

COMMITTENTE



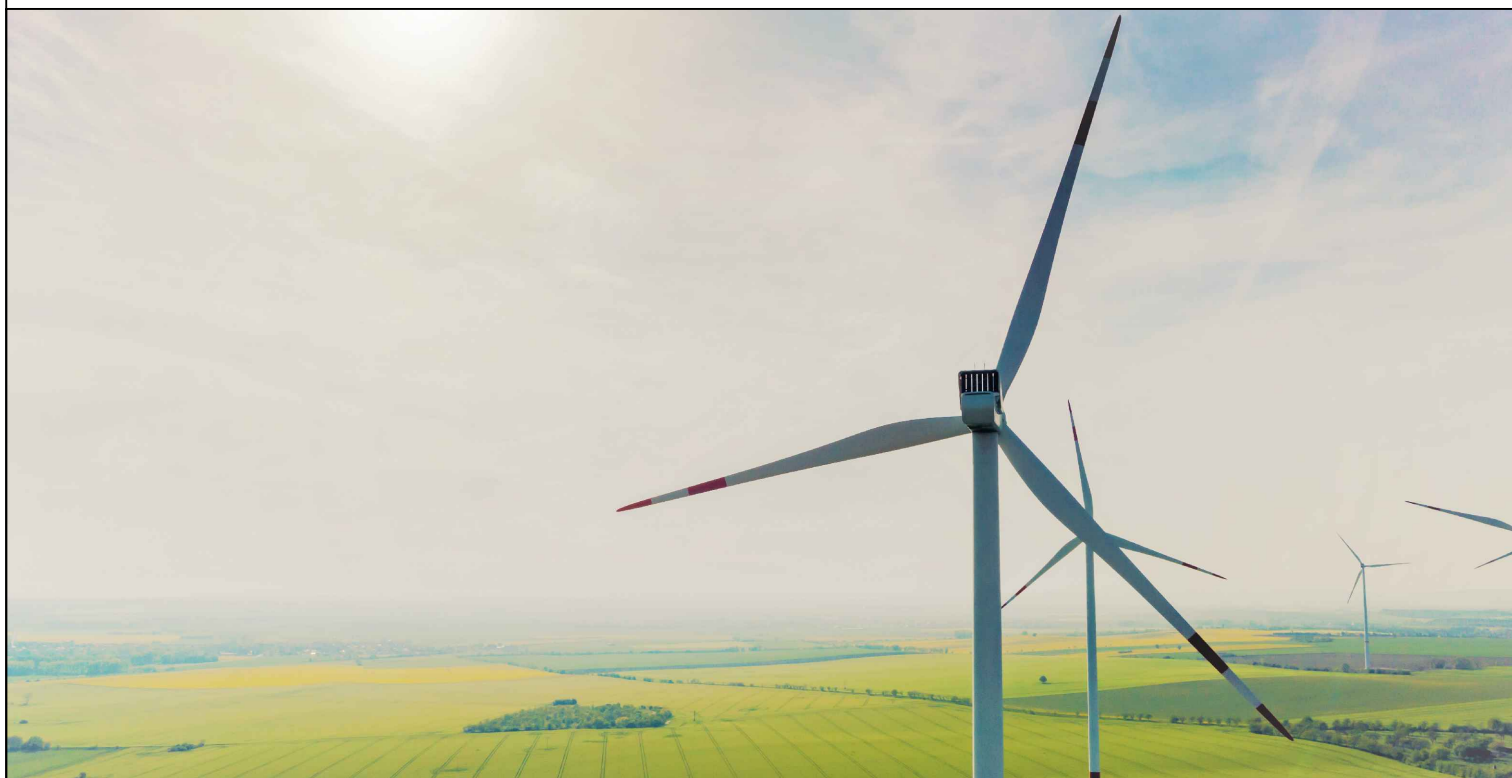
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REGIONE AUTONOMA DELLA SARDEGNA



PROVINCIA MEDIO CAMPIDANO



COMUNE VILLANOVAFRANCA



COMUNE FURTEI



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COMUNE VILLAMAR

PROGETTO

PROGETTO DEFINITIVO PER LA REALIZZAZIONE DI UN PARCO EOLICO DENOMINATO "SU MURDEGU" COMPOSTO DA 7 AEROGENERATORI DA 6.0 MW, PER UNA POTENZA COMPLESSIVA DI 42 MW SITO NEL COMUNE DI VILLANOVAFRANCA (VS), CON OPERE DI CONNESSIONE NEI COMUNI DI VILLANOVAFRANCA, VILLAMAR, FURTEI E SANLURI (VS)

ELABORATO

Titolo:

ANALISI DEGLI EFFETTI DI SHADOW - FLICKERING

Tav./Doc.:

WVNF-RA12

Nome file:

WVNF-RA12 Analisi degli effetti di shadow - flickering

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31/03/2022

PROGETTO DEFINITIVO PER LA REALIZZAZIONE DI UN IMPIANTO EOLICO DA 42 MW E DELLE OPERE DI CONNESSIONE NEL COMUNE DI VILLANOVAFRANCA

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COMUNI DI VILLANOVAFRANCA, FURTEI, SANLURI E VILLAMAR**

LOCALITÀ SU MURDEGU

ELABORATO N°RA12

**ANALISI DEGLI EFFETTI DI
SHADOW-FLICKERING**



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WVNF-RA12_Analisi degli effetti di shadow - flickering

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1. CRITERI GENERALI DI ANALISI E VALUTAZIONE

Il presente elaborato, facente parte integrante dello Studio di impatto ambientale allegato al progetto del parco eolico da 42, proposto dalla GRV Wind Sardegna 7 S.r.l. – Gruppo GR Value, in territorio di Villanovafranca (VS), esamina compiutamente il potenziale disturbo da ombreggiamento intermittente (*shadow flickering*) sui potenziali ricettori individuati nell'area interessata dal proposto impianto, entro una distanza indicativa di 1000 metri dagli aerogeneratori.

A tal fine, nel seguito, si farà riferimento alla ricognizione sugli edifici esistenti eseguita nell'ambito della definizione del layout di impianto e dell'analisi ambientale, i cui risultati sono riepilogati in opportune "schede fabbricati" all'interno di apposito report allegato al progetto del parco eolico (Elaborato WVNF-RA14 - Report dei fabbricati censiti).

Sotto il profilo metodologico, il documento è strutturato in una sezione introduttiva atta a descrivere la natura del fenomeno dell'ombreggiamento intermittente e le ipotesi alla base dei calcoli previsionali, eseguiti a mezzo di specifico software specialistico.

2. DESCRIZIONE DEL FENOMENO

Un ostacolo solido opaco posto tra il sole e il terreno genera un'ombra. Generalmente se l'ostacolo è fermo, l'ombra si proietta al suolo seguendo le regole del movimento relativo del sole sull'orizzonte. Le dimensioni dell'ombra proiettata sono funzione inversa dell'angolo che i raggi del sole formano sull'orizzonte per cui si ha la massima dimensione (elongazione sul terreno) dell'ombra all'alba ed al tramonto con il minimo quando il sole raggiunge la massima altezza (mezzogiorno).

Anche gli aerogeneratori durante il giorno proiettano un'ombra che in parte è fissa (torre e navicella) e in parte è mobile (pale del rotore).

Se l'ombra del rotore invece che sul terreno si proietta sulle aperture di un fabbricato può venirsi a creare l'effetto di ombra intermittente o *shadow flickering* (sfarfallio dell'ombra); in talune circostanze, tale fenomeno di pulsazioni "luce - ombra" può potenzialmente essere all'origine di un disturbo alle normali attività che possono svolgersi all'interno dell'ambiente abitativo.

Il fenomeno si verifica durante il giorno in presenza di cielo sereno ed in assenza di ostacoli naturali, quali vegetazione, alberi, muri ecc., e con le turbine in movimento.

Per le ragioni anzidette, a distanze turbine-ricettore superiori a circa 300 metri solitamente il fenomeno di *shadow flickering* si manifesta all'alba o al tramonto, allorquando le ombre proiettate sono sufficientemente lunghe. Per le stesse ragioni il tremolio dell'ombra è un fenomeno particolarmente avvertito nelle regioni del nord Europa (Germania, Danimarca, ecc.) piuttosto che alle latitudini del Mediterraneo.

L'intensità del *shadow flickering* è definita come la differenza in luminosità, in un determinato sito, in presenza ed assenza di un'ombra.

Di seguito si riassumono alcuni aspetti caratteristici del fenomeno:

- la pala delle turbine eoliche è stretta in corrispondenza dell'estremità più esterna ed assume progressivamente maggiore larghezza verso la giunzione con il mozzo. Quando una turbina è posizionata sufficientemente vicino ad un ricettore, cosicché la porzione più larga della pala oscura una porzione maggiore del campo visivo (o meglio del disco solare), l'intensità di *shadow flickering* aumenterà. A distanze maggiori l'intensità del fenomeno sarà minore in quanto le pale copriranno una porzione inferiore del disco solare;
- l'intensità del *shadow flickering* è più bassa quando l'ombra che intercetta un ricettore si origina dall'estremità esterna del rotore (minore spessore della pala). L'intensità aumenterà allorché l'ombra si muove lungo lo sviluppo della pala fino ad arrivare ad un massimo in corrispondenza del mozzo; a tal punto l'intensità diminuisce quando l'ombra si sposta verso l'estremità della pala opposta;
- bassi impatti da *shadow flickering* sono generalmente indicativi di grandi distanze tra turbine e ricettore e ombre incidenti originate dalle estremità del rotore;
- situazioni di precaria visibilità determineranno modeste intensità di *S. flickering*;
- a distanze ancora maggiori le ombre proiettate risulteranno "fuori-fuoco". Ciò non è causa di un'intensità inferiore del *shadow flickering* ma contribuisce a rendere meno distinto il fenomeno;
- all'interno di un ambiente ben illuminato le ombre svaniscono. Conseguentemente l'accensione di luci in un ambiente riduce l'incidenza del *shadow flickering*;
- schermare una finestra (con tende o quant'altro) previene il fenomeno;
- schermare un edificio (ad esempio con alberature) può rappresentare una misura di mitigazione per prevenire il fenomeno.

La frequenza di pulsazione del tremolio dell'ombra è proporzionale alla velocità di rotazione del rotore. La tipica frequenza di passo fra le pale del rotore (tripala) è compresa tra 0.6 ed 1 Hz (velocità con cui le pale passano attraverso una posizione specifica).

Nel caso specifico, considerando un rotore del diametro indicativo di 170 metri con una velocità massima nominale di rotazione di circa 11 RPM si avrà una frequenza di passo pari a circa 0,5 Hz. Tali frequenze di oscillazione luminosa sono prive di rischi significativi per la salute.

Ricerche finalizzate alla definizione di relazioni cause-effetto tra fenomeni stroboscopici ed attacchi epilettici (Graham e Pamela Harding della *Aston University* e Arnold Wilkins della *University of Essex*) attestano che, al fine di escludere rischi sulla salute, le turbine eoliche dovrebbero ruotare a velocità superiori a 60 RPM (velocità di passo superiori a 3 Hz). Peraltro, non può disconoscersi come il fenomeno del *shadow flickering* possa talvolta costituire, in particolari situazioni, un disturbo per i ricettori più esposti.

Per analizzare i risultati e quindi definire l'effettiva portata del disturbo, è dunque fondamentale conoscere l'esatta destinazione del fabbricato ricettore. Nel seguito saranno considerati potenziali ricettori i soli edifici che, sulla base delle informazioni disponibili e delle verifiche condotte in sito, potrebbero prudenzialmente ricondursi alla fattispecie di "ambienti abitativi".

3. INDIVIDUAZIONE DEI RICETTORI

Al fine di procedere all'individuazione di potenziali ricettori nelle aree più direttamente interessate dalle installazioni eoliche, ricomprese entro una distanza massima di 1000 m dalle postazioni di macchina, si è proceduto ad una individuazione complessiva dei fabbricati con l'ausilio della cartografia ufficiale di riferimento (Carta Tecnica Regionale in scala 1:10.000). Successivamente si è proceduto a verificarne l'effettiva esistenza e consistenza dall'esame di foto aeree e satellitari nonché attraverso specifici sopralluoghi sul campo. In tal modo sono state acquisite le necessarie informazioni preliminari sulle caratteristiche tipologico-costruttive e le condizioni di utilizzo degli edifici. Per completezza di analisi sono stati inclusi nel censimento anche quei fabbricati che, in modo manifesto, non presentavano caratteristiche di potenziali abitazioni (p.e. ruderi o depositi). A valle di tali riscontri, si è proceduto ad accertare la categoria catastale di appartenenza degli edifici, laddove disponibile.

L'Elaborato WVNF-RA14-1 (*Carta con individuazione dei fabbricati*) riporta l'individuazione dei fabbricati censiti in accordo con la metodologia precedentemente indicata. Lo stralcio della ripresa aerea zenitale, la categoria catastale di appartenenza ed una fotografia prospettica degli edifici sono riportati nell'Elaborato WVNF-RA14 allegato alla documentazione progettuale.

Nel caso specifico, ai fini dei calcoli di esposizione all'ombra intermittente, sono stati individuati come ricettori n. 7 fabbricati, con destinazione abitativa accertata (edifici con categoria catastale "A"), ubicati entro una distanza di 1000 m dalle postazioni eoliche.

Entro tali distanze è, infatti, ragionevole che si manifestino i più avvertiti effetti di disturbo in rapporto al fattore di impatto in esame. La Tabella 3.1 riporta, per ciascun ricettore individuato, le relative coordinate secondo il sistema Gauss Boaga, la categoria Catastale e la distanza dal più prossimo aerogeneratore.

Tabella 3.1: Fabbricati con destinazione abitativa esposti al potenziale disturbo da shadow flickering

| FABBRICATO | COMUNE | GB EST | GB NORD | DISTANZA DAL PIÙ PROSSIMO WTG [M] | WTG PIÙ PROSSIMO [M] | CATEGORIA CATASTO FABBRICATI |
|------------|-----------------|---------|---------|-----------------------------------|----------------------|-----------------------------------|
| F03 | Villanovafranca | 1500782 | 4387181 | 875 | V2 | A3 - Abitazioni di tipo economico |
| F05 | Villanovafranca | 1500874 | 4386856 | 547 | V2 | A3 - Abitazioni di tipo economico |
| F14 | Gesico | 1503835 | 4387466 | 668 | V7 | A6 - Abitazioni di tipo rurale |
| F18 | Villanovafranca | 1501312 | 4387238 | 553 | V3 | A3 - Abitazioni di tipo economico |
| F19 | Villanovafranca | 1502115 | 4387919 | 519 | V4 | A4 - Abitazioni di tipo popolare |
| F22 | Villanovafranca | 1502012 | 4388009 | 630 | V4 | A2 - Abitazioni di tipo civile |
| F23 | Villanovafranca | 1502111 | 4388148 | 538 | V5 | A4 - Abitazioni di tipo popolare |

4. IPOTESI ALLA BASE DEL CALCOLO E SOGLIE DI RIFERIMENTO

L'analisi dell'effetto di shadow flickering è stata condotta con l'utilizzo del modulo SHADOW del software WindPro 3.4. Il programma esegue una simulazione completa del percorso del sole durante un intero anno.

I calcoli possono essere eseguiti secondo due scenari: lo scenario peggiore (*worst case*) e il caso reale (*real case*).

Nello scenario *worst case* nessuno, tra i fattori di influenza indicati al capitolo 2 è contemplato nei calcoli del modello di simulazione. In situazioni di cielo coperto o calma di vento, o in caso di direzione del vento tale da porre il piano del rotore in posizione parallela rispetto alla linea sole-ricettore, la WTG non produrrà ombra intermittente, ma il suo contributo teorico è comunque computato dal *software*.

Conseguentemente, nello scenario peggiore, è altamente verosimile che i ricettori considerati saranno soggetti ad un impatto da *shadow flickering* significativamente inferiore a quello ipotizzato dal modello.

Nello scenario *real case*, il software può tenere conto delle reali **condizioni di funzionamento degli aerogeneratori** (in termini di ore di funzionamento attese per ogni settore angolare di provenienza del vento) nonché delle condizioni di **Eliofania**, ossia di durata media del soleggiamento della specifica zona di studio.

Peraltro, in entrambi gli scenari di calcolo, se la simulazione contempla l'effetto dell'orografia sulla propagazione dell'ombra, la stessa ignora l'azione schermante "sito-specifica" esercitata dai manufatti e dalle alberature. In altre parole, il calcolo è sempre conservativo e rappresenta quindi il massimo rischio potenziale di disturbo.

In definitiva, affinché il fenomeno dell'ombra intermittente possa costituire un disturbo per i soggetti più sensibili dovrebbero verificarsi simultaneamente le seguenti circostanze:

- il vento deve soffiare ad una velocità superiore a 3 m/s (velocità di *cut-in* del rotore);
- presenza di luminosità solare diretta;
- l'osservatore deve risultare sufficientemente vicino alla sorgente di *shadow flickering*;
- il ricettore deve essere effettivamente esposto al campo di luce tremolante;
- l'illuminazione dell'ambiente residenziale deve essere bassa;
- il contrasto tra luci ed ombre deve essere alto;
- non devono essere presenti schermature che ostacolano la propagazione dell'ombra (come tendaggi o alberature);
- gli individui potenzialmente soggetti ad un impatto da *shadow flickering* dovrebbero permanere esposti alla luce tremolante per un tempo sufficiente ad avvertire fastidio.

Per le finalità del presente studio, in assenza di una specifica disciplina normativa nazionale o regionale, si è fatto riferimento alle linee guida elaborate dal Gruppo Federale tedesco di Controllo delle Emissioni (*Bund-/Länder-Arbeitsgemeinschaft für Immissionsschutz - LAI*) - aggiornamento 2020.

Per la valutazione degli effetti del tremolio dell'ombra, peraltro, lo stesso legislatore tedesco non ha finora emanato, né risulta che sia in procinto di emanare, norme giuridicamente vincolanti.

Secondo le richiamate linee guida, affinché il fenomeno di ombreggiamento sia significativo dovrebbero essere simultaneamente verificate le seguenti circostanze

- L'angolo del sole sopra l'orizzonte deve essere almeno 3° ;
- l'ingombro della pala della turbina eolica deve coprire almeno il 20% del disco solare.

Il massimo ombreggiamento su un edificio secondo tali linee-guida è stabilito in:

- 30 ore di ombreggiamento annuale;
- 30 minuti di ombreggiamento giornaliero.

In tali archi temporali (30 ore/anno e 30 minuti/giorno), trattandosi di un disturbo effettivamente avvertito dagli occupanti l'edificio, dovrebbero risultare simultaneamente verificate le seguenti condizioni:

- gli ambienti esposti all'ombreggiamento sono occupati;
- gli occupanti sono svegli.

Considerata l'esigua probabilità che si verifichino contemporaneamente tutte le condizioni precedentemente illustrate per l'intera durata del fenomeno, ne deriva che il risultato del calcolo rappresenta comunque una stima prudentiale dell'impatto.

La Figura 4.1 e la Figura 4.2 mostrano i parametri necessari al modello utilizzato dal modulo SHADOW per valutare l'impatto del tremolio dell'ombra.

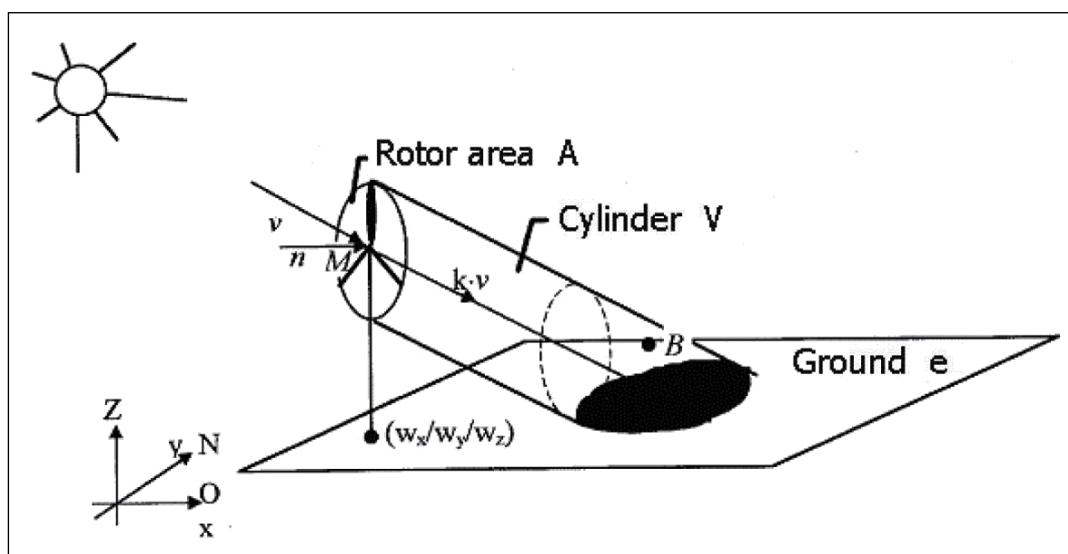


Figura 4.1: Rappresentazione schematica della proiezione dell'ombra del rotore.

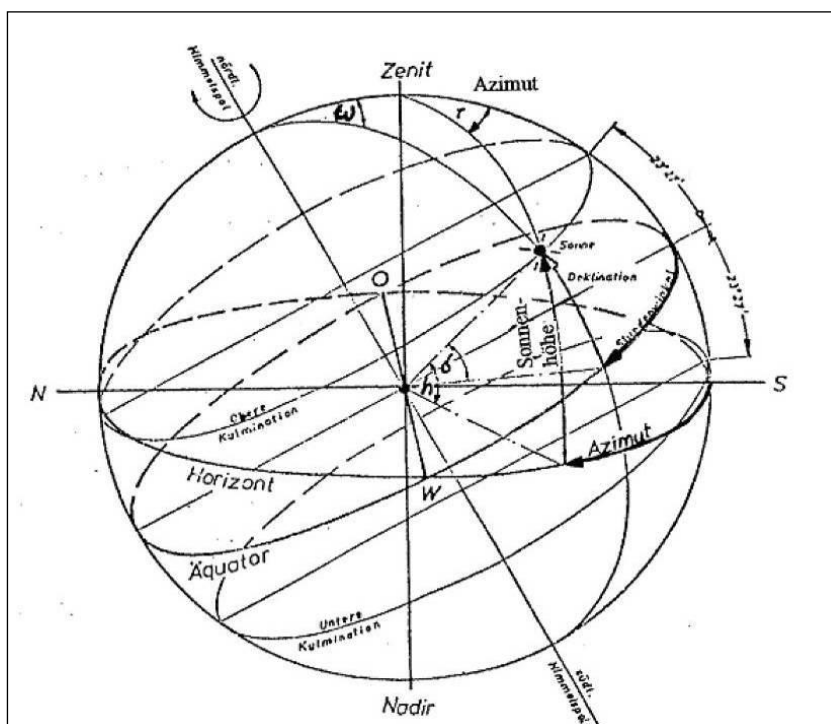


Figura 4.2: Schema dei moti terrestri e parametri di calcolo.

4.1 LO SCENARIO PEGGIORE (WORST CASE)

Questi calcoli sono basati sullo scenario più conservativo (ombra massima astronomica, ossia basata sulla posizione del sole rispetto alle WTG). Se il cielo è coperto o c'è calma di vento, o la direzione del vento è tale da porre il piano del rotore in posizione parallela rispetto alla linea sole-edificio, la WTG non produrrà ombra, ma la sua influenza apparirà comunque nei calcoli. In altre parole, il calcolo descrive lo scenario peggiore possibile, e rappresenta quindi il massimo rischio potenziale di impatto. Per ciascun ricettore il software produce un calendario che indica i giorni ed i periodi di tempo in cui l'ombra sarà presente.

4.2 LO SCENARIO REALE (REAL CASE)

Oltre al calcolo che contempla le ore di "ombra massima astronomica" (detta anche ombra peggiore), il software WINDPRO consente di configurare i parametri statistici per calcolare l'"ombra meteorologica probabile" (detta anche ombra reale). In particolare, possono essere configurati due parametri statistici:

1. Statistica delle ore di funzionamento. È il periodo in cui le turbine saranno operative per ciascuna direzione di provenienza del vento nel corso dell'anno.
2. Statistica dell'eliofania. È la percentuale di ore di sole durante il dì (dall'alba al tramonto). Questa varia notevolmente da luogo a luogo, e si rende opportuno utilizzare, pertanto, una statistica proveniente da stazioni di misura vicine al sito.

WindPRO combina ZVI ed il calcolo dell'ombra in modo da escludere il contributo delle turbine non visibili dai recettori. Questo vale anche per la mappa dell'ombra, in cui saranno incluse solo le WTG visibili da ciascun punto di griglia.

Ai fini del calcolo del tremolio dell'ombra il software di simulazione considera i seguenti parametri:

- diametro del sole, D (1.390.000 km);
- distanza Terra-Sole, d (150.000.000 km);
- angolo di attacco (3°);
- coordinate geografiche e altitudine delle turbine in progetto;
- altezza al mozzo (125 m) e diametro del rotore (162 m);
- coordinate dei recettori;
- recettori considerati in modalità "serra", assumendo che vengano interessati dal fenomeno di shadow-flickering indipendentemente dall'orientamento delle finestre (ipotesi conservativa);
- modello digitale del terreno;
- eliofania del sito;
- statistica delle ore di funzionamento degli aerogeneratori in funzione delle frequenze di provenienza del vento su 12 quadranti convenzionali;
- modello di calcolo della simulazione, che tiene conto sia dell'orbita terrestre rispetto al Sole (rivoluzione), sia della rotazione rispetto al proprio asse.

5. RISULTATI

Il risultato dei calcoli è reso disponibile dal programma di simulazione (*Windpro*) sotto diversi formati:

- Tabellare, (calendario per ciascun ricettore) nel quale per ogni giorno dell'anno sono indicate le ore di luce e l'intervallo di tempo di esposizione all'ombra con l'orario in cui si verifica il fenomeno;
- Grafico, (per ciascun ricettore) nel quale vengono rappresentati i periodi dell'anno in cui si verifica il fenomeno, l'orario e le turbine responsabili dell'ombra;
- grafico globale, con la rappresentazione di isolinee rappresentanti l'incidenza dell'ombra espressa in ore/anno.

Con riferimento allo Scenario di progetto, le isolinee d'ombra sono state rappresentate su specifica tavola grafica, in scala adeguata alla dimensione territoriale da rappresentare, per facilitarne la lettura. La tavola è stata realizzata, pertanto, su base cartografica in scala 1:10.000 (Elaborato WVNF-RA12-1).

I risultati forniti dal modello di calcolo consentono di valutare approssimativamente sia l'impatto puntuale sul singolo ricettore, sia l'impatto distribuito sul territorio (movimento e persistenza dell'ombra).

Nello specifico, all'interno degli allegati report di calcolo sono indicati, per il singolo ricettore, i valori totali di interferenza da *shadow flickering* (espressi in h/anno), il numero di giorni in cui si verifica l'interferenza ed infine la durata massima per singolo giorno.

I risultati numerici delle simulazioni modellistiche, condotti con riferimento a ciascuno scenario di calcolo (*worst e real case*), sono riportati in Appendice.

6. ANALISI E POST-ELABORAZIONE DEI RISULTATI

Le risultanze del calcolo modellistico atto a stimare i valori totali di potenziale interferenza da *shadow flickering* in corrispondenza dei ricettori nello scenario di progetto sono riportate in Tabella 6.1.

Tabella 6.1: Risultati dei calcoli di ombreggiamento intermittente presso i ricettori considerati

| ID | RICETTORE | Cat. Catastale | WTG SF | WTG Più prossimo | Dist. Min. WTG | h/anno SF Worst Case | h/giorno SF Worst Case | h/anno SF Real Case |
|----|-----------|----------------|------------|------------------|----------------|----------------------|------------------------|---------------------|
| 1 | F03 | A3 | V3, V4 | V2 | 875 | 39:37:00 | 00:38 | 11:13:00 |
| 2 | F05 | A3 | V2, V3, V4 | V2 | 547 | 124:02:00 | 1:07 | 34:25:00 |
| 3 | F14 | A6 | V7, V6, V4 | V7 | 668 | 109:44:00 | 1:04 | 27:18:00 |
| 4 | F18 | A3 | V3, V7, V4 | V3 | 553 | 188:12:00 | 1:11 | 51:07:00 |
| 5 | F19 | A4 | V7, V6 | V4 | 519 | 60:39:00 | 0:52 | 15:26:00 |
| 6 | F22 | A2 | V7, V6 | V4 | 630 | 105:05:00 | 0:58 | 31:05:00 |
| 7 | F23 | A4 | V6, V5 | V5 | 538 | 202:30:00 | 1:14 | 59:55:00 |

Come si può osservare dall'esame della Tabella 6.1, l'incidenza dell'ombreggiamento intermittente presso i ricettori considerati nello "scenario reale" è prevalentemente al di sotto del valore guida di 30 h/anno (fabbricati F03, F14, F19), o alquanto prossima (F05, F22), ad eccezione dei fabbricati F18 e F23, interessati dalla proiezione dell'ombra intermittente per una durata stimata in 51 h/anno e 60 h/anno rispettivamente.

Nel seguito si procederà ad esaminare singolarmente le potenziali situazioni di maggiore incidenza del fenomeno di SF, riferibili ai fabbricati F18 e F23, pervenendo alla conclusione che può ragionevolmente escludersi che il *shadow-flickering* possa rappresentare un effettivo disturbo a carico degli occupanti gli edifici considerati.

Ricettore F18

In riferimento alla potenziale incidenza del fenomeno del SF sul ricettore F18 si osserva come il fabbricato sia potenzialmente esposto all'ombreggiamento degli aerogeneratori V3, V4 e V7, ubicati a sudest del fabbricato (Figura 6.1) ad una distanza minima di circa 550 metri (V3).

Trattasi, peraltro, di un edificio ad un unico piano schermato da una fitta cortina arborea frangivento sul lato sudest, come si evince chiaramente dall'esame della ripresa satellitare riportata in Figura 6.2. La suddetta barriera verde è in grado, pertanto, di esercitare un'efficace azione schermante sull'ombreggiamento intermittente che origina dagli aerogeneratori V3, V4 e V7. Tale circostanza consente di escludere con ragionevole certezza un effetto di disturbo significativo derivante dal fenomeno del shadow-flickering sugli occupanti l'edificio.

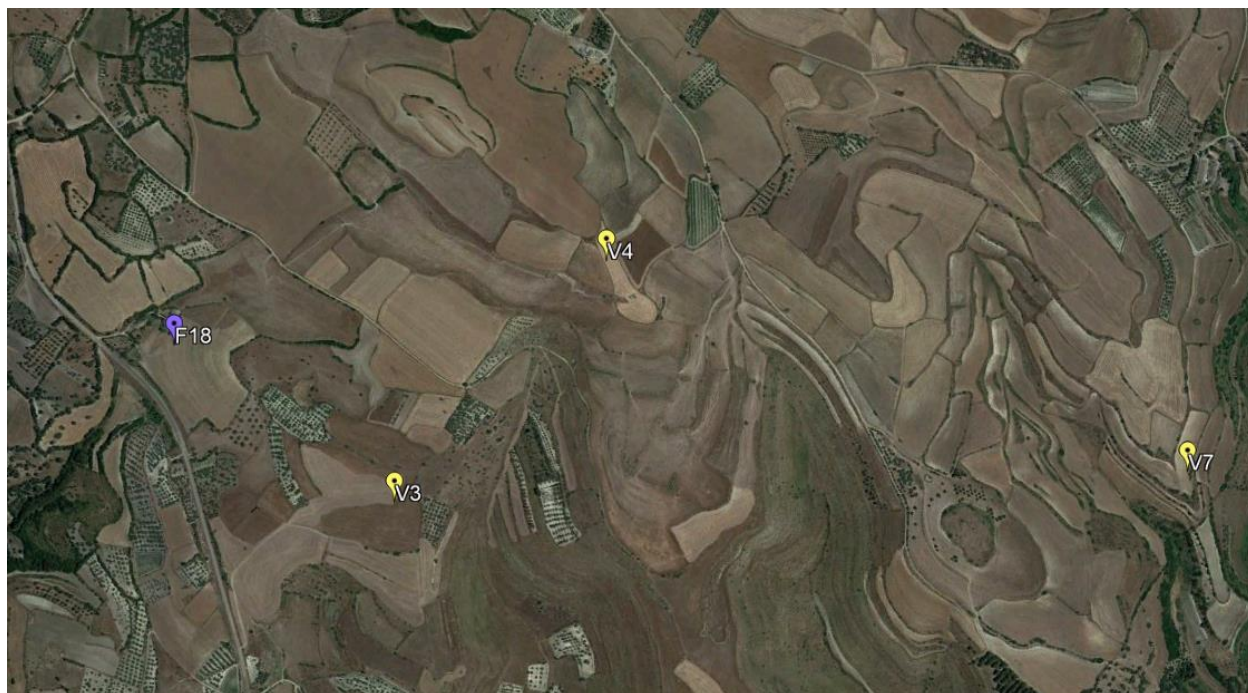


Figura 6.1 – Posizionamento del ricettore F18 rispetto agli aerogeneratori V3, V4 e V7, all'origine di un potenziale ombreggiamento intermittente sul fabbricato



Figura 6.2 – Cortina arborea posizionata a sudest del ricettore F18. La barriera verde esercita un efficace effetto schermante sul potenziale ombreggiamento intermittente esercitato dagli aerogeneratori V3, V4 e V7

Ricettore F23

Il ricettore F23 è esposto al potenziale ombreggiamento intermittente esercitato dagli aerogeneratori V5 e V6, localizzati a ENE e a SE dell'edificio, a distanze di 538 m e 884 m rispettivamente (Figura 6.3).



Figura 6.3 - Posizionamento del ricettore F23 rispetto agli aerogeneratori V4 e V6, all'origine di un potenziale ombreggiamento intermittente sul fabbricato

Esaminando le risultanze dei calcoli contenuti nel report allegato (scenario *real case*) si evince come l'ombra intermittente proiettata sul ricettore F23 sia attribuibile all'aerogeneratore V6 nel periodo novembre-febbraio (940 ore su 3596 di incidenza complessiva del fenomeno – 26% circa) e all'aerogeneratore V5 nella stagione primaverile estiva (indicativamente da aprile a settembre), con un contributo di 2659 ore su 3596 di incidenza complessiva del fenomeno (74% circa).

Il calendario dell'ombra (Figura 6.4) evidenzia come il fenomeno si manifesti alle prime ore del mattino, e specificamente:

- nella fascia oraria 7.00-8.00 a.m. relativamente al contributo dell'aerogeneratore V5;

- nella fascia oraria 8.00-9.00 a.m. relativamente al contributo dell'aerogeneratore V6.

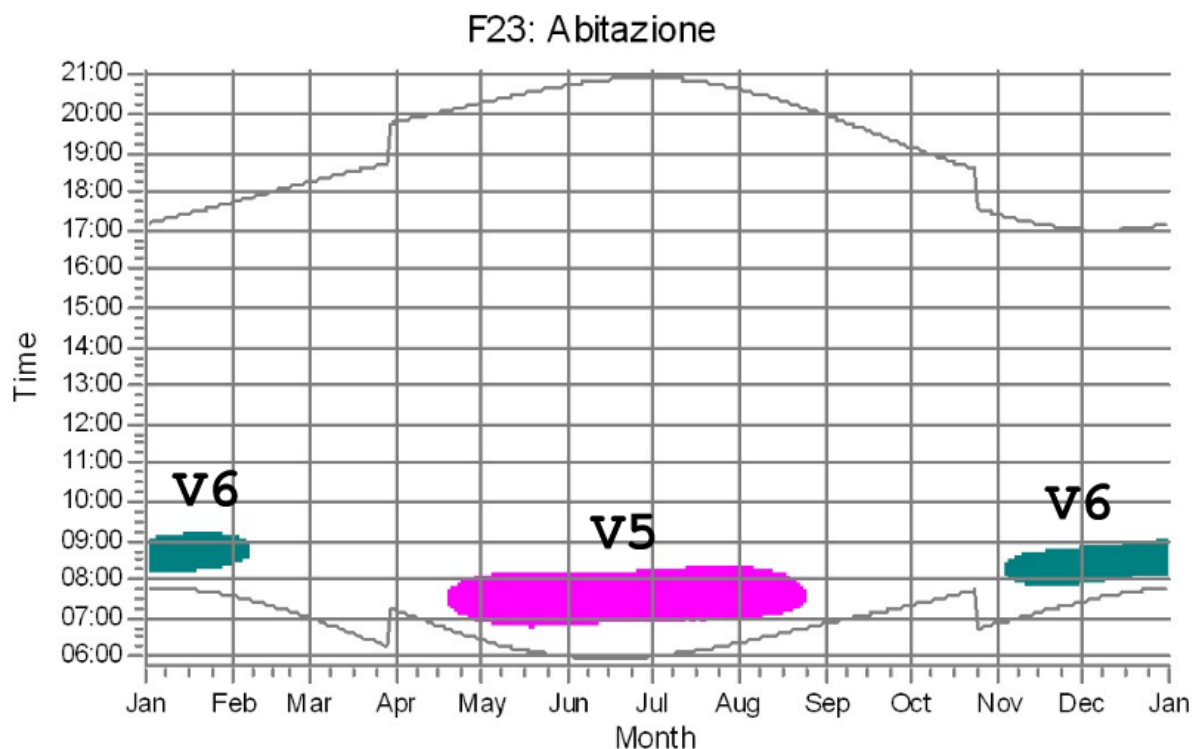


Figura 6.4 – Calendario dell'ombra relativo al ricettore F23

Approfondendo l'analisi sulle caratteristiche del fenomeno *shadow flickering* presso il ricettore F23 si ritiene opportuno formulare le seguenti considerazioni:

- Il ricettore F23 è un edificio a due livelli;
- la proiezione dell'ombra dell'aerogeneratore V5, a cui è principalmente attribuibile il fenomeno di ombreggiamento, interesserà le aperture fenestrate del fabbricato ubicate sul lato nord dell'edificio;
- Le caratteristiche tipologico-costruttive del fabbricato, come si evince dall'esame della Figura 6.5, lasciano presumere che gli ambienti con più alta probabilità di permanenza di persone nel periodo diurno sia riferibile alla porzione sud del fabbricato (non interessata dal fenomeno del SF) ove è posizionato l'ingresso affacciante sul giardino e dove gli spazi risultano più luminosi;
- trattandosi di un fabbricato di supporto alle attività agricole, con attività lavorativa svolgentesi prevalentemente all'esterno negli orari di maggiore esposizione al fenomeno (ossia la mattina dei periodi estivo e primaverile), è ragionevole assumere che la probabilità che gli occupanti l'edificio siano effettivamente presenti negli ambienti oggetto di maggiore ombreggiamento (ossia sul lato nord) nelle fasce orarie indicate sia verosimilmente bassa.

Per quanto sopra, è ragionevole affermare che l'effettivo potenziale disturbo da *shadow flickering* risulterà estremamente più contenuto di quello prospettato dal software di simulazione, tali da potersi ricondurre ai predetti "valori guida" e da non arrecare apprezzabili disturbi agli occupanti l'edificio in esame.

Ad ogni buon conto, laddove durante la fase operativa dell'impianto dovesse essere avvertito un effettivo disturbo da parte degli occupanti l'edificio, saranno attuate – a cura e spese della società

proponente - efficaci misure di mitigazione quali la creazione di una alberatura schermante sul lato nord dell'edificio.



Figura 6.5 – Edificio F23 (vista da sudest)

7. CONCLUSIONI

Il documento ha esaminato compiutamente il potenziale disturbo da ombreggiamento intermittente (*shadow flickering*) in corrispondenza dei più prossimi fabbricati presenti nell'area interessata dal proposto parco eolico. L'individuazione dei ricettori ha fatto riferimento alla ricognizione sugli edifici esistenti eseguita nell'ambito della definizione del layout di impianto e dell'analisi ambientale, i cui risultati sono riepilogati in opportune "schede fabbricati" all'interno di apposito report allegato alla documentazione progettuale.

Ai fini dei calcoli di esposizione all'ombra intermittente, sono stati individuati come ricettori n. 7 fabbricati, con destinazione abitativa accertata (edifici con categoria catastale "A"), ubicati entro una distanza di 1000 m dalle postazioni eoliche.

Per le finalità del presente studio, in assenza di una specifica disciplina normativa nazionale o regionale, si è fatto riferimento alle linee guida elaborate dal Gruppo Federale tedesco di Controllo delle Emissioni (*Bund-/Länder-Arbeitsgemeinschaft für Immissionsschutz - LAI*) - aggiornamento 2020.

L'incidenza dell'ombreggiamento intermittente presso i ricettori considerati nello "scenario reale" è risultata prevalentemente al disotto del valore guida di 30 h/anno (fabbricati F03, F14, F19), o alquanto prossima (F05, F22), ad eccezione dei fabbricati F18 e F23, interessati dalla proiezione dell'ombra intermittente per una durata stimata in 51 h/anno e 60 h/anno rispettivamente.

In riferimento alla potenziale incidenza del fenomeno del SF sul ricettore F18 si osserva come il fabbricato sia potenzialmente esposto all'ombreggiamento degli aerogeneratori V3, V4 e V7, ubicati a sudest del fabbricato ad una distanza minima di circa 550 metri (V3). Trattasi, peraltro, di un edificio ad un unico piano schermato da una fitta cortina arborea frangivento sul lato sudest, in grado, pertanto, di esercitare un'efficace azione schermante sull'ombreggiamento intermittente che origina dagli aerogeneratori V3, V4 e V7. Tale circostanza consente di escludere con ragionevole certezza un effetto di disturbo significativo derivante dal fenomeno del shadow-flickering sugli occupanti l'edificio F18.

Relativamente al fabbricato F23, le simulazioni condotte attraverso il modulo SHADOW del software specialistico WindPro hanno evidenziato come la principale influenza rispetto al fenomeno dell'ombreggiamento è attribuibile all'aerogeneratore V5; questo sarà limitato al periodo da aprile a settembre ed interesserà le ore mattutine (indicativamente dalle 8:00 alle 9:00) con una persistenza massima giornaliera di circa un'ora.

Le caratteristiche tipologico-costruttive del fabbricato lasciano presumere che gli ambienti con più alta probabilità di permanenza di persone nel periodo diurno sia riferibile alla porzione sud del fabbricato (non interessata dal fenomeno del SF) ove è posizionato l'ingresso affacciante sul giardino e dove gli spazi risultano più luminosi.

Trattandosi di un fabbricato di supporto alle attività agricole, inoltre, con attività lavorativa svolgentesi prevalentemente all'esterno negli orari di maggiore esposizione al fenomeno (ossia la mattina dei periodi estivo e primaverile), è ragionevole assumere una bassa probabilità che gli occupanti l'edificio siano effettivamente presenti negli ambienti oggetto di maggiore ombreggiamento (ossia sul lato nord) nelle fasce orarie indicate.

