

# AUTORIZZAZIONE UNICA EX D. LGS. N. 387/2003



## PROGETTO DEFINITIVO PARCO EOLICO GALLURA

Titolo elaborato:

### STUDIO SUGLI EFFETTI DELLO SHADOW FLICKERING

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#### PROPONENTE



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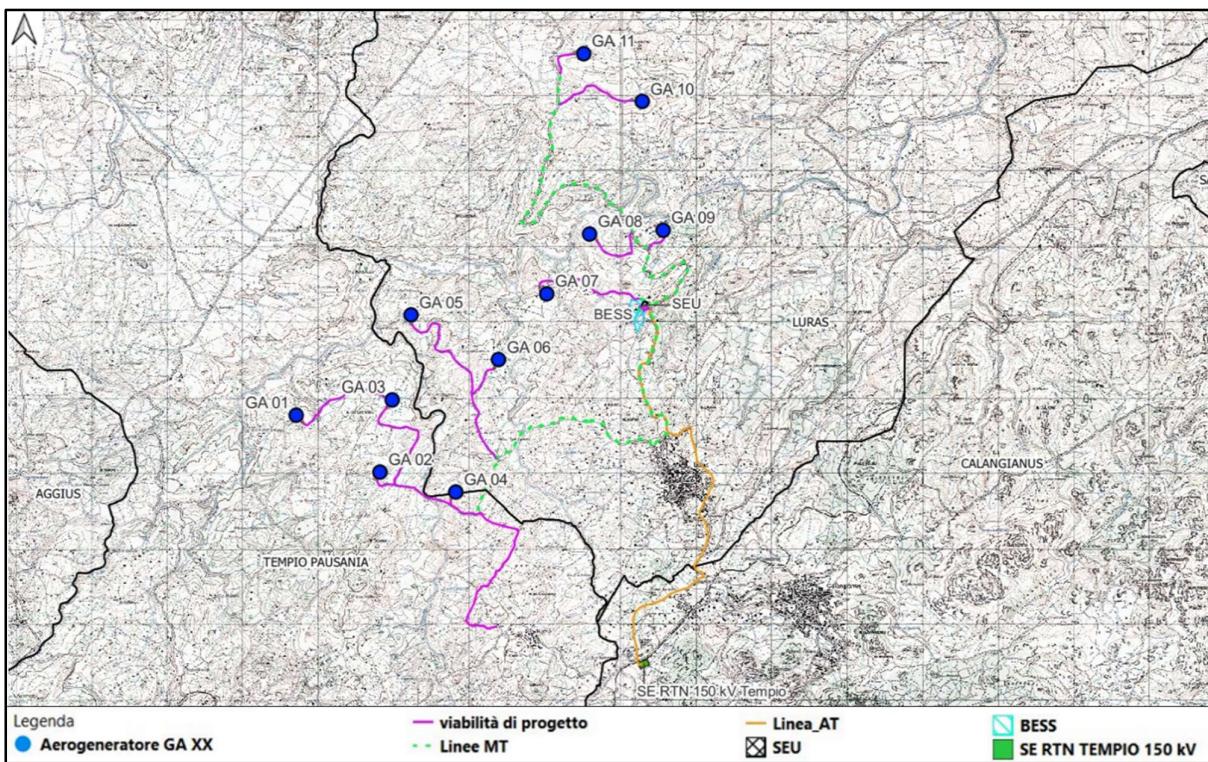
## 1. PREMessa

Nella presente trattazione si descrive l'evoluzione giornaliera delle ombre generate dalle pale eoliche facenti parte dell'impianto eolico denominato "Gallura" al fine di verificare che l'alternanza ciclica dell'ombra non arrechi danni alla salute su un possibile ricettore.

## 2. DESCRIZIONE DEL PROGETTO

L'impianto eolico presenta una potenza nominale totale in immissione pari a 144 MW ed è costituito da 11 aerogeneratori, di potenza nominale pari a 7,2 MW (modello Vestas V172 con altezza torre pari a 114 m e rotore pari a 172 m), per una potenza complessiva installata pari a 79,2 MW, e un sistema di accumulo di energia (BESS, Battery Energy Storage System) di potenza pari a 64,8 MW.

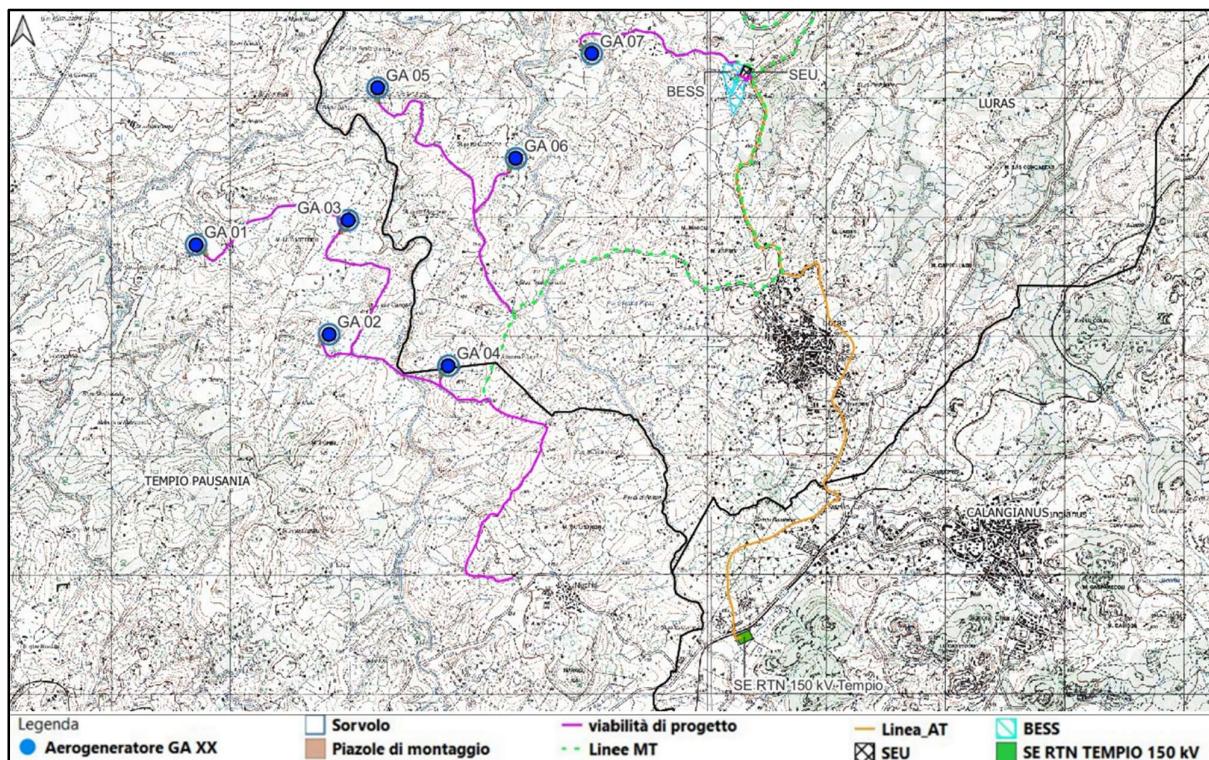
L'impianto interessa prevalentemente il Comune di Tempio Pausania (SS), ove ricadano 3 aerogeneratori, il Comune di Luras (SS), ove ricadono 8 aerogeneratori, il BESS e la Stazione Elettrica Utente (SEU) di trasformazione 150/33 kV, e il Comune di Calangianus (SS), dove ricade la Stazione Elettrica (SE) RTN Terna 150 kV "Tempio" (**Figura 2.1**).



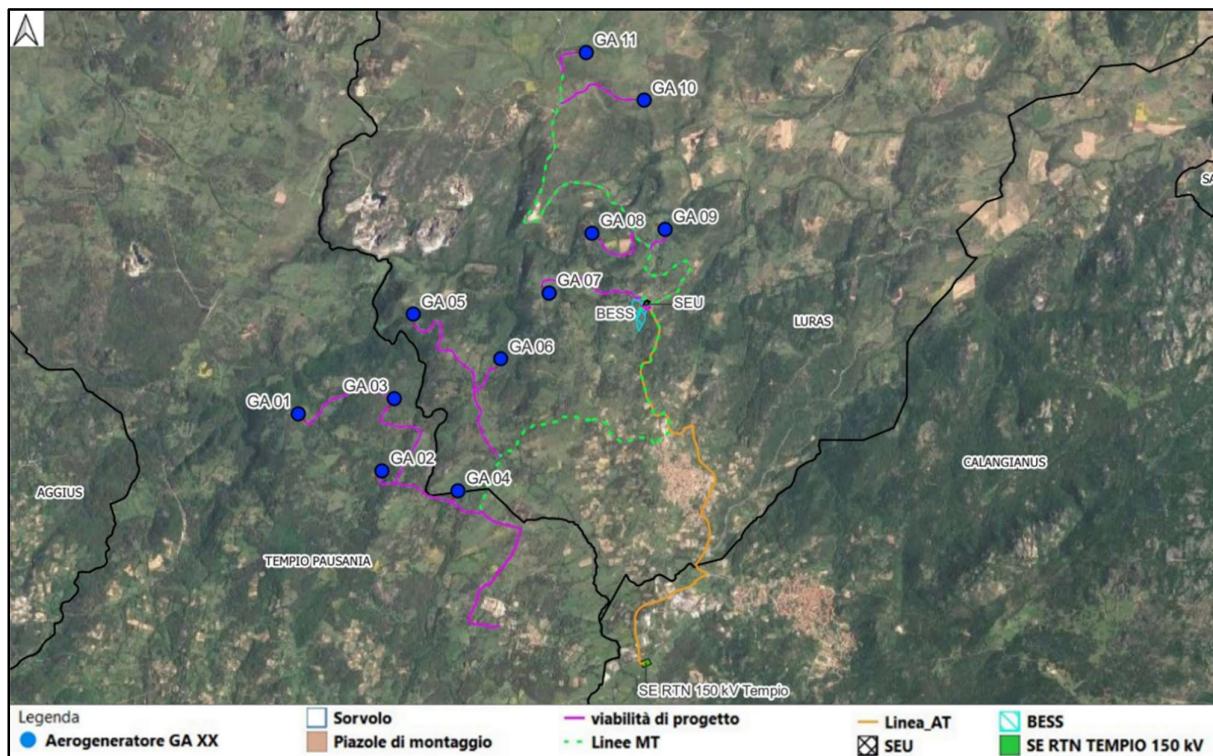
**Figura 2.1:** Inquadramento territoriale dell'impianto eolico Gallura su IGM con i limiti amministrativi dei comuni interessati

La soluzione di connessione (soluzione tecnica minima generale STMG - codice pratica del preventivo di connessione C.P. 202200017) prevede che l'impianto eolico venga collegato in antenna a 150 kV su

una nuova Stazione Elettrica (SE) della RTN a 150 kV in GIS denominata “Tempio” (prevista da Piano di Sviluppo di Terna), previa realizzazione di un nuovo elettrodotto di collegamento della RTN a 150 kV tra la SE di Santa Teresa e la nuova SE Buddusò (di cui al Piano di Sviluppo di Terna) (**Figura 2.2**). Il progetto prevede che la SEU (Sottostazione Elettrica Utente) 150/33 kV venga collegata alla suddetta SE RTN mediante la posa in opera, su strade esistenti o da realizzarsi per lo scopo, di una linea Alta Tensione a 150 kV interrata di lunghezza complessiva di circa 7,2 km. Le turbine eoliche verranno collegate attraverso un sistema di linee elettriche interrate a 33 kV, allocate prevalentemente in corrispondenza del sistema di viabilità interna che servirà per la costruzione e la gestione futura dell’impianto. Tale sistema verrà realizzato prevalentemente adeguando il sistema viario esistente e realizzando nuovi tratti di raccordo per consentire il transito dei mezzi eccezionali.

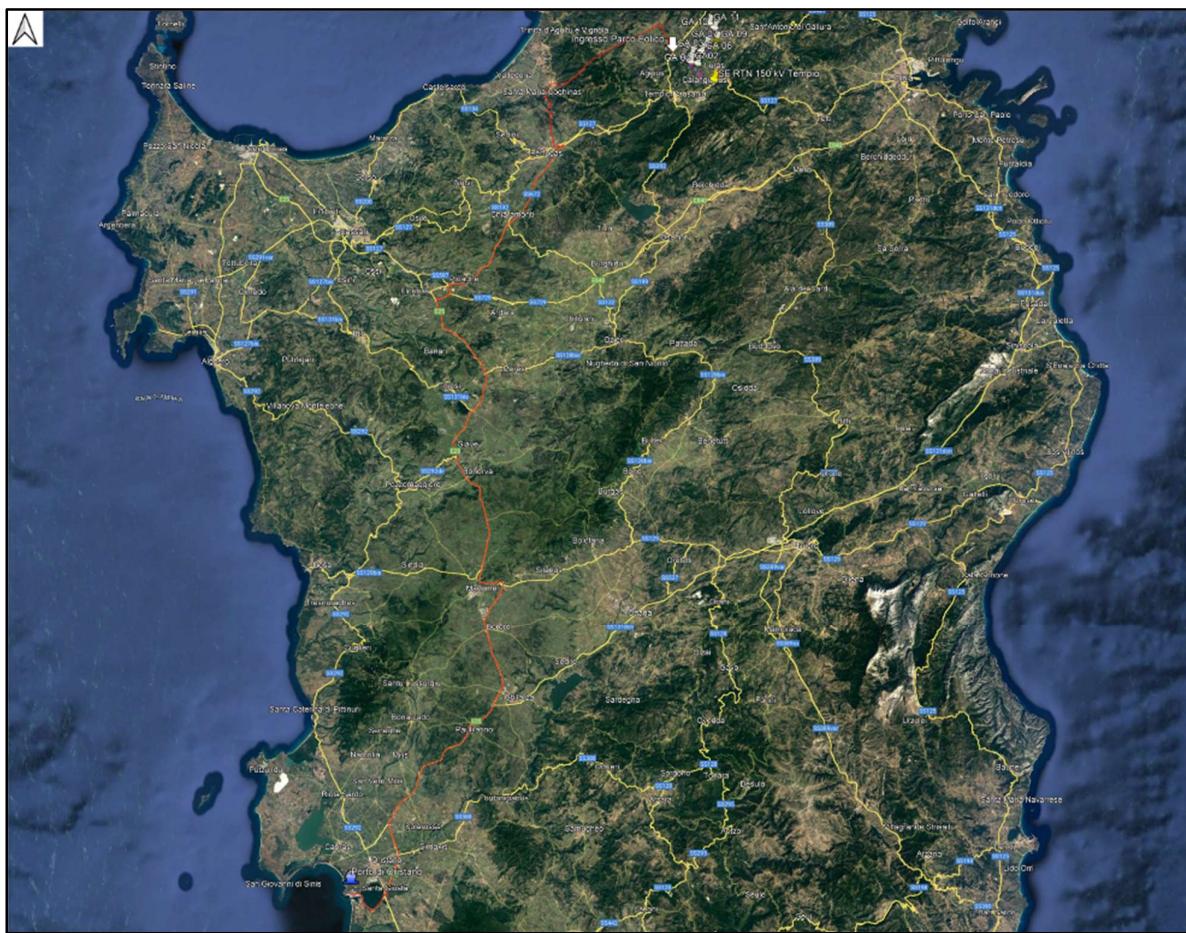


**Figura 2.2:** Soluzione di connessione a 150 kV in corrispondenza della stazione elettrica RTN Terna 150 kV Tempio (di futura realizzazione)



**Figura 2.3:** Inquadramento territoriale dell'impianto eolico Gallura su ortofoto con i limiti amministrativi dei comuni interessati

L'area di progetto (**Figura 2.4**) si raggiunge partendo dal Porto di Oristano, attraversando poi la SS131, SS729, SS672, SP92, SP33, SP74, SP58, SP74, SP5, SS131 e un sistema di viabilità esistente, opportunamente adeguato e migliorato per il transito dei mezzi eccezionali, da utilizzare per consegnare in situ i componenti degli aerogeneratori e da cui si dirameranno nuovi tratti di viabilità necessari per la costruzione e la manutenzione dell'impianto eolico.



**Figura 2.4:** Viabilità di accesso al sito dal Porto Industriale di Oristano su immagine satellitare

### 2.1. Caratteristiche tecniche dell'aerogeneratore

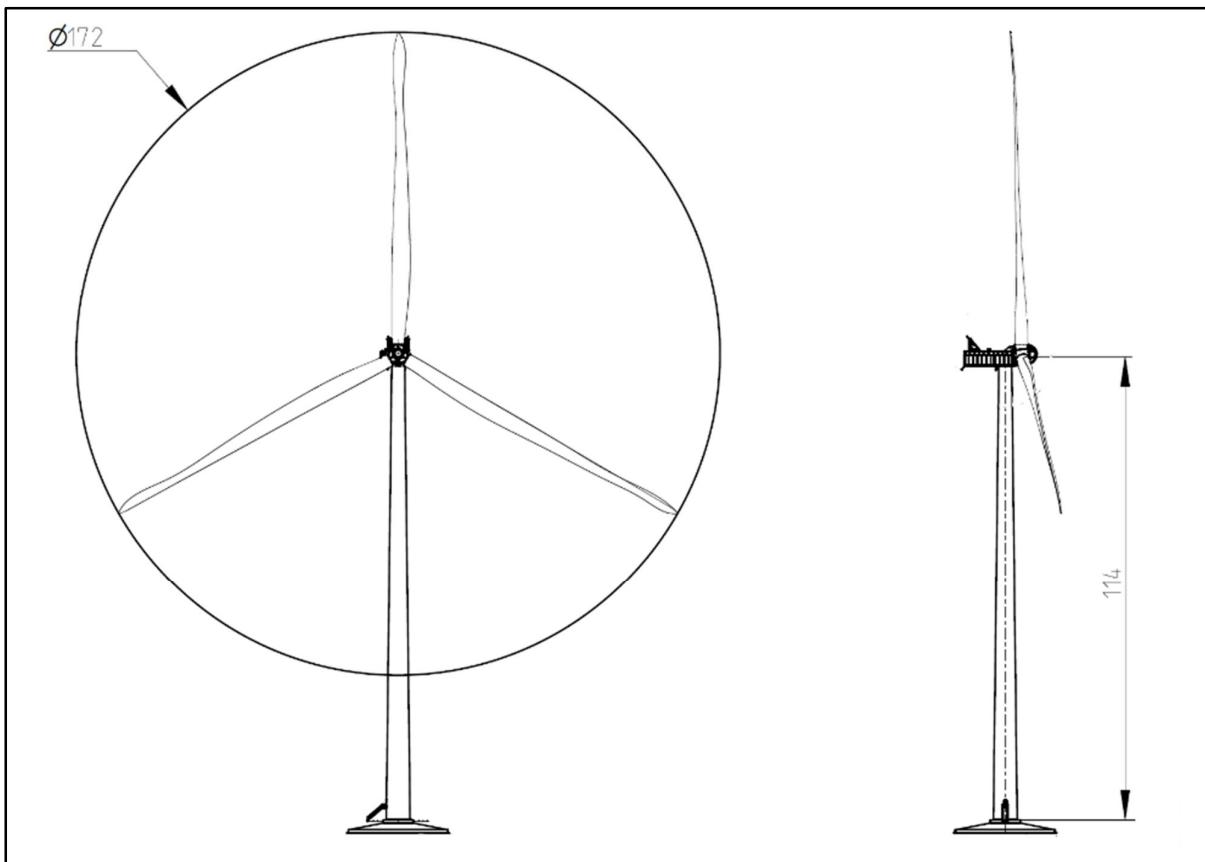
L'aerogeneratore è una macchina rotante che trasforma l'energia cinetica del vento in energia elettrica ed è essenzialmente costituito da una torre (suddivisa in più parti), dalla navicella, dal Drive Train, dall'Hub e tre pale che costituiscono il rotore.

Per il presente progetto una delle possibili macchine che potrebbe essere installata è il modello **Vestas V172**, di potenza nominale pari a 7,2 MW, altezza torre all'hub pari a 114 m e diametro del rotore pari a 172 m (**Figura 2.1.1**).

Oltre ai componenti sopra elencati, un sistema di controllo esegue il controllo della potenza ruotando le pale intorno al proprio asse principale e il controllo dell'orientamento della navicella, detto controllo dell'imbardata, che permette l'allineamento della macchina rispetto alla direzione del vento.

Il rotore, a passo variabile, è in resina epossidica rinforzata con fibra di vetro di diametro pari a 172 m, posto sopravvento al sostegno, con mozzo rigido in acciaio.

Le caratteristiche dell'aerogeneratore descritto sono quelle ritenute idonee in base a quanto disponibile oggi sul mercato, in futuro potrà essere possibile cambiare il modello dell'aerogeneratore senza modificare in maniera sostanziale l'impatto ambientale e i limiti di sicurezza previsti.



**Figura 2.1.1:** Profilo aerogeneratore V172 – 7,2 MW – HH= 114 m – D=172 m

## 2.2. Viabilità e piazzole

La viabilità e le piazze del parco eolico sono elementi progettati considerando la fase di costruzione e la fase di esercizio dell'impianto eolico.

In merito alla viabilità, come detto sopra, si è cercato di utilizzare il sistema viario esistente adeguandolo al passaggio dei mezzi eccezionali. Tale indirizzo progettuale ha consentito di minimizzare l'impatto sul territorio e di ripristinare tratti di viabilità comunale e interpoderali che si trovano in stato di dissesto migliorando l'accessibilità dei luoghi anche alla popolazione locale.

Nei casi in cui tale approccio non è stato applicabile, sono stati progettati tratti di nuova viabilità seguendo il profilo naturale del terreno senza interferire con il reticolo idrografico presente in sito.

Nella **Figura 2.2.1** riportiamo una sezione stradale tipo di riferimento per i tratti di viabilità da adeguare e quelli di nuova realizzazione.

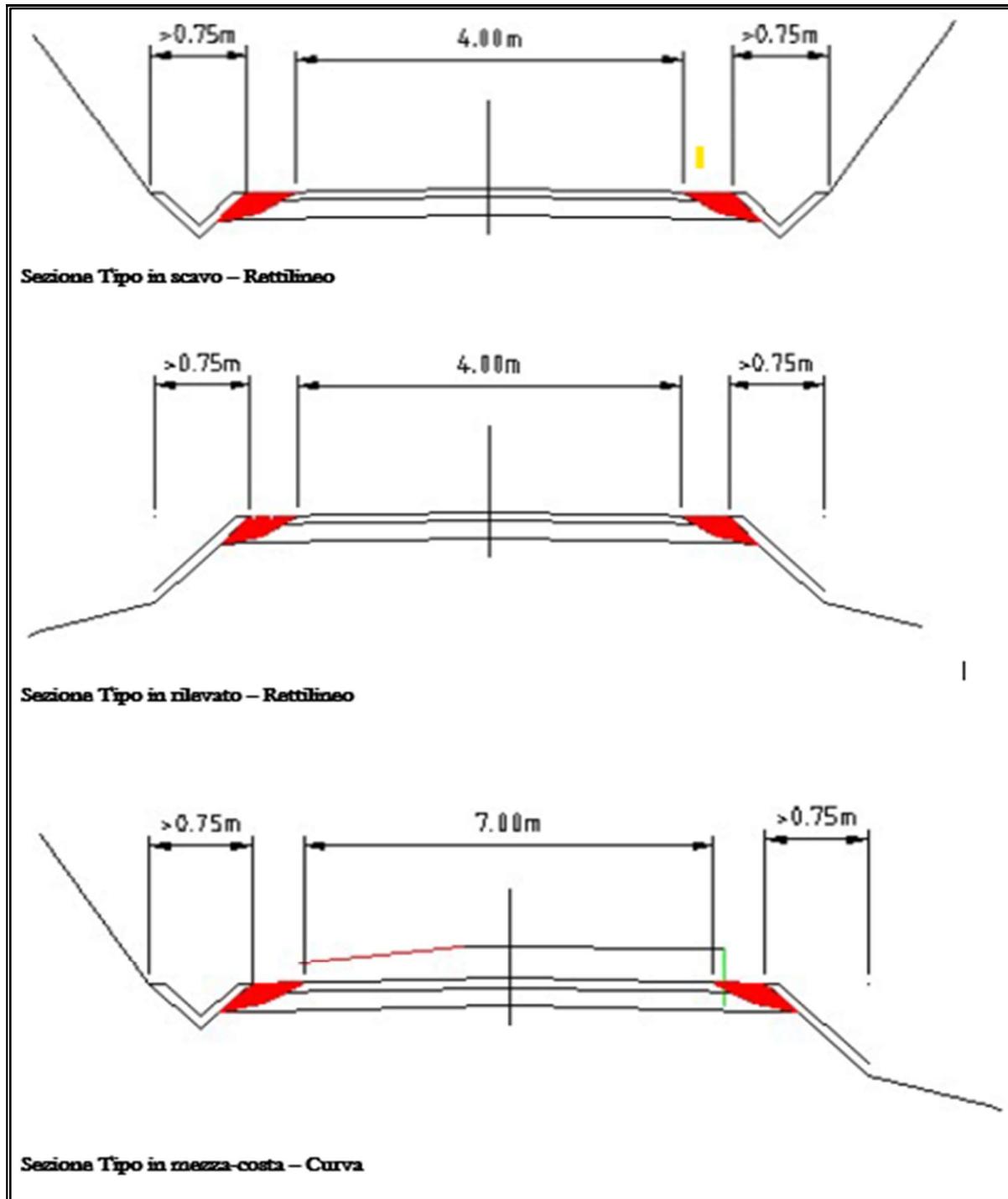


Figura 2.2.1: Sezioni tipo viabilità parco eolico

La progettazione delle piazzole da realizzare per l'installazione di ogni aerogeneratore prevede due configurazioni, la prima necessaria all'installazione dell'aerogeneratore e la seconda, a seguito di opere di ripristino parziale, per la fase di esercizio e manutenzione dell'impianto (**Figura 2.2.2**).

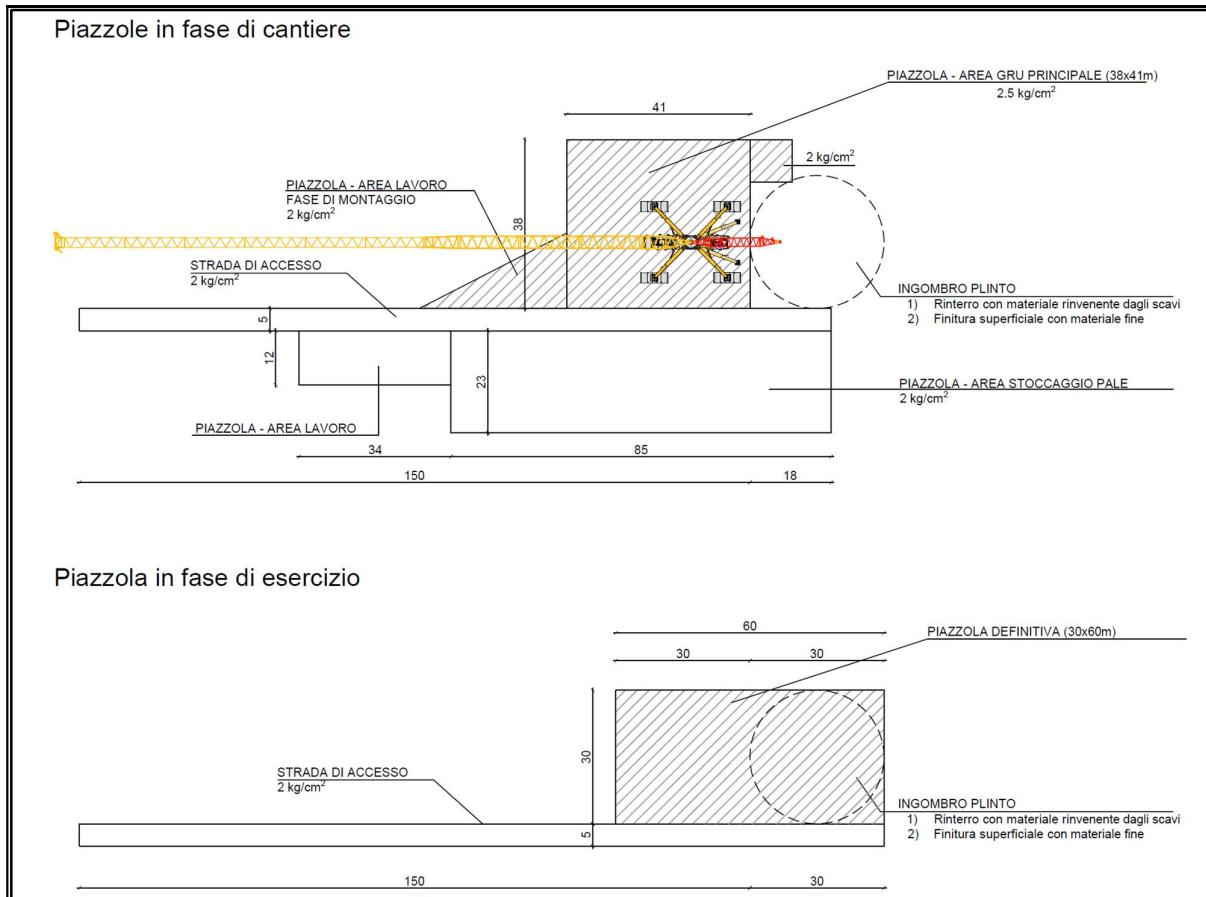


Figura 2.2.2: Planimetria piazzola tipo per la fase di installazione e fase di esercizio e manutenzione

### 3. CARATTERISTICHE PRINCIPALI DEL PARCO EOLICO

L'impianto eolico sarà costituito essenzialmente da 11 aerogeneratori la cui posizione è stata stabilita a seguito di valutazioni che riguardano diversi aspetti quali l'esposizione a tutti i settori della rosa dei venti, la morfologia del territorio, la distanza da fabbricati e strade esistenti ed utilizzate da un elevato numero di veicoli, distanza dal centro abitato e da beni monumentali presenti nell'area oltre agli aspetti legati alla sicurezza e volti a minimizzare l'impatto sull'ambiente:

- ottemperare alle previsioni della normativa vigente e delle linee guida sia nazionali che regionali;
- minimizzare l'impatto visivo;
- migliorare il sistema viario esistente al fine di migliorare l'accessibilità ai terreni per lo sviluppo dell'agricoltura e dell'allevamento di animali;
- disposizione delle macchine ad una distanza reciproca minima pari ad almeno 450 m, atta a minimizzare l'effetto scia, l'effetto selva e l'impatto sull'avifauna;
- condizioni di massima sicurezza, sia in fase di installazione che di esercizio.

La disposizione finale del parco è stata verificata e confermata a seguito di uno studio di fattibilità condotto sulla base delle informazioni sugli aspetti vincolistici dal punto di vista ambientale e paesaggistico e sulla base dei sopralluoghi svolti sul posto per verificare le interferenze presenti in situ e la fattibilità di realizzazione delle opere.

Si riportano di seguito le coordinate delle posizioni scelte per l'installazione degli aerogeneratori.

| ID   | Comune (Provincia)   | Informazioni catastali |            | Coordinate geografiche |                 | D <sub>ROTORE</sub> [m] | H <sub>hub</sub> [m] | H <sub>TOT</sub> [m] |
|------|----------------------|------------------------|------------|------------------------|-----------------|-------------------------|----------------------|----------------------|
|      |                      | Foglio                 | Particella | Latitudine [°]         | Longitudine [°] |                         |                      |                      |
| GA01 | Tempio Pausania (SS) | 161                    | 28         | 40.944209              | 9.114506        | 172                     | 114                  | 200                  |
| GA02 | Tempio Pausania (SS) | 1                      | 72         | 40.937420              | 9.127765        | 172                     | 114                  | 200                  |
| GA03 | Tempio Pausania (SS) | 1                      | 37         | 40.946034              | 9.129671        | 172                     | 114                  | 200                  |
| GA04 | Luras (SS)           | 18                     | 59         | 40.935028              | 9.139665        | 172                     | 114                  | 200                  |
| GA05 | Luras (SS)           | 18                     | 14         | 40.956035              | 9.132634        | 172                     | 114                  | 200                  |
| GA06 | Luras (SS)           | 18                     | 103        | 40.950686              | 9.146434        | 172                     | 114                  | 200                  |
| GA07 | Luras (SS)           | 19                     | 110        | 40.958569              | 9.154009        | 172                     | 114                  | 200                  |
| GA08 | Luras (SS)           | 19                     | 4          | 40.965673              | 9.160778        | 172                     | 114                  | 200                  |
| GA09 | Luras (SS)           | 16                     | 148        | 40.966117              | 9.172209        | 172                     | 114                  | 200                  |
| GA10 | Luras (SS)           | 12                     | 57         | 40.981420              | 9.168951        | 172                     | 114                  | 200                  |
| GA11 | Luras (SS)           | 12                     | 22         | 40.987169              | 9.159870        | 172                     | 114                  | 200                  |

**Tabella 3.1:** Localizzazione planimetrica degli aerogeneratori di progetto

Il progetto prevede l'adeguamento di tratti di strada esistenti, in particolare strade comunali, e la realizzazione di una nuova viabilità a servizio degli aerogeneratori di progetto, ossia di una rete viaria interna al parco che si snoderà seguendo lo sviluppo degli esistenti tratturi non vincolati dalla Soprintendenza.

La disponibilità delle aree, necessaria per l'installazione degli aerogeneratori e le relative opere connesse, è garantita grazie alla Dichiarazione di Pubblica utilità ai sensi degli artt. 52-quater “Disposizioni generali in materia di conformità urbanistica, apposizione del vincolo preordinato all'esproprio e pubblica utilità” e 52-quinquies “Disposizioni particolari per le infrastrutture lineari energetiche facenti parte delle reti energetiche nazionali” D.P.R. 327/2001 a conclusione del procedimento autorizzatorio di cui all'art.12, d.lgs. 387/2003 e gli effetti dell'Autorizzazione Unica ottenuta dopo opportuna conferenza di servizi.

Tutte le aree oggetto interessate dal progetto sono riportate nello specifico elaborato di progetto "LTEG011 Piano Particellare di esproprio descrittivo".

#### 4. FENOMENO DI SHADOW FLICKERING

La presenza delle turbine eoliche provoca la proiezione dell'ombra sulle aree ad esse adiacenti in presenza di luce solare diretta.

Il fenomeno causa effetti quasi statici dovuti alla presenza della torre fissa ed effetti dinamici legati alla rotazione del rotore delle tre pale della turbina.

Gli effetti statici possono aumentare, nelle prime ed ultime ore del giorno, la probabilità di formazione di ghiaccio su eventuali strade asfaltate soggette a traffico.

Gli effetti dinamici si traducono in una variazione alternata di intensità luminosa che, a lungo andare, può provocare fastidio agli occupanti le abitazioni le cui finestre risultano esposte al fenomeno stesso.

Lo "**shadow flickering**" descrive appunto l'effetto stroboscopico delle ombre proiettate dalle pale rotanti degli aerogeneratori allorquando il sole si trova alle loro spalle, come si evince dalla **Figura 4.1**.



**Figura 4.1:** Ombre proiettate dalle pale in rotazione di una turbina

Il conseguente 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 della tensione della rete di alimentazione elettrica.

Lo shadow flickering risulta assente nei casi di presenza di nuvole e nebbia che oscurano il sole e nei casi in cui le pale dell'aerogeneratore sono a riposo (per esempio in assenza del vento).

Per effettuare l'analisi del fenomeno vengono considerati alcuni parametri che ne influenzano la rilevanza.

Il primo di essi da tenere in conto è la frequenza di rotazione delle pale; in particolare, le frequenze che possono provocare un senso di fastidio sono comprese tra i 2,5 ed i 20 Hz.

Solitamente gli 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 (dal MW in su) raramente superano la velocità di rotazione di 20 giri al minuto, corrispondente a frequenze di passaggio delle pale ampiamente minori di quelle ritenute fastidiose per la maggioranza degli individui.

Un ulteriore aspetto da considerare per l'analisi della durata del fenomeno è la relazione spaziale tra un aerogeneratore ed un ricettore (abitazione), così come la direzione del vento.

Per distanze dell'ordine dei 300 m il fenomeno è più rilevante 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 l'effetto delle ombre è meno consistente perché il diametro del sole risulta essere di gran lunga superiore rispetto allo spessore della singola pala.

In questo scenario la condizione più penalizzante corrisponde al caso in cui il piano del rotore risulta essere ortogonale alla congiungente tra sole e ricettore; infatti, in tali condizioni, l'ombra proiettata darà origine ad un cerchio di diametro pari al rotore dell'aerogeneratore.

L'effetto dello shadow flickering risulta evidente e fastidioso in quegli ambienti con finestre rivolte verso le ombre.

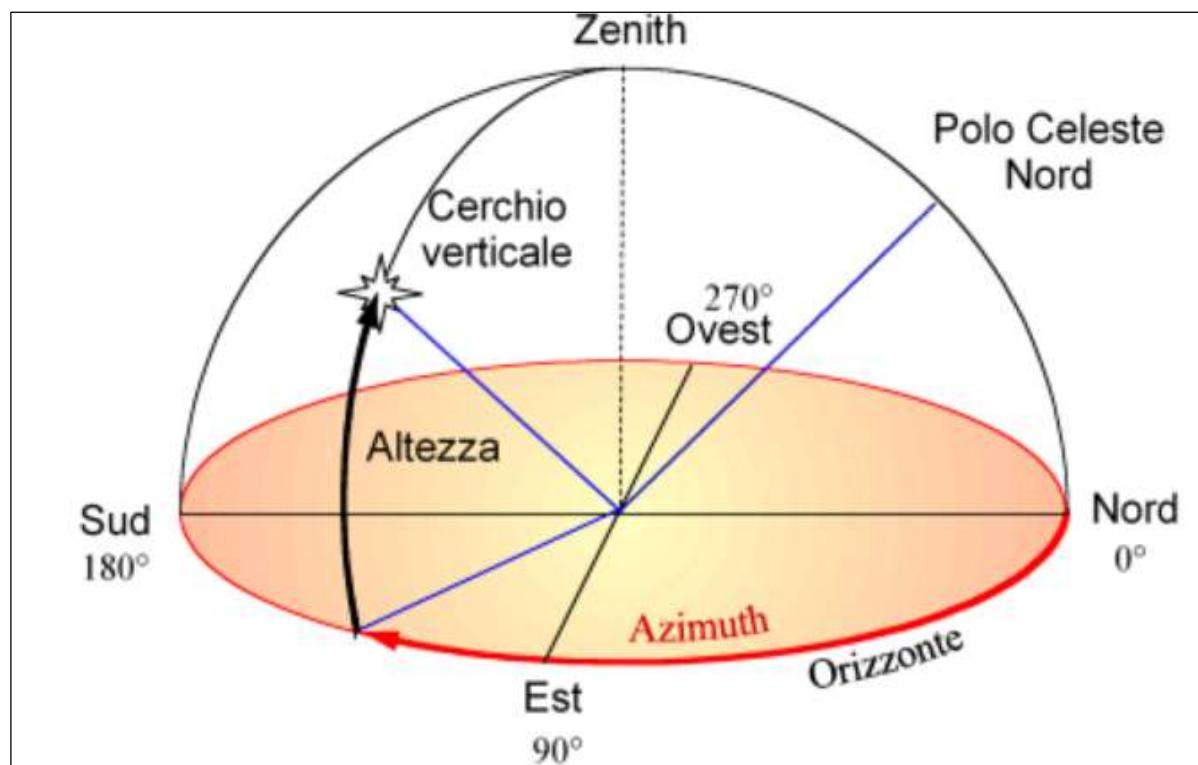
In linea di massima, si può ritenere che l'area soggetta al fenomeno in questione non si estenda oltre i 500 ÷ 1000 m dall'aerogeneratore e le zone a maggiore impatto ricadono entro i 300 m di distanza dalle turbine.

Al fine di analizzare qualitativamente e quantitativamente il fenomeno, risulta necessario individuare la posizione occupata dal sole in maniera univoca tramite due coordinate angolari, azimut ed altezza.

L'azimut per convenzione è l'angolo valutato sul piano orizzontale ed in senso orario, a partire dal nord geografico fino alla proiezione della congiungente (origine del sistema) - sole sul piano orizzontale stesso, ovvero il punto direttamente sotto al sole.

L'altezza o elevazione è misurata sul piano verticale, partendo da tale punto sino ad arrivare in corrispondenza del sole.

Tali coordinate variano con continuità grazie al moto della Terra intorno al sole e la traiettoria descritta nel cielo dal sole è assimilabile ad un arco; ogni giorno si caratterizza per un proprio arco, il quale si discosta, se pur di poco, da quello del giorno immediatamente precedente e successivo.



**Figura 4.2:** Coordinate azimut ed altezza per identificare la posizione del sole

La durata del giorno non coincide con la durata della luce naturale in quanto prima dell'alba e dopo il tramonto sono individuabili due periodi, detti crepuscolo (rispettivamente crepuscolo mattutino e crepuscolo serale o serotino), durante i quali giunge a terra una luce diffusa naturale fornita dai livelli più esterni dell'atmosfera, i quali, trovandosi a quote più elevate, ricevono luce solare diretta per un tempo più lungo riflettendola in parte verso la terra.

Pertanto, la durata dell'illuminazione del sole è pari alla somma della durata del giorno e della durata del crepuscolo mattutino e serale.

## 5. RIFERIMENTI NORMATIVI

L'effetto Shadow – Flickering è più pronunciato alle latitudini settentrionali durante i mesi invernali; infatti, soprattutto nel Nord Europa, l'effetto della minore altezza del sole all'orizzonte è più rilevante.

Pertanto, alcuni paesi hanno adottato dei limiti di legge relativi all'esposizione all'effetto in questione.

In Italia non esistono specifiche norme o linee guida che regolamentino il fenomeno e definiscano i limiti di esposizione in termini di ore o giorni all'anno.

Tuttavia, al fine di fornire una valutazione dell'impatto del fenomeno anche in termini quantitativi, si è cercato di mantenere l'esposizione allo shadow – flickering di ogni ricettore al di sotto delle 30 ore annue, parametro considerato di qualità a livello internazionale.

In particolare, la seguente trattazione fa riferimento alle norme e linee guida tedesche, in base alle quali il fenomeno in questione deve essere valutato nei casi seguenti:

- Fino alle distanze in corrispondenza delle quali il rotore dell'aerogeneratore copre il 20 % del disco solare (per distanze superiori a quella menzionata lo shadow-flickering arreca danni considerati trascurabili);
- per angoli del sole sull'orizzonte superiori a  $3^\circ$ ;
- ad un'altezza di 2 m dal suolo.

Inoltre, come anticipato, le linee guida tedesche stabiliscono i limiti di esposizione al fenomeno di:

- 30 ore all'anno;
- 30 minuti al giorno.

## **6. IPOTESI E METODO DI CALCOLO**

L'obiettivo della trattazione è la stima quantitativa dell'effetto shadow flickering prodotto dall'impianto eolico, fenomeno per cui si genera una intermittenza dell'ombra a seguito del movimento del rotore dell'aerogeneratore quando in esercizio (in particolare quando il piano del rotore risulta perpendicolare alla congiungente tra l'osservatore e il sole) e che potrebbe risultare fastidioso per un osservatore.

Nell'analisi condotta sono stati considerati 11 aerogeneratori di nuova realizzazione e relativi al progetto del Parco Eolico Gallura.

Gli aerogeneratori di progetto hanno un'altezza al mozzo di 114 m, diametro del rotore di 172 m, potenza nominale di 7,2 MWp e 8,2 giri al minuto (RPM).

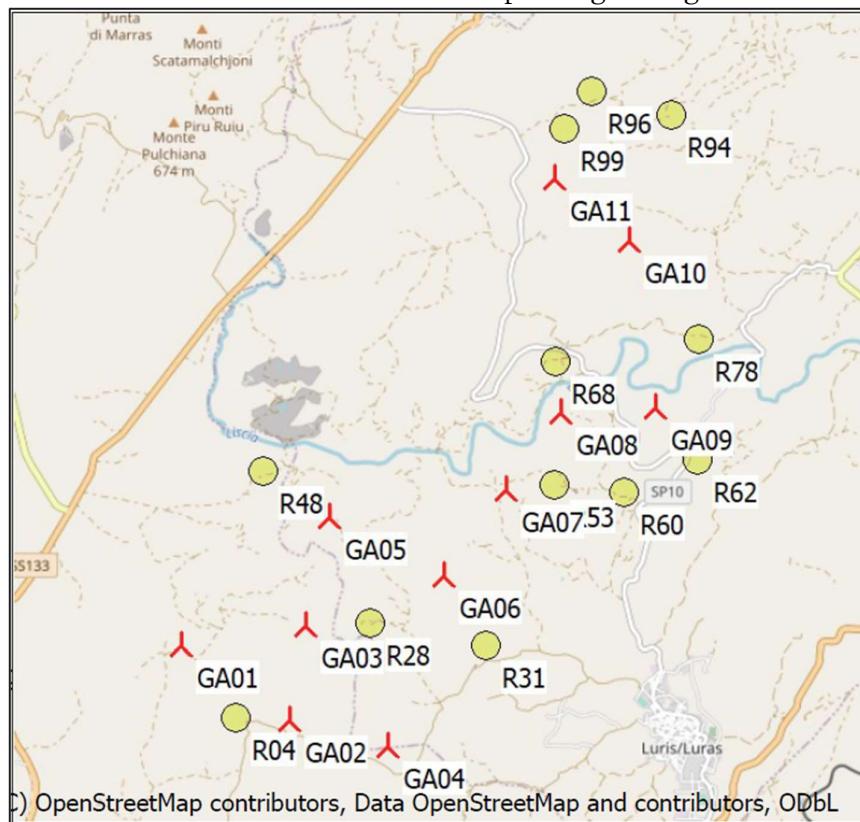
La verifica è stata effettuata in corrispondenza di 12 ricettori ritenuti, per la presenza continuativa di attività umana, sensibili al fenomeno dello shadow flickering e riportati nella **Tabella 6.1**:

| <b>Ricettore</b> | <b>Coordinate UTM WGS 84, <math>33^\circ</math></b> |                    | <b>Comune</b>   | <b>WTG più vicina</b> | <b>Distanza WTG più vicina</b> | <b>Foglio</b> | <b>Particella</b> | <b>Stato accatastamento</b> |
|------------------|---|--------------------|-----------------|-----------------------|--------------------------------|---------------|-------------------|-----------------------------|
|                  | <b>Latitudine</b>                                   | <b>Longitudine</b> |                 |                       |                                |               |                   |                             |
| R04              | 40.937657°  | 9.121307°          | Tempio Pausania | GA02                  | 541                            | 1             | 141               | A03                         |
| R28              | 40.946360°  | 9.137579°          | Luras           | GA03                  | 660                            | 18            | 89                | A/3                         |
| R31              | 40.944313°  | 9.151659°          | Luras           | GA06                  | 834                            | 19            | 103               | A04                         |

| Ricettore | Coordinate UTM WGS 84, 33° |             | Comune          | WTG più vicina | Distanza WTG più vicina | Foglio | Particella | Stato accatastamento |
|-----------|----------------------------|-------------|-----------------|----------------|-------------------------|--------|------------|----------------------|
|           | Latitudine                 | Longitudine |                 |                |                         |        |            |                      |
| R48       | 40.960363°                 | 9.124571°   | Tempio Pausania | GA05           | 828                     | 156    | 147        | A/4                  |
| R53       | 40.958972°                 | 9.159872°   | Luras           | GA07           | 495                     | 19     | 113        | A03                  |
| R60       | 40.958429°                 | 9.168513°   | Luras           | GA09           | 903                     | 16     | 329        | A03                  |
| R62       | 40.961339°                 | 9.177406°   | Luras           | GA09           | 681                     | 17     | 57         | A03                  |
| R68       | 40.970246°                 | 9.160079°   | Luras           | GA08           | 510                     | 16     | 275        | D10                  |
| R78       | 40.972435°                 | 9.177503°   | Luras           | GA09           | 824                     | 16     | 292        | A/3                  |
| R94       | 40.992943°                 | 9.174139°   | Luras           | GA10           | 1340                    | 7      | 157        | A04                  |
| R96       | 40.995118°                 | 9.164523°   | Luras           | GA11           | 958                     | 6      | 353        | A03                  |
| R99       | 40.991752°                 | 9.161065°   | Luras           | GA11           | 515                     | 6      | 349        | A03                  |

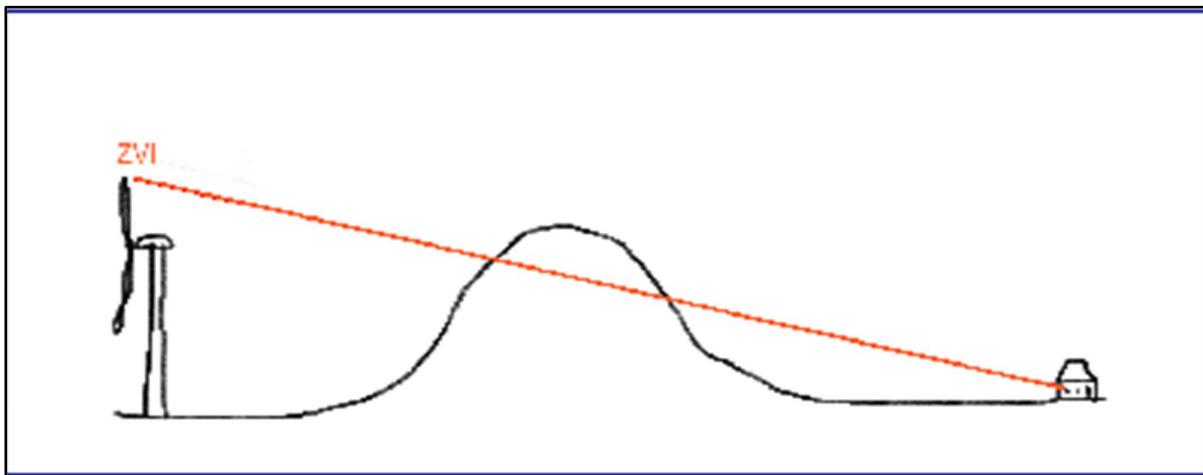
**Tabella 6.1:** Ricettori oggetto di verifica

La distribuzione dei suddetti ricettori rispetto agli aerogeneratori è riportata nelle figure seguenti:

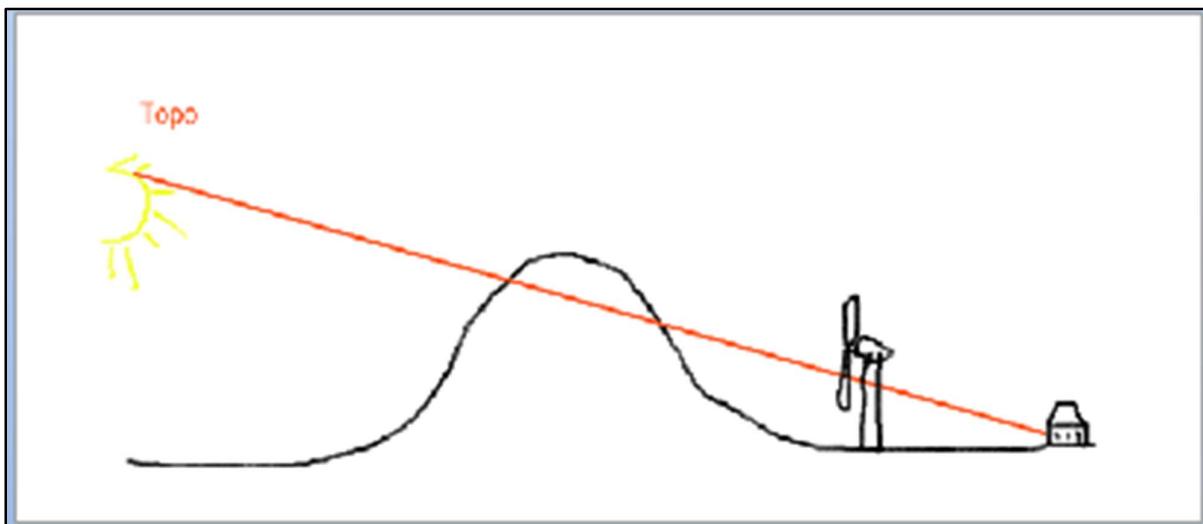
**Figura 6.1:** Localizzazione dei ricettori rispetto agli aerogeneratori di progetto

Il software impiegato per effettuare la verifica di sicurezza all'effetto shadow flickering è il WindPRO versione 3.4.

Tale software esegue la valutazione di zone di influenza degli aerogeneratori (ZVI), considerando l'orografia del terreno e altezza dell'osservatore (nel caso specifico altezza della finestra di un'abitazione) pari a 2 m, prima di effettuare il calcolo fliker in modo da escludere il contributo di quegli aerogeneratori che non sono visibili dal ricevitore.



**Figura 6.2:** Impatto della ZVI, l'orografia del territorio può rendere non visibile l'aerogeneratore al ricevitore



**Figura 6.3:** Impatto dell'orografia del territorio sull'ombreggiamento

Nella prima stima effettuata (**worst case**) si assumono le seguenti ipotesi restrittive:

- l'impianto eolico sempre in funzione durante le ore di sole;
- altezza minima del sole sull'orizzonte pari a  $3^\circ$ ;
- piano del rotore sempre ortogonale alla congiungente tra l'osservatore e il sole;

- totale assenza di ostacoli o schermi vegetazionali presenti negli spazi circostanti i possibili ricettori e che potrebbero inficiare il fenomeno;
- ricettori in modalità “green house”, ovvero le finestre delle abitazioni attenzionate non orientate in una particolare direzione ma omnidirezionali.

Inoltre, in una seconda stima, allo scopo di pervenire a valori più realistici di impatto (**real case**), si è impiegato il valore di eliofania, che tiene in conto del numero medio di ore di cielo libero da nubi durante il giorno, e le ore di funzionamento degli aerogeneratori in presenza del sole.

Per l'area in esame, è stato considerato il valore medio annuale di 8,20 h come da fonte ISPRA con riferimento al Comune di Chilivani e le ore di funzionamento degli aerogeneratori in presenza del sole in funzione della direzione del vento, come riportato nelle tabelle seguenti:

| MESE                     | gen  | feb  | mar  | apr  | mag  | giu  | lug  | ago  | set  | ott  | nov  | dic  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| GIORNI                   | 31   | 28   | 31   | 30   | 31   | 30   | 31   | 31   | 30   | 31   | 30   | 31   |
| PROB. MEDIA<br>ELIOFANIA | 8,20 | 8,20 | 8,20 | 8,20 | 8,20 | 8,20 | 8,20 | 8,20 | 8,20 | 8,20 | 8,20 | 8,20 |

**Tabella 6.2:** Probabilità medie di eliofania e ore di funzionamento aerogeneratori in presenza del sole

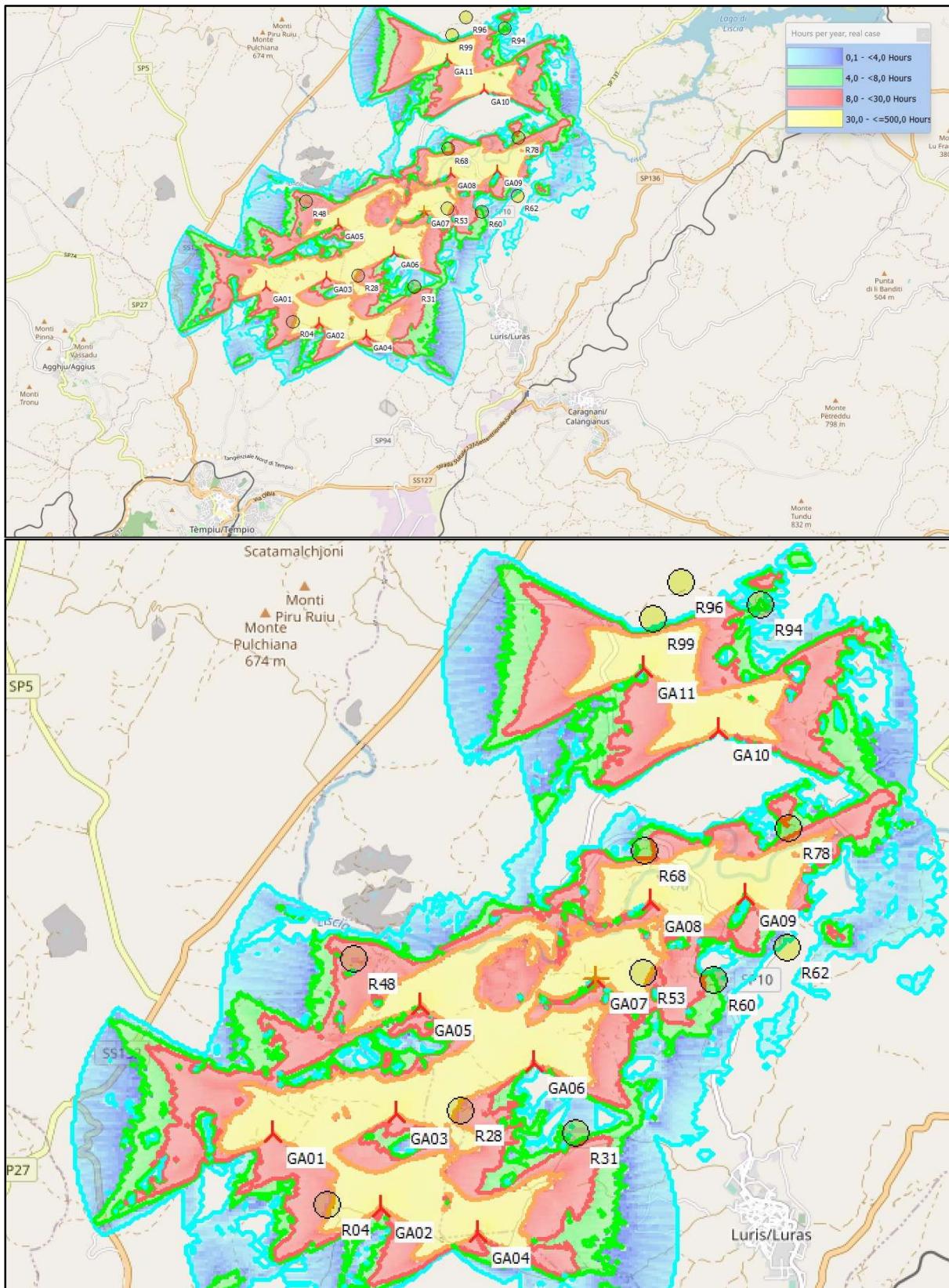
| N  | NNNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Somma |
|----|------|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| 90 | 295  | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

**Tabella 6.3:** Ore di funzionamento degli aerogeneratori in presenza del sole in funzione della direzione del vento

Il modello numerico utilizzato, al pari degli altri presenti sul mercato, produce statisticamente un output relativo al valore atteso delle ore d'ombra per anno relativo ai ricettori.

## 7. CONCLUSIONI

Nella **Figura 7.1** sono rappresentati i ricettori attenzionati rispetto alle posizioni degli aerogeneratori di progetto e gli intervalli delle ore d'ombra per anno ottenute dalla simulazione effettuata nell'area d'impianto.



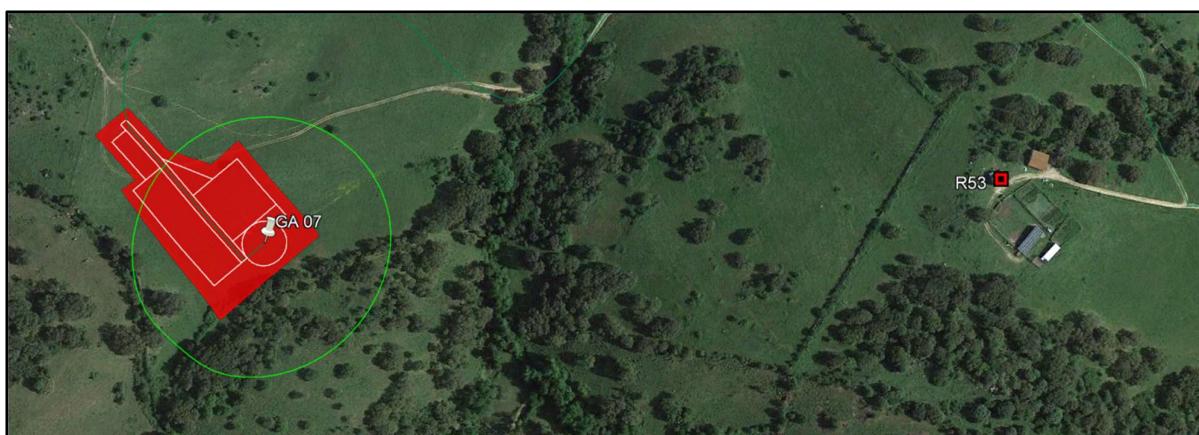
Nella **Tabella 7.1** si riportano i valori attesi delle ore d'ombra intermittente per anno relativamente ai ricettori considerati nelle ipotesi precedentemente indicate:

| Ricettore | ORE/ANNO – WORST CASE | ORE/ANNO – REAL CASE<br>(EXPECTED VALUES) |
|-----------|-----------------------|---|
| R04       | 64:50                 | 25:46                                     |
| R28       | 53:46                 | 22:23                                     |
| R31       | 4:26                  | 1:39                                      |
| R48       | 65:10                 | 22:31                                     |
| R53       | 114:40                | 52:45                                     |
| R60       | 7:33                  | 3:04                                      |
| R62       | 0:00                  | 0:00                                      |
| R68       | 14:58                 | 5:37                                      |
| R78       | 12:41                 | 7:11                                      |
| R94       | 8:54                  | 4:59                                      |
| R96       | 0:00                  | 0:00                                      |
| R99       | 0:00                  | 0:00                                      |

**Tabella 7.1:** Ore d'ombra intermittente per anno sui ricettori nel worst case e real case

Dai risultati riportati nella **Tabella 7.1** si evince che, nelle ipotesi precedentemente elencate e con riferimento al real case, per i ricettori attenzionati, il valore atteso delle ore d'ombra intermittente per anno è inferiore al valore di 30 ore/anno, parametro considerato di qualità a livello internazionale, eccetto che per il ricettore R53.

Tuttavia, la seguente figura mostra come tra il ricettore R53 e l'aerogeneratore GA07 si interpone la vegetazione esistente che tende ad attenuare il fenomeno delle ombreggiature intermittenti.



**Figura 7.2:** Localizzazione del ricettore R53 rispetto all' aerogeneratore GA07

Come l'immagine precedentemente riportata evidenzia, l'immobile R53 risulta essere schermato dagli alberi presenti nelle vicinanze e nella direzione verso l'aerogeneratore.

Tale situazione non è presa in considerazione nel calcolo sopra riportato e, pertanto, è possibile ritenere che l'effetto dello shadow flickering sull'immobile di cui sopra sia molto più attenuato di quello stimato.

Come detto, nell'analisi condotta sono state adottate ipotesi molto restrittive, tra le quali quella secondo cui l'impianto sia sempre in funzione durante le ore di sole, il piano del rotore sempre ortogonale alla congiungente tra l'osservatore e il sole e ci sia totale assenza di ostacoli o schermi vegetazionali presenti negli spazi circostanti i possibili ricettori e che potrebbero attenuare il fenomeno.

Nella stima effettuata è stata considerata l'ulteriore ipotesi conservativa secondo la quale i ricettori siano in modalità "green house", ovvero le finestre delle abitazioni attenzionate siano omnidirezionali, situazione non sempre verificata nella realtà come mostrato nelle figure seguenti, da cui si evince che le aperture delle finestre non sono rivolte verso l'aerogeneratore e quindi non soggette al fenomeno analizzato.



Figura 7.5: Vista del ricettore R53



**Figura 7.6:** Vista del ricettore R53, facciata esposta verso l'aerogeneratore GA07.

Per quanto sopra esposto, nello scenario reale ci si aspetta, quindi, che il fenomeno risulti ulteriormente meno rilevante di quello a cui ha condotto la stima effettuata.

Pertanto, si può ragionevolmente affermare che l'effetto shadow flickering non abbia un impatto negativo sul territorio circostante ed in particolare sul fabbricato attenzionato.

8. **ALLEGATO 1: SHADOW – MAIN RESULT – ELABORAZIONE MEDIANTE IL SOFTWARE  
WINDPRO 3.4 – WORST CASE**

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## SHADOW - Main Result

### Assumptions for shadow calculations

Maximum distance for influence

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

Minimum sun height over horizon for influence

3 °

Day step for calculation

1 days

Time step for calculation

1 minutes

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

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

Height contours used: Elevation Grid Data Object: WF\_Gallura\_EMDGrid\_0.wp

Obstacles used in calculation

Receptor grid resolution: 1,0 m

Topographic shadow included in calculation

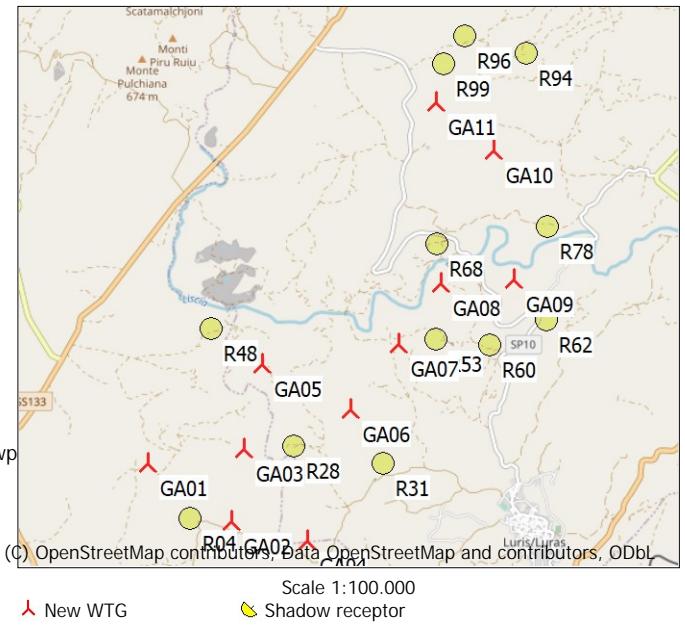
All coordinates are in  
Geo [deg]-WGS84

### WTGs

| Longitude | Latitude    | Z            | Row data/Description          | WTG type |           |                |                   | Shadow data        |                |                          |           |
|-----------|-------------|--------------|-------------------------------|----------|-----------|----------------|-------------------|--------------------|----------------|--------------------------|-----------|
|           |             |              |                               | Valid    | Manufact. | Type-generator | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | Calculation distance [m] | RPM [RPM] |
| [m]       |             |              |                               |          |           |                |                   |                    |                |                          |           |
| GA01      | 9,114506° E | 40,944210° N | 423,5 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041                    | 9,5       |
| GA02      | 9,127765° E | 40,937423° N | 433,1 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041                    | 9,5       |
| GA03      | 9,129671° E | 40,946033° N | 426,8 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041                    | 9,5       |
| GA04      | 9,139665° E | 40,935032° N | 446,2 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041                    | 9,5       |
| GA05      | 9,132639° E | 40,956036° N | 359,6 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041                    | 9,5       |
| GA06      | 9,146434° E | 40,950689° N | 408,9 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041                    | 9,5       |
| GA07      | 9,154012° E | 40,958575° N | 311,2 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041                    | 9,5       |
| GA08      | 9,160780° E | 40,965574° N | 261,9 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041                    | 9,5       |
| GA09      | 9,172211° E | 40,966121° N | 226,8 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041                    | 9,5       |
| GA10      | 9,168955° E | 40,981421° N | 439,9 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041                    | 9,5       |
| GA11      | 9,159869° E | 40,987175° N | 438,5 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041                    | 9,5       |

### Shadow receptor-Input

| No. | Longitude   | Latitude     | Z     | Width | Height | Elevation a.g.l. | Slope of window | Direction mode     | Eye height (ZVI) a.g.l. |
|-----|-------------|--------------|-------|-------|--------|------------------|-----------------|--------------------|-------------------------|
|     |             |              | [m]   | [m]   | [m]    | [m]              | [°]             |                    | [m]                     |
| R04 | 9,121307° E | 40,937657° N | 483,0 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R28 | 9,137579° E | 40,946360° N | 427,1 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R31 | 9,151659° E | 40,94413° N  | 428,7 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R48 | 9,124571° E | 40,960363° N | 347,3 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R53 | 9,159872° E | 40,958972° N | 336,8 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R60 | 9,168513° E | 40,958429° N | 365,2 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R62 | 9,177406° E | 40,961339° N | 313,2 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R68 | 9,160079° E | 40,970246° N | 268,1 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R78 | 9,177503° E | 40,972435° N | 223,2 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R94 | 9,174139° E | 40,992943° N | 432,9 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R96 | 9,164523° E | 40,995118° N | 513,7 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R99 | 9,161065° E | 40,991752° N | 463,9 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |



## SHADOW - Main Result

### Calculation Results

Shadow receptor

Shadow, worst case

| No. | Shadow hours per year [h/year] | Shadow days per year [days/year] | Max shadow hours per day [h/day] |
|-----|--------------------------------|----------------------------------|----------------------------------|
| R04 | 64:50                          | 101                              | 1:03                             |
| R28 | 53:46                          | 84                               | 0:55                             |
| R31 | 4:26                           | 24                               | 0:16                             |
| R48 | 65:10                          | 104                              | 0:47                             |
| R53 | 114:40                         | 163                              | 1:14                             |
| R60 | 7:33                           | 34                               | 0:20                             |
| R62 | 0:00                           | 0                                | 0:00                             |
| R68 | 14:58                          | 50                               | 0:28                             |
| R78 | 12:41                          | 42                               | 0:24                             |
| R94 | 8:54                           | 43                               | 0:20                             |
| R96 | 0:00                           | 0                                | 0:00                             |
| R99 | 0:00                           | 0                                | 0:00                             |

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

| No.  | Name  | Worst case [h/year] |
|------|---|---------------------|
| GA01 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13) | 3:27                |
| GA02 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14) | 62:39               |
| GA03 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15) | 56:24               |
| GA04 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16) | 4:43                |
| GA05 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17) | 65:10               |
| GA06 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18) | 25:52               |
| GA07 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19) | 90:49               |
| GA08 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20) | 12:41               |
| GA09 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (21) | 14:58               |
| GA10 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (22) | 0:00                |
| GA11 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (23) | 8:54                |

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

## SHADOW - Calendar

Shadow receptor: R04 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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         |
|---------------------|---------|----------|----------------|-----------------|-----------------|--------------|
| 1                   | 07:49   | 07:36    | 07:00          | 07:19 (GA04)    | 07:09           | 07:28 (GA02) |
|                     | 17:06   | 17:40    | 18:14          | 5 07:24 (GA04)  | 19:48           | 06:24        |
| 2                   | 07:49   | 07:35    | 06:58          | 07:17 (GA04)    | 07:07           | 20:20        |
|                     | 17:07   | 17:41    | 18:15          | 7 07:24 (GA04)  | 19:49           | 05:49        |
| 3                   | 07:49   | 07:34    | 06:57          | 07:16 (GA04)    | 07:06           | 06:22        |
|                     | 17:08   | 17:43    | 18:16          | 9 07:25 (GA04)  | 19:50           | 05:54        |
| 4                   | 07:49   | 07:33    | 06:55          | 07:14 (GA04)    | 07:04           | 06:20        |
|                     | 17:09   | 17:44    | 18:18          | 10 07:24 (GA04) | 19:51           | 05:54        |
| 5                   | 07:49   | 07:31    | 06:54          | 07:12 (GA04)    | 07:03           | 06:23        |
|                     | 17:10   | 17:45    | 18:19          | 12 07:24 (GA04) | 19:52           | 06:18        |
| 6                   | 07:49   | 07:30    | 06:52          | 07:11 (GA02)    | 07:01           | 06:24        |
|                     | 17:10   | 17:46    | 18:20          | 13 07:24 (GA04) | 19:53           | 20:25        |
| 7                   | 07:49   | 07:29    | 06:50          | 07:09 (GA02)    | 06:59           | 06:17        |
|                     | 17:11   | 17:48    | 18:21          | 14 07:23 (GA04) | 19:54           | 05:53        |
| 8                   | 07:49   | 07:28    | 06:49          | 07:08 (GA02)    | 06:58           | 06:23        |
|                     | 17:12   | 17:49    | 18:22          | 15 07:23 (GA04) | 19:55           | 06:16        |
| 9                   | 07:49   | 07:27    | 06:47          | 07:06 (GA02)    | 06:56           | 06:14        |
|                     | 17:13   | 17:50    | 18:23          | 16 07:22 (GA02) | 19:56           | 05:53        |
| 10                  | 07:49   | 07:26    | 06:46          | 07:04 (GA02)    | 06:54           | 06:13        |
|                     | 17:14   | 17:51    | 18:24          | 20 07:24 (GA02) | 19:57           | 05:52        |
| 11                  | 07:48   | 07:25    | 06:44          | 07:03 (GA02)    | 06:53           | 06:11        |
|                     | 17:15   | 17:53    | 18:25          | 23 07:26 (GA02) | 19:59           | 05:52        |
| 12                  | 07:48   | 07:23    | 06:42          | 07:01 (GA02)    | 06:51           | 06:10        |
|                     | 17:17   | 17:54    | 18:26          | 26 07:27 (GA02) | 20:00           | 05:52        |
| 13                  | 07:48   | 07:22    | 06:41          | 06:59 (GA02)    | 06:50           | 06:09        |
|                     | 17:18   | 17:55    | 18:28          | 29 07:28 (GA02) | 20:01           | 05:52        |
| 14                  | 07:47   | 07:21    | 06:39          | 06:58 (GA02)    | 06:48           | 06:08        |
|                     | 17:19   | 17:56    | 18:29          | 31 07:29 (GA02) | 20:02           | 05:51        |
| 15                  | 07:47   | 07:20    | 06:37          | 06:56 (GA02)    | 06:47           | 06:07        |
|                     | 17:20   | 17:57    | 18:30          | 34 07:30 (GA02) | 20:03           | 05:51        |
| 16                  | 07:47   | 07:18    | 06:36          | 06:54 (GA02)    | 06:45           | 06:06        |
|                     | 17:21   | 17:59    | 18:31          | 36 07:30 (GA02) | 20:04           | 05:51        |
| 17                  | 07:46   | 07:17    | 06:34          | 06:53 (GA02)    | 06:43           | 06:05        |
|                     | 17:22   | 18:00    | 18:32          | 38 07:31 (GA02) | 20:05           | 05:51        |
| 18                  | 07:46   | 07:16    | 06:32          | 06:51 (GA02)    | 06:42           | 06:05        |
|                     | 17:23   | 18:01    | 18:33          | 40 07:31 (GA02) | 20:06           | 05:52        |
| 19                  | 07:45   | 07:14    | 06:31          | 06:49 (GA02)    | 06:40           | 06:04        |
|                     | 17:24   | 18:02    | 18:34          | 42 07:31 (GA02) | 20:07           | 05:52        |
| 20                  | 07:45   | 07:13    | 06:29          | 06:48 (GA02)    | 06:39           | 06:03        |
|                     | 17:26   | 18:04    | 18:35          | 44 07:32 (GA02) | 20:08           | 05:52        |
| 21                  | 07:44   | 07:12    | 06:27          | 06:46 (GA02)    | 06:37           | 06:02        |
|                     | 17:27   | 18:05    | 18:36          | 46 07:32 (GA02) | 20:09           | 05:52        |
| 22                  | 07:44   | 07:10    | 06:26          | 06:44 (GA02)    | 06:36           | 06:01        |
|                     | 17:28   | 18:06    | 18:37          | 48 07:32 (GA02) | 20:10           | 05:52        |
| 23                  | 07:43   | 07:09    | 06:24          | 06:43 (GA02)    | 06:35           | 06:00        |
|                     | 17:29   | 18:07    | 18:38          | 50 07:33 (GA02) | 20:11           | 05:52        |
| 24                  | 07:42   | 07:07    | 06:22          | 06:41 (GA02)    | 06:33           | 06:00        |
|                     | 17:30   | 18:08    | 18:39          | 51 07:32 (GA02) | 20:12           | 05:52        |
| 25                  | 07:41   | 07:06    | 06:21          | 06:39 (GA02)    | 06:32           | 06:01        |
|                     | 17:32   | 18:09    | 18:41          | 53 07:32 (GA02) | 20:13           | 05:52        |
| 26                  | 07:41   | 07:04    | 06:19          | 06:38 (GA02)    | 06:30           | 06:01        |
|                     | 17:33   | 18:11    | 18:42          | 54 07:32 (GA02) | 20:14           | 05:52        |
| 27                  | 07:40   | 07:03    | 06:17          | 06:36 (GA02)    | 06:29           | 05:52        |
|                     | 17:34   | 18:12    | 18:43          | 55 07:31 (GA02) | 20:15           | 05:52        |
| 28                  | 07:39   | 07:01    | 07:20 (GA04)   | 06:16           | 06:34 (GA02)    | 06:28        |
|                     | 17:35   | 18:13    | 2 07:22 (GA04) | 18:44           | 57 07:31 (GA02) | 20:16        |
| 29                  | 07:38   |          |                | 07:14           | 07:33 (GA02)    | 06:26        |
|                     | 17:36   |          |                | 19:45           | 58 08:31 (GA02) | 20:18        |
| 30                  | 07:37   |          |                | 07:12           | 07:31 (GA02)    | 06:25        |
|                     | 17:38   |          |                | 19:46           | 59 08:30 (GA02) | 20:19        |
| 31                  | 07:36   |          |                | 07:11           | 07:29 (GA02)    | 06:25        |
|                     | 17:39   |          |                | 19:47           | 60 08:29 (GA02) | 20:48        |
| Potential sun hours | 298     | 297      |                | 369             | 399             | 448          |
| Total, worst case   |         | 2        |                | 1055            | 873             | 452          |

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 | (WTG causing flicker first time) |
|--------------|------------------|-----------------|----------------------|---------------------------------|----------------------------------|
|              |                  |                 |                      | Last time (hh:mm) with flicker  | (WTG causing flicker last time)  |

## SHADOW - Calendar

Shadow receptor: R04 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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

|                     | July  | August | September    | October      | November     | December     |
|---------------------|-------|--------|--------------|--------------|--------------|--------------|
| 1                   | 05:55 | 06:19  | 06:50        | 07:27 (GA02) | 07:20        | 07:40 (GA02) |
|                     | 21:00 | 20:41  | 19:58        | 49           | 08:16 (GA02) | 19:08        |
| 2                   | 05:56 | 06:20  | 06:51        | 07:24 (GA02) | 07:21        | 08:07 (GA02) |
|                     | 21:00 | 20:40  | 19:56        | 52           | 08:16 (GA02) | 19:06        |
| 3                   | 05:56 | 06:21  | 06:52        | 07:23 (GA02) | 07:22        | 07:42 (GA02) |
|                     | 21:00 | 20:39  | 19:55        | 54           | 08:17 (GA02) | 19:04        |
| 4                   | 05:57 | 06:22  | 06:53        | 07:22 (GA02) | 07:23        | 07:43 (GA02) |
|                     | 20:59 | 20:38  | 19:53        | 56           | 08:18 (GA02) | 19:03        |
| 5                   | 05:57 | 06:23  | 06:54        | 07:21 (GA02) | 07:24        | 07:44 (GA02) |
|                     | 20:59 | 20:37  | 19:52        | 58           | 08:19 (GA02) | 19:01        |
| 6                   | 05:58 | 06:24  | 06:55        | 07:19 (GA02) | 07:25        | 07:45 (GA02) |
|                     | 20:59 | 20:35  | 19:50        | 60           | 08:19 (GA02) | 18:59        |
| 7                   | 05:59 | 06:25  | 06:56        | 07:18 (GA02) | 07:26        | 07:46 (GA02) |
|                     | 20:59 | 20:34  | 19:48        | 62           | 08:20 (GA02) | 18:58        |
| 8                   | 05:59 | 06:26  | 06:57        | 07:18 (GA02) | 07:27        | 07:47 (GA04) |
|                     | 20:58 | 20:33  | 19:47        | 62           | 08:20 (GA02) | 18:56        |
| 9                   | 06:00 | 06:27  | 06:58        | 07:18 (GA02) | 07:28        | 07:48 (GA04) |
|                     | 20:58 | 20:32  | 19:45        | 63           | 08:21 (GA02) | 18:55        |
| 10                  | 06:01 | 06:28  | 06:59        | 07:19 (GA02) | 07:29        | 07:49 (GA04) |
|                     | 20:58 | 20:30  | 19:43        | 62           | 08:21 (GA02) | 18:53        |
| 11                  | 06:01 | 06:29  | 07:00        | 07:20 (GA02) | 07:30        | 07:50 (GA04) |
|                     | 20:57 | 20:29  | 19:42        | 61           | 08:21 (GA02) | 18:51        |
| 12                  | 06:02 | 06:30  | 07:01        | 07:21 (GA02) | 07:31        | 07:51 (GA04) |
|                     | 20:57 | 20:28  | 19:40        | 60           | 08:21 (GA02) | 18:50        |
| 13                  | 06:03 | 06:31  | 07:02        | 07:22 (GA02) | 07:32        | 07:52 (GA04) |
|                     | 20:56 | 20:26  | 19:38        | 59           | 08:21 (GA02) | 18:48        |
| 14                  | 06:03 | 06:32  | 07:03        | 07:23 (GA02) | 07:33        | 07:54 (GA04) |
|                     | 20:56 | 20:25  | 19:36        | 58           | 08:21 (GA02) | 18:47        |
| 15                  | 06:04 | 06:33  | 07:04        | 07:24 (GA02) | 07:34        |              |
|                     | 20:55 | 20:24  | 19:35        | 57           | 08:21 (GA02) | 18:45        |
| 16                  | 06:05 | 06:34  | 07:05        | 07:25 (GA02) | 07:35        |              |
|                     | 20:55 | 20:22  | 19:33        | 56           | 08:21 (GA02) | 18:44        |
| 17                  | 06:06 | 06:35  | 07:06        | 07:26 (GA02) | 07:37        |              |
|                     | 20:54 | 20:21  | 19:31        | 54           | 08:20 (GA02) | 18:42        |
| 18                  | 06:07 | 06:36  | 07:07        | 07:27 (GA02) | 07:38        |              |
|                     | 20:53 | 20:20  | 19:30        | 53           | 08:20 (GA02) | 18:40        |
| 19                  | 06:07 | 06:37  | 07:08        | 07:28 (GA02) | 07:39        |              |
|                     | 20:53 | 20:18  | 19:28        | 52           | 08:20 (GA02) | 18:39        |
| 20                  | 06:08 | 06:38  | 07:09        | 07:29 (GA02) | 07:40        |              |
|                     | 20:52 | 20:17  | 19:26        | 50           | 08:19 (GA02) | 18:38        |
| 21                  | 06:09 | 06:39  | 07:09        | 07:30 (GA02) | 07:41        |              |
|                     | 20:51 | 20:15  | 19:25        | 48           | 08:18 (GA02) | 18:36        |
| 22                  | 06:10 | 06:40  | 07:10        | 07:31 (GA02) | 07:42        |              |
|                     | 20:50 | 20:14  | 19:23        | 47           | 08:18 (GA02) | 18:35        |
| 23                  | 06:11 | 06:41  | 07:11        | 07:32 (GA02) | 07:43        |              |
|                     | 20:50 | 20:12  | 19:21        | 45           | 08:17 (GA02) | 18:33        |
| 24                  | 06:12 | 06:42  | 07:12        | 07:33 (GA02) | 07:44        |              |
|                     | 20:49 | 20:11  | 19:19        | 43           | 08:16 (GA02) | 18:32        |
| 25                  | 06:13 | 06:43  | 07:13        | 07:34 (GA02) | 06:46        |              |
|                     | 20:48 | 20:09  | 17           | 08:02 (GA02) | 19:18        |              |
| 26                  | 06:14 | 06:44  | 07:15        | 08:40 (GA02) | 19:16        |              |
|                     | 20:47 | 20:08  | 26           | 08:06 (GA02) | 19:16        |              |
| 27                  | 06:14 | 06:45  | 07:16        | 39           | 08:14 (GA02) | 17:29        |
|                     | 20:46 | 20:06  | 31           | 08:08 (GA02) | 19:14        |              |
| 28                  | 06:15 | 06:46  | 07:17        | 37           | 08:13 (GA02) | 17:28        |
|                     | 20:45 | 20:04  | 36           | 08:35 (GA02) | 19:13        |              |
| 29                  | 06:16 | 06:47  | 07:18        | 35           | 08:12 (GA02) | 17:26        |
|                     | 20:44 | 20:03  | 40           | 08:12 (GA02) | 19:11        |              |
| 30                  | 06:17 | 06:48  | 07:19        | 32           | 08:10 (GA02) | 17:25        |
|                     | 20:43 | 20:01  | 44           | 08:14 (GA02) | 19:09        |              |
| 31                  | 06:18 | 06:49  | 07:29 (GA02) | 30           | 08:09 (GA02) | 17:24        |
| Potential sun hours | 459   | 428    |              | 375          |              | 17:22        |
| Total, worst case   |       |        | 240          |              | 1535         | 345          |
|                     |       |        |              | 185          |              | 185          |
|                     |       |        |              |              | 298          | 288          |

