

VSB UUSIUTUVA ENERGIA SUOMI OY

Puutionsaaren tuulivoimahanke, Haapavesi

Melu- ja varjostusmallinnukset

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Rintämäki, Henna-Riikka

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1 MELU- JA VARJOSTUSMALLINNUKSEN TAVOITTEET

Haapaveden kunnassa sijaitsevan Puutionsaaren tuulivoimahankkeen hankeomistaja suunnittelee 43 voimalan rakentamista. Varjostusmallinuksissa hankkeen voimaloiden kokonaiskorkeus on 300 metriä, roottorin halkaisija 200 metriä ja napakorkeus 200 metriä. Melumallinuksissa voimaloiden kokonaiskorkeus on 279 metriä, roottorin halkaisija 158 metriä ja napakorkeus 200 metriä. Voimaloiden GE158-5,3MW melupäästö on 106,0 dB(A)+ 2,0 dB(A).

Mallinuksissa on otettu huomioon hankkeen lähellä sijaitsevien Tuomiperän ja Rahkolan tuulivoimapuistojen yhteisvaikutukset.

Tuulivoimaloiden aiheuttamia meluvaikutuksia on arvioitu melun laskentamallin avulla, joiden mukaan on tehty melumallinnus WindPRO-ohjelmalla tuulivoimapuistosta DECIBEL-modulilla. Tuulivoimaloiden aiheuttamat varjostusvaikutukset on mallinnettu WindPro-ohjelman SHADOW-moduulilla.

Melu- ja varjostusmallinnukset on laatinut ins Henna-Riikka Rintamäki FCG Suunnittelu ja tekniikka Oy:stä ja laaduntarkistuksen on tehnyt FM Liisa Karhu FCG Suunnittelu ja tekniikka Oy:stä.

2 LÄHTÖTIEDOT JA MENETELMÄT

2.1 Melu

2.1.1 Melumallinnus

Tuulivoimaloiden aiheuttamat äänenpainetasot on mallinnettu WindPRO-laskentaohjelmalla ISO 9613-2 standardin mukaisesti. Ympäristöhallinnon tuulivoimaloiden melun mallintamista koskevan ohjeen 2/2014 mukaisesti tuulen nopeutena käytettiin 8 m/s, ilman lämpötilana 15 °C, ilmanpaineena 101,325 kPa, ilman suhteellisenä kosteutena 70 % ja maanpinnan kovuutena arvoa 0,4. Laskenta on tehty 4,0 m maan pinnan tasosta. Laskennan pystysuora resoluutio on 0,5 m ja vaakasuora resoluutio on 1 m.

Melumallinnusten laskentatuloksia on havainnollistettu ns. keskiäänitasokarttojen avulla. Keskiäänitasokartoissa on melun keskiäänitaso- eli ekvivalenttiäänitasokäyrät (LAeq) 5 dB välein.

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Taulukko 1. Käytetyt mallinnusparametrit ISO 9613-2 laskelmissa sekä melulle altistuvat kohteet

MALLINNUSOHJELMA JA VERSIO:			
WindPRO version 3.3		Mallinnusmenetelmä: ISO 9613-2	
AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT			
Laskenta korkeus		Laskentaruudun koko [m·m]	
4,0 m		25x25 m	
Suhteellinen kosteus		Lämpötila	
70 %	Muu, mikä ja miksi:	15 C°	
Maastomallin lähde ja tarkkuus			
Maastomallin lähde: MML maastotietokanta		Vaakaresoluutio: 1,0	Pystyresoluutio: 0,5
Maan- ja vedenpinnan absorption ja heijastuksen huomioiminen, käytetyt kertoimet			
Maa		0,4	HUOM
Vesistö		0,0	
Ilmakehän stabiilius laskennassa/meteorologinen korjaus			
Neutraali, (0): Neutraali		Muu, mikä ja miksi:	
Sääolosuhteiden huomiointi; laskennassa käytetty tuulen suunnat ja nopeus			
Tuulen suunta: 0-360°		Tuulenoisuus: 8 m/s	
Voimalan äänen suuntaavuus ja vaimentuminen			
Vapaa avaruus: kyllä	Muu, mikä, miksi:		

2.1.2 Yhteismelumallinnus

Yhteismelumallinnuksessa on mallinnettu tuulivoimahankkeiden Tuomiperä ja Rahkola yhteisvaikutukset. Tuomiperän voimaloiden melupäästö on 106,0 dB(A) + 1,8 dB(A). Voimaloiden kokonaiskorkeus on 240 metriä, roottorin halkaisija 175 metriä ja napakorkeus 152,5 metriä.

Rahkolan voimaloiden V150-4,2MW melupäästö on 104,9 dB(A). Voimalan kokonaiskorkeus on 230 metriä, roottorin halkaisija 150 metriä ja napakorkeus 155 metriä.

2.1.3 Matalataajuinen melu

Matalataajuinen melu laskettiin Ympäristöministeriön ohjeen 2/2014 mukaisin menetelmin käyttäen voimalavalmistajilta saatuja arvioita niiden äänitehotasoista.

Ohje 2/2014 antaa menetelmän matalataajuisen melun laskentaan rakennusten ulkopuolelle. Sosiaali- ja terveysministeriön Asumisterveysasetus 2015 antaa matalataajuiselle melulle toimenpiderajat asuinhuoneissa. Rakennusten sisälle kantautuva äänitaso arvioitiin Turun AMK:n (Keränen, Hakala ja Hongisto, 2017) julkistamien ääneneristävyysarvoin ja tuloksia verrattiin toimenpiderajoihin.

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YM 2/2014 ohjeistaa arvioimaan rakennusten sisälle kantautuvat äänitasot DSO 1284 mukaisesti. Keräsen, Hakalan ja Hongiston (2017) antamat eristysarvot, tersseille 20-200 Hz, ovat 0,6-10,2 dB heikommät kuin vastaavat arvot DSO 1284:ssä. On siten perusteltu arvioida, mikäli melutasot sisällä alittavat asumisterveysasetuksessa annetut toimenpiderajat asuinhuoneissa Keräsen, Hakalan ja Hongiston (2017) arvoilla, ne myös alittuisivat DSO 1284 eristysarviolla.

Taulukko 2. Turun AMK:n eristysarvot pienitaajuisen melun mallinnuksessa. (Keränen, Hakala ja Hongisto, 2017).

Teressin keskitaajuus Hz	10	12,5	16	20	25	31,5	40	50	63	80	100	125	160	200
Äänen eristävyysarvo Hz (Keränen, Hakala ja Hongisto, 2017)	4	5	5	6	6	7	7	8	9	10	11	12	13	14

Matalataajuisen melun laskelmassa huomioitiin maanpinnan muodon vaikutus ohjeen 4/2014 mukaisesti. Tulokset on esitetty taajuuskohtaisena taulukkona hankealuetta ympäröiville asuin- ja lomarakennuksille.

2.2 Varjostusmallinnus

2.2.1 Varjostusmallinnus

Tuulivoimaloiden varjostusvaikutuksia mallinnettiin WindPRO-ohjelman Shadow-moduulilla. Laskennoissa varjot huomioidaan, jos aurinko on yli 3 astetta horisontin yläpuolella ja varjoksi lasketaan, kun siipi peittää vähintään 20 % auringosta.

Varjostusmallin laskennassa on huomioitu hankealueen korkeustiedot, tuulivoimaloiden sijainnit, tuulivoimalan napakorkeudet ja roottorin halkaisija ja hankealueen aikavyöhyke. Mallinnuksessa otettiin huomioon auringon asema horisontissa eri kellon- ja vuodenaikoina, pilvisuus kuukausittain eli kuinka paljon aurinko paistaa ollessaan horisontin yläpuolella sekä tuulivoimalaitosten arvioitu vuotuinen käyntiaika.

Varjostuksen tarkastelukorkeutena lähialueen asuin- tai lomarakennusten pihapiirissä käytettiin 1,0 metriä ja laskenta-alueen koko oli 5,0 x 5,0 metriä. Laskentaikkunoiden suunnat asennettiin voimaloita kohti ns "greenhouse mode".

Auringon keskimääräiset paistetunnit perustuvat Uumajan sääaseman pitkäaikaisiin mitattuihin säätietoihin 1981-2010, (Ilmatieteenlaitos raportti 2012:1. Laskentojen tuulen suunta ja nopeusjakaumana käytettiin NASA:n MERRA-dataa (Modern Era Retrospective-analysis for Research and Applications) hankealueen läheisyydeltä.

Varjostusmallinnuksen tuloksia on havainnollistettu kartan avulla. Kartalla esitetään varjostusvaikutuksen (1, 8 ja 20 tuntia vuodessa) laajuus. Sen lisäksi mallinnuksessa on erikseen laskettu vaikutus tuulivoimahankkeen ympäristössä oleviin herkkiin kohteisiin.

Varjostusmallinnuksessa on huomioitu puuston suojaava vaikutus käyttäen Luonnonvarakeskuksen aineistoa vuodelta 2017.

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2.2.2 Varjostuksen yhteisvaikutusmallinnus

Yhteismelumallinnuksessa on mallinnettu tuulivoimahankkeiden Tuomiperä ja Rahkola yhteisvaikutukset. Tuomiperän voimaloiden koko on (RD) 175 metriä, napakorkeus (HH) 152,5 metriä ja kokonaiskorkeus on 240 metriä.

Rahkolan voimaloiden V150-4,2MW kokonaiskorkeus on 230 metriä, roottorin halkaisija 150 metriä ja napakorkeus 155 metriä.

Voimaloiden käyttötuntimäärä on ilman yhteisvaikutusvoimaloita 8674 tuntia vuodessa ja yhteisvaikutusvoimaloilla mallinnettuna 8673 tuntia vuodessa. Yhteisvaikutusmallinnusten varjostuslaskelmien vaikutukset ovat mallinnuksen mukaan joidenkin laskentapisteiden osalta vähäisemmät, koska voimaloiden käyttötuntimäärä on mallinnuksessa pienempi.

Yhteisvarjostusmallinnuksessa on huomioitu puuston suojaava vaikutus käyttäen Luonnonvarakeskuksen vuoden 2017 aineistoa.

2.3 Kartta-aineisto

Korkeustiedot perustuvat Maanmittauslaitoksen (MML) maastotietokannan korkeuskäyrät-aineistoon. Korkeusaseman intrapoloitimenetelmänä kohteille on käytetty WindPro TIN menetelmää.

Rakennusten käyttötarkoitus on arvoitu MML:n maastotietokannan asuin-, liike- tai julkisen-, loma- teollisen-, kirkollisen, tai muun rakennuksen mukaisesti.

Laskentapisteissä A, B, C ja L sijaitsevat rakennukset eivät ole loma-asunto- tai asuinkäytössä. Laskentapiste A rakennus 71-403-74-129 on metsästysmaja (Ennakkolausunto 12.11.2020, rakennustarkastaja Teijo Hyvärinen, Haapaveden kaupunki).

Laskentapiste B rakennuksen 71-403-46-0 käyttötarkoitus on "ei mitään". Laskentapiste C rakennus 71-403-30-19 käyttötarkoitus on yhden asunnon talot, käyttötilanne: tyhjillään. Laskentapiste L rakennus 71-403-30-14 käyttötarkoitus on vapaa-ajan asunnot ja saunarakennukset, käyttötilanne "muu" (Haapaveden kaupungin käyttötarkoitusselvitys rakennuksista).

Tulokset asuin- ja lomarakennuskäytössä oleville rakennuksille on esitetty taajuuskohtaisena taulukkona hankealueen ympäröidyille taloille.

2.4 Voimalat

Tuulivoimaloiden melumallinnuksen lähtöarvoina on käytetty valmistajan ilmoittamia tuulivoimaloiden melupäästön arvoja.

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Taulukko 3. Hankkeen tuulivoimaloiden kokotiedot varjostusmallinuksissa Generic RD200 HH200.

TUULIVOIMALAN (TUULIVOIMALOIDEN TIEDOT)					
Tuulivoimalan valmistaja: Generic			Tyyppi: RD200		Sarjanumero/t:-
Nimellisteho:		Napakorkeus: 200 m		Roottorin halkaisija: 200 m	Tornin tyyppi: teräs
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun					
Lapakulman säätö		Pyörimisnopeus		Muu, mikä	
Kyllä	- dB	Kyllä	- dB	Noise mode säätö:	-
Ei		Ei		Noise mode, lähtömelutaso	-

Taulukko 4. Hankkeen tuulivoimaloiden GE158-5.3MW HH200 tyyppitiedot ja äänitehotasot sekä melun erityispiirteet.

TUULIVOIMALAN (TUULIVOIMALOIDEN TIEDOT)							
Tuulivoimalan valmistaja: General Electric				Tyyppi: GE158		Sarjanumero/t:-	
Nimellisteho: 5,3 MW		Napakorkeus: 200 m		Roottorin halkaisija: 158 m		Tornin tyyppi: teräs	
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun							
Lapakulman säätö		Pyörimisnopeus		Muu, mikä			
Kyllä	- dB	Kyllä	- dB	Noise mode säätö:		Mode 0 STE – Level 06	
Ei		Ei		Noise mode, lähtömelutaso		106,0 dB(A)	
AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT							
Melupäästötiedot perustuvat dokumenttiin: Noise_Emission-NO_5.3-158-50Hz_IEC_EN_r01.pdf							
Valmistajan ilmoittama tuulivoimalan tuottama äänitehotaso vastaa keskiäänitasoa, jolloin voimalan lähtöarvoihin lisätään mallinuksissa +2 dB vastaamaan ylempää luottamusväliä 95%.							
Oktaaveittain [Hz], dB(A)		1/3-oktaaveittain [Hz], dB(A)					
31,5	-	20	63,1	200	90,8	2000	94,3
63	87,2	25	67,8	250	92,3	2500	92,3
125	92,6	31,5	72,2	315	93,6	3150	89,7
250	97,2	40	76,1	400	94,1	4000	85,9
500	99,7	50	79,4	500	94,9	5000	81,8
1000	101,3	63	82,2	630	95,5	6300	75,5
2000	99,1	80	84,4	800	96	8000	65,9
4000	91,7	100	86,1	1000	96,5	10000	53,3
8000	76	125	87,7	1250	97		
106,0 dB(A)		160	89,2	1600	95,7		
Melun erityispiirteiden mittausta ja havainnot:							
Kapeakaistaisuus / Tonaalisuus		Impulssimaisuus		Merkityksellinen sykintä (amplitudimodulaatio)		Muu, Mikä:	
kyllä	Ei	kyllä	ei	kyllä	ei	kyllä	ei

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Taulukko 5. Rahkolan hankkeen tuulivoimaloiden V150-4.2MW HH155 tyyppitiedot ja äänitehotasot sekä melun erityispiirteet.

TUULIVOIMALAN (TUULIVOIMALOIDEN TIEDOT)							
Tuulivoimalan valmistaja: Vestas				Tyyppi: V150-4.2		Sarjanumero/t:-	
Nimellisteho:4,2 MW		Napakorkeus: 155 m		Roottorin halkaisija: 150 m		Tornin tyyppi: teräs	
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun							
Lapakulman säätö		Pyörimisnopeus		Muu, mikä			
Kyllä	-	dB	Kyllä	-	dB	Noise mode säätö:	Mode PO1 – Mode OS
Ei			Ei			Noise mode, lähtömelutaso	104,9 – 108,0 dB(A)
AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT							
Melupäästötiedot perustuvat dokumenttiin " DMS 0067-4767_V03_V150-4.0/4.2 MW- Third Octave noise emission. Valmistajan ilmoittama tuulivoimalan tuottaman äänitehotaso perustuu todellisiin mittaustuloksiin ja vastaa ylempää luottamusväliä 95%,							
Oktaaveittain [Hz], dB(A)		1/3-oktaaveittain [Hz], dB(A)					
31,5	-	20	62,2	200	92,2	2000	90,2
63	86,5	25	66,5	250	93,4	2500	88,3
125	93,7	31,5	70,6	315	94,3	3150	86,0
250	98,2	40	74,6	400	94,9	4000	83,4
500	99,9	50	77,9	500	95,2	5000	80,5
1000	98,9	63	81,1	630	95,2	6300	77,3
2000	95,1	80	84,1	800	94,8	8000	73,6
4000	88,6	100	86,5	1000	94,2	10000	69,8
8000	79,4	125	88,6	1250	93,2		
104,9 dB(A)		160	90,7	1600	91,8		
Melun erityispiirteiden mittaustulos ja havainnot:							
Kapeakaistaisuus / Tonaalisuus		Impulssimaisuus		Merkityksellinen sykintä (amplitudimodulaatio)		Muu, Mikä:	
kyllä	Ei	kyllä	ei	kyllä	ei	kyllä	ei

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Taulukko 6. Tuomiperän hankkeen tuulivoimaloiden GE158-5.3MW RD175 HH152,5 tyyppitiedot ja äänitehotasot sekä melun erityispiirteet.

TUULIVOIMALAN (TUULIVOIMALOIDEN TIEDOT)							
Tuulivoimalan valmistaja: General Electric				Tyyppi: GE158		Sarjanumero/t:-	
Nimellisteho: 5,3 MW		Napakorkeus: 152,5 m		Roottorin halkaisija: 175 m		Tornin tyyppi: hybridi	
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun							
Lapakulman säätö		Pyörimisnopeus		Muu, mikä			
Kyllä	-	dB	Kyllä	-	dB	Noise mode säätö:	Mode 0 STE – Level 06
Ei			Ei			Noise mode, lähtömelutaso	107,8 dB(A)
AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT							
Melupäästötiedot perustuvat dokumenttiin:							
Technical Documentation Wind Turbine Generator Systems 5.3-158 - 50 Hz, Noise_Emission-NO_5.3-158-50Hz_IEC_EN_r01.docx.							
Voimalan valmistajan ohjeiden mukaisesti äänitehotasoon on lisätty 1,8 dB, että saadaan äänitehotaso vastaamaan takuuarvoja.							
Oktaaveittain [Hz], dB(A)		1/3-oktaaveittain [Hz], dB(A)					
31,5	-	20	64,9	200	92,6	2000	96,1
63	79,8	25	69,6	250	94,1	2500	94,1
125	89	31,5	74	315	95,4	3150	91,5
250	94,4	40	77,9	400	95,9	4000	87,7
500	99	50	81,2	500	96,7	5000	83,6
1000	101,5	63	84	630	97,3	6300	77,3
2000	103,1	80	86,2	800	97,8	8000	67,7
4000	100,9	100	87,9	1000	98,3	10000	55,1
8000	93,5	125	89,5	1250	98,8		
107,8 dB(A)		160	91	1600	97,5		
Melun erityispiirteiden mittausta ja havainnot:							
Kapeakaistaisuus / Tonaalisuus		Impulssimaisuus		Merkityksellinen sykintä (amplitudimodulaatio)		Muu, Mikä:	
kyllä	Ei	kyllä	ei	kyllä	ei	kyllä	ei

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2.5 Raja- ja ohjearvot

2.5.1 Melu

Valtioneuvoston asetuksessa (1107/2015) tuulivoimaloille on määritelty ohjearvot päivä- ja yöajan keskiäänitasojen maksimiarvolle. Asetus tuli voimaan 1.9.2015. Jos tuulivoimalan melu sisältää tonaalisia, kapeakaistaisia tai impulssimaisia komponentteja, tai se on selvästi amplitudimoduloitunutta, mallinnustuloksiin tulee ohjeen mukaan lisätä viisi desibeliä ennen ohjearvoon vertaamista. Koska ohjearvo sisältää jo tyypillisen tuulivoimamelun piirteet, edellä mainitut äänenpiirteiden tulee olla tuulivoimalalle epätyypillisen voimakkaita, jotta mallinnustuloksissa täytyy huomioida viiden desibelin lisä äänenvoimakkuuteen.

Taulukko 7. Valtioneuvoston asetuksen mukaiset tuulivoimaloiden melutason ohjearvot (Valtioneuvoston asetus 1107/2015).

Vaikutuskohde	Päivä (7-22)	Yö (22-7)
Pysyvä asutus	45 dB	40 dB
Loma-asutus	45 dB	40 dB
Hoitolaitokset	45 dB	40 dB
Oppilaitokset	45 dB	—
Virkistysalueet	45 dB	—
Leirintäalueet	45 dB	40 dB
Kansallispuistot	40 dB	40 dB

Sosiaali- ja terveysministeriön asetuksessa (545/2015) on annettu matalataajuiselle melulle toimenpiderajoja. Asetus tuli voimaan 15.5.2015. Toimenpiderajat koskevat asuinhuoneita ja ne on annettu taajuuspainottamattomina yhden tunnin keskiäänitasoina tersseittäin. Toimenpiderajat koskevat yöaikaa ja päivällä sallitaan 5 dB suuremmat arvot.

Taulukko 8. Matalataajuisen sisämelun tunnin keskiäänitason toimenpiderajat nukkumiseen tarkoitetuissa tiloissa.

Terssikaista Hz	20	25	31,5	40	50	63	80	100	125	160	200
Keskiäänitaso LZeq,1h, dB	74	64	56	49	44	42	40	38	36	34	32
Edellisestä laskettu keski- äänitaso A- painotettuna LAeq,1h, dB	24	19	17	14	14	16	18	19	20	21	21

Lisäksi yöaikainen mahdollisesti unihäiriötä aiheuttava melu, joka erottuu selvästi taustamelusta, ei saa ylittää 25 dB yhden tunnin keskiäänitasona LAeq,1h mitattuna niissä tiloissa, jotka on tarkoitettu nukkumiseen.

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2.5.2 Varjostus

Suomessa ei ole viranomaisten antamia yleisiä määräyksiä tuulivoimaloiden muodostaman varjostuksen enimmäiskestoista eikä varjonmuodostuksen arviointiperusteista. Ympäristöministeriön tuulivoimarakentamisen suunnitteluohjeistuksessa esitetään käytettäväksi muiden maiden suosituksia välkkeen rajoittamisesta (Ympäristöministeriö 2012).

Useissa maissa on annettu raja-arvoja tai suosituksia hyväksyttävän välkevaikutuksen määrästä. Esimerkiksi Ruotsissa suositus on kahdeksan tuntia vuodessa ja 30 minuuttia päivässä.

Arvioinnissa on tarkasteltu vaikutuksia alueella, jossa varjoja tai välkettä mallinnuksen mukaisessa todellisessa tilanteessa ("real case") esiintyy vähintään kahdeksan tuntia vuodessa.

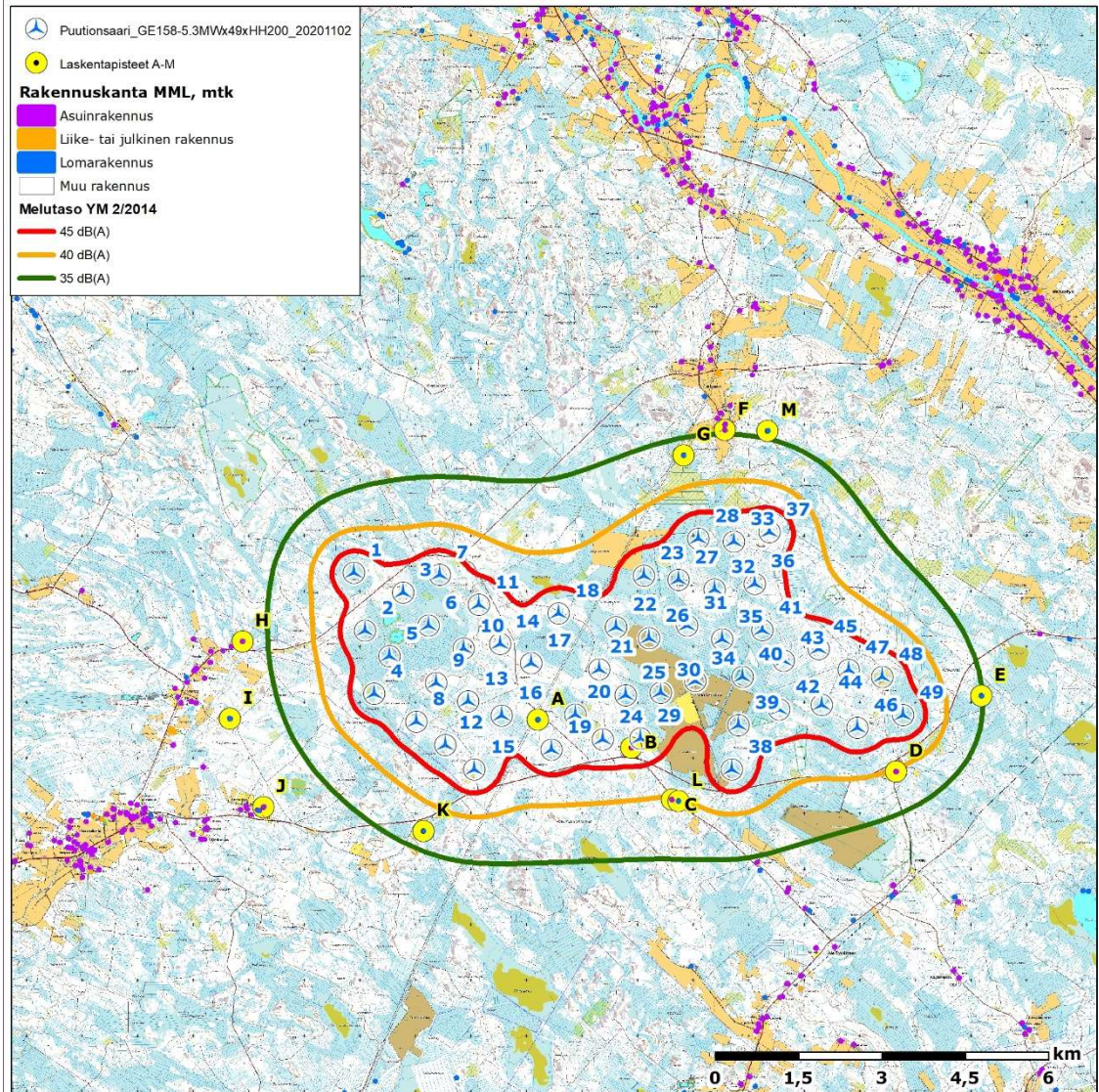
25.11.2020

3 MELU- JA VARJOSTUSMALLINNUSTEN TULOKSET

3.1 Melun laskentatulokset ISO 9613-2

3.1.1 Melumallinnus

Tuulivoimamelu ei ylitä 40 dB tuulivoimahankkeen läheisyydessä sijaitsevilla asuin- ja lomarakennusten laskentapisteissä.



Kuva 1. Laskennalliset melutasot standardin ISO 9613-2 mukaisesti.

25.11.2020

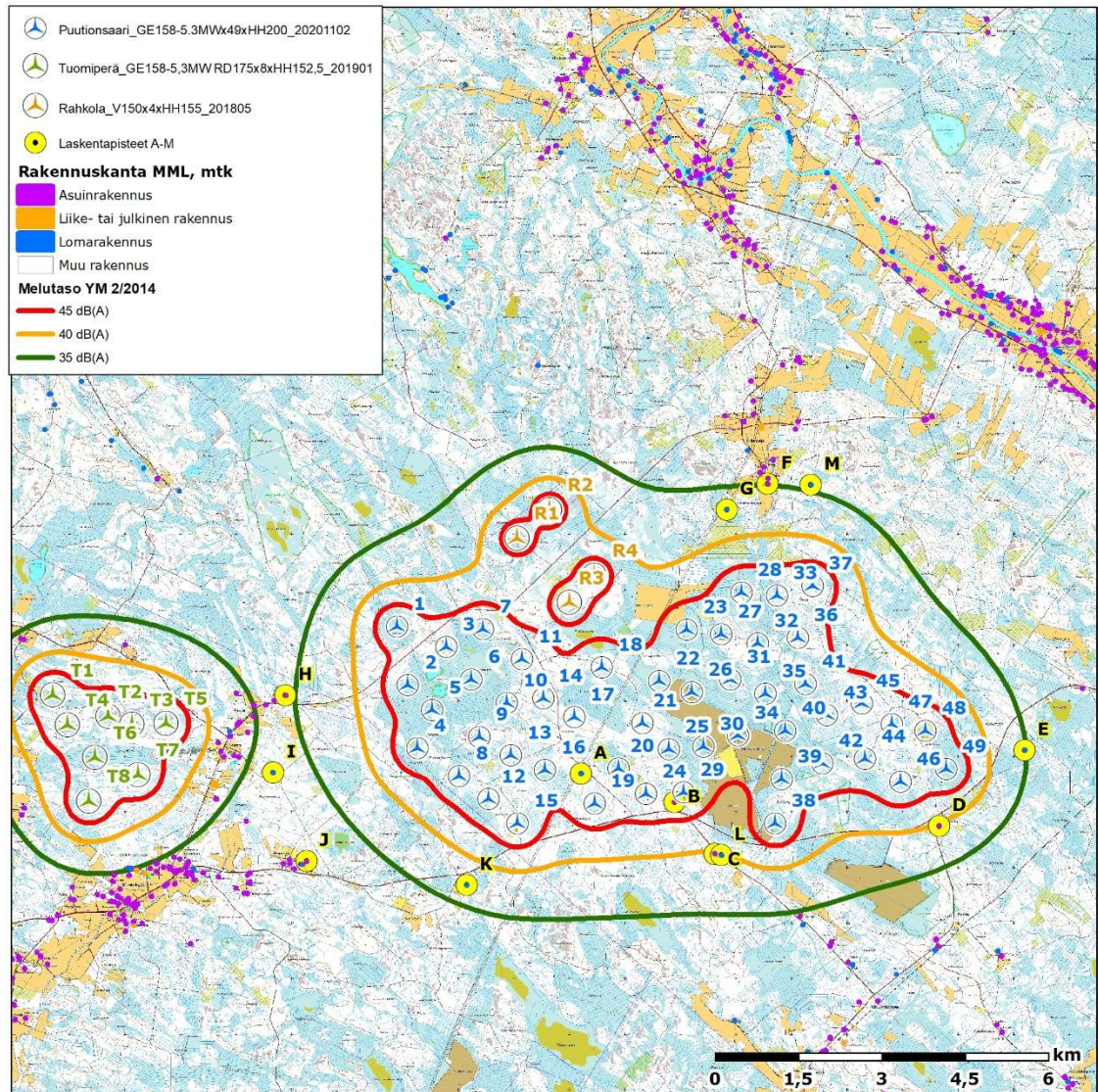
Taulukko 9. Laskennalliset melutasot standardin ISO 9613-2 mukaisesti.

Laskentapiste	ETRS89- TM35 Itä	ETRS89- TM35 Pohjoinen	Kohteen korkeus- asema (m)	Melutaso dB(A)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	39,8
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	39,5
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	35,1
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	34,6
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	36,5
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	32,9
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	31,2
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	30,5
Lomarakennus K (Kurunoja)	400152	7107685	102,3	36,8
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	39,7
Lomarakennus M (Riskalan metsätie)	406348	7114887	102,7	34,3

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3.1.2 Yhteismelumallinnus

Tuulivoimamelu ei ylitä 40 dB tuulivoimahankkeen läheisyydessä sijaitsevilla asuin- ja lomarakennusten laskentapisteeissä.



Kuva 2. Laskennalliset yhteismelutasot standardin ISO 9613-2 mukaisesti.

25.11.2020

Taulukko 10. Laskennalliset yhteismelumallinnuksen melutasot standardin ISO 9613-2 mukaisesti.

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Kohteen korkeus- asema (m)	Melutaso dB(A)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	39,8
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	39,6
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	35,1
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	34,9
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	36,8
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	34,7
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	34,0
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	31,9
Lomarakennus K (Kurunoja)	400152	7107685	102,3	36,9
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	39,7
Lomarakennus M (Riskalan metsätie)	406348	7114887	102,7	34,5

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3.2 Matalataajuiset melutasot

3.2.1 Matalataajuinen melutaso

Matalataajuisen melun ohjearvo ylittyy kahdessa laskentakohteessa. Eniten ohjearvo ylittyy sisätiloissa kohteessa autiotalo C, missä melu on 0,7 dB yli ohjearvon taajuudella 50 Hz. Sisätilojen ohjearvo ylittyy myös kohteessa Muu käyttötarkoitus L. Melun ohjearvo ei ylity käytössä olevissa asuintai lomarakennuksissa. **Taulukko 11. Matalataajuisen melun mallinnustulokset herkissä kohteissa verrattuna Sosiaali- ja terveystieteiden tutkimuskeskuksen asumisterveysohjearvoon.**

Rakennus	Äänitaso ulkona		Äänitaso sisällä	
	Verraten Asumisterveysohjeen L _{eq,1h} ohjearvon sisällä	Hz	L _{eq,1h} - Asumisterveys-ohje sisällä	Hz
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	-	-	Ei oteta huomioon	-
Autiotalo B (Ylivieskantie, Pöhlölä)	-	-	Ei oteta huomioon	-
Autiotalo C (Perkkiöntie 382)	9,0	63	0,7	50
Asuinrakennus D (Alakyläntie 243)	8,0	63	-0,3	50
Lomarakennus E (Kellokankaan metsätie)	5,2	63	-3,0	50
Asuinrakennus F (Ollilantie 112)	5,6	63	-2,6	50
Lomarakennus G (Ollilantie, Siliäkuru)	6,8	63	-1,4	50
Asuinrakennus H (Pinolantie 406)	4,2	63	-4,0	50
Asuinrakennus I (Kortenevantie 116)	3,3	63	-4,9	50
Asuinrakennus J (Haapavesitie 1406)	3,0	63	-5,2	50
Lomarakennus K (Kurunoja)	6,8	63	-1,5	50
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	8,9	63	0,6	50
Lomarakennus M (Riskalan metsätie)	5,3	63	-2,9	50

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3.2.2 Matalataajuinen melu yhteismallinnus

Matalataajuisen melun ohjearvo ylittyy kahdessa laskentakohteessa. Eniten ohjearvo ylittyy sisätiloissa kohteessa autiotalo C, missä melu on 0,7 dB yli ohjearvon taajuudella 50 Hz. Sisätilojen ohjearvo ylittyy myös kohteessa Muu käyttötarkoitus L. Melun ohjearvo ei ylitä käytössä olevissa asuin- tai lomarakennuksissa. **Taulukko 12. Matalataajuisen melun yhteismallinnuksen tulokset herkissä kohteissa verrattuna Sosiaali- ja terveystieteiden tutkimuskeskuksen ohjearvoon.**

Rakennus	Äänitaso ulkona		Äänitaso sisällä	
	Verrattun Asumisterveysohjeen L _{eq,1h} ohjearvon sisällä	Hz	L _{eq,1h} - Asumisterveys-ohje sisällä	Hz
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	-	-	Ei oteta huomioon	-
Autiotalo B (Ylivieskantie, Pöhlölä)	-	-	Ei oteta huomioon	-
Autiotalo C (Perkkiöntie 382)	9,1	63	0,8	50
Asuinrakennus D (Alakyläntie 243)	8,1	63	-0,2	50
Lomarakennus E (Kellokankaan metsätie)	5,3	63	-2,9	50
Asuinrakennus F (Ollilantie 112)	5,9	63	-2,3	50
Lomarakennus G (Ollilantie, Siliäkuru)	7,1	63	-1,1	50
Asuinrakennus H (Pinolantie 406)	5,8	63	-2,4	50
Asuinrakennus I (Kortenevantie 116)	5,4	63	-2,8	50
Asuinrakennus J (Haapavesitie 1406)	4,2	63	-4,0	50
Lomarakennus K (Kurunoja)	7,0	63	-1,2	50
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	9,0	63	0,7	50
Lomarakennus M (Riskalan metsätie)	5,5	63	-2,7	50

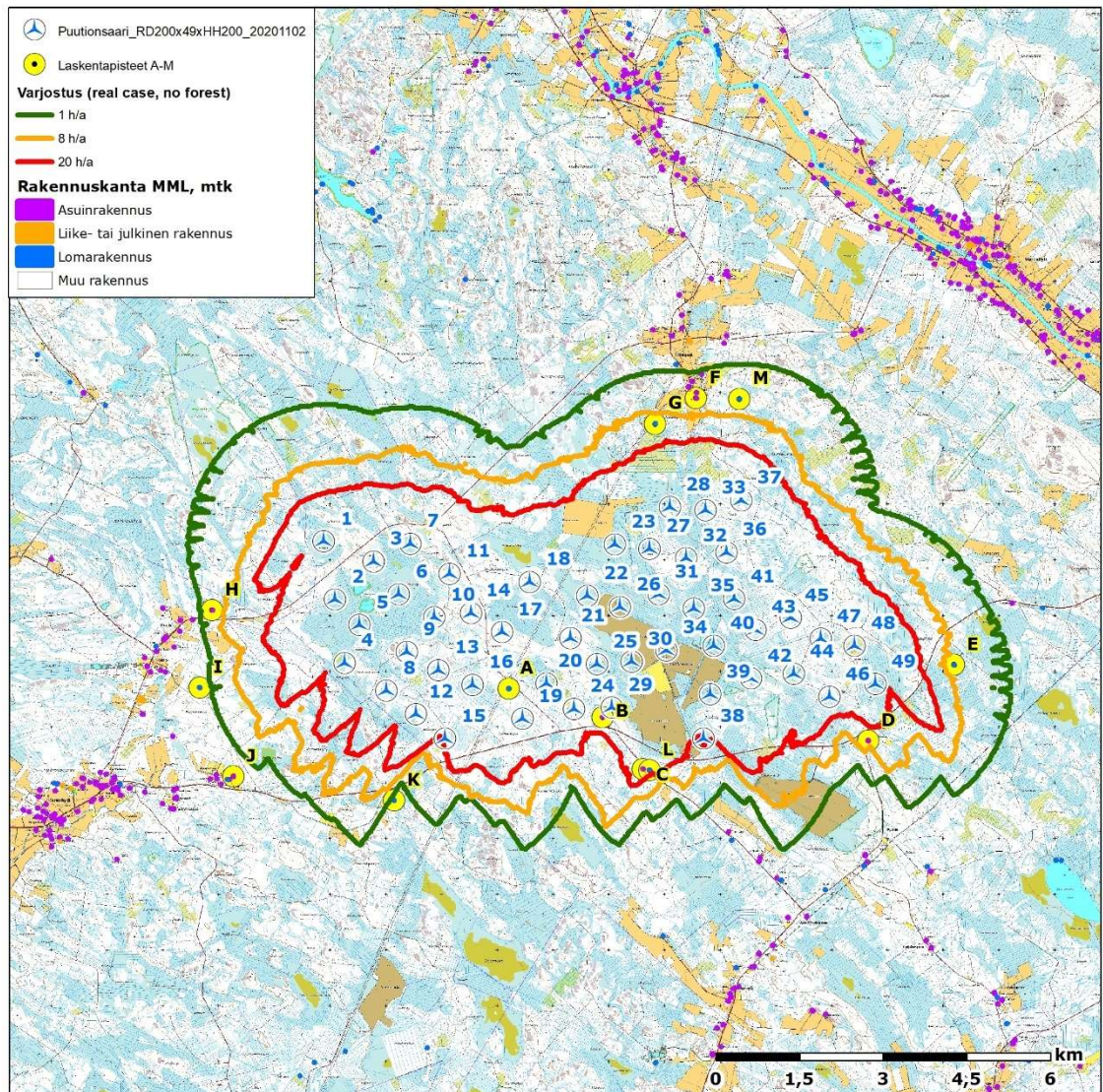
25.11.2020

3.3 Varjostusmallinnuksen tulokset

3.3.1 Varjostusmallinnus

Tuulivoimapuistoa lähimpien asuin- ja lomarakennusten pihapiirissä kohteissa asuinrakennus D (12 tuntia 35 minuuttia), ja lomarakennus G (12 tuntia 50 minuuttia) on varjostusvaikutusta yli 8 tuntia vuodessa.

Muissa kohteissa varjostusvaikutus ylittää 8 h vuodessa autiotalo C (30 tuntia 25 minuuttia) ja Muu käyttötarkoitus L (26 tuntia 0 minuuttia). Mallinnuksessa ei otettu huomioon puustoa.



Kuva 3. Laskennalliset varjostusmallinnuksen tulokset "real case, no forest".

25.11.2020

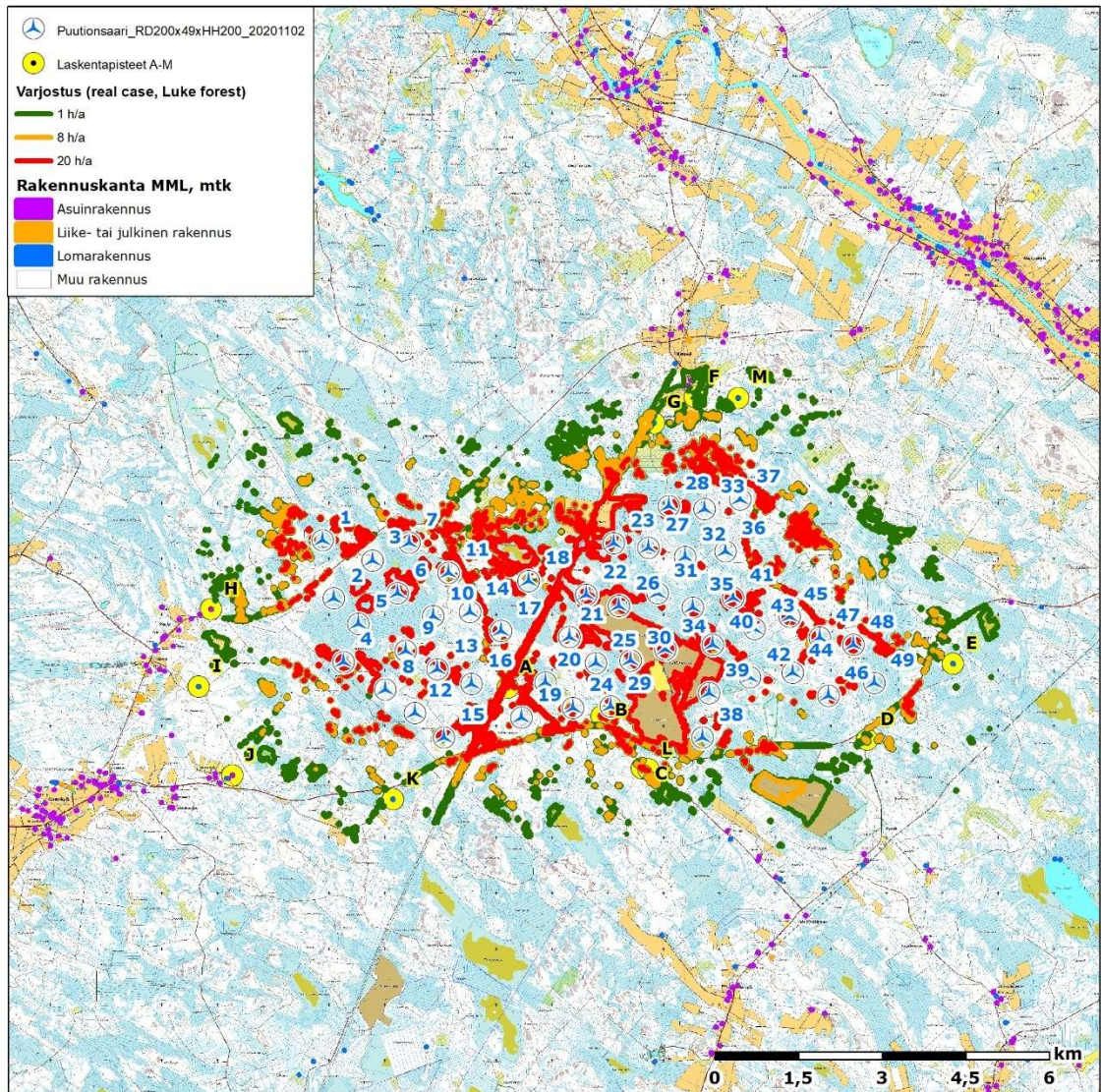
Taulukko 13. Laskennalliset varjostustunnit vuodessa lähialueen laskentapisteissä, kun puuston suojaavaa vaikutusta ei ole huomioitu "real case, no forest".

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Kohteen korkeus-asema	Varjostus (h/a)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	30:25
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	12:35
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	6:19
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	7:04
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	12:50
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	4:31
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	0:00
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	0:00
Lomarakennus K (Kurunoja)	400152	7107685	102,3	0:00
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	26:00
Lomarakennus M (Riskalan metsätie)	406348	7114887	102,7	6:35

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Kun puuston suojaava vaikutus huomioitiin, tuulivoimapuistoa lähimpien asuin- ja lomarakennusten pihapiirissä kohteissa asuinrakennus D (12 tuntia 35 minuuttia) on varjostusvaikutusta yli 8 tuntia vuodessa.

Muissa kohteissa varjostusvaikutus ylittää 8 h vuodessa autiotalo C (30 tuntia 25 minuuttia) ja Muu käyttötarkoitus L (25 tuntia 16 minuuttia)



Kuva 4. Laskennalliset varjostusmallinnuksen tulokset "real case, Luke forest".

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Taulukko 14. Laskennalliset varjostustunnit vuodessa lähialueen laskentapisteissä, kun puuston suojaavaa vaikutus on huomioitu "real case, Luke forest".

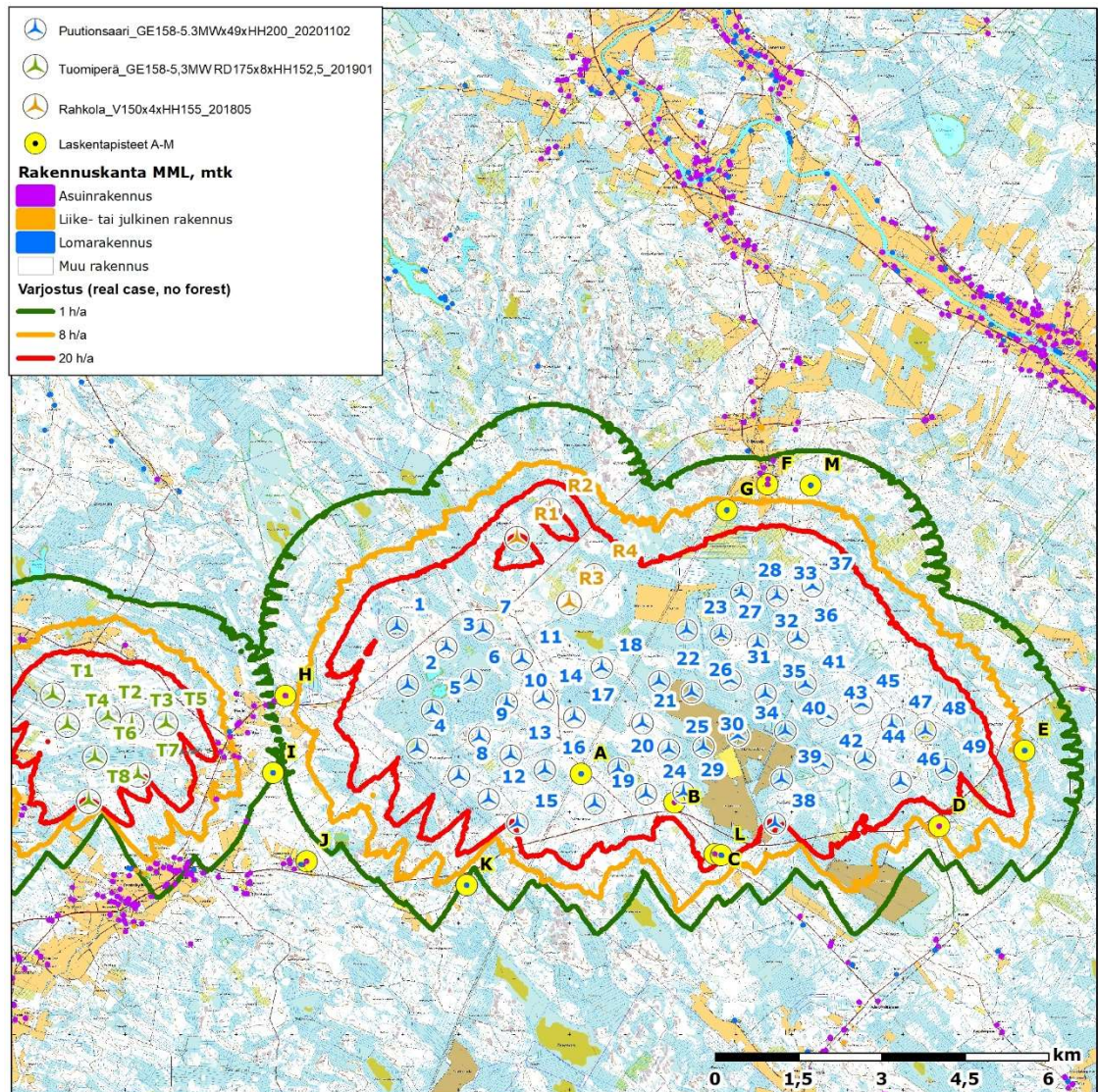
Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Kohteen korkeus-asema	Varjostus (h/a)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	30:25
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	12:35
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	0:00
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	4:51
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	0:00
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	0:00
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	0:00
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	0:00
Lomarakennus K (Kurunoja)	400152	7107685	102,3	0:00
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	25:16
Lomarakennus M (Riskalan metsätie)	406348	7114887	102,7	0:00

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3.3.2 Varjostuksen yhteismallinnus

Tuulivoimapuistoa lähimpien asuin- ja lomarakennusten pihapiirissä kohteissa asuinrakennus D (12 tuntia 35 minuuttia), ja lomarakennus G (12 tuntia 50 minuuttia) on varjostusvaikutusta yli 8 tuntia vuodessa.

Muissa kohteissa varjostusvaikutus ylittää 8 h vuodessa autiotalo C (30 tuntia 25 minuuttia) ja Muu käyttötarkoitus L (26 tuntia 0 minuuttia). Mallinnuksessa ei otettu huomioon puustoa.



Kuva 4. Laskennalliset yhteisvarjostusmallinnuksen tulokset.

25.11.2020

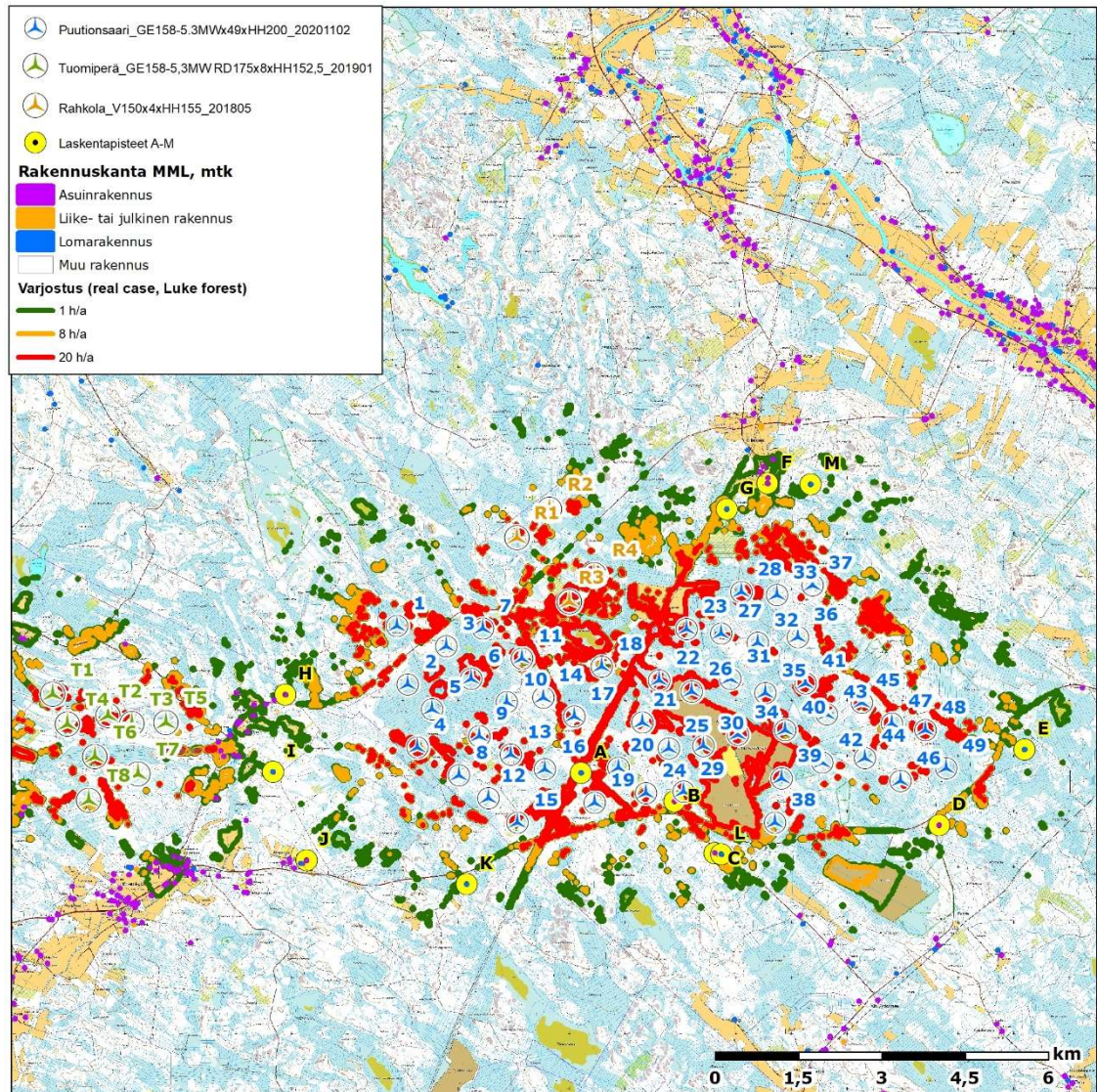
Taulukko 15. Yhteismallinnuksen laskennalliset varjostustunnit vuodessa lähialueen laskentapisteissä, kun puuston suojaavaa vaikutusta ei ole huomioitu "real case, no forest".

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Kohteen korkeus-asema	Varjostus (h/a)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	30:25
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	12:35
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	6:19
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	7:04
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	12:50
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	4:31
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	1:25
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	0:00
Lomarakennus K (Kurunoja)	400152	7107685	102,3	0:00
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	26:00
Lomarakennus M (Riskalan metsätie)	406348	7114887	102,7	6:35

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Kun puuston suojaava vaikutus huomioitiin, tuulivoimapuistoa lähimpien asuin- ja lomarakennusten pihapiirissä kohteissa asuinrakennus D (12 tuntia 35 minuuttia), on varjostusvaikutusta yli 8 tuntia vuodessa.

Muissa kohteissa varjostusvaikutus ylittää 8 h vuodessa autiotalo C (30 tuntia 25 minuuttia) ja Muu käyttötarkoitus L (25 tuntia 16 minuuttia)



Kuva 5. Laskennalliset yhteisvarjostusmallinnuksen tulokset, kun huomioitiin puuston suojaava vaikutus.

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Taulukko 16. Yhteismallinnuksen laskennalliset varjostustunnit vuodessa lähialueen laskentapisteissä, kun puuston suojaavaa vaikutus on huomioitu "real case, Luke forest".

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Kohteen korkeus-asema	Varjostus (h/a)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	30:25
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	12:35
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	0:00
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	4:51
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	0:00
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	0:00
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	1:25
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	0:00
Lomarakennus K (Kurunoja)	400152	7107685	102,3	0:00
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	25:16
Lomarakennus M (Riskalan metsätie)	406348	7114887	102,7	0:00

Laatija

FCG Suunnittelu ja tekniikka Oy

Tarkastaja

FCG Suunnittelu ja tekniikka Oy

25.11.2020

Liite 1: Puutionsaari - Melun leviämismallinnuksen tulokset ISO 9613-2, YM 2/2014

Project:

Puutionsaari_Riskalankangas_2020 VSB
0327

Description:

Licensed user:

FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Main Result

Calculation: Puutionsaari_GE158x49xHH200_20201102

Noise calculation model:

ISO 9613-2 General

Wind speed (in 10 m height):

8,0 m/s

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 0,4

Area object with hard ground: Area object (vesistot): (5)

Area type with hard ground: Vesistot

Ground factor for hard ground: 0,0

Meteorological coefficient, CO:

0,0 dB

Type of demand in calculation:

1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

Noise values in calculation:

All noise values are mean values (Lwa) (Normal)

Pure tones:

Fixed penalty added to source noise of WTGs with pure tones

WTG catalogue

Height above ground level, when no value in NSA object:

4,0 m; Don't allow override of model height with height from NSA object

Uncertainty margin:

0,0 dB; Uncertainty margin in NSA has priority

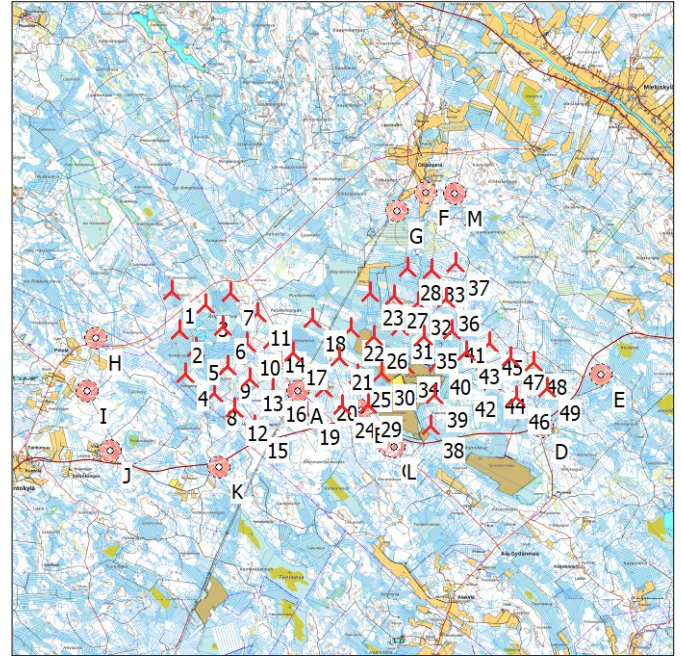
Deviation from "official" noise demands. Negative is more

restrictive, positive is less restrictive.:

0,0 dB(A)

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89



WTGs

Row data/Description	East	North	Z [m]	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data		Wind speed [m/s]	LwA,ref [dB(A)]
				Valid	Manufact.	Type-generator				Creator	Name		
1	398 896	7 112 332	92,5	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
2	399 097	7 111 286	95,0	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
3	399 784	7 111 972	97,5	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
4	399 264	7 110 151	97,1	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
5	399 536	7 110 832	96,4	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
6	400 239	7 111 382	97,5	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
7	400 444	7 112 292	97,0	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
8	400 019	7 109 649	100,0	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
9	400 380	7 110 348	100,0	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
10	400 876	7 110 966	99,5	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
11	401 152	7 111 752	100,0	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
12	400 549	7 109 232	102,5	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
13	400 953	7 110 020	102,5	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
14	401 537	7 111 046	104,5	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
15	401 068	7 108 792	105,3	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
16	401 564	7 109 758	103,4	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
17	402 089	7 110 702	107,5	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
18	402 589	7 111 603	106,8	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
19	402 455	7 109 148	112,5	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
20	402 889	7 109 778	110,0	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
21	403 318	7 110 593	108,0	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
22	403 622	7 111 352	106,9	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
23	404 117	7 112 276	103,6	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
24	403 379	7 109 327	115,0	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
25	403 790	7 110 129	108,4	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
26	404 210	7 111 152	105,6	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
27	404 739	7 112 199	105,0	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
28	405 100	7 112 943	100,4	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
29	404 061	7 109 351	110,0	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
30	404 420	7 110 174	107,1	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
31	404 900	7 111 381	105,1	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
32	405 395	7 112 030	102,4	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
33	405 740	7 112 891	100,2	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
34	405 042	7 110 380	105,8	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
35	405 532	7 111 130	103,9	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
36	406 114	7 112 133	103,1	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
37	406 380	7 113 067	107,2	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
38	405 707	7 108 791	110,8	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
39	405 822	7 109 587	108,8	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
40	405 893	7 110 455	104,9	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
41	406 257	7 111 298	103,9	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
42	406 558	7 109 872	106,6	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0

To be continued on next page...

DECIBEL - Main Result

Calculation: Puutonsaari_GE158x49xHH200_20201102

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	East	North	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data		Wind speed [m/s]	LwA,ref [dB(A)]
					Valid	Manufact.	Type-generator				Creator	Name		
43	406 638	7 110 744	105,9	PUU43	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER 5.3-158 106.0 +2 dB HH200	8,0	106,0	
44	407 324	7 109 954	108,4	PUU44	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER 5.3-158 106.0 +2 dB HH200	8,0	106,0	
45	407 269	7 110 957	112,6	PUU45	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER 5.3-158 106.0 +2 dB HH200	8,0	106,0	
46	407 963	7 109 542	113,6	PUU46	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER 5.3-158 106.0 +2 dB HH200	8,0	106,0	
47	407 809	7 110 582	116,1	PUU47	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER 5.3-158 106.0 +2 dB HH200	8,0	106,0	
48	408 414	7 110 457	120,0	PUU48	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER 5.3-158 106.0 +2 dB HH200	8,0	106,0	
49	408 786	7 109 772	117,5	PUU49	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER 5.3-158 106.0 +2 dB HH200	8,0	106,0	

Calculation Results

Sound level

Noise sensitive area

No.	Name	East	North	Z	Immission height [m]	Demands Noise [dB(A)]	Sound level From WTGs [dB(A)]	Distance to noise demand [m]
A	Laskentapiste A (Metsästysmaja)	402 212	7 109 691	112,5	4,0	40,0	46,4	-1 555
B	Autiotalo B (Ylivieskantie, Pöhlölä)	403 894	7 109 182	114,4	4,0	40,0	49,4	-945
C	Autiotalo C (Perkkiontie 382)	404 620	7 108 247	113,8	4,0	40,0	39,8	48
D	Asuinrakennus D (Alakyläntie 243)	408 659	7 108 752	119,4	4,0	40,0	39,5	56
E	Lomarakennus E (Kellokankaan metsätie)	410 199	7 110 115	122,5	4,0	40,0	35,1	651
F	Asuinrakennus F (Ollilantie 112)	405 573	7 114 900	87,7	4,0	40,0	34,6	920
G	Lomarakennus G (Ollilantie, Siliäkuru)	404 837	7 114 441	100,0	4,0	40,0	36,5	554
H	Asuinrakennus H (Pinolantie 406)	396 893	7 111 098	88,1	4,0	40,0	32,9	1 268
I	Asuinrakennus I (Kortenevantie 116)	396 670	7 109 704	87,5	4,0	40,0	31,2	1 726
J	Asuinrakennus J (Haapavesitie 1406)	397 273	7 108 116	89,3	4,0	40,0	30,5	1 946
K	Lomarakennus K (Kurunoja)	400 152	7 107 685	102,3	4,0	40,0	36,8	487
L	Muu käyttöt. L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	4,0	40,0	39,7	55
M	Lomarakennus M (Riskalan metsätie)	406 348	7 114 887	102,8	4,0	40,0	34,3	929

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M
1	4239	5908	7032	10398	11518	7154	6304	2353	3444	4518	4813	7143	7877
2	3500	5238	6304	9892	11164	7417	6550	2212	2897	3657	3752	6420	8096
3	3332	4968	6104	9441	10579	6488	5624	3021	3852	4602	4302	6214	7182
4	2984	4730	5684	9498	10935	7897	7033	2553	2632	2847	2621	5805	8521
5	2909	4660	5703	9357	10687	7280	6413	2657	3080	3535	3206	5821	7927
6	2599	4266	5387	8821	10040	6390	5523	3359	3944	4412	3698	5498	7043
7	3145	4645	5814	8945	9995	5754	4891	3747	4576	5244	4616	5917	6449
8	2193	3903	4810	8686	10191	7644	6795	3446	3349	3145	1968	4931	8215
9	1946	3702	4732	8431	9822	6906	6051	3567	3765	3826	2672	4849	7498
10	1847	3506	4627	8091	9362	6127	5269	3986	4391	4594	3360	4738	6732
11	2318	3758	4931	8084	9194	5428	4562	4309	4928	5317	4188	5032	6068
12	1725	3345	4188	8124	9690	7575	6747	4105	3908	3461	1597	4310	8100
13	1301	3058	4073	7809	9247	6720	5885	4201	4295	4144	2468	4191	7266
14	1514	3005	4164	7482	8712	5581	4735	4645	5049	5174	3635	4269	6156
15	1455	2853	3593	7591	9226	7590	6791	4770	4492	3855	1437	3715	8064
16	651	2400	3409	7166	8642	6521	5714	4860	4894	4595	2508	3527	7014
17	1019	2360	3526	6853	8131	5456	4640	5211	5510	5467	3585	3629	5971
18	1949	2750	3923	6706	7754	4447	3621	5719	6216	6358	4614	4006	4991
19	595	1439	2345	6216	7804	6543	5804	5894	5812	5284	2728	2464	6935
20	683	1168	2311	5860	7318	5783	5054	6140	6219	5857	3446	2417	6170
21	1428	1524	2683	5649	6898	4862	4137	6445	6707	6533	4299	2764	5255
22	2179	2187	3261	5668	6692	4049	3319	6734	7145	7126	5048	3323	4464
23	3212	3102	4060	5748	6454	3001	2282	7320	7879	8009	6066	4101	3434
24	1222	535	1645	5311	6865	5990	5318	6724	6720	6225	3621	1752	6303
25	1638	953	2057	5060	6409	5094	4437	6965	7133	6821	4383	2130	5402
26	2476	1995	2934	5055	6078	3989	3348	7318	7678	7573	5337	2977	4304
27	3561	3133	3954	5219	5844	2827	2244	7923	8446	8510	6436	3977	3133
28	4350	3950	4721	5498	5831	2014	1521	8412	9031	9196	7220	4734	2310
29	1880	238	1237	4636	6185	5752	5149	7378	7399	6900	4249	1316	5990
30	2260	1123	1937	4471	5779	4865	4287	7584	7764	7438	4941	1977	5092
31	3175	2418	3147	4587	5448	3583	3061	8012	8399	8297	6017	3163	3793
32	3950	3219	3862	4625	5172	2876	2475	8553	9030	9016	6809	3864	3012
33	4763	4143	4777	5064	5252	2016	1794	9027	9614	9721	7637	4775	2087
34	2913	1659	2174	3966	5164	4552	4066	8181	8399	8092	5584	2179	4692

To be continued on next page...

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Main Result

Calculation: Puutionsaari_GE158x49xHH200_20201102

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WTG	A	B	C	D	E	F	G	H	I	J	K	L	M
35	3619	2545	3024	3928	4776	3771	3383	8640	8976	8792	6388	3014	3845
36	4604	3693	4163	4231	4556	2820	2638	9279	9751	9711	7438	4145	2764
37	5364	4612	5131	4879	4827	2003	2066	9690	10276	10366	8231	5115	1820
38	3609	1855	1216	2952	4683	6111	5717	9111	9083	8461	5664	1123	6130
39	3612	1970	1800	2957	4409	5319	4953	9056	9153	8675	5981	1742	5326
40	3760	2370	2549	3248	4319	4457	4124	9023	9253	8932	6374	2513	4455
41	4353	3172	3463	3500	4116	3667	3449	9367	9719	9531	7094	3430	3590
42	4350	2752	2529	2380	3649	5124	4882	9743	9889	9450	6769	2456	5020
43	4550	3157	3211	2837	3616	4291	4112	9752	10022	9727	7171	3157	4153
44	5119	3516	3198	1796	2880	5247	5130	10494	10657	10218	7522	3112	5029
45	5213	3813	3790	2606	3049	4293	4249	10377	10673	10392	7833	3726	4037
46	5753	4085	3585	1052	2308	5867	5811	11179	11294	10785	8029	3484	5584
47	5668	4158	3953	2017	2435	4863	4871	10929	11174	10821	8187	3872	4546
48	6249	4696	4391	1722	1817	5274	5354	11539	11768	11385	8715	4301	4888
49	6575	4927	4436	1028	1454	6052	6115	11967	12116	11632	8883	4334	5667

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s
Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
(when calculated with ground attenuation, then Dc = Domega)

LWA,ref:	Sound pressure level at WTG
K:	Pure tone
Dc:	Directivity correction
Adiv:	the attenuation due to geometrical divergence
Aatm:	the attenuation due to atmospheric absorption
Agr:	the attenuation due to ground effect
Abar:	the attenuation due to a barrier
Amisc:	the attenuation due to miscellaneous other effects
Cmet:	Meteorological correction

Calculation Results

Noise sensitive area: A Laskentapiste A (Metsästysmäja)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4 239	4 243	16,39	106,0	2	0,00	83,55	-	-	0,00	0,00	-
10	1 847	1 856	27,56	106,0	2	0,00	76,37	-	-	0,00	0,00	-
11	2 318	2 325	24,63	106,0	2	0,00	78,33	-	-	0,00	0,00	-
12	1 725	1 735	28,42	106,0	2	0,00	75,79	-	-	0,00	0,00	-
13	1 301	1 314	31,84	106,0	2	0,00	73,37	-	-	0,00	0,00	-
14	1 514	1 526	30,02	106,0	2	0,00	74,67	-	-	0,00	0,00	-
15	1 455	1 467	30,51	106,0	2	0,00	74,33	-	-	0,00	0,00	-
16	651	678	39,42	106,0	2	0,00	67,62	-	-	0,00	0,00	-
17	1 019	1 037	34,65	106,0	2	0,00	71,31	-	-	0,00	0,00	-
18	1 949	1 959	26,87	106,0	2	0,00	76,84	-	-	0,00	0,00	-
19	595	626	40,28	106,0	2	0,00	66,93	-	-	0,00	0,00	-
2	3 500	3 504	19,06	106,0	2	0,00	81,89	-	-	0,00	0,00	-
20	683	710	38,92	106,0	2	0,00	68,02	-	-	0,00	0,00	-
21	1 428	1 440	30,73	106,0	2	0,00	74,17	-	-	0,00	0,00	-
22	2 179	2 187	25,44	106,0	2	0,00	77,80	-	-	0,00	0,00	-
23	3 212	3 217	20,25	106,0	2	0,00	81,15	-	-	0,00	0,00	-
24	1 222	1 239	32,56	106,0	2	0,00	72,86	-	-	0,00	0,00	-
25	1 638	1 649	29,05	106,0	2	0,00	75,35	-	-	0,00	0,00	-
26	2 476	2 483	23,76	106,0	2	0,00	78,90	-	-	0,00	0,00	-
27	3 561	3 566	18,82	106,0	2	0,00	82,04	-	-	0,00	0,00	-
28	4 350	4 354	16,03	106,0	2	0,00	83,78	-	-	0,00	0,00	-
29	1 880	1 890	27,33	106,0	2	0,00	76,53	-	-	0,00	0,00	-
3	3 332	3 336	19,74	106,0	2	0,00	81,47	-	-	0,00	0,00	-
30	2 260	2 268	24,96	106,0	2	0,00	78,11	-	-	0,00	0,00	-
31	3 175	3 181	20,40	106,0	2	0,00	81,05	-	-	0,00	0,00	-
32	3 950	3 955	17,38	106,0	2	0,00	82,94	-	-	0,00	0,00	-
33	4 763	4 767	14,75	106,0	2	0,00	84,56	-	-	0,00	0,00	-
34	2 913	2 919	21,58	106,0	2	0,00	80,30	-	-	0,00	0,00	-
35	3 619	3 624	18,60	106,0	2	0,00	82,18	-	-	0,00	0,00	-
36	4 604	4 607	15,23	106,0	2	0,00	84,27	-	-	0,00	0,00	-
37	5 364	5 368	13,07	106,0	2	0,00	85,60	-	-	0,00	0,00	-
38	3 609	3 614	18,63	106,0	2	0,00	82,16	-	-	0,00	0,00	-
39	3 612	3 617	18,62	106,0	2	0,00	82,17	-	-	0,00	0,00	-
4	2 984	2 989	21,25	106,0	2	0,00	80,51	-	-	0,00	0,00	-
40	3 760	3 764	18,07	106,0	2	0,00	82,51	-	-	0,00	0,00	-
41	4 353	4 357	16,02	106,0	2	0,00	83,78	-	-	0,00	0,00	-
42	4 350	4 354	16,02	106,0	2	0,00	83,78	-	-	0,00	0,00	-
43	4 550	4 554	15,39	106,0	2	0,00	84,17	-	-	0,00	0,00	-
44	5 119	5 123	13,73	106,0	2	0,00	85,19	-	-	0,00	0,00	-
45	5 213	5 217	13,48	106,0	2	0,00	85,35	-	-	0,00	0,00	-
46	5 753	5 756	12,09	106,0	2	0,00	86,20	-	-	0,00	0,00	-
47	5 668	5 671	12,30	106,0	2	0,00	86,07	-	-	0,00	0,00	-
48	6 249	6 253	10,97	106,0	2	0,00	86,92	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
49	6 575	6 578	10,36	106,0	2	0,00	87,36	-	-	0,00	0,00	-
5	2 909	2 915	21,60	106,0	2	0,00	80,29	-	-	0,00	0,00	-
6	2 599	2 605	23,12	106,0	2	0,00	79,32	-	-	0,00	0,00	-
7	3 145	3 150	20,53	106,0	2	0,00	80,97	-	-	0,00	0,00	-
8	2 193	2 201	25,36	106,0	2	0,00	77,85	-	-	0,00	0,00	-
9	1 946	1 955	26,90	106,0	2	0,00	76,82	-	-	0,00	0,00	-
Sum			46,42									

- Data undefined due to calculation with octave data

Noise sensitive area: B Laskentapiste B (Ylivieskantie, Pöhlölä)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5 908	5 910	11,72	106,0	2	0,00	86,43	-	-	0,00	0,00	-
10	3 506	3 511	19,04	106,0	2	0,00	81,91	-	-	0,00	0,00	-
11	3 758	3 763	18,07	106,0	2	0,00	82,51	-	-	0,00	0,00	-
12	3 345	3 350	19,68	106,0	2	0,00	81,50	-	-	0,00	0,00	-
13	3 058	3 064	20,92	106,0	2	0,00	80,72	-	-	0,00	0,00	-
14	3 005	3 011	21,15	106,0	2	0,00	80,57	-	-	0,00	0,00	-
15	2 853	2 859	21,86	106,0	2	0,00	80,12	-	-	0,00	0,00	-
16	2 400	2 407	24,17	106,0	2	0,00	78,63	-	-	0,00	0,00	-
17	2 360	2 367	24,39	106,0	2	0,00	78,49	-	-	0,00	0,00	-
18	2 750	2 757	22,35	106,0	2	0,00	79,81	-	-	0,00	0,00	-
19	1 439	1 452	30,63	106,0	2	0,00	74,24	-	-	0,00	0,00	-
2	5 238	5 241	13,41	106,0	2	0,00	85,39	-	-	0,00	0,00	-
20	1 168	1 184	33,09	106,0	2	0,00	72,47	-	-	0,00	0,00	-
21	1 524	1 536	29,94	106,0	2	0,00	74,73	-	-	0,00	0,00	-
22	2 187	2 195	25,39	106,0	2	0,00	77,83	-	-	0,00	0,00	-
23	3 102	3 108	20,72	106,0	2	0,00	80,85	-	-	0,00	0,00	-
24	535	570	41,28	106,0	2	0,00	66,12	-	-	0,00	0,00	-
25	953	971	35,40	106,0	2	0,00	70,75	-	-	0,00	0,00	-
26	1 995	2 004	26,58	106,0	2	0,00	77,04	-	-	0,00	0,00	-
27	3 133	3 139	20,58	106,0	2	0,00	80,93	-	-	0,00	0,00	-
28	3 950	3 954	17,38	106,0	2	0,00	82,94	-	-	0,00	0,00	-
29	238	305	47,66	106,0	2	0,00	60,69	-	-	0,00	0,00	-
3	4 968	4 971	14,16	106,0	2	0,00	84,93	-	-	0,00	0,00	-
30	1 123	1 139	33,55	106,0	2	0,00	72,13	-	-	0,00	0,00	-
31	2 418	2 425	24,07	106,0	2	0,00	78,70	-	-	0,00	0,00	-
32	3 219	3 225	20,21	106,0	2	0,00	81,17	-	-	0,00	0,00	-
33	4 143	4 147	16,71	106,0	2	0,00	83,35	-	-	0,00	0,00	-
34	1 659	1 670	28,90	106,0	2	0,00	75,45	-	-	0,00	0,00	-
35	2 545	2 552	23,39	106,0	2	0,00	79,14	-	-	0,00	0,00	-
36	3 693	3 697	18,32	106,0	2	0,00	82,36	-	-	0,00	0,00	-
37	4 612	4 616	15,20	106,0	2	0,00	84,29	-	-	0,00	0,00	-
38	1 855	1 865	27,50	106,0	2	0,00	76,41	-	-	0,00	0,00	-
39	1 970	1 979	26,74	106,0	2	0,00	76,93	-	-	0,00	0,00	-
4	4 730	4 734	14,85	106,0	2	0,00	84,50	-	-	0,00	0,00	-
40	2 370	2 377	24,34	106,0	2	0,00	78,52	-	-	0,00	0,00	-
41	3 172	3 177	20,42	106,0	2	0,00	81,04	-	-	0,00	0,00	-
42	2 752	2 758	22,35	106,0	2	0,00	79,81	-	-	0,00	0,00	-
43	3 157	3 163	20,48	106,0	2	0,00	81,00	-	-	0,00	0,00	-
44	3 516	3 521	19,00	106,0	2	0,00	81,93	-	-	0,00	0,00	-
45	3 813	3 818	17,87	106,0	2	0,00	82,64	-	-	0,00	0,00	-
46	4 085	4 090	16,91	106,0	2	0,00	83,23	-	-	0,00	0,00	-
47	4 158	4 162	16,66	106,0	2	0,00	83,39	-	-	0,00	0,00	-
48	4 696	4 701	14,95	106,0	2	0,00	84,44	-	-	0,00	0,00	-
49	4 927	4 931	14,27	106,0	2	0,00	84,86	-	-	0,00	0,00	-
5	4 660	4 663	15,06	106,0	2	0,00	84,37	-	-	0,00	0,00	-
6	4 266	4 270	16,30	106,0	2	0,00	83,61	-	-	0,00	0,00	-
7	4 645	4 648	15,10	106,0	2	0,00	84,35	-	-	0,00	0,00	-
8	3 903	3 907	17,54	106,0	2	0,00	82,84	-	-	0,00	0,00	-
9	3 702	3 707	18,28	106,0	2	0,00	82,38	-	-	0,00	0,00	-
Sum			49,44									

- Data undefined due to calculation with octave data

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s
Noise sensitive area: C Laskentapiste C (Perkkiöntie 382)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	7 032	7 034	9,55	106,0	2	0,00	87,94	-	-	0,00	0,00	-
10	4 627	4 631	15,16	106,0	2	0,00	84,31	-	-	0,00	0,00	-
11	4 931	4 934	14,26	106,0	2	0,00	84,86	-	-	0,00	0,00	-
12	4 188	4 192	16,56	106,0	2	0,00	83,45	-	-	0,00	0,00	-
13	4 073	4 077	16,95	106,0	2	0,00	83,21	-	-	0,00	0,00	-
14	4 164	4 168	16,64	106,0	2	0,00	83,40	-	-	0,00	0,00	-
15	3 593	3 598	18,69	106,0	2	0,00	82,12	-	-	0,00	0,00	-
16	3 409	3 414	19,42	106,0	2	0,00	81,67	-	-	0,00	0,00	-
17	3 526	3 531	18,96	106,0	2	0,00	81,96	-	-	0,00	0,00	-
18	3 923	3 927	17,47	106,0	2	0,00	82,88	-	-	0,00	0,00	-
19	2 345	2 353	24,47	106,0	2	0,00	78,43	-	-	0,00	0,00	-
2	6 304	6 306	10,86	106,0	2	0,00	87,00	-	-	0,00	0,00	-
20	2 311	2 319	24,67	106,0	2	0,00	78,31	-	-	0,00	0,00	-
21	2 683	2 690	22,69	106,0	2	0,00	79,59	-	-	0,00	0,00	-
22	3 261	3 267	20,03	106,0	2	0,00	81,28	-	-	0,00	0,00	-
23	4 060	4 065	16,99	106,0	2	0,00	83,18	-	-	0,00	0,00	-
24	1 645	1 657	29,00	106,0	2	0,00	75,39	-	-	0,00	0,00	-
25	2 057	2 066	26,18	106,0	2	0,00	77,30	-	-	0,00	0,00	-
26	2 934	2 940	21,48	106,0	2	0,00	80,37	-	-	0,00	0,00	-
27	3 954	3 958	17,36	106,0	2	0,00	82,95	-	-	0,00	0,00	-
28	4 721	4 724	14,88	106,0	2	0,00	84,49	-	-	0,00	0,00	-
29	1 237	1 252	32,42	106,0	2	0,00	72,95	-	-	0,00	0,00	-
3	6 104	6 107	11,25	106,0	2	0,00	86,72	-	-	0,00	0,00	-
30	1 937	1 947	26,95	106,0	2	0,00	76,79	-	-	0,00	0,00	-
31	3 147	3 152	20,53	106,0	2	0,00	80,97	-	-	0,00	0,00	-
32	3 862	3 866	17,69	106,0	2	0,00	82,75	-	-	0,00	0,00	-
33	4 777	4 781	14,71	106,0	2	0,00	84,59	-	-	0,00	0,00	-
34	2 174	2 183	25,46	106,0	2	0,00	77,78	-	-	0,00	0,00	-
35	3 024	3 030	21,07	106,0	2	0,00	80,63	-	-	0,00	0,00	-
36	4 163	4 168	16,64	106,0	2	0,00	83,40	-	-	0,00	0,00	-
37	5 131	5 135	13,70	106,0	2	0,00	85,21	-	-	0,00	0,00	-
38	1 216	1 231	32,63	106,0	2	0,00	72,80	-	-	0,00	0,00	-
39	1 800	1 810	27,88	106,0	2	0,00	76,16	-	-	0,00	0,00	-
4	5 684	5 687	12,26	106,0	2	0,00	86,10	-	-	0,00	0,00	-
40	2 549	2 556	23,37	106,0	2	0,00	79,15	-	-	0,00	0,00	-
41	3 463	3 468	19,21	106,0	2	0,00	81,80	-	-	0,00	0,00	-
42	2 529	2 536	23,48	106,0	2	0,00	79,08	-	-	0,00	0,00	-
43	3 211	3 216	20,25	106,0	2	0,00	81,15	-	-	0,00	0,00	-
44	3 198	3 204	20,30	106,0	2	0,00	81,11	-	-	0,00	0,00	-
45	3 790	3 795	17,95	106,0	2	0,00	82,58	-	-	0,00	0,00	-
46	3 585	3 591	18,72	106,0	2	0,00	82,10	-	-	0,00	0,00	-
47	3 953	3 958	17,37	106,0	2	0,00	82,95	-	-	0,00	0,00	-
48	4 391	4 395	15,89	106,0	2	0,00	83,86	-	-	0,00	0,00	-
49	4 436	4 441	15,75	106,0	2	0,00	83,95	-	-	0,00	0,00	-
5	5 703	5 706	12,21	106,0	2	0,00	86,13	-	-	0,00	0,00	-
6	5 387	5 390	13,01	106,0	2	0,00	85,63	-	-	0,00	0,00	-
7	5 814	5 817	11,94	106,0	2	0,00	86,29	-	-	0,00	0,00	-
8	4 810	4 813	14,61	106,0	2	0,00	84,65	-	-	0,00	0,00	-
9	4 732	4 735	14,84	106,0	2	0,00	84,51	-	-	0,00	0,00	-
Sum			39,75									

- Data undefined due to calculation with octave data

Noise sensitive area: D Asuinrakennus D (Alakyläntie 243)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	10 398	10 400	4,81	106,0	2	0,00	91,34	-	-	0,00	0,00	-
10	8 091	8 093	7,85	106,0	2	0,00	89,16	-	-	0,00	0,00	-
11	8 084	8 086	7,86	106,0	2	0,00	89,15	-	-	0,00	0,00	-
12	8 124	8 126	7,80	106,0	2	0,00	89,20	-	-	0,00	0,00	-
13	7 809	7 811	8,28	106,0	2	0,00	88,85	-	-	0,00	0,00	-
14	7 482	7 484	8,80	106,0	2	0,00	88,48	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
15	7 591	7 593	8,62	106,0	2	0,00	88,61	-	-	0,00	0,00	-
16	7 166	7 168	9,32	106,0	2	0,00	88,11	-	-	0,00	0,00	-
17	6 853	6 855	9,86	106,0	2	0,00	87,72	-	-	0,00	0,00	-
18	6 706	6 708	10,12	106,0	2	0,00	87,53	-	-	0,00	0,00	-
19	6 216	6 219	11,03	106,0	2	0,00	86,87	-	-	0,00	0,00	-
2	9 892	9 893	5,43	106,0	2	0,00	90,91	-	-	0,00	0,00	-
20	5 860	5 863	11,83	106,0	2	0,00	86,36	-	-	0,00	0,00	-
21	5 649	5 652	12,35	106,0	2	0,00	86,04	-	-	0,00	0,00	-
22	5 668	5 671	12,30	106,0	2	0,00	86,07	-	-	0,00	0,00	-
23	5 748	5 751	12,10	106,0	2	0,00	86,20	-	-	0,00	0,00	-
24	5 311	5 314	13,21	106,0	2	0,00	85,51	-	-	0,00	0,00	-
25	5 060	5 063	13,90	106,0	2	0,00	85,09	-	-	0,00	0,00	-
26	5 055	5 058	13,91	106,0	2	0,00	85,08	-	-	0,00	0,00	-
27	5 219	5 223	13,46	106,0	2	0,00	85,36	-	-	0,00	0,00	-
28	5 498	5 501	12,73	106,0	2	0,00	85,81	-	-	0,00	0,00	-
29	4 636	4 640	15,13	106,0	2	0,00	84,33	-	-	0,00	0,00	-
3	9 441	9 442	5,98	106,0	2	0,00	90,50	-	-	0,00	0,00	-
30	4 471	4 475	15,64	106,0	2	0,00	84,01	-	-	0,00	0,00	-
31	4 587	4 590	15,28	106,0	2	0,00	84,24	-	-	0,00	0,00	-
32	4 625	4 629	15,16	106,0	2	0,00	84,31	-	-	0,00	0,00	-
33	5 064	5 067	13,89	106,0	2	0,00	85,10	-	-	0,00	0,00	-
34	3 966	3 970	17,32	106,0	2	0,00	82,98	-	-	0,00	0,00	-
35	3 928	3 932	17,46	106,0	2	0,00	82,89	-	-	0,00	0,00	-
36	4 231	4 235	16,41	106,0	2	0,00	83,54	-	-	0,00	0,00	-
37	4 879	4 883	14,41	106,0	2	0,00	84,77	-	-	0,00	0,00	-
38	2 952	2 958	21,40	106,0	2	0,00	80,42	-	-	0,00	0,00	-
39	2 957	2 963	21,37	106,0	2	0,00	80,43	-	-	0,00	0,00	-
4	9 498	9 500	5,90	106,0	2	0,00	90,55	-	-	0,00	0,00	-
40	3 248	3 253	20,09	106,0	2	0,00	81,25	-	-	0,00	0,00	-
41	3 500	3 504	19,06	106,0	2	0,00	81,89	-	-	0,00	0,00	-
42	2 380	2 387	24,28	106,0	2	0,00	78,56	-	-	0,00	0,00	-
43	2 837	2 843	21,94	106,0	2	0,00	80,08	-	-	0,00	0,00	-
44	1 796	1 805	27,91	106,0	2	0,00	76,13	-	-	0,00	0,00	-
45	2 606	2 613	23,08	106,0	2	0,00	79,34	-	-	0,00	0,00	-
46	1 052	1 069	34,29	106,0	2	0,00	71,58	-	-	0,00	0,00	-
47	2 017	2 026	26,43	106,0	2	0,00	77,13	-	-	0,00	0,00	-
48	1 722	1 733	28,43	106,0	2	0,00	75,78	-	-	0,00	0,00	-
49	1 028	1 046	34,55	106,0	2	0,00	71,39	-	-	0,00	0,00	-
5	9 357	9 358	6,09	106,0	2	0,00	90,42	-	-	0,00	0,00	-
6	8 821	8 822	6,80	106,0	2	0,00	89,91	-	-	0,00	0,00	-
7	8 945	8 947	6,63	106,0	2	0,00	90,03	-	-	0,00	0,00	-
8	8 686	8 688	6,99	106,0	2	0,00	89,78	-	-	0,00	0,00	-
9	8 431	8 433	7,35	106,0	2	0,00	89,52	-	-	0,00	0,00	-
Sum			39,55									

- Data undefined due to calculation with octave data

Noise sensitive area: E Lomarakennus E (Kellokankaan metsätie)

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	11 518	11 520	3,57	106,0	2	0,00	92,23	-	-	0,00	0,00	-
10	9 362	9 363	6,08	106,0	2	0,00	90,43	-	-	0,00	0,00	-
11	9 194	9 196	6,30	106,0	2	0,00	90,27	-	-	0,00	0,00	-
12	9 690	9 692	5,66	106,0	2	0,00	90,73	-	-	0,00	0,00	-
13	9 246	9 248	6,23	106,0	2	0,00	90,32	-	-	0,00	0,00	-
14	8 712	8 714	6,95	106,0	2	0,00	89,80	-	-	0,00	0,00	-
15	9 226	9 228	6,26	106,0	2	0,00	90,30	-	-	0,00	0,00	-
16	8 642	8 644	7,05	106,0	2	0,00	89,73	-	-	0,00	0,00	-
17	8 131	8 133	7,79	106,0	2	0,00	89,21	-	-	0,00	0,00	-
18	7 754	7 756	8,36	106,0	2	0,00	88,79	-	-	0,00	0,00	-
19	7 804	7 806	8,29	106,0	2	0,00	88,85	-	-	0,00	0,00	-
2	11 164	11 165	3,96	106,0	2	0,00	91,96	-	-	0,00	0,00	-
20	7 318	7 320	9,07	106,0	2	0,00	88,29	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
21	6 898	6 900	9,78	106,0	2	0,00	87,78	-	-	0,00	0,00	-
22	6 692	6 695	10,14	106,0	2	0,00	87,51	-	-	0,00	0,00	-
23	6 454	6 457	10,58	106,0	2	0,00	87,20	-	-	0,00	0,00	-
24	6 865	6 868	9,84	106,0	2	0,00	87,74	-	-	0,00	0,00	-
25	6 409	6 412	10,66	106,0	2	0,00	87,14	-	-	0,00	0,00	-
26	6 078	6 081	11,32	106,0	2	0,00	86,68	-	-	0,00	0,00	-
27	5 844	5 847	11,87	106,0	2	0,00	86,34	-	-	0,00	0,00	-
28	5 831	5 833	11,90	106,0	2	0,00	86,32	-	-	0,00	0,00	-
29	6 185	6 188	11,09	106,0	2	0,00	86,83	-	-	0,00	0,00	-
3	10 579	10 581	4,60	106,0	2	0,00	91,49	-	-	0,00	0,00	-
30	5 779	5 782	12,02	106,0	2	0,00	86,24	-	-	0,00	0,00	-
31	5 448	5 451	12,86	106,0	2	0,00	85,73	-	-	0,00	0,00	-
32	5 172	5 175	13,59	106,0	2	0,00	85,28	-	-	0,00	0,00	-
33	5 252	5 255	13,37	106,0	2	0,00	85,41	-	-	0,00	0,00	-
34	5 164	5 167	13,61	106,0	2	0,00	85,26	-	-	0,00	0,00	-
35	4 776	4 779	14,71	106,0	2	0,00	84,59	-	-	0,00	0,00	-
36	4 556	4 560	15,38	106,0	2	0,00	84,18	-	-	0,00	0,00	-
37	4 827	4 830	14,56	106,0	2	0,00	84,68	-	-	0,00	0,00	-
38	4 683	4 687	14,99	106,0	2	0,00	84,42	-	-	0,00	0,00	-
39	4 409	4 413	15,84	106,0	2	0,00	83,89	-	-	0,00	0,00	-
4	10 935	10 936	4,20	106,0	2	0,00	91,78	-	-	0,00	0,00	-
40	4 319	4 323	16,13	106,0	2	0,00	83,72	-	-	0,00	0,00	-
41	4 116	4 119	16,80	106,0	2	0,00	83,30	-	-	0,00	0,00	-
42	3 649	3 654	18,48	106,0	2	0,00	82,25	-	-	0,00	0,00	-
43	3 616	3 621	18,61	106,0	2	0,00	82,18	-	-	0,00	0,00	-
44	2 880	2 885	21,74	106,0	2	0,00	80,20	-	-	0,00	0,00	-
45	3 049	3 054	20,96	106,0	2	0,00	80,70	-	-	0,00	0,00	-
46	2 308	2 316	24,68	106,0	2	0,00	78,29	-	-	0,00	0,00	-
47	2 435	2 443	23,98	106,0	2	0,00	78,76	-	-	0,00	0,00	-
48	1 817	1 828	27,76	106,0	2	0,00	76,24	-	-	0,00	0,00	-
49	1 454	1 467	30,51	106,0	2	0,00	74,33	-	-	0,00	0,00	-
5	10 687	10 688	4,48	106,0	2	0,00	91,58	-	-	0,00	0,00	-
6	10 040	10 042	5,23	106,0	2	0,00	91,04	-	-	0,00	0,00	-
7	9 995	9 996	5,29	106,0	2	0,00	91,00	-	-	0,00	0,00	-
8	10 191	10 192	5,05	106,0	2	0,00	91,17	-	-	0,00	0,00	-
9	9 822	9 823	5,50	106,0	2	0,00	90,85	-	-	0,00	0,00	-
Sum			35,09									

- Data undefined due to calculation with octave data

Noise sensitive area: F Asuinrakennus F (Ollilantie 112)

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	7 154	7 157	9,34	106,0	2	0,00	88,09	-	-	0,00	0,00	-
10	6 127	6 131	11,20	106,0	2	0,00	86,75	-	-	0,00	0,00	-
11	5 428	5 432	12,91	106,0	2	0,00	85,70	-	-	0,00	0,00	-
12	7 575	7 577	8,65	106,0	2	0,00	88,59	-	-	0,00	0,00	-
13	6 720	6 724	10,09	106,0	2	0,00	87,55	-	-	0,00	0,00	-
14	5 581	5 585	12,51	106,0	2	0,00	85,94	-	-	0,00	0,00	-
15	7 590	7 593	8,62	106,0	2	0,00	88,61	-	-	0,00	0,00	-
16	6 521	6 524	10,46	106,0	2	0,00	87,29	-	-	0,00	0,00	-
17	5 456	5 460	12,83	106,0	2	0,00	85,74	-	-	0,00	0,00	-
18	4 447	4 452	15,71	106,0	2	0,00	83,97	-	-	0,00	0,00	-
19	6 543	6 547	10,41	106,0	2	0,00	87,32	-	-	0,00	0,00	-
2	7 417	7 419	8,92	106,0	2	0,00	88,41	-	-	0,00	0,00	-
20	5 783	5 787	12,01	106,0	2	0,00	86,25	-	-	0,00	0,00	-
21	4 862	4 867	14,46	106,0	2	0,00	84,75	-	-	0,00	0,00	-
22	4 049	4 055	17,02	106,0	2	0,00	83,16	-	-	0,00	0,00	-
23	3 001	3 009	21,16	106,0	2	0,00	80,57	-	-	0,00	0,00	-
24	5 990	5 994	11,52	106,0	2	0,00	86,55	-	-	0,00	0,00	-
25	5 094	5 098	13,80	106,0	2	0,00	85,15	-	-	0,00	0,00	-
26	3 989	3 994	17,24	106,0	2	0,00	83,03	-	-	0,00	0,00	-
27	2 827	2 835	21,97	106,0	2	0,00	80,05	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
28	2 014	2 025	26,44	106,0	2	0,00	77,13	-	-	0,00	0,00	-
29	5 752	5 756	12,09	106,0	2	0,00	86,20	-	-	0,00	0,00	-
3	6 488	6 491	10,52	106,0	2	0,00	87,25	-	-	0,00	0,00	-
30	4 865	4 870	14,45	106,0	2	0,00	84,75	-	-	0,00	0,00	-
31	3 583	3 590	18,73	106,0	2	0,00	82,10	-	-	0,00	0,00	-
32	2 876	2 884	21,74	106,0	2	0,00	80,20	-	-	0,00	0,00	-
33	2 016	2 027	26,43	106,0	2	0,00	77,14	-	-	0,00	0,00	-
34	4 552	4 557	15,38	106,0	2	0,00	84,17	-	-	0,00	0,00	-
35	3 771	3 777	18,02	106,0	2	0,00	82,54	-	-	0,00	0,00	-
36	2 820	2 828	22,01	106,0	2	0,00	80,03	-	-	0,00	0,00	-
37	2 003	2 015	26,51	106,0	2	0,00	77,08	-	-	0,00	0,00	-
38	6 111	6 115	11,24	106,0	2	0,00	86,73	-	-	0,00	0,00	-
39	5 319	5 324	13,19	106,0	2	0,00	85,52	-	-	0,00	0,00	-
4	7 897	7 900	8,14	106,0	2	0,00	88,95	-	-	0,00	0,00	-
40	4 457	4 462	15,68	106,0	2	0,00	83,99	-	-	0,00	0,00	-
41	3 667	3 673	18,41	106,0	2	0,00	82,30	-	-	0,00	0,00	-
42	5 124	5 128	13,72	106,0	2	0,00	85,20	-	-	0,00	0,00	-
43	4 291	4 296	16,21	106,0	2	0,00	83,66	-	-	0,00	0,00	-
44	5 247	5 252	13,38	106,0	2	0,00	85,41	-	-	0,00	0,00	-
45	4 293	4 298	16,21	106,0	2	0,00	83,67	-	-	0,00	0,00	-
46	5 867	5 871	11,81	106,0	2	0,00	86,37	-	-	0,00	0,00	-
47	4 863	4 868	14,45	106,0	2	0,00	84,75	-	-	0,00	0,00	-
48	5 274	5 279	13,31	106,0	2	0,00	85,45	-	-	0,00	0,00	-
49	6 052	6 056	11,37	106,0	2	0,00	86,64	-	-	0,00	0,00	-
5	7 280	7 283	9,13	106,0	2	0,00	88,25	-	-	0,00	0,00	-
6	6 390	6 393	10,70	106,0	2	0,00	87,11	-	-	0,00	0,00	-
7	5 754	5 758	12,08	106,0	2	0,00	86,21	-	-	0,00	0,00	-
8	7 644	7 647	8,54	106,0	2	0,00	88,67	-	-	0,00	0,00	-
9	6 906	6 909	9,76	106,0	2	0,00	87,79	-	-	0,00	0,00	-
Sum			34,64									

- Data undefined due to calculation with octave data

Noise sensitive area: G Lomarakennus G (Ollilantie, Siliäkuru)

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 304	6 307	10,86	106,0	2	0,00	87,00	-	-	0,00	0,00	-
10	5 269	5 273	13,32	106,0	2	0,00	85,44	-	-	0,00	0,00	-
11	4 562	4 566	15,36	106,0	2	0,00	84,19	-	-	0,00	0,00	-
12	6 747	6 750	10,04	106,0	2	0,00	87,59	-	-	0,00	0,00	-
13	5 885	5 888	11,77	106,0	2	0,00	86,40	-	-	0,00	0,00	-
14	4 735	4 739	14,83	106,0	2	0,00	84,51	-	-	0,00	0,00	-
15	6 791	6 794	9,97	106,0	2	0,00	87,64	-	-	0,00	0,00	-
16	5 714	5 717	12,18	106,0	2	0,00	86,14	-	-	0,00	0,00	-
17	4 640	4 645	15,11	106,0	2	0,00	84,34	-	-	0,00	0,00	-
18	3 621	3 626	18,59	106,0	2	0,00	82,19	-	-	0,00	0,00	-
19	5 804	5 808	11,96	106,0	2	0,00	86,28	-	-	0,00	0,00	-
2	6 550	6 553	10,42	106,0	2	0,00	87,33	-	-	0,00	0,00	-
20	5 054	5 058	13,91	106,0	2	0,00	85,08	-	-	0,00	0,00	-
21	4 137	4 142	16,73	106,0	2	0,00	83,34	-	-	0,00	0,00	-
22	3 319	3 326	19,79	106,0	2	0,00	81,44	-	-	0,00	0,00	-
23	2 282	2 290	24,83	106,0	2	0,00	78,20	-	-	0,00	0,00	-
24	5 318	5 322	13,19	106,0	2	0,00	85,52	-	-	0,00	0,00	-
25	4 437	4 442	15,74	106,0	2	0,00	83,95	-	-	0,00	0,00	-
26	3 348	3 354	19,67	106,0	2	0,00	81,51	-	-	0,00	0,00	-
27	2 244	2 253	25,05	106,0	2	0,00	78,06	-	-	0,00	0,00	-
28	1 521	1 534	29,96	106,0	2	0,00	74,71	-	-	0,00	0,00	-
29	5 149	5 153	13,65	106,0	2	0,00	85,24	-	-	0,00	0,00	-
3	5 624	5 627	12,41	106,0	2	0,00	86,01	-	-	0,00	0,00	-
30	4 287	4 292	16,23	106,0	2	0,00	83,65	-	-	0,00	0,00	-
31	3 061	3 067	20,90	106,0	2	0,00	80,74	-	-	0,00	0,00	-
32	2 475	2 483	23,76	106,0	2	0,00	78,90	-	-	0,00	0,00	-
33	1 794	1 805	27,92	106,0	2	0,00	76,13	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
34	4 066	4 071	16,97	106,0	2	0,00	83,19	-	-	0,00	0,00	-
35	3 383	3 389	19,53	106,0	2	0,00	81,60	-	-	0,00	0,00	-
36	2 638	2 645	22,91	106,0	2	0,00	79,45	-	-	0,00	0,00	-
37	2 066	2 076	26,12	106,0	2	0,00	77,34	-	-	0,00	0,00	-
38	5 717	5 720	12,18	106,0	2	0,00	86,15	-	-	0,00	0,00	-
39	4 953	4 957	14,20	106,0	2	0,00	84,90	-	-	0,00	0,00	-
4	7 033	7 036	9,54	106,0	2	0,00	87,95	-	-	0,00	0,00	-
40	4 124	4 128	16,77	106,0	2	0,00	83,32	-	-	0,00	0,00	-
41	3 449	3 455	19,26	106,0	2	0,00	81,77	-	-	0,00	0,00	-
42	4 882	4 887	14,40	106,0	2	0,00	84,78	-	-	0,00	0,00	-
43	4 112	4 117	16,81	106,0	2	0,00	83,29	-	-	0,00	0,00	-
44	5 130	5 134	13,70	106,0	2	0,00	85,21	-	-	0,00	0,00	-
45	4 249	4 254	16,35	106,0	2	0,00	83,58	-	-	0,00	0,00	-
46	5 811	5 815	11,94	106,0	2	0,00	86,29	-	-	0,00	0,00	-
47	4 871	4 875	14,43	106,0	2	0,00	84,76	-	-	0,00	0,00	-
48	5 354	5 359	13,10	106,0	2	0,00	85,58	-	-	0,00	0,00	-
49	6 115	6 119	11,23	106,0	2	0,00	86,73	-	-	0,00	0,00	-
5	6 413	6 416	10,66	106,0	2	0,00	87,15	-	-	0,00	0,00	-
6	5 523	5 526	12,66	106,0	2	0,00	85,85	-	-	0,00	0,00	-
7	4 891	4 894	14,38	106,0	2	0,00	84,79	-	-	0,00	0,00	-
8	6 795	6 798	9,96	106,0	2	0,00	87,65	-	-	0,00	0,00	-
9	6 051	6 055	11,38	106,0	2	0,00	86,64	-	-	0,00	0,00	-
Sum			36,54									

- Data undefined due to calculation with octave data

Noise sensitive area: H Asuinrakennus H (Pinolantie 406)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2 353	2 362	24,43	106,0	2	0,00	78,46	-	-	0,00	0,00	-
10	3 986	3 991	17,25	106,0	2	0,00	83,02	-	-	0,00	0,00	-
11	4 309	4 314	16,18	106,0	2	0,00	83,70	-	-	0,00	0,00	-
12	4 105	4 110	16,83	106,0	2	0,00	83,28	-	-	0,00	0,00	-
13	4 201	4 206	16,51	106,0	2	0,00	83,48	-	-	0,00	0,00	-
14	4 645	4 650	15,10	106,0	2	0,00	84,35	-	-	0,00	0,00	-
15	4 770	4 774	14,73	106,0	2	0,00	84,58	-	-	0,00	0,00	-
16	4 860	4 864	14,46	106,0	2	0,00	84,74	-	-	0,00	0,00	-
17	5 211	5 216	13,48	106,0	2	0,00	85,35	-	-	0,00	0,00	-
18	5 719	5 723	12,19	106,0	2	0,00	86,15	-	-	0,00	0,00	-
19	5 894	5 898	11,74	106,0	2	0,00	86,41	-	-	0,00	0,00	-
2	2 212	2 222	25,23	106,0	2	0,00	77,93	-	-	0,00	0,00	-
20	6 140	6 144	11,18	106,0	2	0,00	86,77	-	-	0,00	0,00	-
21	6 445	6 449	10,59	106,0	2	0,00	87,19	-	-	0,00	0,00	-
22	6 734	6 738	10,07	106,0	2	0,00	87,57	-	-	0,00	0,00	-
23	7 320	7 323	9,06	106,0	2	0,00	88,29	-	-	0,00	0,00	-
24	6 724	6 727	10,09	106,0	2	0,00	87,56	-	-	0,00	0,00	-
25	6 965	6 968	9,66	106,0	2	0,00	87,86	-	-	0,00	0,00	-
26	7 318	7 321	9,06	106,0	2	0,00	88,29	-	-	0,00	0,00	-
27	7 923	7 926	8,10	106,0	2	0,00	88,98	-	-	0,00	0,00	-
28	8 412	8 415	7,39	106,0	2	0,00	89,50	-	-	0,00	0,00	-
29	7 378	7 381	8,96	106,0	2	0,00	88,36	-	-	0,00	0,00	-
3	3 021	3 028	21,08	106,0	2	0,00	80,62	-	-	0,00	0,00	-
30	7 584	7 587	8,63	106,0	2	0,00	88,60	-	-	0,00	0,00	-
31	8 012	8 015	7,97	106,0	2	0,00	89,08	-	-	0,00	0,00	-
32	8 553	8 556	7,19	106,0	2	0,00	89,65	-	-	0,00	0,00	-
33	9 027	9 030	6,54	106,0	2	0,00	90,11	-	-	0,00	0,00	-
34	8 181	8 184	7,71	106,0	2	0,00	89,26	-	-	0,00	0,00	-
35	8 640	8 642	7,05	106,0	2	0,00	89,73	-	-	0,00	0,00	-
36	9 279	9 282	6,20	106,0	2	0,00	90,35	-	-	0,00	0,00	-
37	9 690	9 692	5,68	106,0	2	0,00	90,73	-	-	0,00	0,00	-
38	9 111	9 114	6,41	106,0	2	0,00	90,19	-	-	0,00	0,00	-
39	9 056	9 059	6,48	106,0	2	0,00	90,14	-	-	0,00	0,00	-
4	2 553	2 562	23,34	106,0	2	0,00	79,17	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
40	9 023	9 026	6,53	106,0	2	0,00	90,11	-	-	0,00	0,00	-
41	9 367	9 369	6,07	106,0	2	0,00	90,43	-	-	0,00	0,00	-
42	9 743	9 745	5,60	106,0	2	0,00	90,78	-	-	0,00	0,00	-
43	9 752	9 754	5,58	106,0	2	0,00	90,78	-	-	0,00	0,00	-
44	10 494	10 496	4,70	106,0	2	0,00	91,42	-	-	0,00	0,00	-
45	10 377	10 380	4,83	106,0	2	0,00	91,32	-	-	0,00	0,00	-
46	11 179	11 181	3,93	106,0	2	0,00	91,97	-	-	0,00	0,00	-
47	10 929	10 931	4,20	106,0	2	0,00	91,77	-	-	0,00	0,00	-
48	11 539	11 541	3,55	106,0	2	0,00	92,25	-	-	0,00	0,00	-
49	11 967	11 969	3,11	106,0	2	0,00	92,56	-	-	0,00	0,00	-
5	2 657	2 665	22,81	106,0	2	0,00	79,51	-	-	0,00	0,00	-
6	3 359	3 365	19,63	106,0	2	0,00	81,54	-	-	0,00	0,00	-
7	3 747	3 753	18,11	106,0	2	0,00	82,49	-	-	0,00	0,00	-
8	3 446	3 452	19,27	106,0	2	0,00	81,76	-	-	0,00	0,00	-
9	3 567	3 573	18,79	106,0	2	0,00	82,06	-	-	0,00	0,00	-
Sum			32,94									

- Data undefined due to calculation with octave data

Noise sensitive area: I Asuinrakennus I (Kortenevantie 116)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	3 444	3 450	19,28	106,0	2	0,00	81,76	-	-	0,00	0,00	-
10	4 391	4 396	15,89	106,0	2	0,00	83,86	-	-	0,00	0,00	-
11	4 928	4 932	14,27	106,0	2	0,00	84,86	-	-	0,00	0,00	-
12	3 908	3 913	17,52	106,0	2	0,00	82,85	-	-	0,00	0,00	-
13	4 295	4 300	16,20	106,0	2	0,00	83,67	-	-	0,00	0,00	-
14	5 049	5 053	13,93	106,0	2	0,00	85,07	-	-	0,00	0,00	-
15	4 492	4 497	15,57	106,0	2	0,00	84,06	-	-	0,00	0,00	-
16	4 894	4 899	14,36	106,0	2	0,00	84,80	-	-	0,00	0,00	-
17	5 510	5 514	12,69	106,0	2	0,00	85,83	-	-	0,00	0,00	-
18	6 216	6 220	11,03	106,0	2	0,00	86,88	-	-	0,00	0,00	-
19	5 812	5 816	11,94	106,0	2	0,00	86,29	-	-	0,00	0,00	-
2	2 897	2 904	21,65	106,0	2	0,00	80,26	-	-	0,00	0,00	-
20	6 219	6 223	11,02	106,0	2	0,00	86,88	-	-	0,00	0,00	-
21	6 707	6 711	10,12	106,0	2	0,00	87,54	-	-	0,00	0,00	-
22	7 145	7 148	9,35	106,0	2	0,00	88,08	-	-	0,00	0,00	-
23	7 879	7 881	8,17	106,0	2	0,00	88,93	-	-	0,00	0,00	-
24	6 720	6 723	10,09	106,0	2	0,00	87,55	-	-	0,00	0,00	-
25	7 133	7 136	9,37	106,0	2	0,00	88,07	-	-	0,00	0,00	-
26	7 678	7 681	8,48	106,0	2	0,00	88,71	-	-	0,00	0,00	-
27	8 446	8 449	7,33	106,0	2	0,00	89,54	-	-	0,00	0,00	-
28	9 031	9 033	6,52	106,0	2	0,00	90,12	-	-	0,00	0,00	-
29	7 399	7 403	8,93	106,0	2	0,00	88,39	-	-	0,00	0,00	-
3	3 852	3 858	17,72	106,0	2	0,00	82,73	-	-	0,00	0,00	-
30	7 764	7 767	8,35	106,0	2	0,00	88,81	-	-	0,00	0,00	-
31	8 399	8 402	7,39	106,0	2	0,00	89,49	-	-	0,00	0,00	-
32	9 030	9 032	6,52	106,0	2	0,00	90,12	-	-	0,00	0,00	-
33	9 614	9 616	5,76	106,0	2	0,00	90,66	-	-	0,00	0,00	-
34	8 399	8 402	7,39	106,0	2	0,00	89,49	-	-	0,00	0,00	-
35	8 976	8 978	6,59	106,0	2	0,00	90,06	-	-	0,00	0,00	-
36	9 751	9 754	5,59	106,0	2	0,00	90,78	-	-	0,00	0,00	-
37	10 276	10 278	4,95	106,0	2	0,00	91,24	-	-	0,00	0,00	-
38	9 083	9 086	6,45	106,0	2	0,00	90,17	-	-	0,00	0,00	-
39	9 153	9 155	6,35	106,0	2	0,00	90,23	-	-	0,00	0,00	-
4	2 632	2 640	22,94	106,0	2	0,00	79,43	-	-	0,00	0,00	-
40	9 253	9 256	6,22	106,0	2	0,00	90,33	-	-	0,00	0,00	-
41	9 719	9 721	5,63	106,0	2	0,00	90,75	-	-	0,00	0,00	-
42	9 889	9 892	5,41	106,0	2	0,00	90,91	-	-	0,00	0,00	-
43	10 022	10 024	5,25	106,0	2	0,00	91,02	-	-	0,00	0,00	-
44	10 657	10 659	4,51	106,0	2	0,00	91,55	-	-	0,00	0,00	-
45	10 673	10 675	4,49	106,0	2	0,00	91,57	-	-	0,00	0,00	-
46	11 294	11 296	3,81	106,0	2	0,00	92,06	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
47	11 174	11 176	3,94	106,0	2	0,00	91,97	-	-	0,00	0,00	-
48	11 768	11 770	3,31	106,0	2	0,00	92,42	-	-	0,00	0,00	-
49	12 116	12 118	2,96	106,0	2	0,00	92,67	-	-	0,00	0,00	-
5	3 080	3 087	20,81	106,0	2	0,00	80,79	-	-	0,00	0,00	-
6	3 944	3 949	17,42	106,0	2	0,00	82,93	-	-	0,00	0,00	-
7	4 576	4 581	15,31	106,0	2	0,00	84,22	-	-	0,00	0,00	-
8	3 349	3 356	19,66	106,0	2	0,00	81,52	-	-	0,00	0,00	-
9	3 765	3 771	18,04	106,0	2	0,00	82,53	-	-	0,00	0,00	-
Sum			31,17									

- Data undefined due to calculation with octave data

Noise sensitive area: J Asuinrakennus J (Haapavesitie 1406)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4 518	4 522	15,49	106,0	2	0,00	84,11	-	-	0,00	0,00	-
10	4 594	4 599	15,25	106,0	2	0,00	84,25	-	-	0,00	0,00	-
11	5 317	5 321	13,20	106,0	2	0,00	85,52	-	-	0,00	0,00	-
12	3 461	3 467	19,21	106,0	2	0,00	81,80	-	-	0,00	0,00	-
13	4 144	4 149	16,70	106,0	2	0,00	83,36	-	-	0,00	0,00	-
14	5 174	5 178	13,58	106,0	2	0,00	85,28	-	-	0,00	0,00	-
15	3 855	3 861	17,71	106,0	2	0,00	82,73	-	-	0,00	0,00	-
16	4 595	4 600	15,25	106,0	2	0,00	84,25	-	-	0,00	0,00	-
17	5 467	5 471	12,80	106,0	2	0,00	85,76	-	-	0,00	0,00	-
18	6 358	6 361	10,76	106,0	2	0,00	87,07	-	-	0,00	0,00	-
19	5 284	5 289	13,28	106,0	2	0,00	85,47	-	-	0,00	0,00	-
2	3 657	3 663	18,45	106,0	2	0,00	82,28	-	-	0,00	0,00	-
20	5 857	5 861	11,83	106,0	2	0,00	86,36	-	-	0,00	0,00	-
21	6 533	6 537	10,43	106,0	2	0,00	87,31	-	-	0,00	0,00	-
22	7 126	7 130	9,38	106,0	2	0,00	88,06	-	-	0,00	0,00	-
23	8 009	8 012	7,97	106,0	2	0,00	89,07	-	-	0,00	0,00	-
24	6 225	6 229	11,01	106,0	2	0,00	86,89	-	-	0,00	0,00	-
25	6 821	6 824	9,91	106,0	2	0,00	87,68	-	-	0,00	0,00	-
26	7 573	7 576	8,65	106,0	2	0,00	88,59	-	-	0,00	0,00	-
27	8 510	8 512	7,24	106,0	2	0,00	89,60	-	-	0,00	0,00	-
28	9 196	9 198	6,30	106,0	2	0,00	90,27	-	-	0,00	0,00	-
29	6 900	6 903	9,77	106,0	2	0,00	87,78	-	-	0,00	0,00	-
3	4 602	4 606	15,26	106,0	2	0,00	84,27	-	-	0,00	0,00	-
30	7 438	7 441	8,87	106,0	2	0,00	88,43	-	-	0,00	0,00	-
31	8 297	8 299	7,54	106,0	2	0,00	89,38	-	-	0,00	0,00	-
32	9 016	9 019	6,54	106,0	2	0,00	90,10	-	-	0,00	0,00	-
33	9 721	9 723	5,62	106,0	2	0,00	90,76	-	-	0,00	0,00	-
34	8 092	8 095	7,85	106,0	2	0,00	89,16	-	-	0,00	0,00	-
35	8 792	8 795	6,84	106,0	2	0,00	89,88	-	-	0,00	0,00	-
36	9 711	9 713	5,64	106,0	2	0,00	90,75	-	-	0,00	0,00	-
37	10 366	10 368	4,84	106,0	2	0,00	91,31	-	-	0,00	0,00	-
38	8 461	8 464	7,30	106,0	2	0,00	89,55	-	-	0,00	0,00	-
39	8 675	8 678	7,00	106,0	2	0,00	89,77	-	-	0,00	0,00	-
4	2 847	2 855	21,88	106,0	2	0,00	80,11	-	-	0,00	0,00	-
40	8 932	8 935	6,65	106,0	2	0,00	90,02	-	-	0,00	0,00	-
41	9 531	9 533	5,86	106,0	2	0,00	90,59	-	-	0,00	0,00	-
42	9 450	9 452	5,97	106,0	2	0,00	90,51	-	-	0,00	0,00	-
43	9 727	9 729	5,62	106,0	2	0,00	90,76	-	-	0,00	0,00	-
44	10 218	10 220	5,02	106,0	2	0,00	91,19	-	-	0,00	0,00	-
45	10 392	10 394	4,81	106,0	2	0,00	91,34	-	-	0,00	0,00	-
46	10 785	10 787	4,36	106,0	2	0,00	91,66	-	-	0,00	0,00	-
47	10 821	10 823	4,32	106,0	2	0,00	91,69	-	-	0,00	0,00	-
48	11 385	11 387	3,71	106,0	2	0,00	92,13	-	-	0,00	0,00	-
49	11 632	11 634	3,45	106,0	2	0,00	92,31	-	-	0,00	0,00	-
5	3 535	3 541	18,92	106,0	2	0,00	81,98	-	-	0,00	0,00	-
6	4 412	4 417	15,82	106,0	2	0,00	83,90	-	-	0,00	0,00	-
7	5 244	5 248	13,41	106,0	2	0,00	85,40	-	-	0,00	0,00	-
8	3 145	3 152	20,53	106,0	2	0,00	80,97	-	-	0,00	0,00	-

To be continued on next page...

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
9	3 826	3 831	17,82	106,0	2	0,00	82,67	-	-	0,00	0,00	-
Sum			30,53									

- Data undefined due to calculation with octave data

Noise sensitive area: K Lomarakennus K (Kurunoja)

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4 813	4 817	14,60	106,0	2	0,00	84,66	-	-	0,00	0,00	-
10	3 360	3 365	19,62	106,0	2	0,00	81,54	-	-	0,00	0,00	-
11	4 188	4 192	16,56	106,0	2	0,00	83,45	-	-	0,00	0,00	-
12	1 597	1 609	29,36	106,0	2	0,00	75,13	-	-	0,00	0,00	-
13	2 468	2 476	23,80	106,0	2	0,00	78,88	-	-	0,00	0,00	-
14	3 635	3 640	18,53	106,0	2	0,00	82,22	-	-	0,00	0,00	-
15	1 437	1 450	30,64	106,0	2	0,00	74,23	-	-	0,00	0,00	-
16	2 508	2 516	23,58	106,0	2	0,00	79,01	-	-	0,00	0,00	-
17	3 585	3 591	18,72	106,0	2	0,00	82,10	-	-	0,00	0,00	-
18	4 614	4 618	15,20	106,0	2	0,00	84,29	-	-	0,00	0,00	-
19	2 728	2 736	22,46	106,0	2	0,00	79,74	-	-	0,00	0,00	-
2	3 752	3 757	18,09	106,0	2	0,00	82,50	-	-	0,00	0,00	-
20	3 446	3 452	19,27	106,0	2	0,00	81,76	-	-	0,00	0,00	-
21	4 299	4 304	16,19	106,0	2	0,00	83,68	-	-	0,00	0,00	-
22	5 048	5 052	13,93	106,0	2	0,00	85,07	-	-	0,00	0,00	-
23	6 066	6 069	11,34	106,0	2	0,00	86,66	-	-	0,00	0,00	-
24	3 621	3 627	18,58	106,0	2	0,00	82,19	-	-	0,00	0,00	-
25	4 383	4 387	15,92	106,0	2	0,00	83,84	-	-	0,00	0,00	-
26	5 337	5 341	13,14	106,0	2	0,00	85,55	-	-	0,00	0,00	-
27	6 436	6 439	10,61	106,0	2	0,00	87,18	-	-	0,00	0,00	-
28	7 220	7 223	9,23	106,0	2	0,00	88,17	-	-	0,00	0,00	-
29	4 249	4 254	16,35	106,0	2	0,00	83,58	-	-	0,00	0,00	-
3	4 302	4 307	16,18	106,0	2	0,00	83,68	-	-	0,00	0,00	-
30	4 941	4 945	14,23	106,0	2	0,00	84,88	-	-	0,00	0,00	-
31	6 017	6 020	11,46	106,0	2	0,00	86,59	-	-	0,00	0,00	-
32	6 809	6 812	9,93	106,0	2	0,00	87,67	-	-	0,00	0,00	-
33	7 637	7 640	8,55	106,0	2	0,00	88,66	-	-	0,00	0,00	-
34	5 584	5 587	12,51	106,0	2	0,00	85,94	-	-	0,00	0,00	-
35	6 388	6 392	10,70	106,0	2	0,00	87,11	-	-	0,00	0,00	-
36	7 438	7 441	8,87	106,0	2	0,00	88,43	-	-	0,00	0,00	-
37	8 231	8 234	7,64	106,0	2	0,00	89,31	-	-	0,00	0,00	-
38	5 664	5 668	12,31	106,0	2	0,00	86,07	-	-	0,00	0,00	-
39	5 981	5 984	11,54	106,0	2	0,00	86,54	-	-	0,00	0,00	-
4	2 621	2 628	23,00	106,0	2	0,00	79,39	-	-	0,00	0,00	-
40	6 374	6 377	10,73	106,0	2	0,00	87,09	-	-	0,00	0,00	-
41	7 094	7 097	9,44	106,0	2	0,00	88,02	-	-	0,00	0,00	-
42	6 769	6 772	10,01	106,0	2	0,00	87,61	-	-	0,00	0,00	-
43	7 171	7 174	9,31	106,0	2	0,00	88,12	-	-	0,00	0,00	-
44	7 522	7 525	8,73	106,0	2	0,00	88,53	-	-	0,00	0,00	-
45	7 833	7 836	8,24	106,0	2	0,00	88,88	-	-	0,00	0,00	-
46	8 029	8 032	7,94	106,0	2	0,00	89,10	-	-	0,00	0,00	-
47	8 187	8 189	7,70	106,0	2	0,00	89,27	-	-	0,00	0,00	-
48	8 715	8 717	6,95	106,0	2	0,00	89,81	-	-	0,00	0,00	-
49	8 883	8 885	6,72	106,0	2	0,00	89,97	-	-	0,00	0,00	-
5	3 206	3 212	20,27	106,0	2	0,00	81,14	-	-	0,00	0,00	-
6	3 698	3 703	18,30	106,0	2	0,00	82,37	-	-	0,00	0,00	-
7	4 616	4 620	15,19	106,0	2	0,00	84,29	-	-	0,00	0,00	-
8	1 968	1 978	26,75	106,0	2	0,00	76,92	-	-	0,00	0,00	-
9	2 672	2 680	22,74	106,0	2	0,00	79,56	-	-	0,00	0,00	-
Sum			36,77									

- Data undefined due to calculation with octave data

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: L Laskentapiste L (Perkkiontie, Ilmola)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	7 143	7 145	9,36	106,0	2	0,00	88,08	-	-	0,00	0,00	-
10	4 738	4 741	14,82	106,0	2	0,00	84,52	-	-	0,00	0,00	-
11	5 032	5 036	13,98	106,0	2	0,00	85,04	-	-	0,00	0,00	-
12	4 310	4 314	16,16	106,0	2	0,00	83,70	-	-	0,00	0,00	-
13	4 191	4 195	16,55	106,0	2	0,00	83,45	-	-	0,00	0,00	-
14	4 269	4 273	16,29	106,0	2	0,00	83,61	-	-	0,00	0,00	-
15	3 715	3 719	18,23	106,0	2	0,00	82,41	-	-	0,00	0,00	-
16	3 527	3 532	18,95	106,0	2	0,00	81,96	-	-	0,00	0,00	-
17	3 629	3 634	18,56	106,0	2	0,00	82,21	-	-	0,00	0,00	-
18	4 006	4 011	17,18	106,0	2	0,00	83,06	-	-	0,00	0,00	-
19	2 464	2 472	23,82	106,0	2	0,00	78,86	-	-	0,00	0,00	-
2	6 420	6 422	10,64	106,0	2	0,00	87,15	-	-	0,00	0,00	-
20	2 417	2 425	24,08	106,0	2	0,00	78,69	-	-	0,00	0,00	-
21	2 764	2 770	22,29	106,0	2	0,00	79,85	-	-	0,00	0,00	-
22	3 323	3 328	19,78	106,0	2	0,00	81,44	-	-	0,00	0,00	-
23	4 101	4 105	16,85	106,0	2	0,00	83,27	-	-	0,00	0,00	-
24	1 752	1 763	28,21	106,0	2	0,00	75,93	-	-	0,00	0,00	-
25	2 130	2 138	25,73	106,0	2	0,00	77,60	-	-	0,00	0,00	-
26	2 977	2 983	21,28	106,0	2	0,00	80,49	-	-	0,00	0,00	-
27	3 977	3 981	17,28	106,0	2	0,00	83,00	-	-	0,00	0,00	-
28	4 734	4 738	14,83	106,0	2	0,00	84,51	-	-	0,00	0,00	-
29	1 316	1 331	31,70	106,0	2	0,00	73,48	-	-	0,00	0,00	-
3	6 214	6 216	11,04	106,0	2	0,00	86,87	-	-	0,00	0,00	-
30	1 977	1 987	26,69	106,0	2	0,00	76,96	-	-	0,00	0,00	-
31	3 163	3 168	20,46	106,0	2	0,00	81,02	-	-	0,00	0,00	-
32	3 864	3 868	17,69	106,0	2	0,00	82,75	-	-	0,00	0,00	-
33	4 775	4 778	14,71	106,0	2	0,00	84,59	-	-	0,00	0,00	-
34	2 179	2 187	25,44	106,0	2	0,00	77,80	-	-	0,00	0,00	-
35	3 014	3 020	21,11	106,0	2	0,00	80,60	-	-	0,00	0,00	-
36	4 145	4 150	16,70	106,0	2	0,00	83,36	-	-	0,00	0,00	-
37	5 115	5 119	13,74	106,0	2	0,00	85,18	-	-	0,00	0,00	-
38	1 123	1 139	33,55	106,0	2	0,00	72,13	-	-	0,00	0,00	-
39	1 742	1 753	28,29	106,0	2	0,00	75,87	-	-	0,00	0,00	-
4	5 805	5 807	11,96	106,0	2	0,00	86,28	-	-	0,00	0,00	-
40	2 513	2 520	23,56	106,0	2	0,00	79,03	-	-	0,00	0,00	-
41	3 430	3 435	19,34	106,0	2	0,00	81,72	-	-	0,00	0,00	-
42	2 456	2 463	23,87	106,0	2	0,00	78,83	-	-	0,00	0,00	-
43	3 157	3 162	20,48	106,0	2	0,00	81,00	-	-	0,00	0,00	-
44	3 112	3 117	20,68	106,0	2	0,00	80,88	-	-	0,00	0,00	-
45	3 726	3 731	18,19	106,0	2	0,00	82,44	-	-	0,00	0,00	-
46	3 484	3 489	19,12	106,0	2	0,00	81,85	-	-	0,00	0,00	-
47	3 872	3 877	17,65	106,0	2	0,00	82,77	-	-	0,00	0,00	-
48	4 301	4 306	16,18	106,0	2	0,00	83,68	-	-	0,00	0,00	-
49	4 334	4 338	16,08	106,0	2	0,00	83,75	-	-	0,00	0,00	-
5	5 821	5 823	11,92	106,0	2	0,00	86,30	-	-	0,00	0,00	-
6	5 498	5 501	12,73	106,0	2	0,00	85,81	-	-	0,00	0,00	-
7	5 917	5 919	11,69	106,0	2	0,00	86,45	-	-	0,00	0,00	-
8	4 931	4 934	14,26	106,0	2	0,00	84,86	-	-	0,00	0,00	-
9	4 849	4 853	14,50	106,0	2	0,00	84,72	-	-	0,00	0,00	-
Sum			39,72									

- Data undefined due to calculation with octave data

Noise sensitive area: M Lomarakennus M (Riskalan metsätie)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	7 877	7 880	8,17	106,0	2	0,00	88,93	-	-	0,00	0,00	-
10	6 732	6 734	10,07	106,0	2	0,00	87,57	-	-	0,00	0,00	-
11	6 068	6 071	11,34	106,0	2	0,00	86,67	-	-	0,00	0,00	-
12	8 100	8 102	7,84	106,0	2	0,00	89,17	-	-	0,00	0,00	-
13	7 266	7 268	9,15	106,0	2	0,00	88,23	-	-	0,00	0,00	-
14	6 156	6 159	11,15	106,0	2	0,00	86,79	-	-	0,00	0,00	-

To be continued on next page...

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
15	8 064	8 066	7,89	106,0	2	0,00	89,13	-	-	0,00	0,00	-
16	7 014	7 016	9,58	106,0	2	0,00	87,92	-	-	0,00	0,00	-
17	5 971	5 974	11,56	106,0	2	0,00	86,53	-	-	0,00	0,00	-
18	4 991	4 995	14,09	106,0	2	0,00	84,97	-	-	0,00	0,00	-
19	6 935	6 938	9,71	106,0	2	0,00	87,82	-	-	0,00	0,00	-
2	8 096	8 098	7,86	106,0	2	0,00	89,17	-	-	0,00	0,00	-
20	6 170	6 173	11,12	106,0	2	0,00	86,81	-	-	0,00	0,00	-
21	5 255	5 259	13,36	106,0	2	0,00	85,42	-	-	0,00	0,00	-
22	4 464	4 468	15,66	106,0	2	0,00	84,00	-	-	0,00	0,00	-
23	3 434	3 440	19,32	106,0	2	0,00	81,73	-	-	0,00	0,00	-
24	6 303	6 306	10,86	106,0	2	0,00	87,00	-	-	0,00	0,00	-
25	5 402	5 406	12,97	106,0	2	0,00	85,66	-	-	0,00	0,00	-
26	4 304	4 308	16,17	106,0	2	0,00	83,69	-	-	0,00	0,00	-
27	3 133	3 139	20,58	106,0	2	0,00	80,94	-	-	0,00	0,00	-
28	2 310	2 318	24,67	106,0	2	0,00	78,30	-	-	0,00	0,00	-
29	5 990	5 993	11,52	106,0	2	0,00	86,55	-	-	0,00	0,00	-
3	7 182	7 184	9,29	106,0	2	0,00	88,13	-	-	0,00	0,00	-
30	5 092	5 096	13,81	106,0	2	0,00	85,14	-	-	0,00	0,00	-
31	3 793	3 798	17,94	106,0	2	0,00	82,59	-	-	0,00	0,00	-
32	3 012	3 018	21,12	106,0	2	0,00	80,59	-	-	0,00	0,00	-
33	2 087	2 096	26,00	106,0	2	0,00	77,43	-	-	0,00	0,00	-
34	4 692	4 697	14,96	106,0	2	0,00	84,44	-	-	0,00	0,00	-
35	3 845	3 850	17,75	106,0	2	0,00	82,71	-	-	0,00	0,00	-
36	2 764	2 771	22,28	106,0	2	0,00	79,85	-	-	0,00	0,00	-
37	1 820	1 831	27,73	106,0	2	0,00	76,26	-	-	0,00	0,00	-
38	6 130	6 133	11,20	106,0	2	0,00	86,75	-	-	0,00	0,00	-
39	5 326	5 330	13,17	106,0	2	0,00	85,53	-	-	0,00	0,00	-
4	8 521	8 523	7,22	106,0	2	0,00	89,61	-	-	0,00	0,00	-
40	4 455	4 460	15,69	106,0	2	0,00	83,99	-	-	0,00	0,00	-
41	3 590	3 596	18,70	106,0	2	0,00	82,12	-	-	0,00	0,00	-
42	5 020	5 024	14,01	106,0	2	0,00	85,02	-	-	0,00	0,00	-
43	4 153	4 158	16,67	106,0	2	0,00	83,38	-	-	0,00	0,00	-
44	5 029	5 033	13,98	106,0	2	0,00	85,04	-	-	0,00	0,00	-
45	4 037	4 042	17,07	106,0	2	0,00	83,13	-	-	0,00	0,00	-
46	5 584	5 588	12,51	106,0	2	0,00	85,94	-	-	0,00	0,00	-
47	4 546	4 551	15,40	106,0	2	0,00	84,16	-	-	0,00	0,00	-
48	4 888	4 893	14,38	106,0	2	0,00	84,79	-	-	0,00	0,00	-
49	5 667	5 671	12,30	106,0	2	0,00	86,07	-	-	0,00	0,00	-
5	7 927	7 930	8,10	106,0	2	0,00	88,98	-	-	0,00	0,00	-
6	7 043	7 045	9,53	106,0	2	0,00	87,96	-	-	0,00	0,00	-
7	6 449	6 452	10,59	106,0	2	0,00	87,19	-	-	0,00	0,00	-
8	8 215	8 217	7,66	106,0	2	0,00	89,29	-	-	0,00	0,00	-
9	7 498	7 500	8,77	106,0	2	0,00	88,50	-	-	0,00	0,00	-
Sum			34,30									

- Data undefined due to calculation with octave data

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Assumptions for noise calculation

Calculation: Puutonsaari_GE158x49xHH200_20201102

Noise calculation model:

ISO 9613-2 General

Wind speed (in 10 m height):

8,0 m/s

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 0,4

Area object with hard ground: Area object (vesistot): (5)

Area type with hard ground: Vesistot

Ground factor for hard ground: 0,0

Meteorological coefficient, CO:

0,0 dB

Type of demand in calculation:

1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

Noise values in calculation:

All noise values are mean values (Lwa) (Normal)

Pure tones:

Fixed penalty added to source noise of WTGs with pure tones

WTG catalogue

Height above ground level, when no value in NSA object:

4,0 m; Don't allow override of model height with height from NSA object

Uncertainty margin:

0,0 dB; Uncertainty margin in NSA has priority

Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:

0,0 dB(A)

Octave data required

Frequency dependent air absorption

63	125	250	500	1 000	2 000	4 000	8 000
[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

WTG: GE WIND ENERGY 5.3-158 Thrust 700 5300 158.0 !O!

Noise: 5.3-158 106.0 +2 dB HH200

Source	Source/Date	Creator	Edited
Noise_Emission-NO_5.3-158-50Hz_IEC_EN_r01	12.3.2018	USER	12.11.2020 15.16

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Penalty [dB]	Octave data							
						63	125	250	500	1000	2000	4000	8000
From Windcat	200,0	8,0	106,0	Yes	2,0	87,2	92,6	97,2	99,6	101,3	99,1	91,7	76,0

Noise sensitive area: A Laskentapiste A (Metsästysmaja)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: B Laskentapiste B (Ylivieskantie, Pöhlölä)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: C Laskentapiste C (Perkkiöntie 382)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Assumptions for noise calculation

Calculation: Puutionsaari_GE158x49xHH200_20201102
Noise sensitive area: D Asuinrakennus D (Alakyläntie 243)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: E Lomarakennus E (Kellokankaan metsätie)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: F Asuinrakennus F (Ollilantie 112)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: G Lomarakennus G (Ollilantie, Siliäkuru)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: H Asuinrakennus H (Pinolantie 406)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: I Asuinrakennus I (Kortenevantie 116)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: J Asuinrakennus J (Haapavesitie 1406)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: K Lomarakennus K (Kurunoja)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: L Laskentapiste L (Perkkiontie, Ilmola)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Project:

Puutionsaari_Riskalankangas_20200327

Description:

VSB

Licensed user:

FCG Suunnittelu ja tekniikka Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi

Calculated:

18.11.2020 14.41/3.4.388

DECIBEL - Assumptions for noise calculation

Calculation: Puutionsaari_GE158x49xHH200_20201102

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: M Lomarakennus M (Riskalan metsätie)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

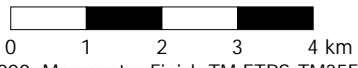
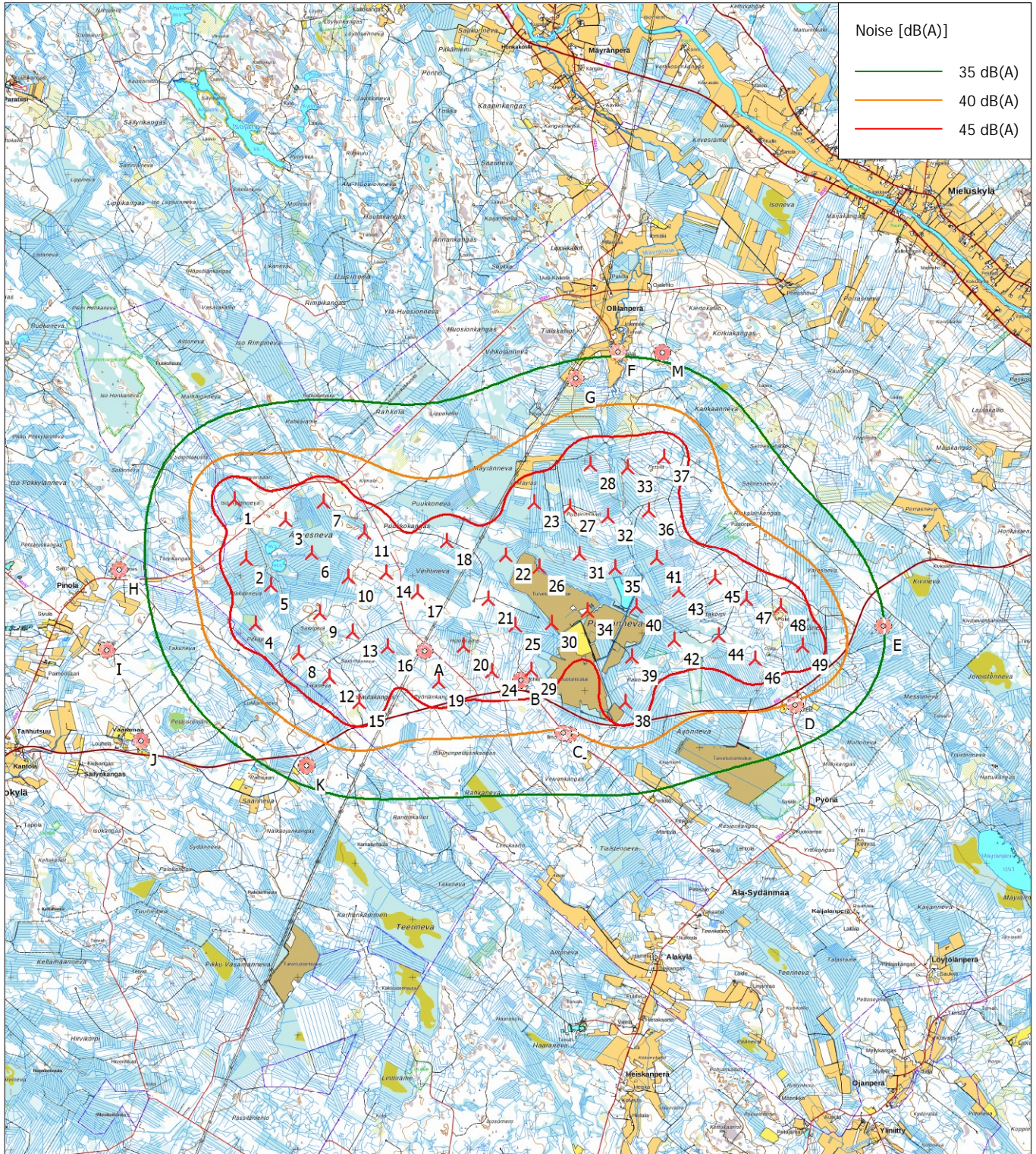
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

DECIBEL - Map 8,0 m/s

Calculation: Puutonsaari_GE158x49xHH200_20201102



Map: Maastokarttarasteri50K, Print scale 1:100 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 403 841 North: 7 110 929

▲ New WTG

■ Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s

Height above sea level from active line object

25.11.2020

**Liite 2: Puutionsaari - Yhteismelun leviämismallinnuksen tulokset ISO 9613-2, YM
2/2014**

Project:

Puutonsaari_Riskalankangas_2020 VSB
0327

Description:

Licensed user:

FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Main Result

Calculation: Puutonsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

Noise calculation model:

ISO 9613-2 General

Wind speed (in 10 m height):

8,0 m/s

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 0,4

Area object with hard ground: Area object (vesistot): (5)

Area type with hard ground: Vesistot

Ground factor for hard ground: 0,0

Meteorological coefficient, CO:

0,0 dB

Type of demand in calculation:

1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

Noise values in calculation:

All noise values are mean values (Lwa) (Normal)

Pure tones:

Fixed penalty added to source noise of WTGs with pure tones

WTG catalogue

Height above ground level, when no value in NSA object:

4,0 m; Don't allow override of model height with height from NSA object

Uncertainty margin:

0,0 dB; Uncertainty margin in NSA has priority

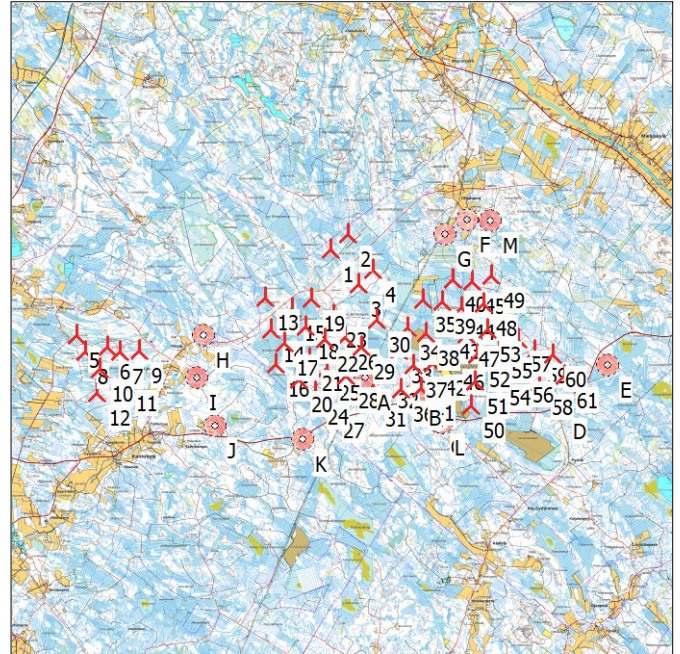
Deviation from "official" noise demands. Negative is more

restrictive, positive is less restrictive.:

0,0 dB(A)

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89



Scale 1:250 000

New WTG

Noise sensitive area

WTGs

East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data Creator	Name	Wind speed [m/s]	Lwa_ref [dB(A)]
1	401 061	7 113 928	105,0 VESTAS V150-4.2 HH155 4200 ...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	USER	Level 00 - Measured - Mode PO1 - 03-2018	8,0	104,9
2	401 644	7 114 439	105,4 VESTAS V150-4.2 HH155 4200 ...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	USER	Level 00 - Measured - Mode PO1 - 03-2018	8,0	104,9
3	401 997	7 112 772	109,3 VESTAS V150-4.2 HH155 4200 ...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	USER	Level 00 - Measured - Mode PO1 - 03-2018	8,0	104,9
4	402 450	7 113 258	106,6 VESTAS V150-4.2 HH155 4200 ...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	USER	Level 00 - Measured - Mode PO1 - 03-2018	8,0	104,9
5	392 697	7 111 104	81,0 GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
6	393 966	7 110 723	85,7 GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
7	394 124	7 110 573	88,7 GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
8	392 964	7 110 572	83,6 GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
9	394 736	7 110 600	89,9 GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
10	393 462	7 109 982	84,9 GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
11	394 233	7 109 674	87,5 GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
12	393 349	7 109 200	83,7 GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
13	398 896	7 112 332	92,5 PUU01	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
14	399 097	7 111 286	95,0 PUU02	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
15	399 784	7 111 972	97,5 PUU03	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
16	399 264	7 110 151	97,1 PUU04	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
17	399 536	7 110 832	96,4 PUU05	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
18	400 239	7 111 382	97,5 PUU06	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
19	400 444	7 112 292	97,0 PUU07	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
20	400 019	7 109 649	100,0 PUU08	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
21	400 380	7 110 348	100,0 PUU09	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
22	400 876	7 110 966	99,5 PUU10	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
23	401 152	7 111 752	100,0 PUU11	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
24	400 549	7 109 232	102,5 PUU12	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
25	400 953	7 110 020	102,5 PUU13	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
26	401 537	7 111 046	104,5 PUU14	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
27	401 068	7 108 792	105,3 PUU15	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
28	401 564	7 109 758	103,4 PUU16	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
29	402 089	7 110 702	107,5 PUU17	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
30	402 589	7 111 603	106,8 PUU18	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
31	402 455	7 109 148	112,5 PUU19	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
32	402 889	7 109 778	110,0 PUU20	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
33	403 318	7 110 593	108,0 PUU21	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
34	403 622	7 111 352	106,9 PUU22	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
35	404 117	7 112 276	103,6 PUU23	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
36	403 379	7 109 327	115,0 PUU24	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
37	403 790	7 110 129	108,4 PUU25	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
38	404 210	7 111 152	105,6 PUU26	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
39	404 739	7 112 199	105,0 PUU27	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
40	405 100	7 112 943	100,4 PUU28	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
41	404 061	7 109 351	110,0 PUU29	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
42	404 420	7 110 174	107,1 PUU30	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
43	404 900	7 111 381	105,1 PUU31	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
44	405 395	7 112 030	102,4 PUU32	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
45	405 740	7 112 891	100,2 PUU33	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
46	405 042	7 110 380	105,8 PUU34	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
47	405 532	7 111 130	103,9 PUU35	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
48	406 114	7 112 133	103,1 PUU36	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
49	406 380	7 113 067	107,2 PUU37	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
50	405 707	7 108 791	110,8 PUU38	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
51	405 822	7 109 587	108,8 PUU39	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0

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DECIBEL - Main Result

Calculation: Puutonsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

...continued from previous page

	East	North	Z	Row data/Description	WTG type		Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data		Wind speed [m/s]	LwA_ref [dB(A)]
					Valid	Manufact.					Creator	Name		
52	405 893	7 110 455	104,9	PUU40	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
53	406 257	7 111 298	103,9	PUU41	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
54	406 558	7 109 872	106,6	PUU42	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
55	406 638	7 110 744	105,9	PUU43	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
56	407 324	7 109 954	108,4	PUU44	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
57	407 269	7 110 957	112,6	PUU45	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
58	407 963	7 109 542	113,6	PUU46	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
59	407 809	7 110 582	116,1	PUU47	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
60	408 414	7 110 457	120,0	PUU48	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0
61	408 786	7 109 772	117,5	PUU49	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106,0 +2 dB HH200	8,0	106,0

Calculation Results

Sound level

No.	Name	East	North	Z	Immission height [m]	Demands Noise [dB(A)]	Sound level		Distance to noise demand [m]
							From WTGs [dB(A)]		
A	Laskentapiste A (Metsästysmaja)	402 212	7 109 691	112,5	4,0	40,0	46,4	-1 563	
B	Autiotalo B (Ylivieskantie, Pöhlölä)	403 894	7 109 182	114,4	4,0	40,0	49,5	-952	
C	Autiotalo C (Perkkiontie 382)	404 620	7 108 247	113,8	4,0	40,0	39,8	43	
D	Asuinrakennus D (Alakyläntie 243)	408 659	7 108 752	119,4	4,0	40,0	39,6	54	
E	Lomarakennus E (Kellokankaan metsätie)	410 199	7 110 115	122,5	4,0	40,0	35,1	650	
F	Asuinrakennus F (Ollilantie 112)	405 573	7 114 900	87,7	4,0	40,0	34,9	908	
G	Lomarakennus G (Ollilantie, Siliäkuru)	404 837	7 114 441	100,0	4,0	40,0	36,8	535	
H	Asuinrakennus H (Pinolantie 406)	396 893	7 111 098	88,1	4,0	40,0	34,7	1 244	
I	Asuinrakennus I (Kortenevantie 116)	396 670	7 109 704	87,5	4,0	40,0	34,0	1 321	
J	Asuinrakennus J (Haapavesitie 1406)	397 273	7 108 116	89,3	4,0	40,0	31,9	1 931	
K	Lomarakennus K (Kurunoja)	400 152	7 107 685	102,3	4,0	40,0	36,9	480	
L	Muu käyttöt. L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	4,0	40,0	39,7	49	
M	Lomarakennus M (Riskalan metsätie)	406 348	7 114 887	102,8	4,0	40,0	34,5	922	

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M
1	4391	5527	6703	9193	9901	4616	3811	5038	6092	6937	6308	6788	5373
2	4782	5718	6870	9030	9586	3956	3193	5809	6867	7687	6917	6944	4725
3	3089	4061	5231	7781	8622	4162	3294	5372	6147	6633	5411	5312	4838
4	3575	4324	5461	7672	8362	3529	2665	5962	6785	7296	6028	5531	4225
5	9619	11361	12260	16134	17530	13424	12590	4196	4212	5465	8201	12382	14165
6	8578	10314	11201	15092	16514	12590	11745	3218	3144	4426	7135	11322	13319
7	8136	9869	10751	14648	16082	12240	11390	2818	2690	3994	6684	10872	12963
8	9290	11018	11886	15800	17241	13331	12488	3964	3806	4960	7746	12007	14062
9	7531	9267	10160	14045	15471	11659	10807	2213	2131	3550	6150	10281	12378
10	8755	10463	11292	15246	16738	13072	12218	3607	3220	4243	7073	11413	13788
11	7979	9674	10484	14455	15972	12487	11626	3017	2437	3416	6244	10606	13189
12	8876	10545	11311	15316	16875	13488	12627	4020	3359	4071	6969	11432	14188
13	4239	5908	7032	10398	11518	7154	6304	2353	3444	4518	4813	7143	7877
14	3500	5238	6304	9892	11164	7417	6550	2212	2897	3657	3752	6420	8096
15	3332	4968	6104	9441	10579	6488	5624	3021	3852	4602	4302	6214	7182
16	2984	4730	5684	9498	10935	7897	7033	2553	2632	2847	2621	5805	8521
17	2909	4660	5703	9357	10687	7280	6413	2657	3080	3535	3206	5821	7927
18	2599	4266	5387	8821	10040	6390	5523	3359	3944	4412	3698	5498	7043
19	3145	4645	5814	8945	9995	5754	4891	3747	4576	5244	4616	5917	6449
20	2193	3903	4810	8686	10191	7644	6795	3446	3349	3145	1968	4931	8215
21	1946	3702	4732	8431	9822	6906	6051	3567	3765	3826	2672	4849	7498
22	1847	3506	4627	8091	9362	6127	5269	3986	4391	4594	3360	4738	6732
23	2318	3758	4931	8084	9194	5428	4562	4309	4928	5317	4188	5032	6068
24	1725	3345	4188	8124	9690	7575	6747	4105	3908	3461	1597	4310	8100
25	1301	3058	4073	7809	9247	6720	5885	4201	4295	4144	2468	4191	7266
26	1514	3005	4164	7482	8712	5581	4735	4645	5049	5174	3635	4269	6156
27	1455	2853	3593	7591	9226	7590	6791	4770	4492	3855	1437	3715	8064
28	651	2400	3409	7166	8642	6521	5714	4860	4894	4595	2508	3527	7014
29	1019	2360	3526	6853	8131	5456	4640	5211	5510	5467	3585	3629	5971
30	1949	2750	3923	6706	7754	4447	3621	5719	6216	6358	4614	4006	4991
31	595	1439	2345	6216	7804	6543	5804	5894	5812	5284	2728	2464	6935
32	683	1168	2311	5860	7318	5783	5054	6140	6219	5857	3446	2417	6170
33	1428	1524	2683	5649	6898	4862	4137	6445	6707	6533	4299	2764	5255
34	2179	2187	3261	5668	6692	4049	3319	6734	7145	7126	5048	3323	4464

To be continued on next page...

DECIBEL - Main Result

Calculation: Puutonsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

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WTG	A	B	C	D	E	F	G	H	I	J	K	L	M
35	3212	3102	4060	5748	6454	3001	2282	7320	7879	8009	6066	4101	3434
36	1222	535	1645	5311	6865	5990	5318	6724	6720	6225	3621	1752	6303
37	1638	953	2057	5060	6409	5094	4437	6965	7133	6821	4383	2130	5402
38	2476	1995	2934	5055	6078	3989	3348	7318	7678	7573	5337	2977	4304
39	3561	3133	3954	5219	5844	2827	2244	7923	8446	8510	6436	3977	3133
40	4350	3950	4721	5498	5831	2014	1521	8412	9031	9196	7220	4734	2310
41	1880	238	1237	4636	6185	5752	5149	7378	7399	6900	4249	1316	5990
42	2260	1123	1937	4471	5779	4865	4287	7584	7764	7438	4941	1977	5092
43	3175	2418	3147	4587	5448	3583	3061	8012	8399	8297	6017	3163	3793
44	3950	3219	3862	4625	5172	2876	2475	8553	9030	9016	6809	3864	3012
45	4763	4143	4777	5064	5252	2016	1794	9027	9614	9721	7637	4775	2087
46	2913	1659	2174	3966	5164	4552	4066	8181	8399	8092	5584	2179	4692
47	3619	2545	3024	3928	4776	3771	3383	8640	8976	8792	6388	3014	3845
48	4604	3693	4163	4231	4556	2820	2638	9279	9751	9711	7438	4145	2764
49	5364	4612	5131	4879	4827	2003	2066	9690	10276	10366	8231	5115	1820
50	3609	1855	1216	2952	4683	6111	5717	9111	9083	8461	5664	1123	6130
51	3612	1970	1800	2957	4409	5319	4953	9056	9153	8675	5981	1742	5326
52	3760	2370	2549	3248	4319	4457	4124	9023	9253	8932	6374	2513	4455
53	4353	3172	3463	3500	4116	3667	3449	9367	9719	9531	7094	3430	3590
54	4350	2752	2529	2380	3649	5124	4882	9743	9889	9450	6769	2456	5020
55	4550	3157	3211	2837	3616	4291	4112	9752	10022	9727	7171	3157	4153
56	5119	3516	3198	1796	2880	5247	5130	10494	10657	10218	7522	3112	5029
57	5213	3813	3790	2606	3049	4293	4249	10377	10673	10392	7833	3726	4037
58	5753	4085	3585	1052	2308	5867	5811	11179	11294	10785	8029	3484	5584
59	5668	4158	3953	2017	2435	4863	4871	10929	11174	10821	8187	3872	4546
60	6249	4696	4391	1722	1817	5274	5354	11539	11768	11385	8715	4301	4888
61	6575	4927	4436	1028	1454	6052	6115	11967	12116	11632	8883	4334	5667

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
(when calculated with ground attenuation, then Dc = Domega)

LWA,ref:	Sound pressure level at WTG
K:	Pure tone
Dc:	Directivity correction
Adiv:	the attenuation due to geometrical divergence
Aatm:	the attenuation due to atmospheric absorption
Agr:	the attenuation due to ground effect
Abar:	the attenuation due to a barrier
Amisc:	the attenuation due to miscellaneous other effects
Cmet:	Meteorological correction

Calculation Results

Noise sensitive area: A Laskentapiste A (Metsästysmaja)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4 391	4 393	14,38	104,9		0,00	83,86	-	-	0,00	0,00	-
10	8 755	8 756	7,06	107,8		0,00	89,85	-	-	0,00	0,00	-
11	7 979	7 980	8,21	107,8		0,00	89,04	-	-	0,00	0,00	-
12	8 876	8 877	6,89	107,8		0,00	89,97	-	-	0,00	0,00	-
13	4 239	4 243	16,39	106,0	2	0,00	83,55	-	-	0,00	0,00	-
14	3 500	3 504	19,06	106,0	2	0,00	81,89	-	-	0,00	0,00	-
15	3 332	3 336	19,74	106,0	2	0,00	81,47	-	-	0,00	0,00	-
16	2 984	2 989	21,25	106,0	2	0,00	80,51	-	-	0,00	0,00	-
17	2 909	2 915	21,60	106,0	2	0,00	80,29	-	-	0,00	0,00	-
18	2 599	2 605	23,12	106,0	2	0,00	79,32	-	-	0,00	0,00	-
19	3 145	3 150	20,53	106,0	2	0,00	80,97	-	-	0,00	0,00	-
2	4 782	4 784	13,21	104,9		0,00	84,60	-	-	0,00	0,00	-
20	2 193	2 201	25,36	106,0	2	0,00	77,85	-	-	0,00	0,00	-
21	1 946	1 955	26,90	106,0	2	0,00	76,82	-	-	0,00	0,00	-
22	1 847	1 856	27,56	106,0	2	0,00	76,37	-	-	0,00	0,00	-
23	2 318	2 325	24,63	106,0	2	0,00	78,33	-	-	0,00	0,00	-
24	1 725	1 735	28,42	106,0	2	0,00	75,79	-	-	0,00	0,00	-
25	1 301	1 314	31,84	106,0	2	0,00	73,37	-	-	0,00	0,00	-
26	1 514	1 526	30,02	106,0	2	0,00	74,67	-	-	0,00	0,00	-
27	1 455	1 467	30,51	106,0	2	0,00	74,33	-	-	0,00	0,00	-
28	651	678	39,42	106,0	2	0,00	67,62	-	-	0,00	0,00	-
29	1 019	1 037	34,65	106,0	2	0,00	71,31	-	-	0,00	0,00	-
3	3 089	3 093	19,10	104,9		0,00	80,81	-	-	0,00	0,00	-
30	1 949	1 959	26,87	106,0	2	0,00	76,84	-	-	0,00	0,00	-
31	595	626	40,28	106,0	2	0,00	66,93	-	-	0,00	0,00	-
32	683	710	38,92	106,0	2	0,00	68,02	-	-	0,00	0,00	-
33	1 428	1 440	30,73	106,0	2	0,00	74,17	-	-	0,00	0,00	-
34	2 179	2 187	25,44	106,0	2	0,00	77,80	-	-	0,00	0,00	-
35	3 212	3 217	20,25	106,0	2	0,00	81,15	-	-	0,00	0,00	-
36	1 222	1 239	32,56	106,0	2	0,00	72,86	-	-	0,00	0,00	-
37	1 638	1 649	29,05	106,0	2	0,00	75,35	-	-	0,00	0,00	-
38	2 476	2 483	23,76	106,0	2	0,00	78,90	-	-	0,00	0,00	-
39	3 561	3 566	18,82	106,0	2	0,00	82,04	-	-	0,00	0,00	-
4	3 575	3 578	17,17	104,9		0,00	82,07	-	-	0,00	0,00	-
40	4 350	4 354	16,03	106,0	2	0,00	83,78	-	-	0,00	0,00	-
41	1 880	1 890	27,33	106,0	2	0,00	76,53	-	-	0,00	0,00	-
42	2 260	2 268	24,96	106,0	2	0,00	78,11	-	-	0,00	0,00	-
43	3 175	3 181	20,40	106,0	2	0,00	81,05	-	-	0,00	0,00	-
44	3 950	3 955	17,38	106,0	2	0,00	82,94	-	-	0,00	0,00	-
45	4 763	4 767	14,75	106,0	2	0,00	84,56	-	-	0,00	0,00	-
46	2 913	2 919	21,58	106,0	2	0,00	80,30	-	-	0,00	0,00	-
47	3 619	3 624	18,60	106,0	2	0,00	82,18	-	-	0,00	0,00	-
48	4 604	4 607	15,23	106,0	2	0,00	84,27	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
49	5 364	5 368	13,07	106,0	2	0,00	85,60	-	-	0,00	0,00	-
5	9 619	9 620	5,89	107,8		0,00	90,66	-	-	0,00	0,00	-
50	3 609	3 614	18,63	106,0	2	0,00	82,16	-	-	0,00	0,00	-
51	3 612	3 617	18,62	106,0	2	0,00	82,17	-	-	0,00	0,00	-
52	3 760	3 764	18,07	106,0	2	0,00	82,51	-	-	0,00	0,00	-
53	4 353	4 357	16,02	106,0	2	0,00	83,78	-	-	0,00	0,00	-
54	4 350	4 354	16,02	106,0	2	0,00	83,78	-	-	0,00	0,00	-
55	4 550	4 554	15,39	106,0	2	0,00	84,17	-	-	0,00	0,00	-
56	5 119	5 123	13,73	106,0	2	0,00	85,19	-	-	0,00	0,00	-
57	5 213	5 217	13,48	106,0	2	0,00	85,35	-	-	0,00	0,00	-
58	5 753	5 756	12,09	106,0	2	0,00	86,20	-	-	0,00	0,00	-
59	5 668	5 671	12,30	106,0	2	0,00	86,07	-	-	0,00	0,00	-
6	8 578	8 579	7,31	107,8		0,00	89,67	-	-	0,00	0,00	-
60	6 249	6 253	10,97	106,0	2	0,00	86,92	-	-	0,00	0,00	-
61	6 575	6 578	10,36	106,0	2	0,00	87,36	-	-	0,00	0,00	-
7	8 136	8 137	7,97	107,8		0,00	89,21	-	-	0,00	0,00	-
8	9 290	9 291	6,32	107,8		0,00	90,36	-	-	0,00	0,00	-
9	7 531	7 532	8,93	107,8		0,00	88,54	-	-	0,00	0,00	-
Sum			46,44									

- Data undefined due to calculation with octave data

Noise sensitive area: B Laskentapiste B (Ylivieskantie, Pöhlölä)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5 527	5 529	11,47	104,9		0,00	85,85	-	-	0,00	0,00	-
10	10 463	10 463	4,85	107,8		0,00	91,39	-	-	0,00	0,00	-
11	9 674	9 674	5,82	107,8		0,00	90,71	-	-	0,00	0,00	-
12	10 545	10 546	4,75	107,8		0,00	91,46	-	-	0,00	0,00	-
13	5 908	5 910	11,72	106,0	2	0,00	86,43	-	-	0,00	0,00	-
14	5 238	5 241	13,41	106,0	2	0,00	85,39	-	-	0,00	0,00	-
15	4 968	4 971	14,16	106,0	2	0,00	84,93	-	-	0,00	0,00	-
16	4 730	4 734	14,85	106,0	2	0,00	84,50	-	-	0,00	0,00	-
17	4 660	4 663	15,06	106,0	2	0,00	84,37	-	-	0,00	0,00	-
18	4 266	4 270	16,30	106,0	2	0,00	83,61	-	-	0,00	0,00	-
19	4 645	4 648	15,10	106,0	2	0,00	84,35	-	-	0,00	0,00	-
2	5 718	5 720	11,05	104,9		0,00	86,15	-	-	0,00	0,00	-
20	3 903	3 907	17,54	106,0	2	0,00	82,84	-	-	0,00	0,00	-
21	3 702	3 707	18,28	106,0	2	0,00	82,38	-	-	0,00	0,00	-
22	3 506	3 511	19,04	106,0	2	0,00	81,91	-	-	0,00	0,00	-
23	3 758	3 763	18,07	106,0	2	0,00	82,51	-	-	0,00	0,00	-
24	3 345	3 350	19,68	106,0	2	0,00	81,50	-	-	0,00	0,00	-
25	3 058	3 064	20,92	106,0	2	0,00	80,72	-	-	0,00	0,00	-
26	3 005	3 011	21,15	106,0	2	0,00	80,57	-	-	0,00	0,00	-
27	2 853	2 859	21,86	106,0	2	0,00	80,12	-	-	0,00	0,00	-
28	2 400	2 407	24,17	106,0	2	0,00	78,63	-	-	0,00	0,00	-
29	2 360	2 367	24,39	106,0	2	0,00	78,49	-	-	0,00	0,00	-
3	4 061	4 063	15,45	104,9		0,00	83,18	-	-	0,00	0,00	-
30	2 750	2 757	22,35	106,0	2	0,00	79,81	-	-	0,00	0,00	-
31	1 439	1 452	30,63	106,0	2	0,00	74,24	-	-	0,00	0,00	-
32	1 168	1 184	33,09	106,0	2	0,00	72,47	-	-	0,00	0,00	-
33	1 524	1 536	29,94	106,0	2	0,00	74,73	-	-	0,00	0,00	-
34	2 187	2 195	25,39	106,0	2	0,00	77,83	-	-	0,00	0,00	-
35	3 102	3 108	20,72	106,0	2	0,00	80,85	-	-	0,00	0,00	-
36	535	570	41,28	106,0	2	0,00	66,12	-	-	0,00	0,00	-
37	953	971	35,40	106,0	2	0,00	70,75	-	-	0,00	0,00	-
38	1 995	2 004	26,58	106,0	2	0,00	77,04	-	-	0,00	0,00	-
39	3 133	3 139	20,58	106,0	2	0,00	80,93	-	-	0,00	0,00	-
4	4 324	4 327	14,59	104,9		0,00	83,72	-	-	0,00	0,00	-
40	3 950	3 954	17,38	106,0	2	0,00	82,94	-	-	0,00	0,00	-
41	238	305	47,66	106,0	2	0,00	60,69	-	-	0,00	0,00	-
42	1 123	1 139	33,55	106,0	2	0,00	72,13	-	-	0,00	0,00	-
43	2 418	2 425	24,07	106,0	2	0,00	78,70	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
44	3 219	3 225	20,21	106,0	2	0,00	81,17	-	-	0,00	0,00	-
45	4 143	4 147	16,71	106,0	2	0,00	83,35	-	-	0,00	0,00	-
46	1 659	1 670	28,90	106,0	2	0,00	75,45	-	-	0,00	0,00	-
47	2 545	2 552	23,39	106,0	2	0,00	79,14	-	-	0,00	0,00	-
48	3 693	3 697	18,32	106,0	2	0,00	82,36	-	-	0,00	0,00	-
49	4 612	4 616	15,20	106,0	2	0,00	84,29	-	-	0,00	0,00	-
5	11 361	11 361	3,83	107,8		0,00	92,11	-	-	0,00	0,00	-
50	1 855	1 865	27,50	106,0	2	0,00	76,41	-	-	0,00	0,00	-
51	1 970	1 979	26,74	106,0	2	0,00	76,93	-	-	0,00	0,00	-
52	2 370	2 377	24,34	106,0	2	0,00	78,52	-	-	0,00	0,00	-
53	3 172	3 177	20,42	106,0	2	0,00	81,04	-	-	0,00	0,00	-
54	2 752	2 758	22,35	106,0	2	0,00	79,81	-	-	0,00	0,00	-
55	3 157	3 163	20,48	106,0	2	0,00	81,00	-	-	0,00	0,00	-
56	3 516	3 521	19,00	106,0	2	0,00	81,93	-	-	0,00	0,00	-
57	3 813	3 818	17,87	106,0	2	0,00	82,64	-	-	0,00	0,00	-
58	4 085	4 090	16,91	106,0	2	0,00	83,23	-	-	0,00	0,00	-
59	4 158	4 162	16,66	106,0	2	0,00	83,39	-	-	0,00	0,00	-
6	10 314	10 315	5,03	107,8		0,00	91,27	-	-	0,00	0,00	-
60	4 696	4 701	14,95	106,0	2	0,00	84,44	-	-	0,00	0,00	-
61	4 927	4 931	14,27	106,0	2	0,00	84,86	-	-	0,00	0,00	-
7	9 869	9 869	5,57	107,8		0,00	90,89	-	-	0,00	0,00	-
8	11 018	11 019	4,21	107,8		0,00	91,84	-	-	0,00	0,00	-
9	9 267	9 268	6,35	107,8		0,00	90,34	-	-	0,00	0,00	-
Sum			49,45									

- Data undefined due to calculation with octave data

Noise sensitive area: C Laskentapiste C (Perkkiontie 382)

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 703	6 705	9,07	104,9		0,00	87,53	-	-	0,00	0,00	-
10	11 292	11 293	3,91	107,8		0,00	92,06	-	-	0,00	0,00	-
11	10 484	10 485	4,82	107,8		0,00	91,41	-	-	0,00	0,00	-
12	11 311	11 312	3,89	107,8		0,00	92,07	-	-	0,00	0,00	-
13	7 032	7 034	9,55	106,0	2	0,00	87,94	-	-	0,00	0,00	-
14	6 304	6 306	10,86	106,0	2	0,00	87,00	-	-	0,00	0,00	-
15	6 104	6 107	11,25	106,0	2	0,00	86,72	-	-	0,00	0,00	-
16	5 684	5 687	12,26	106,0	2	0,00	86,10	-	-	0,00	0,00	-
17	5 703	5 706	12,21	106,0	2	0,00	86,13	-	-	0,00	0,00	-
18	5 387	5 390	13,01	106,0	2	0,00	85,63	-	-	0,00	0,00	-
19	5 814	5 817	11,94	106,0	2	0,00	86,29	-	-	0,00	0,00	-
2	6 870	6 872	8,76	104,9		0,00	87,74	-	-	0,00	0,00	-
20	4 810	4 813	14,61	106,0	2	0,00	84,65	-	-	0,00	0,00	-
21	4 732	4 735	14,84	106,0	2	0,00	84,51	-	-	0,00	0,00	-
22	4 627	4 631	15,16	106,0	2	0,00	84,31	-	-	0,00	0,00	-
23	4 931	4 934	14,26	106,0	2	0,00	84,86	-	-	0,00	0,00	-
24	4 188	4 192	16,56	106,0	2	0,00	83,45	-	-	0,00	0,00	-
25	4 073	4 077	16,95	106,0	2	0,00	83,21	-	-	0,00	0,00	-
26	4 164	4 168	16,64	106,0	2	0,00	83,40	-	-	0,00	0,00	-
27	3 593	3 598	18,69	106,0	2	0,00	82,12	-	-	0,00	0,00	-
28	3 409	3 414	19,42	106,0	2	0,00	81,67	-	-	0,00	0,00	-
29	3 526	3 531	18,96	106,0	2	0,00	81,96	-	-	0,00	0,00	-
3	5 231	5 233	12,14	104,9		0,00	85,37	-	-	0,00	0,00	-
30	3 923	3 927	17,47	106,0	2	0,00	82,88	-	-	0,00	0,00	-
31	2 345	2 353	24,47	106,0	2	0,00	78,43	-	-	0,00	0,00	-
32	2 311	2 319	24,67	106,0	2	0,00	78,31	-	-	0,00	0,00	-
33	2 683	2 690	22,69	106,0	2	0,00	79,59	-	-	0,00	0,00	-
34	3 261	3 267	20,03	106,0	2	0,00	81,28	-	-	0,00	0,00	-
35	4 060	4 065	16,99	106,0	2	0,00	83,18	-	-	0,00	0,00	-
36	1 645	1 657	29,00	106,0	2	0,00	75,39	-	-	0,00	0,00	-
37	2 057	2 066	26,18	106,0	2	0,00	77,30	-	-	0,00	0,00	-
38	2 934	2 940	21,48	106,0	2	0,00	80,37	-	-	0,00	0,00	-
39	3 954	3 958	17,36	106,0	2	0,00	82,95	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
4	5 461	5 463	11,61	104,9		0,00	85,75	-	-	0,00	0,00	-
40	4 721	4 724	14,88	106,0	2	0,00	84,49	-	-	0,00	0,00	-
41	1 237	1 252	32,42	106,0	2	0,00	72,95	-	-	0,00	0,00	-
42	1 937	1 947	26,95	106,0	2	0,00	76,79	-	-	0,00	0,00	-
43	3 147	3 152	20,53	106,0	2	0,00	80,97	-	-	0,00	0,00	-
44	3 862	3 866	17,69	106,0	2	0,00	82,75	-	-	0,00	0,00	-
45	4 777	4 781	14,71	106,0	2	0,00	84,59	-	-	0,00	0,00	-
46	2 174	2 183	25,46	106,0	2	0,00	77,78	-	-	0,00	0,00	-
47	3 024	3 030	21,07	106,0	2	0,00	80,63	-	-	0,00	0,00	-
48	4 163	4 168	16,64	106,0	2	0,00	83,40	-	-	0,00	0,00	-
49	5 131	5 135	13,70	106,0	2	0,00	85,21	-	-	0,00	0,00	-
5	12 260	12 261	2,89	107,8		0,00	92,77	-	-	0,00	0,00	-
50	1 216	1 231	32,63	106,0	2	0,00	72,80	-	-	0,00	0,00	-
51	1 800	1 810	27,88	106,0	2	0,00	76,16	-	-	0,00	0,00	-
52	2 549	2 556	23,37	106,0	2	0,00	79,15	-	-	0,00	0,00	-
53	3 463	3 468	19,21	106,0	2	0,00	81,80	-	-	0,00	0,00	-
54	2 529	2 536	23,48	106,0	2	0,00	79,08	-	-	0,00	0,00	-
55	3 211	3 216	20,25	106,0	2	0,00	81,15	-	-	0,00	0,00	-
56	3 198	3 204	20,30	106,0	2	0,00	81,11	-	-	0,00	0,00	-
57	3 790	3 795	17,95	106,0	2	0,00	82,58	-	-	0,00	0,00	-
58	3 585	3 591	18,72	106,0	2	0,00	82,10	-	-	0,00	0,00	-
59	3 953	3 958	17,37	106,0	2	0,00	82,95	-	-	0,00	0,00	-
6	11 201	11 202	4,01	107,8		0,00	91,99	-	-	0,00	0,00	-
60	4 391	4 395	15,89	106,0	2	0,00	83,86	-	-	0,00	0,00	-
61	4 436	4 441	15,75	106,0	2	0,00	83,95	-	-	0,00	0,00	-
7	10 751	10 751	4,51	107,8		0,00	91,63	-	-	0,00	0,00	-
8	11 886	11 886	3,28	107,8		0,00	92,50	-	-	0,00	0,00	-
9	10 160	10 161	5,21	107,8		0,00	91,14	-	-	0,00	0,00	-
Sum			39,78									

- Data undefined due to calculation with octave data

Noise sensitive area: D Asuinrakennus D (Alakyläntie 243)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	9 193	9 194	5,05	104,9		0,00	90,27	-	-	0,00	0,00	-
10	15 246	15 247	0,21	107,8		0,00	94,66	-	-	0,00	0,00	-
11	14 455	14 456	0,87	107,8		0,00	94,20	-	-	0,00	0,00	-
12	15 316	15 317	0,16	107,8		0,00	94,70	-	-	0,00	0,00	-
13	10 398	10 400	4,81	106,0	2	0,00	91,34	-	-	0,00	0,00	-
14	9 892	9 893	5,43	106,0	2	0,00	90,91	-	-	0,00	0,00	-
15	9 441	9 442	5,98	106,0	2	0,00	90,50	-	-	0,00	0,00	-
16	9 498	9 500	5,90	106,0	2	0,00	90,55	-	-	0,00	0,00	-
17	9 357	9 358	6,09	106,0	2	0,00	90,42	-	-	0,00	0,00	-
18	8 821	8 822	6,80	106,0	2	0,00	89,91	-	-	0,00	0,00	-
19	8 945	8 947	6,63	106,0	2	0,00	90,03	-	-	0,00	0,00	-
2	9 030	9 031	5,28	104,9		0,00	90,11	-	-	0,00	0,00	-
20	8 686	8 688	6,99	106,0	2	0,00	89,78	-	-	0,00	0,00	-
21	8 431	8 433	7,35	106,0	2	0,00	89,52	-	-	0,00	0,00	-
22	8 091	8 093	7,85	106,0	2	0,00	89,16	-	-	0,00	0,00	-
23	8 084	8 086	7,86	106,0	2	0,00	89,15	-	-	0,00	0,00	-
24	8 124	8 126	7,80	106,0	2	0,00	89,20	-	-	0,00	0,00	-
25	7 809	7 811	8,28	106,0	2	0,00	88,85	-	-	0,00	0,00	-
26	7 482	7 484	8,80	106,0	2	0,00	88,48	-	-	0,00	0,00	-
27	7 591	7 593	8,62	106,0	2	0,00	88,61	-	-	0,00	0,00	-
28	7 166	7 168	9,32	106,0	2	0,00	88,11	-	-	0,00	0,00	-
29	6 853	6 855	9,86	106,0	2	0,00	87,72	-	-	0,00	0,00	-
3	7 781	7 782	7,19	104,9		0,00	88,82	-	-	0,00	0,00	-
30	6 706	6 708	10,12	106,0	2	0,00	87,53	-	-	0,00	0,00	-
31	6 216	6 219	11,03	106,0	2	0,00	86,87	-	-	0,00	0,00	-
32	5 860	5 863	11,83	106,0	2	0,00	86,36	-	-	0,00	0,00	-
33	5 649	5 652	12,35	106,0	2	0,00	86,04	-	-	0,00	0,00	-
34	5 668	5 671	12,30	106,0	2	0,00	86,07	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
35	5 748	5 751	12,10	106,0	2	0,00	86,20	-	-	0,00	0,00	-
36	5 311	5 314	13,21	106,0	2	0,00	85,51	-	-	0,00	0,00	-
37	5 060	5 063	13,90	106,0	2	0,00	85,09	-	-	0,00	0,00	-
38	5 055	5 058	13,91	106,0	2	0,00	85,08	-	-	0,00	0,00	-
39	5 219	5 223	13,46	106,0	2	0,00	85,36	-	-	0,00	0,00	-
4	7 672	7 673	7,37	104,9		0,00	88,70	-	-	0,00	0,00	-
40	5 498	5 501	12,73	106,0	2	0,00	85,81	-	-	0,00	0,00	-
41	4 636	4 640	15,13	106,0	2	0,00	84,33	-	-	0,00	0,00	-
42	4 471	4 475	15,64	106,0	2	0,00	84,01	-	-	0,00	0,00	-
43	4 587	4 590	15,28	106,0	2	0,00	84,24	-	-	0,00	0,00	-
44	4 625	4 629	15,16	106,0	2	0,00	84,31	-	-	0,00	0,00	-
45	5 064	5 067	13,89	106,0	2	0,00	85,10	-	-	0,00	0,00	-
46	3 966	3 970	17,32	106,0	2	0,00	82,98	-	-	0,00	0,00	-
47	3 928	3 932	17,46	106,0	2	0,00	82,89	-	-	0,00	0,00	-
48	4 231	4 235	16,41	106,0	2	0,00	83,54	-	-	0,00	0,00	-
49	4 879	4 883	14,41	106,0	2	0,00	84,77	-	-	0,00	0,00	-
5	16 134	16 134	-0,48	107,8		0,00	95,16	-	-	0,00	0,00	-
50	2 952	2 958	21,40	106,0	2	0,00	80,42	-	-	0,00	0,00	-
51	2 957	2 963	21,37	106,0	2	0,00	80,43	-	-	0,00	0,00	-
52	3 248	3 253	20,09	106,0	2	0,00	81,25	-	-	0,00	0,00	-
53	3 500	3 504	19,06	106,0	2	0,00	81,89	-	-	0,00	0,00	-
54	2 380	2 387	24,28	106,0	2	0,00	78,56	-	-	0,00	0,00	-
55	2 837	2 843	21,94	106,0	2	0,00	80,08	-	-	0,00	0,00	-
56	1 796	1 805	27,91	106,0	2	0,00	76,13	-	-	0,00	0,00	-
57	2 606	2 613	23,08	106,0	2	0,00	79,34	-	-	0,00	0,00	-
58	1 052	1 069	34,29	106,0	2	0,00	71,58	-	-	0,00	0,00	-
59	2 017	2 026	26,43	106,0	2	0,00	77,13	-	-	0,00	0,00	-
6	15 092	15 092	0,34	107,8		0,00	94,58	-	-	0,00	0,00	-
60	1 722	1 733	28,43	106,0	2	0,00	75,78	-	-	0,00	0,00	-
61	1 028	1 046	34,55	106,0	2	0,00	71,39	-	-	0,00	0,00	-
7	14 648	14 649	0,71	107,8		0,00	94,32	-	-	0,00	0,00	-
8	15 800	15 800	-0,22	107,8		0,00	94,97	-	-	0,00	0,00	-
9	14 045	14 045	1,22	107,8		0,00	93,95	-	-	0,00	0,00	-
Sum			39,56									

- Data undefined due to calculation with octave data

Noise sensitive area: E Lomarakennus E (Kellokankaan metsätie)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	9 901	9 902	4,10	104,9		0,00	90,91	-	-	0,00	0,00	-
10	16 738	16 738	-0,93	107,8		0,00	95,47	-	-	0,00	0,00	-
11	15 972	15 973	-0,36	107,8		0,00	95,07	-	-	0,00	0,00	-
12	16 875	16 875	-1,03	107,8		0,00	95,54	-	-	0,00	0,00	-
13	11 518	11 520	3,57	106,0	2	0,00	92,23	-	-	0,00	0,00	-
14	11 164	11 165	3,96	106,0	2	0,00	91,96	-	-	0,00	0,00	-
15	10 579	10 581	4,60	106,0	2	0,00	91,49	-	-	0,00	0,00	-
16	10 935	10 936	4,20	106,0	2	0,00	91,78	-	-	0,00	0,00	-
17	10 687	10 688	4,48	106,0	2	0,00	91,58	-	-	0,00	0,00	-
18	10 040	10 042	5,23	106,0	2	0,00	91,04	-	-	0,00	0,00	-
19	9 995	9 996	5,29	106,0	2	0,00	91,00	-	-	0,00	0,00	-
2	9 586	9 586	4,52	104,9		0,00	90,63	-	-	0,00	0,00	-
20	10 191	10 192	5,05	106,0	2	0,00	91,17	-	-	0,00	0,00	-
21	9 822	9 823	5,50	106,0	2	0,00	90,85	-	-	0,00	0,00	-
22	9 362	9 363	6,08	106,0	2	0,00	90,43	-	-	0,00	0,00	-
23	9 194	9 196	6,30	106,0	2	0,00	90,27	-	-	0,00	0,00	-
24	9 690	9 692	5,66	106,0	2	0,00	90,73	-	-	0,00	0,00	-
25	9 246	9 248	6,23	106,0	2	0,00	90,32	-	-	0,00	0,00	-
26	8 712	8 714	6,95	106,0	2	0,00	89,80	-	-	0,00	0,00	-
27	9 226	9 228	6,26	106,0	2	0,00	90,30	-	-	0,00	0,00	-
28	8 642	8 644	7,05	106,0	2	0,00	89,73	-	-	0,00	0,00	-
29	8 131	8 133	7,79	106,0	2	0,00	89,21	-	-	0,00	0,00	-
3	8 622	8 623	5,88	104,9		0,00	89,71	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
30	7 754	7 756	8,36	106,0	2	0,00	88,79	-	-	0,00	0,00	-
31	7 804	7 806	8,29	106,0	2	0,00	88,85	-	-	0,00	0,00	-
32	7 318	7 320	9,07	106,0	2	0,00	88,29	-	-	0,00	0,00	-
33	6 898	6 900	9,78	106,0	2	0,00	87,78	-	-	0,00	0,00	-
34	6 692	6 695	10,14	106,0	2	0,00	87,51	-	-	0,00	0,00	-
35	6 454	6 457	10,58	106,0	2	0,00	87,20	-	-	0,00	0,00	-
36	6 865	6 868	9,84	106,0	2	0,00	87,74	-	-	0,00	0,00	-
37	6 409	6 412	10,66	106,0	2	0,00	87,14	-	-	0,00	0,00	-
38	6 078	6 081	11,32	106,0	2	0,00	86,68	-	-	0,00	0,00	-
39	5 844	5 847	11,87	106,0	2	0,00	86,34	-	-	0,00	0,00	-
4	8 362	8 364	6,27	104,9		0,00	89,45	-	-	0,00	0,00	-
40	5 831	5 833	11,90	106,0	2	0,00	86,32	-	-	0,00	0,00	-
41	6 185	6 188	11,09	106,0	2	0,00	86,83	-	-	0,00	0,00	-
42	5 779	5 782	12,02	106,0	2	0,00	86,24	-	-	0,00	0,00	-
43	5 448	5 451	12,86	106,0	2	0,00	85,73	-	-	0,00	0,00	-
44	5 172	5 175	13,59	106,0	2	0,00	85,28	-	-	0,00	0,00	-
45	5 252	5 255	13,37	106,0	2	0,00	85,41	-	-	0,00	0,00	-
46	5 164	5 167	13,61	106,0	2	0,00	85,26	-	-	0,00	0,00	-
47	4 776	4 779	14,71	106,0	2	0,00	84,59	-	-	0,00	0,00	-
48	4 556	4 560	15,38	106,0	2	0,00	84,18	-	-	0,00	0,00	-
49	4 827	4 830	14,56	106,0	2	0,00	84,68	-	-	0,00	0,00	-
5	17 530	17 530	-1,50	107,8		0,00	95,88	-	-	0,00	0,00	-
50	4 683	4 687	14,99	106,0	2	0,00	84,42	-	-	0,00	0,00	-
51	4 409	4 413	15,84	106,0	2	0,00	83,89	-	-	0,00	0,00	-
52	4 319	4 323	16,13	106,0	2	0,00	83,72	-	-	0,00	0,00	-
53	4 116	4 119	16,80	106,0	2	0,00	83,30	-	-	0,00	0,00	-
54	3 649	3 654	18,48	106,0	2	0,00	82,25	-	-	0,00	0,00	-
55	3 616	3 621	18,61	106,0	2	0,00	82,18	-	-	0,00	0,00	-
56	2 880	2 885	21,74	106,0	2	0,00	80,20	-	-	0,00	0,00	-
57	3 049	3 054	20,96	106,0	2	0,00	80,70	-	-	0,00	0,00	-
58	2 308	2 316	24,68	106,0	2	0,00	78,29	-	-	0,00	0,00	-
59	2 435	2 443	23,98	106,0	2	0,00	78,76	-	-	0,00	0,00	-
6	16 514	16 515	-0,77	107,8		0,00	95,36	-	-	0,00	0,00	-
60	1 817	1 828	27,76	106,0	2	0,00	76,24	-	-	0,00	0,00	-
61	1 454	1 467	30,51	106,0	2	0,00	74,33	-	-	0,00	0,00	-
7	16 082	16 082	-0,44	107,8		0,00	95,13	-	-	0,00	0,00	-
8	17 241	17 241	-1,30	107,8		0,00	95,73	-	-	0,00	0,00	-
9	15 471	15 471	0,04	107,8		0,00	94,79	-	-	0,00	0,00	-
Sum			35,12									

- Data undefined due to calculation with octave data

Noise sensitive area: F Asuinrakennus F (Ollilantie 112)

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4 616	4 619	13,69	104,9		0,00	84,29	-	-	0,00	0,00	-
10	13 072	13 073	2,10	107,8		0,00	93,33	-	-	0,00	0,00	-
11	12 487	12 487	2,67	107,8		0,00	92,93	-	-	0,00	0,00	-
12	13 488	13 489	1,72	107,8		0,00	93,60	-	-	0,00	0,00	-
13	7 154	7 157	9,34	106,0	2	0,00	88,09	-	-	0,00	0,00	-
14	7 417	7 419	8,92	106,0	2	0,00	88,41	-	-	0,00	0,00	-
15	6 488	6 491	10,52	106,0	2	0,00	87,25	-	-	0,00	0,00	-
16	7 897	7 900	8,14	106,0	2	0,00	88,95	-	-	0,00	0,00	-
17	7 280	7 283	9,13	106,0	2	0,00	88,25	-	-	0,00	0,00	-
18	6 390	6 393	10,70	106,0	2	0,00	87,11	-	-	0,00	0,00	-
19	5 754	5 758	12,08	106,0	2	0,00	86,21	-	-	0,00	0,00	-
2	3 956	3 960	15,80	104,9		0,00	82,95	-	-	0,00	0,00	-
20	7 644	7 647	8,54	106,0	2	0,00	88,67	-	-	0,00	0,00	-
21	6 906	6 909	9,76	106,0	2	0,00	87,79	-	-	0,00	0,00	-
22	6 127	6 131	11,20	106,0	2	0,00	86,75	-	-	0,00	0,00	-
23	5 428	5 432	12,91	106,0	2	0,00	85,70	-	-	0,00	0,00	-
24	7 575	7 577	8,65	106,0	2	0,00	88,59	-	-	0,00	0,00	-
25	6 720	6 724	10,09	106,0	2	0,00	87,55	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
26	5 581	5 585	12,51	106,0	2	0,00	85,94	-	-	0,00	0,00	-
27	7 590	7 593	8,62	106,0	2	0,00	88,61	-	-	0,00	0,00	-
28	6 521	6 524	10,46	106,0	2	0,00	87,29	-	-	0,00	0,00	-
29	5 456	5 460	12,83	106,0	2	0,00	85,74	-	-	0,00	0,00	-
3	4 162	4 165	15,11	104,9		0,00	83,39	-	-	0,00	0,00	-
30	4 447	4 452	15,71	106,0	2	0,00	83,97	-	-	0,00	0,00	-
31	6 543	6 547	10,41	106,0	2	0,00	87,32	-	-	0,00	0,00	-
32	5 783	5 787	12,01	106,0	2	0,00	86,25	-	-	0,00	0,00	-
33	4 862	4 867	14,46	106,0	2	0,00	84,75	-	-	0,00	0,00	-
34	4 049	4 055	17,02	106,0	2	0,00	83,16	-	-	0,00	0,00	-
35	3 001	3 009	21,16	106,0	2	0,00	80,57	-	-	0,00	0,00	-
36	5 990	5 994	11,52	106,0	2	0,00	86,55	-	-	0,00	0,00	-
37	5 094	5 098	13,80	106,0	2	0,00	85,15	-	-	0,00	0,00	-
38	3 989	3 994	17,24	106,0	2	0,00	83,03	-	-	0,00	0,00	-
39	2 827	2 835	21,97	106,0	2	0,00	80,05	-	-	0,00	0,00	-
4	3 529	3 533	17,33	104,9		0,00	81,96	-	-	0,00	0,00	-
40	2 014	2 025	26,44	106,0	2	0,00	77,13	-	-	0,00	0,00	-
41	5 752	5 756	12,09	106,0	2	0,00	86,20	-	-	0,00	0,00	-
42	4 865	4 870	14,45	106,0	2	0,00	84,75	-	-	0,00	0,00	-
43	3 583	3 590	18,73	106,0	2	0,00	82,10	-	-	0,00	0,00	-
44	2 876	2 884	21,74	106,0	2	0,00	80,20	-	-	0,00	0,00	-
45	2 016	2 027	26,43	106,0	2	0,00	77,14	-	-	0,00	0,00	-
46	4 552	4 557	15,38	106,0	2	0,00	84,17	-	-	0,00	0,00	-
47	3 771	3 777	18,02	106,0	2	0,00	82,54	-	-	0,00	0,00	-
48	2 820	2 828	22,01	106,0	2	0,00	80,03	-	-	0,00	0,00	-
49	2 003	2 015	26,51	106,0	2	0,00	77,08	-	-	0,00	0,00	-
5	13 424	13 425	1,78	107,8		0,00	93,56	-	-	0,00	0,00	-
50	6 111	6 115	11,24	106,0	2	0,00	86,73	-	-	0,00	0,00	-
51	5 319	5 324	13,19	106,0	2	0,00	85,52	-	-	0,00	0,00	-
52	4 457	4 462	15,68	106,0	2	0,00	83,99	-	-	0,00	0,00	-
53	3 667	3 673	18,41	106,0	2	0,00	82,30	-	-	0,00	0,00	-
54	5 124	5 128	13,72	106,0	2	0,00	85,20	-	-	0,00	0,00	-
55	4 291	4 296	16,21	106,0	2	0,00	83,66	-	-	0,00	0,00	-
56	5 247	5 252	13,38	106,0	2	0,00	85,41	-	-	0,00	0,00	-
57	4 293	4 298	16,21	106,0	2	0,00	83,67	-	-	0,00	0,00	-
58	5 867	5 871	11,81	106,0	2	0,00	86,37	-	-	0,00	0,00	-
59	4 863	4 868	14,45	106,0	2	0,00	84,75	-	-	0,00	0,00	-
6	12 590	12 591	2,57	107,8		0,00	93,00	-	-	0,00	0,00	-
60	5 274	5 279	13,31	106,0	2	0,00	85,45	-	-	0,00	0,00	-
61	6 052	6 056	11,37	106,0	2	0,00	86,64	-	-	0,00	0,00	-
7	12 240	12 241	2,91	107,8		0,00	92,76	-	-	0,00	0,00	-
8	13 331	13 332	1,86	107,8		0,00	93,50	-	-	0,00	0,00	-
9	11 659	11 660	3,51	107,8		0,00	92,33	-	-	0,00	0,00	-
Sum			34,88									

- Data undefined due to calculation with octave data

Noise sensitive area: G Lomarakennus G (Ollilantie, Siliäkuru)

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	3 811	3 814	16,31	104,9		0,00	82,63	-	-	0,00	0,00	-
10	12 218	12 219	2,94	107,8		0,00	92,74	-	-	0,00	0,00	-
11	11 626	11 627	3,55	107,8		0,00	92,31	-	-	0,00	0,00	-
12	12 627	12 628	2,53	107,8		0,00	93,03	-	-	0,00	0,00	-
13	6 304	6 307	10,86	106,0	2	0,00	87,00	-	-	0,00	0,00	-
14	6 550	6 553	10,42	106,0	2	0,00	87,33	-	-	0,00	0,00	-
15	5 624	5 627	12,41	106,0	2	0,00	86,01	-	-	0,00	0,00	-
16	7 033	7 036	9,54	106,0	2	0,00	87,95	-	-	0,00	0,00	-
17	6 413	6 416	10,66	106,0	2	0,00	87,15	-	-	0,00	0,00	-
18	5 523	5 526	12,66	106,0	2	0,00	85,85	-	-	0,00	0,00	-
19	4 891	4 894	14,38	106,0	2	0,00	84,79	-	-	0,00	0,00	-
2	3 193	3 197	18,66	104,9		0,00	81,09	-	-	0,00	0,00	-
20	6 795	6 798	9,96	106,0	2	0,00	87,65	-	-	0,00	0,00	-

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Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutonsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
21	6 051	6 055	11,38	106,0	2	0,00	86,64	-	-	0,00	0,00	-
22	5 269	5 273	13,32	106,0	2	0,00	85,44	-	-	0,00	0,00	-
23	4 562	4 566	15,36	106,0	2	0,00	84,19	-	-	0,00	0,00	-
24	6 747	6 750	10,04	106,0	2	0,00	87,59	-	-	0,00	0,00	-
25	5 885	5 888	11,77	106,0	2	0,00	86,40	-	-	0,00	0,00	-
26	4 735	4 739	14,83	106,0	2	0,00	84,51	-	-	0,00	0,00	-
27	6 791	6 794	9,97	106,0	2	0,00	87,64	-	-	0,00	0,00	-
28	5 714	5 717	12,18	106,0	2	0,00	86,14	-	-	0,00	0,00	-
29	4 640	4 645	15,11	106,0	2	0,00	84,34	-	-	0,00	0,00	-
3	3 294	3 298	18,25	104,9		0,00	81,37	-	-	0,00	0,00	-
30	3 621	3 626	18,59	106,0	2	0,00	82,19	-	-	0,00	0,00	-
31	5 804	5 808	11,96	106,0	2	0,00	86,28	-	-	0,00	0,00	-
32	5 054	5 058	13,91	106,0	2	0,00	85,08	-	-	0,00	0,00	-
33	4 137	4 142	16,73	106,0	2	0,00	83,34	-	-	0,00	0,00	-
34	3 319	3 326	19,79	106,0	2	0,00	81,44	-	-	0,00	0,00	-
35	2 282	2 290	24,83	106,0	2	0,00	78,20	-	-	0,00	0,00	-
36	5 318	5 322	13,19	106,0	2	0,00	85,52	-	-	0,00	0,00	-
37	4 437	4 442	15,74	106,0	2	0,00	83,95	-	-	0,00	0,00	-
38	3 348	3 354	19,67	106,0	2	0,00	81,51	-	-	0,00	0,00	-
39	2 244	2 253	25,05	106,0	2	0,00	78,06	-	-	0,00	0,00	-
4	2 665	2 669	21,01	104,9		0,00	79,53	-	-	0,00	0,00	-
40	1 521	1 534	29,96	106,0	2	0,00	74,71	-	-	0,00	0,00	-
41	5 149	5 153	13,65	106,0	2	0,00	85,24	-	-	0,00	0,00	-
42	4 287	4 292	16,23	106,0	2	0,00	83,65	-	-	0,00	0,00	-
43	3 061	3 067	20,90	106,0	2	0,00	80,74	-	-	0,00	0,00	-
44	2 475	2 483	23,76	106,0	2	0,00	78,90	-	-	0,00	0,00	-
45	1 794	1 805	27,92	106,0	2	0,00	76,13	-	-	0,00	0,00	-
46	4 066	4 071	16,97	106,0	2	0,00	83,19	-	-	0,00	0,00	-
47	3 383	3 389	19,53	106,0	2	0,00	81,60	-	-	0,00	0,00	-
48	2 638	2 645	22,91	106,0	2	0,00	79,45	-	-	0,00	0,00	-
49	2 066	2 076	26,12	106,0	2	0,00	77,34	-	-	0,00	0,00	-
5	12 590	12 591	2,57	107,8		0,00	93,00	-	-	0,00	0,00	-
50	5 717	5 720	12,18	106,0	2	0,00	86,15	-	-	0,00	0,00	-
51	4 953	4 957	14,20	106,0	2	0,00	84,90	-	-	0,00	0,00	-
52	4 124	4 128	16,77	106,0	2	0,00	83,32	-	-	0,00	0,00	-
53	3 449	3 455	19,26	106,0	2	0,00	81,77	-	-	0,00	0,00	-
54	4 882	4 887	14,40	106,0	2	0,00	84,78	-	-	0,00	0,00	-
55	4 112	4 117	16,81	106,0	2	0,00	83,29	-	-	0,00	0,00	-
56	5 130	5 134	13,70	106,0	2	0,00	85,21	-	-	0,00	0,00	-
57	4 249	4 254	16,35	106,0	2	0,00	83,58	-	-	0,00	0,00	-
58	5 811	5 815	11,94	106,0	2	0,00	86,29	-	-	0,00	0,00	-
59	4 871	4 875	14,43	106,0	2	0,00	84,76	-	-	0,00	0,00	-
6	11 745	11 746	3,42	107,8		0,00	92,40	-	-	0,00	0,00	-
60	5 354	5 359	13,10	106,0	2	0,00	85,58	-	-	0,00	0,00	-
61	6 115	6 119	11,23	106,0	2	0,00	86,73	-	-	0,00	0,00	-
7	11 390	11 391	3,80	107,8		0,00	92,13	-	-	0,00	0,00	-
8	12 488	12 488	2,67	107,8		0,00	92,93	-	-	0,00	0,00	-
9	10 807	10 808	4,45	107,8		0,00	91,67	-	-	0,00	0,00	-
Sum			36,84									

- Data undefined due to calculation with octave data

Noise sensitive area: H Asuinrakennus H (Pinolantie 406)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5 038	5 041	12,59	104,9		0,00	85,05	-	-	0,00	0,00	-
10	3 607	3 610	18,45	107,8		0,00	82,15	-	-	0,00	0,00	-
11	3 017	3 020	20,91	107,8		0,00	80,60	-	-	0,00	0,00	-
12	4 020	4 022	16,94	107,8		0,00	83,09	-	-	0,00	0,00	-
13	2 353	2 362	24,43	106,0	2	0,00	78,46	-	-	0,00	0,00	-
14	2 212	2 222	25,23	106,0	2	0,00	77,93	-	-	0,00	0,00	-
15	3 021	3 028	21,08	106,0	2	0,00	80,62	-	-	0,00	0,00	-
16	2 553	2 562	23,34	106,0	2	0,00	79,17	-	-	0,00	0,00	-

To be continued on next page...

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
17	2 657	2 665	22,81	106,0	2	0,00	79,51	-	-	0,00	0,00	-
18	3 359	3 365	19,63	106,0	2	0,00	81,54	-	-	0,00	0,00	-
19	3 747	3 753	18,11	106,0	2	0,00	82,49	-	-	0,00	0,00	-
2	5 809	5 811	10,85	104,9		0,00	86,29	-	-	0,00	0,00	-
20	3 446	3 452	19,27	106,0	2	0,00	81,76	-	-	0,00	0,00	-
21	3 567	3 573	18,79	106,0	2	0,00	82,06	-	-	0,00	0,00	-
22	3 986	3 991	17,25	106,0	2	0,00	83,02	-	-	0,00	0,00	-
23	4 309	4 314	16,18	106,0	2	0,00	83,70	-	-	0,00	0,00	-
24	4 105	4 110	16,83	106,0	2	0,00	83,28	-	-	0,00	0,00	-
25	4 201	4 206	16,51	106,0	2	0,00	83,48	-	-	0,00	0,00	-
26	4 645	4 650	15,10	106,0	2	0,00	84,35	-	-	0,00	0,00	-
27	4 770	4 774	14,73	106,0	2	0,00	84,58	-	-	0,00	0,00	-
28	4 860	4 864	14,46	106,0	2	0,00	84,74	-	-	0,00	0,00	-
29	5 211	5 216	13,48	106,0	2	0,00	85,35	-	-	0,00	0,00	-
3	5 372	5 375	11,81	104,9		0,00	85,61	-	-	0,00	0,00	-
30	5 719	5 723	12,19	106,0	2	0,00	86,15	-	-	0,00	0,00	-
31	5 894	5 898	11,74	106,0	2	0,00	86,41	-	-	0,00	0,00	-
32	6 140	6 144	11,18	106,0	2	0,00	86,77	-	-	0,00	0,00	-
33	6 445	6 449	10,59	106,0	2	0,00	87,19	-	-	0,00	0,00	-
34	6 734	6 738	10,07	106,0	2	0,00	87,57	-	-	0,00	0,00	-
35	7 320	7 323	9,06	106,0	2	0,00	88,29	-	-	0,00	0,00	-
36	6 724	6 727	10,09	106,0	2	0,00	87,56	-	-	0,00	0,00	-
37	6 965	6 968	9,66	106,0	2	0,00	87,86	-	-	0,00	0,00	-
38	7 318	7 321	9,06	106,0	2	0,00	88,29	-	-	0,00	0,00	-
39	7 923	7 926	8,10	106,0	2	0,00	88,98	-	-	0,00	0,00	-
4	5 962	5 964	10,53	104,9		0,00	86,51	-	-	0,00	0,00	-
40	8 412	8 415	7,39	106,0	2	0,00	89,50	-	-	0,00	0,00	-
41	7 378	7 381	8,96	106,0	2	0,00	88,36	-	-	0,00	0,00	-
42	7 584	7 587	8,63	106,0	2	0,00	88,60	-	-	0,00	0,00	-
43	8 012	8 015	7,97	106,0	2	0,00	89,08	-	-	0,00	0,00	-
44	8 553	8 556	7,19	106,0	2	0,00	89,65	-	-	0,00	0,00	-
45	9 027	9 030	6,54	106,0	2	0,00	90,11	-	-	0,00	0,00	-
46	8 181	8 184	7,71	106,0	2	0,00	89,26	-	-	0,00	0,00	-
47	8 640	8 642	7,05	106,0	2	0,00	89,73	-	-	0,00	0,00	-
48	9 279	9 282	6,20	106,0	2	0,00	90,35	-	-	0,00	0,00	-
49	9 690	9 692	5,68	106,0	2	0,00	90,73	-	-	0,00	0,00	-
5	4 196	4 198	16,34	107,8		0,00	83,46	-	-	0,00	0,00	-
50	9 111	9 114	6,41	106,0	2	0,00	90,19	-	-	0,00	0,00	-
51	9 056	9 059	6,48	106,0	2	0,00	90,14	-	-	0,00	0,00	-
52	9 023	9 026	6,53	106,0	2	0,00	90,11	-	-	0,00	0,00	-
53	9 367	9 369	6,07	106,0	2	0,00	90,43	-	-	0,00	0,00	-
54	9 743	9 745	5,60	106,0	2	0,00	90,78	-	-	0,00	0,00	-
55	9 752	9 754	5,58	106,0	2	0,00	90,78	-	-	0,00	0,00	-
56	10 494	10 496	4,70	106,0	2	0,00	91,42	-	-	0,00	0,00	-
57	10 377	10 380	4,83	106,0	2	0,00	91,32	-	-	0,00	0,00	-
58	11 179	11 181	3,93	106,0	2	0,00	91,97	-	-	0,00	0,00	-
59	10 929	10 931	4,20	106,0	2	0,00	91,77	-	-	0,00	0,00	-
6	3 218	3 222	20,03	107,8		0,00	81,16	-	-	0,00	0,00	-
60	11 539	11 541	3,55	106,0	2	0,00	92,25	-	-	0,00	0,00	-
61	11 967	11 969	3,11	106,0	2	0,00	92,56	-	-	0,00	0,00	-
7	2 818	2 822	21,84	107,8		0,00	80,01	-	-	0,00	0,00	-
8	3 964	3 966	17,14	107,8		0,00	82,97	-	-	0,00	0,00	-
9	2 213	2 218	25,05	107,8		0,00	77,92	-	-	0,00	0,00	-
Sum			34,67									

- Data undefined due to calculation with octave data

Noise sensitive area: I Asuinrakennus I (Kortenevantie 116)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 092	6 095	10,27	104,9		0,00	86,70	-	-	0,00	0,00	-
10	3 220	3 223	20,02	107,8		0,00	81,17	-	-	0,00	0,00	-
11	2 437	2 442	23,78	107,8		0,00	78,75	-	-	0,00	0,00	-

To be continued on next page...