Per quanto sopra, è ragionevole affermare che l'effettivo potenziale disturbo da *shadow flickering* risulterà estremamente più contenuto di quello prospettato dal software di simulazione, tale da potersi ricondurre ai predetti "valori guida" e da non arrecare apprezzabili disturbi agli occupanti l'edificio.

Peraltro, laddove durante la fase operativa dell'impianto dovesse essere avvertito un effettivo disturbo da parte degli occupanti l'edificio, saranno attuate - a cura e spese della società proponente - efficaci misure di mitigazione quali la creazione di una alberatura schermante sul lato est dell'edificio.

APPENDICE - REPORT DEI RISULTATI DEL CALCOLO MODELLISTICO

SHADOW - Main Result

Calculation: Progetto_2022_03_15

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) [CAGLIARI / ELMA S]

| | | | | | | | | | | | |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

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

Height contours used: Height Contours: CONTOURLINE_Progetto_GRV Villanovafranca

Obstacles used in calculation

Eye height for map: 1,5 m

Grid resolution: 1,0 m

All coordinates are in

Italian Gauss-Boaga west-ROMA40 (IT-peninsular <±4m)

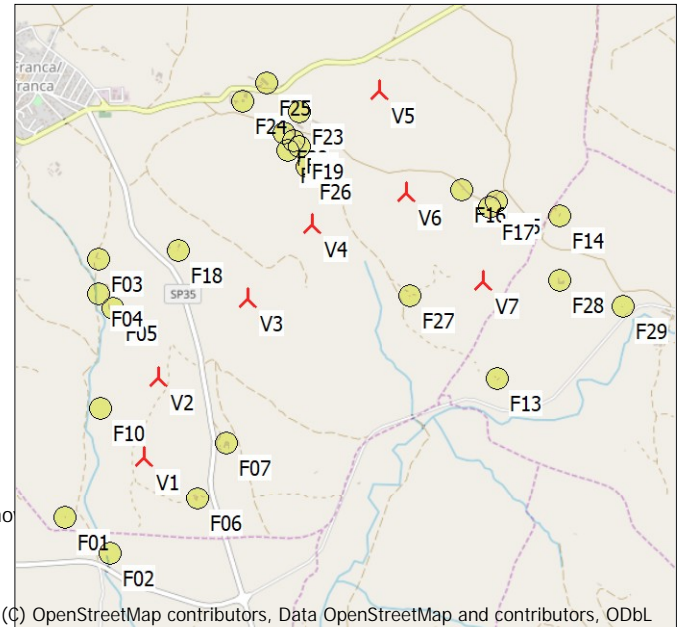
WTGs

| | Easting | Northing | Z | Row data/Description | WTG type | | Type-generator | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | Shadow data | |
|----|-----------|-----------|-------|------------------------|----------|----------------|------------------|-------------------|--------------------|----------------|--------------------------|-----------|
| | | | | | Valid | Manufact. | | | | | Calculation distance [m] | RPM [RPM] |
| | | | [m] | | | | | | | | | |
| V1 | 1.501.082 | 4.385.876 | 258,3 | Siemens Gamesa SG 6... | Yes | Siemens Gamesa | SG 6.0-170-6.000 | 6.000 | 170,0 | 115,0 | 2.041 | 8,8 |
| V2 | 1.501.177 | 4.386.400 | 260,0 | Siemens Gamesa SG 6... | Yes | Siemens Gamesa | SG 6.0-170-6.000 | 6.000 | 170,0 | 115,0 | 2.041 | 8,8 |
| V3 | 1.501.765 | 4.386.921 | 290,0 | Siemens Gamesa SG 6... | Yes | Siemens Gamesa | SG 6.0-170-6.000 | 6.000 | 170,0 | 115,0 | 2.041 | 8,8 |
| V4 | 1.502.190 | 4.387.405 | 350,0 | Siemens Gamesa SG 6... | Yes | Siemens Gamesa | SG 6.0-170-6.000 | 6.000 | 170,0 | 115,0 | 2.041 | 8,8 |
| V5 | 1.502.631 | 4.388.283 | 328,9 | Siemens Gamesa SG 6... | Yes | Siemens Gamesa | SG 6.0-170-6.000 | 6.000 | 170,0 | 115,0 | 2.041 | 8,8 |
| V6 | 1.502.818 | 4.387.619 | 330,5 | Siemens Gamesa SG 6... | Yes | Siemens Gamesa | SG 6.0-170-6.000 | 6.000 | 170,0 | 115,0 | 2.041 | 8,8 |
| V7 | 1.503.327 | 4.387.033 | 265,8 | Siemens Gamesa SG 6... | Yes | Siemens Gamesa | SG 6.0-170-6.000 | 6.000 | 170,0 | 115,0 | 2.041 | 8,8 |

Shadow receptor-Input

| No. | Name | Easting | Northing | Z | Width | Height | Elevation | Slope of | Direction mode | Eye height |
|-----|-------------|-----------|-----------|-------|-------|--------|------------|------------|--------------------|------------------|
| | | | | [m] | [m] | [m] | a.g.l. [m] | window [°] | | (ZVI) a.g.l. [m] |
| F01 | seminativo | 1.500.561 | 4.385.478 | 205,0 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F02 | seminativo | 1.500.859 | 4.385.239 | 187,4 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F03 | Abitazione | 1.500.782 | 4.387.181 | 230,0 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F04 | seminativo | 1.500.776 | 4.386.950 | 230,0 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F05 | Abitazione | 1.500.874 | 4.386.856 | 230,7 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F06 | area fab | 1.501.432 | 4.385.601 | 204,3 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F07 | D10 | 1.501.627 | 4.385.970 | 209,1 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F10 | area fab | 1.500.796 | 4.386.198 | 210,0 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F13 | seminativo | 1.503.425 | 4.386.391 | 228,9 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F14 | Abitazione | 1.503.835 | 4.387.466 | 294,5 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F15 | ente urbano | 1.503.416 | 4.387.559 | 255,8 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F16 | uliveto | 1.503.190 | 4.387.636 | 286,1 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F17 | ente urbano | 1.503.371 | 4.387.526 | 260,4 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F18 | Abitazione | 1.501.312 | 4.387.238 | 262,6 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F19 | Abitazione | 1.502.115 | 4.387.919 | 300,0 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F20 | C2 | 1.502.073 | 4.387.958 | 299,7 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F21 | F3 | 1.502.031 | 4.387.897 | 316,2 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F22 | Abitazione | 1.502.012 | 4.388.009 | 294,2 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F23 | Abitazione | 1.502.111 | 4.388.148 | 303,6 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F24 | D10 | 1.501.737 | 4.388.222 | 280,0 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F25 | D10 | 1.501.888 | 4.388.341 | 299,3 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F26 | ente urbano | 1.502.163 | 4.387.787 | 310,0 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |

To be continued on next page...



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:50.000
 ▲ New WTG ● Shadow receptor

SHADOW - Main Result

Calculation: Progetto_2022_03_15

...continued from previous page

| No. | Name | Easting | Northing | Z | Width | Height | Elevation a.g.l. | Slope of window | Direction mode | Eye height (ZVI) a.g.l. |
|-----|------------|-----------|-----------|-------|-------|--------|---------------------|--------------------|--------------------|----------------------------|
| | | | | [m] | [m] | [m] | [m] | [°] | | [m] |
| F27 | seminativo | 1.502.842 | 4.386.937 | 300,0 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F28 | D10 | 1.503.835 | 4.387.040 | 280,0 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |
| F29 | seminativo | 1.504.254 | 4.386.870 | 220,0 | 1,2 | 1,4 | 1,2 | 90,0 | "Green house mode" | 2,6 |

Calculation Results

Shadow receptor

| No. | Name | Shadow, expected values Shadow hours per year [h/year] |
|-----|-------------|---|
| F01 | seminativo | 0:00 |
| F02 | seminativo | 0:00 |
| F03 | Abitazione | 11:13 |
| F04 | seminativo | 20:27 |
| F05 | Abitazione | 34:25 |
| F06 | area fab | 0:00 |
| F07 | D10 | 21:56 |
| F10 | area fab | 42:03 |
| F13 | seminativo | 4:18 |
| F14 | Abitazione | 27:18 |
| F15 | ente urbano | 36:04 |
| F16 | uliveto | 74:33 |
| F17 | ente urbano | 48:09 |
| F18 | Abitazione | 51:07 |
| F19 | Abitazione | 15:26 |
| F20 | C2 | 13:45 |
| F21 | F3 | 12:52 |
| F22 | Abitazione | 31:05 |
| F23 | Abitazione | 59:55 |
| F24 | D10 | 17:39 |
| F25 | D10 | 22:02 |
| F26 | ente urbano | 40:34 |
| F27 | seminativo | 52:29 |
| F28 | D10 | 33:30 |
| F29 | seminativo | 12:50 |

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

| No. | Name | Worst case [h/year] | Expected [h/year] |
|-----|--|------------------------|----------------------|
| V1 | Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (8) | 252:11 | 63:59 |
| V2 | Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (7) | 65:08 | 15:11 |
| V3 | Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (6) | 234:24 | 63:30 |
| V4 | Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (5) | 251:10 | 69:02 |
| V5 | Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (4) | 224:27 | 70:57 |
| V6 | Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (3) | 506:18 | 152:43 |
| V7 | Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (2) | 366:10 | 106:29 |

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

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F03 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|----------------|----------------|----------------|--------------------------|----------------|----------------|
| 1 | 07:45 17:10 | 07:33 17:43 | 06:59 18:16 | 07:28 (V3) 18:16 33 | 07:10 19:48 | 06:26 20:18 |
| 2 | 07:45 17:11 | 07:32 17:45 | 06:58 18:17 | 07:27 (V3) 08:01 (V3) | 07:09 19:49 | 06:25 20:19 |
| 3 | 07:46 17:12 | 07:31 17:46 | 06:56 18:18 | 07:26 (V3) 08:02 (V3) | 07:07 19:50 | 06:24 20:20 |
| 4 | 07:46 17:13 | 07:30 17:47 | 06:55 18:19 | 07:25 (V3) 08:02 (V3) | 07:06 19:51 | 06:23 20:21 |
| 5 | 07:46 17:14 | 07:29 17:48 | 06:53 18:20 | 07:25 (V3) 08:02 (V3) | 07:04 19:52 | 06:22 20:21 |
| 6 | 07:46 17:15 | 07:28 17:49 | 06:52 18:21 | 07:24 (V3) 08:02 (V3) | 07:02 19:53 | 06:20 20:22 |
| 7 | 07:46 17:16 | 07:27 17:50 | 06:50 18:22 | 07:24 (V3) 08:02 (V3) | 07:01 19:54 | 06:19 20:23 |
| 8 | 07:46 17:17 | 07:26 17:52 | 06:49 18:23 | 07:24 (V3) 08:02 (V3) | 06:59 19:55 | 06:18 20:24 |
| 9 | 07:45 17:18 | 07:25 17:53 | 06:47 18:24 | 07:23 (V3) 08:01 (V3) | 06:58 19:56 | 06:17 20:25 |
| 10 | 07:45 17:19 | 07:24 17:54 | 06:45 18:25 | 07:24 (V3) 08:01 (V3) | 06:56 19:57 | 06:16 20:26 |
| 11 | 07:45 17:20 | 07:23 17:55 | 06:44 18:26 | 07:23 (V3) 08:00 (V3) | 06:55 19:58 | 06:15 20:27 |
| 12 | 07:45 17:21 | 07:22 17:56 | 06:42 18:27 | 07:24 (V3) 07:59 (V3) | 06:53 19:59 | 06:14 20:28 |
| 13 | 07:45 17:22 | 07:21 17:58 | 06:41 18:28 | 07:24 (V3) 07:58 (V3) | 06:52 20:00 | 06:13 20:29 |
| 14 | 07:44 17:23 | 07:19 17:59 | 06:39 18:29 | 07:24 (V3) 07:56 (V3) | 06:50 20:01 | 06:12 20:30 |
| 15 | 07:44 17:24 | 07:18 18:00 | 06:38 18:30 | 07:26 (V3) 07:56 (V3) | 06:49 20:02 | 06:11 20:31 |
| 16 | 07:44 17:25 | 07:17 18:01 | 06:36 18:32 | 07:26 (V3) 07:53 (V3) | 06:47 20:03 | 06:10 20:32 |
| 17 | 07:43 17:26 | 07:16 18:02 | 06:34 18:33 | 07:28 (V3) 07:52 (V3) | 06:46 20:04 | 06:09 20:33 |
| 18 | 07:43 17:27 | 07:14 18:03 | 06:33 18:34 | 07:30 (V3) 07:49 (V3) | 06:44 20:05 | 06:08 20:34 |
| 19 | 07:42 17:28 | 07:13 18:04 | 06:31 18:35 | 07:32 (V3) 07:45 (V3) | 06:43 20:06 | 06:08 20:35 |
| 20 | 07:42 17:29 | 07:12 18:06 | 06:30 18:36 | 07:32 (V3) 07:45 (V3) | 06:41 20:07 | 06:07 20:36 |
| 21 | 07:41 17:30 | 07:10 18:07 | 06:28 18:37 | 07:32 (V3) 07:45 (V3) | 06:40 20:08 | 06:06 20:37 |
| 22 | 07:41 17:32 | 07:09 18:08 | 06:26 18:38 | 07:32 (V3) 07:45 (V3) | 06:38 20:09 | 06:05 20:37 |
| 23 | 07:40 17:33 | 07:08 18:09 | 06:25 18:39 | 07:32 (V3) 07:45 (V3) | 06:37 20:10 | 06:04 20:38 |
| 24 | 07:39 17:34 | 07:06 18:10 | 06:23 18:40 | 07:32 (V3) 07:52 (V3) | 06:36 20:11 | 06:04 20:39 |
| 25 | 07:39 17:35 | 07:05 18:11 | 06:22 18:41 | 07:32 (V3) 07:54 (V3) | 06:34 20:12 | 06:03 20:40 |
| 26 | 07:38 17:36 | 07:03 18:12 | 06:20 18:42 | 07:32 (V3) 07:56 (V3) | 06:33 20:13 | 06:02 20:41 |
| 27 | 07:37 17:37 | 07:02 18:13 | 06:18 18:43 | 07:32 (V3) 07:58 (V3) | 06:32 20:14 | 06:02 20:42 |
| 28 | 07:37 17:39 | 07:00 18:15 | 06:17 18:44 | 07:32 (V3) 07:59 (V3) | 06:30 20:15 | 06:01 20:42 |
| 29 | 07:36 17:40 | 07:00 18:15 | 06:15 19:45 | 07:32 (V3) 07:59 (V3) | 06:29 20:16 | 06:01 20:43 |
| 30 | 07:35 17:41 | 07:00 18:15 | 06:14 19:46 | 07:32 (V3) 07:59 (V3) | 06:28 20:17 | 06:00 20:44 |
| 31 | 07:34 17:42 | 07:00 18:15 | 06:12 19:47 | 07:32 (V3) 07:59 (V3) | 06:27 20:18 | 06:00 20:45 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | | 113 | 617 | 384 | 65 | |
| Sun reduction | | 0,47 | 0,49 | 0,53 | 0,59 | |
| Oper. time red. | | 0,77 | 0,77 | 0,77 | 0,77 | |
| Wind dir. red. | | 0,65 | 0,65 | 0,64 | 0,64 | |
| Total reduction | | 0,24 | 0,25 | 0,26 | 0,29 | |
| Total, real | | 27 | 152 | 101 | 19 | |

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: Progetto_2022_03_15Shadow receptor: F03 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December | |
|---------------------|-------|--------|---------------|---------|---------------|----------|-------|
| 1 | 06:00 | 06:23 | 06:52 | 07:20 | 08:03 (V3) | 06:52 | 07:25 |
| | 20:56 | 20:38 | 19:57 | 19:09 | 08:38 (V3) | 17:24 | 17:01 |
| 2 | 06:00 | 06:24 | 06:53 | 07:21 | 08:02 (V3) | 06:53 | 07:26 |
| | 20:56 | 20:37 | 19:56 | 19:07 | 08:38 (V3) | 17:23 | 17:01 |
| 3 | 06:01 | 06:25 | 06:54 | 07:22 | 08:01 (V3) | 06:54 | 07:27 |
| | 20:56 | 20:36 | 19:54 | 19:05 | 08:38 (V3) | 17:22 | 17:01 |
| 4 | 06:01 | 06:26 | 06:54 | 07:23 | 08:01 (V3) | 06:55 | 07:28 |
| | 20:56 | 20:35 | 19:52 | 19:04 | 08:38 (V3) | 17:20 | 17:00 |
| 5 | 06:02 | 06:26 | 06:55 | 07:24 | 08:00 (V3) | 06:56 | 07:29 |
| | 20:56 | 20:34 | 19:51 | 19:02 | 08:38 (V3) | 17:19 | 17:00 |
| 6 | 06:03 | 06:27 | 06:56 | 07:25 | 08:00 (V3) | 06:58 | 07:30 |
| | 20:55 | 20:33 | 19:49 | 19:01 | 08:38 (V3) | 17:18 | 17:00 |
| 7 | 06:03 | 06:28 | 06:57 | 07:26 | 08:00 (V3) | 06:59 | 07:31 |
| | 20:55 | 20:32 | 19:48 | 18:59 | 08:38 (V3) | 17:17 | 17:00 |
| 8 | 06:04 | 06:29 | 06:58 | 07:27 | 08:00 (V3) | 07:00 | 07:32 |
| | 20:55 | 20:31 | 5 07:37 (V4) | 18:57 | 08:37 (V3) | 17:16 | 17:00 |
| 9 | 06:04 | 06:30 | 06:59 | 07:28 | 08:00 (V3) | 07:01 | 07:33 |
| | 20:54 | 20:29 | 13 07:41 (V4) | 18:56 | 08:37 (V3) | 17:15 | 17:00 |
| 10 | 06:05 | 06:31 | 07:00 | 07:29 | 08:00 (V3) | 07:02 | 07:34 |
| | 20:54 | 20:28 | 16 07:43 (V4) | 18:54 | 08:36 (V3) | 17:14 | 17:00 |
| 11 | 06:06 | 06:32 | 07:01 | 07:30 | 08:00 (V3) | 07:03 | 07:34 |
| | 20:54 | 20:27 | 19 07:44 (V4) | 18:53 | 08:35 (V3) | 17:13 | 17:00 |
| 12 | 06:06 | 06:33 | 07:02 | 07:31 | 08:01 (V3) | 07:04 | 07:35 |
| | 20:53 | 20:26 | 21 07:45 (V4) | 18:51 | 08:34 (V3) | 17:12 | 17:00 |
| 13 | 06:07 | 06:34 | 07:03 | 07:32 | 08:01 (V3) | 07:05 | 07:36 |
| | 20:53 | 20:24 | 23 07:46 (V4) | 18:50 | 08:33 (V3) | 17:11 | 17:01 |
| 14 | 06:08 | 06:35 | 07:04 | 07:33 | 08:02 (V3) | 07:07 | 07:37 |
| | 20:52 | 20:23 | 25 07:47 (V4) | 18:48 | 08:31 (V3) | 17:11 | 17:01 |
| 15 | 06:09 | 06:36 | 07:05 | 07:34 | 08:03 (V3) | 07:08 | 07:37 |
| | 20:52 | 20:22 | 25 07:47 (V4) | 18:47 | 08:29 (V3) | 17:10 | 17:01 |
| 16 | 06:09 | 06:37 | 07:06 | 07:35 | 08:06 (V3) | 07:09 | 07:38 |
| | 20:51 | 20:20 | 27 07:48 (V4) | 18:45 | 08:28 (V3) | 17:09 | 17:01 |
| 17 | 06:10 | 06:38 | 07:06 | 07:36 | 08:08 (V3) | 07:10 | 07:39 |
| | 20:51 | 20:19 | 27 07:48 (V4) | 18:44 | 08:26 (V3) | 17:08 | 17:02 |
| 18 | 06:11 | 06:39 | 07:07 | 07:37 | 08:12 (V3) | 07:11 | 07:39 |
| | 20:50 | 20:18 | 28 07:47 (V4) | 18:42 | 08:21 (V3) | 17:08 | 17:02 |
| 19 | 06:12 | 06:40 | 07:08 | 07:38 | | 07:12 | 07:40 |
| | 20:49 | 20:16 | 28 07:47 (V4) | 18:41 | | 17:07 | 17:02 |
| 20 | 06:12 | 06:40 | 07:09 | 07:39 | | 07:13 | 07:41 |
| | 20:49 | 20:15 | 28 07:47 (V4) | 18:40 | | 17:06 | 17:03 |
| 21 | 06:13 | 06:41 | 07:10 | 07:40 | | 07:14 | 07:41 |
| | 20:48 | 20:14 | 27 07:46 (V4) | 18:38 | | 17:06 | 17:03 |
| 22 | 06:14 | 06:42 | 07:11 | 07:41 | | 07:16 | 07:42 |
| | 20:47 | 20:12 | 26 07:46 (V4) | 18:37 | | 17:05 | 17:04 |
| 23 | 06:15 | 06:43 | 07:12 | 07:42 | | 07:17 | 07:42 |
| | 20:46 | 20:11 | 25 07:45 (V4) | 18:35 | | 17:04 | 17:04 |
| 24 | 06:16 | 06:44 | 07:13 | 07:43 | 08:18 (V3) | 07:18 | 07:43 |
| | 20:46 | 20:09 | 23 07:44 (V4) | 18:34 | 10 08:28 (V3) | 17:04 | 17:05 |
| 25 | 06:17 | 06:45 | 07:14 | 07:44 | 08:14 (V3) | 07:19 | 07:43 |
| | 20:45 | 20:08 | 22 07:43 (V4) | 18:33 | 18 08:32 (V3) | 17:03 | 17:05 |
| 26 | 06:17 | 06:46 | 07:15 | 07:45 | 08:10 (V3) | 07:20 | 07:44 |
| | 20:44 | 20:06 | 20 07:42 (V4) | 18:31 | 23 08:33 (V3) | 17:03 | 17:06 |
| 27 | 06:18 | 06:47 | 07:16 | 07:46 | 08:08 (V3) | 07:21 | 07:44 |
| | 20:43 | 20:05 | 16 07:40 (V4) | 18:30 | 26 08:34 (V3) | 17:02 | 17:07 |
| 28 | 06:19 | 06:48 | 07:17 | 07:47 | 08:07 (V3) | 07:22 | 07:44 |
| | 20:42 | 20:03 | 11 07:36 (V4) | 18:29 | 29 08:36 (V3) | 17:02 | 17:07 |
| 29 | 06:20 | 06:49 | 07:18 | 07:48 | 08:05 (V3) | 07:23 | 07:45 |
| | 20:41 | 20:02 | 19:12 | 18:28 | 31 08:36 (V3) | 17:02 | 17:08 |
| 30 | 06:21 | 06:50 | 07:19 | 07:49 | 08:04 (V3) | 07:24 | 07:45 |
| | 20:40 | 20:00 | 19:10 | 18:26 | 33 08:37 (V3) | 17:01 | 17:09 |
| 31 | 06:22 | 06:51 | | 06:51 | | | 07:45 |
| | 20:39 | 19:59 | | 17:25 | | | 17:09 |
| Potential sun hours | 455 | 425 | 374 | 347 | | 301 | 292 |
| Total, worst case | | | 170 | | 573 | | |
| Sun reduction | | 0,73 | 0,65 | | 0,54 | | |
| Oper. time red. | | 0,77 | 0,77 | | 0,77 | | |
| Wind dir. red. | | 0,64 | 0,65 | | 0,65 | | |
| Total reduction | | 0,36 | 0,32 | | 0,27 | | |
| Total, real | | 165 | 55 | | 156 | | |

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

Project:

Progetto_GRV Villanovafranca

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
15/03/2022 11:20/3.4.415

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F04 - seminativo

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| | | | | | | | | | | | |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June | |
|---------------------|------------------|-----------------------|------------------|-----------------------|------------------|------|------------------|
| 1 | 07:45 17:10 | 09:23 (V2) 17:43 | 07:33 18:16 | 06:59 18:16 | 07:10 19:48 | | 05:59 20:45 |
| 2 | 07:45 17:11 | 09:24 (V2) 17:45 | 07:32 18:17 | 06:58 18:17 | 07:09 19:49 | | 05:59 20:46 |
| 3 | 07:46 17:12 | 09:25 (V2) 17:46 | 07:31 18:18 | 06:56 18:18 | 07:07 19:50 | | 05:58 20:47 |
| 4 | 07:46 17:13 | 09:26 (V2) 17:47 | 07:30 18:19 | 06:55 18:19 | 07:06 19:51 | | 05:58 20:48 |
| 5 | 07:46 17:14 | 09:27 (V2) 17:48 | 07:29 18:20 | 06:53 18:20 | 07:04 19:52 | | 05:58 20:48 |
| 6 | 07:46 17:15 | 09:28 (V2) 17:49 | 07:28 18:21 | 06:52 18:21 | 07:02 19:53 | | 05:57 20:49 |
| 7 | 07:46 17:16 | 09:30 (V2) 17:51 | 07:27 18:22 | 06:50 18:22 | 07:01 19:54 | | 05:57 20:49 |
| 8 | 07:46 17:17 | 09:32 (V2) 17:52 | 07:26 18:23 | 06:49 18:23 | 06:59 19:55 | | 05:57 20:50 |
| 9 | 07:45 17:18 | 09:34 (V2) 17:53 | 07:25 18:24 | 06:47 18:24 | 06:58 19:56 | | 05:57 20:51 |
| 10 | 07:45 17:19 | 09:35 (V2) 17:54 | 07:24 18:25 | 06:45 18:25 | 06:56 19:57 | | 05:57 20:51 |
| 11 | 07:45 17:20 | 09:39 (V2) 17:55 | 07:23 18:26 | 06:44 18:26 | 06:55 19:58 | | 05:56 20:52 |
| 12 | 07:45 17:21 | 09:50 (V2) 17:56 | 07:22 18:27 | 06:42 18:27 | 06:53 19:59 | | 05:56 20:52 |
| 13 | 07:45 17:22 | | 07:21 18:28 | 06:41 18:28 | 06:52 20:00 | | 05:56 20:53 |
| 14 | 07:44 17:23 | | 07:19 18:29 | 06:39 18:29 | 06:50 20:01 | | 05:56 20:53 |
| 15 | 07:44 17:24 | | 07:18 18:30 | 06:38 18:30 | 06:49 20:02 | | 05:56 20:53 |
| 16 | 07:44 17:25 | | 07:17 18:31 | 06:36 18:31 | 06:47 20:03 | | 05:56 20:54 |
| 17 | 07:43 17:26 | | 07:16 18:32 | 06:34 18:32 | 06:46 20:04 | | 05:56 20:54 |
| 18 | 07:43 17:27 | | 07:14 18:33 | 06:33 18:33 | 06:44 20:05 | | 05:56 20:55 |
| 19 | 07:42 17:28 | | 07:13 18:34 | 06:31 18:34 | 06:43 20:06 | | 05:56 20:55 |
| 20 | 07:42 17:29 | | 07:12 18:35 | 06:30 18:35 | 06:41 20:07 | | 05:57 20:55 |
| 21 | 07:41 17:30 | | 07:10 18:36 | 06:28 18:36 | 06:40 20:08 | | 05:57 20:55 |
| 22 | 07:41 17:31 | | 07:09 18:37 | 06:26 18:37 | 06:38 20:09 | | 05:57 20:56 |
| 23 | 07:40 17:32 | | 07:08 18:38 | 06:25 18:38 | 06:37 20:10 | | 05:57 20:56 |
| 24 | 07:39 17:33 | | 07:06 18:39 | 06:23 18:39 | 06:36 20:11 | | 05:57 20:56 |
| 25 | 07:39 17:34 | | 07:05 18:40 | 06:22 18:40 | 06:34 20:12 | | 05:58 20:56 |
| 26 | 07:38 17:35 | | 07:03 18:41 | 06:20 18:41 | 06:33 20:13 | | 05:58 20:56 |
| 27 | 07:38 17:36 | | 07:03 18:42 | 06:20 18:42 | 06:33 20:14 | | 05:58 20:56 |
| 28 | 07:37 17:37 | | 07:02 18:43 | 06:18 18:43 | 06:32 20:15 | | 05:58 20:56 |
| 29 | 07:37 17:38 | | 07:00 18:44 | 06:17 18:44 | 06:30 20:16 | | 05:59 20:56 |
| 30 | 07:37 17:39 | | 07:00 18:45 | 06:17 18:45 | 06:30 20:17 | | 05:59 20:56 |
| 31 | 07:36 17:40 | | 07:00 18:46 | 06:17 18:46 | 06:30 20:18 | | 05:59 20:56 |
| | 07:34 17:42 | | 07:12 18:47 | 07:44 (V3) 19:47 | 06:00 20:45 | | 06:00 20:56 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | | 448 |
| Total, worst case | 298 | | 317 | 465 | 617 | | 59 |
| Sun reduction | 0,45 | | 0,49 | 0,53 | 0,59 | | 0,66 |
| Oper. time red. | 0,77 | | 0,77 | 0,77 | 0,77 | | 0,77 |
| Wind dir. red. | 0,66 | | 0,66 | 0,66 | 0,63 | | 0,63 |
| Total reduction | 0,23 | | 0,25 | 0,27 | 0,29 | | 0,32 |
| Total, real | 68 | | 80 | 125 | 176 | | 19 |

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

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

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F05 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|---------|---------------|-------|-------|-------|------------|
| 1 | 07:45 | 09:25 (V2) | 07:33 | 06:59 | 07:10 | 06:26 |
| | 17:10 | 64 10:29 (V2) | 17:43 | 18:16 | 19:48 | 20:18 |
| 2 | 07:45 | 09:25 (V2) | 07:32 | 06:58 | 07:09 | 07:45 (V3) |
| | 17:11 | 64 10:29 (V2) | 17:45 | 18:17 | 19:49 | 20:19 |
| 3 | 07:46 | 09:26 (V2) | 07:31 | 06:56 | 07:07 | 07:41 (V3) |
| | 17:12 | 63 10:29 (V2) | 17:46 | 18:18 | 19:50 | 20:20 |
| 4 | 07:46 | 09:27 (V2) | 07:30 | 06:55 | 07:06 | 07:38 (V3) |
| | 17:13 | 62 10:29 (V2) | 17:47 | 18:19 | 19:51 | 20:20 |
| 5 | 07:46 | 09:28 (V2) | 07:29 | 06:53 | 07:04 | 07:36 (V3) |
| | 17:14 | 61 10:29 (V2) | 17:48 | 18:20 | 19:52 | 20:21 |
| 6 | 07:46 | 09:28 (V2) | 07:28 | 06:52 | 07:02 | 07:34 (V3) |
| | 17:15 | 61 10:29 (V2) | 17:49 | 18:21 | 19:53 | 20:22 |
| 7 | 07:46 | 09:29 (V2) | 07:27 | 06:50 | 07:01 | 07:32 (V3) |
| | 17:16 | 60 10:29 (V2) | 17:51 | 18:22 | 19:54 | 20:23 |
| 8 | 07:46 | 09:30 (V2) | 07:26 | 06:49 | 06:59 | 07:30 (V3) |
| | 17:17 | 59 10:29 (V2) | 17:52 | 18:23 | 19:55 | 20:24 |
| 9 | 07:45 | 09:31 (V2) | 07:25 | 06:47 | 06:58 | 07:30 (V3) |
| | 17:18 | 58 10:29 (V2) | 17:53 | 18:24 | 19:56 | 20:25 |
| 10 | 07:45 | 09:32 (V2) | 07:24 | 06:45 | 06:56 | 07:28 (V3) |
| | 17:19 | 56 10:28 (V2) | 17:54 | 18:25 | 19:57 | 20:26 |
| 11 | 07:45 | 09:33 (V2) | 07:23 | 06:44 | 06:55 | 07:28 (V3) |
| | 17:20 | 55 10:28 (V2) | 17:55 | 18:26 | 19:58 | 20:27 |
| 12 | 07:45 | 09:34 (V2) | 07:22 | 06:42 | 06:53 | 07:27 (V3) |
| | 17:21 | 54 10:28 (V2) | 17:56 | 18:27 | 19:59 | 20:28 |
| 13 | 07:45 | 09:35 (V2) | 07:21 | 06:41 | 06:52 | 07:26 (V3) |
| | 17:22 | 52 10:27 (V2) | 17:58 | 18:28 | 20:00 | 20:29 |
| 14 | 07:44 | 09:36 (V2) | 07:19 | 06:39 | 06:50 | 07:25 (V3) |
| | 17:23 | 51 10:27 (V2) | 17:59 | 18:29 | 20:01 | 20:30 |
| 15 | 07:44 | 09:38 (V2) | 07:18 | 06:38 | 06:49 | 07:25 (V3) |
| | 17:24 | 48 10:26 (V2) | 18:00 | 18:30 | 20:02 | 20:31 |
| 16 | 07:44 | 09:38 (V2) | 07:17 | 06:36 | 06:47 | 07:25 (V3) |
| | 17:25 | 47 10:25 (V2) | 18:01 | 18:32 | 20:03 | 20:32 |
| 17 | 07:43 | 09:40 (V2) | 07:16 | 06:34 | 06:46 | 07:25 (V3) |
| | 17:26 | 45 10:25 (V2) | 18:02 | 18:33 | 20:04 | 20:33 |
| 18 | 07:43 | 09:41 (V2) | 07:14 | 06:33 | 06:44 | 07:25 (V3) |
| | 17:27 | 42 10:23 (V2) | 18:03 | 18:34 | 20:05 | 20:34 |
| 19 | 07:42 | 09:43 (V2) | 07:13 | 06:31 | 06:43 | 07:24 (V3) |
| | 17:28 | 39 10:22 (V2) | 18:04 | 18:35 | 20:06 | 20:35 |
| 20 | 07:42 | 09:45 (V2) | 07:12 | 06:30 | 06:41 | 07:25 (V3) |
| | 17:29 | 35 10:20 (V2) | 18:06 | 18:36 | 20:07 | 20:36 |
| 21 | 07:41 | 09:47 (V2) | 07:10 | 06:28 | 06:40 | 07:25 (V3) |
| | 17:30 | 31 10:18 (V2) | 18:07 | 18:37 | 20:08 | 20:37 |
| 22 | 07:41 | 09:50 (V2) | 07:09 | 06:26 | 06:38 | 07:25 (V3) |
| | 17:32 | 26 10:16 (V2) | 18:08 | 18:38 | 20:09 | 20:37 |
| 23 | 07:40 | 09:53 (V2) | 07:08 | 06:25 | 06:37 | 07:26 (V3) |
| | 17:33 | 20 10:13 (V2) | 18:09 | 18:39 | 20:10 | 20:38 |
| 24 | 07:39 | 09:57 (V2) | 07:06 | 06:23 | 06:36 | 07:26 (V3) |
| | 17:34 | 11 10:08 (V2) | 18:10 | 18:40 | 20:11 | 20:39 |
| 25 | 07:39 | | 07:05 | 06:22 | 06:34 | 07:27 (V3) |
| | 17:35 | | 18:11 | 18:41 | 20:12 | 20:40 |
| 26 | 07:38 | | 07:03 | 06:20 | 06:33 | 07:28 (V3) |
| | 17:36 | | 18:12 | 18:42 | 20:13 | 20:41 |
| 27 | 07:37 | | 07:02 | 06:18 | 06:32 | 07:28 (V3) |
| | 17:37 | | 18:13 | 18:43 | 20:14 | 20:42 |
| 28 | 07:37 | | 07:00 | 06:17 | 06:30 | 07:30 (V3) |
| | 17:39 | | 18:15 | 18:44 | 20:15 | 20:42 |
| 29 | 07:36 | | | 07:15 | 06:29 | 07:31 (V3) |
| | 17:40 | | | 19:45 | 20:16 | 20:43 |
| 30 | 07:35 | | | 07:14 | 06:28 | 07:33 (V3) |
| | 17:41 | | | 19:46 | 20:17 | 20:44 |
| 31 | 07:34 | | | 07:12 | 06:27 | 07:35 (V3) |
| | 17:42 | | | 19:47 | 20:18 | 20:45 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | 1164 | | | 1024 | 267 | 873 |
| Sun reduction | 0,45 | | | 0,53 | 0,59 | 0,66 |
| Oper. time red. | 0,77 | | | 0,77 | 0,77 | 0,77 |
| Wind dir. red. | 0,66 | | | 0,66 | 0,64 | 0,63 |
| Total reduction | 0,23 | | | 0,27 | 0,29 | 0,32 |
| Total, real | 267 | | | 273 | 77 | 282 |

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

Project:

Progetto_GRV Villanovafranca

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
15/03/2022 11:20/3.4.415

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F05 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Table with 12 columns (Jan to Dec) and 2 rows of data showing sunshine probability values.

Operational time

Table with 13 columns (N, NNE, ENE, E, ESE, SSE, S, SSW, WSW, W, WNW, NNW, Sum) and 2 rows of data showing operational time values.

Main shadow calculation table with columns for months (July to December) and rows for each day of the month, including sun rise/set times, minutes with flicker, and potential sun hours.

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

Matrix layout table with 4 columns: Day in month, Sun rise/set times, Minutes with flicker, and First/Last time with flicker.