Table 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

Shadow receptor: R28 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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            |
|---------------------|---------|----------|-------|-----------------|-----------------|-----------------|
| 1                   | 07:49   | 07:35    | 07:00 | 07:09           | 18:22 (GA03)    | 06:23           |
|                     | 17:06   | 17:40    | 18:14 | 19:48           | 55 19:17 (GA03) | 20:20           |
| 2                   | 07:49   | 07:35    | 06:58 | 07:07           | 18:22 (GA03)    | 06:22           |
|                     | 17:07   | 17:41    | 18:15 | 19:49           | 54 19:16 (GA03) | 20:21           |
| 3                   | 07:49   | 07:34    | 06:57 | 07:06           | 18:22 (GA03)    | 06:21           |
|                     | 17:08   | 17:43    | 18:16 | 19:50           | 54 19:16 (GA03) | 20:22           |
| 4                   | 07:49   | 07:32    | 06:55 | 07:04           | 18:22 (GA03)    | 06:20           |
|                     | 17:09   | 17:44    | 18:17 | 19:51           | 54 19:16 (GA03) | 20:23           |
| 5                   | 07:49   | 07:31    | 06:53 | 07:02           | 18:22 (GA03)    | 06:18           |
|                     | 17:09   | 17:45    | 18:19 | 19:52           | 53 19:15 (GA03) | 20:24           |
| 6                   | 07:49   | 07:30    | 06:52 | 07:01           | 18:22 (GA03)    | 06:17           |
|                     | 17:10   | 17:46    | 18:20 | 19:53           | 51 19:13 (GA03) | 20:25           |
| 7                   | 07:49   | 07:29    | 06:50 |                 | 06:59           | 18:23 (GA03)    |
|                     | 17:11   | 17:48    | 18:21 |                 | 50 19:13 (GA03) | 20:26           |
| 8                   | 07:49   | 07:28    | 06:49 | 18:00 (GA01)    | 06:58           | 18:23 (GA03)    |
|                     | 17:12   | 17:49    | 18:22 | 1 18:01 (GA01)  | 19:55           | 49 19:12 (GA03) |
| 9                   | 07:49   | 07:27    | 06:47 | 17:58 (GA01)    | 06:56           | 18:23 (GA03)    |
|                     | 17:13   | 17:50    | 18:23 | 4 18:02 (GA01)  | 19:56           | 47 19:10 (GA03) |
| 10                  | 07:49   | 07:26    | 06:46 | 17:57 (GA01)    | 06:54           | 18:24 (GA03)    |
|                     | 17:14   | 17:51    | 18:24 | 6 18:03 (GA01)  | 19:57           | 46 19:10 (GA03) |
| 11                  | 07:48   | 07:25    | 06:44 | 17:56 (GA01)    | 06:53           | 18:25 (GA03)    |
|                     | 17:15   | 17:52    | 18:25 | 9 18:05 (GA01)  | 19:58           | 43 19:08 (GA03) |
| 12                  | 07:48   | 07:23    | 06:42 | 17:56 (GA01)    | 06:51           | 18:26 (GA03)    |
|                     | 17:16   | 17:54    | 18:26 | 9 18:05 (GA01)  | 20:00           | 41 19:07 (GA03) |
| 13                  | 07:48   | 07:22    | 06:41 | 17:55 (GA01)    | 06:50           | 18:27 (GA03)    |
|                     | 17:17   | 17:55    | 18:28 | 11 18:06 (GA01) | 20:01           | 38 19:05 (GA03) |
| 14                  | 07:47   | 07:21    | 06:39 | 17:48 (GA03)    | 06:48           | 18:29 (GA03)    |
|                     | 17:19   | 17:56    | 18:29 | 20 18:08 (GA01) | 20:02           | 35 19:04 (GA03) |
| 15                  | 07:47   | 07:20    | 06:37 | 17:43 (GA03)    | 06:47           | 18:30 (GA03)    |
|                     | 17:20   | 17:57    | 18:30 | 26 18:09 (GA01) | 20:03           | 31 19:01 (GA03) |
| 16                  | 07:47   | 07:18    | 06:36 | 17:39 (GA03)    | 06:45           | 18:33 (GA03)    |
|                     | 17:21   | 17:59    | 18:31 | 30 18:09 (GA01) | 20:04           | 26 18:59 (GA03) |
| 17                  | 07:46   | 07:17    | 06:34 | 17:38 (GA03)    | 06:43           | 18:35 (GA03)    |
|                     | 17:22   | 18:00    | 18:32 | 33 18:11 (GA03) | 20:05           | 21 18:56 (GA03) |
| 18                  | 07:46   | 07:16    | 06:32 | 17:35 (GA03)    | 06:42           | 18:39 (GA03)    |
|                     | 17:23   | 18:01    | 18:33 | 37 18:12 (GA03) | 20:06           | 13 18:52 (GA03) |
| 19                  | 07:45   | 07:14    | 06:31 | 17:33 (GA03)    | 06:40           |                 |
|                     | 17:24   | 18:02    | 18:34 | 40 18:13 (GA03) | 20:07           |                 |
| 20                  | 07:45   | 07:13    | 06:29 | 17:32 (GA03)    | 06:39           |                 |
|                     | 17:25   | 18:03    | 18:35 | 43 18:15 (GA03) | 20:08           |                 |
| 21                  | 07:44   | 07:11    | 06:27 | 17:30 (GA03)    | 06:37           |                 |
|                     | 17:27   | 18:05    | 18:36 | 45 18:15 (GA03) | 20:09           |                 |
| 22                  | 07:43   | 07:10    | 06:26 | 17:28 (GA03)    | 06:36           |                 |
|                     | 17:28   | 18:06    | 18:37 | 48 18:16 (GA03) | 20:10           |                 |
| 23                  | 07:43   | 07:09    | 06:24 | 17:28 (GA03)    | 06:34           |                 |
|                     | 17:29   | 18:07    | 18:38 | 49 18:17 (GA03) | 20:11           |                 |
| 24                  | 07:42   | 07:07    | 06:22 | 17:26 (GA03)    | 06:33           |                 |
|                     | 17:30   | 18:08    | 18:39 | 51 18:17 (GA03) | 20:12           |                 |
| 25                  | 07:41   | 07:06    | 06:21 | 17:25 (GA03)    | 06:32           |                 |
|                     | 17:31   | 18:09    | 18:40 | 52 18:17 (GA03) | 20:13           |                 |
| 26                  | 07:41   | 07:04    | 06:19 | 17:25 (GA03)    | 06:30           |                 |
|                     | 17:33   | 18:11    | 18:42 | 53 18:18 (GA03) | 20:14           |                 |
| 27                  | 07:40   | 07:03    | 06:17 | 17:24 (GA03)    | 06:29           |                 |
|                     | 17:34   | 18:12    | 18:43 | 54 18:18 (GA03) | 20:15           |                 |
| 28                  | 07:39   | 07:01    | 06:16 | 17:23 (GA03)    | 06:27           |                 |
|                     | 17:35   | 18:13    | 18:44 | 54 18:17 (GA03) | 20:16           |                 |
| 29                  | 07:38   |          | 07:14 | 18:23 (GA03)    | 06:26           |                 |
|                     | 17:36   |          | 19:45 | 55 19:18 (GA03) | 20:17           |                 |
| 30                  | 07:37   |          | 07:12 | 18:23 (GA03)    | 06:25           |                 |
|                     | 17:38   |          | 19:46 | 55 19:18 (GA03) | 20:19           |                 |
| 31                  | 07:36   |          | 07:11 | 18:22 (GA03)    |                 |                 |
|                     | 17:39   |          | 19:47 | 55 19:17 (GA03) |                 |                 |
| Potential sun hours | 298     | 297      | 369   | 840             | 399             | 761             |
| Total, worst case   |         |          |       |                 |                 |                 |

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 | (WTG causing flicker first time) |
|--------------|------------------|-----------------|----------------------|---------------------------------|----------------------------------|
|              |                  |                 |                      | Last time (hh:mm) with flicker  | (WTG causing flicker last time)  |

## SHADOW - Calendar

Shadow receptor: R28 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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

|                     | July  | August | September          | October      | November | December           |
|---------------------|-------|--------|--------------------|--------------|----------|--------------------|
| 1                   | 05:55 | 06:19  | 06:50              | 18:24 (GA03) | 07:20    | 18:35 (GA01)       |
|                     | 21:00 | 20:41  | 19:58 43           | 19:07 (GA03) | 19:08 11 | 18:46 (GA01) 17:21 |
| 2                   | 05:56 | 06:20  | 06:51              | 18:22 (GA03) | 07:21    | 18:35 (GA01) 06:55 |
|                     | 21:00 | 20:40  | 19:56 46           | 19:08 (GA03) | 19:06 9  | 18:44 (GA01) 17:20 |
| 3                   | 05:56 | 06:21  | 06:52              | 18:21 (GA03) | 07:22    | 18:35 (GA01) 06:56 |
|                     | 21:00 | 20:39  | 19:55 47           | 19:08 (GA03) | 19:04 7  | 18:42 (GA01) 17:19 |
| 4                   | 05:57 | 06:22  | 06:53              | 18:20 (GA03) | 07:23    | 18:35 (GA01) 06:57 |
|                     | 20:59 | 20:38  | 19:53 49           | 19:09 (GA03) | 19:03 5  | 18:40 (GA01) 17:17 |
| 5                   | 05:57 | 06:23  | 06:54              | 18:19 (GA03) | 07:24    | 18:36 (GA01) 06:58 |
|                     | 20:59 | 20:37  | 19:52 50           | 19:09 (GA03) | 19:01 3  | 18:39 (GA01) 17:16 |
| 6                   | 05:58 | 06:24  | 06:55              | 18:18 (GA03) | 07:25    | 07:00 07:33        |
|                     | 20:59 | 20:35  | 19:50 52           | 19:10 (GA03) | 18:59    | 17:15 16:56        |
| 7                   | 05:59 | 06:25  | 06:56              | 18:17 (GA03) | 07:26    | 07:01 07:34        |
|                     | 20:59 | 20:34  | 19:48 53           | 19:10 (GA03) | 18:58    | 17:14 16:56        |
| 8                   | 05:59 | 06:26  | 06:57              | 18:16 (GA03) | 07:27    | 07:02 07:35        |
|                     | 20:58 | 20:33  | 19:47 54           | 19:10 (GA03) | 18:56    | 17:13 16:56        |
| 9                   | 06:00 | 06:27  | 06:58              | 18:16 (GA03) | 07:28    | 07:03 07:36        |
|                     | 20:58 | 20:32  | 19:45 54           | 19:10 (GA03) | 18:54    | 17:12 16:56        |
| 10                  | 06:00 | 06:28  | 06:59              | 18:15 (GA03) | 07:29    | 07:04 07:37        |
|                     | 20:58 | 20:30  | 19:43 55           | 19:10 (GA03) | 18:53    | 17:11 16:56        |
| 11                  | 06:01 | 06:29  | 07:00              | 18:15 (GA03) | 07:30    | 07:05 07:38        |
|                     | 20:57 | 20:29  | 19:42 54           | 19:09 (GA03) | 18:51    | 17:10 16:56        |
| 12                  | 06:02 | 06:30  | 07:01              | 18:14 (GA03) | 07:31    | 07:07 07:39        |
|                     | 20:57 | 20:28  | 19:40 55           | 19:09 (GA03) | 18:50    | 17:09 16:56        |
| 13                  | 06:03 | 06:31  | 07:02              | 18:14 (GA03) | 07:32    | 07:08 07:39        |
|                     | 20:56 | 20:26  | 19:38 55           | 19:09 (GA03) | 18:48    | 17:08 16:56        |
| 14                  | 06:03 | 06:32  | 07:03              | 18:14 (GA03) | 07:33    | 07:09 07:40        |
|                     | 20:56 | 20:25  | 19:36 54           | 19:08 (GA03) | 18:47    | 17:07 16:56        |
| 15                  | 06:04 | 06:33  | 07:03              | 18:13 (GA03) | 07:34    | 07:10 07:41        |
|                     | 20:55 | 20:24  | 19:35 55           | 19:08 (GA03) | 18:45    | 17:06 16:56        |
| 16                  | 06:05 | 06:34  | 07:04              | 18:13 (GA03) | 07:35    | 07:11 07:42        |
|                     | 20:55 | 20:22  | 19:33 54           | 19:07 (GA03) | 18:43    | 17:05 16:57        |
| 17                  | 06:06 | 06:35  | 07:05              | 18:13 (GA03) | 07:36    | 07:13 07:42        |
|                     | 20:54 | 20:21  | 19:31 53           | 19:06 (GA03) | 18:42    | 17:05 16:57        |
| 18                  | 06:06 | 06:36  | 07:06              | 18:13 (GA03) | 07:38    | 07:14 07:43        |
|                     | 20:53 | 20:19  | 19:30 53           | 19:06 (GA03) | 18:40    | 17:04 16:57        |
| 19                  | 06:07 | 06:37  | 07:07              | 18:14 (GA03) | 07:39    | 07:15 07:44        |
|                     | 20:53 | 20:18  | 19:28 51           | 19:05 (GA03) | 18:39    | 17:03 16:58        |
| 20                  | 06:08 | 06:38  | 07:08              | 18:14 (GA03) | 07:40    | 07:16 07:44        |
|                     | 20:52 | 20:17  | 19:26 49           | 19:03 (GA03) | 18:37    | 17:02 16:58        |
| 21                  | 06:09 | 06:39  | 07:09              | 18:13 (GA03) | 07:41    | 07:17 07:45        |
|                     | 20:51 | 20:15  | 19:25 48           | 19:01 (GA03) | 18:36    | 17:02 16:59        |
| 22                  | 06:10 | 06:40  | 07:10              | 18:14 (GA03) | 07:42    | 07:18 07:45        |
|                     | 20:50 | 20:14  | 19:23 46           | 19:00 (GA03) | 18:35    | 17:01 16:59        |
| 23                  | 06:11 | 06:41  | 07:11              | 18:15 (GA03) | 07:43    | 07:20 07:46        |
|                     | 20:50 | 20:12  | 19:21 43           | 18:58 (GA03) | 18:33    | 17:00 17:00        |
| 24                  | 06:12 | 06:42  | 07:12              | 18:16 (GA03) | 07:44    | 07:21 07:46        |
|                     | 20:49 | 20:11  | 19:19 41           | 18:57 (GA03) | 18:32    | 17:00 17:00        |
| 25                  | 06:13 | 06:43  | 18:41 (GA03) 07:13 | 18:17 (GA03) | 06:45    | 07:22 07:47        |
|                     | 20:48 | 20:09  | 18:56 (GA03) 19:18 | 18:55 (GA03) | 17:30    | 16:59 17:01        |
| 26                  | 06:13 | 06:44  | 18:37 (GA03) 07:14 | 18:18 (GA03) | 06:47    | 07:23 07:47        |
|                     | 20:47 | 20:08  | 18:59 (GA03) 19:16 | 18:53 (GA03) | 17:29    | 16:59 17:01        |
| 27                  | 06:14 | 06:45  | 18:34 (GA03) 07:15 | 18:20 (GA03) | 06:48    | 07:24 07:47        |
|                     | 20:46 | 20:06  | 19:02 (GA03) 19:14 | 18:51 (GA01) | 17:28    | 16:58 17:02        |
| 28                  | 06:15 | 06:46  | 18:32 (GA03) 07:16 | 18:22 (GA03) | 06:49    | 07:25 07:48        |
|                     | 20:45 | 20:04  | 19:03 (GA03) 19:13 | 18:50 (GA01) | 17:26    | 16:58 17:03        |
| 29                  | 06:16 | 06:47  | 18:30 (GA03) 07:17 | 18:26 (GA03) | 06:50    | 07:26 07:48        |
|                     | 20:44 | 20:03  | 19:05 (GA03) 19:11 | 18:48 (GA01) | 17:25    | 16:58 17:03        |
| 30                  | 06:17 | 06:48  | 18:28 (GA03) 07:19 | 18:34 (GA01) | 06:51    | 07:27 07:48        |
|                     | 20:43 | 20:01  | 19:06 (GA03) 19:09 | 18:46 (GA01) | 17:24    | 16:57 17:04        |
| 31                  | 06:18 | 06:49  | 18:25 (GA03) 07:20 | 18:52 (GA01) | 06:52    | 07:29 07:49        |
| Potential sun hours | 459   | 428    | 375                | 345          | 35       | 17:05 288          |
| Total, worst case   |       | 210    | 1380               |              |          |                    |

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 | (WTG causing flicker first time) |
|--------------|------------------|-----------------|----------------------|---------------------------------|----------------------------------|
|              |                  |                 |                      | Last time (hh:mm) with flicker  | (WTG causing flicker last time)  |

## SHADOW - Calendar

Shadow receptor: R31 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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   07:49           | 07:35   | 07:00    | 07:09 |                   | 06:23 | 05:55 | 05:55 | 06:19  | 06:50             | 19:20 (GA03) | 07:19                | 06:54    | 07:28 |       |  |
| 1   07:06           | 17:40   | 18:14    | 19:48 |                   | 20:20 | 20:49 | 21:00 | 20:41  | 19:58             | 15           | 19:35 (GA03)         | 19:08    | 17:21 | 16:57 |  |
| 2   07:49           | 07:34   | 06:58    | 07:07 | 19:25 (GA03)      | 06:22 | 05:54 | 05:56 | 06:20  | 06:51             | 19:18 (GA03) | 07:20                | 06:55    | 07:29 |       |  |
| 1   17:07           | 17:41   | 18:15    | 19:49 | 3   19:28 (GA03)  | 20:21 | 20:50 | 21:00 | 20:40  | 19:56             | 16           | 19:34 (GA03)   19:06 | 17:20    | 16:57 |       |  |
| 3   07:49           | 07:33   | 06:57    | 07:06 | 19:23 (GA03)      | 06:21 | 05:54 | 05:56 | 06:21  | 06:52             | 19:18 (GA03) | 07:22                | 06:56    | 07:30 |       |  |
| 1   17:08           | 17:42   | 18:16    | 19:50 | 5   19:28 (GA03)  | 20:22 | 20:50 | 21:00 | 20:39  | 19:55             | 14           | 19:32 (GA03)   19:04 | 17:19    | 16:56 |       |  |
| 4   07:49           | 07:32   | 06:55    | 07:04 | 19:22 (GA03)      | 06:20 | 05:53 | 05:57 | 06:22  | 06:53             | 19:17 (GA03) | 07:23                | 06:57    | 07:31 |       |  |
| 1   17:08           | 17:44   | 18:17    | 19:51 | 8   19:30 (GA03)  | 20:23 | 20:51 | 20:59 | 20:38  | 19:53             | 14           | 19:31 (GA03)   19:03 | 17:17    | 16:56 |       |  |
| 5   07:49           | 07:31   | 06:53    | 07:02 | 19:21 (GA03)      | 06:18 | 05:53 | 05:57 | 06:23  | 06:54             | 19:16 (GA03) | 07:24                | 06:58    | 07:32 |       |  |
| 1   17:09           | 17:45   | 18:19    | 19:52 | 10   19:31 (GA03) | 20:24 | 20:52 | 20:59 | 20:36  | 19:51             | 13           | 19:29 (GA03)   19:01 | 17:16    | 16:56 |       |  |
| 6   07:49           | 07:30   | 06:52    | 07:01 | 19:20 (GA03)      | 06:17 | 05:53 | 05:58 | 06:24  | 06:55             | 19:16 (GA03) | 07:25                | 06:59    | 07:33 |       |  |
| 1   17:10           | 17:46   | 18:20    | 19:53 | 11   19:31 (GA03) | 20:25 | 20:52 | 20:59 | 20:35  | 19:50             | 12           | 19:28 (GA03)   18:59 | 17:15    | 16:56 |       |  |
| 7   07:49           | 07:29   | 06:50    | 06:59 | 19:20 (GA03)      | 06:16 | 05:52 | 05:58 | 06:25  | 06:56             | 19:16 (GA03) | 07:26                | 07:01    | 07:34 |       |  |
| 1   17:11           | 17:47   | 18:21    | 19:54 | 13   19:33 (GA03) | 20:26 | 20:53 | 20:59 | 20:34  | 19:48             | 10           | 19:26 (GA03)   18:58 | 17:14    | 16:56 |       |  |
| 8   07:49           | 07:28   | 06:49    | 06:58 | 19:20 (GA03)      | 06:15 | 05:52 | 05:59 | 06:26  | 06:57             | 19:16 (GA03) | 07:27                | 07:02    | 07:35 |       |  |
| 1   17:12           | 17:49   | 18:22    | 19:55 | 14   19:34 (GA03) | 20:27 | 20:54 | 20:58 | 20:33  | 19:46             | 8            | 19:24 (GA03)   18:56 | 17:13    | 16:56 |       |  |
| 9   07:49           | 07:27   | 06:47    | 06:56 | 19:20 (GA03)      | 06:14 | 05:52 | 06:00 | 06:27  | 06:58             | 19:17 (GA03) | 07:28                | 07:03    | 07:36 |       |  |
| 1   17:13           | 17:50   | 18:23    | 19:56 | 14   19:34 (GA03) | 20:28 | 20:54 | 20:58 | 20:32  | 19:45             | 6            | 19:23 (GA03)   18:54 | 17:12    | 16:56 |       |  |
| 10   07:48          | 07:26   | 06:45    | 06:54 | 19:20 (GA03)      | 06:12 | 05:52 | 06:00 | 06:28  | 06:59             | 19:18 (GA03) | 07:29                | 07:04    | 07:37 |       |  |
| 1   17:14           | 17:51   | 18:24    | 19:57 | 16   19:36 (GA03) | 20:29 | 20:55 | 20:58 | 20:30  | 19:43             | 3            | 19:21 (GA03)   18:53 | 17:11    | 16:56 |       |  |
| 11   07:48          | 07:25   | 06:44    | 06:53 | 19:36 (GA03)      | 06:11 | 05:52 | 06:01 | 06:29  | 06:59             |              | 07:30                | 07:05    | 07:38 |       |  |
| 1   17:15           | 17:52   | 18:25    | 19:58 | 15   19:36 (GA03) | 20:30 | 20:55 | 20:57 | 20:29  | 19:41             |              | 18:51                | 17:10    | 16:56 |       |  |
| 12   07:48          | 07:23   | 06:42    | 06:51 | 19:36 (GA03)      | 06:10 | 05:51 | 06:02 | 06:30  | 07:00             |              | 07:31                | 07:07    | 07:39 |       |  |
| 1   17:16           | 17:54   | 18:26    | 19:59 | 14   19:36 (GA03) | 20:31 | 20:56 | 20:57 | 20:28  | 19:40             |              | 18:50                | 17:09    | 16:56 |       |  |
| 13   07:48          | 07:22   | 06:41    | 06:50 | 19:24 (GA03)      | 06:09 | 05:51 | 06:03 | 06:31  | 07:01             |              | 07:32                | 07:08    | 07:39 |       |  |
| 1   17:17           | 17:55   | 18:27    | 20:01 | 9   19:33 (GA03)  | 20:32 | 20:56 | 20:56 | 20:26  | 19:38             |              | 18:48                | 17:08    | 16:56 |       |  |
| 14   07:47          | 07:21   | 06:39    | 06:48 |                   | 06:08 | 05:51 | 06:03 | 06:32  | 07:02             |              | 07:33                | 07:09    | 07:40 |       |  |
| 1   17:19           | 17:56   | 18:29    | 20:02 |                   | 20:33 | 20:57 | 20:56 | 20:25  | 19:36             |              | 18:46                | 17:07    | 16:56 |       |  |
| 15   07:47          | 07:20   | 06:37    | 06:46 |                   | 06:07 | 05:51 | 06:04 | 06:33  | 07:03             |              | 07:34                | 07:10    | 07:41 |       |  |
| 1   17:20           | 17:57   | 18:30    | 20:03 |                   | 20:34 | 20:57 | 20:55 | 20:24  | 19:35             |              | 18:45                | 17:06    | 16:56 |       |  |
| 16   07:47          | 07:18   | 06:36    | 06:45 |                   | 06:06 | 05:51 | 06:05 | 06:34  | 07:04             |              | 07:35                | 07:11    | 07:42 |       |  |
| 1   17:21           | 17:59   | 18:31    | 20:04 |                   | 20:35 | 20:58 | 20:55 | 20:22  | 19:33             |              | 18:43                | 17:05    | 16:57 |       |  |
| 17   07:46          | 07:17   | 06:34    | 06:43 |                   | 06:05 | 05:51 | 06:06 | 06:35  | 07:05             |              | 07:36                | 07:13    | 07:42 |       |  |
| 1   17:22           | 18:00   | 18:32    | 20:05 |                   | 20:36 | 20:58 | 20:54 | 20:21  | 19:31             |              | 18:42                | 17:05    | 16:57 |       |  |
| 18   07:46          | 07:16   | 06:32    | 06:42 |                   | 06:04 | 05:51 | 06:06 | 06:36  | 07:06             |              | 07:38                | 07:14    | 07:43 |       |  |
| 1   17:23           | 18:01   | 18:33    | 20:06 |                   | 20:37 | 20:58 | 20:53 | 20:19  | 19:30             |              | 18:40                | 17:04    | 16:57 |       |  |
| 19   07:45          | 07:14   | 06:31    | 06:40 |                   | 06:03 | 05:52 | 06:07 | 06:37  | 07:07             |              | 07:39                | 07:15    | 07:44 |       |  |
| 1   17:24           | 18:02   | 18:34    | 20:07 |                   | 20:38 | 20:59 | 20:53 | 20:18  | 19:28             |              | 18:39                | 17:03    | 16:58 |       |  |
| 20   07:45          | 07:13   | 06:29    | 06:39 |                   | 06:03 | 05:52 | 06:08 | 06:38  | 07:08             |              | 07:40                | 07:16    | 07:44 |       |  |
| 1   17:25           | 18:03   | 18:35    | 20:08 |                   | 20:39 | 20:59 | 20:52 | 20:17  | 19:26             |              | 18:37                | 17:02    | 16:58 |       |  |
| 21   07:44          | 07:11   | 06:27    | 06:37 |                   | 06:02 | 05:52 | 06:09 | 06:39  | 07:09             |              | 07:41                | 07:17    | 07:45 |       |  |
| 1   17:27           | 18:05   | 18:36    | 20:09 |                   | 20:40 | 20:59 | 20:51 | 20:15  | 19:24             |              | 18:36                | 17:02    | 16:59 |       |  |
| 22   07:43          | 07:10   | 06:26    | 06:36 |                   | 06:01 | 05:52 | 06:10 | 06:40  | 07:10             |              | 07:42                | 07:18    | 07:45 |       |  |
| 1   17:28           | 18:06   | 18:37    | 20:10 |                   | 20:41 | 20:59 | 20:50 | 20:14  | 19:23             |              | 18:34                | 17:01    | 16:59 |       |  |
| 23   07:43          | 07:09   | 06:24    | 06:34 |                   | 06:00 | 05:52 | 06:11 | 06:41  | 07:11             |              | 07:43                | 07:19    | 07:46 |       |  |
| 1   17:29           | 18:07   | 18:38    | 20:11 |                   | 20:41 | 21:00 | 20:49 | 20:12  | 19:21             |              | 18:33                | 17:00    | 17:00 |       |  |
| 24   07:42          | 07:07   | 06:22    | 06:33 |                   | 05:59 | 05:53 | 06:12 | 06:42  | 07:12             |              | 07:44                | 07:21    | 07:46 |       |  |
| 1   17:30           | 18:08   | 18:39    | 20:12 |                   | 20:42 | 21:00 | 20:49 | 20:11  | 19:19             |              | 18:32                | 17:00    | 17:00 |       |  |
| 25   07:41          | 07:06   | 06:21    | 06:32 |                   | 05:59 | 05:53 | 06:12 | 06:43  | 07:13             |              | 06:45                | 07:22    | 07:47 |       |  |
| 1   17:31           | 18:09   | 18:40    | 20:13 |                   | 20:43 | 21:00 | 20:48 | 20:09  | 19:18             |              | 17:30                | 16:59    | 17:01 |       |  |
| 26   07:41          | 07:04   | 06:19    | 06:30 |                   | 05:58 | 05:53 | 06:13 | 06:44  | 07:14             |              | 06:47                | 07:23    | 07:47 |       |  |
| 1   17:33           | 18:10   | 18:41    | 20:14 |                   | 20:44 | 21:00 | 20:47 | 20:07  | 19:16             |              | 17:29                | 16:59    | 17:01 |       |  |
| 27   07:40          | 07:03   | 06:17    | 06:29 |                   | 05:57 | 05:53 | 06:14 | 06:45  | 07:15             |              | 06:48                | 07:24    | 07:47 |       |  |
| 1   17:34           | 18:12   | 18:43    | 20:15 |                   | 20:45 | 21:00 | 20:46 | 20:06  | 19:14             |              | 17:28                | 16:58    | 17:02 |       |  |
| 28   07:39          | 07:01   | 06:16    | 06:27 |                   | 05:57 | 05:54 | 06:15 | 06:46  | 07:16             |              | 06:49                | 07:25    | 07:48 |       |  |
| 1   17:35           | 18:13   | 18:44    | 20:16 |                   | 20:46 | 21:00 | 20:45 | 20:04  | 19:13             |              | 17:26                | 16:58    | 17:03 |       |  |
| 29   07:38          |         | 07:14    | 06:26 |                   | 05:56 | 05:54 | 06:16 | 06:47  | 07:17             |              | 06:50                | 07:26    | 07:48 |       |  |
| 1   17:36           |         | 07:15    | 06:27 |                   | 20:47 | 21:00 | 20:44 | 20:03  | 19:11             |              | 17:25                | 16:57    | 17:03 |       |  |
| 30   07:37          |         | 07:12    | 06:25 |                   | 05:56 | 05:55 | 06:17 | 06:48  | 19:24 (GA03)      | 07:18        |                      | 06:51    | 07:27 | 07:48 |  |
| 1   17:38           |         | 07:11    | 06:24 | 20:18             | 20:47 | 21:00 | 20:43 | 20:01  | 9   19:33 (GA03)  | 19:09        |                      | 17:24    | 16:57 | 17:04 |  |
| 31   07:36          |         | 07:11    |       |                   | 05:55 |       | 06:18 | 06:49  | 19:21 (GA03)      |              |                      | 06:52    |       | 07:48 |  |
| 1   17:39           |         | 07:14    |       |                   | 20:48 |       | 20:42 | 20:00  | 14   19:35 (GA03) |              |                      | 17:22    |       | 17:05 |  |
| Potential sun hours | 298     | 297      | 369   | 399               | 448   | 452   | 459   | 428    | 23                | 375          |                      | 345      | 298   | 288   |  |
| Total, worst case   |         |          |       |                   |       |       |       |        | 111               |              |                      |          |       |       |  |

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)<br>(WTG causing flicker last time) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|---|
|              |                  |                 |                      |                                 |                                |   |

## SHADOW - Calendar

Shadow receptor: R48 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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         |
|---------------------|---------|--------------|--------------|--------------|-------|--------------|
| 1                   | 07:49   | 08:16 (GA05) | 07:36        | 08:20 (GA05) | 07:00 | 07:09        |
|                     | 17:06   | 32           | 08:48 (GA05) | 17:40        | 43    | 09:03 (GA05) |
| 2                   | 07:49   | 08:16 (GA05) | 07:35        | 08:21 (GA05) | 06:58 | 07:07        |
|                     | 17:07   | 33           | 08:49 (GA05) | 17:41        | 41    | 09:02 (GA05) |
| 3                   | 07:49   | 08:17 (GA05) | 07:34        | 08:22 (GA05) | 06:57 | 07:06        |
|                     | 17:08   | 33           | 08:50 (GA05) | 17:43        | 40    | 09:02 (GA05) |
| 4                   | 07:49   | 08:17 (GA05) | 07:33        | 08:22 (GA05) | 06:55 | 07:04        |
|                     | 17:09   | 34           | 08:51 (GA05) | 17:44        | 38    | 09:00 (GA05) |
| 5                   | 07:49   | 08:17 (GA05) | 07:32        | 08:23 (GA05) | 06:54 | 07:03        |
|                     | 17:09   | 35           | 08:52 (GA05) | 17:45        | 36    | 08:59 (GA05) |
| 6                   | 07:49   | 08:17 (GA05) | 07:30        | 08:24 (GA05) | 06:52 | 07:01        |
|                     | 17:10   | 36           | 08:53 (GA05) | 17:46        | 35    | 08:59 (GA05) |
| 7                   | 07:49   | 08:17 (GA05) | 07:29        | 08:26 (GA05) | 06:50 | 06:59        |
|                     | 17:11   | 36           | 08:53 (GA05) | 17:48        | 31    | 08:57 (GA05) |
| 8                   | 07:49   | 08:17 (GA05) | 07:28        | 08:27 (GA05) | 06:49 | 06:58        |
|                     | 17:12   | 37           | 08:54 (GA05) | 17:49        | 29    | 08:56 (GA05) |
| 9                   | 07:49   | 08:17 (GA05) | 07:27        | 08:29 (GA05) | 06:47 | 06:56        |
|                     | 17:13   | 38           | 08:55 (GA05) | 17:50        | 26    | 08:55 (GA05) |
| 10                  | 07:49   | 08:16 (GA05) | 07:26        | 08:31 (GA05) | 06:46 | 06:54        |
|                     | 17:14   | 39           | 08:55 (GA05) | 17:51        | 20    | 08:51 (GA05) |
| 11                  | 07:48   | 08:16 (GA05) | 07:25        | 08:35 (GA05) | 06:44 | 06:53        |
|                     | 17:15   | 40           | 08:56 (GA05) | 17:53        | 13    | 08:48 (GA05) |
| 12                  | 07:48   | 08:16 (GA05) | 07:23        |              | 06:42 | 06:51        |
|                     | 17:16   | 42           | 08:58 (GA05) | 17:54        |       | 18:26        |
| 13                  | 07:48   | 08:15 (GA05) | 07:22        |              | 06:41 | 06:50        |
|                     | 17:18   | 43           | 08:58 (GA05) | 17:55        |       | 18:28        |
| 14                  | 07:48   | 08:16 (GA05) | 07:21        |              | 06:39 | 06:48        |
|                     | 17:19   | 43           | 08:59 (GA05) | 17:56        |       | 18:29        |
| 15                  | 07:47   | 08:15 (GA05) | 07:20        |              | 06:37 | 06:47        |
|                     | 17:20   | 44           | 08:59 (GA05) | 17:57        |       | 18:30        |
| 16                  | 07:47   | 08:15 (GA05) | 07:18        |              | 06:36 | 06:45        |
|                     | 17:21   | 45           | 09:00 (GA05) | 17:59        |       | 18:31        |
| 17                  | 07:46   | 08:14 (GA05) | 07:17        |              | 06:34 | 06:43        |
|                     | 17:22   | 46           | 09:00 (GA05) | 18:00        |       | 18:32        |
| 18                  | 07:46   | 08:15 (GA05) | 07:16        |              | 06:32 | 06:42        |
|                     | 17:23   | 46           | 09:01 (GA05) | 18:01        |       | 18:33        |
| 19                  | 07:45   | 08:15 (GA05) | 07:14        |              | 06:31 | 06:40        |
|                     | 17:24   | 46           | 09:01 (GA05) | 18:02        |       | 18:34        |
| 20                  | 07:45   | 08:16 (GA05) | 07:13        |              | 06:29 | 06:39        |
|                     | 17:25   | 46           | 09:02 (GA05) | 18:03        |       | 18:35        |
| 21                  | 07:44   | 08:15 (GA05) | 07:12        |              | 06:27 | 06:37        |
|                     | 17:27   | 47           | 09:02 (GA05) | 18:05        |       | 18:36        |
| 22                  | 07:44   | 08:15 (GA05) | 07:10        |              | 06:22 | 06:33        |
|                     | 17:28   | 47           | 09:02 (GA05) | 18:06        |       | 18:37        |
| 23                  | 07:43   | 08:16 (GA05) | 07:09        |              | 06:21 | 06:32        |
|                     | 17:29   | 47           | 09:03 (GA05) | 18:07        |       | 18:38        |
| 24                  | 07:42   | 08:16 (GA05) | 07:07        |              | 06:22 | 06:33        |
|                     | 17:30   | 47           | 09:03 (GA05) | 18:08        |       | 18:39        |
| 25                  | 07:41   | 08:16 (GA05) | 07:06        |              | 06:21 | 06:32        |
|                     | 17:31   | 47           | 09:03 (GA05) | 18:09        |       | 18:41        |
| 26                  | 07:41   | 08:17 (GA05) | 07:04        |              | 06:19 | 06:30        |
|                     | 17:33   | 46           | 09:03 (GA05) | 18:11        |       | 18:42        |
| 27                  | 07:40   | 08:17 (GA05) | 07:03        |              | 06:17 | 06:29        |
|                     | 17:34   | 46           | 09:03 (GA05) | 18:12        |       | 18:43        |
| 28                  | 07:39   | 08:17 (GA05) | 07:01        |              | 06:16 | 06:27        |
|                     | 17:35   | 46           | 09:03 (GA05) | 18:13        |       | 18:44        |
| 29                  | 07:38   | 08:19 (GA05) |              |              | 07:14 | 06:26        |
|                     | 17:36   | 45           | 09:04 (GA05) |              | 19:45 | 20:18        |
| 30                  | 07:37   | 08:19 (GA05) |              |              | 07:12 | 06:25        |
|                     | 17:38   | 44           | 09:03 (GA05) |              | 19:46 | 20:19        |
| 31                  | 07:36   | 08:20 (GA05) |              |              | 07:11 | 05:55        |
|                     | 17:39   | 43           | 09:03 (GA05) |              | 19:47 | 20:48        |
| Potential sun hours | 298     |              | 297          |              | 369   | 399          |
| Total, worst case   |         | 1299         |              |              | 448   | 452          |

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 | (WTG causing flicker first time) |
|--------------|------------------|-----------------|----------------------|---------------------------------|----------------------------------|
|              |                  |                 |                      | Last time (hh:mm) with flicker  | (WTG causing flicker last time)  |

## SHADOW - Calendar

Shadow receptor: R48 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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

|                     | July  | August | September | October | November        | December     |
|---------------------|-------|--------|-----------|---------|-----------------|--------------|
| 1                   | 05:55 | 06:19  | 06:50     | 07:20   | 06:54           | 08:00 (GA05) |
|                     | 21:00 | 20:41  | 19:58     | 19:08   | 17:21           | 08:22 (GA05) |
| 2                   | 05:56 | 06:20  | 06:51     | 07:21   | 06:55           | 07:58 (GA05) |
|                     | 21:00 | 20:40  | 19:56     | 19:06   | 17:20           | 07:29 (GA05) |
| 3                   | 05:56 | 06:21  | 06:52     | 07:22   | 06:56           | 07:57 (GA05) |
|                     | 21:00 | 20:39  | 19:55     | 19:04   | 17:19           | 08:26 (GA05) |
| 4                   | 05:57 | 06:22  | 06:53     | 07:23   | 06:57           | 07:55 (GA05) |
|                     | 21:00 | 20:38  | 19:53     | 19:03   | 17:18           | 07:31 (GA05) |
| 5                   | 05:57 | 06:23  | 06:54     | 07:24   | 06:58           | 08:27 (GA05) |
|                     | 20:59 | 20:37  | 19:52     | 19:01   | 17:16           | 07:54 (GA05) |
| 6                   | 05:58 | 06:24  | 06:55     | 07:25   | 07:00           | 08:29 (GA05) |
|                     | 20:59 | 20:35  | 19:50     | 18:59   | 17:15           | 07:54 (GA05) |
| 7                   | 05:59 | 06:25  | 06:56     | 07:26   | 07:01           | 08:30 (GA05) |
|                     | 20:59 | 20:34  | 19:48     | 18:58   | 17:14           | 07:53 (GA05) |
| 8                   | 05:59 | 06:26  | 06:57     | 07:27   | 07:02           | 08:31 (GA05) |
|                     | 20:58 | 20:33  | 19:47     | 18:56   | 17:13           | 07:52 (GA05) |
| 9                   | 06:00 | 06:27  | 06:58     | 07:28   | 07:03           | 08:32 (GA05) |
|                     | 20:58 | 20:32  | 19:45     | 18:55   | 17:12           | 07:51 (GA05) |
| 10                  | 06:00 | 06:28  | 06:59     | 07:29   | 07:04           | 08:33 (GA05) |
|                     | 20:58 | 20:30  | 19:43     | 18:53   | 17:11           | 07:50 (GA05) |
| 11                  | 06:01 | 06:29  | 07:00     | 07:30   | 07:06           | 08:34 (GA05) |
|                     | 20:57 | 20:29  | 19:42     | 18:51   | 17:10           | 07:50 (GA05) |
| 12                  | 06:02 | 06:30  | 07:01     | 07:31   | 07:07           | 08:35 (GA05) |
|                     | 20:57 | 20:28  | 19:40     | 18:50   | 17:09           | 07:50 (GA05) |
| 13                  | 06:03 | 06:31  | 07:02     | 07:32   | 07:08           | 08:36 (GA05) |
|                     | 20:56 | 20:27  | 19:38     | 18:48   | 17:08           | 07:49 (GA05) |
| 14                  | 06:03 | 06:32  | 07:03     | 07:33   | 07:09           | 08:37 (GA05) |
|                     | 20:56 | 20:25  | 19:36     | 18:47   | 17:07           | 07:50 (GA05) |
| 15                  | 06:04 | 06:33  | 07:04     | 07:34   | 07:10           | 08:38 (GA05) |
|                     | 20:55 | 20:24  | 19:35     | 18:45   | 17:06           | 07:50 (GA05) |
| 16                  | 06:05 | 06:34  | 07:05     | 07:35   | 07:11           | 08:39 (GA05) |
|                     | 20:55 | 20:22  | 19:33     | 18:43   | 17:05           | 07:50 (GA05) |
| 17                  | 06:06 | 06:35  | 07:06     | 07:37   | 07:13           | 08:40 (GA05) |
|                     | 20:54 | 20:21  | 19:31     | 18:42   | 17:05           | 07:49 (GA05) |
| 18                  | 06:06 | 06:36  | 07:06     | 07:38   | 07:14           | 08:41 (GA05) |
|                     | 20:53 | 20:20  | 19:30     | 18:40   | 17:04           | 08:37 (GA05) |
| 19                  | 06:07 | 06:37  | 07:07     | 07:39   | 07:15           | 08:42 (GA05) |
|                     | 20:53 | 20:18  | 19:28     | 18:39   | 17:03           | 08:37 (GA05) |
| 20                  | 06:08 | 06:38  | 07:08     | 07:40   | 07:16           | 08:43 (GA05) |
|                     | 20:52 | 20:17  | 19:26     | 18:37   | 17:02           | 07:50 (GA05) |
| 21                  | 06:09 | 06:39  | 07:09     | 07:41   | 07:17           | 08:44 (GA05) |
|                     | 20:51 | 20:15  | 19:25     | 18:36   | 17:02           | 08:37 (GA05) |
| 22                  | 06:10 | 06:40  | 07:10     | 07:42   | 07:18           | 08:45 (GA05) |
|                     | 20:50 | 20:14  | 19:23     | 18:35   | 17:01           | 07:52 (GA05) |
| 23                  | 06:11 | 06:41  | 07:11     | 07:43   | 07:20           | 08:47 (GA05) |
|                     | 20:50 | 20:12  | 19:21     | 18:33   | 17:00           | 08:38 (GA05) |
| 24                  | 06:12 | 06:42  | 07:12     | 07:44   | 07:21           | 08:49 (GA05) |
|                     | 20:49 | 20:11  | 19:19     | 18:32   | 17:00           | 08:38 (GA05) |
| 25                  | 06:13 | 06:43  | 07:13     | 06:46   | 07:22           | 08:51 (GA05) |
|                     | 20:48 | 20:09  | 19:18     | 17:30   | 16:59           | 08:38 (GA05) |
| 26                  | 06:13 | 06:44  | 07:14     | 06:47   | 07:23           | 08:53 (GA05) |
|                     | 20:47 | 20:08  | 19:16     | 17:29   | 16:59           | 08:38 (GA05) |
| 27                  | 06:14 | 06:45  | 07:16     | 06:48   | 07:24           | 08:55 (GA05) |
|                     | 20:46 | 20:06  | 19:14     | 17:28   | 16:58           | 08:39 (GA05) |
| 28                  | 06:15 | 06:46  | 07:17     | 06:49   | 07:25           | 08:56 (GA05) |
|                     | 20:45 | 20:04  | 19:13     | 17:26   | 16:58           | 08:39 (GA05) |
| 29                  | 06:16 | 06:47  | 07:18     | 06:50   | 07:26           | 08:57 (GA05) |
|                     | 20:44 | 20:03  | 19:11     | 17:25   | 16:58           | 08:39 (GA05) |
| 30                  | 06:17 | 06:48  | 07:19     | 06:51   | 07:27           | 08:57 (GA05) |
|                     | 20:43 | 20:01  | 19:09     | 17:24   | 16:57           | 08:39 (GA05) |
| 31                  | 06:18 | 06:49  |           | 06:52   | 08:04 (GA05)    |              |
|                     | 20:42 | 20:00  |           | 17:22   | 15 08:19 (GA05) |              |
| Potential sun hours | 459   | 428    | 375       | 345     | 298             | 288          |
| Total, worst case   |       |        |           | 15      | 1249            | 995          |

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 | (WTG causing flicker first time) |
|--------------|------------------|-----------------|----------------------|---------------------------------|----------------------------------|
|              |                  |                 |                      | Last time (hh:mm) with flicker  | (WTG causing flicker last time)  |

## SHADOW - Calendar

Shadow receptor: R53 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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               |
|---------------------|---------|--------------|--------------|-------|--------------------|--------------------|
| 1                   | 07:49   | 15:58 (GA06) | 07:35        | 07:00 | 07:09              | 18:06 (GA07) 06:23 |
|                     | 17:06   | 28           | 16:26 (GA06) | 17:40 | 18:14              | 19:19 (GA07) 20:20 |
| 2                   | 07:49   | 15:59 (GA06) | 07:34        | 06:58 | 07:07              | 18:07 (GA07) 06:22 |
|                     | 17:07   | 27           | 16:26 (GA06) | 17:41 | 18:15              | 19:19 (GA07) 20:21 |
| 3                   | 07:49   | 15:59 (GA06) | 07:33        | 06:57 | 07:06              | 18:07 (GA07) 06:21 |
|                     | 17:07   | 28           | 16:27 (GA06) | 17:42 | 18:16              | 19:18 (GA07) 20:22 |
| 4                   | 07:49   | 16:00 (GA06) | 07:32        | 06:55 | 07:04              | 18:07 (GA07) 06:19 |
|                     | 17:08   | 27           | 16:27 (GA06) | 17:44 | 18:17              | 19:17 (GA07) 20:23 |
| 5                   | 07:49   | 16:00 (GA06) | 07:31        | 06:53 | 17:42 (GA07) 07:02 | 18:07 (GA07) 06:18 |
|                     | 17:09   | 28           | 16:28 (GA06) | 17:45 | 18:18 15           | 19:17 (GA07) 20:24 |
| 6                   | 07:49   | 16:01 (GA06) | 07:30        | 06:52 | 17:37 (GA07) 07:01 | 18:07 (GA07) 06:17 |
|                     | 17:10   | 27           | 16:28 (GA06) | 17:46 | 18:20 22           | 19:15 (GA07) 20:25 |
| 7                   | 07:49   | 16:01 (GA06) | 07:29        | 06:50 | 17:33 (GA07) 06:59 | 18:08 (GA07) 06:16 |
|                     | 17:11   | 28           | 16:29 (GA06) | 17:47 | 18:21 27           | 19:15 (GA07) 20:26 |
| 8                   | 07:49   | 16:02 (GA06) | 07:28        | 06:49 | 17:29 (GA07) 06:58 | 18:09 (GA07) 06:15 |
|                     | 17:12   | 27           | 16:29 (GA06) | 17:49 | 18:22 31           | 19:14 (GA07) 20:27 |
| 9                   | 07:49   | 16:02 (GA06) | 07:27        | 06:47 | 17:27 (GA07) 06:56 | 18:09 (GA07) 06:14 |
|                     | 17:13   | 27           | 16:29 (GA06) | 17:50 | 18:23 35           | 19:12 (GA07) 20:28 |
| 10                  | 07:48   | 16:03 (GA06) | 07:26        | 06:45 | 17:25 (GA07) 06:54 | 18:10 (GA07) 06:12 |
|                     | 17:14   | 26           | 16:29 (GA06) | 17:51 | 18:24 38           | 19:12 (GA07) 20:29 |
| 11                  | 07:48   | 16:04 (GA06) | 07:25        | 06:44 | 17:23 (GA07) 06:53 | 18:10 (GA07) 06:11 |
|                     | 17:15   | 26           | 16:30 (GA06) | 17:52 | 18:25 42           | 19:10 (GA07) 20:30 |
| 12                  | 07:48   | 16:04 (GA06) | 07:23        | 06:42 | 17:21 (GA07) 06:51 | 18:12 (GA07) 06:10 |
|                     | 17:16   | 25           | 16:29 (GA06) | 17:54 | 18:26 44           | 19:09 (GA07) 20:31 |
| 13                  | 07:48   | 16:05 (GA06) | 07:22        | 06:41 | 17:19 (GA07) 06:50 | 18:13 (GA07) 06:09 |
|                     | 17:17   | 25           | 16:30 (GA06) | 17:55 | 18:27 47           | 18:06 (GA07) 20:01 |
| 14                  | 07:47   | 16:06 (GA06) | 07:21        | 06:39 | 18:05 (GA07) 06:48 | 18:14 (GA07) 06:08 |
|                     | 17:18   | 24           | 16:30 (GA06) | 17:56 | 18:29 50           | 19:06 (GA07) 20:33 |
| 15                  | 07:47   | 16:06 (GA06) | 07:20        | 06:37 | 17:17 (GA07) 06:46 | 18:15 (GA07) 06:07 |
|                     | 17:20   | 23           | 16:29 (GA06) | 17:57 | 18:30 52           | 19:09 (GA07) 20:34 |
| 16                  | 07:47   | 16:08 (GA06) | 07:18        | 06:36 | 17:15 (GA07) 06:45 | 18:16 (GA07) 06:06 |
|                     | 17:21   | 22           | 16:30 (GA06) | 17:59 | 18:31 54           | 19:02 (GA07) 20:35 |
| 17                  | 07:46   | 16:08 (GA06) | 07:17        | 06:34 | 17:15 (GA07) 06:43 | 18:18 (GA07) 06:05 |
|                     | 17:22   | 21           | 16:29 (GA06) | 18:00 | 18:32 56           | 19:00 (GA07) 20:36 |
| 18                  | 07:46   | 16:10 (GA06) | 07:16        | 06:32 | 17:13 (GA07) 06:42 | 18:19 (GA07) 06:04 |
|                     | 17:23   | 19           | 16:29 (GA06) | 18:01 | 18:33 59           | 18:12 (GA07) 20:06 |
| 19                  | 07:45   | 16:11 (GA06) | 07:14        | 06:31 | 17:12 (GA07) 06:40 | 18:22 (GA07) 06:03 |
|                     | 17:24   | 17           | 16:28 (GA06) | 18:02 | 18:34 61           | 18:13 (GA07) 20:07 |
| 20                  | 07:45   | 16:12 (GA06) | 07:13        | 06:29 | 17:12 (GA07) 06:39 | 18:25 (GA07) 06:03 |
|                     | 17:25   | 14           | 16:26 (GA06) | 18:03 | 18:35 63           | 19:00 (GA07) 20:39 |
| 21                  | 07:44   | 16:15 (GA06) | 07:11        | 06:27 | 17:11 (GA07) 06:37 | 18:28 (GA07) 06:02 |
|                     | 17:26   | 11           | 16:26 (GA06) | 18:05 | 18:36 64           | 18:15 (GA07) 20:40 |
| 22                  | 07:43   | 16:19 (GA06) | 07:10        | 06:26 | 17:10 (GA07) 06:36 | 18:34 (GA07) 06:01 |
|                     | 17:28   | 3            | 16:22 (GA06) | 18:06 | 18:37 66           | 18:16 (GA07) 20:41 |
| 23                  | 07:43   |              |              | 07:09 | 06:24              | 17:09 (GA07) 06:34 |
|                     |         |              |              | 18:07 | 18:38 68           | 18:17 (GA07) 20:11 |
| 24                  | 07:42   |              |              | 07:07 | 06:22              | 17:09 (GA07) 06:33 |
|                     |         |              |              | 18:08 | 18:39 69           | 18:18 (GA07) 20:12 |
| 25                  | 07:41   |              |              | 07:06 | 06:21              | 17:08 (GA07) 06:32 |
|                     |         |              |              | 18:09 | 18:40 71           | 18:19 (GA07) 20:13 |
| 26                  | 07:41   |              |              | 07:04 | 06:19              | 17:07 (GA07) 06:30 |
|                     |         |              |              | 18:10 | 18:41 73           | 18:20 (GA07) 20:14 |
| 27                  | 07:40   |              |              | 07:03 | 06:17              | 17:07 (GA07) 06:29 |
|                     |         |              |              | 18:12 | 18:43 74           | 18:21 (GA07) 20:15 |
| 28                  | 07:39   |              |              | 07:01 | 06:16              | 17:07 (GA07) 06:27 |
|                     |         |              |              | 18:13 | 18:44 74           | 18:21 (GA07) 20:16 |
| 29                  | 07:38   |              |              |       | 07:14              | 18:06 (GA07) 06:26 |
|                     |         |              |              |       | 19:45 74           | 19:20 (GA07) 20:17 |
| 30                  | 07:37   |              |              |       | 07:12              | 18:07 (GA07) 06:25 |
|                     |         |              |              |       | 19:46 73           | 19:20 (GA07) 20:18 |
| 31                  | 07:36   |              |              |       | 07:11              | 18:06 (GA07)       |
|                     |         |              |              |       | 19:47 74           | 19:20 (GA07)       |
| Potential sun hours | 298     |              | 297          | 369   |                    | 399                |
| Total, worst case   |         | 503          |              | 1476  |                    | 1172               |

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

Shadow receptor: R53 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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

|                     | July  | August | September                 | October                   | November                  | December                  |
|---------------------|-------|--------|---------------------------|---------------------------|---------------------------|---------------------------|
| 1                   | 05:55 | 06:19  | 06:50                     | 18:09 (GA07)   07:19      | 17:59 (GA07)   06:54      | 07:28   15:46 (GA06)      |
|                     | 21:00 | 20:41  | 19:58                     | 60   19:09 (GA07)   19:08 | 46   18:45 (GA07)   17:21 | 16:57   26   16:12 (GA06) |
| 2                   | 05:56 | 06:20  | 06:51                     | 18:08 (GA07)   07:20      | 18:00 (GA07)   06:55      | 07:29   15:46 (GA06)      |
|                     | 21:00 | 20:40  | 19:56                     | 62   19:10 (GA07)   19:06 | 43   18:43 (GA07)   17:20 | 16:56   26   16:12 (GA06) |
| 3                   | 05:56 | 06:21  | 06:52                     | 18:07 (GA07)   07:22      | 18:03 (GA07)   06:56      | 07:30   15:46 (GA06)      |
|                     | 21:00 | 20:39  | 19:55                     | 63   19:10 (GA07)   19:04 | 39   18:42 (GA07)   17:19 | 16:56   27   16:13 (GA06) |
| 4                   | 05:57 | 06:22  | 06:53                     | 18:06 (GA07)   07:23      | 18:04 (GA07)   06:57      | 07:31   15:46 (GA06)      |
|                     | 20:59 | 20:38  | 19:53                     | 65   19:11 (GA07)   19:03 | 36   18:40 (GA07)   17:17 | 16:56   27   16:13 (GA06) |
| 5                   | 05:57 | 06:23  | 06:54                     | 18:05 (GA07)   07:24      | 18:06 (GA07)   06:58      | 07:32   15:46 (GA06)      |
|                     | 20:59 | 20:36  | 19:51                     | 66   19:11 (GA07)   19:01 | 33   18:39 (GA07)   17:16 | 16:56   28   16:14 (GA06) |
| 6                   | 05:58 | 06:24  | 06:55                     | 18:04 (GA07)   07:25      | 18:08 (GA07)   06:59      | 07:33   15:47 (GA06)      |
|                     | 20:59 | 20:35  | 19:50                     | 67   19:11 (GA07)   18:59 | 29   18:37 (GA07)   17:15 | 16:56   27   16:14 (GA06) |
| 7                   | 05:58 | 06:25  | 06:56                     | 18:03 (GA07)   07:26      | 18:11 (GA07)   07:01      | 07:34   15:47 (GA06)      |
|                     | 20:59 | 20:34  | 19:48                     | 69   19:12 (GA07)   18:58 | 24   18:40 (GA07)   17:14 | 16:56   28   16:15 (GA06) |
| 8                   | 05:59 | 06:26  | 06:56                     | 18:02 (GA07)   07:27      | 18:15 (GA07)   07:02      | 07:35   15:48 (GA06)      |
|                     | 20:58 | 20:33  | 19:46                     | 70   19:12 (GA07)   18:56 | 18   18:33 (GA07)   17:13 | 16:56   27   16:15 (GA06) |
| 9                   | 06:00 | 06:27  | 06:57                     | 18:01 (GA07)   07:28      | 18:24 (GA07)   07:03      | 07:36   15:48 (GA06)      |
|                     | 20:58 | 20:32  | 19:45                     | 71   19:12 (GA07)   18:54 | 3   18:27 (GA07)   17:12  | 16:56   28   16:16 (GA06) |
| 10                  | 06:00 | 06:28  | 06:58                     | 18:00 (GA07)   07:29      |                           | 07:37   15:49 (GA06)      |
|                     | 20:58 | 20:30  | 19:43                     | 72   19:12 (GA07)   18:53 |                           | 16:56   27   16:16 (GA06) |
| 11                  | 06:01 | 06:29  | 06:59                     | 17:59 (GA07)   07:30      |                           | 07:38   15:48 (GA06)      |
|                     | 20:57 | 20:29  | 19:41                     | 73   19:12 (GA07)   18:51 |                           | 16:56   28   16:16 (GA06) |
| 12                  | 06:02 | 06:30  | 07:00                     | 17:59 (GA07)   07:31      |                           | 07:39   15:49 (GA06)      |
|                     | 20:57 | 20:28  | 19:40                     | 73   19:12 (GA07)   18:50 |                           | 16:56   27   16:16 (GA06) |
| 13                  | 06:02 | 06:31  | 07:01                     | 17:58 (GA07)   07:32      |                           | 07:39   15:50 (GA06)      |
|                     | 20:56 | 20:26  | 19:38                     | 74   19:12 (GA07)   18:48 |                           | 16:56   27   16:17 (GA06) |
| 14                  | 06:03 | 06:32  | 07:02                     | 17:58 (GA07)   07:33      |                           | 07:40   15:50 (GA06)      |
|                     | 20:56 | 20:25  | 19:36                     | 73   19:11 (GA07)   18:46 |                           | 16:56   28   16:18 (GA06) |
| 15                  | 06:04 | 06:33  | 07:03                     | 17:57 (GA07)   07:34      |                           | 07:41   15:50 (GA06)      |
|                     | 20:55 | 20:24  | 19:35                     | 74   19:11 (GA07)   18:45 |                           | 16:56   27   16:17 (GA06) |
| 16                  | 06:05 | 06:34  | 07:04                     | 17:57 (GA07)   07:35      |                           | 07:42   15:51 (GA06)      |
|                     | 20:55 | 20:22  | 19:33                     | 74   19:11 (GA07)   18:43 |                           | 16:57   27   16:18 (GA06) |
| 17                  | 06:06 | 06:35  | 07:05                     | 17:56 (GA07)   07:36      |                           | 07:42   15:52 (GA06)      |
|                     | 20:54 | 20:21  | 19:31                     | 74   19:10 (GA07)   18:42 |                           | 16:57   27   16:19 (GA06) |
| 18                  | 06:06 | 06:36  | 07:06                     | 17:55 (GA07)   07:38      |                           | 07:43   15:52 (GA06)      |
|                     | 20:53 | 20:19  | 19:30                     | 72   19:07 (GA07)   18:40 |                           | 16:57   27   16:19 (GA06) |
| 19                  | 06:07 | 06:37  | 07:07                     | 17:55 (GA07)   07:39      |                           | 07:44   15:52 (GA06)      |
|                     | 20:53 | 20:18  | 19:28                     | 70   19:05 (GA07)   18:39 |                           | 16:58   28   16:20 (GA06) |
| 20                  | 06:08 | 06:38  | 07:08                     | 17:55 (GA07)   07:40      |                           | 16:58   28   15:53 (GA06) |
|                     | 20:52 | 20:17  | 19:26                     | 68   19:03 (GA07)   18:37 |                           | 16:58   28   16:21 (GA06) |
| 21                  | 06:09 | 06:39  | 18:37 (GA07)   07:09      | 17:55 (GA07)   07:41      |                           | 15:53 (GA06)              |
|                     | 20:51 | 20:15  | 12   18:49 (GA07)   19:24 | 67   19:02 (GA07)   18:36 |                           | 16:20 (GA06)              |
| 22                  | 06:10 | 06:40  | 18:32 (GA07)   07:10      | 17:55 (GA07)   07:42      |                           | 15:54 (GA06)              |
|                     | 20:50 | 20:14  | 22   18:54 (GA07)   19:23 | 65   19:00 (GA07)   18:34 |                           | 16:21 (GA06)              |
| 23                  | 06:11 | 06:41  | 18:28 (GA07)   07:11      | 17:55 (GA07)   07:43      |                           | 15:54 (GA06)              |
|                     | 20:49 | 20:12  | 29   18:57 (GA07)   19:21 | 63   18:58 (GA07)   18:33 |                           | 16:22 (GA06)              |
| 24                  | 06:11 | 06:42  | 18:25 (GA07)   07:12      | 17:55 (GA07)   07:44      |                           | 15:54 (GA06)              |
|                     | 20:49 | 20:11  | 35   19:00 (GA07)   19:19 | 62   18:57 (GA07)   18:32 |                           | 16:22 (GA06)              |
| 25                  | 06:12 | 06:43  | 18:23 (GA07)   07:13      | 17:55 (GA07)   06:45      |                           | 15:56 (GA06)              |
|                     | 20:48 | 20:09  | 39   19:02 (GA07)   19:18 | 60   18:55 (GA07)   17:30 |                           | 16:23 (GA06)              |
| 26                  | 06:13 | 06:44  | 18:21 (GA07)   07:14      | 17:56 (GA07)   06:47      |                           | 15:56 (GA06)              |
|                     | 20:47 | 20:07  | 42   19:03 (GA07)   19:16 | 57   18:53 (GA07)   17:29 |                           | 16:23 (GA06)              |
| 27                  | 06:14 | 06:45  | 18:19 (GA07)   07:15      | 17:56 (GA07)   06:48      |                           | 15:56 (GA06)              |
|                     | 20:46 | 20:06  | 46   19:05 (GA07)   19:14 | 55   18:51 (GA07)   17:27 |                           | 16:23 (GA06)              |
| 28                  | 06:15 | 06:46  | 18:17 (GA07)   07:16      | 17:57 (GA07)   06:49      |                           | 15:57 (GA06)              |
|                     | 20:45 | 20:04  | 49   19:06 (GA07)   19:13 | 53   18:50 (GA07)   17:26 |                           | 16:24 (GA06)              |
| 29                  | 06:16 | 06:47  | 18:14 (GA07)   07:17      | 17:57 (GA07)   06:50      |                           | 15:57 (GA06)              |
|                     | 20:44 | 20:03  | 52   19:06 (GA07)   19:11 | 51   18:48 (GA07)   17:25 |                           | 16:25 (GA06)              |
| 30                  | 06:17 | 06:48  | 18:12 (GA07)   07:18      | 17:58 (GA07)   06:51      |                           | 15:58 (GA06)              |
|                     | 20:43 | 20:01  | 55   19:07 (GA07)   19:09 | 48   18:46 (GA07)   17:24 |                           | 16:25 (GA06)              |
| 31                  | 06:18 | 06:49  | 18:11 (GA07)   06:52      |                           |                           | 15:58 (GA06)              |
|                     | 20:42 | 20:00  | 57   19:08 (GA07)   17:22 |                           |                           | 16:25 (GA06)              |
| Potential sun hours | 459   | 428    | 375                       | 345                       | 298                       | 288                       |
| Total, worst case   |       | 438    | 1971                      | 271                       | 204                       | 845                       |

Table 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

Shadow receptor: R60 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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   07:49   07:35   07:00   07:09   19:07 (GA07)   06:23   05:55   05:55   06:19   06:50   07:19   06:53   07:28                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:06   17:40   18:14   19:48   19:26 (GA07)   20:20   20:49   21:00   20:41   19:58   19:07   17:21   16:57                     |         |          |       |       |     |      |      |        |           |         |          |          |
| 2   07:49   07:34   06:58   07:07   19:08 (GA07)   06:22   05:54   05:56   06:20   06:51   07:20   06:55   07:29                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:07   17:41   18:15   19:49   19:28 (GA07)   20:21   20:50   21:00   20:40   19:56   19:06   17:20   16:56                     |         |          |       |       |     |      |      |        |           |         |          |          |
| 3   07:49   07:33   06:56   07:06   19:09 (GA07)   06:21   05:54   05:56   06:21   06:52   07:21   06:56   07:30                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:07   17:42   18:16   19:50   19:28 (GA07)   20:22   20:50   21:00   20:39   19:55   19:04   17:19   16:56                     |         |          |       |       |     |      |      |        |           |         |          |          |
| 4   07:49   07:32   06:55   07:04   19:10 (GA07)   06:19   05:53   05:57   06:22   06:53   07:23   06:57   07:31                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:08   17:44   18:17   19:51   19:28 (GA07)   20:23   20:51   20:59   20:38   19:53   19:02   17:17   16:56                     |         |          |       |       |     |      |      |        |           |         |          |          |
| 5   07:49   07:31   06:53   07:02   19:13 (GA07)   06:18   05:53   05:57   06:23   06:54   07:24   06:58   07:32                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:09   17:45   18:18   19:52   19:25 (GA07)   20:24   20:52   20:59   20:36   19:51   19:01   17:16   16:56                     |         |          |       |       |     |      |      |        |           |         |          |          |
| 6   07:49   07:30   06:52   07:01   06:17   05:53   05:58   06:24   06:54   07:25   06:59   07:33                                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:10   17:46   18:20   19:53   19:28 (GA07)   20:25   20:52   20:59   20:35   19:50   18:59   17:15   16:56                     |         |          |       |       |     |      |      |        |           |         |          |          |
| 7   07:49   07:29   06:50   06:59   06:16   05:52   05:58   06:25   06:55   19:09 (GA07)   07:26   07:01   07:34                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:11   17:47   18:21   19:54   19:28 (GA07)   20:26   20:53   20:59   20:34   19:48   11   19:20 (GA07)   18:58   17:14   16:56 |         |          |       |       |     |      |      |        |           |         |          |          |
| 8   07:49   07:28   06:49   06:57   06:15   05:52   05:59   06:26   06:56   19:06 (GA07)   07:27   07:02   07:35                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:12   17:49   18:22   19:55   19:28 (GA07)   20:27   20:54   20:58   20:33   19:46   16   19:22 (GA07)   18:56   17:13   16:56 |         |          |       |       |     |      |      |        |           |         |          |          |
| 9   07:49   07:27   06:47   06:56   06:13   05:52   06:00   06:27   06:57   19:03 (GA07)   07:28   07:03   07:36                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:13   17:50   18:23   19:56   19:28 (GA07)   20:28   20:54   20:58   20:32   19:45   20   19:23 (GA07)   18:54   17:12   16:56 |         |          |       |       |     |      |      |        |           |         |          |          |
| 10   07:48   07:26   06:45   06:54   06:12   05:52   06:00   06:28   06:58   19:02 (GA07)   07:29   07:04   07:37                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:14   17:51   18:24   19:57   19:28 (GA07)   20:29   20:55   20:58   20:30   19:43   19   19:21 (GA07)   18:53   17:11   16:56 |         |          |       |       |     |      |      |        |           |         |          |          |
| 11   07:48   07:25   06:44   06:53   06:11   05:51   06:01   06:29   06:59   19:00 (GA07)   07:30   07:05   07:38                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:15   17:52   18:25   19:58   19:28 (GA07)   20:30   20:55   20:57   20:29   19:41   19   19:19 (GA07)   18:51   17:10   16:56 |         |          |       |       |     |      |      |        |           |         |          |          |
| 12   07:48   07:23   06:42   06:51   06:10   05:51   06:02   06:30   06:57   18:59 (GA07)   07:31   07:07   07:39                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:16   17:54   18:26   19:59   19:28 (GA07)   20:31   20:56   20:57   20:28   19:40   19   19:18 (GA07)   18:50   17:09   16:56 |         |          |       |       |     |      |      |        |           |         |          |          |
| 13   07:48   07:22   06:41   06:49   06:09   05:51   06:02   06:31   06:51   18:58 (GA07)   07:32   07:08   07:39                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:17   17:55   18:27   20:00   20:32   20:56   20:56   20:26   19:38   18   19:16 (GA07)   18:48   17:08   16:56                |         |          |       |       |     |      |      |        |           |         |          |          |
| 14   07:47   07:21   06:39   06:48   06:08   05:51   06:03   06:32   06:52   18:57 (GA07)   07:33   07:09   07:40                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:18   17:56   18:28   20:02   20:33   20:57   20:56   20:25   19:36   18   19:15 (GA07)   18:46   17:07   16:56                |         |          |       |       |     |      |      |        |           |         |          |          |
| 15   07:47   07:19   06:37   06:46   06:07   05:51   06:04   06:33   06:53   18:57 (GA07)   07:34   07:10   07:41                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:20   17:57   18:30   20:03   20:34   20:57   20:55   20:24   19:35   16   19:13 (GA07)   18:45   17:06   16:56                |         |          |       |       |     |      |      |        |           |         |          |          |
| 16   07:47   07:18   06:36   06:45   06:06   05:51   06:05   06:34   06:54   18:56 (GA07)   07:35   07:11   07:42                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:21   17:58   18:31   20:04   20:35   20:58   20:54   20:22   19:33   15   19:11 (GA07)   18:43   17:05   16:57                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17   07:46   07:17   06:34   06:43   06:05   05:51   06:06   06:35   06:55   18:55 (GA07)   07:36   07:12   07:42                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:22   18:00   18:32   20:05   20:36   20:58   20:54   20:21   19:31   14   19:09 (GA07)   18:42   17:04   16:57                |         |          |       |       |     |      |      |        |           |         |          |          |
| 18   07:46   07:16   06:32   06:42   06:04   05:51   06:06   06:36   06:56   18:55 (GA07)   07:37   07:14   07:43                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:23   18:01   18:33   20:06   20:37   20:58   20:53   20:19   19:30   12   19:07 (GA07)   18:40   17:04   16:57                |         |          |       |       |     |      |      |        |           |         |          |          |
| 19   07:45   07:14   06:31   06:40   06:03   05:51   06:07   06:37   07:07   18:55 (GA07)   07:39   07:15   07:44                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:24   18:02   18:34   20:07   20:38   20:59   20:53   20:18   19:28   10   19:05 (GA07)   18:39   17:03   16:58                |         |          |       |       |     |      |      |        |           |         |          |          |
| 20   07:45   07:13   06:29   18:14 (GA07)   06:39   06:03   05:52   06:08   06:38   18:55 (GA07)   07:40   07:16   07:44         |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:25   18:03   18:35   1   18:15 (GA07)   20:08   20:39   20:59   20:25   19:26   8   19:03 (GA07)   18:37   17:02   16:58      |         |          |       |       |     |      |      |        |           |         |          |          |
| 21   07:44   07:11   06:27   18:12 (GA07)   06:37   06:02   05:52   06:09   06:39   18:55 (GA07)   07:41   07:17   07:45         |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:26   18:04   18:36   3   18:15 (GA07)   20:09   20:40   20:59   20:21   19:24   7   19:02 (GA07)   18:36   17:02   16:58      |         |          |       |       |     |      |      |        |           |         |          |          |
| 22   07:43   07:10   06:26   18:10 (GA07)   06:36   06:01   05:52   06:10   06:40   18:56 (GA07)   07:42   07:18   07:45         |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:28   18:06   18:37   6   18:16 (GA07)   20:10   20:41   20:59   20:20   19:23   4   19:00 (GA07)   18:34   17:01   16:59      |         |          |       |       |     |      |      |        |           |         |          |          |
| 23   07:43   07:08   06:24   18:09 (GA07)   06:34   06:00   05:52   06:11   06:41   18:57 (GA07)   07:43   07:19   07:46         |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:29   18:07   18:38   8   18:17 (GA07)   20:11   20:41   21:00   20:49   20:21   1   18:58 (GA07)   18:33   17:00   16:59      |         |          |       |       |     |      |      |        |           |         |          |          |
| 24   07:42   07:07   06:22   18:08 (GA07)   06:33   05:59   05:52   06:11   06:42   07:12   07:44   07:21   07:46                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:30   18:08   18:39   10   18:18 (GA07)   20:12   20:42   21:00   20:49   20:10   19:19   18:32   17:00   17:00                |         |          |       |       |     |      |      |        |           |         |          |          |
| 25   07:41   07:06   06:21   18:07 (GA07)   06:31   05:59   05:53   06:12   06:43   07:13   06:45   07:22   07:47                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:31   18:09   18:40   12   18:19 (GA07)   20:13   20:43   21:00   20:48   20:09   19:18   17:30   16:59   17:01                |         |          |       |       |     |      |      |        |           |         |          |          |
| 26   07:41   07:04   06:19   18:06 (GA07)   06:30   05:58   05:53   06:13   06:44   07:14   06:47   07:23   07:47                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:32   18:10   18:41   14   18:20 (GA07)   20:14   20:44   21:00   20:47   20:07   19:16   17:29   16:59   17:01                |         |          |       |       |     |      |      |        |           |         |          |          |
| 27   07:40   07:03   06:17   18:07 (GA07)   06:29   05:57   05:53   06:14   06:45   07:15   06:48   07:24   07:47                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:34   18:12   18:42   15   18:22 (GA07)   20:15   20:45   21:00   20:46   20:06   19:14   17:27   16:58   17:02                |         |          |       |       |     |      |      |        |           |         |          |          |
| 28   07:39   07:01   06:16   18:06 (GA07)   06:27   05:57   05:54   06:15   06:46   07:16   06:49   07:25   07:48                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:35   18:13   18:44   16   18:22 (GA07)   20:16   20:46   21:00   20:45   20:04   19:13   17:26   16:58   17:02                |         |          |       |       |     |      |      |        |           |         |          |          |
| 29   07:38   07:01   07:14   19:06 (GA07)   06:26   05:56   05:54   06:16   06:47   07:17   06:50   07:26   07:48                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:36   19:45   17   19:23 (GA07)   20:17   20:47   21:00   20:44   20:03   19:11   17:25   16:57   17:03                        |         |          |       |       |     |      |      |        |           |         |          |          |
| 30   07:37   07:12   19:07 (GA07)   06:25   05:56   05:55   06:17   06:48   07:18   06:51   07:27   07:48                        |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:37   19:46   18   19:25 (GA07)   20:18   20:47   21:00   20:43   20:01   19:09   17:23   16:57   17:04                        |         |          |       |       |     |      |      |        |           |         |          |          |
| 31   07:36   07:11   19:07 (GA07)   06:24   05:55   06:18   06:49   07:22   06:52   07:22   07:22   07:48                        |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:39   19:47   18   19:25 (GA07)   20:18   20:48   21:00   20:42   20:00   19:09   17:22   16:57   17:05                        |         |          |       |       |     |      |      |        |           |         |          |          |
| Potential sun hours   298   297   369   138   399   88   448   452   459   428   375   227   345   298   288                     |         |          |       |       |     |      |      |        |           |         |          |          |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar

Shadow receptor: R62 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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                   | 07:49   | 07:35    | 07:00 | 07:09 | 06:23 | 05:55 | 05:55 | 06:19  | 06:50     | 07:19   | 06:53    | 07:28    |
|                     | 17:06   | 17:40    | 18:14 | 19:48 | 20:19 | 20:49 | 21:00 | 20:41  | 19:58     | 19:07   | 17:21    | 16:57    |
| 2                   | 07:49   | 07:34    | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51     | 07:20   | 06:55    | 07:29    |
|                     | 17:07   | 17:41    | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20    | 16:56    |
| 3                   | 07:49   | 07:33    | 06:56 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:51     | 07:21   | 06:56    | 07:30    |
|                     | 17:07   | 17:42    | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04   | 17:18    | 16:56    |
| 4                   | 07:49   | 07:32    | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:52     | 07:22   | 06:57    | 07:31    |
|                     | 17:08   | 17:44    | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:02   | 17:17    | 16:56    |
| 5                   | 07:49   | 07:31    | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:53     | 07:24   | 06:58    | 07:32    |
|                     | 17:09   | 17:45    | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51     | 19:01   | 17:16    | 16:56    |
| 6                   | 07:49   | 07:30    | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:54     | 07:25   | 06:59    | 07:33    |
|                     | 17:10   | 17:46    | 18:20 | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15    | 16:56    |
| 7                   | 07:49   | 07:29    | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55     | 07:26   | 07:01    | 07:34    |
|                     | 17:11   | 17:47    | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14    | 16:56    |
| 8                   | 07:49   | 07:28    | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56     | 07:27   | 07:02    | 07:35    |
|                     | 17:12   | 17:49    | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13    | 16:56    |
| 9                   | 07:49   | 07:27    | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57     | 07:28   | 07:03    | 07:36    |
|                     | 17:13   | 17:50    | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12    | 16:56    |
| 10                  | 07:48   | 07:26    | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58     | 07:29   | 07:04    | 07:37    |
|                     | 17:14   | 17:51    | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11    | 16:56    |
| 11                  | 07:48   | 07:24    | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59     | 07:30   | 07:05    | 07:38    |
|                     | 17:15   | 17:52    | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10    | 16:56    |
| 12                  | 07:48   | 07:23    | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07    | 07:39    |
|                     | 17:16   | 17:54    | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09    | 16:56    |
| 13                  | 07:48   | 07:22    | 06:40 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01     | 07:32   | 07:08    | 07:39    |
|                     | 17:17   | 17:55    | 18:27 | 20:00 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08    | 16:56    |
| 14                  | 07:47   | 07:21    | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09    | 07:40    |
|                     | 17:18   | 17:56    | 18:28 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07    | 16:56    |
| 15                  | 07:47   | 07:19    | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10    | 07:41    |
|                     | 17:19   | 17:57    | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06    | 16:56    |
| 16                  | 07:47   | 07:18    | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11    | 07:42    |
|                     | 17:21   | 17:58    | 18:31 | 20:04 | 20:35 | 20:58 | 20:54 | 20:22  | 19:33     | 18:43   | 17:05    | 16:57    |
| 17                  | 07:46   | 07:17    | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05     | 07:36   | 07:12    | 07:42    |
|                     | 17:22   | 18:00    | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:04    | 16:57    |
| 18                  | 07:46   | 07:15    | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:37   | 07:14    | 07:43    |
|                     | 17:23   | 18:01    | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:29     | 18:40   | 17:04    | 16:57    |
| 19                  | 07:45   | 07:14    | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15    | 07:44    |
|                     | 17:24   | 18:02    | 18:34 | 20:07 | 20:38 | 20:59 | 20:52 | 20:18  | 19:28     | 18:39   | 17:03    | 16:58    |
| 20                  | 07:45   | 07:13    | 06:29 | 06:39 | 06:02 | 05:52 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16    | 07:44    |
|                     | 17:25   | 18:03    | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:16  | 19:26     | 18:37   | 17:02    | 16:58    |
| 21                  | 07:44   | 07:11    | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17    | 07:45    |
|                     | 17:26   | 18:04    | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:01    | 16:58    |
| 22                  | 07:43   | 07:10    | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42   | 07:18    | 07:45    |
|                     | 17:28   | 18:06    | 18:37 | 20:10 | 20:40 | 20:59 | 20:50 | 20:13  | 19:23     | 18:34   | 17:01    | 16:59    |
| 23                  | 07:43   | 07:08    | 06:24 | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11     | 07:43   | 07:19    | 07:46    |
|                     | 17:29   | 18:07    | 18:38 | 20:11 | 20:41 | 21:00 | 20:49 | 20:12  | 19:21     | 18:33   | 17:00    | 16:59    |
| 24                  | 07:42   | 07:07    | 06:22 | 06:33 | 05:59 | 05:52 | 06:11 | 06:42  | 07:12     | 07:44   | 07:21    | 07:46    |
|                     | 17:30   | 18:08    | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:10  | 19:19     | 18:32   | 17:00    | 17:00    |
| 25                  | 07:41   | 07:06    | 06:21 | 06:31 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13     | 07:45   | 07:22    | 07:47    |
|                     | 17:31   | 18:09    | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 17:30   | 16:59    | 17:00    |
| 26                  | 07:41   | 07:04    | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 07:46   | 07:23    | 07:47    |
|                     | 17:32   | 18:10    | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29   | 16:59    | 17:01    |
| 27                  | 07:40   | 07:03    | 06:17 | 06:29 | 05:57 | 05:53 | 06:14 | 06:45  | 07:15     | 07:48   | 07:24    | 07:47    |
|                     | 17:34   | 18:12    | 18:42 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:27   | 16:58    | 17:02    |
| 28                  | 07:39   | 07:01    | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16     | 07:49   | 07:25    | 07:48    |
|                     | 17:35   | 18:13    | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:12     | 17:26   | 16:58    | 17:02    |
| 29                  | 07:38   |          | 07:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 06:50   | 07:26    | 07:48    |
|                     | 17:36   |          | 19:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57    | 17:03    |
| 30                  | 07:37   |          | 07:12 | 06:25 | 05:56 | 05:55 | 06:17 | 06:48  | 07:18     | 06:51   | 07:27    | 07:48    |
|                     | 17:37   |          | 19:46 | 20:18 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:23   | 16:57    | 17:04    |
| 31                  | 07:36   |          | 07:11 |       | 05:55 |       | 06:18 | 06:49  |           | 06:52   |          | 07:48    |
|                     | 17:39   |          | 19:47 |       | 20:48 |       | 20:42 | 20:00  |           | 17:22   |          | 17:05    |
| Potential sun hours | 298     | 297      | 369   | 399   | 448   | 452   | 459   | 428    | 375       | 345     | 298      | 288      |
| Total, worst case   |         |          |       |       |       |       |       |        |           |         |          |          |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar

Shadow receptor: R68 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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  | July  | August | September/October | November | December |
|---------------------|-----------------|--------------|--------------|-------|-------|-------|-------|--------|-------------------|----------|----------|
| 1                   | 07:49           | 07:35        | 07:55 (GA09) | 07:00 | 06:23 | 05:55 | 05:55 | 06:19  | 06:50             | 07:19    | 06:54    |
| 17:06               | 17:40           | 13           | 08:08 (GA09) | 18:14 | 19:48 | 20:20 | 20:49 | 21:00  | 20:41             | 19:58    | 19:08    |
| 2                   | 07:49           | 07:34        | 07:54 (GA09) | 06:58 | 07:07 | 06:22 | 05:54 | 05:56  | 06:20             | 06:51    | 07:20    |
| 17:07               | 17:41           | 15           | 08:09 (GA09) | 18:15 | 19:49 | 20:21 | 20:50 | 21:00  | 20:40             | 19:56    | 19:06    |
| 3                   | 07:49           | 07:33        | 07:53 (GA09) | 06:57 | 07:06 | 06:21 | 05:54 | 05:56  | 06:21             | 06:52    | 07:22    |
| 17:07               | 17:42           | 17           | 08:10 (GA09) | 18:16 | 19:50 | 20:22 | 20:50 | 21:00  | 20:39             | 19:55    | 19:04    |
| 4                   | 07:49           | 07:32        | 07:52 (GA09) | 06:55 | 07:04 | 06:19 | 05:53 | 05:57  | 06:22             | 06:53    | 07:23    |
| 17:08               | 17:44           | 18           | 08:10 (GA09) | 18:17 | 19:51 | 20:23 | 20:51 | 20:59  | 20:38             | 19:53    | 19:03    |
| 5                   | 07:49           | 07:31        | 07:51 (GA09) | 06:53 | 07:02 | 06:18 | 05:53 | 05:57  | 06:23             | 06:54    | 07:24    |
| 17:09               | 17:45           | 20           | 08:11 (GA09) | 18:18 | 19:52 | 20:24 | 20:52 | 20:59  | 20:36             | 19:51    | 19:01    |
| 6                   | 07:49           | 07:30        | 07:50 (GA09) | 06:52 | 07:01 | 06:17 | 05:53 | 05:58  | 06:24             | 06:55    | 07:25    |
| 17:10               | 17:46           | 21           | 08:11 (GA09) | 18:20 | 19:53 | 20:25 | 20:52 | 20:59  | 20:35             | 19:50    | 18:59    |
| 7                   | 07:49           | 07:29        | 07:49 (GA09) | 06:50 | 06:59 | 06:16 | 05:52 | 05:58  | 06:25             | 06:56    | 07:26    |
| 17:11               | 17:47           | 22           | 08:11 (GA09) | 18:21 | 19:54 | 20:26 | 20:53 | 20:59  | 20:34             | 19:48    | 18:58    |
| 8                   | 07:49           | 07:28        | 07:44 (GA09) | 06:49 | 06:57 | 06:15 | 05:52 | 05:59  | 06:26             | 06:56    | 07:27    |
| 17:12               | 17:49           | 24           | 08:12 (GA09) | 18:22 | 19:55 | 20:27 | 20:54 | 20:58  | 20:33             | 19:46    | 18:56    |
| 9                   | 07:49           | 07:27        | 07:47 (GA09) | 06:47 | 06:55 | 06:13 | 05:52 | 06:00  | 06:27             | 06:57    | 07:28    |
| 17:13               | 17:50           | 25           | 08:12 (GA09) | 18:23 | 19:56 | 20:28 | 20:54 | 20:58  | 20:32             | 19:45    | 18:54    |
| 10                  | 07:49           | 07:26        | 07:45 (GA09) | 06:45 | 06:54 | 06:12 | 05:52 | 06:00  | 06:28             | 06:58    | 07:29    |
| 17:14               | 17:51           | 26           | 08:11 (GA09) | 18:24 | 19:57 | 20:29 | 20:55 | 20:58  | 20:30             | 19:43    | 18:53    |
| 11                  | 07:48           | 07:25        | 07:44 (GA09) | 06:44 | 06:53 | 06:11 | 05:51 | 06:01  | 06:29             | 06:59    | 07:30    |
| 17:15               | 17:52           | 27           | 08:11 (GA09) | 18:25 | 19:58 | 20:30 | 20:55 | 20:57  | 20:29             | 19:41    | 18:51    |
| 12                  | 07:48           | 07:23        | 07:43 (GA09) | 06:42 | 06:51 | 06:10 | 05:51 | 06:02  | 06:30             | 07:00    | 07:31    |
| 17:16               | 17:54           | 27           | 08:10 (GA09) | 18:26 | 19:59 | 20:31 | 20:56 | 20:57  | 20:28             | 19:40    | 18:50    |
| 13                  | 07:48           | 07:22        | 07:42 (GA09) | 06:41 | 06:50 | 06:09 | 05:51 | 06:02  | 06:31             | 07:01    | 07:32    |
| 17:17               | 17:55           | 28           | 08:10 (GA09) | 18:27 | 20:01 | 20:32 | 20:56 | 20:56  | 20:26             | 19:38    | 18:48    |
| 14                  | 07:47           | 07:21        | 07:40 (GA09) | 06:39 | 06:48 | 06:08 | 05:51 | 06:03  | 06:32             | 07:02    | 07:33    |
| 17:18               | 17:56           | 28           | 08:08 (GA09) | 18:29 | 20:02 | 20:33 | 20:57 | 20:56  | 20:25             | 19:36    | 18:46    |
| 15                  | 07:47           | 07:20        | 07:41 (GA09) | 06:37 | 06:46 | 06:07 | 05:51 | 06:04  | 06:33             | 07:03    | 07:34    |
| 17:20               | 17:57           | 27           | 08:03 (GA09) | 18:30 | 20:03 | 20:34 | 20:57 | 20:55  | 20:24             | 19:35    | 18:45    |
| 16                  | 07:47           | 07:18        | 07:43 (GA09) | 06:36 | 06:45 | 06:06 | 05:51 | 06:05  | 06:34             | 07:04    | 07:35    |
| 17:21               | 17:58           | 24           | 08:07 (GA09) | 18:31 | 20:04 | 20:35 | 20:58 | 20:55  | 20:22             | 19:33    | 18:43    |
| 17                  | 07:46           | 07:17        | 07:44 (GA09) | 06:34 | 06:43 | 06:05 | 05:51 | 06:06  | 06:35             | 07:05    | 07:36    |
| 17:22               | 18:00           | 20           | 08:04 (GA09) | 18:32 | 20:05 | 20:36 | 20:58 | 20:54  | 20:21             | 19:31    | 18:42    |
| 18                  | 07:46           | 07:16        | 07:46 (GA09) | 06:32 | 06:42 | 06:04 | 05:51 | 06:06  | 06:36             | 07:06    | 07:38    |
| 17:23               | 18:01           | 16           | 08:02 (GA09) | 18:33 | 20:06 | 20:37 | 20:58 | 20:53  | 20:19             | 19:30    | 18:40    |
| 19                  | 07:45           | 07:14        | 07:49 (GA09) | 06:31 | 06:40 | 06:03 | 05:51 | 06:07  | 06:37             | 07:07    | 07:39    |
| 17:24               | 18:02           | 9            | 07:58 (GA09) | 18:34 | 20:07 | 20:38 | 20:59 | 20:53  | 20:18             | 19:28    | 18:39    |
| 20                  | 07:45           | 07:13        |              | 06:29 | 06:39 | 06:03 | 05:52 | 06:08  | 06:38             | 07:08    | 07:40    |
| 17:25               | 18:03           |              |              | 18:35 | 20:08 | 20:39 | 20:59 | 20:52  | 20:17             | 19:26    | 18:37    |
| 21                  | 07:44           | 07:11        |              | 06:27 | 06:37 | 06:02 | 05:52 | 06:09  | 06:39             | 07:09    | 07:41    |
| 17:26               | 18:05           |              |              | 18:36 | 20:09 | 20:40 | 20:59 | 20:51  | 20:15             | 19:24    | 18:36    |
| 22                  | 07:43           | 07:10        |              | 06:26 | 06:36 | 06:01 | 05:52 | 06:10  | 06:40             | 07:10    | 07:42    |
| 17:28               | 18:06           |              |              | 18:37 | 20:10 | 20:41 | 20:59 | 20:50  | 20:14             | 19:23    | 18:34    |
| 23                  | 07:43           | 07:09        |              | 06:24 | 06:34 | 06:00 | 05:52 | 06:11  | 06:41             | 07:11    | 07:43    |
| 17:29               | 18:07           |              |              | 18:38 | 20:11 | 20:41 | 21:00 | 20:50  | 20:12             | 19:21    | 18:33    |
| 24                  | 07:42           | 07:07        |              | 06:22 | 06:33 | 05:59 | 05:52 | 06:11  | 06:42             | 07:12    | 07:44    |
| 17:30               | 18:08           |              |              | 18:39 | 20:12 | 20:42 | 21:00 | 20:49  | 20:11             | 19:19    | 18:32    |
| 25                  | 07:41           | 07:06        |              | 06:21 | 06:31 | 05:59 | 05:53 | 06:12  | 06:43             | 07:13    | 07:45    |
| 17:31               | 18:09           |              |              | 18:40 | 20:13 | 20:43 | 21:00 | 20:48  | 20:09             | 19:18    | 17:30    |
| 26                  | 07:41           | 08:01 (GA09) | 07:04        | 06:19 | 06:30 | 05:58 | 05:53 | 06:13  | 06:44             | 07:14    | 07:47    |
| 17:32               | 1 08:02 (GA09)  | 18:10        |              | 18:41 | 20:14 | 20:44 | 21:00 | 20:47  | 20:07             | 19:16    | 17:29    |
| 27                  | 07:40           | 08:00 (GA09) | 07:03        | 06:17 | 06:29 | 05:57 | 05:53 | 06:14  | 06:45             | 07:15    | 07:48    |
| 17:34               | 3 08:03 (GA09)  | 18:12        |              | 18:43 | 20:15 | 20:45 | 21:00 | 20:46  | 20:06             | 19:14    | 17:27    |
| 28                  | 07:39           | 07:59 (GA09) | 07:01        | 06:16 | 06:27 | 05:57 | 05:54 | 06:15  | 06:46             | 07:16    | 07:48    |
| 17:35               | 6 08:05 (GA09)  | 18:13        |              | 18:44 | 20:16 | 20:46 | 21:00 | 20:45  | 20:04             | 19:13    | 17:26    |
| 29                  | 07:38           | 07:58 (GA09) |              | 07:14 | 06:26 | 05:56 | 05:54 | 06:16  | 06:47             | 07:17    | 07:48    |
| 17:36               | 8 08:08 (GA09)  |              |              | 19:45 | 20:17 | 20:47 | 21:00 | 20:44  | 20:03             | 19:11    | 17:25    |
| 30                  | 07:37           | 07:57 (GA09) |              | 07:12 | 06:25 | 05:56 | 05:55 | 06:17  | 06:48             | 07:18    | 07:48    |
| 17:37               | 10 08:07 (GA09) |              |              | 19:46 | 20:19 | 20:47 | 21:00 | 20:43  | 20:01             | 19:09    | 17:23    |
| 31                  | 07:36           | 07:56 (GA09) |              | 07:11 |       | 05:55 |       | 06:18  | 06:49             | 06:52    | 07:48    |
| 17:39               | 12 08:08 (GA09) |              |              | 19:47 |       | 20:48 |       | 20:42  | 20:00             | 17:22    | 07:48    |
| Potential sun hours | 298             | 40           |              | 297   | 369   | 399   | 448   | 452    | 459               | 428      | 345      |
| Total, worst case   |                 |              |              |       |       |       |       |        |                   |          | 213      |
|                     |                 |              |              |       |       |       |       |        |                   |          | 298      |
|                     |                 |              |              |       |       |       |       |        |                   |          | 238      |