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
12	3 359	3 362	19,44	107,8		0,00	81,53	-	-	0,00	0,00	-
13	3 444	3 450	19,28	106,0	2	0,00	81,76	-	-	0,00	0,00	-
14	2 897	2 904	21,65	106,0	2	0,00	80,26	-	-	0,00	0,00	-
15	3 852	3 858	17,72	106,0	2	0,00	82,73	-	-	0,00	0,00	-
16	2 632	2 640	22,94	106,0	2	0,00	79,43	-	-	0,00	0,00	-
17	3 080	3 087	20,81	106,0	2	0,00	80,79	-	-	0,00	0,00	-
18	3 944	3 949	17,42	106,0	2	0,00	82,93	-	-	0,00	0,00	-
19	4 576	4 581	15,31	106,0	2	0,00	84,22	-	-	0,00	0,00	-
2	6 867	6 869	8,77	104,9		0,00	87,74	-	-	0,00	0,00	-
20	3 349	3 356	19,66	106,0	2	0,00	81,52	-	-	0,00	0,00	-
21	3 765	3 771	18,04	106,0	2	0,00	82,53	-	-	0,00	0,00	-
22	4 391	4 396	15,89	106,0	2	0,00	83,86	-	-	0,00	0,00	-
23	4 928	4 932	14,27	106,0	2	0,00	84,86	-	-	0,00	0,00	-
24	3 908	3 913	17,52	106,0	2	0,00	82,85	-	-	0,00	0,00	-
25	4 295	4 300	16,20	106,0	2	0,00	83,67	-	-	0,00	0,00	-
26	5 049	5 053	13,93	106,0	2	0,00	85,07	-	-	0,00	0,00	-
27	4 492	4 497	15,57	106,0	2	0,00	84,06	-	-	0,00	0,00	-
28	4 894	4 899	14,36	106,0	2	0,00	84,80	-	-	0,00	0,00	-
29	5 510	5 514	12,69	106,0	2	0,00	85,83	-	-	0,00	0,00	-
3	6 147	6 150	10,15	104,9		0,00	86,78	-	-	0,00	0,00	-
30	6 216	6 220	11,03	106,0	2	0,00	86,88	-	-	0,00	0,00	-
31	5 812	5 816	11,94	106,0	2	0,00	86,29	-	-	0,00	0,00	-
32	6 219	6 223	11,02	106,0	2	0,00	86,88	-	-	0,00	0,00	-
33	6 707	6 711	10,12	106,0	2	0,00	87,54	-	-	0,00	0,00	-
34	7 145	7 148	9,35	106,0	2	0,00	88,08	-	-	0,00	0,00	-
35	7 879	7 881	8,17	106,0	2	0,00	88,93	-	-	0,00	0,00	-
36	6 720	6 723	10,09	106,0	2	0,00	87,55	-	-	0,00	0,00	-
37	7 133	7 136	9,37	106,0	2	0,00	88,07	-	-	0,00	0,00	-
38	7 678	7 681	8,48	106,0	2	0,00	88,71	-	-	0,00	0,00	-
39	8 446	8 449	7,33	106,0	2	0,00	89,54	-	-	0,00	0,00	-
4	6 785	6 787	8,92	104,9		0,00	87,63	-	-	0,00	0,00	-
40	9 031	9 033	6,52	106,0	2	0,00	90,12	-	-	0,00	0,00	-
41	7 399	7 403	8,93	106,0	2	0,00	88,39	-	-	0,00	0,00	-
42	7 764	7 767	8,35	106,0	2	0,00	88,81	-	-	0,00	0,00	-
43	8 399	8 402	7,39	106,0	2	0,00	89,49	-	-	0,00	0,00	-
44	9 030	9 032	6,52	106,0	2	0,00	90,12	-	-	0,00	0,00	-
45	9 614	9 616	5,76	106,0	2	0,00	90,66	-	-	0,00	0,00	-
46	8 399	8 402	7,39	106,0	2	0,00	89,49	-	-	0,00	0,00	-
47	8 976	8 978	6,59	106,0	2	0,00	90,06	-	-	0,00	0,00	-
48	9 751	9 754	5,59	106,0	2	0,00	90,78	-	-	0,00	0,00	-
49	10 276	10 278	4,95	106,0	2	0,00	91,24	-	-	0,00	0,00	-
5	4 212	4 215	16,28	107,8		0,00	83,50	-	-	0,00	0,00	-
50	9 083	9 086	6,45	106,0	2	0,00	90,17	-	-	0,00	0,00	-
51	9 153	9 155	6,35	106,0	2	0,00	90,23	-	-	0,00	0,00	-
52	9 253	9 256	6,22	106,0	2	0,00	90,33	-	-	0,00	0,00	-
53	9 719	9 721	5,63	106,0	2	0,00	90,75	-	-	0,00	0,00	-
54	9 889	9 892	5,41	106,0	2	0,00	90,91	-	-	0,00	0,00	-
55	10 022	10 024	5,25	106,0	2	0,00	91,02	-	-	0,00	0,00	-
56	10 657	10 659	4,51	106,0	2	0,00	91,55	-	-	0,00	0,00	-
57	10 673	10 675	4,49	106,0	2	0,00	91,57	-	-	0,00	0,00	-
58	11 294	11 296	3,81	106,0	2	0,00	92,06	-	-	0,00	0,00	-
59	11 174	11 176	3,94	106,0	2	0,00	91,97	-	-	0,00	0,00	-
6	3 144	3 147	20,35	107,8		0,00	80,96	-	-	0,00	0,00	-
60	11 768	11 770	3,31	106,0	2	0,00	92,42	-	-	0,00	0,00	-
61	12 116	12 118	2,96	106,0	2	0,00	92,67	-	-	0,00	0,00	-
7	2 690	2 694	22,46	107,8		0,00	79,61	-	-	0,00	0,00	-
8	3 806	3 809	17,70	107,8		0,00	82,62	-	-	0,00	0,00	-
9	2 131	2 137	25,54	107,8		0,00	77,59	-	-	0,00	0,00	-
Sum			34,01									

- Data undefined due to calculation with octave data

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: J Asuinrakennus J (Haapavesitie 1406)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 937	6 939	8,66	104,9		0,00	87,83	-	-	0,00	0,00	-
10	4 243	4 246	16,18	107,8		0,00	83,56	-	-	0,00	0,00	-
11	3 416	3 419	19,20	107,8		0,00	81,68	-	-	0,00	0,00	-
12	4 071	4 073	16,76	107,8		0,00	83,20	-	-	0,00	0,00	-
13	4 518	4 522	15,49	106,0	2	0,00	84,11	-	-	0,00	0,00	-
14	3 657	3 663	18,45	106,0	2	0,00	82,28	-	-	0,00	0,00	-
15	4 602	4 606	15,26	106,0	2	0,00	84,27	-	-	0,00	0,00	-
16	2 847	2 855	21,88	106,0	2	0,00	80,11	-	-	0,00	0,00	-
17	3 535	3 541	18,92	106,0	2	0,00	81,98	-	-	0,00	0,00	-
18	4 412	4 417	15,82	106,0	2	0,00	83,90	-	-	0,00	0,00	-
19	5 244	5 248	13,41	106,0	2	0,00	85,40	-	-	0,00	0,00	-
2	7 687	7 689	7,35	104,9		0,00	88,72	-	-	0,00	0,00	-
20	3 145	3 152	20,53	106,0	2	0,00	80,97	-	-	0,00	0,00	-
21	3 826	3 831	17,82	106,0	2	0,00	82,67	-	-	0,00	0,00	-
22	4 594	4 599	15,25	106,0	2	0,00	84,25	-	-	0,00	0,00	-
23	5 317	5 321	13,20	106,0	2	0,00	85,52	-	-	0,00	0,00	-
24	3 461	3 467	19,21	106,0	2	0,00	81,80	-	-	0,00	0,00	-
25	4 144	4 149	16,70	106,0	2	0,00	83,36	-	-	0,00	0,00	-
26	5 174	5 178	13,58	106,0	2	0,00	85,28	-	-	0,00	0,00	-
27	3 855	3 861	17,71	106,0	2	0,00	82,73	-	-	0,00	0,00	-
28	4 595	4 600	15,25	106,0	2	0,00	84,25	-	-	0,00	0,00	-
29	5 467	5 471	12,80	106,0	2	0,00	85,76	-	-	0,00	0,00	-
3	6 633	6 635	9,20	104,9		0,00	87,44	-	-	0,00	0,00	-
30	6 358	6 361	10,76	106,0	2	0,00	87,07	-	-	0,00	0,00	-
31	5 284	5 289	13,28	106,0	2	0,00	85,47	-	-	0,00	0,00	-
32	5 857	5 861	11,83	106,0	2	0,00	86,36	-	-	0,00	0,00	-
33	6 533	6 537	10,43	106,0	2	0,00	87,31	-	-	0,00	0,00	-
34	7 126	7 130	9,38	106,0	2	0,00	88,06	-	-	0,00	0,00	-
35	8 009	8 012	7,97	106,0	2	0,00	89,07	-	-	0,00	0,00	-
36	6 225	6 229	11,01	106,0	2	0,00	86,89	-	-	0,00	0,00	-
37	6 821	6 824	9,91	106,0	2	0,00	87,68	-	-	0,00	0,00	-
38	7 573	7 576	8,65	106,0	2	0,00	88,59	-	-	0,00	0,00	-
39	8 510	8 512	7,24	106,0	2	0,00	89,60	-	-	0,00	0,00	-
4	7 296	7 298	8,00	104,9		0,00	88,26	-	-	0,00	0,00	-
40	9 196	9 198	6,30	106,0	2	0,00	90,27	-	-	0,00	0,00	-
41	6 900	6 903	9,77	106,0	2	0,00	87,78	-	-	0,00	0,00	-
42	7 438	7 441	8,87	106,0	2	0,00	88,43	-	-	0,00	0,00	-
43	8 297	8 299	7,54	106,0	2	0,00	89,38	-	-	0,00	0,00	-
44	9 016	9 019	6,54	106,0	2	0,00	90,10	-	-	0,00	0,00	-
45	9 721	9 723	5,62	106,0	2	0,00	90,76	-	-	0,00	0,00	-
46	8 092	8 095	7,85	106,0	2	0,00	89,16	-	-	0,00	0,00	-
47	8 792	8 795	6,84	106,0	2	0,00	89,88	-	-	0,00	0,00	-
48	9 711	9 713	5,64	106,0	2	0,00	90,75	-	-	0,00	0,00	-
49	10 366	10 368	4,84	106,0	2	0,00	91,31	-	-	0,00	0,00	-
5	5 465	5 467	12,90	107,8		0,00	85,75	-	-	0,00	0,00	-
50	8 461	8 464	7,30	106,0	2	0,00	89,55	-	-	0,00	0,00	-
51	8 675	8 678	7,00	106,0	2	0,00	89,77	-	-	0,00	0,00	-
52	8 932	8 935	6,65	106,0	2	0,00	90,02	-	-	0,00	0,00	-
53	9 531	9 533	5,86	106,0	2	0,00	90,59	-	-	0,00	0,00	-
54	9 450	9 452	5,97	106,0	2	0,00	90,51	-	-	0,00	0,00	-
55	9 727	9 729	5,62	106,0	2	0,00	90,76	-	-	0,00	0,00	-
56	10 218	10 220	5,02	106,0	2	0,00	91,19	-	-	0,00	0,00	-
57	10 392	10 394	4,81	106,0	2	0,00	91,34	-	-	0,00	0,00	-
58	10 785	10 787	4,36	106,0	2	0,00	91,66	-	-	0,00	0,00	-
59	10 821	10 823	4,32	106,0	2	0,00	91,69	-	-	0,00	0,00	-
6	4 426	4 428	15,59	107,8		0,00	83,92	-	-	0,00	0,00	-
60	11 385	11 387	3,71	106,0	2	0,00	92,13	-	-	0,00	0,00	-
61	11 632	11 634	3,45	106,0	2	0,00	92,31	-	-	0,00	0,00	-
7	3 994	3 997	17,03	107,8		0,00	83,03	-	-	0,00	0,00	-
8	4 960	4 962	14,09	107,8		0,00	84,91	-	-	0,00	0,00	-
9	3 550	3 554	18,67	107,8		0,00	82,01	-	-	0,00	0,00	-
Sum			31,86									

- Data undefined due to calculation with octave data

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: K Lomarakennus K (Kurunoja)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 308	6 310	9,83	104,9		0,00	87,00	-	-	0,00	0,00	-
10	7 073	7 074	9,71	107,8		0,00	87,99	-	-	0,00	0,00	-
11	6 244	6 245	11,26	107,8		0,00	86,91	-	-	0,00	0,00	-
12	6 969	6 971	9,89	107,8		0,00	87,87	-	-	0,00	0,00	-
13	4 813	4 817	14,60	106,0	2	0,00	84,66	-	-	0,00	0,00	-
14	3 752	3 757	18,09	106,0	2	0,00	82,50	-	-	0,00	0,00	-
15	4 302	4 307	16,18	106,0	2	0,00	83,68	-	-	0,00	0,00	-
16	2 621	2 628	23,00	106,0	2	0,00	79,39	-	-	0,00	0,00	-
17	3 206	3 212	20,27	106,0	2	0,00	81,14	-	-	0,00	0,00	-
18	3 698	3 703	18,30	106,0	2	0,00	82,37	-	-	0,00	0,00	-
19	4 616	4 620	15,19	106,0	2	0,00	84,29	-	-	0,00	0,00	-
2	6 917	6 918	8,68	104,9		0,00	87,80	-	-	0,00	0,00	-
20	1 968	1 978	26,75	106,0	2	0,00	76,92	-	-	0,00	0,00	-
21	2 672	2 680	22,74	106,0	2	0,00	79,56	-	-	0,00	0,00	-
22	3 360	3 365	19,62	106,0	2	0,00	81,54	-	-	0,00	0,00	-
23	4 188	4 192	16,56	106,0	2	0,00	83,45	-	-	0,00	0,00	-
24	1 597	1 609	29,36	106,0	2	0,00	75,13	-	-	0,00	0,00	-
25	2 468	2 476	23,80	106,0	2	0,00	78,88	-	-	0,00	0,00	-
26	3 635	3 640	18,53	106,0	2	0,00	82,22	-	-	0,00	0,00	-
27	1 437	1 450	30,64	106,0	2	0,00	74,23	-	-	0,00	0,00	-
28	2 508	2 516	23,58	106,0	2	0,00	79,01	-	-	0,00	0,00	-
29	3 585	3 591	18,72	106,0	2	0,00	82,10	-	-	0,00	0,00	-
3	5 411	5 414	11,72	104,9		0,00	85,67	-	-	0,00	0,00	-
30	4 614	4 618	15,20	106,0	2	0,00	84,29	-	-	0,00	0,00	-
31	2 728	2 736	22,46	106,0	2	0,00	79,74	-	-	0,00	0,00	-
32	3 446	3 452	19,27	106,0	2	0,00	81,76	-	-	0,00	0,00	-
33	4 299	4 304	16,19	106,0	2	0,00	83,68	-	-	0,00	0,00	-
34	5 048	5 052	13,93	106,0	2	0,00	85,07	-	-	0,00	0,00	-
35	6 066	6 069	11,34	106,0	2	0,00	86,66	-	-	0,00	0,00	-
36	3 621	3 627	18,58	106,0	2	0,00	82,19	-	-	0,00	0,00	-
37	4 383	4 387	15,92	106,0	2	0,00	83,84	-	-	0,00	0,00	-
38	5 337	5 341	13,14	106,0	2	0,00	85,55	-	-	0,00	0,00	-
39	6 436	6 439	10,61	106,0	2	0,00	87,18	-	-	0,00	0,00	-
4	6 028	6 030	10,40	104,9		0,00	86,61	-	-	0,00	0,00	-
40	7 220	7 223	9,23	106,0	2	0,00	88,17	-	-	0,00	0,00	-
41	4 249	4 254	16,35	106,0	2	0,00	83,58	-	-	0,00	0,00	-
42	4 941	4 945	14,23	106,0	2	0,00	84,88	-	-	0,00	0,00	-
43	6 017	6 020	11,46	106,0	2	0,00	86,59	-	-	0,00	0,00	-
44	6 809	6 812	9,93	106,0	2	0,00	87,67	-	-	0,00	0,00	-
45	7 637	7 640	8,55	106,0	2	0,00	88,66	-	-	0,00	0,00	-
46	5 584	5 587	12,51	106,0	2	0,00	85,94	-	-	0,00	0,00	-
47	6 388	6 392	10,70	106,0	2	0,00	87,11	-	-	0,00	0,00	-
48	7 438	7 441	8,87	106,0	2	0,00	88,43	-	-	0,00	0,00	-
49	8 231	8 234	7,64	106,0	2	0,00	89,31	-	-	0,00	0,00	-
5	8 201	8 202	7,87	107,8		0,00	89,28	-	-	0,00	0,00	-
50	5 664	5 668	12,31	106,0	2	0,00	86,07	-	-	0,00	0,00	-
51	5 981	5 984	11,54	106,0	2	0,00	86,54	-	-	0,00	0,00	-
52	6 374	6 377	10,73	106,0	2	0,00	87,09	-	-	0,00	0,00	-
53	7 094	7 097	9,44	106,0	2	0,00	88,02	-	-	0,00	0,00	-
54	6 769	6 772	10,01	106,0	2	0,00	87,61	-	-	0,00	0,00	-
55	7 171	7 174	9,31	106,0	2	0,00	88,12	-	-	0,00	0,00	-
56	7 522	7 525	8,73	106,0	2	0,00	88,53	-	-	0,00	0,00	-
57	7 833	7 836	8,24	106,0	2	0,00	88,88	-	-	0,00	0,00	-
58	8 029	8 032	7,94	106,0	2	0,00	89,10	-	-	0,00	0,00	-
59	8 187	8 189	7,70	106,0	2	0,00	89,27	-	-	0,00	0,00	-
6	7 135	7 136	9,60	107,8		0,00	88,07	-	-	0,00	0,00	-
60	8 715	8 717	6,95	106,0	2	0,00	89,81	-	-	0,00	0,00	-
61	8 883	8 885	6,72	106,0	2	0,00	89,97	-	-	0,00	0,00	-
7	6 684	6 685	10,41	107,8		0,00	87,50	-	-	0,00	0,00	-
8	7 746	7 747	8,58	107,8		0,00	88,78	-	-	0,00	0,00	-
9	6 150	6 152	11,45	107,8		0,00	86,78	-	-	0,00	0,00	-
Sum			36,88									

- Data undefined due to calculation with octave data

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: L Laskentapiste L (Perkkiontie, Ilmola)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 788	6 789	8,92	104,9		0,00	87,64	-	-	0,00	0,00	-
10	11 413	11 414	3,78	107,8		0,00	92,15	-	-	0,00	0,00	-
11	10 606	10 606	4,68	107,8		0,00	91,51	-	-	0,00	0,00	-
12	11 432	11 432	3,76	107,8		0,00	92,16	-	-	0,00	0,00	-
13	7 143	7 145	9,36	106,0	2	0,00	88,08	-	-	0,00	0,00	-
14	6 420	6 422	10,64	106,0	2	0,00	87,15	-	-	0,00	0,00	-
15	6 214	6 216	11,04	106,0	2	0,00	86,87	-	-	0,00	0,00	-
16	5 805	5 807	11,96	106,0	2	0,00	86,28	-	-	0,00	0,00	-
17	5 821	5 823	11,92	106,0	2	0,00	86,30	-	-	0,00	0,00	-
18	5 498	5 501	12,73	106,0	2	0,00	85,81	-	-	0,00	0,00	-
19	5 917	5 919	11,69	106,0	2	0,00	86,45	-	-	0,00	0,00	-
2	6 944	6 946	8,63	104,9		0,00	87,83	-	-	0,00	0,00	-
20	4 931	4 934	14,26	106,0	2	0,00	84,86	-	-	0,00	0,00	-
21	4 849	4 853	14,50	106,0	2	0,00	84,72	-	-	0,00	0,00	-
22	4 738	4 741	14,82	106,0	2	0,00	84,52	-	-	0,00	0,00	-
23	5 032	5 036	13,98	106,0	2	0,00	85,04	-	-	0,00	0,00	-
24	4 310	4 314	16,16	106,0	2	0,00	83,70	-	-	0,00	0,00	-
25	4 191	4 195	16,55	106,0	2	0,00	83,45	-	-	0,00	0,00	-
26	4 269	4 273	16,29	106,0	2	0,00	83,61	-	-	0,00	0,00	-
27	3 715	3 719	18,23	106,0	2	0,00	82,41	-	-	0,00	0,00	-
28	3 527	3 532	18,95	106,0	2	0,00	81,96	-	-	0,00	0,00	-
29	3 629	3 634	18,56	106,0	2	0,00	82,21	-	-	0,00	0,00	-
3	5 312	5 314	11,95	104,9		0,00	85,51	-	-	0,00	0,00	-
30	4 006	4 011	17,18	106,0	2	0,00	83,06	-	-	0,00	0,00	-
31	2 464	2 472	23,82	106,0	2	0,00	78,86	-	-	0,00	0,00	-
32	2 417	2 425	24,08	106,0	2	0,00	78,69	-	-	0,00	0,00	-
33	2 764	2 770	22,29	106,0	2	0,00	79,85	-	-	0,00	0,00	-
34	3 323	3 328	19,78	106,0	2	0,00	81,44	-	-	0,00	0,00	-
35	4 101	4 105	16,85	106,0	2	0,00	83,27	-	-	0,00	0,00	-
36	1 752	1 763	28,21	106,0	2	0,00	75,93	-	-	0,00	0,00	-
37	2 130	2 138	25,73	106,0	2	0,00	77,60	-	-	0,00	0,00	-
38	2 977	2 983	21,28	106,0	2	0,00	80,49	-	-	0,00	0,00	-
39	3 977	3 981	17,28	106,0	2	0,00	83,00	-	-	0,00	0,00	-
4	5 531	5 533	11,46	104,9		0,00	85,86	-	-	0,00	0,00	-
40	4 734	4 738	14,83	106,0	2	0,00	84,51	-	-	0,00	0,00	-
41	1 316	1 331	31,70	106,0	2	0,00	73,48	-	-	0,00	0,00	-
42	1 977	1 987	26,69	106,0	2	0,00	76,96	-	-	0,00	0,00	-
43	3 163	3 168	20,46	106,0	2	0,00	81,02	-	-	0,00	0,00	-
44	3 864	3 868	17,69	106,0	2	0,00	82,75	-	-	0,00	0,00	-
45	4 775	4 778	14,71	106,0	2	0,00	84,59	-	-	0,00	0,00	-
46	2 179	2 187	25,44	106,0	2	0,00	77,80	-	-	0,00	0,00	-
47	3 014	3 020	21,11	106,0	2	0,00	80,60	-	-	0,00	0,00	-
48	4 145	4 150	16,70	106,0	2	0,00	83,36	-	-	0,00	0,00	-
49	5 115	5 119	13,74	106,0	2	0,00	85,18	-	-	0,00	0,00	-
5	12 382	12 382	2,77	107,8		0,00	92,86	-	-	0,00	0,00	-
50	1 123	1 139	33,55	106,0	2	0,00	72,13	-	-	0,00	0,00	-
51	1 742	1 753	28,29	106,0	2	0,00	75,87	-	-	0,00	0,00	-
52	2 513	2 520	23,56	106,0	2	0,00	79,03	-	-	0,00	0,00	-
53	3 430	3 435	19,34	106,0	2	0,00	81,72	-	-	0,00	0,00	-
54	2 456	2 463	23,87	106,0	2	0,00	78,83	-	-	0,00	0,00	-
55	3 157	3 162	20,48	106,0	2	0,00	81,00	-	-	0,00	0,00	-
56	3 112	3 117	20,68	106,0	2	0,00	80,88	-	-	0,00	0,00	-
57	3 726	3 731	18,19	106,0	2	0,00	82,44	-	-	0,00	0,00	-
58	3 484	3 489	19,12	106,0	2	0,00	81,85	-	-	0,00	0,00	-
59	3 872	3 877	17,65	106,0	2	0,00	82,77	-	-	0,00	0,00	-
6	11 322	11 323	3,87	107,8		0,00	92,08	-	-	0,00	0,00	-
60	4 301	4 306	16,18	106,0	2	0,00	83,68	-	-	0,00	0,00	-
61	4 334	4 338	16,08	106,0	2	0,00	83,75	-	-	0,00	0,00	-
7	10 872	10 873	4,37	107,8		0,00	91,73	-	-	0,00	0,00	-
8	12 007	12 007	3,15	107,8		0,00	92,59	-	-	0,00	0,00	-
9	10 281	10 282	5,06	107,8		0,00	91,24	-	-	0,00	0,00	-
Sum			39,75									

- Data undefined due to calculation with octave data

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: M Lomarakennus M (Riskalan metsatie)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5 373	5 375	11,81	104,9		0,00	85,61	-	-	0,00	0,00	-
10	13 788	13 788	1,45	107,8		0,00	93,79	-	-	0,00	0,00	-
11	13 189	13 189	2,00	107,8		0,00	93,40	-	-	0,00	0,00	-
12	14 188	14 189	1,10	107,8		0,00	94,04	-	-	0,00	0,00	-
13	7 877	7 880	8,17	106,0	2	0,00	88,93	-	-	0,00	0,00	-
14	8 096	8 098	7,86	106,0	2	0,00	89,17	-	-	0,00	0,00	-
15	7 182	7 184	9,29	106,0	2	0,00	88,13	-	-	0,00	0,00	-
16	8 521	8 523	7,22	106,0	2	0,00	89,61	-	-	0,00	0,00	-
17	7 927	7 930	8,10	106,0	2	0,00	88,98	-	-	0,00	0,00	-
18	7 043	7 045	9,53	106,0	2	0,00	87,96	-	-	0,00	0,00	-
19	6 449	6 452	10,59	106,0	2	0,00	87,19	-	-	0,00	0,00	-
2	4 725	4 727	13,37	104,9		0,00	84,49	-	-	0,00	0,00	-
20	8 215	8 217	7,66	106,0	2	0,00	89,29	-	-	0,00	0,00	-
21	7 498	7 500	8,77	106,0	2	0,00	88,50	-	-	0,00	0,00	-
22	6 732	6 734	10,07	106,0	2	0,00	87,57	-	-	0,00	0,00	-
23	6 068	6 071	11,34	106,0	2	0,00	86,67	-	-	0,00	0,00	-
24	8 100	8 102	7,84	106,0	2	0,00	89,17	-	-	0,00	0,00	-
25	7 266	7 268	9,15	106,0	2	0,00	88,23	-	-	0,00	0,00	-
26	6 156	6 159	11,15	106,0	2	0,00	86,79	-	-	0,00	0,00	-
27	8 064	8 066	7,89	106,0	2	0,00	89,13	-	-	0,00	0,00	-
28	7 014	7 016	9,58	106,0	2	0,00	87,92	-	-	0,00	0,00	-
29	5 971	5 974	11,56	106,0	2	0,00	86,53	-	-	0,00	0,00	-
3	4 838	4 840	13,07	104,9		0,00	84,70	-	-	0,00	0,00	-
30	4 991	4 995	14,09	106,0	2	0,00	84,97	-	-	0,00	0,00	-
31	6 935	6 938	9,71	106,0	2	0,00	87,82	-	-	0,00	0,00	-
32	6 170	6 173	11,12	106,0	2	0,00	86,81	-	-	0,00	0,00	-
33	5 255	5 259	13,36	106,0	2	0,00	85,42	-	-	0,00	0,00	-
34	4 464	4 468	15,66	106,0	2	0,00	84,00	-	-	0,00	0,00	-
35	3 434	3 440	19,32	106,0	2	0,00	81,73	-	-	0,00	0,00	-
36	6 303	6 306	10,86	106,0	2	0,00	87,00	-	-	0,00	0,00	-
37	5 402	5 406	12,97	106,0	2	0,00	85,66	-	-	0,00	0,00	-
38	4 304	4 308	16,17	106,0	2	0,00	83,69	-	-	0,00	0,00	-
39	3 133	3 139	20,58	106,0	2	0,00	80,94	-	-	0,00	0,00	-
4	4 225	4 228	14,91	104,9		0,00	83,52	-	-	0,00	0,00	-
40	2 310	2 318	24,67	106,0	2	0,00	78,30	-	-	0,00	0,00	-
41	5 990	5 993	11,52	106,0	2	0,00	86,55	-	-	0,00	0,00	-
42	5 092	5 096	13,81	106,0	2	0,00	85,14	-	-	0,00	0,00	-
43	3 793	3 798	17,94	106,0	2	0,00	82,59	-	-	0,00	0,00	-
44	3 012	3 018	21,12	106,0	2	0,00	80,59	-	-	0,00	0,00	-
45	2 087	2 096	26,00	106,0	2	0,00	77,43	-	-	0,00	0,00	-
46	4 692	4 697	14,96	106,0	2	0,00	84,44	-	-	0,00	0,00	-
47	3 845	3 850	17,75	106,0	2	0,00	82,71	-	-	0,00	0,00	-
48	2 764	2 771	22,28	106,0	2	0,00	79,85	-	-	0,00	0,00	-
49	1 820	1 831	27,73	106,0	2	0,00	76,26	-	-	0,00	0,00	-
5	14 165	14 166	1,12	107,8		0,00	94,02	-	-	0,00	0,00	-
50	6 130	6 133	11,20	106,0	2	0,00	86,75	-	-	0,00	0,00	-
51	5 326	5 330	13,17	106,0	2	0,00	85,53	-	-	0,00	0,00	-
52	4 455	4 460	15,69	106,0	2	0,00	83,99	-	-	0,00	0,00	-
53	3 590	3 596	18,70	106,0	2	0,00	82,12	-	-	0,00	0,00	-
54	5 020	5 024	14,01	106,0	2	0,00	85,02	-	-	0,00	0,00	-
55	4 153	4 158	16,67	106,0	2	0,00	83,38	-	-	0,00	0,00	-
56	5 029	5 033	13,98	106,0	2	0,00	85,04	-	-	0,00	0,00	-
57	4 037	4 042	17,07	106,0	2	0,00	83,13	-	-	0,00	0,00	-
58	5 584	5 588	12,51	106,0	2	0,00	85,94	-	-	0,00	0,00	-
59	4 546	4 551	15,40	106,0	2	0,00	84,16	-	-	0,00	0,00	-
6	13 319	13 320	1,87	107,8		0,00	93,49	-	-	0,00	0,00	-
60	4 888	4 893	14,38	106,0	2	0,00	84,79	-	-	0,00	0,00	-
61	5 667	5 671	12,30	106,0	2	0,00	86,07	-	-	0,00	0,00	-
7	12 963	12 963	2,21	107,8		0,00	93,25	-	-	0,00	0,00	-
8	14 062	14 063	1,21	107,8		0,00	93,96	-	-	0,00	0,00	-
9	12 378	12 378	2,78	107,8		0,00	92,85	-	-	0,00	0,00	-
Sum			34,46									

- Data undefined due to calculation with octave data

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Assumptions for noise calculation

Calculation: Puutonsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

Noise calculation model:

ISO 9613-2 General

Wind speed (in 10 m height):

8,0 m/s

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 0,4

Area object with hard ground: Area object (vesistot): (5)

Area type with hard ground: Vesistot

Ground factor for hard ground: 0,0

Meteorological coefficient, CO:

0,0 dB

Type of demand in calculation:

1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

Noise values in calculation:

All noise values are mean values (Lwa) (Normal)

Pure tones:

Fixed penalty added to source noise of WTGs with pure tones

WTG catalogue

Height above ground level, when no value in NSA object:

4,0 m; Don't allow override of model height with height from NSA object

Uncertainty margin:

0,0 dB; Uncertainty margin in NSA has priority

Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:

0,0 dB(A)

Octave data required

Frequency dependent air absorption

63	125	250	500	1 000	2 000	4 000	8 000
[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

WTG: VESTAS V150-4.2 HH155 4200 150.0 IO!

Noise: Level 00 - Measured - Mode PO1 - 03-2018

Source	Source/Date	Creator	Edited
Manufacturer	15.3.2018	USER	12.11.2020 15.41

Document n. 0067-4767 V06.

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data								
					63	125	250	500	1000	2000	4000	8000	
					[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	155,0	8,0	104,9	No	86,5	93,7	98,2	99,9	98,9	95,1	88,6	79,4	

WTG: GE WIND ENERGY 5.3-158 RD175 5300 175.0 IO!

Noise: 5.3-158 NO_107,8 dB

Source	Source/Date	Creator	Edited
Noise_Emission-NO_5.3-158-50Hz_IEC_EN_r01	12.3.2018	USER	12.11.2020 15.40

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data								
					63	125	250	500	1000	2000	4000	8000	
					[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	152,5	8,0	107,8	No	89,0	94,4	99,0	101,4	103,1	100,9	93,5	77,8	

WTG: GE WIND ENERGY 5.3-158 Thrust 700 5300 158.0 IO!

Noise: 5.3-158 106.0 +2 dB HH200

Source	Source/Date	Creator	Edited
Noise_Emission-NO_5.3-158-50Hz_IEC_EN_r01	12.3.2018	USER	12.11.2020 15.16

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Penalty [dB]	Octave data							
						63	125	250	500	1000	2000	4000	8000
						[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	200,0	8,0	106,0	Yes	2,0	87,2	92,6	97,2	99,6	101,3	99,1	91,7	76,0

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Assumptions for noise calculation

Calculation: Puutonsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

Noise sensitive area: A Laskentapiste A (Metsästysmäja)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: B Laskentapiste B (Ylivieskantie, Pöhlölä)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: C Laskentapiste C (Perkkiöntie 382)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: D Asuinrakennus D (Alakyläntie 243)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: E Lomarakennus E (Kellokankaan metsätie)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: F Asuinrakennus F (Ollilantie 112)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: G Lomarakennus G (Ollilantie, Siliäkuru)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: H Asuinrakennus H (Pinolantie 406)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: I Asuinrakennus I (Kortenevantie 116)

Predefined calculation standard:

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Project:
Puutionsaari_Riskalankangas_20200327

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Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Assumptions for noise calculation

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: J Asuinrakennus J (Haapavesitie 1406)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: K Lomarakennus K (Kurunoja)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: L Laskentapiste L (Perkkiontie, Ilmola)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

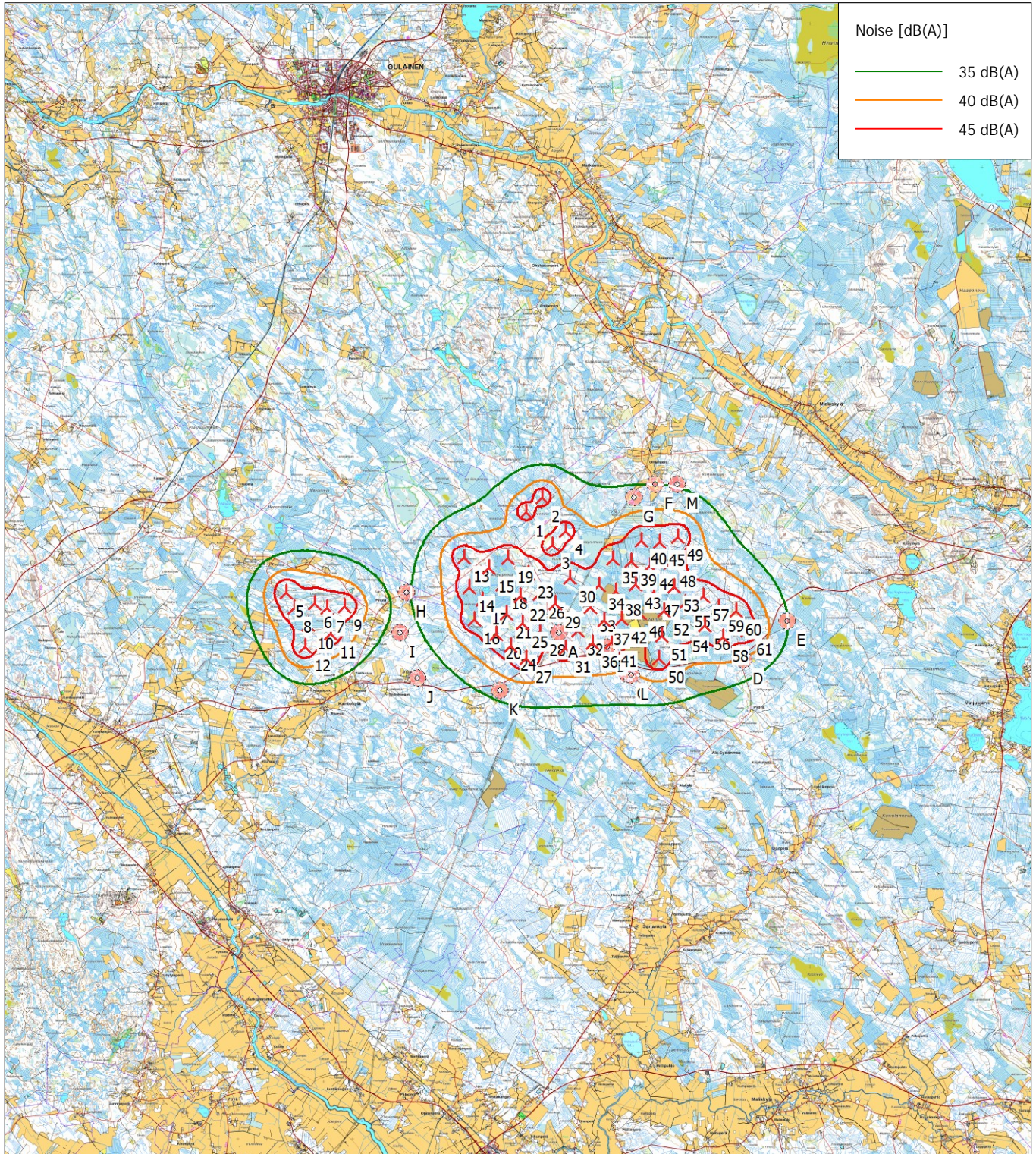
Noise sensitive area: M Lomarakennus M (Riskalan metsätie)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

DECIBEL - Map 8,0 m/s

Calculation: Puutonsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102



0 2,5 5 7,5 10km

Map: Maastokarttarasteri50K , Print scale 1:200 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 400 742 North: 7 111 615

📍 New WTG

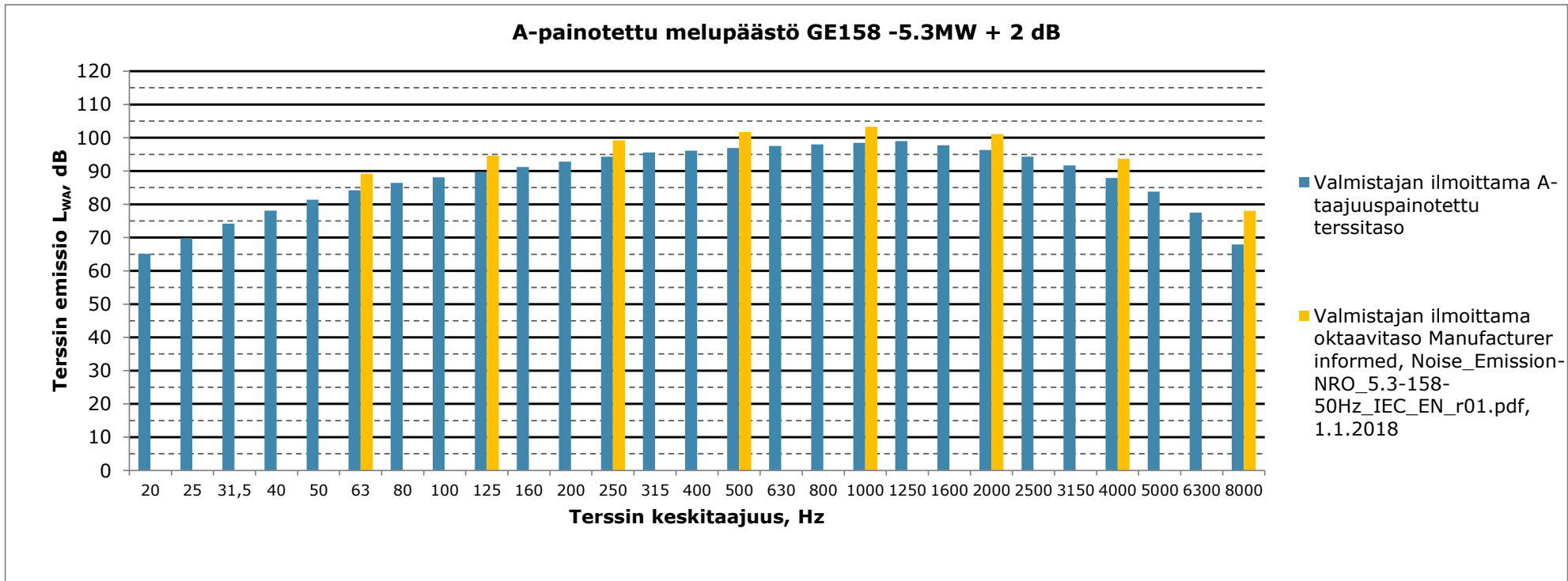
🏠 Noise sensitive area

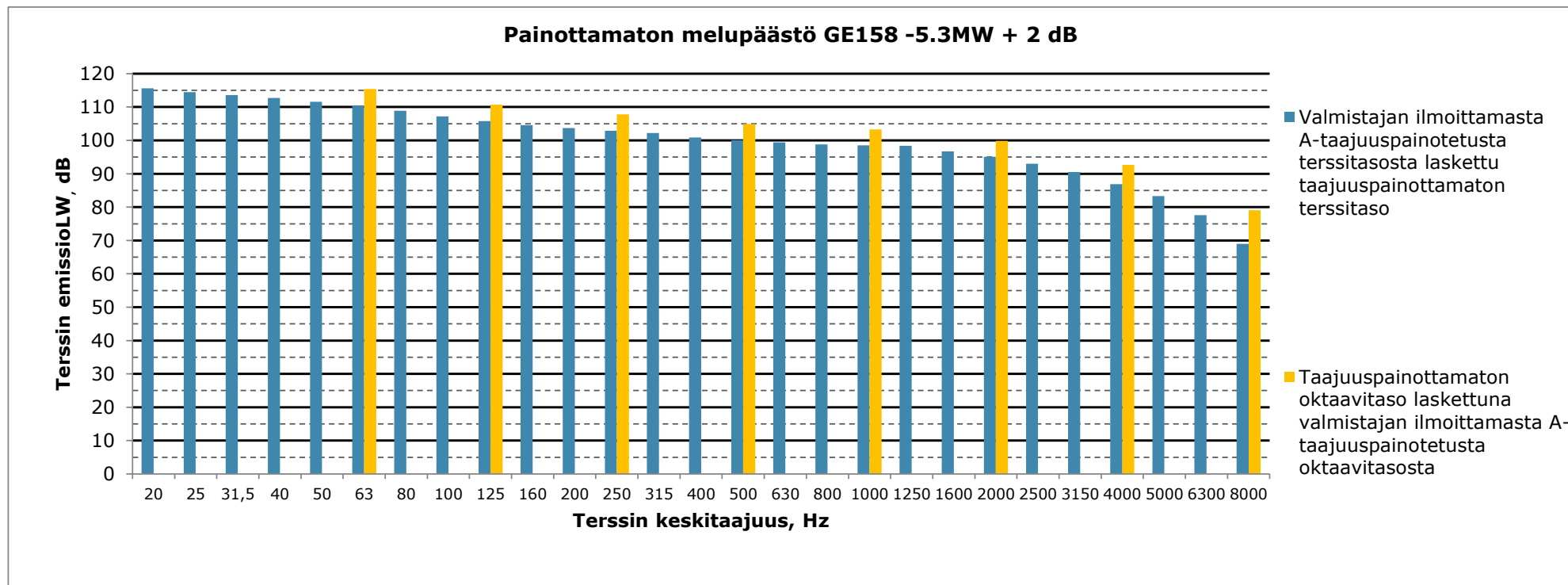
Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s

Height above sea level from active line object

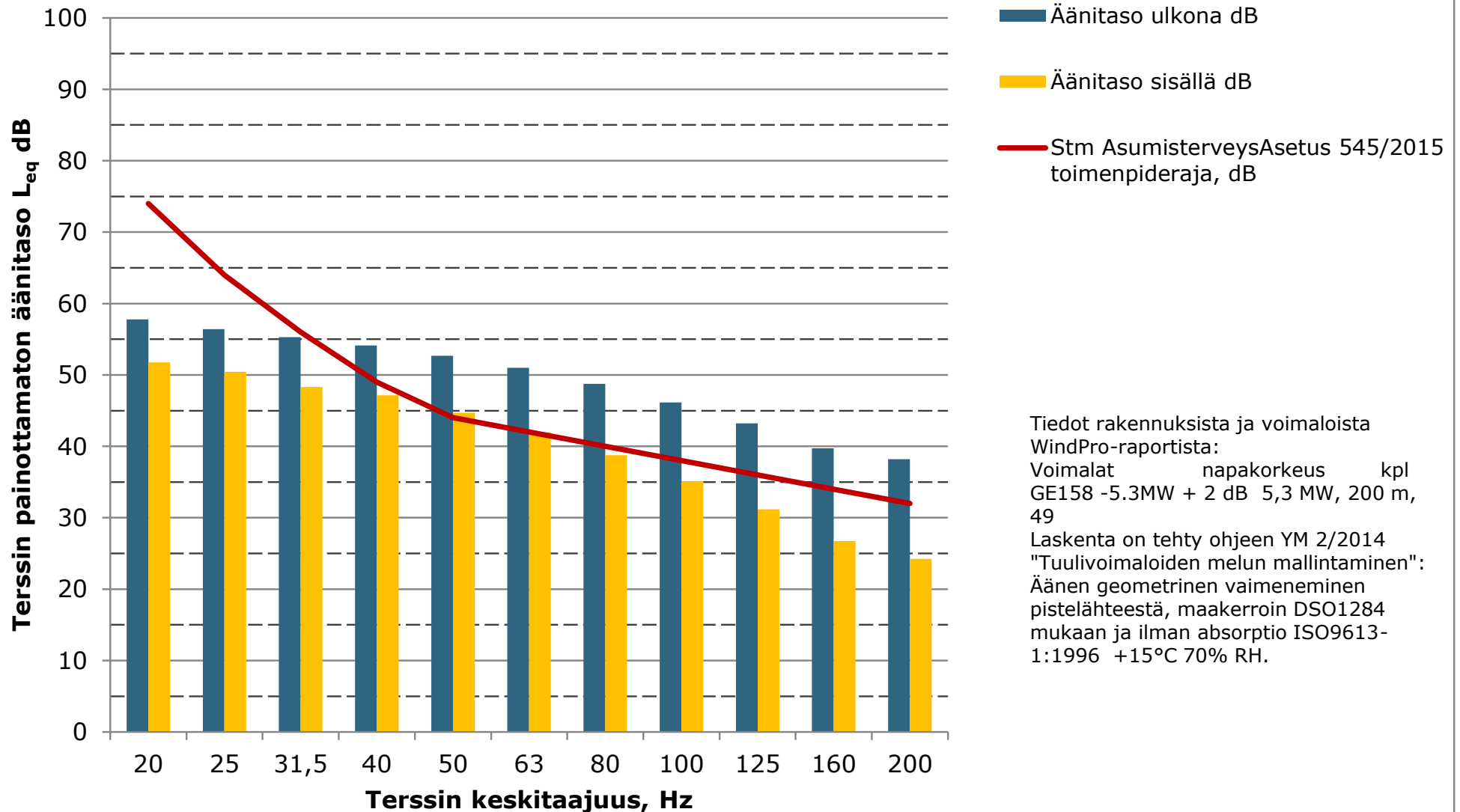
25.11.2020

Liite 3: Puutionsaari - Matalataajuisen melun rakennuskohtaiset arvot

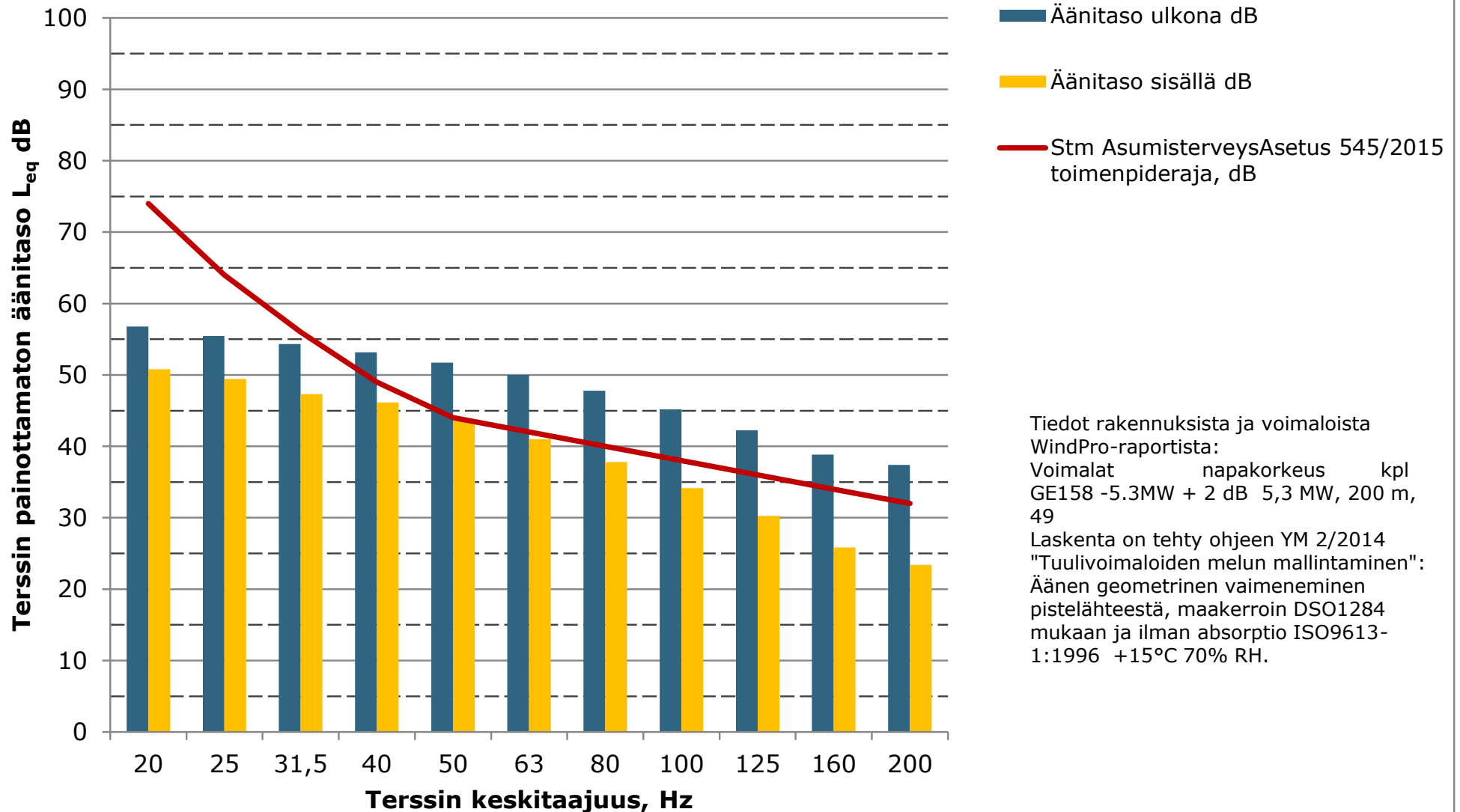




**Matalien taajuuksien äänitasot ulkona ja sisällä, autiotalo C (Perkkiöntie 382),
ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti
DL90 mukaan**



Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus D (Alakyläntie 243), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

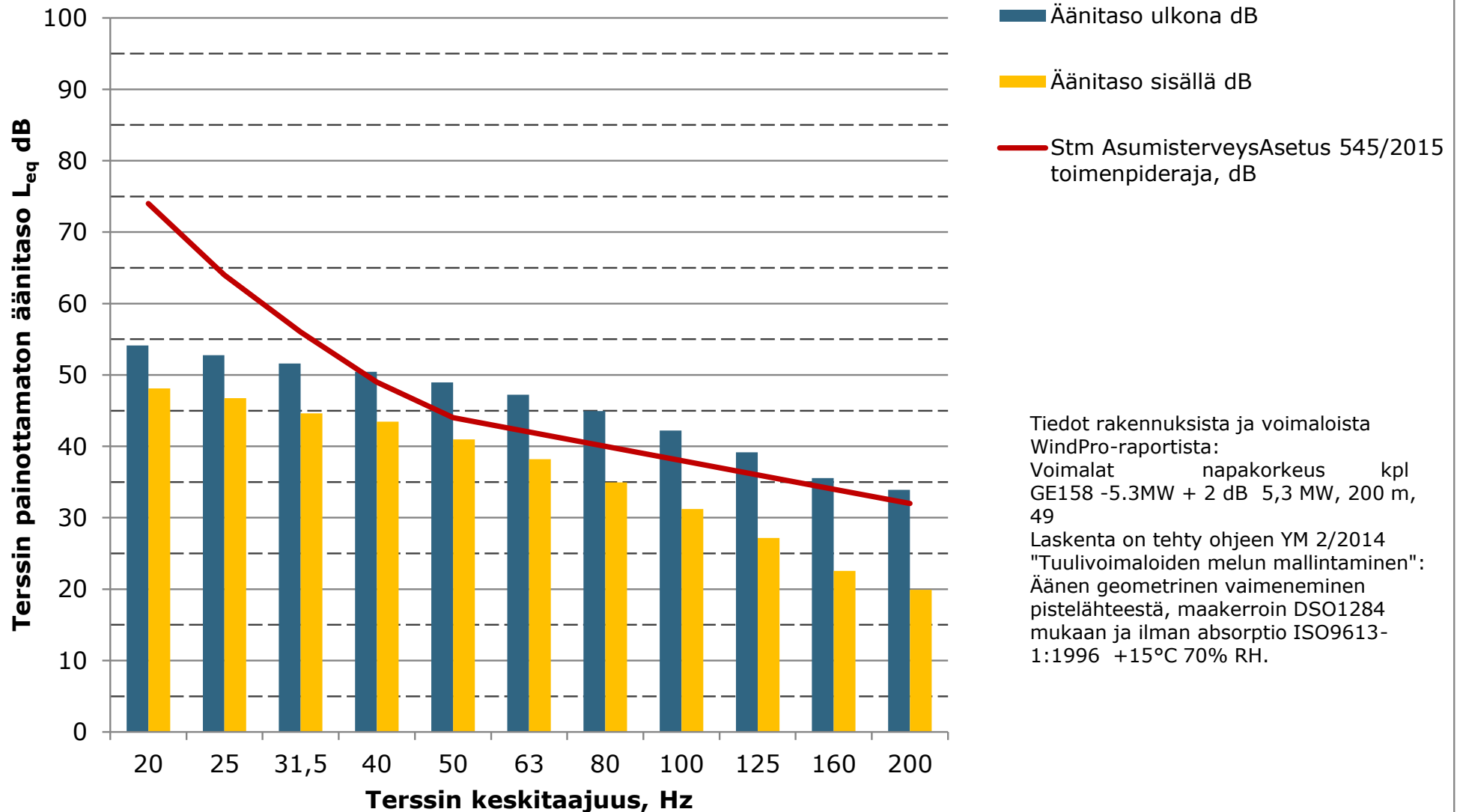


Tiedot rakennuksista ja voimaloista
WindPro-raportista:

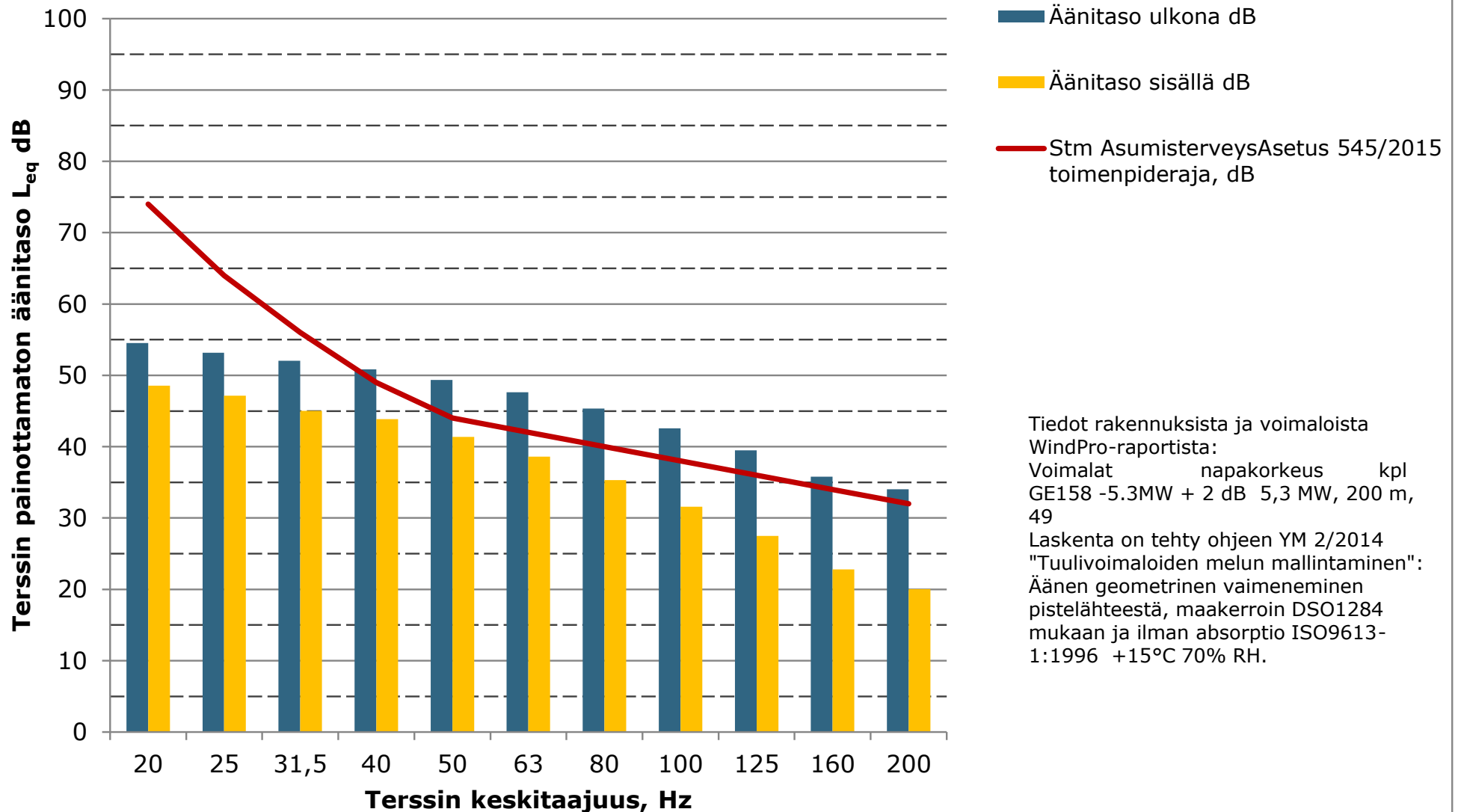
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m,
49

Laskenta on tehty ohjeen YM 2/2014
"Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen
pistelähteestä, maakerroin DSO1284
mukaan ja ilman absorptio ISO9613-
1:1996 +15°C 70% RH.

**Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus E
(Kellokankaan metsätie), ääneneristävyyys Keränen, Hakala, Hongisto 2017,
vähimmäisarvon estimaatti DL90 mukaan**



Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus F (Ollilantie 112), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

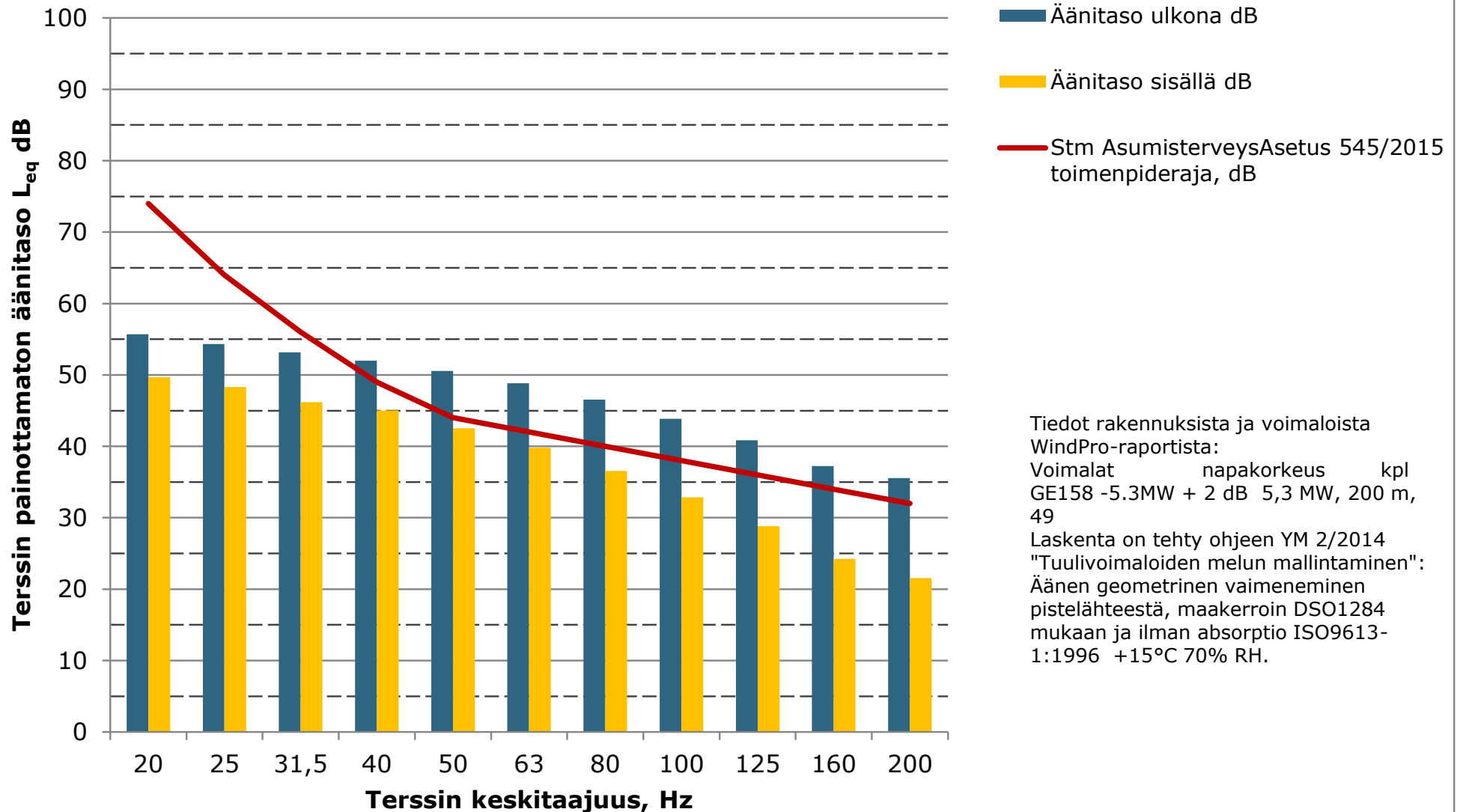


Tiedot rakennuksista ja voimaloista
WindPro-raportista:

Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m,
49

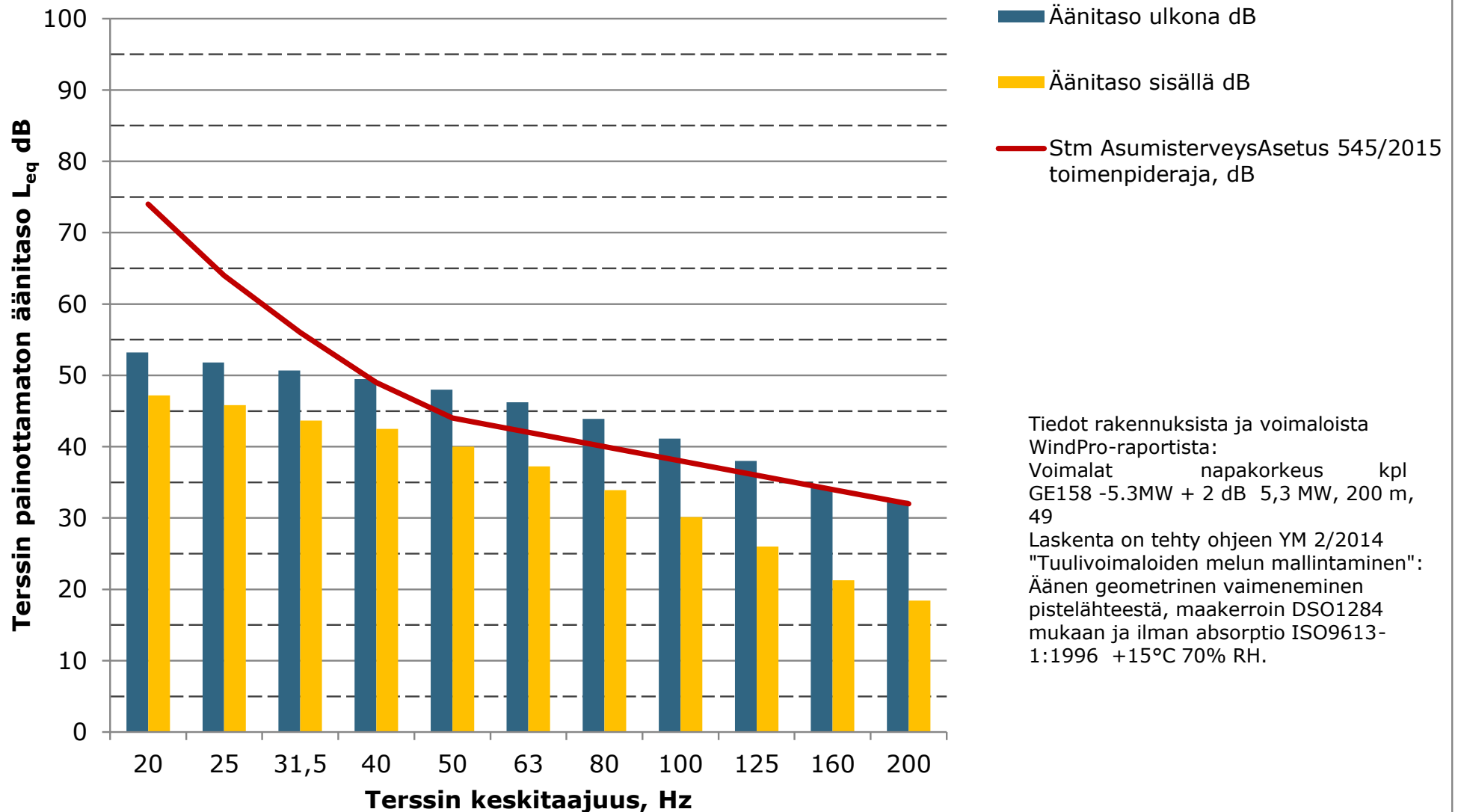
Laskenta on tehty ohjeen YM 2/2014
"Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen
pistelähteestä, maakerroin DSO1284
mukaan ja ilman absorptio ISO9613-
1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus G (Ollilantie, Siliäkuru), ääneneristävyys Keränen, Hakala, Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



Tiedot rakennuksista ja voimaloista
WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m,
49
Laskenta on tehty ohjeen YM 2/2014
"Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen
pistelähteestä, maakerroin DSO1284
mukaan ja ilman absorptio ISO9613-
1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus H (Pinolantie 406), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

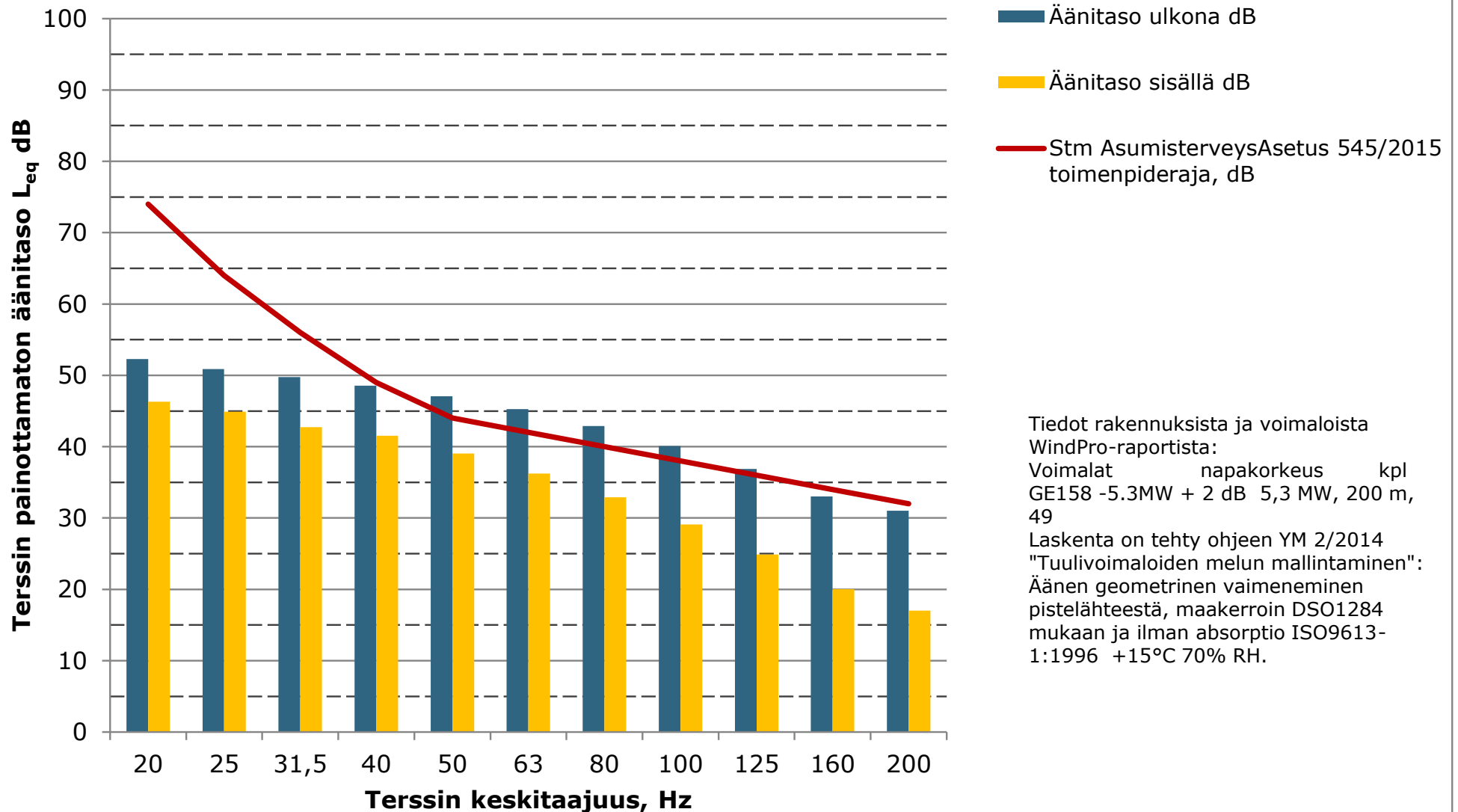


Tiedot rakennuksista ja voimaloista
WindPro-raportista:

Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m,
49

Laskenta on tehty ohjeen YM 2/2014
"Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen
pistelähteestä, maakerroin DSO1284
mukaan ja ilman absorptio ISO9613-
1:1996 +15°C 70% RH.

**Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus I
(Kortenevantie 116), ääneneristävyys Keränen, Hakala, Hongisto 2017,
vähimmäisarvon estimaatti DL90 mukaan**

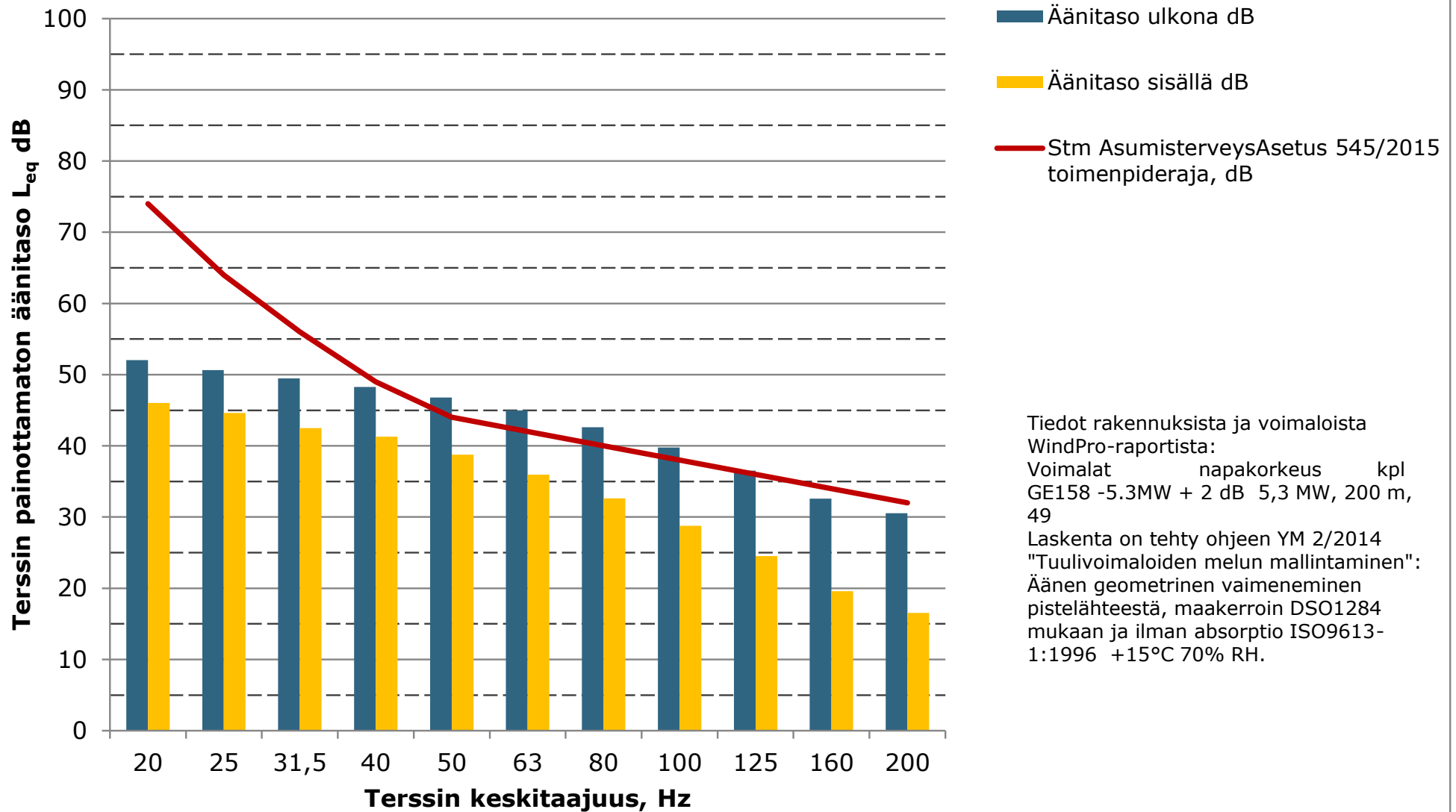


Tiedot rakennuksista ja voimaloista
WindPro-raportista:

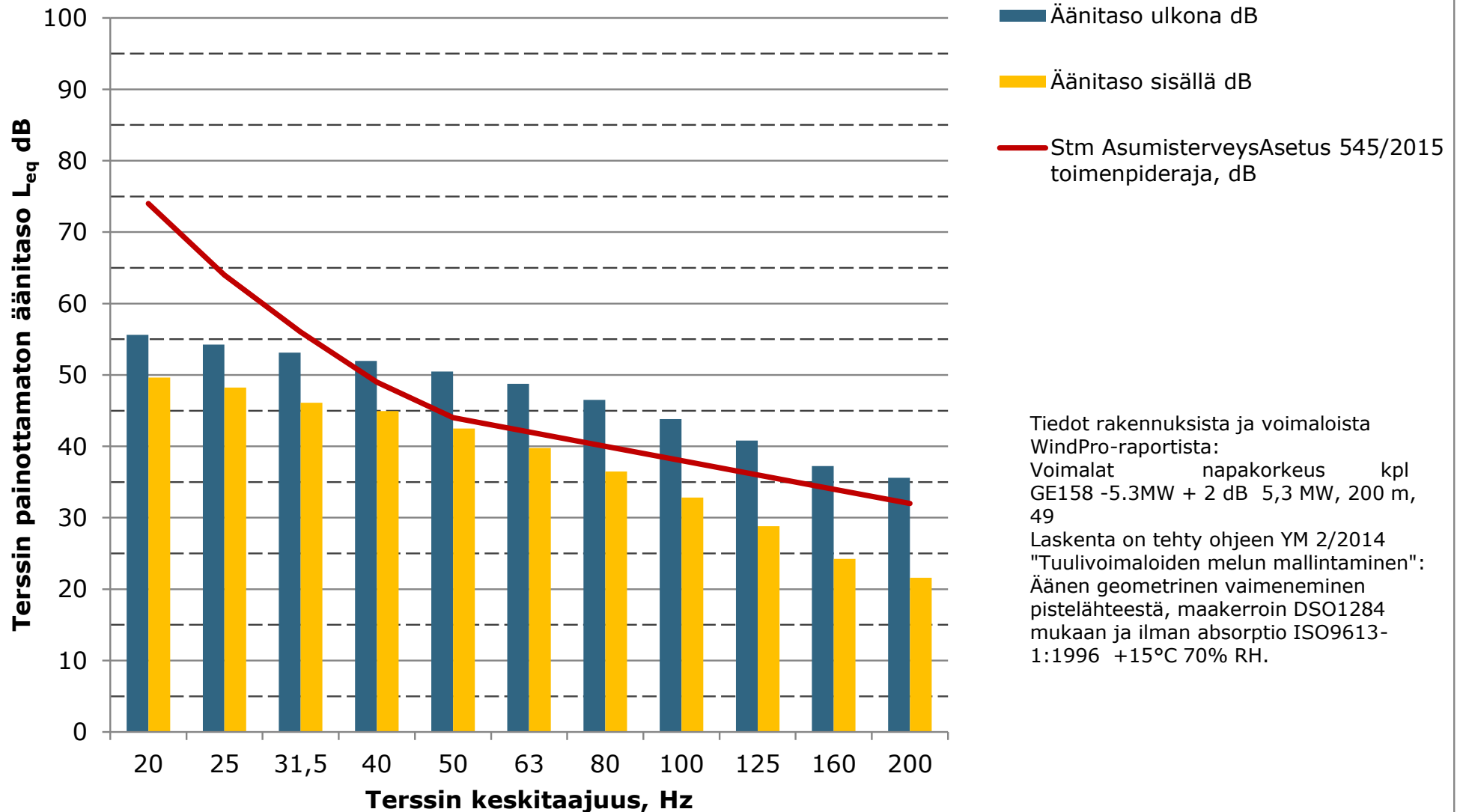
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m,
49

Laskenta on tehty ohjeen YM 2/2014
"Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen
pistelähteestä, maakerroin DSO1284
mukaan ja ilman absorptio ISO9613-
1:1996 +15°C 70% RH.

**Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus J
(Haapavesitie 1406), ääneneristävyys Keränen, Hakala, Hongisto 2017,
vähimmäisarvon estimaatti DL90 mukaan**

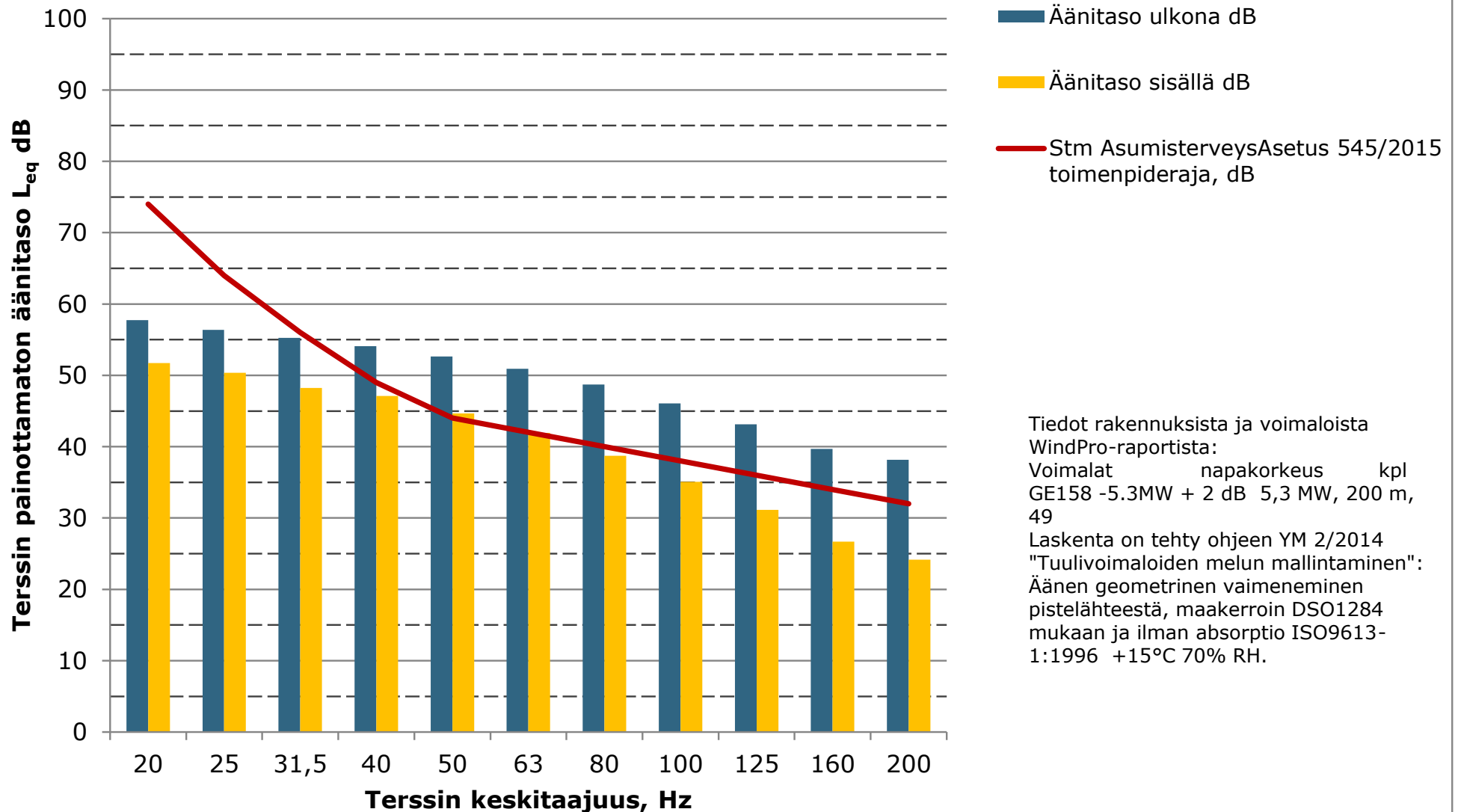


**Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus K (Kurunoja),
ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti
DL90 mukaan**

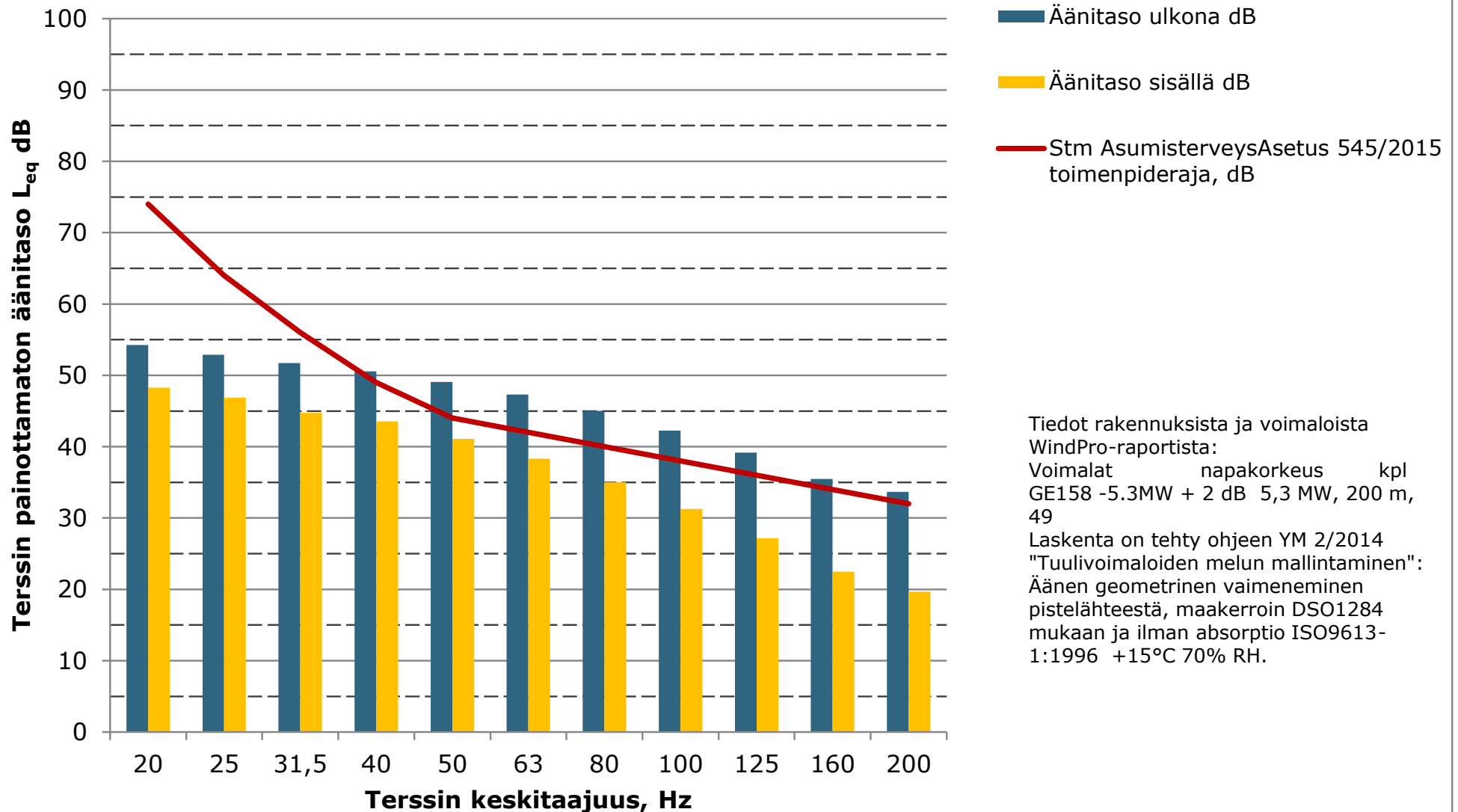


Tiedot rakennuksista ja voimaloista
WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m,
49
Laskenta on tehty ohjeen YM 2/2014
"Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen
pistelähteestä, maakerroin DSO1284
mukaan ja ilman absorptio ISO9613-
1:1996 +15°C 70% RH.

**Matalien taajuuksien äänitasot ulkona ja sisällä, Muu käyttötarkoitus L
(Perkkiontie, Ilmola), ääneneristävyys Keränen, Hakala, Hongisto 2017,
vähimmäisarvon estimaatti DL90 mukaan**



Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus M (Riskalan metsatie), ääneneristävyys Keränen, Hakala, Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



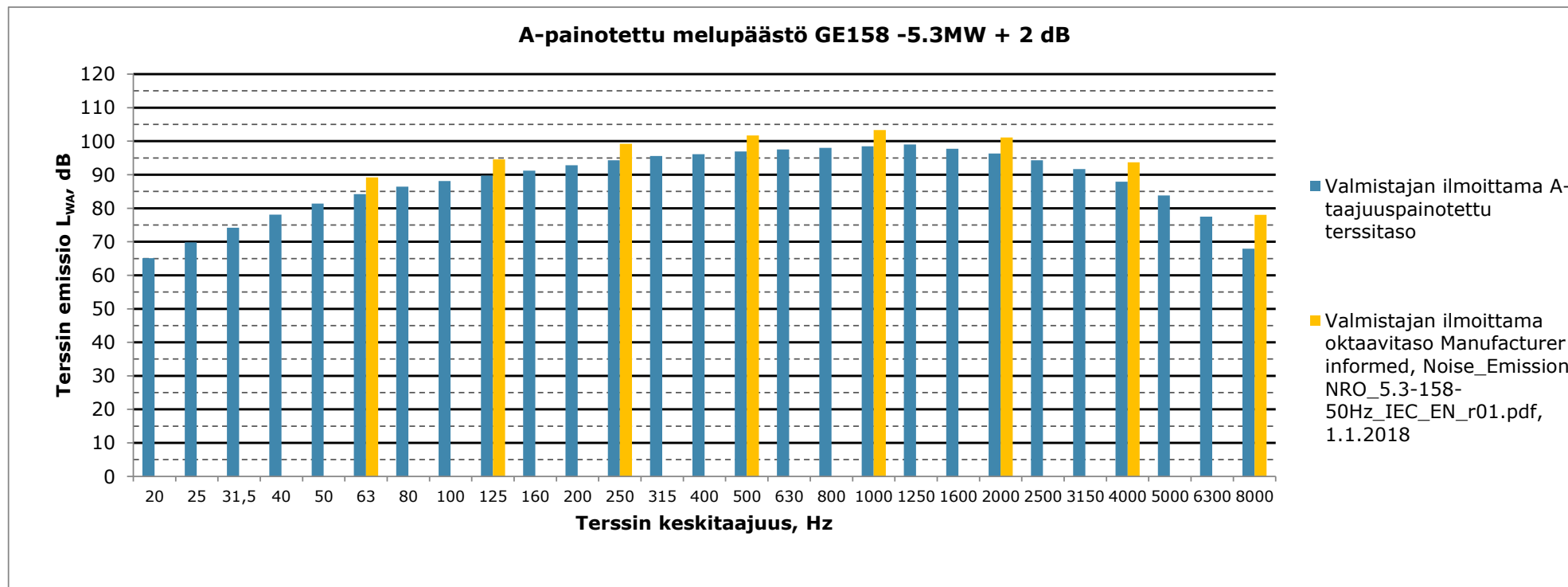
Tiedot rakennuksista ja voimaloista
WindPro-raportista:

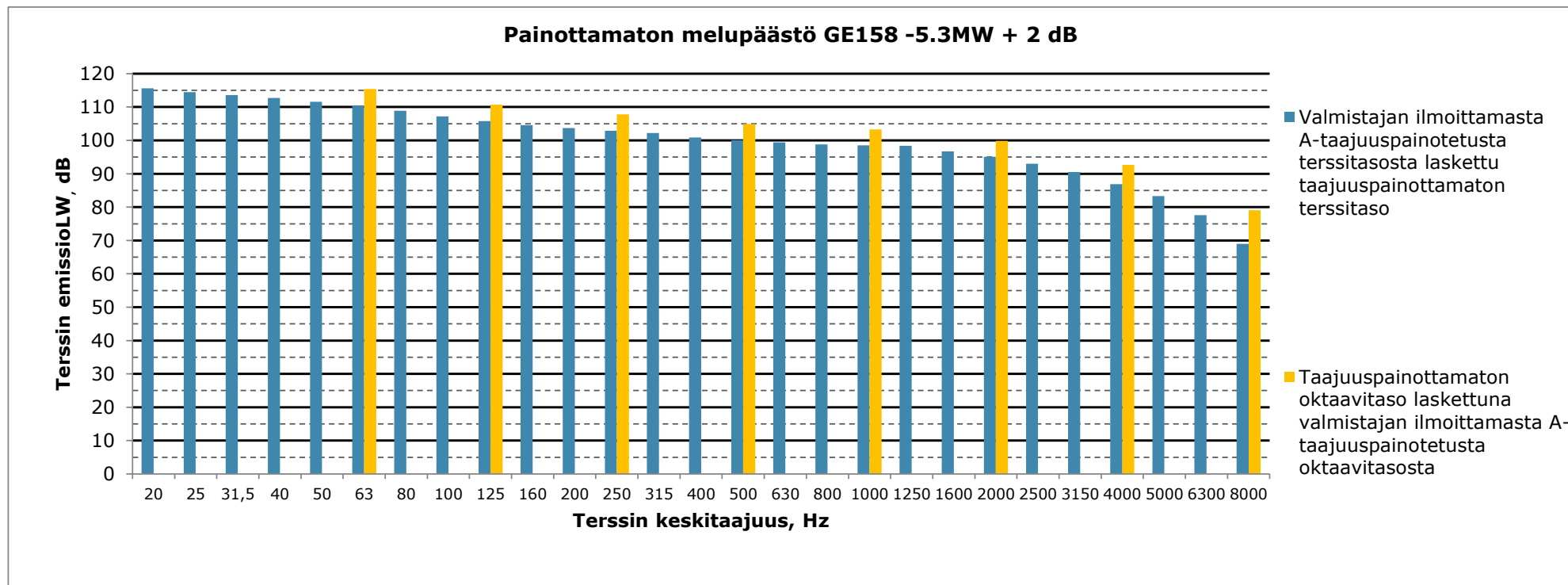
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m,
49

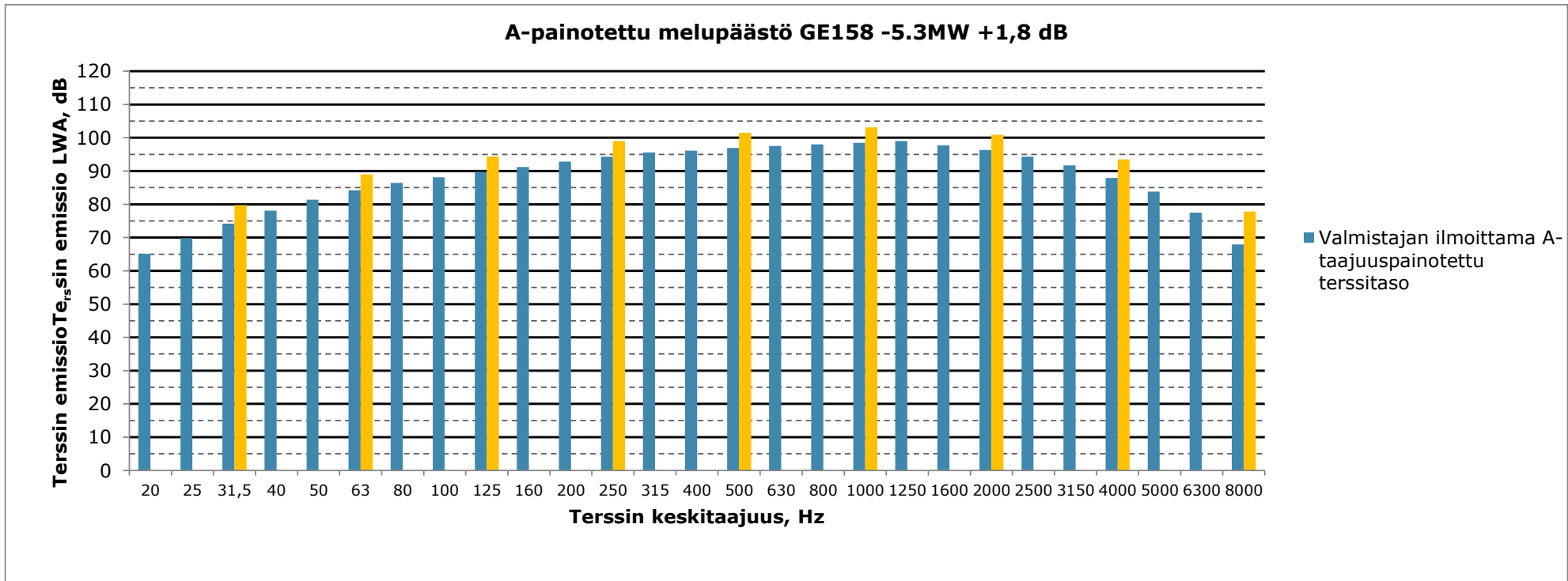
Laskenta on tehty ohjeen YM 2/2014
"Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen
pistelähteestä, maakerroin DSO1284
mukaan ja ilman absorptio ISO9613-
1:1996 +15°C 70% RH.

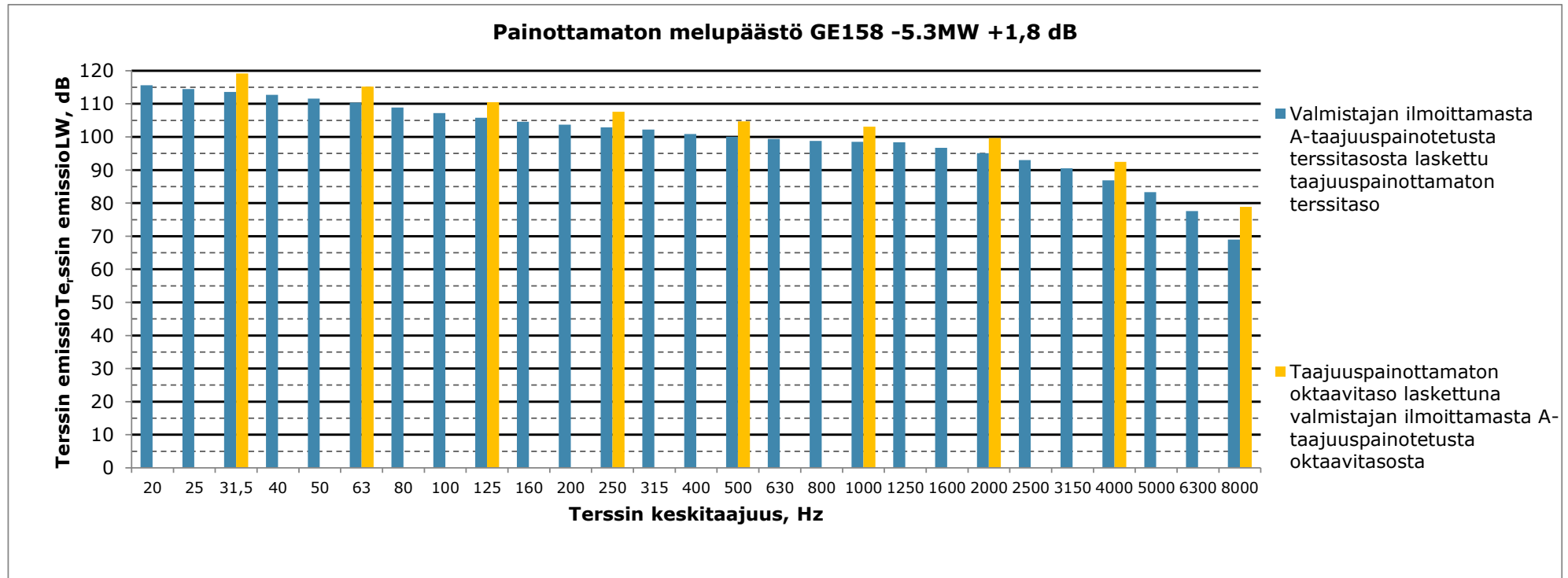
25.11.2020

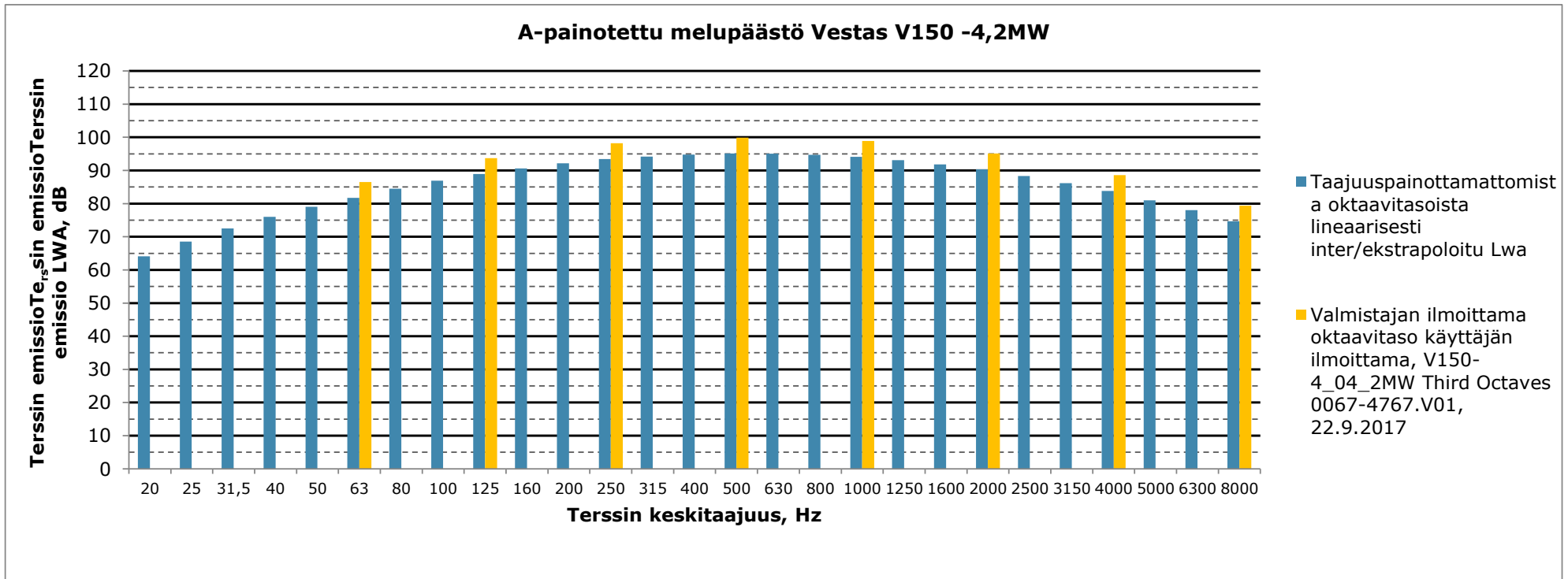
Liite 4: Puutionsaari - Matalataajuisen melun yhteismallinnuksen rakennuskohtaiset arvot

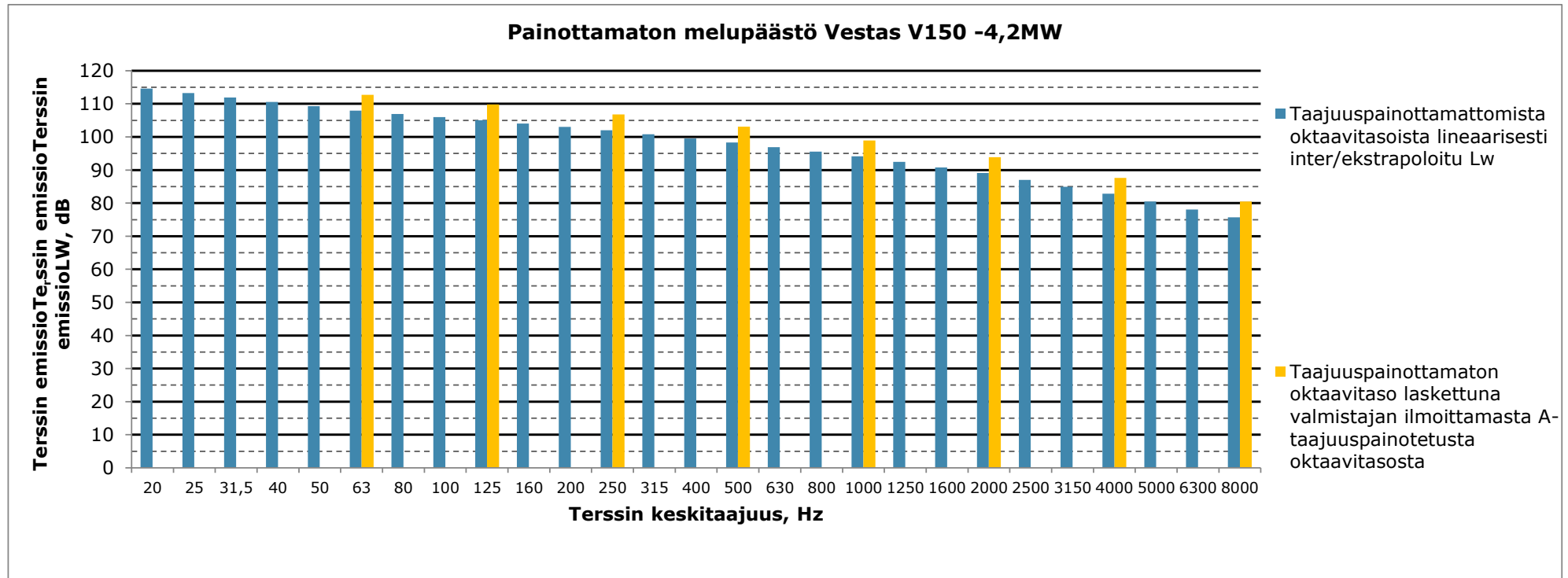




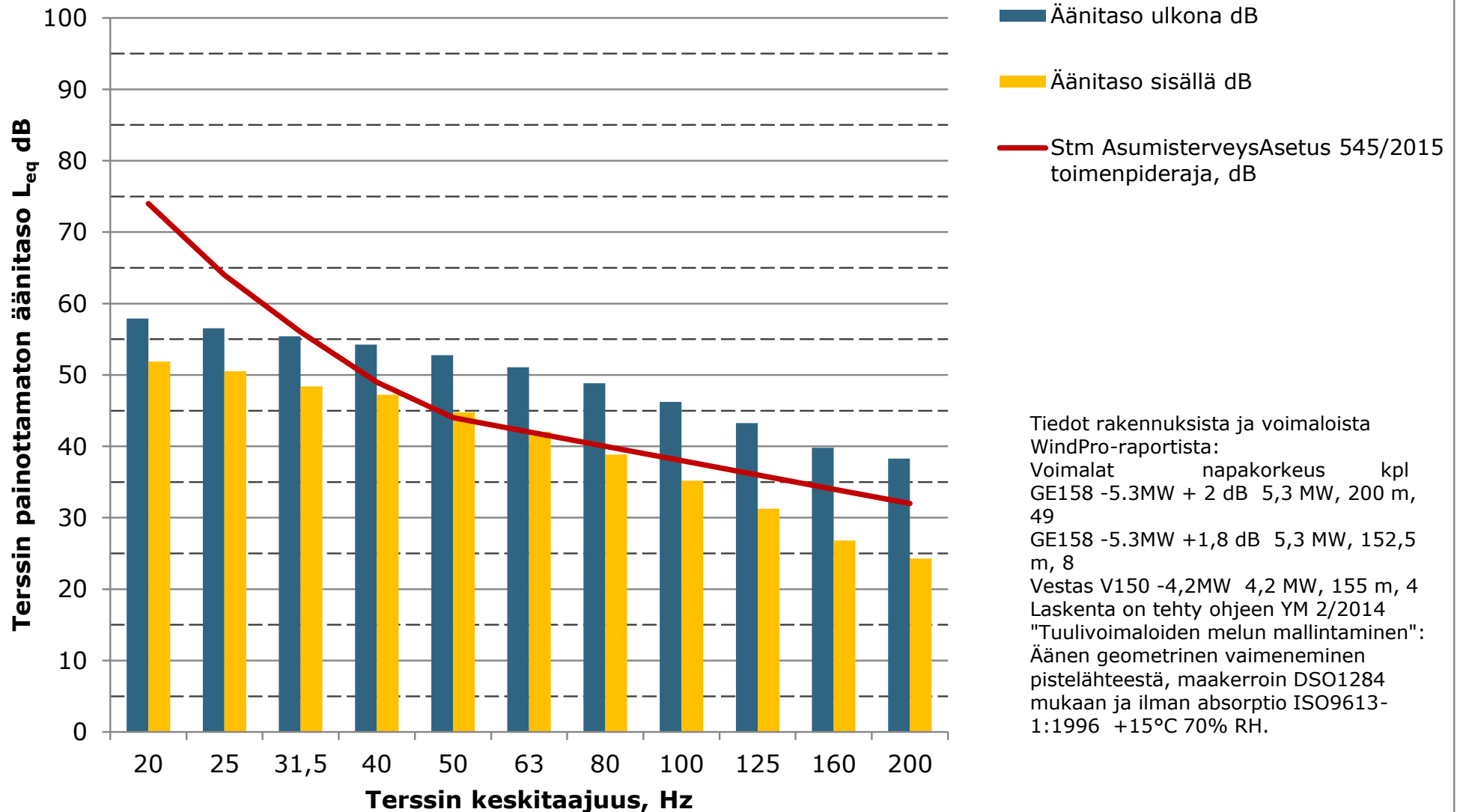




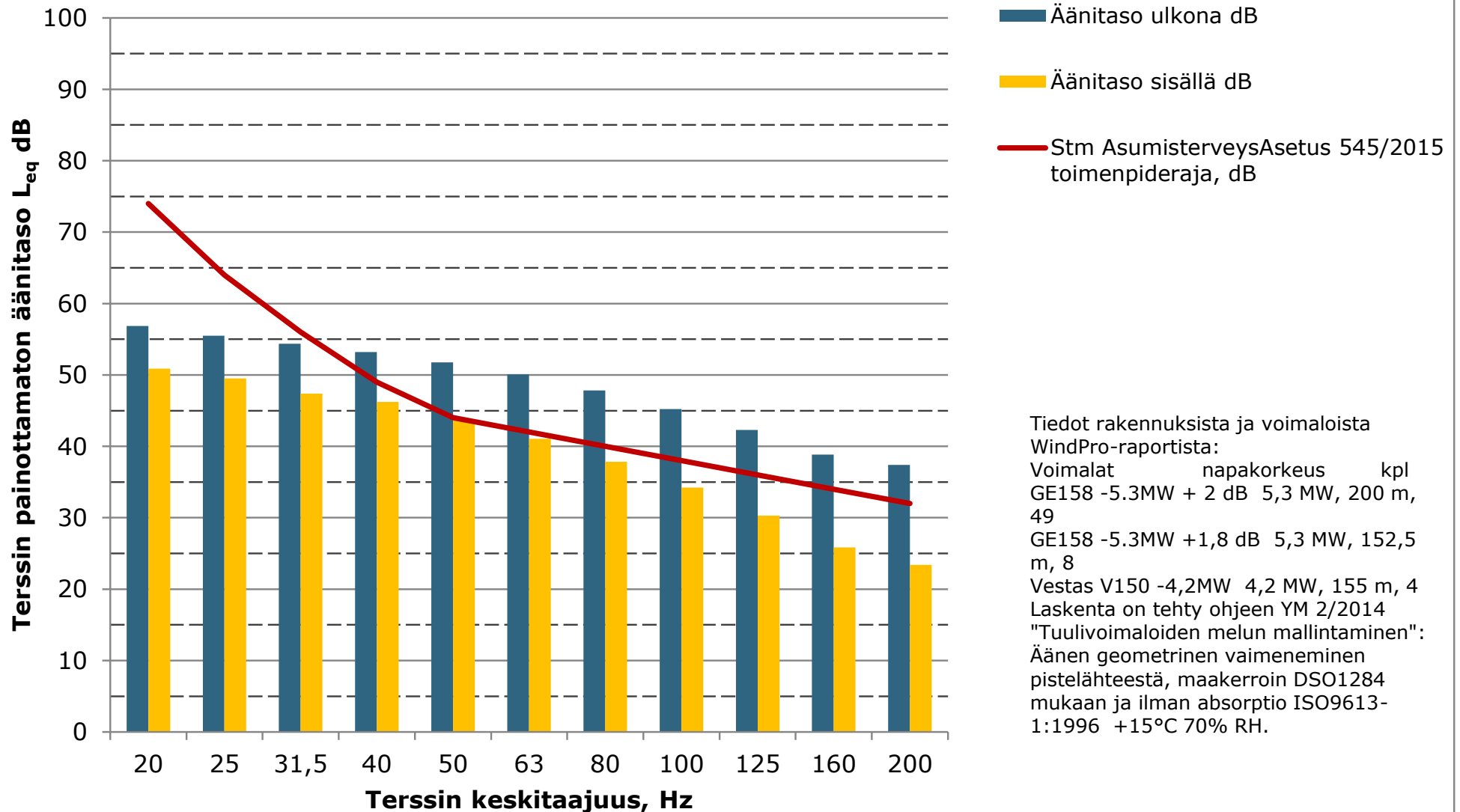




**Matalien taajuuksien äänitasot ulkona ja sisällä, autiotalo C (Perkkiöntie 382),
ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti
DL90 mukaan**

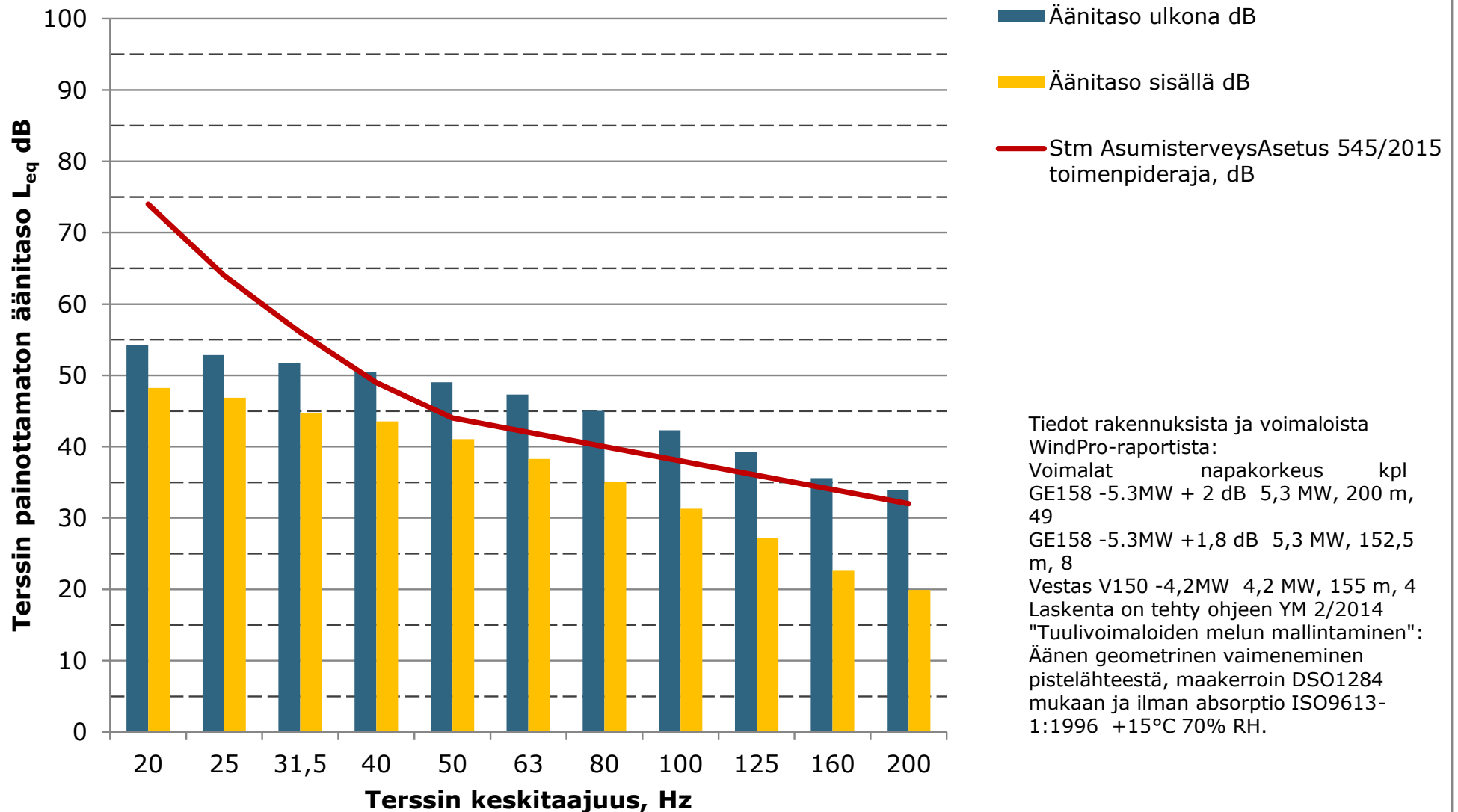


Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus D (Alakyläntie 243), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

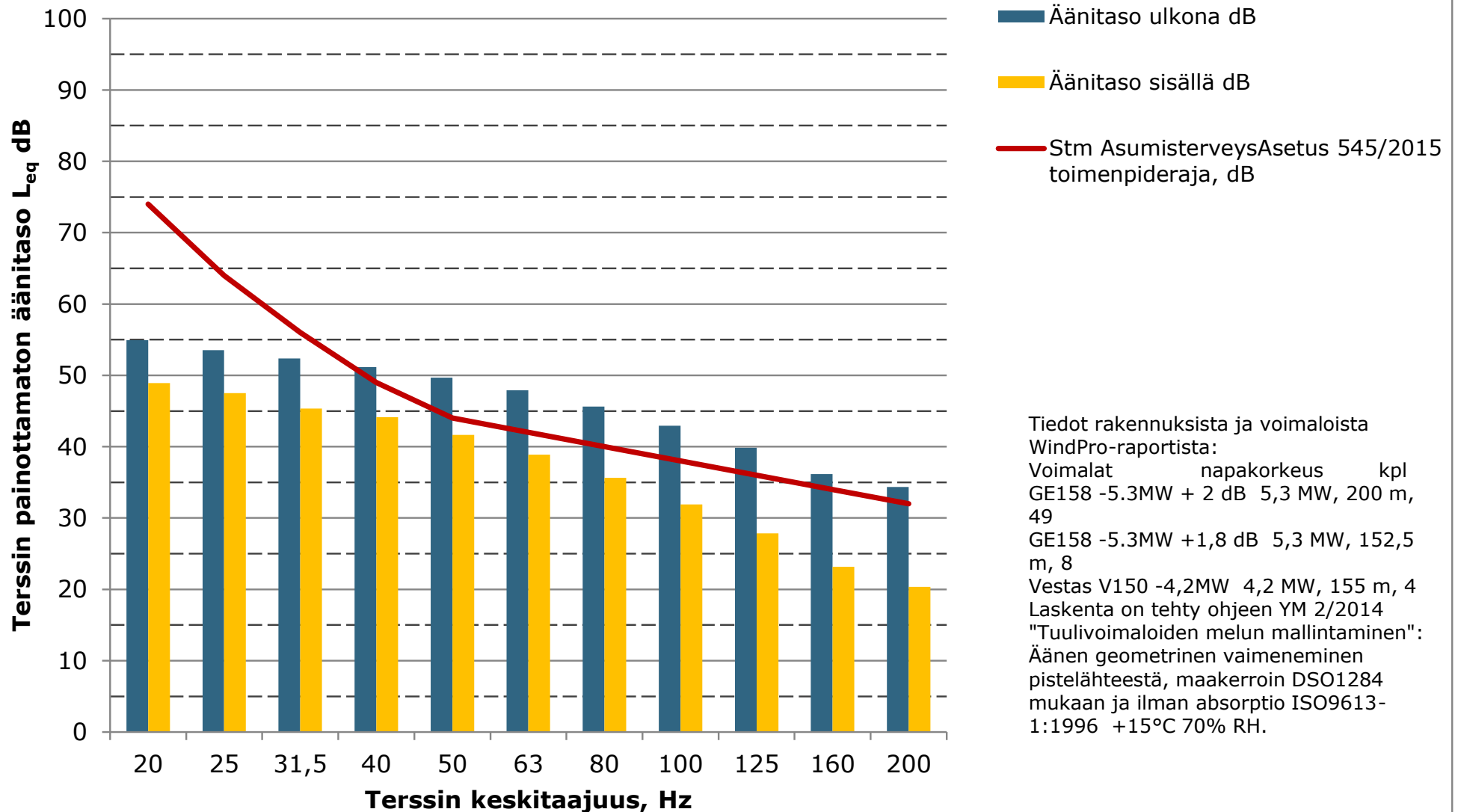


Tiedot rakennuksista ja voimaloista
WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
GE158 -5.3MW +1,8 dB 5,3 MW, 152,5 m, 8
Vestas V150 -4,2MW 4,2 MW, 155 m, 4
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

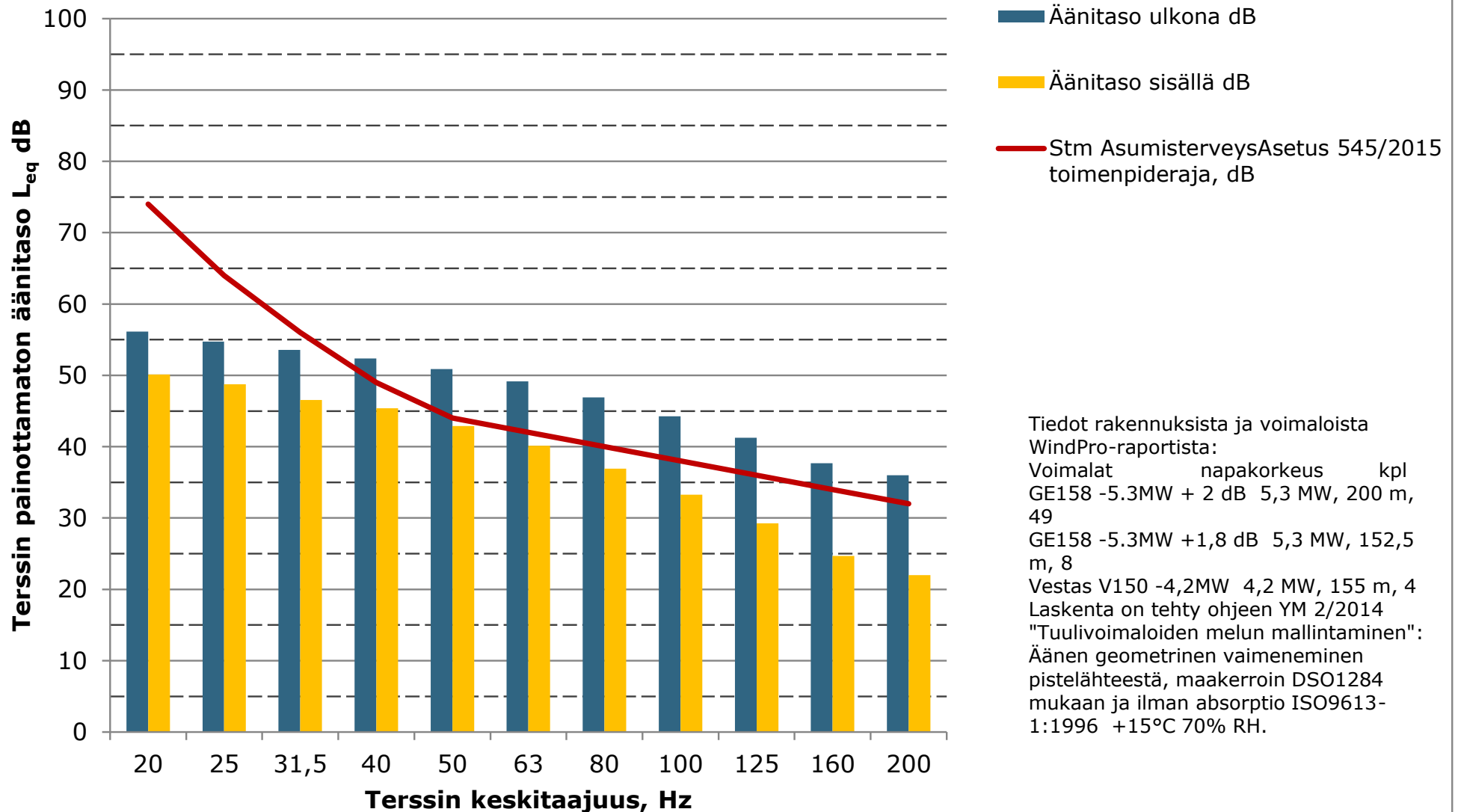
**Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus E
(Kellokankaan metsätie), ääneneristävyys Keränen, Hakala, Hongisto 2017,
vähimmäisarvon estimaatti DL90 mukaan**



Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus F (Ollilantie 112), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

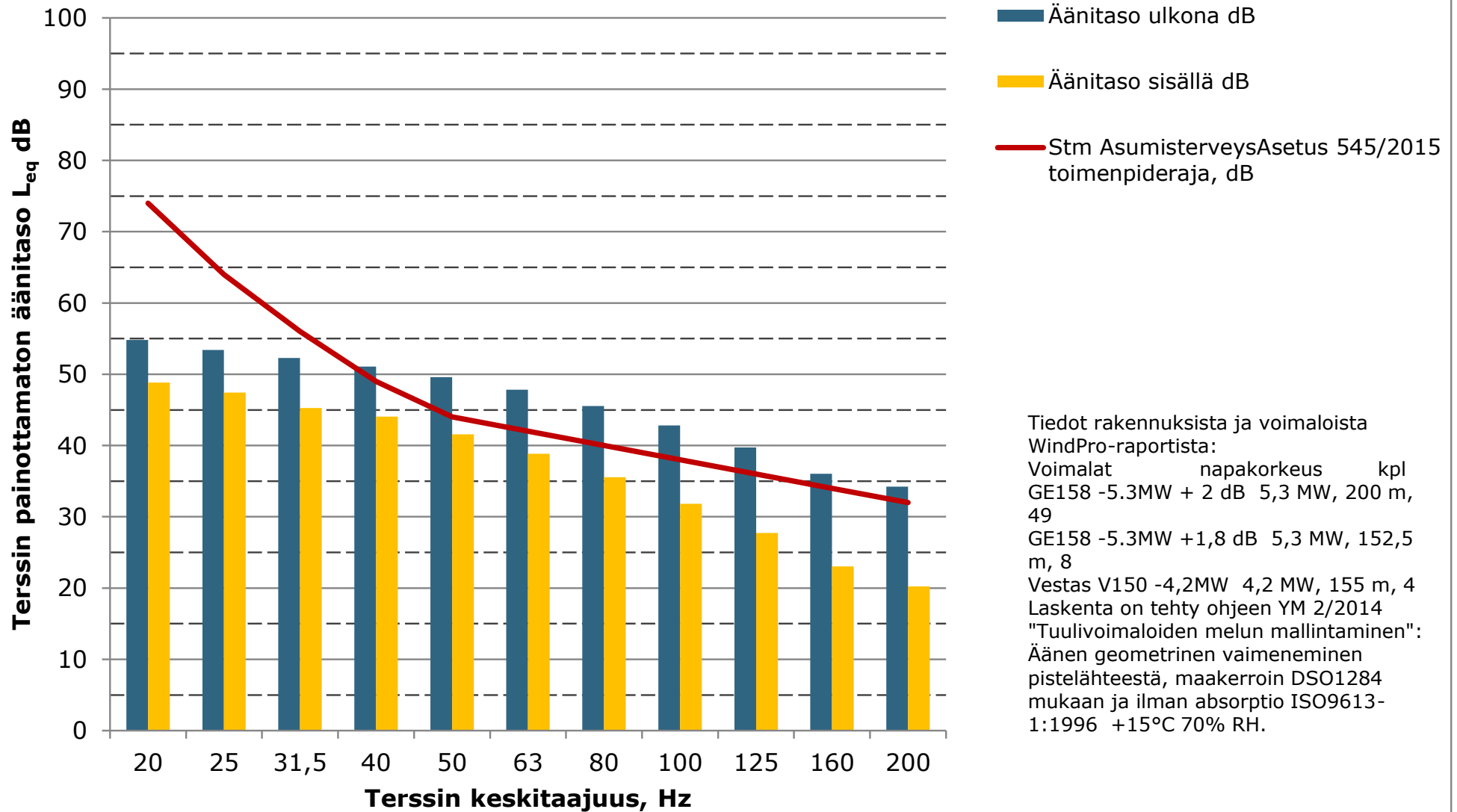


Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus G (Ollilantie, Siliäkuru), ääneneristävyys Keränen, Hakala, Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



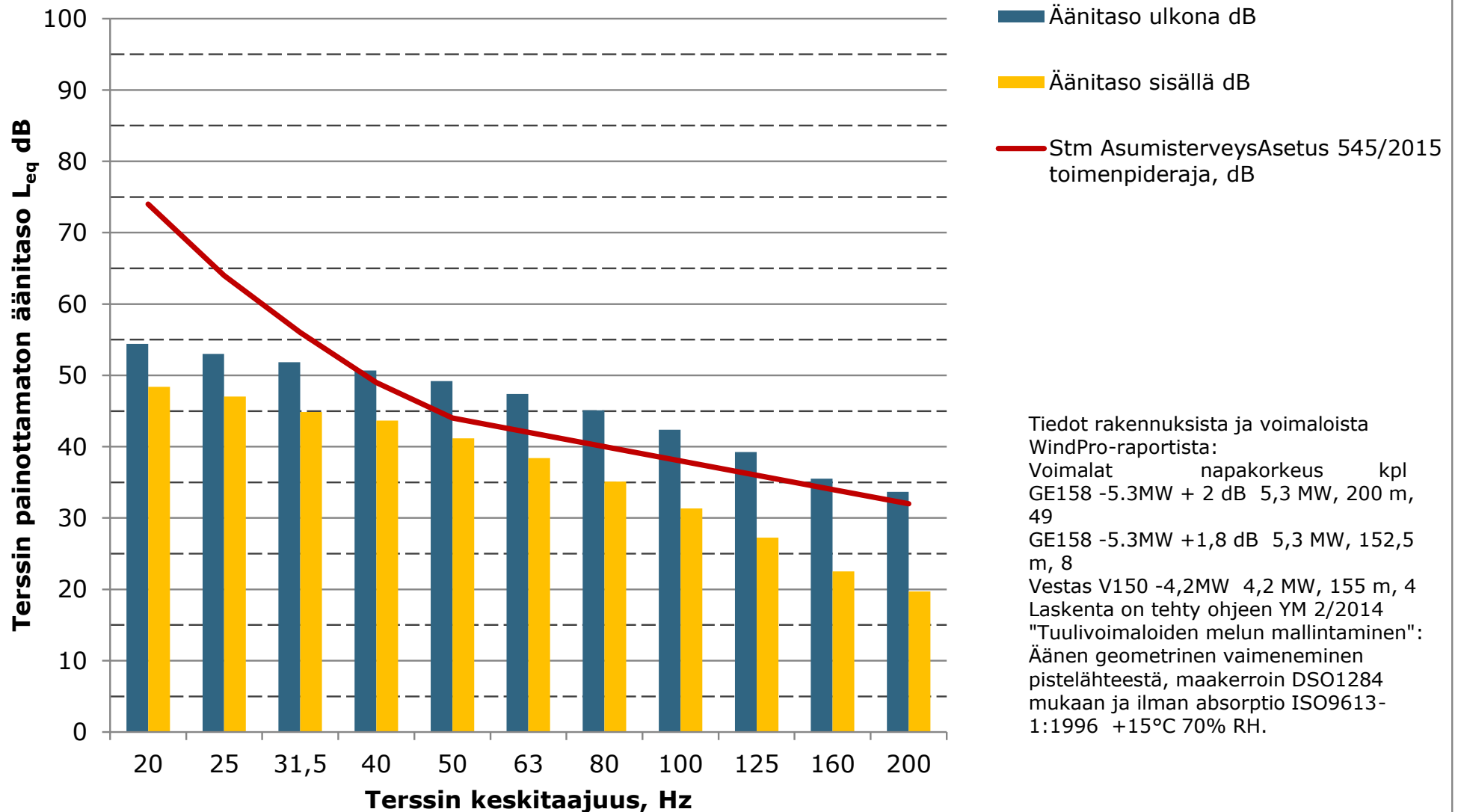
Tiedot rakennuksista ja voimaloista
WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
GE158 -5.3MW +1,8 dB 5,3 MW, 152,5 m, 8
Vestas V150 -4,2MW 4,2 MW, 155 m, 4
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus H (Pinolantie 406), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



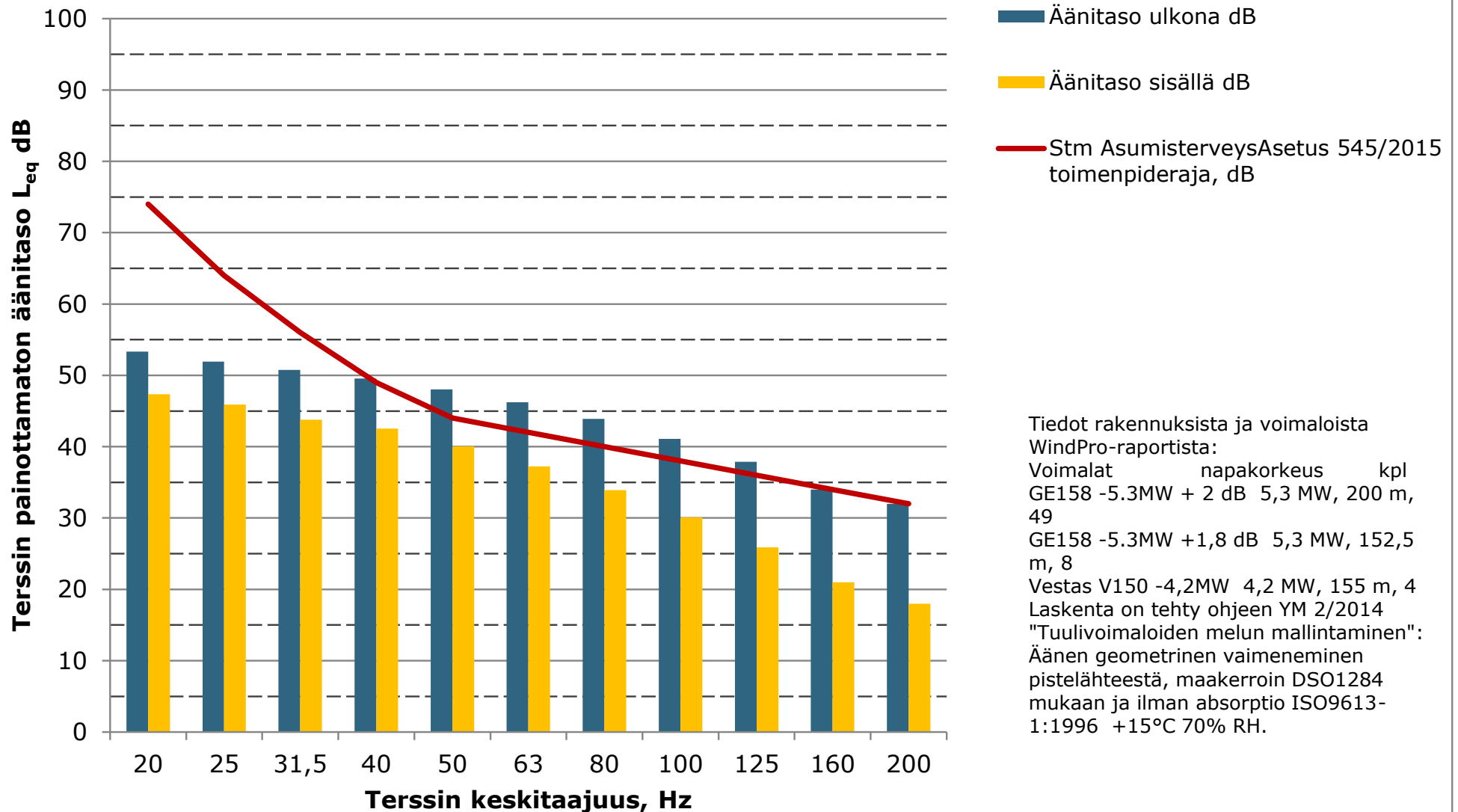
Tiedot rakennuksista ja voimaloista
WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
GE158 -5.3MW +1,8 dB 5,3 MW, 152,5 m, 8
Vestas V150 -4,2MW 4,2 MW, 155 m, 4
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

**Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus I
(Kortenevantie 116), ääneneristävyys Keränen, Hakala, Hongisto 2017,
vähimmäisarvon estimaatti DL90 mukaan**

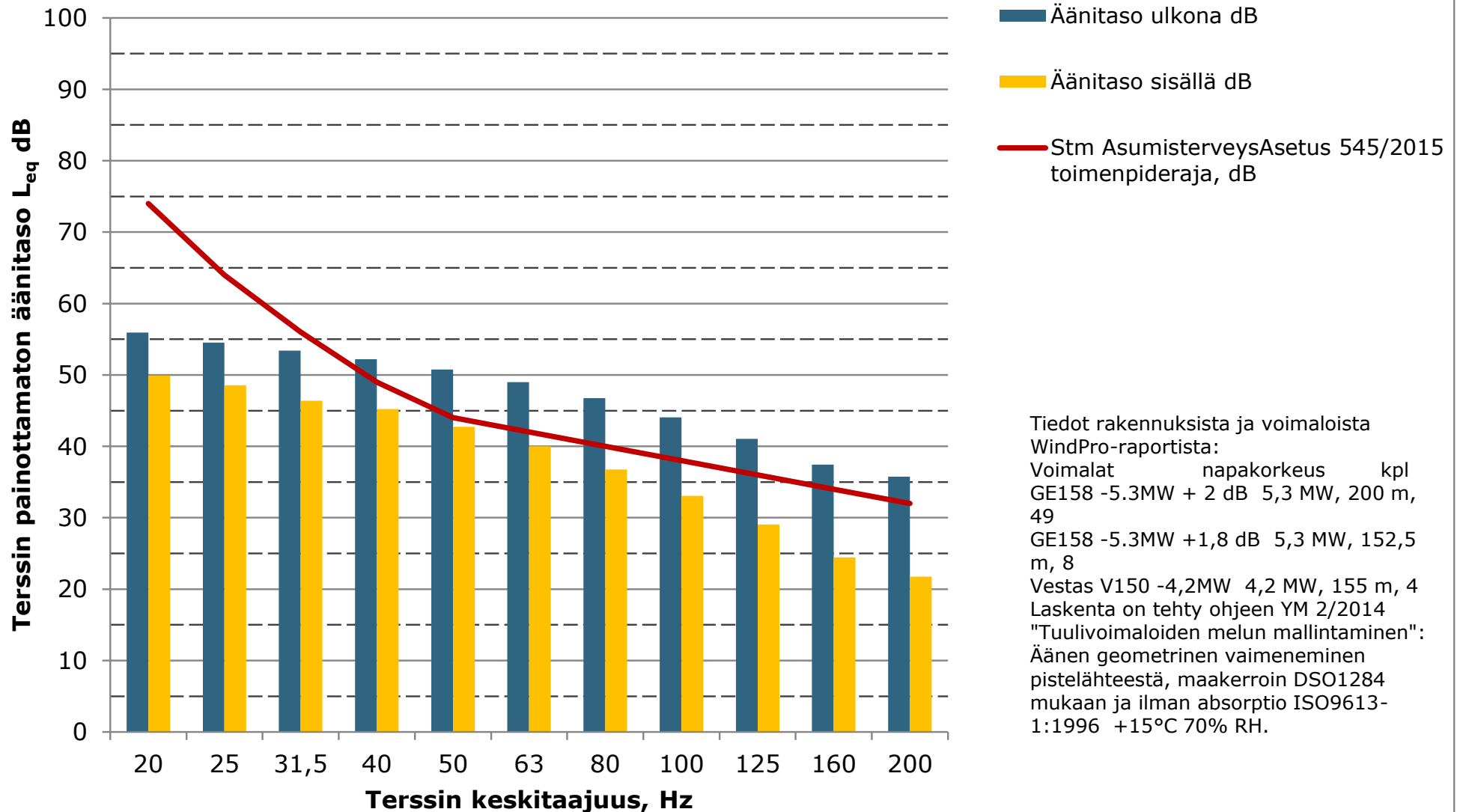


Tiedot rakennuksista ja voimaloista
WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m,
49
GE158 -5.3MW +1,8 dB 5,3 MW, 152,5
m, 8
Vestas V150 -4,2MW 4,2 MW, 155 m, 4
Laskenta on tehty ohjeen YM 2/2014
"Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen
pistelähteestä, maakerroin DSO1284
mukaan ja ilman absorptio ISO9613-
1:1996 +15°C 70% RH.

**Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus J
(Haapavesitie 1406), ääneneristävyys Keränen,Hakala,Hongisto 2017,
vähimmäisarvon estimaatti DL90 mukaan**

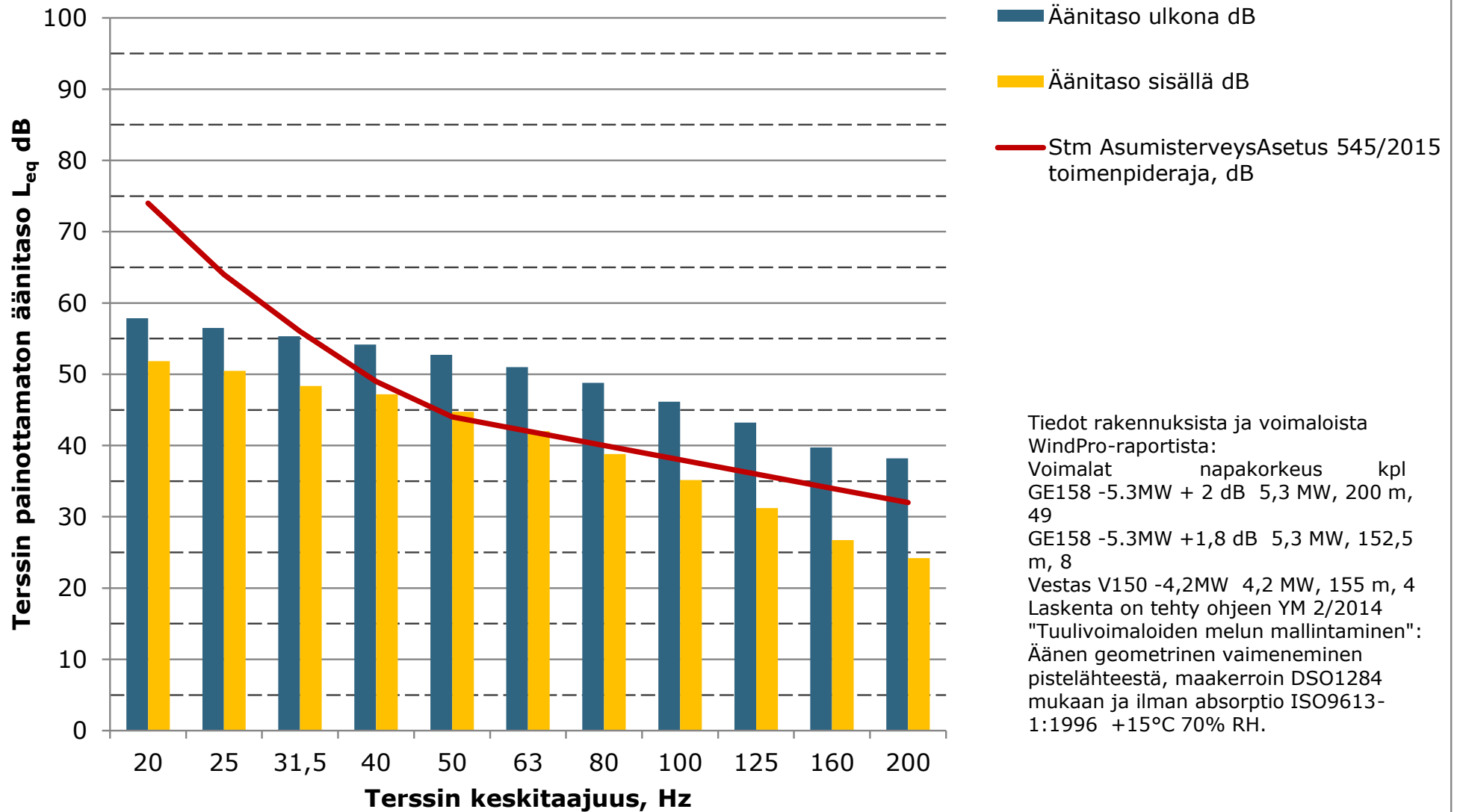


**Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakenus K (Kurunoja),
ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti
DL90 mukaan**

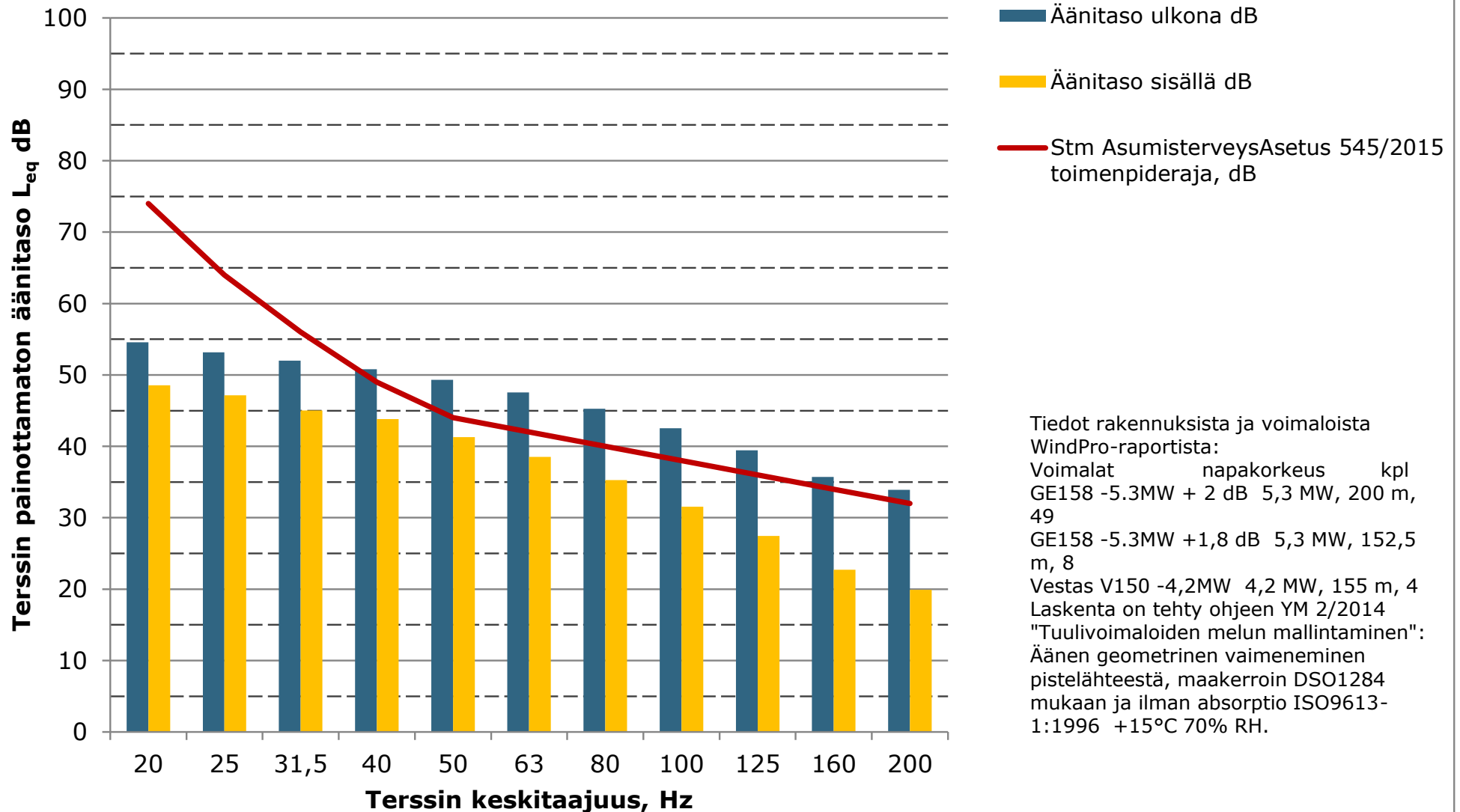


Tiedot rakennuksista ja voimaloista
WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m,
49
GE158 -5.3MW +1,8 dB 5,3 MW, 152,5
m, 8
Vestas V150 -4,2MW 4,2 MW, 155 m, 4
Laskenta on tehty ohjeen YM 2/2014
"Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen
pistelähteestä, maakerroin DSO1284
mukaan ja ilman absorptio ISO9613-
1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Muu käyttötarkoitus L (Perkkiontie, Ilmola), ääneneristävyys Keränen, Hakala, Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus M (Riskalan metsatie), ääneneristävyys Keränen, Hakala, Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



25.11.2020

Liite 5: Puutionsaari - Varjostusmallinnusten tulokset "real case, no forest"

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational hours are calculated from WTGs in calculation and wind distribution:

MERRA_basic_E25.335_N64.000 (3)

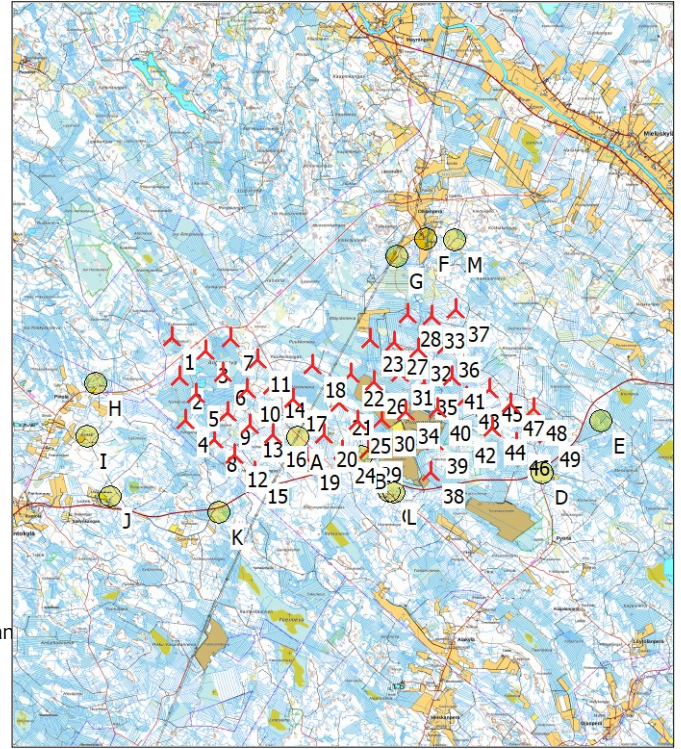
Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Puutionsaari_Riskalan
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:200 000
New WTG Shadow receptor

WTGs

Row	East	North	Z	Row data/Description	WTG type			Shadow data				
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
1	398 896	7 112 332	92,5	PUU01	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
2	399 097	7 111 286	95,0	PUU02	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
3	399 784	7 111 972	97,5	PUU03	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
4	399 264	7 110 151	97,1	PUU04	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
5	399 536	7 110 832	96,4	PUU05	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
6	400 239	7 111 382	97,5	PUU06	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
7	400 444	7 112 292	97,0	PUU07	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
8	400 019	7 109 649	100,0	PUU08	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
9	400 380	7 110 348	100,0	PUU09	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
10	400 876	7 110 966	99,5	PUU10	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
11	401 152	7 111 752	100,0	PUU11	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
12	400 549	7 109 232	102,5	PUU12	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
13	400 953	7 110 020	102,5	PUU13	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
14	401 537	7 111 046	104,5	PUU14	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
15	401 068	7 108 792	105,3	PUU15	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
16	401 564	7 109 758	103,4	PUU16	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
17	402 089	7 110 702	107,5	PUU17	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
18	402 589	7 111 603	106,8	PUU18	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
19	402 455	7 109 148	112,5	PUU19	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
20	402 889	7 109 778	110,0	PUU20	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
21	403 318	7 110 593	108,0	PUU21	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
22	403 622	7 111 352	106,9	PUU22	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
23	404 117	7 112 276	103,6	PUU23	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
24	403 379	7 109 327	115,0	PUU24	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
25	403 790	7 110 129	108,4	PUU25	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
26	404 210	7 111 152	105,6	PUU26	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
27	404 739	7 112 199	105,0	PUU27	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
28	405 100	7 112 943	100,4	PUU28	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
29	404 061	7 109 351	110,0	PUU29	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
30	404 420	7 110 174	107,1	PUU30	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

To be continued on next page...

SHADOW - Main Result

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102

...continued from previous page

	East	North	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM
31	404 900	7 111 381	105,1	PUU31	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
32	405 395	7 112 030	102,4	PUU32	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
33	405 740	7 112 891	100,2	PUU33	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
34	405 042	7 110 380	105,8	PUU34	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
35	405 532	7 111 130	103,9	PUU35	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
36	406 114	7 112 133	103,1	PUU36	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
37	406 380	7 113 067	107,2	PUU37	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
38	405 707	7 108 791	110,8	PUU38	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
39	405 822	7 109 587	108,8	PUU39	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
40	405 893	7 110 455	104,9	PUU40	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
41	406 257	7 111 298	103,9	PUU41	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
42	406 558	7 109 872	106,6	PUU42	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
43	406 638	7 110 744	105,9	PUU43	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
44	407 324	7 109 954	108,4	PUU44	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
45	407 269	7 110 957	112,6	PUU45	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
46	407 963	7 109 542	113,6	PUU46	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
47	407 809	7 110 582	116,1	PUU47	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
48	408 414	7 110 457	120,0	PUU48	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
49	408 786	7 109 772	117,5	PUU49	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Laskentapiste A (Metsästysmaja)	402 212	7 109 691	112,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Autiotalo B (Ylivieskantie, Pohlola)	403 894	7 109 182	114,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Autiotalo C (Perkkiontie 382)	404 620	7 108 247	113,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Asuinrakennus D (Alakylantie 243)	408 659	7 108 752	119,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Lomarakennus E (Kellokankaan metsatie)	410 199	7 110 115	122,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus F (Ollilantie 112)	405 573	7 114 900	87,7	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Lomarakennus G (Ollilantie, Siliakuru)	404 837	7 114 441	100,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus H (Pinolantie 406)	396 893	7 111 098	88,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Asuinrakennus I (Kortenevantie 116)	396 670	7 109 704	87,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Asuinrakennus J (Haapavesitie 1406)	397 273	7 108 116	89,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Lomarakennus K (Kurunoja)	400 152	7 107 685	102,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Muu käyttöt. L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus M (Riskalan metsatie)	406 348	7 114 887	102,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values
		Shadow hours
		per year
		[h/year]
A	Laskentapiste A (Metsästysmaja)	133:58
B	Autiotalo B (Ylivieskantie, Pohlola)	73:24
C	Autiotalo C (Perkkiontie 382)	30:25
D	Asuinrakennus D (Alakylantie 243)	12:35
E	Lomarakennus E (Kellokankaan metsatie)	6:19
F	Asuinrakennus F (Ollilantie 112)	7:04
G	Lomarakennus G (Ollilantie, Siliakuru)	12:50
H	Asuinrakennus H (Pinolantie 406)	4:31
I	Asuinrakennus I (Kortenevantie 116)	0:00
J	Asuinrakennus J (Haapavesitie 1406)	0:00
K	Lomarakennus K (Kurunoja)	0:00
L	Muu käyttöt. L (Perkkiontie, Ilmola)	26:00
M	Lomarakennus M (Riskalan metsatie)	6:35

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	PUU01	10:56	2:46
2	PUU02	7:53	1:45
3	PUU03	0:00	0:00
4	PUU04	0:00	0:00
5	PUU05	0:00	0:00
6	PUU06	0:00	0:00
7	PUU07	0:00	0:00
8	PUU08	6:53	1:25
9	PUU09	11:16	2:30
10	PUU10	28:43	7:58
11	PUU11	0:00	0:00
12	PUU12	12:12	2:21
13	PUU13	26:46	5:55
14	PUU14	0:00	0:00
15	PUU15	18:40	3:52
16	PUU16	142:02	35:00
17	PUU17	12:46	3:26
18	PUU18	0:00	0:00
19	PUU19	120:47	26:39
20	PUU20	211:50	54:50
21	PUU21	33:58	9:10
22	PUU22	8:46	2:29
23	PUU23	12:30	1:42
24	PUU24	207:49	53:17
25	PUU25	17:24	3:46
26	PUU26	0:00	0:00
27	PUU27	16:09	2:14
28	PUU28	51:28	7:44
29	PUU29	10:25	2:04
30	PUU30	7:27	1:35
31	PUU31	0:00	0:00
32	PUU32	0:00	0:00
33	PUU33	48:23	7:26
34	PUU34	17:45	4:50
35	PUU35	0:00	0:00
36	PUU36	0:00	0:00
37	PUU37	44:36	7:21
38	PUU38	90:20	23:11
39	PUU39	25:07	6:22
40	PUU40	10:01	2:32
41	PUU41	0:00	0:00
42	PUU42	7:32	1:49
43	PUU43	0:00	0:00
44	PUU44	31:06	8:38
45	PUU45	0:00	0:00
46	PUU46	14:10	3:36
47	PUU47	5:45	1:16
48	PUU48	12:19	2:43
49	PUU49	17:11	3:18

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

SHADOW - Calendar

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102Shadow receptor: A - Laskentapiste A (Metsästysmaja)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June				
1	10.13 14.35	09.04 16.06	07.31 17.36	10.17 (19) 16.09 (15)	06.42 20.09	08.01 (29) 19.14 (8)	04.57 21.41	06.13 (25) 20.20 (9)	03.19 23.20	171 21.58 (10)
2	10.12 14.37	09.00 16.09	07.28 17.39	10.17 (19) 16.08 (15)	06.39 20.12	08.22 (24) 19.13 (8)	04.53 21.45	06.13 (25) 20.18 (9)	03.16 23.23	171 21.58 (10)
3	10.10 14.39	08.57 16.12	07.25 17.42	10.16 (19) 16.06 (15)	06.35 20.15	08.22 (24) 19.10 (8)	04.50 21.48	06.14 (25) 20.04 (13)	03.14 23.25	170 21.59 (10)
4	10.09 14.42	08.54 16.16	07.21 17.45	10.16 (19) 16.05 (15)	06.32 20.18	08.25 (24) 19.07 (8)	04.46 21.51	06.15 (25) 20.03 (13)	03.12 23.28	171 21.58 (10)
5	10.08 14.44	08.51 16.19	07.18 17.48	10.15 (19) 16.03 (15)	06.28 20.21	08.27 (24) 08.40 (24)	04.43 21.54	06.16 (25) 20.01 (13)	03.09 23.31	172 21.59 (10)
6	10.07 14.46	08.48 16.22	07.14 17.51	10.15 (19) 15.59 (15)	06.24 20.24	10.15 (19) 15.59 (15)	06.24 20.24	04.39 21.57	03.07 23.33	171 21.58 (10)
7	10.05 14.49	08.45 16.26	07.11 17.55	10.15 (19) 16.03 (15)	06.21 20.27	10.15 (19) 16.03 (15)	06.21 20.27	04.36 22.01	03.05 23.35	171 21.59 (10)
8	10.03 14.51	08.42 16.29	07.07 17.58	10.14 (19) 17.21 (12)	06.17 20.30	10.14 (19) 17.21 (12)	06.17 20.30	04.33 22.04	03.03 23.38	173 21.59 (10)
9	10.02 14.54	08.39 16.32	07.04 18.01	10.14 (19) 17.24 (12)	06.14 20.33	19.02 (16) 19.11 (16)	04.29 22.07	06.37 (20) 19.50 (13)	03.01 23.40	172 21.59 (10)
10	10.00 14.56	08.35 16.35	07.00 18.04	10.15 (19) 17.28 (12)	06.10 20.36	18.56 (16) 19.18 (16)	04.26 22.10	06.36 (20) 19.38 (16)	02.57 23.42	171 21.59 (10)
11	09.58 14.59	08.32 16.39	06.57 18.07	10.14 (19) 17.29 (12)	06.07 20.39	06.40 (30) 19.22 (16)	04.23 22.14	06.36 (20) 19.37 (16)	02.56 23.44	171 21.59 (10)
12	09.56 15.02	08.29 16.42	06.53 18.10	10.15 (19) 17.30 (12)	06.03 20.42	06.36 (30) 19.58 (13)	04.19 22.17	06.36 (20) 19.38 (16)	02.54 23.46	172 21.59 (10)
13	09.54 15.05	08.26 16.45	06.50 18.13	10.14 (19) 17.30 (12)	06.00 20.45	06.33 (30) 20.02 (13)	04.16 22.20	06.36 (20) 19.37 (16)	02.53 23.48	170 22.00 (10)
14	09.52 15.08	08.22 16.49	06.46 18.16	10.14 (19) 17.32 (24)	05.56 20.48	06.29 (30) 20.03 (13)	04.13 22.23	06.36 (20) 19.36 (16)	02.52 23.49	169 21.59 (10)
15	09.49 15.11	08.19 16.52	06.43 18.19	10.32 (19) 17.30 (12)	05.53 20.51	07.30 (24) 20.13 (9)	04.10 22.27	06.36 (20) 19.37 (16)	02.51 23.51	170 22.00 (10)
16	09.47 15.14	08.16 16.55	06.39 18.22	10.31 (19) 17.30 (12)	05.49 20.54	07.27 (24) 20.16 (9)	04.06 22.30	06.36 (20) 19.36 (16)	02.50 23.52	168 21.59 (10)
17	09.45 15.17	08.12 16.58	06.35 18.25	10.29 (19) 17.29 (12)	05.45 20.57	07.07 (29) 20.18 (9)	04.03 22.33	06.37 (20) 21.42 (10)	02.50 23.53	170 22.00 (10)
18	09.42 15.20	08.09 17.01	06.32 18.28	10.27 (19) 17.29 (12)	05.42 21.00	07.04 (29) 20.21 (9)	04.00 22.36	06.36 (20) 21.44 (10)	02.49 23.54	169 22.00 (10)
19	09.40 15.23	08.06 17.05	06.28 18.30	10.27 (19) 17.28 (12)	05.38 21.03	07.00 (29) 20.25 (9)	03.57 22.40	04.53 (21) 21.47 (10)	02.49 23.55	169 22.00 (10)
20	09.37 15.26	08.02 17.08	06.25 18.33	10.25 (19) 17.27 (12)	05.35 21.07	06.15 (25) 20.25 (9)	03.54 22.43	04.49 (21) 21.49 (10)	02.49 23.55	169 22.01 (10)
21	09.35 15.29	07.59 17.11	06.21 18.36	10.24 (19) 17.25 (12)	05.31 21.10	06.14 (25) 20.26 (9)	03.50 22.46	04.47 (21) 21.51 (10)	02.49 23.55	168 22.01 (10)
22	09.32 15.33	07.55 17.14	06.18 18.39	10.22 (19) 16.11 (15)	05.28 21.13	06.13 (25) 20.26 (9)	03.47 22.49	04.46 (21) 21.54 (10)	02.49 23.56	169 22.01 (10)
23	09.29 15.36	07.52 17.17	06.14 18.42	10.22 (19) 16.11 (15)	05.24 21.16	06.13 (25) 20.26 (9)	03.44 22.53	04.44 (21) 21.54 (10)	02.50 23.56	169 22.02 (10)
24	09.27 15.39	07.49 17.21	06.11 18.45	10.21 (19) 16.11 (15)	05.21 21.19	06.12 (25) 20.25 (9)	03.41 22.56	04.44 (21) 21.55 (10)	02.50 23.55	169 22.01 (10)
25	09.24 15.42	07.45 17.24	06.07 18.48	10.19 (19) 16.11 (15)	05.17 21.22	06.11 (25) 20.25 (9)	03.38 22.59	04.43 (21) 21.56 (10)	02.51 23.55	169 22.02 (10)
26	09.21 15.46	07.42 17.27	06.04 18.51	10.19 (19) 16.11 (15)	05.14 21.25	06.11 (25) 20.25 (9)	03.35 23.02	04.42 (21) 21.56 (10)	02.52 23.55	170 22.02 (10)
27	09.18 15.49	07.38 17.30	06.00 18.54	10.18 (19) 16.10 (15)	05.10 21.29	06.11 (25) 20.24 (9)	03.33 23.05	04.42 (21) 21.57 (10)	02.53 23.54	170 22.02 (10)
28	09.15 15.52	07.35 17.33	05.56 18.57	10.17 (19) 16.09 (15)	05.07 21.32	06.11 (25) 20.24 (9)	03.30 23.08	04.41 (21) 21.57 (10)	02.55 23.53	171 22.03 (10)
29	09.12 15.56		06.53 20.00	07.56 (29) 19.17 (8)	05.03 21.35	06.12 (25) 20.23 (9)	03.27 23.11	04.41 (21) 21.57 (10)	02.56 23.52	171 22.03 (10)
30	09.10 15.59		06.49 20.03	07.59 (29) 19.16 (8)	05.00 21.38	06.12 (25) 20.22 (9)	03.24 23.14	04.40 (21) 21.57 (10)	02.58 23.51	171 22.03 (10)
31	09.07 16.02		06.46 20.06	07.59 (29) 19.16 (8)			03.22 23.17	04.40 (21) 21.57 (10)		
Potential sun hours	171	238	363	451	570			624		
Total, worst case			1439	3366	3324		5080			5105
Sun reduction			0.33	0.32	0.41		0.47			0.48
Oper. time red.			0.99	0.99	0.99		0.99			0.99
Wind dir. red.			0.65	0.64	0.61		0.62			0.62
Total reduction			0.22	0.20	0.25		0.29			0.29
Total, real		311		690	824		1457			1498

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102Shadow receptor: A - Laskentapiste A (Metsästysmaja)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December		
1	02.59 23.49 170	04.09 (22) 22.03 (10) 22.27 141	04.24 19.48 (16) 20.40	06.00 06.47 (20) 06.03	06.39 (30) 19.21 (16) 18.53	10.53 (19) 18.09 (12) 16.07	08.00 12 10.31 (19)	09.35 14.43
2	03.01 23.48 171	04.10 (22) 22.03 (10) 22.24 141	04.28 19.48 (16) 20.36	06.06 06.46 (20) 06.06	19.00 (16) 19.09 (16) 18.46	10.52 (19) 10.51 (19) 08.17	08.04 16.04	09.38 14.41
3	03.01 23.46 171	04.12 (22) 22.04 (10) 22.20 142	04.31 19.48 (16) 20.32	06.06 06.47 (20) 06.09	19.00 (16) 19.09 (16) 18.46	10.52 (19) 10.51 (19) 08.10	08.07 16.00	09.41 14.39
4	03.03 23.45 171	04.13 (22) 22.04 (10) 22.17 150	04.34 19.48 (16) 20.29	06.09 20.03 (13) 20.29	19.09 (16) 18.42 92	10.52 (19) 18.03 (12) 15.57	08.10 15.57	09.44 14.37
5	03.05 23.43 172	04.14 (22) 22.04 (10) 22.14 163	04.37 20.06 (13) 20.25	06.12 06.31 (25) 06.12	18.39 18.39 88	10.51 (19) 18.00 (12) 15.54	08.13 15.54	09.46 14.35
6	03.08 23.41 171	04.16 (22) 22.05 (10) 22.10 174	04.40 20.08 (13) 20.22	06.15 20.08 (13) 20.22	18.35 18.35 80	10.51 (19) 17.56 (12) 15.51	08.17 15.51	09.49 14.33
7	03.10 23.39 171	04.18 (22) 22.05 (10) 22.07 179	04.44 20.09 (13) 20.18	06.18 20.09 (13) 20.18	08.22 (24) 08.35 (24) 18.32	10.50 (19) 16.33 (15) 15.48	08.20 15.48	09.51 14.32
8	03.12 23.37 170	04.19 (22) 22.05 (10) 22.03 183	04.47 20.11 (13) 20.15	06.20 20.11 (13) 20.15	08.19 (24) 19.00 (8) 18.28	10.51 (19) 16.37 (15) 15.45	08.23 15.45	09.54 14.30
9	03.15 23.34 169	04.21 (22) 22.05 (10) 22.00 186	04.50 20.12 (13) 20.11	06.23 20.12 (13) 20.11	08.17 (24) 19.04 (8) 18.25	10.51 (19) 16.39 (15) 15.41	08.26 15.41	09.56 14.29
10	03.18 23.32 169	04.22 (22) 22.06 (10) 21.57 192	04.53 20.23 (9) 20.08	06.26 20.23 (9) 20.08	08.14 (24) 19.05 (8) 18.21	10.50 (19) 16.40 (15) 15.38	08.30 15.38	09.58 14.28
11	03.20 23.29 171	04.24 (21) 22.06 (10) 21.53 201	04.56 20.27 (9) 20.04	06.29 20.27 (9) 20.04	07.54 (29) 19.06 (8) 18.18	10.50 (19) 16.41 (15) 15.35	08.33 15.35	10.00 14.27
12	03.23 23.27 172	04.25 (21) 22.06 (10) 21.50 205	04.59 20.29 (9) 20.00	06.32 20.29 (9) 20.00	07.50 (29) 19.07 (8) 18.14	10.50 (19) 16.42 (15) 15.32	08.36 15.32	10.02 14.26
13	03.26 23.24 173	04.26 (21) 22.06 (10) 21.46 205	05.02 20.30 (9) 19.57	06.35 20.30 (9) 19.57	07.48 (29) 19.07 (8) 18.11	10.50 (19) 16.42 (15) 15.29	08.39 15.29	10.04 14.25
14	03.29 23.22 174	04.27 (21) 22.06 (10) 21.43 206	05.06 20.30 (9) 19.53	06.38 20.30 (9) 19.53	07.47 (29) 19.08 (8) 18.08	10.51 (19) 16.43 (15) 15.26	08.43 15.26	10.06 14.24
15	03.31 23.19 175	04.28 (21) 22.06 (10) 21.39 205	05.09 20.31 (9) 19.50	06.41 20.31 (9) 19.50	07.45 (29) 19.07 (8) 18.04	10.51 (19) 16.43 (15) 15.23	08.46 15.23	10.07 14.23
16	03.34 23.16 174	04.29 (21) 22.06 (10) 21.36 203	05.12 20.32 (9) 19.46	06.43 20.32 (9) 19.46	07.44 (29) 19.06 (8) 18.01	10.51 (19) 16.43 (15) 15.20	08.49 15.20	10.09 14.23
17	03.37 23.13 176	04.31 (21) 22.06 (10) 21.32 201	05.15 20.31 (9) 19.43	06.46 20.31 (9) 19.43	07.43 (29) 19.05 (8) 17.57	10.51 (19) 16.42 (15) 15.18	08.52 15.18	10.10 14.22
18	03.40 23.11 174	04.32 (21) 22.05 (10) 21.29 200	05.18 20.32 (9) 19.39	06.49 20.32 (9) 19.39	07.43 (29) 19.02 (8) 17.54	10.53 (19) 16.43 (15) 15.15	08.56 15.15	10.11 14.22
19	03.43 23.08 175	04.33 (21) 22.06 (10) 21.25 196	05.21 20.32 (9) 19.36	06.52 20.32 (9) 19.36	07.43 (29) 18.58 (8) 17.50	10.53 (19) 16.42 (15) 15.12	08.59 15.12	10.12 14.22
20	03.46 23.05 173	04.34 (21) 22.05 (10) 21.22 194	05.24 20.32 (9) 19.32	06.55 20.32 (9) 19.32	07.41 (29) 18.54 (8) 17.47	10.53 (19) 16.41 (15) 15.09	09.02 15.09	10.13 14.22
21	03.50 23.02 172	04.35 (21) 22.04 (10) 21.18 191	05.27 20.31 (9) 19.28	06.58 20.31 (9) 19.28	07.42 (29) 18.50 (8) 17.43	10.55 (19) 16.41 (15) 15.07	09.05 15.07	10.14 14.23
22	03.53 22.59 168	04.37 (21) 22.03 (10) 21.15 185	05.30 20.30 (9) 19.25	07.01 20.30 (9) 19.25	07.42 (29) 18.10 (12) 17.40	10.55 (19) 16.40 (15) 15.04	09.08 15.04	10.14 14.23
23	03.56 22.56 164	04.38 (21) 22.00 (10) 21.11 180	05.33 20.30 (9) 19.21	07.03 20.30 (9) 19.21	07.42 (29) 18.11 (12) 17.37	10.57 (19) 16.40 (15) 15.01	09.11 15.01	10.15 14.24
24	03.59 22.53 157	04.39 (21) 21.58 (10) 21.08 172	05.36 20.28 (9) 19.18	07.06 20.28 (9) 19.18	07.43 (29) 18.11 (12) 17.33	10.58 (19) 16.38 (15) 14.59	09.15 14.59	10.15 14.24
25	04.02 22.49 145	04.40 (20) 21.55 (10) 21.04 160	05.39 20.24 (9) 19.14	07.09 20.24 (9) 19.14	07.46 (29) 18.12 (12) 16.30	09.59 (19) 15.37 (15) 14.56	09.18 14.56	10.15 14.25
26	04.05 22.46 142	04.41 (20) 21.53 (10) 21.01 144	05.42 20.21 (9) 19.11	07.12 20.21 (9) 19.11	07.49 (29) 18.12 (12) 16.27	10.00 (19) 15.35 (15) 14.54	09.21 14.54	10.15 14.26
27	04.08 22.43 137	04.42 (20) 21.50 (10) 20.57 121	05.45 20.18 (9) 19.07	07.15 20.18 (9) 19.07	08.08 (24) 18.11 (12) 16.23	10.02 (19) 15.33 (15) 14.51	09.24 14.51	10.15 14.27
28	04.12 22.40 138	04.43 (20) 19.47 (16) 20.54 94	05.48 20.15 (9) 19.04	07.18 20.15 (9) 19.04	08.09 (24) 18.11 (12) 16.20	10.04 (19) 15.30 (15) 14.49	09.27 14.49	10.15 14.28
29	04.15 22.37 139	04.44 (20) 19.47 (16) 20.50 84	05.51 20.04 (13) 19.00	07.21 20.04 (13) 19.00	08.11 (24) 18.10 (12) 16.17	10.06 (19) 10.43 (19) 14.47	09.30 14.47	10.15 14.30
30	04.18 22.33 140	04.45 (20) 19.48 (16) 20.47 70	05.54 20.01 (13) 18.57	07.24 20.01 (13) 18.57	08.14 (24) 18.10 (12) 16.13	10.10 (19) 10.41 (19) 14.45	09.33 14.45	10.14 14.31
31	04.21 22.30 140	04.46 (20) 19.48 (16) 20.43 56	05.57 19.58 (13) 18.57	07.27 19.58 (13) 18.57	07.57 16.10 23	10.14 (19) 10.37 (19) 14.45	09.34 14.45	10.14 14.33
Potential sun hours	609	508	393	305	198	12	137	
Total, worst case	5084	5124	2467	2634	12			
Sun reduction	0,38	0,31	0,33	0,35	0,24			
Oper. time red.	0,99	0,99	0,99	0,99	0,99			
Wind dir. red.	0,62	0,61	0,63	0,65	0,67			
Total reduction	0,23	0,19	0,21	0,23	0,16			
Total, real	1178	974	509	595	2			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102Shadow receptor: B - Laskentapiste B (Ylivieskantie, Pohlola)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June			
1	10.12 14.35	09.03 16.06	07.31 17.36	06.42 20.09	18.43 (19) 19.15 (19)	04.56 21.41	19.08 (24) 19.48 (24)	03.19 23.20	04.18 (34) 21.38 (17)
2	10.11 14.37	09.00 16.09	07.28 17.39	06.39 20.12	18.42 (19) 19.14 (19)	04.53 21.44	19.06 (24) 19.51 (24)	03.16 23.22	04.17 (34) 21.37 (17)
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	18.42 (19) 19.15 (19)	04.50 21.48	19.04 (24) 19.53 (24)	03.14 23.25	04.16 (34) 21.36 (17)
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	18.41 (19) 19.14 (19)	04.46 21.51	19.02 (24) 20.51 (20)	03.11 23.28	04.16 (34) 21.35 (17)
5	10.08 14.44	08.51 16.19	07.17 17.48	06.28 20.21	18.42 (19) 19.14 (19)	04.43 21.54	19.00 (24) 20.54 (20)	03.09 23.30	04.16 (34) 21.08 (20)
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	18.42 (19) 19.14 (19)	04.39 21.57	05.20 (40) 20.57 (20)	03.07 23.33	04.15 (34) 21.07 (20)
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	18.42 (19) 19.13 (19)	04.36 22.00	05.17 (40) 20.59 (20)	03.05 23.35	04.15 (34) 21.07 (20)
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	18.42 (19) 19.12 (19)	04.33 22.04	05.14 (40) 21.00 (20)	03.03 23.38	04.15 (34) 21.07 (20)
9	10.01 14.54	08.38 16.32	07.03 18.00	06.14 20.33	18.42 (19) 19.56 (16)	04.29 22.07	05.11 (40) 21.01 (20)	03.01 23.40	04.15 (34) 21.08 (20)
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	18.43 (19) 19.59 (16)	04.26 22.10	05.08 (40) 21.02 (20)	02.57 23.42	04.15 (34) 21.08 (20)
11	09.58 14.59	08.32 16.39	06.56 18.06	06.07 20.39	06.39 (39) 20.01 (16)	04.23 22.14	05.06 (40) 21.25 (17)	02.56 23.44	04.15 (34) 21.07 (20)
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42	06.36 (39) 20.04 (16)	04.19 22.17	05.07 (40) 21.28 (17)	02.54 23.46	04.14 (34) 21.07 (20)
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45	06.33 (39) 20.07 (16)	04.16 22.20	05.06 (40) 21.31 (17)	02.53 23.47	04.15 (34) 21.08 (20)
14	09.51 15.08	08.22 16.48	06.46 18.15	05.56 20.48	06.30 (39) 20.06 (16)	04.13 22.23	05.06 (40) 21.33 (17)	02.52 23.49	04.15 (34) 21.08 (20)
15	09.49 15.11	08.19 16.52	06.42 18.18	05.52 20.51	06.29 (39) 20.06 (16)	04.09 22.27	05.07 (40) 21.36 (17)	02.51 23.50	04.15 (34) 21.08 (20)
16	09.47 15.14	08.15 16.55	06.39 18.21	05.49 20.54	06.28 (39) 20.05 (16)	04.06 22.30	05.07 (40) 21.38 (17)	02.50 23.52	04.15 (34) 21.08 (20)
17	09.45 15.17	08.12 16.58	06.35 18.24	05.45 20.57	06.27 (39) 20.04 (16)	04.03 22.33	05.06 (40) 21.40 (17)	02.50 23.53	04.15 (34) 21.08 (20)
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	06.27 (39) 20.03 (16)	04.00 22.36	05.07 (40) 21.41 (17)	02.49 23.54	04.15 (34) 21.08 (20)
19	09.40 15.23	08.05 17.05	06.28 18.30	05.38 21.03	06.27 (39) 20.01 (16)	03.57 22.40	05.07 (40) 21.40 (17)	02.49 23.54	04.16 (34) 21.09 (20)
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	06.27 (39) 19.58 (16)	03.53 22.43	05.08 (40) 21.41 (17)	02.49 23.55	04.16 (34) 21.09 (20)
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	06.27 (39) 06.50 (39)	03.50 22.46	05.10 (40) 21.41 (17)	02.49 23.55	04.16 (34) 21.09 (20)
22	09.32 15.33	07.55 17.14	06.18 18.39	05.28 21.13	06.28 (39) 06.50 (39)	03.47 22.49	05.10 (40) 21.41 (17)	02.49 23.55	04.16 (34) 21.09 (20)
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	06.28 (39) 06.49 (39)	03.44 22.52	05.11 (40) 21.41 (17)	02.50 23.55	04.17 (34) 21.10 (20)
24	09.27 15.39	07.49 17.20	06.11 18.45	05.21 21.19	06.28 (39) 06.47 (39)	03.41 22.55	05.13 (40) 21.41 (17)	02.50 23.55	04.16 (34) 21.09 (20)
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	06.30 (39) 06.45 (39)	03.38 22.59	18.47 (24) 21.41 (17)	02.51 23.55	04.17 (34) 21.10 (20)
26	09.21 15.46	07.42 17.27	06.03 18.51	05.14 21.25	06.31 (39) 06.43 (39)	03.35 23.02	18.47 (24) 21.41 (17)	02.52 23.54	04.17 (34) 21.10 (20)
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	06.35 (39) 06.40 (39)	03.32 23.05	18.46 (24) 21.40 (17)	02.53 23.54	04.17 (34) 21.10 (20)
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	06.29 (39) 19.39 (24)	03.30 23.08	18.46 (24) 21.40 (17)	02.55 23.53	04.18 (34) 21.11 (20)
29	09.12 15.56	07.32 17.36	05.53 19.00	05.03 21.35	06.28 (39) 19.16 (24)	03.27 23.11	04.23 (34) 21.39 (17)	02.56 23.52	04.18 (34) 21.11 (20)
30	09.09 15.59	07.29 17.39	06.49 19.03	05.00 21.38	08.07 (38) 19.14 (19)	03.24 23.14	04.21 (34) 21.39 (17)	02.58 23.51	04.19 (34) 21.12 (20)
31	09.06 16.02	07.26 17.42	06.46 19.06	05.00 21.41	18.44 (19) 19.14 (19)	03.21 23.17	04.19 (34) 21.38 (17)	02.59 23.51	04.19 (34) 21.12 (20)
Potential sun hours	171	238	363	451	570	624			
Total, worst case			481	957	3965	4599			
Sun reduction			0,32	0,41	0,47	0,48			
Oper. time red.			0,99	0,99	0,99	0,99			
Wind dir. red.			0,62	0,61	0,62	0,62			
Total reduction			0,20	0,25	0,29	0,29			
Total, real			95	236	1145	1345			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102Shadow receptor: B - Laskentapiste B (Ylivieskantie, Pohlola)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December						
1	02.59	04.19 (34)	04.24	05.17 (40)	06.00	06.39 (39)	07.26	08.00	09.35			
	23.49	154	21.12 (20)	22.27	130	21.37 (17)	20.39	46	20.01 (16)	18.53	16.07	14.42
2	03.01	04.19 (34)	04.28	05.17 (40)	06.03	18.41 (19)	07.29	08.04	09.38			
	23.48	153	21.12 (20)	22.23	124	21.13 (20)	20.36	37	19.57 (16)	18.49	16.03	14.40
3	03.01	04.19 (34)	04.31	05.19 (40)	06.06	18.40 (19)	07.32	08.07	09.41			
	23.46	153	21.12 (20)	22.20	117	21.12 (20)	20.32	35	19.54 (16)	18.46	16.00	14.39
4	03.03	04.20 (34)	04.34	05.22 (40)	06.09	18.39 (19)	07.35	08.10	09.43			
	23.44	154	21.13 (20)	22.17	109	21.11 (20)	20.29	31	19.51 (16)	18.42	15.57	14.37
5	03.05	04.20 (34)	04.37	05.25 (40)	06.12	18.39 (19)	07.38	08.13	09.46			
	23.43	152	21.13 (20)	22.13	102	21.10 (20)	20.25	31	19.10 (19)	18.39	15.54	14.35
6	03.08	04.21 (34)	04.40	05.27 (40)	06.15	18.37 (19)	07.41	08.16	09.49			
	23.41	152	21.14 (20)	22.10	92	21.08 (20)	20.22	32	19.09 (19)	18.35	15.51	14.33
7	03.10	04.21 (34)	04.43	05.30 (40)	06.17	18.37 (19)	07.44	08.20	09.51			
	23.38	151	21.13 (20)	22.07	82	21.06 (20)	20.18	32	19.09 (19)	18.32	15.48	14.32
8	03.12	04.22 (34)	04.47	19.11 (24)	06.20	18.37 (19)	07.47	08.23	09.53			
	23.36	153	21.40 (17)	22.03	71	21.03 (20)	20.15	32	19.09 (19)	18.28	15.44	14.30
9	03.15	04.23 (34)	04.50	19.13 (24)	06.23	18.36 (19)	07.50	08.26	09.56			
	23.34	157	21.43 (17)	22.00	60	21.00 (20)	20.11	33	19.09 (19)	18.25	15.41	14.29
10	03.17	04.24 (34)	04.53	19.14 (24)	06.26	18.35 (19)	07.53	08.29	09.58			
	23.32	156	21.44 (17)	21.56	47	20.01 (24)	20.07	33	19.08 (19)	18.21	15.38	14.28
11	03.20	04.26 (34)	04.56	19.16 (24)	06.29	18.36 (19)	07.56	08.33	10.00			
	23.29	158	21.46 (17)	21.53	43	19.59 (24)	20.04	31	19.07 (19)	18.18	15.35	14.26
12	03.23	04.26 (34)	04.59	19.18 (24)	06.32	18.36 (19)	07.59	08.36	10.02			
	23.27	157	21.46 (17)	21.50	39	19.57 (24)	20.00	31	19.07 (19)	18.14	15.32	14.25
13	03.26	04.28 (34)	05.02	19.20 (24)	06.35	07.59 (38)	08.02	08.39	10.04			
	23.24	154	21.46 (17)	21.46	33	19.53 (24)	19.57	37	19.06 (19)	18.11	15.29	14.25
14	03.29	04.31 (34)	05.05	19.24 (24)	06.38	07.55 (38)	08.05	08.42	10.05			
	23.22	153	21.48 (17)	21.43	26	19.50 (24)	19.53	42	19.04 (19)	18.07	15.26	14.24
15	03.31	18.55 (24)	05.09	19.29 (24)	06.40	07.53 (38)	08.08	08.46	10.07			
	23.19	147	21.49 (17)	21.39	16	19.45 (24)	19.50	44	19.03 (19)	18.04	15.23	14.23
16	03.34	18.55 (24)	05.12	06.41 (39)	06.43	07.52 (38)	08.11	08.49	10.08			
	23.16	148	21.49 (17)	21.36	7	06.48 (39)	19.46	43	19.01 (19)	18.00	15.20	14.23
17	03.37	18.56 (24)	05.15	06.37 (39)	06.46	07.51 (38)	08.14	08.52	10.10			
	23.13	146	21.49 (17)	21.32	13	06.50 (39)	19.43	41	18.59 (19)	17.57	15.18	14.22
18	03.40	18.56 (24)	05.18	06.36 (39)	06.49	07.50 (38)	08.17	08.55	10.11			
	23.10	148	21.50 (17)	21.29	16	06.52 (39)	19.39	38	18.56 (19)	17.54	15.15	14.22
19	03.43	05.25 (40)	05.21	06.35 (39)	06.52	07.48 (38)	08.20	08.59	10.12			
	23.07	151	21.51 (17)	21.25	18	06.53 (39)	19.35	27	18.49 (19)	17.50	15.12	14.22
20	03.46	05.22 (40)	05.24	06.34 (39)	06.55	07.48 (38)	08.23	09.02	10.13			
	23.05	156	21.51 (17)	21.22	20	06.54 (39)	19.32	25	08.13 (38)	17.47	15.09	14.22
21	03.49	05.21 (40)	05.27	06.32 (39)	06.58	07.47 (38)	08.26	09.05	10.14			
	23.02	158	21.51 (17)	21.18	22	06.54 (39)	19.28	26	08.13 (38)	17.43	15.06	14.23
22	03.53	05.20 (40)	05.30	06.31 (39)	07.00	07.47 (38)	08.29	09.08	10.14			
	22.59	161	21.51 (17)	21.15	24	06.55 (39)	19.25	25	08.12 (38)	17.40	15.04	14.23
23	03.56	05.19 (40)	05.33	06.31 (39)	07.03	07.48 (38)	08.32	09.11	10.15			
	22.55	161	21.51 (17)	21.11	32	20.03 (16)	19.21	24	08.12 (38)	17.37	15.01	14.23
24	03.59	05.18 (40)	05.36	06.31 (39)	07.06	07.48 (38)	08.35	09.14	10.15			
	22.52	160	21.51 (17)	21.08	37	20.05 (16)	19.18	23	08.11 (38)	17.33	14.59	14.24
25	04.02	05.18 (40)	05.39	06.30 (39)	07.09	07.48 (38)	07.38	09.18	10.15			
	22.49	161	21.51 (17)	21.04	39	20.05 (16)	19.14	22	08.10 (38)	16.30	14.56	14.25
26	04.05	05.17 (40)	05.42	06.30 (39)	07.12	07.48 (38)	07.41	09.21	10.15			
	22.46	160	21.51 (17)	21.01	41	20.06 (16)	19.11	20	08.08 (38)	16.27	14.54	14.26
27	04.08	05.17 (40)	05.45	06.30 (39)	07.15	07.51 (38)	07.44	09.24	10.15			
	22.43	157	21.50 (17)	20.57	43	20.07 (16)	19.07	15	08.06 (38)	16.23	14.51	14.27
28	04.12	05.17 (40)	05.48	06.31 (39)	07.18	07.54 (38)	07.48	09.27	10.15			
	22.40	154	21.48 (17)	20.54	41	20.07 (16)	19.03	9	08.03 (38)	16.20	14.49	14.28
29	04.15	05.17 (40)	05.51	06.30 (39)	07.21	07.51	07.51	09.30	10.15			
	22.37	148	21.45 (17)	20.50	50	20.06 (16)	19.00		16.17	14.47	14.30	
30	04.18	05.17 (40)	05.54	06.33 (39)	07.23	07.54	07.54	09.32	10.14			
	22.33	144	21.43 (17)	20.47	52	20.06 (16)	18.56		16.13	14.45	14.31	
31	04.21	05.16 (40)	05.57	06.36 (39)		07.57		10.13				
	22.30	138	21.40 (17)	20.43	50	20.04 (16)			16.10		14.33	
Potential sun hours	608		508		393		305		198		137	
Total, worst case	4755		1596		865							
Sun reduction	0,38		0,31		0,33							
Oper. time red.	0,99		0,99		0,99							
Wind dir. red.	0,62		0,61		0,62							
Total reduction	0,23		0,19		0,20							
Total, real	1106		303		174							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102Shadow receptor: C - Laskentapiste C (Perkkiontie 382)
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	20.16 (19) 03.19 04.18 (39)
	14.35	16.06	17.36	20.09	21.41	15 20.31 (19) 23.19 69 21.47 (24)
2	10.11	09.00	07.28	06.38	04.53	20.18 (19) 03.16 04.16 (39)
	14.37	16.09	17.39	20.12	21.44	11 20.29 (19) 23.22 74 21.47 (24)
3	10.10	08.57	07.24	06.35	04.50	05.42 (38) 03.14 04.14 (39)
	14.39	16.12	17.42	20.15	21.47	17 20.26 (19) 23.25 77 21.47 (24)
4	10.09	08.54	07.21	06.31	04.46	05.39 (38) 03.12 04.13 (39)
	14.42	16.15	17.45	20.18	21.51	17 05.56 (38) 23.28 79 21.48 (24)
5	10.08	08.51	07.17	06.28	04.43	05.36 (38) 03.09 04.12 (39)
	14.44	16.19	17.48	20.21	21.54	22 05.58 (38) 23.30 81 21.48 (24)
6	10.06	08.48	07.14	06.24	04.39	05.34 (38) 03.07 04.10 (39)
	14.46	16.22	17.51	20.24	21.57	26 06.00 (38) 23.33 82 21.48 (24)
7	10.05	08.45	07.10	06.21	04.36	05.34 (38) 03.05 04.09 (39)
	14.49	16.25	17.54	20.27	22.00	28 06.02 (38) 23.35 84 21.48 (24)
8	10.03	08.41	07.07	06.17	04.33	05.32 (38) 03.03 04.09 (39)
	14.51	16.29	17.57	20.30	22.04	31 06.03 (38) 23.37 84 21.48 (24)
9	10.01	08.38	07.03	06.14	04.29	05.31 (38) 03.01 04.09 (39)
	14.54	16.32	18.00	20.33	22.07	32 06.03 (38) 23.40 84 21.48 (24)
10	09.59	08.35	07.00	06.10	04.26	05.30 (38) 02.58 04.09 (39)
	14.56	16.35	18.03	20.36	22.10	34 06.04 (38) 23.42 84 21.49 (24)
11	09.58	08.32	06.56	06.07	04.23	05.29 (38) 02.56 04.08 (39)
	14.59	16.39	18.06	20.39	22.13	35 06.04 (38) 23.44 85 21.48 (24)
12	09.56	08.29	06.53	06.03	04.19	05.29 (38) 02.55 04.08 (39)
	15.02	16.42	18.09	20.42	22.17	37 06.06 (38) 23.45 85 21.48 (24)
13	09.53	08.25	06.49	05.59	04.16	05.28 (38) 02.53 04.09 (39)
	15.05	16.45	18.12	20.45	22.20	38 06.06 (38) 23.47 85 21.49 (24)
14	09.51	08.22	06.46	05.56	04.13	05.28 (38) 02.52 04.08 (39)
	15.08	16.48	18.15	20.48	22.23	42 21.33 (20) 23.49 85 21.49 (24)
15	09.49	08.19	06.42	05.52	04.09	05.28 (38) 02.51 04.09 (39)
	15.11	16.52	18.18	20.51	22.26	47 21.36 (20) 23.50 85 21.50 (24)
16	09.47	08.15	06.39	05.49	04.06	05.27 (38) 02.50 04.08 (39)
	15.14	16.55	18.21	20.54	22.30	53 21.38 (20) 23.51 84 21.49 (24)
17	09.44	08.12	06.35	05.45	04.03	05.26 (38) 02.50 04.09 (39)
	15.17	16.58	18.24	20.57	22.33	58 21.40 (20) 23.52 82 21.49 (24)
18	09.42	08.09	06.32	05.42	04.00	05.27 (38) 02.49 04.09 (39)
	15.20	17.01	18.27	21.00	22.36	62 21.44 (20) 23.53 84 21.50 (24)
19	09.40	08.05	06.28	05.38	20.21 (19) 03.57	05.26 (38) 02.49 04.09 (39)
	15.23	17.05	18.30	21.03	4 20.25 (19) 22.39	66 21.45 (20) 23.54 85 21.50 (24)
20	09.37	08.02	06.25	05.35	20.18 (19) 03.54	05.27 (38) 02.49 04.09 (39)
	15.26	17.08	18.33	21.06	9 20.27 (19) 22.43	67 21.46 (20) 23.55 83 21.50 (24)
21	09.34	07.59	06.21	05.31	20.17 (19) 03.50	05.27 (38) 02.49 04.09 (39)
	15.29	17.11	18.36	21.09	13 20.30 (19) 22.46	69 21.47 (20) 23.55 83 21.50 (24)
22	09.32	07.55	06.18	05.28	20.16 (19) 03.47	05.26 (38) 02.49 04.09 (39)
	15.33	17.14	18.39	21.13	17 20.33 (19) 22.49	69 21.46 (20) 23.55 83 21.50 (24)
23	09.29	07.52	06.14	05.24	20.16 (19) 03.44	05.27 (38) 02.50 04.10 (39)
	15.36	17.17	18.42	21.16	20 20.36 (19) 22.52	69 21.46 (20) 23.55 85 21.51 (24)
24	09.26	07.48	06.10	05.21	20.15 (19) 03.41	05.27 (38) 02.50 04.10 (39)
	15.39	17.20	18.45	21.19	20 20.35 (19) 22.55	71 21.47 (20) 23.55 84 21.51 (24)
25	09.24	07.45	06.07	05.17	20.14 (19) 03.38	05.27 (38) 02.51 04.11 (39)
	15.42	17.24	18.48	21.22	21 20.35 (19) 22.58	71 21.47 (20) 23.55 84 21.52 (24)
26	09.21	07.42	06.03	05.14	20.14 (19) 03.35	05.28 (38) 02.52 04.10 (39)
	15.46	17.27	18.51	21.25	21 20.35 (19) 23.02	70 21.47 (20) 23.54 85 21.51 (24)
27	09.18	07.38	06.00	05.10	20.15 (19) 03.33	05.28 (38) 02.53 04.11 (39)
	15.49	17.30	18.54	21.28	20 20.35 (19) 23.05	70 21.47 (20) 23.53 84 21.52 (24)
28	09.15	07.35	05.56	05.07	20.15 (19) 03.30	05.28 (38) 02.55 04.12 (39)
	15.52	17.33	18.57	21.31	19 20.34 (19) 23.08	70 21.47 (20) 23.52 83 21.52 (24)
29	09.12		06.53	05.03	20.15 (19) 03.27	05.28 (38) 02.56 04.12 (39)
	15.56		20.00	21.35	19 20.34 (19) 23.11	70 21.47 (20) 23.51 85 21.53 (24)
30	09.09		06.49	05.00	20.15 (19) 03.24	05.29 (38) 02.58 04.12 (39)
	15.59		20.03	21.38	17 20.32 (19) 23.14	69 21.47 (24) 23.50 85 21.53 (24)
31	09.06		06.46		03.22	05.29 (38)
	16.02		20.06		23.16	69 21.47 (24)
Potential sun hours	171	238	363	451	569	624
Total, worst case				200	1505	2482
Sun reduction				0,41	0,47	0,48
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,63	0,63	0,63
Total reduction				0,25	0,29	0,30
Total, real				51	438	736

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102Shadow receptor: C - Laskentapiste C (Perkkiontie 382)
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December	
1	02.59	04.13 (39)	04.24	05.39 (38)	06.00	07.26	08.00	09.35				
	23.49	85 21.53 (24)	22.27	36 06.15 (38)	20.39	18.53	16.07	14.43				
2	03.01	04.13 (39)	04.28	05.40 (38)	06.03	07.29	08.03	09.38				
	23.47	85 21.53 (24)	22.23	35 06.15 (38)	20.36	18.49	16.03	14.41				
3	03.01	04.13 (39)	04.31	05.40 (38)	06.06	07.32	08.07	09.41				
	23.46	85 21.53 (24)	22.20	34 06.14 (38)	20.32	18.46	16.00	14.39				
4	03.03	04.14 (39)	04.34	05.41 (38)	06.09	07.35	08.10	09.43				
	23.44	85 21.54 (24)	22.17	32 06.13 (38)	20.29	18.42	15.57	14.37				
5	03.06	04.15 (39)	04.37	05.43 (38)	06.12	07.38	08.13	09.46				
	23.42	84 21.54 (24)	22.13	29 06.12 (38)	20.25	18.39	15.54	14.35				
6	03.08	04.16 (39)	04.40	05.43 (38)	06.14	07.41	08.16	09.48				
	23.40	83 21.54 (24)	22.10	27 06.10 (38)	20.22	18.35	15.51	14.33				
7	03.10	04.17 (39)	04.43	05.45 (38)	06.17	07.44	08.20	09.51				
	23.38	82 21.54 (24)	22.07	24 06.09 (38)	20.18	18.32	15.48	14.32				
8	03.12	04.19 (39)	04.47	05.47 (38)	06.20	07.47	08.23	09.53				
	23.36	81 21.54 (24)	22.03	21 06.08 (38)	20.14	18.28	15.44	14.30				
9	03.15	04.21 (39)	04.50	05.49 (38)	06.23	07.50	08.26	09.55				
	23.34	77 21.55 (24)	22.00	16 06.05 (38)	20.11	18.25	15.41	14.29				
10	03.18	04.23 (39)	04.53	05.52 (38)	06.26	07.53	08.29	09.58				
	23.31	75 21.55 (24)	21.56	17 20.37 (19)	20.07	18.21	15.38	14.28				
11	03.20	04.25 (39)	04.56	20.26 (19)	06.29	07.56	08.33	10.00				
	23.29	71 21.55 (24)	21.53	13 20.39 (19)	20.04	18.18	15.35	14.27				
12	03.23	05.38 (38)	04.59	20.25 (19)	06.32	07.58	08.36	10.02				
	23.27	68 21.55 (20)	21.49	15 20.40 (19)	20.00	18.14	15.32	14.26				
13	03.26	05.38 (38)	05.02	20.23 (19)	06.35	08.01	08.39	10.03				
	23.24	68 21.55 (20)	21.46	17 20.40 (19)	19.57	18.11	15.29	14.25				
14	03.29	05.37 (38)	05.05	20.23 (19)	06.38	08.04	08.42	10.05				
	23.21	70 21.55 (20)	21.43	18 20.41 (19)	19.53	18.07	15.26	14.24				
15	03.31	05.37 (38)	05.09	20.22 (19)	06.40	08.07	08.46	10.07				
	23.19	70 21.56 (20)	21.39	20 20.42 (19)	19.50	18.04	15.23	14.23				
16	03.34	05.37 (38)	05.12	20.22 (19)	06.43	08.10	08.49	10.08				
	23.16	70 21.56 (20)	21.36	20 20.42 (19)	19.46	18.00	15.20	14.23				
17	03.37	05.37 (38)	05.15	20.21 (19)	06.46	08.13	08.52	10.09				
	23.13	70 21.56 (20)	21.32	20 20.41 (19)	19.42	17.57	15.18	14.22				
18	03.40	05.37 (38)	05.18	20.21 (19)	06.49	08.17	08.55	10.11				
	23.10	70 21.56 (20)	21.29	20 20.41 (19)	19.39	17.54	15.15	14.22				
19	03.43	05.37 (38)	05.21	20.21 (19)	06.52	08.20	08.58	10.12				
	23.07	71 21.57 (20)	21.25	20 20.41 (19)	19.35	17.50	15.12	14.22				
20	03.46	05.37 (38)	05.24	20.21 (19)	06.55	08.23	09.02	10.13				
	23.04	71 21.57 (20)	21.22	20 20.41 (19)	19.32	17.47	15.09	14.22				
21	03.50	05.37 (38)	05.27	20.21 (19)	06.58	08.26	09.05	10.13				
	23.01	68 21.56 (20)	21.18	16 20.37 (19)	19.28	17.43	15.06	14.23				
22	03.53	05.37 (38)	05.30	20.22 (19)	07.00	08.29	09.08	10.14				
	22.58	69 21.57 (20)	21.15	12 20.34 (19)	19.25	17.40	15.04	14.23				
23	03.56	05.37 (38)	05.33	20.23 (19)	07.03	08.32	09.11	10.15				
	22.55	68 21.56 (20)	21.11	8 20.31 (19)	19.21	17.37	15.01	14.24				
24	03.59	05.37 (38)	05.36	20.25 (19)	07.06	08.35	09.14	10.15				
	22.52	67 21.57 (20)	21.08	3 20.28 (19)	19.18	17.33	14.59	14.24				
25	04.02	05.37 (38)	05.39	07.09	07.38	09.17	10.15					
	22.49	65 21.55 (20)	21.04	19.14	16.30	14.56	14.25					
26	04.05	05.38 (38)	05.42	07.12	07.41	09.20	10.15					
	22.46	60 21.53 (20)	21.01	19.10	16.26	14.54	14.26					
27	04.08	05.37 (38)	05.45	07.15	07.44	09.23	10.15					
	22.43	56 21.50 (20)	20.57	19.07	16.23	14.51	14.27					
28	04.12	05.38 (38)	05.48	07.18	07.47	09.26	10.15					
	22.40	51 21.48 (20)	20.54	19.03	16.20	14.49	14.28					
29	04.15	05.38 (38)	05.51	07.20	07.51	09.29	10.14					
	22.36	45 21.45 (20)	20.50	19.00	16.17	14.47	14.30					
30	04.18	05.39 (38)	05.54	07.23	07.54	09.32	10.14					
	22.33	41 21.43 (20)	20.46	18.56	16.13	14.45	14.31					
31	04.21	05.38 (38)	05.57	07.27	07.57	09.35	10.13					
	22.30	37 06.15 (38)	20.43	16.10	14.33	14.33	14.33					
Potential sun hours	608		508		393		305		198			137
Total, worst case	2148		493									
Sun reduction	0,38		0,31									
Oper. time red.	0,99		0,99									
Wind dir. red.	0,63		0,62									
Total reduction	0,24		0,19									
Total, real	505		95									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102Shadow receptor: D - Asuinrakennus D (Alakyläntie 243)
Assumptions for shadow calculations
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	20.35 (42)
	14.35	16.05	17.36	20.08	21.41	20
2	10.11	09.00	07.27	06.38	04.53	20.34 (42)
	14.37	16.08	17.39	20.11	21.44	21
3	10.10	08.57	07.24	06.35	04.49	20.34 (42)
	14.39	16.12	17.42	20.14	21.47	21
4	10.09	08.54	07.21	06.31	04.46	20.35 (42)
	14.41	16.15	17.45	20.17	21.50	19
5	10.07	08.51	07.17	06.27	04.42	20.35 (42)
	14.43	16.18	17.48	20.20	21.54	19
6	10.06	08.47	07.14	06.24	04.39	20.35 (42)
	14.46	16.22	17.51	20.23	21.57	18
7	10.04	08.44	07.10	06.20	04.36	20.36 (42)
	14.48	16.25	17.54	20.26	22.00	16
8	10.03	08.41	07.07	06.17	04.32	20.37 (42)
	14.51	16.28	17.57	20.29	22.03	14
9	10.01	08.38	07.03	06.13	04.29	20.39 (42)
	14.53	16.32	18.00	20.32	22.07	11
10	09.59	08.35	07.00	06.10	04.26	20.42 (42)
	14.56	16.35	18.03	20.35	22.10	5
11	09.57	08.31	06.56	06.06	04.22	20.47 (42)
	14.59	16.38	18.06	20.38	22.13	
12	09.55	08.28	06.53	06.03	04.19	
	15.02	16.42	18.09	20.42	22.16	
13	09.53	08.25	06.49	05.59	04.16	
	15.04	16.45	18.12	20.45	22.20	
14	09.51	08.22	06.46	05.56	04.12	
	15.07	16.48	18.15	20.48	22.23	
15	09.49	08.18	06.42	05.52	04.09	21.31 (44)
	15.10	16.51	18.18	20.51	22.26	4
16	09.47	08.15	06.38	05.48	04.06	21.29 (44)
	15.13	16.55	18.21	20.54	22.29	9
17	09.44	08.12	06.35	05.45	04.03	21.27 (44)
	15.16	16.58	18.24	20.57	22.33	14
18	09.42	08.08	06.31	05.41	03.59	21.27 (44)
	15.19	17.01	18.27	21.00	22.36	17
19	09.39	08.05	06.28	05.38	03.56	21.25 (44)
	15.23	17.04	18.30	21.03	22.39	21
20	09.37	08.02	06.24	05.34	03.53	21.25 (44)
	15.26	17.07	18.33	21.06	22.42	22
21	09.34	07.58	06.21	05.31	03.50	21.24 (44)
	15.29	17.11	18.36	21.09	22.46	23
22	09.32	07.55	06.17	05.27	03.47	21.24 (44)
	15.32	17.14	18.39	21.12	22.49	24
23	09.29	07.52	06.14	05.24	03.44	21.23 (44)
	15.35	17.17	18.42	21.15	22.52	26
24	09.26	07.48	06.10	05.20	03.41	21.23 (44)
	15.39	17.20	18.45	21.19	22.55	27
25	09.23	07.45	06.07	05.17	03.38	21.22 (44)
	15.42	17.23	18.48	21.22	22.58	27
26	09.21	07.41	06.03	05.13	03.35	21.22 (44)
	15.45	17.26	18.51	21.25	23.01	28
27	09.18	07.38	05.59	05.10	03.32	21.22 (44)
	15.49	17.29	18.54	21.28	23.04	28
28	09.15	07.34	05.56	05.06	03.29	21.22 (44)
	15.52	17.33	18.57	21.31	23.07	28
29	09.12		06.52	05.03	03.27	21.22 (44)
	15.55		20.00	21.34	23.10	28
30	09.09		06.49	05.00	03.24	21.23 (44)
	15.58		20.03	21.38	23.13	28
31	09.06		06.45		03.21	21.23 (44)
	16.02		20.06		23.16	28
Potential sun hours	171	238	363	451	570	624
Total, worst case				64	546	1168
Sun reduction				0,41	0,47	0,48
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,64	0,64	0,64
Total reduction				0,26	0,30	0,30
Total, real				17	162	355

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102Shadow receptor: D - Asuinrakennus D (Alakyläntie 243)
Assumptions for shadow calculations
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December	
1	02.59	21.30 (44)	04.24		06.00	07.26	08.00	09.35				
	23.49	41 22.11 (46)	22.26		20.39	18.52	16.06	14.42				
2	03.01	21.30 (44)	04.27		06.02	07.29	08.03	09.38				
	23.47	40 22.10 (46)	22.23		20.35	18.49	16.03	14.40				
3	03.01	21.30 (44)	04.30		20.51 (42)	06.05	07.32	08.06	09.40			
	23.46	38 22.09 (46)	22.20	7	20.58 (42)	20.32	18.45	16.00	14.38			
4	03.03	21.30 (44)	04.34		20.49 (42)	06.08	07.35	08.10	09.43			
	23.44	35 22.07 (46)	22.16	12	21.01 (42)	20.28	18.42	15.57	14.36			
5	03.05	21.30 (44)	04.37		20.47 (42)	06.11	07.38	08.13	09.46			
	23.42	27 21.57 (44)	22.13	14	21.01 (42)	20.25	18.38	15.53	14.35			
6	03.07	21.30 (44)	04.40		20.46 (42)	06.14	07.40	08.16	09.48			
	23.40	27 21.57 (44)	22.10	16	21.02 (42)	20.21	18.35	15.50	14.33			
7	03.10	21.30 (44)	04.43		20.45 (42)	06.17	07.43	08.19	09.51			
	23.38	28 21.58 (44)	22.06	18	21.03 (42)	20.18	18.31	15.47	14.31			
8	03.12	21.31 (44)	04.46		20.44 (42)	06.20	07.46	08.22	09.53			
	23.36	28 21.59 (44)	22.03	19	21.03 (42)	20.14	18.28	15.44	14.30			
9	03.15	21.30 (44)	04.49		20.44 (42)	06.23	07.49	08.26	09.55			
	23.34	28 21.58 (44)	21.59	19	21.03 (42)	20.11	18.24	15.41	14.28			
10	03.17	21.30 (44)	04.53		20.44 (42)	06.26	07.52	08.29	09.57			
	23.31	28 21.58 (44)	21.56	20	21.04 (42)	20.07	18.21	15.38	14.27			
11	03.20	21.31 (44)	04.56		20.44 (42)	06.29	07.55	08.32	09.59			
	23.29	28 21.59 (44)	21.53	20	21.04 (42)	20.03	18.17	15.35	14.26			
12	03.23	21.31 (44)	04.59		20.43 (42)	06.31	07.58	08.35	10.01			
	23.26	28 21.59 (44)	21.49	20	21.03 (42)	20.00	18.14	15.32	14.25			
13	03.25	21.31 (44)	05.02		20.43 (42)	06.34	08.01	08.39	10.03			
	23.24	28 21.59 (44)	21.46	19	21.02 (42)	19.56	18.10	15.29	14.24			
14	03.28	21.31 (44)	05.05		20.44 (42)	06.37	08.04	08.42	10.05			
	23.21	28 21.59 (44)	21.42	15	20.59 (42)	19.53	18.07	15.26	14.23			
15	03.31	21.31 (44)	05.08		20.44 (42)	06.40	08.07	08.45	10.06			
	23.18	28 21.59 (44)	21.39	12	20.56 (42)	19.49	18.04	15.23	14.23			
16	03.34	21.31 (44)	05.11		20.44 (42)	06.43	08.10	08.48	10.08			
	23.16	28 21.59 (44)	21.35	8	20.52 (42)	19.46	18.00	15.20	14.22			
17	03.37	21.32 (44)	05.14		20.45 (42)	06.46	08.13	08.52	10.09			
	23.13	28 22.00 (44)	21.32	5	20.50 (42)	19.42	17.57	15.17	14.22			
18	03.40	21.32 (44)	05.17		06.49	08.16	08.55	10.10				
	23.10	27 21.59 (44)	21.28		19.39	17.53	15.14	14.22				
19	03.43	21.32 (44)	05.21		06.51	08.19	08.58	10.12				
	23.07	27 21.59 (44)	21.25		19.35	17.50	15.12	14.22				
20	03.46	21.32 (44)	05.24		06.54	08.22	09.01	10.12				
	23.04	26 21.58 (44)	21.21		19.31	17.46	15.09	14.22				
21	03.49	21.34 (44)	05.27		06.57	08.25	09.05	10.13				
	23.01	25 21.59 (44)	21.18		19.28	17.43	15.06	14.22				
22	03.52	21.34 (44)	05.30		07.00	08.28	09.08	10.14				
	22.58	24 21.58 (44)	21.14		19.24	17.40	15.03	14.23				
23	03.55	21.35 (44)	05.33		07.03	08.32	09.11	10.14				
	22.55	23 21.58 (44)	21.11		19.21	17.36	15.01	14.23				
24	03.59	21.35 (44)	05.36		07.06	08.35	09.14	10.15				
	22.52	22 21.57 (44)	21.07		19.17	17.33	14.58	14.24				
25	04.02	21.36 (44)	05.39		07.09	07.38	09.17	10.15				
	22.49	19 21.55 (44)	21.04		19.14	16.29	14.56	14.25				
26	04.05	21.37 (44)	05.42		07.12	07.41	09.20	10.15				
	22.46	15 21.52 (44)	21.00		19.10	16.26	14.53	14.26				
27	04.08	21.39 (44)	05.45		07.14	07.44	09.23	10.15				
	22.43	11 21.50 (44)	20.57		19.07	16.23	14.51	14.27				
28	04.11	21.40 (44)	05.48		07.17	07.47	09.26	10.14				
	22.39	7 21.47 (44)	20.53		19.03	16.19	14.49	14.28				
29	04.14	21.43 (44)	05.51		07.20	07.50	09.29	10.14				
	22.36	2 21.45 (44)	20.50		19.00	16.16	14.46	14.29				
30	04.18		05.54		07.23	07.54	09.32	10.14				
	22.33		20.46		18.56	16.13	14.44	14.31				
31	04.21		05.57			07.57		10.13				
	22.30		20.43			16.10		14.33				
Potential sun hours	608		508		393	305	198	137				
Total, worst case		744		224								
Sun reduction		0,38		0,31								
Oper. time red.		0,99		0,99								
Wind dir. red.		0,64		0,64								
Total reduction		0,24		0,20								
Total, real		178		44								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 Shadow receptor: E - Lomarakenus E (Kellokankaan metsätie)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	03.18
	14.35	16.05	17.35	20.08	21.41	23.19
2	10.11	09.00	07.27	06.38	04.52	03.16
	14.37	16.08	17.39	20.11	21.44	23.22
3	10.10	08.57	07.24	06.34	04.49	03.13
	14.39	16.12	17.42	20.14	21.47	23.25
4	10.09	08.54	07.20	06.31	04.46	03.11
	14.41	16.15	17.45	20.17	21.50	23.27
5	10.07	08.51	07.17	06.27	19.42 (47)	04.42
	14.43	16.18	17.48	20.20	21.44 (47)	23.30
6	10.06	08.47	07.13	06.24	19.40 (48)	04.39
	14.45	16.22	17.51	20.23	21.47 (47)	23.33
7	10.04	08.44	07.10	06.20	19.37 (48)	04.35
	14.48	16.25	17.54	20.26	21.50 (47)	23.35
8	10.03	08.41	07.06	17.19 (46)	06.17	19.34 (48)
	14.50	16.28	17.57	20.29	18	19.52 (47)
9	10.01	08.38	07.03	17.17 (46)	06.13	19.33 (48)
	14.53	16.31	18.00	7	17.24 (46)	20.32
10	09.59	08.35	06.59	17.15 (46)	06.10	19.31 (48)
	14.56	16.35	18.03	12	17.27 (46)	20.35
11	09.57	08.31	06.56	17.15 (46)	06.06	19.31 (48)
	14.58	16.38	18.06	16	17.31 (46)	20.38
12	09.55	08.28	06.52	17.13 (49)	06.02	19.29 (48)
	15.01	16.41	18.09	20	17.33 (46)	20.41
13	09.53	08.25	06.49	17.11 (49)	05.59	19.29 (48)
	15.04	16.45	18.12	22	17.33 (46)	20.44
14	09.51	08.22	06.45	17.09 (49)	05.55	19.29 (48)
	15.07	16.48	18.15	25	17.34 (46)	20.48
15	09.49	08.18	06.42	17.07 (49)	05.52	19.28 (48)
	15.10	16.51	18.18	27	17.34 (49)	20.51
16	09.47	08.15	06.38	17.06 (49)	05.48	19.28 (48)
	15.13	16.54	18.21	28	17.34 (49)	20.54
17	09.44	08.12	06.35	17.05 (49)	05.45	19.29 (48)
	15.16	16.58	18.24	30	17.35 (49)	20.57
18	09.42	08.08	06.31	17.04 (49)	05.41	19.29 (48)
	15.19	17.01	18.27	31	17.35 (49)	21.00
19	09.39	08.05	06.28	17.04 (49)	05.38	19.29 (48)
	15.22	17.04	18.30	32	17.36 (49)	21.03
20	09.37	08.02	06.24	17.03 (49)	05.34	19.30 (48)
	15.26	17.07	18.33	32	17.35 (49)	21.06
21	09.34	07.58	06.21	17.02 (49)	05.31	19.32 (48)
	15.29	17.10	18.36	32	17.34 (49)	21.09
22	09.32	07.55	06.17	17.03 (49)	05.27	19.33 (48)
	15.32	17.14	18.39	32	17.35 (49)	21.12
23	09.29	07.51	06.14	17.02 (49)	05.24	19.36 (48)
	15.35	17.17	18.42	32	17.34 (49)	21.15
24	09.26	07.48	06.10	17.03 (49)	05.20	19.44 (48)
	15.38	17.20	18.45	30	17.33 (49)	21.18
25	09.23	07.45	06.06	17.03 (49)	05.17	19.44 (48)
	15.42	17.23	18.48	29	17.32 (49)	21.22
26	09.21	07.41	06.03	17.04 (49)	05.13	19.44 (48)
	15.45	17.26	18.51	27	17.31 (49)	21.25
27	09.18	07.38	05.59	17.04 (49)	05.10	19.44 (48)
	15.48	17.29	18.54	26	17.30 (49)	21.28
28	09.15	07.34	05.56	17.06 (49)	05.06	19.44 (48)
	15.52	17.32	18.57	23	17.29 (49)	21.31
29	09.12		06.52	18.07 (49)	05.03	19.44 (48)
	15.55		19.59	19	18.26 (49)	21.34
30	09.09		06.49	18.09 (49)	04.59	19.44 (48)
	15.58		20.02	14	18.23 (49)	21.37
31	09.06		06.45	18.15 (49)		19.44 (48)
	16.02		20.05	3	18.18 (49)	21.40
Potential sun hours	171	238	363	451	570	624
Total, worst case			550	375		
Sun reduction			0,32	0,41		
Oper. time red.			0,99	0,99		
Wind dir. red.			0,60	0,61		
Total reduction			0,19	0,25		
Total, real			105	93		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 Shadow receptor: E - Lomarakenus E (Kellokankaan metsätie)
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December		
1	02.59 23.49	04.24 22.26	05.59 20.39	19.30 (48) 25 19.55 (47)	07.26 18.52	17.52 (49) 21 18.13 (46)	08.00 16.06	09.35 14.42
2	03.01 23.47	04.27 22.23	06.02 20.35	19.30 (48) 25 19.55 (47)	07.29 18.49	17.53 (46) 18 18.11 (46)	08.03 16.03	09.38 14.40
3	03.01 23.46	04.30 22.20	06.05 20.32	19.30 (48) 23 19.53 (47)	07.32 18.45	17.53 (46) 14 18.07 (46)	08.06 16.00	09.40 14.38
4	03.03 23.44	04.33 22.16	06.08 20.28	19.31 (48) 19 19.50 (47)	07.35 18.42	17.54 (46) 9 18.03 (46)	08.09 15.56	09.43 14.36
5	03.05 23.42	04.37 22.13	06.11 20.25	19.33 (48) 13 19.46 (47)	07.37 18.38	17.55 (46) 5 18.00 (46)	08.13 15.53	09.46 14.34
6	03.07 23.40	04.40 22.10	06.14 20.21	19.36 (48) 7 19.43 (47)	07.40 18.35	08.16 15.50	08.16 14.33	09.48 14.33
7	03.09 23.38	04.43 22.06	06.17 20.18	19.38 (47) 2 19.40 (47)	07.43 18.31	08.19 15.47	08.19 14.31	09.51 14.31
8	03.12 23.36	04.46 22.03	06.20 20.14	07.46 18.28	08.22 15.44	09.53 14.30	09.53 14.30	09.53 14.30
9	03.14 23.34	04.49 21.59	06.23 20.11	07.49 18.24	08.26 15.41	09.55 14.28	09.55 14.28	09.55 14.28
10	03.17 23.31	04.52 21.56	06.26 20.07	07.52 18.21	08.29 15.38	09.57 14.27	09.57 14.27	09.57 14.27
11	03.19 23.29	04.56 21.53	06.28 20.03	07.55 18.17	08.32 15.35	09.59 14.26	09.59 14.26	09.59 14.26
12	03.22 23.26	04.59 21.49	06.31 20.00	07.58 18.14	08.35 15.32	10.01 14.25	10.01 14.25	10.01 14.25
13	03.25 23.24	05.02 21.46	06.34 19.56	18.01 (49) 13 18.14 (49)	08.01 18.10	08.39 15.29	10.03 14.24	10.03 14.24
14	03.28 23.21	05.05 21.42	06.37 19.53	17.58 (49) 18 18.16 (49)	08.04 18.07	08.42 15.26	10.05 14.23	10.05 14.23
15	03.31 23.18	05.08 21.39	06.40 19.49	17.56 (49) 22 18.18 (49)	08.07 18.03	08.45 15.23	10.07 14.23	10.07 14.23
16	03.34 23.16	05.11 21.35	06.43 19.46	17.53 (49) 25 18.18 (49)	08.10 18.00	08.48 15.20	10.08 14.22	10.08 14.22
17	03.37 23.13	05.14 21.32	06.46 19.42	17.52 (49) 27 18.19 (49)	08.13 17.56	08.52 15.17	10.09 14.22	10.09 14.22
18	03.40 23.10	05.17 21.28	06.48 19.38	17.51 (49) 29 18.20 (49)	08.16 17.53	08.55 15.14	10.11 14.22	10.11 14.22
19	03.43 23.07	05.20 21.25	06.51 19.35	17.50 (49) 30 18.20 (49)	08.19 17.50	08.58 15.11	10.12 14.21	10.12 14.21
20	03.46 23.04	05.23 21.21	19.41 (48) 9 19.50 (48)	06.54 19.31	17.49 (49) 31 18.20 (49)	08.22 17.46	09.01 15.09	10.13 14.22
21	03.49 23.01	05.26 21.18	19.38 (48) 15 19.53 (48)	06.57 19.28	17.48 (49) 32 18.20 (49)	08.25 17.43	09.05 15.06	10.13 14.22
22	03.52 22.58	05.29 21.14	19.36 (48) 18 19.54 (48)	07.00 19.24	17.47 (49) 32 18.19 (49)	08.28 17.39	09.08 15.03	10.14 14.22
23	03.55 22.55	05.33 21.11	19.34 (48) 21 19.55 (48)	07.03 19.21	17.47 (49) 32 18.19 (49)	08.31 17.36	09.11 15.01	10.14 14.23
24	03.58 22.52	05.36 21.07	19.33 (48) 22 19.55 (48)	07.06 19.17	17.47 (49) 32 18.19 (49)	08.35 17.33	09.14 14.58	10.15 14.23
25	04.01 22.49	05.39 21.04	19.32 (48) 24 19.56 (48)	07.09 19.14	17.47 (49) 31 18.18 (49)	07.38 16.29	09.17 14.56	10.15 14.24
26	04.05 22.46	05.42 21.00	19.32 (48) 25 19.57 (48)	07.11 19.10	17.47 (49) 30 18.17 (49)	07.41 16.26	09.20 14.53	10.15 14.25
27	04.08 22.43	05.45 20.57	19.30 (48) 26 19.56 (48)	07.14 19.06	17.48 (49) 28 18.16 (49)	07.44 16.23	09.23 14.51	10.15 14.26
28	04.11 22.39	05.48 20.53	19.30 (48) 26 19.56 (48)	07.17 19.03	17.48 (49) 27 18.15 (49)	07.47 16.19	09.26 14.48	10.15 14.28
29	04.14 22.36	05.50 20.50	19.30 (48) 26 19.56 (48)	07.20 18.59	17.49 (49) 25 18.14 (49)	07.50 16.16	09.29 14.46	10.14 14.29
30	04.17 22.33	05.53 20.46	19.30 (48) 26 19.56 (47)	07.23 18.56	17.50 (49) 24 18.14 (46)	07.53 16.13	09.32 14.44	10.14 14.31
31	04.21 22.30	05.56 20.43	19.29 (48) 26 19.55 (47)	07.26 18.53	07.57 16.09	10.13 14.32	10.13 14.32	10.13 14.32
Potential sun hours	609	509	393	602	305	67	198	137
Total, worst case		264		0,33		0,35		
Sun reduction		0,31		0,99		0,99		
Oper. time red.		0,99		0,60		0,59		
Wind dir. red.		0,61		0,20		0,21		
Total reduction		0,19						
Total, real		50		118		14		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102Shadow receptor: G - Lomarakennus G (Ollilantie, Siliakuru)
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13 14.34	09.04 16.05	10.08 (33) 12.00 (28)	07.31 17.36	06.42 20.09	04.56 21.41
2	10.12 14.36	09.01 16.08	10.08 (33) 12.00 (28)	07.28 17.39	06.38 20.12	04.53 21.45
3	10.11 14.38	12.19 (27) 16.12	10.07 (33) 11.59 (28)	07.24 17.42	06.35 20.15	04.49 21.48
4	10.10 14.41	12.19 (27) 16.15	10.07 (33) 11.58 (28)	07.21 17.45	06.31 20.18	04.46 21.51
5	10.08 14.43	12.19 (27) 16.18	10.07 (33) 11.58 (28)	07.17 17.48	06.28 20.21	04.42 21.54
6	10.07 14.45	12.19 (27) 16.22	10.07 (33) 11.57 (28)	07.14 17.51	06.24 20.24	04.39 21.58
7	10.05 14.48	12.19 (27) 16.25	10.08 (33) 11.56 (28)	07.11 17.54	06.21 20.27	04.35 22.01
8	10.04 14.50	12.19 (27) 16.28	10.08 (33) 11.55 (28)	07.07 17.57	06.17 20.30	04.32 22.04
9	10.02 14.53	12.19 (27) 16.32	10.08 (33) 11.53 (28)	07.03 18.00	06.13 20.33	04.29 22.07
10	10.00 14.56	12.19 (27) 16.35	10.08 (33) 11.49 (28)	07.00 18.03	06.10 20.36	04.25 22.11
11	09.58 14.58	12.19 (27) 16.38	10.09 (33) 10.32 (33)	06.56 18.06	06.06 20.39	04.22 22.14
12	09.56 15.01	11.34 (28) 13.41 (23)	08.29 10.32 (33)	06.53 18.09	06.03 20.42	04.19 22.17
13	09.54 15.04	11.32 (28) 13.46 (23)	08.26 10.31 (33)	06.49 18.12	05.59 20.45	04.15 22.20
14	09.52 15.07	11.31 (28) 13.47 (23)	08.22 10.29 (33)	06.46 18.15	05.56 20.48	04.12 22.24
15	09.50 15.10	11.30 (28) 13.48 (23)	08.19 10.26 (33)	06.42 18.18	05.52 20.51	04.09 22.27
16	09.47 15.13	11.29 (28) 13.49 (23)	08.16 10.20 (37)	06.39 18.21	05.49 20.54	04.06 22.30
17	09.45 15.16	11.29 (28) 13.50 (23)	08.12 10.20 (37)	06.35 18.24	05.45 20.57	04.02 22.34
18	09.43 15.19	11.28 (28) 13.50 (23)	08.09 10.20 (37)	06.32 18.27	05.42 21.00	03.59 22.37
19	09.40 15.22	11.27 (28) 13.50 (23)	08.06 09.21 (37)	06.28 18.30	05.38 21.04	03.56 22.40
20	09.38 15.26	11.27 (28) 13.51 (23)	08.02 09.21 (37)	06.25 18.33	05.34 21.07	03.53 22.43
21	09.35 15.29	11.27 (28) 13.51 (23)	08.58 (37) 09.21 (37)	06.21 18.36	05.31 21.10	03.50 22.47
22	09.32 15.32	11.27 (28) 13.52 (23)	08.58 (37) 09.20 (37)	06.18 18.39	05.27 21.13	03.47 22.50
23	09.30 15.35	11.27 (28) 13.52 (23)	08.59 (37) 09.20 (37)	06.14 18.42	05.24 21.16	03.44 22.53
24	09.27 15.39	11.27 (28) 13.52 (23)	08.59 (37) 09.19 (37)	06.10 18.45	05.20 21.19	03.41 22.56
25	09.24 15.42	11.27 (28) 13.52 (23)	08.07 09.17 (37)	06.07 18.48	05.17 21.22	03.38 22.59
26	09.21 15.45	10.14 (33) 13.52 (23)	07.42 09.02 (37)	06.03 18.51	05.13 21.25	03.35 23.02
27	09.18 15.48	10.12 (33) 13.52 (23)	07.38 09.04 (37)	06.00 18.54	05.10 21.29	03.32 23.05
28	09.16 15.52	10.11 (33) 13.51 (23)	07.35 17.33	05.56 18.57	05.06 21.32	03.29 23.09
29	09.13 15.55	10.09 (33) 13.50 (23)	06.53 20.00	05.03 21.35	05.03 21.35	03.26 23.12
30	09.10 15.58	10.08 (33) 13.49 (23)	06.49 20.03	04.59 21.38	03.23 21.38	03.23 23.15
31	09.07 16.02	10.08 (33) 13.47 (23)	06.46 20.06	03.21 20.06	03.21 23.17	03.21 23.17
Potential sun hours	171	238	363	451	570	625
Total, worst case	1480	883				
Sun reduction	0,19	0,33				
Oper. time red.	0,99	0,99				
Wind dir. red.	0,66	0,66				
Total reduction	0,12	0,22				
Total, real	180	192				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102Shadow receptor: G - Lomarakennus G (Ollilantie, Siliakuru)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.58	04.24	06.00	07.26	08.01	09.37 (33) 09.36 12.01 (27)
	23.50	22.27	20.40	18.53	16.06 37	11.19 (28) 14.42 26 13.17 (23)
2	03.00	04.27	06.03	07.29	08.04	09.37 (33) 09.39 12.02 (27)
	23.49	22.24	20.36	18.49	16.03 43	11.22 (28) 14.40 20 12.22 (27)
3	03.00	04.30	06.06	07.32	08.07	09.37 (33) 09.41 12.02 (27)
	23.47	22.20	20.32	18.46	16.00 49	11.25 (28) 14.38 20 12.22 (27)
4	03.02	04.33	06.08	07.35	08.10	09.37 (33) 09.44 12.03 (27)
	23.45	22.17	20.29	18.42	15.57 51	11.26 (28) 14.36 19 12.22 (27)
5	03.04	04.37	06.11	07.38	08.13	09.37 (33) 09.47 12.05 (27)
	23.43	22.14	20.25	18.39	15.53 53	11.27 (28) 14.34 17 12.22 (27)
6	03.07	04.40	06.14	07.41	08.17	09.37 (33) 09.49 12.05 (27)
	23.41	22.10	20.22	18.35	15.50 54	11.28 (28) 14.32 17 12.22 (27)
7	03.09	04.43	06.17	07.44	08.20	09.37 (33) 09.52 12.06 (27)
	23.39	22.07	20.18	18.32	15.47 56	11.29 (28) 14.31 16 12.22 (27)
8	03.11	04.46	06.20	07.47	08.23	09.38 (33) 09.54 12.07 (27)
	23.37	22.04	20.15	18.28	15.44 56	11.30 (28) 14.29 15 12.22 (27)
9	03.14	04.49	06.23	07.50	08.26	09.38 (33) 09.56 12.08 (27)
	23.35	22.00	20.11	18.25	15.41 57	11.30 (28) 14.28 14 12.22 (27)
10	03.17	04.53	06.26	07.53	08.30	09.39 (33) 09.58
	23.32	21.57	20.07	18.21	15.38 56	11.31 (28) 14.27
11	03.19	04.56	06.29	07.56	08.33	09.39 (33) 10.01
	23.30	21.53	20.04	18.18	15.35 65	13.19 (23) 14.26
12	03.22	04.59	06.32	07.59	08.36	09.40 (33) 10.02
	23.28	21.50	20.00	18.14	15.32 67	13.21 (23) 14.25
13	03.25	05.02	06.35	08.02	08.39	09.41 (33) 10.04
	23.25	21.46	19.57	18.11	15.29 68	13.22 (23) 14.24
14	03.28	05.05	06.37	08.05	08.43	09.43 (33) 10.06
	23.22	21.43	19.53	18.07	15.26 74	13.24 (23) 14.23
15	03.31	05.08	06.40	08.08	09.35 (37) 08.46	09.45 (33) 10.08
	23.20	21.39	19.50	18.04	12 09.47 (37) 15.23 76	13.24 (23) 14.22
16	03.33	05.11	06.43	08.11	09.33 (37) 08.49	09.47 (33) 10.09
	23.17	21.36	19.46	18.00	15 09.48 (37) 15.20 76	13.25 (23) 14.22
17	03.36	05.14	06.46	08.14	09.31 (37) 08.53	11.00 (28) 10.10
	23.14	21.33	19.42	17.57	18 09.49 (37) 15.17 70	13.26 (23) 14.22
18	03.40	05.17	06.49	08.17	09.31 (37) 08.56	11.01 (28) 10.12
	23.11	21.29	19.39	17.53	20 09.51 (37) 15.14 69	13.26 (23) 14.21
19	03.43	05.21	06.52	08.20	09.29 (37) 08.59	11.01 (28) 10.13
	23.08	21.26	19.35	17.50	22 09.51 (37) 15.11 72	13.26 (23) 14.21
20	03.46	05.24	06.55	08.23	09.28 (37) 09.02	11.02 (28) 10.14
	23.05	21.22	19.32	17.47	23 09.51 (37) 15.09 72	13.27 (23) 14.21
21	03.49	05.27	06.58	08.26	09.28 (37) 09.05	11.02 (28) 10.14
	23.02	21.18	19.28	17.43	23 09.51 (37) 15.06 70	13.26 (23) 14.22
22	03.52	05.30	07.00	08.29	09.28 (37) 09.09	11.03 (28) 10.15
	22.59	21.15	19.25	17.40	23 09.51 (37) 15.03 71	13.27 (23) 14.22
23	03.55	05.33	07.03	08.32	09.28 (37) 09.12	11.04 (28) 10.15
	22.56	21.11	19.21	17.36	23 09.51 (37) 15.01 69	13.27 (23) 14.23
24	03.58	05.36	07.06	08.35	09.28 (37) 09.15	11.06 (28) 10.16
	22.53	21.08	19.18	17.33	22 09.50 (37) 14.58 67	13.28 (23) 14.23
25	04.01	05.39	07.09	07.38	08.29 (37) 09.18	11.06 (28) 10.16
	22.50	21.04	19.14	16.30	21 08.50 (37) 14.56 66	13.27 (23) 14.24
26	04.05	05.42	07.12	07.41	08.29 (37) 09.21	11.07 (28) 10.16
	22.47	21.01	19.10	16.26	22 09.51 (33) 14.53 63	13.27 (23) 14.25
27	04.08	05.45	07.15	07.45	08.30 (37) 09.24	11.09 (28) 10.16
	22.43	20.57	19.07	16.23	31 09.57 (33) 14.51 59	13.27 (23) 14.26
28	04.11	05.48	07.18	07.48	08.32 (37) 09.27	11.10 (28) 10.16
	22.40	20.54	19.03	16.20	32 09.59 (33) 14.48 56	13.27 (23) 14.28
29	04.14	05.51	07.21	07.51	08.35 (37) 09.30	11.12 (28) 10.15
	22.37	20.50	19.00	16.16	30 10.00 (33) 14.46 50	13.26 (23) 14.29
30	04.17	05.54	07.23	07.54	08.39 (37) 09.33	11.15 (28) 10.15
	22.34	20.47	18.56	16.13	25 10.02 (33) 14.44 41	13.23 (23) 14.30
31	04.21	05.57	07.27	07.57	09.39 (33)	10.14
	22.30	20.43	18.50	16.10	24 10.03 (33)	14.32
Potential sun hours	609	509	393	305	198	136
Total, worst case				386	1833	164
Sun reduction				0,35	0,24	0,22
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,65	0,66	0,67
Total reduction				0,22	0,16	0,14
Total, real				86	288	24

