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PROVINCIA DI
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COMUNE DI
SCLAFANI BAGNI



COMUNE DI
VALLEDOLMO



COMUNE DI
CALTAVUTURO



COMUNE DI
POLIZZI GENEROSA



COMUNE DI
CASTELLANA
SICULA



COMUNE DI
VILLALBA

OGGETTO:

**Progetto di realizzazione di un parco eolico della potenza di 85,8 MW
denominato "CATERINA I" situato nei comuni di Sclafani Bagni, Valledolmo,
Caltavuturo, Polizzi Generosa, Castellana Sicula in provincia di Palermo(PA)
e Villalba, in provincia di Caltanissetta (CL).**

ELABORATO:

**RELAZIONE SULL'ANALISI DELL'EVOLUZIONE DELL'OMBRA
INDOTTA DAGLI AEREOGENERATORI (EFFETTO SHADOW
FLICKERING)**



PROPONENTE:



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Livello prog.	Cat. opera	N°. prog.elaborato	Tipo elaborato	N° foglio/Tot. fogli	Nome file	Scala
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REV.	DATA	DESCRIZIONE			ESEGUITO	VERIFICATO
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						Ing. Carmen Martone EGM Project

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1. PREMESSA

1.1 Scopo del documento

Con il Decreto Legislativo 29 dicembre 2003, n. 387, il Parlamento Italiano ha proceduto all’attuazione della direttiva 2001/77/CE relativa alla promozione dell'energia elettrica prodotta da fonti energetiche rinnovabili nel mercato interno dell'elettricità.

Con la nuova normativa introdotta dal d.lgs. 30 giugno 2016, n. 127 (legge Madia), la conferenza dei servizi si potrà svolgere in modalità “Sincrona” o “Asincrona”, nei casi previsti dalla legge.

La Regione Siciliana con il D.P. Reg. Siciliana 48/2012, recependo il decreto ministeriale 10 settembre 2010, ha stabilito le procedure amministrative di semplificazione per l’autorizzazione degli impianti da fonti rinnovabili. In particolare per impianti fotovoltaici superiori ad 1 MW di potenza è prevista l’indizione della conferenza dei servizi ai sensi del D.Lgs. 387/2003.

Il citato decreto stabilisce la documentazione amministrativa necessaria e la disciplina del procedimento unico. Il Progetto, nello specifico, è compreso tra le tipologie di intervento riportate nell’Allegato IV alla Parte II, comma 2 del D.Lgs. n. 152 del 3/4/2006 (cfr. 2c) – “Impianti industriali non termici per la produzione di energia, vapore ed acqua calda con potenza complessiva superiore a 1MW”, pertanto rientra tra le categorie di opere da sottoporre alla procedura di Valutazione d’Impatto Ambientale di competenza delle Regioni.

Nel caso specifico, l’iter di VIA si configura come un endo-procedimento della procedura di Autorizzazione Unica ai sensi del D.lgs. 29 dicembre 2003. In data 21 luglio 2017 è entrato in vigore il d. lgs. n. 104 del 16 giugno 2017 (pubblicato in G.U. n. 156 del 06/06/2017), il quale ha modificato la disciplina inserita nel D.lgs. n.152/2006 in tema di Valutazione di Impatto ambientale (VIA).

Il provvedimento trae origine da un adeguamento nazionale alla normativa europea prevista dalla Direttiva 2014/52/UE del 16 aprile 2014, la quale ha modificato la Direttiva 2011/92/UE concernente la valutazione dell’impatto ambientale di determinati progetti pubblici e privati. Scopo del provvedimento in esame è quello di rendere più efficiente le procedure amministrative nonché di innalzare il livello di tutela ambientale.

In linea con l’orientamento mondiale, la società AEI WIND PROJECT X S.R.L. intende realizzare nei comuni di Sclafani Bagni, Valledolmo, Caltavuturo e Polizzi generosa, in provincia di Palermo (PA), un parco eolico della potenza nominale di 85,8 MW.

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Il parco in progetto sarà costituito da 13 aerogeneratori e relative opere accessorie, ovvero la realizzazione della viabilità di accesso al parco, ove non esistente e/o non idonea al trasporto dei componenti delle torri, la posa del cavidotto interno di collegamento tra gli aerogeneratori, la posa del cavidotto di collegamento tra il parco eolico e la nuova cabina di Terna che permetterà l'immissione dell'energia elettrica prodotta alla dorsale nazionale. Il progetto è finalizzato alla produzione di energia elettrica da fonti rinnovabili, in linea con la Strategia Energetica Nazionale (SEN).

2. CONTENUTI DELLA RELAZIONE

Il presente elaborato ha lo scopo di valutare tecnicamente l'eventuale impatto generato dall'effetto di “shadow flickering” derivante dall'evoluzione dell'ombra per il progetto di realizzazione di un parco eolico sito nei comuni di Sclafani Bagni, Valledolmo, Caltavuturo e Polizzi Generosa, in provincia di Palermo (PA), da parte della società AEI WIND PROJECT X S.R.L., relativamente all'installazione di n. 8 aerogeneratori proposti per una futura potenza complessiva del parco eolico di 85,8 MW.

Il presente progetto prevede di considerare per gli 8 aerogeneratori proposti, la turbina da 6,6 MW. Lo shadow flickering è l'espressione comunemente impiegata in ambito specialistico per descrivere l'effetto stroboscopico delle ombre proiettate dalle pale rotanti degli aerogeneratori eolici quando sussistono le condizioni meteorologiche opportune; infatti la possibilità e la durata di tali effetti dipendono da una serie di condizioni ambientali, tra cui:

- ✓ la posizione del sole;
- ✓ l'ora del giorno;
- ✓ il giorno dell'anno;
- ✓ le condizioni atmosferiche ambientali;
- ✓ la posizione della turbina eolica rispetto ad un ricevitore sensibile.

La valutazione tecnica è eseguita con l'ausilio del software di simulazione specifico per la progettazione degli impianti eolici WindPRO, costituito da un insieme di moduli di elaborazione orientati alla simulazione di una serie di aspetti che caratterizzano le diverse fasi progettuali.

Nella presente relazione è riportata:

- una breve descrizione tecnica del fenomeno di shadow flickering;

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- la descrizione del caso studio con le posizioni delle turbine e loro caratteristiche tecniche;
- la descrizione dei recettori soggetti al fenomeno per i quali è stata richiesta questa analisi;
- la sintesi della metodologia di analisi seguita per lo studio;
- la sintesi dei risultati ottenuti, con allegati grafici analitici di dettaglio che descrivono il fenomeno su ognuno dei recettori e da parte di ognuna delle turbine per tutto l’anno solare.

2.1 Iniziativa

Con la realizzazione dell’impianto eolico Caterina I, si intende conseguire un significativo risparmio energetico, mediante il ricorso alla fonte energetica rinnovabile rappresentata dal vento, tale tecnologia nasce dall’esigenza di coniugare:

- ✓ la compatibilità con esigenze paesaggistiche e di tutela ambientale;
- ✓ nessun inquinamento acustico;
- ✓ un risparmio di combustibile fossile;
- ✓ una produzione di energia elettrica senza emissioni di sostanze inquinanti.

Il progetto mira a contribuire al soddisfacimento delle esigenze di “Energia Verde” e allo “Sviluppo Sostenibile” invocate dal Protocollo di Kyoto, dalla Conferenza sul clima e l’ambiente di Copenaghen 2009 e dalla Conferenza sul clima di Parigi del 2015.

2.2 Attenzione per l’ambiente

Ad oggi, la produzione di energia elettrica è per la quasi totalità proveniente da impianti termoelettrici che utilizzano combustibili sostanzialmente di origine fossile.

L'Italia non possiede riserve significative di fonti fossili, ma da esse ricava circa il 90% dell'energia che consuma, con una rilevante dipendenza dall'estero. I costi della bolletta energetica, già alti, per l'aumento della domanda internazionale rischiano di diventare insostenibili per la nostra economia con le sanzioni previste in caso di mancato rispetto degli impegni di Kyoto, Copenaghen e Parigi.

La transizione verso un mix di fonti di energia e con un peso sempre maggiore di rinnovabili è, pertanto, strategica per un Paese come il nostro dove, tuttavia, le risorse idrauliche e geotermiche sono già sfruttate appieno.

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Negli ultimi 10 anni grazie agli incentivi sulle fonti rinnovabili lo sviluppo delle energie verdi nel nostro paese ha subito un notevole incremento soprattutto nel fotovoltaico e nell'eolico, portando l'Italia tra i paesi più sviluppati dal punto di vista dell'innovazione energetica e ambientale.

La conclusione di detti incentivi ha frenato lo sviluppo soprattutto dell'eolico, creando notevoli problemi all'economia del settore.

La società proponente AEI WIND PROJECT X S.R.L. con sede a Roma in Via Savoia n. 78, si pone come obiettivo di attuare la “grid parity” nell'eolico, grazie all'installazione di impianti di elevata potenza, nuovi aerogeneratori, che abbattano i costi fissi e rendono l'energia prodotta dell'eolico conveniente e sullo stesso livello delle energie prodotte dalle fonti fossili.

3. DESCRIZIONE TECNICA DEI COMPONENTI DELL'IMPIANTO

Le pale di un aerogeneratore sono fissate al mozzo e vi è un sistema di controllo che ne modifica costantemente l'orientamento rispetto alla direzione del vento, per offrire allo stesso sempre il medesimo profilo alare garantendo, indipendentemente dalla direzione del vento, un verso orario di rotazione.

L'aerogeneratore previsto per la realizzazione del parco eolico è la turbina da 6.6 MW della Siemes-Gamesa (SG 6.6-170 -MOD 6.6 MW) o similare; nella tabella che segue sono sintetizzate le principali caratteristiche dell'aerogeneratore previsto nel parco eolico.

Altezza al Mozzo	155 m
Diametro Rotore	170 m
Lunghezza singola Pala	83,5 m
Area Spazzata	22,698 m ²
Numero Pale	3
Velocità di Rotazione Max a regime del Rotore	11.20 rpm
Potenza Nominale Turbina	6600 kW
Cut-Out	25 m/s
Cut-in	3 m/s

Tabella 1 - Caratteristiche principali dell'aerogeneratore previsto nel parco eolico.

- **Rotore-Navicella**

Il rotore è una costruzione a tre pale, montata sopravento rispetto alla torre. La potenza erogata è controllata dalla regolazione del passo e della richiesta di coppia. La velocità del rotore è variabile ed è

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progettata per massimizzare la potenza erogata mantenendo carichi e livello di rumorosità.

La gondola è stata progettata per un accesso sicuro a tutti i punti di servizio durante il servizio programmato. Inoltre, la navicella è stata progettata per garantire la presenza sicura dei tecnici di assistenza nella navicella durante le corse di prova di servizio con la turbina eolica in piena attività. Ciò consente un servizio di alta qualità della turbina eolica e fornisce condizioni ottimali per la risoluzione dei problemi.

- **Lame**

Le lame Siemens Gamesa 5.X sono costituite da infusione di fibra di vetro e componenti stampati pultrusi in carbonio. La struttura della pala utilizza gusci aerodinamici contenenti spar-cap incorporati, legati a due reti di taglio principali in resina epossidica-fibra di vetro/balsa/schiuma.

Le lame Siemens Gamesa 5.X utilizzano un design delle lame basato su profili alari proprietari SGRE.

- **Mozzo del rotore**

Il mozzo del rotore è fuso in ghisa sferoidale ed è montato sull'albero lento della trasmissione con un collegamento a flangia. Il mozzo è sufficientemente grande da fornire spazio ai tecnici dell'assistenza durante la manutenzione delle radici delle pale e dei cuscinetti del passo dall'interno della struttura.

- **Treno di trasmissione**

La trasmissione è un concetto di sospensione a 4 punti: albero principale con due cuscinetti principali e cambio con due bracci di reazione assemblati al telaio principale.

Il cambio è in posizione a sbalzo; il portasatelliti del cambio è assemblato all'albero principale mediante a giunto bullonato a flangia e supporta il riduttore.

- **Albero principale**

L'albero principale a bassa velocità è forgiato e trasferisce la coppia del rotore al cambio e i momenti flettenti al telaio del letto tramite i cuscinetti di banco e gli alloggiamenti dei cuscinetti di banco.

- **Cuscinetti principali**

L'albero lento della turbina eolica è supportato da due cuscinetti a rulli conici.

I cuscinetti sono a grasso lubrificato.

- **Riduttore**

Il riduttore è del tipo ad alta velocità a 3 stadi (2 epicicloidali + 1 parallelo).

- **Generatore**

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Il generatore è un generatore asincrono trifase a doppia alimentazione con rotore avvolto, collegato ad un convertitore PWM di frequenza. Lo statore e il rotore del generatore sono entrambi costituiti da lamierini magnetici impilati e avvolgimenti formati.

Il generatore è raffreddato ad aria.

- **Freno meccanico**

Il freno meccanico è montato sul lato opposto alla trasmissione del cambio.

- **Sistema di imbardata**

Un telaio del letto in ghisa collega la trasmissione alla torre. Il cuscinetto di imbardata è un anello a ingranaggi esterni con un cuscinetto a frizione. Una serie di motoriduttori epicicloidali elettrici aziona l'imbardata.

- **Copertura della navicella**

Lo schermo meteorologico e l'alloggiamento attorno ai macchinari nella navicella sono realizzati con pannelli laminati rinforzati con fibra di vetro.

- **Torre**

La turbina eolica è montata di serie su una torre d'acciaio tubolare rastremata. Altre tecnologie di torri sono disponibili per altezze del mozzo più elevate. La torre ha salita interna e accesso diretto al sistema di imbardata e navicella. È dotata di pedane e illuminazione elettrica interna.

- **Controllore**

Il controller per turbine eoliche è un controller industriale basato su microprocessore. Il controllore è completo di quadro e dispositivi di protezione ed è autodiagnosi.

- **Convertitore**

Collegato direttamente al rotore, il convertitore di frequenza è un sistema di conversione 4Q back to back con 2 VSC in un collegamento CC comune.

Il Convertitore di Frequenza consente il funzionamento del generatore a velocità e tensione variabili, fornendo potenza a frequenza e tensione costanti al trasformatore MT.

- **SCADA**

L'aerogeneratore fornisce la connessione al sistema SGRE SCADA. Questo sistema offre il controllo remoto e una varietà di visualizzazioni di stato e report utili da un browser Web Internet standard.

Le viste di stato presentano informazioni tra cui dati elettrici e meccanici, stato operativo e di guasto,

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dati meteorologici e dati della stazione di rete.

- **Monitoraggio delle condizioni della turbina**

Oltre al sistema SCADA SGRE, la turbina eolica può essere dotata dell'esclusiva configurazione di monitoraggio delle condizioni SGRE. Questo sistema monitora il livello di vibrazione dei componenti principali e confronta gli spettri di vibrazione effettivi con una serie di spettri di riferimento stabiliti. Revisione dei risultati, analisi dettagliata e la riprogrammazione può essere eseguita utilizzando un browser web standard.

- **Sistemi operativi**

La turbina eolica funziona automaticamente. Si avvia automaticamente quando la coppia aerodinamica raggiunge un certo valore.

Al di sotto della velocità del vento nominale, il controller della turbina eolica fissa i riferimenti di passo e coppia per operare nel punto aerodinamico ottimale (massima produzione) tenendo conto della capacità del generatore.

Una volta superata la velocità del vento nominale, la richiesta di posizione del passo viene regolata per mantenere una produzione di energia stabile pari al valore nominale.

Se è abilitata la modalità declassamento per vento forte, la produzione di energia viene limitata una volta che la velocità del vento supera un valore di soglia definito dalla progettazione, fino a quando non viene raggiunta la velocità del vento di interruzione e la turbina eolica smette di produrre energia.

Se la velocità media del vento supera il limite operativo massimo, l'aerogeneratore viene spento per beccheggio delle pale.

Quando la velocità media del vento scende al di sotto della velocità media del vento di riavvio, i sistemi si ripristinano automaticamente.

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

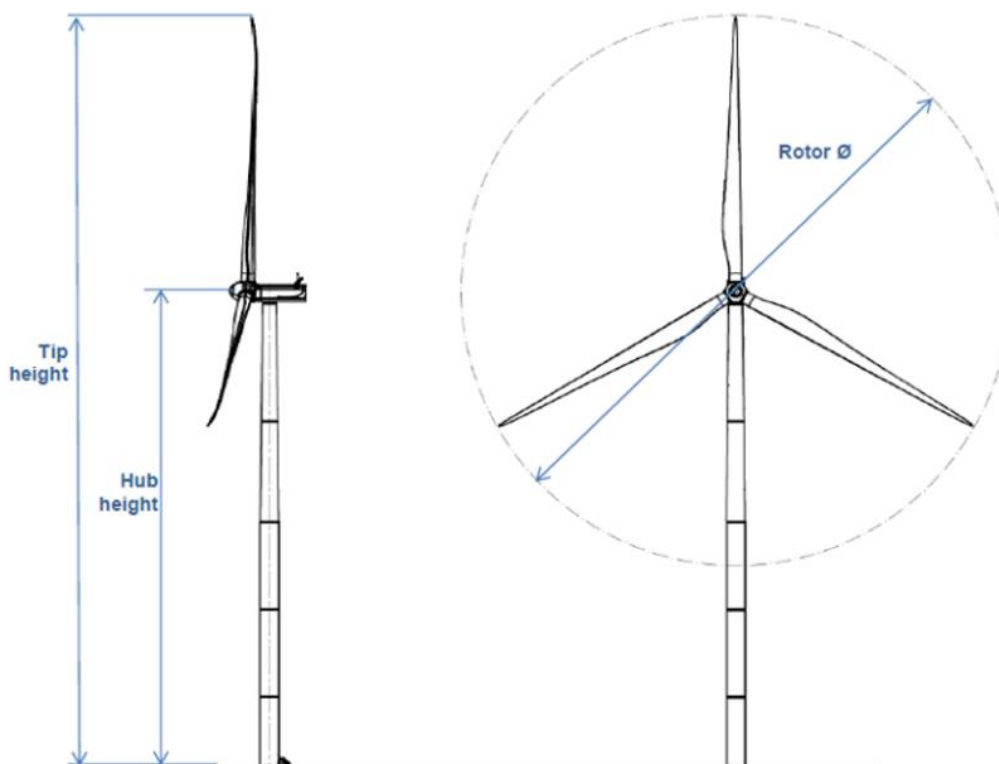


Figura 1 – Esempio Aerogeneratore

La navicella ospita i principali componenti del generatore eolico.

La navicella è ventilata e illuminata da luci elettriche. Un portello fornisce l'accesso alle pale e mozzo. Inoltre all'interno della navicella si trova anche una gru che può essere utilizzata per il sollevamento di strumenti e di altri materiali.

L'accesso dalla torre alla navicella avviene attraverso il fondo della navicella.

La turbina eolica è montata su una torre tubolare in acciaio, con un'altezza di circa 125 m, e ospita alla sua base il sistema di controllo.

È costituita da più sezioni tronco-coniche che verranno assemblate in sito. Al suo interno saranno inserite la scala di accesso alla navicella e il cavedio in cui saranno posizionati i cavi elettrici necessari al trasporto dell'energia elettrica prodotta.

L'accesso alla turbina avviene attraverso una porta alla base della torre che consentirà l'accesso al personale addetto alla manutenzione.

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La torre, il generatore e la cabina di trasformazione andranno a scaricare su una struttura di fondazione in cemento armato di tipo diretto che verrà dimensionata sulla base degli studi geologici e dell'analisi dei carichi trasmessi dalla torre.

L'aerogeneratore ad asse orizzontale è costituito da una torre tubolare che porta alla sua sommità la navicella che supporta le pale e contenente i dispositivi di trasmissione dell'energia meccanica, il generatore elettrico e i dispositivi ausiliari.

La navicella può ruotare rispetto al sostegno in modo tale da tenere l'asse della macchina sempre parallela alla direzione del vento (movimento di imbardata).

Opportuni cavi convogliano al suolo, in un quadro all'interno della torre, l'energia elettrica prodotta e trasmettono i segnali necessari per il controllo remoto del sistema aerogeneratore.

Tutte le funzioni dell'aerogeneratore sono monitorate e controllate da un'unità di controllo basata su microprocessori. Le pale possono essere manovrate singolarmente per una regolazione ottimale della potenza prodotta, questo fa sì che anche a velocità del vento elevate, la produzione d'energia viene mantenuta alla potenza nominale.

La turbina è anche dotata di un sistema meccanico di frenatura che, all'occorrenza, può arrestarne la rotazione. In caso di ventosità pericolosa, per la tenuta meccanica delle pale, l'aerogeneratore dispone anche di un freno aerodinamico, un sistema in grado di ruotare le pale fino a 90° attorno al proprio asse che le posiziona in maniera tale da offrire la minima superficie possibile all'azione del vento.

Le verifiche di stabilità del terreno e delle strutture di fondazione saranno eseguite con i metodi ed i procedimenti della geotecnica, tenendo conto delle massime sollecitazioni sul terreno che la struttura trasmette.

Le massime sollecitazioni sul terreno saranno calcolate con riferimento ai valori nominali delle azioni. Il piano di posa delle fondazioni sarà ad una profondità tale da non ricadere in zona ove risultino apprezzabili le variazioni stagionali del contenuto d'acqua.

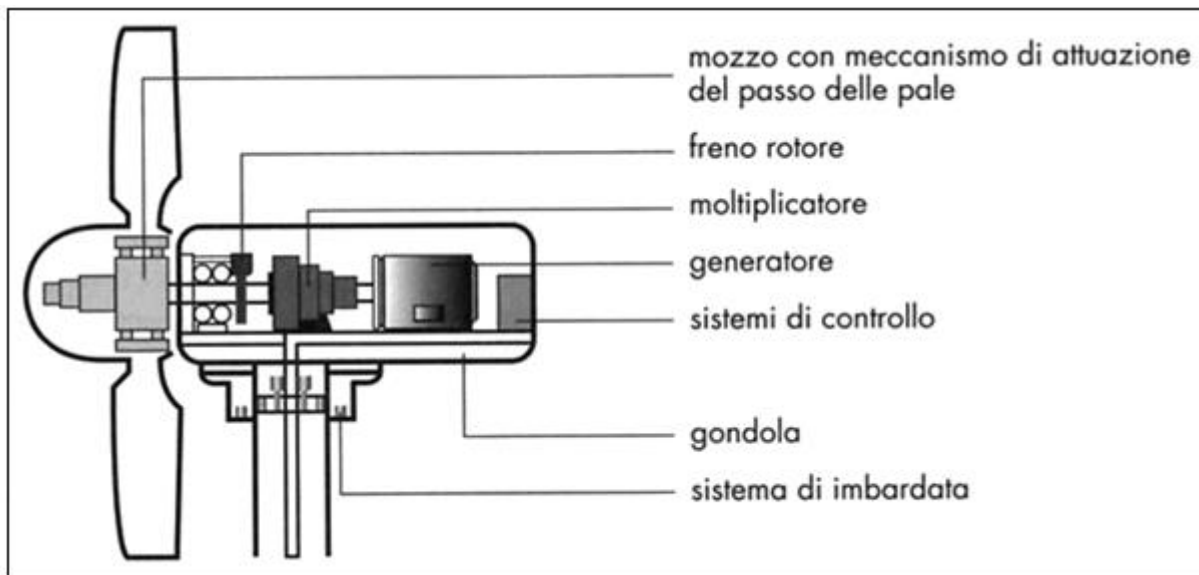


Figura 2 - Schema di principio di un aerogeneratore

4. CENNI SUL FENOMENO DELLO SHADOW FLICKERING

Lo “shadow flickering” (letteralmente “ombreggiamento intermittente”) è l’espressione comunemente impiegata per descrivere l’effetto stroboscopico delle ombre proiettate dalle pale rotanti degli aerogeneratori eolici allorquando il sole si trova alle loro spalle.

Il fenomeno si traduce in una variazione alternata di intensità luminosa che, a lungo andare, può provocare fastidio agli occupanti delle abitazioni le cui finestre risultano esposte al fenomeno stesso. Ovviamente, tale fenomeno risulta assente sia quando il sole è oscurato da nuvole o nebbia, sia quando, in specifiche condizioni di vento, le pale del generatore non sono in rotazione.

Lo shadow flickering consiste in una variazione periodica dell’intensità luminosa osservata causata dalla proiezione, su una superficie, dell’ombra indotta da oggetti in movimento.

Per un impianto eolico tale fenomeno è generato dalla proiezione, al suolo o su un ricettore, dell’ombra prodotta dalle pale in rotazione degli aerogeneratori.

In particolare, le frequenze che possono provocare un senso di fastidio sono comprese tra i 2,5 ed i 20 Hz (Verkuijlen and Westra, 1984), e, l’effetto sugli individui è simile a quello che si sperimenterebbe in seguito alle variazioni di intensità luminosa di una lampada ad incandescenza a causa di continui sbalzi

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della tensione della rete di alimentazione elettrica.

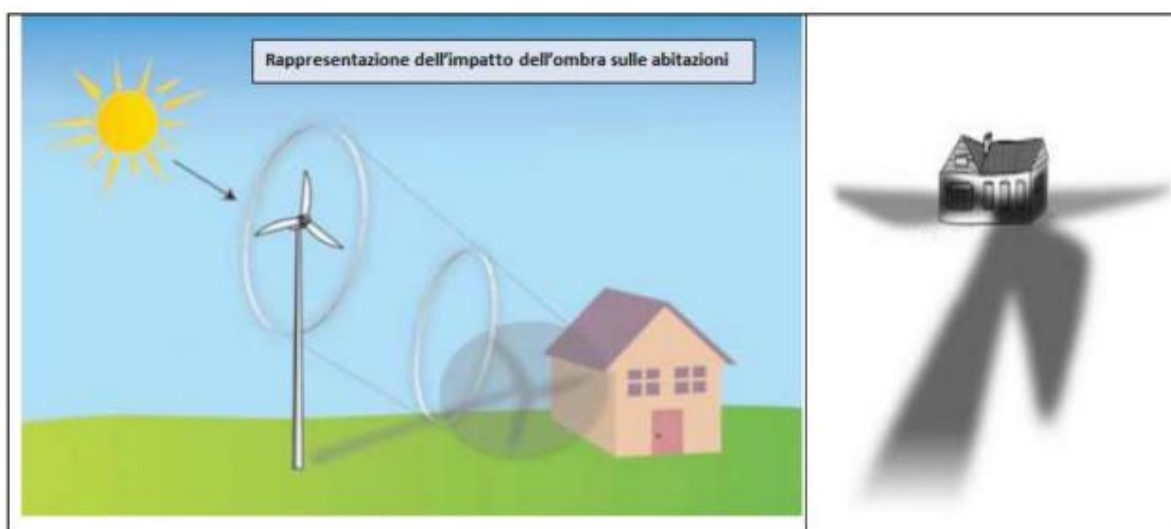


Figura 3 - Rappresentazione schematica del fenomeno dello shadow flickering

La posizione occupata dal sole può essere univocamente individuata con due coordinate angolari: l'azimut, che si misura in senso orario sul piano orizzontale a partire dal nord geografico fino al punto sull'orizzonte direttamente al di sotto dell'oggetto, e l'elevazione (o altezza), che si misura sul piano verticale, partendo dal citato punto, su fino all'oggetto.

Per il movimento della Terra rispetto al sole, l'azimut e l'elevazione cambiano continuamente nel tempo. Pertanto, il percorso seguito dal sole nel cielo durante il giorno appare come un arco che si discosta leggermente, per geometria, sia da quello del giorno precedente, sia da quello che del giorno seguente. Ogni giorno dell'anno, tra l'alba e il tramonto, si ripete quasi esattamente.

In realtà, la durata del giorno non coincide perfettamente con la durata della luce naturale.

Infatti prima dell'alba e dopo il tramonto ci sono intervalli di tempo (denominati rispettivamente crepuscolo mattutino e crepuscolo serale o serotino) durante i quali giunge a terra una luce diffusa naturale fornita dai livelli atmosferici superiori, che ricevono luce solare diretta per un tempo più lungo e ne riflettono una quota verso la sottostante terra.

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

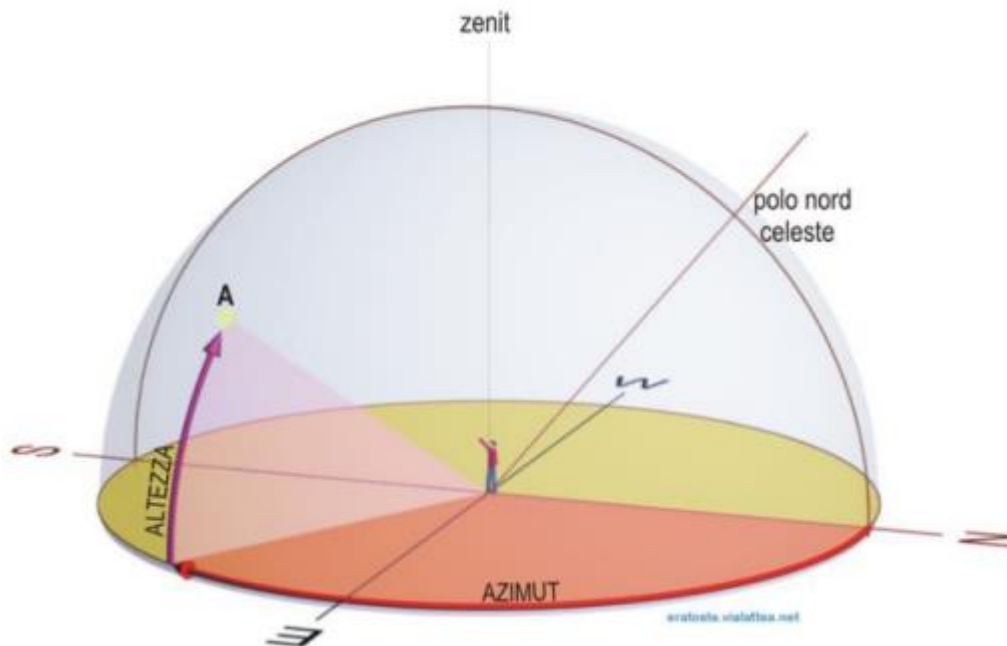


Figura 4 - Altezza e dell'azimut.

Le torri eoliche, essendo strutture fortemente sviluppate in altezza, proiettano ombre sulle aree adiacenti in presenza della luce solare diretta.

Rispetto alle altre strutture sviluppate in altezza (edifici, tralicci della alta tensione, pali della illuminazione, ecc), le turbine eoliche presentano un problema extra, ovvero, oltre alla proiezione dell'ombra sul terreno e/o su strutture esistenti, un impianto eolico può proiettare anche l'ombra in movimento dovuto alla rotazione delle pale.

Le ombre in movimento (periodico a intermittenza), se vissuto dal recettore per periodi di tempo non trascurabile, possono creare disturbo e, in casi rari, danni alla salute.

Questo accade quando vi sono le seguenti condizioni:

- si è in presenza di un livello sufficiente di intensità luminosa, ossia in condizioni di cielo sereno, sgombro da nubi ed in assenza di nebbia e con sole alto rispetto all'orizzonte; questo accade, in riferimento alla latitudine di progetto, in un'altezza del sole pari ad almeno 15-20°;
- le pale sono in movimento;
- la turbina e il recettore sono vicini: le ombre proiettate in prossimità dell'aerogeneratore risultano di maggiore intensità e nitidezza rispetto a quelle proiettate lontano; con l'aumentare della distanza

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tra turbina e recettore, le pale coprono una porzione sempre più piccola del sole, inducendo un fastidio di minore entità; inoltre il fenomeno risulta di trascurabile entità quando l'ombra proiettata sul recettore è indotta dall'estremità delle pale (rotor tip); raggiunge il massimo dell'intensità in corrispondenza dell'attacco di pala all'hub;

- la linea recettore-aerogeneratore non incontra ostacoli; in presenza di vegetazione o edifici interposti l'ombra generata da quest'ultimi ridimensiona o annulla il fenomeno.

I più recenti aerogeneratori tripala operano ad una velocità di rotazione inferiore ai 35 giri al minuto, corrispondente ad una frequenza di passaggio delle pale sulla verticale inferiore a 1,75 Hz, minore, quindi, della frequenza critica di 2,5 Hz.

Inoltre, i generatori di grande potenza (dai 2 MW in su) raramente superano la velocità di rotazione di 20 giri al minuto, nel caso in oggetto addirittura ci si ferma a circa 11,20 giri al minuto, corrispondente a frequenze di passaggio delle pale ampiamente minori di quelle ritenute fastidiose per la maggioranza degli individui.

Studi condotti sui possibili effetti dello shadow flickering sulla salute umana raccomandano, al fine di ridurre al minimo i fastidi, una velocità di flickering non superiore a 3 tagli al secondo (Harding, 4 Aprile 2008). Nel caso di aerogeneratori tripala, tale frequenza si traduce in una velocità massima di rotazione del rotore di 60 rpm (rotazioni per minuto).

Le relazioni spaziali tra un aerogeneratore ed un ricettore (abitazione), così come la direzione del vento risultano essere fattori chiave per la durata del fenomeno di shadow flickering.

Con i moderni aerogeneratori di grandi dimensioni per distanze superiori ai 500 m, il fenomeno in esame potrebbe verificarsi all'alba, oppure al tramonto, ovvero in quelle ore in cui le ombre risultano molto lunghe per effetto della piccola elevazione solare.

Al di là di una certa distanza, comunque, l'ombra smette di essere un problema perché il rapporto tra lo spessore della pala ed il diametro del sole diventa molto piccolo.

Quindi, come è facile immaginare, la condizione più penalizzante corrisponde al caso in cui il piano del rotore risulta ortogonale alla congiungente ricettore-sole; infatti, in tali condizioni, l'ombra proiettata darà origine ad un cerchio di diametro pari al rotore del generatore eolico.

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In generale, l'area soggetta a shadow flickering non si estende oltre i 500÷1.000 m dall'aerogeneratore e le zone a maggiore impatto ricadono entro i 300 m di distanza dalle macchine con durata del fenomeno dell'ordine delle 300 ore all'anno.

L'intensità del fenomeno è definita come la differenza di luminosità che si percepisce in presenza ed in assenza di flickering in una data posizione. In generale, si può affermare che:

- avendo le pale una forma rastremata con lo spessore che cresce verso il mozzo, il fenomeno risulterà tanto più intenso quanto maggiore sarà la porzione di disco solare coperta dalla pala stessa e quanto minore la distanza dal ricettore;
- l'intensità del flickering sarà minima quando l'ombra prodotta è generata all'estremità delle pale;
- maggiori distanze tra generatore e ricettore determinano ombre meno nette; in tal caso l'effetto flickering risulterà meno intenso e distinto.

Se ci riferissimo all'Europa, ad oggi, solo la Germania ha emesso dettagliate linee guida contenenti limiti e condizioni per il calcolo dell'impatto derivante dallo Shadow Flickering.

Le linee guida Tedesche fissano i parametri per il calcolo dell'ombreggiamento, come di seguito riportati:

- ✓ L'angolo minimo del sole rispetto all'orizzonte da cui calcolare l'ombreggiamento deve essere pari a 3°;
- ✓ La percentuale di copertura del sole dalla pala deve essere almeno del 20%.

Inoltre vengono definiti, anche i valori limite espressi in ore/anno di ombreggiamento presso un recettore prossimo ad una centrale eolica:

- ✓ Massimo 30 ore/annue di massima ombra astronomica (caso peggiore);
- ✓ Massimo 30 min/giorno di massima ombra astronomica (caso peggiore);
- ✓ Se si utilizza una regolazione automatica sono previste come impatto d'ombra massimo 8 ore/annue.

5. IL CASO DI STUDIO

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Il sito oggetto dello studio è situato in provincia di Palermo (PA), nei comuni di Sclafani Bagni, Valledolmo, Caltavuturo e Polizzi generosa.

L'area di progetto su cui verrà realizzato il parco eolico è caratterizzata da orografia tipica delle zone montuose della zona, priva di complicazioni eccessive e con un'altezza media compresa tra 490 e 872 metri sul livello del mare.

Si specifica che il parco eolico sarà collegato, attraverso il tracciato del cavidotto, con la stazione elettrica Terna ubicata nella porzione orientale del territorio comunale di Villalba.

Attualmente il sito presenta un uso del suolo principalmente agricolo; la copertura vegetale arborea è scarsa, quindi l'area in esame è caratterizzata da una rugosità media, caratteristica favorevole allo sfruttamento del vento. Le turbine eoliche saranno posizionate in modo omogeneo, in direzione perpendicolare al vento prevalente N.

Per effettuare una localizzazione univoca dei terreni sui quali insiste il parco eolico, di seguito si riportano le cartografie riguardanti:

- sovrapposizione del parco eolico su ortofoto (figura 5);
- sovrapposizione del parco eolico su catastale (figura 6);
- sovrapposizione del parco eolico su CTR (figura 7);
- sovrapposizione del parco eolico su IGM (figura 8).

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

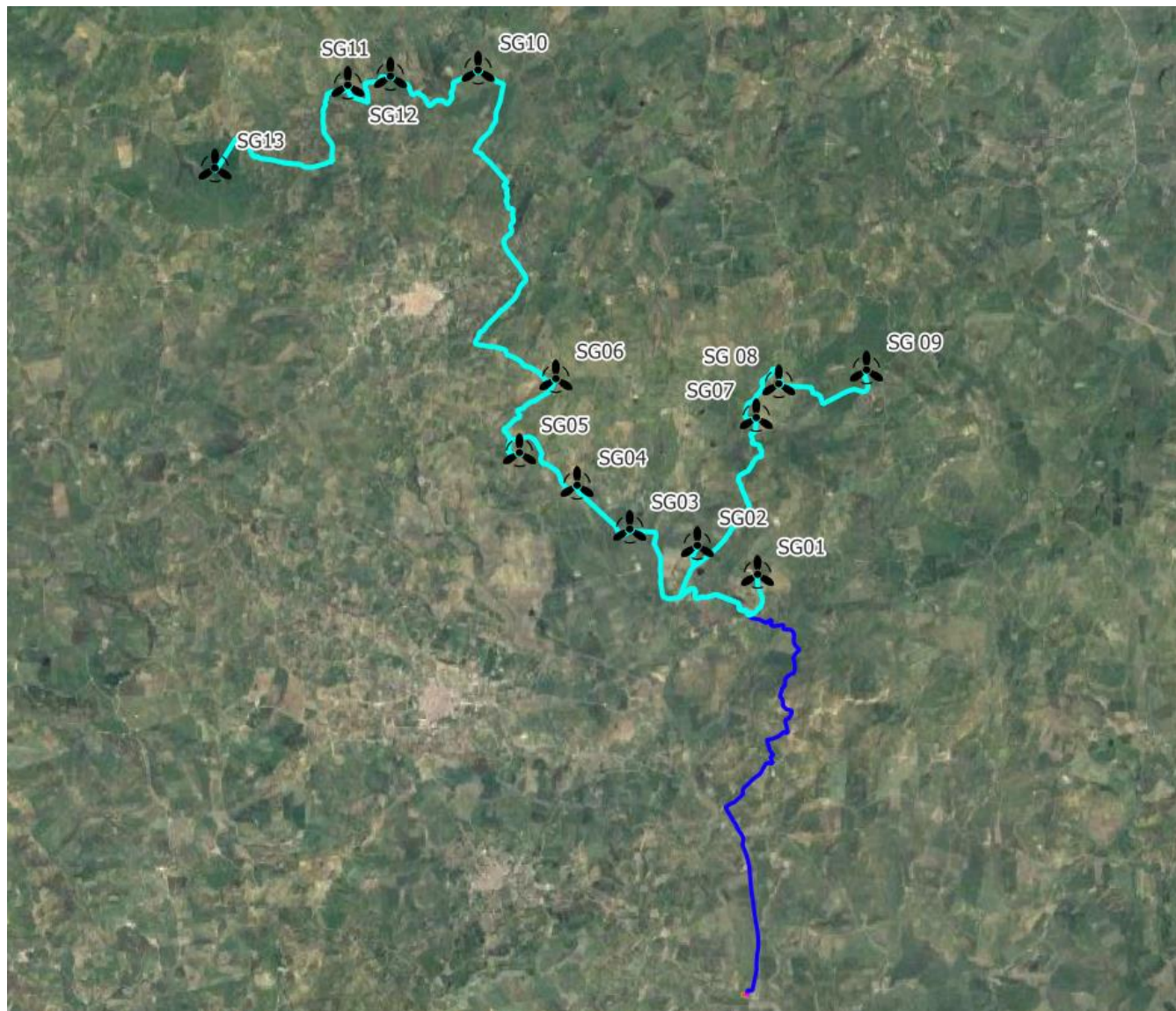


Figura 5 - Inquadramento area parco eolico su base ortofoto

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

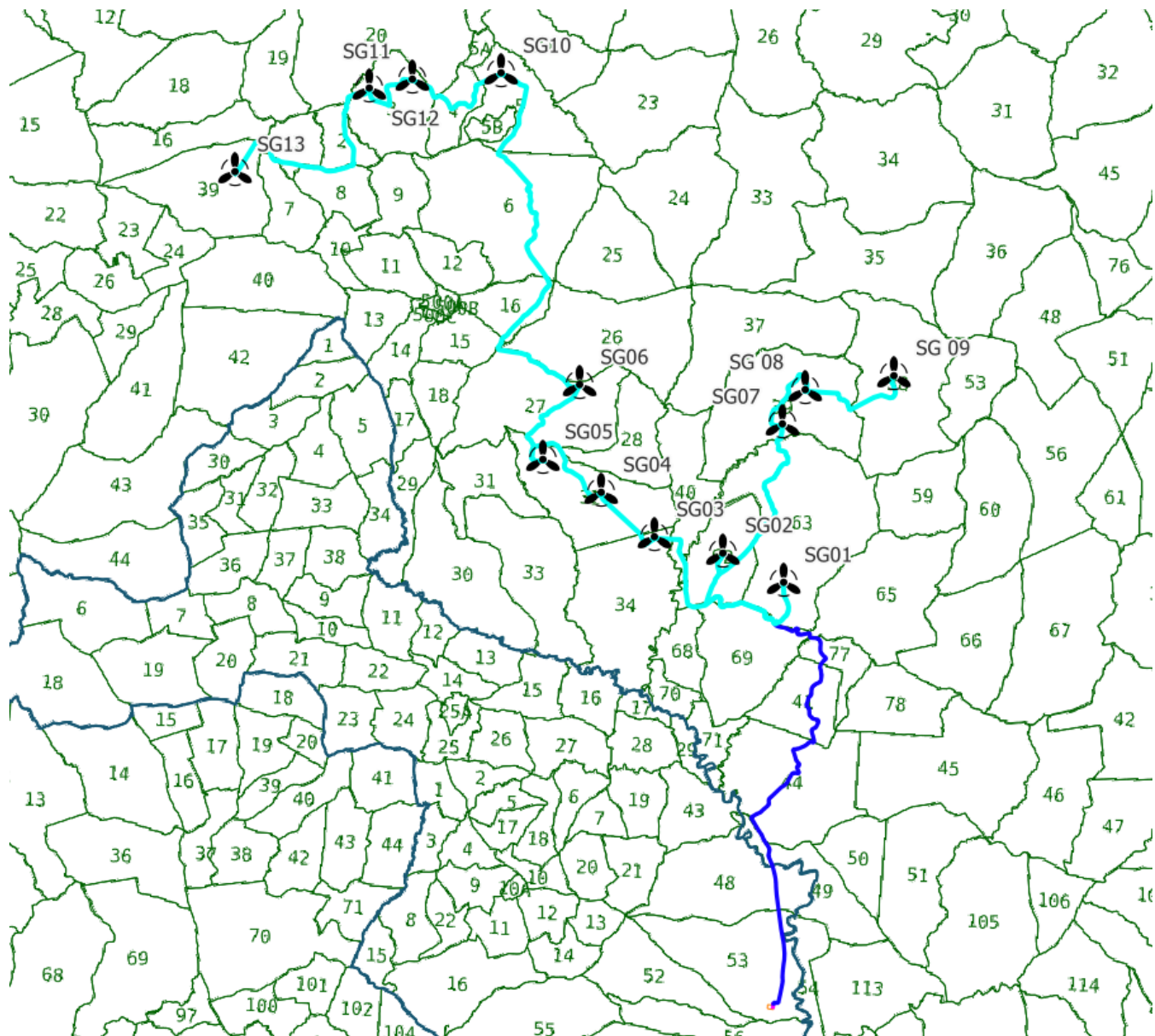


Figura 6 - Inquadramento area parco eolico su catastale

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

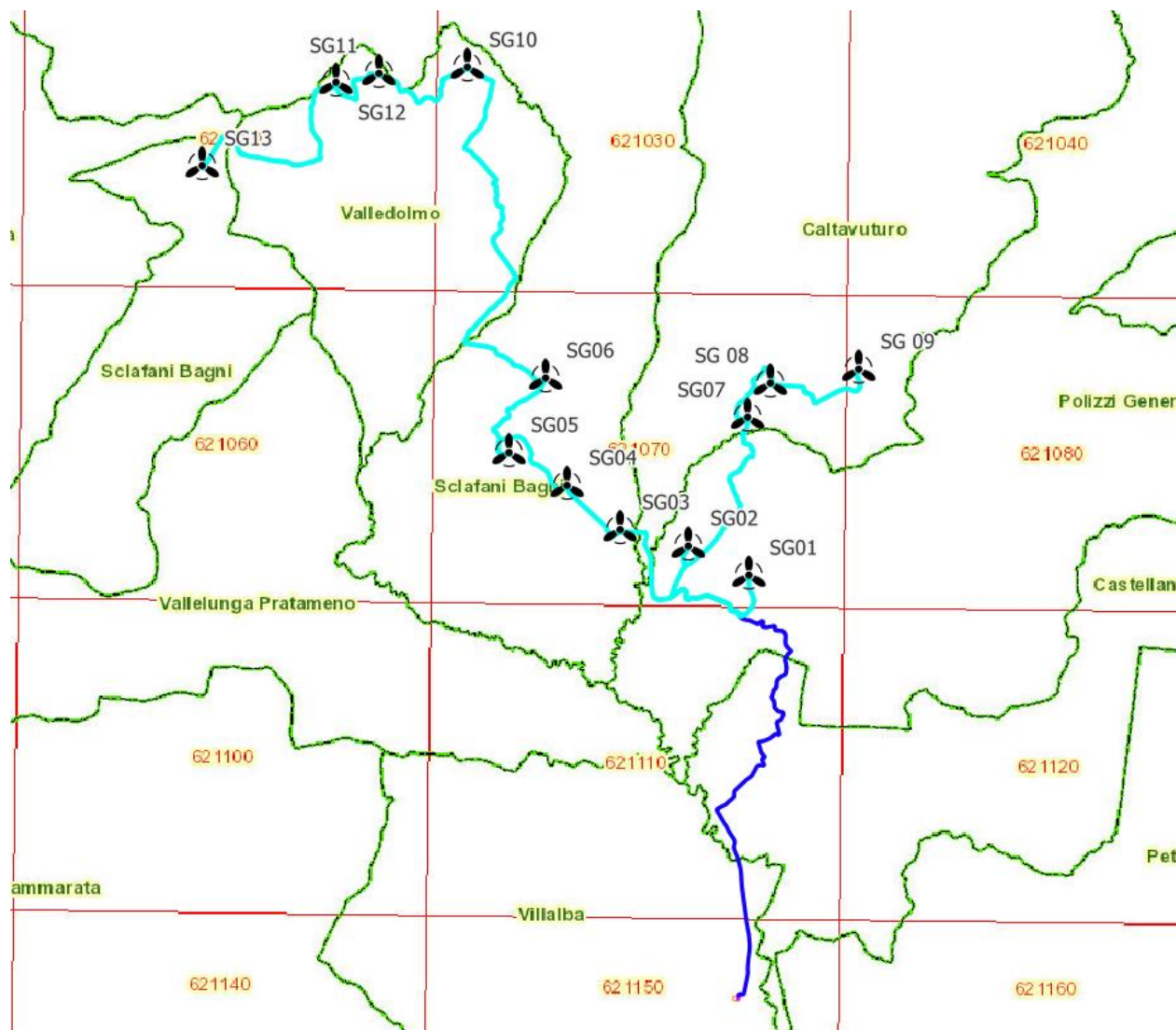


Figura 7 - Inquadramento area parco e sottostazione su CTR

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

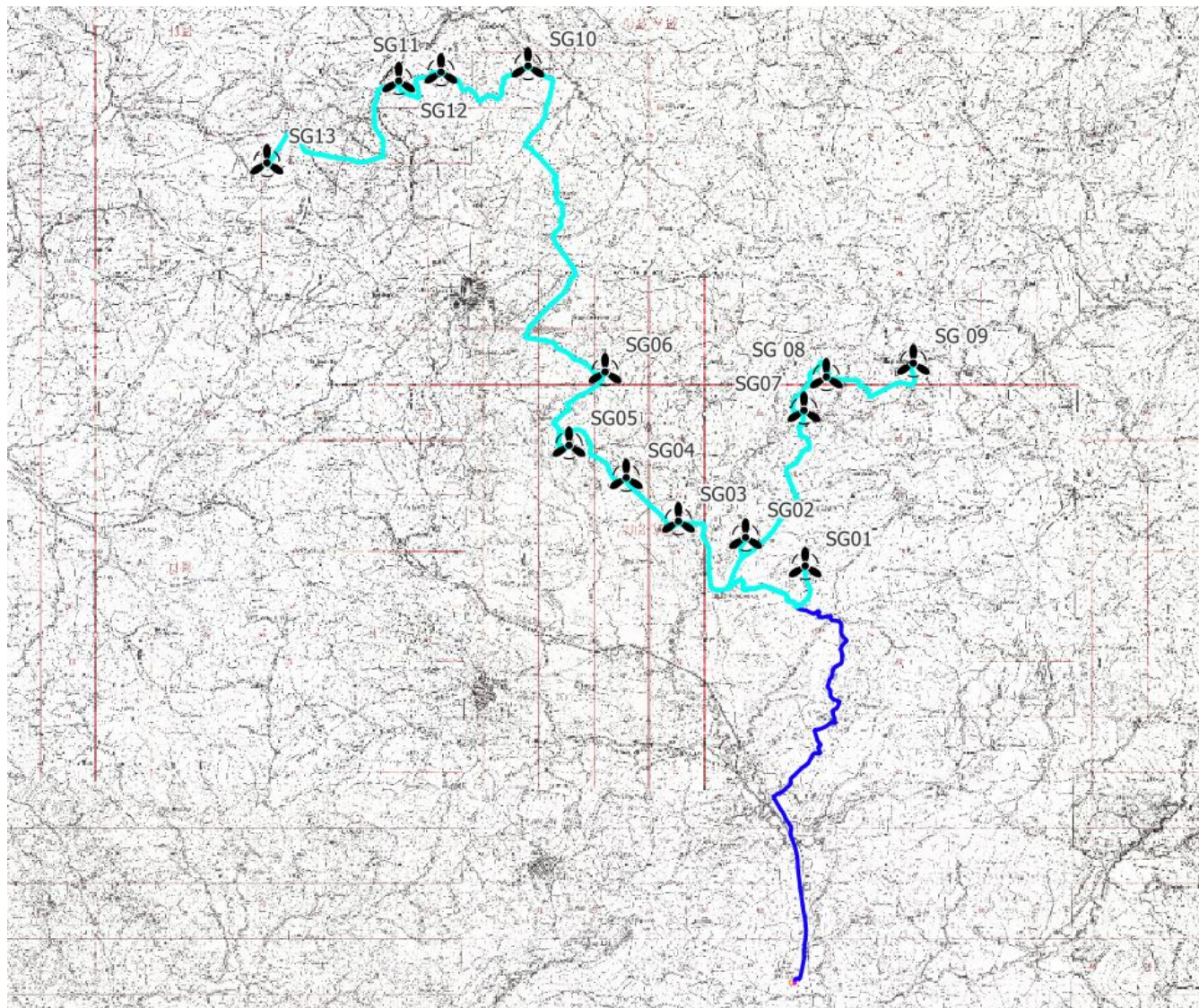


Figura 8 - Inquadramento area parco e sottostazione su IGM

Il parco eolico per la produzione di energia elettrica oggetto di studio avrà le seguenti caratteristiche:

- potenza installata totale: 85,8 MW;
- potenza della singola turbina: 6,6 MW;
- n. 13 turbine;
- n. 1 “Cabina di Raccolta e Smistamento”;
- n. 1 “SSE lato utente di trasformazione”;
- n. 1 Nuova stazione elettrica di trasformazione RTN.

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5.1 Configurazione d’impianto

L’aerogeneratore previsto per la realizzazione del parco eolico è una turbina da 6,6 MW.

Nella tabella che segue sono sintetizzate le principali caratteristiche dell’aerogeneratore previsto nel parco eolico.

Tipo di Aerogeneratore	Altezza al mozzo (m)	Diametro rotore (m)	Potenza nominale (kW)
Aerogeneratore da 6,6 MW	155 m	170 m	6600

Tabella 2 - Caratteristiche principali dell’aerogeneratore previsto nel parco eolico.

L’effetto di shadow flickering è ovviamente tanto più importante quanto più grande è il diametro del rotore della turbina.

La disposizione prevista per le 13 turbine oggetto di studio è riportata nella tabella sottostante in coordinate Geo [deg]-WGS84.

	Longitude	Latitude
SG 01	13.896687° E	37.703660° N
SG 02	13.884525° E	37.708259° N
SG 03	13.870682° E	37.710696° N
SG 04	13.859853° E	37.717721° N
SG 05	13.848144° E	37.722879° N
SG 06	13.855141° E	37.734890° N
SG 07	13.896196° E	37.729071° N
SG 08	13.900757° E	37.734522° N
SG 09	13.918495° E	37.736931° N
SG 10	13.838657° E	37.784659° N
SG 11	13.820859° E	37.783446° N
SG 12	13.812163° E	37.781845° N
SG 13	13.785337° E	37.768214° N

Tabella 3 - Coordinate degli aerogeneratori oggetto di studio

5.2 Individuazione ed analisi dei ricettori

Dal punto di vista di un recettore lo shadow flickering si manifesta in una variazione ciclica dell’intensità luminosa: in presenza di luce solare diretta, un recettore localizzato nella zona d’ombra indotta dal rotore, sarà investito da un continuo alternarsi di luce diretta ed ombra, causato dalla proiezione delle ombre dalle pale in movimento.

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Tale fenomeno se vissuto dal recettore per periodi di tempo non trascurabili può generare un disturbo, quando:

- Si sia in presenza di un livello sufficiente di intensità luminosa, ossia in condizioni di cielo sereno sgombro da nubi ed in assenza di nebbia e con sole alto rispetto all’orizzonte;
- La linea recettore-aerogeneratore non incontri ostacoli: in presenza di vegetazione o edifici interposti l’ombra generata da questi ultimi annulla il fenomeno. Pertanto, ad esempio, qualora il recettore sia una abitazione, perché si generi lo shadow flickering le finestre dovrebbero essere orientate perpendicolarmente alla linea recettore - aerogeneratore e non affacciarsi su ostacoli;
- La turbina sta orientata in modo che il rotore risulti perpendicolare alla linea sole - ricettore: come mostrato nelle figure seguenti, quando il piano del rotore è perpendicolare alla linea sole-recettore, l’ombra proiettata dalle pale risulta muoversi all’interno di un “cerchio” che riferisce alla circonferenza del rotore inducendo uno shadow flickering non trascurabile; per situazioni in cui, dal punto di vista del recettore, il piano del rotore risulti essere in linea con il sole ed il recettore, l’ombra proiettata è sottile, di bassa intensità ed è caratterizzata da un rapido movimento, risultando pertanto lo shadow flickering di entità trascurabile;
- La posizione del sole sia tale da indurre una luminosità sufficiente. Ciò si traduce, in riferimento alla latitudine di progetto, in un’altezza del sole pari ad almeno 15-20°;
- Le pale sono in movimento;
- Turbina e ricettore siano vicini: le ombre proiettate in prossimità dell’aerogeneratore risultano di maggiore intensità e nitidezza rispetto a quelle proiettate lontano. Quando una turbina è posizionata sufficientemente vicino al ricettore, così che una porzione ampia di pala copra il sole, l’intensità del flicker risulta maggiore. All’aumentare della distanza tra turbina e recettore, le pale coprono una porzione sempre più piccola del sole, inducendo un flicker di minore entità. Inoltre, il fenomeno risulta di bassa entità quando l’ombra proiettata sul recettore è indotta dall’estremità delle pale; raggiunge il massimo dell’intensità in corrispondenza dell’attacco di pala all’hub.

Rilevamenti sul campo hanno evidenziato che per distanze tra aerogeneratore di altezza paragonabile a quella delle macchine di progetto) e recettori superiori a 375 m il fenomeno è da rilevarsi solamente all’alba e al tramonto, momenti in cui la radiazione diretta è di minore intensità.

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Ai fini della previsione degli impatti indotti sulle abitazioni e sugli edifici lavorativi dall'impianto eolico in progetto, sono stati censiti i ricettori presenti nel raggio di 1 km dagli aerogeneratori; distanza oltre la quale si può ipotizzare essere nullo il fenomeno di shadow flickering.

I ricettori sono stati individuati calcolando l'involuppo delle circonferenze di raggio pari a 1 km con centro geometrico corrispondente alle coordinate geografiche delle turbine, precedentemente indicate. L'analisi di shadow flickering di cui al presente studio è stata elaborata per specifici n. 43 recettori selezionati sul territorio e corrispondenti a costruzioni ubicate nell'intorno dell'impianto (edifici di Categoria A).

Sebbene il fenomeno dello shadow flickering possa essere percepito anche all'esterno delle costruzioni, esso risulta più evidente e fastidioso all'interno di ambienti chiusi che presentano aperture e/o finestre orientate proprio sul prolungamento della direttrice sole-turbina, mentre risulta meno impattante (o addirittura nullo) per quegli ambienti con aperture e/o finestre il cui orientamento si discosta dal prolungamento della direttrice sole-turbina.