Table 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

Shadow receptor: R78 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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  | July  | August | September/October | November                                | December                 |                      |                      |     |
|---------------------|---------------------------|--------------|--------------|-------|-------|-------|-------|--------|-------------------|---|--------------------------|----------------------|----------------------|-----|
| 1   07:49           | 07:35                     | 16:50 (GA08) | 07:00        | 07:09 | 06:23 | 05:54 | 05:55 | 06:19  | 06:49             | 07:19                                   | 06:53                    | 16:26 (GA08)   07:28 |                      |     |
| 1   17:06           | 17:40                     | 24           | 17:14 (GA08) | 18:14 | 19:48 | 20:19 | 20:49 | 20:41  | 19:58             | 19:07                                   | 17:21                    | 13                   | 16:39 (GA08)   16:57 |     |
| 2   07:49           | 07:34                     | 16:50 (GA08) | 06:58        | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:50             | 07:20                                   | 06:55                    | 16:24 (GA08)   07:29 |                      |     |
| 3   17:07           | 17:41                     | 24           | 17:14 (GA08) | 18:15 | 19:49 | 20:21 | 20:50 | 21:00  | 19:56             | 19:06                                   | 17:20                    | 17                   | 16:41 (GA08)   16:56 |     |
| 3   07:49           | 07:33                     | 16:50 (GA08) | 06:56        | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:51             | 07:21                                   | 06:56                    | 16:24 (GA08)   07:30 |                      |     |
| 4   17:07           | 17:42                     | 24           | 17:14 (GA08) | 18:16 | 19:50 | 20:22 | 20:50 | 21:00  | 19:55             | 19:04                                   | 17:18                    | 19                   | 16:43 (GA08)   16:56 |     |
| 4   07:49           | 07:32                     | 16:51 (GA08) | 06:55        | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:52             | 07:22                                   | 06:57                    | 16:23 (GA08)   07:31 |                      |     |
| 4   17:08           | 17:44                     | 23           | 17:14 (GA08) | 18:17 | 19:51 | 20:23 | 20:51 | 20:59  | 20:38             | 19:53                                   | 17:17                    | 20                   | 16:43 (GA08)   16:56 |     |
| 5   07:49           | 07:31                     | 16:51 (GA08) | 06:53        | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:53             | 07:24                                   | 06:58                    | 16:22 (GA08)   07:32 |                      |     |
| 5   17:09           | 17:45                     | 23           | 17:14 (GA08) | 18:18 | 19:52 | 20:24 | 20:52 | 20:59  | 20:36             | 19:51                                   | 17:16                    | 22                   | 16:44 (GA08)   16:56 |     |
| 6   07:49           | 07:30                     | 16:52 (GA08) | 06:52        | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:54             | 07:25                                   | 06:59                    | 16:21 (GA08)   07:33 |                      |     |
| 7   17:10           | 17:46                     | 22           | 17:14 (GA08) | 18:20 | 19:53 | 20:25 | 20:52 | 20:59  | 20:35             | 19:50                                   | 17:15                    | 23                   | 16:44 (GA08)   16:56 |     |
| 7   07:49           | 07:29                     | 16:53 (GA08) | 06:50        | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55             | 07:26                                   | 07:01                    | 16:21 (GA08)   07:34 |                      |     |
| 7   17:11           | 17:47                     | 20           | 17:13 (GA08) | 18:21 | 19:54 | 20:26 | 20:53 | 20:59  | 20:34             | 19:48                                   | 17:14                    | 24                   | 16:45 (GA08)   16:56 |     |
| 8   07:49           | 07:28                     | 16:54 (GA08) | 06:49        | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56             | 07:27                                   | 07:02                    | 16:21 (GA08)   07:35 |                      |     |
| 8   17:12           | 17:49                     | 19           | 17:13 (GA08) | 18:22 | 19:55 | 20:27 | 20:54 | 20:58  | 20:33             | 19:46                                   | 17:13                    | 24                   | 16:45 (GA08)   16:55 |     |
| 9   07:49           | 07:27                     | 16:55 (GA08) | 06:47        | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57             | 07:28                                   | 07:03                    | 16:21 (GA08)   07:36 |                      |     |
| 9   17:13           | 17:50                     | 16           | 17:12 (GA08) | 18:23 | 19:56 | 20:28 | 20:54 | 20:58  | 20:32             | 19:45                                   | 17:12                    | 24                   | 16:45 (GA08)   16:55 |     |
| 10   07:48          | 07:26                     | 16:57 (GA08) | 06:45        | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58             | 07:29                                   | 07:04                    | 16:21 (GA08)   07:37 |                      |     |
| 10   17:14          | 17:51                     | 12           | 17:09 (GA08) | 18:24 | 19:57 | 20:29 | 20:55 | 20:58  | 20:30             | 19:43                                   | 17:11                    | 24                   | 16:45 (GA08)   16:55 |     |
| 11   07:48          | 07:25                     | 17:00 (GA08) | 06:44        | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59             | 07:30                                   | 07:05                    | 16:22 (GA08)   07:38 |                      |     |
| 11   17:15          | 17:52                     | 6            | 17:06 (GA08) | 18:25 | 19:58 | 20:30 | 20:55 | 20:57  | 20:29             | 19:41                                   | 17:10                    | 24                   | 16:46 (GA08)   16:56 |     |
| 12   07:48          | 07:23                     | 16:51 (GA08) | 06:42        | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00             | 07:31                                   | 07:07                    | 16:22 (GA08)   07:39 |                      |     |
| 12   17:16          | 17:54                     |              | 18:26        | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40             | 18:49                                   | 17:09                    | 23                   | 16:45 (GA08)   16:56 |     |
| 13   07:48          | 07:22                     | 16:40        | 06:49        | 06:09 | 05:51 | 06:02 | 06:31 | 07:01  | 07:32             | 07:08                                   | 16:22 (GA08)   07:39     |                      |                      |     |
| 13   17:17          | 17:55                     |              | 18:27        | 20:00 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38             | 18:48                                   | 17:08                    | 22                   | 16:44 (GA08)   16:56 |     |
| 14   07:47          | 07:21                     | 16:39        | 06:39        | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02             | 07:33                                   | 07:09                    | 16:23 (GA08)   07:40 |                      |     |
| 14   17:18          | 17:56                     |              | 18:28        | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36             | 18:46                                   | 17:07                    | 20                   | 16:43 (GA08)   16:56 |     |
| 15   07:47          | 07:19                     | 16:37        | 06:37        | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03             | 07:34                                   | 07:10                    | 16:24 (GA08)   07:41 |                      |     |
| 15   17:19          | 17:57                     |              | 18:30        | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35             | 18:45                                   | 17:06                    | 18                   | 16:42 (GA08)   16:56 |     |
| 16   07:47          | 07:18                     | 16:36        | 06:45        | 06:06 | 05:51 | 06:05 | 06:34 | 07:04  | 07:35             |   | 07:11                    | 16:25 (GA08)   07:42 |                      |     |
| 16   17:21          | 17:58                     |              | 18:31        | 20:04 | 20:35 | 20:58 | 20:54 | 20:22  | 19:33             | 18:43                                   | 17:05                    | 16                   | 16:41 (GA08)   16:56 |     |
| 17   07:46          | 07:17                     | 16:34        | 06:43        | 06:05 | 05:51 | 06:05 | 06:35 | 07:05  | 07:36             |   | 07:12                    | 16:26 (GA08)   07:42 |                      |     |
| 17   17:22          | 18:00                     |              | 18:32        | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31             | 18:42                                   | 17:04                    | 14                   | 16:40 (GA08)   16:57 |     |
| 18   07:46          | 07:15                     | 16:32        | 06:42        | 06:04 | 05:51 | 06:06 | 06:36 | 07:06  | 07:37             |   | 07:14                    | 16:28 (GA08)   07:43 |                      |     |
| 18   17:23          | 18:01                     |              | 18:33        | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:29             | 18:40                                   | 17:04                    | 12                   | 16:40 (GA08)   16:57 |     |
| 19   07:45          | 07:14                     | 16:31        | 06:40        | 06:03 | 05:51 | 06:07 | 06:37 | 07:07  | 07:39             |   | 07:15                    | 16:29 (GA08)   07:44 |                      |     |
| 19   17:24          | 18:02                     |              | 18:34        | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28             | 18:39                                   | 17:03                    | 10                   | 16:39 (GA08)   16:57 |     |
| 20   07:45          | 07:13                     | 16:29        | 06:39        | 06:02 | 05:51 | 06:08 | 06:38 | 07:08  | 07:40             |   | 07:16                    | 16:32 (GA08)   07:44 |                      |     |
| 20   17:25          | 18:03                     |              | 18:35        | 20:08 | 20:39 | 20:59 | 20:52 | 20:16  | 19:26             | 18:37                                   | 17:02                    | 6                    | 16:38 (GA08)   16:58 |     |
| 21   07:44          | 07:11                     | 16:27        | 06:27        | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09             | 07:41                                   | 07:17                    |                      | 07:45                |     |
| 21   17:26          | 18:04                     |              | 18:36        | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24             | 18:36                                   | 17:01                    |                      | 16:58                |     |
| 22   07:43          | 16:57 (GA08)   07:10      | 16:26        | 06:36        | 06:01 | 05:52 | 06:10 | 06:40 | 07:10  | 07:42             |   | 07:18                    |                      | 07:45                |     |
| 22   17:28          | 6   17:03 (GA08)   18:06  | 18:37        | 20:10        | 20:41 | 20:59 | 20:50 | 20:14 | 19:23  | 18:34             |   | 17:01                    |                      | 16:59                |     |
| 23   07:43          | 16:54 (GA08)   07:08      | 16:24        | 06:34        | 06:00 | 05:52 | 06:10 | 06:41 | 07:11  | 07:43             |   | 07:19                    |                      | 07:46                |     |
| 23   17:29          | 10   17:04 (GA08)   18:07 | 18:38        | 20:11        | 20:41 | 21:00 | 20:49 | 20:12 | 19:21  | 18:33             |   | 17:00                    |                      | 16:59                |     |
| 24   07:42          | 16:54 (GA08)   07:07      | 16:22        | 06:33        | 05:59 | 05:52 | 06:11 | 06:42 | 07:12  | 07:44             |   | 07:21                    |                      | 07:46                |     |
| 24   17:30          | 12   17:06 (GA08)   18:08 | 18:39        | 20:12        | 20:42 | 21:00 | 20:49 | 20:10 | 19:19  | 18:31             |   | 17:00                    |                      | 17:00                |     |
| 25   07:41          | 16:53 (GA08)   07:06      | 16:21        | 06:31        | 05:59 | 05:53 | 06:12 | 06:43 | 07:13  | 07:45             |   | 07:22                    |                      | 07:47                |     |
| 25   17:31          | 14   17:07 (GA08)   18:09 | 18:40        | 20:13        | 20:43 | 21:00 | 20:48 | 20:09 | 19:18  | 17:30             |   | 16:59                    |                      | 17:00                |     |
| 26   07:41          | 16:52 (GA08)   07:04      | 16:19        | 06:30        | 05:58 | 05:53 | 06:13 | 06:44 | 07:14  | 07:46             |   | 07:23                    |                      | 07:47                |     |
| 26   17:32          | 16   17:08 (GA08)   18:10 | 18:41        | 20:14        | 20:44 | 21:00 | 20:47 | 20:07 | 19:16  | 17:29             |   | 16:59                    |                      | 17:01                |     |
| 27   07:40          | 16:51 (GA08)   07:03      | 16:17        | 06:29        | 05:57 | 05:53 | 06:14 | 06:45 | 07:15  | 07:48             |   | 07:24                    |                      | 07:47                |     |
| 27   17:34          | 18   17:09 (GA08)   18:11 | 18:42        | 20:15        | 20:45 | 21:00 | 20:46 | 20:06 | 19:14  | 17:27             |   | 16:58                    |                      | 17:02                |     |
| 28   07:39          | 16:50 (GA08)   07:01      | 16:16        | 06:27        | 05:57 | 05:54 | 06:15 | 06:46 | 07:16  | 07:49             |   | 07:25                    |                      | 07:48                |     |
| 28   17:35          | 20   17:10 (GA08)   18:13 | 18:44        | 20:16        | 20:46 | 21:00 | 20:45 | 20:04 | 19:12  | 17:26             |   | 16:58                    |                      | 17:02                |     |
| 29   07:38          | 16:50 (GA08)   07:01      | 16:14        | 06:26        | 05:56 | 05:54 | 06:16 | 06:47 | 07:17  | 07:50             |   | 07:26                    |                      | 07:48                |     |
| 29   17:36          | 22   17:12 (GA08)   18:13 | 19:45        | 20:17        | 20:47 | 21:00 | 20:44 | 20:03 | 19:11  | 17:25             |   | 16:57                    |                      | 17:03                |     |
| 30   07:37          | 16:50 (GA08)   07:01      | 16:12        | 06:25        | 05:55 | 05:55 | 06:17 | 06:48 | 07:18  | 06:51             |   | 07:27                    |                      | 07:48                |     |
| 30   17:37          | 23   17:13 (GA08)   18:13 | 19:46        | 20:18        | 20:47 | 21:00 | 20:43 | 20:01 | 19:09  | 17:23             |   | 16:57                    |                      | 17:04                |     |
| 31   07:36          | 16:50 (GA08)   07:01      | 16:11        |              | 05:55 |       | 06:18 | 06:49 |        | 06:52             | 8   16:29 (GA08)   16:37 (GA08)   17:05 |                          |                      |                      |     |
| 31   17:39          | 24   17:14 (GA08)   18:13 | 19:47        |              | 05:55 |       | 06:20 | 06:48 | 20:42  | 20:00             | 17:22                                   | 8   16:37 (GA08)   17:05 |                      |                      |     |
| Potential sun hours | 298                       | 165          | 297          | 369   | 399   | 448   | 452   | 459    | 428               | 375                                     | 345                      | 8                    | 298                  | 288 |
| Total, worst case   |                           |              |              |       |       |       |       |        |                   |   |                          | 375                  |                      |     |

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)<br>(WTG causing flicker last time) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|---|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|---|

## SHADOW - Calendar

Shadow receptor: R94 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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   07:49           | 07:35           | 16:49 (GA11)          | 07:00 | 07:09 | 06:23 | 05:54 | 05:55 | 06:19           | 06:49             | 07:19          | 06:54    |
| 1   17:06           | 17:40           | 14 17:03 (GA11)       | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41           | 19:58             | 19:07          | 17:21    |
| 2   07:49           | 07:34           | 16:49 (GA11)          | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20           | 06:50             | 07:20          | 06:55    |
| 3   17:06           | 17:41           | 16 17:05 (GA11)       | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40           | 19:56             | 19:06          | 17:20    |
| 4   07:49           | 07:33           | 16:49 (GA11)          | 06:56 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21           | 06:51             | 07:21          | 06:56    |
| 5   17:07           | 17:42           | 17 17:06 (GA11)       | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39           | 19:55             | 19:04          | 17:18    |
| 6   07:49           | 07:32           | 16:50 (GA11)          | 06:55 | 07:04 | 06:19 | 05:53 | 05:56 | 06:22           | 06:52             | 07:22          | 06:57    |
| 7   17:08           | 17:44           | 18 17:08 (GA11)       | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38           | 19:53             | 19:02          | 17:17    |
| 8   07:49           | 07:31           | 16:51 (GA11)          | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23           | 06:53             | 07:24          | 06:58    |
| 9   17:09           | 17:45           | 18 17:09 (GA11)       | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:36           | 19:51             | 19:01          | 17:16    |
| 10   07:49          | 07:30           | 16:51 (GA11)          | 06:52 | 07:01 | 06:17 | 05:52 | 05:58 | 06:24           | 06:54             | 07:25          | 06:59    |
| 11   07:49          | 07:29           | 17:46 20 17:11 (GA11) | 18:20 | 19:53 | 20:25 | 20:53 | 20:59 | 20:35           | 19:50             | 18:59          | 17:15    |
| 12   17:11          | 17:47           | 20 17:12 (GA11)       | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34           | 19:48             | 18:58          | 17:14    |
| 13   07:49          | 07:28           | 16:54 (GA11)          | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26           | 06:56             | 07:27          | 07:02    |
| 14   07:49          | 07:27           | 16:55 (GA11)          | 06:47 | 06:55 | 06:13 | 05:52 | 05:59 | 06:27           | 06:57             | 07:28          | 07:03    |
| 15   07:49          | 07:26           | 17:50 20 17:15 (GA11) | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32           | 19:45             | 18:54          | 17:12    |
| 16   07:49          | 07:25           | 17:51 16 17:12 (GA11) | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30           | 19:43             | 18:53          | 07:04    |
| 17   07:48          | 07:25           | 16:59 (GA11)          | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29           | 06:59             | 07:30          | 07:05    |
| 18   17:15          | 17:52           | 11 17:10 (GA11)       | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29           | 19:41             | 18:51          | 17:10    |
| 19   07:48          | 07:23           | 16:53                 | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30           | 07:00             | 07:31          | 07:07    |
| 20   17:16          | 17:53           | 18:26                 | 19:59 | 20:31 | 20:56 | 20:57 | 20:58 | 20:33           | 19:46             | 18:56          | 17:13    |
| 21   07:48          | 07:22           | 16:54                 | 06:41 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31           | 07:01             | 07:32          | 07:08    |
| 22   17:17          | 17:55           | 18:27                 | 20:01 | 20:32 | 20:56 | 20:56 | 20:56 | 20:26           | 19:38             | 18:48          | 17:08    |
| 23   07:47          | 07:21           | 16:54 (GA11)          | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32           | 07:02             | 07:33          | 07:09    |
| 24   17:18          | 17:56           | 18:28                 | 20:02 | 20:33 | 20:57 | 20:56 | 20:56 | 20:25           | 19:36             | 18:46          | 17:07    |
| 25   07:47          | 07:20           | 16:57                 | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33           | 07:03             | 07:34          | 07:10    |
| 26   17:19          | 17:57           | 18:30                 | 20:03 | 20:34 | 20:57 | 20:55 | 20:59 | 20:24           | 19:35             | 18:45          | 17:06    |
| 27   07:47          | 07:18           | 16:56                 | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34           | 07:04             | 07:35          | 07:11    |
| 28   17:21          | 17:58           | 18:31                 | 20:04 | 20:35 | 20:58 | 20:55 | 20:59 | 20:22           | 19:33             | 18:43          | 17:05    |
| 29   07:46          | 07:17           | 16:54 (GA11)          | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35           | 07:05             | 07:36          | 07:13    |
| 30   17:22          | 18:00           | 18:32                 | 20:05 | 20:36 | 20:58 | 20:54 | 20:58 | 20:21           | 19:31             | 18:42          | 17:04    |
| 31   07:46          | 07:16           | 16:55 (GA11)          | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36           | 07:06             | 07:37          | 07:14    |
| 32   17:23          | 18:01           | 18:33                 | 20:06 | 20:37 | 20:58 | 20:53 | 20:53 | 20:19           | 19:30             | 18:40          | 17:04    |
| 33   07:45          | 07:14           | 16:56 (GA11)          | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37           | 07:07             | 07:39          | 07:15    |
| 34   17:24          | 18:02           | 18:34                 | 20:07 | 20:38 | 20:59 | 20:53 | 20:58 | 20:18           | 19:28             | 18:39          | 17:03    |
| 35   07:45          | 07:13           | 16:56 (GA11)          | 06:29 | 06:39 | 06:02 | 05:51 | 06:08 | 06:38           | 07:08             | 07:40          | 07:16    |
| 36   17:25          | 18:03           | 18:35                 | 20:08 | 20:39 | 20:59 | 20:52 | 20:52 | 20:17           | 19:26             | 18:37          | 17:02    |
| 37   07:44          | 07:11           | 16:56 (GA11)          | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39           | 07:09             | 07:41          | 07:17    |
| 38   17:26          | 18:04           | 18:36                 | 20:09 | 20:40 | 20:59 | 20:51 | 20:51 | 20:15           | 19:24             | 18:36          | 17:01    |
| 39   07:43          | 16:51 (GA11)    | 07:10                 | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40           | 07:10             | 07:42          | 07:18    |
| 40   17:28          | 1 16:52 (GA11)  | 18:06                 | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14           | 19:23             | 18:34          | 17:01    |
| 41   07:43          | 07:09           | 16:52 (GA11)          | 06:24 | 06:34 | 06:00 | 05:52 | 06:10 | 06:41           | 07:11             | 07:43          | 07:20    |
| 42   17:29          | 2 16:52 (GA11)  | 18:07                 | 18:38 | 20:11 | 20:41 | 21:00 | 20:50 | 20:12           | 19:21             | 18:33          | 17:00    |
| 43   07:42          | 07:07           | 16:51 (GA11)          | 06:22 | 06:33 | 05:59 | 05:52 | 06:11 | 06:42           | 07:12             | 07:44          | 07:21    |
| 44   17:30          | 3 16:54 (GA11)  | 18:08                 | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11           | 19:19             | 18:31          | 17:00    |
| 45   07:41          | 07:06           | 16:50 (GA11)          | 06:21 | 06:31 | 05:59 | 05:53 | 06:12 | 06:43           | 07:13             | 06:45          | 07:22    |
| 46   17:31          | 5 16:55 (GA11)  | 18:09                 | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09           | 19:18             | 17:30          | 16:59    |
| 47   07:41          | 07:04           | 16:49 (GA11)          | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44           | 07:14             | 06:47          | 07:23    |
| 48   17:32          | 7 16:56 (GA11)  | 18:10                 | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07           | 19:16             | 17:29          | 16:59    |
| 49   07:40          | 07:03           | 16:49 (GA11)          | 06:17 | 06:29 | 05:57 | 05:53 | 06:14 | 06:45           | 07:15             | 06:48          | 07:24    |
| 50   17:34          | 8 16:57 (GA11)  | 18:11                 | 18:42 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06           | 19:14             | 17:27          | 16:58    |
| 51   07:39          | 07:01           | 16:49 (GA11)          | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46           | 07:16             | 06:49          | 07:25    |
| 52   17:35          | 9 16:58 (GA11)  | 18:13                 | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04           | 19:12             | 17:26          | 16:58    |
| 53   07:38          | 07:14           | 16:49 (GA11)          | 07:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47           | 07:17             | 06:50          | 07:26    |
| 54   17:36          | 11 17:00 (GA11) | 19:45                 | 20:17 | 20:47 | 21:00 | 20:44 | 20:44 | 20:03           | 19:11             | 17:25          | 16:57    |
| 55   07:37          | 16:48 (GA11)    | 07:12                 | 06:25 | 05:55 | 05:54 | 06:17 | 06:48 | 07:18           | 06:51             | 16:32 (GA11)   | 07:27    |
| 56   17:37          | 13 17:01 (GA11) | 19:46                 | 20:18 | 20:47 | 21:00 | 20:43 | 20:01 | 19:09           | 17:23             | 5 16:37 (GA11) | 16:57    |
| 57   07:36          | 16:49 (GA11)    | 07:11                 | 05:55 | 05:55 | 06:18 | 06:48 | 06:52 | 16:28 (GA11)    | 16:28             | 16:41 (GA11)   | 07:49    |
| 58   17:39          | 13 17:02 (GA11) | 19:47                 | 20:48 | 20:48 | 20:42 | 20:00 | 17:22 | 13 16:41 (GA11) | 17:22             | 16:41 (GA11)   | 17:05    |
| Potential sun hours | 298             | 72                    | 297   | 369   | 399   | 448   | 452   | 459             | 428               | 375            | 345      |
| Total, worst case   |                 |                       |       |       |       |       |       |                 |                   | 18             | 254      |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|              |                  |                 |                      |                                 |                                |                                  |                                 |

## SHADOW - Calendar

Shadow receptor: R96 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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  | July  | August | September | October | November | December |
|---------------------|---------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|
| 1                   | 07:49   | 07:35    | 07:00 | 07:09 | 06:23 | 05:54 | 05:55 | 06:19  | 06:50     | 07:19   | 06:54    | 07:28    |
|                     | 17:06   | 17:40    | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:07   | 17:21    | 16:57    |
| 2                   | 07:49   | 07:35    | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51     | 07:20   | 06:55    | 07:29    |
|                     | 17:06   | 17:41    | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20    | 16:56    |
| 3                   | 07:49   | 07:34    | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:21   | 06:56    | 07:30    |
|                     | 17:07   | 17:42    | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04   | 17:18    | 16:56    |
| 4                   | 07:49   | 07:32    | 06:55 | 07:04 | 06:19 | 05:53 | 05:56 | 06:22  | 06:52     | 07:23   | 06:57    | 07:31    |
|                     | 17:08   | 17:44    | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:02   | 17:17    | 16:56    |
| 5                   | 07:49   | 07:31    | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:53     | 07:24   | 06:58    | 07:32    |
|                     | 17:09   | 17:45    | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:37  | 19:51     | 19:01   | 17:16    | 16:56    |
| 6                   | 07:49   | 07:30    | 06:52 | 07:01 | 06:17 | 05:52 | 05:58 | 06:24  | 06:54     | 07:25   | 06:59    | 07:33    |
|                     | 17:10   | 17:46    | 18:20 | 19:53 | 20:25 | 20:53 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15    | 16:56    |
| 7                   | 07:49   | 07:29    | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55     | 07:26   | 07:01    | 07:34    |
|                     | 17:11   | 17:47    | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14    | 16:56    |
| 8                   | 07:49   | 07:28    | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56     | 07:27   | 07:02    | 07:35    |
|                     | 17:12   | 17:49    | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13    | 16:55    |
| 9                   | 07:49   | 07:27    | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57     | 07:28   | 07:03    | 07:36    |
|                     | 17:13   | 17:50    | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12    | 16:55    |
| 10                  | 07:49   | 07:26    | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58     | 07:29   | 07:04    | 07:37    |
|                     | 17:14   | 17:51    | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11    | 16:55    |
| 11                  | 07:48   | 07:25    | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59     | 07:30   | 07:05    | 07:38    |
|                     | 17:15   | 17:52    | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10    | 16:56    |
| 12                  | 07:48   | 07:23    | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07    | 07:39    |
|                     | 17:16   | 17:54    | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09    | 16:56    |
| 13                  | 07:48   | 07:22    | 06:41 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01     | 07:32   | 07:08    | 07:39    |
|                     | 17:17   | 17:55    | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08    | 16:56    |
| 14                  | 07:47   | 07:21    | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09    | 07:40    |
|                     | 17:18   | 17:56    | 18:28 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07    | 16:56    |
| 15                  | 07:47   | 07:20    | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10    | 07:41    |
|                     | 17:19   | 17:57    | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06    | 16:56    |
| 16                  | 07:47   | 07:18    | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11    | 07:42    |
|                     | 17:21   | 17:58    | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43   | 17:05    | 16:56    |
| 17                  | 07:46   | 07:17    | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05     | 07:36   | 07:13    | 07:42    |
|                     | 17:22   | 18:00    | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:04    | 16:57    |
| 18                  | 07:46   | 07:16    | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:38   | 07:14    | 07:43    |
|                     | 17:23   | 18:01    | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30     | 18:40   | 17:04    | 16:57    |
| 19                  | 07:45   | 07:14    | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15    | 07:44    |
|                     | 17:24   | 18:02    | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39   | 17:03    | 16:57    |
| 20                  | 07:45   | 07:13    | 06:29 | 06:39 | 06:02 | 05:51 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16    | 07:44    |
|                     | 17:25   | 18:03    | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37   | 17:02    | 16:58    |
| 21                  | 07:44   | 07:11    | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17    | 07:45    |
|                     | 17:26   | 18:04    | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:01    | 16:58    |
| 22                  | 07:43   | 07:10    | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42   | 07:18    | 07:45    |
|                     | 17:28   | 18:06    | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:34   | 17:01    | 16:59    |
| 23                  | 07:43   | 07:09    | 06:24 | 06:34 | 06:00 | 05:52 | 06:10 | 06:41  | 07:11     | 07:43   | 07:20    | 07:46    |
|                     | 17:29   | 18:07    | 18:38 | 20:11 | 20:42 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33   | 17:00    | 16:59    |
| 24                  | 07:42   | 07:07    | 06:22 | 06:33 | 05:59 | 05:52 | 06:11 | 06:42  | 07:12     | 07:44   | 07:21    | 07:46    |
|                     | 17:30   | 18:08    | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32   | 17:00    | 17:00    |
| 25                  | 07:41   | 07:06    | 06:21 | 06:31 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13     | 07:45   | 07:22    | 07:47    |
|                     | 17:31   | 18:09    | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 17:30   | 16:59    | 17:00    |
| 26                  | 07:41   | 07:04    | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 07:46   | 07:23    | 07:47    |
|                     | 17:32   | 18:10    | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29   | 16:59    | 17:01    |
| 27                  | 07:40   | 07:03    | 06:17 | 06:29 | 05:57 | 05:53 | 06:14 | 06:45  | 07:15     | 07:48   | 07:24    | 07:47    |
|                     | 17:34   | 18:12    | 18:43 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:27   | 16:58    | 17:02    |
| 28                  | 07:39   | 07:01    | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16     | 07:49   | 07:25    | 07:48    |
|                     | 17:35   | 18:13    | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26   | 16:58    | 17:02    |
| 29                  | 07:38   |          | 07:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 06:50   | 07:26    | 07:48    |
|                     | 17:36   |          | 19:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57    | 17:03    |
| 30                  | 07:37   |          | 07:12 | 06:25 | 05:55 | 05:54 | 06:17 | 06:48  | 07:18     | 06:51   | 07:27    | 07:48    |
|                     | 17:37   |          | 19:46 | 20:19 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:23   | 16:57    | 17:04    |
| 31                  | 07:36   |          | 07:11 |       | 05:55 |       | 06:18 | 06:49  |           | 06:52   |          | 07:49    |
|                     | 17:39   |          | 19:47 |       | 20:48 |       | 20:42 | 20:00  |           | 17:22   |          | 17:05    |
| Potential sun hours | 298     | 297      | 369   | 399   | 448   | 452   | 459   | 428    | 375       | 345     | 298      | 288      |
| Total, worst case   |         |          |       |       |       |       |       |        |           |         |          |          |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar

Shadow receptor: R99 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (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

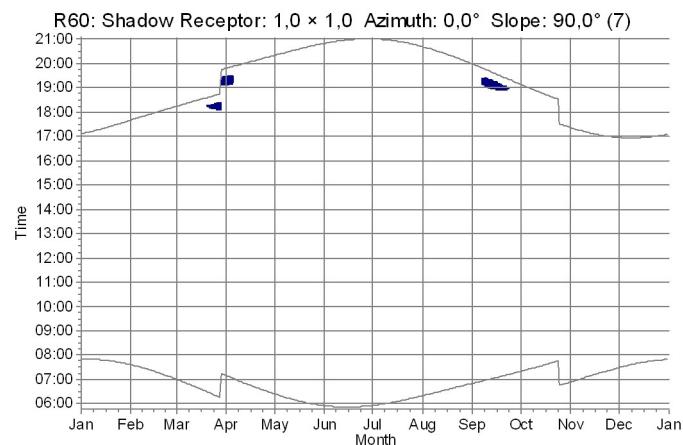
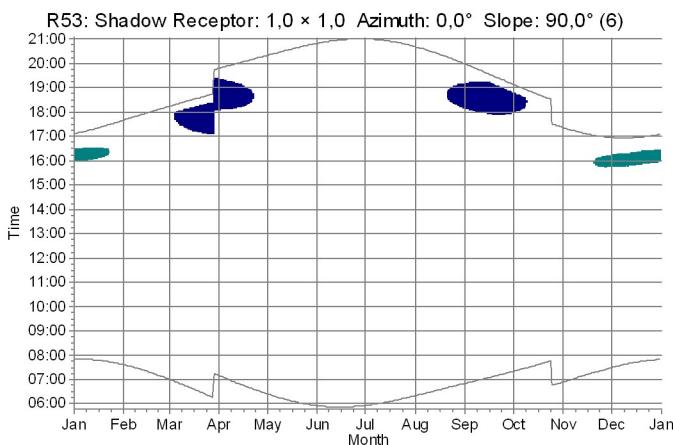
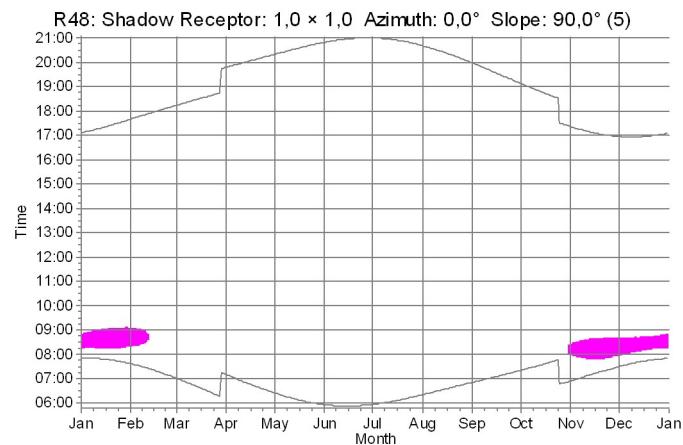
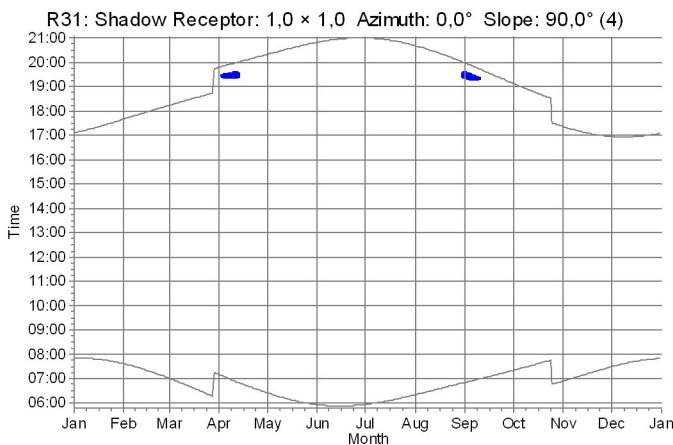
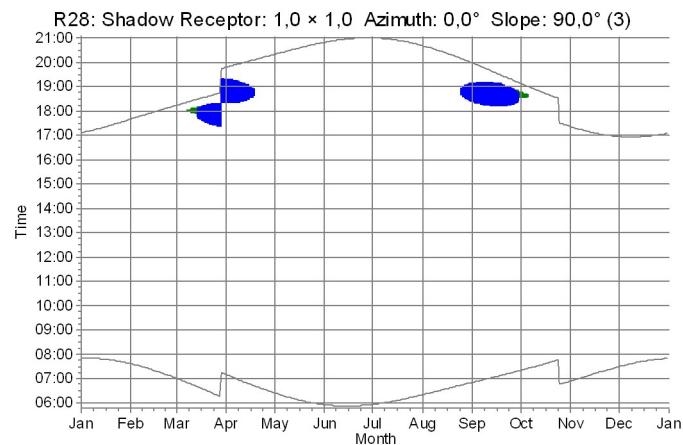
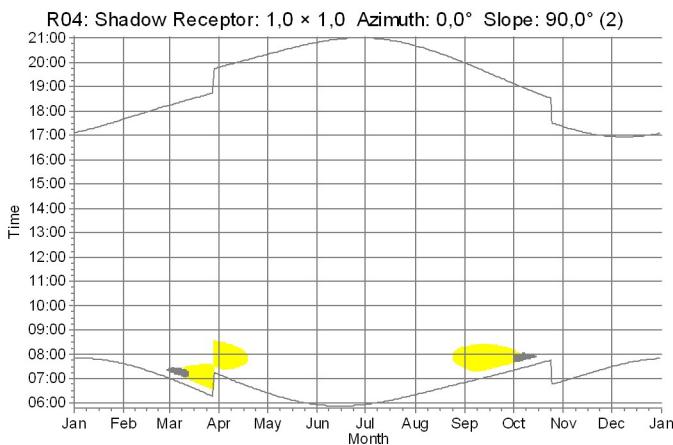
The WTG is always operating

|                     | January | February | March | April | May   | June  | July  | August | September | October | November | December |
|---------------------|---------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|
| 1                   | 07:49   | 07:35    | 07:00 | 07:09 | 06:23 | 05:54 | 05:55 | 06:19  | 06:50     | 07:19   | 06:54    | 07:28    |
|                     | 17:06   | 17:40    | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:08   | 17:21    | 16:57    |
| 2                   | 07:49   | 07:35    | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51     | 07:20   | 06:55    | 07:29    |
|                     | 17:07   | 17:41    | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20    | 16:56    |
| 3                   | 07:49   | 07:34    | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:22   | 06:56    | 07:30    |
|                     | 17:07   | 17:42    | 18:16 | 19:50 | 20:22 | 20:51 | 21:00 | 20:39  | 19:55     | 19:04   | 17:18    | 16:56    |
| 4                   | 07:49   | 07:32    | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:53     | 07:23   | 06:57    | 07:31    |
|                     | 17:08   | 17:44    | 18:17 | 19:51 | 20:23 | 20:51 | 21:00 | 20:38  | 19:53     | 19:03   | 17:17    | 16:56    |
| 5                   | 07:49   | 07:31    | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:54     | 07:24   | 06:58    | 07:32    |
|                     | 17:09   | 17:45    | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:37  | 19:51     | 19:01   | 17:16    | 16:56    |
| 6                   | 07:49   | 07:30    | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:54     | 07:25   | 07:00    | 07:33    |
|                     | 17:10   | 17:46    | 18:20 | 19:53 | 20:25 | 20:53 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15    | 16:56    |
| 7                   | 07:49   | 07:29    | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55     | 07:26   | 07:01    | 07:34    |
|                     | 17:11   | 17:47    | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14    | 16:56    |
| 8                   | 07:49   | 07:28    | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56     | 07:27   | 07:02    | 07:35    |
|                     | 17:12   | 17:49    | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13    | 16:55    |
| 9                   | 07:49   | 07:27    | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57     | 07:28   | 07:03    | 07:36    |
|                     | 17:13   | 17:50    | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12    | 16:55    |
| 10                  | 07:49   | 07:26    | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58     | 07:29   | 07:04    | 07:37    |
|                     | 17:14   | 17:51    | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11    | 16:56    |
| 11                  | 07:48   | 07:25    | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59     | 07:30   | 07:05    | 07:38    |
|                     | 17:15   | 17:52    | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10    | 16:56    |
| 12                  | 07:48   | 07:23    | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07    | 07:39    |
|                     | 17:16   | 17:54    | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09    | 16:56    |
| 13                  | 07:48   | 07:22    | 06:41 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01     | 07:32   | 07:08    | 07:39    |
|                     | 17:17   | 17:55    | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08    | 16:56    |
| 14                  | 07:47   | 07:21    | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09    | 07:40    |
|                     | 17:18   | 17:56    | 18:29 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07    | 16:56    |
| 15                  | 07:47   | 07:20    | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10    | 07:41    |
|                     | 17:19   | 17:57    | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06    | 16:56    |
| 16                  | 07:47   | 07:18    | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11    | 07:42    |
|                     | 17:21   | 17:58    | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43   | 17:05    | 16:56    |
| 17                  | 07:46   | 07:17    | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05     | 07:36   | 07:13    | 07:42    |
|                     | 17:22   | 18:00    | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:04    | 16:57    |
| 18                  | 07:46   | 07:16    | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:38   | 07:14    | 07:43    |
|                     | 17:23   | 18:01    | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30     | 18:40   | 17:04    | 16:57    |
| 19                  | 07:45   | 07:14    | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15    | 07:44    |
|                     | 17:24   | 18:02    | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39   | 17:03    | 16:57    |
| 20                  | 07:45   | 07:13    | 06:29 | 06:39 | 06:02 | 05:51 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16    | 07:44    |
|                     | 17:25   | 18:03    | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37   | 17:02    | 16:58    |
| 21                  | 07:44   | 07:11    | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17    | 07:45    |
|                     | 17:26   | 18:04    | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:01    | 16:58    |
| 22                  | 07:43   | 07:10    | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42   | 07:18    | 07:45    |
|                     | 17:28   | 18:06    | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:34   | 17:01    | 16:59    |
| 23                  | 07:43   | 07:09    | 06:24 | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11     | 07:43   | 07:20    | 07:46    |
|                     | 17:29   | 18:07    | 18:38 | 20:11 | 20:42 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33   | 17:00    | 16:59    |
| 24                  | 07:42   | 07:07    | 06:22 | 06:33 | 05:59 | 05:52 | 06:11 | 06:42  | 07:12     | 07:44   | 07:21    | 07:46    |
|                     | 17:30   | 18:08    | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32   | 17:00    | 17:00    |
| 25                  | 07:41   | 07:06    | 06:21 | 06:31 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13     | 07:45   | 07:22    | 07:47    |
|                     | 17:31   | 18:09    | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 17:30   | 16:59    | 17:00    |
| 26                  | 07:41   | 07:04    | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 07:46   | 07:23    | 07:47    |
|                     | 17:32   | 18:10    | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29   | 16:59    | 17:01    |
| 27                  | 07:40   | 07:03    | 06:17 | 06:29 | 05:57 | 05:53 | 06:14 | 06:45  | 07:15     | 07:48   | 07:24    | 07:47    |
|                     | 17:34   | 18:12    | 18:43 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:27   | 16:58    | 17:02    |
| 28                  | 07:39   | 07:01    | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16     | 07:49   | 07:25    | 07:48    |
|                     | 17:35   | 18:13    | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26   | 16:58    | 17:02    |
| 29                  | 07:38   |          | 07:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 06:50   | 07:26    | 07:48    |
|                     | 17:36   |          | 19:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57    | 17:03    |
| 30                  | 07:37   |          | 07:12 | 06:25 | 05:55 | 05:55 | 06:17 | 06:48  | 07:18     | 06:51   | 07:27    | 07:48    |
|                     | 17:37   |          | 19:46 | 20:19 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:23   | 16:57    | 17:04    |
| 31                  | 07:36   |          | 07:11 |       | 05:55 |       | 06:18 | 06:49  |           | 06:52   |          | 07:49    |
|                     | 17:39   |          | 19:47 |       | 20:48 |       | 20:42 | 20:00  |           | 17:22   |          | 17:05    |
| Potential sun hours | 298     | 297      | 369   | 399   | 448   | 452   | 459   | 428    | 375       | 345     | 298      | 288      |
| Total, worst case   |         |          |       |       |       |       |       |        |           |         |          |          |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar, graphical



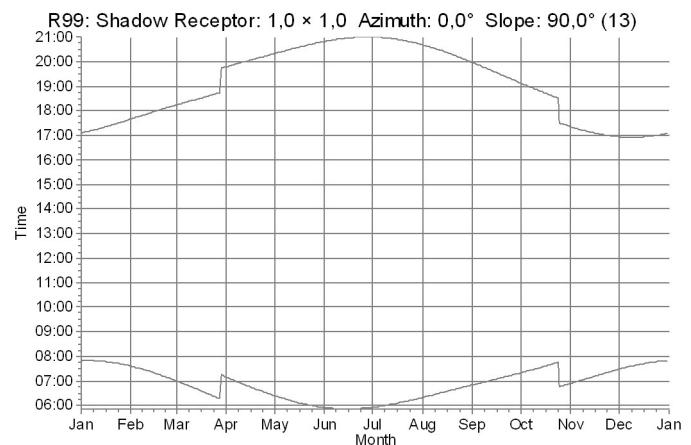
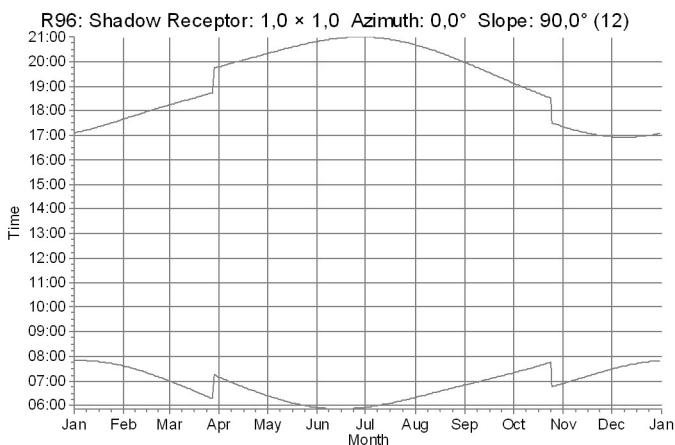
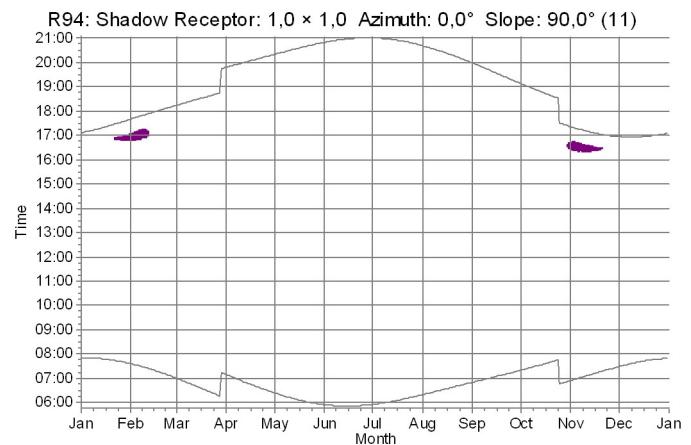
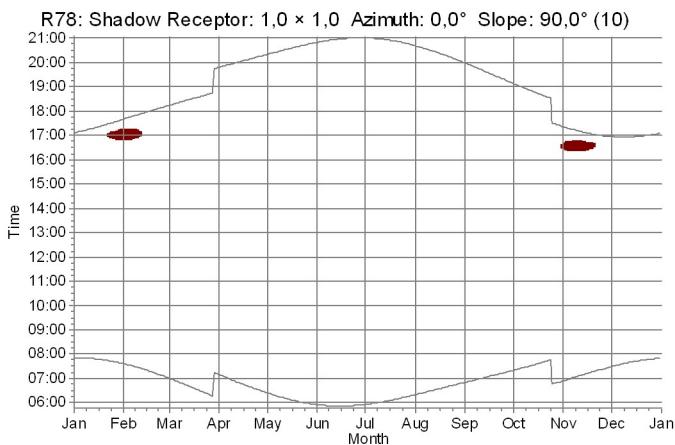
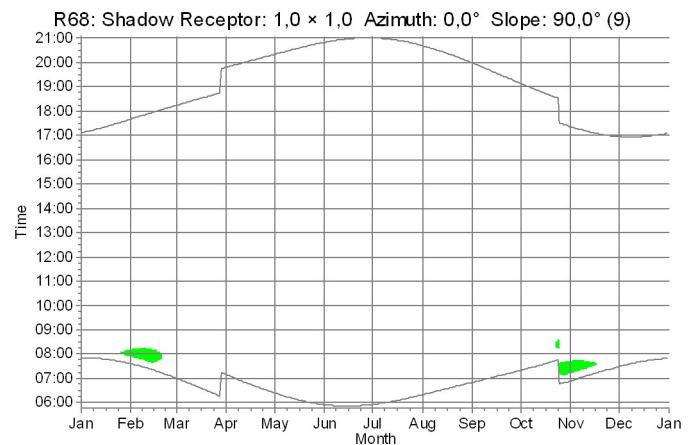
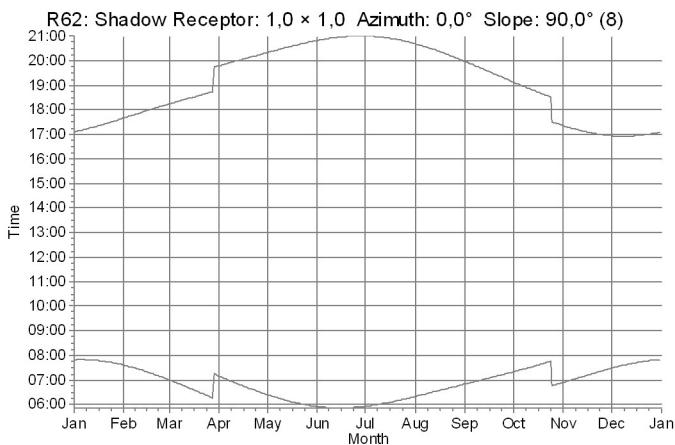
WTGs



- GA01: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
- GA02: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)
- GA03: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- GA04: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

- GA05: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
- GA06: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
- GA07: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)

## SHADOW - Calendar, graphical



WTGs



GA08: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)  
GA09: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (21)



GA11: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (23)

## SHADOW - Calendar per WTG

WTG: GA01 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 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                           | 07:49   | 07:36    | 07:00 | 07:09          | 06:24 | 05:55 | 05:55 | 06:19  | 06:50     | 07:20          | 18:35-18:46/11 | 06:54    |
|                             | 17:06   | 17:40    | 18:14 | 19:48          | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:08          |                | 16:57    |
| 2                           | 07:49   | 07:35    | 06:58 | 07:08          | 06:22 | 05:54 | 05:56 | 06:20  | 06:51     | 07:21          | 18:35-18:44/9  | 06:55    |
|                             | 17:07   | 17:41    | 18:15 | 19:49          | 20:21 | 20:50 | 21:00 | 20:40  | 19:57     | 19:06          |                | 16:57    |
| 3                           | 07:49   | 07:34    | 06:57 | 07:06          | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:22          | 18:35-18:42/7  | 06:56    |
|                             | 17:08   | 17:43    | 18:16 | 19:50          | 20:22 | 20:51 | 21:00 | 20:39  | 19:55     | 19:04          |                | 16:56    |
| 4                           | 07:49   | 07:33    | 06:55 | 07:04          | 06:20 | 05:54 | 05:57 | 06:22  | 06:53     | 07:23          | 18:35-18:40/5  | 06:57    |
|                             | 17:09   | 17:44    | 18:18 | 19:51          | 20:23 | 20:51 | 21:00 | 20:38  | 19:53     | 19:03          |                | 16:56    |
| 5                           | 07:49   | 07:32    | 06:54 | 07:03          | 06:18 | 05:53 | 05:57 | 06:23  | 06:54     | 07:24          | 18:36-18:39/3  | 06:58    |
|                             | 17:10   | 17:45    | 18:19 | 19:52          | 20:24 | 20:52 | 20:59 | 20:37  | 19:52     | 19:01          |                | 16:56    |
| 6                           | 07:49   | 07:30    | 06:52 | 07:01          | 06:17 | 05:53 | 05:58 | 06:24  | 06:55     | 07:25          |                | 07:00    |
|                             | 17:10   | 17:46    | 18:20 | 19:53          | 20:25 | 20:53 | 20:59 | 20:35  | 19:50     | 18:59          |                | 16:56    |
| 7                           | 07:49   | 07:29    | 06:50 | 06:59          | 06:16 | 05:53 | 05:59 | 06:25  | 06:56     | 07:26          |                | 07:01    |
|                             | 17:11   | 17:48    | 18:21 | 19:54          | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58          |                | 16:56    |
| 8                           | 07:49   | 07:28    | 06:49 | 18:00-18:01/1  | 06:58 | 06:15 | 05:52 | 05:59  | 06:26     | 06:57          | 07:27          |          |
|                             | 17:12   | 17:49    | 18:22 | 19:55          | 20:27 | 20:54 | 20:58 | 20:33  | 19:47     | 18:56          |                | 16:56    |
| 9                           | 07:49   | 07:27    | 06:47 | 17:58-18:02/4  | 06:56 | 06:14 | 05:52 | 06:00  | 06:27     | 06:58          | 07:28          |          |
|                             | 17:13   | 17:50    | 18:23 | 19:56          | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:55          |                | 16:56    |
| 10                          | 07:49   | 07:26    | 06:46 | 17:57-18:03/6  | 06:54 | 06:13 | 05:52 | 06:01  | 06:28     | 06:59          | 07:29          |          |
|                             | 17:14   | 17:51    | 18:24 | 19:58          | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53          |                | 16:56    |
| 11                          | 07:48   | 07:25    | 06:44 | 17:56-18:05/9  | 06:53 | 06:12 | 05:52 | 06:01  | 06:29     | 07:00          | 07:30          |          |
|                             | 17:15   | 17:53    | 18:25 | 19:59          | 20:30 | 20:56 | 20:57 | 20:29  | 19:42     | 18:51          |                | 16:56    |
| 12                          | 07:48   | 07:23    | 06:42 | 17:56-18:05/9  | 06:51 | 06:10 | 05:52 | 06:02  | 06:30     | 07:01          | 07:31          |          |
|                             | 17:17   | 17:54    | 18:27 | 20:00          | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50          |                | 16:56    |
| 13                          | 07:48   | 07:22    | 06:41 | 17:55-18:06/11 | 06:50 | 06:09 | 05:52 | 06:03  | 06:31     | 07:02          | 07:32          |          |
|                             | 17:18   | 17:55    | 18:28 | 20:01          | 20:32 | 20:57 | 20:56 | 20:27  | 19:38     | 18:48          |                | 16:56    |
| 14                          | 07:48   | 07:21    | 06:39 | 17:56-18:08/12 | 06:48 | 06:08 | 05:51 | 06:03  | 06:32     | 07:03          | 07:33          |          |
|                             | 17:19   | 17:56    | 18:29 | 20:02          | 20:33 | 20:57 | 20:56 | 20:25  | 19:37     | 18:47          |                | 16:56    |
| 15                          | 07:47   | 07:20    | 06:37 | 17:55-18:09/14 | 06:47 | 06:07 | 05:51 | 06:04  | 06:33     | 07:04          | 07:34          |          |
|                             | 17:20   | 17:57    | 18:30 | 20:03          | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45          |                | 16:57    |
| 16                          | 07:47   | 07:18    | 06:36 | 17:56-18:09/13 | 06:45 | 06:06 | 05:51 | 06:05  | 06:34     | 07:05          | 07:35          |          |
|                             | 17:21   | 17:59    | 18:31 | 20:04          | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:44          |                | 16:57    |
| 17                          | 07:46   | 07:17    | 06:34 | 17:57-18:11/14 | 06:44 | 06:05 | 05:51 | 06:06  | 06:35     | 07:06          | 07:37          |          |
|                             | 17:22   | 18:00    | 18:32 | 20:05          | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42          |                | 16:57    |
| 18                          | 07:46   | 07:16    | 06:32 | 17:59-18:08/9  | 06:42 | 06:05 | 05:52 | 06:07  | 06:36     | 07:07          | 07:38          |          |
|                             | 17:23   | 18:01    | 18:33 | 20:06          | 20:37 | 20:58 | 20:53 | 20:20  | 19:30     | 18:41          |                | 16:57    |
| 19                          | 07:45   | 07:14    | 06:31 | 06:40          | 06:04 | 05:52 | 06:07 | 06:37  | 07:08     | 07:39          |                | 07:15    |
|                             | 17:24   | 18:02    | 18:34 | 20:07          | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39          |                | 16:58    |
| 20                          | 07:45   | 07:13    | 06:29 | 06:39          | 06:03 | 05:52 | 06:08 | 06:38  | 07:09     | 07:40          |                | 07:16    |
|                             | 17:26   | 18:04    | 18:35 | 20:08          | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:38          |                | 16:58    |
| 21                          | 07:44   | 07:12    | 06:27 | 06:37          | 06:02 | 05:52 | 06:09 | 06:39  | 07:10     | 07:41          |                | 07:17    |
|                             | 17:27   | 18:05    | 18:36 | 20:09          | 20:40 | 20:59 | 20:51 | 20:15  | 19:25     | 18:36          |                | 16:59    |
| 22                          | 07:44   | 07:10    | 06:26 | 06:36          | 06:01 | 05:52 | 06:10 | 06:40  | 07:11     | 07:42          |                | 07:18    |
|                             | 17:28   | 18:06    | 18:37 | 20:10          | 20:41 | 21:00 | 20:50 | 20:14  | 19:23     | 18:35          |                | 16:59    |
| 23                          | 07:43   | 07:09    | 06:24 | 06:35          | 06:00 | 05:52 | 06:11 | 06:41  | 07:12     | 07:43          |                | 07:20    |
|                             | 17:29   | 18:07    | 18:38 | 20:11          | 20:42 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33          |                | 17:00    |
| 24                          | 07:42   | 07:07    | 06:22 | 06:33          | 06:00 | 05:53 | 06:12 | 06:42  | 07:13     | 07:44          |                | 07:21    |
|                             | 17:30   | 18:08    | 18:39 | 20:12          | 20:42 | 21:00 | 20:49 | 20:11  | 19:20     | 18:32          |                | 17:00    |
| 25                          | 07:41   | 07:06    | 06:21 | 06:32          | 05:59 | 05:53 | 06:13 | 06:43  | 07:14     | 18:43-18:49/6  | 06:46          |          |
|                             | 17:32   | 18:09    | 18:41 | 20:13          | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 17:30          |                | 16:59    |
| 26                          | 07:41   | 07:04    | 06:19 | 06:30          | 05:58 | 05:53 | 06:14 | 06:44  | 07:15     | 18:39-18:51/12 | 06:47          |          |
|                             | 17:33   | 18:11    | 18:42 | 20:14          | 20:44 | 21:00 | 20:47 | 20:08  | 19:16     | 17:29          |                | 17:01    |
| 27                          | 07:40   | 07:03    | 06:17 | 06:29          | 05:58 | 05:54 | 06:14 | 06:45  | 07:16     | 18:38-18:51/13 | 06:48          |          |
|                             | 17:34   | 18:12    | 18:43 | 20:15          | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:28          |                | 17:02    |
| 28                          | 07:39   | 07:01    | 06:16 | 06:28          | 05:57 | 05:54 | 06:15 | 06:46  | 07:17     | 18:36-18:50/14 | 06:49          |          |
|                             | 17:35   | 18:13    | 18:44 | 20:17          | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26          |                | 17:03    |
| 29                          | 07:38   | 07:14    | 06:14 | 06:26          | 05:56 | 05:54 | 06:16 | 06:47  | 07:18     | 18:35-18:48/13 | 06:50          |          |
|                             | 17:36   | 18:15    | 18:45 | 20:18          | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25          |                | 17:03    |
| 30                          | 07:37   | 07:12    | 06:12 | 06:25          | 05:56 | 05:55 | 06:17 | 06:48  | 07:19     | 18:34-18:46/12 | 06:51          |          |
|                             | 17:38   | 18:16    | 18:46 | 20:19          | 20:48 | 21:00 | 20:43 | 20:01  | 19:09     | 17:24          |                | 17:04    |
| 31                          | 07:37   | 07:11    | 06:11 | 05:55          | 05:55 | 06:18 | 06:49 |        |           | 17:22          |                | 17:05    |
|                             | 17:39   | 18:17    | 18:47 | 20:48          | 20:48 | 20:42 | 20:00 |        |           |                |                |          |
| Potential sun hours         | 298     | 297      | 369   | 399            | 448   | 452   | 459   | 428    | 375       | 345            | 298            | 288      |
| Sum of minutes with flicker | 0       | 0        | 102   | 0              | 0     | 0     | 0     | 0      | 70        | 35             | 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

WTG: GA02 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)

### 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                           | 07:49   | 07:35    | 07:00 | 07:09 07:28-08:29/61 | 06:23                | 05:55 | 06:19 | 06:50 07:27-08:16/49 | 07:20 07:40-08:07/27 | 06:54                | 07:28                |          |       |
| 17:06                       | 17:40   | 18:14    | 19:48 | 20:20                | 20:49                | 21:00 | 20:41 | 19:58                | 19:08                | 17:21                | 16:57                |          |       |
| 2                           | 07:49   | 07:35    | 06:58 | 07:07 07:26-08:28/62 | 06:22                | 05:54 | 05:56 | 06:20                | 06:51 07:24-08:16/52 | 07:21 07:41-08:05/24 | 06:55                | 07:29    |       |
| 17:07                       | 17:41   | 18:15    | 19:49 | 20:21                | 20:50                | 21:00 | 20:40 | 19:56                | 19:06                | 17:20                | 16:57                |          |       |
| 3                           | 07:49   | 07:34    | 06:57 | 07:06 07:24-08:27/63 | 06:21                | 05:54 | 05:56 | 06:21                | 06:52 07:23-08:17/54 | 07:22 07:42-08:03/21 | 06:56                | 07:30    |       |
| 17:08                       | 17:43   | 18:16    | 19:50 | 20:22                | 20:50                | 21:00 | 20:39 | 19:55                | 19:04                | 17:19                | 16:56                |          |       |
| 4                           | 07:49   | 07:33    | 06:55 | 07:04 07:23-08:26/63 | 06:20                | 05:54 | 05:57 | 06:22                | 06:53 07:22-08:18/56 | 07:23 07:43-08:01/18 | 06:57                | 07:31    |       |
| 17:09                       | 17:44   | 18:17    | 19:51 | 20:23                | 20:51                | 20:59 | 20:38 | 19:53                | 19:03                | 17:18                | 16:56                |          |       |
| 5                           | 07:49   | 07:31    | 06:54 | 07:03 07:23-08:25/62 | 06:18                | 05:53 | 05:57 | 06:23                | 06:54 07:21-08:19/58 | 07:24 07:44-07:58/14 | 06:58                | 07:32    |       |
| 17:09                       | 17:45   | 18:19    | 19:52 | 20:24                | 20:52                | 20:59 | 20:37 | 19:52                | 19:01                | 17:16                | 16:56                |          |       |
| 6                           | 07:49   | 07:30    | 06:52 | 07:11-07:13/12       | 07:01 07:23-08:23/60 | 06:17 | 05:53 | 05:58                | 06:24                | 06:55 07:19-08:19/60 | 07:25 07:45-07:55/10 | 07:00    | 07:33 |
| 17:10                       | 17:46   | 18:20    | 19:53 | 20:25                | 20:53                | 20:59 | 20:35 | 19:50                | 18:59                | 17:15                | 16:56                |          |       |
| 7                           | 07:49   | 07:29    | 06:50 | 07:09-07:17/8        | 06:59 07:25-08:23/58 | 06:16 | 05:53 | 05:59                | 06:25                | 06:56 07:18-08:20/62 | 07:26 07:46-07:51/5  | 07:01    | 07:34 |
| 17:11                       | 17:48   | 18:21    | 19:54 | 20:26                | 20:53                | 20:59 | 20:34 | 19:48                | 18:58                | 17:14                | 16:56                |          |       |
| 8                           | 07:49   | 07:28    | 06:49 | 07:08-07:20/12       | 06:58 07:25-08:21/56 | 06:15 | 05:52 | 05:59                | 06:26                | 06:57 07:18-08:20/62 | 07:27                | 07:02    | 07:35 |
| 17:12                       | 17:49   | 18:22    | 19:55 | 20:27                | 20:54                | 20:58 | 20:33 | 19:47                | 18:56                | 17:13                | 16:56                |          |       |
| 9                           | 07:49   | 07:27    | 06:47 | 07:06-07:22/16       | 06:56 07:26-08:20/54 | 06:14 | 05:52 | 06:00                | 06:27                | 06:58 07:18-08:21/63 | 07:28                | 07:03    | 07:36 |
| 17:13                       | 17:50   | 18:23    | 19:56 | 20:28                | 20:54                | 20:58 | 20:32 | 19:45                | 18:55                | 17:12                | 16:56                |          |       |
| 10                          | 07:49   | 07:26    | 06:46 | 07:04-07:24/20       | 06:54 07:26-08:18/52 | 06:13 | 05:52 | 06:01                | 06:28                | 06:59 07:19-08:21/62 | 07:29                | 07:04    | 07:37 |
| 17:14                       | 17:51   | 18:24    | 19:57 | 20:29                | 20:55                | 20:58 | 20:30 | 19:43                | 18:53                | 17:11                | 16:56                |          |       |
| 11                          | 07:48   | 07:25    | 06:44 | 07:03-07:26/23       | 06:53 07:27-08:16/49 | 06:11 | 05:52 | 06:01                | 06:29                | 07:00 07:20-08:21/61 | 07:30                | 07:05    | 07:38 |
| 17:15                       | 17:53   | 18:25    | 19:59 | 20:30                | 20:55                | 20:57 | 20:29 | 19:42                | 18:51                | 17:10                | 16:56                |          |       |
| 12                          | 07:48   | 07:23    | 06:42 | 07:01-07:27/26       | 06:51 07:29-08:15/46 | 06:10 | 05:52 | 06:02                | 06:30                | 07:01 07:21-08:21/60 | 07:31                | 07:07    | 07:39 |
| 17:16                       | 17:54   | 18:26    | 20:00 | 20:31                | 20:56                | 20:57 | 20:28 | 19:40                | 18:50                | 17:09                | 16:56                |          |       |
| 13                          | 07:48   | 07:22    | 06:41 | 06:59-07:28/29       | 06:50 07:30-08:13/43 | 06:09 | 05:52 | 06:03                | 06:31                | 07:02 07:22-08:21/59 | 07:32                | 07:08    | 07:39 |
| 17:18                       | 17:55   | 18:28    | 20:01 | 20:32                | 20:56                | 20:56 | 20:26 | 19:38                | 18:48                | 17:08                | 16:56                |          |       |
| 14                          | 07:47   | 07:21    | 06:39 | 06:58-07:29/31       | 06:48 07:32-08:11/39 | 06:08 | 05:51 | 06:03                | 06:32                | 07:03 07:23-08:21/58 | 07:33                | 07:09    | 07:40 |
| 17:19                       | 17:56   | 18:29    | 20:02 | 20:33                | 20:57                | 20:56 | 20:25 | 19:36                | 18:47                | 17:07                | 16:56                |          |       |
| 15                          | 07:47   | 07:20    | 06:37 | 06:56-07:30/34       | 06:47 07:33-08:08/35 | 06:07 | 05:51 | 06:04                | 06:33                | 07:04 07:24-08:21/57 | 07:34                | 07:10    | 07:41 |
| 17:20                       | 17:57   | 18:30    | 20:03 | 20:34                | 20:57                | 20:55 | 20:24 | 19:35                | 18:45                | 17:06                | 16:57                |          |       |
| 16                          | 07:47   | 07:18    | 06:36 | 06:54-07:30/36       | 06:45 07:36-08:06/30 | 06:06 | 05:51 | 06:05                | 06:34                | 07:05 07:25-08:21/56 | 07:35                | 07:11    | 07:42 |
| 17:21                       | 17:59   | 18:31    | 20:04 | 20:35                | 20:58                | 20:55 | 20:22 | 19:33                | 18:43                | 17:05                | 16:57                |          |       |
| 17                          | 07:46   | 07:17    | 06:34 | 06:53-07:31/38       | 06:43 07:38-08:02/24 | 06:05 | 05:51 | 06:06                | 06:35                | 07:06 07:26-08:20/54 | 07:37                | 07:13    | 07:42 |
| 17:22                       | 18:00   | 18:32    | 20:05 | 20:36                | 20:58                | 20:54 | 20:21 | 19:31                | 18:42                | 17:05                | 16:57                |          |       |
| 18                          | 07:46   | 07:16    | 06:32 | 06:51-07:31/40       | 06:42 07:42-07:58/16 | 06:04 | 05:52 | 06:07                | 06:36                | 07:06 07:27-08:20/53 | 07:38                | 07:14    | 07:43 |
| 17:23                       | 18:01   | 18:33    | 20:06 | 20:37                | 20:58                | 20:53 | 20:20 | 19:30                | 18:40                | 17:04                | 16:57                |          |       |
| 19                          | 07:45   | 07:14    | 06:31 | 06:49-07:31/42       | 06:40 06:04          | 05:52 | 06:07 | 06:37                | 07:07 07:28-08:20/52 | 07:39                | 07:15                | 07:44    |       |
| 17:24                       | 18:02   | 18:34    | 20:07 | 20:38                | 20:59                | 20:53 | 20:18 | 19:28                | 18:39                | 17:03                | 16:58                |          |       |
| 20                          | 07:45   | 07:13    | 06:29 | 06:48-07:32/44       | 06:39                | 06:03 | 05:52 | 06:08                | 06:38                | 07:08 07:29-08:19/50 | 07:40                | 07:16    | 07:44 |
| 17:25                       | 18:03   | 18:35    | 20:08 | 20:39                | 20:59                | 20:52 | 20:17 | 19:26                | 18:37                | 17:02                | 16:58                |          |       |
| 21                          | 07:44   | 07:11    | 06:27 | 06:46-07:32/46       | 06:37                | 06:02 | 05:52 | 06:09                | 06:39                | 07:09 07:30-08:18/48 | 07:41                | 07:17    | 07:45 |
| 17:27                       | 18:05   | 18:36    | 20:09 | 20:40                | 20:59                | 20:51 | 20:15 | 19:25                | 18:36                | 17:02                | 16:59                |          |       |
| 22                          | 07:43   | 07:10    | 06:26 | 06:44-07:32/48       | 06:36                | 06:01 | 05:52 | 06:10                | 06:40                | 07:10 07:31-08:18/47 | 07:42                | 07:18    | 07:45 |
| 17:28                       | 18:06   | 18:37    | 20:10 | 20:41                | 20:59                | 20:50 | 20:14 | 19:23                | 18:35                | 17:01                | 16:59                |          |       |
| 23                          | 07:43   | 07:09    | 06:24 | 06:43-07:33/50       | 06:35                | 06:00 | 05:52 | 06:11                | 06:41                | 07:11 07:32-08:17/45 | 07:43                | 07:20    | 07:46 |
| 17:29                       | 18:07   | 18:38    | 20:11 | 20:42                | 21:00                | 20:50 | 20:12 | 19:21                | 18:33                | 17:01                | 17:00                |          |       |
| 24                          | 07:42   | 07:07    | 06:22 | 06:41-07:32/51       | 06:33                | 06:00 | 05:53 | 06:12                | 06:42                | 07:12 07:33-08:16/43 | 07:44                | 07:21    | 07:46 |
| 17:30                       | 18:08   | 18:39    | 20:12 | 20:42                | 21:00                | 20:49 | 20:11 | 19:19                | 18:32                | 17:00                | 17:00                |          |       |
| 25                          | 07:41   | 07:06    | 06:21 | 06:41-07:32/53       | 06:32                | 05:59 | 05:53 | 06:13                | 06:43 07:45-08:02/17 | 07:13 07:34-08:15/41 | 06:45                | 07:22    | 07:47 |
| 17:31                       | 18:09   | 18:41    | 20:13 | 20:43                | 21:00                | 20:48 | 20:09 | 19:18                | 18:30                | 17:30                | 16:59                |          |       |
| 26                          | 07:41   | 07:04    | 06:19 | 06:38-07:32/54       | 06:30                | 05:58 | 05:53 | 06:13                | 06:44 07:40-08:06/26 | 07:14 07:35-08:14/39 | 06:47                | 07:23    | 07:47 |
| 17:33                       | 18:11   | 18:42    | 20:14 | 20:44                | 21:00                | 20:47 | 20:08 | 19:16                | 18:33                | 17:29                | 16:59                |          |       |
| 27                          | 07:40   | 07:03    | 06:17 | 06:36-07:31/55       | 06:29                | 05:58 | 05:54 | 06:14                | 06:45 07:37-08:08/31 | 07:15 07:36-08:13/37 | 06:48                | 07:24    | 07:47 |
| 17:34                       | 18:12   | 18:43    | 20:15 | 20:45                | 21:00                | 20:46 | 20:06 | 19:14                | 18:28                | 16:58                | 17:02                |          |       |
| 28                          | 07:39   | 07:01    | 06:16 | 06:34-07:31/57       | 06:27                | 05:57 | 05:54 | 06:15                | 06:46 07:35-08:11/36 | 07:17 07:37-08:12/35 | 06:49                | 07:25    | 07:48 |
| 17:35                       | 18:13   | 18:44    | 20:16 | 20:46                | 21:00                | 20:45 | 20:04 | 19:13                | 18:26                | 16:58                | 17:03                |          |       |
| 29                          | 07:38   | 07:01    | 07:14 | 07:33-08:31/58       | 06:26                | 05:56 | 05:54 | 06:16                | 06:47 07:32-08:12/40 | 07:18 07:38-08:10/32 | 06:50                | 07:26    | 07:48 |
| 17:36                       | 18:14   | 18:45    | 20:18 | 20:47                | 21:00                | 20:44 | 20:03 | 19:11                | 18:25                | 17:25                | 16:58                |          |       |
| 30                          | 07:37   | 07:01    | 07:12 | 07:31-08:30/59       | 06:25                | 05:56 | 05:55 | 06:17                | 06:48 07:30-08:14/44 | 07:19 07:39-08:09/30 | 06:51                | 07:27    | 07:48 |
| 17:38                       | 18:15   | 18:46    | 20:19 | 20:47                | 21:00                | 20:43 | 20:01 | 19:09                | 17:24                | 16:57                | 17:04                |          |       |
| 31                          | 07:36   | 07:01    | 07:11 | 07:29-08:29/60       | 05:55                | 05:55 | 06:18 | 06:49 07:29-08:15/46 | 06:52                | 07:22                | 07:49                |          |       |
| 17:39                       | 18:16   | 18:47    | 20:18 | 20:48                | 20:42                | 20:00 | 17:22 | 17:22                | 17:05                | 0                    | 0                    |          |       |
| Potential sun hours         | 298     | 297      | 369   | 399                  | 448                  | 452   | 459   | 428                  | 375                  | 345                  | 298                  | 288      |       |
| Sum of minutes with flicker | 0       | 0        | 992   | 873                  | 0                    | 0     | 0     | 240                  | 1535                 | 119                  | 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

WTG: GA03 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)

### 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                           | 07:49   | 07:36    | 07:00 | 07:09 18:22-19:17/55 | 06:23 | 05:55          | 05:55 | 06:19                | 06:50 19:20-19:35/15 | 07:20                | 06:54    | 07:28    |       |
|                             | 17:06   | 17:40    | 18:14 | 19:48                | 20:20 | 20:49          | 21:00 | 20:41                | 19:58 18:24-19:07/43 | 19:08                | 17:21    | 16:57    |       |
| 2                           | 07:49   | 07:35    | 06:58 | 07:07 19:25-19:28/3  | 06:22 | 05:54          | 05:56 | 06:20                | 06:51 19:18-19:34/16 | 07:21                | 06:55    | 07:29    |       |
|                             | 17:07   | 17:41    | 18:15 | 19:49 18:22-19:16/54 | 20:21 | 20:50          | 21:00 | 20:40                | 19:56 18:22-19:08/46 | 19:06                | 17:20    | 16:57    |       |
| 3                           | 07:49   | 07:34    | 06:57 | 07:06 19:23-19:28/5  | 06:21 | 05:54          | 05:56 | 06:21                | 06:52 19:18-19:32/14 | 07:22                | 06:56    | 07:30    |       |
|                             | 17:08   | 17:43    | 18:16 | 19:50 18:22-19:16/54 | 20:22 | 20:50          | 21:00 | 20:39                | 19:55 18:21-19:08/47 | 19:04                | 17:19    | 16:56    |       |
| 4                           | 07:49   | 07:33    | 06:55 | 07:04 19:22-19:30/8  | 06:20 | 05:53          | 05:57 | 06:22                | 06:53 19:17-19:31/14 | 07:23                | 06:57    | 07:31    |       |
|                             | 17:09   | 17:44    | 18:17 | 19:51 18:22-19:16/54 | 20:23 | 20:51          | 20:59 | 20:38                | 19:53 18:20-19:09/49 | 19:03                | 17:18    | 16:56    |       |
| 5                           | 07:49   | 07:31    | 06:54 | 07:03 19:21-19:31/10 | 06:18 | 05:53          | 05:57 | 06:23                | 06:54 19:16-19:29/13 | 07:24                | 06:58    | 07:32    |       |
|                             | 17:09   | 17:45    | 18:19 | 19:52 18:22-19:15/53 | 20:24 | 20:52          | 20:59 | 20:37                | 19:52 18:19-19:09/50 | 19:01                | 17:16    | 16:56    |       |
| 6                           | 07:49   | 07:30    | 06:52 | 07:01 19:20-19:31/11 | 06:17 | 05:53          | 05:58 | 06:24                | 06:55 19:16-19:28/12 | 07:25                | 07:00    | 07:33    |       |
|                             | 17:10   | 17:46    | 18:20 | 19:53 18:22-19:13/51 | 20:25 | 20:53          | 20:59 | 20:35                | 19:50 18:18-19:10/52 | 18:59                | 17:15    | 16:56    |       |
| 7                           | 07:49   | 07:29    | 06:50 | 06:59 19:20-19:33/13 | 06:16 | 05:53          | 05:59 | 06:25                | 06:56 19:16-19:26/10 | 07:26                | 07:01    | 07:34    |       |
|                             | 17:11   | 17:48    | 18:21 | 19:54 18:23-19:13/50 | 20:26 | 20:53          | 20:59 | 20:34                | 19:48 18:17-19:10/53 | 18:58                | 17:14    | 16:56    |       |
| 8                           | 07:49   | 07:28    | 06:49 | 06:58 19:20-19:34/14 | 06:15 | 05:52          | 05:59 | 06:26                | 06:57 19:16-19:24/8  | 07:27                | 07:02    | 07:35    |       |
|                             | 17:12   | 17:49    | 18:22 | 19:55 18:23-19:12/49 | 20:27 | 20:54          | 20:58 | 20:33                | 19:47 18:16-19:10/54 | 18:56                | 17:13    | 16:56    |       |
| 9                           | 07:49   | 07:27    | 06:47 | 06:56 19:20-19:34/14 | 06:14 | 05:52          | 06:00 | 06:27                | 06:58 19:17-19:23/6  | 07:28                | 07:03    | 07:36    |       |
|                             | 17:13   | 17:50    | 18:23 | 19:56 18:23-19:10/47 | 20:28 | 20:54          | 20:58 | 20:32                | 19:45 18:16-19:10/54 | 18:54                | 17:12    | 16:56    |       |
| 10                          | 07:49   | 07:26    | 06:46 | 06:54 19:20-19:36/16 | 06:13 | 05:52          | 06:00 | 06:28                | 06:59 19:18-19:21/3  | 07:29                | 07:04    | 07:37    |       |
|                             | 17:14   | 17:51    | 18:24 | 19:57 18:24-19:10/46 | 20:29 | 20:55          | 20:58 | 20:30                | 19:43 18:15-19:10/55 | 18:53                | 17:11    | 16:56    |       |
| 11                          | 07:48   | 07:25    | 06:44 | 06:53 19:21-19:36/15 | 06:11 | 05:52          | 06:01 | 06:29                | 07:00 18:15-19:09/54 | 07:30                | 07:05    | 07:38    |       |
|                             | 17:15   | 17:53    | 18:25 | 19:59 18:25-19:08/43 | 20:30 | 20:55          | 20:57 | 20:29                | 19:42                | 18:51                | 17:10    | 16:56    |       |
| 12                          | 07:48   | 07:23    | 06:42 | 06:51 19:22-19:36/14 | 06:10 | 05:52          | 06:02 | 06:30                | 07:01 18:14-19:09/55 | 07:31                | 07:07    | 07:39    |       |
|                             | 17:16   | 17:54    | 18:26 | 20:00 18:26-19:07/41 | 20:31 | 20:56          | 20:57 | 20:28                | 19:40                | 18:50                | 17:09    | 16:56    |       |
| 13                          | 07:48   | 07:22    | 06:41 | 06:50 19:24-19:33/9  | 06:09 | 05:51          | 06:03 | 06:31                | 07:02 18:14-19:09/55 | 07:32                | 07:08    | 07:39    |       |
|                             | 17:18   | 17:55    | 18:28 | 20:01 18:27-19:05/38 | 20:32 | 20:56          | 20:56 | 20:26                | 19:38                | 18:48                | 17:08    | 16:56    |       |
| 14                          | 07:47   | 07:21    | 06:39 | 06:39 17:48-18:01/13 | 06:48 | 05:51          | 06:03 | 06:32                | 07:03 18:14-19:08/54 | 07:33                | 07:09    | 07:40    |       |
|                             | 17:19   | 17:56    | 18:29 | 20:02                | 20:33 | 20:57          | 20:56 | 20:25                | 19:36                | 18:47                | 17:07    | 16:56    |       |
| 15                          | 07:47   | 07:20    | 06:37 | 06:37 17:43-18:05/22 | 06:47 | 18:30-19:01/31 | 06:07 | 06:33                | 07:04 18:13-19:08/55 | 07:34                | 07:10    | 07:41    |       |
|                             | 17:20   | 17:57    | 18:30 | 20:03                | 20:34 | 20:57          | 20:55 | 20:24                | 19:35                | 18:45                | 17:06    | 16:56    |       |
| 16                          | 07:47   | 07:18    | 06:36 | 06:36 17:39-18:08/29 | 06:45 | 18:33-18:59/26 | 06:06 | 06:34                | 07:05 18:13-19:07/54 | 07:35                | 07:11    | 07:42    |       |
|                             | 17:21   | 17:59    | 18:31 | 20:04                | 20:35 | 20:58          | 20:55 | 20:22                | 19:33                | 18:43                | 17:05    | 16:57    |       |
| 17                          | 07:46   | 07:17    | 06:34 | 06:34 17:38-18:11/33 | 06:43 | 18:35-18:56/21 | 06:05 | 06:35                | 07:05 18:13-19:06/53 | 07:37                | 07:13    | 07:42    |       |
|                             | 17:22   | 18:00    | 18:32 | 20:05                | 20:36 | 20:58          | 20:54 | 20:21                | 19:31                | 18:42                | 17:05    | 16:57    |       |
| 18                          | 07:46   | 07:16    | 06:32 | 06:32 17:35-18:12/37 | 06:42 | 18:39-18:52/13 | 06:04 | 06:36                | 07:06 18:13-19:06/53 | 07:38                | 07:14    | 07:43    |       |
|                             | 17:23   | 18:01    | 18:33 | 20:06                | 20:37 | 20:58          | 20:53 | 20:20                | 19:30                | 18:40                | 17:04    | 16:57    |       |
| 19                          | 07:45   | 07:14    | 06:31 | 06:31 17:33-18:13/40 | 06:40 | 06:04          | 05:52 | 06:37                | 07:07 18:14-19:05/51 | 07:39                | 07:15    | 07:44    |       |
|                             | 17:24   | 18:02    | 18:34 | 20:07                | 20:38 | 20:59          | 20:53 | 20:18                | 19:28                | 18:39                | 17:03    | 16:58    |       |
| 20                          | 07:45   | 07:13    | 06:29 | 06:29 17:32-18:15/43 | 06:39 | 06:03          | 05:52 | 06:38                | 07:08 18:14-19:03/49 | 07:40                | 07:16    | 07:44    |       |
|                             | 17:25   | 18:03    | 18:35 | 20:08                | 20:39 | 20:59          | 20:52 | 20:17                | 19:26                | 18:37                | 17:02    | 16:58    |       |
| 21                          | 07:44   | 07:11    | 06:27 | 06:27 17:30-18:15/45 | 06:37 | 06:02          | 05:52 | 06:39                | 07:09 18:13-19:01/48 | 07:41                | 07:17    | 07:45    |       |
|                             | 17:27   | 18:05    | 18:36 | 20:09                | 20:40 | 20:59          | 20:51 | 20:15                | 19:25                | 18:36                | 17:02    | 16:59    |       |
| 22                          | 07:43   | 07:10    | 06:26 | 06:26 17:28-18:16/48 | 06:36 | 06:01          | 05:52 | 06:40                | 07:10 18:14-19:00/46 | 07:42                | 07:18    | 07:45    |       |
|                             | 17:28   | 18:06    | 18:37 | 20:10                | 20:41 | 20:59          | 20:50 | 20:14                | 19:23                | 18:35                | 17:01    | 16:59    |       |
| 23                          | 07:43   | 07:09    | 06:24 | 06:24 17:28-18:17/49 | 06:35 | 06:00          | 05:52 | 06:41                | 07:11 18:15-18:58/43 | 07:43                | 07:20    | 07:46    |       |
|                             | 17:29   | 18:07    | 18:38 | 20:11                | 20:42 | 21:00          | 20:50 | 20:12                | 19:21                | 18:33                | 17:00    | 16:59    |       |
| 24                          | 07:42   | 07:07    | 06:22 | 06:22 17:26-18:17/51 | 06:33 | 06:00          | 05:53 | 06:42                | 07:12 18:16-18:57/41 | 07:44                | 07:21    | 07:46    |       |
|                             | 17:30   | 18:08    | 18:39 | 20:12                | 20:42 | 21:00          | 20:49 | 20:11                | 19:19                | 18:32                | 17:00    | 16:59    |       |
| 25                          | 07:41   | 07:06    | 06:21 | 06:21 17:25-18:17/52 | 06:32 | 05:59          | 05:53 | 06:13                | 06:43 18:41-18:56/15 | 07:13 18:17-18:55/38 | 06:45    | 07:22    | 07:47 |
|                             | 17:31   | 18:09    | 18:40 | 20:13                | 20:43 | 21:00          | 20:48 | 20:09                | 19:18                | 17:30                | 16:59    | 17:01    |       |
| 26                          | 07:41   | 07:04    | 06:19 | 06:19 17:25-18:18/53 | 06:30 | 05:58          | 05:53 | 06:13                | 06:44 18:37-18:59/22 | 07:14 18:18-18:53/35 | 06:47    | 07:23    | 07:47 |
|                             | 17:33   | 18:11    | 18:42 | 20:14                | 20:44 | 21:00          | 20:47 | 20:08                | 19:16                | 17:29                | 16:59    | 17:01    |       |
| 27                          | 07:40   | 07:03    | 06:17 | 06:17 17:24-18:18/54 | 06:29 | 05:58          | 05:54 | 06:14                | 06:45 18:34-19:02/28 | 07:15 18:20-18:50/30 | 06:48    | 07:24    | 07:47 |
|                             | 17:34   | 18:12    | 18:43 | 20:15                | 20:45 | 21:00          | 20:46 | 20:06                | 19:14                | 17:28                | 16:58    | 17:02    |       |
| 28                          | 07:39   | 07:01    | 06:16 | 06:16 17:23-18:17/54 | 06:27 | 05:57          | 05:54 | 06:15                | 06:46 18:32-19:03/31 | 07:16 18:22-18:47/25 | 06:49    | 07:25    | 07:48 |
|                             | 17:35   | 18:13    | 18:44 | 20:16                | 20:46 | 21:00          | 20:45 | 20:04                | 19:13                | 17:26                | 16:58    | 17:03    |       |
| 29                          | 07:38   | 07:00    | 07:14 | 07:14 18:23-19:18/55 | 06:26 | 05:56          | 05:54 | 06:16                | 06:47 18:30-19:05/35 | 07:18 18:26-18:43/17 | 06:50    | 07:26    | 07:48 |
|                             | 17:36   | 18:14    | 19:45 | 20:18                | 20:47 | 21:00          | 20:44 | 20:03                | 19:11                | 17:25                | 16:58    | 17:03    |       |
| 30                          | 07:37   | 07:02    | 07:12 | 07:12 18:23-19:18/55 | 06:25 | 05:56          | 05:55 | 06:17                | 06:48 19:24-19:33/9  | 07:19                | 06:51    | 07:27    | 07:48 |
|                             | 17:38   | 18:14    | 19:46 | 20:19                | 20:47 | 21:00          | 20:43 | 20:01 18:28-19:06/38 | 19:09                | 17:24                | 16:57    | 17:04    |       |
| 31                          | 07:36   | 07:01    | 07:11 | 07:11 18:22-19:17/55 | 06:24 | 05:55          | 06:18 | 06:49 19:21-19:35/14 | 06:52                | 07:22                | 17:22    | 17:05    |       |
|                             | 17:39   | 18:14    | 19:47 | 20:19                | 20:48 | 20:42          | 20:04 | 20:00 18:25-19:06/41 | 17:22                | 17:22                | 17:22    | 17:05    |       |
| Potential sun hours         | 298     | 297      | 369   | 399                  | 448   | 452            | 459   | 428                  | 375                  | 345                  | 298      | 288      |       |
| Sum of minutes with flicker | 0       | 0        | 788   | 893                  | 0     | 0              | 0     | 233                  | 1470                 | 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