Project:

Progetto_GRV Villanovafranca

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

15/03/2022 11:20/3.4.415

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F07 - D10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|----------------|----------------|----------------|--------------------------|--------------------------|----------------|
| 1 | 07:45 17:10 | 07:33 17:43 | 06:59 18:16 | 07:10 19:48 | 17:41 (V1) 18:46 (V1) | 06:26 20:17 |
| 2 | 07:45 17:11 | 07:32 17:45 | 06:58 18:17 | 07:09 19:49 | 17:41 (V1) 18:46 (V1) | 06:25 20:18 |
| 3 | 07:45 17:12 | 07:31 17:46 | 06:56 18:18 | 07:07 19:50 | 17:41 (V1) 18:45 (V1) | 06:24 20:19 |
| 4 | 07:46 17:13 | 07:30 17:47 | 06:55 18:19 | 07:06 19:51 | 17:42 (V1) 18:45 (V1) | 06:23 20:20 |
| 5 | 07:46 17:14 | 07:29 17:48 | 06:53 18:20 | 07:04 19:52 | 17:42 (V1) 18:44 (V1) | 06:22 20:21 |
| 6 | 07:46 17:15 | 07:28 17:49 | 06:52 18:21 | 07:02 19:53 | 17:43 (V1) 18:43 (V1) | 06:20 20:22 |
| 7 | 07:46 17:16 | 07:27 17:50 | 06:50 18:22 | 17:14 (V1) 17:25 (V1) | 07:01 19:54 | 06:19 20:23 |
| 8 | 07:45 17:17 | 07:26 17:52 | 06:48 18:23 | 17:08 (V1) 17:31 (V1) | 06:59 19:55 | 06:18 20:24 |
| 9 | 07:45 17:18 | 07:25 17:53 | 06:47 18:24 | 17:04 (V1) 17:34 (V1) | 06:58 19:56 | 06:17 20:25 |
| 10 | 07:45 17:19 | 07:24 17:54 | 06:45 18:25 | 17:01 (V1) 17:38 (V1) | 06:56 19:57 | 06:16 20:26 |
| 11 | 07:45 17:20 | 07:23 17:55 | 06:44 18:26 | 16:58 (V1) 17:39 (V1) | 06:55 19:58 | 06:15 20:27 |
| 12 | 07:45 17:21 | 07:22 17:56 | 06:42 18:27 | 16:57 (V1) 17:41 (V1) | 06:53 19:59 | 06:14 20:28 |
| 13 | 07:45 17:22 | 07:20 17:58 | 06:41 18:28 | 16:54 (V1) 17:42 (V1) | 06:52 20:00 | 06:13 20:29 |
| 14 | 07:44 17:23 | 07:19 17:59 | 06:39 18:29 | 16:52 (V1) 17:43 (V1) | 06:50 20:01 | 06:12 20:30 |
| 15 | 07:44 17:24 | 07:18 18:00 | 06:38 18:30 | 16:51 (V1) 17:45 (V1) | 06:49 20:02 | 06:11 20:31 |
| 16 | 07:44 17:25 | 07:17 18:01 | 06:36 18:31 | 16:50 (V1) 17:45 (V1) | 06:47 20:03 | 06:10 20:32 |
| 17 | 07:43 17:26 | 07:16 18:02 | 06:34 18:33 | 16:49 (V1) 17:47 (V1) | 06:46 20:04 | 06:09 20:33 |
| 18 | 07:43 17:27 | 07:14 18:03 | 06:33 18:34 | 16:47 (V1) 17:47 (V1) | 06:44 20:05 | 06:08 20:34 |
| 19 | 07:42 17:28 | 07:13 18:04 | 06:31 18:35 | 16:46 (V1) 17:47 (V1) | 06:43 20:06 | 06:08 20:35 |
| 20 | 07:42 17:29 | 07:12 18:06 | 06:30 18:36 | 16:46 (V1) 17:48 (V1) | 06:41 20:07 | 06:07 20:36 |
| 21 | 07:41 17:30 | 07:10 18:07 | 06:28 18:37 | 16:44 (V1) 17:48 (V1) | 06:40 20:07 | 06:06 20:37 |
| 22 | 07:41 17:32 | 07:09 18:08 | 06:26 18:38 | 16:44 (V1) 17:49 (V1) | 06:38 20:08 | 06:05 20:37 |
| 23 | 07:40 17:33 | 07:08 18:09 | 06:25 18:39 | 16:43 (V1) 17:49 (V1) | 06:37 20:09 | 06:04 20:38 |
| 24 | 07:39 17:34 | 07:06 18:10 | 06:23 18:40 | 16:42 (V1) 17:48 (V1) | 06:36 20:10 | 06:04 20:39 |
| 25 | 07:39 17:35 | 07:05 18:11 | 06:22 18:41 | 16:43 (V1) 17:49 (V1) | 06:34 20:11 | 06:03 20:40 |
| 26 | 07:38 17:36 | 07:03 18:12 | 06:20 18:42 | 16:42 (V1) 17:49 (V1) | 06:33 20:12 | 06:02 20:41 |
| 27 | 07:37 17:37 | 07:02 18:13 | 06:18 18:43 | 16:41 (V1) 17:48 (V1) | 06:32 20:13 | 06:02 20:42 |
| 28 | 07:36 17:39 | 07:00 18:15 | 06:17 18:44 | 16:41 (V1) 17:48 (V1) | 06:30 20:14 | 06:01 20:42 |
| 29 | 07:36 17:40 | | 07:15 19:45 | 17:41 (V1) 18:48 (V1) | 06:29 20:15 | 06:01 20:43 |
| 30 | 07:35 17:41 | | 07:13 19:46 | 17:41 (V1) 18:48 (V1) | 06:28 20:16 | 06:00 20:44 |
| 31 | 07:34 17:42 | | 07:12 19:47 | 17:41 (V1) 18:47 (V1) | 06:27 20:17 | 06:00 20:45 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | | | 1363 | | 932 | |
| Sun reduction | | | 0,49 | | 0,53 | |
| Oper. time red. | | | 0,77 | | 0,77 | |
| Wind dir. red. | | | 0,64 | | 0,64 | |
| Total reduction | | | 0,24 | | 0,26 | |
| Total, real | | | 331 | | 243 | |

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: Progetto_2022_03_15Shadow receptor: F07 - D10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December | | |
|---------------------|-------|--------|------------|------------|------------|------------|-------|-------|
| 1 | 06:00 | 06:23 | 06:52 | 17:46 (V1) | 07:20 | 17:35 (V1) | 06:52 | 07:25 |
| | 20:56 | 20:38 | 19:57 | 18:36 (V1) | 19:08 | 18:21 (V1) | 17:24 | 17:01 |
| 2 | 06:00 | 06:24 | 06:53 | 17:44 (V1) | 07:21 | 17:36 (V1) | 06:53 | 07:26 |
| | 20:56 | 20:37 | 19:56 | 18:37 (V1) | 19:07 | 18:19 (V1) | 17:23 | 17:01 |
| 3 | 06:01 | 06:25 | 06:53 | 17:43 (V1) | 07:22 | 17:38 (V1) | 06:54 | 07:27 |
| | 20:56 | 20:36 | 19:54 | 18:38 (V1) | 19:05 | 18:16 (V1) | 17:22 | 17:01 |
| 4 | 06:01 | 06:25 | 06:54 | 17:42 (V1) | 07:23 | 17:40 (V1) | 06:55 | 07:28 |
| | 20:56 | 20:35 | 19:52 | 18:38 (V1) | 19:04 | 18:13 (V1) | 17:20 | 17:00 |
| 5 | 06:02 | 06:26 | 06:55 | 17:39 (V1) | 07:24 | 17:43 (V1) | 06:56 | 07:29 |
| | 20:55 | 20:34 | 19:51 | 18:38 (V1) | 19:02 | 18:10 (V1) | 17:19 | 17:00 |
| 6 | 06:03 | 06:27 | 06:56 | 17:38 (V1) | 07:25 | 17:47 (V1) | 06:57 | 07:30 |
| | 20:55 | 20:33 | 19:49 | 18:38 (V1) | 19:01 | 18:05 (V1) | 17:18 | 17:00 |
| 7 | 06:03 | 06:28 | 06:57 | 17:37 (V1) | 07:25 | | 06:59 | 07:31 |
| | 20:55 | 20:32 | 19:48 | 18:39 (V1) | 18:59 | | 17:17 | 17:00 |
| 8 | 06:04 | 06:29 | 06:58 | 17:36 (V1) | 07:26 | | 07:00 | 07:32 |
| | 20:55 | 20:31 | 19:46 | 18:39 (V1) | 18:57 | | 17:16 | 17:00 |
| 9 | 06:04 | 06:30 | 06:59 | 17:35 (V1) | 07:27 | | 07:01 | 07:33 |
| | 20:54 | 20:29 | 19:44 | 18:39 (V1) | 18:56 | | 17:15 | 17:00 |
| 10 | 06:05 | 06:31 | 07:00 | 17:35 (V1) | 07:28 | | 07:02 | 07:33 |
| | 20:54 | 20:28 | 19:43 | 18:39 (V1) | 18:54 | | 17:14 | 17:00 |
| 11 | 06:06 | 06:32 | 07:01 | 17:34 (V1) | 07:29 | | 07:03 | 07:34 |
| | 20:54 | 20:27 | 19:41 | 18:39 (V1) | 18:53 | | 17:13 | 17:00 |
| 12 | 06:06 | 06:33 | 07:02 | 17:33 (V1) | 07:30 | | 07:04 | 07:35 |
| | 20:53 | 20:26 | 19:40 | 18:39 (V1) | 18:51 | | 17:12 | 17:00 |
| 13 | 06:07 | 06:34 | 07:03 | 17:33 (V1) | 07:31 | | 07:05 | 07:36 |
| | 20:53 | 20:24 | 19:38 | 18:39 (V1) | 18:50 | | 17:11 | 17:01 |
| 14 | 06:08 | 06:35 | 07:04 | 17:31 (V1) | 07:33 | | 07:07 | 07:37 |
| | 20:52 | 20:23 | 19:36 | 18:38 (V1) | 18:48 | | 17:11 | 17:01 |
| 15 | 06:09 | 06:36 | 07:05 | 17:31 (V1) | 07:34 | | 07:08 | 07:37 |
| | 20:52 | 20:22 | 19:35 | 18:38 (V1) | 18:47 | | 17:10 | 17:01 |
| 16 | 06:09 | 06:37 | 07:06 | 17:30 (V1) | 07:35 | | 07:09 | 07:38 |
| | 20:51 | 20:20 | 19:33 | 18:37 (V1) | 18:45 | | 17:09 | 17:01 |
| 17 | 06:10 | 06:38 | 07:06 | 17:30 (V1) | 07:36 | | 07:10 | 07:39 |
| | 20:51 | 20:19 | 19:31 | 18:37 (V1) | 18:44 | | 17:08 | 17:02 |
| 18 | 06:11 | 06:39 | 07:07 | 17:30 (V1) | 07:37 | | 07:11 | 07:39 |
| | 20:50 | 20:18 | 19:30 | 18:36 (V1) | 18:42 | | 17:07 | 17:02 |
| 19 | 06:12 | 06:39 | 07:08 | 17:30 (V1) | 07:38 | | 07:12 | 07:40 |
| | 20:49 | 20:16 | 19:28 | 18:36 (V1) | 18:41 | | 17:07 | 17:02 |
| 20 | 06:12 | 06:40 | 07:09 | 17:30 (V1) | 07:39 | | 07:13 | 07:41 |
| | 20:49 | 20:15 | 19:26 | 18:35 (V1) | 18:39 | | 17:06 | 17:03 |
| 21 | 06:13 | 06:41 | 07:10 | 17:30 (V1) | 07:40 | | 07:14 | 07:41 |
| | 20:48 | 20:13 | 19:25 | 18:34 (V1) | 18:38 | | 17:05 | 17:03 |
| 22 | 06:14 | 06:42 | 07:11 | 17:30 (V1) | 07:41 | | 07:16 | 07:42 |
| | 20:47 | 20:12 | 19:23 | 18:34 (V1) | 18:37 | | 17:05 | 17:04 |
| 23 | 06:15 | 06:43 | 07:12 | 17:30 (V1) | 07:42 | | 07:17 | 07:42 |
| | 20:46 | 20:11 | 19:22 | 18:33 (V1) | 18:35 | | 17:04 | 17:04 |
| 24 | 06:16 | 06:44 | 18:05 (V1) | 07:13 | 17:30 (V1) | 07:43 | 07:18 | 07:43 |
| | 20:46 | 20:09 | 18:23 (V1) | 19:20 | 18:32 (V1) | 18:34 | 17:04 | 17:05 |
| 25 | 06:17 | 06:45 | 18:01 (V1) | 07:14 | 17:30 (V1) | 06:44 | 07:19 | 07:43 |
| | 20:45 | 20:08 | 18:26 (V1) | 19:18 | 18:30 (V1) | 17:33 | 17:03 | 17:05 |
| 26 | 06:17 | 06:46 | 17:58 (V1) | 07:15 | 17:30 (V1) | 06:45 | 07:20 | 07:43 |
| | 20:44 | 20:06 | 18:29 (V1) | 19:17 | 18:29 (V1) | 17:31 | 17:03 | 17:06 |
| 27 | 06:18 | 06:47 | 17:55 (V1) | 07:16 | 17:31 (V1) | 06:46 | 07:21 | 07:44 |
| | 20:43 | 20:05 | 18:30 (V1) | 19:15 | 18:27 (V1) | 17:30 | 17:02 | 17:07 |
| 28 | 06:19 | 06:48 | 17:53 (V1) | 07:17 | 17:31 (V1) | 06:47 | 07:22 | 07:44 |
| | 20:42 | 20:03 | 18:31 (V1) | 19:13 | 18:26 (V1) | 17:29 | 17:02 | 17:07 |
| 29 | 06:20 | 06:49 | 17:51 (V1) | 07:18 | 17:32 (V1) | 06:48 | 07:23 | 07:44 |
| | 20:41 | 20:02 | 18:33 (V1) | 19:12 | 18:24 (V1) | 17:27 | 17:02 | 17:08 |
| 30 | 06:21 | 06:50 | 17:49 (V1) | 07:19 | 17:33 (V1) | 06:50 | 07:24 | 07:45 |
| | 20:40 | 20:00 | 18:34 (V1) | 19:10 | 18:23 (V1) | 17:26 | 17:01 | 17:09 |
| 31 | 06:22 | 06:51 | 17:47 (V1) | | 06:51 | | | 07:45 |
| | 20:39 | 19:59 | 18:35 (V1) | | 17:25 | | | 17:09 |
| Potential sun hours | 455 | 425 | 374 | | 347 | | 301 | 292 |
| Total, worst case | | | 282 | 1833 | | 205 | | |
| Sun reduction | | | 0,73 | 0,65 | | 0,54 | | |
| Oper. time red. | | | 0,77 | 0,77 | | 0,77 | | |
| Wind dir. red. | | | 0,64 | 0,64 | | 0,64 | | |
| Total reduction | | | 0,36 | 0,32 | | 0,27 | | |
| Total, real | | | 102 | 585 | | 55 | | |

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: Progetto_2022_03_15Shadow receptor: F10 - area fab

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|----------------|--------------------------|----------------|--------------------------|----------------|----------------|
| 1 | 07:45 17:10 | 09:02 (V1) 10:24 (V1) | 07:33 17:43 | 09:09 (V1) 10:36 (V1) | 06:59 18:16 | 07:10 19:48 |
| 2 | 07:45 17:11 | 09:02 (V1) 10:25 (V1) | 07:32 17:45 | 09:09 (V1) 10:36 (V1) | 06:58 18:17 | 07:09 19:49 |
| 3 | 07:46 17:12 | 09:02 (V1) 10:25 (V1) | 07:31 17:46 | 09:09 (V1) 10:36 (V1) | 06:56 18:18 | 07:07 19:50 |
| 4 | 07:46 17:13 | 09:02 (V1) 10:26 (V1) | 07:30 17:47 | 09:10 (V1) 10:35 (V1) | 06:55 18:19 | 07:06 19:51 |
| 5 | 07:46 17:14 | 09:03 (V1) 10:26 (V1) | 07:29 17:48 | 09:10 (V1) 10:35 (V1) | 06:53 18:20 | 07:04 19:52 |
| 6 | 07:46 17:15 | 09:03 (V1) 10:27 (V1) | 07:28 17:49 | 09:11 (V1) 10:35 (V1) | 06:52 18:21 | 07:02 19:53 |
| 7 | 07:46 17:16 | 09:03 (V1) 10:28 (V1) | 07:27 17:51 | 09:11 (V1) 10:34 (V1) | 06:50 18:22 | 07:01 19:54 |
| 8 | 07:46 17:17 | 09:04 (V1) 10:29 (V1) | 07:26 17:52 | 09:11 (V1) 10:33 (V1) | 06:49 18:23 | 06:59 19:55 |
| 9 | 07:45 17:18 | 09:04 (V1) 10:29 (V1) | 07:25 17:53 | 09:12 (V1) 10:32 (V1) | 06:47 18:24 | 06:58 19:56 |
| 10 | 07:45 17:19 | 09:04 (V1) 10:29 (V1) | 07:24 17:54 | 09:12 (V1) 10:31 (V1) | 06:45 18:25 | 06:56 19:57 |
| 11 | 07:45 17:20 | 09:04 (V1) 10:30 (V1) | 07:23 17:55 | 09:13 (V1) 10:31 (V1) | 06:44 18:26 | 06:55 19:58 |
| 12 | 07:45 17:21 | 09:04 (V1) 10:31 (V1) | 07:22 17:56 | 09:14 (V1) 10:30 (V1) | 06:42 18:27 | 06:53 19:59 |
| 13 | 07:45 17:22 | 09:04 (V1) 10:31 (V1) | 07:21 17:58 | 09:15 (V1) 10:29 (V1) | 06:41 18:28 | 06:52 20:00 |
| 14 | 07:44 17:23 | 09:05 (V1) 10:32 (V1) | 07:19 17:59 | 09:15 (V1) 10:27 (V1) | 06:39 18:29 | 06:50 20:01 |
| 15 | 07:44 17:24 | 09:05 (V1) 10:33 (V1) | 07:18 18:00 | 09:16 (V1) 10:26 (V1) | 06:38 18:30 | 06:49 20:02 |
| 16 | 07:44 17:25 | 09:05 (V1) 10:33 (V1) | 07:17 18:01 | 09:17 (V1) 10:25 (V1) | 06:36 18:32 | 06:47 20:03 |
| 17 | 07:43 17:26 | 09:05 (V1) 10:34 (V1) | 07:16 18:02 | 09:18 (V1) 10:22 (V1) | 06:34 18:33 | 06:46 20:04 |
| 18 | 07:43 17:27 | 09:05 (V1) 10:34 (V1) | 07:14 18:03 | 09:19 (V1) 10:21 (V1) | 06:33 18:34 | 06:44 20:05 |
| 19 | 07:42 17:28 | 09:06 (V1) 10:35 (V1) | 07:13 18:05 | 09:21 (V1) 10:19 (V1) | 06:31 18:35 | 06:43 20:06 |
| 20 | 07:42 17:29 | 09:06 (V1) 10:34 (V1) | 07:12 18:06 | 09:21 (V1) 10:16 (V1) | 06:30 18:36 | 06:41 20:07 |
| 21 | 07:41 17:30 | 09:05 (V1) 10:34 (V1) | 07:10 18:07 | 09:23 (V1) 10:14 (V1) | 06:28 18:37 | 06:40 20:08 |
| 22 | 07:41 17:32 | 09:06 (V1) 10:35 (V1) | 07:09 18:08 | 09:25 (V1) 10:12 (V1) | 06:26 18:38 | 06:38 20:09 |
| 23 | 07:40 17:33 | 09:06 (V1) 10:35 (V1) | 07:08 18:09 | 09:27 (V1) 10:09 (V1) | 06:25 18:39 | 06:37 20:10 |
| 24 | 07:39 17:34 | 09:06 (V1) 10:35 (V1) | 07:06 18:10 | 09:30 (V1) 10:06 (V1) | 06:23 18:40 | 06:36 20:11 |
| 25 | 07:39 17:35 | 09:07 (V1) 10:36 (V1) | 07:05 18:11 | 09:32 (V1) 10:01 (V1) | 06:22 18:41 | 06:34 20:12 |
| 26 | 07:38 17:36 | 09:07 (V1) 10:36 (V1) | 07:03 18:12 | 09:37 (V1) 09:56 (V1) | 06:20 18:42 | 06:33 20:13 |
| 27 | 07:37 17:37 | 09:07 (V1) 10:36 (V1) | 07:02 18:13 | | 06:18 18:43 | 06:32 20:14 |
| 28 | 07:37 17:39 | 09:07 (V1) 10:36 (V1) | 07:00 18:15 | | 06:17 18:44 | 06:30 20:15 |
| 29 | 07:36 17:40 | 09:07 (V1) 10:36 (V1) | | | 07:15 19:45 | 06:29 20:16 |
| 30 | 07:35 17:41 | 09:08 (V1) 10:37 (V1) | | | 07:14 19:46 | 06:28 20:17 |
| 31 | 07:34 17:42 | 09:08 (V1) 10:37 (V1) | | | 07:12 19:47 | 06:00 20:45 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | 2696 | 1740 | | | | |
| Sun reduction | 0,45 | 0,47 | | | | |
| Oper. time red. | 0,77 | 0,77 | | | | |
| Wind dir. red. | 0,66 | 0,66 | | | | |
| Total reduction | 0,23 | 0,24 | | | | |
| Total, real | 614 | 414 | | | | |

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: Progetto_2022_03_15Shadow receptor: F10 - area fab

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December |
|---------------------|-------|--------|-----------|---------|---------------|---------------|
| 1 | 06:00 | 06:23 | 06:52 | 07:20 | 06:52 | 08:42 (V1) |
| | 20:56 | 20:38 | 19:57 | 19:09 | 17:24 | 79 10:01 (V1) |
| 2 | 06:01 | 06:24 | 06:53 | 07:21 | 06:53 | 08:41 (V1) |
| | 20:56 | 20:37 | 19:56 | 19:07 | 17:23 | 81 10:02 (V1) |
| 3 | 06:01 | 06:25 | 06:54 | 07:22 | 06:54 | 08:41 (V1) |
| | 20:56 | 20:36 | 19:54 | 19:05 | 17:22 | 81 10:02 (V1) |
| 4 | 06:02 | 06:26 | 06:54 | 07:23 | 06:55 | 08:40 (V1) |
| | 20:56 | 20:35 | 19:52 | 19:04 | 17:20 | 83 10:03 (V1) |
| 5 | 06:02 | 06:26 | 06:55 | 07:24 | 06:56 | 08:41 (V1) |
| | 20:56 | 20:34 | 19:51 | 19:02 | 17:19 | 84 10:05 (V1) |
| 6 | 06:03 | 06:27 | 06:56 | 07:25 | 06:57 | 08:40 (V1) |
| | 20:55 | 20:33 | 19:49 | 19:01 | 17:18 | 85 10:05 (V1) |
| 7 | 06:03 | 06:28 | 06:57 | 07:26 | 06:59 | 08:40 (V1) |
| | 20:55 | 20:32 | 19:48 | 18:59 | 17:17 | 85 10:05 (V1) |
| 8 | 06:04 | 06:29 | 06:58 | 07:27 | 07:00 | 08:39 (V1) |
| | 20:55 | 20:31 | 19:46 | 18:57 | 17:16 | 87 10:06 (V1) |
| 9 | 06:04 | 06:30 | 06:59 | 07:28 | 07:01 | 08:40 (V1) |
| | 20:54 | 20:29 | 19:44 | 18:56 | 17:15 | 87 10:07 (V1) |
| 10 | 06:05 | 06:31 | 07:00 | 07:29 | 07:02 | 08:40 (V1) |
| | 20:54 | 20:28 | 19:43 | 18:54 | 17:14 | 87 10:07 (V1) |
| 11 | 06:06 | 06:32 | 07:01 | 07:30 | 07:03 | 08:39 (V1) |
| | 20:54 | 20:27 | 19:41 | 18:53 | 17:13 | 88 10:07 (V1) |
| 12 | 06:06 | 06:33 | 07:02 | 07:31 | 07:04 | 08:39 (V1) |
| | 20:53 | 20:26 | 19:40 | 18:51 | 17:12 | 89 10:08 (V1) |
| 13 | 06:07 | 06:34 | 07:03 | 07:32 | 07:05 | 08:39 (V1) |
| | 20:53 | 20:24 | 19:38 | 18:50 | 17:11 | 89 10:08 (V1) |
| 14 | 06:08 | 06:35 | 07:04 | 07:33 | 07:07 | 08:40 (V1) |
| | 20:52 | 20:23 | 19:36 | 18:48 | 17:11 | 89 10:09 (V1) |
| 15 | 06:09 | 06:36 | 07:05 | 07:34 | 07:08 | 08:40 (V1) |
| | 20:52 | 20:22 | 19:35 | 18:47 | 8 10:22 (V1) | |
| 16 | 06:09 | 06:37 | 07:06 | 07:35 | 07:09 | 08:40 (V1) |
| | 20:51 | 20:20 | 19:33 | 18:45 | 24 10:31 (V1) | |
| 17 | 06:10 | 06:38 | 07:06 | 07:36 | 07:10 | 08:40 (V1) |
| | 20:51 | 20:19 | 19:31 | 18:44 | 32 10:35 (V1) | |
| 18 | 06:11 | 06:39 | 07:07 | 07:37 | 07:11 | 08:40 (V1) |
| | 20:50 | 20:18 | 19:30 | 18:42 | 39 10:39 (V1) | |
| 19 | 06:12 | 06:40 | 07:08 | 07:38 | 07:12 | 08:41 (V1) |
| | 20:49 | 20:16 | 19:28 | 18:41 | 43 10:41 (V1) | |
| 20 | 06:12 | 06:40 | 07:09 | 07:39 | 07:13 | 08:41 (V1) |
| | 20:49 | 20:15 | 19:26 | 18:40 | 49 10:44 (V1) | |
| 21 | 06:13 | 06:41 | 07:10 | 07:40 | 07:14 | 08:41 (V1) |
| | 20:48 | 20:14 | 19:25 | 18:38 | 53 10:46 (V1) | |
| 22 | 06:14 | 06:42 | 07:11 | 07:41 | 07:16 | 08:42 (V1) |
| | 20:47 | 20:12 | 19:23 | 18:37 | 56 10:48 (V1) | |
| 23 | 06:15 | 06:43 | 07:12 | 07:42 | 07:17 | 08:42 (V1) |
| | 20:46 | 20:11 | 19:22 | 18:35 | 59 10:49 (V1) | |
| 24 | 06:16 | 06:44 | 07:13 | 07:43 | 07:18 | 08:42 (V1) |
| | 20:46 | 20:09 | 19:20 | 18:34 | 63 10:51 (V1) | |
| 25 | 06:17 | 06:45 | 07:14 | 07:44 | 07:19 | 08:43 (V1) |
| | 20:45 | 20:08 | 19:18 | 17:33 | 65 09:53 (V1) | |
| 26 | 06:17 | 06:46 | 07:15 | 07:45 | 07:20 | 08:44 (V1) |
| | 20:44 | 20:06 | 19:17 | 17:31 | 68 09:55 (V1) | |
| 27 | 06:18 | 06:47 | 07:16 | 07:46 | 07:21 | 08:44 (V1) |
| | 20:43 | 20:05 | 19:15 | 17:30 | 70 09:56 (V1) | |
| 28 | 06:19 | 06:48 | 07:17 | 07:47 | 07:22 | 08:45 (V1) |
| | 20:42 | 20:03 | 19:13 | 17:29 | 72 09:57 (V1) | |
| 29 | 06:20 | 06:49 | 07:18 | 07:48 | 07:23 | 08:45 (V1) |
| | 20:41 | 20:02 | 19:12 | 17:28 | 74 09:58 (V1) | |
| 30 | 06:21 | 06:50 | 07:19 | 07:50 | 07:24 | 08:46 (V1) |
| | 20:40 | 20:00 | 19:10 | 17:26 | 76 09:59 (V1) | |
| 31 | 06:22 | 06:51 | 07:20 | 07:51 | 07:25 | 08:47 (V1) |
| | 20:39 | 19:59 | 19:09 | 17:25 | 77 10:00 (V1) | |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Total, worst case | | | | 928 | 2609 | 2543 |
| Sun reduction | | | | 0,54 | 0,50 | 0,45 |
| Oper. time red. | | | | 0,77 | 0,77 | 0,77 |
| Wind dir. red. | | | | 0,66 | 0,66 | 0,66 |
| Total reduction | | | | 0,27 | 0,25 | 0,23 |
| Total, real | | | | 254 | 663 | 579 |

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: Progetto_2022_03_15Shadow receptor: F14 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
607 505 420 506 599 570 495 488 555 624 686 669 6.724

Table with columns for months (January to June) and rows for each day of the month. It includes sunrise and sunset times (V7, V4, V6) and a summary section at the bottom for 'Potential sun hours' and 'Total reduction'.

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

Matrix with 4 columns: 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: Progetto_2022_03_15Shadow receptor: F14 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| | | | | | | | | | | | |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December | | | | | | |
|---------------------|----------------|----------------|--------------------------|--------------------------|--------------------------|----------------|---------------------|--------------------------|--------------------------|------|--|--|
| 1 | 06:00 20:56 | 06:23 20:38 | 06:52 19:57 | 19:07 (V6) 19:33 (V6) | 07:20 19:08 | 06:52 17:24 | 07:25 17:01 | 15:28 (V7) 16:27 (V7) | | | | |
| 2 | 06:00 20:56 | 06:24 20:37 | 06:52 19:55 | 19:09 (V6) 19:31 (V6) | 07:21 19:07 | 06:53 17:23 | 07:26 17:01 | 15:28 (V7) 16:27 (V7) | | | | |
| 3 | 06:01 20:56 | 06:24 20:36 | 06:53 19:54 | 19:12 (V6) 19:28 (V6) | 07:21 19:05 | 06:54 17:21 | 07:27 17:00 | 15:28 (V7) 16:28 (V7) | | | | |
| 4 | 06:01 20:56 | 06:25 20:35 | 06:54 19:52 | 19:15 (V6) 19:22 (V6) | 07:22 19:04 | 06:55 17:20 | 07:28 17:00 | 15:28 (V7) 16:29 (V7) | | | | |
| 5 | 06:02 20:55 | 06:26 20:34 | 06:55 19:51 | 19:23 (V6) 19:02 | 07:23 19:02 | 06:56 17:19 | 07:29 17:00 | 15:29 (V7) 16:29 (V7) | | | | |
| 6 | 06:02 20:55 | 06:27 20:33 | 06:56 19:49 | 19:04 (V6) 19:00 | 07:24 19:00 | 06:57 17:18 | 07:30 17:00 | 15:29 (V7) 16:30 (V7) | | | | |
| 7 | 06:03 20:55 | 06:28 20:32 | 19:21 (V6) 19:30 (V6) | 06:57 19:48 | 07:25 18:59 | 06:59 17:17 | 07:31 17:00 | 15:29 (V7) 16:30 (V7) | | | | |
| 8 | 06:04 20:55 | 06:29 20:30 | 19:18 (V6) 19:33 (V6) | 06:58 19:46 | 07:26 18:57 | 07:00 17:16 | 07:32 17:00 | 15:30 (V7) 16:31 (V7) | | | | |
| 9 | 06:04 20:54 | 06:30 20:29 | 19:16 (V6) 19:35 (V6) | 06:59 19:44 | 07:27 18:56 | 07:01 17:15 | 07:33 17:00 | 15:30 (V7) 16:32 (V7) | | | | |
| 10 | 06:05 20:54 | 06:31 20:28 | 19:14 (V6) 19:37 (V6) | 07:00 19:43 | 18:54 (V4) 19:01 (V4) | 07:28 18:54 | 07:33 17:14 | 15:29 (V7) 16:31 (V7) | | | | |
| 11 | 06:06 20:54 | 06:32 20:27 | 19:12 (V6) 19:38 (V6) | 07:01 19:41 | 18:51 (V4) 19:04 (V4) | 07:29 18:53 | 15:48 (V7) 17:13 | 07:34 17:00 | 15:30 (V7) 16:32 (V7) | | | |
| 12 | 06:06 20:53 | 06:33 20:26 | 19:11 (V6) 19:40 (V6) | 07:02 19:39 | 18:49 (V4) 19:05 (V4) | 07:30 18:51 | 15:43 (V7) 17:12 | 07:35 17:00 | 15:31 (V7) 16:33 (V7) | | | |
| 13 | 06:07 20:53 | 06:34 20:24 | 19:10 (V6) 19:41 (V6) | 07:03 19:38 | 18:46 (V4) 19:05 (V4) | 07:31 18:50 | 15:40 (V7) 17:11 | 07:36 17:00 | 15:31 (V7) 16:34 (V7) | | | |
| 14 | 06:08 20:52 | 06:35 20:23 | 19:09 (V6) 19:41 (V6) | 07:04 19:36 | 18:45 (V4) 19:06 (V4) | 07:32 18:48 | 15:38 (V7) 17:10 | 07:37 17:01 | 15:31 (V7) 16:33 (V7) | | | |
| 15 | 06:08 20:52 | 06:36 20:22 | 19:08 (V6) 19:42 (V6) | 07:04 19:35 | 18:44 (V4) 19:06 (V4) | 07:33 18:47 | 15:37 (V7) 17:10 | 07:37 17:01 | 15:31 (V7) 16:34 (V7) | | | |
| 16 | 06:09 20:51 | 06:37 20:20 | 19:07 (V6) 19:42 (V6) | 07:05 19:33 | 18:43 (V4) 19:07 (V4) | 07:34 18:45 | 15:35 (V7) 17:09 | 07:38 17:01 | 15:32 (V7) 16:35 (V7) | | | |
| 17 | 06:10 20:50 | 06:37 20:19 | 19:06 (V6) 19:42 (V6) | 07:06 19:31 | 18:43 (V4) 19:06 (V4) | 07:36 18:44 | 15:34 (V7) 17:08 | 07:39 17:01 | 15:32 (V7) 16:35 (V7) | | | |
| 18 | 06:11 20:50 | 06:38 20:18 | 19:05 (V6) 19:42 (V6) | 07:07 19:30 | 18:42 (V4) 19:06 (V4) | 07:37 18:42 | 15:33 (V7) 17:07 | 07:39 17:02 | 15:33 (V7) 16:36 (V7) | | | |
| 19 | 06:11 20:49 | 06:39 20:16 | 19:05 (V6) 19:42 (V6) | 07:08 19:28 | 18:42 (V4) 19:06 (V4) | 07:38 18:41 | 15:32 (V7) 17:07 | 07:40 17:02 | 15:34 (V7) 16:37 (V7) | | | |
| 20 | 06:12 20:49 | 06:40 20:15 | 19:04 (V6) 19:42 (V6) | 07:09 19:26 | 18:43 (V4) 19:05 (V4) | 07:39 18:39 | 15:32 (V7) 17:06 | 07:41 17:03 | 15:34 (V7) 16:37 (V7) | | | |
| 21 | 06:13 20:48 | 06:41 20:13 | 19:04 (V6) 19:42 (V6) | 07:10 19:25 | 18:43 (V4) 19:03 (V4) | 07:40 18:38 | 15:31 (V7) 17:05 | 07:41 17:03 | 15:34 (V7) 16:38 (V7) | | | |
| 22 | 06:14 20:47 | 06:42 20:12 | 19:04 (V6) 19:42 (V6) | 07:11 19:23 | 18:44 (V4) 19:02 (V4) | 07:41 18:37 | 15:30 (V7) 17:05 | 07:42 17:03 | 15:34 (V7) 16:38 (V7) | | | |
| 23 | 06:15 20:46 | 06:43 20:11 | 19:04 (V6) 19:42 (V6) | 07:12 19:21 | 18:45 (V4) 19:00 (V4) | 07:42 18:35 | 15:29 (V7) 17:04 | 07:42 17:04 | 15:36 (V7) 16:39 (V7) | | | |
| 24 | 06:16 20:46 | 06:44 20:09 | 19:04 (V6) 19:42 (V6) | 07:13 19:20 | 18:46 (V4) 18:57 (V4) | 07:43 18:34 | 15:29 (V7) 17:04 | 07:43 17:05 | 15:36 (V7) 16:39 (V7) | | | |
| 25 | 06:16 20:45 | 06:45 20:08 | 19:04 (V6) 19:41 (V6) | 07:14 19:18 | 18:50 (V4) 18:53 (V4) | 06:44 17:33 | 15:28 (V7) 17:03 | 07:43 17:05 | 15:36 (V7) 16:39 (V7) | | | |
| 26 | 06:17 20:44 | 06:46 20:06 | 19:03 (V6) 19:40 (V6) | 07:15 19:16 | 18:53 (V4) | 06:45 17:31 | 15:29 (V7) 17:03 | 07:43 17:06 | 15:37 (V7) 16:40 (V7) | | | |
| 27 | 06:18 20:43 | 06:47 20:05 | 19:03 (V6) 19:39 (V6) | 07:16 19:15 | 18:53 (V4) | 06:46 17:30 | 15:29 (V7) 17:02 | 07:44 17:06 | 15:37 (V7) 16:40 (V7) | | | |
| 28 | 06:19 20:42 | 06:48 20:03 | 19:04 (V6) 19:38 (V6) | 07:17 19:13 | 18:44 (V4) | 06:47 17:29 | 15:29 (V7) 17:02 | 07:44 17:07 | 15:37 (V7) 16:40 (V7) | | | |
| 29 | 06:20 20:41 | 06:49 20:02 | 19:04 (V6) 19:37 (V6) | 07:18 19:12 | 18:48 (V4) | 06:48 17:27 | 15:28 (V7) 17:02 | 07:44 17:08 | 15:39 (V7) 16:41 (V7) | | | |
| 30 | 06:21 20:40 | 06:50 20:00 | 19:05 (V6) 19:36 (V6) | 07:19 19:10 | 18:48 (V4) | 06:48 17:26 | 15:28 (V7) 17:01 | 07:44 17:08 | 15:39 (V7) 16:42 (V7) | | | |
| 31 | 06:22 20:39 | 06:51 19:59 | 19:06 (V6) 19:35 (V6) | 07:20 | 18:48 (V4) | 06:48 17:25 | 15:28 (V7) 17:09 | 07:44 16:42 (V7) | 15:39 (V7) 16:42 (V7) | | | |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 | | | | | | |
| Total, worst case | | | 790 | 353 | | | | | | 1927 | | |
| Sun reduction | | | 0,73 | 0,65 | | | | | | 0,45 | | |
| Oper. time red. | | | 0,77 | 0,77 | | | | | | 0,77 | | |
| Wind dir. red. | | | 0,66 | 0,66 | | | | | | 0,61 | | |
| Total reduction | | | 0,37 | 0,33 | | | | | | 0,21 | | |
| Total, real | | | 291 | 115 | | | | | | 407 | | |

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: Progetto_2022_03_15Shadow receptor: F15 - ente urbano

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|----------------|----------------|----------------|--------------------------|--------------------------|------------------|
| 1 | 07:45 17:10 | 07:33 17:43 | 06:59 18:16 | 07:10 19:48 | 18:39 (V4) 18:41 (V4) | 06:26 20:17 |
| 2 | 07:45 17:11 | 07:32 17:44 | 06:57 18:17 | 07:09 19:49 | 06:25 20:18 | 63 18:09 (V6) |
| 3 | 07:45 17:12 | 07:31 17:46 | 06:56 18:18 | 07:07 19:49 | 06:24 20:19 | 63 19:12 (V6) |
| 4 | 07:45 17:13 | 07:30 17:47 | 06:54 18:19 | 07:05 19:50 | 06:23 20:20 | 62 19:12 (V6) |
| 5 | 07:46 17:14 | 07:29 17:48 | 06:53 18:20 | 07:04 19:51 | 06:22 20:21 | 62 19:12 (V6) |
| 6 | 07:46 17:15 | 07:28 17:49 | 06:51 18:21 | 07:02 19:52 | 06:20 20:22 | 62 18:09 (V6) |
| 7 | 07:45 17:16 | 07:27 17:50 | 06:50 18:22 | 07:01 19:53 | 06:19 20:23 | 62 19:11 (V6) |
| 8 | 07:45 17:16 | 07:26 17:52 | 06:48 18:23 | 06:59 19:54 | 06:18 20:24 | 61 19:11 (V6) |
| 9 | 07:45 17:17 | 07:25 17:53 | 06:47 18:24 | 06:58 19:55 | 06:17 20:25 | 60 18:10 (V6) |
| 10 | 07:45 17:18 | 07:24 17:54 | 06:45 18:25 | 06:56 19:56 | 06:16 20:26 | 60 18:10 (V6) |
| 11 | 07:45 17:19 | 07:23 17:55 | 06:44 18:26 | 06:55 19:57 | 06:15 20:27 | 59 19:10 (V6) |
| 12 | 07:45 17:20 | 07:22 17:56 | 06:42 18:27 | 06:53 19:58 | 06:14 20:28 | 58 18:11 (V6) |
| 13 | 07:44 17:22 | 07:20 17:57 | 06:41 18:28 | 17:40 (V4) 17:53 (V4) | 06:52 19:59 | 38 18:25 (V6) |
| 14 | 07:44 17:23 | 07:19 17:59 | 06:39 18:29 | 17:36 (V4) 17:55 (V4) | 06:50 20:00 | 42 19:03 (V6) |
| 15 | 07:44 17:24 | 07:18 18:00 | 06:37 18:30 | 17:35 (V4) 17:57 (V4) | 06:49 20:01 | 45 18:21 (V6) |
| 16 | 07:43 17:25 | 07:17 18:01 | 06:36 18:31 | 17:33 (V4) 17:57 (V4) | 06:47 20:02 | 47 19:06 (V6) |
| 17 | 07:43 17:26 | 07:15 18:02 | 06:34 18:32 | 17:32 (V4) 17:59 (V4) | 06:46 20:03 | 50 18:18 (V6) |
| 18 | 07:43 17:27 | 07:14 18:03 | 06:33 18:33 | 17:30 (V4) 17:59 (V4) | 06:44 20:04 | 52 18:16 (V6) |
| 19 | 07:42 17:28 | 07:13 18:04 | 06:31 18:34 | 17:29 (V4) 17:59 (V4) | 06:43 20:05 | 54 19:09 (V6) |
| 20 | 07:42 17:29 | 07:12 18:06 | 06:29 18:35 | 17:29 (V4) 18:00 (V4) | 06:41 20:06 | 55 18:15 (V6) |
| 21 | 07:41 17:30 | 07:10 18:07 | 06:28 18:36 | 17:28 (V4) 17:59 (V4) | 06:40 20:07 | 57 19:10 (V6) |
| 22 | 07:41 17:31 | 07:09 18:08 | 06:26 18:37 | 17:28 (V4) 17:59 (V4) | 06:38 20:08 | 58 18:13 (V6) |
| 23 | 07:40 17:33 | 07:07 18:09 | 06:25 18:38 | 17:28 (V4) 17:59 (V4) | 06:37 20:09 | 60 19:11 (V6) |
| 24 | 07:39 17:34 | 07:06 18:10 | 06:23 18:40 | 17:28 (V4) 17:58 (V4) | 06:36 20:10 | 60 18:11 (V6) |
| 25 | 07:39 17:35 | 07:05 18:11 | 06:21 18:41 | 17:28 (V4) 17:58 (V4) | 06:34 20:11 | 61 19:12 (V6) |
| 26 | 07:38 17:36 | 07:03 18:12 | 06:20 18:42 | 17:28 (V4) 17:57 (V4) | 06:33 20:12 | 61 18:10 (V6) |
| 27 | 07:37 17:37 | 07:02 18:13 | 06:18 18:43 | 17:28 (V4) 17:55 (V4) | 06:32 20:13 | 62 19:12 (V6) |
| 28 | 07:36 17:38 | 07:00 18:14 | 06:17 18:44 | 17:30 (V4) 17:54 (V4) | 06:30 20:14 | 62 18:10 (V6) |
| 29 | 07:36 17:40 | 07:00 19:45 | 06:15 19:45 | 18:30 (V4) 18:52 (V4) | 06:29 20:15 | 63 19:13 (V6) |
| 30 | 07:35 17:41 | 07:03 19:46 | 06:13 19:46 | 18:32 (V4) 18:51 (V4) | 06:28 20:16 | 63 18:09 (V6) |
| 31 | 07:34 17:42 | 07:12 19:47 | 06:12 19:47 | 18:34 (V4) 18:48 (V4) | 06:00 20:16 | 31 20:45 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | | | 483 | 1078 | 1593 | 168 |
| Sun reduction | | | 0,49 | 0,53 | 0,59 | 0,66 |
| Oper. time red. | | | 0,77 | 0,77 | 0,77 | 0,77 |
| Wind dir. red. | | | 0,65 | 0,66 | 0,66 | 0,66 |
| Total reduction | | | 0,25 | 0,27 | 0,30 | 0,34 |
| Total, real | | | 119 | 290 | 477 | 57 |

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: Progetto_2022_03_15Shadow receptor: F15 - ente urbano