Conseguentemente, una corretta valutazione del fenomeno del flickering non può prescindere dall'esatto orientamento delle finestre.

Nella tabella a seguire sono riportati i riferimenti geografici (coordinate Geo [deg]-WGS84) di tutti i recettori oggetto di analisi e simulazione con la relativa indicazione catastale e descrizione d'uso.

Shadow receptor-Input

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

			No.	Longitude	Latitude
			S	13.843786° E	37.715626° N
			T	13.832739° E	37.728415° N
			U	13.833132° E	37.726526° N
			V	13.836676° E	37.729148° N
			W	13.836689° E	37.732699° N
			X	13.840073° E	37.731840° N
			Y	13.838867° E	37.732036° N
			Z	13.842831° E	37.731786° N
			AA	13.833860° E	37.729309° N
			AB	13.862141° E	37.743222° N
			AC	13.870476° E	37.733217° N
			AD	13.848479° E	37.725424° N
			AE	13.772675° E	37.765622° N
			AF	13.771251° E	37.774837° N
			AG	13.772708° E	37.774627° N
			AH	13.777133° E	37.773447° N
			AI	13.786170° E	37.775550° N
			AJ	13.798050° E	37.788037° N
			AK	13.771854° E	37.760359° N
			AL	13.811651° E	37.788996° N
			AM	13.830234° E	37.776537° N
			AN	13.829249° E	37.790749° N
			AO	13.844708° E	37.791343° N
			AP	13.844604° E	37.783456° N
			AQ	13.812669° E	37.770070° N
No.	Longitude	Latitude			
A	13.899881° E	37.711648° N			
B	13.910649° E	37.703023° N			
C	13.900501° E	37.711879° N			
D	13.899338° E	37.713067° N			
E	13.880086° E	37.699456° N			
F	13.885473° E	37.736604° N			
G	13.923937° E	37.748165° N			
H	13.930553° E	37.738852° N			
I	13.931679° E	37.740250° N			
J	13.880405° E	37.699378° N			
K	13.859259° E	37.703943° N			
L	13.860318° E	37.703692° N			
M	13.873094° E	37.716208° N			
N	13.870674° E	37.716464° N			
O	13.872439° E	37.717553° N			
P	13.867736° E	37.722393° N			
Q	13.853828° E	37.722151° N			
R	13.846157° E	37.714199° N			

Tabella 4 - Coordinate delle strutture considerate come ricettori sensibili

Con riferimento all'analisi in esame, in via cautelativa, si considereranno per tutti i ricettori le finestre orientate proprio sul prolungamento della direttrice sole-turbina.

Nella figura successiva vengono mostrati i suddetti ricettori su ortofoto assieme alle turbine oggetto dello studio.

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

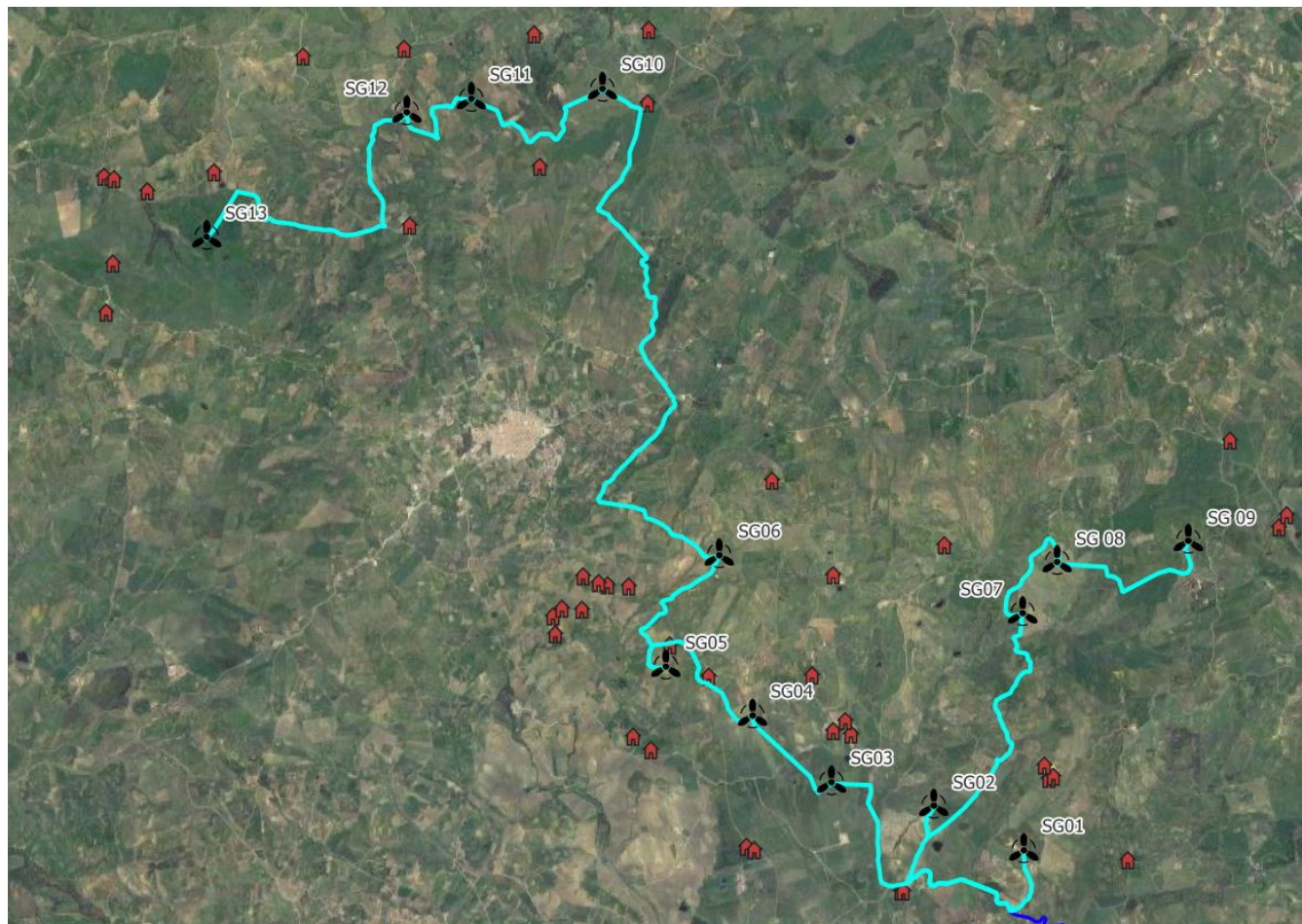


Figura 9 - Localizzazione geografica dei ricettori rispetto alle turbine

In generale, l'area soggetta a shadow flicker non si estende oltre i 500-1000 m dall'aerogeneratore e le zone a maggiore impatto ricadono entro i 300 m di distanza dalle macchine.

Lo “shadow flickering” è ritenuto “pericoloso” in quanto dimostrato che l'effetto visivo, dovuto alla intermittenza dell'ombra creata dal moto delle pale in rotazione, sia causa di possibili danni alla salute umana. Si ritiene più precisamente che il fenomeno sia strettamente connesso con i problemi di epilessia.

6. MODELLO DI CALCOLO E SOFTWARE UTILIZZATO

L'analisi dell'impatto da shadow flickering prodotto da un campo eolico è realizzata, generalmente, attraverso l'impiego di specifici applicativi che modellano il fenomeno in esame.

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I pacchetti software impiegati per la progettazione di impianti eolici contengono moduli specifici per il calcolo e l'analisi del fenomeno di flickering.

L'analisi si basa sull'impiego di un modello digitale del terreno dell'area oggetto di progettazione, sulle posizioni (E, N, quota) degli aerogeneratori e dei recettori sensibili, nonché sui dati che correlano la posizione del sole nell'arco dell'anno con le condizioni operative delle turbine nello stesso arco di tempo.

Al fine di calcolare la posizione relativa del sole nell'arco di un anno rispetto al parco eolico ed ai ricettori è necessario definire la longitudine, la latitudine ed il fuso orario dell'area interessata dal progetto.

Nello specifico è stato impiegato il modulo shadow flickering del software WindPRO.

Esso consente di analizzare la posizione del sole nell'arco di un anno per identificare i tempi in cui ogni turbina può proiettare ombre sulle finestre delle abitazioni vicine.

In particolare, il modello permette di:

- calcolare il potenziale per le ombre intermittenti alle finestre delle abitazioni;
- mostrare un calendario grafico (“Calendar Graphical”) degli eventi di flickering;
- mostrare un elenco dettagliato (“Calendar Time”) di ciascun evento di ombreggiamento (ora di inizio, di fine, durata del fenomeno, aerogeneratore/i coinvolti, etc.);
- creare mappe di impatto potenziale che mostrano le ore d'ombra intermittente per l'intero parco eolico o per le singole macchine (curve di isodurata) nell'arco dell'anno.

6.1 Calcolo dello shadow flickering nel WORST CASE

I calcoli effettuati per l'ombreggiamento rappresentano un approccio molto conservativo e di conseguenza peggiorativo, per questo denominato "worst case", in cui la situazione reale risulterà ben al di sotto dei risultati ottenuti.

Per l'esecuzione della valutazione tecnica il software ha utilizzato una serie di dati di input caratterizzanti quali:

- ✓ l'altimetria della zona simulata;
- ✓ la latitudine e longitudine dell'area interessata;

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- ✓ la disposizione geografica delle turbine e dimensione geometrica dei loro componenti (torre e pale);
- ✓ la disposizione geografica dei “ricettori sensibili” (fabbricati e relative finestre);
- ✓ l’orientamento del rotore rispetto al ricettore;
- ✓ la proiezione dell’ombra rispetto ai ricettori.

Sulla base di questi dati il software calcola il numero di ore annue di esposizione allo shadow flickering per ciascun nodo del grigliato che copre l’intera area, nonché il numero di ore di esposizione per gli ambienti abitativi attraverso le finestre.

Per l’esecuzione della simulazione sono stati fissati i seguenti parametri:

- coordinate geografiche delle turbine considerate (vedi Tabella 3)
- coordinate geografiche dei ricettori considerati (vedi Tabella 4)
- coordinate geografiche baricentriche (Geo WGS84): 13.848278° E, 37.744782° N
- disposizione orizzontale delle finestrate
- estensione area simulata: 10 km x 10 km (100 km²)
- angolo minimo del Sole sull’orizzonte: 3°
- raggio d’influenza massimo: 1 km dal punto di installazione dell’aerogeneratore;
- anno di riferimento: 2023
- altezza del punto di vista dell’osservatore rispetto la mappa: 1,7 m
- altezza del punto di vista (ZVI) rispetto la superficie del suolo: 2,0 m
- parametri turbina:
 - ✓ diametro rotore: 170 m
 - ✓ altezza torre al mozzo: 155 m
 - ✓ altezza complessiva dell’aerogeneratore: 240 m

Per il calcolo dell’orizzonte di ciascun ricettore il modello numerico utilizzato tiene conto dell’ostacolo naturale costituito dall’orografia circostante il ricettore e da eventuali ostacoli imputati specificatamente (ad es. boschi, barriere naturali o artificiali, etc).

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In definitiva è bene evidenziare che, a vantaggio di sicurezza, le simulazioni effettuate sono state eseguite ipotizzando contemporaneamente le seguenti condizioni sfavorevoli per qualunque ricettore soggetto a shadow flickering:

- rotore in movimento alla massima frequenza ed in moto continuo;
- assenza di ostacoli;
- orientamento del rotore ortogonale alla congiungente ricettore-sole.

Come già sottolineato, al di là di una certa distanza l'ombra smette di essere un problema perché il rapporto tra lo spessore della pala e il diametro del sole diventa piccolo.

Poiché non vi è un valore generalmente accettato per questa distanza massima, il software permette di specificare il limite in metri o multipli del diametro della turbina o dell'altezza della pala stessa.

Quindi, come è facile immaginare, la condizione più penalizzante corrisponde al caso in cui il piano del rotore risulta ortogonale alla congiungente ricettore – sole; infatti, in tali condizioni, l'ombra proiettata darà origine ad un cerchio di diametro pari al rotore del generatore eolico.

Sebbene il fenomeno possa essere percepito anche all'esterno, esso risulta evidente e fastidioso in quegli ambienti con finestrate rivolte verso le ombre.

6.2 Risultati

Il modello numerico utilizzato, al pari di altri presenti sul mercato, produce in output una mappa dell'impatto dell'ombra sul terreno, nel caso più penalizzante denominato "worst case", corrispondente alle ore in cui il sole permane al di sopra dell'orizzonte nell'arco dell'anno (**circa 4380h/a di luce**), indipendentemente dalla presenza o meno di nubi, le quali inficerebbero il fenomeno stesso di shadow flickering per impossibilità che si generi il fenomeno di flickering, oltre agli input specificati precedentemente, che rendono il caso in oggetto nettamente peggiorativo, ma soprattutto considerano le turbine sempre in movimento ed alla massima rotazione del rotore.

I risultati dettagliati dell'analisi effettuata sono riportati nei diversi allegati al presente lavoro.

Nell'immagine che segue, si riporta in opportuna scala cromatica il valore massimo di ombreggiamento annuo su superficie orizzontale prodotta dalle opere in progetto nelle condizioni sfavorevoli sopra elencate.

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

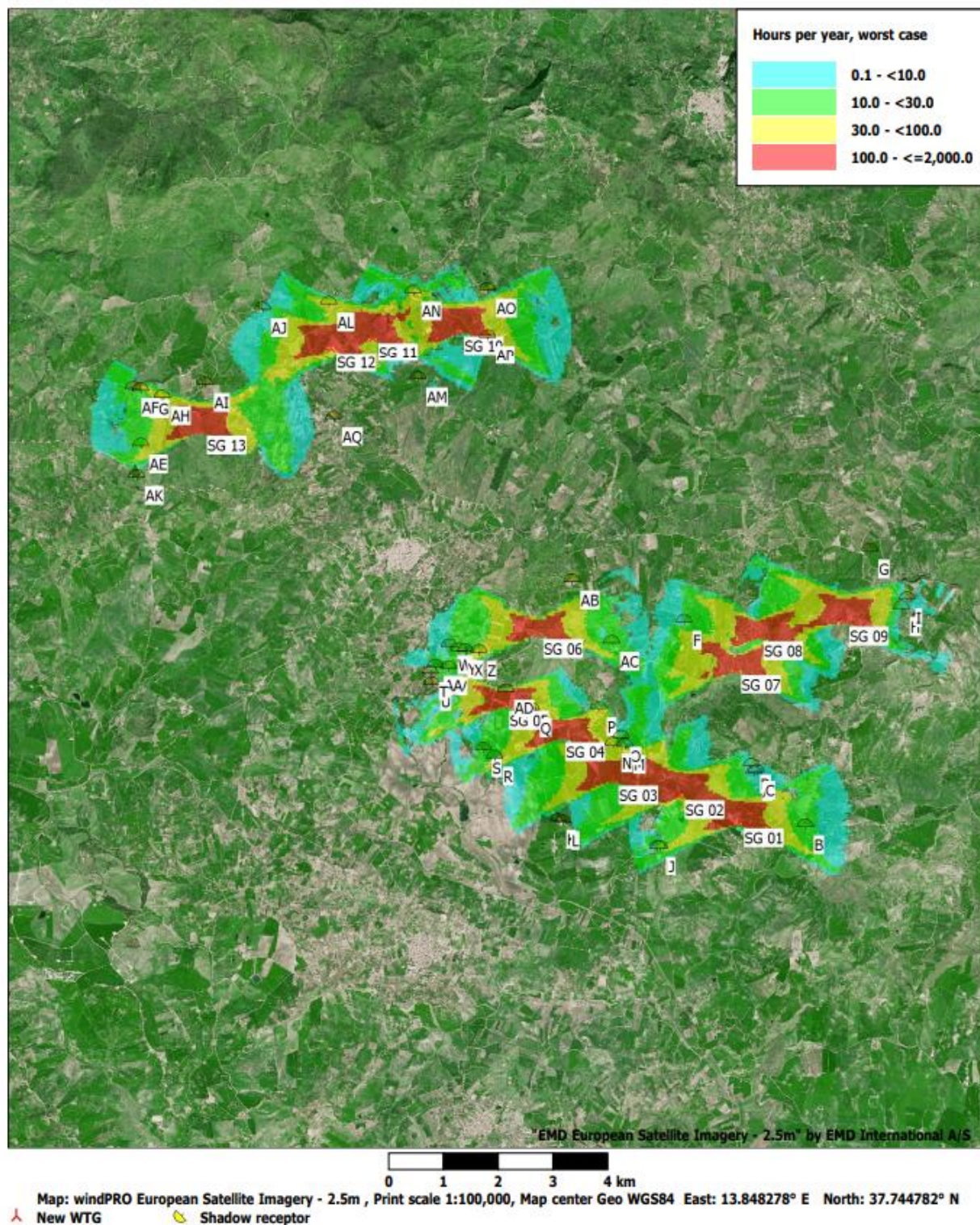


Figura 10 - Rappresentazione grafica dell'ombreggiamento delle turbine rispetto i ricettori

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

Inoltre, per ogni ricettore vengono rappresentati graficamente, negli appositi diagrammi riportati nell'ALLEGATO 2 al termine alla presente relazione, gli intervalli di ombreggiamento durante le varie ore dell'anno (il cosiddetto “Calendar Graph”), dove le curve indicano l'ora dell'alba e del tramonto e le macchie colorate indicano il periodo in cui è possibile il verificarsi del fenomeno. Sull'asse delle ascisse sono riportati i giorni dell'anno e sull'asse delle ordinate l'ora del giorno (ora solare).

Nell'ALLEGATO 3 viene riportato per ciascun ricettore la lista giornaliera dei singoli eventi di shadow flickering indotti da ogni turbina (il cosiddetto “Calendar Time”): per ciascun evento viene specificata l'ora solare di inizio, l'ora solare di fine, la durata complessiva e la copertura (temporale) percentuale del fenomeno dello shadow flickering al netto di eventuali ostacoli (orografici e/o di altro tipo).

Di seguito, vengono presentati sinteticamente in forma tabellare i risultati complessivi della simulazione per i recettori analizzati.

Shadow receptor Shadow, worst case	
No.	Shadow hours per year [h/year]
A	5:06
B	0:40
C	4:20
D	4:00
E	0:00
F	9:47
G	0:00
H	0:01
I	5:17
J	0:00
K	0:00
L	0:00
M	11:04
N	20:02
O	7:01
P	41:18
Q	19:26
R	0:00
S	0:00
T	0:00
U	0:00
V	0:00
W	0:00
X	0:00
Y	0:00
Z	0:00
AA	0:31
AB	0:00
AC	0:00
AD	189:41
AE	0:00

No.	Shadow hours per year [h/year]
AF	17:22
AG	23:45
AH	59:33
AI	0:00
AJ	0:30
AK	0:00
AL	52:06
AM	0:00
AN	55:54
AO	0:00
AP	0:00
AQ	0:00

Tabella 5 - Risultati riepilogativi complessivi del calcolo del fenomeno di shadow flickering per ciascun ricettore nel WORST CASE

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7. ANALISI DEI RISULTATI PER SINGOLO RICETTORE (WORST CASE)

Dalla Tabella 5 si evince che 20 dei 43 ricettori sono interessati dal fenomeno di shadow flickering in quanto tutti caratterizzati da valori non nulli delle ore/anno di shadow.

Di seguito si descrive l'analisi dei risultati ottenuti per ogni singolo ricettore.

Dall'analisi del “Calendar Graph” e del “Calendar Time” nell'ALLEGATO 2 e 3 risulta che:

- il fenomeno dello shadow flickering per il ricettore **E, G, J, K, L, R, S, T, U, V, W, X, Y, Z, AB, AC, AE, AI, AK, AM, AO, AP e AQ** in “WORST CASE” non si viene a verificare nel corso di tutto l'arco dell'anno.
- il fenomeno dello shadow flickering per il ricettore **A** in “WORST CASE” si può verificare nel corso di 2 distinti periodi durante l'anno e più precisamente:
 - ✓ Periodo 1: dal 15 febbraio al 1 marzo causato prevalentemente dalla turbina WTG02;
 - ✓ Periodo 2: dal 12 ottobre al 27 ottobre causato prevalentemente dalla turbina WTG02;
- il fenomeno dello shadow flickering per il ricettore **B** in “WORST CASE” si può verificare nel corso di 2 distinti periodi durante l'anno e più precisamente:
 - ✓ Periodo 1: dal 27 marzo al 1 aprile causato dalla turbina WTG01;
 - ✓ Periodo 2: dal 11 settembre al 16 settembre causato dalla turbina WTG01;
- il fenomeno dello shadow flickering per il ricettore **C** in “WORST CASE” si può verificare nel corso di 2 distinti periodi durante l'anno e più precisamente:
 - ✓ Periodo 1: dal 15 febbraio al 28 febbraio causato dalla turbina WTG02;
 - ✓ Periodo 2: dal 14 ottobre al 27 ottobre causato dalla turbina WTG02;
- il fenomeno dello shadow flickering per il ricettore **D** in “WORST CASE” si può verificare nel corso di 2 distinti periodi durante l'anno e più precisamente:
 - ✓ Periodo 1: dal 31 gennaio al 14 febbraio causato dalla turbina WTG02;
 - ✓ Periodo 2: dal 28 ottobre al 12 novembre causato dalla turbina WTG02;
- il fenomeno dello shadow flickering per il ricettore **F** in “WORST CASE” si può verificare nel corso di 2 distinti periodi durante l'anno e più precisamente:

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- ✓ Periodo 1: dal 1 marzo al 18 marzo causato dalla turbina WTG08;
- ✓ Periodo 2: dal 25 settembre al 12 ottobre causato dalla turbina WTG08;
- il fenomeno dello shadow flickering per il ricettore **H** in “WORST CASE” si può verificare nel corso di 1 periodo continuativo durante l’anno e più precisamente:
- ✓ Periodo 1: il 6 ottobre causato dalla turbina WTG09;
- il fenomeno dello shadow flickering per il ricettore **I** in “WORST CASE” si può verificare nel corso di 2 distinti periodi durante l’anno e più precisamente:
- ✓ Periodo 1: dal 9 febbraio al 25 febbraio causato dalla turbina WTG09;
- ✓ Periodo 2: dal 16 ottobre al 1 novembre causato dalla turbina WTG09;
- il fenomeno dello shadow flickering per il ricettore **M** in “WORST CASE” si può verificare nel corso di 1 periodo continuativo durante l’anno e più precisamente:
- ✓ Periodo 1: dal 5 dicembre al 8 gennaio causato dalla turbina WTG02;
- il fenomeno dello shadow flickering per il ricettore **N** in “WORST CASE” si può verificare nel corso di 1 periodo continuativo durante l’anno e più precisamente:
- ✓ Periodo 1: dal 26 novembre al 16 gennaio causato dalla turbina WTG02;
- il fenomeno dello shadow flickering per il ricettore **O** in “WORST CASE” si può verificare nel corso di 2 periodi continuativo durante l’anno e più precisamente:
- ✓ Periodo 1: dal 27 marzo al 11 aprile causato dalla turbina WTG04;
- ✓ Periodo 2: dal 1 settembre al 16 settembre causato dalla turbina WTG04;
- il fenomeno dello shadow flickering per il ricettore **P** in “WORST CASE” si può verificare nel corso di 3 periodi continuativo durante l’anno e più precisamente:
- ✓ Periodo 1: dal 19 novembre al 23 gennaio causato dalla turbina WTG04;
- ✓ Periodo 2: dal 30 marzo al 1 aprile causato dalla turbina WTG05;
- ✓ Periodo 3: dal 12 settembre al 14 settembre causato dalla turbina WTG09;
- il fenomeno dello shadow flickering per il ricettore **Q** in “WORST CASE” si può verificare nel corso di 3 periodi continuativo durante l’anno e più precisamente:
- ✓ Periodo 1: dal 3 dicembre al 9 gennaio causato dalla turbina WTG04;
- ✓ Periodo 2: dal 14 aprile al 21 aprile causato dalla turbina WTG05;
- ✓ Periodo 3: dal 22 agosto al 29 agosto causato dalla turbina WTG05;

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- il fenomeno dello shadow flickering per il ricevitore **AA** in “WORST CASE” si può verificare nel corso di 2 periodi continuativi durante l’anno e più precisamente:
 - ✓ Periodo 1: dal 24 gennaio al 31 gennaio causato dalla turbina WTG05;
 - ✓ Periodo 2: dal 12 novembre al 18 novembre causato dalla turbina WTG05;
- il fenomeno dello shadow flickering per il ricevitore **AD** in “WORST CASE” si può verificare nel corso di 1 periodo continuativo durante l’anno e più precisamente:
 - ✓ Periodo 1: dal 3 novembre al 8 febbraio causato dalla turbina WTG05;
- il fenomeno dello shadow flickering per il ricevitore **AF** in “WORST CASE” si può verificare nel corso di 2 periodo continuativi durante l’anno e più precisamente:
 - ✓ Periodo 1: dal 20 gennaio al 12 febbraio causato dalla turbina WTG13;
 - ✓ Periodo 2: dal 30 ottobre al 22 novembre causato dalla turbina WTG13;
- il fenomeno dello shadow flickering per il ricevitore **AG** in “WORST CASE” si può verificare nel corso di 2 periodo continuativi durante l’anno e più precisamente:
 - ✓ Periodo 1: dal 10 gennaio al 8 febbraio causato dalla turbina WTG13;
 - ✓ Periodo 2: dal 2 novembre al 2 dicembre causato dalla turbina WTG13;
- il fenomeno dello shadow flickering per il ricevitore **AH** in “WORST CASE” si può verificare nel corso di 1 periodo continuativo durante l’anno e più precisamente:
 - ✓ Periodo 1: dal 5 novembre al 6 febbraio causato dalla turbina WTG13;
- il fenomeno dello shadow flickering per il ricevitore **AJ** in “WORST CASE” si può verificare nel corso di 2 periodo continuativi durante l’anno e più precisamente:
 - ✓ Periodo 1: dal 14 gennaio al 23 gennaio causato dalla turbina WTG12;
 - ✓ Periodo 2: dal 19 novembre al 28 novembre causato dalla turbina WTG12;
- ✓ il fenomeno dello shadow flickering per il ricevitore **AL** in “WORST CASE” si può verificare nel corso di 1 periodo continuativo durante l’anno e più precisamente:
 - ✓ Periodo 1: dal 7 novembre al 3 febbraio causato dalla turbina WTG11;
- il fenomeno dello shadow flickering per il ricevitore **AN** in “WORST CASE” si può verificare nel corso di 4 periodo continuativi durante l’anno e più precisamente:
 - ✓ Periodo 1: dal 18 novembre al 24 gennaio causato dalla turbina WTG10;
 - ✓ Periodo 2: dal 6 dicembre al 6 gennaio causato dalla turbina WTG11;

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- ✓ Periodo 3: dal 16 novembre al 5 dicembre causato dalla turbina WTG12;
- ✓ Periodo 4: dal 7 gennaio al 26 gennaio causato dalla turbina WTG12;

8. ANALISI DEI RISULTATI PER SINGOLO AEROGENERATORE (WORST CASE)

Vengono analizzati nel presente paragrafo i risultati del calcolo del fenomeno di shadow flickering per singola turbina.

Tutte le turbine proposte, a meno della WTG03, WTG06 e WTG07, causano il fenomeno di shadow flickering su 20 dei 43 ricettori selezionati ed analizzati nel presente lavoro.

No.	Name	Worst case [h/year]
SG 01	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (13)	0:40
SG 02	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (12)	38:08
SG 03	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (11)	0:00
SG 04	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (10)	66:56
SG 05	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (9)	191:01
SG 06	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (8)	0:00
SG 07	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (7)	0:00
SG 08	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (2)	9:47
SG 09	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (1)	5:18
SG 10	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (4)	37:19
SG 11	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (5)	63:51
SG 12	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (6)	7:20
SG 13	Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (3)	82:56

Tabella 6 - Tabella riepilogativa dei dati di Shadow per ogni aerogeneratore

Nelle Tabelle e nei grafici presenti nell'ALLEGATO 1 presente al termine del presente elaborato sono mostrati i risultati dettagliati per singola turbina nel WORST CASE.

9. “REAL CASE”

I diagrammi dell'ALLEGATO 2 e le liste dell'ALLGATO 3, posti in coda alla relazione sono rappresentativi di condizioni di shadow flickering che nella realtà non hanno alcuna possibilità di verificarsi.

In particolare, nei documenti citati, viene riportato il valore massimo di ore /anno di ombreggiamento su superficie orizzontale in ciascun punto nell'intorno delle opere in progetto.

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Tale valore massimo di ombreggiamento rappresenta pertanto il numero di ore di fenomeno di shadow flickering che non ha alcuna probabilità di essere superato nel corso di un anno.

Dal punto di vista matematico, tale valore prende il nome di P0 ovverosia quel numero di ore di fenomeno di shadow flickering che ha una probabilità dello zero per cento di essere superato nel corso di un anno.

Estendendo per analogia il concetto, ci si può chiedere quale sia quel valore di ore di fenomeno di shadow flickering che ha una probabilità del 50 per cento (P50) di essere superato nel corso di un anno. Prima di esaminare la metodologia matematica che si utilizza per determinare il valore P50, si cercherà di spiegare l'importanza di tale valore.

Abbiamo già detto come il valore P50 corrisponda a quel valore che ha una probabilità del 50% di essere superato nel corso di un anno.

In pratica, ogni anno si hanno le stesse probabilità (50%) di stare sopra o di stare sotto a questo valore P50; per la legge dei grandi numeri, si ha che nel corso di un periodo di molti anni (come può essere assimilato il periodo ventennale ed oltre di vita attesa dell'impianto) il valore medio di un qualunque fenomeno stocastico tende ad approssimare proprio il valore P50.

Pertanto, il valore P50 può essere considerato come il valore medio di un generico fenomeno stocastico nel corso di un periodo di molti anni.

Riconducendo il discorso matematico generale al caso in studio si può dire che il valore P50 di ore/anno di shadow flickering rappresenta nel corso del periodo ventennale ed oltre di vita attesa dell'impianto il valore medio reale del fenomeno.

Per questa ragione il valore P50 è il corrispondente del REAL CASE.

Il calcolo matematico di P50 si esegue con le regole matematiche della “probability of exceedance” una volta conosciute e quantificate le incertezze che caratterizzano il fenomeno in esame.

Per il caso in studio di shadow flickering le incertezze per quanto detto nei Capitoli precedenti sono date dalla possibile presenza di manto nuvoloso, dalla possibile assenza di vento e dal possibile orientamento del rotore in direzione non ortogonale alla congiungente ricettore-sole.

Allo scopo di pervenire a valori più realistici di impatto, prossimi al caso reale (denominato REAL CASE), si è impiegato il valore di eliofania locale, ovvero il numero di ore di cielo libero da nubi

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durante il giorno; per l'area in esame tale valore di soleggiamento corrisponde a 2664.5 h/yr (rispetto alle 4380h/yr considerate nel worst - case).

I risultati del calcolo possono, ragionevolmente, essere abbattuti del 39,2 %, pari al complemento a 1 del rapporto $2664.5/4380 = 60,8 \%$.

In altri termini, rispetto al WORST CASE, la probabilità di occorrenza del fenomeno di shadow flickering si riduce, per l'area in esame, al 60.8 % che corrisponde proprio alla probabilità che il disco solare risulti libero da nubi.

Tutto ciò non tiene conto di altri fattori che potrebbero diminuire o annullare del tutto l'effetto flickering sul recettore, come la presenza di alberi interposti tra turbina e recettore e/o posizionamento delle abitazioni e dei propri infissi rispetto alla fonte, la presenza del vento (fattore indispensabile per la formazione del fenomeno dello sfarfallio).

10. CONCLUSIONI

A seguito di quanto descritto nei paragrafi precedenti si può concludere che, pur considerando una stima cautelativa in quanto non si è tenuto conto dell'eventuale presenza di ostacoli e/o vegetazione interposti tra il sole e le finestre (ad esclusione degli ostacoli orografici), il fenomeno dello shadow flickering si verifica per 20 dei 43 ricettori in esame.

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

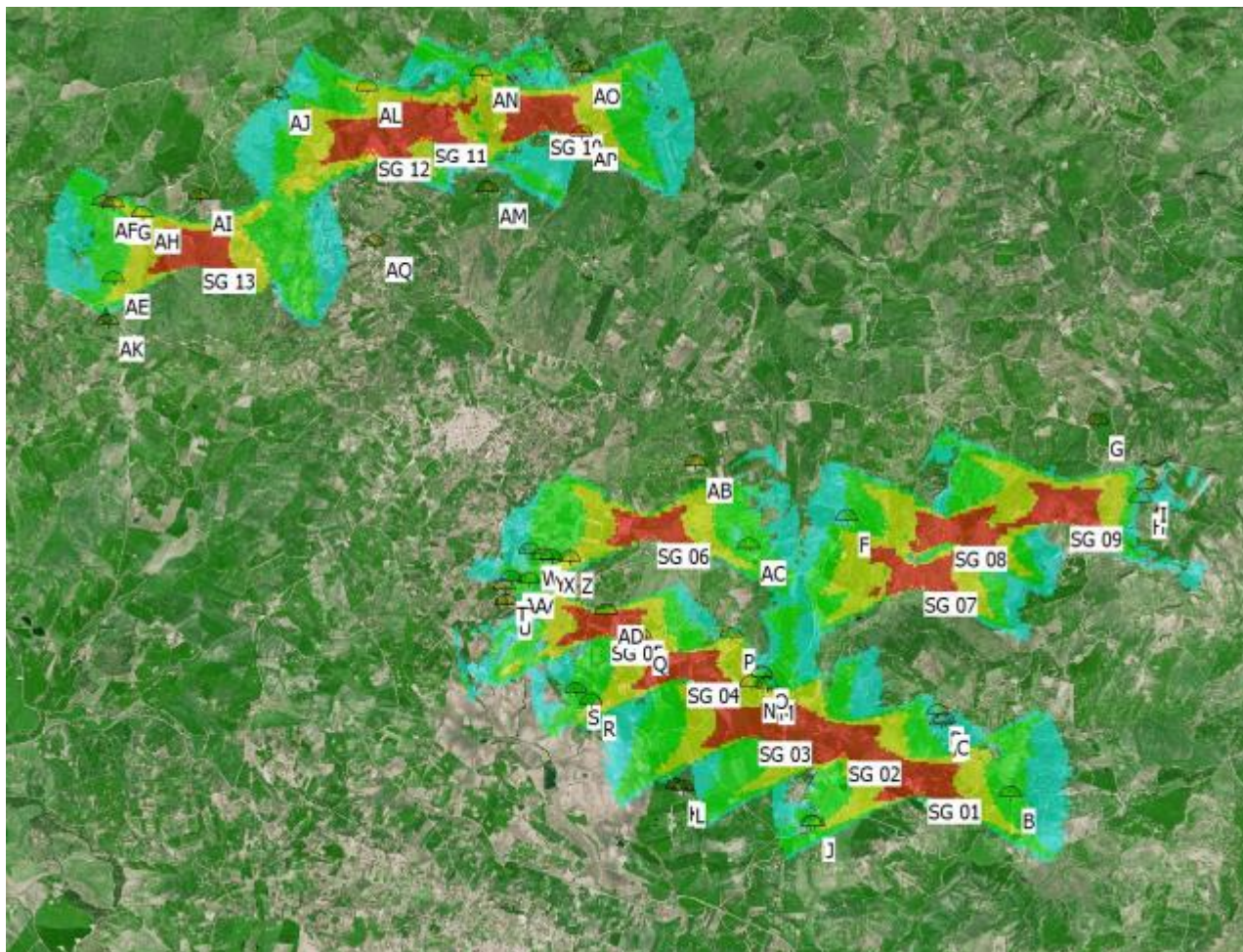


Figura 11 - Localizzazione ricettori e turbine

Tale fenomeno si manifesta però in modo differente per i diversi ricettori per cui non si possono generalizzare le conclusioni, ma è doveroso analizzare i diversi casi.

Per la corretta analisi dello shadow flickering, vanno considerate tutti i fattori che possono influenzare il risultato, anche nel caso di ricettori che apparentemente subiscono un fenomeno rilevante, è necessario verificare se in conclusione il fenomeno stesso dell'ombreggiamento arreca un disturbo reale oppure il fatto stesso non è neppure avvertito da chi abitualmente utilizza i locali.

Partendo proprio dai dati ricavati con condizione peggiorativa (WORST CASE), si analizza quale reale disturbo si trasmette alle attività lavorative nell'area del parco.

A tali considerazioni va altresì sottolineato che:

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

- la velocità di rotazione della turbina è 11,20 rotazioni al minuto, quindi nettamente inferiore a 60 rpm, frequenza massima raccomandata al fine di ridurre al minimo i fastidi e soddisfare le condizioni di benessere;
- nelle condizioni di WORST CASE sono 5 i ricettori maggiormente interessati al fenomeno dello shadow, superando il limite imposto dalla normativa tedesca di 30 h/years (P, AD, AH, AL e AN);

RICETTORE	WORST CASE (h/year)
A	5,06
B	0,40
C	4,20
D	4,00
E	0,00
F	9,47
G	0,00
H	0,01
I	5,17
J	0,00
K	0,00
L	0,00
M	11,04
N	20,02
O	7,01
P	41,18
Q	19,26
R	0,00
S	0,00
T	0,00
U	0,00

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

V	0,00
W	0,00
X	0,00
Y	0,00
Z	0,00
AA	0,31
AB	0,00
AC	0,00
AD	189,41
AE	0,00
AF	17,22
AG	23,45
AH	59,33
AI	0,00
AJ	0,30
AK	0,00
AL	52,06
AM	0,00
AN	55,54
AO	0,00
AP	0,00
AQ	0,00

- i ricettori che subiscono il fenomeno dell'ombreggiamento, ad eccezione dell'edificio AD, sono molto lontani dalle turbine in progetto essendo posti ad una distanza media comprese tra circa 795 m e 1097m. In tali circostanze, al di sopra dei 300 m, l'effetto dell'ombra è trascurabile poiché il rapporto tra lo spessore della pala e la distanza dal recettore diventa molto piccolo;

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

RICETTORE	WORST CASE (h/year)	DISTANZA TURBINA (m)	AEROGENERATORE PIU' VICINO
A	5,06	930	SG01
B	0,40	1233,28	SG01
C	4,20	972,32	SG02
D	4,00	1069,97	SG03
E	0,00	1052,52	SG02
F	9,47	1261,95	SG07
G	0,00	1335,93	SG09
H	0,01	1083,93	SG09
I	5,17	1219	SG09
J	0,00	1050,52	SG02
K	0,00	1255,5	SG03
L	0,00	1199,78	SG03
M	11,04	647,69	SG03
N	20,02	640,21	SG03
O	7,01	776,73	SG03
P	41,18	864,1	SG04
Q	19,26	507,65	SG05
R	0,00	979,29	SG05
S	0,00	892	SG05
T	0,00	1490,59	SG05
U	0,00	1383,98	SG05
V	0,00	1227,22	SG05
W	0,00	1485,8	SG05
X	0,00	1222,87	SG05
Y	0,00	1304,46	SG05
Z	0,00	1093,9	SG05

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AA	0,31	1447,43	SG05
AB	0,00	1111,73	SG06
AC	0,00	1364,41	SG06
AD	189,41	284	SG05
AE	0,00	1152,11	SG13
AF	17,22	1442,37	SG13
AG	23,45	1320,82	SG13
AH	59,33	927,23	SG13
AI	0,00	817,54	SG13
AJ	0,30	1420,57	SG12
AK	0,00	1473,58	SG13
AL	52,06	794,98	SG12
AM	0,00	1127,06	SG11
AN	55,54	1096,92	SG11
AO	0,00	913,47	SG10
AP	0,00	540,59	SG10
AQ	0,00	1307,64	SG12

- il fenomeno è studiato in WORST CASE, quindi nelle condizioni peggiori, considerando il cielo sempre limpido cosa del tutto non vera specialmente per i ricettori che subiscono maggiore ombreggiamento nel periodo invernale, le condizioni di REAL CASE abbatterebbero le ore reali con un'aliquota stimata al 39,2% delle ore rilevate;
- la condizione di WORST CASE, prevede un particolare orientamento delle pale dell'aerogeneratore, sempre fisso e nella stessa direzione, nonché prevede una certa disposizione delle finestre oltre a prevedere una condizione di cielo sempre limpido, tali condizioni sono completamente diverse e comunque mai tutte presenti contemporaneamente nella condizione di REAL CASE.
- nelle condizioni di REAL CASE solo 1 dei suddetti ricettori superano il livello imposto dalla normativa tedesca (AD) posto ad una distanza di circa 285 m.

Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)

RICETTORE	WORST CASE (h/year)	REAL CASE (h/year)	DISTANZA TURBINA (m)	AEROGENERATORE PIU' VICINO
A	5,06	1,98	930	SG01
B	0,40	0,16	1233,28	SG01
C	4,20	1,65	972,32	SG02
D	4,00	1,57	1069,97	SG03
E	0,00	0,00	1052,52	SG02
F	9,47	3,71	1261,95	SG07
G	0,00	0,00	1335,93	SG09
H	0,01	0,00	1083,93	SG09
I	5,17	2,03	1219	SG09
J	0,00	0,00	1050,52	SG02
K	0,00	0,00	1255,5	SG03
L	0,00	0,00	1199,78	SG03
M	11,04	4,33	647,69	SG03
N	20,02	7,85	640,21	SG03
O	7,01	2,75	776,73	SG03
P	41,18	16,14	864,1	SG04
Q	19,26	7,55	507,65	SG05
R	0,00	0,00	979,29	SG05
S	0,00	0,00	892	SG05
T	0,00	0,00	1490,59	SG05
U	0,00	0,00	1383,98	SG05
V	0,00	0,00	1227,22	SG05
W	0,00	0,00	1485,8	SG05
X	0,00	0,00	1222,87	SG05
Y	0,00	0,00	1304,46	SG05
Z	0,00	0,00	1093,9	SG05

 AEI WIND PROJECT X S.R.L. P.I. 17264891007 Via Savoia 78, 00198 Roma	“Progetto di realizzazione di un parco eolico della potenza di 85,8 MW denominato “CATERINA I” situato nei comuni di Sclafani Bagni, Valledolmo, Caltavuturo, Polizzi Generosa, Castellana Sicula in provincia di Palermo (PA) e Villalba, in provincia di Caltanissetta (CL)” Relazione sull'analisi dell'evoluzione dell'ombra indotta dagli aerogeneratori (effetto shadow flickering)	DATA: OTTOBRE 2023 Pag. 44 di 45
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AA	0,31	0,12	1447,43	SG05
AB	0,00	0,00	1111,73	SG06
AC	0,00	0,00	1364,41	SG06
AD	189,41	74,25	284	SG05
AE	0,00	0,00	1152,11	SG13
AF	17,22	6,75	1442,37	SG13
AG	23,45	9,19	1320,82	SG13
AH	59,33	23,26	927,23	SG13
AI	0,00	0,00	817,54	SG13
AJ	0,30	0,12	1420,57	SG12
AK	0,00	0,00	1473,58	SG13
AL	52,06	20,41	794,98	SG12
AM	0,00	0,00	1127,06	SG11
AN	55,54	21,77	1096,92	SG11
AO	0,00	0,00	913,47	SG10
AP	0,00	0,00	540,59	SG10
AQ	0,00	0,00	1307,64	SG12

- tutti i ricettori, sia quelli con emissioni marginali sia quelli con maggiore esposizione al fenomeno, sono adibite a funzioni abitative ma a carattere di supporto alle attività agricole, come il ricettore AD posto ad una distanza dall'aerogeneratore SG05 di poco inferiore ai 300 m.
- La presenza di persone è giustificata per scopo lavorativo o ricreativo e in ogni caso limitato ad alcune fasce orarie.

Si fa presente che nonostante i 5 casi in cui si verifichi il superamento delle ore annue indicate dalla normativa Tedesca nelle condizioni di Worst case (1 in condizioni di Real case), queste sono comunque in condizioni cautelative in quanto non si è tenuto conto degli effetti mitigativi dovuti al piano di rotazione delle pale non sempre ortogonale alla direttrice sole-finestra e non vengono considerate la presenza di alberi nelle immediate vicinanze degli edifici che formano una barriera naturale, come non

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viene considerata la disposizione delle aperture nelle pareti degli edifici come finestre, balconi e porte che consentono all’effetto di sfarfallamento di entrare nell’edificio.

Tale accortezza risulta in alcuni casi fondamentale in quanto il programma di simulazione considera gli edifici formati da soli pareti trasparenti.

Questi accorgimenti potrebbero portare il monte ore indicato ad azzerarsi anche nei casi di superamento, se ciò non avvenisse si potrebbero predisporre, al fine di ridurre e/o eliminare gli effetti di shadow flickering sulle abitazioni interessate, delle opere di mitigazione:

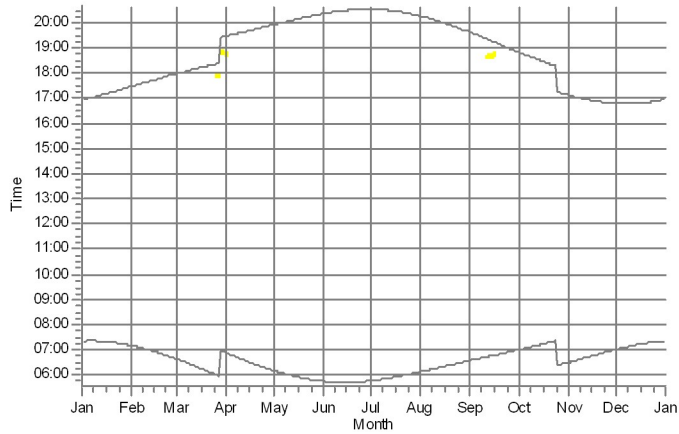
- ✓ completamento della piantumazione già presente come delle barriere di alberi in posizione utile da annullare l’effetto considerato;
- ✓ l'installazione sugli aerogeneratori che causano il fenomeno dell'ombreggiamento, dello Shadow Detection System, una innovativa tecnologia che, attraverso l’analisi della posizione del sole, del rotore della turbina e delle abitazioni circostanti, blocca la turbina nei periodi in cui si creano le condizioni favorevoli per il verificarsi dello shadow flickering, annullando così il fenomeno.

ALLEGATO 1

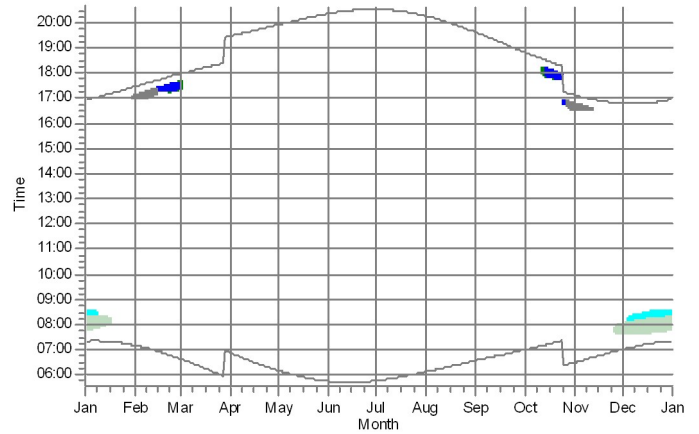
SHADOW - Calendar per WTG, graphical

Calculation: Caterina 1 - Shadow flickering

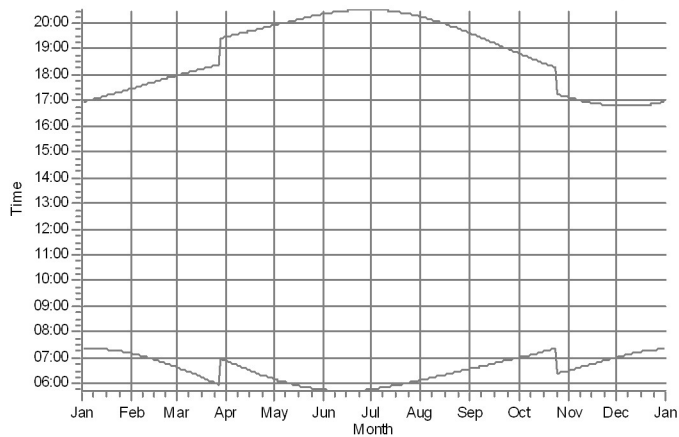
SG 01: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



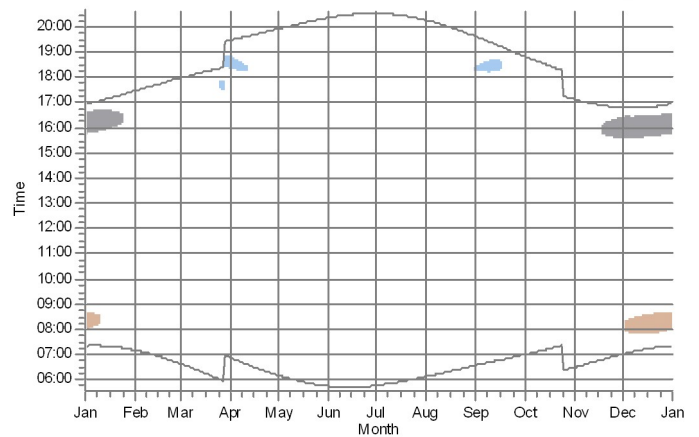
SG 02: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



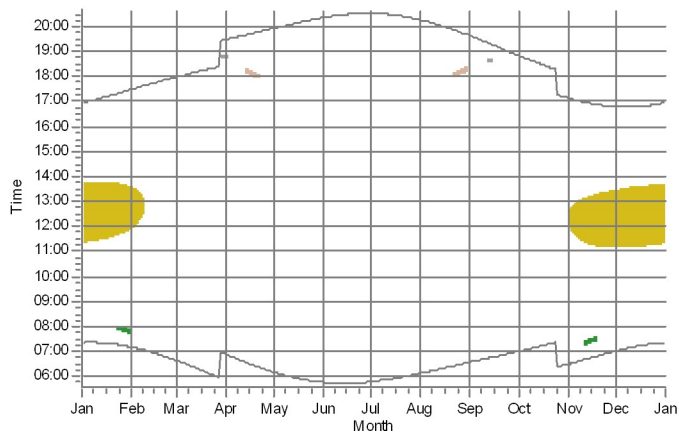
SG 03: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



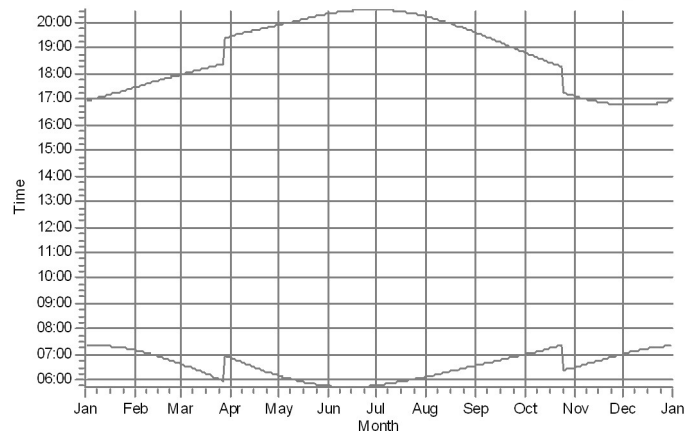
SG 04: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



SG 05: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



SG 06: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



Shadow receptors

A: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (44)
B: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (45)
C: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (46)
D: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (47)

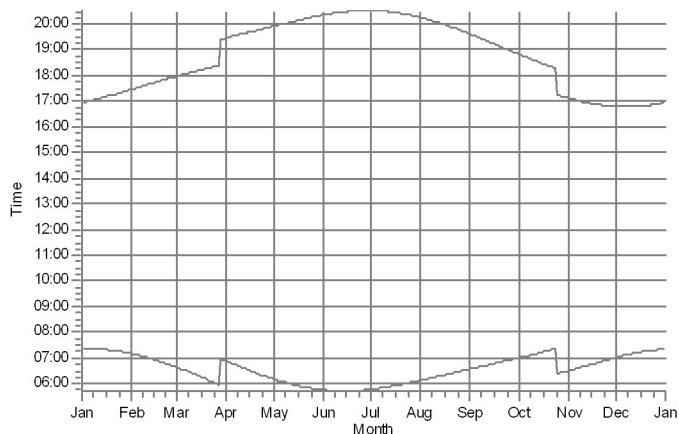
M: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (56)
N: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (57)
O: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (58)
P: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (59)

Q: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (60)
AA: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (70)
AD: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (73)

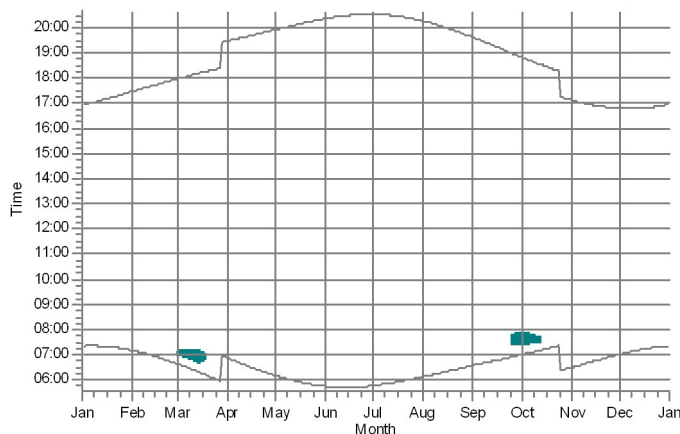
SHADOW - Calendar per WTG, graphical

Calculation: Caterina 1 - Shadow flickering

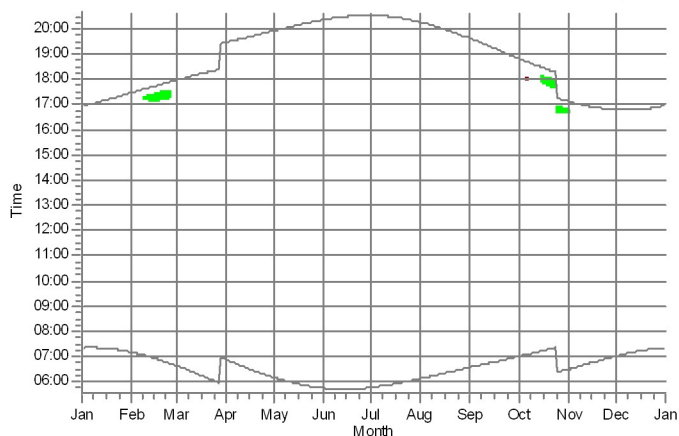
SG 07: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



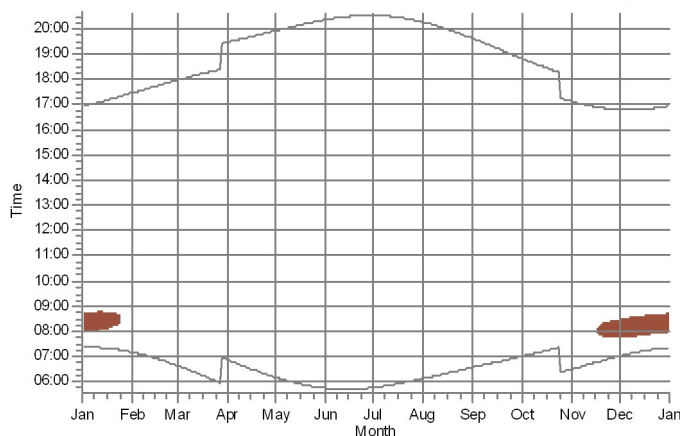
SG 08: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



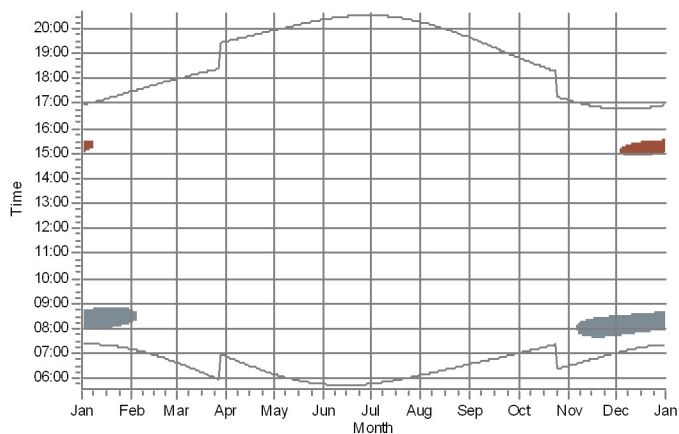
SG 09: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



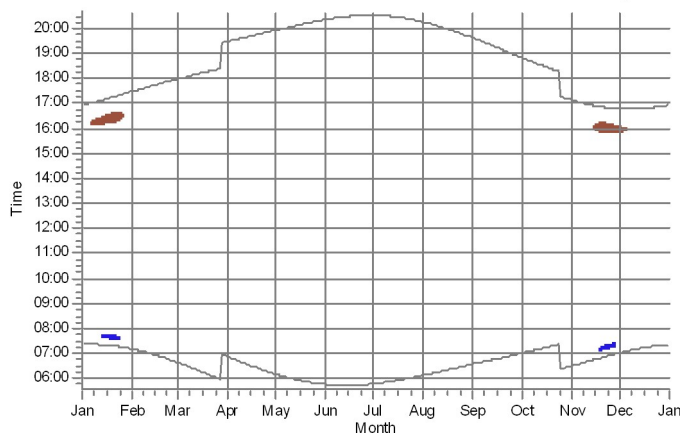
SG 10: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



SG 11: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



SG 12: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



Shadow receptors

F: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (49)
H: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (51)