WTG: GA04 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

### 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                           | 07:49   | 07:35    | 07:00 07:19-07:24/5  | 07:09 | 06:23 | 05:55 | 05:55 | 06:19  | 06:50     | 07:20 07:48-07:52/4  | 06:54    | 07:28    |
|                             | 17:06   | 17:40    | 18:14                | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:08                | 17:21    | 16:57    |
| 2                           | 07:49   | 07:34    | 06:58 07:17-07:24/7  | 07:07 | 06:22 | 05:54 | 05:56 | 06:20  | 06:51     | 07:21 07:43-07:56/13 | 06:55    | 07:29    |
|                             | 17:07   | 17:41    | 18:15                | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06                | 17:20    | 16:57    |
| 3                           | 07:49   | 07:33    | 06:57 07:16-07:25/9  | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:22 07:42-07:57/15 | 06:56    | 07:30    |
|                             | 17:08   | 17:43    | 18:16                | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04                | 17:19    | 16:56    |
| 4                           | 07:49   | 07:32    | 06:55 07:14-07:24/10 | 07:04 | 06:20 | 05:53 | 05:57 | 06:22  | 06:53     | 07:23 07:43-07:58/15 | 06:57    | 07:31    |
|                             | 17:09   | 17:44    | 18:17                | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:03                | 17:18    | 16:56    |
| 5                           | 07:49   | 07:31    | 06:53 07:12-07:24/12 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:54     | 07:24 07:44-07:59/15 | 06:58    | 07:32    |
|                             | 17:09   | 17:45    | 18:19                | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51     | 19:01                | 17:16    | 16:56    |
| 6                           | 07:49   | 07:30    | 06:52 07:11-07:24/13 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:55     | 07:25 07:45-07:59/14 | 06:59    | 07:33    |
|                             | 17:10   | 17:46    | 18:20                | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50     | 18:59                | 17:15    | 16:56    |
| 7                           | 07:49   | 07:29    | 06:50 07:09-07:23/14 | 06:59 | 06:16 | 05:53 | 05:59 | 06:25  | 06:56     | 07:26 07:46-08:00/14 | 07:01    | 07:34    |
|                             | 17:11   | 17:48    | 18:21                | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58                | 17:14    | 16:56    |
| 8                           | 07:49   | 07:28    | 06:49 07:08-07:23/15 | 06:58 | 06:15 | 05:52 | 05:59 | 06:26  | 06:57     | 07:27 07:47-07:59/12 | 07:02    | 07:35    |
|                             | 17:12   | 17:49    | 18:22                | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:47     | 18:56                | 17:13    | 16:56    |
| 9                           | 07:49   | 07:27    | 06:47 07:06-07:21/15 | 06:56 | 06:14 | 05:52 | 06:00 | 06:27  | 06:58     | 07:28 07:48-07:59/11 | 07:03    | 07:36    |
|                             | 17:13   | 17:50    | 18:23                | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54                | 17:12    | 16:56    |
| 10                          | 07:48   | 07:26    | 06:45 07:04-07:20/16 | 06:54 | 06:13 | 05:52 | 06:00 | 06:28  | 06:59     | 07:29 07:49-07:59/10 | 07:04    | 07:37    |
|                             | 17:14   | 17:51    | 18:24                | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53                | 17:11    | 16:56    |
| 11                          | 07:48   | 07:25    | 06:44 07:04-07:18/14 | 06:53 | 06:11 | 05:52 | 06:01 | 06:29  | 07:00     | 07:30 07:50-07:58/8  | 07:05    | 07:38    |
|                             | 17:15   | 17:52    | 18:25                | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51                | 17:10    | 16:56    |
| 12                          | 07:48   | 07:23    | 06:42 07:06-07:15/9  | 06:51 | 06:10 | 05:52 | 06:02 | 06:30  | 07:01     | 07:31 07:51-07:57/6  | 07:07    | 07:39    |
|                             | 17:16   | 17:54    | 18:26                | 20:00 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50                | 17:09    | 16:56    |
| 13                          | 07:48   | 07:22    | 06:41                | 06:09 | 05:51 | 06:03 | 06:31 | 07:02  | 07:32     | 07:52-07:56/4        | 07:08    | 07:39    |
|                             | 17:18   | 17:55    | 18:28                | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48                | 17:08    | 16:56    |
| 14                          | 07:47   | 07:21    | 06:39                | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:03     | 07:33 07:54-07:55/1  | 07:09    | 07:40    |
|                             | 17:19   | 17:56    | 18:29                | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:47                | 17:07    | 16:56    |
| 15                          | 07:47   | 07:20    | 06:37                | 06:47 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34                | 07:10    | 07:41    |
|                             | 17:20   | 17:57    | 18:30                | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45                | 17:06    | 16:56    |
| 16                          | 07:47   | 07:18    | 06:36                | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35                | 07:11    | 07:42    |
|                             | 17:21   | 17:59    | 18:31                | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43                | 17:05    | 16:57    |
| 17                          | 07:46   | 07:17    | 06:34                | 06:43 | 06:05 | 05:51 | 06:06 | 06:35  | 07:05     | 07:36                | 07:13    | 07:42    |
|                             | 17:22   | 18:00    | 18:32                | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42                | 17:05    | 16:57    |
| 18                          | 07:46   | 07:16    | 06:32                | 06:42 | 06:04 | 05:51 | 06:07 | 06:36  | 07:06     | 07:38                | 07:14    | 07:43    |
|                             | 17:23   | 18:01    | 18:33                | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30     | 18:40                | 17:04    | 16:57    |
| 19                          | 07:45   | 07:14    | 06:31                | 06:40 | 06:04 | 05:52 | 06:07 | 06:37  | 07:07     | 07:39                | 07:15    | 07:44    |
|                             | 17:24   | 18:02    | 18:34                | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39                | 17:03    | 16:58    |
| 20                          | 07:45   | 07:13    | 06:29                | 06:39 | 06:03 | 05:52 | 06:08 | 06:38  | 07:08     | 07:40                | 07:16    | 07:44    |
|                             | 17:25   | 18:03    | 18:35                | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37                | 17:02    | 16:58    |
| 21                          | 07:44   | 07:11    | 06:27                | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41                | 07:17    | 07:45    |
|                             | 17:27   | 18:05    | 18:36                | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:25     | 18:36                | 17:02    | 16:59    |
| 22                          | 07:43   | 07:10    | 06:26                | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42                | 07:18    | 07:45    |
|                             | 17:28   | 18:06    | 18:37                | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:35                | 17:01    | 16:59    |
| 23                          | 07:43   | 07:09    | 06:24                | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11     | 07:43                | 07:20    | 07:46    |
|                             | 17:29   | 18:07    | 18:38                | 20:11 | 20:41 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33                | 17:00    | 16:59    |
| 24                          | 07:42   | 07:07    | 06:22                | 06:33 | 06:00 | 05:53 | 06:12 | 06:42  | 07:12     | 07:44                | 07:21    | 07:46    |
|                             | 17:30   | 18:08    | 18:39                | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32                | 17:00    | 17:00    |
| 25                          | 07:41   | 07:06    | 06:21                | 06:32 | 05:59 | 05:53 | 06:13 | 06:43  | 07:13     | 07:45                | 07:22    | 07:47    |
|                             | 17:31   | 18:09    | 18:40                | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 18:30                | 16:59    | 17:01    |
| 26                          | 07:41   | 07:04    | 06:19                | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 07:47                | 07:23    | 07:47    |
|                             | 17:33   | 18:11    | 18:42                | 20:14 | 20:44 | 21:00 | 20:47 | 20:08  | 19:16     | 18:29                | 16:59    | 17:01    |
| 27                          | 07:40   | 07:03    | 06:17                | 06:29 | 05:58 | 05:54 | 06:14 | 06:45  | 07:15     | 07:48                | 07:24    | 07:47    |
|                             | 17:34   | 18:12    | 18:43                | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 18:28                | 16:58    | 17:02    |
| 28                          | 07:39   | 07:01    | 07:20-07:22/2        | 06:16 | 06:27 | 05:57 | 05:54 | 06:15  | 06:46     | 07:16                | 07:25    | 07:48    |
|                             | 17:35   | 18:13    | 18:44                | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 18:26                | 16:58    | 17:03    |
| 29                          | 07:38   |          | 07:14                | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 07:50                | 07:26    | 07:48    |
|                             | 17:36   |          | 19:45                | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25                | 16:58    | 17:03    |
| 30                          | 07:37   |          | 07:12                | 06:25 | 05:56 | 05:55 | 06:17 | 06:48  | 07:18     | 06:51                | 07:27    | 07:48    |
|                             | 17:38   |          | 19:46                | 20:19 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:24                | 16:57    | 17:04    |
| 31                          | 07:36   |          | 07:11                |       | 05:55 |       | 06:18 | 06:49  |           | 06:52                |          | 07:48    |
|                             | 17:39   |          | 19:47                |       | 20:48 |       | 20:42 | 20:00  |           | 17:22                |          | 17:05    |
| Potential sun hours         | 298     | 297      | 369                  | 399   | 448   | 452   | 459   | 428    | 375       | 345                  | 298      | 288      |
| Sum of minutes with flicker | 0       | 2        | 139                  | 0     | 0     | 0     | 0     | 0      | 0         | 142                  | 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

WTG: GA05 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)

### 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                           | 07:49 08:16-08:48/32 | 07:36 08:20-09:03/43 | 07:00 07:09 | 06:23 05:55 | 06:19 06:50 | 07:20 |                |        |           |         | 06:54 08:00-08:22/22 | 07:28 07:58-08:39/41 |
| 17:06                       | 17:40                | 18:14                | 19:48       | 20:20       | 20:49       | 21:00 | 20:41          | 19:58  | 19:08     |         | 17:21                | 16:57                |
| 2                           | 07:49 08:16-08:49/33 | 07:35 08:21-09:02/41 | 06:58 07:07 | 06:22 05:54 | 05:56 06:20 | 06:51 | 07:21          |        |           |         | 06:55 07:58-08:24/26 | 07:29 07:59-08:39/40 |
| 17:07                       | 17:41                | 18:15                | 19:49       | 20:21       | 20:50       | 21:00 | 20:40          | 19:56  | 19:06     |         | 17:20                | 16:57                |
| 3                           | 07:49 08:17-08:50/33 | 07:34 08:22-09:02/40 | 06:57 07:06 | 06:21 05:54 | 05:56 06:21 | 06:52 | 07:22          |        |           |         | 06:56 07:57-08:26/29 | 07:30 08:00-08:39/39 |
| 17:08                       | 17:43                | 18:16                | 19:50       | 20:22       | 20:51       | 21:00 | 20:39          | 19:55  | 19:04     |         | 17:19                | 16:56                |
| 4                           | 07:49 08:17-08:51/34 | 07:33 08:22-09:00/38 | 06:55 07:04 | 06:20 05:53 | 05:57 06:22 | 06:53 | 07:23          |        |           |         | 06:57 07:55-08:27/32 | 07:31 08:01-08:39/38 |
| 17:08                       | 17:44                | 18:17                | 19:51       | 20:23       | 20:51       | 20:59 | 20:38          | 19:53  | 19:03     |         | 17:17                | 16:56                |
| 5                           | 07:49 08:17-08:52/35 | 07:31 08:23-08:59/36 | 06:54 07:02 | 06:18 05:53 | 05:57 06:23 | 06:54 | 07:24          |        |           |         | 06:58 07:54-08:29/35 | 07:32 08:02-08:39/37 |
| 17:09                       | 17:45                | 18:19                | 19:52       | 20:24       | 20:52       | 20:59 | 20:37          | 19:52  | 19:01     |         | 17:16                | 16:56                |
| 6                           | 07:49 08:17-08:53/36 | 07:30 08:24-08:59/35 | 06:52 07:01 | 06:17 05:53 | 05:58 06:24 | 06:55 | 07:25          |        |           |         | 07:00 07:54-08:30/36 | 07:33 08:03-08:39/36 |
| 17:10                       | 17:46                | 18:20                | 19:53       | 20:25       | 20:53       | 20:59 | 20:35          | 19:50  | 18:59     |         | 17:15                | 16:56                |
| 7                           | 07:49 08:17-08:53/36 | 07:29 08:26-08:57/31 | 06:50 06:59 | 06:16 05:52 | 05:58 06:25 | 06:56 | 07:26          |        |           |         | 07:01 07:53-08:31/38 | 07:34 08:04-08:39/35 |
| 17:11                       | 17:48                | 18:21                | 19:54       | 20:26       | 20:53       | 20:59 | 20:34          | 19:48  | 18:58     |         | 17:14                | 16:56                |
| 8                           | 07:49 08:17-08:54/37 | 07:28 08:27-08:56/29 | 06:49 06:58 | 06:15 05:52 | 05:59 06:26 | 06:57 | 07:27          |        |           |         | 07:02 07:52-08:32/40 | 07:35 08:05-08:39/34 |
| 17:12                       | 17:49                | 18:22                | 19:55       | 20:27       | 20:54       | 20:58 | 20:33          | 19:47  | 18:56     |         | 17:13                | 16:56                |
| 9                           | 07:49 08:17-08:55/38 | 07:27 08:29-08:55/26 | 06:47 06:56 | 06:14 05:52 | 06:00 06:27 | 06:58 | 07:28          |        |           |         | 07:03 07:51-08:32/41 | 07:36 08:06-08:39/33 |
| 17:13                       | 17:50                | 18:23                | 19:56       | 20:28       | 20:54       | 20:58 | 20:32          | 19:45  | 18:54     |         | 17:12                | 16:56                |
| 10                          | 07:49 08:16-08:55/39 | 07:26 08:31-08:51/20 | 06:46 06:54 | 06:13 05:52 | 06:00 06:28 | 06:59 | 07:29          |        |           |         | 07:04 07:51-08:34/43 | 07:37 08:06-08:39/33 |
| 17:14                       | 17:51                | 18:24                | 19:57       | 20:29       | 20:55       | 20:58 | 20:30          | 19:43  | 18:53     |         | 17:11                | 16:56                |
| 11                          | 07:48 08:16-08:56/40 | 07:25 08:35-08:48/13 | 06:44 06:53 | 06:11 05:52 | 06:01 06:29 | 07:00 | 07:30          |        |           |         | 07:06 07:50-08:34/44 | 07:38 08:07-08:40/33 |
| 17:15                       | 17:52                | 18:25                | 19:59       | 20:30       | 20:55       | 20:57 | 20:29          | 19:42  | 18:51     |         | 17:10                | 16:56                |
| 12                          | 07:48 08:16-08:58/42 | 07:23                | 06:42 06:51 | 06:10 05:52 | 06:02 06:30 | 07:01 | 07:31          |        |           |         | 07:07 07:50-08:34/44 | 07:39 08:07-08:39/32 |
| 17:16                       | 17:54                | 18:26                | 20:00       | 20:31       | 20:56       | 20:57 | 20:28          | 19:40  | 18:50     |         | 17:09                | 16:56                |
| 13                          | 07:48 08:15-08:58/43 | 07:22                | 06:41 06:50 | 06:09 05:51 | 06:03 06:31 | 07:02 | 07:32          |        |           |         | 07:08 07:49-08:35/46 | 07:39 08:08-08:39/31 |
| 17:17                       | 17:55                | 18:28                | 20:01       | 20:32       | 20:56       | 20:56 | 20:26          | 19:38  | 18:48     |         | 17:08                | 16:56                |
| 14                          | 07:47 08:16-08:59/43 | 07:21                | 06:39 06:48 | 06:08 05:51 | 06:03 06:32 | 07:03 | 07:33          |        |           |         | 07:09 07:50-08:36/46 | 07:40 08:09-08:40/31 |
| 17:19                       | 17:56                | 18:29                | 20:02       | 20:33       | 20:57       | 20:56 | 20:25          | 19:36  | 18:47     |         | 17:07                | 16:56                |
| 15                          | 07:47 08:15-08:59/44 | 07:20                | 06:37 06:47 | 06:07 05:51 | 06:04 06:33 | 07:04 | 07:34          |        |           |         | 07:10 07:50-08:36/46 | 07:41 08:10-08:40/30 |
| 17:20                       | 17:57                | 18:30                | 20:03       | 20:34       | 20:57       | 20:55 | 20:24          | 19:35  | 18:45     |         | 17:06                | 16:56                |
| 16                          | 07:47 08:15-09:00/45 | 07:18                | 06:36 06:45 | 06:06 05:51 | 06:05 06:34 | 07:04 | 07:35          |        |           |         | 07:11 07:50-08:36/46 | 07:42 08:10-08:40/30 |
| 17:21                       | 17:59                | 18:31                | 20:04       | 20:35       | 20:58       | 20:55 | 20:22          | 19:33  | 18:43     |         | 17:05                | 16:57                |
| 17                          | 07:46 08:14-09:00/46 | 07:17                | 06:34 06:43 | 06:05 05:51 | 06:06 06:35 | 07:05 | 07:37          |        |           |         | 07:13 07:49-08:36/47 | 07:42 08:11-08:40/29 |
| 17:22                       | 18:00                | 18:32                | 20:05       | 20:36       | 20:58       | 20:54 | 20:21          | 19:31  | 18:42     |         | 17:05                | 16:57                |
| 18                          | 07:46 08:15-09:01/46 | 07:16                | 06:32 06:42 | 06:04 05:51 | 06:06 06:36 | 07:06 | 07:38          |        |           |         | 07:14 07:50-08:37/47 | 07:43 08:12-08:41/29 |
| 17:23                       | 18:01                | 18:33                | 20:06       | 20:37       | 20:58       | 20:53 | 20:20          | 19:30  | 18:40     |         | 17:04                | 16:57                |
| 19                          | 07:45 08:15-09:01/46 | 07:14                | 06:31 06:40 | 06:04 05:52 | 06:07 06:37 | 07:07 | 07:39          |        |           |         | 07:15 07:50-08:37/47 | 07:44 08:12-08:41/29 |
| 17:24                       | 18:02                | 18:34                | 20:07       | 20:38       | 20:59       | 20:53 | 20:18          | 19:28  | 18:39     |         | 17:03                | 16:58                |
| 20                          | 07:45 08:16-09:02/46 | 07:13                | 06:29 06:39 | 06:03 05:52 | 06:08 06:38 | 07:08 | 07:40          |        |           |         | 07:16 07:50-08:37/47 | 07:44 08:13-08:42/29 |
| 17:25                       | 18:03                | 18:35                | 20:08       | 20:39       | 20:59       | 20:52 | 20:17          | 19:26  | 18:37     |         | 17:02                | 16:58                |
| 21                          | 07:44 08:15-09:02/47 | 07:11                | 06:27 06:37 | 06:02 05:52 | 06:09 06:39 | 07:09 | 07:41          |        |           |         | 07:17 07:50-08:37/47 | 07:45 08:13-08:42/29 |
| 17:27                       | 18:05                | 18:36                | 20:09       | 20:40       | 20:59       | 20:51 | 20:15          | 19:25  | 18:36     |         | 17:02                | 16:59                |
| 22                          | 07:44 08:15-09:02/47 | 07:10                | 06:26 06:36 | 06:01 05:52 | 06:10 06:40 | 07:10 | 07:42          |        |           |         | 07:18 07:52-08:38/46 | 07:45 08:14-08:42/28 |
| 17:28                       | 18:06                | 18:37                | 20:10       | 20:41       | 20:59       | 20:50 | 20:14          | 19:23  | 18:35     |         | 17:01                | 16:59                |
| 23                          | 07:43 08:16-09:03/47 | 07:09                | 06:24 06:34 | 06:00 05:52 | 06:11 06:41 | 07:11 | 07:43          |        |           |         | 07:20 07:52-08:38/46 | 07:46 08:14-08:43/29 |
| 17:29                       | 18:07                | 18:38                | 20:11       | 20:42       | 21:00       | 20:50 | 20:12          | 19:21  | 18:33     |         | 17:00                | 17:00                |
| 24                          | 07:42 08:16-09:03/47 | 07:07                | 06:22 06:33 | 06:00 05:53 | 06:12 06:42 | 07:12 | 07:44          |        |           |         | 07:21 07:52-08:38/46 | 07:46 08:14-08:43/29 |
| 17:30                       | 18:08                | 18:39                | 20:12       | 20:42       | 21:00       | 20:49 | 20:11          | 19:19  | 18:32     |         | 17:00                | 17:00                |
| 25                          | 07:41 08:16-09:03/47 | 07:06                | 06:21 06:32 | 05:59 05:53 | 06:13 06:43 | 07:13 | 07:45          |        |           |         | 07:22 07:52-08:38/46 | 07:47 08:15-08:44/29 |
| 17:31                       | 18:09                | 18:40                | 20:13       | 20:43       | 21:00       | 20:48 | 20:09          | 19:18  | 17:30     |         | 16:59                | 17:01                |
| 26                          | 07:41 08:17-09:03/46 | 07:04                | 06:19 06:30 | 05:58 05:53 | 06:13 06:44 | 07:14 | 07:47          |        |           |         | 07:23 07:53-08:38/45 | 07:47 08:15-08:44/29 |
| 17:33                       | 18:11                | 18:42                | 20:14       | 20:44       | 21:00       | 20:47 | 20:08          | 19:16  | 17:29     |         | 16:59                | 17:01                |
| 27                          | 07:40 08:17-09:03/46 | 07:03                | 06:17 06:29 | 05:57 05:54 | 06:14 06:45 | 07:15 | 07:48          |        |           |         | 07:24 07:55-08:39/44 | 07:47 08:15-08:45/30 |
| 17:34                       | 18:12                | 18:43                | 20:15       | 20:45       | 21:00       | 20:46 | 20:06          | 19:14  | 17:28     |         | 16:58                | 17:02                |
| 28                          | 07:39 08:17-09:03/46 | 07:01                | 06:16 06:27 | 05:57 05:54 | 06:15 06:46 | 07:16 | 07:49          |        |           |         | 07:25 07:56-08:39/43 | 07:48 08:16-08:46/30 |
| 17:35                       | 18:13                | 18:44                | 20:16       | 20:46       | 21:00       | 20:45 | 20:04          | 19:13  | 17:26     |         | 16:58                | 17:03                |
| 29                          | 07:38 08:19-09:04/45 |                      | 07:14 06:26 | 05:56 05:54 | 06:16 06:47 | 07:18 | 07:50          |        |           |         | 07:26 07:57-08:39/42 | 07:48 08:16-08:46/30 |
| 17:36                       |                      | 18:14                | 20:18       | 20:47       | 21:00       | 20:44 | 20:03          | 19:11  | 17:25     |         | 16:58                | 17:03                |
| 30                          | 07:37 08:19-09:03/44 |                      | 07:12 06:25 | 05:56 05:55 | 06:17 06:48 | 07:19 | 06:51          |        |           |         | 07:27 07:57-08:39/42 | 07:48 08:16-08:47/31 |
| 17:38                       |                      | 18:15                | 20:19       | 20:47       | 21:00       | 20:43 | 20:01          | 19:09  | 17:24     |         | 16:57                | 17:04                |
| 31                          | 07:36 08:20-09:03/43 |                      | 07:11 06:21 | 05:55 05:54 | 06:18 06:49 | 06:52 | 08:04-08:19/15 |        |           |         | 17:04                | 07:49 08:16-08:48/32 |
| 17:39                       |                      | 18:16                | 20:19       | 20:48       | 20:42       | 20:00 | 17:22          |        |           |         | 17:05                | 17:05                |
| Potential sun hours         | 298                  | 297                  | 369         | 399         | 448         | 452   | 459            | 375    | 345       | 298     | 288                  | 995                  |
| Sum of minutes with flicker | 1299                 | 352                  | 0           | 0           | 0           | 0     | 0              | 0      | 0         | 1249    | 999                  |                      |

Table 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

WTG: GA06 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)

### 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                           | 07:49 15:58-16:26/28 | 07:35    | 07:00 | 07:09 | 06:23 | 05:55 | 05:55 | 06:19  | 06:50     | 07:19   | 06:54                | 07:28 15:46-16:12/26 |
|                             | 17:06                | 17:40    | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:08   | 17:21                | 16:57                |
| 2                           | 07:49 15:59-16:26/27 | 07:34    | 06:58 | 07:07 | 06:22 | 05:54 | 05:56 | 06:20  | 06:51     | 07:21   | 06:55                | 07:29 15:46-16:12/26 |
|                             | 17:07                | 17:41    | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20                | 16:57                |
| 3                           | 07:49 15:59-16:27/28 | 07:33    | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:22   | 06:56                | 07:30 15:46-16:13/27 |
|                             | 17:08                | 17:42    | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04   | 17:19                | 16:56                |
| 4                           | 07:49 16:00-16:27/27 | 07:32    | 06:55 | 07:04 | 06:20 | 05:53 | 05:57 | 06:22  | 06:53     | 07:23   | 06:57                | 07:31 15:46-16:13/27 |
|                             | 17:08                | 17:44    | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:03   | 17:17                | 16:56                |
| 5                           | 07:49 16:00-16:28/28 | 07:31    | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:54     | 07:24   | 06:58                | 07:32 15:46-16:14/28 |
|                             | 17:09                | 17:45    | 18:19 | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51     | 19:01   | 17:16                | 16:56                |
| 6                           | 07:49 16:01-16:28/27 | 07:30    | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:55     | 07:25   | 06:59                | 07:33 15:47-16:14/27 |
|                             | 17:10                | 17:46    | 18:20 | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15                | 16:56                |
| 7                           | 07:49 16:01-16:29/28 | 07:29    | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:56     | 07:26   | 07:01                | 07:34 15:47-16:15/28 |
|                             | 17:11                | 17:47    | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14                | 16:56                |
| 8                           | 07:49 16:02-16:29/27 | 07:28    | 06:49 | 06:58 | 06:15 | 05:52 | 05:59 | 06:26  | 06:57     | 07:27   | 07:02                | 07:35 15:48-16:15/27 |
|                             | 17:12                | 17:49    | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13                | 16:56                |
| 9                           | 07:49 16:02-16:29/27 | 07:27    | 06:47 | 06:56 | 06:14 | 05:52 | 06:00 | 06:27  | 06:58     | 07:28   | 07:03                | 07:36 15:48-16:16/28 |
|                             | 17:13                | 17:50    | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12                | 16:56                |
| 10                          | 07:48 16:03-16:29/26 | 07:26    | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:59     | 07:29   | 07:04                | 07:37 15:49-16:16/27 |
|                             | 17:14                | 17:51    | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11                | 16:56                |
| 11                          | 07:48 16:04-16:30/26 | 07:25    | 06:44 | 06:53 | 06:11 | 05:52 | 06:01 | 06:29  | 07:00     | 07:30   | 07:05                | 07:38 15:48-16:16/28 |
|                             | 17:15                | 17:52    | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10                | 16:56                |
| 12                          | 07:48 16:04-16:29/25 | 07:23    | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07                | 07:39 15:49-16:16/27 |
|                             | 17:16                | 17:54    | 18:26 | 20:00 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09                | 16:56                |
| 13                          | 07:48 16:05-16:30/25 | 07:22    | 06:41 | 06:50 | 06:09 | 05:51 | 06:03 | 06:31  | 07:01     | 07:32   | 07:08                | 07:39 15:50-16:17/27 |
|                             | 17:17                | 17:55    | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08                | 16:56                |
| 14                          | 07:47 16:06-16:30/24 | 07:21    | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09                | 07:40 15:50-16:18/28 |
|                             | 17:19                | 17:56    | 18:29 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07                | 16:56                |
| 15                          | 07:47 16:06-16:29/23 | 07:20    | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10                | 07:41 15:50-16:17/27 |
|                             | 17:20                | 17:57    | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06                | 16:56                |
| 16                          | 07:47 16:08-16:30/22 | 07:18    | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11                | 07:42 15:51-16:18/27 |
|                             | 17:21                | 17:59    | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43   | 17:05                | 16:57                |
| 17                          | 07:46 16:08-16:29/21 | 07:17    | 06:34 | 06:43 | 06:05 | 05:51 | 06:06 | 06:35  | 07:05     | 07:36   | 07:13                | 07:42 15:52-16:19/27 |
|                             | 17:22                | 18:00    | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:05                | 16:57                |
| 18                          | 07:46 16:10-16:29/19 | 07:16    | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:38   | 07:14                | 07:43 15:52-16:19/27 |
|                             | 17:23                | 18:01    | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30     | 18:40   | 17:04                | 16:57                |
| 19                          | 07:45 16:11-16:28/17 | 07:14    | 06:31 | 06:40 | 06:03 | 05:52 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15                | 07:44 15:52-16:20/28 |
|                             | 17:24                | 18:02    | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39   | 17:03                | 16:58                |
| 20                          | 07:45 16:12-16:26/14 | 07:13    | 06:29 | 06:39 | 06:03 | 05:52 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16 15:54-15:57/3  | 07:44 15:53-16:21/28 |
|                             | 17:25                | 18:03    | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37   | 17:02                | 16:58                |
| 21                          | 07:44 16:15-16:26/11 | 07:11    | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17 15:50-16:01/11 | 07:45 15:53-16:20/27 |
|                             | 17:27                | 18:05    | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:02                | 16:59                |
| 22                          | 07:43 16:19-16:22/3  | 07:10    | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42   | 07:18 15:49-16:03/14 | 07:45 15:54-16:21/27 |
|                             | 17:28                | 18:06    | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:34   | 17:01                | 16:59                |
| 23                          | 07:43                | 07:09    | 06:24 | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11     | 07:43   | 07:20 15:48-16:05/17 | 07:46 15:54-16:22/8  |
|                             | 17:29                | 18:07    | 18:38 | 20:11 | 20:41 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33   | 17:00                | 16:57                |
| 24                          | 07:42                | 07:07    | 06:22 | 06:33 | 05:59 | 05:53 | 06:12 | 06:42  | 07:12     | 07:44   | 07:21 15:47-16:06/19 | 07:46 15:54-16:22/8  |
|                             | 17:30                | 18:08    | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32   | 17:00                | 16:57                |
| 25                          | 07:41                | 07:06    | 06:21 | 06:32 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13     | 07:45   | 07:22 15:46-16:07/21 | 07:47 15:56-16:23/27 |
|                             | 17:31                | 18:09    | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 18:30   | 16:59                | 17:01                |
| 26                          | 07:41                | 07:04    | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 07:46   | 07:23 15:46-16:08/22 | 07:47 15:56-16:23/27 |
|                             | 17:33                | 18:10    | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 18:29   | 16:59                | 17:01                |
| 27                          | 07:40                | 07:03    | 06:17 | 06:29 | 05:57 | 05:53 | 06:14 | 06:45  | 07:15     | 07:48   | 07:24 15:45-16:08/23 | 07:47 15:56-16:23/27 |
|                             | 17:34                | 18:12    | 18:43 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:28   | 16:58                | 17:02                |
| 28                          | 07:39                | 07:01    | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16     | 07:49   | 07:25 15:46-16:10/24 | 07:48 15:57-16:24/27 |
|                             | 17:35                | 18:13    | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26   | 16:58                | 17:03                |
| 29                          | 07:38                | 07:01    | 06:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 07:50   | 07:26 15:46-16:11/25 | 07:48 15:57-16:25/28 |
|                             | 17:36                | 18:14    | 18:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57                | 17:03                |
| 30                          | 07:37                | 07:01    | 06:12 | 06:25 | 05:56 | 05:55 | 06:17 | 06:48  | 07:18     | 07:51   | 07:27 15:46-16:11/25 | 07:48 15:58-16:25/27 |
|                             | 17:38                | 18:15    | 18:46 | 20:19 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:24   | 16:57                | 17:04                |
| 31                          | 07:36                | 07:01    | 06:11 | 06:24 | 05:55 | 05:54 | 06:18 | 06:49  | 07:19     | 07:52   |                      | 07:48 15:58-16:25/27 |
|                             | 17:39                | 18:16    | 18:47 | 20:18 | 20:48 | 20:42 | 20:40 | 20:00  | 17:22     |         |                      | 17:05                |
| Potential sun hours         | 298                  | 297      | 369   | 399   | 448   | 452   | 459   | 428    | 375       | 345     | 298                  | 288                  |
| Sum of minutes with flicker | 503                  | 0        | 0     | 0     | 0     | 0     | 0     | 0      | 0         | 0       | 204                  | 845                  |

Table 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

WTG: GA07 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)

### 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                           | 07:49   | 07:35    | 07:00                | 07:09 18:06-19:26/80 | 06:23 | 05:55 | 05:55 | 06:19                | 06:50 18:09-19:09/60 | 07:19 17:59-18:45/46 | 06:54    | 07:28    |
| 17:06                       | 17:40   | 18:14    | 19:48                | 19:48                | 20:20 | 20:49 | 21:00 | 20:41                | 19:58                | 19:08                | 17:21    | 16:57    |
| 2                           | 07:49   | 07:34    | 06:58                | 07:07 18:07-19:28/81 | 06:22 | 05:54 | 05:56 | 06:20                | 06:51 18:08-19:10/62 | 07:20 18:00-18:43/43 | 06:55    | 07:29    |
| 17:07                       | 17:41   | 18:15    | 19:49                | 19:49                | 20:21 | 20:50 | 21:00 | 20:40                | 19:56                | 19:06                | 17:20    | 16:56    |
| 3                           | 07:49   | 07:33    | 06:57                | 07:06 18:07-19:28/81 | 06:21 | 05:54 | 05:56 | 06:21                | 06:52 18:07-19:10/63 | 07:22 18:03-18:42/39 | 06:56    | 07:30    |
| 17:08                       | 17:42   | 18:16    | 19:50                | 19:50                | 20:22 | 20:50 | 21:00 | 20:39                | 19:55                | 19:04                | 17:19    | 16:56    |
| 4                           | 07:49   | 07:32    | 06:55                | 07:04 18:07-19:28/81 | 06:20 | 05:53 | 05:57 | 06:22                | 06:53 18:06-19:11/65 | 07:23 18:04-18:40/36 | 06:57    | 07:31    |
| 17:08                       | 17:44   | 18:17    | 19:51                | 19:51                | 20:23 | 20:51 | 20:59 | 20:38                | 19:53                | 19:03                | 17:17    | 16:56    |
| 5                           | 07:49   | 07:31    | 06:53 17:42-17:57/15 | 07:02 18:07-19:25/78 | 06:18 | 05:53 | 05:57 | 06:23                | 06:54 18:05-19:11/66 | 07:24 18:06-18:39/33 | 06:58    | 07:32    |
| 17:09                       | 17:45   | 18:19    | 19:52                | 19:52                | 20:24 | 20:52 | 20:59 | 20:36                | 19:51                | 19:01                | 17:16    | 16:56    |
| 6                           | 07:49   | 07:30    | 06:52 17:37-17:59/22 | 07:01 18:07-19:15/68 | 06:17 | 05:53 | 05:58 | 06:24                | 06:55 18:04-19:11/67 | 07:25 18:08-18:37/29 | 06:59    | 07:33    |
| 17:10                       | 17:46   | 18:20    | 19:53                | 19:53                | 20:25 | 20:52 | 20:59 | 20:35                | 19:50                | 18:59                | 17:15    | 16:56    |
| 7                           | 07:49   | 07:29    | 06:50 17:33-18:00/27 | 06:59 18:08-19:15/67 | 06:16 | 05:52 | 05:58 | 06:25                | 06:56 18:03-19:20/77 | 07:26 18:11-18:35/24 | 07:01    | 07:34    |
| 17:11                       | 17:47   | 18:21    | 19:54                | 19:54                | 20:26 | 20:53 | 20:59 | 20:34                | 19:48                | 18:58                | 17:14    | 16:56    |
| 8                           | 07:49   | 07:28    | 06:49 17:29-18:00/31 | 06:58 18:09-19:14/65 | 06:15 | 05:52 | 05:59 | 06:26                | 06:57 18:02-19:22/80 | 07:27 18:15-18:33/18 | 07:02    | 07:35    |
| 17:12                       | 17:49   | 18:22    | 19:55                | 19:55                | 20:27 | 20:54 | 20:58 | 20:33                | 19:46                | 18:56                | 17:13    | 16:56    |
| 9                           | 07:49   | 07:27    | 06:47 17:27-18:02/35 | 06:56 18:09-19:12/63 | 06:14 | 05:52 | 06:00 | 06:27                | 06:58 18:01-19:23/82 | 07:28 18:24-18:27/3  | 07:03    | 07:36    |
| 17:13                       | 17:50   | 18:23    | 19:56                | 19:56                | 20:28 | 20:54 | 20:58 | 20:32                | 19:45                | 18:54                | 17:12    | 16:56    |
| 10                          | 07:48   | 07:26    | 06:45 17:25-18:03/38 | 06:54 18:10-19:12/62 | 06:12 | 05:52 | 06:00 | 06:28                | 06:58 18:00-19:21/81 | 07:29                | 07:04    | 07:37    |
| 17:14                       | 17:51   | 18:24    | 19:57                | 19:57                | 20:29 | 20:55 | 20:58 | 20:30                | 19:43                | 18:53                | 17:11    | 16:56    |
| 11                          | 07:48   | 07:25    | 06:44 17:23-18:05/42 | 06:53 18:10-19:10/60 | 06:11 | 05:52 | 06:01 | 06:29                | 06:59 17:59-19:19/80 | 07:30                | 07:05    | 07:38    |
| 17:15                       | 17:52   | 18:25    | 19:58                | 19:58                | 20:30 | 20:55 | 20:57 | 20:29                | 19:41                | 18:51                | 17:10    | 16:56    |
| 12                          | 07:48   | 07:23    | 06:42 17:21-18:05/44 | 06:51 18:12-19:09/57 | 06:10 | 05:51 | 06:02 | 06:30                | 07:00 17:59-19:18/79 | 07:31                | 07:07    | 07:39    |
| 17:16                       | 17:54   | 18:26    | 19:59                | 19:59                | 20:31 | 20:56 | 20:57 | 20:28                | 19:40                | 18:50                | 17:09    | 16:56    |
| 13                          | 07:48   | 07:22    | 06:41 17:19-18:06/47 | 06:50 18:13-19:07/54 | 06:09 | 05:51 | 06:02 | 06:31                | 07:01 17:58-19:16/78 | 07:32                | 07:08    | 07:39    |
| 17:17                       | 17:55   | 18:27    | 20:01                | 20:01                | 20:32 | 20:56 | 20:56 | 20:26                | 19:38                | 18:48                | 17:08    | 16:56    |
| 14                          | 07:47   | 07:21    | 06:39 17:18-18:08/50 | 06:48 18:14-19:06/52 | 06:08 | 05:51 | 06:03 | 06:32                | 07:02 17:58-19:15/77 | 07:33                | 07:09    | 07:40    |
| 17:18                       | 17:56   | 18:29    | 20:02                | 20:02                | 20:33 | 20:57 | 20:56 | 20:25                | 19:36                | 18:46                | 17:07    | 16:56    |
| 15                          | 07:47   | 07:20    | 06:37 17:17-18:09/52 | 06:46 18:15-19:04/49 | 06:07 | 05:51 | 06:04 | 06:33                | 07:03 17:57-19:13/76 | 07:34                | 07:10    | 07:41    |
| 17:20                       | 17:57   | 18:30    | 20:03                | 20:34                | 20:57 | 20:55 | 20:24 | 19:35                | 18:45                | 17:06                | 16:56    |          |
| 16                          | 07:47   | 07:18    | 06:36 17:15-18:09/54 | 06:45 18:16-19:02/46 | 06:06 | 05:51 | 06:05 | 06:34                | 07:04 17:57-19:11/74 | 07:35                | 07:11    | 07:42    |
| 17:21                       | 17:59   | 18:31    | 20:04                | 20:35                | 20:58 | 20:55 | 20:22 | 19:33                | 18:43                | 17:05                | 16:57    |          |
| 17                          | 07:46   | 07:17    | 06:34 17:15-18:11/56 | 06:43 18:19-00/42    | 06:05 | 05:51 | 06:06 | 06:35                | 07:05 17:56-19:10/74 | 07:36                | 07:13    | 07:42    |
| 17:22                       | 18:00   | 18:32    | 20:05                | 20:36                | 20:58 | 20:54 | 20:21 | 19:31                | 18:42                | 17:05                | 16:57    |          |
| 18                          | 07:46   | 07:16    | 06:32 17:13-18:12/59 | 06:42 18:19-18:58/39 | 06:04 | 05:51 | 06:06 | 06:36                | 07:06 17:55-19:07/72 | 07:38                | 07:14    | 07:43    |
| 17:23                       | 18:01   | 18:33    | 20:06                | 20:37                | 20:58 | 20:53 | 20:19 | 19:30                | 18:40                | 17:04                | 16:57    |          |
| 19                          | 07:45   | 07:14    | 06:31 17:12-18:13/61 | 06:40 18:22-18:56/34 | 06:03 | 05:51 | 06:07 | 06:37                | 07:07 17:55-19:05/70 | 07:39                | 07:15    | 07:44    |
| 17:24                       | 18:02   | 18:34    | 20:07                | 20:38                | 20:59 | 20:53 | 20:18 | 19:28                | 18:39                | 17:03                | 16:58    |          |
| 20                          | 07:45   | 07:13    | 06:29 17:12-18:15/63 | 06:39 18:25-18:53/28 | 06:03 | 05:52 | 06:08 | 06:38                | 07:08 17:55-19:03/68 | 07:40                | 07:16    | 07:44    |
| 17:25                       | 18:03   | 18:35    | 20:08                | 20:39                | 20:59 | 20:52 | 20:17 | 19:26                | 18:37                | 17:02                | 16:58    |          |
| 21                          | 07:44   | 07:11    | 06:27 17:11-18:15/64 | 06:37 18:28-18:49/21 | 06:02 | 05:52 | 06:09 | 06:39 18:37-18:49/12 | 07:09 17:55-19:02/67 | 07:41                | 07:17    | 07:45    |
| 17:27                       | 18:05   | 18:36    | 20:09                | 20:43                | 21:00 | 20:48 | 20:09 | 19:24                | 18:36                | 17:02                | 16:58    |          |
| 22                          | 07:43   | 07:10    | 06:26 17:10-18:16/66 | 06:36 18:34-18:43/9  | 06:01 | 05:52 | 06:10 | 06:40 18:32-18:54/22 | 07:10 17:55-19:00/65 | 07:42                | 07:18    | 07:45    |
| 17:28                       | 18:06   | 18:37    | 20:10                | 20:41                | 20:59 | 20:50 | 20:14 | 19:23                | 18:34                | 17:01                | 16:59    |          |
| 23                          | 07:43   | 07:09    | 06:24 17:09-18:17/68 | 06:34                | 06:00 | 05:52 | 06:11 | 06:41 18:28-18:57/29 | 07:11 17:55-18:58/63 | 07:43                | 07:20    | 07:46    |
| 17:29                       | 18:07   | 18:38    | 20:11                | 20:41                | 21:00 | 20:50 | 20:12 | 19:21                | 18:33                | 17:00                | 16:59    |          |
| 24                          | 07:42   | 07:07    | 06:22 17:09-18:18/69 | 06:33                | 05:59 | 05:52 | 06:12 | 06:42 18:25-19:00/35 | 07:12 17:55-18:57/62 | 07:44                | 07:21    | 07:46    |
| 17:30                       | 18:08   | 18:39    | 20:12                | 20:42                | 21:00 | 20:49 | 20:11 | 19:19                | 18:32                | 17:00                | 17:00    |          |
| 25                          | 07:41   | 07:06    | 06:21 17:08-18:19/71 | 06:32                | 05:59 | 05:53 | 06:12 | 06:43 18:23-19:02/39 | 07:13 17:55-18:55/60 | 06:45                | 07:22    | 07:47    |
| 17:31                       | 18:09   | 18:40    | 20:13                | 20:43                | 21:00 | 20:48 | 20:09 | 19:18                | 17:30                | 16:59                | 17:01    |          |
| 26                          | 07:41   | 07:04    | 06:19 17:07-18:20/73 | 06:30                | 05:58 | 05:53 | 06:13 | 06:44 18:21-19:03/42 | 07:14 17:56-18:53/57 | 06:47                | 07:23    | 07:47    |
| 17:33                       | 18:10   | 18:41    | 20:14                | 20:44                | 21:00 | 20:47 | 20:07 | 19:16                | 17:29                | 16:59                | 17:01    |          |
| 27                          | 07:40   | 07:03    | 06:17 17:07-18:22/75 | 06:29                | 05:57 | 05:53 | 06:14 | 06:45 18:19-19:05/46 | 07:15 17:56-18:51/55 | 06:48                | 07:24    | 07:47    |
| 17:34                       | 18:12   | 18:43    | 20:15                | 20:45                | 21:00 | 20:46 | 20:06 | 19:14                | 17:27                | 16:58                | 17:02    |          |
| 28                          | 07:39   | 07:01    | 06:16 17:07-18:22/75 | 06:27                | 05:57 | 05:54 | 06:15 | 06:46 18:17-19:06/49 | 07:16 17:57-18:50/53 | 06:49                | 07:25    | 07:48    |
| 17:35                       | 18:13   | 18:44    | 20:16                | 20:46                | 21:00 | 20:45 | 20:04 | 19:13                | 17:26                | 16:58                | 17:03    |          |
| 29                          | 07:38   | 07:01    | 07:14 18:06-19:23/77 | 06:26                | 05:56 | 05:54 | 06:16 | 06:47 18:14-19:06/52 | 07:17 17:57-18:48/51 | 06:50                | 07:26    | 07:48    |
| 17:36                       | 18:14   | 18:45    | 20:17                | 20:47                | 21:00 | 20:44 | 20:03 | 19:11                | 17:25                | 16:57                | 17:03    |          |
| 30                          | 07:37   | 07:01    | 07:12 18:07-19:25/78 | 06:25                | 05:56 | 05:55 | 06:17 | 06:48 18:12-19:07/55 | 07:18 17:58-18:46/48 | 06:51                | 07:27    | 07:48    |
| 17:37                       | 18:15   | 18:46    | 20:19                | 20:47                | 21:00 | 20:43 | 20:01 | 19:09                | 17:24                | 16:57                | 17:04    |          |
| 31                          | 07:36   | 07:01    | 07:11 18:06-19:25/79 | 06:24                | 05:55 | 05:54 | 06:18 | 06:49 18:11-19:08/57 | 06:52                | 07:25                | 07:48    |          |
| 17:39                       | 18:15   | 18:47    | 20:17                | 20:48                | 20:42 | 20:40 | 20:00 | 19:11                | 17:22                | 16:57                | 17:05    |          |
| Potential sun hours         | 298     | 297      | 369                  | 399                  | 448   | 452   | 459   | 428                  | 375                  | 345                  | 298      | 288      |
| Sum of minutes with flicker | 0       | 0        | 1491                 | 1217                 | 0     | 0     | 0     | 438                  | 2032                 | 271                  | 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

WTG: GA08 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)

### 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                           | 07:49   | 07:35 16:50-17:14/24 | 07:00 | 07:09 | 06:23 | 05:55 | 05:55 | 06:19  | 06:50     | 07:19   | 06:54 16:26-16:39/13 | 07:28    |
|                             | 17:06   | 17:40                | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:08   | 17:21                | 16:57    |
| 2                           | 07:49   | 07:34 16:50-17:14/24 | 06:58 | 07:07 | 06:22 | 05:54 | 05:56 | 06:20  | 06:51     | 07:20   | 06:55 16:24-16:41/17 | 07:29    |
|                             | 17:07   | 17:41                | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20                | 16:56    |
| 3                           | 07:49   | 07:33 16:50-17:14/24 | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:22   | 06:56 16:24-16:43/19 | 07:30    |
|                             | 17:07   | 17:42                | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04   | 17:19                | 16:56    |
| 4                           | 07:49   | 07:32 16:51-17:14/23 | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:53     | 07:23   | 06:57 16:23-16:43/20 | 07:31    |
|                             | 17:08   | 17:44                | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:03   | 17:17                | 16:56    |
| 5                           | 07:49   | 07:31 16:51-17:14/23 | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:54     | 07:24   | 06:58 16:22-16:44/22 | 07:32    |
|                             | 17:09   | 17:45                | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51     | 19:01   | 17:16                | 16:56    |
| 6                           | 07:49   | 07:30 16:52-17:14/22 | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:55     | 07:25   | 06:59 16:21-16:44/23 | 07:33    |
|                             | 17:10   | 17:46                | 18:20 | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15                | 16:56    |
| 7                           | 07:49   | 07:29 16:53-17:13/20 | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:56     | 07:26   | 07:01 16:21-16:45/24 | 07:34    |
|                             | 17:11   | 17:47                | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14                | 16:56    |
| 8                           | 07:49   | 07:28 16:54-17:13/19 | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56     | 07:27   | 07:02 16:21-16:45/24 | 07:35    |
|                             | 17:12   | 17:49                | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13                | 16:56    |
| 9                           | 07:49   | 07:27 16:56-17:12/16 | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57     | 07:28   | 07:03 16:21-16:45/24 | 07:36    |
|                             | 17:13   | 17:50                | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12                | 16:56    |
| 10                          | 07:48   | 07:26 16:57-17:09/12 | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58     | 07:29   | 07:04 16:21-16:45/24 | 07:37    |
|                             | 17:14   | 17:51                | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11                | 16:56    |
| 11                          | 07:48   | 07:25 17:00-17:06/6  | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59     | 07:30   | 07:05 16:22-16:46/24 | 07:38    |
|                             | 17:15   | 17:52                | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10                | 16:56    |
| 12                          | 07:48   | 07:23                | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07 16:22-16:45/23 | 07:39    |
|                             | 17:16   | 17:54                | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09                | 16:56    |
| 13                          | 07:48   | 07:22                | 06:41 | 06:50 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01     | 07:32   | 07:08 16:22-16:44/22 | 07:39    |
|                             | 17:17   | 17:55                | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08                | 16:56    |
| 14                          | 07:47   | 07:21                | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09 16:23-16:43/20 | 07:40    |
|                             | 17:18   | 17:56                | 18:29 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07                | 16:56    |
| 15                          | 07:47   | 07:20                | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10 16:24-16:42/18 | 07:41    |
|                             | 17:20   | 17:57                | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06                | 16:56    |
| 16                          | 07:47   | 07:18                | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11 16:25-16:41/16 | 07:42    |
|                             | 17:21   | 17:58                | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43   | 17:05                | 16:57    |
| 17                          | 07:46   | 07:17                | 06:34 | 06:43 | 06:05 | 05:51 | 06:06 | 06:35  | 07:05     | 07:36   | 07:13 16:26-16:40/14 | 07:42    |
|                             | 17:22   | 18:00                | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:04                | 16:57    |
| 18                          | 07:46   | 07:16                | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:38   | 07:14 16:28-16:40/12 | 07:43    |
|                             | 17:23   | 18:01                | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:20  | 19:30     | 18:40   | 17:04                | 16:57    |
| 19                          | 07:45   | 07:14                | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15 16:29-16:39/10 | 07:44    |
|                             | 17:24   | 18:02                | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39   | 17:03                | 16:58    |
| 20                          | 07:45   | 07:13                | 06:29 | 06:39 | 06:03 | 05:52 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16 16:32-16:38/6  | 07:44    |
|                             | 17:25   | 18:03                | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37   | 17:02                | 16:58    |
| 21                          | 07:44   | 07:11                | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17                | 07:45    |
|                             | 17:26   | 18:05                | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:02                | 16:58    |
| 22                          | 07:43   | 16:57-17:03/6        | 07:10 | 06:26 | 06:36 | 06:01 | 05:52 | 06:10  | 06:40     | 07:10   | 07:42                | 07:45    |
|                             | 17:28   | 18:06                | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:34   | 17:01                | 16:59    |
| 23                          | 07:43   | 16:54-17:04/10       | 07:09 | 06:24 | 06:34 | 06:00 | 05:52 | 06:11  | 06:41     | 07:11   | 07:43                | 07:46    |
|                             | 17:29   | 18:07                | 18:38 | 20:11 | 20:41 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33   | 17:00                | 16:59    |
| 24                          | 07:42   | 16:54-17:06/12       | 07:07 | 06:22 | 06:33 | 05:59 | 05:52 | 06:11  | 06:42     | 07:12   | 07:44                | 07:46    |
|                             | 17:30   | 18:08                | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32   | 17:00                | 17:00    |
| 25                          | 07:41   | 16:53-17:07/14       | 07:06 | 06:21 | 06:31 | 05:59 | 05:53 | 06:12  | 06:43     | 07:13   | 06:45                | 07:47    |
|                             | 17:31   | 18:09                | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 17:30   | 16:59                | 17:01    |
| 26                          | 07:41   | 16:52-17:08/16       | 07:04 | 06:19 | 06:30 | 05:58 | 05:53 | 06:13  | 06:44     | 07:14   | 06:47                | 07:47    |
|                             | 17:32   | 18:10                | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29   | 16:59                | 17:01    |
| 27                          | 07:40   | 16:51-17:09/18       | 07:03 | 06:17 | 06:29 | 05:57 | 05:53 | 06:14  | 06:45     | 07:15   | 06:48                | 07:47    |
|                             | 17:34   | 18:12                | 18:43 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:27   | 16:58                | 17:02    |
| 28                          | 07:39   | 16:50-17:10/20       | 07:01 | 06:16 | 06:27 | 05:57 | 05:54 | 06:15  | 06:46     | 07:16   | 06:49                | 07:48    |
|                             | 17:35   | 18:13                | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26   | 16:58                | 17:02    |
| 29                          | 07:38   | 16:50-17:12/22       |       | 07:14 | 06:26 | 05:56 | 05:54 | 06:16  | 06:47     | 07:17   | 06:50                | 07:48    |
|                             | 17:36   |                      | 18:14 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57                | 17:03    |
| 30                          | 07:37   | 16:50-17:13/23       |       | 07:12 | 06:25 | 05:56 | 05:55 | 06:17  | 06:48     | 07:18   | 06:51                | 07:48    |
|                             | 17:37   |                      | 18:15 | 20:18 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:23   | 16:57                | 17:04    |
| 31                          | 07:36   | 16:50-17:14/24       |       | 07:11 |       | 05:55 |       | 06:18  | 06:49     |         | 06:52 16:29-16:37/8  | 07:48    |
|                             | 17:39   |                      | 18:16 |       | 20:48 |       | 20:42 | 20:00  |           | 17:22   |                      | 17:05    |
| Potential sun hours         | 298     |                      | 297   |       | 369   | 399   | 448   | 452    | 459       | 428     | 375                  | 298      |
| Sum of minutes with flicker | 165     |                      | 213   |       | 0     | 0     | 0     | 0      | 0         | 0       | 8                    | 375      |
|                             |         |                      |       |       |       |       |       |        |           |         |                      | 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

WTG: GA09 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (21)

### 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                           | 07:49   | 07:35 07:55-08:08/13 | 07:00 | 07:09 | 06:23 | 05:55 | 05:55 | 06:19  | 06:50     | 07:19                | 06:53 07:15-07:40/25 | 07:28    |
|                             | 17:06   | 17:40                | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:07                | 17:21                | 16:57    |
| 2                           | 07:49   | 07:34 07:54-08:09/15 | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51     | 07:20                | 06:55 07:16-07:40/24 | 07:29    |
|                             | 17:07   | 17:41                | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06                | 17:20                | 16:56    |
| 3                           | 07:49   | 07:33 07:53-08:10/17 | 06:56 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:21                | 06:56 07:18-07:41/23 | 07:30    |
|                             | 17:07   | 17:42                | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04                | 17:18                | 16:56    |
| 4                           | 07:49   | 07:32 07:52-08:10/18 | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:52     | 07:22                | 06:57 07:19-07:41/22 | 07:31    |
|                             | 17:08   | 17:44                | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:02                | 17:17                | 16:56    |
| 5                           | 07:49   | 07:31 07:51-08:11/20 | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:53     | 07:24                | 06:58 07:20-07:41/21 | 07:32    |
|                             | 17:09   | 17:45                | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51     | 19:01                | 17:16                | 16:56    |
| 6                           | 07:49   | 07:30 07:50-08:11/21 | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:54     | 07:25                | 06:59 07:21-07:41/20 | 07:33    |
|                             | 17:10   | 17:46                | 18:20 | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50     | 18:59                | 17:15                | 16:56    |
| 7                           | 07:49   | 07:29 07:49-08:11/22 | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55     | 07:26                | 07:01 07:23-07:41/18 | 07:34    |
|                             | 17:11   | 17:47                | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58                | 17:14                | 16:56    |
| 8                           | 07:49   | 07:28 07:48-08:12/24 | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56     | 07:27                | 07:02 07:24-07:41/17 | 07:35    |
|                             | 17:12   | 17:49                | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56                | 17:13                | 16:56    |
| 9                           | 07:49   | 07:27 07:47-08:12/25 | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57     | 07:28                | 07:03 07:25-07:40/15 | 07:36    |
|                             | 17:13   | 17:50                | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54                | 17:12                | 16:56    |
| 10                          | 07:48   | 07:26 07:45-08:11/26 | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58     | 07:29                | 07:04 07:26-07:39/13 | 07:37    |
|                             | 17:14   | 17:51                | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53                | 17:11                | 16:56    |
| 11                          | 07:48   | 07:25 07:44-08:11/27 | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59     | 07:30                | 07:05 07:28-07:40/12 | 07:38    |
|                             | 17:15   | 17:52                | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51                | 17:10                | 16:56    |
| 12                          | 07:48   | 07:23 07:43-08:10/27 | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31                | 07:07 07:29-07:39/10 | 07:39    |
|                             | 17:16   | 17:54                | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50                | 17:09                | 16:56    |
| 13                          | 07:48   | 07:22 07:42-08:10/28 | 06:41 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01     | 07:32                | 07:08 07:30-07:38/8  | 07:39    |
|                             | 17:17   | 17:55                | 18:27 | 20:00 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48                | 17:08                | 16:56    |
| 14                          | 07:47   | 07:21 07:40-08:08/28 | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33                | 07:09 07:32-07:38/6  | 07:40    |
|                             | 17:18   | 17:56                | 18:28 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46                | 17:07                | 16:56    |
| 15                          | 07:47   | 07:19 07:41-08:08/27 | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34                | 07:10 07:33-07:36/3  | 07:41    |
|                             | 17:20   | 17:57                | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45                | 17:06                | 16:56    |
| 16                          | 07:47   | 07:18 07:43-08:07/24 | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35                | 07:11 07:34-07:35/1  | 07:42    |
|                             | 17:21   | 17:58                | 18:31 | 20:04 | 20:35 | 20:58 | 20:54 | 20:22  | 19:33     | 18:43                | 17:05                | 16:57    |
| 17                          | 07:46   | 07:17 07:44-08:04/20 | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05     | 07:36                | 07:12                | 07:42    |
|                             | 17:22   | 18:00                | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42                | 17:04                | 16:57    |
| 18                          | 07:46   | 07:16 07:46-08:02/16 | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:37                | 07:14                | 07:43    |
|                             | 17:23   | 18:01                | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:20  | 19:30     | 18:40                | 17:04                | 16:57    |
| 19                          | 07:45   | 07:14 07:49-07:58/9  | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07     | 07:39                | 07:15                | 07:44    |
|                             | 17:24   | 18:02                | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39                | 17:03                | 16:58    |
| 20                          | 07:45   | 07:13                | 06:29 | 06:39 | 06:02 | 05:52 | 06:08 | 06:38  | 07:08     | 07:40                | 07:16                | 07:44    |
|                             | 17:25   | 18:03                | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:16  | 19:26     | 18:37                | 17:02                | 16:58    |
| 21                          | 07:44   | 07:11                | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41                | 07:17                | 07:45    |
|                             | 17:26   | 18:04                | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36                | 17:02                | 16:58    |
| 22                          | 07:43   | 07:10                | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42                | 07:18                | 07:45    |
|                             | 17:28   | 18:06                | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:34                | 17:01                | 16:59    |
| 23                          | 07:43   | 07:08                | 06:24 | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11     | 07:43 08:18-08:30/12 | 07:19                | 07:46    |
|                             | 17:29   | 18:07                | 18:38 | 20:11 | 20:41 | 21:00 | 20:49 | 20:12  | 19:21     | 18:33                | 17:00                | 16:59    |
| 24                          | 07:42   | 07:07                | 06:22 | 06:33 | 05:59 | 05:52 | 06:11 | 06:42  | 07:12     | 07:44 08:15-08:33/18 | 07:21                | 07:46    |
|                             | 17:30   | 18:08                | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:10  | 19:19     | 18:32                | 17:00                | 16:59    |
| 25                          | 07:41   | 07:06                | 06:21 | 06:31 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13     | 06:45 07:13-07:34/21 | 07:22                | 07:47    |
|                             | 17:31   | 18:09                | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 17:30                | 16:59                | 17:00    |
| 26                          | 07:41   | 08:01-08:02/1        | 07:04 | 06:19 | 06:30 | 05:58 | 05:53 | 06:13  | 06:44     | 07:14                | 06:47 07:12-07:37/25 | 07:23    |
|                             | 17:32   | 18:10                | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29                | 16:59                | 17:01    |
| 27                          | 07:40   | 08:00-08:03/3        | 07:03 | 06:17 | 06:29 | 05:57 | 05:53 | 06:14  | 06:45     | 07:15                | 06:48 07:10-07:38/28 | 07:24    |
|                             | 17:34   | 18:12                | 18:42 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:27                | 16:58                | 17:02    |
| 28                          | 07:39   | 07:59-08:05/6        | 07:01 | 06:16 | 06:27 | 05:57 | 05:54 | 06:15  | 06:46     | 07:16                | 06:49 07:10-07:38/28 | 07:25    |
|                             | 17:35   | 18:13                | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26                | 16:58                | 17:02    |
| 29                          | 07:38   | 07:58-08:06/8        |       | 07:14 | 06:26 | 05:56 | 05:54 | 06:16  | 06:47     | 07:17                | 06:50 07:11-07:39/28 | 07:26    |
|                             | 17:36   |                      |       | 19:45 | 20:17 | 20:47 | 21:00 | 20:44  | 20:03     | 19:11                | 17:25                | 16:57    |
| 30                          | 07:37   | 07:57-08:07/10       |       | 07:12 | 06:25 | 05:56 | 05:55 | 06:17  | 06:48     | 07:18                | 06:51 07:13-07:40/27 | 07:27    |
|                             | 17:37   |                      |       | 19:46 | 20:18 | 20:47 | 21:00 | 20:43  | 20:01     | 19:09                | 17:23                | 16:57    |
| 31                          | 07:36   | 07:56-08:08/12       |       | 07:11 |       | 05:55 |       | 06:18  | 06:49     |                      | 06:52 07:14-07:40/26 | 07:48    |
|                             | 17:39   |                      |       | 19:47 |       | 20:48 |       | 20:42  | 20:00     |                      | 17:22                | 17:05    |
| Potential sun hours         | 298     |                      | 297   | 369   | 399   | 448   | 452   | 459    | 428       | 375                  | 345                  | 298      |
| Sum of minutes with flicker | 40      |                      | 407   | 0     | 0     | 0     | 0     | 0      | 0         | 0                    | 213                  | 238      |
|                             |         |                      |       |       |       |       |       |        |           |                      |                      | 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

WTG: GA10 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (22)

### 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  | 07:49                       | 07:35    | 07:00 | 07:09 | 06:23 | 05:54 | 05:55 | 06:19  | 06:50     | 07:19   | 06:54    | 07:28    |
|    | 17:06                       | 17:40    | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:07   | 17:21    | 16:57    |
| 2  | 07:49                       | 07:34    | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51     | 07:20   | 06:55    | 07:29    |
|    | 17:07                       | 17:41    | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20    | 16:56    |
| 3  | 07:49                       | 07:33    | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:21   | 06:56    | 07:30    |
|    | 17:07                       | 17:42    | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04   | 17:18    | 16:56    |
| 4  | 07:49                       | 07:32    | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:52     | 07:23   | 06:57    | 07:31    |
|    | 17:08                       | 17:44    | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:02   | 17:17    | 16:56    |
| 5  | 07:49                       | 07:31    | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:53     | 07:24   | 06:58    | 07:32    |
|    | 17:09                       | 17:45    | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51     | 19:01   | 17:16    | 16:56    |
| 6  | 07:49                       | 07:30    | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:54     | 07:25   | 06:59    | 07:33    |
|    | 17:10                       | 17:46    | 18:20 | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15    | 16:56    |
| 7  | 07:49                       | 07:29    | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55     | 07:26   | 07:01    | 07:34    |
|    | 17:11                       | 17:47    | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14    | 16:56    |
| 8  | 07:49                       | 07:28    | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56     | 07:27   | 07:02    | 07:35    |
|    | 17:12                       | 17:49    | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13    | 16:55    |
| 9  | 07:49                       | 07:27    | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57     | 07:28   | 07:03    | 07:36    |
|    | 17:13                       | 17:50    | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12    | 16:55    |
| 10 | 07:48                       | 07:26    | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58     | 07:29   | 07:04    | 07:37    |
|    | 17:14                       | 17:51    | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11    | 16:56    |
| 11 | 07:48                       | 07:25    | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59     | 07:30   | 07:05    | 07:38    |
|    | 17:15                       | 17:52    | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10    | 16:56    |
| 12 | 07:48                       | 07:23    | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07    | 07:39    |
|    | 17:16                       | 17:54    | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09    | 16:56    |
| 13 | 07:48                       | 07:22    | 06:41 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01     | 07:32   | 07:08    | 07:39    |
|    | 17:17                       | 17:55    | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08    | 16:56    |
| 14 | 07:47                       | 07:21    | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09    | 07:40    |
|    | 17:18                       | 17:56    | 18:28 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07    | 16:56    |
| 15 | 07:47                       | 07:20    | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10    | 07:41    |
|    | 17:19                       | 17:57    | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06    | 16:56    |
| 16 | 07:47                       | 07:18    | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11    | 07:42    |
|    | 17:21                       | 17:58    | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43   | 17:05    | 16:56    |
| 17 | 07:46                       | 07:17    | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05     | 07:36   | 07:13    | 07:42    |
|    | 17:22                       | 18:00    | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:04    | 16:57    |
| 18 | 07:46                       | 07:16    | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:37   | 07:14    | 07:43    |
|    | 17:23                       | 18:01    | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30     | 18:40   | 17:04    | 16:57    |
| 19 | 07:45                       | 07:14    | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15    | 07:44    |
|    | 17:24                       | 18:02    | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39   | 17:03    | 16:57    |
| 20 | 07:45                       | 07:13    | 06:29 | 06:39 | 06:02 | 05:51 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16    | 07:44    |
|    | 17:25                       | 18:03    | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37   | 17:02    | 16:58    |
| 21 | 07:44                       | 07:11    | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17    | 07:45    |
|    | 17:26                       | 18:04    | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:01    | 16:58    |
| 22 | 07:43                       | 07:10    | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42   | 07:18    | 07:45    |
|    | 17:28                       | 18:06    | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:34   | 17:01    | 16:59    |
| 23 | 07:43                       | 07:09    | 06:24 | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11     | 07:43   | 07:20    | 07:46    |
|    | 17:29                       | 18:07    | 18:38 | 20:11 | 20:41 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33   | 17:00    | 16:59    |
| 24 | 07:42                       | 07:07    | 06:22 | 06:33 | 05:59 | 05:52 | 06:11 | 06:42  | 07:12     | 07:44   | 07:21    | 07:46    |
|    | 17:30                       | 18:08    | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32   | 17:00    | 17:00    |
| 25 | 07:41                       | 07:06    | 06:21 | 06:31 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13     | 06:45   | 07:22    | 07:47    |
|    | 17:31                       | 18:09    | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 17:30   | 16:59    | 17:00    |
| 26 | 07:41                       | 07:04    | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 06:47   | 07:23    | 07:47    |
|    | 17:32                       | 18:10    | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29   | 16:59    | 17:01    |
| 27 | 07:40                       | 07:03    | 06:17 | 06:29 | 05:57 | 05:53 | 06:14 | 06:45  | 07:15     | 06:48   | 07:24    | 07:47    |
|    | 17:34                       | 18:12    | 18:42 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:27   | 16:58    | 17:02    |
| 28 | 07:39                       | 07:01    | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16     | 06:49   | 07:25    | 07:48    |
|    | 17:35                       | 18:13    | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26   | 16:58    | 17:02    |
| 29 | 07:38                       |          | 07:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 06:50   | 07:26    | 07:48    |
|    | 17:36                       |          | 19:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57    | 17:03    |
| 30 | 07:37                       |          | 07:12 | 06:25 | 05:55 | 05:55 | 06:17 | 06:48  | 07:18     | 06:51   | 07:27    | 07:48    |
|    | 17:37                       |          | 19:46 | 20:18 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:23   | 16:57    | 17:04    |
| 31 | 07:36                       |          | 07:11 |       | 05:55 |       | 06:18 | 06:49  |           | 06:52   |          | 07:48    |
|    | 17:39                       |          | 19:47 |       | 20:48 |       | 20:42 | 20:00  |           | 17:22   |          | 17:05    |
|    | Potential sun hours         | 298      | 297   | 369   | 399   | 448   | 452   | 459    | 428       | 375     | 345      | 298      |
|    | Sum of minutes with flicker | 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

WTG: GA11 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (23)

### 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

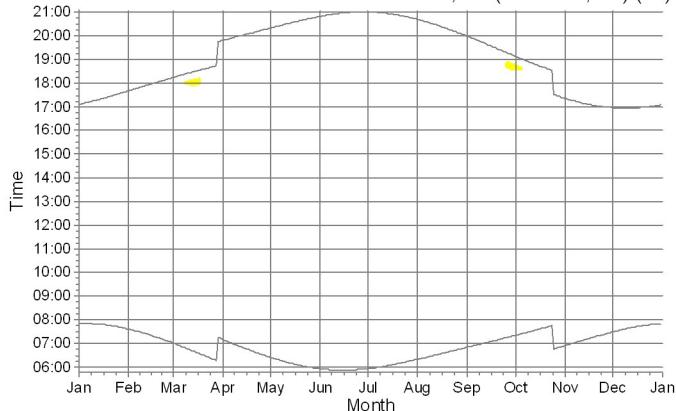
|                             | January | February             | March | April | May   | June  | July  | August | September | October | November             | December |
|-----------------------------|---------|----------------------|-------|-------|-------|-------|-------|--------|-----------|---------|----------------------|----------|
| 1                           | 07:49   | 07:35 16:49-17:03/14 | 07:00 | 07:09 | 06:23 | 05:54 | 05:55 | 06:19  | 06:50     | 07:19   | 06:54 16:25-16:42/17 | 07:28    |
|                             | 17:06   | 17:40                | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:08   | 17:21                | 16:57    |
| 2                           | 07:49   | 07:35 16:49-17:05/16 | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51     | 07:20   | 06:55 16:24-16:44/20 | 07:29    |
|                             | 17:07   | 17:41                | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20                | 16:56    |
| 3                           | 07:49   | 07:34 16:49-17:06/17 | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:22   | 06:56 16:23-16:43/20 | 07:30    |
|                             | 17:07   | 17:42                | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04   | 17:19                | 16:56    |
| 4                           | 07:49   | 07:32 16:50-17:08/18 | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:53     | 07:23   | 06:57 16:22-16:42/20 | 07:31    |
|                             | 17:08   | 17:44                | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:03   | 17:17                | 16:56    |
| 5                           | 07:49   | 07:31 16:51-17:09/18 | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:54     | 07:24   | 06:58 16:21-16:41/20 | 07:32    |
|                             | 17:09   | 17:45                | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:37  | 19:51     | 19:01   | 17:16                | 16:56    |
| 6                           | 07:49   | 07:30 16:51-17:11/20 | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:55     | 07:25   | 07:00 16:20-16:39/19 | 07:33    |
|                             | 17:10   | 17:46                | 18:20 | 19:53 | 20:25 | 20:53 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15                | 16:56    |
| 7                           | 07:49   | 07:29 16:52-17:12/20 | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55     | 07:26   | 07:01 16:21-16:39/18 | 07:34    |
|                             | 17:11   | 17:47                | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14                | 16:56    |
| 8                           | 07:49   | 07:28 16:54-17:14/20 | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56     | 07:27   | 07:02 16:20-16:37/17 | 07:35    |
|                             | 17:12   | 17:49                | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13                | 16:56    |
| 9                           | 07:49   | 07:27 16:55-17:15/20 | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57     | 07:28   | 07:03 16:20-16:36/16 | 07:36    |
|                             | 17:13   | 17:50                | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12                | 16:55    |
| 10                          | 07:49   | 07:26 16:56-17:12/16 | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58     | 07:29   | 07:04 16:20-16:34/14 | 07:37    |
|                             | 17:14   | 17:51                | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11                | 16:56    |
| 11                          | 07:48   | 07:25 16:59-17:10/11 | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59     | 07:30   | 07:05 16:20-16:34/14 | 07:38    |
|                             | 17:15   | 17:52                | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10                | 16:56    |
| 12                          | 07:48   | 07:23                | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07 16:20-16:33/13 | 07:39    |
|                             | 17:16   | 17:54                | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09                | 16:56    |
| 13                          | 07:48   | 07:22                | 06:41 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01     | 07:32   | 07:08 16:20-16:31/11 | 07:39    |
|                             | 17:17   | 17:55                | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08                | 16:56    |
| 14                          | 07:47   | 07:21                | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09 16:22-16:31/9  | 07:40    |
|                             | 17:18   | 17:56                | 18:29 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07                | 16:56    |
| 15                          | 07:47   | 07:20                | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10 16:22-16:30/8  | 07:41    |
|                             | 17:19   | 17:57                | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06                | 16:56    |
| 16                          | 07:47   | 07:18                | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11 16:22-16:29/7  | 07:42    |
|                             | 17:21   | 17:58                | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43   | 17:05                | 16:56    |
| 17                          | 07:46   | 07:17                | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05     | 07:36   | 07:13 16:23-16:28/5  | 07:42    |
|                             | 17:22   | 18:00                | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:04                | 16:57    |
| 18                          | 07:46   | 07:16                | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:38   | 07:14 16:25-16:28/3  | 07:43    |
|                             | 17:23   | 18:01                | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30     | 18:40   | 17:04                | 16:57    |
| 19                          | 07:45   | 07:14                | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15 16:25-16:27/2  | 07:44    |
|                             | 17:24   | 18:02                | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39   | 17:03                | 16:57    |
| 20                          | 07:45   | 07:13                | 06:29 | 06:39 | 06:02 | 05:51 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16 16:26-16:27/1  | 07:44    |
|                             | 17:25   | 18:03                | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37   | 17:02                | 16:58    |
| 21                          | 07:44   | 07:11                | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17                | 07:45    |
|                             | 17:26   | 18:04                | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:02                | 16:58    |
| 22                          | 07:43   | 16:51-16:52/1        | 07:10 | 06:26 | 06:36 | 06:01 | 05:52 | 06:10  | 06:40     | 07:10   | 07:42                | 07:45    |
|                             | 17:28   | 18:06                | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:34   | 17:01                | 16:59    |
| 23                          | 07:43   | 16:50-16:52/2        | 07:09 | 06:24 | 06:34 | 06:00 | 05:52 | 06:11  | 06:41     | 07:11   | 07:43                | 07:20    |
|                             | 17:29   | 18:07                | 18:38 | 20:11 | 20:42 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33   | 17:00                | 16:59    |
| 24                          | 07:42   | 16:51-16:54/3        | 07:07 | 06:22 | 06:33 | 05:59 | 05:52 | 06:11  | 06:42     | 07:12   | 07:21                | 07:46    |
|                             | 17:30   | 18:08                | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32   | 17:00                | 17:00    |
| 25                          | 07:41   | 16:50-16:55/5        | 07:06 | 06:21 | 06:31 | 05:59 | 05:53 | 06:12  | 06:43     | 07:13   | 07:22                | 07:47    |
|                             | 17:31   | 18:09                | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 17:30   | 16:59                | 17:00    |
| 26                          | 07:41   | 16:49-16:56/7        | 07:04 | 06:19 | 06:30 | 05:58 | 05:53 | 06:13  | 06:44     | 07:14   | 07:23                | 07:47    |
|                             | 17:32   | 18:10                | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29   | 16:59                | 17:01    |
| 27                          | 07:40   | 16:49-16:57/8        | 07:03 | 06:17 | 06:29 | 05:57 | 05:53 | 06:14  | 06:45     | 07:15   | 07:24                | 07:47    |
|                             | 17:34   | 18:12                | 18:43 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:27   | 16:58                | 17:02    |
| 28                          | 07:39   | 16:49-16:58/9        | 07:01 | 06:16 | 06:27 | 05:57 | 05:54 | 06:15  | 06:46     | 07:16   | 06:49                | 07:25    |
|                             | 17:35   | 18:13                | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26   | 16:58                | 17:02    |
| 29                          | 07:38   | 16:49-17:00/11       |       | 07:14 | 06:26 | 05:56 | 05:54 | 06:16  | 06:47     | 07:17   | 06:50                | 07:26    |
|                             | 17:36   |                      | 18:14 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57                | 17:03    |
| 30                          | 07:37   | 16:48-17:01/13       |       | 07:12 | 06:25 | 05:56 | 05:55 | 06:17  | 06:48     | 07:18   | 06:51 16:32-16:37/5  | 07:27    |
|                             | 17:37   |                      | 18:15 | 20:19 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:23   | 16:57                | 17:04    |
| 31                          | 07:36   | 16:49-17:02/13       |       | 07:11 |       | 05:55 |       | 06:18  | 06:49     |         | 06:52 16:28-16:41/13 | 07:49    |
|                             | 17:39   |                      | 18:16 | 20:19 | 20:48 | 20:42 | 20:00 | 20:00  | 17:22     |         |                      | 17:05    |
| Potential sun hours         | 298     | 297                  | 369   | 399   | 448   | 452   | 459   | 428    | 375       | 345     | 298                  | 288      |
| Sum of minutes with flicker | 72      | 190                  | 0     | 0     | 0     | 0     | 0     | 0      | 0         | 0       | 254                  | 0        |

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

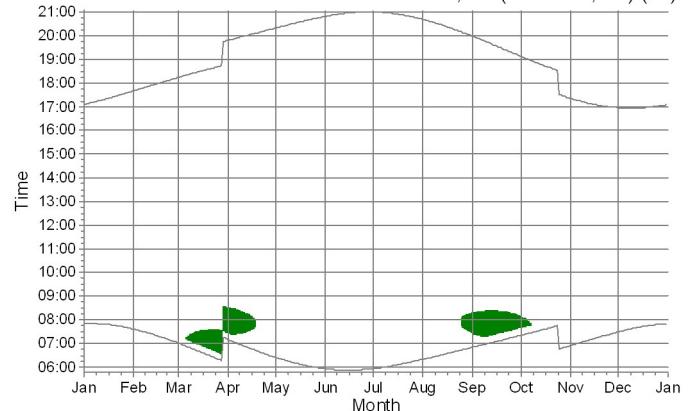
|              |                  |                                 |                                |                      |
|--------------|------------------|---------------------------------|--------------------------------|----------------------|
| Day in month | Sun rise (hh:mm) | First time (hh:mm)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

## SHADOW - Calendar per WTG, graphical

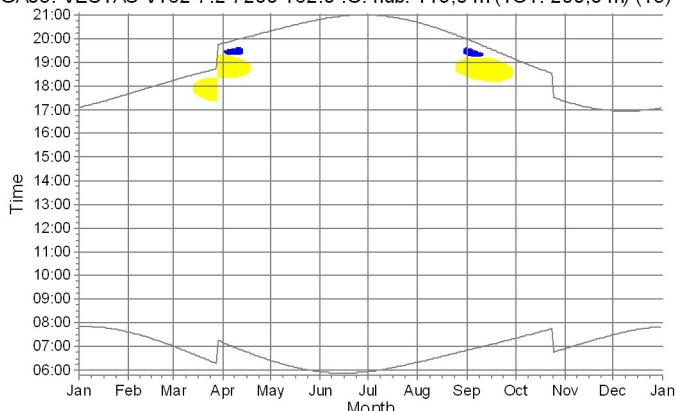
GA01: VESTAS V162-7.2 7200 162.0 !O! hub: 119.0 m (TOT: 200,0 m) (13)