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102Shadow receptor: H - Asuinrakennus H (Pinolantie 406)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December					
1	10.13	09.04	07.32	06.43	04.57	03.19	03.00	04.25	05.21 (1)	06.00	06.55 (2)	07.27	08.01	09.36			
	14.36	16.06	17.37	20.09	21.42	23.20	23.50	22.27	21	05.42 (1)	20.40	21	07.16 (2)	18.53	16.07	14.43	
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	05.21 (1)	06.03	06.54 (2)	07.30	08.04	09.39			
	14.38	16.09	17.40	20.12	21.45	23.23	23.49	22.24	20	05.41 (1)	20.37	22	07.16 (2)	18.50	16.04	14.41	
3	10.11	08.58	07.25	06.36	04.50	03.14	03.01	04.31	05.21 (1)	06.06	06.54 (2)	07.33	08.07	09.42			
	14.40	16.13	17.43	20.15	21.48	23.26	23.47	22.21	20	05.41 (1)	20.33	22	07.16 (2)	18.46	16.01	14.39	
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.34	05.22 (1)	06.09	06.53 (2)	07.36	08.11	09.44			
	14.42	16.16	17.46	20.18	21.51	23.29	23.45	22.17	17	05.39 (1)	20.29	21	07.14 (2)	18.43	15.58	14.37	
5	10.09	08.52	07.18	06.28	04.43	03.09	03.06	04.38	05.25 (1)	06.12	06.54 (2)	07.39	08.14	09.47			
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	14	05.39 (1)	20.26	20	07.14 (2)	18.39	15.54	14.35	
6	10.07	08.49	07.15	06.25	04.40	03.07	03.08	04.41	05.28 (1)	06.15	06.54 (2)	07.41	08.17	09.49			
	14.46	16.23	17.52	20.24	21.58	23.34	23.41	22.11	10	05.38 (1)	20.22	19	07.13 (2)	18.36	15.51	14.34	
7	10.06	08.45	07.11	06.21	04.36	03.05	03.10	04.44	05.31 (1)	06.18	06.56 (2)	07.44	08.20	09.52			
	14.49	16.26	17.55	20.27	21	05.29 (1)	23.36	22.07	6	05.37 (1)	20.19	16	07.12 (2)	18.32	15.48	14.32	
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	05.33 (1)	06.21	06.58 (2)	07.47	08.24	09.54			
	14.51	16.29	17.58	20.30	21	05.29 (1)	23.38	22.04	1	05.34 (1)	20.15	12	07.10 (2)	18.29	15.45	14.31	
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	05.34 (1)	06.24	07.01 (2)	07.50	08.27	09.56			
	14.54	16.33	18.01	20.33	22	05.30 (1)	23.41	22.01		20.12	6	07.07 (2)	18.25	15.42	14.29		
10	10.00	08.36	07.01	06.11	04.26	02.58	03.18	04.53	05.33 (1)	06.27	07.07 (2)	07.53	08.30	09.59			
	14.57	16.36	18.04	20.36	22	05.31 (1)	23.43	21.57		20.08		18.22	15.39	14.28			
11	09.58	08.33	06.57	06.07	04.23	02.56	03.20	04.57	05.33 (1)	06.30	07.07 (2)	07.56	08.33	10.01			
	14.59	16.39	18.07	20.40	21	05.31 (1)	23.45	21.54		20.04		18.18	15.36	14.27			
12	09.56	08.29	06.54	06.04	04.20	02.55	03.23	05.00	05.33 (1)	06.32	07.07 (2)	07.59	08.37	10.03			
	15.02	16.42	18.10	20.43	20	05.31 (1)	23.47	21.50		20.01		18.15	15.33	14.26			
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	05.33 (1)	06.35	07.07 (2)	08.02	08.40	10.04			
	15.05	16.46	18.13	20.46	19	05.31 (1)	23.48	21.52		19.57		18.11	15.30	14.25			
14	09.52	08.23	06.47	05.56	04.13	02.52	03.29	05.06	05.33 (1)	06.38	07.07 (2)	08.05	08.43	10.06			
	15.08	16.49	18.16	20.49	17	05.31 (1)	23.50	21.43		19.54		18.08	15.27	14.24			
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	05.33 (1)	06.41	07.07 (2)	08.08	08.46	10.08			
	15.11	16.52	18.19	20.52	13	07.11 (2)	22.27	21	05.31 (1)	23.51	23.20	21.40	18.04	15.24	14.24		
16	09.48	08.16	06.39	05.49	04.07	02.51	03.35	05.12	05.33 (1)	06.44	07.07 (2)	08.11	08.50	10.09			
	15.14	16.55	18.22	20.55	9	07.09 (2)	22.31	20	05.30 (1)	23.53	23.17	21.36	18.01	15.21	14.23		
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	05.33 (1)	06.47	07.07 (2)	08.14	08.53	10.11			
	15.17	16.59	18.25	20.58	22.34	20	05.31 (1)	23.54	23.14	21.33	19.43	17.58	15.18	14.23			
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	05.33 (1)	06.50	07.07 (2)	08.17	08.56	10.12			
	15.20	17.02	18.28	21.01	22.37	19	05.30 (1)	23.55	23.11	21.29	19.40	17.54	15.15	14.23			
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	05.33 (1)	06.52	07.07 (2)	08.20	08.59	10.13			
	15.23	17.05	18.31	21.04	22.40	18	05.30 (1)	23.55	23.08	7	05.34 (1)	21.26	17.51	15.12	14.23		
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.25	05.33 (1)	06.54	07.07 (2)	08.23	09.03	10.14			
	15.27	17.08	18.34	21.07	22.44	17	05.30 (1)	23.56	23.05	10	05.35 (1)	21.22	17.47	15.10	14.23		
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.25	05.33 (1)	06.58	07.07 (2)	08.26	09.06	10.14			
	15.30	17.11	18.37	21.10	22.47	15	05.28 (1)	23.56	23.02	12	05.37 (1)	21.19	17.44	15.07	14.23		
22	09.33	07.56	06.18	05.28	03.48	02.49	03.53	05.23	05.33 (1)	06.51	07.07 (2)	08.29	09.09	10.15			
	15.33	17.15	18.40	21.13	22.50	14	05.28 (1)	23.56	22.59	15	05.38 (1)	21.15	17.25	15.04	14.23		
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.22	05.33 (1)	06.54	07.07 (2)	08.33	09.12	10.16			
	15.36	17.18	18.43	21.16	22.53	12	05.27 (1)	23.56	22.56	16	05.38 (1)	21.12	17.22	15.02	14.24		
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.22	05.33 (1)	06.57	07.07 (2)	08.36	09.15	10.16			
	15.39	17.21	18.46	21.20	22.56	8	05.24 (1)	23.56	22.53	18	05.40 (1)	21.08	17.34	14.59	14.24		
25	09.24	07.46	06.08	05.18	03.39	02.51	04.02	05.21	05.33 (1)	06.50	07.07 (2)	08.39	09.18	10.16			
	15.43	17.24	18.49	21.23	22.59	3	05.22 (1)	23.56	22.50	19	05.40 (1)	21.05	17.15	14.57	14.25		
26	09.22	07.42	06.04	05.14	03.36	02.52	04.06	05.21	05.33 (1)	06.53	07.07 (2)	08.42	09.21	10.16			
	15.46	17.27	18.52	21.26	23.03		23.55	22.47	20	05.41 (1)	21.01	19.11	16.27	14.54	14.26		
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.20	05.33 (1)	06.46	07.07 (2)	07.15	07.45	09.24	10.16		
	15.49	17.30	18.55	21.29	23.06		23.55	22.44	21	05.41 (1)	20.58	9	07.11 (2)	19.08	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.21	05.33 (1)	06.49	06.59 (2)	07.18	07.48	09.27	10.16		
	15.53	17.33	18.58	21.32	23.09		23.54	22.41	20	05.41 (1)	20.54	14	07.13 (2)	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.21	05.33 (1)	06.52	06.58 (2)	07.21	07.51	09.30	10.15		
	15.56		20.01	21.35	23.12		23.53	22.37	21	05.42 (1)	20.51	16	07.14 (2)	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.20	05.33 (1)	06.55	06.57 (2)	07.24	07.55	09.33	10.15		
	15.59		20.04	21.39	23.15		23.51	22.34	21	05.41 (1)	20.47	18	07.15 (2)	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.21	05.33 (1)	06.57	06.55 (2)		07.58		10.14		
	16.03		20.07		23.18		23.41	22.31	21	05.42 (1)	20.44	20	07.15 (2)		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509		393		305	198	137			
Total, worst case				237		326		221		186		159					
Sun reduction				0.41		0.47		0.38		0.31		0.33					
Oper. time red.				0.99		0.99		0.99		0.99		0.99					
Wind dir. red.				0.62		0.62		0.62		0.62		0.62					
Total reduction				0.25		0.29		0.23		0.19		0.20					
Total, real				59		94		51		36		32					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102Shadow receptor: I - Asuinrakennus I (Kortenevantie 116)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.14	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.52	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.05	03.11	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.24	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.08	23.40	23.35	22.00	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.26	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.54	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04	04.20	02.55	03.23	05.00	06.32	07.59	08.37	10.02
	15.02	16.43	18.10	20.43	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.26	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.23
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	17.30	14.57	14.26
26	09.22	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.49	17.30	18.55	21.29	23.05	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.27	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.01	21.35	23.11	23.52	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	15.59		20.04	21.39	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.17		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102Shadow receptor: J - Asuinrakennus J (Haapavesitie 1406)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.25	23.46	22.21	20.33	18.46	16.01	14.39
4	10.09	08.55	07.21	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.14	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.36
6	10.07	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.06	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.47	08.23	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.07	23.40	23.34	22.00	20.12	18.25	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.04	04.20	02.55	03.24	05.00	06.32	07.59	08.36	10.02
	15.03	16.43	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.46	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.16	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.11
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.52	08.20	08.59	10.12
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.25	05.35	03.54	02.50	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.26	09.05	10.14
	15.30	17.12	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.24
23	09.30	07.52	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.15
	15.40	17.21	18.46	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.55	22.50	21.05	19.15	17.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.50	17.30	18.55	21.29	23.05	23.54	22.43	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.15
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.28	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.51	19.00	16.17	14.47	14.31
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.11		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102Shadow receptor: K - Lomarakenus K (Kurunoja)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.11	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.13	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.47	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.53
	14.52	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.15	04.50	06.24	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	03.00	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.21	04.57	06.29	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.46	18.13	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.30	14.25
14	09.52	08.22	06.46	05.56	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.27	14.24
15	09.49	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.08
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.59	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.26	19.36	17.51	15.12	14.23
20	09.37	08.02	06.25	05.35	03.54	02.50	03.47	05.24	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.21	05.32	03.51	02.50	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.40	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.43	21.16	22.52	23.55	22.56	21.11	19.21	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.45	06.07	05.18	03.39	02.52	04.03	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	17.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.42	07.12	07.42	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.27
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.24	14.52	14.28
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.12		06.53	05.04	03.27	02.57	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.57		10.13
	16.03		20.06		23.17		22.30	20.43		16.10		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102Shadow receptor: L - Laskentapiste L (Perkkiontie, Ilmola)
Assumptions for shadow calculations
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

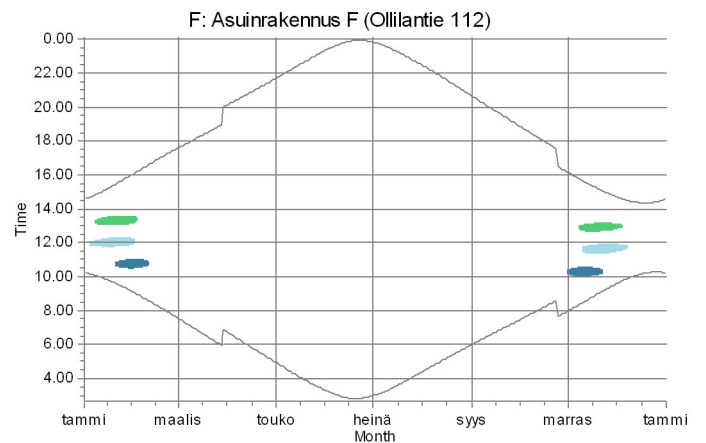
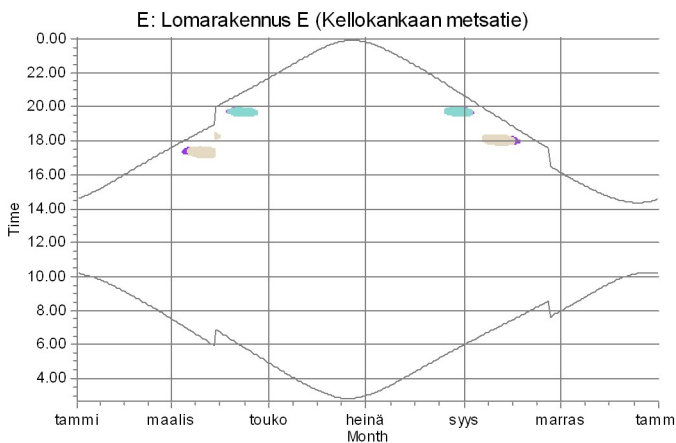
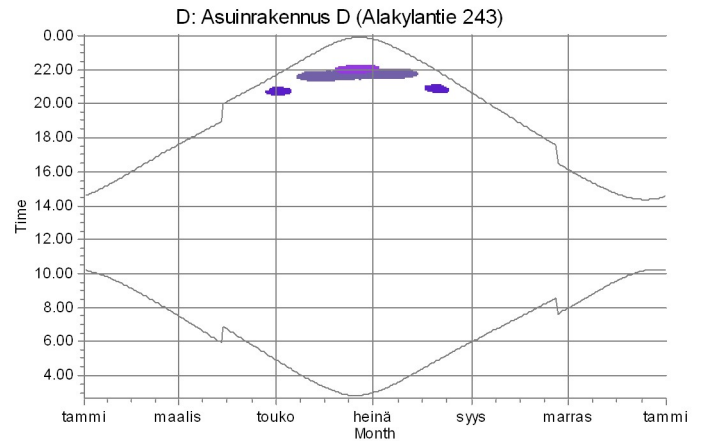
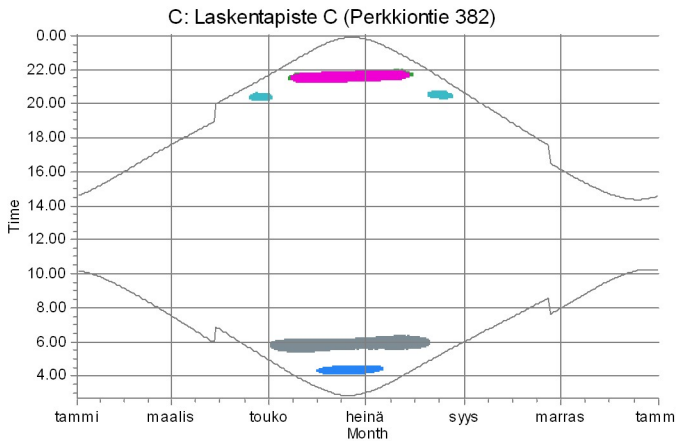
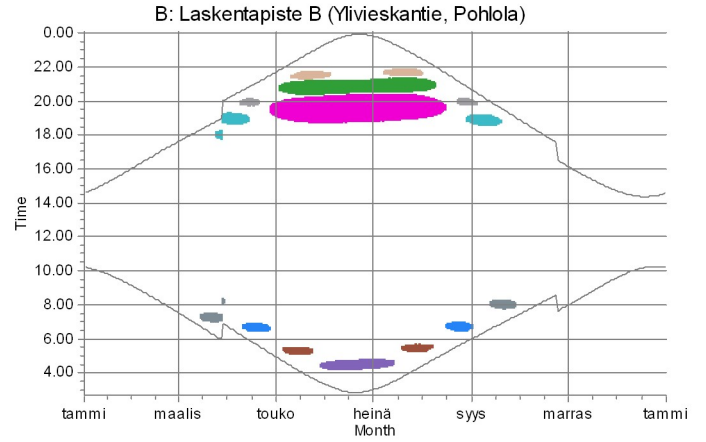
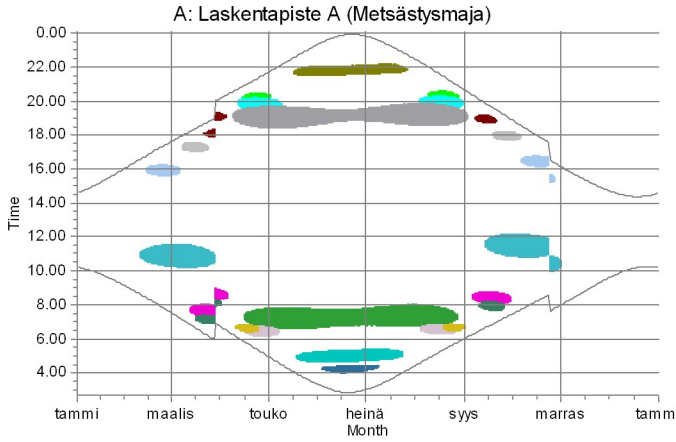
	January	February	March	April	May	June	July	August	September	October	November	December				
1	10.12	09.03	07.31	06.42	04.56	03.19	05.13 (38)	02.59	05.18 (38)	04.24	05.33 (38)	06.00	07.26	08.00	09.35	
2	14.35	16.06	17.36	20.09	21.41	23.19	21.39 (24)	23.49	21.43 (24)	22.27	21.37 (20)	20.39	18.53	16.07	14.43	
3	10.11	09.00	07.28	06.38	04.53	03.16	05.13 (38)	03.01	05.18 (38)	04.28	05.35 (38)	06.03	07.29	08.03	09.38	
4	14.37	16.09	17.39	20.12	21.44	23.22	21.39 (24)	23.47	21.43 (24)	22.23	18	05.53 (38)	20.36	18.49	16.03	14.41
5	10.10	08.57	07.24	06.35	04.50	03.14	05.12 (38)	03.01	05.18 (38)	04.31	05.38 (38)	06.06	07.32	08.07	09.41	
6	14.39	16.12	17.42	20.15	21.47	23.25	21.38 (24)	23.46	21.43 (24)	22.20	12	05.50 (38)	20.32	18.46	16.00	14.39
7	10.09	08.54	07.21	06.31	04.46	03.12	05.13 (38)	03.03	05.19 (38)	04.34		06.09	07.35	08.10	09.43	
8	14.42	16.15	17.45	20.18	21.51	23.28	21.39 (24)	23.44	21.44 (24)	22.17		20.29	18.42	15.57	14.37	
9	10.08	08.51	07.17	06.28	04.43	03.09	05.13 (38)	03.05	05.19 (38)	04.37		06.12	07.38	08.13	09.46	
10	14.44	16.19	17.48	20.21	21.54	23.30	21.39 (24)	23.40	21.44 (24)	22.13		20.25	18.39	15.54	14.35	
11	10.06	08.48	07.14	06.24	04.39	03.07	05.13 (38)	03.08	05.19 (38)	04.40		06.14	07.41	08.16	09.48	
12	14.46	16.22	17.51	20.24	21.57	23.33	21.38 (24)	23.40	21.45 (24)	22.10		20.22	18.35	15.51	14.33	
13	10.05	08.45	07.10	06.21	04.36	03.05	05.13 (38)	03.10	05.19 (38)	04.43		06.17	07.44	08.20	09.51	
14	14.49	16.25	17.54	20.27	22.00	23.35	21.39 (24)	23.38	21.45 (24)	22.07		20.18	18.32	15.48	14.32	
15	10.03	08.41	07.07	06.17	04.33	03.03	05.14 (38)	03.12	05.20 (38)	04.47		06.20	07.47	08.23	09.53	
16	14.51	16.29	17.57	20.30	22.04	23.37	21.39 (24)	23.36	21.45 (24)	22.03		20.14	18.28	15.44	14.30	
17	10.01	08.38	07.03	06.14	04.29	03.01	05.14 (38)	03.15	05.20 (38)	04.50		06.23	07.50	08.26	09.55	
18	14.54	16.32	18.00	20.33	22.07	6	05.37 (38)	23.40	21.46 (24)	22.00		20.11	18.25	15.41	14.29	
19	09.59	08.35	07.00	06.10	04.26	03.00	05.26 (38)	02.58	05.14 (38)	03.18		06.26	07.53	08.29	09.58	
20	14.56	16.35	18.03	20.36	22.10	15	05.41 (38)	23.42	21.39 (24)	23.31		20.07	18.21	15.38	14.28	
21	09.58	08.32	06.56	06.07	04.23	03.00	05.24 (38)	02.56	05.14 (38)	03.20		06.29	07.55	08.33	10.00	
22	14.59	16.39	18.06	20.39	22.13	19	05.43 (38)	23.44	21.39 (24)	23.29		20.04	18.18	15.35	14.27	
23	09.56	08.29	06.53	06.03	04.19	03.00	05.22 (38)	02.55	05.14 (38)	03.23		06.32	07.58	08.36	10.02	
24	15.02	16.42	18.09	20.42	22.17	32	21.28 (20)	23.45	21.38 (24)	23.27		20.00	18.14	15.32	14.26	
25	09.53	08.25	06.49	05.59	04.16	03.00	05.20 (38)	02.53	04.04 (39)	03.26		06.35	08.01	08.39	10.03	
26	15.05	16.45	18.12	20.45	22.20	41	21.31 (20)	23.47	21.39 (24)	23.24		20.00	18.11	15.29	14.25	
27	09.51	08.22	06.46	05.56	04.13	03.00	05.19 (38)	02.52	04.03 (39)	03.29		06.38	08.04	08.42	10.05	
28	15.08	16.48	18.15	20.48	22.23	47	21.33 (20)	23.49	21.39 (24)	23.21		20.00	18.07	15.26	14.24	
29	09.49	08.19	06.42	05.52	04.09	03.00	05.18 (38)	02.51	04.03 (39)	03.31		06.40	08.07	08.46	10.07	
30	15.11	16.52	18.18	20.51	22.26	54	21.36 (20)	23.50	21.39 (24)	23.19		20.00	18.04	15.23	14.23	
31	09.47	08.15	06.39	05.49	04.06	03.00	05.17 (38)	02.50	04.02 (39)	03.34		06.43	08.10	08.49	10.08	
32	15.14	16.55	18.21	20.54	22.30	58	21.38 (20)	23.51	21.39 (24)	23.16		20.00	18.00	15.20	14.23	
33	09.44	08.12	06.35	05.45	04.03	03.00	05.15 (38)	02.50	04.02 (39)	03.37		06.46	08.13	08.52	10.09	
34	15.17	16.58	18.24	20.57	22.33	64	21.40 (20)	23.52	21.39 (24)	23.13		20.00	18.00	15.20	14.22	
35	09.42	08.09	06.32	05.42	04.00	03.00	05.15 (38)	02.49	04.02 (39)	03.40		06.49	08.16	08.55	10.11	
36	15.20	17.01	18.27	21.00	22.36	66	21.40 (20)	23.53	21.39 (24)	23.10		20.00	18.00	15.20	14.22	
37	09.40	08.05	06.28	05.38	03.57	03.00	05.14 (38)	02.49	04.02 (39)	03.43		06.52	08.20	08.58	10.12	
38	15.23	17.05	18.30	21.03	22.39	68	21.40 (20)	23.54	21.40 (24)	23.07		20.00	18.00	15.20	14.22	
39	09.37	08.02	06.25	05.35	03.54	03.00	05.14 (38)	02.49	04.02 (39)	03.46		06.55	08.23	09.02	10.13	
40	15.26	17.08	18.33	21.06	22.43	69	21.40 (20)	23.55	21.40 (24)	23.04		20.00	18.00	15.20	14.22	
41	09.34	07.59	06.21	05.31	03.50	03.00	05.14 (38)	02.49	04.02 (39)	03.50		06.58	08.26	09.05	10.13	
42	15.29	17.11	18.36	21.09	22.46	71	21.41 (20)	23.55	21.40 (24)	23.01		20.00	18.00	15.20	14.23	
43	09.32	07.55	06.18	05.28	03.47	03.00	05.13 (38)	02.49	04.02 (39)	03.53		06.59	08.29	09.08	10.14	
44	15.33	17.14	18.39	21.13	22.49	72	21.40 (20)	23.55	21.40 (24)	22.58		20.00	18.00	15.20	14.23	
45	09.29	07.52	06.14	05.24	03.44	03.00	05.13 (38)	02.50	04.03 (39)	03.56		06.59	08.32	09.11	10.15	
46	15.36	17.17	18.42	21.16	22.52	72	21.40 (20)	23.55	21.41 (24)	22.55		20.00	18.00	15.20	14.24	
47	09.26	07.48	06.10	05.21	03.41	03.00	05.13 (38)	02.50	04.03 (39)	03.59		06.59	08.35	09.14	10.15	
48	15.39	17.20	18.45	21.19	22.55	72	21.40 (20)	23.55	21.40 (24)	22.52		20.00	18.00	15.20	14.24	
49	09.24	07.45	06.07	05.17	03.38	03.00	05.13 (38)	02.51	04.04 (39)	04.02		06.59	08.38	09.17	10.15	
50	15.42	17.24	18.48	21.22	22.58	72	21.40 (20)	23.55	21.41 (24)	22.49		20.00	18.00	15.20	14.25	
51	09.21	07.42	06.03	05.14	03.35	03.00	05.13 (38)	02.52	04.04 (39)	04.05		06.59	08.42	09.20	10.15	
52	15.46	17.27	18.51	21.25	23.02	73	21.40 (20)	23.54	21.41 (24)	22.46		20.00	18.00	15.20	14.26	
53	09.18	07.38	06.00	05.10	03.33	03.00	05.13 (38)	02.53	04.05 (39)	04.08		06.59	08.45	09.23	10.15	
54	15.49	17.30	18.54	21.28	23.05	73	21.40 (20)	23.53	21.41 (24)	22.43		20.00	18.00	15.20	14.27	
55	09.15	07.35	05.56	05.07	03.30	03.00	05.13 (38)	02.55	04.06 (39)	04.12		06.59	08.48	09.26	10.15	
56	15.52	17.33	18.57	21.31	23.08	72	21.39 (20)	23.52	21.42 (24)	22.40		20.00	18.00	15.20	14.28	
57	09.12	06.53	05.03	03.27	02.56	03.00	05.12 (38)	02.56	04.07 (39)	04.15		06.59	08.51	09.29	10.14	
58	15.56	20.00	21.35	23.11	24.87	74	21.39 (20)	23.51	21.42 (24)	22.36		20.00	18.00	15.20	14.30	
59	09.09	06.49	05.00	03.24	02.58	03.00	05.12 (38)	02.58	05.18 (38)	04.18		06.59	08.54	09.32	10.14	
60	15.59	20.03	21.38	23.14	24.90	74	21.39 (24)	23.50	21.43 (24)	22.33		20.00	18.00	15.20	14.31	
61	09.06	06.46	05.00	03.22	02.56	03.00	05.12 (38)	02.58	04.21	05.31 (38)		06.59	08.57	09.35	10.13	
62	16.02	20.06	21.41	23.16	24.92	73	21.38 (24)	23.49	21.43 (24)	22.30		20.00	18.00	15.20	14.33	
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137				
Total, worst case					1337	2221	2105	56								
Sun reduction					0.47	0.48	0.38	0.31								
Oper. time red.					0.99	0.99	0.99	0.99								
Wind dir. red.					0.63	0.63	0.63	0.62								
Total reduction					0.29	0.30	0.24	0.19								
Total, real					392	661	497	11								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar, graphical

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102

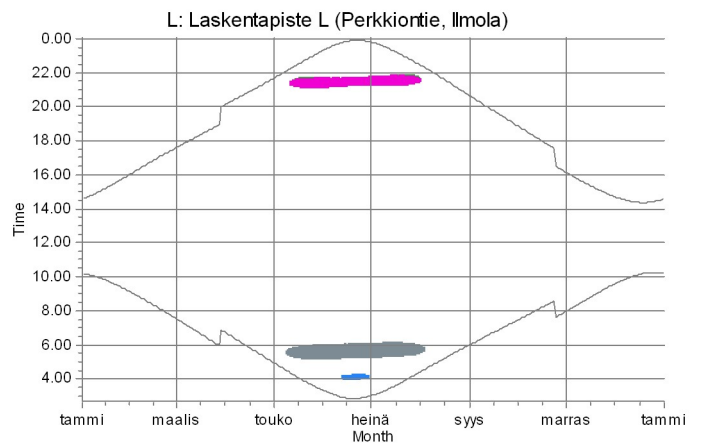
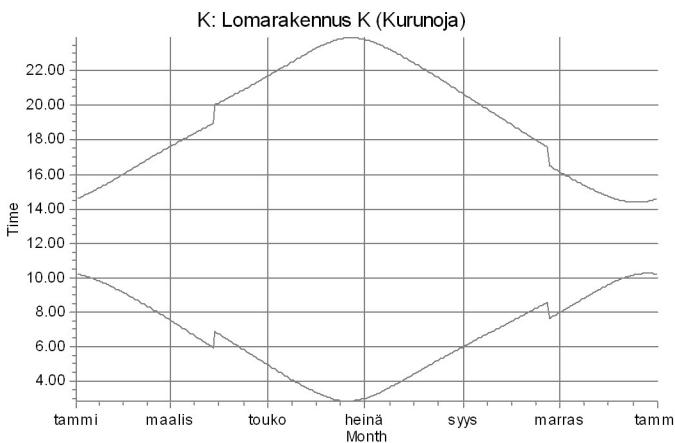
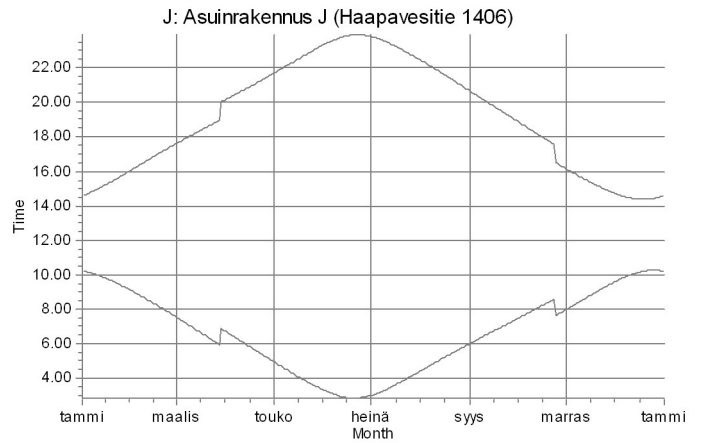
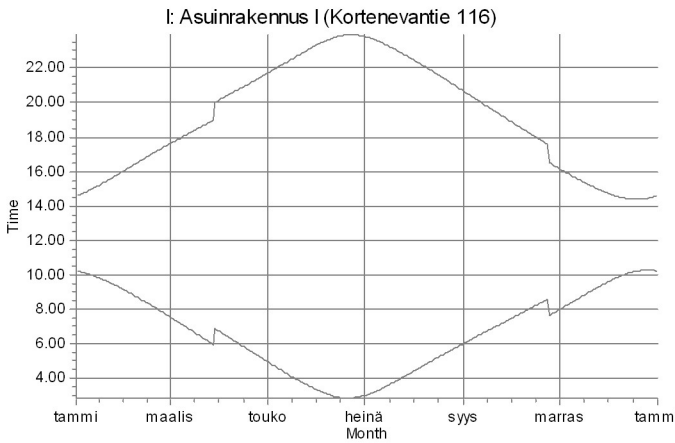
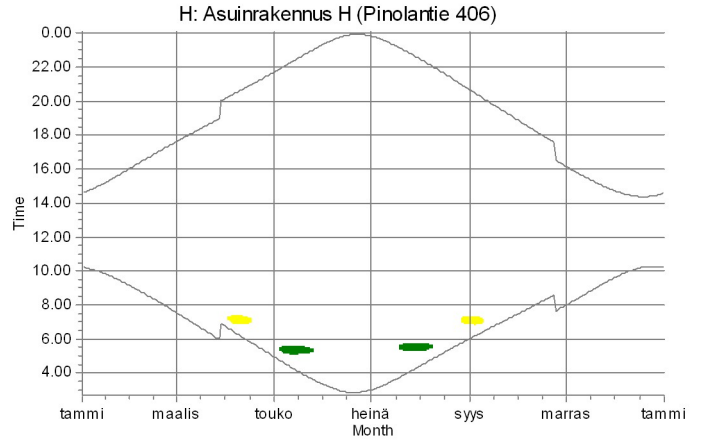
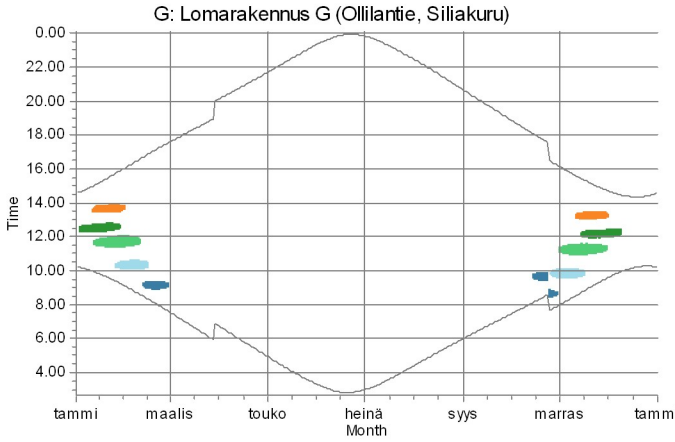


WTGs

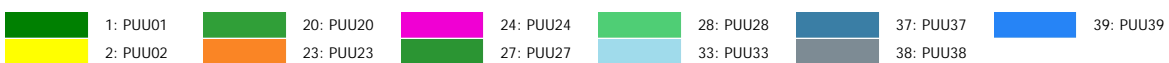
8: PUU08	15: PUU15	21: PUU21	29: PUU29	38: PUU38	46: PUU46
9: PUU09	16: PUU16	22: PUU22	30: PUU30	39: PUU39	47: PUU47
10: PUU10	17: PUU17	24: PUU24	33: PUU33	40: PUU40	48: PUU48
12: PUU12	19: PUU19	25: PUU25	34: PUU34	42: PUU42	49: PUU49
13: PUU13	20: PUU20	28: PUU28	37: PUU37	44: PUU44	

SHADOW - Calendar, graphical

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102

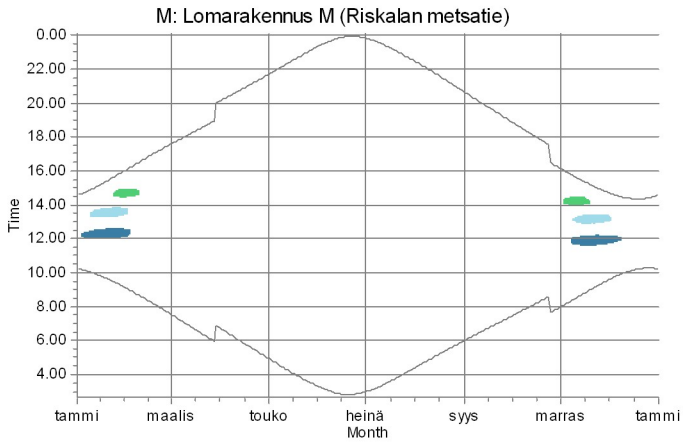


WTGs



SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



WTGs

28: PUU28 33: PUU33 37: PUU37

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 1 - PUU01

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24 05.21-05.42/21	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28 05.21-05.41/20	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31 05.21-05.41/20	06.06	07.33	08.07	09.42
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34 05.22-05.39/17	06.09	07.35	08.11	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.09	08.52	07.18	06.28	04.43 05.23-05.26/3	03.09	03.05	04.37 05.25-05.39/14	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.14	06.25	04.40 05.20-05.27/7	03.07	03.07	04.40 05.28-05.38/10	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.36	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36 05.17-05.29/12	03.05	03.10	04.44 05.31-05.37/6	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33 05.14-05.29/15	03.03	03.12	04.47 05.33-05.34/1	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29 05.11-05.30/19	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.01	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26 05.11-05.31/20	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23 05.11-05.31/20	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.10-05.31/21	02.54	03.23	04.59	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16 05.10-05.31/21	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13 05.10-05.31/21	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10 05.10-05.31/21	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06 05.10-05.30/20	02.50	03.34	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03 05.11-05.31/20	02.49	03.37	05.15	06.47	08.14	08.53	10.11
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00 05.11-05.30/19	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57 05.12-05.30/18	02.49	03.43 05.27-05.34/7	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54 05.13-05.30/17	02.49	03.46 05.25-05.35/10	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.50 05.13-05.28/15	02.49	03.50 05.25-05.37/12	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47 05.14-05.28/14	02.49	03.53 05.23-05.38/15	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44 05.15-05.27/12	02.49	03.56 05.22-05.38/16	05.33	07.04	08.32	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.57	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41 05.16-05.24/8	02.50	03.59 05.22-05.40/18	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38 05.19-05.22/3	02.51	04.02 05.21-05.40/19	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05 05.21-05.41/20	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.08 05.20-05.41/21	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12 05.21-05.41/20	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		05.53	05.04	03.27	02.56	04.15 05.21-05.42/21	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		05.50	05.00	03.24	02.57	04.18 05.20-05.41/21	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.21		04.21 05.21-05.42/21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	326	0	221	109	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 2 - PUU02

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	06.55-07.16/21	07.27	08.01	09.36	
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40		18.53	16.07	14.43	
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	06.54-07.16/22	07.30	08.04	09.39	
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36		18.50	16.04	14.41	
3	10.11	08.58	07.25	06.35	07.08-07.14/6	04.50	03.14	03.01	04.31	06.06	06.54-07.16/22	07.33	08.07	09.41
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33		18.46	16.01	14.39	
4	10.10	08.55	07.21	06.32	07.04-07.15/11	04.46	03.12	03.03	04.34	06.09	06.53-07.14/21	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29		18.43	15.57	14.37	
5	10.08	08.52	07.18	06.28	07.01-07.17/16	04.43	03.09	03.05	04.37	06.12	06.54-07.14/20	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26		18.39	15.54	14.35	
6	10.07	08.48	07.14	06.25	06.58-07.17/19	04.40	03.07	03.08	04.41	06.15	06.54-07.13/19	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22		18.36	15.51	14.33	
7	10.05	08.45	07.11	06.21	06.57-07.18/21	04.36	03.05	03.10	04.44	06.18	06.56-07.12/16	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19		18.32	15.48	14.32	
8	10.04	08.42	07.07	06.18	06.56-07.17/21	04.33	03.03	03.12	04.47	06.21	06.58-07.10/12	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15		18.29	15.45	14.30	
9	10.02	08.39	07.04	06.14	06.56-07.18/22	04.29	03.01	03.15	04.50	06.24	07.01-07.07/6	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11		18.25	15.42	14.29	
10	10.00	08.36	07.00	06.10	06.55-07.17/22	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58	
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08		18.22	15.38	14.28	
11	09.58	08.32	06.57	06.07	06.56-07.17/21	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01	
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04		18.18	15.35	14.27	
12	09.56	08.29	06.53	06.03	06.56-07.16/20	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02	
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01		18.15	15.32	14.26	
13	09.54	08.26	06.50	06.00	06.56-07.15/19	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04	
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57		18.11	15.29	14.25	
14	09.52	08.23	06.46	05.56	06.57-07.14/17	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06	
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54		18.08	15.26	14.24	
15	09.50	08.19	06.43	05.53	06.58-07.11/13	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.08	
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50		18.04	15.24	14.23	
16	09.48	08.16	06.39	05.49	07.00-07.09/9	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09	
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46		18.01	15.21	14.23	
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	06.47	08.14	08.53	10.10	
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43		17.57	15.18	14.23	
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	06.49	08.17	08.56	10.12	
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39		17.54	15.15	14.22	
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	06.52	08.20	08.59	10.13	
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36		17.51	15.12	14.22	
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.24	06.55	06.55	08.23	09.02	10.14	
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32		17.47	15.09	14.22	
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	06.58	08.26	09.06	10.14	
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29		17.44	15.07	14.23	
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	07.01	08.29	09.09	10.15	
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25		17.40	15.04	14.23	
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	07.04	08.32	09.12	10.15	
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22		17.37	15.01	14.24	
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	07.07	08.36	09.15	10.16	
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18		17.34	14.59	14.24	
25	09.24	07.46	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.09	07.39	09.18	10.16	
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14		16.30	14.56	14.25	
26	09.22	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.12	07.42	09.21	10.16	
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11		16.27	14.54	14.26	
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.02-07.11/9	07.15	07.45	09.24	10.16	
	15.49	17.30	18.54	21.29	23.05	23.54	22.44	20.58	19.07		16.23	14.52	14.27	
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	06.59-07.13/14	07.18	07.48	09.27	10.16	
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04		16.20	14.49	14.29	
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	06.58-07.14/16	07.21	07.51	09.30	10.15	
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00		16.17	14.47	14.30	
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	06.57-07.15/18	07.24	07.54	09.33	10.15	
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57		16.14	14.45	14.31	
31	09.07		06.46		03.22		04.21	05.57	06.55-07.15/20		07.58		10.14	
	16.02		20.06		23.17		22.31	20.43			16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	159	305	198	137	
Sum of minutes with flicker	0	0	0	237	0	0	0	77	0	159	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 3 - PUU03

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.46	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 4 - PUU04

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.40	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.06	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 5 - PUU05

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 6 - PUU06

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.21
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 7 - PUU07

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 8 - PUU08

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	18.56-19.14/18	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36	
	14.36	16.06	17.36	20.09		21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43	
2	10.12	09.01	07.28	06.39	18.58-19.13/15	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.38	
	14.38	16.09	17.39	20.12		21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41	
3	10.11	08.58	07.25	06.35	18.59-19.10/11	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41	
	14.40	16.12	17.42	20.15		21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39	
4	10.09	08.54	07.21	06.32	19.03-19.07/4	04.46	03.12	03.04	04.34	06.09	07.35	08.10	09.44	
	14.42	16.16	17.46	20.18		21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37	
5	10.08	08.51	07.18	06.28		04.43	03.09	03.06	04.37	06.12	07.38	08.14	09.46	
	14.44	16.19	17.49	20.21		21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35	
6	10.07	08.48	07.14	06.25		04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49	
	14.46	16.22	17.52	20.24		21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34	
7	10.05	08.45	07.11	06.21		04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51	
	14.49	16.26	17.55	20.27		22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32	
8	10.04	08.42	07.07	06.18		04.33	03.03	03.13	04.47	06.21	18.58-19.00/2	07.47	08.23	09.54
	14.51	16.29	17.58	20.30		22.04	23.38	23.37	22.04	20.15		18.29	15.45	14.30
9	10.02	08.39	07.04	06.14		04.30	03.01	03.15	04.50	06.24	18.53-19.04/11	07.50	08.26	09.56
	14.54	16.32	18.01	20.33		22.07	23.40	23.34	22.00	20.11		18.25	15.42	14.29
10	10.00	08.35	07.00	06.10		04.26	02.58	03.18	04.53	06.26	18.50-19.05/15	07.53	08.30	09.58
	14.57	16.36	18.04	20.36		22.11	23.42	23.32	21.57	20.08		18.22	15.39	14.28
11	09.58	08.32	06.57	06.07		04.23	02.56	03.20	04.56	06.29	18.49-19.06/17	07.56	08.33	10.00
	14.59	16.39	18.07	20.39		22.14	23.44	23.30	21.53	20.04		18.18	15.35	14.27
12	09.56	08.29	06.53	06.03		04.20	02.55	03.23	05.00	06.32	18.48-19.07/19	07.59	08.36	10.02
	15.02	16.42	18.10	20.42		22.17	23.46	23.27	21.50	20.01		18.15	15.32	14.26
13	09.54	08.26	06.50	06.00		04.16	02.53	03.26	05.03	06.35	18.47-19.07/20	08.02	08.40	10.04
	15.05	16.45	18.13	20.45		22.20	23.48	23.25	21.46	19.57		18.11	15.29	14.25
14	09.52	08.22	06.46	05.56		04.13	02.52	03.29	05.06	06.38	18.46-19.08/22	08.05	08.43	10.06
	15.08	16.49	18.16	20.48		22.24	23.49	23.22	21.43	19.54		18.08	15.26	14.24
15	09.50	08.19	06.43	05.53		04.10	02.51	03.32	05.09	06.41	18.45-19.07/22	08.08	08.46	10.07
	15.11	16.52	18.19	20.51		22.27	23.51	23.19	21.40	19.50		18.04	15.24	14.24
16	09.47	08.16	06.39	05.49		04.06	02.51	03.35	05.12	06.44	18.45-19.06/21	08.11	08.49	10.09
	15.14	16.55	18.22	20.54		22.30	23.52	23.16	21.36	19.46		18.01	15.21	14.23
17	09.45	08.12	06.36	05.46		04.03	02.50	03.38	05.15	06.46	18.45-19.05/20	08.14	08.52	10.10
	15.17	16.58	18.25	20.58		22.33	23.53	23.14	21.33	19.43		17.57	15.18	14.23
18	09.43	08.09	06.32	05.42		04.00	02.49	03.41	05.18	06.49	18.46-19.02/16	08.17	08.56	10.11
	15.20	17.02	18.28	21.01		22.37	23.54	23.11	21.29	19.39		17.54	15.15	14.22
19	09.40	08.06	06.29	05.39		03.57	02.49	03.44	05.21	06.52	18.46-18.58/12	08.20	08.59	10.12
	15.23	17.05	18.31	21.04		22.40	23.55	23.08	21.26	19.36		17.50	15.12	14.22
20	09.38	08.02	06.25	05.35		03.54	02.49	03.47	05.24	06.55	18.46-18.54/8	08.23	09.02	10.13
	15.26	17.08	18.34	21.07		22.43	23.55	23.05	21.22	19.32		17.47	15.09	14.23
21	09.35	07.59	06.21	05.32		03.51	02.49	03.50	05.27	06.58	18.48-18.50/2	08.26	09.05	10.14
	15.30	17.11	18.37	21.10		22.46	23.56	23.02	21.19	19.29		17.44	15.07	14.23
22	09.32	07.56	06.18	18.04-18.05/1	05.28	03.48	02.49	03.53	05.30	07.01		08.29	09.09	10.15
	15.33	17.14	18.40		21.13	22.50	23.56	22.59	21.15	19.25		17.40	15.04	14.23
23	09.30	07.52	06.14	18.01-18.07/6	05.25	03.45	02.50	03.56	05.33	07.04		08.32	09.12	10.15
	15.36	17.18	18.43		21.16	22.53	23.56	22.56	21.12	19.21		17.37	15.01	14.24
24	09.27	07.49	06.11	17.59-18.10/11	05.21	03.42	02.51	03.59	05.36	07.07		08.35	09.15	10.15
	15.39	17.21	18.45		21.19	22.56	23.56	22.53	21.08	19.18		17.34	14.59	14.24
25	09.24	07.45	06.07	17.58-18.13/15	05.18	03.39	02.51	04.02	05.39	07.09		07.38	09.18	10.16
	15.43	17.24	18.48		21.22	22.59	23.55	22.50	21.05	19.14		16.30	14.56	14.25
26	09.21	07.42	06.04	17.57-18.16/19	05.14	03.36	02.52	04.05	05.42	07.12		07.42	09.21	10.16
	15.46	17.27	18.51		21.26	23.02	23.55	22.46	21.01	19.11		16.27	14.54	14.26
27	09.18	07.39	06.00	17.56-18.18/22	05.11	03.33	02.53	04.09	05.45	07.15		07.45	09.24	10.16
	15.49	17.30	18.54		21.29	23.05	23.54	22.43	20.57	19.07		16.23	14.52	14.27
28	09.16	07.35	05.57	17.55-18.17/22	05.07	03.30	02.55	04.12	05.48	07.18		07.48	09.27	10.15
	15.53	17.33	18.57		21.32	23.08	23.53	22.40	20.54	19.04		16.20	14.49	14.29
29	09.13		06.53	18.56-19.17/21	05.04	03.27	02.56	04.15	05.51	07.21		07.51	09.30	10.15
	15.56		20.00		21.35	23.11	23.52	22.37	20.50	19.00		16.17	14.47	14.30
30	09.10		06.50	18.55-19.16/21	05.00	03.24	02.58	04.18	05.54	07.24		07.54	09.33	10.14
	15.59		20.03		21.38	23.14	23.51	22.34	20.47	18.57		16.14	14.45	14.32
31	09.07		06.46	18.56-19.16/20		03.22		04.21	05.57			07.57		10.14
	16.02		20.06			23.17		22.30	20.43			16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	0	137	0
Sum of minutes with flicker	0	0	158	48	0	0	0	0	207	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 9 - PUU09

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13 14.35	09.04 16.06	07.32 17.36	06.42 20.09	04.57 21.41	20.06-20.20/14 23.20	03.19 02.59	04.25 22.27	06.00 20.40	07.27 18.53	08.01 16.07	09.36 14.43
2	10.12 14.37	09.01 16.09	07.28 17.39	06.39 20.12	04.53 21.45	20.08-20.18/10 23.23	03.16 03.01	04.28 22.24	06.03 20.36	07.30 18.50	08.04 16.04	09.39 14.41
3	10.11 14.39	08.58 16.12	07.25 17.42	06.35 20.15	04.50 21.48	03.14 03.12	03.01 03.03	04.31 22.20	06.06 20.33	07.32 18.46	08.07 16.00	09.41 14.39
4	10.10 14.42	08.55 16.16	07.21 17.45	06.32 20.18	04.46 21.51	04.46 23.28	03.03 23.45	04.34 22.17	06.09 20.29	07.35 18.43	08.10 15.57	09.44 14.37
5	10.08 14.44	08.51 16.19	07.18 17.49	06.28 20.21	04.43 21.54	04.43 23.31	03.05 23.43	04.37 22.14	06.12 20.26	07.38 18.39	08.14 15.54	09.47 14.35
6	10.07 14.46	08.48 16.22	07.14 17.52	06.25 20.24	04.40 21.58	04.40 23.33	03.08 23.41	04.41 22.10	06.15 20.22	07.41 18.36	08.17 15.51	09.49 14.33
7	10.05 14.49	08.45 16.26	07.11 17.55	06.21 20.27	04.36 22.01	03.05 23.36	03.10 23.39	04.44 22.07	06.18 20.18	07.44 18.32	08.20 15.48	09.51 14.32
8	10.04 14.51	08.42 16.29	07.07 17.58	06.17 20.30	04.33 22.04	03.03 23.38	03.12 23.37	04.47 22.04	06.21 20.15	07.47 18.29	08.23 15.45	09.54 14.30
9	10.02 14.54	08.39 16.32	07.04 18.01	06.14 20.33	04.29 22.07	03.01 23.40	03.15 23.34	04.50 22.00	06.23 20.11	07.50 18.25	08.27 15.42	09.56 14.29
10	10.00 14.56	08.35 16.36	07.00 18.04	06.10 20.36	04.26 22.11	02.57 23.42	03.18 23.32	04.53 21.57	06.26 20.08	07.53 18.22	08.30 15.38	09.58 14.28
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	04.23 22.14	02.56 23.44	03.20 23.30	04.56 21.53	06.29 20.04	07.56 18.18	08.33 15.35	10.00 14.27
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	04.19 22.17	02.55 23.46	03.23 23.27	04.59 21.50	06.32 20.01	07.59 18.15	08.36 15.32	10.02 14.26
13	09.54 15.05	08.26 16.45	06.50 18.13	06.00 20.45	04.16 22.20	02.53 23.48	03.26 23.25	04.59 21.47	06.35 19.57	08.02 18.11	08.40 15.29	10.04 14.25
14	09.52 15.08	08.22 16.49	06.46 18.16	05.56 20.48	04.13 22.24	02.52 23.49	03.29 23.22	05.06 21.43	06.38 19.53	08.05 18.08	08.43 15.26	10.06 14.24
15	09.50 15.11	08.19 16.52	06.43 18.19	05.53 20.51	04.10 22.27	02.51 23.51	03.32 23.19	05.09 21.40	06.41 19.50	08.08 18.04	08.46 15.23	10.07 14.23
16	09.47 15.14	08.16 16.55	06.39 18.22	05.49 20.54	04.06 22.30	02.50 23.52	03.34 23.17	05.12 21.36	06.44 19.46	08.11 18.01	08.49 15.21	10.09 14.23
17	09.45 15.17	08.12 16.58	06.36 18.25	05.46 20.58	04.03 22.33	02.50 23.53	03.37 23.14	05.15 21.33	06.46 19.43	08.14 17.57	08.53 15.18	10.10 14.23
18	09.43 15.20	08.09 17.02	06.32 18.28	05.42 21.01	04.00 22.37	02.49 23.54	03.40 23.11	05.18 21.29	06.49 19.39	08.17 17.54	08.56 15.15	10.11 14.22
19	09.40 15.23	08.06 17.05	06.29 18.31	05.39 21.04	03.57 22.40	02.49 23.55	03.43 23.08	05.21 21.26	06.52 19.36	08.20 17.50	08.59 15.12	10.12 14.22
20	09.38 15.26	08.02 17.08	06.25 18.34	05.35 21.07	03.54 22.43	02.49 23.55	03.47 23.05	05.24 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	09.35 15.30	07.59 17.11	06.21 18.37	05.31 21.10	03.51 22.46	02.49 23.56	03.50 23.02	05.27 21.19	06.58 19.29	08.26 17.44	09.05 15.07	10.14 14.23
22	09.32 15.33	07.56 17.14	06.18 18.40	05.28 21.13	03.47 22.50	02.49 23.56	03.53 22.59	05.30 21.15	07.01 19.25	08.29 17.40	09.09 15.04	10.15 14.23
23	09.30 15.36	07.52 17.18	06.14 18.43	05.24 21.16	03.44 22.53	02.50 23.56	03.56 22.56	05.33 21.12	07.04 19.21	08.32 17.37	09.12 15.01	10.15 14.24
24	09.27 15.39	07.49 17.21	06.11 18.45	05.21 21.19	03.41 22.56	02.50 23.56	03.59 22.53	05.36 21.08	07.06 19.18	08.35 17.33	09.15 14.59	10.16 14.24
25	09.24 15.43	07.45 17.24	06.07 18.48	05.17 21.22	03.38 22.59	02.51 23.55	04.02 22.50	05.39 21.05	07.09 19.14	07.38 16.30	09.18 14.56	10.16 14.25
26	09.21 15.46	07.42 17.27	06.04 18.51	05.14 21.26	03.36 23.02	02.52 23.55	04.05 22.47	05.42 21.01	07.12 19.11	07.42 16.27	09.21 14.54	10.16 14.26
27	09.18 15.49	07.39 17.30	06.00 18.54	05.11 21.29	03.33 23.05	02.53 23.54	04.09 22.43	05.45 20.57	07.15 19.07	07.45 16.23	09.24 14.52	10.16 14.27
28	09.16 15.52	07.35 17.33	05.57 18.57	05.07 21.32	03.30 23.08	02.55 23.53	04.12 22.40	05.48 20.54	07.18 19.04	07.48 16.20	09.27 14.49	10.15 14.29
29	09.13 15.56	07.32 17.33	05.53 18.53	05.04 21.35	03.27 23.11	02.56 23.52	04.15 22.37	05.51 20.50	07.21 19.00	07.51 16.17	09.30 14.47	10.15 14.30
30	09.10 15.59	07.29 17.30	05.49 18.54	05.00 21.38	03.24 23.14	02.58 23.51	04.18 22.34	05.54 20.47	07.24 18.57	07.54 16.13	09.33 14.45	10.14 14.31
31	09.07 16.02	07.26 17.33	05.46 18.56	04.97 21.41	03.22 23.17	02.57 23.52	04.21 22.30	05.57 20.43	07.21 18.54	07.57 16.10	09.30 14.45	10.14 14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	309	24	0	0	343	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 10 - PUU10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.13 14.35	09.04 16.06	07.32 17.36	06.42 20.09	04.57 21.41	03.19 23.20	21.31-21.58/27 23.50	02.59 22.27	21.37-22.03/26 20.40	04.24 18.53	06.00 16.07	07.27 14.43	08.01 16.07
2	10.12 14.37	09.01 16.09	07.28 17.39	06.39 20.12	04.53 21.45	03.16 23.23	21.30-21.58/28 23.48	03.01 22.24	21.37-22.03/26 20.36	04.28 18.50	06.03 16.04	07.29 14.41	08.04 16.04
3	10.11 14.39	08.58 16.12	07.25 17.42	06.35 20.15	04.50 21.48	03.14 23.26	21.31-21.59/28 23.47	03.01 22.21	21.38-22.04/26 20.33	04.31 18.46	06.06 16.00	07.32 14.39	08.07 16.00
4	10.10 14.41	08.55 16.16	07.21 17.45	06.32 20.18	04.46 21.51	03.11 23.28	21.31-21.58/27 23.45	03.03 22.17	21.37-22.04/27 20.34	04.34 18.43	06.09 16.09	07.35 15.57	08.10 14.37
5	10.08 14.44	08.51 16.19	07.18 17.49	06.28 20.21	04.43 21.54	03.09 23.31	21.31-21.59/28 23.43	03.05 22.14	21.37-22.04/27 20.37	04.37 18.43	06.12 16.09	07.38 15.54	08.14 14.35
6	10.07 14.46	08.48 16.22	07.14 17.52	06.25 20.24	04.39 21.58	03.07 23.33	21.31-21.58/27 23.41	03.08 22.10	21.38-22.05/27 20.40	04.40 18.35	06.15 16.09	07.41 15.51	08.17 14.33
7	10.05 14.49	08.45 16.26	07.11 17.55	06.21 20.27	04.36 22.01	03.05 23.36	21.31-21.59/28 23.39	03.10 22.07	21.38-22.05/27 20.44	04.44 18.32	06.18 16.09	07.44 15.48	08.20 14.32
8	10.04 14.51	08.42 16.29	07.07 17.58	06.17 20.30	04.33 22.04	03.03 23.38	21.32-21.59/27 23.37	03.12 22.04	21.38-22.05/27 20.47	04.47 18.28	06.21 16.09	07.47 15.45	08.23 14.30
9	10.02 14.54	08.39 16.32	07.04 18.01	06.14 20.33	04.29 22.07	03.01 23.40	21.32-21.59/27 23.35	03.15 22.00	21.38-22.05/27 20.45	04.50 18.25	06.23 16.09	07.50 15.41	08.27 14.29
10	10.00 14.56	08.35 16.36	07.00 18.04	06.10 20.36	04.26 22.11	02.57 23.42	21.32-21.59/27 23.32	03.17 22.00	21.38-22.06/28 20.53	04.53 18.21	06.26 16.09	07.53 15.38	08.30 14.28
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	04.23 22.14	02.56 23.44	21.32-21.59/27 23.30	03.20 22.00	21.39-22.06/27 20.56	04.56 18.18	06.29 16.09	07.56 15.35	08.33 14.26
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	04.19 22.17	02.54 23.46	21.32-21.59/27 23.27	03.23 22.00	21.39-22.06/27 20.59	04.59 18.15	06.32 16.09	07.59 15.32	08.36 14.25
13	09.54 15.05	08.26 16.45	06.50 18.13	06.00 20.45	04.16 22.20	02.53 23.48	21.33-22.00/27 23.25	03.26 22.00	21.39-22.06/27 20.53	05.03 18.11	06.35 16.09	08.02 15.29	08.40 14.25
14	09.52 15.08	08.22 16.49	06.46 18.16	05.56 20.48	04.13 22.24	02.52 23.50	21.33-21.59/26 23.22	03.28 22.00	21.39-22.06/27 20.56	05.06 18.08	06.38 16.09	08.05 15.26	08.43 14.24
15	09.50 15.11	08.19 16.52	06.43 18.19	05.53 20.51	04.10 22.27	02.51 23.51	21.34-22.00/26 23.19	03.31 22.00	21.39-22.06/27 20.59	05.09 18.04	06.41 16.09	08.08 15.23	08.46 14.23
16	09.47 15.14	08.16 16.55	06.39 18.22	05.49 20.54	04.06 22.30	02.50 23.52	21.34-21.59/25 23.17	03.34 22.00	21.40-22.06/26 20.52	05.12 18.01	06.44 16.09	08.11 15.20	08.49 14.23
17	09.45 15.17	08.12 16.58	06.36 18.25	05.46 20.57	04.03 22.33	02.50 23.53	21.34-22.00/26 23.14	03.37 22.00	21.40-22.06/26 20.51	05.15 18.01	06.46 16.09	08.14 15.18	08.53 14.22
18	09.43 15.20	08.09 17.02	06.32 18.28	05.42 21.01	04.00 22.37	02.49 23.54	21.34-22.00/26 23.11	03.40 22.00	21.40-22.05/25 20.51	05.18 18.01	06.49 16.09	08.17 15.15	08.56 14.22
19	09.40 15.23	08.06 17.05	06.29 18.31	05.38 21.04	03.57 22.40	02.49 23.55	21.35-22.00/25 23.08	03.43 22.00	21.41-22.06/25 20.51	05.21 18.01	06.52 16.09	08.20 15.12	08.59 14.22
20	09.38 15.26	08.02 17.08	06.25 18.34	05.35 21.07	03.54 22.43	02.49 23.55	21.35-22.01/26 23.05	03.46 22.00	21.41-22.05/24 20.52	05.24 18.01	06.55 16.09	08.23 15.09	09.02 14.22
21	09.35 15.29	07.59 17.11	06.21 18.37	05.31 21.10	03.50 22.46	02.49 23.56	21.35-22.01/26 23.02	03.50 22.00	21.41-22.04/23 20.52	05.27 18.01	06.58 16.09	08.26 15.07	09.05 14.23
22	09.32 15.33	07.56 17.14	06.18 18.40	05.28 21.13	03.47 22.50	02.49 23.56	21.35-22.01/26 22.59	03.53 22.00	21.43-22.03/20 20.53	05.30 18.01	07.01 16.09	08.29 15.04	09.09 14.23
23	09.30 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.53	02.50 23.56	21.36-22.02/26 22.56	03.56 22.00	21.43-22.00/17 20.53	05.33 18.01	07.04 16.09	08.32 15.01	09.12 14.23
24	09.27 15.39	07.49 17.21	06.11 18.45	05.21 21.19	03.41 22.56	02.50 23.56	21.36-22.01/25 22.53	03.59 22.00	21.45-21.58/13 20.53	05.36 18.01	07.06 16.09	08.35 15.01	09.15 14.24
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	03.38 22.59	02.51 23.56	21.36-22.02/26 22.50	04.02 22.00	21.45-21.55/10 20.53	05.39 18.01	07.09 16.09	07.38 15.01	09.18 14.25
26	09.21 15.46	07.42 17.27	06.04 18.51	05.14 21.26	03.35 23.02	02.52 23.55	21.36-22.02/26 22.47	04.05 22.00	21.47-21.53/6 20.52	05.42 18.01	07.12 16.09	07.42 15.01	09.21 14.26
27	09.18 15.49	07.39 17.30	06.00 18.54	05.10 21.29	03.33 23.05	02.53 23.54	21.36-22.02/26 22.43	04.08 22.00	21.49-21.50/1 20.54	05.45 18.01	07.15 16.09	07.45 15.01	09.24 14.27
28	09.16 15.52	07.35 17.33	05.57 18.57	05.07 21.32	03.30 23.08	02.54 23.53	21.36-22.03/27 22.40	04.12 22.00	05.48 20.54	05.48 18.01	07.18 16.09	07.48 15.01	09.27 14.28
29	09.13 15.56	07.33 18.00	05.53 19.00	05.03 21.35	03.27 23.11	02.56 23.52	21.37-22.03/26 22.37	04.15 22.00	05.51 20.50	05.51 18.01	07.21 16.09	07.51 15.01	09.30 14.30
30	09.10 15.59	07.30 18.03	05.49 19.03	05.00 21.38	03.24 23.14	02.58 23.51	21.37-22.03/26 22.34	04.18 22.00	05.54 20.47	05.54 18.01	07.24 16.09	07.54 15.01	09.33 14.31
31	09.07 16.02	07.27 18.06	05.46 19.06	05.00 21.37	03.21 23.17	03.21 23.30	21.37-22.03/26 22.30	04.21 22.00	05.57 20.43	05.57 18.01	07.57 16.09	07.57 15.01	09.34 14.33
Potential sun hours	171	238	363	451	570	624	795	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	309	795	619	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 11 - PUU11

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 12 - PUU12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	17.44-18.09/25	08.01	09.36
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53		16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29	17.44-18.08/24	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50		16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	17.45-18.06/21	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46		16.01	14.39
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35	17.46-18.03/17	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43		15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	17.48-18.00/12	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39		15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	17.51-17.56/5	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36		15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44		08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32		15.48	14.32
8	10.03	08.42	07.07	17.12-17.21/9	06.17	04.33	03.03	03.13	04.47	06.21		08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29		15.45	14.30
9	10.02	08.39	07.04	17.09-17.24/15	06.14	04.30	03.01	03.15	04.50	06.23		08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25		15.42	14.29
10	10.00	08.35	07.00	17.08-17.28/20	06.10	04.26	02.58	03.18	04.53	06.26		08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22		15.39	14.28
11	09.58	08.32	06.57	17.06-17.29/23	06.07	04.23	02.56	03.20	04.56	06.29		08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18		15.35	14.27
12	09.56	08.29	06.53	17.06-17.30/24	06.03	04.20	02.55	03.23	05.00	06.32		08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15		15.32	14.26
13	09.54	08.26	06.50	17.04-17.30/26	06.00	04.16	02.53	03.26	05.03	06.35		08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11		15.29	14.25
14	09.52	08.22	06.46	17.03-17.30/27	05.56	04.13	02.52	03.29	05.06	06.38		08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08		15.26	14.24
15	09.50	08.19	06.43	17.03-17.30/27	05.53	04.10	02.51	03.32	05.09	06.41		08.08	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04		15.24	14.24
16	09.47	08.16	06.39	17.03-17.30/27	05.49	04.06	02.51	03.35	05.12	06.44		08.11	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01		15.21	14.23
17	09.45	08.12	06.36	17.02-17.29/27	05.46	04.03	02.50	03.38	05.15	06.46		08.14	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	18.04		15.18	14.23
18	09.42	08.09	06.32	17.03-17.29/26	05.42	04.00	02.49	03.41	05.18	06.49		08.17	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	18.04		15.15	14.23
19	09.40	08.06	06.29	17.02-17.28/26	05.39	03.57	02.49	03.44	05.21	06.52	17.59-18.04/5	08.20	08.59
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	18.04		15.12	14.22
20	09.37	08.02	06.25	17.04-17.27/23	05.35	03.54	02.49	03.47	05.24	06.55	17.54-18.07/13	08.23	09.02
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	18.04		15.09	14.23
21	09.35	07.59	06.21	17.04-17.25/21	05.32	03.51	02.49	03.50	05.27	06.58	17.51-18.09/18	08.26	09.05
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	18.04		15.07	14.23
22	09.32	07.56	06.18	17.06-17.24/18	05.28	03.48	02.49	03.53	05.30	07.01	17.49-18.10/21	08.29	09.08
	15.33	17.14	18.40	21.13	22.49	23.56	22.59	21.15	19.25	18.04		15.04	14.23
23	09.30	07.52	06.14	17.07-17.22/15	05.25	03.45	02.50	03.56	05.33	07.04	17.48-18.11/23	08.32	09.12
	15.36	17.18	18.42	21.16	22.53	23.56	22.56	21.12	19.21	18.04		15.01	14.24
24	09.27	07.49	06.11	17.10-17.18/8	05.21	03.42	02.51	03.59	05.36	07.06	17.47-18.11/24	08.35	09.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	18.04		15.01	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09	07.46-18.12/26	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	18.04		14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.45-18.12/27	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	18.04		14.54	14.26
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	17.44-18.11/27	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	18.04		14.52	14.27
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	17.43-18.11/28	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	18.04		14.49	14.29
29	09.13	07.33	05.53	05.04	03.27	02.56	04.15	05.51	07.21	17.43-18.10/27	07.51	09.30	10.15
	15.56	17.36	18.60	21.35	23.11	23.52	22.37	20.50	19.00	18.04		14.47	14.30
30	09.10	07.30	05.49	05.00	03.24	02.58	04.18	05.54	07.24	17.43-18.10/27	07.54	09.33	10.14
	15.59	17.33	18.63	21.38	23.14	23.51	22.34	20.47	18.57	18.04		14.45	14.32
31	09.07	07.27	05.46	05.00	03.22	02.57	04.21	05.57	07.27	17.43-18.10/27	07.57	09.33	10.14
	16.02	17.36	18.66	21.41	23.17	23.54	22.30	20.43	18.57	18.04		14.45	14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137	0
Sum of minutes with flicker	0	0	362	0	0	0	0	0	266	104	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 13 - PUU13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	04.57	19.33-20.05/32	03.19	02.59	04.25	06.00	07.27	08.01	09.36	
	14.35	16.06	17.36	20.09	21.41		23.20	23.50	22.27	20.40	18.53	16.07	14.43	
2	10.12	09.01	07.28	06.39	04.53	19.34-20.05/31	03.16	03.01	04.28	06.03	07.29	08.04	09.38	
	14.37	16.09	17.39	20.12	21.45		23.23	23.48	22.24	20.36	18.50	16.04	14.41	
3	10.11	08.58	07.25	06.35	04.50	19.35-20.04/29	03.14	03.01	04.31	06.06	07.32	08.07	09.41	
	14.39	16.12	17.42	20.15	21.48		23.25	23.46	22.20	20.33	18.46	16.00	14.39	
4	10.09	08.54	07.21	06.32	04.46	19.35-20.03/28	03.12	03.03	04.34	19.54-20.03/9	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51		23.28	23.45	22.17	20.29	18.43	15.57	14.37	
5	10.08	08.51	07.18	06.28	04.43	19.37-20.01/24	03.09	03.05	04.37	19.51-20.06/15	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54		23.31	23.43	22.14	20.25	18.39	15.54	14.35	
6	10.07	08.48	07.14	06.25	04.40	19.38-20.00/22	03.07	03.08	04.40	19.49-20.08/19	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58		23.33	23.41	22.10	20.22	18.35	15.51	14.33	
7	10.05	08.45	07.11	06.21	04.36	19.40-19.58/18	03.05	03.10	04.44	19.47-20.09/22	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01		23.36	23.39	22.07	20.18	18.32	15.48	14.32	
8	10.03	08.42	07.07	06.17	04.33	19.42-19.55/13	03.03	03.12	04.47	19.45-20.11/26	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04		23.38	23.37	22.04	20.15	18.28	15.45	14.30	
9	10.02	08.39	07.04	06.14	04.29	19.47-19.50/3	03.01	03.15	04.50	19.44-20.12/28	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07		23.40	23.34	22.00	20.11	18.25	15.41	14.29	
10	10.00	08.35	07.00	06.10	04.26		02.58	03.18	04.53	19.42-20.12/30	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11		23.42	23.32	21.57	20.08	18.22	15.38	14.28	
11	09.58	08.32	06.57	06.07	04.23		02.56	03.20	04.56	19.42-20.13/31	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14		23.44	23.30	21.53	20.04	18.18	15.35	14.27	
12	09.56	08.29	06.53	06.03	19.47-19.58/11	04.19	02.55	03.23	04.59	19.41-20.14/33	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17		23.46	23.27	21.50	20.01	18.15	15.32	14.26	
13	09.54	08.26	06.50	06.00	19.44-20.02/18	04.16	02.53	03.26	05.03	19.40-20.14/34	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20		23.48	23.25	21.46	19.57	18.11	15.29	14.25	
14	09.52	08.22	06.46	05.56	19.40-20.03/23	04.13	02.52	03.29	05.06	19.39-20.14/35	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24		23.49	23.22	21.43	19.53	18.08	15.26	14.24	
15	09.50	08.19	06.43	05.53	19.39-20.05/26	04.10	02.51	03.32	05.09	19.39-20.14/35	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27		23.51	23.19	21.40	19.50	18.04	15.23	14.23	
16	09.47	08.16	06.39	05.49	19.38-20.06/28	04.06	02.50	03.34	05.12	19.39-20.15/36	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30		23.52	23.16	21.36	19.46	18.01	15.21	14.23	
17	09.45	08.12	06.36	05.46	19.36-20.06/30	04.03	02.50	03.37	05.15	19.37-20.14/37	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33		23.53	23.14	21.33	19.43	17.57	15.18	14.23	
18	09.42	08.09	06.32	05.42	19.35-20.07/32	04.00	02.49	03.40	05.18	19.37-20.14/37	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37		23.54	23.11	21.29	19.39	17.54	15.15	14.22	
19	09.40	08.06	06.28	05.38	19.34-20.08/34	03.57	02.49	03.43	05.21	19.37-20.14/37	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40		23.55	23.08	21.26	19.36	17.50	15.12	14.22	
20	09.37	08.02	06.25	05.35	19.33-20.08/35	03.54	02.49	03.47	05.24	19.37-20.14/37	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43		23.55	23.05	21.22	19.32	17.47	15.09	14.22	
21	09.35	07.59	06.21	05.31	19.32-20.08/36	03.51	02.49	03.50	05.27	19.37-20.13/36	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46		23.56	23.02	21.19	19.29	17.44	15.07	14.23	
22	09.32	07.56	06.18	05.28	19.32-20.09/37	03.47	02.49	03.53	05.30	19.37-20.13/36	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49		23.56	22.59	21.15	19.25	17.40	15.04	14.23	
23	09.30	07.52	06.14	05.24	19.32-20.09/37	03.44	02.50	03.56	05.33	19.38-20.12/34	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53		23.56	22.56	21.12	19.21	17.37	15.01	14.24	
24	09.27	07.49	06.11	05.21	19.31-20.08/37	03.41	02.50	03.59	05.36	19.38-20.12/34	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56		23.56	22.53	21.08	19.18	17.33	14.59	14.24	
25	09.24	07.45	06.07	05.17	19.31-20.08/37	03.38	02.51	04.02	05.39	19.38-20.10/32	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59		23.55	22.50	21.04	19.14	16.30	14.56	14.25	
26	09.21	07.42	06.04	05.14	19.31-20.08/37	03.36	02.52	04.05	05.42	19.39-20.09/30	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02		23.55	22.46	21.01	19.11	16.27	14.54	14.26	
27	09.18	07.38	06.00	05.10	19.31-20.07/36	03.33	02.53	04.09	05.45	19.40-20.08/28	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05		23.54	22.43	20.57	19.07	16.23	14.52	14.27	
28	09.16	07.35	05.57	05.07	19.32-20.07/35	03.30	02.55	04.12	05.48	19.41-20.07/26	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08		23.53	22.40	20.54	19.04	16.20	14.49	14.29	
29	09.13		06.53	05.04	19.32-20.07/35	03.27	02.56	04.15	05.51	19.41-20.04/23	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11		23.52	22.37	20.50	19.00	16.17	14.47	14.30	
30	09.10		06.49	05.00	19.32-20.06/34	03.24	02.58	04.18	05.54	19.44-20.01/17	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14		23.51	22.34	20.47	18.57	16.13	14.45	14.31	
31	09.07		06.46		03.22			04.21	05.57	19.47-19.58/11		07.57		10.14
	16.02		20.06		23.17			22.30	20.43		16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	
Sum of minutes with flicker	0	0	0	598	200	0	0	808	0	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 14 - PUU14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.54	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 15 - PUU15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32 15.40-16.09/29	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28 15.40-16.08/28	06.39	04.53	03.17	03.00	04.28	06.03	07.29	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25 15.41-16.06/25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21 15.43-16.05/22	06.32	04.46	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18 15.44-16.03/19	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14 15.47-15.59/12	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44 16.25-16.33/8	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.13	04.47	06.21	07.47 16.21-16.37/16	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.45	14.31
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50 16.18-16.39/21	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53 16.16-16.40/24	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56 16.15-16.41/26	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59 16.13-16.42/29	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02 16.12-16.42/30	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22 15.49-16.01/12	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05 16.12-16.43/31	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.49	08.19 15.46-16.04/18	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08 16.11-16.43/32	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16 15.45-16.07/22	06.39	05.49	04.06	02.51	03.35	05.12	06.44	08.11 16.10-16.43/33	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12 15.43-16.08/25	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14 16.10-16.42/32	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09 15.42-16.08/26	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17 16.10-16.43/33	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06 15.41-16.10/29	06.28	05.39	03.57	02.49	03.44	05.21	06.52	08.20 16.10-16.42/32	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.25	19.36	17.50	15.12	14.22
20	09.37	08.02 15.40-16.10/30	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23 16.10-16.41/31	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59 15.39-16.11/32	06.21	05.32	03.51	02.49	03.50	05.27	06.58	08.26 16.10-16.41/31	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.18	19.29	17.44	15.07	14.23
22	09.32	07.56 15.39-16.11/32	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29 16.10-16.40/30	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52 15.39-16.11/32	06.14	05.24	03.45	02.50	03.56	05.33	07.04	08.32 16.12-16.40/28	09.11	10.15
	15.36	17.18	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.24
24	09.27	07.49 15.38-16.11/33	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35 16.12-16.38/26	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45 15.38-16.11/33	06.07	05.17	03.39	02.51	04.02	05.39	07.09	07.38 15.13-15.37/24	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42 15.39-16.11/32	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.41 15.14-15.35/21	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38 15.38-16.10/32	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45 15.16-15.33/17	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.15	07.35 15.38-16.09/31	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48 15.19-15.30/11	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.12		05.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	419	135	0	0	0	0	0	0	566	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 16 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13	09.04	07.32	06.42	04.57 18.27-19.39/72	03.19 18.40-19.31/51
	14.35	16.06	17.36	20.09	21.41	23.20
2	10.12	09.01	07.28	06.39	04.53 18.27-19.39/72	03.16 18.40-19.30/50
	14.37	16.09	17.39	20.12	21.45	23.23
3	10.11	08.57	07.25	06.35	04.50 18.27-19.39/72	03.14 18.42-19.30/48
	14.39	16.12	17.42	20.15	21.48	23.25
4	10.09	08.54	07.21	06.32	04.46 18.27-19.39/72	03.12 18.42-19.29/47
	14.42	16.16	17.45	20.18	21.51	23.28
5	10.08	08.51	07.18	06.28	04.43 18.27-19.39/72	03.09 18.43-19.29/46
	14.44	16.19	17.48	20.21	21.54	23.31
6	10.07	08.48	07.14	06.25	04.39 18.26-19.39/73	03.07 18.43-19.28/45
	14.46	16.22	17.52	20.24	21.57	23.33
7	10.05	08.45	07.11	06.21	04.36 18.26-19.39/73	03.05 18.45-19.28/43
	14.49	16.26	17.55	20.27	22.01	23.36
8	10.03	08.42	07.07	06.17	04.33 18.26-19.38/72	03.03 18.45-19.28/43
	14.51	16.29	17.58	20.30	22.04	23.38
9	10.02	08.39	07.04	06.14 19.50-19.56/6	04.29 18.26-19.38/72	03.01 18.46-19.28/42
	14.54	16.32	18.01	20.33 19.02-19.11/9	22.07	23.40
10	10.00	08.35	07.00	06.10 19.49-19.59/10	04.26 18.26-19.38/72	02.58 18.47-19.27/40
	14.56	16.36	18.04	20.36 18.56-19.18/22	22.10	23.42
11	09.58	08.32	06.57	06.07 19.47-20.01/14	04.23 18.26-19.37/71	02.56 18.48-19.27/39
	14.59	16.39	18.07	20.39 18.52-19.22/30	22.14	23.44
12	09.56	08.29	06.53	06.03 19.47-20.04/17	04.19 18.27-19.38/71	02.55 18.48-19.27/39
	15.02	16.42	18.10	20.42 18.48-19.24/36	22.17	23.46
13	09.54	08.26	06.50	06.00 19.47-20.07/20	04.16 18.27-19.37/70	02.53 18.50-19.27/37
	15.05	16.45	18.13	20.45 18.46-19.27/41	22.20	23.48
14	09.52	08.22	06.46	05.56 19.46-20.06/20	04.13 18.27-19.36/69	02.52 18.50-19.26/36
	15.08	16.49	18.16	20.48 18.43-19.28/45	22.24	23.49
15	09.49	08.19	06.43	05.53 19.46-20.06/20	04.10 18.28-19.37/69	02.51 18.51-19.27/36
	15.11	16.52	18.19	20.51 18.42-19.30/48	22.27	23.51
16	09.47	08.16	06.39	05.49 19.47-20.05/18	04.06 18.28-19.36/68	02.50 18.51-19.26/35
	15.14	16.55	18.22	20.54 18.40-19.31/51	22.30	23.52
17	09.45	08.12	06.36	05.46 19.46-20.04/18	04.03 18.29-19.36/67	02.50 18.51-19.26/35
	15.17	16.58	18.25	20.57 18.38-19.32/54	22.33	23.53
18	09.42	08.09	06.32	05.42 19.47-20.03/16	04.00 18.29-19.35/66	02.49 18.52-19.27/35
	15.20	17.02	18.28	21.00 18.37-19.33/56	22.37	23.54
19	09.40	08.06	06.28	05.38 19.49-20.01/12	03.57 18.30-19.36/66	02.49 18.52-19.27/35
	15.23	17.05	18.31	21.04 18.36-19.34/58	22.40	23.55
20	09.37	08.02	06.25	05.35 19.51-19.58/7	03.54 18.30-19.35/65	02.49 18.53-19.27/34
	15.26	17.08	18.34	21.07 18.34-19.34/60	22.43	23.55
21	09.35	07.59	06.21	05.31 18.33-19.35/62	03.51 18.31-19.35/64	02.49 18.53-19.27/34
	15.29	17.11	18.36	21.10	22.46	23.56
22	09.32	07.56	06.18	05.28 18.32-19.36/64	03.47 18.32-19.35/63	02.49 18.53-19.27/34
	15.33	17.14	18.39	21.13	22.49	23.56
23	09.29	07.52	06.14	05.24 18.32-19.37/65	03.44 18.32-19.33/61	02.50 18.54-19.28/34
	15.36	17.17	18.42	21.16	22.53	23.56
24	09.27	07.49	06.11	05.21 18.30-19.37/67	03.41 18.33-19.33/60	02.50 18.53-19.28/35
	15.39	17.21	18.45	21.19	22.56	23.56
25	09.24	07.45	06.07	05.17 18.29-19.37/68	03.38 18.34-19.33/59	02.51 18.54-19.28/34
	15.42	17.24	18.48	21.22	22.59	23.55
26	09.21	07.42	06.04	05.14 18.29-19.38/69	03.36 18.35-19.33/58	02.52 18.53-19.28/35
	15.46	17.27	18.51	21.25	23.02	23.55
27	09.18	07.38	06.00	05.10 18.29-19.38/69	03.33 18.36-19.32/56	02.53 18.53-19.29/36
	15.49	17.30	18.54	21.29	23.05	23.54
28	09.15	07.35	05.57	05.07 18.28-19.38/70	03.30 18.36-19.32/56	02.55 18.53-19.30/37
	15.52	17.33	18.57	21.32	23.08	23.53
29	09.13		06.53	05.04 18.28-19.39/71	03.27 18.37-19.32/55	02.56 18.53-19.30/37
	15.56		20.00	21.35	23.11	23.52
30	09.10		06.49	05.00 18.27-19.39/72	03.24 18.38-19.31/53	02.58 18.53-19.31/38
	15.59		20.03	21.38	23.14	23.51
31	09.07		06.46		03.22 18.38-19.30/52	
	16.02		20.06		23.17	
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	0	1365	2041	1170

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 16 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 18.52-19.31/39 23.49	04.25 18.37-19.48/71 22.27	06.00 19.47-20.01/14 20.40 18.51-19.21/30	07.27 18.53	08.01 16.07	09.36 14.43
2	03.01 18.52-19.32/40 23.48	04.28 18.37-19.48/71 22.24	06.03 19.47-19.57/10 20.36 18.54-19.16/22	07.29 18.50	08.04 16.04	09.38 14.41
3	03.01 18.52-19.33/41 23.46	04.31 18.36-19.48/72 22.20	06.06 19.48-19.54/6 20.33 19.00-19.09/9	07.32 18.46	08.07 16.00	09.41 14.39
4	03.03 18.51-19.33/42 23.45	04.34 18.36-19.48/72 22.17	06.09 19.50-19.51/1 20.29	07.35 18.42	08.10 15.57	09.44 14.37
5	03.05 18.50-19.33/43 23.43	04.37 18.36-19.48/72 22.14	06.12 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	03.08 18.50-19.35/45 23.41	04.40 18.36-19.49/73 22.10	06.15 20.22	07.41 18.35	08.17 15.51	09.49 14.33
7	03.10 18.50-19.36/46 23.39	04.44 18.35-19.48/73 22.07	06.18 20.18	07.44 18.32	08.20 15.48	09.51 14.32
8	03.12 18.49-19.36/47 23.37	04.47 18.36-19.48/72 22.04	06.20 20.15	07.47 18.28	08.23 15.45	09.54 14.30
9	03.15 18.49-19.37/48 23.34	04.50 18.36-19.48/72 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.29
10	03.18 18.49-19.37/48 23.32	04.53 18.35-19.47/72 21.57	06.26 20.08	07.53 18.21	08.30 15.38	09.58 14.28
11	03.20 18.48-19.38/50 23.30	04.56 18.35-19.47/72 21.53	06.29 20.04	07.56 18.18	08.33 15.35	10.00 14.27
12	03.23 18.48-19.39/51 23.27	04.59 18.35-19.47/72 21.50	06.32 20.01	07.59 18.14	08.36 15.32	10.02 14.26
13	03.26 18.47-19.40/53 23.24	05.03 18.36-19.47/71 21.46	06.35 19.57	08.02 18.11	08.39 15.29	10.04 14.25
14	03.29 18.46-19.40/54 23.22	05.06 18.35-19.46/71 21.43	06.38 19.53	08.05 18.08	08.43 15.26	10.06 14.24
15	03.32 18.46-19.41/55 23.19	05.09 18.35-19.46/71 21.39	06.41 19.50	08.08 18.04	08.46 15.23	10.07 14.23
16	03.34 18.45-19.41/56 23.16	05.12 18.36-19.45/69 21.36	06.43 19.46	08.11 18.01	08.49 15.21	10.09 14.23
17	03.37 18.44-19.42/58 23.14	05.15 18.35-19.44/69 21.32	06.46 19.43	08.14 17.57	08.52 15.18	10.10 14.23
18	03.40 18.44-19.42/58 23.11	05.18 18.36-19.43/67 21.29	06.49 19.39	08.17 17.54	08.56 15.15	10.11 14.22
19	03.43 18.44-19.43/59 23.08	05.21 18.37-19.43/66 21.26	06.52 19.36	08.20 17.50	08.59 15.12	10.12 14.22
20	03.47 18.43-19.43/60 23.05	05.24 18.37-19.42/65 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	03.50 18.42-19.44/62 23.02	05.27 18.37-19.41/64 21.19	06.58 19.28	08.26 17.44	09.05 15.07	10.14 14.23
22	03.53 18.42-19.45/63 22.59	05.30 18.38-19.40/62 21.15	07.01 19.25	08.29 17.40	09.08 15.04	10.15 14.23
23	03.56 18.41-19.45/64 22.56	05.33 19.55-20.03/8 21.11 18.39-19.39/60	07.04 19.21	08.32 17.37	09.12 15.01	10.15 14.24
24	03.59 18.41-19.46/65 22.53	05.36 19.52-20.05/13 21.08 18.40-19.38/58	07.06 19.18	08.35 17.33	09.15 14.59	10.15 14.24
25	04.02 18.40-19.46/66 22.50	05.39 19.50-20.05/15 21.04 18.40-19.36/56	07.09 19.14	07.38 16.30	09.18 14.56	10.16 14.25
26	04.05 18.40-19.47/67 22.46	05.42 19.49-20.06/17 21.01 18.41-19.34/53	07.12 19.11	07.41 16.27	09.21 14.54	10.16 14.26
27	04.09 18.39-19.46/67 22.43	05.45 19.48-20.07/19 20.57 18.42-19.33/51	07.15 19.07	07.45 16.23	09.24 14.51	10.15 14.27
28	04.12 18.39-19.47/68 22.40	05.48 19.48-20.07/19 20.54 18.44-19.31/47	07.18 19.04	07.48 16.20	09.27 14.49	10.15 14.29
29	04.15 18.38-19.47/69 22.37	05.51 19.47-20.06/19 20.50 18.44-19.28/44	07.21 19.00	07.51 16.17	09.30 14.47	10.15 14.30
30	04.18 18.38-19.48/70 22.34	05.54 19.47-20.06/19 20.47 18.46-19.26/40	07.24 18.57	07.54 16.13	09.33 14.45	10.14 14.31
31	04.21 18.38-19.48/70 22.30	05.57 19.47-20.04/17 20.43 18.48-19.24/36		07.57 16.10		10.14 14.33
Potential sun hours	609	509	393	305	198	137
Sum of minutes with flicker	1724	2130	92	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 17 - PUU17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.19 21.26-21.38/12	02.59	04.24 21.34-21.37/3	06.00	07.26	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16 21.27-21.37/10	03.01	04.28	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.04	14.40
3	10.11	08.57	07.25	06.35	04.50	03.14 21.28-21.36/8	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46	03.11 21.30-21.35/5	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12 21.38-21.40/2	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15 21.36-21.43/7	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17 21.35-21.44/9	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23 21.24-21.25/1	02.56	03.20 21.34-21.46/12	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 21.24-21.28/4	02.54	03.23 21.33-21.46/13	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16 21.22-21.31/9	02.53	03.26 21.32-21.46/14	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13 21.21-21.33/12	02.52	03.28 21.32-21.48/16	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09 21.21-21.36/15	02.51	03.31 21.32-21.49/17	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06 21.20-21.38/18	02.50	03.34 21.31-21.49/18	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03 21.20-21.40/20	02.49	03.37 21.31-21.49/18	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00 21.20-21.41/21	02.49	03.40 21.30-21.50/20	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57 21.19-21.40/21	02.49	03.43 21.31-21.51/20	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 21.20-21.41/21	02.49	03.46 21.30-21.51/21	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 21.20-21.41/21	02.49	03.49 21.30-21.51/21	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47 21.19-21.41/22	02.49	03.53 21.30-21.51/21	05.30	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44 21.20-21.41/21	02.49	03.56 21.30-21.51/21	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41 21.20-21.41/21	02.50	03.59 21.30-21.51/21	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38 21.21-21.41/20	02.51	04.02 21.30-21.51/21	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35 21.21-21.41/20	02.52	04.05 21.30-21.51/21	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32 21.22-21.40/18	02.53	04.08 21.31-21.50/19	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30 21.23-21.40/17	02.54	04.12 21.31-21.48/17	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13	07.32	05.53	05.03	03.27 21.23-21.39/16	02.56	04.15 21.31-21.45/14	05.51	07.21	07.51	09.30	10.15
	15.56	17.37	19.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10	07.29	05.49	05.00	03.24 21.24-21.39/15	02.57	04.18 21.32-21.43/11	05.54	07.24	07.54	09.33	10.14
	15.59	17.40	19.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07	07.26	05.46	04.97	03.21 21.24-21.38/14	02.58	04.21 21.33-21.40/7	05.57	07.27	07.57	09.36	10.14
	16.02	17.49	19.06	21.41	23.17	23.52	22.30	20.43	18.57	16.10	14.46	14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	347	35	381	3	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 18 - PUU18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.33	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.52	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.10	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 19 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	
1	10.12 14.35	09.03 16.06	07.31 17.36	10.17-11.31/74 17.39	06.42 20.09	18.43-19.15/32 21.41	04.57 23.20
2	14.37 10.11	16.09 09.00	07.28 17.39	10.17-11.31/74 17.39	06.39 20.12	18.42-19.14/32 21.44	04.53 23.22
3	10.10 14.39	08.57 16.12	07.25 17.42	10.16-11.30/74 20.15	06.35 20.15	18.42-19.15/33 21.48	04.50 23.25
4	10.09 14.42	08.54 16.16	07.21 17.45	10.16-11.31/75 20.18	06.32 20.18	18.41-19.14/33 21.51	04.46 23.28
5	10.08 14.44	08.51 16.19	07.18 17.48	10.15-11.31/76 20.21	06.28 20.21	18.42-19.14/32 21.54	04.43 23.30
6	10.06 14.46	08.48 16.22	07.14 17.51	10.15-11.30/75 20.24	06.24 20.24	18.42-19.14/32 21.57	04.39 23.33
7	10.05 14.49	08.45 16.26	07.11 17.55	10.15-11.31/76 20.27	06.21 20.27	18.42-19.13/31 22.01	04.36 23.35
8	10.03 14.51	08.42 16.29	07.07 17.58	10.14-11.30/76 20.30	06.17 20.30	18.42-19.12/30 22.04	04.33 23.38
9	10.02 14.54	08.38 16.32	07.04 18.01	10.14-11.30/76 20.33	06.14 20.33	18.42-19.11/29 22.07	04.29 23.40
10	10.00 14.56	08.35 16.35	07.00 18.04	10.15-11.30/75 20.36	06.10 20.36	18.43-19.10/27 22.10	04.26 23.42
11	09.58 14.59	08.32 16.39	06.57 18.07	10.14-11.29/75 20.39	06.07 20.39	18.44-19.08/24 22.14	04.23 23.44
12	09.56 15.02	08.29 16.42	06.53 18.10	10.15-11.29/74 20.42	06.03 20.42	18.46-19.06/20 22.17	04.19 23.46
13	09.54 15.05	08.25 16.45	06.50 18.13	10.15-11.28/73 20.45	06.00 20.45	18.48-19.04/16 22.20	04.16 23.47
14	09.52 15.08	08.22 16.49	06.46 18.16	10.14-11.27/73 20.48	05.56 20.48	18.51-19.00/9 22.23	04.13 23.49
15	09.49 15.11	08.19 16.52	06.43 18.19	10.15-11.26/71 20.51	05.53 20.51	04.10 22.27	04.10 23.50
16	09.47 15.14	08.16 16.55	06.39 18.22	10.15-11.25/70 20.54	05.49 20.54	04.06 22.30	04.06 23.52
17	09.45 15.17	08.12 16.58	06.35 18.25	10.15-11.23/68 20.57	05.45 20.57	04.03 22.33	04.03 23.53
18	09.42 15.20	08.09 17.01	06.32 18.28	10.16-11.23/67 21.00	05.42 21.00	04.00 22.36	04.00 23.54
19	09.40 15.23	08.06 17.05	06.28 18.30	10.16-11.21/65 21.03	05.38 21.03	20.21-20.25/4 22.40	03.57 23.54
20	09.37 15.26	08.02 17.08	06.25 18.33	10.18-11.20/62 21.07	05.35 21.07	20.18-20.27/9 22.43	03.54 23.55
21	09.35 15.29	07.59 17.11	06.21 18.36	10.18-11.18/60 21.10	05.31 21.10	20.17-20.30/13 22.46	03.51 23.55
22	09.32 15.33	07.55 17.14	06.18 18.39	10.20-11.16/56 21.13	05.28 21.13	20.16-20.33/17 22.49	03.47 23.56
23	09.29 15.36	07.52 17.17	06.14 18.42	10.20-11.14/54 21.16	05.24 21.16	20.16-20.36/20 22.52	03.44 23.56
24	09.27 15.39	07.49 17.21	06.11 18.45	10.21-11.11/50 21.19	05.21 21.19	20.15-20.35/20 22.56	03.41 23.55
25	09.24 15.42	07.45 17.24	06.07 18.48	17.55-18.08/13 21.22	05.17 21.22	20.14-20.35/21 22.59	03.38 23.55
26	09.21 15.46	07.42 17.27	06.04 18.51	17.52-18.10/18 21.25	05.14 21.25	20.14-20.35/21 23.02	03.36 23.54
27	09.18 15.49	07.38 17.30	06.00 18.54	17.50-18.12/22 21.28	05.10 21.28	20.15-20.35/20 23.05	03.33 23.54
28	09.15 15.52	07.35 17.33	05.56 18.57	17.48-18.13/25 21.32	05.07 21.32	20.15-20.34/19 23.08	03.30 23.53
29	09.12 15.56		06.53 20.00	18.47-19.14/27 21.35	05.03 21.35	20.15-20.34/19 23.11	03.27 23.52
30	09.09 15.59		06.49 20.03	18.45-19.14/29 21.38	05.00 21.38	20.15-20.32/17 23.14	03.24 23.51
31	09.06 16.02		06.46 20.06	18.44-19.14/30 21.41		03.22 23.17	
Potential sun hours	171	238	363	451	570	624	0
Sum of minutes with flicker	0	1020	1969	580	32	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 19 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	03.00 23.49	04.24 22.27	06.00 18.44-19.08/24 20.40	07.26 10.53-12.07/74 18.53	08.00 10.19-10.31/12 16.07	09.35 14.43
2	03.00 23.48	04.28 22.24	06.03 18.41-19.08/27 20.36	07.29 10.53-12.07/74 18.49	08.04 16.04	09.38 14.41
3	03.01 23.46	04.31 22.20	06.06 18.40-19.09/29 20.32	07.32 10.52-12.07/75 18.46	08.07 16.00	09.41 14.39
4	03.03 23.44	04.34 22.17	06.09 18.39-19.09/30 20.29	07.35 10.52-12.07/75 18.42	08.10 15.57	09.44 14.37
5	03.06 23.43	04.37 22.14	06.12 18.39-19.10/31 20.25	07.38 10.51-12.07/76 18.39	08.13 15.54	09.46 14.35
6	03.08 23.41	04.40 22.10	06.15 18.37-19.09/32 20.22	07.41 10.51-12.06/75 18.35	08.17 15.51	09.49 14.33
7	03.10 23.39	04.44 22.07	06.18 18.37-19.09/32 20.18	07.44 10.50-12.06/76 18.32	08.20 15.48	09.51 14.32
8	03.13 23.36	04.47 22.03	06.20 18.37-19.09/32 20.15	07.47 10.51-12.07/76 18.28	08.23 15.45	09.53 14.30
9	03.15 23.34	04.50 22.00	06.23 18.36-19.09/33 20.11	07.50 10.51-12.06/75 18.25	08.26 15.41	09.56 14.29
10	03.18 23.32	04.53 20.29-20.37/8 21.57	06.26 18.35-19.08/33 20.08	07.53 10.50-12.05/75 18.21	08.30 15.38	09.58 14.28
11	03.20 23.29	04.56 20.26-20.39/13 21.53	06.29 18.36-19.07/31 20.04	07.56 10.50-12.05/75 18.18	08.33 15.35	10.00 14.27
12	03.23 23.27	04.59 20.25-20.40/15 21.50	06.32 18.36-19.07/31 20.00	07.59 10.50-12.04/74 18.14	08.36 15.32	10.02 14.26
13	03.26 23.24	05.02 20.23-20.40/17 21.46	06.35 18.37-19.06/29 19.57	08.02 10.50-12.03/73 18.11	08.39 15.29	10.04 14.25
14	03.29 23.22	05.06 20.23-20.41/18 21.43	06.38 18.36-19.04/28 19.53	08.05 10.51-12.03/72 18.08	08.43 15.26	10.05 14.24
15	03.32 23.19	05.09 20.22-20.42/20 21.39	06.41 18.37-19.03/26 19.50	08.08 10.51-12.02/71 18.04	08.46 15.23	10.07 14.23
16	03.34 23.16	05.12 20.22-20.42/20 21.36	06.43 18.38-19.01/23 19.46	08.11 10.51-12.01/70 18.01	08.49 15.20	10.08 14.23
17	03.37 23.13	05.15 20.21-20.41/20 21.32	06.46 18.40-18.59/19 19.43	08.14 10.51-12.00/69 17.57	08.52 15.18	10.10 14.23
18	03.40 23.11	05.18 20.21-20.41/20 21.29	06.49 18.42-18.56/14 19.39	08.17 10.53-12.00/67 17.54	08.55 15.15	10.11 14.22
19	03.43 23.08	05.21 20.21-20.41/20 21.25	06.52 18.47-18.49/2 19.36	08.20 10.53-11.59/66 17.50	08.59 15.12	10.12 14.22
20	03.47 23.05	05.24 20.21-20.41/20 21.22	06.55 11.07-11.59/52 19.32	08.23 10.53-11.57/64 17.47	09.02 15.09	10.13 14.22
21	03.50 23.02	05.27 20.21-20.37/16 21.18	06.58 11.05-12.01/56 19.28	08.26 10.55-11.57/62 17.43	09.05 15.07	10.14 14.23
22	03.53 22.59	05.30 20.22-20.34/12 21.15	07.01 11.03-12.02/59 19.25	08.29 10.55-11.55/60 17.40	09.08 15.04	10.14 14.23
23	03.56 22.56	05.33 20.23-20.31/8 21.11	07.03 11.02-12.03/61 19.21	08.32 10.57-11.54/57 17.37	09.11 15.01	10.15 14.24
24	03.59 22.53	05.36 20.25-20.28/3 21.08	07.06 11.01-12.04/63 19.18	08.35 10.58-11.52/54 17.33	09.15 14.59	10.15 14.24
25	04.02 22.49	05.39 21.04	07.09 10.59-12.05/66 19.14	07.38 09.59-10.51/52 16.30	09.18 14.56	10.15 14.25
26	04.05 22.46	05.42 21.01	07.12 10.58-12.06/68 19.11	07.41 10.00-10.49/49 16.27	09.21 14.54	10.15 14.26
27	04.09 22.43	05.45 20.57	07.15 10.56-12.06/70 19.07	07.45 10.02-10.48/46 16.23	09.24 14.51	10.15 14.27
28	04.12 22.40	05.48 20.54	07.18 10.56-12.06/70 19.04	07.48 10.04-10.45/41 16.20	09.27 14.49	10.15 14.29
29	04.15 22.37	05.51 18.51-19.01/10 20.50	07.21 10.55-12.07/72 19.00	07.51 10.06-10.43/37 16.17	09.30 14.47	10.15 14.30
30	04.18 22.33	05.54 18.48-19.04/16 20.47	07.24 10.54-12.07/73 18.56	07.54 10.10-10.41/31 16.13	09.33 14.45	10.14 14.31
31	04.21 22.30	05.57 18.46-19.06/20 20.43		07.57 10.14-10.37/23 16.10		10.13 14.33
Potential sun hours	608	508	393	305	198	137
Sum of minutes with flicker	0	276	1394	1964	12	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 20 - PUU20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12 14.35	09.03 16.06	07.31 17.36	06.42 20.09	04.56 21.41	06.40-07.45/65 23.20 20.27-21.08/41
2	10.12 14.37	09.00 16.09	07.28 17.39	06.39 20.12	04.53 21.44	06.40-07.45/65 23.23 20.27-21.08/41
3	10.10 14.39	08.57 16.12	07.25 17.42	06.35 20.15	04.50 21.48	06.39-07.45/66 23.25 20.27-21.07/40
4	10.09 14.41	08.54 16.16	07.21 17.45	06.32 20.18	04.46 21.51	20.40-20.51/11 06.39-07.46/67
5	10.08 14.44	08.51 16.19	07.18 17.48	06.28 20.21	04.43 21.54	20.36-20.54/18 06.38-07.46/68
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	20.35-20.57/22 06.38-07.46/68
7	10.05 14.49	08.45 16.26	07.11 17.54	06.21 20.27	04.36 22.01	20.33-20.59/26 06.37-07.46/69
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	04.33 22.04	20.32-21.00/28 06.37-07.46/69
9	10.02 14.54	08.38 16.32	07.04 18.01	06.14 20.33	04.29 22.07	20.30-21.01/31 06.37-07.46/69
10	10.00 14.56	08.35 16.35	07.00 18.04	06.10 20.36	04.26 22.10	20.29-21.02/33 06.36-07.46/70
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	04.23 22.14	20.28-21.03/35 06.36-07.46/70
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	04.19 22.17	21.24-21.28/4 06.36-07.46/70 20.28-21.04/36
13	09.54 15.05	08.25 16.45	06.50 18.13	06.00 20.45	04.16 22.20	21.22-21.31/9 06.36-07.46/70 20.27-21.04/37
14	09.52 15.08	08.22 16.49	06.46 18.16	05.56 20.48	04.13 22.23	21.21-21.33/12 06.36-07.46/70 20.26-21.05/39
15	09.49 15.11	08.19 16.52	06.42 18.19	05.52 20.51	04.09 22.27	21.21-21.36/15 06.36-07.46/70 20.26-21.06/40
16	09.47 15.14	08.16 16.55	06.39 18.22	05.49 20.54	04.06 22.30	21.21-21.38/17 06.36-07.46/70 20.26-21.06/40
17	09.45 15.17	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33	21.20-21.40/20 06.37-07.46/69 20.25-21.06/41
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	04.00 22.36	21.20-21.44/24 06.36-07.45/69 20.25-21.06/41
19	09.40 15.23	08.06 17.05	06.28 18.30	05.38 21.03	03.57 22.40	21.19-21.45/26 06.37-07.46/69 20.24-21.06/42
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.07	03.54 22.43	21.20-21.46/26 06.37-07.45/68 20.25-21.07/42
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	03.50 22.46	21.20-21.47/27 06.37-07.45/68 20.25-21.07/42
22	09.32 15.33	07.55 17.14	06.18 18.39	05.28 21.13	03.47 22.49	21.20-21.46/26 06.38-07.45/67 20.24-21.07/43
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.52	21.20-21.46/26 06.37-07.44/67 20.24-21.07/43
24	09.27 15.39	07.49 17.20	06.11 18.45	05.21 21.19	03.41 22.56	21.21-21.47/26 06.38-07.44/66 20.25-21.07/42
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	03.38 22.59	21.21-21.47/26 06.38-07.44/66 20.25-21.08/43
26	09.21 15.46	07.42 17.27	06.04 18.51	05.14 21.25	03.35 23.02	21.22-21.47/25 06.39-07.44/65 20.25-21.08/43
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	03.33 23.05	21.22-21.47/25 06.39-07.44/65 20.25-21.08/43
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	03.30 23.08	21.23-21.47/24 06.40-07.43/63 20.25-21.08/43
29	09.12 15.56	07.32 17.36	05.53 19.00	05.03 21.35	03.27 23.11	21.23-21.47/24 06.40-07.43/63 20.26-21.08/42
30	09.09 15.59	07.29 17.39	05.50 19.03	05.00 21.38	03.24 23.14	21.24-21.46/22 06.40-07.42/62 20.26-21.08/42
31	09.06 16.02	07.26 17.42	05.47 19.06	04.57 21.41	03.21 23.17	21.25-21.46/21 06.40-07.42/62 20.26-21.07/41
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	0	694	3539	2935

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 20 - PUU20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 21.40-21.46/6 06.50-07.44/54 23.49 20.34-21.12/38	04.24 21.34-21.37/3 06.46-07.56/70 22.27 20.38-21.14/36	06.00 20.40	07.26 18.53	08.00 16.07	09.35 14.43
2	03.01 21.39-21.47/8 06.49-07.45/56 23.48 20.34-21.12/38	04.28 20.39-21.13/34 22.24 06.47-07.57/70	06.03 20.36	07.29 18.49	08.04 16.04	09.38 14.40
3	03.01 21.38-21.48/10 06.50-07.46/56 23.46 20.34-21.12/38	04.31 20.39-21.12/33 22.20 06.46-07.56/70	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.39
4	03.03 21.38-21.49/11 06.50-07.46/56 23.45 20.34-21.13/39	04.34 20.41-21.11/30 22.17 06.47-07.56/69	06.09 20.29	07.35 18.42	08.10 15.57	09.44 14.37
5	03.05 21.37-21.49/12 06.49-07.46/57 23.43 20.34-21.13/39	04.37 20.42-21.10/28 22.14 06.47-07.56/69	06.12 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	03.08 21.37-21.51/14 06.50-07.47/57 23.41 20.34-21.14/40	04.40 20.43-21.08/25 22.10 06.47-07.56/69	06.15 20.22	07.41 18.35	08.17 15.51	09.49 14.33
7	03.10 21.36-21.51/15 06.50-07.48/58 23.39 20.34-21.13/39	04.44 20.45-21.06/21 22.07 06.47-07.55/68	06.17 20.18	07.44 18.32	08.20 15.48	09.51 14.32
8	03.12 21.36-21.52/16 06.49-07.48/59 23.36 20.34-21.14/40	04.47 20.47-21.03/16 22.03 06.47-07.55/68	06.20 20.15	07.47 18.28	08.23 15.44	09.54 14.30
9	03.15 21.36-21.53/17 06.49-07.49/60 23.34 20.34-21.15/41	04.50 20.51-21.00/9 22.00 06.48-07.55/67	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.29
10	03.17 21.36-21.53/17 06.49-07.49/60 23.32 20.35-21.15/40	04.53 06.47-07.53/66 21.57	06.26 20.08	07.53 18.21	08.30 15.38	09.58 14.28
11	03.20 21.35-21.54/19 06.49-07.50/61 23.29 20.35-21.16/41	04.56 06.48-07.53/65 21.53	06.29 20.04	07.56 18.18	08.33 15.35	10.00 14.26
12	03.23 21.34-21.55/21 06.49-07.51/62 23.27 20.34-21.15/41	04.59 06.49-07.53/64 21.50	06.32 20.00	07.59 18.14	08.36 15.32	10.02 14.25
13	03.26 21.32-21.55/23 06.49-07.51/62 23.24 20.34-21.15/41	05.02 06.49-07.52/63 21.46	06.35 19.57	08.02 18.11	08.39 15.29	10.04 14.25
14	03.29 21.33-21.55/22 06.49-07.52/63 23.22 20.35-21.17/42	05.06 06.49-07.51/62 21.43	06.38 19.53	08.05 18.07	08.43 15.26	10.05 14.24
15	03.31 21.32-21.56/24 06.49-07.52/63 23.19 20.34-21.17/43	05.09 06.50-07.50/60 21.39	06.41 19.50	08.08 18.04	08.46 15.23	10.07 14.23
16	03.34 21.32-21.56/24 06.48-07.52/64 23.16 20.34-21.17/43	05.12 06.51-07.49/58 21.36	06.43 19.46	08.11 18.01	08.49 15.20	10.09 14.23
17	03.37 21.31-21.56/25 06.48-07.53/65 23.13 20.34-21.17/43	05.15 06.51-07.47/56 21.32	06.46 19.43	08.14 17.57	08.52 15.18	10.10 14.22
18	03.40 21.30-21.56/26 06.48-07.53/65 23.11 20.34-21.17/43	05.18 06.52-07.47/55 21.29	06.49 19.39	08.17 17.54	08.56 15.15	10.11 14.22
19	03.43 21.31-21.57/26 06.48-07.54/66 23.08 20.35-21.17/42	05.21 06.53-07.45/52 21.25	06.52 19.35	08.20 17.50	08.59 15.12	10.12 14.22
20	03.46 21.30-21.57/27 06.48-07.54/66 23.05 20.35-21.17/42	05.24 06.55-07.44/49 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	03.50 21.30-21.56/26 06.47-07.54/67 23.02 20.34-21.17/43	05.27 06.55-07.42/47 21.18	06.58 19.28	08.26 17.43	09.05 15.06	10.14 14.23
22	03.53 21.30-21.57/27 06.48-07.55/67 22.59 20.35-21.18/43	05.30 06.57-07.40/43 21.15	07.01 19.25	08.29 17.40	09.08 15.04	10.14 14.23
23	03.56 21.30-21.56/26 06.47-07.55/68 22.56 20.35-21.17/42	05.33 06.59-07.38/39 21.11	07.03 19.21	08.32 17.37	09.11 15.01	10.15 14.23
24	03.59 21.30-21.57/27 06.47-07.56/69 22.53 20.35-21.16/41	05.36 07.01-07.36/35 21.08	07.06 19.18	08.35 17.33	09.15 14.59	10.15 14.24
25	04.02 21.30-21.55/25 06.47-07.56/69 22.49 20.35-21.17/42	05.39 07.03-07.33/30 21.04	07.09 19.14	07.38 16.30	09.18 14.56	10.15 14.25
26	04.05 21.30-21.53/23 06.47-07.56/69 22.46 20.35-21.16/41	05.42 07.06-07.29/23 21.01	07.12 19.11	07.41 16.27	09.21 14.54	10.15 14.26
27	04.08 21.31-21.50/19 06.47-07.56/69 22.43 20.36-21.16/40	05.45 07.11-07.24/13 20.57	07.15 19.07	07.45 16.23	09.24 14.51	10.15 14.27
28	04.12 21.32-21.48/16 06.47-07.57/70 22.40 20.37-21.16/39	05.48 20.54	07.18 19.04	07.48 16.20	09.27 14.49	10.15 14.28
29	04.15 21.31-21.45/14 06.46-07.56/70 22.37 20.37-21.15/38	05.51 20.50	07.21 19.00	07.51 16.17	09.30 14.47	10.15 14.30
30	04.18 21.33-21.43/10 06.47-07.57/70 22.33 20.37-21.15/38	05.54 20.47	07.24 18.56	07.54 16.13	09.33 14.45	10.14 14.31
31	04.21 21.33-21.39/6 06.47-07.57/70 22.30 20.37-21.14/37	05.57 20.43	 20.43	 16.10	 14.45	 14.33
Potential sun hours	609	509	393	305	198	137
Sum of minutes with flicker	3807	1735	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 21 - PUU21

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	10.13	09.04	07.31	06.42	04.56	03.19	04.41-05.13/32	02.59	04.45-05.20/35	04.24	06.00	07.26	08.00	09.36	
	14.35	16.05	17.36	20.09	21.41	23.20		23.50		22.27	20.40	18.53	16.07	14.42	
2	10.12	09.00	07.28	06.39	04.53	03.16	04.40-05.13/33	03.01	04.45-05.20/35	04.27	06.03	07.29	08.04	09.38	
	14.37	16.09	17.39	20.12	21.44	23.23		23.48		22.24	20.36	18.49	16.03	14.40	
3	10.11	08.57	07.24	06.35	04.50	03.14	04.40-05.14/34	03.01	04.46-05.21/35	04.31	06.06	07.32	08.07	09.41	
	14.39	16.12	17.42	20.15	21.48	23.25		23.46		22.20	20.32	18.46	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	03.11	04.40-05.13/33	03.03	04.46-05.20/34	04.34	06.09	07.35	08.10	09.44	
	14.41	16.15	17.45	20.18	21.51	23.28		23.45		22.17	20.29	18.42	15.57	14.37	
5	10.08	08.51	07.18	06.28	04.43	03.09	04.40-05.14/34	03.05	04.45-05.20/35	04.37	06.12	07.38	08.13	09.46	
	14.44	16.19	17.48	20.21	21.54	23.31		23.43		22.14	20.25	18.39	15.54	14.35	
6	10.07	08.48	07.14	06.24	04.39	03.07	04.40-05.14/34	03.07	04.46-05.20/34	04.40	06.15	07.41	08.17	09.49	
	14.46	16.22	17.51	20.24	21.57	23.33		23.41		22.10	20.22	18.35	15.51	14.33	
7	10.05	08.45	07.11	06.21	04.36	03.05	04.40-05.14/34	03.10	04.47-05.21/34	04.43	06.17	07.44	08.20	09.51	
	14.48	16.25	17.54	20.27	22.01	23.36		23.39		22.07	20.18	18.32	15.47	14.32	
8	10.03	08.42	07.07	06.17	04.33	03.03	04.40-05.15/35	03.12	04.47-05.20/33	04.47	06.20	07.47	08.23	09.54	
	14.51	16.29	17.57	20.30	22.04	23.38		23.37		22.03	20.15	18.28	15.44	14.30	
9	10.02	08.38	07.04	06.14	04.29	03.01	04.40-05.15/35	03.15	04.47-05.20/33	04.50	06.23	07.50	08.26	09.56	
	14.54	16.32	18.00	20.33	22.07	23.40		23.34		22.00	20.11	18.25	15.41	14.29	
10	10.00	08.35	07.00	06.10	04.26	02.57	04.40-05.15/35	03.17	04.48-05.21/33	04.53	06.26	07.53	08.30	09.58	
	14.56	16.35	18.03	20.36	22.10	23.42		23.32		21.57	20.08	18.21	15.38	14.27	
11	09.58	08.32	06.57	06.07	04.22	02.56	04.40-05.15/35	03.20	04.48-05.21/33	04.56	06.29	07.56	08.33	10.00	
	14.59	16.39	18.07	20.39	22.14	23.44		23.30		21.53	20.04	18.18	15.35	14.26	
12	09.56	08.29	06.53	06.03	04.19	02.54	04.40-05.15/35	03.23	04.49-05.21/32	04.59	06.32	07.59	08.36	10.02	
	15.02	16.42	18.10	20.42	22.17	23.46		23.27		21.50	20.00	18.14	15.32	14.25	
13	09.54	08.25	06.50	05.59	04.16	02.53	04.41-05.16/35	03.25	04.49-05.20/31	05.02	06.35	08.02	08.39	10.04	
	15.05	16.45	18.13	20.45	22.20	23.48		23.24		21.46	19.57	18.11	15.29	14.24	
14	09.52	08.22	06.46	05.56	04.13	02.52	04.41-05.16/35	03.28	04.50-05.20/30	05.05	06.38	08.05	08.43	10.06	
	15.08	16.48	18.16	20.48	22.23	23.49		23.22		21.43	19.53	18.07	15.26	14.24	
15	09.49	08.19	06.42	05.52	04.09	02.51	04.41-05.17/36	03.31	04.50-05.20/30	05.09	06.40	08.08	08.46	10.07	
	15.11	16.52	18.19	20.51	22.27	23.51		23.19		21.39	19.50	18.04	15.23	14.23	
16	09.47	08.16	06.39	05.49	04.06	02.50	04.41-05.16/35	03.34	04.51-05.19/28	05.12	06.43	08.11	08.49	10.09	
	15.14	16.55	18.21	20.54	22.30	23.52		23.16		21.36	19.46	18.00	15.20	14.23	
17	09.45	08.12	06.35	05.45	04.03	02.49	04.41-05.17/36	03.37	04.51-05.18/27	05.15	06.46	08.14	08.52	10.10	
	15.17	16.58	18.24	20.57	22.33	23.53		23.14		21.32	19.43	17.57	15.17	14.22	
18	09.42	08.09	06.32	05.42	04.00	02.49	04.42-05.17/35	03.40	04.52-05.18/26	05.18	06.49	08.17	08.56	10.11	
	15.20	17.01	18.27	21.00	22.37	23.54		23.11		21.29	19.39	17.54	15.15	14.22	
19	09.40	08.06	06.28	05.38	03.57	04.53-04.58/5	02.49	04.42-05.18/36	03.43	04.53-05.18/25	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55		23.08		21.25	19.35	17.50	15.12	14.22	
20	09.37	08.02	06.25	05.35	03.53	04.49-05.01/12	02.49	04.42-05.18/36	03.46	04.54-05.17/23	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55		23.05		21.22	19.32	17.47	15.09	14.22	
21	09.35	07.59	06.21	05.31	03.50	04.47-05.04/17	02.49	04.42-05.18/36	03.49	04.55-05.15/20	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56		23.02		21.18	19.28	17.43	15.06	14.22	
22	09.32	07.55	06.18	05.28	03.47	04.46-05.05/19	02.49	04.42-05.18/36	03.52	04.57-05.15/18	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56		22.59		21.15	19.25	17.40	15.04	14.23	
23	09.29	07.52	06.14	05.24	03.44	04.44-05.06/22	02.49	04.43-05.19/36	03.56	04.58-05.13/15	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56		22.56		21.11	19.21	17.37	15.01	14.23	
24	09.27	07.49	06.11	05.21	03.41	04.44-05.07/23	02.50	04.43-05.18/35	03.59	05.01-05.11/10	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56		22.53		21.08	19.18	17.33	14.59	14.24	
25	09.24	07.45	06.07	05.17	03.38	04.43-05.08/25	02.51	04.43-05.19/36	04.02	05.39	07.09	07.38	09.18	10.16	
	15.42	17.24	18.48	21.22	22.59	23.55		22.49		21.04	19.14	16.30	14.56	14.25	
26	09.21	07.42	06.03	05.14	03.35	04.42-05.09/27	02.52	04.43-05.19/36	04.05	05.42	07.12	07.41	09.21	10.16	
	15.46	17.27	18.51	21.25	23.02	23.55		22.46		21.01	19.11	16.27	14.54	14.26	
27	09.18	07.38	06.00	05.10	03.32	04.42-05.10/28	02.53	04.44-05.19/35	04.08	05.45	07.15	07.45	09.24	10.15	
	15.49	17.30	18.54	21.29	23.05	23.54		22.43		20.57	19.07	16.23	14.51	14.27	
28	09.15	07.35	05.56	05.07	03.30	04.41-05.10/29	02.54	04.44-05.19/35	04.11	05.48	07.18	07.48	09.27	10.15	
	15.52	17.33	18.57	21.32	23.08	23.53		22.40		20.54	19.03	16.20	14.49	14.28	
29	09.12		05.53	05.03	03.27	04.41-05.11/30	02.56	04.44-05.20/36	04.15	05.51	07.21	07.51	09.30	10.15	
	15.55		20.00	21.35	23.11	23.52		22.37		20.50	19.00	16.17	14.47	14.30	
30	09.09		06.49	05.00	03.24	04.40-05.11/31	02.57	04.44-05.20/36	04.18	05.54	07.23	07.54	09.33	10.14	
	15.59		20.03	21.38	23.14	23.51		22.33		20.47	18.56	16.13	14.44	14.31	
31	09.07		06.46		03.21	04.40-05.11/31		04.21		05.57		07.57		10.14	
	16.02		20.06		23.17			22.30		20.43		16.10		14.33	
Potential sun hours	171	238	363	451	570	624	1050	609	689	509	393	305	198	137	0
Sum of minutes with flicker	0	0	0	0	299	624	1050	609	689	509	393	305	198	137	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 22 - PUU22

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59 04.09-04.25/16	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01 04.10-04.24/14	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01 04.12-04.25/13	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11 04.13-04.16/3	03.03 04.13-04.25/12	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09 04.12-04.17/5	03.05 04.14-04.24/10	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07 04.10-04.17/7	03.07 04.16-04.24/8	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04 04.09-04.18/9	03.10 04.18-04.24/6	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02 04.08-04.19/11	03.12 04.19-04.23/4	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01 04.07-04.19/12	03.15 04.21-04.22/1	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 04.06-04.20/14	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55 04.05-04.20/15	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54 04.04-04.20/16	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53 04.04-04.21/17	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52 04.03-04.21/18	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.42	05.52	04.09	02.51 04.03-04.22/19	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50 04.02-04.22/20	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49 04.02-04.22/20	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49 04.02-04.23/21	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48 04.03-04.23/20	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48 04.03-04.23/20	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48 04.03-04.23/20	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49 04.03-04.23/20	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49 04.04-04.24/20	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50 04.03-04.24/21	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51 04.04-04.25/21	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52 04.04-04.24/20	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53 04.05-04.24/19	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54 04.06-04.25/19	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56 04.07-04.25/18	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57 04.08-04.25/17	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	442	84	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 23 - PUU23

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13 14.35	09.04 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.18 23.20	02.59 23.50	04.24 22.27	06.00 20.40	07.26 18.53	08.00 16.07	09.36 14.42
2	10.12 14.37	09.01 16.09	07.28 17.39	06.38 20.12	04.53 21.45	03.16 23.23	03.01 23.48	04.27 22.24	06.03 20.36	07.29 18.49	08.04 16.03	09.38 14.40
3	10.11 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.48	03.13 23.26	03.01 23.47	04.30 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28	03.03 23.45	04.34 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.44 14.36
5	10.08 14.43	08.51 16.19	07.18 17.48	06.28 20.21	04.43 21.54	03.09 23.31	03.05 23.43	04.37 22.14	06.12 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	10.07 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	03.06 23.33	03.07 23.41	04.40 22.10	06.14 20.22	07.41 18.35	08.17 15.50	09.49 14.33
7	10.05 14.48	08.45 16.25	07.11 17.54	06.21 20.27	04.36 22.01	03.04 23.36	03.09 23.39	04.43 22.07	06.17 20.18	07.44 18.32	08.20 15.47	09.51 14.31
8	10.04 14.51	08.42 16.29	07.07 17.57	06.17 20.30	04.32 22.04	03.02 23.38	03.12 23.37	04.46 22.03	06.20 20.15	07.47 18.28	08.23 15.44	09.54 14.30
9	10.02 14.53	08.39 16.32	07.04 18.00	06.14 20.33	04.29 22.07	03.00 23.40	03.14 23.35	04.50 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.28
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.11	02.57 23.42	03.17 23.32	04.53 21.57	06.26 20.07	07.53 18.21	08.30 15.38	09.58 14.27
11	09.58 14.59	13.30-13.35/5 16.38	08.32 18.06	06.56 20.39	04.22 22.14	02.55 23.44	03.20 23.30	04.56 21.53	06.29 20.04	07.56 18.18	08.33 15.35	13.10-13.19/9 14.26
12	09.56 15.01	13.30-13.41/11 16.42	08.29 18.09	06.53 20.42	06.03 22.17	04.19 23.46	02.54 23.27	04.59 21.50	06.32 20.00	07.59 18.14	08.36 15.32	13.08-13.21/13 14.25
13	09.54 15.04	13.30-13.46/16 16.45	08.26 18.12	06.49 20.45	06.59 22.20	04.16 23.48	02.53 23.25	05.02 21.46	06.35 19.57	08.02 18.11	08.39 15.29	13.06-13.22/16 14.24
14	09.52 15.07	13.30-13.47/17 16.48	08.22 18.15	06.46 20.48	05.56 22.24	04.12 23.50	02.51 23.22	03.28 21.43	06.38 19.53	08.05 18.07	08.43 15.26	13.06-13.24/18 14.23
15	09.50 15.10	13.29-13.48/19 16.52	08.19 18.18	06.42 20.51	05.52 22.27	04.09 23.51	02.50 23.19	03.31 21.39	05.08 19.50	06.40 18.04	08.08 15.23	13.05-13.24/19 14.23
16	09.47 15.13	13.29-13.49/20 16.55	08.16 18.21	06.39 20.54	05.49 22.30	04.06 23.52	02.50 23.16	03.34 21.36	05.11 19.46	06.43 18.00	08.11 15.20	13.05-13.25/20 14.22
17	09.45 15.16	13.29-13.50/21 16.58	08.12 18.24	06.35 20.57	05.45 22.33	04.03 23.53	02.49 23.14	03.37 21.32	05.15 19.43	06.46 17.57	08.14 15.17	13.05-13.26/21 14.22
18	09.42 15.20	13.29-13.50/21 17.01	08.09 18.27	06.32 21.00	05.42 22.37	03.59 23.54	02.49 23.11	03.40 21.29	05.18 19.39	06.49 17.54	08.17 15.14	13.05-13.26/21 14.22
19	09.40 15.23	13.29-13.50/21 17.04	08.06 18.30	06.28 21.03	05.38 22.40	03.56 23.55	02.48 23.08	03.43 21.25	05.21 19.35	06.52 17.50	08.20 15.12	13.04-13.26/22 14.22
20	09.37 15.26	13.29-13.51/22 17.08	08.02 18.33	06.25 21.07	05.35 22.43	03.53 23.56	02.48 23.05	03.46 21.22	05.24 19.32	06.55 17.47	08.23 15.09	13.05-13.27/22 14.22
21	09.35 15.29	13.30-13.51/21 17.11	07.59 18.36	06.21 21.10	05.31 22.46	03.50 23.56	02.48 23.02	03.49 21.18	05.27 19.28	06.58 17.43	08.26 15.06	13.05-13.26/21 14.22
22	09.32 15.32	13.30-13.52/22 17.14	07.55 18.39	06.18 21.13	05.28 22.50	03.47 23.56	02.48 22.59	03.52 21.15	05.30 19.25	07.00 17.40	08.29 15.04	13.05-13.27/22 14.22
23	09.30 15.35	13.30-13.52/22 17.17	07.52 18.42	06.14 21.16	05.24 22.53	03.44 23.56	02.49 22.56	03.55 21.11	05.33 19.21	07.03 17.36	08.32 15.01	13.06-13.27/21 14.23
24	09.27 15.39	13.31-13.52/21 17.20	07.49 18.45	06.10 21.19	05.21 22.56	03.41 23.56	02.50 22.53	03.59 21.08	05.36 19.18	07.06 17.33	08.35 14.58	13.07-13.28/21 14.24
25	09.24 15.42	13.31-13.52/21 17.23	07.45 18.48	06.07 21.22	05.17 22.59	03.38 23.56	02.50 22.50	04.02 21.04	05.39 19.14	07.09 16.30	07.38 14.56	13.07-13.27/20 14.25
26	09.21 15.45	13.32-13.52/20 17.27	07.42 18.51	06.03 21.25	05.14 23.02	03.35 23.55	02.51 22.46	04.05 21.01	05.42 19.11	07.12 16.26	07.41 14.53	13.07-13.27/20 14.26
27	09.18 15.49	13.33-13.52/19 17.30	07.38 18.54	06.00 21.29	05.10 23.05	03.32 23.54	02.53 22.43	04.08 20.57	05.45 19.07	07.15 16.23	07.45 14.51	13.08-13.27/19 14.27
28	09.15 15.52	13.33-13.51/18 17.33	07.35 18.57	05.56 21.32	05.07 23.08	03.29 23.53	02.54 22.40	04.11 20.54	05.48 19.03	07.18 16.20	07.48 14.49	13.09-13.27/18 14.28
29	09.13 15.55	13.34-13.50/16 17.36	07.32 20.00	05.53 21.35	05.03 23.11	03.26 23.52	02.55 22.37	04.14 20.50	05.51 19.00	07.21 16.16	07.51 14.46	13.10-13.26/16 14.29
30	09.10 15.59	13.36-13.49/13 17.39	07.29 20.03	05.50 21.38	05.00 23.14	03.24 23.51	02.57 22.34	04.18 20.47	05.54 18.56	07.23 16.13	07.54 14.44	13.12-13.23/11 14.31
31	09.07 16.02	13.38-13.47/9 17.42	07.26 20.06	06.46 21.38	06.46 23.17	03.21 23.51	02.57 22.30	04.21 20.43	05.57 19.00	07.57 16.10	08.00 14.44	14.33 14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	375	0	0	0	0	0	0	0	0	0	370	5

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 24 - PUU24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12 14.35	09.03 16.06	07.31 17.36	06.42 20.09	08.20-08.50/30 21.41	04.56 19.08-19.48/40 23.20 18.46-20.14/88
2	10.11 14.37	09.00 16.09	07.28 17.39	06.39 20.12	08.22-08.49/27 21.44	04.53 19.06-19.51/45 23.22 18.46-20.14/88
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	08.22-08.47/25 21.48	04.50 19.04-19.53/49 23.25 18.46-20.14/88
4	10.09 14.41	08.54 16.16	07.21 17.45	06.31 20.18	08.25-08.44/19 21.51	04.46 19.02-19.55/53 23.28 18.46-20.15/89
5	10.08 14.44	08.51 16.19	07.18 17.48	06.28 20.21	08.27-08.40/13 21.54	04.43 19.00-19.56/56 23.30 18.47-20.16/89
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	19.00-19.59/59 21.57	03.07 21.12-21.48/36 23.33 18.46-20.15/89
7	10.05 14.49	08.45 16.25	07.11 17.54	06.21 20.27	18.58-20.00/62 22.01	03.05 21.12-21.48/36 23.35 18.46-20.16/90
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	18.57-20.01/64 22.04	03.03 21.13-21.48/35 23.38 18.47-20.16/89
9	10.01 14.54	08.38 16.32	07.04 18.00	06.14 20.33	18.56-20.02/66 22.07	03.01 21.13-21.48/35 23.40 18.47-20.16/89
10	10.00 14.56	08.35 16.35	07.00 18.04	06.10 20.36	18.54-20.03/69 22.10	02.57 21.14-21.49/35 23.42 18.47-20.16/89
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	18.53-20.03/70 22.14	02.56 21.14-21.48/34 23.44 18.47-20.17/90
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	21.20-21.27/7 22.17 18.53-20.05/72	02.54 21.14-21.48/34 23.46 18.47-20.17/90
13	09.54 15.05	08.25 16.45	06.49 07.37-07.46/9 18.13	06.00 20.45	21.17-21.30/13 22.20 18.52-20.05/73	02.53 21.15-21.49/34 23.47 18.48-20.17/89
14	09.52 15.08	08.22 16.48	06.46 07.32-07.50/18 18.16	05.56 20.48	21.15-21.31/16 22.23 18.51-20.06/75	02.52 21.15-21.49/34 23.49 18.47-20.17/90
15	09.49 15.11	08.19 16.52	06.42 07.30-07.53/23 18.18	05.52 20.51	21.14-21.33/19 22.27 18.51-20.07/76	02.51 21.16-21.50/34 23.50 18.48-20.18/90
16	09.47 15.14	08.16 16.55	06.39 07.27-07.54/27 18.21	05.49 20.54	21.13-21.35/22 22.30 18.50-20.07/77	02.50 21.15-21.49/34 23.52 18.48-20.18/90
17	09.45 15.17	08.12 16.58	06.35 07.25-07.55/30 18.24	05.45 20.57	21.12-21.37/25 22.33 18.49-20.07/78	02.50 21.16-21.49/33 23.53 18.48-20.18/90
18	09.42 15.20	08.09 17.01	06.32 07.24-07.56/32 18.27	05.42 21.00	21.11-21.39/28 22.36 18.49-20.08/79	02.49 21.16-21.50/34 23.54 18.48-20.18/90
19	09.40 15.23	08.05 17.05	06.28 07.23-07.56/33 18.30	05.38 21.03	21.10-21.40/30 22.40 18.48-20.08/80	02.49 21.17-21.50/33 23.54 18.49-20.19/90
20	09.37 15.26	08.02 17.08	06.25 07.22-07.57/35 18.33	05.35 21.06	21.10-21.41/31 22.43 18.48-20.09/81	02.49 21.17-21.50/33 23.55 18.49-20.19/90
21	09.35 15.29	07.59 17.11	06.21 07.21-07.57/36 18.36	05.31 21.10	21.10-21.43/33 22.46 18.48-20.10/82	02.49 21.17-21.50/33 23.55 18.49-20.19/90
22	09.32 15.33	07.55 17.14	06.18 07.21-07.58/37 18.39	05.28 21.13	21.09-21.43/34 22.49 18.47-20.10/83	02.49 21.17-21.50/33 23.55 18.49-20.19/90
23	09.29 15.36	07.52 17.17	06.14 07.20-07.57/37 18.42	05.24 21.16	21.09-21.44/35 22.52 18.47-20.11/84	02.50 21.18-21.51/33 23.55 18.50-20.20/90
24	09.27 15.39	07.49 17.20	06.11 07.19-07.57/38 18.45	05.21 21.19	21.10-21.44/34 22.56 18.47-20.11/84	02.50 21.18-21.51/33 23.55 18.50-20.20/90
25	09.24 15.42	07.45 17.24	06.07 07.19-07.57/38 18.48	05.17 21.22	21.10-21.45/35 22.59 18.47-20.12/85	02.51 21.18-21.52/34 23.55 18.50-20.20/90
26	09.21 15.46	07.42 17.27	06.03 07.18-07.56/38 18.51	05.14 21.25	21.10-21.45/35 23.02 18.47-20.12/85	02.52 21.18-21.51/33 23.54 18.50-20.20/90
27	09.18 15.49	07.38 17.30	06.00 07.19-07.56/37 18.54	05.10 21.28	21.10-21.46/36 23.05 18.46-20.13/87	02.53 21.18-21.52/34 23.54 18.50-20.20/90
28	09.15 15.52	07.35 17.33	05.56 07.18-07.55/37 18.57	05.07 21.32	19.21-19.39/18 23.08 18.46-20.13/87	02.55 21.18-21.52/34 23.53 18.51-20.21/90
29	09.12 15.56	07.32 17.36	05.53 08.19-08.55/36 20.00	05.03 21.35	19.16-19.44/28 23.11 18.46-20.13/87	02.56 21.18-21.53/35 23.52 18.51-20.21/90
30	09.09 15.59	07.29 17.39	05.50 08.19-08.53/34 20.03	05.00 21.38	19.12-19.47/35 23.14 18.46-20.13/87	02.58 21.18-21.53/35 23.51 18.51-20.21/90
31	09.06 16.02	07.26 17.42	05.47 08.20-08.52/32 20.06	04.57 21.41	21.10-21.47/37 23.17 18.46-20.13/87	02.58 21.18-21.53/35 23.51 18.51-20.21/90
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	607	195	2841	3719

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 24 - PUU24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 21.18-21.53/35	04.24 21.33-21.34/1	06.00	07.26	08.00	09.35
	23.49 18.51-20.21/90	22.27 19.03-20.14/71	20.39	18.53	16.07	14.43
2	03.01 21.18-21.53/35	04.28 19.04-20.14/70	06.03	07.29	08.04	09.38
	23.48 18.51-20.21/90	22.23	20.36	18.49	16.04	14.41
3	03.01 21.18-21.53/35	04.31 19.05-20.12/67	06.06	07.32	08.07	09.41
	23.46 18.51-20.21/90	22.20	20.32	18.46	16.00	14.39
4	03.03 21.18-21.54/36	04.34 19.06-20.11/65	06.09	07.35	08.10	09.44
	23.44 18.52-20.22/90	22.17	20.29	18.42	15.57	14.37
5	03.05 21.18-21.54/36	04.37 19.07-20.10/63	06.12	07.38	08.13	09.46
	23.43 18.52-20.21/89	22.13	20.25	18.39	15.54	14.35
6	03.08 21.18-21.54/36	04.40 19.08-20.08/60	06.15	07.41	08.16	09.49
	23.41 18.53-20.22/89	22.10	20.22	18.35	15.51	14.33
7	03.10 21.18-21.54/36	04.44 19.09-20.07/58	06.17 08.22-08.35/13	07.44	08.20	09.51
	23.39 18.52-20.21/89	22.07	20.18	18.32	15.48	14.32
8	03.12 21.18-21.54/36	04.47 19.11-20.06/55	06.20 08.19-08.38/19	07.47	08.23	09.53
	23.36 18.53-20.22/89	22.03	20.15	18.28	15.44	14.30
9	03.15 21.18-21.55/37	04.50 19.13-20.04/51	06.23 08.17-08.41/24	07.50	08.26	09.56
	23.34 18.53-20.22/89	22.00	20.11	18.25	15.41	14.29
10	03.18 21.19-21.55/36	04.53 19.14-20.01/47	06.26 08.14-08.41/27	07.53	08.29	09.58
	23.32 18.54-20.22/88	21.57	20.07	18.21	15.38	14.28
11	03.20 21.19-21.55/36	04.56 19.16-19.59/43	06.29 08.13-08.43/30	07.56	08.33	10.00
	23.29 18.54-20.22/88	21.53	20.04	18.18	15.35	14.27
12	03.23 21.19-21.55/36	04.59 19.18-19.57/39	06.32 08.12-08.44/32	07.59	08.36	10.02
	23.27 18.53-20.21/88	21.50	20.00	18.14	15.32	14.25
13	03.26 21.18-21.55/37	05.02 19.20-19.53/33	06.35 08.11-08.44/33	08.02	08.39	10.04
	23.24 18.54-20.21/87	21.46	19.57	18.11	15.29	14.25
14	03.29 21.19-21.55/36	05.06 19.24-19.50/26	06.38 08.10-08.45/35	08.05	08.42	10.05
	23.22 18.55-20.22/87	21.43	19.53	18.07	15.26	14.24
15	03.31 21.19-21.55/36	05.09 19.29-19.45/16	06.40 08.08-08.44/36	08.08	08.46	10.07
	23.19 18.55-20.22/87	21.39	19.50	18.04	15.23	14.23
16	03.34 21.19-21.55/36	05.12	06.43 08.07-08.45/38	08.11	08.49	10.08
	23.16 18.55-20.22/87	21.36	19.46	18.01	15.20	14.23
17	03.37 21.19-21.55/36	05.15	06.46 08.07-08.45/38	08.14	08.52	10.10
	23.13 18.56-20.21/85	21.32	19.43	17.57	15.18	14.22
18	03.40 21.19-21.54/35	05.18	06.49 08.07-08.45/38	08.17	08.55	10.11
	23.10 18.56-20.21/85	21.29	19.39	17.54	15.15	14.22
19	03.43 21.20-21.55/35	05.21	06.52 08.06-08.45/39	08.20	08.59	10.12
	23.08 18.57-20.22/85	21.25	19.35	17.50	15.12	14.22
20	03.46 21.20-21.54/34	05.24	06.55 08.05-08.43/38	08.23	09.02	10.13
	23.05 18.57-20.21/84	21.22	19.32	17.47	15.09	14.22
21	03.50 21.19-21.53/34	05.27	06.58 08.05-08.43/38	08.26	09.05	10.14
	23.02 18.57-20.20/83	21.18	19.28	17.43	15.06	14.23
22	03.53 21.20-21.53/33	05.30	07.00 08.06-08.42/36	08.29	09.08	10.14
	22.59 18.58-20.21/83	21.15	19.25	17.40	15.04	14.23
23	03.56 21.20-21.52/32	05.33	07.03 08.06-08.41/35	08.32	09.11	10.15
	22.56 18.58-20.20/82	21.11	19.21	17.37	15.01	14.24
24	03.59 21.20-21.52/32	05.36	07.06 08.06-08.40/34	08.35	09.14	10.15
	22.52 18.58-20.19/81	21.08	19.18	17.33	14.59	14.24
25	04.02 21.21-21.50/29	05.39	07.09 08.07-08.39/32	07.38	09.18	10.15
	22.49 18.59-20.19/80	21.04	19.14	16.30	14.56	14.25
26	04.05 21.22-21.49/27	05.42	07.12 08.08-08.38/30	07.41	09.21	10.15
	22.46 18.59-20.18/79	21.01	19.11	16.27	14.54	14.26
27	04.08 21.23-21.47/24	05.45	07.15 08.08-08.35/27	07.44	09.24	10.15
	22.43 19.00-20.18/78	20.57	19.07	16.23	14.51	14.27
28	04.12 21.24-21.45/21	05.48	07.18 08.09-08.34/25	07.48	09.27	10.15
	22.40 19.01-20.18/77	20.54	19.03	16.20	14.49	14.28
29	04.15 21.25-21.42/17	05.51	07.21 08.11-08.31/20	07.51	09.30	10.15
	22.37 19.01-20.17/76	20.50	19.00	16.17	14.47	14.30
30	04.18 21.26-21.41/15	05.54	07.23 08.14-08.28/14	07.54	09.33	10.14
	22.33 19.02-20.16/74	20.47	18.56	16.13	14.45	14.31
31	04.21 21.28-21.38/10	05.57		07.57		10.13
	22.30 19.02-20.15/73	20.43		16.10		14.33
Potential sun hours	608	508	393	305	198	137
Sum of minutes with flicker	3611	765	731	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 25 - PUU25

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	06.13-06.39/26	03.19	02.59	04.24	06.00	07.26	08.00	09.35	
	14.35	16.05	17.36	20.09	21.41		23.20	23.49	22.27	20.39	18.53	16.07	14.42	
2	10.12	09.00	07.28	06.39	04.53	06.13-06.38/25	03.16	03.01	04.27	06.03	07.29	08.04	09.38	
	14.37	16.09	17.39	20.12	21.44		23.23	23.48	22.24	20.36	18.49	16.03	14.40	
3	10.10	08.57	07.24	06.35	04.50	06.14-06.37/23	03.14	03.01	04.31	06.06	07.32	08.07	09.41	
	14.39	16.12	17.42	20.15	21.48		23.25	23.46	22.20	20.32	18.46	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	06.15-06.36/21	03.11	03.03	04.34	06.09	07.35	08.10	09.44	
	14.41	16.15	17.45	20.18	21.51		23.28	23.45	22.17	20.29	18.42	15.57	14.37	
5	10.08	08.51	07.17	06.28	04.43	06.16-06.35/19	03.09	03.05	04.37	06.31-06.38/7	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54		23.31	23.43	22.14	20.25	18.39	15.54	14.35	
6	10.06	08.48	07.14	06.24	04.39	06.17-06.33/16	03.07	03.07	04.40	06.28-06.41/13	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57		23.33	23.41	22.10	20.22	18.35	15.51	14.33	
7	10.05	08.45	07.11	06.21	04.36	06.19-06.30/11	03.05	03.10	04.43	06.26-06.43/17	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01		23.35	23.39	22.07	20.18	18.32	15.47	14.32	
8	10.03	08.42	07.07	06.17	04.33	06.23-06.26/3	03.03	03.12	04.47	06.24-06.44/20	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04		23.38	23.36	22.03	20.15	18.28	15.44	14.30	
9	10.02	08.38	07.04	06.14	04.29		03.01	03.15	04.50	06.23-06.46/23	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07		23.40	23.34	22.00	20.11	18.25	15.41	14.29	
10	10.00	08.35	07.00	06.10	04.26		02.57	03.17	04.53	06.22-06.46/24	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10		23.42	23.32	21.57	20.07	18.21	15.38	14.27	
11	09.58	08.32	06.56	06.07	04.22		02.56	03.20	04.56	06.21-06.47/26	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14		23.44	23.29	21.53	20.04	18.18	15.35	14.26	
12	09.56	08.29	06.53	06.03	04.19		02.54	03.23	04.59	06.21-06.48/27	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17		23.46	23.27	21.50	20.00	18.14	15.32	14.25	
13	09.54	08.25	06.49	05.59	04.16		02.53	03.26	05.02	06.20-06.48/28	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20		23.48	23.24	21.46	19.57	18.11	15.29	14.24	
14	09.52	08.22	06.46	05.56	04.13		02.52	03.28	05.05	06.19-06.48/29	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23		23.49	23.22	21.43	19.53	18.07	15.26	14.24	
15	09.49	08.19	06.42	05.52	04.09		02.51	03.31	05.09	06.19-06.48/29	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27		23.51	23.19	21.39	19.50	18.04	15.23	14.23	
16	09.47	08.16	06.39	05.49	06.25-06.33/8	04.06	02.50	03.34	05.12	06.19-06.48/29	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30		23.52	23.16	21.36	19.46	18.00	15.20	14.23	
17	09.45	08.12	06.35	05.45	06.20-06.35/15	04.03	02.49	03.37	05.15	06.18-06.47/29	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33		23.53	23.13	21.32	19.43	17.57	15.17	14.22	
18	09.42	08.09	06.32	05.42	06.18-06.37/19	04.00	02.49	03.40	05.18	06.18-06.47/29	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36		23.54	23.11	21.29	19.39	17.54	15.15	14.22	
19	09.40	08.05	06.28	05.38	06.17-06.39/22	03.57	02.49	03.43	05.21	06.18-06.47/29	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40		23.55	23.08	21.25	19.35	17.50	15.12	14.22	
20	09.37	08.02	06.25	05.35	06.15-06.39/24	03.53	02.49	03.46	05.24	06.18-06.47/29	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43		23.55	23.05	21.22	19.32	17.47	15.09	14.22	
21	09.35	07.59	06.21	05.31	06.14-06.40/26	03.50	02.49	03.49	05.27	06.18-06.45/27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46		23.55	23.02	21.18	19.28	17.43	15.06	14.22	
22	09.32	07.55	06.18	05.28	06.13-06.41/28	03.47	02.49	03.52	05.30	06.19-06.44/25	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49		23.56	22.59	21.15	19.25	17.40	15.04	14.23	
23	09.29	07.52	06.14	05.24	06.13-06.41/28	03.44	02.49	03.56	05.33	06.20-06.43/23	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52		23.56	22.56	21.11	19.21	17.37	15.01	14.23	
24	09.27	07.49	06.11	05.21	06.12-06.41/29	03.41	02.50	03.59	05.36	06.21-06.42/21	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56		23.55	22.53	21.08	19.18	17.33	14.59	14.24	
25	09.24	07.45	06.07	05.17	06.11-06.41/30	03.38	02.51	04.02	05.39	06.21-06.40/19	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59		23.55	22.49	21.04	19.14	16.30	14.56	14.25	
26	09.21	07.42	06.03	05.14	06.11-06.41/30	03.35	02.52	04.05	05.42	06.23-06.38/15	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02		23.55	22.46	21.01	19.11	16.26	14.54	14.26	
27	09.18	07.38	06.00	05.10	06.11-06.41/30	03.32	02.53	04.08	05.45	06.27-06.34/7	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05		23.54	22.43	20.57	19.07	16.23	14.51	14.27	
28	09.15	07.35	05.56	05.07	06.11-06.41/30	03.30	02.54	04.11	05.48	07.18	07.48	09.27	10.15	
	15.52	17.33	18.57	21.32	23.08		23.53	22.40	20.54	19.03	16.20	14.49	14.28	
29	09.12		06.53	05.03	06.12-06.40/28	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15	
	15.55		20.00	21.35	23.11		23.52	22.37	20.50	19.00	16.17	14.47	14.30	
30	09.09		06.49	05.00	06.12-06.40/28	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14	
	15.59		20.03	21.38	23.14		23.51	22.33	20.47	18.56	16.13	14.45	14.31	
31	09.06		06.46		03.21			04.21	05.57		07.57		10.13	
	16.02		20.06		23.17			22.30	20.43		16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	
Sum of minutes with flicker	0	0	0	375	144	0	0	525	0	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 26 - PUU26

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 27 - PUU27

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12	07.32	05.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55	17.36	19.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10	07.30	05.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59	17.39	19.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07	07.27	05.46	05.00	03.21	02.58	04.21	05.57	07.26	07.57	09.36	10.14
	16.02	17.48	19.11	21.41	23.17	23.50	22.30	20.43	18.63	16.10	14.44	14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	484	0	0	0	0	0	0	0	0	326	0	159

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 28 - PUU28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	
1	10.13 14.35	09.04 14.32-14.53/21 16.05 11.28-12.00/32	13.15-13.31/16	07.31 17.36	06.42 20.09	04.56 21.41	03.18 23.20
2	10.12 14.37	09.00 14.32-14.53/21 16.08 11.29-12.00/31	13.17-13.29/12	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.23
3	10.11 14.39	08.57 14.33-14.53/20 16.12 11.29-11.59/30	13.21-13.25/4	07.24 17.42	06.35 20.15	04.49 21.48	03.13 23.26
4	10.10 14.41	08.54 14.33-14.52/19 16.15 11.30-11.58/28		07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28
5	10.08 14.43	08.51 14.34-14.52/18 16.18 11.30-11.58/28		07.17 17.48	06.28 20.21	04.42 21.54	03.08 23.31
6	10.07 14.45	08.48 14.35-14.51/16 16.22 11.31-11.57/26		07.14 17.51	06.24 20.24	04.39 21.57	03.06 23.33
7	10.05 14.48	08.45 14.37-14.50/13 16.25 11.33-11.56/23		07.10 17.54	06.21 20.27	04.36 22.01	03.04 23.36
8	10.04 13.14-13.17/3 14.50	08.42 14.39-14.48/9 16.28 11.34-11.55/21		07.07 17.57	06.17 20.30	04.32 22.04	03.02 23.38
9	10.02 13.11-13.19/8 14.53	08.38 11.36-11.53/17 16.32		07.03 18.00	06.13 20.33	04.29 22.07	03.00 23.40
10	10.00 13.10-13.21/11 14.56	08.35 11.39-11.49/10 16.35		07.00 18.03	06.10 20.36	04.25 22.10	02.57 23.43
11	09.58 13.09-13.23/14 14.59	08.32 16.38		06.56 18.06	06.06 20.39	04.22 22.14	02.55 23.45
12	09.56 11.34-11.43/9 15.01 13.09-13.25/16	08.29 16.42		06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.46
13	09.54 11.32-11.45/13 15.04 13.08-13.26/18	08.25 16.45		06.49 18.12	05.59 20.45	04.16 22.20	02.52 23.48
14	09.52 11.31-11.47/16 15.07 13.09-13.27/18	08.22 16.48		06.46 18.15	05.56 20.48	04.12 22.24	02.51 23.50
15	09.50 11.30-11.48/18 15.10 13.08-13.28/20	08.19 16.51		06.42 18.18	05.52 20.51	04.09 22.27	02.50 23.51
16	09.47 11.29-11.50/21 15.13 13.08-13.29/21	08.16 16.55		06.39 18.21	05.49 20.54	04.06 22.30	02.49 23.52
17	09.45 11.29-11.51/22 15.16 13.08-13.30/22	08.12 16.58		06.35 18.24	05.45 20.57	04.02 22.33	02.49 23.53
18	09.42 11.28-11.52/24 15.19 13.07-13.30/23	08.09 17.01		06.32 18.27	05.42 21.00	03.59 22.37	02.48 23.54
19	09.40 11.27-11.53/26 15.22 13.07-13.31/24	08.06 17.04		06.28 18.30	05.38 21.03	03.56 22.40	02.48 23.55
20	09.37 11.27-11.54/27 15.26 13.07-13.31/24	08.02 17.08		06.25 18.33	05.35 21.07	03.53 22.43	02.48 23.56
21	09.35 11.27-11.55/28 15.29 13.08-13.32/24	07.59 17.11		06.21 18.36	05.31 21.10	03.50 22.46	02.48 23.56
22	09.32 11.27-11.56/29 15.32 13.08-13.32/24	07.55 17.14		06.18 18.39	05.27 21.13	03.47 22.50	02.48 23.56
23	09.30 11.27-11.57/30 15.35 13.08-13.33/25	07.52 17.17		06.14 18.42	05.24 21.16	03.44 22.53	02.49 23.56
24	09.27 14.34-14.39/5 13.08-13.33/25 15.39 11.27-11.57/30	07.49 17.20		06.10 18.45	05.20 21.19	03.41 22.56	02.49 23.56
25	09.24 14.33-14.44/11 13.09-13.33/24 15.42 11.27-11.58/31	07.45 17.23		06.07 18.48	05.17 21.22	03.38 22.59	02.50 23.56
26	09.21 14.32-14.48/16 13.09-13.33/24 15.45 11.27-11.58/31	07.42 17.26		06.03 18.51	05.13 21.25	03.35 23.02	02.51 23.55
27	09.18 14.32-14.51/19 13.10-13.33/23 15.49 11.27-11.59/32	07.38 17.30		06.00 18.54	05.10 21.28	03.32 23.05	02.52 23.54
28	09.15 14.31-14.51/20 13.10-13.33/23 15.52 11.27-11.59/32	07.35 17.33		05.56 18.57	05.06 21.32	03.29 23.08	02.54 23.53
29	09.12 14.31-14.52/21 13.11-13.32/21 15.55 11.27-11.59/32			06.53 20.00	05.03 21.35	03.26 23.11	02.55 23.52
30	09.10 14.31-14.52/21 13.12-13.32/20 15.58 11.27-11.59/32			06.49 20.03	05.00 21.38	03.24 23.14	02.57 23.51
31	09.07 14.31-14.52/21 13.13-13.31/18 16.02 11.27-11.59/32			06.46 20.06		03.21 23.17	
Potential sun hours	171	238		363	451	570	625
Sum of minutes with flicker	1122	415		0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 28 - PUU28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.58	04.24	06.00	07.26	08.00	11.08-11.19/11
	23.50	22.27	20.39	18.53	16.06	09.36 12.51-13.05/14
2	03.00	04.27	06.03	07.29	08.04	11.05-11.22/17
	23.48	22.24	20.36	18.49	16.03	09.38 12.53-13.05/12
3	03.00	04.30	06.06	07.32	08.07	14.08-14.18/10
	23.47	22.20	20.32	18.46	16.00	11.03-11.25/22
4	03.02	04.34	06.08	07.35	08.10	14.06-14.20/14
	23.45	22.17	20.29	18.42	15.57	11.02-11.26/24
5	03.05	04.37	06.11	07.38	08.13	14.05-14.21/16
	23.43	22.14	20.25	18.39	15.54	11.01-11.27/26
6	03.07	04.40	06.14	07.41	08.17	14.04-14.22/18
	23.41	22.10	20.22	18.35	15.50	11.01-11.28/27
7	03.09	04.43	06.17	07.44	08.20	14.04-14.23/19
	23.39	22.07	20.18	18.32	15.47	11.00-11.29/29
8	03.12	04.46	06.20	07.47	08.23	14.03-14.24/21
	23.37	22.03	20.15	18.28	15.44	11.00-11.30/30
9	03.14	04.49	06.23	07.50	08.26	14.03-14.24/21
	23.35	22.00	20.11	18.25	15.41	10.59-11.30/31
10	03.17	04.53	06.26	07.53	08.30	14.03-14.24/21
	23.32	21.57	20.07	18.21	15.38	10.59-11.31/32
11	03.19	04.56	06.29	07.56	08.33	14.03-14.24/21
	23.30	21.53	20.04	18.18	15.35	10.59-11.31/32
12	03.22	04.59	06.32	07.59	08.36	14.03-14.24/21
	23.27	21.50	20.00	18.14	15.32	10.59-11.31/32
13	03.25	05.02	06.35	08.02	08.39	14.03-14.24/21
	23.25	21.46	19.57	18.11	15.29	10.59-11.31/32
14	03.28	05.05	06.37	08.05	08.43	14.03-14.23/20
	23.22	21.43	19.53	18.07	15.26	10.59-11.32/33
15	03.31	05.08	06.40	08.08	08.46	14.05-14.24/19
	23.19	21.39	19.50	18.04	15.23	10.59-11.31/32
16	03.34	05.11	06.43	08.11	08.49	14.05-14.21/16
	23.17	21.36	19.46	18.00	15.20	10.59-11.31/32
17	03.37	05.14	06.46	08.14	08.52	14.06-14.16/10
	23.14	21.32	19.42	17.57	15.17	11.00-11.32/32
18	03.40	05.18	06.49	08.17	08.56	14.07-14.13/6
	23.11	21.29	19.39	17.53	15.14	11.01-11.31/30
19	03.43	05.21	06.52	08.20	08.59	11.01-11.31/30
	23.08	21.25	19.35	17.50	15.11	12.42-13.07/25
20	03.46	05.24	06.55	08.23	09.02	11.02-11.31/29
	23.05	21.22	19.32	17.47	15.09	12.43-13.07/24
21	03.49	05.27	06.57	08.26	09.05	11.02-11.30/28
	23.02	21.18	19.28	17.43	15.06	12.44-13.08/24
22	03.52	05.30	07.00	08.29	09.08	11.03-11.30/27
	22.59	21.15	19.25	17.40	15.03	12.44-13.07/23
23	03.55	05.33	07.03	08.32	09.12	11.04-11.30/26
	22.56	21.11	19.21	17.36	15.01	12.44-13.08/24
24	03.58	05.36	07.06	08.35	09.15	11.06-11.30/24
	22.53	21.08	19.18	17.33	14.58	12.45-13.08/23
25	04.02	05.39	07.09	07.38	09.18	11.06-11.29/23
	22.50	21.04	19.14	16.30	14.56	12.45-13.07/22
26	04.05	05.42	07.12	07.41	09.21	11.07-11.28/21
	22.46	21.01	19.10	16.26	14.53	12.46-13.07/21
27	04.08	05.45	07.15	07.45	09.24	11.09-11.27/18
	22.43	20.57	19.07	16.23	14.51	12.47-13.07/20
28	04.11	05.48	07.18	07.48	09.27	11.10-11.26/16
	22.40	20.54	19.03	16.20	14.49	12.48-13.06/18
29	04.14	05.51	07.20	07.51	09.30	11.12-11.25/13
	22.37	20.50	19.00	16.16	14.46	12.49-13.06/17
30	04.17	05.54	07.23	07.54	09.33	11.15-11.24/9
	22.34	20.47	18.56	16.13	14.44	12.51-13.06/15
31	04.21	05.57		07.57		
	22.30	20.43		16.10		
Potential sun hours	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	1512	39

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 29 - PUU29

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	08.01-08.08/7	04.56 21.41	03.19 23.20	02.59 23.49	04.24 22.27	06.00 20.39	07.26 18.53	08.00 16.07	09.35 14.42	
2	10.11 14.37	09.00 16.09	07.28 17.39	06.39 20.12		04.53 21.44	03.16 23.22	03.01 23.48	04.28 22.23	06.03 20.36	07.29 18.49	08.03 16.03	09.38 14.40	
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15		04.50 21.48	03.14 23.25	03.01 23.46	04.31 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38	
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18		04.46 21.51	03.11 23.28	03.03 23.44	04.34 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.43 14.37	
5	10.08 14.44	08.51 16.19	07.17 17.48	06.28 20.21		04.43 21.54	03.09 23.30	03.05 23.43	04.37 22.13	06.12 20.25	07.38 18.39	08.13 15.54	09.46 14.35	
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24		04.39 21.57	03.07 23.33	03.08 23.41	04.40 22.10	06.15 20.22	07.41 18.35	08.16 15.51	09.49 14.33	
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27		04.36 22.00	03.05 23.35	03.10 23.38	04.43 22.07	06.17 20.18	07.44 18.32	08.20 15.48	09.51 14.32	
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30		04.33 22.04	03.03 23.38	03.12 23.36	04.47 22.03	06.20 20.15	07.47 18.28	08.23 15.44	09.53 14.30	
9	10.01 14.54	08.38 16.32	07.03 18.00	06.14 20.33		04.29 22.07	03.01 23.40	03.15 23.34	04.50 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.29	
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36		04.26 22.10	02.57 23.42	03.17 23.32	04.53 21.56	06.26 20.07	07.53 18.21	08.29 15.38	09.58 14.28	
11	09.58 14.59	08.32 16.39	06.56 18.06	06.07 20.39		04.23 22.14	02.56 23.44	03.20 23.29	04.56 21.53	06.29 20.04	07.54-08.00/6	07.56 18.18	08.33 15.35	10.00 14.26
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42		04.19 22.17	02.54 23.46	03.23 23.27	04.59 21.50	06.32 20.00	07.50-08.04/14	07.59 18.14	08.36 15.32	10.02 14.25
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45		04.16 22.20	02.53 23.47	03.26 23.24	05.02 21.46	06.35 19.57	07.48-08.06/18	08.02 18.11	08.39 15.29	10.04 14.25
14	09.51 15.08	08.22 16.48	06.46 18.15	05.56 20.48		04.13 22.23	02.52 23.49	03.28 23.22	05.05 21.43	06.38 19.53	07.47-08.07/20	08.05 18.07	08.42 15.26	10.05 14.24
15	09.49 15.11	08.19 16.52	06.42 18.18	05.52 20.51		04.09 22.27	02.51 23.50	03.31 23.19	05.09 21.39	06.40 19.50	07.45-08.07/22	08.08 18.04	08.46 15.23	10.07 14.23
16	09.47 15.14	08.15 16.55	06.39 18.21	05.49 20.54		04.06 22.30	02.50 23.52	03.34 23.16	05.12 21.36	06.43 19.46	07.44-08.07/23	08.11 18.00	08.49 15.20	10.08 14.23
17	09.45 15.17	08.12 16.58	06.35 18.24	05.45 20.57	07.07-07.14/7	04.03 22.33	02.50 23.53	03.37 23.13	05.15 21.32	06.46 19.42	07.43-08.08/25	08.14 17.57	08.52 15.17	10.10 14.22
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	07.04-07.17/13	04.00 22.36	02.49 23.54	03.40 23.10	05.18 21.29	06.49 19.39	07.43-08.08/25	08.17 17.54	08.55 15.15	10.11 14.22
19	09.40 15.23	08.05 17.05	06.28 18.30	05.38 21.03	07.00-07.18/18	03.57 22.40	02.49 23.54	03.43 23.08	05.21 21.25	06.52 19.35	07.43-08.08/25	08.20 17.50	08.59 15.12	10.12 14.22
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	06.59-07.20/21	03.53 22.43	02.49 23.55	03.46 23.05	05.24 21.22	06.55 19.32	07.41-08.06/25	08.23 17.47	09.02 15.09	10.13 14.22
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	06.57-07.20/23	03.50 22.46	02.49 23.55	03.49 23.02	05.27 21.18	06.58 19.28	07.42-08.06/24	08.26 17.43	09.05 15.06	10.14 14.22
22	09.32 15.33	07.55 17.14	06.18 18.39	05.28 21.13	06.57-07.21/24	03.47 22.49	02.49 23.55	03.53 22.59	05.30 21.15	07.00 19.25	07.42-08.05/23	08.29 17.40	09.08 15.04	10.14 14.23
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	06.56-07.20/24	03.44 22.52	02.50 23.55	03.56 22.55	05.33 21.11	07.03 19.21	07.42-08.04/22	08.32 17.37	09.11 15.01	10.15 14.23
24	09.27 15.39	07.48 17.20	06.11 18.45	05.21 21.19	06.55-07.20/25	03.41 22.55	02.50 23.55	03.59 22.52	05.36 21.08	07.06 19.18	07.43-08.03/20	08.35 17.33	09.14 14.59	10.15 14.24
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	06.55-07.20/25	03.38 22.59	02.51 23.55	04.02 22.49	05.39 21.04	07.09 19.14	07.46-08.01/15	07.38 16.30	09.18 14.56	10.15 14.25
26	09.21 15.46	07.42 17.27	06.03 18.51	05.14 21.25	06.55-07.19/24	03.35 23.02	02.52 23.54	04.05 22.46	05.42 21.01	07.12 19.11	07.49-07.58/9	07.41 16.26	09.21 14.54	10.15 14.26
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	06.55-07.19/24	03.32 23.05	02.53 23.54	04.08 22.43	05.45 20.57	07.15 19.07		07.44 16.23	09.24 14.51	10.15 14.27
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	06.55-07.17/22	03.30 23.08	02.54 23.53	04.12 22.40	05.48 20.54	07.18 19.03		07.48 16.20	09.27 14.49	10.15 14.28
29	09.12 15.56		06.53 20.00	05.03 21.35	07.56-08.17/21	03.27 23.11	02.56 23.52	04.15 22.37	05.51 20.50	07.21 19.00		07.51 16.17	09.30 14.47	10.15 14.30
30	09.09 15.59		06.49 20.03	05.00 21.38	07.57-08.14/17	03.24 23.14	02.58 23.51	04.18 22.33	05.54 20.47	07.23 18.56		07.54 16.13	09.32 14.45	10.14 14.31
31	09.06 16.02		06.46 20.06	05.00 21.38	07.59-08.13/14	03.21 23.17	03.21 23.17	04.21 22.30	05.57 20.43	18.56		07.57 16.10	09.31 14.43	10.13 14.33
Potential sun hours	171	238	363	451	7	570	624	608	508	393	316	305	198	0
Sum of minutes with flicker	0	0	302	7	0	0	0	0	0	316	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 30 - PUU30

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	06.39-06.43/4	07.26	08.00	09.35	
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39		18.53	16.07	14.42	
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03		07.29	08.04	09.38	
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36		18.49	16.03	14.40	
3	10.10	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06		07.32	08.07	09.41	
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32		18.46	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09		07.35	08.10	09.44	
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29		18.42	15.57	14.37	
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12		07.38	08.13	09.46	
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25		18.39	15.54	14.35	
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14		07.41	08.16	09.49	
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22		18.35	15.51	14.33	
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17		07.44	08.20	09.51	
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18		18.32	15.47	14.31	
8	10.03	08.42	07.07	06.17	04.32	03.03	03.12	04.47	06.20		07.47	08.23	09.53	
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15		18.28	15.44	14.30	
9	10.02	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23		07.50	08.26	09.56	
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11		18.25	15.41	14.29	
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26		07.53	08.29	09.58	
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07		18.21	15.38	14.27	
11	09.58	08.32	06.56	06.06	06.40-06.44/4	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00	
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04		18.18	15.35	14.26	
12	09.56	08.29	06.53	06.03	06.36-06.45/9	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02	
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00		18.14	15.32	14.25	
13	09.54	08.25	06.49	05.59	06.33-06.47/14	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04	
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57		18.11	15.29	14.24	
14	09.52	08.22	06.46	05.56	06.29-06.46/17	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05	
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53		18.07	15.26	14.24	
15	09.49	08.19	06.42	05.52	06.27-06.47/20	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07	
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50		18.04	15.23	14.23	
16	09.47	08.15	06.39	05.49	06.27-06.48/21	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08	
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46		18.00	15.20	14.23	
17	09.45	08.12	06.35	05.45	06.26-06.47/21	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10	
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42		17.57	15.17	14.22	
18	09.42	08.09	06.32	05.42	06.26-06.47/21	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11	
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39		17.54	15.15	14.22	
19	09.40	08.05	06.28	05.38	06.26-06.47/21	03.56	02.49	03.43	05.21	06.36-06.46/10	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35		17.50	15.12	14.22	
20	09.37	08.02	06.25	05.35	06.26-06.45/19	03.53	02.49	03.46	05.24	06.34-06.48/14	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32		17.47	15.09	14.22	
21	09.35	07.59	06.21	05.31	06.26-06.44/18	03.50	02.49	03.49	05.27	06.32-06.48/16	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28		17.43	15.06	14.22	
22	09.32	07.55	06.18	05.28	06.27-06.43/16	03.47	02.49	03.52	05.30	06.31-06.49/18	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25		17.40	15.04	14.23	
23	09.29	07.52	06.14	05.24	06.29-06.42/13	03.44	02.49	03.56	05.33	06.30-06.50/20	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21		17.37	15.01	14.23	
24	09.27	07.48	06.10	05.21	06.30-06.39/9	03.41	02.50	03.59	05.36	06.30-06.50/20	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18		17.33	14.59	14.24	
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	06.28-06.49/21	07.09	07.38	09.18	10.15	
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14		16.30	14.56	14.25	
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	06.28-06.49/21	07.12	07.41	09.21	10.15	
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10		16.26	14.54	14.26	
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	06.28-06.49/21	07.15	07.44	09.24	10.15	
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07		16.23	14.51	14.27	
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	06.29-06.49/20	07.18	07.48	09.27	10.15	
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03		16.20	14.49	14.28	
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	06.30-06.47/17	07.21	07.51	09.30	10.15	
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00		16.16	14.47	14.30	
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	06.33-06.46/13	07.23	07.54	09.33	10.14	
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56		16.13	14.44	14.31	
31	09.06		06.46		03.21		04.21	05.57	06.36-06.45/9		07.57		10.13	
	16.02		20.06		23.17		22.30	20.43			16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	0	137	
Sum of minutes with flicker	0	0	0	223	0	0	0	220	4	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 31 - PUU31

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 32 - PUU32

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 33 - PUU33

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	
1	10.13 14.35	09.03 13.32-13.43/11 16.05 10.08-10.33/25	12.01-12.10/9	07.31 17.36	06.42 20.09	04.56 21.41	03.18 23.20
2	10.12 14.37	09.00 10.08-10.33/25 16.08		07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.23
3	10.11 14.39	08.57 10.07-10.33/26 16.12		07.24 17.42	06.35 20.15	04.49 21.48	03.13 23.26
4	10.09 14.41	08.54 10.07-10.34/27 16.15		07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28
5	10.08 11.54-11.59/5 14.43	08.51 10.07-10.34/27 16.18		07.17 17.48	06.28 20.21	04.42 21.54	03.08 23.31
6	10.07 11.52-12.01/9 14.45	08.48 10.07-10.34/27 16.22		07.14 17.51	06.24 20.24	04.39 21.57	03.06 23.33
7	10.05 11.52-12.03/11 14.48	08.45 10.08-10.35/27 16.25		07.10 17.54	06.21 20.27	04.36 22.01	03.04 23.36
8	10.03 11.52-12.05/13 14.50	08.42 10.08-10.34/26 16.28		07.07 17.57	06.17 20.30	04.32 22.04	03.02 23.38
9	10.02 11.50-12.05/15 14.53	08.38 10.08-10.34/26 16.32		07.03 18.00	06.13 20.33	04.29 22.07	03.00 23.40
10	10.00 13.23-13.29/6 14.56 11.50-12.07/17	08.35 10.08-10.33/25 16.35		07.00 18.03	06.10 20.36	04.25 22.10	02.57 23.42
11	09.58 13.23-13.34/11 14.58 11.50-12.07/17	08.32 10.09-10.32/23 16.38		06.56 18.06	06.06 20.39	04.22 22.14	02.55 23.44
12	09.56 13.23-13.40/17 15.01 11.50-12.09/19	08.29 10.10-10.32/22 16.42		06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.46
13	09.54 13.22-13.40/18 15.04 11.49-12.10/21	08.25 10.11-10.31/20 16.45		06.49 18.12	05.59 20.45	04.15 22.20	02.52 23.48
14	09.52 13.23-13.42/19 15.07 11.50-12.11/21	08.22 10.13-10.29/16 16.48		06.46 18.15	05.56 20.48	04.12 22.24	02.51 23.50
15	09.50 13.22-13.42/20 15.10 11.49-12.11/22	08.19 10.15-10.26/11 16.51		06.42 18.18	05.52 20.51	04.09 22.27	02.50 23.51
16	09.47 13.22-13.43/21 15.13 11.49-12.12/23	08.15 16.55		06.39 18.21	05.49 20.54	04.06 22.30	02.49 23.52
17	09.45 13.22-13.44/22 15.16 11.50-12.13/23	08.12 16.58		06.35 18.24	05.45 20.57	04.02 22.33	02.49 23.53
18	09.42 13.21-13.44/23 15.19 11.49-12.13/24	08.09 17.01		06.32 18.27	05.42 21.00	03.59 22.37	02.48 23.54
19	09.40 13.22-13.45/23 15.22 11.49-12.14/25	08.05 17.04		06.28 18.30	05.38 21.03	03.56 22.40	02.48 23.55
20	09.37 13.22-13.46/24 15.26 11.50-12.14/24	08.02 17.07		06.25 18.33	05.34 21.06	03.53 22.43	02.48 23.56
21	09.35 13.22-13.46/24 15.29 11.50-12.15/25	07.59 17.11		06.21 18.36	05.31 21.10	03.50 22.46	02.48 23.56
22	09.32 13.23-13.46/23 15.32 11.50-12.15/25	07.55 17.14		06.17 18.39	05.27 21.13	03.47 22.49	02.48 23.56
23	09.29 13.23-13.47/24 15.35 11.51-12.15/24	07.52 17.17		06.14 18.42	05.24 21.16	03.44 22.53	02.49 23.56
24	09.27 13.23-13.47/24 15.39 11.51-12.15/24	07.48 17.20		06.10 18.45	05.20 21.19	03.41 22.56	02.49 23.56
25	09.24 13.24-13.47/23 15.42 11.52-12.15/23	07.45 17.23		06.07 18.48	05.17 21.22	03.38 22.59	02.50 23.56
26	09.21 13.24-13.47/23 11.52-12.15/23 15.45 10.14-10.24/10	07.42 17.26		06.03 18.51	05.13 21.25	03.35 23.02	02.51 23.55
27	09.18 13.25-13.47/22 11.53-12.15/22 15.48 10.12-10.26/14	07.38 17.30		06.00 18.54	05.10 21.28	03.32 23.05	02.52 23.54
28	09.15 13.26-13.46/20 11.54-12.15/21 15.52 10.11-10.28/17	07.35 17.33		05.56 18.57	05.06 21.32	03.29 23.08	02.54 23.53
29	09.12 13.26-13.46/20 11.55-12.14/19 15.55 10.09-10.29/20			06.53 20.00	05.03 21.35	03.26 23.11	02.55 23.52
30	09.09 13.28-13.45/17 11.56-12.13/17 15.58 10.08-10.30/22			06.49 20.03	05.00 21.38	03.23 23.14	02.57 23.51
31	09.06 13.29-13.43/14 11.57-12.11/14 16.02 10.08-10.31/23			06.45 20.06		03.21 23.17	
Potential sun hours	171	238		363	451	570	625
Sum of minutes with flicker	1070	373		0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 33 - PUU33

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.58 23.50	04.24 22.27	06.00 20.39	07.26 18.53	08.00 16.06	09.36 14.42
2	03.00 23.48	04.27 22.24	06.03 20.36	07.29 18.49	08.04 16.03	09.38 14.40
3	03.00 23.47	04.30 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38
4	03.02 23.45	04.33 22.17	06.08 20.29	07.35 18.42	08.10 15.57	09.44 14.36
5	03.05 23.43	04.37 22.14	06.11 20.25	07.38 18.39	08.13 15.53	09.46 14.34
6	03.07 23.41	04.40 22.10	06.14 20.22	07.41 18.35	08.16 15.50	09.49 14.33
7	03.09 23.39	04.43 22.07	06.17 20.18	07.44 18.32	08.20 15.47	09.51 14.31
8	03.12 23.37	04.46 22.03	06.20 20.15	07.47 18.28	08.23 15.44	09.54 14.30
9	03.14 23.35	04.49 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.28
10	03.17 23.32	04.53 21.57	06.26 20.07	07.53 18.21	08.30 15.38	09.58 14.27
11	03.19 23.30	04.56 21.53	06.29 20.04	07.56 18.18	08.33 15.35	10.00 14.26
12	03.22 23.27	04.59 21.50	06.32 20.00	07.58 18.14	08.36 15.32	10.02 14.25
13	03.25 23.25	05.02 21.46	06.35 19.57	08.01 18.11	08.39 15.29	10.04 14.24
14	03.28 23.22	05.05 21.43	06.37 19.53	08.04 18.07	08.43 15.26	10.06 14.23
15	03.31 23.19	05.08 21.39	06.40 19.50	08.07 18.04	08.46 15.23	10.07 14.23
16	03.34 23.16	05.11 21.36	06.43 19.46	08.10 18.00	08.49 15.20	10.09 14.22
17	03.37 23.14	05.14 21.32	06.46 19.42	08.14 17.57	08.52 15.17	10.10 14.22
18	03.40 23.11	05.17 21.29	06.49 19.39	08.17 17.53	08.56 15.14	10.11 14.22
19	03.43 23.08	05.21 21.25	06.52 19.35	08.20 17.50	08.59 15.11	10.12 14.21
20	03.46 23.05	05.24 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	03.49 23.02	05.27 21.18	06.57 19.28	08.26 17.43	09.05 15.06	10.14 14.22
22	03.52 22.59	05.30 21.15	07.00 19.25	08.29 17.40	09.08 15.03	10.15 14.22
23	03.55 22.56	05.33 21.11	07.03 19.21	08.32 17.36	09.12 15.01	10.15 14.23
24	03.58 22.53	05.36 21.08	07.06 19.17	08.35 17.33	09.15 14.58	10.15 14.23
25	04.01 22.50	05.39 21.04	07.09 19.14	08.38 17.30	09.18 14.56	10.16 14.24
26	04.05 22.46	05.42 21.01	07.12 19.10	07.41 16.26	09.21 14.53	10.16 14.25
27	04.08 22.43	05.45 20.57	07.15 19.07	07.44 16.23	09.24 14.51	10.16 14.26
28	04.11 22.40	05.48 20.54	07.18 19.03	07.48 16.20	09.27 14.48	10.15 14.28
29	04.14 22.37	05.51 20.50	07.20 19.00	07.51 16.16	09.30 14.46	10.15 14.29
30	04.17 22.34	05.54 20.47	07.23 18.56	07.54 16.13	09.33 14.44	10.14 14.31
31	04.21 22.30	05.57 20.43		07.57 16.10		10.14 14.32
Potential sun hours	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	99	1255	106

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 34 - PUU34

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.19 23.20	04.18-04.34/16 23.49	02.59 23.49	04.19-04.45/26 22.27	04.24 20.39	07.26 18.53	08.00 16.07	09.35 14.42
2	10.11 14.37	09.00 16.09	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.22	04.17-04.35/18 23.48	03.01 23.48	04.19-04.44/25 22.23	04.27 20.36	07.29 18.49	08.03 16.03	09.38 14.40
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.48	03.14 23.25	04.16-04.35/19 23.46	03.01 23.46	04.19-04.44/25 22.20	04.31 20.32	07.32 18.46	08.07 16.00	09.41 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28	04.16-04.37/21 23.45	03.03 23.45	04.20-04.45/25 22.17	04.34 20.29	07.35 18.42	08.10 15.57	09.44 14.36
5	10.08 14.43	08.51 16.19	07.17 17.48	06.28 20.21	04.43 21.54	03.09 23.30	04.16-04.38/22 23.43	03.05 23.43	04.20-04.44/24 22.13	04.37 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	03.07 23.33	04.15-04.38/23 23.41	03.07 23.41	04.21-04.44/23 22.10	04.40 20.22	07.41 18.35	08.16 15.51	09.49 14.33
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	04.36 22.01	03.05 23.35	04.15-04.38/23 23.39	03.10 23.39	04.21-04.44/23 22.07	04.43 20.18	07.44 18.32	08.20 15.47	09.51 14.31
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	04.32 22.04	03.02 23.38	04.15-04.39/24 23.36	03.12 23.36	04.22-04.44/22 22.03	04.46 20.14	07.47 18.28	08.23 15.44	09.53 14.30
9	10.01 14.53	08.38 16.32	07.03 18.00	06.14 20.33	04.29 22.07	03.01 23.40	04.15-04.40/25 23.34	03.15 23.34	04.23-04.43/20 22.00	04.50 20.11	07.50 18.25	08.26 15.41	09.56 14.29
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	02.57 23.42	04.15-04.40/25 23.32	03.17 23.32	04.24-04.43/19 21.56	04.53 20.07	07.53 18.21	08.29 15.38	09.58 14.27
11	09.58 14.59	08.32 16.38	06.56 18.06	06.06 20.39	04.22 22.14	02.56 23.44	04.15-04.40/25 23.29	03.20 23.29	04.26-04.43/17 21.53	04.56 20.04	07.56 18.18	08.33 15.35	10.00 14.26
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.46	04.14-04.40/26 23.27	03.23 23.27	04.26-04.41/15 21.50	04.59 20.00	07.58 18.14	08.36 15.32	10.02 14.25
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20	02.53 23.48	04.15-04.41/26 23.24	03.25 23.24	04.28-04.40/12 21.46	05.02 19.57	08.01 18.11	08.39 15.29	10.04 14.24
14	09.52 15.07	08.22 16.48	06.46 18.15	05.56 20.48	04.12 22.23	02.52 23.49	04.15-04.41/26 23.22	03.28 23.22	04.31-04.39/8 21.43	05.05 19.53	08.04 18.07	08.42 15.26	10.05 14.24
15	09.49 15.10	08.19 16.52	06.42 18.18	05.52 20.51	04.09 22.27	02.51 23.51	04.15-04.42/27 23.19	03.31 23.19	05.08 21.39	06.40 19.50	08.07 18.04	08.46 15.23	10.07 14.23
16	09.47 15.13	08.15 16.55	06.39 18.21	05.49 20.54	04.06 22.30	02.50 23.52	04.15-04.42/27 23.16	03.34 23.16	05.12 21.36	06.43 19.46	08.10 18.00	08.49 15.20	10.08 14.22
17	09.45 15.17	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33	02.49 23.53	04.15-04.42/27 23.13	03.37 23.13	05.15 21.32	06.46 19.42	08.14 17.57	08.52 15.17	10.10 14.22
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	04.00 22.36	02.49 23.54	04.15-04.43/28 23.10	03.40 23.10	05.18 21.29	06.49 19.39	08.17 17.53	08.55 15.14	10.11 14.22
19	09.40 15.23	08.05 17.04	06.28 18.30	05.38 21.03	03.56 22.40	02.49 23.54	04.16-04.43/27 23.08	03.43 23.08	05.21 21.25	06.52 19.35	08.20 17.50	08.59 15.12	10.12 14.22
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	03.53 22.43	02.48 23.55	04.16-04.43/27 23.05	03.46 23.05	05.24 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	03.50 22.46	02.49 23.55	04.16-04.43/27 23.02	03.49 23.02	05.27 21.18	06.57 19.28	08.26 17.43	09.05 15.06	10.14 14.22
22	09.32 15.32	07.55 17.14	06.18 18.39	05.28 21.13	03.47 22.49	02.49 23.56	04.16-04.43/27 22.59	03.52 22.59	05.30 21.15	07.00 19.25	08.29 17.40	09.08 15.04	10.14 14.23
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.52	02.49 23.56	04.17-04.44/27 22.56	03.55 22.56	05.33 21.11	07.03 19.21	08.32 17.36	09.11 15.01	10.15 14.23
24	09.27 15.39	07.48 17.20	06.10 18.45	05.21 21.19	03.41 22.56	02.50 23.55	04.16-04.44/28 22.52	03.59 22.52	05.36 21.08	07.06 19.18	08.35 17.33	09.14 14.58	10.15 14.24
25	09.24 15.42	07.45 17.23	06.07 18.48	05.17 21.22	03.38 22.59	02.51 23.55	04.17-04.44/27 22.49	04.02 22.49	05.39 21.04	07.09 19.14	07.38 16.30	09.18 14.56	10.15 14.25
26	09.21 15.45	07.42 17.27	06.03 18.51	05.14 21.25	03.35 23.02	02.52 23.55	04.17-04.44/27 22.46	04.05 22.46	05.42 21.01	07.12 19.10	07.41 16.26	09.21 14.53	10.15 14.26
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	03.32 23.05	02.53 23.54	04.17-04.44/27 22.43	04.08 22.43	05.45 20.57	07.15 19.07	07.44 16.23	09.24 14.51	10.15 14.27
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	03.29 23.08	02.54 23.53	04.18-04.45/27 22.40	04.11 22.40	05.48 20.54	07.18 19.03	07.48 16.20	09.27 14.49	10.15 14.28
29	09.12 15.55	07.32 17.36	05.53 18.53	05.03 21.35	03.27 23.11	02.56 23.52	04.18-04.45/27 22.37	04.15 22.37	05.51 20.50	07.20 19.00	07.51 16.16	09.30 14.47	10.15 14.30
30	09.09 15.59	07.29 17.39	05.49 18.54	05.00 21.38	03.24 23.14	02.57 23.51	04.19-04.45/26 22.33	04.18 22.33	05.54 20.46	07.23 18.56	07.54 16.13	09.33 14.44	10.14 14.31
31	09.06 16.02	07.26 17.42	05.46 18.57	04.99 21.41	03.21 23.17	03.21 23.30	04.19-04.32/13 22.30	04.21 22.30	05.57 20.43	07.57 16.10	07.57 15.44	10.13 14.33	10.13 14.33
Potential sun hours	171	238	363	451	570	624	752	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	29	29	284	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 35 - PUU35

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 36 - PUU36

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 37 - PUU37

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.13	09.03 12.12-12.30/18	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00 10.12-10.20/8	09.36 11.47-12.07/20	
	14.35	16.05 10.34-10.59/25	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42	
2	10.12	09.00 12.14-12.29/15	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04 10.09-10.23/14	09.38 11.48-12.07/19	
	14.36	16.08 10.34-10.59/25	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40	
3	10.11	08.57 12.17-12.26/9	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07 10.08-10.25/17	09.41 11.49-12.06/17	
	14.39	16.12 10.35-10.58/23	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38	
4	10.09	12.11-12.13/2	08.54 10.35-10.58/23	07.21	06.31	04.46	03.11	03.02	04.33	06.08	08.10 10.07-10.26/19	09.44 11.50-12.05/15	
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36	
5	10.08	12.08-12.16/8	08.51 10.35-10.58/23	07.17	06.28	04.42	03.08	03.04	04.37	06.11	08.13 10.06-10.27/21	09.46 11.52-12.05/13	
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34	
6	10.07	12.07-12.18/11	08.48 10.36-10.57/21	07.14	06.24	04.39	03.06	03.07	04.40	06.14	08.16 10.06-10.28/22	09.49 11.54-12.05/11	
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33	
7	10.05	12.07-12.20/13	08.45 10.38-10.57/19	07.10	06.20	04.35	03.04	03.09	04.43	06.17	08.20 10.05-10.29/24	09.51 11.55-12.03/8	
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31	
8	10.03	12.07-12.21/14	08.42 10.39-10.55/16	07.07	06.17	04.32	03.02	03.11	04.46	06.20	08.23 11.47-11.57/10	09.54 11.58-12.01/3	
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.29	
9	10.02	12.05-12.22/17	08.38 10.40-10.53/13	07.03	06.13	04.29	03.00	03.14	04.49	06.23	08.26 11.44-11.59/15	09.56	
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.24	15.41	14.28	
10	10.00	12.05-12.23/18	08.35 10.43-10.50/7	07.00	06.10	04.25	02.56	03.17	04.52	06.26	08.29 11.43-12.01/18	09.58	
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27	
11	09.58	12.05-12.24/19	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33 11.42-12.02/20	10.00
	14.58	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26	
12	09.56	12.05-12.26/21	08.29 09.09-09.13/4	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36 11.41-12.03/22	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25	
13	09.54	12.04-12.26/22	08.25 09.05-09.16/11	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39 11.40-12.04/24	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24	
14	09.52	12.05-12.28/23	08.22 09.01-09.17/16	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43 11.39-12.04/25	10.06
	15.07	16.48	18.15	20.48	22.23	23.50	23.22	21.43	19.53	18.07	15.26	14.23	
15	09.49	12.04-12.28/24	08.19 09.00-09.18/18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07 09.35-09.47/12	10.07	
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.22	
16	09.47	12.04-12.29/25	08.15 09.00-09.20/20	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10 09.33-09.48/15	10.09	
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22	
17	09.45	12.05-12.30/25	08.12 08.59-09.20/21	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13 09.31-09.49/18	10.10	
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22	
18	09.42	12.04-12.30/26	08.09 08.58-09.20/22	06.32	05.41	03.59	02.48	03.40	05.17	06.49	08.17 09.31-09.51/20	10.11	
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.21	
19	09.40	12.04-12.31/27	08.05 08.58-09.21/23	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20 09.29-09.51/22	10.12	
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21	
20	09.37	12.04-12.31/27	08.02 08.58-09.21/23	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23 09.28-09.51/23	10.13	
	15.26	17.07	18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.46	15.09	14.21	
21	09.35	12.05-12.32/27	07.59 08.58-09.21/23	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26 09.28-09.51/23	10.14	
	15.29	10.39-10.48/9	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	14.22	
22	09.32	12.05-12.32/27	07.55 08.58-09.20/22	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29 09.28-09.51/23	10.15	
	15.32	10.38-10.50/12	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	14.22	
23	09.29	12.05-12.32/27	07.52 08.59-09.20/21	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32 09.28-09.51/23	10.15	
	15.35	10.36-10.52/16	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	14.23	
24	09.27	12.06-12.33/27	07.48 08.59-09.19/20	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35 09.28-09.50/22	10.15	
	15.38	10.36-10.53/17	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.23	
25	09.24	12.06-12.33/27	07.45 09.00-09.17/17	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38 08.29-08.50/21	10.16	
	15.42	10.35-10.54/19	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.24	
26	09.21	12.06-12.33/27	07.42 09.02-09.16/14	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41 08.29-08.49/20	10.16	
	15.45	10.34-10.55/21	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.25	
27	09.18	12.07-12.33/26	07.38 09.04-09.13/9	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44 08.30-08.48/18	10.16	
	15.48	10.34-10.56/22	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.26	
28	09.15	12.08-12.32/24	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.17	07.48 08.32-08.47/15	10.15	
	15.52	10.34-10.57/23	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.19	14.48	
29	09.12	12.08-12.32/24	07.32	05.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51 08.35-08.45/10	10.15	
	15.55	10.33-10.57/24	17.36	18.60	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	
30	09.09	12.09-12.31/22	07.29	05.49	05.03	03.23	02.57	04.17	05.54	07.23	07.54 08.39-08.41/2	10.14	
	15.58	10.33-10.57/24	17.32	18.53	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.31	
31	09.06	12.10-12.30/20	07.26	05.45	05.01	03.21	02.51	04.21	05.57	07.26	07.57	10.14	
	16.02	10.33-10.58/25	17.39	18.66	21.41	23.17	23.54	22.30	20.43	18.60	16.10	14.32	
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136	
Sum of minutes with flicker		812	521	0	0	0	0	0	0	287	950	106	

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 38 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.19 05.13-06.08/55 23.19
2	10.11 14.37	09.00 16.09	07.28 17.39	06.38 20.12	04.53 21.44	03.16 05.13-06.07/54 23.22
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 05.42-05.53/11 21.47	03.14 05.12-06.07/55 23.25
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 05.39-05.56/17 21.51	03.11 05.13-06.07/54 23.28
5	10.08 14.44	08.51 16.19	07.17 17.48	06.28 20.21	04.43 05.36-05.58/22 21.54	03.09 05.13-06.07/54 23.30
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 05.34-06.00/26 21.57	03.07 05.13-06.06/53 23.33
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	04.36 05.34-06.02/28 22.00	03.05 05.13-06.07/54 23.35
8	10.03 14.51	08.41 16.29	07.07 17.57	06.17 20.30	04.32 05.32-06.03/31 22.04	03.03 05.14-06.07/53 23.37
9	10.01 14.54	08.38 16.32	07.03 18.00	06.14 20.33	04.29 05.31-06.03/32 22.07	03.01 05.14-06.07/53 23.40
10	09.59 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 05.26-06.04/38 22.10	02.57 05.14-06.06/52 23.42
11	09.57 14.59	08.32 16.39	06.56 18.06	06.06 20.39	04.22 05.24-06.04/40 22.13	02.56 05.14-06.06/52 23.44
12	09.56 15.02	08.28 16.42	06.53 18.09	06.03 20.42	04.19 05.22-06.06/44 22.17	02.54 05.14-06.06/52 23.45
13	09.53 15.05	08.25 16.45	06.49 18.12	05.59 20.45	04.16 05.20-06.06/46 22.20	02.53 05.15-06.07/52 23.47
14	09.51 15.08	08.22 16.48	06.46 18.15	05.56 20.48	04.13 05.19-06.06/47 22.23	02.52 05.15-06.06/51 23.49
15	09.49 15.11	08.19 16.52	06.42 07.15-07.22/7 18.18	05.52 20.51	04.09 05.18-06.07/49 22.26	02.51 05.15-06.07/52 23.50
16	09.47 15.14	08.15 16.55	06.39 07.11-07.24/13 18.21	05.49 20.54	04.06 05.17-06.07/50 22.30	02.50 05.15-06.06/51 23.51
17	09.44 15.17	08.12 16.58	06.35 07.07-07.25/18 18.24	05.45 20.57	04.03 05.15-06.07/52 22.33	02.50 05.16-06.06/50 23.52
18	09.42 15.20	08.09 17.01	06.32 07.06-07.27/21 18.27	05.42 21.00	04.00 05.15-06.07/52 22.36	02.49 05.16-06.07/51 23.53
19	09.40 15.23	08.05 17.04	06.28 07.04-07.27/23 18.30	05.38 21.03	03.57 05.14-06.07/53 22.39	02.49 05.16-06.07/51 23.54
20	09.37 15.26	08.02 17.08	06.25 07.04-07.28/24 18.33	05.35 21.06	03.53 05.14-06.07/53 22.43	02.49 05.16-06.07/51 23.55
21	09.34 15.29	07.59 17.11	06.21 07.03-07.27/24 18.36	05.31 21.09	03.50 05.14-06.08/54 22.46	02.49 05.16-06.07/51 23.55
22	09.32 15.32	07.55 17.14	06.17 07.02-07.27/25 18.39	05.28 21.12	03.47 05.13-06.07/54 22.49	02.49 05.16-06.07/51 23.55
23	09.29 15.36	07.52 17.17	06.14 07.02-07.27/25 18.42	05.24 21.16	03.44 05.13-06.08/55 22.52	02.50 05.17-06.08/51 23.55
24	09.26 15.39	07.48 17.20	06.10 07.01-07.26/25 18.45	05.21 21.19	03.41 05.13-06.08/55 22.55	02.50 05.17-06.08/51 23.55
25	09.24 15.42	07.45 17.23	06.07 07.02-07.26/24 18.48	05.17 21.22	03.38 05.13-06.08/55 22.58	02.51 05.18-06.09/51 23.55
26	09.21 15.45	07.41 17.27	06.03 07.02-07.25/23 18.51	05.14 21.25	03.35 05.13-06.08/55 23.02	02.52 05.17-06.08/51 23.54
27	09.18 15.49	07.38 17.30	06.00 07.03-07.24/21 18.54	05.10 21.28	03.32 05.13-06.08/55 23.05	02.53 05.18-06.09/51 23.53
28	09.15 15.52	07.35 17.33	05.56 07.03-07.22/19 18.57	05.07 21.31	03.30 05.13-06.08/55 23.08	02.54 05.18-06.09/51 23.53
29	09.12 15.55		06.53 08.05-08.20/15 20.00	05.03 21.35	03.27 05.12-06.08/56 23.11	02.56 05.18-06.10/52 23.51
30	09.09 15.59		06.49 08.07-08.17/10 20.03	05.00 21.38	03.24 05.12-06.07/55 23.14	02.58 05.18-06.10/52 23.50
31	09.06 16.02		06.46 20.06		03.21 05.12-06.07/55 23.16	
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	317	0	1295	1562

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 38 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 05.18-06.11/53 23.49	04.24 05.33-06.15/42 22.27	06.00 20.39	07.26 18.53	08.00 16.07	09.35 14.42
2	03.01 05.18-06.11/53 23.47	04.27 05.35-06.15/40 22.23	06.03 20.36	07.29 18.49	08.03 16.03	09.38 14.40
3	03.01 05.18-06.11/53 23.46	04.31 05.38-06.14/36 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38
4	03.03 05.19-06.12/53 23.44	04.34 05.41-06.13/32 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.43 14.37
5	03.05 05.19-06.12/53 23.42	04.37 05.43-06.12/29 22.13	06.11 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	03.08 05.19-06.13/54 23.40	04.40 05.43-06.10/27 22.10	06.14 20.22	07.41 18.35	08.16 15.51	09.48 14.33
7	03.10 05.19-06.13/54 23.38	04.43 05.45-06.09/24 22.06	06.17 20.18	07.44 18.32	08.19 15.47	09.51 14.32
8	03.12 05.20-06.14/54 23.36	04.47 05.47-06.08/21 22.03	06.20 20.14	07.47 18.28	08.23 15.44	09.53 14.30
9	03.15 05.20-06.14/54 23.34	04.50 05.49-06.05/16 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.55 14.29
10	03.17 05.20-06.15/55 23.31	04.53 05.52-06.01/9 21.56	06.26 20.07	07.52 18.21	08.29 15.38	09.58 14.28
11	03.20 05.21-06.15/54 23.29	04.56 21.53	06.29 20.04	07.55 18.18	08.32 15.35	10.00 14.26
12	03.23 05.21-06.16/55 23.27	04.59 21.49	06.32 20.00	07.58 18.14	08.36 15.32	10.02 14.25
13	03.26 05.20-06.16/56 23.24	05.02 21.46	06.35 07.59-08.07/8 19.57	08.01 18.11	08.39 15.29	10.03 14.24
14	03.28 05.21-06.17/56 23.21	05.05 21.43	06.37 07.55-08.09/14 19.53	08.04 18.07	08.42 15.26	10.05 14.24
15	03.31 05.21-06.17/56 23.19	05.08 21.39	06.40 07.53-08.11/18 19.49	08.07 18.04	08.45 15.23	10.07 14.23
16	03.34 05.22-06.17/55 23.16	05.12 21.36	06.43 07.52-08.12/20 19.46	08.10 18.00	08.49 15.20	10.08 14.23
17	03.37 05.22-06.17/55 23.13	05.15 21.32	06.46 07.51-08.13/22 19.42	08.13 17.57	08.52 15.17	10.09 14.22
18	03.40 05.22-06.17/55 23.10	05.18 21.29	06.49 07.50-08.14/24 19.39	08.16 17.53	08.55 15.15	10.11 14.22
19	03.43 05.23-06.18/55 23.07	05.21 21.25	06.52 07.48-08.13/25 19.35	08.19 17.50	08.58 15.12	10.12 14.22
20	03.46 05.23-06.18/55 23.04	05.24 21.22	06.55 07.48-08.13/25 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	03.49 05.23-06.17/54 23.01	05.27 21.18	06.57 07.47-08.13/26 19.28	08.26 17.43	09.05 15.06	10.13 14.22
22	03.52 05.24-06.18/54 22.58	05.30 21.15	07.00 07.47-08.12/25 19.25	08.29 17.40	09.08 15.04	10.14 14.23
23	03.56 05.24-06.18/54 22.55	05.33 21.11	07.03 07.48-08.12/24 19.21	08.32 17.36	09.11 15.01	10.15 14.23
24	03.59 05.24-06.18/54 22.52	05.36 21.08	07.06 07.48-08.11/23 19.17	08.35 17.33	09.14 14.59	10.15 14.24
25	04.02 05.25-06.18/53 22.49	05.39 21.04	07.09 07.48-08.10/22 19.14	07.38 16.30	09.17 14.56	10.15 14.25
26	04.05 05.25-06.18/53 22.46	05.42 21.01	07.12 07.48-08.08/20 19.10	07.41 16.26	09.20 14.54	10.15 14.26
27	04.08 05.27-06.17/50 22.43	05.45 20.57	07.15 07.51-08.06/15 19.07	07.44 16.23	09.23 14.51	10.15 14.27
28	04.11 05.28-06.18/50 22.40	05.48 20.53	07.18 07.54-08.03/9 19.03	07.47 16.20	09.26 14.49	10.15 14.28
29	04.15 05.28-06.17/49 22.36	05.51 20.50	07.20 19.00	07.51 16.16	09.29 14.47	10.14 14.30
30	04.18 05.30-06.17/47 22.33	05.54 20.46	07.23 18.56	07.54 16.13	09.32 14.44	10.14 14.31
31	04.21 05.31-06.15/44 22.30	05.57 20.43		07.57 16.10		10.13 14.33
Potential sun hours	608	508	393	305	198	137
Sum of minutes with flicker	1650	276	320	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 39 - PUU39

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.19 23.19	04.18-04.19/1 23.49	02.59 23.49	04.13-04.34/21 22.27	04.24 20.39	06.00 18.53	06.39-06.47/8 16.07 14.42
2	10.11 14.37	09.00 16.09	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.22	04.16-04.22/6 23.48	03.01 23.48	04.13-04.34/21 22.23	04.27 20.36	06.03 18.49	07.29 16.03 09.38 14.40
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.47	03.14 23.25	04.14-04.23/9 23.46	03.01 23.46	04.13-04.33/20 22.20	04.31 20.32	06.06 18.46	07.32 16.00 09.41 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28	04.13-04.25/12 23.44	03.03 23.42	04.14-04.34/20 22.17	04.34 20.29	06.09 18.42	07.35 16.00 09.43 14.36
5	10.08 14.43	08.51 16.19	07.17 17.48	06.28 20.21	04.43 21.54	03.09 23.30	04.12-04.26/14 23.42	03.05 23.42	04.15-04.33/18 22.13	04.37 20.25	06.11 18.39	07.38 16.00 09.46 14.35
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	03.07 23.33	04.10-04.26/16 23.38	03.07 23.38	04.16-04.33/17 22.07	04.40 20.18	06.14 18.35	07.41 16.00 09.48 14.33
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	04.36 22.00	03.05 23.35	04.09-04.27/18 23.37	03.10 23.36	04.17-04.32/15 22.03	04.43 20.14	06.17 18.32	07.44 16.00 09.51 14.31
8	10.03 14.51	08.41 16.29	07.07 17.57	06.17 20.30	04.32 22.04	03.03 23.37	04.09-04.28/19 23.36	03.12 23.36	04.19-04.32/13 22.03	04.46 20.14	06.20 18.28	07.47 16.00 09.53 14.30
9	10.01 14.53	08.38 16.32	07.03 18.00	06.13 20.33	04.29 22.07	03.01 23.40	04.09-04.29/20 23.34	03.15 23.34	04.21-04.31/10 22.00	04.50 20.11	06.23 18.25	07.50 16.00 09.56 14.29
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	02.57 23.42	04.09-04.29/20 23.32	03.17 23.32	04.23-04.30/7 21.56	04.53 20.07	06.26 18.21	07.52 16.00 09.58 14.27
11	09.58 14.59	08.32 16.38	06.56 18.06	06.06 20.39	04.22 22.13	02.56 23.44	04.08-04.30/22 23.29	03.20 23.29	04.25-04.29/4 21.53	04.56 20.04	06.29 18.18	07.55 16.00 09.58 14.26
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.46	04.08-04.30/22 23.27	03.23 23.27	04.08-04.30/22 21.49	04.59 20.00	06.32 18.14	07.58 16.00 09.58 14.25
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20	02.53 23.47	04.04-04.08/4 23.24	03.25 23.24	04.04-04.08/4 21.46	06.35 19.57	08.01 18.11	08.39 16.00 09.58 14.24
14	09.51 15.07	08.22 16.48	06.46 18.15	06.30 20.48	04.12 22.23	02.52 23.49	04.03-04.31/28 23.21	03.28 23.21	04.03-04.31/28 21.43	06.37 19.53	08.04 18.07	08.42 16.00 09.58 14.24
15	09.49 15.10	08.19 16.52	06.42 18.18	06.29 20.51	04.09 22.26	02.51 23.50	04.03-04.32/29 23.19	03.31 23.19	04.03-04.32/29 21.39	06.40 19.49	08.07 18.04	08.46 16.00 09.58 14.23
16	09.47 15.13	08.15 16.55	06.39 18.21	06.28 20.54	04.06 22.30	02.50 23.52	04.02-04.31/29 23.16	03.34 23.16	04.02-04.31/29 21.36	06.43 19.46	08.10 18.00	08.49 16.00 09.58 14.23
17	09.44 15.17	08.12 16.58	06.35 18.24	06.27 20.57	04.03 22.33	02.49 23.53	04.02-04.32/30 23.13	03.37 23.13	04.02-04.32/30 21.32	06.46 19.42	08.13 17.57	08.52 16.00 09.58 14.22
18	09.42 15.20	08.09 17.01	06.32 18.27	06.27 21.00	04.00 22.36	02.49 23.54	04.02-04.32/30 23.10	03.40 23.10	04.02-04.32/30 21.29	06.49 19.39	08.16 17.53	08.55 16.00 09.58 14.22
19	09.40 15.23	08.05 17.04	06.28 18.30	06.27 21.03	03.56 22.39	02.49 23.54	04.02-04.33/31 23.07	03.43 23.07	04.02-04.33/31 21.25	06.52 19.35	08.19 17.50	08.58 16.00 09.58 14.22
20	09.37 15.26	08.02 17.08	06.25 18.33	06.27 21.06	03.53 22.43	02.49 23.55	04.02-04.33/31 23.04	03.46 23.04	04.02-04.33/31 21.22	06.55 19.32	08.23 17.47	09.02 16.00 09.58 14.22
21	09.34 15.29	07.59 17.11	06.21 18.36	06.27 21.09	03.50 22.46	02.49 23.55	04.02-04.33/31 23.01	03.49 23.01	04.02-04.33/31 21.18	06.57 19.28	08.26 17.43	09.05 16.00 09.58 14.22
22	09.32 15.32	07.55 17.14	06.17 18.39	06.28 21.13	03.47 22.49	02.49 23.55	04.02-04.33/31 22.58	03.52 22.58	04.02-04.33/31 21.15	07.00 19.25	08.29 17.40	09.08 16.00 09.58 14.23
23	09.29 15.36	07.52 17.17	06.14 18.42	06.28 21.16	03.44 22.52	02.49 23.55	04.03-04.34/31 22.55	03.56 22.55	04.03-04.34/31 21.11	07.03 19.21	08.32 17.36	09.11 16.00 09.58 14.23
24	09.26 15.39	07.48 17.20	06.10 18.45	06.28 21.19	03.41 22.55	02.50 23.55	04.03-04.33/30 22.52	03.59 22.52	04.03-04.33/30 21.08	07.06 19.17	08.35 17.33	09.14 16.00 09.58 14.24
25	09.24 15.42	07.45 17.23	06.07 18.48	06.30 21.22	03.38 22.59	02.51 23.55	04.04-04.34/30 22.49	04.02 22.49	04.04-04.34/30 21.04	07.09 19.14	08.38 16.30	09.17 16.00 09.58 14.25
26	09.21 15.45	07.42 17.27	06.03 18.51	06.31 21.25	03.35 23.02	02.52 23.54	04.04-04.34/30 22.46	04.05 22.46	04.04-04.34/30 21.01	07.12 19.10	08.41 16.26	09.20 16.00 09.58 14.26
27	09.18 15.49	07.38 17.30	06.00 18.54	06.35 21.28	03.32 23.05	02.53 23.54	04.05-04.34/29 22.43	04.08 22.43	04.05-04.34/29 21.07	07.15 19.07	08.44 16.23	09.24 16.00 09.58 14.27
28	09.15 15.52	07.35 17.33	05.56 18.57	06.35 21.31	03.29 23.08	02.54 23.53	04.06-04.34/28 22.40	04.11 22.40	04.06-04.34/28 21.03	07.18 19.03	08.47 16.20	09.26 16.00 09.58 14.28
29	09.12 15.55	07.32 17.36	05.53 19.00	06.35 21.34	03.27 23.11	02.56 23.52	04.07-04.34/27 22.36	04.15 22.36	04.07-04.34/27 21.00	07.20 19.00	08.51 16.16	09.29 16.00 09.58 14.30
30	09.09 15.59	07.29 17.39	05.50 19.03	06.35 21.37	03.24 23.14	02.57 23.50	04.12-04.34/22 22.33	04.18 22.33	04.12-04.34/22 21.07	07.23 18.56	08.54 16.13	09.32 16.00 09.58 14.31
31	09.06 16.02	07.26 17.42	05.47 19.06	06.35 21.40	03.21 23.17	02.58 23.53	04.13-04.34/21 22.30	04.21 22.30	04.13-04.34/21 21.04	07.26 18.50	08.57 16.10	09.33 16.00 09.58 14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	318	0	702	166	313	8	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 40 - PUU40