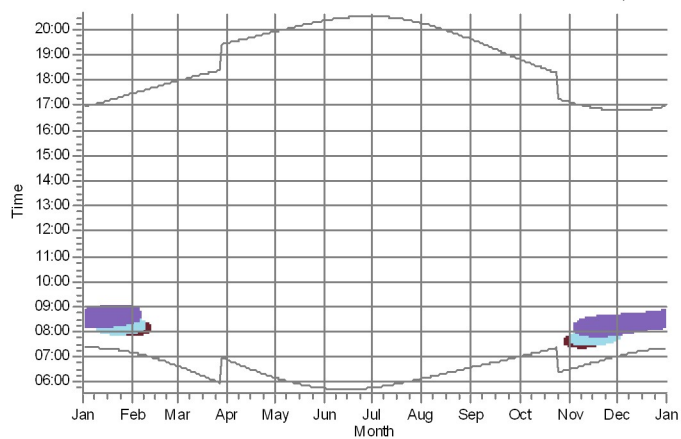
I: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (52)
A: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (79)

AL: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (81)
AN: Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (83)

SHADOW - Calendar per WTG, graphical

Calculation: Caterina 1 - Shadow flickering

SG 13: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 2



Shadow receptors

AF: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (75)

AG: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (76)

AH: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (77)

SHADOW - Calendar per WTG

Calculation: Caterina 1 - Shadow flickering WTG: SG 01 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (13)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:28	06:38 17:58	06:52 19:27	18:43-18:44/1 19:54	06:11 20:20	05:45 20:31	05:46 20:14	06:08 19:36	06:34 18:50	07:00 17:08	06:29 16:47
2	07:20 16:57	07:09 17:29	06:36 17:59	06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:09 20:13	06:35 19:34	06:30 18:48	07:01 17:06	06:30 16:46
3	07:20 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:47 20:30	06:09 20:12	06:36 19:33	06:30 18:47	07:01 17:05	06:31 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:11	06:37 19:31	06:30 18:45	07:02 17:04	06:32 16:46
5	07:21 17:00	07:06 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:38 19:30	06:30 18:44	07:03 17:03	06:33 16:46
6	07:21 17:01	07:05 17:33	06:31 18:03	06:44 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:09	06:38 19:28	06:30 18:42	07:04 17:02	06:34 16:46
7	07:21 17:01	07:04 17:34	06:29 18:04	06:43 19:32	06:04 20:00	05:43 20:24	05:49 20:30	06:13 20:08	06:39 19:27	06:30 18:41	07:05 17:01	06:35 16:46
8	07:21 17:02	07:03 17:35	06:28 18:05	06:41 19:33	06:03 20:01	05:43 20:25	05:50 20:29	06:14 20:07	06:40 19:25	06:30 18:39	07:06 17:00	06:37 16:46
9	07:21 17:03	07:02 17:37	06:26 18:06	06:40 19:34	06:02 20:02	05:43 20:25	05:51 20:29	06:14 20:06	06:41 19:24	06:30 18:38	07:07 16:59	06:38 16:46
10	07:20 17:04	07:01 17:38	06:25 18:07	06:39 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	06:30 18:36	07:08 16:59	06:39 16:46
11	07:20 17:05	07:00 17:39	06:24 18:08	06:37 19:36	06:00 20:03	05:43 20:26	05:52 20:28	06:16 20:04	06:43 19:21	18:36-18:37/1 18:35	07:09 16:58	06:40 16:46
12	07:20 17:06	06:59 17:40	06:22 18:08	06:36 19:37	05:59 20:04	05:43 20:27	05:52 20:28	06:17 20:03	06:43 19:19	18:36-18:39/3 18:33	07:10 16:57	06:41 16:46
13	07:20 17:07	06:58 17:41	06:21 18:09	06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:01	06:44 19:17	18:36-18:40/4 18:32	07:10 16:56	06:42 16:47
14	07:20 17:08	06:57 17:42	06:19 18:10	06:33 19:39	05:57 20:06	05:43 20:28	05:54 20:27	06:19 20:00	06:45 19:16	18:37-18:42/5 18:30	07:11 16:55	06:43 16:47
15	07:19 17:09	06:56 17:43	06:18 18:11	06:31 19:40	05:56 20:07	05:43 20:28	05:54 20:27	06:20 19:59	06:46 19:14	18:39-18:43/4 18:29	07:12 16:54	06:44 16:47
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:43 20:28	05:55 20:26	06:21 19:58	06:47 19:13	18:42-18:45/3 18:28	07:13 16:54	06:45 16:47
17	07:19 17:11	06:53 17:45	06:15 18:13	06:29 19:42	05:54 20:09	05:43 20:29	05:56 20:26	06:21 19:56	06:48 19:11	07:14 18:26	06:46 16:53	06:47 16:48
18	07:18 17:12	06:52 17:46	06:13 18:14	06:27 19:42	05:54 20:10	05:43 20:29	05:57 20:25	06:22 19:55	06:48 19:10	07:15 18:25	06:47 16:52	06:48 16:48
19	07:18 17:13	06:51 17:47	06:12 18:15	06:26 19:43	05:53 20:10	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:23	06:48 16:52	06:49 16:48
20	07:18 17:14	06:50 17:48	06:10 18:16	06:24 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:52	06:50 19:07	07:17 18:22	06:49 16:51	06:50 16:49
21	07:17 17:16	06:48 17:49	06:09 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	06:50 16:51	06:51 16:49
22	07:17 17:17	06:47 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:43 20:30	06:00 20:23	06:26 19:50	06:52 19:03	07:19 18:20	06:51 16:50	06:52 16:50
23	07:16 17:18	06:46 17:52	06:06 18:19	06:20 19:47	05:50 20:14	05:44 20:30	06:00 20:22	06:26 19:48	06:53 19:02	07:20 18:18	06:52 16:50	06:53 16:50
24	07:15 17:19	06:45 17:53	06:04 18:20	06:19 19:48	05:49 20:14	05:44 20:30	06:01 20:21	06:27 19:47	06:54 19:00	07:21 18:17	06:53 16:49	06:54 16:51
25	07:15 17:20	06:43 17:54	06:02 18:21	06:18 19:49	05:49 20:15	05:44 20:30	06:02 20:20	06:28 19:46	06:54 18:59	06:22 17:16	06:54 16:49	06:54 16:51
26	07:14 17:21	06:42 17:55	06:01 18:21	06:17 19:50	05:48 20:16	05:45 20:31	06:03 20:20	06:29 19:44	06:55 18:57	06:23 17:14	06:55 16:48	06:55 16:52
27	07:13 17:22	06:41 17:56	05:59 18:22	06:15 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56	06:24 17:13	06:57 16:48	06:57 16:53
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52	05:47 20:17	05:45 20:31	06:04 20:18	06:31 19:41	06:57 18:54	06:25 17:12	06:58 16:48	06:58 16:53
29	07:12 17:24		06:56 18:48-18:52/4	06:13 19:53	05:47 20:18	05:46 20:31	06:05 20:17	06:32 19:40	06:58 18:53	06:26 17:11	06:59 16:47	06:59 16:54
30	07:11 17:25		06:55 18:45-18:49/4	06:12 19:53	05:46 20:19	05:46 20:31	06:06 20:16	06:32 19:39	06:59 18:51	06:27 17:10	06:59 16:47	06:59 16:55
31	07:11 17:27		06:53 18:44-18:47/3		05:46 20:20		06:07 20:15	06:33 19:37		06:28 17:09		06:59 16:55
Potential sun hours	306	302	370	395	440	442	449	422	374	349	305	298
Sum of minutes with flicker	0	0	19	1	0	0	0	0	20	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: Caterina 1 - Shadow flickering WTG: SG 02 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (12)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	07:20 07:50-08:32/42 16:56	07:10 17:02-17:05/3 17:28	06:38 17:25-17:37/12 17:58	06:52 19:27	06:11 19:54	05:45 20:20
2	07:20 07:51-08:32/41 16:57	07:09 17:02-17:06/4 17:29	06:37 17:59	06:50 19:28	06:09 19:55	05:45 20:21
3	07:21 07:51-08:32/41 16:58	07:08 17:02-17:08/6 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22
4	07:21 07:52-08:32/40 16:59	07:07 17:02-17:09/7 17:31	06:34 18:01	06:47 19:30	06:07 19:57	05:44 20:22
5	07:21 07:52-08:31/39 17:00	07:06 17:02-17:10/8 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23
6	07:21 07:53-08:18/25 17:01 08:19-08:30/11	07:05 17:02-17:11/9 17:33	06:31 18:03	06:44 19:32	06:05 19:59	05:44 20:24
7	07:21 07:54-08:18/24 17:02 08:21-08:29/8	07:04 17:03-17:12/9 17:34	06:29 18:04	06:43 19:32	06:04 20:00	05:43 20:24
8	07:21 07:55-08:18/23 17:02 08:24-08:27/3	07:03 17:03-17:13/10 17:36	06:28 18:05	06:41 19:33	06:03 20:01	05:43 20:25
9	07:21 07:56-08:18/22 17:03	07:02 17:04-17:15/11 17:37	06:27 18:06	06:40 19:34	06:02 20:02	05:43 20:25
10	07:21 07:57-08:18/21 17:04	07:01 17:05-17:16/11 17:38	06:25 18:07	06:39 19:35	06:01 20:03	05:43 20:26
11	07:20 07:58-08:18/20 17:05	07:00 17:06-17:17/11 17:39	06:24 18:08	06:37 19:36	06:00 20:03	05:43 20:26
12	07:20 07:59-08:17/18 17:06	06:59 17:08-17:19/11 17:40	06:22 18:09	06:36 19:37	05:59 20:04	05:43 20:27
13	07:20 08:00-08:17/17 17:07	06:58 17:09-17:19/10 17:41	06:21 18:09	06:34 19:38	05:58 20:05	05:43 20:27
14	07:20 08:02-08:16/14 17:08	06:57 17:12-17:20/8 17:42	06:19 18:10	06:33 19:39	05:57 20:06	05:43 20:28
15	07:19 08:03-08:14/11 17:09	06:56 17:19-17:22/3 17:43	06:18 18:11	06:31 19:40	05:56 20:07	05:43 20:28
16	07:19 08:06-08:13/7 17:10	06:55 17:19-17:23/4 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:43 20:28
17	07:19 17:11	06:53 17:19-17:24/5 17:45	06:15 18:13	06:29 19:42	05:54 20:09	05:43 20:29
18	07:18 17:12	06:52 17:18-17:26/8 17:46	06:13 18:14	06:27 19:42	05:54 20:10	05:43 20:29
19	07:18 17:13	06:51 17:18-17:26/8 17:47	06:12 18:15	06:26 19:43	05:53 20:10	05:43 20:29
20	07:18 17:15	06:50 17:18-17:27/9 17:48	06:10 18:16	06:24 19:44	05:52 20:11	05:43 20:30
21	07:17 17:16	06:49 17:18-17:29/11 17:50	06:09 18:17	06:23 19:45	05:51 20:12	05:43 20:30
22	07:17 17:17	06:47 17:17-17:29/12 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:43 20:30
23	07:16 17:18	06:46 17:18-17:31/13 17:52	06:06 18:19	06:21 19:47	05:50 20:14	05:44 20:30
24	07:15 17:19	06:45 17:19-17:32/13 17:53	06:04 18:20	06:19 19:48	05:49 20:14	05:44 20:30
25	07:15 17:20	06:43 17:19-17:32/13 17:54	06:03 18:21	06:18 19:49	05:49 20:15	05:44 20:31
26	07:14 17:21	06:42 17:20-17:34/14 17:55	06:01 18:22	06:17 19:50	05:48 20:16	05:45 20:31
27	07:14 17:22	06:41 17:21-17:35/14 17:56	05:59 18:22	06:15 19:51	05:48 20:17	05:45 20:31
28	07:13 17:23	06:39 17:22-17:36/14 17:57	05:58 18:23	06:14 19:52	05:47 20:18	05:45 20:31
29	07:12 17:24		06:56 19:24	06:13 19:53	05:47 20:18	05:46 20:31
30	07:11 17:26		06:55 19:25	06:12 19:53	05:46 20:19	05:46 20:31
31	07:11 17:01-17:03/2 17:27		06:53 19:26		05:46 20:20	
Potential sun hours	306	302	370	395	440	442
Sum of minutes with flicker	429	259	12	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: Caterina 1 - Shadow flickering WTG: SG 02 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (12)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	05:46 20:31	06:08 20:14	06:34 19:36	07:00 18:50	06:29 16:34-16:45/11 17:08	07:01 07:40-08:00/20 16:47
2	05:47 20:31	06:09 20:13	06:35 19:34	07:01 18:48	06:30 16:34-16:44/10 17:06	07:01 07:40-08:01/21 16:47
3	05:47 20:31	06:09 20:12	06:36 19:33	07:01 18:47	06:31 16:33-16:43/10 17:05	07:02 07:40-08:02/22 16:46
4	05:48 20:30	06:10 20:11	06:37 19:31	07:02 18:45	06:32 16:32-16:42/10 17:04	07:03 07:40-08:03/23 16:46
5	05:48 20:30	06:11 20:10	06:38 19:30	07:03 18:44	06:33 16:32-16:41/9 17:03	07:04 07:39-08:03/24 16:46 08:06-08:14/8
6	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42	06:34 16:32-16:40/8 17:02	07:05 07:39-08:04/25 16:46 08:05-08:16/11
7	05:49 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:36 16:32-16:38/6 17:01	07:06 07:40-08:18/38 16:46
8	05:50 20:30	06:14 20:07	06:40 19:25	07:06 18:39	06:37 16:32-16:37/5 17:00	07:07 07:40-08:20/40 16:46
9	05:51 20:29	06:15 20:06	06:41 19:24	07:07 18:38	06:38 16:32-16:36/4 16:59	07:08 07:40-08:21/41 16:46
10	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:33-16:36/3 16:59	07:09 07:41-08:22/41 16:46
11	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:33-16:35/2 16:58	07:09 07:41-08:23/42 16:46
12	05:52 20:28	06:17 20:03	06:43 19:19	07:10 18:01-18:08/7 18:33	06:41 16:33-16:34/1 16:57	07:10 07:41-08:23/42 16:46
13	05:53 20:28	06:18 20:01	06:44 19:17	07:10 17:57-18:10/13 18:32	06:42 16:56	07:11 07:41-08:24/43 16:47
14	05:54 20:27	06:19 20:00	06:45 19:16	07:11 17:55-18:09/14 18:30	06:43 16:55	07:12 07:42-08:26/44 16:47
15	05:55 20:27	06:20 19:59	06:46 19:14	07:12 17:53-18:07/14 18:29	06:44 16:55	07:12 07:42-08:26/44 16:47
16	05:55 20:26	06:21 19:58	06:47 19:13	07:13 17:52-18:06/14 18:28	06:45 16:54	07:13 07:42-08:27/45 16:47
17	05:56 20:26	06:21 19:56	06:48 19:11	07:14 17:51-18:05/14 18:26	06:46 16:53	07:14 07:43-08:28/45 16:48
18	05:57 20:25	06:22 19:55	06:48 19:10	07:15 17:50-18:03/13 18:25	06:47 16:52	07:14 07:43-08:28/45 16:48
19	05:57 20:25	06:23 19:54	06:49 19:08	07:16 17:49-18:02/13 18:24	06:48 16:52	07:15 07:44-08:29/45 16:48
20	05:58 20:24	06:24 19:52	06:50 19:07	07:17 17:49-18:00/11 18:22	06:49 16:51	07:15 07:44-08:29/45 16:49
21	05:59 20:23	06:25 19:51	06:51 19:05	07:18 17:49-17:59/10 18:21	06:50 16:51	07:16 07:45-08:30/45 16:49
22	06:00 20:23	06:26 19:50	06:52 19:03	07:19 17:48-17:58/10 18:20	06:51 16:50	07:17 07:45-08:30/45 16:50
23	06:00 20:22	06:27 19:48	06:53 19:02	07:20 17:48-17:56/8 18:18	06:52 16:50	07:17 07:46-08:31/45 16:50
24	06:01 20:21	06:27 19:47	06:54 19:00	07:21 17:48-17:55/7 18:17	06:54 16:49	07:18 07:46-08:31/45 16:51
25	06:02 20:20	06:28 19:46	06:54 18:59	06:22 16:48-16:54/6 17:16	06:55 16:49	07:18 07:47-08:32/45 16:51
26	06:03 20:20	06:29 19:44	06:55 18:57	06:23 16:49-16:52/3 17:15	06:56 07:45-07:52/7 16:48	07:18 07:47-08:32/45 16:52
27	06:04 20:19	06:30 19:43	06:56 18:56	06:24 16:49-16:51/2 17:13	06:57 07:43-07:54/11 16:48	07:19 07:47-08:32/45 16:53
28	06:04 20:18	06:31 19:41	06:57 18:54	06:25 16:41-16:50/9 17:12	06:58 07:42-07:56/14 16:48	07:19 07:49-08:33/44 16:53
29	06:05 20:17	06:32 19:40	06:58 18:53	06:26 16:38-16:48/10 17:11	06:59 07:41-07:58/17 16:47	07:19 07:49-08:33/44 16:54
30	06:06 20:16	06:33 19:39	06:59 18:51	06:27 16:36-16:47/11 17:10	07:00 07:41-07:59/18 16:47	07:20 07:49-08:32/43 16:55
31	06:07 20:15	06:33 19:37		06:28 16:35-16:46/11 17:09		07:20 07:50-08:32/42 16:55
Potential sun hours	449	422	374	349	305	298
Sum of minutes with flicker	0	0	0	200	146	1242

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: Caterina 1 - Shadow flickering WTG: SG 03 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (11)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:54	05:45 20:20	05:46 20:31	06:08 20:14	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
2	07:20 16:57	07:09 17:29	06:37 17:59	06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:30 17:07	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:47 20:31	06:09 20:13	06:36 19:33	07:01 18:47	06:31 17:05	07:02 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:12	06:37 19:31	07:02 18:45	06:32 17:04	07:03 16:46
5	07:21 17:00	07:06 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:38 19:30	07:03 18:44	06:33 17:03	07:04 16:46
6	07:21 17:01	07:05 17:33	06:31 18:03	06:44 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42	06:35 17:02	07:05 16:46
7	07:21 17:02	07:04 17:34	06:29 18:04	06:43 19:33	06:04 20:00	05:43 20:24	05:50 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:36 17:01	07:06 16:46
8	07:21 17:02	07:03 17:36	06:28 18:05	06:42 19:33	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:07	06:40 19:25	07:06 18:39	06:37 17:00	07:07 16:46
9	07:21 17:03	07:02 17:37	06:27 18:06	06:40 19:34	06:02 20:02	05:43 20:25	05:51 20:29	06:15 20:06	06:41 19:24	07:07 18:38	06:38 17:00	07:08 16:46
10	07:21 17:04	07:01 17:38	06:25 18:07	06:39 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:59	07:09 16:46
11	07:20 17:05	07:00 17:39	06:24 18:08	06:37 19:36	06:00 20:04	05:43 20:26	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:09 16:46
12	07:20 17:06	06:59 17:40	06:22 18:09	06:36 19:37	05:59 20:04	05:43 20:27	05:53 20:28	06:17 20:03	06:44 19:19	07:10 18:33	06:41 16:57	07:10 16:46
13	07:20 17:07	06:58 17:41	06:21 18:10	06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:01	06:44 19:18	07:11 18:32	06:42 16:56	07:11 16:47
14	07:20 17:08	06:57 17:42	06:19 18:10	06:33 19:39	05:57 20:06	05:43 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:11 18:30	06:43 16:55	07:12 16:47
15	07:20 17:09	06:56 17:43	06:18 18:11	06:31 19:40	05:56 20:07	05:43 20:28	05:55 20:27	06:20 19:59	06:46 19:14	07:12 18:29	06:44 16:55	07:12 16:47
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:43 20:28	05:55 20:26	06:21 19:58	06:47 19:13	07:13 18:28	06:45 16:54	07:13 16:47
17	07:19 17:11	06:53 17:45	06:15 18:13	06:29 19:42	05:55 20:09	05:43 20:29	05:56 20:26	06:21 19:56	06:48 19:11	07:14 18:26	06:46 16:53	07:14 16:48
18	07:18 17:12	06:52 17:46	06:13 18:14	06:27 19:43	05:54 20:10	05:43 20:29	05:57 20:25	06:22 19:55	06:49 19:10	07:15 18:25	06:47 16:52	07:14 16:48
19	07:18 17:14	06:51 17:47	06:12 18:15	06:26 19:43	05:53 20:10	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:24	06:48 16:52	07:15 16:48
20	07:18 17:15	06:50 17:49	06:10 18:16	06:25 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:53	06:50 19:07	07:17 18:22	06:49 16:51	07:16 16:49
21	07:17 17:16	06:49 17:50	06:09 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	06:50 16:51	07:16 16:49
22	07:17 17:17	06:47 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:44 20:30	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	06:51 16:50	07:17 16:50
23	07:16 17:18	06:46 17:52	06:06 18:19	06:21 19:47	05:50 20:14	05:44 20:30	06:00 20:22	06:27 19:48	06:53 19:02	07:20 18:18	06:53 16:50	07:17 16:50
24	07:16 17:19	06:45 17:53	06:04 18:20	06:19 19:48	05:49 20:15	05:44 20:30	06:01 20:21	06:27 19:47	06:54 19:00	07:21 18:17	06:54 16:49	07:18 16:51
25	07:15 17:20	06:43 17:54	06:03 18:21	06:18 19:49	05:49 20:15	05:44 20:31	06:02 20:21	06:28 19:46	06:54 18:59	07:22 17:16	06:55 16:49	07:18 16:51
26	07:14 17:21	06:42 17:55	06:01 18:22	06:17 19:50	05:48 20:16	05:45 20:31	06:03 20:20	06:29 19:44	06:55 18:57	07:23 17:15	06:56 16:48	07:18 16:52
27	07:14 17:22	06:41 17:56	06:00 18:23	06:15 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56	07:24 17:13	06:57 16:48	07:19 16:53
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52	05:47 20:18	05:45 20:31	06:04 20:18	06:31 19:41	06:57 18:54	07:25 17:12	06:58 16:48	07:19 16:53
29	07:12 17:24		06:56 19:24	06:13 19:53	05:47 20:18	05:46 20:31	06:05 20:17	06:32 19:40	06:58 18:53	07:26 17:11	06:59 16:47	07:19 16:54
30	07:11 17:26		06:55 19:25	06:12 19:54	05:46 20:19	05:46 20:31	06:06 20:16	06:33 19:39	06:59 18:51	07:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:53 19:26		05:46 20:20		06:07 20:15	06:33 19:37		06:28 17:09		07:20 16:55
Potential sun hours	306	302	370	395	440	442	449	422	374	349	305	298
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: Caterina 1 - Shadow flickering WTG: SG 04 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (10)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January			February			March			April			May			June		
1	07:20	08:05-08:36/31		07:10		06:38				06:52	18:25-18:45/20		06:11		05:45			
	16:57	15:50-16:32/42		17:28		17:58				19:27			19:55		20:21			
2	07:21	08:06-08:36/30		07:09		06:37				06:50	18:24-18:42/18		06:09		05:45			
	16:57	15:51-16:32/41		17:29		17:59				19:28			19:55		20:21			
3	07:21	08:08-08:36/28		07:08		06:35				06:49	18:23-18:41/18		06:08		05:45			
	16:58	15:51-16:33/42		17:30		18:00				19:29			19:56		20:22			
4	07:21	08:09-08:36/27		07:07		06:34				06:47	18:22-18:38/16		06:07		05:44			
	16:59	15:52-16:34/42		17:31		18:01				19:30			19:57		20:22			
5	07:21	08:10-08:35/25		07:06		06:32				06:46	18:22-18:36/14		06:06		05:44			
	17:00	15:52-16:35/43		17:32		18:02				19:31			19:58		20:23			
6	07:21	08:11-08:34/23		07:05		06:31				06:45	18:21-18:33/12		06:05		05:44			
	17:01	15:53-16:36/43		17:33		18:03				19:32			19:59		20:24			
7	07:21	08:13-08:33/20		07:04		06:30				06:43	18:21-18:31/10		06:04		05:44			
	17:02	15:54-16:37/43		17:35		18:04				19:33			20:00		20:24			
8	07:21	08:15-08:31/16		07:03		06:28				06:42	18:20-18:29/9		06:03		05:43			
	17:03	15:55-16:38/43		17:36		18:05				19:33			20:01		20:25			
9	07:21	08:18-08:29/11		07:02		06:27				06:40	18:21-18:27/6		06:02		05:43			
	17:03	15:56-16:38/42		17:37		18:06				19:34			20:02		20:25			
10	07:21	15:57-16:39/42		07:01		06:25				06:39	18:20-18:24/4		06:01		05:43			
	17:04			17:38		18:07				19:35			20:03		20:26			
11	07:20	15:58-16:39/41		07:00		06:24				06:37	18:21-18:22/1		06:00		05:43			
	17:05			17:39		18:08				19:36			20:04		20:26			
12	07:20	15:58-16:38/40		06:59		06:22				06:36			05:59		05:43			
	17:06			17:40		18:09				19:37			20:04		20:27			
13	07:20	15:59-16:38/39		06:58		06:21				06:34			05:58		05:43			
	17:07			17:41		18:10				19:38			20:05		20:27			
14	07:20	16:00-16:38/38		06:57		06:19				06:33			05:57		05:43			
	17:08			17:42		18:11				19:39			20:06		20:28			
15	07:20	16:01-16:37/36		06:56		06:18				06:31			05:56		05:43			
	17:09			17:43		18:11				19:40			20:07		20:28			
16	07:19	16:02-16:37/35		06:55		06:16				06:30			05:55		05:43			
	17:10			17:44		18:12				19:41			20:08		20:29			
17	07:19	16:04-16:37/33		06:54		06:15				06:29			05:55		05:43			
	17:11			17:45		18:13				19:42			20:09		20:29			
18	07:19	16:05-16:36/31		06:52		06:13				06:27			05:54		05:43			
	17:12			17:46		18:14				19:43			20:10		20:29			
19	07:18	16:07-16:36/29		06:51		06:12				06:26			05:53		05:43			
	17:14			17:48		18:15				19:44			20:11		20:29			
20	07:18	16:08-16:34/26		06:50		06:10				06:25			05:52		05:43			
	17:15			17:49		18:16				19:44			20:11		20:30			
21	07:17	16:10-16:33/23		06:49		06:09				06:23			05:51		05:43			
	17:16			17:50		18:17				19:45			20:12		20:30			
22	07:17	16:12-16:31/19		06:47		06:07				06:22			05:51		05:44			
	17:17			17:51		18:18				19:46			20:13		20:30			
23	07:16	16:16-16:29/13		06:46		06:06				06:21			05:50		05:44			
	17:18			17:52		18:19				19:47			20:14		20:30			
24	07:16			06:45		06:04				06:19			05:49		05:44			
	17:19			17:53		18:20				19:48			20:15		20:31			
25	07:15			06:43		06:03				06:18			05:49		05:44			
	17:20			17:54		18:21				19:49			20:15		20:31			
26	07:14			06:42		06:01				06:17			05:48		05:45			
	17:21			17:55		18:22				19:50			20:16		20:31			
27	07:14			06:41		06:00	17:36-17:45/9			06:15			05:48		05:45			
	17:22			17:56		18:23				19:51			20:17		20:31			
28	07:13			06:39		05:58	17:33-17:46/13			06:14			05:47		05:45			
	17:23			17:57		18:23				19:52			20:18		20:31			
29	07:12					06:57	18:29-18:47/18			06:13			05:47		05:46			
	17:24					19:24				19:53			20:18		20:31			
30	07:11					06:55	18:28-18:48/20			06:12			05:46		05:46			
	17:26					19:25				19:54			20:19		20:31			
31	07:11					06:54	18:26-18:47/21						05:46					
	17:27					19:26							20:20					
Potential sun hours	306			302		370				395			440		442			
Sum of minutes with flicker	1037			0		81				128			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: Caterina 1 - Shadow flickering WTG: SG 04 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (10)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	05:47 20:31	06:08 20:15	06:34 18:20-18:21/1 19:36	07:00 18:50	06:29 17:08	07:01 15:40-16:21/41 16:47
2	05:47 20:31	06:09 20:14	06:35 18:19-18:23/4 19:34	07:01 18:48	06:30 17:07	07:02 15:40-16:22/42 16:47
3	05:47 20:31	06:09 20:13	06:36 18:19-18:25/6 19:33	07:02 18:47	06:31 17:05	07:03 08:03-08:13/10 16:46 15:40-16:22/42
4	05:48 20:31	06:10 20:12	06:37 18:17-18:26/9 19:31	07:02 18:45	06:32 17:04	07:03 08:01-08:16/15 16:46 15:40-16:23/43
5	05:48 20:30	06:11 20:11	06:38 18:17-18:27/10 19:30	07:03 18:44	06:34 17:03	07:04 07:59-08:19/20 16:46 15:40-16:23/43
6	05:49 20:30	06:12 20:09	06:39 18:17-18:29/12 19:28	07:04 18:42	06:35 17:02	07:05 07:57-08:20/23 16:46 15:39-16:22/43
7	05:50 20:30	06:13 20:08	06:39 18:17-18:31/14 19:27	07:05 18:41	06:36 17:01	07:06 07:57-08:21/24 16:46 15:39-16:22/43
8	05:50 20:30	06:14 20:07	06:40 18:17-18:33/16 19:25	07:06 18:39	06:37 17:00	07:07 07:56-08:23/27 16:46 15:40-16:22/42
9	05:51 20:29	06:15 20:06	06:41 18:16-18:34/18 19:24	07:07 18:38	06:38 17:00	07:08 07:56-08:24/28 16:46 15:40-16:22/42
10	05:51 20:29	06:15 20:05	06:42 18:17-18:35/18 19:22	07:08 18:36	06:39 16:59	07:09 07:56-08:26/30 16:46 15:41-16:23/42
11	05:52 20:29	06:16 20:04	06:43 18:17-18:37/20 19:21	07:09 18:35	06:40 16:58	07:09 07:56-08:27/31 16:46 15:41-16:23/42
12	05:53 20:28	06:17 20:03	06:44 18:18-18:39/21 19:19	07:10 18:33	06:41 16:57	07:10 07:55-08:27/32 16:47 15:41-16:22/41
13	05:53 20:28	06:18 20:01	06:44 18:19-18:39/20 19:18	07:11 18:32	06:42 16:56	07:11 07:55-08:28/33 16:47 15:41-16:23/42
14	05:54 20:27	06:19 20:00	06:45 18:19-18:37/18 19:16	07:12 18:31	06:43 16:55	07:12 07:56-08:30/34 16:47 15:42-16:23/41
15	05:55 20:27	06:20 19:59	06:46 18:21-18:36/15 19:14	07:12 18:29	06:44 16:55	07:12 07:56-08:31/35 16:47 15:42-16:23/41
16	05:55 20:26	06:21 19:58	06:47 18:24-18:34/10 19:13	07:13 18:28	06:45 16:54	07:13 07:55-08:31/36 16:47 15:42-16:23/41
17	05:56 20:26	06:21 19:57	06:48 19:11	07:14 18:26	06:46 16:53	07:14 07:56-08:32/36 16:48 15:43-16:24/41
18	05:57 20:25	06:22 19:55	06:49 19:10	07:15 18:25	06:47 16:53	07:14 07:56-08:32/36 16:48 15:43-16:24/41
19	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:24	06:48 16:52	07:15 07:56-08:33/37 16:49 15:44-16:24/40
20	05:58 20:24	06:24 19:53	06:50 19:07	07:17 18:22	06:49 16:51	07:16 07:56-08:33/37 16:49 15:44-16:24/40
21	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	06:51 16:51	07:16 07:57-08:34/37 16:49 15:45-16:25/40
22	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	06:52 16:50	07:17 07:57-08:34/37 16:50 15:45-16:25/40
23	06:00 20:22	06:27 19:49	06:53 19:02	07:20 18:18	06:53 16:50	07:17 07:58-08:35/37 16:50 15:46-16:26/40
24	06:01 20:21	06:27 19:47	06:54 19:00	07:21 18:17	06:54 16:49	07:18 07:58-08:35/37 16:51 15:46-16:26/40
25	06:02 20:21	06:28 19:46	06:55 18:59	06:22 17:16	06:55 16:49	07:18 08:00-08:36/36 16:51 15:47-16:27/40
26	06:03 20:20	06:29 19:44	06:55 18:57	06:23 17:15	06:56 16:48	07:19 08:00-08:36/36 16:52 15:47-16:28/41
27	06:04 20:19	06:30 19:43	06:56 18:56	06:24 17:13	06:57 16:48	07:19 08:00-08:36/36 16:53 15:47-16:28/41
28	06:04 20:18	06:31 19:42	06:57 18:54	06:25 17:12	06:58 16:48	07:19 08:02-08:37/35 16:53 15:48-16:29/41
29	06:05 20:17	06:32 19:40	06:58 18:53	06:26 17:11	06:59 16:47	07:20 08:02-08:37/35 16:54 15:49-16:30/41
30	06:06 20:16	06:33 19:39	06:59 18:51	06:27 17:10	07:00 16:47	07:20 08:03-08:37/34 16:55 15:49-16:30/41
31	06:07 20:15	06:33 19:37		06:28 17:09		07:20 08:04-08:36/32 16:56 15:49-16:31/42
Potential sun hours	449	422	374	349	305	298
Sum of minutes with flicker	0	0	212	0	362	2196

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: Caterina 1 - Shadow flickering WTG: SG 05 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (9)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	07:20 11:24-13:39/135 16:57	07:10 11:59-13:30/91 17:28	06:38 17:58	06:52 18:44-18:45/1 19:27	06:11 19:55	05:45 20:21
2	07:21 11:25-13:40/135 16:57	07:09 12:02-13:28/86 17:29	06:37 17:59	06:51 19:28	06:10 19:55	05:45 20:21
3	07:21 11:26-13:40/134 16:58	07:08 12:05-13:26/81 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22
4	07:21 11:27-13:40/133 16:59	07:07 12:09-13:24/75 17:31	06:34 18:01	06:48 19:30	06:07 19:57	05:44 20:23
5	07:21 11:27-13:41/134 17:00	07:06 12:13-13:21/68 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23
6	07:21 11:28-13:41/133 17:01	07:05 12:18-13:17/59 17:33	06:31 18:03	06:45 19:32	06:05 19:59	05:44 20:24
7	07:21 11:28-13:40/132 17:02	07:05 12:24-13:12/48 17:35	06:30 18:04	06:43 19:33	06:04 20:00	05:44 20:24
8	07:21 11:28-13:40/132 17:03	07:04 12:34-13:05/31 17:36	06:28 18:05	06:42 19:34	06:03 20:01	05:43 20:25
9	07:21 11:29-13:41/132 17:03	07:03 17:37	06:27 18:06	06:40 19:34	06:02 20:02	05:43 20:25
10	07:21 11:30-13:41/131 17:04	07:01 17:38	06:25 18:07	06:39 19:35	06:01 20:03	05:43 20:26
11	07:21 11:31-13:41/130 17:05	07:00 17:39	06:24 18:08	06:37 19:36	06:00 20:04	05:43 20:26
12	07:20 11:32-13:42/130 17:06	06:59 17:40	06:22 18:09	06:36 19:37	05:59 20:05	05:43 20:27
13	07:20 11:32-13:41/129 17:07	06:58 17:41	06:21 18:10	06:34 19:38	05:58 20:05	05:43 20:27
14	07:20 11:34-13:41/127 17:08	06:57 17:42	06:19 18:11	06:33 18:14-18:16/2 19:39	05:57 20:06	05:43 20:28
15	07:20 11:35-13:42/127 17:09	06:56 17:43	06:18 18:12	06:32 18:10-18:13/3 19:40	05:56 20:07	05:43 20:28
16	07:19 11:35-13:41/126 17:10	06:55 17:44	06:16 18:12	06:30 18:08-18:11/3 19:41	05:55 20:08	05:43 20:29
17	07:19 11:36-13:41/125 17:11	06:54 17:45	06:15 18:13	06:29 18:05-18:08/3 19:42	05:55 20:09	05:43 20:29
18	07:19 11:37-13:40/123 17:13	06:52 17:47	06:13 18:14	06:27 18:03-18:06/3 19:43	05:54 20:10	05:43 20:29
19	07:18 11:38-13:41/123 17:14	06:51 17:48	06:12 18:15	06:26 18:02-18:04/2 19:44	05:53 20:11	05:43 20:30
20	07:18 11:39-13:40/121 17:15	06:50 17:49	06:10 18:16	06:25 18:00-18:02/2 19:44	05:52 20:11	05:43 20:30
21	07:17 11:41-13:40/119 17:16	06:49 17:50	06:09 18:17	06:23 17:59-18:00/1 19:45	05:52 20:12	05:43 20:30
22	07:17 11:41-13:39/118 17:17	06:47 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:44 20:30
23	07:16 11:43-13:39/116 17:18	06:46 17:52	06:06 18:19	06:21 19:47	05:50 20:14	05:44 20:30
24	07:16 11:44-13:38/114 17:19	06:45 17:53	06:04 18:20	06:19 19:48	05:49 20:15	05:44 20:31
25	07:15 11:45-13:37/112 17:20	06:43 17:54	06:03 18:21	06:18 19:49	05:49 20:15	05:44 20:31
26	07:14 11:47-13:37/110 17:21	06:42 17:55	06:01 18:22	06:17 19:50	05:48 20:16	05:45 20:31
27	07:14 11:49-13:36/107 17:22	06:41 17:56	06:00 18:23	06:16 19:51	05:48 20:17	05:45 20:31
28	07:13 11:50-13:35/105 17:23	06:39 17:57	05:58 18:24	06:14 19:52	05:47 20:18	05:45 20:31
29	07:12 11:52-13:34/102 17:25		06:57 19:24	06:13 19:53	05:47 20:18	05:46 20:31
30	07:12 11:55-13:33/98 17:26		06:55 18:46-18:47/1 19:25	06:12 19:54	05:46 20:19	05:46 20:31
31	07:11 11:57-13:32/95 17:27		06:54 18:44-18:47/3 19:26		05:46 20:20	
Potential sun hours	306	302	370	395	440	442
Sum of minutes with flicker	3804	539	4	20	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: Caterina 1 - Shadow flickering WTG: SG 05 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (9)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 11:13-13:23/130 16:47
2	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:30 17:07	07:02 11:13-13:24/131 16:47
3	05:47 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:31 12:02-12:37/35 17:06	07:03 11:13-13:25/132 16:46
4	05:48 20:31	06:10 20:12	06:37 19:31	07:02 18:45	06:33 11:53-12:43/50 17:04	07:04 11:14-13:25/131 16:46
5	05:48 20:30	06:11 20:11	06:38 19:30	07:03 18:44	06:34 11:47-12:48/61 17:03	07:04 11:14-13:26/132 16:46
6	05:49 20:30	06:12 20:10	06:39 19:28	07:04 18:42	06:35 11:42-12:51/69 17:02	07:05 11:13-13:26/133 16:46
7	05:50 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:36 11:38-12:54/76 17:01	07:06 11:13-13:27/134 16:46
8	05:50 20:30	06:14 20:07	06:40 19:25	07:06 18:39	06:37 11:36-12:57/81 17:01	07:07 11:14-13:27/133 16:46
9	05:51 20:29	06:15 20:06	06:41 19:24	07:07 18:38	06:38 11:33-12:59/86 17:00	07:08 11:14-13:28/134 16:46
10	05:51 20:29	06:16 20:05	06:42 19:22	07:08 18:36	06:39 11:30-13:01/91 16:59	07:09 11:14-13:29/135 16:46
11	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 11:28-13:03/95 16:58	07:10 11:15-13:30/135 16:46
12	05:53 20:28	06:17 20:03	06:44 18:37-18:39/2 19:19	07:10 18:33	06:41 11:26-13:05/99 16:57 07:20-07:22/2	07:10 11:14-13:29/135 16:47
13	05:53 20:28	06:18 20:02	06:44 18:37-18:39/2 19:18	07:11 18:32	06:42 11:24-13:06/102 16:56 07:21-07:24/3	07:11 11:15-13:30/135 16:47
14	05:54 20:27	06:19 20:00	06:45 18:36-18:37/1 19:16	07:12 18:31	06:43 11:22-13:07/105 16:55 07:22-07:25/3	07:12 11:16-13:31/135 16:47
15	05:55 20:27	06:20 19:59	06:46 19:15	07:13 18:29	06:44 11:22-13:09/107 16:55 07:24-07:27/3	07:13 11:16-13:32/136 16:47
16	05:55 20:27	06:21 19:58	06:47 19:13	07:13 18:28	06:45 11:20-13:10/110 16:54 07:26-07:28/2	07:13 11:16-13:32/136 16:47
17	05:56 20:26	06:22 19:57	06:48 19:11	07:14 18:26	06:46 11:19-13:11/112 16:53 07:28-07:29/1	07:14 11:17-13:33/136 16:48
18	05:57 20:25	06:22 19:55	06:49 19:10	07:15 18:25	06:47 11:18-13:12/114 16:53 07:29-07:30/1	07:14 11:17-13:33/136 16:48
19	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:24	06:48 11:17-13:13/116 16:52	07:15 11:17-13:34/137 16:49
20	05:58 20:24	06:24 19:53	06:50 19:07	07:17 18:22	06:50 11:16-13:14/118 16:51	07:16 11:18-13:34/136 16:49
21	05:59 20:24	06:25 19:51	06:51 19:05	07:18 18:21	06:51 11:16-13:15/119 16:51	07:16 11:18-13:34/136 16:49
22	06:00 20:23	06:26 18:04-18:05/1 19:50	06:52 19:04	07:19 18:20	06:52 11:15-13:16/121 16:50	07:17 11:18-13:34/136 16:50
23	06:01 20:22	06:27 18:05-18:07/2 19:49	06:53 19:02	07:20 18:18	06:53 11:14-13:17/123 16:50	07:17 11:19-13:35/136 16:50
24	06:01 20:21	06:28 18:06-18:09/3 19:47	06:54 19:01	07:21 18:17	06:54 11:15-13:18/123 16:49	07:18 11:19-13:36/137 16:51
25	06:02 20:21	06:28 18:06-18:09/3 19:46	06:55 18:59	07:22 17:16	06:55 11:14-13:19/125 16:49	07:18 11:21-13:37/136 16:52
26	06:03 20:20	06:29 18:08-18:11/3 19:44	06:55 18:57	07:23 17:15	06:56 11:14-13:20/126 16:48	07:19 11:21-13:37/136 16:52
27	06:04 20:19	06:30 18:10-18:13/3 19:43	06:56 18:56	07:24 17:13	06:57 11:14-13:21/127 16:48	07:19 11:21-13:37/136 16:53
28	06:05 20:18	06:31 18:12-18:15/3 19:42	06:57 18:54	07:25 17:12	06:58 11:14-13:21/127 16:48	07:19 11:22-13:38/136 16:53
29	06:05 20:17	06:32 18:15-18:17/2 19:40	06:58 18:53	07:26 17:11	06:59 11:13-13:22/129 16:47	07:20 11:22-13:38/136 16:54
30	06:06 20:16	06:33 19:39	06:59 18:51	07:27 17:10	07:00 11:13-13:23/130 16:47	07:20 11:23-13:38/135 16:55
31	06:07 20:16	06:33 19:37		07:28 17:09		07:20 11:23-13:38/135 16:56
Potential sun hours	449	422	374	349	305	298
Sum of minutes with flicker	0	20	5	0	2892	4177