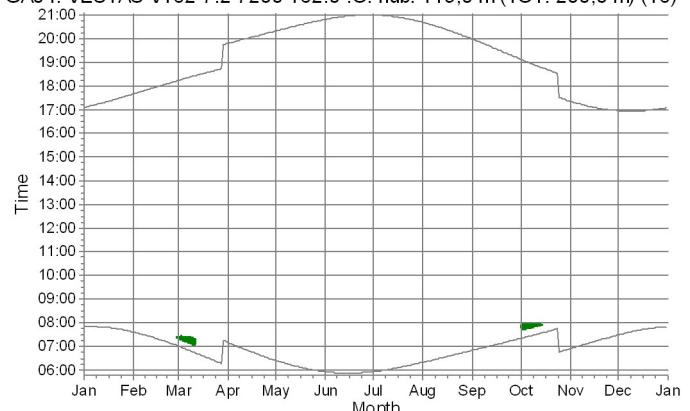
GA02: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)



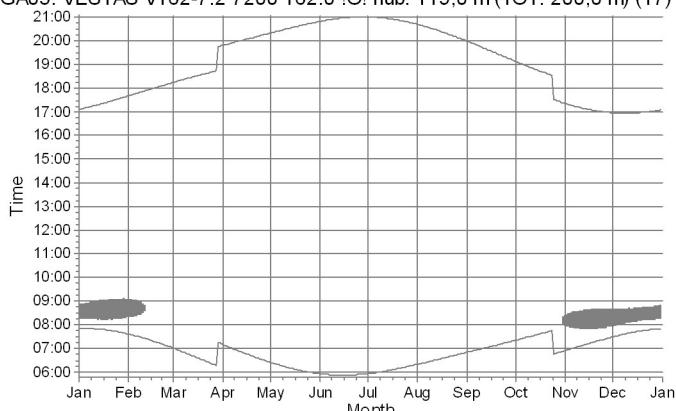
GA03: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)



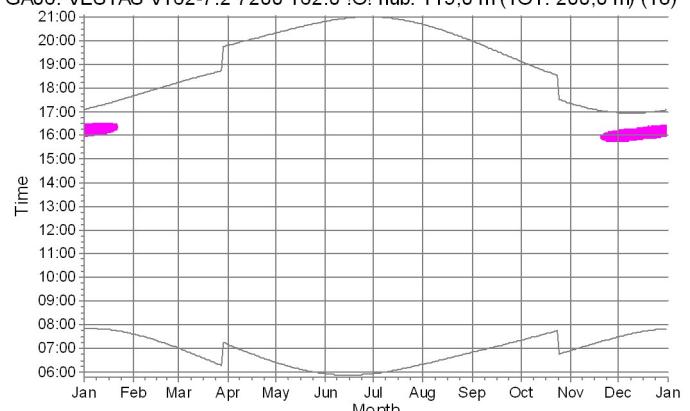
GA04: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)



GA05: VESTAS V162-7.2 7200 162.0 !O! hub: 119.0 m (TOT: 200,0 m) (17)



GA06: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)



Shadow receptors



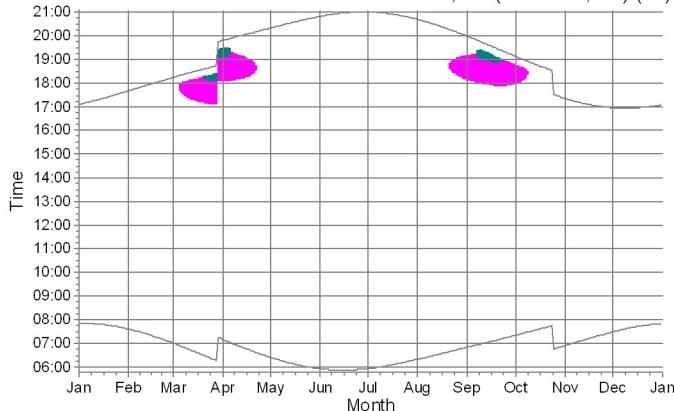
- R40: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (2)
- R28: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (3)
- R31: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (4)



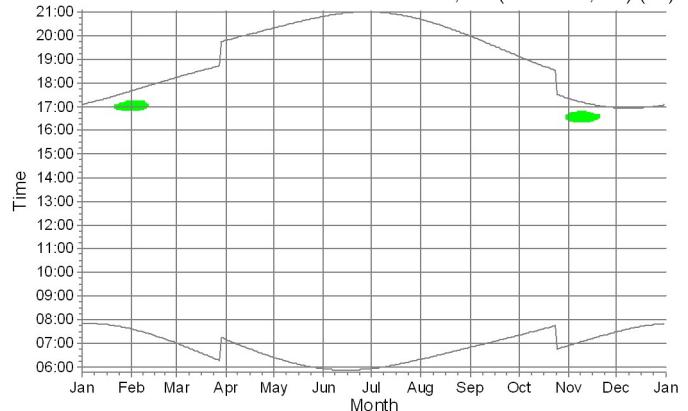
- R48: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (5)
- R53: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (6)

## SHADOW - Calendar per WTG, graphical

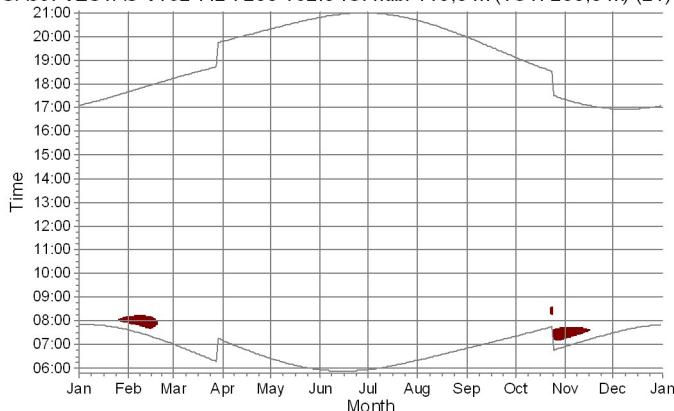
GA07: VESTAS V162-7.2 7200 162.0 !O! hub: 119.0 m (TOT: 200,0 m) (19)



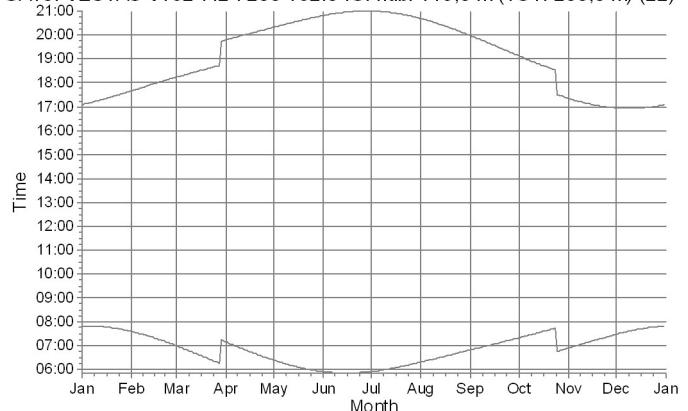
GA08: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)



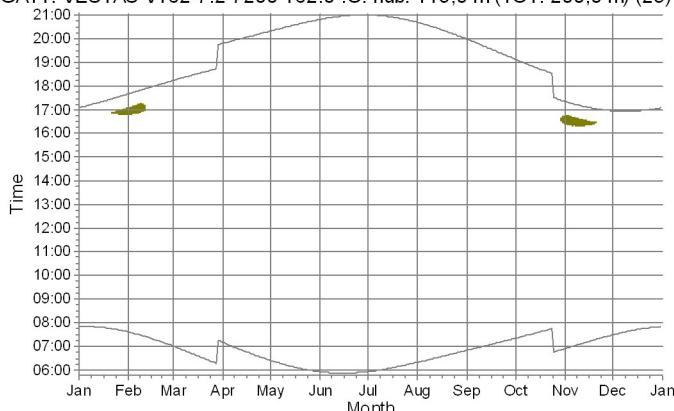
GA09: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (21)



GA10: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (22)



GA11: VESTAS V162-7.2 7200 162.0 !O! hub: 119.0 m (TOT: 200,0 m) (23)

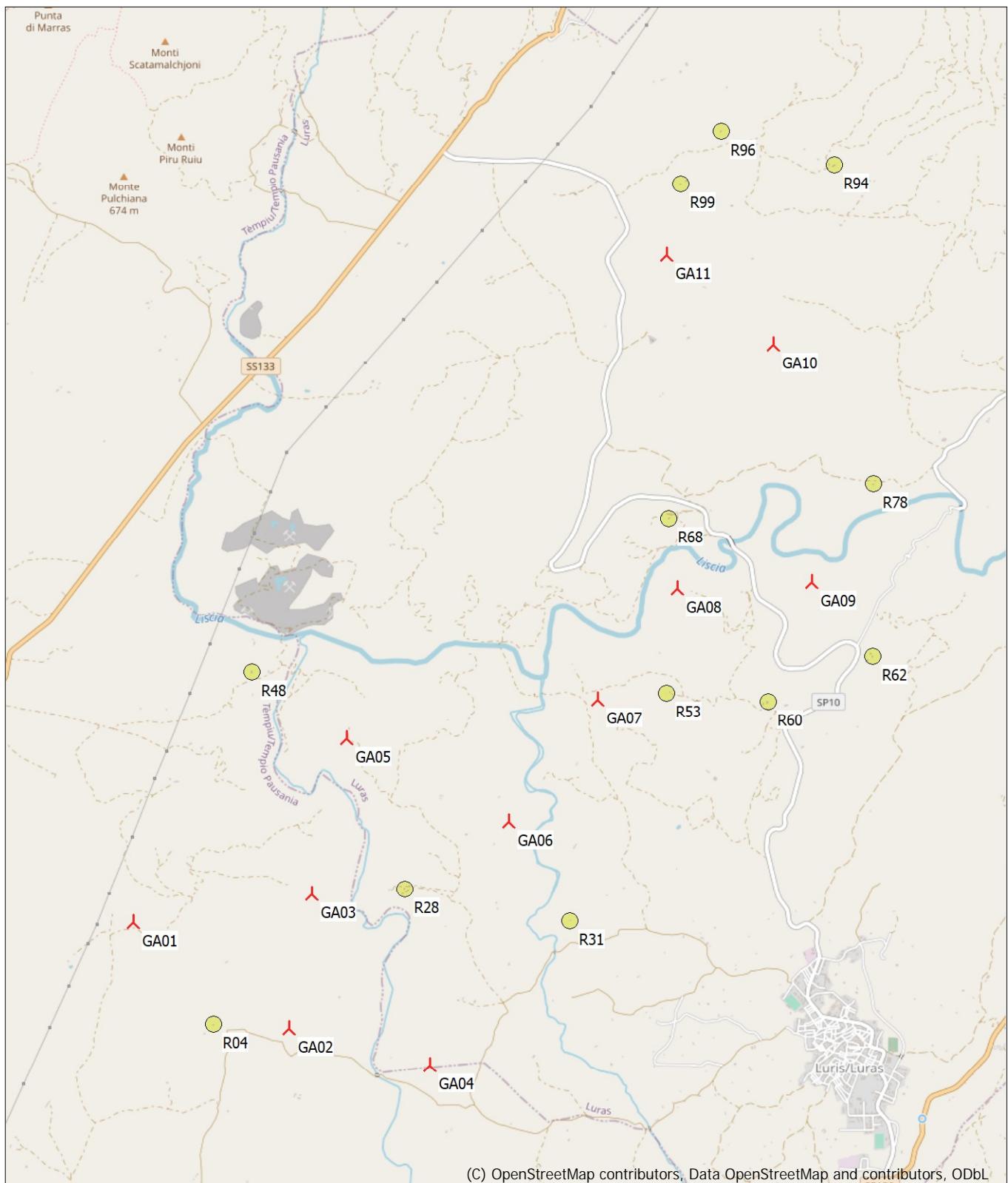


Shadow receptors

|  |  |
|--|--|
| <span style="background-color: magenta; border: 1px solid black; padding: 2px 10px;"></span> | R53: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (6) |
| <span style="background-color: teal; border: 1px solid black; padding: 2px 10px;"></span>    | R60: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (7) |
| <span style="background-color: darkred; border: 1px solid black; padding: 2px 10px;"></span> | R68: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (9) |

|  |   |
|--|---|
| <span style="background-color: lime; border: 1px solid black; padding: 2px 10px;"></span>  | R78: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (10) |
| <span style="background-color: olive; border: 1px solid black; padding: 2px 10px;"></span> | R94: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (11) |

## SHADOW - Map



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:40.000, Map center Geo WGS84 East: 9,146008° E North: 40,965077° N

>New WTG

Shadow receptor

Flicker map level: Elevation Grid Data Object: WF Gallura\_EMDGrid\_0.wpg (1)

9. **ALLEGATO 2: SHADOW – MAIN RESULT – ELABORAZIONE MEDIANTE IL  
SOFTWARE WINDPRO 3.4 – EXPECTED VALUES**

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## SHADOW - Main Result

Calculation: Caso reale su dati statistici

Assumptions for shadow calculations

Maximum distance for influence

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

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

|   |  |
|---|--|
| Sunshine probability S (Average daily sunshine hours) []    |  |
| Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec             |  |
| 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 |  |

Operational time

|  |  |
|--|--|
| N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum              |  |
| 90 295 742 511 343 267 107 562 1.775 1.844 553 102 7.191 |  |

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

Height contours used: Elevation Grid Data Object: WF Gallura\_EMDGrid\_0.wpg

Obstacles used in calculation

Receptor grid resolution: 1,0 m

Topographic shadow included in calculation

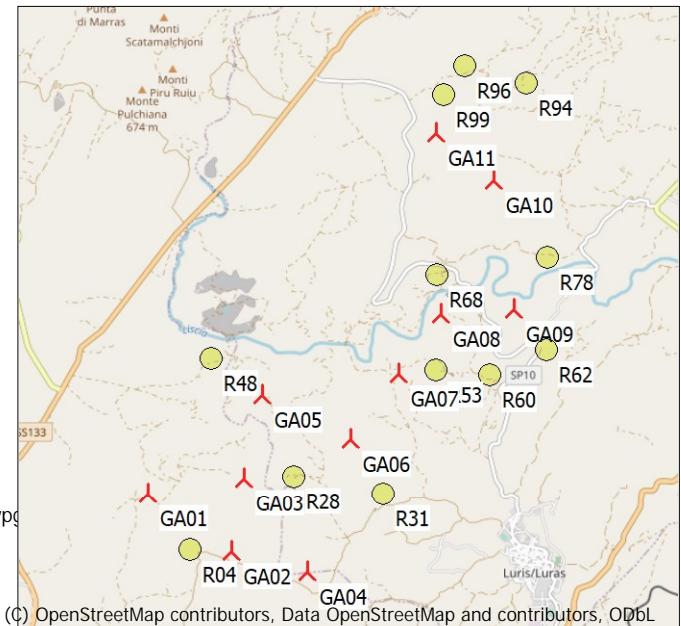
All coordinates are in  
Geo [deg]-WGS84

WTGs

| Longitude | Latitude    | Z            | Row data/Description          | WTG type |           |                | Shadow data       |                    |                |           |
|-----------|-------------|--------------|-------------------------------|----------|-----------|----------------|-------------------|--------------------|----------------|-----------|
|           |             |              |                               | Valid    | Manufact. | Type-generator | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | RPM       |
| [m]       |             |              |                               |          |           |                |                   |                    |                |           |
| GA01      | 9,114506° E | 40,944210° N | 423,5 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041 9,5 |
| GA02      | 9,127765° E | 40,937423° N | 433,1 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041 9,5 |
| GA03      | 9,129671° E | 40,946033° N | 426,8 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041 9,5 |
| GA04      | 9,139665° E | 40,935032° N | 446,2 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041 9,5 |
| GA05      | 9,132639° E | 40,956036° N | 359,6 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041 9,5 |
| GA06      | 9,146434° E | 40,950689° N | 408,9 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041 9,5 |
| GA07      | 9,154012° E | 40,958575° N | 311,2 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041 9,5 |
| GA08      | 9,160780° E | 40,965674° N | 261,9 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041 9,5 |
| GA09      | 9,172211° E | 40,966121° N | 226,8 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041 9,5 |
| GA10      | 9,168955° E | 40,981421° N | 439,9 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041 9,5 |
| GA11      | 9,159869° E | 40,987175° N | 438,5 VESTAS V162-7.2 7200... | Yes      | VESTAS    | V162-7.2-7.200 | 7.200             | 162,0              | 119,0          | 2.041 9,5 |

### Shadow receptor-Input

| No. | Longitude   | Latitude     | Z     | Width | Height | Elevation a.g.l. | Slope of window | Direction mode     | Eye height (ZVI) a.g.l. |
|-----|-------------|--------------|-------|-------|--------|------------------|-----------------|--------------------|-------------------------|
|     |             |              |       | [m]   | [m]    | [m]              | [m]             |                    | [m]                     |
| R04 | 9,121307° E | 40,937657° N | 483,0 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R28 | 9,137579° E | 40,946360° N | 427,1 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R31 | 9,151659° E | 40,944313° N | 428,7 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R48 | 9,124571° E | 40,960363° N | 347,3 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R53 | 9,159872° E | 40,958972° N | 336,8 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R60 | 9,168513° E | 40,958429° N | 365,2 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R62 | 9,177406° E | 40,961339° N | 313,2 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R68 | 9,160079° E | 40,970246° N | 268,1 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R78 | 9,177503° E | 40,972435° N | 223,2 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R94 | 9,174139° E | 40,992943° N | 432,9 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R96 | 9,164523° E | 40,995118° N | 513,7 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |
| R99 | 9,161065° E | 40,991752° N | 463,9 | 1,0   | 1,0    | 1,0              | 90,0            | "Green house mode" | 2,0                     |



## SHADOW - Main Result

Calculation: Caso reale su dati statistici

### Calculation Results

Shadow receptor

Shadow, expected values

No. Shadow hours

per year  
[h/year]

|     |       |
|-----|-------|
| R04 | 25:46 |
| R28 | 22:23 |
| R31 | 1:39  |
| R48 | 22:31 |
| R53 | 52:45 |
| R60 | 3:04  |
| R62 | 0:00  |
| R68 | 5:37  |
| R78 | 7:11  |
| R94 | 4:59  |
| R96 | 0:00  |
| R99 | 0:00  |

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

| No.  | Name  | Expected<br>[h/year] |
|------|---|----------------------|
| GA01 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13) | 1:32                 |
| GA02 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14) | 24:56                |
| GA03 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15) | 23:12                |
| GA04 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16) | 1:52                 |
| GA05 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17) | 22:31                |
| GA06 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18) | 15:18                |
| GA07 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19) | 37:42                |
| GA08 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20) | 7:11                 |
| GA09 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (21) | 5:37                 |
| GA10 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (22) | 0:00                 |
| GA11 | VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (23) | 4:59                 |

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

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R04 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (2)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

| Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                     | January | February | March        | April           | May          | June         |               |
|---------------------|---------|----------|--------------|-----------------|--------------|--------------|---------------|
| 1                   | 07:49   | 07:36    | 07:00        | 07:19 (GA04)    | 07:09        | 07:28 (GA02) | 06:24   05:55 |
|                     | 17:06   | 17:40    | 18:14        | 5 07:24 (GA04)  | 19:48 61     | 08:29 (GA02) | 20:20   20:49 |
| 2                   | 07:49   | 07:35    | 06:58        | 07:17 (GA04)    | 07:07        | 07:26 (GA02) | 06:22   05:54 |
|                     | 17:07   | 17:41    | 18:15        | 7 07:24 (GA04)  | 19:49 62     | 08:28 (GA02) | 20:21   20:50 |
| 3                   | 07:49   | 07:34    | 06:57        | 07:16 (GA04)    | 07:06        | 07:24 (GA02) | 06:21   05:54 |
|                     | 17:08   | 17:43    | 18:16        | 9 07:25 (GA04)  | 19:50 63     | 08:27 (GA02) | 20:22   20:50 |
| 4                   | 07:49   | 07:33    | 06:55        | 07:14 (GA04)    | 07:04        | 07:23 (GA02) | 06:20   05:54 |
|                     | 17:09   | 17:44    | 18:18        | 10 07:24 (GA04) | 19:51 63     | 08:26 (GA02) | 20:23   20:51 |
| 5                   | 07:49   | 07:31    | 06:54        | 07:12 (GA04)    | 07:03        | 07:23 (GA02) | 06:18   05:53 |
|                     | 17:10   | 17:45    | 18:19        | 12 07:24 (GA04) | 19:52 62     | 08:25 (GA02) | 20:24   20:52 |
| 6                   | 07:49   | 07:30    | 06:52        | 07:11 (GA02)    | 07:01        | 07:23 (GA02) | 06:17   05:53 |
|                     | 17:10   | 17:46    | 18:20        | 13 07:24 (GA04) | 19:53 60     | 08:23 (GA02) | 20:25   20:53 |
| 7                   | 07:49   | 07:29    | 06:50        | 07:09 (GA02)    | 06:59        | 07:25 (GA02) | 06:16   05:53 |
|                     | 17:11   | 17:48    | 18:21        | 14 07:23 (GA04) | 19:54 58     | 08:23 (GA02) | 20:26   20:53 |
| 8                   | 07:49   | 07:28    | 06:49        | 07:08 (GA02)    | 06:58        | 07:25 (GA02) | 06:15   05:52 |
|                     | 17:12   | 17:49    | 18:22        | 15 07:23 (GA04) | 19:55 56     | 08:21 (GA02) | 20:27   20:54 |
| 9                   | 07:49   | 07:27    | 06:47        | 07:06 (GA02)    | 06:56        | 07:26 (GA02) | 06:14   05:52 |
|                     | 17:13   | 17:50    | 18:23        | 16 07:22 (GA02) | 19:56 54     | 08:20 (GA02) | 20:28   20:54 |
| 10                  | 07:49   | 07:26    | 06:46        | 07:04 (GA02)    | 06:54        | 07:26 (GA02) | 06:13   05:52 |
|                     | 17:14   | 17:51    | 18:24        | 20 07:24 (GA02) | 19:57 52     | 08:18 (GA02) | 20:29   20:55 |
| 11                  | 07:48   | 07:25    | 06:44        | 07:03 (GA02)    | 06:53        | 07:27 (GA02) | 06:11   05:52 |
|                     | 17:15   | 17:53    | 18:25        | 23 07:26 (GA02) | 19:59 49     | 08:16 (GA02) | 20:30   20:55 |
| 12                  | 07:48   | 07:23    | 06:42        | 07:01 (GA02)    | 06:51        | 07:29 (GA02) | 06:10   05:52 |
|                     | 17:17   | 17:54    | 18:26        | 26 07:27 (GA02) | 20:00 46     | 08:15 (GA02) | 20:31   20:56 |
| 13                  | 07:48   | 07:22    | 06:41        | 06:59 (GA02)    | 06:50        | 07:30 (GA02) | 06:09   05:52 |
|                     | 17:18   | 17:55    | 18:28        | 29 07:28 (GA02) | 20:01 43     | 08:13 (GA02) | 20:32   20:56 |
| 14                  | 07:47   | 07:25    | 06:39        | 06:58 (GA02)    | 06:48        | 07:32 (GA02) | 06:08   05:51 |
|                     | 17:19   | 17:56    | 18:29        | 31 07:29 (GA02) | 20:02 39     | 08:11 (GA02) | 20:33   20:57 |
| 15                  | 07:47   | 07:20    | 06:37        | 06:56 (GA02)    | 06:47        | 07:33 (GA02) | 06:07   05:51 |
|                     | 17:20   | 17:57    | 18:30        | 34 07:30 (GA02) | 20:03 35     | 08:08 (GA02) | 20:34   20:57 |
| 16                  | 07:47   | 07:18    | 06:36        | 06:54 (GA02)    | 06:45        | 07:36 (GA02) | 06:06   05:51 |
|                     | 17:21   | 17:59    | 18:31        | 36 07:30 (GA02) | 20:04 30     | 08:06 (GA02) | 20:35   20:58 |
| 17                  | 07:46   | 07:17    | 06:34        | 06:53 (GA02)    | 06:43        | 07:38 (GA02) | 06:05   05:51 |
|                     | 17:22   | 18:00    | 18:32        | 38 07:31 (GA02) | 20:05 24     | 08:02 (GA02) | 20:36   20:58 |
| 18                  | 07:46   | 07:16    | 06:32        | 06:51 (GA02)    | 06:42        | 07:42 (GA02) | 06:05   05:52 |
|                     | 17:23   | 18:01    | 18:33        | 40 07:31 (GA02) | 20:06 16     | 07:58 (GA02) | 20:37   20:58 |
| 19                  | 07:45   | 07:14    | 06:31        | 06:49 (GA02)    | 06:40        |              | 06:04   05:52 |
|                     | 17:24   | 18:02    | 18:34        | 42 07:31 (GA02) | 20:07        |              | 20:38   20:59 |
| 20                  | 07:45   | 07:13    | 06:29        | 06:48 (GA02)    | 06:39        |              | 06:03   05:52 |
|                     | 17:26   | 18:04    | 18:35        | 44 07:32 (GA02) | 20:08        |              | 20:39   20:59 |
| 21                  | 07:44   | 07:12    | 06:27        | 06:46 (GA02)    | 06:37        |              | 06:02   05:52 |
|                     | 17:27   | 18:05    | 18:36        | 46 07:32 (GA02) | 20:09        |              | 20:40   20:59 |
| 22                  | 07:44   | 07:10    | 06:26        | 06:44 (GA02)    | 06:36        |              | 06:01   05:52 |
|                     | 17:28   | 18:06    | 18:37        | 48 07:32 (GA02) | 20:10        |              | 20:41   20:59 |
| 23                  | 07:43   | 07:09    | 06:24        | 06:43 (GA02)    | 06:35        |              | 06:00   05:52 |
|                     | 17:29   | 18:07    | 18:38        | 50 07:33 (GA02) | 20:11        |              | 20:42   21:00 |
| 24                  | 07:42   | 07:07    | 06:22        | 06:41 (GA02)    | 06:33        |              | 06:00   05:53 |
|                     | 17:30   | 18:08    | 18:39        | 51 07:32 (GA02) | 20:12        |              | 20:42   21:00 |
| 25                  | 07:41   | 07:06    | 06:21        | 06:39 (GA02)    | 06:32        |              | 05:59   05:53 |
|                     | 17:32   | 18:09    | 18:41        | 53 07:32 (GA02) | 20:13        |              | 20:43   21:00 |
| 26                  | 07:41   | 07:04    | 06:19        | 06:38 (GA02)    | 06:30        |              | 05:58   05:53 |
|                     | 17:33   | 18:11    | 18:42        | 54 07:32 (GA02) | 20:14        |              | 20:44   21:00 |
| 27                  | 07:40   | 07:03    | 06:17        | 06:36 (GA02)    | 06:29        |              | 05:58   05:54 |
|                     | 17:34   | 18:12    | 18:43        | 55 07:31 (GA02) | 20:15        |              | 20:45   21:00 |
| 28                  | 07:39   | 07:01    | 07:20 (GA04) | 06:16           | 06:34 (GA02) | 06:28        | 05:57   05:54 |
|                     | 17:35   | 18:13    | 18:44        | 57 07:31 (GA02) | 20:16        |              | 20:46   21:00 |
| 29                  | 07:38   |          | 07:14        | 07:33 (GA02)    | 06:26        |              | 05:56   05:54 |
|                     | 17:36   |          | 19:45        | 58 08:31 (GA02) | 20:18        |              | 20:47   21:00 |
| 30                  | 07:37   |          | 07:12        | 07:31 (GA02)    | 06:25        |              | 05:56   05:55 |
|                     | 17:38   |          | 19:46        | 59 08:30 (GA02) | 20:19        |              | 20:47   21:00 |
| 31                  | 07:36   |          | 07:11        | 07:29 (GA02)    |              |              | 05:55         |
|                     | 17:39   |          | 19:47        | 60 08:29 (GA02) |              |              | 20:48         |
| Potential sun hours | 298     | 297      | 369          | 399             |              |              | 448   452     |
| Total, worst case   |         | 2        | 1055         | 873             |              |              |               |
| Sun reduction       |         | 0,77     | 0,69         | 0,62            |              |              |               |
| Oper. time red.     |         | 0,82     | 0,82         | 0,82            |              |              |               |
| Wind dir. red.      |         | 0,68     | 0,74         | 0,74            |              |              |               |
| Total reduction     |         | 0,43     | 0,42         | 0,38            |              |              |               |
| Total, real         |         | 1        | 438          | 328             |              |              |               |

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 | (WTG causing flicker first time) | Last time (hh:mm) with flicker | (WTG causing flicker last time) |
|--------------|------------------|-----------------|----------------------|---------------------------------|----------------------------------|--------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|----------------------------------|--------------------------------|---------------------------------|

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R04 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (2)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

|  | Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|--|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
|  | N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|  | 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                     | July  | August | September    | October      | November     | December     |              |              |       |       |
|---------------------|-------|--------|--------------|--------------|--------------|--------------|--------------|--------------|-------|-------|
| 1                   | 05:55 | 06:19  | 06:50        | 07:27 (GA02) | 07:20        | 07:40 (GA02) | 06:54        | 07:28        |       |       |
|                     | 21:00 | 20:41  | 19:58        | 49           | 08:16 (GA02) | 19:08        | 27           | 08:07 (GA02) | 17:21 | 16:57 |
| 2                   | 05:56 | 06:20  | 06:51        | 07:24 (GA02) | 07:21        | 07:41 (GA02) | 06:55        | 07:29        |       |       |
|                     | 21:00 | 20:40  | 19:56        | 52           | 08:16 (GA02) | 19:06        | 24           | 08:05 (GA02) | 17:20 | 16:57 |
| 3                   | 05:56 | 06:21  | 06:52        | 07:23 (GA02) | 07:22        | 07:42 (GA02) | 06:56        | 07:30        |       |       |
|                     | 21:00 | 20:39  | 19:55        | 54           | 08:17 (GA02) | 19:04        | 21           | 08:03 (GA02) | 17:19 | 16:56 |
| 4                   | 05:57 | 06:22  | 06:53        | 07:22 (GA02) | 07:23        | 07:43 (GA02) | 06:57        | 07:31        |       |       |
|                     | 20:59 | 20:38  | 19:53        | 56           | 08:18 (GA02) | 19:03        | 18           | 08:01 (GA02) | 17:18 | 16:56 |
| 5                   | 05:57 | 06:23  | 06:54        | 07:21 (GA02) | 07:24        | 07:44 (GA02) | 06:58        | 07:32        |       |       |
|                     | 20:59 | 20:37  | 19:52        | 58           | 08:19 (GA02) | 19:01        | 15           | 07:59 (GA04) | 17:16 | 16:56 |
| 6                   | 05:58 | 06:24  | 06:55        | 07:19 (GA02) | 07:25        | 07:45 (GA02) | 07:00        | 07:33        |       |       |
|                     | 20:59 | 20:35  | 19:50        | 60           | 08:19 (GA02) | 18:59        | 14           | 07:59 (GA04) | 17:15 | 16:56 |
| 7                   | 05:59 | 06:25  | 06:56        | 07:18 (GA02) | 07:26        | 07:46 (GA02) | 07:01        | 07:34        |       |       |
|                     | 20:59 | 20:34  | 19:48        | 62           | 08:20 (GA02) | 18:58        | 14           | 08:00 (GA04) | 17:14 | 16:56 |
| 8                   | 05:59 | 06:26  | 06:57        | 07:18 (GA02) | 07:27        | 07:47 (GA04) | 07:02        | 07:35        |       |       |
|                     | 20:58 | 20:33  | 19:47        | 62           | 08:20 (GA02) | 18:56        | 12           | 07:59 (GA04) | 17:13 | 16:56 |
| 9                   | 06:00 | 06:27  | 06:58        | 07:18 (GA02) | 07:28        | 07:48 (GA04) | 07:03        | 07:36        |       |       |
|                     | 20:58 | 20:32  | 19:45        | 63           | 08:21 (GA02) | 18:55        | 11           | 07:59 (GA04) | 17:12 | 16:56 |
| 10                  | 06:01 | 06:28  | 06:59        | 07:19 (GA02) | 07:29        | 07:49 (GA04) | 07:04        | 07:37        |       |       |
|                     | 20:58 | 20:30  | 19:43        | 62           | 08:21 (GA02) | 18:53        | 10           | 07:59 (GA04) | 17:11 | 16:56 |
| 11                  | 06:01 | 06:29  | 07:00        | 07:20 (GA02) | 07:30        | 07:50 (GA04) | 07:06        | 07:38        |       |       |
|                     | 20:57 | 20:29  | 19:42        | 61           | 08:21 (GA02) | 18:51        | 8            | 07:58 (GA04) | 17:10 | 16:56 |
| 12                  | 06:02 | 06:30  | 07:01        | 07:21 (GA02) | 07:31        | 07:51 (GA04) | 07:07        | 07:39        |       |       |
|                     | 20:57 | 20:28  | 19:40        | 60           | 08:21 (GA02) | 18:50        | 6            | 07:57 (GA04) | 17:09 | 16:56 |
| 13                  | 06:03 | 06:31  | 07:02        | 07:22 (GA02) | 07:32        | 07:52 (GA04) | 07:08        | 07:39        |       |       |
|                     | 20:56 | 20:26  | 19:38        | 59           | 08:21 (GA02) | 18:48        | 4            | 07:56 (GA04) | 17:08 | 16:56 |
| 14                  | 06:03 | 06:32  | 07:03        | 07:23 (GA02) | 07:33        | 07:54 (GA04) | 07:09        | 07:40        |       |       |
|                     | 20:56 | 20:25  | 19:36        | 58           | 08:21 (GA02) | 18:47        | 1            | 07:55 (GA04) | 17:07 | 16:56 |
| 15                  | 06:04 | 06:33  | 07:04        | 07:24 (GA02) | 07:34        |              | 07:10        | 07:41        |       |       |
|                     | 20:55 | 20:24  | 19:35        | 57           | 08:21 (GA02) | 18:45        |              | 17:06        | 16:57 |       |
| 16                  | 06:05 | 06:34  | 07:05        | 07:25 (GA02) | 07:35        |              | 07:11        | 07:42        |       |       |
|                     | 20:55 | 20:22  | 19:33        | 56           | 08:21 (GA02) | 18:44        |              | 17:06        | 16:57 |       |
| 17                  | 06:06 | 06:35  | 07:06        | 07:26 (GA02) | 07:37        |              | 07:13        | 07:42        |       |       |
|                     | 20:54 | 20:21  | 19:31        | 54           | 08:20 (GA02) | 18:42        |              | 17:05        | 16:57 |       |
| 18                  | 06:07 | 06:36  | 07:07        | 07:27 (GA02) | 07:38        |              | 07:14        | 07:43        |       |       |
|                     | 20:53 | 20:20  | 19:30        | 53           | 08:20 (GA02) | 18:40        |              | 17:04        | 16:57 |       |
| 19                  | 06:07 | 06:37  | 07:08        | 07:28 (GA02) | 07:39        |              | 07:15        | 07:44        |       |       |
|                     | 20:53 | 20:18  | 19:28        | 52           | 08:20 (GA02) | 18:39        |              | 17:03        | 16:58 |       |
| 20                  | 06:08 | 06:38  | 07:09        | 07:29 (GA02) | 07:40        |              | 07:16        | 07:44        |       |       |
|                     | 20:52 | 20:17  | 19:26        | 50           | 08:19 (GA02) | 18:38        |              | 17:02        | 16:58 |       |
| 21                  | 06:09 | 06:39  | 07:09        | 07:30 (GA02) | 07:41        |              | 07:17        | 07:45        |       |       |
|                     | 20:51 | 20:15  | 19:25        | 48           | 08:18 (GA02) | 18:36        |              | 17:02        | 16:59 |       |
| 22                  | 06:10 | 06:40  | 07:10        | 07:31 (GA02) | 07:42        |              | 07:18        | 07:45        |       |       |
|                     | 20:50 | 20:14  | 19:23        | 47           | 08:18 (GA02) | 18:35        |              | 17:01        | 16:59 |       |
| 23                  | 06:11 | 06:41  | 07:11        | 07:32 (GA02) | 07:43        |              | 07:20        | 07:46        |       |       |
|                     | 20:50 | 20:12  | 19:21        | 45           | 08:17 (GA02) | 18:33        |              | 17:01        | 17:00 |       |
| 24                  | 06:12 | 06:42  | 07:12        | 07:33 (GA02) | 07:44        |              | 07:21        | 07:46        |       |       |
|                     | 20:49 | 20:11  | 19:19        | 43           | 08:16 (GA02) | 18:32        |              | 17:00        | 17:00 |       |
| 25                  | 06:13 | 06:43  | 07:45 (GA02) | 07:13        | 07:34 (GA02) | 06:46        |              | 07:22        | 07:47 |       |
|                     | 20:48 | 20:09  | 17           | 08:02 (GA02) | 19:18        | 41           | 08:15 (GA02) | 17:30        |       |       |
| 26                  | 06:14 | 06:44  | 07:40 (GA02) | 07:15        | 07:35 (GA02) | 06:47        |              | 16:59        | 17:01 |       |
|                     | 20:47 | 20:08  | 26           | 08:06 (GA02) | 19:16        | 39           | 08:14 (GA02) | 17:29        |       |       |
| 27                  | 06:14 | 06:45  | 07:37 (GA02) | 07:16        | 07:36 (GA02) | 06:48        |              | 16:59        | 17:01 |       |
|                     | 20:46 | 20:06  | 31           | 08:08 (GA02) | 19:14        | 37           | 08:13 (GA02) | 17:28        |       |       |
| 28                  | 06:15 | 06:46  | 07:35 (GA02) | 07:17        | 07:37 (GA02) | 06:49        |              | 16:58        | 17:02 |       |
|                     | 20:45 | 20:04  | 36           | 08:11 (GA02) | 19:13        | 35           | 08:12 (GA02) | 17:26        |       |       |
| 29                  | 06:16 | 06:47  | 07:32 (GA02) | 07:18        | 07:38 (GA02) | 06:50        |              | 16:58        | 17:03 |       |
|                     | 20:44 | 20:03  | 40           | 08:12 (GA02) | 19:11        | 32           | 08:10 (GA02) | 17:25        |       |       |
| 30                  | 06:17 | 06:48  | 07:30 (GA02) | 07:19        | 07:39 (GA02) | 06:51        |              | 16:58        | 17:03 |       |
|                     | 20:43 | 20:01  | 44           | 08:14 (GA02) | 19:09        | 30           | 08:09 (GA02) | 17:24        |       |       |
| 31                  | 06:18 | 06:49  | 07:29 (GA02) |              |              | 613          |              | 16:57        | 17:04 |       |
|                     | 20:42 | 20:00  | 46           | 08:15 (GA02) |              |              | 79           |              | 17:05 |       |
| Potential sun hours | 459   | 428    |              | 375          |              | 345          |              | 298          | 288   |       |
| Total, worst case   |       |        | 240          | 1535         |              | 185          |              |              |       |       |
| Sun reduction       |       |        | 0,59         | 0,66         |              | 0,74         |              |              |       |       |
| Oper. time red.     |       |        | 0,82         | 0,82         |              | 0,82         |              |              |       |       |
| Wind dir. red.      |       |        | 0,74         | 0,74         |              | 0,71         |              |              |       |       |
| Total reduction     |       |        | 0,36         | 0,40         |              | 0,43         |              |              |       |       |
| Total, real         |       |        | 87           | 613          |              | 79           |              |              |       |       |

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 | (WTG causing flicker first time) |
|--------------|------------------|-----------------|----------------------|---------------------------------|----------------------------------|
|              |                  |                 |                      | Last time (hh:mm) with flicker  | (WTG causing flicker last time)  |

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R28 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (3)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

|  | Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|--|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
|  | N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|  | 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                     | January | February | March | April           |              | May          | June  |
|---------------------|---------|----------|-------|-----------------|--------------|--------------|-------|
| 1                   | 07:49   | 07:35    | 07:00 | 07:09           | 18:22 (GA03) | 06:23        | 05:55 |
|                     | 17:06   | 17:40    | 18:14 | 19:48           | 19:17 (GA03) | 20:20        | 20:49 |
| 2                   | 07:49   | 07:35    | 06:58 | 07:07           | 18:22 (GA03) | 06:22        | 05:54 |
|                     | 17:07   | 17:41    | 18:15 | 19:49           | 19:16 (GA03) | 20:21        | 20:50 |
| 3                   | 07:49   | 07:34    | 06:57 | 07:06           | 18:22 (GA03) | 06:21        | 05:54 |
|                     | 17:08   | 17:43    | 18:16 | 19:50           | 19:16 (GA03) | 20:22        | 20:50 |
| 4                   | 07:49   | 07:32    | 06:55 | 07:04           | 18:22 (GA03) | 06:20        | 05:53 |
|                     | 17:09   | 17:44    | 18:17 | 19:51           | 19:16 (GA03) | 20:23        | 20:51 |
| 5                   | 07:49   | 07:31    | 06:53 | 07:02           | 18:22 (GA03) | 06:18        | 05:53 |
|                     | 17:09   | 17:45    | 18:19 | 19:52           | 19:15 (GA03) | 20:24        | 20:52 |
| 6                   | 07:49   | 07:30    | 06:52 | 07:01           | 18:22 (GA03) | 06:17        | 05:53 |
|                     | 17:10   | 17:46    | 18:20 | 19:53           | 19:13 (GA03) | 20:25        | 20:52 |
| 7                   | 07:49   | 07:29    | 06:50 | 06:59           | 18:23 (GA03) | 06:16        | 05:52 |
|                     | 17:11   | 17:48    | 18:21 | 19:54           | 19:13 (GA03) | 20:26        | 20:53 |
| 8                   | 07:49   | 07:28    | 06:49 | 18:00 (GA01)    | 06:58        | 18:23 (GA03) | 06:15 |
|                     | 17:12   | 17:49    | 18:22 | 1 18:01 (GA01)  | 19:55        | 19:12 (GA03) | 20:27 |
| 9                   | 07:49   | 07:27    | 06:47 | 17:58 (GA01)    | 06:56        | 18:23 (GA03) | 06:14 |
|                     | 17:13   | 17:50    | 18:23 | 4 18:02 (GA01)  | 19:56        | 19:10 (GA03) | 20:28 |
| 10                  | 07:49   | 07:26    | 06:46 | 17:57 (GA01)    | 06:54        | 18:24 (GA03) | 06:13 |
|                     | 17:14   | 17:51    | 18:24 | 6 18:03 (GA01)  | 19:57        | 19:10 (GA03) | 20:29 |
| 11                  | 07:48   | 07:25    | 06:44 | 17:56 (GA01)    | 06:53        | 18:25 (GA03) | 06:11 |
|                     | 17:15   | 17:52    | 18:25 | 9 18:05 (GA01)  | 19:58        | 19:08 (GA03) | 20:30 |
| 12                  | 07:48   | 07:23    | 06:42 | 17:56 (GA01)    | 06:51        | 18:26 (GA03) | 06:10 |
|                     | 17:16   | 17:54    | 18:26 | 9 18:05 (GA01)  | 20:00        | 19:07 (GA03) | 20:31 |
| 13                  | 07:48   | 07:22    | 06:41 | 17:55 (GA01)    | 06:50        | 18:27 (GA03) | 06:09 |
|                     | 17:17   | 17:55    | 18:28 | 11 18:06 (GA01) | 20:01        | 19:05 (GA03) | 20:32 |
| 14                  | 07:47   | 07:25    | 06:39 | 17:48 (GA03)    | 06:48        | 18:29 (GA03) | 06:08 |
|                     | 17:19   | 17:56    | 18:29 | 20 18:08 (GA01) | 20:02        | 19:04 (GA03) | 20:33 |
| 15                  | 07:47   | 07:20    | 06:37 | 17:43 (GA03)    | 06:47        | 18:30 (GA03) | 06:07 |
|                     | 17:20   | 17:57    | 18:30 | 26 18:09 (GA01) | 20:03        | 19:01 (GA03) | 20:34 |
| 16                  | 07:47   | 07:18    | 06:36 | 17:39 (GA03)    | 06:45        | 18:33 (GA03) | 06:06 |
|                     | 17:21   | 17:59    | 18:31 | 30 18:09 (GA01) | 20:04        | 18:59 (GA03) | 20:35 |
| 17                  | 07:46   | 07:17    | 06:34 | 17:38 (GA03)    | 06:43        | 18:35 (GA03) | 06:05 |
|                     | 17:22   | 18:00    | 18:32 | 33 18:11 (GA03) | 20:05        | 18:56 (GA03) | 20:36 |
| 18                  | 07:46   | 07:16    | 06:32 | 17:35 (GA03)    | 06:42        | 18:39 (GA03) | 06:04 |
|                     | 17:23   | 18:01    | 18:33 | 37 18:12 (GA03) | 20:06        | 18:52 (GA03) | 20:37 |
| 19                  | 07:45   | 07:14    | 06:31 | 17:33 (GA03)    | 06:40        |              | 06:04 |
|                     | 17:24   | 18:02    | 18:34 | 40 18:13 (GA03) | 20:07        |              | 20:38 |
| 20                  | 07:45   | 07:13    | 06:29 | 17:32 (GA03)    | 06:39        |              | 20:59 |
|                     | 17:25   | 18:03    | 18:35 | 43 18:15 (GA03) | 20:08        |              | 20:59 |
| 21                  | 07:44   | 07:11    | 06:27 | 17:30 (GA03)    | 06:37        |              | 06:02 |
|                     | 17:27   | 18:05    | 18:36 | 45 18:15 (GA03) | 20:09        |              | 20:59 |
| 22                  | 07:43   | 07:10    | 06:26 | 17:28 (GA03)    | 06:36        |              | 06:01 |
|                     | 17:28   | 18:06    | 18:37 | 48 18:16 (GA03) | 20:10        |              | 20:41 |
| 23                  | 07:43   | 07:09    | 06:24 | 17:28 (GA03)    | 06:34        |              | 06:00 |
|                     | 17:29   | 18:07    | 18:38 | 49 18:17 (GA03) | 20:11        |              | 20:41 |
| 24                  | 07:42   | 07:07    | 06:22 | 17:26 (GA03)    | 06:33        |              | 06:00 |
|                     | 17:30   | 18:08    | 18:39 | 51 18:17 (GA03) | 20:12        |              | 20:42 |
| 25                  | 07:41   | 07:06    | 06:21 | 17:25 (GA03)    | 06:32        |              | 05:59 |
|                     | 17:31   | 18:09    | 18:40 | 52 18:17 (GA03) | 20:13        |              | 20:43 |
| 26                  | 07:41   | 07:04    | 06:19 | 17:25 (GA03)    | 06:30        |              | 05:58 |
|                     | 17:33   | 18:11    | 18:42 | 53 18:18 (GA03) | 20:14        |              | 20:44 |
| 27                  | 07:40   | 07:03    | 06:17 | 17:24 (GA03)    | 06:29        |              | 05:57 |
|                     | 17:34   | 18:12    | 18:43 | 54 18:18 (GA03) | 20:15        |              | 20:45 |
| 28                  | 07:39   | 07:01    | 06:16 | 17:23 (GA03)    | 06:27        |              | 05:57 |
|                     | 17:35   | 18:13    | 18:44 | 54 18:17 (GA03) | 20:16        |              | 20:46 |
| 29                  | 07:38   |          | 07:14 | 18:23 (GA03)    | 06:26        |              | 05:56 |
|                     | 17:36   |          | 19:45 | 55 19:18 (GA03) | 20:17        |              | 20:47 |
| 30                  | 07:37   |          | 07:12 | 18:23 (GA03)    | 06:25        |              | 05:56 |
|                     | 17:38   |          | 19:46 | 55 19:18 (GA03) | 20:19        |              | 20:47 |
| 31                  | 07:36   |          | 07:11 | 18:22 (GA03)    |              |              | 05:55 |
|                     | 17:39   |          | 19:47 | 55 19:17 (GA03) |              |              | 20:48 |
| Potential sun hours | 298     | 297      | 369   | 399             |              | 448          | 452   |
| Total, worst case   |         |          | 840   | 761             |              |              |       |
| Sun reduction       |         |          | 0,69  | 0,62            |              |              |       |
| Oper. time red.     |         |          | 0,82  | 0,82            |              |              |       |
| Wind dir. red.      |         |          | 0,78  | 0,78            |              |              |       |
| Total reduction     |         |          | 0,44  | 0,39            |              |              |       |
| Total, real         |         |          | 369   | 300             |              |              |       |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R28 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (3)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

|  | Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|--|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
|  | N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|  | 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                     | July  | August | September    | October      | November     | December     |              |              |       |       |  |
|---------------------|-------|--------|--------------|--------------|--------------|--------------|--------------|--------------|-------|-------|--|
| 1                   | 05:55 | 06:19  | 06:50        | 18:24 (GA03) | 07:20        | 18:35 (GA01) | 06:54        | 07:28        |       |       |  |
|                     | 21:00 | 20:41  | 19:58        | 43           | 19:07 (GA03) | 19:08        | 11           | 18:46 (GA01) | 17:21 | 16:57 |  |
| 2                   | 05:56 | 06:20  | 06:51        | 18:22 (GA03) | 07:21        | 18:35 (GA01) | 06:55        | 07:29        |       |       |  |
|                     | 21:00 | 20:40  | 19:56        | 46           | 19:08 (GA03) | 19:06        | 9            | 18:44 (GA01) | 17:20 | 16:57 |  |
| 3                   | 05:56 | 06:21  | 06:52        | 18:21 (GA03) | 07:22        | 18:35 (GA01) | 06:56        | 07:30        |       |       |  |
|                     | 21:00 | 20:39  | 19:55        | 47           | 19:08 (GA03) | 19:04        | 7            | 18:42 (GA01) | 17:19 | 16:56 |  |
| 4                   | 05:57 | 06:22  | 06:53        | 18:20 (GA03) | 07:23        | 18:35 (GA01) | 06:57        | 07:31        |       |       |  |
|                     | 20:59 | 20:38  | 19:53        | 49           | 19:09 (GA03) | 19:03        | 5            | 18:40 (GA01) | 17:17 | 16:56 |  |
| 5                   | 05:57 | 06:23  | 06:54        | 18:19 (GA03) | 07:24        | 18:36 (GA01) | 06:58        | 07:32        |       |       |  |
|                     | 20:59 | 20:37  | 19:52        | 50           | 19:09 (GA03) | 19:01        | 3            | 18:39 (GA01) | 17:16 | 16:56 |  |
| 6                   | 05:58 | 06:24  | 06:55        | 18:18 (GA03) | 07:25        |              |              | 07:00        | 07:33 |       |  |
|                     | 20:59 | 20:35  | 19:50        | 52           | 19:10 (GA03) | 18:59        |              | 17:15        | 16:56 |       |  |
| 7                   | 05:59 | 06:25  | 06:56        | 18:17 (GA03) | 07:26        |              |              | 07:01        | 07:34 |       |  |
|                     | 20:59 | 20:34  | 19:48        | 53           | 19:10 (GA03) | 18:58        |              | 17:14        | 16:56 |       |  |
| 8                   | 05:59 | 06:26  | 06:57        | 18:16 (GA03) | 07:27        |              |              | 07:02        | 07:35 |       |  |
|                     | 20:58 | 20:33  | 19:47        | 54           | 19:10 (GA03) | 18:56        |              | 17:13        | 16:56 |       |  |
| 9                   | 06:00 | 06:27  | 06:58        | 18:16 (GA03) | 07:28        |              |              | 07:03        | 07:36 |       |  |
|                     | 20:58 | 20:32  | 19:45        | 54           | 19:10 (GA03) | 18:54        |              | 17:12        | 16:56 |       |  |
| 10                  | 06:00 | 06:28  | 06:59        | 18:15 (GA03) | 07:29        |              |              | 07:04        | 07:37 |       |  |
|                     | 20:58 | 20:30  | 19:43        | 55           | 19:10 (GA03) | 18:53        |              | 17:11        | 16:56 |       |  |
| 11                  | 06:01 | 06:29  | 07:00        | 18:15 (GA03) | 07:30        |              |              | 07:05        | 07:38 |       |  |
|                     | 20:57 | 20:29  | 19:42        | 54           | 19:09 (GA03) | 18:51        |              | 17:10        | 16:56 |       |  |
| 12                  | 06:02 | 06:30  | 07:01        | 18:14 (GA03) | 07:31        |              |              | 07:07        | 07:39 |       |  |
|                     | 20:57 | 20:28  | 19:40        | 55           | 19:09 (GA03) | 18:50        |              | 17:09        | 16:56 |       |  |
| 13                  | 06:03 | 06:31  | 07:02        | 18:14 (GA03) | 07:32        |              |              | 07:08        | 07:39 |       |  |
|                     | 20:56 | 20:26  | 19:38        | 55           | 19:09 (GA03) | 18:48        |              | 17:08        | 16:56 |       |  |
| 14                  | 06:03 | 06:32  | 07:03        | 18:14 (GA03) | 07:33        |              |              | 07:09        | 07:40 |       |  |
|                     | 20:56 | 20:25  | 19:36        | 54           | 19:08 (GA03) | 18:47        |              | 17:07        | 16:56 |       |  |
| 15                  | 06:04 | 06:33  | 07:03        | 18:13 (GA03) | 07:34        |              |              | 07:10        | 07:41 |       |  |
|                     | 20:55 | 20:24  | 19:35        | 55           | 19:08 (GA03) | 18:45        |              | 17:06        | 16:56 |       |  |
| 16                  | 06:05 | 06:34  | 07:04        | 18:13 (GA03) | 07:35        |              |              | 07:11        | 07:42 |       |  |
|                     | 20:55 | 20:22  | 19:33        | 54           | 19:07 (GA03) | 18:43        |              | 17:05        | 16:57 |       |  |
| 17                  | 06:06 | 06:35  | 07:05        | 18:13 (GA03) | 07:36        |              |              | 07:13        | 07:42 |       |  |
|                     | 20:54 | 20:21  | 19:31        | 53           | 19:06 (GA03) | 18:42        |              | 17:05        | 16:57 |       |  |
| 18                  | 06:06 | 06:36  | 07:06        | 18:13 (GA03) | 07:38        |              |              | 07:14        | 07:43 |       |  |
|                     | 20:53 | 20:19  | 19:30        | 53           | 19:06 (GA03) | 18:40        |              | 17:04        | 16:57 |       |  |
| 19                  | 06:07 | 06:37  | 07:07        | 18:14 (GA03) | 07:39        |              |              | 07:15        | 07:44 |       |  |
|                     | 20:53 | 20:18  | 19:28        | 51           | 19:05 (GA03) | 18:39        |              | 17:03        | 16:58 |       |  |
| 20                  | 06:08 | 06:38  | 07:08        | 18:14 (GA03) | 07:40        |              |              | 07:16        | 07:44 |       |  |
|                     | 20:52 | 20:17  | 19:26        | 49           | 19:03 (GA03) | 18:37        |              | 17:02        | 16:58 |       |  |
| 21                  | 06:09 | 06:39  | 07:09        | 18:13 (GA03) | 07:41        |              |              | 07:17        | 07:45 |       |  |
|                     | 20:51 | 20:15  | 19:25        | 48           | 19:01 (GA03) | 18:36        |              | 17:02        | 16:59 |       |  |
| 22                  | 06:10 | 06:40  | 07:10        | 18:14 (GA03) | 07:42        |              |              | 07:18        | 07:45 |       |  |
|                     | 20:50 | 20:14  | 19:23        | 46           | 19:00 (GA03) | 18:35        |              | 17:01        | 16:59 |       |  |
| 23                  | 06:11 | 06:41  | 07:11        | 18:15 (GA03) | 07:43        |              |              | 07:20        | 07:46 |       |  |
|                     | 20:50 | 20:12  | 19:21        | 43           | 18:58 (GA03) | 18:33        |              | 17:00        | 17:00 |       |  |
| 24                  | 06:12 | 06:42  | 07:12        | 18:16 (GA03) | 07:44        |              |              | 07:21        | 07:46 |       |  |
|                     | 20:49 | 20:11  | 19:19        | 41           | 18:57 (GA03) | 18:32        |              | 17:00        | 17:00 |       |  |
| 25                  | 06:13 | 06:43  | 18:41 (GA03) | 07:13        | 18:17 (GA03) | 06:45        |              | 07:22        | 07:47 |       |  |
|                     | 20:48 | 20:09  | 15           | 18:56 (GA03) | 19:18        | 38           | 18:55 (GA03) | 17:30        | 16:59 | 17:01 |  |
| 26                  | 06:13 | 06:44  | 18:37 (GA03) | 07:14        | 18:18 (GA03) | 06:47        |              | 07:23        | 07:47 |       |  |
|                     | 20:47 | 20:08  | 22           | 18:59 (GA03) | 19:16        | 35           | 18:53 (GA03) | 17:29        | 16:59 | 17:01 |  |
| 27                  | 06:14 | 06:45  | 18:34 (GA03) | 07:15        | 18:20 (GA03) | 06:48        |              | 07:24        | 07:47 |       |  |
|                     | 20:46 | 20:06  | 28           | 19:02 (GA03) | 19:14        | 31           | 18:51 (GA01) | 17:28        | 16:58 | 17:02 |  |
| 28                  | 06:15 | 06:46  | 18:32 (GA03) | 07:16        | 18:22 (GA03) | 06:49        |              | 07:25        | 07:48 |       |  |
|                     | 20:45 | 20:04  | 31           | 19:03 (GA03) | 19:13        | 28           | 18:50 (GA01) | 17:26        | 16:58 | 17:03 |  |
| 29                  | 06:16 | 06:47  | 18:30 (GA03) | 07:17        | 18:26 (GA03) | 06:50        |              | 07:26        | 07:48 |       |  |
|                     | 20:44 | 20:03  | 35           | 19:05 (GA03) | 19:11        | 22           | 18:48 (GA01) | 17:25        | 16:58 | 17:03 |  |
| 30                  | 06:17 | 06:48  | 18:28 (GA03) | 07:19        | 18:34 (GA01) | 06:51        |              | 07:27        | 07:48 |       |  |
|                     | 20:43 | 20:01  | 38           | 19:06 (GA03) | 19:09        | 12           | 18:46 (GA01) | 17:24        | 16:57 | 17:04 |  |
| 31                  | 06:18 | 06:49  | 18:25 (GA03) |              |              | 06:52        |              |              | 07:49 |       |  |
|                     | 20:42 | 20:00  | 41           | 19:06 (GA03) |              | 17:22        |              |              | 17:05 |       |  |
| Potential sun hours | 459   | 428    |              | 375          |              | 345          |              | 298          | 288   |       |  |
| Total, worst case   |       |        | 210          |              | 1380         |              | 35           |              |       |       |  |
| Sun reduction       |       |        | 0,59         |              | 0,66         |              | 0,74         |              |       |       |  |
| Oper. time red.     |       |        | 0,82         |              | 0,82         |              | 0,82         |              |       |       |  |
| Wind dir. red.      |       |        | 0,78         |              | 0,78         |              | 0,80         |              |       |       |  |
| Total reduction     |       |        | 0,38         |              | 0,42         |              | 0,48         |              |       |       |  |
| Total, real         |       |        | 80           |              | 578          |              | 17           |              |       |       |  |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R31 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (4)  
Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

Operational time  
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
90 295 742 511 343 267 107 562 1.775 1.844 553 102 7.191

|                     | January | February | March | April             | May   | June  | July  | August | September         | October         | November | December |
|---------------------|---------|----------|-------|-------------------|-------|-------|-------|--------|-------------------|-----------------|----------|----------|
| 1   07:49           | 07:35   | 07:00    | 07:09 |                   | 06:23 | 05:55 | 05:55 | 06:19  | 06:50             | 19:20 (GA03)    | 07:19    | 06:54    |
| 17:06               | 17:40   | 18:14    | 19:48 |                   | 20:20 | 20:49 | 21:00 | 20:41  | 19:58             | 15 19:35 (GA03) | 19:08    | 17:21    |
| 2   07:49           | 07:34   | 06:58    | 07:07 | 19:25 (GA03)      | 06:22 | 05:54 | 05:56 | 06:20  | 06:51             | 19:18 (GA03)    | 07:20    | 06:55    |
| 17:07               | 17:41   | 18:15    | 19:49 | 3   19:28 (GA03)  | 20:21 | 20:50 | 21:00 | 20:40  | 19:56             | 16 19:34 (GA03) | 19:06    | 17:20    |
| 3   07:49           | 07:33   | 06:57    | 07:06 | 19:23 (GA03)      | 06:21 | 05:54 | 05:56 | 06:21  | 06:52             | 19:18 (GA03)    | 07:22    | 06:56    |
| 17:08               | 17:42   | 18:16    | 19:50 | 5   19:28 (GA03)  | 20:22 | 20:50 | 21:00 | 20:39  | 19:55             | 14 19:32 (GA03) | 19:04    | 17:19    |
| 4   07:49           | 07:32   | 06:55    | 07:04 | 19:22 (GA03)      | 06:20 | 05:53 | 05:57 | 06:22  | 06:53             | 19:17 (GA03)    | 07:23    | 06:57    |
| 17:08               | 17:44   | 18:17    | 19:51 | 8   19:30 (GA03)  | 20:23 | 20:51 | 20:59 | 20:38  | 19:53             | 14 19:31 (GA03) | 19:03    | 17:17    |
| 5   07:49           | 07:31   | 06:53    | 07:02 | 19:21 (GA03)      | 06:18 | 05:53 | 05:57 | 06:23  | 06:54             | 19:16 (GA03)    | 07:24    | 06:58    |
| 17:09               | 17:45   | 18:19    | 19:52 | 10   19:31 (GA03) | 20:24 | 20:52 | 20:59 | 20:36  | 19:51             | 13 19:29 (GA03) | 19:01    | 17:16    |
| 6   07:49           | 07:30   | 06:52    | 07:01 | 19:20 (GA03)      | 06:17 | 05:53 | 05:58 | 06:24  | 06:55             | 19:16 (GA03)    | 07:25    | 06:59    |
| 17:10               | 17:46   | 18:20    | 19:53 | 11   19:31 (GA03) | 20:25 | 20:52 | 20:59 | 20:35  | 19:50             | 12 19:28 (GA03) | 18:59    | 17:15    |
| 7   07:49           | 07:29   | 06:50    | 06:59 | 19:20 (GA03)      | 06:16 | 05:52 | 05:58 | 06:25  | 06:56             | 19:16 (GA03)    | 07:26    | 07:01    |
| 17:11               | 17:47   | 18:21    | 19:54 | 13   19:33 (GA03) | 20:26 | 20:53 | 20:59 | 20:34  | 19:48             | 10 19:26 (GA03) | 18:58    | 17:14    |
| 8   07:49           | 07:28   | 06:49    | 06:58 | 19:20 (GA03)      | 06:15 | 05:52 | 05:59 | 06:26  | 06:57             | 19:16 (GA03)    | 07:27    | 07:35    |
| 17:12               | 17:49   | 18:22    | 19:55 | 14   19:34 (GA03) | 20:27 | 20:54 | 20:58 | 20:33  | 19:46             | 8 19:24 (GA03)  | 18:56    | 17:13    |
| 9   07:49           | 07:27   | 06:47    | 06:56 | 19:20 (GA03)      | 06:14 | 05:52 | 06:00 | 06:27  | 06:58             | 19:17 (GA03)    | 07:28    | 07:03    |
| 17:13               | 17:50   | 18:23    | 19:56 | 14   19:34 (GA03) | 20:28 | 20:54 | 20:58 | 20:32  | 19:45             | 6 19:23 (GA03)  | 18:54    | 17:12    |
| 10   07:48          | 07:26   | 06:45    | 06:54 | 19:20 (GA03)      | 06:12 | 05:52 | 06:00 | 06:28  | 06:59             | 19:18 (GA03)    | 07:29    | 07:37    |
| 17:14               | 17:51   | 18:24    | 19:57 | 16   19:36 (GA03) | 20:29 | 20:55 | 20:58 | 20:30  | 19:43             | 3 19:21 (GA03)  | 18:53    | 17:11    |
| 11   07:48          | 07:25   | 06:44    | 06:53 | 19:21 (GA03)      | 06:11 | 05:52 | 06:01 | 06:29  | 06:59             |                 | 07:30    | 07:05    |
| 17:15               | 17:52   | 18:25    | 19:58 | 15   19:36 (GA03) | 20:30 | 20:55 | 20:57 | 20:29  | 19:41             |                 | 18:51    | 17:10    |
| 12   07:48          | 07:23   | 06:42    | 06:51 | 19:22 (GA03)      | 06:10 | 05:51 | 06:02 | 06:30  | 07:00             |                 | 07:31    | 07:07    |
| 17:16               | 17:54   | 18:26    | 19:59 | 14   19:36 (GA03) | 20:31 | 20:56 | 20:57 | 20:28  | 19:40             |                 | 18:50    | 17:09    |
| 13   07:48          | 07:22   | 06:41    | 06:50 | 19:24 (GA03)      | 06:09 | 05:51 | 06:03 | 06:31  | 07:01             |                 | 07:32    | 07:39    |
| 17:17               | 17:55   | 18:27    | 20:01 | 9   19:33 (GA03)  | 20:32 | 20:56 | 20:56 | 20:26  | 19:38             |                 | 18:48    | 17:08    |
| 14   07:47          | 07:21   | 06:39    | 06:48 |                   | 06:08 | 05:51 | 06:03 | 06:32  | 07:02             |                 | 07:33    | 07:09    |
| 17:19               | 17:56   | 18:29    | 20:02 |                   | 20:33 | 20:57 | 20:56 | 20:25  | 19:36             |                 | 18:46    | 17:07    |
| 15   07:47          | 07:20   | 06:37    | 06:46 |                   | 06:07 | 05:51 | 06:04 | 06:33  | 07:03             |                 | 07:34    | 07:10    |
| 17:20               | 17:57   | 18:30    | 20:03 |                   | 20:34 | 20:57 | 20:55 | 20:24  | 19:35             |                 | 18:45    | 17:06    |
| 16   07:47          | 07:18   | 06:36    | 06:45 |                   | 06:06 | 05:51 | 06:05 | 06:34  | 07:04             |                 | 07:35    | 07:11    |
| 17   07:46          | 07:17   | 06:34    | 06:43 |                   | 20:35 | 20:58 | 20:55 | 20:22  | 19:33             |                 | 18:43    | 17:05    |
| 17:22               | 18:00   | 18:32    | 20:05 |                   | 20:36 | 20:58 | 20:54 | 20:21  | 19:31             |                 | 18:42    | 17:05    |
| 18   07:46          | 07:16   | 06:32    | 06:42 |                   | 06:04 | 05:51 | 06:06 | 06:36  | 07:06             |                 | 07:38    | 07:14    |
| 17:23               | 18:01   | 18:33    | 20:06 |                   | 20:37 | 20:58 | 20:53 | 20:19  | 19:30             |                 | 18:40    | 17:04    |
| 19   07:45          | 07:14   | 06:31    | 06:40 |                   | 06:03 | 05:52 | 06:07 | 06:37  | 07:07             |                 | 07:39    | 07:15    |
| 17:24               | 18:02   | 18:34    | 20:07 |                   | 20:38 | 20:59 | 20:53 | 20:18  | 19:28             |                 | 18:39    | 17:03    |
| 20   07:45          | 07:13   | 06:29    | 06:39 |                   | 06:03 | 05:52 | 06:08 | 06:38  | 07:08             |                 | 07:40    | 07:16    |
| 17:25               | 18:03   | 18:35    | 20:08 |                   | 20:39 | 20:59 | 20:52 | 20:17  | 19:26             |                 | 18:37    | 17:02    |
| 21   07:44          | 07:11   | 06:27    | 06:37 |                   | 06:02 | 05:52 | 06:09 | 06:39  | 07:09             |                 | 07:41    | 07:17    |
| 17:27               | 18:05   | 18:36    | 20:09 |                   | 20:40 | 20:59 | 20:51 | 20:15  | 19:24             |                 | 18:36    | 17:02    |
| 22   07:43          | 07:10   | 06:26    | 06:36 |                   | 06:01 | 05:52 | 06:10 | 06:40  | 07:10             |                 | 07:42    | 07:45    |
| 17:28               | 18:06   | 18:37    | 20:10 |                   | 20:41 | 20:59 | 20:50 | 20:14  | 19:23             |                 | 18:34    | 17:01    |
| 23   07:43          | 07:09   | 06:24    | 06:34 |                   | 06:00 | 05:52 | 06:11 | 06:41  | 07:11             |                 | 07:43    | 07:19    |
| 17:29               | 18:07   | 18:38    | 20:11 |                   | 20:41 | 21:00 | 20:49 | 20:12  | 19:21             |                 | 18:33    | 17:00    |
| 24   07:42          | 07:07   | 06:22    | 06:33 |                   | 05:59 | 05:53 | 06:12 | 06:42  | 07:12             |                 | 07:44    | 07:21    |
| 17:30               | 18:08   | 18:39    | 20:12 |                   | 20:42 | 21:00 | 20:49 | 20:11  | 19:19             |                 | 18:32    | 17:00    |
| 25   07:41          | 07:06   | 06:21    | 06:32 |                   | 05:59 | 05:53 | 06:12 | 06:43  | 07:13             |                 | 06:45    | 07:22    |
| 17:31               | 18:09   | 18:40    | 20:13 |                   | 20:43 | 21:00 | 20:48 | 20:09  | 19:18             |                 | 17:30    | 16:59    |
| 26   07:41          | 07:04   | 06:19    | 06:30 |                   | 05:58 | 05:53 | 06:13 | 06:44  | 07:14             |                 | 06:47    | 07:23    |
| 17:33               | 18:10   | 18:41    | 20:14 |                   | 20:44 | 21:00 | 20:47 | 20:07  | 19:16             |                 | 17:29    | 16:59    |
| 27   07:40          | 07:03   | 06:17    | 06:29 |                   | 05:57 | 05:53 | 06:14 | 06:45  | 07:15             |                 | 06:48    | 07:24    |
| 17:34               | 18:12   | 18:43    | 20:15 |                   | 20:45 | 21:00 | 20:46 | 20:06  | 19:14             |                 | 17:28    | 16:58    |
| 28   07:39          | 07:01   | 06:16    | 06:27 |                   | 05:57 | 05:54 | 06:15 | 06:46  | 07:16             |                 | 06:49    | 07:25    |
| 17:35               | 18:13   | 18:44    | 20:16 |                   | 20:46 | 21:00 | 20:45 | 20:04  | 19:13             |                 | 17:26    | 16:58    |
| 29   07:38          | 07:14   | 06:26    |       |                   | 05:56 | 05:54 | 06:16 | 06:47  | 07:17             |                 | 06:50    | 07:26    |
| 17:36               |         | 18:45    | 20:17 |                   | 20:47 | 21:00 | 20:44 | 20:03  | 19:11             |                 | 17:25    | 16:57    |
| 30   07:37          |         | 07:12    | 06:25 |                   | 05:56 | 05:55 | 06:17 | 06:48  | 19:24 (GA03)      | 07:18           | 06:51    | 07:27    |
| 17:38               |         | 19:46    | 20:18 |                   | 20:47 | 21:00 | 20:43 | 20:01  | 9   19:33 (GA03)  | 19:09           | 17:24    | 16:57    |
| 31   07:36          |         | 07:11    |       |                   | 05:55 |       | 06:18 | 06:49  | 19:21 (GA03)      |                 | 06:52    | 07:48    |
| 17:39               |         | 19:47    |       |                   | 20:48 |       | 20:42 | 20:00  | 14   19:35 (GA03) |                 | 17:22    | 17:05    |
| Potential sun hours | 298     | 297      | 369   | 399               | 448   | 452   | 459   | 428    | 375               | 345             | 298      | 288      |
| Total, worst case   |         |          |       | 132               |       |       | 23    |        | 111               |                 |          |          |
| Sun reduction       |         |          |       | 0.62              |       |       | 0.59  |        | 0.66              |                 |          |          |
| Oper. time red.     |         |          |       | 0.82              |       |       | 0.82  |        | 0.82              |                 |          |          |
| Wind dir. red.      |         |          |       | 0.72              |       |       | 0.72  |        | 0.72              |                 |          |          |
| Total reduction     |         |          |       | 0.36              |       |       | 0.35  |        | 0.39              |                 |          |          |
| Total, real         |         |          |       | 48                |       |       | 8     |        | 43                |                 |          |          |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|              |                  |                 |                      |                                 |                                |                                  |                                 |

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R48 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (5)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

|  | Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|--|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
|  | N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|  | 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                     | January |              | February |              | March        |       | April |       | May   |  | June |  |  |
|---------------------|---------|--------------|----------|--------------|--------------|-------|-------|-------|-------|--|------|--|--|
| 1                   | 07:49   | 08:16 (GA05) | 07:36    | 08:20 (GA05) | 07:00        | 07:09 | 06:23 | 05:55 |       |  |      |  |  |
| 17:06               | 32      | 08:48 (GA05) | 17:40    | 43           | 09:03 (GA05) | 18:14 | 19:48 | 20:20 | 20:49 |  |      |  |  |
| 2                   | 07:49   | 08:16 (GA05) | 07:35    | 08:21 (GA05) | 06:58        | 07:07 | 06:22 | 05:54 |       |  |      |  |  |
| 17:07               | 33      | 08:49 (GA05) | 17:41    | 41           | 09:02 (GA05) | 18:15 | 19:49 | 20:21 | 20:50 |  |      |  |  |
| 3                   | 07:49   | 08:17 (GA05) | 07:34    | 08:22 (GA05) | 06:57        | 07:06 | 06:21 | 05:54 |       |  |      |  |  |
| 17:08               | 33      | 08:50 (GA05) | 17:43    | 40           | 09:02 (GA05) | 18:16 | 19:50 | 20:22 | 20:51 |  |      |  |  |
| 4                   | 07:49   | 08:17 (GA05) | 07:33    | 08:22 (GA05) | 06:55        | 07:04 | 06:20 | 05:53 |       |  |      |  |  |
| 17:09               | 34      | 08:51 (GA05) | 17:44    | 38           | 09:00 (GA05) | 18:17 | 19:51 | 20:23 | 20:51 |  |      |  |  |
| 5                   | 07:49   | 08:17 (GA05) | 07:32    | 08:23 (GA05) | 06:54        | 07:03 | 06:18 | 05:53 |       |  |      |  |  |
| 17:09               | 35      | 08:52 (GA05) | 17:45    | 36           | 08:59 (GA05) | 18:19 | 19:52 | 20:24 | 20:52 |  |      |  |  |
| 6                   | 07:49   | 08:17 (GA05) | 07:30    | 08:24 (GA05) | 06:52        | 07:01 | 06:17 | 05:53 |       |  |      |  |  |
| 17:10               | 36      | 08:53 (GA05) | 17:46    | 35           | 08:59 (GA05) | 18:20 | 19:53 | 20:25 | 20:53 |  |      |  |  |
| 7                   | 07:49   | 08:17 (GA05) | 07:29    | 08:26 (GA05) | 06:50        | 06:59 | 06:16 | 05:52 |       |  |      |  |  |
| 17:11               | 36      | 08:53 (GA05) | 17:48    | 31           | 08:57 (GA05) | 18:21 | 19:54 | 20:26 | 20:53 |  |      |  |  |
| 8                   | 07:49   | 08:17 (GA05) | 07:28    | 08:27 (GA05) | 06:49        | 06:58 | 06:15 | 05:52 |       |  |      |  |  |
| 17:12               | 37      | 08:54 (GA05) | 17:49    | 29           | 08:56 (GA05) | 18:22 | 19:55 | 20:27 | 20:54 |  |      |  |  |
| 9                   | 07:49   | 08:17 (GA05) | 07:27    | 08:29 (GA05) | 06:47        | 06:56 | 06:14 | 05:52 |       |  |      |  |  |
| 17:13               | 38      | 08:55 (GA05) | 17:50    | 26           | 08:55 (GA05) | 18:23 | 19:56 | 20:28 | 20:54 |  |      |  |  |
| 10                  | 07:49   | 08:16 (GA05) | 07:26    | 08:31 (GA05) | 06:46        | 06:54 | 06:13 | 05:52 |       |  |      |  |  |
| 17:14               | 39      | 08:55 (GA05) | 17:51    | 20           | 08:51 (GA05) | 18:24 | 19:57 | 20:29 | 20:55 |  |      |  |  |
| 11                  | 07:48   | 08:16 (GA05) | 07:25    | 08:35 (GA05) | 06:44        | 06:53 | 06:11 | 05:52 |       |  |      |  |  |
| 17:15               | 40      | 08:56 (GA05) | 17:53    | 13           | 08:48 (GA05) | 18:25 | 19:59 | 20:30 | 20:56 |  |      |  |  |
| 12                  | 07:48   | 08:16 (GA05) | 07:23    |              | 06:42        | 06:51 | 06:10 | 05:52 |       |  |      |  |  |
| 17:16               | 42      | 08:58 (GA05) | 17:54    |              | 18:26        | 20:00 | 20:31 | 20:56 |       |  |      |  |  |
| 13                  | 07:48   | 08:15 (GA05) | 07:22    |              | 06:41        | 06:50 | 06:09 | 05:51 |       |  |      |  |  |
| 17:18               | 43      | 08:58 (GA05) | 17:55    |              | 18:28        | 20:01 | 20:32 | 20:57 |       |  |      |  |  |
| 14                  | 07:48   | 08:16 (GA05) | 07:21    |              | 06:39        | 06:48 | 06:08 | 05:51 |       |  |      |  |  |
| 17:19               | 43      | 08:59 (GA05) | 17:56    |              | 18:29        | 20:02 | 20:33 | 20:57 |       |  |      |  |  |
| 15                  | 07:47   | 08:15 (GA05) | 07:20    |              | 06:37        | 06:47 | 06:07 | 05:51 |       |  |      |  |  |
| 17:20               | 44      | 08:59 (GA05) | 17:57    |              | 18:30        | 20:03 | 20:34 | 20:57 |       |  |      |  |  |
| 16                  | 07:47   | 08:15 (GA05) | 07:18    |              | 06:36        | 06:45 | 06:06 | 05:51 |       |  |      |  |  |
| 17:21               | 45      | 09:00 (GA05) | 17:59    |              | 18:31        | 20:04 | 20:35 | 20:58 |       |  |      |  |  |
| 17                  | 07:46   | 08:14 (GA05) | 07:17    |              | 06:34        | 06:43 | 06:05 | 05:51 |       |  |      |  |  |
| 17:22               | 46      | 09:00 (GA05) | 18:00    |              | 18:32        | 20:05 | 20:36 | 20:58 |       |  |      |  |  |
| 18                  | 07:46   | 08:15 (GA05) | 07:16    |              | 06:32        | 06:42 | 06:04 | 05:51 |       |  |      |  |  |
| 17:23               | 46      | 09:01 (GA05) | 18:01    |              | 18:33        | 20:06 | 20:37 | 20:58 |       |  |      |  |  |
| 19                  | 07:45   | 08:15 (GA05) | 07:14    |              | 06:31        | 06:40 | 06:04 | 05:52 |       |  |      |  |  |
| 17:24               | 46      | 09:01 (GA05) | 18:02    |              | 18:34        | 20:07 | 20:38 | 20:59 |       |  |      |  |  |
| 20                  | 07:45   | 08:16 (GA05) | 07:13    |              | 06:29        | 06:39 | 06:03 | 05:52 |       |  |      |  |  |
| 17:25               | 46      | 09:02 (GA05) | 18:03    |              | 18:35        | 20:08 | 20:39 | 20:59 |       |  |      |  |  |
| 21                  | 07:44   | 08:15 (GA05) | 07:12    |              | 06:27        | 06:37 | 06:02 | 05:52 |       |  |      |  |  |
| 17:27               | 47      | 09:02 (GA05) | 18:05    |              | 18:36        | 20:09 | 20:40 | 20:59 |       |  |      |  |  |
| 22                  | 07:44   | 08:15 (GA05) | 07:10    |              | 06:26        | 06:36 | 06:01 | 05:52 |       |  |      |  |  |
| 17:28               | 47      | 09:02 (GA05) | 18:06    |              | 18:37        | 20:10 | 20:41 | 21:00 |       |  |      |  |  |
| 23                  | 07:43   | 08:16 (GA05) | 07:09    |              | 06:24        | 06:35 | 06:00 | 05:52 |       |  |      |  |  |
| 17:29               | 47      | 09:03 (GA05) | 18:07    |              | 18:38        | 20:11 | 20:42 | 21:00 |       |  |      |  |  |
| 24                  | 07:42   | 08:16 (GA05) | 07:07    |              | 06:22        | 06:33 | 06:00 | 05:53 |       |  |      |  |  |
| 17:30               | 47      | 09:03 (GA05) | 18:08    |              | 18:39        | 20:12 | 20:42 | 21:00 |       |  |      |  |  |
| 25                  | 07:41   | 08:16 (GA05) | 07:06    |              | 06:21        | 06:32 | 05:59 | 05:53 |       |  |      |  |  |
| 17:31               | 47      | 09:03 (GA05) | 18:09    |              | 18:41        | 20:13 | 20:43 | 21:00 |       |  |      |  |  |
| 26                  | 07:41   | 08:17 (GA05) | 07:04    |              | 06:19        | 06:30 | 05:58 | 05:53 |       |  |      |  |  |
| 17:33               | 46      | 09:03 (GA05) | 18:11    |              | 18:42        | 20:14 | 20:44 | 21:00 |       |  |      |  |  |
| 27                  | 07:40   | 08:17 (GA05) | 07:03    |              | 06:17        | 06:29 | 05:57 | 05:54 |       |  |      |  |  |
| 17:34               | 46      | 09:03 (GA05) | 18:12    |              | 18:43        | 20:15 | 20:45 | 21:00 |       |  |      |  |  |
| 28                  | 07:39   | 08:17 (GA05) | 07:01    |              | 06:16        | 06:27 | 05:57 | 05:54 |       |  |      |  |  |
| 17:35               | 46      | 09:03 (GA05) | 18:13    |              | 18:44        | 20:17 | 20:46 | 21:00 |       |  |      |  |  |
| 29                  | 07:38   | 08:19 (GA05) |          |              | 07:14        | 06:26 | 05:56 | 05:54 |       |  |      |  |  |
| 17:36               | 45      | 09:04 (GA05) |          |              | 19:45        | 20:18 | 20:47 | 21:00 |       |  |      |  |  |
| 30                  | 07:37   | 08:19 (GA05) |          |              | 07:12        | 06:25 | 05:56 | 05:55 |       |  |      |  |  |
| 17:38               | 44      | 09:03 (GA05) |          |              | 19:46        | 20:19 | 20:48 | 21:00 |       |  |      |  |  |
| 31                  | 07:36   | 08:20 (GA05) |          |              | 07:11        |       | 05:55 |       |       |  |      |  |  |
| 17:39               | 43      | 09:03 (GA05) |          |              | 19:47        |       | 20:48 |       |       |  |      |  |  |
| Potential sun hours | 298     |              | 297      |              | 369          | 399   | 448   | 452   |       |  |      |  |  |
| Total, worst case   |         | 1299         |          | 352          |              |       |       |       |       |  |      |  |  |
| Sun reduction       |         | 0.85         |          | 0.77         |              |       |       |       |       |  |      |  |  |
| Oper. time red.     |         | 0.82         |          | 0.82         |              |       |       |       |       |  |      |  |  |
| Wind dir. red.      |         | 0.50         |          | 0.50         |              |       |       |       |       |  |      |  |  |
| Total reduction     |         | 0.35         |          | 0.32         |              |       |       |       |       |  |      |  |  |
| Total, real         |         | 454          |          | 111          |              |       |       |       |       |  |      |  |  |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R48 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (5)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

| Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                     | July  | August | September | October         | November | December        |       |                 |
|---------------------|-------|--------|-----------|-----------------|----------|-----------------|-------|-----------------|
| 1                   | 05:55 | 06:19  | 06:50     | 07:20           | 06:54    | 08:00 (GA05)    | 07:28 | 07:58 (GA05)    |
|                     | 21:00 | 20:41  | 19:58     | 19:08           | 17:21    | 22 08:22 (GA05) | 16:57 | 41 08:39 (GA05) |
| 2                   | 05:56 | 06:20  | 06:51     | 07:21           | 06:55    | 07:58 (GA05)    | 07:29 | 07:59 (GA05)    |
|                     | 21:00 | 20:40  | 19:56     | 19:06           | 17:20    | 26 08:24 (GA05) | 16:57 | 40 08:39 (GA05) |
| 3                   | 05:56 | 06:21  | 06:52     | 07:22           | 06:56    | 07:57 (GA05)    | 07:30 | 08:00 (GA05)    |
|                     | 21:00 | 20:39  | 19:55     | 19:04           | 17:19    | 29 08:26 (GA05) | 16:56 | 39 08:39 (GA05) |
| 4                   | 05:57 | 06:22  | 06:53     | 07:23           | 06:57    | 07:55 (GA05)    | 07:31 | 08:01 (GA05)    |
|                     | 21:00 | 20:38  | 19:53     | 19:03           | 17:18    | 32 08:27 (GA05) | 16:56 | 38 08:39 (GA05) |
| 5                   | 05:57 | 06:23  | 06:54     | 07:24           | 06:58    | 07:54 (GA05)    | 07:32 | 08:02 (GA05)    |
|                     | 20:59 | 20:37  | 19:52     | 19:01           | 17:16    | 35 08:29 (GA05) | 16:56 | 37 08:39 (GA05) |
| 6                   | 05:58 | 06:24  | 06:55     | 07:25           | 07:00    | 07:54 (GA05)    | 07:33 | 08:03 (GA05)    |
|                     | 20:59 | 20:35  | 19:50     | 18:59           | 17:15    | 36 08:30 (GA05) | 16:56 | 36 08:39 (GA05) |
| 7                   | 05:59 | 06:25  | 06:56     | 07:26           | 07:01    | 07:53 (GA05)    | 07:34 | 08:04 (GA05)    |
|                     | 20:59 | 20:34  | 19:48     | 18:58           | 17:14    | 38 08:31 (GA05) | 16:56 | 35 08:39 (GA05) |
| 8                   | 05:59 | 06:26  | 06:57     | 07:27           | 07:02    | 07:52 (GA05)    | 07:35 | 08:05 (GA05)    |
|                     | 20:58 | 20:33  | 19:47     | 18:56           | 17:13    | 40 08:32 (GA05) | 16:56 | 34 08:39 (GA05) |
| 9                   | 06:00 | 06:27  | 06:58     | 07:28           | 07:03    | 07:51 (GA05)    | 07:36 | 08:06 (GA05)    |
|                     | 20:58 | 20:32  | 19:45     | 18:55           | 17:12    | 41 08:32 (GA05) | 16:56 | 33 08:39 (GA05) |
| 10                  | 06:00 | 06:28  | 06:59     | 07:29           | 07:04    | 07:51 (GA05)    | 07:37 | 08:06 (GA05)    |
|                     | 20:58 | 20:30  | 19:43     | 18:53           | 17:11    | 43 08:34 (GA05) | 16:56 | 33 08:39 (GA05) |
| 11                  | 06:01 | 06:29  | 07:00     | 07:30           | 07:06    | 07:50 (GA05)    | 07:38 | 08:07 (GA05)    |
|                     | 20:57 | 20:29  | 19:42     | 18:51           | 17:10    | 44 08:34 (GA05) | 16:56 | 33 08:40 (GA05) |
| 12                  | 06:02 | 06:30  | 07:01     | 07:31           | 07:07    | 07:50 (GA05)    | 07:39 | 08:07 (GA05)    |
|                     | 20:57 | 20:28  | 19:40     | 18:50           | 17:09    | 44 08:34 (GA05) | 16:56 | 32 08:39 (GA05) |
| 13                  | 06:03 | 06:31  | 07:02     | 07:32           | 07:08    | 07:49 (GA05)    | 07:40 | 08:08 (GA05)    |
|                     | 20:56 | 20:27  | 19:38     | 18:48           | 17:08    | 46 08:35 (GA05) | 16:56 | 31 08:39 (GA05) |
| 14                  | 06:03 | 06:32  | 07:03     | 07:33           | 07:09    | 07:50 (GA05)    | 07:40 | 08:09 (GA05)    |
|                     | 20:56 | 20:25  | 19:36     | 18:47           | 17:07    | 46 08:36 (GA05) | 16:56 | 31 08:40 (GA05) |
| 15                  | 06:04 | 06:33  | 07:04     | 07:34           | 07:10    | 07:50 (GA05)    | 07:41 | 08:10 (GA05)    |
|                     | 20:55 | 20:24  | 19:35     | 18:45           | 17:06    | 46 08:36 (GA05) | 16:56 | 30 08:40 (GA05) |
| 16                  | 06:05 | 06:34  | 07:05     | 07:35           | 07:11    | 07:50 (GA05)    | 07:42 | 08:10 (GA05)    |
|                     | 20:55 | 20:22  | 19:33     | 18:43           | 17:05    | 46 08:36 (GA05) | 16:57 | 30 08:40 (GA05) |
| 17                  | 06:06 | 06:35  | 07:06     | 07:37           | 07:13    | 07:49 (GA05)    | 07:42 | 08:11 (GA05)    |
|                     | 20:54 | 20:21  | 19:31     | 18:42           | 17:05    | 47 08:36 (GA05) | 16:57 | 29 08:40 (GA05) |
| 18                  | 06:06 | 06:36  | 07:06     | 07:38           | 07:14    | 07:50 (GA05)    | 07:43 | 08:12 (GA05)    |
|                     | 20:53 | 20:20  | 19:30     | 18:40           | 17:04    | 47 08:37 (GA05) | 16:57 | 29 08:41 (GA05) |
| 19                  | 06:07 | 06:37  | 07:07     | 07:39           | 07:15    | 07:50 (GA05)    | 07:44 | 08:12 (GA05)    |
|                     | 20:53 | 20:18  | 19:28     | 18:39           | 17:03    | 47 08:37 (GA05) | 16:58 | 29 08:41 (GA05) |
| 20                  | 06:08 | 06:38  | 07:08     | 07:40           | 07:16    | 07:50 (GA05)    | 07:44 | 08:13 (GA05)    |
|                     | 20:52 | 20:17  | 19:26     | 18:37           | 17:02    | 47 08:37 (GA05) | 16:58 | 29 08:42 (GA05) |
| 21                  | 06:09 | 06:39  | 07:09     | 07:41           | 07:17    | 07:50 (GA05)    | 07:45 | 08:13 (GA05)    |
|                     | 20:51 | 20:15  | 19:25     | 18:36           | 17:02    | 47 08:37 (GA05) | 16:59 | 29 08:42 (GA05) |
| 22                  | 06:10 | 06:40  | 07:10     | 07:42           | 07:18    | 07:52 (GA05)    | 07:45 | 08:14 (GA05)    |
|                     | 20:50 | 20:14  | 19:23     | 18:35           | 17:01    | 46 08:38 (GA05) | 16:59 | 28 08:42 (GA05) |
| 23                  | 06:11 | 06:41  | 07:11     | 07:43           | 07:20    | 07:52 (GA05)    | 07:46 | 08:14 (GA05)    |
|                     | 20:50 | 20:12  | 19:21     | 18:33           | 17:00    | 46 08:38 (GA05) | 17:00 | 29 08:43 (GA05) |
| 24                  | 06:12 | 06:42  | 07:12     | 07:44           | 07:21    | 07:52 (GA05)    | 07:46 | 08:14 (GA05)    |
|                     | 20:49 | 20:11  | 19:19     | 18:32           | 17:00    | 46 08:38 (GA05) | 17:00 | 29 08:43 (GA05) |
| 25                  | 06:13 | 06:43  | 07:13     | 07:46           | 07:22    | 07:52 (GA05)    | 07:47 | 08:15 (GA05)    |
|                     | 20:48 | 20:09  | 19:18     | 17:30           | 16:59    | 46 08:38 (GA05) | 17:01 | 29 08:44 (GA05) |
| 26                  | 06:13 | 06:44  | 07:14     | 07:47           | 07:23    | 07:53 (GA05)    | 07:47 | 08:15 (GA05)    |
|                     | 20:47 | 20:08  | 19:16     | 17:29           | 16:59    | 45 08:38 (GA05) | 17:01 | 29 08:44 (GA05) |
| 27                  | 06:14 | 06:45  | 07:16     | 07:48           | 07:24    | 07:55 (GA05)    | 07:48 | 08:15 (GA05)    |
|                     | 20:46 | 20:06  | 19:14     | 17:28           | 16:58    | 44 08:39 (GA05) | 17:02 | 30 08:45 (GA05) |
| 28                  | 06:15 | 06:46  | 07:17     | 07:49           | 07:25    | 07:56 (GA05)    | 07:48 | 08:16 (GA05)    |
|                     | 20:45 | 20:04  | 19:13     | 17:26           | 16:58    | 43 08:39 (GA05) | 17:03 | 30 08:46 (GA05) |
| 29                  | 06:16 | 06:47  | 07:18     | 06:50           | 07:26    | 07:57 (GA05)    | 07:48 | 08:16 (GA05)    |
|                     | 20:44 | 20:03  | 19:11     | 17:25           | 16:58    | 42 08:39 (GA05) | 17:03 | 30 08:46 (GA05) |
| 30                  | 06:17 | 06:48  | 07:19     | 06:51           | 07:27    | 07:57 (GA05)    | 07:48 | 08:16 (GA05)    |
|                     | 20:43 | 20:01  | 19:09     | 17:24           | 16:57    | 42 08:39 (GA05) | 17:04 | 31 08:47 (GA05) |
| 31                  | 06:18 | 06:49  | 06:52     | 08:04 (GA05)    | 07:49    |                 |       | 08:16 (GA05)    |
|                     | 20:42 | 20:00  | 17:22     | 15 08:19 (GA05) | 17:05    |                 |       | 32 08:48 (GA05) |
| Potential sun hours | 459   | 428    | 375       | 345             | 298      |                 |       | 288             |
| Total, worst case   |       |        |           | 15              |          | 1249            |       | 995             |
| Sun reduction       |       |        |           | 0.74            |          | 0.83            |       | 0.88            |
| Oper. time red.     |       |        |           | 0.82            |          | 0.82            |       | 0.82            |
| Wind dir. red.      |       |        |           | 0.50            |          | 0.50            |       | 0.50            |
| Total reduction     |       |        |           | 0.30            |          | 0.34            |       | 0.36            |
| Total, real         |       |        |           | 5               |          | 422             |       | 360             |