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24 05.17-05.37/20	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27 05.17-05.37/20	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30 05.19-05.36/17	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34 05.22-05.36/14	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37 05.25-05.36/11	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 05.20-05.24/4	03.07	03.07	04.40 05.27-05.34/7	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 05.17-05.25/8	03.04	03.10	04.43 05.30-05.33/3	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 05.14-05.26/12	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 05.11-05.26/15	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26 05.08-05.26/18	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22 05.06-05.26/20	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.07-05.27/20	02.54	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16 05.06-05.27/21	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12 05.06-05.27/21	02.52	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09 05.07-05.27/20	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06 05.07-05.27/20	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03 05.06-05.26/20	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59 05.07-05.26/19	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56 05.07-05.25/18	02.48	03.43 05.25-05.29/4	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 05.08-05.25/17	02.48	03.46 05.22-05.31/9	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 05.10-05.24/14	02.48	03.49 05.21-05.32/11	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47 05.10-05.23/13	02.49	03.52 05.20-05.34/14	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 05.11-05.22/11	02.49	03.55 05.19-05.35/16	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21	03.41 05.13-05.20/7	02.50	03.59 05.18-05.35/17	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02 05.18-05.36/18	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05 05.17-05.36/19	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08 05.17-05.37/20	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11 05.17-05.38/21	05.48	07.18	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12	07.32	05.53	05.03	03.27	02.56	04.14 05.17-05.37/20	05.51	07.20	07.51	09.30	10.15
	15.55	07.30	18.54	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09	07.29	05.51	05.00	03.24	02.57	04.18 05.17-05.38/21	05.54	07.23	07.54	09.32	10.14
	15.59	07.27	18.55	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06	07.26	05.45	05.00	03.21	02.58	04.21 05.16-05.37/21	05.57	07.26	07.57	09.33	10.13
	16.02	07.24	18.56	21.41	23.17	23.50	22.30	20.43	18.54	16.10	14.41	14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	298	0	211	92	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 41 - PUU41

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 42 - PUU42

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	20.35-20.55/20	03.19 23.19	02.59 23.49	04.24 22.27	06.00 20.39	07.26 18.53	08.00 16.06	09.35 14.42
2	10.11 14.37	09.00 16.09	07.28 17.39	06.38 20.12	04.53 21.44	20.34-20.55/21	03.16 23.22	03.01 23.48	04.27 22.23	06.03 20.36	07.29 18.49	08.03 16.03	09.38 14.40
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.47	20.34-20.55/21	03.14 23.25	03.01 23.46	04.30 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	20.35-20.54/19	03.11 23.28	03.03 23.44	04.34 22.17	06.08 20.29	07.35 18.42	08.10 15.57	09.43 14.36
5	10.08 14.43	08.51 16.19	07.17 17.48	06.28 20.21	04.42 21.54	20.35-20.54/19	03.09 23.30	03.05 23.42	04.37 22.13	06.11 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	20.35-20.53/18	03.07 23.33	03.07 23.40	04.40 22.10	06.14 20.21	07.41 18.35	08.16 15.50	09.48 14.33
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	04.36 22.00	20.36-20.52/16	03.04 23.35	03.10 23.38	04.43 22.07	06.17 20.18	07.44 18.32	08.19 15.47	09.51 14.31
8	10.03 14.51	08.41 16.29	07.07 17.57	06.17 20.30	04.32 22.04	20.37-20.51/14	03.02 23.37	03.12 23.36	04.46 22.03	06.20 20.14	07.47 18.28	08.23 15.44	09.53 14.30
9	10.01 14.53	08.38 16.32	07.03 18.00	06.13 20.33	04.29 22.07	20.39-20.50/11	03.01 23.40	03.15 23.34	04.50 22.00	06.23 20.11	07.49 18.25	08.26 15.41	09.56 14.29
10	09.59 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	20.42-20.47/5	02.57 23.32	03.17 23.32	04.53 21.56	06.26 20.07	07.52 18.21	08.29 15.38	09.58 14.27
11	09.58 14.59	08.32 16.38	06.56 18.06	06.06 20.39	04.22 22.13		02.55 23.44	03.20 23.29	04.56 21.53	06.29 20.04	07.55 18.18	08.32 15.35	10.00 14.26
12	09.56 15.02	08.28 16.42	06.53 18.09	06.03 20.42	04.19 22.17		02.54 23.46	03.23 23.27	04.59 21.49	06.32 20.00	07.58 18.14	08.36 15.32	10.02 14.25
13	09.53 15.04	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20		02.53 23.47	03.25 23.24	05.02 21.46	06.34 19.57	08.01 18.11	08.39 15.29	10.04 14.24
14	09.51 15.07	08.22 16.48	06.46 18.15	05.56 20.48	04.12 22.23		02.52 23.49	03.28 23.21	05.05 21.43	06.37 19.53	08.04 18.07	08.42 15.26	10.05 14.24
15	09.49 15.10	08.19 16.51	06.42 18.18	05.52 20.51	04.09 22.26		02.51 23.50	03.31 23.19	05.08 21.39	06.40 19.49	08.07 18.04	08.46 15.23	10.07 14.23
16	09.47 15.13	08.15 16.55	06.39 18.21	05.49 20.54	04.06 22.30		02.50 23.52	03.34 23.16	05.11 21.36	06.43 19.46	08.10 18.00	08.49 15.20	10.08 14.22
17	09.44 15.16	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33		02.49 23.53	03.37 23.13	05.15 21.32	06.46 19.42	08.13 17.57	08.52 15.17	10.10 14.22
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	03.59 22.36		02.49 23.54	03.40 23.10	05.18 21.29	06.49 19.39	08.16 17.53	08.55 15.14	10.11 14.22
19	09.40 15.23	08.05 17.04	06.28 18.30	05.38 21.03	03.56 22.39		02.49 23.54	03.43 23.07	05.21 21.25	06.52 19.35	08.19 17.50	08.58 15.12	10.12 14.22
20	09.37 15.26	08.02 17.08	06.24 18.33	05.35 21.06	03.53 22.43		02.48 23.55	03.46 23.04	05.24 21.22	06.55 19.32	08.22 17.47	09.02 15.09	10.13 14.22
21	09.34 15.29	07.59 17.11	06.21 18.36	05.31 21.09	03.50 22.46		02.49 23.55	03.49 23.01	05.27 21.18	06.57 19.28	08.26 17.43	09.05 15.06	10.14 14.22
22	09.32 15.32	07.55 17.14	06.17 18.39	05.27 21.12	03.47 22.49		02.49 23.55	03.52 22.58	05.30 21.15	07.00 19.25	08.29 17.40	09.08 15.04	10.14 14.23
23	09.29 15.35	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.52		02.49 23.55	03.55 22.55	05.33 21.11	07.03 19.21	08.32 17.36	09.11 15.01	10.15 14.23
24	09.26 15.39	07.48 17.20	06.10 18.45	05.20 21.19	03.41 22.55		02.50 23.55	03.59 22.52	05.36 21.08	07.06 19.17	08.35 17.33	09.14 14.58	10.15 14.24
25	09.24 15.42	07.45 17.23	06.07 18.48	05.17 21.22	03.38 22.58	20.40-20.41/1	02.51 23.55	04.02 22.49	05.39 21.04	07.09 19.09	07.38 16.30	09.17 14.56	10.15 14.25
26	09.21 15.45	07.41 17.26	06.03 18.51	05.13 21.25	03.35 23.02	20.39-20.44/5	02.52 23.54	04.05 22.46	05.42 21.01	07.12 19.10	07.41 16.26	09.20 14.53	10.15 14.26
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	03.32 23.05	20.37-20.46/9	02.53 23.54	04.08 22.43	05.45 20.57	07.15 19.07	07.44 16.23	09.23 14.51	10.15 14.27
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.31	03.29 23.08	20.36-20.49/13	02.54 23.53	04.11 22.40	05.48 20.53	07.17 19.03	07.47 16.20	09.26 14.49	10.15 14.28
29	09.12 15.55	07.32 17.36	05.53 18.57	05.03 21.35	03.27 23.11	20.35-20.52/17	02.56 23.52	04.14 22.36	05.51 20.50	07.20 19.00	07.51 16.16	09.29 14.46	10.14 14.29
30	09.09 15.59	07.29 17.39	05.49 19.00	05.00 21.38	03.24 23.14	20.35-20.54/19	02.57 23.50	04.18 22.33	05.54 20.46	07.23 18.56	07.54 16.13	09.32 14.44	10.14 14.31
31	09.06 16.02	07.26 17.42	05.45 19.06		03.21 23.17		02.57 23.50	04.21 22.30	05.57 20.43	07.20 18.56	07.57 16.10		10.13 14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0
Sum of minutes with flicker	0	0	0	64	164	0	0	224	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 43 - PUU43

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.59	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 44 - PUU44

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	21.23-21.51/28	02.59	21.30-21.57/27	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19		23.49		22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	21.23-21.52/29	03.01	21.30-21.57/27	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22		23.48		22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	21.23-21.51/28	03.01	21.30-21.57/27	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25		23.46		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	21.24-21.52/28	03.03	21.30-21.57/27	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28		23.44		22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	21.24-21.51/27	03.05	21.30-21.57/27	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30		23.42		22.13	20.25	18.38	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	21.24-21.52/28	03.07	21.30-21.57/27	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33		23.40		22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	21.25-21.52/27	03.10	21.30-21.58/28	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35		23.38		22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	21.25-21.52/27	03.12	21.31-21.59/28	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.37		23.36		22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	21.25-21.52/27	03.14	21.30-21.58/28	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40		23.34		22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.26	02.57	21.26-21.52/26	03.17	21.30-21.58/28	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42		23.32		21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	21.26-21.52/26	03.20	21.31-21.59/28	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44		23.29		21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	21.26-21.52/26	03.22	21.31-21.59/28	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46		23.27		21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16	02.53	21.26-21.52/26	03.25	21.31-21.59/28	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47		23.24		21.46	19.56	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52	21.27-21.52/25	03.28	21.31-21.59/28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49		23.21		21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	21.26-21.52/26	03.31	21.31-21.59/28	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50		23.19		21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	21.27-21.53/26	03.34	21.31-21.59/28	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52		23.16		21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	02.49	21.28-21.53/25	03.37	21.32-22.00/28	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53		23.13		21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	21.28-21.53/25	03.40	21.32-21.59/27	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53		23.10		21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	21.27-21.53/26	03.43	21.32-21.59/27	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54		23.07		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	21.29-21.54/25	03.46	21.32-21.58/26	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55		23.04		21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	21.29-21.54/25	03.49	21.34-21.59/25	05.27	06.57	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55		23.01		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	21.29-21.54/25	03.52	21.34-21.58/24	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55		22.58		21.15	19.24	17.40	15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	21.28-21.54/26	03.55	21.35-21.58/23	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55		22.55		21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	21.29-21.54/25	03.58	21.35-21.57/22	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55		22.52		21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	21.29-21.54/25	04.02	21.36-21.55/19	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	21.29-21.55/26	04.05	21.37-21.52/15	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54		22.46		21.00	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	21.30-21.55/25	04.08	21.39-21.50/11	05.45	07.15	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05	23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	21.30-21.56/26	04.11	21.40-21.47/7	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53		22.40		20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.56	21.29-21.55/26	04.14	21.43-21.45/2	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.34	23.11	23.52		22.36		20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	21.29-21.55/26	04.18		05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50		22.33		20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21	03.21	21.23-21.51/28	04.21		05.57		07.57		10.13
	16.02		20.06		23.17			22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	382	786		698		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 45 - PUU45

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.56	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.29	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102WTG: 46 - PUU46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	21.56-22.11/15	04.24	06.00	07.26	17.53-18.13/20	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49		22.26	20.39	18.53		16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	21.56-22.10/14	04.27	06.02	07.29	17.53-18.11/18	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.47		22.23	20.36	18.49		16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	21.58-22.09/11	04.30	06.05	07.32	17.53-18.07/14	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46		22.20	20.32	18.45		16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	21.59-22.07/8	04.34	06.08	07.35	17.54-18.03/9	08.10	09.43
	14.41	16.15	17.45	20.18	21.50	23.27	23.44		22.16	20.28	18.42		15.57	14.36
5	10.07	08.51	07.17	06.28	04.42	03.09	03.05		04.37	06.11	07.38	17.55-18.00/5	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42		22.13	20.25	18.38		15.53	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07		04.40	06.14	07.41		08.16	09.48
	14.46	16.22	17.51	20.23	21.57	23.33	23.40		22.10	20.21	18.35		15.50	14.33
7	10.05	08.44	07.10	06.20	04.36	03.04	03.10		04.43	06.17	07.43		08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38		22.06	20.18	18.31		15.47	14.31
8	10.03	08.41	07.07	17.19-17.20/1	06.17	04.32	03.02	21.56-22.01/5	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.29	22.03	23.37	23.36		22.03	20.14	18.28		15.44	14.30
9	10.01	08.38	07.03	17.17-17.24/7	06.13	04.29	03.00	21.54-22.04/10	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40	23.34		22.00	20.11	18.24		15.41	14.28
10	09.59	08.35	07.00	17.15-17.27/12	06.10	04.26	02.57	21.52-22.05/13	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.31		21.56	20.07	18.21		15.38	14.27
11	09.57	08.32	06.56	17.15-17.31/16	06.06	04.22	02.55	21.51-22.07/16	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29		21.53	20.04	18.17		15.35	14.26
12	09.55	08.28	06.53	17.14-17.33/19	06.03	04.19	02.54	21.51-22.07/16	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.16	23.45	23.26		21.49	20.00	18.14		15.32	14.25
13	09.53	08.25	06.49	17.13-17.33/20	05.59	04.16	02.53	21.50-22.08/18	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24		21.46	19.56	18.11		15.29	14.24
14	09.51	08.22	06.46	17.13-17.34/21	05.56	04.12	02.52	21.50-22.09/19	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21		21.42	19.53	18.07		15.26	14.23
15	09.49	08.18	06.42	17.13-17.33/20	05.52	04.09	02.51	21.49-22.10/21	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19		21.39	19.49	18.04		15.23	14.23
16	09.47	08.15	06.39	17.13-17.31/18	05.49	04.06	02.50	21.49-22.11/22	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.51	23.16		21.35	19.46	18.00		15.20	14.22
17	09.44	08.12	06.35	17.14-17.31/17	05.45	04.03	02.49	21.50-22.11/21	03.37	05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13		21.32	19.42	18.00		15.17	14.22
18	09.42	08.08	06.31	17.14-17.29/15	05.41	03.59	02.49	21.50-22.12/22	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10		21.28	19.39	18.00		15.14	14.22
19	09.39	08.05	06.28	17.17-17.27/10	05.38	03.56	02.48	21.49-22.11/22	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07		21.25	19.35	18.00		15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	21.50-22.13/23	03.46	05.24	06.54	08.22	09.02	09.22	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04		21.21	19.32	18.00		15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	21.50-22.13/23	03.49	05.27	06.57	08.25	09.05	09.25	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01		21.18	19.28	18.00		15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	21.50-22.13/23	03.52	05.30	07.00	08.29	09.08	09.28	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58		21.14	19.24	18.00		15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	21.50-22.13/23	03.55	05.33	07.03	08.32	09.11	09.31	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55		21.11	19.21	18.00		15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	21.51-22.13/22	03.58	05.36	07.06	18.01-18.10/9	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52		21.07	19.17	18.00		14.58	14.24
25	09.23	07.45	06.07	05.17	03.38	02.51	21.51-22.13/22	04.02	05.39	07.09	17.58-18.12/14	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49		21.04	19.14	18.00		14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	21.51-22.13/22	04.05	05.42	07.12	17.56-18.13/17	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46		21.00	19.10	18.00		14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	21.52-22.13/21	04.08	05.45	07.14	17.55-18.13/18	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05	23.53	22.43		20.57	19.07	18.00		14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	21.53-22.13/20	04.11	05.48	07.17	17.54-18.14/20	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.39		20.53	19.03	18.00		14.49	14.28
29	09.12		05.52	05.03	03.26	02.56	21.53-22.12/19	04.14	05.51	07.20	17.53-18.14/21	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.51	22.36		20.50	19.00	18.00		14.46	14.29
30	09.09		05.49	05.00	03.24	02.57	21.54-22.11/17	04.18	05.54	07.23	17.53-18.14/21	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.50	22.33		20.46	18.56	18.00		14.44	14.31
31	09.06		05.45		03.21		04.21		05.57					10.13
	16.02		20.06		23.16		22.30		20.43		16.10			14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	120	305	198	137	0
Sum of minutes with flicker	0	0	176	0	0	440	48	0	66	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 47 - PUU47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	19.36-19.55/19	07.26	08.00	09.35	
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39		18.53	16.06	14.42	
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	19.36-19.55/19	07.29	08.03	09.38	
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36		18.49	16.03	14.40	
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	19.35-19.53/18	07.32	08.06	09.41	
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32		18.45	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	19.35-19.50/15	07.35	08.10	09.43	
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29		18.42	15.57	14.36	
5	10.08	08.51	07.17	06.28	19.42-19.44/2	04.42	03.09	03.05	04.37	06.11	19.36-19.46/10	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.42	22.13	20.25		18.38	15.53	14.34	
6	10.06	08.48	07.14	06.24	19.41-19.47/6	04.39	03.06	03.07	04.40	06.14	19.37-19.43/6	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21		18.35	15.50	14.33	
7	10.05	08.45	07.10	06.20	19.40-19.50/10	04.36	03.04	03.09	04.43	06.17	19.38-19.40/2	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.06	20.18		18.31	15.47	14.31	
8	10.03	08.41	07.07	06.17	19.38-19.52/14	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53	
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14		18.28	15.44	14.30	
9	10.01	08.38	07.03	06.13	19.38-19.56/18	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56	
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11		18.24	15.41	14.28	
10	09.59	08.35	07.00	06.10	19.37-19.56/19	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58	
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07		18.21	15.38	14.27	
11	09.58	08.32	06.56	06.06	19.37-19.56/19	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00	
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04		18.17	15.35	14.26	
12	09.56	08.28	06.53	06.03	19.36-19.55/19	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02	
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00		18.14	15.32	14.25	
13	09.53	08.25	06.49	05.59	19.37-19.55/18	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.04	
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56		18.10	15.29	14.24	
14	09.51	08.22	06.46	05.56	19.38-19.54/16	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05	
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53		18.07	15.26	14.23	
15	09.49	08.19	06.42	05.52	19.38-19.52/14	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07	
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49		18.04	15.23	14.23	
16	09.47	08.15	06.39	05.48	19.40-19.50/10	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08	
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46		18.00	15.20	14.22	
17	09.44	08.12	06.35	05.45	19.43-19.47/4	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10	
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42		17.57	15.17	14.22	
18	09.42	08.09	06.31	05.41		03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11	
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39		17.53	15.14	14.22	
19	09.40	08.05	06.28	05.38		03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12	
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35		17.50	15.11	14.22	
20	09.37	08.02	06.24	05.34		03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13	
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.22	19.32		17.46	15.09	14.22	
21	09.34	07.58	06.21	05.31		03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.14	
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28		17.43	15.06	14.22	
22	09.32	07.55	06.17	05.27		03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14	
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.24		17.40	15.03	14.22	
23	09.29	07.52	06.14	05.24		03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15	
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21		17.36	15.01	14.23	
24	09.26	07.48	06.10	05.20		03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15	
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17		17.33	14.58	14.24	
25	09.24	07.45	06.07	05.17		03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15	
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14		16.29	14.56	14.24	
26	09.21	07.41	06.03	05.13		03.35	02.51	04.05	05.42	19.45-19.51/6	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10		16.26	14.53	14.25	
27	09.18	07.38	06.00	05.10		03.32	02.53	04.08	05.45	19.41-19.52/11	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07		16.23	14.51	14.25	
28	09.15	07.35	05.56	05.06		03.29	02.54	04.11	05.48	19.39-19.54/15	07.17	07.47	09.26	10.17
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03		16.19	14.49	14.28	
29	09.12		06.52	05.03		03.26	02.55	04.14	05.51	19.38-19.55/17	07.20	07.50	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00		16.16	14.46	14.29	
30	09.09		06.49	04.59		03.24	02.57	04.17	05.54	19.37-19.56/19	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56		16.13	14.44	14.31	
31	09.06		06.45			03.21	04.21	05.57	19.36-19.55/19		07.57		10.13	
	16.02		20.06		23.17		22.30	20.43			16.10		14.32	
Potential sun hours	171	238	363	451	570	624	609	509	393	89	305	198	0	137
Sum of minutes with flicker	0	0	0	169	0	0	0	87	89	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 48 - PUU48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	19.30-19.54/24	07.26	08.00	09.35	
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.26	20.39		18.52	16.06	14.42	
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	19.30-19.53/23	07.29	08.03	09.38	
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36		18.49	16.03	14.40	
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	19.30-19.51/21	07.32	08.06	09.41	
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32		18.45	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	19.31-19.50/19	07.35	08.10	09.43	
	14.41	16.15	17.45	20.17	21.51	23.28	23.44	22.17	20.28		18.42	15.57	14.36	
5	10.08	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	19.33-19.46/13	07.38	08.13	09.46	
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25		18.38	15.53	14.34	
6	10.06	08.48	07.14	06.24	19.40-19.47/7	04.39	03.06	03.07	04.40	19.36-19.43/7	07.41	08.16	09.48	
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21		18.35	15.50	14.33	
7	10.05	08.44	07.10	06.20	19.37-19.50/13	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51	
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18		18.31	15.47	14.31	
8	10.03	08.41	07.07	06.17	19.34-19.52/18	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53	
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14		18.28	15.44	14.30	
9	10.01	08.38	07.03	06.13	19.33-19.54/21	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55	
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11		18.24	15.41	14.28	
10	09.59	08.35	07.00	06.10	19.31-19.54/23	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.58	
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07		18.21	15.38	14.27	
11	09.57	08.32	06.56	06.06	19.31-19.55/24	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00	
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04		18.17	15.35	14.26	
12	09.55	08.28	06.53	06.03	19.29-19.55/26	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02	
	15.01	16.41	18.09	20.42	22.17	23.46	23.27	21.49	20.00		18.14	15.32	14.25	
13	09.53	08.25	06.49	05.59	19.29-19.55/26	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03	
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56		18.10	15.29	14.24	
14	09.51	08.22	06.46	05.56	19.29-19.55/26	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05	
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53		18.07	15.26	14.23	
15	09.49	08.18	06.42	05.52	19.28-19.54/26	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07	
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49		18.04	15.23	14.23	
16	09.47	08.15	06.39	05.48	19.28-19.54/26	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08	
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.35	19.46		18.00	15.20	14.22	
17	09.44	08.12	06.35	05.45	19.29-19.54/25	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10	
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42		17.57	15.17	14.22	
18	09.42	08.08	06.31	05.41	19.29-19.52/23	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11	
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.28	19.39		17.53	15.14	14.22	
19	09.39	08.05	06.28	05.38	19.29-19.52/23	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12	
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35		17.50	15.11	14.22	
20	09.37	08.02	06.24	05.34	19.30-19.51/21	03.53	02.48	03.46	05.24	19.41-19.50/9	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.21	19.31		17.46	15.09	14.22	
21	09.34	07.58	06.21	05.31	19.32-19.50/18	03.50	02.48	03.49	05.27	19.38-19.53/15	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28		17.43	15.06	14.22	
22	09.32	07.55	06.17	05.27	19.33-19.47/14	03.47	02.49	03.52	05.30	19.36-19.54/18	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24		17.40	15.03	14.22	
23	09.29	07.52	06.14	05.24	19.36-19.44/8	03.44	02.49	03.55	05.33	19.34-19.55/21	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21		17.36	15.01	14.23	
24	09.26	07.48	06.10	05.20		03.41	02.50	03.58	05.36	19.33-19.55/22	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19		22.55	23.55	22.52	21.07		19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17		03.38	02.50	04.02	05.39	19.32-19.56/24	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22		22.58	23.55	22.49	21.04		19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13		03.35	02.51	04.05	05.42	19.32-19.57/25	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25		23.02	23.54	22.46	21.00		19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10		03.32	02.53	04.08	05.45	19.30-19.56/26	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28		23.05	23.54	22.43	20.57		19.07	16.23	14.51	14.25
28	09.15	07.34	05.56	05.06		03.29	02.54	04.11	05.48	19.30-19.56/26	07.17	07.47	09.26	10.17
	15.52	17.32	18.57	21.31		23.08	23.53	22.40	20.53		19.03	16.19	14.49	14.28
29	09.12		05.52	05.03		03.26	02.55	04.14	05.51	19.30-19.56/26	07.20	07.50	09.29	10.14
	15.55		20.00	21.34		23.11	23.52	22.36	20.50		19.00	16.16	14.46	14.29
30	09.09		06.49	04.59		03.24	02.57	04.17	05.54	19.30-19.56/26	07.23	07.54	09.32	10.14
	15.58		20.03	21.38		23.14	23.50	22.33	20.46		18.56	16.13	14.44	14.31
31	09.06		06.45			03.21		04.21	05.57	19.29-19.55/26		07.57		10.13
	16.02		20.06			23.17		22.30	20.43			16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	107	305	198	0	137
Sum of minutes with flicker	0	0	0	368	0	0	0	264	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102WTG: 49 - PUU49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

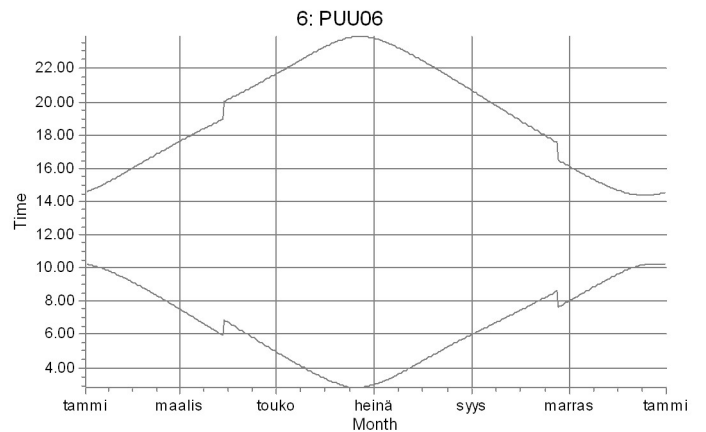
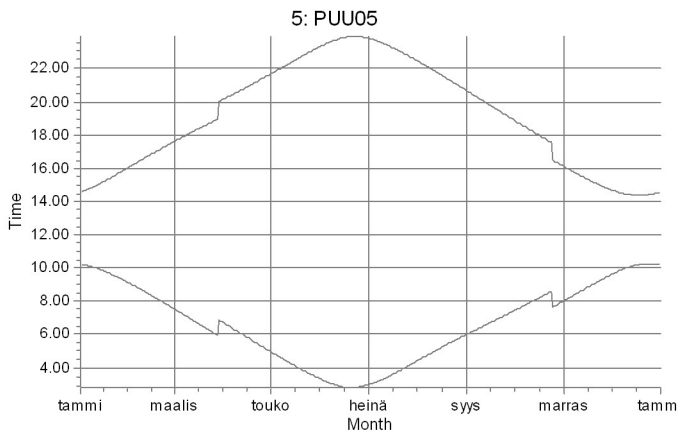
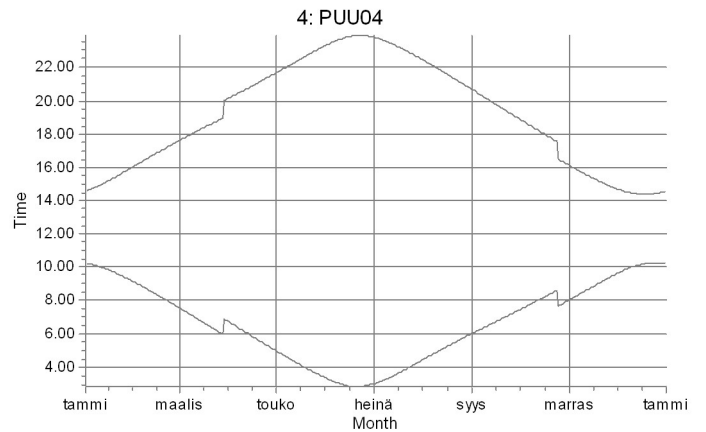
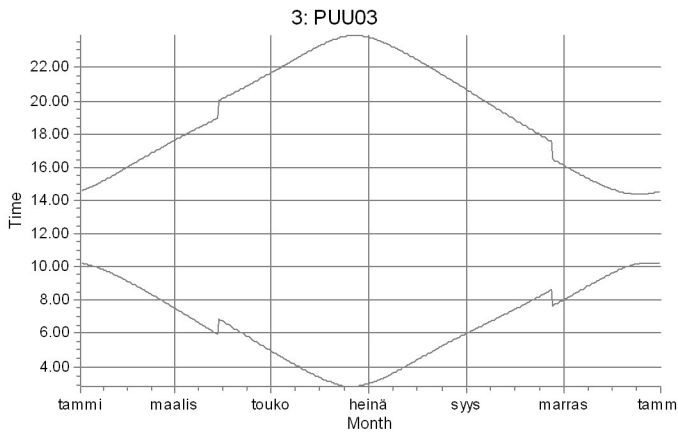
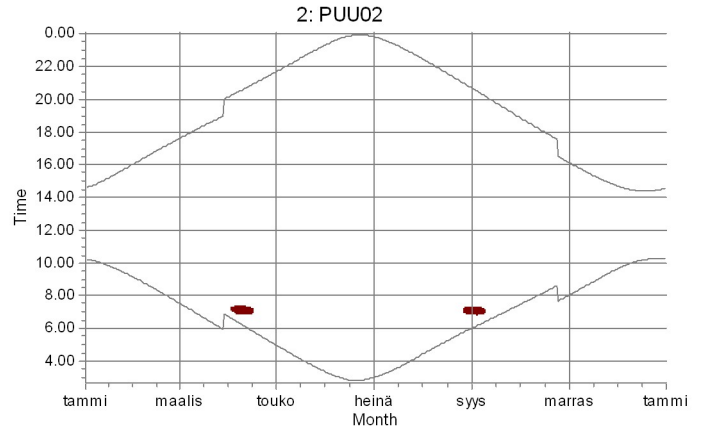
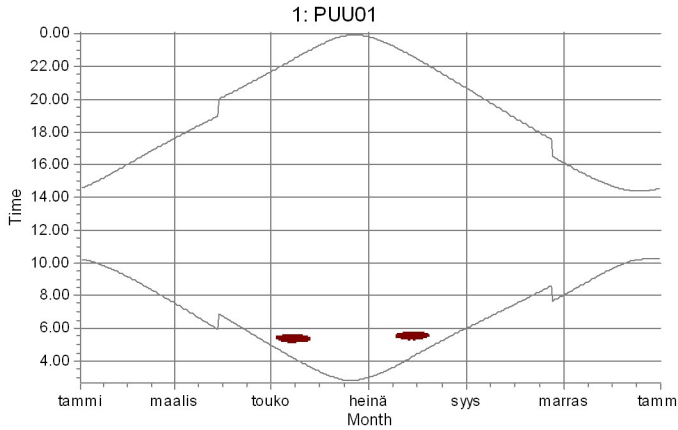
	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	17.52-18.10/18	08.00	09.35	
	14.35	16.05	17.36	20.08	21.41	23.19	23.49	22.26	20.39	18.52		16.06	14.42	
2	10.11	09.00	07.27	06.38	04.53	03.16	03.01	04.27	06.02	07.29	17.54-18.06/12	08.03	09.38	
	14.37	16.08	17.39	20.11	21.44	23.22	23.47	22.23	20.36	18.49		16.03	14.40	
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32		08.06	09.41	
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45		16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35		08.10	09.43	
	14.41	16.15	17.45	20.17	21.50	23.27	23.44	22.16	20.28	18.42		15.57	14.36	
5	10.07	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	07.38		08.13	09.46	
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38		15.53	14.34	
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.40		08.16	09.48	
	14.46	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35		15.50	14.33	
7	10.04	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43		08.19	09.51	
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31		15.47	14.31	
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46		08.23	09.53	
	14.51	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28		15.44	14.30	
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49		08.26	09.55	
	14.53	16.32	18.00	20.32	22.07	23.40	23.34	22.00	20.11	18.24		15.41	14.28	
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52		08.29	09.57	
	14.56	16.35	18.03	20.35	22.10	23.42	23.31	21.56	20.07	18.21		15.38	14.27	
11	09.57	08.32	06.56	17.18-17.26/8	06.06	04.22	02.55	03.20	04.56	06.29		08.32	10.00	
	14.59	16.38	18.06	20.38	22.13	23.44	23.29	21.53	20.03	18.17		15.35	14.26	
12	09.55	08.28	06.53	17.13-17.29/16	06.03	04.19	02.54	03.22	04.59	06.31		08.36	10.01	
	15.01	16.41	18.09	20.42	22.16	23.45	23.26	21.49	20.00	18.14		15.32	14.25	
13	09.53	08.25	06.49	17.11-17.31/20	05.59	04.15	02.53	03.25	05.02	06.34	18.01-18.14/13	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10		15.29	14.24	
14	09.51	08.22	06.46	17.09-17.33/24	05.56	04.12	02.51	03.28	05.05	06.37	17.58-18.16/18	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07		15.26	14.23	
15	09.49	08.18	06.42	17.07-17.34/27	05.52	04.09	02.51	03.31	05.08	06.40	17.56-18.18/22	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04		15.23	14.23	
16	09.47	08.15	06.38	17.06-17.34/28	05.48	04.06	02.50	03.34	05.11	06.43	17.53-18.18/25	08.10	08.49	10.08
	15.13	16.54	18.21	20.54	22.29	23.51	23.16	21.35	19.46	18.00		15.20	14.22	
17	09.44	08.12	06.35	17.05-17.35/30	05.45	04.02	02.49	03.37	05.14	06.46	17.52-18.19/27	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13	21.32	19.42	17.57		15.17	14.22	
18	09.42	08.08	06.31	17.04-17.35/31	05.41	03.59	02.49	03.40	05.17	06.49	17.51-18.20/29	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10	21.28	19.39	17.53		15.14	14.22	
19	09.39	08.05	06.28	17.04-17.36/32	05.38	03.56	02.48	03.43	05.20	06.51	17.50-18.20/30	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50		15.11	14.22	
20	09.37	08.02	06.24	17.03-17.35/32	05.34	03.53	02.48	03.46	05.24	06.54	17.49-18.20/31	08.22	09.01	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04	21.21	19.31	17.46		15.09	14.22	
21	09.34	07.58	06.21	17.02-17.34/32	05.31	03.50	02.48	03.49	05.27	06.57	17.48-18.20/32	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43		15.06	14.22	
22	09.32	07.55	06.17	17.03-17.35/32	05.27	03.47	02.49	03.52	05.30	07.00	17.47-18.19/32	08.28	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40		15.03	14.22	
23	09.29	07.52	06.14	17.02-17.34/32	05.24	03.44	02.49	03.55	05.33	07.03	17.47-18.19/32	08.32	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36		15.01	14.23	
24	09.26	07.48	06.10	17.03-17.33/30	05.20	03.41	02.50	03.58	05.36	07.06	17.47-18.19/32	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33		14.58	14.24	
25	09.23	07.45	06.07	17.03-17.32/29	05.17	03.38	02.51	04.02	05.39	07.09	17.47-18.18/31	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29		14.56	14.25	
26	09.21	07.41	06.03	17.04-17.31/27	05.13	03.35	02.52	04.05	05.42	07.12	17.47-18.17/30	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46	21.00	19.10	16.26		14.53	14.25	
27	09.18	07.38	05.59	17.04-17.30/26	05.10	03.32	02.53	04.08	05.45	07.14	17.48-18.16/28	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.04	23.53	22.43	20.57	19.07	16.23		14.51	14.27	
28	09.15	07.34	05.56	17.06-17.29/23	05.06	03.29	02.54	04.11	05.48	07.17	17.48-18.15/27	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.39	20.53	19.03	16.19		14.49	14.28	
29	09.12		06.52	18.07-18.26/19	05.03	03.26	02.55	04.14	05.51	07.20	17.49-18.14/25	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.51	22.36	20.50	19.00	16.16		14.46	14.29	
30	09.09		06.49	18.09-18.23/14	04.59	03.24	02.57	04.17	05.54	07.23	17.50-18.12/22	07.54	09.32	10.14
	15.58		20.03	21.38	23.13	23.50	22.33	20.46	18.56	16.13		14.44	14.31	
31	09.06		06.45	18.15-18.18/3		03.21	02.51	04.21	05.57	07.57			10.13	
	16.02		20.06		23.16		22.30	20.43		16.10			14.32	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	30	198	137	0
Sum of minutes with flicker	0	0	515	0	0	0	0	0	486	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102



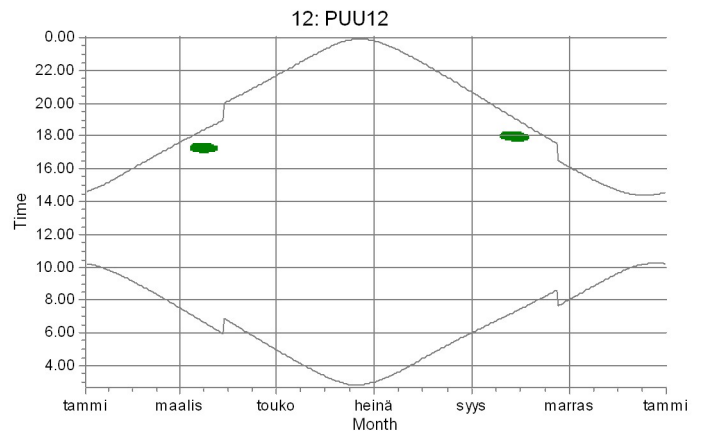
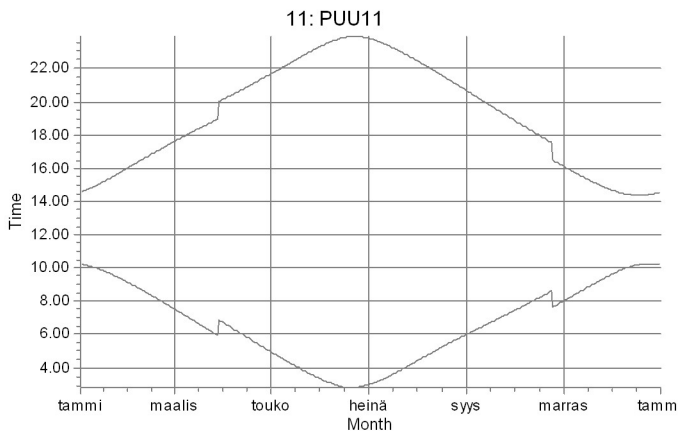
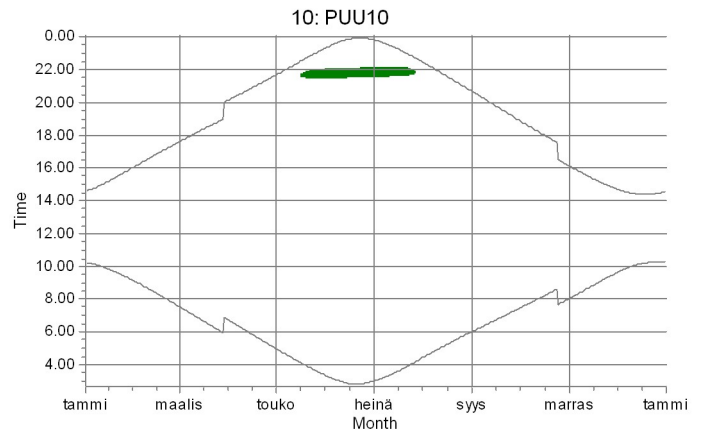
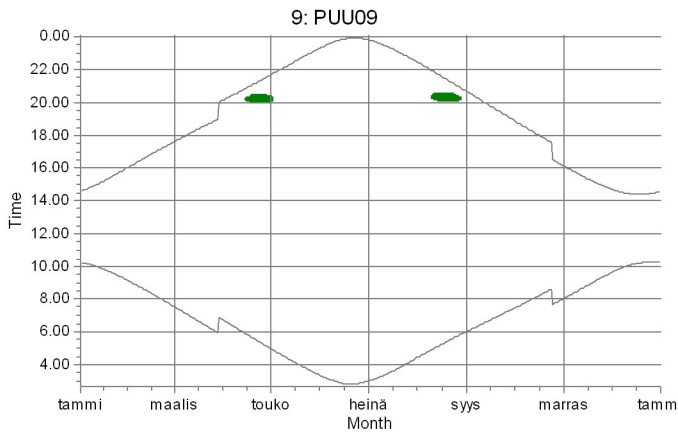
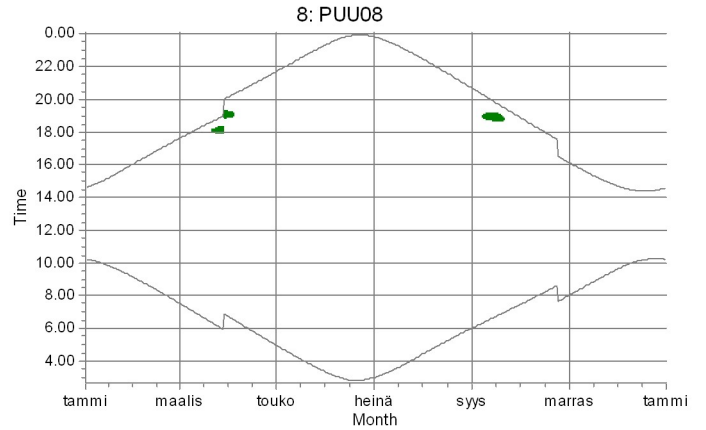
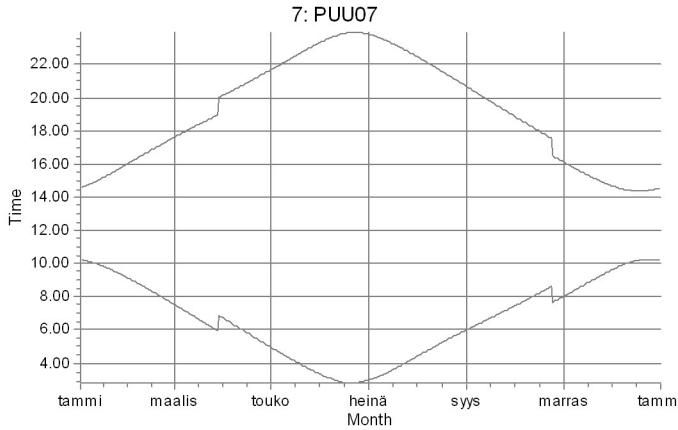
Shadow receptors



H: Asuinrakennus H (Pinolantie 406)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102



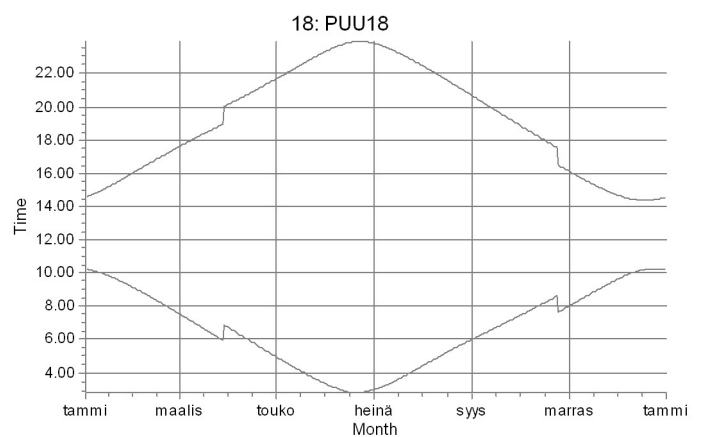
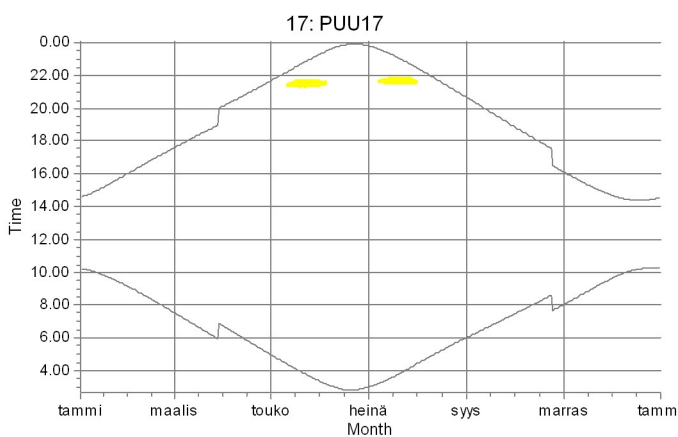
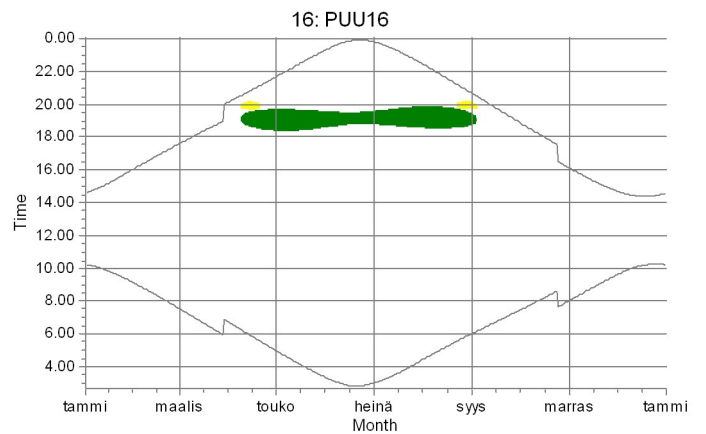
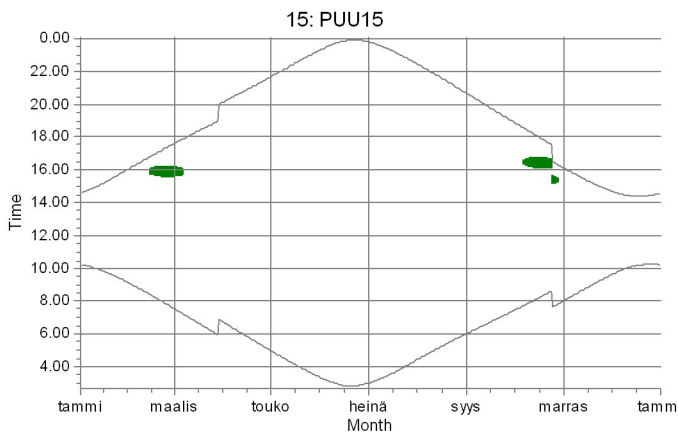
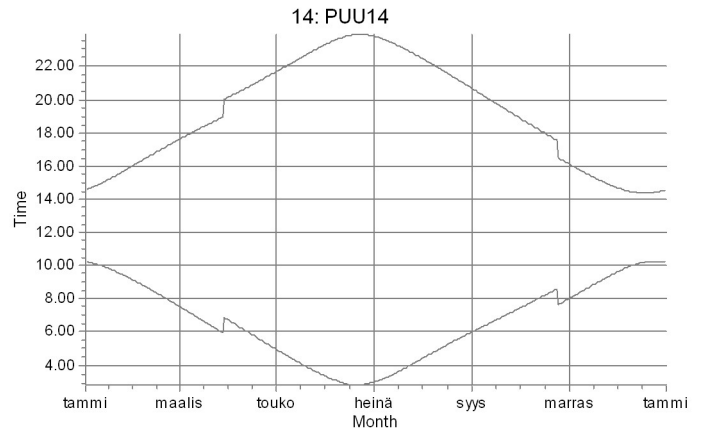
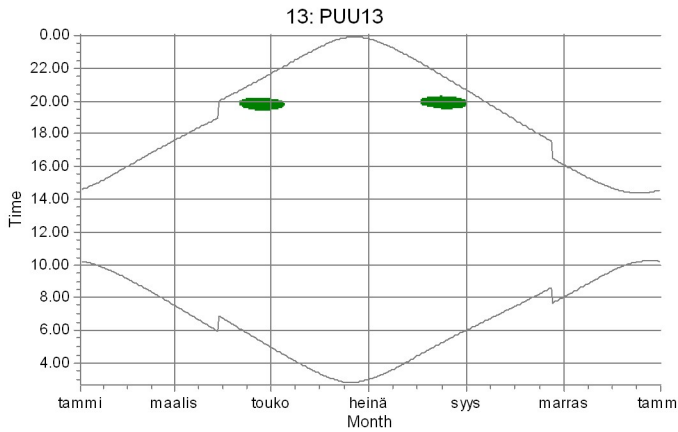
Shadow receptors



A: Laskentapiste A (Metsästysmaja)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102



Shadow receptors



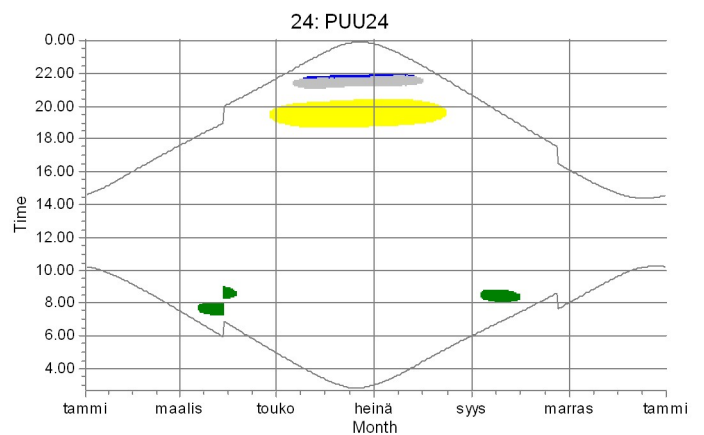
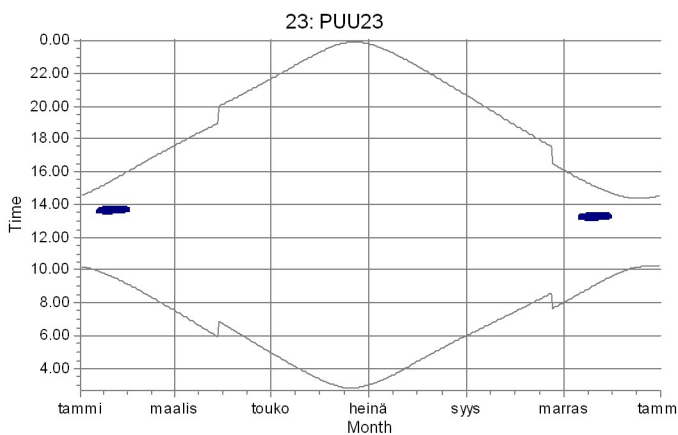
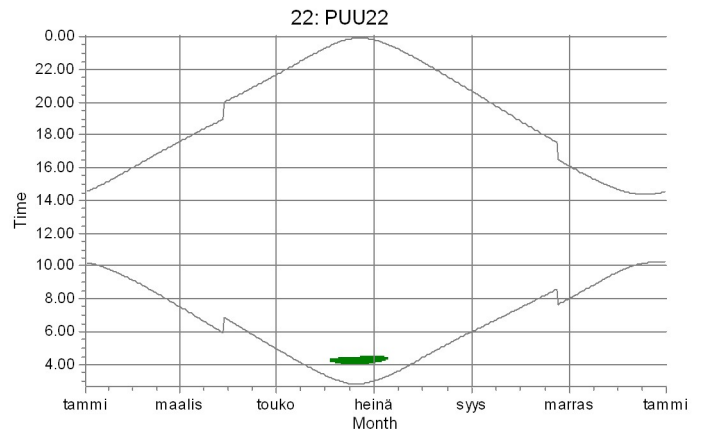
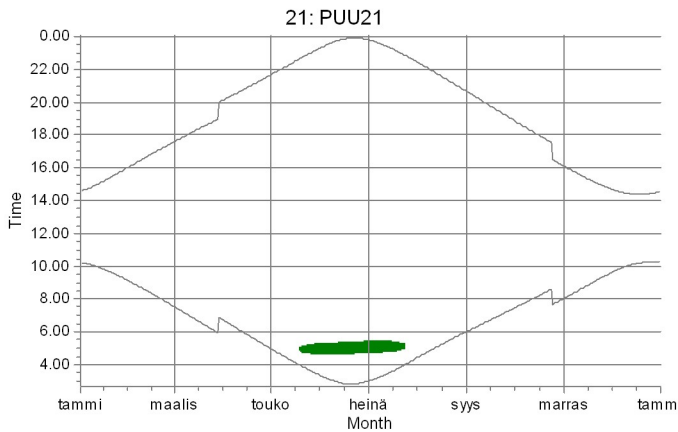
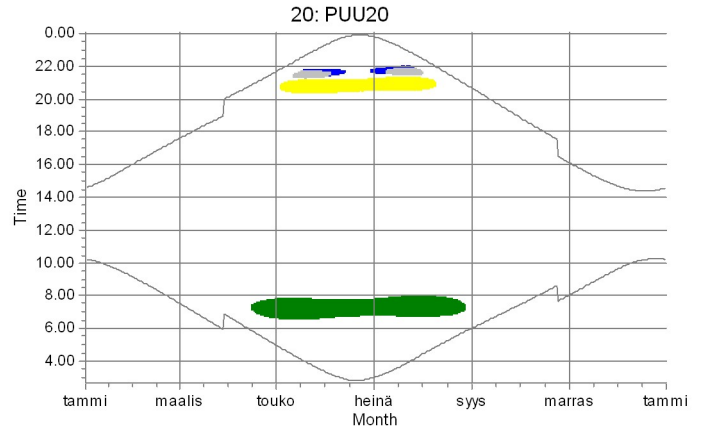
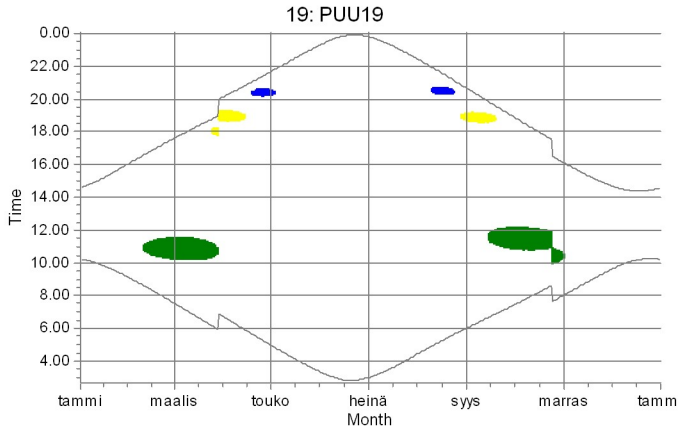
A: Laskentapiste A (Metsästysmaja)



B: Laskentapiste B (Ylivieskantie, Pohlola)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102



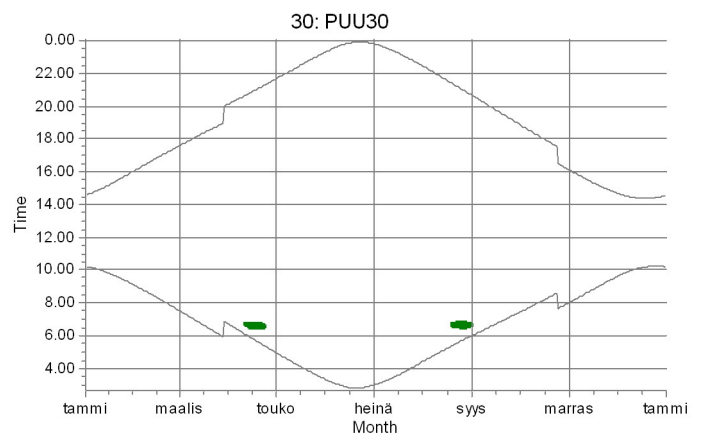
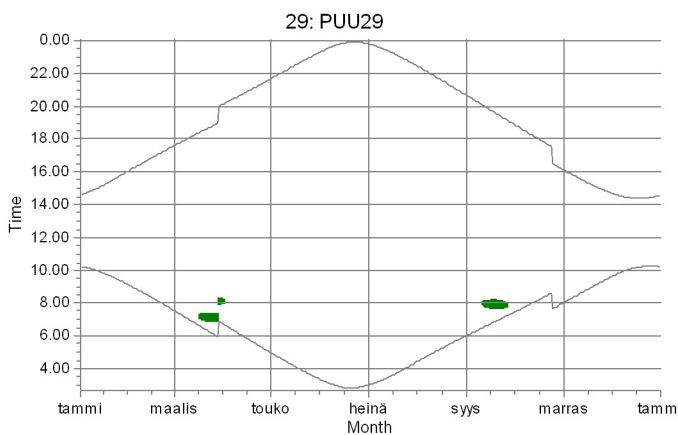
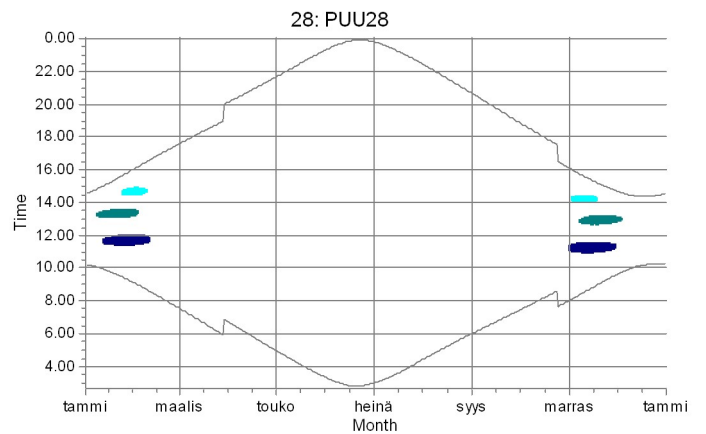
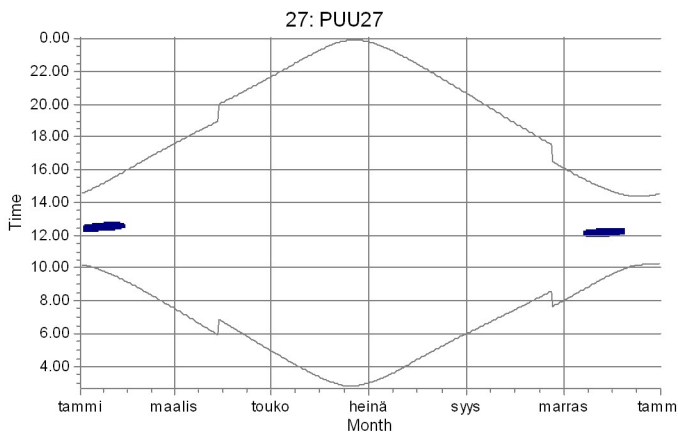
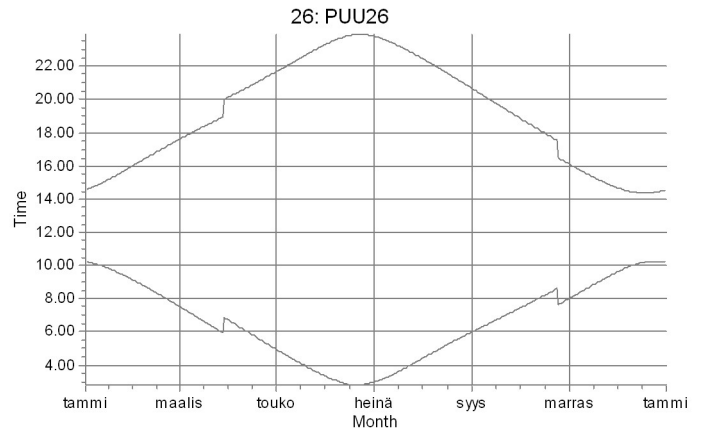
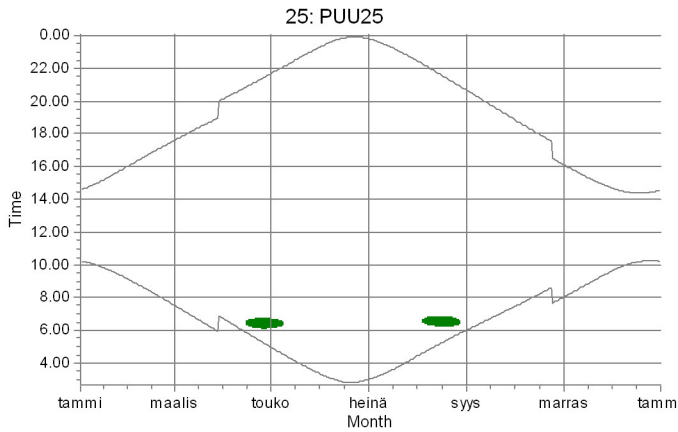
Shadow receptors

- A: Laskentapiste A (Metsästysmaja)
- B: Laskentapiste B (Ylivieskantie, Pohlola)
- C: Laskentapiste C (Perkkiontie 382)

- G: Lomarakennus G (Ollilantie, Siliakuru)
- L: Laskentapiste L (Perkkiontie, Ilmola)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102



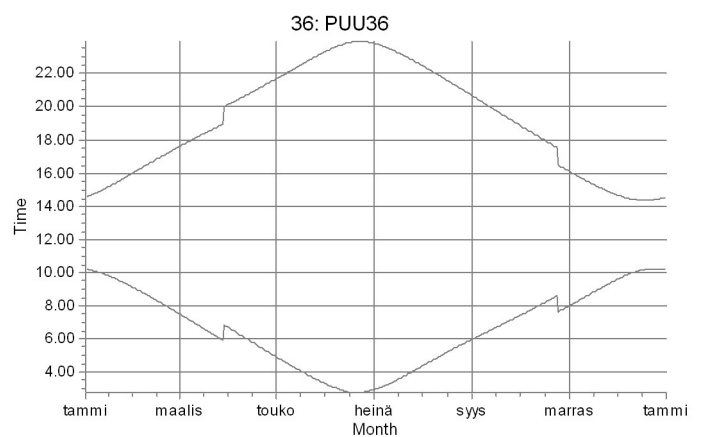
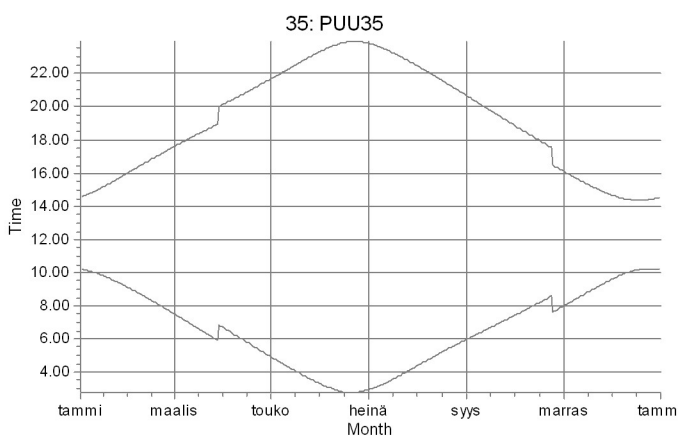
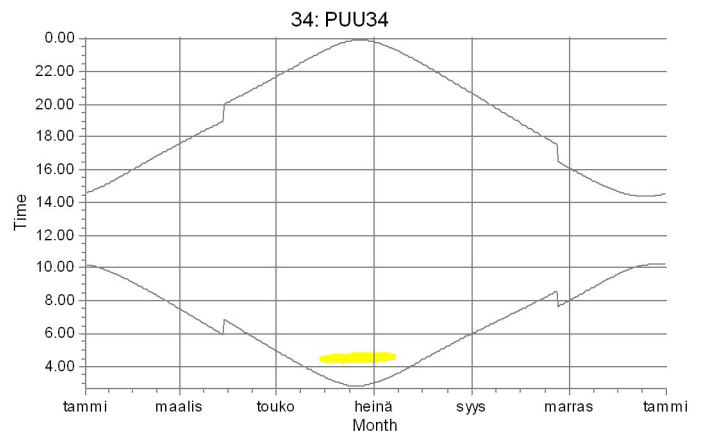
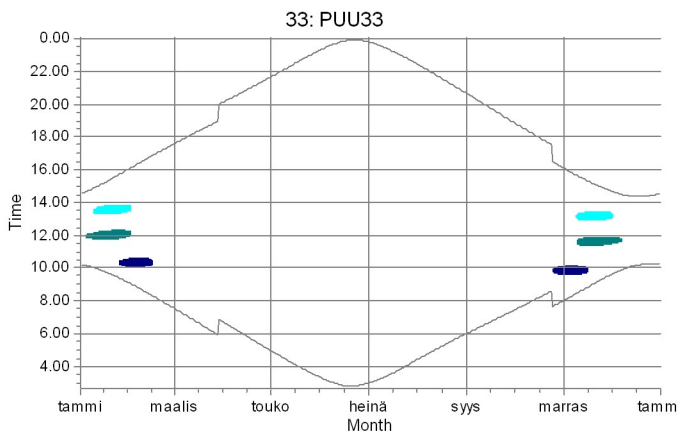
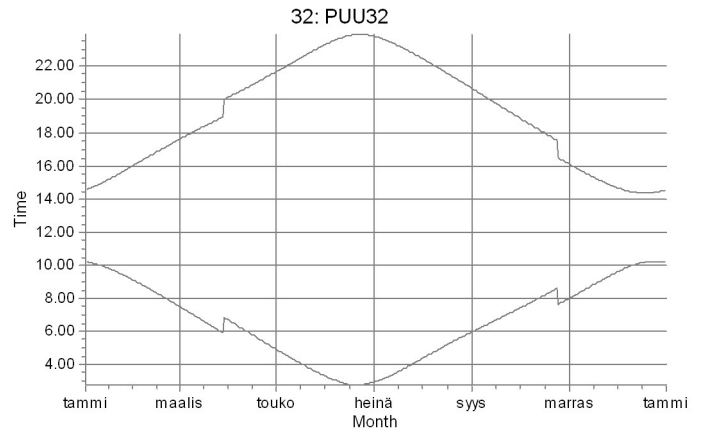
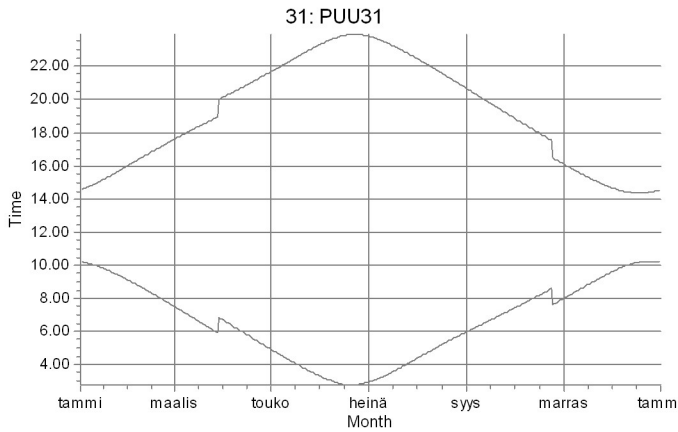
Shadow receptors

A: Laskentapiste A (Metsästysmaja)
 F: Asuinrakennus F (Ollilantie 112)

G: Lomarakennus G (Ollilantie, Siliakuru)
 M: Lomarakennus M (Riskalan metsätie)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102



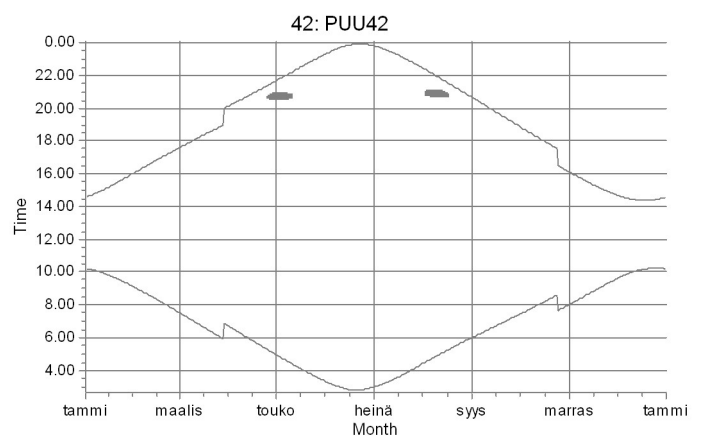
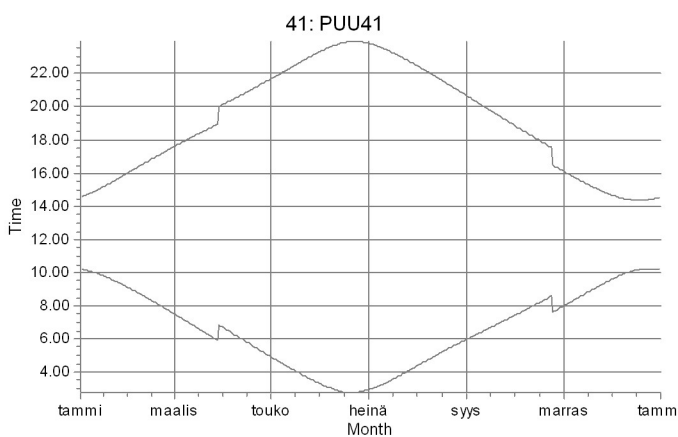
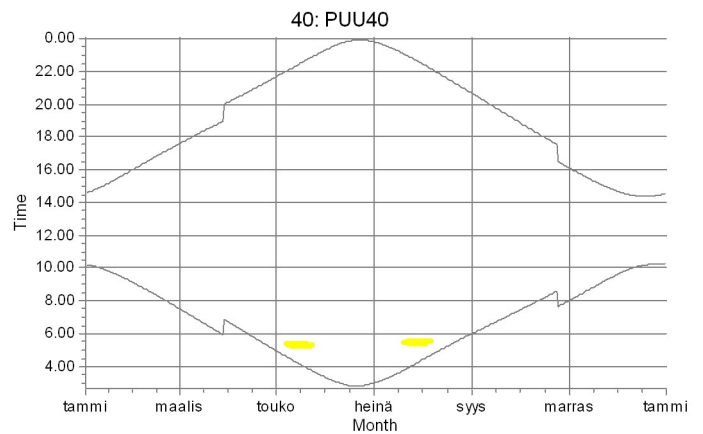
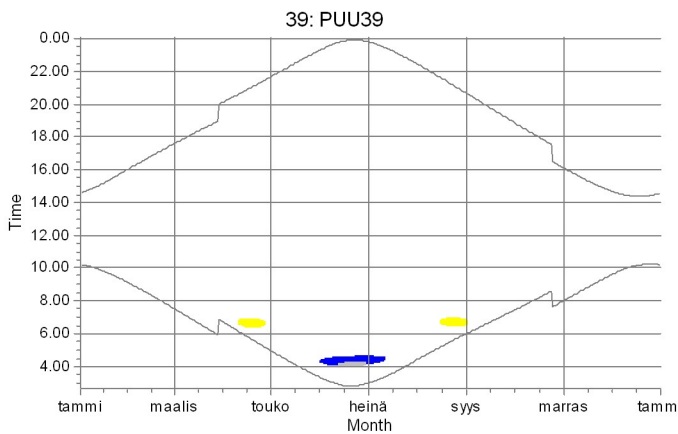
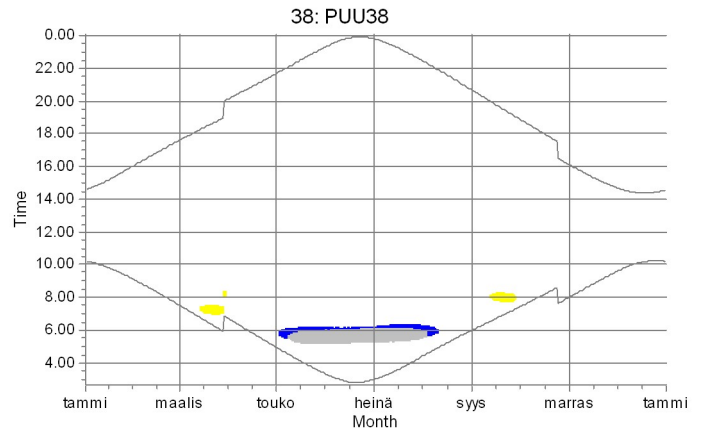
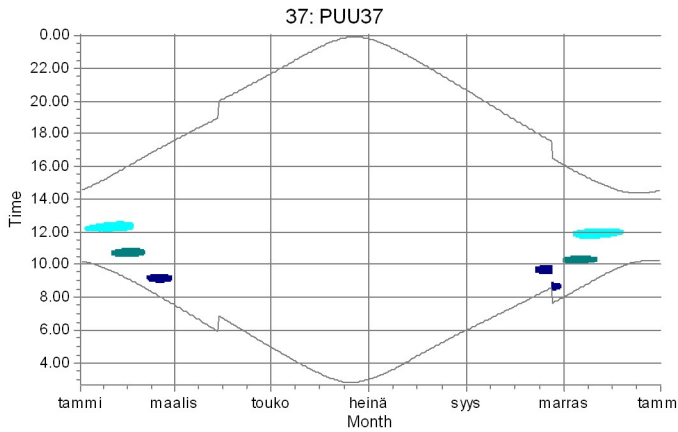
Shadow receptors

B: Laskentapiste B (Ylivieskantie, Pohlola)
 F: Asuinrakennus F (Ollilantie 112)

G: Lomarakenus G (Ollilantie, Siliakuru)
 M: Lomarakenus M (Riskalan metsatie)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102



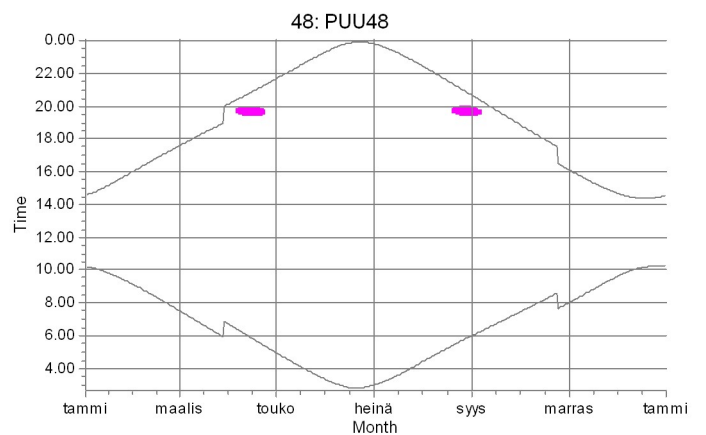
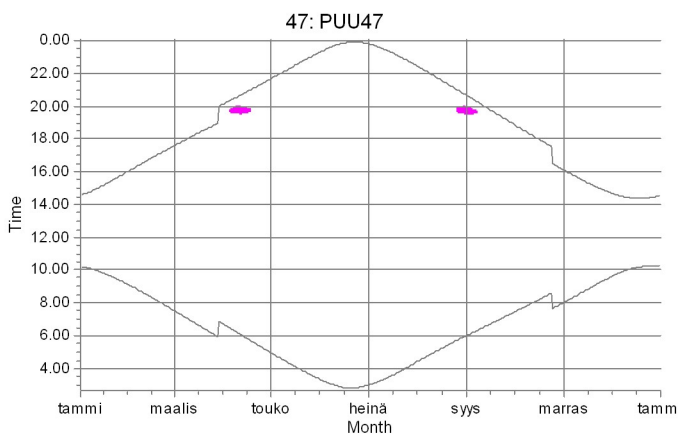
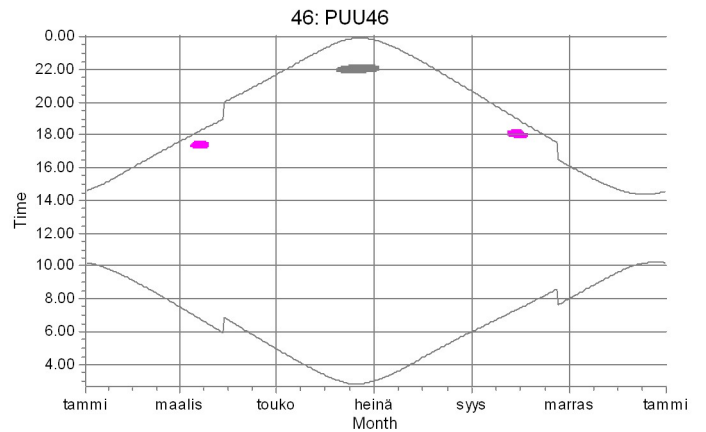
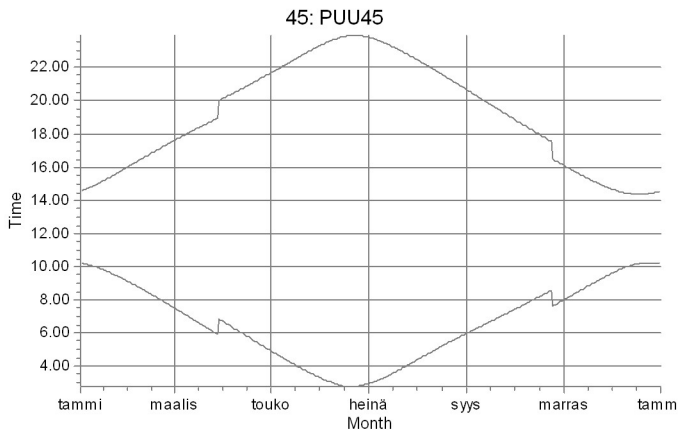
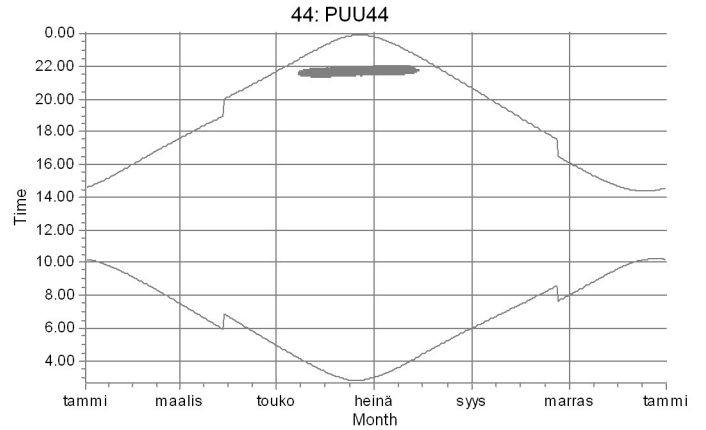
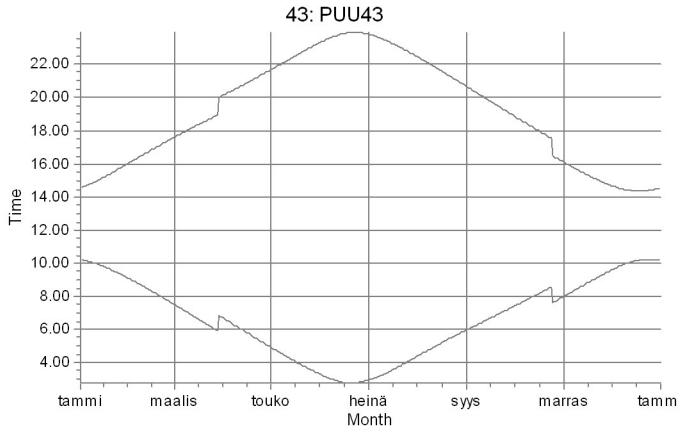
Shadow receptors

- B: Laskentapiste B (Ylivieskantie, Pohlola)
- C: Laskentapiste C (Perkkiontie 382)
- D: Asuinrakennus D (Alakylantie 243)
- F: Asuinrakennus F (Ollilantie 112)


- G: Lomarakenus G (Ollilantie, Siliakuru)
- L: Laskentapiste L (Perkkiontie, Ilmola)
- M: Lomarakenus M (Riskalan metsatie)


SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_no forest_20201102



Shadow receptors

 D: Asuinrakennus D (Alakylantie 243)

 E: Lomarakennus E (Kellokankaan metsätie)

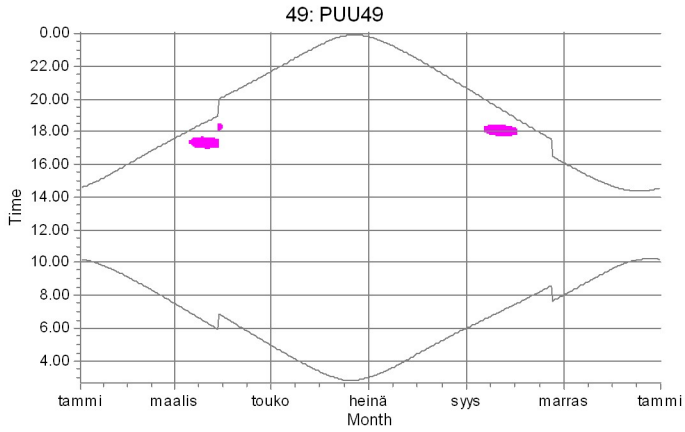
Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102

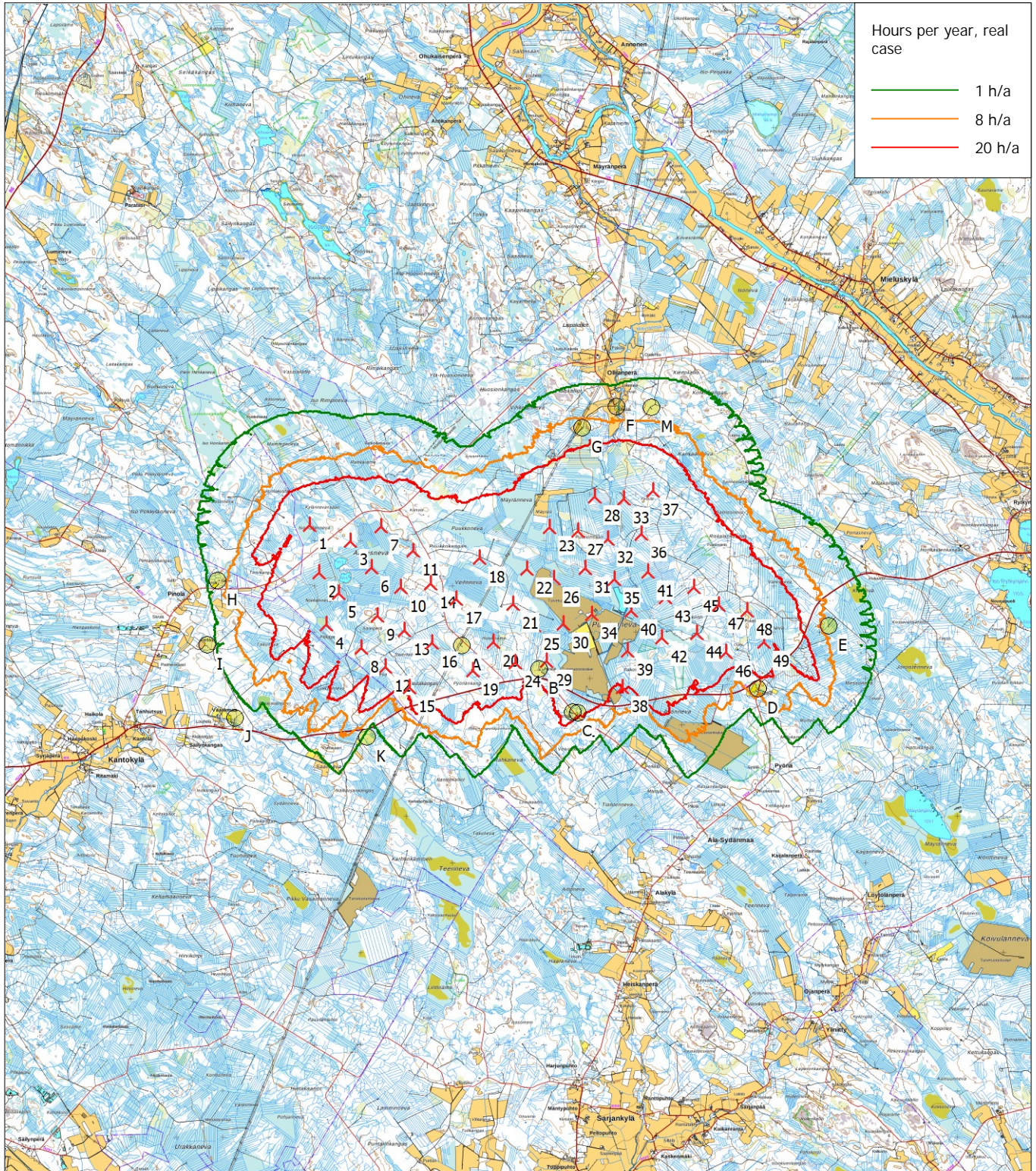


Shadow receptors

E: Lomarakennus E (Kellokankaan metsätie)

SHADOW - Map

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



0 2,5 5 7,5 10km

Map: Maastokarttarasteri50K , Print scale 1:125 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 403 440 North: 7 110 930

📍 New WTG 📍 Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Puutionsaari_Riskalankangas_20200327_1.wpo (2)

25.11.2020

Liite 6: Puutionsaari - Varjostusmallinnusten tulokset "real case, Luke forest"

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational hours are calculated from WTGs in calculation and wind distribution:

MERRA_basic_E25.335_N64.000 (3)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

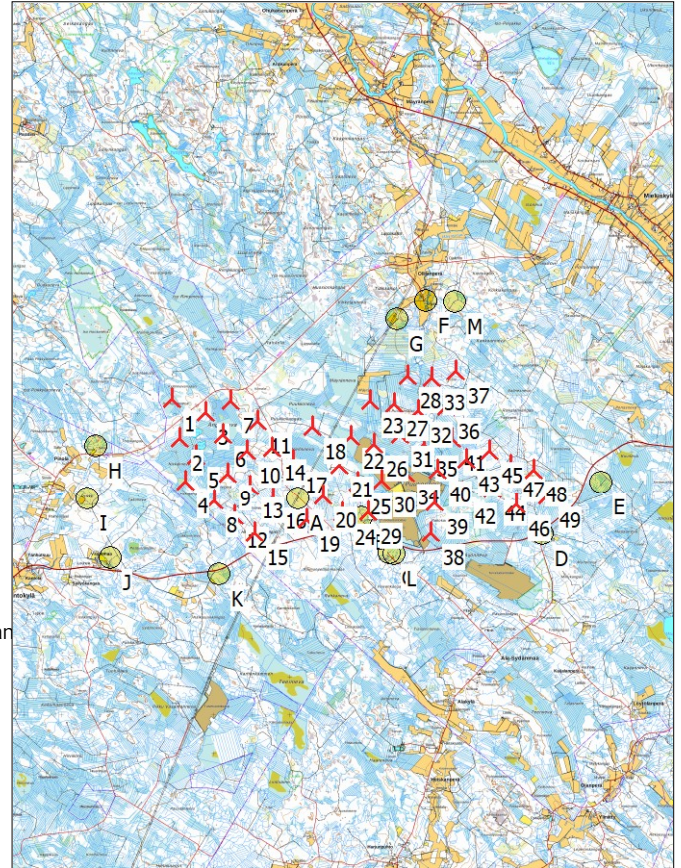
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Puutionsaari_Riskalan

Area object(s) used in calculation:

Area object (Luke2017_SE): (1)
Area object (Luke2017_SW): (2)
Area object (Luke2017_NE): (3)
Area object (Luke2017_NW): (4)

Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



🚩 New WTG

🚩 Shadow receptor

WTGs

	East	North	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1	398 896	7 112 332	92,5	PUU01	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
2	399 097	7 111 286	95,0	PUU02	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
3	399 784	7 111 972	97,5	PUU03	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
4	399 264	7 110 151	97,1	PUU04	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
5	399 536	7 110 832	96,4	PUU05	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
6	400 239	7 111 382	97,5	PUU06	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
7	400 444	7 112 292	97,0	PUU07	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
8	400 019	7 110 649	100,0	PUU08	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
9	400 380	7 110 348	100,0	PUU09	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
10	400 876	7 110 966	99,5	PUU10	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
11	401 152	7 111 752	100,0	PUU11	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
12	400 549	7 109 232	102,5	PUU12	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
13	400 953	7 110 020	102,5	PUU13	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
14	401 537	7 111 046	104,5	PUU14	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
15	401 068	7 108 792	105,3	PUU15	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
16	401 564	7 109 758	103,4	PUU16	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
17	402 089	7 110 702	107,5	PUU17	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
18	402 589	7 111 603	106,8	PUU18	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
19	402 455	7 109 148	112,5	PUU19	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
20	402 889	7 109 778	110,0	PUU20	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
21	403 318	7 110 593	108,0	PUU21	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
22	403 622	7 111 352	106,9	PUU22	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
23	404 117	7 112 276	103,6	PUU23	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
24	403 379	7 109 327	115,0	PUU24	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
25	403 790	7 110 129	108,4	PUU25	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

To be continued on next page...

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102

...continued from previous page

	East	North	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
26	404 210	7 111 152	105,6	PUU26	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
27	404 739	7 112 199	105,0	PUU27	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
28	405 100	7 112 943	100,4	PUU28	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
29	404 061	7 109 351	110,0	PUU29	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
30	404 420	7 110 174	107,1	PUU30	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
31	404 900	7 111 381	105,1	PUU31	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
32	405 395	7 112 030	102,4	PUU32	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
33	405 740	7 112 891	100,2	PUU33	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
34	405 042	7 110 380	105,8	PUU34	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
35	405 532	7 111 130	103,9	PUU35	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
36	406 114	7 112 133	103,1	PUU36	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
37	406 380	7 113 067	107,2	PUU37	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
38	405 707	7 108 791	110,8	PUU38	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
39	405 822	7 109 587	108,8	PUU39	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
40	405 893	7 110 455	104,9	PUU40	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
41	406 257	7 111 298	103,9	PUU41	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
42	406 558	7 109 872	106,6	PUU42	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
43	406 638	7 110 744	105,9	PUU43	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
44	407 324	7 109 954	108,4	PUU44	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
45	407 269	7 110 957	112,6	PUU45	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
46	407 963	7 109 542	113,6	PUU46	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
47	407 809	7 110 582	116,1	PUU47	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
48	408 414	7 110 457	120,0	PUU48	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
49	408 786	7 109 772	117,5	PUU49	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width [m]	Height [m]	Elevation a.g.l. [m]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
A	Laskentapiste A (Metsästysmaja)	402 212	7 109 691	112,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Autiotalo B (Ylivieskantie, Pohlola)	403 894	7 109 182	114,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Autiotalo C (Perkkiontie 382)	404 620	7 108 247	113,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Asuinrakennus D (Alakylantie 243)	408 659	7 108 752	119,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Lomarakennus E (Kellokankaan metsatie)	410 199	7 110 115	122,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus F (Ollilantie 112)	405 573	7 114 900	87,7	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Lomarakennus G (Ollilantie, Siliakuru)	404 837	7 114 441	100,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus H (Pinolantie 406)	396 893	7 111 098	88,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Asuinrakennus I (Kortenevantie 116)	396 670	7 109 704	87,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Asuinrakennus J (Haapavesitie 1406)	397 273	7 108 116	89,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Lomarakennus K (Kurunoja)	400 152	7 107 685	102,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Muu käyttöt. L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus M (Riskalan metsatie)	406 348	7 114 887	102,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Laskentapiste A (Metsästysmaja)	65:52
B	Autiotalo B (Ylivieskantie, Pohlola)	51:30
C	Autiotalo C (Perkkiontie 382)	30:25
D	Asuinrakennus D (Alakylantie 243)	12:35
E	Lomarakennus E (Kellokankaan metsatie)	0:00
F	Asuinrakennus F (Ollilantie 112)	4:51
G	Lomarakennus G (Ollilantie, Siliakuru)	0:00
H	Asuinrakennus H (Pinolantie 406)	0:00
I	Asuinrakennus I (Kortenevantie 116)	0:00
J	Asuinrakennus J (Haapavesitie 1406)	0:00
K	Lomarakennus K (Kurunoja)	0:00
L	Muu käyttöt. L (Perkkiontie, Ilmola)	25:16
M	Lomarakennus M (Riskalan metsatie)	0:00

SHADOW - Main Result

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	PUU01	0:00	0:00
2	PUU02	0:00	0:00
3	PUU03	0:00	0:00
4	PUU04	0:00	0:00
5	PUU05	0:00	0:00
6	PUU06	0:00	0:00
7	PUU07	0:00	0:00
8	PUU08	6:53	1:25
9	PUU09	11:16	2:30
10	PUU10	0:00	0:00
11	PUU11	0:00	0:00
12	PUU12	12:12	2:21
13	PUU13	26:46	5:55
14	PUU14	0:00	0:00
15	PUU15	0:00	0:00
16	PUU16	136:07	33:43
17	PUU17	12:46	3:26
18	PUU18	0:00	0:00
19	PUU19	102:31	22:40
20	PUU20	19:32	5:15
21	PUU21	0:00	0:00
22	PUU22	0:00	0:00
23	PUU23	0:00	0:00
24	PUU24	183:37	48:22
25	PUU25	0:00	0:00
26	PUU26	0:00	0:00
27	PUU27	0:00	0:00
28	PUU28	16:54	2:20
29	PUU29	0:00	0:00
30	PUU30	0:00	0:00
31	PUU31	0:00	0:00
32	PUU32	0:00	0:00
33	PUU33	17:53	2:30
34	PUU34	17:45	4:50
35	PUU35	0:00	0:00
36	PUU36	0:00	0:00
37	PUU37	0:00	0:00
38	PUU38	90:20	23:11
39	PUU39	23:20	5:49
40	PUU40	10:01	2:32
41	PUU41	0:00	0:00
42	PUU42	7:32	1:49
43	PUU43	0:00	0:00
44	PUU44	31:06	8:38
45	PUU45	0:00	0:00
46	PUU46	8:08	2:26
47	PUU47	0:00	0:00
48	PUU48	0:00	0:00
49	PUU49	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: A - Laskentapiste A (Metsästysmaja)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June					
1	10.13	09.04	07.31	10.17 (19)	06.42	18.56 (8)	04.57	18.27 (16)	03.19	18.40 (16)	
	14.35	16.06	17.36	74 11.31 (19)	20.09	18.14 (8)	21.41	112 20.20 (9)	23.20	51 19.31 (16)	
2	10.12	09.00	07.28	10.17 (19)	06.39	18.58 (8)	04.53	18.27 (16)	03.16	18.40 (16)	
	14.37	16.09	17.39	74 11.31 (19)	20.12	19.13 (8)	21.45	108 20.18 (9)	23.23	50 19.30 (16)	
3	10.10	08.57	07.25	10.16 (19)	06.35	18.59 (8)	04.50	18.27 (16)	03.14	18.42 (16)	
	14.39	16.12	17.42	74 11.30 (19)	20.15	19.10 (8)	21.48	97 20.04 (13)	23.25	48 19.30 (16)	
4	10.09	08.54	07.21	10.16 (19)	06.32	19.03 (8)	04.46	18.27 (16)	03.12	18.42 (16)	
	14.42	16.16	17.45	75 11.31 (19)	20.18	19.07 (8)	21.51	96 20.03 (13)	23.28	47 19.29 (16)	
5	10.08	08.51	07.18	10.15 (19)	06.28	18.27 (16)	04.43	18.27 (16)	03.09	18.43 (16)	
	14.44	16.19	17.48	76 11.31 (19)	20.21	21.54	94 20.01 (13)	23.31	46 19.29 (16)		
6	10.07	08.48	07.14	10.15 (19)	06.24	18.26 (16)	04.39	18.26 (16)	03.07	18.43 (16)	
	14.46	16.22	17.51	75 11.30 (19)	20.24	21.57	94 20.00 (13)	23.33	45 19.28 (16)		
7	10.05	08.45	07.11	10.15 (19)	06.21	18.26 (16)	04.36	18.26 (16)	03.05	18.45 (16)	
	14.49	16.26	17.55	76 11.31 (19)	20.27	22.01	91 19.58 (13)	23.35	43 19.28 (16)		
8	10.03	08.42	07.07	10.14 (19)	06.17	18.26 (16)	04.33	18.26 (16)	03.03	18.45 (16)	
	14.51	16.29	17.58	85 17.21 (12)	20.30	22.04	85 19.55 (13)	23.38	43 19.28 (16)		
9	10.02	08.39	07.04	10.14 (19)	06.14	19.02 (16)	04.29	18.26 (16)	03.01	18.46 (16)	
	14.54	16.32	18.01	91 17.24 (12)	20.33	9 19.11 (16)	22.07	75 19.50 (13)	23.40	42 19.28 (16)	
10	10.00	08.35	10.48 (19)	07.00	10.15 (19)	06.10	18.56 (16)	04.26	18.26 (16)	02.57	18.47 (16)
	14.56	16.35	15 11.03 (19)	18.04	95 17.28 (12)	20.36	22 19.18 (16)	22.10	72 19.38 (16)	23.42	40 19.27 (16)
11	09.58	08.32	10.43 (19)	06.57	10.14 (19)	06.07	18.52 (16)	04.23	18.26 (16)	02.56	18.48 (16)
	14.59	16.39	25 11.08 (19)	18.07	98 17.29 (12)	20.39	30 19.22 (16)	22.14	71 19.37 (16)	23.44	39 19.27 (16)
12	09.56	08.29	10.40 (19)	06.53	10.15 (19)	06.03	18.48 (16)	04.19	18.27 (16)	02.54	18.48 (16)
	15.02	16.42	32 11.12 (19)	18.10	98 17.30 (12)	20.42	47 19.58 (13)	22.17	71 19.38 (16)	23.46	39 19.28 (16)
13	09.54	08.26	10.37 (19)	06.50	10.15 (19)	06.00	18.46 (16)	04.16	18.27 (16)	02.53	18.50 (16)
	15.05	16.45	37 11.14 (19)	18.13	99 17.30 (12)	20.45	59 20.02 (13)	22.20	70 19.37 (16)	23.48	37 19.27 (16)
14	09.52	08.22	10.34 (19)	06.46	10.14 (19)	05.56	18.43 (16)	04.13	18.27 (16)	02.52	18.50 (16)
	15.08	16.49	42 11.16 (19)	18.16	100 17.30 (12)	20.48	68 20.03 (13)	22.23	69 19.36 (16)	23.49	36 19.26 (16)
15	09.49	08.19	10.32 (19)	06.43	10.15 (19)	05.53	18.42 (16)	04.10	18.28 (16)	02.51	18.51 (16)
	15.11	16.52	46 11.18 (19)	18.19	98 17.30 (12)	20.51	76 20.13 (9)	22.27	69 19.37 (16)	23.51	36 19.27 (16)
16	09.47	08.16	10.31 (19)	06.39	10.15 (19)	05.49	18.40 (16)	04.06	18.28 (16)	02.50	18.51 (16)
	15.14	16.55	49 11.20 (19)	18.22	97 17.30 (12)	20.54	86 20.16 (9)	22.30	68 19.36 (16)	23.52	35 19.26 (16)
17	09.45	08.12	10.29 (19)	06.35	10.15 (19)	05.45	18.38 (16)	04.03	18.29 (16)	02.50	18.51 (16)
	15.17	16.58	53 11.22 (19)	18.25	95 17.29 (12)	20.57	96 20.18 (9)	22.33	67 19.36 (16)	23.53	35 19.26 (16)
18	09.42	08.09	10.27 (19)	06.32	10.16 (19)	05.42	18.37 (16)	04.00	18.29 (16)	02.49	18.52 (16)
	15.20	17.01	56 11.23 (19)	18.28	93 17.29 (12)	21.00	102 20.21 (9)	22.36	66 19.35 (16)	23.54	35 19.27 (16)
19	09.40	08.06	10.27 (19)	06.28	10.16 (19)	05.38	18.36 (16)	03.57	18.30 (16)	02.49	18.52 (16)
	15.23	17.05	58 11.25 (19)	18.30	91 17.28 (12)	21.03	109 20.25 (9)	22.40	66 19.36 (16)	23.55	35 19.27 (16)
20	09.37	08.02	10.25 (19)	06.25	10.18 (19)	05.35	18.34 (16)	03.54	18.30 (16)	02.49	18.53 (16)
	15.26	17.08	60 11.25 (19)	18.33	85 17.27 (12)	21.07	111 20.25 (9)	22.43	65 19.35 (16)	23.55	34 19.27 (16)
21	09.35	07.59	10.24 (19)	06.21	10.18 (19)	05.31	18.33 (16)	03.50	18.31 (16)	02.49	18.53 (16)
	15.29	17.11	62 11.26 (19)	18.36	81 17.25 (12)	21.10	113 20.26 (9)	22.46	64 19.35 (16)	23.55	34 19.27 (16)
22	09.32	07.55	10.22 (19)	06.18	10.20 (19)	05.28	18.32 (16)	03.47	18.32 (16)	02.49	18.53 (16)
	15.33	17.14	65 11.27 (19)	18.39	75 18.05 (8)	21.13	114 20.26 (9)	22.49	63 19.35 (16)	23.56	34 19.27 (16)
23	09.29	07.52	10.22 (19)	06.14	10.20 (19)	05.24	18.32 (16)	03.44	18.32 (16)	02.50	18.54 (16)
	15.36	17.17	66 11.28 (19)	18.42	75 18.07 (8)	21.16	114 20.26 (9)	22.53	61 19.33 (16)	23.56	34 19.28 (16)
24	09.27	07.49	10.21 (19)	06.11	10.21 (19)	05.21	18.30 (16)	03.41	18.33 (16)	02.50	18.53 (16)
	15.39	17.21	68 11.29 (19)	18.45	69 18.10 (8)	21.19	115 20.25 (9)	22.56	60 19.33 (16)	23.55	35 19.28 (16)
25	09.24	07.45	10.19 (19)	06.07	10.24 (19)	05.17	18.29 (16)	03.38	18.34 (16)	02.51	18.54 (16)
	15.42	17.24	70 11.29 (19)	18.48	59 18.13 (8)	21.22	116 20.25 (9)	22.59	59 19.33 (16)	23.55	34 19.28 (16)
26	09.21	07.42	10.19 (19)	06.04	10.26 (19)	05.14	18.29 (16)	03.35	18.35 (16)	02.52	18.53 (16)
	15.46	17.27	71 11.30 (19)	18.51	58 18.16 (8)	21.25	116 20.25 (9)	23.02	58 19.33 (16)	23.55	35 19.28 (16)
27	09.18	07.38	10.18 (19)	06.00	10.29 (19)	05.10	18.29 (16)	03.33	18.36 (16)	02.53	18.53 (16)
	15.49	17.30	72 11.30 (19)	18.54	54 18.18 (8)	21.29	115 20.24 (9)	23.05	56 19.32 (16)	23.54	36 19.29 (16)
28	09.15	07.35	10.17 (19)	05.56	10.33 (19)	05.07	18.28 (16)	03.30	18.36 (16)	02.55	18.53 (16)
	15.52	17.33	73 11.30 (19)	18.57	43 18.17 (8)	21.32	116 20.24 (9)	23.08	56 19.32 (16)	23.53	37 19.30 (16)
29	09.12		06.53	18.56 (8)	05.03	18.28 (16)	03.27	18.37 (16)	02.56	18.53 (16)	
	15.56		20.00	21 19.17 (8)	21.35	115 20.23 (9)	23.11	55 19.32 (16)	23.52	37 19.30 (16)	
30	09.10		06.49	18.55 (8)	05.00	18.27 (16)	03.24	18.38 (16)	02.58	18.53 (16)	
	15.59		20.03	21 19.16 (8)	21.38	115 20.22 (9)	23.14	53 19.31 (16)	23.51	38 19.31 (16)	
31	09.07		06.46	18.56 (8)			03.22	18.38 (16)			
	16.02		20.06	20 19.16 (8)			23.17	52 19.30 (16)			
Potential sun hours	171	238	363	451	570	624					
Total, worst case		1020	2325	2012	2243	1170					
Sun reduction		0,33	0,32	0,41	0,47	0,48					
Oper. time red.		0,99	0,99	0,99	0,99	0,99					
Wind dir. red.		0,67	0,65	0,62	0,62	0,62					
Total reduction		0,22	0,21	0,25	0,29	0,29					
Total, real		225	485	503	647	344					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: A - Laskentapiste A (Metsästysmaja)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December									
1	02.59	18.52 (16)	04.24	18.37 (16)	06.00	18.51 (16)	07.26	10.53 (19)	08.00		10.19 (19)	09.35			
	23.49	39	19.31 (16)	22.27	71	19.48 (16)	20.40	30	19.21 (16)	18.53	18.09 (12)	16.07	12	10.31 (19)	14.43
2	03.01	18.52 (16)	04.28	18.37 (16)	06.03	18.54 (16)	07.29	99	18.54 (16)	07.29	10.53 (19)	08.04			09.38
	23.48	40	19.32 (16)	22.24	71	19.48 (16)	20.36	22	19.16 (16)	18.49	18.08 (12)	16.04			14.41
3	03.01	18.52 (16)	04.31	18.36 (16)	06.06	19.00 (16)	07.32		19.00 (16)	07.32	10.52 (19)	08.07			09.41
	23.46	41	19.33 (16)	22.20	72	19.48 (16)	20.32	9	19.09 (16)	18.46	18.06 (12)	16.00			14.39
4	03.03	18.51 (16)	04.34	18.36 (16)	06.09		07.35			18.46	10.52 (19)	08.10			09.44
	23.45	42	19.33 (16)	22.17	81	20.03 (13)	20.29			18.42	18.03 (12)	15.57			14.37
5	03.05	18.50 (16)	04.37	18.36 (16)	06.12		07.38			18.36	10.51 (19)	08.13			09.46
	23.43	43	19.33 (16)	22.14	87	20.06 (13)	20.25			18.39	18.00 (12)	15.54			14.35
6	03.08	18.50 (16)	04.40	18.36 (16)	06.15		07.41			18.36	10.51 (19)	08.17			09.49
	23.41	45	19.35 (16)	22.10	92	20.08 (13)	20.22			18.35	17.56 (12)	15.51			14.33
7	03.10	18.50 (16)	04.44	18.35 (16)	06.18		07.44			18.35	10.50 (19)	08.20			09.51
	23.39	46	19.36 (16)	22.07	94	20.09 (13)	20.18			18.32	12.06 (19)	15.48			14.32
8	03.12	18.49 (16)	04.47	18.36 (16)	06.20		07.47		18.58 (8)	18.28	10.51 (19)	08.23			09.54
	23.37	47	19.36 (16)	22.03	95	20.11 (13)	20.15	2	19.00 (8)	18.28	12.07 (19)	15.45			14.30
9	03.15	18.49 (16)	04.50	18.36 (16)	06.23		07.50		18.53 (8)	18.25	10.51 (19)	08.26			09.56
	23.34	48	19.37 (16)	22.00	96	20.12 (13)	20.11	11	19.04 (8)	18.25	12.06 (19)	15.41			14.29
10	03.18	18.49 (16)	04.53	18.35 (16)	06.26		07.53		18.50 (8)	18.25	10.50 (19)	08.30			09.58
	23.32	48	19.37 (16)	21.57	102	20.23 (9)	20.08	15	19.05 (8)	18.21	12.05 (19)	15.38			14.28
11	03.20	18.48 (16)	04.56	18.35 (16)	06.29		07.56		18.49 (8)	18.21	10.50 (19)	08.33			10.00
	23.29	50	19.38 (16)	21.53	110	20.27 (9)	20.04	17	19.06 (8)	18.18	12.05 (19)	15.35			14.27
12	03.23	18.48 (16)	04.59	18.35 (16)	06.32		07.59		18.48 (8)	18.18	10.50 (19)	08.36			10.02
	23.27	51	19.39 (16)	21.50	114	20.29 (9)	20.00	19	19.07 (8)	18.14	12.04 (19)	15.32			14.26
13	03.26	18.47 (16)	05.02	18.36 (16)	06.35		08.02		18.47 (8)	18.11	10.50 (19)	08.39			10.04
	23.24	53	19.40 (16)	21.46	114	20.30 (9)	19.57	20	19.07 (8)	18.11	12.03 (19)	15.29			14.25
14	03.29	18.46 (16)	05.06	18.35 (16)	06.38		08.05		18.46 (8)	18.08	10.51 (19)	08.43			10.06
	23.22	54	19.40 (16)	21.43	115	20.30 (9)	19.53	22	19.08 (8)	18.08	12.03 (19)	15.26			14.24
15	03.31	18.46 (16)	05.09	18.35 (16)	06.41		08.08		11.24 (19)	18.08	10.51 (19)	08.46			10.07
	23.19	55	19.41 (16)	21.39	116	20.31 (9)	19.50	41	19.07 (8)	18.04	12.02 (19)	15.23			14.23
16	03.34	18.45 (16)	05.12	18.36 (16)	06.43		08.11		11.18 (19)	18.01	10.51 (19)	08.49			10.09
	23.16	56	19.41 (16)	21.36	116	20.32 (9)	19.46	52	19.06 (8)	18.01	12.01 (19)	15.20			14.23
17	03.37	18.44 (16)	05.15	18.35 (16)	06.46		08.14		11.15 (19)	18.01	10.51 (19)	08.52			10.10
	23.13	58	19.42 (16)	21.32	116	20.31 (9)	19.43	57	19.05 (8)	17.57	12.00 (19)	15.18			14.22
18	03.40	18.44 (16)	05.18	18.36 (16)	06.49		08.17		11.12 (19)	18.01	10.53 (19)	08.56			10.11
	23.11	58	19.42 (16)	21.29	116	20.32 (9)	19.39	59	19.02 (8)	17.54	12.00 (19)	15.15			14.22
19	03.43	18.44 (16)	05.21	18.37 (16)	06.52		08.20		11.10 (19)	18.01	10.53 (19)	08.59			10.12
	23.08	59	19.43 (16)	21.25	115	20.32 (9)	19.36	65	18.58 (8)	17.50	11.59 (19)	15.12			14.22
20	03.46	18.43 (16)	05.24	18.37 (16)	06.55		08.23		11.07 (19)	18.01	10.53 (19)	09.02			10.13
	23.05	60	19.43 (16)	21.22	115	20.32 (9)	19.32	73	18.54 (8)	17.47	11.57 (19)	15.09			14.22
21	03.50	18.42 (16)	05.27	18.37 (16)	06.58		08.26		11.05 (19)	18.01	10.55 (19)	09.05			10.14
	23.02	62	19.44 (16)	21.18	114	20.31 (9)	19.28	76	18.50 (8)	17.43	11.57 (19)	15.07			14.23
22	03.53	18.42 (16)	05.30	18.38 (16)	07.01		08.29		11.03 (19)	18.01	10.55 (19)	09.08			10.14
	22.59	63	19.45 (16)	21.15	112	20.30 (9)	19.25	80	18.10 (12)	17.40	11.55 (19)	15.04			14.23
23	03.56	18.41 (16)	05.33	18.39 (16)	07.03		08.32		11.02 (19)	18.01	10.57 (19)	09.11			10.15
	22.56	64	19.45 (16)	21.11	111	20.30 (9)	19.21	84	18.11 (12)	17.37	11.54 (19)	15.01			14.24
24	03.59	18.41 (16)	05.36	18.40 (16)	07.06		08.35		11.01 (19)	18.01	10.58 (19)	09.15			10.15
	22.53	65	19.46 (16)	21.08	108	20.28 (9)	19.18	87	18.11 (12)	17.33	11.52 (19)	14.59			14.24
25	04.02	18.40 (16)	05.39	18.40 (16)	07.09		08.38		11.00 (19)	18.01	10.59 (19)	09.18			10.15
	22.49	66	19.46 (16)	21.04	102	20.24 (9)	19.14	92	18.12 (12)	17.30	11.51 (19)	14.56			14.25
26	04.05	18.40 (16)	05.42	18.41 (16)	07.12		08.41		11.00 (19)	18.01	10.50 (19)	09.21			10.15
	22.46	67	19.47 (16)	21.01	95	20.21 (9)	19.11	95	18.12 (12)	17.27	11.49 (19)	14.54			14.26
27	04.08	18.39 (16)	05.45	18.42 (16)	07.15		08.44		11.00 (19)	18.01	10.50 (19)	09.24			10.15
	22.43	67	19.46 (16)	20.57	86	20.18 (9)	19.07	97	18.11 (12)	17.23	11.48 (19)	14.51			14.27
28	04.12	18.39 (16)	05.48	18.44 (16)	07.18		08.47		11.00 (19)	18.01	10.50 (19)	09.27			10.15
	22.40	68	19.47 (16)	20.54	74	20.15 (9)	19.04	98	18.11 (12)	17.20	11.47 (19)	14.49			14.28
29	04.15	18.38 (16)	05.51	18.44 (16)	07.21		08.50		11.00 (19)	18.01	10.50 (19)	09.30			10.15
	22.37	69	19.47 (16)	20.50	67	20.04 (13)	19.00	99	18.10 (12)	17.17	11.46 (19)	14.47			14.30
30	04.18	18.38 (16)	05.54	18.46 (16)	07.24		08.53		11.00 (19)	18.01	10.50 (19)	09.33			10.14
	22.33	70	19.48 (16)	20.47	57	20.01 (13)	18.57	100	18.10 (12)	17.13	11.45 (19)	14.45			14.31
31	04.21	18.38 (16)	05.57	18.48 (16)	07.27		08.56		11.00 (19)	18.01	10.50 (19)	09.36			10.14
	22.30	70	19.48 (16)	20.43	47	19.58 (13)	18.54		11.00 (19)	18.01	10.50 (19)	09.39			14.33
Potential sun hours	609		508		393		305		198						137
Total, worst case	1724		2981		1422		2068		12						
Sun reduction	0,38		0,31		0,33		0,35		0,24						
Oper. time red.	0,99		0,99		0,99		0,99		0,99						
Wind dir. red.	0,62		0,62		0,64		0,66		0,67						
Total reduction	0,23		0,19		0,21		0,23		0,16						
Total, real	401		571		299		474		2						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: B - Laskentapiste B (Ylivieskantie, Pohola)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	03.19
	14.35	16.06	17.36	20.09	21.41	19.08 (24)
2	10.11	09.00	07.28	06.39	04.53	03.16
	14.37	16.09	17.39	20.12	21.44	19.51 (24)
3	10.10	08.57	07.24	06.35	04.50	03.14
	14.39	16.12	17.42	20.15	21.48	19.53 (24)
4	10.09	08.54	07.21	06.31	04.46	03.11
	14.41	16.15	17.45	20.18	21.51	19.55 (24)
5	10.08	08.51	07.17	06.28	04.43	03.09
	14.44	16.19	17.48	20.21	21.54	19.56 (24)
6	10.06	08.48	07.14	06.24	04.39	03.07
	14.46	16.22	17.51	20.24	21.57	19.59 (24)
7	10.05	08.45	07.10	06.21	04.36	03.05
	14.48	16.25	17.54	20.27	22.00	20.00 (24)
8	10.03	08.42	07.07	06.17	04.33	03.03
	14.51	16.29	17.57	20.30	22.04	20.01 (24)
9	10.01	08.38	07.03	06.14	04.29	03.01
	14.54	16.32	18.00	20.33	22.07	20.02 (24)
10	10.00	08.35	07.00	06.10	04.26	02.57
	14.56	16.35	18.03	20.36	22.10	20.03 (24)
11	09.58	08.32	06.56	06.07	04.23	02.56
	14.59	16.39	18.06	20.39	8 06.47 (39)	21.25 (17)
12	09.56	08.29	06.53	06.03	04.19	02.54
	15.02	16.42	18.09	20.42	13 06.49 (39)	21.28 (17)
13	09.54	08.25	06.49	05.59	04.16	02.53
	15.05	16.45	18.12	20.45	17 06.50 (39)	21.31 (17)
14	09.51	08.22	06.46	05.56	04.13	02.52
	15.08	16.48	18.15	20.48	20 06.50 (39)	21.33 (17)
15	09.49	08.19	06.42	05.52	04.09	02.51
	15.11	16.52	18.18	7 07.22 (38)	22.27	21.36 (17)
16	09.47	08.15	06.39	05.49	04.06	02.50
	15.14	16.55	18.21	13 07.24 (38)	22.30	21.38 (17)
17	09.45	08.12	06.35	05.45	04.03	02.50
	15.17	16.58	18.24	18 07.25 (38)	22.33	21.40 (17)
18	09.42	08.09	06.32	05.42	04.00	02.49
	15.20	17.01	18.27	21 07.27 (38)	22.36	21.41 (17)
19	09.40	08.05	06.28	05.38	03.57	02.49
	15.23	17.05	18.30	23 07.27 (38)	22.40	21.40 (17)
20	09.37	08.02	06.25	05.35	03.53	02.49
	15.26	17.08	18.33	24 07.28 (38)	22.43	21.41 (17)
21	09.35	07.59	06.21	05.31	03.50	02.49
	15.29	17.11	18.36	24 07.27 (38)	22.46	21.41 (17)
22	09.32	07.55	06.18	05.28	03.47	02.49
	15.33	17.14	18.39	25 07.27 (38)	22.49	21.41 (17)
23	09.29	07.52	06.14	05.24	03.44	02.50
	15.36	17.17	18.42	25 07.27 (38)	22.52	21.41 (17)
24	09.27	07.49	06.11	05.21	03.41	02.50
	15.39	17.20	18.45	25 07.26 (38)	22.55	21.41 (17)
25	09.24	07.45	06.07	05.17	03.38	02.51
	15.42	17.24	18.48	24 07.26 (38)	22.59	21.41 (17)
26	09.21	07.42	06.03	05.14	03.35	02.52
	15.46	17.27	18.51	23 07.25 (38)	23.02	21.41 (17)
27	09.18	07.38	06.00	05.10	03.32	02.53
	15.49	17.30	18.54	21 07.24 (38)	23.05	21.40 (17)
28	09.15	07.35	05.56	05.07	03.30	02.55
	15.52	17.33	18.57	19 07.22 (38)	23.08	21.40 (17)
29	09.12		05.53	05.03	03.27	02.56
	15.56		20.00	15 08.20 (38)	23.11	21.39 (17)
30	09.09		05.49	05.00	03.24	02.58
	15.59		20.03	10 08.17 (38)	23.14	21.39 (17)
31	09.06		05.46		03.21	04.19 (34)
	16.02		20.06		23.17	21.38 (17)
Potential sun hours	171	238	363	451	570	624
Total, worst case			317	399	2936	3474
Sun reduction			0,32	0,41	0,47	0,48
Oper. time red.			0,99	0,99	0,99	0,99
Wind dir. red.			0,61	0,60	0,61	0,61
Total reduction			0,20	0,24	0,29	0,29
Total, real			62	97	838	1003

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: B - Laskentapiste B (Ylivieskantie, Pohlola)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December						
1	02.59	04.19 (34)	04.24	05.17 (40)	06.00	06.39 (39)	07.26	08.00	09.35			
	23.49	116	20.21 (24)	22.27	94	21.37 (17)	20.39	8	06.47 (39)	18.53	16.07	14.42
2	03.01	04.19 (34)	04.28	05.17 (40)	06.03	07.29	08.04	09.38				
	23.48	115	20.21 (24)	22.23	90	20.14 (24)	20.36		18.49	16.03	14.40	
3	03.01	04.19 (34)	04.31	05.19 (40)	06.06	07.32	08.07	09.41				
	23.46	115	20.21 (24)	22.20	84	20.12 (24)	20.32		18.46	16.00	14.39	
4	03.03	04.20 (34)	04.34	05.22 (40)	06.09	07.35	08.10	09.43				
	23.44	115	20.22 (24)	22.17	79	20.11 (24)	20.29		18.42	15.57	14.37	
5	03.05	04.20 (34)	04.37	05.25 (40)	06.12	07.38	08.13	09.46				
	23.43	113	20.21 (24)	22.13	74	20.10 (24)	20.25		18.39	15.54	14.35	
6	03.08	04.21 (34)	04.40	05.27 (40)	06.15	07.41	08.16	09.49				
	23.41	112	20.22 (24)	22.10	67	20.08 (24)	20.22		18.35	15.51	14.33	
7	03.10	04.21 (34)	04.43	05.30 (40)	06.17	07.44	08.20	09.51				
	23.38	112	20.21 (24)	22.07	61	20.07 (24)	20.18		18.32	15.48	14.32	
8	03.12	04.22 (34)	04.47	05.34 (40)	06.21	07.47	08.23	09.53				
	23.36	113	21.40 (17)	22.03	55	20.06 (24)	20.15		18.28	15.44	14.30	
9	03.15	04.23 (34)	04.50	05.37 (40)	06.23	07.50	08.26	09.56				
	23.34	116	21.43 (17)	22.00	51	20.04 (24)	20.11		18.25	15.41	14.29	
10	03.17	04.24 (34)	04.53	05.40 (40)	06.26	07.53	08.29	09.58				
	23.32	116	21.44 (17)	21.56	47	20.01 (24)	20.07		18.21	15.38	14.28	
11	03.20	04.26 (34)	04.56	05.43 (40)	06.29	07.56	08.33	10.00				
	23.29	117	21.46 (17)	21.53	43	19.59 (24)	20.04		18.18	15.35	14.26	
12	03.23	04.26 (34)	04.59	05.46 (40)	06.32	07.59	08.36	10.02				
	23.27	116	21.46 (17)	21.50	39	19.57 (24)	20.00		18.14	15.32	14.25	
13	03.26	04.28 (34)	05.02	05.49 (40)	06.35	07.59 (38)	08.02	09.39				
	23.24	113	21.46 (17)	21.46	33	19.53 (24)	19.57	8	08.07 (38)	18.11	15.29	14.25
14	03.29	04.31 (34)	05.05	05.52 (40)	06.38	07.55 (38)	08.05	09.42				
	23.22	111	21.48 (17)	21.43	26	19.50 (24)	19.53	14	08.09 (38)	18.07	15.26	14.24
15	03.31	04.33 (34)	05.09	05.56 (40)	06.40	07.53 (38)	08.08	09.46				
	23.19	104	21.49 (17)	21.39	16	19.45 (24)	19.50	18	08.11 (38)	18.04	15.23	14.23
16	03.34	04.35 (34)	05.12	05.63 (40)	06.43	07.52 (38)	08.11	09.49				
	23.16	105	21.49 (17)	21.36	7	19.48 (39)	19.46	20	08.12 (38)	18.00	15.20	14.23
17	03.37	04.37 (34)	05.15	05.66 (40)	06.46	07.51 (38)	08.14	09.52				
	23.13	103	21.49 (17)	21.32	13	19.45 (39)	19.43	22	08.13 (38)	17.57	15.18	14.22
18	03.40	04.39 (34)	05.18	05.69 (40)	06.49	07.50 (38)	08.17	09.55				
	23.10	105	21.50 (17)	21.29	16	19.42 (39)	19.39	24	08.14 (38)	17.54	15.15	14.22
19	03.43	04.41 (34)	05.21	05.72 (40)	06.52	07.48 (38)	08.20	09.59				
	23.07	109	21.51 (17)	21.25	18	19.38 (39)	19.35	25	08.13 (38)	17.50	15.12	14.22
20	03.46	04.43 (34)	05.24	05.75 (40)	06.55	07.48 (38)	08.23	09.02				
	23.05	114	21.51 (17)	21.22	20	19.32 (39)	19.32	25	08.13 (38)	17.47	15.09	14.22
21	03.49	04.45 (34)	05.27	05.78 (40)	06.58	07.47 (38)	08.26	09.05				
	23.02	115	21.51 (17)	21.18	22	19.28 (39)	19.28	26	08.13 (38)	17.43	15.06	14.23
22	03.53	04.47 (34)	05.30	05.81 (40)	06.59	07.47 (38)	08.29	09.08				
	22.59	118	21.51 (17)	21.15	24	19.25 (39)	19.25	25	08.12 (38)	17.40	15.04	14.23
23	03.56	04.49 (34)	05.33	05.84 (40)	06.59	07.48 (38)	08.32	09.11				
	22.55	119	21.51 (17)	21.11	24	19.21 (39)	19.21	24	08.12 (38)	17.37	15.01	14.23
24	03.59	04.51 (34)	05.36	05.87 (40)	06.59	07.48 (38)	08.35	09.14				
	22.52	119	21.51 (17)	21.08	24	19.18 (39)	19.18	23	08.11 (38)	17.33	14.59	14.24
25	04.02	04.53 (34)	05.39	05.90 (40)	06.59	07.48 (38)	08.38	09.18				
	22.49	119	21.51 (17)	21.04	24	19.14 (39)	19.14	22	08.10 (38)	17.30	14.56	14.25
26	04.05	04.55 (34)	05.42	05.93 (40)	06.59	07.48 (38)	08.41	09.21				
	22.46	119	21.51 (17)	21.01	24	19.11 (39)	19.11	20	08.08 (38)	17.27	14.54	14.26
27	04.08	04.57 (34)	05.45	05.96 (40)	06.59	07.51 (38)	08.44	09.24				
	22.43	117	21.50 (17)	20.57	24	19.07 (39)	19.07	15	08.06 (38)	17.23	14.51	14.27
28	04.12	04.59 (34)	05.48	05.99 (40)	06.59	07.54 (38)	08.47	09.27				
	22.40	115	21.48 (17)	20.54	22	19.03 (39)	19.03	9	08.03 (38)	17.20	14.49	14.28
29	04.15	04.61 (34)	05.51	06.02 (40)	06.59	07.51 (38)	08.50	09.30				
	22.37	110	21.45 (17)	20.50	21	18.99 (39)	18.99		16.17	14.47	14.30	
30	04.18	04.63 (34)	05.54	06.05 (40)	06.59	07.54 (38)	08.53	09.32				
	22.33	106	21.43 (17)	20.47	17	18.95 (39)	18.95		16.13	14.45	14.31	
31	04.21	04.65 (34)	05.57	06.08 (40)	06.59	07.57 (38)	08.56	09.35				
	22.30	101	21.40 (17)	20.43	13	18.91 (39)	18.91		16.10	14.42	14.33	
Potential sun hours	608		508		393		305		198		137	
Total, worst case	3498		1172		328							
Sun reduction	0,38		0,31		0,33							
Oper. time red.	0,99		0,99		0,99							
Wind dir. red.	0,61		0,61		0,61							
Total reduction	0,23		0,19		0,20							
Total, real	804		221		66							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: C - Laskentapiste C (Perkkiontie 382)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	20.16 (19) 03.19 04.18 (39)
	14.35	16.06	17.36	20.09	21.41	15 20.31 (19) 23.19 69 21.47 (24)
2	10.11	09.00	07.28	06.38	04.53	20.18 (19) 03.16 04.16 (39)
	14.37	16.09	17.39	20.12	21.44	11 20.29 (19) 23.22 74 21.47 (24)
3	10.10	08.57	07.24	06.35	04.50	05.42 (38) 03.14 04.14 (39)
	14.39	16.12	17.42	20.15	21.47	17 20.26 (19) 23.25 77 21.47 (24)
4	10.09	08.54	07.21	06.31	04.46	05.39 (38) 03.12 04.13 (39)
	14.42	16.15	17.45	20.18	21.51	17 05.56 (38) 23.28 79 21.48 (24)
5	10.08	08.51	07.17	06.28	04.43	05.36 (38) 03.09 04.12 (39)
	14.44	16.19	17.48	20.21	21.54	22 05.58 (38) 23.30 81 21.48 (24)
6	10.06	08.48	07.14	06.24	04.39	05.34 (38) 03.07 04.10 (39)
	14.46	16.22	17.51	20.24	21.57	26 06.00 (38) 23.33 82 21.48 (24)
7	10.05	08.45	07.10	06.21	04.36	05.34 (38) 03.05 04.09 (39)
	14.49	16.25	17.54	20.27	22.00	28 06.02 (38) 23.35 84 21.48 (24)
8	10.03	08.41	07.07	06.17	04.33	05.32 (38) 03.03 04.09 (39)
	14.51	16.29	17.57	20.30	22.04	31 06.03 (38) 23.37 84 21.48 (24)
9	10.01	08.38	07.03	06.14	04.29	05.31 (38) 03.01 04.09 (39)
	14.54	16.32	18.00	20.33	22.07	32 06.03 (38) 23.40 84 21.48 (24)
10	09.59	08.35	07.00	06.10	04.26	05.30 (38) 02.58 04.09 (39)
	14.56	16.35	18.03	20.36	22.10	34 06.04 (38) 23.42 84 21.49 (24)
11	09.58	08.32	06.56	06.07	04.23	05.29 (38) 02.56 04.08 (39)
	14.59	16.39	18.06	20.39	22.13	35 06.04 (38) 23.44 85 21.48 (24)
12	09.56	08.29	06.53	06.03	04.19	05.29 (38) 02.55 04.08 (39)
	15.02	16.42	18.09	20.42	22.17	37 06.06 (38) 23.45 85 21.48 (24)
13	09.53	08.25	06.49	05.59	04.16	05.28 (38) 02.53 04.09 (39)
	15.05	16.45	18.12	20.45	22.20	38 06.06 (38) 23.47 85 21.49 (24)
14	09.51	08.22	06.46	05.56	04.13	05.28 (38) 02.52 04.08 (39)
	15.08	16.48	18.15	20.48	22.23	42 21.33 (20) 23.49 85 21.49 (24)
15	09.49	08.19	06.42	05.52	04.09	05.28 (38) 02.51 04.09 (39)
	15.11	16.52	18.18	20.51	22.26	47 21.36 (20) 23.50 85 21.50 (24)
16	09.47	08.15	06.39	05.49	04.06	05.27 (38) 02.50 04.08 (39)
	15.14	16.55	18.21	20.54	22.30	53 21.38 (20) 23.51 84 21.49 (24)
17	09.44	08.12	06.35	05.45	04.03	05.26 (38) 02.50 04.09 (39)
	15.17	16.58	18.24	20.57	22.33	58 21.40 (20) 23.52 82 21.49 (24)
18	09.42	08.09	06.32	05.42	04.00	05.27 (38) 02.49 04.09 (39)
	15.20	17.01	18.27	21.00	22.36	62 21.44 (20) 23.53 84 21.50 (24)
19	09.40	08.05	06.28	05.38	20.21 (19) 03.57	05.26 (38) 02.49 04.09 (39)
	15.23	17.05	18.30	21.03	4 20.25 (19) 22.39	66 21.45 (20) 23.54 85 21.50 (24)
20	09.37	08.02	06.25	05.35	20.18 (19) 03.54	05.27 (38) 02.49 04.09 (39)
	15.26	17.08	18.33	21.06	9 20.27 (19) 22.43	67 21.46 (20) 23.55 83 21.50 (24)
21	09.34	07.59	06.21	05.31	20.17 (19) 03.50	05.27 (38) 02.49 04.09 (39)
	15.29	17.11	18.36	21.09	13 20.30 (19) 22.46	69 21.47 (20) 23.55 83 21.50 (24)
22	09.32	07.55	06.18	05.28	20.16 (19) 03.47	05.26 (38) 02.49 04.09 (39)
	15.33	17.14	18.39	21.13	17 20.33 (19) 22.49	69 21.46 (20) 23.55 83 21.50 (24)
23	09.29	07.52	06.14	05.24	20.16 (19) 03.44	05.27 (38) 02.50 04.10 (39)
	15.36	17.17	18.42	21.16	20 20.36 (19) 22.52	69 21.46 (20) 23.55 85 21.51 (24)
24	09.26	07.48	06.10	05.21	20.15 (19) 03.41	05.27 (38) 02.50 04.10 (39)
	15.39	17.20	18.45	21.19	20 20.35 (19) 22.55	71 21.47 (20) 23.55 84 21.51 (24)
25	09.24	07.45	06.07	05.17	20.14 (19) 03.38	05.27 (38) 02.51 04.11 (39)
	15.42	17.24	18.48	21.22	21 20.35 (19) 22.58	71 21.47 (20) 23.55 84 21.52 (24)
26	09.21	07.42	06.03	05.14	20.14 (19) 03.35	05.28 (38) 02.52 04.10 (39)
	15.46	17.27	18.51	21.25	21 20.35 (19) 23.02	70 21.47 (20) 23.54 85 21.51 (24)
27	09.18	07.38	06.00	05.10	20.15 (19) 03.33	05.28 (38) 02.53 04.11 (39)
	15.49	17.30	18.54	21.28	20 20.35 (19) 23.05	70 21.47 (20) 23.53 84 21.52 (24)
28	09.15	07.35	05.56	05.07	20.15 (19) 03.30	05.28 (38) 02.55 04.12 (39)
	15.52	17.33	18.57	21.31	19 20.34 (19) 23.08	70 21.47 (20) 23.52 83 21.52 (24)
29	09.12		06.53	05.03	20.15 (19) 03.27	05.28 (38) 02.56 04.12 (39)
	15.56		20.00	21.35	19 20.34 (19) 23.11	70 21.47 (20) 23.51 85 21.53 (24)
30	09.09		06.49	05.00	20.15 (19) 03.24	05.29 (38) 02.58 04.12 (39)
	15.59		20.03	21.38	17 20.32 (19) 23.14	69 21.47 (24) 23.50 85 21.53 (24)
31	09.06		06.46		03.22	05.29 (38)
	16.02		20.06		23.16	69 21.47 (24)
Potential sun hours	171	238	363	451	569	624
Total, worst case				200	1505	2482
Sun reduction				0,41	0,47	0,48
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,63	0,63	0,63
Total reduction				0,25	0,29	0,30
Total, real				51	438	736

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: C - Laskentapiste C (Perkkiontie 382)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December	
1	02.59	04.13 (39)	04.24	05.39 (38)	06.00	07.26	08.00	09.35				
	23.49	85 21.53 (24)	22.27	36 06.15 (38)	20.39	18.53	16.07	14.43				
2	03.01	04.13 (39)	04.28	05.40 (38)	06.03	07.29	08.03	09.38				
	23.47	85 21.53 (24)	22.23	35 06.15 (38)	20.36	18.49	16.03	14.41				
3	03.01	04.13 (39)	04.31	05.40 (38)	06.06	07.32	08.07	09.41				
	23.46	85 21.53 (24)	22.20	34 06.14 (38)	20.32	18.46	16.00	14.39				
4	03.03	04.14 (39)	04.34	05.41 (38)	06.09	07.35	08.10	09.43				
	23.44	85 21.54 (24)	22.17	32 06.13 (38)	20.29	18.42	15.57	14.37				
5	03.06	04.15 (39)	04.37	05.43 (38)	06.12	07.38	08.13	09.46				
	23.42	84 21.54 (24)	22.13	29 06.12 (38)	20.25	18.39	15.54	14.35				
6	03.08	04.16 (39)	04.40	05.43 (38)	06.14	07.41	08.16	09.48				
	23.40	83 21.54 (24)	22.10	27 06.10 (38)	20.22	18.35	15.51	14.33				
7	03.10	04.17 (39)	04.43	05.45 (38)	06.17	07.44	08.20	09.51				
	23.38	82 21.54 (24)	22.07	24 06.09 (38)	20.18	18.32	15.48	14.32				
8	03.12	04.19 (39)	04.47	05.47 (38)	06.20	07.47	08.23	09.53				
	23.36	81 21.54 (24)	22.03	21 06.08 (38)	20.14	18.28	15.44	14.30				
9	03.15	04.21 (39)	04.50	05.49 (38)	06.23	07.50	08.26	09.55				
	23.34	77 21.55 (24)	22.00	16 06.05 (38)	20.11	18.25	15.41	14.29				
10	03.18	04.23 (39)	04.53	05.52 (38)	06.26	07.53	08.29	09.58				
	23.31	75 21.55 (24)	21.56	17 20.37 (19)	20.07	18.21	15.38	14.28				
11	03.20	04.25 (39)	04.56	20.26 (19)	06.29	07.56	08.33	10.00				
	23.29	71 21.55 (24)	21.53	13 20.39 (19)	20.04	18.18	15.35	14.27				
12	03.23	05.38 (38)	04.59	20.25 (19)	06.32	07.58	08.36	10.02				
	23.27	68 21.55 (20)	21.49	15 20.40 (19)	20.00	18.14	15.32	14.26				
13	03.26	05.38 (38)	05.02	20.23 (19)	06.35	08.01	08.39	10.03				
	23.24	68 21.55 (20)	21.46	17 20.40 (19)	19.57	18.11	15.29	14.25				
14	03.29	05.37 (38)	05.05	20.23 (19)	06.38	08.04	08.42	10.05				
	23.21	70 21.55 (20)	21.43	18 20.41 (19)	19.53	18.07	15.26	14.24				
15	03.31	05.37 (38)	05.09	20.22 (19)	06.40	08.07	08.46	10.07				
	23.19	70 21.56 (20)	21.39	20 20.42 (19)	19.50	18.04	15.23	14.23				
16	03.34	05.37 (38)	05.12	20.22 (19)	06.43	08.10	08.49	10.08				
	23.16	70 21.56 (20)	21.36	20 20.42 (19)	19.46	18.00	15.20	14.23				
17	03.37	05.37 (38)	05.15	20.21 (19)	06.46	08.13	08.52	10.09				
	23.13	70 21.56 (20)	21.32	20 20.41 (19)	19.42	17.57	15.18	14.22				
18	03.40	05.37 (38)	05.18	20.21 (19)	06.49	08.17	08.55	10.11				
	23.10	70 21.56 (20)	21.29	20 20.41 (19)	19.39	17.54	15.15	14.22				
19	03.43	05.37 (38)	05.21	20.21 (19)	06.52	08.20	08.58	10.12				
	23.07	71 21.57 (20)	21.25	20 20.41 (19)	19.35	17.50	15.12	14.22				
20	03.46	05.37 (38)	05.24	20.21 (19)	06.55	08.23	09.02	10.13				
	23.04	71 21.57 (20)	21.22	20 20.41 (19)	19.32	17.47	15.09	14.22				
21	03.50	05.37 (38)	05.27	20.21 (19)	06.58	08.26	09.05	10.13				
	23.01	68 21.56 (20)	21.18	16 20.37 (19)	19.28	17.43	15.06	14.23				
22	03.53	05.37 (38)	05.30	20.22 (19)	07.00	08.29	09.08	10.14				
	22.58	69 21.57 (20)	21.15	12 20.34 (19)	19.25	17.40	15.04	14.23				
23	03.56	05.37 (38)	05.33	20.23 (19)	07.03	08.32	09.11	10.15				
	22.55	68 21.56 (20)	21.11	8 20.31 (19)	19.21	17.37	15.01	14.24				
24	03.59	05.37 (38)	05.36	20.25 (19)	07.06	08.35	09.14	10.15				
	22.52	67 21.57 (20)	21.08	3 20.28 (19)	19.18	17.33	14.59	14.24				
25	04.02	05.37 (38)	05.39	07.09	07.38	09.17	10.15					
	22.49	65 21.55 (20)	21.04	19.14	16.30	14.56	14.25					
26	04.05	05.38 (38)	05.42	07.12	07.41	09.20	10.15					
	22.46	60 21.53 (20)	21.01	19.10	16.26	14.54	14.26					
27	04.08	05.37 (38)	05.45	07.15	07.44	09.23	10.15					
	22.43	56 21.50 (20)	20.57	19.07	16.23	14.51	14.27					
28	04.12	05.38 (38)	05.48	07.18	07.47	09.26	10.15					
	22.40	51 21.48 (20)	20.54	19.03	16.20	14.49	14.28					
29	04.15	05.38 (38)	05.51	07.20	07.51	09.29	10.14					
	22.36	45 21.45 (20)	20.50	19.00	16.17	14.47	14.30					
30	04.18	05.39 (38)	05.54	07.23	07.54	09.32	10.14					
	22.33	41 21.43 (20)	20.46	18.56	16.13	14.45	14.31					
31	04.21	05.38 (38)	05.57		07.57		10.13					
	22.30	37 06.15 (38)	20.43		16.10		14.33					
Potential sun hours	608		508		393		305		198			137
Total, worst case	2148		493									
Sun reduction	0,38		0,31									
Oper. time red.	0,99		0,99									
Wind dir. red.	0,63		0,62									
Total reduction	0,24		0,19									
Total, real	505		95									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: D - Asuinrakennus D (Alakylantie 243)
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	20.35 (42) 03.19 21.23 (44)
	14.35	16.05	17.36	20.08	21.41	20 20.55 (42) 23.19 28 21.51 (44)
2	10.11	09.00	07.27	06.38	04.53	20.34 (42) 03.16 21.23 (44)
	14.37	16.08	17.39	20.11	21.44	21 20.55 (42) 23.22 29 21.52 (44)
3	10.10	08.57	07.24	06.35	04.49	20.34 (42) 03.14 21.23 (44)
	14.39	16.12	17.42	20.14	21.47	21 20.55 (42) 23.25 28 21.51 (44)
4	10.09	08.54	07.21	06.31	04.46	20.35 (42) 03.11 21.24 (44)
	14.41	16.15	17.45	20.17	21.50	19 20.54 (42) 23.27 28 21.52 (44)
5	10.07	08.51	07.17	06.27	04.42	20.35 (42) 03.09 21.24 (44)
	14.43	16.18	17.48	20.20	21.54	19 20.54 (42) 23.30 27 21.51 (44)
6	10.06	08.47	07.14	06.24	04.39	20.35 (42) 03.07 21.24 (44)
	14.46	16.22	17.51	20.23	21.57	18 20.53 (42) 23.32 28 21.52 (44)
7	10.04	08.44	07.10	06.20	04.36	20.36 (42) 03.04 21.25 (44)
	14.48	16.25	17.54	20.26	22.00	16 20.52 (42) 23.35 27 21.52 (44)
8	10.03	08.41	07.07	06.17	04.32	20.37 (42) 03.02 21.25 (44)
	14.51	16.28	17.57	20.29	22.03	14 20.51 (42) 23.37 32 22.01 (46)
9	10.01	08.38	07.03	06.13	04.29	20.39 (42) 03.01 21.25 (44)
	14.53	16.32	18.00	20.32	22.07	11 20.50 (42) 23.39 37 22.04 (46)
10	09.59	08.35	07.00	06.10	04.26	20.42 (42) 02.57 21.26 (44)
	14.56	16.35	18.03	20.35	22.10	5 20.47 (42) 23.41 39 22.05 (46)
11	09.57	08.31	06.56	06.06	04.22	20.42 (42) 02.56 21.26 (44)
	14.59	16.38	18.06	20.38	22.13	23.43 41 22.07 (46)
12	09.55	08.28	06.53	06.03	04.19	20.42 (42) 02.54 21.26 (44)
	15.02	16.42	18.09	20.42	22.16	23.45 41 22.07 (46)
13	09.53	08.25	06.49	05.59	04.16	20.42 (42) 02.53 21.26 (44)
	15.04	16.45	18.12	20.45	22.20	23.47 42 22.08 (46)
14	09.51	08.22	06.46	05.56	04.12	20.42 (42) 02.52 21.27 (44)
	15.07	16.48	18.15	20.48	22.23	23.48 42 22.09 (46)
15	09.49	08.18	06.42	05.52	04.09	21.31 (44) 02.51 21.26 (44)
	15.10	16.51	18.18	20.51	22.26	4 21.35 (44) 23.50 44 22.10 (46)
16	09.47	08.15	06.38	05.48	04.06	21.29 (44) 02.50 21.27 (44)
	15.13	16.55	18.21	20.54	22.29	9 21.38 (44) 23.51 44 22.11 (46)
17	09.44	08.12	06.35	05.45	04.03	21.27 (44) 02.49 21.28 (44)
	15.16	16.58	18.24	20.57	22.33	14 21.41 (44) 23.52 43 22.11 (46)
18	09.42	08.08	06.31	05.41	03.59	21.27 (44) 02.49 21.28 (44)
	15.19	17.01	18.27	21.00	22.36	17 21.44 (44) 23.53 44 22.12 (46)
19	09.39	08.05	06.28	05.38	03.56	21.25 (44) 02.49 21.27 (44)
	15.23	17.04	18.30	21.03	22.39	21 21.46 (44) 23.54 44 22.11 (46)
20	09.37	08.02	06.24	05.34	03.53	21.25 (44) 02.49 21.29 (44)
	15.26	17.07	18.33	21.06	22.42	22 21.47 (44) 23.54 44 22.13 (46)
21	09.34	07.58	06.21	05.31	03.50	21.24 (44) 02.49 21.29 (44)
	15.29	17.11	18.36	21.09	22.46	23 21.47 (44) 23.55 44 22.13 (46)
22	09.32	07.55	06.17	05.27	03.47	21.24 (44) 02.49 21.29 (44)
	15.32	17.14	18.39	21.12	22.49	24 21.48 (44) 23.55 44 22.13 (46)
23	09.29	07.52	06.14	05.24	03.44	21.23 (44) 02.49 21.28 (44)
	15.35	17.17	18.42	21.15	22.52	26 21.49 (44) 23.55 45 22.13 (46)
24	09.26	07.48	06.10	05.20	03.41	21.23 (44) 02.50 21.29 (44)
	15.39	17.20	18.45	21.19	22.55	27 21.50 (44) 23.55 44 22.13 (46)
25	09.23	07.45	06.07	05.17	03.38	21.22 (44) 02.51 21.29 (44)
	15.42	17.23	18.48	21.22	22.58	27 21.49 (44) 23.54 44 22.13 (46)
26	09.21	07.41	06.03	05.13	03.35	21.22 (44) 02.52 21.29 (44)
	15.45	17.26	18.51	21.25	23.01	28 21.50 (44) 23.54 44 22.13 (46)
27	09.18	07.38	05.59	05.10	03.32	21.22 (44) 02.53 21.30 (44)
	15.49	17.29	18.54	21.28	23.04	28 21.50 (44) 23.53 43 22.13 (46)
28	09.15	07.34	05.56	05.06	03.29	21.22 (44) 02.54 21.30 (44)
	15.52	17.33	18.57	21.31	23.07	28 21.50 (44) 23.52 43 22.13 (46)
29	09.12		06.52	05.03	03.27	21.22 (44) 02.56 21.29 (44)
	15.55		20.00	21.34	23.10	28 21.50 (44) 23.51 43 22.12 (46)
30	09.09		06.49	05.00	03.24	21.23 (44) 02.57 21.29 (44)
	15.58		20.03	21.38	23.13	28 21.51 (44) 23.50 42 22.11 (46)
31	09.06		06.45		03.21	21.23 (44)
	16.02		20.06		23.16	28 21.51 (44)
Potential sun hours	171	238	363	451	570	624
Total, worst case				64	546	1168
Sun reduction				0,41	0,47	0,48
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,64	0,64	0,64
Total reduction				0,26	0,30	0,30
Total, real				17	162	355

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: D - Asuinrakennus D (Alakylantie 243)
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July		August		September	October	November	December
1	02.59	21.30 (44)	04.24		06.00	07.26	08.00	09.35
	23.49	41 22.11 (46)	22.26		20.39	18.52	16.06	14.42
2	03.01	21.30 (44)	04.27		06.02	07.29	08.03	09.38
	23.47	40 22.10 (46)	22.23		20.35	18.49	16.03	14.40
3	03.01	21.30 (44)	04.30		20.51 (42)	06.05	07.32	08.06
	23.46	38 22.09 (46)	22.20	7	20.58 (42)	20.32	18.45	16.00
4	03.03	21.30 (44)	04.34		20.49 (42)	06.08	07.35	08.10
	23.44	35 22.07 (46)	22.16	12	21.01 (42)	20.28	18.42	15.57
5	03.05	21.30 (44)	04.37		20.47 (42)	06.11	07.38	08.13
	23.42	27 21.57 (44)	22.13	14	21.01 (42)	20.25	18.38	15.53
6	03.07	21.30 (44)	04.40		20.46 (42)	06.14	07.40	08.16
	23.40	27 21.57 (44)	22.10	16	21.02 (42)	20.21	18.35	15.50
7	03.10	21.30 (44)	04.43		20.45 (42)	06.17	07.43	08.19
	23.38	28 21.58 (44)	22.06	18	21.03 (42)	20.18	18.31	15.47
8	03.12	21.31 (44)	04.46		20.44 (42)	06.20	07.46	08.22
	23.36	28 21.59 (44)	22.03	19	21.03 (42)	20.14	18.28	15.44
9	03.15	21.30 (44)	04.49		20.44 (42)	06.23	07.49	08.26
	23.34	28 21.58 (44)	21.59	19	21.03 (42)	20.11	18.24	15.41
10	03.17	21.30 (44)	04.53		20.44 (42)	06.26	07.52	08.29
	23.31	28 21.58 (44)	21.56	20	21.04 (42)	20.07	18.21	15.38
11	03.20	21.31 (44)	04.56		20.44 (42)	06.29	07.55	08.32
	23.29	28 21.59 (44)	21.53	20	21.04 (42)	20.03	18.17	15.35
12	03.23	21.31 (44)	04.59		20.43 (42)	06.31	07.58	08.35
	23.26	28 21.59 (44)	21.49	20	21.03 (42)	20.00	18.14	15.32
13	03.25	21.31 (44)	05.02		20.43 (42)	06.34	08.01	08.39
	23.24	28 21.59 (44)	21.46	19	21.02 (42)	19.56	18.10	15.29
14	03.28	21.31 (44)	05.05		20.44 (42)	06.37	08.04	08.42
	23.21	28 21.59 (44)	21.42	15	20.59 (42)	19.53	18.07	15.26
15	03.31	21.31 (44)	05.08		20.44 (42)	06.40	08.07	08.45
	23.18	28 21.59 (44)	21.39	12	20.56 (42)	19.49	18.04	15.23
16	03.34	21.31 (44)	05.11		20.44 (42)	06.43	08.10	08.48
	23.16	28 21.59 (44)	21.35	8	20.52 (42)	19.46	18.00	15.20
17	03.37	21.32 (44)	05.14		20.45 (42)	06.46	08.13	08.52
	23.13	28 22.00 (44)	21.32	5	20.50 (42)	19.42	17.57	15.17
18	03.40	21.32 (44)	05.17		06.49	08.16	08.55	10.10
	23.10	27 21.59 (44)	21.28		19.39	17.53	15.14	14.22
19	03.43	21.32 (44)	05.21		06.51	08.19	08.58	10.12
	23.07	27 21.59 (44)	21.25		19.35	17.50	15.12	14.22
20	03.46	21.32 (44)	05.24		06.54	08.22	09.01	10.12
	23.04	26 21.58 (44)	21.21		19.31	17.46	15.09	14.22
21	03.49	21.34 (44)	05.27		06.57	08.25	09.05	10.13
	23.01	25 21.59 (44)	21.18		19.28	17.43	15.06	14.22
22	03.52	21.34 (44)	05.30		07.00	08.28	09.08	10.14
	22.58	24 21.58 (44)	21.14		19.24	17.40	15.03	14.23
23	03.55	21.35 (44)	05.33		07.03	08.32	09.11	10.14
	22.55	23 21.58 (44)	21.11		19.21	17.36	15.01	14.23
24	03.59	21.35 (44)	05.36		07.06	08.35	09.14	10.15
	22.52	22 21.57 (44)	21.07		19.17	17.33	14.58	14.24
25	04.02	21.36 (44)	05.39		07.09	07.38	09.17	10.15
	22.49	19 21.55 (44)	21.04		19.14	16.29	14.56	14.25
26	04.05	21.37 (44)	05.42		07.12	07.41	09.20	10.15
	22.46	15 21.52 (44)	21.00		19.10	16.26	14.53	14.26
27	04.08	21.39 (44)	05.45		07.14	07.44	09.23	10.15
	22.43	11 21.50 (44)	20.57		19.07	16.23	14.51	14.27
28	04.11	21.40 (44)	05.48		07.17	07.47	09.26	10.14
	22.39	7 21.47 (44)	20.53		19.03	16.19	14.49	14.28
29	04.14	21.43 (44)	05.51		07.20	07.50	09.29	10.14
	22.36	2 21.45 (44)	20.50		19.00	16.16	14.46	14.29
30	04.18		05.54		07.23	07.54	09.32	10.14
	22.33		20.46		18.56	16.13	14.44	14.31
31	04.21		05.57			07.57		10.13
	22.30		20.43			16.10		14.33
Potential sun hours	608		508		393	305	198	137
Total, worst case		744		224				
Sun reduction		0,38		0,31				
Oper. time red.		0,99		0,99				
Wind dir. red.		0,64		0,64				
Total reduction		0,24		0,20				
Total, real		178		44				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: E - Lomarakenus E (Kellokankaan metsätie)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.35	20.08	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.27	06.38	04.52	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.11	21.44	23.22	23.47	22.23	20.35	18.49	16.03	14.40
3	10.10	08.57	07.24	06.34	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.40
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.20	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.09	09.43
	14.41	16.15	17.45	20.17	21.50	23.27	23.44	22.16	20.28	18.42	15.56	14.36
5	10.07	08.51	07.17	06.27	04.42	03.08	03.05	04.37	06.11	07.37	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.47	07.13	06.24	04.39	03.06	03.07	04.40	06.14	07.40	08.16	09.48
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.04	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.06	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.22	09.53
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.31	18.00	20.32	22.07	23.39	23.34	21.59	20.11	18.24	15.41	14.28
10	09.59	08.35	06.59	06.10	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.57
	14.56	16.35	18.03	20.35	22.10	23.42	23.31	21.56	20.07	18.21	15.38	14.27
11	09.57	08.31	06.56	06.06	04.22	02.55	03.19	04.56	06.28	07.55	08.32	09.59
	14.58	16.38	18.06	20.38	22.13	23.44	23.29	21.53	20.03	18.17	15.35	14.26
12	09.55	08.28	06.52	06.02	04.19	02.54	03.22	04.59	06.31	07.58	08.35	10.01
	15.01	16.41	18.09	20.41	22.16	23.45	23.26	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.44	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.45	05.55	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.18	21.39	19.49	18.03	15.23	14.23
16	09.47	08.15	06.38	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.48	10.08
	15.13	16.54	18.21	20.54	22.29	23.51	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13	21.32	19.42	17.56	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.48	03.40	05.17	06.48	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10	21.28	19.38	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.21
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.23	06.54	08.22	09.01	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.26	06.57	08.25	09.05	10.13
	15.29	17.10	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.29	07.00	08.28	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.39	15.03	14.22
23	09.29	07.51	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.31	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.38	17.20	18.45	21.18	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.23
25	09.23	07.45	06.06	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	17.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.11	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.52	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.04	23.53	22.43	20.57	19.06	16.23	14.51	14.26
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.07	23.52	22.39	20.53	19.03	16.19	14.48	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.50	07.20	07.50	09.29	10.14
	15.55		19.59	21.34	23.10	23.51	22.36	20.50	18.59	16.16	14.46	14.29
30	09.09		06.49	04.59	03.23	02.57	04.17	05.53	07.23	07.53	09.32	10.14
	15.58		20.02	21.37	23.13	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.56		07.57		10.13
	16.02		20.05		23.16		22.30	20.43		16.09		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: F - Asuinrakennus F (Ollilantie 112)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	10.13	09.04	12.01 (33)	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36	11.32 (33)	
2	14.34	16.05	13.31 (28)	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.06	14.42	32	13.05 (28)
3	10.12	09.01	13.17 (28)	07.28	06.38	04.52	03.15	03.00	04.27	06.03	07.29	08.04	09.39		11.33 (33)
4	14.36	16.08	13.29 (28)	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40	29	13.05 (28)
5	10.11	08.58	13.21 (28)	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	09.41		11.34 (33)
6	14.38	16.12	13.25 (28)	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38	24	13.03 (28)
7	10.10	08.54		07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10	09.44		11.35 (33)
8	14.41	16.15		17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36	17	13.01 (28)
9	10.08	11.54 (33)	08.51	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	09.47		11.37 (33)
10	14.43	11.59 (33)	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34	11	11.48 (33)
11	10.07	11.52 (33)	08.48	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17	09.49		11.39 (33)
12	14.45	12.01 (33)	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	14.32	9	11.48 (33)
13	10.05	11.52 (33)	08.45	07.10	06.21	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.52		11.41 (33)
14	14.48	12.03 (33)	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31	5	11.46 (33)
15	10.04	11.52 (33)	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	12.51 (28)		09.54
16	14.50	13.17 (28)	16.28	17.57	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.29		12.56 (28)
17	10.02	11.50 (33)	08.39	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	12.47 (28)		09.56
18	14.53	13.19 (28)	16.32	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.28		13.00 (28)
19	10.00	11.50 (33)	08.35	07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	11.31 (33)		09.58
20	14.55	13.21 (28)	16.35	18.03	20.36	22.11	23.43	23.33	21.57	20.07	18.21	15.38	14.27		13.01 (28)
21	10.58	11.50 (33)	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33	11.29 (33)		10.01
22	14.58	13.23 (28)	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26		13.03 (28)
23	10.56	11.50 (33)	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.59	08.36	11.27 (33)		10.02
24	15.01	13.25 (28)	16.42	18.09	20.42	22.17	23.47	23.28	21.50	20.00	18.14	15.32	14.25		13.04 (28)
25	10.54	11.49 (33)	08.26	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.02	08.39	11.26 (33)		10.04
26	15.04	13.26 (28)	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.21		13.04 (28)
27	10.52	11.50 (33)	08.22	06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.05	08.43	11.26 (33)		10.06
28	15.07	13.27 (28)	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23		13.06 (28)
29	10.50	11.49 (33)	08.19	06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.08	08.46	11.26 (33)		10.08
30	15.10	13.28 (28)	16.51	18.18	20.51	22.27	23.51	23.20	21.39	19.50	18.04	15.23	14.22		13.06 (28)
31	10.47	11.49 (33)	08.16	06.39	05.49	04.05	02.49	03.33	05.11	06.43	08.11	08.49	11.25 (33)		10.09
32	15.13	13.29 (28)	16.55	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.27		13.06 (28)
33	10.45	11.50 (33)	08.12	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	11.26 (33)		10.10
34	15.16	13.30 (28)	16.58	18.24	20.57	22.34	23.54	23.14	21.32	19.42	17.57	15.17	14.27		13.07 (28)
35	10.43	11.49 (33)	08.09	06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	11.25 (33)		10.12
36	15.19	13.30 (28)	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	14.29		13.07 (28)
37	10.40	11.49 (33)	08.06	06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	11.25 (33)		10.13
38	15.22	13.31 (28)	17.04	18.30	21.03	22.40	23.56	23.08	21.25	19.35	17.50	15.11	14.21		13.07 (28)
39	10.38	11.50 (33)	08.02	06.25	05.34	03.53	02.47	03.46	05.24	06.55	08.23	09.02	11.25 (33)		10.14
40	15.25	13.31 (28)	17.07	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.09	14.21		13.07 (28)
41	10.35	11.50 (33)	07.59	06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	11.26 (33)		10.14
42	15.29	13.32 (28)	17.11	18.36	21.10	22.47	23.56	23.02	21.18	19.28	17.43	15.06	14.22		13.08 (28)
43	10.32	11.50 (33)	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.09	11.26 (33)		10.15
44	15.32	13.32 (28)	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	14.27		13.07 (28)
45	10.30	11.51 (33)	07.52	06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	11.26 (33)		10.15
46	15.35	13.33 (28)	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.01	14.22		13.08 (28)
47	10.27	11.51 (33)	07.49	06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	11.27 (33)		10.16
48	15.38	13.33 (28)	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.23		13.08 (28)
49	10.24	11.52 (33)	07.45	06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18	11.27 (33)		10.16
50	15.42	13.33 (28)	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	17.30	14.55	14.24		13.07 (28)
51	10.21	11.52 (33)	07.42	06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	11.28 (33)		10.16
52	15.45	13.33 (28)	17.26	18.51	21.25	23.02	23.56	22.47	21.01	19.10	17.26	14.53	14.25		13.07 (28)
53	10.18	11.53 (33)	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	11.28 (33)		10.16
54	15.48	13.33 (28)	17.30	18.54	21.29	23.05	23.55	22.43	20.57	19.07	17.23	14.51	14.27		13.07 (28)
55	10.16	11.54 (33)	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	11.29 (33)		10.16
56	15.52	13.33 (28)	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.03	17.19	14.48	14.28		13.06 (28)
57	10.13	11.55 (33)		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	11.30 (33)		10.15
58	15.55	13.32 (28)		20.00	21.35	23.12	23.53	22.37	20.50	19.00	17.16	14.46	14.29		13.06 (28)
59	10.10	11.56 (33)		06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	11.31 (33)		10.15
60	15.58	13.32 (28)		20.03	21.38	23.15	23.52	22.34	20.47	18.56	17.13	14.44	14.30		13.06 (28)
61	10.07	11.57 (33)		06.45	05.05	03.20	02.54	04.20	05.57	07.26	07.57	09.36	11.32 (33)		10.14
62	16.02	13.31 (28)		20.06	21.41	23.17	23.50	22.30	20.43	18.50	17.10	14.42	14.32		13.06 (28)
Potential sun hours	170	238	363	451	570	625	609	509	393	305	198	127	136		
Total, worst case	999	41									920		127		
Sun reduction	0,19	0,33									0,24		0,22		
Oper. time red.	0,99	0,99									0,99		0,99		
Wind dir. red.	0,66	0,65									0,66		0,66		
Total reduction	0,12	0,22									0,16		0,14		
Total, real	121	9									144		18		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: G - Lomarakenus G (Ollilantie, Siliakuru)
Assumptions for shadow calculations
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.01	09.36
	14.34	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.06	14.42
2	10.12	09.01	07.28	06.38	04.53	03.15	03.00	04.27	06.03	07.29	08.04	09.39
	14.36	16.08	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.38	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	09.47
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	14.32
7	10.05	08.45	07.11	06.21	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.29
9	10.02	08.39	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.11	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33	10.01
	14.58	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.47	23.28	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.15	02.52	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.08
	15.10	16.51	18.18	20.51	22.27	23.51	23.20	21.39	19.50	18.04	15.23	14.22
16	09.47	08.16	06.39	05.49	04.06	02.49	03.33	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.53	10.10
	15.16	16.58	18.24	20.57	22.34	23.54	23.14	21.33	19.42	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.17	06.49	08.17	08.56	10.12
	15.19	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.22	17.04	18.30	21.04	22.40	23.55	23.08	21.26	19.35	17.50	15.11	14.21
20	09.38	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.21
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30	07.52	06.14	05.24	03.44	02.48	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.47	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.48	17.30	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	14.26
28	09.16	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.03	16.20	14.48	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	10.15
	15.58		20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44	14.30
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: H - Asuinrakennus H (Pinolantie 406)
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.40	20.12	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.42
	14.40	16.13	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.34	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.58	14.37
5	10.09	08.52	07.18	06.28	04.43	03.09	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.15	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.23	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.34
7	10.06	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.08	23.41	23.35	22.01	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.26	02.58	03.18	04.53	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07	04.23	02.56	03.20	04.57	06.30	07.56	08.33	10.01
	14.59	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04	04.20	02.55	03.23	05.00	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.24	14.24
16	09.48	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.03	10.14
	15.27	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.26	09.06	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.49	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.37	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.20	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.08	05.18	03.39	02.51	04.02	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	17.30	14.57	14.25
26	09.22	07.42	06.04	05.14	03.36	02.52	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.46	07.15	07.45	09.24	10.16
	15.49	17.30	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.33	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.01	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.55	07.24	07.55	09.33	10.15
	15.59		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: I - Asuinrakennus I (Kortenevantie 116)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.14	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.52	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.05	03.11	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.24	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.08	23.40	23.35	22.00	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.26	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.54	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04	04.20	02.55	03.23	05.00	06.32	07.59	08.37	10.02
	15.02	16.43	18.10	20.43	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.26	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.23
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	17.30	14.57	14.26
26	09.22	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.49	17.30	18.55	21.29	23.05	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.27	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.01	21.35	23.11	23.52	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	15.59		20.04	21.39	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.17		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: J - Asuinrakennus J (Haapavesitie 1406)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.25	23.46	22.21	20.33	18.46	16.01	14.39
4	10.09	08.55	07.21	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.14	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.36
6	10.07	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.06	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.47	08.23	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.07	23.40	23.34	22.00	20.12	18.25	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.04	04.20	02.55	03.24	05.00	06.32	07.59	08.36	10.02
	15.03	16.43	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.46	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.16	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.11
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.52	08.20	08.59	10.12
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.25	05.35	03.54	02.50	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.26	09.05	10.14
	15.30	17.12	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.24
23	09.30	07.52	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.15
	15.40	17.21	18.46	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.55	22.50	21.05	19.15	17.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.50	17.30	18.55	21.29	23.05	23.54	22.43	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.15
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.28	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.51	19.00	16.17	14.47	14.31
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.11		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: K - Lomarakennus K (Kurunoja)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.11	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.13	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.47	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.53
	14.52	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.15	04.50	06.24	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	03.00	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.21	04.57	06.29	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.46	18.13	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.30	14.25
14	09.52	08.22	06.46	05.56	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.27	14.24
15	09.49	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.08
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.59	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.26	19.36	17.51	15.12	14.23
20	09.37	08.02	06.25	05.35	03.54	02.50	03.47	05.24	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.21	05.32	03.51	02.50	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.40	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.43	21.16	22.52	23.55	22.56	21.11	19.21	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.45	06.07	05.18	03.39	02.52	04.03	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	17.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.42	07.12	07.42	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.27
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.24	14.52	14.28
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.12		06.53	05.04	03.27	02.57	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.57		10.13
	16.03		20.06		23.17		22.30	20.43		16.10		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: L - Laskentapiste L (Perkkiontie, Ilmola)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December				
1	10.12	09.03	07.31	06.42	04.56	03.19	05.13 (38)	02.59	05.18 (38)	04.24	05.33 (38)	06.00	07.26	08.00	09.35	
2	14.35	16.06	17.36	20.09	21.41	23.19	21.39 (24)	23.49	21.43 (24)	22.27	26	21.37 (20)	20.39	18.53	16.07	14.43
3	10.11	09.00	07.28	06.38	04.53	03.16	05.13 (38)	03.01	05.18 (38)	04.28	18	05.35 (38)	06.03	07.29	08.03	09.38
4	14.37	16.09	17.39	20.12	21.44	23.22	21.39 (24)	23.47	21.43 (24)	22.23	12	05.38 (38)	06.06	07.32	08.07	09.41
5	10.10	08.57	07.24	06.35	04.50	03.14	05.12 (38)	03.01	05.18 (38)	04.31	12	05.50 (38)	06.06	07.32	08.07	09.41
6	14.39	16.12	17.42	20.15	21.47	23.25	21.38 (24)	23.46	21.43 (24)	22.20	20	05.38 (38)	06.06	07.32	08.07	09.41
7	10.09	08.54	07.21	06.31	04.46	03.12	05.13 (38)	03.03	05.19 (38)	04.34	18	05.38 (38)	06.09	07.35	08.10	09.43
8	14.42	16.15	17.45	20.18	21.51	23.28	21.39 (24)	23.44	21.44 (24)	22.17	18	05.38 (38)	06.09	07.35	08.10	09.43
9	10.08	08.51	07.17	06.28	04.43	03.09	05.13 (38)	03.05	05.19 (38)	04.37	18	05.38 (38)	06.12	07.38	08.13	09.46
10	14.44	16.19	17.48	20.21	21.54	23.30	21.39 (24)	23.42	21.44 (24)	22.13	18	05.38 (38)	06.12	07.38	08.13	09.46
11	10.06	08.48	07.14	06.24	04.39	03.07	05.13 (38)	03.08	05.19 (38)	04.40	18	05.38 (38)	06.14	07.41	08.16	09.48
12	14.46	16.22	17.51	20.24	21.57	23.33	21.38 (24)	23.40	21.45 (24)	22.10	18	05.38 (38)	06.14	07.41	08.16	09.48
13	10.05	08.45	07.10	06.21	04.36	03.05	05.13 (38)	03.10	05.19 (38)	04.43	18	05.38 (38)	06.17	07.44	08.20	09.51
14	14.49	16.25	17.54	20.27	22.00	23.35	21.39 (24)	23.38	21.45 (24)	22.07	18	05.38 (38)	06.17	07.44	08.20	09.51
15	10.03	08.41	07.07	06.17	04.33	03.03	05.14 (38)	03.12	05.20 (38)	04.47	18	05.38 (38)	06.20	07.47	08.23	09.53
16	14.51	16.29	17.57	20.30	22.04	23.37	21.39 (24)	23.36	21.45 (24)	22.03	18	05.38 (38)	06.20	07.47	08.23	09.53
17	10.01	08.38	07.03	06.14	04.29	03.01	05.14 (38)	03.15	05.20 (38)	04.50	18	05.38 (38)	06.23	07.50	08.26	09.55
18	14.54	16.32	18.00	20.33	22.07	23.40	21.39 (24)	23.34	21.46 (24)	22.00	18	05.38 (38)	06.23	07.50	08.26	09.55
19	10.09	08.35	07.00	06.10	04.26	03.06	05.14 (38)	03.18	05.20 (38)	04.53	18	05.38 (38)	06.26	07.53	08.29	09.58
20	14.56	16.35	18.03	20.36	22.10	23.42	21.39 (24)	23.31	21.46 (24)	21.56	18	05.38 (38)	06.26	07.53	08.29	09.58
21	10.08	08.32	06.56	06.07	04.23	03.04	05.14 (38)	03.20	05.21 (38)	04.56	18	05.38 (38)	06.29	07.55	08.33	10.00
22	14.59	16.39	18.06	20.39	22.13	23.44	21.39 (24)	23.29	21.47 (24)	21.53	18	05.38 (38)	06.29	07.55	08.33	10.00
23	10.06	08.29	06.53	06.03	04.19	03.02	05.14 (38)	03.23	05.21 (38)	04.59	18	05.38 (38)	06.32	07.58	08.36	10.02
24	15.02	16.42	18.09	20.42	22.17	23.45	21.38 (24)	23.27	21.47 (24)	21.49	18	05.38 (38)	06.32	07.58	08.36	10.02
25	10.03	08.25	06.49	05.59	04.16	03.00	05.15 (38)	03.26	05.20 (38)	05.02	18	05.38 (38)	06.35	08.01	08.39	10.03
26	15.05	16.45	18.12	20.45	22.20	23.47	21.39 (24)	23.24	21.46 (24)	21.46	18	05.38 (38)	06.35	08.01	08.39	10.03
27	10.01	08.22	06.46	05.56	04.13	03.00	05.15 (38)	03.29	05.21 (38)	05.05	18	05.38 (38)	06.38	08.04	08.42	10.05
28	15.08	16.48	18.15	20.48	22.23	23.49	21.39 (24)	23.21	21.48 (24)	21.43	18	05.38 (38)	06.38	08.04	08.42	10.05
29	10.09	08.19	06.42	05.52	04.09	03.01	05.15 (38)	03.31	05.21 (38)	05.09	18	05.38 (38)	06.40	08.07	08.46	10.07
30	15.11	16.52	18.18	20.51	22.26	23.50	21.39 (24)	23.19	21.48 (24)	21.39	18	05.38 (38)	06.40	08.07	08.46	10.07
31	10.07	08.15	06.39	05.49	04.06	03.00	05.15 (38)	03.34	05.22 (38)	05.12	18	05.38 (38)	06.43	08.10	08.49	10.08
32	15.14	16.55	18.21	20.54	22.30	23.51	21.39 (24)	23.16	21.49 (24)	21.36	18	05.38 (38)	06.43	08.10	08.49	10.08
33	10.04	08.12	06.35	05.45	04.03	03.00	05.16 (38)	03.37	05.22 (38)	05.15	18	05.38 (38)	06.46	08.13	08.52	10.09
34	15.17	16.58	18.24	20.57	22.33	23.52	21.39 (24)	23.13	21.49 (24)	21.32	18	05.38 (38)	06.46	08.13	08.52	10.09
35	10.02	08.09	06.32	05.42	04.00	03.00	05.16 (38)	03.40	05.22 (38)	05.18	18	05.38 (38)	06.49	08.16	08.55	10.11
36	15.20	17.01	18.27	21.00	22.36	23.53	21.39 (24)	23.10	21.49 (24)	21.29	18	05.38 (38)	06.49	08.16	08.55	10.11
37	10.00	08.05	06.28	05.38	03.57	02.49	05.16 (38)	03.43	05.23 (38)	05.21	18	05.38 (38)	06.52	08.20	08.58	10.12
38	15.23	17.05	18.30	21.03	22.39	23.54	21.40 (24)	23.07	21.50 (24)	21.25	18	05.38 (38)	06.52	08.20	08.58	10.12
39	10.07	08.02	06.25	05.35	03.54	02.49	05.16 (38)	03.46	05.23 (38)	05.24	18	05.38 (38)	06.55	08.23	09.02	10.13
40	15.26	17.08	18.33	21.06	22.43	23.55	21.40 (24)	23.04	21.50 (24)	21.22	18	05.38 (38)	06.55	08.23	09.02	10.13
41	10.04	07.59	06.21	05.31	03.50	02.49	05.16 (38)	03.50	05.23 (38)	05.27	18	05.38 (38)	06.58	08.26	09.05	10.13
42	15.29	17.11	18.36	21.09	22.46	23.55	21.41 (24)	23.01	21.50 (24)	21.18	18	05.38 (38)	06.58	08.26	09.05	10.13
43	10.02	07.55	06.18	05.28	03.47	02.49	05.16 (38)	03.53	05.24 (38)	05.30	18	05.38 (38)	06.61	08.29	09.08	10.14
44	15.33	17.14	18.39	21.13	22.49	23.55	21.40 (24)	22.58	21.51 (24)	21.15	18	05.38 (38)	06.61	08.29	09.08	10.14
45	10.09	07.52	06.14	05.24	03.44	02.50	05.13 (38)	03.56	05.24 (38)	05.33	18	05.38 (38)	06.64	08.32	09.11	10.15
46	15.36	17.17	18.42	21.16	22.52	23.55	21.41 (24)	22.55	21.51 (24)	21.11	18	05.38 (38)	06.64	08.32	09.11	10.15
47	10.06	07.48	06.10	05.21	03.41	02.50	05.13 (38)	03.59	05.24 (38)	05.36	18	05.38 (38)	06.67	08.35	09.14	10.15
48	15.39	17.20	18.45	21.19	22.55	23.55	21.40 (24)	22.52	21.50 (24)	21.08	18	05.38 (38)	06.67	08.35	09.14	10.15
49	10.04	07.45	06.07	05.17	03.38	02.51	05.13 (38)	04.02	05.25 (38)	05.39	18	05.38 (38)	06.70	08.38	09.17	10.15
50	15.42	17.24	18.48	21.22	22.58	23.55	21.41 (24)	22.49	21.51 (24)	21.04	18	05.38 (38)	06.70	08.38	09.17	10.15
51	10.01	07.42	06.03	05.14	03.35	02.52	05.13 (38)	04.05	05.25 (38)	05.42	18	05.38 (38)	06.73	08.41	09.20	10.15
52	15.45	17.27	18.51	21.25	23.02	23.54	21.40 (24)	22.46	21.50 (24)	21.01	18	05.38 (38)	06.73	08.41	09.20	10.15
53	10.08	07.38	06.00	05.10	03.33	02.53	05.13 (38)	04.08	05.27 (38)	05.45	18	05.38 (38)	06.76	08.44	09.23	10.15
54	15.49	17.30	18.54	21.28	23.05	23.53	21.41 (24)	22.43	21.50 (24)	20.57	18	05.38 (38)	06.76	08.44	09.23	10.15
55	10.05	07.35	05.56	05.07	03.30	02.55	05.13 (38)	04.12	05.28 (38)	05.48	18	05.38 (38)	06.79	08.47	09.26	10.15
56	15.52	17.33	18.57	21.31	23.08	23.52	21.39 (24)	22.40	21.48 (24)	20.54	18	05.38 (38)	06.79	08.47	09.26	10.15
57	10.02	06.53	05.03	03.27	02.56	02.56	05.12 (38)	04.15	05.28 (38)	05.51	18	05.38 (38)	06.82	08.50	09.34	10.16
58	15.56	17.35	18.59	21.35	23.11	23.51	21.39 (24)	22.36	21.45 (24)	20.50	18	05.38 (38)	06.82	08.50	09.34	10.16
59	10.09	06.49	05.00	03.24	02.58	02.58	05.12 (38)	04.18	05.30 (38)	05.54	18	05.38 (38)	06.85	08.53	09.37	10.16
60	15.59	17.38	18.62	21.38	23.14	23.50	21.39 (24)	22.33	21.43 (24)	20.46	18	05.38 (38)	06.85	08.53	09.37	10.16
61	10.06	06.46	05.00	03.22	02.56	02.56	05.12 (38)	04.21	05.31 (38)	05.57	18	05.38 (38)	06.88	08.56	09.40	10.16
62	16.02	17.41	19.06	21.40	23.16	23.50	21.38 (24)	22.30	21.39 (24)	20.43	18	05.38 (38)	06.88	08.56	09.40	10.16
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137				
Total, worst case					1337	2075	2105	56								
Sun reduction					0.47	0.48	0.38	0.31								
Oper. time red.					0.99	0.99	0.99	0.99								
Wind dir. red.					0.63	0.63	0.63	0.62								
Total reduction					0.29	0.30	0.24	0.19								
Total, real					3											

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102Shadow receptor: M - Lomarakennus M (Riskalan metsätie)
Assumptions for shadow calculations
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

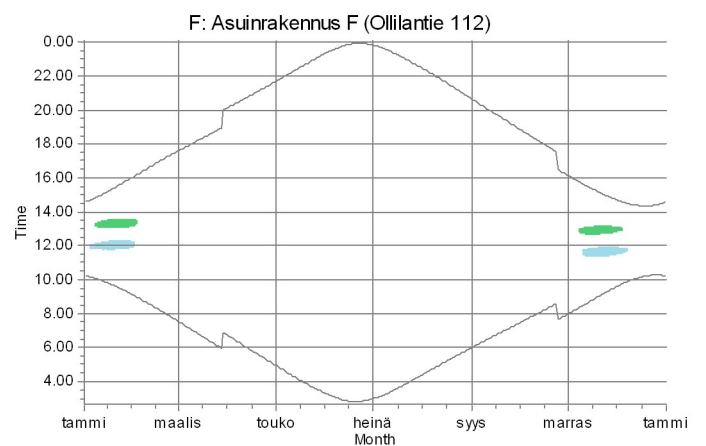
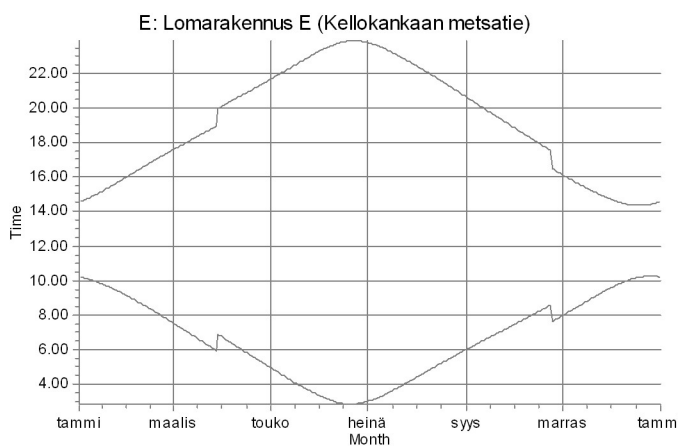
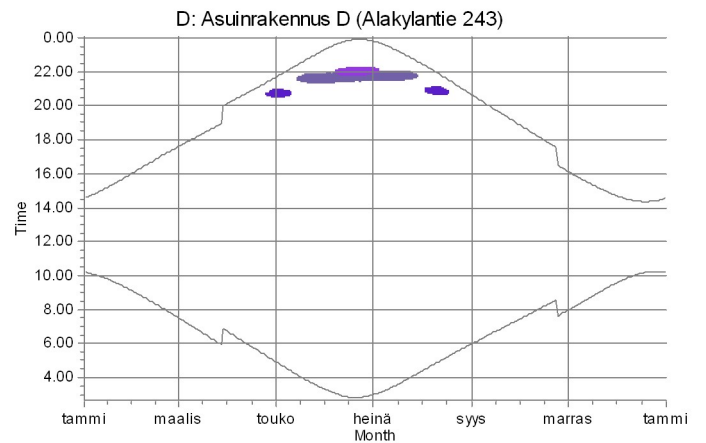
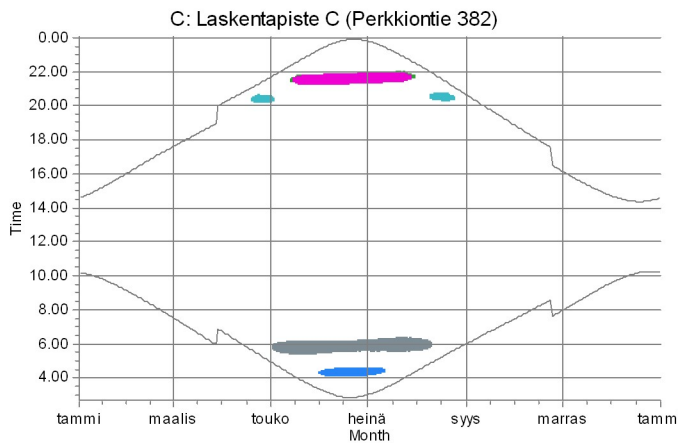
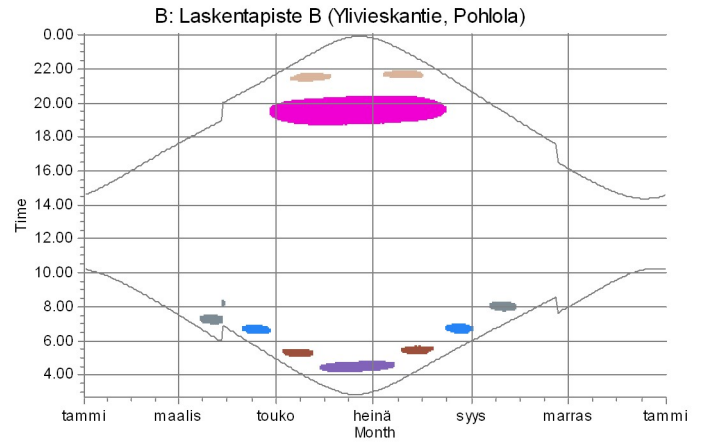
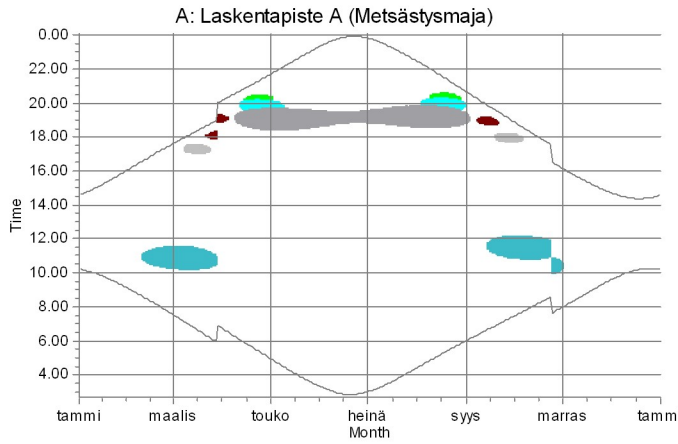
	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36
	14.34	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.01	07.28	06.38	04.52	03.15	03.00	04.27	06.02	07.29	08.04	09.39
	14.36	16.08	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	09.41
	14.38	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10	09.44
	14.40	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.36	06.11	07.38	08.13	09.47
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	14.32
7	10.05	08.45	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.31	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.29
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	09.58
	14.55	16.35	18.03	20.36	22.11	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.54	03.19	04.56	06.29	07.56	08.33	10.00
	14.58	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.17	15.35	14.25
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.41	18.09	20.42	22.17	23.47	23.27	21.50	20.00	18.14	15.32	14.24
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.07	08.46	10.08
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.22
16	09.47	08.16	06.39	05.48	04.05	02.49	03.33	05.11	06.43	08.11	08.49	10.09
	15.13	16.54	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.54	23.14	21.32	19.42	17.57	15.17	14.21
18	09.43	08.09	06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	10.12
	15.19	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	10.13
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.38	08.02	06.25	05.34	03.53	02.47	03.45	05.23	06.55	08.23	09.02	10.14
	15.25	17.07	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.08	14.21
21	09.35	07.59	06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.21
22	09.32	07.55	06.17	05.27	03.46	02.48	03.52	05.30	07.00	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30	07.52	06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.00	14.22
24	09.27	07.48	06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.38	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	17.29	14.55	14.24
26	09.21	07.42	06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.47	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.48	17.29	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.03	16.19	14.48	14.27
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.53	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	10.15
	15.58		20.03	21.38	23.14	23.52	22.34	20.47	18.56	16.13	14.44	14.30
31	09.07		06.45		03.20		04.20	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	170	238	363	451	570	625	609	509	393	305	198	136
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar, graphical

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102

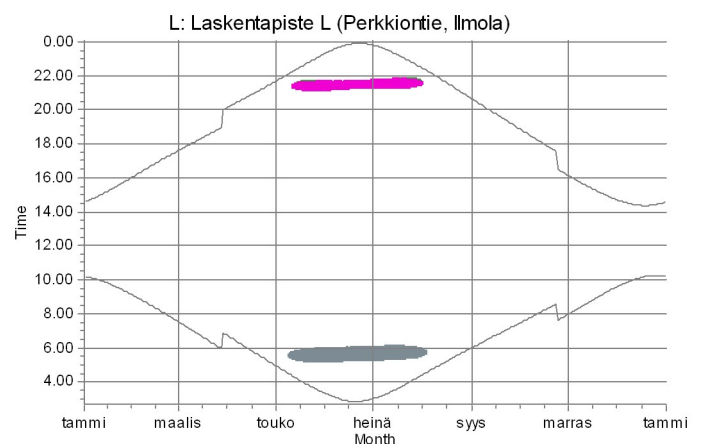
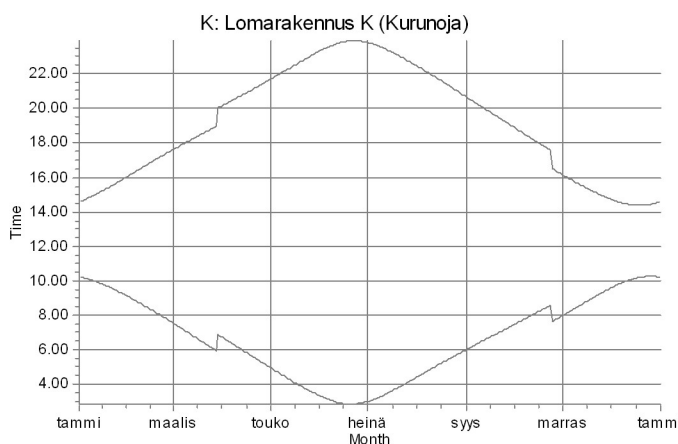
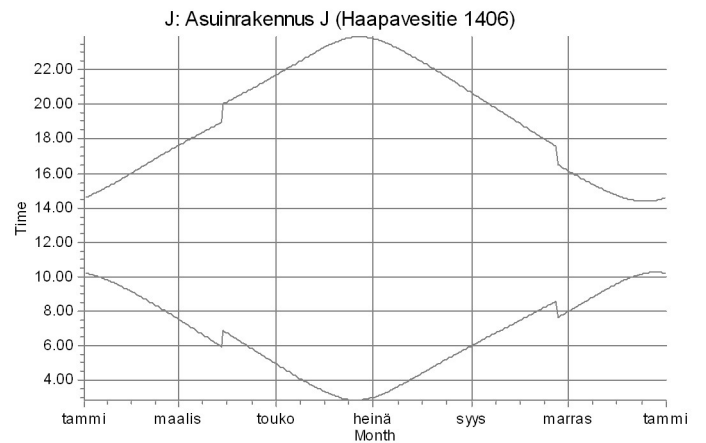
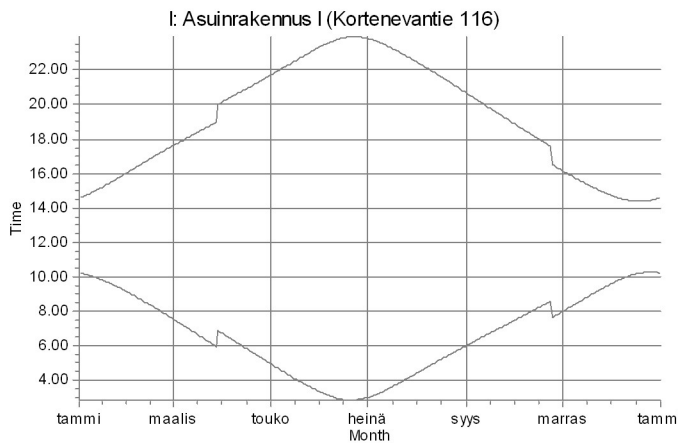
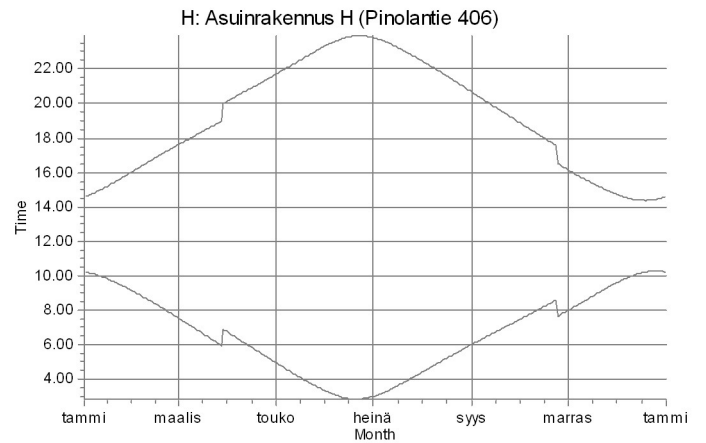
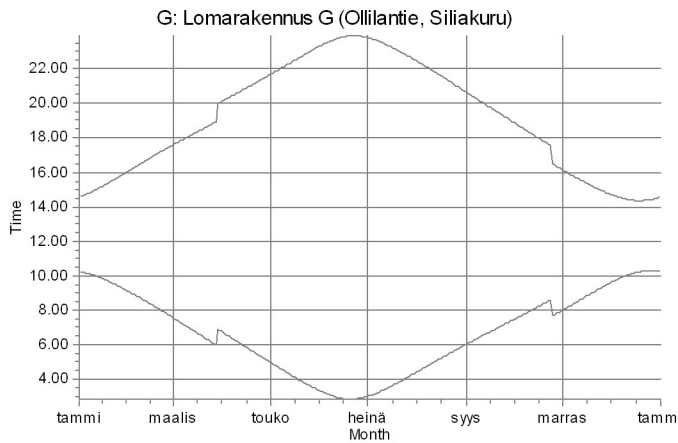


WTGs

8: PUU08	13: PUU13	19: PUU19	28: PUU28	38: PUU38	42: PUU42
9: PUU09	16: PUU16	20: PUU20	33: PUU33	39: PUU39	44: PUU44
12: PUU12	17: PUU17	24: PUU24	34: PUU34	40: PUU40	46: PUU46

SHADOW - Calendar, graphical

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102



WTGs



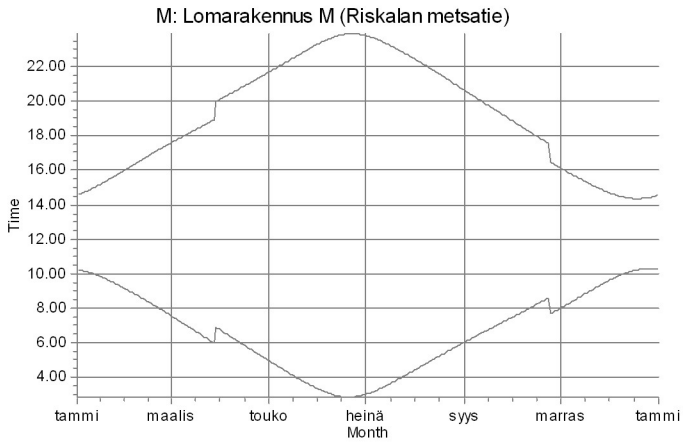
Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



WTGs

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 1 - PUU01

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.42
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.11	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.09	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.14	06.25	04.40	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.36	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.01	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.47	08.14	08.53	10.11
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.57	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 2 - PUU02

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.24	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.44	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 3 - PUU03

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.46	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 4 - PUU04

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.40	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.06	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 5 - PUU05

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 6 - PUU06

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 7 - PUU07

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102WTG: 8 - PUU08

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	18.56-19.14/18	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36	
	14.36	16.06	17.36	20.09		21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43	
2	10.12	09.01	07.28	06.39	18.58-19.13/15	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.38	
	14.38	16.09	17.39	20.12		21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41	
3	10.11	08.58	07.25	06.35	18.59-19.10/11	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41	
	14.40	16.12	17.42	20.15		21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39	
4	10.09	08.54	07.21	06.32	19.03-19.07/4	04.46	03.12	03.04	04.34	06.09	07.35	08.10	09.44	
	14.42	16.16	17.46	20.18		21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37	
5	10.08	08.51	07.18	06.28		04.43	03.09	03.06	04.37	06.12	07.38	08.14	09.46	
	14.44	16.19	17.49	20.21		21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35	
6	10.07	08.48	07.14	06.25		04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49	
	14.46	16.22	17.52	20.24		21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34	
7	10.05	08.45	07.11	06.21		04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51	
	14.49	16.26	17.55	20.27		22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32	
8	10.04	08.42	07.07	06.18		04.33	03.03	03.13	04.47	06.21	18.58-19.00/2	07.47	08.23	09.54
	14.51	16.29	17.58	20.30		22.04	23.38	23.37	22.04	20.15		18.29	15.45	14.30
9	10.02	08.39	07.04	06.14		04.30	03.01	03.15	04.50	06.24	18.53-19.04/11	07.50	08.26	09.56
	14.54	16.32	18.01	20.33		22.07	23.40	23.34	22.00	20.11		18.25	15.42	14.29
10	10.00	08.35	07.00	06.10		04.26	02.58	03.18	04.53	06.26	18.50-19.05/15	07.53	08.30	09.58
	14.57	16.36	18.04	20.36		22.11	23.42	23.32	21.57	20.08		18.22	15.39	14.28
11	09.58	08.32	06.57	06.07		04.23	02.56	03.20	04.56	06.29	18.49-19.06/17	07.56	08.33	10.00
	14.59	16.39	18.07	20.39		22.14	23.44	23.30	21.53	20.04		18.18	15.35	14.27
12	09.56	08.29	06.53	06.03		04.20	02.55	03.23	05.00	06.32	18.48-19.07/19	07.59	08.36	10.02
	15.02	16.42	18.10	20.42		22.17	23.46	23.27	21.50	20.01		18.15	15.32	14.26
13	09.54	08.26	06.50	06.00		04.16	02.53	03.26	05.03	06.35	18.47-19.07/20	08.02	08.40	10.04
	15.05	16.45	18.13	20.45		22.20	23.48	23.25	21.46	19.57		18.11	15.29	14.25
14	09.52	08.22	06.46	05.56		04.13	02.52	03.29	05.06	06.38	18.46-19.08/22	08.05	08.43	10.06
	15.08	16.49	18.16	20.48		22.24	23.49	23.22	21.43	19.54		18.08	15.26	14.24
15	09.50	08.19	06.43	05.53		04.10	02.51	03.32	05.09	06.41	18.45-19.07/22	08.08	08.46	10.07
	15.11	16.52	18.19	20.51		22.27	23.51	23.19	21.40	19.50		18.04	15.24	14.24
16	09.47	08.16	06.39	05.49		04.06	02.51	03.35	05.12	06.44	18.45-19.06/21	08.11	08.49	10.09
	15.14	16.55	18.22	20.54		22.30	23.52	23.16	21.36	19.46		18.01	15.21	14.23
17	09.45	08.12	06.36	05.46		04.03	02.50	03.38	05.15	06.46	18.45-19.05/20	08.14	08.52	10.10
	15.17	16.58	18.25	20.58		22.33	23.53	23.14	21.33	19.43		17.57	15.18	14.23
18	09.43	08.09	06.32	05.42		04.00	02.49	03.41	05.18	06.49	18.46-19.02/16	08.17	08.56	10.11
	15.20	17.02	18.28	21.01		22.37	23.54	23.11	21.29	19.39		17.54	15.15	14.22
19	09.40	08.06	06.29	05.39		03.57	02.49	03.44	05.21	06.52	18.46-18.58/12	08.20	08.59	10.12
	15.23	17.05	18.31	21.04		22.40	23.55	23.08	21.26	19.36		17.50	15.12	14.22
20	09.38	08.02	06.25	05.35		03.54	02.49	03.47	05.24	06.55	18.46-18.54/8	08.23	09.02	10.13
	15.26	17.08	18.34	21.07		22.43	23.55	23.05	21.22	19.32		17.47	15.09	14.23
21	09.35	07.59	06.21	05.32		03.51	02.49	03.50	05.27	06.58	18.48-18.50/2	08.26	09.05	10.14
	15.30	17.11	18.37	21.10		22.46	23.56	23.02	21.19	19.29		17.44	15.07	14.23
22	09.32	07.56	06.18	18.04-18.05/1	05.28	03.48	02.49	03.53	05.30	07.01		08.29	09.09	10.15
	15.33	17.14	18.40		21.13	22.50	23.56	22.59	21.15	19.25		17.40	15.04	14.23
23	09.30	07.52	06.14	18.01-18.07/6	05.25	03.45	02.50	03.56	05.33	07.04		08.32	09.12	10.15
	15.36	17.18	18.43		21.16	22.53	23.56	22.56	21.12	19.21		17.37	15.01	14.24
24	09.27	07.49	06.11	17.59-18.10/11	05.21	03.42	02.51	03.59	05.36	07.07		08.35	09.15	10.15
	15.39	17.21	18.45		21.19	22.56	23.56	22.53	21.08	19.18		17.34	14.59	14.24
25	09.24	07.45	06.07	17.58-18.13/15	05.18	03.39	02.51	04.02	05.39	07.09		07.38	09.18	10.16
	15.43	17.24	18.48		21.22	22.59	23.55	22.50	21.05	19.14		16.30	14.56	14.25
26	09.21	07.42	06.04	17.57-18.16/19	05.14	03.36	02.52	04.05	05.42	07.12		07.42	09.21	10.16
	15.46	17.27	18.51		21.26	23.02	23.55	22.46	21.01	19.11		16.27	14.54	14.26
27	09.18	07.39	06.00	17.56-18.18/22	05.11	03.33	02.53	04.09	05.45	07.15		07.45	09.24	10.16
	15.49	17.30	18.54		21.29	23.05	23.54	22.43	20.57	19.07		16.23	14.52	14.27
28	09.16	07.35	05.57	17.55-18.17/22	05.07	03.30	02.55	04.12	05.48	07.18		07.48	09.27	10.15
	15.53	17.33	18.57		21.32	23.08	23.53	22.40	20.54	19.04		16.20	14.49	14.29
29	09.13		06.53	18.56-19.17/21	05.04	03.27	02.56	04.15	05.51	07.21		07.51	09.30	10.15
	15.56		20.00		21.35	23.11	23.52	22.37	20.50	19.00		16.17	14.47	14.30
30	09.10		06.50	18.55-19.16/21	05.00	03.24	02.58	04.18	05.54	07.24		07.54	09.33	10.14
	15.59		20.03		21.38	23.14	23.51	22.34	20.47	18.57		16.14	14.45	14.32
31	09.07		06.46	18.56-19.16/20		03.22		04.21	05.57			07.57		10.14
	16.02		20.06			23.17		22.30	20.43			16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137	0	
Sum of minutes with flicker	0	0	158	48	0	0	0	0	207	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102WTG: 9 - PUU09

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	04.57	20.06-20.20/14	03.19	02.59	04.25	06.00	07.27	08.01	09.36	
	14.35	16.06	17.36	20.09	21.41		23.20	23.50	22.27	20.40	18.53	16.07	14.43	
2	10.12	09.01	07.28	06.39	04.53	20.08-20.18/10	03.16	03.01	04.28	06.03	07.30	08.04	09.39	
	14.37	16.09	17.39	20.12	21.45		23.23	23.48	22.24	20.36	18.50	16.04	14.41	
3	10.11	08.58	07.25	06.35	04.50		03.14	03.01	04.31	06.06	07.32	08.07	09.41	
	14.39	16.12	17.42	20.15	21.48		23.26	23.47	22.20	20.33	18.46	16.00	14.39	
4	10.10	08.55	07.21	06.32	04.46		03.12	03.03	04.34	06.09	07.35	08.10	09.44	
	14.42	16.16	17.45	20.18	21.51		23.28	23.45	22.17	20.29	18.43	15.57	14.37	
5	10.08	08.51	07.18	06.28	04.43		03.09	03.05	04.37	06.12	07.38	08.14	09.47	
	14.44	16.19	17.49	20.21	21.54		23.31	23.43	22.14	20.26	18.39	15.54	14.35	
6	10.07	08.48	07.14	06.25	04.40		03.07	03.08	04.41	06.15	07.41	08.17	09.49	
	14.46	16.22	17.52	20.24	21.58		23.33	23.41	22.10	20.22	18.36	15.51	14.33	
7	10.05	08.45	07.11	06.21	04.36		03.05	03.10	04.44	06.18	07.44	08.20	09.51	
	14.49	16.26	17.55	20.27	22.01		23.36	23.39	22.07	20.18	18.32	15.48	14.32	
8	10.04	08.42	07.07	06.17	04.33		03.03	03.12	04.47	06.21	07.47	08.23	09.54	
	14.51	16.29	17.58	20.30	22.04		23.38	23.37	22.04	20.15	18.29	15.45	14.30	
9	10.02	08.39	07.04	06.14	04.29		03.01	03.15	04.50	06.23	07.50	08.27	09.56	
	14.54	16.32	18.01	20.33	22.07		23.40	23.34	22.00	20.11	18.25	15.42	14.29	
10	10.00	08.35	07.00	06.10	04.26		02.57	03.18	04.53	20.18-20.23/5	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11		23.42	23.32	21.57	20.08	18.22	15.38	14.28	
11	09.58	08.32	06.57	06.07	04.23		02.56	03.20	04.56	20.15-20.27/12	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14		23.44	23.30	21.53	20.04	18.18	15.35	14.27	
12	09.56	08.29	06.53	06.03	04.19		02.55	03.23	04.59	20.13-20.29/16	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17		23.46	23.27	21.50	20.01	18.15	15.32	14.26	
13	09.54	08.26	06.50	06.00	04.16		02.53	03.26	05.03	20.12-20.30/18	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20		23.48	23.25	21.47	19.57	18.11	15.29	14.25	
14	09.52	08.22	06.46	05.56	04.13		02.52	03.29	05.06	20.10-20.30/20	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24		23.49	23.22	21.43	19.53	18.08	15.26	14.24	
15	09.50	08.19	06.43	05.53	20.11-20.13/2		02.51	03.32	05.09	20.09-20.31/22	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27		23.51	23.19	21.40	19.50	18.04	15.23	14.23	
16	09.47	08.16	06.39	05.49	20.09-20.16/7		02.50	03.34	05.12	20.09-20.32/23	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30		23.52	23.17	21.36	19.46	18.01	15.21	14.23	
17	09.45	08.12	06.36	05.46	20.06-20.18/12		02.50	03.37	05.15	20.07-20.31/24	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.33		23.53	23.14	21.33	19.43	17.57	15.18	14.23	
18	09.43	08.09	06.32	05.42	20.05-20.21/16		02.49	03.40	05.18	20.07-20.32/25	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37		23.54	23.11	21.29	19.39	17.54	15.15	14.22	
19	09.40	08.06	06.29	05.39	20.04-20.25/21		02.49	03.43	05.21	20.07-20.32/25	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40		23.55	23.08	21.26	19.36	17.50	15.12	14.22	
20	09.38	08.02	06.25	05.35	20.02-20.25/23		02.49	03.47	05.24	20.07-20.32/25	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43		23.55	23.05	21.22	19.32	17.47	15.09	14.22	
21	09.35	07.59	06.21	05.31	20.02-20.26/24		02.49	03.50	05.27	20.06-20.31/25	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46		23.56	23.02	21.19	19.29	17.44	15.07	14.23	
22	09.32	07.56	06.18	05.28	20.02-20.26/24		02.49	03.53	05.30	20.06-20.30/24	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50		23.56	22.59	21.15	19.25	17.40	15.04	14.23	
23	09.30	07.52	06.14	05.24	20.01-20.26/25		02.50	03.56	05.33	20.07-20.30/23	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53		23.56	22.56	21.12	19.21	17.37	15.01	14.24	
24	09.27	07.49	06.11	05.21	20.01-20.25/24		02.50	03.59	05.36	20.08-20.28/20	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56		23.56	22.53	21.08	19.18	17.33	14.59	14.24	
25	09.24	07.45	06.07	05.17	20.01-20.25/24		02.51	04.02	05.39	20.08-20.24/16	07.09	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59		23.55	22.50	21.05	19.14	16.30	14.56	14.25	
26	09.21	07.42	06.04	05.14	20.01-20.25/24		02.52	04.05	05.42	20.09-20.21/12	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02		23.55	22.47	21.01	19.11	16.27	14.54	14.26	
27	09.18	07.39	06.00	05.11	20.01-20.24/23		02.53	04.09	05.45	20.11-20.18/7	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05		23.54	22.43	20.57	19.07	16.23	14.52	14.27	
28	09.16	07.35	05.57	05.07	20.02-20.24/22		02.55	04.12	05.48	20.14-20.15/1	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08		23.53	22.40	20.54	19.04	16.20	14.49	14.29	
29	09.13		05.53	05.04	20.03-20.23/20		02.56	04.15	05.51		07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11		23.52	22.37	20.50	19.00	16.17	14.47	14.30	
30	09.10		06.49	05.00	20.04-20.22/18		02.58	04.18	05.54		07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14		23.51	22.34	20.47	18.57	16.13	14.45	14.31	
31	09.07		06.46		03.22			04.21	05.57		07.57		10.14	
	16.02		20.06		23.17			22.30	20.43		16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	
Sum of minutes with flicker	0	0	0	309	24	0	0	343	0	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 10 - PUU10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 11 - PUU11