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: Caterina 1 - Shadow flickering WTG: SG 06 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (8)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:46 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:30 17:07	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:47 20:31	06:09 20:13	06:36 19:33	07:02 18:47	06:31 17:05	07:03 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:48 19:30	06:07 19:57	05:44 20:23	05:48 20:31	06:10 20:12	06:37 19:31	07:02 18:45	06:33 17:04	07:04 16:46
5	07:21 17:00	07:06 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:11	06:38 19:30	07:03 18:44	06:34 17:03	07:04 16:46
6	07:21 17:01	07:05 17:33	06:31 18:03	06:45 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:10	06:39 19:28	07:04 18:42	06:35 17:02	07:05 16:46
7	07:21 17:02	07:05 17:34	06:30 18:04	06:43 19:33	06:04 20:00	05:43 20:24	05:50 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:36 17:01	07:06 16:46
8	07:21 17:02	07:04 17:36	06:28 18:05	06:42 19:34	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:07	06:40 19:25	07:06 18:39	06:37 17:00	07:07 16:46
9	07:21 17:03	07:03 17:37	06:27 18:06	06:40 19:34	06:02 20:02	05:43 20:25	05:51 20:29	06:15 20:06	06:41 19:24	07:07 18:38	06:38 17:00	07:08 16:46
10	07:21 17:04	07:01 17:38	06:25 18:07	06:39 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:59	07:09 16:46
11	07:21 17:05	07:00 17:39	06:24 18:08	06:37 19:36	06:00 20:04	05:43 20:26	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:10 16:46
12	07:20 17:06	06:59 17:40	06:22 18:09	06:36 19:37	05:59 20:05	05:43 20:27	05:53 20:28	06:17 20:03	06:44 19:19	07:10 18:33	06:41 16:57	07:10 16:46
13	07:20 17:07	06:58 17:41	06:21 18:10	06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:02	06:44 19:18	07:11 18:32	06:42 16:56	07:11 16:47
14	07:20 17:08	06:57 17:42	06:19 18:11	06:33 19:39	05:57 20:06	05:43 20:28	05:54 20:28	06:19 20:00	06:45 19:16	07:12 18:31	06:43 16:55	07:12 16:47
15	07:20 17:09	06:56 17:43	06:18 18:11	06:31 19:40	05:56 20:07	05:43 20:28	05:55 20:27	06:20 19:59	06:46 19:15	07:12 18:29	06:44 16:55	07:13 16:47
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:43 20:29	05:55 20:27	06:21 19:58	06:47 19:13	07:13 18:28	06:45 16:54	07:13 16:47
17	07:19 17:11	06:54 17:45	06:15 18:13	06:29 19:42	05:55 20:09	05:43 20:29	05:56 20:26	06:21 19:57	06:48 19:11	07:14 18:26	06:46 16:53	07:14 16:48
18	07:19 17:12	06:52 17:46	06:13 18:14	06:27 19:43	05:54 20:10	05:43 20:29	05:57 20:25	06:22 19:55	06:49 19:10	07:15 18:25	06:47 16:52	07:14 16:48
19	07:18 17:14	06:51 17:48	06:12 18:15	06:26 19:44	05:53 20:11	05:43 20:30	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:24	06:48 16:52	07:15 16:48
20	07:18 17:15	06:50 17:49	06:10 18:16	06:25 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:53	06:50 19:07	07:17 18:22	06:50 16:51	07:16 16:49
21	07:17 17:16	06:49 17:50	06:09 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:24	06:25 19:51	06:51 19:05	07:18 18:21	06:51 16:51	07:16 16:49
22	07:17 17:17	06:47 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:44 20:30	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	06:52 16:50	07:17 16:50
23	07:16 17:18	06:46 17:52	06:06 18:19	06:21 19:47	05:50 20:14	05:44 20:30	06:00 20:22	06:27 19:49	06:53 19:02	07:20 18:18	06:53 16:50	07:17 16:50
24	07:16 17:19	06:45 17:53	06:04 18:20	06:19 19:48	05:49 20:15	05:44 20:31	06:01 20:21	06:27 19:47	06:54 19:01	07:21 18:17	06:54 16:49	07:18 16:51
25	07:15 17:20	06:43 17:54	06:03 18:21	06:18 19:49	05:49 20:15	05:44 20:31	06:02 20:21	06:28 19:46	06:55 18:59	07:22 17:16	06:55 16:49	07:18 16:51
26	07:14 17:21	06:42 17:55	06:01 18:22	06:17 19:50	05:48 20:16	05:45 20:31	06:03 20:20	06:29 19:44	06:55 18:57	07:23 17:15	06:56 16:48	07:19 16:52
27	07:14 17:22	06:41 17:56	06:00 18:23	06:15 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56	07:24 17:13	06:57 16:48	07:19 16:53
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52	05:47 20:18	05:45 20:31	06:04 20:18	06:31 19:42	06:57 18:54	07:25 17:12	06:58 16:48	07:19 16:53
29	07:12 17:24		06:57 19:24	06:13 19:53	05:47 20:18	05:46 20:31	06:05 20:17	06:32 19:40	06:58 18:53	07:26 17:11	06:59 16:47	07:20 16:54
30	07:12 17:26		06:55 19:25	06:12 19:54	05:46 20:19	05:46 20:31	06:06 20:16	06:33 19:39	06:59 18:51	07:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:16	06:33 19:37		07:28 17:09		07:20 16:55
Potential sun hours	306	302	370	395	440	442	449	422	374	349	305	298
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: Caterina 1 - Shadow flickering WTG: SG 07 - Siemens Gamesa SG 6.6-170 6600 170.0 !OI hub: 155.0 m (TOT: 240.0 m) (7)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:28	06:38 17:58	06:52 19:27	06:10 19:54	05:45 20:20	05:46 20:31	06:08 20:14	06:34 19:36	07:00 18:50	06:29 17:07	07:01 16:47
2	07:20 16:57	07:09 17:29	06:36 17:59	06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:08 20:13	06:35 19:34	07:00 18:48	06:30 17:06	07:01 16:46
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:44 20:22	05:47 20:31	06:09 20:12	06:36 19:33	07:01 18:47	06:31 17:05	07:02 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:11	06:37 19:31	07:02 18:45	06:32 17:04	07:03 16:46
5	07:21 17:00	07:06 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:38 19:30	07:03 18:43	06:33 17:03	07:04 16:46
6	07:21 17:01	07:05 17:33	06:31 18:03	06:44 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42	06:34 17:02	07:05 16:46
7	07:21 17:01	07:04 17:34	06:29 18:04	06:43 19:32	06:04 20:00	05:43 20:24	05:49 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:36 17:01	07:06 16:46
8	07:21 17:02	07:03 17:35	06:28 18:05	06:41 19:33	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:07	06:40 19:25	07:06 18:39	06:37 17:00	07:07 16:46
9	07:21 17:03	07:02 17:37	06:26 18:06	06:40 19:34	06:02 20:02	05:43 20:25	05:51 20:29	06:14 20:06	06:41 19:24	07:07 18:38	06:38 16:59	07:08 16:46
10	07:21 17:04	07:01 17:38	06:25 18:07	06:38 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:58	07:09 16:46
11	07:20 17:05	07:00 17:39	06:24 18:08	06:37 19:36	06:00 20:03	05:43 20:26	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:09 16:46
12	07:20 17:06	06:59 17:40	06:22 18:08	06:36 19:37	05:59 20:04	05:43 20:27	05:52 20:28	06:17 20:03	06:43 19:19	07:10 18:33	06:41 16:57	07:10 16:46
13	07:20 17:07	06:58 17:41	06:21 18:09	06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:01	06:44 19:17	07:10 18:32	06:42 16:56	07:11 16:47
14	07:20 17:08	06:57 17:42	06:19 18:10	06:33 19:39	05:57 20:06	05:43 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:11 18:30	06:43 16:55	07:12 16:47
15	07:19 17:09	06:56 17:43	06:18 18:11	06:31 19:40	05:56 20:07	05:43 20:28	05:54 20:27	06:20 19:59	06:46 19:14	07:12 18:29	06:44 16:54	07:12 16:47
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:43 20:28	05:55 20:26	06:20 19:58	06:47 19:13	07:13 18:28	06:45 16:54	07:13 16:47
17	07:19 17:11	06:53 17:45	06:15 18:13	06:29 19:42	05:54 20:09	05:43 20:29	05:56 20:26	06:21 19:56	06:48 19:11	07:14 18:26	06:46 16:53	07:14 16:48
18	07:18 17:12	06:52 17:46	06:13 18:14	06:27 19:42	05:54 20:10	05:43 20:29	05:57 20:25	06:22 19:55	06:48 19:10	07:15 18:25	06:47 16:52	07:14 16:48
19	07:18 17:13	06:51 17:47	06:12 18:15	06:26 19:43	05:53 20:10	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:23	06:48 16:52	07:15 16:48
20	07:18 17:14	06:50 17:48	06:10 18:16	06:24 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:52	06:50 19:07	07:17 18:22	06:49 16:51	07:16 16:49
21	07:17 17:15	06:48 17:49	06:09 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	06:50 16:51	07:16 16:49
22	07:17 17:17	06:47 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:43 20:30	06:00 20:23	06:26 19:50	06:52 19:03	07:19 18:20	06:51 16:50	07:17 16:50
23	07:16 17:18	06:46 17:52	06:06 18:19	06:20 19:47	05:50 20:14	05:44 20:30	06:00 20:22	06:26 19:48	06:53 19:02	07:20 18:18	06:52 16:49	07:17 16:50
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25	07:15 17:20	06:43 17:54	06:02 18:21	06:18 19:49	05:49 20:15	05:44 20:31	06:02 20:20	06:28 19:46	06:54 18:59	07:22 17:16	06:55 16:49	07:18 16:51
26	07:14 17:21	06:42 17:55	06:01 18:21	06:17 19:50	05:48 20:16	05:44 20:31	06:03 20:20	06:29 19:44	06:55 18:57	07:23 17:14	06:56 16:48	07:18 16:52
27	07:14 17:22	06:41 17:56	05:59 18:22	06:15 19:51	05:48 20:17	05:45 20:31	06:03 20:19	06:30 19:43	06:56 18:56	07:24 17:13	06:57 16:48	07:19 16:53
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52	05:47 20:18	05:45 20:31	06:04 20:18	06:31 19:41	06:57 18:54	07:25 17:12	06:58 16:47	07:19 16:53
29	07:12 17:24		06:56 19:24	06:13 19:53	05:46 20:18	05:45 20:31	06:05 20:17	06:32 19:40	06:58 18:53	07:26 17:11	06:59 16:47	07:19 16:54
30	07:11 17:25		06:55 19:25	06:12 19:53	05:46 20:19	05:46 20:31	06:06 20:16	06:32 19:39	06:59 18:51	07:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:53 19:26		05:46 20:20		06:07 20:15	06:33 19:37		06:28 17:09		07:20 16:55
Potential sun hours	306	302	370	395	440	442	449	422	374	349	305	298
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: Caterina 1 - Shadow flickering WTG: SG 08 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (2)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:28	06:38 07:01-07:03/2 17:58	06:52 19:27	06:10 19:54	05:45 20:20	05:46 20:31	06:08 20:14	06:34 19:36	07:00 07:27-07:49/22 18:50	06:29 17:07	07:01 16:47
2	07:20 16:57	07:09 17:29	06:36 07:01-07:06/5 17:59	06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:08 20:13	06:35 19:34	07:00 07:28-07:50/22 18:48	06:30 17:06	07:01 16:46
3	07:21 16:58	07:08 17:30	06:35 06:59-07:08/9 18:00	06:49 19:29	06:08 19:56	05:44 20:22	05:47 20:31	06:09 20:12	06:36 19:33	07:01 07:28-07:48/20 18:46	06:31 17:05	07:02 16:46
4	07:21 16:59	07:07 17:31	06:34 06:59-07:09/10 18:01	06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:11	06:37 19:31	07:02 07:29-07:48/19 18:45	06:32 17:04	07:03 16:46
5	07:21 17:00	07:06 17:32	06:32 06:57-07:10/13 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:37 19:30	07:03 07:29-07:48/19 18:43	06:33 17:03	07:04 16:46
6	07:21 17:00	07:05 17:33	06:31 06:56-07:11/15 18:03	06:44 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:09	06:38 19:28	07:04 07:30-07:47/17 18:42	06:34 17:02	07:05 16:46
7	07:21 17:01	07:04 17:34	06:29 06:54-07:11/17 18:04	06:43 19:32	06:04 20:00	05:43 20:24	05:49 20:30	06:13 20:08	06:39 19:27	07:05 07:31-07:47/16 18:40	06:36 17:01	07:06 16:46
8	07:21 17:02	07:03 17:35	06:28 06:53-07:11/18 18:05	06:41 19:33	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:07	06:40 19:25	07:06 07:32-07:46/14 18:39	06:37 17:00	07:07 16:46
9	07:21 17:03	07:02 17:37	06:26 06:52-07:11/19 18:06	06:40 19:34	06:02 20:02	05:43 20:25	05:50 20:29	06:14 20:06	06:41 19:24	07:07 07:33-07:45/12 18:38	06:38 16:59	07:08 16:46
10	07:21 17:04	07:01 17:38	06:25 06:51-07:11/20 18:07	06:38 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 07:33-07:43/10 18:36	06:39 16:58	07:09 16:46
11	07:20 17:05	07:00 17:39	06:24 06:49-07:10/21 18:07	06:37 19:36	06:00 20:03	05:43 20:26	05:52 20:29	06:16 20:04	06:43 19:21	07:09 07:34-07:41/7 18:35	06:40 16:58	07:09 16:46
12	07:20 17:06	06:59 17:40	06:22 06:48-07:10/22 18:08	06:36 19:37	05:59 20:04	05:43 20:27	05:52 20:28	06:17 20:03	06:43 19:19	07:10 07:34-07:39/5 18:33	06:41 16:57	07:10 16:46
13	07:20 17:07	06:58 17:41	06:21 06:46-07:09/23 18:09	06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:01	06:44 19:17	07:10 18:32	06:42 16:56	07:11 16:46
14	07:20 17:08	06:57 17:42	06:19 06:45-07:08/23 18:10	06:33 19:39	05:57 20:06	05:42 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:11 18:30	06:43 16:55	07:12 16:47
15	07:19 17:09	06:56 17:43	06:18 06:43-07:07/24 18:11	06:31 19:40	05:56 20:07	05:42 20:28	05:54 20:27	06:20 19:59	06:46 19:14	07:12 18:29	06:44 16:54	07:12 16:47
16	07:19 17:10	06:55 17:44	06:16 06:45-07:05/20 18:12	06:30 19:41	05:55 20:08	05:43 20:28	05:55 20:26	06:20 19:58	06:47 19:13	07:13 18:28	06:45 16:54	07:13 16:47
17	07:19 17:11	06:53 17:45	06:15 06:46-07:03/17 18:13	06:29 19:42	05:54 20:09	05:43 20:29	05:56 20:26	06:21 19:56	06:48 19:11	07:14 18:26	06:46 16:53	07:14 16:48
18	07:18 17:12	06:52 17:46	06:13 06:49-07:01/12 18:14	06:27 19:42	05:54 20:10	05:43 20:29	05:56 20:25	06:22 19:55	06:48 19:10	07:15 18:25	06:47 16:52	07:14 16:48
19	07:18 17:13	06:51 17:47	06:12 18:15	06:26 19:43	05:53 20:10	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:23	06:48 16:52	07:15 16:48
20	07:18 17:14	06:50 17:48	06:10 18:16	06:24 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:52	06:50 19:07	07:17 18:22	06:49 16:51	07:16 16:49
21	07:17 17:15	06:48 17:49	06:09 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	06:50 16:50	07:16 16:49
22	07:17 17:17	06:47 17:50	06:07 18:18	06:22 19:46	05:51 20:13	05:43 20:30	06:00 20:23	06:26 19:50	06:52 19:03	07:19 18:19	06:51 16:50	07:17 16:50
23	07:16 17:18	06:46 17:52	06:05 18:19	06:20 19:47	05:50 20:14	05:44 20:30	06:00 20:22	06:26 19:48	06:53 19:02	07:20 18:18	06:52 16:49	07:17 16:50
24	07:15 17:19	06:45 17:53	06:04 18:20	06:19 19:48	05:49 20:14	05:44 20:30	06:01 20:21	06:27 19:47	06:54 19:00	07:21 18:17	06:54 16:49	07:18 16:51
25	07:15 17:20	06:43 17:54	06:02 18:21	06:18 19:49	05:49 20:15	05:44 20:31	06:02 20:20	06:28 19:46	06:54 07:32-07:42/10 18:59	06:22 17:16	06:55 16:49	07:18 16:51
26	07:14 17:21	06:42 17:55	06:01 18:21	06:17 19:50	05:48 20:16	05:44 20:31	06:03 20:20	06:29 19:44	06:55 07:29-07:45/16 18:57	06:23 17:14	06:56 16:48	07:18 16:52
27	07:14 17:22	06:41 17:56	05:59 18:22	06:15 19:51	05:47 20:17	05:45 20:31	06:03 20:19	06:30 19:43	06:56 07:27-07:46/19 18:56	06:24 17:13	06:57 16:48	07:19 16:53
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52	05:47 20:18	05:45 20:31	06:04 20:18	06:31 19:41	06:57 07:25-07:48/23 18:54	06:25 17:12	06:58 16:47	07:19 16:53
29	07:12 17:24		19:24	06:13 19:53	05:46 20:18	05:45 20:31	06:05 20:17	06:32 19:40	07:25-07:48/23 18:53	06:26 17:11	06:59 16:47	07:19 16:54
30	07:11 17:25		19:25	06:12 19:53	05:46 20:19	05:46 20:31	06:06 20:16	06:32 19:39	07:26-07:49/23 18:51	06:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:26		06:53 19:26		05:46 20:20		06:07 20:15	06:33 19:37		06:28 17:09		07:20 16:55
Potential sun hours	306	302	370	395	440	442	449	422	374	349	305	298
Sum of minutes with flicker	0	0	290	0	0	0	0	0	114	183	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: Caterina 1 - Shadow flickering WTG: SG 09 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (1)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:28	06:38 17:58	06:52 19:27	06:10 19:54	05:45 20:20	05:46 20:31	06:08 20:14	06:34 19:36	07:00 18:49	06:29 17:07	16:43-16:44/1 16:47
2	07:20 16:57	07:09 17:29	06:36 17:59	06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:08 20:13	06:35 19:34	07:00 18:48	06:30 17:06	16:46 16:46
3	07:20 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:44 20:22	05:47 20:30	06:09 20:12	06:36 19:33	07:01 18:46	06:31 17:05	16:46 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:11	06:37 19:31	07:02 18:45	06:32 17:04	16:46 16:46
5	07:21 17:00	07:06 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:37 19:30	07:03 18:43	06:33 17:03	16:46 16:46
6	07:21 17:00	07:05 17:33	06:31 18:03	06:44 19:31	06:05 19:59	05:43 20:24	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42	18:01-18:02/1 17:02	06:34 16:46
7	07:21 17:01	07:04 17:34	06:29 18:04	06:43 19:32	06:04 20:00	05:43 20:24	05:49 20:30	06:13 20:08	06:39 19:27	07:05 18:40	06:35 17:01	16:46 16:46
8	07:21 17:02	07:03 17:35	06:28 18:05	06:41 19:33	06:03 20:01	05:43 20:25	05:50 20:29	06:13 20:07	06:40 19:25	07:06 18:39	06:37 17:00	16:46 16:46
9	07:21 17:03	07:02 17:36	06:26 18:05	06:40 19:34	06:02 20:02	05:43 20:25	05:50 20:29	06:14 20:06	06:41 19:24	07:07 18:37	06:38 16:59	16:46 16:46
10	07:20 17:04	07:01 17:38	06:25 18:06	06:38 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:58	16:46 16:46
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12	07:20 17:06	06:59 17:40	06:22 18:08	06:35 19:37	05:59 20:04	05:42 20:27	05:52 20:28	06:17 20:02	06:43 19:19	07:09 18:33	06:41 16:57	16:46 16:46
13	07:20 17:07	06:58 17:41	06:21 18:09	06:34 19:38	05:58 20:05	05:42 20:27	05:53 20:28	06:18 20:01	06:44 19:17	07:10 18:32	06:42 16:56	16:46 16:46
14	07:20 17:08	06:57 17:42	06:19 18:10	06:33 19:39	05:57 20:06	05:42 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:11 18:30	06:43 16:55	16:46 16:46
15	07:19 17:09	06:56 17:43	06:18 18:11	06:31 19:40	05:56 20:07	05:42 20:28	05:54 20:27	06:19 19:59	06:46 19:14	07:12 18:29	06:44 16:54	16:46 16:46
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:42 20:28	05:55 20:26	06:20 19:58	06:47 19:13	07:13 18:27	17:55-18:03/8 16:54	16:46 16:46
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18	07:18 17:12	06:52 17:46	06:13 18:14	06:27 19:42	05:53 20:09	05:43 20:29	05:56 20:25	06:22 19:55	06:48 19:10	07:15 18:25	17:49-18:01/12 16:52	16:46 16:46
19	07:18 17:13	06:51 17:47	06:11 18:15	06:26 19:43	05:53 20:10	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:23	17:48-18:01/13 16:52	16:46 16:46
20	07:17 17:14	06:50 17:48	06:10 18:16	06:24 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:52	06:50 19:06	07:17 18:22	17:47-18:00/13 16:51	16:46 16:46
21	07:17 17:15	06:48 17:49	06:08 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	17:45-17:59/14 16:50	16:46 16:46
22	07:16 17:16	06:47 17:50	06:07 18:18	06:22 19:46	05:50 20:13	05:43 20:30	05:59 20:23	06:26 19:50	06:52 19:03	07:19 18:19	17:44-17:58/14 16:50	16:46 16:46
23	07:16 17:18	06:46 17:51	06:05 18:19	06:20 19:47	05:50 20:14	05:43 20:30	06:00 20:22	06:26 19:48	06:53 19:02	07:20 18:18	17:44-17:56/12 16:49	16:46 16:46
24	07:15 17:19	06:45 17:52	06:04 18:20	06:19 19:48	05:49 20:14	05:44 20:30	06:01 20:21	06:27 19:47	06:53 19:00	07:21 18:17	17:43-17:55/12 16:49	16:46 16:46
25	07:15 17:20	06:43 17:54	06:02 18:20	06:18 19:49	05:49 20:15	05:44 20:30	06:02 20:20	06:28 19:46	06:54 18:59	06:22 17:16	16:43-16:54/11 16:48	16:46 16:46
26	07:14 17:21	06:42 17:55	06:01 18:21	06:16 19:50	05:48 20:16	05:44 20:31	06:03 20:20	06:29 19:44	06:55 18:57	06:23 17:14	16:42-16:52/10 16:48	16:46 16:46
27	07:13 17:22	06:41 17:56	05:59 18:22	06:15 19:51	05:47 20:17	05:45 20:31	06:03 20:19	06:30 19:43	06:56 18:56	06:24 17:13	16:42-16:51/9 16:48	16:46 16:46
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52	05:47 20:17	05:45 20:31	06:04 20:18	06:31 19:41	06:57 18:54	06:25 17:12	16:42-16:50/8 16:47	16:46 16:46
29	07:12 17:24		05:56 19:24	06:13 19:52	05:46 20:18	05:45 20:31	06:05 20:17	06:31 19:40	06:58 18:53	06:26 17:11	16:42-16:48/6 16:47	16:46 16:46
30	07:11 17:25		05:55 19:25	06:12 19:53	05:46 20:19	05:46 20:31	06:06 20:16	06:32 19:38	06:59 18:51	06:27 17:10	16:42-16:47/5 16:47	16:46 16:46
31	07:11 17:26		05:53 19:26		05:45 20:20		06:07 20:15	06:33 19:37		06:28 17:08	16:42-16:46/4 16:47	16:46 16:46
Potential sun hours	306	302	370	395	440	442	449	422	374	349	305	298
Sum of minutes with flicker	0	154	0	0	0	0	0	0	0	163	1	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: Caterina 1 - Shadow flickering WTG: SG 10 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (4)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 08:02-08:40/38 16:56	07:10 06:38 17:28 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:46 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:30 17:08		07:01 07:49-08:24/35 16:47
2	07:21 08:02-08:40/38 16:57	07:09 06:37 17:29 17:59	06:51 19:28	06:09 19:56	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:31 17:07		07:02 07:49-08:25/36 16:47
3	07:21 08:02-08:41/39 16:58	07:08 06:35 17:30 18:00	06:49 19:29	06:08 19:57	05:45 20:22	05:47 20:31	06:09 20:13	06:36 19:33	07:02 18:47	06:32 17:05		07:03 07:49-08:26/37 16:46
4	07:21 08:02-08:41/39 16:59	07:08 06:34 17:31 18:01	06:48 19:30	06:07 19:57	05:44 20:23	05:48 20:31	06:10 20:12	06:37 19:31	07:03 18:45	06:33 17:04		07:04 07:49-08:26/37 16:46
5	07:21 08:03-08:41/38 17:00	07:07 06:33 17:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:31	06:11 20:11	06:38 19:30	07:03 18:44	06:34 17:03		07:05 07:49-08:27/38 16:46
6	07:21 08:04-08:42/38 17:01	07:06 06:31 17:33 18:03	06:45 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:10	06:39 19:28	07:04 18:42	06:35 17:02		07:06 07:50-08:28/38 16:46
7	07:21 08:04-08:42/38 17:01	07:05 06:30 17:34 18:04	06:43 19:33	06:04 20:00	05:43 20:25	05:49 20:30	06:13 20:09	06:39 19:27	07:05 18:41	06:36 17:01		07:06 07:50-08:28/38 16:46
8	07:21 08:05-08:42/37 17:02	07:04 06:28 17:36 18:05	06:42 19:34	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:08	06:40 19:25	07:06 18:39	06:37 17:00		07:07 07:51-08:29/38 16:46
9	07:21 08:05-08:42/37 17:03	07:03 06:27 17:37 18:06	06:40 19:35	06:02 20:02	05:43 20:26	05:51 20:30	06:15 20:06	06:41 19:24	07:07 18:38	06:38 17:00		07:08 07:50-08:29/39 16:46
10	07:21 08:06-08:42/36 17:04	07:02 06:25 17:38 18:07	06:39 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:59		07:09 07:51-08:29/38 16:46
11	07:21 08:06-08:42/36 17:05	07:01 06:24 17:39 18:08	06:37 19:36	06:00 20:04	05:43 20:27	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58		07:10 07:52-08:30/38 16:46
12	07:21 08:07-08:43/36 17:06	06:59 06:22 17:40 18:09	06:36 19:37	05:59 20:05	05:43 20:27	05:52 20:29	06:17 20:03	06:44 19:19	07:10 18:33	06:41 16:57		07:11 07:53-08:31/38 16:46
13	07:20 08:08-08:43/35 17:07	06:58 06:21 17:41 18:10	06:34 19:38	05:58 20:06	05:43 20:28	05:53 20:28	06:18 20:02	06:44 19:18	07:11 18:32	06:42 16:56		07:11 07:53-08:31/38 16:47
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16	07:20 08:10-08:41/31 17:10	06:55 06:16 17:44 18:12	06:30 19:41	05:55 20:08	05:43 20:29	05:55 20:27	06:21 19:58	06:47 19:13	07:14 18:28	06:45 16:54		07:13 07:55-08:32/37 16:47
17	07:19 08:12-08:41/29 17:11	06:54 06:15 17:45 18:13	06:29 19:42	05:54 20:09	05:43 20:29	05:56 20:26	06:21 19:57	06:48 19:11	07:15 18:26	06:47 16:53		07:14 07:56-08:33/37 16:48
18	07:19 08:13-08:41/28 17:12	06:53 06:13 17:46 18:14	06:27 19:43	05:54 20:10	05:43 20:29	05:57 20:26	06:22 19:55	06:49 19:10	07:15 18:25	06:48 07:58-08:06/8 16:52		07:15 07:57-08:34/37 16:48
19	07:18 08:14-08:40/26 17:13	06:51 06:12 17:48 18:15	06:26 19:44	05:53 20:11	05:43 20:30	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:24	06:49 07:55-08:10/15 16:52		07:15 07:57-08:34/37 16:48
20	07:18 08:16-08:40/24 17:15	06:50 06:10 17:49 18:16	06:25 19:45	05:52 20:12	05:43 20:30	05:58 20:24	06:24 19:53	06:50 19:07	07:17 18:22	06:50 07:53-08:12/19 16:51		07:16 07:58-08:34/36 16:49
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22	07:17 08:18-08:37/19 17:17	06:48 06:07 17:51 18:18	06:22 19:46	05:51 20:13	05:43 20:30	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	06:52 07:52-08:16/24 16:50		07:17 07:59-08:35/36 16:50
23	07:16 08:21-08:36/15 17:18	06:46 06:06 17:52 18:19	06:21 19:47	05:50 20:14	05:44 20:31	06:00 20:22	06:27 19:49	06:53 19:02	07:20 18:18	06:53 07:51-08:17/26 16:50		07:17 07:59-08:35/36 16:50
24	07:16 08:24-08:32/8 17:19	06:45 06:04 17:53 18:20	06:19 19:48	05:49 20:15	05:44 20:31	06:01 20:22	06:27 19:47	06:54 19:01	07:21 18:17	06:54 07:50-08:18/28 16:49		07:18 08:00-08:37/37 16:51
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31	07:11 07:11 17:27	06:54 06:12 19:26 19:55	06:12 20:20	05:46 20:20	05:46 20:20	06:07 20:16	06:33 19:37	06:59 17:09	06:28 17:09	07:00 08:02-08:40/38 16:55		07:20 08:02-08:40/38 16:55
Potential sun hours	306	302	370	395	440	442	449	422	374	348	305	298
Sum of minutes with flicker	752	0	0	0	0	0	0	0	0	0	336	1151

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: Caterina 1 - Shadow flickering WTG: SG 11 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (5)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 15:08-15:29/21 16:56 08:02-08:38/36	07:10 08:18-08:40/22 17:28	06:38 17:58 19:27	06:52 19:27 19:55	06:11 20:21 20:31	05:45 20:15 20:31	05:46 20:31 20:15	06:08 20:15 19:36	06:34 18:50 17:08	07:00 18:50 17:08	06:30 17:08 16:47	07:01 16:47 07:02
2	07:21 15:09-15:28/19 16:57 08:02-08:39/37	07:09 08:20-08:38/18 17:29	06:37 17:59 19:28	06:51 19:28 19:56	06:10 20:22 20:31	05:45 20:14 20:31	05:47 20:31 20:14	06:09 19:36 18:48	06:35 17:01 16:31	07:01 17:01 16:31	06:31 16:31 16:07	07:02 16:07 07:03
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6	07:21 15:15-15:26/11 17:01 08:03-08:41/38	07:06 17:33	06:31 18:03 19:32	06:45 19:32 19:59	06:05 20:24 20:30	05:44 20:10 20:30	05:49 20:30 20:10	06:12 19:28 18:42	06:39 17:04 16:30	07:04 17:04 16:30	06:35 16:30 16:02	07:06 16:02 07:07
7	07:21 15:17-15:25/8 17:02 08:03-08:42/39	07:05 17:35	06:30 18:04 19:33	06:43 20:00 20:00	06:04 20:25 20:30	05:43 20:09 20:30	05:49 20:30 20:09	06:13 19:27 18:41	06:39 17:01 16:30	07:05 17:01 16:30	06:36 16:30 16:01	07:06 16:01 07:07
8	07:21 08:03-08:42/39 17:02	07:04 17:36	06:28 18:05 19:34	06:42 20:01 20:01	06:03 20:25 20:30	05:43 20:08 20:30	05:50 20:30 20:08	06:14 19:25 18:39	06:40 17:01 16:30	07:06 17:01 16:30	06:37 16:30 16:01	07:07 16:01 07:08
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27	07:14 08:11-08:45/34 17:22	06:41 17:56	06:00 18:23 19:51	06:16 20:17 20:17	05:48 20:31 20:19	05:45 20:01 20:19	06:04 20:19 20:01	06:30 19:43 18:56	06:56 17:13 16:48	07:24 17:13 16:48	07:44-08:24/40 16:59	07:26 16:59 07:27
28	07:13 08:12-08:44/32 17:23	06:40 17:57	05:58 18:24 19:52	06:14 20:18 20:18	05:47 20:31 20:18	05:45 20:01 20:18	06:04 20:18 20:01	06:31 19:42 18:54	06:57 17:12 16:48	07:25 17:12 16:48	07:44-08:25/41 16:59	07:27 16:59 07:28
29	07:13 08:14-08:44/30 17:24		06:57 19:25 19:53	06:13 20:19 20:19	05:47 20:31 20:18	05:46 20:01 20:18	06:05 20:18 20:01	06:32 19:40 18:53	06:58 17:11 16:47	07:26 17:11 16:47	07:45-08:25/40 16:59	07:28 16:59 07:29
30	07:12 08:15-08:43/28 17:26		06:55 19:25 19:54	06:12 20:19 20:19	05:46 20:31 20:17	05:46 20:01 20:17	06:06 20:17 20:01	06:33 19:39 18:51	06:59 17:10 16:47	07:27 17:10 16:47	07:45-08:25/40 16:59	07:29 16:59 07:30
31	07:11 08:16-08:42/26 17:27		06:54 19:26 20:20		05:46 20:20 20:16		06:07 20:16 20:01	06:34 19:37 18:51	06:29 17:09 16:30	07:28 17:09 16:30		07:30 16:30 07:31
Potential sun hours	306	302	370	395	440	442	449	422	374	348	305	298
Sum of minutes with flicker	1264	54	0	0	0	0	0	0	0	0	795	1718

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: Caterina 1 - Shadow flickering WTG: SG 12 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (6)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:30 17:08	07:01 15:55-16:01/6 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:10 19:56	05:45 20:22	05:47 20:31	06:09 20:14	06:35 19:35	07:01 18:48	06:31 17:07	07:02 15:55-16:00/5 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:57	05:45 20:22	05:47 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:32 17:06	07:03 15:56-15:59/3 16:46
4	07:21 16:59	07:08 17:31	06:34 18:01	06:48 19:30	06:07 19:58	05:44 20:23	05:48 20:31	06:10 20:12	06:37 19:32	07:03 18:45	06:33 17:05	07:04 15:56-15:59/3 16:46
5	07:21 17:00	07:07 17:32	06:33 18:02	06:46 19:31	06:06 19:59	05:44 20:23	05:48 20:31	06:11 20:11	06:38 19:30	07:04 18:44	06:34 17:03	07:05 15:57-15:58/1 16:46
6	07:21 17:01	07:06 17:33	06:31 18:03	06:45 19:32	06:05 19:59	05:44 20:24	05:49 20:31	06:12 20:10	06:39 19:29	07:04 18:42	06:35 17:02	07:06 16:46
7	07:21 16:12-16:13/1 17:02	07:05 17:35	06:30 18:04	06:43 19:33	06:04 20:00	05:44 20:25	05:50 20:30	06:13 20:09	06:39 19:27	07:05 18:41	06:36 17:02	07:07 16:46
8	07:21 16:12-16:15/3 17:03	07:04 17:36	06:28 18:05	06:42 19:34	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:08	06:40 19:25	07:06 18:39	06:37 17:01	07:07 16:46
9	07:21 16:12-16:15/3 17:03	07:03 17:37	06:27 18:06	06:40 19:35	06:02 20:02	05:43 20:26	05:51 20:30	06:15 20:07	06:41 19:24	07:07 18:38	06:38 17:00	07:08 16:46
10	07:21 16:12-16:17/5 17:04	07:02 17:38	06:25 18:07	06:39 19:36	06:01 20:03	05:43 20:26	05:51 20:29	06:16 20:05	06:42 19:22	07:08 18:36	06:39 16:59	07:09 16:46
11	07:21 16:13-16:19/6 17:05	07:01 17:39	06:24 18:08	06:37 19:36	06:00 20:04	05:43 20:27	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:10 16:46
12	07:21 16:13-16:20/7 17:06	07:00 17:40	06:22 18:09	06:36 19:37	05:59 20:05	05:43 20:27	05:53 20:29	06:17 20:03	06:44 19:19	07:10 18:34	06:41 16:57	07:11 16:47
13	07:20 16:14-16:22/8 17:07	06:58 17:41	06:21 18:10	06:34 19:38	05:58 20:06	05:43 20:28	05:53 20:28	06:18 20:02	06:45 19:18	07:11 18:32	06:42 16:56	07:11 16:47
14	07:20 16:13-16:23/10 17:08 07:40-07:41/1	06:57 17:42	06:19 18:11	06:33 19:39	05:57 20:07	05:43 20:28	05:54 20:28	06:19 20:01	06:45 19:16	07:12 18:31	06:43 16:55	07:12 16:47
15	07:20 16:14-16:25/11 17:09 07:40-07:41/1	06:56 17:43	06:18 18:12	06:32 19:40	05:56 20:07	05:43 20:29	05:55 20:27	06:20 19:59	06:46 19:15	07:13 18:29	06:44 16:55	07:13 16:47
16	07:20 16:14-16:26/12 17:10 07:40-07:41/1	06:55 17:44	06:16 18:13	06:30 19:41	05:55 20:08	05:43 20:29	05:55 20:27	06:21 19:58	06:47 19:13	07:14 18:28	16:01-16:04/3 16:54	07:14 16:47
17	07:19 16:15-16:29/14 17:11 07:39-07:41/2	06:54 17:46	06:15 18:14	06:29 19:42	05:55 20:09	05:43 20:29	05:56 20:26	06:22 19:57	06:48 19:12	07:15 18:26	15:57-16:07/10 16:53	07:14 16:48
18	07:19 16:16-16:31/15 17:13 07:39-07:41/2	06:53 17:47	06:13 18:14	06:27 19:43	05:54 20:10	05:43 20:30	05:57 20:26	06:22 19:56	06:49 19:10	07:16 18:25	15:56-16:09/13 16:53	07:15 16:48
19	07:18 16:16-16:32/16 17:14 07:38-07:40/2	06:51 17:48	06:12 18:15	06:26 19:44	05:53 20:11	05:43 20:30	05:57 20:25	06:23 19:54	06:50 19:08	07:17 18:24	15:54-16:10/16 16:52	07:15 16:49
20	07:18 16:18-16:35/17 17:15 07:38-07:40/2	06:50 17:49	06:10 18:16	06:25 19:45	05:52 20:12	05:43 20:30	05:58 20:24	06:24 19:53	06:50 19:07	07:18 18:22	15:54-16:11/17 16:51	07:16 16:49
21	07:18 16:18-16:36/18 17:16 07:37-07:39/2	06:49 17:50	06:09 18:17	06:23 19:46	05:52 20:13	05:43 20:30	05:59 20:24	06:25 19:52	06:51 19:05	07:18 18:21	15:54-16:12/18 16:51	07:17 16:49
22	07:17 16:19-16:36/17 17:17 07:37-07:38/1	06:48 17:51	06:07 18:18	06:22 19:47	05:51 20:13	05:44 20:31	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	15:54-16:11/17 16:50	07:17 16:50
23	07:16 16:20-16:36/16 17:18 07:36-07:37/1	06:46 17:52	06:06 18:19	06:21 19:47	05:50 20:14	05:44 20:31	06:01 20:22	06:27 19:49	06:53 19:02	07:20 18:18	15:53-16:09/16 16:50	07:18 16:50
24	07:16 16:22-16:35/13 17:19	06:45 17:53	06:04 18:20	06:19 19:48	05:49 20:15	05:44 20:31	06:01 20:22	06:28 19:47	06:54 19:01	07:21 18:17	15:53-16:08/15 16:49	07:18 16:51
25	07:15 16:24-16:34/10 17:20	06:44 17:54	06:03 18:21	06:18 19:49	05:49 20:16	05:44 20:31	06:02 20:21	06:28 19:46	06:55 18:59	06:22 17:16	15:53-16:07/14 16:49	07:18 16:52
26	07:15 16:28-16:30/2 17:21	06:42 17:55	06:01 18:22	06:17 19:50	05:48 20:17	05:45 20:31	06:03 20:20	06:29 19:45	06:56 18:58	06:23 17:15	15:53-16:06/13 16:48	07:19 16:52
27	07:14 17:22	06:41 17:56	06:00 18:23	06:16 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56	06:24 17:14	15:53-16:04/11 16:48	07:19 16:53
28	07:13 17:23	06:40 17:57	05:58 18:24	06:14 19:52	05:47 20:18	05:45 20:31	06:05 20:18	06:31 19:42	06:57 18:54	06:26 17:12	15:54-16:03/9 16:48	07:20 16:53
29	07:13 17:25		06:57 19:25	06:13 19:53	05:47 20:19	05:46 20:31	06:05 20:18	06:32 19:40	06:58 18:53	06:27 17:11	15:54-16:02/8 16:47	07:20 16:54
30	07:12 17:26		06:55 19:26	06:12 19:54	05:46 20:19	05:46 20:31	06:06 20:17	06:33 19:39	06:59 18:51	06:28 17:10	15:54-16:02/8 16:47	07:20 16:55
31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:16	06:34 19:37		06:29 17:09		07:20 16:56
Potential sun hours	306	302	370	395	440	442	449	422	374	348	305	298
Sum of minutes with flicker	219	0	0	0	0	0	0	0	0	0	203	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	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: Caterina 1 - Shadow flickering WTG: SG 13 - Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (3)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 08:11-08:50/39 16:57	07:10 07:54-08:56/62 17:28	06:38 06:52 17:58	06:52 06:11 19:27	06:11 05:46 19:55	05:46 05:47 20:21	05:47 06:08 20:31	06:08 06:35 20:15	06:35 07:00 19:36	07:00 06:30 18:50	06:30 07:29-07:47/18 17:08	07:01 07:55-08:38/43 16:47
2	07:21 08:12-08:50/38 16:57	07:09 07:54-08:55/61 17:29	06:37 06:51 17:59	06:51 06:10 19:28	06:10 05:45 19:56	05:45 05:47 20:22	05:47 06:09 20:31	06:09 06:35 20:14	06:35 07:01 19:35	07:01 06:31 18:48	06:31 07:28-07:48/20 17:07	07:02 07:56-08:39/42 16:47
3	07:21 08:12-08:51/39 16:58	07:09 07:54-08:53/59 17:30	06:36 06:49 18:00	06:49 06:09 19:29	06:09 05:45 19:57	05:45 05:48 20:22	05:48 06:10 20:31	06:10 06:36 20:13	06:36 07:02 19:33	07:02 06:32 18:47	06:32 07:27-07:50/23 17:06	07:03 07:56-08:38/42 16:47
4	07:21 08:12-08:51/39 16:59	07:08 08:29-08:52/23 17:31	06:34 06:48 18:01	06:48 06:07 19:30	06:07 05:44 19:58	05:44 05:48 20:23	05:48 06:11 20:31	06:11 06:37 20:12	06:37 07:03 19:32	07:03 06:33 18:45	06:33 07:26-07:52/26 17:05	07:04 07:57-08:38/41 16:46
5	07:21 08:12-08:52/40 17:00	07:07 08:31-08:50/19 17:32	06:33 06:46 18:02	06:46 06:06 19:31	06:06 05:44 19:59	05:44 05:49 20:24	05:49 06:11 20:31	06:11 06:38 20:11	06:38 07:04 19:30	07:04 06:34 18:44	06:34 08:03-08:18/15 17:04	07:05 07:58-08:39/41 16:46
6	07:21 08:12-08:53/41 17:01	07:06 08:34-08:47/13 17:34	06:31 06:45 18:03	06:45 06:05 19:32	06:05 05:44 19:59	05:44 05:49 20:24	05:49 06:12 20:31	06:12 06:39 20:10	06:39 07:05 19:29	07:05 06:35 18:42	06:35 08:01-08:20/19 17:03	07:06 07:58-08:39/41 16:46
7	07:21 08:13-08:53/40 17:02	07:05 07:57-08:23/26 17:35	06:30 06:43 18:04	06:43 06:04 19:33	06:04 05:44 20:00	05:44 05:50 20:25	05:50 06:13 20:30	06:13 06:40 20:09	06:40 07:05 19:27	07:05 06:36 18:41	06:36 07:59-08:23/24 17:02	07:07 07:59-08:39/40 16:46
8	07:21 08:13-08:54/41 17:03	07:04 07:58-08:21/23 17:36	06:28 06:42 18:05	06:42 06:03 19:34	06:03 05:43 20:01	05:43 05:50 20:25	05:50 06:14 20:30	06:14 06:40 20:08	06:40 07:06 19:26	07:06 06:37 18:39	06:37 07:25-08:24/59 17:01	07:07 08:00-08:39/39 16:46
9	07:21 08:13-08:55/42 17:04	07:03 07:59-08:19/20 17:37	06:27 06:40 18:06	06:40 06:02 19:35	06:02 05:43 20:02	05:43 05:51 20:26	05:51 06:15 20:30	06:15 06:41 20:07	06:41 07:07 19:24	07:07 06:38 18:38	06:38 07:25-08:26/61 17:00	07:08 08:00-08:39/39 16:46
10	07:21 08:13-08:55/42 17:05	07:02 08:00-08:17/17 17:38	06:25 06:39 18:07	06:39 06:01 19:36	06:01 05:43 20:03	05:43 05:51 20:26	05:51 06:16 20:29	06:16 06:42 20:06	06:42 07:08 19:23	07:08 06:39 18:37	06:39 07:25-08:27/62 16:59	07:09 08:01-08:39/38 16:46
11	07:21 08:13-08:56/43 17:06	07:01 08:02-08:15/13 17:39	06:24 06:37 18:08	06:37 06:00 19:37	06:00 05:43 20:04	05:43 05:52 20:27	05:52 06:17 20:29	06:17 06:43 20:04	06:43 07:09 19:21	07:09 06:40 18:35	06:40 07:25-08:28/63 16:58	07:10 08:01-08:40/39 16:47
12	07:21 08:13-08:56/43 17:06	07:00 08:05-08:12/7 17:40	06:23 06:36 18:09	06:36 05:59 19:37	05:59 05:43 20:05	05:43 05:53 20:27	05:53 06:17 20:29	06:17 06:44 20:03	06:44 07:10 19:19	07:10 06:41 18:34	06:41 07:26-08:30/64 16:57	07:11 08:02-08:40/38 16:47
13	07:21 08:13-08:57/44 17:07	06:59 06:59 17:41	06:21 06:35 18:10	06:35 05:58 19:38	05:58 05:43 20:06	05:43 05:53 20:28	05:53 06:18 20:28	06:18 06:45 20:02	06:45 07:11 19:18	07:11 06:42 18:32	06:42 07:26-08:30/64 16:56	07:12 08:03-08:41/38 16:47
14	07:21 08:13-08:57/44 17:09	06:57 06:57 17:42	06:20 06:33 18:11	06:33 05:57 19:39	05:57 05:43 20:07	05:43 05:54 20:28	05:54 06:19 20:28	06:19 06:46 20:01	06:46 07:12 19:16	07:12 06:43 18:31	06:43 07:27-08:31/64 16:56	07:13 08:04-08:41/37 16:47
15	07:21 08:13-08:58/45 17:10	06:56 06:56 17:43	06:18 06:32 18:12	06:32 05:56 19:40	05:56 05:43 20:08	05:43 05:55 20:29	05:55 06:21 20:27	06:21 06:47 19:59	06:47 07:13 19:15	07:13 06:45 18:29	06:45 07:27-08:32/65 16:55	07:14 08:05-08:42/37 16:47
16	07:21 08:13-08:58/45 17:11	06:55 06:55 17:45	06:17 06:30 18:13	06:30 05:56 19:41	05:56 05:43 20:08	05:43 05:55 20:29	05:55 06:21 20:27	06:21 06:47 19:58	06:47 07:14 19:13	07:14 06:46 18:28	06:46 07:28-08:32/64 16:54	07:14 08:05-08:42/37 16:48
17	07:21 08:13-08:58/45 17:12	06:54 06:54 17:46	06:15 06:29 18:14	06:29 05:55 19:42	05:55 05:43 20:09	05:43 05:56 20:29	05:56 06:22 20:26	06:22 06:48 19:57	06:48 07:15 19:12	07:15 06:47 18:27	06:47 07:29-08:33/64 16:53	07:14 08:05-08:41/36 16:48
18	07:21 08:13-08:59/46 17:13	06:53 06:53 17:47	06:14 06:28 18:15	06:28 05:54 19:43	05:54 05:43 20:10	05:43 05:57 20:30	05:57 06:23 20:26	06:23 06:49 19:56	06:49 07:16 19:10	07:16 06:48 18:25	06:48 07:30-08:33/63 16:53	07:15 08:06-08:42/36 16:48
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23	07:21 08:13-08:59/46 17:18	06:46 06:46 17:52	06:06 06:21 18:19	06:21 05:50 19:48	05:50 05:44 20:14	05:44 06:01 20:31	06:01 06:27 20:23	06:27 06:53 19:49	06:53 07:21 19:02	07:21 06:53 18:19	06:53 07:34-08:36/62 16:50	07:18 08:08-08:44/36 16:51
24	07:21 08:13-08:59/46 17:19	06:45 06:45 17:53	06:04 06:20 18:20	06:20 05:50 19:48	05:50 05:44 20:15	05:44 06:01 20:31	06:01 06:28 20:22	06:28 06:54 19:48	06:54 07:22 19:01	07:22 06:54 18:17	06:54 07:35-08:36/61 16:49	07:18 08:09-08:45/36 16:51
25	07:21 08:13-08:59/46 17:20	06:44 06:44 17:54	06:03 06:18 18:21	06:18 05:49 19:49	05:49 05:44 20:16	05:44 06:02 20:31	06:02 06:29 20:21	06:29 06:55 19:46	06:55 07:23 18:59	07:23 06:55 17:16	06:55 07:36-08:36/60 16:49	07:19 08:09-08:45/36 16:52
26	07:21 08:13-08:59/46 17:21	06:42 06:42 17:55	06:01 06:17 18:22	06:17 05:48 19:50	05:48 05:45 20:17	05:45 06:03 20:31	06:03 06:29 20:20	06:29 06:56 19:45	06:56 07:24 18:58	07:24 06:56 17:15	06:56 07:37-08:37/60 16:49	07:19 08:09-08:45/36 16:52
27	07:21 08:13-08:59/46 17:22	06:41 06:41 17:56	06:00 06:16 18:23	06:16 05:48 19:51	05:48 05:45 20:17	05:45 06:04 20:31	06:04 06:30 20:19	06:30 06:57 19:43	06:57 07:25 18:56	07:25 06:57 17:14	06:57 07:38-08:37/59 16:48	07:19 08:10-08:46/36 16:53
28	07:21 08:13-08:59/46 17:23	06:40 06:40 17:57	05:58 06:14 18:24	06:14 05:47 19:52	05:47 05:45 20:18	05:45 06:05 20:31	06:05 06:31 20:19	06:31 06:57 19:42	06:57 07:26 18:55	07:26 06:58 17:12	06:58 07:40-08:37/57 16:48	07:20 08:10-08:47/37 16:54
29	07:21 08:13-08:59/46 17:24	06:39 06:39 17:58	05:57 06:13 18:25	06:13 05:47 19:53	05:47 05:46 20:19	05:46 06:05 20:31	06:05 06:32 20:18	06:32 06:58 19:40	06:58 07:27 18:53	07:27 06:59 17:11	06:59 07:41-08:37/56 16:47	07:20 08:10-08:47/37 16:54
30	07:21 08:13-08:59/46 17:25	06:38 06:38 17:59	05:56 06:12 18:26	06:12 05:46 19:54	05:46 05:46 20:20	05:46 06:06 20:31	06:06 06:33 20:17	06:33 06:59 19:39	06:59 07:28 18:52	07:28 06:59 17:10	06:59 07:43-08:37/54 16:47	07:20 08:11-08:49/38 16:55
31	07:21 08:13-08:59/46 17:26	06:37 06:37 17:59	05:55 06:11 18:27	06:11 05:46 19:54	05:46 05:46 20:20	05:46 06:07 20:31	06:07 06:34 20:16	06:34 06:59 19:38	06:59 07:29 18:52	07:29 06:59 17:09	06:59 07:44-08:37/54 16:47	07:20 08:11-08:49/38 16:56
Potential sun hours	306	302	370	395	440	442	449	422	374	349	305	298
Sum of minutes with flicker	1682	434	0	0	0	0	0	0	0	23	1647	1190

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

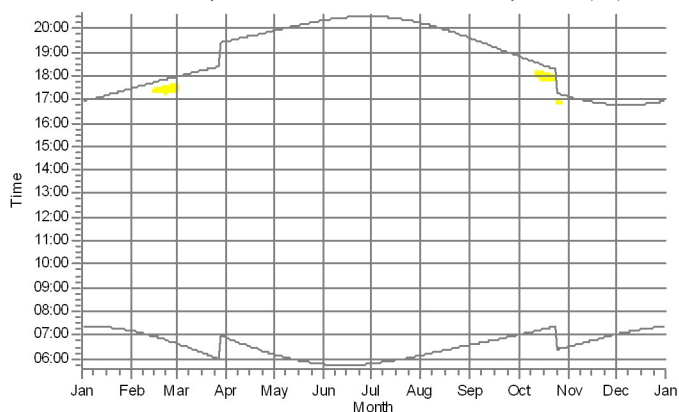
Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

ALLEGATO 2

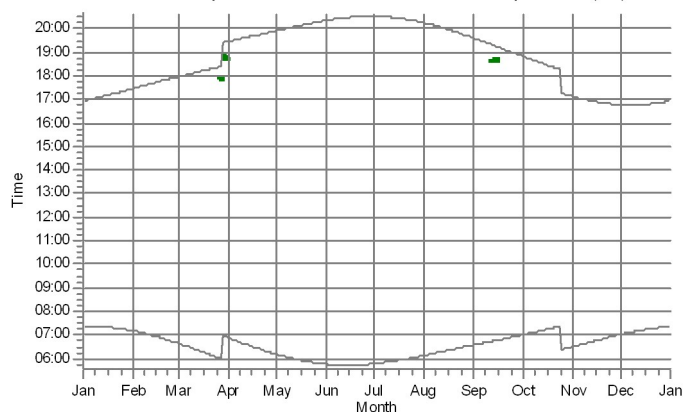
SHADOW - Calendar, graphical

Calculation: Caterina 1 - Shadow flickering

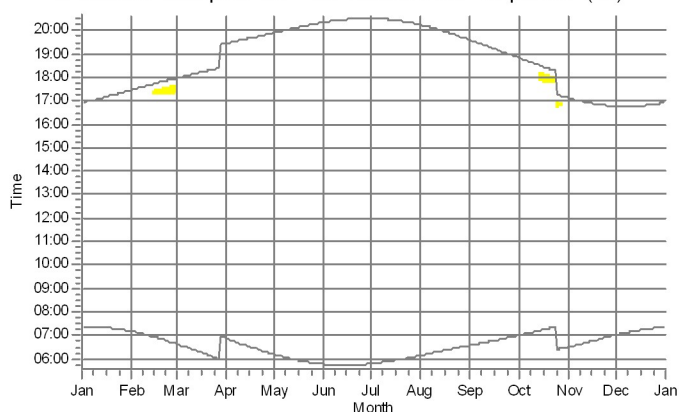
A: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (44)



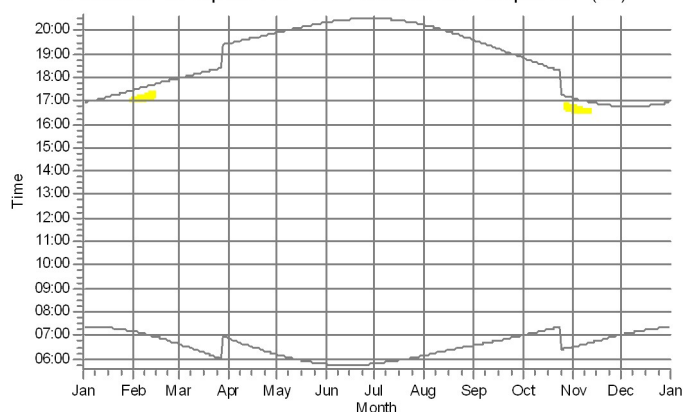
B: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (45)



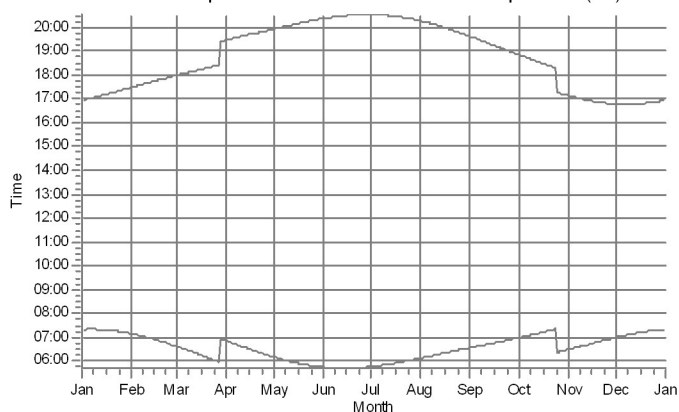
C: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (46)



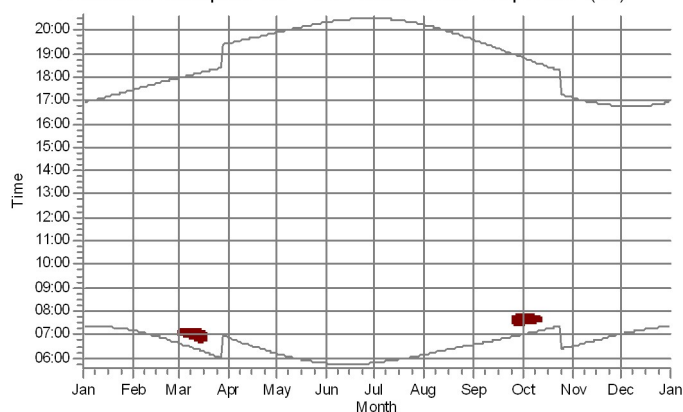
D: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (47)



E: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (48)



F: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (49)



WTGs

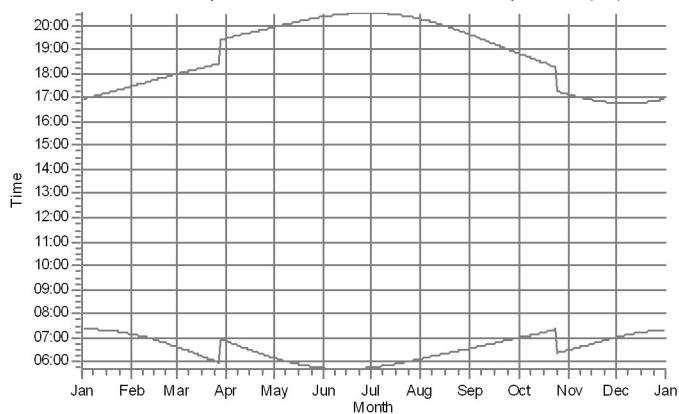
SG 01: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (13)
SG 02: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (12)

SG 08: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (2)

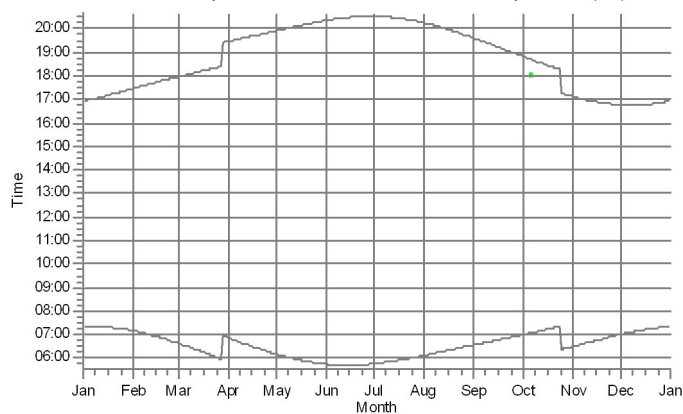
SHADOW - Calendar, graphical

Calculation: Caterina 1 - Shadow flickering

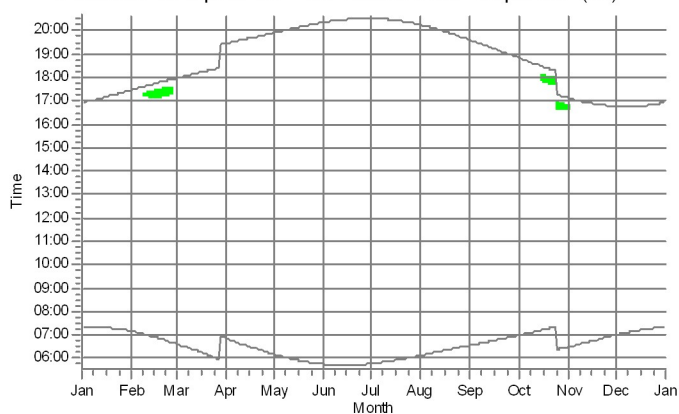
G: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (50)



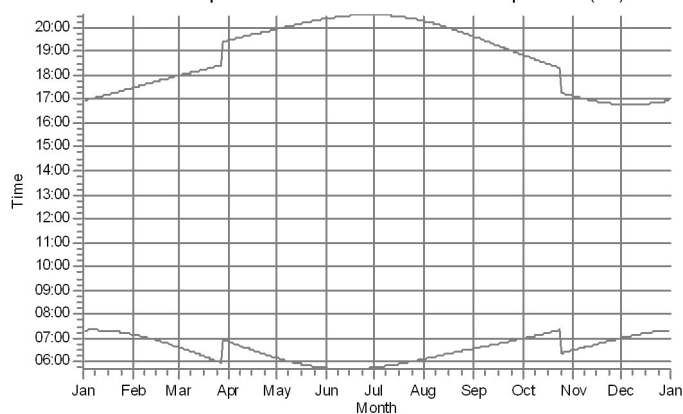
H: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (51)



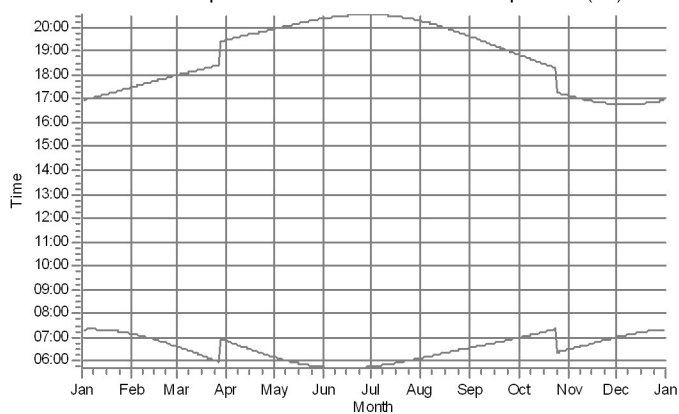
I: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (52)



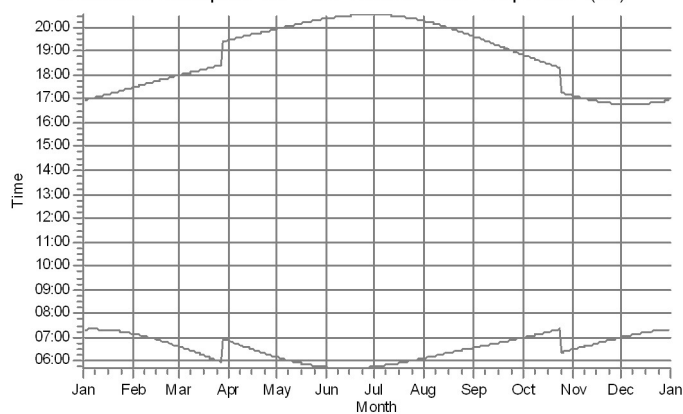
J: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (53)



K: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (54)



L: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (55)

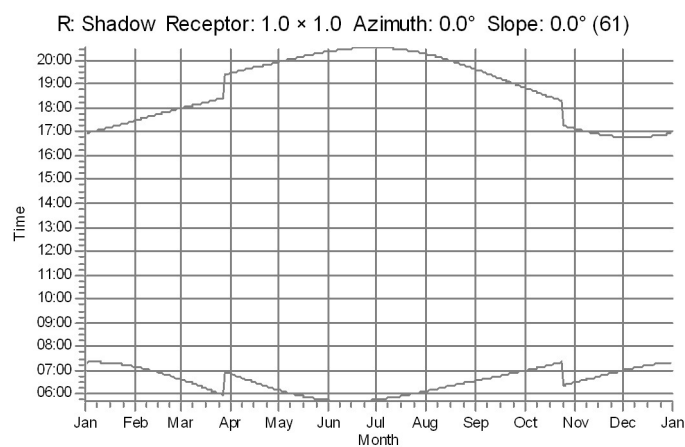
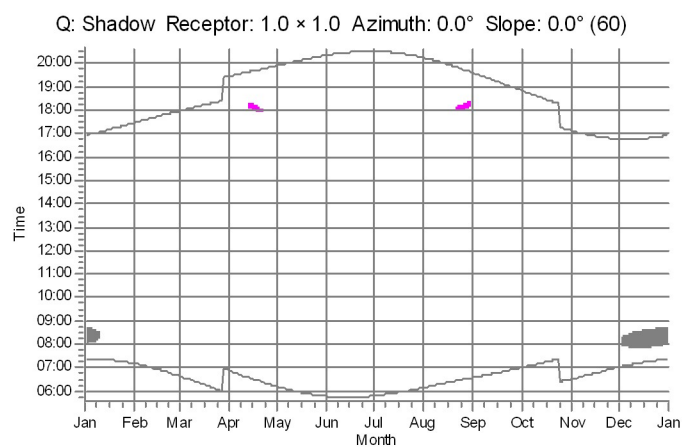
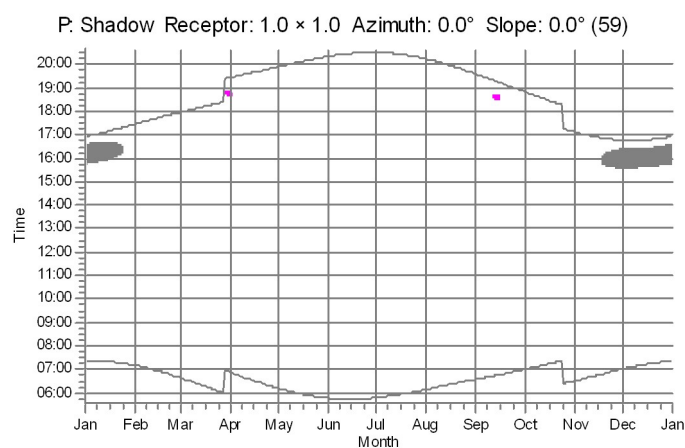
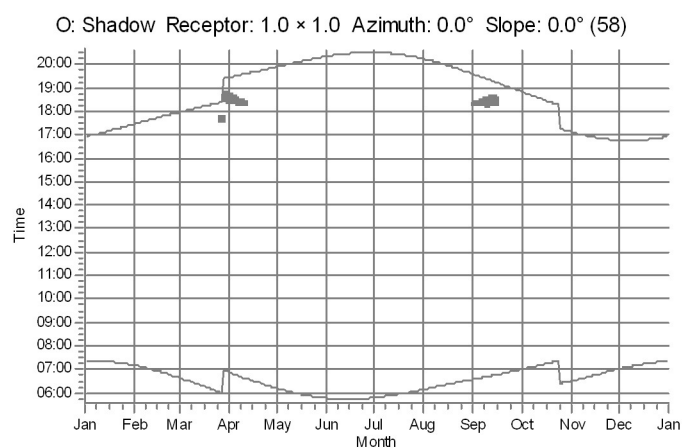
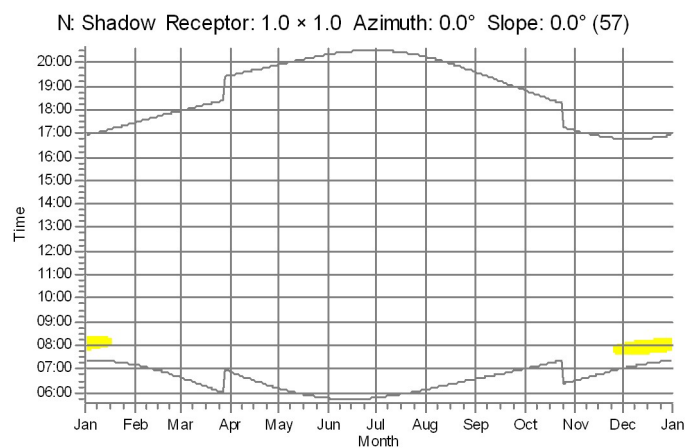
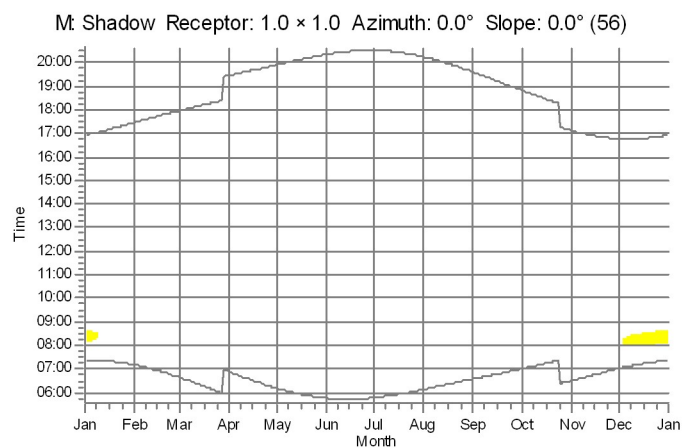


WTGs

SG 09: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (1)

SHADOW - Calendar, graphical

Calculation: Caterina 1 - Shadow flickering



WTGs

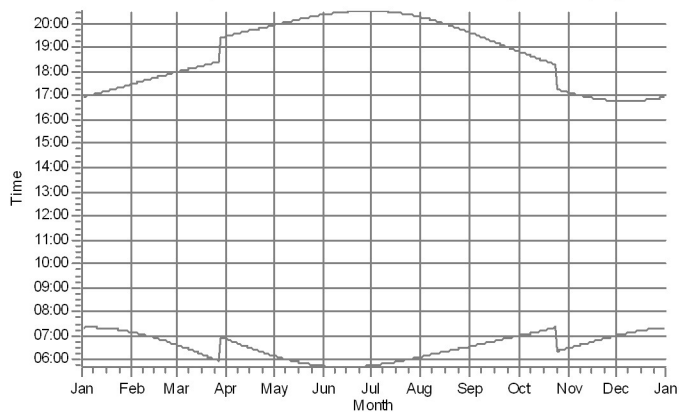
SG 02: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (12)
SG 04: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (10)

SG 05: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (9)

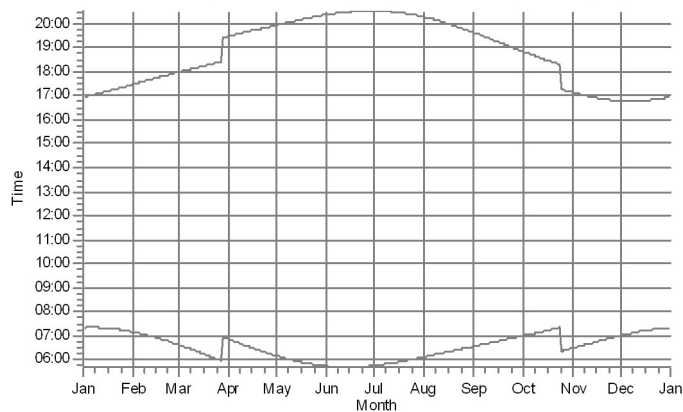
SHADOW - Calendar, graphical

Calculation: Caterina 1 - Shadow flickering

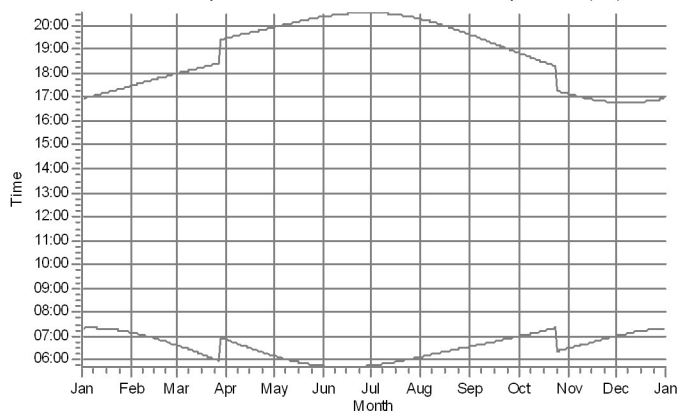
S: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (62)