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December |
|---------------------|-------|------------|------------|------------|------------|------------|
| 1 | 06:00 | 06:23 | 18:22 (V6) | 06:52 | 18:30 (V6) | 07:20 |
| | 20:56 | 20:38 | 19:20 (V6) | 19:57 | 18:57 (V6) | 19:08 |
| 2 | 06:00 | 06:24 | 18:21 (V6) | 06:52 | 18:33 (V6) | 07:21 |
| | 20:56 | 20:37 | 19:20 (V6) | 19:55 | 18:53 (V6) | 19:07 |
| 3 | 06:01 | 06:24 | 18:21 (V6) | 06:53 | 18:40 (V6) | 07:21 |
| | 20:56 | 20:36 | 19:21 (V6) | 19:54 | 18:46 (V6) | 19:05 |
| 4 | 06:01 | 18:45 (V6) | 06:25 | 18:21 (V6) | 06:54 | 07:22 |
| | 20:56 | 18:54 (V6) | 20:35 | 19:21 (V6) | 19:52 | 19:04 |
| 5 | 06:02 | 18:43 (V6) | 06:26 | 18:20 (V6) | 06:55 | 07:23 |
| | 20:55 | 18:56 (V6) | 20:34 | 19:21 (V6) | 19:51 | 19:02 |
| 6 | 06:02 | 18:41 (V6) | 06:27 | 18:20 (V6) | 06:56 | 07:24 |
| | 20:55 | 18:57 (V6) | 20:33 | 19:21 (V6) | 19:49 | 19:00 |
| 7 | 06:03 | 18:41 (V6) | 06:28 | 18:19 (V6) | 06:57 | 07:25 |
| | 20:55 | 18:59 (V6) | 20:32 | 19:21 (V6) | 19:48 | 18:59 |
| 8 | 06:04 | 18:40 (V6) | 06:29 | 18:18 (V6) | 06:58 | 07:26 |
| | 20:55 | 19:01 (V6) | 20:30 | 19:21 (V6) | 19:46 | 18:57 |
| 9 | 06:04 | 18:38 (V6) | 06:30 | 18:18 (V6) | 06:59 | 07:27 |
| | 20:54 | 19:02 (V6) | 20:29 | 19:21 (V6) | 19:44 | 18:56 |
| 10 | 06:05 | 18:38 (V6) | 06:31 | 18:18 (V6) | 07:00 | 07:28 |
| | 20:54 | 19:03 (V6) | 20:28 | 19:21 (V6) | 19:43 | 18:54 |
| 11 | 06:06 | 18:37 (V6) | 06:32 | 18:18 (V6) | 07:01 | 07:29 |
| | 20:54 | 19:05 (V6) | 20:27 | 19:21 (V6) | 19:41 | 18:53 |
| 12 | 06:06 | 18:36 (V6) | 06:33 | 18:18 (V6) | 07:02 | 18:27 (V4) |
| | 20:53 | 19:05 (V6) | 20:26 | 19:21 (V6) | 19:39 | 18:40 (V4) |
| 13 | 06:07 | 18:35 (V6) | 06:34 | 18:18 (V6) | 07:03 | 18:23 (V4) |
| | 20:53 | 19:07 (V6) | 20:24 | 19:20 (V6) | 19:38 | 18:41 (V4) |
| 14 | 06:08 | 18:34 (V6) | 06:35 | 18:18 (V6) | 07:04 | 18:21 (V4) |
| | 20:52 | 19:08 (V6) | 20:23 | 19:20 (V6) | 19:36 | 18:42 (V4) |
| 15 | 06:08 | 18:33 (V6) | 06:36 | 18:18 (V6) | 07:04 | 18:19 (V4) |
| | 20:52 | 19:08 (V6) | 20:22 | 19:20 (V6) | 19:35 | 18:43 (V4) |
| 16 | 06:09 | 18:32 (V6) | 06:37 | 18:18 (V6) | 07:05 | 18:18 (V4) |
| | 20:51 | 19:10 (V6) | 20:20 | 19:20 (V6) | 19:33 | 18:44 (V4) |
| 17 | 06:10 | 18:32 (V6) | 06:38 | 18:17 (V6) | 07:06 | 18:17 (V4) |
| | 20:51 | 19:11 (V6) | 20:19 | 19:18 (V6) | 19:31 | 18:45 (V4) |
| 18 | 06:11 | 18:31 (V6) | 06:38 | 18:17 (V6) | 07:07 | 18:16 (V4) |
| | 20:50 | 19:12 (V6) | 20:18 | 19:18 (V6) | 19:30 | 18:45 (V4) |
| 19 | 06:11 | 18:30 (V6) | 06:39 | 18:17 (V6) | 07:08 | 18:15 (V4) |
| | 20:49 | 19:12 (V6) | 20:16 | 19:17 (V6) | 19:28 | 18:45 (V4) |
| 20 | 06:12 | 18:29 (V6) | 06:40 | 18:17 (V6) | 07:09 | 18:14 (V4) |
| | 20:49 | 19:13 (V6) | 20:15 | 19:16 (V6) | 19:26 | 18:45 (V4) |
| 21 | 06:13 | 18:29 (V6) | 06:41 | 18:18 (V6) | 07:10 | 18:14 (V4) |
| | 20:48 | 19:14 (V6) | 20:13 | 19:16 (V6) | 19:25 | 18:45 (V4) |
| 22 | 06:14 | 18:28 (V6) | 06:42 | 18:18 (V6) | 07:11 | 18:14 (V4) |
| | 20:47 | 19:15 (V6) | 20:12 | 19:15 (V6) | 19:23 | 18:45 (V4) |
| 23 | 06:15 | 18:27 (V6) | 06:43 | 18:19 (V6) | 07:12 | 18:13 (V4) |
| | 20:46 | 19:15 (V6) | 20:11 | 19:14 (V6) | 19:21 | 18:44 (V4) |
| 24 | 06:16 | 18:26 (V6) | 06:44 | 18:19 (V6) | 07:13 | 18:12 (V4) |
| | 20:46 | 19:16 (V6) | 20:09 | 19:13 (V6) | 19:20 | 18:43 (V4) |
| 25 | 06:16 | 18:26 (V6) | 06:45 | 18:20 (V6) | 07:14 | 18:13 (V4) |
| | 20:45 | 19:17 (V6) | 20:08 | 19:12 (V6) | 19:18 | 18:42 (V4) |
| 26 | 06:17 | 18:25 (V6) | 06:46 | 18:20 (V6) | 07:15 | 18:13 (V4) |
| | 20:44 | 19:17 (V6) | 20:06 | 19:09 (V6) | 19:17 | 18:41 (V4) |
| 27 | 06:18 | 18:25 (V6) | 06:47 | 18:21 (V6) | 07:16 | 18:14 (V4) |
| | 20:43 | 19:18 (V6) | 20:05 | 19:08 (V6) | 19:15 | 18:39 (V4) |
| 28 | 06:19 | 18:24 (V6) | 06:48 | 18:22 (V6) | 07:17 | 18:15 (V4) |
| | 20:42 | 19:19 (V6) | 20:03 | 19:06 (V6) | 19:13 | 18:38 (V4) |
| 29 | 06:20 | 18:24 (V6) | 06:49 | 18:23 (V6) | 07:18 | 18:16 (V4) |
| | 20:41 | 19:19 (V6) | 20:02 | 19:05 (V6) | 19:12 | 18:36 (V4) |
| 30 | 06:21 | 18:23 (V6) | 06:50 | 18:25 (V6) | 07:19 | 18:18 (V4) |
| | 20:40 | 19:19 (V6) | 20:00 | 19:02 (V6) | 19:10 | 18:33 (V4) |
| 31 | 06:22 | 18:22 (V6) | 06:51 | 18:27 (V6) | | 06:51 |
| | 20:39 | 19:19 (V6) | 19:59 | 19:00 (V6) | | 17:25 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Total, worst case | 1057 | 1753 | 537 | 7 | | |
| Sun reduction | 0,74 | 0,73 | 0,65 | 0,54 | | |
| Oper. time red. | 0,77 | 0,77 | 0,77 | 0,77 | | |
| Wind dir. red. | 0,66 | 0,66 | 0,65 | 0,65 | | |
| Total reduction | 0,37 | 0,37 | 0,32 | 0,27 | | |
| Total, real | 396 | 651 | 174 | 2 | | |

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

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

Project:

Progetto_GRV Villanovafranca

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

15/03/2022 11:20/3.4.415

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F16 - uliveto

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June | |
|---------------------|----------------|------------------|----------------|---------------------|---------------------|---------------------|------------|
| 1 | 07:45 17:10 | 07:33 17:43 | 06:59 18:16 | 07:10 17:43 (V4) | 06:26 18:46 (V6) | 05:59 18:51 (V6) | 17:43 (V6) |
| 2 | 07:45 17:11 | 07:32 17:44 | 06:57 18:17 | 07:09 17:45 (V4) | 06:25 18:47 (V6) | 05:59 18:50 (V6) | 17:44 (V6) |
| 3 | 07:45 17:12 | 07:31 17:46 | 06:56 18:18 | 07:07 17:19 (V4) | 06:24 17:29 (V6) | 05:58 17:21 (V6) | 17:44 (V6) |
| 4 | 07:46 17:13 | 07:30 17:47 | 06:54 18:19 | 07:05 17:17 (V4) | 06:23 17:28 (V6) | 05:58 17:21 (V6) | 17:45 (V6) |
| 5 | 07:46 17:14 | 07:29 17:48 | 06:53 18:20 | 07:04 17:16 (V4) | 06:22 17:27 (V6) | 05:58 17:22 (V6) | 17:46 (V6) |
| 6 | 07:46 17:15 | 07:28 17:49 | 06:51 18:21 | 07:02 17:15 (V4) | 06:20 17:25 (V6) | 05:57 17:22 (V6) | 17:47 (V6) |
| 7 | 07:46 17:16 | 07:27 17:50 | 06:50 18:22 | 07:01 17:14 (V4) | 06:19 17:25 (V6) | 05:57 17:22 (V6) | 17:48 (V6) |
| 8 | 07:45 17:17 | 07:26 17:52 | 06:48 18:23 | 06:59 17:14 (V4) | 06:18 17:23 (V6) | 05:57 17:23 (V6) | 17:49 (V6) |
| 9 | 07:45 17:17 | 07:25 17:53 | 06:47 18:24 | 06:58 17:13 (V4) | 06:17 17:23 (V6) | 05:57 17:24 (V6) | 17:50 (V6) |
| 10 | 07:45 17:18 | 07:24 17:54 | 06:45 18:25 | 06:56 17:13 (V4) | 06:16 17:22 (V6) | 05:56 17:24 (V6) | 17:51 (V6) |
| 11 | 07:45 17:19 | 07:23 17:55 | 06:44 18:26 | 06:55 17:12 (V4) | 06:15 17:22 (V6) | 05:56 17:25 (V6) | 17:51 (V6) |
| 12 | 07:45 17:21 | 07:22 17:56 | 06:42 18:27 | 06:53 17:12 (V4) | 06:14 17:21 (V6) | 05:56 17:25 (V6) | 17:52 (V6) |
| 13 | 07:45 17:22 | 07:20 17:57 | 06:41 18:28 | 06:52 17:12 (V4) | 06:13 17:20 (V6) | 05:56 17:26 (V6) | 17:53 (V6) |
| 14 | 07:44 17:23 | 07:19 17:59 | 06:39 18:29 | 06:50 17:12 (V4) | 06:12 17:20 (V6) | 05:56 17:28 (V6) | 17:54 (V6) |
| 15 | 07:44 17:24 | 07:18 18:00 | 06:37 18:30 | 06:49 17:12 (V4) | 06:11 17:20 (V6) | 05:56 17:28 (V6) | 17:54 (V6) |
| 16 | 07:44 17:25 | 07:17 18:01 | 06:36 18:31 | 06:47 17:12 (V4) | 06:10 17:19 (V6) | 05:56 17:29 (V6) | 17:55 (V6) |
| 17 | 07:43 17:26 | 07:15 18:02 | 06:34 18:32 | 06:46 17:13 (V4) | 06:09 17:19 (V6) | 05:56 17:30 (V6) | 17:55 (V6) |
| 18 | 07:43 17:27 | 07:14 18:03 | 06:33 18:33 | 06:44 17:14 (V4) | 06:08 17:18 (V6) | 05:56 17:30 (V6) | 17:55 (V6) |
| 19 | 07:42 17:28 | 07:13 18:04 | 06:31 18:34 | 06:43 17:14 (V4) | 06:07 17:18 (V6) | 05:56 17:31 (V6) | 17:56 (V6) |
| 20 | 07:42 17:29 | 07:12 18:06 | 06:29 18:35 | 06:41 17:16 (V4) | 06:07 17:19 (V6) | 05:56 17:32 (V6) | 17:56 (V6) |
| 21 | 07:41 17:30 | 07:10 18:07 | 06:28 18:36 | 06:40 17:17 (V4) | 06:06 17:18 (V6) | 05:57 17:33 (V6) | 17:56 (V6) |
| 22 | 07:41 17:31 | 07:09 18:08 | 06:26 18:38 | 06:38 17:03 (V6) | 06:05 17:18 (V6) | 05:57 17:33 (V6) | 17:57 (V6) |
| 23 | 07:40 17:33 | 07:07 18:09 | 06:25 18:39 | 06:37 16:57 (V6) | 06:04 17:18 (V6) | 05:57 17:35 (V6) | 17:57 (V6) |
| 24 | 07:39 17:34 | 07:06 18:10 | 06:23 18:40 | 06:36 16:52 (V6) | 06:04 17:18 (V6) | 05:57 17:35 (V6) | 17:56 (V6) |
| 25 | 07:39 17:35 | 07:05 18:11 | 06:21 18:41 | 06:34 16:49 (V6) | 06:03 17:19 (V6) | 05:58 17:36 (V6) | 17:56 (V6) |
| 26 | 07:38 17:36 | 07:03 18:12 | 06:20 18:42 | 06:33 16:45 (V6) | 06:02 17:18 (V6) | 05:58 17:37 (V6) | 17:57 (V6) |
| 27 | 07:37 17:37 | 07:02 18:13 | 06:18 18:43 | 06:32 16:42 (V6) | 06:02 17:19 (V6) | 05:58 17:38 (V6) | 17:56 (V6) |
| 28 | 07:36 17:38 | 07:00 18:14 | 06:17 18:44 | 06:30 16:40 (V6) | 06:01 17:19 (V6) | 05:59 17:39 (V6) | 17:57 (V6) |
| 29 | 07:36 17:40 | 14 17:40 (V4) | 07:15 18:44 | 06:29 17:38 (V6) | 06:01 17:20 (V6) | 05:59 17:40 (V6) | 17:56 (V6) |
| 30 | 07:35 17:41 | | 07:13 18:44 | 06:28 17:36 (V6) | 06:00 17:19 (V6) | 05:59 17:41 (V6) | 17:55 (V6) |
| 31 | 07:34 17:42 | | 07:12 18:45 | 06:27 17:34 (V6) | 06:00 20:45 | 05:59 17:41 (V6) | 18:33 (V6) |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 | |
| Total, worst case | | 14 | 1197 | 2703 | 2295 | 1158 | |
| Sun reduction | | 0,47 | 0,49 | 0,53 | 0,59 | 0,66 | |
| Oper. time red. | | 0,77 | 0,77 | 0,77 | 0,77 | 0,77 | |
| Wind dir. red. | | 0,63 | 0,64 | 0,66 | 0,66 | 0,66 | |
| Total reduction | | 0,23 | 0,24 | 0,27 | 0,30 | 0,33 | |
| Total, real | | 3 | 291 | 721 | 682 | 387 | |

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

Project:

Progetto_GRV Villanovafranca

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
15/03/2022 11:20/3.4.415

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F17 - ente urbano

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| | | | | | | | | | | | |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June | |
|---------------------|----------------|----------------|----------------|---------------------|---------------------|---------------------|------------|
| 1 | 07:45 17:10 | 07:33 17:43 | 06:59 18:16 | 07:10 19:48 | 18:31 (V4) 06:26 | 18:16 (V6) 05:59 | 18:18 (V6) |
| 2 | 07:45 17:11 | 07:32 17:44 | 06:57 18:17 | 07:09 19:49 | 18:33 (V4) 06:25 | 18:15 (V6) 05:59 | 18:19 (V6) |
| 3 | 07:45 17:12 | 07:31 17:46 | 06:56 18:18 | 07:07 19:50 | 18:35 (V4) 06:24 | 18:15 (V6) 05:58 | 18:19 (V6) |
| 4 | 07:45 17:13 | 07:30 17:47 | 06:54 18:19 | 07:05 19:50 | 18:39 (V4) 06:23 | 18:14 (V6) 05:58 | 18:20 (V6) |
| 5 | 07:46 17:14 | 07:29 17:48 | 06:53 18:20 | 07:04 19:51 | 18:47 (V4) 06:22 | 18:14 (V6) 05:58 | 18:21 (V6) |
| 6 | 07:46 17:15 | 07:28 17:49 | 06:51 18:21 | 07:02 19:52 | 06:20 20:22 | 18:13 (V6) 05:57 | 18:20 (V6) |
| 7 | 07:45 17:16 | 07:27 17:50 | 06:50 18:22 | 07:01 19:53 | 06:19 20:23 | 18:13 (V6) 05:57 | 18:21 (V6) |
| 8 | 07:45 17:16 | 07:26 17:52 | 06:48 18:23 | 06:59 19:54 | 06:18 20:24 | 18:13 (V6) 05:57 | 18:22 (V6) |
| 9 | 07:45 17:17 | 07:25 17:53 | 06:47 18:24 | 06:58 19:55 | 06:17 20:25 | 18:12 (V6) 05:57 | 18:22 (V6) |
| 10 | 07:45 17:18 | 07:24 17:54 | 06:45 18:25 | 06:56 19:56 | 06:16 20:26 | 18:12 (V6) 05:56 | 18:23 (V6) |
| 11 | 07:45 17:19 | 07:23 17:55 | 06:44 18:26 | 06:55 19:57 | 06:15 20:27 | 18:12 (V6) 05:56 | 18:23 (V6) |
| 12 | 07:45 17:20 | 07:22 17:56 | 06:42 18:27 | 06:53 19:58 | 06:14 20:28 | 18:12 (V6) 05:56 | 18:24 (V6) |
| 13 | 07:44 17:22 | 07:20 17:57 | 06:41 18:28 | 06:52 19:59 | 06:13 20:29 | 18:12 (V6) 05:56 | 18:24 (V6) |
| 14 | 07:44 17:23 | 07:19 17:59 | 06:39 18:29 | 06:50 20:00 | 06:12 20:30 | 18:13 (V6) 05:56 | 18:24 (V6) |
| 15 | 07:44 17:24 | 07:18 18:00 | 06:37 18:30 | 17:44 (V4) 06:49 | 06:11 20:31 | 18:13 (V6) 05:56 | 18:25 (V6) |
| 16 | 07:43 17:25 | 07:17 18:01 | 06:36 18:31 | 17:54 (V4) 06:47 | 06:10 20:32 | 18:13 (V6) 05:56 | 18:25 (V6) |
| 17 | 07:43 17:26 | 07:15 18:02 | 06:34 18:32 | 17:56 (V4) 06:46 | 18:44 (V6) 06:09 | 18:13 (V6) 05:56 | 18:25 (V6) |
| 18 | 07:43 17:27 | 07:14 18:03 | 06:33 18:33 | 17:59 (V4) 06:44 | 18:55 (V6) 06:08 | 18:13 (V6) 05:56 | 18:26 (V6) |
| 19 | 07:42 17:28 | 07:13 18:04 | 06:31 18:34 | 18:00 (V4) 06:43 | 19:00 (V6) 06:07 | 18:13 (V6) 05:56 | 18:26 (V6) |
| 20 | 07:42 17:29 | 07:12 18:06 | 06:29 18:35 | 17:33 (V4) 06:41 | 19:03 (V6) 06:07 | 18:13 (V6) 05:56 | 18:26 (V6) |
| 21 | 07:41 17:30 | 07:10 18:07 | 06:28 18:36 | 18:02 (V4) 06:40 | 19:06 (V6) 06:06 | 18:14 (V6) 05:57 | 18:26 (V6) |
| 22 | 07:41 17:31 | 07:09 18:08 | 06:26 18:37 | 18:01 (V4) 06:38 | 19:08 (V6) 06:05 | 18:14 (V6) 05:57 | 18:27 (V6) |
| 23 | 07:40 17:33 | 07:07 18:09 | 06:25 18:39 | 17:30 (V4) 06:37 | 19:10 (V6) 06:04 | 18:14 (V6) 05:57 | 18:27 (V6) |
| 24 | 07:39 17:34 | 07:06 18:10 | 06:23 18:40 | 18:02 (V4) 06:36 | 19:11 (V6) 06:04 | 18:15 (V6) 05:57 | 18:27 (V6) |
| 25 | 07:39 17:35 | 07:05 18:11 | 06:21 18:41 | 18:02 (V4) 06:34 | 19:12 (V6) 06:03 | 18:15 (V6) 05:58 | 18:26 (V6) |
| 26 | 07:38 17:36 | 07:03 18:12 | 06:20 18:42 | 17:30 (V4) 06:33 | 19:14 (V6) 06:02 | 18:15 (V6) 05:58 | 18:27 (V6) |
| 27 | 07:37 17:37 | 07:02 18:13 | 06:18 18:43 | 18:01 (V4) 06:32 | 19:14 (V6) 06:02 | 18:16 (V6) 05:58 | 18:27 (V6) |
| 28 | 07:36 17:38 | 07:00 18:14 | 06:17 18:44 | 18:00 (V4) 06:30 | 19:15 (V6) 06:01 | 18:16 (V6) 05:59 | 18:28 (V6) |
| 29 | 07:36 17:40 | 07:15 19:45 | 07:15 18:45 | 18:29 (V4) 06:29 | 18:18 (V6) 06:01 | 18:17 (V6) 05:59 | 18:27 (V6) |
| 30 | 07:35 17:41 | 07:13 19:46 | 07:13 18:46 | 18:59 (V4) 06:28 | 19:17 (V6) 06:00 | 18:17 (V6) 05:59 | 18:27 (V6) |
| 31 | 07:34 17:42 | 07:12 19:47 | 07:12 18:47 | 18:31 (V4) 06:26 | 19:17 (V6) 06:00 | 18:18 (V6) 05:59 | 18:27 (V6) |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 | |
| Total, worst case | | | 465 | 684 | 2040 | 1687 | |
| Sun reduction | | | 0,49 | 0,53 | 0,59 | 0,66 | |
| Oper. time red. | | | 0,77 | 0,77 | 0,77 | 0,77 | |
| Wind dir. red. | | | 0,65 | 0,66 | 0,66 | 0,66 | |
| Total reduction | | | 0,25 | 0,27 | 0,30 | 0,34 | |
| Total, real | | | 115 | 183 | 608 | 565 | |

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

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

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F17 - ente urbano

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December |
|---------------------|-------|-------------------------|-------------------------|-------------------------|----------|----------|
| 1 | 06:00 | 18:27 (V6) 06:23 | 18:23 (V6) 06:52 | 07:20 | 06:52 | 07:25 |
| | 20:56 | 56 19:23 (V6) 20:38 | 68 19:31 (V6) 19:57 | 19:08 | 17:24 | 17:01 |
| 2 | 06:00 | 18:27 (V6) 06:24 | 18:23 (V6) 06:52 | 07:21 | 06:53 | 07:26 |
| | 20:56 | 56 19:23 (V6) 20:37 | 68 19:31 (V6) 19:55 | 19:07 | 17:23 | 17:01 |
| 3 | 06:01 | 18:27 (V6) 06:24 | 18:23 (V6) 06:53 | 07:21 | 06:54 | 07:27 |
| | 20:56 | 57 19:24 (V6) 20:36 | 68 19:31 (V6) 19:54 | 19:05 | 17:21 | 17:00 |
| 4 | 06:01 | 18:27 (V6) 06:25 | 18:23 (V6) 06:54 | 07:22 | 06:55 | 07:28 |
| | 20:56 | 57 19:24 (V6) 20:35 | 68 19:31 (V6) 19:52 | 19:04 | 17:20 | 17:00 |
| 5 | 06:02 | 18:27 (V6) 06:26 | 18:23 (V6) 06:55 | 07:23 | 06:56 | 07:29 |
| | 20:55 | 58 19:25 (V6) 20:34 | 67 19:30 (V6) 19:51 | 19:02 | 17:19 | 17:00 |
| 6 | 06:02 | 18:27 (V6) 06:27 | 18:23 (V6) 06:56 | 07:24 | 06:57 | 07:30 |
| | 20:55 | 58 19:25 (V6) 20:33 | 67 19:30 (V6) 19:49 | 19:00 | 17:18 | 17:00 |
| 7 | 06:03 | 18:27 (V6) 06:28 | 18:23 (V6) 06:57 | 07:25 | 06:59 | 07:31 |
| | 20:55 | 59 19:26 (V6) 20:32 | 66 19:29 (V6) 19:48 | 18:59 | 17:17 | 17:00 |
| 8 | 06:04 | 18:27 (V6) 06:29 | 18:23 (V6) 06:58 | 18:34 (V4) 07:26 | 07:00 | 07:32 |
| | 20:55 | 59 19:26 (V6) 20:30 | 65 19:28 (V6) 19:46 | 6 18:40 (V4) 18:57 | 17:16 | 17:00 |
| 9 | 06:04 | 18:26 (V6) 06:30 | 18:23 (V6) 06:59 | 18:29 (V4) 07:27 | 07:01 | 07:33 |
| | 20:54 | 60 19:26 (V6) 20:29 | 65 19:28 (V6) 19:44 | 15 18:44 (V4) 18:56 | 17:15 | 17:00 |
| 10 | 06:05 | 18:27 (V6) 06:31 | 18:24 (V6) 07:00 | 18:27 (V4) 07:28 | 07:02 | 07:33 |
| | 20:54 | 60 19:27 (V6) 20:28 | 63 19:27 (V6) 19:43 | 19 18:46 (V4) 18:54 | 17:14 | 17:00 |
| 11 | 06:06 | 18:27 (V6) 06:32 | 18:24 (V6) 07:01 | 18:25 (V4) 07:29 | 07:03 | 07:34 |
| | 20:54 | 61 19:28 (V6) 20:27 | 63 19:27 (V6) 19:41 | 23 18:48 (V4) 18:53 | 17:13 | 17:00 |
| 12 | 06:06 | 18:26 (V6) 06:33 | 18:24 (V6) 07:02 | 18:23 (V4) 07:30 | 07:04 | 07:35 |
| | 20:53 | 61 19:27 (V6) 20:26 | 62 19:26 (V6) 19:39 | 26 18:49 (V4) 18:51 | 17:12 | 17:00 |
| 13 | 06:07 | 18:26 (V6) 06:34 | 18:25 (V6) 07:03 | 18:21 (V4) 07:31 | 07:05 | 07:36 |
| | 20:53 | 62 19:28 (V6) 20:24 | 60 19:25 (V6) 19:38 | 27 18:48 (V4) 18:50 | 17:11 | 17:00 |
| 14 | 06:08 | 18:26 (V6) 06:35 | 18:25 (V6) 07:04 | 18:20 (V4) 07:32 | 07:06 | 07:37 |
| | 20:52 | 63 19:29 (V6) 20:23 | 60 19:25 (V6) 19:36 | 29 18:49 (V4) 18:48 | 17:10 | 17:01 |
| 15 | 06:08 | 18:25 (V6) 06:36 | 18:26 (V6) 07:04 | 18:19 (V4) 07:33 | 07:08 | 07:37 |
| | 20:52 | 63 19:28 (V6) 20:22 | 58 19:24 (V6) 19:35 | 30 18:49 (V4) 18:47 | 17:10 | 17:01 |
| 16 | 06:09 | 18:25 (V6) 06:37 | 18:27 (V6) 07:05 | 18:18 (V4) 07:35 | 07:09 | 07:38 |
| | 20:51 | 64 19:29 (V6) 20:20 | 56 19:23 (V6) 19:33 | 31 18:49 (V4) 18:45 | 17:09 | 17:01 |
| 17 | 06:10 | 18:25 (V6) 06:38 | 18:27 (V6) 07:06 | 18:17 (V4) 07:36 | 07:10 | 07:39 |
| | 20:51 | 65 19:30 (V6) 20:19 | 53 19:20 (V6) 19:31 | 32 18:49 (V4) 18:44 | 17:08 | 17:01 |
| 18 | 06:11 | 18:26 (V6) 06:38 | 18:28 (V6) 07:07 | 18:17 (V4) 07:37 | 07:11 | 07:39 |
| | 20:50 | 64 19:30 (V6) 20:18 | 51 19:19 (V6) 19:30 | 32 18:49 (V4) 18:42 | 17:07 | 17:02 |
| 19 | 06:11 | 18:25 (V6) 06:39 | 18:29 (V6) 07:08 | 18:17 (V4) 07:38 | 07:12 | 07:40 |
| | 20:49 | 65 19:30 (V6) 20:16 | 49 19:18 (V6) 19:28 | 32 18:49 (V4) 18:41 | 17:07 | 17:02 |
| 20 | 06:12 | 18:25 (V6) 06:40 | 18:30 (V6) 07:09 | 18:16 (V4) 07:39 | 07:13 | 07:41 |
| | 20:49 | 65 19:30 (V6) 20:15 | 46 19:16 (V6) 19:26 | 33 18:49 (V4) 18:39 | 17:06 | 17:03 |
| 21 | 06:13 | 18:25 (V6) 06:41 | 18:32 (V6) 07:10 | 18:16 (V4) 07:40 | 07:14 | 07:41 |
| | 20:48 | 66 19:31 (V6) 20:13 | 42 19:14 (V6) 19:25 | 32 18:48 (V4) 18:38 | 17:05 | 17:03 |
| 22 | 06:14 | 18:25 (V6) 06:42 | 18:33 (V6) 07:11 | 18:17 (V4) 07:41 | 07:15 | 07:42 |
| | 20:47 | 66 19:31 (V6) 20:12 | 39 19:12 (V6) 19:23 | 30 18:47 (V4) 18:37 | 17:05 | 17:04 |
| 23 | 06:15 | 18:24 (V6) 06:43 | 18:36 (V6) 07:12 | 18:17 (V4) 07:42 | 07:17 | 07:42 |
| | 20:46 | 66 19:30 (V6) 20:11 | 34 19:10 (V6) 19:21 | 29 18:46 (V4) 18:35 | 17:04 | 17:04 |
| 24 | 06:16 | 18:24 (V6) 06:44 | 18:38 (V6) 07:13 | 18:17 (V4) 07:43 | 07:18 | 07:43 |
| | 20:46 | 67 19:31 (V6) 20:09 | 29 19:07 (V6) 19:20 | 27 18:44 (V4) 18:34 | 17:04 | 17:05 |
| 25 | 06:16 | 18:24 (V6) 06:45 | 18:42 (V6) 07:14 | 18:17 (V4) 07:44 | 07:19 | 07:43 |
| | 20:45 | 67 19:31 (V6) 20:08 | 21 19:03 (V6) 19:18 | 26 18:43 (V4) 17:33 | 17:03 | 17:05 |
| 26 | 06:17 | 18:24 (V6) 06:46 | 18:47 (V6) 07:15 | 18:18 (V4) 07:45 | 07:20 | 07:43 |
| | 20:44 | 67 19:31 (V6) 20:06 | 9 18:56 (V6) 19:17 | 23 18:41 (V4) 17:31 | 17:03 | 17:06 |
| 27 | 06:18 | 18:24 (V6) 06:47 | 07:16 | 18:20 (V4) 07:46 | 07:21 | 07:44 |
| | 20:43 | 67 19:31 (V6) 20:05 | 19 19:15 | 19 18:39 (V4) 17:30 | 17:02 | 17:06 |
| 28 | 06:19 | 18:24 (V6) 06:48 | 07:17 | 18:23 (V4) 07:47 | 07:22 | 07:44 |
| | 20:42 | 68 19:32 (V6) 20:03 | 13 19:13 | 13 18:36 (V4) 17:29 | 17:02 | 17:07 |
| 29 | 06:20 | 18:24 (V6) 06:49 | 07:18 | 06:48 | 07:23 | 07:44 |
| | 20:41 | 68 19:32 (V6) 20:02 | 19:12 | 17:27 | 17:02 | 17:08 |
| 30 | 06:21 | 18:23 (V6) 06:50 | 07:19 | 06:50 | 07:24 | 07:45 |
| | 20:40 | 68 19:31 (V6) 20:00 | 19:10 | 17:26 | 17:01 | 17:08 |
| 31 | 06:22 | 18:23 (V6) 06:51 | 07:20 | 06:51 | 07:25 | 07:45 |
| | 20:39 | 68 19:31 (V6) 19:59 | 374 | 17:25 | 17:09 | 17:09 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Total, worst case | 1951 | 1397 | 534 | | | |
| Sun reduction | 0,74 | 0,73 | 0,65 | | | |
| Oper. time red. | 0,77 | 0,77 | 0,77 | | | |
| Wind dir. red. | 0,66 | 0,66 | 0,65 | | | |
| Total reduction | 0,37 | 0,37 | 0,32 | | | |
| Total, real | 728 | 517 | 173 | | | |

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: Progetto_2022_03_15Shadow receptor: F18 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|---------|------------|-------|------------|-------|------------|
| 1 | 07:45 | 08:25 (V3) | 07:33 | 08:19 (V3) | 06:59 | 06:26 |
| | 17:10 | 09:04 (V3) | 17:43 | 09:30 (V3) | 18:16 | 20:18 |
| 2 | 07:45 | 08:24 (V3) | 07:32 | 08:19 (V3) | 06:58 | 06:25 |
| | 17:11 | 09:05 (V3) | 17:45 | 09:30 (V3) | 18:17 | 20:19 |
| 3 | 07:46 | 08:24 (V3) | 07:31 | 08:19 (V3) | 06:56 | 06:24 |
| | 17:12 | 09:06 (V3) | 17:46 | 09:30 (V3) | 18:18 | 20:19 |
| 4 | 07:46 | 08:24 (V3) | 07:30 | 08:19 (V3) | 06:55 | 06:23 |
| | 17:13 | 09:07 (V3) | 17:47 | 09:30 (V3) | 18:19 | 20:20 |
| 5 | 07:46 | 08:24 (V3) | 07:29 | 08:19 (V3) | 06:53 | 06:22 |
| | 17:14 | 09:08 (V3) | 17:48 | 09:30 (V3) | 18:20 | 20:21 |
| 6 | 07:46 | 08:24 (V3) | 07:28 | 08:20 (V3) | 06:52 | 06:20 |
| | 17:15 | 09:09 (V3) | 17:49 | 09:30 (V3) | 18:21 | 20:22 |
| 7 | 07:46 | 08:24 (V3) | 07:27 | 08:20 (V3) | 06:50 | 06:19 |
| | 17:16 | 09:10 (V3) | 17:50 | 09:30 (V3) | 18:22 | 20:23 |
| 8 | 07:46 | 08:24 (V3) | 07:26 | 08:19 (V3) | 06:48 | 06:18 |
| | 17:17 | 09:11 (V3) | 17:52 | 09:29 (V3) | 18:23 | 20:24 |
| 9 | 07:45 | 08:24 (V3) | 07:25 | 08:19 (V3) | 06:47 | 06:17 |
| | 17:18 | 09:13 (V3) | 17:53 | 09:29 (V3) | 18:24 | 20:25 |
| 10 | 07:45 | 08:23 (V3) | 07:24 | 08:20 (V3) | 06:45 | 06:16 |
| | 17:19 | 09:13 (V3) | 17:54 | 09:29 (V3) | 18:25 | 20:26 |
| 11 | 07:45 | 08:23 (V3) | 07:23 | 08:20 (V3) | 06:44 | 06:15 |
| | 17:20 | 09:14 (V3) | 17:55 | 09:29 (V3) | 18:26 | 20:27 |
| 12 | 07:45 | 08:23 (V3) | 07:22 | 08:21 (V3) | 06:42 | 06:14 |
| | 17:21 | 09:15 (V3) | 17:56 | 09:29 (V3) | 18:27 | 20:28 |
| 13 | 07:45 | 08:22 (V3) | 07:21 | 08:22 (V3) | 06:41 | 06:13 |
| | 17:22 | 09:16 (V3) | 17:58 | 09:29 (V3) | 18:28 | 20:29 |
| 14 | 07:44 | 08:22 (V3) | 07:19 | 08:21 (V3) | 06:39 | 06:12 |
| | 17:23 | 09:17 (V3) | 17:59 | 09:27 (V3) | 18:29 | 20:30 |
| 15 | 07:44 | 08:22 (V3) | 07:18 | 08:22 (V3) | 06:38 | 06:11 |
| | 17:24 | 09:19 (V3) | 18:00 | 09:27 (V3) | 18:30 | 20:31 |
| 16 | 07:44 | 08:21 (V3) | 07:17 | 08:23 (V3) | 06:36 | 06:10 |
| | 17:25 | 09:19 (V3) | 18:01 | 09:26 (V3) | 18:31 | 20:32 |
| 17 | 07:43 | 08:21 (V3) | 07:16 | 08:23 (V3) | 06:34 | 06:09 |
| | 17:26 | 09:20 (V3) | 18:02 | 09:25 (V3) | 18:33 | 20:33 |
| 18 | 07:43 | 08:21 (V3) | 07:14 | 08:24 (V3) | 06:33 | 06:08 |
| | 17:27 | 09:21 (V3) | 18:03 | 09:24 (V3) | 18:34 | 20:34 |
| 19 | 07:42 | 08:21 (V3) | 07:13 | 08:25 (V3) | 06:31 | 06:50 (V7) |
| | 17:28 | 09:22 (V3) | 18:04 | 09:23 (V3) | 18:35 | 20:06 |
| 20 | 07:42 | 08:20 (V3) | 07:12 | 08:25 (V3) | 06:30 | 07:03 (V7) |
| | 17:29 | 09:23 (V3) | 18:06 | 09:21 (V3) | 18:36 | 20:07 |
| 21 | 07:41 | 08:20 (V3) | 07:10 | 08:27 (V3) | 06:28 | 07:01 (V7) |
| | 17:30 | 09:23 (V3) | 18:07 | 09:20 (V3) | 18:37 | 20:08 |
| 22 | 07:41 | 08:20 (V3) | 07:09 | 08:28 (V3) | 06:26 | 07:22 (V4) |
| | 17:32 | 09:24 (V3) | 18:08 | 09:19 (V3) | 18:38 | 20:09 |
| 23 | 07:40 | 08:20 (V3) | 07:08 | 08:29 (V3) | 06:25 | 07:46 (V4) |
| | 17:33 | 09:25 (V3) | 18:09 | 09:17 (V3) | 18:39 | 20:09 |
| 24 | 07:39 | 08:19 (V3) | 07:06 | 08:30 (V3) | 06:23 | 06:59 (V6) |
| | 17:34 | 09:25 (V3) | 18:10 | 09:15 (V3) | 18:40 | 20:10 |
| 25 | 07:39 | 08:20 (V3) | 07:05 | 08:31 (V3) | 06:22 | 07:51 (V4) |
| | 17:35 | 09:27 (V3) | 18:11 | 09:13 (V3) | 18:41 | 20:11 |
| 26 | 07:38 | 08:19 (V3) | 07:03 | 08:34 (V3) | 06:20 | 06:56 (V6) |
| | 17:36 | 09:27 (V3) | 18:12 | 09:11 (V3) | 18:42 | 20:12 |
| 27 | 07:37 | 08:19 (V3) | 07:02 | 08:37 (V3) | 06:18 | 07:53 (V4) |
| | 17:37 | 09:27 (V3) | 18:13 | 09:08 (V3) | 18:43 | 20:13 |
| 28 | 07:37 | 08:19 (V3) | 07:00 | 08:39 (V3) | 06:17 | 06:53 (V6) |
| | 17:39 | 09:28 (V3) | 18:15 | 09:04 (V3) | 18:44 | 20:14 |
| 29 | 07:36 | 08:19 (V3) | | | 07:15 | 07:54 (V4) |
| | 17:40 | 09:28 (V3) | | | 19:45 | 20:15 |
| 30 | 07:35 | 08:19 (V3) | | | 07:14 | 06:53 (V6) |
| | 17:41 | 09:29 (V3) | | | 19:46 | 20:16 |
| 31 | 07:34 | 08:19 (V3) | | | 07:12 | 06:52 (V6) |
| | 17:42 | 09:30 (V3) | | | 19:47 | 20:17 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | 1756 | 1670 | 124 | 555 | 1171 | |
| Sun reduction | 0,45 | 0,47 | 0,49 | 0,53 | 0,59 | |
| Oper. time red. | 0,77 | 0,77 | 0,77 | 0,77 | 0,77 | |
| Wind dir. red. | 0,67 | 0,67 | 0,66 | 0,64 | 0,64 | |
| Total reduction | 0,23 | 0,24 | 0,25 | 0,26 | 0,29 | |
| Total, real | 410 | 407 | 31 | 144 | 339 | |

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: Progetto_2022_03_15Shadow receptor: F18 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Table with 12 columns (Jan-Dec) and 1 row of values: 4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

Table with 13 columns (N to Sum) and 1 row of values: 607 505 420 506 599 570 495 488 555 624 686 669 6.724

Main shadow calculation table with columns for months (July-December) and rows for each day of the month, including sunrise/set times, shadow angles, and reduction percentages.