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102WTG: 12 - PUU12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	17.44-18.09/25	08.01	09.36
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53		16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29	17.44-18.08/24	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50		16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	17.45-18.06/21	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46		16.01	14.39
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35	17.46-18.03/17	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43		15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	17.48-18.00/12	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39		15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	17.51-17.56/5	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36		15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44		08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32		15.48	14.32
8	10.03	08.42	07.07	17.12-17.21/9	06.17	04.33	03.03	03.13	04.47	06.21		08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29		15.45	14.30
9	10.02	08.39	07.04	17.09-17.24/15	06.14	04.30	03.01	03.15	04.50	06.23		08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25		15.42	14.29
10	10.00	08.35	07.00	17.08-17.28/20	06.10	04.26	02.58	03.18	04.53	06.26		08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22		15.39	14.28
11	09.58	08.32	06.57	17.06-17.29/23	06.07	04.23	02.56	03.20	04.56	06.29		08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18		15.35	14.27
12	09.56	08.29	06.53	17.06-17.30/24	06.03	04.20	02.55	03.23	05.00	06.32		08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15		15.32	14.26
13	09.54	08.26	06.50	17.04-17.30/26	06.00	04.16	02.53	03.26	05.03	06.35		08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11		15.29	14.25
14	09.52	08.22	06.46	17.03-17.30/27	05.56	04.13	02.52	03.29	05.06	06.38		08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08		15.26	14.24
15	09.50	08.19	06.43	17.03-17.30/27	05.53	04.10	02.51	03.32	05.09	06.41		08.08	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04		15.24	14.24
16	09.47	08.16	06.39	17.03-17.30/27	05.49	04.06	02.51	03.35	05.12	06.44		08.11	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01		15.21	14.23
17	09.45	08.12	06.36	17.02-17.29/27	05.46	04.03	02.50	03.38	05.15	06.46		08.14	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	18.04		15.18	14.23
18	09.42	08.09	06.32	17.03-17.29/26	05.42	04.00	02.49	03.41	05.18	06.49		08.17	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54		15.15	14.23
19	09.40	08.06	06.29	17.02-17.28/26	05.39	03.57	02.49	03.44	05.21	06.52	17.59-18.04/5	08.20	08.59
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50		15.12	14.22
20	09.37	08.02	06.25	17.04-17.27/23	05.35	03.54	02.49	03.47	05.24	06.55	17.54-18.07/13	08.23	09.02
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47		15.09	14.23
21	09.35	07.59	06.21	17.04-17.25/21	05.32	03.51	02.49	03.50	05.27	06.58	17.51-18.09/18	08.26	09.05
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44		15.07	14.23
22	09.32	07.56	06.18	17.06-17.24/18	05.28	03.48	02.49	03.53	05.30	07.01	17.49-18.10/21	08.29	09.08
	15.33	17.14	18.40	21.13	22.49	23.56	22.59	21.15	19.25	17.40		15.04	14.23
23	09.30	07.52	06.14	17.07-17.22/15	05.25	03.45	02.50	03.56	05.33	07.04	17.48-18.11/23	08.32	09.12
	15.36	17.18	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37		15.01	14.24
24	09.27	07.49	06.11	17.10-17.18/8	05.21	03.42	02.51	03.59	05.36	07.06	17.47-18.11/24	08.35	09.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33		14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09	07.46-18.12/26	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30		14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.45-18.12/27	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27		14.54	14.26
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	17.44-18.11/27	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23		14.52	14.27
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	17.43-18.11/28	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20		14.49	14.29
29	09.13	07.33	05.53	05.04	03.27	02.56	04.15	05.51	07.21	17.43-18.10/27	07.51	09.30	10.15
	15.56	17.36	18.60	21.35	23.11	23.52	22.37	20.50	19.00	16.17		14.47	14.30
30	09.10	07.30	05.49	05.00	03.24	02.58	04.18	05.54	07.24	17.43-18.10/27	07.54	09.33	10.14
	15.59	17.39	18.63	21.38	23.14	23.51	22.34	20.47	18.57	16.14		14.45	14.32
31	09.07	07.27	05.46	05.00	03.22	02.57	04.21	05.57	07.31	17.43-18.10/27	07.57	09.36	10.14
	16.02	17.46	18.66	21.41	23.17	23.50	22.30	20.43	18.60	16.10		14.43	14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137	0
Sum of minutes with flicker	0	0	362	0	0	0	0	0	266	104	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102WTG: 13 - PUU13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	04.57	19.33-20.05/32	03.19	02.59	04.25	06.00	07.27	08.01	09.36	
	14.35	16.06	17.36	20.09	21.41		23.20	23.50	22.27	20.40	18.53	16.07	14.43	
2	10.12	09.01	07.28	06.39	04.53	19.34-20.05/31	03.16	03.01	04.28	06.03	07.29	08.04	09.38	
	14.37	16.09	17.39	20.12	21.45		23.23	23.48	22.24	20.36	18.50	16.04	14.41	
3	10.11	08.58	07.25	06.35	04.50	19.35-20.04/29	03.14	03.01	04.31	06.06	07.32	08.07	09.41	
	14.39	16.12	17.42	20.15	21.48		23.25	23.46	22.20	20.33	18.46	16.00	14.39	
4	10.09	08.54	07.21	06.32	04.46	19.35-20.03/28	03.12	03.03	04.34	19.54-20.03/9	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51		23.28	23.45	22.17	20.29	18.43	15.57	14.37	
5	10.08	08.51	07.18	06.28	04.43	19.37-20.01/24	03.09	03.05	04.37	19.51-20.06/15	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54		23.31	23.43	22.14	20.25	18.39	15.54	14.35	
6	10.07	08.48	07.14	06.25	04.40	19.38-20.00/22	03.07	03.08	04.40	19.49-20.08/19	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58		23.33	23.41	22.10	20.22	18.35	15.51	14.33	
7	10.05	08.45	07.11	06.21	04.36	19.40-19.58/18	03.05	03.10	04.44	19.47-20.09/22	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01		23.36	23.39	22.07	20.18	18.32	15.48	14.32	
8	10.03	08.42	07.07	06.17	04.33	19.42-19.55/13	03.03	03.12	04.47	19.45-20.11/26	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04		23.38	23.37	22.04	20.15	18.28	15.45	14.30	
9	10.02	08.39	07.04	06.14	04.29	19.47-19.50/3	03.01	03.15	04.50	19.44-20.12/28	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07		23.40	23.34	22.00	20.11	18.25	15.41	14.29	
10	10.00	08.35	07.00	06.10	04.26		02.58	03.18	04.53	19.42-20.12/30	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11		23.42	23.32	21.57	20.08	18.22	15.38	14.28	
11	09.58	08.32	06.57	06.07	04.23		02.56	03.20	04.56	19.42-20.13/31	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14		23.44	23.30	21.53	20.04	18.18	15.35	14.27	
12	09.56	08.29	06.53	06.03	19.47-19.58/11	04.19	02.55	03.23	04.59	19.41-20.14/33	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17		23.46	23.27	21.50	20.01	18.15	15.32	14.26	
13	09.54	08.26	06.50	06.00	19.44-20.02/18	04.16	02.53	03.26	05.03	19.40-20.14/34	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20		23.48	23.25	21.46	19.57	18.11	15.29	14.25	
14	09.52	08.22	06.46	05.56	19.40-20.03/23	04.13	02.52	03.29	05.06	19.39-20.14/35	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24		23.49	23.22	21.43	19.53	18.08	15.26	14.24	
15	09.50	08.19	06.43	05.53	19.39-20.05/26	04.10	02.51	03.32	05.09	19.39-20.14/35	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27		23.51	23.19	21.40	19.50	18.04	15.23	14.23	
16	09.47	08.16	06.39	05.49	19.38-20.06/28	04.06	02.50	03.34	05.12	19.39-20.15/36	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30		23.52	23.16	21.36	19.46	18.01	15.21	14.23	
17	09.45	08.12	06.36	05.46	19.36-20.06/30	04.03	02.50	03.37	05.15	19.37-20.14/37	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33		23.53	23.14	21.33	19.43	17.57	15.18	14.23	
18	09.42	08.09	06.32	05.42	19.35-20.07/32	04.00	02.49	03.40	05.18	19.37-20.14/37	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37		23.54	23.11	21.29	19.39	17.54	15.15	14.22	
19	09.40	08.06	06.28	05.38	19.34-20.08/34	03.57	02.49	03.43	05.21	19.37-20.14/37	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40		23.55	23.08	21.26	19.36	17.50	15.12	14.22	
20	09.37	08.02	06.25	05.35	19.33-20.08/35	03.54	02.49	03.47	05.24	19.37-20.14/37	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43		23.55	23.05	21.22	19.32	17.47	15.09	14.22	
21	09.35	07.59	06.21	05.31	19.32-20.08/36	03.51	02.49	03.50	05.27	19.37-20.13/36	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46		23.56	23.02	21.19	19.29	17.44	15.07	14.23	
22	09.32	07.56	06.18	05.28	19.32-20.09/37	03.47	02.49	03.53	05.30	19.37-20.13/36	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49		23.56	22.59	21.15	19.25	17.40	15.04	14.23	
23	09.30	07.52	06.14	05.24	19.32-20.09/37	03.44	02.50	03.56	05.33	19.38-20.12/34	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53		23.56	22.56	21.12	19.21	17.37	15.01	14.24	
24	09.27	07.49	06.11	05.21	19.31-20.08/37	03.41	02.50	03.59	05.36	19.38-20.12/34	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56		23.56	22.53	21.08	19.18	17.33	14.59	14.24	
25	09.24	07.45	06.07	05.17	19.31-20.08/37	03.38	02.51	04.02	05.39	19.38-20.10/32	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59		23.55	22.50	21.04	19.14	16.30	14.56	14.25	
26	09.21	07.42	06.04	05.14	19.31-20.08/37	03.36	02.52	04.05	05.42	19.39-20.09/30	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02		23.55	22.46	21.01	19.11	16.27	14.54	14.26	
27	09.18	07.38	06.00	05.10	19.31-20.07/36	03.33	02.53	04.09	05.45	19.40-20.08/28	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05		23.54	22.43	20.57	19.07	16.23	14.52	14.27	
28	09.16	07.35	05.57	05.07	19.32-20.07/35	03.30	02.55	04.12	05.48	19.41-20.07/26	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08		23.53	22.40	20.54	19.04	16.20	14.49	14.29	
29	09.13		06.53	05.04	19.32-20.07/35	03.27	02.56	04.15	05.51	19.41-20.04/23	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11		23.52	22.37	20.50	19.00	16.17	14.47	14.30	
30	09.10		06.49	05.00	19.32-20.06/34	03.24	02.58	04.18	05.54	19.44-20.01/17	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14		23.51	22.34	20.47	18.57	16.13	14.45	14.31	
31	09.07		06.46		03.22			04.21	05.57	19.47-19.58/11		07.57		10.14
	16.02		20.06		23.17			22.30	20.43		16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	
Sum of minutes with flicker	0	0	0	598	200	0	0	808	0	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 14 - PUU14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.54	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 15 - PUU15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.45	14.31
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.49	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.06	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.28	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.25	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.21	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.18	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.39	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.12		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102WTG: 16 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13 14.35	09.04 16.06	07.32 17.36	06.42 20.09	04.57 21.41	18.27-19.39/72 23.20
2	10.12 14.37	09.01 16.09	07.28 17.39	06.39 20.12	04.53 21.45	18.27-19.39/72 23.23
3	10.11 14.39	08.57 16.12	07.25 17.42	06.35 20.15	04.50 21.48	18.27-19.39/72 23.25
4	10.09 14.42	08.54 16.16	07.21 17.45	06.32 20.18	04.46 21.51	18.27-19.39/72 23.28
5	10.08 14.44	08.51 16.19	07.18 17.48	06.28 20.21	04.43 21.54	18.27-19.39/72 23.31
6	10.07 14.46	08.48 16.22	07.14 17.52	06.25 20.24	04.39 21.57	18.26-19.39/73 23.33
7	10.05 14.49	08.45 16.26	07.11 17.55	06.21 20.27	04.36 22.01	18.26-19.39/73 23.36
8	10.03 14.51	08.42 16.29	07.07 17.58	06.17 20.30	04.33 22.04	18.26-19.38/72 23.38
9	10.02 14.54	08.39 16.32	07.04 18.01	06.14 20.33	04.29 22.07	19.02-19.11/9 23.40
10	10.00 14.56	08.35 16.36	07.00 18.04	06.10 20.36	04.26 22.10	18.56-19.18/22 23.42
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	04.23 22.14	18.52-19.22/30 23.44
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	04.19 22.17	18.48-19.24/36 23.46
13	09.54 15.05	08.26 16.45	06.50 18.13	06.00 20.45	04.16 22.20	18.46-19.27/41 23.48
14	09.52 15.08	08.22 16.49	06.46 18.16	05.56 20.48	04.13 22.24	18.43-19.28/45 23.49
15	09.49 15.11	08.19 16.52	06.43 18.19	05.53 20.51	04.10 22.27	18.28-19.37/69 23.51
16	09.47 15.14	08.16 16.55	06.39 18.22	05.49 20.54	04.06 22.30	18.28-19.36/68 23.52
17	09.45 15.17	08.12 16.58	06.36 18.25	05.46 20.57	04.03 22.33	18.29-19.36/67 23.53
18	09.42 15.20	08.09 17.02	06.32 18.28	05.42 21.00	04.00 22.37	18.29-19.35/66 23.54
19	09.40 15.23	08.06 17.05	06.28 18.31	05.38 21.04	03.57 22.40	18.30-19.36/66 23.55
20	09.37 15.26	08.02 17.08	06.25 18.34	05.35 21.07	03.54 22.43	18.30-19.35/65 23.55
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	03.51 22.46	18.31-19.35/64 23.56
22	09.32 15.33	07.56 17.14	06.18 18.39	05.28 21.13	03.47 22.49	18.32-19.35/63 23.56
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.53	18.32-19.33/61 23.56
24	09.27 15.39	07.49 17.21	06.11 18.45	05.21 21.19	03.41 22.56	18.33-19.33/60 23.56
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	03.38 22.59	18.34-19.33/59 23.55
26	09.21 15.46	07.42 17.27	06.04 18.51	05.14 21.25	03.36 23.02	18.35-19.33/58 23.55
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.29	03.33 23.05	18.36-19.32/56 23.54
28	09.15 15.52	07.35 17.33	05.57 18.57	05.07 21.32	03.30 23.08	18.36-19.32/56 23.53
29	09.13 15.56		06.53 20.00	05.04 21.35	03.27 23.11	18.37-19.32/55 23.52
30	09.10 15.59		06.49 20.03	05.00 21.38	03.24 23.14	18.27-19.39/72 23.51
31	09.07 16.02		06.46 20.06		03.22 23.17	18.38-19.30/52 23.51
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	0	1187	2041	1170

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 16 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 18.52-19.31/39 23.49	04.25 18.37-19.48/71 22.27	06.00 18.51-19.21/30 20.40	07.27 18.53	08.01 16.07	09.36 14.43
2	03.01 18.52-19.32/40 23.48	04.28 18.37-19.48/71 22.24	06.03 18.54-19.16/22 20.36	07.29 18.50	08.04 16.04	09.38 14.41
3	03.01 18.52-19.33/41 23.46	04.31 18.36-19.48/72 22.20	06.06 19.00-19.09/9 20.33	07.32 18.46	08.07 16.00	09.41 14.39
4	03.03 18.51-19.33/42 23.45	04.34 18.36-19.48/72 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.44 14.37
5	03.05 18.50-19.33/43 23.43	04.37 18.36-19.48/72 22.14	06.12 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	03.08 18.50-19.35/45 23.41	04.40 18.36-19.49/73 22.10	06.15 20.22	07.41 18.35	08.17 15.51	09.49 14.33
7	03.10 18.50-19.36/46 23.39	04.44 18.35-19.48/73 22.07	06.18 20.18	07.44 18.32	08.20 15.48	09.51 14.32
8	03.12 18.49-19.36/47 23.37	04.47 18.36-19.48/72 22.04	06.20 20.15	07.47 18.28	08.23 15.45	09.54 14.30
9	03.15 18.49-19.37/48 23.34	04.50 18.36-19.48/72 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.29
10	03.18 18.49-19.37/48 23.32	04.53 18.35-19.47/72 21.57	06.26 20.08	07.53 18.21	08.30 15.38	09.58 14.28
11	03.20 18.48-19.38/50 23.30	04.56 18.35-19.47/72 21.53	06.29 20.04	07.56 18.18	08.33 15.35	10.00 14.27
12	03.23 18.48-19.39/51 23.27	04.59 18.35-19.47/72 21.50	06.32 20.01	07.59 18.14	08.36 15.32	10.02 14.26
13	03.26 18.47-19.40/53 23.24	05.03 18.36-19.47/71 21.46	06.35 19.57	08.02 18.11	08.39 15.29	10.04 14.25
14	03.29 18.46-19.40/54 23.22	05.06 18.35-19.46/71 21.43	06.38 19.53	08.05 18.08	08.43 15.26	10.06 14.24
15	03.32 18.46-19.41/55 23.19	05.09 18.35-19.46/71 21.39	06.41 19.50	08.08 18.04	08.46 15.23	10.07 14.23
16	03.34 18.45-19.41/56 23.16	05.12 18.36-19.45/69 21.36	06.43 19.46	08.11 18.01	08.49 15.21	10.09 14.23
17	03.37 18.44-19.42/58 23.14	05.15 18.35-19.44/69 21.32	06.46 19.43	08.14 17.57	08.52 15.18	10.10 14.23
18	03.40 18.44-19.42/58 23.11	05.18 18.36-19.43/67 21.29	06.49 19.39	08.17 17.54	08.56 15.15	10.11 14.22
19	03.43 18.44-19.43/59 23.08	05.21 18.37-19.43/66 21.26	06.52 19.36	08.20 17.50	08.59 15.12	10.12 14.22
20	03.47 18.43-19.43/60 23.05	05.24 18.37-19.42/65 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	03.50 18.42-19.44/62 23.02	05.27 18.37-19.41/64 21.19	06.58 19.28	08.26 17.44	09.05 15.07	10.14 14.23
22	03.53 18.42-19.45/63 22.59	05.30 18.38-19.40/62 21.15	07.01 19.25	08.29 17.40	09.08 15.04	10.15 14.23
23	03.56 18.41-19.45/64 22.56	05.33 18.39-19.39/60 21.11	07.04 19.21	08.32 17.37	09.12 15.01	10.15 14.24
24	03.59 18.41-19.46/65 22.53	05.36 18.40-19.38/58 21.08	07.06 19.18	08.35 17.33	09.15 14.59	10.15 14.24
25	04.02 18.40-19.46/66 22.50	05.39 18.40-19.36/56 21.04	07.09 19.14	07.38 16.30	09.18 14.56	10.16 14.25
26	04.05 18.40-19.47/67 22.46	05.42 18.41-19.34/53 21.01	07.12 19.11	07.41 16.27	09.21 14.54	10.16 14.26
27	04.09 18.39-19.46/67 22.43	05.45 18.42-19.33/51 20.57	07.15 19.07	07.45 16.23	09.24 14.51	10.15 14.27
28	04.12 18.39-19.47/68 22.40	05.48 18.44-19.31/47 20.54	07.18 19.04	07.48 16.20	09.27 14.49	10.15 14.29
29	04.15 18.38-19.47/69 22.37	05.51 18.44-19.28/44 20.50	07.21 19.00	07.51 16.17	09.30 14.47	10.15 14.30
30	04.18 18.38-19.48/70 22.34	05.54 18.46-19.26/40 20.47	07.24 18.57	07.54 16.13	09.33 14.45	10.14 14.31
31	04.21 18.38-19.48/70 22.30	05.57 18.48-19.24/36 20.43		07.57 16.10		10.14 14.33
Potential sun hours	609	509	393	305	198	137
Sum of minutes with flicker	1724	1984	61	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102WTG: 17 - PUU17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	04.56	03.19	21.26-21.38/12	02.59	04.24	21.34-21.37/3	06.00	07.26	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42		
2	10.12	09.01	07.28	06.39	04.53	03.16	21.27-21.37/10	03.01	04.28	06.03	07.29	08.04	09.38	
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.04	14.40		
3	10.11	08.57	07.25	06.35	04.50	03.14	21.28-21.36/8	03.01	04.31	06.06	07.32	08.07	09.41	
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.33	18.46	16.00	14.39		
4	10.09	08.54	07.21	06.32	04.46	03.11	21.30-21.35/5	03.03	04.34	06.09	07.35	08.10	09.44	
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37		
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46		
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35		
6	10.07	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49		
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33		
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51		
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32		
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	21.38-21.40/2	04.47	06.20	07.47	08.23	09.54	
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30		
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	21.36-21.43/7	04.50	06.23	07.50	08.26	09.56	
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29		
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	21.35-21.44/9	04.53	06.26	07.53	08.30	09.58	
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28		
11	09.58	08.32	06.57	06.07	04.23	21.24-21.25/1	02.56	03.20	21.34-21.46/12	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26		
12	09.56	08.29	06.53	06.03	04.19	21.24-21.28/4	02.54	03.23	21.33-21.46/13	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25		
13	09.54	08.26	06.50	06.00	04.16	21.22-21.31/9	02.53	03.26	21.32-21.46/14	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25		
14	09.52	08.22	06.46	05.56	04.13	21.21-21.33/12	02.52	03.28	21.32-21.48/16	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24		
15	09.50	08.19	06.43	05.53	04.09	21.21-21.36/15	02.51	03.31	21.32-21.49/17	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23		
16	09.47	08.16	06.39	05.49	04.06	21.20-21.38/18	02.50	03.34	21.31-21.49/18	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.20	14.23		
17	09.45	08.12	06.35	05.45	04.03	21.20-21.40/20	02.49	03.37	21.31-21.49/18	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22		
18	09.42	08.09	06.32	05.42	04.00	21.20-21.41/21	02.49	03.40	21.30-21.50/20	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22		
19	09.40	08.06	06.28	05.38	03.57	21.19-21.40/21	02.49	03.43	21.31-21.51/20	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22		
20	09.37	08.02	06.25	05.35	03.53	21.20-21.41/21	02.49	03.46	21.30-21.51/21	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22		
21	09.35	07.59	06.21	05.31	03.50	21.20-21.41/21	02.49	03.49	21.30-21.51/21	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22		
22	09.32	07.56	06.18	05.28	03.47	21.19-21.41/22	02.49	03.53	21.30-21.51/21	05.30	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23		
23	09.30	07.52	06.14	05.24	03.44	21.20-21.41/21	02.49	03.56	21.30-21.51/21	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23		
24	09.27	07.49	06.11	05.21	03.41	21.20-21.41/21	02.50	03.59	21.30-21.51/21	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24		
25	09.24	07.45	06.07	05.17	03.38	21.21-21.41/20	02.51	04.02	21.30-21.51/21	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25		
26	09.21	07.42	06.04	05.14	03.35	21.21-21.41/20	02.52	04.05	21.30-21.51/21	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26		
27	09.18	07.38	06.00	05.10	03.32	21.22-21.40/18	02.53	04.08	21.31-21.50/19	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27		
28	09.15	07.35	05.56	05.07	03.30	21.23-21.40/17	02.54	04.12	21.31-21.48/17	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28		
29	09.13	07.33	05.53	05.03	03.27	21.23-21.39/16	02.56	04.15	21.31-21.45/14	05.51	07.21	07.51	09.30	10.15
	15.56	17.36	19.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30		
30	09.10	07.30	05.49	05.00	03.24	21.24-21.39/15	02.57	04.18	21.32-21.43/11	05.54	07.24	07.54	09.33	10.14
	15.59	17.39	19.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31		
31	09.07	07.27	05.46	05.01	03.21	21.24-21.38/14	02.57	04.21	21.33-21.40/7	05.57	07.27	07.57	09.36	10.14
	16.02	17.41	19.06	21.41	23.17	23.51	22.30	20.43	18.57	16.10	14.46	14.33		
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137		
Sum of minutes with flicker	0	0	0	0	347	35	381	3	0	0	0	0		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 18 - PUU18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.33	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.52	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.10	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 19 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12 14.35	09.03 16.06	07.31 17.36	10.17-11.31/74 20.09	06.42 21.41	20.16-20.31/15 23.20
2	10.11 14.37	09.00 16.09	07.28 17.39	10.17-11.31/74 20.12	06.39 21.44	20.18-20.29/11 23.22
3	10.10 14.39	08.57 16.12	07.25 17.42	10.16-11.30/74 20.15	06.35 21.48	20.20-20.26/6 23.25
4	10.09 14.42	08.54 16.16	07.21 17.45	10.16-11.31/75 20.18	06.32 21.51	04.46 23.28
5	10.08 14.44	08.51 16.19	07.18 17.48	10.15-11.31/76 20.21	06.28 21.54	04.43 23.30
6	10.06 14.46	08.48 16.22	07.14 17.51	10.15-11.30/75 20.24	06.24 21.57	04.39 23.33
7	10.05 14.49	08.45 16.26	07.11 17.55	10.15-11.31/76 20.27	06.21 22.01	04.36 23.35
8	10.03 14.51	08.42 16.29	07.07 17.58	10.14-11.30/76 20.30	06.17 22.04	04.33 23.38
9	10.02 14.54	08.38 16.32	07.04 18.01	10.14-11.30/76 20.33	06.14 22.07	04.29 23.40
10	10.00 14.56	08.35 16.35	07.00 18.04	10.15-11.30/75 20.36	06.10 22.10	04.26 23.42
11	09.58 14.59	08.32 16.39	06.57 18.07	10.14-11.29/75 20.39	06.07 22.14	04.23 23.44
12	09.56 15.02	08.29 16.42	06.53 18.10	10.15-11.29/74 20.42	06.03 22.17	04.19 23.46
13	09.54 15.05	08.25 16.45	06.50 18.13	10.15-11.28/73 20.45	06.00 22.20	04.16 23.47
14	09.52 15.08	08.22 16.49	06.46 18.16	10.14-11.27/73 20.48	05.56 22.23	04.13 23.49
15	09.49 15.11	08.19 16.52	06.43 18.19	10.15-11.26/71 20.51	05.53 22.27	04.10 23.50
16	09.47 15.14	08.16 16.55	06.39 18.22	10.15-11.25/70 20.54	05.49 22.30	04.06 23.52
17	09.45 15.17	08.12 16.58	06.35 18.25	10.15-11.23/68 20.57	05.45 22.33	04.03 23.53
18	09.42 15.20	08.09 17.01	06.32 18.28	10.16-11.23/67 21.00	05.42 22.36	04.00 23.54
19	09.40 15.23	08.06 17.05	06.28 18.30	10.16-11.21/65 21.03	05.38 22.40	20.21-20.25/4 23.54
20	09.37 15.26	08.02 17.08	06.25 18.33	10.18-11.20/62 21.07	05.35 22.43	20.18-20.27/9 23.55
21	09.35 15.29	07.59 17.11	06.21 18.36	10.18-11.18/60 21.10	05.31 22.46	20.17-20.30/13 23.55
22	09.32 15.33	07.55 17.14	06.18 18.39	10.20-11.16/56 21.13	05.28 22.49	20.16-20.33/17 23.56
23	09.29 15.36	07.52 17.17	06.14 18.42	10.20-11.14/54 21.16	05.24 22.52	20.16-20.36/20 23.56
24	09.27 15.39	07.49 17.21	06.11 18.45	10.21-11.11/50 21.19	05.21 22.56	20.15-20.35/20 23.55
25	09.24 15.42	07.45 17.24	06.07 18.48	10.24-11.08/44 21.22	05.17 22.59	20.14-20.35/21 23.55
26	09.21 15.46	07.42 17.27	06.04 18.51	10.26-11.05/39 21.25	05.14 23.02	20.14-20.35/21 23.54
27	09.18 15.49	07.38 17.30	06.00 18.54	10.29-11.01/32 21.28	05.10 23.05	20.15-20.35/20 23.53
28	09.15 15.52	07.35 17.33	05.56 18.57	10.33-10.54/21 21.32	05.07 23.08	20.15-20.34/19 23.53
29	09.12 15.56		06.53 20.00		05.03 23.11	20.15-20.34/19 23.52
30	09.09 15.59		06.49 20.03		05.00 23.14	20.15-20.32/17 23.51
31	09.06 16.02		06.46 20.06		05.00 23.17	
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	1020	1805	200	32	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 19 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	03.00 23.49	04.24 22.27	06.00 20.40	07.26 18.53	10.53-12.07/74 16.07	08.00 14.43
2	03.00 23.48	04.28 22.24	06.03 20.36	07.29 18.49	10.53-12.07/74 16.04	08.04 14.41
3	03.01 23.46	04.31 22.20	06.06 20.32	07.32 18.46	10.52-12.07/75 16.00	08.07 14.39
4	03.03 23.44	04.34 22.17	06.09 20.29	07.35 18.42	10.52-12.07/75 15.57	08.10 14.37
5	03.06 23.43	04.37 22.14	06.12 20.25	07.38 18.39	10.51-12.07/76 15.54	08.13 14.35
6	03.08 23.41	04.40 22.10	06.15 20.22	07.41 18.35	10.51-12.06/75 15.51	08.17 14.33
7	03.10 23.39	04.44 22.07	06.18 20.18	07.44 18.32	10.50-12.06/76 15.48	08.20 14.32
8	03.13 23.36	04.47 22.03	06.20 20.15	07.47 18.28	10.51-12.07/76 15.45	08.23 14.30
9	03.15 23.34	04.50 22.00	06.23 20.11	07.50 18.25	10.51-12.06/75 15.41	08.26 14.29
10	03.18 23.32	04.53 21.57	20.29-20.37/8 20.08	06.26 18.21	10.50-12.05/75 15.38	08.30 14.28
11	03.20 23.29	04.56 21.53	20.26-20.39/13 20.04	06.29 18.18	10.50-12.05/75 15.35	08.33 14.27
12	03.23 23.27	04.59 21.50	20.25-20.40/15 20.00	06.32 18.14	10.50-12.04/74 15.32	08.36 14.26
13	03.26 23.24	05.02 21.46	20.23-20.40/17 19.57	06.35 18.11	10.50-12.03/73 15.29	08.39 14.25
14	03.29 23.22	05.06 21.43	20.23-20.41/18 19.53	06.38 18.08	10.51-12.03/72 15.26	08.43 14.24
15	03.32 23.19	05.09 21.39	20.22-20.42/20 19.50	06.41 18.04	11.24-11.43/19 15.23	08.46 14.23
16	03.34 23.16	05.12 21.36	20.22-20.42/20 19.46	06.43 18.01	11.18-11.49/31 15.20	08.49 14.23
17	03.37 23.13	05.15 21.32	20.21-20.41/20 19.43	06.46 17.57	11.15-11.52/37 15.18	08.52 14.23
18	03.40 23.11	05.18 21.29	20.21-20.41/20 19.39	06.49 17.54	11.12-11.55/43 15.15	08.55 14.22
19	03.43 23.08	05.21 21.25	20.21-20.41/20 19.36	06.52 17.50	11.10-11.58/48 15.12	08.59 14.22
20	03.47 23.05	05.24 21.22	20.21-20.41/20 19.32	06.55 17.47	11.07-11.59/52 15.09	09.02 14.22
21	03.50 23.02	05.27 21.18	20.21-20.37/16 19.28	06.58 17.43	11.05-12.01/56 15.07	09.05 14.23
22	03.53 22.59	05.30 21.15	20.22-20.34/12 19.25	07.01 17.40	11.03-12.02/59 15.04	09.08 14.23
23	03.56 22.56	05.33 21.11	20.23-20.31/8 19.21	07.03 17.37	11.02-12.03/61 15.01	09.11 14.24
24	03.59 22.53	05.36 21.08	20.25-20.28/3 19.18	07.06 17.33	11.01-12.04/63 15.04	09.15 14.24
25	04.02 22.49	05.39 21.04	20.25-20.28/3 19.14	07.09 16.30	10.59-12.05/66 14.56	09.18 14.25
26	04.05 22.46	05.42 21.01	20.25-20.28/3 19.11	07.12 16.27	10.58-12.06/68 14.54	09.21 14.26
27	04.09 22.43	05.45 20.57	20.25-20.28/3 19.07	07.15 16.23	10.56-12.06/70 14.51	09.24 14.27
28	04.12 22.40	05.48 20.54	20.25-20.28/3 19.04	07.18 16.20	10.56-12.06/70 14.49	09.27 14.29
29	04.15 22.37	05.51 20.50	20.25-20.28/3 19.01	07.21 16.17	10.55-12.07/72 14.47	09.30 14.30
30	04.18 22.33	05.54 20.47	20.25-20.28/3 18.56	07.24 16.13	10.54-12.07/73 14.45	09.33 14.31
31	04.21 22.30	05.57 20.43	20.25-20.28/3 18.53	07.27 16.10	10.14-10.37/23 14.42	09.36 14.33
Potential sun hours	608	508	393	305	198	137
Sum of minutes with flicker	0	230	888	1964	12	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 20 - PUU20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	10.12	09.03	07.31	06.42	04.56	03.19	21.26-21.46/20	02.59	21.40-21.46/6	04.24	21.34-21.37/3	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41	23.20		23.49		20.40	18.53	16.07	14.43	14.43	14.43
2	10.12	09.00	07.28	06.39	04.53	03.16	21.27-21.46/19	03.01	21.39-21.47/8	04.28	06.03	07.29	08.04	09.38	09.38
	14.37	16.09	17.39	20.12	21.44	23.23		23.48		22.24	20.36	18.49	16.04	14.40	14.40
3	10.10	08.57	07.25	06.35	04.50	03.14	21.28-21.45/17	03.01	21.38-21.48/10	04.31	06.06	07.32	08.07	09.41	09.41
	14.39	16.12	17.42	20.15	21.48	23.25		23.46		22.20	20.32	18.46	16.00	14.39	14.39
4	10.09	08.54	07.21	06.32	04.46	03.11	21.29-21.45/16	03.03	21.38-21.49/11	04.34	06.09	07.35	08.10	09.44	09.44
	14.41	16.16	17.45	20.18	21.51	23.28		23.45		22.17	20.29	18.42	15.57	14.37	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	21.30-21.45/15	03.05	21.37-21.49/12	04.37	06.12	07.38	08.13	09.46	09.46
	14.44	16.19	17.48	20.21	21.54	23.31		23.43		22.14	20.25	18.39	15.54	14.35	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	21.30-21.44/14	03.08	21.37-21.51/14	04.40	06.15	07.41	08.17	09.49	09.49
	14.46	16.22	17.51	20.24	21.57	23.33		23.41		22.10	20.22	18.35	15.51	14.33	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	21.31-21.44/13	03.10	21.36-21.51/15	04.44	06.17	07.44	08.20	09.51	09.51
	14.49	16.26	17.54	20.27	22.01	23.35		23.39		22.07	20.18	18.32	15.48	14.32	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	21.32-21.44/12	03.12	21.36-21.52/16	04.47	06.20	07.47	08.23	09.54	09.54
	14.51	16.29	17.57	20.30	22.04	23.38		23.36		22.03	20.15	18.28	15.44	14.30	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	21.33-21.43/10	03.15	21.36-21.53/17	04.50	06.23	07.50	08.26	09.56	09.56
	14.54	16.32	18.01	20.33	22.07	23.40		23.34		22.00	20.11	18.25	15.41	14.29	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	21.34-21.43/9	03.17	21.36-21.53/17	04.53	06.26	07.53	08.30	09.58	09.58
	14.56	16.35	18.04	20.36	22.10	23.42		23.32		21.57	20.08	18.21	15.38	14.28	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	21.35-21.42/7	03.20	21.35-21.54/19	04.56	06.29	07.56	08.33	10.00	10.00
	14.59	16.39	18.07	20.39	22.14	23.44		23.29		21.53	20.04	18.18	15.35	14.26	14.26
12	09.56	08.29	06.53	06.03	04.19	21.24-21.28/4	02.54	21.36-21.41/5	03.23	21.34-21.55/21	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46		23.27		21.50	20.00	18.14	15.32	14.25	14.25
13	09.54	08.25	06.50	06.00	04.16	21.22-21.31/9	02.53	21.39-21.40/1	03.26	21.32-21.55/23	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48		23.24		21.46	19.57	18.11	15.29	14.25	14.25
14	09.52	08.22	06.46	05.56	04.13	21.21-21.33/12	02.52	03.29	21.33-21.55/22	05.06	06.38	08.05	08.43	10.05	10.05
	15.08	16.49	18.16	20.48	22.23	23.49		23.22		21.43	19.53	18.07	15.26	14.24	14.24
15	09.49	08.19	06.42	05.52	04.09	21.21-21.36/15	02.51	03.31	21.32-21.56/24	05.09	06.41	08.08	08.46	10.07	10.07
	15.11	16.52	18.19	20.51	22.27	23.51		23.19		21.39	19.50	18.04	15.23	14.23	14.23
16	09.47	08.16	06.39	05.49	04.06	21.21-21.38/17	02.50	03.34	21.32-21.56/24	05.12	06.43	08.11	08.49	10.09	10.09
	15.14	16.55	18.22	20.54	22.30	23.52		23.16		21.36	19.46	18.01	15.20	14.23	14.23
17	09.45	08.12	06.35	05.45	04.03	21.20-21.40/20	02.50	03.37	21.31-21.56/25	05.15	06.46	08.14	08.52	10.10	10.10
	15.17	16.58	18.24	20.57	22.33	23.53		23.13		21.32	19.43	17.57	15.18	14.22	14.22
18	09.42	08.09	06.32	05.42	04.00	21.20-21.44/24	02.49	03.40	21.30-21.56/26	05.18	06.49	08.17	08.56	10.11	10.11
	15.20	17.01	18.27	21.00	22.36	23.54		23.11		21.29	19.39	17.54	15.15	14.22	14.22
19	09.40	08.06	06.28	05.38	03.57	21.19-21.45/26	02.49	03.43	21.31-21.57/26	05.21	06.52	08.20	08.59	10.12	10.12
	15.23	17.05	18.30	21.03	22.40	23.55		23.08		21.25	19.35	17.50	15.12	14.22	14.22
20	09.37	08.02	06.25	05.35	03.54	21.20-21.46/26	02.49	03.46	21.30-21.57/27	05.24	06.55	08.23	09.02	10.13	10.13
	15.26	17.08	18.33	21.07	22.43	23.55		23.05		21.22	19.32	17.47	15.09	14.22	14.22
21	09.35	07.59	06.21	05.31	03.50	21.20-21.47/27	02.49	03.50	21.30-21.56/26	05.27	06.58	08.26	09.05	10.14	10.14
	15.29	17.11	18.36	21.10	22.46	23.55		23.02		21.18	19.28	17.43	15.06	14.23	14.23
22	09.32	07.55	06.18	05.28	03.47	21.20-21.46/26	02.49	03.53	21.30-21.57/27	05.30	07.01	08.29	09.08	10.14	10.14
	15.33	17.14	18.39	21.13	22.49	23.56		22.59		21.15	19.25	17.40	15.04	14.23	14.23
23	09.29	07.52	06.14	05.24	03.44	21.20-21.46/26	02.50	03.56	21.30-21.56/26	05.33	07.03	08.32	09.11	10.15	10.15
	15.36	17.17	18.42	21.16	22.52	23.56		22.56		21.11	19.21	17.37	15.01	14.23	14.23
24	09.27	07.49	06.11	05.21	03.41	21.21-21.47/26	02.50	03.59	21.30-21.57/27	05.36	07.06	08.35	09.15	10.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.55		22.53		21.08	19.18	17.33	14.59	14.24	14.24
25	09.24	07.45	06.07	05.17	03.38	21.21-21.47/26	02.51	04.02	21.30-21.55/25	05.39	07.09	08.38	09.18	10.15	10.15
	15.42	17.24	18.48	21.22	22.59	23.55		22.49		21.04	19.14	16.30	14.56	14.25	14.25
26	09.21	07.42	06.04	05.14	03.35	21.22-21.47/25	02.52	04.05	21.30-21.53/23	05.42	07.12	08.41	09.21	10.15	10.15
	15.46	17.27	18.51	21.25	23.02	23.55		22.46		21.01	19.11	16.27	14.54	14.26	14.26
27	09.18	07.38	06.00	05.10	03.33	21.22-21.47/25	02.53	04.08	21.31-21.50/19	05.45	07.15	08.45	09.24	10.15	10.15
	15.49	17.30	18.54	21.28	23.05	23.54		22.43		20.57	19.07	16.23	14.51	14.27	14.27
28	09.15	07.35	05.56	05.07	03.30	21.23-21.47/24	02.54	04.12	21.32-21.48/16	05.48	07.18	08.48	09.27	10.15	10.15
	15.52	17.33	18.57	21.32	23.08	23.53		22.40		20.54	19.04	16.20	14.49	14.28	14.28
29	09.12	07.32	05.53	05.03	03.27	21.23-21.47/24	02.56	04.15	21.31-21.45/14	05.51	07.21	08.51	09.30	10.15	10.15
	15.56	17.37	19.00	21.35	23.11	23.52		22.37		20.50	19.00	16.17	14.47	14.30	14.30
30	09.09	07.29	05.49	05.00	03.24	21.24-21.46/22	02.58	21.41-21.45/4	04.18	21.33-21.43/10	05.54	07.24	08.54	09.33	10.14
	15.59	17.40	19.03	21.38	23.14	23.51		22.33		20.47	18.56	16.13	14.45	14.31	14.31
31	09.06	07.26	05.46	05.00	03.21	21.25-21.46/21	02.59	04.21	21.33-21.39/6	05.57	07.27	08.57	09.36	10.13	10.13
	16.02	17.43	19.06	21.40	23.17	23.52		22.30		20.43	18.60	16.10	14.45	14.33	14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	0	0
Sum of minutes with flicker	0	0	0	0	425	162	582	3							

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 21 - PUU21

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.50	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 22 - PUU22

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 23 - PUU23

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.11	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102WTG: 24 - PUU24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December				
1	10.12	09.03	07.31	06.42	04.56	19.08-19.48/40	03.19	21.11-21.47/36	02.59	21.18-21.53/35	04.24	21.33-21.34/1	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41		23.20	18.46-20.14/88	23.49	18.51-20.21/90	22.27	19.03-20.14/71	20.39	18.53	16.07	14.43
2	10.11	09.00	07.28	06.39	04.53	19.06-19.51/45	03.16	21.11-21.47/36	03.01	21.18-21.53/35	04.28	19.04-20.14/70	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44		23.22	18.46-20.14/88	23.48	18.51-20.21/90	22.23		20.36	18.49	16.04	14.41
3	10.10	08.57	07.24	06.35	04.50	19.04-19.53/49	03.14	21.11-21.47/36	03.01	21.18-21.53/35	04.31	19.05-20.12/67	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48		23.25	18.46-20.14/88	23.46	18.51-20.21/90	22.20		20.32	18.46	16.00	14.39
4	10.09	08.54	07.21	06.31	04.46	19.02-19.55/53	03.12	21.11-21.48/37	03.03	21.18-21.54/36	04.34	19.06-20.11/65	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51		23.28	18.46-20.15/89	23.44	18.52-20.22/90	22.17		20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	19.00-19.56/56	03.09	21.12-21.48/36	03.05	21.18-21.54/36	04.37	19.07-20.10/63	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54		23.30	18.47-20.16/89	23.43	18.52-20.21/89	22.13		20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	19.00-19.59/59	03.07	21.12-21.48/36	03.08	21.18-21.54/36	04.40	19.08-20.08/60	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57		23.33	18.46-20.16/90	23.39	18.53-20.22/89	22.10		20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	18.58-20.00/62	03.05	21.12-21.48/36	03.10	21.18-21.54/36	04.44	19.09-20.07/58	06.17	07.44	08.20	09.51
	14.49	16.25	17.54	20.27	22.01		23.35	18.46-20.16/90	23.39	18.52-20.21/89	22.07		20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	18.57-20.01/64	03.03	21.13-21.48/35	03.12	21.18-21.54/36	04.47	19.11-20.06/55	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04		23.38	18.47-20.16/89	23.36	18.53-20.22/89	22.03		20.15	18.28	15.44	14.30
9	10.01	08.38	07.04	06.14	04.29	18.56-20.02/66	03.01	21.13-21.48/35	03.15	21.18-21.55/37	04.50	19.13-20.04/51	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07		23.40	18.47-20.16/89	23.34	18.53-20.22/89	22.00		20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	18.54-20.03/69	02.57	21.14-21.49/35	03.18	21.19-21.55/36	04.53	19.14-20.01/47	06.26	07.53	08.29	09.58
	14.56	16.35	18.04	20.36	22.10		23.42	18.47-20.16/89	23.32	18.54-20.22/88	21.57		20.07	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	18.53-20.03/70	02.56	21.14-21.48/34	03.20	21.19-21.55/36	04.56	19.16-19.59/43	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14		23.44	18.47-20.17/90	23.29	18.54-20.22/88	21.53		20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	21.20-21.27/7	02.54	21.14-21.48/34	03.23	21.19-21.55/36	04.59	19.18-19.57/39	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	18.53-20.05/72	02.56	21.17-20.17/90	23.27	18.53-20.21/88	21.50		20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	06.00	04.16	21.17-21.30/13	02.53	21.15-21.49/34	03.26	21.18-21.55/37	05.02	19.20-19.53/33	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	18.52-20.05/73	02.47	21.18-20.17/89	23.24	18.54-20.21/87	21.46		19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	21.15-21.31/16	02.52	21.15-21.49/34	03.29	21.19-21.55/36	05.06	19.24-19.50/26	06.38	08.05	08.42	10.05
	15.08	16.48	18.16	20.48	22.23	18.51-20.06/75	02.49	21.17-20.17/90	23.22	18.55-20.22/87	21.43		19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	21.14-21.33/19	02.51	21.16-21.50/34	03.31	21.19-21.55/36	05.09	19.29-19.45/16	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	18.51-20.07/76	02.50	21.18-20.18/90	23.19	18.55-20.22/87	21.39		19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	21.13-21.35/22	02.50	21.15-21.49/34	03.34	21.19-21.55/36	05.12		06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	18.50-20.07/77	02.52	21.18-20.18/90	23.16	18.55-20.22/87	21.36		19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	21.12-21.37/25	02.50	21.16-21.49/33	03.37	21.19-21.55/36	05.15		06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	18.49-20.07/78	02.53	21.18-20.18/90	23.13	18.56-20.21/85	21.32		19.43	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00	21.11-21.39/28	02.49	21.16-21.50/34	03.40	21.19-21.54/35	05.18		06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	18.49-20.08/79	02.54	21.18-20.18/90	23.10	18.56-20.21/85	21.29		19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57	21.10-21.40/30	02.49	21.17-21.50/33	03.43	21.20-21.55/35	05.21		06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	18.48-20.08/80	02.54	21.18-20.19/90	23.08	18.57-20.22/85	21.25		19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54	21.10-21.41/31	02.49	21.17-21.50/33	03.46	21.20-21.54/34	05.24		06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	18.48-20.09/81	02.55	21.18-20.19/90	23.05	18.57-20.21/84	21.22		19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	21.10-21.43/33	02.49	21.17-21.50/33	03.50	21.19-21.53/34	05.27		06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	18.48-20.10/82	02.55	21.18-20.19/90	23.02	18.57-20.20/83	21.18		19.28	17.43	15.06	14.23
22	09.32	07.55	06.18	05.28	03.47	21.09-21.43/34	02.49	21.17-21.50/33	03.53	21.20-21.53/33	05.30		07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	18.47-20.10/83	02.55	21.18-20.19/90	22.59	18.58-20.21/83	21.15		19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	21.09-21.44/35	02.50	21.18-21.51/33	03.56	21.20-21.52/32	05.33		07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	18.47-20.11/84	02.55	21.18-20.20/90	22.56	18.58-20.20/82	21.11		19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	21.10-21.44/34	02.50	21.18-21.51/33	03.59	21.20-21.52/32	05.36		07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	18.47-20.11/84	02.55	21.18-20.20/90	22.52	18.58-20.19/81	21.08		19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	21.10-21.45/35	02.51	21.18-21.52/34	04.02	21.21-21.50/29	05.39		07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	18.47-20.12/85	02.55	21.18-20.20/90	22.49	18.59-20.19/80	21.04		19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	21.10-21.45/35	02.52	21.18-21.51/33	04.05	21.22-21.49/27	05.42		07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	18.47-20.12/85	02.54	21.18-20.20/90	22.46	18.59-20.18/79	21.01		19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.33	21.10-21.46/36	02.53	21.18-21.52/34	04.08	21.23-21.47/24	05.45		07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	18.46-20.13/87	02.54	21.18-20.20/90	22.43	19.00-20.18/78	20.57		19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	21.10-21.46/36	02.55	21.18-21.52/34	04.12	21.24-21.45/21	05.48		07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	18.46-20.13/87	02.53	21.18-20.21/90	22.40	19.01-20.18/77	20.54		19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	21.10-21.46/36	02.56	21.18-21.53/35	04.15	21.25-21.42/17	05.51		07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	18.46-20.13/87	02.52	21.18-20.21/90	22.37	19.01-20.17/76	20.50		19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	21.10-21.47/37	02.58	21.18-21.53/35	04.18	21.26-21.41/15	05.54		07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	18.46-20.13/87	02.51	21.18-20.21/90	22.33	19.02-20.16/74	20.47		18.56			

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 25 - PUU25

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.07	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 26 - PUU26

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 27 - PUU27

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 28 - PUU28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04 13.15-13.31/16	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36 12.51-13.05/14
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00 13.17-13.29/12	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38 12.53-13.05/12
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57 13.21-13.25/4	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41 12.54-13.03/9
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44 12.57-13.01/4
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04 13.14-13.17/3	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23 12.51-12.56/5	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02 13.11-13.19/8	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26 12.47-13.00/13	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00 13.10-13.21/11	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.30 12.46-13.01/15	09.58
	14.56	16.35	18.03	20.36	22.10	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58 13.09-13.23/14	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33 12.44-13.03/19	10.00
	14.59	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56 13.09-13.25/16	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36 12.43-13.04/21	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54 13.08-13.26/18	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.39 12.43-13.04/21	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52 13.09-13.27/18	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43 12.43-13.06/23	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50 13.08-13.28/20	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46 12.42-13.06/24	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47 13.08-13.29/21	08.16	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.11	08.49 12.42-13.06/24	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45 13.08-13.30/22	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.14	08.52 12.43-13.07/24	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42 13.07-13.30/23	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56 12.42-13.07/25	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40 13.07-13.31/24	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59 12.42-13.07/25	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37 13.07-13.31/24	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02 12.43-13.07/24	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35 13.08-13.32/24	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05 12.44-13.08/24	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32 13.08-13.32/24	07.55	06.18	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08 12.44-13.07/23	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30 13.08-13.33/25	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12 12.44-13.08/24	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27 13.08-13.33/25	07.49	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15 12.45-13.08/23	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24 13.09-13.33/24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18 12.45-13.07/22	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21 13.09-13.33/24	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21 12.46-13.07/21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18 13.10-13.33/23	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24 12.47-13.07/20	10.16
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15 13.10-13.33/23	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27 12.48-13.06/18	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12 13.11-13.32/21		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30 12.49-13.06/17	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10 13.12-13.32/20		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33 12.51-13.06/15	10.14
	15.58		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07 13.13-13.31/18		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	473	32	0	0	0	0	0	0	0	0	470	39

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 29 - PUU29

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.28
11	09.58	08.32	06.56	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.29	14.25
14	09.51	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.50	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.53	05.30	07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.50	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.37	15.01	14.23
24	09.27	07.48	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.58	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 30 - PUU30

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.03	03.12	04.47	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 31 - PUU31

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 32 - PUU32

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 33 - PUU33

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	11.54-11.59/5	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	11.52-12.01/9	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	11.52-12.03/11	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	11.52-12.05/13	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	11.50-12.05/15	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	11.50-12.07/17	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.30
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	11.50-12.07/17	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33
	14.58	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	11.50-12.09/19	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	11.49-12.10/21	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.35	08.01	08.39
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	11.50-12.11/21	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	11.49-12.11/22	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	11.49-12.12/23	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.45
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	11.50-12.13/23	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.14	08.52
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	11.49-12.13/24	08.09	06.32	05.42	03.59	02.48	03.40	05.17	06.49	08.17	08.56
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	11.49-12.14/25	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.37	11.50-12.14/24	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02
	15.26	17.07	18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	11.50-12.15/25	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	11.50-12.15/25	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	11.51-12.15/24	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	11.51-12.15/24	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24	11.52-12.15/23	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	11.52-12.15/23	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	11.53-12.15/22	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	11.54-12.15/21	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.48	14.28
29	09.12	11.55-12.14/19		05.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30
	15.55			20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46
30	09.09	11.56-12.13/17		05.49	05.00	03.23	02.57	04.17	05.54	07.23	07.54	09.33
	15.58			20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44
31	09.06	11.57-12.11/14		05.45		03.21		04.21	05.57		07.57	
	16.02			20.06		23.17		22.30	20.43		16.10	
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	526	9	0	0	0	0	0	0	0	0	450	88

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102WTG: 34 - PUU34

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.19 23.20	04.18-04.34/16 23.49	02.59 22.27	04.19-04.45/26 22.27	04.24 20.39	06.00 18.53	07.26 16.07	08.00 14.42
2	10.11 14.37	09.00 16.09	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.22	04.17-04.35/18 23.48	03.01 22.23	04.19-04.44/25 22.23	04.27 20.36	06.03 18.49	07.29 16.03	08.03 14.40
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.48	03.14 23.25	04.16-04.35/19 23.46	03.01 22.20	04.19-04.44/25 22.20	04.31 20.32	06.06 18.46	07.32 16.00	08.07 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28	04.16-04.37/21 23.45	03.03 22.17	04.20-04.45/25 22.17	04.34 20.29	06.09 18.42	07.35 15.57	08.10 14.36
5	10.08 14.43	08.51 16.19	07.17 17.48	06.28 20.21	04.43 21.54	03.09 23.30	04.16-04.38/22 23.43	03.05 22.13	04.20-04.44/24 22.13	04.37 20.25	06.11 18.39	07.38 15.54	08.13 14.35
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	03.07 23.33	04.15-04.38/23 23.41	03.07 22.10	04.21-04.44/23 22.10	04.40 20.22	06.14 18.35	07.41 15.51	08.16 14.33
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	04.36 22.01	03.05 23.35	04.15-04.38/23 23.39	03.10 22.07	04.21-04.44/23 22.07	04.43 20.18	06.17 18.32	07.44 15.47	08.20 14.31
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	04.32 22.04	03.02 23.38	04.15-04.39/24 23.36	03.12 22.03	04.22-04.44/22 22.03	04.46 20.14	06.20 18.28	07.47 15.44	08.23 14.30
9	10.01 14.53	08.38 16.32	07.03 18.00	06.14 20.33	04.29 22.07	03.01 23.40	04.15-04.40/25 23.34	03.15 22.00	04.23-04.43/20 22.00	04.50 20.11	06.23 18.25	07.50 15.41	08.26 14.29
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	02.57 23.42	04.15-04.40/25 23.32	03.17 22.10	04.24-04.43/19 22.10	04.53 20.07	06.26 18.21	07.53 15.38	08.29 14.27
11	09.58 14.59	08.32 16.38	06.56 18.06	06.06 20.39	04.22 22.14	02.56 23.44	04.15-04.40/25 23.29	03.20 22.13	04.26-04.43/17 22.13	04.56 20.04	06.29 18.18	07.56 15.35	08.33 14.26
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.46	04.14-04.40/26 23.27	03.23 22.10	04.26-04.41/15 22.10	04.59 20.00	06.32 18.14	07.58 15.32	08.36 14.25
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20	02.53 23.48	04.15-04.41/26 23.24	03.25 22.16	04.28-04.40/12 22.16	05.02 19.57	06.35 18.11	08.01 15.29	08.39 14.24
14	09.52 15.07	08.22 16.48	06.46 18.15	05.56 20.48	04.12 22.23	02.52 23.49	04.15-04.41/26 23.22	03.28 22.13	04.31-04.39/8 22.13	05.05 19.53	06.37 18.07	08.04 15.26	08.42 14.24
15	09.49 15.10	08.19 16.52	06.42 18.18	05.52 20.51	04.09 22.27	02.51 23.51	04.15-04.42/27 23.19	03.31 22.19	05.08 19.50	06.40 18.04	08.07 15.23	08.46 14.23	10.07 10.08
16	09.47 15.13	08.15 16.55	06.39 18.21	05.49 20.54	04.06 22.30	02.50 23.52	04.15-04.42/27 23.16	03.34 22.16	05.12 19.46	06.43 18.00	08.10 15.20	08.49 14.22	10.23 10.22
17	09.45 15.17	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33	02.49 23.53	04.15-04.42/27 23.13	03.37 22.13	05.15 19.42	06.46 17.57	08.14 15.17	08.52 14.22	10.10 10.11
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	04.00 22.36	02.49 23.54	04.15-04.43/28 23.10	03.40 22.19	05.18 19.39	06.49 17.53	08.17 15.14	08.55 14.22	10.11 10.12
19	09.40 15.23	08.05 17.04	06.28 18.30	05.38 21.03	03.56 22.40	02.49 23.54	04.16-04.43/27 23.08	03.43 22.25	05.21 19.35	06.52 17.50	08.20 15.12	08.59 14.22	10.12 10.13
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	03.53 22.43	02.48 23.55	04.16-04.43/27 23.05	03.46 22.22	05.24 19.32	06.55 17.47	08.23 15.09	09.02 14.22	10.13 10.14
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	03.50 22.46	02.49 23.55	04.16-04.43/27 23.02	03.49 22.18	05.27 19.28	06.57 17.43	08.26 15.06	09.05 14.22	10.14 10.15
22	09.32 15.32	07.55 17.14	06.18 18.39	05.28 21.13	03.47 22.49	02.49 23.56	04.16-04.43/27 22.59	03.52 22.15	05.30 19.25	07.00 17.40	08.29 15.04	09.08 14.23	10.14 10.15
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.52	02.49 23.56	04.17-04.44/27 22.56	03.55 22.11	05.33 19.21	07.03 17.36	08.32 15.01	09.11 14.23	10.15 10.15
24	09.27 15.39	07.48 17.20	06.10 18.45	05.21 21.19	03.41 22.56	02.50 23.55	04.16-04.44/28 22.52	03.59 22.08	05.36 19.18	07.06 17.33	08.35 14.58	09.14 14.24	10.15 10.15
25	09.24 15.42	07.45 17.23	06.07 18.48	05.17 21.22	03.38 22.59	02.51 23.55	04.17-04.44/27 22.49	04.02 22.04	05.39 19.14	07.09 16.30	07.38 14.56	09.18 14.25	10.15 10.15
26	09.21 15.45	07.42 17.27	06.03 18.51	05.14 21.25	03.35 23.02	02.52 23.55	04.17-04.44/27 22.46	04.05 22.01	05.42 19.10	07.12 16.26	07.41 14.53	09.21 14.26	10.15 10.15
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	03.32 23.05	02.53 23.54	04.17-04.44/27 22.43	04.08 22.07	05.45 19.07	07.15 16.23	07.44 14.51	09.24 14.27	10.15 10.15
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	03.29 23.08	02.54 23.53	04.18-04.45/27 22.40	04.11 22.04	05.48 20.54	07.18 19.03	07.48 16.20	09.27 14.49	10.15 10.15
29	09.12 15.55	07.32 17.36	05.53 18.53	05.03 21.35	03.27 23.11	02.56 23.52	04.18-04.45/27 22.37	04.15 22.05	05.51 20.50	07.20 19.00	07.51 16.16	09.30 14.47	10.15 10.15
30	09.09 15.59	07.29 17.39	05.49 18.54	05.00 21.38	03.24 23.14	02.57 23.51	04.19-04.45/26 22.33	04.18 22.06	05.54 20.46	07.23 18.56	07.54 16.13	09.33 14.44	10.14 10.14
31	09.06 16.02	07.26 17.42	05.46 18.57	04.99 21.41	03.21 23.17	03.21 23.51	04.19-04.32/13 22.30	04.21 22.03	05.57 20.43	07.57 16.10	07.57 15.41	10.13 14.33	10.13 10.13
Potential sun hours	171	238	363	451	570	624	752	864	939	1005	1050	1080	1100
Sum of minutes with flicker	0	0	0	0	29	752	284	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 35 - PUU35

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 36 - PUU36

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 37 - PUU37

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38
	14.36	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.29
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.17	04.52	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.58	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.22
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.48	03.40	05.17	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.46	15.09	14.21
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.38	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.17	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.19	14.48	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.23	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 38 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.19 23.19
2	10.11 14.37	09.00 16.09	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.22
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.47	03.14 23.25
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28
5	10.08 14.44	08.51 16.19	07.17 17.48	06.28 20.21	04.43 21.54	03.09 23.30
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	03.07 23.33
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	04.36 22.00	03.05 23.35
8	10.03 14.51	08.41 16.29	07.07 17.57	06.17 20.30	04.32 22.04	03.03 23.37
9	10.01 14.54	08.38 16.32	07.03 18.00	06.14 20.33	04.29 22.07	03.01 23.40
10	09.59 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	02.57 23.42
11	09.57 14.59	08.32 16.39	06.56 18.06	06.06 20.39	04.22 22.13	02.56 23.44
12	09.56 15.02	08.28 16.42	06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.45
13	09.53 15.05	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20	02.53 23.47
14	09.51 15.08	08.22 16.48	06.46 18.15	05.56 20.48	04.13 22.23	02.52 23.49
15	09.49 15.11	08.19 16.52	06.42 18.18	05.52 20.51	04.09 22.26	02.51 23.50
16	09.47 15.14	08.15 16.55	06.39 18.21	05.49 20.54	04.06 22.30	02.50 23.51
17	09.44 15.17	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33	02.50 23.52
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	04.00 22.36	02.49 23.53
19	09.40 15.23	08.05 17.04	06.28 18.30	05.38 21.03	03.57 22.39	02.49 23.54
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	03.53 22.43	02.49 23.55
21	09.34 15.29	07.59 17.11	06.21 18.36	05.31 21.09	03.50 22.46	02.49 23.55
22	09.32 15.32	07.55 17.14	06.17 18.39	05.28 21.12	03.47 22.49	02.49 23.55
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.52	02.50 23.55
24	09.26 15.39	07.48 17.20	06.10 18.45	05.21 21.19	03.41 22.55	02.50 23.55
25	09.24 15.42	07.45 17.23	06.07 18.48	05.17 21.22	03.38 22.58	02.51 23.55
26	09.21 15.45	07.41 17.27	06.03 18.51	05.14 21.25	03.35 23.02	02.52 23.54
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	03.32 23.05	02.53 23.53
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.31	03.30 23.08	02.54 23.53
29	09.12 15.55		05.53 20.00	05.03 21.35	03.27 23.11	02.56 23.51
30	09.09 15.59		06.49 20.03	05.00 21.38	03.24 23.14	02.58 23.50
31	09.06 16.02		06.46 20.06		03.21 23.16	
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	317	0	1295	1562

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 38 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 05.18-06.11/53 23.49	04.24 05.33-06.15/42 22.27	06.00 20.39	07.26 18.53	08.00 16.07	09.35 14.42
2	03.01 05.18-06.11/53 23.47	04.27 05.35-06.15/40 22.23	06.03 20.36	07.29 18.49	08.03 16.03	09.38 14.40
3	03.01 05.18-06.11/53 23.46	04.31 05.38-06.14/36 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38
4	03.03 05.19-06.12/53 23.44	04.34 05.41-06.13/32 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.43 14.37
5	03.05 05.19-06.12/53 23.42	04.37 05.43-06.12/29 22.13	06.11 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	03.08 05.19-06.13/54 23.40	04.40 05.43-06.10/27 22.10	06.14 20.22	07.41 18.35	08.16 15.51	09.48 14.33
7	03.10 05.19-06.13/54 23.38	04.43 05.45-06.09/24 22.06	06.17 20.18	07.44 18.32	08.19 15.47	09.51 14.32
8	03.12 05.20-06.14/54 23.36	04.47 05.47-06.08/21 22.03	06.20 20.14	07.47 18.28	08.23 15.44	09.53 14.30
9	03.15 05.20-06.14/54 23.34	04.50 05.49-06.05/16 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.55 14.29
10	03.17 05.20-06.15/55 23.31	04.53 05.52-06.01/9 21.56	06.26 20.07	07.52 18.21	08.29 15.38	09.58 14.28
11	03.20 05.21-06.15/54 23.29	04.56 21.53	06.29 20.04	07.55 18.18	08.32 15.35	10.00 14.26
12	03.23 05.21-06.16/55 23.27	04.59 21.49	06.32 20.00	07.58 18.14	08.36 15.32	10.02 14.25
13	03.26 05.20-06.16/56 23.24	05.02 21.46	06.35 07.59-08.07/8 19.57	08.01 18.11	08.39 15.29	10.03 14.24
14	03.28 05.21-06.17/56 23.21	05.05 21.43	06.37 07.55-08.09/14 19.53	08.04 18.07	08.42 15.26	10.05 14.24
15	03.31 05.21-06.17/56 23.19	05.08 21.39	06.40 07.53-08.11/18 19.49	08.07 18.04	08.45 15.23	10.07 14.23
16	03.34 05.22-06.17/55 23.16	05.12 21.36	06.43 07.52-08.12/20 19.46	08.10 18.00	08.49 15.20	10.08 14.23
17	03.37 05.22-06.17/55 23.13	05.15 21.32	06.46 07.51-08.13/22 19.42	08.13 17.57	08.52 15.17	10.09 14.22
18	03.40 05.22-06.17/55 23.10	05.18 21.29	06.49 07.50-08.14/24 19.39	08.16 17.53	08.55 15.15	10.11 14.22
19	03.43 05.23-06.18/55 23.07	05.21 21.25	06.52 07.48-08.13/25 19.35	08.19 17.50	08.58 15.12	10.12 14.22
20	03.46 05.23-06.18/55 23.04	05.24 21.22	06.55 07.48-08.13/25 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	03.49 05.23-06.17/54 23.01	05.27 21.18	06.57 07.47-08.13/26 19.28	08.26 17.43	09.05 15.06	10.13 14.22
22	03.52 05.24-06.18/54 22.58	05.30 21.15	07.00 07.47-08.12/25 19.25	08.29 17.40	09.08 15.04	10.14 14.23
23	03.56 05.24-06.18/54 22.55	05.33 21.11	07.03 07.48-08.12/24 19.21	08.32 17.36	09.11 15.01	10.15 14.23
24	03.59 05.24-06.18/54 22.52	05.36 21.08	07.06 07.48-08.11/23 19.17	08.35 17.33	09.14 14.59	10.15 14.24
25	04.02 05.25-06.18/53 22.49	05.39 21.04	07.09 07.48-08.10/22 19.14	07.38 16.30	09.17 14.56	10.15 14.25
26	04.05 05.25-06.18/53 22.46	05.42 21.01	07.12 07.48-08.08/20 19.10	07.41 16.26	09.20 14.54	10.15 14.26
27	04.08 05.27-06.17/50 22.43	05.45 20.57	07.15 07.51-08.06/15 19.07	07.44 16.23	09.23 14.51	10.15 14.27
28	04.11 05.28-06.18/50 22.40	05.48 20.53	07.18 07.54-08.03/9 19.03	07.47 16.20	09.26 14.49	10.15 14.28
29	04.15 05.28-06.17/49 22.36	05.51 20.50	07.20 19.00	07.51 16.16	09.29 14.47	10.14 14.30
30	04.18 05.30-06.17/47 22.33	05.54 20.46	07.23 18.56	07.54 16.13	09.32 14.44	10.14 14.31
31	04.21 05.31-06.15/44 22.30	05.57 20.43		07.57 16.10		10.13 14.33
Potential sun hours	608	508	393	305	198	137
Sum of minutes with flicker	1650	276	320	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 39 - PUU39

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.19 23.19	04.18-04.19/1 23.49	02.59 22.27	04.13-04.34/21 20.39	04.24 18.53	06.00 16.07	06.39-06.47/8 14.42
2	10.11 14.37	09.00 16.09	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.22	04.16-04.22/6 23.48	03.01 22.23	04.13-04.34/21 20.36	04.27 18.49	06.03 16.03	07.29 14.40
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.47	03.14 23.25	04.14-04.23/9 23.46	03.01 22.20	04.13-04.33/20 20.31	04.31 18.46	06.06 16.00	07.32 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28	04.13-04.25/12 23.44	03.03 22.17	04.14-04.34/20 20.29	04.34 18.42	06.09 16.00	07.35 14.36
5	10.08 14.43	08.51 16.19	07.17 17.48	06.28 20.21	04.43 21.54	03.09 23.30	04.12-04.26/14 23.42	03.05 22.13	04.15-04.33/18 20.25	04.37 18.39	06.11 16.00	07.38 14.35
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	03.07 23.33	04.10-04.26/16 23.40	03.07 22.07	04.16-04.33/17 20.22	04.40 18.35	06.14 16.00	07.41 14.33
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	04.36 22.00	03.05 23.35	04.09-04.27/18 23.38	03.10 22.07	04.17-04.32/15 20.18	04.43 18.32	06.17 16.00	07.44 14.31
8	10.03 14.51	08.41 16.29	07.07 17.57	06.17 20.30	04.32 22.04	03.03 23.37	04.09-04.28/19 23.36	03.12 22.03	04.19-04.32/13 20.14	04.46 18.28	06.20 16.00	07.47 14.30
9	10.01 14.53	08.38 16.32	07.03 18.00	06.13 20.33	04.29 22.07	03.01 23.40	04.09-04.29/20 23.34	03.15 22.00	04.21-04.31/10 20.11	04.50 18.25	06.23 16.00	07.50 14.29
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	02.57 23.42	04.09-04.29/20 23.32	03.17 21.56	04.23-04.30/7 20.07	04.53 18.21	06.26 16.00	07.52 14.27
11	09.58 14.59	08.32 16.38	06.56 18.06	06.06 20.39	04.22 22.13	02.56 23.44	04.08-04.30/22 23.29	03.20 21.53	04.25-04.29/4 20.04	04.56 18.18	06.29 16.00	07.55 14.26
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.46	04.08-04.30/22 23.27	03.23 21.49	04.08-04.30/22 20.00	04.59 18.14	06.32 16.00	07.58 14.25
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20	02.53 23.47	04.09-04.31/22 23.24	03.25 21.46	05.02 19.57	06.35 18.11	06.01 16.00	08.01 14.24
14	09.51 15.07	08.22 16.48	06.46 18.15	05.56 20.48	04.12 22.23	02.52 23.49	04.08-04.31/23 23.21	03.28 21.43	05.05 19.53	06.37 18.07	06.04 16.00	08.04 14.23
15	09.49 15.10	08.19 16.52	06.42 18.18	05.52 20.51	04.09 22.26	02.51 23.50	04.09-04.32/23 23.19	03.31 21.39	05.08 19.49	06.40 18.04	06.07 16.00	08.07 14.23
16	09.47 15.13	08.15 16.55	06.39 18.21	05.49 20.54	04.06 22.30	02.50 23.52	04.08-04.31/23 23.16	03.34 21.36	06.41-06.48/7 19.46	06.43 18.00	06.10 16.00	08.09 14.23
17	09.44 15.17	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33	02.49 23.53	04.09-04.32/23 23.13	03.37 21.32	06.37-06.50/13 19.42	06.46 18.03	06.10 16.00	08.13 14.22
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	04.00 22.36	02.49 23.54	04.09-04.32/23 23.10	03.40 21.29	06.36-06.52/16 19.39	06.49 17.53	06.10 16.00	08.16 14.22
19	09.40 15.23	08.05 17.04	06.28 18.30	05.38 21.03	03.56 22.39	02.49 23.54	04.09-04.33/24 23.07	03.43 21.25	06.35-06.53/18 19.35	06.52 17.50	06.10 16.00	08.19 14.22
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	03.53 22.43	02.49 23.55	04.09-04.33/24 23.04	03.46 21.22	06.34-06.54/20 19.32	06.55 17.47	06.10 16.00	08.23 14.22
21	09.34 15.29	07.59 17.11	06.21 18.36	05.31 21.09	03.50 22.46	02.49 23.55	04.09-04.33/24 23.01	03.49 21.18	06.32-06.54/22 19.28	06.57 17.43	06.10 16.00	08.26 14.22
22	09.32 15.32	07.55 17.14	06.17 18.39	05.28 21.13	03.47 22.49	02.49 23.55	04.09-04.33/24 22.58	03.52 21.15	06.31-06.55/24 19.25	07.00 17.40	06.10 16.00	08.29 14.23
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.52	02.49 23.55	04.10-04.34/24 22.55	03.56 21.11	06.31-06.55/24 19.21	07.03 17.36	06.10 16.00	08.32 14.23
24	09.26 15.39	07.48 17.20	06.10 18.45	05.21 21.19	03.41 22.55	02.50 23.55	04.10-04.33/23 22.52	03.59 21.08	06.31-06.55/24 19.17	07.06 17.33	06.10 16.00	08.35 14.24
25	09.24 15.42	07.45 17.23	06.07 18.48	05.17 21.22	03.38 22.59	02.51 23.55	04.11-04.34/23 22.49	04.02 21.04	06.30-06.54/24 19.14	07.09 17.30	06.10 16.00	08.38 14.25
26	09.21 15.45	07.42 17.27	06.03 18.51	05.14 21.25	03.35 23.02	02.52 23.54	04.10-04.34/24 22.46	04.05 21.01	06.30-06.54/24 19.10	07.12 17.27	06.10 16.00	08.41 14.26
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	03.32 23.05	02.53 23.54	04.11-04.34/23 22.43	04.08 22.43	06.30-06.54/24 19.07	07.15 17.23	06.10 16.00	08.44 14.27
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.31	03.29 23.08	02.54 23.53	04.12-04.34/22 22.40	04.11 22.40	06.31-06.53/22 19.03	07.18 17.20	06.10 16.00	08.47 14.28
29	09.12 15.55	07.33 18.00	05.53 19.00	05.03 21.35	03.27 23.11	02.56 23.52	04.12-04.34/22 22.36	04.15 22.36	06.30-06.51/21 19.00	07.20 17.16	06.10 16.00	08.51 14.30
30	09.09 15.59	07.30 18.03	05.49 19.00	05.00 21.38	03.24 23.14	02.57 23.50	04.12-04.34/22 22.33	04.18 22.33	06.33-06.50/17 18.56	07.23 17.13	06.10 16.00	08.54 14.31
31	09.06 16.02	07.27 18.06	05.45 19.00	05.00 21.38	03.21 23.17	02.57 23.50	04.12-04.34/22 22.30	04.21 22.30	06.36-06.49/13 18.43	07.27 17.10	06.10 16.00	08.57 14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	318	0	595	166	313	8	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102WTG: 40 - PUU40

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24 05.17-05.37/20	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27 05.17-05.37/20	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30 05.19-05.36/17	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34 05.22-05.36/14	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37 05.25-05.36/11	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 05.20-05.24/4	03.07	03.07	04.40 05.27-05.34/7	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 05.17-05.25/8	03.04	03.10	04.43 05.30-05.33/3	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 05.14-05.26/12	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 05.11-05.26/15	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26 05.08-05.26/18	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22 05.06-05.26/20	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.07-05.27/20	02.54	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16 05.06-05.27/21	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12 05.06-05.27/21	02.52	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09 05.07-05.27/20	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06 05.07-05.27/20	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03 05.06-05.26/20	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59 05.07-05.26/19	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56 05.07-05.25/18	02.48	03.43 05.25-05.29/4	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 05.08-05.25/17	02.48	03.46 05.22-05.31/9	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 05.10-05.24/14	02.48	03.49 05.21-05.32/11	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47 05.10-05.23/13	02.49	03.52 05.20-05.34/14	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 05.11-05.22/11	02.49	03.55 05.19-05.35/16	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21	03.41 05.13-05.20/7	02.50	03.59 05.18-05.35/17	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02 05.18-05.36/18	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05 05.17-05.36/19	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08 05.17-05.37/20	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11 05.17-05.38/21	05.48	07.18	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12	07.32	05.53	05.03	03.27	02.56	04.14 05.17-05.37/20	05.51	07.20	07.51	09.30	10.15
	15.55	17.36	19.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09	07.30	05.49	05.00	03.24	02.57	04.18 05.17-05.38/21	05.54	07.23	07.54	09.32	10.14
	15.59	17.39	19.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06	07.27	05.45	05.00	03.21	02.58	04.21 05.16-05.37/21	05.57	07.26	07.57	09.34	10.13
	16.02	17.48	19.11	21.41	23.17	23.50	22.30	20.43	18.59	16.10	14.46	14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	298	0	211	92	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 41 - PUU41

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102WTG: 42 - PUU42

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	20.35-20.55/20	03.19	02.59	04.24	06.00	07.26	08.00	09.35	
	14.35	16.05	17.36	20.09	21.41		23.19	23.49	22.27	20.39	18.53	16.06	14.42	
2	10.11	09.00	07.28	06.38	04.53	20.34-20.55/21	03.16	03.01	04.27	06.03	07.29	08.03	09.38	
	14.37	16.09	17.39	20.12	21.44		23.22	23.48	22.23	20.36	18.49	16.03	14.40	
3	10.10	08.57	07.24	06.35	04.49	20.34-20.55/21	03.14	03.01	04.30	20.51-20.58/7	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47		23.25	23.46	22.20	20.32	18.46	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	20.35-20.54/19	03.11	03.03	04.34	20.49-21.01/12	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51		23.28	23.44	22.17	20.29	18.42	15.57	14.36	
5	10.08	08.51	07.17	06.28	04.42	20.35-20.54/19	03.09	03.05	04.37	20.47-21.01/14	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54		23.30	23.42	22.13	20.25	18.39	15.54	14.35	
6	10.06	08.48	07.14	06.24	04.39	20.35-20.53/18	03.07	03.07	04.40	20.46-21.02/16	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57		23.33	23.40	22.10	20.21	18.35	15.50	14.33	
7	10.05	08.45	07.10	06.21	04.36	20.36-20.52/16	03.04	03.10	04.43	20.45-21.03/18	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00		23.35	23.38	22.07	20.18	18.32	15.47	14.31	
8	10.03	08.41	07.07	06.17	04.32	20.37-20.51/14	03.02	03.12	04.46	20.44-21.03/19	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04		23.37	23.36	22.03	20.14	18.28	15.44	14.30	
9	10.01	08.38	07.03	06.13	04.29	20.39-20.50/11	03.01	03.15	04.50	20.44-21.03/19	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07		23.40	23.34	22.00	20.11	18.25	15.41	14.29	
10	09.59	08.35	07.00	06.10	04.26	20.42-20.47/5	02.57	03.17	04.53	20.44-21.04/20	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10		23.42	23.32	21.56	20.07	18.21	15.38	14.27	
11	09.58	08.32	06.56	06.06	04.22		02.55	03.20	04.56	20.44-21.04/20	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13		23.44	23.29	21.53	20.04	18.18	15.35	14.26	
12	09.56	08.28	06.53	06.03	04.19		02.54	03.23	04.59	20.43-21.03/20	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17		23.46	23.27	21.49	20.00	18.14	15.32	14.25	
13	09.53	08.25	06.49	05.59	04.16		02.53	03.25	05.02	20.43-21.02/19	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20		23.47	23.24	21.46	19.57	18.11	15.29	14.24	
14	09.51	08.22	06.46	05.56	04.12		02.52	03.28	05.05	20.44-20.59/15	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23		23.49	23.21	21.43	19.53	18.07	15.26	14.24	
15	09.49	08.19	06.42	05.52	04.09		02.51	03.31	05.08	20.44-20.56/12	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26		23.50	23.19	21.39	19.49	18.04	15.23	14.23	
16	09.47	08.15	06.39	05.49	04.06		02.50	03.34	05.11	20.44-20.52/8	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30		23.52	23.16	21.36	19.46	18.00	15.20	14.22	
17	09.44	08.12	06.35	05.45	04.03		02.49	03.37	05.15	20.45-20.50/5	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33		23.53	23.13	21.32	19.42	17.57	15.17	14.22	
18	09.42	08.09	06.32	05.42	03.59		02.49	03.40	05.18		06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36		23.54	23.10	21.29	19.39	17.53	15.14	14.22	
19	09.40	08.05	06.28	05.38	03.56		02.49	03.43	05.21		06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39		23.54	23.07	21.25	19.35	17.50	15.12	14.22	
20	09.37	08.02	06.24	05.35	03.53		02.48	03.46	05.24		06.55	08.22	09.02	10.13
	15.26	17.08	18.33	21.06	22.43		23.55	23.04	21.22	19.32	17.47	15.09	14.22	
21	09.34	07.59	06.21	05.31	03.50		02.49	03.49	05.27		06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46		23.55	23.01	21.18	19.28	17.43	15.06	14.22	
22	09.32	07.55	06.17	05.27	03.47		02.49	03.52	05.30		07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49		23.55	22.58	21.15	19.25	17.40	15.04	14.23	
23	09.29	07.52	06.14	05.24	03.44		02.49	03.55	05.33		07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52		23.55	22.55	21.11	19.21	17.36	15.01	14.23	
24	09.26	07.48	06.10	05.20	03.41		02.50	03.59	05.36		07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55		23.55	22.52	21.08	19.17	17.33	14.58	14.24	
25	09.24	07.45	06.07	05.17	20.40-20.41/1		02.51	04.02	05.39		07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58		23.55	22.49	21.04	19.14	16.30	14.56	14.25	
26	09.21	07.41	06.03	05.13	20.39-20.44/5		02.52	04.05	05.42		07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02		23.54	22.46	21.01	19.10	16.26	14.53	14.26	
27	09.18	07.38	06.00	05.10	20.37-20.46/9		02.53	04.08	05.45		07.15	07.44	09.23	10.15
	15.49	17.30	18.54	21.28	23.05		23.54	22.43	20.57	19.07	16.23	14.51	14.27	
28	09.15	07.35	05.56	05.07	20.36-20.49/13		02.54	04.11	05.48		07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08		23.53	22.40	20.53	19.03	16.20	14.49	14.28	
29	09.12		05.53	05.03	20.35-20.52/17		02.56	04.14	05.51		07.20	07.51	09.29	10.14
	15.55		20.00	21.35	23.11		23.52	22.36	20.50	19.00	16.16	14.46	14.29	
30	09.09		06.49	05.00	20.35-20.54/19		02.57	04.18	05.54		07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14		23.50	22.33	20.46	18.56	16.13	14.44	14.31	
31	09.06		06.45		03.21			04.21	05.57		07.57		10.13	
	16.02		20.06		23.17			22.30	20.43		16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	
Sum of minutes with flicker	0	0	0	64	164	0	0	224	0	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 43 - PUU43

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.59	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102WTG: 44 - PUU44

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	21.23-21.51/28	02.59	21.30-21.57/27	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19		23.49		22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	21.23-21.52/29	03.01	21.30-21.57/27	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22		23.48		22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	21.23-21.51/28	03.01	21.30-21.57/27	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25		23.46		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	21.24-21.52/28	03.03	21.30-21.57/27	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28		23.44		22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	21.24-21.51/27	03.05	21.30-21.57/27	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30		23.42		22.13	20.25	18.38	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	21.24-21.52/28	03.07	21.30-21.57/27	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33		23.40		22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	21.25-21.52/27	03.10	21.30-21.58/28	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35		23.38		22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	21.25-21.52/27	03.12	21.31-21.59/28	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.37		23.36		22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	21.25-21.52/27	03.14	21.30-21.58/28	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40		23.34		22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.26	02.57	21.26-21.52/26	03.17	21.30-21.58/28	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42		23.32		21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	21.26-21.52/26	03.20	21.31-21.59/28	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44		23.29		21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	21.26-21.52/26	03.22	21.31-21.59/28	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46		23.27		21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16	02.53	21.26-21.52/26	03.25	21.31-21.59/28	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47		23.24		21.46	19.56	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52	21.27-21.52/25	03.28	21.31-21.59/28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49		23.21		21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	21.26-21.52/26	03.31	21.31-21.59/28	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50		23.19		21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	21.27-21.53/26	03.34	21.31-21.59/28	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52		23.16		21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	02.49	21.28-21.53/25	03.37	21.32-22.00/28	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53		23.13		21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	21.28-21.53/25	03.40	21.32-21.59/27	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53		23.10		21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	21.27-21.53/26	03.43	21.32-21.59/27	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54		23.07		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	21.29-21.54/25	03.46	21.32-21.58/26	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55		23.04		21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	21.29-21.54/25	03.49	21.34-21.59/25	05.27	06.57	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55		23.01		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	21.29-21.54/25	03.52	21.34-21.58/24	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55		22.58		21.15	19.24	17.40	15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	21.28-21.54/26	03.55	21.35-21.58/23	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55		22.55		21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	21.29-21.54/25	03.58	21.35-21.57/22	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55		22.52		21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	21.29-21.54/25	04.02	21.36-21.55/19	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	21.29-21.55/26	04.05	21.37-21.52/15	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54		22.46		21.00	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	21.30-21.55/25	04.08	21.39-21.50/11	05.45	07.15	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05	23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	21.30-21.56/26	04.11	21.40-21.47/7	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53		22.40		20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.56	21.29-21.55/26	04.14	21.43-21.45/2	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.34	23.11	23.52		22.36		20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	21.29-21.55/26	04.18		05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50		22.33		20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21	03.21	21.23-21.51/28	04.21		05.57		07.57		10.13
	16.02		20.06		23.17			22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	382	786		698		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 45 - PUU45

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.56	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.29	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 46 - PUU46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.18 23.19	02.59 23.49	21.56-22.11/15 22.26	04.24 20.39	06.00 18.53	07.26 16.06	08.00 14.42
2	10.11 14.37	09.00 16.08	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.22	03.01 23.47	21.56-22.10/14 22.23	04.27 20.36	06.02 18.49	07.29 16.03	08.03 14.40
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.47	03.13 23.25	03.01 23.46	21.58-22.09/11 22.20	04.30 20.32	06.05 18.45	07.32 16.00	08.06 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.50	03.11 23.27	03.03 23.44	21.59-22.07/8 22.16	04.34 20.28	06.08 18.42	07.35 15.57	08.10 14.36
5	10.07 14.43	08.51 16.18	07.17 17.48	06.28 20.20	04.42 21.54	03.09 23.30	03.05 23.42	03.07 22.13	04.40 20.25	06.14 18.38	07.41 15.53	08.16 14.35
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.23	04.39 21.57	03.07 23.33	03.07 23.40	04.40 22.10	06.14 20.21	07.41 18.35	08.16 15.50	09.48 14.33
7	10.05 14.48	08.44 16.25	07.10 17.54	06.20 20.26	04.36 22.00	03.04 23.35	03.10 23.38	04.43 22.06	06.17 20.18	07.43 18.31	08.19 15.47	09.51 14.31
8	10.03 14.51	08.41 16.28	07.07 17.57	06.17 20.29	04.32 22.03	03.02 23.37	03.12 23.36	21.56-22.01/5 22.03	04.46 20.14	06.20 18.28	07.46 15.44	08.23 14.30
9	10.01 14.53	08.38 16.32	07.03 18.00	06.13 20.33	04.29 22.07	03.00 23.40	03.14 23.34	21.54-22.04/10 22.00	04.49 20.11	06.23 18.24	07.49 15.41	08.26 14.28
10	09.59 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	02.57 23.42	03.17 23.31	21.52-22.05/13 21.56	04.53 20.07	06.26 18.21	07.52 15.38	08.29 14.27
11	09.57 14.59	08.32 16.38	06.56 18.06	06.06 20.39	04.22 22.13	02.55 23.44	03.20 23.29	21.51-22.07/16 21.53	04.56 20.04	06.29 18.17	07.55 15.35	08.32 14.26
12	09.55 15.01	08.28 16.42	06.53 18.09	06.03 20.42	04.19 22.16	02.54 23.45	03.22 23.26	21.51-22.07/16 21.49	04.59 20.00	06.31 18.14	07.58 15.32	08.36 14.25
13	09.53 15.04	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20	02.53 23.47	03.25 23.24	21.50-22.08/18 21.46	05.02 19.56	06.34 18.11	08.01 15.29	08.39 14.24
14	09.51 15.07	08.22 16.48	06.46 18.15	05.56 20.48	04.12 22.23	02.52 23.49	03.28 23.21	21.50-22.09/19 21.42	05.05 19.53	06.37 18.07	08.04 15.26	08.42 14.23
15	09.49 15.10	08.18 16.51	06.42 18.18	05.52 20.51	04.09 22.26	02.51 23.50	03.31 23.19	21.49-22.10/21 21.39	05.08 19.49	06.40 18.04	08.07 15.23	08.45 14.23
16	09.47 15.13	08.15 16.55	06.39 18.21	05.49 20.54	04.06 22.30	02.50 23.51	03.34 23.16	21.49-22.11/22 21.35	05.11 19.46	06.43 18.00	08.10 15.20	08.49 14.22
17	09.44 15.16	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33	02.49 23.52	03.37 23.13	21.50-22.11/21 21.32	05.14 19.42	06.46 17.57	08.13 15.17	08.52 14.22
18	09.42 15.19	08.08 17.01	06.31 18.27	05.41 21.00	03.59 22.36	02.49 23.53	03.40 23.10	21.50-22.12/22 21.28	05.17 19.39	06.49 17.53	08.16 15.14	08.55 14.22
19	09.39 15.23	08.05 17.04	06.28 18.30	05.38 21.03	03.56 22.39	02.48 23.54	03.43 23.07	21.49-22.11/22 21.25	05.21 19.35	06.52 17.50	08.19 15.12	08.58 14.22
20	09.37 15.26	08.02 17.07	06.24 18.33	05.34 21.06	03.53 22.42	02.48 23.55	03.46 23.04	21.50-22.13/23 21.21	05.24 19.32	06.54 17.46	08.22 15.09	09.02 14.22
21	09.34 15.29	07.58 17.11	06.21 18.36	05.31 21.09	03.50 22.46	02.48 23.55	03.49 23.01	21.50-22.13/23 21.18	05.27 19.28	06.57 17.43	08.25 15.06	09.05 14.22
22	09.32 15.32	07.55 17.14	06.17 18.39	05.27 21.12	03.47 22.49	02.49 23.55	03.52 22.58	21.50-22.13/23 21.14	05.30 19.24	07.00 17.40	08.29 15.03	09.08 14.23
23	09.29 15.35	07.52 17.17	06.14 18.42	05.24 21.15	03.44 22.52	02.49 23.55	03.55 22.55	21.50-22.13/23 21.11	05.33 19.21	07.03 17.36	08.32 15.01	09.11 14.23
24	09.26 15.39	07.48 17.20	06.10 18.45	05.20 21.19	03.41 22.55	02.50 23.55	03.58 22.52	21.51-22.13/22 21.07	05.36 19.17	07.06 17.33	08.35 14.58	09.14 14.24
25	09.23 15.42	07.45 17.23	06.07 18.48	05.17 21.22	03.38 22.58	02.51 23.55	04.02 22.49	21.51-22.13/22 21.04	05.39 19.14	07.09 16.30	07.38 14.56	09.17 14.25
26	09.21 15.45	07.41 17.26	06.03 18.51	05.13 21.25	03.35 23.01	02.52 23.54	04.05 22.46	21.51-22.13/22 21.00	05.42 19.10	07.12 16.26	07.41 14.53	09.20 14.26
27	09.18 15.49	07.38 17.29	06.00 18.54	05.10 21.28	03.32 23.05	02.53 23.53	04.08 22.43	21.52-22.13/21 20.57	05.45 19.07	07.14 16.23	07.44 14.51	09.23 14.27
28	09.15 15.52	07.34 17.33	05.56 18.57	05.06 21.31	03.29 23.08	02.54 23.53	04.11 22.39	21.53-22.13/20 20.53	05.48 19.03	07.17 16.20	07.47 14.49	09.26 14.28
29	09.12 15.55	07.31 17.30	05.52 18.54	05.03 21.34	03.26 23.11	02.56 23.51	04.14 22.36	21.53-22.12/19 20.50	05.51 19.00	07.20 16.16	07.50 14.46	09.29 14.29
30	09.09 15.58	07.28 17.27	05.49 18.53	05.00 21.38	03.24 23.14	02.57 23.50	04.18 22.33	21.54-22.11/17 20.46	05.54 18.56	07.23 16.13	07.54 14.44	09.32 14.31
31	09.06 16.02	07.25 17.24	05.45 18.52	05.03 21.41	03.21 23.16	03.21 23.50	04.21 22.30	04.21 20.43	05.57 18.56	07.57 16.10	07.57 14.44	10.13 14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	440	48	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 47 - PUU47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 48 - PUU48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.17	21.51	23.28	23.44	22.17	20.28	18.42	15.57	14.36
5	10.08	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.48
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.41	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		05.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102WTG: 49 - PUU49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

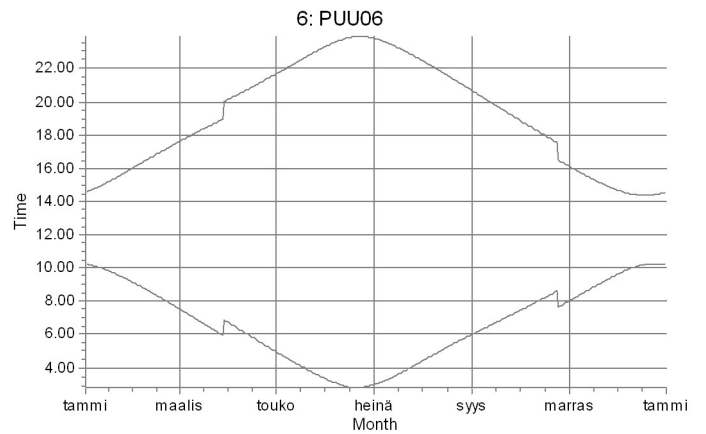
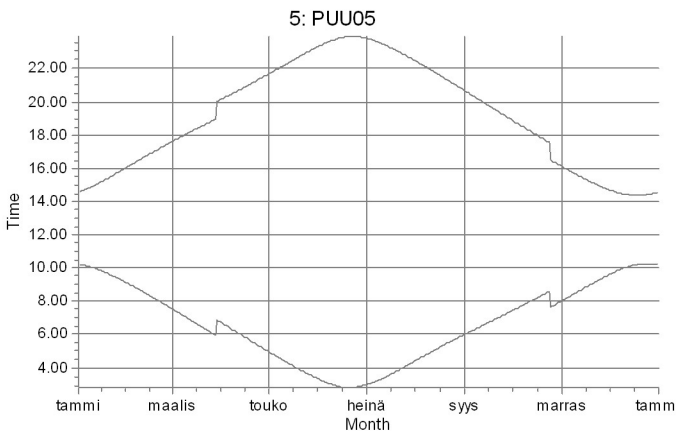
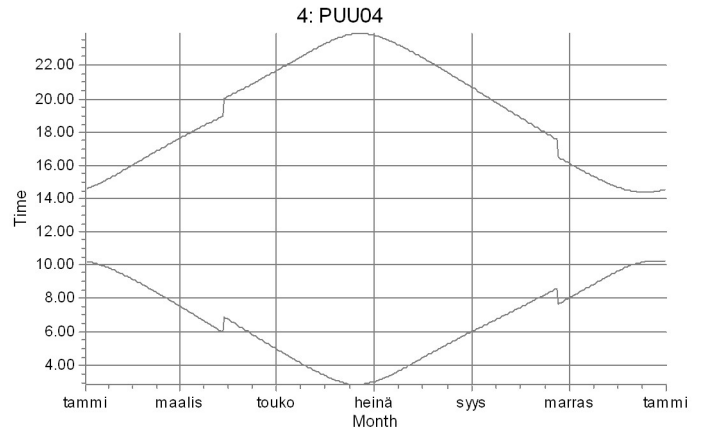
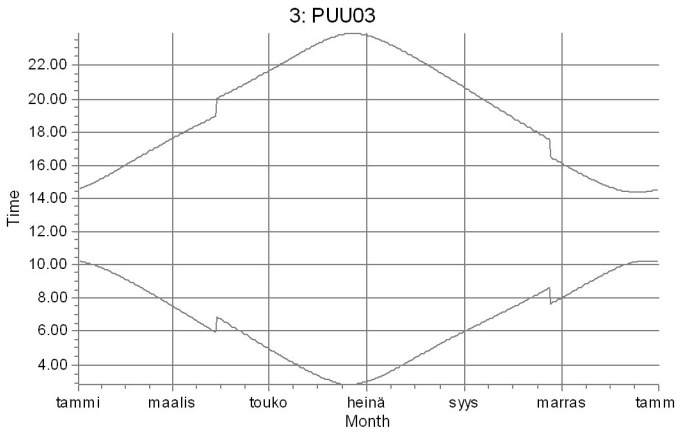
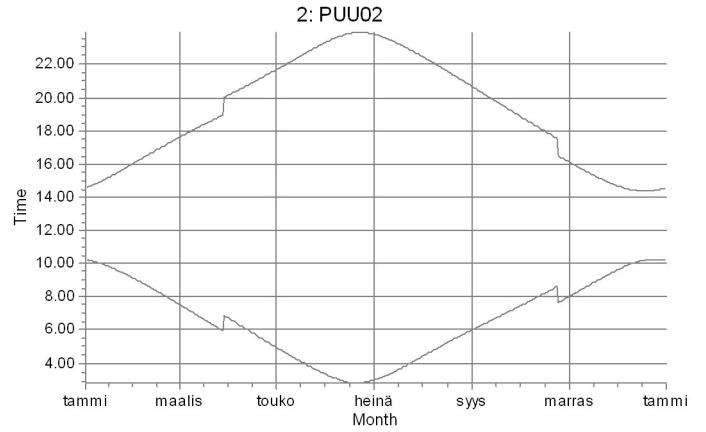
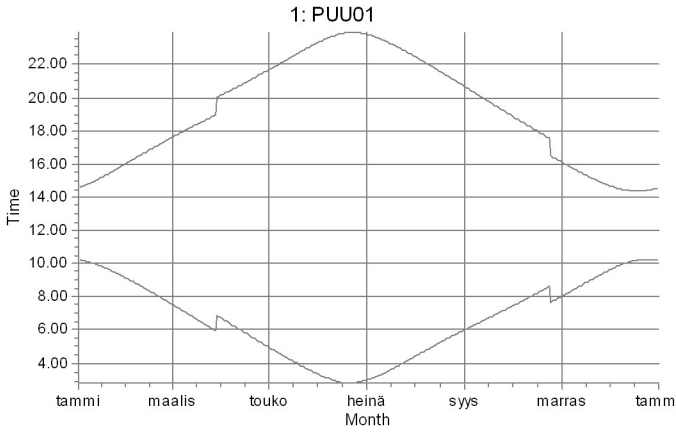
	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.36	20.08	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.27	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.11	21.44	23.22	23.47	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.17	21.50	23.27	23.44	22.16	20.28	18.42	15.57	14.36
5	10.07	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.40	08.16	09.48
	14.46	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.04	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.32	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.57
	14.56	16.35	18.03	20.35	22.10	23.42	23.31	21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.38	22.13	23.44	23.29	21.53	20.03	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.01
	15.01	16.41	18.09	20.42	22.16	23.45	23.26	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.38	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.54	18.21	20.54	22.29	23.51	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10	21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.01	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.28	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.23	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.04	23.53	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.39	20.53	19.03	16.19	14.49	14.28
29	09.12		05.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.51	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.13	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.16		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG, graphical

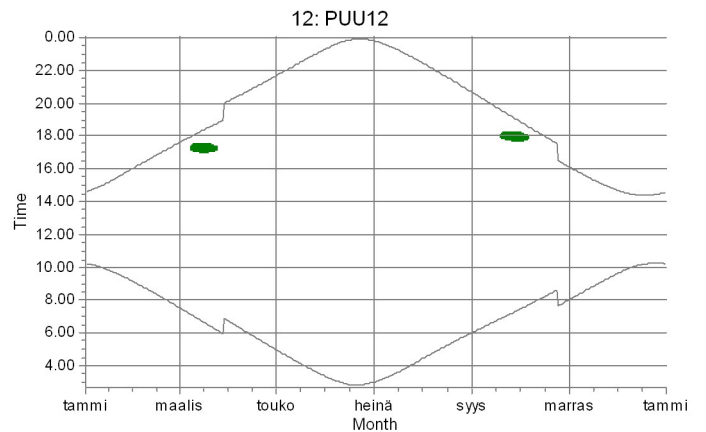
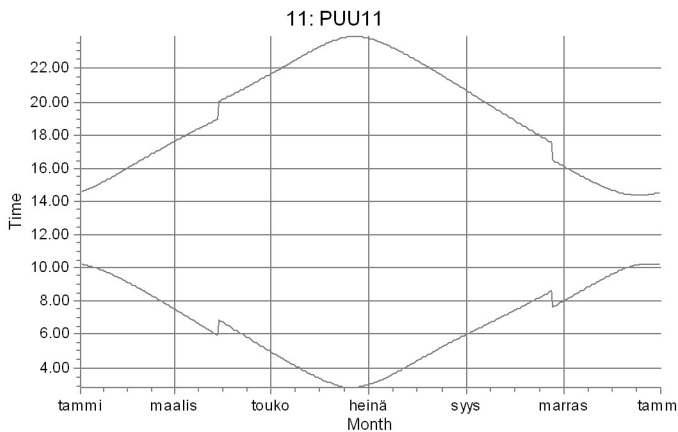
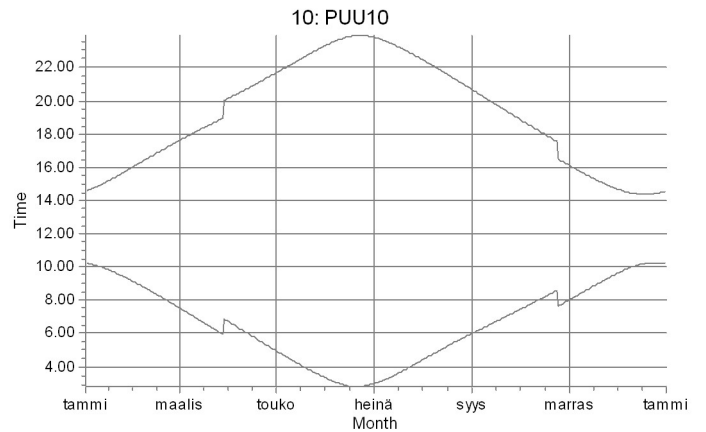
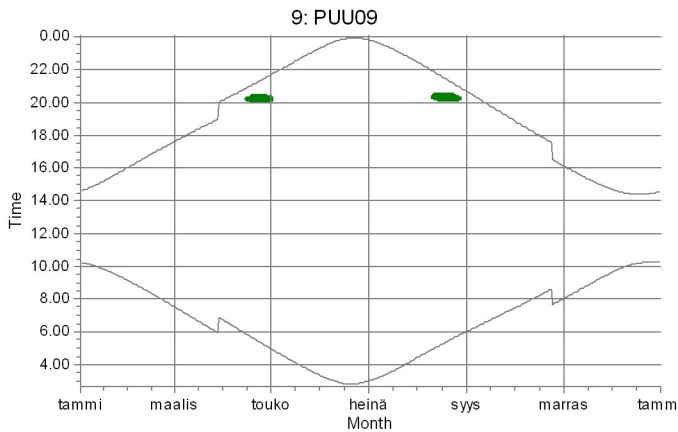
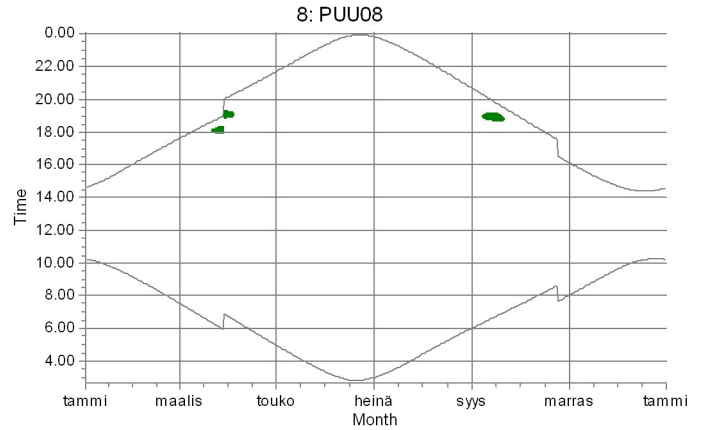
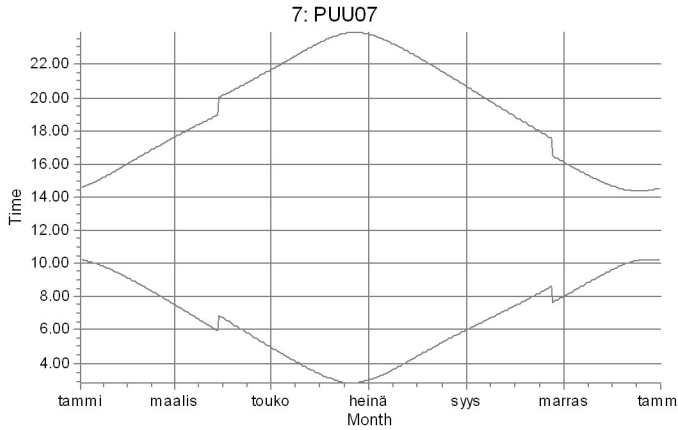
Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102



Shadow receptors

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102



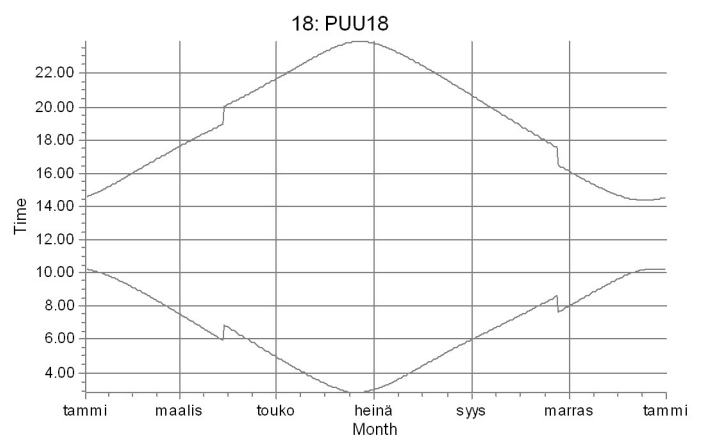
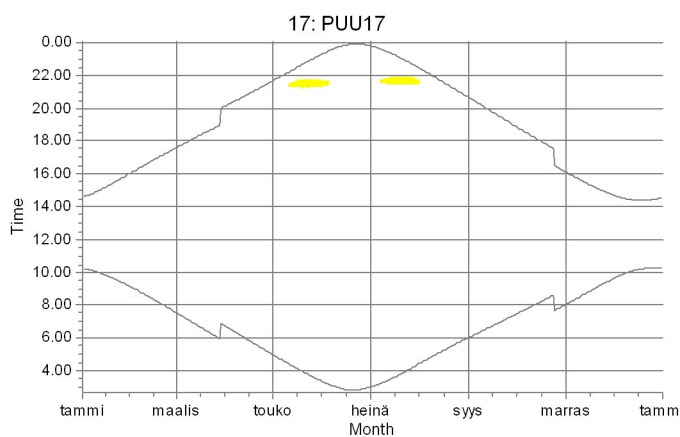
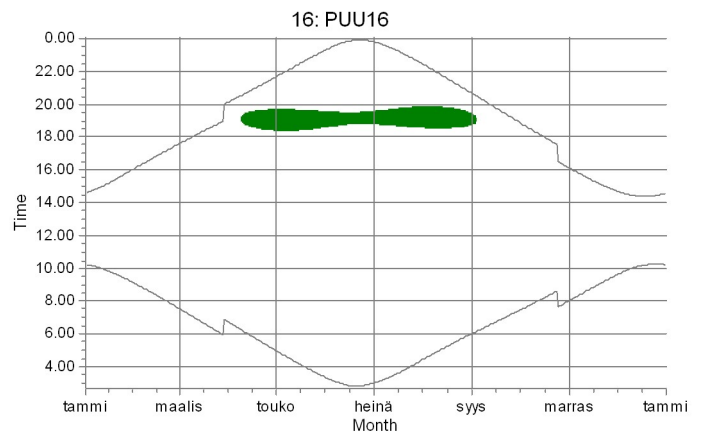
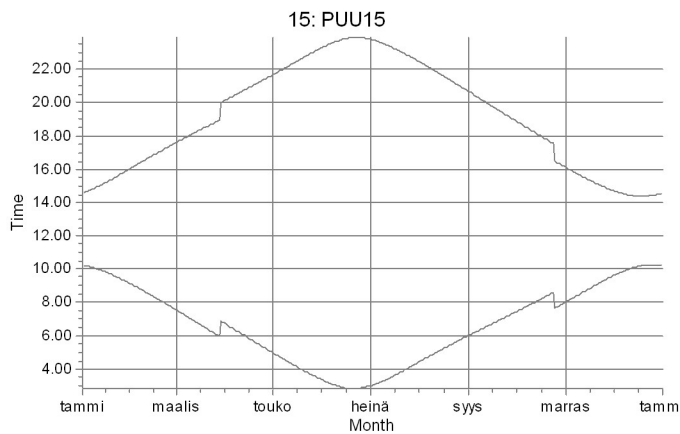
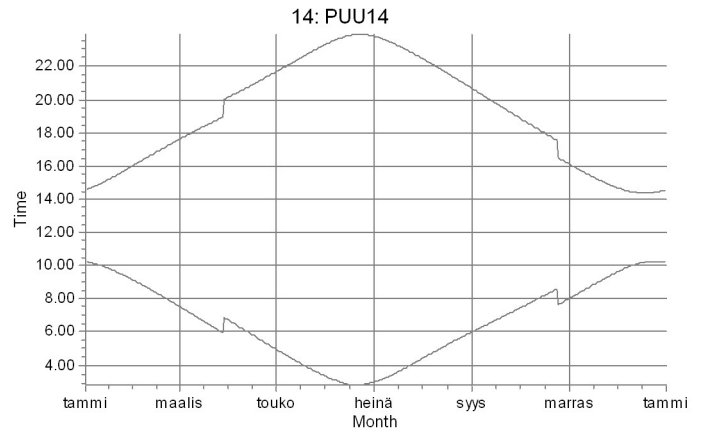
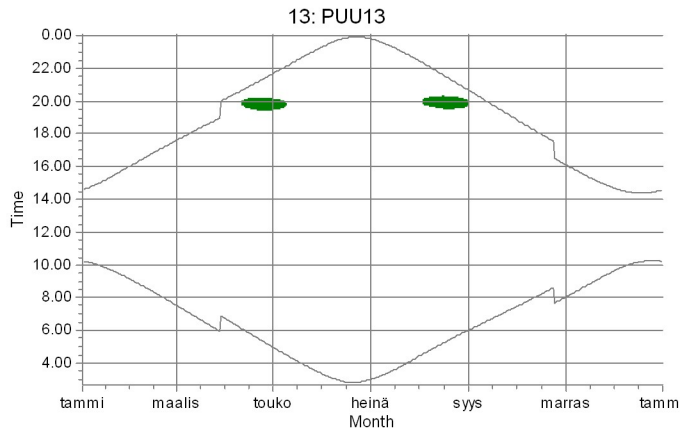
Shadow receptors



A: Laskentapiste A (Metsästysmaja)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102



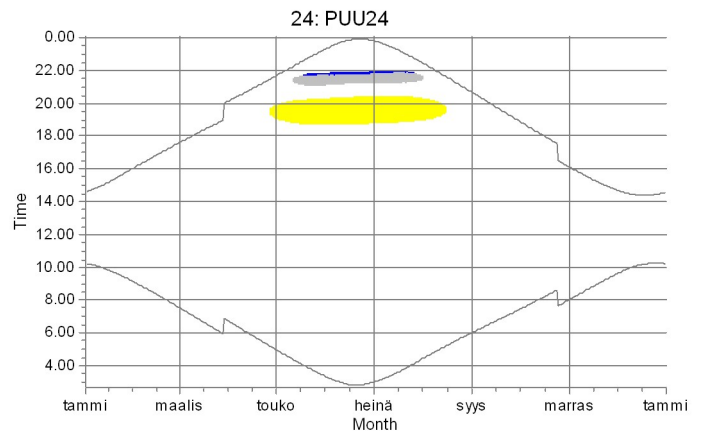
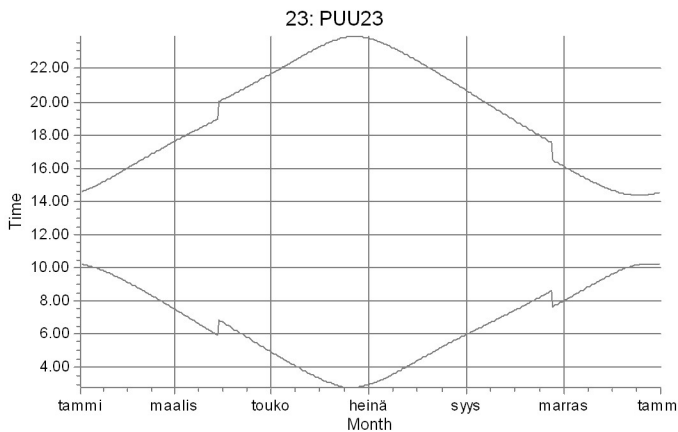
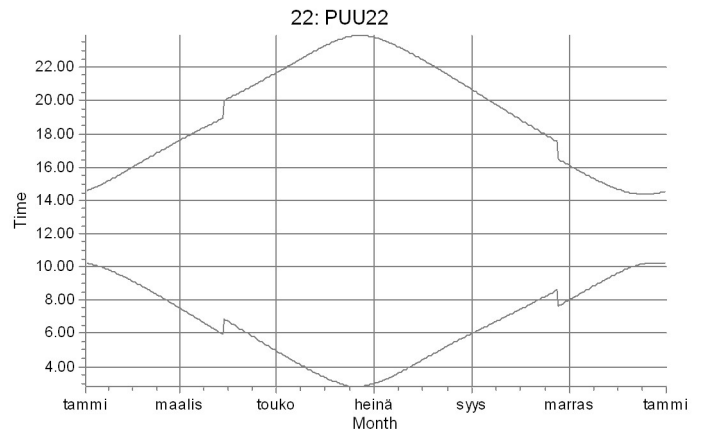
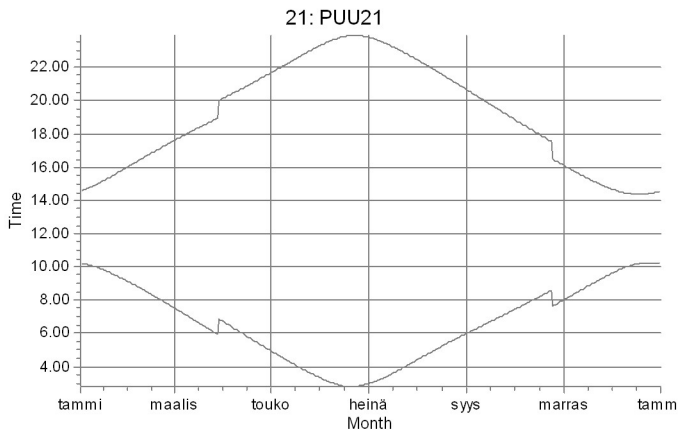
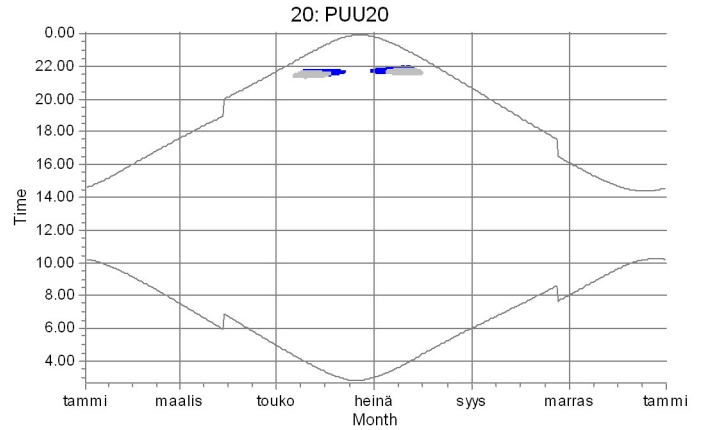
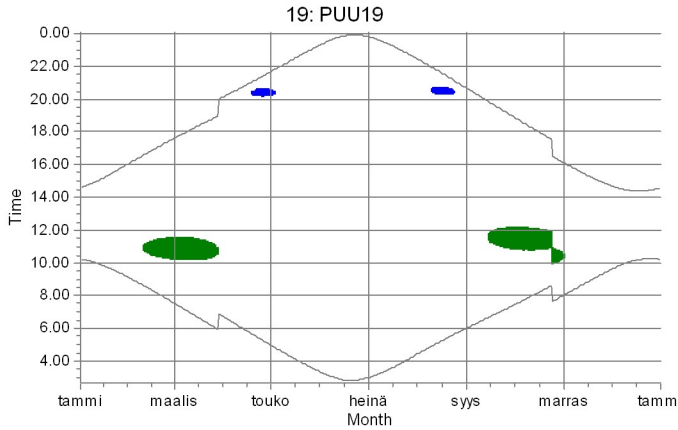
Shadow receptors

A: Laskentapiste A (Metsästysmaja)



B: Laskentapiste B (Ylivieskantie, Pohlola)



SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102



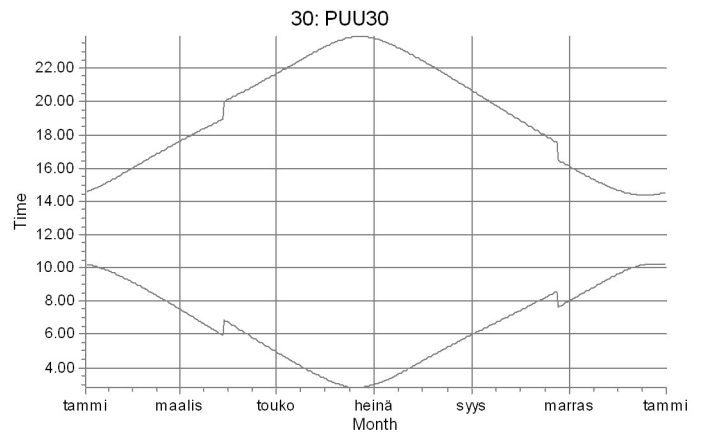
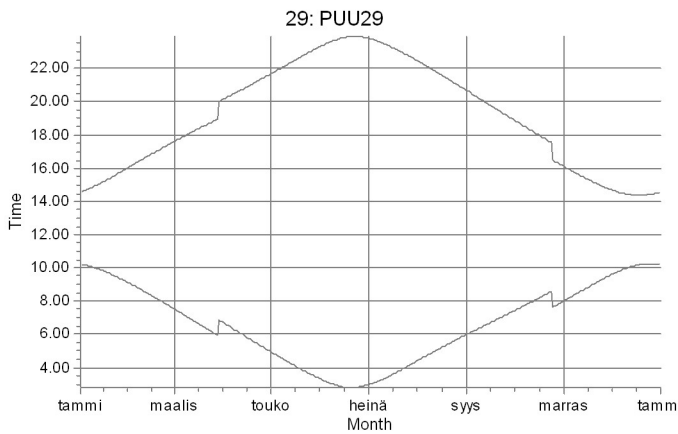
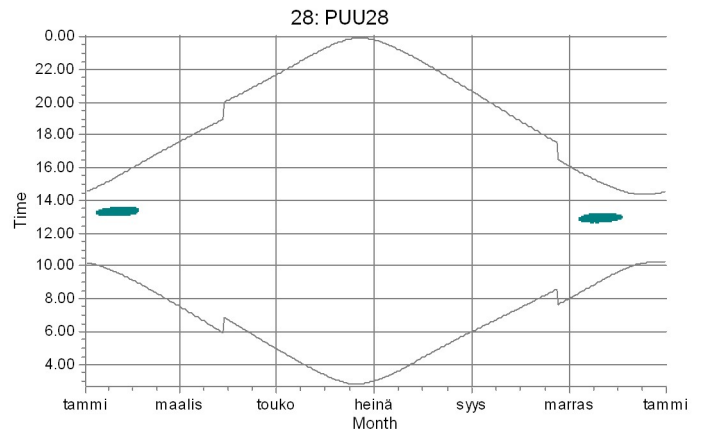
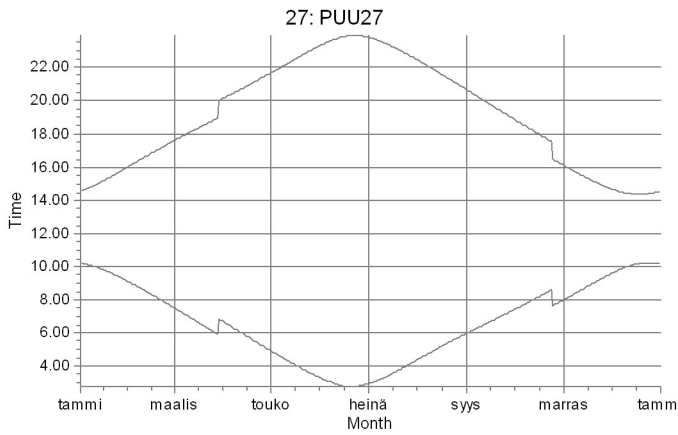
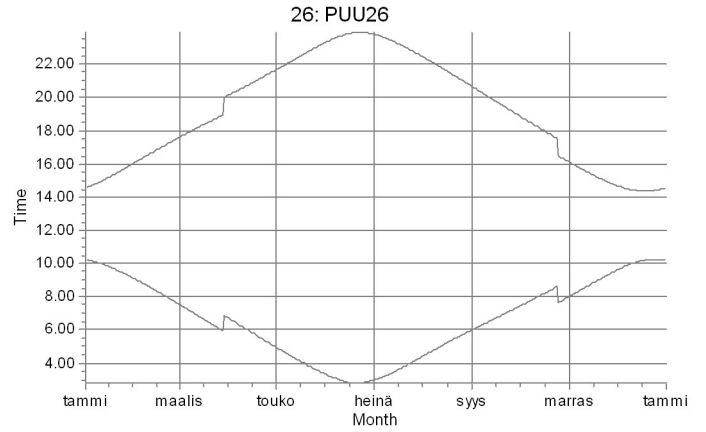
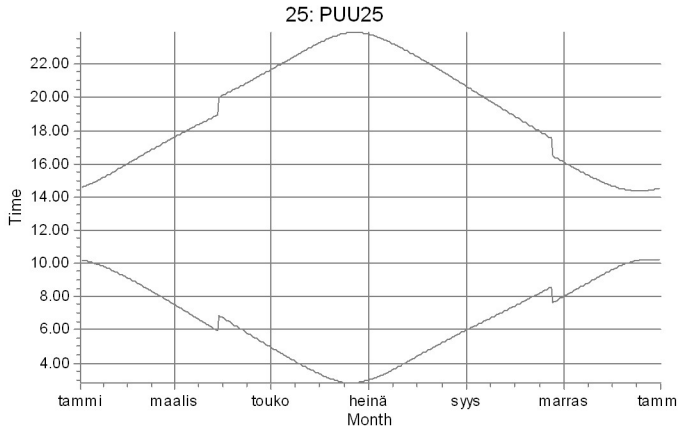
Shadow receptors

 A: Laskentapiste A (Metsästysmaja)
 B: Laskentapiste B (Ylivieskantie, Pohlola)


 C: Laskentapiste C (Perkkiontie 382)
 L: Laskentapiste L (Perkkiontie, Ilmola)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102

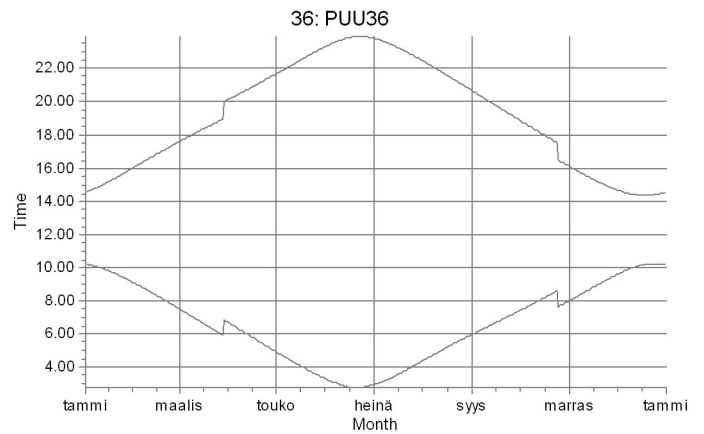
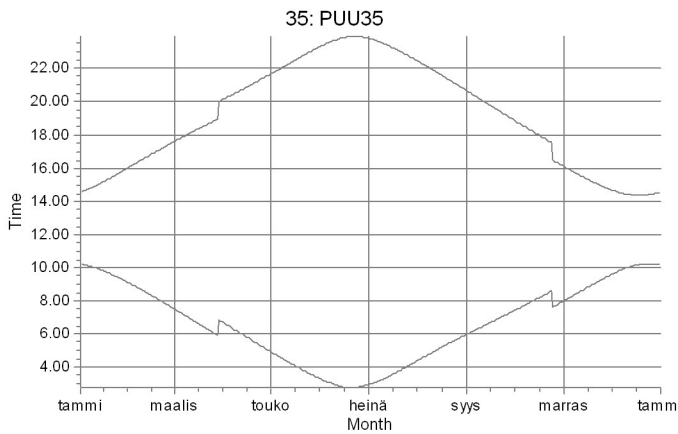
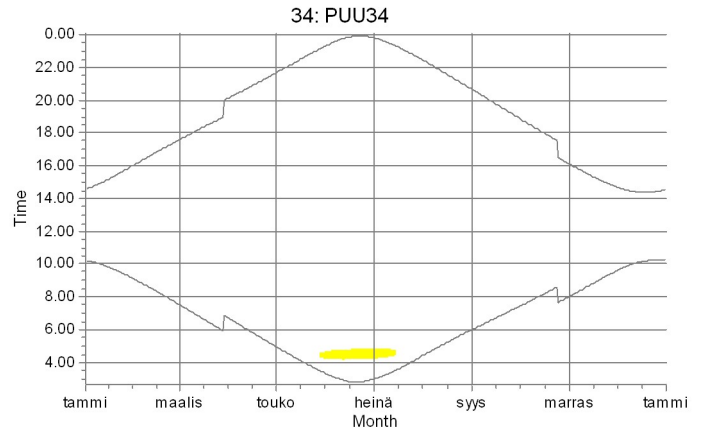
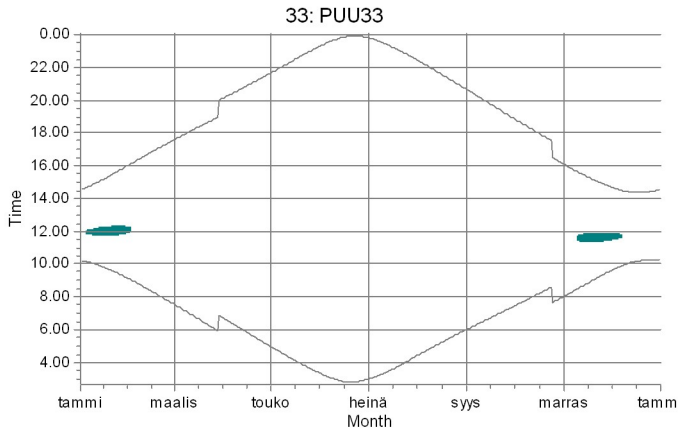
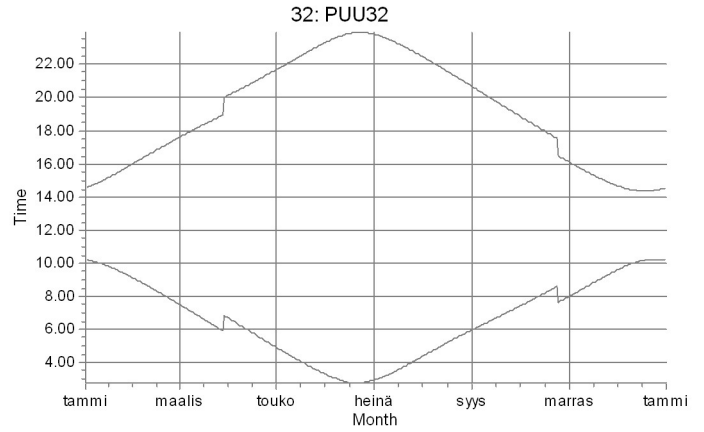
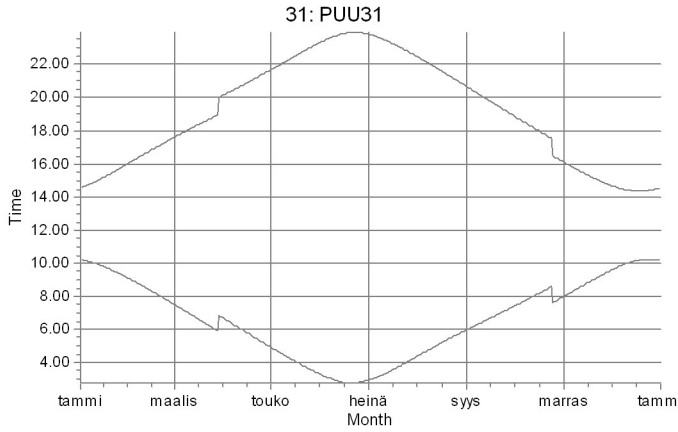


Shadow receptors

 F: Asuinrakennus F (Ollilantie 112)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102



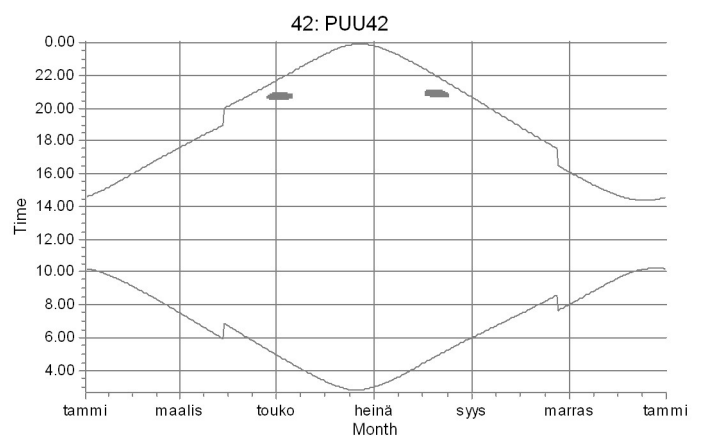
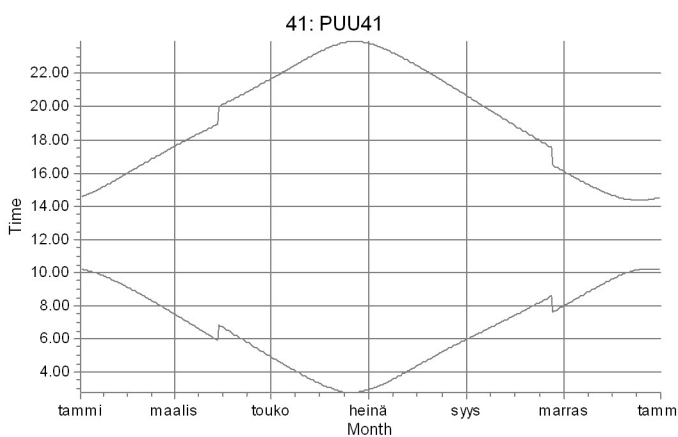
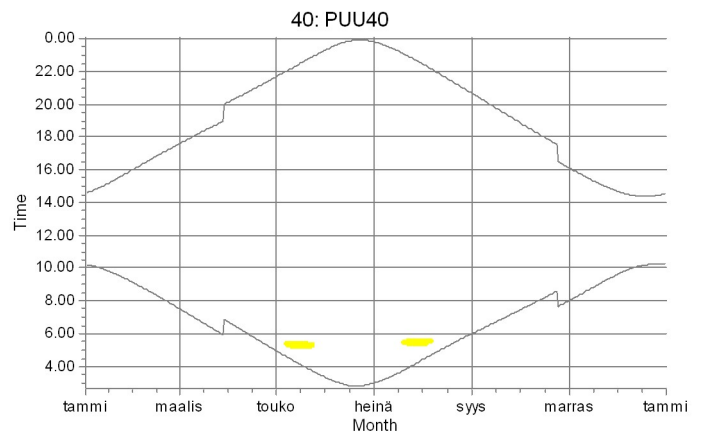
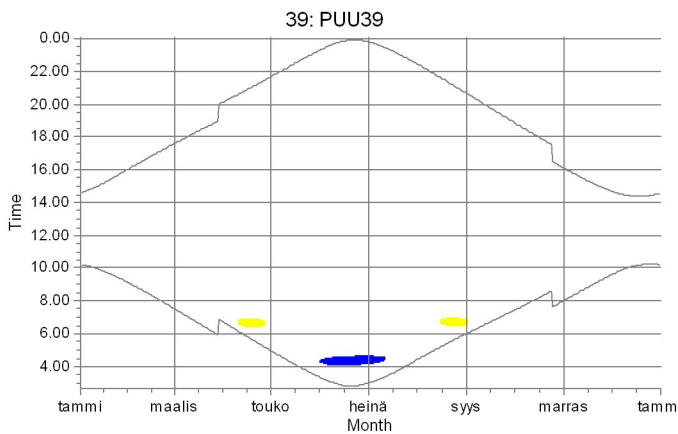
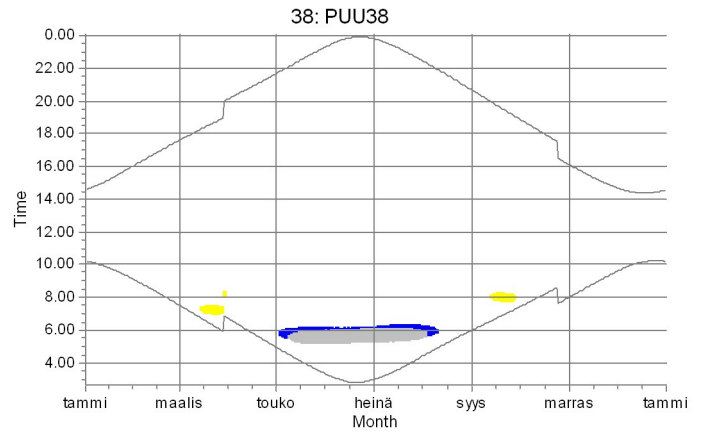
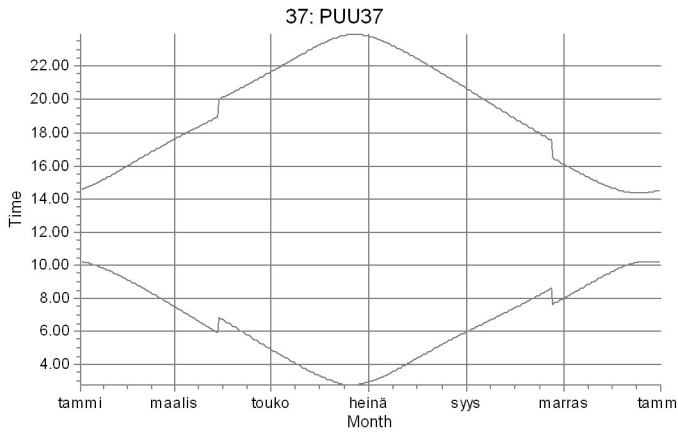
Shadow receptors

B: Laskentapiste B (Ylivieskantie, Pohlola)

F: Asuinrakennus F (Ollilantie 112)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102



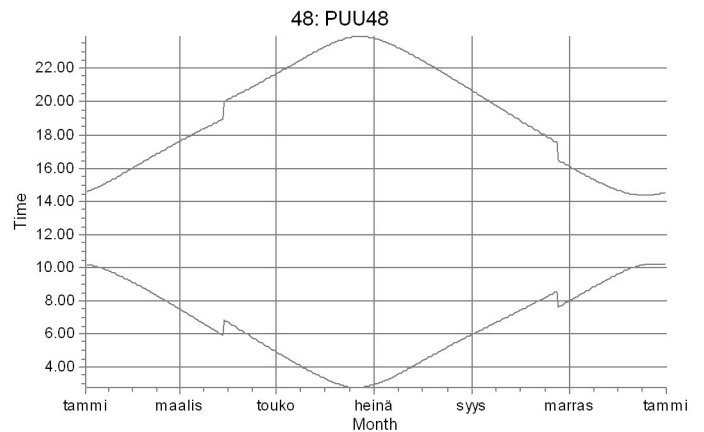
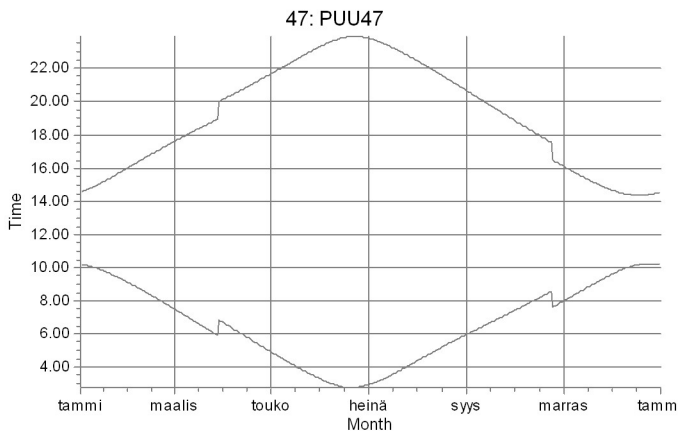
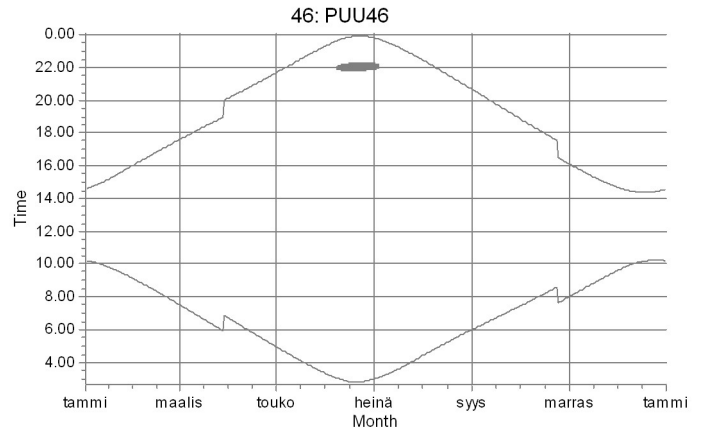
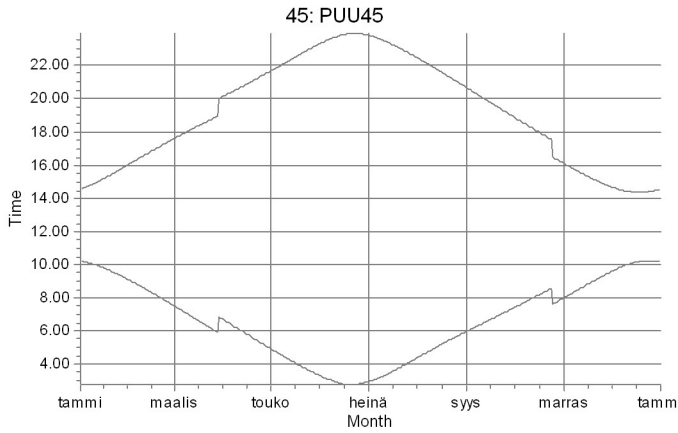
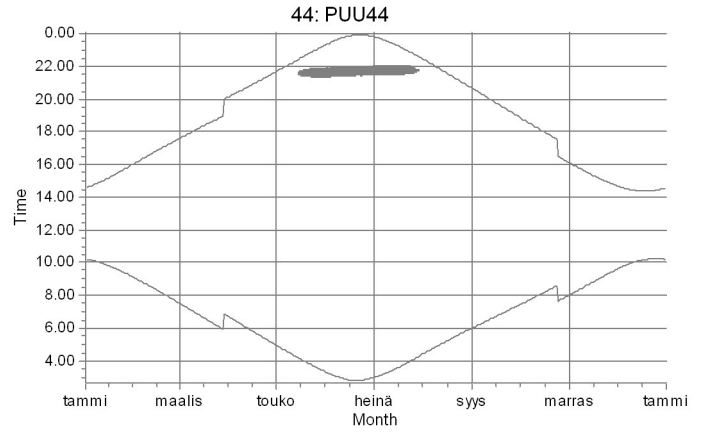
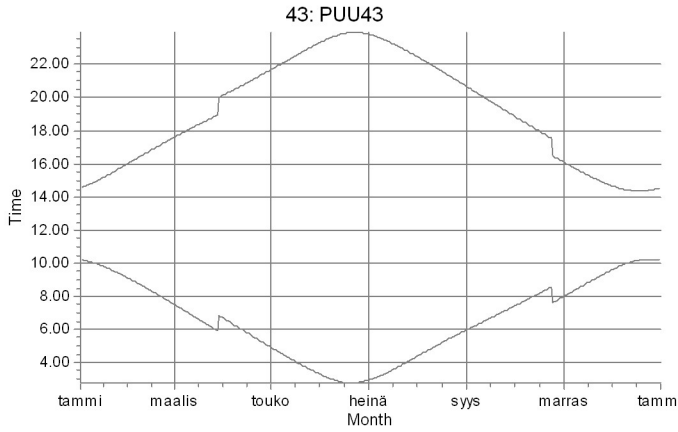
Shadow receptors

B: Laskentapiste B (Ylivieskantie, Pohlola)
 C: Laskentapiste C (Perkkiontie 382)

D: Asuinrakennus D (Alakyläntie 243)
 L: Laskentapiste L (Perkkiontie, Ilmola)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Luke forest_20201102

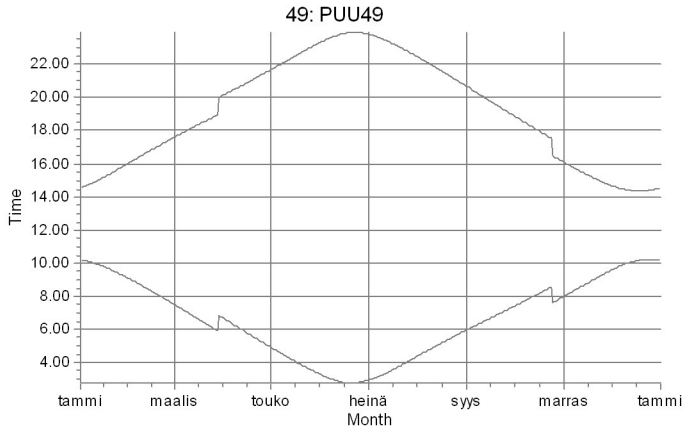


Shadow receptors

D: Asuinrakennus D (Alakylantie 243)

SHADOW - Calendar per WTG, graphical

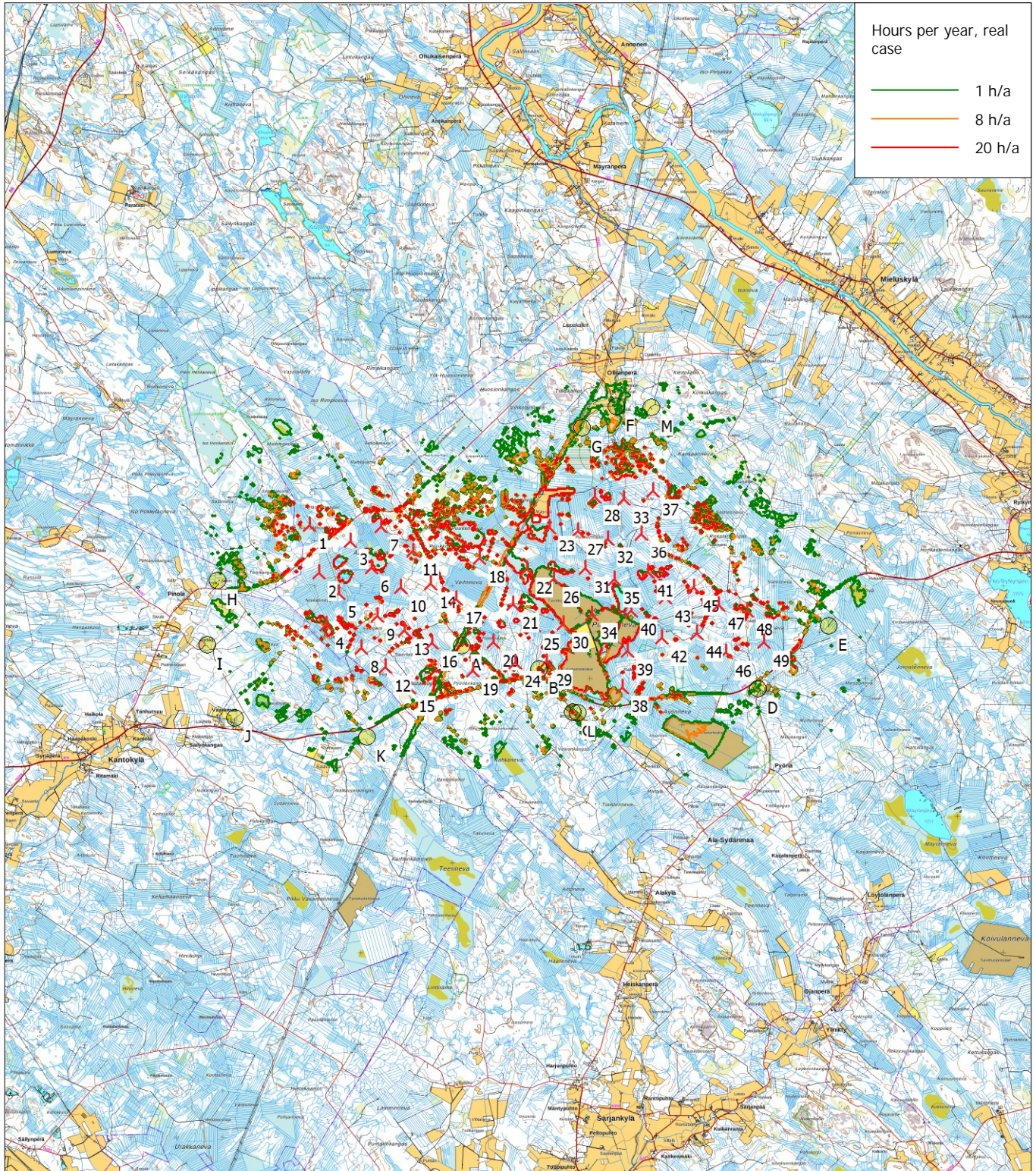
Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



Shadow receptors

SHADOW - Map

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



0 2,5 5 7,5 10km

Map: Maastokarttarasteri50K , Print scale 1:125 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 403 440 North: 7 110 930

🏗️ New WTG

🟡 Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Puutionsaari_Riskalankangas_20200327_1.wpo (2)

25.11.2020

Liite 7: Puutionsaari – Varjostuksen yhteismallinnusten tulokset “real case, no forest”

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102
Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational hours are calculated from WTGs in calculation and wind distribution:

MERRA_basic_E25.335_N64.000 (3)

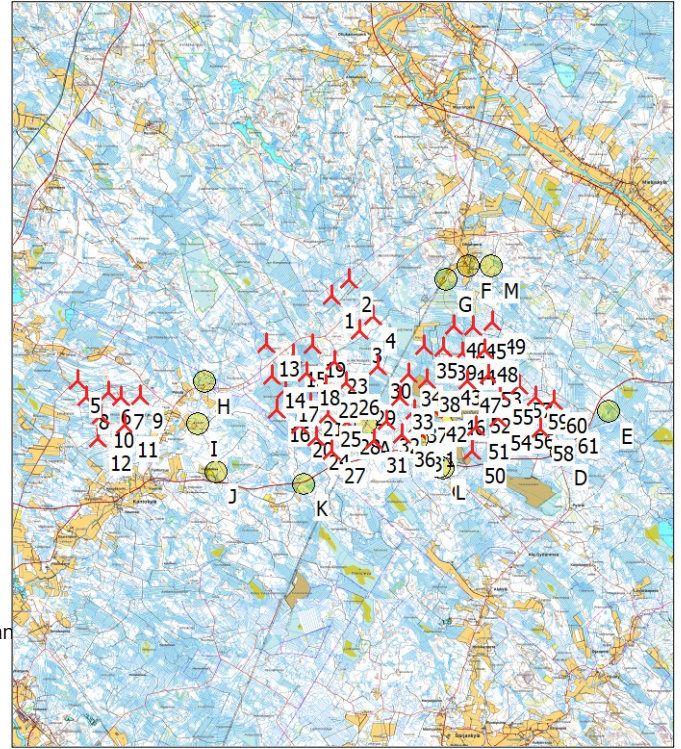
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1047	1090	994	842	717	711	8674

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Puutionsaari_Riskalan
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:250 000
New WTG Shadow receptor

WTGs

	East	North	Z	Row data/Description	WTG type			Shadow data				
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM [RPM]
1	401 061	7 113 928	105,0	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
2	401 644	7 114 439	105,4	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
3	401 997	7 112 772	109,3	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
4	402 450	7 113 258	106,6	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
5	392 697	7 111 104	81,0	GE WIND ENERGY 5...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
6	393 696	7 110 723	85,7	GE WIND ENERGY 5...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
7	394 124	7 110 573	88,7	GE WIND ENERGY 5...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
8	392 964	7 110 572	83,6	GE WIND ENERGY 5...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
9	394 736	7 110 600	89,9	GE WIND ENERGY 5...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
10	393 462	7 109 982	84,9	GE WIND ENERGY 5...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
11	394 233	7 109 674	87,5	GE WIND ENERGY 5...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
12	393 349	7 109 200	83,7	GE WIND ENERGY 5...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
13	398 896	7 112 332	92,5	PUU01	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
14	399 097	7 111 286	95,0	PUU02	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
15	399 784	7 111 972	97,5	PUU03	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
16	399 264	7 110 151	97,1	PUU04	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
17	399 536	7 110 832	96,4	PUU05	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
18	400 239	7 111 382	97,5	PUU06	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
19	400 444	7 112 292	97,0	PUU07	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
20	400 019	7 109 649	100,0	PUU08	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
21	400 380	7 110 348	100,0	PUU09	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
22	400 876	7 110 966	99,5	PUU10	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
23	401 152	7 111 752	100,0	PUU11	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
24	400 549	7 109 232	102,5	PUU12	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
25	400 953	7 110 020	102,5	PUU13	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
26	401 537	7 111 046	104,5	PUU14	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
27	401 068	7 108 792	105,3	PUU15	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
28	401 564	7 109 758	103,4	PUU16	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
29	402 089	7 110 702	107,5	PUU17	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
30	402 589	7 111 603	106,8	PUU18	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

To be continued on next page...

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

...continued from previous page

	East	North	Z	Row data/Description	WTG type		Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.					Calculation distance [m]	RPM [RPM]
			[m]									
31	402 455	7 109 148	112,5	PUU19	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
32	402 889	7 109 778	110,0	PUU20	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
33	403 318	7 110 593	108,0	PUU21	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
34	403 622	7 111 352	106,9	PUU22	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
35	404 117	7 112 276	103,6	PUU23	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
36	403 379	7 109 327	115,0	PUU24	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
37	403 790	7 110 129	108,4	PUU25	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
38	404 210	7 111 152	105,6	PUU26	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
39	404 739	7 112 199	105,0	PUU27	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
40	405 100	7 112 943	100,4	PUU28	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
41	404 061	7 109 351	110,0	PUU29	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
42	404 420	7 110 174	107,1	PUU30	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
43	404 900	7 111 381	105,1	PUU31	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
44	405 395	7 112 030	102,4	PUU32	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
45	405 740	7 112 891	100,2	PUU33	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
46	405 042	7 110 380	105,8	PUU34	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
47	405 532	7 111 130	103,9	PUU35	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
48	406 114	7 112 133	103,1	PUU36	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
49	406 380	7 113 067	107,2	PUU37	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
50	405 707	7 108 791	110,8	PUU38	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
51	405 822	7 109 587	108,8	PUU39	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
52	405 893	7 110 455	104,9	PUU40	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
53	406 257	7 111 298	103,9	PUU41	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
54	406 558	7 109 872	106,6	PUU42	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
55	406 638	7 110 744	105,9	PUU43	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
56	407 324	7 109 954	108,4	PUU44	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
57	407 269	7 110 957	112,6	PUU45	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
58	407 963	7 109 542	113,6	PUU46	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
59	407 809	7 110 582	116,1	PUU47	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
60	408 414	7 110 457	120,0	PUU48	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
61	408 786	7 109 772	117,5	PUU49	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
A	Laskentapiste A (Metsästysmaja)	402 212	7 109 691	112,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Laskentapiste B (Ylivieskantie, Pohlola)	403 894	7 109 182	114,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Laskentapiste C (Perkkiontie 382)	404 620	7 108 247	113,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Asuinrakennus D (Alakylantie 243)	408 659	7 108 752	119,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Lomarakennus E (Kellokankaan metsatie)	410 199	7 110 115	122,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus F (Ollilantie 112)	405 573	7 114 900	87,7	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Lomarakennus G (Ollilantie, Siliakuru)	404 837	7 114 441	100,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus H (Pinolantie 406)	396 893	7 111 098	88,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Asuinrakennus I (Kortenevantie 116)	396 670	7 109 704	87,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Asuinrakennus J (Haapavesitie 1406)	397 273	7 108 116	89,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Lomarakennus K (Kurunoja)	400 152	7 107 685	102,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Muu käyttöt. L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus M (Riskalan metsatie)	406 348	7 114 887	102,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Laskentapiste A (Metsästysmaja)	133:58
B	Autiotalo B (Ylivieskantie, Pohlola)	73:24
C	Autiotalo C (Perkkiontie 382)	30:25
D	Asuinrakennus D (Alakylantie 243)	12:35
E	Lomarakennus E (Kellokankaan metsatie)	6:19
F	Asuinrakennus F (Ollilantie 112)	7:04

To be continued on next page...

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

...continued from previous page

No.	Name	Shadow, expected values	
		Shadow hours	per year [h/year]
G	Lomarakennus G (Ollilantie, Siliakuru)		12:50
H	Asuinrakennus H (Pinolantie 406)		4:31
I	Asuinrakennus I (Kortenevantie 116)		1:25
J	Asuinrakennus J (Haapavesitie 1406)		0:00
K	Lomarakennus K (Kurunoja)		0:00
L	Muu käyttö. L (Perkkiontie, Ilmola)		26:00
M	Lomarakennus M (Riskalan metsatie)		6:35

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (235)	0:00	0:00
2	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (236)	0:00	0:00
3	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (237)	0:00	0:00
4	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (238)	0:00	0:00
5	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (239)	0:00	0:00
6	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (240)	0:00	0:00
7	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (241)	0:00	0:00
8	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (242)	0:00	0:00
9	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (243)	6:12	1:25
10	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (244)	0:00	0:00
11	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (245)	0:00	0:00
12	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (246)	0:00	0:00
13	PUU01	10:56	2:46
14	PUU02	7:53	1:45
15	PUU03	0:00	0:00
16	PUU04	0:00	0:00
17	PUU05	0:00	0:00
18	PUU06	0:00	0:00
19	PUU07	0:00	0:00
20	PUU08	6:53	1:25
21	PUU09	11:16	2:30
22	PUU10	28:43	7:58
23	PUU11	0:00	0:00
24	PUU12	12:12	2:21
25	PUU13	26:46	5:55
26	PUU14	0:00	0:00
27	PUU15	18:40	3:52
28	PUU16	142:02	35:00
29	PUU17	12:46	3:26
30	PUU18	0:00	0:00
31	PUU19	120:47	26:39
32	PUU20	211:50	54:50
33	PUU21	33:58	9:10
34	PUU22	8:46	2:29
35	PUU23	12:30	1:42
36	PUU24	207:49	53:17
37	PUU25	17:24	3:46
38	PUU26	0:00	0:00
39	PUU27	16:09	2:14
40	PUU28	51:28	7:44
41	PUU29	10:25	2:04
42	PUU30	7:27	1:35
43	PUU31	0:00	0:00
44	PUU32	0:00	0:00
45	PUU33	48:23	7:26
46	PUU34	17:45	4:50
47	PUU35	0:00	0:00
48	PUU36	0:00	0:00
49	PUU37	44:36	7:21
50	PUU38	90:20	23:11
51	PUU39	25:07	6:22
52	PUU40	10:01	2:32

To be continued on next page...

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
53	PUU41	0:00	0:00
54	PUU42	7:32	1:49
55	PUU43	0:00	0:00
56	PUU44	31:06	8:38
57	PUU45	0:00	0:00
58	PUU46	14:10	3:36
59	PUU47	5:45	1:16
60	PUU48	12:19	2:43
61	PUU49	17:11	3:18

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

SHADOW - Calendar

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_2020110\$Shadow receptor: A - Laskentapistä A (Metsästysmaja)
Assumptions for shadow calculations
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June					
1	10.13	09.04	07.31	10.17 (31)	06.42	08.01 (41)	04.57	06.13 (37)	03.19	04.41 (33)	
	14.35	16.06	17.36	103 16.09 (27)	20.09	55 19.14 (20)	21.41	203 20.20 (21)	23.20	171 21.58 (22)	
2	10.12	09.00	07.28	10.17 (31)	06.39	08.22 (36)	04.53	06.13 (37)	03.16	04.40 (33)	
	14.37	16.09	17.39	102 16.08 (27)	20.12	42 19.13 (20)	21.45	198 20.18 (21)	23.23	171 21.58 (22)	
3	10.10	08.57	07.25	10.16 (31)	06.35	08.22 (36)	04.50	06.14 (37)	03.14	04.40 (33)	
	14.39	16.12	17.42	99 16.06 (27)	20.15	36 19.10 (20)	21.48	186 20.04 (25)	23.25	170 21.59 (22)	
4	10.09	08.54	07.21	10.16 (31)	06.32	08.25 (36)	04.46	06.15 (37)	03.12	04.13 (34)	
	14.42	16.16	17.45	97 16.05 (27)	20.18	23 19.07 (20)	21.51	184 20.03 (25)	23.28	169 21.58 (22)	
5	10.08	08.51	07.18	10.15 (31)	06.28	08.27 (36)	04.43	06.16 (37)	03.09	04.12 (34)	
	14.44	16.19	17.48	95 16.03 (27)	20.21	13 08.40 (36)	21.54	181 20.01 (25)	23.31	172 21.59 (22)	
6	10.07	08.48	07.14	10.15 (31)	06.24	04.39		06.17 (37)	03.07	04.10 (34)	
	14.46	16.22	17.51	87 15.59 (27)	20.24	21.57	178 20.00 (25)	23.33	171 21.58 (22)		
7	10.05	08.45	07.11	10.15 (31)	06.21	04.36		06.19 (37)	03.05	04.09 (34)	
	14.49	16.26	17.55	76 11.31 (31)	20.27	22.01	171 19.58 (25)	23.35	171 21.59 (22)		
8	10.03	08.42	07.07	10.14 (31)	06.17	04.33		06.23 (37)	03.03	04.08 (34)	
	14.51	16.29	17.58	85 17.21 (24)	20.30	22.04	157 19.55 (25)	23.38	173 21.59 (22)		
9	10.02	08.39	07.04	10.14 (31)	06.14	19.02 (28)	04.29	06.37 (32)	03.01	04.07 (34)	
	14.54	16.32	18.01	91 17.24 (24)	20.33	9 19.11 (28)	22.07	144 19.50 (25)	23.40	172 21.59 (22)	
10	10.00	08.35	10.48 (31)	07.00	10.15 (31)	06.10	18.56 (28)	04.26	06.36 (32)	02.57	04.06 (34)
	14.56	16.35	15 11.03 (31)	18.04	95 17.28 (24)	20.36	22 19.18 (28)	22.10	142 19.38 (28)	23.42	171 21.59 (22)
11	09.58	08.32	10.43 (31)	06.57	10.14 (31)	06.07	06.40 (42)	04.23	06.36 (32)	02.56	04.05 (34)
	14.59	16.39	25 11.08 (31)	18.07	98 17.29 (24)	20.39	34 19.22 (28)	22.14	141 19.37 (28)	23.44	171 21.59 (22)
12	09.56	08.29	10.40 (31)	06.53	10.15 (31)	06.03	06.36 (42)	04.19	06.36 (32)	02.54	04.04 (34)
	15.02	16.42	32 11.12 (31)	18.10	98 17.30 (24)	20.42	56 19.58 (25)	22.17	141 19.38 (28)	23.46	172 21.59 (22)
13	09.54	08.26	10.37 (31)	06.50	07.37 (36)	06.00	06.33 (42)	04.16	06.36 (32)	02.53	04.04 (34)
	15.05	16.45	37 11.14 (31)	18.13	108 17.30 (24)	20.45	73 20.02 (25)	22.20	140 19.37 (28)	23.48	170 22.00 (22)
14	09.52	08.22	10.34 (31)	06.46	07.32 (36)	05.56	06.29 (42)	04.13	06.36 (32)	02.52	04.03 (34)
	15.08	16.49	54 16.01 (27)	18.16	118 17.30 (24)	20.48	85 20.03 (25)	22.23	139 19.36 (28)	23.49	169 21.59 (22)
15	09.49	08.19	10.32 (31)	06.43	07.30 (36)	05.53	06.27 (42)	04.10	06.36 (32)	02.51	04.03 (34)
	15.11	16.52	64 16.04 (27)	18.19	121 17.30 (24)	20.51	96 20.13 (21)	22.27	139 19.37 (28)	23.51	170 22.00 (22)
16	09.47	08.16	10.31 (31)	06.39	07.27 (36)	05.49	06.25 (37)	04.06	06.36 (32)	02.50	04.02 (34)
	15.14	16.55	71 16.07 (27)	18.22	124 17.30 (24)	20.54	123 20.16 (21)	22.30	138 19.36 (28)	23.52	168 21.59 (22)
17	09.45	08.12	10.29 (31)	06.35	07.07 (41)	05.45	06.20 (37)	04.03	06.37 (32)	02.50	04.02 (34)
	15.17	16.58	78 16.08 (27)	18.25	132 17.29 (24)	20.57	147 20.18 (21)	22.33	140 21.42 (22)	23.53	170 22.00 (22)
18	09.42	08.09	10.27 (31)	06.32	07.04 (41)	05.42	06.18 (37)	04.00	06.36 (32)	02.49	04.02 (34)
	15.20	17.01	82 16.08 (27)	18.28	138 17.29 (24)	21.00	161 20.21 (21)	22.36	143 21.44 (22)	23.54	169 22.00 (22)
19	09.40	08.06	10.27 (31)	06.28	07.00 (41)	05.38	06.17 (37)	03.57	04.53 (33)	02.49	04.03 (34)
	15.23	17.05	87 16.10 (27)	18.30	142 17.28 (24)	21.03	175 20.25 (21)	22.40	152 21.47 (22)	23.55	169 22.00 (22)
20	09.37	08.02	10.25 (31)	06.25	06.59 (41)	05.35	06.15 (37)	03.54	04.49 (33)	02.49	04.03 (34)
	15.26	17.08	90 16.10 (27)	18.33	141 17.27 (24)	21.07	181 20.25 (21)	22.43	161 21.49 (22)	23.55	169 22.01 (22)
21	09.35	07.59	10.24 (31)	06.21	06.57 (41)	05.31	06.14 (37)	03.50	04.47 (33)	02.49	04.03 (34)
	15.29	17.11	94 16.11 (27)	18.36	140 17.25 (24)	21.10	187 20.26 (21)	22.46	167 21.51 (22)	23.55	168 22.01 (22)
22	09.32	07.55	10.22 (31)	06.18	06.57 (41)	05.28	06.13 (37)	03.47	04.46 (33)	02.49	04.03 (34)
	15.33	17.14	97 16.11 (27)	18.39	136 18.05 (20)	21.13	192 20.26 (21)	22.49	170 21.54 (22)	23.56	169 22.01 (22)
23	09.29	07.52	10.22 (31)	06.14	06.56 (41)	05.24	06.13 (37)	03.44	04.44 (33)	02.50	04.04 (34)
	15.36	17.17	98 16.11 (27)	18.42	136 18.07 (20)	21.16	193 20.26 (21)	22.53	173 21.54 (22)	23.56	169 22.02 (22)
24	09.27	07.49	10.21 (31)	06.11	06.55 (41)	05.21	06.12 (37)	03.41	04.44 (33)	02.50	04.03 (34)
	15.39	17.21	101 16.11 (27)	18.45	131 18.10 (20)	21.19	196 20.25 (21)	22.56	173 21.55 (22)	23.55	169 22.01 (22)
25	09.24	07.45	10.19 (31)	06.07	06.55 (41)	05.17	06.11 (37)	03.38	04.43 (33)	02.51	04.04 (34)
	15.42	17.24	103 16.11 (27)	18.48	121 18.13 (20)	21.22	201 20.25 (21)	22.59	175 21.56 (22)	23.55	169 22.02 (22)
26	09.21	07.42	10.19 (31)	06.04	06.55 (41)	05.14	06.11 (37)	03.35	04.42 (33)	02.52	04.04 (34)
	15.46	17.27	103 16.11 (27)	18.51	119 18.16 (20)	21.25	203 20.25 (21)	23.02	175 21.56 (22)	23.55	170 22.02 (22)
27	09.18	07.38	10.18 (31)	06.00	06.55 (41)	05.10	06.11 (37)	03.33	04.42 (33)	02.53	04.05 (34)
	15.49	17.30	104 16.10 (27)	18.54	115 18.18 (20)	21.29	204 20.24 (21)	23.05	175 21.57 (22)	23.54	170 22.02 (22)
28	09.15	07.35	10.17 (31)	05.56	06.55 (41)	05.07	06.11 (37)	03.30	04.41 (33)	02.55	04.06 (34)
	15.52	17.33	104 16.09 (27)	18.57	102 18.17 (20)	21.32	206 20.24 (21)	23.08	174 21.57 (22)	23.53	171 22.03 (22)
29	09.12			06.53	07.56 (41)	05.03	06.12 (37)	03.27	04.41 (33)	02.56	04.07 (34)
	15.56			20.00	78 19.17 (20)	21.35	205 20.23 (21)	23.11	175 21.57 (22)	23.52	171 22.03 (22)
30	09.10			06.49	07.57 (41)	05.00	06.12 (37)	03.24	04.40 (33)	02.58	04.08 (34)
	15.59			20.03	72 19.16 (20)	21.38	206 20.22 (21)	23.14	173 21.57 (22)	23.51	171 22.03 (22)
31	09.07			06.46	07.59 (41)			03.22	04.40 (33)		
	16.02			20.06	66 19.16 (20)			23.17	172 21.57 (22)		
Potential sun hours	171	238	363		451		570		624		
Total, worst case				3366		3324		5080		5105	
Sun reduction		1439		0.32		0.41		0.47		0.48	
Oper. time red.		0.99		0.99		0.99		0.99		0.99	
Wind dir. red.		0.65		0.64		0.61		0.62		0.62	
Total reduction		0.22		0.20		0.25		0.29		0.29	
Total, real		311		690		824		1457		1498	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201105 Shadow receptor: A - Laskentapistä A (Metsästysmaja)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December				
1	02.59	04.09 (34)	04.24	06.46 (32)	06.00	06.39 (42)	07.26	10.53 (31)	08.00		10.19 (31)	09.35			
	23.49	170	22.03 (22)	22.27	141	19.48 (28)	20.40	34	19.21 (28)	18.53	18.09 (24)	16.07	12	10.31 (31)	14.43
2	03.01	04.10 (34)	04.28	06.47 (32)	06.03	18.54 (28)	07.29	10.53 (31)	08.04						09.38
	23.48	171	22.03 (22)	22.24	141	19.48 (28)	20.36	22	19.16 (28)	18.49	18.08 (24)	16.04			14.41
3	03.01	04.12 (34)	04.31	06.46 (32)	06.06	19.00 (28)	07.32	10.52 (31)	08.07						09.41
	23.46	171	22.04 (22)	22.20	142	19.48 (28)	20.32	9	19.09 (28)	18.46	18.06 (24)	16.00			14.39
4	03.03	04.13 (34)	04.34	06.47 (32)	06.09										09.44
	23.45	171	22.04 (22)	22.17	150	20.03 (25)	20.29								14.37
5	03.05	04.14 (34)	04.37	06.31 (37)	06.12										09.46
	23.43	172	22.04 (22)	22.14	163	20.06 (25)	20.25								14.35
6	03.08	04.16 (34)	04.40	06.28 (37)	06.15										09.49
	23.41	171	22.05 (22)	22.10	174	20.08 (25)	20.22								14.33
7	03.10	04.18 (34)	04.44	06.26 (37)	06.18										09.51
	23.39	171	22.05 (22)	22.07	179	20.09 (25)	20.18	13	08.22 (36)	07.44	16.33 (27)	15.48			14.32
8	03.12	04.19 (34)	04.47	06.24 (37)	06.20										09.54
	23.37	170	22.05 (22)	22.03	183	20.11 (25)	20.15	21	19.00 (20)	18.28	16.37 (27)	15.45			14.30
9	03.15	04.21 (34)	04.50	06.23 (37)	06.23										09.56
	23.34	169	22.05 (22)	22.00	186	20.12 (25)	20.11	35	19.04 (20)	18.25	16.39 (27)	15.41			14.29
10	03.18	04.48 (33)	04.53	06.22 (37)	06.26										09.58
	23.32	169	22.06 (22)	21.57	192	20.23 (21)	20.08	42	19.05 (20)	18.21	16.40 (27)	15.38			14.28
11	03.20	04.48 (33)	04.56	06.21 (37)	06.29										10.00
	23.29	171	22.06 (22)	21.53	201	20.27 (21)	20.04	53	19.06 (20)	18.18	16.41 (27)	15.35			14.27
12	03.23	04.49 (33)	04.59	06.21 (37)	06.32										10.02
	23.27	172	22.06 (22)	21.50	205	20.29 (21)	20.00	65	19.07 (20)	18.14	16.42 (27)	15.32			14.26
13	03.26	04.49 (33)	05.02	06.20 (37)	06.35										10.04
	23.24	173	22.06 (22)	21.46	205	20.30 (21)	19.57	71	19.07 (20)	18.11	16.42 (27)	15.29			14.25
14	03.29	04.50 (33)	05.06	06.19 (37)	06.38										10.06
	23.22	174	22.06 (22)	21.43	206	20.30 (21)	19.53	77	19.08 (20)	18.08	16.43 (27)	15.26			14.24
15	03.31	04.50 (33)	05.09	06.19 (37)	06.41										10.07
	23.19	175	22.06 (22)	21.39	205	20.31 (21)	19.50	99	19.07 (20)	18.04	16.43 (27)	15.23			14.23
16	03.34	04.51 (33)	05.12	06.19 (37)	06.43										10.09
	23.16	174	22.06 (22)	21.36	203	20.32 (21)	19.46	113	19.06 (20)	18.01	16.43 (27)	15.20			14.23
17	03.37	04.51 (33)	05.15	06.18 (37)	06.46										10.10
	23.13	176	22.06 (22)	21.32	201	20.31 (21)	19.43	119	19.05 (20)	17.57	16.42 (27)	15.18			14.22
18	03.40	04.52 (33)	05.18	06.18 (37)	06.49										10.11
	23.11	174	22.05 (22)	21.29	200	20.32 (21)	19.39	121	19.02 (20)	17.54	16.43 (27)	15.15			14.22
19	03.43	04.53 (33)	05.21	06.18 (37)	06.52										10.12
	23.08	175	22.06 (22)	21.25	196	20.32 (21)	19.36	127	18.58 (20)	17.50	16.42 (27)	15.12			14.22
20	03.46	04.54 (33)	05.24	06.18 (37)	06.55										10.13
	23.05	173	22.05 (22)	21.22	194	20.32 (21)	19.32	135	18.54 (20)	17.47	16.41 (27)	15.09			14.22
21	03.50	04.55 (33)	05.27	06.18 (37)	06.58										10.14
	23.02	172	22.04 (22)	21.18	191	20.31 (21)	19.28	137	18.50 (20)	17.43	16.41 (27)	15.07			14.23
22	03.53	04.57 (33)	05.30	06.19 (37)	07.01										10.14
	22.59	168	22.03 (22)	21.15	185	20.30 (21)	19.25	139	18.10 (24)	17.40	16.40 (27)	15.04			14.23
23	03.56	04.58 (33)	05.33	06.20 (37)	07.03										10.15
	22.56	164	22.00 (22)	21.11	180	20.30 (21)	19.21	141	18.11 (24)	17.37	16.40 (27)	15.01			14.24
24	03.59	05.01 (33)	05.36	06.21 (37)	07.06										10.15
	22.53	157	21.58 (22)	21.08	172	20.28 (21)	19.18	141	18.11 (24)	17.33	16.38 (27)	14.59			14.24
25	04.02	06.47 (32)	05.39	06.21 (37)	07.09										10.15
	22.49	145	21.55 (22)	21.04	160	20.24 (21)	19.14	139	18.12 (24)	16.30	15.37 (27)	14.56			14.25
26	04.05	06.47 (32)	05.42	06.23 (37)	07.12										10.15
	22.46	142	21.53 (22)	21.01	144	20.21 (21)	19.11	134	18.12 (24)	16.27	15.35 (27)	14.54			14.26
27	04.08	06.47 (32)	05.45	06.27 (37)	07.15										10.15
	22.43	137	21.50 (22)	20.57	121	20.18 (21)	19.07	124	18.11 (24)	16.23	15.33 (27)	14.51			14.27
28	04.12	06.47 (32)	05.48	06.29 (42)	07.18										10.15
	22.40	138	19.47 (28)	20.54	94	20.15 (21)	19.04	123	18.11 (24)	16.20	15.30 (27)	14.49			14.28
29	04.15	06.46 (32)	05.51	06.30 (42)	07.21										10.15
	22.37	139	19.47 (28)	20.50	84	20.04 (25)	19.00	119	18.10 (24)	16.17	15.30 (27)	14.47			14.30
30	04.18	06.47 (32)	05.54	06.33 (42)	07.24										10.14
	22.33	140	19.48 (28)	20.47	70	20.01 (25)	18.57	114	18.10 (24)	16.13	15.30 (27)	14.45			14.31
31	04.21	06.47 (32)	05.57	06.36 (42)											10.14
	22.30	140	19.48 (28)	20.43	56	19.58 (25)									14.33
Potential sun hours	609		508		393										137
Total, worst case	5084		5124		2467										
Sun reduction	0,38		0,31		0,33										0,24
Oper. time red.	0,99		0,99		0,99										0,99
Wind dir. red.	0,62		0,61		0,63										0,67
Total reduction	0,23		0,19		0,21										0,16
Total, real	1178		974		509										2

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152_5_no forest_20201105 Shadow receptor: B - Laskentapist B (Ylivieskantie, Pohlola)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12 14.35	09.03 16.06	07.31 17.36	06.42 20.09	18.43 (31) 19.15 (31)	04.56 21.41
2	10.11 14.37	09.00 16.09	07.28 17.39	06.39 20.12	18.42 (31) 19.14 (31)	04.53 21.44
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	18.42 (31) 19.15 (31)	04.50 21.48
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	18.41 (31) 19.14 (31)	04.46 21.51
5	10.08 14.44	08.51 16.19	07.17 17.48	06.28 20.21	18.42 (31) 19.14 (31)	04.43 21.54
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	18.42 (31) 19.14 (31)	04.39 21.57
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	18.42 (31) 19.13 (31)	04.36 22.00
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	18.42 (31) 19.12 (31)	04.33 22.04
9	10.01 14.54	08.38 16.32	07.03 18.00	06.14 20.33	18.42 (31) 19.56 (28)	04.29 22.07
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	18.43 (31) 19.59 (28)	04.26 22.10
11	09.58 14.59	08.32 16.39	06.56 18.06	06.07 20.39	06.39 (51) 20.01 (28)	04.23 22.14
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42	06.36 (51) 20.06 (28)	04.19 22.17
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45	06.33 (51) 20.07 (28)	04.16 22.20
14	09.51 15.08	08.22 16.48	06.46 18.15	05.56 20.48	06.30 (51) 20.06 (28)	04.13 22.23
15	09.49 15.11	08.19 16.52	06.42 18.18	05.52 20.51	06.29 (51) 20.06 (28)	04.09 22.27
16	09.47 15.14	08.15 16.55	06.39 18.21	05.49 20.54	06.28 (51) 20.05 (28)	04.06 22.30
17	09.45 15.17	08.12 16.58	06.35 18.24	05.45 20.57	06.27 (51) 20.04 (28)	04.03 22.33
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	06.27 (51) 20.03 (28)	04.00 22.36
19	09.40 15.23	08.05 17.05	06.28 18.30	05.38 21.03	06.27 (51) 20.01 (28)	03.57 22.40
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	06.27 (51) 19.58 (28)	03.53 22.43
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	06.27 (51) 06.50 (51)	03.50 22.46
22	09.32 15.33	07.55 17.14	06.18 18.39	05.28 21.13	06.28 (51) 06.50 (51)	03.47 22.49
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	06.28 (51) 06.49 (51)	03.44 22.52
24	09.27 15.39	07.49 17.20	06.11 18.45	05.21 21.19	06.28 (51) 06.47 (51)	03.41 22.55
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	06.30 (51) 06.45 (51)	03.38 22.59
26	09.21 15.46	07.42 17.27	06.03 18.51	05.14 21.25	06.31 (51) 06.43 (51)	03.35 23.02
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	06.35 (51) 06.40 (51)	03.32 23.05
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	19.21 (36) 19.39 (36)	03.30 23.08
29	09.12 15.56		06.53 20.00	05.03 21.35	19.16 (36) 19.44 (36)	03.27 23.11
30	09.09 15.59		06.49 20.03	05.00 21.38	19.12 (36) 19.47 (36)	03.24 23.14
31	09.06 16.02		06.46 20.06	05.00 21.38		03.21 23.17
Potential sun hours	171	238	363	451	570	624
Total, worst case			481	957	3965	4599
Sun reduction			0,32	0,41	0,47	0,48
Oper. time red.			0,99	0,99	0,99	0,99
Wind dir. red.			0,62	0,61	0,62	0,62
Total reduction			0,20	0,25	0,29	0,29
Total, real			95	236	1145	1345

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201105 Shadow receptor: B - Laskentapiste B (Ylivieskantie, Pohlola)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 23.49	04.19 (46) 22.27	04.24 21.37 (29)	05.17 (52) 20.39	06.00 20.01 (28)	07.26 18.53
2	03.01 23.48	04.19 (46) 22.23	04.28 21.13 (32)	05.17 (52) 20.36	06.03 19.57 (28)	07.29 18.49
3	03.01 23.46	04.19 (46) 22.20	04.31 21.12 (32)	05.19 (52) 20.32	06.06 18.40 (31)	07.32 18.46
4	03.03 23.44	04.20 (46) 22.17	04.34 21.11 (32)	05.22 (52) 20.29	06.09 18.39 (31)	07.35 18.42
5	03.05 23.43	04.20 (46) 22.13	04.37 21.10 (32)	05.25 (52) 20.25	06.12 19.10 (31)	07.38 18.39
6	03.08 23.41	04.21 (46) 22.10	04.40 21.08 (32)	05.27 (52) 20.22	06.15 19.09 (31)	07.41 18.35
7	03.10 23.38	04.21 (46) 22.07	04.43 21.06 (32)	05.30 (52) 20.18	06.17 19.09 (31)	07.44 18.32
8	03.12 23.36	04.22 (46) 22.03	04.47 21.03 (32)	06.20 20.15	06.20 19.09 (31)	07.47 18.28
9	03.15 23.34	04.23 (46) 22.00	04.50 21.00 (32)	06.23 20.11	06.23 19.09 (31)	07.50 18.25
10	03.17 23.32	04.24 (46) 21.56	04.53 20.01 (36)	06.26 20.07	06.26 19.08 (31)	07.53 18.21
11	03.20 23.29	04.24 (46) 21.53	04.56 19.59 (36)	06.29 20.04	06.29 19.07 (31)	07.56 18.18
12	03.23 23.27	04.26 (46) 21.50	04.59 19.18 (36)	06.32 19.57 (36)	06.32 20.00	07.59 18.14
13	03.26 23.24	04.28 (46) 21.46	05.02 19.20 (36)	06.35 19.57 (36)	06.35 19.06 (31)	08.02 18.11
14	03.29 23.22	04.31 (46) 21.48	05.05 21.48 (29)	06.38 19.50 (36)	06.38 19.04 (31)	08.05 18.07
15	03.31 23.19	18.55 (36) 21.49	05.09 21.39	06.40 19.45 (36)	06.40 19.50	08.08 18.04
16	03.34 23.16	18.55 (36) 21.49	05.12 21.36	06.41 (51) 19.46	06.43 19.01 (31)	08.11 18.00
17	03.37 23.13	18.56 (36) 21.49	05.15 21.32	06.37 (51) 19.43	06.46 18.59 (31)	08.14 17.57
18	03.40 23.10	18.56 (36) 21.29	05.18 16.62 (51)	06.49 19.39	06.49 18.56 (31)	08.17 17.54
19	03.43 23.07	05.25 (52) 21.51	05.21 21.25	06.35 (51) 19.35	06.52 18.49 (31)	08.20 17.50
20	03.46 23.05	05.22 (52) 21.51	05.24 21.22	06.34 (51) 19.32	06.55 08.13 (50)	08.23 17.47
21	03.49 23.02	05.21 (52) 21.51	05.27 21.18	06.32 (51) 19.28	06.58 08.13 (50)	08.26 17.43
22	03.53 22.59	05.20 (52) 21.51	05.30 21.15	06.31 (51) 19.25	07.00 08.12 (50)	08.29 17.40
23	03.56 22.55	05.19 (52) 21.51	05.33 21.11	06.31 (51) 20.03 (28)	07.03 19.21	08.32 17.37
24	03.59 22.52	05.18 (52) 21.51	05.36 21.08	06.31 (51) 20.05 (28)	07.06 19.18	08.35 17.33
25	04.02 22.49	05.18 (52) 21.51	05.39 21.04	06.30 (51) 20.05 (28)	07.09 19.14	07.38 16.30
26	04.05 22.46	05.17 (52) 21.51	05.42 21.01	06.30 (51) 20.06 (28)	07.12 19.11	07.41 16.27
27	04.08 22.43	05.17 (52) 21.50	05.45 20.57	06.30 (51) 20.07 (28)	07.15 19.07	07.44 16.23
28	04.12 22.40	05.17 (52) 21.48	05.48 20.54	06.31 (51) 20.07 (28)	07.18 19.03	07.48 16.20
29	04.15 22.37	05.17 (52) 21.45	05.51 20.50	06.30 (51) 20.06 (28)	07.21 19.00	07.51 16.17
30	04.18 22.33	05.17 (52) 21.43	05.54 20.47	06.33 (51) 20.06 (28)	07.23 18.56	07.54 16.13
31	04.21 22.30	05.16 (52) 21.40	05.57 20.43	06.36 (51) 20.04 (28)	07.27	07.57 16.10
Potential sun hours	608	508	393	305	198	137
Total, worst case	4755	1596	865			
Sun reduction	0,38	0,31	0,33			
Oper. time red.	0,99	0,99	0,99			
Wind dir. red.	0,62	0,61	0,62			
Total reduction	0,23	0,19	0,20			
Total, real	1106	303	174			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 Shadow receptor: C - Laskentapiste C (Perkkiontie 382)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	20.16 (31) 03.19 04.18 (51)
	14.35	16.06	17.36	20.09	21.41	15 20.31 (31) 23.19 69 21.47 (36)
2	10.11	09.00	07.28	06.38	04.53	20.18 (31) 03.16 04.16 (51)
	14.37	16.09	17.39	20.12	21.44	11 20.29 (31) 23.22 74 21.47 (36)
3	10.10	08.57	07.24	06.35	04.50	05.42 (50) 03.14 04.14 (51)
	14.39	16.12	17.42	20.15	21.47	17 20.26 (31) 23.25 77 21.47 (36)
4	10.09	08.54	07.21	06.31	04.46	05.39 (50) 03.12 04.13 (51)
	14.42	16.15	17.45	20.18	21.51	17 05.56 (50) 23.28 79 21.48 (36)
5	10.08	08.51	07.17	06.28	04.43	05.36 (50) 03.09 04.12 (51)
	14.44	16.19	17.48	20.21	21.54	22 05.58 (50) 23.30 81 21.48 (36)
6	10.06	08.48	07.14	06.24	04.39	05.34 (50) 03.07 04.10 (51)
	14.46	16.22	17.51	20.24	21.57	26 06.00 (50) 23.33 82 21.48 (36)
7	10.05	08.45	07.10	06.21	04.36	05.34 (50) 03.05 04.09 (51)
	14.49	16.25	17.54	20.27	22.00	28 06.02 (50) 23.35 84 21.48 (36)
8	10.03	08.41	07.07	06.17	04.33	05.32 (50) 03.03 04.09 (51)
	14.51	16.29	17.57	20.30	22.04	31 06.03 (50) 23.37 84 21.48 (36)
9	10.01	08.38	07.03	06.14	04.29	05.31 (50) 03.01 04.09 (51)
	14.54	16.32	18.00	20.33	22.07	32 06.03 (50) 23.40 84 21.48 (36)
10	09.59	08.35	07.00	06.10	04.26	05.30 (50) 02.58 04.09 (51)
	14.56	16.35	18.03	20.36	22.10	34 06.04 (50) 23.42 84 21.49 (36)
11	09.58	08.32	06.56	06.07	04.23	05.29 (50) 02.56 04.08 (51)
	14.59	16.39	18.06	20.39	22.13	35 06.04 (50) 23.44 85 21.48 (36)
12	09.56	08.29	06.53	06.03	04.19	05.29 (50) 02.55 04.08 (51)
	15.02	16.42	18.09	20.42	22.17	37 06.06 (50) 23.45 85 21.48 (36)
13	09.53	08.25	06.49	05.59	04.16	05.28 (50) 02.53 04.09 (51)
	15.05	16.45	18.12	20.45	22.20	38 06.06 (50) 23.47 85 21.49 (36)
14	09.51	08.22	06.46	05.56	04.13	05.28 (50) 02.52 04.08 (51)
	15.08	16.48	18.15	20.48	22.23	42 21.33 (32) 23.49 85 21.49 (36)
15	09.49	08.19	06.42	05.52	04.09	05.28 (50) 02.51 04.09 (51)
	15.11	16.52	18.18	20.51	22.26	47 21.36 (32) 23.50 85 21.50 (36)
16	09.47	08.15	06.39	05.49	04.06	05.27 (50) 02.50 04.08 (51)
	15.14	16.55	18.21	20.54	22.30	53 21.38 (32) 23.51 84 21.49 (36)
17	09.44	08.12	06.35	05.45	04.03	05.26 (50) 02.50 04.09 (51)
	15.17	16.58	18.24	20.57	22.33	58 21.40 (32) 23.52 82 21.49 (36)
18	09.42	08.09	06.32	05.42	04.00	05.27 (50) 02.49 04.09 (51)
	15.20	17.01	18.27	21.00	22.36	62 21.44 (32) 23.53 84 21.50 (36)
19	09.40	08.05	06.28	05.38	20.21 (31) 03.57	05.26 (50) 02.49 04.09 (51)
	15.23	17.05	18.30	21.03	4 20.25 (31) 22.39	66 21.45 (32) 23.54 85 21.50 (36)
20	09.37	08.02	06.25	05.35	20.18 (31) 03.54	05.27 (50) 02.49 04.09 (51)
	15.26	17.08	18.33	21.06	9 20.27 (31) 22.43	67 21.46 (32) 23.55 83 21.50 (36)
21	09.34	07.59	06.21	05.31	20.17 (31) 03.50	05.27 (50) 02.49 04.09 (51)
	15.29	17.11	18.36	21.09	13 20.30 (31) 22.46	69 21.47 (32) 23.55 83 21.50 (36)
22	09.32	07.55	06.18	05.28	20.16 (31) 03.47	05.26 (50) 02.49 04.09 (51)
	15.33	17.14	18.39	21.13	17 20.33 (31) 22.49	69 21.46 (32) 23.55 83 21.50 (36)
23	09.29	07.52	06.14	05.24	20.16 (31) 03.44	05.27 (50) 02.50 04.10 (51)
	15.36	17.17	18.42	21.16	20 20.36 (31) 22.52	69 21.46 (32) 23.55 85 21.51 (36)
24	09.26	07.48	06.10	05.21	20.15 (31) 03.41	05.27 (50) 02.50 04.10 (51)
	15.39	17.20	18.45	21.19	20 20.35 (31) 22.55	71 21.47 (32) 23.55 84 21.51 (36)
25	09.24	07.45	06.07	05.17	20.14 (31) 03.38	05.27 (50) 02.51 04.11 (51)
	15.42	17.24	18.48	21.22	21 20.35 (31) 22.58	71 21.47 (32) 23.55 84 21.52 (36)
26	09.21	07.42	06.03	05.14	20.14 (31) 03.35	05.28 (50) 02.52 04.10 (51)
	15.46	17.27	18.51	21.25	21 20.35 (31) 23.02	70 21.47 (32) 23.54 85 21.51 (36)
27	09.18	07.38	06.00	05.10	20.15 (31) 03.33	05.28 (50) 02.53 04.11 (51)
	15.49	17.30	18.54	21.28	20 20.35 (31) 23.05	70 21.47 (32) 23.53 84 21.52 (36)
28	09.15	07.35	05.56	05.07	20.15 (31) 03.30	05.28 (50) 02.55 04.12 (51)
	15.52	17.33	18.57	21.31	19 20.34 (31) 23.08	70 21.47 (32) 23.52 83 21.52 (36)
29	09.12		06.53	05.03	20.15 (31) 03.27	05.28 (50) 02.56 04.12 (51)
	15.56		20.00	21.35	19 20.34 (31) 23.11	70 21.47 (32) 23.51 85 21.53 (36)
30	09.09		06.49	05.00	20.15 (31) 03.24	05.29 (50) 02.58 04.12 (51)
	15.59		20.03	21.38	17 20.32 (31) 23.14	69 21.47 (36) 23.50 85 21.53 (36)
31	09.06		06.46		03.22	05.29 (50)
	16.02		20.06		23.16	69 21.47 (36)
Potential sun hours	171	238	363	451	569	624
Total, worst case				200	1505	2482
Sun reduction				0,41	0,47	0,48
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,63	0,63	0,63
Total reduction				0,25	0,29	0,30
Total, real				51	438	736

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 Shadow receptor: C - Laskentapiste C (Perkkiontie 382)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December	
1	02.59	04.13 (51)	04.24	05.39 (50)	06.00	07.26	08.00	09.35				
	23.49	85 21.53 (36)	22.27	36 06.15 (50)	20.39	18.53	16.07	14.43				
2	03.01	04.13 (51)	04.28	05.40 (50)	06.03	07.29	08.03	09.38				
	23.47	85 21.53 (36)	22.23	35 06.15 (50)	20.36	18.49	16.03	14.41				
3	03.01	04.13 (51)	04.31	05.40 (50)	06.06	07.32	08.07	09.41				
	23.46	85 21.53 (36)	22.20	34 06.14 (50)	20.32	18.46	16.00	14.39				
4	03.03	04.14 (51)	04.34	05.41 (50)	06.09	07.35	08.10	09.43				
	23.44	85 21.54 (36)	22.17	32 06.13 (50)	20.29	18.42	15.57	14.37				
5	03.06	04.15 (51)	04.37	05.43 (50)	06.12	07.38	08.13	09.46				
	23.42	84 21.54 (36)	22.13	29 06.12 (50)	20.25	18.39	15.54	14.35				
6	03.08	04.16 (51)	04.40	05.43 (50)	06.14	07.41	08.16	09.48				
	23.40	83 21.54 (36)	22.10	27 06.10 (50)	20.22	18.35	15.51	14.33				
7	03.10	04.17 (51)	04.43	05.45 (50)	06.17	07.44	08.20	09.51				
	23.38	82 21.54 (36)	22.07	24 06.09 (50)	20.18	18.32	15.48	14.32				
8	03.12	04.19 (51)	04.47	05.47 (50)	06.20	07.47	08.23	09.53				
	23.36	81 21.54 (36)	22.03	21 06.08 (50)	20.14	18.28	15.44	14.30				
9	03.15	04.21 (51)	04.50	05.49 (50)	06.23	07.50	08.26	09.55				
	23.34	77 21.55 (36)	22.00	16 06.05 (50)	20.11	18.25	15.41	14.29				
10	03.18	04.23 (51)	04.53	05.52 (50)	06.26	07.53	08.29	09.58				
	23.31	75 21.55 (36)	21.56	17 20.37 (31)	20.07	18.21	15.38	14.28				
11	03.20	04.25 (51)	04.56	20.26 (31)	06.29	07.56	08.33	10.00				
	23.29	71 21.55 (36)	21.53	13 20.39 (31)	20.04	18.18	15.35	14.27				
12	03.23	05.38 (50)	04.59	20.25 (31)	06.32	07.58	08.36	10.02				
	23.27	68 21.55 (32)	21.49	15 20.40 (31)	20.00	18.14	15.32	14.26				
13	03.26	05.38 (50)	05.02	20.23 (31)	06.35	08.01	08.39	10.03				
	23.24	68 21.55 (32)	21.46	17 20.40 (31)	19.57	18.11	15.29	14.25				
14	03.29	05.37 (50)	05.05	20.23 (31)	06.38	08.04	08.42	10.05				
	23.21	70 21.55 (32)	21.43	18 20.41 (31)	19.53	18.07	15.26	14.24				
15	03.31	05.37 (50)	05.09	20.22 (31)	06.40	08.07	08.46	10.07				
	23.19	70 21.56 (32)	21.39	20 20.42 (31)	19.50	18.04	15.23	14.23				
16	03.34	05.37 (50)	05.12	20.22 (31)	06.43	08.10	08.49	10.08				
	23.16	70 21.56 (32)	21.36	20 20.42 (31)	19.46	18.00	15.20	14.23				
17	03.37	05.37 (50)	05.15	20.21 (31)	06.46	08.13	08.52	10.09				
	23.13	70 21.56 (32)	21.32	20 20.41 (31)	19.42	17.57	15.18	14.22				
18	03.40	05.37 (50)	05.18	20.21 (31)	06.49	08.17	08.55	10.11				
	23.10	70 21.56 (32)	21.29	20 20.41 (31)	19.39	17.54	15.15	14.22				
19	03.43	05.37 (50)	05.21	20.21 (31)	06.52	08.20	08.58	10.12				
	23.07	71 21.57 (32)	21.25	20 20.41 (31)	19.35	17.50	15.12	14.22				
20	03.46	05.37 (50)	05.24	20.21 (31)	06.55	08.23	09.02	10.13				
	23.04	71 21.57 (32)	21.22	20 20.41 (31)	19.32	17.47	15.09	14.22				
21	03.50	05.37 (50)	05.27	20.21 (31)	06.58	08.26	09.05	10.13				
	23.01	68 21.56 (32)	21.18	16 20.37 (31)	19.28	17.43	15.06	14.23				
22	03.53	05.37 (50)	05.30	20.22 (31)	07.00	08.29	09.08	10.14				
	22.58	69 21.57 (32)	21.15	12 20.34 (31)	19.25	17.40	15.04	14.23				
23	03.56	05.37 (50)	05.33	20.23 (31)	07.03	08.32	09.11	10.15				
	22.55	68 21.56 (32)	21.11	8 20.31 (31)	19.21	17.37	15.01	14.24				
24	03.59	05.37 (50)	05.36	20.25 (31)	07.06	08.35	09.14	10.15				
	22.52	67 21.57 (32)	21.08	3 20.28 (31)	19.18	17.33	14.59	14.24				
25	04.02	05.37 (50)	05.39	07.09	07.38	09.17	10.15					
	22.49	65 21.55 (32)	21.04	19.14	16.30	14.56	14.25					
26	04.05	05.38 (50)	05.42	07.12	07.41	09.20	10.15					
	22.46	60 21.53 (32)	21.01	19.10	16.26	14.54	14.26					
27	04.08	05.37 (50)	05.45	07.15	07.44	09.23	10.15					
	22.43	56 21.50 (32)	20.57	19.07	16.23	14.51	14.27					
28	04.12	05.38 (50)	05.48	07.18	07.47	09.26	10.15					
	22.40	51 21.48 (32)	20.54	19.03	16.20	14.49	14.28					
29	04.15	05.38 (50)	05.51	07.20	07.51	09.29	10.14					
	22.36	45 21.45 (32)	20.50	19.00	16.17	14.47	14.30					
30	04.18	05.39 (50)	05.54	07.23	07.54	09.32	10.14					
	22.33	41 21.43 (32)	20.46	18.56	16.13	14.45	14.31					
31	04.21	05.38 (50)	05.57	07.27	07.57	09.35	10.13					
	22.30	37 06.15 (50)	20.43	16.10	14.33	14.33	14.33					
Potential sun hours	608		508		393		305		198			137
Total, worst case	2148		493									
Sun reduction	0,38		0,31									
Oper. time red.	0,99		0,99									
Wind dir. red.	0,63		0,62									
Total reduction	0,24		0,19									
Total, real	505		95									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152_5_no forest_20201105 Shadow receptor: D - Asuinrakennus D (Alakylantie 243)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	20.35 (54)
	14.35	16.05	17.36	20.08	21.41	20
2	10.11	09.00	07.27	06.38	04.53	20.34 (54)
	14.37	16.08	17.39	20.11	21.44	21
3	10.10	08.57	07.24	06.35	04.49	20.34 (54)
	14.39	16.12	17.42	20.14	21.47	21
4	10.09	08.54	07.21	06.31	04.46	20.35 (54)
	14.41	16.15	17.45	20.17	21.50	19
5	10.07	08.51	07.17	06.27	04.42	20.35 (54)
	14.43	16.18	17.48	20.20	21.54	19
6	10.06	08.47	07.14	06.24	04.39	20.35 (54)
	14.46	16.22	17.51	20.23	21.57	18
7	10.04	08.44	07.10	06.20	04.36	20.36 (54)
	14.48	16.25	17.54	20.26	22.00	16
8	10.03	08.41	07.07	06.17	04.32	20.37 (54)
	14.51	16.28	17.57	20.29	22.03	14
9	10.01	08.38	07.03	06.13	04.29	20.39 (54)
	14.53	16.32	18.00	20.32	22.07	11
10	09.59	08.35	07.00	06.10	04.26	20.42 (54)
	14.56	16.35	18.03	20.35	22.10	5
11	09.57	08.31	06.56	06.06	04.22	20.47 (54)
	14.59	16.38	18.06	20.38	22.13	
12	09.55	08.28	06.53	06.03	04.19	
	15.02	16.42	18.09	20.42	22.16	
13	09.53	08.25	06.49	05.59	04.16	
	15.04	16.45	18.12	20.45	22.20	
14	09.51	08.22	06.46	05.56	04.12	
	15.07	16.48	18.15	20.48	22.23	
15	09.49	08.18	06.42	05.52	04.09	21.31 (56)
	15.10	16.51	18.18	20.51	22.26	4
16	09.47	08.15	06.38	05.48	04.06	21.29 (56)
	15.13	16.55	18.21	20.54	22.29	9
17	09.44	08.12	06.35	05.45	04.03	21.27 (56)
	15.16	16.58	18.24	20.57	22.33	14
18	09.42	08.08	06.31	05.41	03.59	21.27 (56)
	15.19	17.01	18.27	21.00	22.36	17
19	09.39	08.05	06.28	05.38	03.56	21.25 (56)
	15.23	17.04	18.30	21.03	22.39	21
20	09.37	08.02	06.24	05.34	03.53	21.25 (56)
	15.26	17.07	18.33	21.06	22.42	22
21	09.34	07.58	06.21	05.31	03.50	21.24 (56)
	15.29	17.11	18.36	21.09	22.46	23
22	09.32	07.55	06.17	05.27	03.47	21.24 (56)
	15.32	17.14	18.39	21.12	22.49	24
23	09.29	07.52	06.14	05.24	03.44	21.23 (56)
	15.35	17.17	18.42	21.15	22.52	26
24	09.26	07.48	06.10	05.20	03.41	21.23 (56)
	15.39	17.20	18.45	21.19	22.55	27
25	09.23	07.45	06.07	05.17	03.38	21.22 (56)
	15.42	17.23	18.48	21.22	22.58	27
26	09.21	07.41	06.03	05.13	03.35	21.22 (56)
	15.45	17.26	18.51	21.25	23.01	28
27	09.18	07.38	05.59	05.10	03.32	21.22 (56)
	15.49	17.29	18.54	21.28	23.04	28
28	09.15	07.34	05.56	05.06	03.29	21.22 (56)
	15.52	17.33	18.57	21.31	23.07	28
29	09.12		06.52	05.03	03.27	21.22 (56)
	15.55		20.00	21.34	23.10	28
30	09.09		06.49	05.00	03.24	21.23 (56)
	15.58		20.03	21.38	23.13	28
31	09.06		06.45		03.21	21.23 (56)
	16.02		20.06		23.16	28
Potential sun hours	171	238	363	451	570	624
Total, worst case				64	546	1168
Sun reduction				0,41	0,47	0,48
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,64	0,64	0,64
Total reduction				0,26	0,30	0,30
Total, real				17	162	355

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201105Shadow receptor: D - Asuinrakennus D (Alakylantie 243)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September	October	November	December
1	02.59	21.30 (56)	04.24		06.00	07.26	08.00	09.35
	23.49	41 22.11 (58)	22.26		20.39	18.52	16.06	14.42
2	03.01	21.30 (56)	04.27		06.02	07.29	08.03	09.38
	23.47	40 22.10 (58)	22.23		20.35	18.49	16.03	14.40
3	03.01	21.30 (56)	04.30		20.51 (54)	06.05	07.32	08.06
	23.46	38 22.09 (58)	22.20	7	20.58 (54)	20.32	18.45	16.00
4	03.03	21.30 (56)	04.34		20.49 (54)	06.08	07.35	08.10
	23.44	35 22.07 (58)	22.16	12	21.01 (54)	20.28	18.42	15.57
5	03.05	21.30 (56)	04.37		20.47 (54)	06.11	07.38	08.13
	23.42	27 21.57 (56)	22.13	14	21.01 (54)	20.25	18.38	15.53
6	03.07	21.30 (56)	04.40		20.46 (54)	06.14	07.40	08.16
	23.40	27 21.57 (56)	22.10	16	21.02 (54)	20.21	18.35	15.50
7	03.10	21.30 (56)	04.43		20.45 (54)	06.17	07.43	08.19
	23.38	28 21.58 (56)	22.06	18	21.03 (54)	20.18	18.31	15.47
8	03.12	21.31 (56)	04.46		20.44 (54)	06.20	07.46	08.22
	23.36	28 21.59 (56)	22.03	19	21.03 (54)	20.14	18.28	15.44
9	03.15	21.30 (56)	04.49		20.44 (54)	06.23	07.49	08.26
	23.34	28 21.58 (56)	21.59	19	21.03 (54)	20.11	18.24	15.41
10	03.17	21.30 (56)	04.53		20.44 (54)	06.26	07.52	08.29
	23.31	28 21.58 (56)	21.56	20	21.04 (54)	20.07	18.21	15.38
11	03.20	21.31 (56)	04.56		20.44 (54)	06.29	07.55	08.32
	23.29	28 21.59 (56)	21.53	20	21.04 (54)	20.03	18.17	15.35
12	03.23	21.31 (56)	04.59		20.43 (54)	06.31	07.58	08.35
	23.26	28 21.59 (56)	21.49	20	21.03 (54)	20.00	18.14	15.32
13	03.25	21.31 (56)	05.02		20.43 (54)	06.34	08.01	08.39
	23.24	28 21.59 (56)	21.46	19	21.02 (54)	19.56	18.10	15.29
14	03.28	21.31 (56)	05.05		20.44 (54)	06.37	08.04	08.42
	23.21	28 21.59 (56)	21.42	15	20.59 (54)	19.53	18.07	15.26
15	03.31	21.31 (56)	05.08		20.44 (54)	06.40	08.07	08.45
	23.18	28 21.59 (56)	21.39	12	20.56 (54)	19.49	18.04	15.23
16	03.34	21.31 (56)	05.11		20.44 (54)	06.43	08.10	08.48
	23.16	28 21.59 (56)	21.35	8	20.52 (54)	19.46	18.00	15.20
17	03.37	21.32 (56)	05.14		20.45 (54)	06.46	08.13	08.52
	23.13	28 22.00 (56)	21.32	5	20.50 (54)	19.42	17.57	15.17
18	03.40	21.32 (56)	05.17		06.49	08.16	08.55	10.10
	23.10	27 21.59 (56)	21.28		19.39	17.53	15.14	14.22
19	03.43	21.32 (56)	05.21		06.51	08.19	08.58	10.12
	23.07	27 21.59 (56)	21.25		19.35	17.50	15.12	14.22
20	03.46	21.32 (56)	05.24		06.54	08.22	09.01	10.12
	23.04	26 21.58 (56)	21.21		19.31	17.46	15.09	14.22
21	03.49	21.34 (56)	05.27		06.57	08.25	09.05	10.13
	23.01	25 21.59 (56)	21.18		19.28	17.43	15.06	14.22
22	03.52	21.34 (56)	05.30		07.00	08.28	09.08	10.14
	22.58	24 21.58 (56)	21.14		19.24	17.40	15.03	14.23
23	03.55	21.35 (56)	05.33		07.03	08.32	09.11	10.14
	22.55	23 21.58 (56)	21.11		19.21	17.36	15.01	14.23
24	03.59	21.35 (56)	05.36		07.06	08.35	09.14	10.15
	22.52	22 21.57 (56)	21.07		19.17	17.33	14.58	14.24
25	04.02	21.36 (56)	05.39		07.09	07.38	09.17	10.15
	22.49	19 21.55 (56)	21.04		19.14	16.29	14.56	14.25
26	04.05	21.37 (56)	05.42		07.12	07.41	09.20	10.15
	22.46	15 21.52 (56)	21.00		19.10	16.26	14.53	14.26
27	04.08	21.39 (56)	05.45		07.14	07.44	09.23	10.15
	22.43	11 21.50 (56)	20.57		19.07	16.23	14.51	14.27
28	04.11	21.40 (56)	05.48		07.17	07.47	09.26	10.14
	22.39	7 21.47 (56)	20.53		19.03	16.19	14.49	14.28
29	04.14	21.43 (56)	05.51		07.20	07.50	09.29	10.14
	22.36	2 21.45 (56)	20.50		19.00	16.16	14.46	14.29
30	04.18		05.54		07.23	07.54	09.32	10.14
	22.33		20.46		18.56	16.13	14.44	14.31
31	04.21		05.57			07.57		10.13
	22.30		20.43			16.10		14.33
Potential sun hours	608		508		393	305	198	137
Total, worst case		744		224				
Sun reduction		0,38		0,31				
Oper. time red.		0,99		0,99				
Wind dir. red.		0,64		0,64				
Total reduction		0,24		0,20				
Total, real		178		44				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152.5_no forest_20201102Shadow receptor: E - Lomarakenus E (Kellokankaan metsätie)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	03.18
	14.35	16.05	17.35	20.08	21.41	23.19
2	10.11	09.00	07.27	06.38	04.52	03.16
	14.37	16.08	17.39	20.11	21.44	23.22
3	10.10	08.57	07.24	06.34	04.49	03.13
	14.39	16.12	17.42	20.14	21.47	23.25
4	10.09	08.54	07.20	06.31	04.46	03.11
	14.41	16.15	17.45	20.17	21.50	23.27
5	10.07	08.51	07.17	06.27	19.42 (59)	04.42
	14.43	16.18	17.48	20.20	21.54	23.30
6	10.06	08.47	07.13	06.24	19.40 (60)	04.39
	14.45	16.22	17.51	20.23	21.57	23.33
7	10.04	08.44	07.10	06.20	19.37 (60)	04.35
	14.48	16.25	17.54	20.26	21.59	23.35
8	10.03	08.41	07.06	17.19 (58)	06.17	19.34 (60)
	14.50	16.28	17.57	20.29	18	19.52 (59)
9	10.01	08.38	07.03	17.17 (58)	06.13	19.33 (60)
	14.53	16.31	18.00	7	17.24 (58)	20.32
10	09.59	08.35	06.59	17.15 (58)	06.10	19.31 (60)
	14.56	16.35	18.03	12	17.27 (58)	20.35
11	09.57	08.31	06.56	17.15 (58)	06.06	19.31 (60)
	14.58	16.38	18.06	16	17.31 (58)	20.38
12	09.55	08.28	06.52	17.13 (61)	06.02	19.29 (60)
	15.01	16.41	18.09	20	17.33 (58)	20.41
13	09.53	08.25	06.49	17.11 (61)	05.59	19.29 (60)
	15.04	16.45	18.12	22	17.33 (58)	20.44
14	09.51	08.22	06.45	17.09 (61)	05.55	19.29 (60)
	15.07	16.48	18.15	25	17.34 (58)	20.48
15	09.49	08.18	06.42	17.07 (61)	05.52	19.28 (60)
	15.10	16.51	18.18	27	17.34 (61)	20.51
16	09.47	08.15	06.38	17.06 (61)	05.48	19.28 (60)
	15.13	16.54	18.21	28	17.34 (61)	20.54
17	09.44	08.12	06.35	17.05 (61)	05.45	19.29 (60)
	15.16	16.58	18.24	30	17.35 (61)	20.57
18	09.42	08.08	06.31	17.04 (61)	05.41	19.29 (60)
	15.19	17.01	18.27	31	17.35 (61)	21.00
19	09.39	08.05	06.28	17.04 (61)	05.38	19.29 (60)
	15.22	17.04	18.30	32	17.36 (61)	21.03
20	09.37	08.02	06.24	17.03 (61)	05.34	19.30 (60)
	15.26	17.07	18.33	32	17.35 (61)	21.06
21	09.34	07.58	06.21	17.02 (61)	05.31	19.32 (60)
	15.29	17.10	18.36	32	17.34 (61)	21.09
22	09.32	07.55	06.17	17.03 (61)	05.27	19.33 (60)
	15.32	17.14	18.39	32	17.35 (61)	21.12
23	09.29	07.51	06.14	17.02 (61)	05.24	19.36 (60)
	15.35	17.17	18.42	32	17.34 (61)	21.15
24	09.26	07.48	06.10	17.03 (61)	05.20	19.44 (60)
	15.38	17.20	18.45	30	17.33 (61)	21.18
25	09.23	07.45	06.06	17.03 (61)	05.17	19.44 (60)
	15.42	17.23	18.48	29	17.32 (61)	21.22
26	09.21	07.41	06.03	17.04 (61)	05.13	19.44 (60)
	15.45	17.26	18.51	27	17.31 (61)	21.25
27	09.18	07.38	05.59	17.04 (61)	05.10	19.44 (60)
	15.48	17.29	18.54	26	17.30 (61)	21.28
28	09.15	07.34	05.56	17.06 (61)	05.06	19.44 (60)
	15.52	17.32	18.57	23	17.29 (61)	21.31
29	09.12		06.52	18.07 (61)	05.03	19.44 (60)
	15.55		19.59	19	18.26 (61)	21.34
30	09.09		06.49	18.09 (61)	04.59	19.44 (60)
	15.58		20.02	14	18.23 (61)	21.37
31	09.06		06.45	18.15 (61)		19.44 (60)
	16.02		20.05	3	18.18 (61)	21.40
Potential sun hours	171	238	363	451	570	624
Total, worst case			550		375	
Sun reduction			0,32		0,41	
Oper. time red.			0,99		0,99	
Wind dir. red.			0,60		0,61	
Total reduction			0,19		0,25	
Total, real			105		93	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152.5_no forest_20201102Shadow receptor: E - Lomarakenus E (Kellokankaan metsätie)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 23.49	04.24 22.26	05.59 20.39	19.30 (60) 18.52	07.26 18.13 (58)	08.00 16.06
2	03.01 23.47	04.27 22.23	06.02 20.35	19.30 (60) 18.49	07.29 18.11 (58)	08.03 16.03
3	03.01 23.46	04.30 22.20	06.05 20.32	19.30 (60) 18.45	07.32 18.07 (58)	08.06 16.00
4	03.03 23.44	04.33 22.16	06.08 20.28	19.31 (60) 19.50 (59)	07.35 18.42	08.09 15.56
5	03.05 23.42	04.37 22.13	06.11 20.25	19.33 (60) 19.46 (59)	07.37 18.38	08.13 15.53
6	03.07 23.40	04.40 22.10	06.14 20.21	19.36 (60) 19.43 (59)	07.40 18.35	08.16 15.50
7	03.09 23.38	04.43 22.06	06.17 20.18	19.38 (59) 19.40 (59)	07.43 18.31	08.19 15.47
8	03.12 23.36	04.46 22.03	06.20 20.14	07.46 18.28	08.22 15.44	09.53 14.30
9	03.14 23.34	04.49 21.59	06.23 20.11	07.49 18.24	08.26 15.41	09.55 14.28
10	03.17 23.31	04.52 21.56	06.26 20.07	07.52 18.21	08.29 15.38	09.57 14.27
11	03.19 23.29	04.56 21.53	06.28 20.03	07.55 18.17	08.32 15.35	09.59 14.26
12	03.22 23.26	04.59 21.49	06.31 20.00	07.58 18.14	08.35 15.32	10.01 14.25
13	03.25 23.24	05.02 21.46	06.34 19.56	18.01 (61) 18.14 (61)	08.01 18.10	08.39 15.29
14	03.28 23.21	05.05 21.42	06.37 19.53	17.58 (61) 18.16 (61)	08.04 18.07	08.42 15.26
15	03.31 23.18	05.08 21.39	06.40 19.49	17.56 (61) 18.18 (61)	08.07 18.03	08.45 15.23
16	03.34 23.16	05.11 21.35	06.43 19.46	17.53 (61) 18.18 (61)	08.10 18.00	08.48 15.20
17	03.37 23.13	05.14 21.32	06.46 19.42	17.52 (61) 18.19 (61)	08.13 17.56	08.52 15.17
18	03.40 23.10	05.17 21.28	06.48 19.38	17.51 (61) 18.20 (61)	08.16 17.53	08.55 15.14
19	03.43 23.07	05.20 21.25	06.51 19.35	17.50 (61) 18.20 (61)	08.19 17.50	08.58 15.11
20	03.46 23.04	05.23 21.21	19.41 (60) 19.50 (60)	06.54 19.31	08.22 18.20 (61)	09.01 15.09
21	03.49 23.01	05.26 21.18	19.38 (60) 19.53 (60)	06.57 19.28	08.25 18.20 (61)	09.05 15.06
22	03.52 22.58	05.29 21.14	19.36 (60) 19.54 (60)	07.00 19.24	08.28 18.19 (61)	09.08 15.03
23	03.55 22.55	05.33 21.11	19.34 (60) 19.55 (60)	07.03 19.21	08.31 18.19 (61)	09.11 15.01
24	03.58 22.52	05.36 21.07	19.33 (60) 19.55 (60)	07.06 19.17	08.35 18.19 (61)	09.14 14.58
25	04.01 22.49	05.39 21.04	19.32 (60) 19.56 (60)	07.09 19.14	07.38 18.18 (61)	09.17 14.56
26	04.05 22.46	05.42 21.00	19.32 (60) 19.57 (60)	07.11 19.10	07.41 18.17 (61)	09.20 14.53
27	04.08 22.43	05.45 20.57	19.30 (60) 19.56 (60)	07.14 19.06	07.44 18.16 (61)	09.23 14.51
28	04.11 22.39	05.48 20.53	19.30 (60) 19.56 (60)	07.17 19.03	07.47 18.15 (61)	09.26 14.48
29	04.14 22.36	05.50 20.50	19.30 (60) 19.56 (60)	07.20 18.59	07.50 18.14 (61)	09.29 14.46
30	04.17 22.33	05.53 20.46	19.30 (60) 19.56 (59)	07.23 18.56	07.53 18.14 (58)	09.32 14.44
31	04.21 22.30	05.56 20.43	19.29 (60) 19.55 (59)	07.26 19.55 (59)	07.57 16.09	10.13 14.32
Potential sun hours	609	509	393	305	198	137
Total, worst case		264	602	67		
Sun reduction		0,31	0,33	0,35		
Oper. time red.		0,99	0,99	0,99		
Wind dir. red.		0,61	0,60	0,59		
Total reduction		0,19	0,20	0,21		
Total, real		50	118	14		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no_forest_20201105Shadow receptor: F - Asuinrakennus F (Ollilantie 112)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December							
1	10.13	09.04	10.34 (49)	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	10.12 (49)	09.36	11.32 (45)				
14.34	16.05	50	13.31 (40)	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.06	8	10.20 (49)	14.42	32	13.05 (40)		
2	10.12	09.01	10.34 (49)	07.28	06.38	04.52	03.15	03.00	04.27	06.03	07.29	08.04	10.09 (49)	09.39	11.33 (45)				
14.36	16.08	37	13.29 (40)	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14	10.23 (49)	14.40	29	13.05 (40)		
3	10.11	08.58	10.35 (49)	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	10.08 (49)	09.41	11.34 (45)				
14.38	16.12	27	13.25 (40)	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	17	10.25 (49)	14.38	24	13.03 (40)		
4	10.10	08.54	10.35 (49)	07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10	10.07 (49)	09.44	11.35 (45)				
14.41	16.15	23	10.58 (49)	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	19	10.26 (49)	14.36	17	13.01 (40)		
5	10.08	11.54 (45)	08.51	10.35 (49)	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	10.06 (49)	09.47	11.37 (45)			
14.43	5	11.59 (45)	16.18	23	10.58 (49)	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	21	10.27 (49)	14.34	11	11.48 (45)
6	10.07	11.52 (45)	08.48	10.36 (49)	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17	10.06 (49)	09.49	11.39 (45)			
14.45	9	12.01 (45)	16.22	21	10.57 (49)	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	22	10.28 (49)	14.32	9	11.48 (45)
7	10.05	11.52 (45)	08.45	10.38 (49)	07.10	06.21	04.35	03.04	03.09	04.43	06.17	07.44	08.20	10.05 (49)	09.52	11.41 (45)			
14.48	11	12.03 (45)	16.25	19	10.57 (49)	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	24	10.29 (49)	14.31	5	11.46 (45)
8	10.04	11.52 (45)	08.42	10.39 (49)	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	10.05 (49)	09.54	11.41 (45)			
14.50	16	13.17 (40)	16.28	16	10.55 (49)	17.57	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	29	12.56 (40)	14.29		
9	10.02	11.50 (45)	08.39	10.40 (49)	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	10.05 (49)	09.56	11.41 (45)			
14.53	23	13.19 (40)	16.32	13	10.53 (49)	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	37	13.00 (40)	14.28		
10	10.00	11.50 (45)	08.35	10.43 (49)	07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	10.05 (49)	09.58	11.41 (45)			
14.55	28	13.21 (40)	16.35	7	10.50 (49)	18.03	20.36	22.11	23.43	23.33	21.57	20.07	18.21	15.38	49	13.01 (40)	14.27		
11	09.58	11.50 (45)	08.32	10.45 (49)	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33	10.05 (49)	10.01	11.41 (45)			
14.58	31	13.23 (40)	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	57	13.03 (40)	14.26				
12	09.56	11.50 (45)	08.29	10.46 (49)	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.59	08.36	10.05 (49)	10.02	11.41 (45)			
15.01	35	13.25 (40)	16.42	18.09	20.42	22.17	23.47	23.28	21.50	20.00	18.14	15.32	63	13.04 (40)	14.25				
13	09.54	11.49 (45)	08.26	10.47 (49)	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.02	08.39	10.05 (49)	10.04	11.41 (45)			
15.04	39	13.26 (40)	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	65	13.04 (40)	14.24				
14	09.52	11.50 (45)	08.22	10.48 (49)	06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.05	08.43	10.06 (49)	10.06	11.41 (45)			
15.07	39	13.27 (40)	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	67	13.06 (40)	14.23				
15	09.50	11.49 (45)	08.19	10.49 (49)	06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.08	08.46	10.07 (49)	10.08	11.41 (45)			
15.10	42	13.28 (40)	16.51	18.18	20.51	22.27	23.51	23.20	21.39	19.50	18.04	15.23	68	13.06 (40)	14.22				
16	09.47	11.49 (45)	08.16	10.50 (49)	06.39	05.49	04.05	02.49	03.33	05.11	06.43	08.11	08.49	10.07 (49)	10.09	11.41 (45)			
15.13	44	13.29 (40)	16.55	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	68	13.06 (40)	14.22				
17	09.45	11.50 (45)	08.12	10.51 (49)	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	10.09 (49)	10.10	11.41 (45)			
15.16	45	13.30 (40)	16.58	18.24	20.57	22.34	23.54	23.14	21.32	19.42	17.57	15.17	66	13.07 (40)	14.21				
18	09.43	11.49 (45)	08.09	10.52 (49)	06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	10.09 (49)	10.12	11.41 (45)			
15.19	47	13.30 (40)	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	67	13.07 (40)	14.21				
19	09.40	11.49 (45)	08.06	10.53 (49)	06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	10.10 (49)	10.13	11.41 (45)			
15.22	49	13.31 (40)	17.04	18.30	21.03	22.40	23.56	23.08	21.25	19.35	17.50	15.11	65	13.07 (40)	14.21				
20	09.38	11.50 (45)	08.02	10.54 (49)	06.25	05.34	03.53	02.47	03.46	05.24	06.55	08.23	09.02	10.13 (49)	10.14	11.41 (45)			
15.25	48	13.31 (40)	17.07	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.09	61	13.07 (40)	14.21				
21	09.35	10.39 (49)	07.59	10.55 (49)	06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	10.15 (49)	10.14	11.41 (45)			
15.29	58	13.32 (40)	17.11	18.36	21.10	22.47	23.56	23.02	21.18	19.28	17.43	15.06	58	13.08 (40)	14.22				
22	09.32	10.38 (49)	07.55	10.56 (49)	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.09	11.26 (45)	10.15	11.41 (45)			
15.32	61	13.32 (40)	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	47	13.07 (40)	14.22				
23	09.30	10.36 (49)	07.52	10.57 (49)	06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	11.26 (45)	10.15	11.41 (45)			
15.35	65	13.33 (40)	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.01	49	13.08 (40)	14.22				
24	09.27	10.36 (49)	07.49	10.58 (49)	06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	11.27 (45)	10.16	11.41 (45)			
15.38	66	13.33 (40)	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	47	13.08 (40)	14.23				
25	09.24	10.35 (49)	07.45	10.59 (49)	06.07	05.17	03.37	02.50	04.01	05.39	07.09	08.38	09.18	11.27 (45)	10.16	11.41 (45)			
15.42	66	13.33 (40)	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.55	45	13.07 (40)	14.24				
26	09.21	10.34 (49)	07.42	10.60 (49)	06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	11.28 (45)	10.16	11.41 (45)			
15.45	68	13.33 (40)	17.26	18.51	21.25	23.02	23.56	22.47	21.01	19.10	16.26	14.53	43	13.07 (40)	14.25				
27	09.18	10.34 (49)	07.38	10.61 (49)	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	11.28 (45)	10.16	11.41 (45)			
15.48	67	13.33 (40)	17.30	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	42	13.07 (40)	14.26				
28	09.16	10.34 (49)	07.35	10.62 (49)	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	11.29 (45)	10.16	11.41 (45)			
15.52	67	13.33 (40)	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.03	16.19	14.48	39	13.06 (40)	14.27				
29	09.13	10.33 (49)	07.32	10.63 (49)	06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	11.30 (45)	10.15	11.41 (45)			
15.55	64	13.32 (40)	17.34	19.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46	37	13.06 (40)	14.29				
30	09.10	10.33 (49)	07.31	10.64 (49)	06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	11.31 (45)	10.15	11.41 (45)			
15.58	61	13.32 (40)	17.35	19.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44	35	13.06 (40)	14.30				
31	09.07	10.33 (49)	07.30	10.65 (49)	06.45	05.03	03.20	02.54	04.20	05.57	07.26	07.57	09.36	11.32 (45)	10.14	11.41 (45)			
16.02	57	13.31 (40)	17.36	19.06	21.37	23.17	23.30	22.30	20.43	18.66	16.10	14.44	35	13.06 (40)	14.30				
Potential sun hours	170	238	363	451	570	625	609	509	393	305	198	136	127	136	136				
Total, worst case	1211	236									1329		127						