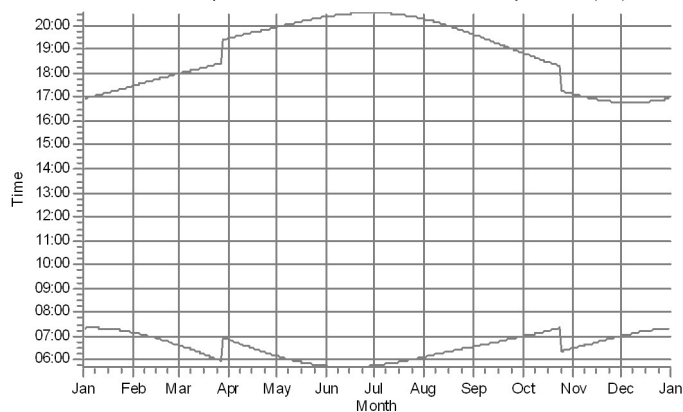
T: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (63)



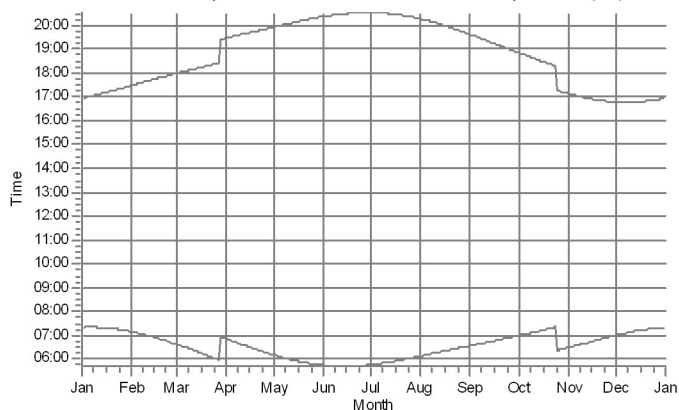
U: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (64)



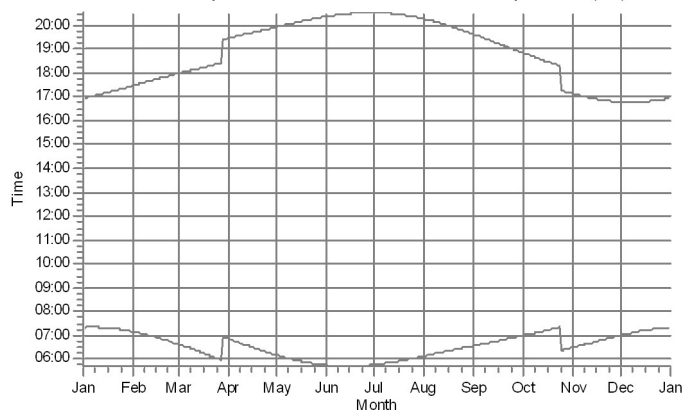
V: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (65)



W: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (66)



X: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (67)

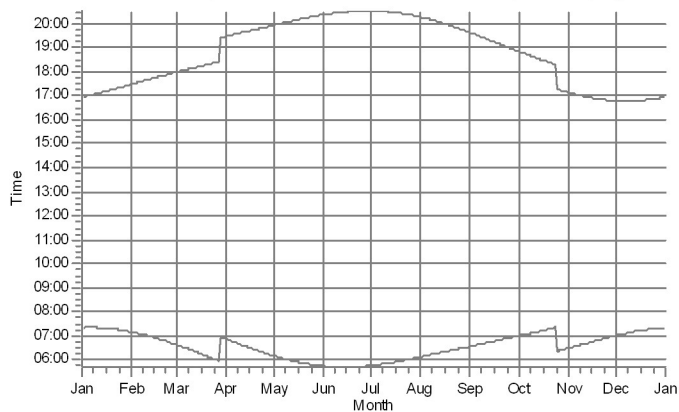


WTGs

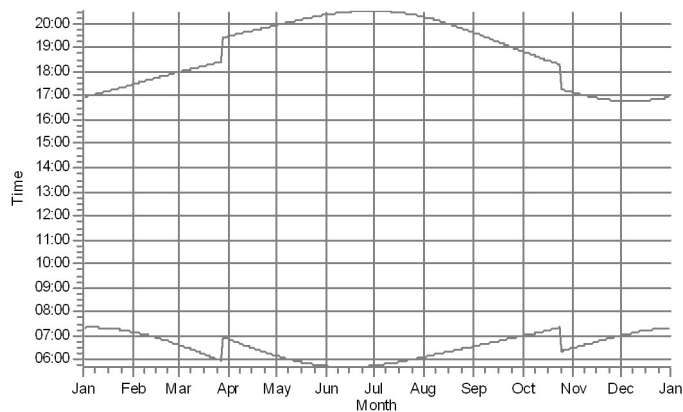
SHADOW - Calendar, graphical

Calculation: Caterina 1 - Shadow flickering

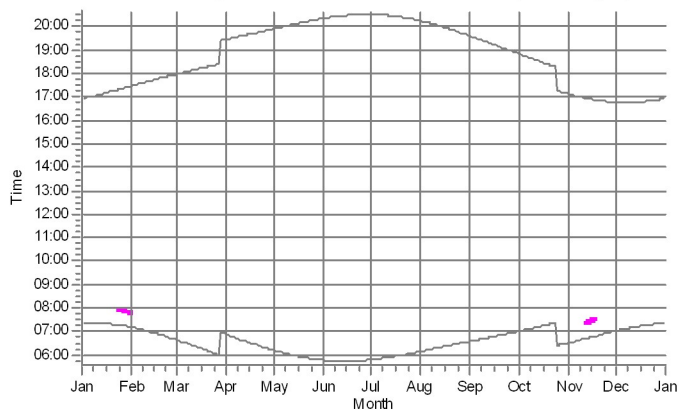
Y: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (68)



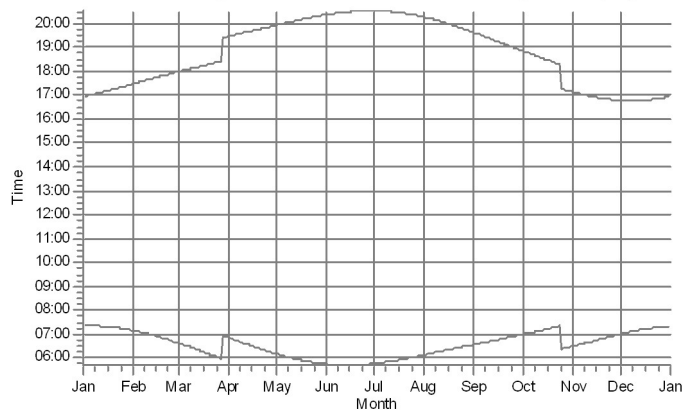
Z: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (69)



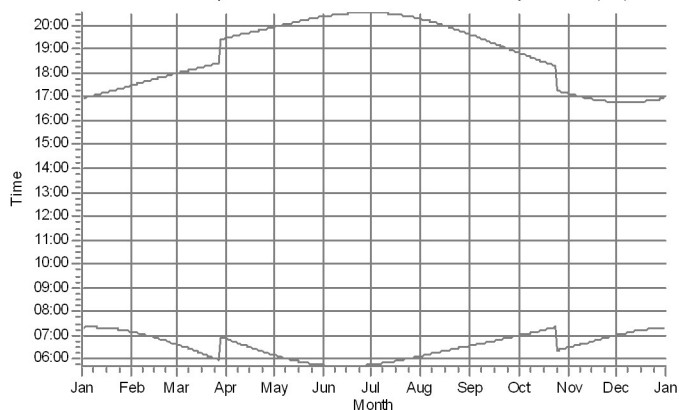
AA: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (70)



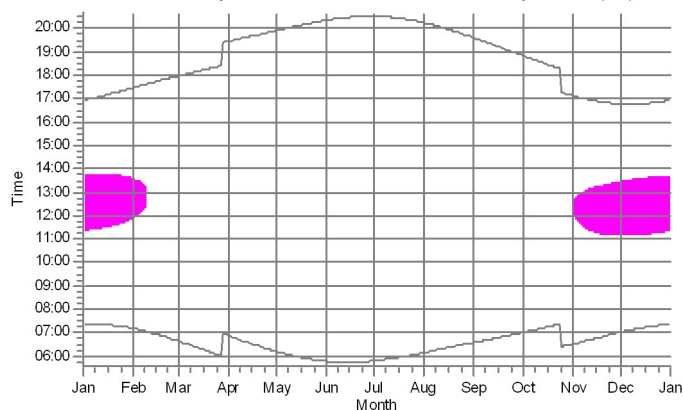
AB: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (71)



AC: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (72)



AD: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (73)



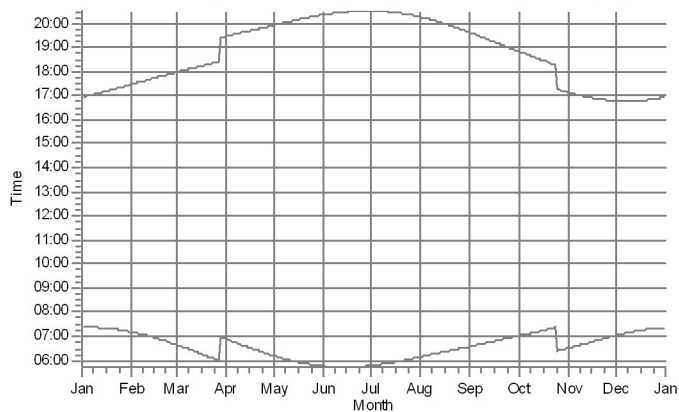
WTGs

SG 05: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (9)

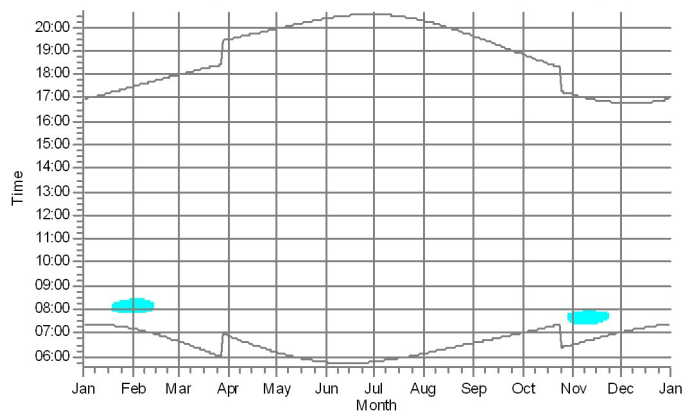
SHADOW - Calendar, graphical

Calculation: Caterina 1 - Shadow flickering

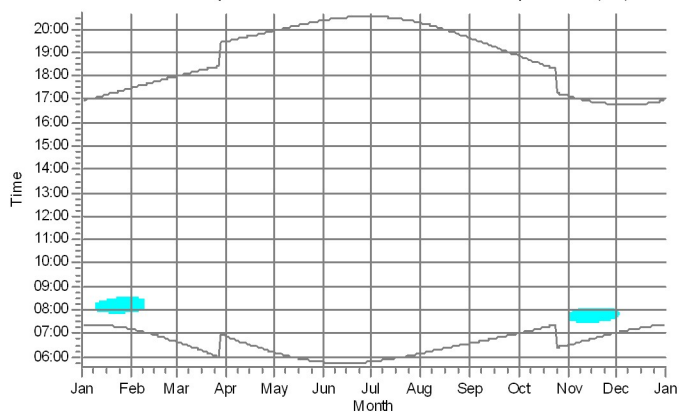
AE: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (74)



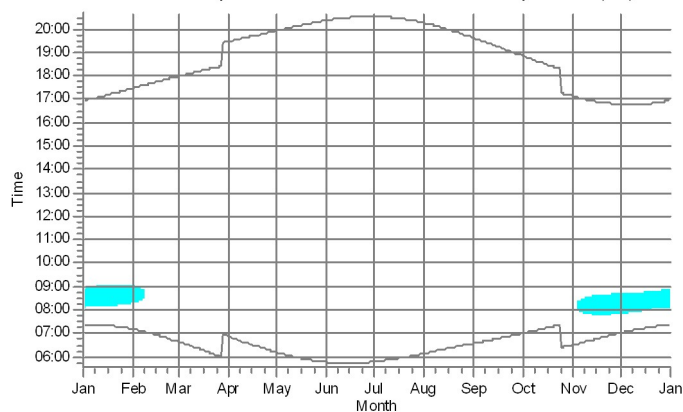
AF: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (75)



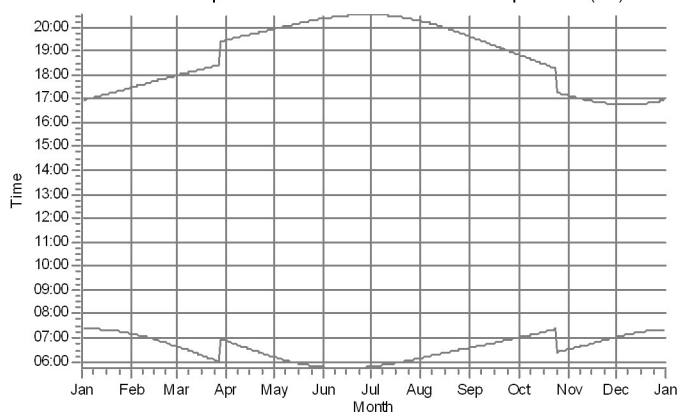
AG: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (76)



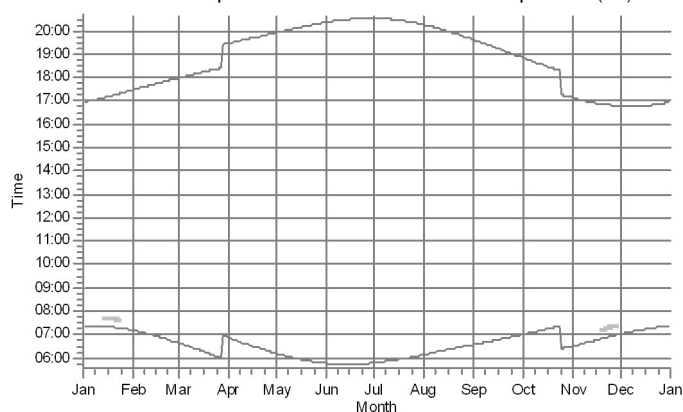
AH: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (77)



AI: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (78)



AJ: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (79)



WTGs

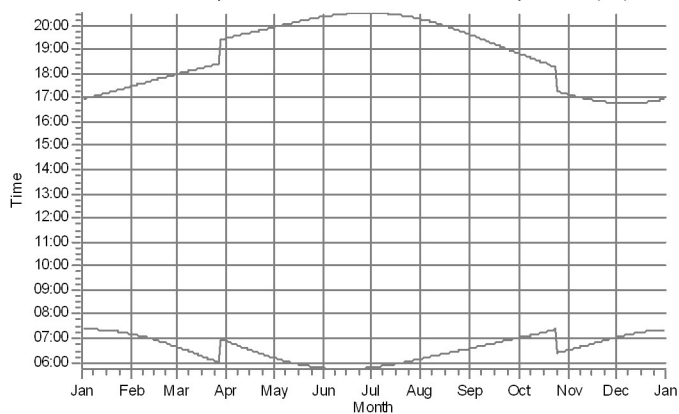
SG 12: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (6)

SG 13: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (3)

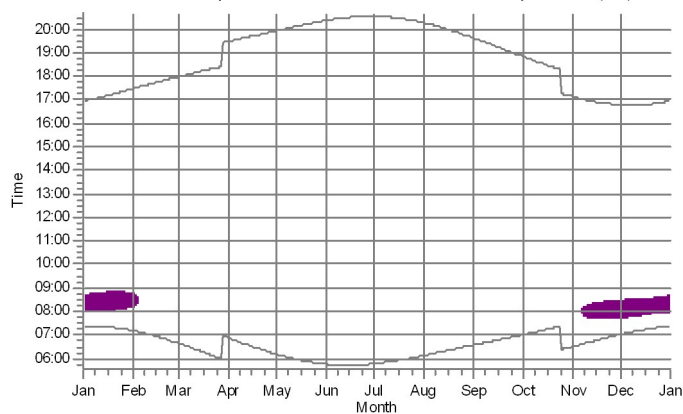
SHADOW - Calendar, graphical

Calculation: Caterina 1 - Shadow flickering

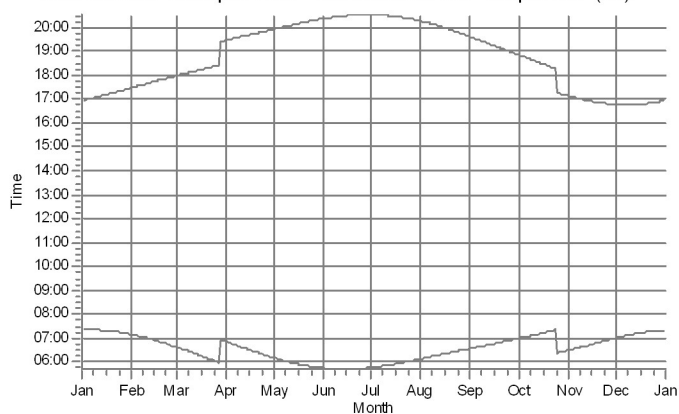
AK: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (80)



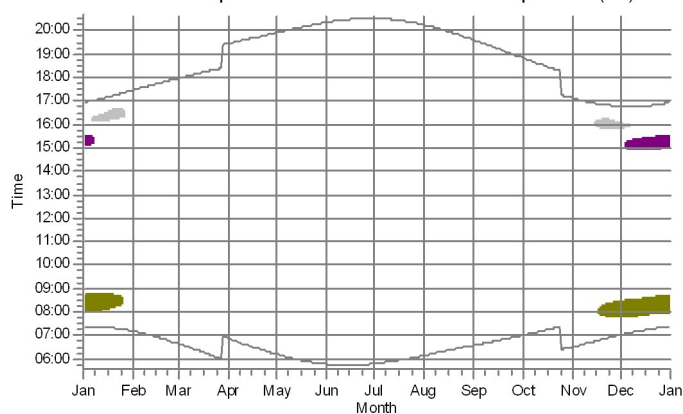
AL: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (81)



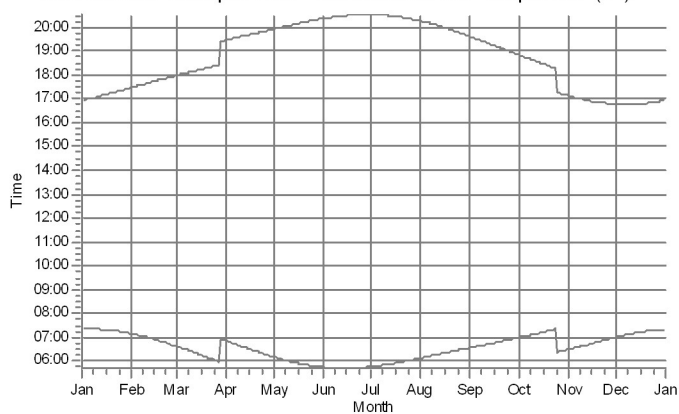
AM: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (82)



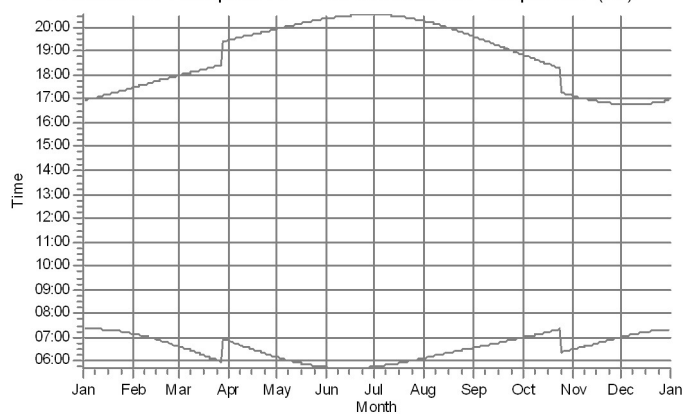
AN: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (83)



AO: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (84)



AP: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (85)



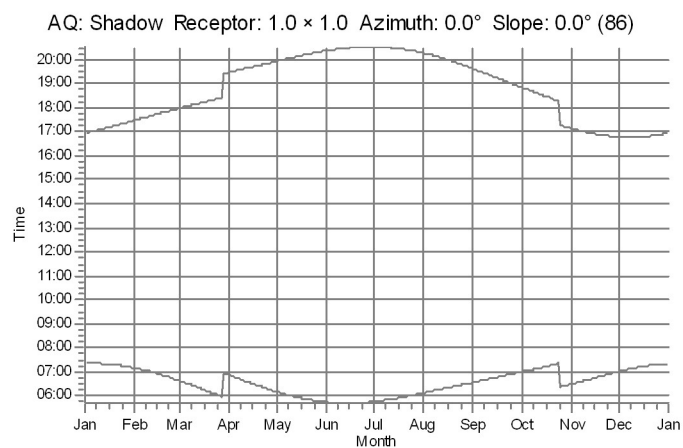
WTGs

- SG 10: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (4)
- SG 11: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (5)

- SG 12: Siemens Gamesa SG 6.6-170 6600 170.0 !O! hub: 155.0 m (TOT: 240.0 m) (6)

SHADOW - Calendar, graphical

Calculation: Caterina 1 - Shadow flickering



WTGs

ALLEGATO 3

SHADOW - Calendar

Calculation: Caterina 1 - Shadow flickering Shadow receptor: A - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (44)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:20 16:56	07:10 17:28	06:38 17:58	12 17:25 (SG 02) 17:37 (SG 02)	06:52 19:27	06:10 19:54	05:45 20:20	05:46 20:31	06:08 20:14	06:34 19:36	07:00 18:50	06:29 17:07	07:00 16:47	
2	07:20 16:57	07:09 17:29	06:36 17:59		06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:08 20:13	06:35 19:34	07:00 18:48	06:30 17:06	07:01 16:46	
3	07:20 16:58	07:08 17:30	06:35 18:00		06:49 19:29	06:08 19:56	05:44 20:22	05:47 20:30	06:09 20:12	06:36 19:33	07:01 18:47	06:31 17:05	07:02 16:46	
4	07:21 16:59	07:07 17:31	06:34 18:01		06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:11	06:37 19:31	07:02 18:45	06:32 17:04	07:03 16:46	
5	07:21 17:00	07:06 17:32	06:32 18:02		06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:38 19:30	07:03 18:43	06:33 17:03	07:04 16:46	
6	07:21 17:01	07:05 17:33	06:31 18:03		06:44 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42	06:34 17:02	07:05 16:46	
7	07:21 17:01	07:04 17:34	06:29 18:04		06:43 19:32	06:04 20:00	05:43 20:24	05:49 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:35 17:01	07:06 16:46	
8	07:21 17:02	07:03 17:35	06:28 18:05		06:41 19:33	06:03 20:01	05:43 20:25	05:50 20:29	06:14 20:07	06:40 19:25	07:06 18:39	06:37 17:00	07:07 16:46	
9	07:21 17:03	07:02 17:37	06:26 18:06		06:40 19:34	06:02 20:02	05:43 20:25	05:51 20:29	06:14 20:06	06:41 19:24	07:07 18:38	06:38 16:59	07:08 16:46	
10	07:20 17:04	07:01 17:38	06:25 18:07		06:38 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:59	07:08 16:46	
11	07:20 17:05	07:00 17:39	06:24 18:07		06:37 19:36	06:00 20:03	05:43 20:26	05:52 20:29	06:16 20:04	06:43 19:20	07:09 18:35	06:40 16:58	07:09 16:46	
12	07:20 17:06	06:59 17:40	06:22 18:08		06:36 19:37	05:59 20:04	05:43 20:27	05:52 20:28	06:17 20:03	06:43 19:19	07:09 18:33	18:01 (SG 02) 18:08 (SG 02)	06:41 16:57	07:10 16:46
13	07:20 17:07	06:58 17:41	06:21 18:09		06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:01	06:44 19:17	07:10 18:32	17:57 (SG 02) 18:10 (SG 02)	06:42 16:56	07:11 16:47
14	07:20 17:08	06:57 17:42	06:19 18:10		06:33 19:39	05:57 20:06	05:43 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:11 18:30	17:55 (SG 02) 18:09 (SG 02)	06:43 16:55	07:12 16:47
15	07:19 17:09	06:56 17:43	17:20 (SG 02) 18:11		06:31 19:40	05:56 20:07	05:43 20:28	05:54 20:27	06:20 19:59	06:46 19:14	07:12 18:29	17:53 (SG 02) 18:07 (SG 02)	06:44 16:54	07:12 16:47
16	07:19 17:10	06:55 17:44	17:20 (SG 02) 18:12		06:30 19:41	05:55 20:08	05:43 20:28	05:55 20:26	06:20 19:58	06:47 19:13	07:13 18:28	17:52 (SG 02) 18:06 (SG 02)	06:45 16:54	07:13 16:47
17	07:19 17:11	06:53 17:45	17:19 (SG 02) 18:13		06:29 19:42	05:54 20:09	05:43 20:29	05:56 20:26	06:21 19:56	06:48 19:11	07:14 18:26	17:51 (SG 02) 18:05 (SG 02)	06:46 16:53	07:14 16:48
18	07:18 17:12	06:52 17:46	17:19 (SG 02) 18:13		06:27 19:42	05:54 20:10	05:43 20:29	05:57 20:25	06:22 19:55	06:48 19:10	07:15 18:25	17:50 (SG 02) 18:03 (SG 02)	06:47 16:52	07:14 16:48
19	07:18 17:13	06:51 17:47	17:18 (SG 02) 18:15		06:26 19:43	05:53 20:10	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:23	17:49 (SG 02) 18:02 (SG 02)	06:48 16:52	07:15 16:48
20	07:18 17:14	06:50 17:48	17:18 (SG 02) 18:16		06:24 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:52	06:50 19:07	07:17 18:22	17:49 (SG 02) 18:00 (SG 02)	06:49 16:51	07:15 16:49
21	07:17 17:16	06:48 17:49	17:18 (SG 02) 18:17		06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	17:49 (SG 02) 17:59 (SG 02)	06:50 16:51	07:16 16:49
22	07:17 17:17	06:47 17:51	17:17 (SG 02) 18:18		06:22 19:46	05:51 20:13	05:43 20:30	06:00 20:23	06:26 19:50	06:52 19:03	07:19 18:20	17:48 (SG 02) 17:58 (SG 02)	06:51 16:50	07:17 16:50
23	07:16 17:18	06:46 17:52	17:18 (SG 02) 18:19		06:20 19:47	05:50 20:14	05:44 20:30	06:00 20:22	06:26 19:48	06:53 19:02	07:20 18:18	17:48 (SG 02) 17:56 (SG 02)	06:52 16:50	07:17 16:50
24	07:15 17:19	06:45 17:53	17:19 (SG 02) 18:20		06:19 19:48	05:49 20:14	05:44 20:30	06:01 20:21	06:27 19:47	06:54 19:00	07:21 18:17	17:49 (SG 02) 17:55 (SG 02)	06:53 16:49	07:17 16:51
25	07:15 17:20	06:43 17:54	17:19 (SG 02) 18:21		06:18 19:49	05:49 20:15	05:44 20:30	06:02 20:20	06:28 19:46	06:54 18:59	06:22 17:16	16:49 (SG 02) 16:54 (SG 02)	06:54 16:49	07:18 16:51
26	07:14 17:21	06:42 17:55	17:20 (SG 02) 18:21		06:17 19:50	05:48 20:16	05:44 20:31	06:03 20:20	06:29 19:44	06:55 18:57	06:23 17:14	16:49 (SG 02) 16:52 (SG 02)	06:56 16:48	07:18 16:52
27	07:13 17:22	06:41 17:56	17:21 (SG 02) 18:22		06:15 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56	06:24 17:13	16:50 (SG 02) 16:51 (SG 02)	06:57 16:48	07:19 16:53
28	07:13 17:23	06:39 17:57	17:22 (SG 02) 18:23		06:14 19:52	05:47 20:17	05:45 20:31	06:04 20:18	06:31 19:41	06:57 18:54	06:25 17:12		06:58 16:47	07:19 16:53
29	07:12 17:24		06:56 19:24		06:13 19:53	05:47 20:18	05:46 20:31	06:05 20:17	06:32 19:40	06:58 18:53	06:26 17:11		06:59 16:47	07:19 16:54
30	07:11 17:25		06:55 19:25		06:12 19:53	05:46 20:19	05:46 20:31	06:06 20:16	06:32 19:39	06:59 18:51	06:27 17:10		06:59 16:47	07:20 16:55
31	07:11 17:27		06:53 19:26			05:46 20:20		06:07 20:15	06:33 19:37		06:28 17:09			07:20 16:55
Potential sun hours	306	302	370	12	395	440	442	449	422	374	349	305	298	
Total, worst case		138									156			

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: Caterina 1 - Shadow flickering Shadow receptor: B - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (45)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March		April		May	June	July	August	September		October	November	December
1	07:20	07:10	06:38		06:52	18:43 (SG 01)	06:10	05:45	05:46	06:08	06:34		07:00	06:29	07:00
	16:56	17:28	17:58		19:27	18:44 (SG 01)	19:54	20:20	20:31	20:14	19:36		18:50	17:07	16:47
2	07:20	07:09	06:36		06:50		06:09	05:45	05:47	06:08	06:35		07:00	06:30	07:01
	16:57	17:29	17:59		19:28		19:55	20:21	20:31	20:13	19:34		18:48	17:06	16:46
3	07:20	07:08	06:35		06:49		06:08	05:44	05:47	06:09	06:36		07:01	06:31	07:02
	16:58	17:30	18:00		19:29		19:56	20:22	20:30	20:12	19:33		18:46	17:05	16:46
4	07:21	07:07	06:34		06:47		06:07	05:44	05:48	06:10	06:37		07:02	06:32	07:03
	16:59	17:31	18:01		19:30		19:57	20:22	20:30	20:11	19:31		18:45	17:04	16:46
5	07:21	07:06	06:32		06:46		06:06	05:44	05:48	06:11	06:37		07:03	06:33	07:04
	17:00	17:32	18:02		19:31		19:58	20:23	20:30	20:10	19:30		18:43	17:03	16:46
6	07:21	07:05	06:31		06:44		06:05	05:44	05:49	06:12	06:38		07:04	06:34	07:05
	17:01	17:33	18:03		19:31		19:59	20:23	20:30	20:09	19:28		18:42	17:02	16:46
7	07:21	07:04	06:29		06:43		06:04	05:43	05:49	06:13	06:39		07:05	06:35	07:06
	17:01	17:34	18:04		19:32		20:00	20:24	20:30	20:08	19:27		18:40	17:01	16:46
8	07:21	07:03	06:28		06:41		06:03	05:43	05:50	06:14	06:40		07:06	06:36	07:07
	17:02	17:35	18:05		19:33		20:01	20:25	20:29	20:07	19:25		18:39	17:00	16:46
9	07:21	07:02	06:26		06:40		06:02	05:43	05:51	06:14	06:41		07:07	06:38	07:08
	17:03	17:37	18:06		19:34		20:02	20:25	20:29	20:06	19:24		18:38	16:59	16:46
10	07:20	07:01	06:25		06:38		06:01	05:43	05:51	06:15	06:42		07:08	06:39	07:08
	17:04	17:38	18:06		19:35		20:02	20:26	20:29	20:05	19:22		18:36	16:58	16:46
11	07:20	07:00	06:23		06:37		06:00	05:43	05:52	06:16	06:43	18:36 (SG 01)	07:09	06:40	07:09
	17:05	17:39	18:07		19:36		20:03	20:26	20:28	20:04	19:20	18:37 (SG 01)	18:35	16:58	16:46
12	07:20	06:59	06:22		06:36		05:59	05:43	05:52	06:17	06:43	18:36 (SG 01)	07:09	06:41	07:10
	17:06	17:40	18:08		19:37		20:04	20:27	20:28	20:02	19:19	18:39 (SG 01)	18:33	16:57	16:46
13	07:20	06:58	06:21		06:34		05:58	05:43	05:53	06:18	06:44	18:36 (SG 01)	07:10	06:42	07:11
	17:07	17:41	18:09		19:38		20:05	20:27	20:28	20:01	19:17	18:40 (SG 01)	18:32	16:56	16:47
14	07:20	06:57	06:19		06:33		05:57	05:43	05:54	06:19	06:45	18:37 (SG 01)	07:11	06:43	07:11
	17:08	17:42	18:10		19:39		20:06	20:27	20:27	20:00	19:16	18:42 (SG 01)	18:30	16:55	16:47
15	07:19	06:56	06:18		06:31		05:56	05:43	05:54	06:20	06:46	18:39 (SG 01)	07:12	06:44	07:12
	17:09	17:43	18:11		19:40		20:07	20:28	20:27	19:59	19:14	18:43 (SG 01)	18:29	16:54	16:47
16	07:19	06:55	06:16		06:30		05:55	05:43	05:55	06:20	06:47	18:42 (SG 01)	07:13	06:45	07:13
	17:10	17:44	18:12		19:41		20:08	20:28	20:26	19:58	19:13	18:45 (SG 01)	18:28	16:54	16:47
17	07:19	06:53	06:15		06:29		05:54	05:43	05:56	06:21	06:48	18:45 (SG 01)	07:14	06:46	07:14
	17:11	17:45	18:13		19:41		20:09	20:29	20:26	19:56	19:11		18:26	16:53	16:48
18	07:18	06:52	06:13		06:27		05:54	05:43	05:57	06:22	06:48		07:15	06:47	07:14
	17:12	17:46	18:14		19:42		20:09	20:29	20:25	19:55	19:10		18:25	16:52	16:48
19	07:18	06:51	06:12		06:26		05:53	05:43	05:57	06:23	06:49		07:16	06:48	07:15
	17:13	17:47	18:15		19:43		20:10	20:29	20:25	19:54	19:08		18:23	16:52	16:48
20	07:17	06:50	06:10		06:24		05:52	05:43	05:58	06:24	06:50		07:17	06:49	07:15
	17:14	17:48	18:16		19:44		20:11	20:29	20:24	19:52	19:06		18:22	16:51	16:49
21	07:17	06:48	06:08		06:23		05:51	05:43	05:59	06:25	06:51		07:18	06:50	07:16
	17:16	17:49	18:17		19:45		20:12	20:30	20:23	19:51	19:05		18:21	16:51	16:49
22	07:16	06:47	06:07		06:22		05:51	05:43	06:00	06:26	06:52		07:19	06:51	07:16
	17:17	17:50	18:18		19:46		20:13	20:30	20:23	19:50	19:03		18:19	16:50	16:50
23	07:16	06:46	06:05		06:20		05:50	05:44	06:00	06:26	06:53		07:20	06:52	07:17
	17:18	17:52	18:19		19:47		20:14	20:30	20:22	19:48	19:02		18:18	16:49	16:50
24	07:15	06:45	06:04		06:19		05:49	05:44	06:01	06:27	06:53		07:21	06:53	07:17
	17:19	17:53	18:20		19:48		20:14	20:30	20:21	19:47	19:00		18:17	16:49	16:51
25	07:15	06:43	06:02		06:18		05:49	05:44	06:02	06:28	06:54		06:22	06:54	07:18
	17:20	17:54	18:21		19:49		20:15	20:30	20:20	19:46	18:59		17:16	16:49	16:51
26	07:14	06:42	06:01		06:17		05:48	05:44	06:03	06:29	06:55		06:23	06:55	07:18
	17:21	17:55	18:21		19:50		20:16	20:31	20:20	19:44	18:57		17:14	16:48	16:52
27	07:13	06:41	05:59	17:53 (SG 01)	06:15		05:48	05:45	06:04	06:30	06:56		06:24	06:56	07:19
	17:22	17:56	18:22	3	19:51		20:17	20:31	20:19	19:43	18:56		17:13	16:48	16:53
28	07:13	06:39	05:58	17:50 (SG 01)	06:14		05:47	05:45	06:04	06:31	06:57		06:25	06:57	07:19
	17:23	17:57	18:23	5	19:52		20:17	20:31	20:18	19:41	18:54		17:12	16:47	16:53
29	07:12		06:56	18:48 (SG 01)	06:13		05:47	05:46	06:05	06:32	06:58		06:26	06:58	07:19
	17:24		19:24	4	19:52		20:18	20:31	20:17	19:40	18:53		17:11	16:47	16:54
30	07:11		06:55	18:45 (SG 01)	06:12		05:46	05:46	06:06	06:32	06:59		06:27	06:59	07:20
	17:25		19:25	4	19:53		20:19	20:31	20:16	19:38	18:51		17:10	16:47	16:55
31	07:10		06:53	18:44 (SG 01)			05:46		06:07	06:33			06:28		07:20
	17:27		19:26	3	18:47 (SG 01)		20:20		20:15	19:37			17:09		16:55
Potential sun hours	306	302	370		395		440	442	449	422	374		349	305	298
Total, worst case			19			1					20				

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: Caterina 1 - Shadow flickering Shadow receptor: C - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (46)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

		January	February		March	April	May	June	July	August	September	October		November	December
1	07:20	07:10		06:38	06:52	06:10	05:45	05:46	06:08	06:34	07:00		06:29	07:00	
	16:56	17:28		17:58	19:27	19:54	20:20	20:31	20:14	19:36	18:50		17:07	16:47	
2	07:20	07:09		06:36	06:50	06:09	05:45	05:47	06:08	06:35	07:00		06:30	07:01	
	16:57	17:29		17:59	19:28	19:55	20:21	20:31	20:13	19:34	18:48		17:06	16:46	
3	07:20	07:08		06:35	06:49	06:08	05:44	05:47	06:09	06:36	07:01		06:31	07:02	
	16:58	17:30		18:00	19:29	19:56	20:22	20:30	20:12	19:33	18:47		17:05	16:46	
4	07:21	07:07		06:34	06:47	06:07	05:44	05:48	06:10	06:37	07:02		06:32	07:03	
	16:59	17:31		18:01	19:30	19:57	20:22	20:30	20:11	19:31	18:45		17:04	16:46	
5	07:21	07:06		06:32	06:46	06:06	05:44	05:48	06:11	06:38	07:03		06:33	07:04	
	17:00	17:32		18:02	19:31	19:58	20:23	20:30	20:10	19:30	18:43		17:03	16:46	
6	07:21	07:05		06:31	06:44	06:05	05:44	05:49	06:12	06:38	07:04		06:34	07:05	
	17:01	17:33		18:03	19:32	19:59	20:24	20:30	20:09	19:28	18:42		17:02	16:46	
7	07:21	07:04		06:29	06:43	06:04	05:43	05:49	06:13	06:39	07:05		06:35	07:06	
	17:01	17:34		18:04	19:32	20:00	20:24	20:30	20:08	19:27	18:41		17:01	16:46	
8	07:21	07:03		06:28	06:41	06:03	05:43	05:50	06:14	06:40	07:06		06:37	07:07	
	17:02	17:35		18:05	19:33	20:01	20:25	20:29	20:07	19:25	18:39		17:00	16:46	
9	07:21	07:02		06:26	06:40	06:02	05:43	05:51	06:14	06:41	07:07		06:38	07:08	
	17:03	17:37		18:06	19:34	20:02	20:25	20:29	20:06	19:24	18:38		16:59	16:46	
10	07:20	07:01		06:25	06:38	06:01	05:43	05:51	06:15	06:42	07:08		06:39	07:08	
	17:04	17:38		18:07	19:35	20:03	20:26	20:29	20:05	19:22	18:36		16:59	16:46	
11	07:20	07:00		06:24	06:37	06:00	05:43	05:52	06:16	06:43	07:09		06:40	07:09	
	17:05	17:39		18:07	19:36	20:03	20:26	20:29	20:04	19:20	18:35		16:58	16:46	
12	07:20	06:59		06:22	06:36	05:59	05:43	05:52	06:17	06:43	07:09		06:41	07:10	
	17:06	17:40		18:08	19:37	20:04	20:27	20:28	20:03	19:19	18:33		16:57	16:46	
13	07:20	06:58		06:21	06:34	05:58	05:43	05:53	06:18	06:44	07:10		06:42	07:11	
	17:07	17:41		18:09	19:38	20:05	20:27	20:28	20:01	19:17	18:32		16:56	16:47	
14	07:20	06:57		06:19	06:33	05:57	05:43	05:54	06:19	06:45	07:11	17:58 (SG 02)	06:43	07:12	
	17:08	17:42		18:10	19:39	20:06	20:28	20:27	20:00	19:16	18:30	11 18:09 (SG 02)	16:55	16:47	
15	07:19	06:56	3 17:19 (SG 02)	06:18	06:31	05:56	05:43	05:54	06:20	06:46	07:12	17:55 (SG 02)	06:44	07:12	
	17:09	17:43		18:11	19:40	20:07	20:28	20:27	19:59	19:14	18:29	12 18:07 (SG 02)	16:54	16:47	
16	07:19	06:55	17:19 (SG 02)	06:16	06:30	05:55	05:43	05:55	06:20	06:47	07:13	17:53 (SG 02)	06:45	07:13	
	17:10	17:44	4 17:23 (SG 02)	18:12	19:41	20:08	20:28	20:26	19:58	19:13	18:28	13 18:06 (SG 02)	16:54	16:47	
17	07:19	06:53	17:19 (SG 02)	06:15	06:29	05:54	05:43	05:56	06:21	06:48	07:14	17:52 (SG 02)	06:46	07:14	
	17:11	17:45	5 17:24 (SG 02)	18:13	19:42	20:09	20:29	20:26	19:56	19:11	18:26	13 18:05 (SG 02)	16:53	16:48	
18	07:18	06:52	17:18 (SG 02)	06:13	06:27	05:54	05:43	05:57	06:22	06:48	07:15	17:51 (SG 02)	06:47	07:14	
	17:12	17:46	8 17:26 (SG 02)	18:14	19:42	20:10	20:29	20:25	19:55	19:10	18:25	12 18:03 (SG 02)	16:52	16:48	
19	07:18	06:51	17:18 (SG 02)	06:12	06:26	05:53	05:43	05:57	06:23	06:49	07:16	17:50 (SG 02)	06:48	07:15	
	17:13	17:47	8 17:26 (SG 02)	18:15	19:43	20:10	20:29	20:25	19:54	19:08	18:23	12 18:02 (SG 02)	16:52	16:48	
20	07:18	06:50	17:18 (SG 02)	06:10	06:24	05:52	05:43	05:58	06:24	06:50	07:17	17:49 (SG 02)	06:49	07:15	
	17:14	17:48	9 17:27 (SG 02)	18:16	19:44	20:11	20:30	20:24	19:52	19:07	18:22	11 18:00 (SG 02)	16:51	16:49	
21	07:17	06:48	17:18 (SG 02)	06:09	06:23	05:51	05:43	05:59	06:25	06:51	07:18	17:49 (SG 02)	06:50	07:16	
	17:16	17:49	11 17:29 (SG 02)	18:17	19:45	20:12	20:30	20:23	19:51	19:05	18:21	10 17:59 (SG 02)	16:51	16:49	
22	07:17	06:47	17:18 (SG 02)	06:07	06:22	05:51	05:43	06:00	06:26	06:52	07:19	17:48 (SG 02)	06:51	07:17	
	17:17	17:51	11 17:29 (SG 02)	18:18	19:46	20:13	20:30	20:23	19:50	19:03	18:20	10 17:58 (SG 02)	16:50	16:50	
23	07:16	06:46	17:18 (SG 02)	06:05	06:20	05:50	05:44	06:00	06:26	06:53	07:20	17:48 (SG 02)	06:52	07:17	
	17:18	17:52	13 17:31 (SG 02)	18:19	19:47	20:14	20:30	20:22	19:48	19:02	18:18	8 17:56 (SG 02)	16:50	16:50	
24	07:15	06:45	17:19 (SG 02)	06:04	06:19	05:49	05:44	06:01	06:27	06:54	07:21	17:48 (SG 02)	06:53	07:17	
	17:19	17:53	13 17:32 (SG 02)	18:20	19:48	20:14	20:30	20:21	19:47	19:00	18:17	7 17:55 (SG 02)	16:49	16:51	
25	07:15	06:43	17:20 (SG 02)	06:02	06:18	05:49	05:44	06:02	06:28	06:54	07:22	16:48 (SG 02)	06:54	07:18	
	17:20	17:54	12 17:32 (SG 02)	18:21	19:49	20:15	20:30	20:20	19:46	18:59	17:16	6 16:54 (SG 02)	16:49	16:51	
26	07:14	06:42	17:21 (SG 02)	06:01	06:17	05:48	05:44	06:03	06:29	06:55	07:23	16:49 (SG 02)	06:56	07:18	
	17:21	17:55	13 17:34 (SG 02)	18:21	19:50	20:16	20:31	20:20	19:44	18:57	17:14	3 16:52 (SG 02)	16:48	16:52	
27	07:13	06:41	17:23 (SG 02)	05:59	06:15	05:48	05:45	06:04	06:30	06:56	07:24	16:49 (SG 02)	06:57	07:19	
	17:22	17:56	12 17:35 (SG 02)	18:22	19:51	20:17	20:31	20:19	19:43	18:56	17:13	2 16:51 (SG 02)	16:48	16:53	
28	07:13	06:39	17:26 (SG 02)	05:58	06:14	05:47	05:45	06:04	06:31	06:57	07:25		06:58	07:19	
	17:23	17:57	8 17:34 (SG 02)	18:23	19:52	20:17	20:31	20:18	19:41	18:54	17:12		16:47	16:53	
29	07:12			06:56	06:13	05:47	05:46	06:05	06:32	06:58	07:26		06:59	07:19	
	17:24			19:24	19:53	20:18	20:31	20:17	19:40	18:53	17:11		16:47	16:54	
30	07:11			06:55	06:12	05:46	05:46	06:06	06:32	06:59	07:27		06:59	07:20	
	17:25			19:25	19:53	20:19	20:31	20:16	19:38	18:51	17:10		16:47	16:55	
31	07:11			06:53		05:46		06:07	06:33		07:28			07:20	
	17:27			19:26		20:20		20:15	19:37		17:09			16:55	
Potential sun hours	306	302		370	395	440	442	449	422	374	349		305	298	
Total, worst case			130									130			

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: Caterina 1 - Shadow flickering Shadow receptor: D - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (47)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:28	17:02 (SG 02) 06:38 17:05 (SG 02) 17:58	06:52 19:27	06:10 19:54	05:45 20:20	05:46 20:31	06:08 20:14	06:34 19:36	07:00 18:50	06:29 17:07	16:34 (SG 02) 07:00 16:45 (SG 02) 16:47
2	07:20 16:57	07:09 17:29	17:02 (SG 02) 06:36 17:06 (SG 02) 17:59	06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:08 20:13	06:35 19:34	07:00 18:48	06:30 17:06	16:34 (SG 02) 07:01 16:44 (SG 02) 16:46
3	07:20 16:58	07:08 17:30	17:02 (SG 02) 06:35 17:08 (SG 02) 18:00	06:49 19:29	06:08 19:56	05:44 20:22	05:47 20:30	06:09 20:12	06:36 19:33	07:01 18:47	06:31 17:05	16:33 (SG 02) 07:02 16:43 (SG 02) 16:46
4	07:21 16:59	07:07 17:31	17:02 (SG 02) 06:34 17:09 (SG 02) 18:01	06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:11	06:37 19:31	07:02 18:45	06:32 17:04	16:32 (SG 02) 07:03 16:42 (SG 02) 16:46
5	07:21 17:00	07:06 17:32	17:02 (SG 02) 06:32 17:10 (SG 02) 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:38 19:30	07:03 18:43	06:33 17:03	16:32 (SG 02) 07:04 16:41 (SG 02) 16:46
6	07:21 17:01	07:05 17:33	17:02 (SG 02) 06:31 17:11 (SG 02) 18:03	06:44 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42	06:34 17:02	16:32 (SG 02) 07:05 16:40 (SG 02) 16:46
7	07:21 17:01	07:04 17:34	17:03 (SG 02) 06:29 17:12 (SG 02) 18:04	06:43 19:32	06:04 20:00	05:43 20:24	05:49 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:35 17:01	16:32 (SG 02) 07:06 16:38 (SG 02) 16:46
8	07:21 17:02	07:03 17:35	17:03 (SG 02) 06:28 17:13 (SG 02) 18:05	06:41 19:33	06:03 20:01	05:43 20:25	05:50 20:29	06:14 20:07	06:40 19:25	07:06 18:39	06:37 17:00	16:32 (SG 02) 07:07 16:37 (SG 02) 16:46
9	07:21 17:03	07:02 17:37	17:04 (SG 02) 06:26 17:15 (SG 02) 18:06	06:40 19:34	06:02 20:02	05:43 20:25	05:51 20:29	06:14 20:06	06:41 19:24	07:07 18:38	06:38 16:59	16:32 (SG 02) 07:08 16:36 (SG 02) 16:46
10	07:20 17:04	07:01 17:38	17:05 (SG 02) 06:25 17:16 (SG 02) 18:07	06:38 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:59	16:33 (SG 02) 07:08 16:36 (SG 02) 16:46
11	07:20 17:05	07:00 17:39	17:06 (SG 02) 06:24 17:17 (SG 02) 18:07	06:37 19:36	06:00 20:03	05:43 20:26	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58	16:33 (SG 02) 07:09 16:35 (SG 02) 16:46
12	07:20 17:06	06:59 17:40	17:08 (SG 02) 06:22 17:19 (SG 02) 18:08	06:36 19:37	05:59 20:04	05:43 20:27	05:52 20:28	06:17 20:03	06:43 19:19	07:09 18:33	06:41 16:57	16:33 (SG 02) 07:10 16:34 (SG 02) 16:46
13	07:20 17:07	06:58 17:41	17:09 (SG 02) 06:21 17:19 (SG 02) 18:09	06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:01	06:44 19:17	07:10 18:32	06:42 16:56	16:34 (SG 02) 07:11 16:47
14	07:20 17:08	06:57 17:42	17:12 (SG 02) 06:19 17:20 (SG 02) 18:10	06:33 19:39	05:57 20:06	05:43 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:11 18:30	06:43 16:55	16:47
15	07:19 17:09	06:56 17:43	06:18 18:11	06:31 19:40	05:56 20:07	05:43 20:28	05:54 20:27	06:20 19:59	06:46 19:14	07:12 18:29	16:55 16:54	16:47
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:43 20:28	05:55 20:26	06:20 19:58	06:47 19:13	07:13 18:28	16:54 16:46	16:47
17	07:19 17:11	06:53 17:45	06:15 18:13	06:29 19:42	05:54 20:09	05:43 20:29	05:56 20:26	06:21 19:56	06:48 19:11	07:14 18:26	16:46 16:53	16:47
18	07:18 17:12	06:52 17:46	06:13 18:14	06:27 19:42	05:54 20:10	05:43 20:29	05:57 20:25	06:22 19:55	06:48 19:10	07:15 18:25	16:47 16:52	16:48
19	07:18 17:13	06:51 17:47	06:12 18:15	06:26 19:43	05:53 20:10	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:23	16:48 16:52	16:48
20	07:18 17:14	06:50 17:48	06:10 18:16	06:24 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:52	06:50 19:07	07:17 18:22	16:49 16:51	16:48
21	07:17 17:16	06:48 17:49	06:09 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	16:50 16:51	16:49
22	07:17 17:17	06:47 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:43 20:30	06:00 20:23	06:26 19:50	06:52 19:03	07:19 18:20	16:51 16:50	16:49
23	07:16 17:18	06:46 17:52	06:05 18:19	06:20 19:47	05:50 20:14	05:44 20:30	06:00 20:22	06:26 19:48	06:53 19:02	07:20 18:18	16:52 16:50	16:49
24	07:15 17:19	06:45 17:53	06:04 18:20	06:19 19:48	05:49 20:14	05:44 20:30	06:01 20:21	06:27 19:47	06:54 19:00	07:21 18:17	16:53 16:49	16:48
25	07:15 17:20	06:43 17:54	06:02 18:21	06:18 19:49	05:48 20:15	05:44 20:30	06:02 20:20	06:28 19:46	06:54 18:59	07:22 17:16	16:54 16:49	16:48
26	07:14 17:21	06:42 17:55	06:01 18:21	06:17 19:50	05:48 20:16	05:44 20:31	06:03 20:20	06:29 19:44	06:55 18:57	07:23 17:14	16:55 16:48	16:48
27	07:13 17:22	06:41 17:56	05:59 18:22	06:15 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56	07:24 17:13	16:56 16:48	16:48
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52	05:47 20:17	05:45 20:31	06:04 20:18	06:31 19:41	06:57 18:54	07:25 17:12	16:57 16:48	16:48
29	07:12 17:24	06:36 17:58	05:56 18:24	06:13 19:53	05:47 20:18	05:46 20:31	06:05 20:17	06:32 19:40	06:58 18:53	07:26 17:11	16:58 16:48	16:48
30	07:11 17:25	06:34 17:59	05:55 18:25	06:12 19:53	05:46 20:19	05:46 20:31	06:06 20:16	06:32 19:39	06:59 18:51	07:27 17:10	16:59 16:47	16:48
31	07:11 17:27	06:33 18:01	05:53 18:26	06:11 19:54	05:45 20:20	05:45 20:31	06:07 20:15	06:33 19:37	06:58 18:49	07:28 17:09	16:55 16:46	16:48
Potential sun hours	306	302	370	395	440	442	449	422	374	349	305	298
Total, worst case	2	118								41	79	

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)

SHADOW - Calendar

Calculation: Caterina 1 - Shadow flickering Shadow receptor: E - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (48)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:54	05:45 20:20	05:46 20:31	06:08 20:14	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
2	07:20 16:57	07:09 17:29	06:37 17:59	06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:09 20:13	06:35 19:34	07:01 18:48	06:30 17:06	07:01 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:47 20:31	06:09 20:12	06:36 19:33	07:01 18:47	06:31 17:05	07:02 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:11	06:37 19:31	07:02 18:45	06:32 17:04	07:03 16:46
5	07:21 17:00	07:06 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:38 19:30	07:03 18:44	06:33 17:03	07:04 16:46
6	07:21 17:01	07:05 17:33	06:31 18:03	06:44 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42	06:34 17:02	07:05 16:46
7	07:21 17:02	07:04 17:34	06:29 18:04	06:43 19:32	06:04 20:00	05:43 20:24	05:50 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:36 17:01	07:06 16:46
8	07:21 17:02	07:03 17:36	06:28 18:05	06:42 19:33	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:07	06:40 19:25	07:06 18:39	06:37 17:00	07:07 16:46
9	07:21 17:03	07:02 17:37	06:27 18:06	06:40 19:34	06:02 20:02	05:43 20:25	05:51 20:29	06:15 20:06	06:41 19:24	07:07 18:38	06:38 17:00	07:08 16:46
10	07:21 17:04	07:01 17:38	06:25 18:07	06:39 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:59	07:09 16:46
11	07:20 17:05	07:00 17:39	06:24 18:08	06:37 19:36	06:00 20:03	05:43 20:26	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:09 16:46
12	07:20 17:06	06:59 17:40	06:22 18:09	06:36 19:37	05:59 20:04	05:43 20:27	05:53 20:28	06:17 20:03	06:43 19:19	07:10 18:33	06:41 16:57	07:10 16:46
13	07:20 17:07	06:58 17:41	06:21 18:09	06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:01	06:44 19:17	07:10 18:32	06:42 16:56	07:11 16:47
14	07:20 17:08	06:57 17:42	06:19 18:10	06:33 19:39	05:57 20:06	05:43 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:11 18:30	06:43 16:55	07:12 16:47
15	07:19 17:09	06:56 17:43	06:18 18:11	06:31 19:40	05:56 20:07	05:43 20:28	05:55 20:27	06:20 19:59	06:46 19:14	07:12 18:29	06:44 16:55	07:12 16:47
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:43 20:28	05:55 20:26	06:21 19:58	06:47 19:13	07:13 18:28	06:45 16:54	07:13 16:47
17	07:19 17:11	06:53 17:45	06:15 18:13	06:29 19:42	05:55 20:09	05:43 20:29	05:56 20:26	06:21 19:56	06:48 19:11	07:14 18:26	06:46 16:53	07:14 16:48
18	07:18 17:12	06:52 17:46	06:13 18:14	06:27 19:43	05:54 20:10	05:43 20:29	05:57 20:25	06:22 19:55	06:49 19:10	07:15 18:25	06:47 16:52	07:14 16:48
19	07:18 17:13	06:51 17:47	06:12 18:15	06:26 19:43	05:53 20:10	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:24	06:48 16:52	07:15 16:48
20	07:18 17:15	06:50 17:49	06:10 18:16	06:25 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:52	06:50 19:07	07:17 18:22	06:49 16:51	07:15 16:49
21	07:17 17:16	06:49 17:50	06:09 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	06:50 16:51	07:16 16:49
22	07:17 17:17	06:47 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:44 20:30	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	06:51 16:50	07:17 16:50
23	07:16 17:18	06:46 17:52	06:06 18:19	06:21 19:47	05:50 20:14	05:44 20:30	06:00 20:22	06:27 19:48	06:53 19:02	07:20 18:18	06:52 16:50	07:17 16:50
24	07:15 17:19	06:45 17:53	06:04 18:20	06:19 19:48	05:49 20:14	05:44 20:30	06:01 20:21	06:27 19:47	06:54 19:00	07:21 18:17	06:54 16:49	07:18 16:51
25	07:15 17:20	06:43 17:54	06:03 18:21	06:18 19:49	05:49 20:15	05:44 20:31	06:02 20:20	06:28 19:46	06:54 18:59	07:22 17:16	06:55 16:49	07:18 16:51
26	07:14 17:21	06:42 17:55	06:01 18:22	06:17 19:50	05:48 20:16	05:45 20:31	06:03 20:20	06:29 19:44	06:55 18:57	07:23 17:15	06:56 16:48	07:18 16:52
27	07:14 17:22	06:41 17:56	05:59 18:22	06:15 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56	07:24 17:13	06:57 16:48	07:19 16:53
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52	05:47 20:18	05:45 20:31	06:04 20:18	06:31 19:41	06:57 18:54	07:25 17:12	06:58 16:48	07:19 16:53
29	07:12 17:24		06:56 19:24	06:13 19:53	05:47 20:18	05:46 20:31	06:05 20:17	06:32 19:40	06:58 18:53	07:26 17:11	06:59 16:47	07:19 16:54
30	07:11 17:26		06:55 19:25	06:12 19:53	05:46 20:19	05:46 20:31	06:06 20:16	06:33 19:39	06:59 18:51	07:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:53 19:26		05:46 20:20		06:07 20:15	06:33 19:37		06:28 17:09		07:20 16:55
Potential sun hours	306	302	370	395	440	442	449	422	374	349	305	298
Total, worst case												