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 | (WTG causing flicker first time) | Last time (hh:mm) with flicker | (WTG causing flicker last time) |
|--------------|------------------|-----------------|----------------------|---------------------------------|----------------------------------|--------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|----------------------------------|--------------------------------|---------------------------------|

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R53 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (6)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

| Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                     |       | January         | February | March | April           | May          | June            |       |       |  |  |  |
|---------------------|-------|-----------------|----------|-------|-----------------|--------------|-----------------|-------|-------|--|--|--|
| 1                   | 07:49 | 15:58 (GA06)    | 07:35    | 07:00 | 07:09           | 18:06 (GA07) | 06:23           | 05:55 |       |  |  |  |
|                     | 17:06 | 28 16:26 (GA06) | 17:40    | 18:14 | 19:48           | 19:19 (GA07) | 20:20           | 20:49 |       |  |  |  |
| 2                   | 07:49 | 15:59 (GA06)    | 07:34    | 06:58 | 07:07           | 18:07 (GA07) | 06:22           | 05:54 |       |  |  |  |
|                     | 17:07 | 27 16:26 (GA06) | 17:41    | 18:15 | 19:49           | 19:19 (GA07) | 20:21           | 20:50 |       |  |  |  |
| 3                   | 07:49 | 15:59 (GA06)    | 07:33    | 06:57 | 07:06           | 18:07 (GA07) | 06:21           | 05:54 |       |  |  |  |
|                     | 17:07 | 28 16:27 (GA06) | 17:42    | 18:16 | 19:50           | 19:18 (GA07) | 20:22           | 20:50 |       |  |  |  |
| 4                   | 07:49 | 16:00 (GA06)    | 07:32    | 06:55 | 07:04           | 18:07 (GA07) | 06:19           | 05:53 |       |  |  |  |
|                     | 17:08 | 27 16:27 (GA06) | 17:44    | 18:17 | 19:51           | 19:17 (GA07) | 20:23           | 20:51 |       |  |  |  |
| 5                   | 07:49 | 16:00 (GA06)    | 07:31    | 06:53 | 17:42 (GA07)    | 07:02        | 18:07 (GA07)    | 06:18 | 05:53 |  |  |  |
|                     | 17:09 | 28 16:28 (GA06) | 17:45    | 18:18 | 15 17:57 (GA07) | 19:52        | 19:17 (GA07)    | 20:24 | 20:52 |  |  |  |
| 6                   | 07:49 | 16:01 (GA06)    | 07:30    | 06:52 | 17:37 (GA07)    | 07:01        | 18:07 (GA07)    | 06:17 | 05:53 |  |  |  |
|                     | 17:10 | 27 16:28 (GA06) | 17:46    | 18:20 | 22 17:59 (GA07) | 19:53        | 68 19:15 (GA07) | 20:25 | 20:52 |  |  |  |
| 7                   | 07:49 | 16:01 (GA06)    | 07:29    | 06:50 | 17:33 (GA07)    | 06:59        | 18:08 (GA07)    | 06:16 | 05:52 |  |  |  |
|                     | 17:11 | 28 16:29 (GA06) | 17:47    | 18:21 | 27 18:00 (GA07) | 19:54        | 67 19:15 (GA07) | 20:26 | 20:53 |  |  |  |
| 8                   | 07:49 | 16:02 (GA06)    | 07:28    | 06:49 | 17:29 (GA07)    | 06:58        | 18:09 (GA07)    | 06:15 | 05:52 |  |  |  |
|                     | 17:12 | 27 16:29 (GA06) | 17:49    | 18:22 | 31 18:00 (GA07) | 19:55        | 65 19:14 (GA07) | 20:27 | 20:54 |  |  |  |
| 9                   | 07:49 | 16:02 (GA06)    | 07:27    | 06:47 | 17:27 (GA07)    | 06:56        | 18:09 (GA07)    | 06:14 | 05:52 |  |  |  |
|                     | 17:13 | 27 16:29 (GA06) | 17:50    | 18:23 | 35 18:02 (GA07) | 19:56        | 63 19:12 (GA07) | 20:28 | 20:54 |  |  |  |
| 10                  | 07:48 | 16:03 (GA06)    | 07:26    | 06:45 | 17:25 (GA07)    | 06:54        | 18:10 (GA07)    | 06:12 | 05:52 |  |  |  |
|                     | 17:14 | 26 16:29 (GA06) | 17:51    | 18:24 | 38 18:03 (GA07) | 19:57        | 62 19:12 (GA07) | 20:29 | 20:55 |  |  |  |
| 11                  | 07:48 | 16:04 (GA06)    | 07:25    | 06:44 | 17:23 (GA07)    | 06:53        | 18:10 (GA07)    | 06:11 | 05:52 |  |  |  |
|                     | 17:15 | 26 16:30 (GA06) | 17:52    | 18:25 | 42 18:05 (GA07) | 19:58        | 60 19:10 (GA07) | 20:30 | 20:55 |  |  |  |
| 12                  | 07:48 | 16:04 (GA06)    | 07:23    | 06:42 | 17:21 (GA07)    | 06:51        | 18:12 (GA07)    | 06:10 | 05:51 |  |  |  |
|                     | 17:16 | 25 16:29 (GA06) | 17:54    | 18:26 | 44 18:05 (GA07) | 19:59        | 57 19:09 (GA07) | 20:31 | 20:56 |  |  |  |
| 13                  | 07:48 | 16:05 (GA06)    | 07:22    | 06:41 | 17:19 (GA07)    | 06:50        | 18:13 (GA07)    | 06:09 | 05:51 |  |  |  |
|                     | 17:17 | 25 16:30 (GA06) | 17:55    | 18:27 | 47 18:06 (GA07) | 20:01        | 54 19:07 (GA07) | 20:32 | 20:56 |  |  |  |
| 14                  | 07:47 | 16:06 (GA06)    | 07:25    | 06:44 | 17:23 (GA07)    | 06:53        | 18:10 (GA07)    | 06:11 | 05:52 |  |  |  |
|                     | 17:18 | 24 16:30 (GA06) | 17:56    | 18:29 | 50 18:08 (GA07) | 20:02        | 52 19:06 (GA07) | 20:33 | 20:57 |  |  |  |
| 15                  | 07:47 | 16:06 (GA06)    | 07:20    | 06:37 | 17:17 (GA07)    | 06:46        | 18:15 (GA07)    | 06:07 | 05:51 |  |  |  |
|                     | 17:20 | 23 16:29 (GA06) | 17:57    | 18:30 | 52 18:09 (GA07) | 20:03        | 49 19:04 (GA07) | 20:34 | 20:57 |  |  |  |
| 16                  | 07:47 | 16:08 (GA06)    | 07:18    | 06:36 | 17:15 (GA07)    | 06:45        | 18:16 (GA07)    | 06:06 | 05:51 |  |  |  |
|                     | 17:21 | 22 16:30 (GA06) | 17:59    | 18:31 | 54 18:09 (GA07) | 20:04        | 46 19:02 (GA07) | 20:35 | 20:58 |  |  |  |
| 17                  | 07:46 | 16:08 (GA06)    | 07:17    | 06:34 | 17:15 (GA07)    | 06:43        | 18:18 (GA07)    | 06:05 | 05:51 |  |  |  |
|                     | 17:22 | 21 16:29 (GA06) | 18:00    | 18:32 | 56 18:11 (GA07) | 20:05        | 42 19:00 (GA07) | 20:36 | 20:58 |  |  |  |
| 18                  | 07:46 | 16:10 (GA06)    | 07:16    | 06:32 | 17:13 (GA07)    | 06:42        | 18:19 (GA07)    | 06:04 | 05:51 |  |  |  |
|                     | 17:23 | 19 16:29 (GA06) | 18:01    | 18:33 | 59 18:12 (GA07) | 20:06        | 39 18:58 (GA07) | 20:37 | 20:58 |  |  |  |
| 19                  | 07:45 | 16:11 (GA06)    | 07:14    | 06:31 | 17:12 (GA07)    | 06:40        | 18:22 (GA07)    | 06:03 | 05:51 |  |  |  |
|                     | 17:24 | 17 16:28 (GA06) | 18:02    | 18:34 | 61 18:13 (GA07) | 20:07        | 34 18:56 (GA07) | 20:38 | 20:59 |  |  |  |
| 20                  | 07:45 | 16:12 (GA06)    | 07:13    | 06:29 | 17:12 (GA07)    | 06:39        | 18:25 (GA07)    | 06:03 | 05:52 |  |  |  |
|                     | 17:25 | 14 16:26 (GA06) | 18:03    | 18:35 | 63 18:15 (GA07) | 20:08        | 28 18:53 (GA07) | 20:39 | 20:59 |  |  |  |
| 21                  | 07:44 | 16:15 (GA06)    | 07:11    | 06:27 | 17:11 (GA07)    | 06:37        | 18:28 (GA07)    | 06:02 | 05:52 |  |  |  |
|                     | 17:26 | 11 16:26 (GA06) | 18:05    | 18:36 | 64 18:15 (GA07) | 20:09        | 21 18:49 (GA07) | 20:40 | 20:59 |  |  |  |
| 22                  | 07:43 | 16:19 (GA06)    | 07:10    | 06:26 | 17:10 (GA07)    | 06:36        | 18:34 (GA07)    | 06:01 | 05:52 |  |  |  |
|                     | 17:28 | 3 16:22 (GA06)  | 18:06    | 18:37 | 66 18:16 (GA07) | 20:10        | 9 18:43 (GA07)  | 20:41 | 20:59 |  |  |  |
| 23                  | 07:43 |                 | 07:09    | 06:24 | 17:09 (GA07)    | 06:34        |                 | 06:00 | 05:52 |  |  |  |
|                     | 17:29 |                 | 18:07    | 18:38 | 68 18:17 (GA07) | 20:11        |                 | 04:41 | 21:00 |  |  |  |
| 24                  | 07:42 |                 | 07:07    | 06:22 | 17:09 (GA07)    | 06:33        |                 | 05:59 | 05:52 |  |  |  |
|                     | 17:30 |                 | 18:08    | 18:39 | 69 18:18 (GA07) | 20:12        |                 | 20:42 | 21:00 |  |  |  |
| 25                  | 07:41 |                 | 07:06    | 06:21 | 17:08 (GA07)    | 06:32        |                 | 05:59 | 05:53 |  |  |  |
|                     | 17:31 |                 | 18:09    | 18:40 | 71 18:19 (GA07) | 20:13        |                 | 20:43 | 21:00 |  |  |  |
| 26                  | 07:41 |                 | 07:04    | 06:19 | 17:07 (GA07)    | 06:30        |                 | 05:58 | 05:53 |  |  |  |
|                     | 17:33 |                 | 18:10    | 18:41 | 73 18:20 (GA07) | 20:14        |                 | 20:44 | 21:00 |  |  |  |
| 27                  | 07:40 |                 | 07:03    | 06:17 | 17:07 (GA07)    | 06:29        |                 | 05:57 | 05:53 |  |  |  |
|                     | 17:34 |                 | 18:12    | 18:43 | 74 18:21 (GA07) | 20:15        |                 | 20:45 | 21:00 |  |  |  |
| 28                  | 07:39 |                 | 07:01    | 06:16 | 17:07 (GA07)    | 06:27        |                 | 05:57 | 05:54 |  |  |  |
|                     | 17:35 |                 | 18:13    | 18:44 | 74 18:21 (GA07) | 20:16        |                 | 20:46 | 21:00 |  |  |  |
| 29                  | 07:38 |                 | 07:14    |       | 18:06 (GA07)    | 06:26        |                 | 05:56 | 05:54 |  |  |  |
|                     | 17:36 |                 | 19:45    |       | 74 19:20 (GA07) | 20:17        |                 | 20:47 | 21:00 |  |  |  |
| 30                  | 07:37 |                 | 07:12    |       | 18:07 (GA07)    | 06:25        |                 | 05:56 | 05:55 |  |  |  |
|                     | 17:37 |                 | 19:46    |       | 73 19:20 (GA07) | 20:18        |                 | 20:47 | 21:00 |  |  |  |
| 31                  | 07:36 |                 | 07:11    |       | 18:06 (GA07)    |              |                 | 05:55 |       |  |  |  |
|                     | 17:39 |                 | 19:47    |       | 74 19:20 (GA07) |              |                 | 20:48 |       |  |  |  |
| Potential sun hours | 298   |                 | 297      | 369   |                 | 399          |                 | 448   | 452   |  |  |  |
| Total, worst case   | 503   |                 |          |       | 1476            |              | 1172            |       |       |  |  |  |
| Sun reduction       | 0,85  |                 |          |       | 0,69            |              | 0,62            |       |       |  |  |  |
| Oper. time red.     | 0,82  |                 |          |       | 0,82            |              | 0,82            |       |       |  |  |  |
| Wind dir. red.      | 0,83  |                 |          |       | 0,79            |              | 0,79            |       |       |  |  |  |
| Total reduction     | 0,58  |                 |          |       | 0,44            |              | 0,40            |       |       |  |  |  |
| Total, real         | 293   |                 |          |       | 654             |              | 466             |       |       |  |  |  |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R53 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (6)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

| Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|    | July                | August   | September    | October      | November     | December     |                       |                       |
|----|---------------------|----------|--------------|--------------|--------------|--------------|-----------------------|-----------------------|
| 1  | 05:55               | 06:19    | 06:50        | 18:09 (GA07) | 07:19        | 17:59 (GA07) | 06:54                 | 07:28 15:46 (GA06)    |
|    | 21:00               | 20:41    | 19:58 60     | 19:09 (GA07) | 19:08 46     | 18:45 (GA07) | 17:21                 | 16:57 26 16:12 (GA06) |
| 2  | 05:56               | 06:20    | 06:51        | 18:08 (GA07) | 07:20        | 18:00 (GA07) | 06:55                 | 07:29 15:46 (GA06)    |
|    | 21:00               | 20:40    | 19:56 62     | 19:10 (GA07) | 19:06 43     | 18:43 (GA07) | 17:20                 | 16:56 26 16:12 (GA06) |
| 3  | 05:56               | 06:21    | 06:52        | 18:07 (GA07) | 07:22        | 18:03 (GA07) | 06:56                 | 07:30 15:46 (GA06)    |
|    | 21:00               | 20:39    | 19:55 63     | 19:10 (GA07) | 19:04 39     | 18:42 (GA07) | 17:19                 | 16:56 27 16:13 (GA06) |
| 4  | 05:57               | 06:22    | 06:53        | 18:06 (GA07) | 07:23        | 18:04 (GA07) | 06:57                 | 07:31 15:46 (GA06)    |
|    | 20:59               | 20:38    | 19:53 65     | 19:11 (GA07) | 19:03 36     | 18:40 (GA07) | 17:17                 | 16:56 27 16:13 (GA06) |
| 5  | 05:57               | 06:23    | 06:54        | 18:05 (GA07) | 07:24        | 18:06 (GA07) | 06:58                 | 07:32 15:46 (GA06)    |
|    | 20:59               | 20:36    | 19:51 66     | 19:11 (GA07) | 19:01 33     | 18:39 (GA07) | 17:16                 | 16:56 28 16:14 (GA06) |
| 6  | 05:58               | 06:24    | 06:55        | 18:04 (GA07) | 07:25        | 18:08 (GA07) | 06:59                 | 07:33 15:47 (GA06)    |
|    | 20:59               | 20:35    | 19:50 67     | 19:11 (GA07) | 18:59 29     | 18:37 (GA07) | 17:15                 | 16:56 27 16:14 (GA06) |
| 7  | 05:58               | 06:25    | 06:56        | 18:03 (GA07) | 07:26        | 18:11 (GA07) | 07:01                 | 07:34 15:47 (GA06)    |
|    | 20:59               | 20:34    | 19:48 69     | 19:12 (GA07) | 18:58 24     | 18:35 (GA07) | 17:14                 | 16:56 28 16:15 (GA06) |
| 8  | 05:59               | 06:26    | 06:56        | 18:02 (GA07) | 07:27        | 18:15 (GA07) | 07:02                 | 07:35 15:48 (GA06)    |
|    | 20:58               | 20:33    | 19:46 70     | 19:12 (GA07) | 18:56 18     | 18:33 (GA07) | 17:13                 | 16:56 27 16:15 (GA06) |
| 9  | 06:00               | 06:27    | 06:57        | 18:01 (GA07) | 07:28        | 18:24 (GA07) | 07:03                 | 07:36 15:48 (GA06)    |
|    | 20:58               | 20:32    | 19:45 71     | 19:12 (GA07) | 18:54 3      | 18:27 (GA07) | 17:12                 | 16:56 28 16:16 (GA06) |
| 10 | 06:00               | 06:28    | 06:58        | 18:00 (GA07) | 07:29        |              | 07:04                 | 07:37 15:49 (GA06)    |
|    | 20:58               | 20:30    | 19:43 72     | 19:12 (GA07) | 18:53        |              | 17:11                 | 16:56 27 16:16 (GA06) |
| 11 | 06:01               | 06:29    | 06:59        | 17:59 (GA07) | 07:30        |              | 07:05                 | 07:38 15:48 (GA06)    |
|    | 20:57               | 20:29    | 19:41 73     | 19:12 (GA07) | 18:51        |              | 17:10                 | 16:56 28 16:16 (GA06) |
| 12 | 06:02               | 06:30    | 07:00        | 17:59 (GA07) | 07:31        |              | 07:07                 | 07:39 15:49 (GA06)    |
|    | 20:57               | 20:28    | 19:40 73     | 19:12 (GA07) | 18:50        |              | 17:09                 | 16:56 27 16:16 (GA06) |
| 13 | 06:02               | 06:31    | 07:01        | 17:58 (GA07) | 07:32        |              | 07:08                 | 07:39 15:50 (GA06)    |
|    | 20:56               | 20:26    | 19:38 74     | 19:12 (GA07) | 18:48        |              | 17:08                 | 16:56 27 16:17 (GA06) |
| 14 | 06:03               | 06:32    | 07:02        | 17:58 (GA07) | 07:33        |              | 07:09                 | 07:40 15:50 (GA06)    |
|    | 20:56               | 20:25    | 19:36 73     | 19:11 (GA07) | 18:46        |              | 17:07                 | 16:56 28 16:18 (GA06) |
| 15 | 06:04               | 06:33    | 07:03        | 17:57 (GA07) | 07:34        |              | 07:10                 | 07:41 15:50 (GA06)    |
|    | 20:55               | 20:24    | 19:35 74     | 19:11 (GA07) | 18:45        |              | 17:06                 | 16:56 27 16:17 (GA06) |
| 16 | 06:05               | 06:34    | 07:04        | 17:57 (GA07) | 07:35        |              | 07:11                 | 07:42 15:51 (GA06)    |
|    | 20:55               | 20:22    | 19:33 74     | 19:11 (GA07) | 18:43        |              | 17:05                 | 16:57 27 16:18 (GA06) |
| 17 | 06:06               | 06:35    | 07:05        | 17:56 (GA07) | 07:36        |              | 07:13                 | 07:42 15:52 (GA06)    |
|    | 20:54               | 20:21    | 19:31 74     | 19:10 (GA07) | 18:42        |              | 17:04                 | 16:57 27 16:19 (GA06) |
| 18 | 06:06               | 06:36    | 07:06        | 17:55 (GA07) | 07:38        |              | 07:14                 | 07:43 15:52 (GA06)    |
|    | 20:53               | 20:19    | 19:30 72     | 19:07 (GA07) | 18:40        |              | 17:04                 | 16:57 27 16:19 (GA06) |
| 19 | 06:07               | 06:37    | 07:07        | 17:55 (GA07) | 07:39        |              | 07:15                 | 07:44 15:52 (GA06)    |
|    | 20:53               | 20:18    | 19:28 70     | 19:05 (GA07) | 18:39        |              | 17:03                 | 16:58 28 16:20 (GA06) |
| 20 | 06:08               | 06:38    | 07:08        | 17:55 (GA07) | 07:40        |              | 07:16 15:54 (GA06)    | 07:44 15:53 (GA06)    |
|    | 20:52               | 20:17    | 19:26 68     | 19:03 (GA07) | 18:37        |              | 17:02 3 15:57 (GA06)  | 16:58 28 16:21 (GA06) |
| 21 | 06:09               | 06:39    | 18:37 (GA07) | 07:09        | 17:55 (GA07) | 07:41        | 07:17 15:50 (GA06)    | 07:45 15:53 (GA06)    |
|    | 20:51               | 20:15 12 | 18:49 (GA07) | 19:24 67     | 19:02 (GA07) | 18:36        | 17:02 11 16:01 (GA06) | 16:58 27 16:20 (GA06) |
| 22 | 06:10               | 06:40    | 18:32 (GA07) | 07:10        | 17:55 (GA07) | 07:42        | 07:18 15:49 (GA06)    | 07:45 15:54 (GA06)    |
|    | 20:50               | 20:14 22 | 18:54 (GA07) | 19:23 65     | 19:00 (GA07) | 18:34        | 17:01 14 16:03 (GA06) | 16:59 27 16:21 (GA06) |
| 23 | 06:11               | 06:41    | 18:28 (GA07) | 07:11        | 17:55 (GA07) | 07:43        | 07:19 15:48 (GA06)    | 07:46 15:54 (GA06)    |
|    | 20:49               | 20:12 29 | 18:57 (GA07) | 19:21 63     | 18:58 (GA07) | 18:33        | 17:00 17 16:05 (GA06) | 16:59 28 16:22 (GA06) |
| 24 | 06:11               | 06:42    | 18:25 (GA07) | 07:12        | 17:55 (GA07) | 07:44        | 07:21 15:47 (GA06)    | 07:46 15:54 (GA06)    |
|    | 20:49               | 20:11 35 | 19:00 (GA07) | 19:19 62     | 18:57 (GA07) | 18:32        | 17:00 19 16:06 (GA06) | 17:00 28 16:22 (GA06) |
| 25 | 06:12               | 06:43    | 18:23 (GA07) | 07:13        | 17:55 (GA07) | 06:45        | 07:22 15:46 (GA06)    | 07:47 15:56 (GA06)    |
|    | 20:48               | 20:09 39 | 19:02 (GA07) | 19:18 60     | 18:55 (GA07) | 17:30        | 16:59 21 16:07 (GA06) | 17:01 27 16:23 (GA06) |
| 26 | 06:13               | 06:44    | 18:21 (GA07) | 07:14        | 17:56 (GA07) | 06:47        | 07:23 15:46 (GA06)    | 07:47 15:56 (GA06)    |
|    | 20:47               | 20:07 42 | 19:03 (GA07) | 19:16 57     | 18:53 (GA07) | 17:29        | 16:59 22 16:08 (GA06) | 17:01 27 16:23 (GA06) |
| 27 | 06:14               | 06:45    | 18:19 (GA07) | 07:15        | 17:56 (GA07) | 06:48        | 07:24 15:45 (GA06)    | 07:47 15:56 (GA06)    |
|    | 20:46               | 20:06 46 | 19:05 (GA07) | 19:14 55     | 18:51 (GA07) | 17:27        | 16:58 23 16:08 (GA06) | 17:02 27 16:23 (GA06) |
| 28 | 06:15               | 06:46    | 18:17 (GA07) | 07:16        | 17:57 (GA07) | 06:49        | 07:25 15:46 (GA06)    | 07:48 15:57 (GA06)    |
|    | 20:45               | 20:04 49 | 19:06 (GA07) | 19:13 53     | 18:50 (GA07) | 17:26        | 16:58 24 16:10 (GA06) | 17:03 27 16:24 (GA06) |
| 29 | 06:16               | 06:47    | 18:14 (GA07) | 07:17        | 17:57 (GA07) | 06:50        | 07:26 15:46 (GA06)    | 07:48 15:57 (GA06)    |
|    | 20:44               | 20:03 52 | 19:06 (GA07) | 19:11 51     | 18:48 (GA07) | 17:25        | 16:57 25 16:11 (GA06) | 17:03 28 16:25 (GA06) |
| 30 | 06:17               | 06:48    | 18:12 (GA07) | 07:18        | 17:58 (GA07) | 06:51        | 07:27 15:46 (GA06)    | 07:48 15:58 (GA06)    |
|    | 20:43               | 20:01 55 | 19:07 (GA07) | 19:09 48     | 18:46 (GA07) | 17:24        | 16:57 25 16:11 (GA06) | 17:04 27 16:25 (GA06) |
| 31 | 06:18               | 06:49    | 18:11 (GA07) |              |              | 06:52        |                       | 07:48 15:58 (GA06)    |
|    | 20:42               | 20:00 57 | 19:08 (GA07) |              |              | 17:22        |                       | 17:05 27 16:25 (GA06) |
|    | Potential sun hours | 459      | 428          | 375          | 345          | 298          | 288                   |                       |
|    | Total, worst case   |          | 438          | 1971         | 271          | 204          | 845                   |                       |
|    | Sun reduction       |          | 0,59         | 0,66         | 0,74         | 0,83         | 0,88                  |                       |
|    | Oper. time red.     |          | 0,82         | 0,82         | 0,82         | 0,82         | 0,82                  |                       |
|    | Wind dir. red.      |          | 0,79         | 0,79         | 0,79         | 0,83         | 0,83                  |                       |
|    | Total reduction     |          | 0,38         | 0,42         | 0,47         | 0,56         | 0,60                  |                       |
|    | Total, real         |          | 168          | 833          | 129          | 115          | 508                   |                       |

Table 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: Caso reale su dati statistici  
Shadow receptor: R60 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (7)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

Operational time  
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
90 295 742 511 343 267 107 562 1.775 1.844 553 102 7.191

|   | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|
| 1   07:49   07:35   07:00   07:09   19:07 (GA07)   06:23   05:55   05:55   06:19   06:50   07:19   06:53   07:28                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:06   17:40   18:14   19:48   19:26 (GA07)   20:20   20:49   21:00   20:41   19:58   19:07   17:21   16:57                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 2   07:49   07:34   06:58   07:07   19:08 (GA07)   06:22   05:54   05:56   06:20   06:51   07:20   06:55   07:29                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:07   17:41   18:15   19:49   19:28 (GA07)   20:21   20:50   21:00   20:40   19:56   19:06   17:20   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 3   07:49   07:33   06:56   07:06   19:09 (GA07)   06:21   05:54   05:56   06:21   06:52   07:21   06:56   07:30                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:07   17:42   18:16   19:50   19:28 (GA07)   20:22   20:50   21:00   20:39   19:55   19:04   17:19   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 4   07:49   07:32   06:55   07:04   19:10 (GA07)   06:19   05:53   05:57   06:22   06:53   07:23   06:57   07:31                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:08   17:44   18:17   19:51   19:28 (GA07)   20:23   20:51   20:59   20:38   19:53   19:02   17:17   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 5   07:49   07:31   06:53   07:02   19:13 (GA07)   06:18   05:53   05:57   06:23   06:54   07:24   06:58   07:32                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:09   17:45   18:18   19:52   19:25 (GA07)   20:24   20:52   20:59   20:36   19:51   19:01   17:16   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 6   07:49   07:30   06:52   07:01   06:17   05:53   05:58   06:24   06:54   07:25   06:59   07:33                               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:10   17:46   18:20   19:53   19:25   20:52   20:59   20:35   19:50   18:59   17:15   16:56                                   |         |          |       |       |     |      |      |        |           |         |          |          |
| 7   07:49   07:29   06:50   06:59   06:16   05:52   05:58   06:25   06:55   19:09 (GA07)   07:26   07:01   07:34                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:11   17:47   18:21   19:54   20:26   20:53   20:59   20:34   19:48   19:20 (GA07)   18:58   17:14   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 8   07:49   07:28   06:49   06:57   06:15   05:52   05:59   06:26   06:56   19:06 (GA07)   07:27   07:02   07:35                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:12   17:49   18:22   19:55   20:27   20:54   20:58   20:33   19:46   19:22 (GA07)   18:56   17:13   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 9   07:49   07:27   06:47   06:56   06:13   05:52   06:00   06:27   06:57   19:03 (GA07)   07:28   07:03   07:36                |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:13   17:50   18:23   19:56   20:28   20:54   20:58   20:32   19:45   19:23 (GA07)   18:54   17:12   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 10   07:48   07:26   06:45   06:54   06:12   05:52   06:00   06:28   06:58   19:02 (GA07)   07:29   07:04   07:37               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:14   17:51   18:24   19:57   20:29   20:55   20:58   20:30   19:43   19:21 (GA07)   18:53   17:11   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 11   07:48   07:25   06:44   06:53   06:11   05:51   06:01   06:29   06:59   19:00 (GA07)   07:30   07:05   07:38               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:15   17:52   18:25   19:58   20:30   20:55   20:57   20:29   19:41   19:19 (GA07)   18:51   17:10   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 12   07:48   07:23   06:42   06:51   06:10   05:51   06:02   06:30   07:00   18:59 (GA07)   07:31   07:07   07:39               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:16   17:54   18:26   19:59   20:31   20:56   20:57   20:28   19:40   19:18 (GA07)   18:50   17:09   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 13   07:48   07:22   06:41   06:49   06:09   05:51   06:02   06:31   07:01   18:58 (GA07)   07:32   07:08   07:39               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:17   17:55   18:27   20:00   20:32   20:56   20:56   20:26   19:38   19:16 (GA07)   18:48   17:08   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 14   07:47   07:21   06:39   06:48   06:08   05:51   06:03   06:32   07:02   18:57 (GA07)   07:33   07:09   07:40               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:18   17:56   18:28   20:02   20:33   20:57   20:56   20:25   19:36   19:15 (GA07)   18:46   17:07   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 15   07:47   07:19   06:37   06:46   06:07   05:51   06:04   06:33   07:03   18:57 (GA07)   07:34   07:10   07:41               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:20   17:57   18:30   20:03   20:34   20:57   20:55   20:24   19:35   19:13 (GA07)   18:45   17:06   16:56                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 16   07:47   07:18   06:36   06:45   06:06   05:51   06:05   06:34   07:04   18:56 (GA07)   07:35   07:11   07:42               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:21   17:58   18:31   20:04   20:35   20:58   20:54   20:22   19:33   19:11 (GA07)   18:43   17:05   16:57                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 17   07:46   07:17   06:34   06:43   06:05   05:51   06:06   06:35   07:05   18:55 (GA07)   07:36   07:12   07:42               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:22   18:00   18:32   20:05   20:36   20:58   20:54   20:21   19:31   19:09 (GA07)   18:42   17:04   16:57                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 18   07:46   07:16   06:32   06:42   06:04   05:51   06:06   06:36   07:06   18:55 (GA07)   07:37   07:14   07:43               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:23   18:01   18:33   20:06   20:37   20:58   20:53   20:19   19:30   19:07 (GA07)   18:40   17:04   16:57                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 19   07:45   07:14   06:31   06:40   06:03   05:51   06:07   06:37   07:07   18:55 (GA07)   07:39   07:15   07:44               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:24   18:02   18:34   20:07   20:38   20:59   20:53   20:18   19:28   19:05 (GA07)   18:39   17:03   16:58                    |         |          |       |       |     |      |      |        |           |         |          |          |
| 20   07:45   07:13   06:29   18:14 (GA07)   06:39   06:03   05:52   06:08   07:08   18:55 (GA07)   07:40   07:16   07:44        |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:25   18:03   18:35   18:15 (GA07)   20:08   20:39   20:59   20:52   20:16   19:26   8 19:03 (GA07)   18:37   17:02   16:58   |         |          |       |       |     |      |      |        |           |         |          |          |
| 21   07:44   07:11   06:27   18:12 (GA07)   06:37   06:02   05:52   06:09   07:09   18:55 (GA07)   07:41   07:17   07:45        |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:26   18:04   18:36   3 18:15 (GA07)   20:09   20:40   20:59   20:51   20:15   19:24   7 19:02 (GA07)   18:36   17:02   16:58 |         |          |       |       |     |      |      |        |           |         |          |          |
| 22   07:43   07:10   06:26   18:10 (GA07)   06:36   06:01   05:52   06:10   07:10   18:56 (GA07)   07:42   07:18   07:45        |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:28   18:06   18:37   6 18:16 (GA07)   20:10   20:41   20:59   20:50   20:14   19:23   4 19:00 (GA07)   18:34   17:01   16:59 |         |          |       |       |     |      |      |        |           |         |          |          |
| 23   07:43   07:08   06:24   18:09 (GA07)   06:34   06:00   05:52   06:11   07:11   18:57 (GA07)   07:43   07:19   07:46        |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:29   18:07   18:38   8 18:17 (GA07)   20:11   20:41   21:00   20:49   20:12   19:21   1 18:58 (GA07)   18:33   17:00   16:59 |         |          |       |       |     |      |      |        |           |         |          |          |
| 24   07:42   07:07   06:22   18:08 (GA07)   06:33   05:59   05:52   06:11   06:42   07:12   07:44   07:21   07:46               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:30   18:08   18:39   10 18:18 (GA07)   20:12   20:42   21:00   20:49   20:10   19:19   18:32   17:00   17:00                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 25   07:41   07:06   06:21   18:07 (GA07)   06:31   05:59   05:53   06:12   06:43   07:13   06:45   07:22   07:47               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:31   18:09   18:40   12 18:19 (GA07)   20:13   20:43   21:00   20:48   20:09   19:18   17:30   16:59   17:01                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 26   07:41   07:04   06:19   18:06 (GA07)   06:30   05:58   05:53   06:13   06:44   07:14   06:47   07:23   07:47               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:32   18:10   18:41   14 18:20 (GA07)   20:14   20:44   21:00   20:47   20:07   19:16   17:29   16:59   17:01                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 27   07:40   07:03   06:17   18:07 (GA07)   06:29   05:57   05:53   06:14   06:45   07:15   06:48   07:24   07:47               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:34   18:12   18:42   15 18:22 (GA07)   20:15   20:45   21:00   20:46   20:06   19:14   17:27   16:58   17:02                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 28   07:39   07:01   06:16   18:06 (GA07)   06:27   05:57   05:54   06:15   06:46   07:16   06:49   07:25   07:48               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:35   18:13   18:44   16 18:22 (GA07)   20:16   20:46   21:00   20:45   20:04   19:13   17:26   16:58   17:02                 |         |          |       |       |     |      |      |        |           |         |          |          |
| 29   07:38   07:14   06:15   19:06 (GA07)   06:26   05:56   05:54   06:16   06:47   07:17   06:50   07:26   07:48               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:36   19:45   17 19:23 (GA07)   20:17   20:47   21:00   20:44   20:03   19:11   17:25   16:57   17:03                         |         |          |       |       |     |      |      |        |           |         |          |          |
| 30   07:37   07:12   06:17   19:07 (GA07)   06:25   05:56   05:55   06:17   06:48   07:18   06:51   07:27   07:48               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:37   19:46   18 19:25 (GA07)   20:18   20:47   21:00   20:43   20:01   19:09   17:23   16:57   17:04                         |         |          |       |       |     |      |      |        |           |         |          |          |
| 31   07:36   07:11   06:18   19:07 (GA07)   06:24   05:55   06:18   06:49   07:22   06:52   07:22   07:22   07:48               |         |          |       |       |     |      |      |        |           |         |          |          |
| 17:39   19:47   18 19:25 (GA07)   20:18   20:48   20:42   20:40   20:00   92   17:22   07:22   07:05                            |         |          |       |       |     |      |      |        |           |         |          |          |
| Potential sun hours   298   297   369   399   448   452   459   428   375   227   345   298   288                               |         |          |       |       |     |      |      |        |           |         |          |          |
| Total, worst case   |         |          |       |       |     |      |      |        |           |         |          |          |
| Sun reduction   |         |          |       |       |     |      |      |        |           |         |          |          |
| Oper. time red.   |         |          |       |       |     |      |      |        |           |         |          |          |
| Wind dir. red.  |         |          |       |       |     |      |      |        |           |         |          |          |
| Total reduction   |         |          |       |       |     |      |      |        |           |         |          |          |
| Total, real   |         |          |       |       |     |      |      |        |           |         |          |          |
|   |         |          |       |       |     |      |      |        |           |         |          |          |

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R62 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (8)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

| Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                     | January | February | March | April | May   | June  | July  | August | September | October | November | December |
|---------------------|---------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|
| 1                   | 07:49   | 07:35    | 07:00 | 07:09 | 06:23 | 05:55 | 05:55 | 06:19  | 06:50     | 07:19   | 06:53    | 07:28    |
|                     | 17:06   | 17:40    | 18:14 | 19:48 | 20:19 | 20:49 | 21:00 | 20:41  | 19:58     | 19:07   | 17:21    | 16:57    |
| 2                   | 07:49   | 07:34    | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51     | 07:20   | 06:55    | 07:29    |
|                     | 17:07   | 17:41    | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20    | 16:56    |
| 3                   | 07:49   | 07:33    | 06:56 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:51     | 07:21   | 06:56    | 07:30    |
|                     | 17:07   | 17:42    | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04   | 17:18    | 16:56    |
| 4                   | 07:49   | 07:32    | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:52     | 07:22   | 06:57    | 07:31    |
|                     | 17:08   | 17:44    | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:02   | 17:17    | 16:56    |
| 5                   | 07:49   | 07:31    | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:53     | 07:24   | 06:58    | 07:32    |
|                     | 17:09   | 17:45    | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51     | 19:01   | 17:16    | 16:56    |
| 6                   | 07:49   | 07:30    | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:54     | 07:25   | 06:59    | 07:33    |
|                     | 17:10   | 17:46    | 18:20 | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15    | 16:56    |
| 7                   | 07:49   | 07:29    | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55     | 07:26   | 07:01    | 07:34    |
|                     | 17:11   | 17:47    | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14    | 16:56    |
| 8                   | 07:49   | 07:28    | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56     | 07:27   | 07:02    | 07:35    |
|                     | 17:12   | 17:49    | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13    | 16:56    |
| 9                   | 07:49   | 07:27    | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57     | 07:28   | 07:03    | 07:36    |
|                     | 17:13   | 17:50    | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12    | 16:56    |
| 10                  | 07:48   | 07:26    | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58     | 07:29   | 07:04    | 07:37    |
|                     | 17:14   | 17:51    | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11    | 16:56    |
| 11                  | 07:48   | 07:24    | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59     | 07:30   | 07:05    | 07:38    |
|                     | 17:15   | 17:52    | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10    | 16:56    |
| 12                  | 07:48   | 07:23    | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07    | 07:39    |
|                     | 17:16   | 17:54    | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09    | 16:56    |
| 13                  | 07:48   | 07:22    | 06:40 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01     | 07:32   | 07:08    | 07:39    |
|                     | 17:17   | 17:55    | 18:27 | 20:00 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08    | 16:56    |
| 14                  | 07:47   | 07:21    | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09    | 07:40    |
|                     | 17:18   | 17:56    | 18:28 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07    | 16:56    |
| 15                  | 07:47   | 07:19    | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10    | 07:41    |
|                     | 17:19   | 17:57    | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06    | 16:56    |
| 16                  | 07:47   | 07:18    | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11    | 07:42    |
|                     | 17:21   | 17:58    | 18:31 | 20:04 | 20:35 | 20:58 | 20:54 | 20:22  | 19:33     | 18:43   | 17:05    | 16:57    |
| 17                  | 07:46   | 07:17    | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05     | 07:36   | 07:12    | 07:42    |
|                     | 17:22   | 18:00    | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:04    | 16:57    |
| 18                  | 07:46   | 07:15    | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:37   | 07:14    | 07:43    |
|                     | 17:23   | 18:01    | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:29     | 18:40   | 17:04    | 16:57    |
| 19                  | 07:45   | 07:14    | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15    | 07:44    |
|                     | 17:24   | 18:02    | 18:34 | 20:07 | 20:38 | 20:59 | 20:52 | 20:18  | 19:28     | 18:39   | 17:03    | 16:58    |
| 20                  | 07:45   | 07:13    | 06:29 | 06:39 | 06:02 | 05:52 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16    | 07:44    |
|                     | 17:25   | 18:03    | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:16  | 19:26     | 18:37   | 17:02    | 16:58    |
| 21                  | 07:44   | 07:11    | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17    | 07:45    |
|                     | 17:26   | 18:04    | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:01    | 16:58    |
| 22                  | 07:43   | 07:10    | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42   | 07:18    | 07:45    |
|                     | 17:28   | 18:06    | 18:37 | 20:10 | 20:40 | 20:59 | 20:50 | 20:13  | 19:23     | 18:34   | 17:01    | 16:59    |
| 23                  | 07:43   | 07:08    | 06:24 | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11     | 07:43   | 07:19    | 07:46    |
|                     | 17:29   | 18:07    | 18:38 | 20:11 | 20:41 | 21:00 | 20:49 | 20:12  | 19:21     | 18:33   | 17:00    | 16:59    |
| 24                  | 07:42   | 07:07    | 06:22 | 06:33 | 05:59 | 05:52 | 06:11 | 06:42  | 07:12     | 07:44   | 07:21    | 07:46    |
|                     | 17:30   | 18:08    | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:10  | 19:19     | 18:32   | 17:00    | 17:00    |
| 25                  | 07:41   | 07:06    | 06:21 | 06:31 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13     | 07:45   | 07:22    | 07:47    |
|                     | 17:31   | 18:09    | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 18:30   | 16:59    | 17:00    |
| 26                  | 07:41   | 07:04    | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 07:46   | 07:23    | 07:47    |
|                     | 17:32   | 18:10    | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29   | 16:59    | 17:01    |
| 27                  | 07:40   | 07:03    | 06:17 | 06:29 | 05:57 | 05:53 | 06:14 | 06:45  | 07:15     | 07:48   | 07:24    | 07:47    |
|                     | 17:34   | 18:12    | 18:42 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:27   | 16:58    | 17:02    |
| 28                  | 07:39   | 07:01    | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16     | 07:49   | 07:25    | 07:48    |
|                     | 17:35   | 18:13    | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:12     | 17:26   | 16:58    | 17:02    |
| 29                  | 07:38   |          | 06:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 07:50   | 07:26    | 07:48    |
|                     | 17:36   |          | 19:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57    | 17:03    |
| 30                  | 07:37   |          | 06:12 | 06:25 | 05:56 | 05:55 | 06:17 | 06:48  | 07:18     | 06:51   | 07:27    | 07:48    |
|                     | 17:37   |          | 19:46 | 20:18 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:23   | 16:57    | 17:04    |
| 31                  | 07:36   |          | 06:11 |       | 05:55 |       | 06:18 | 06:49  |           | 06:52   |          | 07:48    |
|                     | 17:39   |          | 19:47 |       | 20:48 |       | 20:42 | 20:00  |           | 17:22   |          | 17:05    |
| Potential sun hours | 298     | 297      | 369   | 399   | 448   | 452   | 459   | 428    | 375       | 345     | 298      | 288      |
| Total, worst case   |         |          |       |       |       |       |       |        |           |         |          |          |
| Sun reduction       |         |          |       |       |       |       |       |        |           |         |          |          |
| Oper. time red.     |         |          |       |       |       |       |       |        |           |         |          |          |
| Wind dir. red.      |         |          |       |       |       |       |       |        |           |         |          |          |
| Total reduction     |         |          |       |       |       |       |       |        |           |         |          |          |
| Total, real         |         |          |       |       |       |       |       |        |           |         |          |          |

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

| Day in month | Sun rise (hh:mm) | 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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R68 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (9)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

Operational time  
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
90 295 742 511 343 267 107 562 1.775 1.844 553 102 7.191

|                     | January         | February           | March       | April       | May         | June               | July | August | September/October | November              | December |
|---------------------|-----------------|--------------------|-------------|-------------|-------------|--------------------|------|--------|-------------------|-----------------------|----------|
| 1   07:49           |                 | 07:35 07:55 (GA09) | 07:00 07:09 | 06:23 05:55 | 06:19 06:50 | 07:19 06:54        |      |        |                   | 07:15 (GA09)          | 07:28    |
| 1   17:06           | 17:40           | 13 08:08 (GA09)    | 18:14 19:48 | 20:20 20:49 | 21:00 20:41 | 19:58 19:08        |      |        |                   | 17:21 25 07:40 (GA09) | 16:57    |
| 2   07:49           | 07:34           | 07:54 (GA09)       | 06:58 07:07 | 06:22 05:54 | 05:56 06:20 | 05:51 07:20        |      |        |                   | 06:55 07:16 (GA09)    | 07:29    |
| 3   17:07           | 17:41           | 15 08:09 (GA09)    | 18:15 19:49 | 20:21 20:50 | 21:00 20:40 | 19:56 19:06        |      |        |                   | 17:20 24 07:40 (GA09) | 16:56    |
| 3   07:49           | 07:33           | 07:53 (GA09)       | 06:57 07:06 | 06:21 05:54 | 06:21 05:56 | 07:22 06:52        |      |        |                   | 06:56 07:18 (GA09)    | 07:30    |
| 4   17:07           | 17:42           | 17 08:10 (GA09)    | 18:16 19:50 | 20:22 20:50 | 21:00 20:39 | 19:55 19:04        |      |        |                   | 06:57 07:23 (GA09)    | 07:31    |
| 4   07:49           | 07:32           | 07:52 (GA09)       | 06:55 07:04 | 06:19 05:53 | 06:22 05:57 | 07:23 06:53        |      |        |                   | 06:57 07:19 (GA09)    | 07:31    |
| 5   17:08           | 17:44           | 18 08:10 (GA09)    | 18:17 19:51 | 20:23 20:51 | 20:59 20:38 | 19:53 19:03        |      |        |                   | 17:17 22 07:41 (GA09) | 16:56    |
| 5   07:49           | 07:31           | 07:51 (GA09)       | 06:53 07:02 | 06:18 05:53 | 06:23 05:57 | 07:24 06:54        |      |        |                   | 06:58 07:20 (GA09)    | 07:32    |
| 6   17:09           | 17:45           | 20 08:11 (GA09)    | 18:18 19:52 | 20:24 20:52 | 20:59 20:36 | 19:51 19:01        |      |        |                   | 17:16 21 07:41 (GA09) | 16:56    |
| 6   07:49           | 07:30           | 07:50 (GA09)       | 06:52 07:01 | 06:17 05:53 | 06:24 05:58 | 07:25 06:55        |      |        |                   | 06:59 07:21 (GA09)    | 07:33    |
| 7   17:10           | 17:46           | 21 08:11 (GA09)    | 18:20 19:53 | 20:25 20:52 | 20:59 20:35 | 19:50 18:59        |      |        |                   | 17:15 20 07:41 (GA09) | 16:56    |
| 7   07:49           | 07:29           | 07:49 (GA09)       | 06:50 06:59 | 06:16 05:52 | 06:25 05:58 | 07:26 06:56        |      |        |                   | 07:01 07:23 (GA09)    | 07:34    |
| 7   17:11           | 17:47           | 22 08:11 (GA09)    | 18:21 19:54 | 20:26 20:53 | 20:59 20:34 | 19:48 18:58        |      |        |                   | 17:14 18 07:41 (GA09) | 16:56    |
| 8   07:49           | 07:28           | 07:48 (GA09)       | 06:49 06:57 | 06:15 05:52 | 06:26 05:59 | 07:27 06:56        |      |        |                   | 07:02 07:24 (GA09)    | 07:35    |
| 9   17:12           | 17:49           | 24 08:12 (GA09)    | 18:22 19:55 | 20:27 20:54 | 20:58 20:33 | 19:46 18:56        |      |        |                   | 17:13 17 07:41 (GA09) | 16:56    |
| 9   07:49           | 07:27           | 07:47 (GA09)       | 06:47 06:56 | 06:13 05:52 | 06:00 06:27 | 07:28 06:57        |      |        |                   | 07:03 07:25 (GA09)    | 07:36    |
| 10   17:13          | 17:50           | 25 08:12 (GA09)    | 18:23 19:56 | 20:28 20:54 | 20:58 20:32 | 19:45 18:54        |      |        |                   | 17:12 15 07:40 (GA09) | 16:56    |
| 10   07:49          | 07:26           | 07:45 (GA09)       | 06:45 06:54 | 06:12 05:52 | 06:00 06:28 | 07:29 06:58        |      |        |                   | 07:04 07:26 (GA09)    | 07:37    |
| 11   17:14          | 17:51           | 26 08:11 (GA09)    | 18:24 19:57 | 20:29 20:55 | 20:58 20:30 | 19:43 18:53        |      |        |                   | 17:11 13 07:39 (GA09) | 16:56    |
| 11   07:48          | 07:25           | 07:44 (GA09)       | 06:44 06:53 | 06:11 05:51 | 06:01 06:29 | 07:30 06:59        |      |        |                   | 07:05 07:28 (GA09)    | 07:38    |
| 12   17:15          | 17:52           | 27 08:11 (GA09)    | 18:25 19:58 | 20:30 20:55 | 20:57 20:29 | 19:41 18:51        |      |        |                   | 17:10 12 07:40 (GA09) | 16:56    |
| 12   07:48          | 07:23           | 07:43 (GA09)       | 06:42 06:51 | 06:10 05:51 | 06:02 06:30 | 07:31 07:00        |      |        |                   | 07:07 07:29 (GA09)    | 07:39    |
| 13   17:16          | 17:54           | 27 08:10 (GA09)    | 18:26 19:59 | 20:31 20:56 | 20:57 20:28 | 19:40 18:50        |      |        |                   | 17:09 10 07:39 (GA09) | 16:56    |
| 13   07:48          | 07:22           | 07:42 (GA09)       | 06:41 06:50 | 06:09 05:51 | 06:02 06:31 | 07:32 07:01        |      |        |                   | 07:08 07:30 (GA09)    | 07:39    |
| 14   17:17          | 17:55           | 28 08:10 (GA09)    | 18:27 20:01 | 20:32 20:56 | 20:56 20:26 | 19:38 18:48        |      |        |                   | 17:08 8 07:38 (GA09)  | 16:56    |
| 14   07:47          | 07:21           | 07:40 (GA09)       | 06:39 06:48 | 06:08 05:51 | 06:03 06:32 | 07:33 07:02        |      |        |                   | 07:09 07:32 (GA09)    | 07:40    |
| 15   17:18          | 17:56           | 28 08:09 (GA09)    | 18:29 20:02 | 20:33 20:57 | 20:56 20:25 | 19:36 18:46        |      |        |                   | 17:07 6 07:38 (GA09)  | 16:56    |
| 15   07:47          | 07:20           | 07:41 (GA09)       | 06:37 06:46 | 06:07 05:51 | 06:04 06:33 | 07:34 07:03        |      |        |                   | 07:10 07:33 (GA09)    | 07:41    |
| 16   17:20          | 17:57           | 27 08:08 (GA09)    | 18:30 20:03 | 20:34 20:57 | 20:55 20:24 | 19:35 18:45        |      |        |                   | 17:06 3 07:36 (GA09)  | 16:56    |
| 16   07:47          | 07:18           | 07:43 (GA09)       | 06:36 06:45 | 06:06 05:51 | 06:05 06:34 | 07:35 07:04        |      |        |                   | 07:11 07:34 (GA09)    | 07:42    |
| 17   17:21          | 17:58           | 24 08:07 (GA09)    | 18:31 20:04 | 20:35 20:58 | 20:55 20:22 | 19:33 18:43        |      |        |                   | 17:05 1 07:35 (GA09)  | 16:57    |
| 17   07:46          | 07:17           | 07:44 (GA09)       | 06:34 06:43 | 06:05 05:51 | 06:06 06:35 | 07:36 07:05        |      |        |                   | 07:13 07:42 (GA09)    | 16:57    |
| 18   17:22          | 18:00           | 20 08:04 (GA09)    | 18:32 20:05 | 20:36 20:58 | 20:54 20:21 | 19:31 18:42        |      |        |                   | 17:04 07:43 (GA09)    | 16:57    |
| 18   07:46          | 07:16           | 07:46 (GA09)       | 06:32 06:42 | 06:04 05:51 | 06:06 06:36 | 07:38 07:06        |      |        |                   | 07:14 07:43 (GA09)    | 16:57    |
| 19   17:23          | 18:01           | 16 08:02 (GA09)    | 18:33 20:06 | 20:37 20:58 | 20:53 20:19 | 19:30 18:40        |      |        |                   | 17:04 07:44 (GA09)    | 16:57    |
| 19   07:45          | 07:14           | 07:49 (GA09)       | 06:31 06:40 | 06:03 05:51 | 06:07 06:37 | 07:39 07:07        |      |        |                   | 07:15 07:44 (GA09)    | 16:57    |
| 19   17:24          | 18:02           | 9 07:58 (GA09)     | 18:34 20:07 | 20:38 20:59 | 20:53 20:18 | 19:28 18:39        |      |        |                   | 17:03 16:58           |          |
| 20   07:45          | 07:13           |                    | 06:29 06:39 | 06:03 05:52 | 06:08 06:38 | 07:40 07:08        |      |        |                   | 07:16 07:44 (GA09)    |          |
| 21   17:25          | 18:03           |                    | 06:35 08:09 | 06:39 20:08 | 20:39 20:59 | 20:22 18:37        |      |        |                   | 17:02 16:58           |          |
| 21   07:44          | 07:11           |                    | 06:27 06:37 | 06:02 05:52 | 06:09 06:39 | 07:41 07:09        |      |        |                   | 07:17 07:45 (GA09)    |          |
| 22   17:26          | 18:05           |                    | 06:36 08:09 | 06:36 20:09 | 20:40 20:59 | 20:15 18:36        |      |        |                   | 17:02 16:58           |          |
| 22   07:43          | 07:10           |                    | 06:26 08:02 | 06:01 05:52 | 06:10 06:40 | 07:42 07:10        |      |        |                   | 07:18 07:45 (GA09)    |          |
| 23   17:28          | 18:06           |                    | 06:37 08:01 | 06:41 20:10 | 20:41 20:59 | 20:14 18:34        |      |        |                   | 17:01 16:59           |          |
| 23   07:43          | 07:09           |                    | 06:24 08:01 | 06:34 06:00 | 06:52 06:11 | 07:43 06:41        |      |        |                   | 07:20 07:46 (GA09)    |          |
| 23   17:29          | 18:07           |                    | 06:38 08:03 | 07:11 20:11 | 20:41 21:00 | 20:50 19:21        |      |        |                   | 17:00 16:59           |          |
| 24   07:42          | 07:07           |                    | 06:22 08:03 | 06:33 05:59 | 06:11 06:42 | 07:44 07:12        |      |        |                   | 07:21 07:46 (GA09)    |          |
| 24   17:30          | 18:08           |                    | 06:39 08:05 | 07:19 20:12 | 20:42 21:00 | 20:49 19:19        |      |        |                   | 17:00 17:46 (GA09)    |          |
| 25   07:41          | 07:06           |                    | 06:21 08:05 | 06:31 05:59 | 06:12 06:43 | 07:13 06:45        |      |        |                   | 07:22 07:47 (GA09)    |          |
| 25   17:31          | 18:09           |                    | 06:40 08:05 | 07:13 20:13 | 20:43 21:00 | 20:48 19:18        |      |        |                   | 17:01 17:47 (GA09)    |          |
| 26   07:41          | 08:01 (GA09)    | 07:04              | 06:19 08:01 | 06:30 05:58 | 06:53 06:13 | 07:14 06:44        |      |        |                   | 07:23 07:47 (GA09)    |          |
| 26   17:32          | 1 08:02 (GA09)  | 18:10              | 18:41 20:14 | 20:44 21:00 | 20:47 20:07 | 19:16 17:29        |      |        |                   | 17:01 17:47 (GA09)    |          |
| 27   07:40          | 08:00 (GA09)    | 07:03              | 06:17 06:29 | 05:57 05:53 | 06:14 06:45 | 07:15 06:48        |      |        |                   | 07:24 07:47 (GA09)    |          |
| 27   17:34          | 3 08:03 (GA09)  | 18:12              | 18:43 20:15 | 20:45 21:00 | 20:46 20:06 | 19:14 17:27        |      |        |                   | 07:21 17:02 (GA09)    |          |
| 28   07:39          | 07:59 (GA09)    | 07:01              | 06:16 06:27 | 05:57 05:54 | 06:15 06:46 | 07:16 06:49        |      |        |                   | 07:25 07:48 (GA09)    |          |
| 28   17:35          | 6 08:05 (GA09)  | 18:13              | 18:44 20:16 | 20:46 21:00 | 20:45 20:04 | 19:13 17:26        |      |        |                   | 07:22 17:02 (GA09)    |          |
| 29   07:38          | 07:58 (GA09)    |                    | 07:14 06:26 | 05:56 05:54 | 06:16 06:47 | 07:17 06:50        |      |        |                   | 07:26 07:48 (GA09)    |          |
| 29   17:36          | 8 08:06 (GA09)  |                    | 19:45 20:17 | 20:47 21:00 | 20:44 20:04 | 19:11 17:25        |      |        |                   | 07:27 17:03 (GA09)    |          |
| 30   07:37          | 07:57 (GA09)    |                    | 07:12 06:25 | 05:56 05:55 | 06:17 06:48 | 07:18 06:51        |      |        |                   | 07:27 17:04 (GA09)    |          |
| 30   17:37          | 10 08:07 (GA09) |                    | 19:46 20:19 | 20:47 21:00 | 20:43 20:01 | 19:09 17:23        |      |        |                   | 07:57 17:04 (GA09)    |          |
| 31   07:36          | 07:56 (GA09)    |                    | 07:11 05:55 | 06:18 06:49 | 06:18 06:52 | 07:14 07:14 (GA09) |      |        |                   | 07:48 17:04 (GA09)    |          |
| 31   17:39          | 12 08:08 (GA09) |                    | 19:47 20:48 | 20:48 20:00 | 20:42 17:22 | 26 07:40 (GA09)    |      |        |                   | 17:05 17:05 (GA09)    |          |
| Potential sun hours | 298             |                    | 297         | 369         | 399         | 448                | 452  | 459    | 428               | 375                   | 345      |
| Total, worst case   | 40              |                    | 407         |             |             |                    |      |        |                   |                       | 298      |
| Sun reduction       | 0.85            |                    | 0.77        |             |             |                    |      |        |                   |                       | 238      |
| Oper. time red.     | 0.82            |                    | 0.82        |             |             |                    |      |        |                   |                       | 0.83     |
| Wind dir. red.      | 0.59            |                    | 0.59        |             |             |                    |      |        |                   |                       | 0.82     |
| Total reduction     | 0.41            |                    | 0.37        |             |             |                    |      |        |                   |                       | 0.59     |
| Total, real         | 16              |                    | 151         |             |             |                    |      |        |                   |                       | 0.40     |
|                     |                 |                    |             |             |             |                    |      |        |                   |                       | 0.28     |
|                     |                 |                    |             |             |             |                    |      |        |                   |                       | 95       |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R78 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (10)  
Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

Operational time  
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
90 295 742 511 343 267 107 562 1.775 1.844 553 102 7.191

|                     | January         | February | March           | April | May   | June  | July  | August | September/October | November     | December     |     |
|---------------------|-----------------|----------|-----------------|-------|-------|-------|-------|--------|-------------------|--------------|--------------|-----|
| 1   07:49           |                 | 07:35    | 16:50 (GA08)    | 07:00 | 07:09 | 06:23 | 05:54 | 05:55  | 06:19             | 06:49        | 07:19        |     |
| 1   17:06           |                 | 17:40    | 24 17:14 (GA08) | 18:14 | 19:48 | 20:19 | 20:49 | 21:00  | 20:41             | 19:58        | 19:07        |     |
| 2   07:49           |                 | 07:34    | 16:50 (GA08)    | 06:58 | 07:07 | 06:22 | 05:54 | 05:55  | 06:20             | 06:50        | 07:20        |     |
| 3   17:07           |                 | 17:41    | 24 17:14 (GA08) | 18:15 | 19:49 | 20:21 | 20:50 | 21:00  | 20:40             | 19:56        | 19:06        |     |
| 3   07:49           |                 | 07:33    | 16:50 (GA08)    | 06:56 | 07:06 | 06:21 | 05:54 | 05:56  | 06:21             | 06:51        | 07:21        |     |
| 4   17:07           |                 | 17:42    | 24 17:14 (GA08) | 18:16 | 19:50 | 20:22 | 20:50 | 21:00  | 20:39             | 19:55        | 19:04        |     |
| 4   07:49           |                 | 07:32    | 16:51 (GA08)    | 06:55 | 07:04 | 06:19 | 05:53 | 05:57  | 06:22             | 06:52        | 07:22        |     |
| 5   17:08           |                 | 17:44    | 23 17:14 (GA08) | 18:17 | 19:51 | 20:23 | 20:51 | 20:59  | 20:38             | 19:53        | 19:02        |     |
| 5   07:49           |                 | 07:31    | 16:51 (GA08)    | 06:53 | 07:02 | 06:18 | 05:53 | 05:57  | 06:23             | 06:53        | 07:24        |     |
| 6   17:09           |                 | 17:45    | 23 17:14 (GA08) | 18:18 | 19:52 | 20:24 | 20:52 | 20:59  | 20:36             | 19:51        | 19:01        |     |
| 6   07:49           |                 | 07:30    | 16:52 (GA08)    | 06:52 | 07:01 | 06:17 | 05:53 | 05:58  | 06:24             | 06:54        | 07:25        |     |
| 7   17:10           |                 | 17:46    | 22 17:14 (GA08) | 18:20 | 19:53 | 20:25 | 20:52 | 20:59  | 20:35             | 19:50        | 18:59        |     |
| 7   07:49           |                 | 07:29    | 16:53 (GA08)    | 06:50 | 06:59 | 06:16 | 05:52 | 05:58  | 06:25             | 06:55        | 07:26        |     |
| 7   17:11           |                 | 17:47    | 20 17:13 (GA08) | 18:21 | 19:54 | 20:26 | 20:53 | 20:59  | 20:34             | 19:48        | 18:58        |     |
| 8   07:49           |                 | 07:28    | 16:54 (GA08)    | 06:49 | 06:57 | 06:15 | 05:52 | 05:59  | 06:26             | 06:56        | 07:27        |     |
| 9   17:12           |                 | 17:49    | 19 17:13 (GA08) | 18:22 | 19:55 | 20:27 | 20:54 | 20:58  | 20:33             | 19:46        | 18:56        |     |
| 9   07:49           |                 | 07:27    | 16:55 (GA08)    | 06:47 | 06:56 | 06:13 | 05:52 | 06:00  | 06:27             | 06:57        | 07:28        |     |
| 10   17:13          |                 | 17:50    | 16 17:12 (GA08) | 18:23 | 19:56 | 20:28 | 20:54 | 20:58  | 20:32             | 19:45        | 18:54        |     |
| 10   07:48          |                 | 07:26    | 16:57 (GA08)    | 06:45 | 06:54 | 06:12 | 05:52 | 06:00  | 06:28             | 06:58        | 07:29        |     |
| 11   17:14          |                 | 17:51    | 12 17:09 (GA08) | 18:24 | 19:57 | 20:29 | 20:55 | 20:58  | 20:30             | 19:43        | 18:53        |     |
| 11   07:48          |                 | 07:25    | 17:00 (GA08)    | 06:44 | 06:53 | 06:11 | 05:51 | 06:01  | 06:29             | 06:59        | 07:30        |     |
| 11   17:15          |                 | 17:52    | 6 17:06 (GA08)  | 18:25 | 19:58 | 20:30 | 20:55 | 20:57  | 20:29             | 19:41        | 18:51        |     |
| 12   07:48          |                 | 07:23    |                 | 06:42 | 06:51 | 06:10 | 05:51 | 06:02  | 06:30             | 07:00        | 07:31        |     |
| 12   17:16          |                 | 17:54    |                 | 18:26 | 19:59 | 20:31 | 20:56 | 20:57  | 20:28             | 19:40        | 18:49        |     |
| 13   07:48          |                 | 07:22    |                 | 06:40 | 06:49 | 06:09 | 05:51 | 06:02  | 06:31             | 07:01        | 07:32        |     |
| 13   17:17          |                 | 17:55    |                 | 18:27 | 20:00 | 20:32 | 20:56 | 20:56  | 20:26             | 19:38        | 18:48        |     |
| 14   07:47          |                 | 07:21    |                 | 06:39 | 06:48 | 06:08 | 05:51 | 06:03  | 06:32             | 07:02        | 07:33        |     |
| 14   17:18          |                 | 17:56    |                 | 18:28 | 20:02 | 20:33 | 20:57 | 20:56  | 20:25             | 19:36        | 18:46        |     |
| 15   07:47          |                 | 07:19    |                 | 06:37 | 06:46 | 06:07 | 05:51 | 06:04  | 06:33             | 07:03        | 07:34        |     |
| 15   17:19          |                 | 17:57    |                 | 18:30 | 20:03 | 20:34 | 20:57 | 20:55  | 20:24             | 19:35        | 18:45        |     |
| 16   07:47          |                 | 07:18    |                 | 06:36 | 06:45 | 06:06 | 05:51 | 06:05  | 06:34             | 07:04        | 07:35        |     |
| 16   17:21          |                 | 17:58    |                 | 18:31 | 20:04 | 20:35 | 20:58 | 20:54  | 20:22             | 19:33        | 18:43        |     |
| 17   07:46          |                 | 07:17    |                 | 06:34 | 06:43 | 06:05 | 05:51 | 06:05  | 06:35             | 07:05        | 07:36        |     |
| 17   17:22          |                 | 18:00    |                 | 18:32 | 20:05 | 20:36 | 20:58 | 20:54  | 20:21             | 19:31        | 18:42        |     |
| 18   07:46          |                 | 07:15    |                 | 06:32 | 06:42 | 06:04 | 05:51 | 06:06  | 06:36             | 07:06        | 07:37        |     |
| 18   17:23          |                 | 18:01    |                 | 18:33 | 20:06 | 20:37 | 20:58 | 20:53  | 20:19             | 19:29        | 18:40        |     |
| 19   07:45          |                 | 07:14    |                 | 06:31 | 06:40 | 06:03 | 05:51 | 06:07  | 06:37             | 07:07        | 07:39        |     |
| 19   17:24          |                 | 18:02    |                 | 18:34 | 20:07 | 20:38 | 20:59 | 20:53  | 20:18             | 19:28        | 18:39        |     |
| 20   07:45          |                 | 07:13    |                 | 06:29 | 06:39 | 06:02 | 05:51 | 06:08  | 06:38             | 07:08        | 07:40        |     |
| 20   17:25          |                 | 18:03    |                 | 18:35 | 20:08 | 20:39 | 20:59 | 20:52  | 20:16             | 19:26        | 18:37        |     |
| 21   07:44          |                 | 07:11    |                 | 06:27 | 06:37 | 06:02 | 05:52 | 06:09  | 06:39             | 07:09        | 07:41        |     |
| 21   17:26          |                 | 18:04    |                 | 18:36 | 20:09 | 20:40 | 20:59 | 20:51  | 20:15             | 19:24        | 18:36        |     |
| 22   07:43          | 16:57 (GA08)    | 07:10    |                 | 06:26 | 06:36 | 06:01 | 05:52 | 06:10  | 06:40             | 07:10        | 07:42        |     |
| 22   17:28          | 6 17:03 (GA08)  | 18:06    |                 | 18:37 | 20:10 | 20:41 | 20:59 | 20:50  | 20:14             | 19:23        | 18:34        |     |
| 23   07:43          | 16:54 (GA08)    | 07:08    |                 | 06:24 | 06:34 | 06:00 | 05:52 | 06:10  | 06:41             | 07:11        | 07:43        |     |
| 23   17:29          | 10 17:04 (GA08) | 18:07    |                 | 18:38 | 20:11 | 20:41 | 21:00 | 20:49  | 20:12             | 19:21        | 18:33        |     |
| 24   07:42          | 16:54 (GA08)    | 07:07    |                 | 06:22 | 06:33 | 05:59 | 05:52 | 06:11  | 06:42             | 07:12        | 07:44        |     |
| 24   17:30          | 12 17:06 (GA08) | 18:08    |                 | 18:39 | 20:12 | 20:42 | 21:00 | 20:49  | 20:10             | 19:19        | 18:31        |     |
| 25   07:41          | 16:53 (GA08)    | 07:06    |                 | 06:21 | 06:31 | 05:59 | 05:53 | 06:12  | 06:43             | 07:13        | 07:45        |     |
| 25   17:31          | 14 17:07 (GA08) | 18:09    |                 | 18:40 | 20:13 | 20:43 | 21:00 | 20:48  | 20:09             | 19:18        | 17:30        |     |
| 26   07:41          | 16:52 (GA08)    | 07:04    |                 | 06:19 | 06:30 | 05:58 | 05:53 | 06:13  | 06:44             | 07:14        | 07:46        |     |
| 26   17:32          | 16 17:08 (GA08) | 18:10    |                 | 18:41 | 20:14 | 20:44 | 21:00 | 20:47  | 20:07             | 19:16        | 17:29        |     |
| 27   07:40          | 16:51 (GA08)    | 07:03    |                 | 06:17 | 06:29 | 05:57 | 05:53 | 06:14  | 06:45             | 07:15        | 07:47        |     |
| 27   17:34          | 18 17:09 (GA08) | 18:11    |                 | 18:42 | 20:15 | 20:45 | 21:00 | 20:46  | 20:06             | 19:14        | 17:27        |     |
| 28   07:39          | 16:50 (GA08)    | 07:01    |                 | 06:16 | 06:27 | 05:57 | 05:54 | 06:15  | 06:46             | 07:16        | 07:48        |     |
| 28   17:35          | 20 17:10 (GA08) | 18:13    |                 | 18:44 | 20:16 | 20:46 | 21:00 | 20:45  | 20:04             | 19:12        | 17:26        |     |
| 29   07:38          | 16:50 (GA08)    |          |                 | 07:14 | 06:26 | 05:56 | 05:54 | 06:16  | 06:47             | 07:17        | 07:48        |     |
| 29   17:36          | 22 17:12 (GA08) |          |                 | 19:45 | 20:17 | 20:47 | 21:00 | 20:44  | 20:03             | 19:11        | 17:25        |     |
| 30   07:37          | 16:50 (GA08)    |          |                 | 07:12 | 06:25 | 05:55 | 05:55 | 06:17  | 06:48             | 07:18        | 07:48        |     |
| 30   17:37          | 23 17:13 (GA08) |          |                 | 19:46 | 20:18 | 20:47 | 21:00 | 20:43  | 20:01             | 19:09        | 17:23        |     |
| 31   07:36          | 16:50 (GA08)    |          |                 | 07:11 |       | 05:55 |       | 06:18  | 06:49             | 06:52        | 16:29 (GA08) |     |
| 31   17:39          | 24 17:14 (GA08) |          |                 | 19:47 |       | 05:55 |       | 06:20  | 06:50             | 16:37 (GA08) | 17:05        |     |
| Potential sun hours | 298             |          |                 | 297   |       | 369   | 399   | 448    | 452               | 459          | 428          | 375 |
| Total, worst case   | 165             |          |                 | 213   |       |       |       |        |                   |              |              |     |
| Sun reduction       | 0.85            |          |                 | 0.77  |       |       |       |        |                   |              |              |     |
| Oper. time red.     | 0.82            |          |                 | 0.82  |       |       |       |        |                   |              |              |     |
| Wind dir. red.      | 0.85            |          |                 | 0.85  |       |       |       |        |                   |              |              |     |
| Total reduction     | 0.59            |          |                 | 0.54  |       |       |       |        |                   |              |              |     |
| Total, real         | 98              |          |                 | 114   |       |       |       |        |                   |              |              |     |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R94 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (11)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

### Operational time

| N  | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| 90 | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                     | January           | February     | March        | April | May   | June  | July  | August | September/October | November          | December         |              |
|---------------------|-------------------|--------------|--------------|-------|-------|-------|-------|--------|-------------------|-------------------|------------------|--------------|
| 1   07:49           |                   | 07:35        | 16:49 (GA11) | 07:00 | 07:09 | 06:23 | 05:54 | 05:55  | 06:19             | 06:49             | 07:19            | 06:54        |
| 1   17:06           | 17:40             | 14           | 17:03 (GA11) | 18:14 | 19:48 | 20:20 | 20:49 | 21:00  | 20:41             | 19:58             | 19:07            | 17:21        |
| 2   07:49           | 07:34             | 16:49 (GA11) | 06:58        | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:50             | 07:20             | 06:55            | 16:24 (GA11) |
| 3   17:06           | 17:41             | 16           | 17:05 (GA11) | 18:15 | 19:49 | 20:21 | 20:50 | 21:00  | 20:40             | 19:56             | 19:06            | 17:20        |
| 3   07:49           | 07:33             | 16:49 (GA11) | 06:56        | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:51             | 07:21             | 06:56            | 16:23 (GA11) |
| 4   17:07           | 17:42             | 17           | 17:06 (GA11) | 18:16 | 19:50 | 20:22 | 20:50 | 21:00  | 20:39             | 19:55             | 19:04            | 17:18        |
| 4   07:49           | 07:32             | 16:50 (GA11) | 06:55        | 07:04 | 06:19 | 05:53 | 05:56 | 06:22  | 06:52             | 07:22             | 06:57            | 16:22 (GA11) |
| 4   17:08           | 17:44             | 18           | 17:08 (GA11) | 18:17 | 19:51 | 20:23 | 20:51 | 20:59  | 20:38             | 19:53             | 19:02            | 17:17        |
| 5   07:49           | 07:31             | 16:51 (GA11) | 06:53        | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:53             | 07:24             | 06:58            | 16:21 (GA11) |
| 5   17:09           | 17:45             | 18           | 17:09 (GA11) | 18:18 | 19:52 | 20:24 | 20:52 | 20:59  | 20:36             | 19:51             | 19:01            | 17:16        |
| 6   07:49           | 07:30             | 16:51 (GA11) | 06:52        | 07:01 | 06:17 | 05:52 | 05:58 | 06:24  | 06:54             | 07:25             | 06:59            | 16:20 (GA11) |
| 6   17:10           | 17:46             | 20           | 17:11 (GA11) | 18:20 | 19:53 | 20:25 | 20:53 | 20:59  | 20:35             | 19:50             | 18:59            | 17:15        |
| 7   07:49           | 07:29             | 16:52 (GA11) | 06:50        | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55             | 07:26             | 07:01            | 16:21 (GA11) |
| 7   17:11           | 17:47             | 20           | 17:12 (GA11) | 18:21 | 19:54 | 20:26 | 20:53 | 20:59  | 20:34             | 19:48             | 18:58            | 17:14        |
| 8   07:49           | 07:28             | 16:54 (GA11) | 06:49        | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56             | 07:27             | 07:02            | 16:20 (GA11) |
| 9   17:12           | 17:49             | 20           | 17:14 (GA11) | 18:22 | 19:55 | 20:27 | 20:54 | 20:58  | 20:33             | 19:46             | 18:56            | 17:13        |
| 9   07:49           | 07:27             | 16:55 (GA11) | 06:47        | 06:56 | 06:13 | 05:52 | 05:59 | 06:27  | 06:57             | 07:28             | 07:03            | 16:20 (GA11) |
| 10   17:13          | 17:50             | 20           | 17:15 (GA11) | 18:23 | 19:56 | 20:28 | 20:54 | 20:58  | 20:32             | 19:45             | 18:54            | 17:12        |
| 10   07:49          | 07:26             | 16:56 (GA11) | 06:45        | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58             | 07:29             | 07:04            | 16:20 (GA11) |
| 11   17:14          | 17:51             | 16           | 17:12 (GA11) | 18:24 | 19:57 | 20:29 | 20:55 | 20:58  | 20:30             | 19:43             | 18:53            | 17:11        |
| 11   07:48          | 07:25             | 16:59 (GA11) | 06:44        | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59             | 07:30             | 07:05            | 16:20 (GA11) |
| 11   17:15          | 17:52             | 11           | 17:10 (GA11) | 18:25 | 19:58 | 20:30 | 20:55 | 20:57  | 20:29             | 19:41             | 18:51            | 17:10        |
| 12   07:48          | 07:23             |              | 06:42        | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00             | 07:31             | 07:07            | 16:20 (GA11) |
| 12   17:16          | 17:53             |              | 18:26        | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40             | 18:49             | 17:09            | 13           |
| 13   07:48          | 07:22             |              | 06:41        | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01             | 07:32             | 07:08            | 16:20 (GA11) |
| 14   17:17          | 17:55             |              | 18:27        | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38             | 18:48             | 17:08            | 11           |
| 14   07:47          | 07:21             |              | 06:39        | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02             | 07:33             | 07:09            | 16:22 (GA11) |
| 14   17:18          | 17:56             |              | 18:28        | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36             | 18:46             | 17:07            | 9            |
| 15   07:47          | 07:20             |              | 06:37        | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03             | 07:34             | 07:10            | 16:22 (GA11) |
| 15   17:19          | 17:57             |              | 18:30        | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35             | 18:45             | 17:06            | 8            |
| 16   07:47          | 07:18             |              | 06:36        | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04             | 07:35             | 07:11            | 16:22 (GA11) |
| 16   17:21          | 17:58             |              | 18:31        | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33             | 18:43             | 17:05            | 7            |
| 17   07:46          | 07:17             |              | 06:34        | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05             | 07:36             | 07:13            | 16:23 (GA11) |
| 17   17:22          | 18:00             |              | 18:32        | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31             | 18:42             | 17:04            | 5            |
| 18   07:46          | 07:16             |              | 06:32        | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06             | 07:37             | 07:14            | 16:28 (GA11) |
| 18   17:23          | 18:01             |              | 18:33        | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30             | 18:40             | 17:04            | 3            |
| 19   07:45          | 07:14             |              | 06:31        | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07             | 07:39             | 07:15            | 16:25 (GA11) |
| 19   17:24          | 18:02             |              | 18:34        | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28             | 18:39             | 17:03            | 2            |
| 20   07:45          | 07:13             |              | 06:29        | 06:39 | 06:02 | 05:51 | 06:08 | 06:38  | 07:08             | 07:40             | 07:16            | 16:26 (GA11) |
| 21   17:25          | 18:03             |              | 18:35        | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26             | 18:37             | 17:02            | 1            |
| 21   07:44          | 07:11             |              | 06:27        | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09             | 07:41             | 07:17            | 17:45        |
| 21   17:26          | 18:04             |              | 18:36        | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24             | 18:36             | 17:01            | 17:58        |
| 22   07:43          | 16:51 (GA11)      | 10:10        | 06:26        | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10             | 07:42             | 07:18            | 17:45        |
| 22   17:28          | 16:52 (GA11)      | 18:06        | 18:37        | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23             | 18:34             | 17:01            | 16:59        |
| 23   07:43          | 16:50 (GA11)      | 07:09        | 06:24        | 06:34 | 06:00 | 05:52 | 06:10 | 06:41  | 07:11             | 07:43             | 07:20            | 17:46        |
| 23   17:29          | 16:52 (GA11)      | 18:07        | 18:38        | 20:11 | 20:41 | 21:00 | 20:50 | 20:12  | 19:21             | 18:33             | 17:00            | 16:59        |
| 24   07:42          | 16:51 (GA11)      | 07:07        | 06:22        | 06:33 | 05:59 | 05:52 | 06:11 | 06:42  | 07:12             | 07:44             | 07:21            | 17:46        |
| 25   17:30          | 3   16:54 (GA11)  | 18:08        | 18:39        | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19             | 18:31             | 17:00            | 17:00        |
| 25   07:41          | 16:50 (GA11)      | 07:06        | 06:21        | 06:31 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13             | 07:45             | 07:22            | 17:47        |
| 25   17:31          | 5   16:55 (GA11)  | 18:09        | 18:40        | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18             | 17:30             | 16:59            | 17:00        |
| 26   07:41          | 16:49 (GA11)      | 07:04        | 06:19        | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14             | 07:47             | 07:23            | 17:47        |
| 26   17:32          | 7   16:56 (GA11)  | 18:10        | 18:41        | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16             | 17:29             | 16:59            | 17:01        |
| 27   07:40          | 16:49 (GA11)      | 07:03        | 06:17        | 06:29 | 05:57 | 05:53 | 06:14 | 06:45  | 07:15             | 06:48             | 07:24            | 17:47        |
| 27   17:34          | 8   16:57 (GA11)  | 18:11        | 18:42        | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14             | 17:27             | 16:58            | 17:02        |
| 28   07:39          | 16:49 (GA11)      | 07:01        | 06:16        | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16             | 06:49             | 07:25            | 17:48        |
| 28   17:35          | 9   16:58 (GA11)  | 18:13        | 18:44        | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:12             | 17:26             | 16:58            | 17:02        |
| 29   07:38          | 16:49 (GA11)      | 07:14        | 06:14        | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17             | 06:50             | 07:26            | 17:48        |
| 29   17:36          | 11   17:00 (GA11) |              | 19:45        | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11             | 17:25             | 16:57            | 17:03        |
| 30   07:37          | 16:48 (GA11)      | 07:12        | 06:25        | 05:55 | 05:54 | 06:17 | 06:48 | 07:18  | 06:51             | 16:32 (GA11)      | 07:27            | 17:48        |
| 30   17:37          | 13   17:01 (GA11) |              | 19:46        | 20:18 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09             | 17:23             | 5   16:37 (GA11) | 16:57        |
| 31   07:36          | 16:49 (GA11)      | 07:11        |              | 07:11 | 05:55 | 06:18 | 06:48 | 06:52  | 16:28 (GA11)      |                   | 16:28 (GA11)     | 17:49        |
| 31   17:39          | 13   17:02 (GA11) |              | 19:47        |       | 20:48 |       | 20:42 | 20:00  | 17:22             | 13   16:41 (GA11) |                  | 17:05        |
| Potential sun hours | 298               |              | 297          | 369   | 399   | 448   | 452   | 459    | 428               | 375               | 345              | 298          |
| Total, worst case   | 72                |              | 190          |       |       |       |       |        |                   | 18                |                  | 254          |
| Sun reduction       | 0.85              |              | 0.77         |       |       |       |       |        |                   | 0.74              |                  | 0.83         |
| Oper. time red.     | 0.82              |              | 0.82         |       |       |       |       |        |                   | 0.82              |                  | 0.82         |
| Wind dir. red.      | 0.85              |              | 0.85         |       |       |       |       |        |                   | 0.85              |                  | 0.85         |
| Total reduction     | 0.59              |              | 0.54         |       |       |       |       |        |                   | 0.51              |                  | 0.57         |
| Total, real         | 43                |              | 102          |       |       |       |       |        |                   | 9                 |                  | 146          |