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201105Shadow receptor: G - Lomarakennus G (Ollilantie, Siliakuru)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13 14.34	09.04 16.05	10.08 (45) 12.00 (40)	07.31 17.36	06.42 20.09	04.56 21.41
2	10.12 14.36	09.01 16.08	10.08 (45) 12.00 (40)	07.28 17.39	06.38 20.12	04.53 21.45
3	10.11 14.38	12.19 (39) 16.12	10.07 (45) 11.59 (40)	07.24 17.42	06.35 20.15	04.49 21.48
4	10.10 14.41	12.19 (39) 16.15	10.07 (45) 11.58 (40)	07.21 17.45	06.31 20.18	04.46 21.51
5	10.08 14.43	12.19 (39) 16.18	10.07 (45) 11.58 (40)	07.17 17.48	06.28 20.21	04.42 21.54
6	10.07 14.45	12.19 (39) 16.22	10.07 (45) 11.57 (40)	07.14 17.51	06.24 20.24	04.39 21.58
7	10.05 14.48	12.19 (39) 16.25	10.08 (45) 11.56 (40)	07.11 17.54	06.21 20.27	04.35 22.01
8	10.04 14.50	12.19 (39) 16.28	10.08 (45) 11.55 (40)	07.07 17.57	06.17 20.30	04.32 22.04
9	10.02 14.53	12.19 (39) 16.32	10.08 (45) 11.53 (40)	07.03 18.00	06.13 20.33	04.29 22.07
10	10.00 14.56	12.19 (39) 16.35	10.08 (45) 11.49 (40)	07.00 18.03	06.10 20.36	04.25 22.11
11	09.58 14.58	12.19 (39) 16.38	10.09 (45) 10.32 (45)	06.56 18.06	06.06 20.39	04.22 22.14
12	09.56 15.01	11.34 (40) 13.41 (35)	08.29 16.42	09.09 (49) 18.09	06.53 20.42	04.19 22.17
13	09.54 15.04	11.32 (40) 13.46 (35)	08.26 16.45	09.05 (49) 18.12	06.49 20.45	04.15 22.20
14	09.52 15.07	11.31 (40) 13.47 (35)	08.22 16.48	09.01 (49) 18.15	06.46 20.48	04.12 22.24
15	09.50 15.10	11.30 (40) 13.48 (35)	08.19 16.51	09.00 (49) 18.18	06.42 20.51	04.09 22.27
16	09.47 15.13	11.29 (40) 13.49 (35)	08.16 16.55	09.00 (49) 18.21	06.39 20.54	04.06 22.30
17	09.45 15.16	11.29 (40) 13.50 (35)	08.12 16.58	08.59 (49) 18.24	06.35 20.57	04.02 22.34
18	09.43 15.19	11.28 (40) 13.50 (35)	08.09 17.01	08.58 (49) 18.27	06.32 21.00	03.59 22.37
19	09.40 15.22	11.27 (40) 13.50 (35)	08.06 17.04	08.58 (49) 18.30	06.28 21.04	03.56 22.40
20	09.38 15.26	11.27 (40) 13.51 (35)	08.02 17.08	08.58 (49) 18.33	06.25 21.07	03.53 22.43
21	09.35 15.29	11.27 (40) 13.51 (35)	07.59 17.11	08.58 (49) 18.36	06.21 21.10	03.50 22.47
22	09.32 15.32	11.27 (40) 13.52 (35)	07.55 17.14	08.58 (49) 18.39	06.18 21.13	03.47 22.50
23	09.30 15.35	11.27 (40) 13.52 (35)	07.52 17.17	08.59 (49) 18.42	06.14 21.16	03.44 22.53
24	09.27 15.39	11.27 (40) 13.52 (35)	07.49 17.20	08.59 (49) 18.45	06.10 21.19	03.41 22.56
25	09.24 15.42	11.27 (40) 13.52 (35)	07.45 17.23	09.00 (49) 18.48	06.07 21.22	03.38 22.59
26	09.21 15.45	10.14 (45) 13.52 (35)	07.42 17.26	09.02 (49) 18.51	06.03 21.25	03.35 23.02
27	09.18 15.48	10.12 (45) 13.52 (35)	07.38 17.30	09.04 (49) 18.54	06.00 21.29	03.32 23.05
28	09.16 15.52	10.11 (45) 13.51 (35)	07.35 17.33	09.13 (49) 18.57	05.56 21.32	03.29 23.09
29	09.13 15.55	10.09 (45) 13.50 (35)		06.53 20.00	05.03 21.35	03.26 23.12
30	09.10 15.58	10.08 (45) 13.49 (35)		06.49 20.03	04.59 21.38	03.23 23.15
31	09.07 16.02	10.08 (45) 13.47 (35)		06.46 20.06	03.21 23.17	
Potential sun hours	171	238	363	451	570	625
Total, worst case	1480	883				
Sun reduction	0,19	0,33				
Oper. time red.	0,99	0,99				
Wind dir. red.	0,66	0,66				
Total reduction	0,12	0,22				
Total, real	180	192				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152_5_no forest_20201105Shadow receptor: G - Lomarakennus G (Ollilantie, Siliakuru)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.58	04.24	06.00	07.26	08.01	09.37 (45) 09.36 12.01 (39)
	23.50	22.27	20.40	18.53	16.06	37 11.19 (40) 14.42 26 13.17 (35)
2	03.00	04.27	06.03	07.29	08.04	09.37 (45) 09.39 12.02 (39)
	23.49	22.24	20.36	18.49	16.03	43 11.22 (40) 14.40 20 12.22 (39)
3	03.00	04.30	06.06	07.32	08.07	09.37 (45) 09.41 12.02 (39)
	23.47	22.20	20.32	18.46	16.00	49 11.25 (40) 14.38 20 12.22 (39)
4	03.02	04.33	06.08	07.35	08.10	09.37 (45) 09.44 12.03 (39)
	23.45	22.17	20.29	18.42	15.57	51 11.26 (40) 14.36 19 12.22 (39)
5	03.04	04.37	06.11	07.38	08.13	09.37 (45) 09.47 12.05 (39)
	23.43	22.14	20.25	18.39	15.53	53 11.27 (40) 14.34 17 12.22 (39)
6	03.07	04.40	06.14	07.41	08.17	09.37 (45) 09.49 12.05 (39)
	23.41	22.10	20.22	18.35	15.50	54 11.28 (40) 14.32 17 12.22 (39)
7	03.09	04.43	06.17	07.44	08.20	09.37 (45) 09.52 12.06 (39)
	23.39	22.07	20.18	18.32	15.47	56 11.29 (40) 14.31 16 12.22 (39)
8	03.11	04.46	06.20	07.47	08.23	09.38 (45) 09.54 12.07 (39)
	23.37	22.04	20.15	18.28	15.44	56 11.30 (40) 14.29 15 12.22 (39)
9	03.14	04.49	06.23	07.50	08.26	09.38 (45) 09.56 12.08 (39)
	23.35	22.00	20.11	18.25	15.41	57 11.30 (40) 14.28 14 12.22 (39)
10	03.17	04.53	06.26	07.53	08.30	09.39 (45) 09.58
	23.32	21.57	20.07	18.21	15.38	56 11.31 (40) 14.27
11	03.19	04.56	06.29	07.56	08.33	09.39 (45) 10.01
	23.30	21.53	20.04	18.18	15.35	65 13.19 (35) 14.26
12	03.22	04.59	06.32	07.59	08.36	09.40 (45) 10.02
	23.28	21.50	20.00	18.14	15.32	67 13.21 (35) 14.25
13	03.25	05.02	06.35	08.02	08.39	09.41 (45) 10.04
	23.25	21.46	19.57	18.11	15.29	68 13.22 (35) 14.24
14	03.28	05.05	06.37	08.05	08.43	09.43 (45) 10.06
	23.22	21.43	19.53	18.07	15.26	74 13.24 (35) 14.23
15	03.31	05.08	06.40	08.08	08.46	09.45 (45) 10.08
	23.20	21.39	19.50	18.04	15.23	76 13.24 (35) 14.22
16	03.33	05.11	06.43	08.11	08.49	09.47 (45) 10.09
	23.17	21.36	19.46	18.00	15.20	76 13.25 (35) 14.22
17	03.36	05.14	06.46	08.14	08.53	11.00 (40) 10.10
	23.14	21.33	19.42	17.57	15.17	70 13.26 (35) 14.22
18	03.40	05.17	06.49	08.17	08.56	11.01 (40) 10.12
	23.11	21.29	19.39	17.53	15.14	69 13.26 (35) 14.21
19	03.43	05.21	06.52	08.20	08.59	11.01 (40) 10.13
	23.08	21.26	19.35	17.50	15.11	72 13.26 (35) 14.21
20	03.46	05.24	06.55	08.23	09.02	11.02 (40) 10.14
	23.05	21.22	19.32	17.47	15.09	72 13.27 (35) 14.21
21	03.49	05.27	06.58	08.26	09.05	11.02 (40) 10.14
	23.02	21.18	19.28	17.43	15.06	70 13.26 (35) 14.22
22	03.52	05.30	07.00	08.29	09.09	11.03 (40) 10.15
	22.59	21.15	19.25	17.40	15.03	71 13.27 (35) 14.22
23	03.55	05.33	07.03	08.32	09.12	11.04 (40) 10.15
	22.56	21.11	19.21	17.36	15.01	69 13.27 (35) 14.23
24	03.58	05.36	07.06	08.35	09.15	11.06 (40) 10.16
	22.53	21.08	19.18	17.33	14.58	67 13.28 (35) 14.23
25	04.01	05.39	07.09	07.38	08.29 (49) 09.18	11.06 (40) 10.16
	22.50	21.04	19.14	16.30	14.56	66 13.27 (35) 14.24
26	04.05	05.42	07.12	07.41	08.29 (49) 09.21	11.07 (40) 10.16
	22.47	21.01	19.10	16.26	14.53	63 13.27 (35) 14.25
27	04.08	05.45	07.15	07.45	08.30 (49) 09.24	11.09 (40) 10.16
	22.43	20.57	19.07	16.23	14.51	59 13.27 (35) 14.26
28	04.11	05.48	07.18	07.48	08.32 (49) 09.27	11.10 (40) 10.16
	22.40	20.54	19.03	16.20	14.48	56 13.27 (35) 14.28
29	04.14	05.51	07.21	07.51	08.35 (49) 09.30	11.12 (40) 10.15
	22.37	20.50	19.00	16.16	14.46	50 13.26 (35) 14.29
30	04.17	05.54	07.23	07.54	08.39 (49) 09.33	11.15 (40) 10.15
	22.34	20.47	18.56	16.13	14.44	41 13.23 (35) 14.30
31	04.21	05.57	07.27	07.57	09.39 (45)	10.14
	22.30	20.43	18.52	16.10	10.03 (45)	14.32
Potential sun hours	609	509	393	305	198	136
Total, worst case				386	1833	164
Sun reduction				0,35	0,24	0,22
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,65	0,66	0,67
Total reduction				0,22	0,16	0,14
Total, real				86	288	24

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_2021102 Shadow receptor: H - Asuinrakennus H (Pinolantie 406)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13	09.04	07.32	06.43	04.57	03.19
	14.36	16.06	17.37	20.09	21.42	23.20
2	10.12	09.01	07.28	06.39	04.53	03.17
	14.38	16.09	17.40	20.12	21.45	23.23
3	10.11	08.58	07.25	06.36	07.08 (14)	04.50
	14.40	16.13	17.43	20.15	6 07.14 (14)	21.48
4	10.10	08.55	07.22	06.32	07.04 (14)	04.47
	14.42	16.16	17.46	20.18	11 07.15 (14)	21.51
5	10.09	08.52	07.18	06.28	07.01 (14)	04.43
	14.44	16.19	17.49	20.21	16 07.17 (14)	21.55
6	10.07	08.49	07.15	06.25	06.58 (14)	04.40
	14.46	16.23	17.52	20.24	19 07.17 (14)	21.58
7	10.06	08.45	07.11	06.21	06.57 (14)	04.36
	14.49	16.26	17.55	20.27	21 07.18 (14)	22.01
8	10.04	08.42	07.08	06.18	06.56 (14)	04.33
	14.51	16.29	17.58	20.30	21 07.17 (14)	22.04
9	10.02	08.39	07.04	06.14	06.56 (14)	04.30
	14.54	16.33	18.01	20.33	22 07.18 (14)	22.08
10	10.00	08.36	07.01	06.11	06.55 (14)	04.26
	14.57	16.36	18.04	20.36	22 07.17 (14)	22.11
11	09.58	08.33	06.57	06.07	06.56 (14)	04.23
	14.59	16.39	18.07	20.40	21 07.17 (14)	22.14
12	09.56	08.29	06.54	06.04	06.56 (14)	04.20
	15.02	16.42	18.10	20.43	20 07.16 (14)	22.18
13	09.54	08.26	06.50	06.00	06.56 (14)	04.16
	15.05	16.46	18.13	20.46	19 07.15 (14)	22.21
14	09.52	08.23	06.47	05.56	06.57 (14)	04.13
	15.08	16.49	18.16	20.49	17 07.14 (14)	22.24
15	09.50	08.19	06.43	05.53	06.58 (14)	04.10
	15.11	16.52	18.19	20.52	13 07.11 (14)	22.27
16	09.48	08.16	06.39	05.49	07.00 (14)	04.07
	15.14	16.55	18.22	20.55	9 07.09 (14)	22.31
17	09.45	08.13	06.36	05.46		04.03
	15.17	16.59	18.25	20.58		22.34
18	09.43	08.09	06.32	05.42		04.00
	15.20	17.02	18.28	21.01		22.37
19	09.40	08.06	06.29	05.39		03.57
	15.23	17.05	18.31	21.04		22.40
20	09.38	08.03	06.25	05.35		03.54
	15.27	17.08	18.34	21.07		22.44
21	09.35	07.59	06.22	05.32		03.51
	15.30	17.11	18.37	21.10		22.47
22	09.33	07.56	06.18	05.28		03.48
	15.33	17.15	18.40	21.13		22.50
23	09.30	07.53	06.15	05.25		03.45
	15.36	17.18	18.43	21.16		22.53
24	09.27	07.49	06.11	05.21		03.42
	15.39	17.21	18.46	21.20		22.56
25	09.24	07.46	06.08	05.18		03.39
	15.43	17.24	18.49	21.23		22.59
26	09.22	07.42	06.04	05.14		03.36
	15.46	17.27	18.52	21.26		23.03
27	09.19	07.39	06.00	05.11		03.33
	15.49	17.30	18.55	21.29		23.06
28	09.16	07.35	05.57	05.07		03.30
	15.53	17.33	18.58	21.32		23.09
29	09.13		06.53	05.04		03.27
	15.56		20.01	21.35		23.12
30	09.10		06.50	05.00		03.24
	15.59		20.04	21.39		23.15
31	09.07		06.46			03.22
	16.03		20.07			23.18
Potential sun hours	171	238	363	451	570	624
Total, worst case				237		326
Sun reduction				0,41		0,47
Oper. time red.				0,99		0,99
Wind dir. red.				0,62		0,62
Total reduction				0,25		0,29
Total, real				59		94

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_2021102 Shadow receptor: H - Asuinrakennus H (Pinolantie 406)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December		
1	03.00	04.25	05.21 (13)	06.00	06.55 (14)	07.27	08.01	09.36
	23.50	22.27	21 05.42 (13)	20.40	21 07.16 (14)	18.53	16.07	14.43
2	03.00	04.28	05.21 (13)	06.03	06.54 (14)	07.30	08.04	09.39
	23.49	22.24	20 05.41 (13)	20.37	22 07.16 (14)	18.50	16.04	14.41
3	03.01	04.31	05.21 (13)	06.06	06.54 (14)	07.33	08.07	09.42
	23.47	22.21	20 05.41 (13)	20.33	22 07.16 (14)	18.46	16.01	14.39
4	03.04	04.34	05.22 (13)	06.09	06.53 (14)	07.36	08.11	09.44
	23.45	22.17	17 05.39 (13)	20.29	21 07.14 (14)	18.43	15.58	14.37
5	03.06	04.38	05.25 (13)	06.12	06.54 (14)	07.39	08.14	09.47
	23.43	22.14	14 05.39 (13)	20.26	20 07.14 (14)	18.39	15.54	14.35
6	03.08	04.41	05.28 (13)	06.15	06.54 (14)	07.41	08.17	09.49
	23.41	22.11	10 05.38 (13)	20.22	19 07.13 (14)	18.36	15.51	14.34
7	03.10	04.44	05.31 (13)	06.18	06.56 (14)	07.44	08.20	09.52
	23.39	22.07	6 05.37 (13)	20.19	16 07.12 (14)	18.32	15.48	14.32
8	03.13	04.47	05.33 (13)	06.21	06.58 (14)	07.47	08.24	09.54
	23.37	22.04	1 05.34 (13)	20.15	12 07.10 (14)	18.29	15.45	14.31
9	03.15	04.50		06.24	07.01 (14)	07.50	08.27	09.56
	23.35	22.01		20.12	6 07.07 (14)	18.25	15.42	14.29
10	03.18	04.53		06.27		07.53	08.30	09.59
	23.33	21.57		20.08		18.22	15.39	14.28
11	03.20	04.57		06.30		07.56	08.33	10.01
	23.30	21.54		20.04		18.18	15.36	14.27
12	03.23	05.00		06.32		07.59	08.37	10.03
	23.28	21.50		20.01		18.15	15.33	14.26
13	03.26	05.03		06.35		08.02	08.40	10.04
	23.25	21.47		19.57		18.11	15.30	14.25
14	03.29	05.06		06.38		08.05	08.43	10.06
	23.22	21.43		19.54		18.08	15.27	14.24
15	03.32	05.09		06.41		08.08	08.46	10.08
	23.20	21.40		19.50		18.04	15.24	14.24
16	03.35	05.12		06.44		08.11	08.50	10.09
	23.17	21.36		19.47		18.01	15.21	14.23
17	03.38	05.15		06.47		08.14	08.53	10.11
	23.14	21.33		19.43		17.58	15.18	14.23
18	03.41	05.18		06.50		08.17	08.56	10.12
	23.11	21.29		19.40		17.54	15.15	14.23
19	03.44	05.27 (13)	05.21	06.52		08.20	08.59	10.13
	23.08	7 05.34 (13)	21.26	19.36		17.51	15.12	14.23
20	03.47	05.25 (13)	05.24	06.55		08.23	09.03	10.14
	23.05	10 05.35 (13)	21.22	19.32		17.47	15.10	14.23
21	03.50	05.25 (13)	05.28	06.58		08.26	09.06	10.14
	23.02	12 05.37 (13)	21.19	19.29		17.44	15.07	14.23
22	03.53	05.23 (13)	05.31	07.01		08.29	09.09	10.15
	22.59	15 05.38 (13)	21.15	19.25		17.40	15.04	14.23
23	03.56	05.22 (13)	05.34	07.04		08.33	09.12	10.16
	22.56	16 05.38 (13)	21.12	19.22		17.37	15.02	14.24
24	03.59	05.22 (13)	05.37	07.07		08.36	09.15	10.16
	22.53	18 05.40 (13)	21.08	19.18		17.34	14.59	14.24
25	04.02	05.21 (13)	05.40	07.10		07.39	09.18	10.16
	22.50	19 05.40 (13)	21.05	19.15		16.30	14.57	14.25
26	04.06	05.21 (13)	05.43	07.13		07.42	09.21	10.16
	22.47	20 05.41 (13)	21.01	19.11		16.27	14.54	14.26
27	04.09	05.20 (13)	05.46	07.15		07.45	09.24	10.16
	22.44	21 05.41 (13)	20.58	9 07.11 (14)	19.08	16.24	14.52	14.27
28	04.12	05.21 (13)	05.49	06.59 (14)	07.18	07.48	09.27	10.16
	22.41	20 05.41 (13)	20.54	14 07.13 (14)	19.04	16.20	14.49	14.29
29	04.15	05.21 (13)	05.52	06.58 (14)	07.21	07.51	09.30	10.15
	22.37	21 05.42 (13)	20.51	16 07.14 (14)	19.00	16.17	14.47	14.30
30	04.18	05.20 (13)	05.55	06.57 (14)	07.24	07.55	09.33	10.15
	22.34	21 05.41 (13)	20.47	18 07.15 (14)	18.57	16.14	14.45	14.32
31	04.22	05.21 (13)	05.57	06.55 (14)		07.58		10.14
	22.31	21 05.42 (13)	20.44	20 07.15 (14)		16.10		14.33
Potential sun hours	609		509	393		305	198	137
Total, worst case	221		186		159			
Sun reduction	0,38		0,31		0,33			
Oper. time red.	0,99		0,99		0,99			
Wind dir. red.	0,62		0,62		0,62			
Total reduction	0,23		0,19		0,20			
Total, real	51		36		32			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152_5_no forest_2020110 Shadow receptor: I - Asuinrakennus I (Kortenevantie 116)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December				
1	10.13	09.04	07.32	06.43	04.57	20.26 (9)	03.19	03.00	04.25	06.00	07.27	08.01	09.36			
	14.36	16.06	17.37	20.09	21.42	15	20.41 (9)	23.20	23.50	22.27	20.40	18.53	16.07	14.43		
2	10.12	09.01	07.28	06.39	04.54		20.27 (9)	03.17	03.00	04.28	06.03	07.30	08.04	09.39		
	14.38	16.09	17.40	20.12	21.45	13	20.40 (9)	23.23	23.48	22.24	20.36	18.50	16.04	14.41		
3	10.11	08.58	07.25	06.36	04.50		20.29 (9)	03.14	03.02	04.31	06.06	07.33	08.07	09.41		
	14.40	16.13	17.43	20.15	21.48	9	20.38 (9)	23.26	23.47	22.21	20.33	18.46	16.01	14.39		
4	10.10	08.55	07.22	06.32	04.47			03.12	03.04	04.35	06.09	07.36	08.11	09.44		
	14.42	16.16	17.46	20.18	21.51			23.28	23.45	22.17	20.29	18.43	15.58	14.37		
5	10.08	08.52	07.18	06.28	04.43			03.10	03.06	04.38	06.12	07.39	08.14	09.47		
	14.44	16.19	17.49	20.21	21.55			23.31	23.43	22.14	20.26	18.39	15.54	14.35		
6	10.07	08.49	07.15	06.25	04.40			03.08	03.08	04.41	06.15	07.41	08.17	09.49		
	14.47	16.23	17.52	20.24	21.58			23.33	23.41	22.11	20.22	18.36	15.51	14.34		
7	10.05	08.45	07.11	06.21	04.37			03.05	03.11	04.44	06.18	07.44	08.20	09.52		
	14.49	16.26	17.55	20.27	22.01			23.36	23.39	22.07	20.19	18.32	15.48	14.32		
8	10.04	08.42	07.08	06.18	04.33			03.03	03.13	04.47	06.21	07.47	08.24	09.54		
	14.52	16.29	17.58	20.30	22.04			23.38	23.37	22.04	20.15	18.29	15.45	14.31		
9	10.02	08.39	07.04	06.14	04.30			03.01	03.15	04.50	06.24	07.50	08.27	09.56		
	14.54	16.33	18.01	20.33	22.08			23.40	23.35	22.00	5	20.45 (9)	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.26			03.00	03.18	04.54	06.27	07.53	08.30	09.58		
	14.57	16.36	18.04	20.36	22.11			23.43	23.32	21.57	11	20.48 (9)	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07	04.23			02.56	03.21	04.57	06.30	07.56	08.33	10.00		
	15.00	16.39	18.07	20.39	22.14			23.44	23.30	21.54	13	20.49 (9)	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04	04.20			02.55	03.23	05.00	06.32	07.59	08.37	10.02		
	15.02	16.43	18.10	20.43	22.17			23.46	23.27	21.50	16	20.50 (9)	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17			02.54	03.26	05.03	06.33	07.59	08.37	10.02		
	15.05	16.46	18.13	20.46	22.21			23.48	23.25	21.47	18	20.51 (9)	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13			02.53	03.29	05.06	06.33	07.59	08.37	10.02		
	15.08	16.49	18.16	20.49	22.24			23.50	23.22	21.43	18	20.51 (9)	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10			02.52	03.32	05.09	06.31	07.56	08.34	10.00		
	15.11	16.52	18.19	20.52	22.27			23.51	23.19	21.40	20	20.51 (9)	19.50	18.05	15.24	14.24
16	09.48	08.16	06.39	05.49	04.07			02.51	03.35	05.12	06.31	07.56	08.34	10.00		
	15.14	16.56	18.22	20.55	22.30			23.52	23.17	21.36	20	20.51 (9)	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04			02.50	03.38	05.15	06.31	07.56	08.34	10.00		
	15.17	16.59	18.25	20.58	22.34			23.53	23.14	21.33	20	20.51 (9)	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00			02.50	03.41	05.18	06.31	07.56	08.34	10.00		
	15.20	17.02	18.28	21.01	22.37			23.54	23.11	21.29	17	20.48 (9)	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57			02.49	03.44	05.21	06.31	07.56	08.34	10.00		
	15.24	17.05	18.31	21.04	22.40			23.55	23.08	21.26	13	20.44 (9)	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35	03.54			02.49	03.47	05.25	06.31	07.56	08.34	10.00		
	15.27	17.08	18.34	21.07	22.43			23.56	23.05	21.22	10	20.41 (9)	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	3	20.28 (9)	03.51	02.49	03.50	05.28	06.32	07.56	08.34	10.00		
	15.30	17.12	18.37	21.10	22.47			23.56	23.02	21.19	6	20.38 (9)	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	20.26 (9)	03.48		02.50	03.53	05.31	06.31	07.56	08.34	10.00		
	15.33	17.15	18.40	21.13	7	20.33 (9)	22.50	23.56	22.59	21.15	2	20.35 (9)	19.25	17.41	15.04	14.23
23	09.30	07.53	06.15	05.25	20.26 (9)	03.45		02.50	03.56	05.34	06.31	07.56	08.34	10.00		
	15.36	17.18	18.43	21.16	10	20.36 (9)	22.53	23.56	22.56	21.12	07.04	08.33	09.12	10.15		
24	09.27	07.49	06.11	05.21	20.25 (9)	03.42		02.51	03.59	05.37	06.31	07.56	08.34	10.00		
	15.40	17.21	18.46	21.20	14	20.39 (9)	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.25		
25	09.24	07.46	06.08	05.18	20.25 (9)	03.39		02.52	04.03	05.40	06.31	07.56	08.34	10.00		
	15.43	17.24	18.49	21.23	17	20.42 (9)	22.59	23.56	22.50	21.05	07.10	07.39	09.18	10.16		
26	09.22	07.42	06.04	05.14	20.25 (9)	03.36		02.53	04.06	05.43	06.31	07.56	08.34	10.00		
	15.46	17.27	18.52	21.26	20	20.45 (9)	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27		
27	09.19	07.39	06.00	05.11	20.24 (9)	03.33		02.54	04.09	05.46	06.31	07.56	08.34	10.00		
	15.49	17.30	18.55	21.29	20	20.44 (9)	23.05	23.54	22.44	20.58	19.08	16.24	14.52	14.28		
28	09.16	07.35	05.57	05.07	20.24 (9)	03.30		02.55	04.12	05.49	06.31	07.56	08.34	10.00		
	15.53	17.33	18.58	21.32	19	20.43 (9)	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29		
29	09.13		06.53	05.04	20.24 (9)	03.27		02.57	04.15	05.52	06.31	07.56	08.34	10.00		
	15.56		20.01	21.35	19	20.43 (9)	23.11	23.52	22.37	20.51	19.01	16.17	14.47	14.30		
30	09.10		06.50	05.00	20.25 (9)	03.25		02.58	04.19	05.55	06.31	07.56	08.34	10.00		
	15.59		20.04	21.39	17	20.42 (9)	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32		
31	09.07		06.46						04.22	05.58		07.58		10.14		
	16.03		20.07						22.31	20.44		16.11		14.34		
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137				
Total, worst case				146	37			189								
Sun reduction				0,41	0,47			0,31								
Oper. time red.				0,99	0,99			0,99								
Wind dir. red.				0,64	0,64			0,64								
Total reduction				0,26	0,30			0,20								
Total, real				37	11			37								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152_5_no forest_20201105 Shadow receptor: J - Asuinrakennus J (Haapavesitie 1406)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.25	23.46	22.21	20.33	18.46	16.01	14.39
4	10.09	08.55	07.21	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.14	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.36
6	10.07	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.06	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.47	08.23	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.07	23.40	23.34	22.00	20.12	18.25	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.04	04.20	02.55	03.24	05.00	06.32	07.59	08.36	10.02
	15.03	16.43	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.46	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.16	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.11
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.52	08.20	08.59	10.12
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.25	05.35	03.54	02.50	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.26	09.05	10.14
	15.30	17.12	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.24
23	09.30	07.52	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.15
	15.40	17.21	18.46	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.55	22.50	21.05	19.15	17.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.50	17.30	18.55	21.29	23.05	23.54	22.43	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.15
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.28	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.51	19.00	16.17	14.47	14.31
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.11		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102Shadow receptor: K - Lomarakennus K (Kurunoja)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.11	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.13	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.47	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.53
	14.52	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.15	04.50	06.24	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	03.00	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.21	04.57	06.29	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.46	18.13	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.30	14.25
14	09.52	08.22	06.46	05.56	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.27	14.24
15	09.49	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.08
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.59	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.26	19.36	17.51	15.12	14.23
20	09.37	08.02	06.25	05.35	03.54	02.50	03.47	05.24	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.21	05.32	03.51	02.50	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.40	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.43	21.16	22.52	23.55	22.56	21.11	19.21	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.45	06.07	05.18	03.39	02.52	04.03	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	17.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.42	07.12	07.42	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.27
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.24	14.52	14.28
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.12		06.53	05.04	03.27	02.57	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.57		10.13
	16.03		20.06		23.17		22.30	20.43		16.10		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152_5_no forest_2020110 Shadow receptor: L - Laskentapistel L (Perkkiontie, Ilmola)
Assumptions for shadow calculations

Shade probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December				
1	10.12	09.03	07.31	06.42	04.56	03.19	05.13 (50)	02.59	05.18 (50)	04.24	05.33 (50)	06.00	07.26	08.00	09.35	
2	14.35	16.06	17.36	20.09	21.41	23.19	21.39 (36)	23.49	21.43 (36)	22.27	26	21.37 (32)	20.39	18.53	16.07	14.43
3	10.11	09.00	07.28	06.38	04.53	03.16	05.13 (50)	03.01	05.18 (50)	04.28	18	05.35 (50)	06.03	07.29	08.03	09.38
4	14.37	16.09	17.39	20.12	21.44	23.22	21.39 (36)	23.47	21.43 (36)	22.23	12	05.53 (50)	20.36	18.49	16.03	14.41
5	10.10	08.57	07.24	06.35	04.50	03.14	05.12 (50)	03.01	05.18 (50)	04.31	12	05.38 (50)	06.06	07.32	08.07	09.41
6	14.39	16.12	17.42	20.15	21.47	23.25	21.38 (36)	23.46	21.43 (36)	22.20	12	05.50 (50)	20.32	18.46	16.00	14.39
7	10.09	08.54	07.21	06.31	04.46	03.12	05.13 (50)	03.03	05.19 (50)	04.34	12	05.38 (50)	06.09	07.35	08.10	09.43
8	14.42	16.15	17.45	20.18	21.51	23.28	21.39 (36)	23.44	21.44 (36)	22.17	12	05.38 (50)	20.29	18.42	15.57	14.37
9	10.08	08.51	07.17	06.28	04.43	03.09	05.13 (50)	03.05	05.19 (50)	04.37	12	05.38 (50)	06.12	07.38	08.13	09.46
10	14.44	16.19	17.48	20.21	21.54	23.30	21.39 (36)	23.42	21.44 (36)	22.13	12	05.38 (50)	20.25	18.39	15.54	14.35
11	10.06	08.48	07.14	06.24	04.39	03.07	05.13 (50)	03.08	05.19 (50)	04.40	12	05.38 (50)	06.14	07.41	08.16	09.48
12	14.46	16.22	17.51	20.24	21.57	23.33	21.38 (36)	23.40	21.45 (36)	22.10	12	05.38 (50)	20.22	18.35	15.51	14.33
13	10.05	08.45	07.10	06.21	04.36	03.05	05.13 (50)	03.10	05.19 (50)	04.43	12	05.38 (50)	06.17	07.44	08.20	09.51
14	14.49	16.25	17.54	20.27	22.00	23.35	21.39 (36)	23.38	21.45 (36)	22.07	12	05.38 (50)	20.18	18.32	15.48	14.32
15	10.03	08.41	07.07	06.17	04.33	03.03	05.14 (50)	03.12	05.20 (50)	04.47	12	05.38 (50)	06.20	07.47	08.23	09.53
16	14.51	16.29	17.57	20.30	22.04	23.37	21.39 (36)	23.36	21.45 (36)	22.03	12	05.38 (50)	20.14	18.28	15.44	14.30
17	10.01	08.38	07.03	06.14	04.29	03.01	05.14 (50)	03.15	05.20 (50)	04.50	12	05.38 (50)	06.23	07.50	08.26	09.55
18	14.54	16.32	18.00	20.33	22.07	23.40	21.39 (36)	23.40	21.46 (36)	22.00	12	05.38 (50)	20.11	18.25	15.41	14.29
19	10.09	08.35	07.00	06.10	04.26	03.05	05.26 (50)	02.58	05.14 (50)	03.18	12	05.38 (50)	06.26	07.53	08.29	09.58
20	14.56	16.35	18.03	20.36	22.10	23.42	21.39 (36)	23.42	21.46 (36)	21.56	12	05.38 (50)	20.07	18.21	15.38	14.28
21	10.08	08.32	06.56	06.07	04.23	03.04	05.24 (50)	02.56	05.14 (50)	03.20	12	05.38 (50)	06.29	07.55	08.33	10.00
22	14.59	16.39	18.06	20.39	22.13	23.44	21.39 (36)	23.42	21.47 (36)	21.53	12	05.38 (50)	20.04	18.18	15.35	14.27
23	10.06	08.29	06.53	06.03	04.19	03.02	05.24 (50)	02.55	05.14 (50)	03.23	12	05.38 (50)	06.32	07.58	08.36	10.02
24	15.02	16.42	18.09	20.42	22.17	23.45	21.28 (32)	23.45	21.47 (36)	21.49	12	05.38 (50)	20.00	18.14	15.32	14.26
25	10.03	08.25	06.49	05.59	04.16	03.01	05.20 (50)	02.53	04.04 (51)	03.26	12	05.38 (50)	06.35	08.01	08.39	10.03
26	15.05	16.45	18.12	20.45	22.20	23.47	21.31 (32)	23.47	21.39 (36)	23.24	12	05.38 (50)	21.46	18.11	15.29	14.25
27	10.01	08.22	06.46	05.56	04.13	03.00	05.19 (50)	02.52	04.03 (51)	03.29	12	05.38 (50)	06.38	08.04	08.42	10.05
28	15.08	16.48	18.15	20.48	22.23	23.49	21.33 (32)	23.49	21.39 (36)	23.21	12	05.38 (50)	21.43	18.07	15.26	14.24
29	10.09	08.19	06.42	05.52	04.09	03.00	05.18 (50)	02.51	04.03 (51)	03.31	12	05.38 (50)	06.40	08.07	08.46	10.07
30	15.11	16.52	18.18	20.51	22.26	23.50	21.36 (32)	23.50	21.48 (32)	21.39	12	05.38 (50)	21.50	18.04	15.23	14.23
31	10.07	08.15	06.39	05.49	04.06	03.00	05.17 (50)	02.50	04.02 (51)	03.34	12	05.38 (50)	06.43	08.10	08.49	10.08
32	15.14	16.55	18.21	20.54	22.30	23.51	21.38 (32)	23.51	21.49 (32)	21.36	12	05.38 (50)	21.46	18.00	15.20	14.23
33	10.04	08.12	06.35	05.45	04.03	03.00	05.15 (50)	02.50	04.02 (51)	03.37	12	05.38 (50)	06.46	08.13	08.52	10.09
34	15.17	16.58	18.24	20.57	22.33	23.52	21.40 (32)	23.52	21.39 (36)	23.13	12	05.38 (50)	21.42	18.11	15.18	14.22
35	10.02	08.09	06.32	05.42	04.00	03.00	05.15 (50)	02.49	04.02 (51)	03.40	12	05.38 (50)	06.49	08.16	08.55	10.11
36	15.20	17.01	18.27	21.00	22.36	23.53	21.40 (32)	23.53	21.39 (36)	23.10	12	05.38 (50)	21.29	18.08	15.15	14.22
37	10.09	08.05	06.28	05.38	03.57	02.49	05.14 (50)	02.49	04.02 (51)	03.43	12	05.38 (50)	06.52	08.20	08.58	10.12
38	15.23	17.05	18.30	21.03	22.39	23.54	21.40 (32)	23.54	21.40 (36)	23.07	12	05.38 (50)	21.25	18.05	15.12	14.22
39	10.07	08.02	06.25	05.35	03.54	02.49	05.14 (50)	02.49	04.02 (51)	03.46	12	05.38 (50)	06.55	08.23	09.02	10.13
40	15.26	17.08	18.33	21.06	22.43	23.55	21.40 (32)	23.55	21.40 (36)	23.04	12	05.38 (50)	21.22	18.02	15.09	14.22
41	10.04	07.59	06.21	05.31	03.50	02.49	05.14 (50)	02.49	04.02 (51)	03.50	12	05.38 (50)	06.58	08.26	09.05	10.13
42	15.29	17.11	18.36	21.09	22.46	23.55	21.41 (32)	23.55	21.40 (36)	23.01	12	05.38 (50)	21.18	18.03	15.06	14.23
43	10.02	07.55	06.18	05.28	03.47	02.49	05.13 (50)	02.49	04.02 (51)	03.53	12	05.38 (50)	06.50	08.29	09.08	10.14
44	15.33	17.14	18.39	21.13	22.49	23.55	21.40 (32)	23.55	21.40 (36)	22.58	12	05.38 (50)	21.15	18.02	15.04	14.23
45	10.09	07.52	06.14	05.24	03.44	02.50	05.13 (50)	02.50	04.03 (51)	03.56	12	05.38 (50)	06.53	08.32	09.11	10.15
46	15.36	17.17	18.42	21.16	22.52	23.55	21.40 (32)	23.55	21.41 (36)	22.55	12	05.38 (50)	21.11	18.01	15.01	14.24
47	10.06	07.48	06.10	05.21	03.41	02.50	05.13 (50)	02.50	04.03 (51)	03.59	12	05.38 (50)	06.56	08.35	09.14	10.15
48	15.39	17.20	18.45	21.19	22.55	23.55	21.40 (32)	23.55	21.40 (36)	22.52	12	05.38 (50)	21.08	18.01	15.04	14.24
49	10.04	07.45	06.07	05.17	03.38	02.51	05.13 (50)	02.51	04.04 (51)	04.02	12	05.38 (50)	06.59	08.38	09.17	10.15
50	15.42	17.24	18.48	21.22	22.58	23.55	21.40 (32)	23.55	21.41 (36)	22.49	12	05.38 (50)	21.04	18.01	15.06	14.25
51	10.01	07.42	06.03	05.14	03.35	02.52	05.13 (50)	02.52	04.04 (51)	04.05	12	05.38 (50)	06.52	08.31	09.10	10.15
52	15.45	17.27	18.51	21.25	23.02	23.54	21.40 (32)	23.54	21.41 (36)	22.46	12	05.38 (50)	21.01	18.01	15.04	14.26
53	10.08	07.38	06.00	05.10	03.33	02.53	05.13 (50)	02.53	04.05 (51)	04.08	12	05.38 (50)	06.54	08.33	09.12	10.15
54	15.49	17.30	18.54	21.28	23.05	23.53	21.41 (36)	22.43	21.41 (36)	22.43	12	05.38 (50)	20.57	18.01	15.01	14.27
55	10.05	07.35	05.56	05.07	03.30	02.55	05.13 (50)	02.55	04.06 (51)	04.12	12	05.38 (50)	06.58	08.37	09.16	10.15
56	15.52	17.33	18.57	21.31	23.08	23.52	21.39 (32)	23.52	21.42 (36)	22.40	12	05.38 (50)	20.54	18.01	15.04	14.28
57	10.02	06.53	05.03	03.27	02.56	02.56	05.12 (50)	02.56	04.07 (51)	04.15	12	05.38 (50)	06.51	08.40	09.19	10.14
58	15.56	17.35	18.99	21.35	23.11	23.51	21.39 (32)	23.51	21.42 (36)	22.36	12	05.38 (50)	20.50	18.01	15.04	14.30
59	10.09	06.49	05.00	03.24	02.58	02.58	05.12 (50)	02.58	05.18 (50)	04.18	12	05.38 (50)	06.54	08.43	09.22	10.14
60	15.59	17.38	19.02	21.38	23.14	23.50	21.39 (36)	23.50	21.43 (36)	22.33	12	05.38 (50)	20.46	18.01	15.04	14.31
61	10.06	06.46	05.00	03.22	02.52	02.52	05.12 (50)	02.52	04.21	04.21	12	05.38 (50)	06.57	08.46	09.25	10.13
62	16.02	17.41	19.05	21.36	23.12	23.48	21.38 (36)	23.48	21.43 (36)	22.30	12	05.38 (50)	20.43	18.01	15.04	14.33
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137				
Total, worst case					1337	2221	2105	56								
Sun reduction					0.47	0.48	0.38	0.31								
Oper. time red.					0.99	0.99	0.99	0.99								
Wind dir. red.					0.63	0.63	0.63	0.62								
Total reduction					0.29	0.30	0.24	0.19			</					

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152_5_no forest_20201105 Shadow receptor: M - Lomarakennus M (Riskalan metsätie)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

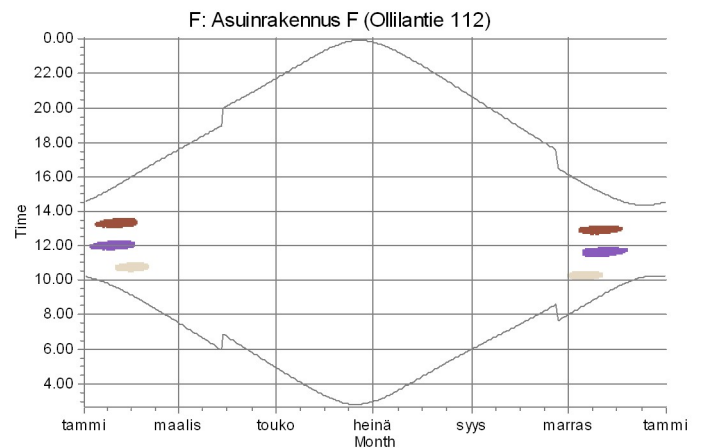
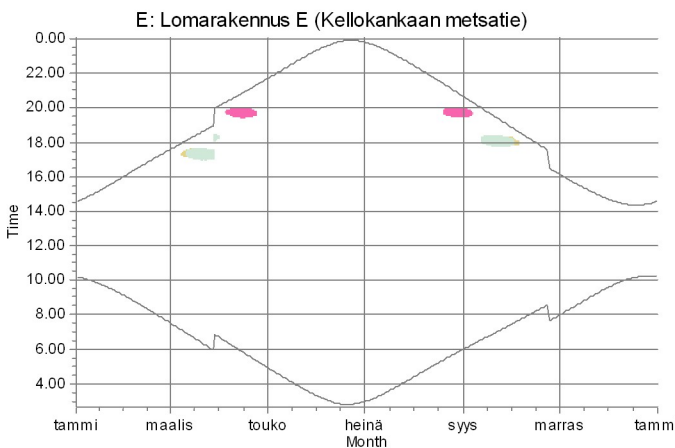
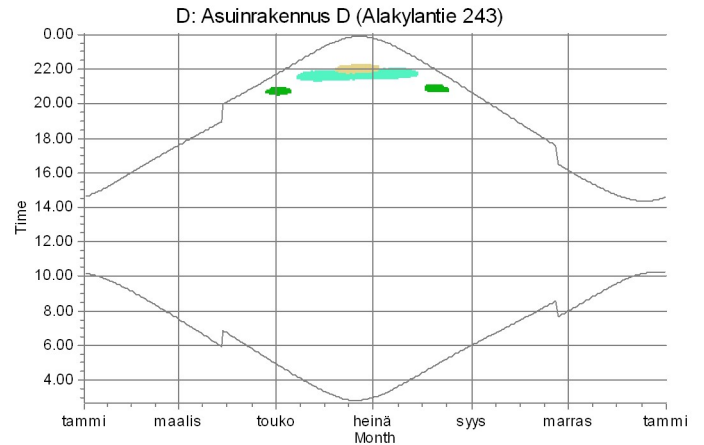
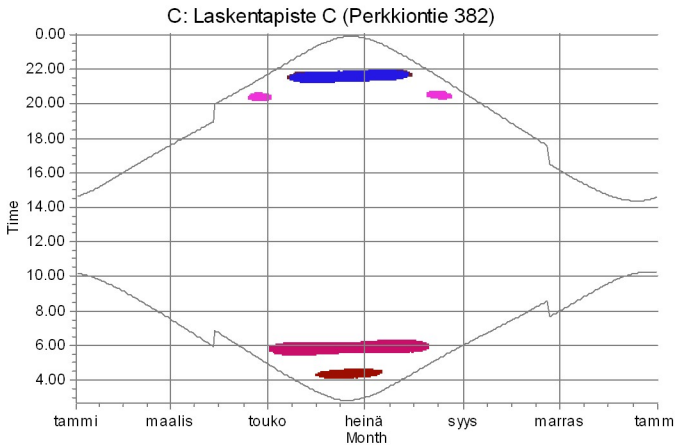
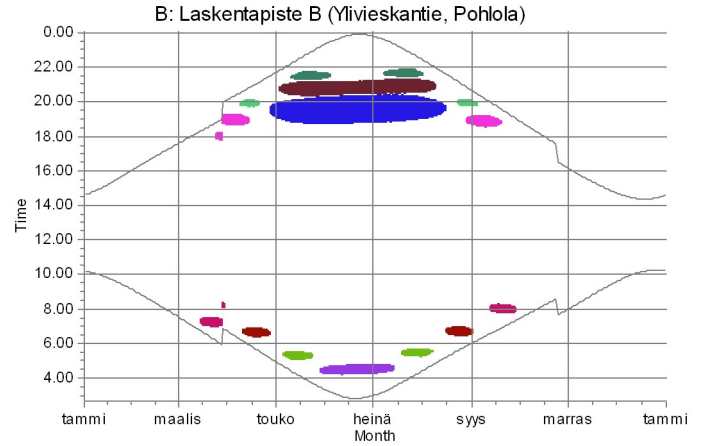
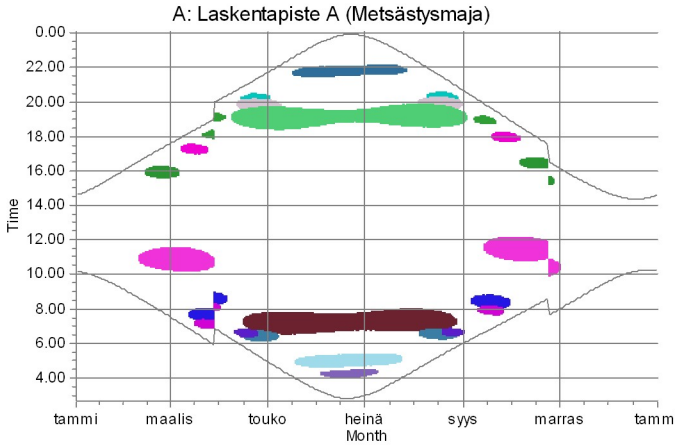
Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

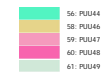
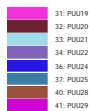
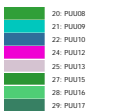
	January	February	March	April	May	June	July	August	September	October	November	December							
1	10.13	09.04	12.12 (49)	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36	11.47 (49)					
14.34	16.05	50	14.53 (40)	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42	32	13.17 (45)				
2	10.12	09.01	12.14 (49)	07.28	06.38	04.52	03.15	03.00	04.27	06.02	07.29	08.04	09.39	11.48 (49)					
14.36	16.08	36	14.53 (40)	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40	25	13.13 (45)				
3	10.11	08.57	12.17 (49)	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	09.41	11.49 (49)					
14.38	16.12	29	14.53 (40)	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	10	14.08 (40)	14.38	17	12.06 (49)		
4	10.10	12.11 (49)	08.54	14.33 (40)	07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10	14.06 (40)	09.44	11.50 (49)			
14.40	2	12.13 (49)	16.15	19	14.52 (40)	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14	14.20 (40)	14.36	15	12.05 (49)
5	10.08	12.08 (49)	08.51	14.34 (40)	07.17	06.28	04.42	03.08	03.04	04.36	06.11	07.38	08.13	14.05 (40)	09.47	11.52 (49)			
14.43	8	12.16 (49)	16.18	18	14.52 (40)	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	16	14.21 (40)	14.34	13	12.05 (49)
6	10.07	12.07 (49)	08.48	14.35 (40)	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17	14.04 (40)	09.49	11.54 (49)			
14.45	11	12.18 (49)	16.22	16	14.51 (40)	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	18	14.22 (40)	14.32	11	12.05 (49)
7	10.05	12.07 (49)	08.45	14.37 (40)	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20	14.04 (40)	09.52	11.55 (49)			
14.48	13	12.20 (49)	16.25	13	14.50 (40)	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.31	15.47	19	14.23 (40)	14.31	8	12.03 (49)
8	10.04	12.07 (49)	08.42	14.39 (40)	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	11.47 (49)	09.54	11.58 (49)			
14.50	14	12.21 (49)	16.28	9	14.48 (40)	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	31	14.24 (40)	14.29	3	12.01 (49)
9	10.02	12.05 (49)	08.38	14.38 (40)	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	11.44 (49)	09.56	11.44 (49)	10.06		
14.53	17	12.22 (49)	16.32	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.24	15.41	38	14.24 (40)	14.28	14.24 (40)	14.28		
10	10.00	12.05 (49)	08.35	14.39 (40)	07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	11.43 (49)	09.58	11.43 (49)	10.06		
14.55	24	13.29 (45)	16.35	18.03	20.36	22.11	23.43	23.32	21.57	20.07	18.21	15.38	50	14.24 (40)	14.27	14.24 (40)	14.27		
11	09.58	12.05 (49)	08.32	14.40 (40)	06.56	06.06	04.22	02.54	03.19	04.56	06.29	07.56	08.33	11.42 (49)	10.00	11.42 (49)	10.00		
14.58	30	13.34 (45)	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.17	15.35	55	14.24 (40)	14.25	14.24 (40)	14.25		
12	09.56	12.05 (49)	08.29	14.41 (40)	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36	11.41 (49)	10.02	11.41 (49)	10.02		
15.01	38	13.40 (45)	16.41	18.09	20.42	22.17	23.47	23.27	21.50	20.00	18.14	15.32	61	14.24 (40)	14.24	14.24 (40)	14.24		
13	09.54	12.04 (49)	08.25	14.42 (40)	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	11.40 (49)	10.04	11.40 (49)	10.04		
15.04	40	13.40 (45)	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	64	14.24 (40)	14.24	14.24 (40)	14.24		
14	09.52	12.05 (49)	08.22	14.43 (40)	06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.04	08.43	11.39 (49)	10.06	11.39 (49)	10.06		
15.07	42	13.42 (45)	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	66	14.23 (40)	14.23	14.23 (40)	14.23		
15	09.50	12.04 (49)	08.19	14.44 (40)	06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.07	08.46	11.40 (49)	10.08	11.40 (49)	10.08		
15.10	44	13.42 (45)	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	67	14.24 (40)	14.22	14.24 (40)	14.22		
16	09.47	12.04 (49)	08.16	14.45 (40)	06.39	05.48	04.05	02.49	03.33	05.11	06.43	08.11	08.49	11.39 (49)	10.09	11.39 (49)	10.09		
15.13	46	13.43 (45)	16.54	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	66	14.21 (40)	14.22	14.21 (40)	14.22		
17	09.45	12.05 (49)	08.12	14.46 (40)	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	11.39 (49)	10.10	11.39 (49)	10.10		
15.16	47	13.44 (45)	16.58	18.24	20.57	22.33	23.54	23.14	21.32	19.42	17.57	15.17	60	14.16 (40)	14.21	14.16 (40)	14.21		
18	09.43	12.04 (49)	08.09	14.47 (40)	06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	11.40 (49)	10.12	11.40 (49)	10.12		
15.19	49	13.44 (45)	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	57	14.13 (40)	14.21	14.13 (40)	14.21		
19	09.40	12.04 (49)	08.05	14.48 (40)	06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	11.39 (49)	10.13	11.39 (49)	10.13		
15.22	50	13.45 (45)	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	51	13.21 (45)	14.21	13.21 (45)	14.21		
20	09.38	12.04 (49)	08.02	14.49 (40)	06.25	05.34	03.53	02.47	03.45	05.23	06.55	08.23	09.02	11.40 (49)	10.14	11.40 (49)	10.14		
15.25	51	13.46 (45)	17.07	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.08	50	13.21 (45)	14.21	13.21 (45)	14.21		
21	09.35	12.05 (49)	07.59	14.50 (40)	06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	11.40 (49)	10.14	11.40 (49)	10.14		
15.29	51	13.46 (45)	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	51	13.21 (45)	14.21	13.21 (45)	14.21		
22	09.32	12.05 (49)	07.55	14.51 (40)	06.17	05.27	03.46	02.48	03.52	05.30	07.00	08.29	09.09	11.40 (49)	10.15	11.40 (49)	10.15		
15.32	50	13.46 (45)	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	51	13.22 (45)	14.22	13.22 (45)	14.22		
23	09.30	12.05 (49)	07.52	14.52 (40)	06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	11.41 (49)	10.15	11.41 (49)	10.15		
15.35	51	13.47 (45)	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.00	50	13.22 (45)	14.22	13.22 (45)	14.22		
24	09.27	12.06 (49)	07.48	14.53 (40)	06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	11.42 (49)	10.16	11.42 (49)	10.16		
15.38	56	14.39 (40)	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	48	13.22 (45)	14.23	13.22 (45)	14.23		
25	09.24	12.06 (49)	07.45	14.54 (40)	06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18	11.42 (49)	10.16	11.42 (49)	10.16		
15.42	61	14.44 (40)	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.29	14.55	48	13.22 (45)	14.24	13.22 (45)	14.24		
26	09.21	12.06 (49)	07.42	14.55 (40)	06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	11.43 (49)	10.16	11.43 (49)	10.16		
15.45	66	14.48 (40)	17.26	18.51	21.25	23.02	23.55	22.47	21.01	19.10	16.26	14.53	46	13.22 (45)	14.25	13.22 (45)	14.25		
27	09.18	12.07 (49)	07.38	14.56 (40)	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	11.43 (49)	10.16	11.43 (49)	10.16		
15.48	67	14.51 (40)	17.29	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	44	13.21 (45)	14.26	13.21 (45)	14.26		
28	09.15	12.08 (49)	07.35	14.57 (40)	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	11.44 (49)	10.16	11.44 (49)	10.16		
15.52	64	14.51 (40)	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.03	16.19	14.48	42	13.21 (45)	14.27	13.21 (45)	14.27		
29	09.13	12.08 (49)	07.32	14.58 (40)	05.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	11.45 (49)	10.15	11.45 (49)	10.15		
15.55	65	14.52 (40)	17.36	19.00	21.35	23.11	23.53	22.37	20.50	19.00	16.16	14.46	40	13.21 (45)	14.29	13.21 (45)	14.29		
30	09.10	12.09 (49)	07.29	14.59 (40)	05.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	11.46 (49)	10.15	11.46 (49)	10.15		

SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

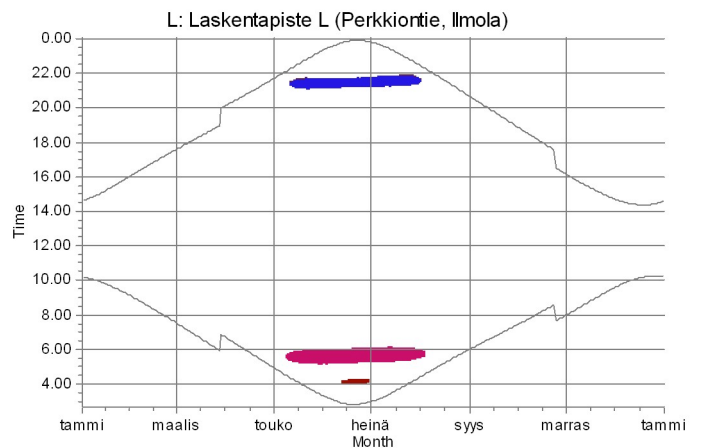
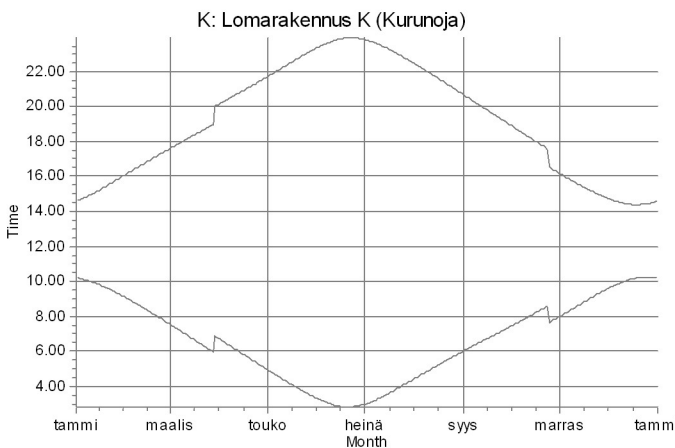
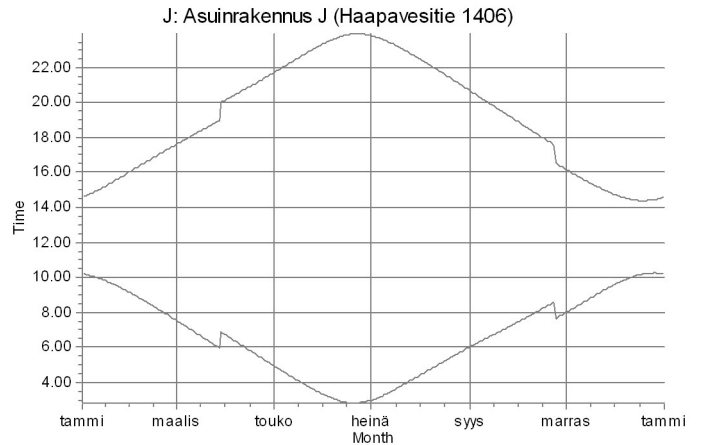
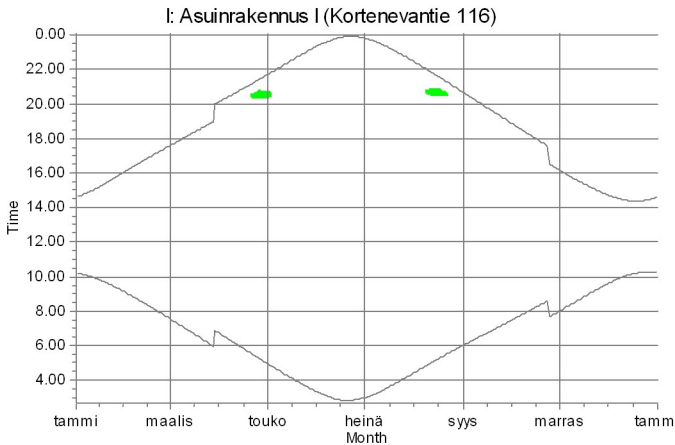
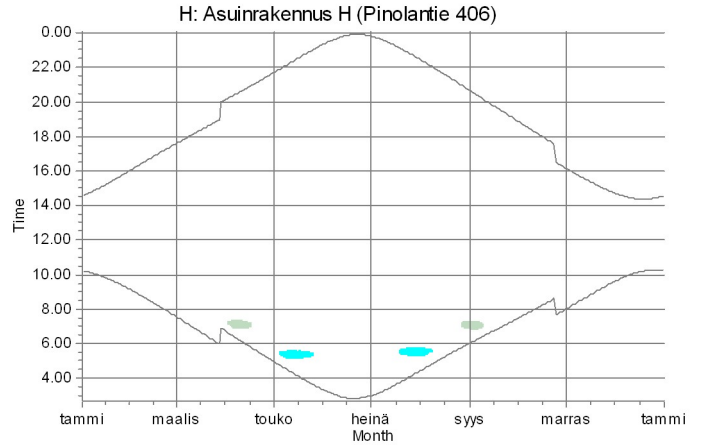
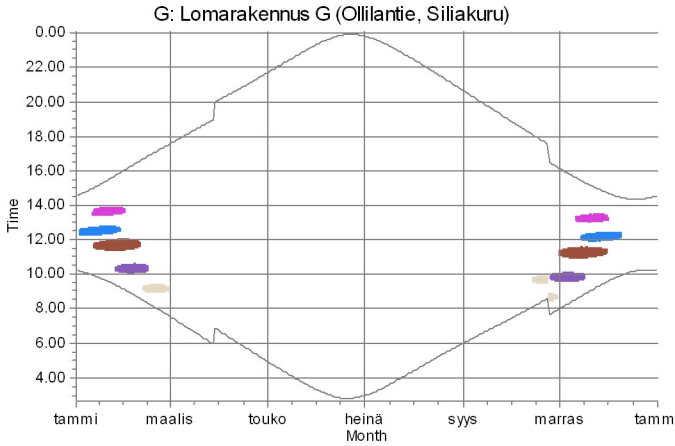


WTGS



SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



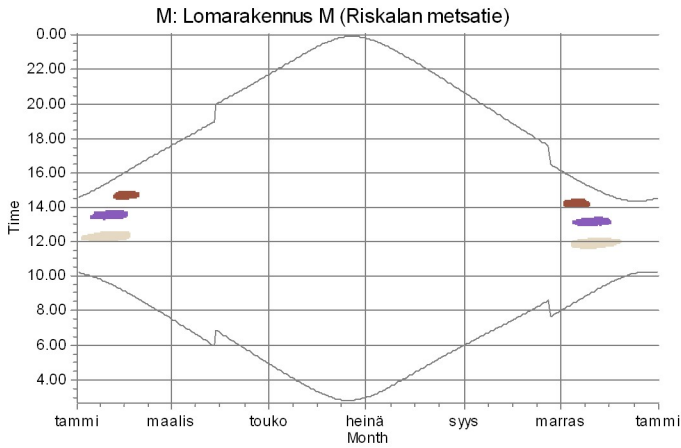
Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



WTGS
40: PU028

45: PU033

49: PU037

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 WTG: 1 - VESTAS V150-4.2 HH155 4200 150.0 IOI hub: 155.0 m (TOT: 230.0 m) (235)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.21	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.42
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.46	22.17	20.29	18.42	15.57	14.36
5	10.09	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.55	23.31	23.44	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.35	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.18	07.44	08.20	09.52
	14.48	16.25	17.55	20.27	22.01	23.36	23.40	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.57
	14.53	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.35	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.05
	15.04	16.45	18.13	20.45	22.21	23.49	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.09	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.52	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.50	10.09
	15.13	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.13	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.11
	15.16	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.56	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.57	23.02	21.19	19.29	17.43	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.04	08.32	09.12	10.16
	15.36	17.17	18.42	21.16	22.53	23.57	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.57	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.03	23.56	22.47	21.01	19.11	16.27	14.53	14.26
27	09.19	07.39	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 WTG: 2 - VESTAS V150-4.2 HH155 4200 150.0 IOI hub: 155.0 m (TOT: 230.0 m) (236)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.58	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.21	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.42
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.02	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.46	22.17	20.29	18.42	15.57	14.36
5	10.09	08.52	07.18	06.28	04.43	03.08	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.55	23.31	23.44	22.14	20.26	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.42	22.11	20.22	18.35	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.40	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.57
	14.53	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.35	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.21	15.38	14.27
11	09.59	08.32	06.57	06.07	04.22	02.55	03.19	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.03
	15.01	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.05
	15.04	16.45	18.13	20.45	22.21	23.49	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.23	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.08	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.52	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.49	03.34	05.12	06.43	08.11	08.50	10.09
	15.13	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.13	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.11
	15.16	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.56	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.36	21.10	22.47	23.57	23.02	21.19	19.29	17.43	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.04	08.32	09.12	10.16
	15.36	17.17	18.42	21.16	22.53	23.57	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.57	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.24
26	09.22	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.03	23.56	22.47	21.01	19.11	16.26	14.53	14.25
27	09.19	07.39	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 WTG: 3 - VESTAS V150-4.2 HH155 4200 150.0 IOI hub: 155.0 m (TOT: 230.0 m) (237)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.56
	14.53	16.32	18.01	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.09	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.22	20.54	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.57	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.21
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.55	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 WTG: 4 - VESTAS V150-4.2 HH155 4200 150.0 IOI hub: 155.0 m (TOT: 230.0 m) (238)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.56
	14.53	16.32	18.01	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.04
	15.04	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.08	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.22	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.16	16.58	18.25	20.57	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.26	14.53	14.26
27	09.19	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102\WTG: 5 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (239)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.08	14.43
2	10.13	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.05	09.39
	14.38	16.10	17.40	20.13	21.45	23.24	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.49	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.45
	14.42	16.16	17.46	20.19	21.52	23.29	23.46	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.32	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.02	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.43	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.55
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.16	18.29	15.45	14.31
9	10.03	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.54	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.57	08.34	10.01
	15.00	16.39	18.07	20.40	22.15	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	08.00	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.49	23.25	21.47	19.58	18.12	15.30	14.25
14	09.53	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.28	23.52	23.20	21.40	19.51	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.12	08.50	10.10
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.15	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.18	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.12	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.56	23.09	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.59	08.27	09.06	10.15
	15.30	17.12	18.37	21.11	22.47	23.57	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.19	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.57	21.12	19.22	17.37	15.02	14.24
24	09.28	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.16	10.16
	15.40	17.21	18.46	21.20	22.57	23.57	22.53	21.09	19.19	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.19	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.28	18.52	21.26	23.03	23.56	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.49	09.28	10.16
	15.53	17.34	18.58	21.33	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.38	20.51	19.01	16.17	14.48	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.34	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.48	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102\WTG: 6 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (240)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.52	18.19	20.52	22.28	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.00	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.15	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102\WTG: 7 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (241)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.24
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.00	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.49	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.36	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.42	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.18	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.15	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102\WTG: 8 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (242)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.49	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.45
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.43	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.54	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.57	08.34	10.01
	15.00	16.40	18.07	20.40	22.15	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.06	16.46	18.13	20.46	22.21	23.49	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.28	23.51	23.20	21.40	19.51	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.24
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.18	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.55	23.09	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.19	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.57	21.12	19.22	17.37	15.02	14.24
24	09.28	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.57	23.56	22.53	21.09	19.19	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.19	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.49	09.28	10.16
	15.53	17.34	18.58	21.33	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.38	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102\WTG: 9 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152,5 m (TOT: 240.0 m) (243)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.43	04.57	20.26-20.41/15	03.19	03.00	04.25	06.01	07.27	08.01	09.36	
	14.36	16.06	17.37	20.10	21.42		23.20	23.50	22.28	20.40	18.54	16.07	14.43	
2	10.12	09.01	07.29	06.39	04.54	20.27-20.40/13	03.17	03.00	04.28	06.04	07.30	08.04	09.39	
	14.38	16.10	17.40	20.13	21.45		23.23	23.49	22.24	20.37	18.50	16.04	14.41	
3	10.11	08.58	07.25	06.36	04.50	20.29-20.38/9	03.14	03.02	04.31	06.06	07.33	08.08	09.42	
	14.40	16.13	17.43	20.16	21.48		23.26	23.47	22.21	20.33	18.47	16.01	14.39	
4	10.10	08.55	07.22	06.32	04.47		03.12	03.04	04.35	06.09	07.36	08.11	09.44	
	14.42	16.16	17.46	20.19	21.52		23.29	23.45	22.18	20.30	18.43	15.58	14.37	
5	10.09	08.52	07.18	06.29	04.43		03.10	03.06	04.38	06.12	07.39	08.14	09.47	
	14.44	16.20	17.49	20.22	21.55		23.31	23.43	22.14	20.26	18.40	15.55	14.36	
6	10.07	08.49	07.15	06.25	04.40		03.08	03.08	04.41	06.15	07.42	08.17	09.49	
	14.47	16.23	17.52	20.25	21.58		23.34	23.41	22.11	20.22	18.36	15.51	14.34	
7	10.06	08.46	07.11	06.21	04.37		03.05	03.11	04.44	06.18	07.45	08.20	09.52	
	14.49	16.26	17.55	20.28	22.01		23.36	23.39	22.08	20.19	18.32	15.48	14.32	
8	10.04	08.42	07.08	06.18	04.33		03.03	03.13	04.47	06.21	07.48	08.24	09.54	
	14.52	16.29	17.58	20.31	22.05		23.39	23.37	22.04	20.15	18.29	15.45	14.31	
9	10.02	08.39	07.04	06.14	04.30		03.01	03.15	04.50	20.40-20.45/5	06.24	07.50	08.27	09.57
	14.54	16.33	18.01	20.34	22.08		23.41	23.35	22.01	20.12	18.25	15.42	14.29	
10	10.00	08.36	07.01	06.11	04.27		03.00	03.18	04.54	20.37-20.48/11	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11		23.43	23.33	21.57	20.08	18.22	15.39	14.28	
11	09.59	08.33	06.57	06.07	04.23		02.56	03.21	04.57	20.36-20.49/13	06.30	07.56	08.33	10.01
	15.00	16.39	18.07	20.40	22.14		23.45	23.30	21.54	20.05	18.19	15.36	14.27	
12	09.57	08.29	06.54	06.04	04.20		02.55	03.23	05.00	20.34-20.50/16	06.33	07.59	08.37	10.03
	15.02	16.43	18.10	20.43	22.18		23.47	23.28	21.50	20.01	18.15	15.33	14.26	
13	09.54	08.26	06.50	06.00	04.17		02.54	03.26	05.03	20.33-20.51/18	06.35	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21		23.48	23.25	21.47	19.58	18.12	15.30	14.25	
14	09.52	08.23	06.47	05.57	04.13		02.53	03.29	05.06	20.33-20.51/18	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24		23.50	23.22	21.44	19.54	18.08	15.27	14.24	
15	09.50	08.20	06.43	05.53	04.10		02.52	03.32	05.09	20.31-20.51/20	06.41	08.08	08.47	10.08
	15.11	16.52	18.19	20.52	22.27		23.51	23.20	21.40	19.50	18.05	15.24	14.24	
16	09.48	08.16	06.40	05.50	04.07		02.51	03.35	05.12	20.31-20.51/20	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31		23.53	23.17	21.37	19.47	18.01	15.21	14.23	
17	09.45	08.13	06.36	05.46	04.04		02.50	03.38	05.15	20.31-20.51/20	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34		23.54	23.14	21.33	19.43	17.58	15.18	14.23	
18	09.43	08.10	06.33	05.43	04.00		02.50	03.41	05.19	20.31-20.48/17	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37		23.55	23.11	21.30	19.40	17.54	15.15	14.23	
19	09.41	08.06	06.29	05.39	03.57		02.49	03.44	05.22	20.31-20.44/13	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40		23.55	23.08	21.26	19.36	17.51	15.13	14.23	
20	09.38	08.03	06.25	05.35	03.54		02.49	03.47	05.25	20.31-20.41/10	06.55	08.23	09.03	10.14
	15.27	17.08	18.34	21.07	22.44		23.56	23.05	21.23	19.33	17.47	15.10	14.23	
21	09.35	07.59	06.22	05.32	20.28-20.31/3	03.51	02.49	03.50	05.28	20.32-20.38/6	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47		23.56	23.02	21.19	19.29	17.44	15.07	14.23	
22	09.33	07.56	06.18	05.28	20.26-20.33/7	03.48	02.50	03.53	05.31	20.33-20.35/2	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.13	22.50		23.56	22.59	21.16	19.25	17.41	15.04	14.24	
23	09.30	07.53	06.15	05.25	20.26-20.36/10	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16	
	15.36	17.18	18.43	21.17	22.53		23.56	22.56	21.12	19.22	17.37	15.02	14.24	
24	09.27	07.49	06.11	05.21	20.25-20.39/14	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16	
	15.40	17.21	18.46	21.20	22.56		23.56	22.53	21.09	19.18	17.34	14.59	14.25	
25	09.25	07.46	06.08	05.18	20.25-20.42/17	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16	
	15.43	17.24	18.49	21.23	23.00		23.56	22.50	21.05	19.15	16.31	14.57	14.26	
26	09.22	07.42	06.04	05.14	20.25-20.45/20	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16	
	15.46	17.27	18.52	21.26	23.03		23.55	22.47	21.01	19.11	16.27	14.54	14.27	
27	09.19	07.39	06.01	05.11	20.24-20.44/20	03.33	02.54	04.09	05.46	07.16	07.45	09.24	10.16	
	15.50	17.31	18.55	21.29	23.06		23.55	22.44	20.58	19.08	16.24	14.52	14.28	
28	09.16	07.36	05.57	05.07	20.24-20.43/19	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16	
	15.53	17.34	18.58	21.32	23.09		23.54	22.41	20.54	19.04	16.21	14.50	14.29	
29	09.13		06.54	05.04	20.24-20.43/19	03.27	02.57	04.15	05.52	07.21	07.52	09.30	10.15	
	15.56		20.01	21.36	23.12		23.53	22.37	20.51	19.01	16.17	14.47	14.30	
30	09.10		06.50	05.01	20.25-20.42/17	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15	
	16.00		20.04	21.39	23.15		23.52	22.34	20.47	18.57	16.14	14.45	14.32	
31	09.07		06.46		03.22			04.22	05.58		07.58		10.14	
	16.03		20.07		23.18			22.31	20.44		16.11		14.34	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	
Sum of minutes with flicker	0	0	0	146	37	0	0	189	0	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102\WTG: 10 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (244)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102\WTG: 11 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (245)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.49
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.20	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.07	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.51	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.29	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.04
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.52	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.23	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.42	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.24	10.16
	15.50	17.31	18.55	21.29	23.06	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102\WTG: 12 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (246)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.38
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.45	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.09	04.41	06.15	07.42	08.17	09.49
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.20	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.33
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.48	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.56
	14.55	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.29
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.01
	15.00	16.40	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.29	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.46	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.27	05.03	06.36	08.02	08.40	10.04
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.26
14	09.52	08.23	06.47	05.57	04.14	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.09	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.12	16.53	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.15	16.56	18.22	20.55	22.31	23.52	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.51	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.30	19.40	17.54	15.16	14.23
19	09.41	08.06	06.29	05.39	03.58	02.50	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.54	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.51	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	15.00	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.24	10.16
	15.50	17.31	18.55	21.29	23.06	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.31	02.55	04.12	05.49	07.19	07.48	09.27	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.59	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.46	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 13 - PUU01
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24 05.21-05.42/21	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28 05.21-05.41/20	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31 05.21-05.41/20	06.06	07.33	08.07	09.42
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34 05.22-05.39/17	06.09	07.35	08.11	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.09	08.52	07.18	06.28	04.43 05.23-05.26/3	03.09	03.05	04.37 05.25-05.39/14	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.14	06.25	04.40 05.20-05.27/7	03.07	03.07	04.40 05.28-05.38/10	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.36	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36 05.17-05.29/12	03.05	03.10	04.44 05.31-05.37/6	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33 05.14-05.29/15	03.03	03.12	04.47 05.33-05.34/1	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29 05.11-05.30/19	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.01	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26 05.11-05.31/20	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23 05.11-05.31/20	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.10-05.31/21	02.54	03.23	04.59	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16 05.10-05.31/21	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13 05.10-05.31/21	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10 05.10-05.31/21	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06 05.10-05.30/20	02.50	03.34	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03 05.11-05.31/20	02.49	03.37	05.15	06.47	08.14	08.53	10.11
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00 05.11-05.30/19	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57 05.12-05.30/18	02.49	03.43 05.27-05.34/7	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54 05.13-05.30/17	02.49	03.46 05.25-05.35/10	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.50 05.13-05.28/15	02.49	03.50 05.25-05.37/12	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47 05.14-05.28/14	02.49	03.53 05.23-05.38/15	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44 05.15-05.27/12	02.49	03.56 05.22-05.38/16	05.33	07.04	08.32	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.57	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41 05.16-05.24/8	02.50	03.59 05.22-05.40/18	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38 05.19-05.22/3	02.51	04.02 05.21-05.40/19	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05 05.21-05.41/20	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.08 05.20-05.41/21	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12 05.21-05.41/20	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		05.53	05.04	03.27	02.56	04.15 05.21-05.42/21	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		05.50	05.00	03.24	02.57	04.18 05.20-05.41/21	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.21		04.21 05.21-05.42/21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	326	0	221	109	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 14 - PUU02
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	06.55-07.16/21	07.27	08.01	09.36	
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40		18.53	16.07	14.43	
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	06.54-07.16/22	07.30	08.04	09.39	
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36		18.50	16.04	14.41	
3	10.11	08.58	07.25	06.35	07.08-07.14/6	04.50	03.14	03.01	04.31	06.06	06.54-07.16/22	07.33	08.07	09.41
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33		18.46	16.01	14.39	
4	10.10	08.55	07.21	06.32	07.04-07.15/11	04.46	03.12	03.03	04.34	06.09	06.53-07.14/21	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29		18.43	15.57	14.37	
5	10.08	08.52	07.18	06.28	07.01-07.17/16	04.43	03.09	03.05	04.37	06.12	06.54-07.14/20	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26		18.39	15.54	14.35	
6	10.07	08.48	07.14	06.25	06.58-07.17/19	04.40	03.07	03.08	04.41	06.15	06.54-07.13/19	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22		18.36	15.51	14.33	
7	10.05	08.45	07.11	06.21	06.57-07.18/21	04.36	03.05	03.10	04.44	06.18	06.56-07.12/16	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19		18.32	15.48	14.32	
8	10.04	08.42	07.07	06.18	06.56-07.17/21	04.33	03.03	03.12	04.47	06.21	06.58-07.10/12	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15		18.29	15.45	14.30	
9	10.02	08.39	07.04	06.14	06.56-07.18/22	04.29	03.01	03.15	04.50	06.24	07.01-07.07/6	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11		18.25	15.42	14.29	
10	10.00	08.36	07.00	06.10	06.55-07.17/22	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58	
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08		18.22	15.38	14.28	
11	09.58	08.32	06.57	06.07	06.56-07.17/21	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01	
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04		18.18	15.35	14.27	
12	09.56	08.29	06.53	06.03	06.56-07.16/20	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02	
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01		18.15	15.32	14.26	
13	09.54	08.26	06.50	06.00	06.56-07.15/19	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04	
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57		18.11	15.29	14.25	
14	09.52	08.23	06.46	05.56	06.57-07.14/17	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06	
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54		18.08	15.26	14.24	
15	09.50	08.19	06.43	05.53	06.58-07.11/13	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.08	
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50		18.04	15.24	14.23	
16	09.48	08.16	06.39	05.49	07.00-07.09/9	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09	
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46		18.01	15.21	14.23	
17	09.45	08.13	06.36	05.46		04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10	
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43		17.57	15.18	14.23	
18	09.43	08.09	06.32	05.42		04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12	
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39		17.54	15.15	14.22	
19	09.40	08.06	06.29	05.39		03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13	
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36		17.51	15.12	14.22	
20	09.38	08.03	06.25	05.35		03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.14	
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32		17.47	15.09	14.22	
21	09.35	07.59	06.22	05.32		03.51	02.49	03.50	05.27	06.58	08.26	09.06	10.14	
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29		17.44	15.07	14.23	
22	09.33	07.56	06.18	05.28		03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15	
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25		17.40	15.04	14.23	
23	09.30	07.52	06.14	05.25		03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15	
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22		17.37	15.01	14.24	
24	09.27	07.49	06.11	05.21		03.41	02.50	03.59	05.36	07.07	08.36	09.15	10.16	
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18		17.34	14.59	14.24	
25	09.24	07.46	06.07	05.18		03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16	
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14		16.30	14.56	14.25	
26	09.22	07.42	06.04	05.14		03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16	
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11		16.27	14.54	14.26	
27	09.19	07.39	06.00	05.11		03.33	02.53	04.09	05.45	07.02-07.11/9	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.44	20.58	19.07		16.23	14.52	14.27	
28	09.16	07.35	05.57	05.07		03.30	02.55	04.12	05.48	06.59-07.13/14	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04		16.20	14.49	14.29	
29	09.13		06.53	05.04		03.27	02.56	04.15	05.51	06.58-07.14/16	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00		16.17	14.47	14.30	
30	09.10		06.50	05.00		03.24	02.58	04.18	05.54	06.57-07.15/18	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57		16.14	14.45	14.31	
31	09.07		06.46			03.22		04.21	05.57	06.55-07.15/20		07.58		10.14
	16.02		20.06		23.17		22.31	20.43			16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	159	305	198	0	137
Sum of minutes with flicker	0	0	0	237	0	0	0	77	0	159	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 15 - PUU03
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.46	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 16 - PUU04
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.40	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.06	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 17 - PUU05
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 18 - PUU06
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 19 - PUU07
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 20 - PUU08
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13 14.36	09.04 16.06	07.32 17.36	06.42 20.09	18.56-19.14/18	04.57 21.41	03.19 23.20	03.00 23.50	04.25 22.27	06.00 20.40	07.27 18.53	08.01 16.07	09.36 14.43	
2	10.12 14.38	09.01 16.09	07.28 17.39	06.39 20.12	18.58-19.13/15	04.53 21.45	03.17 23.23	03.00 23.48	04.28 22.24	06.03 20.36	07.30 18.50	08.04 16.04	09.38 14.41	
3	10.11 14.40	08.58 16.12	07.25 17.42	06.35 20.15	18.59-19.10/11	04.50 21.48	03.14 23.25	03.02 23.46	04.31 22.20	06.06 20.33	07.32 18.46	08.07 16.01	09.41 14.39	
4	10.09 14.42	08.54 16.16	07.21 17.46	06.32 20.18	19.03-19.07/4	04.46 21.51	03.12 23.28	03.04 23.45	04.34 22.17	06.09 20.29	07.35 18.43	08.10 15.57	09.44 14.37	
5	10.08 14.44	08.51 16.19	07.18 17.49	06.28 20.21		04.43 21.54	03.09 23.31	03.06 23.43	04.37 22.14	06.12 20.26	07.38 18.39	08.14 15.54	09.46 14.35	
6	10.07 14.46	08.48 16.22	07.14 17.52	06.25 20.24		04.40 21.58	03.07 23.33	03.08 23.41	04.41 22.10	06.15 20.22	07.41 18.36	08.17 15.51	09.49 14.34	
7	10.05 14.49	08.45 16.26	07.11 17.55	06.21 20.27		04.36 22.01	03.05 23.36	03.10 23.39	04.44 22.07	06.18 20.18	07.44 18.32	08.20 15.48	09.51 14.32	
8	10.04 14.51	08.42 16.29	07.07 17.58	06.18 20.30		04.33 22.04	03.03 23.38	03.13 23.37	04.47 22.04	06.21 20.15	18.58-19.00/2	07.47 18.29	08.23 15.45	09.54 14.30
9	10.02 14.54	08.39 16.32	07.04 18.01	06.14 20.33		04.30 22.07	03.01 23.40	03.15 23.34	04.50 22.00	06.24 20.11	18.53-19.04/11	07.50 18.25	08.26 15.42	09.56 14.29
10	10.00 14.57	08.35 16.36	07.00 18.04	06.10 20.36		04.26 22.11	02.58 23.42	03.18 23.32	04.53 21.57	06.26 20.08	18.50-19.05/15	07.53 18.22	08.30 15.39	09.58 14.28
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39		04.23 22.14	02.56 23.44	03.20 23.30	04.56 21.53	06.29 20.04	18.49-19.06/17	07.56 18.18	08.33 15.35	10.00 14.27
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42		04.20 22.17	02.55 23.46	03.23 23.27	05.00 21.50	06.32 20.01	18.48-19.07/19	07.59 18.15	08.36 15.32	10.02 14.26
13	09.54 15.05	08.26 16.45	06.50 18.13	06.00 20.45		04.16 22.20	02.53 23.48	03.26 23.25	05.03 21.46	06.35 19.57	18.47-19.07/20	08.02 18.11	08.40 15.29	10.04 14.25
14	09.52 15.08	08.22 16.49	06.46 18.16	05.56 20.48		04.13 22.24	02.52 23.49	03.29 23.22	05.06 21.43	06.38 19.54	18.46-19.08/22	08.05 18.08	08.43 15.26	10.06 14.24
15	09.50 15.11	08.19 16.52	06.43 18.19	05.53 20.51		04.10 22.27	02.51 23.51	03.32 23.19	05.09 21.40	06.41 19.50	18.45-19.07/22	08.08 18.04	08.46 15.24	10.07 14.24
16	09.47 15.14	08.16 16.55	06.39 18.22	05.49 20.54		04.06 22.30	02.51 23.52	03.35 23.16	05.12 21.36	06.44 19.46	18.45-19.06/21	08.11 18.01	08.49 15.21	10.09 14.23
17	09.45 15.17	08.12 16.58	06.36 18.25	05.46 20.58		04.03 22.33	02.50 23.53	03.38 23.14	05.15 21.33	06.46 19.43	18.45-19.05/20	08.14 17.57	08.52 15.18	10.10 14.23
18	09.43 15.20	08.09 17.02	06.32 18.28	05.42 21.01		04.00 22.37	02.49 23.54	03.41 23.11	05.18 21.29	06.49 19.39	18.46-19.02/16	08.17 17.54	08.56 15.15	10.11 14.22
19	09.40 15.23	08.06 17.05	06.29 18.31	05.39 21.04		03.57 22.40	02.49 23.55	03.44 23.08	05.21 21.26	06.52 19.36	18.46-18.58/12	08.20 17.50	08.59 15.12	10.12 14.22
20	09.38 15.26	08.02 17.08	06.25 18.34	05.35 21.07		03.54 22.43	02.49 23.55	03.47 23.05	05.24 21.22	06.55 19.32	18.46-18.54/8	08.23 17.47	09.02 15.09	10.13 14.23
21	09.35 15.30	07.59 17.11	06.21 18.37	05.32 21.10		03.51 22.46	02.49 23.56	03.50 23.02	05.27 21.19	06.58 19.29	18.48-18.50/2	08.26 17.44	09.05 15.07	10.14 14.23
22	09.32 15.33	07.56 17.14	06.18 18.40	18.04-18.05/1	05.28	03.48	02.49	03.53	05.30	07.01		08.29	09.09	10.15
23	09.30 15.36	07.52 17.18	06.14 18.43	18.01-18.07/6	05.25	03.45	02.50	03.56	05.33	07.04		08.32	09.12	10.15
24	09.27 15.39	07.49 17.21	06.11 18.45	17.59-18.10/11	05.21	03.42	02.51	03.59	05.36	07.07		08.35	09.15	10.15
25	09.24 15.43	07.45 17.24	06.07 18.48	17.58-18.13/15	05.18	03.39	02.51	04.02	05.39	07.09		08.38	09.18	10.16
26	09.21 15.46	07.42 17.27	06.04 18.51	17.57-18.16/19	05.14	03.36	02.52	04.05	05.42	07.12		08.42	09.21	10.16
27	09.18 15.49	07.39 17.30	06.00 18.54	17.56-18.18/22	05.11	03.33	02.53	04.09	05.45	07.15		08.45	09.24	10.16
28	09.16 15.53	07.35 17.33	05.57 18.57	17.55-18.17/22	05.07	03.30	02.55	04.12	05.48	07.18		08.48	09.27	10.15
29	09.13 15.56	07.32 17.36	05.53 18.59	18.56-19.17/21	05.04	03.27	02.56	04.15	05.51	07.21		08.51	09.30	10.15
30	09.10 15.59	07.29 17.39	05.50 18.59	18.55-19.16/21	05.00	03.24	02.58	04.18	05.54	07.24		08.54	09.33	10.14
31	09.07 16.02	07.26 17.42	05.46 18.56	18.56-19.16/20	04.57	03.21	02.57	04.21	05.57	07.27		08.57	09.34	10.14
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137	0	
Sum of minutes with flicker	0	0	158	48	0	0	0	0	207	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 21 - PUU09
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	04.57	20.06-20.20/14	03.19	02.59	04.25	06.00	07.27	08.01	09.36	
	14.35	16.06	17.36	20.09	21.41		23.20	23.50	22.27	20.40	18.53	16.07	14.43	
2	10.12	09.01	07.28	06.39	04.53	20.08-20.18/10	03.16	03.01	04.28	06.03	07.30	08.04	09.39	
	14.37	16.09	17.39	20.12	21.45		23.23	23.48	22.24	20.36	18.50	16.04	14.41	
3	10.11	08.58	07.25	06.35	04.50		03.14	03.01	04.31	06.06	07.32	08.07	09.41	
	14.39	16.12	17.42	20.15	21.48		23.26	23.47	22.20	20.33	18.46	16.00	14.39	
4	10.10	08.55	07.21	06.32	04.46		03.12	03.03	04.34	06.09	07.35	08.10	09.44	
	14.42	16.16	17.45	20.18	21.51		23.28	23.45	22.17	20.29	18.43	15.57	14.37	
5	10.08	08.51	07.18	06.28	04.43		03.09	03.05	04.37	06.12	07.38	08.14	09.47	
	14.44	16.19	17.49	20.21	21.54		23.31	23.43	22.14	20.26	18.39	15.54	14.35	
6	10.07	08.48	07.14	06.25	04.40		03.07	03.08	04.41	06.15	07.41	08.17	09.49	
	14.46	16.22	17.52	20.24	21.58		23.33	23.41	22.10	20.22	18.36	15.51	14.33	
7	10.05	08.45	07.11	06.21	04.36		03.05	03.10	04.44	06.18	07.44	08.20	09.51	
	14.49	16.26	17.55	20.27	22.01		23.36	23.39	22.07	20.18	18.32	15.48	14.32	
8	10.04	08.42	07.07	06.17	04.33		03.03	03.12	04.47	06.21	07.47	08.23	09.54	
	14.51	16.29	17.58	20.30	22.04		23.38	23.37	22.04	20.15	18.29	15.45	14.30	
9	10.02	08.39	07.04	06.14	04.29		03.01	03.15	04.50	06.23	07.50	08.27	09.56	
	14.54	16.32	18.01	20.33	22.07		23.40	23.34	22.00	20.11	18.25	15.42	14.29	
10	10.00	08.35	07.00	06.10	04.26		02.57	03.18	04.53	20.18-20.23/5	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11		23.42	23.32	21.57	20.08	18.22	15.38	14.28	
11	09.58	08.32	06.57	06.07	04.23		02.56	03.20	04.56	20.15-20.27/12	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14		23.44	23.30	21.53	20.04	18.18	15.35	14.27	
12	09.56	08.29	06.53	06.03	04.19		02.55	03.23	04.59	20.13-20.29/16	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17		23.46	23.27	21.50	20.01	18.15	15.32	14.26	
13	09.54	08.26	06.50	06.00	04.16		02.53	03.26	05.03	20.12-20.30/18	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20		23.48	23.25	21.47	19.57	18.11	15.29	14.25	
14	09.52	08.22	06.46	05.56	04.13		02.52	03.29	05.06	20.10-20.30/20	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24		23.49	23.22	21.43	19.53	18.08	15.26	14.24	
15	09.50	08.19	06.43	05.53	20.11-20.13/2		02.51	03.32	05.09	20.09-20.31/22	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27		23.51	23.19	21.40	19.50	18.04	15.23	14.23	
16	09.47	08.16	06.39	05.49	20.09-20.16/7		02.50	03.34	05.12	20.09-20.32/23	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30		23.52	23.17	21.36	19.46	18.01	15.21	14.23	
17	09.45	08.12	06.36	05.46	20.06-20.18/12		02.50	03.37	05.15	20.07-20.31/24	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.33		23.53	23.14	21.33	19.43	17.57	15.18	14.23	
18	09.43	08.09	06.32	05.42	20.05-20.21/16		02.49	03.40	05.18	20.07-20.32/25	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37		23.54	23.11	21.29	19.39	17.54	15.15	14.22	
19	09.40	08.06	06.29	05.39	20.04-20.25/21		02.49	03.43	05.21	20.07-20.32/25	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40		23.55	23.08	21.26	19.36	17.50	15.12	14.22	
20	09.38	08.02	06.25	05.35	20.02-20.25/23		02.49	03.47	05.24	20.07-20.32/25	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43		23.55	23.05	21.22	19.32	17.47	15.09	14.22	
21	09.35	07.59	06.21	05.31	20.02-20.26/24		02.49	03.50	05.27	20.06-20.31/25	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46		23.56	23.02	21.19	19.29	17.44	15.07	14.23	
22	09.32	07.56	06.18	05.28	20.02-20.26/24		02.49	03.53	05.30	20.06-20.30/24	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50		23.56	22.59	21.15	19.25	17.40	15.04	14.23	
23	09.30	07.52	06.14	05.24	20.01-20.26/25		02.50	03.56	05.33	20.07-20.30/23	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53		23.56	22.56	21.12	19.21	17.37	15.01	14.24	
24	09.27	07.49	06.11	05.21	20.01-20.25/24		02.50	03.59	05.36	20.08-20.28/20	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56		23.56	22.53	21.08	19.18	17.33	14.59	14.24	
25	09.24	07.45	06.07	05.17	20.01-20.25/24		02.51	04.02	05.39	20.08-20.24/16	07.09	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59		23.55	22.50	21.05	19.14	16.30	14.56	14.25	
26	09.21	07.42	06.04	05.14	20.01-20.25/24		02.52	04.05	05.42	20.09-20.21/12	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02		23.55	22.47	21.01	19.11	16.27	14.54	14.26	
27	09.18	07.39	06.00	05.11	20.01-20.24/23		02.53	04.09	05.45	20.11-20.18/7	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05		23.54	22.43	20.57	19.07	16.23	14.52	14.27	
28	09.16	07.35	05.57	05.07	20.02-20.24/22		02.55	04.12	05.48	20.14-20.15/1	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08		23.53	22.40	20.54	19.04	16.20	14.49	14.29	
29	09.13		05.53	05.04	20.03-20.23/20		02.56	04.15	05.51		07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11		23.52	22.37	20.50	19.00	16.17	14.47	14.30	
30	09.10		06.49	05.00	20.04-20.22/18		02.58	04.18	05.54		07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14		23.51	22.34	20.47	18.57	16.13	14.45	14.31	
31	09.07		06.46		03.22			04.21	05.57		07.57		10.14	
	16.02		20.06		23.17			22.30	20.43		16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	
Sum of minutes with flicker	0	0	0	309	24	0	0	343	0	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 22 - PUU10
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.13 14.35	09.04 16.06	07.32 17.36	06.42 20.09	04.57 21.41	03.19 23.20	21.31-21.58/27 23.50	02.59 23.50	21.37-22.03/26 22.27	04.24 20.40	06.00 18.53	07.27 16.07	08.01 14.43
2	10.12 14.37	09.01 16.09	07.28 17.39	06.39 20.12	04.53 21.45	03.16 23.23	21.30-21.58/28 23.48	03.01 23.48	21.37-22.03/26 22.24	04.28 20.36	06.03 18.50	07.29 16.04	08.04 14.41
3	10.11 14.39	08.58 16.12	07.25 17.42	06.35 20.15	04.50 21.48	03.14 23.26	21.31-21.59/28 23.47	03.01 23.47	21.38-22.04/26 22.21	04.31 20.33	06.06 18.46	07.32 16.00	08.07 14.39
4	10.10 14.41	08.55 16.16	07.21 17.45	06.32 20.18	04.46 21.51	03.11 23.28	21.31-21.58/27 23.45	03.03 23.45	21.37-22.04/27 22.17	04.34 20.29	06.09 18.43	07.35 15.57	08.10 14.37
5	10.08 14.44	08.51 16.19	07.18 17.49	06.28 20.21	04.43 21.54	03.09 23.31	21.31-21.59/28 23.43	03.05 23.43	21.37-22.04/27 22.14	04.37 20.26	06.12 18.39	07.38 15.54	08.14 14.35
6	10.07 14.46	08.48 16.22	07.14 17.52	06.25 20.24	04.39 21.58	03.07 23.33	21.31-21.58/27 23.41	03.08 23.41	21.38-22.05/27 22.10	04.40 20.22	06.15 18.35	07.41 15.51	08.17 14.33
7	10.05 14.49	08.45 16.26	07.11 17.55	06.21 20.27	04.36 22.01	03.05 23.36	21.31-21.59/28 23.39	03.10 23.39	21.38-22.05/27 22.07	04.44 20.18	06.18 18.32	07.44 15.48	08.20 14.32
8	10.04 14.51	08.42 16.29	07.07 17.58	06.17 20.30	04.33 22.04	03.03 23.38	21.32-21.59/27 23.37	03.12 23.37	21.38-22.05/27 22.04	04.47 20.15	06.21 18.28	07.47 15.45	08.23 14.30
9	10.02 14.54	08.39 16.32	07.04 18.01	06.14 20.33	04.29 22.07	03.01 23.40	21.32-21.59/27 23.35	03.15 23.35	21.38-22.05/27 22.00	04.50 20.11	06.23 18.25	07.50 15.41	08.27 14.29
10	10.00 14.56	08.35 16.36	07.00 18.04	06.10 20.36	04.26 22.11	02.57 23.42	21.32-21.59/27 23.32	03.17 23.32	21.38-22.06/28 21.57	04.53 20.08	06.26 18.21	07.53 15.38	08.30 14.28
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	04.23 22.14	02.56 23.44	21.32-21.59/27 23.30	03.20 23.30	21.39-22.06/27 21.53	04.56 20.04	06.29 18.18	07.56 15.35	08.33 14.26
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	04.19 22.17	02.54 23.46	21.32-21.59/27 23.27	03.23 23.27	21.39-22.06/27 21.50	04.59 20.01	06.32 18.15	07.59 15.32	08.36 14.25
13	09.54 15.05	08.26 16.45	06.50 18.13	06.00 20.45	04.16 22.20	02.53 23.48	21.33-22.00/27 23.25	03.26 23.25	21.39-22.06/27 21.47	05.03 19.57	06.35 18.11	08.02 15.29	08.40 14.25
14	09.52 15.08	08.22 16.49	06.46 18.16	05.56 20.48	04.13 22.24	02.52 23.50	21.33-21.59/26 23.22	03.28 23.22	21.39-22.06/27 21.43	05.06 19.53	06.38 18.08	08.05 15.26	08.43 14.24
15	09.50 15.11	08.19 16.52	06.43 18.19	05.53 20.51	04.10 22.27	02.51 23.51	21.34-22.00/26 23.19	03.31 23.19	21.39-22.06/27 21.40	05.09 19.50	06.41 18.04	08.08 15.23	08.46 14.23
16	09.47 15.14	08.16 16.55	06.39 18.22	05.49 20.54	04.06 22.30	02.50 23.52	21.34-21.59/25 23.17	03.34 23.17	21.40-22.06/26 21.36	05.12 19.46	06.44 18.01	08.11 15.20	08.49 14.23
17	09.45 15.17	08.12 16.58	06.36 18.25	05.46 20.57	04.03 22.33	02.50 23.53	21.34-22.00/26 23.14	03.37 23.14	21.40-22.06/26 21.33	05.15 19.43	06.46 17.57	08.14 15.18	08.53 14.22
18	09.43 15.20	08.09 17.02	06.32 18.28	05.42 21.01	04.00 22.37	02.49 23.54	21.34-22.00/26 23.11	03.40 23.11	21.40-22.05/25 21.29	05.18 19.39	06.49 17.54	08.17 15.15	08.56 14.22
19	09.40 15.23	08.06 17.05	06.29 18.31	05.38 21.04	03.57 22.40	02.49 23.55	21.35-22.00/25 23.08	03.43 23.08	21.41-22.06/25 21.26	05.21 19.36	06.52 17.50	08.20 15.12	08.59 14.22
20	09.38 15.26	08.02 17.08	06.25 18.34	05.35 21.07	03.54 22.43	02.49 23.55	21.35-22.01/26 23.05	03.46 23.05	21.41-22.05/24 21.22	05.24 19.32	06.55 17.47	08.23 15.09	09.02 14.22
21	09.35 15.29	07.59 17.11	06.21 18.37	05.31 21.10	03.50 22.46	02.49 23.56	21.35-22.01/26 23.02	03.50 23.02	21.41-22.04/23 21.19	05.27 19.29	06.58 17.44	08.26 15.07	09.05 14.23
22	09.32 15.33	07.56 17.14	06.18 18.40	05.28 21.13	03.47 22.50	02.49 23.56	21.35-22.01/26 22.59	03.53 22.59	21.43-22.03/20 21.15	05.30 19.25	07.01 17.40	08.29 15.04	09.09 14.23
23	09.30 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.53	02.50 23.56	21.36-22.02/26 22.56	03.56 22.56	21.43-22.00/17 21.12	05.33 19.21	07.04 17.37	08.32 15.01	09.12 14.23
24	09.27 15.39	07.49 17.21	06.11 18.45	05.21 21.19	03.41 22.56	02.50 23.56	21.36-22.01/25 22.53	03.59 22.53	21.45-21.58/13 21.08	05.36 19.18	07.06 17.33	08.35 14.59	09.15 14.24
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	03.38 22.59	02.51 23.56	21.36-22.02/26 22.50	04.02 22.50	21.45-21.55/10 21.05	05.39 19.14	07.09 16.30	07.38 14.56	09.18 14.25
26	09.21 15.46	07.42 17.27	06.04 18.51	05.14 21.26	03.35 23.02	02.52 23.55	21.36-22.02/26 22.47	04.05 22.47	21.47-21.53/6 21.01	05.42 19.11	07.12 16.27	07.42 14.54	09.21 14.26
27	09.18 15.49	07.39 17.30	06.00 18.54	05.10 21.29	03.33 23.05	02.53 23.54	21.36-22.02/26 22.43	04.08 22.43	21.49-21.50/1 20.57	05.45 19.07	07.15 16.23	07.45 14.51	09.24 14.27
28	09.16 15.52	07.35 17.33	05.57 18.57	05.07 21.32	03.30 23.08	02.54 23.53	21.36-22.03/27 22.40	04.12 22.40	05.48 20.54	07.18 19.04	07.48 16.20	08.27 14.49	09.27 14.28
29	09.13 15.56	07.33 17.36	05.53 18.53	05.03 21.35	03.27 23.11	02.56 23.52	21.37-22.03/26 22.37	04.15 22.37	05.51 20.50	07.21 19.00	07.51 16.17	09.30 14.47	09.30 14.30
30	09.10 15.59	07.30 17.39	05.49 18.54	05.00 21.38	03.24 23.14	02.58 23.51	21.37-22.03/26 22.34	04.18 22.34	05.54 20.47	07.24 18.57	07.54 16.13	09.33 14.45	09.33 14.31
31	09.07 16.02	07.27 17.44	05.46 18.59	05.00 21.41	03.21 23.17	03.21 23.17	21.37-22.03/26 22.31	04.21 22.30	05.57 20.43	07.57 16.10	07.57 15.00	09.34 14.33	09.34 14.33
Potential sun hours	171	238	363	451	570	624	795	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	309	795	619	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 23 - PUU11
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 24 - PUU12
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	17.44-18.09/25	08.01	09.36	
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53		16.07	14.43	
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29	17.44-18.08/24	08.04	09.38	
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50		16.04	14.41	
3	10.11	08.58	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	17.45-18.06/21	08.07	09.41	
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46		16.01	14.39	
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35	17.46-18.03/17	08.10	09.44	
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43		15.57	14.37	
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	17.48-18.00/12	08.13	09.46	
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39		15.54	14.35	
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	17.51-17.56/5	08.17	09.49	
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36		15.51	14.34	
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44		08.20	09.51	
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32		15.48	14.32	
8	10.03	08.42	07.07	17.12-17.21/9	06.17	04.33	03.03	03.13	04.47	06.21		08.23	09.54	
	14.51	16.29	17.58		20.30	22.04	23.38	23.37	22.04	20.15		18.29	15.45	14.30
9	10.02	08.39	07.04	17.09-17.24/15	06.14	04.30	03.01	03.15	04.50	06.23		08.26	09.56	
	14.54	16.32	18.01		20.33	22.07	23.40	23.34	22.00	20.11		18.25	15.42	14.29
10	10.00	08.35	07.00	17.08-17.28/20	06.10	04.26	02.58	03.18	04.53	06.26		08.30	09.58	
	14.57	16.36	18.04		20.36	22.11	23.42	23.32	21.57	20.08		18.22	15.39	14.28
11	09.58	08.32	06.57	17.06-17.29/23	06.07	04.23	02.56	03.20	04.56	06.29		08.33	10.00	
	14.59	16.39	18.07		20.39	22.14	23.44	23.30	21.53	20.04		18.18	15.35	14.27
12	09.56	08.29	06.53	17.06-17.30/24	06.03	04.20	02.55	03.23	05.00	06.32		08.36	10.02	
	15.02	16.42	18.10		20.42	22.17	23.46	23.27	21.50	20.01		18.15	15.32	14.26
13	09.54	08.26	06.50	17.04-17.30/26	06.00	04.16	02.53	03.26	05.03	06.35		08.02	08.39	10.04
	15.05	16.45	18.13		20.45	22.20	23.48	23.24	21.46	19.57		18.11	15.29	14.25
14	09.52	08.22	06.46	17.03-17.30/27	05.56	04.13	02.52	03.29	05.06	06.38		08.05	08.43	10.06
	15.08	16.49	18.16		20.48	22.24	23.49	23.22	21.43	19.53		18.08	15.26	14.24
15	09.50	08.19	06.43	17.03-17.30/27	05.53	04.10	02.51	03.32	05.09	06.41		08.08	08.46	10.07
	15.11	16.52	18.19		20.51	22.27	23.51	23.19	21.39	19.50		18.04	15.24	14.24
16	09.47	08.16	06.39	17.03-17.30/27	05.49	04.06	02.51	03.35	05.12	06.44		08.11	08.49	10.09
	15.14	16.55	18.22		20.54	22.30	23.52	23.16	21.36	19.46		18.01	15.21	14.23
17	09.45	08.12	06.36	17.02-17.29/27	05.46	04.03	02.50	03.38	05.15	06.46		08.14	08.52	10.10
	15.17	16.58	18.25		20.57	22.33	23.53	23.14	21.33	19.43		18.04	15.18	14.23
18	09.42	08.09	06.32	17.03-17.29/26	05.42	04.00	02.49	03.41	05.18	06.49		08.17	08.56	10.11
	15.20	17.02	18.28		21.01	22.37	23.54	23.11	21.29	19.39		18.04	15.15	14.23
19	09.40	08.06	06.29	17.02-17.28/26	05.39	03.57	02.49	03.44	05.21	06.52	17.59-18.04/5	08.20	08.59	10.12
	15.23	17.05	18.31		21.04	22.40	23.55	23.08	21.26	19.36		18.04	15.12	14.22
20	09.37	08.02	06.25	17.04-17.27/23	05.35	03.54	02.49	03.47	05.24	06.55	17.54-18.07/13	08.23	09.02	10.13
	15.26	17.08	18.34		21.07	22.43	23.55	23.05	21.22	19.32		18.04	15.09	14.23
21	09.35	07.59	06.21	17.04-17.25/21	05.32	03.51	02.49	03.50	05.27	06.58	17.51-18.09/18	08.26	09.05	10.14
	15.30	17.11	18.37		21.10	22.46	23.55	23.02	21.19	19.29		18.04	15.07	14.23
22	09.32	07.56	06.18	17.06-17.24/18	05.28	03.48	02.49	03.53	05.30	07.01	17.49-18.10/21	08.29	09.08	10.15
	15.33	17.14	18.40		21.13	22.49	23.56	22.59	21.15	19.25		18.04	15.04	14.23
23	09.30	07.52	06.14	17.07-17.22/15	05.25	03.45	02.50	03.56	05.33	07.04	17.48-18.11/23	08.32	09.12	10.15
	15.36	17.18	18.42		21.16	22.53	23.56	22.56	21.12	19.21		18.04	15.01	14.24
24	09.27	07.49	06.11	17.10-17.18/8	05.21	03.42	02.51	03.59	05.36	07.06	17.47-18.11/24	08.35	09.15	10.15
	15.39	17.21	18.45		21.19	22.56	23.55	22.53	21.08	19.18		18.04	14.59	14.24
25	09.24	07.45	06.07		05.18	03.39	02.51	04.02	05.39	07.09	17.46-18.12/26	08.38	09.18	10.16
	15.43	17.24	18.48		21.22	22.59	23.55	22.50	21.04	19.14		18.04	14.56	14.25
26	09.21	07.42	06.04		05.14	03.36	02.52	04.05	05.42	07.12	17.45-18.12/27	08.42	09.21	10.16
	15.46	17.27	18.51		21.25	23.02	23.55	22.46	21.01	19.11		18.04	14.54	14.26
27	09.18	07.38	06.00		05.11	03.33	02.54	04.09	05.45	07.15	17.44-18.11/27	08.45	09.24	10.15
	15.49	17.30	18.54		21.29	23.05	23.54	22.43	20.57	19.07		18.04	14.52	14.27
28	09.15	07.35	05.57		05.07	03.30	02.55	04.12	05.48	07.18	17.43-18.11/28	08.48	09.27	10.15
	15.52	17.33	18.57		21.32	23.08	23.53	22.40	20.54	19.04		18.04	14.49	14.29
29	09.13		05.53		05.04	03.27	02.56	04.15	05.51	07.21	17.43-18.10/27	08.51	09.30	10.15
	15.56		20.00		21.35	23.11	23.52	22.37	20.50	19.00		18.04	14.47	14.30
30	09.10		06.49		05.00	03.24	02.58	04.18	05.54	07.24	17.43-18.10/27	08.54	09.33	10.14
	15.59		20.03		21.38	23.14	23.51	22.34	20.47	18.57		18.04	14.45	14.32
31	09.07		06.46			03.22		04.21	05.57			08.57	09.36	10.14
	16.02		20.06			23.17		22.30	20.43			16.10	14.41	14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137	0	
Sum of minutes with flicker	0	0	362	0	0	0	0	0	266	104	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 25 - PUU13
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	04.57	19.33-20.05/32	03.19	02.59	04.25	06.00	07.27	08.01	09.36	
	14.35	16.06	17.36	20.09	21.41		23.20	23.50	22.27	20.40	18.53	16.07	14.43	
2	10.12	09.01	07.28	06.39	04.53	19.34-20.05/31	03.16	03.01	04.28	06.03	07.29	08.04	09.38	
	14.37	16.09	17.39	20.12	21.45		23.23	23.48	22.24	20.36	18.50	16.04	14.41	
3	10.11	08.58	07.25	06.35	04.50	19.35-20.04/29	03.14	03.01	04.31	06.06	07.32	08.07	09.41	
	14.39	16.12	17.42	20.15	21.48		23.25	23.46	22.20	20.33	18.46	16.00	14.39	
4	10.09	08.54	07.21	06.32	04.46	19.35-20.03/28	03.12	03.03	04.34	19.54-20.03/9	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51		23.28	23.45	22.17	20.29	18.43	15.57	14.37	
5	10.08	08.51	07.18	06.28	04.43	19.37-20.01/24	03.09	03.05	04.37	19.51-20.06/15	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54		23.31	23.43	22.14	20.25	18.39	15.54	14.35	
6	10.07	08.48	07.14	06.25	04.40	19.38-20.00/22	03.07	03.08	04.40	19.49-20.08/19	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58		23.33	23.41	22.10	20.22	18.35	15.51	14.33	
7	10.05	08.45	07.11	06.21	04.36	19.40-19.58/18	03.05	03.10	04.44	19.47-20.09/22	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01		23.36	23.39	22.07	20.18	18.32	15.48	14.32	
8	10.03	08.42	07.07	06.17	04.33	19.42-19.55/13	03.03	03.12	04.47	19.45-20.11/26	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04		23.38	23.37	22.04	20.15	18.28	15.45	14.30	
9	10.02	08.39	07.04	06.14	04.29	19.47-19.50/3	03.01	03.15	04.50	19.44-20.12/28	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07		23.40	23.34	22.00	20.11	18.25	15.41	14.29	
10	10.00	08.35	07.00	06.10	04.26		02.58	03.18	04.53	19.42-20.12/30	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11		23.42	23.32	21.57	20.08	18.22	15.38	14.28	
11	09.58	08.32	06.57	06.07	04.23		02.56	03.20	04.56	19.42-20.13/31	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14		23.44	23.30	21.53	20.04	18.18	15.35	14.27	
12	09.56	08.29	06.53	06.03	19.47-19.58/11	04.19	02.55	03.23	04.59	19.41-20.14/33	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17		23.46	23.27	21.50	20.01	18.15	15.32	14.26	
13	09.54	08.26	06.50	06.00	19.44-20.02/18	04.16	02.53	03.26	05.03	19.40-20.14/34	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20		23.48	23.25	21.46	19.57	18.11	15.29	14.25	
14	09.52	08.22	06.46	05.56	19.40-20.03/23	04.13	02.52	03.29	05.06	19.39-20.14/35	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24		23.49	23.22	21.43	19.53	18.08	15.26	14.24	
15	09.50	08.19	06.43	05.53	19.39-20.05/26	04.10	02.51	03.32	05.09	19.39-20.14/35	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27		23.51	23.19	21.40	19.50	18.04	15.23	14.23	
16	09.47	08.16	06.39	05.49	19.38-20.06/28	04.06	02.50	03.34	05.12	19.39-20.15/36	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30		23.52	23.16	21.36	19.46	18.01	15.21	14.23	
17	09.45	08.12	06.36	05.46	19.36-20.06/30	04.03	02.50	03.37	05.15	19.37-20.14/37	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33		23.53	23.14	21.33	19.43	17.57	15.18	14.23	
18	09.42	08.09	06.32	05.42	19.35-20.07/32	04.00	02.49	03.40	05.18	19.37-20.14/37	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37		23.54	23.11	21.29	19.39	17.54	15.15	14.22	
19	09.40	08.06	06.28	05.38	19.34-20.08/34	03.57	02.49	03.43	05.21	19.37-20.14/37	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40		23.55	23.08	21.26	19.36	17.50	15.12	14.22	
20	09.37	08.02	06.25	05.35	19.33-20.08/35	03.54	02.49	03.47	05.24	19.37-20.14/37	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43		23.55	23.05	21.22	19.32	17.47	15.09	14.22	
21	09.35	07.59	06.21	05.31	19.32-20.08/36	03.51	02.49	03.50	05.27	19.37-20.13/36	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46		23.56	23.02	21.19	19.29	17.44	15.07	14.23	
22	09.32	07.56	06.18	05.28	19.32-20.09/37	03.47	02.49	03.53	05.30	19.37-20.13/36	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49		23.56	22.59	21.15	19.25	17.40	15.04	14.23	
23	09.30	07.52	06.14	05.24	19.32-20.09/37	03.44	02.50	03.56	05.33	19.38-20.12/34	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53		23.56	22.56	21.12	19.21	17.37	15.01	14.24	
24	09.27	07.49	06.11	05.21	19.31-20.08/37	03.41	02.50	03.59	05.36	19.38-20.12/34	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56		23.56	22.53	21.08	19.18	17.33	14.59	14.24	
25	09.24	07.45	06.07	05.17	19.31-20.08/37	03.38	02.51	04.02	05.39	19.38-20.10/32	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59		23.55	22.50	21.04	19.14	16.30	14.56	14.25	
26	09.21	07.42	06.04	05.14	19.31-20.08/37	03.36	02.52	04.05	05.42	19.39-20.09/30	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02		23.55	22.46	21.01	19.11	16.27	14.54	14.26	
27	09.18	07.38	06.00	05.10	19.31-20.07/36	03.33	02.53	04.09	05.45	19.40-20.08/28	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05		23.54	22.43	20.57	19.07	16.23	14.52	14.27	
28	09.16	07.35	05.57	05.07	19.32-20.07/35	03.30	02.55	04.12	05.48	19.41-20.07/26	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08		23.53	22.40	20.54	19.04	16.20	14.49	14.29	
29	09.13		06.53	05.04	19.32-20.07/35	03.27	02.56	04.15	05.51	19.41-20.04/23	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11		23.52	22.37	20.50	19.00	16.17	14.47	14.30	
30	09.10		06.49	05.00	19.32-20.06/34	03.24	02.58	04.18	05.54	19.44-20.01/17	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14		23.51	22.34	20.47	18.57	16.13	14.45	14.31	
31	09.07		06.46		03.22			04.21	05.57	19.47-19.58/11		07.57		10.14
	16.02		20.06		23.17			22.30	20.43		16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	
Sum of minutes with flicker	0	0	0	598	200	0	0	808	0	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 26 - PUU14
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.54	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 27 - PUU15
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.04	07.32	15.40-16.09/29	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35	
	14.36	16.06	17.36		20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43	
2	10.12	09.01	07.28	15.40-16.08/28	06.39	04.53	03.17	03.00	04.28	06.03	07.29	08.04	09.38	
	14.38	16.09	17.39		20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41	
3	10.10	08.57	07.25	15.41-16.06/25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41	
	14.40	16.12	17.42		20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.00	14.39	
4	10.09	08.54	07.21	15.43-16.05/22	06.32	04.46	03.12	03.04	04.34	06.09	07.35	08.10	09.44	
	14.42	16.16	17.45		20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37	
5	10.08	08.51	07.18	15.44-16.03/19	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.13	09.46	
	14.44	16.19	17.49		20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35	
6	10.06	08.48	07.14	15.47-15.59/12	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49	
	14.46	16.22	17.52		20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.34	
7	10.05	08.45	07.11		06.21	04.36	03.05	03.10	04.44	06.18	07.44	16.25-16.33/8	08.20	09.51
	14.49	16.26	17.55		20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.48	14.32	
8	10.03	08.42	07.07		06.17	04.33	03.03	03.13	04.47	06.21	07.47	16.21-16.37/16	08.23	09.54
	14.51	16.29	17.58		20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.45	14.31	
9	10.02	08.39	07.04		06.14	04.29	03.01	03.15	04.50	06.23	07.50	16.18-16.39/21	08.26	09.56
	14.54	16.32	18.01		20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29	
10	10.00	08.35	07.00		06.10	04.26	02.58	03.18	04.53	06.26	07.53	16.16-16.40/24	08.30	09.58
	14.57	16.36	18.04		20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.38	14.28	
11	09.58	08.32	06.57		06.07	04.23	02.56	03.20	04.56	06.29	07.56	16.15-16.41/26	08.33	10.00
	14.59	16.39	18.07		20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.27	
12	09.56	08.29	06.53		06.03	04.20	02.55	03.23	05.00	06.32	07.59	16.13-16.42/29	08.36	10.02
	15.02	16.42	18.10		20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26	
13	09.54	08.26	06.50		06.00	04.16	02.54	03.26	05.03	06.35	08.02	16.12-16.42/30	08.39	10.04
	15.05	16.45	18.13		20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25	
14	09.52	08.22	15.49-16.01/12	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	16.12-16.43/31	08.43	10.05
	15.08	16.49	18.16		20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.26	14.24	
15	09.49	08.19	15.46-16.04/18	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	16.11-16.43/32	08.46	10.07
	15.11	16.52	18.19		20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24	
16	09.47	08.16	15.45-16.07/22	06.39	05.49	04.06	02.51	03.35	05.12	06.44	08.11	16.10-16.43/33	08.49	10.09
	15.14	16.55	18.22		20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23	
17	09.45	08.12	15.43-16.08/25	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	16.10-16.42/32	08.52	10.10
	15.17	16.58	18.25		20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23	
18	09.42	08.09	15.42-16.08/26	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	16.10-16.43/33	08.56	10.11
	15.20	17.02	18.28		21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.23	
19	09.40	08.06	15.41-16.10/29	06.28	05.39	03.57	02.49	03.44	05.21	06.52	08.20	16.10-16.42/32	08.59	10.12
	15.23	17.05	18.31		21.04	22.40	23.54	23.08	21.25	19.36	17.50	15.12	14.22	
20	09.37	08.02	15.40-16.10/30	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	16.10-16.41/31	09.02	10.13
	15.26	17.08	18.34		21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23	
21	09.35	07.59	15.39-16.11/32	06.21	05.32	03.51	02.49	03.50	05.27	06.58	08.26	16.10-16.41/31	09.05	10.14
	15.30	17.11	18.37		21.10	22.46	23.55	23.02	21.18	19.29	17.44	15.07	14.23	
22	09.32	07.56	15.39-16.11/32	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	16.10-16.40/30	09.08	10.14
	15.33	17.14	18.39		21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23	
23	09.29	07.52	15.39-16.11/32	06.14	05.24	03.45	02.50	03.56	05.33	07.04	08.32	16.12-16.40/28	09.11	10.15
	15.36	17.18	18.42		21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.24	
24	09.27	07.49	15.38-16.11/33	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	16.12-16.38/26	09.15	10.15
	15.39	17.21	18.45		21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24	
25	09.24	07.45	15.38-16.11/33	06.07	05.17	03.39	02.51	04.02	05.39	07.09	07.38	15.13-15.37/24	09.18	10.15
	15.43	17.24	18.48		21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25	
26	09.21	07.42	15.39-16.11/32	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.41	15.14-15.35/21	09.21	10.15
	15.46	17.27	18.51		21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.26	
27	09.18	07.38	15.38-16.10/32	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	15.16-15.33/17	09.24	10.15
	15.49	17.30	18.54		21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27	
28	09.15	07.35	15.38-16.09/31	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	15.19-15.30/11	09.27	10.15
	15.52	17.33	18.57		21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29	
29	09.12		05.53	05.04	03.27	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15	
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30		
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14		
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.57	16.14	14.45	14.32		
31	09.07		06.46		03.22	03.22	04.21	05.57		07.57		10.13		
	16.02		20.06		23.17	23.30	22.30	20.43		16.10		14.33		
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137	0	
Sum of minutes with flicker	0	419	135	0	0	0	0	0	0	566	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 28 - PUU16
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13 14.35	09.04 16.06	07.32 17.36	06.42 20.09	04.57 21.41	18.27-19.39/72 23.20
2	10.12 14.37	09.01 16.09	07.28 17.39	06.39 20.12	04.53 21.45	18.27-19.39/72 23.23
3	10.11 14.39	08.57 16.12	07.25 17.42	06.35 20.15	04.50 21.48	18.27-19.39/72 23.25
4	10.09 14.42	08.54 16.16	07.21 17.45	06.32 20.18	04.46 21.51	18.27-19.39/72 23.28
5	10.08 14.44	08.51 16.19	07.18 17.48	06.28 20.21	04.43 21.54	18.27-19.39/72 23.31
6	10.07 14.46	08.48 16.22	07.14 17.52	06.25 20.24	04.39 21.57	18.26-19.39/73 23.33
7	10.05 14.49	08.45 16.26	07.11 17.55	06.21 20.27	04.36 22.01	18.26-19.39/73 23.36
8	10.03 14.51	08.42 16.29	07.07 17.58	06.17 20.30	04.33 22.04	18.26-19.38/72 23.38
9	10.02 14.54	08.39 16.32	07.04 18.01	06.14 20.33	19.50-19.56/6 19.02-19.11/9	18.26-19.38/72 22.07
10	10.00 14.56	08.35 16.36	07.00 18.04	06.10 20.36	19.49-19.59/10 18.56-19.18/22	18.26-19.38/72 22.10
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	19.47-20.01/14 18.52-19.22/30	18.26-19.37/71 22.14
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	19.47-20.04/17 18.48-19.24/36	18.27-19.38/71 22.17
13	09.54 15.05	08.26 16.45	06.50 18.13	06.00 20.45	19.47-20.07/20 18.46-19.27/41	18.27-19.37/70 22.20
14	09.52 15.08	08.22 16.49	06.46 18.16	05.56 20.48	19.46-20.06/20 18.43-19.28/45	18.27-19.36/69 22.24
15	09.49 15.11	08.19 16.52	06.43 18.19	05.53 20.51	19.46-20.06/20 18.42-19.30/48	18.28-19.37/69 22.27
16	09.47 15.14	08.16 16.55	06.39 18.22	05.49 20.54	19.47-20.05/18 18.40-19.31/51	18.28-19.36/68 22.30
17	09.45 15.17	08.12 16.58	06.36 18.25	05.46 20.57	19.46-20.04/18 18.38-19.32/54	18.29-19.36/67 22.33
18	09.42 15.20	08.09 17.02	06.32 18.28	05.42 21.00	19.47-20.03/16 18.37-19.33/56	18.29-19.35/66 22.37
19	09.40 15.23	08.06 17.05	06.28 18.31	05.38 21.04	19.49-20.01/12 18.36-19.34/58	18.30-19.36/66 22.40
20	09.37 15.26	08.02 17.08	06.25 18.34	05.35 21.07	19.51-19.58/7 18.34-19.34/60	18.30-19.35/65 22.43
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	18.33-19.35/62 21.10	18.31-19.35/64 22.46
22	09.32 15.33	07.56 17.14	06.18 18.39	05.28 21.13	18.32-19.36/64 21.13	18.32-19.35/63 22.49
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	18.32-19.37/65 21.16	18.32-19.33/61 22.53
24	09.27 15.39	07.49 17.21	06.11 18.45	05.21 21.19	18.30-19.37/67 21.19	18.33-19.33/60 22.56
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	18.29-19.37/68 21.22	18.34-19.33/59 22.59
26	09.21 15.46	07.42 17.27	06.04 18.51	05.14 21.25	18.29-19.38/69 21.25	18.35-19.33/58 23.02
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.29	18.29-19.38/69 21.29	18.36-19.32/56 23.05
28	09.15 15.52	07.35 17.33	05.57 18.57	05.07 21.32	18.28-19.38/70 21.32	18.36-19.32/56 23.08
29	09.13 15.56		06.53 20.00	05.04 21.35	18.28-19.39/71 21.35	18.37-19.32/55 23.11
30	09.10 15.59		06.49 20.03	05.00 21.38	18.27-19.39/72 21.38	18.38-19.31/53 23.14
31	09.07 16.02		06.46 20.06			18.38-19.30/52 23.17
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	0	1365	2041	1170

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 28 - PUU16
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 18.52-19.31/39 23.49	04.25 18.37-19.48/71 22.27	06.00 19.47-20.01/14 20.40 18.51-19.21/30	07.27 18.53	08.01 16.07	09.36 14.43
2	03.01 18.52-19.32/40 23.48	04.28 18.37-19.48/71 22.24	06.03 19.47-19.57/10 20.36 18.54-19.16/22	07.29 18.50	08.04 16.04	09.38 14.41
3	03.01 18.52-19.33/41 23.46	04.31 18.36-19.48/72 22.20	06.06 19.48-19.54/6 20.33 19.00-19.09/9	07.32 18.46	08.07 16.00	09.41 14.39
4	03.03 18.51-19.33/42 23.45	04.34 18.36-19.48/72 22.17	06.09 19.50-19.51/1 20.29	07.35 18.42	08.10 15.57	09.44 14.37
5	03.05 18.50-19.33/43 23.43	04.37 18.36-19.48/72 22.14	06.12 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	03.08 18.50-19.35/45 23.41	04.40 18.36-19.49/73 22.10	06.15 20.22	07.41 18.35	08.17 15.51	09.49 14.33
7	03.10 18.50-19.36/46 23.39	04.44 18.35-19.48/73 22.07	06.18 20.18	07.44 18.32	08.20 15.48	09.51 14.32
8	03.12 18.49-19.36/47 23.37	04.47 18.36-19.48/72 22.04	06.20 20.15	07.47 18.28	08.23 15.45	09.54 14.30
9	03.15 18.49-19.37/48 23.34	04.50 18.36-19.48/72 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.29
10	03.18 18.49-19.37/48 23.32	04.53 18.35-19.47/72 21.57	06.26 20.08	07.53 18.21	08.30 15.38	09.58 14.28
11	03.20 18.48-19.38/50 23.30	04.56 18.35-19.47/72 21.53	06.29 20.04	07.56 18.18	08.33 15.35	10.00 14.27
12	03.23 18.48-19.39/51 23.27	04.59 18.35-19.47/72 21.50	06.32 20.01	07.59 18.14	08.36 15.32	10.02 14.26
13	03.26 18.47-19.40/53 23.24	05.03 18.36-19.47/71 21.46	06.35 19.57	08.02 18.11	08.39 15.29	10.04 14.25
14	03.29 18.46-19.40/54 23.22	05.06 18.35-19.46/71 21.43	06.38 19.53	08.05 18.08	08.43 15.26	10.06 14.24
15	03.32 18.46-19.41/55 23.19	05.09 18.35-19.46/71 21.39	06.41 19.50	08.08 18.04	08.46 15.23	10.07 14.23
16	03.34 18.45-19.41/56 23.16	05.12 18.36-19.45/69 21.36	06.43 19.46	08.11 18.01	08.49 15.21	10.09 14.23
17	03.37 18.44-19.42/58 23.14	05.15 18.35-19.44/69 21.32	06.46 19.43	08.14 17.57	08.52 15.18	10.10 14.23
18	03.40 18.44-19.42/58 23.11	05.18 18.36-19.43/67 21.29	06.49 19.39	08.17 17.54	08.56 15.15	10.11 14.22
19	03.43 18.44-19.43/59 23.08	05.21 18.37-19.43/66 21.26	06.52 19.36	08.20 17.50	08.59 15.12	10.12 14.22
20	03.47 18.43-19.43/60 23.05	05.24 18.37-19.42/65 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	03.50 18.42-19.44/62 23.02	05.27 18.37-19.41/64 21.19	06.58 19.28	08.26 17.44	09.05 15.07	10.14 14.23
22	03.53 18.42-19.45/63 22.59	05.30 18.38-19.40/62 21.15	07.01 19.25	08.29 17.40	09.08 15.04	10.15 14.23
23	03.56 18.41-19.45/64 22.56	05.33 19.55-20.03/8 21.11 18.39-19.39/60	07.04 19.21	08.32 17.37	09.12 15.01	10.15 14.24
24	03.59 18.41-19.46/65 22.53	05.36 19.52-20.05/13 21.08 18.40-19.38/58	07.06 19.18	08.35 17.33	09.15 14.59	10.15 14.24
25	04.02 18.40-19.46/66 22.50	05.39 19.50-20.05/15 21.04 18.40-19.36/56	07.09 19.14	07.38 16.30	09.18 14.56	10.16 14.25
26	04.05 18.40-19.47/67 22.46	05.42 19.49-20.06/17 21.01 18.41-19.34/53	07.12 19.11	07.41 16.27	09.21 14.54	10.16 14.26
27	04.09 18.39-19.46/67 22.43	05.45 19.48-20.07/19 20.57 18.42-19.33/51	07.15 19.07	07.45 16.23	09.24 14.51	10.15 14.27
28	04.12 18.39-19.47/68 22.40	05.48 19.48-20.07/19 20.54 18.44-19.31/47	07.18 19.04	07.48 16.20	09.27 14.49	10.15 14.29
29	04.15 18.38-19.47/69 22.37	05.51 19.47-20.06/19 20.50 18.44-19.28/44	07.21 19.00	07.51 16.17	09.30 14.47	10.15 14.30
30	04.18 18.38-19.48/70 22.34	05.54 19.47-20.06/19 20.47 18.46-19.26/40	07.24 18.57	07.54 16.13	09.33 14.45	10.14 14.31
31	04.21 18.38-19.48/70 22.30	05.57 19.47-20.04/17 20.43 18.48-19.24/36		07.57 16.10		10.14 14.33
Potential sun hours	609	509	393	305	198	137
Sum of minutes with flicker	1724	2130	92	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 29 - PUU17
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	10.13	09.04	07.32	06.42	04.56	03.19	21.26-21.38/12	02.59	04.24	21.34-21.37/3	06.00	07.26	08.01	09.36	
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42			
2	10.12	09.01	07.28	06.39	04.53	03.16	21.27-21.37/10	03.01	04.28	06.03	07.29	08.04	09.38		
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.04	14.40			
3	10.11	08.57	07.25	06.35	04.50	03.14	21.28-21.36/8	03.01	04.31	06.06	07.32	08.07	09.41		
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.33	18.46	16.00	14.39			
4	10.09	08.54	07.21	06.32	04.46	03.11	21.30-21.35/5	03.03	04.34	06.09	07.35	08.10	09.44		
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37			
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46			
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35			
6	10.07	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49			
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33			
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51			
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32			
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	21.38-21.40/2	04.47	06.20	07.47	08.23	09.54		
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30			
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	21.36-21.43/7	04.50	06.23	07.50	08.26	09.56		
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29			
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	21.35-21.44/9	04.53	06.26	07.53	08.30	09.58		
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28			
11	09.58	08.32	06.57	06.07	04.23	21.24-21.25/1	02.56	03.20	21.34-21.46/12	04.56	06.29	07.56	08.33	10.00	
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26			
12	09.56	08.29	06.53	06.03	04.19	21.24-21.28/4	02.54	03.23	21.33-21.46/13	04.59	06.32	07.59	08.36	10.02	
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25			
13	09.54	08.26	06.50	06.00	04.16	21.22-21.31/9	02.53	03.26	21.32-21.46/14	05.02	06.35	08.02	08.39	10.04	
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25			
14	09.52	08.22	06.46	05.56	04.13	21.21-21.33/12	02.52	03.28	21.32-21.48/16	05.06	06.38	08.05	08.43	10.06	
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24			
15	09.50	08.19	06.43	05.53	04.09	21.21-21.36/15	02.51	03.31	21.32-21.49/17	05.09	06.41	08.08	08.46	10.07	
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23			
16	09.47	08.16	06.39	05.49	04.06	21.20-21.38/18	02.50	03.34	21.31-21.49/18	05.12	06.43	08.11	08.49	10.09	
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.20	14.23			
17	09.45	08.12	06.35	05.45	04.03	21.20-21.40/20	02.49	03.37	21.31-21.49/18	05.15	06.46	08.14	08.52	10.10	
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22			
18	09.42	08.09	06.32	05.42	04.00	21.20-21.41/21	02.49	03.40	21.30-21.50/20	05.18	06.49	08.17	08.56	10.11	
	15.20	17.01	18.28	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22			
19	09.40	08.06	06.28	05.38	03.57	21.19-21.40/21	02.49	03.43	21.31-21.51/20	05.21	06.52	08.20	08.59	10.12	
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22			
20	09.37	08.02	06.25	05.35	03.53	21.20-21.41/21	02.49	03.46	21.30-21.51/21	05.24	06.55	08.23	09.02	10.13	
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22			
21	09.35	07.59	06.21	05.31	03.50	21.20-21.41/21	02.49	03.49	21.30-21.51/21	05.27	06.58	08.26	09.05	10.14	
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22			
22	09.32	07.56	06.18	05.28	03.47	21.19-21.41/22	02.49	03.53	21.30-21.51/21	05.30	07.01	08.29	09.08	10.15	
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23			
23	09.30	07.52	06.14	05.24	03.44	21.20-21.41/21	02.49	03.56	21.30-21.51/21	05.33	07.03	08.32	09.12	10.15	
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23			
24	09.27	07.49	06.11	05.21	03.41	21.20-21.41/21	02.50	03.59	21.30-21.51/21	05.36	07.06	08.35	09.15	10.15	
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24			
25	09.24	07.45	06.07	05.17	03.38	21.21-21.41/20	02.51	04.02	21.30-21.51/21	05.39	07.09	07.38	09.18	10.16	
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25			
26	09.21	07.42	06.04	05.14	03.35	21.21-21.41/20	02.52	04.05	21.30-21.51/21	05.42	07.12	07.41	09.21	10.16	
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26			
27	09.18	07.38	06.00	05.10	03.32	21.22-21.40/18	02.53	04.08	21.31-21.50/19	05.45	07.15	07.45	09.24	10.16	
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27			
28	09.15	07.35	05.56	05.07	03.30	21.23-21.40/17	02.54	04.12	21.31-21.48/17	05.48	07.18	07.48	09.27	10.15	
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28			
29	09.13	07.33	05.53	05.03	03.27	21.23-21.39/16	02.56	04.15	21.31-21.45/14	05.51	07.21	07.51	09.30	10.15	
	15.56	17.36	19.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30			
30	09.10	07.30	05.49	05.00	03.24	21.24-21.39/15	02.57	04.18	21.32-21.43/11	05.54	07.24	07.54	09.33	10.14	
	15.59	17.39	19.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31			
31	09.07	07.27	05.46	05.00	03.21	21.24-21.38/14	02.57	04.21	21.33-21.40/7	05.57	07.27	07.57	09.36	10.14	
	16.02	17.42	19.06	21.41	23.17	23.54	22.30	20.43	18.57	16.10	14.46	14.33			
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137			
Sum of minutes with flicker	0	0	0	0	347	35	381	3	0	0	0	0			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 30 - PUU18
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.33	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.52	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.10	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 31 - PUU19
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12 14.35	09.03 16.06	07.31 17.36	10.17-11.31/74 20.09	06.42 18.43-19.15/32 21.41	04.57 20.16-20.31/15 23.20
2	10.11 14.37	09.00 16.09	07.28 17.39	10.17-11.31/74 20.12	06.39 18.42-19.14/32 21.44	04.53 20.18-20.29/11 23.22
3	10.10 14.39	08.57 16.12	07.25 17.42	10.16-11.30/74 20.15	06.35 18.42-19.15/33 21.48	04.50 20.20-20.26/6 23.25
4	10.09 14.42	08.54 16.16	07.21 17.45	10.16-11.31/75 20.18	06.32 18.41-19.14/33 21.51	04.46 23.28
5	10.08 14.44	08.51 16.19	07.18 17.48	10.15-11.31/76 20.21	06.28 18.42-19.14/32 21.54	04.43 23.30
6	10.06 14.46	08.48 16.22	07.14 17.51	10.15-11.30/75 20.24	06.24 18.42-19.14/32 21.57	04.39 23.33
7	10.05 14.49	08.45 16.26	07.11 17.55	10.15-11.31/76 20.27	06.21 18.42-19.13/31 22.01	04.36 23.35
8	10.03 14.51	08.42 16.29	07.07 17.58	10.14-11.30/76 20.30	06.17 18.42-19.12/30 22.04	04.33 23.38
9	10.02 14.54	08.38 16.32	07.04 18.01	10.14-11.30/76 20.33	06.14 18.42-19.11/29 22.07	04.29 23.40
10	10.00 14.56	08.35 16.35	07.00 18.04	10.15-11.30/75 20.36	06.10 18.43-19.10/27 22.10	04.26 23.42
11	09.58 14.59	08.32 16.39	06.57 18.07	10.14-11.29/75 20.39	06.07 18.44-19.08/24 22.14	04.23 23.44
12	09.56 15.02	08.29 16.42	06.53 18.10	10.15-11.29/74 20.42	06.03 18.46-19.06/20 22.17	04.19 23.46
13	09.54 15.05	08.25 16.45	06.50 18.13	10.15-11.28/73 20.45	06.00 18.48-19.04/16 22.20	04.16 23.47
14	09.52 15.08	08.22 16.49	06.46 18.16	10.14-11.27/73 20.48	05.56 18.51-19.00/9 22.23	04.13 23.49
15	09.49 15.11	08.19 16.52	06.43 18.19	10.15-11.26/71 20.51	05.53 20.51 22.27	04.10 23.50
16	09.47 15.14	08.16 16.55	06.39 18.22	10.15-11.25/70 20.54	05.49 20.54 22.30	04.06 23.52
17	09.45 15.17	08.12 16.58	06.35 18.25	10.15-11.23/68 20.57	05.45 20.57 22.33	04.03 23.53
18	09.42 15.20	08.09 17.01	06.32 18.28	10.16-11.23/67 21.00	05.42 21.00 22.36	04.00 23.54
19	09.40 15.23	08.06 17.05	06.28 18.30	10.16-11.21/65 21.03	05.38 20.21-20.25/4 22.40	03.57 23.54
20	09.37 15.26	08.02 17.08	06.25 18.33	10.18-11.20/62 21.07	05.35 20.18-20.27/9 22.43	03.54 23.55
21	09.35 15.29	07.59 17.11	06.21 18.36	10.18-11.18/60 21.10	05.31 20.17-20.30/13 22.46	03.51 23.55
22	09.32 15.33	07.55 17.14	06.18 18.39	10.20-11.16/56 21.13	05.28 20.16-20.33/17 22.49	03.47 23.56
23	09.29 15.36	07.52 17.17	06.14 18.42	10.20-11.14/54 21.16	05.24 20.16-20.36/20 22.52	03.44 23.56
24	09.27 15.39	07.49 17.21	06.11 18.45	10.21-11.11/50 21.19	05.21 20.15-20.35/20 22.56	03.41 23.55
25	09.24 15.42	07.45 17.24	06.07 18.48	17.55-18.08/13 21.22	05.17 20.14-20.35/21 22.59	03.38 23.55
26	09.21 15.46	07.42 17.27	06.04 18.51	17.52-18.10/18 21.25	05.14 20.14-20.35/21 23.02	03.36 23.54
27	09.18 15.49	07.38 17.30	06.00 18.54	17.50-18.12/22 21.28	05.10 20.15-20.35/20 23.05	03.33 23.54
28	09.15 15.52	07.35 17.33	05.56 18.57	17.48-18.13/25 21.32	05.07 20.15-20.34/19 23.08	03.30 23.53
29	09.12 15.56		06.53 20.00	18.47-19.14/27 21.35	05.03 20.15-20.34/19 23.11	03.27 23.52
30	09.09 15.59		06.49 20.03	18.45-19.14/29 21.38	05.00 20.15-20.32/17 23.14	03.24 23.51
31	09.06 16.02		06.46 20.06	18.44-19.14/30	03.22 23.17	
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	1020	1969	580	32	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 31 - PUU19
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	03.00 23.49	04.24 22.27	06.00 18.44-19.08/24 20.40	07.26 10.53-12.07/74 18.53	08.00 10.19-10.31/12 16.07	09.35 14.43
2	03.00 23.48	04.28 22.24	06.03 18.41-19.08/27 20.36	07.29 10.53-12.07/74 18.49	08.04 16.04	09.38 14.41
3	03.01 23.46	04.31 22.20	06.06 18.40-19.09/29 20.32	07.32 10.52-12.07/75 18.46	08.07 16.00	09.41 14.39
4	03.03 23.44	04.34 22.17	06.09 18.39-19.09/30 20.29	07.35 10.52-12.07/75 18.42	08.10 15.57	09.44 14.37
5	03.06 23.43	04.37 22.14	06.12 18.39-19.10/31 20.25	07.38 10.51-12.07/76 18.39	08.13 15.54	09.46 14.35
6	03.08 23.41	04.40 22.10	06.15 18.37-19.09/32 20.22	07.41 10.51-12.06/75 18.35	08.17 15.51	09.49 14.33
7	03.10 23.39	04.44 22.07	06.18 18.37-19.09/32 20.18	07.44 10.50-12.06/76 18.32	08.20 15.48	09.51 14.32
8	03.13 23.36	04.47 22.03	06.20 18.37-19.09/32 20.15	07.47 10.51-12.07/76 18.28	08.23 15.45	09.53 14.30
9	03.15 23.34	04.50 22.00	06.23 18.36-19.09/33 20.11	07.50 10.51-12.06/75 18.25	08.26 15.41	09.56 14.29
10	03.18 23.32	04.53 20.29-20.37/8 21.57	06.26 18.35-19.08/33 20.08	07.53 10.50-12.05/75 18.21	08.30 15.38	09.58 14.28
11	03.20 23.29	04.56 20.26-20.39/13 21.53	06.29 18.36-19.07/31 20.04	07.56 10.50-12.05/75 18.18	08.33 15.35	10.00 14.27
12	03.23 23.27	04.59 20.25-20.40/15 21.50	06.32 18.36-19.07/31 20.00	07.59 10.50-12.04/74 18.14	08.36 15.32	10.02 14.26
13	03.26 23.24	05.02 20.23-20.40/17 21.46	06.35 18.37-19.06/29 19.57	08.02 10.50-12.03/73 18.11	08.39 15.29	10.04 14.25
14	03.29 23.22	05.06 20.23-20.41/18 21.43	06.38 18.36-19.04/28 19.53	08.05 10.51-12.03/72 18.08	08.43 15.26	10.05 14.24
15	03.32 23.19	05.09 20.22-20.42/20 21.39	06.41 18.37-19.03/26 19.50	08.08 10.51-12.02/71 18.04	08.46 15.23	10.07 14.23
16	03.34 23.16	05.12 20.22-20.42/20 21.36	06.43 18.38-19.01/23 19.46	08.11 10.51-12.01/70 18.01	08.49 15.20	10.08 14.23
17	03.37 23.13	05.15 20.21-20.41/20 21.32	06.46 18.40-18.59/19 19.43	08.14 10.51-12.00/69 17.57	08.52 15.18	10.10 14.23
18	03.40 23.11	05.18 20.21-20.41/20 21.29	06.49 18.42-18.56/14 19.39	08.17 10.53-12.00/67 17.54	08.55 15.15	10.11 14.22
19	03.43 23.08	05.21 20.21-20.41/20 21.25	06.52 18.47-18.49/2 19.36	08.20 10.53-11.59/66 17.50	08.59 15.12	10.12 14.22
20	03.47 23.05	05.24 20.21-20.41/20 21.22	06.55 11.07-11.59/52 19.32	08.23 10.53-11.57/64 17.47	09.02 15.09	10.13 14.22
21	03.50 23.02	05.27 20.21-20.37/16 21.18	06.58 11.05-12.01/56 19.28	08.26 10.55-11.57/62 17.43	09.05 15.07	10.14 14.23
22	03.53 22.59	05.30 20.22-20.34/12 21.15	07.01 11.03-12.02/59 19.25	08.29 10.55-11.55/60 17.40	09.08 15.04	10.14 14.23
23	03.56 22.56	05.33 20.23-20.31/8 21.11	07.03 11.02-12.03/61 19.21	08.32 10.57-11.54/57 17.37	09.11 15.01	10.15 14.24
24	03.59 22.53	05.36 20.25-20.28/3 21.08	07.06 11.01-12.04/63 19.18	08.35 10.58-11.52/54 17.33	09.15 14.59	10.15 14.24
25	04.02 22.49	05.39 21.04	07.09 10.59-12.05/66 19.14	07.38 09.59-10.51/52 16.30	09.18 14.56	10.15 14.25
26	04.05 22.46	05.42 21.01	07.12 10.58-12.06/68 19.11	07.41 10.00-10.49/49 16.27	09.21 14.54	10.15 14.26
27	04.09 22.43	05.45 20.57	07.15 10.56-12.06/70 19.07	07.45 10.02-10.48/46 16.23	09.24 14.51	10.15 14.27
28	04.12 22.40	05.48 20.54	07.18 10.56-12.06/70 19.04	07.48 10.04-10.45/41 16.20	09.27 14.49	10.15 14.29
29	04.15 22.37	05.51 18.51-19.01/10 20.50	07.21 10.55-12.07/72 19.00	07.51 10.06-10.43/37 16.17	09.30 14.47	10.15 14.30
30	04.18 22.33	05.54 18.48-19.04/16 20.47	07.24 10.54-12.07/73 18.56	07.54 10.10-10.41/31 16.13	09.33 14.45	10.14 14.31
31	04.21 22.30	05.57 18.46-19.06/20 20.43		07.57 10.14-10.37/23 16.10		10.13 14.33
Potential sun hours	608	508	393	305	198	137
Sum of minutes with flicker	0	276	1394	1964	12	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 32 - PUU20
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12 14.35	09.03 16.06	07.31 17.36	06.42 20.09	04.56 21.41	03.19 23.20
2	10.12 14.37	09.00 16.09	07.28 17.39	06.39 20.12	04.53 21.44	03.16 23.23
3	10.10 14.39	08.57 16.12	07.25 17.42	06.35 20.15	04.50 21.48	03.14 23.25
4	10.09 14.41	08.54 16.16	07.21 17.45	06.32 20.18	04.46 21.51	03.11 23.28
5	10.08 14.44	08.51 16.19	07.18 17.48	06.28 20.21	04.43 21.54	03.09 23.31
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	03.07 23.33
7	10.05 14.49	08.45 16.26	07.11 17.54	06.21 20.27	04.36 22.01	03.05 23.35
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	04.33 22.04	03.03 23.38
9	10.02 14.54	08.38 16.32	07.04 18.01	06.14 20.33	04.29 22.07	03.01 23.40
10	10.00 14.56	08.35 16.35	07.00 18.04	06.10 20.36	04.26 22.10	02.57 23.42
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	04.23 22.14	02.56 23.44
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	04.19 22.17	02.54 23.46
13	09.54 15.05	08.25 16.45	06.50 18.13	06.00 20.45	04.16 22.20	02.53 23.48
14	09.52 15.08	08.22 16.49	06.46 18.16	05.56 20.48	04.13 22.23	02.52 23.49
15	09.49 15.11	08.19 16.52	06.42 18.19	05.52 20.51	04.09 22.27	02.51 23.51
16	09.47 15.14	08.16 16.55	06.39 18.22	05.49 20.54	04.06 22.30	02.50 23.52
17	09.45 15.17	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33	02.50 23.53
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	04.00 22.36	02.49 23.54
19	09.40 15.23	08.06 17.05	06.28 18.30	05.38 21.03	03.57 22.40	02.49 23.55
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.07	03.54 22.43	02.49 23.55
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	03.50 22.46	02.49 23.55
22	09.32 15.33	07.55 17.14	06.18 18.39	05.28 21.13	03.47 22.49	02.49 23.56
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.52	02.50 23.56
24	09.27 15.39	07.49 17.20	06.11 18.45	05.21 21.19	03.41 22.56	02.50 23.55
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	03.38 22.59	02.51 23.55
26	09.21 15.46	07.42 17.27	06.04 18.51	05.14 21.25	03.35 23.02	02.52 23.55
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	03.33 23.05	02.53 23.54
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	03.30 23.08	02.54 23.53
29	09.12 15.56	07.32 17.37	05.53 19.00	05.03 21.35	03.27 23.11	02.56 23.52
30	09.09 15.59	07.29 17.40	05.50 19.03	05.00 21.38	03.24 23.14	02.58 23.51
31	09.06 16.02	07.26 17.43	05.47 19.06	04.57 21.41	03.21 23.17	02.59 23.50
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	0	694	3539	2935

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 32 - PUU20
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 21.40-21.46/6 06.50-07.44/54 23.49 20.34-21.12/38	04.24 21.34-21.37/3 06.46-07.56/70 22.27 20.38-21.14/36	06.00 07.26	07.26 08.00	08.00 09.35	09.35 14.43
2	03.01 21.39-21.47/8 06.49-07.45/56 23.48 20.34-21.12/38	04.28 20.39-21.13/34 22.24 06.47-07.57/70	06.03 20.36	07.29 18.49	08.04 16.04	09.38 14.40
3	03.01 21.38-21.48/10 06.50-07.46/56 23.46 20.34-21.12/38	04.31 20.39-21.12/33 22.20 06.46-07.56/70	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.39
4	03.03 21.38-21.49/11 06.50-07.46/56 23.45 20.34-21.13/39	04.34 20.41-21.11/30 22.17 06.47-07.56/69	06.09 20.29	07.35 18.42	08.10 15.57	09.44 14.37
5	03.05 21.37-21.49/12 06.49-07.46/57 23.43 20.34-21.13/39	04.37 20.42-21.10/28 22.14 06.47-07.56/69	06.12 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	03.08 21.37-21.51/14 06.50-07.47/57 23.41 20.34-21.14/40	04.40 20.43-21.08/25 22.10 06.47-07.56/69	06.15 20.22	07.41 18.35	08.17 15.51	09.49 14.33
7	03.10 21.36-21.51/15 06.50-07.48/58 23.39 20.34-21.13/39	04.44 20.45-21.06/21 22.07 06.47-07.55/68	06.17 20.18	07.44 18.32	08.20 15.48	09.51 14.32
8	03.12 21.36-21.52/16 06.49-07.48/59 23.36 20.34-21.14/40	04.47 20.47-21.03/16 22.03 06.47-07.55/68	06.20 20.15	07.47 18.28	08.23 15.44	09.54 14.30
9	03.15 21.36-21.53/17 06.49-07.49/60 23.34 20.34-21.15/41	04.50 20.51-21.00/9 22.00 06.48-07.55/67	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.29
10	03.17 21.36-21.53/17 06.49-07.49/60 23.32 20.35-21.15/40	04.53 06.47-07.53/66 21.57	06.26 20.08	07.53 18.21	08.30 15.38	09.58 14.28
11	03.20 21.35-21.54/19 06.49-07.50/61 23.29 20.35-21.16/41	04.56 06.48-07.53/65 21.53	06.29 20.04	07.56 18.18	08.33 15.35	10.00 14.26
12	03.23 21.34-21.55/21 06.49-07.51/62 23.27 20.34-21.15/41	04.59 06.49-07.53/64 21.50	06.32 20.00	07.59 18.14	08.36 15.32	10.02 14.25
13	03.26 21.32-21.55/23 06.49-07.51/62 23.24 20.34-21.15/41	05.02 06.49-07.52/63 21.46	06.35 19.57	08.02 18.11	08.39 15.29	10.04 14.25
14	03.29 21.33-21.55/22 06.49-07.52/63 23.22 20.35-21.17/42	05.06 06.49-07.51/62 21.43	06.38 19.53	08.05 18.07	08.43 15.26	10.05 14.24
15	03.31 21.32-21.56/24 06.49-07.52/63 23.19 20.34-21.17/43	05.09 06.50-07.50/60 21.39	06.41 19.50	08.08 18.04	08.46 15.23	10.07 14.23
16	03.34 21.32-21.56/24 06.48-07.52/64 23.16 20.34-21.17/43	05.12 06.51-07.49/58 21.36	06.43 19.46	08.11 18.01	08.49 15.20	10.09 14.23
17	03.37 21.31-21.56/25 06.48-07.53/65 23.13 20.34-21.17/43	05.15 06.51-07.47/56 21.32	06.46 19.43	08.14 17.57	08.52 15.18	10.10 14.22
18	03.40 21.30-21.56/26 06.48-07.53/65 23.11 20.34-21.17/43	05.18 06.52-07.47/55 21.29	06.49 19.39	08.17 17.54	08.56 15.15	10.11 14.22
19	03.43 21.31-21.57/26 06.48-07.54/66 23.08 20.35-21.17/42	05.21 06.53-07.45/52 21.25	06.52 19.35	08.20 17.50	08.59 15.12	10.12 14.22
20	03.46 21.30-21.57/27 06.48-07.54/66 23.05 20.35-21.17/42	05.24 06.55-07.44/49 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	03.50 21.30-21.56/26 06.47-07.54/67 23.02 20.34-21.17/43	05.27 06.55-07.42/47 21.18	06.58 19.28	08.26 17.43	09.05 15.06	10.14 14.23
22	03.53 21.30-21.57/27 06.48-07.55/67 22.59 20.35-21.18/43	05.30 06.57-07.40/43 21.15	07.01 19.25	08.29 17.40	09.08 15.04	10.14 14.23
23	03.56 21.30-21.56/26 06.47-07.55/68 22.56 20.35-21.17/42	05.33 06.59-07.38/39 21.11	07.03 19.21	08.32 17.37	09.11 15.01	10.15 14.23
24	03.59 21.30-21.57/27 06.47-07.56/69 22.53 20.35-21.16/41	05.36 07.01-07.36/35 21.08	07.06 19.18	08.35 17.33	09.15 14.59	10.15 14.24
25	04.02 21.30-21.55/25 06.47-07.56/69 22.49 20.35-21.17/42	05.39 07.03-07.33/30 21.04	07.09 19.14	07.38 16.30	09.18 14.56	10.15 14.25
26	04.05 21.30-21.53/23 06.47-07.56/69 22.46 20.35-21.16/41	05.42 07.06-07.29/23 21.01	07.12 19.11	07.41 16.27	09.21 14.54	10.15 14.26
27	04.08 21.31-21.50/19 06.47-07.56/69 22.43 20.36-21.16/40	05.45 07.11-07.24/13 20.57	07.15 19.07	07.45 16.23	09.24 14.51	10.15 14.27
28	04.12 21.32-21.48/16 06.47-07.57/70 22.40 20.37-21.16/39	05.48 20.54	07.18 19.04	07.48 16.20	09.27 14.49	10.15 14.28
29	04.15 21.31-21.45/14 06.46-07.56/70 22.37 20.37-21.15/38	05.51 20.50	07.21 19.00	07.51 16.17	09.30 14.47	10.15 14.30
30	04.18 21.33-21.43/10 06.47-07.57/70 22.33 20.37-21.15/38	05.54 20.47	07.24 18.56	07.54 16.13	09.33 14.45	10.14 14.31
31	04.21 21.33-21.39/6 06.47-07.57/70 22.30 20.37-21.14/37	05.57 20.43	 	07.57 16.10	 14.43	10.13 14.33
Potential sun hours	609	509	393	305	198	137
Sum of minutes with flicker	3807	1735	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 33 - PUU21
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	10.13	09.04	07.31	06.42	04.56	03.19	04.41-05.13/32	02.59	04.45-05.20/35	04.24	06.00	07.26	08.00	09.36	
	14.35	16.05	17.36	20.09	21.41	23.20		23.50		22.27	20.40	18.53	16.07	14.42	
2	10.12	09.00	07.28	06.39	04.53	03.16	04.40-05.13/33	03.01	04.45-05.20/35	04.27	06.03	07.29	08.04	09.38	
	14.37	16.09	17.39	20.12	21.44	23.23		23.48		22.24	20.36	18.49	16.03	14.40	
3	10.11	08.57	07.24	06.35	04.50	03.14	04.40-05.14/34	03.01	04.46-05.21/35	04.21	06.06	07.32	08.07	09.41	
	14.39	16.12	17.42	20.15	21.48	23.25		23.46		22.20	20.32	18.46	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	03.11	04.40-05.13/33	03.03	04.46-05.20/34	04.34	06.09	07.35	08.10	09.44	
	14.41	16.15	17.45	20.18	21.51	23.28		23.45		22.17	20.29	18.42	15.57	14.37	
5	10.08	08.51	07.18	06.28	04.43	03.09	04.40-05.14/34	03.05	04.45-05.20/35	04.37	06.12	07.38	08.13	09.46	
	14.44	16.19	17.48	20.21	21.54	23.31		23.43		22.14	20.25	18.39	15.54	14.35	
6	10.07	08.48	07.14	06.24	04.39	03.07	04.40-05.14/34	03.07	04.46-05.20/34	04.40	06.15	07.41	08.17	09.49	
	14.46	16.22	17.51	20.24	21.57	23.33		23.41		22.10	20.22	18.35	15.51	14.33	
7	10.05	08.45	07.11	06.21	04.36	03.05	04.40-05.14/34	03.10	04.47-05.21/34	04.43	06.17	07.44	08.20	09.51	
	14.48	16.25	17.54	20.27	22.01	23.36		23.39		22.07	20.18	18.32	15.47	14.32	
8	10.03	08.42	07.07	06.17	04.33	03.03	04.40-05.15/35	03.12	04.47-05.20/33	04.47	06.20	07.47	08.23	09.54	
	14.51	16.29	17.57	20.30	22.04	23.38		23.37		22.03	20.15	18.28	15.44	14.30	
9	10.02	08.38	07.04	06.14	04.29	03.01	04.40-05.15/35	03.15	04.47-05.20/33	04.50	06.23	07.50	08.26	09.56	
	14.54	16.32	18.00	20.33	22.07	23.40		23.34		22.00	20.11	18.25	15.41	14.29	
10	10.00	08.35	07.00	06.10	04.26	02.57	04.40-05.15/35	03.17	04.48-05.21/33	04.53	06.26	07.53	08.30	09.58	
	14.56	16.35	18.03	20.36	22.10	23.42		23.32		21.57	20.08	18.21	15.38	14.27	
11	09.58	08.32	06.57	06.07	04.22	02.56	04.40-05.15/35	03.20	04.48-05.21/33	04.56	06.29	07.56	08.33	10.00	
	14.59	16.39	18.07	20.39	22.14	23.44		23.30		21.53	20.04	18.18	15.35	14.26	
12	09.56	08.29	06.53	06.03	04.19	02.54	04.40-05.15/35	03.23	04.49-05.21/32	04.59	06.32	07.59	08.36	10.02	
	15.02	16.42	18.10	20.42	22.17	23.46		23.27		21.50	20.00	18.14	15.32	14.25	
13	09.54	08.25	06.50	05.59	04.16	02.53	04.41-05.16/35	03.25	04.49-05.20/31	05.02	06.35	08.02	08.39	10.04	
	15.05	16.45	18.13	20.45	22.20	23.48		23.24		21.46	19.57	18.11	15.29	14.24	
14	09.52	08.22	06.46	05.56	04.13	02.52	04.41-05.16/35	03.28	04.50-05.20/30	05.05	06.38	08.05	08.43	10.06	
	15.08	16.48	18.16	20.48	22.23	23.49		23.22		21.43	19.53	18.07	15.26	14.24	
15	09.49	08.19	06.42	05.52	04.09	02.51	04.41-05.17/36	03.31	04.50-05.20/30	05.09	06.40	08.08	08.46	10.07	
	15.11	16.52	18.19	20.51	22.27	23.51		23.19		21.39	19.50	18.04	15.23	14.23	
16	09.47	08.16	06.39	05.49	04.06	02.50	04.41-05.16/35	03.34	04.51-05.19/28	05.12	06.43	08.11	08.49	10.09	
	15.14	16.55	18.21	20.54	22.30	23.52		23.16		21.36	19.46	18.00	15.20	14.23	
17	09.45	08.12	06.35	05.45	04.03	02.49	04.41-05.17/36	03.37	04.51-05.18/27	05.15	06.46	08.14	08.52	10.10	
	15.17	16.58	18.24	20.57	22.33	23.53		23.14		21.32	19.43	17.57	15.17	14.22	
18	09.42	08.09	06.32	05.42	04.00	02.49	04.42-05.17/35	03.40	04.52-05.18/26	05.18	06.49	08.17	08.56	10.11	
	15.20	17.01	18.27	21.00	22.37	23.54		23.11		21.29	19.39	17.54	15.15	14.22	
19	09.40	08.06	06.28	05.38	03.57	04.53-04.58/5	02.49	04.42-05.18/36	03.43	04.53-05.18/25	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55		23.08		21.25	19.35	17.50	15.12	14.22	
20	09.37	08.02	06.25	05.35	03.53	04.49-05.01/12	02.49	04.42-05.18/36	03.46	04.54-05.17/23	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55		23.05		21.22	19.32	17.47	15.09	14.22	
21	09.35	07.59	06.21	05.31	03.50	04.47-05.04/17	02.49	04.42-05.18/36	03.49	04.55-05.15/20	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56		23.02		21.18	19.28	17.43	15.06	14.22	
22	09.32	07.55	06.18	05.28	03.47	04.46-05.05/19	02.49	04.42-05.18/36	03.52	04.57-05.15/18	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56		22.59		21.15	19.25	17.40	15.04	14.23	
23	09.29	07.52	06.14	05.24	03.44	04.44-05.06/22	02.49	04.43-05.19/36	03.56	04.58-05.13/15	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56		22.56		21.11	19.21	17.37	15.01	14.23	
24	09.27	07.49	06.11	05.21	03.41	04.44-05.07/23	02.50	04.43-05.18/35	03.59	05.01-05.11/10	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56		22.53		21.08	19.18	17.33	14.59	14.24	
25	09.24	07.45	06.07	05.17	03.38	04.43-05.08/25	02.51	04.43-05.19/36	04.02	05.39	07.09	07.38	09.18	10.16	
	15.42	17.24	18.48	21.22	22.59	23.55		22.49		21.04	19.14	16.30	14.56	14.25	
26	09.21	07.42	06.03	05.14	03.35	04.42-05.09/27	02.52	04.43-05.19/36	04.05	05.42	07.12	07.41	09.21	10.16	
	15.46	17.27	18.51	21.25	23.02	23.55		22.46		21.01	19.11	16.27	14.54	14.26	
27	09.18	07.38	06.00	05.10	03.32	04.42-05.10/28	02.53	04.44-05.19/35	04.08	05.45	07.15	07.45	09.24	10.15	
	15.49	17.30	18.54	21.29	23.05	23.54		22.43		20.57	19.07	16.23	14.51	14.27	
28	09.15	07.35	05.56	05.07	03.30	04.41-05.10/29	02.54	04.44-05.19/35	04.11	05.48	07.18	07.48	09.27	10.15	
	15.52	17.33	18.57	21.32	23.08	23.53		22.40		20.54	19.03	16.20	14.49	14.28	
29	09.12		05.53	05.03	03.27	04.41-05.11/30	02.56	04.44-05.20/36	04.15	05.51	07.21	07.51	09.30	10.15	
	15.55		20.00	21.35	23.11	23.52		22.37		20.50	19.00	16.17	14.47	14.30	
30	09.09		06.49	05.00	03.24	04.40-05.11/31	02.57	04.44-05.20/36	04.18	05.54	07.23	07.54	09.33	10.14	
	15.59		20.03	21.38	23.14	23.51		22.33		20.47	18.56	16.13	14.44	14.31	
31	09.07		06.46		03.21	04.40-05.11/31		04.21		05.57		07.57		10.14	
	16.02		20.06		23.17			22.30		20.43		16.10		14.33	
Potential sun hours	171	238	363	451	570	624		609		509	393	305	198	137	0
Sum of minutes with flicker	0	0	0	0	299	1050		689		0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 34 - PUU22
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59 04.09-04.25/16	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01 04.10-04.24/14	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01 04.12-04.25/13	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11 04.13-04.16/3	03.03 04.13-04.25/12	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09 04.12-04.17/5	03.05 04.14-04.24/10	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07 04.10-04.17/7	03.07 04.16-04.24/8	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04 04.09-04.18/9	03.10 04.18-04.24/6	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02 04.08-04.19/11	03.12 04.19-04.23/4	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01 04.07-04.19/12	03.15 04.21-04.22/1	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 04.06-04.20/14	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55 04.05-04.20/15	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54 04.04-04.20/16	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53 04.04-04.21/17	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52 04.03-04.21/18	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.42	05.52	04.09	02.51 04.03-04.22/19	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50 04.02-04.22/20	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49 04.02-04.22/20	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49 04.02-04.23/21	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48 04.03-04.23/20	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48 04.03-04.23/20	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48 04.03-04.23/20	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49 04.03-04.23/20	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49 04.04-04.24/20	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50 04.03-04.24/21	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51 04.04-04.25/21	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52 04.04-04.24/20	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53 04.05-04.24/19	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54 04.06-04.25/19	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56 04.07-04.25/18	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57 04.08-04.25/17	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	442	84	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 35 - PUU23
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.11	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	13.30-13.35/5	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	13.30-13.41/11	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	13.30-13.46/16	08.26	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	13.30-13.47/17	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	13.29-13.48/19	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	13.29-13.49/20	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	13.29-13.50/21	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	13.29-13.50/21	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.56
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	13.29-13.50/21	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	13.29-13.51/22	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	13.30-13.51/21	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	13.30-13.52/22	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	13.30-13.52/22	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	13.31-13.52/21	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	13.31-13.52/21	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	13.32-13.52/20	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	13.33-13.52/19	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	13.33-13.51/18	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.13	13.34-13.50/16		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10	13.36-13.49/13		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07	13.38-13.47/9		06.46		03.21		04.21	05.57		07.57	
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	375	0	0	0	0	0	0	0	0	0	370	5

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 36 - PUU24
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12 14.35	09.03 16.06	07.31 17.36	06.42 20.09	08.20-08.50/30 21.41	04.56 19.08-19.48/40 23.20 18.46-20.14/88
2	10.11 14.37	09.00 16.09	07.28 17.39	06.39 20.12	08.22-08.49/27 21.44	04.53 19.06-19.51/45 23.22 18.46-20.14/88
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	08.22-08.47/25 21.48	04.50 19.04-19.53/49 23.25 18.46-20.14/88
4	10.09 14.41	08.54 16.16	07.21 17.45	06.31 20.18	08.25-08.44/19 21.51	04.46 19.02-19.55/53 23.28 18.46-20.15/89
5	10.08 14.44	08.51 16.19	07.18 17.48	06.28 20.21	08.27-08.40/13 21.54	04.43 19.00-19.56/56 23.30 18.47-20.16/89
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 19.00-19.59/59 21.57	03.07 21.12-21.48/36 23.33 18.46-20.15/89
7	10.05 14.49	08.45 16.25	07.11 17.54	06.21 20.27	04.36 18.58-20.00/62 22.01	03.05 21.12-21.48/36 23.35 18.46-20.16/90
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	04.33 18.57-20.01/64 22.04	03.03 21.13-21.48/35 23.38 18.47-20.16/89
9	10.01 14.54	08.38 16.32	07.04 18.00	06.14 20.33	04.29 18.56-20.02/66 22.07	03.01 21.13-21.48/35 23.40 18.47-20.16/89
10	10.00 14.56	08.35 16.35	07.00 18.04	06.10 20.36	04.26 18.54-20.03/69 22.10	02.57 21.14-21.49/35 23.42 18.47-20.16/89
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	04.23 18.53-20.03/70 22.14	02.56 21.14-21.48/34 23.44 18.47-20.17/90
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	04.19 21.20-21.27/7 22.17 18.53-20.05/72	02.54 21.14-21.48/34 23.46 18.47-20.17/90
13	09.54 15.05	08.25 16.45	06.49 07.37-07.46/9 18.13	06.00 20.45	04.16 21.17-21.30/13 22.20 18.52-20.05/73	02.53 21.15-21.49/34 23.47 18.48-20.17/89
14	09.52 15.08	08.22 16.48	06.46 07.32-07.50/18 18.16	05.56 20.48	04.13 21.15-21.31/16 22.23 18.51-20.06/75	02.52 21.15-21.49/34 23.49 18.47-20.17/90
15	09.49 15.11	08.19 16.52	06.42 07.30-07.53/23 18.18	05.52 20.51	04.09 21.14-21.33/19 22.27 18.51-20.07/76	02.51 21.16-21.50/34 23.50 18.48-20.18/90
16	09.47 15.14	08.16 16.55	06.39 07.27-07.54/27 18.21	05.49 20.54	04.06 21.13-21.35/22 22.30 18.50-20.07/77	02.50 21.15-21.49/34 23.52 18.48-20.18/90
17	09.45 15.17	08.12 16.58	06.35 07.25-07.55/30 18.24	05.45 20.57	04.03 21.12-21.37/25 22.33 18.49-20.07/78	02.50 21.16-21.49/33 23.53 18.48-20.18/90
18	09.42 15.20	08.09 17.01	06.32 07.24-07.56/32 18.27	05.42 21.00	04.00 21.11-21.39/28 22.36 18.49-20.08/79	02.49 21.16-21.50/34 23.54 18.48-20.18/90
19	09.40 15.23	08.05 17.05	06.28 07.23-07.56/33 18.30	05.38 21.03	03.57 21.10-21.40/30 22.40 18.48-20.08/80	02.49 21.17-21.50/33 23.54 18.49-20.19/90
20	09.37 15.26	08.02 17.08	06.25 07.22-07.57/35 18.33	05.35 21.06	03.54 21.10-21.41/31 22.43 18.48-20.09/81	02.49 21.17-21.50/33 23.55 18.49-20.19/90
21	09.35 15.29	07.59 17.11	06.21 07.21-07.57/36 18.36	05.31 21.10	03.50 21.10-21.43/33 22.46 18.48-20.10/82	02.49 21.17-21.50/33 23.55 18.49-20.19/90
22	09.32 15.33	07.55 17.14	06.18 07.21-07.58/37 18.39	05.28 21.13	03.47 21.09-21.43/34 22.49 18.47-20.10/83	02.49 21.17-21.50/33 23.55 18.49-20.19/90
23	09.29 15.36	07.52 17.17	06.14 07.20-07.57/37 18.42	05.24 21.16	03.44 21.09-21.44/35 22.52 18.47-20.11/84	02.50 21.18-21.51/33 23.55 18.50-20.20/90
24	09.27 15.39	07.49 17.20	06.11 07.19-07.57/38 18.45	05.21 21.19	03.41 21.10-21.44/34 22.56 18.47-20.11/84	02.50 21.18-21.51/33 23.55 18.50-20.20/90
25	09.24 15.42	07.45 17.24	06.07 07.19-07.57/38 18.48	05.17 21.22	03.38 21.10-21.45/35 22.59 18.47-20.12/85	02.51 21.18-21.52/34 23.55 18.50-20.20/90
26	09.21 15.46	07.42 17.27	06.03 07.18-07.56/38 18.51	05.14 21.25	03.35 21.10-21.45/35 23.02 18.47-20.12/85	02.52 21.18-21.51/33 23.54 18.50-20.20/90
27	09.18 15.49	07.38 17.30	06.00 07.19-07.56/37 18.54	05.10 21.28	03.33 21.10-21.46/36 23.05 18.46-20.13/87	02.53 21.18-21.52/34 23.54 18.50-20.20/90
28	09.15 15.52	07.35 17.33	05.56 07.18-07.55/37 18.57	05.07 21.32	03.30 21.10-21.46/36 23.08 18.46-20.13/87	02.55 21.18-21.52/34 23.53 18.51-20.21/90
29	09.12 15.56	07.32 17.36	05.53 08.19-08.55/36 20.00	05.03 21.35	03.27 21.10-21.46/36 23.11 18.46-20.13/87	02.56 21.18-21.53/35 23.52 18.51-20.21/90
30	09.09 15.59	07.29 17.39	05.50 08.19-08.53/34 20.03	05.00 21.38	03.24 21.10-21.47/37 23.14 18.46-20.13/87	02.58 21.18-21.53/35 23.51 18.51-20.21/90
31	09.06 16.02	07.26 17.42	05.47 08.20-08.52/32 20.06	04.57 21.41	03.22 21.10-21.47/37 23.17 18.46-20.13/87	02.59 21.18-21.53/35 23.50 18.51-20.21/90
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	607	195	2841	3719

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 36 - PUU24
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59	21.18-21.53/35	04.24	21.33-21.34/1	06.00		07.26	08.00	09.35
	23.49	18.51-20.21/90	22.27	19.03-20.14/71	20.39		18.53	16.07	14.43
2	03.01	21.18-21.53/35	04.28	19.04-20.14/70	06.03		07.29	08.04	09.38
	23.48	18.51-20.21/90	22.23		20.36		18.49	16.04	14.41
3	03.01	21.18-21.53/35	04.31	19.05-20.12/67	06.06		07.32	08.07	09.41
	23.46	18.51-20.21/90	22.20		20.32		18.46	16.00	14.39
4	03.03	21.18-21.54/36	04.34	19.06-20.11/65	06.09		07.35	08.10	09.44
	23.44	18.52-20.22/90	22.17		20.29		18.42	15.57	14.37
5	03.05	21.18-21.54/36	04.37	19.07-20.10/63	06.12		07.38	08.13	09.46
	23.43	18.52-20.21/89	22.13		20.25		18.39	15.54	14.35
6	03.08	21.18-21.54/36	04.40	19.08-20.08/60	06.15		07.41	08.16	09.49
	23.41	18.53-20.22/89	22.10		20.22		18.35	15.51	14.33
7	03.10	21.18-21.54/36	04.44	19.09-20.07/58	06.17	08.22-08.35/13	07.44	08.20	09.51
	23.39	18.52-20.21/89	22.07		20.18		18.32	15.48	14.32
8	03.12	21.18-21.54/36	04.47	19.11-20.06/55	06.20	08.19-08.38/19	07.47	08.23	09.53
	23.36	18.53-20.22/89	22.03		20.15		18.28	15.44	14.30
9	03.15	21.18-21.55/37	04.50	19.13-20.04/51	06.23	08.17-08.41/24	07.50	08.26	09.56
	23.34	18.53-20.22/89	22.00		20.11		18.25	15.41	14.29
10	03.18	21.19-21.55/36	04.53	19.14-20.01/47	06.26	08.14-08.41/27	07.53	08.29	09.58
	23.32	18.54-20.22/88	21.57		20.07		18.21	15.38	14.28
11	03.20	21.19-21.55/36	04.56	19.16-19.59/43	06.29	08.13-08.43/30	07.56	08.33	10.00
	23.29	18.54-20.22/88	21.53		20.04		18.18	15.35	14.27
12	03.23	21.19-21.55/36	04.59	19.18-19.57/39	06.32	08.12-08.44/32	07.59	08.36	10.02
	23.27	18.53-20.21/88	21.50		20.00		18.14	15.32	14.25
13	03.26	21.18-21.55/37	05.02	19.20-19.53/33	06.35	08.11-08.44/33	08.02	08.39	10.04
	23.24	18.54-20.21/87	21.46		19.57		18.11	15.29	14.25
14	03.29	21.19-21.55/36	05.06	19.24-19.50/26	06.38	08.10-08.45/35	08.05	08.42	10.05
	23.22	18.55-20.22/87	21.43		19.53		18.07	15.26	14.24
15	03.31	21.19-21.55/36	05.09	19.29-19.45/16	06.40	08.08-08.44/36	08.08	08.46	10.07
	23.19	18.55-20.22/87	21.39		19.50		18.04	15.23	14.23
16	03.34	21.19-21.55/36	05.12		06.43	08.07-08.45/38	08.11	08.49	10.08
	23.16	18.55-20.22/87	21.36		19.46		18.01	15.20	14.23
17	03.37	21.19-21.55/36	05.15		06.46	08.07-08.45/38	08.14	08.52	10.10
	23.13	18.56-20.21/85	21.32		19.43		17.57	15.18	14.22
18	03.40	21.19-21.54/35	05.18		06.49	08.07-08.45/38	08.17	08.55	10.11
	23.10	18.56-20.21/85	21.29		19.39		17.54	15.15	14.22
19	03.43	21.20-21.55/35	05.21		06.52	08.06-08.45/39	08.20	08.59	10.12
	23.08	18.57-20.22/85	21.25		19.35		17.50	15.12	14.22
20	03.46	21.20-21.54/34	05.24		06.55	08.05-08.43/38	08.23	09.02	10.13
	23.05	18.57-20.21/84	21.22		19.32		17.47	15.09	14.22
21	03.50	21.19-21.53/34	05.27		06.58	08.05-08.43/38	08.26	09.05	10.14
	23.02	18.57-20.20/83	21.18		19.28		17.43	15.06	14.23
22	03.53	21.20-21.53/33	05.30		07.00	08.06-08.42/36	08.29	09.08	10.14
	22.59	18.58-20.21/83	21.15		19.25		17.40	15.04	14.23
23	03.56	21.20-21.52/32	05.33		07.03	08.06-08.41/35	08.32	09.11	10.15
	22.56	18.58-20.20/82	21.11		19.21		17.37	15.01	14.24
24	03.59	21.20-21.52/32	05.36		07.06	08.06-08.40/34	08.35	09.14	10.15
	22.52	18.58-20.19/81	21.08		19.18		17.33	14.59	14.24
25	04.02	21.21-21.50/29	05.39		07.09	08.07-08.39/32	07.38	09.18	10.15
	22.49	18.59-20.19/80	21.04		19.14		16.30	14.56	14.25
26	04.05	21.22-21.49/27	05.42		07.12	08.08-08.38/30	07.41	09.21	10.15
	22.46	18.59-20.18/79	21.01		19.11		16.27	14.54	14.26
27	04.08	21.23-21.47/24	05.45		07.15	08.08-08.35/27	07.44	09.24	10.15
	22.43	19.00-20.18/78	20.57		19.07		16.23	14.51	14.27
28	04.12	21.24-21.45/21	05.48		07.18	08.09-08.34/25	07.48	09.27	10.15
	22.40	19.01-20.18/77	20.54		19.03		16.20	14.49	14.28
29	04.15	21.25-21.42/17	05.51		07.21	08.11-08.31/20	07.51	09.30	10.15
	22.37	19.01-20.17/76	20.50		19.00		16.17	14.47	14.30
30	04.18	21.26-21.41/15	05.54		07.23	08.14-08.28/14	07.54	09.33	10.14
	22.33	19.02-20.16/74	20.47		18.56		16.13	14.45	14.31
31	04.21	21.28-21.38/10	05.57				07.57		10.13
	22.30	19.02-20.15/73	20.43				16.10		14.33
Potential sun hours	608		508		393		305	198	137
Sum of minutes with flicker	3611		765		731		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 37 - PUU25
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	06.13-06.39/26 23.20	03.19 23.49	02.59 22.27	04.24 22.27	06.00 20.39	07.26 18.53	08.00 16.07	09.35 14.42
2	10.12 14.37	09.00 16.09	07.28 17.39	06.39 20.12	04.53 21.44	06.13-06.38/25 23.23	03.16 23.48	03.01 22.24	04.27 22.24	06.03 20.36	07.29 18.49	08.04 16.03	09.38 14.40
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.50 21.48	06.14-06.37/23 23.25	03.14 23.46	03.01 22.20	04.31 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	06.15-06.36/21 23.28	03.11 23.45	03.03 22.17	04.34 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.44 14.37
5	10.08 14.44	08.51 16.19	07.17 17.48	06.28 20.21	04.43 21.54	06.16-06.35/19 23.31	03.09 23.43	03.05 22.14	06.31-06.38/7 22.14	06.12 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	06.17-06.33/16 23.33	03.07 23.41	03.07 22.10	06.28-06.41/13 22.10	06.15 20.22	07.41 18.35	08.16 15.51	09.49 14.33
7	10.05 14.48	08.45 16.25	07.11 17.54	06.21 20.27	04.36 22.01	06.19-06.30/11 23.35	03.05 23.39	03.10 22.07	04.43 22.07	06.26-06.43/17 22.07	06.17 18.32	07.44 15.47	09.51 14.32
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	04.33 22.04	06.23-06.26/3 23.38	03.03 23.36	03.12 22.03	04.47 22.03	06.24-06.44/20 22.03	06.20 18.28	07.47 15.44	09.54 14.30
9	10.02 14.54	08.38 16.32	07.04 18.00	06.14 20.33	04.29 22.07	04.30 23.40	03.01 23.34	03.15 22.00	04.50 22.00	06.23-06.46/23 22.00	06.23 18.25	07.50 15.41	09.56 14.29
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	04.31 23.42	02.57 23.32	03.17 22.10	04.53 21.57	06.22-06.46/24 21.57	06.26 18.21	07.53 15.38	09.58 14.27
11	09.58 14.59	08.32 16.39	06.56 18.06	06.07 20.39	04.22 22.14	04.32 23.44	02.56 23.29	03.20 21.53	04.56 21.53	06.21-06.47/26 21.53	06.29 18.18	07.56 15.35	10.00 14.26
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42	04.19 22.17	04.33 23.46	02.54 23.27	03.23 21.50	04.59 21.50	06.21-06.48/27 21.50	06.32 18.14	07.59 15.32	10.02 14.25
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20	04.34 23.48	02.53 23.24	03.26 21.46	05.02 21.46	06.20-06.48/28 21.46	06.35 18.11	08.02 15.29	10.04 14.24
14	09.52 15.08	08.22 16.48	06.46 18.15	05.56 20.48	04.13 22.23	04.35 23.49	02.52 23.22	03.28 21.43	05.05 21.43	06.19-06.48/29 21.43	06.38 18.07	08.05 15.26	10.05 14.24
15	09.49 15.11	08.19 16.52	06.42 18.18	05.52 20.51	04.09 22.27	04.36 23.51	02.51 23.19	03.31 21.39	05.09 21.39	06.19-06.48/29 21.39	06.40 18.04	08.08 15.23	10.07 14.23
16	09.47 15.14	08.16 16.55	06.39 18.21	05.49 20.54	04.06 22.30	04.37 23.52	02.50 23.16	03.34 21.36	05.12 21.36	06.19-06.48/29 21.36	06.43 18.00	08.11 15.20	10.09 14.23
17	09.45 15.17	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33	04.38 23.53	02.49 23.13	03.37 21.32	05.15 21.32	06.18-06.47/29 21.32	06.46 17.57	08.14 15.17	10.10 14.22
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	04.00 22.36	04.39 23.54	02.49 23.11	03.40 21.29	05.18 21.29	06.18-06.47/29 21.29	06.49 17.54	08.17 15.15	10.11 14.22
19	09.40 15.23	08.05 17.05	06.28 18.30	05.38 21.03	03.57 22.40	04.40 23.55	02.49 23.08	03.43 21.25	05.21 21.25	06.18-06.47/29 21.25	06.52 17.50	08.20 15.12	10.12 14.22
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	03.53 22.43	04.41 23.55	02.49 23.05	03.46 21.22	05.24 21.22	06.18-06.47/29 21.22	06.55 17.47	08.23 15.09	10.13 14.22
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	03.50 22.46	04.42 23.55	02.49 23.02	03.49 21.18	05.27 21.18	06.18-06.45/27 21.18	06.58 17.43	08.26 15.06	10.14 14.22
22	09.32 15.32	07.55 17.14	06.18 18.39	05.28 21.13	03.47 22.49	04.43 23.56	02.49 22.59	03.52 21.15	05.30 21.15	06.19-06.44/25 21.15	07.00 19.25	08.29 17.40	10.14 14.23
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.52	04.44 23.56	02.49 22.56	03.56 21.11	05.33 21.11	06.20-06.43/23 21.11	07.03 19.21	08.32 17.37	10.15 14.23
24	09.27 15.39	07.49 17.20	06.11 18.45	05.21 21.19	03.41 22.56	04.45 23.55	02.50 22.53	03.59 21.08	05.36 21.08	06.21-06.42/21 21.08	07.06 19.18	08.35 17.33	10.15 14.24
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	03.38 22.59	04.46 23.55	02.51 22.49	04.02 21.04	05.39 21.04	06.21-06.40/19 21.04	07.09 19.14	07.38 16.30	10.15 14.25
26	09.21 15.46	07.42 17.27	06.03 18.51	05.14 21.25	03.35 23.02	04.47 23.55	02.52 22.46	04.05 21.01	05.42 21.01	06.23-06.38/15 21.01	07.12 19.11	07.41 16.26	10.15 14.26
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	03.32 23.05	04.48 23.54	02.53 22.43	04.08 20.57	05.45 20.57	06.27-06.34/7 20.57	07.15 19.07	07.44 16.23	10.15 14.27
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	03.30 23.08	04.49 23.53	02.54 22.40	04.11 20.54	05.48 20.54	06.28-06.41/13 20.54	07.18 19.03	07.48 16.20	10.15 14.28
29	09.12 15.55	07.32 17.36	05.53 18.54	05.03 21.35	03.27 23.11	04.50 23.52	02.56 22.37	04.15 20.50	05.51 20.50	06.29-06.42/13 20.50	07.21 19.00	07.51 16.17	10.15 14.30
30	09.09 15.59	07.30 17.39	05.50 18.51	05.00 21.38	03.24 23.14	04.51 23.51	02.57 22.33	04.18 20.47	05.54 20.47	06.30-06.43/10 20.47	07.23 18.56	07.54 16.13	10.14 14.31
31	09.06 16.02	07.27 17.46	05.46 18.46	04.57 21.41	03.21 23.17	04.52 23.52	02.58 22.30	04.21 20.43	05.57 20.43	06.31-06.44/10 20.43	07.25 16.10	07.57 15.08	10.13 14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0
Sum of minutes with flicker	0	0	0	375	144	0	0	525	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 38 - PUU26
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 39 - PUU27
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13 14.35	09.04 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.18 23.20	02.59 23.50	04.24 22.27	06.00 20.39	07.26 18.53	08.00 16.06	09.36 14.42
2	10.12 14.37	09.00 16.09	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.23	03.01 23.48	04.27 22.24	06.03 20.36	07.29 18.49	08.04 16.03	09.38 14.40
3	10.11 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.48	03.13 23.26	03.01 23.47	04.30 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28	03.03 23.45	04.34 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.44 14.36
5	10.08 14.43	08.51 16.19	07.17 17.48	06.28 20.21	04.42 21.54	03.09 23.31	03.05 23.43	04.37 22.14	06.11 20.25	07.38 18.39	08.13 15.54	09.46 14.34
6	10.07 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	03.06 23.33	03.07 23.41	04.40 22.10	06.14 20.22	07.41 18.35	08.17 15.50	09.49 14.33
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	04.36 22.01	03.04 23.36	03.09 23.39	04.43 22.07	06.17 20.18	07.44 18.32	08.20 15.47	09.51 14.31
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	04.32 22.04	03.02 23.38	03.12 23.37	04.46 22.03	06.20 20.15	07.47 18.28	08.23 15.44	09.54 14.30
9	10.02 14.53	08.38 16.32	07.03 18.00	06.14 20.33	04.29 22.07	03.00 23.40	03.14 23.34	04.50 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.28
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	02.57 23.42	03.17 23.32	04.53 21.57	06.26 20.07	07.53 18.21	08.30 15.38	09.58 14.27
11	09.58 14.59	08.32 16.38	06.56 18.06	06.06 20.39	04.22 22.14	02.55 23.44	03.20 23.30	04.56 21.53	06.29 20.04	07.56 18.18	08.33 15.35	10.00 14.26
12	09.56 15.01	08.29 16.42	06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.46	03.22 23.27	04.59 21.50	06.32 20.00	07.59 18.14	08.36 15.32	10.02 14.25
13	09.54 15.04	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20	02.52 23.48	03.25 23.25	05.02 21.46	06.35 19.57	08.02 18.11	08.39 15.29	10.04 14.24
14	09.52 15.07	08.22 16.48	06.46 18.15	05.56 20.48	04.12 22.24	02.51 23.50	03.28 23.22	05.05 21.43	06.37 19.53	08.05 18.07	08.43 15.26	10.06 14.23
15	09.50 15.10	08.19 16.51	06.42 18.18	05.52 20.51	04.09 22.27	02.50 23.51	03.31 23.19	05.08 21.39	06.40 19.50	08.08 18.04	08.46 15.23	10.07 14.23
16	09.47 15.13	08.16 16.55	06.39 18.21	05.49 20.54	04.06 22.30	02.50 23.52	03.34 23.16	05.11 21.36	06.43 19.46	08.11 18.00	08.49 15.20	10.09 14.22
17	09.45 15.16	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33	02.49 23.53	03.37 23.14	05.15 21.32	06.46 19.42	08.14 17.57	08.52 15.17	10.10 14.22
18	09.42 15.19	08.09 17.01	06.32 18.27	05.42 21.00	03.59 22.37	02.48 23.54	03.40 23.11	05.18 21.29	06.49 19.39	08.17 17.53	08.56 15.14	10.11 14.22
19	09.40 15.23	08.05 17.04	06.28 18.30	05.38 21.03	03.56 22.40	02.48 23.55	03.43 23.08	05.21 21.25	06.52 19.35	08.20 17.50	08.59 15.12	10.12 14.22
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.07	03.53 22.43	02.48 23.55	03.46 23.05	05.24 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	03.50 22.46	02.48 23.56	03.49 23.02	05.27 21.18	06.58 19.28	08.26 17.43	09.05 15.06	10.14 14.22
22	09.32 15.32	07.55 17.14	06.18 18.39	05.28 21.13	03.47 22.49	02.48 23.56	03.52 22.59	05.30 21.15	07.00 19.25	08.29 17.40	09.08 15.03	10.15 14.22
23	09.29 15.35	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.53	02.49 23.56	03.55 22.56	05.33 21.11	07.03 19.21	08.32 17.36	09.12 15.01	10.15 14.23
24	09.27 15.39	07.49 17.20	06.10 18.45	05.21 21.19	03.41 22.56	02.50 23.56	03.58 22.53	05.36 21.08	07.06 19.18	08.35 17.33	09.15 14.58	10.15 14.24
25	09.24 15.42	07.45 17.23	06.07 18.48	05.17 21.22	03.38 22.59	02.50 23.55	04.02 22.50	05.39 21.04	07.09 19.14	07.38 16.30	09.18 14.56	10.16 14.24
26	09.21 15.45	07.42 17.27	06.03 18.51	05.14 21.25	03.35 23.02	02.51 23.55	04.05 22.46	05.42 21.01	07.12 19.10	07.41 16.26	09.21 14.53	10.16 14.25
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	03.32 23.05	02.52 23.54	04.08 22.43	05.45 20.57	07.15 19.07	07.44 16.23	09.24 14.51	10.16 14.27
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	03.29 23.08	02.54 23.53	04.11 22.40	05.48 20.54	07.18 19.03	07.48 16.20	09.27 14.49	10.15 14.28
29	09.12 15.55	07.32 17.30	05.53 18.57	05.03 21.35	03.26 23.11	02.55 23.52	04.14 22.37	05.51 20.50	07.21 19.00	07.51 16.16	09.30 14.46	10.15 14.29
30	09.10 15.59	07.30 17.27	05.49 18.54	05.00 21.38	03.24 23.14	02.57 23.51	04.18 22.34	05.54 20.47	07.23 18.56	07.54 16.13	09.33 14.44	10.14 14.31
31	09.07 16.02	07.27 17.24	05.46 18.51	05.00 21.41	03.21 23.17	02.57 23.30	04.21 22.30	05.57 20.43	07.20 16.10	07.57 14.44	09.33 14.44	10.14 14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	484	0	0	0	0	0	0	0	0	326	0	159

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 40 - PUU28
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13 14.35	09.04 14.32-14.53/21 16.05 11.28-12.00/32	07.31 17.36	06.42 20.09	04.56 21.41	03.18 23.20
2	10.12 14.37	09.00 14.32-14.53/21 16.08 11.29-12.00/31	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.23
3	10.11 14.39	08.57 14.33-14.53/20 16.12 11.29-11.59/30	07.24 17.42	06.35 20.15	04.49 21.48	03.13 23.26
4	10.10 14.41	08.54 14.33-14.52/19 16.15 11.30-11.58/28	07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28
5	10.08 14.43	08.51 14.34-14.52/18 16.18 11.30-11.58/28	07.17 17.48	06.28 20.21	04.42 21.54	03.08 23.31
6	10.07 14.45	08.48 14.35-14.51/16 16.22 11.31-11.57/26	07.14 17.51	06.24 20.24	04.39 21.57	03.06 23.33
7	10.05 14.48	08.45 14.37-14.50/13 16.25 11.33-11.56/23	07.10 17.54	06.21 20.27	04.36 22.01	03.04 23.36
8	10.04 13.14-13.17/3 14.50	08.42 14.39-14.48/9 16.28 11.34-11.55/21	07.07 17.57	06.17 20.30	04.32 22.04	03.02 23.38
9	10.02 13.11-13.19/8 14.53	08.38 11.36-11.53/17 16.32	07.03 18.00	06.13 20.33	04.29 22.07	03.00 23.40
10	10.00 13.10-13.21/11 14.56	08.35 11.39-11.49/10 16.35	07.00 18.03	06.10 20.36	04.25 22.10	02.57 23.43
11	09.58 13.09-13.23/14 14.59	08.32 16.38	06.56 18.06	06.06 20.39	04.22 22.14	02.55 23.45
12	09.56 11.34-11.43/9 15.01 13.09-13.25/16	08.29 16.42	06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.46
13	09.54 11.32-11.45/13 15.04 13.08-13.26/18	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20	02.52 23.48
14	09.52 11.31-11.47/16 15.07 13.09-13.27/18	08.22 16.48	06.46 18.15	05.56 20.48	04.12 22.24	02.51 23.50
15	09.50 11.30-11.48/18 15.10 13.08-13.28/20	08.19 16.51	06.42 18.18	05.52 20.51	04.09 22.27	02.50 23.51
16	09.47 11.29-11.50/21 15.13 13.08-13.29/21	08.16 16.55	06.39 18.21	05.49 20.54	04.06 22.30	02.49 23.52
17	09.45 11.29-11.51/22 15.16 13.08-13.30/22	08.12 16.58	06.35 18.24	05.45 20.57	04.02 22.33	02.49 23.53
18	09.42 11.28-11.52/24 15.19 13.07-13.30/23	08.09 17.01	06.32 18.27	05.42 21.00	03.59 22.37	02.48 23.54
19	09.40 11.27-11.53/26 15.22 13.07-13.31/24	08.06 17.04	06.28 18.30	05.38 21.03	03.56 22.40	02.48 23.55
20	09.37 11.27-11.54/27 15.26 13.07-13.31/24	08.02 17.08	06.25 18.33	05.35 21.07	03.53 22.43	02.48 23.56
21	09.35 11.27-11.55/28 15.29 13.08-13.32/24	07.59 17.11	06.21 18.36	05.31 21.10	03.50 22.46	02.48 23.56
22	09.32 11.27-11.56/29 15.32 13.08-13.32/24	07.55 17.14	06.18 18.39	05.27 21.13	03.47 22.50	02.48 23.56
23	09.30 11.27-11.57/30 15.35 13.08-13.33/25	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.53	02.49 23.56
24	09.27 14.34-14.39/5 13.08-13.33/25 15.39 11.27-11.57/30	07.49 17.20	06.10 18.45	05.20 21.19	03.41 22.56	02.49 23.56
25	09.24 14.33-14.44/11 13.09-13.33/24 15.42 11.27-11.58/31	07.45 17.23	06.07 18.48	05.17 21.22	03.38 22.59	02.50 23.56
26	09.21 14.32-14.48/16 13.09-13.33/24 15.45 11.27-11.58/31	07.42 17.26	06.03 18.51	05.13 21.25	03.35 23.02	02.51 23.55
27	09.18 14.32-14.51/19 13.10-13.33/23 15.49 11.27-11.59/32	07.38 17.30	06.00 18.54	05.10 21.28	03.32 23.05	02.52 23.54
28	09.15 14.31-14.51/20 13.10-13.33/23 15.52 11.27-11.59/32	07.35 17.33	05.56 18.57	05.06 21.32	03.29 23.08	02.54 23.53
29	09.12 14.31-14.52/21 13.11-13.32/21 15.55 11.27-11.59/32	07.32 17.36	05.53 19.00	05.03 21.35	03.26 23.11	02.55 23.52
30	09.10 14.31-14.52/21 13.12-13.32/20 15.58 11.27-11.59/32	07.29 17.39	05.50 19.03	05.00 21.38	03.24 23.14	02.57 23.51
31	09.07 14.31-14.52/21 13.13-13.31/18 16.02 11.27-11.59/32	07.26 17.42	05.46 19.06	04.97 21.41	03.21 23.17	02.58 23.50
Potential sun hours	171	238	363	451	570	625
Sum of minutes with flicker	1122	415	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 40 - PUU28
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.58 23.50	04.24 22.27	06.00 20.39	07.26 18.53	08.00 16.06	11.08-11.19/11 14.42
2	03.00 23.48	04.27 22.24	06.03 20.36	07.29 18.49	08.04 16.03	11.05-11.22/17 14.40
3	03.00 23.47	04.30 22.20	06.06 20.32	07.32 18.46	08.07 16.00	14.08-14.18/10 11.03-11.25/22 14.38
4	03.02 23.45	04.34 22.17	06.08 20.29	07.35 18.42	08.10 15.57	14.06-14.20/14 11.02-11.26/24 14.36
5	03.05 23.43	04.37 22.14	06.11 20.25	07.38 18.39	08.13 15.54	14.05-14.21/16 11.01-11.27/26 14.34
6	03.07 23.41	04.40 22.10	06.14 20.22	07.41 18.35	08.17 15.50	14.04-14.22/18 11.01-11.28/27 14.33
7	03.09 23.39	04.43 22.07	06.17 20.18	07.44 18.32	08.20 15.47	14.04-14.23/19 11.00-11.29/29 14.31
8	03.12 23.37	04.46 22.03	06.20 20.15	07.47 18.28	08.23 15.44	14.03-14.24/21 11.00-11.30/30 14.30
9	03.14 23.35	04.49 22.00	06.23 20.11	07.50 18.25	08.26 15.41	14.03-14.24/21 12.47-13.00/13 10.59-11.30/31 14.28
10	03.17 23.32	04.53 21.57	06.26 20.07	07.53 18.21	08.30 15.38	14.03-14.24/21 12.46-13.01/15 10.59-11.31/32 14.27
11	03.19 23.30	04.56 21.53	06.29 20.04	07.56 18.18	08.33 15.35	14.03-14.24/21 12.44-13.03/19 10.59-11.31/32 14.26
12	03.22 23.27	04.59 21.50	06.32 20.00	07.59 18.14	08.36 15.32	14.03-14.24/21 12.43-13.04/21 10.59-11.31/32 14.25
13	03.25 23.25	05.02 21.46	06.35 19.57	08.02 18.11	08.39 15.29	14.03-14.24/21 12.43-13.04/21 10.59-11.31/32 14.24
14	03.28 23.22	05.05 21.43	06.37 19.53	08.05 18.07	08.43 15.26	14.03-14.23/20 12.43-13.06/23 10.59-11.32/33 14.23
15	03.31 23.19	05.08 21.39	06.40 19.50	08.08 18.04	08.46 15.23	14.05-14.24/19 12.42-13.06/24 10.59-11.31/32 14.23
16	03.34 23.17	05.11 21.36	06.43 19.46	08.11 18.00	08.49 15.20	14.05-14.21/16 12.42-13.06/24 10.59-11.31/32 14.22
17	03.37 23.14	05.14 21.32	06.46 19.42	08.14 17.57	08.52 15.17	14.06-14.16/10 12.43-13.07/24 11.00-11.32/32 14.22
18	03.40 23.11	05.18 21.29	06.49 19.39	08.17 17.53	08.56 15.14	14.07-14.13/6 12.42-13.07/25 11.01-11.31/30 14.22
19	03.43 23.08	05.21 21.25	06.52 19.35	08.20 17.50	08.59 15.11	11.01-11.31/30 12.42-13.07/25 14.22
20	03.46 23.05	05.24 21.22	06.55 19.32	08.23 17.47	09.02 15.09	11.02-11.31/29 12.43-13.07/24 14.22
21	03.49 23.02	05.27 21.18	06.57 19.28	08.26 17.43	09.05 15.06	11.02-11.30/28 12.44-13.08/24 14.22
22	03.52 22.59	05.30 21.15	07.00 19.25	08.29 17.40	09.08 15.03	11.03-11.30/27 12.44-13.07/23 14.22
23	03.55 22.56	05.33 21.11	07.03 19.21	08.32 17.36	09.12 15.01	11.04-11.30/26 12.44-13.08/24 14.23
24	03.58 22.53	05.36 21.08	07.06 19.18	08.35 17.33	09.15 14.58	11.06-11.30/24 12.45-13.08/23 14.24
25	04.02 22.50	05.39 21.04	07.09 19.14	07.38 16.30	09.18 14.56	11.06-11.29/23 12.45-13.07/22 14.24
26	04.05 22.46	05.42 21.01	07.12 19.10	07.41 16.26	09.21 14.53	11.07-11.28/21 12.46-13.07/21 14.25
27	04.08 22.43	05.45 20.57	07.15 19.07	07.45 16.23	09.24 14.51	11.09-11.27/18 12.47-13.07/20 14.26
28	04.11 22.40	05.48 20.54	07.18 19.03	07.48 16.20	09.27 14.49	11.10-11.26/16 12.48-13.06/18 14.28
29	04.14 22.37	05.51 20.50	07.20 19.00	07.51 16.16	09.30 14.46	11.12-11.25/13 12.49-13.06/17 14.29
30	04.17 22.34	05.54 20.47	07.23 18.56	07.54 16.13	09.33 14.44	11.15-11.24/9 12.51-13.06/15 14.31
31	04.21 22.30	05.57 20.43		07.57 16.10		14.32
Potential sun hours	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	1512	39

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 41 - PUU29
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	08.01-08.08/7	04.56 21.41	03.19 23.20	02.59 23.49	04.24 22.27	06.00 20.39	07.26 18.53	08.00 16.07	09.35 14.42	
2	10.11 14.37	09.00 16.09	07.28 17.39	06.39 20.12		04.53 21.44	03.16 23.22	03.01 23.48	04.28 22.23	06.03 20.36	07.29 18.49	08.03 16.03	09.38 14.40	
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15		04.50 21.48	03.14 23.25	03.01 23.46	04.31 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38	
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18		04.46 21.51	03.11 23.28	03.03 23.44	04.34 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.43 14.37	
5	10.08 14.44	08.51 16.19	07.17 17.48	06.28 20.21		04.43 21.54	03.09 23.30	03.05 23.43	04.37 22.13	06.12 20.25	07.38 18.39	08.13 15.54	09.46 14.35	
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24		04.39 21.57	03.07 23.33	03.08 23.41	04.40 22.10	06.15 20.22	07.41 18.35	08.16 15.51	09.49 14.33	
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27		04.36 22.00	03.05 23.35	03.10 23.38	04.43 22.07	06.17 20.18	07.44 18.32	08.20 15.48	09.51 14.32	
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30		04.33 22.04	03.03 23.38	03.12 23.36	04.47 22.03	06.20 20.15	07.47 18.28	08.23 15.44	09.53 14.30	
9	10.01 14.54	08.38 16.32	07.03 18.00	06.14 20.33		04.29 22.07	03.01 23.40	03.15 23.34	04.50 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.29	
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36		04.26 22.10	02.57 23.42	03.17 23.32	04.53 21.56	06.26 20.07	07.53 18.21	08.29 15.38	09.58 14.28	
11	09.58 14.59	08.32 16.39	06.56 18.06	06.07 20.39		04.23 22.14	02.56 23.44	03.20 23.29	04.56 21.53	06.29 20.04	07.54-08.00/6	07.56 18.18	08.33 15.35	10.00 14.26
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42		04.19 22.17	02.54 23.46	03.23 23.27	04.59 21.50	06.32 20.00	07.50-08.04/14	07.59 18.14	08.36 15.32	10.02 14.25
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45		04.16 22.20	02.53 23.47	03.26 23.24	05.02 21.46	06.35 19.57	07.48-08.06/18	08.02 18.11	08.39 15.29	10.04 14.25
14	09.51 15.08	08.22 16.48	06.46 18.15	05.56 20.48		04.13 22.23	02.52 23.49	03.28 23.22	05.05 21.43	06.38 19.53	07.47-08.07/20	08.05 18.07	08.42 15.26	10.05 14.24
15	09.49 15.11	08.19 16.52	06.42 18.18	05.52 20.51		04.09 22.27	02.51 23.50	03.31 23.19	05.09 21.39	06.40 19.50	07.45-08.07/22	08.08 18.04	08.46 15.23	10.07 14.23
16	09.47 15.14	08.15 16.55	06.39 18.21	05.49 20.54		04.06 22.30	02.50 23.52	03.34 23.16	05.12 21.36	06.43 19.46	07.44-08.07/23	08.11 18.00	08.49 15.20	10.08 14.23
17	09.45 15.17	08.12 16.58	06.35 18.24	05.45 20.57	07.07-07.14/7	04.03 22.33	02.50 23.53	03.37 23.13	05.15 21.32	06.46 19.42	07.43-08.08/25	08.14 17.57	08.52 15.17	10.10 14.22
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	07.04-07.17/13	04.00 22.36	02.49 23.54	03.40 23.10	05.18 21.29	06.49 19.39	07.43-08.08/25	08.17 17.54	08.55 15.15	10.11 14.22
19	09.40 15.23	08.05 17.05	06.28 18.30	05.38 21.03	07.00-07.18/18	03.57 22.40	02.49 23.54	03.43 23.08	05.21 21.25	06.52 19.35	07.43-08.08/25	08.20 17.50	08.59 15.12	10.12 14.22
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	06.59-07.20/21	03.53 22.43	02.49 23.55	03.46 23.05	05.24 21.22	06.55 19.32	07.41-08.06/25	08.23 17.47	09.02 15.09	10.13 14.22
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	06.57-07.20/23	03.50 22.46	02.49 23.55	03.49 23.02	05.27 21.18	06.58 19.28	07.42-08.06/24	08.26 17.43	09.05 15.06	10.14 14.22
22	09.32 15.33	07.55 17.14	06.18 18.39	05.28 21.13	06.57-07.21/24	03.47 22.49	02.49 23.55	03.53 22.59	05.30 21.15	07.00 19.25	07.42-08.05/23	08.29 17.40	09.08 15.04	10.14 14.23
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	06.56-07.20/24	03.44 22.52	02.50 23.55	03.56 22.55	05.33 21.11	07.03 19.21	07.42-08.04/22	08.32 17.37	09.11 15.01	10.15 14.23
24	09.27 15.39	07.48 17.20	06.11 18.45	05.21 21.19	06.55-07.20/25	03.41 22.55	02.50 23.55	03.59 22.52	05.36 21.08	07.06 19.18	07.43-08.03/20	08.35 17.33	09.14 14.59	10.15 14.24
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	06.55-07.20/25	03.38 22.59	02.51 23.55	04.02 22.49	05.39 21.04	07.09 19.14	07.46-08.01/15	07.38 16.30	09.18 14.56	10.15 14.25
26	09.21 15.46	07.42 17.27	06.03 18.51	05.14 21.25	06.55-07.19/24	03.35 23.02	02.52 23.54	04.05 22.46	05.42 21.01	07.12 19.11	07.49-07.58/9	07.41 16.26	09.21 14.54	10.15 14.26
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	06.55-07.19/24	03.32 23.05	02.53 23.54	04.08 22.43	05.45 20.57	07.15 19.07		07.44 16.23	09.24 14.51	10.15 14.27
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	06.55-07.17/22	03.30 23.08	02.54 23.53	04.12 22.40	05.48 20.54	07.18 19.03		07.48 16.20	09.27 14.49	10.15 14.28
29	09.12 15.56		06.53 20.00	05.03 21.35	07.56-08.17/21	03.27 23.11	02.56 23.52	04.15 22.37	05.51 20.50	07.21 19.00		07.51 16.17	09.30 14.47	10.15 14.30
30	09.09 15.59		06.49 20.03	05.00 21.38	07.57-08.14/17	03.24 23.14	02.58 23.51	04.18 22.33	05.54 20.47	07.23 18.56		07.54 16.13	09.32 14.45	10.14 14.31
31	09.06 16.02		06.46 20.06	05.00 21.38	07.59-08.13/14	03.21 23.17	03.21 23.51	04.21 22.30	05.57 20.43	18.56		07.57 16.10	10.13 14.33	
Potential sun hours	171	238	363	451	7	570	624	608	508	393	316	305	198	0
Sum of minutes with flicker	0	0	302	7	0	0	0	0	0	0	316	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 42 - PUU30
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	06.39-06.43/4	07.26	08.00	09.35	
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39		18.53	16.07	14.42	
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03		07.29	08.04	09.38	
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36		18.49	16.03	14.40	
3	10.10	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06		07.32	08.07	09.41	
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32		18.46	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09		07.35	08.10	09.44	
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29		18.42	15.57	14.37	
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12		07.38	08.13	09.46	
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25		18.39	15.54	14.35	
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14		07.41	08.16	09.49	
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22		18.35	15.51	14.33	
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17		07.44	08.20	09.51	
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18		18.32	15.47	14.31	
8	10.03	08.42	07.07	06.17	04.32	03.03	03.12	04.47	06.20		07.47	08.23	09.53	
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15		18.28	15.44	14.30	
9	10.02	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23		07.50	08.26	09.56	
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11		18.25	15.41	14.29	
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26		07.53	08.29	09.58	
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07		18.21	15.38	14.27	
11	09.58	08.32	06.56	06.06	06.40-06.44/4	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00	
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04		18.18	15.35	14.26	
12	09.56	08.29	06.53	06.03	06.36-06.45/9	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02	
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00		18.14	15.32	14.25	
13	09.54	08.25	06.49	05.59	06.33-06.47/14	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04	
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57		18.11	15.29	14.24	
14	09.52	08.22	06.46	05.56	06.29-06.46/17	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05	
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53		18.07	15.26	14.24	
15	09.49	08.19	06.42	05.52	06.27-06.47/20	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07	
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50		18.04	15.23	14.23	
16	09.47	08.15	06.39	05.49	06.27-06.48/21	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08	
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46		18.00	15.20	14.23	
17	09.45	08.12	06.35	05.45	06.26-06.47/21	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10	
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42		17.57	15.17	14.22	
18	09.42	08.09	06.32	05.42	06.26-06.47/21	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11	
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39		17.54	15.15	14.22	
19	09.40	08.05	06.28	05.38	06.26-06.47/21	03.56	02.49	03.43	05.21	06.36-06.46/10	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35		17.50	15.12	14.22	
20	09.37	08.02	06.25	05.35	06.26-06.45/19	03.53	02.49	03.46	05.24	06.34-06.48/14	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32		17.47	15.09	14.22	
21	09.35	07.59	06.21	05.31	06.26-06.44/18	03.50	02.49	03.49	05.27	06.32-06.48/16	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28		17.43	15.06	14.22	
22	09.32	07.55	06.18	05.28	06.27-06.43/16	03.47	02.49	03.52	05.30	06.31-06.49/18	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25		17.40	15.04	14.23	
23	09.29	07.52	06.14	05.24	06.29-06.42/13	03.44	02.49	03.56	05.33	06.30-06.50/20	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21		17.37	15.01	14.23	
24	09.27	07.48	06.10	05.21	06.30-06.39/9	03.41	02.50	03.59	05.36	06.30-06.50/20	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18		17.33	14.59	14.24	
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	06.28-06.49/21	07.09	07.38	09.18	10.15	
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14		16.30	14.56	14.25	
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	06.28-06.49/21	07.12	07.41	09.21	10.15	
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10		16.26	14.54	14.26	
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	06.28-06.49/21	07.15	07.44	09.24	10.15	
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07		16.23	14.51	14.27	
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	06.29-06.49/20	07.18	07.48	09.27	10.15	
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03		16.20	14.49	14.28	
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	06.30-06.47/17	07.21	07.51	09.30	10.15	
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00		16.16	14.47	14.30	
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	06.33-06.46/13	07.23	07.54	09.33	10.14	
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56		16.13	14.44	14.31	
31	09.06		06.46		03.21		04.21	05.57	06.36-06.45/9		07.57		10.13	
	16.02		20.06		23.17		22.30	20.43			16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	0	137	
Sum of minutes with flicker	0	0	0	223	0	0	0	220	4	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 43 - PUU31
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 44 - PUU32
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 45 - PUU33
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	
1	10.13 14.35	09.03 13.32-13.43/11 16.05 10.08-10.33/25	12.01-12.10/9	07.31 17.36	06.42 20.09	04.56 21.41	03.18 23.20
2	10.12 14.37	09.00 10.08-10.33/25 16.08		07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.23
3	10.11 14.39	08.57 10.07-10.33/26 16.12		07.24 17.42	06.35 20.15	04.49 21.48	03.13 23.26
4	10.09 14.41	08.54 10.07-10.34/27 16.15		07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28
5	10.08 11.54-11.59/5 14.43	08.51 10.07-10.34/27 16.18		07.17 17.48	06.28 20.21	04.42 21.54	03.08 23.31
6	10.07 11.52-12.01/9 14.45	08.48 10.07-10.34/27 16.22		07.14 17.51	06.24 20.24	04.39 21.57	03.06 23.33
7	10.05 11.52-12.03/11 14.48	08.45 10.08-10.35/27 16.25		07.10 17.54	06.21 20.27	04.36 22.01	03.04 23.36
8	10.03 11.52-12.05/13 14.50	08.42 10.08-10.34/26 16.28		07.07 17.57	06.17 20.30	04.32 22.04	03.02 23.38
9	10.02 11.50-12.05/15 14.53	08.38 10.08-10.34/26 16.32		07.03 18.00	06.13 20.33	04.29 22.07	03.00 23.40
10	10.00 13.23-13.29/6 14.56 11.50-12.07/17	08.35 10.08-10.33/25 16.35		07.00 18.03	06.10 20.36	04.25 22.10	02.57 23.42
11	09.58 13.23-13.34/11 14.58 11.50-12.07/17	08.32 10.09-10.32/23 16.38		06.56 18.06	06.06 20.39	04.22 22.14	02.55 23.44
12	09.56 13.23-13.40/17 15.01 11.50-12.09/19	08.29 10.10-10.32/22 16.42		06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.46
13	09.54 13.22-13.40/18 15.04 11.49-12.10/21	08.25 10.11-10.31/20 16.45		06.49 18.12	05.59 20.45	04.15 22.20	02.52 23.48
14	09.52 13.23-13.42/19 15.07 11.50-12.11/21	08.22 10.13-10.29/16 16.48		06.46 18.15	05.56 20.48	04.12 22.24	02.51 23.50
15	09.50 13.22-13.42/20 15.10 11.49-12.11/22	08.19 10.15-10.26/11 16.51		06.42 18.18	05.52 20.51	04.09 22.27	02.50 23.51
16	09.47 13.22-13.43/21 15.13 11.49-12.12/23	08.15 16.55		06.39 18.21	05.49 20.54	04.06 22.30	02.49 23.52
17	09.45 13.22-13.44/22 15.16 11.50-12.13/23	08.12 16.58		06.35 18.24	05.45 20.57	04.02 22.33	02.49 23.53
18	09.42 13.21-13.44/23 15.19 11.49-12.13/24	08.09 17.01		06.32 18.27	05.42 21.00	03.59 22.37	02.48 23.54
19	09.40 13.22-13.45/23 15.22 11.49-12.14/25	08.05 17.04		06.28 18.30	05.38 21.03	03.56 22.40	02.48 23.55
20	09.37 13.22-13.46/24 15.26 11.50-12.14/24	08.02 17.07		06.25 18.33	05.34 21.06	03.53 22.43	02.48 23.56
21	09.35 13.22-13.46/24 15.29 11.50-12.15/25	07.59 17.11		06.21 18.36	05.31 21.10	03.50 22.46	02.48 23.56
22	09.32 13.23-13.46/23 15.32 11.50-12.15/25	07.55 17.14		06.17 18.39	05.27 21.13	03.47 22.49	02.48 23.56
23	09.29 13.23-13.47/24 15.35 11.51-12.15/24	07.52 17.17		06.14 18.42	05.24 21.16	03.44 22.53	02.49 23.56
24	09.27 13.23-13.47/24 15.39 11.51-12.15/24	07.48 17.20		06.10 18.45	05.20 21.19	03.41 22.56	02.49 23.56
25	09.24 13.24-13.47/23 15.42 11.52-12.15/23	07.45 17.23		06.07 18.48	05.17 21.22	03.38 22.59	02.50 23.56
26	09.21 13.24-13.47/23 11.52-12.15/23 15.45 10.14-10.24/10	07.42 17.26		06.03 18.51	05.13 21.25	03.35 23.02	02.51 23.55
27	09.18 13.25-13.47/22 11.53-12.15/22 15.48 10.12-10.26/14	07.38 17.30		06.00 18.54	05.10 21.28	03.32 23.05	02.52 23.54
28	09.15 13.26-13.46/20 11.54-12.15/21 15.52 10.11-10.28/17	07.35 17.33		05.56 18.57	05.06 21.32	03.29 23.08	02.54 23.53
29	09.12 13.26-13.46/20 11.55-12.14/19 15.55 10.09-10.29/20			06.53 20.00	05.03 21.35	03.26 23.11	02.55 23.52
30	09.09 13.28-13.45/17 11.56-12.13/17 15.58 10.08-10.30/22			06.49 20.03	05.00 21.38	03.23 23.14	02.57 23.51
31	09.06 13.29-13.43/14 11.57-12.11/14 16.02 10.08-10.31/23			06.45 20.06		03.21 23.17	
Potential sun hours	171	238		363	451	570	625
Sum of minutes with flicker	1070	373		0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 45 - PUU33
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.58 23.50	04.24 22.27	06.00 20.39	07.26 18.53	08.00 16.06	09.36 13.05-13.17/12 14.42 11.32-11.50/18
2	03.00 23.48	04.27 22.24	06.03 20.36	07.29 18.49	08.04 16.03	09.37-10.03/26 14.40 11.33-11.50/17
3	03.00 23.47	04.30 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.37-10.04/27 14.38
4	03.02 23.45	04.33 22.17	06.08 20.29	07.35 18.42	08.10 15.57	09.37-10.04/27 14.36
5	03.05 23.43	04.37 22.14	06.11 20.25	07.38 18.39	08.13 15.53	09.37-10.04/27 14.34
6	03.07 23.41	04.40 22.10	06.14 20.22	07.41 18.35	08.16 15.50	09.37-10.04/27 14.33
7	03.09 23.39	04.43 22.07	06.17 20.18	07.44 18.32	08.20 15.47	09.37-10.04/27 14.31
8	03.12 23.37	04.46 22.03	06.20 20.15	07.47 18.28	08.23 15.44	09.38-10.04/26 14.30
9	03.14 23.35	04.49 22.00	06.23 20.11	07.50 18.25	08.26 15.41	13.07-13.09/2 09.38-10.04/26 14.28
10	03.17 23.32	04.53 21.57	06.26 20.07	07.53 18.21	08.30 15.38	13.02-13.13/11 11.31-11.41/10 09.39-10.03/24 14.27
11	03.19 23.30	04.56 21.53	06.29 20.04	07.56 18.18	08.33 15.35	13.01-13.15/14 11.29-11.43/14 09.39-10.03/24 14.26
12	03.22 23.27	04.59 21.50	06.32 20.00	07.58 18.14	08.36 15.32	12.59-13.17/18 11.27-11.45/18 09.40-10.02/22 14.25
13	03.25 23.25	05.02 21.46	06.35 19.57	08.01 18.11	08.39 15.29	12.58-13.17/19 11.26-11.46/20 09.41-10.01/20 14.24
14	03.28 23.22	05.05 21.43	06.37 19.53	08.04 18.07	08.43 15.26	12.57-13.18/21 11.26-11.47/21 09.43-10.00/17 14.23
15	03.31 23.19	05.08 21.39	06.40 19.50	08.07 18.04	08.46 15.23	12.58-13.20/22 11.26-11.48/22 09.45-09.59/14 14.23
16	03.34 23.16	05.11 21.36	06.43 19.46	08.10 18.00	08.49 15.20	12.57-13.20/23 11.25-11.48/23 09.47-09.56/9 14.22
17	03.37 23.14	05.14 21.32	06.46 19.42	08.14 17.57	08.52 15.17	12.57-13.20/23 11.26-11.49/23 14.22
18	03.40 23.11	05.17 21.29	06.49 19.39	08.17 17.53	08.56 15.14	12.57-13.21/24 11.25-11.49/24 14.22
19	03.43 23.08	05.21 21.25	06.52 19.35	08.20 17.50	08.59 15.11	12.57-13.21/24 11.25-11.49/24 14.21
20	03.46 23.05	05.24 21.22	06.55 19.32	08.23 17.47	09.02 15.09	12.58-13.21/23 11.25-11.50/25 14.22
21	03.49 23.02	05.27 21.18	06.57 19.28	08.26 17.43	09.05 15.06	12.57-13.21/24 11.26-11.51/25 14.22
22	03.52 22.59	05.30 21.15	07.00 19.25	08.29 17.40	09.08 15.03	12.58-13.22/24 11.26-11.50/24 14.22
23	03.55 22.56	05.33 21.11	07.03 19.21	08.32 17.36	09.12 15.01	12.59-13.22/23 11.26-11.51/25 14.23
24	03.58 22.53	05.36 21.08	07.06 19.17	08.35 17.33	09.15 14.58	13.00-13.22/22 11.27-11.51/24 14.23
25	04.01 22.50	05.39 21.04	07.09 19.14	07.38 16.30	09.18 14.56	12.59-13.22/23 11.27-11.50/23 14.24
26	04.05 22.46	05.42 21.01	07.12 19.10	07.41 16.26	09.21 14.53	13.00-13.22/22 11.28-11.50/22 14.25
27	04.08 22.43	05.45 20.57	07.15 19.07	07.44 16.23	09.24 14.51	13.01-13.21/20 11.28-11.50/22 14.26
28	04.11 22.40	05.48 20.54	07.18 19.03	07.48 16.20	09.27 14.48	13.02-13.21/19 11.29-11.50/21 14.28
29	04.14 22.37	05.51 20.50	07.20 19.00	07.51 16.16	09.30 14.46	13.03-13.21/18 11.30-11.50/20 14.29
30	04.17 22.34	05.54 20.47	07.23 18.56	07.54 16.13	09.33 14.44	13.04-13.21/17 11.31-11.51/20 14.31
31	04.21 22.30	05.57 20.43		07.57 16.10		09.39-10.03/24 14.32
Potential sun hours	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	99	1255	106