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: Caterina 1 - Shadow flickering Shadow receptor: F - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (49)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March		April	May	June	July	August	September		October		November	December	
1	07:20	07:10	06:38		07:01 (SG 08)	06:52	06:11	05:45	05:46	06:08	06:34		07:00	07:27 (SG 08)	06:29	07:01
	16:56	17:28	17:58	2	07:03 (SG 08)	19:27	19:54	20:20	20:31	20:14	19:36		18:50	22 07:49 (SG 08)	17:07	16:47
2	07:20	07:09	06:37		07:01 (SG 08)	06:50	06:09	05:45	05:47	06:08	06:35		07:01	07:28 (SG 08)	06:30	07:02
	16:57	17:29	17:59	5	07:06 (SG 08)	19:28	19:55	20:21	20:31	20:14	19:34		18:48	22 07:50 (SG 08)	17:06	16:46
3	07:21	07:08	06:35		06:59 (SG 08)	06:49	06:08	05:44	05:47	06:09	06:36		07:01	07:28 (SG 08)	06:31	07:02
	16:58	17:30	18:00	9	07:08 (SG 08)	19:29	19:56	20:22	20:31	20:13	19:33		18:47	20 07:48 (SG 08)	17:05	16:46
4	07:21	07:07	06:34		06:59 (SG 08)	06:47	06:07	05:44	05:48	06:10	06:37		07:02	07:29 (SG 08)	06:32	07:03
	16:59	17:31	18:01	10	07:09 (SG 08)	19:30	19:57	20:22	20:30	20:12	19:31		18:45	19 07:48 (SG 08)	17:04	16:46
5	07:21	07:06	06:32		06:57 (SG 08)	06:46	06:06	05:44	05:48	06:11	06:38		07:03	07:29 (SG 08)	06:33	07:04
	17:00	17:32	18:02	13	07:10 (SG 08)	19:31	19:58	20:23	20:30	20:10	19:30		18:44	19 07:48 (SG 08)	17:03	16:46
6	07:21	07:05	06:31		06:56 (SG 08)	06:44	06:05	05:44	05:49	06:12	06:38		07:04	07:30 (SG 08)	06:35	07:05
	17:01	17:33	18:03	15	07:11 (SG 08)	19:32	19:59	20:24	20:30	20:09	19:28		18:42	17 07:47 (SG 08)	17:02	16:46
7	07:21	07:04	06:29		06:54 (SG 08)	06:43	06:04	05:43	05:49	06:13	06:39		07:05	07:31 (SG 08)	06:36	07:06
	17:01	17:34	18:04	17	07:11 (SG 08)	19:32	20:00	20:24	20:30	20:08	19:27		18:41	16 07:47 (SG 08)	17:01	16:46
8	07:21	07:03	06:28		06:53 (SG 08)	06:41	06:03	05:43	05:50	06:14	06:40		07:06	07:32 (SG 08)	06:37	07:07
	17:02	17:35	18:05	18	07:11 (SG 08)	19:33	20:01	20:25	20:30	20:07	19:25		18:39	14 07:46 (SG 08)	17:00	16:46
9	07:21	07:02	06:27		06:52 (SG 08)	06:40	06:02	05:43	05:51	06:14	06:41		07:07	07:33 (SG 08)	06:38	07:08
	17:03	17:37	18:06	19	07:11 (SG 08)	19:34	20:02	20:25	20:29	20:06	19:24		18:38	12 07:45 (SG 08)	16:59	16:46
10	07:21	07:01	06:25		06:51 (SG 08)	06:39	06:01	05:43	05:51	06:15	06:42		07:08	07:33 (SG 08)	06:39	07:09
	17:04	17:38	18:07	20	07:11 (SG 08)	19:35	20:03	20:26	20:29	20:05	19:22		18:36	10 07:43 (SG 08)	16:59	16:46
11	07:20	07:00	06:24		06:49 (SG 08)	06:37	06:00	05:43	05:52	06:16	06:43		07:09	07:34 (SG 08)	06:40	07:09
	17:05	17:39	18:08	21	07:10 (SG 08)	19:36	20:04	20:26	20:29	20:04	19:21		18:35	7 07:41 (SG 08)	16:58	16:46
12	07:20	06:59	06:22		06:48 (SG 08)	06:36	05:59	05:43	05:52	06:17	06:43		07:10	07:34 (SG 08)	06:41	07:10
	17:06	17:40	18:09	22	07:10 (SG 08)	19:37	20:04	20:27	20:28	20:03	19:19		18:33	5 07:39 (SG 08)	16:57	16:46
13	07:20	06:58	06:21		06:46 (SG 08)	06:34	05:58	05:43	05:53	06:18	06:44		07:10		06:42	07:11
	17:07	17:41	18:09	23	07:09 (SG 08)	19:38	20:05	20:27	20:28	20:01	19:17		18:32		16:56	16:47
14	07:20	06:57	06:19		06:45 (SG 08)	06:33	05:57	05:43	05:54	06:19	06:45		07:11		06:43	07:12
	17:08	17:42	18:10	23	07:08 (SG 08)	19:39	20:06	20:28	20:27	20:00	19:16		18:30		16:55	16:47
15	07:20	06:56	06:18		06:43 (SG 08)	06:31	05:56	05:43	05:54	06:20	06:46		07:12		06:44	07:12
	17:09	17:43	18:11	24	07:07 (SG 08)	19:40	20:07	20:28	20:27	19:59	19:14		18:29		16:54	16:47
16	07:19	06:55	06:16		06:45 (SG 08)	06:30	05:55	05:43	05:55	06:20	06:47		07:13		06:45	07:13
	17:10	17:44	18:12	20	07:05 (SG 08)	19:41	20:08	20:28	20:26	19:58	19:13		18:28		16:54	16:47
17	07:19	06:53	06:15		06:46 (SG 08)	06:29	05:54	05:43	05:56	06:21	06:48		07:14		06:46	07:14
	17:11	17:45	18:13	17	07:03 (SG 08)	19:42	20:09	20:29	20:26	19:56	19:11		18:26		16:53	16:48
18	07:18	06:52	06:13		06:49 (SG 08)	06:27	05:54	05:43	05:57	06:22	06:48		07:15		06:47	07:14
	17:12	17:46	18:14	12	07:01 (SG 08)	19:43	20:10	20:29	20:25	19:55	19:10		18:25		16:52	16:48
19	07:18	06:51	06:12		06:26	05:53	05:43	05:57	06:23	06:49		07:16		06:48	07:15	
	17:13	17:47	18:15		19:43	20:10	20:29	20:25	19:54	19:08		18:23		16:52	16:48	
20	07:18	06:50	06:10		06:24	05:52	05:43	05:58	06:24	06:50		07:17		06:49	07:16	
	17:14	17:48	18:16		19:44	20:11	20:30	20:24	19:53	19:07		18:22		16:51	16:49	
21	07:17	06:49	06:09		06:23	05:51	05:43	05:59	06:25	06:51		07:18		06:50	07:16	
	17:16	17:50	18:17		19:45	20:12	20:30	20:23	19:51	19:05		18:21		16:51	16:49	
22	07:17	06:47	06:07		06:22	05:51	05:43	06:00	06:26	06:52		07:19		06:51	07:17	
	17:17	17:51	18:18		19:46	20:13	20:30	20:23	19:50	19:03		18:20		16:50	16:50	
23	07:16	06:46	06:06		06:20	05:50	05:44	06:00	06:26	06:53		07:20		06:53	07:17	
	17:18	17:52	18:19		19:47	20:14	20:30	20:22	19:48	19:02		18:18		16:50	16:50	
24	07:16	06:45	06:04		06:19	05:49	05:44	06:01	06:27	06:54		07:21		06:54	07:18	
	17:19	17:53	18:20		19:48	20:15	20:30	20:21	19:47	19:00		18:17		16:49	16:51	
25	07:15	06:43	06:03		06:18	05:49	05:44	06:02	06:28	06:54		07:22	10 07:32 (SG 08)	06:22	06:55	07:18
	17:20	17:54	18:21		19:49	20:15	20:31	20:21	19:46	18:59		17:16	07:42 (SG 08)	06:23	16:49	16:51
26	07:14	06:42	06:01		06:17	05:48	05:44	06:03	06:29	06:55		07:23	07:29 (SG 08)	06:23	06:56	07:18
	17:21	17:55	18:22		19:50	20:16	20:31	20:20	19:44	18:57		17:14	16 07:45 (SG 08)	06:24	16:48	16:52
27	07:14	06:41	05:59		06:15	05:48	05:45	06:04	06:30	06:56		07:24	07:27 (SG 08)	06:24	06:57	07:19
	17:22	17:56	18:22		19:51	20:17	20:31	20:19	19:43	18:56		17:13	19 07:46 (SG 08)	06:25	16:48	16:53
28	07:13	06:39	05:58		06:14	05:47	05:45	06:04	06:31	06:57		07:25	07:25 (SG 08)	06:25	06:58	07:19
	17:23	17:57	18:23		19:52	20:18	20:31	20:18	19:41	18:54		17:12	23 07:48 (SG 08)	06:26	16:47	16:53
29	07:12		06:56		06:13	05:47	05:46	06:05	06:32	06:58		07:26	07:25 (SG 08)	06:26	06:59	07:19
	17:24		19:24		19:53	20:18	20:31	20:17	19:40	18:53		17:11	23 07:48 (SG 08)	06:27	16:47	16:54
30	07:11		06:55		06:12	05:46	05:46	06:06	06:32	06:59		07:27	07:26 (SG 08)	06:27	07:00	07:20
	17:25		19:25		19:54	20:19	20:31	20:16	19:39	18:51		17:10	23 07:49 (SG 08)	06:28	16:47	16:55
31	07:11		06:53			05:46		06:07	06:33			06:28				07:20
	17:27		19:26			20:20		20:15	19:37			17:09				16:55
Potential sun hours	306	302	370		395	440	442	449	422	374		349		305	298	
Total, worst case			290							114		183				

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: Caterina 1 - Shadow flickering Shadow receptor: G - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (50)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:27	06:38 17:58	06:52 19:27	06:10 19:54	05:45 20:20	05:46 20:31	06:07 20:14	06:34 19:36	06:59 18:49	06:29 17:07	07:00 16:46
2	07:20 16:57	07:09 17:29	06:36 17:59	06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:08 20:13	06:35 19:34	07:00 18:48	06:30 17:06	07:01 16:46
3	07:20 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:44 20:22	05:47 20:30	06:09 20:12	06:36 19:33	07:01 18:46	06:31 17:05	07:02 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:11	06:37 19:31	07:02 18:45	06:32 17:04	07:03 16:46
5	07:21 16:59	07:06 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:37 19:30	07:03 18:43	06:33 17:03	07:04 16:46
6	07:21 17:00	07:05 17:33	06:31 18:03	06:44 19:31	06:05 19:59	05:43 20:24	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42	06:34 17:02	07:05 16:46
7	07:21 17:01	07:04 17:34	06:29 18:04	06:43 19:32	06:04 20:00	05:43 20:24	05:49 20:30	06:13 20:08	06:39 19:27	07:05 18:40	06:35 17:01	07:06 16:46
8	07:21 17:02	07:03 17:35	06:28 18:04	06:41 19:33	06:03 20:01	05:43 20:25	05:50 20:29	06:13 20:07	06:40 19:25	07:06 18:39	06:37 17:00	07:07 16:46
9	07:21 17:03	07:02 17:36	06:26 18:05	06:40 19:34	06:02 20:02	05:43 20:25	05:50 20:29	06:14 20:06	06:41 19:23	07:07 18:37	06:38 16:59	07:08 16:46
10	07:20 17:04	07:01 17:38	06:25 18:06	06:38 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:58	07:08 16:46
11	07:20 17:05	07:00 17:39	06:23 18:07	06:37 19:36	06:00 20:03	05:43 20:26	05:52 20:29	06:16 20:04	06:42 19:20	07:08 18:35	06:40 16:57	07:09 16:46
12	07:20 17:06	06:59 17:40	06:22 18:08	06:35 19:37	05:59 20:04	05:42 20:27	05:52 20:28	06:17 20:02	06:43 19:19	07:09 18:33	06:41 16:57	07:10 16:46
13	07:20 17:07	06:58 17:41	06:20 18:09	06:34 19:38	05:58 20:05	05:42 20:27	05:53 20:28	06:18 20:01	06:44 19:17	07:10 18:32	06:42 16:56	07:11 16:46
14	07:20 17:08	06:57 17:42	06:19 18:10	06:33 19:39	05:57 20:06	05:42 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:11 18:30	06:43 16:55	07:12 16:47
15	07:19 17:09	06:56 17:43	06:18 18:11	06:31 19:40	05:56 20:07	05:42 20:28	05:54 20:27	06:19 19:59	06:46 19:14	07:12 18:29	06:44 16:54	07:12 16:47
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:42 20:28	05:55 20:26	06:20 19:58	06:47 19:13	07:13 18:27	06:45 16:54	07:13 16:47
17	07:19 17:11	06:53 17:45	06:14 18:13	06:28 19:41	05:54 20:09	05:42 20:29	05:56 20:26	06:21 19:56	06:47 19:11	07:14 18:26	06:46 16:53	07:14 16:47
18	07:18 17:12	06:52 17:46	06:13 18:14	06:27 19:42	05:53 20:10	05:43 20:29	05:56 20:25	06:22 19:55	06:48 19:10	07:15 18:25	06:47 16:52	07:14 16:48
19	07:18 17:13	06:51 17:47	06:11 18:15	06:26 19:43	05:53 20:10	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:23	06:48 16:52	07:15 16:48
20	07:17 17:14	06:50 17:48	06:10 18:16	06:24 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:52	06:50 19:06	07:17 18:22	06:49 16:51	07:15 16:49
21	07:17 17:15	06:48 17:49	06:08 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	06:50 16:50	07:16 16:49
22	07:17 17:16	06:47 17:50	06:07 18:18	06:22 19:46	05:50 20:13	05:43 20:30	05:59 20:23	06:25 19:50	06:52 19:03	07:19 18:19	06:51 16:50	07:17 16:50
23	07:16 17:18	06:46 17:51	06:05 18:19	06:20 19:47	05:50 20:14	05:43 20:30	06:00 20:22	06:26 19:48	06:53 19:02	07:20 18:18	06:52 16:49	07:17 16:50
24	07:15 17:19	06:45 17:52	06:04 18:20	06:19 19:48	05:49 20:14	05:44 20:30	06:01 20:21	06:27 19:47	06:53 19:00	07:21 18:17	06:53 16:49	07:17 16:51
25	07:15 17:20	06:43 17:53	06:02 18:20	06:18 19:49	05:49 20:15	05:44 20:31	06:02 20:20	06:28 19:46	06:54 18:59	07:22 17:16	06:54 16:48	07:18 16:51
26	07:14 17:21	06:42 17:55	06:01 18:21	06:16 19:50	05:48 20:16	05:44 20:31	06:03 20:20	06:29 19:44	06:55 18:57	07:23 17:14	06:55 16:48	07:18 16:52
27	07:13 17:22	06:41 17:56	05:59 18:22	06:15 19:51	05:47 20:17	05:45 20:31	06:03 20:19	06:30 19:43	06:56 18:56	07:24 17:13	06:56 16:48	07:19 16:52
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52	05:47 20:17	05:45 20:31	06:04 20:18	06:31 19:41	06:57 18:54	07:25 17:12	06:57 16:47	07:19 16:53
29	07:12 17:24		06:56 19:24	06:13 19:52	05:46 20:18	05:45 20:31	06:05 20:17	06:31 19:40	06:58 18:52	07:26 17:11	06:58 16:47	07:19 16:54
30	07:11 17:25		06:55 19:25	06:12 19:53	05:46 20:19	05:46 20:31	06:06 20:16	06:32 19:38	06:59 18:51	07:27 17:10	06:59 16:47	07:20 16:54
31	07:11 17:26		06:53 19:26		05:45 20:20		06:07 20:15	06:33 19:37		06:28 17:08		07:20 16:55
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: H - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (51)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October		November	December
1	07:20 16:56	07:10 17:27	06:38 17:58	06:52 19:27	06:10 19:54	05:45 20:20	05:46 20:31	06:07 20:14	06:34 19:35	06:59 18:49		06:29 17:07	07:00 16:46
2	07:20 16:57	07:09 17:29	06:36 17:59	06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:08 20:13	06:35 19:34	07:00 18:48		06:30 17:06	07:01 16:46
3	07:20 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:44 20:22	05:47 20:30	06:09 20:12	06:36 19:33	07:01 18:46		06:31 17:05	07:02 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:11	06:37 19:31	07:02 18:45		06:32 17:04	07:03 16:46
5	07:21 16:59	07:06 17:32	06:32 18:02	06:46 19:30	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:37 19:30	07:03 18:43		06:33 17:03	07:04 16:46
6	07:21 17:00	07:05 17:33	06:31 18:03	06:44 19:31	06:05 19:59	05:43 20:23	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42	18:01 (SG 09) 18:02 (SG 09)	06:34 17:02	07:05 16:46
7	07:21 17:01	07:04 17:34	06:29 18:03	06:43 19:32	06:04 20:00	05:43 20:24	05:49 20:30	06:13 20:08	06:39 19:27	07:05 18:40		06:35 17:01	07:06 16:46
8	07:21 17:02	07:03 17:35	06:28 18:04	06:41 19:33	06:03 20:01	05:43 20:25	05:50 20:29	06:13 20:07	06:40 19:25	07:06 18:39		06:36 17:00	07:07 16:46
9	07:21 17:03	07:02 17:36	06:26 18:05	06:40 19:34	06:02 20:02	05:43 20:25	05:50 20:29	06:14 20:06	06:41 19:23	07:07 18:37		06:38 16:59	07:08 16:46
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11	07:20 17:05	07:00 17:39	06:23 18:07	06:37 19:36	06:00 20:03	05:43 20:26	05:52 20:28	06:16 20:04	06:42 19:20	07:08 18:35		06:40 16:57	07:09 16:46
12	07:20 17:06	06:59 17:40	06:22 18:08	06:35 19:37	05:59 20:04	05:42 20:27	05:52 20:28	06:17 20:02	06:43 19:19	07:09 18:33		06:41 16:57	07:10 16:46
13	07:20 17:07	06:58 17:41	06:20 18:09	06:34 19:38	05:58 20:05	05:42 20:27	05:53 20:28	06:18 20:01	06:44 19:17	07:10 18:32		06:42 16:56	07:11 16:46
14	07:20 17:08	06:57 17:42	06:19 18:10	06:33 19:39	05:57 20:06	05:42 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:11 18:30		06:43 16:55	07:12 16:47
15	07:19 17:09	06:56 17:43	06:17 18:11	06:31 19:40	05:56 20:07	05:42 20:28	05:54 20:27	06:19 19:59	06:46 19:14	07:12 18:29		06:44 16:54	07:12 16:47
16	07:19 17:10	06:54 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:42 20:28	05:55 20:26	06:20 19:58	06:47 19:13	07:13 18:27		06:45 16:54	07:13 16:47
17	07:19 17:11	06:53 17:45	06:14 18:13	06:28 19:41	05:54 20:09	05:42 20:29	05:56 20:26	06:21 19:56	06:47 19:11	07:14 18:26		06:46 16:53	07:14 16:47
18	07:18 17:12	06:52 17:46	06:13 18:14	06:27 19:42	05:53 20:09	05:43 20:29	05:56 20:25	06:22 19:55	06:48 19:10	07:15 18:25		06:47 16:52	07:14 16:48
19	07:18 17:13	06:51 17:47	06:11 18:15	06:26 19:43	05:53 20:10	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:23		06:48 16:52	07:15 16:48
20	07:17 17:14	06:50 17:48	06:10 18:16	06:24 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:52	06:50 19:06	07:17 18:22		06:49 16:51	07:15 16:49
21	07:17 17:15	06:48 17:49	06:08 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21		06:50 16:50	07:16 16:49
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31	07:10 17:26		06:53 19:26		05:45 20:20		06:07 20:15	06:33 19:37		06:28 17:08			07:20 16:55
Potential sun hours	306	302	370	395	440	442	449	422	374	349		305	298
Total, worst case											1		

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: Caterina 1 - Shadow flickering Shadow receptor: I - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (52)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February		March	April	May	June	July	August	September	October		November		December
1	07:20 16:56	07:10 17:27		06:38 17:58	06:52 19:27	06:10 19:54	05:45 20:20	05:46 20:31	06:07 20:14	06:34 19:35	06:59 18:49		06:29 17:07	16:43 (SG 09) 16:44 (SG 09)	07:00 16:46
2	07:20 16:57	07:09 17:29		06:36 17:59	06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:08 20:13	06:35 19:34	07:00 18:48		06:30 17:06		07:01 16:46
3	07:20 16:58	07:08 17:30		06:35 18:00	06:49 19:29	06:08 19:56	05:44 20:22	05:47 20:30	06:09 20:12	06:36 19:33	07:01 18:46		06:31 17:05		07:02 16:46
4	07:21 16:59	07:07 17:31		06:34 18:01	06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:11	06:37 19:31	07:02 18:45		06:32 17:04		07:03 16:46
5	07:21 16:59	07:06 17:32		06:32 18:02	06:46 19:30	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:37 19:30	07:03 18:43		06:33 17:03		07:04 16:46
6	07:21 17:00	07:05 17:33		06:31 18:03	06:44 19:31	06:05 19:59	05:43 20:23	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42		06:34 17:02		07:05 16:46
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9	07:21 17:03	07:02 17:36		17:14 (SG 09) 17:15 (SG 09)	06:26 18:05	06:02 19:34	05:43 20:25	05:50 20:29	06:14 20:06	06:41 19:23	07:07 18:37		06:38 16:59		07:08 16:46
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11	07:20 17:05	07:00 17:39	2	17:13 (SG 09) 17:17 (SG 09)	06:23 18:07	06:00 19:36	05:43 20:26	05:52 20:28	06:16 20:04	06:42 19:20	07:08 18:35		06:40 16:57		07:09 16:46
12	07:20 17:06	06:59 17:40	4	17:13 (SG 09) 17:18 (SG 09)	06:22 18:08	06:35 19:37	05:42 20:27	05:52 20:28	06:17 20:02	06:43 19:19	07:09 18:33		06:41 16:57		07:10 16:46
13	07:20 17:07	06:58 17:41	5	17:12 (SG 09) 17:19 (SG 09)	06:20 18:09	06:34 19:38	05:42 20:27	05:53 20:28	06:18 20:01	06:44 19:17	07:10 18:32		06:42 16:56		07:11 16:46
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19	07:18 17:13	06:51 17:47	13	17:13 (SG 09) 17:26 (SG 09)	06:11 18:15	06:26 19:43	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:23	17:48 (SG 09) 18:01 (SG 09)	06:48 16:52		07:15 16:48
20	07:17 17:14	06:50 17:48	14	17:14 (SG 09) 17:27 (SG 09)	06:10 18:16	06:24 19:44	05:43 20:11	05:58 20:24	06:24 19:52	06:50 19:06	07:17 18:22	17:47 (SG 09) 18:00 (SG 09)	06:49 16:51		07:15 16:49
21	07:17 17:15	06:48 17:49	13	17:15 (SG 09) 17:28 (SG 09)	06:08 18:17	06:23 19:45	05:43 20:12	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	17:45 (SG 09) 17:59 (SG 09)	06:50 16:50		07:16 16:49
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Potential sun hours	306	302		370	395	440	442	449	422	374	349		305		298
Total, worst case		154									162		1		

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: Caterina 1 - Shadow flickering Shadow receptor: J - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (53)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:54	05:45 20:20	05:46 20:31	06:08 20:14	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
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30	07:11 17:26		06:55 19:25	06:12 19:53	05:46 20:19	05:46 20:31	06:06 20:16	06:33 19:39	06:59 18:51	07:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:53 19:26		05:46 20:20		06:07 20:15	06:33 19:37		06:28 17:09		07:20 16:55
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: K - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (54)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:20	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
2	07:20 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:10 19:55	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:30 17:07	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:47 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:31 17:05	07:03 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:48 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:12	06:37 19:31	07:02 18:45	06:32 17:04	07:03 16:46
5	07:21 17:00	07:06 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:11	06:38 19:30	07:03 18:44	06:34 17:03	07:04 16:46
6	07:21 17:01	07:05 17:33	06:31 18:03	06:45 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:09	06:39 19:28	07:04 18:42	06:35 17:02	07:05 16:46
7	07:21 17:02	07:04 17:35	06:30 18:04	06:43 19:33	06:04 20:00	05:44 20:24	05:50 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:36 17:01	07:06 16:46
8	07:21 17:03	07:03 17:36	06:28 18:05	06:42 19:33	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:07	06:40 19:25	07:06 18:39	06:37 17:01	07:07 16:46
9	07:21 17:03	07:02 17:37	06:27 18:06	06:40 19:34	06:02 20:02	05:43 20:25	05:51 20:29	06:15 20:06	06:41 19:24	07:07 18:38	06:38 17:00	07:08 16:46
10	07:21 17:04	07:01 17:38	06:25 18:07	06:39 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:59	07:09 16:46
11	07:20 17:05	07:00 17:39	06:24 18:08	06:37 19:36	06:00 20:04	05:43 20:26	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:09 16:46
12	07:20 17:06	06:59 17:40	06:22 18:09	06:36 19:37	05:59 20:04	05:43 20:27	05:53 20:28	06:17 20:03	06:44 19:19	07:10 18:33	06:41 16:57	07:10 16:47
13	07:20 17:07	06:58 17:41	06:21 18:10	06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:01	06:44 19:18	07:11 18:32	06:42 16:56	07:11 16:47
14	07:20 17:08	06:57 17:42	06:19 18:11	06:33 19:39	05:57 20:06	05:43 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:12 18:31	06:43 16:55	07:12 16:47
15	07:20 17:09	06:56 17:43	06:18 18:11	06:32 19:40	05:56 20:07	05:43 20:28	05:55 20:27	06:20 19:59	06:46 19:14	07:12 18:29	06:44 16:55	07:12 16:47
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:43 20:28	05:55 20:26	06:21 19:58	06:47 19:13	07:13 18:28	06:45 16:54	07:13 16:48
17	07:19 17:11	06:54 17:45	06:15 18:13	06:29 19:42	05:55 20:09	05:43 20:29	05:56 20:26	06:22 19:56	06:48 19:11	07:14 18:26	06:46 16:53	07:14 16:48
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20	07:18 17:15	06:50 17:49	06:10 18:16	06:25 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:53	06:50 19:07	07:17 18:22	06:49 16:51	07:16 16:49
21	07:17 17:16	06:49 17:50	06:09 18:17	06:23 19:45	05:52 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	06:50 16:51	07:16 16:49
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25	07:15 17:20	06:43 17:54	06:03 18:21	06:18 19:49	05:49 20:15	05:44 20:31	06:02 20:21	06:28 19:46	06:55 18:59	07:22 17:16	06:55 16:49	07:18 16:52
26	07:14 17:21	06:42 17:55	06:01 18:22	06:17 19:50	05:48 20:16	05:45 20:31	06:03 20:20	06:29 19:44	06:55 18:57	07:23 17:15	06:56 16:48	07:18 16:52
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29	07:12 17:24		06:57 19:24	06:13 19:53	05:47 20:18	05:46 20:31	06:05 20:17	06:32 19:40	06:58 18:53	07:26 17:11	06:59 16:47	07:19 16:54
30	07:11 17:26		06:55 19:25	06:12 19:54	05:46 20:19	05:46 20:31	06:06 20:16	06:33 19:39	06:59 18:51	07:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:15	06:33 19:37		06:28 17:09		07:20 16:56
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: L - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (55)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:54	05:45 20:20	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
2	07:20 16:57	07:09 17:29	06:37 17:59	06:50 19:28	06:10 19:55	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:30 17:07	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:47 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:31 17:05	07:02 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:48 19:30	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:12	06:37 19:31	07:02 18:45	06:32 17:04	07:03 16:46
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13	07:20 17:07	06:58 17:41	06:21 18:10	06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:01	06:44 19:18	07:11 18:32	06:42 16:56	07:11 16:47
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23	07:16 17:18	06:46 17:52	06:06 18:19	06:21 19:47	05:50 20:14	05:44 20:30	06:01 20:22	06:27 19:49	06:53 19:02	07:20 18:18	06:53 16:50	07:17 16:50
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25	07:15 17:20	06:43 17:54	06:03 18:21	06:18 19:49	05:49 20:15	05:44 20:31	06:02 20:21	06:28 19:46	06:55 18:59	07:22 17:16	06:55 16:49	07:18 16:52
26	07:14 17:21	06:42 17:55	06:01 18:22	06:17 19:50	05:48 20:16	05:45 20:31	06:03 20:20	06:29 19:44	06:55 18:57	07:23 17:15	06:56 16:48	07:18 16:52
27	07:14 17:22	06:41 17:56	06:00 18:23	06:16 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56	07:24 17:13	06:57 16:48	07:19 16:53
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29	07:12 17:24		06:57 19:24	06:13 19:53	05:47 20:18	05:46 20:31	06:05 20:17	06:32 19:40	06:58 18:53	07:26 17:11	06:59 16:47	07:19 16:54
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31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:15	06:33 19:37		06:28 17:09		07:20 16:56
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: M - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (56)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

		January	February	March	April	May	June	July	August	September	October	November	December		
1	07:20	08:13 (SG 02)	07:10	06:38	06:52	06:11	05:45	05:46	06:08	06:34	07:00	06:29	07:01		
	16:56	19	08:32 (SG 02)	17:28	17:58	19:27	19:54	20:20	20:31	20:14	19:36	18:50	17:08	16:47	
2	07:20		08:14 (SG 02)	07:09	06:37	06:50	06:09	05:45	05:47	06:09	06:35	07:01	06:30	07:02	
	16:57	18	08:32 (SG 02)	17:29	17:59	19:28	19:55	20:21	20:31	20:14	19:34	18:48	17:06	16:47	
3	07:21		08:15 (SG 02)	07:08	06:35	06:49	06:08	05:45	05:47	06:09	06:36	07:01	06:31	07:02	
	16:58	17	08:32 (SG 02)	17:30	18:00	19:29	19:56	20:22	20:31	20:13	19:33	18:47	17:05	16:46	
4	07:21		08:16 (SG 02)	07:07	06:34	06:47	06:07	05:44	05:48	06:10	06:37	07:02	06:32	07:03	
	16:59	16	08:32 (SG 02)	17:31	18:01	19:30	19:57	20:22	20:30	20:12	19:31	18:45	17:04	16:46	
5	07:21		08:17 (SG 02)	07:06	06:32	06:46	06:06	05:44	05:48	06:11	06:38	07:03	06:33	07:04	08:06 (SG 02)
	17:00	14	08:31 (SG 02)	17:32	18:02	19:31	19:58	20:23	20:30	20:10	19:30	18:44	17:03	16:46	8 08:14 (SG 02)
6	07:21		08:19 (SG 02)	07:05	06:31	06:44	06:05	05:44	05:49	06:12	06:38	07:04	06:35	07:05	08:05 (SG 02)
	17:01	11	08:30 (SG 02)	17:33	18:03	19:32	19:59	20:24	20:30	20:09	19:28	18:42	17:02	16:46	11 08:16 (SG 02)
7	07:21		08:21 (SG 02)	07:04	06:29	06:43	06:04	05:43	05:49	06:13	06:39	07:05	06:36	07:06	08:04 (SG 02)
	17:02	8	08:29 (SG 02)	17:34	18:04	19:33	20:00	20:24	20:30	20:08	19:27	18:41	17:01	16:46	14 08:18 (SG 02)
8	07:21		08:24 (SG 02)	07:03	06:28	06:42	06:03	05:43	05:50	06:14	06:40	07:06	06:37	07:07	08:04 (SG 02)
	17:02	3	08:27 (SG 02)	17:36	18:05	19:33	20:01	20:25	20:30	20:07	19:25	18:39	17:00	16:46	16 08:20 (SG 02)
9	07:21			07:02	06:27	06:40	06:02	05:43	05:51	06:15	06:41	07:07	06:38	07:08	08:04 (SG 02)
	17:03			17:37	18:06	19:34	20:02	20:25	20:29	20:06	19:24	18:38	17:00	16:46	17 08:21 (SG 02)
10	07:21			07:01	06:25	06:39	06:01	05:43	05:51	06:15	06:42	07:08	06:39	07:09	08:04 (SG 02)
	17:04			17:38	18:07	19:35	20:03	20:26	20:29	20:05	19:22	18:36	16:59	16:46	18 08:22 (SG 02)
11	07:20			07:00	06:24	06:37	06:00	05:43	05:52	06:16	06:43	07:09	06:40	07:09	08:04 (SG 02)
	17:05			17:39	18:08	19:36	20:04	20:26	20:29	20:04	19:21	18:35	16:58	16:46	19 08:23 (SG 02)
12	07:20			06:59	06:22	06:36	05:59	05:43	05:53	06:17	06:43	07:10	06:41	07:10	08:03 (SG 02)
	17:06			17:40	18:09	19:37	20:04	20:27	20:28	20:03	19:19	18:33	16:57	16:46	20 08:23 (SG 02)
13	07:20			06:58	06:21	06:34	05:58	05:43	05:53	06:18	06:44	07:11	06:42	07:11	08:04 (SG 02)
	17:07			17:41	18:10	19:38	20:05	20:27	20:28	20:01	19:18	18:32	16:56	16:47	20 08:24 (SG 02)
14	07:20			06:57	06:19	06:33	05:57	05:43	05:54	06:19	06:45	07:11	06:43	07:12	08:04 (SG 02)
	17:08			17:42	18:10	19:39	20:06	20:28	20:27	20:00	19:16	18:30	16:55	16:47	22 08:26 (SG 02)
15	07:20			06:56	06:18	06:31	05:56	05:43	05:55	06:20	06:46	07:12	06:44	07:12	08:03 (SG 02)
	17:09			17:43	18:11	19:40	20:07	20:28	20:27	19:59	19:14	18:29	16:55	16:47	23 08:26 (SG 02)
16	07:19			06:55	06:16	06:30	05:55	05:43	05:55	06:21	06:47	07:13	06:45	07:13	08:04 (SG 02)
	17:10			17:44	18:12	19:41	20:08	20:28	20:26	19:58	19:13	18:28	16:54	16:47	23 08:27 (SG 02)
17	07:19			06:53	06:15	06:29	05:55	05:43	05:56	06:21	06:48	07:14	06:46	07:14	08:05 (SG 02)
	17:11			17:45	18:13	19:42	20:09	20:29	20:26	19:56	19:11	18:26	16:53	16:48	23 08:28 (SG 02)
18	07:18			06:52	06:13	06:27	05:54	05:43	05:57	06:22	06:49	07:15	06:47	07:14	08:04 (SG 02)
	17:12			17:46	18:14	19:43	20:10	20:29	20:25	19:55	19:10	18:25	16:52	16:48	24 08:28 (SG 02)
19	07:18			06:51	06:12	06:26	05:53	05:43	05:57	06:23	06:49	07:16	06:48	07:15	08:05 (SG 02)
	17:13			17:47	18:15	19:43	20:10	20:29	20:25	19:54	19:08	18:24	16:52	16:48	24 08:29 (SG 02)
20	07:18			06:50	06:10	06:25	05:52	05:43	05:58	06:24	06:50	07:17	06:49	07:16	08:05 (SG 02)
	17:15			17:49	18:16	19:44	20:11	20:30	20:24	19:53	19:07	18:22	16:51	16:49	24 08:29 (SG 02)
21	07:17			06:49	06:09	06:23	05:51	05:43	05:59	06:25	06:51	07:18	06:50	07:16	08:06 (SG 02)
	17:16			17:50	18:17	19:45	20:12	20:30	20:23	19:51	19:05	18:21	16:51	16:49	24 08:30 (SG 02)
22	07:17			06:47	06:07	06:22	05:51	05:43	06:00	06:26	06:52	07:19	06:51	07:17	08:06 (SG 02)
	17:17			17:51	18:18	19:46	20:13	20:30	20:23	19:50	19:04	18:20	16:50	16:50	24 08:30 (SG 02)
23	07:16			06:46	06:06	06:21	05:50	05:44	06:00	06:27	06:53	07:20	06:53	07:17	08:07 (SG 02)
	17:18			17:52	18:19	19:47	20:14	20:30	20:22	19:48	19:02	18:18	16:50	16:50	24 08:31 (SG 02)
24	07:16			06:45	06:04	06:19	05:49	05:44	06:01	06:27	06:54	07:21	06:54	07:18	08:07 (SG 02)
	17:19			17:53	18:20	19:48	20:15	20:30	20:21	19:47	19:00	18:17	16:49	16:51	24 08:31 (SG 02)
25	07:15			06:43	06:03	06:18	05:49	05:44	06:02	06:28	06:54	06:22	06:55	07:18	08:08 (SG 02)
	17:20			17:54	18:21	19:49	20:15	20:31	20:21	19:46	18:59	17:16	16:49	16:51	24 08:32 (SG 02)
26	07:14			06:42	06:01	06:17	05:48	05:45	06:03	06:29	06:55	06:23	06:56	07:18	08:09 (SG 02)
	17:21			17:55	18:22	19:50	20:16	20:31	20:20	19:44	18:57	17:15	16:48	16:52	23 08:32 (SG 02)
27	07:14			06:41	06:00	06:15	05:48	05:45	06:04	06:30	06:56	06:24	06:57	07:19	08:09 (SG 02)
	17:22			17:56	18:23	19:51	20:17	20:31	20:19	19:43	18:56	17:13	16:48	16:53	23 08:32 (SG 02)
28	07:13			06:39	05:58	06:14	05:47	05:45	06:04	06:31	06:57	06:25	06:58	07:19	08:10 (SG 02)
	17:23			17:57	18:23	19:52	20:18	20:31	20:18	19:41	18:54	17:12	16:48	16:53	23 08:33 (SG 02)
29	07:12				06:56	06:13	05:47	05:46	06:05	06:32	06:58	06:26	06:59	07:19	08:11 (SG 02)
	17:24				19:24	19:53	20:18	20:31	20:17	19:40	18:53	17:11	16:47	16:54	22 08:33 (SG 02)
30	07:11				06:55	06:12	05:46	05:46	06:06	06:33	06:59	06:27	07:00	07:20	08:11 (SG 02)
	17:26				19:25	19:54	20:19	20:31	20:16	19:39	18:51	17:10	16:47	16:55	21 08:32 (SG 02)
31	07:11				06:53		05:46		06:07	06:33		06:28		07:20	08:12 (SG 02)
	17:27				19:26		20:20		20:15	19:37		17:09		16:55	20 08:32 (SG 02)
Potential sun hours		306	302	370	395	440	442	449	422	374	349	305	298		
Total, worst case		106												558	

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: Caterina 1 - Shadow flickering Shadow receptor: N - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (57)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

		January	February	March	April	May	June	July	August	September	October	November	December
1	07:20	07:50 (SG 02)	07:10	06:38	06:52	06:11	05:45	05:46	06:08	06:34	07:00	06:29	07:01
	16:56	27	08:17 (SG 02)	17:28	17:58	19:27	19:54	20:20	20:31	20:14	19:36	18:50	17:08
2	07:20		07:51 (SG 02)	07:09	06:37	06:50	06:09	05:45	05:47	06:09	06:35	07:01	06:30
	16:57	26	08:17 (SG 02)	17:29	17:59	19:28	19:55	20:21	20:31	20:14	19:34	18:48	17:06
3	07:21		07:51 (SG 02)	07:08	06:35	06:49	06:08	05:45	05:47	06:09	06:36	07:01	06:31
	16:58	26	08:17 (SG 02)	17:30	18:00	19:29	19:56	20:22	20:31	20:13	19:33	18:47	17:05
4	07:21		07:52 (SG 02)	07:07	06:34	06:47	06:07	05:44	05:48	06:10	06:37	07:02	06:32
	16:59	25	08:17 (SG 02)	17:31	18:01	19:30	19:57	20:22	20:30	20:12	19:31	18:45	17:04
5	07:21		07:52 (SG 02)	07:06	06:32	06:46	06:06	05:44	05:48	06:11	06:38	07:03	06:33
	17:00	25	08:17 (SG 02)	17:32	18:02	19:31	19:58	20:23	20:30	20:10	19:30	18:44	17:03
6	07:21		07:53 (SG 02)	07:05	06:31	06:44	06:05	05:44	05:49	06:12	06:38	07:04	06:35
	17:01	25	08:18 (SG 02)	17:33	18:03	19:32	19:59	20:24	20:30	20:09	19:28	18:42	17:02
7	07:21		07:54 (SG 02)	07:04	06:29	06:43	06:04	05:43	05:49	06:13	06:39	07:05	06:36
	17:02	24	08:18 (SG 02)	17:34	18:04	19:33	20:00	20:24	20:30	20:08	19:27	18:41	17:01
8	07:21		07:55 (SG 02)	07:03	06:28	06:42	06:03	05:43	05:50	06:14	06:40	07:06	06:37
	17:02	23	08:18 (SG 02)	17:36	18:05	19:33	20:01	20:25	20:30	20:07	19:25	18:39	17:00
9	07:21		07:56 (SG 02)	07:02	06:27	06:40	06:02	05:43	05:51	06:15	06:41	07:07	06:38
	17:03	22	08:18 (SG 02)	17:37	18:06	19:34	20:02	20:25	20:29	20:06	19:24	18:38	17:00
10	07:21		07:57 (SG 02)	07:01	06:25	06:39	06:01	05:43	05:51	06:15	06:42	07:08	06:39
	17:04	21	08:18 (SG 02)	17:38	18:07	19:35	20:03	20:26	20:29	20:05	19:22	18:36	16:59
11	07:20		07:58 (SG 02)	07:00	06:24	06:37	06:00	05:43	05:52	06:16	06:43	07:09	06:40
	17:05	20	08:18 (SG 02)	17:39	18:08	19:36	20:04	20:26	20:29	20:04	19:21	18:35	16:58
12	07:20		07:59 (SG 02)	06:59	06:22	06:36	05:59	05:43	05:53	06:17	06:43	07:10	06:41
	17:06	18	08:17 (SG 02)	17:40	18:09	19:37	20:04	20:27	20:28	20:03	19:19	18:33	16:57
13	07:20		08:00 (SG 02)	06:58	06:21	06:34	05:58	05:43	05:53	06:18	06:44	07:11	06:42
	17:07	17	08:17 (SG 02)	17:41	18:10	19:38	20:05	20:27	20:28	20:01	19:18	18:32	16:56
14	07:20		08:02 (SG 02)	06:57	06:19	06:33	05:57	05:43	05:54	06:19	06:45	07:11	06:43
	17:08	14	08:16 (SG 02)	17:42	18:10	19:39	20:06	20:28	20:27	20:00	19:16	18:30	16:55
15	07:20		08:03 (SG 02)	06:56	06:18	06:31	05:56	05:43	05:55	06:20	06:46	07:12	06:44
	17:09	11	08:14 (SG 02)	17:43	18:11	19:40	20:07	20:28	20:27	19:59	19:14	18:29	16:55
16	07:19		08:06 (SG 02)	06:55	06:16	06:30	05:55	05:43	05:55	06:21	06:47	07:13	06:45
	17:10	7	08:13 (SG 02)	17:44	18:12	19:41	20:08	20:28	20:26	19:58	19:13	18:28	16:54
17	07:19			06:54	06:15	06:29	05:55	05:43	05:56	06:21	06:48	07:14	06:46
	17:11			17:45	18:13	19:42	20:09	20:29	20:26	19:56	19:11	18:26	16:53
18	07:18			06:52	06:13	06:27	05:54	05:43	05:57	06:22	06:49	07:15	06:47
	17:12			17:46	18:14	19:43	20:10	20:29	20:25	19:55	19:10	18:25	16:52
19	07:18			06:51	06:12	06:26	05:53	05:43	05:57	06:23	06:49	07:16	06:48
	17:13			17:47	18:15	19:43	20:10	20:29	20:25	19:54	19:08	18:24	16:52
20	07:18			06:50	06:10	06:25	05:52	05:43	05:58	06:24	06:50	07:17	06:49
	17:15			17:49	18:16	19:44	20:11	20:30	20:24	19:53	19:07	18:22	16:51
21	07:17			06:49	06:09	06:23	05:51	05:43	05:59	06:25	06:51	07:18	06:50
	17:16			17:50	18:17	19:45	20:12	20:30	20:23	19:51	19:05	18:21	16:51
22	07:17			06:47	06:07	06:22	05:51	05:43	06:00	06:26	06:52	07:19	06:52
	17:17			17:51	18:18	19:46	20:13	20:30	20:23	19:50	19:04	18:20	16:50
23	07:16			06:46	06:06	06:21	05:50	05:44	06:00	06:27	06:53	07:20	06:53
	17:18			17:52	18:19	19:47	20:14	20:30	20:22	19:49	19:02	18:18	16:50
24	07:16			06:45	06:04	06:19	05:49	05:44	06:01	06:27	06:54	07:21	06:54
	17:19			17:53	18:20	19:48	20:15	20:30	20:21	19:47	19:00	18:17	16:49
25	07:15			06:43	06:03	06:18	05:49	05:44	06:02	06:28	06:54	06:22	06:55
	17:20			17:54	18:21	19:49	20:15	20:31	20:21	19:46	18:59	17:16	16:49
26	07:14			06:42	06:01	06:17	05:48	05:45	06:03	06:29	06:55	06:23	06:56
	17:21			17:55	18:22	19:50	20:16	20:31	20:20	19:44	18:57	17:15	16:48
27	07:14			06:41	06:00	06:15	05:48	05:45	06:04	06:30	06:56	06:24	06:57
	17:22			17:56	18:23	19:51	20:17	20:31	20:19	19:43	18:56	17:13	16:48
28	07:13			06:39	05:58	06:14	05:47	05:45	06:04	06:31	06:57	06:25	06:58
	17:23			17:57	18:23	19:52	20:18	20:31	20:18	19:42	18:54	17:12	16:48
29	07:12				06:56	06:13	05:47	05:46	06:05	06:32	06:58	06:26	06:59
	17:24				19:24	19:53	20:18	20:31	20:17	19:40	18:53	17:11	16:47
30	07:11				06:55	06:12	05:46	05:46	06:06	06:33	06:59	06:27	07:00
	17:26				19:25	19:54	20:19	20:31	20:16	19:39	18:51	17:10	16:47
31	07:11				06:53		05:46		06:07	06:33		06:28	
	17:27				19:26		20:20		20:15	19:37		17:09	
Potential sun hours	306		302	370	395	440	442	449	422	374	349	305	298
Total, worst case		331									67		804

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: Caterina 1 - Shadow flickering Shadow receptor: O - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (58)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:20 16:56	07:10 17:28	06:38 17:58	06:52 19:27	18:25 (SG 04) 20 18:45 (SG 04)	06:11 19:54	05:45 20:20	05:46 20:31	06:08 20:14	06:34 19:36	18:20 (SG 04) 1 18:21 (SG 04)	07:00 18:50	06:29 17:08	07:01 16:47
2	07:20 16:57	07:09 17:29	06:37 17:59	06:50 19:28	18 18:42 (SG 04)	06:09 19:55	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	18:19 (SG 04) 4 18:23 (SG 04)	07:01 18:48	06:30 17:06	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	18 18:23 (SG 04)	06:08 19:56	05:45 20:22	05:47 20:31	06:09 20:13	06:36 19:33	18:19 (SG 04) 6 18:25 (SG 04)	07:01 18:47	06:31 17:05	07:02 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:47 19:30	18 18:22 (SG 04)	06:07 19:57	05:44 20:22	05:48 20:30	06:10 20:12	06:37 19:31	18:17 (SG 04) 9 18:26 (SG 04)	07:02 18:45	06:32 17:04	07:03 16:46
5	07:21 17:00	07:06 17:32	06:32 18:02	06:46 19:31	16 18:22 (SG 04)	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:10	06:38 19:30	18:17 (SG 04) 10 18:27 (SG 04)	07:03 18:44	06:33 17:03	07:04 16:46
6	07:21 17:01	07:05 17:33	06:31 18:03	06:44 19:32	14 18:21 (SG 04)	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:09	06:38 19:28	18:17 (SG 04) 12 18:29 (SG 04)	07:04 18:42	06:35 17:02	07:05 16:46
7	07:21 17:02	07:04 17:34	06:29 18:04	06:43 19:33	12 18:33 (SG 04)	06:04 20:00	05:43 20:24	05:49 20:30	06:13 20:08	06:39 19:27	18:17 (SG 04) 14 18:31 (SG 04)	07:05 18:41	06:36 17:01	07:06 16:46
8	07:21 17:02	07:03 17:36	06:28 18:05	06:42 19:33	10 18:31 (SG 04)	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:07	06:40 19:25	18:17 (SG 04) 16 18:33 (SG 04)	07:06 18:39	06:37 17:00	07:07 16:46
9	07:21 17:03	07:02 17:37	06:27 18:06	06:40 19:34	9 18:29 (SG 04)	06:02 20:02	05:43 20:25	05:51 20:29	06:15 20:06	06:41 19:24	18:16 (SG 04) 18 18:34 (SG 04)	07:07 18:38	06:38 17:00	07:08 16:46
10	07:21 17:04	07:01 17:38	06:25 18:07	06:39 19:35	6 18:20 (SG 04)	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	18:17 (SG 04) 18 18:35 (SG 04)	07:08 18:36	06:39 16:59	07:09 16:46
11	07:20 17:05	07:00 17:39	06:24 18:08	06:37 19:36	4 18:21 (SG 04)	06:00 20:04	05:43 20:26	05:52 20:29	06:16 20:04	06:43 19:21	18:17 (SG 04) 20 18:37 (SG 04)	07:09 18:35	06:40 16:58	07:09 16:46
12	07:20 17:06	06:59 17:40	06:22 18:09	06:36 19:37	1 18:22 (SG 04)	05:59 20:04	05:43 20:27	05:53 20:28	06:17 20:03	06:43 19:19	18:18 (SG 04) 21 18:39 (SG 04)	07:10 18:33	06:41 16:57	07:10 16:46
13	07:20 17:07	06:58 17:41	06:21 18:10	06:34 19:38		05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:01	06:44 19:18	18:19 (SG 04) 20 18:39 (SG 04)	07:11 18:32	06:42 16:56	07:11 16:47
14	07:20 17:07	06:57 17:42	06:19 18:10	06:33 19:39		05:57 20:06	05:43 20:28	05:54 20:27	06:19 20:00	06:45 19:16	18:19 (SG 04) 18 18:37 (SG 04)	07:11 18:30	06:43 16:55	07:12 16:47
15	07:20 17:08	06:56 17:43	06:18 18:11	06:31 19:40		05:56 20:07	05:43 20:28	05:55 20:27	06:20 19:59	06:46 19:14	18:21 (SG 04) 15 18:36 (SG 04)	07:12 18:29	06:44 16:55	07:12 16:47
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41		05:55 20:08	05:43 20:28	05:55 20:26	06:21 19:58	06:47 19:13	18:24 (SG 04) 10 18:34 (SG 04)	07:13 18:28	06:45 16:54	07:13 16:47
17	07:19 17:11	06:54 17:45	06:15 18:13	06:29 19:42		05:55 20:09	05:43 20:29	05:56 20:26	06:21 19:56	06:48 19:11		07:14 18:26	06:46 16:53	07:14 16:48
18	07:18 17:12	06:52 17:46	06:13 18:14	06:27 19:43		05:54 20:10	05:43 20:29	05:57 20:25	06:22 19:55	06:49 19:10		07:15 18:25	06:47 16:52	07:14 16:48
19	07:18 17:13	06:51 17:47	06:12 18:15	06:26 19:43		05:53 20:10	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08		07:16 18:24	06:48 16:52	07:15 16:48
20	07:18 17:15	06:50 17:49	06:10 18:16	06:25 19:44		05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:53	06:50 19:07		07:17 18:22	06:49 16:51	07:16 16:49
21	07:17 17:16	06:49 17:50	06:09 18:17	06:23 19:45		05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05		07:18 18:21	06:50 16:51	07:16 16:49
22	07:17 17:17	06:47 17:51	06:07 18:18	06:22 19:46		05:51 20:13	05:43 20:30	06:00 20:23	06:26 19:50	06:52 19:04		07:19 18:20	06:52 16:50	07:17 16:50
23	07:16 17:18	06:46 17:52	06:06 18:19	06:21 19:47		05:50 20:14	05:44 20:30	06:00 20:22	06:27 19:49	06:53 19:02		07:20 18:18	06:53 16:50	07:17 16:50
24	07:16 17:19	06:45 17:53	06:04 18:20	06:19 19:48		05:49 20:15	05:44 20:30	06:01 20:21	06:27 19:47	06:54 19:00		07:21 18:17	06:54 16:49	07:18 16:51
25	07:15 17:20	06:43 17:54	06:03 18:21	06:18 19:49		05:49 20:15	05:44 20:31	06:02 20:21	06:28 19:46	06:54 18:59		07:22 17:16	06:55 16:49	07:18 16:51
26	07:14 17:21	06:42 17:55	06:01 18:22	06:17 19:50		05:48 20:16	05:45 20:31	06:03 20:20	06:29 19:44	06:59 18:57		07:23 17:15	06:56 16:48	07:18 16:52
27	07:14 17:22	06:41 17:56	06:00 18:23	06:15 19:51		05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56		07:24 17:13	06:57 16:48	07:19 16:53
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52		05:47 20:18	05:45 20:31	06:04 20:18	06:31 19:41	06:57 18:54		07:25 17:12	06:58 16:48	07:19 16:53
29	07:12 17:24		06:56 18:29 (SG 04)	06:13 19:53	13 17:33 (SG 04)	05:47 20:18	05:46 20:31	06:05 20:17	06:32 19:40	06:58 18:53		07:26 17:11	06:59 16:47	07:19 16:54
30	07:11 17:26		06:55 18:28 (SG 04)	06:12 19:54	18 18:47 (SG 04)	05:46 20:19	05:46 20:31	06:06 20:16	06:33 19:39	06:59 18:51		07:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:53 18:26 (SG 04)		20 18:47 (SG 04)	05:46 20:20		06:07 20:15	06:33 19:37			07:28 17:09	07:01 16:48	07:20 16:55
Potential sun hours	306	302	370	395	440	442	449	422	374	212	349	305	298	
Total, worst case			81	128										

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: Caterina 1 - Shadow flickering Shadow receptor: P - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (59)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