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

Summary table with columns: 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: Progetto_2022_03_15Shadow receptor: F19 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

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

4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
607 505 420 506 599 570 495 488 555 624 686 669 6.724

| | January | February | March | April | May | June | | | |
|---------------------|----------------|--------------------------|----------------|---------------------|-----|--------------------------|----------------|----------------|----------------|
| 1 | 07:45 17:10 | 08:07 (V7) 08:27 (V7) | 07:33 17:43 | 06:59 18:16 | 45 | 07:47 (V6) 08:32 (V6) | 07:10 19:48 | 06:26 20:17 | 05:59 20:45 |
| 2 | 07:45 17:11 | 08:07 (V7) 08:27 (V7) | 07:32 17:44 | 06:58 18:17 | 43 | 07:47 (V6) 08:30 (V6) | 07:09 19:49 | 06:25 20:18 | 05:59 20:46 |
| 3 | 07:45 17:12 | 08:07 (V7) 08:27 (V7) | 07:31 17:46 | 08:05 (V6) 18:18 | 41 | 07:48 (V6) 08:29 (V6) | 07:07 19:50 | 06:24 20:19 | 05:58 20:47 |
| 4 | 07:46 17:13 | 08:07 (V7) 08:28 (V7) | 07:30 17:47 | 08:01 (V6) 18:19 | 39 | 07:49 (V6) 08:28 (V6) | 07:06 19:51 | 06:23 20:20 | 05:58 20:48 |
| 5 | 07:46 17:14 | 08:07 (V7) 08:28 (V7) | 07:29 17:48 | 07:58 (V6) 18:20 | 36 | 07:50 (V6) 08:26 (V6) | 07:04 19:52 | 06:22 20:21 | 05:58 20:48 |
| 6 | 07:46 17:15 | 08:08 (V7) 08:28 (V7) | 07:28 17:49 | 07:56 (V6) 18:21 | 33 | 07:51 (V6) 08:24 (V6) | 07:02 19:53 | 06:20 20:22 | 05:57 20:49 |
| 7 | 07:46 17:16 | 08:09 (V7) 08:27 (V7) | 07:27 17:50 | 07:55 (V6) 18:22 | 29 | 07:52 (V6) 08:21 (V6) | 07:01 19:54 | 06:19 20:23 | 05:57 20:49 |
| 8 | 07:45 17:17 | 08:10 (V7) 08:27 (V7) | 07:26 17:52 | 07:53 (V6) 18:23 | 24 | 07:53 (V6) 08:19 (V6) | 06:59 19:55 | 06:18 20:24 | 05:57 20:50 |
| 9 | 07:45 17:18 | 08:12 (V7) 08:27 (V7) | 07:25 17:53 | 07:51 (V6) 18:24 | 17 | 07:54 (V6) 08:15 (V6) | 06:58 19:56 | 06:17 20:25 | 05:57 20:51 |
| 10 | 07:45 17:19 | 08:13 (V7) 08:26 (V7) | 07:24 17:54 | 07:51 (V6) 18:25 | 5 | 08:04 (V6) 08:09 (V6) | 06:56 19:57 | 06:16 20:26 | 05:56 20:51 |
| 11 | 07:45 17:20 | 08:15 (V7) 08:25 (V7) | 07:23 17:55 | 07:50 (V6) 18:26 | | | 06:55 19:58 | 06:15 20:27 | 05:56 20:52 |
| 12 | 07:45 17:21 | 08:18 (V7) 08:23 (V7) | 07:22 17:56 | 07:49 (V6) 18:27 | | | 06:53 19:59 | 06:14 20:28 | 05:56 20:52 |
| 13 | 07:45 17:22 | | 07:20 17:57 | 07:48 (V6) 18:28 | | | 06:52 20:00 | 06:13 20:29 | 05:56 20:53 |
| 14 | 07:44 17:23 | | 07:19 17:59 | 07:47 (V6) 18:29 | | | 06:50 20:01 | 06:12 20:30 | 05:56 20:53 |
| 15 | 07:44 17:24 | | 07:18 18:00 | 07:47 (V6) 18:30 | | | 06:49 20:02 | 06:11 20:31 | 05:56 20:53 |
| 16 | 07:44 17:25 | | 07:17 18:01 | 07:46 (V6) 18:31 | | | 06:47 20:03 | 06:10 20:32 | 05:56 20:54 |
| 17 | 07:43 17:26 | | 07:16 18:02 | 07:45 (V6) 18:32 | | | 06:46 20:04 | 06:09 20:33 | 05:56 20:54 |
| 18 | 07:43 17:27 | | 07:14 18:03 | 07:45 (V6) 18:33 | | | 06:44 20:05 | 06:08 20:34 | 05:56 20:55 |
| 19 | 07:42 17:28 | | 07:13 18:04 | 07:45 (V6) 18:35 | | | 06:43 20:06 | 06:07 20:35 | 05:56 20:55 |
| 20 | 07:42 17:29 | | 07:12 18:06 | 07:44 (V6) 18:36 | | | 06:41 20:07 | 06:07 20:36 | 05:56 20:55 |
| 21 | 07:41 17:30 | | 07:10 18:07 | 07:45 (V6) 18:37 | | | 06:40 20:08 | 06:06 20:37 | 05:57 20:55 |
| 22 | 07:41 17:32 | | 07:09 18:08 | 07:45 (V6) 18:38 | | | 06:38 20:09 | 06:05 20:37 | 05:57 20:56 |
| 23 | 07:40 17:33 | | 07:08 18:09 | 07:44 (V6) 18:39 | | | 06:37 20:09 | 06:04 20:38 | 05:57 20:56 |
| 24 | 07:39 17:34 | | 07:06 18:10 | 07:45 (V6) 18:40 | | | 06:36 20:10 | 06:04 20:39 | 05:57 20:56 |
| 25 | 07:39 17:35 | | 07:05 18:11 | 07:44 (V6) 18:41 | | | 06:34 20:11 | 06:03 20:40 | 05:58 20:56 |
| 26 | 07:38 17:36 | | 07:03 18:12 | 07:45 (V6) 18:42 | | | 06:33 20:12 | 06:02 20:41 | 05:58 20:56 |
| 27 | 07:37 17:37 | | 07:02 18:13 | 07:46 (V6) 18:43 | | | 06:32 20:13 | 06:02 20:42 | 05:58 20:56 |
| 28 | 07:36 17:39 | | 07:00 18:14 | 07:46 (V6) 18:44 | | | 06:30 20:14 | 06:01 20:42 | 05:59 20:56 |
| 29 | 07:36 17:40 | | | 07:15 19:45 | | | 06:29 20:15 | 06:01 20:43 | 05:59 20:56 |
| 30 | 07:35 17:41 | | | 07:13 19:46 | | | 06:28 20:16 | 06:00 20:44 | 05:59 20:56 |
| 31 | 07:34 17:42 | | | 07:12 19:47 | | | 06:00 20:45 | | |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 | | | |
| Total, worst case | 200 | 1102 | 312 | | | | | | |
| Sun reduction | 0,45 | 0,47 | 0,49 | | | | | | |
| Oper. time red. | 0,77 | 0,77 | 0,77 | | | | | | |
| Wind dir. red. | 0,67 | 0,67 | 0,67 | | | | | | |
| Total reduction | 0,23 | 0,24 | 0,25 | | | | | | |
| Total, real | 46 | 267 | 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 | Last time (hh:mm) with flicker | (WTG causing flicker first time) | (WTG causing flicker last time) |
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|
|--------------|------------------|-----------------|----------------------|---------------------------------|--------------------------------|----------------------------------|---------------------------------|

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F19 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December |
|---------------------|----------------|----------------|----------------|----------------|--------------------------|----------------|
| 1 | 06:00 20:56 | 06:23 20:38 | 06:52 19:57 | 07:20 19:08 | 06:52 17:24 | 07:25 17:01 |
| 2 | 06:00 20:56 | 06:24 20:37 | 06:53 19:56 | 07:21 19:07 | 06:53 17:23 | 07:26 17:01 |
| 3 | 06:01 20:56 | 06:25 20:36 | 06:53 19:54 | 07:22 19:05 | 06:54 17:21 | 07:27 17:01 |
| 4 | 06:01 20:56 | 06:25 20:35 | 06:54 19:52 | 07:23 19:04 | 08:37 (V6) 08:51 (V6) | 07:28 17:00 |
| 5 | 06:02 20:56 | 06:26 20:34 | 06:55 19:51 | 07:24 19:02 | 08:33 (V6) 08:54 (V6) | 07:29 17:00 |
| 6 | 06:03 20:55 | 06:27 20:33 | 06:56 19:49 | 07:24 19:00 | 08:30 (V6) 08:57 (V6) | 07:30 17:00 |
| 7 | 06:03 20:55 | 06:28 20:32 | 06:57 19:48 | 07:25 18:59 | 08:28 (V6) 08:59 (V6) | 07:31 17:00 |
| 8 | 06:04 20:55 | 06:29 20:31 | 06:58 19:46 | 07:26 18:57 | 08:26 (V6) 09:00 (V6) | 07:32 17:00 |
| 9 | 06:04 20:54 | 06:30 20:29 | 06:59 19:44 | 07:27 18:56 | 08:24 (V6) 09:01 (V6) | 07:33 17:00 |
| 10 | 06:05 20:54 | 06:31 20:28 | 07:00 19:43 | 07:28 18:54 | 08:22 (V6) 09:03 (V6) | 07:34 17:00 |
| 11 | 06:06 20:54 | 06:32 20:27 | 07:01 19:41 | 07:29 18:53 | 08:21 (V6) 09:03 (V6) | 07:34 17:00 |
| 12 | 06:06 20:53 | 06:33 20:26 | 07:02 19:40 | 07:30 18:51 | 08:20 (V6) 09:04 (V6) | 07:35 17:00 |
| 13 | 06:07 20:53 | 06:34 20:24 | 07:03 19:38 | 07:31 18:50 | 08:19 (V6) 09:05 (V6) | 07:36 17:00 |
| 14 | 06:08 20:52 | 06:35 20:23 | 07:04 19:36 | 07:33 18:48 | 08:18 (V6) 09:05 (V6) | 07:37 17:01 |
| 15 | 06:08 20:52 | 06:36 20:22 | 07:05 19:35 | 07:34 18:47 | 08:17 (V6) 09:05 (V6) | 07:37 17:01 |
| 16 | 06:09 20:51 | 06:37 20:20 | 07:05 19:33 | 07:35 18:45 | 08:17 (V6) 09:07 (V6) | 07:38 17:01 |
| 17 | 06:10 20:51 | 06:38 20:19 | 07:06 19:31 | 07:36 18:44 | 08:17 (V6) 09:07 (V6) | 07:39 17:01 |
| 18 | 06:11 20:50 | 06:39 20:18 | 07:07 19:30 | 07:37 18:42 | 08:16 (V6) 09:07 (V6) | 07:39 17:02 |
| 19 | 06:12 20:49 | 06:39 20:16 | 07:08 19:28 | 07:38 18:41 | 08:16 (V6) 09:07 (V6) | 07:40 17:02 |
| 20 | 06:12 20:49 | 06:40 20:15 | 07:09 19:26 | 07:39 18:39 | 08:15 (V6) 09:07 (V6) | 07:41 17:03 |
| 21 | 06:13 20:48 | 06:41 20:13 | 07:10 19:25 | 07:40 18:38 | 08:15 (V6) 09:06 (V6) | 07:41 17:03 |
| 22 | 06:14 20:47 | 06:42 20:12 | 07:11 19:23 | 07:41 18:37 | 08:15 (V6) 09:06 (V6) | 07:42 17:04 |
| 23 | 06:15 20:46 | 06:43 20:11 | 07:12 19:21 | 07:42 18:35 | 08:15 (V6) 09:06 (V6) | 07:42 17:04 |
| 24 | 06:16 20:46 | 06:44 20:09 | 07:13 19:20 | 07:43 18:34 | 08:15 (V6) 09:05 (V6) | 07:43 17:05 |
| 25 | 06:16 20:45 | 06:45 20:08 | 07:14 19:18 | 07:44 17:33 | 07:16 (V6) 08:06 (V6) | 07:43 17:05 |
| 26 | 06:17 20:44 | 06:46 20:06 | 07:15 19:17 | 07:45 17:31 | 07:16 (V6) 08:05 (V6) | 07:43 17:06 |
| 27 | 06:18 20:43 | 06:47 20:05 | 07:16 19:15 | 07:46 17:30 | 07:17 (V6) 08:04 (V6) | 07:44 17:06 |
| 28 | 06:19 20:42 | 06:48 20:03 | 07:17 19:13 | 07:47 17:29 | 07:17 (V6) 08:03 (V6) | 07:44 17:07 |
| 29 | 06:20 20:41 | 06:49 20:02 | 07:18 19:12 | 07:48 17:27 | 07:17 (V6) 08:02 (V6) | 07:44 17:08 |
| 30 | 06:21 20:40 | 06:50 20:00 | 07:19 19:10 | 07:49 17:26 | 07:18 (V6) 08:01 (V6) | 07:45 17:09 |
| 31 | 06:22 20:39 | 06:51 19:59 | 07:20 19:08 | 07:50 17:25 | 07:20 (V6) 08:01 (V6) | 07:45 17:09 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Total, worst case | | | | 1210 | 225 | 590 |
| Sun reduction | | | | 0,54 | 0,51 | 0,45 |
| Oper. time red. | | | | 0,77 | 0,77 | 0,77 |
| Wind dir. red. | | | | 0,67 | 0,67 | 0,67 |
| Total reduction | | | | 0,28 | 0,26 | 0,23 |
| Total, real | | | | 338 | 58 | 137 |

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: Progetto_2022_03_15Shadow receptor: F20 - C2

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|-------------------------|-----------------------------------|----------------------|-----------------------------------|-------------------------|---|
| 1 | 07:45 17:10 19 | 08:07 (V7) 08:26 (V7) 17:43 | 07:33 17:43 21 | 08:01 (V6) 08:22 (V6) 18:16 | 06:59 18:16 32 | 07:55 (V6) 08:27 (V6) 19:48 20:17 20:45 |
| 2 | 07:45 17:11 19 | 08:07 (V7) 08:26 (V7) 17:44 | 07:32 17:44 26 | 07:59 (V6) 08:25 (V6) 18:17 | 06:58 18:17 29 | 07:56 (V6) 08:25 (V6) 19:49 20:18 20:46 |
| 3 | 07:45 17:12 19 | 08:07 (V7) 08:26 (V7) 17:46 | 07:31 17:46 28 | 07:58 (V6) 08:26 (V6) 18:18 | 06:56 18:18 25 | 07:58 (V6) 08:23 (V6) 19:50 20:19 20:47 |
| 4 | 07:46 17:13 18 | 08:08 (V7) 08:26 (V7) 17:47 | 07:30 17:47 32 | 07:56 (V6) 08:28 (V6) 18:19 | 06:55 18:19 20 | 08:00 (V6) 08:20 (V6) 19:51 20:20 20:48 |
| 5 | 07:46 17:14 17 | 08:09 (V7) 08:26 (V7) 17:48 | 07:29 17:48 35 | 07:55 (V6) 08:30 (V6) 18:20 | 06:53 18:20 10 | 08:05 (V6) 08:15 (V6) 19:52 20:21 20:48 |
| 6 | 07:46 17:15 15 | 08:11 (V7) 08:26 (V7) 17:49 | 07:28 17:49 37 | 07:54 (V6) 08:31 (V6) 18:21 | 06:52 18:21 19:53 | 07:02 19:53 20:22 20:49 |
| 7 | 07:46 17:16 14 | 08:12 (V7) 08:26 (V7) 17:50 | 07:27 17:50 39 | 07:53 (V6) 08:32 (V6) 18:22 | 06:50 18:22 19:54 | 07:01 19:54 20:23 20:49 |
| 8 | 07:45 17:17 11 | 08:14 (V7) 08:25 (V7) 17:52 | 07:26 17:52 40 | 07:52 (V6) 08:32 (V6) 18:23 | 06:48 18:23 19:55 | 06:59 19:55 20:24 20:50 |
| 9 | 07:45 17:18 8 | 08:16 (V7) 08:24 (V7) 17:53 | 07:25 17:53 42 | 07:51 (V6) 08:33 (V6) 18:24 | 06:47 18:24 19:56 | 06:17 19:56 20:25 20:51 |
| 10 | 07:45 17:19 1 | 08:19 (V7) 08:20 (V7) 17:54 | 07:24 17:54 44 | 07:50 (V6) 08:34 (V6) 18:25 | 06:45 18:25 19:57 | 06:16 20:26 20:51 |
| 11 | 07:45 17:20 17:20 | 08:20 (V7) 07:23 17:55 | 07:23 17:55 45 | 07:50 (V6) 08:35 (V6) 18:26 | 06:44 18:26 19:58 | 06:15 20:27 20:52 |
| 12 | 07:45 17:21 17:21 | 07:22 17:56 46 | 07:22 17:56 46 | 07:50 (V6) 08:36 (V6) 18:27 | 06:42 18:27 19:59 | 06:14 20:28 20:52 |
| 13 | 07:45 17:22 17:22 | 07:20 17:58 46 | 07:20 17:58 46 | 07:50 (V6) 08:36 (V6) 18:28 | 06:41 18:28 20:00 | 06:13 20:29 20:53 |
| 14 | 07:44 17:23 17:23 | 07:19 17:59 47 | 07:19 17:59 47 | 07:49 (V6) 08:36 (V6) 18:29 | 06:39 18:29 20:01 | 06:12 20:30 20:53 |
| 15 | 07:44 17:24 17:24 | 07:18 18:00 47 | 07:18 18:00 47 | 07:49 (V6) 08:36 (V6) 18:30 | 06:38 18:30 20:02 | 06:11 20:31 20:53 |
| 16 | 07:44 17:25 17:25 | 07:17 18:01 48 | 07:17 18:01 48 | 07:49 (V6) 08:37 (V6) 18:31 | 06:36 18:31 20:03 | 06:10 20:32 20:54 |
| 17 | 07:43 17:26 17:26 | 07:16 18:02 48 | 07:16 18:02 48 | 07:48 (V6) 08:36 (V6) 18:32 | 06:34 18:32 20:04 | 06:09 20:33 20:54 |
| 18 | 07:43 17:27 17:27 | 07:14 18:03 48 | 07:14 18:03 48 | 07:48 (V6) 08:36 (V6) 18:34 | 06:33 18:34 20:05 | 06:08 20:34 20:55 |
| 19 | 07:42 17:28 17:28 | 07:13 18:04 48 | 07:13 18:04 48 | 07:48 (V6) 08:36 (V6) 18:35 | 06:31 18:35 20:06 | 06:07 20:35 20:55 |
| 20 | 07:42 17:29 17:29 | 07:12 18:06 47 | 07:12 18:06 47 | 07:48 (V6) 08:35 (V6) 18:36 | 06:30 18:36 20:07 | 06:07 20:36 20:55 |
| 21 | 07:41 17:30 17:30 | 07:10 18:07 46 | 07:10 18:07 46 | 07:49 (V6) 08:35 (V6) 18:37 | 06:28 18:37 20:08 | 06:06 20:37 20:55 |
| 22 | 07:41 17:32 17:32 | 07:09 18:08 46 | 07:09 18:08 46 | 07:49 (V6) 08:35 (V6) 18:38 | 06:26 18:38 20:09 | 06:05 20:37 20:56 |
| 23 | 07:40 17:33 17:33 | 07:08 18:09 45 | 07:08 18:09 45 | 07:49 (V6) 08:34 (V6) 18:39 | 06:25 18:39 20:10 | 06:04 20:38 20:56 |
| 24 | 07:39 17:34 17:34 | 07:06 18:10 43 | 07:06 18:10 43 | 07:50 (V6) 08:33 (V6) 18:40 | 06:23 18:40 20:11 | 06:04 20:39 20:56 |
| 25 | 07:39 17:35 17:35 | 07:05 18:11 42 | 07:05 18:11 42 | 07:50 (V6) 08:32 (V6) 18:41 | 06:21 18:41 20:11 | 06:03 20:40 20:56 |
| 26 | 07:38 17:36 17:36 | 07:03 18:12 40 | 07:03 18:12 40 | 07:51 (V6) 08:31 (V6) 18:42 | 06:20 18:42 20:12 | 06:02 20:41 20:56 |
| 27 | 07:37 17:37 17:37 | 07:02 18:13 39 | 07:02 18:13 39 | 07:52 (V6) 08:31 (V6) 18:43 | 06:18 18:43 20:13 | 06:02 20:42 20:56 |
| 28 | 07:37 17:39 17:39 | 07:00 18:14 36 | 07:00 18:14 36 | 07:53 (V6) 08:29 (V6) 18:44 | 06:17 18:44 20:14 | 06:01 20:42 20:56 |
| 29 | 07:36 17:40 17:40 | | | 07:15 19:45 | 07:15 19:45 | 06:29 20:15 20:43 20:56 |
| 30 | 07:35 17:41 17:41 | 08:10 (V6) 08:13 (V6) 3 | | 07:13 19:46 | 07:13 19:46 | 06:28 20:16 20:44 20:56 |
| 31 | 07:34 17:42 15 | 08:04 (V6) 08:19 (V6) | | 07:12 19:47 | 07:12 19:47 | 06:00 20:45 20:56 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | 159 | 1151 | 116 | | | |
| Sun reduction | 0,45 | 0,47 | 0,49 | | | |
| Oper. time red. | 0,77 | 0,77 | 0,77 | | | |
| Wind dir. red. | 0,67 | 0,67 | 0,67 | | | |
| Total reduction | 0,23 | 0,24 | 0,25 | | | |
| Total, real | 37 | 280 | 29 | | | |

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: Progetto_2022_03_15Shadow receptor: F20 - C2

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December | |
|---------------------|-------|--------|-----------|---------|---------------|---------------|-------|
| 1 | 06:00 | 06:23 | 06:52 | 07:20 | 06:52 | 07:20 (V6) | 07:25 |
| | 20:56 | 20:38 | 19:57 | 19:08 | 17:24 | 44 08:04 (V6) | 17:01 |
| 2 | 06:00 | 06:24 | 06:53 | 07:21 | 06:53 | 07:21 (V6) | 07:26 |
| | 20:56 | 20:37 | 19:56 | 19:07 | 17:23 | 42 08:03 (V6) | 17:01 |
| 3 | 06:01 | 06:25 | 06:53 | 07:22 | 06:54 | 07:21 (V6) | 07:27 |
| | 20:56 | 20:36 | 19:54 | 19:05 | 17:21 | 41 08:02 (V6) | 17:01 |
| 4 | 06:01 | 06:25 | 06:54 | 07:23 | 06:55 | 07:22 (V6) | 07:28 |
| | 20:56 | 20:35 | 19:52 | 19:04 | 17:20 | 39 08:01 (V6) | 17:00 |
| 5 | 06:02 | 06:26 | 06:55 | 07:24 | 06:56 | 07:24 (V6) | 07:29 |
| | 20:56 | 20:34 | 19:51 | 19:02 | 17:19 | 37 08:01 (V6) | 17:00 |
| 6 | 06:03 | 06:27 | 06:56 | 07:24 | 06:57 | 07:25 (V6) | 07:30 |
| | 20:55 | 20:33 | 19:49 | 19:00 | 17:18 | 34 07:59 (V6) | 17:00 |
| 7 | 06:03 | 06:28 | 06:57 | 07:25 | 06:59 | 07:26 (V6) | 07:31 |
| | 20:55 | 20:32 | 19:48 | 18:59 | 17:17 | 32 07:58 (V6) | 17:00 |
| 8 | 06:04 | 06:29 | 06:58 | 07:26 | 07:00 | 07:28 (V6) | 07:32 |
| | 20:55 | 20:31 | 19:46 | 18:57 | 17:16 | 28 07:56 (V6) | 17:00 |
| 9 | 06:04 | 06:30 | 06:59 | 07:27 | 07:01 | 07:29 (V6) | 07:33 |
| | 20:54 | 20:29 | 19:44 | 18:56 | 15 08:37 (V6) | 07:01 | 17:00 |
| 10 | 06:05 | 06:31 | 07:00 | 07:28 | 08:33 (V6) | 07:02 | 07:34 |
| | 20:54 | 20:28 | 19:43 | 18:54 | 22 08:55 (V6) | 17:14 | 17:00 |
| 11 | 06:06 | 06:32 | 07:01 | 07:29 | 08:30 (V6) | 07:03 | 07:34 |
| | 20:54 | 20:27 | 19:41 | 18:53 | 28 08:58 (V6) | 17:13 | 17:00 |
| 12 | 06:06 | 06:33 | 07:02 | 07:30 | 08:28 (V6) | 07:04 | 07:35 |
| | 20:53 | 20:26 | 19:40 | 18:51 | 31 08:59 (V6) | 17:12 | 17:00 |
| 13 | 06:07 | 06:34 | 07:03 | 07:31 | 08:26 (V6) | 07:05 | 07:36 |
| | 20:53 | 20:24 | 19:38 | 18:50 | 35 09:01 (V6) | 17:11 | 17:00 |
| 14 | 06:08 | 06:35 | 07:04 | 07:33 | 08:25 (V6) | 07:07 | 07:37 |
| | 20:52 | 20:23 | 19:36 | 18:48 | 37 09:02 (V6) | 17:11 | 17:01 |
| 15 | 06:08 | 06:36 | 07:05 | 07:34 | 08:23 (V6) | 07:08 | 07:37 |
| | 20:52 | 20:22 | 19:35 | 18:47 | 40 09:03 (V6) | 17:10 | 17:01 |
| 16 | 06:09 | 06:37 | 07:05 | 07:35 | 08:23 (V6) | 07:09 | 07:38 |
| | 20:51 | 20:20 | 19:33 | 18:45 | 41 09:04 (V6) | 17:09 | 17:01 |
| 17 | 06:10 | 06:38 | 07:06 | 07:36 | 08:22 (V6) | 07:10 | 07:39 |
| | 20:51 | 20:19 | 19:31 | 18:44 | 43 09:05 (V6) | 17:08 | 17:01 |
| 18 | 06:11 | 06:39 | 07:07 | 07:37 | 08:21 (V6) | 07:11 | 07:39 |
| | 20:50 | 20:18 | 19:30 | 18:42 | 44 09:05 (V6) | 17:07 | 17:02 |
| 19 | 06:12 | 06:39 | 07:08 | 07:38 | 08:20 (V6) | 07:12 | 07:40 |
| | 20:49 | 20:16 | 19:28 | 18:41 | 46 09:06 (V6) | 17:07 | 17:02 |
| 20 | 06:12 | 06:40 | 07:09 | 07:39 | 08:20 (V6) | 07:13 | 07:41 |
| | 20:49 | 20:15 | 19:26 | 18:39 | 46 09:06 (V6) | 17:06 | 17:03 |
| 21 | 06:13 | 06:41 | 07:10 | 07:40 | 08:19 (V6) | 07:14 | 07:41 |
| | 20:48 | 20:13 | 19:25 | 18:38 | 47 09:06 (V6) | 17:05 | 17:03 |
| 22 | 06:14 | 06:42 | 07:11 | 07:41 | 08:19 (V6) | 07:16 | 07:42 |
| | 20:47 | 20:12 | 19:23 | 18:37 | 47 09:06 (V6) | 17:05 | 17:04 |
| 23 | 06:15 | 06:43 | 07:12 | 07:42 | 08:18 (V6) | 07:17 | 07:42 |
| | 20:46 | 20:11 | 19:21 | 18:35 | 48 09:06 (V6) | 17:04 | 17:04 |
| 24 | 06:16 | 06:44 | 07:13 | 07:43 | 08:18 (V6) | 07:18 | 07:43 |
| | 20:46 | 20:09 | 19:20 | 18:34 | 48 09:06 (V6) | 17:04 | 17:05 |
| 25 | 06:16 | 06:45 | 07:14 | 07:44 | 07:19 (V6) | 07:19 | 07:43 |
| | 20:45 | 20:08 | 19:18 | 17:33 | 48 08:07 (V6) | 17:03 | 17:05 |
| 26 | 06:17 | 06:46 | 07:15 | 07:45 | 07:18 (V6) | 07:20 | 07:44 |
| | 20:44 | 20:06 | 19:17 | 17:31 | 48 08:06 (V6) | 17:03 | 17:06 |
| 27 | 06:18 | 06:47 | 07:16 | 07:46 | 07:18 (V6) | 07:21 | 07:44 |
| | 20:43 | 20:05 | 19:15 | 17:30 | 48 08:06 (V6) | 17:02 | 17:06 |
| 28 | 06:19 | 06:48 | 07:17 | 07:47 | 07:18 (V6) | 07:22 | 07:44 |
| | 20:42 | 20:03 | 19:13 | 17:29 | 47 08:05 (V6) | 17:02 | 17:07 |
| 29 | 06:20 | 06:49 | 07:18 | 07:48 | 07:18 (V6) | 07:23 | 07:44 |
| | 20:41 | 20:02 | 19:12 | 17:27 | 47 08:05 (V6) | 17:02 | 17:08 |
| 30 | 06:21 | 06:50 | 07:19 | 07:49 | 07:19 (V6) | 07:24 | 07:45 |
| | 20:40 | 20:00 | 19:10 | 17:26 | 45 08:04 (V6) | 17:01 | 17:09 |
| 31 | 06:22 | 06:51 | 07:20 | 07:50 | 07:20 (V6) | 07:25 | 07:45 |
| | 20:39 | 19:59 | 19:09 | 17:25 | 45 08:05 (V6) | 17:01 | 17:09 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | | 292 |
| Total, worst case | | | | 946 | 358 | | 520 |
| Sun reduction | | | | 0,54 | 0,51 | | 0,45 |
| Oper. time red. | | | | 0,77 | 0,77 | | 0,77 |
| Wind dir. red. | | | | 0,67 | 0,67 | | 0,67 |
| Total reduction | | | | 0,28 | 0,26 | | 0,23 |
| Total, real | | | | 265 | 93 | | 121 |

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

Project:

Progetto_GRV Villanovafranca

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
 Via Santa Margherita 4
 IT-09124 Cagliari
 +39 070 658297
 Giuseppe Frongia / direttore@iatprogetti.it
 Calculated:
 15/03/2022 11:20/3.4.415

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F21 - F3

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|---------|---------------|------------|-------|---------------|-------|
| 1 | 07:45 | 08:07 (V7) | 07:33 | 06:59 | 07:31 (V6) | 07:10 |
| | 17:10 | 12 08:19 (V7) | 17:43 | 18:16 | 45 08:16 (V6) | 19:48 |
| 2 | 07:45 | 08:07 (V7) | 07:32 | 06:58 | 07:31 (V6) | 07:09 |
| | 17:11 | 12 08:19 (V7) | 17:44 | 18:17 | 44 08:15 (V6) | 19:49 |
| 3 | 07:46 | 08:07 (V7) | 07:31 | 06:56 | 07:32 (V6) | 07:07 |
| | 17:12 | 13 08:20 (V7) | 17:46 | 18:18 | 43 08:15 (V6) | 19:50 |
| 4 | 07:46 | 08:07 (V7) | 07:30 | 06:55 | 07:32 (V6) | 07:06 |
| | 17:13 | 13 08:20 (V7) | 17:47 | 18:19 | 41 08:13 (V6) | 19:51 |
| 5 | 07:46 | 08:07 (V7) | 07:29 | 06:53 | 07:33 (V6) | 07:04 |
| | 17:14 | 13 08:20 (V7) | 17:48 | 18:20 | 40 08:13 (V6) | 19:52 |
| 6 | 07:46 | 08:07 (V7) | 07:28 | 06:52 | 07:33 (V6) | 07:02 |
| | 17:15 | 14 08:21 (V7) | 17:49 | 18:21 | 38 08:11 (V6) | 19:53 |
| 7 | 07:46 | 08:07 (V7) | 07:27 | 06:50 | 07:34 (V6) | 07:01 |
| | 17:16 | 14 08:21 (V7) | 17:50 | 18:22 | 35 08:09 (V6) | 19:54 |
| 8 | 07:45 | 08:07 (V7) | 07:26 | 06:48 | 07:36 (V6) | 06:59 |
| | 17:17 | 14 08:21 (V7) | 17:52 | 18:23 | 32 08:08 (V6) | 19:55 |
| 9 | 07:45 | 08:07 (V7) | 07:25 | 06:47 | 07:37 (V6) | 06:58 |
| | 17:18 | 14 08:21 (V7) | 17:53 | 18:24 | 28 08:05 (V6) | 19:56 |
| 10 | 07:45 | 08:06 (V7) | 07:24 | 06:45 | 07:39 (V6) | 06:56 |
| | 17:19 | 15 08:21 (V7) | 17:54 | 18:25 | 24 08:03 (V6) | 19:57 |
| 11 | 07:45 | 08:06 (V7) | 07:23 | 06:44 | 07:42 (V6) | 06:55 |
| | 17:20 | 15 08:21 (V7) | 17:55 | 18:26 | 17 07:59 (V6) | 19:58 |
| 12 | 07:45 | 08:06 (V7) | 07:22 | 06:42 | 07:41 (V6) | 06:53 |
| | 17:21 | 15 08:21 (V7) | 17:56 | 18:27 | 6 07:54 (V6) | 19:59 |
| 13 | 07:45 | 08:05 (V7) | 07:20 | 06:41 | 07:40 (V6) | 06:52 |
| | 17:22 | 15 08:20 (V7) | 17:58 | 18:28 | 08:11 (V6) | 20:00 |
| 14 | 07:44 | 08:05 (V7) | 07:19 | 06:39 | 07:38 (V6) | 06:50 |
| | 17:23 | 15 08:20 (V7) | 17:59 | 18:29 | 08:12 (V6) | 20:01 |
| 15 | 07:44 | 08:05 (V7) | 07:18 | 06:38 | 07:37 (V6) | 06:49 |
| | 17:24 | 15 08:20 (V7) | 18:00 | 18:30 | 08:13 (V6) | 20:02 |
| 16 | 07:44 | 08:05 (V7) | 07:17 | 06:36 | 07:36 (V6) | 06:47 |
| | 17:25 | 13 08:18 (V7) | 18:01 | 18:31 | 08:15 (V6) | 20:03 |
| 17 | 07:43 | 08:07 (V7) | 07:16 | 06:34 | 07:34 (V6) | 06:46 |
| | 17:26 | 11 08:18 (V7) | 18:02 | 18:32 | 08:15 (V6) | 20:04 |
| 18 | 07:43 | 08:10 (V7) | 07:14 | 06:33 | 07:33 (V6) | 06:44 |
| | 17:27 | 4 08:14 (V7) | 18:03 | 18:34 | 08:16 (V6) | 20:05 |
| 19 | 07:42 | 07:13 | 07:33 (V6) | 06:31 | 07:33 (V6) | 06:43 |
| | 17:28 | 18:04 | 08:17 (V6) | 18:35 | 08:17 (V6) | 20:06 |
| 20 | 07:42 | 07:12 | 07:32 (V6) | 06:30 | 07:32 (V6) | 06:41 |
| | 17:29 | 18:06 | 08:17 (V6) | 18:36 | 08:18 (V6) | 20:07 |
| 21 | 07:41 | 07:10 | 07:32 (V6) | 06:28 | 07:32 (V6) | 06:40 |
| | 17:30 | 18:07 | 08:17 (V6) | 18:37 | 08:19 (V6) | 20:08 |
| 22 | 07:41 | 07:09 | 07:32 (V6) | 06:26 | 07:32 (V6) | 06:38 |
| | 17:32 | 18:08 | 08:18 (V6) | 18:38 | 08:20 (V6) | 20:09 |
| 23 | 07:40 | 07:08 | 07:31 (V6) | 06:25 | 07:31 (V6) | 06:37 |
| | 17:33 | 18:09 | 08:17 (V6) | 18:39 | 08:21 (V6) | 20:10 |
| 24 | 07:39 | 07:06 | 07:31 (V6) | 06:23 | 07:31 (V6) | 06:36 |
| | 17:34 | 18:10 | 08:18 (V6) | 18:40 | 08:22 (V6) | 20:11 |
| 25 | 07:39 | 07:05 | 07:30 (V6) | 06:21 | 07:30 (V6) | 06:34 |
| | 17:35 | 18:11 | 08:17 (V6) | 18:41 | 08:23 (V6) | 20:12 |
| 26 | 07:38 | 07:03 | 07:30 (V6) | 06:20 | 07:30 (V6) | 06:33 |
| | 17:36 | 18:12 | 08:17 (V6) | 18:42 | 08:24 (V6) | 20:12 |
| 27 | 07:37 | 07:02 | 07:31 (V6) | 06:18 | 07:31 (V6) | 06:32 |
| | 17:37 | 18:13 | 08:17 (V6) | 18:43 | 08:25 (V6) | 20:13 |
| 28 | 07:37 | 07:00 | 07:30 (V6) | 06:17 | 07:30 (V6) | 06:30 |
| | 17:39 | 18:14 | 08:16 (V6) | 18:44 | 08:26 (V6) | 20:14 |
| 29 | 07:36 | 07:15 | 07:15 | 06:29 | 07:15 | 06:29 |
| | 17:40 | 19:45 | 08:16 (V6) | 18:45 | 08:27 (V6) | 20:15 |
| 30 | 07:35 | 07:13 | 07:13 | 06:28 | 07:13 | 06:28 |
| | 17:41 | 19:46 | 08:17 (V6) | 18:46 | 08:28 (V6) | 20:16 |
| 31 | 07:34 | 07:12 | 07:12 | 06:27 | 07:12 | 06:27 |
| | 17:42 | 19:47 | 08:18 (V6) | 18:47 | 08:29 (V6) | 20:17 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | 237 | 769 | 393 | | | |
| Sun reduction | 0,45 | 0,47 | 0,49 | | | |
| Oper. time red. | 0,77 | 0,77 | 0,77 | | | |
| Wind dir. red. | 0,67 | 0,66 | 0,66 | | | |
| Total reduction | 0,23 | 0,24 | 0,25 | | | |
| Total, real | 55 | 185 | 98 | | | |

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: Progetto_2022_03_15Shadow receptor: F21 - F3

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December |
|---------------------|-------|--------|-----------|---------|------------|------------|
| 1 | 06:00 | 06:23 | 06:52 | 07:20 | 06:52 | 07:15 (V6) |
| | 20:56 | 20:38 | 19:57 | 19:08 | 17:24 | 17:01 |
| 2 | 06:00 | 06:24 | 06:53 | 07:21 | 08:22 (V6) | 06:53 |
| | 20:56 | 20:37 | 19:56 | 19:07 | 17:23 | 17:01 |
| 3 | 06:01 | 06:25 | 06:53 | 07:22 | 08:18 (V6) | 06:54 |
| | 20:56 | 20:36 | 19:54 | 19:05 | 17:21 | 17:01 |
| 4 | 06:01 | 06:25 | 06:54 | 07:23 | 08:15 (V6) | 06:55 |
| | 20:56 | 20:35 | 19:52 | 19:04 | 17:20 | 17:00 |
| 5 | 06:02 | 06:26 | 06:55 | 07:24 | 08:13 (V6) | 06:56 |
| | 20:56 | 20:34 | 19:51 | 19:02 | 17:19 | 17:00 |
| 6 | 06:03 | 06:27 | 06:56 | 07:24 | 08:11 (V6) | 06:57 |
| | 20:55 | 20:33 | 19:49 | 19:00 | 17:18 | 17:00 |
| 7 | 06:03 | 06:28 | 06:57 | 07:25 | 08:10 (V6) | 06:59 |
| | 20:55 | 20:32 | 19:48 | 18:59 | 17:17 | 17:00 |
| 8 | 06:04 | 06:29 | 06:58 | 07:26 | 08:08 (V6) | 07:00 |
| | 20:55 | 20:31 | 19:46 | 18:57 | 17:16 | 17:00 |
| 9 | 06:04 | 06:30 | 06:59 | 07:27 | 08:07 (V6) | 07:01 |
| | 20:54 | 20:29 | 19:44 | 18:56 | 17:15 | 17:00 |
| 10 | 06:05 | 06:31 | 07:00 | 07:28 | 08:06 (V6) | 07:02 |
| | 20:54 | 20:28 | 19:43 | 18:54 | 17:14 | 17:00 |
| 11 | 06:06 | 06:32 | 07:01 | 07:29 | 08:05 (V6) | 07:03 |
| | 20:54 | 20:27 | 19:41 | 18:53 | 17:13 | 17:00 |
| 12 | 06:06 | 06:33 | 07:02 | 07:30 | 08:04 (V6) | 07:04 |
| | 20:53 | 20:26 | 19:40 | 18:51 | 17:12 | 17:00 |
| 13 | 06:07 | 06:34 | 07:03 | 07:31 | 08:03 (V6) | 07:05 |
| | 20:53 | 20:24 | 19:38 | 18:50 | 17:11 | 17:00 |
| 14 | 06:08 | 06:35 | 07:04 | 07:33 | 08:03 (V6) | 07:07 |
| | 20:52 | 20:23 | 19:36 | 18:48 | 17:11 | 17:01 |
| 15 | 06:08 | 06:36 | 07:05 | 07:34 | 08:02 (V6) | 07:08 |
| | 20:52 | 20:22 | 19:35 | 18:47 | 17:10 | 17:01 |
| 16 | 06:09 | 06:37 | 07:05 | 07:35 | 08:03 (V6) | 07:09 |
| | 20:51 | 20:20 | 19:33 | 18:45 | 17:09 | 17:01 |
| 17 | 06:10 | 06:38 | 07:06 | 07:36 | 08:03 (V6) | 07:10 |
| | 20:51 | 20:19 | 19:31 | 18:44 | 17:08 | 17:01 |
| 18 | 06:11 | 06:39 | 07:07 | 07:37 | 08:02 (V6) | 07:11 |
| | 20:50 | 20:18 | 19:30 | 18:42 | 17:07 | 17:02 |
| 19 | 06:12 | 06:39 | 07:08 | 07:38 | 08:02 (V6) | 07:12 |
| | 20:49 | 20:16 | 19:28 | 18:41 | 17:07 | 17:02 |
| 20 | 06:12 | 06:40 | 07:09 | 07:39 | 08:02 (V6) | 07:13 |
| | 20:49 | 20:15 | 19:26 | 18:39 | 17:06 | 17:03 |
| 21 | 06:13 | 06:41 | 07:10 | 07:40 | 08:02 (V6) | 07:14 |
| | 20:48 | 20:13 | 19:25 | 18:38 | 17:05 | 17:03 |
| 22 | 06:14 | 06:42 | 07:11 | 07:41 | 08:03 (V6) | 07:16 |
| | 20:47 | 20:12 | 19:23 | 18:37 | 17:05 | 17:04 |
| 23 | 06:15 | 06:43 | 07:12 | 07:42 | 08:03 (V6) | 07:17 |
| | 20:46 | 20:11 | 19:21 | 18:35 | 17:04 | 17:04 |
| 24 | 06:16 | 06:44 | 07:13 | 07:43 | 08:03 (V6) | 07:18 |
| | 20:46 | 20:09 | 19:20 | 18:34 | 17:04 | 17:05 |
| 25 | 06:16 | 06:45 | 07:14 | 07:44 | 07:05 (V6) | 07:19 |
| | 20:45 | 20:08 | 19:18 | 17:33 | 17:03 | 17:05 |
| 26 | 06:17 | 06:46 | 07:15 | 07:45 | 07:06 (V6) | 07:20 |
| | 20:44 | 20:06 | 19:17 | 17:31 | 17:03 | 17:06 |
| 27 | 06:18 | 06:47 | 07:16 | 07:46 | 07:07 (V6) | 07:21 |
| | 20:43 | 20:05 | 19:15 | 17:30 | 17:02 | 17:06 |
| 28 | 06:19 | 06:48 | 07:17 | 07:47 | 07:08 (V6) | 07:22 |
| | 20:42 | 20:03 | 19:13 | 17:29 | 17:02 | 17:07 |
| 29 | 06:20 | 06:49 | 07:18 | 07:48 | 07:09 (V6) | 07:23 |
| | 20:41 | 20:02 | 19:12 | 17:27 | 17:02 | 17:08 |
| 30 | 06:21 | 06:50 | 07:19 | 07:49 | 07:10 (V6) | 07:24 |
| | 20:40 | 20:00 | 19:10 | 17:26 | 17:01 | 17:09 |
| 31 | 06:22 | 06:51 | 07:20 | 07:50 | 07:11 (V6) | 07:25 |
| | 20:39 | 19:59 | 19:09 | 17:25 | 17:01 | 17:09 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Total, worst case | | | | 1149 | 118 | 366 |
| Sun reduction | | | | 0,54 | 0,51 | 0,45 |
| Oper. time red. | | | | 0,77 | 0,77 | 0,77 |
| Wind dir. red. | | | | 0,66 | 0,67 | 0,67 |
| Total reduction | | | | 0,28 | 0,26 | 0,23 |
| Total, real | | | | 318 | 31 | 85 |