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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|              |                  |                 |                      |                                 |                                |                                  |                                 |

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R96 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (12)  
Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

| Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                     | January | February | March | April | May   | June  | July  | August | September | October | November | December |
|---------------------|---------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|
| 1                   | 07:49   | 07:35    | 07:00 | 07:09 | 06:23 | 05:54 | 05:55 | 06:19  | 06:50     | 07:19   | 06:54    | 07:28    |
|                     | 17:06   | 17:40    | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:07   | 17:21    | 16:57    |
| 2                   | 07:49   | 07:35    | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51     | 07:20   | 06:55    | 07:29    |
|                     | 17:06   | 17:41    | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20    | 16:56    |
| 3                   | 07:49   | 07:34    | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:21   | 06:56    | 07:30    |
|                     | 17:07   | 17:42    | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04   | 17:18    | 16:56    |
| 4                   | 07:49   | 07:32    | 06:55 | 07:04 | 06:19 | 05:53 | 05:56 | 06:22  | 06:52     | 07:23   | 06:57    | 07:31    |
|                     | 17:08   | 17:44    | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:02   | 17:17    | 16:56    |
| 5                   | 07:49   | 07:31    | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:53     | 07:24   | 06:58    | 07:32    |
|                     | 17:09   | 17:45    | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:37  | 19:51     | 19:01   | 17:16    | 16:56    |
| 6                   | 07:49   | 07:30    | 06:52 | 07:01 | 06:17 | 05:52 | 05:58 | 06:24  | 06:54     | 07:25   | 06:59    | 07:33    |
|                     | 17:10   | 17:46    | 18:20 | 19:53 | 20:25 | 20:53 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15    | 16:56    |
| 7                   | 07:49   | 07:29    | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55     | 07:26   | 07:01    | 07:34    |
|                     | 17:11   | 17:47    | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14    | 16:56    |
| 8                   | 07:49   | 07:28    | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56     | 07:27   | 07:02    | 07:35    |
|                     | 17:12   | 17:49    | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13    | 16:55    |
| 9                   | 07:49   | 07:27    | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57     | 07:28   | 07:03    | 07:36    |
|                     | 17:13   | 17:50    | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12    | 16:55    |
| 10                  | 07:49   | 07:26    | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58     | 07:29   | 07:04    | 07:37    |
|                     | 17:14   | 17:51    | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11    | 16:55    |
| 11                  | 07:48   | 07:25    | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59     | 07:30   | 07:05    | 07:38    |
|                     | 17:15   | 17:52    | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10    | 16:56    |
| 12                  | 07:48   | 07:23    | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07    | 07:39    |
|                     | 17:16   | 17:54    | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09    | 16:56    |
| 13                  | 07:48   | 07:22    | 06:41 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01     | 07:32   | 07:08    | 07:39    |
|                     | 17:17   | 17:55    | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08    | 16:56    |
| 14                  | 07:47   | 07:21    | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09    | 07:40    |
|                     | 17:18   | 17:56    | 18:28 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07    | 16:56    |
| 15                  | 07:47   | 07:20    | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10    | 07:41    |
|                     | 17:19   | 17:57    | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06    | 16:56    |
| 16                  | 07:47   | 07:18    | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11    | 07:42    |
|                     | 17:21   | 17:58    | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43   | 17:05    | 16:56    |
| 17                  | 07:46   | 07:17    | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05     | 07:36   | 07:13    | 07:42    |
|                     | 17:22   | 18:00    | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:04    | 16:57    |
| 18                  | 07:46   | 07:16    | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:38   | 07:14    | 07:43    |
|                     | 17:23   | 18:01    | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30     | 18:40   | 17:04    | 16:57    |
| 19                  | 07:45   | 07:14    | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15    | 07:44    |
|                     | 17:24   | 18:02    | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39   | 17:03    | 16:57    |
| 20                  | 07:45   | 07:13    | 06:29 | 06:39 | 06:02 | 05:51 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16    | 07:44    |
|                     | 17:25   | 18:03    | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37   | 17:02    | 16:58    |
| 21                  | 07:44   | 07:11    | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17    | 07:45    |
|                     | 17:26   | 18:04    | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:01    | 16:58    |
| 22                  | 07:43   | 07:10    | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42   | 07:18    | 07:45    |
|                     | 17:28   | 18:06    | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:34   | 17:01    | 16:59    |
| 23                  | 07:43   | 07:09    | 06:24 | 06:34 | 06:00 | 05:52 | 06:10 | 06:41  | 07:11     | 07:43   | 07:20    | 07:46    |
|                     | 17:29   | 18:07    | 18:38 | 20:11 | 20:42 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33   | 17:00    | 16:59    |
| 24                  | 07:42   | 07:07    | 06:22 | 06:33 | 05:59 | 05:52 | 06:11 | 06:42  | 07:12     | 07:44   | 07:21    | 07:46    |
|                     | 17:30   | 18:08    | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32   | 17:00    | 17:00    |
| 25                  | 07:41   | 07:06    | 06:21 | 06:31 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13     | 07:45   | 07:22    | 07:47    |
|                     | 17:31   | 18:09    | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 18:30   | 16:59    | 17:00    |
| 26                  | 07:41   | 07:04    | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 07:47   | 07:23    | 07:47    |
|                     | 17:32   | 18:10    | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29   | 16:59    | 17:01    |
| 27                  | 07:40   | 07:03    | 06:17 | 06:29 | 05:57 | 05:53 | 06:14 | 06:45  | 07:15     | 07:48   | 07:24    | 07:47    |
|                     | 17:34   | 18:12    | 18:43 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:27   | 16:58    | 17:02    |
| 28                  | 07:39   | 07:01    | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16     | 07:49   | 07:25    | 07:48    |
|                     | 17:35   | 18:13    | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26   | 16:58    | 17:02    |
| 29                  | 07:38   |          | 06:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 07:50   | 07:26    | 07:48    |
|                     | 17:36   |          | 19:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57    | 17:03    |
| 30                  | 07:37   |          | 06:12 | 06:25 | 05:55 | 05:54 | 06:17 | 06:48  | 07:18     | 06:51   | 07:27    | 07:48    |
|                     | 17:37   |          | 19:46 | 20:19 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:23   | 16:57    | 17:04    |
| 31                  | 07:36   |          | 06:11 |       | 05:55 |       | 06:18 | 06:49  |           | 06:52   |          | 07:49    |
|                     | 17:39   |          | 19:47 |       | 20:48 |       | 20:42 | 20:00  |           | 17:22   |          | 17:05    |
| Potential sun hours | 298     | 297      | 369   | 399   | 448   | 452   | 459   | 428    | 375       | 345     | 298      | 288      |
| Total, worst case   |         |          |       |       |       |       |       |        |           |         |          |          |
| Sun reduction       |         |          |       |       |       |       |       |        |           |         |          |          |
| Oper. time red.     |         |          |       |       |       |       |       |        |           |         |          |          |
| Wind dir. red.      |         |          |       |       |       |       |       |        |           |         |          |          |
| Total reduction     |         |          |       |       |       |       |       |        |           |         |          |          |
| Total, real         |         |          |       |       |       |       |       |        |           |         |          |          |

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

| Day in month | Sun rise (hh:mm) | 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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar

Calculation: Caso reale su dati statistici  
Shadow receptor: R99 - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (13)  
Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

| Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

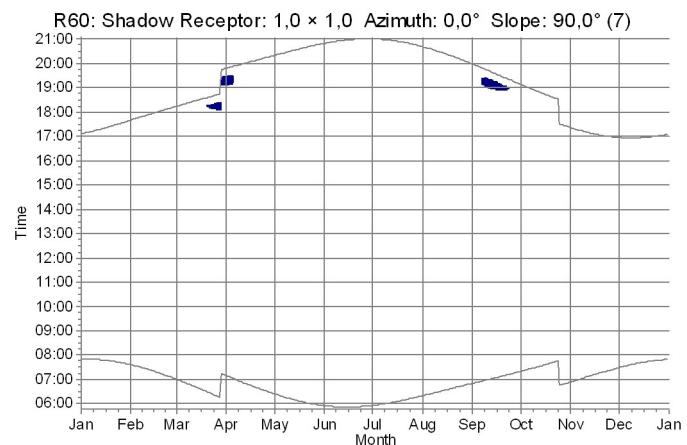
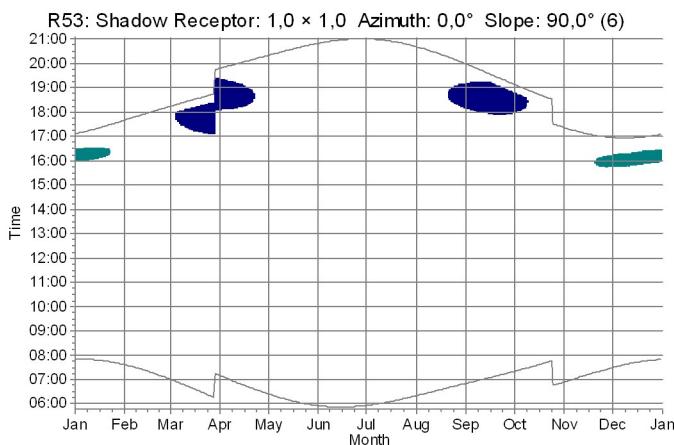
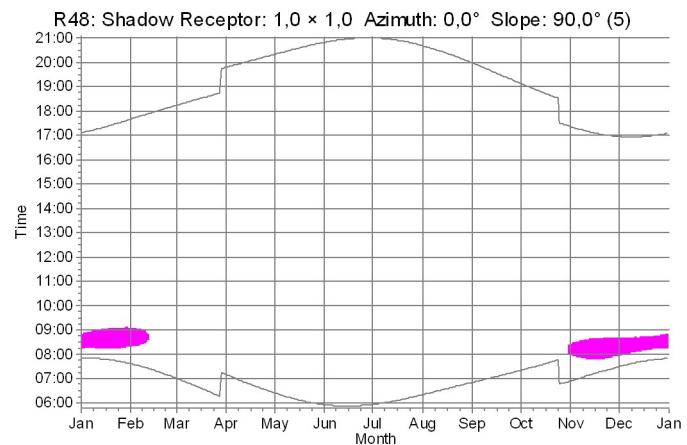
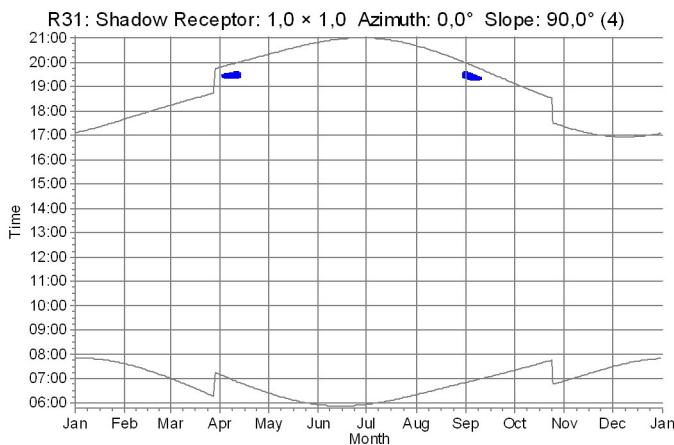
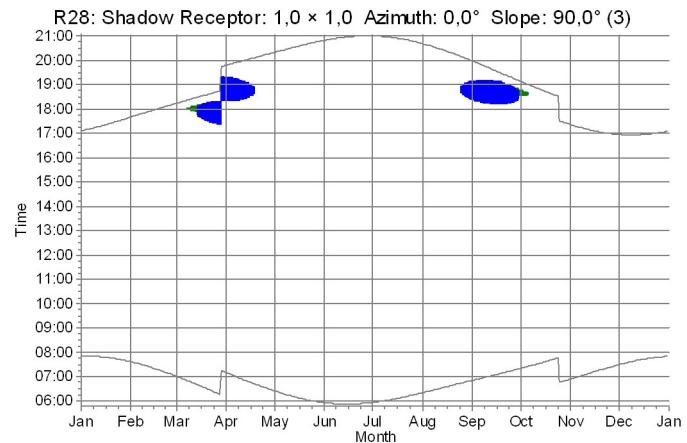
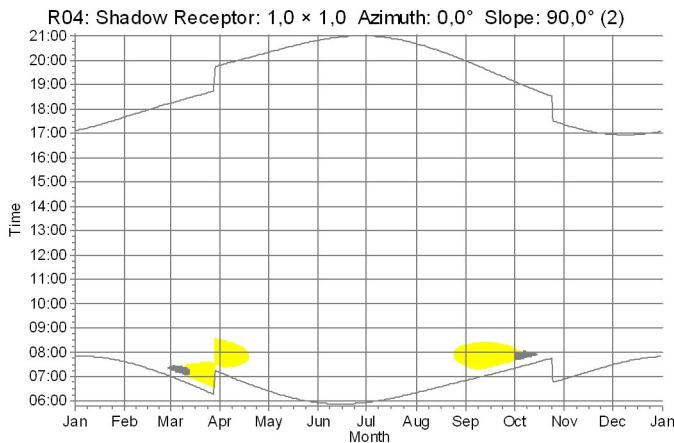
|                     | January | February | March | April | May   | June  | July  | August | September | October | November | December |
|---------------------|---------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|
| 1                   | 07:49   | 07:35    | 07:00 | 07:09 | 06:23 | 05:54 | 05:55 | 06:19  | 06:50     | 07:19   | 06:54    | 07:28    |
|                     | 17:06   | 17:40    | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:08   | 17:21    | 16:57    |
| 2                   | 07:49   | 07:35    | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51     | 07:20   | 06:55    | 07:29    |
|                     | 17:07   | 17:41    | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20    | 16:56    |
| 3                   | 07:49   | 07:34    | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:22   | 06:56    | 07:30    |
|                     | 17:07   | 17:42    | 18:16 | 19:50 | 20:22 | 20:51 | 21:00 | 20:39  | 19:55     | 19:04   | 17:18    | 16:56    |
| 4                   | 07:49   | 07:32    | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:53     | 07:23   | 06:57    | 07:31    |
|                     | 17:08   | 17:44    | 18:17 | 19:51 | 20:23 | 20:51 | 21:00 | 20:38  | 19:53     | 19:03   | 17:17    | 16:56    |
| 5                   | 07:49   | 07:31    | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:54     | 07:24   | 06:58    | 07:32    |
|                     | 17:09   | 17:45    | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:37  | 19:51     | 19:01   | 17:16    | 16:56    |
| 6                   | 07:49   | 07:30    | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:54     | 07:25   | 07:00    | 07:33    |
|                     | 17:10   | 17:46    | 18:20 | 19:53 | 20:25 | 20:53 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15    | 16:56    |
| 7                   | 07:49   | 07:29    | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55     | 07:26   | 07:01    | 07:34    |
|                     | 17:11   | 17:47    | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14    | 16:56    |
| 8                   | 07:49   | 07:28    | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56     | 07:27   | 07:02    | 07:35    |
|                     | 17:12   | 17:49    | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13    | 16:55    |
| 9                   | 07:49   | 07:27    | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57     | 07:28   | 07:03    | 07:36    |
|                     | 17:13   | 17:50    | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12    | 16:55    |
| 10                  | 07:49   | 07:26    | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58     | 07:29   | 07:04    | 07:37    |
|                     | 17:14   | 17:51    | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11    | 16:56    |
| 11                  | 07:48   | 07:25    | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59     | 07:30   | 07:05    | 07:38    |
|                     | 17:15   | 17:52    | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10    | 16:56    |
| 12                  | 07:48   | 07:23    | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07    | 07:39    |
|                     | 17:16   | 17:54    | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09    | 16:56    |
| 13                  | 07:48   | 07:22    | 06:41 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01     | 07:32   | 07:08    | 07:39    |
|                     | 17:17   | 17:55    | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08    | 16:56    |
| 14                  | 07:47   | 07:21    | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09    | 07:40    |
|                     | 17:18   | 17:56    | 18:29 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07    | 16:56    |
| 15                  | 07:47   | 07:20    | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10    | 07:41    |
|                     | 17:19   | 17:57    | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06    | 16:56    |
| 16                  | 07:47   | 07:18    | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11    | 07:42    |
|                     | 17:21   | 17:58    | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43   | 17:05    | 16:56    |
| 17                  | 07:46   | 07:17    | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05     | 07:36   | 07:13    | 07:42    |
|                     | 17:22   | 18:00    | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:04    | 16:57    |
| 18                  | 07:46   | 07:16    | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:38   | 07:14    | 07:43    |
|                     | 17:23   | 18:01    | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30     | 18:40   | 17:04    | 16:57    |
| 19                  | 07:45   | 07:14    | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15    | 07:44    |
|                     | 17:24   | 18:02    | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39   | 17:03    | 16:57    |
| 20                  | 07:45   | 07:13    | 06:29 | 06:39 | 06:02 | 05:51 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16    | 07:44    |
|                     | 17:25   | 18:03    | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37   | 17:02    | 16:58    |
| 21                  | 07:44   | 07:11    | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17    | 07:45    |
|                     | 17:26   | 18:04    | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:01    | 16:58    |
| 22                  | 07:43   | 07:10    | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42   | 07:18    | 07:45    |
|                     | 17:28   | 18:06    | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:34   | 17:01    | 16:59    |
| 23                  | 07:43   | 07:09    | 06:24 | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11     | 07:43   | 07:20    | 07:46    |
|                     | 17:29   | 18:07    | 18:38 | 20:11 | 20:42 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33   | 17:00    | 16:59    |
| 24                  | 07:42   | 07:07    | 06:22 | 06:33 | 05:59 | 05:52 | 06:11 | 06:42  | 07:12     | 07:44   | 07:21    | 07:46    |
|                     | 17:30   | 18:08    | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32   | 17:00    | 17:00    |
| 25                  | 07:41   | 07:06    | 06:21 | 06:31 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13     | 07:45   | 07:22    | 07:47    |
|                     | 17:31   | 18:09    | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 18:30   | 16:59    | 17:00    |
| 26                  | 07:41   | 07:04    | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 07:47   | 07:23    | 07:47    |
|                     | 17:32   | 18:10    | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29   | 16:59    | 17:01    |
| 27                  | 07:40   | 07:03    | 06:17 | 06:29 | 05:57 | 05:53 | 06:14 | 06:45  | 07:15     | 07:48   | 07:24    | 07:47    |
|                     | 17:34   | 18:12    | 18:43 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:27   | 16:58    | 17:02    |
| 28                  | 07:39   | 07:01    | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16     | 07:49   | 07:25    | 07:48    |
|                     | 17:35   | 18:13    | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26   | 16:58    | 17:02    |
| 29                  | 07:38   |          | 06:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 07:50   | 07:26    | 07:48    |
|                     | 17:36   |          | 19:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57    | 17:03    |
| 30                  | 07:37   |          | 06:12 | 06:25 | 05:55 | 05:55 | 06:17 | 06:48  | 07:18     | 06:51   | 07:27    | 07:48    |
|                     | 17:37   |          | 19:46 | 20:19 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:23   | 16:57    | 17:04    |
| 31                  | 07:36   |          | 06:11 |       | 05:55 |       | 06:18 | 06:49  |           | 06:52   |          | 07:49    |
|                     | 17:39   |          | 19:47 |       | 20:48 |       | 20:42 | 20:00  |           | 17:22   |          | 17:05    |
| Potential sun hours | 298     | 297      | 369   | 399   | 448   | 452   | 459   | 428    | 375       | 345     | 298      | 288      |
| Total, worst case   |         |          |       |       |       |       |       |        |           |         |          |          |
| Sun reduction       |         |          |       |       |       |       |       |        |           |         |          |          |
| Oper. time red.     |         |          |       |       |       |       |       |        |           |         |          |          |
| Wind dir. red.      |         |          |       |       |       |       |       |        |           |         |          |          |
| Total reduction     |         |          |       |       |       |       |       |        |           |         |          |          |
| Total, real         |         |          |       |       |       |       |       |        |           |         |          |          |

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

| Day in month | Sun rise (hh:mm) | 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) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

## SHADOW - Calendar, graphical

Calculation: Caso reale su dati statistici



WTGs

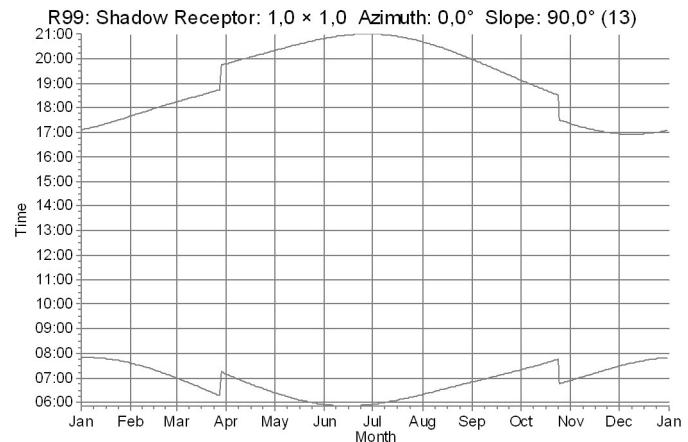
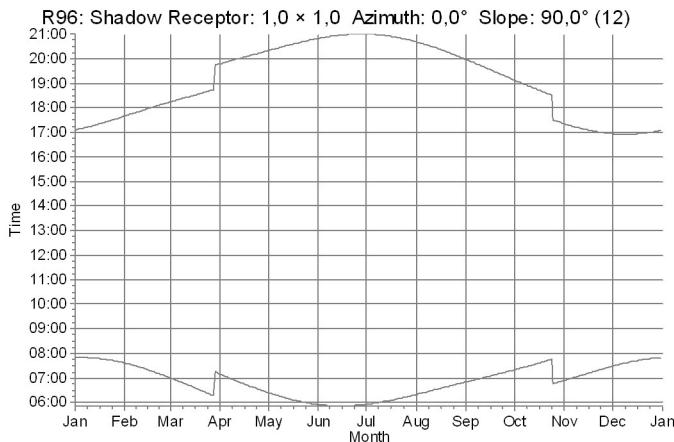
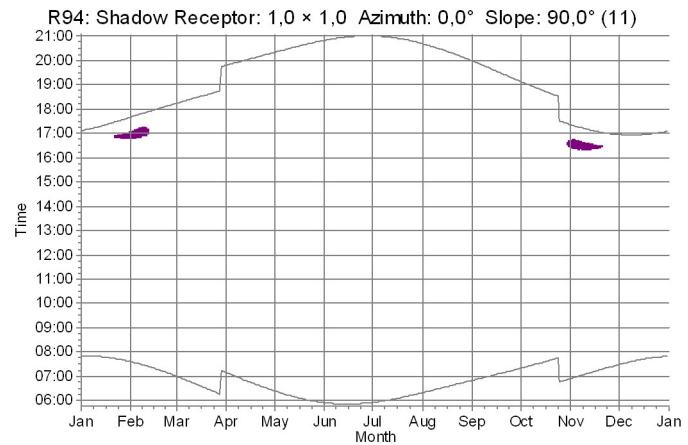
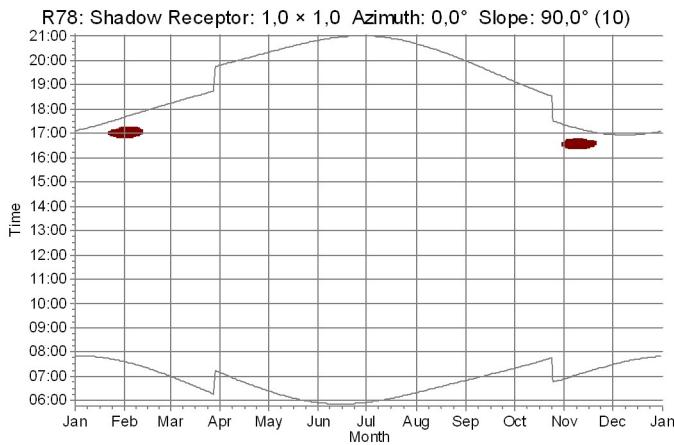
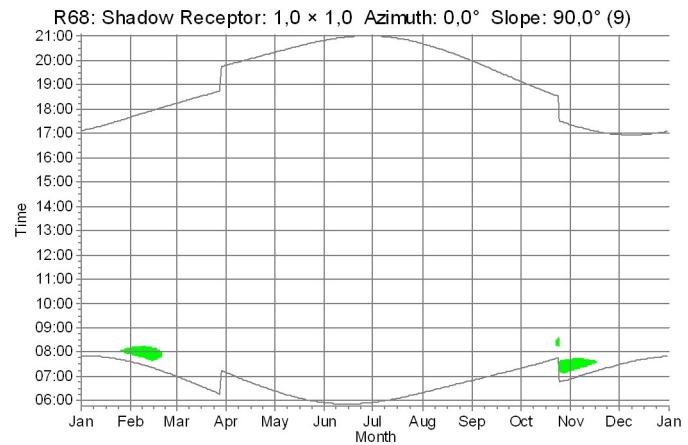
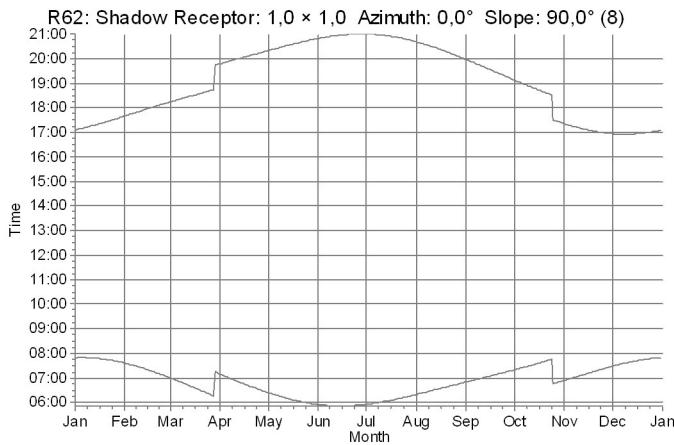


- GA01: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
- GA02: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)
- GA03: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- GA04: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

- GA05: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
- GA06: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
- GA07: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)

## SHADOW - Calendar, graphical

Calculation: Caso reale su dati statistici



WTGs



GA08: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)  
GA09: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (21)



GA11: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (23)

## SHADOW - Calendar per WTG

Calculation: Caso reale su dati statisticiWTG: GA01 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

|  | Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|--|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
|  | N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|  | 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                             | January | February | March | April          | May   | June  | July  | August | September | October        | November       | December |       |       |
|-----------------------------|---------|----------|-------|----------------|-------|-------|-------|--------|-----------|----------------|----------------|----------|-------|-------|
| 1                           | 07:49   | 07:36    | 07:00 | 07:09          | 06:24 | 05:55 | 05:55 | 06:19  | 06:50     | 07:20          | 18:35-18:46/11 | 06:54    | 07:28 |       |
|                             | 17:06   | 17:40    | 18:14 | 19:48          | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:08          |                | 17:21    | 16:57 |       |
| 2                           | 07:49   | 07:35    | 06:58 | 07:08          | 06:22 | 05:54 | 05:56 | 06:20  | 06:51     | 07:21          | 18:35-18:44/9  | 06:55    | 07:29 |       |
|                             | 17:07   | 17:41    | 18:15 | 19:49          | 20:21 | 20:50 | 21:00 | 20:40  | 19:57     | 19:06          |                | 17:20    | 16:57 |       |
| 3                           | 07:49   | 07:34    | 06:57 | 07:06          | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:22          | 18:35-18:42/7  | 06:56    | 07:30 |       |
|                             | 17:08   | 17:43    | 18:16 | 19:50          | 20:22 | 20:51 | 21:00 | 20:39  | 19:55     | 19:04          |                | 17:19    | 16:56 |       |
| 4                           | 07:49   | 07:33    | 06:55 | 07:04          | 06:20 | 05:54 | 05:57 | 06:22  | 06:53     | 07:23          | 18:35-18:40/5  | 06:57    | 07:31 |       |
|                             | 17:09   | 17:44    | 18:18 | 19:51          | 20:23 | 20:51 | 21:00 | 20:38  | 19:53     | 19:03          |                | 17:18    | 16:56 |       |
| 5                           | 07:49   | 07:32    | 06:54 | 07:03          | 06:18 | 05:53 | 05:57 | 06:23  | 06:54     | 07:24          | 18:36-18:39/3  | 06:58    | 07:32 |       |
|                             | 17:10   | 17:45    | 18:19 | 19:52          | 20:24 | 20:52 | 20:59 | 20:37  | 19:52     | 19:01          |                | 17:16    | 16:56 |       |
| 6                           | 07:49   | 07:30    | 06:52 | 07:01          | 06:17 | 05:53 | 05:58 | 06:24  | 06:55     | 07:25          |                | 07:00    | 07:33 |       |
|                             | 17:10   | 17:46    | 18:20 | 19:53          | 20:25 | 20:53 | 20:59 | 20:35  | 19:50     | 18:59          |                | 17:15    | 16:56 |       |
| 7                           | 07:49   | 07:29    | 06:50 | 06:59          | 06:16 | 05:53 | 05:59 | 06:25  | 06:56     | 07:26          |                | 07:01    | 07:34 |       |
|                             | 17:11   | 17:48    | 18:21 | 19:54          | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58          |                | 17:14    | 16:56 |       |
| 8                           | 07:49   | 07:28    | 06:49 | 18:00-18:01/1  | 06:58 | 06:15 | 05:52 | 05:59  | 06:26     | 06:57          | 07:27          |          | 07:02 | 07:35 |
|                             | 17:12   | 17:49    | 18:22 | 19:55          | 20:27 | 20:54 | 20:58 | 20:33  | 19:47     | 18:56          |                | 17:13    | 16:56 |       |
| 9                           | 07:49   | 07:27    | 06:47 | 17:58-18:02/4  | 06:56 | 06:14 | 05:52 | 06:00  | 06:27     | 06:58          | 07:28          |          | 07:03 | 07:36 |
|                             | 17:13   | 17:50    | 18:23 | 19:56          | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:55          |                | 17:12    | 16:56 |       |
| 10                          | 07:49   | 07:26    | 06:46 | 17:57-18:03/6  | 06:54 | 06:13 | 05:52 | 06:01  | 06:28     | 06:59          | 07:29          |          | 07:04 | 07:37 |
|                             | 17:14   | 17:51    | 18:24 | 19:58          | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53          |                | 17:11    | 16:56 |       |
| 11                          | 07:48   | 07:25    | 06:44 | 17:56-18:05/9  | 06:53 | 06:12 | 05:52 | 06:01  | 06:29     | 07:00          | 07:30          |          | 07:06 | 07:38 |
|                             | 17:15   | 17:53    | 18:25 | 19:59          | 20:30 | 20:56 | 20:57 | 20:29  | 19:42     | 18:51          |                | 17:10    | 16:56 |       |
| 12                          | 07:48   | 07:23    | 06:42 | 17:56-18:05/9  | 06:51 | 06:10 | 05:52 | 06:02  | 06:30     | 07:01          | 07:31          |          | 07:07 | 07:39 |
|                             | 17:17   | 17:54    | 18:27 | 20:00          | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50          |                | 17:09    | 16:56 |       |
| 13                          | 07:48   | 07:22    | 06:41 | 17:55-18:06/11 | 06:50 | 06:09 | 05:52 | 06:03  | 06:31     | 07:02          | 07:32          |          | 07:08 | 07:40 |
|                             | 17:18   | 17:55    | 18:28 | 20:01          | 20:32 | 20:57 | 20:56 | 20:27  | 19:38     | 18:48          |                | 17:08    | 16:56 |       |
| 14                          | 07:48   | 07:21    | 06:39 | 17:56-18:08/12 | 06:48 | 06:08 | 05:51 | 06:03  | 06:32     | 07:03          | 07:33          |          | 07:09 | 07:40 |
|                             | 17:19   | 17:56    | 18:29 | 20:02          | 20:33 | 20:57 | 20:56 | 20:25  | 19:37     | 18:47          |                | 17:07    | 16:56 |       |
| 15                          | 07:47   | 07:20    | 06:37 | 17:55-18:09/14 | 06:47 | 06:07 | 05:51 | 06:04  | 06:33     | 07:04          | 07:34          |          | 07:10 | 07:41 |
|                             | 17:20   | 17:57    | 18:30 | 20:03          | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45          |                | 17:06    | 16:57 |       |
| 16                          | 07:47   | 07:18    | 06:36 | 17:56-18:09/13 | 06:45 | 06:06 | 05:51 | 06:05  | 06:34     | 07:05          | 07:35          |          | 07:11 | 07:42 |
|                             | 17:21   | 17:59    | 18:31 | 20:04          | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:44          |                | 17:06    | 16:57 |       |
| 17                          | 07:46   | 07:17    | 06:34 | 17:57-18:11/14 | 06:44 | 06:05 | 05:51 | 06:06  | 06:35     | 07:06          | 07:37          |          | 07:13 | 07:42 |
|                             | 17:22   | 18:00    | 18:32 | 20:05          | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42          |                | 17:05    | 16:57 |       |
| 18                          | 07:46   | 07:16    | 06:32 | 17:59-18:08/9  | 06:42 | 06:05 | 05:52 | 06:07  | 06:36     | 07:07          | 07:38          |          | 07:14 | 07:43 |
|                             | 17:23   | 18:01    | 18:33 | 20:06          | 20:37 | 20:58 | 20:53 | 20:20  | 19:30     | 18:41          |                | 17:04    | 16:57 |       |
| 19                          | 07:45   | 07:14    | 06:31 | 06:40          | 06:04 | 05:52 | 06:07 | 06:37  | 07:08     | 07:39          |                | 07:15    | 07:44 |       |
|                             | 17:24   | 18:02    | 18:34 | 20:07          | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39          |                | 17:03    | 16:58 |       |
| 20                          | 07:45   | 07:13    | 06:29 | 06:39          | 06:03 | 05:52 | 06:08 | 06:38  | 07:09     | 07:40          |                | 07:16    | 07:44 |       |
|                             | 17:26   | 18:04    | 18:35 | 20:08          | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:38          |                | 17:02    | 16:58 |       |
| 21                          | 07:44   | 07:12    | 06:27 | 06:37          | 06:02 | 05:52 | 06:09 | 06:39  | 07:10     | 07:41          |                | 07:17    | 07:45 |       |
|                             | 17:27   | 18:05    | 18:36 | 20:09          | 20:40 | 20:59 | 20:51 | 20:15  | 19:25     | 18:36          |                | 17:02    | 16:59 |       |
| 22                          | 07:44   | 07:10    | 06:26 | 06:36          | 06:01 | 05:52 | 06:10 | 06:40  | 07:11     | 07:42          |                | 07:18    | 07:45 |       |
|                             | 17:28   | 18:06    | 18:37 | 20:10          | 20:41 | 21:00 | 20:50 | 20:14  | 19:23     | 18:35          |                | 17:01    | 16:59 |       |
| 23                          | 07:43   | 07:09    | 06:24 | 06:35          | 06:00 | 05:52 | 06:11 | 06:41  | 07:12     | 07:43          |                | 07:20    | 07:46 |       |
|                             | 17:29   | 18:07    | 18:38 | 20:11          | 20:42 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33          |                | 17:01    | 17:00 |       |
| 24                          | 07:42   | 07:07    | 06:22 | 06:33          | 06:00 | 05:53 | 06:12 | 06:42  | 07:13     | 07:44          |                | 07:21    | 07:46 |       |
|                             | 17:30   | 18:08    | 18:39 | 20:12          | 20:42 | 21:00 | 20:49 | 20:11  | 19:20     | 18:32          |                | 17:00    | 17:00 |       |
| 25                          | 07:41   | 07:06    | 06:21 | 06:32          | 05:59 | 05:53 | 06:13 | 06:43  | 07:14     | 18:43-18:49/6  | 06:46          |          | 07:22 | 07:47 |
|                             | 17:32   | 18:09    | 18:41 | 20:13          | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 17:30          |                | 16:59    | 17:01 |       |
| 26                          | 07:41   | 07:04    | 06:19 | 06:30          | 05:58 | 05:53 | 06:14 | 06:44  | 07:15     | 18:39-18:51/12 | 06:47          |          | 07:23 | 07:47 |
|                             | 17:33   | 18:11    | 18:42 | 20:14          | 20:44 | 21:00 | 20:47 | 20:08  | 19:16     | 17:29          |                | 16:59    | 17:01 |       |
| 27                          | 07:40   | 07:03    | 06:17 | 06:29          | 05:58 | 05:54 | 06:14 | 06:45  | 07:16     | 18:38-18:51/13 | 06:48          |          | 07:24 | 07:48 |
|                             | 17:34   | 18:12    | 18:43 | 20:15          | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:28          |                | 16:58    | 17:02 |       |
| 28                          | 07:39   | 07:01    | 06:16 | 06:28          | 05:57 | 05:54 | 06:15 | 06:46  | 07:17     | 18:36-18:50/14 | 06:49          |          | 07:25 | 07:48 |
|                             | 17:35   | 18:13    | 18:44 | 20:17          | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26          |                | 16:58    | 17:03 |       |
| 29                          | 07:38   | 07:01    | 06:14 | 06:26          | 05:56 | 05:54 | 06:16 | 06:47  | 07:18     | 18:35-18:48/13 | 06:50          |          | 07:26 | 07:48 |
|                             | 17:36   | 18:14    | 18:45 | 20:18          | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25          |                | 16:58    | 17:03 |       |
| 30                          | 07:37   | 07:01    | 06:12 | 06:25          | 05:56 | 05:55 | 06:17 | 06:48  | 07:19     | 18:34-18:46/12 | 06:51          |          | 07:27 | 07:48 |
|                             | 17:38   | 18:14    | 18:46 | 20:19          | 20:48 | 21:00 | 20:43 | 20:01  | 19:09     | 17:24          |                | 16:57    | 17:04 |       |
| 31                          | 07:37   | 07:01    | 06:11 |                | 05:55 |       | 06:18 | 06:49  |           | 06:53          |                |          | 07:49 |       |
|                             | 17:39   | 18:14    | 18:47 |                | 20:48 |       | 20:42 | 20:00  |           | 17:22          |                |          | 17:05 |       |
| Potential sun hours         | 298     | 297      | 369   | 399            | 448   | 452   | 459   | 428    | 375       | 345            | 298            | 288      |       |       |
| Sum of minutes with flicker | 0       | 0        | 102   | 0              | 0     | 0     | 0     | 0      | 0         | 70             | 35             | 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: Caso reale su dati statisticiWTG: GA02 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)  
Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

### Operational time

| N  | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| 90 | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                             | January | February | March                | April                | May   | June  | July                 | August               | September            | October              | November | December |
|-----------------------------|---------|----------|----------------------|----------------------|-------|-------|----------------------|----------------------|----------------------|----------------------|----------|----------|
| 1                           | 07:49   | 07:35    | 07:00                | 07:09 07:28-08:29/61 | 06:23 | 05:55 | 05:19                | 06:50 07:27-08:16/49 | 07:20 07:40-08:07/27 | 06:54                | 07:28    |          |
|                             | 17:06   | 17:40    | 18:14                | 19:48                | 20:20 | 20:49 | 21:00                | 20:41                | 19:58                | 19:08                | 17:21    | 16:57    |
| 2                           | 07:49   | 07:35    | 06:58                | 07:07 07:26-08:28/62 | 06:22 | 05:54 | 05:56                | 06:20                | 06:51 07:24-08:16/52 | 07:21 07:41-08:05/24 | 06:55    | 07:29    |
|                             | 17:07   | 17:41    | 18:15                | 19:49                | 20:21 | 20:50 | 21:00                | 20:40                | 19:56                | 19:06                | 17:20    | 16:57    |
| 3                           | 07:49   | 07:34    | 06:57                | 07:06 07:24-08:27/63 | 06:21 | 05:54 | 05:56                | 06:21                | 06:52 07:23-08:17/54 | 07:22 07:42-08:03/21 | 06:56    | 07:30    |
|                             | 17:08   | 17:43    | 18:16                | 19:50                | 20:22 | 20:50 | 21:00                | 20:39                | 19:55                | 19:04                | 17:19    | 16:56    |
| 4                           | 07:49   | 07:33    | 06:55                | 07:04 07:23-08:26/63 | 06:20 | 05:54 | 05:57                | 06:22                | 06:53 07:22-08:18/56 | 07:23 07:43-08:01/18 | 06:57    | 07:31    |
|                             | 17:09   | 17:44    | 18:17                | 19:51                | 20:23 | 20:51 | 20:59                | 20:38                | 19:53                | 19:03                | 17:18    | 16:56    |
| 5                           | 07:49   | 07:31    | 06:54                | 07:03 07:23-08:25/62 | 06:18 | 05:53 | 05:57                | 06:23                | 06:54 07:21-08:19/58 | 07:24 07:44-07:58/14 | 06:58    | 07:32    |
|                             | 17:09   | 17:45    | 18:19                | 19:52                | 20:24 | 20:52 | 20:59                | 20:37                | 19:52                | 19:01                | 17:16    | 16:56    |
| 6                           | 07:49   | 07:30    | 06:52 07:11-07:13/2  | 07:01 07:23-08:23/60 | 06:17 | 05:53 | 05:58                | 06:24                | 06:55 07:19-08:19/60 | 07:25 07:45-07:55/10 | 07:00    | 07:33    |
|                             | 17:10   | 17:46    | 18:20                | 19:53                | 20:25 | 20:59 | 20:35                | 19:50                | 18:59                | 17:15                | 16:56    |          |
| 7                           | 07:49   | 07:29    | 06:50 07:09-07:17/8  | 06:59 07:25-08:23/58 | 06:16 | 05:53 | 05:59                | 06:25                | 06:56 07:18-08:20/62 | 07:26 07:46-07:51/5  | 07:01    | 07:34    |
|                             | 17:11   | 17:48    | 18:21                | 19:54                | 20:26 | 20:59 | 20:34                | 19:48                | 18:58                | 17:14                | 16:56    |          |
| 8                           | 07:49   | 07:28    | 06:49 07:08-07:20/12 | 06:58 07:25-08:21/56 | 06:15 | 05:52 | 05:59                | 06:26                | 06:57 07:18-08:20/62 | 07:27                | 07:02    | 07:35    |
|                             | 17:12   | 17:49    | 18:22                | 19:55                | 20:27 | 20:54 | 20:58                | 20:33                | 19:47                | 18:56                | 17:13    | 16:56    |
| 9                           | 07:49   | 07:27    | 06:47 07:06-07:22/16 | 06:56 07:26-08:20/54 | 06:14 | 05:52 | 06:00                | 06:27                | 06:58 07:18-08:21/63 | 07:28                | 07:03    | 07:36    |
|                             | 17:13   | 17:50    | 18:23                | 19:56                | 20:28 | 20:54 | 20:58                | 20:32                | 19:45                | 18:55                | 17:12    | 16:56    |
| 10                          | 07:49   | 07:26    | 06:46 07:04-07:24/20 | 06:54 07:26-08:18/52 | 06:13 | 05:52 | 06:01                | 06:28                | 06:59 07:19-08:21/62 | 07:29                | 07:04    | 07:37    |
|                             | 17:14   | 17:51    | 18:24                | 19:57                | 20:29 | 20:55 | 20:58                | 20:30                | 19:43                | 18:53                | 17:11    | 16:56    |
| 11                          | 07:48   | 07:25    | 06:44 07:03-07:26/23 | 06:53 07:27-08:16/49 | 06:11 | 05:52 | 06:01                | 06:29                | 07:00 07:20-08:21/61 | 07:30                | 07:05    | 07:38    |
|                             | 17:15   | 17:53    | 18:25                | 19:59                | 20:30 | 20:55 | 20:57                | 20:29                | 19:42                | 18:51                | 17:10    | 16:56    |
| 12                          | 07:48   | 07:23    | 06:42 07:01-07:27/26 | 06:51 07:29-08:15/46 | 06:10 | 05:52 | 06:02                | 06:30                | 07:01 07:21-08:21/60 | 07:31                | 07:07    | 07:39    |
|                             | 17:16   | 17:54    | 18:26                | 20:00                | 20:31 | 20:56 | 20:57                | 20:28                | 19:40                | 18:50                | 17:09    | 16:56    |
| 13                          | 07:48   | 07:22    | 06:41 06:59-07:28/29 | 06:50 07:30-08:13/43 | 06:09 | 05:52 | 06:03                | 06:31                | 07:02 07:22-08:21/59 | 07:32                | 07:08    | 07:39    |
|                             | 17:18   | 17:55    | 18:28                | 20:01                | 20:32 | 20:56 | 20:56                | 20:26                | 19:38                | 18:48                | 17:08    | 16:56    |
| 14                          | 07:47   | 07:21    | 06:39 06:58-07:29/31 | 06:48 07:32-08:11/39 | 06:08 | 05:51 | 06:03                | 06:32                | 07:03 07:23-08:21/58 | 07:33                | 07:09    | 07:40    |
|                             | 17:19   | 17:56    | 18:29                | 20:02                | 20:33 | 20:57 | 20:56                | 20:25                | 19:36                | 18:47                | 17:07    | 16:56    |
| 15                          | 07:47   | 07:20    | 06:37 06:56-07:30/34 | 06:47 07:33-08:08/35 | 06:07 | 05:51 | 06:04                | 06:33                | 07:04 07:24-08:21/57 | 07:34                | 07:10    | 07:41    |
|                             | 17:20   | 17:57    | 18:30                | 20:03                | 20:34 | 20:57 | 20:55                | 20:24                | 19:35                | 18:45                | 17:06    | 16:57    |
| 16                          | 07:47   | 07:18    | 06:36 06:54-07:30/36 | 06:45 07:36-08:06/30 | 06:06 | 05:51 | 06:05                | 06:34                | 07:05 07:25-08:21/56 | 07:35                | 07:11    | 07:42    |
|                             | 17:21   | 17:59    | 18:31                | 20:04                | 20:35 | 20:58 | 20:55                | 20:22                | 19:33                | 18:43                | 17:05    | 16:57    |
| 17                          | 07:46   | 07:17    | 06:34 06:53-07:31/38 | 06:43 07:38-08:02/24 | 06:05 | 05:51 | 06:06                | 06:35                | 07:06 07:26-08:20/54 | 07:37                | 07:13    | 07:42    |
|                             | 17:22   | 18:00    | 18:32                | 20:05                | 20:36 | 20:58 | 20:54                | 20:21                | 19:31                | 18:42                | 17:05    | 16:57    |
| 18                          | 07:46   | 07:16    | 06:32 06:51-07:31/40 | 06:42 07:42-07:58/16 | 06:04 | 05:52 | 06:07                | 06:36                | 07:06 07:27-08:20/53 | 07:38                | 07:14    | 07:43    |
|                             | 17:23   | 18:01    | 18:33                | 20:06                | 20:37 | 20:58 | 20:53                | 20:20                | 19:30                | 18:40                | 17:04    | 16:57    |
| 19                          | 07:45   | 07:14    | 06:31 06:49-07:31/42 | 06:40 06:04          | 05:52 | 06:07 | 06:37                | 07:07 07:28-08:20/52 | 07:39                | 07:15                | 07:44    |          |
|                             | 17:24   | 18:02    | 18:34                | 20:07                | 20:38 | 20:59 | 20:53                | 20:18                | 19:28                | 18:39                | 17:03    | 16:58    |
| 20                          | 07:45   | 07:13    | 06:29 06:48-07:32/44 | 06:39 06:03          | 05:52 | 06:08 | 06:38                | 07:08 07:29-08:19/50 | 07:40                | 07:16                | 07:44    |          |
|                             | 17:25   | 18:03    | 18:35                | 20:08                | 20:39 | 20:59 | 20:52                | 20:17                | 19:26                | 18:37                | 17:02    | 16:58    |
| 21                          | 07:44   | 07:11    | 06:27 06:46-07:32/46 | 06:37 06:02          | 05:52 | 06:09 | 06:39                | 07:09 07:30-08:18/48 | 07:41                | 07:17                | 07:45    |          |
|                             | 17:27   | 18:05    | 18:36                | 20:09                | 20:40 | 20:59 | 20:51                | 20:15                | 19:25                | 18:36                | 17:02    | 16:59    |
| 22                          | 07:43   | 07:10    | 06:26 06:44-07:32/48 | 06:36 06:01          | 05:52 | 06:10 | 06:40                | 07:10 07:31-08:18/47 | 07:42                | 07:18                | 07:45    |          |
|                             | 17:28   | 18:06    | 18:37                | 20:10                | 20:41 | 20:59 | 20:50                | 20:14                | 19:23                | 18:35                | 17:01    | 16:59    |
| 23                          | 07:43   | 07:09    | 06:24 06:43-07:33/50 | 06:35 06:00          | 05:52 | 06:11 | 06:41                | 07:11 07:32-08:17/45 | 07:43                | 07:20                | 07:46    |          |
|                             | 17:29   | 18:07    | 18:38                | 20:11                | 20:42 | 21:00 | 20:50                | 20:12                | 19:21                | 18:33                | 17:01    | 17:00    |
| 24                          | 07:42   | 07:07    | 06:22 06:41-07:32/51 | 06:33 06:00          | 05:53 | 06:12 | 06:42                | 07:12 07:33-08:16/43 | 07:44                | 07:21                | 07:46    |          |
|                             | 17:30   | 18:08    | 18:39                | 20:12                | 20:42 | 21:00 | 20:49                | 20:11                | 19:19                | 18:32                | 17:00    | 17:00    |
| 25                          | 07:41   | 07:06    | 06:21 06:39-07:32/53 | 06:32 05:59          | 05:53 | 06:13 | 06:43 07:45-08:02/17 | 07:13 07:34-08:15/41 | 06:45                | 07:22                | 07:47    |          |
|                             | 17:31   | 18:09    | 18:41                | 20:13                | 20:43 | 21:00 | 20:48                | 20:09                | 19:18                | 17:30                | 16:59    | 17:01    |
| 26                          | 07:41   | 07:04    | 06:19 06:38-07:32/54 | 06:30 05:58          | 05:53 | 06:13 | 06:44 07:40-08:06/26 | 07:14 07:35-08:14/39 | 06:47                | 07:23                | 07:47    |          |
|                             | 17:33   | 18:11    | 18:42                | 20:14                | 20:44 | 21:00 | 20:47                | 20:08                | 19:16                | 17:29                | 16:59    | 17:01    |
| 27                          | 07:40   | 07:03    | 06:17 06:36-07:31/55 | 06:29 05:58          | 05:54 | 06:14 | 06:45 07:37-08:08/31 | 07:15 07:36-08:13/37 | 06:48                | 07:24                | 07:47    |          |
|                             | 17:34   | 18:12    | 18:43                | 20:15                | 20:45 | 21:00 | 20:46                | 20:06                | 19:14                | 17:28                | 16:58    | 17:02    |
| 28                          | 07:39   | 07:01    | 06:16 06:34-07:31/57 | 06:27 05:57          | 05:54 | 06:15 | 06:46 07:35-08:11/36 | 07:17 07:37-08:12/35 | 06:49                | 07:25                | 07:48    |          |
|                             | 17:35   | 18:13    | 18:44                | 20:16                | 20:46 | 21:00 | 20:45                | 20:04                | 19:13                | 17:26                | 16:58    | 17:03    |
| 29                          | 07:38   | 07:01    | 07:14 07:33-08:31/58 | 06:26 05:56          | 05:54 | 06:16 | 06:47 07:32-08:12/40 | 07:18 07:38-08:10/32 | 06:50                | 07:26                | 07:48    |          |
|                             | 17:36   | 18:15    | 18:45                | 20:18                | 20:47 | 21:00 | 20:44                | 20:03                | 19:11                | 17:25                | 16:58    | 17:03    |
| 30                          | 07:37   | 07:01    | 07:12 07:31-08:30/59 | 06:25 05:56          | 05:55 | 06:17 | 06:48 07:30-08:14/44 | 07:19 07:39-08:09/30 | 06:51                | 07:27                | 07:48    |          |
|                             | 17:38   | 18:16    | 18:46                | 20:19                | 20:47 | 21:00 | 20:43                | 20:01                | 19:09                | 17:24                | 16:57    | 17:04    |
| 31                          | 07:36   | 07:01    | 07:11 07:29-08:29/60 | 06:25 05:55          | 05:54 | 06:18 | 06:49 07:29-08:15/46 | 06:52                | 07:22                | 07:49                |          |          |
|                             | 17:39   | 18:17    | 18:47                | 20:18                | 20:48 | 20:42 | 20:40                | 20:00                | 19:11                | 17:22                | 16:58    | 17:05    |
| Potential sun hours         | 298     | 297      | 369                  | 399                  | 448   | 452   | 459                  | 428                  | 375                  | 345                  | 298      | 288      |
| Sum of minutes with flicker | 0       | 0        | 992                  | 873                  | 0     | 0     | 240                  | 1535                 | 119                  | 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: Caso reale su dati statisticiWTG: GA03 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

Operational time  
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
90 295 742 511 343 267 107 562 1.775 1.844 553 102 7.191

|                             | January | February | March | April                | May                  | June  | July  | August               | September            | October              | November | December |       |
|-----------------------------|---------|----------|-------|----------------------|----------------------|-------|-------|----------------------|----------------------|----------------------|----------|----------|-------|
| 1                           | 07:49   | 07:36    | 07:00 | 07:09 18:22-19:17/55 | 06:23                | 05:55 | 05:55 | 06:19                | 06:50 19:20-19:35/15 | 07:20                | 06:54    | 07:28    |       |
|                             | 17:06   | 17:40    | 18:14 | 19:48                | 20:20                | 20:49 | 21:00 | 20:41                | 19:58 18:24-19:07/43 | 19:08                | 17:21    | 16:57    |       |
| 2                           | 07:49   | 07:35    | 06:58 | 07:07 19:25-19:28/3  | 06:22                | 05:54 | 05:56 | 06:20                | 06:51 19:18-19:34/16 | 07:21                | 06:55    | 07:29    |       |
|                             | 17:07   | 17:41    | 18:15 | 19:49 18:22-19:16/54 | 20:21                | 20:50 | 21:00 | 20:40                | 19:56 18:22-19:08/46 | 19:06                | 17:20    | 16:57    |       |
| 3                           | 07:49   | 07:34    | 06:57 | 07:06 19:23-19:28/5  | 06:21                | 05:54 | 05:56 | 06:21                | 06:52 19:18-19:32/14 | 07:22                | 06:56    | 07:30    |       |
|                             | 17:08   | 17:43    | 18:16 | 19:50 18:22-19:16/54 | 20:22                | 20:50 | 21:00 | 20:39                | 19:55 18:21-19:08/47 | 19:04                | 17:19    | 16:56    |       |
| 4                           | 07:49   | 07:33    | 06:55 | 07:04 19:22-19:30/8  | 06:20                | 05:53 | 05:57 | 06:22                | 06:53 19:17-19:31/14 | 07:23                | 06:57    | 07:31    |       |
|                             | 17:09   | 17:44    | 18:17 | 19:51 18:22-19:16/54 | 20:23                | 20:51 | 20:59 | 20:38                | 19:53 18:20-19:09/49 | 19:03                | 17:18    | 16:56    |       |
| 5                           | 07:49   | 07:31    | 06:54 | 07:03 19:21-19:31/10 | 06:18                | 05:53 | 05:57 | 06:23                | 06:54 19:16-19:29/13 | 07:24                | 06:58    | 07:32    |       |
|                             | 17:09   | 17:45    | 18:19 | 19:52 18:22-19:15/53 | 20:24                | 20:52 | 20:59 | 20:37                | 19:52 18:19-19:09/50 | 19:01                | 17:16    | 16:56    |       |
| 6                           | 07:49   | 07:30    | 06:52 | 07:01 19:20-19:31/11 | 06:17                | 05:53 | 05:58 | 06:24                | 06:55 19:16-19:28/12 | 07:25                | 07:00    | 07:33    |       |
|                             | 17:10   | 17:46    | 18:20 | 19:53 18:22-19:13/51 | 20:25                | 20:53 | 20:59 | 20:35                | 19:50 18:18-19:10/52 | 18:59                | 17:15    | 16:56    |       |
| 7                           | 07:49   | 07:29    | 06:50 | 06:59 19:20-19:33/13 | 06:16                | 05:53 | 05:59 | 06:25                | 06:56 19:16-19:26/10 | 07:26                | 07:01    | 07:34    |       |
|                             | 17:11   | 17:48    | 18:21 | 19:54 18:23-19:13/50 | 20:26                | 20:53 | 20:59 | 20:34                | 19:48 18:17-19:10/53 | 18:58                | 17:14    | 16:56    |       |
| 8                           | 07:49   | 07:28    | 06:49 | 06:58 19:20-19:34/14 | 06:15                | 05:52 | 05:59 | 06:26                | 06:57 19:16-19:24/8  | 07:27                | 07:02    | 07:35    |       |
|                             | 17:12   | 17:49    | 18:22 | 19:55 18:23-19:12/49 | 20:27                | 20:54 | 20:58 | 20:33                | 19:47 18:16-19:10/54 | 18:56                | 17:13    | 16:56    |       |
| 9                           | 07:49   | 07:27    | 06:47 | 06:56 19:20-19:34/14 | 06:14                | 05:52 | 06:00 | 06:27                | 06:58 19:17-19:23/6  | 07:28                | 07:03    | 07:36    |       |
|                             | 17:13   | 17:50    | 18:23 | 19:56 18:23-19:10/47 | 20:28                | 20:54 | 20:58 | 20:32                | 19:45 18:16-19:10/54 | 18:54                | 17:12    | 16:56    |       |
| 10                          | 07:49   | 07:26    | 06:46 | 06:54 19:20-19:36/16 | 06:13                | 05:52 | 06:00 | 06:28                | 06:59 19:18-19:21/3  | 07:29                | 07:04    | 07:37    |       |
|                             | 17:14   | 17:51    | 18:24 | 19:57 18:24-19:10/46 | 20:29                | 20:55 | 20:58 | 20:30                | 19:43 18:15-19:10/55 | 18:53                | 17:11    | 16:56    |       |
| 11                          | 07:48   | 07:25    | 06:44 | 06:53 19:21-19:36/15 | 06:11                | 05:52 | 06:01 | 06:29                | 07:00 18:15-19:09/54 | 07:30                | 07:05    | 07:38    |       |
|                             | 17:15   | 17:53    | 18:25 | 19:59 18:25-19:08/43 | 20:30                | 20:55 | 20:57 | 20:29                | 19:42                | 18:51                | 17:10    | 16:56    |       |
| 12                          | 07:48   | 07:23    | 06:42 | 06:51 19:22-19:36/14 | 06:10                | 05:52 | 06:02 | 06:30                | 07:01 18:14-19:09/55 | 07:31                | 07:07    | 07:39    |       |
|                             | 17:16   | 17:54    | 18:26 | 20:00 18:26-19:07/41 | 20:31                | 20:56 | 20:57 | 20:28                | 19:40                | 18:50                | 17:09    | 16:56    |       |
| 13                          | 07:48   | 07:22    | 06:41 | 06:50 19:24-19:33/9  | 06:09                | 05:51 | 06:03 | 06:31                | 07:02 18:14-19:09/55 | 07:32                | 07:08    | 07:39    |       |
|                             | 17:18   | 17:55    | 18:28 | 20:01 18:27-19:05/38 | 20:32                | 20:56 | 20:56 | 20:26                | 19:38                | 18:48                | 17:08    | 16:56    |       |
| 14                          | 07:47   | 07:21    | 06:39 | 17:48-18:01/13       | 06:48 18:29-19:04/35 | 06:08 | 05:51 | 06:03                | 06:32                | 07:03 18:14-19:08/54 | 07:33    | 07:09    | 07:40 |
|                             | 17:19   | 17:56    | 18:29 | 20:02                | 20:33                | 20:57 | 20:56 | 20:25                | 19:36                | 18:47                | 17:07    | 16:56    |       |
| 15                          | 07:47   | 07:20    | 06:37 | 17:43-18:05/22       | 06:47 18:30-19:01/31 | 06:07 | 05:51 | 06:04                | 06:33                | 07:04 18:13-19:08/55 | 07:34    | 07:10    | 07:41 |
|                             | 17:20   | 17:57    | 18:30 | 20:03                | 20:34                | 20:57 | 20:55 | 20:24                | 19:35                | 18:45                | 17:06    | 16:56    |       |
| 16                          | 07:47   | 07:18    | 06:36 | 17:39-18:08/29       | 06:45 18:33-18:59/26 | 06:06 | 05:51 | 06:05                | 06:34                | 07:05 18:13-19:07/54 | 07:35    | 07:11    | 07:42 |
|                             | 17:21   | 17:59    | 18:31 | 20:04                | 20:35                | 20:58 | 20:55 | 20:22                | 19:33                | 18:43                | 17:05    | 16:57    |       |
| 17                          | 07:46   | 07:17    | 06:34 | 17:38-18:11/33       | 06:43 18:35-18:56/21 | 06:05 | 05:51 | 06:06                | 06:35                | 07:05 18:13-19:06/53 | 07:37    | 07:13    | 07:42 |
|                             | 17:22   | 18:00    | 18:32 | 20:05                | 20:36                | 20:58 | 20:54 | 20:21                | 19:31                | 18:42                | 17:05    | 16:57    |       |
| 18                          | 07:46   | 07:16    | 06:32 | 17:35-18:12/37       | 06:42 18:39-18:52/13 | 06:04 | 05:52 | 06:07                | 06:36                | 07:06 18:13-19:06/53 | 07:38    | 07:14    | 07:43 |
|                             | 17:23   | 18:01    | 18:33 | 20:06                | 20:37                | 20:58 | 20:53 | 20:20                | 19:30                | 18:40                | 17:04    | 16:57    |       |
| 19                          | 07:45   | 07:14    | 06:31 | 17:33-18:13/40       | 06:40                | 06:04 | 05:52 | 06:07                | 06:37                | 07:07 18:14-19:05/51 | 07:39    | 07:15    | 07:44 |
|                             | 17:24   | 18:02    | 18:34 | 20:07                | 20:38                | 20:59 | 20:53 | 20:18                | 19:28                | 18:39                | 17:03    | 16:58    |       |
| 20                          | 07:45   | 07:13    | 06:29 | 17:32-18:15/43       | 06:39                | 06:03 | 05:52 | 06:08                | 06:38                | 07:08 18:14-19:03/49 | 07:40    | 07:16    | 07:44 |
|                             | 17:25   | 18:03    | 18:35 | 20:08                | 20:39                | 20:59 | 20:52 | 20:17                | 19:26                | 18:37                | 17:02    | 16:58    |       |
| 21                          | 07:44   | 07:11    | 06:27 | 17:30-18:15/45       | 06:37                | 06:02 | 05:52 | 06:09                | 06:39                | 07:09 18:13-19:01/48 | 07:41    | 07:17    | 07:45 |
|                             | 17:27   | 18:05    | 18:36 | 20:09                | 20:40                | 20:59 | 20:51 | 20:15                | 19:25                | 18:36                | 17:02    | 16:59    |       |
| 22                          | 07:43   | 07:10    | 06:26 | 17:28-18:16/48       | 06:36                | 06:01 | 05:52 | 06:10                | 06:40                | 07:10 18:14-19:00/46 | 07:42    | 07:18    | 07:45 |
|                             | 17:28   | 18:06    | 18:37 | 20:10                | 20:41                | 20:59 | 20:50 | 20:14                | 19:23                | 18:35                | 17:01    | 16:59    |       |
| 23                          | 07:43   | 07:09    | 06:24 | 17:28-18:17/49       | 06:35                | 06:00 | 05:52 | 06:11                | 06:41                | 07:11 18:15-18:58/43 | 07:43    | 07:20    | 07:46 |
|                             | 17:29   | 18:07    | 18:38 | 20:11                | 20:42                | 21:00 | 20:50 | 20:12                | 19:21                | 18:33                | 17:00    | 17:00    |       |
| 24                          | 07:42   | 07:07    | 06:22 | 17:26-18:17/51       | 06:33                | 06:00 | 05:53 | 06:12                | 06:42                | 07:12 18:16-18:57/41 | 07:44    | 07:21    | 07:46 |
|                             | 17:30   | 18:08    | 18:39 | 20:12                | 20:42                | 21:00 | 20:49 | 20:11                | 19:19                | 18:32                | 17:00    | 17:00    |       |
| 25                          | 07:41   | 07:06    | 06:21 | 17:25-18:17/52       | 06:32                | 05:59 | 05:53 | 06:13                | 06:43 18:41-18:56/15 | 07:13 18:17-18:55/38 | 06:45    | 07:22    | 07:47 |
|                             | 17:31   | 18:09    | 18:40 | 20:13                | 20:43                | 21:00 | 20:48 | 20:09                | 19:18                | 17:30                | 16:59    | 17:01    |       |
| 26                          | 07:41   | 07:04    | 06:19 | 17:25-18:18/53       | 06:30                | 05:58 | 05:53 | 06:13                | 06:44 18:37-18:59/22 | 07:14 18:18-18:53/35 | 06:47    | 07:23    | 07:47 |
|                             | 17:33   | 18:11    | 18:42 | 20:14                | 20:44                | 21:00 | 20:47 | 20:08                | 19:16                | 17:29                | 16:59    | 17:01    |       |
| 27                          | 07:40   | 07:03    | 06:17 | 17:24-18:18/54       | 06:29                | 05:58 | 05:54 | 06:14                | 06:45 18:34-19:02/28 | 07:15 18:20-18:50/30 | 06:48    | 07:24    | 07:47 |
|                             | 17:34   | 18:12    | 18:43 | 20:15                | 20:45                | 21:00 | 20:46 | 20:06                | 19:14                | 17:28                | 16:58    | 17:02    |       |
| 28                          | 07:39   | 07:01    | 06:16 | 17:23-18:17/54       | 06:27                | 05:57 | 05:54 | 06:15                | 06:46 18:32-19:03/31 | 07:16 18:22-18:47/25 | 06:49    | 07:25    | 07:48 |
|                             | 17:35   | 18:13    | 18:44 | 20:16                | 20:46                | 21:00 | 20:45 | 20:04                | 19:13                | 17:26                | 16:58    | 17:03    |       |
| 29                          | 07:38   | 07:01    | 07:14 | 18:23-19:18/55       | 06:26                | 05:56 | 05:54 | 06:16                | 06:47 18:30-19:05/35 | 07:18 18:26-18:43/17 | 06:50    | 07:26    | 07:48 |
|                             | 17:36   | 18:14    | 19:45 | 20:18                | 20:47                | 21:00 | 20:44 | 20:03                | 19:11                | 17:25                | 16:58    | 17:03    |       |
| 30                          | 07:37   | 07:12    | 07:12 | 18:23-19:18/55       | 06:25                | 05:56 | 05:55 | 06:17                | 06:48 19:24-19:33/9  | 07:19                | 06:51    | 07:27    | 07:48 |
|                             | 17:38   | 18:14    | 19:46 | 20:19                | 20:47                | 21:00 | 20:43 | 20:01 18:28-19:06/38 | 19:09                | 17:24                | 16:57    | 17:04    |       |
| 31                          | 07:36   | 07:11    | 07:11 | 18:22-19:17/55       | 06:24                | 05:55 | 06:18 | 06:49 19:21-19:35/14 | 06:52                | 06:52                | 07:49    | 07:49    |       |
|                             | 17:39   | 18:14    | 19:47 | 20:19                | 20:48                | 20:42 | 20:04 | 20:00 18:25-19:06/41 | 17:22                | 17:22                | 17:05    | 17:05    |       |
| Potential sun hours         | 298     | 297      | 369   | 399                  | 448                  | 452   | 459   | 428                  | 375                  | 345                  | 298      | 288      |       |
| Sum of minutes with flicker | 0       | 0        | 788   | 893                  | 0                    | 0     | 0     | 233                  | 1470                 | 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: Caso reale su dati statisticiWTG: GA04 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

|  | Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|--|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
|  | N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|  | 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                             | January | February | March                | April | May   | June  | July  | August | September | October              | November | December |       |       |
|-----------------------------|---------|----------|----------------------|-------|-------|-------|-------|--------|-----------|----------------------|----------|----------|-------|-------|
| 1                           | 07:49   | 07:35    | 07:00 07:19-07:24/5  | 07:09 | 06:23 | 05:55 | 05:55 | 06:19  | 06:50     | 07:20 07:48-07:52/4  | 06:54    | 07:28    |       |       |
|                             | 17:06   | 17:40    | 18:14                | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:08                |          | 17:21    | 16:57 |       |
| 2                           | 07:49   | 07:34    | 06:58 07:17-07:24/7  | 07:07 | 06:22 | 05:54 | 05:56 | 06:20  | 06:51     | 07:21 07:43-07:56/13 | 06:55    | 07:29    |       |       |
|                             | 17:07   | 17:41    | 18:15                | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06                |          | 17:20    | 16:57 |       |
| 3                           | 07:49   | 07:33    | 06:57 07:16-07:25/9  | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:22 07:42-07:57/15 | 06:56    | 07:30    |       |       |
|                             | 17:08   | 17:43    | 18:16                | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04                |          | 17:19    | 16:56 |       |
| 4                           | 07:49   | 07:32    | 06:55 07:14-07:24/10 | 07:04 | 06:20 | 05:53 | 05:57 | 06:22  | 06:53     | 07:23 07:43-07:58/15 | 06:57    | 07:31    |       |       |
|                             | 17:09   | 17:44    | 18:17                | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:03                |          | 17:18    | 16:56 |       |
| 5                           | 07:49   | 07:31    | 06:53 07:12-07:24/12 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:54     | 07:24 07:44-07:59/15 | 06:58    | 07:32    |       |       |
|                             | 17:09   | 17:45    | 18:19                | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51     | 19:01                |          | 17:16    | 16:56 |       |
| 6                           | 07:49   | 07:30    | 06:52 07:11-07:24/13 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:55     | 07:25 07:45-07:59/14 | 06:59    | 07:33    |       |       |
|                             | 17:10   | 17:46    | 18:20                | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50     | 18:59                |          | 17:15    | 16:56 |       |
| 7                           | 07:49   | 07:29    | 06:50 07:09-07:23/14 | 06:59 | 06:16 | 05:53 | 05:59 | 06:25  | 06:56     | 07:26 07:46-08:00/14 | 07:01    | 07:34    |       |       |
|                             | 17:11   | 17:48    | 18:21                | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58                |          | 17:14    | 16:56 |       |
| 8                           | 07:49   | 07:28    | 06:49 07:08-07:23/15 | 06:58 | 06:15 | 05:52 | 05:59 | 06:26  | 06:57     | 07:27 07:47-07:59/12 | 07:02    | 07:35    |       |       |
|                             | 17:12   | 17:49    | 18:22                | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:47     | 18:56                |          | 17:13    | 16:56 |       |
| 9                           | 07:49   | 07:27    | 06:47 07:06-07:21/15 | 06:56 | 06:14 | 05:52 | 06:00 | 06:27  | 06:58     | 07:28 07:48-07:59/11 | 07:03    | 07:36    |       |       |
|                             | 17:13   | 17:50    | 18:23                | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54                |          | 17:12    | 16:56 |       |
| 10                          | 07:48   | 07:26    | 06:45 07:04-07:20/16 | 06:54 | 06:13 | 05:52 | 06:00 | 06:28  | 06:59     | 07:29 07:49-07:59/10 | 07:04    | 07:37    |       |       |
|                             | 17:14   | 17:51    | 18:24                | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53                |          | 17:11    | 16:56 |       |
| 11                          | 07:48   | 07:25    | 06:44 07:04-07:18/14 | 06:53 | 06:11 | 05:52 | 06:01 | 06:29  | 07:00     | 07:30 07:50-07:58/8  | 07:05    | 07:38    |       |       |
|                             | 17:15   | 17:52    | 18:25                | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51                |          | 17:10    | 16:56 |       |
| 12                          | 07:48   | 07:23    | 06:42 07:06-07:15/9  | 06:51 | 06:10 | 05:52 | 06:02 | 06:30  | 07:01     | 07:31 07:51-07:57/6  | 07:07    | 07:39    |       |       |
|                             | 17:16   | 17:54    | 18:26                | 20:00 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50                |          | 17:09    | 16:56 |       |
| 13                          | 07:48   | 07:22    | 06:41                | 06:09 | 05:51 | 06:03 | 06:31 | 07:02  | 07:32     | 07:52-07:56/4        | 07:08    | 07:39    |       |       |
|                             | 17:18   | 17:55    | 18:28                | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48                |          | 17:08    | 16:56 |       |
| 14                          | 07:47   | 07:21    | 06:39                | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:03     | 07:33 07:54-07:55/1  | 07:09    | 07:40    |       |       |
|                             | 17:19   | 17:56    | 18:29                | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:47                |          | 17:07    | 16:56 |       |
| 15                          | 07:47   | 07:20    | 06:37                | 06:47 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34                |          | 07:10    | 07:41 |       |
|                             | 17:20   | 17:57    | 18:30                | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45                |          | 17:06    | 16:56 |       |
| 16                          | 07:47   | 07:18    | 06:36                | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35                |          | 07:11    | 07:42 |       |
|                             | 17:21   | 17:59    | 18:31                | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43                |          | 17:05    | 16:57 |       |
| 17                          | 07:46   | 07:17    | 06:34                | 06:43 | 06:05 | 05:51 | 06:06 | 06:35  | 07:05     | 07:36                |          | 07:13    | 07:42 |       |
|                             | 17:22   | 18:00    | 18:32                | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42                |          | 17:05    | 16:57 |       |
| 18                          | 07:46   | 07:16    | 06:32                | 06:42 | 06:04 | 05:51 | 06:07 | 06:36  | 07:06     | 07:38                |          | 07:14    | 07:43 |       |
|                             | 17:23   | 18:01    | 18:33                | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30     | 18:40                |          | 17:04    | 16:57 |       |
| 19                          | 07:45   | 07:14    | 06:31                | 06:40 | 06:04 | 05:52 | 06:07 | 06:37  | 07:07     | 07:39                |          | 07:15    | 07:44 |       |
|                             | 17:24   | 18:02    | 18:34                | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39                |          | 17:03    | 16:58 |       |
| 20                          | 07:45   | 07:13    | 06:29                | 06:39 | 06:03 | 05:52 | 06:08 | 06:38  | 07:08     | 07:40                |          | 07:16    | 07:44 |       |
|                             | 17:25   | 18:03    | 18:35                | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37                |          | 17:02    | 16:58 |       |
| 21                          | 07:44   | 07:11    | 06:27                | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41                |          | 07:17    | 07:45 |       |
|                             | 17:27   | 18:05    | 18:36                | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:25     | 18:36                |          | 17:02    | 16:59 |       |
| 22                          | 07:43   | 07:10    | 06:26                | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42                |          | 07:18    | 07:45 |       |
|                             | 17:28   | 18:06    | 18:37                | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:35                |          | 17:01    | 16:59 |       |
| 23                          | 07:43   | 07:09    | 06:24                | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11     | 07:43                |          | 07:20    | 07:46 |       |
|                             | 17:29   | 18:07    | 18:38                | 20:11 | 20:41 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33                |          | 17:00    | 17:00 |       |
| 24                          | 07:42   | 07:07    | 06:22                | 06:33 | 06:00 | 05:53 | 06:12 | 06:42  | 07:12     | 07:44                |          | 07:21    | 07:46 |       |
|                             | 17:30   | 18:08    | 18:39                | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32                |          | 17:00    | 17:00 |       |
| 25                          | 07:41   | 07:06    | 06:21                | 06:32 | 05:59 | 05:53 | 06:13 | 06:43  | 07:13     | 06:45                |          | 07:22    | 07:47 |       |
|                             | 17:31   | 18:09    | 18:40                | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 17:30                |          | 16:59    | 17:01 |       |
| 26                          | 07:41   | 07:04    | 06:19                | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 06:47                |          | 07:23    | 07:47 |       |
|                             | 17:33   | 18:11    | 18:42                | 20:14 | 20:44 | 21:00 | 20:47 | 20:08  | 19:16     | 17:29                |          | 16:59    | 17:01 |       |
| 27                          | 07:40   | 07:03    | 06:17                | 06:29 | 05:58 | 05:54 | 06:14 | 06:45  | 07:15     | 06:48                |          | 07:24    | 07:47 |       |
|                             | 17:34   | 18:12    | 18:43                | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:28                |          | 16:58    | 17:02 |       |
| 28                          | 07:39   | 07:01    | 07:20-07:22/2        | 06:16 | 06:27 | 05:57 | 05:54 | 06:15  | 06:46     | 07:16                | 06:49    |          | 07:25 | 07:48 |
|                             | 17:35   | 18:13    | 18:44                | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26                |          | 16:58    | 17:03 |       |
| 29                          | 07:38   |          | 07:14                | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 06:50                |          | 07:26    | 07:48 |       |
|                             | 17:36   |          | 19:45                | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25                |          | 16:58    | 17:03 |       |
| 30                          | 07:37   |          | 07:12                | 06:25 | 05:56 | 05:55 | 06:17 | 06:48  | 07:18     | 06:51                |          | 07:27    | 07:48 |       |
|                             | 17:38   |          | 19:46                | 20:19 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:24                |          | 16:57    | 17:04 |       |
| 31                          | 07:36   |          | 07:11                |       | 05:55 |       | 06:18 | 06:49  |           | 06:52                |          |          | 07:48 |       |
|                             | 17:39   |          | 19:47                |       | 20:48 |       | 20:42 | 20:00  |           | 17:22                |          |          | 17:05 |       |
| Potential sun hours         | 298     | 297      | 369                  | 399   | 448   | 452   | 459   | 428    | 375       | 345                  | 298      | 288      |       |       |
| Sum of minutes with flicker | 0       | 2        | 139                  | 0     | 0     | 0     | 0     | 0      | 0         | 0                    | 142      | 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: Caso reale su dati statisticiWTG: GA05 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)  
Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