January			February		March	April		May	June
1	07:20	15:50 (SG 04)	07:10	06:38		06:52	18:44 (SG 05)	06:11	05:45
	16:56	42	16:32 (SG 04)	17:28	17:58	19:27	18:45 (SG 05)	19:55	20:20
2	07:21	15:51 (SG 04)	07:09	06:37		06:50		06:09	05:45
	16:57	41	16:32 (SG 04)	17:29	17:59	19:28		19:55	20:21
3	07:21	15:51 (SG 04)	07:08	06:35		06:49		06:08	05:45
	16:58	42	16:33 (SG 04)	17:30	18:00	19:29		19:56	20:22
4	07:21	15:52 (SG 04)	07:07	06:34		06:47		06:07	05:44
	16:59	42	16:34 (SG 04)	17:31	18:01	19:30		19:57	20:22
5	07:21	15:52 (SG 04)	07:06	06:32		06:46		06:06	05:44
	17:00	43	16:35 (SG 04)	17:32	18:02	19:31		19:58	20:23
6	07:21	15:53 (SG 04)	07:05	06:31		06:44		06:05	05:44
	17:01	43	16:36 (SG 04)	17:33	18:03	19:32		19:59	20:24
7	07:21	15:54 (SG 04)	07:04	06:30		06:43		06:04	05:43
	17:02	43	16:37 (SG 04)	17:34	18:04	19:33		20:00	20:24
8	07:21	15:55 (SG 04)	07:03	06:28		06:42		06:03	05:43
	17:02	43	16:38 (SG 04)	17:36	18:05	19:33		20:01	20:25
9	07:21	15:56 (SG 04)	07:02	06:27		06:40		06:02	05:43
	17:03	42	16:38 (SG 04)	17:37	18:06	19:34		20:02	20:25
10	07:21	15:57 (SG 04)	07:01	06:25		06:39		06:01	05:43
	17:04	42	16:39 (SG 04)	17:38	18:07	19:35		20:03	20:26
11	07:20	15:58 (SG 04)	07:00	06:24		06:37		06:00	05:43
	17:05	41	16:39 (SG 04)	17:39	18:08	19:36		20:04	20:26
12	07:20	15:58 (SG 04)	06:59	06:22		06:36		05:59	05:43
	17:06	40	16:38 (SG 04)	17:40	18:09	19:37		20:04	20:27
13	07:20	15:59 (SG 04)	06:58	06:21		06:34		05:58	05:43
	17:07	39	16:38 (SG 04)	17:41	18:10	19:38		20:05	20:27
14	07:20	16:00 (SG 04)	06:57	06:19		06:33		05:57	05:43
	17:08	38	16:38 (SG 04)	17:42	18:10	19:39		20:06	20:28
15	07:20	16:01 (SG 04)	06:56	06:18		06:31		05:56	05:43
	17:09	36	16:37 (SG 04)	17:43	18:11	19:40		20:07	20:28
16	07:19	16:02 (SG 04)	06:55	06:16		06:30		05:55	05:43
	17:10	35	16:37 (SG 04)	17:44	18:12	19:41		20:08	20:28
17	07:19	16:04 (SG 04)	06:54	06:15		06:29		05:55	05:43
	17:11	33	16:37 (SG 04)	17:45	18:13	19:42		20:09	20:29
18	07:19	16:05 (SG 04)	06:52	06:13		06:27		05:54	05:43
	17:12	31	16:36 (SG 04)	17:46	18:14	19:43		20:10	20:29
19	07:18	16:07 (SG 04)	06:51	06:12		06:26		05:53	05:43
	17:13	29	16:36 (SG 04)	17:47	18:15	19:43		20:11	20:29
20	07:18	16:08 (SG 04)	06:50	06:10		06:25		05:52	05:43
	17:15	26	16:34 (SG 04)	17:49	18:16	19:44		20:11	20:30
21	07:17	16:10 (SG 04)	06:49	06:09		06:23		05:51	05:43
	17:16	23	16:33 (SG 04)	17:50	18:17	19:45		20:12	20:30
22	07:17	16:12 (SG 04)	06:47	06:07		06:22		05:51	05:43
	17:17	19	16:31 (SG 04)	17:51	18:18	19:46		20:13	20:30
23	07:16	16:16 (SG 04)	06:46	06:06		06:21		05:50	05:44
	17:18	13	16:29 (SG 04)	17:52	18:19	19:47		20:14	20:30
24	07:16		06:45	06:04		06:19		05:49	05:44
	17:19		17:53	18:20		19:48		20:15	20:31
25	07:15		06:43	06:03		06:18		05:49	05:44
	17:20		17:54	18:21		19:49		20:15	20:31
26	07:14		06:42	06:01		06:17		05:48	05:45
	17:21		17:55	18:22		19:50		20:16	20:31
27	07:14		06:41	06:00		06:15		05:48	05:45
	17:22		17:56	18:23		19:51		20:17	20:31
28	07:13		06:39	05:58		06:14		05:47	05:45
	17:23		17:57	18:23		19:52		20:18	20:31
29	07:12			06:56		06:13		05:47	05:46
	17:24			19:24		19:53		20:18	20:31
30	07:11			06:55	18:46 (SG 05)	06:12		05:46	05:46
	17:26			19:25	18:47 (SG 05)	19:54		20:19	20:31
31	07:11			06:53	18:44 (SG 05)			05:46	
	17:27			19:26	18:47 (SG 05)			20:20	
Potential sun hours	306		302	370		395		440	442
Total, worst case	826			4		1			

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: Caterina 1 - Shadow flickering Shadow receptor: P - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (59)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December	
1	05:46 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47	15:40 (SG 04) 41 16:21 (SG 04)
2	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:30 17:06	07:02 16:47	15:40 (SG 04) 42 16:22 (SG 04)
3	05:47 20:31	06:09 20:13	06:36 19:33	07:01 18:47	06:31 17:05	07:03 16:46	15:40 (SG 04) 42 16:22 (SG 04)
4	05:48 20:30	06:10 20:12	06:37 19:31	07:02 18:45	06:32 17:04	07:03 16:46	15:40 (SG 04) 43 16:23 (SG 04)
5	05:48 20:30	06:11 20:11	06:38 19:30	07:03 18:44	06:34 17:03	07:04 16:46	15:40 (SG 04) 43 16:23 (SG 04)
6	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42	06:35 17:02	07:05 16:46	15:39 (SG 04) 43 16:22 (SG 04)
7	05:49 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:36 17:01	07:06 16:46	15:39 (SG 04) 43 16:22 (SG 04)
8	05:50 20:30	06:14 20:07	06:40 19:25	07:06 18:39	06:37 17:00	07:07 16:46	15:40 (SG 04) 42 16:22 (SG 04)
9	05:51 20:29	06:15 20:06	06:41 19:24	07:07 18:38	06:38 17:00	07:08 16:46	15:40 (SG 04) 42 16:22 (SG 04)
10	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:59	07:09 16:46	15:41 (SG 04) 42 16:23 (SG 04)
11	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:09 16:46	15:41 (SG 04) 42 16:23 (SG 04)
12	05:53 20:28	06:17 20:03	06:44 19:19	18:37 (SG 05) 18:39 (SG 05)	07:10 18:33	06:41 16:57	15:41 (SG 04) 41 16:22 (SG 04)
13	05:53 20:28	06:18 20:01	06:44 19:18	18:37 (SG 05) 18:39 (SG 05)	07:11 18:32	06:42 16:56	15:41 (SG 04) 42 16:23 (SG 04)
14	05:54 20:27	06:19 20:00	06:45 19:16	18:36 (SG 05) 18:37 (SG 05)	07:11 18:30	06:43 16:55	15:42 (SG 04) 41 16:23 (SG 04)
15	05:55 20:27	06:20 19:59	06:46 19:14	07:12 18:29	06:44 16:55	07:12 16:47	15:42 (SG 04) 41 16:23 (SG 04)
16	05:55 20:26	06:21 19:58	06:47 19:13	07:13 18:28	06:45 16:54	07:13 16:47	15:42 (SG 04) 41 16:23 (SG 04)
17	05:56 20:26	06:21 19:56	06:48 19:11	07:14 18:26	06:46 16:53	07:14 16:48	15:43 (SG 04) 41 16:24 (SG 04)
18	05:57 20:25	06:22 19:55	06:49 19:10	07:15 18:25	06:47 16:52	07:14 16:48	15:43 (SG 04) 41 16:24 (SG 04)
19	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:24	06:48 16:52	15:50 (SG 04) 16:03 (SG 04)	07:15 16:48
20	05:58 20:24	06:24 19:53	06:50 19:07	07:17 18:22	06:49 16:51	15:47 (SG 04) 16:06 (SG 04)	07:16 16:49
21	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	06:50 16:51	15:45 (SG 04) 16:08 (SG 04)	07:16 16:49
22	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	06:52 16:50	15:44 (SG 04) 16:10 (SG 04)	07:17 16:50
23	06:00 20:22	06:27 19:49	06:53 19:02	07:20 18:18	06:53 16:50	15:43 (SG 04) 16:12 (SG 04)	07:17 16:50
24	06:01 20:21	06:27 19:47	06:54 19:00	07:21 18:17	06:54 16:49	15:42 (SG 04) 16:13 (SG 04)	07:18 16:51
25	06:02 20:21	06:28 19:46	06:54 18:59	06:55 17:16	06:55 16:49	15:42 (SG 04) 16:15 (SG 04)	07:18 16:51
26	06:03 20:20	06:29 19:44	06:55 18:57	06:56 17:15	06:56 16:48	15:41 (SG 04) 16:16 (SG 04)	07:18 16:52
27	06:04 20:19	06:30 19:43	06:56 18:56	06:57 17:13	06:57 16:48	15:41 (SG 04) 16:17 (SG 04)	07:19 16:53
28	06:04 20:18	06:31 19:42	06:57 18:54	06:58 17:12	06:58 16:48	15:40 (SG 04) 16:18 (SG 04)	07:19 16:53
29	06:05 20:17	06:32 19:40	06:58 18:53	06:59 17:11	06:59 16:47	15:40 (SG 04) 16:19 (SG 04)	07:20 16:54
30	06:06 20:16	06:33 19:39	06:59 18:51	06:59 17:10	07:00 16:47	15:40 (SG 04) 16:20 (SG 04)	07:20 16:55
31	06:07 20:15	06:33 19:37		06:28 17:09		07:20 16:55	15:49 (SG 04) 42 16:31 (SG 04)
Potential sun hours	449	422	374	349	305	298	1280
Total, worst case			5		362		

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: Caterina 1 - Shadow flickering Shadow receptor: Q - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (60)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

		January		February	March	April		May	June	July	August		September	October	November	December		
1	07:20		08:05 (SG 04)	07:10	06:38	06:52		06:11	05:45	05:47	06:08		06:34	07:00	06:29	07:01		
	16:57	31	08:36 (SG 04)	17:28	17:58	19:27		19:55	20:21	20:31	20:15		19:36	18:50	17:08	16:47		
2	07:21		08:06 (SG 04)	07:09	06:37	06:51		06:09	05:45	05:47	06:09		06:35	07:01	06:30	07:02		
	16:57	30	08:36 (SG 04)	17:29	17:59	19:28		19:55	20:21	20:31	20:14		19:34	18:48	17:07	16:47		
3	07:21		08:08 (SG 04)	07:08	06:35	06:49		06:08	05:45	05:47	06:10		06:36	07:02	06:31	07:03		
	16:58	28	08:36 (SG 04)	17:30	18:00	19:29		19:56	20:22	20:31	20:13		19:33	18:47	17:05	16:46		
4	07:21		08:09 (SG 04)	07:07	06:34	06:48		06:07	05:44	05:48	06:10		06:37	07:02	06:33	07:03		
	16:59	27	08:36 (SG 04)	17:31	18:01	19:30		19:57	20:23	20:31	20:12		19:31	18:45	17:04	16:46		
5	07:21		08:10 (SG 04)	07:06	06:32	06:46		06:06	05:44	05:48	06:11		06:38	07:03	06:34	07:04		
	17:00	25	08:35 (SG 04)	17:32	18:02	19:31		19:58	20:23	20:30	20:11		19:30	18:44	17:03	16:46		
6	07:21		08:11 (SG 04)	07:05	06:31	06:45		06:05	05:44	05:49	06:12		06:39	07:04	06:35	07:05		
	17:01	23	08:34 (SG 04)	17:33	18:03	19:32		19:59	20:24	20:30	20:10		19:28	18:42	17:02	16:46		
7	07:21		08:13 (SG 04)	07:05	06:30	06:43		06:04	05:44	05:50	06:13		06:39	07:05	06:36	07:06		
	17:02	20	08:33 (SG 04)	17:35	18:04	19:33		20:00	20:24	20:30	20:08		19:27	18:41	17:01	16:46		
8	07:21		08:15 (SG 04)	07:04	06:28	06:42		06:03	05:43	05:50	06:14		06:40	07:06	06:37	07:07		
	17:03	16	08:31 (SG 04)	17:36	18:05	19:34		20:01	20:25	20:30	20:07		19:25	18:39	17:00	16:46		
9	07:21		08:18 (SG 04)	07:02	06:27	06:40		06:02	05:43	05:51	06:15		06:41	07:07	06:38	07:08		
	17:03	11	08:29 (SG 04)	17:37	18:06	19:34		20:02	20:25	20:29	20:06		19:24	18:38	17:00	16:46		
10	07:21			07:01	06:25	06:39		06:01	05:43	05:51	06:15		06:42	07:08	06:39	07:09		
	17:04			17:38	18:07	19:35		20:03	20:26	20:29	20:05		19:22	18:36	16:59	16:46		
11	07:21			07:00	06:24	06:37		06:00	05:43	05:52	06:16		06:43	07:09	06:40	07:10		
	17:05			17:39	18:08	19:36		20:04	20:26	20:29	20:04		19:21	18:35	16:58	16:46		
12	07:20			06:59	06:22	06:36		05:59	05:43	05:53	06:17		06:44	07:10	06:41	07:10		
	17:06			17:40	18:09	19:37		20:05	20:27	20:28	20:03		19:19	18:33	16:57	16:47		
13	07:20			06:58	06:21	06:34		05:58	05:43	05:53	06:18		06:44	07:11	06:42	07:11		
	17:07			17:41	18:10	19:38		20:05	20:27	20:28	20:02		19:18	18:32	16:56	16:47		
14	07:20			06:57	06:19	06:33		18:14 (SG 05)	05:57	05:43	05:54		06:45	07:12	06:43	07:12		
	17:08			17:42	18:11	19:39	2	18:16 (SG 05)	20:06	20:28	20:27	20:00		19:16	18:31	16:55	16:47	
15	07:20			06:56	06:18	06:32		18:10 (SG 05)	05:56	05:43	05:55	06:20		06:46	07:12	06:44	07:12	
	17:09			17:43	18:11	19:40	3	18:13 (SG 05)	20:07	20:28	20:27	19:59		19:15	18:29	16:55	16:47	
16	07:19			06:55	06:16	06:30		18:08 (SG 05)	05:55	05:43	05:55	06:21		06:47	07:13	06:45	07:13	
	17:10			17:44	18:12	19:41	3	18:11 (SG 05)	20:08	20:29	20:26	19:58		19:13	18:28	16:54	16:47	
17	07:19			06:54	06:15	06:29		18:05 (SG 05)	05:55	05:43	05:56	06:22		06:48	07:14	06:46	07:14	
	17:11			17:45	18:13	19:42	3	18:08 (SG 05)	20:09	20:29	20:26	19:57		19:11	18:26	16:53	16:48	
18	07:19			06:52	06:13	06:27		18:03 (SG 05)	05:54	05:43	05:57	06:22		06:49	07:15	06:47	07:14	
	17:12			17:46	18:14	19:43	3	18:06 (SG 05)	20:10	20:29	20:25	19:55		19:10	18:25	16:53	16:48	
19	07:18			06:51	06:12	06:26		18:02 (SG 05)	05:53	05:43	05:57	06:23		06:49	07:16	06:48	07:15	
	17:14			17:48	18:15	19:44	2	18:04 (SG 05)	20:11	20:30	20:25	19:54		19:08	18:24	16:52	16:49	
20	07:18			06:50	06:10	06:25		18:00 (SG 05)	05:52	05:43	05:58	06:24		06:50	07:17	06:49	07:16	
	17:15			17:49	18:16	19:44	2	18:02 (SG 05)	20:11	20:30	20:24	19:53		19:07	18:22	16:51	16:49	
21	07:17			06:49	06:09	06:23		17:59 (SG 05)	05:51	05:43	05:59	06:25		06:51	07:18	06:51	07:16	
	17:16			17:50	18:17	19:45	1	18:00 (SG 05)	20:12	20:30	20:24	19:51		19:05	18:21	16:51	16:49	
22	07:17			06:47	06:07	06:22		05:51	05:44	06:00	06:26		18:04 (SG 05)	06:52	07:19	06:52	07:17	
	17:17			17:51	18:18	19:46		20:13	20:30	20:23	19:50	1	18:05 (SG 05)	19:04	18:20	16:50	16:50	
23	07:16			06:46	06:06	06:21		05:50	05:44	06:00	06:27		18:05 (SG 05)	06:53	07:20	06:53	07:17	
	17:18			17:52	18:19	19:47		20:14	20:30	20:22	19:49	2	18:07 (SG 05)	19:02	18:18	16:50	16:50	
24	07:16			06:45	06:04	06:19		05:49	05:44	06:01	06:27		18:06 (SG 05)	06:54	07:21	06:54	07:18	
	17:19			17:53	18:20	19:48		20:15	20:31	20:21	19:47	3	18:09 (SG 05)	19:01	18:17	16:49	16:51	
25	07:15			06:43	06:03	06:18		05:49	05:44	06:02	06:28		18:06 (SG 05)	06:55	06:22	06:55	07:18	
	17:20			17:54	18:21	19:49		20:15	20:31	20:21	19:46	3	18:09 (SG 05)	18:59	17:16	16:49	16:52	
26	07:14			06:42	06:01	06:17		05:48	05:45	06:03	06:29		18:08 (SG 05)	06:55	06:23	06:56	07:19	
	17:21			17:55	18:22	19:50		20:16	20:31	20:20	19:44	3	18:11 (SG 05)	18:57	17:15	16:48	16:52	
27	07:14			06:41	06:00	06:16		05:48	05:45	06:04	06:30		18:10 (SG 05)	06:56	06:24	06:57	07:19	
	17:22			17:56	18:23	19:51		20:17	20:31	20:19	19:43	3	18:13 (SG 05)	18:56	17:13	16:48	16:53	
28	07:13			06:39	05:58	06:14		05:47	05:45	06:04	06:31		18:12 (SG 05)	06:57	06:25	06:58	07:19	
	17:23			17:57	18:23	19:52		20:18	20:31	20:18	19:42	3	18:15 (SG 05)	18:54	17:12	16:48	16:53	
29	07:12				06:57	06:13		05:47	05:46	06:05	06:32		18:15 (SG 05)	06:58	06:26	06:59	07:20	
	17:24				19:24	19:53		20:18	20:31	20:17	19:40	2	18:17 (SG 05)	18:53	17:11	16:47	16:54	
30	07:12				06:55	06:12		05:46	05:46	06:06	06:33			06:59	06:27	07:00	07:20	
	17:26				19:25	19:54		20:19	20:31	20:16	19:39			18:51	17:10	16:47	16:55	
31	07:11				06:54			05:46		06:07	06:33				06:28		07:20	
	17:27				19:26			20:20		20:16	19:37				17:09		16:56	32
Potential sun hours	306			302	370	395	19	440	442	449	422	20	374	349	305	298	916	
Total, worst case		211																

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: Caterina 1 - Shadow flickering Shadow receptor: R - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (61)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:10 19:55	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:30 17:07	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:48 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:31 17:06	07:03 16:47
4	07:21 16:59	07:07 17:31	06:34 18:01	06:48 19:30	06:07 19:57	05:44 20:23	05:48 20:31	06:10 20:12	06:37 19:31	07:02 18:45	06:33 17:04	07:04 16:46
5	07:21 17:00	07:06 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:49 20:30	06:11 20:11	06:38 19:30	07:03 18:44	06:34 17:03	07:04 16:46
6	07:21 17:01	07:05 17:33	06:31 18:03	06:45 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:10	06:39 19:28	07:04 18:42	06:35 17:02	07:05 16:46
7	07:21 17:02	07:05 17:35	06:30 18:04	06:43 19:33	06:04 20:00	05:44 20:24	05:50 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:36 17:01	07:06 16:46
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31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:16	06:33 19:37		06:28 17:09		07:20 16:56
Potential sun hours	306	302	370	395	440	442	449	422	374	349	305	298
Total, worst case												

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: Caterina 1 - Shadow flickering Shadow receptor: S - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (62)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:10 19:56	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:30 17:07	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:48 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:31 17:06	07:03 16:47
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31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:16	06:34 19:37		06:28 17:09		07:20 16:56
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: T - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (63)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

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2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:10 19:56	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:31 17:07	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:48 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:32 17:06	07:03 16:47
4	07:21 16:59	07:07 17:31	06:34 18:01	06:48 19:30	06:07 19:57	05:44 20:23	05:48 20:31	06:10 20:12	06:37 19:31	07:03 18:45	06:33 17:05	07:04 16:46
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Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: U - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (64)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
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Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: V - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (65)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
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31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:16	06:34 19:37		06:28 17:09		07:20 16:56
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: W - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (66)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:10 19:56	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:31 17:07	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:47 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:32 17:06	07:03 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:48 19:30	06:07 19:57	05:44 20:23	05:48 20:31	06:10 20:12	06:37 19:31	07:02 18:45	06:33 17:04	07:04 16:46
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Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: X - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (67)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Caterina 1 - Shadow flickering Shadow receptor: Y - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (68)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

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25	07:15 17:20	06:44 17:54	06:03 18:21	06:18 19:49	05:49 20:16	05:44 20:31	06:02 20:21	06:28 19:46	06:55 18:59	07:22 17:16	06:55 16:49	07:18 16:52
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28	07:13 17:23	06:39 17:57	05:58 18:24	06:14 19:52	05:47 20:18	05:45 20:31	06:05 20:18	06:31 19:42	06:57 18:54	07:25 17:12	06:58 16:48	07:19 16:53
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31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:16	06:34 19:37		06:28 17:09		07:20 16:56
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: Z - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (69)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:10 19:56	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:30 17:07	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:47 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:32 17:06	07:03 16:46
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31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:16	06:33 19:37		06:28 17:09		07:20 16:56
Potential sun hours	306	302	370	395	440	442	449	422	374	349	305	298
Total, worst case												

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: Caterina 1 - Shadow flickering Shadow receptor: AA - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (70)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
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Potential sun hours	306	302	307	395	440	442	449	422	374	349	305	298
Total, worst case	16										15	

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: Caterina 1 - Shadow flickering Shadow receptor: AB - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (71)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:46 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
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13	07:20 17:07	06:58 17:41	06:21 18:10	06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:02	06:44 19:18	07:11 18:32	06:42 16:56	07:11 16:47
14	07:20 17:08	06:57 17:42	06:19 18:10	06:33 19:39	05:57 20:06	05:43 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:12 18:30	06:43 16:55	07:12 16:47
15	07:20 17:09	06:56 17:43	06:18 18:11	06:31 19:40	05:56 20:07	05:43 20:28	05:54 20:27	06:20 19:59	06:46 19:14	07:12 18:29	06:44 16:55	07:13 16:47
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:43 20:29	05:55 20:27	06:21 19:58	06:47 19:13	07:13 18:28	06:45 16:54	07:13 16:47
17	07:19 17:11	06:54 17:45	06:15 18:13	06:29 19:42	05:54 20:09	05:43 20:29	05:56 20:26	06:21 19:57	06:48 19:11	07:14 18:26	06:46 16:53	07:14 16:48
18	07:19 17:12	06:52 17:46	06:13 18:14	06:27 19:43	05:54 20:10	05:43 20:29	05:57 20:25	06:22 19:55	06:49 19:10	07:15 18:25	06:47 16:52	07:14 16:48
19	07:18 17:13	06:51 17:47	06:12 18:15	06:26 19:44	05:53 20:11	05:43 20:30	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:24	06:48 16:52	07:15 16:48
20	07:18 17:15	06:50 17:49	06:10 18:16	06:25 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:53	06:50 19:07	07:17 18:22	06:50 16:51	07:16 16:49
21	07:17 17:16	06:49 17:50	06:09 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:24	06:25 19:51	06:51 19:05	07:18 18:21	06:51 16:51	07:16 16:49
22	07:17 17:17	06:47 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:43 20:30	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	06:52 16:50	07:17 16:50
23	07:16 17:18	06:46 17:52	06:06 18:19	06:21 19:47	05:50 20:14	05:44 20:30	06:00 20:22	06:27 19:49	06:53 19:02	07:20 18:18	06:53 16:50	07:17 16:50
24	07:16 17:19	06:45 17:53	06:04 18:20	06:19 19:48	05:49 20:15	05:44 20:31	06:01 20:21	06:27 19:47	06:54 19:00	07:21 18:17	06:54 16:49	07:18 16:51
25	07:15 17:20	06:43 17:54	06:03 18:21	06:18 19:49	05:49 20:15	05:44 20:31	06:02 20:21	06:28 19:46	06:55 18:59	07:22 17:16	06:55 16:49	07:18 16:51
26	07:14 17:21	06:42 17:55	06:01 18:22	06:17 19:50	05:48 20:16	05:45 20:31	06:03 20:20	06:29 19:44	06:55 18:57	07:23 17:15	06:56 16:48	07:19 16:52
27	07:14 17:22	06:41 17:56	06:00 18:23	06:15 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56	07:24 17:13	06:57 16:48	07:19 16:53
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52	05:47 20:18	05:45 20:31	06:04 20:18	06:31 19:42	06:57 18:54	07:25 17:12	06:58 16:48	07:19 16:53
29	07:12 17:24		06:57 19:24	06:13 19:53	05:47 20:18	05:46 20:31	06:05 20:17	06:32 19:40	06:58 18:53	07:26 17:11	06:59 16:47	07:20 16:54
30	07:12 17:26		06:55 19:25	06:12 19:54	05:46 20:19	05:46 20:31	06:06 20:16	06:33 19:39	06:59 18:51	07:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:53 19:26		05:46 20:20		06:07 20:16	06:33 19:37		06:28 17:09		07:20 16:55
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: AC - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (72)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:20 16:56	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:46 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:29 17:08	07:01 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:50 19:28	06:09 19:55	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:30 17:06	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:56	05:45 20:22	05:47 20:31	06:09 20:13	06:36 19:33	07:01 18:47	06:31 17:05	07:03 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:47 19:30	06:07 19:57	05:44 20:22	05:48 20:31	06:10 20:12	06:37 19:31	07:02 18:45	06:32 17:04	07:03 16:46
5	07:21 17:00	07:06 17:32	06:32 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:30	06:11 20:11	06:38 19:30	07:03 18:44	06:34 17:03	07:04 16:46
6	07:21 17:01	07:05 17:33	06:31 18:03	06:44 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:09	06:38 19:28	07:04 18:42	06:35 17:02	07:05 16:46
7	07:21 17:02	07:04 17:34	06:30 18:04	06:43 19:33	06:04 20:00	05:43 20:24	05:49 20:30	06:13 20:08	06:39 19:27	07:05 18:41	06:36 17:01	07:06 16:46
8	07:21 17:02	07:03 17:36	06:28 18:05	06:42 19:33	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:07	06:40 19:25	07:06 18:39	06:37 17:00	07:07 16:46
9	07:21 17:03	07:02 17:37	06:27 18:06	06:40 19:34	06:02 20:02	05:43 20:25	05:51 20:29	06:15 20:06	06:41 19:24	07:07 18:38	06:38 16:59	07:08 16:46
10	07:21 17:04	07:01 17:38	06:25 18:07	06:39 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:59	07:09 16:46
11	07:20 17:05	07:00 17:39	06:24 18:08	06:37 19:36	06:00 20:04	05:43 20:26	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:09 16:46
12	07:20 17:06	06:59 17:40	06:22 18:09	06:36 19:37	05:59 20:04	05:43 20:27	05:52 20:28	06:17 20:03	06:43 19:19	07:10 18:33	06:41 16:57	07:10 16:46
13	07:20 17:07	06:58 17:41	06:21 18:10	06:34 19:38	05:58 20:05	05:43 20:27	05:53 20:28	06:18 20:01	06:44 19:18	07:11 18:32	06:42 16:56	07:11 16:47
14	07:20 17:08	06:57 17:42	06:19 18:10	06:33 19:39	05:57 20:06	05:43 20:28	05:54 20:27	06:19 20:00	06:45 19:16	07:11 18:30	06:43 16:55	07:12 16:47
15	07:20 17:09	06:56 17:43	06:18 18:11	06:31 19:40	05:56 20:07	05:43 20:28	05:54 20:27	06:20 19:59	06:46 19:14	07:12 18:29	06:44 16:55	07:12 16:47
16	07:19 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:43 20:29	05:55 20:26	06:21 19:58	06:47 19:13	07:13 18:28	06:45 16:54	07:13 16:47
17	07:19 17:11	06:54 17:45	06:15 18:13	06:29 19:42	05:54 20:09	05:43 20:29	05:56 20:26	06:21 19:56	06:48 19:11	07:14 18:26	06:46 16:53	07:14 16:48
18	07:19 17:12	06:52 17:46	06:13 18:14	06:27 19:43	05:54 20:10	05:43 20:29	05:57 20:25	06:22 19:55	06:49 19:10	07:15 18:25	06:47 16:52	07:14 16:48
19	07:18 17:13	06:51 17:47	06:12 18:15	06:26 19:43	05:53 20:11	05:43 20:29	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:24	06:48 16:52	07:15 16:48
20	07:18 17:15	06:50 17:49	06:10 18:16	06:25 19:44	05:52 20:11	05:43 20:30	05:58 20:24	06:24 19:53	06:50 19:07	07:17 18:22	06:49 16:51	07:16 16:49
21	07:17 17:16	06:49 17:50	06:09 18:17	06:23 19:45	05:51 20:12	05:43 20:30	05:59 20:23	06:25 19:51	06:51 19:05	07:18 18:21	06:50 16:51	07:16 16:49
22	07:17 17:17	06:47 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:43 20:30	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	06:52 16:50	07:17 16:50
23	07:16 17:18	06:46 17:52	06:06 18:19	06:21 19:47	05:50 20:14	05:44 20:30	06:00 20:22	06:27 19:49	06:53 19:02	07:20 18:18	06:53 16:50	07:17 16:50
24	07:16 17:19	06:45 17:53	06:04 18:20	06:19 19:48	05:49 20:15	05:44 20:31	06:01 20:21	06:27 19:47	06:54 19:00	07:21 18:17	06:54 16:49	07:18 16:51
25	07:15 17:20	06:43 17:54	06:03 18:21	06:18 19:49	05:49 20:15	05:44 20:31	06:02 20:21	06:28 19:46	06:54 18:59	07:22 17:16	06:55 16:49	07:18 16:51
26	07:14 17:21	06:42 17:55	06:01 18:22	06:17 19:50	05:48 20:16	05:45 20:31	06:03 20:20	06:29 19:44	06:55 18:57	07:23 17:15	06:56 16:48	07:19 16:52
27	07:14 17:22	06:41 17:56	06:00 18:23	06:15 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56	07:24 17:13	06:57 16:48	07:19 16:53
28	07:13 17:23	06:39 17:57	05:58 18:23	06:14 19:52	05:47 20:18	05:45 20:31	06:04 20:18	06:31 19:42	06:57 18:54	07:25 17:12	06:58 16:48	07:19 16:53
29	07:12 17:24		06:56 19:24	06:13 19:53	05:47 20:18	05:46 20:31	06:05 20:17	06:32 19:40	06:58 18:53	07:26 17:11	06:59 16:47	07:20 16:54
30	07:11 17:26		06:55 19:25	06:12 19:54	05:46 20:19	05:46 20:31	06:06 20:16	06:33 19:39	06:59 18:51	07:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:53 19:26		05:46 20:20		06:07 20:15	06:33 19:37		06:28 17:09		07:20 16:55
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: AD - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (73)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January		February		March		April		May		June		July		August		September		October		November		December	
1	07:20	11:24 (SG 05)	07:10	11:59 (SG 05)	06:38	06:52	06:11	05:45	05:47	06:08	06:34	07:00	06:29	07:01	11:13 (SG 05)									
	16:57	135	13:39 (SG 05)	17:28	91	13:30 (SG 05)	17:58	19:27	19:55	20:25	20:31	20:15	19:36	18:50	17:08	16:47	130	13:23 (SG 05)						
2	07:21	11:25 (SG 05)	07:09	12:02 (SG 05)	06:37	06:51	06:10	05:45	05:47	06:09	06:35	07:01	06:30	07:02	11:13 (SG 05)									
	16:57	135	13:40 (SG 05)	17:29	86	13:28 (SG 05)	17:59	19:28	19:56	20:21	20:31	20:14	19:34	18:48	17:07	16:47	131	13:24 (SG 05)						
3	07:21	11:26 (SG 05)	07:08	12:05 (SG 05)	06:35	06:49	06:08	05:45	05:47	06:10	06:36	07:02	06:31	07:03	11:13 (SG 05)									
	16:58	134	13:40 (SG 05)	17:30	81	13:26 (SG 05)	18:00	19:29	19:56	20:22	20:31	20:13	19:33	18:47	17:06	35	12:02 (SG 05)	12:37 (SG 05)	16:46	132	13:25 (SG 05)			
4	07:21	11:27 (SG 05)	07:07	12:09 (SG 05)	06:34	06:48	06:07	05:44	05:48	06:10	06:37	07:02	06:33	07:04	11:14 (SG 05)									
	16:59	133	13:40 (SG 05)	17:31	75	13:24 (SG 05)	18:01	19:30	19:57	20:23	20:31	20:12	19:31	18:45	17:04	50	12:43 (SG 05)	16:46	131	13:25 (SG 05)				
5	07:21	11:27 (SG 05)	07:06	12:13 (SG 05)	06:32	06:46	06:06	05:44	05:48	06:11	06:38	07:03	06:34	07:04	11:14 (SG 05)									
	17:00	134	13:41 (SG 05)	17:32	68	13:21 (SG 05)	18:02	19:31	19:58	20:23	20:30	20:11	19:30	18:44	17:03	61	12:48 (SG 05)	16:46	132	13:26 (SG 05)				
6	07:21	11:28 (SG 05)	07:05	12:18 (SG 05)	06:31	06:45	06:05	05:44	05:49	06:12	06:39	07:04	06:35	07:05	11:15 (SG 05)									
	17:01	133	13:41 (SG 05)	17:33	59	13:17 (SG 05)	18:03	19:32	19:59	20:24	20:30	20:10	19:28	18:42	17:02	69	12:50 (SG 05)	16:46	133	13:26 (SG 05)				
7	07:21	11:28 (SG 05)	07:05	12:24 (SG 05)	06:30	06:43	06:04	05:44	05:50	06:13	06:39	07:05	06:36	07:06	11:15 (SG 05)									
	17:02	132	13:40 (SG 05)	17:35	48	13:12 (SG 05)	18:04	19:33	20:00	20:24	20:30	20:08	19:27	18:41	17:01	76	12:54 (SG 05)	16:46	134	13:27 (SG 05)				
8	07:21	11:28 (SG 05)	07:04	12:34 (SG 05)	06:28	06:42	06:03	05:43	05:50	06:14	06:40	07:06	06:37	07:07	11:16 (SG 05)									
	17:03	132	13:40 (SG 05)	17:36	31	13:05 (SG 05)	18:05	19:34	20:01	20:25	20:30	20:07	19:25	18:39	17:01	81	12:57 (SG 05)	16:46	133	13:27 (SG 05)				
9	07:21	11:29 (SG 05)	07:03	12:35 (SG 05)	06:27	06:40	06:02	05:43	05:51	06:15	06:41	07:07	06:38	07:08	11:17 (SG 05)									
	17:03	132	13:41 (SG 05)	17:37	25	13:00 (SG 05)	18:06	19:34	20:02	20:25	20:29	20:06	19:24	18:38	17:00	86	12:59 (SG 05)	16:46	134	13:28 (SG 05)				
10	07:21	11:30 (SG 05)	07:01	12:36 (SG 05)	06:25	06:39	06:01	05:43	05:51	06:16	06:42	07:08	06:39	07:09	11:18 (SG 05)									
	17:04	131	13:41 (SG 05)	17:38	19	12:55 (SG 05)	18:07	19:35	20:03	20:26	20:29	20:05	19:22	18:36	16:59	91	13:01 (SG 05)	16:46	135	13:29 (SG 05)				
11	07:21	11:31 (SG 05)	07:00	12:37 (SG 05)	06:24	06:37	06:00	05:43	05:52	06:16	06:43	07:09	06:40	07:10	11:19 (SG 05)									
	17:05	130	13:41 (SG 05)	17:39	13	12:50 (SG 05)	18:08	19:36	20:04	20:26	20:29	20:04	19:21	18:35	16:58	95	13:03 (SG 05)	16:46	135	13:30 (SG 05)				
12	07:20	11:32 (SG 05)	06:59	12:38 (SG 05)	06:22	06:36	05:59	05:43	05:53	06:17	06:44	07:10	06:41	07:11	11:20 (SG 05)									
	17:06	130	13:42 (SG 05)	17:40	7	12:45 (SG 05)	18:09	19:37	20:05	20:27	20:28	20:03	19:19	18:33	16:57	99	13:05 (SG 05)	16:47	135	13:29 (SG 05)				
13	07:20	11:32 (SG 05)	06:58	12:39 (SG 05)	06:21	06:34	05:58	05:43	05:53	06:18	06:44	07:11	06:42	07:12	11:21 (SG 05)									
	17:07	129	13:41 (SG 05)	17:41	1	12:40 (SG 05)	18:10	19:38	20:05	20:27	20:28	20:02	19:18	18:32	16:56	102	13:06 (SG 05)	16:47	135	13:30 (SG 05)				
14	07:20	11:34 (SG 05)	06:57	12:40 (SG 05)	06:19	06:33	05:57	05:43	05:54	06:19	06:45	07:12	06:43	07:13	11:22 (SG 05)									
	17:08	127	13:41 (SG 05)	17:42	1	12:35 (SG 05)	18:11	19:39	20:06	20:28	20:28	20:00	19:16	18:31	16:55	105	13:07 (SG 05)	16:47	135	13:31 (SG 05)				
15	07:20	11:35 (SG 05)	06:56	12:41 (SG 05)	06:18	06:32	05:56	05:43	05:55	06:20	06:46	07:13	06:44	07:14	11:23 (SG 05)									
	17:09	127	13:42 (SG 05)	17:43	1	12:30 (SG 05)	18:11	19:40	20:07	20:28	20:27	19:59	19:15	18:29	16:55	107	13:09 (SG 05)	16:47	136	13:32 (SG 05)				
16	07:19	11:36 (SG 05)	06:55	12:42 (SG 05)	06:16	06:30	05:55	05:43	05:55	06:21	06:47	07:13	06:45	07:15	11:24 (SG 05)									
	17:10	126	13:41 (SG 05)	17:44	1	12:25 (SG 05)	18:12	19:41	20:08	20:29	20:27	19:58	19:13	18:28	16:54	110	13:10 (SG 05)	16:47	136	13:32 (SG 05)				
17	07:19	11:36 (SG 05)	06:54	12:43 (SG 05)	06:15	06:29	05:55	05:43	05:56	06:22	06:48	07:14	06:46	07:16	11:25 (SG 05)									
	17:11	125	13:41 (SG 05)	17:45	1	12:20 (SG 05)	18:13	19:42	20:09	20:29	20:26	19:57	19:11	18:26	16:53	112	13:11 (SG 05)	16:48	136	13:33 (SG 05)				
18	07:19	11:37 (SG 05)	06:52	12:44 (SG 05)	06:13	06:27	05:54	05:43	05:57	06:22	06:49	07:15	06:47	07:17	11:26 (SG 05)									
	17:12	123	13:40 (SG 05)	17:47	1	12:15 (SG 05)	18:14	19:43	20:10	20:29	20:25	19:55	19:10	18:25	16:53	114	13:12 (SG 05)	16:48	136	13:33 (SG 05)				
19	07:18	11:38 (SG 05)	06:51	12:45 (SG 05)	06:12	06:26	05:53	05:43	05:57	06:23	06:49	07:16	06:48	07:18	11:27 (SG 05)									
	17:14	123	13:41 (SG 05)	17:48	1	12:10 (SG 05)	18:15	19:44	20:11	20:30	20:25	19:54	19:08	18:24	16:52	116	13:13 (SG 05)	16:49	137	13:34 (SG 05)				
20	07:18	11:39 (SG 05)	06:50	12:46 (SG 05)	06:10	06:25	05:52	05:43	05:58	06:24	06:50	07:17	06:50	07:19	11:28 (SG 05)									
	17:15	121	13:40 (SG 05)	17:49	1	12:05 (SG 05)	18:16	19:44	20:11	20:30	20:24	19:53	19:07	18:22	16:51	118	13:14 (SG 05)	16:49	136	13:34 (SG 05)				
21	07:17	11:41 (SG 05)	06:49	12:47 (SG 05)	06:09	06:23	05:52	05:43	05:59	06:25	06:51	07:18	06:51	07:20	11:29 (SG 05)									
	17:16	119	13:40 (SG 05)	17:50	1	12:00 (SG 05)	18:17	19:45	20:12	20:30	20:24	19:51	19:05	18:21	16:51	119	13:15 (SG 05)	16:49	136	13:34 (SG 05)				
22	07:17	11:41 (SG 05)	06:47	12:48 (SG 05)	06:07	06:22	05:51	05:44	06:00	06:26	06:52	07:19	06:52	07:21	11:30 (SG 05)									
	17:17	118	13:39 (SG 05)	17:51	1	11:55 (SG 05)	18:18	19:46	20:13	20:30	20:23	19:50	19:04	18:20	16:50	121	13:16 (SG 05)	16:50	136	13:34 (SG 05)				
23	07:16	11:43 (SG 05)	06:46	12:49 (SG 05)	06:06	06:21	05:50	05:44	06:01	06:27	06:53	07:20	06:53	07:21	11:31 (SG 05)									
	17:18	116	13:39 (SG 05)	17:52	1	11:50 (SG 05)	18:19	19:47	20:14	20:30	20:22	19:49	19:02	18:18	16:50	123	13:17 (SG 05)	16:50	136	13:35 (SG 05)				
24	07:16	11:44 (SG 05)	06:45	12:50 (SG 05)	06:04	06:19	05:49	05:44	06:01	06:28	06:54	07:21	06:54	07:22	11:32 (SG 05)									
	17:19	114	13:38 (SG 05)	17:53	1	11:45 (SG 05)	18:20	19:48	20:15	20:31	20:21	19:47	19:01	18:17	16:49	123	13:18 (SG 05)	16:51	137	13:36 (SG 05)				
25	07:15	11:45 (SG 05)	06:43	12:51 (SG 05)	06:03	06:18	05:49	05:44	06:02	06:28	06:55	07:22	06:55	07:23	11:33 (SG 05)									
	17:20	112	13:37 (SG 05)	17:54	1	11:40 (SG 05)	18:21	19:49	20:1															

SHADOW - Calendar

Calculation: Caterina 1 - Shadow flickering Shadow receptor: AE - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (74)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:46 20:21	05:47 20:31	06:08 20:15	06:35 19:36	07:00 18:50	06:30 17:08	07:01 16:47
2	07:21 16:58	07:09 17:29	06:37 17:59	06:51 19:28	06:10 19:56	05:45 20:22	05:47 20:31	06:09 20:14	06:35 19:35	07:01 18:49	06:31 17:07	07:02 16:47
3	07:21 16:58	07:09 17:30	06:36 18:00	06:49 19:29	06:09 19:57	05:45 20:22	05:48 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:32 17:06	07:03 16:47
4	07:21 16:59	07:08 17:31	06:34 18:01	06:48 19:30	06:07 19:58	05:45 20:23	05:48 20:31	06:11 20:12	06:37 19:32	07:03 18:45	06:33 17:05	07:04 16:47
5	07:21 17:00	07:07 17:33	06:33 18:02	06:46 19:31	06:06 19:59	05:44 20:24	05:49 20:31	06:11 20:11	06:38 19:30	07:04 18:44	06:34 17:04	07:05 16:46
6	07:21 17:01	07:06 17:34	06:31 18:03	06:45 19:32	06:05 20:00	05:44 20:24	05:49 20:31	06:12 20:10	06:39 19:29	07:05 18:42	06:35 17:03	07:06 16:46
7	07:21 17:02	07:05 17:35	06:30 18:04	06:43 19:33	06:04 20:00	05:44 20:25	05:50 20:30	06:13 20:09	06:40 19:27	07:05 18:41	06:36 17:02	07:07 16:46
8	07:21 17:03	07:04 17:36	06:28 18:05	06:42 19:34	06:03 20:01	05:44 20:25	05:50 20:30	06:14 20:08	06:41 19:26	07:06 18:40	06:37 17:01	07:07 16:46
9	07:21 17:04	07:03 17:37	06:27 18:06	06:40 19:35	06:02 20:02	05:43 20:26	05:51 20:30	06:15 20:07	06:41 19:24	07:07 18:38	06:38 17:00	07:08 16:46
10	07:21 17:05	07:02 17:38	06:26 18:07	06:39 19:36	06:01 20:03	05:43 20:26	05:52 20:30	06:16 20:05	06:42 19:23	07:08 18:37	06:39 16:59	07:09 16:46
11	07:21 17:06	07:01 17:39	06:24 18:08	06:37 19:37	06:00 20:04	05:43 20:27	05:52 20:29	06:17 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:10 16:47
12	07:21 17:07	07:00 17:40	06:23 18:09	06:36 19:38	05:59 20:05	05:43 20:27	05:53 20:29	06:17 20:03	06:44 19:19	07:10 18:34	06:41 16:57	07:11 16:47
13	07:21 17:08	06:59 17:41	06:21 18:10	06:35 19:38	05:58 20:06	05:43 20:28	05:53 20:28	06:18 20:02	06:45 19:18	07:11 18:32	06:42 16:56	07:11 16:47
14	07:20 17:09	06:57 17:42	06:20 18:11	06:33 19:39	05:57 20:07	05:43 20:28	05:54 20:28	06:19 20:01	06:46 19:16	07:12 18:31	06:44 16:56	07:12 16:47
15	07:20 17:10	06:56 17:44	06:18 18:12	06:32 19:40	05:56 20:08	05:43 20:29	05:55 20:27	06:20 19:59	06:46 19:15	07:13 18:29	06:45 16:55	07:13 16:47
16	07:20 17:11	06:55 17:45	06:17 18:13	06:30 19:41	05:56 20:08	05:43 20:29	05:55 20:27	06:21 19:58	06:47 19:13	07:14 18:28	06:46 16:54	07:14 16:48
17	07:19 17:12	06:54 17:46	06:15 18:14	06:29 19:42	05:55 20:09	05:43 20:29	05:56 20:26	06:22 19:57	06:48 19:12	07:15 18:27	06:47 16:53	07:14 16:48
18	07:19 17:13	06:53 17:47	06:14 18:15	06:28 19:43	05:54 20:10	05:43 20:30	05:57 20:26	06:23 19:56	06:49 19:10	07:16 18:25	06:48 16:53	07:15 16:48
19	07:19 17:14	06:52 17:48	06:12 18:16	06:26 19:44	05:53 20:11	05:43 20:30	05:58 20:25	06:23 19:54	06:50 19:09	07:17 18:24	06:49 16:52	07:16 16:49
20	07:18 17:15	06:50 17:49	06:11 18:16	06:25 19:45	05:52 20:12	05:43 20:30	05:58 20:25	06:24 19:53	06:51 19:07	07:18 18:23	06:50 16:52	07:16 16:49
21	07:18 17:16	06:49 17:50	06:09 18:17	06:24 19:46	05:52 20:13	05:44 20:30	05:59 20:24	06:25 19:52	06:51 19:05	07:19 18:21	06:51 16:51	07:17 16:50
22	07:17 17:17	06:48 17:51	06:08 18:18	06:22 19:47	05:51 20:13	05:44 20:31	06:00 20:23	06:26 19:50	06:52 19:04	07:20 18:20	06:52 16:50	07:17 16:50
23	07:17 17:18	06:46 17:52	06:06 18:19	06:21 19:48	05:50 20:14	05:44 20:31	06:01 20:23	06:27 19:49	06:53 19:02	07:21 18:19	06:53 16:50	07:18 16:51
24	07:16 17:19	06:45 17:53	06:04 18:20	06:20 19:49	05:50 20:15	05:44 20:31	06:01 20:22	06:28 19:48	06:54 19:01	07:22 18:17	06:54 16:49	07:18 16:51
25	07:15 17:21	06:44 17:55	06:03 18:22	06:18 19:50	05:49 20:17	05:45 20:31	06:02 20:20	06:29 19:45	06:55 18:58	07:23 17:15	06:55 16:49	07:19 16:52
26	07:15 17:22	06:42 17:56	06:01 18:23	06:17 19:51	05:48 20:17	05:45 20:31	06:03 20:19	06:29 19:43	06:56 18:56	07:24 17:14	06:56 16:48	07:19 16:53
27	07:14 17:22	06:41 17:56	06:00 18:23	06:16 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:57 18:56	07:25 17:14	06:57 16:48	07:19 16:53
28	07:13 17:24	06:40 17:57	05:58 18:24	06:15 19:52	05:47 20:18	05:46 20:31	06:05 20:19	06:31 19:42	06:57 18:55	07:26 17:12	06:58 16:48	07:20 16:54
29	07:13 17:25		06:57 19:25	06:13 19:53	05:47 20:19	05:46 20:31	06:06 20:18	06:32 19:41	06:58 18:53	07:27 17:11	06:59 16:48	07:20 16:54
30	07:12 17:26		06:55 19:26	06:12 19:54	05:46 20:20	05:46 20:31	06:06 20:17	06:33 19:39	06:59 18:52	07:28 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:54 19:27		05:46 20:20		06:07 20:16	06:34 19:38		06:29 17:09		07:21 16:56
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: AF - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (75)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 16:57	07:10 17:28	07:54 (SG 13) 06:38 08:22 (SG 13) 17:58	06:52 19:28	06:11 19:55	05:46 20:21	05:47 20:31	06:08 20:15	06:35 19:36	07:00 18:50	06:30 17:08	07:29 (SG 13) 07:01 07:47 (SG 13) 16:47
2	07:21 16:58	07:10 17:29	07:54 (SG 13) 06:37 08:22 (SG 13) 17:59	06:51 19:28	06:10 19:56	05:45 20:22	05:47 20:31	06:09 20:14	06:35 19:35	07:01 18:49	06:31 17:07	07:28 (SG 13) 07:02 07:48 (SG 13) 16:47
3	07:21 16:58	07:09 17:30	07:54 (SG 13) 06:36 08:22 (SG 13) 18:00	06:49 19:29	06:09 19:57	05:45 20:22	05:48 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:32 17:06	07:27 (SG 13) 07:03 07:49 (SG 13) 16:47
4	07:21 16:59	07:08 17:31	07:55 (SG 13) 06:34 08:23 (SG 13) 18:01	06:48 19:30	06:07 19:58	05:44 20:23	05:48 20:31	06:11 20:12	06:37 19:32	07:03 18:45	06:33 17:05	07:26 (SG 13) 07:04 07:50 (SG 13) 16:47
5	07:21 17:00	07:07 17:33	07:56 (SG 13) 06:33 08:22 (SG 13) 18:02	06:46 19:31	06:06 19:59	05:44 20:24	05:49 20:31	06:11 20:11	06:38 19:30	07:04 18:44	06:34 17:04	07:26 (SG 13) 07:05 07:52 (SG 13) 16:46
6	07:21 17:01	07:06 17:34	07:56 (SG 13) 06:31 08:22 (SG 13) 18:03	06:45 19:32	06:05 20:00	05:44 20:24	05:49 20:31	06:12 20:10	06:39 19:29	07:05 18:42	06:35 17:03	07:26 (SG 13) 07:06 07:52 (SG 13) 16:46
7	07:21 17:02	07:05 17:35	07:57 (SG 13) 06:30 08:21 (SG 13) 18:04	06:43 19:33	06:04 20:00	05:44 20:25	05:50 20:30	06:13 20:09	06:40 19:27	07:05 18:41	06:36 17:02	07:25 (SG 13) 07:07 07:52 (SG 13) 16:46
8	07:21 17:03	07:04 17:36	07:58 (SG 13) 06:28 08:20 (SG 13) 18:05	06:42 19:34	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:08	06:40 19:26	07:06 18:40	06:37 17:01	07:25 (SG 13) 07:08 07:53 (SG 13) 16:46
9	07:21 17:04	07:03 17:37	07:59 (SG 13) 06:27 08:19 (SG 13) 18:06	06:40 19:35	06:02 20:02	05:43 20:26	05:51 20:30	06:15 20:07	06:41 19:24	07:07 18:38	06:38 17:00	07:25 (SG 13) 07:08 07:53 (SG 13) 16:46
10	07:21 17:05	07:02 17:38	08:00 (SG 13) 06:26 08:17 (SG 13) 18:07	06:39 19:36	06:01 20:03	05:43 20:26	05:51 20:30	06:16 20:06	06:42 19:23	07:08 18:37	06:39 16:59	07:25 (SG 13) 07:09 07:53 (SG 13) 16:46
11	07:21 17:06	07:01 17:39	08:02 (SG 13) 06:24 08:15 (SG 13) 18:08	06:37 19:37	06:00 20:04	05:43 20:27	05:52 20:29	06:17 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:25 (SG 13) 07:10 07:53 (SG 13) 16:47
12	07:21 17:07	07:00 17:40	08:05 (SG 13) 06:23 08:12 (SG 13) 18:09	06:36 19:38	05:59 20:05	05:43 20:27	05:53 20:29	06:17 20:03	06:44 19:20	07:10 18:34	06:41 16:57	07:26 (SG 13) 07:11 07:53 (SG 13) 16:47
13	07:21 17:08	06:59 17:41	06:21 18:10	06:35 19:38	05:58 20:06	05:43 20:28	05:53 20:28	06:18 20:02	06:45 19:18	07:11 18:32	06:42 16:56	07:26 (SG 13) 07:12 07:53 (SG 13) 16:47
14	07:20 17:09	06:57 17:42	06:20 18:11	06:33 19:39	05:57 20:07	05:43 20:28	05:54 20:28	06:19 20:01	06:46 19:16	07:12 18:31	06:44 16:56	07:27 (SG 13) 07:12 07:53 (SG 13) 16:47
15	07:20 17:10	06:56 17:44	06:18 18:12	06:32 19:40	05:56 20:08	05:43 20:29	05:55 20:27	06:20 19:59	06:46 19:15	07:13 18:29	06:45 16:55	07:27 (SG 13) 07:13 07:52 (SG 13) 16:47
16	07:20 17:11	06:55 17:45	06:17 18:13	06:30 19:41	05:56 20:08	05:43 20:29	05:55 20:27	06:21 19:58	06:47 19:13	07:14 18:28	06:46 16:54	07:28 (SG 13) 07:14 07:52 (SG 13) 16:48
17	07:19 17:12	06:54 17:46	06:15 18:14	06:29 19:42	05:55 20:09	05:43 20:29	05:56 20:26	06:22 19:57	06:48 19:12	07:15 18:27	06:47 16:53	07:29 (SG 13) 07:14 07:51 (SG 13) 16:48
18	07:19 17:13	06:53 17:47	06:14 18:15	06:28 19:43	05:54 20:10	05:43 20:30	05:57 20:26	06:23 19:56	06:49 19:10	07:16 18:25	06:48 16:53	07:30 (SG 13) 07:15 07:50 (SG 13) 16:48
19	07:19 17:14	06:52 17:48	06:12 18:16	06:26 19:44	05:53 20:11	05:43 20:30	05:58 20:25	06:23 19:54	06:50 19:09	07:17 18:24	06:49 16:52	07:32 (SG 13) 07:16 07:50 (SG 13) 16:49
20	07:18 17:15	06:50 17:49	06:11 18:16	06:25 19:45	05:52 20:12	05:43 20:30	05:58 20:25	06:24 19:53	06:51 19:07	07:18 18:23	06:50 16:51	07:33 (SG 13) 07:16 07:49 (SG 13) 16:49
21	07:18 17:16	06:49 17:50	06:09 18:17	06:24 19:46	05:52 20:13	05:44 20:31	05:59 20:24	06:25 19:52	06:51 19:06	07:19 18:21	06:51 16:51	07:35 (SG 13) 07:17 07:48 (SG 13) 16:50
22	07:17 17:17	06:48 17:51	06:08 18:18	06:22 19:47	05:51 20:14	05:44 20:31	06:00 20:23	06:26 19:50	06:52 19:04	07:20 18:20	06:52 16:50	07:38 (SG 13) 07:17 07:45 (SG 13) 16:50
23	07:17 17:18	06:46 17:52	06:06 18:19	06:21 19:48	05:50 20:14	05:44 20:31	06:01 20:23	06:27 19:49	06:53 19:02	07:21 18:19	06:53 16:50	07:39 (SG 13) 07:18 07:46 (SG 13) 16:51
24	07:16 17:19	06:45 17:53	06:04 18:20	06:20 19:49	05:50 20:15	05:44 20:31	06:01 20:22	06:28 19:48	06:54 19:01	07:22 18:17	06:54 16:49	07:40 (SG 13) 07:19 07:47 (SG 13) 16:51
25	07:15 17:20	06:44 17:54	06:03 18:21	06:18 19:49	05:49 20:16	05:44 20:31	06:02 20:21	06:29 19:46	06:55 18:59	06:23 17:16	06:55 16:49	07:41 (SG 13) 07:20 07:48 (SG 13) 16:52
26	07:15 17:21	06:43 17:55	06:01 18:22	06:17 19:50	05:48 20:17	05:45 20:31	06:03 20:20	06:29 19:45	06:56 18:58	06:24 17:15	06:56 16:49	07:42 (SG 13) 07:21 07:49 (SG 13) 16:52
27	07:14 17:22	06:41 17:56	06:00 18:23	06:16 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:57 18:56	06:25 17:14	06:57 16:48	07:43 (SG 13) 07:22 07:50 (SG 13) 16:53
28	07:13 17:24	06:40 17:57	05:58 18:24	06:15 19:52	05:47 20:18	05:45 20:31	06:05 20:19	06:31 19:42	06:57 18:55	06:26 17:12	06:58 16:48	07:44 (SG 13) 07:23 07:51 (SG 13) 16:54
29	07:13 17:25	06:39 17:58	06:57 19:25	06:13 19:53	05:47 20:19	05:46 20:31	06:06 20:18	06:32 19:41	06:58 18:53	06:27 17:11	06:59 16:48	07:45 (SG 13) 07:24 07:52 (SG 13) 16:54
30	07:12 17:26	06:38 17:59	06:56 19:26	06:12 19:54	05:46 20:20	05:46 20:31	06:06 20:17	06:33 19:39	06:59 18:52	06:28 17:10	07:00 16:47	07:46 (SG 13) 07:25 07:53 (SG 13) 16:55
31	07:11 17:27	06:37 18:00	06:55 19:27	06:11 19:55	05:45 20:20	05:45 20:31	06:06 20:16	06:34 19:38	06:59 17:09	06:29 17:09	07:01 16:47	07:47 (SG 13) 07:26 07:54 (SG 13) 16:56
Potential sun hours	306	302	302	302	302	302	302	302	302	302	302	298
Total, worst case	252	267	270	270	270	270	270	270	270	270	270	270

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)