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: Progetto_2022_03_15Shadow receptor: F22 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June | |
|---------------------|---------|---------------|-------|---------------|-------|-------|---------------|
| 1 | 07:45 | 08:08 (V7) | 07:33 | 07:59 (V6) | 06:59 | 07:10 | 06:26 |
| | 17:10 | 18 08:26 (V7) | 17:43 | 30 08:29 (V6) | 18:16 | 19:48 | 20:17 |
| 2 | 07:45 | 08:09 (V7) | 07:32 | 07:58 (V6) | 06:58 | 07:09 | 06:25 |
| | 17:11 | 17 08:26 (V7) | 17:44 | 32 08:30 (V6) | 18:17 | 19:49 | 20:18 |
| 3 | 07:46 | 08:09 (V7) | 07:31 | 07:57 (V6) | 06:56 | 07:07 | 06:24 |
| | 17:12 | 17 08:26 (V7) | 17:46 | 35 08:32 (V6) | 18:18 | 19:50 | 20:19 |
| 4 | 07:46 | 08:11 (V7) | 07:30 | 07:56 (V6) | 06:55 | 07:06 | 06:23 |
| | 17:13 | 14 08:25 (V7) | 17:47 | 37 08:33 (V6) | 18:19 | 19:51 | 20:20 |
| 5 | 07:46 | 08:12 (V7) | 07:29 | 07:56 (V6) | 06:53 | 07:04 | 06:22 |
| | 17:14 | 13 08:25 (V7) | 17:48 | 38 08:34 (V6) | 18:20 | 19:52 | 20:21 |
| 6 | 07:46 | 08:13 (V7) | 07:28 | 07:55 (V6) | 06:52 | 07:02 | 06:20 |
| | 17:15 | 12 08:25 (V7) | 17:49 | 40 08:35 (V6) | 18:21 | 19:53 | 20:22 |
| 7 | 07:46 | 08:15 (V7) | 07:27 | 07:55 (V6) | 06:50 | 07:01 | 06:19 |
| | 17:16 | 9 08:24 (V7) | 17:50 | 40 08:35 (V6) | 18:22 | 19:54 | 20:23 |
| 8 | 07:45 | 08:17 (V7) | 07:26 | 07:53 (V6) | 06:48 | 06:59 | 06:18 |
| | 17:17 | 6 08:23 (V7) | 17:52 | 42 08:35 (V6) | 18:23 | 19:55 | 20:24 |
| 9 | 07:45 | | 07:25 | 07:53 (V6) | 06:47 | 06:58 | 06:17 |
| | 17:18 | | 17:53 | 43 08:36 (V6) | 18:24 | 19:56 | 20:25 |
| 10 | 07:45 | | 07:24 | 07:53 (V6) | 06:45 | 06:56 | 06:16 |
| | 17:19 | | 17:54 | 43 08:36 (V6) | 18:25 | 19:57 | 20:26 |
| 11 | 07:45 | | 07:23 | 07:53 (V6) | 06:44 | 06:55 | 06:15 |
| | 17:20 | | 17:55 | 44 08:37 (V6) | 18:26 | 19:58 | 20:27 |
| 12 | 07:45 | | 07:22 | 07:53 (V6) | 06:42 | 06:53 | 06:14 |
| | 17:21 | | 17:56 | 44 08:37 (V6) | 18:27 | 19:59 | 20:28 |
| 13 | 07:45 | | 07:20 | 07:53 (V6) | 06:41 | 06:52 | 06:13 |
| | 17:22 | | 17:58 | 44 08:37 (V6) | 18:28 | 20:00 | 20:29 |
| 14 | 07:44 | | 07:19 | 07:52 (V6) | 06:39 | 06:50 | 06:12 |
| | 17:23 | | 17:59 | 45 08:37 (V6) | 18:29 | 20:01 | 20:30 |
| 15 | 07:44 | | 07:18 | 07:53 (V6) | 06:38 | 06:49 | 06:11 |
| | 17:24 | | 18:00 | 44 08:37 (V6) | 18:30 | 20:02 | 20:31 |
| 16 | 07:44 | | 07:17 | 07:53 (V6) | 06:36 | 06:47 | 06:10 |
| | 17:25 | | 18:01 | 44 08:37 (V6) | 18:31 | 20:03 | 20:32 |
| 17 | 07:43 | | 07:16 | 07:53 (V6) | 06:34 | 06:46 | 06:09 |
| | 17:26 | | 18:02 | 43 08:36 (V6) | 18:32 | 20:04 | 20:33 |
| 18 | 07:43 | | 07:14 | 07:53 (V6) | 06:33 | 06:44 | 06:08 |
| | 17:27 | | 18:03 | 43 08:36 (V6) | 18:34 | 20:05 | 20:34 |
| 19 | 07:42 | | 07:13 | 07:54 (V6) | 06:31 | 06:43 | 06:07 |
| | 17:28 | | 18:04 | 41 08:35 (V6) | 18:35 | 20:06 | 20:35 |
| 20 | 07:42 | | 07:12 | 07:54 (V6) | 06:30 | 06:41 | 06:07 |
| | 17:29 | | 18:06 | 40 08:34 (V6) | 18:36 | 20:07 | 20:36 |
| 21 | 07:41 | | 07:10 | 07:55 (V6) | 06:28 | 06:40 | 06:06 |
| | 17:30 | | 18:07 | 38 08:33 (V6) | 18:37 | 20:08 | 20:37 |
| 22 | 07:41 | | 07:09 | 07:56 (V6) | 06:26 | 06:38 | 06:05 |
| | 17:32 | | 18:08 | 37 08:33 (V6) | 18:38 | 20:09 | 20:37 |
| 23 | 07:40 | | 07:08 | 07:56 (V6) | 06:25 | 06:37 | 06:04 |
| | 17:33 | | 18:09 | 35 08:31 (V6) | 18:39 | 20:10 | 20:38 |
| 24 | 07:39 | | 07:06 | 07:58 (V6) | 06:23 | 06:36 | 06:04 |
| | 17:34 | | 18:10 | 32 08:30 (V6) | 18:40 | 20:11 | 20:39 |
| 25 | 07:39 | | 07:05 | 07:59 (V6) | 06:21 | 06:34 | 06:03 |
| | 17:35 | | 18:11 | 29 08:28 (V6) | 18:41 | 20:12 | 20:40 |
| 26 | 07:38 | | 07:03 | 08:01 (V6) | 06:20 | 06:33 | 06:02 |
| | 17:36 | | 18:12 | 25 08:26 (V6) | 18:42 | 20:13 | 20:41 |
| 27 | 07:37 | 08:11 (V6) | 07:02 | 08:03 (V6) | 06:18 | 06:32 | 06:02 |
| | 17:37 | 3 08:14 (V6) | 18:13 | 21 08:24 (V6) | 18:43 | 20:14 | 20:42 |
| 28 | 07:37 | 08:06 (V6) | 07:00 | 08:06 (V6) | 06:17 | 06:30 | 06:01 |
| | 17:39 | 14 08:20 (V6) | 18:14 | 14 08:20 (V6) | 18:44 | 20:14 | 20:42 |
| 29 | 07:36 | 08:03 (V6) | | | 07:15 | 06:29 | 06:01 |
| | 17:40 | 20 08:23 (V6) | | | 19:45 | 20:15 | 20:43 |
| 30 | 07:35 | 08:02 (V6) | | | 07:13 | 06:28 | 06:00 |
| | 17:41 | 24 08:26 (V6) | | | 19:46 | 20:16 | 20:44 |
| 31 | 07:34 | 08:01 (V6) | | | 07:12 | | 06:00 |
| | 17:42 | 26 08:27 (V6) | | | 19:47 | 20:45 | 50 07:23 (V5) |
| Potential sun hours | 301 | 299 | | 370 | 397 | 445 | 448 |
| Total, worst case | 193 | | 1043 | | | | 1677 |
| Sun reduction | 0,45 | | 0,47 | | | | 0,66 |
| Oper. time red. | 0,77 | | 0,77 | | | | 0,77 |
| Wind dir. red. | 0,67 | | 0,67 | | | | 0,63 |
| Total reduction | 0,23 | | 0,24 | | | | 0,32 |
| Total, real | 45 | | 255 | | | 167 | 543 |

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: Progetto_2022_03_15Shadow receptor: F22 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December |
|---------------------|-------|---------------|-----------|---------|----------|---------------|
| 1 | 06:00 | 06:36 (V5) | 06:23 | 06:52 | 07:20 | 06:52 |
| | 20:56 | 57 07:33 (V5) | 20:38 | 19:57 | 19:08 | 17:24 |
| 2 | 06:00 | 06:36 (V5) | 06:24 | 06:53 | 07:21 | 06:53 |
| | 20:56 | 56 07:32 (V5) | 20:37 | 19:56 | 19:07 | 17:23 |
| 3 | 06:01 | 06:37 (V5) | 06:25 | 06:53 | 07:22 | 06:54 |
| | 20:56 | 56 07:33 (V5) | 20:36 | 19:54 | 19:05 | 17:21 |
| 4 | 06:01 | 06:37 (V5) | 06:25 | 06:54 | 07:23 | 06:55 |
| | 20:56 | 55 07:32 (V5) | 20:35 | 19:52 | 19:04 | 17:20 |
| 5 | 06:02 | 06:38 (V5) | 06:26 | 06:55 | 07:24 | 06:56 |
| | 20:56 | 55 07:33 (V5) | 20:34 | 19:51 | 19:02 | 17:19 |
| 6 | 06:03 | 06:38 (V5) | 06:27 | 06:56 | 07:24 | 06:57 |
| | 20:55 | 54 07:32 (V5) | 20:33 | 19:49 | 19:00 | 17:18 |
| 7 | 06:03 | 06:39 (V5) | 06:28 | 06:57 | 07:25 | 06:59 |
| | 20:55 | 53 07:32 (V5) | 20:32 | 19:48 | 18:59 | 17:17 |
| 8 | 06:04 | 06:39 (V5) | 06:29 | 06:58 | 07:26 | 07:00 |
| | 20:55 | 54 07:33 (V5) | 20:31 | 19:46 | 18:57 | 17:16 |
| 9 | 06:04 | 06:39 (V5) | 06:30 | 06:59 | 07:27 | 07:01 |
| | 20:54 | 53 07:32 (V5) | 20:29 | 19:44 | 18:56 | 17:15 |
| 10 | 06:05 | 06:40 (V5) | 06:31 | 07:00 | 07:28 | 07:02 |
| | 20:54 | 52 07:32 (V5) | 20:28 | 19:43 | 18:54 | 17:14 |
| 11 | 06:06 | 06:41 (V5) | 06:32 | 07:01 | 07:29 | 07:03 |
| | 20:54 | 51 07:32 (V5) | 20:27 | 19:41 | 18:53 | 17:13 |
| 12 | 06:06 | 06:41 (V5) | 06:33 | 07:02 | 07:30 | 07:04 |
| | 20:53 | 50 07:31 (V5) | 20:26 | 19:40 | 18:51 | 17:12 |
| 13 | 06:07 | 06:42 (V5) | 06:34 | 07:03 | 07:31 | 07:05 |
| | 20:53 | 49 07:31 (V5) | 20:24 | 19:38 | 18:50 | 6 08:49 (V6) |
| 14 | 06:08 | 06:43 (V5) | 06:35 | 07:04 | 07:33 | 07:07 |
| | 20:52 | 48 07:31 (V5) | 20:23 | 19:36 | 18:48 | 17 08:54 (V6) |
| 15 | 06:08 | 06:43 (V5) | 06:36 | 07:05 | 07:34 | 07:08 |
| | 20:52 | 47 07:30 (V5) | 20:22 | 19:35 | 18:47 | 23 08:57 (V6) |
| 16 | 06:09 | 06:44 (V5) | 06:37 | 07:05 | 07:35 | 07:09 |
| | 20:51 | 46 07:30 (V5) | 20:20 | 19:33 | 18:45 | 26 08:59 (V6) |
| 17 | 06:10 | 06:45 (V5) | 06:38 | 07:06 | 07:36 | 07:10 |
| | 20:51 | 44 07:29 (V5) | 20:19 | 19:31 | 18:44 | 30 09:01 (V6) |
| 18 | 06:11 | 06:46 (V5) | 06:39 | 07:07 | 07:37 | 07:11 |
| | 20:50 | 43 07:29 (V5) | 20:18 | 19:30 | 18:42 | 33 09:02 (V6) |
| 19 | 06:12 | 06:46 (V5) | 06:39 | 07:08 | 07:38 | 07:12 |
| | 20:49 | 41 07:27 (V5) | 20:16 | 19:28 | 18:41 | 35 09:03 (V6) |
| 20 | 06:12 | 06:47 (V5) | 06:40 | 07:09 | 07:39 | 07:13 |
| | 20:49 | 40 07:27 (V5) | 20:15 | 19:26 | 18:39 | 38 09:04 (V6) |
| 21 | 06:13 | 06:49 (V5) | 06:41 | 07:10 | 07:40 | 07:14 |
| | 20:48 | 37 07:26 (V5) | 20:13 | 19:25 | 18:38 | 39 09:04 (V6) |
| 22 | 06:14 | 06:50 (V5) | 06:42 | 07:11 | 07:41 | 07:16 |
| | 20:47 | 35 07:25 (V5) | 20:12 | 19:23 | 18:37 | 41 09:05 (V6) |
| 23 | 06:15 | 06:52 (V5) | 06:43 | 07:12 | 07:42 | 07:17 |
| | 20:46 | 32 07:24 (V5) | 20:11 | 19:21 | 18:35 | 42 09:05 (V6) |
| 24 | 06:16 | 06:53 (V5) | 06:44 | 07:13 | 07:43 | 07:18 |
| | 20:46 | 29 07:22 (V5) | 20:09 | 19:20 | 18:34 | 42 09:05 (V6) |
| 25 | 06:16 | 06:55 (V5) | 06:45 | 07:14 | 07:44 | 07:19 |
| | 20:45 | 25 07:20 (V5) | 20:08 | 19:18 | 17:33 | 44 08:07 (V6) |
| 26 | 06:17 | 06:57 (V5) | 06:46 | 07:15 | 07:45 | 07:20 |
| | 20:44 | 21 07:18 (V5) | 20:06 | 19:17 | 17:31 | 44 08:07 (V6) |
| 27 | 06:18 | 07:01 (V5) | 06:47 | 07:16 | 07:46 | 07:21 |
| | 20:43 | 14 07:15 (V5) | 20:05 | 19:15 | 17:30 | 44 08:06 (V6) |
| 28 | 06:19 | | 06:48 | 07:17 | 07:47 | 07:22 |
| | 20:42 | | 20:03 | 19:13 | 17:29 | 44 08:06 (V6) |
| 29 | 06:20 | | 06:49 | 07:18 | 07:48 | 07:23 |
| | 20:41 | | 20:02 | 19:12 | 17:27 | 44 08:06 (V6) |
| 30 | 06:21 | | 06:50 | 07:19 | 07:49 | 07:24 |
| | 20:40 | | 20:00 | 19:10 | 17:26 | 44 08:06 (V6) |
| 31 | 06:22 | | 06:51 | 07:20 | 07:50 | 07:25 |
| | 20:39 | | 19:59 | 17:25 | 17:25 | 43 08:06 (V6) |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Total, worst case | 1197 | | | 679 | 460 | 476 |
| Sun reduction | 0,74 | | | 0,54 | 0,51 | 0,45 |
| Oper. time red. | 0,77 | | | 0,77 | 0,77 | 0,77 |
| Wind dir. red. | 0,63 | | | 0,67 | 0,67 | 0,67 |
| Total reduction | 0,36 | | | 0,28 | 0,26 | 0,23 |
| Total, real | 432 | | | 191 | 120 | 111 |

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

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F23 - Abitazione

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|---------|---------------|-------|---------------|-------|---------------|
| 1 | 07:45 | 08:13 (V6) | 07:33 | 08:29 (V6) | 06:59 | 07:10 |
| 1 | 17:10 | 44 08:57 (V6) | 17:43 | 33 09:02 (V6) | 18:16 | 19:48 |
| 2 | 07:45 | 08:14 (V6) | 07:32 | 08:30 (V6) | 06:58 | 07:09 |
| 2 | 17:11 | 43 08:57 (V6) | 17:44 | 31 09:01 (V6) | 18:17 | 19:49 |
| 3 | 07:46 | 08:14 (V6) | 07:31 | 08:32 (V6) | 06:56 | 07:07 |
| 3 | 17:12 | 44 08:58 (V6) | 17:46 | 27 08:59 (V6) | 18:18 | 19:50 |
| 4 | 07:46 | 08:14 (V6) | 07:30 | 08:34 (V6) | 06:55 | 07:06 |
| 4 | 17:13 | 45 08:59 (V6) | 17:47 | 23 08:57 (V6) | 18:19 | 19:51 |
| 5 | 07:46 | 08:14 (V6) | 07:29 | 08:36 (V6) | 06:53 | 07:04 |
| 5 | 17:14 | 45 08:59 (V6) | 17:48 | 19 08:55 (V6) | 18:20 | 19:52 |
| 6 | 07:46 | 08:15 (V6) | 07:28 | 08:39 (V6) | 06:52 | 07:02 |
| 6 | 17:15 | 45 09:00 (V6) | 17:49 | 13 08:52 (V6) | 18:21 | 19:53 |
| 7 | 07:46 | 08:15 (V6) | 07:27 | 06:50 | 07:01 | 06:19 |
| 7 | 17:16 | 46 09:01 (V6) | 17:50 | 18:22 | 19:54 | 20:23 |
| 8 | 07:45 | 08:16 (V6) | 07:26 | 06:48 | 06:59 | 06:18 |
| 8 | 17:17 | 45 09:01 (V6) | 17:52 | 18:23 | 19:55 | 20:24 |
| 9 | 07:45 | 08:16 (V6) | 07:25 | 06:47 | 06:58 | 06:17 |
| 9 | 17:18 | 46 09:02 (V6) | 17:53 | 18:24 | 19:56 | 20:25 |
| 10 | 07:45 | 08:16 (V6) | 07:24 | 06:45 | 06:56 | 06:16 |
| 10 | 17:19 | 46 09:02 (V6) | 17:54 | 18:25 | 19:57 | 20:26 |
| 11 | 07:45 | 08:16 (V6) | 07:23 | 06:44 | 06:55 | 06:15 |
| 11 | 17:20 | 47 09:03 (V6) | 17:55 | 18:26 | 19:58 | 20:27 |
| 12 | 07:45 | 08:17 (V6) | 07:22 | 06:42 | 06:53 | 06:14 |
| 12 | 17:21 | 46 09:03 (V6) | 17:56 | 18:27 | 19:59 | 20:28 |
| 13 | 07:45 | 08:16 (V6) | 07:20 | 06:41 | 06:52 | 06:13 |
| 13 | 17:22 | 47 09:03 (V6) | 17:57 | 18:28 | 20:00 | 20:29 |
| 14 | 07:44 | 08:17 (V6) | 07:19 | 06:39 | 06:50 | 06:12 |
| 14 | 17:23 | 47 09:04 (V6) | 17:59 | 18:29 | 20:01 | 20:30 |
| 15 | 07:44 | 08:18 (V6) | 07:18 | 06:38 | 06:49 | 06:11 |
| 15 | 17:24 | 47 09:05 (V6) | 18:00 | 18:30 | 20:02 | 20:31 |
| 16 | 07:44 | 08:18 (V6) | 07:17 | 06:36 | 06:47 | 06:10 |
| 16 | 17:25 | 46 09:04 (V6) | 18:01 | 18:31 | 20:03 | 20:32 |
| 17 | 07:43 | 08:18 (V6) | 07:16 | 06:34 | 06:46 | 06:09 |
| 17 | 17:26 | 47 09:05 (V6) | 18:02 | 18:32 | 20:04 | 20:33 |
| 18 | 07:43 | 08:18 (V6) | 07:14 | 06:33 | 06:44 | 06:08 |
| 18 | 17:27 | 47 09:05 (V6) | 18:03 | 18:33 | 20:05 | 20:34 |
| 19 | 07:42 | 08:19 (V6) | 07:13 | 06:31 | 06:43 | 06:07 |
| 19 | 17:28 | 47 09:06 (V6) | 18:04 | 18:35 | 20:06 | 20:35 |
| 20 | 07:42 | 08:19 (V6) | 07:12 | 06:30 | 06:41 | 06:07 |
| 20 | 17:29 | 47 09:06 (V6) | 18:06 | 18:36 | 20:07 | 20:36 |
| 21 | 07:41 | 08:19 (V6) | 07:10 | 06:28 | 06:40 | 06:06 |
| 21 | 17:30 | 46 09:05 (V6) | 18:07 | 18:37 | 20:08 | 20:37 |
| 22 | 07:41 | 08:20 (V6) | 07:09 | 06:26 | 06:38 | 06:05 |
| 22 | 17:32 | 46 09:06 (V6) | 18:08 | 18:38 | 20:09 | 20:37 |
| 23 | 07:40 | 08:21 (V6) | 07:08 | 06:25 | 06:37 | 06:04 |
| 23 | 17:33 | 45 09:06 (V6) | 18:09 | 18:39 | 20:10 | 20:38 |
| 24 | 07:39 | 08:21 (V6) | 07:06 | 06:23 | 06:36 | 06:04 |
| 24 | 17:34 | 44 09:05 (V6) | 18:10 | 18:40 | 20:11 | 20:39 |
| 25 | 07:39 | 08:22 (V6) | 07:05 | 06:21 | 06:34 | 06:03 |
| 25 | 17:35 | 44 09:06 (V6) | 18:11 | 18:41 | 20:12 | 20:40 |
| 26 | 07:38 | 08:23 (V6) | 07:03 | 06:20 | 06:33 | 06:02 |
| 26 | 17:36 | 42 09:05 (V6) | 18:12 | 18:42 | 20:13 | 20:41 |
| 27 | 07:37 | 08:23 (V6) | 07:02 | 06:18 | 06:32 | 06:02 |
| 27 | 17:37 | 42 09:05 (V6) | 18:13 | 18:43 | 20:13 | 20:42 |
| 28 | 07:37 | 08:24 (V6) | 07:00 | 06:17 | 06:30 | 06:01 |
| 28 | 17:39 | 40 09:04 (V6) | 18:14 | 18:44 | 20:14 | 20:42 |
| 29 | 07:36 | 08:25 (V6) | | 07:15 | 06:29 | 07:02 (V5) |
| 29 | 17:40 | 39 09:04 (V6) | | 19:45 | 20:15 | 56 07:58 (V5) |
| 30 | 07:35 | 08:27 (V6) | | 07:13 | 06:28 | 07:00 (V5) |
| 30 | 17:41 | 37 09:04 (V6) | | 19:46 | 20:16 | 58 07:58 (V5) |
| 31 | 07:34 | 08:28 (V6) | | 07:12 | 06:00 | 06:52 (V5) |
| 31 | 17:42 | 35 09:03 (V6) | | 19:47 | 20:45 | 72 08:04 (V5) |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | 1377 | 146 | | | 2205 | 2091 |
| Sun reduction | 0,45 | 0,47 | | | 0,59 | 0,66 |
| Oper. time red. | 0,77 | 0,77 | | | 0,77 | 0,77 |
| Wind dir. red. | 0,67 | 0,67 | | | 0,63 | 0,63 |
| Total reduction | 0,23 | 0,24 | | | 0,28 | 0,32 |
| Total, real | 321 | 36 | | 117 | 628 | 669 |

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: Progetto_2022_03_15Shadow receptor: F24 - D10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|----------------|--------------------------|----------------|--------------------------|----------------|----------------|
| 1 | 07:45 17:10 | 08:14 (V7) 08:20 (V7) | 07:33 17:43 | 08:02 (V6) 08:34 (V6) | 06:59 18:16 | 07:10 19:48 |
| 2 | 07:45 17:11 | | 32 17:44 | 08:02 (V6) 08:35 (V6) | 06:58 18:17 | 07:09 19:49 |
| 3 | 07:46 17:12 | | 33 17:46 | 08:02 (V6) 08:35 (V6) | 06:56 18:18 | 07:07 19:50 |
| 4 | 07:46 17:13 | | 33 17:47 | 08:02 (V6) 08:35 (V6) | 06:55 18:19 | 07:06 19:51 |
| 5 | 07:46 17:14 | | 32 17:48 | 08:03 (V6) 08:35 (V6) | 06:53 18:20 | 07:04 19:52 |
| 6 | 07:46 17:15 | | 31 17:49 | 08:03 (V6) 08:34 (V6) | 06:52 18:21 | 07:02 19:53 |
| 7 | 07:46 17:16 | | 30 17:50 | 08:04 (V6) 08:34 (V6) | 06:48 18:22 | 07:01 19:54 |
| 8 | 07:46 17:17 | | 29 17:52 | 08:04 (V6) 08:33 (V6) | 06:48 18:23 | 06:59 19:55 |
| 9 | 07:45 17:18 | | 27 17:53 | 08:05 (V6) 08:32 (V6) | 06:47 18:24 | 06:58 19:56 |
| 10 | 07:45 17:19 | | 25 17:54 | 08:06 (V6) 08:31 (V6) | 06:45 18:25 | 06:56 19:57 |
| 11 | 07:45 17:20 | | 23 17:55 | 08:07 (V6) 08:30 (V6) | 06:44 18:26 | 06:55 19:58 |
| 12 | 07:45 17:21 | | 20 17:56 | 08:09 (V6) 08:29 (V6) | 06:42 18:27 | 06:53 19:59 |
| 13 | 07:45 17:22 | | 16 17:58 | 08:11 (V6) 08:27 (V6) | 06:41 18:28 | 06:52 20:00 |
| 14 | 07:44 17:23 | | 10 17:59 | 08:13 (V6) 08:23 (V6) | 06:39 18:29 | 06:50 20:01 |
| 15 | 07:44 17:24 | | | | 06:38 18:30 | 06:49 20:02 |
| 16 | 07:44 17:25 | | | | 06:36 18:31 | 06:47 20:03 |
| 17 | 07:43 17:26 | | | | 06:34 18:32 | 06:46 20:04 |
| 18 | 07:43 17:27 | 08:09 (V6) | 07:14 18:03 | 06:33 18:34 | 06:44 20:05 | 06:42 20:06 |
| 19 | 07:42 17:28 | 10 08:08 (V6) | 07:13 18:04 | 06:31 18:35 | 06:43 20:06 | 06:41 20:07 |
| 20 | 07:42 17:29 | 14 08:22 (V6) | 07:12 18:06 | 06:30 18:36 | 06:41 20:07 | 06:40 20:08 |
| 21 | 07:41 17:30 | 17 08:23 (V6) | 07:10 18:07 | 06:28 18:37 | 06:40 20:08 | 06:39 20:09 |
| 22 | 07:41 17:31 | 20 08:25 (V6) | 07:09 18:08 | 06:26 18:38 | 06:38 20:09 | 06:37 20:10 |
| 23 | 07:41 17:32 | 22 08:27 (V6) | 07:09 18:08 | 06:26 18:38 | 06:38 20:09 | 06:37 20:10 |
| 24 | 07:40 17:33 | 24 08:28 (V6) | 07:08 18:09 | 06:25 18:39 | 06:37 20:10 | 06:36 20:11 |
| 25 | 07:39 17:34 | 26 08:29 (V6) | 07:06 18:10 | 06:23 18:40 | 06:36 20:11 | 06:35 20:12 |
| 26 | 07:39 17:35 | 27 08:30 (V6) | 07:05 18:11 | 06:22 18:41 | 06:34 20:12 | 06:33 20:13 |
| 27 | 07:38 17:36 | 29 08:02 (V6) | 07:03 18:12 | 06:20 18:42 | 06:33 20:13 | 06:32 20:14 |
| 28 | 07:38 17:37 | 31 08:31 (V6) | 07:02 18:12 | 06:18 18:43 | 06:32 20:14 | 06:31 20:15 |
| 29 | 07:37 17:37 | 30 08:32 (V6) | 07:02 18:13 | 06:18 18:43 | 06:32 20:14 | 06:31 20:15 |
| 30 | 07:37 17:38 | 32 08:01 (V6) | 07:00 18:13 | 06:17 18:44 | 06:30 20:15 | 06:29 20:16 |
| 31 | 07:37 17:39 | 31 08:32 (V6) | 07:00 18:15 | 06:17 18:44 | 06:30 20:15 | 06:29 20:16 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | 351 | 374 | 6 | 1023 | | |
| Sun reduction | 0,45 | 0,47 | 0,49 | 0,53 | | |
| Oper. time red. | 0,77 | 0,77 | 0,77 | 0,77 | | |
| Wind dir. red. | 0,67 | 0,67 | 0,66 | 0,66 | | |
| Total reduction | 0,23 | 0,24 | 0,25 | 0,27 | | |
| Total, real | 82 | 91 | 1 | 273 | | |

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: Progetto_2022_03_15Shadow receptor: F24 - D10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December | | | | | |
|---------------------|----------------|----------------|----------------|---------------------|----------------|----------------|------------------|---------------------|------------------|--|--|
| 1 | 06:00 20:56 | 06:23 20:38 | 06:52 19:57 | 07:25 (V5) 19:51 | 07:20 19:08 | 06:52 17:24 | 07:35 (V6) 26 | 07:01 (V6) 17:01 | | | |
| 2 | 06:00 20:56 | 06:24 20:37 | 06:53 19:56 | 07:25 (V5) 19:07 | 07:21 19:07 | 06:53 17:23 | 07:34 (V6) 28 | 07:02 (V6) 17:01 | | | |
| 3 | 06:01 20:56 | 06:25 20:36 | 06:53 19:54 | 07:25 (V5) 19:05 | 07:22 19:05 | 06:54 17:21 | 07:33 (V6) 29 | 07:02 (V6) 17:01 | | | |
| 4 | 06:01 20:56 | 06:25 20:35 | 06:54 19:52 | 07:26 (V5) 19:04 | 07:23 19:04 | 06:55 17:20 | 07:32 (V6) 31 | 07:02 (V6) 17:00 | | | |
| 5 | 06:02 20:56 | 06:26 20:34 | 06:55 19:51 | 07:25 (V5) 19:02 | 07:24 19:02 | 06:56 17:19 | 07:33 (V6) 31 | 07:02 (V6) 17:00 | | | |
| 6 | 06:03 20:55 | 06:27 20:33 | 06:56 19:49 | 07:26 (V5) 19:01 | 07:25 19:01 | 06:57 17:18 | 07:32 (V6) 32 | 07:02 (V6) 17:00 | | | |
| 7 | 06:03 20:55 | 06:28 20:32 | 06:57 19:48 | 07:27 (V5) 18:59 | 07:25 18:59 | 06:59 17:17 | 07:32 (V6) 32 | 07:02 (V6) 17:00 | | | |
| 8 | 06:04 20:55 | 06:29 20:31 | 06:58 19:46 | 07:28 (V5) 18:57 | 07:26 18:57 | 07:00 17:16 | 07:32 (V6) 33 | 07:02 (V6) 17:00 | | | |
| 9 | 06:04 20:54 | 06:30 20:29 | 06:59 19:44 | 07:29 (V5) 18:56 | 07:27 18:56 | 07:01 17:15 | 07:33 (V6) 32 | 07:02 (V6) 17:00 | | | |
| 10 | 06:05 20:54 | 06:31 20:28 | 07:00 19:43 | 07:31 (V5) 18:54 | 07:28 18:54 | 07:02 17:14 | 07:33 (V6) 32 | 07:02 (V6) 17:00 | | | |
| 11 | 06:06 20:54 | 06:32 20:27 | 07:01 19:41 | 07:34 (V5) 18:53 | 07:29 18:53 | 07:03 17:13 | 07:33 (V6) 32 | 07:02 (V6) 17:00 | 08:05 (V7) 5 | | |
| 12 | 06:06 20:53 | 06:33 20:26 | 07:02 19:40 | 07:38 (V5) 18:51 | 07:30 18:51 | 07:04 17:12 | 07:33 (V6) 32 | 07:02 (V6) 17:00 | 08:10 (V7) 7 | | |
| 13 | 06:07 20:53 | 06:34 20:24 | 07:03 19:38 | 07:45 (V5) 19:38 | 07:32 18:50 | 07:05 17:11 | 07:33 (V6) 31 | 07:02 (V6) 17:00 | 08:04 (V7) 9 | | |
| 14 | 06:08 20:52 | 06:35 20:23 | 07:04 19:36 | 07:41 (V5) 19:36 | 07:33 18:48 | 07:07 17:11 | 07:34 (V6) 31 | 07:02 (V6) 17:00 | 08:04 (V7) 10 | | |
| 15 | 06:08 20:52 | 06:36 20:22 | 07:05 19:35 | 07:39 (V5) 19:35 | 07:34 18:47 | 07:08 17:10 | 07:35 (V6) 29 | 07:02 (V6) 17:00 | 08:03 (V7) 11 | | |
| 16 | 06:09 20:51 | 06:37 20:20 | 07:05 19:33 | 07:37 (V5) 19:33 | 07:35 18:45 | 07:09 17:09 | 07:35 (V6) 29 | 07:02 (V6) 17:00 | 08:04 (V7) 11 | | |
| 17 | 06:10 20:51 | 06:38 20:19 | 07:06 19:31 | 07:35 (V5) 19:31 | 07:36 18:44 | 07:10 17:08 | 07:36 (V6) 27 | 07:02 (V6) 17:00 | 08:04 (V7) 13 | | |
| 18 | 06:11 20:50 | 06:39 20:18 | 07:07 19:30 | 07:33 (V5) 19:30 | 07:37 18:42 | 07:11 17:07 | 07:37 (V6) 26 | 07:02 (V6) 17:00 | 08:04 (V7) 13 | | |
| 19 | 06:12 20:49 | 06:39 20:16 | 07:08 19:28 | 07:32 (V5) 19:28 | 07:38 18:41 | 07:12 17:07 | 07:39 (V6) 24 | 07:02 (V6) 17:00 | 08:05 (V7) 13 | | |
| 20 | 06:12 20:49 | 06:40 20:15 | 07:09 19:26 | 07:31 (V5) 19:26 | 07:39 18:39 | 07:13 17:06 | 07:40 (V6) 22 | 07:02 (V6) 17:00 | 08:05 (V7) 13 | | |
| 21 | 06:13 20:48 | 06:41 20:14 | 07:10 19:25 | 07:30 (V5) 19:25 | 07:40 18:38 | 07:14 17:05 | 07:41 (V6) 20 | 07:02 (V6) 17:00 | 08:06 (V7) 13 | | |
| 22 | 06:14 20:47 | 06:42 20:12 | 07:11 19:23 | 07:29 (V5) 19:23 | 07:41 18:37 | 07:16 17:05 | 07:42 (V6) 18 | 07:02 (V6) 17:00 | 08:06 (V7) 13 | | |
| 23 | 06:15 20:46 | 06:43 20:11 | 07:12 19:21 | 07:28 (V5) 19:21 | 07:42 18:35 | 07:17 17:04 | 07:44 (V6) 14 | 07:02 (V6) 17:00 | 08:07 (V7) 13 | | |
| 24 | 06:16 20:46 | 06:44 20:09 | 07:13 19:20 | 07:28 (V5) 19:20 | 07:43 18:34 | 07:18 17:04 | 07:46 (V6) 10 | 07:02 (V6) 17:00 | 08:07 (V7) 13 | | |
| 25 | 06:17 20:45 | 06:45 20:08 | 07:14 19:18 | 07:27 (V5) 19:18 | 07:44 17:33 | 07:19 17:03 | 07:56 (V6) 10 | 07:02 (V6) 17:00 | 08:08 (V7) 13 | | |
| 26 | 06:17 20:44 | 06:46 20:06 | 07:15 19:17 | 07:27 (V5) 19:17 | 07:45 17:31 | 07:20 17:03 | 07:58 (V6) 10 | 07:02 (V6) 17:00 | 08:08 (V7) 13 | | |
| 27 | 06:18 20:43 | 06:47 20:05 | 07:16 19:15 | 07:25 (V5) 19:15 | 07:46 17:30 | 07:21 17:02 | 07:59 (V6) 10 | 07:02 (V6) 17:00 | 08:09 (V7) 11 | | |
| 28 | 06:19 20:42 | 06:48 20:03 | 07:17 19:13 | 07:25 (V5) 19:13 | 07:47 17:29 | 07:22 17:02 | 07:59 (V6) 12 | 07:02 (V6) 17:00 | 08:09 (V7) 11 | | |
| 29 | 06:20 20:41 | 06:49 20:02 | 07:18 19:12 | 07:25 (V5) 19:12 | 07:49 17:27 | 07:23 17:02 | 07:59 (V6) 17 | 07:02 (V6) 17:00 | 08:10 (V7) 10 | | |
| 30 | 06:21 20:40 | 06:50 20:00 | 07:19 19:10 | 07:25 (V5) 19:10 | 07:50 17:26 | 07:24 17:01 | 07:59 (V6) 21 | 07:02 (V6) 17:00 | 08:11 (V7) 9 | | |
| 31 | 06:22 20:39 | 06:51 19:59 | 07:20 19:09 | 07:25 (V5) 19:09 | 07:51 17:25 | 07:25 17:01 | 07:59 (V6) 23 | 07:02 (V6) 17:00 | 08:12 (V7) 8 | | |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 | | | | | |
| Total, worst case | | 661 | 379 | 73 | 651 | 232 | | | | | |
| Sun reduction | | 0,73 | 0,65 | 0,54 | 0,51 | 0,45 | | | | | |
| Oper. time red. | | 0,77 | 0,77 | 0,77 | 0,77 | 0,77 | | | | | |
| Wind dir. red. | | 0,66 | 0,66 | 0,67 | 0,67 | 0,67 | | | | | |
| Total reduction | | 0,37 | 0,33 | 0,28 | 0,26 | 0,23 | | | | | |
| Total, real | | 244 | 124 | 21 | 170 | 54 | | | | | |

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: Progetto_2022_03_15Shadow receptor: F25 - D10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|---------|---------------|-------|---------------|---------------|---------------|
| 1 | 07:45 | 08:15 (V6) | 07:33 | 06:59 | 07:10 | 07:47 (V5) |
| | 17:10 | 36 08:51 (V6) | 17:43 | 18:16 | 19:48 | 50 08:37 (V5) |
| 2 | 07:45 | 08:15 (V6) | 07:32 | 06:58 | 07:09 | 07:47 (V5) |
| | 17:11 | 36 08:51 (V6) | 17:44 | 18:17 | 19:49 | 50 08:37 (V5) |
| 3 | 07:46 | 08:15 (V6) | 07:31 | 06:56 | 07:07 | 07:47 (V5) |
| | 17:12 | 36 08:51 (V6) | 17:46 | 18:18 | 19:50 | 49 08:36 (V5) |
| 4 | 07:46 | 08:16 (V6) | 07:30 | 06:55 | 07:06 | 07:48 (V5) |
| | 17:13 | 36 08:52 (V6) | 17:47 | 18:19 | 19:51 | 47 08:35 (V5) |
| 5 | 07:46 | 08:16 (V6) | 07:29 | 06:53 | 07:04 | 07:47 (V5) |
| | 17:14 | 36 08:52 (V6) | 17:48 | 18:20 | 19:52 | 47 08:34 (V5) |
| 6 | 07:46 | 08:17 (V6) | 07:28 | 06:52 | 07:02 | 07:47 (V5) |
| | 17:15 | 36 08:53 (V6) | 17:49 | 18:21 | 19:53 | 46 08:33 (V5) |
| 7 | 07:46 | 08:18 (V6) | 07:27 | 06:50 | 07:01 | 07:48 (V5) |
| | 17:16 | 35 08:53 (V6) | 17:50 | 18:22 | 19:54 | 44 08:32 (V5) |
| 8 | 07:46 | 08:18 (V6) | 07:26 | 06:48 | 06:59 | 07:49 (V5) |
| | 17:17 | 35 08:53 (V6) | 17:52 | 18:23 | 19:55 | 41 08:30 (V5) |
| 9 | 07:45 | 08:19 (V6) | 07:25 | 06:47 | 06:58 | 07:50 (V5) |
| | 17:18 | 35 08:54 (V6) | 17:53 | 18:24 | 19:56 | 39 08:29 (V5) |
| 10 | 07:45 | 08:19 (V6) | 07:24 | 06:45 | 06:56 | 07:51 (V5) |
| | 17:19 | 34 08:53 (V6) | 17:54 | 18:25 | 19:57 | 36 08:27 (V5) |
| 11 | 07:45 | 08:20 (V6) | 07:23 | 06:44 | 06:55 | 07:52 (V5) |
| | 17:20 | 34 08:54 (V6) | 17:55 | 18:26 | 19:58 | 34 08:26 (V5) |
| 12 | 07:45 | 08:21 (V6) | 07:22 | 06:42 | 06:53 | 07:53 (V5) |
| | 17:21 | 33 08:54 (V6) | 17:56 | 18:27 | 19:59 | 30 08:23 (V5) |
| 13 | 07:45 | 08:21 (V6) | 07:21 | 06:41 | 07:15 (V5) | 06:52 |
| | 17:22 | 33 08:54 (V6) | 17:58 | 18:28 | 7 07:22 (V5) | 20:00 |
| 14 | 07:44 | 08:22 (V6) | 07:19 | 06:39 | 07:08 (V5) | 06:50 |
| | 17:23 | 32 08:54 (V6) | 17:59 | 18:29 | 19 07:27 (V5) | 20:01 |
| 15 | 07:44 | 08:23 (V6) | 07:18 | 06:38 | 07:05 (V5) | 06:49 |
| | 17:24 | 31 08:54 (V6) | 18:00 | 18:30 | 26 07:31 (V5) | 20:02 |
| 16 | 07:44 | 08:23 (V6) | 07:17 | 06:36 | 07:02 (V5) | 06:47 |
| | 17:25 | 31 08:54 (V6) | 18:01 | 18:31 | 31 07:33 (V5) | 20:03 |
| 17 | 07:43 | 08:25 (V6) | 07:16 | 06:34 | 07:01 (V5) | 06:46 |
| | 17:26 | 29 08:54 (V6) | 18:02 | 18:32 | 34 07:35 (V5) | 20:04 |
| 18 | 07:43 | 08:25 (V6) | 07:14 | 06:33 | 06:58 (V5) | 06:44 |
| | 17:27 | 28 08:53 (V6) | 18:03 | 18:34 | 38 07:36 (V5) | 20:05 |
| 19 | 07:42 | 08:27 (V6) | 07:13 | 06:31 | 06:56 (V5) | 06:43 |
| | 17:28 | 26 08:53 (V6) | 18:04 | 18:35 | 40 07:36 (V5) | 20:06 |
| 20 | 07:42 | 08:27 (V6) | 07:12 | 06:30 | 06:55 (V5) | 06:41 |
| | 17:29 | 25 08:52 (V6) | 18:06 | 18:36 | 43 07:38 (V5) | 20:07 |
| 21 | 07:41 | 08:28 (V6) | 07:10 | 06:28 | 06:54 (V5) | 06:40 |
| | 17:30 | 23 08:51 (V6) | 18:07 | 18:37 | 44 07:38 (V5) | 20:08 |
| 22 | 07:41 | 08:30 (V6) | 07:09 | 06:26 | 06:53 (V5) | 06:38 |
| | 17:32 | 21 08:51 (V6) | 18:08 | 18:38 | 46 07:39 (V5) | 20:09 |
| 23 | 07:40 | 08:32 (V6) | 07:08 | 06:25 | 06:52 (V5) | 06:37 |
| | 17:33 | 17 08:49 (V6) | 18:09 | 18:39 | 47 07:39 (V5) | 20:10 |
| 24 | 07:39 | 08:34 (V6) | 07:06 | 06:23 | 06:50 (V5) | 06:36 |
| | 17:34 | 13 08:47 (V6) | 18:10 | 18:40 | 49 07:39 (V5) | 20:11 |
| 25 | 07:39 | 08:39 (V6) | 07:05 | 06:21 | 06:50 (V5) | 06:34 |
| | 17:35 | 5 08:44 (V6) | 18:11 | 18:41 | 50 07:40 (V5) | 20:12 |
| 26 | 07:38 | | 07:03 | 06:20 | 06:49 (V5) | 06:33 |
| | 17:36 | | 18:12 | 18:42 | 51 07:40 (V5) | 20:13 |
| 27 | 07:37 | | 07:02 | 06:18 | 06:48 (V5) | 06:32 |
| | 17:37 | | 18:13 | 18:43 | 51 07:39 (V5) | 20:14 |
| 28 | 07:37 | | 07:00 | 06:17 | 06:48 (V5) | 06:30 |
| | 17:39 | | 18:15 | 18:44 | 52 07:40 (V5) | 20:15 |
| 29 | 07:36 | | 07:15 | 06:15 | 07:47 (V5) | 06:29 |
| | 17:40 | | 19:45 | 52 08:39 (V5) | 20:16 | 20:43 |
| 30 | 07:35 | | 07:13 | 06:13 | 07:48 (V5) | 06:28 |
| | 17:41 | | 19:46 | 51 08:39 (V5) | 20:17 | 20:44 |
| 31 | 07:34 | | 07:12 | 06:11 | 07:47 (V5) | 06:27 |
| | 17:42 | | 19:47 | 51 08:38 (V5) | 20:18 | 20:45 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | 736 | | 782 | | 568 | |
| Sun reduction | 0,45 | | 0,49 | | 0,53 | |
| Oper. time red. | 0,77 | | 0,77 | | 0,77 | |
| Wind dir. red. | 0,67 | | 0,66 | | 0,66 | |
| Total reduction | 0,23 | | 0,25 | | 0,27 | |
| Total, real | 171 | | 196 | | 153 | |