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 46 - PUU34
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.19 23.20	04.18-04.34/16 23.49	02.59 23.49	04.19-04.45/26 22.27	04.24 20.39	07.26 18.53	08.00 16.07	09.35 14.42
2	10.11 14.37	09.00 16.09	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.22	04.17-04.35/18 23.48	03.01 23.48	04.19-04.44/25 22.23	04.27 20.36	06.03 18.49	08.03 16.03	09.38 14.40
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.48	03.14 23.25	04.16-04.35/19 23.46	03.01 23.46	04.19-04.44/25 22.20	04.31 20.32	06.06 18.46	08.07 16.00	09.41 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28	04.16-04.37/21 23.45	03.03 23.45	04.20-04.45/25 22.17	04.34 20.29	06.09 18.42	08.10 15.57	09.44 14.36
5	10.08 14.43	08.51 16.19	07.17 17.48	06.28 20.21	04.43 21.54	03.09 23.30	04.16-04.38/22 23.43	03.05 23.43	04.20-04.44/24 22.13	04.37 20.25	06.11 18.39	08.13 15.54	09.46 14.35
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	03.07 23.33	04.15-04.38/23 23.41	03.07 23.41	04.21-04.44/23 22.10	04.40 20.22	06.14 18.35	08.16 15.51	09.49 14.33
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	04.36 22.01	03.05 23.35	04.15-04.38/23 23.39	03.10 23.39	04.21-04.44/23 22.07	04.43 20.18	06.17 18.32	08.20 15.47	09.51 14.31
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	04.32 22.04	03.02 23.38	04.15-04.39/24 23.36	03.12 23.36	04.22-04.44/22 22.03	04.46 20.14	06.20 18.28	07.47 15.44	09.53 14.30
9	10.01 14.53	08.38 16.32	07.03 18.00	06.14 20.33	04.29 22.07	03.01 23.40	04.15-04.40/25 23.34	03.15 23.34	04.23-04.43/20 22.00	04.50 20.11	06.23 18.25	08.26 15.41	09.56 14.29
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	02.57 23.42	04.15-04.40/25 23.32	03.17 23.32	04.24-04.43/19 21.56	04.53 20.07	06.26 18.21	08.29 15.38	09.58 14.27
11	09.58 14.59	08.32 16.38	06.56 18.06	06.06 20.39	04.22 22.14	02.56 23.44	04.15-04.40/25 23.29	03.20 23.29	04.26-04.43/17 21.53	04.56 20.04	06.29 18.18	08.33 15.35	10.00 14.26
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.46	04.14-04.40/26 23.27	03.23 23.27	04.26-04.41/15 21.50	04.59 20.00	06.32 18.14	08.36 15.32	10.02 14.25
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20	02.53 23.48	04.15-04.41/26 23.24	03.25 23.24	04.28-04.40/12 21.46	05.02 19.57	06.35 18.11	08.39 15.29	10.04 14.24
14	09.52 15.07	08.22 16.48	06.46 18.15	05.56 20.48	04.12 22.23	02.52 23.49	04.15-04.41/26 23.22	03.28 23.22	04.31-04.39/8 21.43	05.05 19.53	06.37 18.07	08.42 15.26	10.05 14.24
15	09.49 15.10	08.19 16.52	06.42 18.18	05.52 20.51	04.09 22.27	02.51 23.51	04.15-04.42/27 23.19	03.31 23.19	05.08 21.39	06.40 19.50	08.07 18.04	08.46 15.23	10.07 14.23
16	09.47 15.13	08.15 16.55	06.39 18.21	05.49 20.54	04.06 22.30	02.50 23.52	04.15-04.42/27 23.16	03.34 23.16	05.12 21.36	06.43 19.46	08.10 18.00	08.49 15.20	10.08 14.22
17	09.45 15.17	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33	02.49 23.53	04.15-04.42/27 23.13	03.37 23.13	05.15 21.32	06.46 19.42	08.14 17.57	08.52 15.17	10.10 14.22
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	04.00 22.36	02.49 23.54	04.15-04.43/28 23.10	03.40 23.10	05.18 21.29	06.49 19.39	08.17 17.53	08.55 15.14	10.11 14.22
19	09.40 15.23	08.05 17.04	06.28 18.30	05.38 21.03	03.56 22.40	02.49 23.54	04.16-04.43/27 23.08	03.43 23.08	05.21 21.25	06.52 19.35	08.20 17.50	08.59 15.12	10.12 14.22
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	03.53 22.43	02.48 23.55	04.16-04.43/27 23.05	03.46 23.05	05.24 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	03.50 22.46	02.49 23.55	04.16-04.43/27 23.02	03.49 23.02	05.27 21.18	06.57 19.28	08.26 17.43	09.05 15.06	10.14 14.22
22	09.32 15.32	07.55 17.14	06.18 18.39	05.28 21.13	03.47 22.49	02.49 23.56	04.16-04.43/27 22.59	03.52 22.59	05.30 21.15	07.00 19.25	08.29 17.40	09.08 15.04	10.14 14.23
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.52	02.49 23.56	04.17-04.44/27 22.56	03.55 22.56	05.33 21.11	07.03 19.21	08.32 17.36	09.11 15.01	10.15 14.23
24	09.27 15.39	07.48 17.20	06.10 18.45	05.21 21.19	03.41 22.56	02.50 23.55	04.16-04.44/28 22.52	03.59 22.52	05.36 21.08	07.06 19.18	08.35 17.33	09.14 14.58	10.15 14.24
25	09.24 15.42	07.45 17.23	06.07 18.48	05.17 21.22	03.38 22.59	02.51 23.55	04.17-04.44/27 22.49	04.02 22.49	05.39 21.04	07.09 19.14	07.38 16.30	09.18 14.56	10.15 14.25
26	09.21 15.45	07.42 17.27	06.03 18.51	05.14 21.25	03.35 23.02	02.52 23.55	04.17-04.44/27 22.46	04.05 22.46	05.42 21.01	07.12 19.10	07.41 16.26	09.21 14.53	10.15 14.26
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	03.32 23.05	02.53 23.54	04.17-04.44/27 22.43	04.08 22.43	05.45 20.57	07.15 19.07	07.44 16.23	09.24 14.51	10.15 14.27
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	03.29 23.08	02.54 23.53	04.18-04.45/27 22.40	04.11 22.40	05.48 20.54	07.18 19.03	07.48 16.20	09.27 14.49	10.15 14.28
29	09.12 15.55	07.32 17.36	05.53 18.53	05.03 21.35	03.27 23.11	02.56 23.52	04.18-04.45/27 22.37	04.15 22.37	05.51 20.50	07.20 19.00	07.51 16.16	09.30 14.47	10.15 14.30
30	09.09 15.59	07.30 17.39	06.49 18.54	05.00 21.38	03.24 23.14	02.57 23.51	04.19-04.45/26 22.33	04.18 22.33	05.54 20.46	07.23 18.56	07.54 16.13	09.33 14.44	10.14 14.31
31	09.06 16.02	07.27 17.42	06.46 18.57	05.00 21.41	03.21 23.17	03.21 23.17	04.19-04.32/13 23.17	04.21 23.17	05.57 20.43	07.57 18.56	07.57 16.10	10.13 14.33	10.13 14.33
Potential sun hours	171	238	363	451	570	624	752	864	939	1005	1055	1095	1130
Sum of minutes with flicker	0	0	0	0	29	624	752	864	939	1005	1055	1095	1130

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 47 - PUU35
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 48 - PUU36
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 49 - PUU37
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.13	09.03 12.12-12.30/18	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00 10.12-10.20/8	09.36 11.47-12.07/20	
	14.35	16.05 10.34-10.59/25	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42	
2	10.12	09.00 12.14-12.29/15	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04 10.09-10.23/14	09.38 11.48-12.07/19	
	14.36	16.08 10.34-10.59/25	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40	
3	10.11	08.57 12.17-12.26/9	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07 10.08-10.25/17	09.41 11.49-12.06/17	
	14.39	16.12 10.35-10.58/23	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38	
4	10.09	12.11-12.13/2	08.54 10.35-10.58/23	07.21	06.31	04.46	03.11	03.02	04.33	06.08	08.10 10.07-10.26/19	09.44 11.50-12.05/15	
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36	
5	10.08	12.08-12.16/8	08.51 10.35-10.58/23	07.17	06.28	04.42	03.08	03.04	04.37	06.11	08.13 10.06-10.27/21	09.46 11.52-12.05/13	
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34	
6	10.07	12.07-12.18/11	08.48 10.36-10.57/21	07.14	06.24	04.39	03.06	03.07	04.40	06.14	08.16 10.06-10.28/22	09.49 11.54-12.05/11	
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33	
7	10.05	12.07-12.20/13	08.45 10.38-10.57/19	07.10	06.20	04.35	03.04	03.09	04.43	06.17	08.20 10.05-10.29/24	09.51 11.55-12.03/8	
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31	
8	10.03	12.07-12.21/14	08.42 10.39-10.55/16	07.07	06.17	04.32	03.02	03.11	04.46	06.20	08.23 11.47-11.57/10	09.54 11.58-12.01/3	
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44 10.05-10.29/24	14.29	
9	10.02	12.05-12.22/17	08.38 10.40-10.53/13	07.03	06.13	04.29	03.00	03.14	04.49	06.23	08.26 11.44-11.59/15	09.56	
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.24	15.41 10.05-10.29/24	14.28	
10	10.00	12.05-12.23/18	08.35 10.43-10.50/7	07.00	06.10	04.25	02.56	03.17	04.52	06.26	08.29 11.43-12.01/18	09.58	
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38 10.05-10.29/24	14.27	
11	09.58	12.05-12.24/19	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33 11.42-12.02/20	10.00
	14.58	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35 10.05-10.29/24	14.26	
12	09.56	12.05-12.26/21	08.29 09.09-09.13/4	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36 11.41-12.03/22	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32 10.05-10.29/24	14.25	
13	09.54	12.04-12.26/22	08.25 09.05-09.16/11	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39 11.40-12.04/24	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29 10.05-10.29/24	14.24	
14	09.52	12.05-12.28/23	08.22 09.01-09.17/16	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43 11.39-12.04/25	10.06
	15.07	16.48	18.15	20.48	22.23	23.50	23.22	21.43	19.53	18.07	15.26 10.06-10.29/23	14.23	
15	09.49	12.04-12.28/24	08.19 09.00-09.18/18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07 09.35-09.47/12	10.07	
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23 10.07-10.29/22	14.22	
16	09.47	12.04-12.29/25	08.15 09.00-09.20/20	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10 09.33-09.48/15	10.09	
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20 10.07-10.28/21	14.22	
17	09.45	12.05-12.30/25	08.12 08.59-09.20/21	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13 09.31-09.49/18	10.10	
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17 10.09-10.28/19	14.22	
18	09.42	12.04-12.30/26	08.09 08.58-09.20/22	06.32	05.41	03.59	02.48	03.40	05.17	06.49	08.17 09.31-09.51/20	10.11	
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14 10.09-10.27/18	14.21	
19	09.40	12.04-12.31/27	08.05 08.58-09.21/23	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20 09.29-09.51/22	10.12	
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11 10.10-10.26/16	14.21	
20	09.37	12.04-12.31/27	08.02 08.58-09.21/23	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23 09.28-09.51/23	09.02 11.40-12.07/27	10.13
	15.26	17.07	18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.46	15.09 10.13-10.25/12	14.21	
21	09.35	12.05-12.32/27	07.59 08.58-09.21/23	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26 09.28-09.51/23	09.05 11.40-12.07/27	10.14
	15.29	10.39-10.48/9	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06 10.15-10.24/9	14.22
22	09.32	12.05-12.32/27	07.55 08.58-09.20/22	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29 09.28-09.51/23	09.08 11.40-12.07/27	10.15
	15.32	10.38-10.50/12	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	12.05-12.32/27	07.52 08.59-09.20/21	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32 09.28-09.51/23	09.11 11.41-12.08/27	10.15
	15.35	10.36-10.52/16	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	12.06-12.33/27	07.48 08.59-09.19/20	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35 09.28-09.50/22	09.15 11.42-12.08/26	10.15
	15.38	10.36-10.53/17	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24	12.06-12.33/27	07.45 09.00-09.17/17	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38 08.29-08.50/21	09.18 11.42-12.07/25	10.16
	15.42	10.35-10.54/19	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	12.06-12.33/27	07.42 09.02-09.16/14	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41 08.29-08.49/20	09.21 11.43-12.07/24	10.16
	15.45	10.34-10.55/21	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	12.07-12.33/26	07.38 09.04-09.13/9	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44 08.30-08.48/18	09.24 11.43-12.07/24	10.16
	15.48	10.34-10.56/22	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	12.08-12.32/24	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.17	07.48 08.32-08.47/15	09.27 11.44-12.07/23	10.15
	15.52	10.34-10.57/23	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.19	14.48	14.28
29	09.12	12.08-12.32/24	07.32	05.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51 08.35-08.45/10	09.30 11.45-12.07/22	10.15
	15.55	10.33-10.57/24	17.34	20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09	12.09-12.31/22	07.29	06.49	04.59	03.23	02.57	04.17	05.54	07.23	07.54 08.39-08.41/2	09.33 11.46-12.07/21	10.14
	15.58	10.33-10.57/24	17.32	20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06	12.10-12.30/20	07.26	06.45	04.58	03.21	02.56	04.21	05.57	07.25	07.57	16.10	10.14
	16.02	10.33-10.58/25	17.35	20.06	21.41	23.17	23.50	22.30	20.43	18.57	16.10	14.32	14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136	
Sum of minutes with flicker	812	521	0	0	0	0	0	0	0	287	950	106	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 50 - PUU38
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	03.19 05.13-06.08/55
	14.35	16.05	17.36	20.09	21.41	23.19
2	10.11	09.00	07.28	06.38	04.53	03.16 05.13-06.07/54
	14.37	16.09	17.39	20.12	21.44	23.22
3	10.10	08.57	07.24	06.35	04.49 05.42-05.53/11	03.14 05.12-06.07/55
	14.39	16.12	17.42	20.15	21.47	23.25
4	10.09	08.54	07.21	06.31	04.46 05.39-05.56/17	03.11 05.13-06.07/54
	14.41	16.15	17.45	20.18	21.51	23.28
5	10.08	08.51	07.17	06.28	04.43 05.36-05.58/22	03.09 05.13-06.07/54
	14.44	16.19	17.48	20.21	21.54	23.30
6	10.06	08.48	07.14	06.24	04.39 05.34-06.00/26	03.07 05.13-06.06/53
	14.46	16.22	17.51	20.24	21.57	23.33
7	10.05	08.45	07.10	06.21	04.36 05.34-06.02/28	03.05 05.13-06.07/54
	14.48	16.25	17.54	20.27	22.00	23.35
8	10.03	08.41	07.07	06.17	04.32 05.32-06.03/31	03.03 05.14-06.07/53
	14.51	16.29	17.57	20.30	22.04	23.37
9	10.01	08.38	07.03	06.14	04.29 05.31-06.03/32	03.01 05.14-06.07/53
	14.54	16.32	18.00	20.33	22.07	23.40
10	09.59	08.35	07.00	06.10	04.26 05.26-06.04/38	02.57 05.14-06.06/52
	14.56	16.35	18.03	20.36	22.10	23.42
11	09.57	08.32	06.56	06.06	04.22 05.24-06.04/40	02.56 05.14-06.06/52
	14.59	16.39	18.06	20.39	22.13	23.44
12	09.56	08.28	06.53	06.03	04.19 05.22-06.06/44	02.54 05.14-06.06/52
	15.02	16.42	18.09	20.42	22.17	23.45
13	09.53	08.25	06.49	05.59	04.16 05.20-06.06/46	02.53 05.15-06.07/52
	15.05	16.45	18.12	20.45	22.20	23.47
14	09.51	08.22	06.46	05.56	04.13 05.19-06.06/47	02.52 05.15-06.06/51
	15.08	16.48	18.15	20.48	22.23	23.49
15	09.49	08.19	06.42 07.15-07.22/7	05.52	04.09 05.18-06.07/49	02.51 05.15-06.07/52
	15.11	16.52	18.18	20.51	22.26	23.50
16	09.47	08.15	06.39 07.11-07.24/13	05.49	04.06 05.17-06.07/50	02.50 05.15-06.06/51
	15.14	16.55	18.21	20.54	22.30	23.51
17	09.44	08.12	06.35 07.07-07.25/18	05.45	04.03 05.15-06.07/52	02.50 05.16-06.06/50
	15.17	16.58	18.24	20.57	22.33	23.52
18	09.42	08.09	06.32 07.06-07.27/21	05.42	04.00 05.15-06.07/52	02.49 05.16-06.07/51
	15.20	17.01	18.27	21.00	22.36	23.53
19	09.40	08.05	06.28 07.04-07.27/23	05.38	03.57 05.14-06.07/53	02.49 05.16-06.07/51
	15.23	17.04	18.30	21.03	22.39	23.54
20	09.37	08.02	06.25 07.04-07.28/24	05.35	03.53 05.14-06.07/53	02.49 05.16-06.07/51
	15.26	17.08	18.33	21.06	22.43	23.55
21	09.34	07.59	06.21 07.03-07.27/24	05.31	03.50 05.14-06.08/54	02.49 05.16-06.07/51
	15.29	17.11	18.36	21.09	22.46	23.55
22	09.32	07.55	06.17 07.02-07.27/25	05.28	03.47 05.13-06.07/54	02.49 05.16-06.07/51
	15.32	17.14	18.39	21.12	22.49	23.55
23	09.29	07.52	06.14 07.02-07.27/25	05.24	03.44 05.13-06.08/55	02.50 05.17-06.08/51
	15.36	17.17	18.42	21.16	22.52	23.55
24	09.26	07.48	06.10 07.01-07.26/25	05.21	03.41 05.13-06.08/55	02.50 05.17-06.08/51
	15.39	17.20	18.45	21.19	22.55	23.55
25	09.24	07.45	06.07 07.02-07.26/24	05.17	03.38 05.13-06.08/55	02.51 05.18-06.09/51
	15.42	17.23	18.48	21.22	22.58	23.55
26	09.21	07.41	06.03 07.02-07.25/23	05.14	03.35 05.13-06.08/55	02.52 05.17-06.08/51
	15.45	17.27	18.51	21.25	23.02	23.54
27	09.18	07.38	06.00 07.03-07.24/21	05.10	03.32 05.13-06.08/55	02.53 05.18-06.09/51
	15.49	17.30	18.54	21.28	23.05	23.53
28	09.15	07.35	05.56 07.03-07.22/19	05.07	03.30 05.13-06.08/55	02.54 05.18-06.09/51
	15.52	17.33	18.57	21.31	23.08	23.53
29	09.12		06.53 08.05-08.20/15	05.03	03.27 05.12-06.08/56	02.56 05.18-06.10/52
	15.55		20.00	21.35	23.11	23.51
30	09.09		06.49 08.07-08.17/10	05.00	03.24 05.12-06.07/55	02.58 05.18-06.10/52
	15.59		20.03	21.38	23.14	23.50
31	09.06		06.46		03.21 05.12-06.07/55	
	16.02		20.06		23.16	
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	317	0	1295	1562

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 50 - PUU38
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 05.18-06.11/53 23.49	04.24 05.33-06.15/42 22.27	06.00 20.39	07.26 18.53	08.00 16.07	09.35 14.42
2	03.01 05.18-06.11/53 23.47	04.27 05.35-06.15/40 22.23	06.03 20.36	07.29 18.49	08.03 16.03	09.38 14.40
3	03.01 05.18-06.11/53 23.46	04.31 05.38-06.14/36 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38
4	03.03 05.19-06.12/53 23.44	04.34 05.41-06.13/32 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.43 14.37
5	03.05 05.19-06.12/53 23.42	04.37 05.43-06.12/29 22.13	06.11 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	03.08 05.19-06.13/54 23.40	04.40 05.43-06.10/27 22.10	06.14 20.22	07.41 18.35	08.16 15.51	09.48 14.33
7	03.10 05.19-06.13/54 23.38	04.43 05.45-06.09/24 22.06	06.17 20.18	07.44 18.32	08.19 15.47	09.51 14.32
8	03.12 05.20-06.14/54 23.36	04.47 05.47-06.08/21 22.03	06.20 20.14	07.47 18.28	08.23 15.44	09.53 14.30
9	03.15 05.20-06.14/54 23.34	04.50 05.49-06.05/16 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.55 14.29
10	03.17 05.20-06.15/55 23.31	04.53 05.52-06.01/9 21.56	06.26 20.07	07.52 18.21	08.29 15.38	09.58 14.28
11	03.20 05.21-06.15/54 23.29	04.56 21.53	06.29 20.04	07.55 18.18	08.32 15.35	10.00 14.26
12	03.23 05.21-06.16/55 23.27	04.59 21.49	06.32 20.00	07.58 18.14	08.36 15.32	10.02 14.25
13	03.26 05.20-06.16/56 23.24	05.02 21.46	06.35 07.59-08.07/8 19.57	08.01 18.11	08.39 15.29	10.03 14.24
14	03.28 05.21-06.17/56 23.21	05.05 21.43	06.37 07.55-08.09/14 19.53	08.04 18.07	08.42 15.26	10.05 14.24
15	03.31 05.21-06.17/56 23.19	05.08 21.39	06.40 07.53-08.11/18 19.49	08.07 18.04	08.45 15.23	10.07 14.23
16	03.34 05.22-06.17/55 23.16	05.12 21.36	06.43 07.52-08.12/20 19.46	08.10 18.00	08.49 15.20	10.08 14.23
17	03.37 05.22-06.17/55 23.13	05.15 21.32	06.46 07.51-08.13/22 19.42	08.13 17.57	08.52 15.17	10.09 14.22
18	03.40 05.22-06.17/55 23.10	05.18 21.29	06.49 07.50-08.14/24 19.39	08.16 17.53	08.55 15.15	10.11 14.22
19	03.43 05.23-06.18/55 23.07	05.21 21.25	06.52 07.48-08.13/25 19.35	08.19 17.50	08.58 15.12	10.12 14.22
20	03.46 05.23-06.18/55 23.04	05.24 21.22	06.55 07.48-08.13/25 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	03.49 05.23-06.17/54 23.01	05.27 21.18	06.57 07.47-08.13/26 19.28	08.26 17.43	09.05 15.06	10.13 14.22
22	03.52 05.24-06.18/54 22.58	05.30 21.15	07.00 07.47-08.12/25 19.25	08.29 17.40	09.08 15.04	10.14 14.23
23	03.56 05.24-06.18/54 22.55	05.33 21.11	07.03 07.48-08.12/24 19.21	08.32 17.36	09.11 15.01	10.15 14.23
24	03.59 05.24-06.18/54 22.52	05.36 21.08	07.06 07.48-08.11/23 19.17	08.35 17.33	09.14 14.59	10.15 14.24
25	04.02 05.25-06.18/53 22.49	05.39 21.04	07.09 07.48-08.10/22 19.14	07.38 16.30	09.17 14.56	10.15 14.25
26	04.05 05.25-06.18/53 22.46	05.42 21.01	07.12 07.48-08.08/20 19.10	07.41 16.26	09.20 14.54	10.15 14.26
27	04.08 05.27-06.17/50 22.43	05.45 20.57	07.15 07.51-08.06/15 19.07	07.44 16.23	09.23 14.51	10.15 14.27
28	04.11 05.28-06.18/50 22.40	05.48 20.53	07.18 07.54-08.03/9 19.03	07.47 16.20	09.26 14.49	10.15 14.28
29	04.15 05.28-06.17/49 22.36	05.51 20.50	07.20 19.00	07.51 16.16	09.29 14.47	10.14 14.30
30	04.18 05.30-06.17/47 22.33	05.54 20.46	07.23 18.56	07.54 16.13	09.32 14.44	10.14 14.31
31	04.21 05.31-06.15/44 22.30	05.57 20.43		07.57 16.10		10.13 14.33
Potential sun hours	608	508	393	305	198	137
Sum of minutes with flicker	1650	276	320	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 51 - PUU39
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.19 23.19	04.18-04.19/1 23.19	02.59 23.49	04.13-04.34/21 23.49	04.24 22.27	06.00 20.39	06.39-06.47/8 18.53	08.00 16.07	09.35 14.42
2	10.11 14.37	09.00 16.09	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.22	04.16-04.22/6 23.22	03.01 23.48	04.13-04.34/21 23.48	04.27 22.23	06.03 20.36	07.29 18.49	08.03 16.03	09.38 14.40
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.47	03.14 23.25	04.14-04.23/9 23.25	03.01 23.46	04.13-04.33/20 23.46	04.31 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28	04.13-04.25/12 23.28	03.03 23.44	04.14-04.34/20 23.44	04.34 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.43 14.36
5	10.08 14.43	08.51 16.19	07.17 17.48	06.28 20.21	04.43 21.54	03.09 23.30	04.12-04.26/14 23.30	03.05 23.42	04.15-04.33/18 23.42	04.37 22.13	06.11 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	03.07 23.33	04.10-04.26/16 23.33	03.07 23.38	04.16-04.33/17 23.38	04.40 22.10	06.14 20.22	07.41 18.35	08.16 15.50	09.48 14.33
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	04.36 22.00	03.05 23.35	04.09-04.27/18 23.35	03.10 23.38	04.17-04.32/15 23.38	04.43 22.07	06.17 20.18	07.44 18.32	08.20 15.47	09.51 14.31
8	10.03 14.51	08.41 16.29	07.07 17.57	06.17 20.30	04.32 22.04	03.03 23.37	04.09-04.28/19 23.37	03.12 23.36	04.19-04.32/13 23.36	04.46 22.03	06.20 20.14	07.47 18.28	08.23 15.44	09.53 14.30
9	10.01 14.53	08.38 16.32	07.03 18.00	06.13 20.33	04.29 22.07	03.01 23.40	04.09-04.29/20 23.40	03.15 23.34	04.21-04.31/10 23.34	04.50 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.29
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	02.57 23.42	04.09-04.29/20 23.42	03.17 23.32	04.23-04.30/7 23.32	04.53 21.56	06.26 20.07	07.52 18.21	08.29 15.38	09.58 14.27
11	09.58 14.59	08.32 16.38	06.56 18.06	06.06 20.39	06.39-06.47/8 22.13	04.22 23.44	02.56 23.44	04.08-04.30/22 23.29	03.20 21.53	04.56 20.04	06.29 20.04	07.55 18.18	08.33 15.35	10.00 14.26
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42	06.36-06.49/13 22.17	04.19 23.46	02.54 23.46	04.08-04.30/22 23.27	03.23 21.49	04.59 20.00	06.32 20.00	07.58 18.14	08.36 15.32	10.02 14.25
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45	06.33-06.50/17 22.20	04.16 23.47	02.53 23.47	04.04-04.08/4 23.24	03.25 21.46	05.02 19.57	06.35 20.00	08.01 18.11	08.39 15.29	10.04 14.24
14	09.51 15.07	08.22 16.48	06.46 18.15	05.56 20.48	06.30-06.50/20 22.23	04.12 23.49	02.52 23.49	04.03-04.31/28 23.21	03.28 21.43	05.05 19.53	06.37 20.00	08.04 18.07	08.42 15.26	10.05 14.24
15	09.49 15.10	08.19 16.52	06.42 18.18	05.52 20.51	06.29-06.51/22 22.26	04.09 23.50	02.51 23.50	04.03-04.32/29 23.19	03.31 21.39	05.08 19.49	06.40 20.00	08.07 18.04	08.46 15.23	10.07 14.23
16	09.47 15.13	08.15 16.55	06.39 18.21	05.49 20.54	06.28-06.52/24 22.30	04.06 23.52	02.50 23.52	04.02-04.31/29 23.16	03.34 21.36	05.11 19.46	06.41-06.48/7 19.46	06.43 18.00	08.49 15.20	10.08 14.23
17	09.44 15.17	08.12 16.58	06.35 18.24	05.45 20.57	06.27-06.51/24 22.33	04.03 23.53	02.49 23.53	04.02-04.32/30 23.13	03.37 21.32	05.15 19.42	06.37-06.50/13 19.42	06.46 18.13	08.52 15.17	10.10 14.22
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	06.27-06.52/25 22.36	04.00 23.54	02.49 23.54	04.02-04.32/30 23.10	03.40 21.29	05.18 19.39	06.36-06.52/16 19.39	06.49 17.53	08.55 15.14	10.11 14.22
19	09.40 15.23	08.05 17.04	06.28 18.30	05.38 21.03	06.27-06.52/25 22.39	03.56 23.54	02.49 23.54	04.02-04.33/31 23.07	03.43 21.25	05.21 19.35	06.35-06.53/18 19.35	06.52 17.50	08.58 15.12	10.12 14.22
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	06.27-06.50/23 22.43	03.53 23.55	02.49 23.55	04.02-04.33/31 23.04	03.46 21.22	05.24 19.32	06.34-06.54/20 19.32	06.55 17.47	09.02 15.09	10.13 14.22
21	09.34 15.29	07.59 17.11	06.21 18.36	05.31 21.09	06.27-06.50/23 22.46	03.50 23.55	02.49 23.55	04.02-04.33/31 23.01	03.49 21.18	05.27 19.28	06.32-06.54/22 19.28	06.57 17.43	09.05 15.06	10.14 14.22
22	09.32 15.32	07.55 17.14	06.17 18.39	05.28 21.13	06.28-06.50/22 22.49	03.47 23.55	02.49 23.55	04.02-04.33/31 22.58	03.52 21.15	05.30 19.25	06.31-06.55/24 19.25	07.00 17.40	09.08 15.04	10.14 14.23
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	06.28-06.49/21 22.52	03.44 23.55	02.49 23.55	04.03-04.34/31 22.55	03.56 21.11	05.33 19.21	06.31-06.55/24 19.21	07.03 17.36	09.11 15.01	10.15 14.23
24	09.26 15.39	07.48 17.20	06.10 18.45	05.21 21.19	06.28-06.47/19 22.55	03.41 23.55	02.50 23.55	04.03-04.33/30 22.52	03.59 21.08	05.36 19.17	06.31-06.55/24 19.17	07.06 17.33	09.14 14.58	10.15 14.24
25	09.24 15.42	07.45 17.23	06.07 18.48	05.17 21.22	06.30-06.45/15 22.59	03.38 23.55	02.51 23.55	04.04-04.34/30 22.49	04.02 21.04	05.39 19.14	06.30-06.54/24 19.14	07.09 17.38	09.17 14.56	10.15 14.25
26	09.21 15.45	07.42 17.27	06.03 18.51	05.14 21.25	06.31-06.43/12 23.02	03.35 23.54	02.52 23.54	04.04-04.34/30 22.46	04.05 21.01	05.42 19.10	06.30-06.54/24 19.10	07.12 17.41	09.20 14.54	10.15 14.26
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	06.35-06.40/5 23.02	03.32 23.05	02.53 23.54	04.05-04.34/29 22.43	04.08 22.43	05.45 20.57	06.30-06.54/24 19.07	07.15 17.42	09.24 14.51	10.15 14.27
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.31	06.35-06.40/5 23.08	03.29 23.08	02.54 23.53	04.06-04.34/28 22.40	04.11 22.40	05.48 20.53	06.31-06.53/22 19.03	07.18 17.47	09.26 14.49	10.15 14.28
29	09.12 15.55	07.32 18.00	05.53 19.04	05.03 21.35	06.35-06.40/5 23.11	03.27 23.52	02.56 23.52	04.07-04.34/27 22.36	04.15 22.36	05.51 20.50	06.30-06.51/21 19.00	07.20 17.51	09.29 14.47	10.14 14.30
30	09.09 15.59	07.29 18.03	05.49 19.08	05.00 21.38	06.35-06.40/5 23.14	03.24 23.50	02.57 23.50	04.12-04.34/22 22.33	04.18 22.33	05.54 20.46	06.33-06.50/17 18.56	07.23 17.54	09.32 14.44	10.14 14.31
31	09.06 16.02	07.26 18.06	05.45 19.12	05.00 21.41	06.35-06.40/5 23.17	03.21 23.49	02.54 23.49	04.12-04.34/22 22.30	04.21 22.30	05.57 20.43	06.36-06.49/13 18.56	07.27 17.57	09.34 14.45	10.13 14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	0
Sum of minutes with flicker	0	0	0	318	0	702	166	313	8	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 52 - PUU40
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24 05.17-05.37/20	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27 05.17-05.37/20	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30 05.19-05.36/17	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34 05.22-05.36/14	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37 05.25-05.36/11	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 05.20-05.24/4	03.07	03.07	04.40 05.27-05.34/7	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 05.17-05.25/8	03.04	03.10	04.43 05.30-05.33/3	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 05.14-05.26/12	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 05.11-05.26/15	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26 05.08-05.26/18	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22 05.06-05.26/20	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.07-05.27/20	02.54	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16 05.06-05.27/21	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12 05.06-05.27/21	02.52	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09 05.07-05.27/20	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06 05.07-05.27/20	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03 05.06-05.26/20	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59 05.07-05.26/19	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56 05.07-05.25/18	02.48	03.43 05.25-05.29/4	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 05.08-05.25/17	02.48	03.46 05.22-05.31/9	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 05.10-05.24/14	02.48	03.49 05.21-05.32/11	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47 05.10-05.23/13	02.49	03.52 05.20-05.34/14	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 05.11-05.22/11	02.49	03.55 05.19-05.35/16	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21	03.41 05.13-05.20/7	02.50	03.59 05.18-05.35/17	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02 05.18-05.36/18	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05 05.17-05.36/19	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08 05.17-05.37/20	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11 05.17-05.38/21	05.48	07.18	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		05.53	05.03	03.27	02.56	04.14 05.17-05.37/20	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18 05.17-05.38/21	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21 05.16-05.37/21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	298	0	211	92	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 53 - PUU41
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 54 - PUU42
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	20.35-20.55/20	03.19	02.59	04.24	06.00	07.26	08.00	09.35	
	14.35	16.05	17.36	20.09	21.41		23.19	23.49	22.27	20.39	18.53	16.06	14.42	
2	10.11	09.00	07.28	06.38	04.53	20.34-20.55/21	03.16	03.01	04.27	06.03	07.29	08.03	09.38	
	14.37	16.09	17.39	20.12	21.44		23.22	23.48	22.23	20.36	18.49	16.03	14.40	
3	10.10	08.57	07.24	06.35	04.49	20.34-20.55/21	03.14	03.01	04.30	20.51-20.58/7	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47		23.25	23.46	22.20	20.32	18.46	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	20.35-20.54/19	03.11	03.03	04.34	20.49-21.01/12	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51		23.28	23.44	22.17	20.29	18.42	15.57	14.36	
5	10.08	08.51	07.17	06.28	04.42	20.35-20.54/19	03.09	03.05	04.37	20.47-21.01/14	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54		23.30	23.42	22.13	20.25	18.39	15.54	14.35	
6	10.06	08.48	07.14	06.24	04.39	20.35-20.53/18	03.07	03.07	04.40	20.46-21.02/16	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57		23.33	23.40	22.10	20.21	18.35	15.50	14.33	
7	10.05	08.45	07.10	06.21	04.36	20.36-20.52/16	03.04	03.10	04.43	20.45-21.03/18	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00		23.35	23.38	22.07	20.18	18.32	15.47	14.31	
8	10.03	08.41	07.07	06.17	04.32	20.37-20.51/14	03.02	03.12	04.46	20.44-21.03/19	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04		23.37	23.36	22.03	20.14	18.28	15.44	14.30	
9	10.01	08.38	07.03	06.13	04.29	20.39-20.50/11	03.01	03.15	04.50	20.44-21.03/19	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07		23.40	23.34	22.00	20.11	18.25	15.41	14.29	
10	09.59	08.35	07.00	06.10	04.26	20.42-20.47/5	02.57	03.17	04.53	20.44-21.04/20	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10		23.42	23.32	21.56	20.07	18.21	15.38	14.27	
11	09.58	08.32	06.56	06.06	04.22		02.55	03.20	04.56	20.44-21.04/20	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13		23.44	23.29	21.53	20.04	18.18	15.35	14.26	
12	09.56	08.28	06.53	06.03	04.19		02.54	03.23	04.59	20.43-21.03/20	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17		23.46	23.27	21.49	20.00	18.14	15.32	14.25	
13	09.53	08.25	06.49	05.59	04.16		02.53	03.25	05.02	20.43-21.02/19	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20		23.47	23.24	21.46	19.57	18.11	15.29	14.24	
14	09.51	08.22	06.46	05.56	04.12		02.52	03.28	05.05	20.44-20.59/15	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23		23.49	23.21	21.43	19.53	18.07	15.26	14.24	
15	09.49	08.19	06.42	05.52	04.09		02.51	03.31	05.08	20.44-20.56/12	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26		23.50	23.19	21.39	19.49	18.04	15.23	14.23	
16	09.47	08.15	06.39	05.49	04.06		02.50	03.34	05.11	20.44-20.52/8	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30		23.52	23.16	21.36	19.46	18.00	15.20	14.22	
17	09.44	08.12	06.35	05.45	04.03		02.49	03.37	05.15	20.45-20.50/5	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33		23.53	23.13	21.32	19.42	17.57	15.17	14.22	
18	09.42	08.09	06.32	05.42	03.59		02.49	03.40	05.18		06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36		23.54	23.10	21.29	19.39	17.53	15.14	14.22	
19	09.40	08.05	06.28	05.38	03.56		02.49	03.43	05.21		06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39		23.54	23.07	21.25	19.35	17.50	15.12	14.22	
20	09.37	08.02	06.24	05.35	03.53		02.48	03.46	05.24		06.55	08.22	09.02	10.13
	15.26	17.08	18.33	21.06	22.43		23.55	23.04	21.22	19.32	17.47	15.09	14.22	
21	09.34	07.59	06.21	05.31	03.50		02.49	03.49	05.27		06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46		23.55	23.01	21.18	19.28	17.43	15.06	14.22	
22	09.32	07.55	06.17	05.27	03.47		02.49	03.52	05.30		07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49		23.55	22.58	21.15	19.25	17.40	15.04	14.23	
23	09.29	07.52	06.14	05.24	03.44		02.49	03.55	05.33		07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52		23.55	22.55	21.11	19.21	17.36	15.01	14.23	
24	09.26	07.48	06.10	05.20	03.41		02.50	03.59	05.36		07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55		23.55	22.52	21.08	19.17	17.33	14.58	14.24	
25	09.24	07.45	06.07	05.17	20.40-20.41/1		02.51	04.02	05.39		07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58		23.55	22.49	21.04	19.14	16.30	14.56	14.25	
26	09.21	07.41	06.03	05.13	20.39-20.44/5		02.52	04.05	05.42		07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02		23.54	22.46	21.01	19.10	16.26	14.53	14.26	
27	09.18	07.38	06.00	05.10	20.37-20.46/9		02.53	04.08	05.45		07.15	07.44	09.23	10.15
	15.49	17.30	18.54	21.28	23.05		23.54	22.43	20.57	19.07	16.23	14.51	14.27	
28	09.15	07.35	05.56	05.07	20.36-20.49/13		02.54	04.11	05.48		07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08		23.53	22.40	20.53	19.03	16.20	14.49	14.28	
29	09.12		05.53	05.03	20.35-20.52/17		02.56	04.14	05.51		07.20	07.51	09.29	10.14
	15.55		20.00	21.35	23.11		23.52	22.36	20.50	19.00	16.16	14.46	14.29	
30	09.09		06.49	05.00	20.35-20.54/19		02.57	04.18	05.54		07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14		23.50	22.33	20.46	18.56	16.13	14.44	14.31	
31	09.06		06.45		03.21			04.21	05.57		07.57		10.13	
	16.02		20.06		23.17			22.30	20.43		16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	
Sum of minutes with flicker	0	0	0	64	164	0	0	224	0	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 55 - PUU43
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.59	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 56 - PUU44
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	21.23-21.51/28	02.59	21.30-21.57/27	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19		23.49		22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	21.23-21.52/29	03.01	21.30-21.57/27	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22		23.48		22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	21.23-21.51/28	03.01	21.30-21.57/27	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25		23.46		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	21.24-21.52/28	03.03	21.30-21.57/27	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28		23.44		22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	21.24-21.51/27	03.05	21.30-21.57/27	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30		23.42		22.13	20.25	18.38	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	21.24-21.52/28	03.07	21.30-21.57/27	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33		23.40		22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	21.25-21.52/27	03.10	21.30-21.58/28	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35		23.38		22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	21.25-21.52/27	03.12	21.31-21.59/28	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.37		23.36		22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	21.25-21.52/27	03.14	21.30-21.58/28	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40		23.34		22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.26	02.57	21.26-21.52/26	03.17	21.30-21.58/28	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42		23.32		21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	21.26-21.52/26	03.20	21.31-21.59/28	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44		23.29		21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	21.26-21.52/26	03.22	21.31-21.59/28	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46		23.27		21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16	02.53	21.26-21.52/26	03.25	21.31-21.59/28	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47		23.24		21.46	19.56	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52	21.27-21.52/25	03.28	21.31-21.59/28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49		23.21		21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	21.26-21.52/26	03.31	21.31-21.59/28	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50		23.19		21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	21.27-21.53/26	03.34	21.31-21.59/28	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52		23.16		21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	02.49	21.28-21.53/25	03.37	21.32-22.00/28	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53		23.13		21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	21.28-21.53/25	03.40	21.32-21.59/27	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53		23.10		21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	21.27-21.53/26	03.43	21.32-21.59/27	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54		23.07		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	21.29-21.54/25	03.46	21.32-21.58/26	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55		23.04		21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	21.29-21.54/25	03.49	21.34-21.59/25	05.27	06.57	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55		23.01		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	21.29-21.54/25	03.52	21.34-21.58/24	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55		22.58		21.15	19.24	17.40	15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	21.28-21.54/26	03.55	21.35-21.58/23	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55		22.55		21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	21.23-21.50/27	03.58	21.35-21.57/22	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55		22.52		21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	21.29-21.54/25	04.02	21.36-21.55/19	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	21.29-21.55/26	04.05	21.37-21.52/15	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54		22.46		21.00	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	21.30-21.55/25	04.08	21.39-21.50/11	05.45	07.15	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05	23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	21.30-21.56/26	04.11	21.40-21.47/7	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53		22.40		20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.56	21.22-21.50/28	04.14	21.43-21.45/2	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.34	23.11	23.52		22.36		20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	21.29-21.55/26	04.18		05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50		22.33		20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21	03.21	21.23-21.51/28	04.21		05.57		07.57		10.13
	16.02		20.06		23.17			22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	382	786		698		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 57 - PUU45
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.56	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.29	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 58 - PUU46
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	21.56-22.11/15	04.24	06.00	07.26	17.53-18.13/20	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49		22.26	20.39	18.53		16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	21.56-22.10/14	04.27	06.02	07.29	17.53-18.11/18	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.47		22.23	20.36	18.49		16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	21.58-22.09/11	04.30	06.05	07.32	17.53-18.07/14	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46		22.20	20.32	18.45		16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	21.59-22.07/8	04.34	06.08	07.35	17.54-18.03/9	08.10	09.43
	14.41	16.15	17.45	20.18	21.50	23.27	23.44		22.16	20.28	18.42		15.57	14.36
5	10.07	08.51	07.17	06.28	04.42	03.09	03.05		04.37	06.11	07.38	17.55-18.00/5	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42		22.13	20.25	18.38		15.53	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07		04.40	06.14	07.41		08.16	09.48
	14.46	16.22	17.51	20.23	21.57	23.33	23.40		22.10	20.21	18.35		15.50	14.33
7	10.05	08.44	07.10	06.20	04.36	03.04	03.10		04.43	06.17	07.43		08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38		22.06	20.18	18.31		15.47	14.31
8	10.03	08.41	07.07	17.19-17.20/1	06.17	04.32	03.02	21.56-22.01/5	03.12	04.46	06.20		07.46	08.23
	14.51	16.28	17.57	20.29	22.03	23.37	23.36		22.03	20.14	18.28		15.44	14.30
9	10.01	08.38	07.03	17.17-17.24/7	06.13	04.29	03.00	21.54-22.04/10	03.14	04.49	06.23		07.49	08.26
	14.53	16.32	18.00	20.33	22.07	23.40	23.34		22.00	20.11	18.24		15.41	14.28
10	09.59	08.35	07.00	17.15-17.27/12	06.10	04.26	02.57	21.52-22.05/13	03.17	04.53	06.26		07.52	08.29
	14.56	16.35	18.03	20.36	22.10	23.42	23.31		21.56	20.07	18.21		15.38	14.27
11	09.57	08.32	06.56	17.15-17.31/16	06.06	04.22	02.55	21.51-22.07/16	03.20	04.56	06.29		07.55	08.32
	14.59	16.38	18.06	20.39	22.13	23.44	23.29		21.53	20.04	18.17		15.35	14.26
12	09.55	08.28	06.53	17.14-17.33/19	06.03	04.19	02.54	21.51-22.07/16	03.22	04.59	06.31		07.58	08.36
	15.01	16.42	18.09	20.42	22.16	23.45	23.26		21.49	20.00	18.14		15.32	14.25
13	09.53	08.25	06.49	17.13-17.33/20	05.59	04.16	02.53	21.50-22.08/18	03.25	05.02	06.34		08.01	08.39
	15.04	16.45	18.12	20.45	22.20	23.47	23.24		21.46	19.56	18.11		15.29	14.24
14	09.51	08.22	06.46	17.13-17.34/21	05.56	04.12	02.52	21.50-22.09/19	03.28	05.05	06.37		08.04	08.42
	15.07	16.48	18.15	20.48	22.23	23.49	23.21		21.42	19.53	18.07		15.26	14.23
15	09.49	08.18	06.42	17.13-17.33/20	05.52	04.09	02.51	21.49-22.10/21	03.31	05.08	06.40		08.07	08.45
	15.10	16.51	18.18	20.51	22.26	23.50	23.19		21.39	19.49	18.04		15.23	14.23
16	09.47	08.15	06.39	17.13-17.31/18	05.49	04.06	02.50	21.49-22.11/22	03.34	05.11	06.43		08.10	08.49
	15.13	16.55	18.21	20.54	22.30	23.51	23.16		21.35	19.46	18.00		15.20	14.22
17	09.44	08.12	06.35	17.14-17.31/17	05.45	04.03	02.49	21.50-22.11/21	03.37	05.14	06.46		08.13	08.52
	15.16	16.58	18.24	20.57	22.33	23.52	23.13		21.32	19.42	17.57		15.17	14.22
18	09.42	08.08	06.31	17.14-17.29/15	05.41	03.59	02.49	21.50-22.12/22	03.40	05.17	06.49		08.16	08.55
	15.19	17.01	18.27	21.00	22.36	23.53	23.10		21.28	19.39	17.53		15.14	14.22
19	09.39	08.05	06.28	17.17-17.27/10	05.38	03.56	02.48	21.49-22.11/22	03.43	05.21	06.52		08.19	08.58
	15.23	17.04	18.30	21.03	22.39	23.54	23.07		21.25	19.35	17.50		15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	21.50-22.13/23	03.46	05.24	06.54	08.22		09.02	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04		21.21	19.32	17.46		15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	21.50-22.13/23	03.49	05.27	06.57	08.25		09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01		21.18	19.28	17.43		15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	21.50-22.13/23	03.52	05.30	07.00	08.29		09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58		21.14	19.24	17.40		15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	21.50-22.13/23	03.55	05.33	07.03	08.32		09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55		21.11	19.21	17.36		15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	21.51-22.13/22	03.58	05.36	07.06	18.01-18.10/9		08.35	09.14
	15.39	17.20	18.45	21.19	22.55	23.55	22.52		21.07	19.17	17.33		14.58	14.24
25	09.23	07.45	06.07	05.17	03.38	02.51	21.51-22.13/22	04.02	05.39	07.09	17.58-18.12/14		07.38	09.17
	15.42	17.23	18.48	21.22	22.58	23.55	22.49		21.04	19.14	16.30		14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	21.51-22.13/22	04.05	05.42	07.12	17.56-18.13/17		07.41	09.20
	15.45	17.26	18.51	21.25	23.01	23.54	22.46		21.00	19.10	16.26		14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	21.52-22.13/21	04.08	05.45	07.14	17.55-18.13/18		07.44	09.23
	15.49	17.29	18.54	21.28	23.05	23.53	22.43		20.57	19.07	16.23		14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	21.53-22.13/20	04.11	05.48	07.17	17.54-18.14/20		07.47	09.26
	15.52	17.33	18.57	21.31	23.08	23.53	22.39		20.53	19.03	16.20		14.49	14.28
29	09.12		05.52	05.03	03.26	02.56	21.53-22.12/19	04.14	05.51	07.20	17.53-18.14/21		07.50	09.29
	15.55		20.00	21.34	23.11	23.51	22.36		20.50	19.00	16.16		14.46	14.29
30	09.09		05.49	05.00	03.24	02.57	21.54-22.11/17	04.18	05.54	07.23	17.53-18.14/21		07.54	09.32
	15.58		20.03	21.38	23.14	23.50	22.33		20.46	18.56	16.13		14.44	14.31
31	09.06		05.45		03.21		04.21		05.57		07.57			10.13
	16.02		20.06		23.16		22.30		20.43		16.10			14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	120	305	198	137	0
Sum of minutes with flicker	0	0	176	0	0	440	48	0	393	120	66	0	137	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 59 - PUU47
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	19.36-19.55/19	07.26	08.00	09.35	
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39		18.53	16.06	14.42	
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	19.36-19.55/19	07.29	08.03	09.38	
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36		18.49	16.03	14.40	
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	19.35-19.53/18	07.32	08.06	09.41	
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32		18.45	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	19.35-19.50/15	07.35	08.10	09.43	
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29		18.42	15.57	14.36	
5	10.08	08.51	07.17	06.28	19.42-19.44/2	04.42	03.09	03.05	04.37	06.11	19.36-19.46/10	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.42	22.13	20.25		18.38	15.53	14.34	
6	10.06	08.48	07.14	06.24	19.41-19.47/6	04.39	03.06	03.07	04.40	06.14	19.37-19.43/6	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21		18.35	15.50	14.33	
7	10.05	08.45	07.10	06.20	19.40-19.50/10	04.36	03.04	03.09	04.43	06.17	19.38-19.40/2	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.06	20.18		18.31	15.47	14.31	
8	10.03	08.41	07.07	06.17	19.38-19.52/14	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53	
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14		18.28	15.44	14.30	
9	10.01	08.38	07.03	06.13	19.38-19.56/18	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56	
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11		18.24	15.41	14.28	
10	09.59	08.35	07.00	06.10	19.37-19.56/19	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58	
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07		18.21	15.38	14.27	
11	09.58	08.32	06.56	06.06	19.37-19.56/19	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00	
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04		18.17	15.35	14.26	
12	09.56	08.28	06.53	06.03	19.36-19.55/19	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02	
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00		18.14	15.32	14.25	
13	09.53	08.25	06.49	05.59	19.37-19.55/18	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.04	
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56		18.10	15.29	14.24	
14	09.51	08.22	06.46	05.56	19.38-19.54/16	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05	
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53		18.07	15.26	14.23	
15	09.49	08.19	06.42	05.52	19.38-19.52/14	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07	
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49		18.04	15.23	14.23	
16	09.47	08.15	06.39	05.48	19.40-19.50/10	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08	
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46		18.00	15.20	14.22	
17	09.44	08.12	06.35	05.45	19.43-19.47/4	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10	
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42		17.57	15.17	14.22	
18	09.42	08.09	06.31	05.41		03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11	
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39		17.53	15.14	14.22	
19	09.40	08.05	06.28	05.38		03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12	
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35		17.50	15.11	14.22	
20	09.37	08.02	06.24	05.34		03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13	
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.22	19.32		17.46	15.09	14.22	
21	09.34	07.58	06.21	05.31		03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.14	
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28		17.43	15.06	14.22	
22	09.32	07.55	06.17	05.27		03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14	
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.24		17.40	15.03	14.22	
23	09.29	07.52	06.14	05.24		03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15	
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21		17.36	15.01	14.23	
24	09.26	07.48	06.10	05.20		03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15	
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17		17.33	14.58	14.24	
25	09.24	07.45	06.07	05.17		03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15	
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14		16.29	14.56	14.24	
26	09.21	07.41	06.03	05.13		03.35	02.51	04.05	05.42	19.45-19.51/6	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10		16.26	14.53	14.25	
27	09.18	07.38	06.00	05.10		03.32	02.53	04.08	05.45	19.41-19.52/11	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07		16.23	14.51	14.27	
28	09.15	07.35	05.56	05.06		03.29	02.54	04.11	05.48	19.39-19.54/15	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03		16.19	14.49	14.28	
29	09.12		06.52	05.03		03.26	02.55	04.14	05.51	19.38-19.55/17	07.20	07.50	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00		16.16	14.46	14.29	
30	09.09		06.49	04.59		03.24	02.57	04.17	05.54	19.37-19.56/19	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56		16.13	14.44	14.31	
31	09.06		06.45			03.21	04.21	05.57	19.36-19.55/19		07.57		10.13	
	16.02		20.06		23.17		22.30	20.43			16.10		14.32	
Potential sun hours	171	238	363	451	570	624	609	509	393	89	305	198	0	137
Sum of minutes with flicker	0	0	0	169	0	0	0	87	89	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 60 - PUU48
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	19.30-19.54/24	07.26	08.00	09.35	
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.26	20.39		18.52	16.06	14.42	
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	19.30-19.53/23	07.29	08.03	09.38	
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36		18.49	16.03	14.40	
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	19.30-19.51/21	07.32	08.06	09.41	
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32		18.45	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	19.31-19.50/19	07.35	08.10	09.43	
	14.41	16.15	17.45	20.17	21.51	23.28	23.44	22.17	20.28		18.42	15.57	14.36	
5	10.08	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	19.33-19.46/13	07.38	08.13	09.46	
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25		18.38	15.53	14.34	
6	10.06	08.48	07.14	06.24	19.40-19.47/7	04.39	03.06	03.07	04.40	19.36-19.43/7	07.41	08.16	09.48	
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21		18.35	15.50	14.33	
7	10.05	08.44	07.10	06.20	19.37-19.50/13	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51	
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18		18.31	15.47	14.31	
8	10.03	08.41	07.07	06.17	19.34-19.52/18	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53	
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14		18.28	15.44	14.30	
9	10.01	08.38	07.03	06.13	19.33-19.54/21	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55	
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11		18.24	15.41	14.28	
10	09.59	08.35	07.00	06.10	19.31-19.54/23	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.58	
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07		18.21	15.38	14.27	
11	09.57	08.32	06.56	06.06	19.31-19.55/24	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00	
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04		18.17	15.35	14.26	
12	09.55	08.28	06.53	06.03	19.29-19.55/26	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02	
	15.01	16.41	18.09	20.42	22.17	23.46	23.27	21.49	20.00		18.14	15.32	14.25	
13	09.53	08.25	06.49	05.59	19.29-19.55/26	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03	
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56		18.10	15.29	14.24	
14	09.51	08.22	06.46	05.56	19.29-19.55/26	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05	
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53		18.07	15.26	14.23	
15	09.49	08.18	06.42	05.52	19.28-19.54/26	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07	
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49		18.04	15.23	14.23	
16	09.47	08.15	06.39	05.48	19.28-19.54/26	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08	
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.35	19.46		18.00	15.20	14.22	
17	09.44	08.12	06.35	05.45	19.29-19.54/25	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10	
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42		17.57	15.17	14.22	
18	09.42	08.08	06.31	05.41	19.29-19.52/23	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11	
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.28	19.39		17.53	15.14	14.22	
19	09.39	08.05	06.28	05.38	19.29-19.52/23	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12	
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35		17.50	15.11	14.22	
20	09.37	08.02	06.24	05.34	19.30-19.51/21	03.53	02.48	03.46	05.24	19.41-19.50/9	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.21	19.31		17.46	15.09	14.22	
21	09.34	07.58	06.21	05.31	19.32-19.50/18	03.50	02.48	03.49	05.27	19.38-19.53/15	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28		17.43	15.06	14.22	
22	09.32	07.55	06.17	05.27	19.33-19.47/14	03.47	02.49	03.52	05.30	19.36-19.54/18	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24		17.40	15.03	14.22	
23	09.29	07.52	06.14	05.24	19.36-19.44/8	03.44	02.49	03.55	05.33	19.34-19.55/21	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21		17.36	15.01	14.23	
24	09.26	07.48	06.10	05.20		03.41	02.50	03.58	05.36	19.33-19.55/22	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19		22.55	23.55	22.52	21.07		19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17		03.38	02.50	04.02	05.39	19.32-19.56/24	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22		22.58	23.55	22.49	21.04		19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13		03.35	02.51	04.05	05.42	19.32-19.57/25	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25		23.02	23.54	22.46	21.00		19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10		03.32	02.53	04.08	05.45	19.30-19.56/26	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28		23.05	23.54	22.43	20.57		19.07	16.23	14.51	14.25
28	09.15	07.34	05.56	05.06		03.29	02.54	04.11	05.48	19.30-19.56/26	07.17	07.47	09.26	10.17
	15.52	17.32	18.57	21.31		23.08	23.53	22.40	20.53		19.03	16.19	14.49	14.28
29	09.12		05.52	05.03		03.26	02.55	04.14	05.51	19.30-19.56/26	07.20	07.50	09.29	10.14
	15.55		20.00	21.34		23.11	23.52	22.36	20.50		19.00	16.16	14.46	14.29
30	09.09		06.49	04.59		03.24	02.57	04.17	05.54	19.30-19.56/26	07.23	07.54	09.32	10.14
	15.58		20.03	21.38		23.14	23.50	22.33	20.46		18.56	16.13	14.44	14.31
31	09.06		06.45			03.21		04.21	05.57	19.29-19.55/26		07.57		10.13
	16.02		20.06			23.17		22.30	20.43			16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	0	0	137
Sum of minutes with flicker	0	0	0	368	0	0	0	264	107	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102WTG: 61 - PUU49
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	17.52-18.10/18	08.00	09.35	
	14.35	16.05	17.36	20.08	21.41	23.19	23.49	22.26	20.39	18.52		16.06	14.42	
2	10.11	09.00	07.27	06.38	04.53	03.16	03.01	04.27	06.02	07.29	17.54-18.06/12	08.03	09.38	
	14.37	16.08	17.39	20.11	21.44	23.22	23.47	22.23	20.36	18.49		16.03	14.40	
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32		08.06	09.41	
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45		16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35		08.10	09.43	
	14.41	16.15	17.45	20.17	21.50	23.27	23.44	22.16	20.28	18.42		15.57	14.36	
5	10.07	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	07.38		08.13	09.46	
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38		15.53	14.34	
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.40		08.16	09.48	
	14.46	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35		15.50	14.33	
7	10.04	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43		08.19	09.51	
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31		15.47	14.31	
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46		08.23	09.53	
	14.51	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28		15.44	14.30	
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49		08.26	09.55	
	14.53	16.32	18.00	20.32	22.07	23.40	23.34	22.00	20.11	18.24		15.41	14.28	
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52		08.29	09.57	
	14.56	16.35	18.03	20.35	22.10	23.42	23.31	21.56	20.07	18.21		15.38	14.27	
11	09.57	08.32	06.56	17.18-17.26/8	06.06	04.22	02.55	03.20	04.56	06.29		08.32	10.00	
	14.59	16.38	18.06	20.38	22.13	23.44	23.29	21.53	20.03	18.17		15.35	14.26	
12	09.55	08.28	06.53	17.13-17.29/16	06.03	04.19	02.54	03.22	04.59	06.31		08.36	10.01	
	15.01	16.41	18.09	20.42	22.16	23.45	23.26	21.49	20.00	18.14		15.32	14.25	
13	09.53	08.25	06.49	17.11-17.31/20	05.59	04.15	02.53	03.25	05.02	06.34	18.01-18.14/13	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10		15.29	14.24	
14	09.51	08.22	06.46	17.09-17.33/24	05.56	04.12	02.51	03.28	05.05	06.37	17.58-18.16/18	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07		15.26	14.23	
15	09.49	08.18	06.42	17.07-17.34/27	05.52	04.09	02.51	03.31	05.08	06.40	17.56-18.18/22	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04		15.23	14.23	
16	09.47	08.15	06.38	17.06-17.34/28	05.48	04.06	02.50	03.34	05.11	06.43	17.53-18.18/25	08.10	08.49	10.08
	15.13	16.54	18.21	20.54	22.29	23.51	23.16	21.35	19.46	18.00		15.20	14.22	
17	09.44	08.12	06.35	17.05-17.35/30	05.45	04.02	02.49	03.37	05.14	06.46	17.52-18.19/27	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13	21.32	19.42	17.57		15.17	14.22	
18	09.42	08.08	06.31	17.04-17.35/31	05.41	03.59	02.49	03.40	05.17	06.49	17.51-18.20/29	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10	21.28	19.39	17.53		15.14	14.22	
19	09.39	08.05	06.28	17.04-17.36/32	05.38	03.56	02.48	03.43	05.20	06.51	17.50-18.20/30	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50		15.11	14.22	
20	09.37	08.02	06.24	17.03-17.35/32	05.34	03.53	02.48	03.46	05.24	06.54	17.49-18.20/31	08.22	09.01	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04	21.21	19.31	17.46		15.09	14.22	
21	09.34	07.58	06.21	17.02-17.34/32	05.31	03.50	02.48	03.49	05.27	06.57	17.48-18.20/32	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43		15.06	14.22	
22	09.32	07.55	06.17	17.03-17.35/32	05.27	03.47	02.49	03.52	05.30	07.00	17.47-18.19/32	08.28	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40		15.03	14.22	
23	09.29	07.52	06.14	17.02-17.34/32	05.24	03.44	02.49	03.55	05.33	07.03	17.47-18.19/32	08.32	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36		15.01	14.23	
24	09.26	07.48	06.10	17.03-17.33/30	05.20	03.41	02.50	03.58	05.36	07.06	17.47-18.19/32	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33		14.58	14.24	
25	09.23	07.45	06.07	17.03-17.32/29	05.17	03.38	02.51	04.02	05.39	07.09	17.47-18.18/31	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29		14.56	14.25	
26	09.21	07.41	06.03	17.04-17.31/27	05.13	03.35	02.52	04.05	05.42	07.12	17.47-18.17/30	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46	21.00	19.10	16.26		14.53	14.25	
27	09.18	07.38	05.59	17.04-17.30/26	05.10	03.32	02.53	04.08	05.45	07.14	17.48-18.16/28	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.04	23.53	22.43	20.57	19.07	16.23		14.51	14.27	
28	09.15	07.34	05.56	17.06-17.29/23	05.06	03.29	02.54	04.11	05.48	07.17	17.48-18.15/27	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.39	20.53	19.03	16.19		14.49	14.28	
29	09.12		06.52	18.07-18.26/19	05.03	03.26	02.55	04.14	05.51	07.20	17.49-18.14/25	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.51	22.36	20.50	19.00	16.16		14.46	14.29	
30	09.09		06.49	18.09-18.23/14	04.59	03.24	02.57	04.17	05.54	07.23	17.50-18.12/22	07.54	09.32	10.14
	15.58		20.03	21.38	23.13	23.50	22.33	20.46	18.56	16.13		14.44	14.31	
31	09.06		06.45	18.15-18.18/3		03.21	02.53	04.21	05.57	07.57			10.13	
	16.02		20.06		23.16		22.30	20.43		16.10			14.32	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	0
Sum of minutes with flicker	0	0	515	0	0	0	0	0	486	30	0	0	0	0

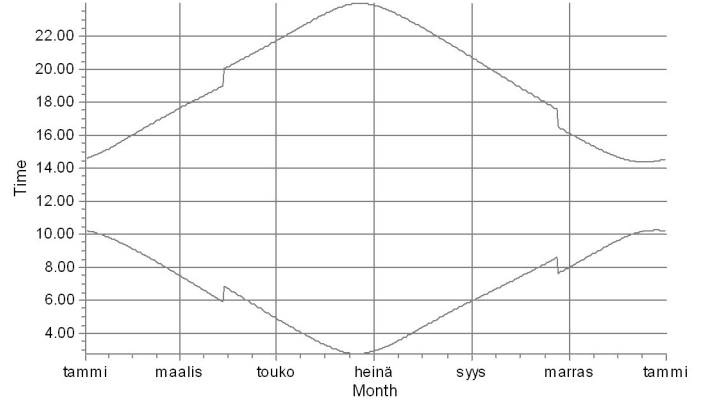
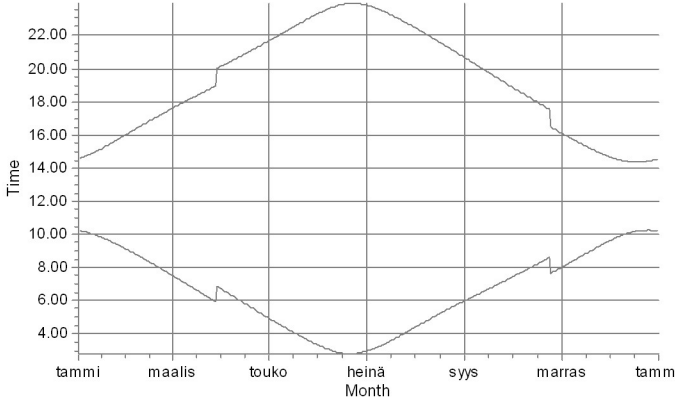
Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

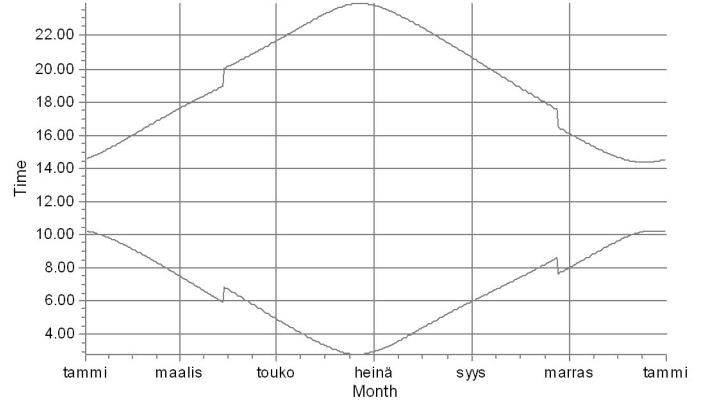
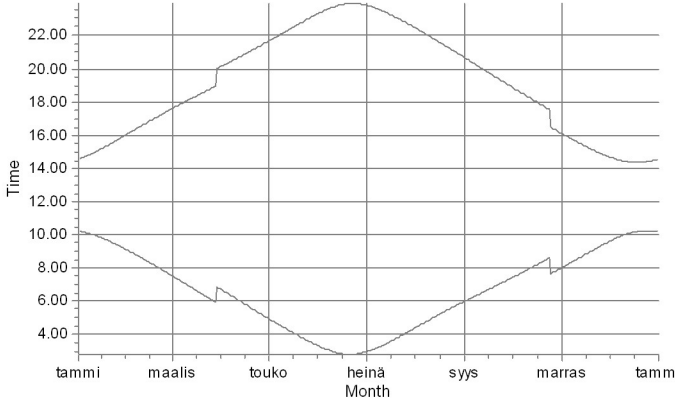
SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

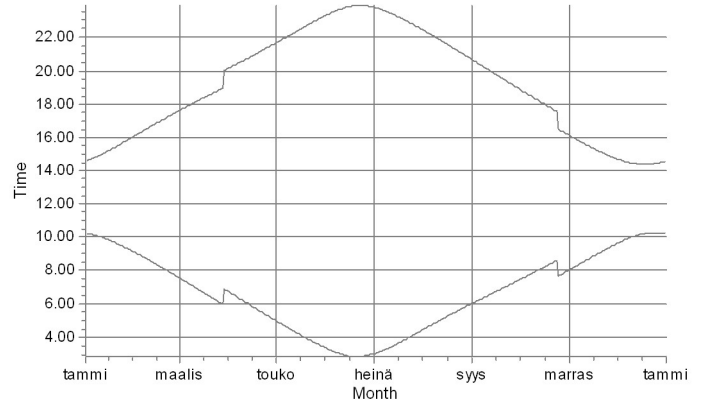
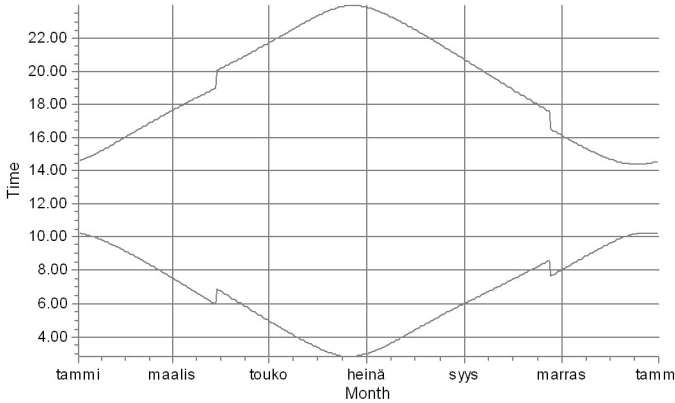
1: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (2) 2: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (236)



3: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (2) 4: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (238)



5: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (24) 6: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (240)

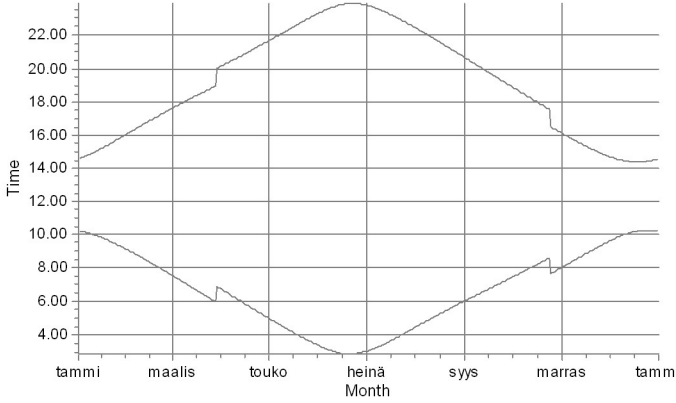


Shadow receptors

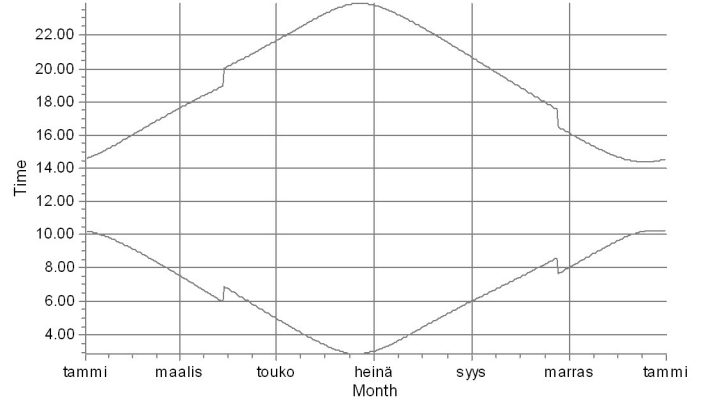
SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

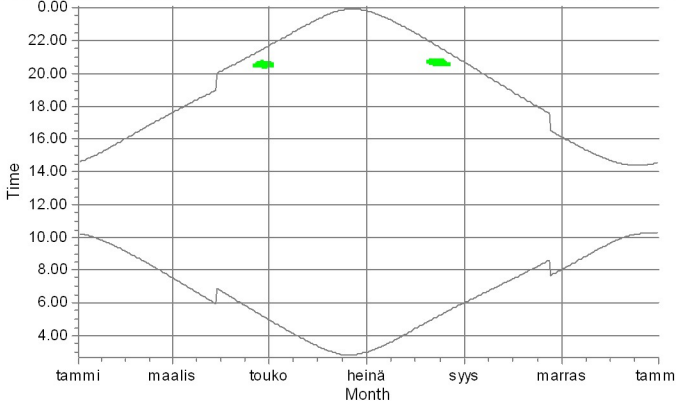
7: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 24



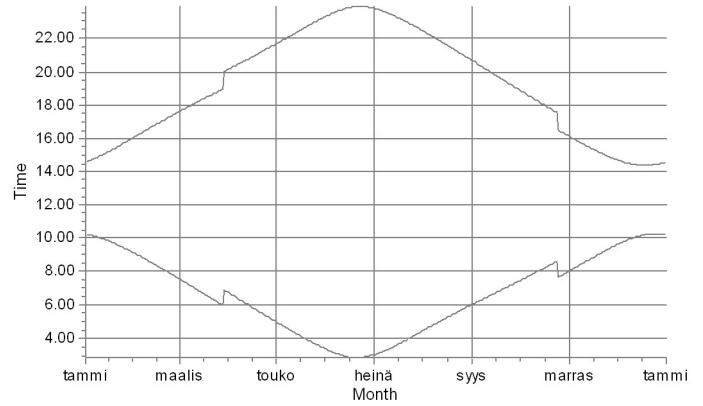
8: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m)



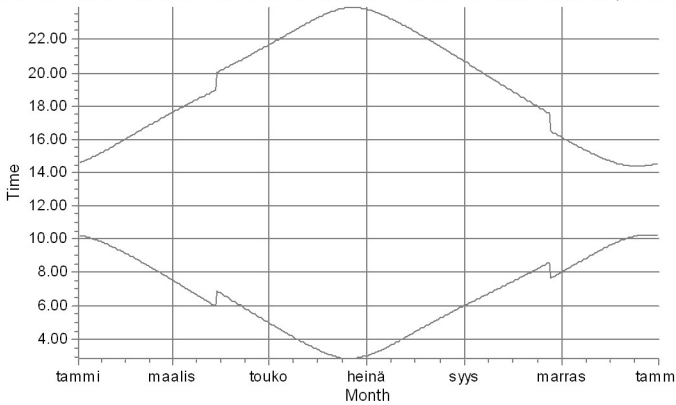
9: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 24



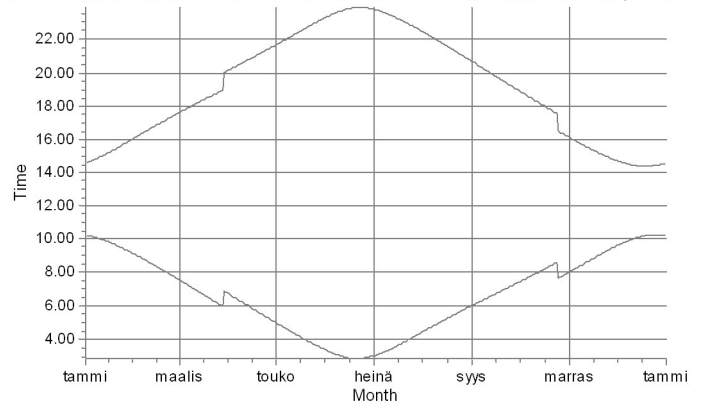
10: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m)



11: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 2



12: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m)

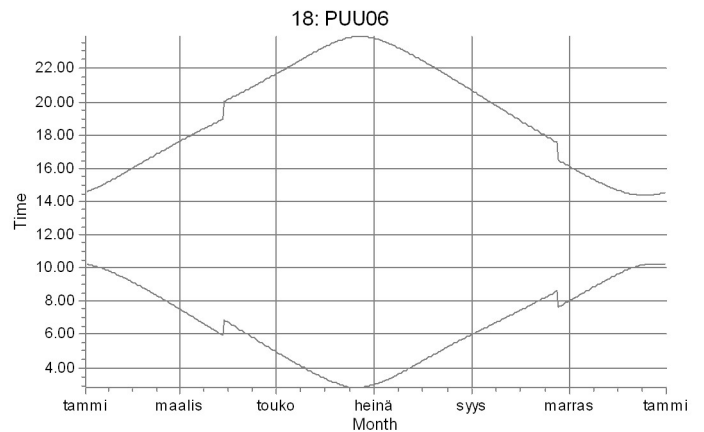
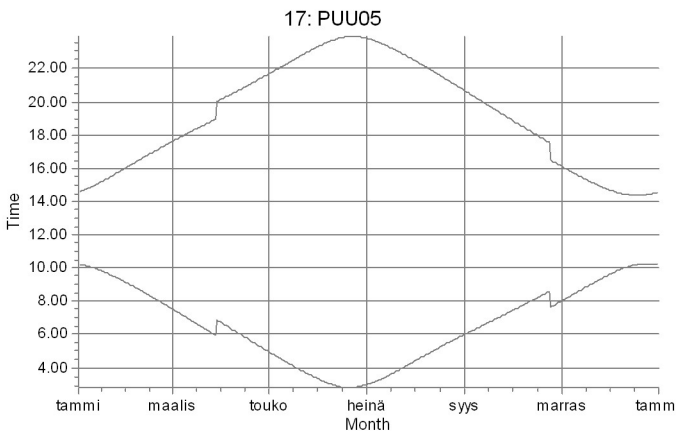
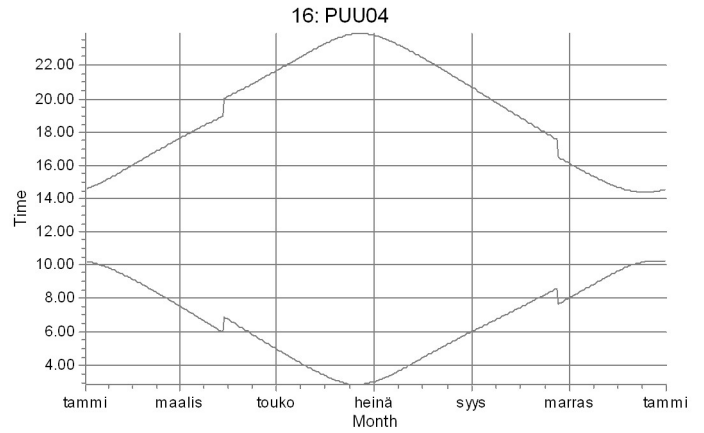
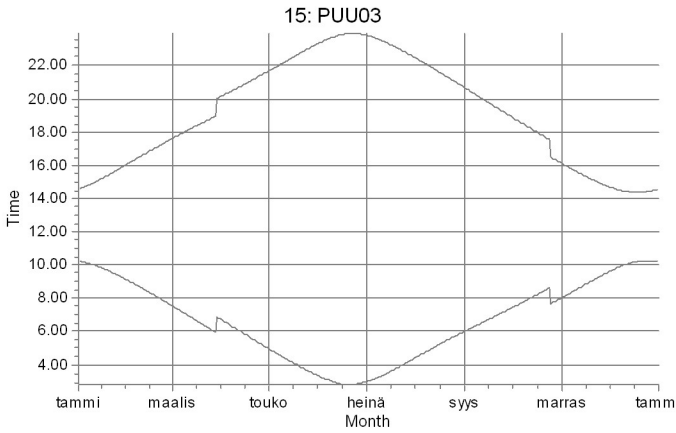
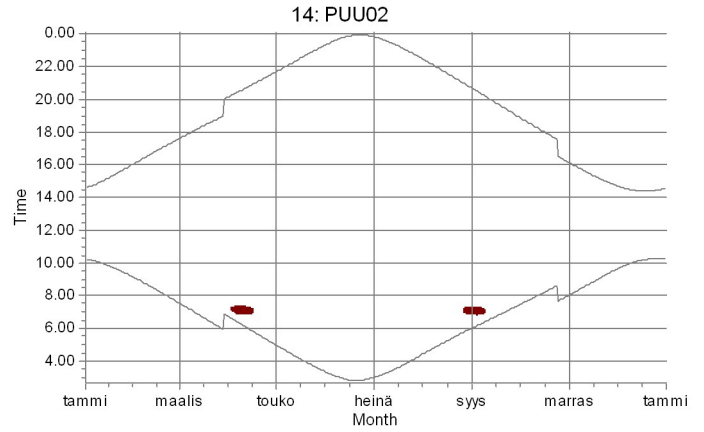
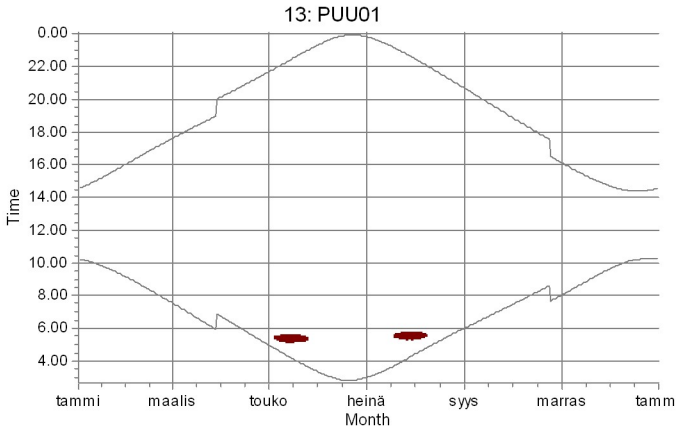


Shadow receptors


I: Asuinrakennus I (Kortenevantie 116)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

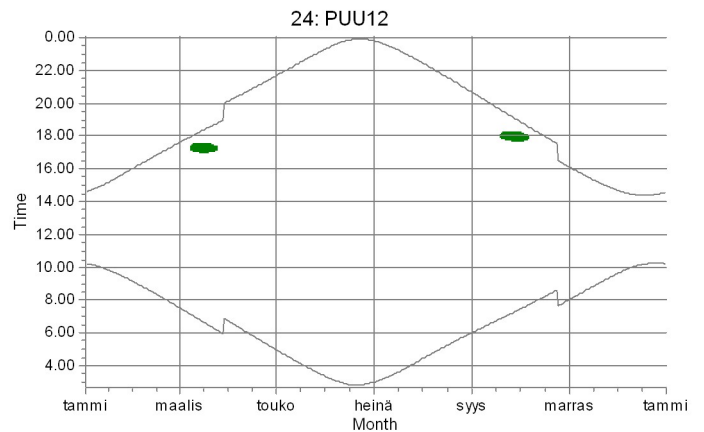
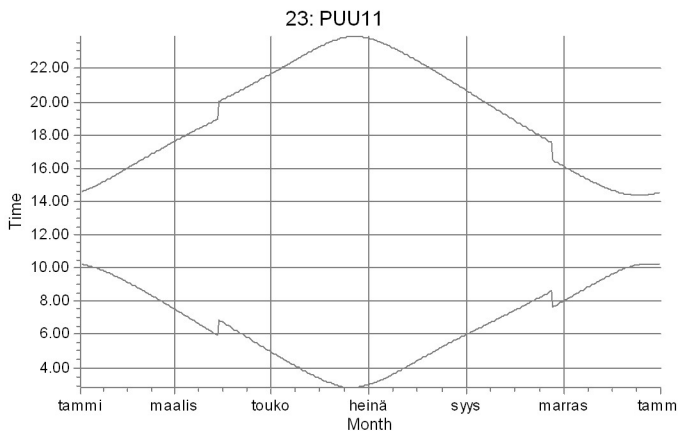
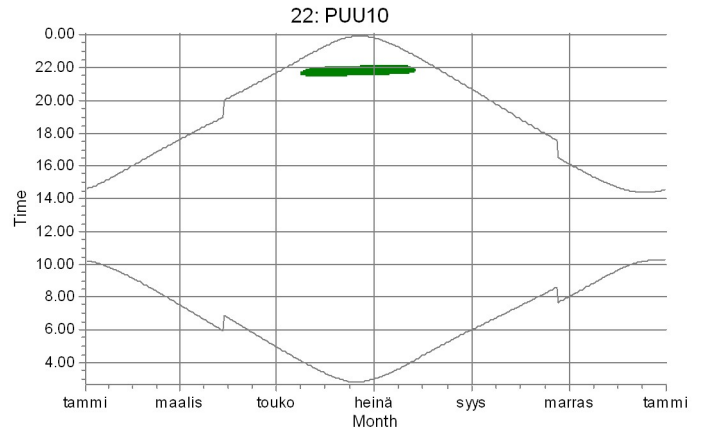
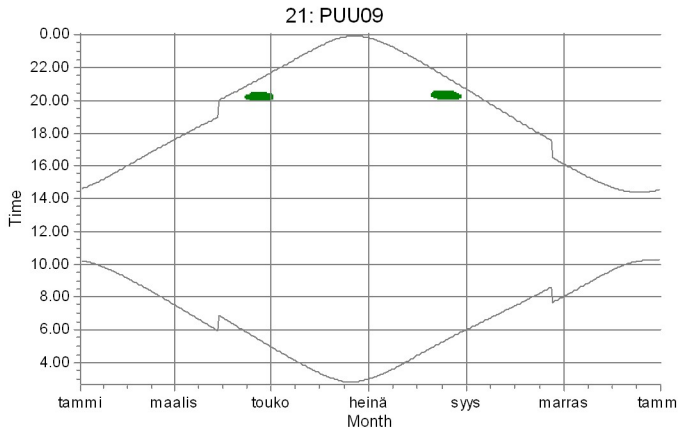
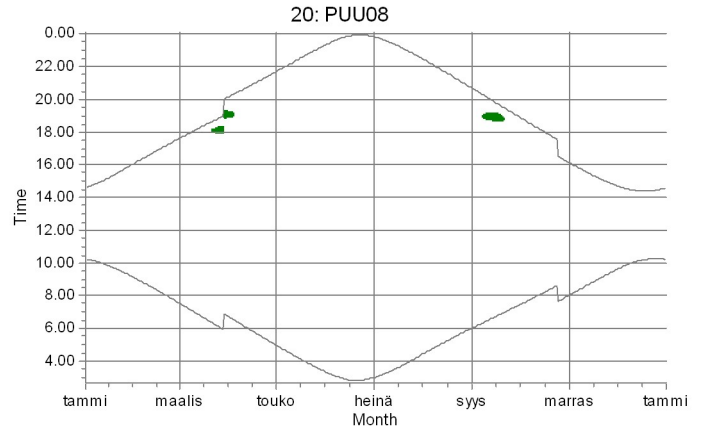
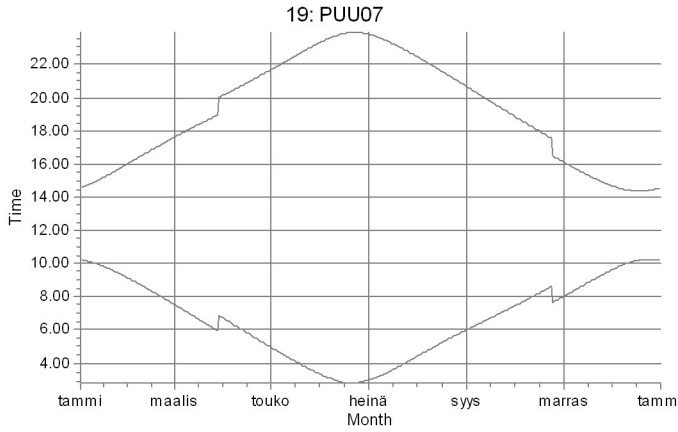


Shadow receptors

 H: Asuinrakennus H (Pinolantie 406)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

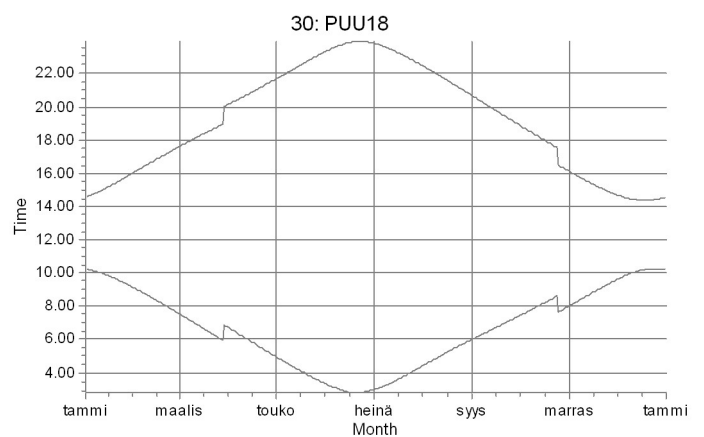
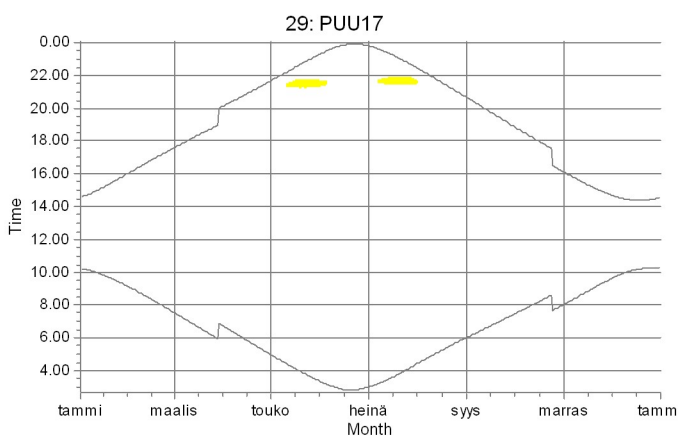
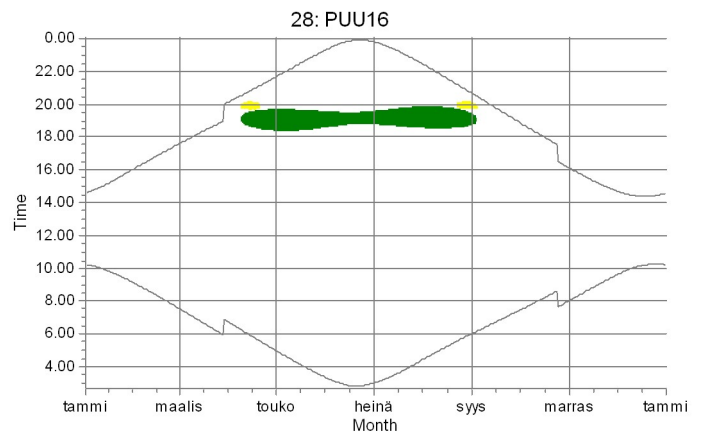
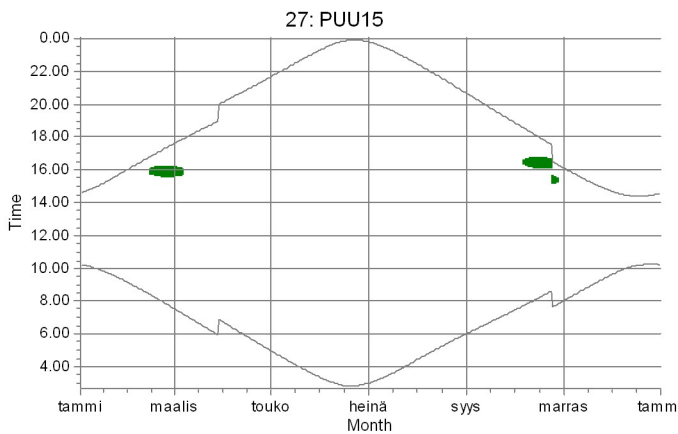
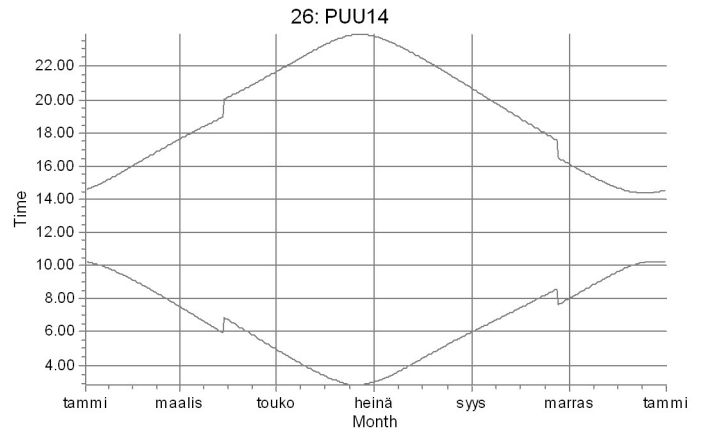
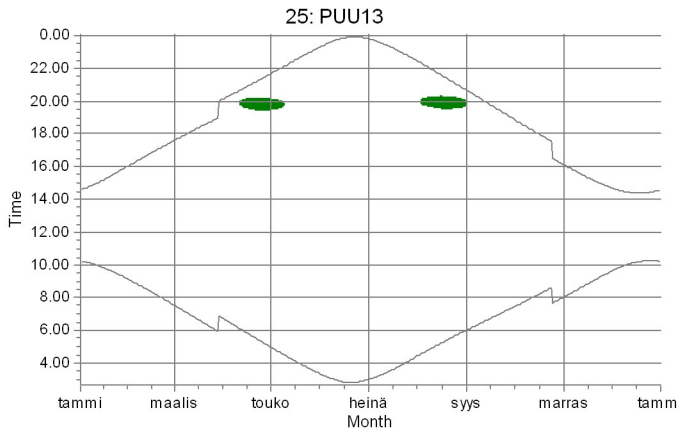


Shadow receptors

A: Laskentapiste A (Metsästysmaja)

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



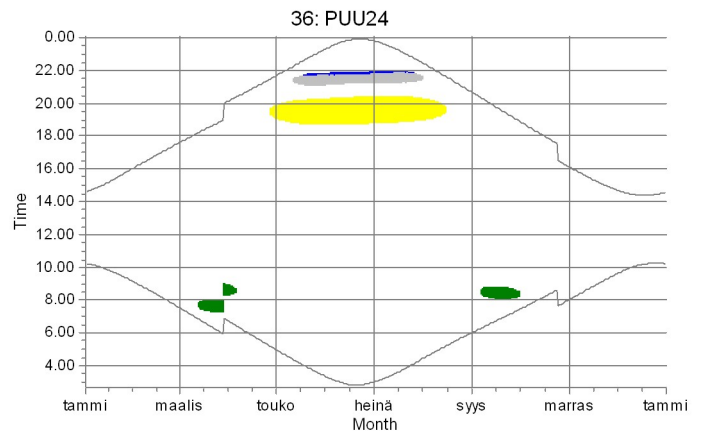
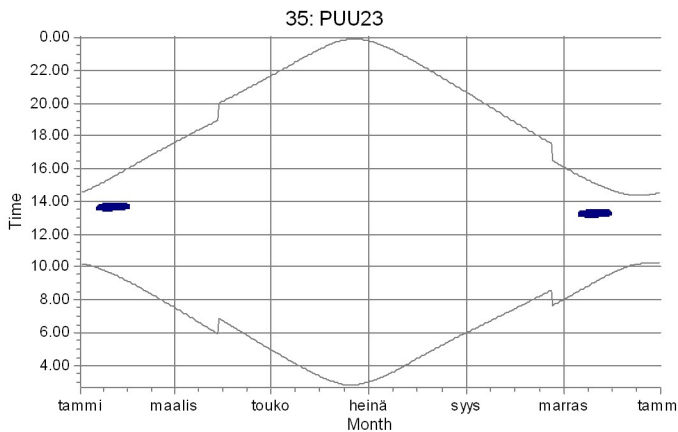
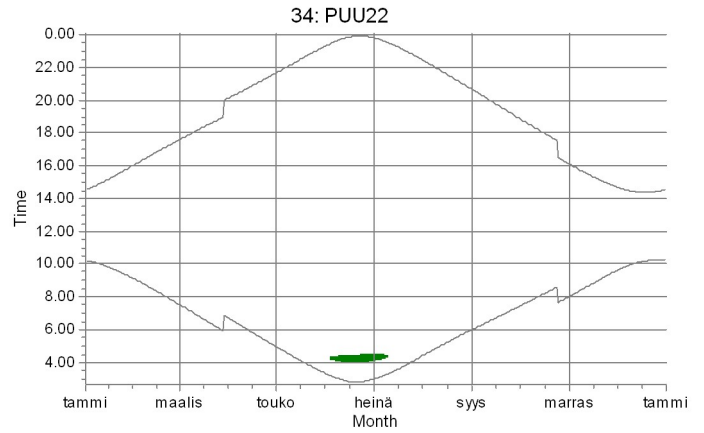
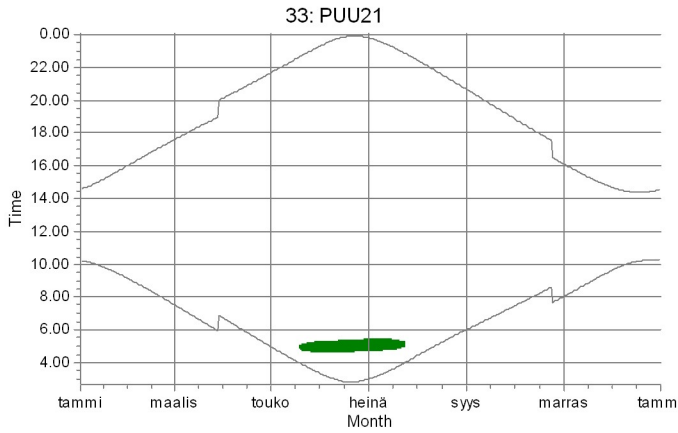
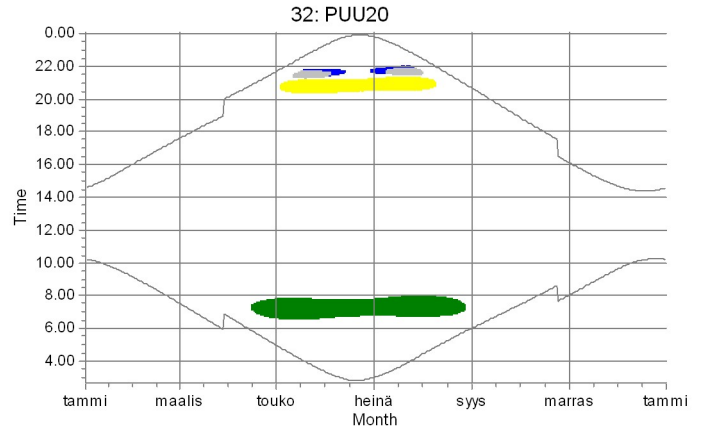
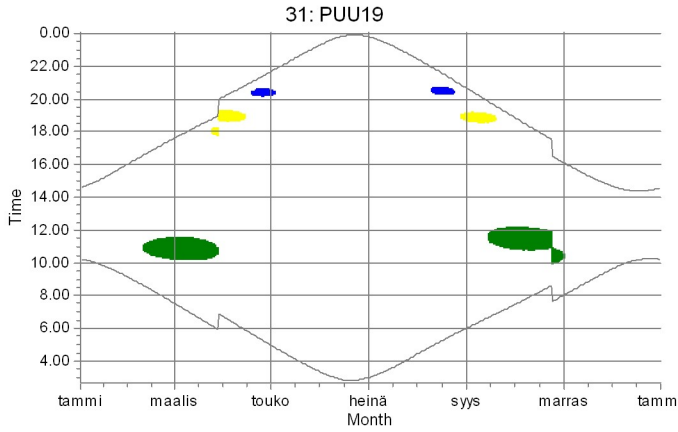
Shadow receptors

 A: Laskentapiste A (Metsästysmaja)

 B: Laskentapiste B (Ylivieskantie, Pohlola)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

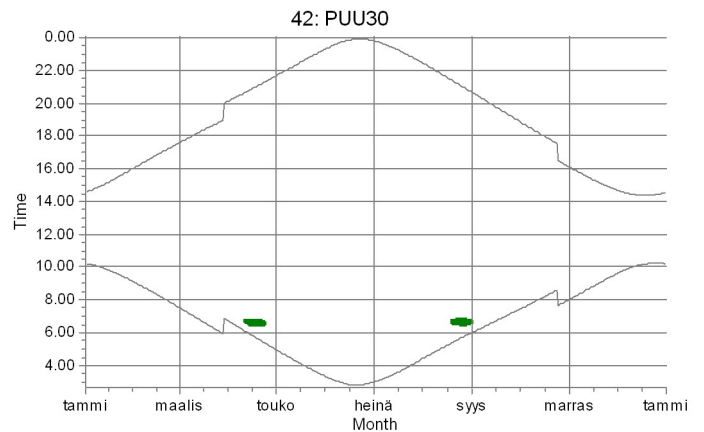
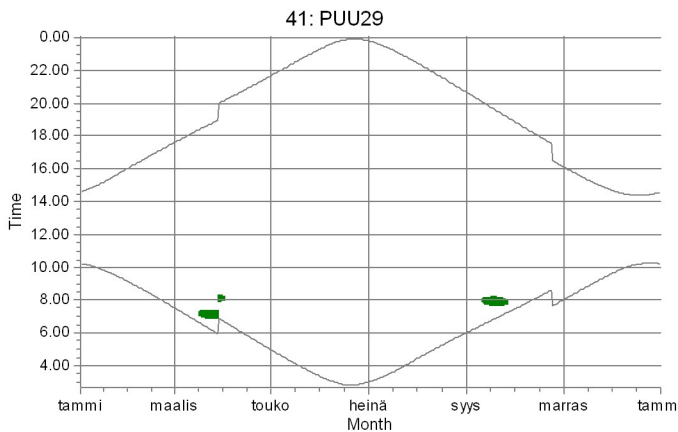
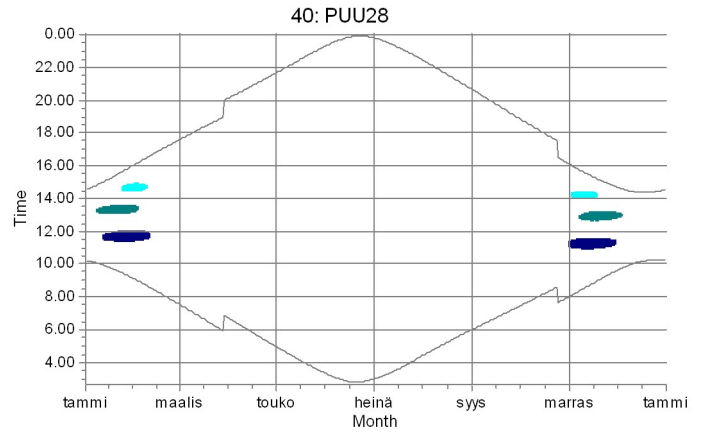
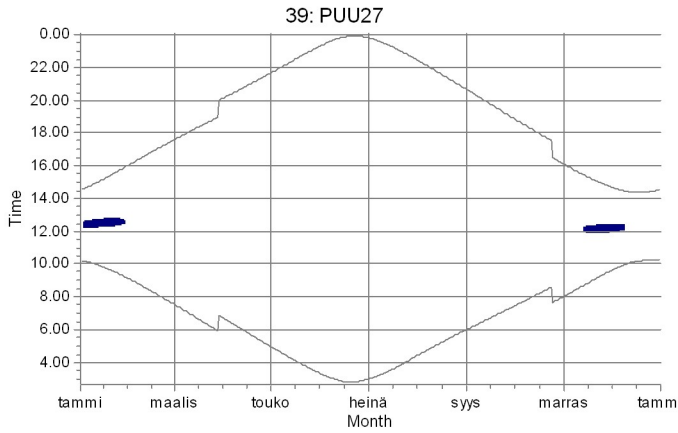
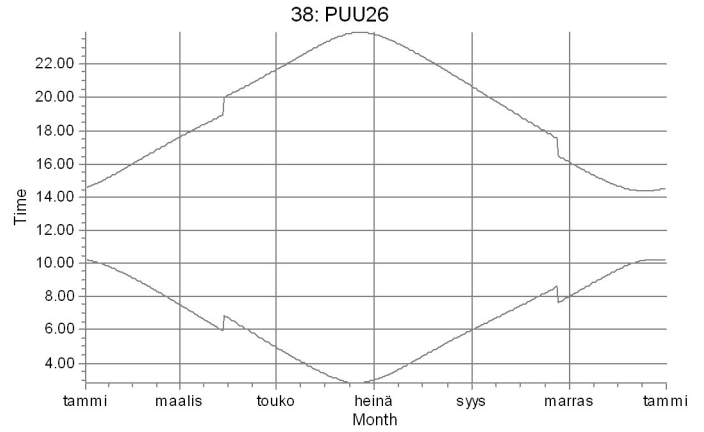
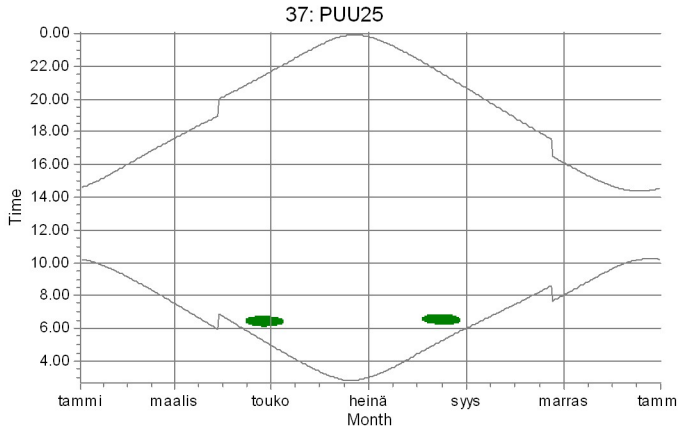


Shadow receptors



SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



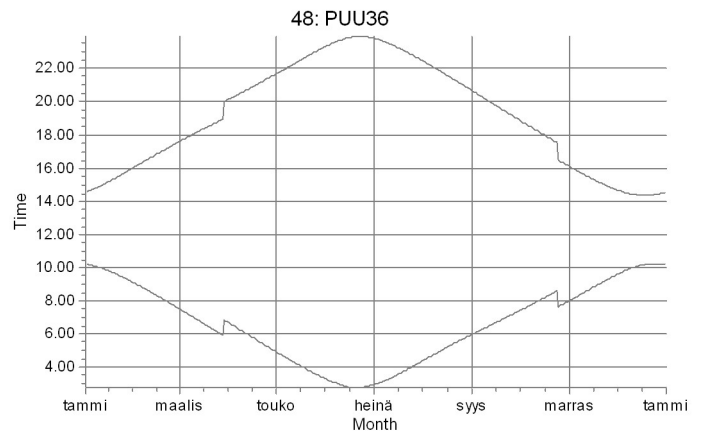
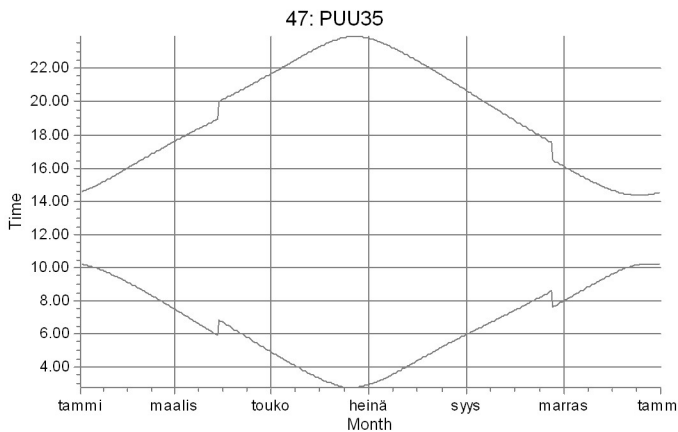
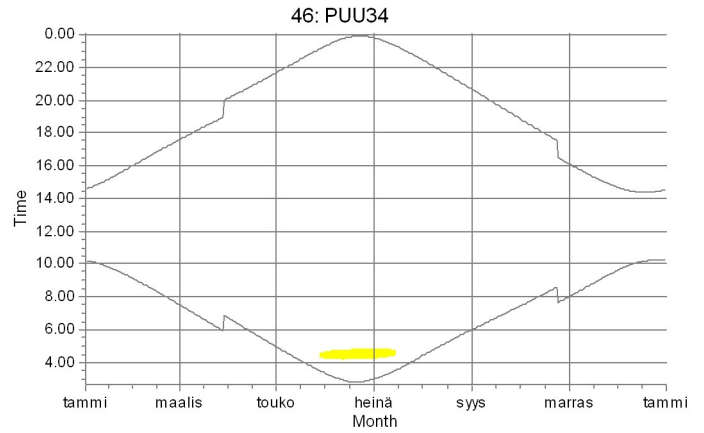
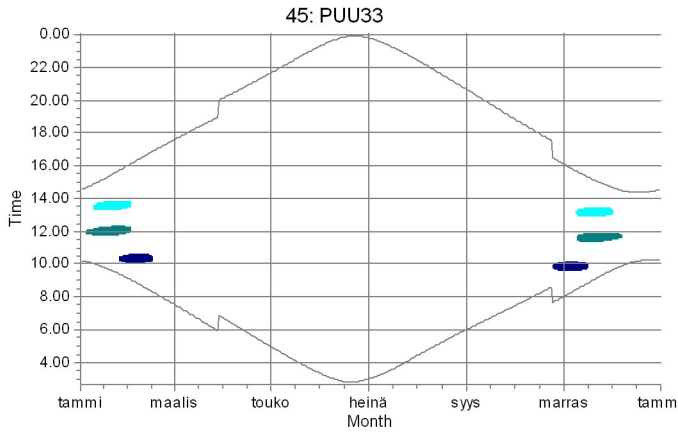
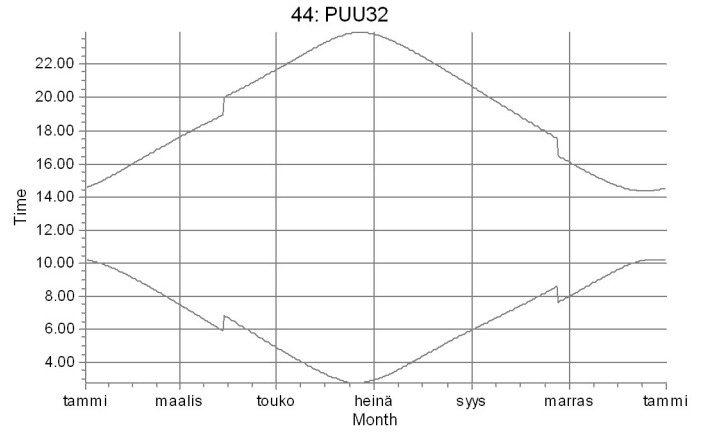
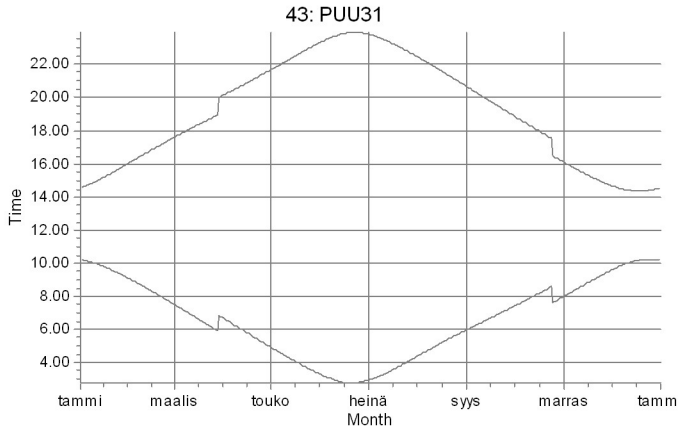
Shadow receptors

A: Laskentapiste A (Metsästysmaja)
 F: Asuinrakennus F (Ollilantie 112)



G: Lomarakenus G (Ollilantie, Siliakuru)
 M: Lomarakenus M (Riskalan metsätie)



SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



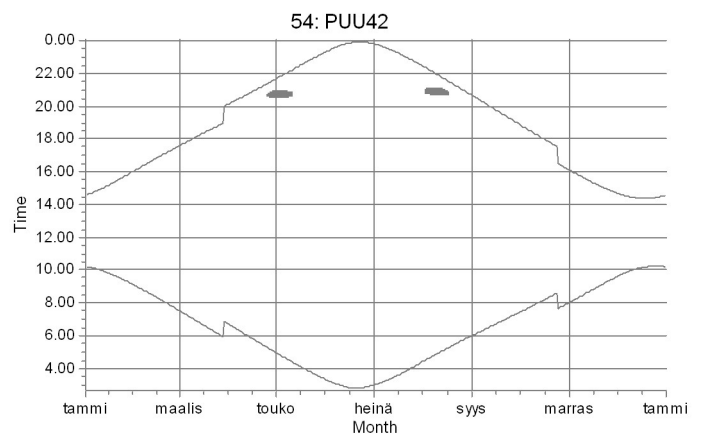
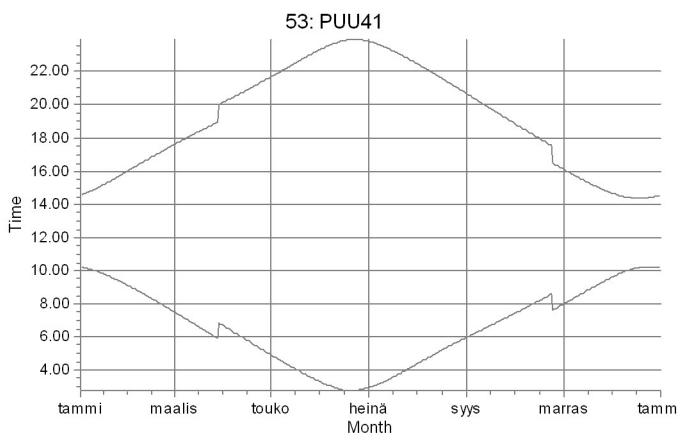
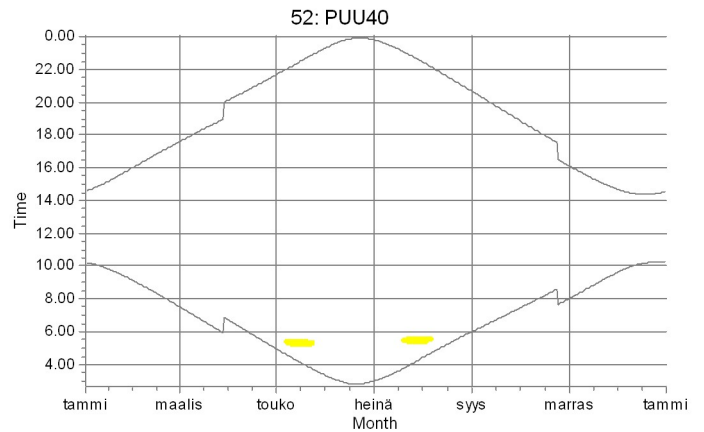
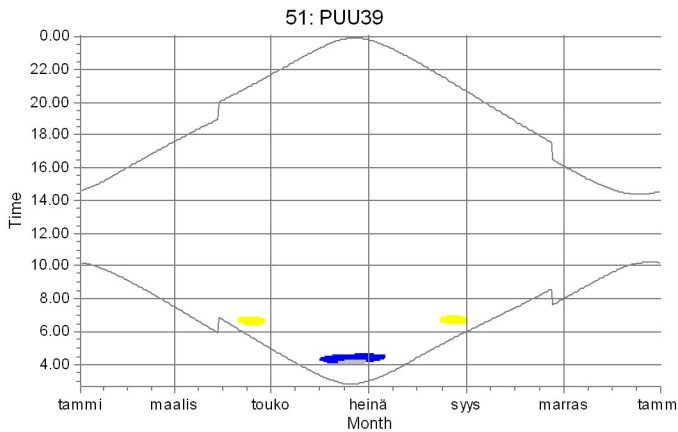
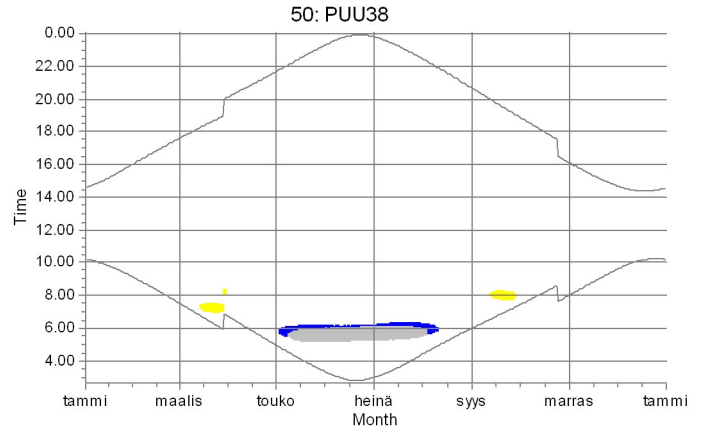
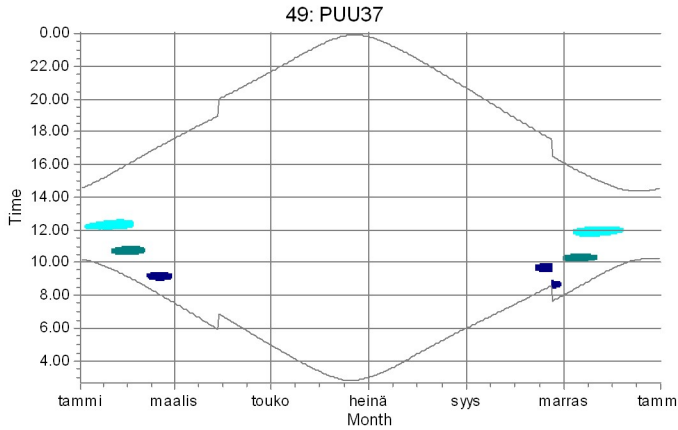
Shadow receptors

 B: Laskentapiste B (Ylivieskantie, Pohlola)
 F: Asuinrakennus F (Ollilantie 112)

 G: Lomarakenus G (Ollilantie, Siliakuru)
 M: Lomarakenus M (Riskalan metsatie)

SHADOW - Calendar per WTG, graphical

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



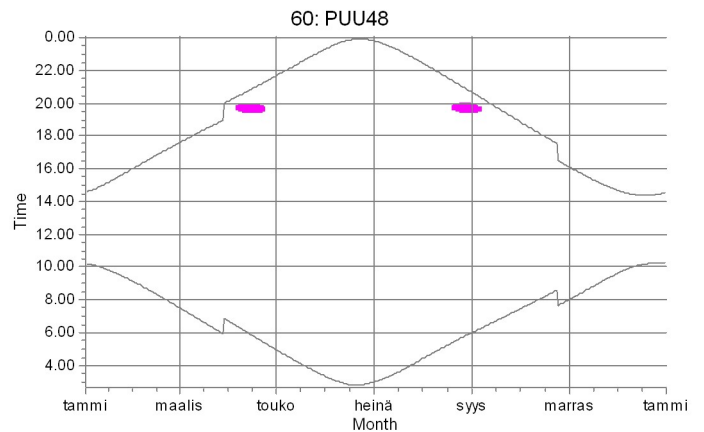
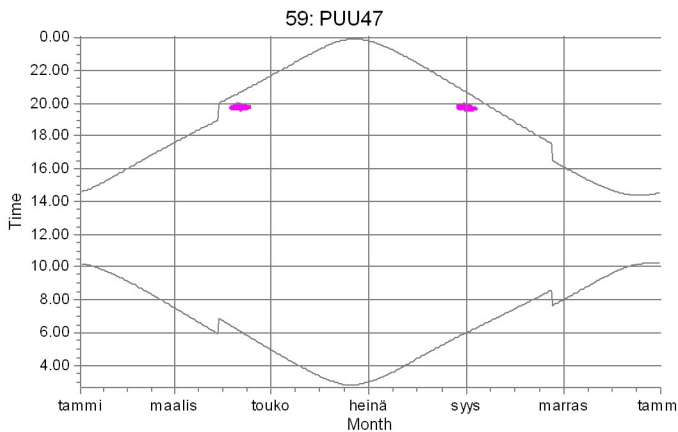
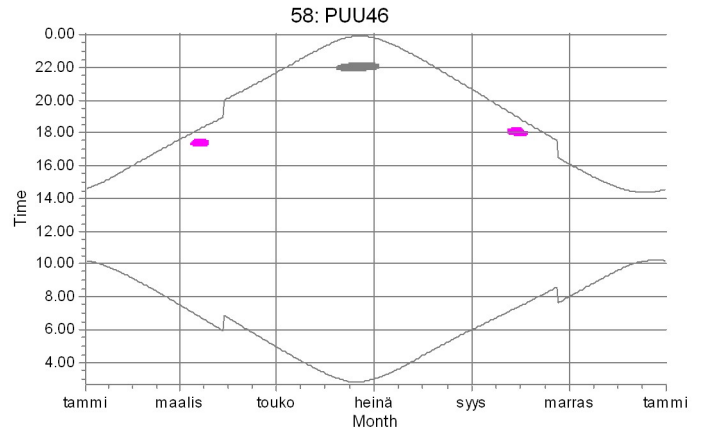
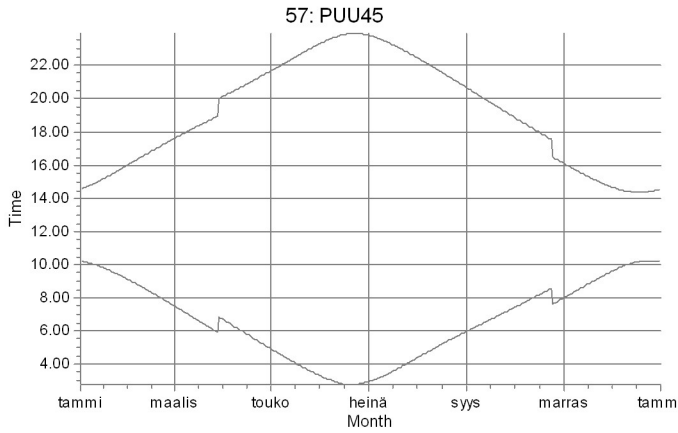
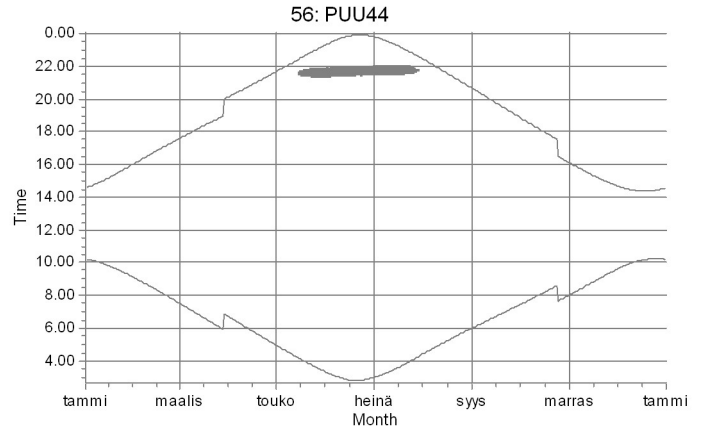
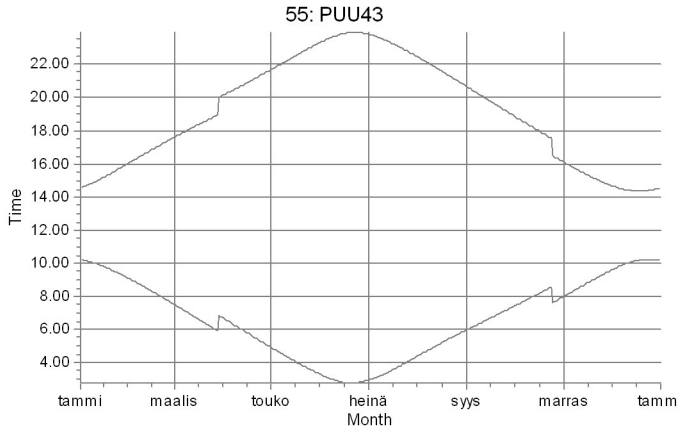
Shadow receptors

- B: Laskentapiste B (Ylivieskantie, Pohlola)
- C: Laskentapiste C (Perkkiontie 382)
- D: Asuinrakennus D (Alakylantie 243)
- F: Asuinrakennus F (Ollilantie 112)


- G: Lomarakennus G (Ollilantie, Siliakuru)
- L: Laskentapiste L (Perkkiontie, Ilmola)
- M: Lomarakennus M (Riskalan metsätie)


SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Shadow receptors

 D: Asuinrakennus D (Alakylantie 243)

 E: Lomarakennus E (Kellokankaan metsätie)

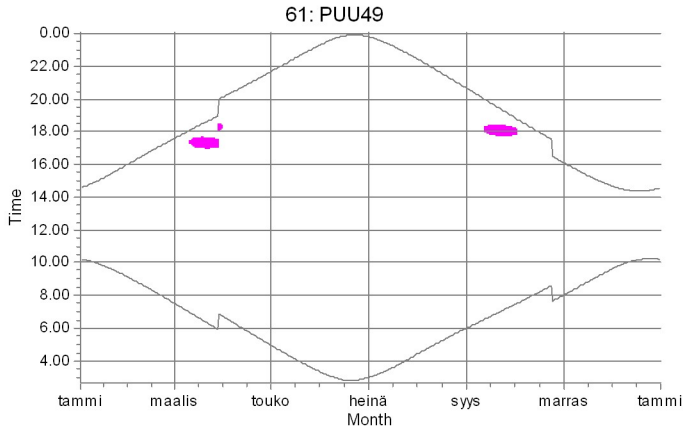
Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

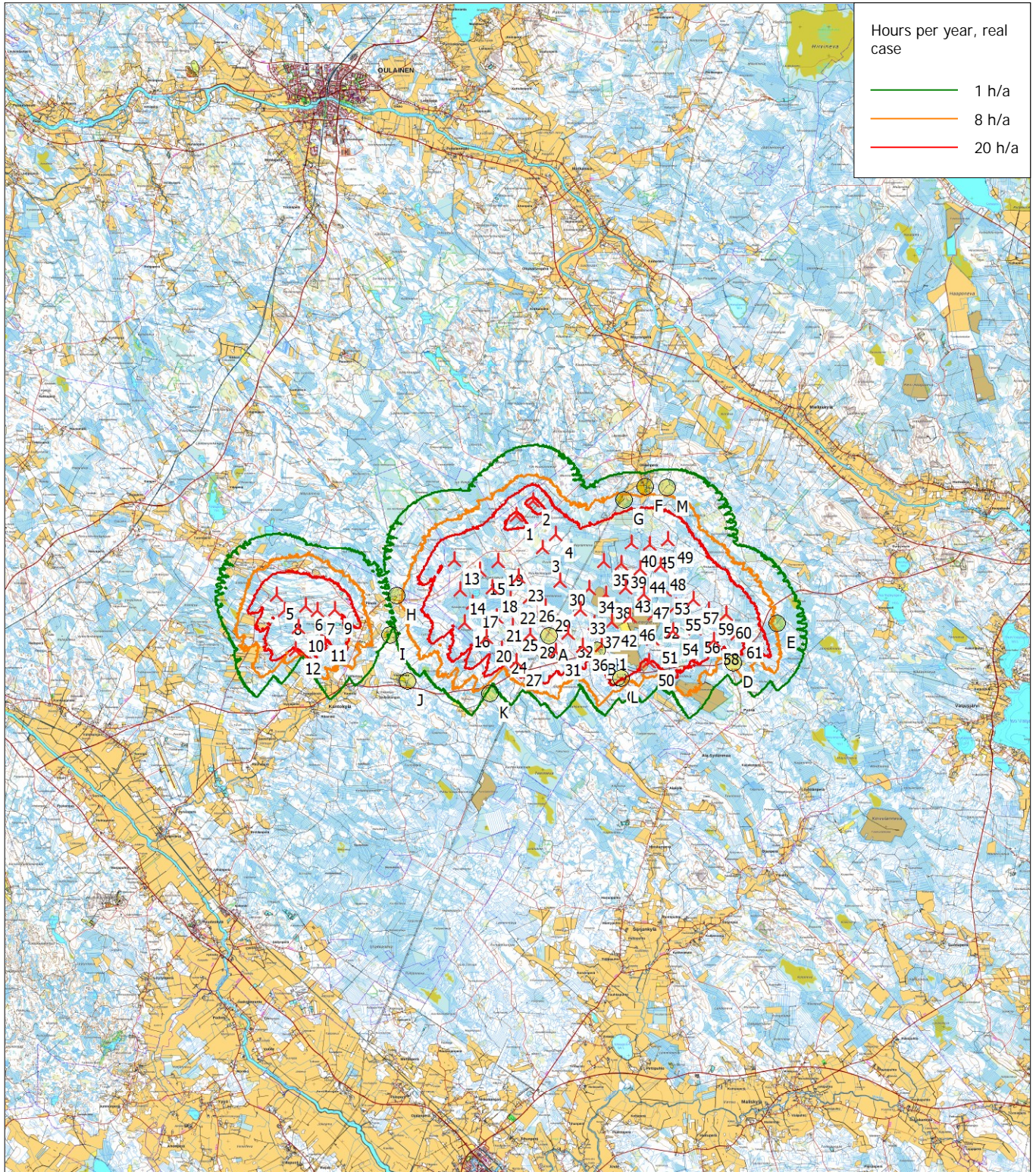


Shadow receptors

E: Lomarakennus E (Kellokankaan metsätie)

SHADOW - Map

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Map: Maastokarttarasteri50K , Print scale 1:200 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 401 070 North: 7 111 410

📍 New WTG

📍 Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Puutionsaari_Riskalankangas_20200327_1.wpo (2)

25.11.2020

Liite 8: Puutionsaari – Varjostuksen yhteismallinnusten tulokset “real case, Luke forest”

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102
Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational hours are calculated from WTGs in calculation and wind distribution:

MERRA_basic_E25.335_N64.000 (3)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

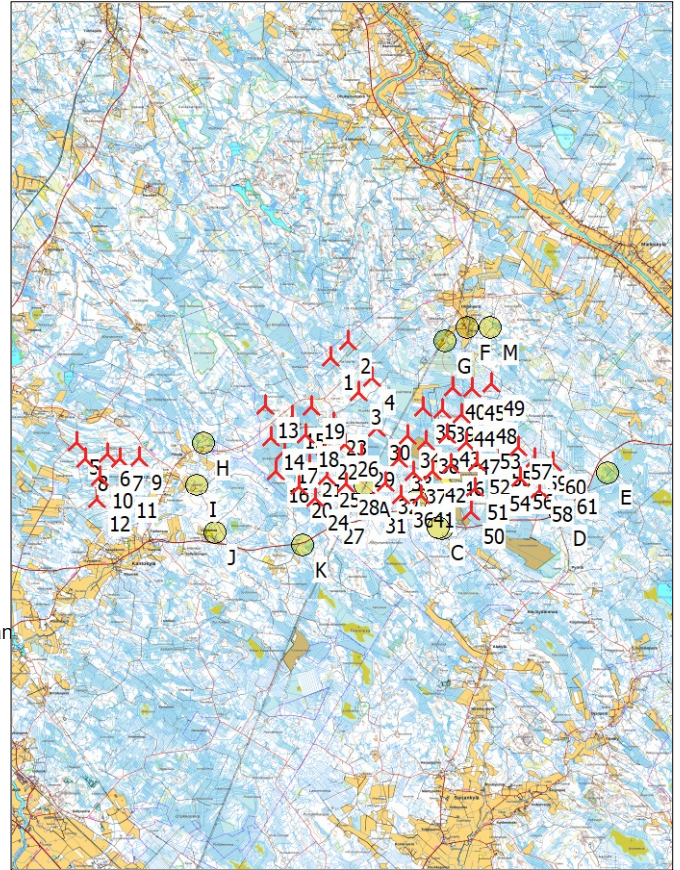
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Puutionsaari_Riskalan

Area object(s) used in calculation:

Area object (Luke2017_SE): (1)
Area object (Luke2017_SW): (2)
Area object (Luke2017_NE): (3)
Area object (Luke2017_NW): (4)

Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:250 000

🚩 New WTG

🌞 Shadow receptor

WTGs

WTG ID	East	North	Z [m]	Row data/Description	WTG type		Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.					Calculation distance [m]	RPM [RPM]
1	401 061	7 113 928	105,0	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
2	401 644	7 114 439	105,4	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
3	401 997	7 112 772	109,3	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
4	402 450	7 113 258	106,6	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
5	392 697	7 111 104	81,0	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
6	393 696	7 110 723	85,7	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
7	394 124	7 110 573	88,7	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
8	392 964	7 110 572	83,6	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
9	394 736	7 110 600	89,9	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
10	393 462	7 109 982	84,9	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
11	394 233	7 109 674	87,5	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
12	393 349	7 109 200	83,7	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
13	398 896	7 112 332	92,5	PUU01	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
14	399 097	7 111 286	95,0	PUU02	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
15	399 784	7 111 972	97,5	PUU03	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
16	399 264	7 110 151	97,1	PUU04	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
17	399 536	7 110 832	96,4	PUU05	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
18	400 239	7 111 382	97,5	PUU06	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
19	400 444	7 112 292	97,0	PUU07	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
20	400 019	7 109 649	100,0	PUU08	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
21	400 380	7 110 348	100,0	PUU09	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
22	400 876	7 110 966	99,5	PUU10	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
23	401 152	7 111 752	100,0	PUU11	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
24	400 549	7 109 232	102,5	PUU12	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
25	400 953	7 110 020	102,5	PUU13	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

To be continued on next page...

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

...continued from previous page

	East	North	Z	Row data/Description	WTG type		Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.					Calculation distance [m]	RPM [RPM]
			[m]									
26	401 537	7 111 046	104,5	PUU14	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
27	401 068	7 108 792	105,3	PUU15	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
28	401 564	7 109 758	103,4	PUU16	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
29	402 089	7 110 702	107,5	PUU17	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
30	402 589	7 111 603	106,8	PUU18	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
31	402 455	7 109 148	112,5	PUU19	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
32	402 889	7 109 778	110,0	PUU20	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
33	403 318	7 110 593	108,0	PUU21	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
34	403 622	7 111 352	106,9	PUU22	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
35	404 117	7 112 276	103,6	PUU23	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
36	403 379	7 109 327	115,0	PUU24	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
37	403 790	7 110 129	108,4	PUU25	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
38	404 210	7 111 152	105,6	PUU26	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
39	404 739	7 112 199	105,0	PUU27	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
40	405 100	7 112 943	100,4	PUU28	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
41	404 061	7 109 351	110,0	PUU29	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
42	404 420	7 110 174	107,1	PUU30	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
43	404 900	7 111 381	105,1	PUU31	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
44	405 395	7 112 030	102,4	PUU32	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
45	405 740	7 112 891	100,2	PUU33	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
46	405 042	7 110 380	105,8	PUU34	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
47	405 532	7 111 130	103,9	PUU35	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
48	406 114	7 112 133	103,1	PUU36	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
49	406 380	7 113 067	107,2	PUU37	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
50	405 707	7 108 791	110,8	PUU38	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
51	405 822	7 109 587	108,8	PUU39	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
52	405 893	7 110 455	104,9	PUU40	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
53	406 257	7 111 298	103,9	PUU41	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
54	406 558	7 109 872	106,6	PUU42	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
55	406 638	7 110 744	105,9	PUU43	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
56	407 324	7 109 954	108,4	PUU44	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
57	407 269	7 110 957	112,6	PUU45	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
58	407 963	7 109 542	113,6	PUU46	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
59	407 809	7 110 582	116,1	PUU47	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
60	408 414	7 110 457	120,0	PUU48	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
61	408 786	7 109 772	117,5	PUU49	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
				[m]	[m]	[m]	a.g.l.	window		(ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Laskentapiste A (Metsästysmaja)	402 212	7 109 691	112,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Laskentapiste B (Ylivieskantie, Pohlola)	403 894	7 109 182	114,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Laskentapiste C (Perkkiontie 382)	404 620	7 108 247	113,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Asuinrakennus D (Alakylantie 243)	408 659	7 108 752	119,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Lomarakennus E (Kellokankaan metsätie)	410 199	7 110 115	122,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus F (Ollilantie 112)	405 573	7 114 900	87,7	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Lomarakennus G (Ollilantie, Siliakuru)	404 837	7 114 441	100,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus H (Pinolantie 406)	396 893	7 111 098	88,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Asuinrakennus I (Kortenevantie 116)	396 670	7 109 704	87,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Asuinrakennus J (Haapavesitie 1406)	397 273	7 108 116	89,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Lomarakennus K (Kurunoja)	400 152	7 107 685	102,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Muu käyttöt. L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus M (Riskalan metsätie)	406 348	7 114 887	102,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102
Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Laskentapiste A (Metsästysmaja)	65:52
B	Autiotalo B (Ylivieskantie, Pohlola)	51:30
C	Autiotalo C (Perkkiontie 382)	30:25
D	Asuinrakennus D (Alakylantie 243)	12:35
E	Lomarakennus E (Kellokankaan metsatie)	0:00
F	Asuinrakennus F (Ollilantie 112)	4:51
G	Lomarakennus G (Ollilantie, Siliakuru)	0:00
H	Asuinrakennus H (Pinolantie 406)	0:00
I	Asuinrakennus I (Kortenevantie 116)	1:25
J	Asuinrakennus J (Haapavesitie 1406)	0:00
K	Lomarakennus K (Kurunoja)	0:00
L	Muu käyttöt. L (Perkkiontie, Ilmola)	25:16
M	Lomarakennus M (Riskalan metsatie)	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (235)	0:00	0:00
2	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (236)	0:00	0:00
3	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (237)	0:00	0:00
4	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (238)	0:00	0:00
5	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (239)	0:00	0:00
6	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (240)	0:00	0:00
7	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (241)	0:00	0:00
8	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (242)	0:00	0:00
9	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (243)	6:12	1:25
10	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (244)	0:00	0:00
11	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (245)	0:00	0:00
12	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (246)	0:00	0:00
13	PUU01	0:00	0:00
14	PUU02	0:00	0:00
15	PUU03	0:00	0:00
16	PUU04	0:00	0:00
17	PUU05	0:00	0:00
18	PUU06	0:00	0:00
19	PUU07	0:00	0:00
20	PUU08	6:53	1:25
21	PUU09	11:16	2:30
22	PUU10	0:00	0:00
23	PUU11	0:00	0:00
24	PUU12	12:12	2:21
25	PUU13	26:46	5:55
26	PUU14	0:00	0:00
27	PUU15	0:00	0:00
28	PUU16	136:07	33:43
29	PUU17	12:46	3:26
30	PUU18	0:00	0:00
31	PUU19	102:31	22:40
32	PUU20	19:32	5:15
33	PUU21	0:00	0:00
34	PUU22	0:00	0:00
35	PUU23	0:00	0:00
36	PUU24	183:37	48:22
37	PUU25	0:00	0:00
38	PUU26	0:00	0:00
39	PUU27	0:00	0:00
40	PUU28	16:54	2:20
41	PUU29	0:00	0:00
42	PUU30	0:00	0:00
43	PUU31	0:00	0:00
44	PUU32	0:00	0:00
45	PUU33	17:53	2:30

To be continued on next page...

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
46	PUU34	17:45	4:50
47	PUU35	0:00	0:00
48	PUU36	0:00	0:00
49	PUU37	0:00	0:00
50	PUU38	90:20	23:11
51	PUU39	23:20	5:49
52	PUU40	10:01	2:32
53	PUU41	0:00	0:00
54	PUU42	7:32	1:49
55	PUU43	0:00	0:00
56	PUU44	31:06	8:38
57	PUU45	0:00	0:00
58	PUU46	8:08	2:26
59	PUU47	0:00	0:00
60	PUU48	0:00	0:00
61	PUU49	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_2020110 Shadow receptor: A - Laskentapistä A (Metsästysmaja)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	
1	10.13 14.35	09.04 16.06	07.31 17.36	10.17 (31) 11.31 (31)	06.42 20.09	18.56 (20) 19.14 (20)	04.57 21.41
2	10.12 14.37	09.00 16.09	07.28 17.39	10.17 (31) 11.31 (31)	06.39 20.12	18.58 (20) 19.13 (20)	04.53 21.45
3	10.10 14.39	08.57 16.12	07.25 17.42	10.16 (31) 11.30 (31)	06.35 20.15	18.59 (20) 19.10 (20)	04.50 21.48
4	10.09 14.42	08.54 16.16	07.21 17.45	10.16 (31) 11.31 (31)	06.32 20.18	19.03 (20) 19.07 (20)	04.46 21.51
5	10.08 14.44	08.51 16.19	07.18 17.48	10.15 (31) 11.31 (31)	06.28 20.21	18.27 (28) 21.54	04.43 21.54
6	10.07 14.46	08.48 16.22	07.14 17.51	10.15 (31) 11.30 (31)	06.24 20.24	18.26 (28) 21.57	04.39 21.57
7	10.05 14.49	08.45 16.26	07.11 17.55	10.15 (31) 11.31 (31)	06.21 20.27	18.26 (28) 22.01	04.36 22.01
8	10.03 14.51	08.42 16.29	07.07 17.58	10.14 (31) 17.21 (24)	06.17 20.30	18.26 (28) 22.04	04.33 22.04
9	10.02 14.54	08.39 16.32	07.04 18.01	10.14 (31) 17.24 (24)	06.14 20.33	19.02 (28) 19.11 (28)	04.29 22.07
10	10.00 14.56	08.35 16.35	07.00 18.04	10.15 (31) 17.28 (24)	06.10 20.36	18.56 (28) 19.18 (28)	04.26 22.10
11	09.58 14.59	08.32 16.39	10.43 (31) 11.08 (31)	06.57 18.07	10.14 (31) 17.29 (24)	18.52 (28) 19.22 (28)	04.23 22.14
12	09.56 15.02	08.29 16.42	10.40 (31) 11.12 (31)	06.53 18.10	10.15 (31) 17.30 (24)	18.48 (28) 19.58 (25)	04.19 22.17
13	09.54 15.05	08.26 16.45	10.37 (31) 11.14 (31)	06.50 18.13	10.15 (31) 17.30 (24)	18.46 (28) 20.02 (25)	04.16 22.20
14	09.52 15.08	08.22 16.49	10.34 (31) 11.16 (31)	06.46 18.16	10.14 (31) 17.30 (24)	18.43 (28) 20.03 (25)	04.13 22.23
15	09.49 15.11	08.19 16.52	10.32 (31) 11.18 (31)	06.43 18.19	10.15 (31) 17.30 (24)	18.42 (28) 20.13 (21)	04.10 22.27
16	09.47 15.14	08.16 16.55	10.31 (31) 11.20 (31)	06.39 18.22	10.15 (31) 17.30 (24)	18.40 (28) 20.16 (21)	04.06 22.30
17	09.45 15.17	08.12 16.58	10.29 (31) 11.22 (31)	06.35 18.25	10.15 (31) 17.29 (24)	18.38 (28) 20.18 (21)	04.03 22.33
18	09.42 15.20	08.09 17.01	10.27 (31) 11.23 (31)	06.32 18.28	10.16 (31) 17.29 (24)	18.37 (28) 20.21 (21)	04.00 22.36
19	09.40 15.23	08.06 17.05	10.27 (31) 11.25 (31)	06.28 18.30	10.16 (31) 17.28 (24)	18.36 (28) 20.25 (21)	03.57 22.40
20	09.37 15.26	08.02 17.08	10.25 (31) 11.25 (31)	06.25 18.33	10.18 (31) 17.27 (24)	18.34 (28) 20.25 (21)	03.54 22.43
21	09.35 15.29	07.59 17.11	10.24 (31) 11.26 (31)	06.21 18.36	10.18 (31) 17.25 (24)	18.33 (28) 20.26 (21)	03.50 22.46
22	09.32 15.33	07.55 17.14	10.22 (31) 11.27 (31)	06.18 18.39	10.20 (31) 18.05 (20)	18.32 (28) 20.26 (21)	03.47 22.49
23	09.29 15.36	07.52 17.17	10.22 (31) 11.28 (31)	06.14 18.42	10.20 (31) 18.07 (20)	18.32 (28) 20.26 (21)	03.44 22.53
24	09.27 15.39	07.49 17.21	10.21 (31) 11.29 (31)	06.11 18.45	10.21 (31) 18.10 (20)	18.30 (28) 20.25 (21)	03.41 22.56
25	09.24 15.42	07.45 17.24	10.19 (31) 11.29 (31)	06.07 18.48	10.24 (31) 18.13 (20)	18.29 (28) 20.25 (21)	03.38 22.59
26	09.21 15.46	07.42 17.27	10.19 (31) 11.30 (31)	06.04 18.51	10.26 (31) 18.16 (20)	18.29 (28) 20.25 (21)	03.35 23.02
27	09.18 15.49	07.38 17.30	10.18 (31) 11.30 (31)	06.00 18.54	10.29 (31) 18.18 (20)	18.29 (28) 20.24 (21)	03.33 23.05
28	09.15 15.52	07.35 17.33	10.17 (31) 11.30 (31)	05.56 18.57	10.33 (31) 18.17 (20)	18.28 (28) 20.24 (21)	03.30 23.08
29	09.12 15.56		06.53 20.00	18.56 (20) 19.17 (20)	05.03 21.35	18.28 (28) 20.23 (21)	03.27 23.11
30	09.10 15.59		06.49 20.03	18.55 (20) 19.16 (20)	05.00 21.38	18.27 (28) 20.22 (21)	03.24 23.14
31	09.07 16.02		06.46 20.06	18.56 (20) 19.16 (20)		03.22 23.17	18.38 (28) 19.30 (28)
Potential sun hours	171	238	363	451	570	624	
Total, worst case		1020	2325	2012	2243	1170	
Sun reduction		0,33	0,32	0,41	0,47	0,48	
Oper. time red.		0,99	0,99	0,99	0,99	0,99	
Wind dir. red.		0,67	0,65	0,62	0,62	0,62	
Total reduction		0,22	0,21	0,25	0,29	0,29	
Total, real		225	485	503	647	344	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_2020110 Shadow receptor: A - Laskentapist A (Metsästysmaja)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December					
1	02.59	18.52 (28)	04.24	18.37 (28)	06.00	18.51 (28)	07.26	10.53 (31)	08.00		10.19 (31)	09.35				
	23.49	39	19.31 (28)	22.27	71	19.48 (28)	20.40	30	19.21 (28)	18.53	99	18.09 (24)	16.07	12	10.31 (31)	14.43
2	03.01	18.52 (28)	04.28	18.37 (28)	06.03	18.54 (28)	07.29	10.53 (31)	08.04			09.38				
	23.48	40	19.32 (28)	22.24	71	19.48 (28)	20.36	22	19.16 (28)	18.49	98	18.08 (24)	16.04			14.41
3	03.01	18.52 (28)	04.31	18.36 (28)	06.06	19.00 (28)	07.32	10.52 (31)	08.07			09.41				
	23.46	41	19.33 (28)	22.20	72	19.48 (28)	20.32	9	19.09 (28)	18.46	96	18.06 (24)	16.00			14.39
4	03.03	18.51 (28)	04.34	18.36 (28)	06.09		07.35	10.52 (31)	08.10			09.44				
	23.45	42	19.33 (28)	22.17	81	20.03 (25)	20.29	18.42	92	18.03 (24)	15.57	14.37				
5	03.05	18.50 (28)	04.37	18.36 (28)	06.12		07.38	10.51 (31)	08.13			09.46				
	23.43	43	19.33 (28)	22.14	87	20.06 (25)	20.25	18.39	88	18.00 (24)	15.54	14.35				
6	03.08	18.50 (28)	04.40	18.36 (28)	06.15		07.41	10.51 (31)	08.17			09.49				
	23.41	45	19.35 (28)	22.10	92	20.08 (25)	20.22	18.35	80	17.56 (24)	15.51	14.33				
7	03.10	18.50 (28)	04.44	18.35 (28)	06.18		07.44	10.50 (31)	08.20			09.51				
	23.39	46	19.36 (28)	22.07	94	20.09 (25)	20.18	18.32	76	12.06 (31)	15.48	14.32				
8	03.12	18.49 (28)	04.47	18.36 (28)	06.20	18.58 (20)	07.47	10.51 (31)	08.23			09.54				
	23.37	47	19.36 (28)	22.03	95	20.11 (25)	20.15	2	19.00 (20)	18.28	76	12.07 (31)	15.45			14.30
9	03.15	18.49 (28)	04.50	18.36 (28)	06.23	18.53 (20)	07.50	10.51 (31)	08.26			09.56				
	23.34	48	19.37 (28)	22.00	96	20.12 (25)	20.11	11	19.04 (20)	18.25	75	12.06 (31)	15.41			14.29
10	03.18	18.49 (28)	04.53	18.35 (28)	06.26	18.50 (20)	07.53	10.50 (31)	08.30			09.58				
	23.32	48	19.37 (28)	21.57	102	20.23 (21)	20.08	15	19.05 (20)	18.21	75	12.05 (31)	15.38			14.28
11	03.20	18.48 (28)	04.56	18.35 (28)	06.29	18.49 (20)	07.56	10.50 (31)	08.33			10.00				
	23.29	50	19.38 (28)	21.53	110	20.27 (21)	20.04	17	19.06 (20)	18.18	75	12.05 (31)	15.35			14.27
12	03.23	18.48 (28)	04.59	18.35 (28)	06.32	18.48 (20)	07.59	10.50 (31)	08.36			10.02				
	23.27	51	19.39 (28)	21.50	114	20.29 (21)	20.00	19	19.07 (20)	18.14	74	12.04 (31)	15.32			14.26
13	03.26	18.47 (28)	05.02	18.36 (28)	06.35	18.47 (20)	08.02	10.50 (31)	08.39			10.04				
	23.24	53	19.40 (28)	21.46	114	20.30 (21)	19.57	20	19.07 (20)	18.11	73	12.03 (31)	15.29			14.25
14	03.29	18.46 (28)	05.06	18.35 (28)	06.38	18.46 (20)	08.05	10.51 (31)	08.43			10.06				
	23.22	54	19.40 (28)	21.43	115	20.30 (21)	19.53	22	19.08 (20)	18.08	72	12.03 (31)	15.26			14.24
15	03.31	18.46 (28)	05.09	18.35 (28)	06.41	11.24 (31)	08.08	10.51 (31)	08.46			10.07				
	23.19	55	19.41 (28)	21.39	116	20.31 (21)	19.50	41	19.07 (20)	18.04	71	12.02 (31)	15.23			14.23
16	03.34	18.45 (28)	05.12	18.36 (28)	06.43	11.18 (31)	08.11	10.51 (31)	08.49			10.09				
	23.16	56	19.41 (28)	21.36	116	20.32 (21)	19.46	52	19.06 (20)	18.01	70	12.01 (31)	15.20			14.23
17	03.37	18.44 (28)	05.15	18.35 (28)	06.46	11.15 (31)	08.14	10.51 (31)	08.52			10.10				
	23.13	58	19.42 (28)	21.32	116	20.31 (21)	19.43	57	19.05 (20)	17.57	69	12.00 (31)	15.18			14.22
18	03.40	18.44 (28)	05.18	18.36 (28)	06.49	11.12 (31)	08.17	10.53 (31)	08.56			10.11				
	23.11	58	19.42 (28)	21.29	116	20.32 (21)	19.39	59	19.02 (20)	17.54	67	12.00 (31)	15.15			14.22
19	03.43	18.44 (28)	05.21	18.37 (28)	06.52	11.10 (31)	08.20	10.53 (31)	08.59			10.12				
	23.08	59	19.43 (28)	21.25	115	20.32 (21)	19.36	65	18.58 (20)	17.50	66	11.59 (31)	15.12			14.22
20	03.46	18.43 (28)	05.24	18.37 (28)	06.55	11.07 (31)	08.23	10.53 (31)	09.02			10.13				
	23.05	60	19.43 (28)	21.22	115	20.32 (21)	19.32	73	18.54 (20)	17.47	64	11.57 (31)	15.09			14.22
21	03.50	18.42 (28)	05.27	18.37 (28)	06.58	11.05 (31)	08.26	10.55 (31)	09.05			10.14				
	23.02	62	19.44 (28)	21.18	114	20.31 (21)	19.28	76	18.50 (20)	17.43	62	11.57 (31)	15.07			14.23
22	03.53	18.42 (28)	05.30	18.38 (28)	07.01	11.03 (31)	08.29	10.55 (31)	09.08			10.14				
	22.59	63	19.45 (28)	21.15	112	20.30 (21)	19.25	80	18.10 (24)	17.40	60	11.55 (31)	15.04			14.23
23	03.56	18.41 (28)	05.33	18.39 (28)	07.03	11.02 (31)	08.32	10.57 (31)	09.11			10.15				
	22.56	64	19.45 (28)	21.11	111	20.30 (21)	19.21	84	18.11 (24)	17.37	57	11.54 (31)	15.01			14.24
24	03.59	18.41 (28)	05.36	18.40 (28)	07.06	11.01 (31)	08.35	10.58 (31)	09.15			10.15				
	22.53	65	19.46 (28)	21.08	108	20.28 (21)	19.18	87	18.11 (24)	17.33	54	11.52 (31)	14.59			14.24
25	04.02	18.40 (28)	05.39	18.40 (28)	07.09	10.59 (31)	07.38	09.59 (31)	09.18			10.15				
	22.49	66	19.46 (28)	21.04	102	20.24 (21)	19.14	92	18.12 (24)	16.30	52	10.51 (31)	14.56			14.25
26	04.05	18.40 (28)	05.42	18.41 (28)	07.12	10.58 (31)	07.41	10.00 (31)	09.21			10.15				
	22.46	67	19.47 (28)	21.01	95	20.21 (21)	19.11	95	18.12 (24)	16.27	49	10.49 (31)	14.54			14.26
27	04.08	18.39 (28)	05.45	18.42 (28)	07.15	10.56 (31)	07.45	10.02 (31)	09.24			10.15				
	22.43	67	19.46 (28)	20.57	86	20.18 (21)	19.07	97	18.11 (24)	16.23	46	10.48 (31)	14.51			14.27
28	04.12	18.39 (28)	05.48	18.44 (28)	07.18	10.56 (31)	07.48	10.04 (31)	09.27			10.15				
	22.40	68	19.47 (28)	20.54	74	20.15 (21)	19.04	98	18.11 (24)	16.20	41	10.45 (31)	14.49			14.28
29	04.15	18.38 (28)	05.51	18.44 (28)	07.21	10.55 (31)	07.51	10.06 (31)	09.30			10.15				
	22.37	69	19.47 (28)	20.50	67	20.04 (25)	19.00	99	18.10 (24)	16.17	37	10.43 (31)	14.47			14.30
30	04.18	18.38 (28)	05.54	18.46 (28)	07.24	10.54 (31)	07.54	10.10 (31)	09.33			10.14				
	22.33	70	19.48 (28)	20.47	57	20.01 (25)	18.57	100	18.10 (24)	16.13	31	10.41 (31)	14.45			14.31
31	04.21	18.38 (28)	05.57	18.48 (28)			07.57	10.14 (31)				10.14				
	22.30	70	19.48 (28)	20.43	47	19.58 (25)		16.10	23	10.37 (31)		14.33				
Potential sun hours	609		508		393		305		198			137				
Total, worst case	1724		2981		1422		2068		12							
Sun reduction	0,38		0,31		0,33		0,35		0,24							
Oper. time red.	0,99		0,99		0,99		0,99		0,99							
Wind dir. red.	0,62		0,62		0,64		0,66		0,67							
Total reduction	0,23		0,19		0,21		0,23		0,16							
Total, real	401		571		299		474		2							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152.5_Luke forest_20201102Shadow receptor: B - Laskentapist B (Ylivieskantie, Pohlola)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	03.19
	14.35	16.06	17.36	20.09	21.41	19.08 (36)
2	10.11	09.00	07.28	06.39	04.53	03.16
	14.37	16.09	17.39	20.12	21.44	19.06 (36)
3	10.10	08.57	07.24	06.35	04.50	03.14
	14.39	16.12	17.42	20.15	21.48	19.04 (36)
4	10.09	08.54	07.21	06.31	04.46	03.11
	14.41	16.15	17.45	20.18	21.51	19.03 (36)
5	10.08	08.51	07.17	06.28	04.43	03.09
	14.44	16.19	17.48	20.21	21.54	19.00 (36)
6	10.06	08.48	07.14	06.24	04.39	03.07
	14.46	16.22	17.51	20.24	21.57	19.00 (52)
7	10.05	08.45	07.10	06.21	04.36	03.05
	14.48	16.25	17.54	20.27	22.00	19.56 (36)
8	10.03	08.42	07.07	06.17	04.33	03.03
	14.51	16.29	17.57	20.30	22.04	19.53 (36)
9	10.01	08.38	07.03	06.14	04.29	03.01
	14.54	16.32	18.00	20.33	22.07	19.53 (36)
10	10.00	08.35	07.00	06.10	04.26	02.57
	14.56	16.35	18.03	20.36	22.10	19.53 (52)
11	09.58	08.32	06.56	06.07	06.39 (51)	04.23
	14.59	16.39	18.06	20.39	8 06.47 (51)	22.14
12	09.56	08.29	06.53	06.03	06.36 (51)	04.19
	15.02	16.42	18.09	20.42	13 06.49 (51)	22.17
13	09.54	08.25	06.49	05.59	06.33 (51)	04.16
	15.05	16.45	18.12	20.45	17 06.50 (51)	22.20
14	09.51	08.22	06.46	05.56	06.30 (51)	04.13
	15.08	16.48	18.15	20.48	20 06.50 (51)	22.23
15	09.49	08.19	06.42	05.52	06.29 (51)	04.09
	15.11	16.52	18.18	20.51	22 06.51 (51)	22.27
16	09.47	08.15	06.39	05.49	06.28 (51)	04.06
	15.14	16.55	18.21	20.54	24 06.52 (51)	22.30
17	09.45	08.12	06.35	05.45	06.27 (51)	04.03
	15.17	16.58	18.24	20.57	24 06.51 (51)	22.33
18	09.42	08.09	06.32	05.42	06.27 (51)	04.00
	15.20	17.01	18.27	21.00	25 06.52 (51)	22.36
19	09.40	08.05	06.28	05.38	06.27 (51)	03.57
	15.23	17.05	18.30	21.03	25 06.52 (51)	22.40
20	09.37	08.02	06.25	05.35	06.27 (51)	03.53
	15.26	17.08	18.33	21.06	23 06.50 (51)	22.43
21	09.35	07.59	06.21	05.31	06.27 (51)	03.50
	15.29	17.11	18.36	21.10	23 06.50 (51)	22.46
22	09.32	07.55	06.18	05.28	06.28 (51)	03.47
	15.33	17.14	18.39	21.13	22 06.50 (51)	22.49
23	09.29	07.52	06.14	05.24	06.28 (51)	03.44
	15.36	17.17	18.42	21.16	21 06.49 (51)	22.52
24	09.27	07.49	06.11	05.21	06.28 (51)	03.41
	15.39	17.20	18.45	21.19	19 06.47 (51)	22.55
25	09.24	07.45	06.07	05.17	06.30 (51)	03.38
	15.42	17.24	18.48	21.22	15 06.45 (51)	22.59
26	09.21	07.42	06.03	05.14	06.31 (51)	03.35
	15.46	17.27	18.51	21.25	12 06.43 (51)	23.02
27	09.18	07.38	06.00	05.10	06.35 (51)	03.32
	15.49	17.30	18.54	21.28	5 06.40 (51)	23.05
28	09.15	07.35	05.56	05.07	06.30 (51)	03.30
	15.52	17.33	18.57	21.32	18 06.39 (51)	23.08
29	09.12		05.53	05.03	06.30 (51)	03.27
	15.56		20.00	21.35	28 06.36 (51)	23.11
30	09.09		05.49	05.00	06.30 (51)	03.24
	15.59		20.03	21.38	35 06.34 (51)	23.14
31	09.06		05.46			03.21
	16.02		20.06			23.17
Potential sun hours	171	238	363	451	570	624
Total, worst case			317	399		2936
Sun reduction			0,32	0,41		0,47
Oper. time red.			0,99	0,99		0,99
Wind dir. red.			0,61	0,60		0,61
Total reduction			0,20	0,24		0,29
Total, real			62	97		838
						1003

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152.5_Luke forest_20201102Shadow receptor: B - Laskentapiste B (Ylivieskantie, Pohlola)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December						
1	02.59	04.19 (46)	04.24	05.17 (52)	06.00	06.39 (51)	07.26	08.00	09.35			
	23.49	116	20.21 (36)	22.27	94	21.37 (29)	20.39	8	06.47 (51)	18.53	16.07	14.42
2	03.01	04.19 (46)	04.28	05.17 (52)	06.03	07.29	08.04	09.38				
	23.48	115	20.21 (36)	22.23	90	20.14 (36)	20.36		18.49	16.03	14.40	
3	03.01	04.19 (46)	04.31	05.19 (52)	06.06	07.32	08.07	09.41				
	23.46	115	20.21 (36)	22.20	84	20.12 (36)	20.32		18.46	16.00	14.39	
4	03.03	04.20 (46)	04.34	05.22 (52)	06.09	07.35	08.10	09.43				
	23.44	115	20.22 (36)	22.17	79	20.11 (36)	20.29		18.42	15.57	14.37	
5	03.05	04.20 (46)	04.37	05.25 (52)	06.12	07.38	08.13	09.46				
	23.43	113	20.21 (36)	22.13	74	20.10 (36)	20.25		18.39	15.54	14.35	
6	03.08	04.21 (46)	04.40	05.27 (52)	06.15	07.41	08.16	09.49				
	23.41	112	20.22 (36)	22.10	67	20.08 (36)	20.22		18.35	15.51	14.33	
7	03.10	04.21 (46)	04.43	05.30 (52)	06.17	07.44	08.20	09.51				
	23.38	112	20.21 (36)	22.07	61	20.07 (36)	20.18		18.32	15.48	14.32	
8	03.12	04.22 (46)	04.47	05.34 (52)	06.20	07.47	08.23	09.53				
	23.36	113	21.40 (29)	22.03	55	20.06 (36)	20.15		18.28	15.44	14.30	
9	03.15	04.23 (46)	04.50	05.37 (52)	06.23	07.50	08.26	09.56				
	23.34	116	21.43 (29)	22.00	51	20.04 (36)	20.11		18.25	15.41	14.29	
10	03.17	04.24 (46)	04.53	05.40 (52)	06.26	07.53	08.29	09.58				
	23.32	116	21.44 (29)	21.56	47	20.01 (36)	20.07		18.21	15.38	14.28	
11	03.20	04.26 (46)	04.56	05.43 (52)	06.29	07.56	08.33	10.00				
	23.29	117	21.46 (29)	21.53	43	19.59 (36)	20.04		18.18	15.35	14.26	
12	03.23	04.26 (46)	04.59	05.46 (52)	06.32	07.59	08.36	10.02				
	23.27	116	21.46 (29)	21.50	39	19.57 (36)	20.00		18.14	15.32	14.25	
13	03.26	04.28 (46)	05.02	05.49 (52)	06.35	07.59 (50)	08.02	10.04				
	23.24	113	21.46 (29)	21.46	33	19.53 (36)	19.57	8	08.07 (50)	18.11	15.29	14.25
14	03.29	04.31 (46)	05.05	05.52 (52)	06.38	07.55 (50)	08.05	10.05				
	23.22	111	21.48 (29)	21.43	26	19.50 (36)	19.53	14	08.09 (50)	18.07	15.26	14.24
15	03.31	04.32 (46)	05.09	05.56 (52)	06.40	07.53 (50)	08.08	10.07				
	23.19	104	21.49 (29)	21.39	16	19.45 (36)	19.50	18	08.11 (50)	18.04	15.23	14.23
16	03.34	04.33 (46)	05.12	05.59 (52)	06.43	07.52 (50)	08.11	10.08				
	23.16	105	21.49 (29)	21.36	7	19.48 (51)	19.46	20	08.12 (50)	18.00	15.20	14.23
17	03.37	04.34 (46)	05.15	05.62 (52)	06.46	07.51 (50)	08.14	10.10				
	23.13	103	21.49 (29)	21.32	13	19.40 (51)	19.43	22	08.13 (50)	17.57	15.18	14.22
18	03.40	04.35 (46)	05.18	05.65 (52)	06.49	07.50 (50)	08.17	10.11				
	23.10	105	21.50 (29)	21.29	16	19.42 (51)	19.39	24	08.14 (50)	17.54	15.15	14.22
19	03.43	04.36 (46)	05.21	05.68 (52)	06.52	07.48 (50)	08.20	10.12				
	23.07	109	21.51 (29)	21.25	18	19.40 (51)	19.35	25	08.13 (50)	17.50	15.12	14.22
20	03.46	04.37 (46)	05.24	05.71 (52)	06.55	07.48 (50)	08.23	10.13				
	23.05	114	21.51 (29)	21.22	20	19.40 (51)	19.32	25	08.13 (50)	17.47	15.09	14.22
21	03.49	04.38 (46)	05.27	05.74 (52)	06.58	07.47 (50)	08.26	10.14				
	23.02	115	21.51 (29)	21.18	22	19.40 (51)	19.28	26	08.13 (50)	17.43	15.06	14.23
22	03.53	04.39 (46)	05.30	05.77 (52)	06.58	07.47 (50)	08.29	10.14				
	22.59	118	21.51 (29)	21.15	24	19.40 (51)	19.25	25	08.12 (50)	17.40	15.04	14.23
23	03.56	04.40 (46)	05.33	05.80 (52)	06.58	07.48 (50)	08.32	10.15				
	22.55	119	21.51 (29)	21.11	24	19.40 (51)	19.21	24	08.12 (50)	17.37	15.01	14.23
24	03.59	04.41 (46)	05.36	05.83 (52)	06.58	07.48 (50)	08.35	10.15				
	22.52	119	21.51 (29)	21.08	24	19.40 (51)	19.18	23	08.11 (50)	17.33	14.99	14.24
25	04.02	04.42 (46)	05.39	05.86 (52)	06.58	07.48 (50)	08.38	10.15				
	22.49	119	21.51 (29)	21.04	24	19.40 (51)	19.14	22	08.10 (50)	17.30	14.96	14.25
26	04.05	04.43 (46)	05.42	05.89 (52)	06.58	07.48 (50)	08.41	10.15				
	22.46	119	21.51 (29)	21.01	24	19.40 (51)	19.11	20	08.08 (50)	17.27	14.94	14.26
27	04.08	04.44 (46)	05.45	05.92 (52)	06.58	07.51 (50)	08.44	10.15				
	22.43	117	21.50 (29)	20.57	24	19.40 (51)	19.07	15	08.06 (50)	17.23	14.91	14.27
28	04.12	04.45 (46)	05.48	05.95 (52)	06.58	07.54 (50)	08.47	10.15				
	22.40	115	21.48 (29)	20.54	22	19.40 (51)	19.03	9	08.03 (50)	17.20	14.89	14.28
29	04.15	04.46 (46)	05.51	06.00 (52)	06.58	07.51 (50)	08.50	10.15				
	22.37	110	21.45 (29)	20.50	21	19.40 (51)	19.00		16.17	14.47	14.30	
30	04.18	04.47 (46)	05.54	06.03 (52)	06.58	07.54 (50)	08.53	10.15				
	22.33	106	21.43 (29)	20.47	17	19.40 (51)	18.56		16.13	14.45	14.31	
31	04.21	04.48 (46)	05.57	06.06 (52)	06.58	07.57 (50)	08.56	10.13				
	22.30	101	21.40 (29)	20.43	13	19.40 (51)	18.59		16.10	14.42	14.33	
Potential sun hours	608		508		393		305		198		137	
Total, worst case	3498		1172		328							
Sun reduction	0,38		0,31		0,33							
Oper. time red.	0,99		0,99		0,99							
Wind dir. red.	0,61		0,61		0,61							
Total reduction	0,23		0,19		0,20							
Total, real	804		221		66							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_2020110 Shadow receptor: C - Laskentapiste C (Perkkiontie 382)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	20.16 (31) 03.19 04.18 (51)
	14.35	16.06	17.36	20.09	21.41	15 20.31 (31) 23.19 69 21.47 (36)
2	10.11	09.00	07.28	06.38	04.53	20.18 (31) 03.16 04.16 (51)
	14.37	16.09	17.39	20.12	21.44	11 20.29 (31) 23.22 74 21.47 (36)
3	10.10	08.57	07.24	06.35	04.50	05.42 (50) 03.14 04.14 (51)
	14.39	16.12	17.42	20.15	21.47	17 20.26 (31) 23.25 77 21.47 (36)
4	10.09	08.54	07.21	06.31	04.46	05.39 (50) 03.12 04.13 (51)
	14.42	16.15	17.45	20.18	21.51	17 05.56 (50) 23.28 79 21.48 (36)
5	10.08	08.51	07.17	06.28	04.43	05.36 (50) 03.09 04.12 (51)
	14.44	16.19	17.48	20.21	21.54	22 05.58 (50) 23.30 81 21.48 (36)
6	10.06	08.48	07.14	06.24	04.39	05.34 (50) 03.07 04.10 (51)
	14.46	16.22	17.51	20.24	21.57	26 06.00 (50) 23.33 82 21.48 (36)
7	10.05	08.45	07.10	06.21	04.36	05.34 (50) 03.05 04.09 (51)
	14.49	16.25	17.54	20.27	22.00	28 06.02 (50) 23.35 84 21.48 (36)
8	10.03	08.41	07.07	06.17	04.33	05.32 (50) 03.03 04.09 (51)
	14.51	16.29	17.57	20.30	22.04	31 06.03 (50) 23.37 84 21.48 (36)
9	10.01	08.38	07.03	06.14	04.29	05.31 (50) 03.01 04.09 (51)
	14.54	16.32	18.00	20.33	22.07	32 06.03 (50) 23.40 84 21.48 (36)
10	09.59	08.35	07.00	06.10	04.26	05.30 (50) 02.58 04.09 (51)
	14.56	16.35	18.03	20.36	22.10	34 06.04 (50) 23.42 84 21.49 (36)
11	09.58	08.32	06.56	06.07	04.23	05.29 (50) 02.56 04.08 (51)
	14.59	16.39	18.06	20.39	22.13	35 06.04 (50) 23.44 85 21.48 (36)
12	09.56	08.29	06.53	06.03	04.19	05.29 (50) 02.55 04.08 (51)
	15.02	16.42	18.09	20.42	22.17	37 06.06 (50) 23.45 85 21.48 (36)
13	09.53	08.25	06.49	05.59	04.16	05.28 (50) 02.53 04.09 (51)
	15.05	16.45	18.12	20.45	22.20	38 06.06 (50) 23.47 85 21.49 (36)
14	09.51	08.22	06.46	05.56	04.13	05.28 (50) 02.52 04.08 (51)
	15.08	16.48	18.15	20.48	22.23	42 21.33 (32) 23.49 85 21.49 (36)
15	09.49	08.19	06.42	05.52	04.09	05.28 (50) 02.51 04.09 (51)
	15.11	16.52	18.18	20.51	22.26	47 21.36 (32) 23.50 85 21.50 (36)
16	09.47	08.15	06.39	05.49	04.06	05.27 (50) 02.50 04.08 (51)
	15.14	16.55	18.21	20.54	22.30	53 21.38 (32) 23.51 84 21.49 (36)
17	09.44	08.12	06.35	05.45	04.03	05.26 (50) 02.50 04.09 (51)
	15.17	16.58	18.24	20.57	22.33	58 21.40 (32) 23.52 82 21.49 (36)
18	09.42	08.09	06.32	05.42	04.00	05.27 (50) 02.49 04.09 (51)
	15.20	17.01	18.27	21.00	22.36	62 21.44 (32) 23.53 84 21.50 (36)
19	09.40	08.05	06.28	05.38	20.21 (31) 03.57	05.26 (50) 02.49 04.09 (51)
	15.23	17.05	18.30	21.03	4 20.25 (31) 22.39	66 21.45 (32) 23.54 85 21.50 (36)
20	09.37	08.02	06.25	05.35	20.18 (31) 03.54	05.27 (50) 02.49 04.09 (51)
	15.26	17.08	18.33	21.06	9 20.27 (31) 22.43	67 21.46 (32) 23.55 83 21.50 (36)
21	09.34	07.59	06.21	05.31	20.17 (31) 03.50	05.27 (50) 02.49 04.09 (51)
	15.29	17.11	18.36	21.09	13 20.30 (31) 22.46	69 21.47 (32) 23.55 83 21.50 (36)
22	09.32	07.55	06.18	05.28	20.16 (31) 03.47	05.26 (50) 02.49 04.09 (51)
	15.33	17.14	18.39	21.13	17 20.33 (31) 22.49	69 21.46 (32) 23.55 83 21.50 (36)
23	09.29	07.52	06.14	05.24	20.16 (31) 03.44	05.27 (50) 02.50 04.10 (51)
	15.36	17.17	18.42	21.16	20 20.36 (31) 22.52	69 21.46 (32) 23.55 85 21.51 (36)
24	09.26	07.48	06.10	05.21	20.15 (31) 03.41	05.27 (50) 02.50 04.10 (51)
	15.39	17.20	18.45	21.19	20 20.35 (31) 22.55	71 21.47 (32) 23.55 84 21.51 (36)
25	09.24	07.45	06.07	05.17	20.14 (31) 03.38	05.27 (50) 02.51 04.11 (51)
	15.42	17.24	18.48	21.22	21 20.35 (31) 22.58	71 21.47 (32) 23.55 84 21.52 (36)
26	09.21	07.42	06.03	05.14	20.14 (31) 03.35	05.28 (50) 02.52 04.10 (51)
	15.46	17.27	18.51	21.25	21 20.35 (31) 23.02	70 21.47 (32) 23.54 85 21.51 (36)
27	09.18	07.38	06.00	05.10	20.15 (31) 03.33	05.28 (50) 02.53 04.11 (51)
	15.49	17.30	18.54	21.28	20 20.35 (31) 23.05	70 21.47 (32) 23.53 84 21.52 (36)
28	09.15	07.35	05.56	05.07	20.15 (31) 03.30	05.28 (50) 02.55 04.12 (51)
	15.52	17.33	18.57	21.31	19 20.34 (31) 23.08	70 21.47 (32) 23.52 83 21.52 (36)
29	09.12		06.53	05.03	20.15 (31) 03.27	05.28 (50) 02.56 04.12 (51)
	15.56		20.00	21.35	19 20.34 (31) 23.11	70 21.47 (32) 23.51 85 21.53 (36)
30	09.09		06.49	05.00	20.15 (31) 03.24	05.29 (50) 02.58 04.12 (51)
	15.59		20.03	21.38	17 20.32 (31) 23.14	69 21.47 (36) 23.50 85 21.53 (36)
31	09.06		06.46		03.22	05.29 (50)
	16.02		20.06		23.16	69 21.47 (36)
Potential sun hours	171	238	363	451	569	624
Total, worst case				200	1505	2482
Sun reduction				0,41	0,47	0,48
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,63	0,63	0,63
Total reduction				0,25	0,29	0,30
Total, real				51	438	736

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_2020110 Shadow receptor: C - Laskentapiste C (Perkkiontie 382)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December	
1	02.59	04.13 (51)	04.24	05.39 (50)	06.00	07.26	08.00	09.35				
	23.49	85 21.53 (36)	22.27	36 06.15 (50)	20.39	18.53	16.07	14.43				
2	03.01	04.13 (51)	04.28	05.40 (50)	06.03	07.29	08.03	09.38				
	23.47	85 21.53 (36)	22.23	35 06.15 (50)	20.36	18.49	16.03	14.41				
3	03.01	04.13 (51)	04.31	05.40 (50)	06.06	07.32	08.07	09.41				
	23.46	85 21.53 (36)	22.20	34 06.14 (50)	20.32	18.46	16.00	14.39				
4	03.03	04.14 (51)	04.34	05.41 (50)	06.09	07.35	08.10	09.43				
	23.44	85 21.54 (36)	22.17	32 06.13 (50)	20.29	18.42	15.57	14.37				
5	03.06	04.15 (51)	04.37	05.43 (50)	06.12	07.38	08.13	09.46				
	23.42	84 21.54 (36)	22.13	29 06.12 (50)	20.25	18.39	15.54	14.35				
6	03.08	04.16 (51)	04.40	05.43 (50)	06.14	07.41	08.16	09.48				
	23.40	83 21.54 (36)	22.10	27 06.10 (50)	20.22	18.35	15.51	14.33				
7	03.10	04.17 (51)	04.43	05.45 (50)	06.17	07.44	08.20	09.51				
	23.38	82 21.54 (36)	22.07	24 06.09 (50)	20.18	18.32	15.48	14.32				
8	03.12	04.19 (51)	04.47	05.47 (50)	06.20	07.47	08.23	09.53				
	23.36	81 21.54 (36)	22.03	21 06.08 (50)	20.14	18.28	15.44	14.30				
9	03.15	04.21 (51)	04.50	05.49 (50)	06.23	07.50	08.26	09.55				
	23.34	77 21.55 (36)	22.00	16 06.05 (50)	20.11	18.25	15.41	14.29				
10	03.18	04.23 (51)	04.53	05.52 (50)	06.26	07.53	08.29	09.58				
	23.31	75 21.55 (36)	21.56	17 20.37 (31)	20.07	18.21	15.38	14.28				
11	03.20	04.25 (51)	04.56	20.26 (31)	06.29	07.56	08.33	10.00				
	23.29	71 21.55 (36)	21.53	13 20.39 (31)	20.04	18.18	15.35	14.27				
12	03.23	05.38 (50)	04.59	20.25 (31)	06.32	07.58	08.36	10.02				
	23.27	68 21.55 (32)	21.49	15 20.40 (31)	20.00	18.14	15.32	14.26				
13	03.26	05.38 (50)	05.02	20.23 (31)	06.35	08.01	08.39	10.03				
	23.24	68 21.55 (32)	21.46	17 20.40 (31)	19.57	18.11	15.29	14.25				
14	03.29	05.37 (50)	05.05	20.23 (31)	06.38	08.04	08.42	10.05				
	23.21	70 21.55 (32)	21.43	18 20.41 (31)	19.53	18.07	15.26	14.24				
15	03.31	05.37 (50)	05.09	20.22 (31)	06.40	08.07	08.46	10.07				
	23.19	70 21.56 (32)	21.39	20 20.42 (31)	19.50	18.04	15.23	14.23				
16	03.34	05.37 (50)	05.12	20.22 (31)	06.43	08.10	08.49	10.08				
	23.16	70 21.56 (32)	21.36	20 20.42 (31)	19.46	18.00	15.20	14.23				
17	03.37	05.37 (50)	05.15	20.21 (31)	06.46	08.13	08.52	10.09				
	23.13	70 21.56 (32)	21.32	20 20.41 (31)	19.42	17.57	15.18	14.22				
18	03.40	05.37 (50)	05.18	20.21 (31)	06.49	08.17	08.55	10.11				
	23.10	70 21.56 (32)	21.29	20 20.41 (31)	19.39	17.54	15.15	14.22				
19	03.43	05.37 (50)	05.21	20.21 (31)	06.52	08.20	08.58	10.12				
	23.07	71 21.57 (32)	21.25	20 20.41 (31)	19.35	17.50	15.12	14.22				
20	03.46	05.37 (50)	05.24	20.21 (31)	06.55	08.23	09.02	10.13				
	23.04	71 21.57 (32)	21.22	20 20.41 (31)	19.32	17.47	15.09	14.22				
21	03.50	05.37 (50)	05.27	20.21 (31)	06.58	08.26	09.05	10.13				
	23.01	68 21.56 (32)	21.18	16 20.37 (31)	19.28	17.43	15.06	14.23				
22	03.53	05.37 (50)	05.30	20.22 (31)	07.00	08.29	09.08	10.14				
	22.58	69 21.57 (32)	21.15	12 20.34 (31)	19.25	17.40	15.04	14.23				
23	03.56	05.37 (50)	05.33	20.23 (31)	07.03	08.32	09.11	10.15				
	22.55	68 21.56 (32)	21.11	8 20.31 (31)	19.21	17.37	15.01	14.24				
24	03.59	05.37 (50)	05.36	20.25 (31)	07.06	08.35	09.14	10.15				
	22.52	67 21.57 (32)	21.08	3 20.28 (31)	19.18	17.33	14.59	14.24				
25	04.02	05.37 (50)	05.39	07.09	07.38	09.17	10.15					
	22.49	65 21.55 (32)	21.04	19.14	16.30	14.56	14.25					
26	04.05	05.38 (50)	05.42	07.12	07.41	09.20	10.15					
	22.46	60 21.53 (32)	21.01	19.10	16.26	14.54	14.26					
27	04.08	05.37 (50)	05.45	07.15	07.44	09.23	10.15					
	22.43	56 21.50 (32)	20.57	19.07	16.23	14.51	14.27					
28	04.12	05.38 (50)	05.48	07.18	07.47	09.26	10.15					
	22.40	51 21.48 (32)	20.54	19.03	16.20	14.49	14.28					
29	04.15	05.38 (50)	05.51	07.20	07.51	09.29	10.14					
	22.36	45 21.45 (32)	20.50	19.00	16.17	14.47	14.30					
30	04.18	05.39 (50)	05.54	07.23	07.54	09.32	10.14					
	22.33	41 21.43 (32)	20.46	18.56	16.13	14.45	14.31					
31	04.21	05.38 (50)	05.57	07.27	07.57	09.35	10.13					
	22.30	37 06.15 (50)	20.43	16.10	14.33	14.33	14.33					
Potential sun hours	608		508		393		305		198			137
Total, worst case	2148		493									
Sun reduction	0,38		0,31									
Oper. time red.	0,99		0,99									
Wind dir. red.	0,63		0,62									
Total reduction	0,24		0,19									
Total, real	505		95									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_2020110 Shadow receptor: D - Asuinrakennus D (Alakylantie 243)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	20.35 (54)
	14.35	16.05	17.36	20.08	21.41	20
2	10.11	09.00	07.27	06.38	04.53	20.34 (54)
	14.37	16.08	17.39	20.11	21.44	21
3	10.10	08.57	07.24	06.35	04.49	20.34 (54)
	14.39	16.12	17.42	20.14	21.47	21
4	10.09	08.54	07.21	06.31	04.46	20.35 (54)
	14.41	16.15	17.45	20.17	21.50	19
5	10.07	08.51	07.17	06.27	04.42	20.35 (54)
	14.43	16.18	17.48	20.20	21.54	19
6	10.06	08.47	07.14	06.24	04.39	20.35 (54)
	14.46	16.22	17.51	20.23	21.57	18
7	10.04	08.44	07.10	06.20	04.36	20.36 (54)
	14.48	16.25	17.54	20.26	22.00	16
8	10.03	08.41	07.07	06.17	04.32	20.37 (54)
	14.51	16.28	17.57	20.29	22.03	14
9	10.01	08.38	07.03	06.13	04.29	20.39 (54)
	14.53	16.32	18.00	20.32	22.07	11
10	09.59	08.35	07.00	06.10	04.26	20.42 (54)
	14.56	16.35	18.03	20.35	22.10	5
11	09.57	08.31	06.56	06.06	04.22	20.47 (54)
	14.59	16.38	18.06	20.38	22.13	
12	09.55	08.28	06.53	06.03	04.19	
	15.02	16.42	18.09	20.42	22.16	
13	09.53	08.25	06.49	05.59	04.16	
	15.04	16.45	18.12	20.45	22.20	
14	09.51	08.22	06.46	05.56	04.12	
	15.07	16.48	18.15	20.48	22.23	
15	09.49	08.18	06.42	05.52	04.09	21.31 (56)
	15.10	16.51	18.18	20.51	22.26	4
16	09.47	08.15	06.38	05.48	04.06	21.29 (56)
	15.13	16.55	18.21	20.54	22.29	9
17	09.44	08.12	06.35	05.45	04.03	21.27 (56)
	15.16	16.58	18.24	20.57	22.33	14
18	09.42	08.08	06.31	05.41	03.59	21.27 (56)
	15.19	17.01	18.27	21.00	22.36	17
19	09.39	08.05	06.28	05.38	03.56	21.25 (56)
	15.23	17.04	18.30	21.03	22.39	21
20	09.37	08.02	06.24	05.34	03.53	21.25 (56)
	15.26	17.07	18.33	21.06	22.42	22
21	09.34	07.58	06.21	05.31	03.50	21.24 (56)
	15.29	17.11	18.36	21.09	22.46	23
22	09.32	07.55	06.17	05.27	03.47	21.24 (56)
	15.32	17.14	18.39	21.12	22.49	24
23	09.29	07.52	06.14	05.24	03.44	21.23 (56)
	15.35	17.17	18.42	21.15	22.52	26
24	09.26	07.48	06.10	05.20	03.41	21.23 (56)
	15.39	17.20	18.45	21.19	22.55	27
25	09.23	07.45	06.07	05.17	03.38	21.22 (56)
	15.42	17.23	18.48	21.22	22.58	27
26	09.21	07.41	06.03	05.13	03.35	21.22 (56)
	15.45	17.26	18.51	21.25	23.01	28
27	09.18	07.38	05.59	05.10	03.32	21.22 (56)
	15.49	17.29	18.54	21.28	23.04	28
28	09.15	07.34	05.56	05.06	03.29	21.22 (56)
	15.52	17.33	18.57	21.31	23.07	28
29	09.12		06.52	05.03	03.27	21.22 (56)
	15.55		20.00	21.34	23.10	28
30	09.09		06.49	05.00	03.24	21.23 (56)
	15.58		20.03	21.38	23.13	28
31	09.06		06.45		03.21	21.23 (56)
	16.02		20.06		23.16	28
Potential sun hours	171	238	363	451	570	624
Total, worst case				64	546	1168
Sun reduction				0,41	0,47	0,48
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,64	0,64	0,64
Total reduction				0,26	0,30	0,30
Total, real				17	162	355

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_2020110 Shadow receptor: D - Asuinrakennus D (Alakylantie 243)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July		August		September	October	November	December
1	02.59	21.30 (56)	04.24		06.00	07.26	08.00	09.35
	23.49	41 22.11 (58)	22.26		20.39	18.52	16.06	14.42
2	03.01	21.30 (56)	04.27		06.02	07.29	08.03	09.38
	23.47	40 22.10 (58)	22.23		20.35	18.49	16.03	14.40
3	03.01	21.30 (56)	04.30		20.51 (54)	06.05	07.32	08.06
	23.46	38 22.09 (58)	22.20	7	20.58 (54)	20.32	18.45	16.00
4	03.03	21.30 (56)	04.34		20.49 (54)	06.08	07.35	08.10
	23.44	35 22.07 (58)	22.16	12	21.01 (54)	20.28	18.42	15.57
5	03.05	21.30 (56)	04.37		20.47 (54)	06.11	07.38	08.13
	23.42	27 21.57 (56)	22.13	14	21.01 (54)	20.25	18.38	15.53
6	03.07	21.30 (56)	04.40		20.46 (54)	06.14	07.40	08.16
	23.40	27 21.57 (56)	22.10	16	21.02 (54)	20.21	18.35	15.50
7	03.10	21.30 (56)	04.43		20.45 (54)	06.17	07.43	08.19
	23.38	28 21.58 (56)	22.06	18	21.03 (54)	20.18	18.31	15.47
8	03.12	21.31 (56)	04.46		20.44 (54)	06.20	07.46	08.22
	23.36	28 21.59 (56)	22.03	19	21.03 (54)	20.14	18.28	15.44
9	03.15	21.30 (56)	04.49		20.44 (54)	06.23	07.49	08.26
	23.34	28 21.58 (56)	21.59	19	21.03 (54)	20.11	18.24	15.41
10	03.17	21.30 (56)	04.53		20.44 (54)	06.26	07.52	08.29
	23.31	28 21.58 (56)	21.56	20	21.04 (54)	20.07	18.21	15.38
11	03.20	21.31 (56)	04.56		20.44 (54)	06.29	07.55	08.32
	23.29	28 21.59 (56)	21.53	20	21.04 (54)	20.03	18.17	15.35
12	03.23	21.31 (56)	04.59		20.43 (54)	06.31	07.58	08.35
	23.26	28 21.59 (56)	21.49	20	21.03 (54)	20.00	18.14	15.32
13	03.25	21.31 (56)	05.02		20.43 (54)	06.34	08.01	08.39
	23.24	28 21.59 (56)	21.46	19	21.02 (54)	19.56	18.10	15.29
14	03.28	21.31 (56)	05.05		20.44 (54)	06.37	08.04	08.42
	23.21	28 21.59 (56)	21.42	15	20.59 (54)	19.53	18.07	15.26
15	03.31	21.31 (56)	05.08		20.44 (54)	06.40	08.07	08.45
	23.18	28 21.59 (56)	21.39	12	20.56 (54)	19.49	18.04	15.23
16	03.34	21.31 (56)	05.11		20.44 (54)	06.43	08.10	08.48
	23.16	28 21.59 (56)	21.35	8	20.52 (54)	19.46	18.00	15.20
17	03.37	21.32 (56)	05.14		20.45 (54)	06.46	08.13	08.52
	23.13	28 22.00 (56)	21.32	5	20.50 (54)	19.42	17.57	15.17
18	03.40	21.32 (56)	05.17		06.49	08.16	08.55	10.10
	23.10	27 21.59 (56)	21.28		19.39	17.53	15.14	14.22
19	03.43	21.32 (56)	05.21		06.51	08.19	08.58	10.12
	23.07	27 21.59 (56)	21.25		19.35	17.50	15.12	14.22
20	03.46	21.32 (56)	05.24		06.54	08.22	09.01	10.12
	23.04	26 21.58 (56)	21.21		19.31	17.46	15.09	14.22
21	03.49	21.34 (56)	05.27		06.57	08.25	09.05	10.13
	23.01	25 21.59 (56)	21.18		19.28	17.43	15.06	14.22
22	03.52	21.34 (56)	05.30		07.00	08.28	09.08	10.14
	22.58	24 21.58 (56)	21.14		19.24	17.40	15.03	14.23
23	03.55	21.35 (56)	05.33		07.03	08.32	09.11	10.14
	22.55	23 21.58 (56)	21.11		19.21	17.36	15.01	14.23
24	03.59	21.35 (56)	05.36		07.06	08.35	09.14	10.15
	22.52	22 21.57 (56)	21.07		19.17	17.33	14.58	14.24
25	04.02	21.36 (56)	05.39		07.09	07.38	09.17	10.15
	22.49	19 21.55 (56)	21.04		19.14	16.29	14.56	14.25
26	04.05	21.37 (56)	05.42		07.12	07.41	09.20	10.15
	22.46	15 21.52 (56)	21.00		19.10	16.26	14.53	14.26
27	04.08	21.39 (56)	05.45		07.14	07.44	09.23	10.15
	22.43	11 21.50 (56)	20.57		19.07	16.23	14.51	14.27
28	04.11	21.40 (56)	05.48		07.17	07.47	09.26	10.14
	22.39	7 21.47 (56)	20.53		19.03	16.19	14.49	14.28
29	04.14	21.43 (56)	05.51		07.20	07.50	09.29	10.14
	22.36	2 21.45 (56)	20.50		19.00	16.16	14.46	14.29
30	04.18		05.54		07.23	07.54	09.32	10.14
	22.33		20.46		18.56	16.13	14.44	14.31
31	04.21		05.57			07.57		10.13
	22.30		20.43			16.10		14.33
Potential sun hours	608		508		393	305	198	137
Total, worst case		744		224				
Sun reduction		0,38		0,31				
Oper. time red.		0,99		0,99				
Wind dir. red.		0,64		0,64				
Total reduction		0,24		0,20				
Total, real		178		44				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152.5_Luke forest_20201102Shadow receptor: E - Lomarakenus E (Kellokankaan metsätie)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.35	20.08	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.27	06.38	04.52	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.11	21.44	23.22	23.47	22.23	20.35	18.49	16.03	14.40
3	10.10	08.57	07.24	06.34	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.40
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.20	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.09	09.43
	14.41	16.15	17.45	20.17	21.50	23.27	23.44	22.16	20.28	18.42	15.56	14.36
5	10.07	08.51	07.17	06.27	04.42	03.08	03.05	04.37	06.11	07.37	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.47	07.13	06.24	04.39	03.06	03.07	04.40	06.14	07.40	08.16	09.48
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.04	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.06	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.22	09.53
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.31	18.00	20.32	22.07	23.39	23.34	21.59	20.11	18.24	15.41	14.28
10	09.59	08.35	06.59	06.10	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.57
	14.56	16.35	18.03	20.35	22.10	23.42	23.31	21.56	20.07	18.21	15.38	14.27
11	09.57	08.31	06.56	06.06	04.22	02.55	03.19	04.56	06.28	07.55	08.32	09.59
	14.58	16.38	18.06	20.38	22.13	23.44	23.29	21.53	20.03	18.17	15.35	14.26
12	09.55	08.28	06.52	06.02	04.19	02.54	03.22	04.59	06.31	07.58	08.35	10.01
	15.01	16.41	18.09	20.41	22.16	23.45	23.26	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.44	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.45	05.55	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.18	21.39	19.49	18.03	15.23	14.23
16	09.47	08.15	06.38	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.48	10.08
	15.13	16.54	18.21	20.54	22.29	23.51	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13	21.32	19.42	17.56	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.48	03.40	05.17	06.48	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10	21.28	19.38	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.21
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.23	06.54	08.22	09.01	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.26	06.57	08.25	09.05	10.13
	15.29	17.10	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.29	07.00	08.28	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.39	15.03	14.22
23	09.29	07.51	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.31	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.38	17.20	18.45	21.18	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.23
25	09.23	07.45	06.06	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.11	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.52	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.04	23.53	22.43	20.57	19.06	16.23	14.51	14.26
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.07	23.52	22.39	20.53	19.03	16.19	14.48	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.50	07.20	07.50	09.29	10.14
	15.55		19.59	21.34	23.10	23.51	22.36	20.50	18.59	16.16	14.46	14.29
30	09.09		06.49	04.59	03.23	02.57	04.17	05.53	07.23	07.53	09.32	10.14
	15.58		20.02	21.37	23.13	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.56		07.57		10.13
	16.02		20.05		23.16		22.30	20.43		16.09		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102Shadow receptor: F - Asuinrakennus F (Ollilantie 112)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	10.13	09.04	12.01 (45)	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36	11.32 (45)	
14.34	16.05	13.31 (40)	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.06	14.42	32	13.05 (40)	
2	10.12	09.01	13.17 (40)	07.28	06.38	04.52	03.15	03.00	04.27	06.03	07.29	08.04	09.39	11.33 (45)	
14.36	16.08	12	13.29 (40)	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40	29	13.05 (40)
3	10.11	08.58	13.21 (40)	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	09.41	11.34 (45)	
14.38	16.12	4	13.25 (40)	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38	24	13.03 (40)
4	10.10	08.54		07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10	09.44	11.35 (45)	
14.41	16.15			17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36	17	13.01 (40)
5	10.08	11.54 (45)	08.51	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	09.47	11.37 (45)	
14.43	5	11.59 (45)	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34	11	11.48 (45)
6	10.07	11.52 (45)	08.48	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17	09.49	11.39 (45)	
14.45	9	12.01 (45)	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	14.32	9	11.48 (45)
7	10.05	11.52 (45)	08.45	07.10	06.21	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.52	11.41 (45)	
14.48	11	12.03 (45)	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31	5	11.46 (45)
8	10.04	11.52 (45)	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	12.51 (40)	09.54	
14.50	16	13.17 (40)	16.28	17.57	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	5	12.56 (40)	14.29
9	10.02	11.50 (45)	08.39	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	12.47 (40)	09.56	
14.53	23	13.19 (40)	16.32	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	13	13.00 (40)	14.28
10	10.00	11.50 (45)	08.35	07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	11.31 (45)	09.58	
14.55	28	13.21 (40)	16.35	18.03	20.36	22.11	23.43	23.33	21.57	20.07	18.21	15.38	25	13.01 (40)	14.27
11	09.58	11.50 (45)	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33	11.29 (45)	10.01	
14.58	31	13.23 (40)	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	33	13.03 (40)	14.26
12	09.56	11.50 (45)	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.59	08.36	11.27 (45)	10.02	
15.01	35	13.25 (40)	16.42	18.09	20.42	22.17	23.47	23.28	21.50	20.00	18.14	15.32	39	13.04 (40)	14.25
13	09.54	11.49 (45)	08.26	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.02	08.39	11.26 (45)	10.04	
15.04	39	13.26 (40)	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	41	13.04 (40)	14.24
14	09.52	11.50 (45)	08.22	06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.05	08.43	11.26 (45)	10.06	
15.07	39	13.27 (40)	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	44	13.06 (40)	14.23
15	09.50	11.49 (45)	08.19	06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.08	08.46	11.26 (45)	10.08	
15.10	42	13.28 (40)	16.51	18.18	20.51	22.27	23.51	23.20	21.39	19.50	18.04	15.23	46	13.06 (40)	14.22
16	09.47	11.49 (45)	08.16	06.39	05.49	04.05	02.49	03.33	05.11	06.43	08.11	08.49	11.25 (45)	10.09	
15.13	44	13.29 (40)	16.55	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	47	13.06 (40)	14.22
17	09.45	11.50 (45)	08.12	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	11.26 (45)	10.10	
15.16	45	13.30 (40)	16.58	18.24	20.57	22.34	23.54	23.14	21.32	19.42	17.57	15.17	47	13.07 (40)	14.21
18	09.43	11.49 (45)	08.09	06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	11.25 (45)	10.12	
15.19	47	13.30 (40)	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	49	13.07 (40)	14.21
19	09.40	11.49 (45)	08.06	06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	11.25 (45)	10.13	
15.22	49	13.31 (40)	17.04	18.30	21.03	22.40	23.56	23.08	21.25	19.35	17.50	15.11	49	13.07 (40)	14.21
20	09.38	11.50 (45)	08.02	06.25	05.34	03.53	02.47	03.46	05.24	06.55	08.23	09.02	11.25 (45)	10.14	
15.25	48	13.31 (40)	17.07	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.09	49	13.07 (40)	14.21
21	09.35	11.50 (45)	07.59	06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	11.26 (45)	10.14	
15.29	49	13.32 (40)	17.11	18.36	21.10	22.47	23.56	23.02	21.18	19.28	17.43	15.06	49	13.08 (40)	14.22
22	09.32	11.50 (45)	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.09	11.26 (45)	10.15	
15.32	49	13.32 (40)	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	47	13.07 (40)	14.22
23	09.30	11.51 (45)	07.52	06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	11.26 (45)	10.15	
15.35	49	13.33 (40)	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.01	49	13.08 (40)	14.22
24	09.27	11.51 (45)	07.49	06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	11.27 (45)	10.16	
15.38	49	13.33 (40)	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	47	13.08 (40)	14.23
25	09.24	11.52 (45)	07.45	06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18	11.27 (45)	10.16	
15.42	47	13.33 (40)	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.55	45	13.07 (40)	14.24
26	09.21	11.52 (45)	07.42	06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	11.28 (45)	10.16	
15.45	47	13.33 (40)	17.26	18.51	21.25	23.02	23.56	22.47	21.01	19.10	16.26	14.53	43	13.07 (40)	14.25
27	09.18	11.53 (45)	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	11.28 (45)	10.16	
15.48	45	13.33 (40)	17.30	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	42	13.07 (40)	14.26
28	09.16	11.54 (45)	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	11.29 (45)	10.16	
15.52	44	13.33 (40)	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.03	16.19	14.48	39	13.06 (40)	14.27
29	09.13	11.55 (45)		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	11.30 (45)	10.15	
15.55	40	13.32 (40)		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46	37	13.06 (40)	14.29
30	09.10	11.56 (45)		06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	11.31 (45)	10.15	
15.58	37	13.32 (40)		20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44	35	13.06 (40)	14.30
31	09.07	11.57 (45)		06.45		03.20		04.20	05.57		07.57			10.14	
16.02	32	13.31 (40)		20.06		23.17		22.30	20.43		16.10			14.32	
Potential sun hours	170	238	363	451	570	625	609	509	393	305	198			136	
Total, worst case	999		41								920			127	
Sun reduction	0,19		0,33								0,24			0,22	
Oper. time red.	0,99		0,99								0,99			0,99	
Wind dir. red.	0,66		0,65								0,66			0,66	
Total reduction	0,12		0,22								0,16			0,14	
Total, real	121		9								144			18	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152.5_Luke forest_20201102Shadow receptor: G - Lomarakennus G (Ollilantie, Siliakuru)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.01	09.36
	14.34	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.06	14.42
2	10.12	09.01	07.28	06.38	04.53	03.15	03.00	04.27	06.03	07.29	08.04	09.39
	14.36	16.08	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.38	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	09.47
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	14.32
7	10.05	08.45	07.11	06.21	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.29
9	10.02	08.39	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.11	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33	10.01
	14.58	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.47	23.28	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.15	02.52	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.08
	15.10	16.51	18.18	20.51	22.27	23.51	23.20	21.39	19.50	18.04	15.23	14.22
16	09.47	08.16	06.39	05.49	04.06	02.49	03.33	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.53	10.10
	15.16	16.58	18.24	20.57	22.34	23.54	23.14	21.33	19.42	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.17	06.49	08.17	08.56	10.12
	15.19	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.22	17.04	18.30	21.04	22.40	23.55	23.08	21.26	19.35	17.50	15.11	14.21
20	09.38	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.21
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30	07.52	06.14	05.24	03.44	02.48	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	17.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.47	21.01	19.10	17.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.48	17.30	18.54	21.29	23.05	23.55	22.43	20.57	19.07	17.23	14.51	14.26
28	09.16	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.03	17.20	14.48	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	17.16	14.46	14.29
30	09.10		06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	10.15
	15.58		20.03	21.38	23.15	23.52	22.34	20.47	18.56	17.13	14.44	14.30
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_2020110 Shadow receptor: H - Asuinrakennus H (Pinolantie 406)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.40	20.12	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.42
	14.40	16.13	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.34	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.58	14.37
5	10.09	08.52	07.18	06.28	04.43	03.09	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.15	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.23	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.34
7	10.06	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.08	23.41	23.35	22.01	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.26	02.58	03.18	04.53	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07	04.23	02.56	03.20	04.57	06.30	07.56	08.33	10.01
	14.59	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04	04.20	02.55	03.23	05.00	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.24	14.24
16	09.48	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.03	10.14
	15.27	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.26	09.06	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.49	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.37	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.20	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.08	05.18	03.39	02.51	04.02	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.30	14.57	14.25
26	09.22	07.42	06.04	05.14	03.36	02.52	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.46	07.15	07.45	09.24	10.16
	15.49	17.30	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.33	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.01	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.55	07.24	07.55	09.33	10.15
	15.59		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_2020110 Shadow receptor: I - Asuinrakennus I (Kortenevantie 116)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December				
1	10.13	09.04	07.32	06.43	04.57	20.26 (9)	03.19	03.00	04.25	06.00	07.27	08.01	09.36			
	14.36	16.06	17.37	20.09	21.42	15	20.41 (9)	23.20	23.50	22.27	20.40	18.53	16.07	14.43		
2	10.12	09.01	07.28	06.39	04.54		20.27 (9)	03.17	03.00	04.28	06.03	07.30	08.04	09.39		
	14.38	16.09	17.40	20.12	21.45	13	20.40 (9)	23.23	23.48	22.24	20.36	18.50	16.04	14.41		
3	10.11	08.58	07.25	06.36	04.50		20.29 (9)	03.14	03.02	04.31	06.06	07.33	08.07	09.41		
	14.40	16.13	17.43	20.15	21.48	9	20.38 (9)	23.26	23.47	22.21	20.33	18.46	16.01	14.39		
4	10.10	08.55	07.22	06.32	04.47			03.12	03.04	04.35	06.09	07.36	08.11	09.44		
	14.42	16.16	17.46	20.18	21.51			23.28	23.45	22.17	20.29	18.43	15.58	14.37		
5	10.08	08.52	07.18	06.28	04.43			03.10	03.06	04.38	06.12	07.39	08.14	09.47		
	14.44	16.19	17.49	20.21	21.55			23.31	23.43	22.14	20.26	18.39	15.54	14.35		
6	10.07	08.49	07.15	06.25	04.40			03.08	03.08	04.41	06.15	07.41	08.17	09.49		
	14.47	16.23	17.52	20.24	21.58			23.33	23.41	22.11	20.22	18.36	15.51	14.34		
7	10.05	08.45	07.11	06.21	04.37			03.05	03.11	04.44	06.18	07.44	08.20	09.52		
	14.49	16.26	17.55	20.27	22.01			23.36	23.39	22.07	20.19	18.32	15.48	14.32		
8	10.04	08.42	07.08	06.18	04.33			03.03	03.13	04.47	06.21	07.47	08.24	09.54		
	14.52	16.29	17.58	20.30	22.04			23.38	23.37	22.04	20.15	18.29	15.45	14.31		
9	10.02	08.39	07.04	06.14	04.30			03.01	03.15	04.50	06.24	07.50	08.27	09.56		
	14.54	16.33	18.01	20.33	22.08			23.40	23.35	22.00	5	20.45 (9)	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.26			03.00	03.18	04.54	6	20.37 (9)	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11			23.43	23.32	21.57	11	20.48 (9)	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07	04.23			02.56	03.21	04.57	12	20.36 (9)	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14			23.44	23.30	21.54	13	20.49 (9)	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04	04.20			02.55	03.23	05.00	14	20.34 (9)	06.32	07.59	08.37	10.02
	15.02	16.43	18.10	20.43	22.17			23.46	23.27	21.50	16	20.50 (9)	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17			02.54	03.26	05.03	17	20.33 (9)	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.46	22.21			23.48	23.25	21.47	18	20.51 (9)	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13			02.53	03.29	05.06	19	20.33 (9)	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24			23.50	23.22	21.43	18	20.51 (9)	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10			02.52	03.32	05.09	20	20.31 (9)	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27			23.51	23.19	21.40	20	20.51 (9)	19.50	18.05	15.24	14.24
16	09.48	08.16	06.39	05.49	04.07			02.51	03.35	05.12	21	20.31 (9)	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.30			23.52	23.17	21.36	20	20.51 (9)	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04			02.50	03.38	05.15	22	20.31 (9)	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34			23.53	23.14	21.33	20	20.51 (9)	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00			02.50	03.41	05.18	23	20.31 (9)	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37			23.54	23.11	21.29	17	20.48 (9)	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57			02.49	03.44	05.21	24	20.31 (9)	06.52	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40			23.55	23.08	21.26	13	20.44 (9)	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35	03.54			02.49	03.47	05.25	25	20.31 (9)	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43			23.56	23.05	21.22	10	20.41 (9)	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	3	20.28 (9)	03.51	02.49	03.50	05.28	26	20.32 (9)	06.58	08.26	09.06	10.14
	15.30	17.12	18.37	21.10	22.47			23.56	23.02	21.19	6	20.38 (9)	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	20.26 (9)	03.48		02.50	03.53	05.31	27	20.33 (9)	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	7	20.33 (9)	22.50	23.56	22.59	21.15	2	20.35 (9)	19.25	17.41	15.04	14.23
23	09.30	07.53	06.15	05.25	20.26 (9)	03.45		02.50	03.56	05.34	28	20.31 (9)	07.04	08.33	09.12	10.15
	15.36	17.18	18.43	21.16	10	20.36 (9)	22.53	23.56	22.56	21.12	29	20.31 (9)	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	20.25 (9)	03.42		02.51	03.59	05.37	30	20.31 (9)	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	14	20.39 (9)	22.56	23.56	22.53	21.08	31	20.31 (9)	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	20.25 (9)	03.39		02.52	04.03	05.40	32	20.31 (9)	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	17	20.42 (9)	22.59	23.56	22.50	21.05	33	20.31 (9)	19.15	16.30	14.57	14.26
26	09.22	07.42	06.04	05.14	20.25 (9)	03.36		02.53	04.06	05.43	34	20.31 (9)	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	20	20.45 (9)	23.02	23.55	22.47	21.01	35	20.31 (9)	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	20.24 (9)	03.33		02.54	04.09	05.46	36	20.31 (9)	07.15	07.45	09.24	10.16
	15.49	17.30	18.55	21.29	20	20.44 (9)	23.05	23.54	22.44	20.58	37	20.31 (9)	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	20.24 (9)	03.30		02.55	04.12	05.49	38	20.31 (9)	07.18	07.48	09.27	10.16
	15.53	17.33	18.58	21.32	19	20.43 (9)	23.08	23.53	22.40	20.54	39	20.31 (9)	19.04	16.20	14.50	14.29
29	09.13	06.53	05.04	03.27	20.24 (9)	03.27		02.57	04.15	05.52	40	20.31 (9)	07.21	07.51	09.30	10.15
	15.56	06.01	21.35	19	20.43 (9)	23.11		23.52	22.37	20.51	41	20.31 (9)	19.01	16.17	14.47	14.30
30	09.10	06.50	05.00	03.25	20.25 (9)	03.25		02.58	04.19	05.55	42	20.31 (9)	07.24	07.55	09.33	10.15
	15.59	06.04	21.39	17	20.42 (9)	23.14		23.51	22.34	20.47	43	20.31 (9)	18.57	16.14	14.45	14.32
31	09.07	06.46		03.22		03.22			04.22	05.58	44	20.31 (9)		07.58		10.14
	16.03	06.07		23.17		23.17			22.31	20.44	45	20.31 (9)		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137				
Total, worst case				146	37			189								
Sun reduction				0,41	0,47			0,31								
Oper. time red.				0,99	0,99			0,99								
Wind dir. red.				0,64	0,64			0,64								
Total reduction				0,26	0,30			0,20								
Total, real				37	11			37								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_2020110 Shadow receptor: J - Asuinrakennus J (Haapavesitie 1406)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.25	23.46	22.21	20.33	18.46	16.01	14.39
4	10.09	08.55	07.21	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.14	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.36
6	10.07	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.06	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.47	08.23	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.07	23.40	23.34	22.00	20.12	18.25	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.04	04.20	02.55	03.24	05.00	06.32	07.59	08.36	10.02
	15.03	16.43	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.46	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.16	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.11
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.52	08.20	08.59	10.12
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.25	05.35	03.54	02.50	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.26	09.05	10.14
	15.30	17.12	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.24
23	09.30	07.52	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.15
	15.40	17.21	18.46	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.55	22.50	21.05	19.15	17.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.50	17.30	18.55	21.29	23.05	23.54	22.43	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.15
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.28	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.51	19.00	16.17	14.47	14.31
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.11		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_202110 Shadow receptor: K - Lomarakennus K (Kurunoja)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.11	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.13	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.47	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.53
	14.52	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.15	04.50	06.24	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	03.00	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.21	04.57	06.29	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.46	18.13	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.30	14.25
14	09.52	08.22	06.46	05.56	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.27	14.24
15	09.49	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.08
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.59	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.26	19.36	17.51	15.12	14.23
20	09.37	08.02	06.25	05.35	03.54	02.50	03.47	05.24	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.21	05.32	03.51	02.50	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.40	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.43	21.16	22.52	23.55	22.56	21.11	19.21	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.45	06.07	05.18	03.39	02.52	04.03	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	17.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.42	07.12	07.42	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.27
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.24	14.52	14.28
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.12		06.53	05.04	03.27	02.57	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.57		10.13
	16.03		20.06		23.17		22.30	20.43		16.10		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152_5_Luke forest_2020110 Shadow receptor: L - Laskentapiste L (Perkkiontie, Ilmola)
Assumptions for shadow calculations