SHADOW - Calendar

Calculation: Caterina 1 - Shadow flickering Shadow receptor: AG - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (76)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January		February		March		April		May		June		July		August		September		October		November		December	
1	07:21 16:57		07:10 17:28	29	07:59 (SG 13) 08:28 (SG 13)	06:38 17:58	06:52 19:27	06:11 19:55	05:46 20:21	05:47 20:31	06:08 20:15	06:35 19:36	07:00 18:50	06:30 17:08								07:01 16:47	9	07:45 (SG 13) 07:54 (SG 13)
2	07:21 16:58		07:10 17:29	27	08:00 (SG 13) 08:27 (SG 13)	06:37 17:59	06:51 19:28	06:10 19:56	05:45 20:22	05:47 20:31	06:09 20:14	06:35 19:35	07:01 18:49	06:31 17:07	3	07:42 (SG 13)						07:02 16:47	3	07:48 (SG 13) 07:51 (SG 13)
3	07:21 16:58		07:09 17:30	27	08:00 (SG 13) 08:27 (SG 13)	06:36 18:00	06:49 19:29	06:09 19:57	05:45 20:22	05:48 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:32 17:06	13	07:37 (SG 13)						07:03 16:47		
4	07:21 16:59		07:08 17:31	25	08:02 (SG 13) 08:27 (SG 13)	06:34 18:01	06:48 19:30	06:07 19:58	05:44 20:23	05:48 20:31	06:11 20:12	06:37 19:32	07:03 18:45	06:33 17:05	17	07:35 (SG 13)						07:04 16:47		
5	07:21 17:00		07:07 17:33	23	08:03 (SG 13) 08:26 (SG 13)	06:33 18:02	06:46 19:31	06:06 19:59	05:44 20:24	05:49 20:31	06:11 20:11	06:38 19:30	07:04 18:44	06:34 17:04	21	07:34 (SG 13)						07:05 16:46		
6	07:21 17:01		07:06 17:34	20	08:05 (SG 13) 08:25 (SG 13)	06:31 18:03	06:45 19:32	06:05 20:00	05:44 20:24	05:49 20:31	06:12 20:10	06:39 19:29	07:05 18:42	06:35 17:03	23	07:33 (SG 13)						07:06 16:46		
7	07:21 17:02		07:05 17:35	17	08:06 (SG 13) 08:23 (SG 13)	06:30 18:04	06:43 19:33	06:04 20:00	05:44 20:25	05:50 20:30	06:13 20:09	06:40 19:27	07:06 18:41	06:36 17:02	25	07:32 (SG 13)						07:07 16:46		
8	07:21 17:03		07:04 17:36	12	08:09 (SG 13) 08:21 (SG 13)	06:28 18:05	06:42 19:34	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:08	06:40 19:26	07:06 18:40	06:37 17:01	27	07:31 (SG 13)						07:08 16:46		
9	07:21 17:04		07:03 17:37				06:27 18:06	06:40 19:35	06:02 20:02	05:43 20:26	05:51 20:30	06:15 20:07	06:41 19:24	07:07 18:38	28	07:30 (SG 13)						07:08 16:46		
10	07:21 17:05	2	08:06 (SG 13) 08:08 (SG 13)				06:26 18:07	06:39 19:36	06:01 20:03	05:43 20:26	05:51 20:30	06:16 20:05	06:42 19:23	07:08 18:37	29	07:29 (SG 13)						07:09 16:46		
11	07:21 17:06	9	08:03 (SG 13) 08:12 (SG 13)				06:24 18:08	06:37 19:37	06:00 20:04	05:43 20:27	05:52 20:29	06:17 20:04	06:43 19:21	07:09 18:35	29	07:28 (SG 13)						07:10 16:47		
12	07:21 17:07		08:02 (SG 13) 08:15 (SG 13)				06:23 18:09	06:36 19:38	05:59 20:05	05:43 20:27	05:53 20:29	06:17 20:03	06:44 19:19	07:10 18:34	30	07:27 (SG 13)						07:11 16:47		
13	07:21 17:08	13	08:01 (SG 13) 08:17 (SG 13)				06:21 18:10	06:35 19:38	05:58 20:06	05:43 20:28	05:53 20:28	06:18 20:02	06:45 19:18	07:11 18:32	30	07:26 (SG 13)						07:12 16:47		
14	07:20 17:09	16	08:17 (SG 13) 08:17 (SG 13)				06:20 18:11	06:33 19:39	05:57 20:07	05:43 20:28	05:54 20:28	06:19 20:01	06:46 19:16	07:12 18:31	31	07:25 (SG 13)						07:12 16:47		
15	07:20 17:10		07:59 (SG 13) 08:19 (SG 13)				06:18 18:12	06:32 19:40	05:56 20:08	05:43 20:29	05:55 20:27	06:20 19:59	06:46 19:15	07:13 18:29	31	07:24 (SG 13)						07:13 16:47		
16	07:20 17:11	22	07:59 (SG 13) 08:21 (SG 13)				06:17 18:13	06:30 19:41	05:56 20:08	05:43 20:29	05:55 20:27	06:21 19:58	06:47 19:13	07:14 18:28	31	07:23 (SG 13)						07:14 16:48		
17	07:19 17:12		07:58 (SG 13) 08:21 (SG 13)				06:15 18:14	06:29 19:42	05:55 20:09	05:43 20:29	05:56 20:26	06:22 19:57	06:48 19:12	07:15 18:27	31	07:22 (SG 13)						07:14 16:48		
18	07:19 17:13	23	07:58 (SG 13) 08:23 (SG 13)				06:14 18:15	06:28 19:43	05:54 20:10	05:43 20:30	05:57 20:26	06:23 19:56	06:49 19:10	07:16 18:25	30	07:21 (SG 13)						07:15 16:48		
19	07:19 17:14	25	07:58 (SG 13) 08:25 (SG 13)				06:12 18:16	06:26 19:44	05:53 20:11	05:43 20:30	05:58 20:25	06:23 19:54	06:50 19:09	07:17 18:24	30	07:20 (SG 13)						07:16 16:49		
20	07:18 17:15	26	07:57 (SG 13) 08:25 (SG 13)				06:12 18:16	06:26 19:45	05:53 20:12	05:43 20:30	05:58 20:25	06:23 19:53	06:50 19:07	07:17 18:23	29	07:19 (SG 13)						07:16 16:49		
21	07:18 17:16	27	07:57 (SG 13) 08:25 (SG 13)				06:11 18:17	06:25 19:46	05:52 20:13	05:43 20:31	05:58 20:24	06:24 19:52	06:51 19:06	07:18 18:21	28	07:18 (SG 13)						07:16 16:50		
22	07:17 17:17	28	07:57 (SG 13) 08:26 (SG 13)				06:09 18:18	06:24 19:47	05:52 20:13	05:44 20:31	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	27	07:17 (SG 13)						07:17 16:50		
23	07:17 17:18	29	07:57 (SG 13) 08:26 (SG 13)				06:06 18:19	06:21 19:48	05:50 20:14	05:44 20:31	06:01 20:23	06:27 19:49	06:53 19:02	07:21 18:19	27	07:16 (SG 13)						07:18 16:51		
24	07:16 17:19	30	07:57 (SG 13) 08:27 (SG 13)				06:04 18:20	06:20 19:49	05:50 20:15	05:44 20:31	06:01 20:22	06:28 19:48	06:54 19:01	07:22 18:17	26	07:15 (SG 13)						07:18 16:51		
25	07:15 17:20	31	07:57 (SG 13) 08:28 (SG 13)				06:03 18:21	06:18 19:49	05:49 20:16	05:44 20:31	06:02 20:21	06:29 19:46	06:55 18:59	07:23 17:16	25	07:14 (SG 13)						07:19 16:52		
26	07:15 17:21		07:57 (SG 13) 08:28 (SG 13)				06:01 18:22	06:17 19:50	05:48 20:17	05:45 20:31	06:03 20:20	06:29 19:45	06:56 18:58	07:24 17:15	24	07:13 (SG 13)						07:19 16:52		
27	07:14 17:22	31	07:57 (SG 13) 08:28 (SG 13)				06:00 18:23	06:16 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:57 18:56	07:25 17:14	23	07:12 (SG 13)						07:19 16:53		
28	07:13 17:24		07:58 (SG 13) 08:29 (SG 13)				05:58 18:24	06:15 19:52	05:47 20:18	05:45 20:31	06:05 20:19	06:31 19:42	06:57 18:55	07:26 17:12	22	07:11 (SG 13)						07:20 16:54		
29	07:13 17:25	31	07:58 (SG 13) 08:29 (SG 13)				05:57 18:25	06:13 19:53	05:47 20:19	05:46 20:31	06:06 20:18	06:32 19:41	06:58 18:53	07:27 17:11	21	07:10 (SG 13)						07:20 16:54		
30	07:12 17:26		07:58 (SG 13) 08:28 (SG 13)				05:55 18:26	06:12 19:54	05:46 20:20	05:46 20:31	06:06 20:17	06:33 19:39	06:59 18:52	07:28 17:10	20	07:09 (SG 13)						07:20 16:55		
31	07:11 17:27	29	07:59 (SG 13) 08:28 (SG 13)				05:54 18:27	06:14 19:27	05:46 20:20	05:46 20:20	06:07 20:16	06:34 19:38	06:59 17:09	07:29 16:47	19	07:08 (SG 13)						07:21 16:56		
Potential sun hours	306		302				370	395	440	442	449	422	374	348	305	704						298	12	
Total, worst case	529		180																					

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: Caterina 1 - Shadow flickering Shadow receptor: AH - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (77)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January		February		March		April		May		June		July		August		September		October		November		December	
1	07:21	08:11 (SG 13)	07:10	08:24 (SG 13)	06:38	06:52	06:11	05:46	05:47	06:08	06:35	07:00	06:30									07:01	07:55 (SG 13)	
	16:57	39 08:50 (SG 13)	17:28	08:56 (SG 13)	17:58	19:27	19:55	20:21	20:31	20:15	19:36	18:50	17:08									16:47	43 08:38 (SG 13)	
2	07:21	08:12 (SG 13)	07:09	08:25 (SG 13)	06:37	06:51	06:10	05:45	05:47	06:09	06:35	07:01	06:31									07:02	07:56 (SG 13)	
	16:57	38 08:50 (SG 13)	17:29	08:55 (SG 13)	17:59	19:28	19:56	20:22	20:31	20:14	19:35	18:48	17:07									16:47	42 08:38 (SG 13)	
3	07:21	08:12 (SG 13)	07:09	08:26 (SG 13)	06:36	06:49	06:09	05:45	05:48	06:10	06:36	07:02	06:32									07:03	07:56 (SG 13)	
	16:58	39 08:51 (SG 13)	17:30	08:53 (SG 13)	18:00	19:29	19:57	20:22	20:31	20:13	19:33	18:47	17:06									16:47	42 08:38 (SG 13)	
4	07:21	08:12 (SG 13)	07:08	08:29 (SG 13)	06:34	06:48	06:07	05:44	05:48	06:11	06:37	07:03	06:33									07:04	07:57 (SG 13)	
	16:59	39 08:51 (SG 13)	17:31	08:52 (SG 13)	18:01	19:30	19:58	20:23	20:31	20:12	19:32	18:45	17:05									16:46	41 08:38 (SG 13)	
5	07:21	08:12 (SG 13)	07:07	08:31 (SG 13)	06:33	06:46	06:06	05:44	05:49	06:11	06:38	07:04	06:34									07:05	07:58 (SG 13)	
	17:00	40 08:52 (SG 13)	17:33	08:50 (SG 13)	18:02	19:31	19:59	20:24	20:31	20:11	19:30	18:44	17:04	15			08:03 (SG 13)					07:05	07:59 (SG 13)	
6	07:21	08:12 (SG 13)	07:06	08:34 (SG 13)	06:31	06:45	06:05	05:44	05:49	06:12	06:39	07:05	06:35				08:01 (SG 13)					07:06	07:58 (SG 13)	
	17:01	41 08:53 (SG 13)	17:34	08:47 (SG 13)	18:03	19:32	20:00	20:24	20:31	20:10	19:29	18:42	17:03	19			08:02 (SG 13)					07:06	07:59 (SG 13)	
7	07:21	08:13 (SG 13)	07:05	08:30	06:43	06:04	05:44	05:50	06:13	06:40	07:05	06:36	07:07				07:59 (SG 13)					07:07	07:59 (SG 13)	
	17:02	40 08:53 (SG 13)	17:35	18:04	19:33	20:00	20:25	20:30	20:09	19:27	18:41	17:02	16:46	24			08:23 (SG 13)					07:08	08:00 (SG 13)	
8	07:21	08:13 (SG 13)	07:04	08:28	06:42	06:03	05:43	05:50	06:14	06:40	07:06	06:37	07:07				07:57 (SG 13)					07:08	08:00 (SG 13)	
	17:03	41 08:54 (SG 13)	17:36	18:05	19:34	20:01	20:25	20:30	20:08	19:26	18:39	17:01	16:46	27			08:24 (SG 13)					07:09	08:00 (SG 13)	
9	07:21	08:13 (SG 13)	07:03	08:27	06:40	06:02	05:43	05:51	06:15	06:41	07:07	06:38	07:08				07:56 (SG 13)					07:09	08:01 (SG 13)	
	17:04	42 08:55 (SG 13)	17:37	18:06	19:35	20:02	20:26	20:30	20:07	19:24	18:38	17:00	16:46	30			08:26 (SG 13)					07:10	08:01 (SG 13)	
10	07:21	08:13 (SG 13)	07:02	08:26	06:39	06:01	05:43	05:51	06:16	06:42	07:08	06:39	07:09				07:54 (SG 13)					07:10	08:01 (SG 13)	
	17:05	42 08:55 (SG 13)	17:38	18:07	19:36	20:03	20:26	20:30	20:05	19:23	18:37	16:59	16:47	33			08:27 (SG 13)					07:11	08:01 (SG 13)	
11	07:21	08:13 (SG 13)	07:01	08:24	06:37	06:00	05:43	05:52	06:17	06:43	07:09	06:40	07:10				07:53 (SG 13)					07:11	08:01 (SG 13)	
	17:06	43 08:56 (SG 13)	17:39	18:08	19:37	20:04	20:27	20:29	20:04	19:21	18:35	16:58	16:47	35			08:28 (SG 13)					07:11	08:02 (SG 13)	
12	07:21	08:14 (SG 13)	07:00	08:23	06:36	05:59	05:43	05:53	06:17	06:44	07:10	06:41	07:10				07:54 (SG 13)					07:11	08:02 (SG 13)	
	17:07	42 08:56 (SG 13)	17:40	18:09	19:38	20:05	20:27	20:29	20:03	19:19	18:34	16:57	16:47	36			08:30 (SG 13)					07:11	08:03 (SG 13)	
13	07:21	08:14 (SG 13)	06:59	08:21	06:35	05:58	05:43	05:53	06:18	06:45	07:11	06:42	07:11				07:53 (SG 13)					07:11	08:03 (SG 13)	
	17:08	43 08:57 (SG 13)	17:41	18:10	19:38	20:06	20:28	20:28	20:02	19:18	18:32	16:56	16:47	37			08:30 (SG 13)					07:11	08:03 (SG 13)	
14	07:20	08:14 (SG 13)	06:57	08:20	06:33	05:57	05:43	05:54	06:19	06:46	07:12	06:44	07:12				07:52 (SG 13)					07:12	08:04 (SG 13)	
	17:09	43 08:57 (SG 13)	17:42	18:11	19:39	20:07	20:28	20:28	20:01	19:16	18:31	16:56	16:47	39			08:31 (SG 13)					07:12	08:04 (SG 13)	
15	07:20	08:14 (SG 13)	06:56	08:18	06:32	05:56	05:43	05:55	06:20	06:46	07:13	06:45	07:13				07:52 (SG 13)					07:13	08:04 (SG 13)	
	17:10	44 08:58 (SG 13)	17:44	18:12	19:40	20:08	20:29	20:27	19:59	19:15	18:29	16:55	16:48	40			08:32 (SG 13)					07:13	08:04 (SG 13)	
16	07:20	08:15 (SG 13)	06:55	08:17	06:30	05:56	05:43	05:55	06:21	06:47	07:14	06:46	07:14				07:52 (SG 13)					07:14	08:05 (SG 13)	
	17:11	43 08:58 (SG 13)	17:45	18:13	19:41	20:08	20:29	20:27	19:58	19:13	18:28	16:54	16:48	40			08:32 (SG 13)					07:14	08:05 (SG 13)	
17	07:19	08:15 (SG 13)	06:54	08:15	06:29	05:55	05:43	05:56	06:22	06:48	07:15	06:47	07:15				07:51 (SG 13)					07:14	08:05 (SG 13)	
	17:12	43 08:58 (SG 13)	17:46	18:14	19:42	20:09	20:29	20:26	19:57	19:12	18:27	16:53	16:48	42			08:33 (SG 13)					07:14	08:05 (SG 13)	
18	07:19	08:15 (SG 13)	06:53	08:14	06:28	05:54	05:43	05:57	06:23	06:49	07:16	06:48	07:16				07:51 (SG 13)					07:15	08:06 (SG 13)	
	17:13	44 08:59 (SG 13)	17:47	18:15	19:43	20:10	20:30	20:26	19:56	19:10	18:25	16:53	16:48	42			08:33 (SG 13)					07:15	08:06 (SG 13)	
19	07:19	08:15 (SG 13)	06:52	08:12	06:26	05:53	05:43	05:58	06:23	06:50	07:17	06:49	07:16				07:51 (SG 13)					07:16	08:06 (SG 13)	
	17:14	44 08:59 (SG 13)	17:48	18:16	19:44	20:11	20:30	20:25	19:54	19:09	18:24	16:52	16:49	43			08:34 (SG 13)					07:16	08:06 (SG 13)	
20	07:18	08:16 (SG 13)	06:50	08:11	06:25	05:52	05:43	05:58	06:24	06:51	07:18	06:50	07:16				07:52 (SG 13)					07:16	08:07 (SG 13)	
	17:15	44 09:00 (SG 13)	17:49	18:16	19:45	20:12	20:30	20:25	19:53	19:07	18:23	16:51	16:49	43			08:35 (SG 13)					07:16	08:07 (SG 13)	
21	07:18	08:16 (SG 13)	06:49	08:09	06:23	05:52	05:43	05:59	06:25	06:51	07:19	06:51	07:17				07:52 (SG 13)					07:17	08:07 (SG 13)	
	17:16	43 08:59 (SG 13)	17:50	18:17	19:46	20:13	20:30	20:24	19:52	19:05	18:21	16:51	16:48	43			08:35 (SG 13)					07:17	08:07 (SG 13)	
22	07:17	08:17 (SG 13)	06:48	08:08	06:22	05:51	05:44	06:00	06:26	06:52	07:20	06:52	07:17				07:52 (SG 13)					07:17	08:08 (SG 13)	
	17:17	43 09:00 (SG 13)	17:51	18:18	19:47	20:13	20:31	20:23	19:50	19:04	18:20	16:50	16:49	44			08:36 (SG 13)					07:17	08:08 (SG 13)	
23	07:17	08:17 (SG 13)	06:46	08:06	06:21	05:50	05:44	06:01	06:27	06:53	07:21	06:53	07:18				07:52 (SG 13)					07:18	08:08 (SG 13)	
	17:18	43 09:00 (SG 13)	17:52	18:19	19:48	20:14	20:31	20:23	19:49	19:02	18:19	16:50	16:49	44			08:36 (SG 13)					07:18	08:08 (SG 13)	
24	07:16	08:17 (SG 13)	06:45	08:04	06:20	05:50	05:44	06:01	06:28	06:54	07:22	06:54	07:18				07:52 (SG 13)					07:18	08:09 (SG 13)	
	17:19	42 08:59 (SG 13)	17:53	18:20	19:49	20:15	20:31	20:22	19:48	19:01	18:17	16:49	16:51	44			08:36 (SG 13)					07:18	08:09 (SG 13)	
25	07:15	08:18 (SG 13)	06:44	08:03	06:18	05:49	05:44	06:02	06:29	06:55	07:23	06:55	07:19				07:53 (SG 13)					07:19	08:09 (SG 13)	
	17:20	42 09:00 (SG 13)	17:54	18:21	19:49	20:16	20:31	20:21	19:46	18:59	17:16	16:49	16:52	43			08:36 (SG 13)					07:19	08:09 (SG 13)	
26	07:15	08:19 (SG 13)	06:42	08:01	06:17	05:48	05:45	06:03	06:29	06:56	07:24	06:56	07:19				07:53 (SG 13)					07:19	08:09 (SG 13)	
	17:21	40 08:59 (SG 13)	17:55	18:22	19:50	20:17	20:31	20:20	19:45	18:58	17:15	16:49	16:52	44			08:37 (SG 13)					07:19	08:10 (SG 13)	
27	07:14	08:19 (SG 13)	06:41	08:00	06:16	05:48	05:45	06:04	06:30	06:57	07:25	06:57	07:19				07:53 (SG 13)					07:19	08:10 (SG 13)	
	17:22	40 08:59 (SG 13)	17:56	18:23	19:51	20:17	20:31	20:19	19:43	18:56	17:14	16:48	16:53	44			08:37 (SG 13)					07:19	08:10 (SG 13)	
28	07:13	08																						

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: Caterina 1 - Shadow flickering Shadow receptor: AI - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (78)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:35 19:36	07:00 18:50	06:30 17:08	07:01 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:10 19:56	05:45 20:22	05:47 20:31	06:09 20:14	06:35 19:35	07:01 18:48	06:31 17:07	07:02 16:47
3	07:21 16:58	07:09 17:30	06:36 18:00	06:49 19:29	06:09 19:57	05:45 20:22	05:48 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:32 17:06	07:03 16:47
4	07:21 16:59	07:08 17:31	06:34 18:01	06:48 19:30	06:07 19:58	05:44 20:23	05:48 20:31	06:11 20:12	06:37 19:32	07:03 18:45	06:33 17:05	07:04 16:46
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6	07:21 17:01	07:06 17:34	06:31 18:03	06:45 19:32	06:05 20:00	05:44 20:24	05:49 20:31	06:12 20:10	06:39 19:29	07:05 18:42	06:35 17:03	07:06 16:46
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31	07:11 17:27		06:54 19:27		05:46 20:20		06:07 20:16	06:34 19:38		06:29 17:09		07:21 16:56
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	348	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: AJ - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (79)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:30 17:08	07:01 16:47
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3	07:21 16:58	07:09 17:30	06:36 18:00	06:49 19:29	06:08 19:57	05:45 20:22	05:47 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:32 17:06	07:03 16:47
4	07:21 16:59	07:08 17:31	06:34 18:01	06:48 19:30	06:07 19:58	05:44 20:23	05:48 20:31	06:10 20:12	06:37 19:32	07:03 18:45	06:33 17:05	07:04 16:46
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Potential sun hours	306	302	370	395	440	442	449	422	374	348	305	298
Total, worst case	15										15	

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: Caterina 1 - Shadow flickering Shadow receptor: AK - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (80)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:46 20:21	05:47 20:31	06:08 20:15	06:35 19:36	07:00 18:50	06:30 17:08	07:01 16:47
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23	07:17 17:18	06:46 17:52	06:06 18:19	06:21 19:48	05:50 20:14	05:44 20:31	06:01 20:23	06:27 19:49	06:53 19:02	07:21 18:19	06:53 16:50	07:18 16:51
24	07:16 17:19	06:45 17:53	06:04 18:20	06:20 19:49	05:50 20:15	05:44 20:31	06:02 20:22	06:28 19:48	06:54 19:01	07:22 18:17	06:54 16:49	07:18 16:51
25	07:15 17:21	06:44 17:55	06:03 18:22	06:18 19:50	05:49 20:17	05:45 20:31	06:02 20:20	06:29 19:45	06:55 18:58	07:23 17:15	06:55 16:49	07:19 16:52
26	07:15 17:21	06:42 17:55	06:01 18:22	06:17 19:50	05:48 20:17	05:45 20:31	06:03 20:20	06:29 19:45	06:56 18:58	07:24 17:15	06:56 16:49	07:19 16:52
27	07:14 17:23	06:41 17:56	06:00 18:23	06:16 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:57 18:56	07:25 17:14	06:57 16:48	07:19 16:53
28	07:13 17:24	06:40 17:57	05:58 18:24	06:15 19:52	05:47 20:18	05:46 20:31	06:05 20:19	06:31 19:42	06:57 18:55	07:26 17:12	06:58 16:48	07:20 16:54
29	07:13 17:25		06:57 19:25	06:13 19:53	05:47 20:19	05:46 20:31	06:06 20:18	06:32 19:41	06:58 18:53	07:27 17:11	06:59 16:48	07:20 16:54
30	07:12 17:26		06:55 19:26	06:12 19:54	05:46 20:20	05:46 20:31	06:06 20:17	06:33 19:39	06:59 18:52	07:28 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:54 19:27		05:46 20:20		06:07 20:16	06:34 19:38		06:29 17:09		07:21 16:56
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	349	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: AL - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (81)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

January		February		March		April	May	June	July	August	September	October	November	December	
1	07:21	08:02 (SG 11)	07:10	08:18 (SG 11)	06:38	06:52	06:11	05:45	05:46	06:08	06:34	07:00	06:30	07:01	07:46 (SG 11)
2	16:57	08:38 (SG 11)	17:28	08:40 (SG 11)	17:58	19:27	19:55	20:21	20:31	20:15	19:36	18:50	17:08	16:47	08:26 (SG 11)
3	07:21	08:02 (SG 11)	07:09	08:20 (SG 11)	06:37	06:51	06:10	05:45	05:47	06:09	06:35	07:01	06:31	07:02	07:46 (SG 11)
4	16:57	08:39 (SG 11)	17:29	08:38 (SG 11)	17:59	19:28	19:56	20:22	20:31	20:14	19:35	18:48	17:07	16:47	08:26 (SG 11)
5	07:21	08:02 (SG 11)	07:09	08:22 (SG 11)	06:35	06:49	06:08	05:45	05:47	06:10	06:36	07:02	06:32	07:03	07:47 (SG 11)
6	16:58	08:39 (SG 11)	17:30	08:36 (SG 11)	18:00	19:29	19:57	20:22	20:31	20:13	19:33	18:47	17:06	16:46	08:26 (SG 11)
7	07:21	08:02 (SG 11)	07:08		06:34	06:48	06:07	05:44	05:48	06:10	06:37	07:03	06:33	07:04	07:47 (SG 11)
8	16:59	08:40 (SG 11)	17:31		18:01	19:30	19:58	20:23	20:31	20:12	19:32	18:45	17:04	16:46	08:26 (SG 11)
9	07:21	08:02 (SG 11)	07:07		06:33	06:46	06:06	05:44	05:48	06:11	06:38	07:04	06:34	07:05	07:48 (SG 11)
10	17:00	08:40 (SG 11)	17:32		18:02	19:31	19:59	20:23	20:31	20:11	19:30	18:44	17:03	16:46	08:27 (SG 11)
11	07:21	08:03 (SG 11)	07:06		06:31	06:45	06:05	05:44	05:49	06:12	06:39	07:04	06:35	07:06	07:49 (SG 11)
12	17:01	08:41 (SG 11)	17:33		18:03	19:32	19:59	20:24	20:31	20:10	19:29	18:42	17:02	16:46	08:27 (SG 11)
13	07:21	08:03 (SG 11)	07:05		06:30	06:43	06:04	05:43	05:50	06:13	06:39	07:05	06:36	07:07	07:49 (SG 11)
14	17:02	08:42 (SG 11)	17:35		18:04	19:33	20:00	20:25	20:30	20:09	19:27	18:41	17:01	16:46	08:27 (SG 11)
15	07:21	08:03 (SG 11)	07:04		06:28	06:42	06:03	05:43	05:50	06:14	06:40	07:06	06:37	07:07	07:50 (SG 11)
16	17:03	08:42 (SG 11)	17:36		18:05	19:34	20:01	20:25	20:30	20:08	19:25	18:39	17:01	16:46	08:28 (SG 11)
17	07:21	08:04 (SG 11)	07:03		06:27	06:40	06:02	05:43	05:51	06:15	06:41	07:07	06:38	07:08	08:29 (SG 11)
18	17:03	08:43 (SG 11)	17:37		18:06	19:35	20:02	20:26	20:30	20:07	19:24	18:38	17:00	16:46	08:27 (SG 11)
19	07:21	08:03 (SG 11)	07:02		06:25	06:39	06:01	05:43	05:51	06:16	06:42	07:08	06:39	07:09	08:30 (SG 11)
20	17:04	08:43 (SG 11)	17:38		18:07	19:36	20:03	20:26	20:29	20:05	19:22	18:36	16:59	16:46	08:28 (SG 11)
21	07:21	08:04 (SG 11)	07:01		06:24	06:37	06:00	05:43	05:52	06:16	06:43	07:09	06:40	07:10	08:30 (SG 11)
22	17:05	08:43 (SG 11)	17:39		18:08	19:36	20:04	20:27	20:29	20:04	19:21	18:35	16:58	16:46	08:28 (SG 11)
23	07:21	08:04 (SG 11)	07:00		06:22	06:36	05:59	05:43	05:53	06:17	06:44	07:10	06:41	07:11	08:31 (SG 11)
24	17:06	08:44 (SG 11)	17:40		18:09	19:37	20:05	20:27	20:29	20:03	19:19	18:34	16:57	16:47	08:29 (SG 11)
25	07:20	08:05 (SG 11)	06:58		06:21	06:34	05:58	05:43	05:53	06:18	06:45	07:11	06:42	07:11	08:30 (SG 11)
26	17:07	08:45 (SG 11)	17:41		18:10	19:38	20:06	20:28	20:28	20:02	19:18	18:32	16:56	16:47	08:29 (SG 11)
27	07:20	08:04 (SG 11)	06:57		06:19	06:33	05:57	05:43	05:54	06:19	06:45	07:12	06:43	07:12	08:31 (SG 11)
28	17:08	08:45 (SG 11)	17:42		18:11	19:39	20:07	20:28	20:28	20:01	19:16	18:31	16:55	16:47	08:30 (SG 11)
29	07:20	08:05 (SG 11)	06:56		06:18	06:32	05:56	05:43	05:55	06:20	06:46	07:13	06:44	07:13	08:31 (SG 11)
30	17:09	08:45 (SG 11)	17:43		18:12	19:40	20:07	20:29	20:27	19:59	19:15	18:29	16:55	16:47	08:30 (SG 11)
31	07:20	08:06 (SG 11)	06:55		06:16	06:30	05:55	05:43	05:55	06:21	06:47	07:14	06:46	07:14	08:31 (SG 11)
32	17:10	08:46 (SG 11)	17:44		18:13	19:41	20:08	20:29	20:27	19:58	19:13	18:28	16:54	16:47	08:30 (SG 11)
33	07:19	08:06 (SG 11)	06:54		06:15	06:29	05:55	05:43	05:56	06:22	06:48	07:15	06:47	07:14	08:31 (SG 11)
34	17:11	08:46 (SG 11)	17:45		18:14	19:42	20:09	20:29	20:26	19:57	19:12	18:26	16:53	16:48	08:30 (SG 11)
35	07:19	08:06 (SG 11)	06:53		06:13	06:27	05:54	05:43	05:57	06:22	06:49	07:16	06:48	07:15	08:31 (SG 11)
36	17:12	08:47 (SG 11)	17:47		18:14	19:43	20:10	20:30	20:26	19:56	19:10	18:25	16:53	16:48	08:31 (SG 11)
37	07:18	08:06 (SG 11)	06:51		06:12	06:26	05:53	05:43	05:57	06:23	06:50	07:17	06:49	07:15	08:31 (SG 11)
38	17:14	08:46 (SG 11)	17:48		18:15	19:44	20:11	20:30	20:25	19:54	19:08	18:24	16:52	16:49	08:30 (SG 11)
39	07:18	08:07 (SG 11)	06:50		06:10	06:25	05:52	05:43	05:58	06:24	06:50	07:18	06:50	07:16	08:31 (SG 11)
40	17:15	08:47 (SG 11)	17:49		18:16	19:45	20:12	20:30	20:25	19:53	19:07	18:22	16:51	16:49	08:31 (SG 11)
41	07:18	08:07 (SG 11)	06:49		06:09	06:23	05:51	05:43	05:59	06:25	06:51	07:18	06:51	07:17	08:31 (SG 11)
42	17:16	08:46 (SG 11)	17:50		18:17	19:46	20:13	20:30	20:24	19:52	19:05	18:21	16:51	16:49	08:31 (SG 11)
43	07:17	08:08 (SG 11)	06:48		06:07	06:22	05:51	05:44	06:00	06:26	06:52	07:19	06:52	07:17	08:31 (SG 11)
44	17:17	08:47 (SG 11)	17:51		18:18	19:47	20:13	20:31	20:23	19:50	19:04	18:20	16:50	16:49	08:32 (SG 11)
45	07:17	08:09 (SG 11)	06:46		06:06	06:21	05:50	05:44	06:00	06:27	06:53	07:20	06:53	07:18	08:32 (SG 11)
46	17:18	08:47 (SG 11)	17:52		18:19	19:47	20:14	20:31	20:22	19:49	19:02	18:18	16:50	16:49	08:32 (SG 11)
47	07:16	08:09 (SG 11)	06:45		06:04	06:19	05:49	05:44	06:01	06:28	06:54	07:21	06:54	07:18	08:33 (SG 11)
48	17:19	08:46 (SG 11)	17:53		18:20	19:48	20:15	20:31	20:22	19:47	19:01	18:17	16:49	16:49	08:33 (SG 11)
49	07:15	08:10 (SG 11)	06:44		06:03	06:18	05:49	05:44	06:02	06:28	06:55	07:22	06:55	07:18	08:33 (SG 11)
50	17:20	08:46 (SG 11)	17:54		18:21	19:49	20:16	20:31	20:21	19:46	18:59	17:16	16:49	16:51	08:33 (SG 11)
51	07:15	08:11 (SG 11)	06:42		06:01	06:17	05:48	05:45	06:03	06:29	06:56	07:23	06:56	07:19	08:33 (SG 11)
52	17:21	08:46 (SG 11)	17:55		18:22	19:50	20:17	20:31	20:20	19:45	18:58	17:15	16:48	16:52	08:34 (SG 11)
53	07:14	08:11 (SG 11)	06:41		06:00	06:16	05:48	05:45	06:04	06:30	06:56	07:24	06:57	07:19	08:34 (SG 11)
54	17:22	08:45 (SG 11)	17:56		18:23	19:51	20:17	20:31	20:19	19:43	18:56	17:13	16:48	16:53	08:35 (SG 11)
55	07:13	08:12 (SG 11)	06:40		05:58	06:14	05:47	05:45	06:05	06:31	06:57	07:26	06:58	07:20	08:35 (SG 11)
56	17:23	08:44 (SG 11)	17:57		18:24	19:52	20:18	20:31	20:19	19:42	18:54	17:12	16:48	16:53	08:35 (SG 11)
57	07:13	08:14 (SG 11)			06:57	06:13	05:47	05:46	06:05	06:32	06:58	07:27	06:59	07:20	08:35 (SG 11)
58	17:25	08:44 (SG 11)			19:25	19:53	20:19	20:31	20:18	19:40	18:53	17:11	16:47	16:54	08:36 (SG 11)
59	07:12	08:15 (SG 11)			06:55	06:12	05:46	05:46	06:06	06:33	06:59	07:28	07:00	07:20	08:36 (SG 11)
60	17:26	08:43 (SG 11)			19:26	19:54	20:20	20:31	20:17	19:39	18:51	17:10	16:47	16:55	08:36 (SG 11)
61	07:11	08:16 (SG 11)			06:54		05:46		06:07	06:34		06:29		07:20	08:37 (SG 11)
62	17:27	08:42 (SG 11)			19:26		20:20		20:16	19:37		17:09		16:56	08:37 (SG 11)
Potential sun hours	306		302		370	395	440	442	449	422	374	348	305	298	1121
Total, worst case	1156		54									795			

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: Caterina 1 - Shadow flickering Shadow receptor: AM - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (82)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 16:56	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:46 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:30 17:08	07:01 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:09 19:56	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:31 17:07	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:57	05:45 20:22	05:47 20:31	06:09 20:13	06:36 19:33	07:02 18:47	06:32 17:05	07:03 16:46
4	07:21 16:59	07:08 17:31	06:34 18:01	06:48 19:30	06:07 19:58	05:44 20:23	05:48 20:31	06:10 20:12	06:37 19:31	07:03 18:45	06:33 17:04	07:04 16:46
5	07:21 17:00	07:07 17:32	06:33 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:31	06:11 20:11	06:38 19:30	07:03 18:44	06:34 17:03	07:05 16:46
6	07:21 17:01	07:06 17:33	06:31 18:03	06:45 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:10	06:39 19:28	07:04 18:42	06:35 17:02	07:06 16:46
7	07:21 17:02	07:05 17:35	06:30 18:04	06:43 19:33	06:04 20:00	05:43 20:25	05:49 20:30	06:13 20:09	06:39 19:27	07:05 18:41	06:36 17:01	07:06 16:46
8	07:21 17:02	07:04 17:36	06:28 18:05	06:42 19:34	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:08	06:40 19:25	07:06 18:39	06:37 17:00	07:07 16:46
9	07:21 17:03	07:03 17:37	06:27 18:06	06:40 19:35	06:02 20:02	05:43 20:26	05:51 20:30	06:15 20:06	06:41 19:24	07:07 18:38	06:38 17:00	07:08 16:46
10	07:21 17:04	07:02 17:38	06:25 18:07	06:39 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:59	07:09 16:46
11	07:21 17:05	07:01 17:39	06:24 18:08	06:37 19:36	06:00 20:04	05:43 20:27	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:10 16:46
12	07:21 17:06	06:59 17:40	06:22 18:09	06:36 19:37	05:59 20:05	05:43 20:27	05:53 20:29	06:17 20:03	06:44 19:19	07:10 18:33	06:41 16:57	07:11 16:46
13	07:20 17:07	06:58 17:41	06:21 18:10	06:34 19:38	05:58 20:06	05:43 20:28	05:53 20:28	06:18 20:02	06:44 19:18	07:11 18:32	06:42 16:56	07:11 16:47
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19	07:18 17:14	06:51 17:48	06:12 18:15	06:26 19:44	05:53 20:11	05:43 20:30	05:57 20:25	06:23 19:54	06:50 19:08	07:16 18:24	06:49 16:52	07:15 16:48
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21	07:17 17:16	06:49 17:50	06:09 18:17	06:23 19:46	05:51 20:12	05:43 20:30	05:59 20:24	06:25 19:51	06:51 19:05	07:18 18:21	06:51 16:51	07:16 16:49
22	07:17 17:17	06:48 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:43 20:30	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	06:52 16:50	07:17 16:50
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29	07:12 17:24		06:57 19:25	06:13 19:53	05:47 20:19	05:46 20:31	06:05 20:18	06:32 19:40	06:58 18:53	07:26 17:11	06:59 16:47	07:20 16:54
30	07:12 17:26		06:55 19:25	06:12 19:54	05:46 20:19	05:46 20:31	06:06 20:17	06:33 19:39	06:59 18:51	07:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:16	06:33 19:37		06:29 17:09		07:20 16:55
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	348	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: AN - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (83) Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January		February		March		April		May		June		July		August		September		October		November		December	
1	07:21		08:02 (SG 10)	07:10	06:38		06:52	06:11	05:45	05:46	06:08	06:34	07:00	06:30							07:01		07:49 (SG 10)	
	16:56	59	15:29 (SG 11)	17:28	17:58		19:27	19:55	20:21	20:31	20:15	19:36	18:50	17:08							16:47	41	16:01 (SG 12)	
2	07:21		08:02 (SG 10)	07:09	06:37		06:51	06:09	05:45	05:47	06:09	06:35	07:01	06:31							07:02		07:49 (SG 10)	
	16:57	57	15:28 (SG 11)	17:29	17:59		19:28	19:56	20:22	20:31	20:14	19:34	18:48	17:07							16:47	41	16:00 (SG 12)	
3	07:21		08:02 (SG 10)	07:08	06:35		06:49	06:08	05:45	05:47	06:09	06:36	07:02	06:32							07:03		07:49 (SG 10)	
	16:58	57	15:28 (SG 11)	17:30	18:00		19:29	19:57	20:22	20:31	20:13	19:33	18:47	17:05							16:46	40	15:59 (SG 12)	
4	07:21		08:02 (SG 10)	07:08	06:34		06:48	06:07	05:44	05:48	06:10	06:37	07:03	06:33							07:04		07:49 (SG 10)	
	16:59	56	15:28 (SG 11)	17:31	18:01		19:30	19:58	20:23	20:31	20:12	19:31	18:45	17:04							16:46	40	15:59 (SG 12)	
5	07:21		08:03 (SG 10)	07:07	06:33		06:46	06:06	05:44	05:48	06:11	06:38	07:03	06:34							07:05		07:49 (SG 10)	
	17:00	52	15:27 (SG 11)	17:32	18:02		19:31	19:58	20:23	20:31	20:11	19:30	18:44	17:03							16:46	46	15:58 (SG 12)	
6	07:21		08:04 (SG 10)	07:06	06:31		06:45	06:05	05:44	05:49	06:12	06:39	07:04	06:35							07:06		07:50 (SG 10)	
	17:01	49	15:26 (SG 11)	17:33	18:03		19:32	19:59	20:24	20:30	20:10	19:28	18:42	17:02							16:46	49	15:12 (SG 11)	
7	07:21		08:04 (SG 10)	07:05	06:30		06:43	06:04	05:43	05:49	06:13	06:39	07:05	06:36							07:06		07:50 (SG 10)	
	17:02	47	16:13 (SG 12)	17:34	18:04		19:33	20:00	20:25	20:30	20:09	19:27	18:41	17:01							16:46	52	15:14 (SG 11)	
8	07:21		08:05 (SG 10)	07:04	06:28		06:42	06:03	05:43	05:50	06:14	06:40	07:06	06:37							07:07		07:51 (SG 10)	
	17:02	40	16:15 (SG 12)	17:36	18:05		19:34	20:01	20:25	20:30	20:08	19:25	18:39	17:00							16:46	55	15:16 (SG 11)	
9	07:21		08:05 (SG 10)	07:03	06:27		06:40	06:02	05:43	05:51	06:15	06:41	07:07	06:38							07:08		07:50 (SG 10)	
	17:03	40	16:15 (SG 12)	17:37	18:06		19:35	20:02	20:26	20:30	20:06	19:24	18:38	17:00							16:46	57	15:16 (SG 11)	
10	07:21		08:06 (SG 10)	07:02	06:25		06:39	06:01	05:43	05:51	06:15	06:42	07:08	06:39							07:09		07:51 (SG 10)	
	17:04	41	16:17 (SG 12)	17:38	18:07		19:36	20:03	20:26	20:29	20:05	19:22	18:36	16:59							16:46	57	15:17 (SG 11)	
11	07:21		08:06 (SG 10)	07:01	06:24		06:37	06:00	05:43	05:52	06:16	06:43	07:09	06:40							07:10		07:52 (SG 10)	
	17:05	42	16:19 (SG 12)	17:39	18:08		19:36	20:04	20:27	20:29	20:04	19:21	18:35	16:58							16:46	59	15:19 (SG 11)	
12	07:21		08:07 (SG 10)	07:00	06:22		06:36	05:59	05:43	05:52	06:17	06:44	07:10	06:41							07:11		07:53 (SG 10)	
	17:06	43	16:20 (SG 12)	17:40	18:09		19:37	20:05	20:27	20:29	20:03	19:19	18:33	16:57							16:46	60	15:20 (SG 11)	
13	07:20		08:08 (SG 10)	06:58	06:21		06:34	05:58	05:43	05:53	06:18	06:44	07:11	06:42							07:11		07:53 (SG 10)	
	17:07	43	16:22 (SG 12)	17:41	18:10		19:38	20:06	20:28	20:28	20:02	19:18	18:32	16:56							16:47	61	15:20 (SG 11)	
14	07:20		08:09 (SG 10)	06:57	06:19		06:33	05:57	05:43	05:54	06:19	06:45	07:12	06:43							07:12		07:54 (SG 10)	
	17:08	43	16:23 (SG 12)	17:42	18:11		19:39	20:07	20:28	20:28	20:01	19:16	18:31	16:55							16:47	60	15:21 (SG 11)	
15	07:20		08:10 (SG 10)	06:56	06:18		06:32	05:56	05:43	05:54	06:20	06:46	07:13	06:44							07:13		07:55 (SG 10)	
	17:09	43	16:25 (SG 12)	17:43	18:12		19:40	20:07	20:28	20:27	19:59	19:15	18:29	16:55							16:47	61	15:22 (SG 11)	
16	07:20		08:10 (SG 10)	06:55	06:16		06:30	05:55	05:43	05:55	06:21	06:47	07:14	06:45							16:01 (SG 12)	07:13		07:55 (SG 10)
	17:10	43	16:26 (SG 12)	17:44	18:13		19:41	20:08	20:29	20:27	19:58	19:13	18:28	16:54	3						15:57 (SG 12)	16:47	62	15:22 (SG 11)
17	07:19		08:12 (SG 10)	06:54	06:15		06:29	05:55	05:43	05:56	06:21	06:48	07:15	06:47							15:57 (SG 12)	07:14		07:56 (SG 10)
	17:11	43	16:29 (SG 12)	17:45	18:13		19:42	20:09	20:29	20:26	19:57	19:12	18:26	16:53	10						16:07 (SG 12)	16:48	62	15:23 (SG 11)
18	07:19		08:13 (SG 10)	06:53	06:13		06:27	05:54	05:43	05:57	06:22	06:49	07:16	06:48							07:58 (SG 10)	07:15		07:57 (SG 10)
	17:12	43	16:31 (SG 12)	17:46	18:14		19:43	20:10	20:30	20:26	19:55	19:10	18:25	16:52	21						16:09 (SG 12)	16:48	62	15:24 (SG 11)
19	07:18		08:14 (SG 10)	06:51	06:12		06:26	05:53	05:43	05:57	06:23	06:50	07:16	06:49							07:55 (SG 10)	07:15		07:57 (SG 10)
	17:13	42	16:32 (SG 12)	17:48	18:15		19:44	20:11	20:30	20:25	19:54	19:08	18:24	16:52	31						16:10 (SG 12)	16:48	62	15:24 (SG 11)
20	07:18		08:16 (SG 10)	06:50	06:10		06:25	05:52	05:43	05:58	06:24	06:50	07:17	06:50							07:53 (SG 10)	07:16		07:58 (SG 10)
	17:15	41	16:35 (SG 12)	17:49	18:16		19:45	20:12	20:30	20:24	19:53	19:07	18:22	16:51	36						16:11 (SG 12)	16:49	62	15:25 (SG 11)
21	07:17		08:17 (SG 10)	06:49	06:09		06:23	05:51	05:43	05:59	06:25	06:51	07:18	06:51							07:53 (SG 10)	07:17		07:58 (SG 10)
	17:16	40	16:36 (SG 12)	17:50	18:17		19:46	20:12	20:30	20:24	19:51	19:05	18:21	16:51	40						16:12 (SG 12)	16:49	62	15:25 (SG 11)
22	07:17		08:18 (SG 10)	06:48	06:07		06:22	05:51	05:43	06:00	06:26	06:52	07:19	06:52							07:52 (SG 10)	07:17		07:59 (SG 10)
	17:17	36	16:36 (SG 12)	17:51	18:18		19:46	20:13	20:31	20:23	19:50	19:04	18:20	16:50	41						16:11 (SG 12)	16:50	62	15:26 (SG 11)
23	07:16		08:21 (SG 10)	06:46	06:06		06:21	05:50	05:44	06:00	06:27	06:53	07:20	06:53							07:51 (SG 10)	07:18		07:59 (SG 10)
	17:18	31	16:36 (SG 12)	17:52	18:19		19:47	20:14	20:31	20:22	19:49	19:02	18:18	16:50	42						16:09 (SG 12)	16:50	62	15:26 (SG 11)
24	07:16		08:24 (SG 10)	06:45	06:04		06:19	05:49	05:44	06:01	06:28	06:54	07:21	06:54							07:50 (SG 10)	07:18		08:00 (SG 10)
	17:19	21	16:35 (SG 12)	17:53	18:20		19:48	20:15	20:31	20:22	19:47	19:01	18:17	16:49	43						16:08 (SG 12)	16:51	63	15:27 (SG 11)
25	07:15		16:24 (SG 12)	06:44	06:03		06:18	05:49	05:44	06:02	06:28	06:55	06:22	06:55							07:50 (SG 10)	07:18		08:00 (SG 10)
	17:20	10	16:34 (SG 12)	17:54	18:21		19:49	20:16	20:31	20:21	19:46	18:59	17:16	16:49	43						16:07 (SG 12)	16:51	62	15:27 (SG 11)
26	07:15		16:28 (SG 12)	06:42	06:01		06:17	05:48	05:45	06:03	06:29	06:56	06:23	06:56							07:49 (SG 10)	07:19		08:00 (SG 10)
	17:21	2	16:30 (SG 12)	17:55	18:22		19:50	20:16	20:31	20:20	19:45	18:58	17:15	16:48	44						16:06 (SG 12)	16:52	62	15:27 (SG 11)
27	07:14			06:41	06:00		06:15	05:48	05:45	06:04	06:30	06:56	06:24	06:57							07:49 (SG 10)	07:19		08:01 (SG 10)
	17:22			17:56	18:23		19:51	20:17	20:31	20:19	19:43	18:56	17											

SHADOW - Calendar

Calculation: Caterina 1 - Shadow flickering Shadow receptor: AO - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (84)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 16:56	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:46 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:30 17:08	07:01 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:09 19:56	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:31 17:06	07:02 16:46
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:57	05:44 20:22	05:47 20:31	06:09 20:13	06:36 19:33	07:02 18:47	06:32 17:05	07:03 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:48 19:30	06:07 19:57	05:44 20:23	05:48 20:31	06:10 20:12	06:37 19:31	07:02 18:45	06:33 17:04	07:04 16:46
5	07:21 17:00	07:07 17:32	06:33 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:31	06:11 20:11	06:38 19:30	07:03 18:44	06:34 17:03	07:05 16:46
6	07:21 17:01	07:06 17:33	06:31 18:03	06:45 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:10	06:39 19:28	07:04 18:42	06:35 17:02	07:06 16:46
7	07:21 17:01	07:05 17:34	06:30 18:04	06:43 19:33	06:04 20:00	05:43 20:25	05:49 20:30	06:13 20:09	06:39 19:27	07:05 18:41	06:36 17:01	07:06 16:46
8	07:21 17:02	07:04 17:36	06:28 18:05	06:42 19:34	06:03 20:01	05:43 20:25	05:50 20:30	06:14 20:08	06:40 19:25	07:06 18:39	06:37 17:00	07:07 16:46
9	07:21 17:03	07:03 17:37	06:27 18:06	06:40 19:35	06:02 20:02	05:43 20:26	05:51 20:30	06:15 20:06	06:41 19:24	07:07 18:38	06:38 16:59	07:08 16:46
10	07:21 17:04	07:02 17:38	06:25 18:07	06:39 19:35	06:01 20:03	05:43 20:26	05:51 20:29	06:15 20:05	06:42 19:22	07:08 18:36	06:39 16:59	07:09 16:46
11	07:21 17:05	07:01 17:39	06:24 18:08	06:37 19:36	06:00 20:04	05:43 20:27	05:52 20:29	06:16 20:04	06:43 19:21	07:09 18:35	06:40 16:58	07:10 16:46
12	07:21 17:06	06:59 17:40	06:22 18:09	06:36 19:37	05:59 20:05	05:43 20:27	05:52 20:29	06:17 20:03	06:44 19:19	07:10 18:33	06:41 16:57	07:11 16:46
13	07:20 17:07	06:58 17:41	06:21 18:10	06:34 19:38	05:58 20:06	05:43 20:28	05:53 20:28	06:18 20:02	06:44 19:18	07:11 18:32	06:42 16:56	07:11 16:47
14	07:20 17:08	06:57 17:42	06:19 18:11	06:33 19:39	05:57 20:06	05:43 20:28	05:54 20:28	06:19 20:00	06:45 19:16	07:12 18:31	06:43 16:55	07:12 16:47
15	07:20 17:09	06:56 17:43	06:18 18:12	06:31 19:40	05:56 20:07	05:43 20:28	05:54 20:27	06:20 19:59	06:46 19:15	07:13 18:29	06:44 16:54	07:13 16:47
16	07:20 17:10	06:55 17:44	06:16 18:12	06:30 19:41	05:55 20:08	05:43 20:29	05:55 20:27	06:21 19:58	06:47 19:13	07:14 18:28	06:45 16:54	07:13 16:47
17	07:19 17:11	06:54 17:45	06:15 18:13	06:29 19:42	05:54 20:09	05:43 20:29	05:56 20:26	06:21 19:57	06:48 19:11	07:14 18:26	06:47 16:53	07:14 16:48
18	07:19 17:12	06:53 17:46	06:13 18:14	06:27 19:43	05:54 20:10	05:43 20:29	05:57 20:26	06:22 19:55	06:49 19:10	07:15 18:25	06:48 16:52	07:15 16:48
19	07:18 17:13	06:51 17:47	06:12 18:15	06:26 19:44	05:53 20:11	05:43 20:30	05:57 20:25	06:23 19:54	06:49 19:08	07:16 18:24	06:49 16:52	07:15 16:48
20	07:18 17:14	06:50 17:49	06:10 18:16	06:25 19:45	05:52 20:12	05:43 20:30	05:58 20:24	06:24 19:53	06:50 19:07	07:17 18:22	06:50 16:51	07:16 16:49
21	07:17 17:16	06:49 17:50	06:09 18:17	06:23 19:46	05:51 20:12	05:43 20:30	05:59 20:24	06:25 19:51	06:51 19:05	07:18 18:21	06:51 16:51	07:16 16:49
22	07:17 17:17	06:47 17:51	06:07 18:18	06:22 19:46	05:51 20:13	05:43 20:30	06:00 20:23	06:26 19:50	06:52 19:04	07:19 18:20	06:52 16:50	07:17 16:50
23	07:16 17:18	06:46 17:52	06:06 18:19	06:21 19:47	05:50 20:14	05:44 20:31	06:00 20:22	06:27 19:49	06:53 19:02	07:20 18:18	06:53 16:50	07:17 16:50
24	07:16 17:19	06:45 17:53	06:04 18:20	06:19 19:48	05:49 20:15	05:44 20:31	06:01 20:22	06:27 19:47	06:54 19:01	07:21 18:17	06:54 16:49	07:18 16:51
25	07:15 17:21	06:44 17:55	06:03 18:22	06:18 19:50	05:49 20:16	05:44 20:31	06:02 20:20	06:28 19:45	06:55 18:57	07:22 17:15	06:55 16:48	07:18 16:52
26	07:15 17:22	06:42 17:56	06:01 18:23	06:17 19:51	05:48 20:17	05:44 20:31	06:03 20:19	06:29 19:43	06:55 18:56	07:23 17:13	06:56 16:48	07:19 16:53
27	07:14 17:22	06:41 17:56	06:00 18:23	06:15 19:51	05:48 20:17	05:45 20:31	06:04 20:19	06:30 19:43	06:56 18:56	07:24 17:13	06:57 16:48	07:19 16:53
28	07:13 17:23	06:40 17:57	05:58 18:24	06:14 19:52	05:47 20:18	05:45 20:31	06:04 20:18	06:31 19:42	06:57 18:54	07:25 17:12	06:58 16:47	07:19 16:53
29	07:12 17:24		06:57 19:24	06:13 19:53	05:47 20:19	05:46 20:31	06:05 20:18	06:32 19:40	06:58 18:53	07:26 17:11	06:59 16:47	07:20 16:54
30	07:12 17:25		06:55 19:25	06:12 19:54	05:46 20:19	05:46 20:31	06:06 20:17	06:33 19:39	06:59 18:51	07:27 17:10	07:00 16:47	07:20 16:55
31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:16	06:33 19:37		06:28 17:09		07:20 16:55
Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	348	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: AP - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (85)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 16:56	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:46 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:30 17:08	07:01 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:09 19:56	05:45 20:21	05:47 20:31	06:09 20:14	06:35 19:34	07:01 18:48	06:31 17:06	07:02 16:46
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:57	05:44 20:22	05:47 20:31	06:09 20:13	06:36 19:33	07:02 18:47	06:32 17:05	07:03 16:46
4	07:21 16:59	07:07 17:31	06:34 18:01	06:48 19:30	06:07 19:57	05:44 20:23	05:48 20:31	06:10 20:12	06:37 19:31	07:02 18:45	06:33 17:04	07:04 16:46
5	07:21 17:00	07:07 17:32	06:33 18:02	06:46 19:31	06:06 19:58	05:44 20:23	05:48 20:31	06:11 20:11	06:38 19:30	07:03 18:44	06:34 17:03	07:05 16:46
6	07:21 17:01	07:06 17:33	06:31 18:03	06:45 19:32	06:05 19:59	05:44 20:24	05:49 20:30	06:12 20:10	06:39 19:28	07:04 18:42	06:35 17:02	07:06 16:46
7	07:21 17:01	07:05 17:34	06:30 18:04	06:43 19:33	06:04 20:00	05:43 20:25	05:49 20:30	06:13 20:09	06:39 19:27	07:05 18:41	06:36 17:01	07:06 16:46
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Potential sun hours Total, worst case	306	302	370	395	440	442	449	422	374	348	305	298

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: Caterina 1 - Shadow flickering Shadow receptor: AQ - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (86)
Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:21 16:57	07:10 17:28	06:38 17:58	06:52 19:27	06:11 19:55	05:45 20:21	05:47 20:31	06:08 20:15	06:34 19:36	07:00 18:50	06:30 17:08	07:01 16:47
2	07:21 16:57	07:09 17:29	06:37 17:59	06:51 19:28	06:10 19:56	05:45 20:22	05:47 20:31	06:09 20:14	06:35 19:35	07:01 18:48	06:31 17:07	07:02 16:47
3	07:21 16:58	07:08 17:30	06:35 18:00	06:49 19:29	06:08 19:57	05:45 20:22	05:47 20:31	06:10 20:13	06:36 19:33	07:02 18:47	06:32 17:06	07:03 16:46
4	07:21 16:59	07:08 17:31	06:34 18:01	06:48 19:30	06:07 19:58	05:44 20:23	05:48 20:31	06:10 20:12	06:37 19:32	07:03 18:45	06:33 17:05	07:04 16:46
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31	07:11 17:27		06:54 19:26		05:46 20:20		06:07 20:16	06:34 19:37		07:28 17:09		07:20 16:56
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		