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: Progetto_2022_03_15Shadow receptor: F25 - D10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December |
|---------------------|----------------|----------------|--------------------------|--------------------------|----------------|------------------------|
| 1 | 06:00 20:56 | 06:23 20:38 | 06:52 19:57 | 07:51 (V5) 08:25 (V5) | 07:20 19:08 | 06:52 17:24 |
| 2 | 06:00 20:56 | 06:24 20:37 | 06:53 19:56 | 07:50 (V5) 08:26 (V5) | 07:21 19:07 | 06:53 17:23 |
| 3 | 06:01 20:56 | 06:25 20:36 | 06:53 19:54 | 07:48 (V5) 08:27 (V5) | 07:22 19:05 | 06:54 17:21 |
| 4 | 06:01 20:56 | 06:25 20:35 | 06:54 19:52 | 07:47 (V5) 08:28 (V5) | 07:23 19:04 | 06:55 17:20 |
| 5 | 06:02 20:56 | 06:26 20:34 | 06:55 19:51 | 07:44 (V5) 08:28 (V5) | 07:24 19:02 | 06:56 17:19 |
| 6 | 06:03 20:55 | 06:27 20:33 | 06:56 19:49 | 07:43 (V5) 08:29 (V5) | 07:24 19:00 | 06:57 17:18 |
| 7 | 06:03 20:55 | 06:28 20:32 | 06:57 19:48 | 07:42 (V5) 08:29 (V5) | 07:25 18:59 | 06:59 17:17 |
| 8 | 06:04 20:55 | 06:29 20:31 | 06:58 19:46 | 07:42 (V5) 08:30 (V5) | 07:26 18:57 | 07:00 17:16 |
| 9 | 06:04 20:54 | 06:30 20:29 | 06:59 19:44 | 07:41 (V5) 08:30 (V5) | 07:27 18:56 | 07:01 17:15 |
| 10 | 06:05 20:54 | 06:31 20:28 | 07:00 19:43 | 07:40 (V5) 08:30 (V5) | 07:28 18:54 | 07:02 17:14 |
| 11 | 06:06 20:54 | 06:32 20:27 | 07:01 19:41 | 07:40 (V5) 08:30 (V5) | 07:29 18:53 | 07:03 17:13 |
| 12 | 06:06 20:53 | 06:33 20:26 | 07:02 19:40 | 07:39 (V5) 08:30 (V5) | 07:30 18:51 | 07:04 17:12 |
| 13 | 06:07 20:53 | 06:34 20:24 | 07:03 19:38 | 07:39 (V5) 08:30 (V5) | 07:32 18:50 | 07:05 17:11 |
| 14 | 06:08 20:52 | 06:35 20:23 | 07:04 19:36 | 07:38 (V5) 08:29 (V5) | 07:33 18:48 | 07:07 17:11 |
| 15 | 06:08 20:52 | 06:36 20:22 | 07:05 19:35 | 07:37 (V5) 08:29 (V5) | 07:34 18:47 | 07:08 17:10 |
| 16 | 06:09 20:51 | 06:37 20:20 | 07:05 19:33 | 07:37 (V5) 08:28 (V5) | 07:35 18:45 | 07:09 17:09 |
| 17 | 06:10 20:51 | 06:38 20:19 | 07:06 19:31 | 07:37 (V5) 08:28 (V5) | 07:36 18:44 | 07:10 17:08 |
| 18 | 06:11 20:50 | 06:39 20:18 | 07:07 19:30 | 07:37 (V5) 08:27 (V5) | 07:37 18:42 | 6 08:11 (V6) 17:07 |
| 19 | 06:12 20:49 | 06:39 20:16 | 07:08 19:28 | 07:37 (V5) 08:27 (V5) | 07:38 18:41 | 13 08:08 (V6) 17:07 |
| 20 | 06:12 20:49 | 06:40 20:15 | 07:09 19:26 | 07:38 (V5) 08:26 (V5) | 07:39 18:39 | 17 08:21 (V6) 17:07 |
| 21 | 06:13 20:48 | 06:41 20:14 | 07:10 19:25 | 07:38 (V5) 08:25 (V5) | 07:40 18:38 | 21 08:07 (V6) 17:07 |
| 22 | 06:14 20:47 | 06:42 20:12 | 07:11 19:23 | 07:39 (V5) 08:24 (V5) | 07:41 18:37 | 23 08:24 (V6) 17:07 |
| 23 | 06:15 20:46 | 06:43 20:11 | 07:12 19:21 | 07:39 (V5) 08:23 (V5) | 07:42 18:35 | 25 08:03 (V6) 17:07 |
| 24 | 06:16 20:46 | 06:44 20:09 | 07:13 19:20 | 07:40 (V5) 08:21 (V5) | 07:43 18:34 | 26 08:28 (V6) 17:07 |
| 25 | 06:16 20:45 | 06:45 20:08 | 07:14 19:18 | 07:40 (V5) 08:19 (V5) | 06:44 17:33 | 28 08:02 (V6) 17:07 |
| 26 | 06:17 20:44 | 06:46 20:06 | 07:15 19:17 | 07:41 (V5) 08:17 (V5) | 06:45 17:31 | 31 08:30 (V6) 17:07 |
| 27 | 06:18 20:43 | 06:47 20:05 | 07:16 19:15 | 07:43 (V5) 08:15 (V5) | 06:46 17:30 | 33 08:02 (V6) 17:07 |
| 28 | 06:19 20:42 | 06:48 20:03 | 07:17 19:13 | 07:45 (V5) 08:14 (V5) | 06:47 17:29 | 31 08:33 (V6) 17:07 |
| 29 | 06:20 20:41 | 06:49 20:02 | 07:18 19:12 | 07:58 (V5) 08:18 (V5) | 06:49 17:27 | 32 08:02 (V6) 17:07 |
| 30 | 06:21 20:40 | 06:50 20:00 | 07:19 19:10 | 07:58 (V5) 08:18 (V5) | 06:50 17:26 | 33 08:34 (V6) 17:07 |
| 31 | 06:22 20:39 | 06:51 19:59 | 07:53 (V5) 08:23 (V5) | 07:19 08:04 (V5) | 06:51 17:25 | 33 08:02 (V6) 17:07 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Total, worst case | | 87 | 1285 | | 348 | 1110 |
| Sun reduction | | 0,73 | 0,65 | | 0,51 | 0,45 |
| Oper. time red. | | 0,77 | 0,77 | | 0,77 | 0,77 |
| Wind dir. red. | | 0,66 | 0,66 | | 0,67 | 0,67 |
| Total reduction | | 0,37 | 0,33 | | 0,26 | 0,23 |
| Total, real | | 32 | 423 | | 90 | 257 |

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: Progetto_2022_03_15Shadow receptor: F26 - ente urbano

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June | | |
|---------------------|----------------|--------------------------|----------------|----------------|--------------------------|----------------|----------------|----------------|
| 1 | 07:45 17:10 | 08:07 (V7) 12:56 (V4) | 07:33 17:43 | 06:59 18:16 | 07:24 (V6) 08:12 (V6) | 07:10 19:48 | 06:26 20:17 | 05:59 20:45 |
| 2 | 07:45 17:11 | 08:07 (V7) 12:56 (V4) | 07:32 17:44 | 06:57 18:17 | 07:22 (V6) 08:12 (V6) | 07:09 19:49 | 06:25 20:18 | 05:59 20:46 |
| 3 | 07:45 17:12 | 08:07 (V7) 12:56 (V4) | 07:31 17:46 | 06:56 18:18 | 07:22 (V6) 08:13 (V6) | 07:07 19:50 | 06:24 20:19 | 05:58 20:47 |
| 4 | 07:46 17:13 | 08:07 (V7) 12:56 (V4) | 07:30 17:47 | 06:55 18:19 | 07:20 (V6) 08:13 (V6) | 07:06 19:51 | 06:23 20:20 | 05:58 20:48 |
| 5 | 07:46 17:14 | 08:07 (V7) 12:56 (V4) | 07:29 17:48 | 06:53 18:20 | 07:20 (V6) 08:14 (V6) | 07:04 19:52 | 06:22 20:21 | 05:58 20:48 |
| 6 | 07:46 17:15 | 08:07 (V7) 12:56 (V4) | 07:28 17:49 | 06:52 18:21 | 07:19 (V6) 08:14 (V6) | 07:02 19:53 | 06:20 20:22 | 05:57 20:49 |
| 7 | 07:46 17:16 | 08:07 (V7) 12:56 (V4) | 07:27 17:50 | 06:50 18:22 | 07:18 (V6) 08:13 (V6) | 07:01 19:54 | 06:19 20:23 | 05:57 20:49 |
| 8 | 07:45 17:17 | 08:07 (V7) 12:56 (V4) | 07:26 17:52 | 06:48 18:23 | 07:18 (V6) 08:14 (V6) | 06:59 19:55 | 06:18 20:24 | 05:57 20:50 |
| 9 | 07:45 17:18 | 08:07 (V7) 12:56 (V4) | 07:25 17:53 | 06:47 18:24 | 07:17 (V6) 08:14 (V6) | 06:58 19:56 | 06:17 20:25 | 05:57 20:51 |
| 10 | 07:45 17:19 | 08:06 (V7) 12:55 (V4) | 07:24 17:54 | 06:45 18:25 | 07:17 (V6) 08:14 (V6) | 06:56 19:57 | 06:16 20:26 | 05:56 20:51 |
| 11 | 07:45 17:20 | 08:06 (V7) 12:55 (V4) | 07:23 17:55 | 06:44 18:26 | 07:17 (V6) 08:13 (V6) | 06:55 19:58 | 06:15 20:27 | 05:56 20:52 |
| 12 | 07:45 17:21 | 08:06 (V7) 12:55 (V4) | 07:22 17:56 | 06:42 18:27 | 07:17 (V6) 08:13 (V6) | 06:53 19:59 | 06:14 20:28 | 05:56 20:52 |
| 13 | 07:45 17:22 | 08:05 (V7) 12:54 (V4) | 07:20 17:57 | 06:41 18:28 | 07:16 (V6) 08:12 (V6) | 06:52 20:00 | 06:13 20:29 | 05:56 20:53 |
| 14 | 07:44 17:23 | 08:05 (V7) 12:54 (V4) | 07:19 17:59 | 06:39 18:29 | 07:16 (V6) 08:12 (V6) | 06:50 20:01 | 06:12 20:30 | 05:56 20:53 |
| 15 | 07:44 17:24 | 08:05 (V7) 12:54 (V4) | 07:18 18:00 | 06:38 18:30 | 07:16 (V6) 08:11 (V6) | 06:49 20:02 | 06:11 20:31 | 05:56 20:53 |
| 16 | 07:44 17:25 | 08:04 (V7) 12:53 (V4) | 07:17 18:01 | 06:36 18:31 | 07:16 (V6) 08:10 (V6) | 06:47 20:03 | 06:10 20:32 | 05:56 20:54 |
| 17 | 07:43 17:26 | 08:04 (V7) 12:52 (V4) | 07:16 18:02 | 06:34 18:32 | 07:17 (V6) 08:10 (V6) | 06:46 20:04 | 06:09 20:33 | 05:56 20:54 |
| 18 | 07:43 17:27 | 08:03 (V7) 12:51 (V4) | 07:14 18:03 | 06:33 18:33 | 07:17 (V6) 08:09 (V6) | 06:44 20:05 | 06:08 20:34 | 05:56 20:55 |
| 19 | 07:42 17:28 | 08:03 (V7) 12:50 (V4) | 07:13 18:04 | 06:31 18:35 | 07:17 (V6) 08:07 (V6) | 06:43 20:06 | 06:07 20:35 | 05:56 20:55 |
| 20 | 07:42 17:29 | 08:02 (V7) 12:49 (V4) | 07:12 18:06 | 06:30 18:36 | 07:18 (V6) 08:06 (V6) | 06:41 20:07 | 06:07 20:36 | 05:56 20:55 |
| 21 | 07:41 17:30 | 08:03 (V7) 12:47 (V4) | 07:10 18:07 | 06:28 18:37 | 07:18 (V6) 08:05 (V6) | 06:40 20:07 | 06:06 20:37 | 05:57 20:55 |
| 22 | 07:41 17:32 | 08:06 (V7) 12:46 (V4) | 07:09 18:08 | 06:26 18:38 | 07:37 (V6) 08:00 (V6) | 06:38 20:08 | 06:05 20:37 | 05:57 20:56 |
| 23 | 07:40 17:33 | 08:08 (V7) 12:43 (V4) | 07:08 18:09 | 06:25 18:39 | 07:34 (V6) 08:03 (V6) | 06:37 20:09 | 06:04 20:38 | 05:57 20:56 |
| 24 | 07:39 17:34 | 08:12 (V7) 12:40 (V4) | 07:06 18:10 | 06:23 18:40 | 07:32 (V6) 08:05 (V6) | 06:36 20:10 | 06:04 20:39 | 05:57 20:56 |
| 25 | 07:39 17:35 | 11:55 (V4) 12:38 (V4) | 07:05 18:11 | 06:21 18:41 | 07:29 (V6) 08:06 (V6) | 06:34 20:11 | 06:03 20:40 | 05:58 20:56 |
| 26 | 07:38 17:36 | 11:59 (V4) 12:34 (V4) | 07:03 18:12 | 06:20 18:42 | 07:28 (V6) 08:08 (V6) | 06:33 20:12 | 06:02 20:41 | 05:58 20:56 |
| 27 | 07:37 17:37 | 12:05 (V4) 12:28 (V4) | 07:02 18:13 | 06:18 18:43 | 07:27 (V6) 08:10 (V6) | 06:32 20:13 | 06:02 20:42 | 05:58 20:56 |
| 28 | 07:36 17:39 | | 07:00 18:14 | 06:17 18:44 | 07:25 (V6) 08:11 (V6) | 06:30 20:14 | 06:01 20:42 | 05:59 20:56 |
| 29 | 07:36 17:40 | | | 06:15 19:45 | 07:15 08:39 (V6) | 06:29 20:15 | 06:01 20:43 | 05:59 20:56 |
| 30 | 07:35 17:41 | | | 06:13 19:46 | | 06:28 20:16 | 06:00 20:44 | 05:59 20:56 |
| 31 | 07:34 17:42 | | | 06:12 19:47 | | 06:00 20:45 | | |
| Potential sun hours | 301 | 299 | 370 | | 397 | 445 | | 448 |
| Total, worst case | 2385 | | 266 | | 1353 | | | |
| Sun reduction | 0,45 | | 0,47 | | 0,49 | | | |
| Oper. time red. | 0,77 | | 0,77 | | 0,77 | | | |
| Wind dir. red. | 0,64 | | 0,65 | | 0,65 | | | |
| Total reduction | 0,22 | | 0,24 | | 0,25 | | | |
| Total, real | 527 | | 63 | | 334 | | | |

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: Progetto_2022_03_15Shadow receptor: F26 - ente urbano

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December |
|---------------------|----------------|----------------|----------------|----------------|---------------------|----------------|
| 1 | 06:00 20:56 | 06:23 20:38 | 06:52 19:57 | 07:20 19:08 | 07:55 (V6) 17:24 | 06:52 17:01 |
| 2 | 06:00 20:56 | 06:24 20:37 | 06:53 19:56 | 07:21 19:07 | 07:55 (V6) 17:23 | 06:53 17:01 |
| 3 | 06:01 20:56 | 06:25 20:36 | 06:53 19:54 | 07:22 19:05 | 07:55 (V6) 17:21 | 06:54 17:01 |
| 4 | 06:01 20:56 | 06:25 20:35 | 06:54 19:52 | 07:23 19:04 | 07:55 (V6) 17:20 | 06:55 17:00 |
| 5 | 06:02 20:55 | 06:26 20:34 | 06:55 19:51 | 07:24 19:02 | 07:54 (V6) 17:19 | 06:56 17:00 |
| 6 | 06:03 20:55 | 06:27 20:33 | 06:56 19:49 | 07:24 19:00 | 07:54 (V6) 17:18 | 06:57 17:00 |
| 7 | 06:03 20:55 | 06:28 20:32 | 06:57 19:48 | 07:25 18:59 | 07:54 (V6) 17:17 | 06:59 17:00 |
| 8 | 06:04 20:55 | 06:29 20:31 | 06:58 19:46 | 07:26 18:57 | 07:55 (V6) 17:16 | 07:00 17:00 |
| 9 | 06:04 20:54 | 06:30 20:29 | 06:59 19:44 | 07:27 18:56 | 07:55 (V6) 17:15 | 07:01 17:00 |
| 10 | 06:05 20:54 | 06:31 20:28 | 07:00 19:43 | 07:28 18:54 | 07:55 (V6) 17:14 | 07:02 17:00 |
| 11 | 06:06 20:54 | 06:32 20:27 | 07:01 19:41 | 07:29 18:53 | 07:56 (V6) 17:13 | 07:03 17:00 |
| 12 | 06:06 20:53 | 06:33 20:26 | 07:02 19:40 | 07:30 18:51 | 07:56 (V6) 17:12 | 07:04 17:00 |
| 13 | 06:07 20:53 | 06:34 20:24 | 07:03 19:38 | 07:31 18:50 | 07:57 (V6) 17:11 | 07:05 17:00 |
| 14 | 06:08 20:52 | 06:35 20:23 | 07:04 19:36 | 07:33 18:48 | 07:58 (V6) 17:11 | 07:07 17:01 |
| 15 | 06:08 20:52 | 06:36 20:22 | 07:05 19:35 | 07:34 18:47 | 07:59 (V6) 17:10 | 07:08 17:01 |
| 16 | 06:09 20:51 | 06:37 20:20 | 07:05 19:33 | 07:35 18:45 | 08:01 (V6) 17:09 | 07:09 17:01 |
| 17 | 06:10 20:51 | 06:38 20:19 | 07:06 19:31 | 07:36 18:44 | 08:02 (V6) 17:08 | 07:10 17:01 |
| 18 | 06:11 20:50 | 06:39 20:18 | 07:07 19:30 | 07:37 18:42 | 08:04 (V6) 17:07 | 07:11 17:02 |
| 19 | 06:12 20:49 | 06:39 20:16 | 07:08 19:28 | 07:38 18:41 | 08:06 (V6) 17:07 | 07:12 17:02 |
| 20 | 06:12 20:49 | 06:40 20:15 | 07:09 19:26 | 07:39 18:39 | 08:09 (V6) 17:06 | 07:13 17:03 |
| 21 | 06:13 20:48 | 06:41 20:13 | 07:10 19:25 | 07:40 18:38 | 08:13 (V6) 17:05 | 07:14 17:03 |
| 22 | 06:14 20:47 | 06:42 20:12 | 07:11 19:23 | 07:41 18:37 | 08:16 (V6) 17:05 | 07:15 17:04 |
| 23 | 06:15 20:46 | 06:43 20:11 | 07:12 19:21 | 07:42 18:35 | 08:19 (V6) 17:04 | 07:16 17:04 |
| 24 | 06:16 20:46 | 06:44 20:09 | 07:13 19:20 | 07:43 18:34 | 08:22 (V6) 17:04 | 07:17 17:05 |
| 25 | 06:16 20:45 | 06:45 20:08 | 07:14 19:18 | 07:44 18:33 | 08:25 (V6) 17:03 | 07:18 17:05 |
| 26 | 06:17 20:44 | 06:46 20:06 | 07:15 19:17 | 07:45 18:31 | 08:28 (V6) 17:03 | 07:19 17:06 |
| 27 | 06:18 20:43 | 06:47 20:05 | 07:16 19:15 | 07:46 18:30 | 08:31 (V6) 17:02 | 07:20 17:06 |
| 28 | 06:19 20:42 | 06:48 20:03 | 07:17 19:13 | 07:47 18:29 | 08:34 (V6) 17:02 | 07:21 17:07 |
| 29 | 06:20 20:41 | 06:49 20:02 | 07:18 19:12 | 07:48 18:27 | 08:37 (V6) 17:02 | 07:22 17:08 |
| 30 | 06:21 20:40 | 06:50 20:00 | 07:19 19:10 | 07:49 18:26 | 08:40 (V6) 17:01 | 07:23 17:09 |
| 31 | 06:22 20:39 | 06:51 19:59 | 07:20 19:09 | 07:50 18:25 | 08:43 (V6) 17:01 | 07:24 17:09 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Total, worst case | | | 692 | 954 | 1229 | 3289 |
| Sun reduction | | | 0,65 | 0,54 | 0,51 | 0,45 |
| Oper. time red. | | | 0,77 | 0,77 | 0,77 | 0,77 |
| Wind dir. red. | | | 0,65 | 0,65 | 0,64 | 0,63 |
| Total reduction | | | 0,32 | 0,27 | 0,25 | 0,22 |
| Total, real | | | 224 | 260 | 303 | 725 |

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

Project:

Progetto_GRV Villanovafranca

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

15/03/2022 11:20/3.4.415

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F27 - seminativo

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June | | | | | |
|---------------------|----------------|----------------|----------------|----------------|--------------------------|----------------|------------------|---------------------|------------------|--|--|
| 1 | 07:45 17:10 | 07:33 17:43 | 06:59 18:16 | 07:10 19:48 | 07:28 (V7) 19:25 (V3) | 06:26 20:17 | 06:45 (V7) 74 | 07:59 (V7) 20:45 | 06:55 (V7) 49 | | |
| 2 | 07:45 17:11 | 07:32 17:44 | 06:57 18:17 | 07:09 19:49 | 07:27 (V7) 19:25 (V3) | 06:25 20:18 | 06:44 (V7) 75 | 07:59 (V7) 20:46 | 06:56 (V7) 47 | | |
| 3 | 07:45 17:12 | 07:31 17:46 | 06:56 18:18 | 07:07 19:50 | 07:25 (V7) 19:23 (V3) | 06:24 20:19 | 06:43 (V7) 76 | 07:59 (V7) 20:47 | 06:56 (V7) 46 | | |
| 4 | 07:46 17:13 | 07:30 17:47 | 06:54 18:19 | 07:05 19:51 | 07:24 (V7) 19:23 (V3) | 06:23 20:20 | 06:42 (V7) 77 | 07:59 (V7) 20:47 | 06:57 (V7) 45 | | |
| 5 | 07:46 17:14 | 07:29 17:48 | 06:53 18:20 | 07:04 19:52 | 07:22 (V7) 19:20 (V3) | 06:22 20:21 | 06:41 (V7) 78 | 07:59 (V7) 20:48 | 06:58 (V7) 44 | | |
| 6 | 07:46 17:15 | 07:28 17:49 | 06:51 18:21 | 07:02 19:53 | 07:20 (V7) 19:18 (V3) | 06:20 20:22 | 06:40 (V7) 78 | 07:59 (V7) 20:49 | 06:59 (V7) 41 | | |
| 7 | 07:46 17:16 | 07:27 17:50 | 06:50 18:22 | 07:01 19:54 | 07:19 (V7) 19:16 (V3) | 06:19 20:23 | 06:39 (V7) 78 | 07:59 (V7) 20:49 | 07:00 (V7) 40 | | |
| 8 | 07:45 17:17 | 07:26 17:52 | 06:48 18:23 | 06:59 19:55 | 07:17 (V7) 19:15 (V3) | 06:18 20:24 | 06:40 (V7) 77 | 07:59 (V7) 20:50 | 07:01 (V7) 39 | | |
| 9 | 07:45 17:18 | 07:25 17:53 | 06:47 18:24 | 06:58 19:55 | 07:16 (V7) 19:14 (V3) | 06:17 20:25 | 06:40 (V7) 76 | 07:59 (V7) 20:51 | 07:02 (V7) 37 | | |
| 10 | 07:45 17:19 | 07:24 17:54 | 06:45 18:25 | 06:56 19:56 | 07:14 (V7) 19:13 (V3) | 06:16 20:26 | 06:40 (V7) 76 | 07:59 (V7) 20:51 | 07:02 (V7) 37 | | |
| 11 | 07:45 17:20 | 07:23 17:55 | 06:44 18:26 | 06:55 19:57 | 07:13 (V7) 19:12 (V3) | 06:15 20:27 | 06:41 (V7) 74 | 07:59 (V7) 20:52 | 07:03 (V7) 36 | | |
| 12 | 07:45 17:21 | 07:22 17:56 | 06:42 18:27 | 06:53 19:58 | 07:11 (V7) 19:11 (V3) | 06:14 20:28 | 06:41 (V7) 74 | 07:59 (V7) 20:52 | 07:04 (V7) 35 | | |
| 13 | 07:45 17:22 | 07:20 17:57 | 06:41 18:28 | 06:52 19:59 | 07:10 (V7) 19:10 (V3) | 06:13 20:29 | 06:41 (V7) 73 | 07:59 (V7) 20:53 | 07:05 (V7) 33 | | |
| 14 | 07:44 17:23 | 07:19 17:59 | 06:39 18:29 | 06:50 20:00 | 07:08 (V7) 19:09 (V3) | 06:12 20:30 | 06:43 (V7) 72 | 07:59 (V7) 20:53 | 07:06 (V7) 32 | | |
| 15 | 07:44 17:24 | 07:18 18:00 | 06:37 18:30 | 06:49 20:01 | 07:07 (V7) 19:08 (V3) | 06:11 20:31 | 06:43 (V7) 71 | 07:59 (V7) 20:53 | 07:06 (V7) 32 | | |
| 16 | 07:44 17:25 | 07:17 18:01 | 06:36 18:31 | 06:47 20:02 | 07:05 (V7) 19:07 (V3) | 06:10 20:32 | 06:43 (V7) 70 | 07:59 (V7) 20:54 | 07:07 (V7) 30 | | |
| 17 | 07:43 17:26 | 07:15 18:02 | 06:34 18:32 | 06:46 20:03 | 07:04 (V7) 19:07 (V3) | 06:09 20:33 | 06:44 (V7) 68 | 07:59 (V7) 20:54 | 07:07 (V7) 30 | | |
| 18 | 07:43 17:27 | 07:14 18:03 | 06:33 18:33 | 06:44 20:04 | 07:02 (V7) 19:06 (V3) | 06:08 20:34 | 06:44 (V7) 68 | 07:59 (V7) 20:54 | 07:08 (V7) 29 | | |
| 19 | 07:42 17:28 | 07:13 18:04 | 06:31 18:34 | 06:43 20:05 | 07:01 (V7) 19:05 (V3) | 06:07 20:35 | 06:44 (V7) 67 | 07:59 (V7) 20:55 | 07:08 (V7) 29 | | |
| 20 | 07:42 17:29 | 07:12 18:06 | 06:29 18:35 | 06:41 20:06 | 07:00 (V7) 19:04 (V3) | 06:07 20:36 | 06:46 (V7) 65 | 07:59 (V7) 20:55 | 07:08 (V7) 29 | | |
| 21 | 07:41 17:30 | 07:10 18:07 | 06:28 18:37 | 06:40 20:07 | 06:58 (V7) 19:03 (V3) | 06:06 20:36 | 06:46 (V7) 64 | 07:59 (V7) 20:55 | 07:08 (V7) 29 | | |
| 22 | 07:41 17:32 | 07:09 18:08 | 06:26 18:38 | 06:38 20:08 | 06:57 (V7) 19:02 (V3) | 06:05 20:37 | 06:47 (V7) 62 | 07:59 (V7) 20:56 | 07:09 (V7) 29 | | |
| 23 | 07:40 17:33 | 07:07 18:09 | 06:25 18:39 | 06:37 20:09 | 06:55 (V7) 19:01 (V3) | 06:04 20:38 | 06:48 (V7) 61 | 07:59 (V7) 20:56 | 07:09 (V7) 29 | | |
| 24 | 07:39 17:34 | 07:06 18:10 | 06:23 18:40 | 06:36 20:10 | 06:54 (V7) 19:00 (V3) | 06:04 20:39 | 06:48 (V7) 60 | 07:59 (V7) 20:56 | 07:09 (V7) 29 | | |
| 25 | 07:39 17:35 | 07:05 18:11 | 06:21 18:41 | 06:34 20:11 | 06:53 (V7) 19:00 (V3) | 06:03 20:40 | 06:49 (V7) 58 | 07:59 (V7) 20:56 | 07:08 (V7) 30 | | |
| 26 | 07:38 17:36 | 07:03 18:12 | 06:20 18:42 | 06:33 20:12 | 06:52 (V7) 19:00 (V3) | 06:02 20:41 | 06:50 (V7) 57 | 07:59 (V7) 20:56 | 07:09 (V7) 30 | | |
| 27 | 07:37 17:37 | 07:02 18:13 | 06:18 18:43 | 06:32 20:13 | 06:50 (V7) 19:00 (V3) | 06:02 20:42 | 06:50 (V7) 56 | 07:59 (V7) 20:56 | 07:08 (V7) 32 | | |
| 28 | 07:36 17:39 | 07:00 18:14 | 06:17 18:44 | 06:30 20:14 | 06:49 (V7) 19:00 (V3) | 06:01 20:43 | 06:52 (V7) 54 | 07:59 (V7) 20:56 | 07:09 (V7) 32 | | |
| 29 | 07:36 17:40 | 07:00 18:14 | 06:17 19:45 | 06:30 20:15 | 06:49 (V7) 19:00 (V3) | 06:01 20:44 | 06:52 (V7) 53 | 07:59 (V7) 20:56 | 07:09 (V7) 33 | | |
| 30 | 07:35 17:41 | 07:00 18:15 | 06:16 19:46 | 06:29 20:16 | 06:48 (V7) 19:00 (V3) | 06:00 20:45 | 06:53 (V7) 52 | 07:59 (V7) 20:56 | 07:07 (V7) 34 | | |
| 31 | 07:34 17:42 | 07:00 18:16 | 06:15 19:47 | 06:28 20:17 | 06:47 (V7) 19:00 (V3) | 06:00 20:46 | 06:53 (V7) 51 | 07:59 (V7) 20:56 | 07:07 (V7) 34 | | |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 | | | | | |
| Total, worst case | | | 344 | 1669 | 2095 | 1047 | | | | | |
| Sun reduction | | 0,47 | 0,49 | 0,53 | 0,59 | 0,66 | | | | | |
| Oper. time red. | | 0,77 | 0,77 | 0,77 | 0,77 | 0,77 | | | | | |
| Wind dir. red. | | 0,63 | 0,66 | 0,64 | 0,64 | 0,64 | | | | | |
| Total reduction | | 0,23 | 0,25 | 0,26 | 0,29 | 0,32 | | | | | |
| Total, real | | 22 | 86 | 434 | 605 | 340 | | | | | |

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: Progetto_2022_03_15Shadow receptor: F27 - seminativo

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 607 505 420 506 599 570 495 488 555 624 686 669 6.724

| | July | August | September | October | November | December |
|---------------------|-------|-------------------------|-------------------------|-------------------------|-------------------------|----------|
| 1 | 06:00 | 07:08 (V7) 06:23 | 06:51 (V7) 06:52 | 07:12 (V7) 07:20 | 06:52 | 07:25 |
| | 20:56 | 35 07:43 (V7) 20:38 | 75 08:06 (V7) 19:57 | 43 07:55 (V7) 19:08 | 17:24 | 17:01 |
| 2 | 06:00 | 07:07 (V7) 06:24 | 06:51 (V7) 06:53 | 07:13 (V7) 07:21 | 06:53 | 07:26 |
| | 20:56 | 36 07:43 (V7) 20:37 | 75 08:06 (V7) 19:55 | 41 07:54 (V7) 19:07 | 17:23 | 17:01 |
| 3 | 06:01 | 07:07 (V7) 06:25 | 06:51 (V7) 06:53 | 07:14 (V7) 07:22 | 06:54 | 07:27 |
| | 20:56 | 37 07:44 (V7) 20:36 | 76 08:07 (V7) 19:54 | 38 07:52 (V7) 19:05 | 17:21 | 17:01 |
| 4 | 06:01 | 07:06 (V7) 06:25 | 06:50 (V7) 06:54 | 07:15 (V7) 07:22 | 06:55 | 07:28 |
| | 20:56 | 39 07:45 (V7) 20:35 | 77 08:07 (V7) 19:52 | 47 19:10 (V3) 19:04 | 17:20 | 17:00 |
| 5 | 06:02 | 07:06 (V7) 06:26 | 06:50 (V7) 06:55 | 07:15 (V7) 07:23 | 06:56 | 07:29 |
| | 20:55 | 40 07:46 (V7) 20:34 | 78 08:08 (V7) 19:51 | 50 19:12 (V3) 19:02 | 17:19 | 17:00 |
| 6 | 06:03 | 07:05 (V7) 06:27 | 06:50 (V7) 06:56 | 07:16 (V7) 07:24 | 06:57 | 07:30 |
| | 20:55 | 41 07:46 (V7) 20:33 | 78 08:08 (V7) 19:49 | 52 19:14 (V3) 19:00 | 17:18 | 17:00 |
| 7 | 06:03 | 07:05 (V7) 06:28 | 06:49 (V7) 06:57 | 07:17 (V7) 07:25 | 06:59 | 07:31 |
| | 20:55 | 42 07:47 (V7) 20:32 | 78 08:07 (V7) 19:48 | 51 19:15 (V3) 18:59 | 17:17 | 17:00 |
| 8 | 06:04 | 07:05 (V7) 06:29 | 06:50 (V7) 06:58 | 07:18 (V7) 07:26 | 07:00 | 07:32 |
| | 20:55 | 44 07:49 (V7) 20:30 | 78 08:08 (V7) 19:46 | 50 19:17 (V3) 18:57 | 17:16 | 17:00 |
| 9 | 06:04 | 07:04 (V7) 06:30 | 06:51 (V7) 06:59 | 07:19 (V7) 07:27 | 07:01 | 07:33 |
| | 20:54 | 45 07:49 (V7) 20:29 | 77 08:08 (V7) 19:44 | 48 19:17 (V3) 18:56 | 17:15 | 17:00 |
| 10 | 06:05 | 07:04 (V7) 06:31 | 06:52 (V7) 07:00 | 07:20 (V7) 07:28 | 07:02 | 07:33 |
| | 20:54 | 46 07:50 (V7) 20:28 | 76 08:08 (V7) 19:43 | 45 19:18 (V3) 18:54 | 17:14 | 17:00 |
| 11 | 06:06 | 07:03 (V7) 06:32 | 06:53 (V7) 07:01 | 07:21 (V7) 07:29 | 07:03 | 07:34 |
| | 20:54 | 48 07:51 (V7) 20:27 | 75 08:08 (V7) 19:41 | 38 19:18 (V3) 18:53 | 17:13 | 17:00 |
| 12 | 06:06 | 07:02 (V7) 06:33 | 06:54 (V7) 07:02 | 18:44 (V3) 07:30 | 07:04 | 07:35 |
| | 20:53 | 50 07:52 (V7) 20:26 | 74 08:08 (V7) 19:39 | 34 19:18 (V3) 18:51 | 17:12 | 17:00 |
| 13 | 06:07 | 07:02 (V7) 06:34 | 06:55 (V7) 07:03 | 18:43 (V3) 07:31 | 07:05 | 07:36 |
| | 20:53 | 51 07:53 (V7) 20:24 | 73 08:08 (V7) 19:38 | 34 19:17 (V3) 18:50 | 17:11 | 17:00 |
| 14 | 06:08 | 07:02 (V7) 06:35 | 06:56 (V7) 07:04 | 18:42 (V3) 07:32 | 07:07 | 07:37 |
| | 20:52 | 52 07:54 (V7) 20:23 | 72 08:08 (V7) 19:36 | 32 19:14 (V3) 18:48 | 17:11 | 17:01 |
| 15 | 06:08 | 07:00 (V7) 06:36 | 06:57 (V7) 07:05 | 18:41 (V3) 07:33 | 07:08 | 07:37 |
| | 20:52 | 54 07:54 (V7) 20:22 | 71 08:08 (V7) 19:35 | 31 19:12 (V3) 18:47 | 17:10 | 17:01 |
| 16 | 06:09 | 07:00 (V7) 06:37 | 06:58 (V7) 07:05 | 18:41 (V3) 07:35 | 07:09 | 07:38 |
| | 20:51 | 55 07:55 (V7) 20:20 | 70 08:08 (V7) 19:33 | 30 19:11 (V3) 18:45 | 17:09 | 17:01 |
| 17 | 06:10 | 07:00 (V7) 06:38 | 06:58 (V7) 07:06 | 18:41 (V3) 07:36 | 07:10 | 07:39 |
| | 20:51 | 56 07:56 (V7) 20:19 | 69 08:07 (V7) 19:31 | 28 19:09 (V3) 18:44 | 17:08 | 17:01 |
| 18 | 06:11 | 06:59 (V7) 06:38 | 06:59 (V7) 07:07 | 18:41 (V3) 07:37 | 18:10 (V2) 07:11 | 07:39 |
| | 20:50 | 58 07:57 (V7) 20:18 | 68 08:07 (V7) 19:30 | 27 19:08 (V3) 18:42 | 10 18:20 (V2) 17:07 | 17:02 |
| 19 | 06:12 | 06:58 (V7) 06:39 | 07:00 (V7) 07:08 | 18:41 (V3) 07:38 | 18:07 (V2) 07:12 | 07:40 |
| | 20:49 | 59 07:57 (V7) 20:16 | 66 08:06 (V7) 19:28 | 25 19:06 (V3) 18:41 | 11 18:18 (V2) 17:07 | 17:02 |
| 20 | 06:12 | 06:58 (V7) 06:40 | 07:01 (V7) 07:09 | 18:41 (V3) 07:39 | 18:05 (V2) 07:13 | 07:41 |
| | 20:49 | 60 07:58 (V7) 20:15 | 65 08:06 (V7) 19:26 | 24 19:05 (V3) 18:39 | 12 18:17 (V2) 17:06 | 17:03 |
| 21 | 06:13 | 06:57 (V7) 06:41 | 07:02 (V7) 07:10 | 18:42 (V3) 07:40 | 18:04 (V2) 07:14 | 07:41 |
| | 20:48 | 62 07:59 (V7) 20:13 | 64 08:06 (V7) 19:25 | 21 19:03 (V3) 18:38 | 11 18:15 (V2) 17:05 | 17:03 |
| 22 | 06:14 | 06:57 (V7) 06:42 | 07:03 (V7) 07:11 | 18:42 (V3) 07:41 | 18:03 (V2) 07:15 | 07:42 |
| | 20:47 | 63 08:00 (V7) 20:12 | 62 08:05 (V7) 19:23 | 20 19:02 (V3) 18:37 | 11 18:14 (V2) 17:05 | 17:04 |
| 23 | 06:15 | 06:57 (V7) 06:43 | 07:04 (V7) 07:12 | 18:43 (V3) 07:42 | 18:02 (V2) 07:17 | 07:42 |
| | 20:46 | 64 08:01 (V7) 20:11 | 61 08:05 (V7) 19:21 | 17 19:00 (V3) 18:35 | 10 18:12 (V2) 17:04 | 17:04 |
| 24 | 06:16 | 06:55 (V7) 06:44 | 07:05 (V7) 07:13 | 18:43 (V3) 07:43 | 18:02 (V2) 07:18 | 07:43 |
| | 20:46 | 66 08:01 (V7) 20:09 | 59 08:04 (V7) 19:20 | 14 18:57 (V3) 18:34 | 9 18:11 (V2) 17:04 | 17:05 |
| 25 | 06:16 | 06:55 (V7) 06:45 | 07:06 (V7) 07:14 | 18:45 (V3) 06:44 | 17:03 (V2) 07:19 | 07:43 |
| | 20:45 | 67 08:02 (V7) 20:08 | 58 08:04 (V7) 19:18 | 11 18:56 (V3) 17:33 | 7 17:10 (V2) 17:03 | 17:05 |
| 26 | 06:17 | 06:54 (V7) 06:46 | 07:07 (V7) 07:15 | 18:47 (V3) 06:45 | 17:02 (V2) 07:20 | 07:43 |
| | 20:44 | 69 08:03 (V7) 20:06 | 56 08:03 (V7) 19:17 | 7 18:54 (V3) 17:31 | 7 17:09 (V2) 17:03 | 17:06 |
| 27 | 06:18 | 06:54 (V7) 06:47 | 07:07 (V7) 07:16 | 18:51 (V3) 06:46 | 17:02 (V2) 07:21 | 07:44 |
| | 20:43 | 69 08:03 (V7) 20:05 | 54 08:01 (V7) 19:15 | 2 18:53 (V3) 17:30 | 5 17:07 (V2) 17:02 | 17:06 |
| 28 | 06:19 | 06:54 (V7) 06:48 | 07:08 (V7) 07:17 | 06:47 | 17:03 (V2) 07:22 | 07:44 |
| | 20:42 | 70 08:04 (V7) 20:03 | 52 08:00 (V7) 19:13 | 17:29 | 3 17:06 (V2) 17:02 | 17:07 |
| 29 | 06:20 | 06:53 (V7) 06:49 | 07:09 (V7) 07:18 | 06:48 | 17:03 (V2) 07:23 | 07:44 |
| | 20:41 | 72 08:05 (V7) 20:02 | 50 07:59 (V7) 19:12 | 17:27 | 1 17:04 (V2) 17:02 | 17:08 |
| 30 | 06:21 | 06:52 (V7) 06:50 | 07:10 (V7) 07:19 | 06:50 | 07:24 | 07:45 |
| | 20:40 | 72 08:04 (V7) 20:00 | 48 07:58 (V7) 19:10 | 17:26 | 17:01 | 17:09 |
| 31 | 06:22 | 06:52 (V7) 06:51 | 07:11 (V7) | 06:51 | 07:45 | 07:45 |
| | 20:39 | 73 08:05 (V7) 19:59 | 46 07:57 (V7) | 17:25 | 17:09 | 17:09 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Total, worst case | 1695 | 2081 | 860 | 97 | | |
| Sun reduction | 0,74 | 0,73 | 0,65 | 0,54 | | |
| Oper. time red. | 0,77 | 0,77 | 0,77 | 0,77 | | |
| Wind dir. red. | 0,64 | 0,64 | 0,65 | 0,63 | | |
| Total reduction | 0,36 | 0,36 | 0,32 | 0,26 | | |
| Total, real | 613 | 746 | 279 | 26 | | |