### Operational time

| N  | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| 90 | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                             | January              | February             | March | April | May   | June  | July  | August | September/October | November             | December             |                      |  |
|-----------------------------|----------------------|----------------------|-------|-------|-------|-------|-------|--------|-------------------|----------------------|----------------------|----------------------|--|
| 1                           | 07:49 08:16-08:48/32 | 07:36 08:20-09:03/43 | 07:00 | 07:09 | 06:23 | 05:55 | 05:19 | 06:50  | 07:20             | 06:54 08:00-08:22/22 | 07:28 07:58-08:39/41 |                      |  |
| 17:06                       | 17:40                | 18:14                | 19:48 | 20:20 | 20:49 | 21:00 | 20:41 | 19:58  | 19:08             | 17:21                | 16:57                |                      |  |
| 2                           | 07:49 08:16-08:49/33 | 07:35 08:21-09:02/41 | 06:58 | 07:07 | 06:22 | 05:54 | 05:56 | 06:20  | 06:51             | 07:21                | 06:55 07:58-08:24/26 | 07:29 07:59-08:39/40 |  |
| 17:07                       | 17:41                | 18:15                | 19:49 | 20:21 | 20:50 | 21:00 | 20:40 | 19:56  | 19:06             | 17:20                | 16:57                |                      |  |
| 3                           | 07:49 08:17-08:50/33 | 07:34 08:22-09:02/40 | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52             | 07:22                | 06:56 07:57-08:26/29 | 07:30 08:00-08:39/39 |  |
| 17:08                       | 17:43                | 18:16                | 19:50 | 20:22 | 20:51 | 21:00 | 20:39 | 19:55  | 19:04             | 17:19                | 16:56                |                      |  |
| 4                           | 07:49 08:17-08:51/34 | 07:33 08:22-09:00/38 | 06:55 | 07:04 | 06:20 | 05:53 | 05:57 | 06:22  | 06:53             | 07:23                | 06:57 07:55-08:27/32 | 07:31 08:01-08:39/38 |  |
| 17:08                       | 17:44                | 18:17                | 19:51 | 20:23 | 20:51 | 20:59 | 20:38 | 19:53  | 19:03             | 17:17                | 16:56                |                      |  |
| 5                           | 07:49 08:17-08:52/35 | 07:31 08:23-08:59/36 | 06:54 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:54             | 07:24                | 06:58 07:54-08:29/35 | 07:32 08:02-08:39/37 |  |
| 17:09                       | 17:45                | 18:19                | 19:52 | 20:24 | 20:52 | 20:59 | 20:37 | 19:52  | 19:01             | 17:16                | 16:56                |                      |  |
| 6                           | 07:49 08:17-08:53/36 | 07:30 08:24-08:59/35 | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:55             | 07:25                | 07:00 07:54-08:30/36 | 07:33 08:03-08:39/36 |  |
| 17:10                       | 17:46                | 18:20                | 19:53 | 20:25 | 20:53 | 20:59 | 20:35 | 19:50  | 18:59             | 17:15                | 16:56                |                      |  |
| 7                           | 07:49 08:17-08:53/36 | 07:29 08:26-08:57/31 | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:56             | 07:26                | 07:01 07:53-08:31/38 | 07:34 08:04-08:39/35 |  |
| 17:11                       | 17:48                | 18:21                | 19:54 | 20:26 | 20:53 | 20:59 | 20:34 | 19:48  | 18:58             | 17:14                | 16:56                |                      |  |
| 8                           | 07:49 08:17-08:54/37 | 07:28 08:27-08:56/29 | 06:49 | 06:58 | 06:15 | 05:52 | 05:59 | 06:26  | 06:57             | 07:27                | 07:02 07:52-08:32/40 | 07:35 08:05-08:39/34 |  |
| 17:12                       | 17:49                | 18:22                | 19:55 | 20:27 | 20:54 | 20:58 | 20:33 | 19:47  | 18:56             | 17:13                | 16:56                |                      |  |
| 9                           | 07:49 08:17-08:55/38 | 07:27 08:29-08:55/26 | 06:47 | 06:56 | 06:14 | 05:52 | 06:00 | 06:27  | 06:58             | 07:28                | 07:03 07:51-08:32/41 | 07:36 08:06-08:39/33 |  |
| 17:13                       | 17:50                | 18:23                | 19:56 | 20:28 | 20:54 | 20:58 | 20:32 | 19:45  | 18:54             | 17:12                | 16:56                |                      |  |
| 10                          | 07:49 08:16-08:55/39 | 07:26 08:31-08:51/20 | 06:46 | 06:46 | 06:13 | 05:52 | 06:00 | 06:28  | 06:59             | 07:29                | 07:04 07:51-08:34/43 | 07:37 08:06-08:39/33 |  |
| 17:14                       | 17:51                | 18:24                | 19:57 | 20:29 | 20:55 | 20:58 | 20:30 | 19:43  | 18:53             | 17:11                | 16:56                |                      |  |
| 11                          | 07:48 08:16-08:56/40 | 07:25 08:35-08:48/13 | 06:44 | 06:53 | 06:11 | 05:52 | 06:01 | 06:29  | 07:00             | 07:30                | 07:06 07:50-08:34/44 | 07:38 08:07-08:40/33 |  |
| 17:15                       | 17:52                | 18:25                | 19:59 | 20:30 | 20:55 | 20:57 | 20:29 | 19:42  | 18:51             | 17:10                | 16:56                |                      |  |
| 12                          | 07:48 08:16-08:58/42 | 07:23                | 06:42 | 06:51 | 06:10 | 05:52 | 06:02 | 06:30  | 07:01             | 07:31                | 07:07 07:50-08:34/44 | 07:39 08:07-08:39/32 |  |
| 17:16                       | 17:54                | 18:26                | 20:00 | 20:31 | 20:56 | 20:57 | 20:28 | 19:40  | 18:50             | 17:09                | 16:56                |                      |  |
| 13                          | 07:48 08:15-08:58/43 | 07:22                | 06:41 | 06:50 | 06:09 | 05:51 | 06:03 | 06:31  | 07:02             | 07:32                | 07:08 07:49-08:35/46 | 07:39 08:08-08:39/31 |  |
| 17:17                       | 17:55                | 18:28                | 20:01 | 20:32 | 20:56 | 20:56 | 20:26 | 19:38  | 18:48             | 17:08                | 16:56                |                      |  |
| 14                          | 07:47 08:16-08:59/43 | 07:21                | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:03             | 07:33                | 07:09 07:50-08:36/46 | 07:40 08:09-08:40/31 |  |
| 17:19                       | 17:56                | 18:29                | 20:02 | 20:33 | 20:57 | 20:56 | 20:25 | 19:36  | 18:47             | 17:07                | 16:56                |                      |  |
| 15                          | 07:47 08:15-08:59/44 | 07:20                | 06:37 | 06:47 | 06:07 | 05:51 | 06:04 | 06:33  | 07:04             | 07:34                | 07:10 07:50-08:36/46 | 07:41 08:10-08:40/30 |  |
| 17:20                       | 17:57                | 18:30                | 20:03 | 20:34 | 20:57 | 20:55 | 20:24 | 19:35  | 18:45             | 17:06                | 16:56                |                      |  |
| 16                          | 07:47 08:15-09:00/45 | 07:18                | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04             | 07:35                | 07:11 07:50-08:36/46 | 07:42 08:10-08:40/30 |  |
| 17:21                       | 17:59                | 18:31                | 20:04 | 20:35 | 20:58 | 20:55 | 20:22 | 19:33  | 18:43             | 17:05                | 16:57                |                      |  |
| 17                          | 07:46 08:14-09:00/46 | 07:17                | 06:34 | 06:43 | 06:05 | 05:51 | 06:06 | 06:35  | 07:05             | 07:37                | 07:13 07:49-08:36/47 | 07:42 08:11-08:40/29 |  |
| 17:22                       | 18:00                | 18:32                | 20:05 | 20:36 | 20:58 | 20:54 | 20:21 | 19:31  | 18:42             | 17:05                | 16:57                |                      |  |
| 18                          | 07:46 08:15-09:01/46 | 07:16                | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06             | 07:38                | 07:14 07:50-08:37/47 | 07:43 08:12-08:41/29 |  |
| 17:23                       | 18:01                | 18:33                | 20:06 | 20:37 | 20:58 | 20:53 | 20:20 | 19:30  | 18:40             | 17:04                | 16:57                |                      |  |
| 19                          | 07:45 08:15-09:01/46 | 07:14                | 06:31 | 06:40 | 06:04 | 05:52 | 06:07 | 06:37  | 07:07             | 07:39                | 07:15 07:50-08:37/47 | 07:44 08:12-08:41/29 |  |
| 17:24                       | 18:02                | 18:34                | 20:07 | 20:38 | 20:59 | 20:53 | 20:18 | 19:28  | 18:39             | 17:03                | 16:58                |                      |  |
| 20                          | 07:45 08:16-09:02/46 | 07:13                | 06:29 | 06:39 | 06:03 | 05:52 | 06:08 | 06:38  | 07:08             | 07:40                | 07:16 07:50-08:37/47 | 07:44 08:13-08:42/29 |  |
| 17:25                       | 18:03                | 18:35                | 20:08 | 20:39 | 20:59 | 20:52 | 20:17 | 19:26  | 18:37             | 17:02                | 16:58                |                      |  |
| 21                          | 07:44 08:15-09:02/47 | 07:11                | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09             | 07:41                | 07:17 07:50-08:37/47 | 07:45 08:13-08:42/29 |  |
| 17:27                       | 18:05                | 18:36                | 20:09 | 20:40 | 20:59 | 20:51 | 20:15 | 19:25  | 18:36             | 17:02                | 16:59                |                      |  |
| 22                          | 07:44 08:15-09:02/47 | 07:10                | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10             | 07:42                | 07:18 07:52-08:38/46 | 07:45 08:14-08:42/28 |  |
| 17:28                       | 18:06                | 18:37                | 20:10 | 20:41 | 20:59 | 20:50 | 20:14 | 19:23  | 18:35             | 17:01                | 16:59                |                      |  |
| 23                          | 07:43 08:16-09:03/47 | 07:09                | 06:24 | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11             | 07:43                | 07:20 07:52-08:38/46 | 07:46 08:14-08:43/29 |  |
| 17:29                       | 18:07                | 18:38                | 20:11 | 20:42 | 21:00 | 20:50 | 20:12 | 19:21  | 18:33             | 17:00                | 16:00                |                      |  |
| 24                          | 07:42 08:16-09:03/47 | 07:07                | 06:22 | 06:33 | 06:00 | 05:53 | 06:12 | 06:42  | 07:12             | 07:44                | 07:21 07:52-08:38/46 | 07:46 08:14-08:43/29 |  |
| 17:30                       | 18:08                | 18:39                | 20:12 | 20:42 | 21:00 | 20:49 | 20:11 | 19:19  | 18:32             | 17:00                | 16:00                |                      |  |
| 25                          | 07:41 08:16-09:03/47 | 07:06                | 06:21 | 06:32 | 05:59 | 05:53 | 06:13 | 06:43  | 07:13             | 06:45                | 07:22 07:52-08:38/46 | 07:47 08:15-08:44/29 |  |
| 17:31                       | 18:09                | 18:40                | 20:13 | 20:43 | 21:00 | 20:48 | 20:09 | 19:18  | 17:30             | 16:59                | 17:01                |                      |  |
| 26                          | 07:41 08:17-09:03/46 | 07:04                | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14             | 06:47                | 07:23 07:53-08:38/45 | 07:47 08:15-08:44/29 |  |
| 17:33                       | 18:11                | 18:42                | 20:14 | 20:44 | 21:00 | 20:47 | 20:08 | 19:16  | 17:29             | 16:59                | 17:01                |                      |  |
| 27                          | 07:40 08:17-09:03/46 | 07:03                | 06:17 | 06:29 | 05:57 | 05:54 | 06:14 | 06:45  | 07:15             | 06:48                | 07:24 07:55-08:39/44 | 07:47 08:15-08:45/30 |  |
| 17:34                       | 18:12                | 18:43                | 20:15 | 20:45 | 21:00 | 20:46 | 20:06 | 19:14  | 17:28             | 16:58                | 17:02                |                      |  |
| 28                          | 07:39 08:17-09:03/46 | 07:01                | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16             | 06:49                | 07:25 07:56-08:39/43 | 07:48 08:16-08:46/30 |  |
| 17:35                       | 18:13                | 18:44                | 20:16 | 20:46 | 21:00 | 20:45 | 20:04 | 19:13  | 17:26             | 16:58                | 17:03                |                      |  |
| 29                          | 07:38 08:19-09:04/45 |                      | 07:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:18             | 06:50                | 07:26 07:57-08:39/42 | 07:48 08:16-08:46/30 |  |
| 17:36                       |                      | 19:45                | 20:18 | 20:47 | 21:00 | 20:44 | 20:03 | 19:11  | 17:25             | 16:58                | 17:03                |                      |  |
| 30                          | 07:37 08:19-09:03/44 |                      | 07:12 | 06:25 | 05:56 | 05:55 | 06:17 | 06:48  | 07:19             | 06:51                | 07:27 07:57-08:39/42 | 07:48 08:16-08:47/31 |  |
| 17:38                       |                      | 19:46                | 20:19 | 20:47 | 21:00 | 20:43 | 20:01 | 19:09  | 17:24             | 16:57                | 17:04                |                      |  |
| 31                          | 07:36 08:20-09:03/43 |                      | 07:11 |       | 05:55 |       | 06:18 | 06:49  |                   | 06:52 08:04-08:19/15 |                      | 07:49 08:16-08:48/32 |  |
| 17:39                       |                      | 19:47                |       | 20:48 |       | 20:42 | 20:00 |        | 17:22             |                      | 17:05                |                      |  |
| Potential sun hours         | 298                  | 297                  | 369   | 399   | 448   | 452   | 459   | 428    | 375               | 345                  | 298                  | 288                  |  |
| Sum of minutes with flicker | 1299                 | 352                  | 0     | 0     | 0     | 0     | 0     | 0      | 0                 | 0                    | 1249                 | 995                  |  |

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

## SHADOW - Calendar per WTG

Calculation: Caso reale su dati statisticiWTG: GA06 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

| Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                             | January              | February | March | April | May   | June  | July  | August | September | October | November | December             |
|-----------------------------|----------------------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------------------|
| 1                           | 07:49 15:58-16:26/28 | 07:35    | 07:00 | 07:09 | 06:23 | 05:55 | 05:55 | 06:19  | 06:50     | 07:19   | 06:54    | 07:28 15:46-16:12/26 |
|                             | 17:06                | 17:40    | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:08   | 17:21    | 16:57                |
| 2                           | 07:49 15:59-16:26/27 | 07:34    | 06:58 | 07:07 | 06:22 | 05:54 | 05:56 | 06:20  | 06:51     | 07:21   | 06:55    | 07:29 15:46-16:12/26 |
|                             | 17:07                | 17:41    | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20    | 16:57                |
| 3                           | 07:49 15:59-16:27/28 | 07:33    | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:22   | 06:56    | 07:30 15:46-16:13/27 |
|                             | 17:08                | 17:42    | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04   | 17:19    | 16:56                |
| 4                           | 07:49 16:00-16:27/27 | 07:32    | 06:55 | 07:04 | 06:20 | 05:53 | 05:57 | 06:22  | 06:53     | 07:23   | 06:57    | 07:31 15:46-16:13/27 |
|                             | 17:08                | 17:44    | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:03   | 17:17    | 16:56                |
| 5                           | 07:49 16:00-16:28/28 | 07:31    | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:54     | 07:24   | 06:58    | 07:32 15:46-16:14/28 |
|                             | 17:09                | 17:45    | 18:19 | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51     | 19:01   | 17:16    | 16:56                |
| 6                           | 07:49 16:01-16:28/27 | 07:30    | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:55     | 07:25   | 06:59    | 07:33 15:47-16:14/27 |
|                             | 17:10                | 17:46    | 18:20 | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15    | 16:56                |
| 7                           | 07:49 16:01-16:29/28 | 07:29    | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:56     | 07:26   | 07:01    | 07:34 15:47-16:15/28 |
|                             | 17:11                | 17:47    | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14    | 16:56                |
| 8                           | 07:49 16:02-16:29/27 | 07:28    | 06:49 | 06:58 | 06:15 | 05:52 | 05:59 | 06:26  | 06:57     | 07:27   | 07:02    | 07:35 15:48-16:15/27 |
|                             | 17:12                | 17:49    | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13    | 16:56                |
| 9                           | 07:49 16:02-16:29/27 | 07:27    | 06:47 | 06:56 | 06:14 | 05:52 | 06:00 | 06:27  | 06:58     | 07:28   | 07:03    | 07:36 15:48-16:16/28 |
|                             | 17:13                | 17:50    | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12    | 16:56                |
| 10                          | 07:48 16:03-16:29/26 | 07:26    | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:59     | 07:29   | 07:04    | 07:37 15:49-16:16/27 |
|                             | 17:14                | 17:51    | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11    | 16:56                |
| 11                          | 07:48 16:04-16:30/26 | 07:25    | 06:44 | 06:53 | 06:11 | 05:52 | 06:01 | 06:29  | 07:00     | 07:30   | 07:05    | 07:38 15:48-16:16/28 |
|                             | 17:15                | 17:52    | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10    | 16:56                |
| 12                          | 07:48 16:04-16:29/25 | 07:23    | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07    | 07:39 15:49-16:16/27 |
|                             | 17:16                | 17:54    | 18:26 | 20:00 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09    | 16:56                |
| 13                          | 07:48 16:05-16:30/25 | 07:22    | 06:41 | 06:50 | 06:09 | 05:51 | 06:03 | 06:31  | 07:01     | 07:32   | 07:08    | 07:39 15:50-16:17/27 |
|                             | 17:17                | 17:55    | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08    | 16:56                |
| 14                          | 07:47 16:06-16:30/24 | 07:21    | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09    | 07:40 15:50-16:18/28 |
|                             | 17:19                | 17:56    | 18:29 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07    | 16:56                |
| 15                          | 07:47 16:06-16:29/23 | 07:20    | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10    | 07:41 15:50-16:17/27 |
|                             | 17:20                | 17:57    | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06    | 16:56                |
| 16                          | 07:47 16:08-16:30/22 | 07:18    | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11    | 07:42 15:51-16:18/27 |
|                             | 17:21                | 17:59    | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43   | 17:05    | 16:57                |
| 17                          | 07:46 16:08-16:29/21 | 07:17    | 06:34 | 06:43 | 06:05 | 05:51 | 06:06 | 06:35  | 07:05     | 07:36   | 07:13    | 07:42 15:52-16:19/27 |
|                             | 17:22                | 18:00    | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:05    | 16:57                |
| 18                          | 07:46 16:10-16:29/19 | 07:16    | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:38   | 07:14    | 07:43 15:52-16:19/27 |
|                             | 17:23                | 18:01    | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30     | 18:40   | 17:04    | 16:57                |
| 19                          | 07:45 16:11-16:28/17 | 07:14    | 06:31 | 06:40 | 06:03 | 05:52 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15    | 07:44 15:52-16:20/28 |
|                             | 17:24                | 18:02    | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39   | 17:03    | 16:58                |
| 20                          | 07:45 16:12-16:26/14 | 07:13    | 06:29 | 06:39 | 06:03 | 05:52 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16    | 07:44 15:53-16:21/28 |
|                             | 17:25                | 18:03    | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37   | 17:02    | 16:58                |
| 21                          | 07:44 16:15-16:26/11 | 07:11    | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17    | 07:45 15:53-16:20/27 |
|                             | 17:27                | 18:05    | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:02    | 16:59                |
| 22                          | 07:43 16:19-16:22/3  | 07:10    | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42   | 07:18    | 07:45 15:54-16:21/27 |
|                             | 17:28                | 18:06    | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:34   | 17:01    | 16:59                |
| 23                          | 07:43                | 07:09    | 06:24 | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11     | 07:43   | 07:20    | 07:46 15:54-16:22/28 |
|                             | 17:29                | 18:07    | 18:38 | 20:11 | 20:41 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33   | 17:00    | 17:00                |
| 24                          | 07:42                | 07:07    | 06:22 | 06:33 | 05:59 | 05:53 | 06:12 | 06:42  | 07:12     | 07:44   | 07:21    | 07:46 15:54-16:22/28 |
|                             | 17:30                | 18:08    | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32   | 17:00    | 17:00                |
| 25                          | 07:41                | 07:06    | 06:21 | 06:32 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13     | 06:45   | 07:22    | 07:47 15:56-16:23/27 |
|                             | 17:31                | 18:09    | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 17:30   | 16:59    | 17:01                |
| 26                          | 07:41                | 07:04    | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 06:47   | 07:23    | 07:47 15:56-16:23/27 |
|                             | 17:33                | 18:10    | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29   | 16:59    | 17:01                |
| 27                          | 07:40                | 07:03    | 06:17 | 06:29 | 05:57 | 05:53 | 06:14 | 06:45  | 07:15     | 06:48   | 07:24    | 07:47 15:56-16:23/27 |
|                             | 17:34                | 18:12    | 18:43 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:28   | 16:58    | 17:02                |
| 28                          | 07:39                | 07:01    | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16     | 06:49   | 07:25    | 07:48 15:57-16:24/27 |
|                             | 17:35                | 18:13    | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26   | 16:58    | 17:03                |
| 29                          | 07:38                | 07:01    | 06:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 06:50   | 07:26    | 07:48 15:57-16:25/28 |
|                             | 17:36                | 18:14    | 18:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57    | 17:03                |
| 30                          | 07:37                | 07:01    | 06:12 | 06:25 | 05:56 | 05:55 | 06:17 | 06:48  | 07:18     | 06:51   | 07:27    | 07:48 15:58-16:25/27 |
|                             | 17:38                | 18:14    | 18:46 | 20:19 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:24   | 16:57    | 17:04                |
| 31                          | 07:36                | 07:01    | 06:11 | 06:24 | 05:55 | 05:53 | 06:18 | 06:49  | 07:13     | 06:52   | 07:24    | 07:48 15:58-16:25/27 |
|                             | 17:39                | 18:14    | 18:47 | 20:18 | 20:48 | 20:42 | 20:00 | 17:22  | 17:22     | 17:05   |          |                      |
| Potential sun hours         | 298                  | 297      | 369   | 399   | 448   | 452   | 459   | 428    | 375       | 345     | 298      | 288                  |
| Sum of minutes with flicker | 503                  | 0        | 0     | 0     | 0     | 0     | 0     | 0      | 0         | 0       | 204      | 845                  |

Table 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: Caso reale su dati statisticiWTG: GA07 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

### Operational time

| N  | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| 90 | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|                             | January | February | March | April                | May                  | June  | July  | August               | September            | October              | November             | December |       |
|-----------------------------|---------|----------|-------|----------------------|----------------------|-------|-------|----------------------|----------------------|----------------------|----------------------|----------|-------|
| 1                           | 07:49   | 07:35    | 07:00 | 07:09 18:06-19:26/80 | 06:23                | 05:55 | 05:55 | 06:19                | 06:50 18:09-19:09/60 | 07:19 17:59-18:45/46 | 06:54                | 07:28    |       |
| 2                           | 17:06   | 17:40    | 18:14 | 19:48                | 20:20                | 20:49 | 21:00 | 20:41                | 19:58                | 19:08                | 17:21                | 16:57    |       |
| 3                           | 07:49   | 07:34    | 06:58 | 07:07 18:07-19:28/81 | 06:22                | 05:54 | 05:56 | 06:20                | 06:51 18:08-19:10/62 | 07:20 18:00-18:43/43 | 06:55                | 07:29    |       |
| 4                           | 17:07   | 17:41    | 18:15 | 19:49                | 20:21                | 20:50 | 21:00 | 20:40                | 19:56                | 19:06                | 17:20                | 16:56    |       |
| 5                           | 07:49   | 07:33    | 06:57 | 07:06 18:07-19:28/81 | 06:21                | 05:54 | 05:56 | 06:21                | 06:52 18:07-19:10/63 | 07:22 18:03-18:42/39 | 06:56                | 07:30    |       |
| 6                           | 17:08   | 17:42    | 18:16 | 19:50                | 20:22                | 20:50 | 21:00 | 20:39                | 19:55                | 19:04                | 17:19                | 16:56    |       |
| 7                           | 07:49   | 07:32    | 06:55 | 07:04 18:07-19:28/81 | 06:20                | 05:53 | 05:57 | 06:22                | 06:53 18:06-19:11/65 | 07:23 18:04-18:40/36 | 06:57                | 07:31    |       |
| 8                           | 17:08   | 17:44    | 18:17 | 19:51                | 20:23                | 20:51 | 20:59 | 20:38                | 19:53                | 19:03                | 17:17                | 16:56    |       |
| 9                           | 07:49   | 07:31    | 06:53 | 17:42-17:57/15       | 07:02 18:07-19:25/78 | 06:18 | 05:53 | 05:57                | 06:23                | 06:54 18:05-19:11/66 | 07:24 18:06-18:39/33 | 06:58    | 07:32 |
| 10                          | 17:09   | 17:45    | 18:19 | 19:52                | 20:24                | 20:52 | 20:59 | 20:36                | 19:51                | 19:01                | 17:16                | 16:56    |       |
| 11                          | 07:49   | 07:30    | 06:52 | 17:37-17:59/22       | 07:01 18:07-19:15/68 | 06:17 | 05:53 | 05:58                | 06:24                | 06:55 18:04-19:11/67 | 07:25 18:08-18:37/29 | 06:59    | 07:33 |
| 12                          | 17:10   | 17:46    | 18:20 | 19:53                | 20:25                | 20:52 | 20:59 | 20:35                | 19:50                | 18:59                | 17:15                | 16:56    |       |
| 13                          | 07:49   | 07:29    | 06:50 | 17:33-18:00/27       | 06:59 18:08-19:15/67 | 06:16 | 05:52 | 05:58                | 06:25                | 06:56 18:03-19:20/77 | 07:26 18:11-18:35/24 | 07:01    | 07:34 |
| 14                          | 17:11   | 17:47    | 18:21 | 19:54                | 20:26                | 20:53 | 20:59 | 20:34                | 19:48                | 18:58                | 17:14                | 16:56    |       |
| 15                          | 07:49   | 07:28    | 06:49 | 17:29-18:00/31       | 06:58 18:09-19:14/65 | 06:15 | 05:52 | 05:59                | 06:26                | 06:57 18:02-19:22/80 | 07:27 18:15-18:33/18 | 07:02    | 07:35 |
| 16                          | 17:12   | 17:49    | 18:22 | 19:55                | 20:27                | 20:54 | 20:58 | 20:33                | 19:46                | 18:56                | 17:13                | 16:56    |       |
| 17                          | 07:49   | 07:27    | 06:47 | 17:27-18:02/35       | 06:56 18:09-19:12/63 | 06:14 | 05:52 | 06:00                | 06:27                | 06:58 18:01-19:23/82 | 07:28 18:24-18:27/3  | 07:03    | 07:36 |
| 18                          | 17:13   | 17:50    | 18:23 | 19:56                | 20:28                | 20:54 | 20:58 | 20:32                | 19:45                | 18:54                | 17:12                | 16:56    |       |
| 19                          | 07:48   | 07:26    | 06:45 | 17:25-18:03/38       | 06:54 18:10-19:12/62 | 06:12 | 05:52 | 06:00                | 06:28                | 06:58 18:00-19:21/81 | 07:29                | 07:04    | 07:37 |
| 20                          | 17:14   | 17:51    | 18:24 | 19:57                | 20:29                | 20:55 | 20:58 | 20:30                | 19:43                | 18:53                | 17:11                | 16:56    |       |
| 21                          | 07:48   | 07:25    | 06:44 | 17:23-18:05/42       | 06:53 18:10-19:10/60 | 06:11 | 05:52 | 06:01                | 06:29                | 06:59 17:59-19:19/80 | 07:30                | 07:05    | 07:38 |
| 22                          | 17:15   | 17:52    | 18:25 | 19:58                | 20:30                | 20:55 | 20:57 | 20:29                | 19:41                | 18:51                | 17:10                | 16:56    |       |
| 23                          | 07:48   | 07:23    | 06:42 | 17:21-18:05/44       | 06:51 18:12-19:09/57 | 06:10 | 05:51 | 06:02                | 06:30                | 07:00 17:59-19:18/79 | 07:31                | 07:07    | 07:39 |
| 24                          | 17:16   | 17:54    | 18:26 | 19:59                | 20:31                | 20:56 | 20:57 | 20:28                | 19:40                | 18:50                | 17:09                | 16:56    |       |
| 25                          | 07:48   | 07:22    | 06:41 | 17:19-18:06/47       | 06:50 18:13-19:07/54 | 06:09 | 05:51 | 06:02                | 06:31                | 07:01 17:58-19:16/78 | 07:32                | 07:08    | 07:39 |
| 26                          | 17:17   | 17:55    | 18:27 | 20:01                | 20:32                | 20:56 | 20:56 | 20:26                | 19:38                | 18:48                | 17:08                | 16:56    |       |
| 27                          | 07:47   | 07:21    | 06:39 | 17:18-18:08/50       | 06:48 18:14-19:06/52 | 06:08 | 05:51 | 06:03                | 06:32                | 07:02 17:58-19:15/77 | 07:33                | 07:09    | 07:40 |
| 28                          | 17:18   | 17:56    | 18:29 | 20:02                | 20:33                | 20:57 | 20:56 | 20:25                | 19:36                | 18:46                | 17:07                | 16:56    |       |
| 29                          | 07:47   | 07:20    | 06:37 | 17:17-18:09/52       | 06:46 18:15-19:04/49 | 06:07 | 05:51 | 06:04                | 06:33                | 07:03 17:57-19:13/76 | 07:34                | 07:10    | 07:41 |
| 30                          | 17:20   | 17:57    | 18:30 | 20:03                | 20:34                | 20:57 | 20:55 | 20:24                | 19:35                | 18:45                | 17:06                | 16:56    |       |
| 31                          | 07:47   | 07:18    | 06:36 | 17:15-18:09/54       | 06:45 18:16-19:02/46 | 06:06 | 05:51 | 06:05                | 06:34                | 07:04 17:57-19:11/74 | 07:35                | 07:11    | 07:42 |
| 32                          | 17:21   | 17:59    | 18:31 | 20:04                | 20:35                | 20:58 | 20:55 | 20:22                | 19:33                | 18:43                | 17:05                | 16:57    |       |
| 33                          | 07:46   | 07:17    | 06:34 | 17:15-18:11/56       | 06:43 18:18-19:00/42 | 06:05 | 05:51 | 06:06                | 06:35                | 07:05 17:56-19:10/74 | 07:36                | 07:13    | 07:42 |
| 34                          | 17:22   | 18:00    | 18:32 | 20:05                | 20:36                | 20:58 | 20:54 | 20:21                | 19:31                | 18:42                | 17:05                | 16:57    |       |
| 35                          | 07:46   | 07:16    | 06:32 | 17:13-18:12/59       | 06:42 18:19-18:58/39 | 06:04 | 05:51 | 06:06                | 06:36                | 07:06 17:55-19:07/72 | 07:38                | 07:14    | 07:43 |
| 36                          | 17:23   | 18:01    | 18:33 | 20:06                | 20:37                | 20:58 | 20:53 | 20:19                | 19:30                | 18:40                | 17:04                | 16:57    |       |
| 37                          | 07:45   | 07:14    | 06:31 | 17:12-18:13/61       | 06:40 18:22-18:56/34 | 06:03 | 05:51 | 06:07                | 06:37                | 07:07 17:55-19:05/70 | 07:39                | 07:15    | 07:44 |
| 38                          | 17:24   | 18:02    | 18:34 | 20:07                | 20:38                | 20:59 | 20:53 | 20:18                | 19:28                | 18:39                | 17:03                | 16:58    |       |
| 39                          | 07:45   | 07:13    | 06:29 | 17:12-18:15/63       | 06:39 18:25-18:53/28 | 06:03 | 05:52 | 06:08                | 06:38                | 07:08 17:55-19:03/68 | 07:40                | 07:16    | 07:44 |
| 40                          | 17:25   | 18:03    | 18:35 | 20:08                | 20:39                | 20:59 | 20:52 | 20:17                | 19:26                | 18:37                | 17:02                | 16:58    |       |
| 41                          | 07:44   | 07:11    | 06:27 | 17:11-18:15/64       | 06:37 18:28-18:49/21 | 06:02 | 05:52 | 06:09                | 06:39 18:37-18:49/12 | 07:09 17:55-19:02/67 | 07:41                | 07:17    | 07:45 |
| 42                          | 17:27   | 18:05    | 18:36 | 20:09                | 20:40                | 20:59 | 20:51 | 20:15                | 19:24                | 18:36                | 17:02                | 16:58    |       |
| 43                          | 07:43   | 07:10    | 06:26 | 17:10-18:16/66       | 06:36 18:34-18:43/9  | 06:01 | 05:52 | 06:10                | 06:40 18:32-18:54/22 | 07:10 17:55-19:00/65 | 07:42                | 07:18    | 07:45 |
| 44                          | 17:28   | 18:06    | 18:37 | 20:10                | 20:41                | 20:59 | 20:50 | 20:14                | 19:23                | 18:34                | 17:01                | 16:59    |       |
| 45                          | 07:43   | 07:09    | 06:24 | 17:09-18:17/68       | 06:34                | 06:00 | 05:52 | 06:11                | 06:41 18:28-18:57/29 | 07:11 17:55-18:58/63 | 07:43                | 07:20    | 07:46 |
| 46                          | 17:29   | 18:07    | 18:38 | 20:11                | 20:41                | 21:00 | 20:50 | 20:12                | 19:21                | 18:33                | 17:00                | 16:59    |       |
| 47                          | 07:42   | 07:07    | 06:22 | 17:09-18:18/69       | 06:33                | 05:59 | 05:52 | 06:12                | 06:42 18:25-19:00/35 | 07:12 17:55-18:57/62 | 07:44                | 07:21    | 07:46 |
| 48                          | 17:30   | 18:08    | 18:39 | 20:12                | 20:42                | 21:00 | 20:49 | 20:11                | 19:19                | 18:32                | 17:00                | 17:00    |       |
| 49                          | 07:41   | 07:06    | 06:21 | 17:08-18:19/71       | 06:32                | 05:59 | 05:53 | 06:12                | 06:43 18:23-19:02/39 | 07:13 17:55-18:55/60 | 06:45                | 07:22    | 07:47 |
| 50                          | 17:31   | 18:09    | 18:40 | 20:13                | 20:43                | 21:00 | 20:48 | 20:09                | 19:18                | 17:30                | 16:59                | 17:01    |       |
| 51                          | 07:41   | 07:04    | 06:19 | 17:07-18:20/73       | 06:30                | 05:58 | 05:53 | 06:13                | 06:44 18:21-19:03/42 | 07:14 17:56-18:53/57 | 06:47                | 07:23    | 07:47 |
| 52                          | 17:33   | 18:10    | 18:41 | 20:14                | 20:44                | 21:00 | 20:47 | 20:07                | 19:16                | 17:29                | 16:59                | 17:01    |       |
| 53                          | 07:40   | 07:03    | 06:17 | 17:07-18:22/75       | 06:29                | 05:57 | 05:53 | 06:14                | 06:45 18:19-19:05/46 | 07:15 17:56-18:51/55 | 06:48                | 07:24    | 07:47 |
| 54                          | 17:34   | 18:12    | 18:43 | 20:15                | 20:45                | 21:00 | 20:46 | 20:06                | 19:14                | 17:27                | 16:58                | 17:02    |       |
| 55                          | 07:39   | 07:01    | 06:16 | 17:07-18:22/75       | 06:27                | 05:57 | 05:54 | 06:15                | 06:46 18:17-19:06/49 | 07:16 17:57-18:50/53 | 06:49                | 07:25    | 07:48 |
| 56                          | 17:35   | 18:13    | 18:44 | 20:16                | 20:46                | 21:00 | 20:45 | 20:04                | 19:13                | 17:26                | 16:58                | 17:03    |       |
| 57                          | 07:38   | 07:01    | 07:14 | 18:06-19:23/77       | 06:26                | 05:56 | 05:54 | 06:16                | 06:47 18:14-19:06/52 | 07:17 17:57-18:48/51 | 06:50                | 07:26    | 07:48 |
| 58                          | 17:36   | 18:14    | 18:45 | 20:17                | 20:47                | 21:00 | 20:44 | 20:03                | 19:11                | 17:25                | 16:57                | 17:03    |       |
| 59                          | 07:37   | 07:01    | 07:12 | 18:07-19:25/78       | 06:25                | 05:56 | 05:55 | 06:17                | 06:48 18:12-19:07/55 | 07:18 17:58-18:46/48 | 06:51                | 07:27    | 07:48 |
| 60                          | 17:37   | 18:15    | 18:46 | 20:19                | 20:47                | 21:00 | 20:43 | 20:01                | 19:09                | 17:24                | 16:57                | 17:04    |       |
| 61                          | 07:36   | 07:01    | 07:11 | 18:06-19:25/79       | 05:55                | 05:55 | 06:18 | 06:49 18:11-19:08/57 | 06:52                | 07:22                | 07:48                | 07:05    | 07:05 |
| 62                          | 17:39   | 18:16    | 18:47 | 20:17                | 20:48                | 20:42 | 20:40 | 20:00                | 19:11                | 17:22                | 16:57                | 17:05    |       |
| Potential sun hours         | 298     | 297      | 369   | 399                  | 448                  | 452   | 459   | 428                  | 375                  | 345                  | 298                  | 288      |       |
| Sum of minutes with flicker | 0       | 0        | 1491  | 1217                 | 0                    | 0     | 0     | 438                  | 2032                 | 271                  | 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 |
|--------------|------------------|---------------------------------|--------------------------------|
|--------------|------------------|---------------------------------|--------------------------------|

## SHADOW - Calendar per WTG

Calculation: Caso reale su dati statisticiWTG: GA08 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

|  | Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|--|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
|  | N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|  | 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|    | January                     | February             | March | April | May   | June  | July  | August | September     | October | November             | December |
|----|-----------------------------|----------------------|-------|-------|-------|-------|-------|--------|---------------|---------|----------------------|----------|
| 1  | 07:49                       | 07:35 16:50-17:14/24 | 07:00 | 07:09 | 06:23 | 05:55 | 05:55 | 06:19  | 06:50         | 07:19   | 06:54 16:26-16:39/13 | 07:28    |
|    | 17:06                       | 17:40                | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58         | 19:08   | 17:21                | 16:57    |
| 2  | 07:49                       | 07:34 16:50-17:14/24 | 06:58 | 07:07 | 06:22 | 05:54 | 05:56 | 06:20  | 06:51         | 07:20   | 06:55 16:24-16:41/17 | 07:29    |
|    | 17:07                       | 17:41                | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56         | 19:06   | 17:20                | 16:56    |
| 3  | 07:49                       | 07:33 16:50-17:14/24 | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52         | 07:22   | 06:56 16:24-16:43/19 | 07:30    |
|    | 17:07                       | 17:42                | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55         | 19:04   | 17:19                | 16:56    |
| 4  | 07:49                       | 07:32 16:51-17:14/23 | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:53         | 07:23   | 06:57 16:23-16:43/20 | 07:31    |
|    | 17:08                       | 17:44                | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53         | 19:03   | 17:17                | 16:56    |
| 5  | 07:49                       | 07:31 16:51-17:14/23 | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:54         | 07:24   | 06:58 16:22-16:44/22 | 07:32    |
|    | 17:09                       | 17:45                | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51         | 19:01   | 17:16                | 16:56    |
| 6  | 07:49                       | 07:30 16:52-17:14/22 | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:55         | 07:25   | 06:59 16:21-16:44/23 | 07:33    |
|    | 17:10                       | 17:46                | 18:20 | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50         | 18:59   | 17:15                | 16:56    |
| 7  | 07:49                       | 07:29 16:53-17:13/20 | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:56         | 07:26   | 07:01 16:21-16:45/24 | 07:34    |
|    | 17:11                       | 17:47                | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48         | 18:58   | 17:14                | 16:56    |
| 8  | 07:49                       | 07:28 16:54-17:13/19 | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56         | 07:27   | 07:02 16:21-16:45/24 | 07:35    |
|    | 17:12                       | 17:49                | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46         | 18:56   | 17:13                | 16:56    |
| 9  | 07:49                       | 07:27 16:56-17:12/16 | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57         | 07:28   | 07:03 16:21-16:45/24 | 07:36    |
|    | 17:13                       | 17:50                | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45         | 18:54   | 17:12                | 16:56    |
| 10 | 07:48                       | 07:26 16:57-17:09/12 | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58         | 07:29   | 07:04 16:21-16:45/24 | 07:37    |
|    | 17:14                       | 17:51                | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43         | 18:53   | 17:11                | 16:56    |
| 11 | 07:48                       | 07:25 17:00-17:06/6  | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59         | 07:30   | 07:05 16:22-16:46/24 | 07:38    |
|    | 17:15                       | 17:52                | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41         | 18:51   | 17:10                | 16:56    |
| 12 | 07:48                       | 07:23                | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00         | 07:31   | 07:07 16:22-16:45/23 | 07:39    |
|    | 17:16                       | 17:54                | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40         | 18:50   | 17:09                | 16:56    |
| 13 | 07:48                       | 07:22                | 06:41 | 06:50 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01         | 07:32   | 07:08 16:22-16:44/22 | 07:39    |
|    | 17:17                       | 17:55                | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38         | 18:48   | 17:08                | 16:56    |
| 14 | 07:47                       | 07:21                | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02         | 07:33   | 07:09 16:23-16:43/20 | 07:40    |
|    | 17:18                       | 17:56                | 18:29 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36         | 18:46   | 17:07                | 16:56    |
| 15 | 07:47                       | 07:20                | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03         | 07:34   | 07:10 16:24-16:42/18 | 07:41    |
|    | 17:20                       | 17:57                | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35         | 18:45   | 17:06                | 16:56    |
| 16 | 07:47                       | 07:18                | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04         | 07:35   | 07:11 16:25-16:41/16 | 07:42    |
|    | 17:21                       | 17:58                | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33         | 18:43   | 17:05                | 16:57    |
| 17 | 07:46                       | 07:17                | 06:34 | 06:43 | 06:05 | 05:51 | 06:06 | 06:35  | 07:05         | 07:36   | 07:13 16:26-16:40/14 | 07:42    |
|    | 17:22                       | 18:00                | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31         | 18:42   | 17:04                | 16:57    |
| 18 | 07:46                       | 07:16                | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06         | 07:38   | 07:14 16:28-16:40/12 | 07:43    |
|    | 17:23                       | 18:01                | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:21  | 19:30         | 18:40   | 17:04                | 16:57    |
| 19 | 07:45                       | 07:14                | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07         | 07:39   | 07:15 16:29-16:39/10 | 07:44    |
|    | 17:24                       | 18:02                | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:21  | 19:28         | 18:39   | 17:03                | 16:58    |
| 20 | 07:45                       | 07:13                | 06:29 | 06:39 | 06:03 | 05:52 | 06:08 | 06:38  | 07:08         | 07:40   | 07:16 16:32-16:38/6  | 07:44    |
|    | 17:25                       | 18:03                | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26         | 18:37   | 17:02                | 16:58    |
| 21 | 07:44                       | 07:11                | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09         | 07:41   | 07:17                | 07:45    |
|    | 17:26                       | 18:05                | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24         | 18:36   | 17:02                | 16:58    |
| 22 | 07:43                       | 16:57-17:03/6        | 07:10 | 06:26 | 06:36 | 06:01 | 05:52 | 06:10  | 06:40         | 07:10   | 07:42                | 07:45    |
|    | 17:28                       | 18:06                | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23         | 18:34   | 17:01                | 16:59    |
| 23 | 07:43                       | 16:54-17:04/10       | 07:09 | 06:24 | 06:34 | 06:00 | 05:52 | 06:11  | 06:41         | 07:11   | 07:43                | 07:46    |
|    | 17:29                       | 18:07                | 18:38 | 20:11 | 20:41 | 21:00 | 20:50 | 20:12  | 19:21         | 18:33   | 17:00                | 16:59    |
| 24 | 07:42                       | 16:54-17:06/12       | 07:07 | 06:22 | 06:33 | 05:59 | 05:52 | 06:11  | 06:42         | 07:12   | 07:44                | 07:46    |
|    | 17:30                       | 18:08                | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:21  | 19:19         | 18:32   | 17:00                | 16:59    |
| 25 | 07:41                       | 16:53-17:07/14       | 07:06 | 06:21 | 06:31 | 05:59 | 05:53 | 06:12  | 06:43         | 07:13   | 07:22                | 07:47    |
|    | 17:31                       | 18:09                | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:20  | 19:18         | 17:30   | 16:59                | 17:01    |
| 26 | 07:41                       | 16:52-17:08/16       | 07:04 | 06:19 | 06:30 | 05:58 | 05:53 | 06:13  | 06:44         | 07:14   | 07:23                | 07:47    |
|    | 17:32                       | 18:10                | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:27  | 19:16         | 17:29   | 16:59                | 17:01    |
| 27 | 07:40                       | 16:51-17:09/18       | 07:03 | 06:17 | 06:29 | 05:57 | 05:53 | 06:14  | 06:45         | 07:15   | 07:24                | 07:47    |
|    | 17:34                       | 18:12                | 18:43 | 20:15 | 20:45 | 21:00 | 20:46 | 20:26  | 19:14         | 17:27   | 16:58                | 17:02    |
| 28 | 07:39                       | 16:50-17:10/20       | 07:01 | 06:16 | 06:27 | 05:57 | 05:54 | 06:15  | 06:46         | 07:16   | 07:25                | 07:48    |
|    | 17:35                       | 18:13                | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:24  | 19:13         | 17:26   | 16:58                | 17:02    |
| 29 | 07:38                       | 16:50-17:12/22       | 07:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17         | 06:50   | 07:26                | 07:48    |
|    | 17:36                       | 18:14                | 18:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:23  | 19:11         | 17:25   | 16:57                | 17:03    |
| 30 | 07:37                       | 16:50-17:13/23       | 07:12 | 06:25 | 05:56 | 05:55 | 06:17 | 06:48  | 07:18         | 06:51   | 07:27                | 07:48    |
|    | 17:37                       | 18:15                | 18:46 | 20:18 | 20:47 | 21:00 | 20:43 | 20:21  | 19:09         | 17:23   | 16:57                | 17:04    |
| 31 | 07:36                       | 16:50-17:14/24       | 07:11 | 06:24 | 05:55 | 06:18 | 06:49 | 06:52  | 16:29-16:37/8 |         |                      | 07:48    |
|    | 17:39                       | 18:16                | 18:47 | 20:19 | 20:48 | 20:42 | 20:20 | 17:22  |               |         |                      | 17:05    |
|    | Potential sun hours         | 298                  | 297   | 369   | 399   | 448   | 452   | 459    | 428           | 375     | 345                  | 288      |
|    | Sum of minutes with flicker | 165                  | 213   | 0     | 0     | 0     | 0     | 0      | 0             | 0       | 8                    | 0        |
|    |                             |                      |       |       |       |       |       |        |               |         | 375                  | 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: Caso reale su dati statisticiWTG: GA09 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (21)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

Operational time  
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
90 295 742 511 343 267 107 562 1.775 1.844 553 102 7.191

|    | January                     | February             | March | April | May   | June  | July  | August | September      | October              | November             | December |       |
|----|-----------------------------|----------------------|-------|-------|-------|-------|-------|--------|----------------|----------------------|----------------------|----------|-------|
| 1  | 07:49                       | 07:35 07:55-08:08/13 | 07:00 | 07:09 | 06:23 | 05:55 | 05:55 | 06:19  | 06:50          | 07:19                | 06:53 07:15-07:40/25 | 07:28    |       |
|    | 17:06                       | 17:40                | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58          | 19:07                | 17:21                | 16:57    |       |
| 2  | 07:49                       | 07:34 07:54-08:09/15 | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51          | 07:20                | 06:55 07:16-07:40/24 | 07:29    |       |
|    | 17:07                       | 17:41                | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56          | 19:06                | 17:20                | 16:56    |       |
| 3  | 07:49                       | 07:33 07:53-08:10/17 | 06:56 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52          | 07:21                | 06:56 07:18-07:41/23 | 07:30    |       |
|    | 17:07                       | 17:42                | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55          | 19:04                | 17:18                | 16:56    |       |
| 4  | 07:49                       | 07:32 07:52-08:10/18 | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:52          | 07:22                | 06:57 07:19-07:41/22 | 07:31    |       |
|    | 17:08                       | 17:44                | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53          | 19:02                | 17:17                | 16:56    |       |
| 5  | 07:49                       | 07:31 07:51-08:11/20 | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:53          | 07:24                | 06:58 07:20-07:41/21 | 07:32    |       |
|    | 17:09                       | 17:45                | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51          | 19:01                | 17:16                | 16:56    |       |
| 6  | 07:49                       | 07:30 07:50-08:11/21 | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:54          | 07:25                | 06:59 07:21-07:41/20 | 07:33    |       |
|    | 17:10                       | 17:46                | 18:20 | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50          | 18:59                | 17:15                | 16:56    |       |
| 7  | 07:49                       | 07:29 07:49-08:11/22 | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55          | 07:26                | 07:01 07:23-07:41/18 | 07:34    |       |
|    | 17:11                       | 17:47                | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48          | 18:58                | 17:14                | 16:56    |       |
| 8  | 07:49                       | 07:28 07:48-08:12/24 | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56          | 07:27                | 07:02 07:24-07:41/17 | 07:35    |       |
|    | 17:12                       | 17:49                | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46          | 18:56                | 17:13                | 16:56    |       |
| 9  | 07:49                       | 07:27 07:47-08:12/25 | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57          | 07:28                | 07:03 07:25-07:40/15 | 07:36    |       |
|    | 17:13                       | 17:50                | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45          | 18:54                | 17:12                | 16:56    |       |
| 10 | 07:48                       | 07:26 07:45-08:11/26 | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58          | 07:29                | 07:04 07:26-07:39/13 | 07:37    |       |
|    | 17:14                       | 17:51                | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43          | 18:53                | 17:11                | 16:56    |       |
| 11 | 07:48                       | 07:25 07:44-08:11/27 | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59          | 07:30                | 07:05 07:28-07:40/12 | 07:38    |       |
|    | 17:15                       | 17:52                | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41          | 18:51                | 17:10                | 16:56    |       |
| 12 | 07:48                       | 07:23 07:43-08:10/27 | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00          | 07:31                | 07:07 07:29-07:39/10 | 07:39    |       |
|    | 17:16                       | 17:54                | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40          | 18:50                | 17:09                | 16:56    |       |
| 13 | 07:48                       | 07:22 07:42-08:10/28 | 06:41 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01          | 07:32                | 07:08 07:30-07:38/8  | 07:39    |       |
|    | 17:17                       | 17:55                | 18:27 | 20:00 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38          | 18:48                | 17:08                | 16:56    |       |
| 14 | 07:47                       | 07:21 07:40-08:08/28 | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02          | 07:33                | 07:09 07:32-07:38/6  | 07:40    |       |
|    | 17:18                       | 17:56                | 18:28 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36          | 18:46                | 17:07                | 16:56    |       |
| 15 | 07:47                       | 07:19 07:41-08:08/27 | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03          | 07:34                | 07:10 07:33-07:36/3  | 07:41    |       |
|    | 17:20                       | 17:57                | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35          | 18:45                | 17:06                | 16:56    |       |
| 16 | 07:47                       | 07:18 07:43-08:07/24 | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04          | 07:35                | 07:11 07:34-07:35/1  | 07:42    |       |
|    | 17:21                       | 17:58                | 18:31 | 20:04 | 20:35 | 20:58 | 20:54 | 20:22  | 19:33          | 18:43                | 17:05                | 16:57    |       |
| 17 | 07:46                       | 07:17 07:44-08:04/20 | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05          | 07:36                | 07:12                | 07:42    |       |
|    | 17:22                       | 18:00                | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31          | 18:42                | 17:04                | 16:57    |       |
| 18 | 07:46                       | 07:16 07:46-08:02/16 | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06          | 07:37                | 07:14                | 07:43    |       |
|    | 17:23                       | 18:01                | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30          | 18:40                | 17:04                | 16:57    |       |
| 19 | 07:45                       | 07:14 07:49-07:58/9  | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07          | 07:39                | 07:15                | 07:44    |       |
|    | 17:24                       | 18:02                | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28          | 18:39                | 17:03                | 16:58    |       |
| 20 | 07:45                       | 07:13                | 06:29 | 06:39 | 06:02 | 05:52 | 06:08 | 06:38  | 07:08          | 07:40                | 07:16                | 07:44    |       |
|    | 17:25                       | 18:03                | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:16  | 19:26          | 18:37                | 17:02                | 16:58    |       |
| 21 | 07:44                       | 07:11                | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09          | 07:41                | 07:17                | 07:45    |       |
|    | 17:26                       | 18:04                | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24          | 18:36                | 17:02                | 16:58    |       |
| 22 | 07:43                       | 07:10                | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10          | 07:42                | 07:18                | 07:45    |       |
|    | 17:28                       | 18:06                | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23          | 18:34                | 17:01                | 16:59    |       |
| 23 | 07:43                       | 07:08                | 06:24 | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11          | 07:43 08:18-08:30/12 | 07:19                | 07:46    |       |
|    | 17:29                       | 18:07                | 18:38 | 20:11 | 20:41 | 21:00 | 20:49 | 20:12  | 19:21          | 18:33                | 17:00                | 16:59    |       |
| 24 | 07:42                       | 07:07                | 06:22 | 06:33 | 05:59 | 05:52 | 06:11 | 06:42  | 07:12          | 07:44 08:15-08:33/18 | 07:21                | 07:46    |       |
|    | 17:30                       | 18:08                | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:10  | 19:19          | 18:32                | 17:00                | 16:59    |       |
| 25 | 07:41                       | 07:06                | 06:21 | 06:31 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13          | 06:45 07:13-07:34/21 | 07:22                | 07:47    |       |
|    | 17:31                       | 18:09                | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18          | 17:30                | 16:59                | 17:00    |       |
| 26 | 07:41                       | 08:01-08:02/1        | 07:04 | 06:19 | 06:30 | 05:58 | 05:53 | 06:13  | 06:44          | 07:14                | 06:47 07:12-07:37/25 | 07:23    | 07:47 |
|    | 17:32                       | 18:10                | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16          | 17:29                | 16:59                | 17:01    |       |
| 27 | 07:40                       | 08:00-08:03/3        | 07:03 | 06:17 | 06:29 | 05:57 | 05:53 | 06:14  | 06:45          | 07:15                | 06:48 07:10-07:38/28 | 07:24    | 07:47 |
|    | 17:34                       | 18:12                | 18:42 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14          | 17:27                | 16:58                | 17:02    |       |
| 28 | 07:39                       | 07:59-08:05/6        | 07:01 | 06:16 | 06:27 | 05:57 | 05:54 | 06:15  | 06:46          | 07:16                | 06:49 07:10-07:38/28 | 07:25    | 07:48 |
|    | 17:35                       | 18:13                | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13          | 17:26                | 16:58                | 17:02    |       |
| 29 | 07:38                       | 07:58-08:06/8        | 07:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17          | 06:50 07:11-07:39/28 | 07:26                | 07:48    |       |
|    | 17:36                       | 18:14                | 18:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11          | 17:25                | 16:57                | 17:03    |       |
| 30 | 07:37                       | 07:57-08:07/10       | 07:12 | 06:25 | 05:56 | 05:55 | 06:17 | 06:48  | 07:18          | 06:51 07:13-07:40/27 | 07:27                | 07:48    |       |
|    | 17:37                       | 18:15                | 18:46 | 20:18 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09          | 17:23                | 16:57                | 17:04    |       |
| 31 | 07:36                       | 07:56-08:08/12       | 07:11 | 06:24 | 05:55 | 06:18 | 06:49 | 06:52  | 07:14-07:40/26 | 07:26                | 07:48                | 17:05    |       |
|    | 17:39                       | 18:16                | 18:47 | 20:19 | 20:48 | 20:42 | 20:00 | 17:22  | 17:22          | 17:22                | 17:22                | 17:05    |       |
|    | Potential sun hours         | 298                  | 297   | 369   | 399   | 448   | 452   | 459    | 428            | 375                  | 345                  | 298      | 288   |
|    | Sum of minutes with flicker | 40                   | 407   | 0     | 0     | 0     | 0     | 0      | 0              | 0                    | 213                  | 238      | 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: Caso reale su dati statisticiWTG: GA10 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (22)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

|  | Operational time |     |     |     |     |     |     |     |       |       |     |     |       |
|--|------------------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
|  | N                | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
|  | 90               | 295 | 742 | 511 | 343 | 267 | 107 | 562 | 1.775 | 1.844 | 553 | 102 | 7.191 |

|    | January                     | February | March | April | May   | June  | July  | August | September | October | November | December |     |
|----|-----------------------------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|-----|
| 1  | 07:49                       | 07:35    | 07:00 | 07:09 | 06:23 | 05:54 | 05:55 | 06:19  | 06:50     | 07:19   | 06:54    | 07:28    |     |
|    | 17:06                       | 17:40    | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58     | 19:07   | 17:21    | 16:57    |     |
| 2  | 07:49                       | 07:34    | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51     | 07:20   | 06:55    | 07:29    |     |
|    | 17:07                       | 17:41    | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56     | 19:06   | 17:20    | 16:56    |     |
| 3  | 07:49                       | 07:33    | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52     | 07:21   | 06:56    | 07:30    |     |
|    | 17:07                       | 17:42    | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55     | 19:04   | 17:18    | 16:56    |     |
| 4  | 07:49                       | 07:32    | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:52     | 07:23   | 06:57    | 07:31    |     |
|    | 17:08                       | 17:44    | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53     | 19:02   | 17:17    | 16:56    |     |
| 5  | 07:49                       | 07:31    | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:53     | 07:24   | 06:58    | 07:32    |     |
|    | 17:09                       | 17:45    | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:36  | 19:51     | 19:01   | 17:16    | 16:56    |     |
| 6  | 07:49                       | 07:30    | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:54     | 07:25   | 06:59    | 07:33    |     |
|    | 17:10                       | 17:46    | 18:20 | 19:53 | 20:25 | 20:52 | 20:59 | 20:35  | 19:50     | 18:59   | 17:15    | 16:56    |     |
| 7  | 07:49                       | 07:29    | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55     | 07:26   | 07:01    | 07:34    |     |
|    | 17:11                       | 17:47    | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48     | 18:58   | 17:14    | 16:56    |     |
| 8  | 07:49                       | 07:28    | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56     | 07:27   | 07:02    | 07:35    |     |
|    | 17:12                       | 17:49    | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46     | 18:56   | 17:13    | 16:55    |     |
| 9  | 07:49                       | 07:27    | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57     | 07:28   | 07:03    | 07:36    |     |
|    | 17:13                       | 17:50    | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45     | 18:54   | 17:12    | 16:55    |     |
| 10 | 07:48                       | 07:26    | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58     | 07:29   | 07:04    | 07:37    |     |
|    | 17:14                       | 17:51    | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43     | 18:53   | 17:11    | 16:56    |     |
| 11 | 07:48                       | 07:25    | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59     | 07:30   | 07:05    | 07:38    |     |
|    | 17:15                       | 17:52    | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41     | 18:51   | 17:10    | 16:56    |     |
| 12 | 07:48                       | 07:23    | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00     | 07:31   | 07:07    | 07:39    |     |
|    | 17:16                       | 17:54    | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40     | 18:50   | 17:09    | 16:56    |     |
| 13 | 07:48                       | 07:22    | 06:41 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01     | 07:32   | 07:08    | 07:39    |     |
|    | 17:17                       | 17:55    | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38     | 18:48   | 17:08    | 16:56    |     |
| 14 | 07:47                       | 07:21    | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02     | 07:33   | 07:09    | 07:40    |     |
|    | 17:18                       | 17:56    | 18:28 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36     | 18:46   | 17:07    | 16:56    |     |
| 15 | 07:47                       | 07:20    | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03     | 07:34   | 07:10    | 07:41    |     |
|    | 17:19                       | 17:57    | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35     | 18:45   | 17:06    | 16:56    |     |
| 16 | 07:47                       | 07:18    | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04     | 07:35   | 07:11    | 07:42    |     |
|    | 17:21                       | 17:58    | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33     | 18:43   | 17:05    | 16:56    |     |
| 17 | 07:46                       | 07:17    | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05     | 07:36   | 07:13    | 07:42    |     |
|    | 17:22                       | 18:00    | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31     | 18:42   | 17:04    | 16:57    |     |
| 18 | 07:46                       | 07:16    | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06     | 07:37   | 07:14    | 07:43    |     |
|    | 17:23                       | 18:01    | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:19  | 19:30     | 18:40   | 17:04    | 16:57    |     |
| 19 | 07:45                       | 07:14    | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07     | 07:39   | 07:15    | 07:44    |     |
|    | 17:24                       | 18:02    | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:18  | 19:28     | 18:39   | 17:03    | 16:57    |     |
| 20 | 07:45                       | 07:13    | 06:29 | 06:39 | 06:02 | 05:51 | 06:08 | 06:38  | 07:08     | 07:40   | 07:16    | 07:44    |     |
|    | 17:25                       | 18:03    | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26     | 18:37   | 17:02    | 16:58    |     |
| 21 | 07:44                       | 07:11    | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09     | 07:41   | 07:17    | 07:45    |     |
|    | 17:26                       | 18:04    | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24     | 18:36   | 17:01    | 16:58    |     |
| 22 | 07:43                       | 07:10    | 06:26 | 06:36 | 06:01 | 05:52 | 06:10 | 06:40  | 07:10     | 07:42   | 07:18    | 07:45    |     |
|    | 17:28                       | 18:06    | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23     | 18:34   | 17:01    | 16:59    |     |
| 23 | 07:43                       | 07:09    | 06:24 | 06:34 | 06:00 | 05:52 | 06:11 | 06:41  | 07:11     | 07:43   | 07:20    | 07:46    |     |
|    | 17:29                       | 18:07    | 18:38 | 20:11 | 20:41 | 21:00 | 20:50 | 20:12  | 19:21     | 18:33   | 17:00    | 16:59    |     |
| 24 | 07:42                       | 07:07    | 06:22 | 06:33 | 05:59 | 05:52 | 06:11 | 06:42  | 07:12     | 07:44   | 07:21    | 07:46    |     |
|    | 17:30                       | 18:08    | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19     | 18:32   | 17:00    | 16:59    |     |
| 25 | 07:41                       | 07:06    | 06:21 | 06:31 | 05:59 | 05:53 | 06:12 | 06:43  | 07:13     | 06:45   | 07:22    | 07:47    |     |
|    | 17:31                       | 18:09    | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18     | 18:30   | 16:59    | 17:00    |     |
| 26 | 07:41                       | 07:04    | 06:19 | 06:30 | 05:58 | 05:53 | 06:13 | 06:44  | 07:14     | 06:47   | 07:23    | 07:47    |     |
|    | 17:32                       | 18:10    | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16     | 17:29   | 16:59    | 17:01    |     |
| 27 | 07:40                       | 07:03    | 06:17 | 06:29 | 05:57 | 05:53 | 06:14 | 06:45  | 07:15     | 06:48   | 07:24    | 07:47    |     |
|    | 17:34                       | 18:12    | 18:42 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14     | 17:27   | 16:58    | 17:02    |     |
| 28 | 07:39                       | 07:01    | 06:16 | 06:27 | 05:57 | 05:54 | 06:15 | 06:46  | 07:16     | 06:49   | 07:25    | 07:48    |     |
|    | 17:35                       | 18:13    | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13     | 17:26   | 16:58    | 17:02    |     |
| 29 | 07:38                       |          | 07:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17     | 06:50   | 07:26    | 07:48    |     |
|    | 17:36                       |          | 19:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11     | 17:25   | 16:57    | 17:03    |     |
| 30 | 07:37                       |          | 07:12 | 06:25 | 05:55 | 05:55 | 06:17 | 06:48  | 07:18     | 06:51   | 07:27    | 07:48    |     |
|    | 17:37                       |          | 19:46 | 20:18 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09     | 17:23   | 16:57    | 17:04    |     |
| 31 | 07:36                       |          | 07:11 |       | 05:55 |       | 06:18 | 06:49  |           | 06:52   |          | 07:48    |     |
|    | 17:39                       |          | 19:47 |       | 20:48 |       | 20:42 | 20:00  |           | 17:22   |          | 17:05    |     |
|    | Potential sun hours         | 298      | 297   | 369   | 399   | 448   | 452   | 459    | 428       | 375     | 345      | 298      | 288 |
|    | 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: Caso reale su dati statisticiWTG: GA11 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (23)  
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20 8,20

Operational time  
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
90 295 742 511 343 267 107 562 1.775 1.844 553 102 7.191

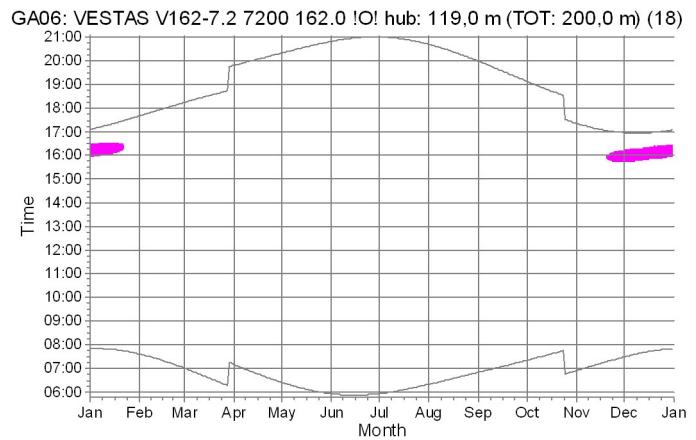
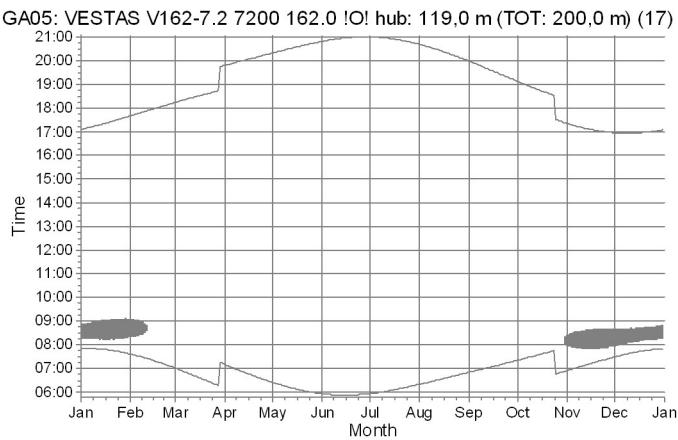
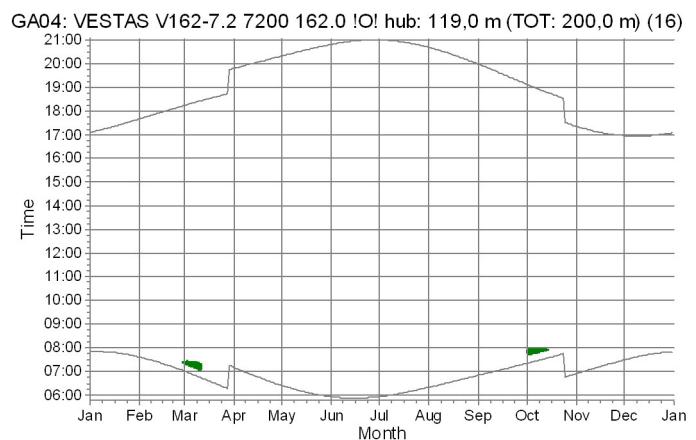
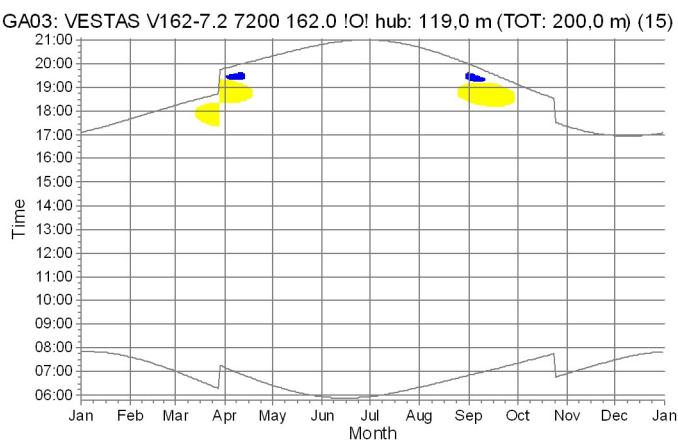
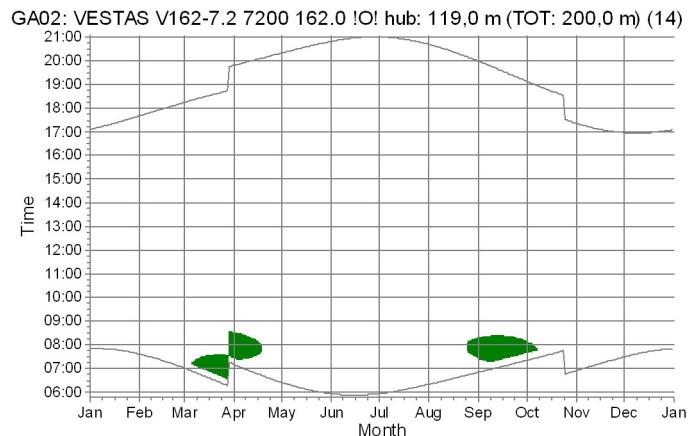
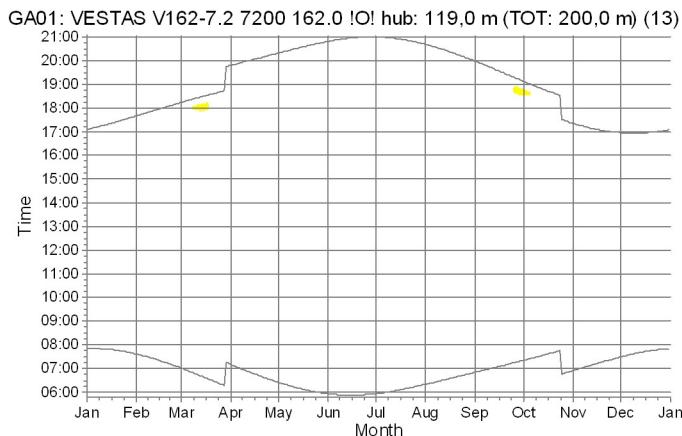
|    | January                     | February             | March | April | May   | June  | July  | August | September      | October | November             | December |
|----|-----------------------------|----------------------|-------|-------|-------|-------|-------|--------|----------------|---------|----------------------|----------|
| 1  | 07:49                       | 07:35 16:49-17:03/14 | 07:00 | 07:09 | 06:23 | 05:54 | 05:55 | 06:19  | 06:50          | 07:19   | 06:54 16:25-16:42/17 | 07:28    |
|    | 17:06                       | 17:40                | 18:14 | 19:48 | 20:20 | 20:49 | 21:00 | 20:41  | 19:58          | 19:08   | 17:21                | 16:57    |
| 2  | 07:49                       | 07:35 16:49-17:05/16 | 06:58 | 07:07 | 06:22 | 05:54 | 05:55 | 06:20  | 06:51          | 07:20   | 06:55 16:24-16:44/20 | 07:29    |
|    | 17:07                       | 17:41                | 18:15 | 19:49 | 20:21 | 20:50 | 21:00 | 20:40  | 19:56          | 19:06   | 17:20                | 16:56    |
| 3  | 07:49                       | 07:34 16:49-17:06/17 | 06:57 | 07:06 | 06:21 | 05:54 | 05:56 | 06:21  | 06:52          | 07:22   | 06:56 16:23-16:43/20 | 07:30    |
|    | 17:07                       | 17:42                | 18:16 | 19:50 | 20:22 | 20:50 | 21:00 | 20:39  | 19:55          | 19:04   | 17:19                | 16:56    |
| 4  | 07:49                       | 07:32 16:50-17:08/18 | 06:55 | 07:04 | 06:19 | 05:53 | 05:57 | 06:22  | 06:53          | 07:23   | 06:57 16:22-16:42/20 | 07:31    |
|    | 17:08                       | 17:44                | 18:17 | 19:51 | 20:23 | 20:51 | 20:59 | 20:38  | 19:53          | 19:03   | 17:17                | 16:56    |
| 5  | 07:49                       | 07:31 16:51-17:09/18 | 06:53 | 07:02 | 06:18 | 05:53 | 05:57 | 06:23  | 06:54          | 07:24   | 06:58 16:21-16:41/20 | 07:32    |
|    | 17:09                       | 17:45                | 18:18 | 19:52 | 20:24 | 20:52 | 20:59 | 20:37  | 19:51          | 19:01   | 17:16                | 16:56    |
| 6  | 07:49                       | 07:30 16:51-17:11/20 | 06:52 | 07:01 | 06:17 | 05:53 | 05:58 | 06:24  | 06:55          | 07:25   | 07:00 16:20-16:39/19 | 07:33    |
|    | 17:10                       | 17:46                | 18:20 | 19:53 | 20:25 | 20:53 | 20:59 | 20:35  | 19:50          | 18:59   | 17:15                | 16:56    |
| 7  | 07:49                       | 07:29 16:52-17:12/20 | 06:50 | 06:59 | 06:16 | 05:52 | 05:58 | 06:25  | 06:55          | 07:26   | 07:01 16:21-16:39/18 | 07:34    |
|    | 17:11                       | 17:47                | 18:21 | 19:54 | 20:26 | 20:53 | 20:59 | 20:34  | 19:48          | 18:58   | 17:14                | 16:56    |
| 8  | 07:49                       | 07:28 16:54-17:14/20 | 06:49 | 06:57 | 06:15 | 05:52 | 05:59 | 06:26  | 06:56          | 07:27   | 07:02 16:20-16:37/17 | 07:35    |
|    | 17:12                       | 17:49                | 18:22 | 19:55 | 20:27 | 20:54 | 20:58 | 20:33  | 19:46          | 18:56   | 17:13                | 16:56    |
| 9  | 07:49                       | 07:27 16:55-17:15/20 | 06:47 | 06:56 | 06:13 | 05:52 | 06:00 | 06:27  | 06:57          | 07:28   | 07:03 16:20-16:36/16 | 07:36    |
|    | 17:13                       | 17:50                | 18:23 | 19:56 | 20:28 | 20:54 | 20:58 | 20:32  | 19:45          | 18:54   | 17:12                | 16:55    |
| 10 | 07:49                       | 07:26 16:56-17:12/16 | 06:45 | 06:54 | 06:12 | 05:52 | 06:00 | 06:28  | 06:58          | 07:29   | 07:04 16:20-16:34/14 | 07:37    |
|    | 17:14                       | 17:51                | 18:24 | 19:57 | 20:29 | 20:55 | 20:58 | 20:30  | 19:43          | 18:53   | 17:11                | 16:56    |
| 11 | 07:48                       | 07:25 16:59-17:10/11 | 06:44 | 06:53 | 06:11 | 05:51 | 06:01 | 06:29  | 06:59          | 07:30   | 07:05 16:20-16:34/14 | 07:38    |
|    | 17:15                       | 17:52                | 18:25 | 19:58 | 20:30 | 20:55 | 20:57 | 20:29  | 19:41          | 18:51   | 17:10                | 16:56    |
| 12 | 07:48                       | 07:23                | 06:42 | 06:51 | 06:10 | 05:51 | 06:02 | 06:30  | 07:00          | 07:31   | 07:07 16:20-16:33/13 | 07:39    |
|    | 17:16                       | 17:54                | 18:26 | 19:59 | 20:31 | 20:56 | 20:57 | 20:28  | 19:40          | 18:50   | 17:09                | 16:56    |
| 13 | 07:48                       | 07:22                | 06:41 | 06:49 | 06:09 | 05:51 | 06:02 | 06:31  | 07:01          | 07:32   | 07:08 16:20-16:31/11 | 07:39    |
|    | 17:17                       | 17:55                | 18:27 | 20:01 | 20:32 | 20:56 | 20:56 | 20:26  | 19:38          | 18:48   | 17:08                | 16:56    |
| 14 | 07:47                       | 07:21                | 06:39 | 06:48 | 06:08 | 05:51 | 06:03 | 06:32  | 07:02          | 07:33   | 07:09 16:22-16:31/9  | 07:40    |
|    | 17:18                       | 17:56                | 18:29 | 20:02 | 20:33 | 20:57 | 20:56 | 20:25  | 19:36          | 18:46   | 17:07                | 16:56    |
| 15 | 07:47                       | 07:20                | 06:37 | 06:46 | 06:07 | 05:51 | 06:04 | 06:33  | 07:03          | 07:34   | 07:10 16:22-16:30/8  | 07:41    |
|    | 17:19                       | 17:57                | 18:30 | 20:03 | 20:34 | 20:57 | 20:55 | 20:24  | 19:35          | 18:45   | 17:06                | 16:56    |
| 16 | 07:47                       | 07:18                | 06:36 | 06:45 | 06:06 | 05:51 | 06:05 | 06:34  | 07:04          | 07:35   | 07:11 16:22-16:29/7  | 07:42    |
|    | 17:21                       | 17:58                | 18:31 | 20:04 | 20:35 | 20:58 | 20:55 | 20:22  | 19:33          | 18:43   | 17:05                | 16:56    |
| 17 | 07:46                       | 07:17                | 06:34 | 06:43 | 06:05 | 05:51 | 06:05 | 06:35  | 07:05          | 07:36   | 07:13 16:23-16:28/5  | 07:42    |
|    | 17:22                       | 18:00                | 18:32 | 20:05 | 20:36 | 20:58 | 20:54 | 20:21  | 19:31          | 18:42   | 17:04                | 16:57    |
| 18 | 07:46                       | 07:16                | 06:32 | 06:42 | 06:04 | 05:51 | 06:06 | 06:36  | 07:06          | 07:38   | 07:14 16:25-16:28/3  | 07:43    |
|    | 17:23                       | 18:01                | 18:33 | 20:06 | 20:37 | 20:58 | 20:53 | 20:21  | 19:30          | 18:40   | 17:04                | 16:57    |
| 19 | 07:45                       | 07:14                | 06:31 | 06:40 | 06:03 | 05:51 | 06:07 | 06:37  | 07:07          | 07:39   | 07:15 16:25-16:27/2  | 07:44    |
|    | 17:24                       | 18:02                | 18:34 | 20:07 | 20:38 | 20:59 | 20:53 | 20:28  | 19:28          | 18:39   | 17:03                | 16:57    |
| 20 | 07:45                       | 07:13                | 06:29 | 06:39 | 06:02 | 05:51 | 06:08 | 06:38  | 07:08          | 07:40   | 07:16 16:26-16:27/1  | 07:44    |
|    | 17:25                       | 18:03                | 18:35 | 20:08 | 20:39 | 20:59 | 20:52 | 20:17  | 19:26          | 18:37   | 17:02                | 16:58    |
| 21 | 07:44                       | 07:11                | 06:27 | 06:37 | 06:02 | 05:52 | 06:09 | 06:39  | 07:09          | 07:41   | 07:17                | 07:45    |
|    | 17:26                       | 18:04                | 18:36 | 20:09 | 20:40 | 20:59 | 20:51 | 20:15  | 19:24          | 18:36   | 17:02                | 16:58    |
| 22 | 07:43                       | 16:51-16:52/1        | 07:10 | 06:26 | 06:36 | 06:01 | 05:52 | 06:10  | 06:40          | 07:10   | 07:42                | 07:18    |
|    | 17:28                       | 18:06                | 18:37 | 20:10 | 20:41 | 20:59 | 20:50 | 20:14  | 19:23          | 18:34   | 17:01                | 16:59    |
| 23 | 07:43                       | 16:50-16:52/2        | 07:09 | 06:24 | 06:34 | 06:00 | 05:52 | 06:11  | 06:41          | 07:11   | 07:43                | 07:20    |
|    | 17:29                       | 18:07                | 18:38 | 20:11 | 20:42 | 21:00 | 20:50 | 20:12  | 19:21          | 18:33   | 17:00                | 16:59    |
| 24 | 07:42                       | 16:51-16:54/3        | 07:07 | 06:22 | 06:33 | 05:59 | 05:52 | 06:11  | 06:42          | 07:12   | 07:44                | 07:21    |
|    | 17:30                       | 18:08                | 18:39 | 20:12 | 20:42 | 21:00 | 20:49 | 20:11  | 19:19          | 18:32   | 17:00                | 17:00    |
| 25 | 07:41                       | 16:50-16:55/5        | 07:06 | 06:21 | 06:31 | 05:59 | 05:53 | 06:12  | 06:43          | 07:13   | 06:45                | 07:22    |
|    | 17:31                       | 18:09                | 18:40 | 20:13 | 20:43 | 21:00 | 20:48 | 20:09  | 19:18          | 18:30   | 16:59                | 17:00    |
| 26 | 07:41                       | 16:49-16:56/7        | 07:04 | 06:19 | 06:30 | 05:58 | 05:53 | 06:13  | 06:44          | 07:14   | 06:47                | 07:23    |
|    | 17:32                       | 18:10                | 18:41 | 20:14 | 20:44 | 21:00 | 20:47 | 20:07  | 19:16          | 17:29   | 16:59                | 17:01    |
| 27 | 07:40                       | 16:49-16:57/8        | 07:03 | 06:17 | 06:29 | 05:57 | 05:53 | 06:14  | 06:45          | 07:15   | 06:48                | 07:24    |
|    | 17:34                       | 18:12                | 18:43 | 20:15 | 20:45 | 21:00 | 20:46 | 20:06  | 19:14          | 17:27   | 16:58                | 17:02    |
| 28 | 07:39                       | 16:49-16:58/9        | 07:01 | 06:16 | 06:27 | 05:57 | 05:54 | 06:15  | 06:46          | 07:16   | 06:49                | 07:25    |
|    | 17:35                       | 18:13                | 18:44 | 20:16 | 20:46 | 21:00 | 20:45 | 20:04  | 19:13          | 17:26   | 16:58                | 17:02    |
| 29 | 07:38                       | 16:49-17:00/11       | 07:14 | 06:26 | 05:56 | 05:54 | 06:16 | 06:47  | 07:17          | 06:50   | 07:26                | 07:48    |
|    | 17:36                       | 18:14                | 18:45 | 20:17 | 20:47 | 21:00 | 20:44 | 20:03  | 19:11          | 17:25   | 16:57                | 17:03    |
| 30 | 07:37                       | 16:48-17:01/13       | 07:12 | 06:25 | 05:56 | 05:55 | 06:17 | 06:48  | 07:18          | 06:51   | 16:32-16:37/5        | 07:27    |
|    | 17:37                       | 18:15                | 18:46 | 20:19 | 20:47 | 21:00 | 20:43 | 20:01  | 19:09          | 17:23   | 16:57                | 17:04    |
| 31 | 07:36                       | 16:49-17:02/13       | 07:11 | 06:24 | 05:55 | 06:18 | 06:49 | 06:52  | 16:28-16:41/13 | 17:22   | 16:57                | 07:49    |
|    | 17:39                       | 18:16                | 18:47 | 20:19 | 20:48 | 20:42 | 20:00 | 17:22  | 17:22          | 17:22   | 17:05                | 17:05    |
|    | Potential sun hours         | 298                  | 297   | 369   | 399   | 448   | 452   | 459    | 428            | 375     | 345                  | 298      |
|    | Sum of minutes with flicker | 72                   | 190   | 0     | 0     | 0     | 0     | 0      | 0              | 0       | 0                    | 0        |
|    |                             |                      |       |       |       |       |       |        |                |         | 254                  | 0        |

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

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

## SHADOW - Calendar per WTG, graphical

Calculation: Caso reale su dati statistici



Shadow receptors

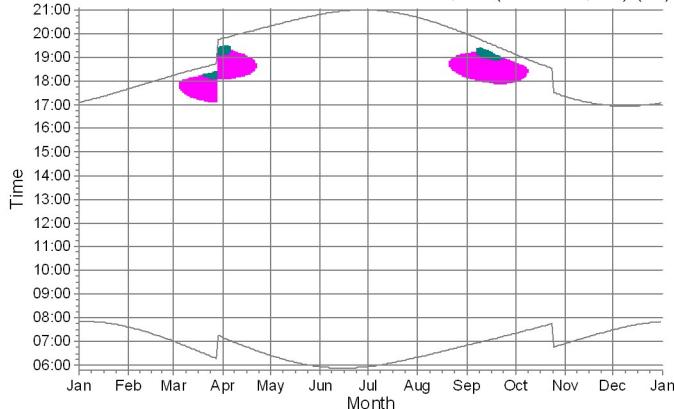
|  |  |
|--|--|
|  | R04: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (2) |
|  | R28: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (3) |
|  | R31: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (4) |

|  |  |
|--|--|
|  | R48: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (5) |
|  | R53: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (6) |

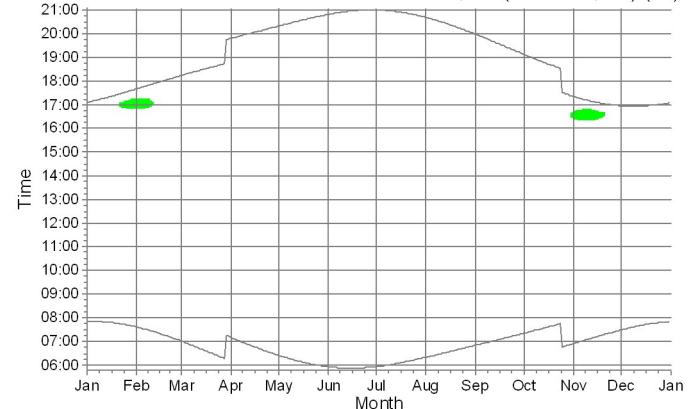
## SHADOW - Calendar per WTG, graphical

Calculation: Caso reale su dati statistici

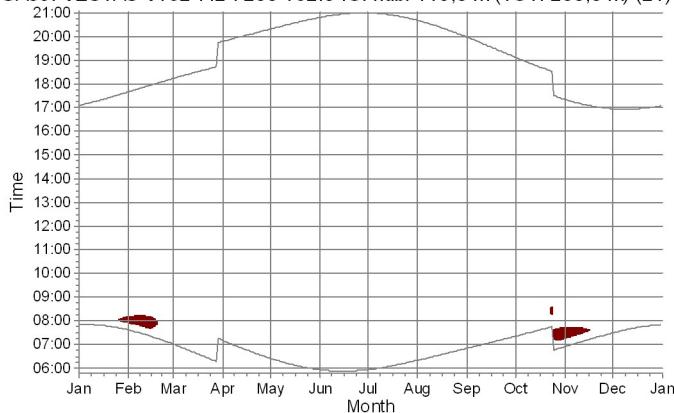
GA07: VESTAS V162-7.2 7200 162.0 !O! hub: 119.0 m (TOT: 200,0 m) (19)



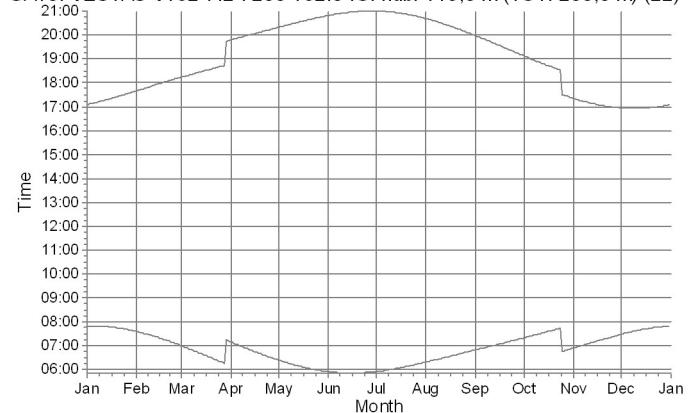
GA08: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)



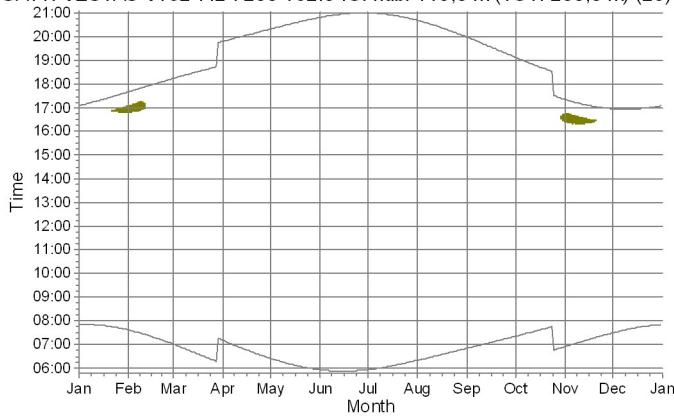
GA09: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (21)



GA10: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (22)



GA11: VESTAS V162-7.2 7200 162.0 !O! hub: 119.0 m (TOT: 200,0 m) (23)



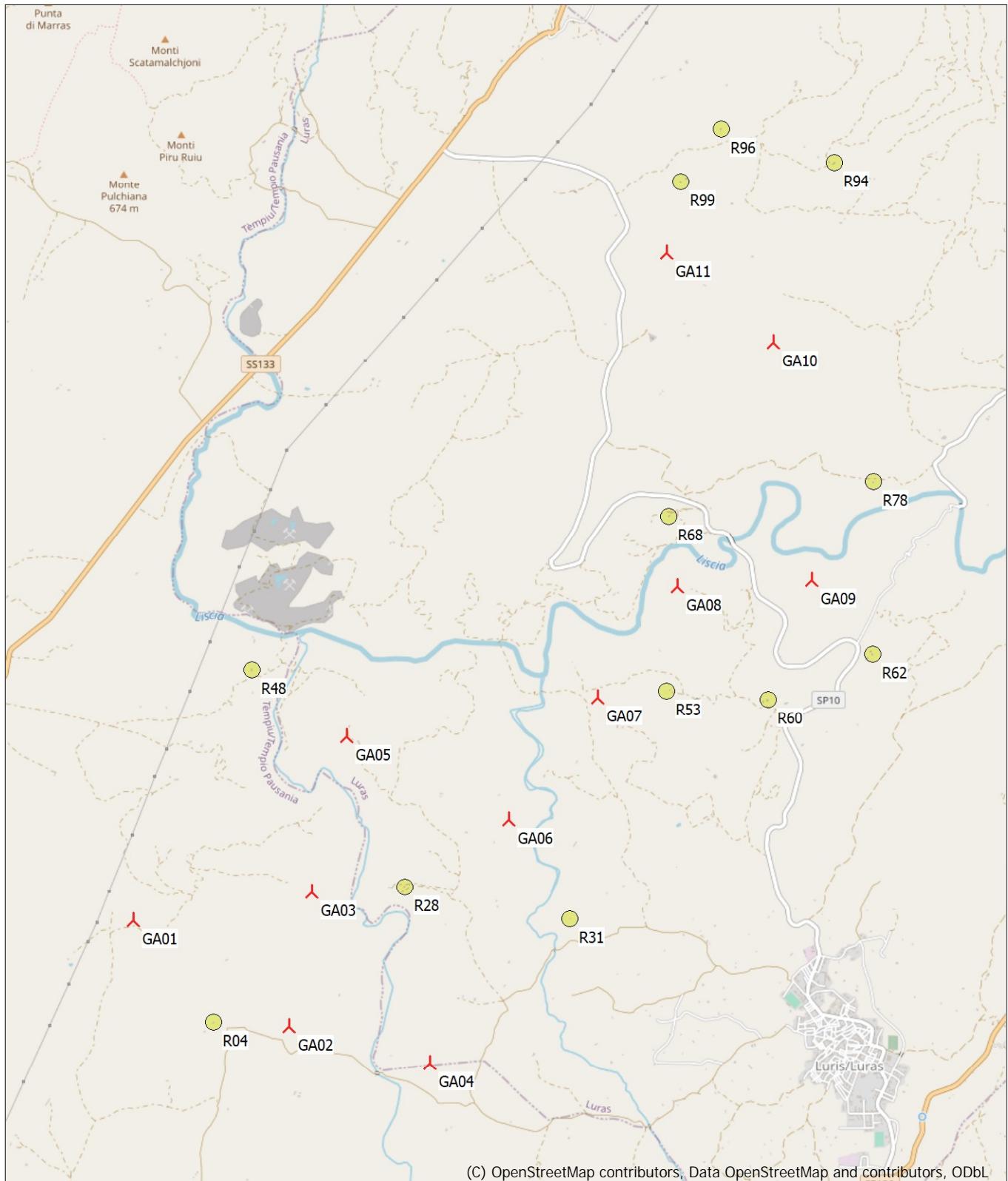
Shadow receptors

|  |  |
|--|--|
| <span style="background-color: magenta; border: 1px solid black; padding: 2px 10px;"></span> | R53: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (6) |
| <span style="background-color: teal; border: 1px solid black; padding: 2px 10px;"></span>    | R60: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (7) |
| <span style="background-color: darkred; border: 1px solid black; padding: 2px 10px;"></span> | R68: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (9) |

|  |   |
|--|---|
| <span style="background-color: limegreen; border: 1px solid black; padding: 2px 10px;"></span> | R78: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (10) |
| <span style="background-color: olive; border: 1px solid black; padding: 2px 10px;"></span>     | R94: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (11) |

## SHADOW - Map

Calculation: Caso reale su dati statistici



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:40.000, Map center Geo WGS84 East: 9,146008° E North: 40,965077° N

>New WTG

Shadow receptor

Flicker map level: Elevation Grid Data Object: WF Gallura\_EMDGrid\_0.wpg (1)