Shine probability S (Average daily sunshine hours) [UMEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December				
1	10.12	09.03	07.31	06.42	04.56	03.19	05.13 (50)	02.59	05.18 (50)	04.24	05.33 (50)	06.00	07.26	08.00	09.35	
2	14.35	16.06	17.36	20.09	21.41	23.19	21.39 (36)	23.49	21.43 (36)	22.27	26	21.37 (32)	20.39	18.53	16.07	14.43
3	10.11	09.00	07.28	06.38	04.53	03.16	05.13 (50)	03.01	05.18 (50)	04.28	18	05.35 (50)	06.03	07.29	08.03	09.38
4	14.37	16.09	17.39	20.12	21.44	23.22	21.39 (36)	23.47	21.43 (36)	22.23	12	05.53 (50)	20.36	18.49	16.03	14.41
5	10.10	08.57	07.24	06.35	04.50	03.14	05.12 (50)	03.01	05.18 (50)	04.31	12	05.38 (50)	06.06	07.32	08.07	09.41
6	14.39	16.12	17.42	20.15	21.47	23.25	21.38 (36)	23.46	21.43 (36)	22.20	12	05.50 (50)	20.32	18.46	16.00	14.39
7	10.09	08.54	07.21	06.31	04.46	03.12	05.13 (50)	03.03	05.19 (50)	04.34	12	05.38 (50)	06.09	07.35	08.10	09.43
8	14.42	16.15	17.45	20.18	21.51	23.28	21.39 (36)	23.44	21.44 (36)	22.17	12	05.50 (50)	20.29	18.42	15.57	14.37
9	10.08	08.51	07.17	06.28	04.43	03.09	05.13 (50)	03.05	05.19 (50)	04.37	12	05.38 (50)	06.12	07.38	08.13	09.46
10	14.44	16.19	17.48	20.21	21.54	23.30	21.39 (36)	23.42	21.44 (36)	22.13	12	05.50 (50)	20.25	18.39	15.54	14.35
11	10.06	08.48	07.14	06.24	04.39	03.07	05.13 (50)	03.08	05.19 (50)	04.40	12	05.38 (50)	06.14	07.41	08.16	09.48
12	14.46	16.22	17.51	20.24	21.57	23.33	21.38 (36)	23.40	21.45 (36)	22.10	12	05.50 (50)	20.22	18.35	15.51	14.33
13	10.05	08.45	07.10	06.21	04.36	03.05	05.13 (50)	03.10	05.19 (50)	04.43	12	05.38 (50)	06.17	07.44	08.20	09.51
14	14.49	16.25	17.54	20.27	22.00	23.35	21.39 (36)	23.38	21.45 (36)	22.07	12	05.50 (50)	20.18	18.32	15.48	14.32
15	10.03	08.41	07.07	06.17	04.33	03.03	05.14 (50)	03.12	05.20 (50)	04.47	12	05.38 (50)	06.20	07.47	08.23	09.53
16	14.51	16.29	17.57	20.30	22.04	23.37	21.39 (36)	23.36	21.45 (36)	22.03	12	05.50 (50)	20.14	18.28	15.44	14.30
17	10.01	08.38	07.03	06.14	04.29	03.01	05.14 (50)	03.15	05.20 (50)	04.50	12	05.38 (50)	06.23	07.50	08.26	09.55
18	14.54	16.32	18.00	20.33	22.07	23.40	21.39 (36)	23.40	21.46 (36)	22.00	12	05.50 (50)	20.11	18.25	15.41	14.29
19	10.09	08.35	07.00	06.10	04.26	03.05	05.26 (50)	02.58	05.14 (50)	03.18	12	05.38 (50)	06.26	07.53	08.29	09.58
20	14.56	16.35	18.03	20.36	22.10	23.42	21.39 (36)	23.42	21.46 (36)	21.56	12	05.50 (50)	20.07	18.21	15.38	14.28
21	10.08	08.32	06.56	06.07	04.23	03.04	05.24 (50)	02.56	05.14 (50)	03.20	12	05.38 (50)	06.29	07.55	08.33	10.00
22	14.59	16.39	18.06	20.39	22.13	23.44	21.39 (36)	23.42	21.47 (36)	21.53	12	05.50 (50)	20.04	18.18	15.35	14.27
23	10.06	08.29	06.53	06.03	04.19	03.02	05.22 (50)	02.55	05.14 (50)	03.23	12	05.38 (50)	06.32	07.58	08.36	10.02
24	15.02	16.42	18.09	20.42	22.17	23.45	21.28 (32)	23.45	21.47 (36)	21.49	12	05.50 (50)	20.00	18.14	15.32	14.26
25	10.03	08.25	06.49	05.59	04.16	03.01	05.20 (50)	02.53	05.15 (50)	03.26	12	05.38 (50)	06.35	08.01	08.39	10.03
26	15.05	16.45	18.12	20.45	22.20	23.47	21.31 (32)	23.47	21.46 (32)	21.46	12	05.50 (50)	19.57	18.11	15.29	14.25
27	10.01	08.22	06.46	05.56	04.13	03.00	05.19 (50)	02.52	05.15 (50)	03.29	12	05.38 (50)	06.38	08.04	08.42	10.05
28	15.08	16.48	18.15	20.48	22.23	23.49	21.33 (32)	23.49	21.48 (32)	21.43	12	05.50 (50)	19.53	18.07	15.26	14.24
29	10.09	08.19	06.42	05.52	04.09	03.01	05.18 (50)	02.51	05.15 (50)	03.31	12	05.38 (50)	06.40	08.07	08.46	10.07
30	15.11	16.52	18.18	20.51	22.26	23.50	21.36 (32)	23.50	21.48 (32)	21.39	12	05.50 (50)	19.50	18.04	15.23	14.23
31	10.07	08.15	06.39	05.49	04.06	03.00	05.17 (50)	02.50	05.15 (50)	03.34	12	05.38 (50)	06.43	08.10	08.49	10.08
32	15.14	16.55	18.21	20.54	22.30	23.51	21.38 (32)	23.51	21.49 (32)	21.36	12	05.50 (50)	19.46	18.00	15.20	14.28
33	10.04	08.12	06.35	05.45	04.03	03.00	05.15 (50)	02.50	05.16 (50)	03.37	12	05.38 (50)	06.46	08.13	08.52	10.09
34	15.17	16.58	18.24	20.57	22.33	23.52	21.40 (32)	23.52	21.49 (32)	21.32	12	05.50 (50)	19.42	17.57	15.18	14.22
35	10.02	08.09	06.32	05.42	04.00	03.00	05.15 (50)	02.49	05.16 (50)	03.40	12	05.38 (50)	06.49	08.16	08.55	10.11
36	15.20	17.01	18.27	21.00	22.36	23.53	21.40 (32)	23.53	21.49 (32)	21.29	12	05.50 (50)	19.39	17.54	15.15	14.22
37	10.09	08.05	06.28	05.38	03.57	02.49	05.14 (50)	02.49	05.16 (50)	03.43	12	05.38 (50)	06.52	08.20	08.58	10.12
38	15.23	17.05	18.30	21.03	22.39	23.54	21.40 (32)	23.54	21.50 (32)	21.25	12	05.50 (50)	19.35	17.50	15.12	14.22
39	10.07	08.02	06.25	05.35	03.54	02.49	05.14 (50)	02.49	05.16 (50)	03.46	12	05.38 (50)	06.55	08.23	09.02	10.13
40	15.26	17.08	18.33	21.06	22.43	23.55	21.40 (32)	23.55	21.40 (36)	23.04	12	05.50 (50)	19.32	17.47	15.09	14.22
41	10.04	07.59	06.21	05.31	03.50	02.49	05.14 (50)	02.49	05.16 (50)	03.50	12	05.38 (50)	06.58	08.26	09.05	10.13
42	15.29	17.11	18.36	21.09	22.46	23.55	21.41 (32)	23.55	21.40 (36)	23.01	12	05.50 (50)	19.28	17.43	15.06	14.23
43	10.02	07.55	06.18	05.28	03.47	02.49	05.13 (50)	02.49	05.16 (50)	03.53	12	05.38 (50)	07.00	08.29	09.08	10.14
44	15.33	17.14	18.39	21.13	22.49	23.55	21.40 (32)	23.55	21.40 (36)	22.58	12	05.50 (50)	19.25	17.40	15.04	14.23
45	10.09	07.52	06.14	05.24	03.44	02.50	05.13 (50)	02.50	05.17 (50)	03.56	12	05.38 (50)	07.03	08.32	09.11	10.15
46	15.36	17.17	18.42	21.16	22.52	23.55	21.40 (32)	23.55	21.41 (36)	22.55	12	05.50 (50)	19.21	17.37	15.01	14.24
47	10.06	07.48	06.10	05.21	03.41	02.50	05.13 (50)	02.50	05.17 (50)	03.59	12	05.38 (50)	07.06	08.35	09.14	10.15
48	15.39	17.20	18.45	21.19	22.55	23.55	21.40 (32)	23.55	21.40 (36)	22.52	12	05.50 (50)	19.18	17.33	14.59	14.24
49	10.04	07.45	06.07	05.17	03.38	02.51	05.13 (50)	02.51	05.18 (50)	04.02	12	05.38 (50)	07.09	08.38	09.17	10.15
50	15.42	17.24	18.48	21.22	22.58	23.55	21.40 (32)	23.55	21.41 (36)	22.49	12	05.50 (50)	19.14	16.30	14.56	14.25
51	10.01	07.42	06.03	05.14	03.35	02.52	05.13 (50)	02.52	05.17 (50)	04.05	12	05.38 (50)	07.12	08.41	09.20	10.15
52	15.45	17.27	18.51	21.25	23.02	23.54	21.40 (32)	23.54	21.41 (36)	22.46	12	05.50 (50)	19.10	16.26	14.54	14.26
53	10.08	07.38	06.00	05.10	03.33	02.53	05.13 (50)	02.53	05.18 (50)	04.08	12	05.38 (50)	07.15	08.44	09.23	10.15
54	15.49	17.30	18.54	21.28	23.05	23.53	21.40 (32)	23.53	21.41 (36)	22.43	12	05.50 (50)	19.07	16.23	14.51	14.27
55	10.05	07.35	05.56	05.07	03.30	02.55	05.13 (50)	02.55	05.18 (50)	04.12	12	05.38 (50)	07.18	08.47	09.26	10.15
56	15.52	17.33	18.57	21.31	23.08	23.52	21.39 (32)	23.52	21.42 (36)	22.40	12	05.50 (50)	19.03	16.20	14.49	14.28
57	10.02	06.53	05.03	03.27	02.56	02.56	05.12 (50)	02.56	05.18 (50)	04.15	12	05.38 (50)	07.20	08.49	09.29	10.14
58	15.56	17.35	18.99	21.35	23.11	23.51	21.39 (32)	23.51	21.42 (36)	22.36	12	05.50 (50)	19.00	16.17	14.47	14.30
59	10.09	06.49	05.00	03.24	02.58	02.58	05.12 (50)	02.58	05.18 (50)	04.18	12	05.38 (50)	07.23	08.52	09.32	10.14
60	15.59	17.38	19.02	21.38	23.14	23.50	21.39 (36)	23.50	21.43 (36)	22.33	12	05.50 (50)	18.56	16.13	14.45	14.31
61	10.06	06.46	05.00	03.22	02.56	02.56	05.12 (50)	02.56	05.18 (50)	04.18	12	05.38 (50)	07.23	08.52	09.32	10.14
62	15.02	16.42	18.09	20.42	22.17	23.45	21.28 (32)	23.45	21.47 (36)	21.49	12	05.50 (50)	20.00	18.14	15.32	14.26
63	10.03	08.25	06.49	05.59	04.16	03.01	05.20 (50)	02.53	05.15 (50)	03.26	12	05.38 (50)	06.35	08.01	08.39	10.03
64	15.05	16.45	18.12	20.45	22.20	23.47	21.31 (32)	23.47	21.46 (32)	21.46	12	05.50 (50)	19.57	18.11	15.29	14.25
65	10.01	08.22	06.46	05.56	04.13	03.00	05.19 (50)	02.52	05.15 (50)	03.29	12	05.38 (50)	06.38</			

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_2020110 Shadow receptor: M - Lomarakenus M (Riskalan metsätie)
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

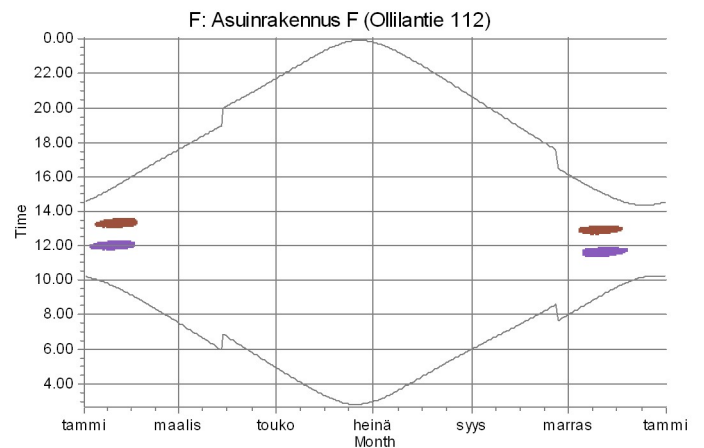
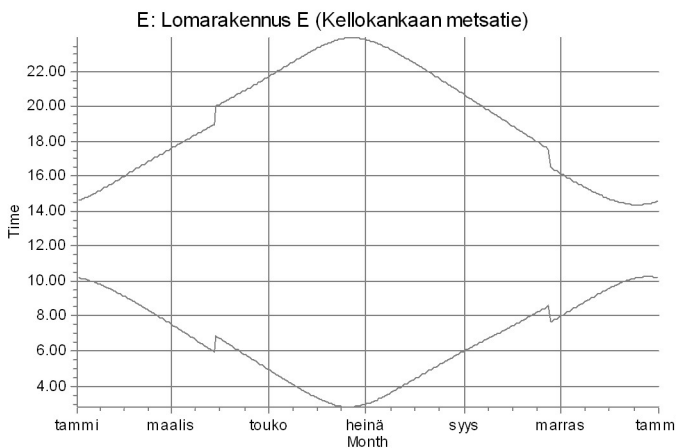
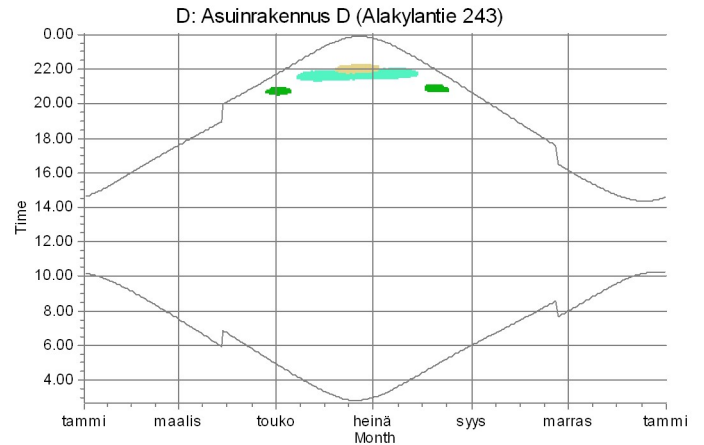
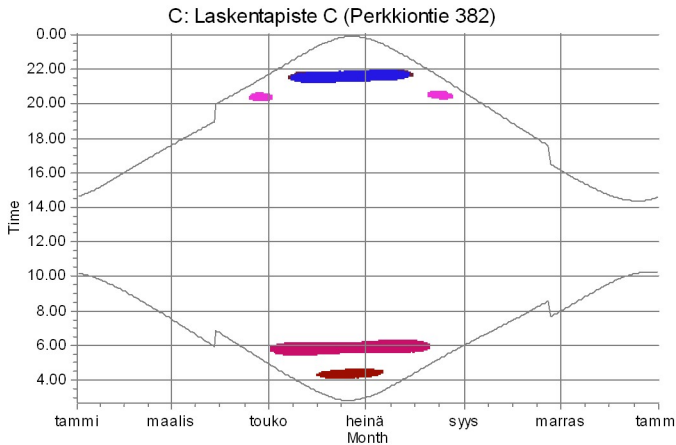
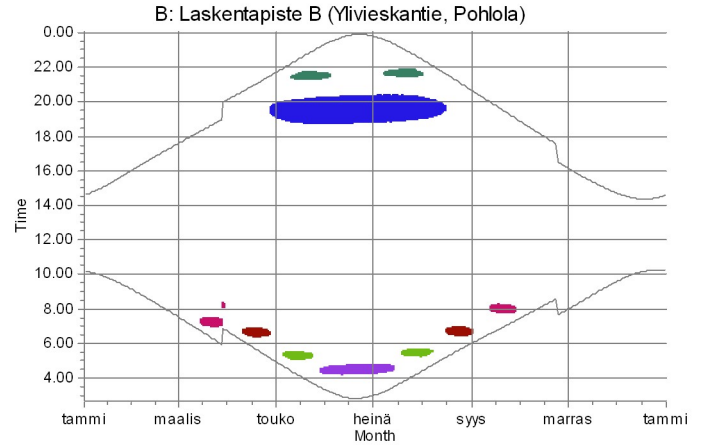
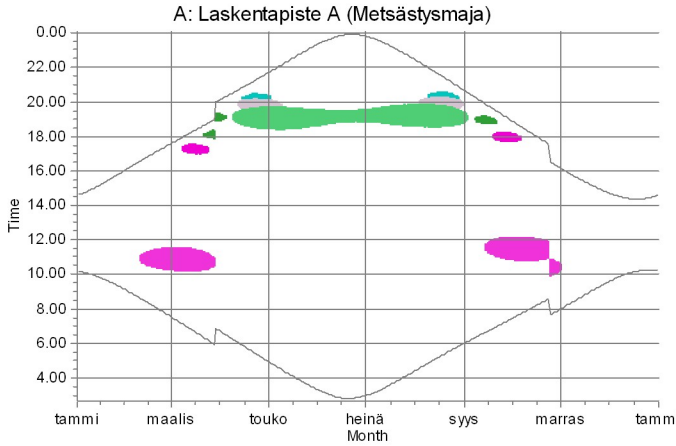
	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36
	14.34	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.01	07.28	06.38	04.52	03.15	03.00	04.27	06.02	07.29	08.04	09.39
	14.36	16.08	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	09.41
	14.38	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10	09.44
	14.40	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.36	06.11	07.38	08.13	09.47
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	14.32
7	10.05	08.45	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.31	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.29
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	09.58
	14.55	16.35	18.03	20.36	22.11	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.54	03.19	04.56	06.29	07.56	08.33	10.00
	14.58	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.17	15.35	14.25
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.41	18.09	20.42	22.17	23.47	23.27	21.50	20.00	18.14	15.32	14.24
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.07	08.46	10.08
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.22
16	09.47	08.16	06.39	05.48	04.05	02.49	03.33	05.11	06.43	08.11	08.49	10.09
	15.13	16.54	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.54	23.14	21.32	19.42	17.57	15.17	14.21
18	09.43	08.09	06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	10.12
	15.19	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	10.13
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.38	08.02	06.25	05.34	03.53	02.47	03.45	05.23	06.55	08.23	09.02	10.14
	15.25	17.07	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.08	14.21
21	09.35	07.59	06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.21
22	09.32	07.55	06.17	05.27	03.46	02.48	03.52	05.30	07.00	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30	07.52	06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.00	14.22
24	09.27	07.48	06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.38	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	17.29	14.55	14.24
26	09.21	07.42	06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.47	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.48	17.29	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.03	16.19	14.48	14.27
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.53	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	10.15
	15.58		20.03	21.38	23.14	23.52	22.34	20.47	18.56	16.13	14.44	14.30
31	09.07		06.45		03.20		04.20	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	170	238	363	451	570	625	609	509	393	305	198	136
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

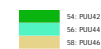
Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

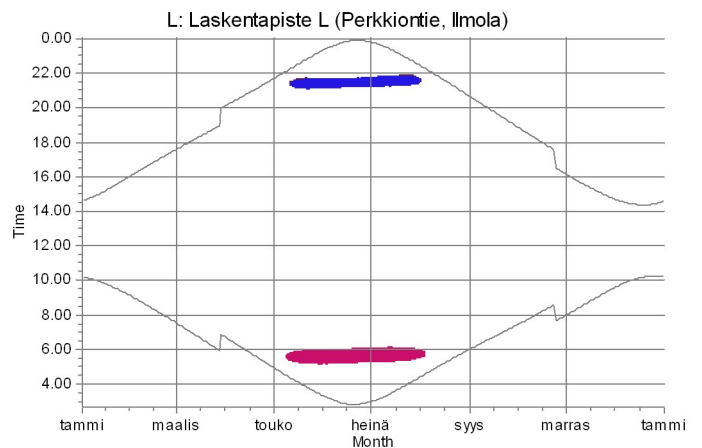
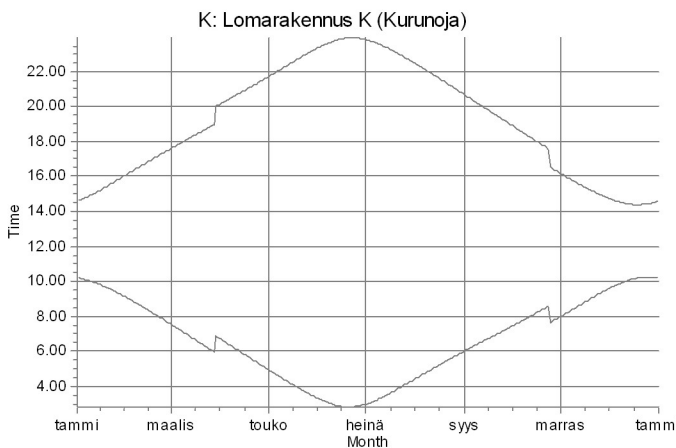
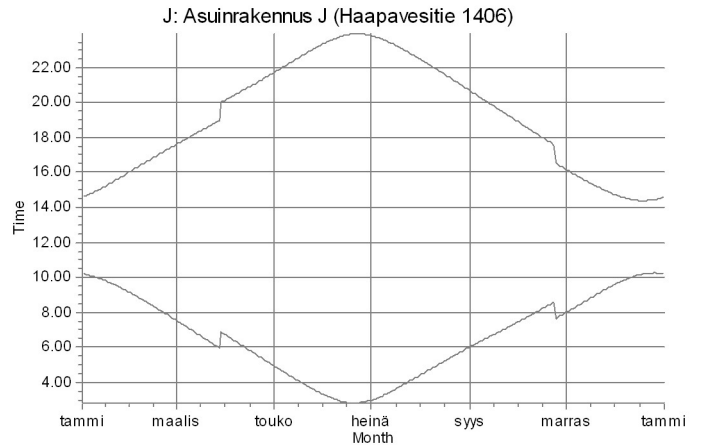
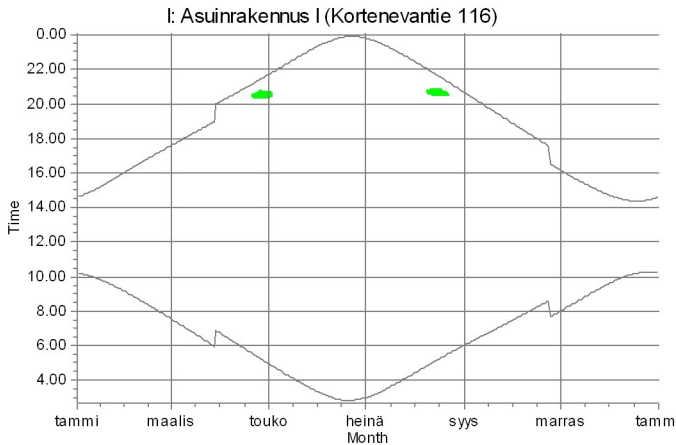
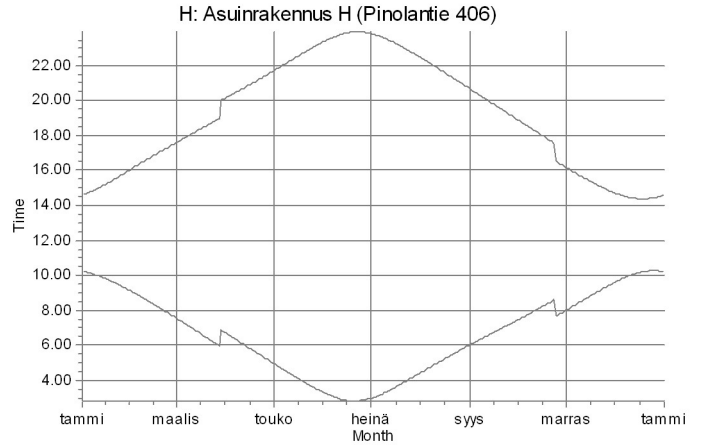
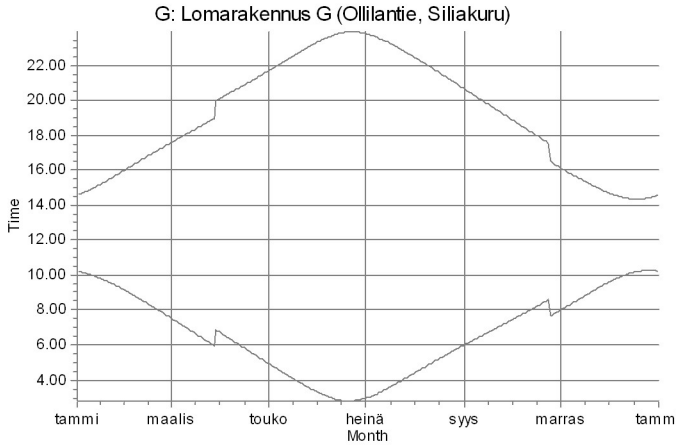


WTGS



SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



WTGS
9: GE WIND ENERGY 5.3-158 RD175 5300 175.0 101 hub: 152.5 m (TOT: 240.0 m) (243) 32: PUJ00

36: PUJ24

50: PUJ38

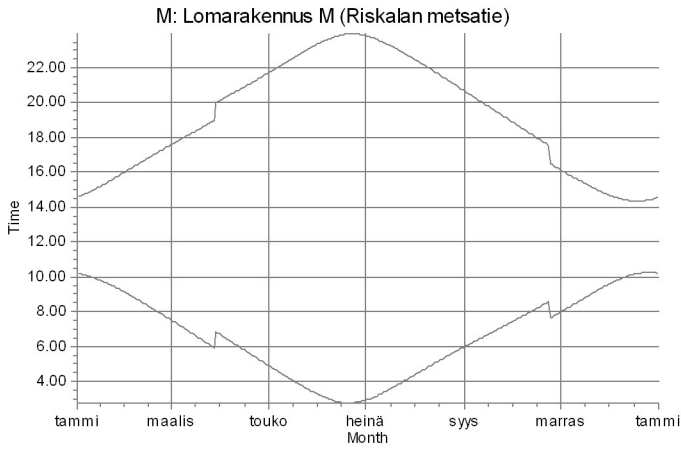
Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



WTGS

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 WTG: 1 - VESTAS V150-4.2 HH155 4200 150.0 IOI hub: 155.0 m (TOT: 230.0 m) (235)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.21	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.42
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.46	22.17	20.29	18.42	15.57	14.36
5	10.09	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.55	23.31	23.44	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.35	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.18	07.44	08.20	09.52
	14.48	16.25	17.55	20.27	22.01	23.36	23.40	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.57
	14.53	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.35	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.05
	15.04	16.45	18.13	20.45	22.21	23.49	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.09	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.52	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.50	10.09
	15.13	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.13	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.11
	15.16	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.56	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.57	23.02	21.19	19.29	17.43	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.04	08.32	09.12	10.16
	15.36	17.17	18.42	21.16	22.53	23.57	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.57	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.03	23.56	22.47	21.01	19.11	16.27	14.53	14.26
27	09.19	07.39	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 WTG: 2 - VESTAS V150-4.2 HH155 4200 150.0 IOI hub: 155.0 m (TOT: 230.0 m) (236)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.58	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.21	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.42
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.02	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.46	22.17	20.29	18.42	15.57	14.36
5	10.09	08.52	07.18	06.28	04.43	03.08	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.55	23.31	23.44	22.14	20.26	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.42	22.11	20.22	18.35	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.40	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.57
	14.53	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.35	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.21	15.38	14.27
11	09.59	08.32	06.57	06.07	04.22	02.55	03.19	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.03
	15.01	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.05
	15.04	16.45	18.13	20.45	22.21	23.49	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.23	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.08	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.52	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.49	03.34	05.12	06.43	08.11	08.50	10.09
	15.13	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.13	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.11
	15.16	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.56	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.36	21.10	22.47	23.57	23.02	21.19	19.29	17.43	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.04	08.32	09.12	10.16
	15.36	17.17	18.42	21.16	22.53	23.57	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.57	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.24
26	09.22	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.03	23.56	22.47	21.01	19.11	16.26	14.53	14.25
27	09.19	07.39	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		05.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 WTG: 3 - VESTAS V150-4.2 HH155 4200 150.0 IOI hub: 155.0 m (TOT: 230.0 m) (237)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.56
	14.53	16.32	18.01	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.09	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.22	20.54	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.57	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.21
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.55	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 WTG: 4 - VESTAS V150-4.2 HH155 4200 150.0 IOI hub: 155.0 m (TOT: 230.0 m) (238)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.56
	14.53	16.32	18.01	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.04
	15.04	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.08	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.22	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.16	16.58	18.25	20.57	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.26	14.53	14.26
27	09.19	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201101\WTG: 5 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (239)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.08	14.43
2	10.13	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.05	09.39
	14.38	16.10	17.40	20.13	21.45	23.24	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.49	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.45
	14.42	16.16	17.46	20.19	21.52	23.29	23.46	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.32	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.02	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.43	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.55
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.16	18.29	15.45	14.31
9	10.03	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.54	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.57	08.34	10.01
	15.00	16.39	18.07	20.40	22.15	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	08.00	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.49	23.25	21.47	19.58	18.12	15.30	14.25
14	09.53	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.28	23.52	23.20	21.40	19.51	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.12	08.50	10.10
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.15	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.18	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.12	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.56	23.09	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.59	08.27	09.06	10.15
	15.30	17.12	18.37	21.11	22.47	23.57	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.19	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.57	21.12	19.22	17.37	15.02	14.24
24	09.28	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.16	10.16
	15.40	17.21	18.46	21.20	22.57	23.57	22.53	21.09	19.19	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.19	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.28	18.52	21.26	23.03	23.56	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.49	09.28	10.16
	15.53	17.34	18.58	21.33	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.38	20.51	19.01	16.17	14.48	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.34	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.48	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201101\WTG: 6 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (240) Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.52	18.19	20.52	22.28	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.00	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.15	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201101\WTG: 7 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (241)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.24
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.00	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.49	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.36	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.42	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.18	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.15	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201101\WTG: 8 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (242)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.49	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.45
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.43	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.54	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.57	08.34	10.01
	15.00	16.40	18.07	20.40	22.15	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.06	16.46	18.13	20.46	22.21	23.49	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.28	23.51	23.20	21.40	19.51	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.24
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.18	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.55	23.09	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.19	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.57	21.12	19.22	17.37	15.02	14.24
24	09.28	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.57	23.56	22.53	21.09	19.19	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.19	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.49	09.28	10.16
	15.53	17.34	18.58	21.33	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.38	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201103WTG: 9 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (243)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.13 14.36	09.04 16.06	07.32 17.37	06.43 20.10	04.57 21.42	20.26-20.41/15	03.19 23.20	03.00 23.50	04.25 22.28	06.01 20.40	07.27 18.54	08.01 16.07	09.36 14.43
2	10.12 14.38	09.01 16.10	07.29 17.40	06.39 20.13	04.54 21.45	20.27-20.40/13	03.17 23.23	03.00 23.49	04.28 22.24	06.04 20.37	07.30 18.50	08.04 16.04	09.39 14.41
3	10.11 14.40	08.58 16.13	07.25 17.43	06.36 20.16	04.50 21.48	20.29-20.38/9	03.14 23.26	03.02 23.47	04.31 22.21	06.06 20.33	07.33 18.47	08.08 16.01	09.42 14.39
4	10.10 14.42	08.55 16.16	07.22 17.46	06.32 20.19	04.47 21.52		03.12 23.29	03.04 23.45	04.35 22.18	06.09 20.30	07.36 18.43	08.11 15.58	09.44 14.37
5	10.09 14.44	08.52 16.20	07.18 17.49	06.29 20.22	04.43 21.55		03.10 23.31	03.06 23.43	04.38 22.14	06.12 20.26	07.39 18.40	08.14 15.55	09.47 14.36
6	10.07 14.47	08.49 16.23	07.15 17.52	06.25 20.25	04.40 21.58		03.08 23.34	03.08 23.41	04.41 22.11	06.15 20.22	07.42 18.36	08.17 15.51	09.49 14.34
7	10.06 14.49	08.46 16.26	07.11 17.55	06.21 20.28	04.37 22.01		03.05 23.36	03.11 23.39	04.44 22.08	06.18 20.19	07.45 18.32	08.20 15.48	09.52 14.32
8	10.04 14.52	08.42 16.29	07.08 17.58	06.18 20.31	04.33 22.05		03.03 23.39	03.13 23.37	04.47 22.04	06.21 20.15	07.48 18.29	08.24 15.45	09.54 14.31
9	10.02 14.54	08.39 16.33	07.04 18.01	06.14 20.34	04.30 22.08		03.01 23.41	03.15 23.35	04.50 22.01	06.24 20.12	07.50 18.25	08.27 15.42	09.57 14.29
10	10.00 14.57	08.36 16.36	07.01 18.04	06.11 20.37	04.27 22.11		03.00 23.43	03.18 23.33	04.54 21.57	06.27 20.08	07.53 18.22	08.30 15.39	09.59 14.28
11	09.59 15.00	08.33 16.39	06.57 18.07	06.07 20.40	04.23 22.14		02.56 23.45	03.21 23.30	04.57 21.54	06.30 20.05	07.56 18.19	08.33 15.36	10.01 14.27
12	09.57 15.02	08.29 16.43	06.54 18.10	06.04 20.43	04.20 22.18		02.55 23.47	03.23 23.28	05.00 21.50	06.33 20.01	07.59 18.15	08.37 15.33	10.03 14.26
13	09.54 15.05	08.26 16.46	06.50 18.13	06.00 20.46	04.17 22.21		02.54 23.48	03.26 23.25	05.03 21.47	06.35 20.01	08.02 18.12	08.40 15.30	10.05 14.25
14	09.52 15.08	08.23 16.49	06.47 18.16	05.57 20.49	04.13 22.24		02.53 23.50	03.29 23.22	05.06 21.44	06.38 20.01	08.05 18.08	08.43 15.27	10.06 14.24
15	09.50 15.11	08.20 16.52	06.43 18.19	05.53 20.52	04.10 22.27		02.52 23.51	03.32 23.20	05.09 21.40	06.41 20.00	08.08 18.05	08.47 15.24	10.08 14.24
16	09.48 15.14	08.16 16.56	06.40 18.22	05.50 20.55	04.07 22.31		02.51 23.53	03.35 23.17	05.12 21.37	06.44 20.00	08.11 18.01	08.50 15.21	10.09 14.23
17	09.45 15.17	08.13 16.59	06.36 18.25	05.46 20.58	04.04 22.34		02.50 23.54	03.38 23.14	05.15 21.33	06.47 20.00	08.14 17.58	08.53 15.18	10.11 14.23
18	09.43 15.20	08.10 17.02	06.33 18.28	05.43 21.01	04.00 22.37		02.50 23.55	03.41 23.11	05.19 21.30	06.50 20.00	08.17 17.54	08.56 15.15	10.12 14.23
19	09.41 15.24	08.06 17.05	06.29 18.31	05.39 21.04	03.57 22.40		02.49 23.55	03.44 23.08	05.22 21.26	06.53 20.00	08.20 17.51	08.59 15.13	10.13 14.23
20	09.38 15.27	08.03 17.08	06.25 18.34	05.35 21.07	03.54 22.44		02.49 23.56	03.47 23.05	05.25 21.23	06.55 20.00	08.23 17.47	09.03 15.10	10.14 14.23
21	09.35 15.30	07.59 17.12	06.22 18.37	05.32 21.10	03.51 22.47	20.28-20.31/3	02.49 23.56	03.50 23.02	05.28 21.19	06.58 20.00	08.27 17.44	09.06 15.07	10.15 14.23
22	09.33 15.33	07.56 17.15	06.18 18.40	05.28 21.13	03.48 22.50	20.26-20.33/7	02.50 23.56	03.53 22.59	05.31 21.16	07.01 20.00	08.30 17.41	09.09 15.04	10.15 14.24
23	09.30 15.36	07.53 17.18	06.15 18.43	05.25 21.17	03.45 22.53	20.26-20.36/10	02.50 23.56	03.56 22.56	05.34 21.12	07.04 20.00	08.33 17.37	09.12 15.02	10.16 14.24
24	09.27 15.40	07.49 17.21	06.11 18.46	05.21 21.20	03.42 22.56	20.25-20.39/14	02.51 23.56	04.00 22.53	05.37 21.09	07.07 20.00	08.36 17.34	09.15 14.59	10.16 14.25
25	09.25 15.43	07.46 17.24	06.08 18.49	05.18 21.23	03.39 23.00	20.25-20.42/17	02.52 23.56	04.03 22.50	05.40 21.05	07.10 20.00	07.39 16.31	09.18 14.57	10.16 14.26
26	09.22 15.46	07.42 17.27	06.04 18.52	05.14 21.26	03.36 23.03	20.25-20.45/20	02.53 23.55	04.06 22.47	05.43 21.01	07.13 20.00	07.42 16.27	09.21 14.54	10.16 14.27
27	09.19 15.50	07.39 17.31	06.01 18.55	05.11 21.29	03.33 23.06	20.24-20.44/20	02.54 23.55	04.09 22.44	05.46 20.58	07.16 20.00	07.45 16.24	09.24 14.52	10.16 14.28
28	09.16 15.53	07.36 17.34	05.57 18.58	05.07 21.32	03.30 23.09	20.24-20.43/19	02.55 23.54	04.12 22.41	05.49 20.54	07.18 20.00	07.48 16.21	09.27 14.50	10.16 14.29
29	09.13 15.56	07.33 17.37	05.54 18.58	05.04 21.36	03.27 23.12	20.24-20.43/19	02.57 23.53	04.15 22.37	05.52 20.51	07.21 20.00	07.52 16.17	09.30 14.47	10.15 14.30
30	09.10 16.00	07.30 17.40	05.50 18.58	05.01 21.39	03.25 23.15	20.25-20.42/17	02.58 23.52	04.19 22.34	05.55 20.47	07.24 20.00	07.55 16.14	09.33 14.45	10.15 14.32
31	09.07 16.03	07.27 17.40	05.46 18.58	05.00 21.40	03.22 23.18		02.57 23.52	04.22 22.31	05.58 20.44	07.24 20.00	07.58 16.11	09.33 14.45	10.14 14.34
Potential sun hours	171	238	363	451	570		624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	146	37		0	0	189	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201101\WTG: 10 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (244)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201101\WTG: 11 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (245)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.49
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.20	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.07	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.51	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.29	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.04
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.52	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.23	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.42	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.24	10.16
	15.50	17.31	18.55	21.29	23.06	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201101\WTG: 12 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 IOI hub: 152.5 m (TOT: 240.0 m) (246)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.38
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.45	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.09	04.41	06.15	07.42	08.17	09.49
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.20	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.33
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.48	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.56
	14.55	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.29
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.01
	15.00	16.40	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.29	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.46	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.27	05.03	06.36	08.02	08.40	10.04
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.26
14	09.52	08.23	06.47	05.57	04.14	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.09	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.12	16.53	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.15	16.56	18.22	20.55	22.31	23.52	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.51	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.30	19.40	17.54	15.16	14.23
19	09.41	08.06	06.29	05.39	03.58	02.50	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.54	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.51	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	15.00	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.24	10.16
	15.50	17.31	18.55	21.29	23.06	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.31	02.55	04.12	05.49	07.19	07.48	09.27	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.59	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.46	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 13 - PUU01
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.42
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.11	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.09	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.14	06.25	04.40	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.36	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.01	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.47	08.14	08.53	10.11
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.57	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 14 - PUU02
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.24	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.44	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 15 - PUU03
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.46	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 16 - PUU04
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.40	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.24	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.06	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 17 - PUU05
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 18 - PUU06
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 19 - PUU07
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.21
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 20 - PUU08
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	09.04	07.32	06.42	18.56-19.14/18	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36	
	14.36	16.06	17.36	20.09		21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43	
2	10.12	09.01	07.28	06.39	18.58-19.13/15	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.38	
	14.38	16.09	17.39	20.12		21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41	
3	10.11	08.58	07.25	06.35	18.59-19.10/11	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41	
	14.40	16.12	17.42	20.15		21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39	
4	10.09	08.54	07.21	06.32	19.03-19.07/4	04.46	03.12	03.04	04.34	06.09	07.35	08.10	09.44	
	14.42	16.16	17.46	20.18		21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37	
5	10.08	08.51	07.18	06.28		04.43	03.09	03.06	04.37	06.12	07.38	08.14	09.46	
	14.44	16.19	17.49	20.21		21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35	
6	10.07	08.48	07.14	06.25		04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49	
	14.46	16.22	17.52	20.24		21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34	
7	10.05	08.45	07.11	06.21		04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51	
	14.49	16.26	17.55	20.27		22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32	
8	10.04	08.42	07.07	06.18		04.33	03.03	03.13	04.47	06.21	18.58-19.00/2	07.47	08.23	09.54
	14.51	16.29	17.58	20.30		22.04	23.38	23.37	22.04	20.15		18.29	15.45	14.30
9	10.02	08.39	07.04	06.14		04.30	03.01	03.15	04.50	06.24	18.53-19.04/11	07.50	08.26	09.56
	14.54	16.32	18.01	20.33		22.07	23.40	23.34	22.00	20.11		18.25	15.42	14.29
10	10.00	08.35	07.00	06.10		04.26	02.58	03.18	04.53	06.26	18.50-19.05/15	07.53	08.30	09.58
	14.57	16.36	18.04	20.36		22.11	23.42	23.32	21.57	20.08		18.22	15.39	14.28
11	09.58	08.32	06.57	06.07		04.23	02.56	03.20	04.56	06.29	18.49-19.06/17	07.56	08.33	10.00
	14.59	16.39	18.07	20.39		22.14	23.44	23.30	21.53	20.04		18.18	15.35	14.27
12	09.56	08.29	06.53	06.03		04.20	02.55	03.23	05.00	06.32	18.48-19.07/19	07.59	08.36	10.02
	15.02	16.42	18.10	20.42		22.17	23.46	23.27	21.50	20.01		18.15	15.32	14.26
13	09.54	08.26	06.50	06.00		04.16	02.53	03.26	05.03	06.35	18.47-19.07/20	08.02	08.40	10.04
	15.05	16.45	18.13	20.45		22.20	23.48	23.25	21.46	19.57		18.11	15.29	14.25
14	09.52	08.22	06.46	05.56		04.13	02.52	03.29	05.06	06.38	18.46-19.08/22	08.05	08.43	10.06
	15.08	16.49	18.16	20.48		22.24	23.49	23.22	21.43	19.54		18.08	15.26	14.24
15	09.50	08.19	06.43	05.53		04.10	02.51	03.32	05.09	06.41	18.45-19.07/22	08.08	08.46	10.07
	15.11	16.52	18.19	20.51		22.27	23.51	23.19	21.40	19.50		18.04	15.24	14.24
16	09.47	08.16	06.39	05.49		04.06	02.51	03.35	05.12	06.44	18.45-19.06/21	08.11	08.49	10.09
	15.14	16.55	18.22	20.54		22.30	23.52	23.16	21.36	19.46		18.01	15.21	14.23
17	09.45	08.12	06.36	05.46		04.03	02.50	03.38	05.15	06.46	18.45-19.05/20	08.14	08.52	10.10
	15.17	16.58	18.25	20.58		22.33	23.53	23.14	21.33	19.43		17.57	15.18	14.23
18	09.43	08.09	06.32	05.42		04.00	02.49	03.41	05.18	06.49	18.46-19.02/16	08.17	08.56	10.11
	15.20	17.02	18.28	21.01		22.37	23.54	23.11	21.29	19.39		17.54	15.15	14.22
19	09.40	08.06	06.29	05.39		03.57	02.49	03.44	05.21	06.52	18.46-18.58/12	08.20	08.59	10.12
	15.23	17.05	18.31	21.04		22.40	23.55	23.08	21.26	19.36		17.50	15.12	14.22
20	09.38	08.02	06.25	05.35		03.54	02.49	03.47	05.24	06.55	18.46-18.54/8	08.23	09.02	10.13
	15.26	17.08	18.34	21.07		22.43	23.55	23.05	21.22	19.32		17.47	15.09	14.23
21	09.35	07.59	06.21	05.32		03.51	02.49	03.50	05.27	06.58	18.48-18.50/2	08.26	09.05	10.14
	15.30	17.11	18.37	21.10		22.46	23.56	23.02	21.19	19.29		17.44	15.07	14.23
22	09.32	07.56	06.18	18.04-18.05/1	05.28	03.48	02.49	03.53	05.30	07.01		08.29	09.09	10.15
	15.33	17.14	18.40		21.13	22.50	23.56	22.59	21.15	19.25		17.40	15.04	14.23
23	09.30	07.52	06.14	18.01-18.07/6	05.25	03.45	02.50	03.56	05.33	07.04		08.32	09.12	10.15
	15.36	17.18	18.43		21.16	22.53	23.56	22.56	21.12	19.21		17.37	15.01	14.24
24	09.27	07.49	06.11	17.59-18.10/11	05.21	03.42	02.51	03.59	05.36	07.07		08.35	09.15	10.15
	15.39	17.21	18.45		21.19	22.56	23.56	22.53	21.08	19.18		17.34	14.59	14.24
25	09.24	07.45	06.07	17.58-18.13/15	05.18	03.39	02.51	04.02	05.39	07.09		07.38	09.18	10.16
	15.43	17.24	18.48		21.22	22.59	23.55	22.50	21.05	19.14		16.30	14.56	14.25
26	09.21	07.42	06.04	17.57-18.16/19	05.14	03.36	02.52	04.05	05.42	07.12		07.42	09.21	10.16
	15.46	17.27	18.51		21.26	23.02	23.55	22.46	21.01	19.11		16.27	14.54	14.26
27	09.18	07.39	06.00	17.56-18.18/22	05.11	03.33	02.53	04.09	05.45	07.15		07.45	09.24	10.16
	15.49	17.30	18.54		21.29	23.05	23.54	22.43	20.57	19.07		16.23	14.52	14.27
28	09.16	07.35	05.57	17.55-18.17/22	05.07	03.30	02.55	04.12	05.48	07.18		07.48	09.27	10.15
	15.53	17.33	18.57		21.32	23.08	23.53	22.40	20.54	19.04		16.20	14.49	14.29
29	09.13		06.53	18.56-19.17/21	05.04	03.27	02.56	04.15	05.51	07.21		07.51	09.30	10.15
	15.56		20.00		21.35	23.11	23.52	22.37	20.50	19.00		16.17	14.47	14.30
30	09.10		06.50	18.55-19.16/21	05.00	03.24	02.58	04.18	05.54	07.24		07.54	09.33	10.14
	15.59		20.03		21.38	23.14	23.51	22.34	20.47	18.57		16.14	14.45	14.32
31	09.07		06.46	18.56-19.16/20		03.22		04.21	05.57			07.57		10.14
	16.02		20.06			23.17		22.30	20.43			16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137	0	
Sum of minutes with flicker	0	0	158	48	0	0	0	0	207	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 21 - PUU09
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.13 14.35	09.04 16.06	07.32 17.36	06.42 20.09	04.57 21.41	20.06-20.20/14 23.20	03.19 23.50	02.59 22.27	04.25 22.27	06.00 20.40	07.27 18.53	08.01 16.07	09.36 14.43
2	10.12 14.37	09.01 16.09	07.28 17.39	06.39 20.12	04.53 21.45	20.08-20.18/10 23.23	03.16 23.48	03.01 22.24	04.28 22.24	06.03 20.36	07.30 18.50	08.04 16.04	09.39 14.41
3	10.11 14.39	08.58 16.12	07.25 17.42	06.35 20.15	04.50 21.48	03.14 23.26	03.01 23.47	04.31 22.20	04.31 22.20	06.06 20.33	07.32 18.46	08.07 16.00	09.41 14.39
4	10.10 14.42	08.55 16.16	07.21 17.45	06.32 20.18	04.46 21.51	03.12 23.28	03.03 23.45	04.34 22.17	04.34 22.17	06.09 20.29	07.35 18.43	08.10 15.57	09.44 14.37
5	10.08 14.44	08.51 16.19	07.18 17.49	06.28 20.21	04.43 21.54	03.09 23.31	03.05 23.43	04.37 22.14	04.37 22.14	06.12 20.26	07.38 18.39	08.14 15.54	09.47 14.35
6	10.07 14.46	08.48 16.22	07.14 17.52	06.25 20.24	04.40 21.58	03.07 23.33	03.08 23.41	04.41 22.10	04.41 22.10	06.15 20.22	07.41 18.36	08.17 15.51	09.49 14.33
7	10.05 14.49	08.45 16.26	07.11 17.55	06.21 20.27	04.36 22.01	03.05 23.36	03.10 23.39	04.44 22.07	04.44 22.07	06.18 20.18	07.44 18.32	08.20 15.48	09.51 14.32
8	10.04 14.51	08.42 16.29	07.07 17.58	06.17 20.30	04.33 22.04	03.03 23.38	03.12 23.37	04.47 22.04	04.47 22.04	06.21 20.15	07.47 18.29	08.23 15.45	09.54 14.30
9	10.02 14.54	08.39 16.32	07.04 18.01	06.14 20.33	04.29 22.07	03.01 23.40	03.15 23.34	04.50 22.00	04.50 22.00	06.23 20.11	07.50 18.25	08.27 15.42	09.56 14.29
10	10.00 14.56	08.35 16.36	07.00 18.04	06.10 20.36	04.26 22.11	02.57 23.42	03.18 23.32	04.53 21.57	20.18-20.23/5 21.57	06.26 20.08	07.53 18.22	08.30 15.38	09.58 14.28
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	04.23 22.14	02.56 23.44	03.20 23.30	04.56 21.53	20.15-20.27/12 21.53	06.29 20.04	07.56 18.18	08.33 15.35	10.00 14.27
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	04.19 22.17	02.55 23.46	03.23 23.27	04.59 21.50	20.13-20.29/16 21.50	06.32 20.01	07.59 18.15	08.36 15.32	10.02 14.26
13	09.54 15.05	08.26 16.45	06.50 18.13	06.00 20.45	04.16 22.20	02.53 23.48	03.26 23.25	05.03 21.47	20.12-20.30/18 21.47	06.35 19.57	08.02 18.11	08.40 15.29	10.04 14.25
14	09.52 15.08	08.22 16.49	06.46 18.16	05.56 20.48	04.13 22.24	02.52 23.49	03.29 23.22	05.06 21.43	20.10-20.30/20 21.43	06.38 19.53	08.05 18.08	08.43 15.26	10.06 14.24
15	09.50 15.11	08.19 16.52	06.43 18.19	05.53 20.51	04.10 22.27	02.51 23.51	03.32 23.19	05.09 21.40	20.09-20.31/22 21.40	06.41 19.50	08.08 18.04	08.46 15.23	10.07 14.23
16	09.47 15.14	08.16 16.55	06.39 18.22	05.49 20.54	04.06 22.30	02.50 23.52	03.34 23.17	05.12 21.36	20.09-20.32/23 21.36	06.44 19.46	08.11 18.01	08.49 15.21	10.09 14.23
17	09.45 15.17	08.12 16.58	06.36 18.25	05.46 20.58	04.03 22.33	02.50 23.53	03.37 23.14	05.15 21.33	20.07-20.31/24 21.33	06.46 19.43	08.14 17.57	08.53 15.18	10.10 14.23
18	09.43 15.20	08.09 17.02	06.32 18.28	05.42 21.01	04.00 22.37	02.49 23.54	03.40 23.11	05.18 21.29	20.07-20.32/25 21.29	06.49 19.39	08.17 17.54	08.56 15.15	10.11 14.22
19	09.40 15.23	08.06 17.05	06.29 18.31	05.39 21.04	03.57 22.40	02.49 23.55	03.43 23.08	05.21 21.26	20.07-20.32/25 21.26	06.52 19.36	08.20 17.50	08.59 15.12	10.12 14.22
20	09.38 15.26	08.02 17.08	06.25 18.34	05.35 21.07	03.54 22.43	02.49 23.55	03.47 23.05	05.24 21.22	20.07-20.32/25 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	09.35 15.30	07.59 17.11	06.21 18.37	05.31 21.10	03.51 22.46	02.49 23.56	03.50 23.02	05.27 21.19	20.06-20.31/25 21.19	06.58 19.29	08.26 17.44	09.05 15.07	10.14 14.23
22	09.32 15.33	07.56 17.14	06.18 18.40	05.28 21.13	03.47 22.50	02.49 23.56	03.53 22.59	05.30 21.15	20.06-20.30/24 21.15	07.01 19.25	08.29 17.40	09.09 15.04	10.15 14.23
23	09.30 15.36	07.52 17.18	06.14 18.43	05.24 21.16	03.44 22.53	02.50 23.56	03.56 22.56	05.33 21.12	20.07-20.30/23 21.12	07.04 19.21	08.32 17.37	09.12 15.01	10.15 14.24
24	09.27 15.39	07.49 17.21	06.11 18.45	05.21 21.19	03.41 22.56	02.50 23.56	03.59 22.53	05.36 21.08	20.08-20.28/20 21.08	07.06 19.18	08.35 17.33	09.15 14.59	10.16 14.24
25	09.24 15.43	07.45 17.24	06.07 18.48	05.17 21.22	03.38 22.59	02.51 23.55	04.02 22.50	05.39 21.05	20.08-20.24/16 21.05	07.09 19.14	07.38 16.30	09.18 14.56	10.16 14.25
26	09.21 15.46	07.42 17.27	06.04 18.51	05.14 21.26	03.36 23.02	02.52 23.55	04.05 22.47	05.42 21.01	20.09-20.21/12 21.01	07.12 19.11	07.42 16.27	09.21 14.54	10.16 14.26
27	09.18 15.49	07.39 17.30	06.00 18.54	05.11 21.29	03.33 23.05	02.53 23.54	04.09 22.43	05.45 20.57	20.11-20.18/7 20.57	07.15 19.07	07.45 16.23	09.24 14.52	10.16 14.27
28	09.16 15.52	07.35 17.33	05.57 18.57	05.07 21.32	03.30 23.08	02.55 23.53	04.12 22.40	05.48 20.54	20.14-20.15/1 20.54	07.18 19.04	07.48 16.20	09.27 14.49	10.15 14.29
29	09.13 15.56	07.32 17.33	05.53 18.57	05.04 21.35	03.27 23.11	02.56 23.52	04.15 22.37	05.51 20.50	05.51 20.50	07.21 19.00	07.51 16.17	09.30 14.47	10.15 14.30
30	09.10 15.59	07.30 17.33	05.50 18.57	05.00 21.38	03.24 23.14	02.58 23.51	04.18 22.34	05.54 20.47	05.54 20.47	07.24 18.57	07.54 16.13	09.33 14.45	10.14 14.31
31	09.07 16.02	07.27 17.33	05.46 18.57	05.00 21.38	03.22 23.17	02.57 23.51	04.21 22.30	05.57 20.43	05.57 20.43	07.57 16.10	07.57 15.45	14.45 14.33	10.14 14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0
Sum of minutes with flicker	0	0	0	309	24	0	0	343	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 22 - PUU10
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 23 - PUU11
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 24 - PUU12
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	17.44-18.09/25	08.01	09.36
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53		16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29	17.44-18.08/24	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50		16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	17.45-18.06/21	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46		16.01	14.39
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35	17.46-18.03/17	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43		15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	17.48-18.00/12	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39		15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	17.51-17.56/5	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36		15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44		08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32		15.48	14.32
8	10.03	08.42	07.07	17.12-17.21/9	06.17	04.33	03.03	03.13	04.47	06.21		08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29		15.45	14.30
9	10.02	08.39	07.04	17.09-17.24/15	06.14	04.30	03.01	03.15	04.50	06.23		08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25		15.42	14.29
10	10.00	08.35	07.00	17.08-17.28/20	06.10	04.26	02.58	03.18	04.53	06.26		08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22		15.39	14.28
11	09.58	08.32	06.57	17.06-17.29/23	06.07	04.23	02.56	03.20	04.56	06.29		08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18		15.35	14.27
12	09.56	08.29	06.53	17.06-17.30/24	06.03	04.20	02.55	03.23	05.00	06.32		08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15		15.32	14.26
13	09.54	08.26	06.50	17.04-17.30/26	06.00	04.16	02.53	03.26	05.03	06.35		08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11		15.29	14.25
14	09.52	08.22	06.46	17.03-17.30/27	05.56	04.13	02.52	03.29	05.06	06.38		08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08		15.26	14.24
15	09.50	08.19	06.43	17.03-17.30/27	05.53	04.10	02.51	03.32	05.09	06.41		08.08	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04		15.24	14.24
16	09.47	08.16	06.39	17.03-17.30/27	05.49	04.06	02.51	03.35	05.12	06.44		08.11	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01		15.21	14.23
17	09.45	08.12	06.36	17.02-17.29/27	05.46	04.03	02.50	03.38	05.15	06.46		08.14	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57		15.18	14.23
18	09.42	08.09	06.32	17.03-17.29/26	05.42	04.00	02.49	03.41	05.18	06.49		08.17	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54		15.15	14.23
19	09.40	08.06	06.29	17.02-17.28/26	05.39	03.57	02.49	03.44	05.21	06.52	17.59-18.04/5	08.20	08.59
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50		15.12	14.22
20	09.37	08.02	06.25	17.04-17.27/23	05.35	03.54	02.49	03.47	05.24	06.55	17.54-18.07/13	08.23	09.02
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47		15.09	14.23
21	09.35	07.59	06.21	17.04-17.25/21	05.32	03.51	02.49	03.50	05.27	06.58	17.51-18.09/18	08.26	09.05
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44		15.07	14.23
22	09.32	07.56	06.18	17.06-17.24/18	05.28	03.48	02.49	03.53	05.30	07.01	17.49-18.10/21	08.29	09.08
	15.33	17.14	18.40	21.13	22.49	23.56	22.59	21.15	19.25	17.40		15.04	14.23
23	09.30	07.52	06.14	17.07-17.22/15	05.25	03.45	02.50	03.56	05.33	07.04	17.48-18.11/23	08.32	09.12
	15.36	17.18	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37		15.01	14.24
24	09.27	07.49	06.11	17.10-17.18/8	05.21	03.42	02.51	03.59	05.36	07.06	17.47-18.11/24	08.35	09.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33		14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09	07.46-18.12/26	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30		14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.45-18.12/27	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27		14.54	14.26
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	17.44-18.11/27	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23		14.52	14.27
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	17.43-18.11/28	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20		14.49	14.29
29	09.13	07.33	05.53	05.04	03.27	02.56	04.15	05.51	07.21	17.43-18.10/27	07.51	09.30	10.15
	15.56	17.36	18.61	21.35	23.11	23.52	22.37	20.50	19.00	16.17		14.47	14.30
30	09.10	07.30	05.49	05.00	03.24	02.58	04.18	05.54	07.24	17.43-18.10/27	07.54	09.33	10.14
	15.59	17.33	18.64	21.38	23.14	23.51	22.34	20.47	18.57	16.14		14.45	14.32
31	09.07	07.27	05.46	05.00	03.22	02.57	04.21	05.57	07.27	17.43-18.10/27	07.57	09.33	10.14
	16.02	17.36	18.66	21.41	23.17	23.54	22.30	20.43	18.57	16.10		14.45	14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137	0
Sum of minutes with flicker	0	0	362	0	0	0	0	0	266	104	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 25 - PUU13
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.13 14.35	09.04 16.06	07.32 17.36	06.42 20.09	04.57 21.41	19.33-20.05/32 23.20	02.59 23.50	04.25 22.27	06.00 20.40	07.27 18.53	08.01 16.07	09.36 14.43	
2	10.12 14.37	09.01 16.09	07.28 17.39	06.39 20.12	04.53 21.45	19.34-20.05/31 23.23	03.16 23.48	04.28 22.24	06.03 20.36	07.29 18.50	08.04 16.04	09.38 14.41	
3	10.11 14.39	08.58 16.12	07.25 17.42	06.35 20.15	04.50 21.48	19.35-20.04/29 23.25	03.14 23.46	04.31 22.20	06.06 20.33	07.32 18.46	08.07 16.00	09.41 14.39	
4	10.09 14.42	08.54 16.16	07.21 17.45	06.32 20.18	04.46 21.51	19.35-20.03/28 23.12	03.03 23.28	04.34 23.45	19.54-20.03/9 22.17	06.09 20.29	07.35 18.43	08.10 15.57	09.44 14.37
5	10.08 14.44	08.51 16.19	07.18 17.49	06.28 20.21	04.43 21.54	19.37-20.01/24 23.09	03.05 23.43	04.37 22.14	19.51-20.06/15 20.25	06.12 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	10.07 14.46	08.48 16.22	07.14 17.52	06.25 20.24	04.40 21.58	19.38-20.00/22 23.07	03.08 23.33	04.40 23.41	19.49-20.08/19 22.10	06.15 20.22	07.41 18.35	08.17 15.51	09.49 14.33
7	10.05 14.49	08.45 16.26	07.11 17.55	06.21 20.27	04.36 22.01	19.40-19.58/18 23.36	03.10 23.39	04.44 22.07	19.47-20.09/22 20.18	06.18 18.32	07.44 15.48	08.20 14.32	09.51 14.32
8	10.03 14.51	08.42 16.29	07.07 17.58	06.17 20.30	04.33 22.04	19.42-19.55/13 23.03	03.12 23.37	04.47 22.04	19.45-20.11/26 20.15	06.21 18.28	07.47 15.45	08.23 14.30	09.54 14.30
9	10.02 14.54	08.39 16.32	07.04 18.01	06.14 20.33	04.29 22.07	19.47-19.50/3 23.01	03.15 23.34	04.50 22.00	19.44-20.12/28 20.11	06.23 18.25	07.50 15.41	08.26 14.29	09.56 14.29
10	10.00 14.56	08.35 16.36	07.00 18.04	06.10 20.36	04.26 22.11	02.58 23.42	03.18 23.32	04.53 21.57	19.42-20.12/30 20.08	06.26 18.22	07.53 15.38	08.30 14.28	09.58 14.28
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	04.23 22.14	02.56 23.44	03.20 23.30	04.56 21.53	19.42-20.13/31 20.04	06.29 18.18	07.56 15.35	08.33 14.27	10.00 14.27
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	04.19 22.17	19.47-19.58/11 23.46	03.23 23.27	04.59 21.50	19.41-20.14/33 20.01	06.32 18.15	07.59 15.32	08.36 14.26	10.02 14.26
13	09.54 15.05	08.26 16.45	06.50 18.13	06.00 20.45	04.16 22.20	19.44-20.02/18 23.48	03.26 23.25	05.03 21.46	19.40-20.14/34 19.57	06.35 18.11	08.02 15.29	08.39 14.25	10.04 14.25
14	09.52 15.08	08.22 16.49	06.46 18.16	05.56 20.48	04.13 22.24	19.40-20.03/23 23.49	03.29 23.22	05.06 21.43	19.39-20.14/35 19.53	06.38 18.08	08.05 15.26	08.43 14.24	10.06 14.24
15	09.50 15.11	08.19 16.52	06.43 18.19	05.53 20.51	04.10 22.27	19.39-20.05/26 23.51	03.32 23.19	05.09 21.40	19.39-20.14/35 19.50	06.41 18.04	08.08 15.23	08.46 14.23	10.07 14.23
16	09.47 15.14	08.16 16.55	06.39 18.22	05.49 20.54	04.06 22.30	19.38-20.06/28 23.52	03.34 23.16	05.12 21.36	19.39-20.15/36 19.46	06.44 18.01	08.11 15.21	08.49 14.23	10.09 14.23
17	09.45 15.17	08.12 16.58	06.36 18.25	05.46 20.57	04.03 22.33	19.36-20.06/30 23.53	03.37 23.14	05.15 21.33	19.37-20.14/37 19.43	06.46 17.57	08.14 15.18	08.52 14.23	10.10 14.23
18	09.42 15.20	08.09 17.02	06.32 18.28	05.42 21.01	04.00 22.37	19.35-20.07/32 23.54	03.40 23.11	05.18 21.29	19.37-20.14/37 19.39	06.49 17.54	08.17 15.15	08.56 14.22	10.11 14.22
19	09.40 15.23	08.06 17.05	06.28 18.31	05.38 21.04	03.57 22.40	19.34-20.08/34 23.55	03.43 23.08	05.21 21.26	19.37-20.14/37 19.36	06.52 17.50	08.20 15.12	08.59 14.22	10.12 14.22
20	09.37 15.26	08.02 17.08	06.25 18.34	05.35 21.07	03.54 22.43	19.33-20.08/35 23.56	03.47 23.05	05.24 21.22	19.37-20.14/37 19.32	06.55 17.47	08.23 15.09	09.02 14.22	10.13 14.22
21	09.35 15.29	07.59 17.11	06.21 18.37	05.31 21.10	03.51 22.46	19.32-20.08/36 23.57	03.50 23.02	05.27 21.19	19.37-20.13/36 19.29	06.58 17.44	08.26 15.07	09.05 14.23	10.14 14.23
22	09.32 15.33	07.56 17.14	06.18 18.39	05.28 21.13	03.47 22.49	19.32-20.09/37 23.58	03.53 22.59	05.30 21.15	19.37-20.13/36 19.25	07.01 17.40	08.29 15.04	09.08 14.23	10.15 14.23
23	09.30 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.53	19.32-20.09/37 23.59	03.56 22.56	05.33 21.12	19.38-20.12/34 19.21	07.04 17.37	08.32 15.01	09.12 14.24	10.15 14.24
24	09.27 15.39	07.49 17.21	06.11 18.45	05.21 21.19	03.41 22.56	19.31-20.08/37 23.60	03.59 22.53	05.36 21.08	19.38-20.12/34 19.18	07.06 17.33	08.35 14.59	09.15 14.24	10.15 14.24
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	03.38 22.59	19.31-20.08/37 23.61	04.02 22.50	05.39 21.04	19.38-20.10/32 19.14	07.09 16.30	07.38 14.56	09.18 14.25	10.16 14.25
26	09.21 15.46	07.42 17.27	06.04 18.51	05.14 21.25	03.36 23.02	19.31-20.08/37 23.62	04.05 22.46	05.42 21.01	19.39-20.09/30 19.11	07.12 16.27	07.42 14.54	09.21 14.26	10.16 14.26
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.29	03.33 23.05	19.31-20.07/36 23.63	04.09 22.43	05.45 20.57	19.40-20.08/28 19.07	07.15 16.23	07.45 14.52	09.24 14.27	10.16 14.27
28	09.16 15.52	07.35 17.33	05.57 18.57	05.07 21.32	03.30 23.08	19.32-20.07/35 23.64	04.12 22.40	05.48 20.54	19.41-20.07/26 19.04	07.18 16.20	07.48 14.49	09.27 14.29	10.15 14.29
29	09.13 15.56	07.32 17.36	05.54 18.54	05.04 21.35	03.27 23.11	19.32-20.07/35 23.65	04.15 22.37	05.51 20.50	19.41-20.04/23 19.00	07.21 16.17	07.51 14.47	09.30 14.30	10.15 14.30
30	09.10 15.59	07.30 17.39	05.52 18.52	05.02 21.38	03.24 23.14	19.32-20.06/34 23.66	04.18 22.34	05.54 20.47	19.44-20.01/17 18.57	07.24 16.13	07.54 14.45	09.33 14.31	10.14 14.31
31	09.07 16.02	07.27 17.42	05.49 18.49	05.00 21.41	03.22 23.17	19.32-20.06/34 23.67	04.21 22.30	05.57 20.43	19.47-19.58/11 18.57	07.27 16.10	07.57 14.45	09.34 14.32	10.14 14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	
Sum of minutes with flicker	0	0	0	598	200	0	0	808	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 26 - PUU14
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.54	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 27 - PUU15
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.45	14.31
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.49	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.06	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.28	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.25	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.21	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.18	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.39	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.12		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 28 - PUU16
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13 14.35	09.04 16.06	07.32 17.36	06.42 20.09	04.57 21.41	18.27-19.39/72 23.20
2	10.12 14.37	09.01 16.09	07.28 17.39	06.39 20.12	04.53 21.45	18.27-19.39/72 23.23
3	10.11 14.39	08.57 16.12	07.25 17.42	06.35 20.15	04.50 21.48	18.27-19.39/72 23.25
4	10.09 14.42	08.54 16.16	07.21 17.45	06.32 20.18	04.46 21.51	18.27-19.39/72 23.28
5	10.08 14.44	08.51 16.19	07.18 17.48	06.28 20.21	04.43 21.54	18.27-19.39/72 23.31
6	10.07 14.46	08.48 16.22	07.14 17.52	06.25 20.24	04.39 21.57	18.26-19.39/73 23.33
7	10.05 14.49	08.45 16.26	07.11 17.55	06.21 20.27	04.36 22.01	18.26-19.39/73 23.36
8	10.03 14.51	08.42 16.29	07.07 17.58	06.17 20.30	04.33 22.04	18.26-19.38/72 23.38
9	10.02 14.54	08.39 16.32	07.04 18.01	06.14 20.33	04.29 22.07	19.02-19.11/9 23.40
10	10.00 14.56	08.35 16.36	07.00 18.04	06.10 20.36	04.26 22.10	18.56-19.18/22 23.42
11	09.58 14.59	08.32 16.39	06.57 18.07	06.07 20.39	04.23 22.14	18.52-19.22/30 23.44
12	09.56 15.02	08.29 16.42	06.53 18.10	06.03 20.42	04.19 22.17	18.48-19.24/36 23.46
13	09.54 15.05	08.26 16.45	06.50 18.13	06.00 20.45	04.16 22.20	18.46-19.27/41 23.48
14	09.52 15.08	08.22 16.49	06.46 18.16	05.56 20.48	04.13 22.24	18.43-19.28/45 23.49
15	09.49 15.11	08.19 16.52	06.43 18.19	05.53 20.51	04.10 22.27	18.28-19.37/69 23.51
16	09.47 15.14	08.16 16.55	06.39 18.22	05.49 20.54	04.06 22.30	18.28-19.36/68 23.52
17	09.45 15.17	08.12 16.58	06.36 18.25	05.46 20.57	04.03 22.33	18.29-19.36/67 23.53
18	09.42 15.20	08.09 17.02	06.32 18.28	05.42 21.00	04.00 22.37	18.29-19.35/66 23.54
19	09.40 15.23	08.06 17.05	06.28 18.31	05.38 21.04	03.57 22.40	18.30-19.36/66 23.55
20	09.37 15.26	08.02 17.08	06.25 18.34	05.35 21.07	03.54 22.43	18.30-19.35/65 23.55
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	03.51 22.46	18.31-19.35/64 23.56
22	09.32 15.33	07.56 17.14	06.18 18.39	05.28 21.13	03.47 22.49	18.32-19.35/63 23.56
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.53	18.32-19.33/61 23.56
24	09.27 15.39	07.49 17.21	06.11 18.45	05.21 21.19	03.41 22.56	18.33-19.33/60 23.56
25	09.24 15.42	07.45 17.24	06.07 18.48	05.17 21.22	03.38 22.59	18.34-19.33/59 23.55
26	09.21 15.46	07.42 17.27	06.04 18.51	05.14 21.25	03.36 23.02	18.35-19.33/58 23.55
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.29	03.33 23.05	18.36-19.32/56 23.54
28	09.15 15.52	07.35 17.33	05.57 18.57	05.07 21.32	03.30 23.08	18.36-19.32/56 23.53
29	09.13 15.56		06.53 20.00	05.04 21.35	03.27 23.11	18.37-19.32/55 23.52
30	09.10 15.59		06.49 20.03	05.00 21.38	03.24 23.14	18.27-19.39/72 23.51
31	09.07 16.02		06.46 20.06		03.22 23.17	18.38-19.30/52 23.51
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	0	1187	2041	1170

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 28 - PUU16
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 18.52-19.31/39 23.49	04.25 18.37-19.48/71 22.27	06.00 18.51-19.21/30 20.40	07.27 18.53	08.01 16.07	09.36 14.43
2	03.01 18.52-19.32/40 23.48	04.28 18.37-19.48/71 22.24	06.03 18.54-19.16/22 20.36	07.29 18.50	08.04 16.04	09.38 14.41
3	03.01 18.52-19.33/41 23.46	04.31 18.36-19.48/72 22.20	06.06 19.00-19.09/9 20.33	07.32 18.46	08.07 16.00	09.41 14.39
4	03.03 18.51-19.33/42 23.45	04.34 18.36-19.48/72 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.44 14.37
5	03.05 18.50-19.33/43 23.43	04.37 18.36-19.48/72 22.14	06.12 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	03.08 18.50-19.35/45 23.41	04.40 18.36-19.49/73 22.10	06.15 20.22	07.41 18.35	08.17 15.51	09.49 14.33
7	03.10 18.50-19.36/46 23.39	04.44 18.35-19.48/73 22.07	06.18 20.18	07.44 18.32	08.20 15.48	09.51 14.32
8	03.12 18.49-19.36/47 23.37	04.47 18.36-19.48/72 22.04	06.20 20.15	07.47 18.28	08.23 15.45	09.54 14.30
9	03.15 18.49-19.37/48 23.34	04.50 18.36-19.48/72 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.56 14.29
10	03.18 18.49-19.37/48 23.32	04.53 18.35-19.47/72 21.57	06.26 20.08	07.53 18.21	08.30 15.38	09.58 14.28
11	03.20 18.48-19.38/50 23.30	04.56 18.35-19.47/72 21.53	06.29 20.04	07.56 18.18	08.33 15.35	10.00 14.27
12	03.23 18.48-19.39/51 23.27	04.59 18.35-19.47/72 21.50	06.32 20.01	07.59 18.14	08.36 15.32	10.02 14.26
13	03.26 18.47-19.40/53 23.24	05.03 18.36-19.47/71 21.46	06.35 19.57	08.02 18.11	08.39 15.29	10.04 14.25
14	03.29 18.46-19.40/54 23.22	05.06 18.35-19.46/71 21.43	06.38 19.53	08.05 18.08	08.43 15.26	10.06 14.24
15	03.32 18.46-19.41/55 23.19	05.09 18.35-19.46/71 21.39	06.41 19.50	08.08 18.04	08.46 15.23	10.07 14.23
16	03.34 18.45-19.41/56 23.16	05.12 18.36-19.45/69 21.36	06.43 19.46	08.11 18.01	08.49 15.21	10.09 14.23
17	03.37 18.44-19.42/58 23.14	05.15 18.35-19.44/69 21.32	06.46 19.43	08.14 17.57	08.52 15.18	10.10 14.23
18	03.40 18.44-19.42/58 23.11	05.18 18.36-19.43/67 21.29	06.49 19.39	08.17 17.54	08.56 15.15	10.11 14.22
19	03.43 18.44-19.43/59 23.08	05.21 18.37-19.43/66 21.26	06.52 19.36	08.20 17.50	08.59 15.12	10.12 14.22
20	03.47 18.43-19.43/60 23.05	05.24 18.37-19.42/65 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	03.50 18.42-19.44/62 23.02	05.27 18.37-19.41/64 21.19	06.58 19.28	08.26 17.44	09.05 15.07	10.14 14.23
22	03.53 18.42-19.45/63 22.59	05.30 18.38-19.40/62 21.15	07.01 19.25	08.29 17.40	09.08 15.04	10.15 14.23
23	03.56 18.41-19.45/64 22.56	05.33 18.39-19.39/60 21.11	07.04 19.21	08.32 17.37	09.12 15.01	10.15 14.24
24	03.59 18.41-19.46/65 22.53	05.36 18.40-19.38/58 21.08	07.06 19.18	08.35 17.33	09.15 14.59	10.15 14.24
25	04.02 18.40-19.46/66 22.50	05.39 18.40-19.36/56 21.04	07.09 19.14	07.38 16.30	09.18 14.56	10.16 14.25
26	04.05 18.40-19.47/67 22.46	05.42 18.41-19.34/53 21.01	07.12 19.11	07.41 16.27	09.21 14.54	10.16 14.26
27	04.09 18.39-19.46/67 22.43	05.45 18.42-19.33/51 20.57	07.15 19.07	07.45 16.23	09.24 14.51	10.15 14.27
28	04.12 18.39-19.47/68 22.40	05.48 18.44-19.31/47 20.54	07.18 19.04	07.48 16.20	09.27 14.49	10.15 14.29
29	04.15 18.38-19.47/69 22.37	05.51 18.44-19.28/44 20.50	07.21 19.00	07.51 16.17	09.30 14.47	10.15 14.30
30	04.18 18.38-19.48/70 22.34	05.54 18.46-19.26/40 20.47	07.24 18.57	07.54 16.13	09.33 14.45	10.14 14.31
31	04.21 18.38-19.48/70 22.30	05.57 18.48-19.24/36 20.43		07.57 16.10		10.14 14.33
Potential sun hours	609	509	393	305	198	137
Sum of minutes with flicker	1724	1984	61	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 29 - PUU17
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	10.13	09.04	07.32	06.42	04.56	03.19	21.26-21.38/12	02.59	04.24	21.34-21.37/3	06.00	07.26	08.01	09.36	
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42	14.42		
2	10.12	09.01	07.28	06.39	04.53	03.16	21.27-21.37/10	03.01	04.28	06.03	07.29	08.04	09.38		
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.04	14.40	14.40		
3	10.11	08.57	07.25	06.35	04.50	03.14	21.28-21.36/8	03.01	04.31	06.06	07.32	08.07	09.41		
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.33	18.46	16.00	14.39	14.39		
4	10.09	08.54	07.21	06.32	04.46	03.11	21.30-21.35/5	03.03	04.34	06.09	07.35	08.10	09.44		
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37	14.37		
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46	09.46		
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35	14.35		
6	10.07	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49	09.49		
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33	14.33		
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51	09.51		
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32	14.32		
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	21.38-21.40/2	04.47	06.20	07.47	08.23	09.54	09.54	
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30	14.30		
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	21.36-21.43/7	04.50	06.23	07.50	08.26	09.56	09.56	
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29	14.29		
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	21.35-21.44/9	04.53	06.26	07.53	08.30	09.58	09.58	
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28	14.28		
11	09.58	08.32	06.57	06.07	04.23	21.24-21.25/1	02.56	03.20	21.34-21.46/12	04.56	06.29	07.56	08.33	10.00	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26	14.26		
12	09.56	08.29	06.53	06.03	04.19	21.24-21.28/4	02.54	03.23	21.33-21.46/13	04.59	06.32	07.59	08.36	10.02	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25	14.25		
13	09.54	08.26	06.50	06.00	04.16	21.22-21.31/9	02.53	03.26	21.32-21.46/14	05.02	06.35	08.02	08.39	10.04	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25	14.25		
14	09.52	08.22	06.46	05.56	04.13	21.21-21.33/12	02.52	03.28	21.32-21.48/16	05.06	06.38	08.05	08.43	10.06	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24	14.24		
15	09.50	08.19	06.43	05.53	04.09	21.21-21.36/15	02.51	03.31	21.32-21.49/17	05.09	06.41	08.08	08.46	10.07	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23	14.23		
16	09.47	08.16	06.39	05.49	04.06	21.20-21.38/18	02.50	03.34	21.31-21.49/18	05.12	06.43	08.11	08.49	10.09	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.20	14.23	14.23		
17	09.45	08.12	06.35	05.45	04.03	21.20-21.40/20	02.49	03.37	21.31-21.49/18	05.15	06.46	08.14	08.52	10.10	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22	14.22		
18	09.42	08.09	06.32	05.42	04.00	21.20-21.41/21	02.49	03.40	21.30-21.50/20	05.18	06.49	08.17	08.56	10.11	10.11
	15.20	17.01	18.28	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22	14.22		
19	09.40	08.06	06.28	05.38	03.57	21.19-21.40/21	02.49	03.43	21.31-21.51/20	05.21	06.52	08.20	08.59	10.12	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22	14.22		
20	09.37	08.02	06.25	05.35	03.53	21.20-21.41/21	02.49	03.46	21.30-21.51/21	05.24	06.55	08.23	09.02	10.13	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22	14.22		
21	09.35	07.59	06.21	05.31	03.50	21.20-21.41/21	02.49	03.49	21.30-21.51/21	05.27	06.58	08.26	09.05	10.14	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22	14.22		
22	09.32	07.56	06.18	05.28	03.47	21.19-21.41/22	02.49	03.53	21.30-21.51/21	05.30	07.01	08.29	09.08	10.15	10.15
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23	14.23		
23	09.30	07.52	06.14	05.24	03.44	21.20-21.41/21	02.49	03.56	21.30-21.51/21	05.33	07.03	08.32	09.12	10.15	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23	14.23		
24	09.27	07.49	06.11	05.21	03.41	21.20-21.41/21	02.50	03.59	21.30-21.51/21	05.36	07.06	08.35	09.15	10.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24	14.24		
25	09.24	07.45	06.07	05.17	03.38	21.21-21.41/20	02.51	04.02	21.30-21.51/21	05.39	07.09	07.38	09.18	10.16	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25	14.25		
26	09.21	07.42	06.04	05.14	03.35	21.21-21.41/20	02.52	04.05	21.30-21.51/21	05.42	07.12	07.41	09.21	10.16	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26	14.26		
27	09.18	07.38	06.00	05.10	03.32	21.22-21.40/18	02.53	04.08	21.31-21.50/19	05.45	07.15	07.45	09.24	10.16	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27	14.27		
28	09.15	07.35	05.56	05.07	03.30	21.23-21.40/17	02.54	04.12	21.31-21.48/17	05.48	07.18	07.48	09.27	10.15	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28	14.28		
29	09.13	07.33	05.53	05.03	03.27	21.23-21.39/16	02.56	04.15	21.31-21.45/14	05.51	07.21	07.51	09.30	10.15	10.15
	15.56	17.35	19.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30	14.30		
30	09.10	07.30	05.49	05.00	03.24	21.24-21.39/15	02.57	04.18	21.32-21.43/11	05.54	07.24	07.54	09.33	10.14	10.14
	15.59	17.37	19.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31	14.31		
31	09.07	07.27	05.46	05.00	03.21	21.24-21.38/14	02.57	04.21	21.33-21.40/7	05.57	07.27	07.57	09.36	10.14	10.14
	16.02	17.40	19.06	21.41	23.17	23.51	22.30	20.43	18.57	16.10	14.45	14.33	14.33		
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	137		
Sum of minutes with flicker	0	0	0	0	347	35	381	3	0	0	0	0	0		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 30 - PUU18
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.33	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.52	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.10	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 31 - PUU19
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12 14.35	09.03 16.06	07.31 17.36	10.17-11.31/74 20.09	06.42 21.41	04.57 23.20
2	14.37 10.11	16.09 09.00	17.39 07.28	10.17-11.31/74 06.39	20.12 04.53	20.18-20.29/11 03.16
3	10.10 14.39	08.57 16.12	07.25 17.42	10.16-11.30/74 20.15	06.35 21.48	20.20-20.26/6 03.14
4	10.09 14.42	08.54 16.16	07.21 17.45	10.16-11.31/75 20.18	06.32 21.51	04.46 23.28
5	10.08 14.44	08.51 16.19	07.18 17.48	10.15-11.31/76 20.21	06.28 21.54	04.43 23.30
6	10.06 14.46	08.48 16.22	07.14 17.51	10.15-11.30/75 20.24	06.24 21.57	04.39 23.33
7	10.05 14.49	08.45 16.26	07.11 17.55	10.15-11.31/76 20.27	06.21 22.01	04.36 23.35
8	10.03 14.51	08.42 16.29	07.07 17.58	10.14-11.30/76 20.30	06.17 22.04	04.33 23.38
9	10.02 14.54	08.38 16.32	07.04 18.01	10.14-11.30/76 20.33	06.14 22.07	04.29 23.40
10	10.00 14.56	08.35 16.35	07.00 18.04	10.15-11.30/75 20.36	06.10 22.10	04.26 23.42
11	09.58 14.59	08.32 16.39	06.57 18.07	10.14-11.29/75 20.39	06.07 22.14	04.23 23.44
12	09.56 15.02	08.29 16.42	06.53 18.10	10.15-11.29/74 20.42	06.03 22.17	04.19 23.46
13	09.54 15.05	08.25 16.45	06.50 18.13	10.15-11.28/73 20.45	06.00 22.20	04.16 23.47
14	09.52 15.08	08.22 16.49	06.46 18.16	10.14-11.27/73 20.48	05.56 22.23	04.13 23.49
15	09.49 15.11	08.19 16.52	06.43 18.19	10.15-11.26/71 20.51	05.53 22.27	04.10 23.50
16	09.47 15.14	08.16 16.55	06.39 18.22	10.15-11.25/70 20.54	05.49 22.30	04.06 23.52
17	09.45 15.17	08.12 16.58	06.35 18.25	10.15-11.23/68 20.57	05.45 22.33	04.03 23.53
18	09.42 15.20	08.09 17.01	06.32 18.28	10.16-11.23/67 21.00	05.42 22.36	04.00 23.54
19	09.40 15.23	08.06 17.05	06.28 18.30	10.16-11.21/65 21.03	05.38 22.40	20.21-20.25/4 23.54
20	09.37 15.26	08.02 17.08	06.25 18.33	10.18-11.20/62 21.07	05.35 22.43	20.18-20.27/9 23.55
21	09.35 15.29	07.59 17.11	06.21 18.36	10.18-11.18/60 21.10	05.31 22.46	20.17-20.30/13 23.55
22	09.32 15.33	07.55 17.14	06.18 18.39	10.20-11.16/56 21.13	05.28 22.49	20.16-20.33/17 23.56
23	09.29 15.36	07.52 17.17	06.14 18.42	10.20-11.14/54 21.16	05.24 22.52	20.16-20.36/20 23.56
24	09.27 15.39	07.49 17.21	06.11 18.45	10.21-11.11/50 21.19	05.21 22.56	20.15-20.35/20 23.55
25	09.24 15.42	07.45 17.24	06.07 18.48	10.24-11.08/44 21.22	05.17 22.59	20.14-20.35/21 23.55
26	09.21 15.46	07.42 17.27	06.04 18.51	10.26-11.05/39 21.25	05.14 23.02	20.14-20.35/21 23.54
27	09.18 15.49	07.38 17.30	06.00 18.54	10.29-11.01/32 21.28	05.10 23.05	20.15-20.35/20 23.53
28	09.15 15.52	07.35 17.33	05.56 18.57	10.33-10.54/21 21.32	05.07 23.08	20.15-20.34/19 23.53
29	09.12 15.56		06.53 20.00		05.03 23.11	20.15-20.34/19 23.52
30	09.09 15.59		06.49 20.03		05.00 23.14	20.15-20.32/17 23.51
31	09.06 16.02		06.46 20.06		03.22 23.17	
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	1020	1805	200	32	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 31 - PUU19
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	03.00 23.49	04.24 22.27	06.00 20.40	07.26 18.53	10.53-12.07/74 16.07	09.35 14.43
2	03.00 23.48	04.28 22.24	06.03 20.36	07.29 18.49	10.53-12.07/74 16.04	09.38 14.41
3	03.01 23.46	04.31 22.20	06.06 20.32	07.32 18.46	10.52-12.07/75 16.00	09.41 14.39
4	03.03 23.44	04.34 22.17	06.09 20.29	07.35 18.42	10.52-12.07/75 15.57	09.44 14.37
5	03.06 23.43	04.37 22.14	06.12 20.25	07.38 18.39	10.51-12.07/76 15.54	09.46 14.35
6	03.08 23.41	04.40 22.10	06.15 20.22	07.41 18.35	10.51-12.06/75 15.51	09.49 14.33
7	03.10 23.39	04.44 22.07	06.18 20.18	07.44 18.32	10.50-12.06/76 15.48	09.51 14.32
8	03.13 23.36	04.47 22.03	06.20 20.15	07.47 18.28	10.51-12.07/76 15.45	09.53 14.30
9	03.15 23.34	04.50 22.00	06.23 20.11	07.50 18.25	10.51-12.06/75 15.41	09.56 14.29
10	03.18 23.32	04.53 21.57	20.29-20.37/8 20.08	06.26 18.21	10.50-12.05/75 15.38	09.58 14.28
11	03.20 23.29	04.56 21.53	20.26-20.39/13 20.04	06.29 18.18	10.50-12.05/75 15.35	10.00 14.27
12	03.23 23.27	04.59 21.50	20.25-20.40/15 20.00	06.32 18.14	10.50-12.04/74 15.32	10.02 14.26
13	03.26 23.24	05.02 21.46	20.23-20.40/17 19.57	06.35 18.11	10.50-12.03/73 15.29	10.04 14.25
14	03.29 23.22	05.06 21.43	20.23-20.41/18 19.53	06.38 18.08	10.51-12.03/72 15.26	10.05 14.24
15	03.32 23.19	05.09 21.39	20.22-20.42/20 19.50	06.41 18.04	11.24-11.43/19 10.51-12.02/71	10.07 15.23
16	03.34 23.16	05.12 21.36	20.22-20.42/20 19.46	06.43 18.01	11.18-11.49/31 10.51-12.01/70	10.08 15.20
17	03.37 23.13	05.15 21.32	20.21-20.41/20 19.43	06.46 17.57	11.15-11.52/37 10.51-12.00/69	10.10 15.18
18	03.40 23.11	05.18 21.29	20.21-20.41/20 19.39	06.49 17.54	11.12-11.55/43 10.53-12.00/67	10.11 15.15
19	03.43 23.08	05.21 21.25	20.21-20.41/20 19.36	06.52 17.50	11.10-11.58/48 10.53-11.59/66	10.12 15.12
20	03.47 23.05	05.24 21.22	20.21-20.41/20 19.32	06.55 17.47	11.07-11.59/52 10.53-11.57/64	10.13 15.09
21	03.50 23.02	05.27 21.18	20.21-20.37/16 19.28	06.58 17.43	11.05-12.01/56 10.55-11.57/62	10.14 15.07
22	03.53 22.59	05.30 21.15	20.22-20.34/12 19.25	07.01 17.40	11.03-12.02/59 10.55-11.55/60	10.14 15.04
23	03.56 22.56	05.33 21.11	20.23-20.31/8 19.21	07.03 17.37	11.02-12.03/61 10.57-11.54/57	10.15 15.01
24	03.59 22.53	05.36 21.08	20.25-20.28/3 19.18	07.06 17.33	11.01-12.04/63 10.58-11.52/54	10.15 14.59
25	04.02 22.49	05.39 21.04	07.09 19.14	10.59-12.05/66 16.30	09.59-10.51/52 14.56	10.15 14.25
26	04.05 22.46	05.42 21.01	07.12 19.11	10.58-12.06/68 16.27	10.00-10.49/49 14.54	10.15 14.26
27	04.09 22.43	05.45 20.57	07.15 19.07	10.56-12.06/70 16.23	10.02-10.48/46 14.51	10.15 14.27
28	04.12 22.40	05.48 20.54	07.18 19.04	10.56-12.06/70 16.20	10.04-10.45/41 14.49	10.15 14.29
29	04.15 22.37	05.51 20.50	07.21 19.00	10.55-12.07/72 16.17	10.06-10.43/37 14.47	10.15 14.30
30	04.18 22.33	05.54 20.47	07.24 18.56	10.54-12.07/73 16.13	10.10-10.41/31 14.45	10.14 14.31
31	04.21 22.30	05.57 20.43		07.57 16.10	10.14-10.37/23 14.43	10.13 14.33
Potential sun hours	608	508	393	305	198	137
Sum of minutes with flicker	0	230	888	1964	12	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 32 - PUU20
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	10.12	09.03	07.31	06.42	04.56	03.19	21.26-21.46/20	02.59	21.40-21.46/6	04.24	21.34-21.37/3	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41	23.20	23.49	23.49	23.49	20.40	18.53	16.07	14.43	14.43	14.43
2	10.12	09.00	07.28	06.39	04.53	03.16	21.27-21.46/19	03.01	21.39-21.47/8	04.28	06.03	07.29	08.04	09.38	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	23.48	22.24	20.36	18.49	16.04	14.40	14.40	14.40
3	10.10	08.57	07.25	06.35	04.50	03.14	21.28-21.45/17	03.01	21.38-21.48/10	04.31	06.06	07.32	08.07	09.41	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	23.46	22.20	20.32	18.46	16.00	14.39	14.39	14.39
4	10.09	08.54	07.21	06.32	04.46	03.11	21.29-21.45/16	03.03	21.38-21.49/11	04.34	06.09	07.35	08.10	09.44	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	23.45	22.17	20.29	18.42	15.57	14.37	14.37	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	21.30-21.45/15	03.05	21.37-21.49/12	04.37	06.12	07.38	08.13	09.46	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	23.43	22.14	20.25	18.39	15.54	14.35	14.35	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	21.30-21.44/14	03.08	21.37-21.51/14	04.40	06.15	07.41	08.17	09.49	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	23.41	22.10	20.22	18.35	15.51	14.33	14.33	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	21.31-21.44/13	03.10	21.36-21.51/15	04.44	06.17	07.44	08.20	09.51	09.51
	14.49	16.26	17.54	20.27	22.01	23.35	23.39	23.39	22.07	20.18	18.32	15.48	14.32	14.32	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	21.32-21.44/12	03.12	21.36-21.52/16	04.47	06.20	07.47	08.23	09.54	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	23.36	22.03	20.15	18.28	15.44	14.30	14.30	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	21.33-21.43/10	03.15	21.36-21.53/17	04.50	06.23	07.50	08.26	09.56	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	23.34	22.00	20.11	18.25	15.41	14.29	14.29	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	21.34-21.43/9	03.17	21.36-21.53/17	04.53	06.26	07.53	08.30	09.58	09.58
	14.56	16.35	18.04	20.36	22.10	23.42	23.32	23.32	21.57	20.08	18.21	15.38	14.28	14.28	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	21.35-21.42/7	03.20	21.35-21.54/19	04.56	06.29	07.56	08.33	10.00	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.29	23.29	21.53	20.04	18.18	15.35	14.26	14.26	14.26
12	09.56	08.29	06.53	06.03	04.19	21.24-21.28/4	02.54	21.36-21.41/5	04.59	06.32	07.59	08.36	10.02	10.02	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	23.27	21.50	20.00	18.14	15.32	14.25	14.25	14.25
13	09.54	08.25	06.50	06.00	04.16	21.22-21.31/9	02.53	21.39-21.40/1	05.02	06.35	08.02	08.39	10.04	10.04	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	23.24	21.46	19.57	18.11	15.29	14.25	14.25	14.25
14	09.52	08.22	06.46	05.56	04.13	21.21-21.33/12	02.52	03.29	21.33-21.55/22	05.06	06.38	08.05	08.43	10.05	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	23.22	21.43	19.53	18.07	15.26	14.24	14.24	14.24
15	09.49	08.19	06.42	05.52	04.09	21.21-21.36/15	02.51	03.31	21.32-21.56/24	05.09	06.41	08.08	08.46	10.07	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	23.19	21.39	19.50	18.04	15.23	14.23	14.23	14.23
16	09.47	08.16	06.39	05.49	04.06	21.21-21.38/17	02.50	03.34	21.32-21.56/24	05.12	06.43	08.11	08.49	10.09	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	23.16	21.36	19.46	18.01	15.20	14.23	14.23	14.23
17	09.45	08.12	06.35	05.45	04.03	21.20-21.40/20	02.50	03.37	21.31-21.56/25	05.15	06.46	08.14	08.52	10.10	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	23.13	21.32	19.43	17.57	15.18	14.22	14.22	14.22
18	09.42	08.09	06.32	05.42	04.00	21.20-21.44/24	02.49	03.40	21.30-21.56/26	05.18	06.49	08.17	08.56	10.11	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	23.11	21.29	19.39	17.54	15.15	14.22	14.22	14.22
19	09.40	08.06	06.28	05.38	03.57	21.19-21.45/26	02.49	03.43	21.31-21.57/26	05.21	06.52	08.20	08.59	10.12	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	23.08	21.25	19.35	17.50	15.12	14.22	14.22	14.22
20	09.37	08.02	06.25	05.35	03.54	21.20-21.46/26	02.49	03.46	21.30-21.57/27	05.24	06.55	08.23	09.02	10.13	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	23.05	21.22	19.32	17.47	15.09	14.22	14.22	14.22
21	09.35	07.59	06.21	05.31	03.50	21.20-21.47/27	02.49	03.50	21.30-21.56/26	05.27	06.58	08.26	09.05	10.14	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	23.02	21.18	19.28	17.43	15.06	14.23	14.23	14.23
22	09.32	07.55	06.18	05.28	03.47	21.20-21.46/26	02.49	03.53	21.30-21.57/27	05.30	07.01	08.29	09.08	10.14	10.14
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	22.59	21.15	19.25	17.40	15.04	14.23	14.23	14.23
23	09.29	07.52	06.14	05.24	03.44	21.20-21.46/26	02.50	03.56	21.30-21.56/26	05.33	07.03	08.32	09.11	10.15	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	22.56	21.11	19.21	17.37	15.01	14.23	14.23	14.23
24	09.27	07.49	06.11	05.21	03.41	21.21-21.47/26	02.50	03.59	21.30-21.57/27	05.36	07.06	08.35	09.15	10.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.53	22.53	21.08	19.18	17.33	14.59	14.24	14.24	14.24
25	09.24	07.45	06.07	05.17	03.38	21.21-21.47/26	02.51	04.02	21.30-21.55/25	05.39	07.09	08.38	09.18	10.15	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	22.49	21.04	19.14	16.30	14.56	14.25	14.25	14.25
26	09.21	07.42	06.04	05.14	03.35	21.22-21.47/25	02.52	04.05	21.30-21.53/23	05.42	07.12	08.41	09.21	10.15	10.15
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	22.46	21.01	19.11	16.27	14.54	14.26	14.26	14.26
27	09.18	07.38	06.00	05.10	03.33	21.22-21.47/25	02.53	04.08	21.31-21.50/19	05.45	07.15	08.45	09.24	10.15	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	22.43	20.57	19.07	16.23	14.51	14.27	14.27	14.27
28	09.15	07.35	05.56	05.07	03.30	21.23-21.47/24	02.54	04.12	21.32-21.48/16	05.48	07.18	08.48	09.27	10.15	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	22.40	20.54	19.04	16.20	14.49	14.28	14.28	14.28
29	09.12	07.35	05.53	05.03	03.27	21.23-21.47/24	02.56	04.15	21.31-21.45/14	05.51	07.21	08.51	09.30	10.15	10.15
	15.56	17.37	19.00	21.35	23.11	23.52	22.37	22.37	20.50	19.00	16.17	14.47	14.30	14.30	14.30
30	09.09	07.49	06.09	05.00	03.24	21.24-21.46/22	02.58	21.41-21.45/4	04.18	21.33-21.43/10	05.54	07.24	08.54	09.33	10.14
	15.59	17.40	19.03	21.38	23.14	23.51	22.33	22.33	20.47	18.56	16.13	14.45	14.31	14.31	14.31
31	09.06	07.46	06.06	05.00	03.21	21.25-21.46/21	02.59	04.21	21.33-21.39/6	05.57	07.27	08.97	09.76	10.13	10.13
	16.02	17.43	19.06	21.40	23.17	23.54	22.30	2							

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 33 - PUU21
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.50	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 34 - PUU22
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 35 - PUU23
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.11	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 36 - PUU24
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December				
1	10.12	09.03	07.31	06.42	04.56	19.08-19.48/40	03.19	21.11-21.47/36	02.59	21.18-21.53/35	04.24	21.33-21.34/1	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41		23.20	18.46-20.14/88	23.49	18.51-20.21/90	22.27	19.03-20.14/71	20.39	18.53	16.07	14.43
2	10.11	09.00	07.28	06.39	04.53	19.06-19.51/45	03.16	21.11-21.47/36	03.01	21.18-21.53/35	04.28	19.04-20.14/70	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44		23.22	18.46-20.14/88	23.48	18.51-20.21/90	22.23		20.36	18.49	16.04	14.41
3	10.10	08.57	07.24	06.35	04.50	19.04-19.53/49	03.14	21.11-21.47/36	03.01	21.18-21.53/35	04.31	19.05-20.12/67	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48		23.25	18.46-20.14/88	23.46	18.51-20.21/90	22.20		20.32	18.46	16.00	14.39
4	10.09	08.54	07.21	06.31	04.46	19.02-19.55/53	03.12	21.11-21.48/37	03.03	21.18-21.54/36	04.34	19.06-20.11/65	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51		23.28	18.46-20.15/89	23.44	18.52-20.22/90	22.17		20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	19.00-19.56/56	03.09	21.12-21.48/36	03.05	21.18-21.54/36	04.37	19.07-20.10/63	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54		23.30	18.47-20.16/89	23.43	18.52-20.21/89	22.13		20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	19.00-19.59/59	03.07	21.12-21.48/36	03.08	21.18-21.54/36	04.40	19.08-20.08/60	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57		23.33	18.46-20.16/90	23.39	18.53-20.22/89	22.10		20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	18.58-20.00/62	03.05	21.12-21.48/36	03.10	21.18-21.54/36	04.44	19.09-20.07/58	06.17	07.44	08.20	09.51
	14.49	16.25	17.54	20.27	22.01		23.35	18.46-20.16/90	23.39	18.52-20.21/89	22.07		20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	18.57-20.01/64	03.03	21.13-21.48/35	03.12	21.18-21.54/36	04.47	19.11-20.06/55	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04		23.38	18.47-20.16/89	23.36	18.53-20.22/89	22.03		20.15	18.28	15.44	14.30
9	10.01	08.38	07.04	06.14	04.29	18.56-20.02/66	03.01	21.13-21.48/35	03.15	21.18-21.55/37	04.50	19.13-20.04/51	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07		23.40	18.47-20.16/89	23.34	18.53-20.22/89	22.00		20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	18.54-20.03/69	02.57	21.14-21.49/35	03.18	21.19-21.55/36	04.53	19.14-20.01/47	06.26	07.53	08.29	09.58
	14.56	16.35	18.04	20.36	22.10		23.42	18.47-20.16/89	23.32	18.54-20.22/88	21.57		20.07	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	18.53-20.03/70	02.56	21.14-21.48/34	03.20	21.19-21.55/36	04.56	19.16-19.59/43	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14		23.44	18.47-20.17/90	23.29	18.54-20.22/88	21.53		20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	21.20-21.27/7	02.54	21.14-21.48/34	03.23	21.19-21.55/36	04.59	19.18-19.57/39	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	18.53-20.05/72	02.56	21.15-21.49/34	23.27	18.53-20.21/88	21.50		20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	06.00	04.16	21.17-21.30/13	02.53	21.18-21.49/34	03.26	21.18-21.55/37	05.02	19.20-19.53/33	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	18.52-20.05/73	23.47	18.48-20.17/89	23.24	18.54-20.21/87	21.46		19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	21.15-21.31/16	02.52	21.15-21.49/34	03.29	21.19-21.55/36	05.06	19.24-19.50/26	06.38	08.05	08.42	10.05
	15.08	16.48	18.16	20.48	22.23	18.51-20.06/75	23.49	18.47-20.17/90	23.22	18.55-20.22/87	21.43		19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	21.14-21.33/19	02.51	21.16-21.50/34	03.31	21.19-21.55/36	05.09	19.29-19.45/16	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	18.51-20.07/76	23.50	18.48-20.18/90	23.19	18.55-20.22/87	21.39		19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	21.13-21.35/22	02.50	21.15-21.49/34	03.34	21.19-21.55/36	05.12		06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	18.50-20.07/77	23.52	18.48-20.18/90	23.16	18.55-20.22/87	21.36		19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	21.12-21.37/25	02.50	21.16-21.49/33	03.37	21.19-21.55/36	05.15		06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	18.49-20.07/78	23.53	18.48-20.18/90	23.13	18.56-20.21/85	21.32		19.43	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00	21.11-21.39/28	02.49	21.16-21.50/34	03.40	21.19-21.54/35	05.18		06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	18.49-20.08/79	23.54	18.48-20.18/90	23.10	18.56-20.21/85	21.29		19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57	21.10-21.40/30	02.49	21.17-21.50/33	03.43	21.20-21.55/35	05.21		06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	18.48-20.08/80	23.54	18.49-20.19/90	23.08	18.57-20.22/85	21.25		19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54	21.10-21.41/31	02.49	21.17-21.50/33	03.46	21.20-21.54/34	05.24		06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	18.48-20.09/81	23.55	18.49-20.19/90	23.05	18.57-20.21/84	21.22		19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	21.10-21.43/33	02.49	21.17-21.50/33	03.50	21.19-21.53/34	05.27		06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	18.48-20.10/82	23.55	18.49-20.19/90	23.02	18.57-20.20/83	21.18		19.28	17.43	15.06	14.23
22	09.32	07.55	06.18	05.28	03.47	21.09-21.43/34	02.49	21.17-21.50/33	03.53	21.20-21.53/33	05.30		07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	18.47-20.10/83	23.55	18.49-20.19/90	22.59	18.58-20.21/83	21.15		19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	21.09-21.44/35	02.50	21.18-21.51/33	03.56	21.20-21.52/32	05.33		07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	18.47-20.11/84	23.55	18.50-20.20/90	22.56	18.58-20.20/82	21.11		19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	21.10-21.44/34	02.50	21.18-21.51/33	03.59	21.20-21.52/32	05.36		07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	18.47-20.11/84	23.55	18.50-20.20/90	22.52	18.58-20.19/81	21.08		19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	21.10-21.45/35	02.51	21.18-21.52/34	04.02	21.21-21.50/29	05.39		07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	18.47-20.12/85	23.55	18.50-20.20/90	22.49	18.59-20.19/80	21.04		19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	21.10-21.45/35	02.52	21.18-21.51/33	04.05	21.22-21.49/27	05.42		07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	18.47-20.12/85	23.54	18.50-20.20/90	22.46	18.59-20.18/79	21.01		19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.33	21.10-21.46/36	02.53	21.18-21.52/34	04.08	21.23-21.47/24	05.45		07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	18.46-20.13/87	23.54	18.50-20.20/90	22.43	19.00-20.18/78	20.57		19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	21.10-21.46/36	02.55	21.18-21.52/34	04.12	21.24-21.45/21	05.48		07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	18.46-20.13/87	23.53	18.51-20.21/90	22.40	19.01-20.18/77	20.54		19.03	16.20	14.49	14.28
29	09.12	07.32	05.53	05.03	03.27	21.10-21.46/36	02.56	21.18-21.53/35	04.15	21.25-21.42/17	05.51		07.21	07.51	09.30	10.15
	15.56	17.37	19.01	21.35	23.11	18.46-20.13/87	23.52	18.51-20.21/90	22.37	19.01-20.17/76	20.50		19.00	16.17	14.47	14.30
30	09.09	07.30	05.51	05.00	03.24	21.10-21.47/37	02.58	21.18-21.53/35	04.18	21.26-21.41/15	05.54		07.23	07.54	09.33	10.14
	15.59	17.40	19.04	21.38	23.14	18.46-20.13/87	23.51	18.51-20.21/90	22.33	19.02-20.16/74	20.47		18.56	16.13	1	

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 37 - PUU25
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.07	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 38 - PUU26
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 39 - PUU27
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 40 - PUU28
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04 13.15-13.31/16	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36 12.51-13.05/14
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00 13.17-13.29/12	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38 12.53-13.05/12
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57 13.21-13.25/4	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41 12.54-13.03/9
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44 12.57-13.01/4
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04 13.14-13.17/3	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23 12.51-12.56/5	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02 13.11-13.19/8	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26 12.47-13.00/13	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00 13.10-13.21/11	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.30 12.46-13.01/15	09.58
	14.56	16.35	18.03	20.36	22.10	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58 13.09-13.23/14	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33 12.44-13.03/19	10.00
	14.59	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56 13.09-13.25/16	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36 12.43-13.04/21	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54 13.08-13.26/18	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.39 12.43-13.04/21	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52 13.09-13.27/18	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43 12.43-13.06/23	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50 13.08-13.28/20	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46 12.42-13.06/24	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47 13.08-13.29/21	08.16	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.11	08.49 12.42-13.06/24	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45 13.08-13.30/22	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.14	08.52 12.43-13.07/24	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42 13.07-13.30/23	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56 12.42-13.07/25	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40 13.07-13.31/24	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59 12.42-13.07/25	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37 13.07-13.31/24	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02 12.43-13.07/24	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35 13.08-13.32/24	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05 12.44-13.08/24	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32 13.08-13.32/24	07.55	06.18	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08 12.44-13.07/23	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30 13.08-13.33/25	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12 12.44-13.08/24	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27 13.08-13.33/25	07.49	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15 12.45-13.08/23	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24 13.09-13.33/24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18 12.45-13.07/22	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21 13.09-13.33/24	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21 12.46-13.07/21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18 13.10-13.33/23	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24 12.47-13.07/20	10.16
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15 13.10-13.33/23	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27 12.48-13.06/18	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12 13.11-13.32/21		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30 12.49-13.06/17	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10 13.12-13.32/20		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33 12.51-13.06/15	10.14
	15.58		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07 13.13-13.31/18		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	473	32	0	0	0	0	0	0	0	0	470	39

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 41 - PUU29
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.28
11	09.58	08.32	06.56	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.29	14.25
14	09.51	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.50	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.53	05.30	07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.50	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.37	15.01	14.23
24	09.27	07.48	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.58	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 42 - PUU30
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.03	03.12	04.47	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 43 - PUU31
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 44 - PUU32
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 45 - PUU33
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	11.54-11.59/5	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	11.52-12.01/9	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	11.52-12.03/11	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	11.52-12.05/13	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	11.50-12.05/15	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	11.50-12.07/17	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.30
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	11.50-12.07/17	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33
	14.58	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	11.50-12.09/19	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	11.49-12.10/21	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.35	08.01	08.39
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	11.50-12.11/21	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	11.49-12.11/22	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	11.49-12.12/23	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.45
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	11.50-12.13/23	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.14	08.52
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	11.49-12.13/24	08.09	06.32	05.42	03.59	02.48	03.40	05.17	06.49	08.17	08.56
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	11.49-12.14/25	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.37	11.50-12.14/24	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02
	15.26	17.07	18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	11.50-12.15/25	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	11.50-12.15/25	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	11.51-12.15/24	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	11.51-12.15/24	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24	11.52-12.15/23	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	11.52-12.15/23	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	11.53-12.15/22	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	11.54-12.15/21	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.48	14.28
29	09.12	11.55-12.14/19		05.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30
	15.55			20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46
30	09.09	11.56-12.13/17		05.49	05.00	03.23	02.57	04.17	05.54	07.23	07.54	09.33
	15.58			20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44
31	09.06	11.57-12.11/14		05.45		03.21		04.21	05.57		07.57	
	16.02			20.06		23.17		22.30	20.43		16.10	
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	526	9	0	0	0	0	0	0	0	0	450	88

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 46 - PUU34
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.12 14.35	09.03 16.05	07.31 17.36	06.42 20.09	04.56 21.41	03.19 23.20	04.18-04.34/16 23.49	02.59 23.49	04.19-04.45/26 22.27	04.24 20.39	07.26 18.53	08.00 16.07	09.35 14.42
2	10.11 14.37	09.00 16.09	07.28 17.39	06.38 20.12	04.53 21.44	03.16 23.22	04.17-04.35/18 23.48	03.01 23.48	04.19-04.44/25 22.23	04.27 20.36	06.03 18.49	08.03 16.03	09.38 14.40
3	10.10 14.39	08.57 16.12	07.24 17.42	06.35 20.15	04.49 21.48	03.14 23.25	04.16-04.35/19 23.46	03.01 23.46	04.19-04.44/25 22.20	04.31 20.32	06.06 18.46	07.32 16.00	09.41 14.38
4	10.09 14.41	08.54 16.15	07.21 17.45	06.31 20.18	04.46 21.51	03.11 23.28	04.16-04.37/21 23.45	03.03 23.45	04.20-04.45/25 22.17	04.34 20.29	06.09 18.42	07.35 15.57	09.44 14.36
5	10.08 14.43	08.51 16.19	07.17 17.48	06.28 20.21	04.43 21.54	03.09 23.30	04.16-04.38/22 23.43	03.05 23.43	04.20-04.44/24 22.13	04.37 20.25	06.11 18.39	07.38 15.54	09.46 14.35
6	10.06 14.46	08.48 16.22	07.14 17.51	06.24 20.24	04.39 21.57	03.07 23.33	04.15-04.38/23 23.41	03.07 23.41	04.21-04.44/23 22.10	04.40 20.22	06.14 18.35	07.41 15.51	09.49 14.33
7	10.05 14.48	08.45 16.25	07.10 17.54	06.21 20.27	04.36 22.01	03.05 23.35	04.15-04.38/23 23.39	03.10 23.39	04.21-04.44/23 22.07	04.43 20.18	06.17 18.32	07.44 15.47	09.51 14.31
8	10.03 14.51	08.42 16.29	07.07 17.57	06.17 20.30	04.32 22.04	03.02 23.38	04.15-04.39/24 23.36	03.12 23.36	04.22-04.44/22 22.03	04.46 20.14	06.20 18.28	07.47 15.44	09.53 14.30
9	10.01 14.53	08.38 16.32	07.03 18.00	06.14 20.33	04.29 22.07	03.01 23.40	04.15-04.40/25 23.34	03.15 23.34	04.23-04.43/20 22.00	04.50 20.11	06.23 18.25	07.50 15.41	09.56 14.29
10	10.00 14.56	08.35 16.35	07.00 18.03	06.10 20.36	04.26 22.10	02.57 23.42	04.15-04.40/25 23.32	03.17 23.32	04.24-04.43/19 21.56	04.53 20.07	06.26 18.21	07.53 15.38	09.58 14.27
11	09.58 14.59	08.32 16.38	06.56 18.06	06.06 20.39	04.22 22.14	02.56 23.44	04.15-04.40/25 23.29	03.20 23.29	04.26-04.43/17 21.53	04.56 20.04	06.29 18.18	07.56 15.35	10.00 14.26
12	09.56 15.02	08.29 16.42	06.53 18.09	06.03 20.42	04.19 22.17	02.54 23.46	04.14-04.40/26 23.27	03.23 23.27	04.26-04.41/15 21.50	04.59 20.00	06.32 18.14	07.58 15.32	10.02 14.25
13	09.54 15.05	08.25 16.45	06.49 18.12	05.59 20.45	04.16 22.20	02.53 23.48	04.15-04.41/26 23.24	03.25 23.24	04.28-04.40/12 21.46	05.02 19.57	06.35 18.11	08.01 15.29	10.04 14.24
14	09.52 15.07	08.22 16.48	06.46 18.15	05.56 20.48	04.12 22.23	02.52 23.49	04.15-04.41/26 23.22	03.28 23.22	04.31-04.39/8 21.43	05.05 19.53	06.37 18.07	08.04 15.26	10.05 14.24
15	09.49 15.10	08.19 16.52	06.42 18.18	05.52 20.51	04.09 22.27	02.51 23.51	04.15-04.42/27 23.19	03.31 23.19	05.08 21.39	06.40 19.50	08.07 18.04	08.46 15.23	10.07 14.23
16	09.47 15.13	08.15 16.55	06.39 18.21	05.49 20.54	04.06 22.30	02.50 23.52	04.15-04.42/27 23.16	03.34 23.16	05.12 21.36	06.43 19.46	08.10 18.00	08.49 15.20	10.08 14.22
17	09.45 15.17	08.12 16.58	06.35 18.24	05.45 20.57	04.03 22.33	02.49 23.53	04.15-04.42/27 23.13	03.37 23.13	05.15 21.32	06.46 19.42	08.14 17.57	08.52 15.17	10.10 14.22
18	09.42 15.20	08.09 17.01	06.32 18.27	05.42 21.00	04.00 22.36	02.49 23.54	04.15-04.43/28 23.10	03.40 23.10	05.18 21.29	06.49 19.39	08.17 17.53	08.55 15.14	10.11 14.22
19	09.40 15.23	08.05 17.04	06.28 18.30	05.38 21.03	03.56 22.40	02.49 23.54	04.16-04.43/27 23.08	03.43 23.08	05.21 21.25	06.52 19.35	08.20 17.50	08.59 15.12	10.12 14.22
20	09.37 15.26	08.02 17.08	06.25 18.33	05.35 21.06	03.53 22.43	02.48 23.55	04.16-04.43/27 23.05	03.46 23.05	05.24 21.22	06.55 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	09.35 15.29	07.59 17.11	06.21 18.36	05.31 21.10	03.50 22.46	02.49 23.55	04.16-04.43/27 23.02	03.49 23.02	05.27 21.18	06.57 19.28	08.26 17.43	09.05 15.06	10.14 14.22
22	09.32 15.32	07.55 17.14	06.18 18.39	05.28 21.13	03.47 22.49	02.49 23.56	04.16-04.43/27 22.59	03.52 22.59	05.30 21.15	07.00 19.25	08.29 17.40	09.08 15.04	10.14 14.23
23	09.29 15.36	07.52 17.17	06.14 18.42	05.24 21.16	03.44 22.52	02.49 23.56	04.17-04.44/27 22.56	03.55 22.56	05.33 21.11	07.03 19.21	08.32 17.36	09.11 15.01	10.15 14.23
24	09.27 15.39	07.48 17.20	06.10 18.45	05.21 21.19	03.41 22.56	02.50 23.55	04.16-04.44/28 22.52	03.59 22.52	05.36 21.08	07.06 19.18	08.35 17.33	09.14 14.58	10.15 14.24
25	09.24 15.42	07.45 17.23	06.07 18.48	05.17 21.22	03.38 22.59	02.51 23.55	04.17-04.44/27 22.49	04.02 22.49	05.39 21.04	07.09 19.14	07.38 16.30	09.18 14.56	10.15 14.25
26	09.21 15.45	07.42 17.27	06.03 18.51	05.14 21.25	03.35 23.02	02.52 23.55	04.17-04.44/27 22.46	04.05 22.46	05.42 21.01	07.12 19.10	07.41 16.26	09.21 14.53	10.15 14.26
27	09.18 15.49	07.38 17.30	06.00 18.54	05.10 21.28	03.32 23.05	02.53 23.54	04.17-04.44/27 22.43	04.08 22.43	05.45 20.57	07.15 19.07	07.44 16.23	09.24 14.51	10.15 14.27
28	09.15 15.52	07.35 17.33	05.56 18.57	05.07 21.32	03.29 23.08	02.54 23.53	04.18-04.45/27 22.40	04.11 22.40	05.48 20.54	07.18 19.03	07.48 16.20	09.27 14.49	10.15 14.28
29	09.12 15.55	07.32 17.36	05.53 18.53	05.03 21.35	03.27 23.11	02.56 23.52	04.18-04.45/27 22.37	04.15 22.37	05.51 20.50	07.20 19.00	07.51 16.16	09.30 14.47	10.15 14.30
30	09.09 15.59	07.30 17.39	06.49 18.54	05.00 21.38	03.24 23.14	02.57 23.51	04.19-04.45/26 22.33	04.18 22.33	05.54 20.46	07.23 18.56	07.54 16.13	09.33 14.44	10.14 14.31
31	09.06 16.02	07.27 17.42	06.46 18.57	05.00 21.41	03.21 23.17	03.21 23.50	04.19-04.32/13 22.30	04.21 22.30	05.57 20.43	07.57 18.56	07.57 16.10	10.13 14.33	10.13 14.33
Potential sun hours	171	238	363	451	570	624	752	864	939	1005	1055	1095	1130
Sum of minutes with flicker	0	0	0	0	29	624	752	864	939	1005	1055	1095	1130

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 47 - PUU35
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 48 - PUU36
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 49 - PUU37
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38
	14.36	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.29
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.17	04.52	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.58	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.22
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.48	03.40	05.17	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.46	15.09	14.21
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.38	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.17	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.19	14.48	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.23	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 50 - PUU38
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.12	09.03	07.31	06.42	04.56	03.19 05.13-06.08/55
	14.35	16.05	17.36	20.09	21.41	23.19
2	10.11	09.00	07.28	06.38	04.53	03.16 05.13-06.07/54
	14.37	16.09	17.39	20.12	21.44	23.22
3	10.10	08.57	07.24	06.35	04.49 05.42-05.53/11	03.14 05.12-06.07/55
	14.39	16.12	17.42	20.15	21.47	23.25
4	10.09	08.54	07.21	06.31	04.46 05.39-05.56/17	03.11 05.13-06.07/54
	14.41	16.15	17.45	20.18	21.51	23.28
5	10.08	08.51	07.17	06.28	04.43 05.36-05.58/22	03.09 05.13-06.07/54
	14.44	16.19	17.48	20.21	21.54	23.30
6	10.06	08.48	07.14	06.24	04.39 05.34-06.00/26	03.07 05.13-06.06/53
	14.46	16.22	17.51	20.24	21.57	23.33
7	10.05	08.45	07.10	06.21	04.36 05.34-06.02/28	03.05 05.13-06.07/54
	14.48	16.25	17.54	20.27	22.00	23.35
8	10.03	08.41	07.07	06.17	04.32 05.32-06.03/31	03.03 05.14-06.07/53
	14.51	16.29	17.57	20.30	22.04	23.37
9	10.01	08.38	07.03	06.14	04.29 05.31-06.03/32	03.01 05.14-06.07/53
	14.54	16.32	18.00	20.33	22.07	23.40
10	09.59	08.35	07.00	06.10	04.26 05.26-06.04/38	02.57 05.14-06.06/52
	14.56	16.35	18.03	20.36	22.10	23.42
11	09.57	08.32	06.56	06.06	04.22 05.24-06.04/40	02.56 05.14-06.06/52
	14.59	16.39	18.06	20.39	22.13	23.44
12	09.56	08.28	06.53	06.03	04.19 05.22-06.06/44	02.54 05.14-06.06/52
	15.02	16.42	18.09	20.42	22.17	23.45
13	09.53	08.25	06.49	05.59	04.16 05.20-06.06/46	02.53 05.15-06.07/52
	15.05	16.45	18.12	20.45	22.20	23.47
14	09.51	08.22	06.46	05.56	04.13 05.19-06.06/47	02.52 05.15-06.06/51
	15.08	16.48	18.15	20.48	22.23	23.49
15	09.49	08.19	06.42 07.15-07.22/7	05.52	04.09 05.18-06.07/49	02.51 05.15-06.07/52
	15.11	16.52	18.18	20.51	22.26	23.50
16	09.47	08.15	06.39 07.11-07.24/13	05.49	04.06 05.17-06.07/50	02.50 05.15-06.06/51
	15.14	16.55	18.21	20.54	22.30	23.51
17	09.44	08.12	06.35 07.07-07.25/18	05.45	04.03 05.15-06.07/52	02.50 05.16-06.06/50
	15.17	16.58	18.24	20.57	22.33	23.52
18	09.42	08.09	06.32 07.06-07.27/21	05.42	04.00 05.15-06.07/52	02.49 05.16-06.07/51
	15.20	17.01	18.27	21.00	22.36	23.53
19	09.40	08.05	06.28 07.04-07.27/23	05.38	03.57 05.14-06.07/53	02.49 05.16-06.07/51
	15.23	17.04	18.30	21.03	22.39	23.54
20	09.37	08.02	06.25 07.04-07.28/24	05.35	03.53 05.14-06.07/53	02.49 05.16-06.07/51
	15.26	17.08	18.33	21.06	22.43	23.55
21	09.34	07.59	06.21 07.03-07.27/24	05.31	03.50 05.14-06.08/54	02.49 05.16-06.07/51
	15.29	17.11	18.36	21.09	22.46	23.55
22	09.32	07.55	06.17 07.02-07.27/25	05.28	03.47 05.13-06.07/54	02.49 05.16-06.07/51
	15.32	17.14	18.39	21.12	22.49	23.55
23	09.29	07.52	06.14 07.02-07.27/25	05.24	03.44 05.13-06.08/55	02.50 05.17-06.08/51
	15.36	17.17	18.42	21.16	22.52	23.55
24	09.26	07.48	06.10 07.01-07.26/25	05.21	03.41 05.13-06.08/55	02.50 05.17-06.08/51
	15.39	17.20	18.45	21.19	22.55	23.55
25	09.24	07.45	06.07 07.02-07.26/24	05.17	03.38 05.13-06.08/55	02.51 05.18-06.09/51
	15.42	17.23	18.48	21.22	22.58	23.55
26	09.21	07.41	06.03 07.02-07.25/23	05.14	03.35 05.13-06.08/55	02.52 05.17-06.08/51
	15.45	17.27	18.51	21.25	23.02	23.54
27	09.18	07.38	06.00 07.03-07.24/21	05.10	03.32 05.13-06.08/55	02.53 05.18-06.09/51
	15.49	17.30	18.54	21.28	23.05	23.53
28	09.15	07.35	05.56 07.03-07.22/19	05.07	03.30 05.13-06.08/55	02.54 05.18-06.09/51
	15.52	17.33	18.57	21.31	23.08	23.53
29	09.12		06.53 08.05-08.20/15	05.03	03.27 05.12-06.08/56	02.56 05.18-06.10/52
	15.55		20.00	21.35	23.11	23.51
30	09.09		06.49 08.07-08.17/10	05.00	03.24 05.12-06.07/55	02.58 05.18-06.10/52
	15.59		20.03	21.38	23.14	23.50
31	09.06		06.46		03.21 05.12-06.07/55	
	16.02		20.06		23.16	
Potential sun hours	171	238	363	451	570	624
Sum of minutes with flicker	0	0	317	0	1295	1562

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 50 - PUU38
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 05.18-06.11/53 23.49	04.24 05.33-06.15/42 22.27	06.00 20.39	07.26 18.53	08.00 16.07	09.35 14.42
2	03.01 05.18-06.11/53 23.47	04.27 05.35-06.15/40 22.23	06.03 20.36	07.29 18.49	08.03 16.03	09.38 14.40
3	03.01 05.18-06.11/53 23.46	04.31 05.38-06.14/36 22.20	06.06 20.32	07.32 18.46	08.07 16.00	09.41 14.38
4	03.03 05.19-06.12/53 23.44	04.34 05.41-06.13/32 22.17	06.09 20.29	07.35 18.42	08.10 15.57	09.43 14.37
5	03.05 05.19-06.12/53 23.42	04.37 05.43-06.12/29 22.13	06.11 20.25	07.38 18.39	08.13 15.54	09.46 14.35
6	03.08 05.19-06.13/54 23.40	04.40 05.43-06.10/27 22.10	06.14 20.22	07.41 18.35	08.16 15.51	09.48 14.33
7	03.10 05.19-06.13/54 23.38	04.43 05.45-06.09/24 22.06	06.17 20.18	07.44 18.32	08.19 15.47	09.51 14.32
8	03.12 05.20-06.14/54 23.36	04.47 05.47-06.08/21 22.03	06.20 20.14	07.47 18.28	08.23 15.44	09.53 14.30
9	03.15 05.20-06.14/54 23.34	04.50 05.49-06.05/16 22.00	06.23 20.11	07.50 18.25	08.26 15.41	09.55 14.29
10	03.17 05.20-06.15/55 23.31	04.53 05.52-06.01/9 21.56	06.26 20.07	07.52 18.21	08.29 15.38	09.58 14.28
11	03.20 05.21-06.15/54 23.29	04.56 21.53	06.29 20.04	07.55 18.18	08.32 15.35	10.00 14.26
12	03.23 05.21-06.16/55 23.27	04.59 21.49	06.32 20.00	07.58 18.14	08.36 15.32	10.02 14.25
13	03.26 05.20-06.16/56 23.24	05.02 21.46	06.35 07.59-08.07/8 19.57	08.01 18.11	08.39 15.29	10.03 14.24
14	03.28 05.21-06.17/56 23.21	05.05 21.43	06.37 07.55-08.09/14 19.53	08.04 18.07	08.42 15.26	10.05 14.24
15	03.31 05.21-06.17/56 23.19	05.08 21.39	06.40 07.53-08.11/18 19.49	08.07 18.04	08.45 15.23	10.07 14.23
16	03.34 05.22-06.17/55 23.16	05.12 21.36	06.43 07.52-08.12/20 19.46	08.10 18.00	08.49 15.20	10.08 14.23
17	03.37 05.22-06.17/55 23.13	05.15 21.32	06.46 07.51-08.13/22 19.42	08.13 17.57	08.52 15.17	10.09 14.22
18	03.40 05.22-06.17/55 23.10	05.18 21.29	06.49 07.50-08.14/24 19.39	08.16 17.53	08.55 15.15	10.11 14.22
19	03.43 05.23-06.18/55 23.07	05.21 21.25	06.52 07.48-08.13/25 19.35	08.19 17.50	08.58 15.12	10.12 14.22
20	03.46 05.23-06.18/55 23.04	05.24 21.22	06.55 07.48-08.13/25 19.32	08.23 17.47	09.02 15.09	10.13 14.22
21	03.49 05.23-06.17/54 23.01	05.27 21.18	06.57 07.47-08.13/26 19.28	08.26 17.43	09.05 15.06	10.13 14.22
22	03.52 05.24-06.18/54 22.58	05.30 21.15	07.00 07.47-08.12/25 19.25	08.29 17.40	09.08 15.04	10.14 14.23
23	03.56 05.24-06.18/54 22.55	05.33 21.11	07.03 07.48-08.12/24 19.21	08.32 17.36	09.11 15.01	10.15 14.23
24	03.59 05.24-06.18/54 22.52	05.36 21.08	07.06 07.48-08.11/23 19.17	08.35 17.33	09.14 14.59	10.15 14.24
25	04.02 05.25-06.18/53 22.49	05.39 21.04	07.09 07.48-08.10/22 19.14	07.38 16.30	09.17 14.56	10.15 14.25
26	04.05 05.25-06.18/53 22.46	05.42 21.01	07.12 07.48-08.08/20 19.10	07.41 16.26	09.20 14.54	10.15 14.26
27	04.08 05.27-06.17/50 22.43	05.45 20.57	07.15 07.51-08.06/15 19.07	07.44 16.23	09.23 14.51	10.15 14.27
28	04.11 05.28-06.18/50 22.40	05.48 20.53	07.18 07.54-08.03/9 19.03	07.47 16.20	09.26 14.49	10.15 14.28
29	04.15 05.28-06.17/49 22.36	05.51 20.50	07.20 19.00	07.51 16.16	09.29 14.47	10.14 14.30
30	04.18 05.30-06.17/47 22.33	05.54 20.46	07.23 18.56	07.54 16.13	09.32 14.44	10.14 14.31
31	04.21 05.31-06.15/44 22.30	05.57 20.43		07.57 16.10		10.13 14.33
Potential sun hours	608	508	393	305	198	137
Sum of minutes with flicker	1650	276	320	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 51 - PUU39
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	10.12	09.03	07.31	06.42	04.56	03.19	04.18-04.19/1	02.59	04.13-04.34/21	04.24	06.00	06.39-06.47/8	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19		23.49		22.27	20.39		18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	04.16-04.22/6	03.01	04.13-04.34/21	04.27	06.03		07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22		23.48		22.23	20.36		18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14	04.14-04.23/9	03.01	04.13-04.33/20	04.31	06.06		07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25		23.46		22.20	20.32		18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	04.13-04.25/12	03.03	04.14-04.34/20	04.34	06.09		07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28		23.44		22.17	20.29		18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09	04.12-04.26/14	03.05	04.15-04.33/18	04.37	06.11		07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30		23.42		22.13	20.25		18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	04.10-04.26/16	03.07	04.16-04.33/17	04.40	06.14		07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33		23.40		22.10	20.22		18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	04.09-04.27/18	03.10	04.17-04.32/15	04.43	06.17		07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35		23.38		22.07	20.18		18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.03	04.09-04.28/19	03.12	04.19-04.32/13	04.46	06.20		07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.37		23.36		22.03	20.14		18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.01	04.09-04.29/20	03.15	04.21-04.31/10	04.50	06.23		07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40		23.34		22.00	20.11		18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	04.09-04.29/20	03.17	04.23-04.30/7	04.53	06.26		07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42		23.32		21.56	20.07		18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.56	04.08-04.30/22	03.20	04.25-04.29/4	04.56	06.29		07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44		23.29		21.53	20.04		18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	04.08-04.30/22	03.23		04.59	06.32		07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46		23.27		21.49	20.00		18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	04.09-04.31/22	03.25		05.02	06.35		08.01	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.47		23.24		21.46	19.57		18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52	04.08-04.31/23	03.28		05.05	06.37		08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49		23.21		21.43	19.53		18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	04.09-04.32/23	03.31		05.08	06.40		08.07	08.46	10.07
	15.10	16.52	18.18	20.51	22.26	23.50		23.19		21.39	19.49		18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	04.08-04.31/23	03.34		05.11	06.41-06.48/7		08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52		23.16		21.36	19.46		18.00	15.20	14.23
17	09.44	08.12	06.35	05.45	04.03	02.49	04.09-04.32/23	03.37		05.15	06.37-06.50/13		08.13	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53		23.13		21.32	19.42		17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	04.09-04.32/23	03.40		05.18	06.36-06.52/16		08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54		23.10		21.29	19.39		17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	04.00	02.49	04.09-04.33/24	03.43		05.21	06.35-06.53/18		08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54		23.07		21.25	19.35		17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	04.00	02.49	04.09-04.33/24	03.46		05.24	06.34-06.54/20		08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55		23.04		21.22	19.32		17.47	15.09	14.22
21	09.34	07.59	06.21	05.31	04.00	02.49	04.09-04.33/24	03.49		05.27	06.32-06.54/22		08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55		23.01		21.18	19.28		17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	04.00	02.49	04.09-04.33/24	03.52		05.30	06.31-06.55/24		08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.55		22.58		21.15	19.25		17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	04.00	02.49	04.10-04.34/24	03.56		05.33	06.31-06.55/24		08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.55		22.55		21.11	19.21		17.36	15.01	14.23
24	09.26	07.48	06.10	05.21	04.00	02.50	04.10-04.33/23	03.59		05.36	06.31-06.55/24		08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55		22.52		21.08	19.17		17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	04.00	02.51	04.11-04.34/23	04.02		05.39	06.30-06.54/24		07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55		22.49		21.04	19.14		16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	04.00	02.52	04.10-04.34/24	04.05		05.42	06.30-06.54/24		07.41	09.20	10.15
	15.45	17.27	18.51	21.25	23.02	23.54		22.46		21.01	19.10		16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	04.00	02.53	04.11-04.34/23	04.08		05.45	06.30-06.54/24		07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54		22.43		20.57	19.07		16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	04.00	02.54	04.12-04.34/22	04.11		05.48	06.31-06.53/22		07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53		22.40		20.53	19.03		16.20	14.49	14.28
29	09.12		06.53	05.03	04.00	02.56	04.12-04.34/22	04.15		05.51	06.30-06.51/21		07.51	09.29	10.14
	15.55		20.00	21.35	23.11	23.52		22.36		20.50	19.00		16.16	14.47	14.30
30	09.09		06.49	05.00	04.00	02.57	04.12-04.34/22	04.18		05.54	06.33-06.50/17		07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50		22.33		20.46	18.56		16.13	14.44	14.31
31	09.06		06.45		04.00	02.51		04.21		05.57	06.36-06.49/13		07.57		10.13
	16.02		20.06		23.17			22.30		20.43			16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137			
Sum of minutes with flicker	0	0	0	318	0	595	166	313	8	0	0	0			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 52 - PUU40
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24 05.17-05.37/20	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27 05.17-05.37/20	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30 05.19-05.36/17	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34 05.22-05.36/14	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37 05.25-05.36/11	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 05.20-05.24/4	03.07	03.07	04.40 05.27-05.34/7	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 05.17-05.25/8	03.04	03.10	04.43 05.30-05.33/3	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 05.14-05.26/12	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 05.11-05.26/15	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26 05.08-05.26/18	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22 05.06-05.26/20	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.07-05.27/20	02.54	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16 05.06-05.27/21	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12 05.06-05.27/21	02.52	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09 05.07-05.27/20	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06 05.07-05.27/20	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03 05.06-05.26/20	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59 05.07-05.26/19	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56 05.07-05.25/18	02.48	03.43 05.25-05.29/4	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 05.08-05.25/17	02.48	03.46 05.22-05.31/9	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 05.10-05.24/14	02.48	03.49 05.21-05.32/11	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47 05.10-05.23/13	02.49	03.52 05.20-05.34/14	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 05.11-05.22/11	02.49	03.55 05.19-05.35/16	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21	03.41 05.13-05.20/7	02.50	03.59 05.18-05.35/17	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02 05.18-05.36/18	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05 05.17-05.36/19	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08 05.17-05.37/20	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11 05.17-05.38/21	05.48	07.18	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		05.53	05.03	03.27	02.56	04.14 05.17-05.37/20	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18 05.17-05.38/21	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21 05.16-05.37/21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	298	0	211	92	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 53 - PUU41
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 54 - PUU42
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	20.35-20.55/20	03.19	02.59	04.24	06.00	07.26	08.00	09.35	
	14.35	16.05	17.36	20.09	21.41		23.19	23.49	22.27	20.39	18.53	16.06	14.42	
2	10.11	09.00	07.28	06.38	04.53	20.34-20.55/21	03.16	03.01	04.27	06.03	07.29	08.03	09.38	
	14.37	16.09	17.39	20.12	21.44		23.22	23.48	22.23	20.36	18.49	16.03	14.40	
3	10.10	08.57	07.24	06.35	04.49	20.34-20.55/21	03.14	03.01	04.30	20.51-20.58/7	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47		23.25	23.46	22.20	20.32	18.46	16.00	14.38	
4	10.09	08.54	07.21	06.31	04.46	20.35-20.54/19	03.11	03.03	04.34	20.49-21.01/12	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51		23.28	23.44	22.17	20.29	18.42	15.57	14.36	
5	10.08	08.51	07.17	06.28	04.42	20.35-20.54/19	03.09	03.05	04.37	20.47-21.01/14	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54		23.30	23.42	22.13	20.25	18.39	15.54	14.35	
6	10.06	08.48	07.14	06.24	04.39	20.35-20.53/18	03.07	03.07	04.40	20.46-21.02/16	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57		23.33	23.40	22.10	20.21	18.35	15.50	14.33	
7	10.05	08.45	07.10	06.21	04.36	20.36-20.52/16	03.04	03.10	04.43	20.45-21.03/18	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00		23.35	23.38	22.07	20.18	18.32	15.47	14.31	
8	10.03	08.41	07.07	06.17	04.32	20.37-20.51/14	03.02	03.12	04.46	20.44-21.03/19	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04		23.37	23.36	22.03	20.14	18.28	15.44	14.30	
9	10.01	08.38	07.03	06.13	04.29	20.39-20.50/11	03.01	03.15	04.50	20.44-21.03/19	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07		23.40	23.34	22.00	20.11	18.25	15.41	14.29	
10	09.59	08.35	07.00	06.10	04.26	20.42-20.47/5	02.57	03.17	04.53	20.44-21.04/20	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10		23.42	23.32	21.56	20.07	18.21	15.38	14.27	
11	09.58	08.32	06.56	06.06	04.22		02.55	03.20	04.56	20.44-21.04/20	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13		23.44	23.29	21.53	20.04	18.18	15.35	14.26	
12	09.56	08.28	06.53	06.03	04.19		02.54	03.23	04.59	20.43-21.03/20	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17		23.46	23.27	21.49	20.00	18.14	15.32	14.25	
13	09.53	08.25	06.49	05.59	04.16		02.53	03.25	05.02	20.43-21.02/19	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20		23.47	23.24	21.46	19.57	18.11	15.29	14.24	
14	09.51	08.22	06.46	05.56	04.12		02.52	03.28	05.05	20.44-20.59/15	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23		23.49	23.21	21.43	19.53	18.07	15.26	14.24	
15	09.49	08.19	06.42	05.52	04.09		02.51	03.31	05.08	20.44-20.56/12	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26		23.50	23.19	21.39	19.49	18.04	15.23	14.23	
16	09.47	08.15	06.39	05.49	04.06		02.50	03.34	05.11	20.44-20.52/8	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30		23.52	23.16	21.36	19.46	18.00	15.20	14.22	
17	09.44	08.12	06.35	05.45	04.03		02.49	03.37	05.15	20.45-20.50/5	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33		23.53	23.13	21.32	19.42	17.57	15.17	14.22	
18	09.42	08.09	06.32	05.42	03.59		02.49	03.40	05.18	06.49	08.16	08.55	10.11	
	15.20	17.01	18.27	21.00	22.36		23.54	23.10	21.29	19.39	17.53	15.14	14.22	
19	09.40	08.05	06.28	05.38	03.56		02.49	03.43	05.21	06.52	08.19	08.58	10.12	
	15.23	17.04	18.30	21.03	22.39		23.54	23.07	21.25	19.35	17.50	15.12	14.22	
20	09.37	08.02	06.24	05.35	03.53		02.48	03.46	05.24	06.55	08.22	09.02	10.13	
	15.26	17.08	18.33	21.06	22.43		23.55	23.04	21.22	19.32	17.47	15.09	14.22	
21	09.34	07.59	06.21	05.31	03.50		02.49	03.49	05.27	06.57	08.26	09.05	10.14	
	15.29	17.11	18.36	21.09	22.46		23.55	23.01	21.18	19.28	17.43	15.06	14.22	
22	09.32	07.55	06.17	05.27	03.47		02.49	03.52	05.30	07.00	08.29	09.08	10.14	
	15.32	17.14	18.39	21.12	22.49		23.55	22.58	21.15	19.25	17.40	15.04	14.23	
23	09.29	07.52	06.14	05.24	03.44		02.49	03.55	05.33	07.03	08.32	09.11	10.15	
	15.35	17.17	18.42	21.16	22.52		23.55	22.55	21.11	19.21	17.36	15.01	14.23	
24	09.26	07.48	06.10	05.20	03.41		02.50	03.59	05.36	07.06	08.35	09.14	10.15	
	15.39	17.20	18.45	21.19	22.55		23.55	22.52	21.08	19.17	17.33	14.58	14.24	
25	09.24	07.45	06.07	05.17	20.40-20.41/1		02.51	04.02	05.39	07.09	07.38	09.17	10.15	
	15.42	17.23	18.48	21.22	22.58		23.55	22.49	21.04	19.14	16.30	14.56	14.25	
26	09.21	07.41	06.03	05.13	20.39-20.44/5		02.52	04.05	05.42	07.12	07.41	09.20	10.15	
	15.45	17.26	18.51	21.25	23.02		23.54	22.46	21.01	19.10	16.26	14.53	14.26	
27	09.18	07.38	06.00	05.10	20.37-20.46/9		02.53	04.08	05.45	07.15	07.44	09.23	10.15	
	15.49	17.30	18.54	21.28	23.05		23.54	22.43	20.57	19.07	16.23	14.51	14.27	
28	09.15	07.35	05.56	05.07	20.36-20.49/13		02.54	04.11	05.48	07.17	07.47	09.26	10.15	
	15.52	17.33	18.57	21.31	23.08		23.53	22.40	20.53	19.03	16.20	14.49	14.28	
29	09.12		05.53	05.03	20.35-20.52/17		02.56	04.14	05.51	07.20	07.51	09.29	10.14	
	15.55		20.00	21.35	23.11		23.52	22.36	20.50	19.00	16.16	14.46	14.29	
30	09.09		06.49	05.00	20.35-20.54/19		02.57	04.18	05.54	07.23	07.54	09.32	10.14	
	15.59		20.03	21.38	23.14		23.50	22.33	20.46	18.56	16.13	14.44	14.31	
31	09.06		06.45		03.21			04.21	05.57		07.57		10.13	
	16.02		20.06		23.17			22.30	20.43		16.10		14.33	
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137	0	
Sum of minutes with flicker	0	0	0	64	164	0	0	224	0	0	0	0	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 55 - PUU43
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.59	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 56 - PUU44
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.12	09.03	07.31	06.42	04.56	03.18	21.23-21.51/28	02.59	21.30-21.57/27	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19		23.49		22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	21.23-21.52/29	03.01	21.30-21.57/27	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22		23.48		22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	21.23-21.51/28	03.01	21.30-21.57/27	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25		23.46		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	21.24-21.52/28	03.03	21.30-21.57/27	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28		23.44		22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	21.24-21.51/27	03.05	21.30-21.57/27	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30		23.42		22.13	20.25	18.38	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	21.24-21.52/28	03.07	21.30-21.57/27	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33		23.40		22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	21.25-21.52/27	03.10	21.30-21.58/28	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35		23.38		22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	21.25-21.52/27	03.12	21.31-21.59/28	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.37		23.36		22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	21.25-21.52/27	03.14	21.30-21.58/28	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40		23.34		22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.26	02.57	21.26-21.52/26	03.17	21.30-21.58/28	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42		23.32		21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	21.26-21.52/26	03.20	21.31-21.59/28	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44		23.29		21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	21.26-21.52/26	03.22	21.31-21.59/28	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46		23.27		21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16	02.53	21.26-21.52/26	03.25	21.31-21.59/28	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47		23.24		21.46	19.56	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52	21.27-21.52/25	03.28	21.31-21.59/28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49		23.21		21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	21.26-21.52/26	03.31	21.31-21.59/28	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50		23.19		21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	21.27-21.53/26	03.34	21.31-21.59/28	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52		23.16		21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	02.49	21.28-21.53/25	03.37	21.32-22.00/28	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53		23.13		21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	21.28-21.53/25	03.40	21.32-21.59/27	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53		23.10		21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	21.27-21.53/26	03.43	21.32-21.59/27	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54		23.07		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	21.29-21.54/25	03.46	21.32-21.58/26	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55		23.04		21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	21.29-21.54/25	03.49	21.34-21.59/25	05.27	06.57	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55		23.01		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	21.29-21.54/25	03.52	21.34-21.58/24	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55		22.58		21.15	19.24	17.40	15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	21.28-21.54/26	03.55	21.35-21.58/23	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55		22.55		21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	21.29-21.54/25	03.58	21.35-21.57/22	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55		22.52		21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	21.29-21.54/25	04.02	21.36-21.55/19	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	21.29-21.55/26	04.05	21.37-21.52/15	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54		22.46		21.00	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	21.30-21.55/25	04.08	21.39-21.50/11	05.45	07.15	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05	23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	21.30-21.56/26	04.11	21.40-21.47/7	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53		22.40		20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.56	21.29-21.55/26	04.14	21.43-21.45/2	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.34	23.11	23.52		22.36		20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	21.29-21.55/26	04.18		05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50		22.33		20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21	03.21	21.23-21.51/28	04.21		05.57		07.57		10.13
	16.02		20.06		23.17			22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	382	786		698		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 57 - PUU45
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.56	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.29	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:
Puutonsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 58 - PUU46
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59 21.56-22.11/15	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.26	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01 21.56-22.10/14	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.47	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01 21.58-22.09/11	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03 21.59-22.07/8	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.50	23.27	23.44	22.16	20.28	18.42	15.57	14.36
5	10.07	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.44	07.10	06.20	04.36	03.04	03.10	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02 21.56-22.01/5	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00 21.54-22.04/10	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.26	02.57 21.52-22.05/13	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.31	21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06	04.22	02.55 21.51-22.07/16	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03	04.19	02.54 21.51-22.07/16	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.16	23.45	23.26	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16	02.53 21.50-22.08/18	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52 21.50-22.09/19	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.51 21.49-22.10/21	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50 21.49-22.11/22	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.51	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	02.49 21.50-22.11/21	03.37	05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.49 21.50-22.12/22	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10	21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48 21.49-22.11/22	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48 21.50-22.13/23	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04	21.21	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48 21.50-22.13/23	03.49	05.27	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49 21.50-22.13/23	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40	15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49 21.50-22.13/23	03.55	05.33	07.03	08.32	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50 21.51-22.13/22	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.23	07.45	06.07	05.17	03.38	02.51 21.51-22.13/22	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52 21.51-22.13/22	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46	21.00	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53 21.52-22.13/21	04.08	05.45	07.14	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05	23.53	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54 21.53-22.13/20	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.39	20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.56 21.53-22.12/19	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.51	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57 21.54-22.11/17	04.18	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.16		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	440	48	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 59 - PUU47
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 60 - PUU48
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.17	21.51	23.28	23.44	22.17	20.28	18.42	15.57	14.36
5	10.08	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.48
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.41	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutonsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102WTG: 61 - PUU49
Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,02 2,84 3,78 6,14 8,62 9,94 7,42 5,13 4,32 3,43 1,58 0,96

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
576 423 402 429 548 894 1 047 1 090 994 842 717 711 8 674
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.36	20.08	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.27	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.11	21.44	23.22	23.47	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.17	21.50	23.27	23.44	22.16	20.28	18.42	15.57	14.36
5	10.07	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.40	08.16	09.48
	14.46	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.04	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.32	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.57
	14.56	16.35	18.03	20.35	22.10	23.42	23.31	21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.38	22.13	23.44	23.29	21.53	20.03	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.01
	15.01	16.41	18.09	20.42	22.16	23.45	23.26	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.38	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.54	18.21	20.54	22.29	23.51	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10	21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.01	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.28	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.23	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.04	23.53	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.39	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.51	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.13	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.16		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

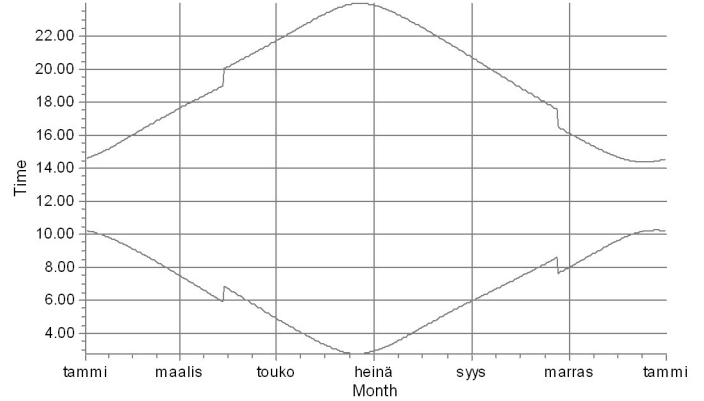
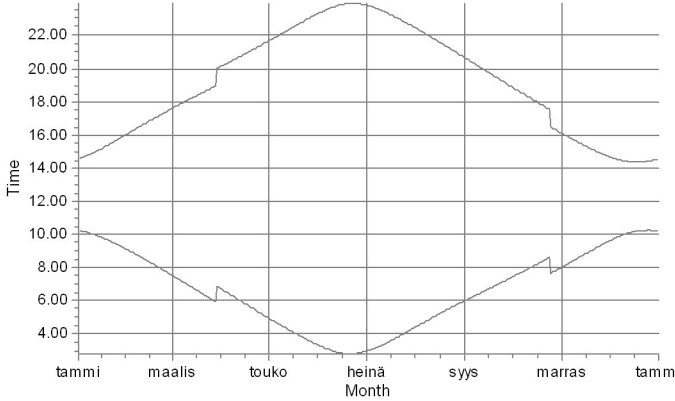
Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

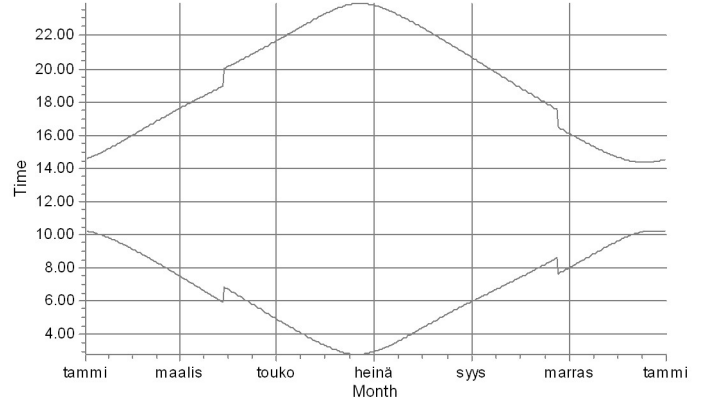
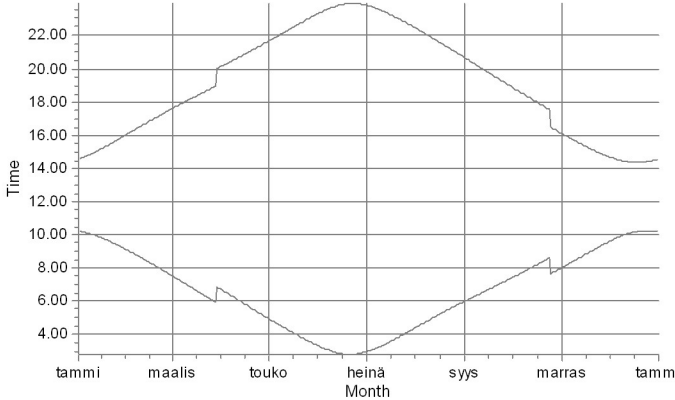
SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

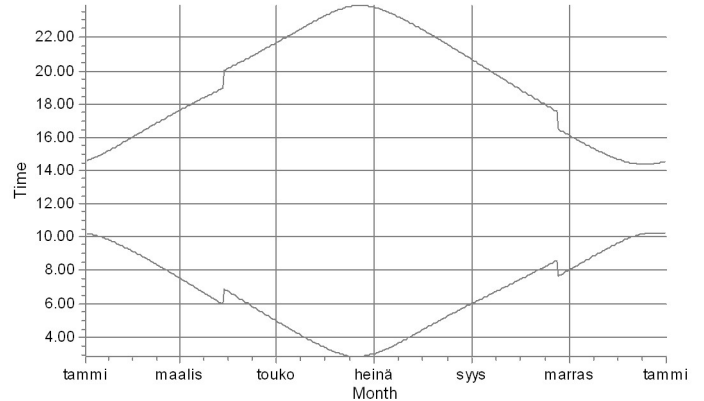
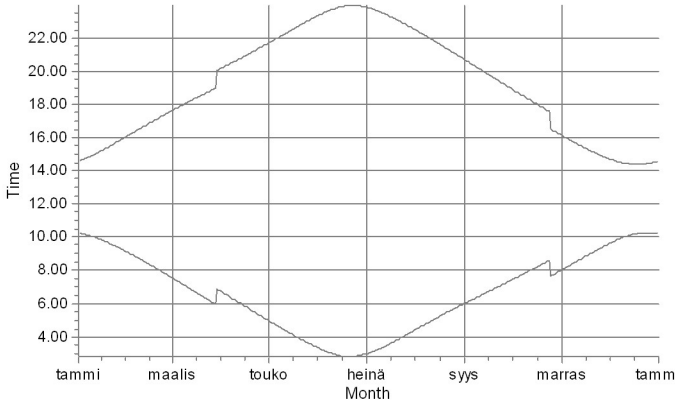
1: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (2) 2: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (236)



3: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (2) 4: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (238)



5: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (24) 6: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (240)

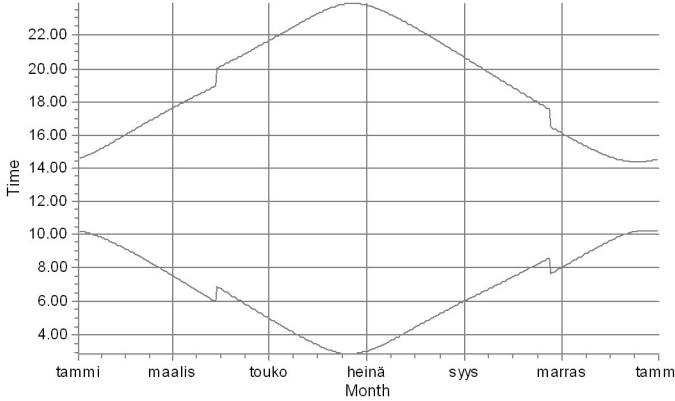


Shadow receptors

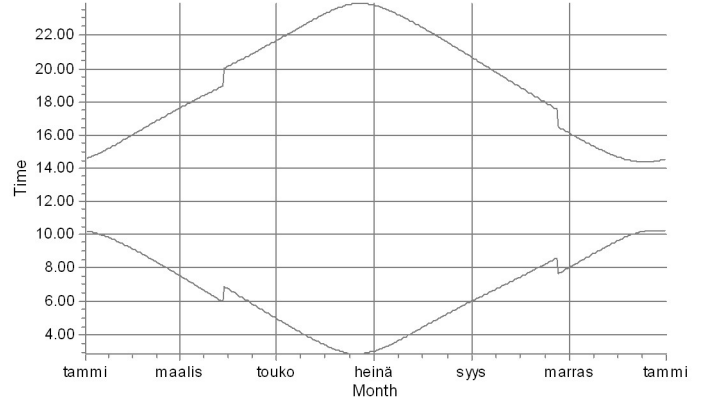
SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

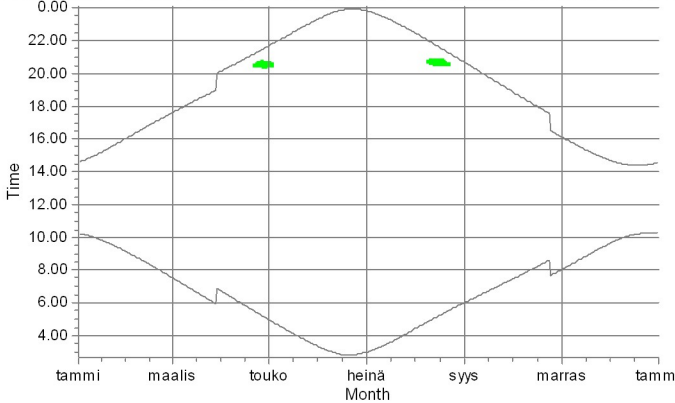
7: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 24



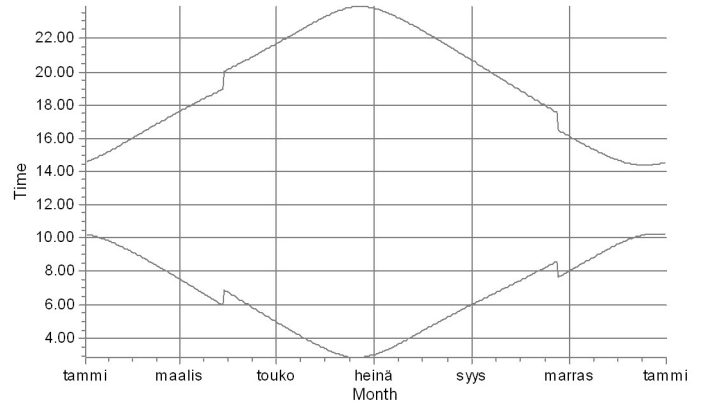
8: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m)



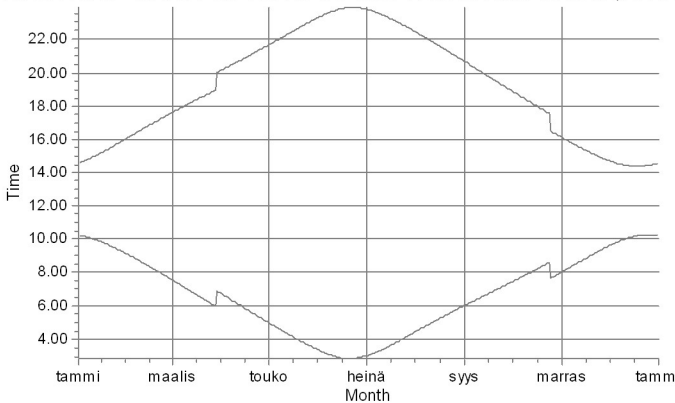
9: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 24



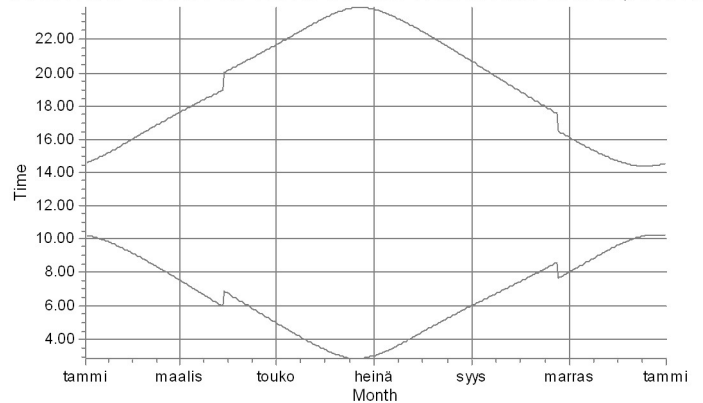
10: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m)



11: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 2



12: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m)



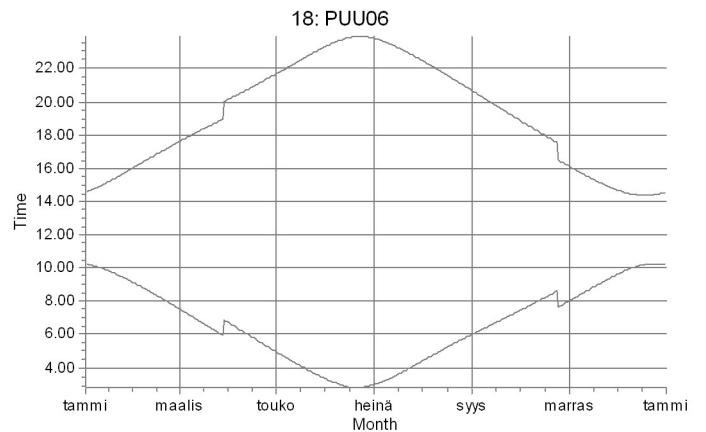
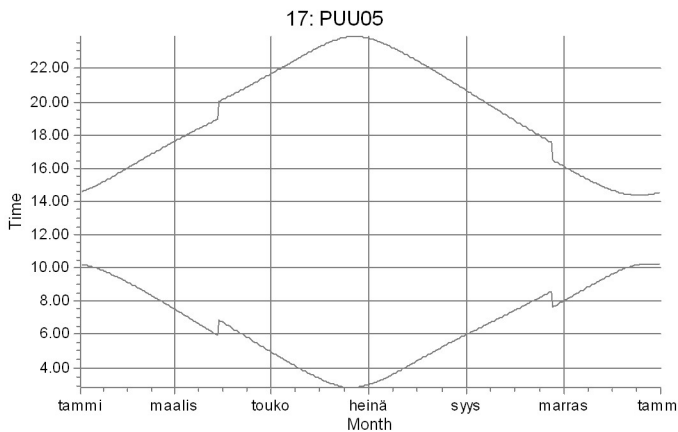
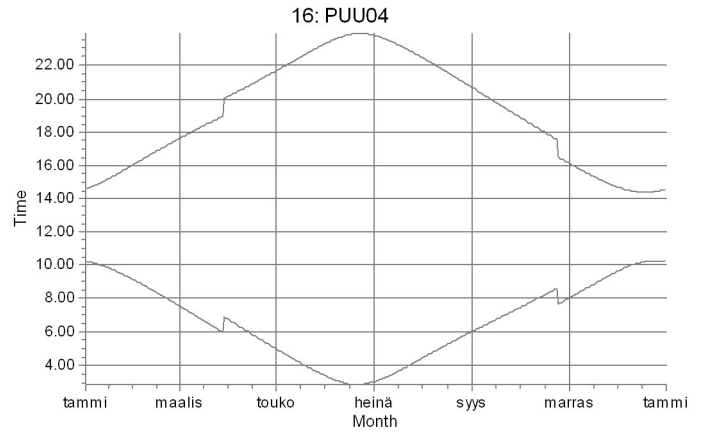
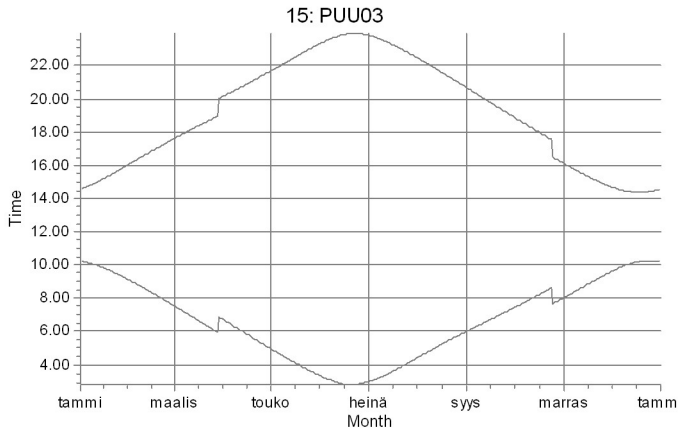
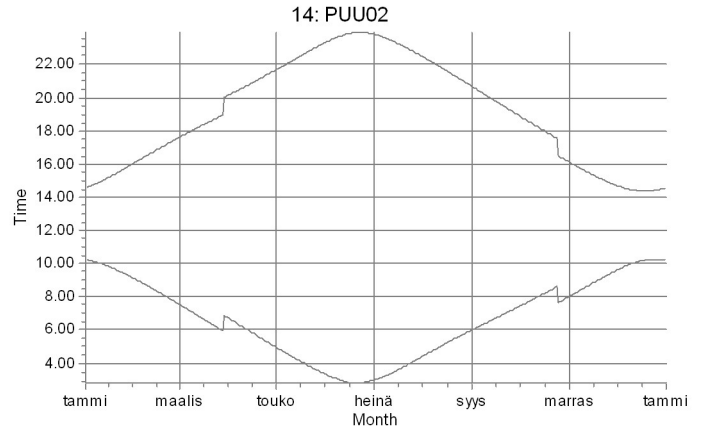
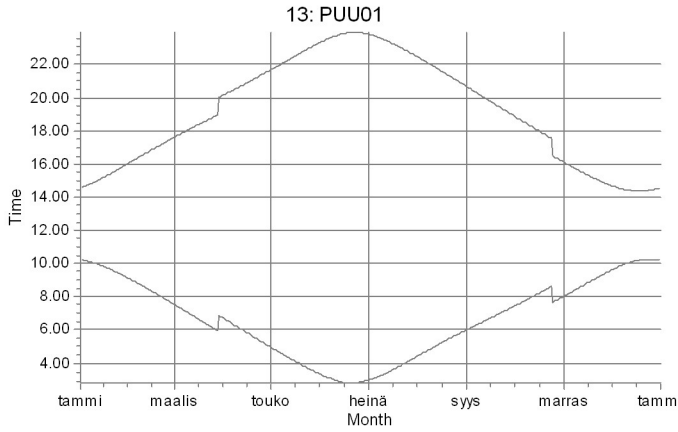
Shadow receptors



I: Asuinrakennus I (Kortenevantie 116)

SHADOW - Calendar per WTG, graphical

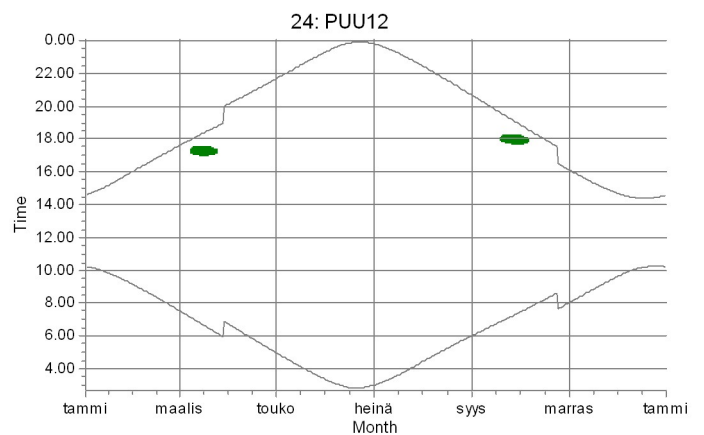
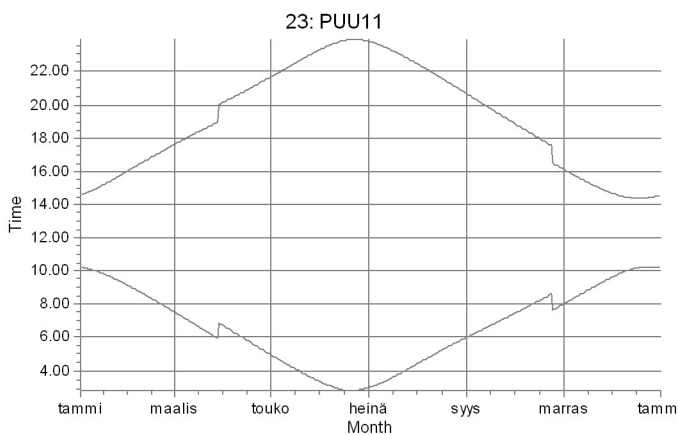
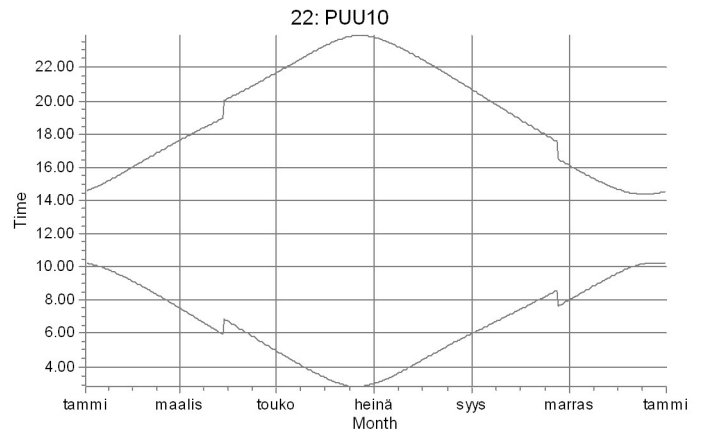
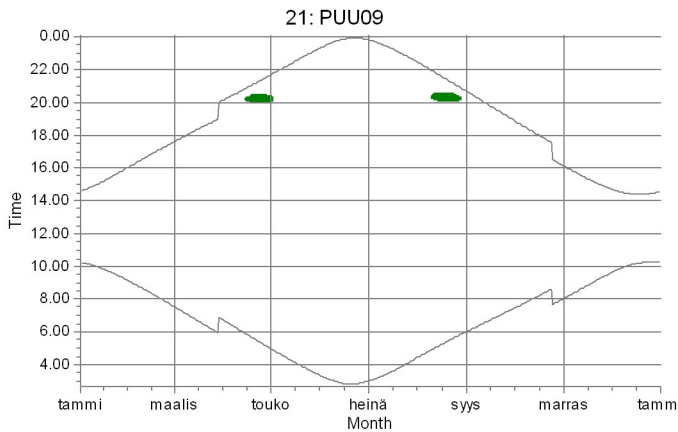
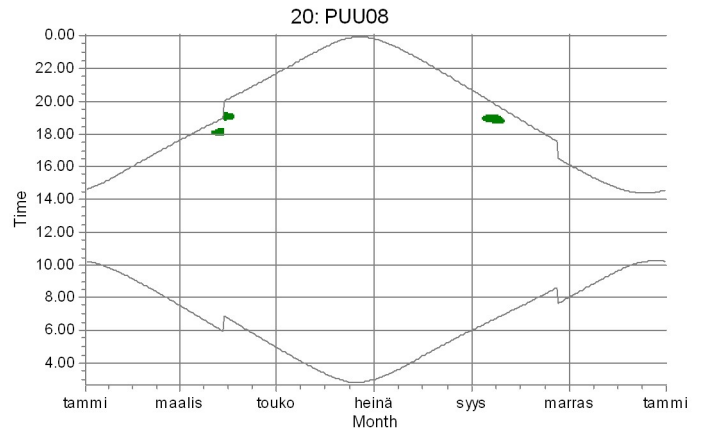
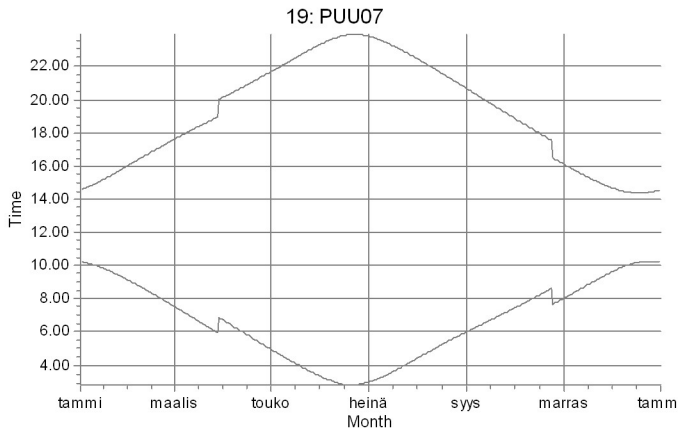
Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Shadow receptors

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



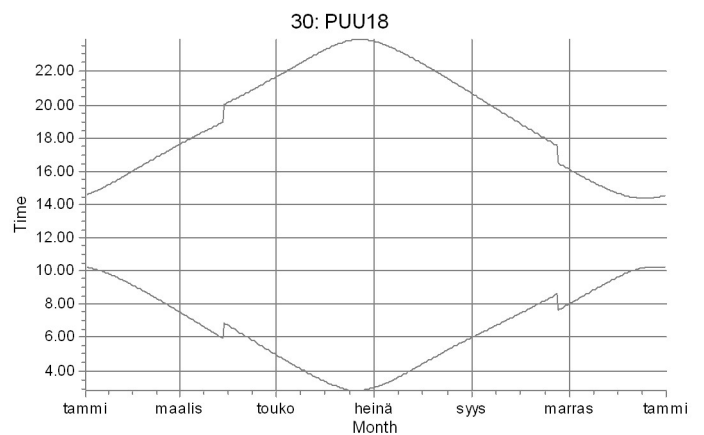
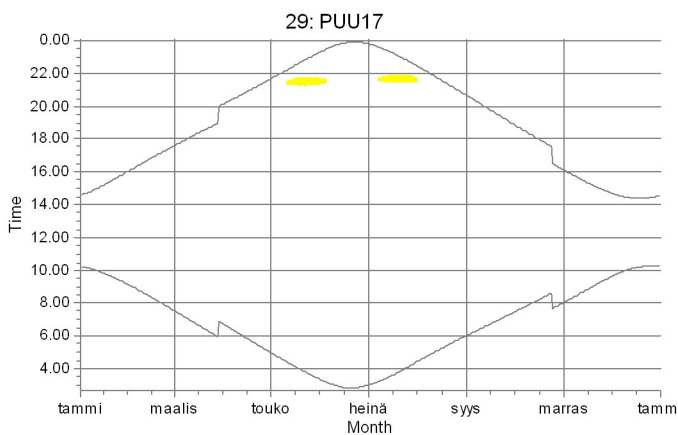
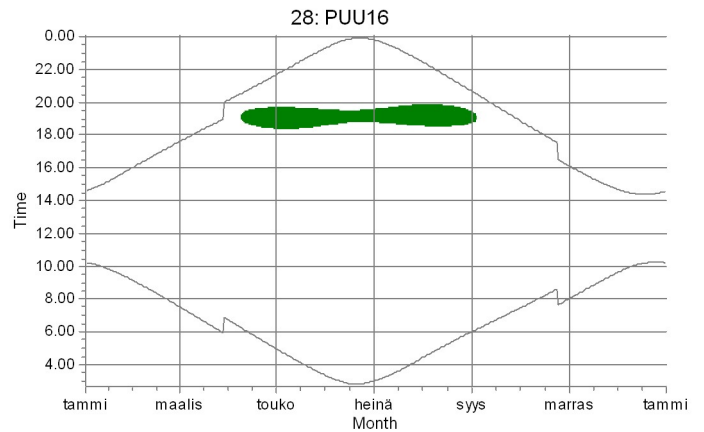
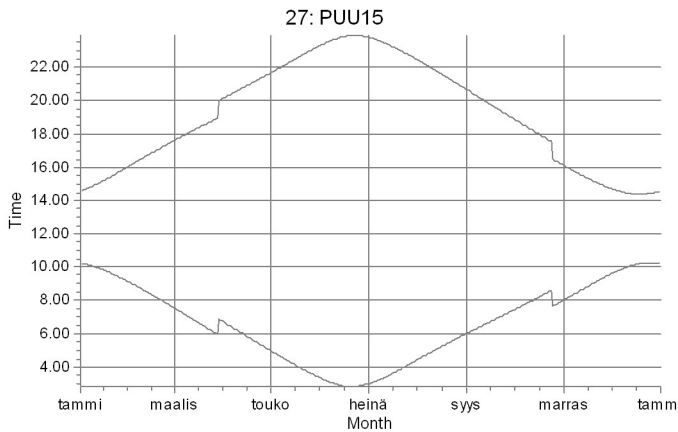
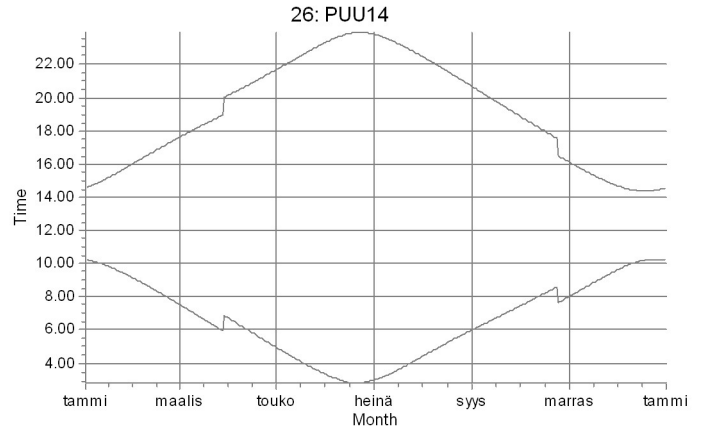
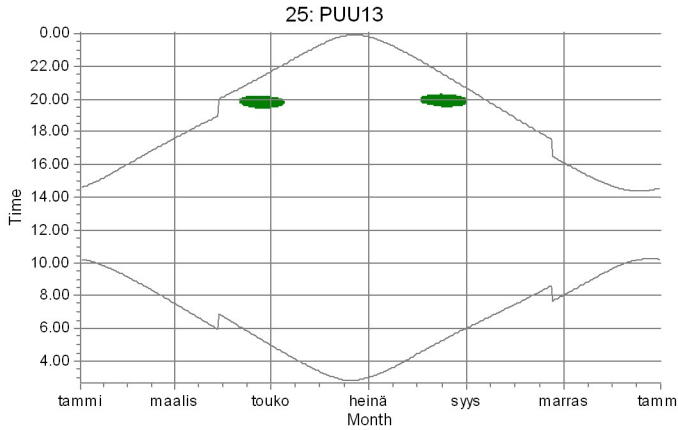
Shadow receptors



A: Laskentapiste A (Metsästysmaja)

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Shadow receptors



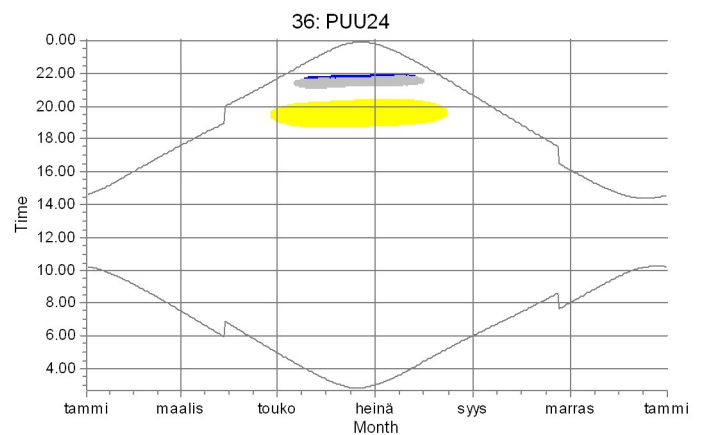
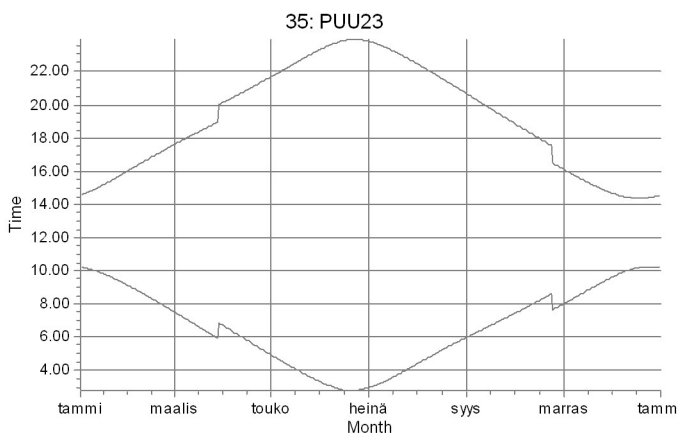
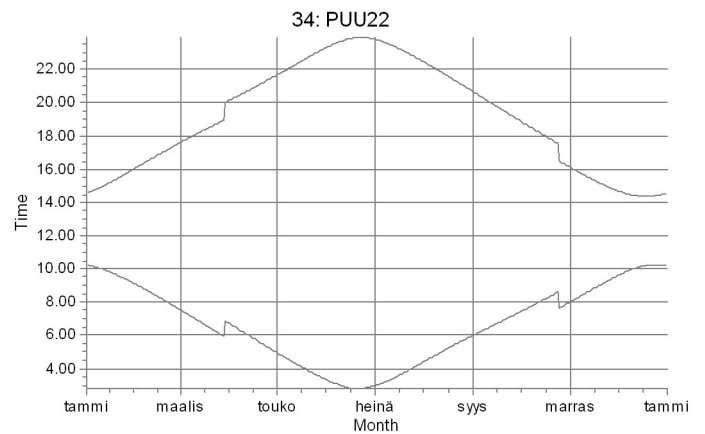
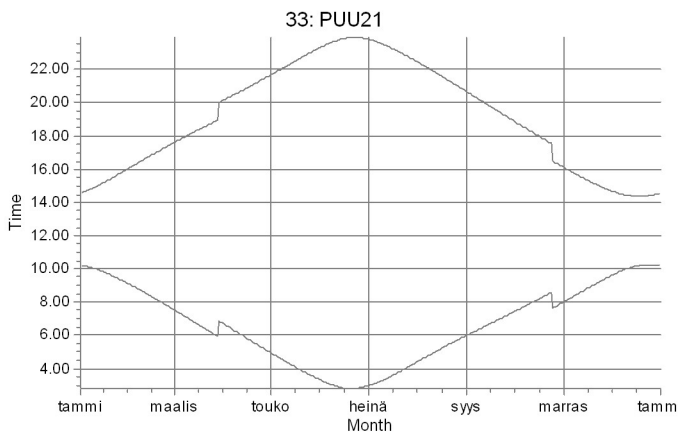
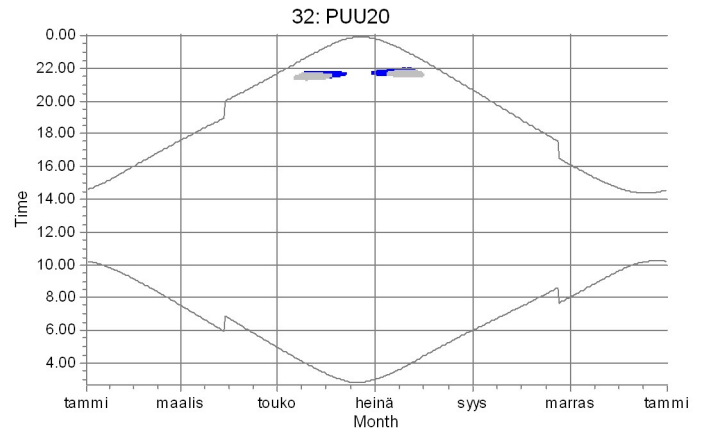
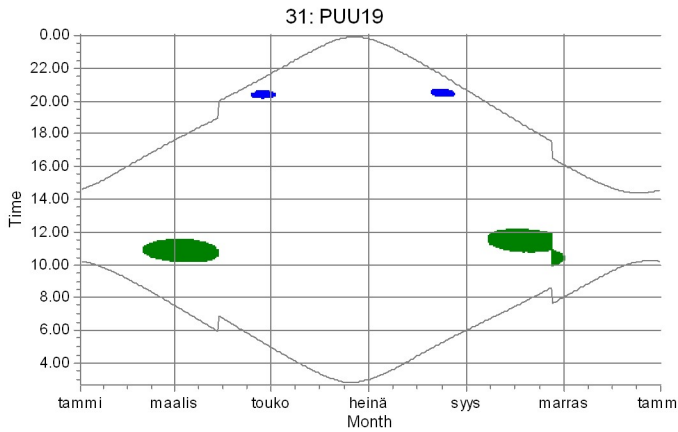
A: Laskentapiste A (Metsästysmaja)



B: Laskentapiste B (Ylivieskantie, Pohola)

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



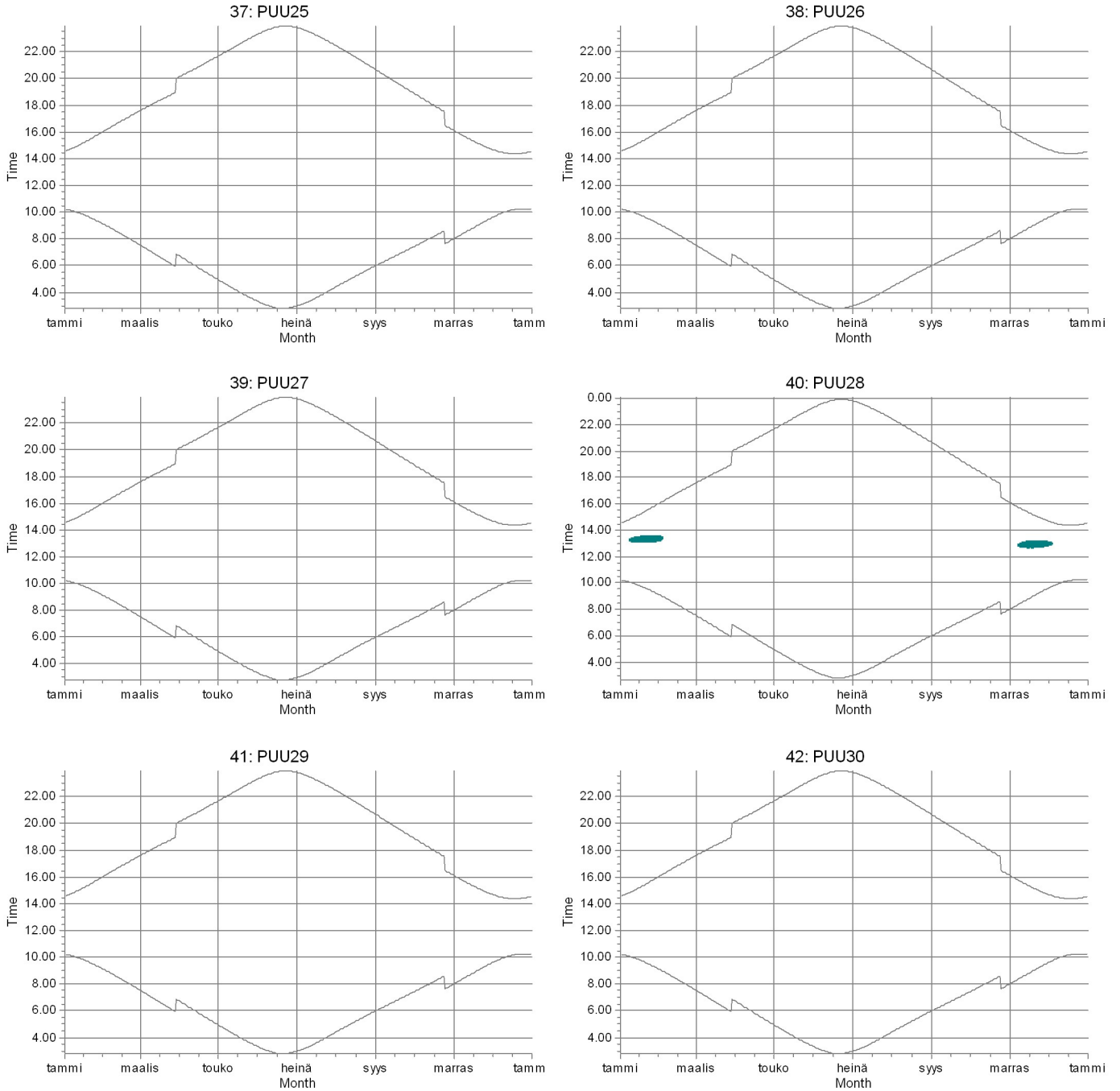
Shadow receptors

A: Laskentapiste A (Metsästysmaja)
 B: Laskentapiste B (Ylivieskantie, Pohlola)


C: Laskentapiste C (Perkkiontie 382)
 L: Laskentapiste L (Perkkiontie, Ilmola)

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

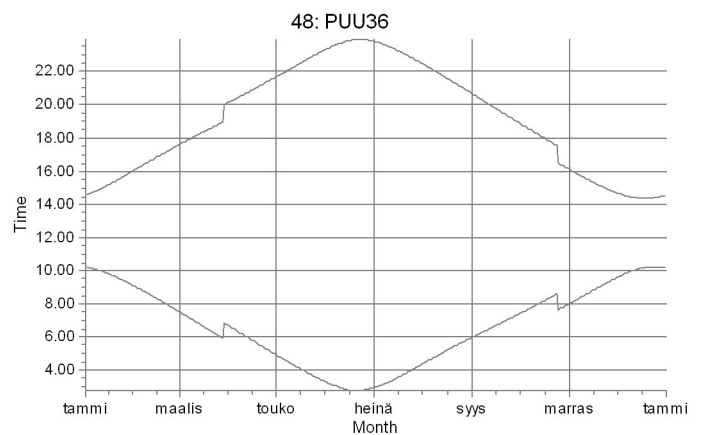
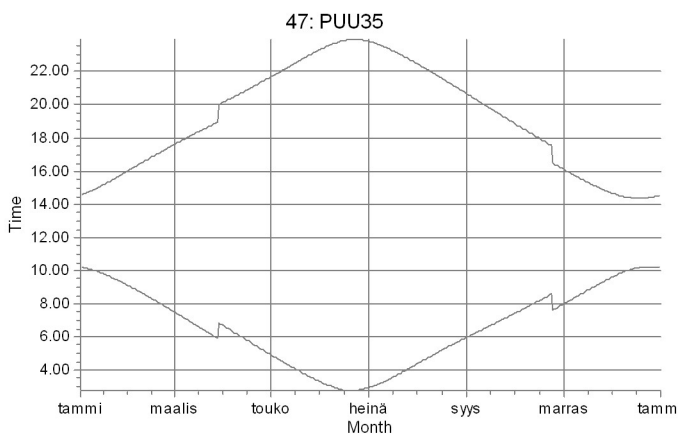
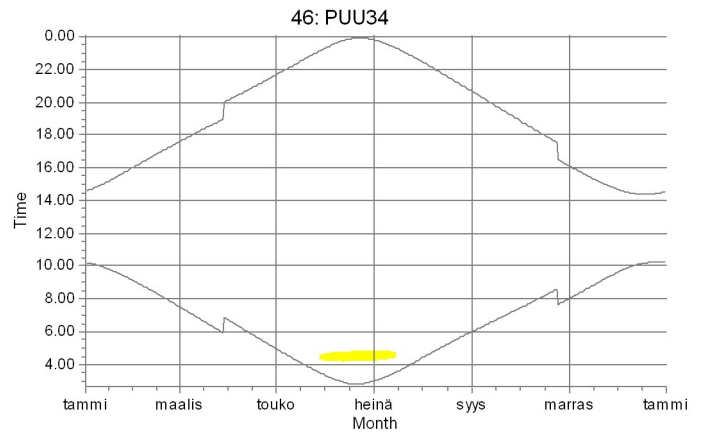
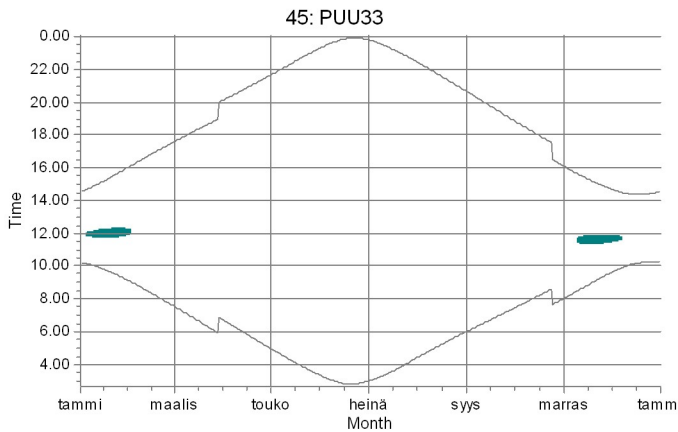
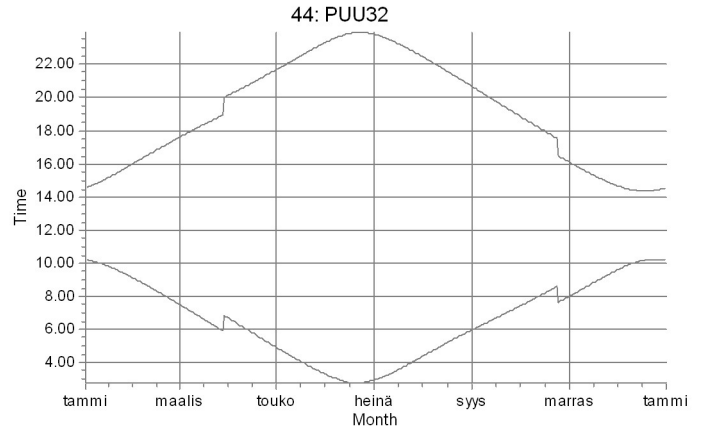
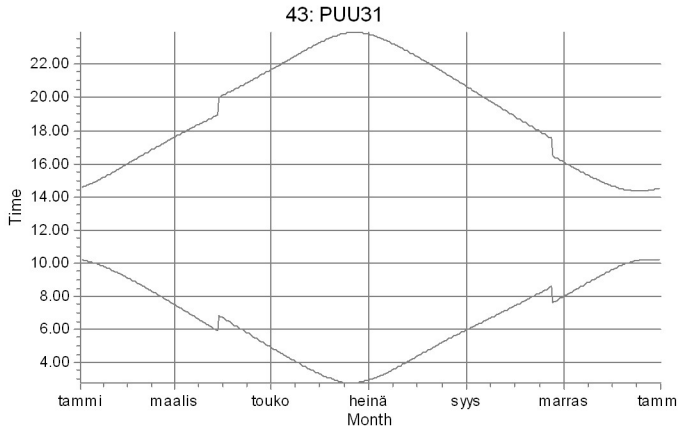


Shadow receptors

 F: Asuinrakennus F (Ollilantie 112)

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



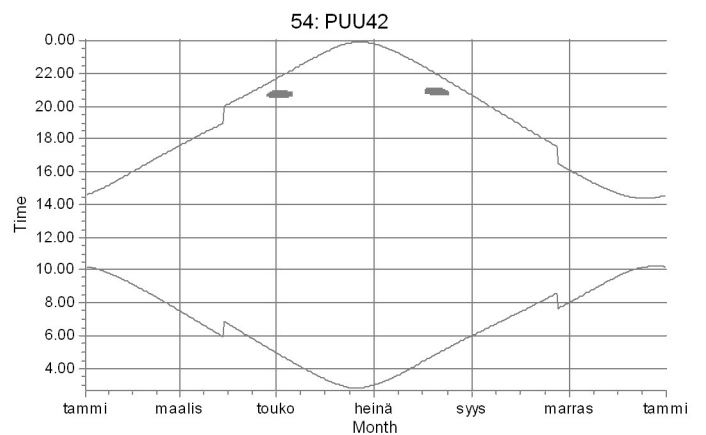
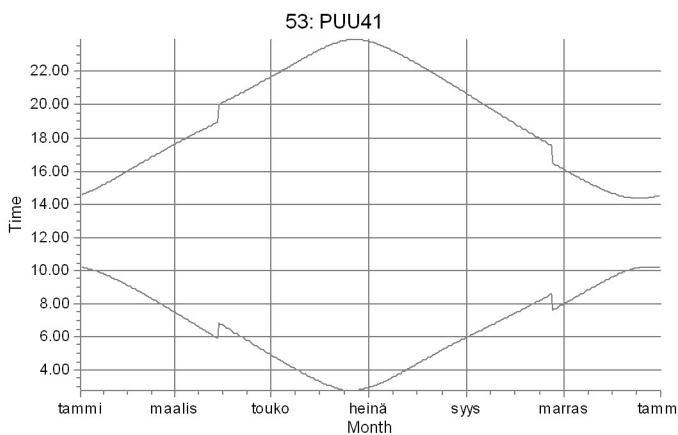
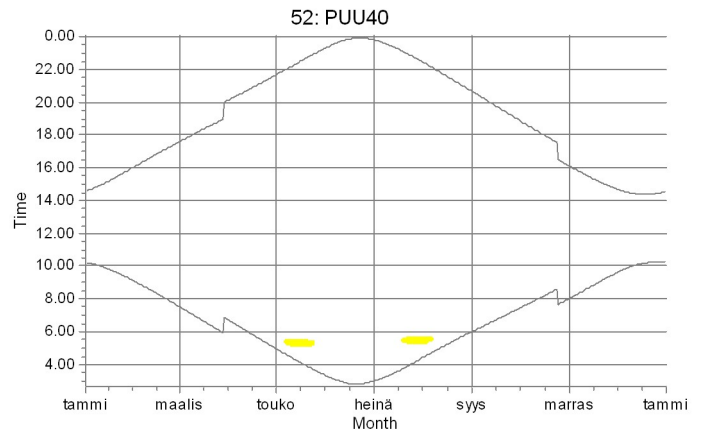
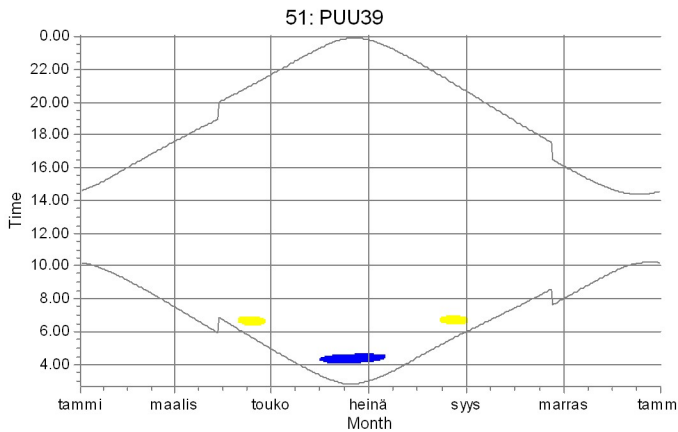
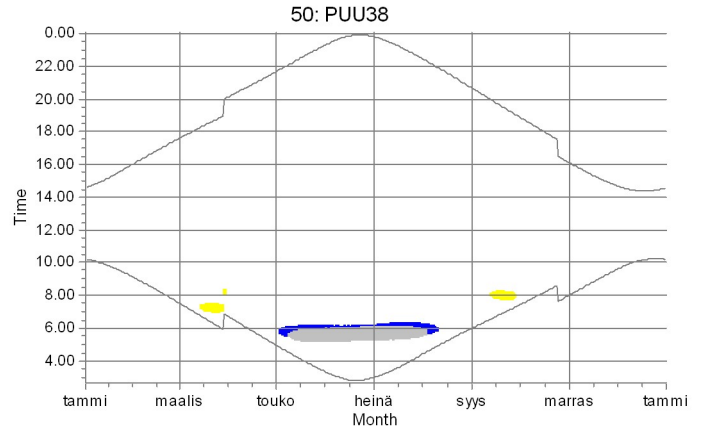
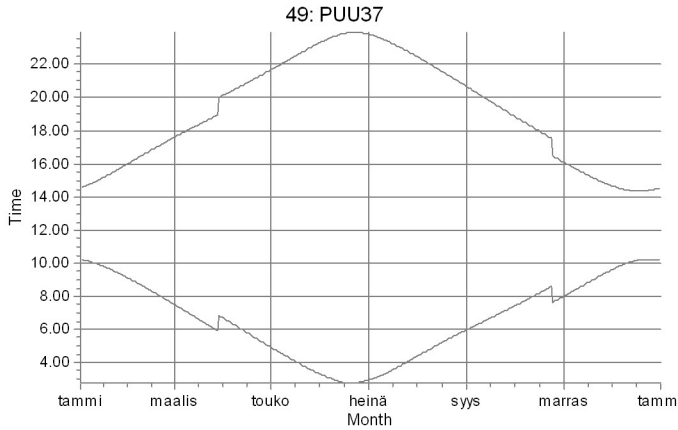
Shadow receptors

B: Laskentapiste B (Ylivieskantie, Pohlola)



F: Asuinrakennus F (Ollilantie 112)



SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



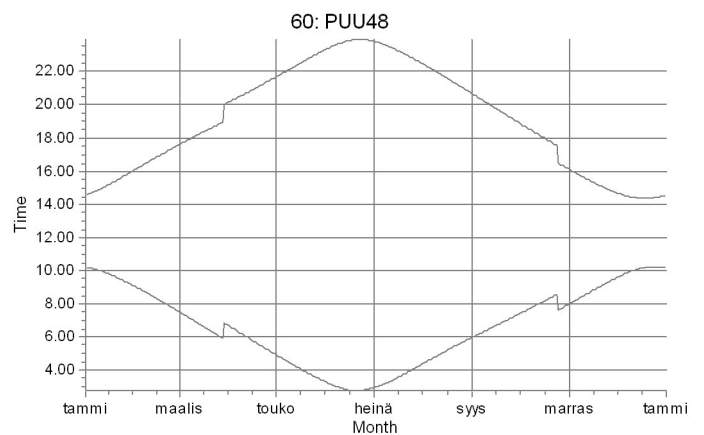
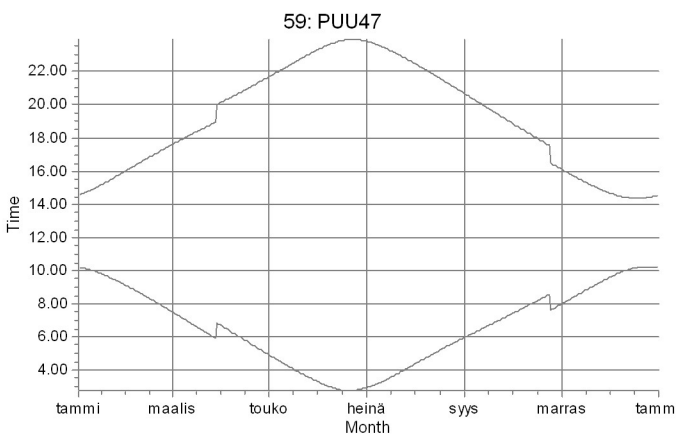
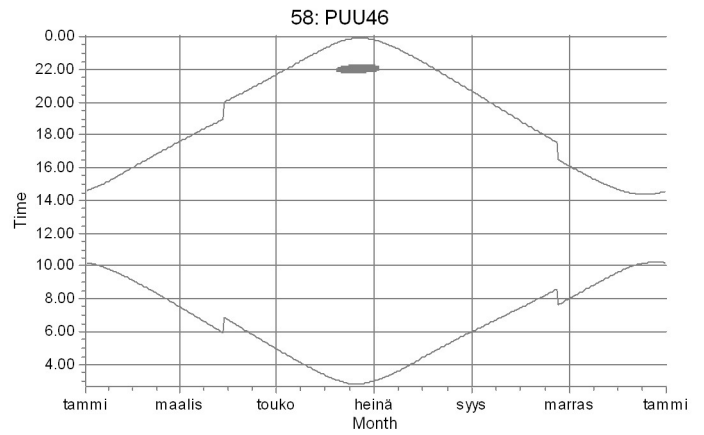
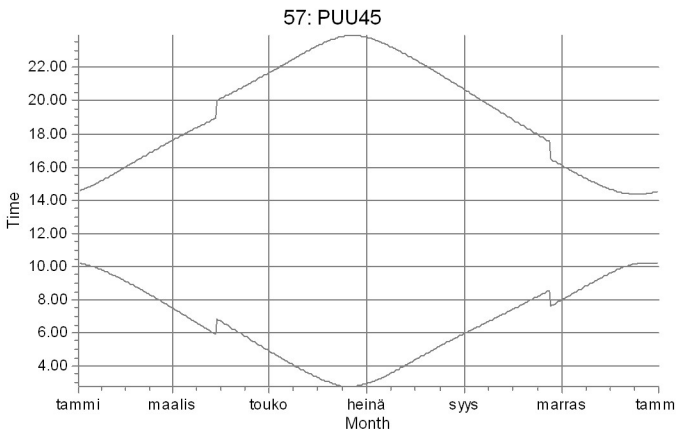
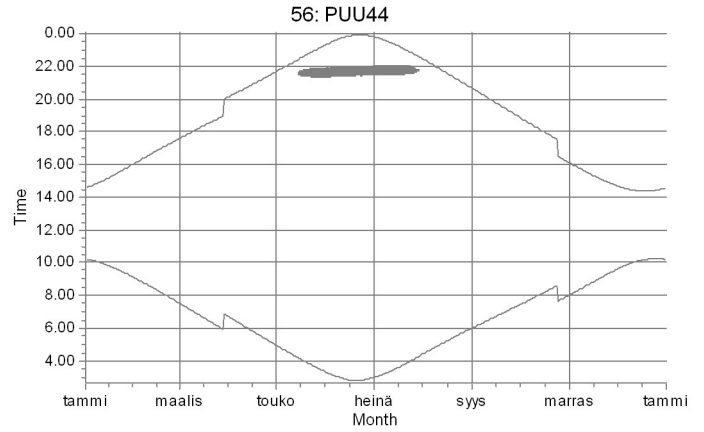
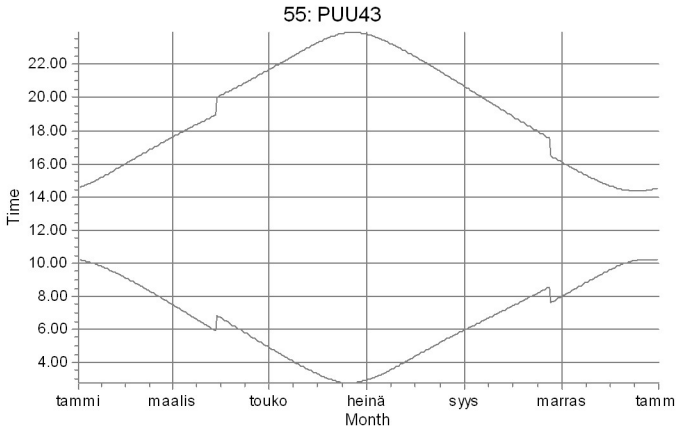
Shadow receptors

 B: Laskentapiste B (Ylivieskantie, Pohlola)
 C: Laskentapiste C (Perkkiontie 382)

 D: Asuinrakennus D (Alakyläntie 243)
 L: Laskentapiste L (Perkkiontie, Ilmola)

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Shadow receptors

■ D: Asuinrakennus D (Alakylantie 243)

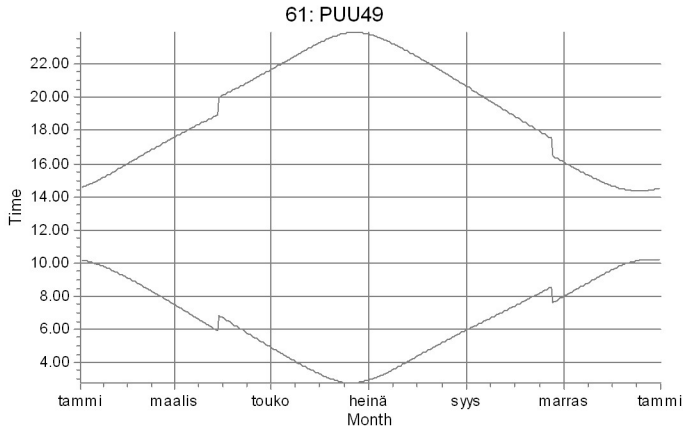
Project:
Puutionsaari_Riskalankangas_20200327

Description:
VSB

Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG, graphical

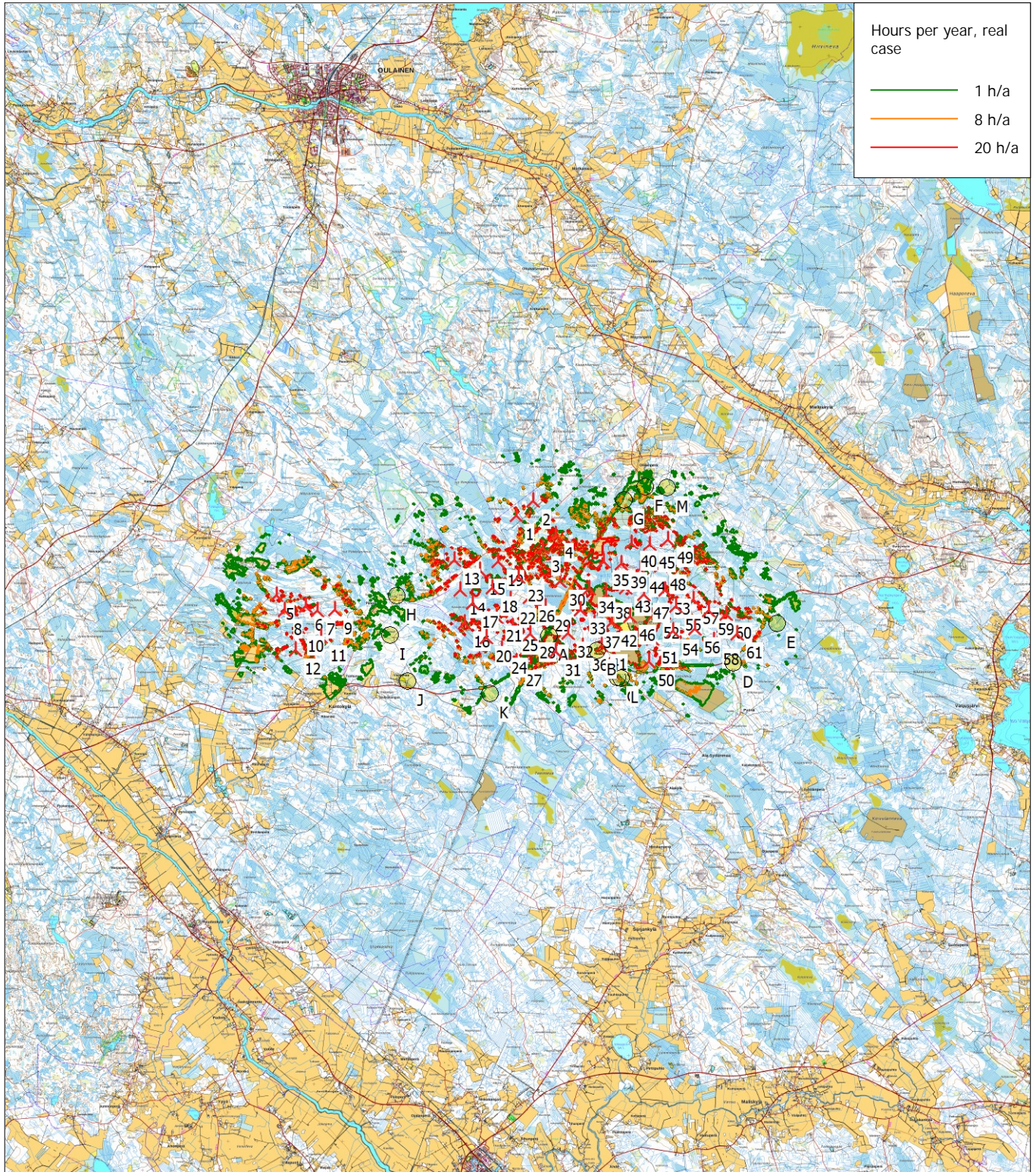
Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Shadow receptors

SHADOW - Map

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Map: Maastokarttarasteri50K , Print scale 1:200 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 401 070 North: 7 111 410

📍 New WTG

📍 Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Puutionsaari_Riskalankangas_20200327_1.wpo (2)