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

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

SHADOW - Calendar

Calculation: Progetto_2022_03_15Shadow receptor: F28 - D10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|---------------------|----------------|----------------|----------------|--------------------------|--------------------------|----------------|
| 1 | 07:45 17:10 | 07:33 17:43 | 06:59 18:16 | 07:10 19:47 | 18:14 (V7) 19:26 (V7) | 06:26 20:17 |
| 2 | 07:45 17:11 | 07:32 17:44 | 06:57 18:17 | 07:09 19:48 | 18:15 (V7) 19:28 (V7) | 06:25 20:18 |
| 3 | 07:45 17:12 | 07:31 17:46 | 06:56 18:18 | 07:07 19:49 | 18:14 (V7) 19:28 (V7) | 06:24 20:19 |
| 4 | 07:45 17:13 | 07:30 17:47 | 06:54 18:19 | 07:05 19:50 | 18:14 (V7) 19:29 (V7) | 06:23 20:20 |
| 5 | 07:45 17:14 | 07:29 17:48 | 06:53 18:20 | 07:04 19:51 | 18:13 (V7) 19:29 (V7) | 06:22 20:21 |
| 6 | 07:45 17:15 | 07:28 17:49 | 06:51 18:21 | 07:02 19:52 | 18:12 (V7) 19:28 (V7) | 06:20 20:22 |
| 7 | 07:45 17:16 | 07:27 17:50 | 06:50 18:22 | 07:01 19:53 | 18:13 (V7) 19:28 (V7) | 06:19 20:23 |
| 8 | 07:45 17:16 | 07:26 17:52 | 06:48 18:23 | 06:59 19:54 | 18:12 (V7) 19:28 (V7) | 06:18 20:24 |
| 9 | 07:45 17:17 | 07:25 17:53 | 06:47 18:24 | 06:58 19:55 | 18:13 (V7) 19:28 (V7) | 06:17 20:25 |
| 10 | 07:45 17:18 | 07:24 17:54 | 06:45 18:25 | 06:56 19:56 | 18:12 (V7) 19:27 (V7) | 06:16 20:26 |
| 11 | 07:45 17:19 | 07:23 17:55 | 06:44 18:26 | 06:55 19:57 | 18:13 (V7) 19:27 (V7) | 06:15 20:27 |
| 12 | 07:45 17:20 | 07:22 17:56 | 06:42 18:27 | 06:53 19:58 | 18:13 (V7) 19:26 (V7) | 06:14 20:28 |
| 13 | 07:44 17:22 | 07:20 17:57 | 06:41 18:28 | 17:50 (V7) 18:05 (V7) | 06:51 19:59 | 06:13 20:29 |
| 14 | 07:44 17:23 | 07:19 17:59 | 06:39 18:29 | 17:44 (V7) 18:08 (V7) | 06:50 20:00 | 06:12 20:30 |
| 15 | 07:44 17:24 | 07:18 18:00 | 06:37 18:30 | 17:41 (V7) 18:10 (V7) | 06:48 20:01 | 06:11 20:31 |
| 16 | 07:43 17:25 | 07:17 18:01 | 06:36 18:31 | 17:37 (V7) 18:11 (V7) | 06:47 20:02 | 06:10 20:32 |
| 17 | 07:43 17:26 | 07:15 18:02 | 06:34 18:32 | 17:35 (V7) 18:12 (V7) | 06:46 20:03 | 06:09 20:33 |
| 18 | 07:43 17:27 | 07:14 18:03 | 06:33 18:33 | 17:32 (V7) 18:13 (V7) | 06:44 20:04 | 06:08 20:34 |
| 19 | 07:42 17:28 | 07:13 18:04 | 06:31 18:34 | 17:30 (V7) 18:14 (V7) | 06:43 20:05 | 06:07 20:35 |
| 20 | 07:42 17:29 | 07:12 18:05 | 06:29 18:35 | 17:28 (V7) 18:15 (V7) | 06:41 20:06 | 06:07 20:36 |
| 21 | 07:41 17:30 | 07:10 18:07 | 06:28 18:36 | 17:26 (V7) 18:16 (V7) | 06:40 20:07 | 06:06 20:36 |
| 22 | 07:41 17:31 | 07:09 18:08 | 06:26 18:37 | 17:24 (V7) 18:16 (V7) | 06:38 20:08 | 06:05 20:37 |
| 23 | 07:40 17:33 | 07:07 18:09 | 06:25 18:38 | 17:23 (V7) 18:18 (V7) | 06:37 20:09 | 06:04 20:38 |
| 24 | 07:39 17:34 | 07:06 18:10 | 06:23 18:39 | 17:22 (V7) 18:19 (V7) | 06:36 20:10 | 06:04 20:39 |
| 25 | 07:39 17:35 | 07:05 18:11 | 06:21 18:40 | 17:21 (V7) 18:20 (V7) | 06:34 20:11 | 06:03 20:40 |
| 26 | 07:38 17:36 | 07:03 18:12 | 06:20 18:41 | 17:20 (V7) 18:21 (V7) | 06:33 20:12 | 06:02 20:41 |
| 27 | 07:37 17:37 | 07:02 18:13 | 06:18 18:42 | 17:18 (V7) 18:21 (V7) | 06:32 20:13 | 06:02 20:42 |
| 28 | 07:36 17:38 | 07:00 18:14 | 06:17 18:43 | 17:18 (V7) 18:23 (V7) | 06:30 20:14 | 06:01 20:42 |
| 29 | 07:36 17:40 | 07:00 19:44 | 06:15 19:44 | 18:17 (V7) 19:24 (V7) | 06:29 20:15 | 06:01 20:43 |
| 30 | 07:35 17:41 | 07:13 19:45 | 06:13 19:45 | 18:16 (V7) 19:25 (V7) | 06:28 20:16 | 06:00 20:44 |
| 31 | 07:34 17:42 | 07:12 19:46 | 06:12 19:46 | 18:15 (V7) 19:26 (V7) | 06:27 20:16 | 06:00 20:45 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Total, worst case | | | 940 | 2184 | | 144 |
| Sun reduction | | | 0,49 | 0,53 | | 0,59 |
| Oper. time red. | | | 0,77 | 0,77 | | 0,77 |
| Wind dir. red. | | | 0,66 | 0,66 | | 0,66 |
| Total reduction | | | 0,25 | 0,27 | | 0,30 |
| Total, real | | | 235 | 585 | | 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: Progetto_2022_03_15Shadow receptor: F28 - D10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | July | August | September | October | November | December |
|---------------------|----------------|----------------|--------------------------|--------------------------|--------------------------|----------------|
| 1 | 06:00 20:56 | 06:23 20:38 | 06:52 19:57 | 18:12 (V7) 19:26 (V7) | 07:20 19:08 | 06:52 17:24 |
| 2 | 06:00 20:56 | 06:24 20:37 | 06:52 19:55 | 18:11 (V7) 19:26 (V7) | 07:20 19:07 | 06:53 17:23 |
| 3 | 06:01 20:56 | 06:24 20:36 | 06:53 19:54 | 18:11 (V7) 19:26 (V7) | 07:21 19:05 | 06:54 17:21 |
| 4 | 06:01 20:56 | 06:25 20:35 | 06:54 19:52 | 18:09 (V7) 19:25 (V7) | 07:22 19:04 | 06:55 17:20 |
| 5 | 06:02 20:55 | 06:26 20:34 | 06:55 19:51 | 18:09 (V7) 19:24 (V7) | 07:23 19:02 | 06:56 17:19 |
| 6 | 06:02 20:55 | 06:27 20:33 | 06:56 19:49 | 18:09 (V7) 19:24 (V7) | 07:24 19:00 | 06:57 17:18 |
| 7 | 06:03 20:55 | 06:28 20:32 | 19:40 (V4) 06:57 | 18:08 (V7) 19:24 (V7) | 07:25 18:59 | 06:58 17:17 |
| 8 | 06:04 20:55 | 06:29 20:30 | 19:36 (V4) 19:47 (V4) | 06:58 19:46 | 18:08 (V7) 18:57 | 07:26 17:16 |
| 9 | 06:04 20:54 | 06:30 20:29 | 19:35 (V4) 19:49 (V4) | 06:59 19:44 | 18:08 (V7) 19:23 (V7) | 07:27 18:56 |
| 10 | 06:05 20:54 | 06:31 20:28 | 18:46 (V7) 19:51 (V4) | 07:00 19:43 | 18:08 (V7) 19:21 (V7) | 07:28 18:54 |
| 11 | 06:06 20:54 | 06:32 20:27 | 18:42 (V7) 19:51 (V4) | 07:01 19:41 | 18:08 (V7) 19:20 (V7) | 07:29 18:53 |
| 12 | 06:06 20:53 | 06:33 20:26 | 18:39 (V7) 19:52 (V4) | 07:02 19:39 | 18:08 (V7) 19:18 (V7) | 07:30 18:51 |
| 13 | 06:07 20:53 | 06:34 20:24 | 18:37 (V7) 19:53 (V4) | 07:03 19:38 | 18:07 (V7) 19:16 (V7) | 07:31 18:50 |
| 14 | 06:08 20:52 | 06:35 20:23 | 18:35 (V7) 19:53 (V4) | 07:04 19:36 | 18:07 (V7) 19:14 (V7) | 07:32 18:48 |
| 15 | 06:08 20:52 | 06:36 20:22 | 18:33 (V7) 19:53 (V4) | 07:04 19:35 | 18:07 (V7) 19:12 (V7) | 07:33 18:47 |
| 16 | 06:09 20:51 | 06:37 20:20 | 18:31 (V7) 19:53 (V4) | 07:05 19:33 | 18:07 (V7) 19:11 (V7) | 07:34 18:45 |
| 17 | 06:10 20:50 | 06:38 20:19 | 18:28 (V7) 19:52 (V4) | 07:06 19:31 | 18:08 (V7) 19:09 (V7) | 07:36 18:44 |
| 18 | 06:11 20:50 | 06:38 20:18 | 18:27 (V7) 19:52 (V4) | 07:07 19:30 | 18:08 (V7) 19:08 (V7) | 07:37 18:42 |
| 19 | 06:11 20:49 | 06:39 20:16 | 18:26 (V7) 19:51 (V4) | 07:08 19:28 | 18:09 (V7) 19:06 (V7) | 07:38 18:41 |
| 20 | 06:12 20:49 | 06:40 20:15 | 18:24 (V7) 19:51 (V4) | 07:09 19:26 | 18:09 (V7) 19:05 (V7) | 07:39 18:39 |
| 21 | 06:13 20:48 | 06:41 20:13 | 18:23 (V7) 19:50 (V4) | 07:10 19:25 | 18:10 (V7) 19:03 (V7) | 07:40 18:38 |
| 22 | 06:14 20:47 | 06:42 20:12 | 18:22 (V7) 19:49 (V4) | 07:11 19:23 | 18:11 (V7) 19:02 (V7) | 07:41 18:37 |
| 23 | 06:15 20:46 | 06:43 20:11 | 18:21 (V7) 19:47 (V4) | 07:12 19:21 | 18:12 (V7) 19:00 (V7) | 07:42 18:35 |
| 24 | 06:16 20:46 | 06:44 20:09 | 18:19 (V7) 19:45 (V4) | 07:13 19:20 | 18:12 (V7) 18:57 (V7) | 07:43 18:34 |
| 25 | 06:16 20:45 | 06:45 20:08 | 18:18 (V7) 19:42 (V4) | 07:14 19:18 | 18:14 (V7) 18:56 (V7) | 07:44 17:33 |
| 26 | 06:17 20:44 | 06:46 20:06 | 18:17 (V7) 19:24 (V7) | 07:15 19:16 | 18:16 (V7) 18:54 (V7) | 07:45 17:31 |
| 27 | 06:18 20:43 | 06:47 20:05 | 18:16 (V7) 19:25 (V7) | 07:16 19:15 | 18:18 (V7) 18:53 (V7) | 07:46 17:30 |
| 28 | 06:19 20:42 | 06:48 20:03 | 18:15 (V7) 19:25 (V7) | 07:17 19:13 | 18:20 (V7) 18:51 (V7) | 07:47 17:29 |
| 29 | 06:20 20:41 | 06:49 20:02 | 18:14 (V7) 19:25 (V7) | 07:18 19:12 | 18:23 (V7) 18:49 (V7) | 07:48 17:27 |
| 30 | 06:21 20:40 | 06:50 20:00 | 18:13 (V7) 19:25 (V7) | 07:19 19:10 | 18:27 (V7) 18:47 (V7) | 07:49 17:26 |
| 31 | 06:22 20:39 | 06:51 19:59 | 18:13 (V7) 19:26 (V7) | | 06:51 17:25 | 07:45 17:09 |
| Potential sun hours | 455 | 425 | 374 | | 347 | 292 |
| Total, worst case | | 1528 | | 1780 | | |
| Sun reduction | | 0,73 | | 0,65 | | |
| Oper. time red. | | 0,77 | | 0,77 | | |
| Wind dir. red. | | 0,66 | | 0,66 | | |
| Total reduction | | 0,37 | | 0,33 | | |
| Total, real | | 565 | | 584 | | |

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: Progetto_2022_03_15Shadow receptor: F29 - seminativo

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June | | | |
|---------------------|---------|----------|-------|-------|---------------|---------------|---------------|-------|---------------|
| 1 | 07:45 | 07:33 | 06:59 | 07:10 | 06:26 | 18:56 (V7) | 05:59 | | |
| | 17:10 | 17:43 | 18:15 | 19:47 | 20:17 | 40 19:36 (V7) | 20:45 | | |
| 2 | 07:45 | 07:32 | 06:57 | 07:09 | 06:25 | 18:56 (V7) | 05:59 | | |
| | 17:11 | 17:44 | 18:17 | 19:48 | 20:18 | 40 19:36 (V7) | 20:46 | | |
| 3 | 07:45 | 07:31 | 06:56 | 07:07 | 06:24 | 18:57 (V7) | 05:58 | | |
| | 17:12 | 17:46 | 18:18 | 19:49 | 20:19 | 39 19:36 (V7) | 20:47 | | |
| 4 | 07:45 | 07:30 | 06:54 | 07:05 | 06:23 | 18:57 (V7) | 05:58 | | |
| | 17:13 | 17:47 | 18:19 | 19:50 | 20:20 | 38 19:35 (V7) | 20:47 | | |
| 5 | 07:45 | 07:29 | 06:53 | 07:04 | 06:21 | 18:58 (V7) | 05:58 | | |
| | 17:14 | 17:48 | 18:20 | 19:51 | 20:21 | 37 19:35 (V7) | 20:48 | | |
| 6 | 07:45 | 07:28 | 06:51 | 07:02 | 06:20 | 18:58 (V7) | 05:57 | | |
| | 17:15 | 17:49 | 18:21 | 19:52 | 20:22 | 35 19:33 (V7) | 20:49 | | |
| 7 | 07:45 | 07:27 | 06:50 | 07:01 | 06:19 | 18:58 (V7) | 05:57 | | |
| | 17:16 | 17:50 | 18:22 | 19:53 | 20:23 | 34 19:32 (V7) | 20:49 | | |
| 8 | 07:45 | 07:26 | 06:48 | 06:59 | 06:18 | 18:59 (V7) | 05:57 | | |
| | 17:16 | 17:52 | 18:23 | 19:54 | 20:24 | 32 19:31 (V7) | 20:50 | | |
| 9 | 07:45 | 07:25 | 06:47 | 06:58 | 06:17 | 19:00 (V7) | 05:57 | | |
| | 17:17 | 17:53 | 18:24 | 19:55 | 20:25 | 30 19:30 (V7) | 20:50 | | |
| 10 | 07:45 | 07:24 | 06:45 | 06:56 | 06:16 | 19:01 (V7) | 05:56 | | |
| | 17:18 | 17:54 | 18:25 | 19:56 | 20:26 | 28 19:29 (V7) | 20:51 | | |
| 11 | 07:45 | 07:23 | 06:44 | 06:55 | 06:15 | 19:03 (V7) | 05:56 | | |
| | 17:19 | 17:55 | 18:26 | 19:57 | 20:27 | 25 19:28 (V7) | 20:52 | | |
| 12 | 07:45 | 07:22 | 06:42 | 06:53 | 19:17 (V7) | 06:14 | 19:04 (V7) | 05:56 | 20:10 (V6) |
| | 17:20 | 17:56 | 18:27 | 19:58 | 6 19:23 (V7) | 20:28 | 22 19:26 (V7) | 20:52 | 3 20:13 (V6) |
| 13 | 07:44 | 07:20 | 06:41 | 06:51 | 19:12 (V7) | 06:13 | 19:06 (V7) | 05:56 | 20:08 (V6) |
| | 17:22 | 17:57 | 18:28 | 19:59 | 16 19:28 (V7) | 20:29 | 18 19:24 (V7) | 20:52 | 7 20:15 (V6) |
| 14 | 07:44 | 07:19 | 06:39 | 06:50 | 19:08 (V7) | 06:12 | 19:09 (V7) | 05:56 | 20:08 (V6) |
| | 17:23 | 17:59 | 18:29 | 20:00 | 22 19:30 (V7) | 20:30 | 14 19:23 (V7) | 20:53 | 8 20:16 (V6) |
| 15 | 07:44 | 07:18 | 06:37 | 06:48 | 19:06 (V7) | 06:11 | 19:14 (V7) | 05:56 | 20:07 (V6) |
| | 17:24 | 18:00 | 18:30 | 20:01 | 26 19:32 (V7) | 20:31 | 4 19:18 (V7) | 20:53 | 9 20:16 (V6) |
| 16 | 07:43 | 07:17 | 06:36 | 06:47 | 19:04 (V7) | 06:10 | | 05:56 | 20:07 (V6) |
| | 17:25 | 18:01 | 18:31 | 20:02 | 29 19:33 (V7) | 20:32 | | 20:54 | 10 20:17 (V6) |
| 17 | 07:43 | 07:15 | 06:34 | 06:46 | 19:03 (V7) | 06:09 | | 05:56 | 20:07 (V6) |
| | 17:26 | 18:02 | 18:32 | 20:03 | 32 19:35 (V7) | 20:33 | | 20:54 | 10 20:17 (V6) |
| 18 | 07:43 | 07:14 | 06:33 | 06:44 | 19:01 (V7) | 06:08 | | 05:56 | 20:07 (V6) |
| | 17:27 | 18:03 | 18:33 | 20:04 | 34 19:35 (V7) | 20:34 | | 20:54 | 11 20:18 (V6) |
| 19 | 07:42 | 07:13 | 06:31 | 06:43 | 19:00 (V7) | 06:07 | | 05:56 | 20:07 (V6) |
| | 17:28 | 18:04 | 18:34 | 20:05 | 36 19:36 (V7) | 20:35 | | 20:55 | 11 20:18 (V6) |
| 20 | 07:42 | 07:11 | 06:29 | 06:41 | 18:59 (V7) | 06:07 | | 05:56 | 20:06 (V6) |
| | 17:29 | 18:05 | 18:35 | 20:06 | 38 19:37 (V7) | 20:36 | | 20:55 | 12 20:18 (V6) |
| 21 | 07:41 | 07:10 | 06:28 | 06:40 | 18:58 (V7) | 06:06 | | 05:57 | 20:06 (V6) |
| | 17:30 | 18:07 | 18:36 | 20:07 | 39 19:37 (V7) | 20:36 | | 20:55 | 12 20:18 (V6) |
| 22 | 07:41 | 07:09 | 06:26 | 06:38 | 18:58 (V7) | 06:05 | | 05:57 | 20:07 (V6) |
| | 17:31 | 18:08 | 18:37 | 20:08 | 40 19:38 (V7) | 20:37 | | 20:55 | 12 20:19 (V6) |
| 23 | 07:40 | 07:07 | 06:25 | 06:37 | 18:56 (V7) | 06:04 | | 05:57 | 20:08 (V6) |
| | 17:33 | 18:09 | 18:38 | 20:09 | 41 19:37 (V7) | 20:38 | | 20:56 | 11 20:19 (V6) |
| 24 | 07:39 | 07:06 | 06:23 | 06:36 | 18:56 (V7) | 06:04 | | 05:57 | 20:08 (V6) |
| | 17:34 | 18:10 | 18:39 | 20:10 | 42 19:38 (V7) | 20:39 | | 20:56 | 11 20:19 (V6) |
| 25 | 07:39 | 07:05 | 06:21 | 06:34 | 18:56 (V7) | 06:03 | | 05:58 | 20:08 (V6) |
| | 17:35 | 18:11 | 18:40 | 20:11 | 42 19:38 (V7) | 20:40 | | 20:56 | 11 20:19 (V6) |
| 26 | 07:38 | 07:03 | 06:20 | 06:33 | 18:55 (V7) | 06:02 | | 05:58 | 20:09 (V6) |
| | 17:36 | 18:12 | 18:41 | 20:12 | 42 19:37 (V7) | 20:41 | | 20:56 | 10 20:19 (V6) |
| 27 | 07:37 | 07:02 | 06:18 | 06:31 | 18:55 (V7) | 06:02 | | 05:58 | 20:09 (V6) |
| | 17:37 | 18:13 | 18:42 | 20:13 | 42 19:37 (V7) | 20:41 | | 20:56 | 10 20:19 (V6) |
| 28 | 07:36 | 07:00 | 06:17 | 06:30 | 18:56 (V7) | 06:01 | | 05:59 | 20:11 (V6) |
| | 17:38 | 18:14 | 18:43 | 20:14 | 42 19:38 (V7) | 20:42 | | 20:56 | 8 20:19 (V6) |
| 29 | 07:36 | | 07:15 | 06:29 | 18:56 (V7) | 06:01 | | 05:59 | 20:11 (V6) |
| | 17:40 | | 19:44 | 20:15 | 42 19:38 (V7) | 20:43 | | 20:56 | 7 20:18 (V6) |
| 30 | 07:35 | | 07:13 | 06:28 | 18:55 (V7) | 06:00 | | 05:59 | 20:12 (V6) |
| | 17:41 | | 19:45 | 20:16 | 41 19:36 (V7) | 20:44 | | 20:56 | 5 20:17 (V6) |
| 31 | 07:34 | | 07:12 | | | 06:00 | | | |
| | 17:42 | | 19:46 | | | 20:45 | | | |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | | 448 | | |
| Total, worst case | | | | 652 | | 436 | | 178 | |
| Sun reduction | | | | 0,53 | | 0,59 | | 0,66 | |
| Oper. time red. | | | | 0,77 | | 0,77 | | 0,77 | |
| Wind dir. red. | | | | 0,66 | | 0,66 | | 0,67 | |
| Total reduction | | | | 0,27 | | 0,30 | | 0,34 | |
| Total, real | | | | 174 | | 130 | | 61 | |

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: Progetto_2022_03_15Shadow receptor: F29 - seminativo

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

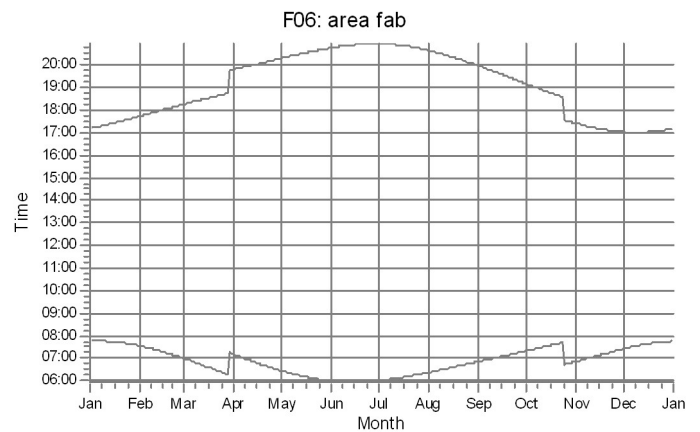
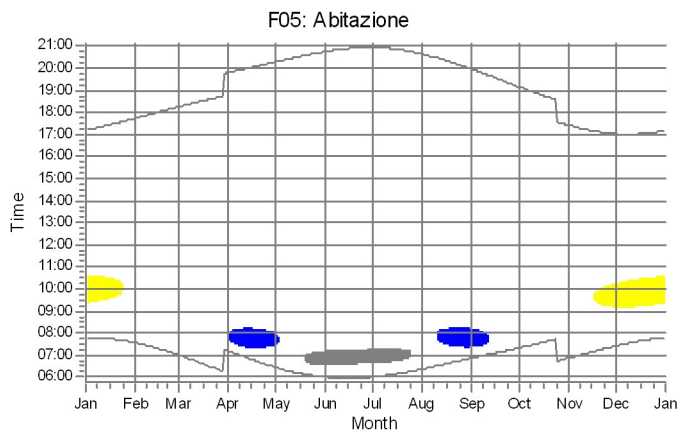
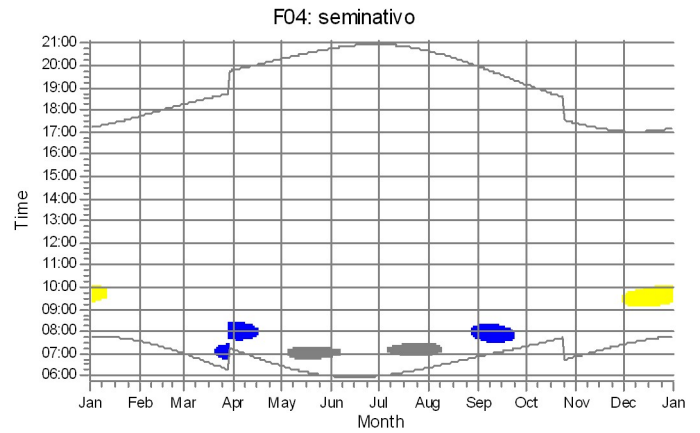
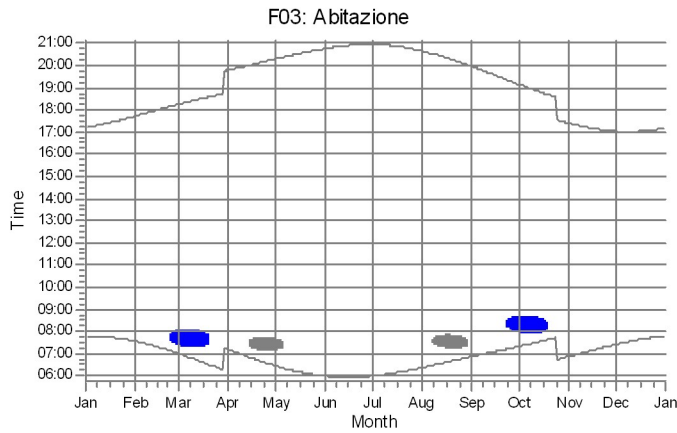
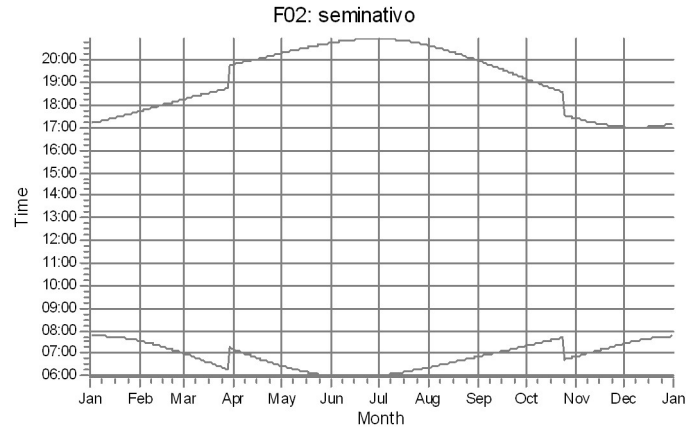
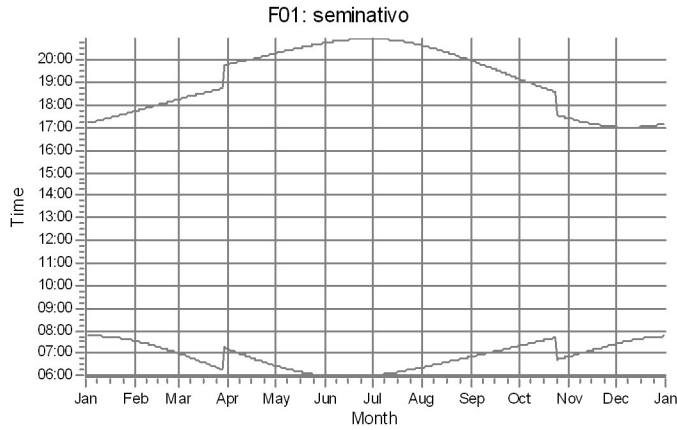
| | July | August | September | October | November | December | | |
|---------------------|-------|---------------|------------|--------------|----------|----------|-------|-------|
| 1 | 06:00 | 06:23 | 19:14 (V7) | 06:52 | 07:20 | 06:52 | 07:25 | |
| | 20:56 | 20:38 | 19:37 (V7) | 19:57 | 19:08 | 17:24 | 17:01 | |
| 2 | 06:00 | 06:24 | 19:13 (V7) | 06:52 | 07:20 | 06:53 | 07:26 | |
| | 20:56 | 20:37 | 19:39 (V7) | 19:55 | 19:07 | 17:23 | 17:01 | |
| 3 | 06:01 | 06:24 | 19:12 (V7) | 06:53 | 07:21 | 06:54 | 07:27 | |
| | 20:56 | 20:36 | 19:40 (V7) | 19:54 | 19:05 | 17:21 | 17:00 | |
| 4 | 06:01 | 06:25 | 19:11 (V7) | 06:54 | 07:22 | 06:55 | 07:28 | |
| | 20:56 | 20:35 | 19:41 (V7) | 19:52 | 19:04 | 17:20 | 17:00 | |
| 5 | 06:02 | 06:26 | 19:10 (V7) | 06:55 | 07:23 | 06:56 | 07:29 | |
| | 20:55 | 20:34 | 19:42 (V7) | 19:51 | 19:02 | 17:19 | 17:00 | |
| 6 | 06:02 | 06:27 | 19:09 (V7) | 06:56 | 07:24 | 06:57 | 07:30 | |
| | 20:55 | 20:33 | 19:43 (V7) | 19:49 | 19:00 | 17:18 | 17:00 | |
| 7 | 06:03 | 06:28 | 19:07 (V7) | 06:57 | 07:25 | 06:58 | 07:31 | |
| | 20:55 | 20:32 | 19:43 (V7) | 19:47 | 18:59 | 17:17 | 17:00 | |
| 8 | 06:04 | 06:29 | 19:06 (V7) | 06:58 | 07:26 | 07:00 | 07:32 | |
| | 20:55 | 20:30 | 19:43 (V7) | 19:46 | 18:57 | 17:16 | 17:00 | |
| 9 | 06:04 | 06:30 | 19:06 (V7) | 06:59 | 07:27 | 07:01 | 07:33 | |
| | 20:54 | 20:29 | 19:44 (V7) | 19:44 | 18:56 | 17:15 | 17:00 | |
| 10 | 06:05 | 06:31 | 19:05 (V7) | 07:00 | 07:28 | 07:02 | 07:33 | |
| | 20:54 | 20:28 | 19:44 (V7) | 19:43 | 18:54 | 17:14 | 17:00 | |
| 11 | 06:06 | 06:32 | 19:05 (V7) | 07:01 | 07:29 | 07:03 | 07:34 | |
| | 20:53 | 20:27 | 19:45 (V7) | 19:41 | 18:53 | 17:13 | 17:00 | |
| 12 | 06:06 | 06:33 | 19:04 (V7) | 07:02 | 07:30 | 07:04 | 07:35 | |
| | 20:53 | 20:26 | 19:45 (V7) | 19:39 | 18:51 | 17:12 | 17:00 | |
| 13 | 06:07 | 06:34 | 19:04 (V7) | 07:03 | 07:31 | 07:05 | 07:36 | |
| | 20:53 | 20:24 | 19:45 (V7) | 19:38 | 18:50 | 17:11 | 17:00 | |
| 14 | 06:08 | 06:35 | 19:04 (V7) | 07:04 | 07:32 | 07:06 | 07:37 | |
| | 20:52 | 20:23 | 19:45 (V7) | 19:36 | 18:48 | 17:10 | 17:01 | |
| 15 | 06:08 | 06:36 | 19:03 (V7) | 07:04 | 07:33 | 07:08 | 07:37 | |
| | 20:52 | 20:22 | 19:45 (V7) | 19:35 | 18:47 | 17:10 | 17:01 | |
| 16 | 06:09 | 06:37 | 19:03 (V7) | 07:05 | 07:34 | 07:09 | 07:38 | |
| | 20:51 | 20:20 | 19:45 (V7) | 19:33 | 18:45 | 17:09 | 17:01 | |
| 17 | 06:10 | 06:37 | 19:02 (V7) | 07:06 | 07:35 | 07:10 | 07:39 | |
| | 20:50 | 20:19 | 19:44 (V7) | 19:31 | 18:44 | 17:08 | 17:01 | |
| 18 | 06:11 | 06:38 | 19:02 (V7) | 07:07 | 07:37 | 07:11 | 07:39 | |
| | 20:50 | 20:18 | 19:44 (V7) | 19:30 | 18:42 | 17:07 | 17:02 | |
| 19 | 06:11 | 06:39 | 19:02 (V7) | 07:08 | 07:38 | 07:12 | 07:40 | |
| | 20:49 | 20:16 | 19:43 (V7) | 19:28 | 18:41 | 17:07 | 17:02 | |
| 20 | 06:12 | 06:40 | 19:02 (V7) | 07:09 | 07:39 | 07:13 | 07:40 | |
| | 20:49 | 20:15 | 19:43 (V7) | 19:26 | 18:39 | 17:06 | 17:03 | |
| 21 | 06:13 | 06:41 | 19:03 (V7) | 07:10 | 07:40 | 07:14 | 07:41 | |
| | 20:48 | 20:13 | 19:42 (V7) | 19:25 | 18:38 | 17:05 | 17:03 | |
| 22 | 06:14 | 06:42 | 19:03 (V7) | 07:11 | 07:41 | 07:15 | 07:42 | |
| | 20:47 | 20:12 | 19:42 (V7) | 19:23 | 18:37 | 17:05 | 17:03 | |
| 23 | 06:15 | 06:43 | 19:03 (V7) | 07:12 | 07:42 | 07:17 | 07:42 | |
| | 20:46 | 20:11 | 19:41 (V7) | 19:21 | 18:35 | 17:04 | 17:04 | |
| 24 | 06:16 | 06:44 | 19:04 (V7) | 07:13 | 07:43 | 07:18 | 07:43 | |
| | 20:46 | 20:09 | 19:40 (V7) | 19:20 | 18:34 | 17:04 | 17:05 | |
| 25 | 06:16 | 06:45 | 19:05 (V7) | 07:14 | 06:44 | 07:19 | 07:43 | |
| | 20:45 | 20:08 | 19:39 (V7) | 19:18 | 17:33 | 17:03 | 17:05 | |
| 26 | 06:17 | 06:46 | 19:05 (V7) | 07:15 | 06:45 | 07:20 | 07:43 | |
| | 20:44 | 20:06 | 19:37 (V7) | 19:16 | 17:31 | 17:03 | 17:06 | |
| 27 | 06:18 | 06:47 | 19:06 (V7) | 07:16 | 06:46 | 07:21 | 07:44 | |
| | 20:43 | 20:05 | 19:35 (V7) | 19:15 | 17:30 | 17:02 | 17:06 | |
| 28 | 06:19 | 06:48 | 19:07 (V7) | 07:17 | 06:47 | 07:22 | 07:44 | |
| | 20:42 | 20:03 | 19:33 (V7) | 19:13 | 17:29 | 17:02 | 17:07 | |
| 29 | 06:20 | 19:22 (V7) | 06:49 | 19:09 (V7) | 07:18 | 06:48 | 07:23 | 07:44 |
| | 20:41 | 9 19:31 (V7) | 20:02 | 19:31 (V7) | 19:12 | 17:27 | 17:02 | 17:08 |
| 30 | 06:21 | 19:18 (V7) | 06:50 | 19:12 (V7) | 07:19 | 06:49 | 07:24 | 07:45 |
| | 20:40 | 15 19:33 (V7) | 20:00 | 19:28 (V7) | 19:10 | 17:26 | 17:01 | 17:08 |
| 31 | 06:22 | 19:16 (V7) | 06:51 | 19:17 (V7) | | 06:51 | | 07:45 |
| | 20:39 | 20 19:36 (V7) | 19:59 | 5 19:22 (V7) | | 17:25 | | 17:09 |
| Potential sun hours | 455 | | 425 | 374 | 347 | 301 | 292 | |
| Total, worst case | 44 | | 1052 | | | | | |
| Sun reduction | 0,74 | | 0,73 | | | | | |
| Oper. time red. | 0,77 | | 0,77 | | | | | |
| Wind dir. red. | 0,66 | | 0,66 | | | | | |
| Total reduction | 0,37 | | 0,37 | | | | | |
| Total, real | 16 | | 389 | | | | | |

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: Progetto_2022_03_15

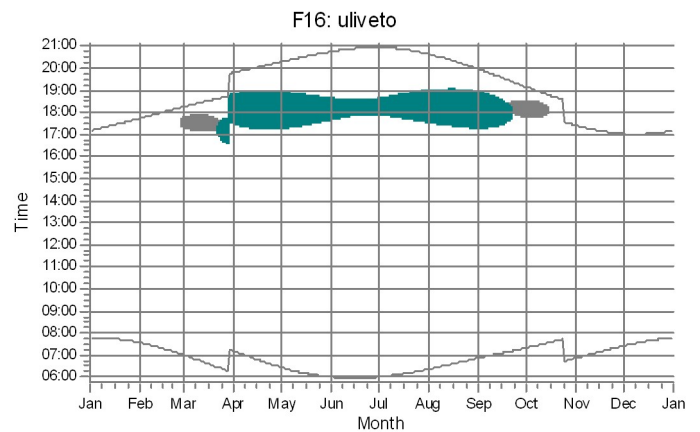
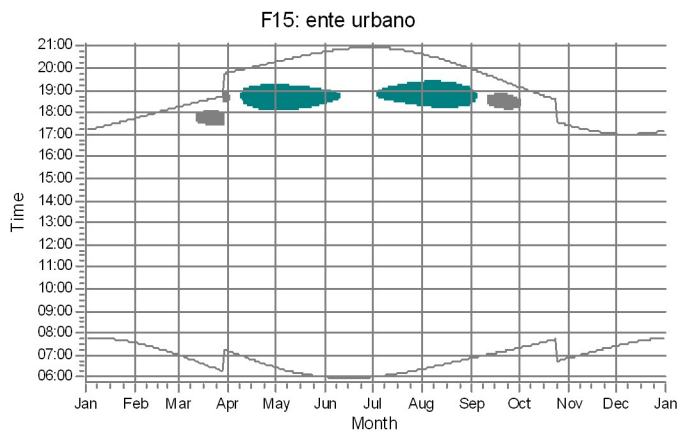
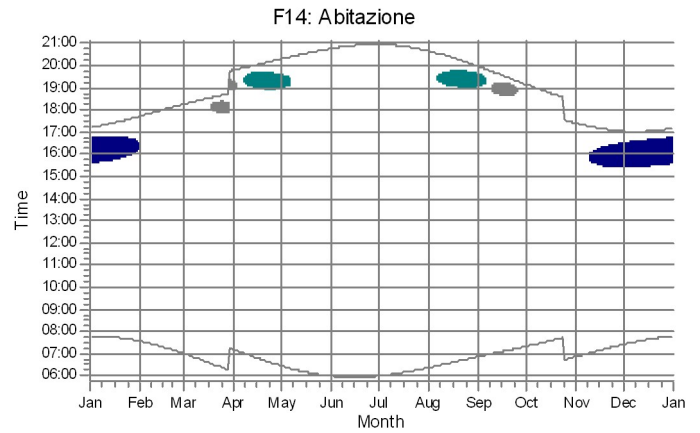
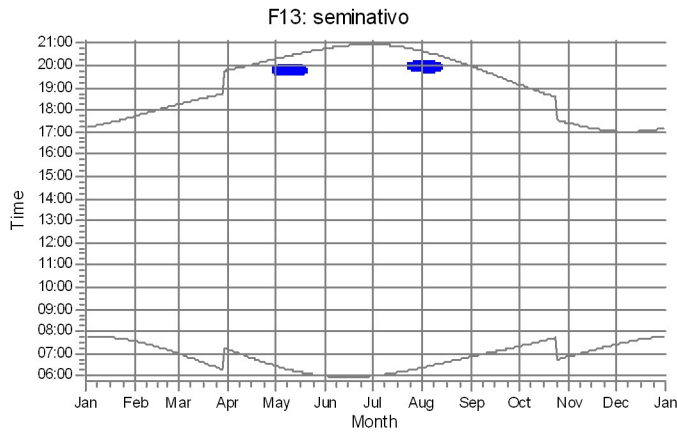
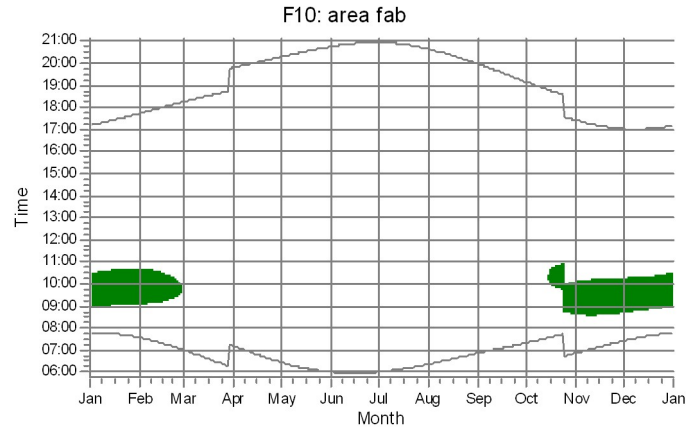
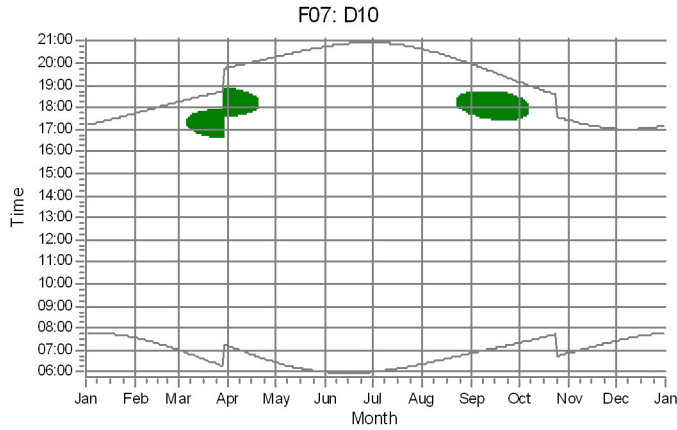


WTGs

- V2: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (7)
- V3: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (6)
- V4: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (5)

SHADOW - Calendar, graphical

Calculation: Progetto_2022_03_15

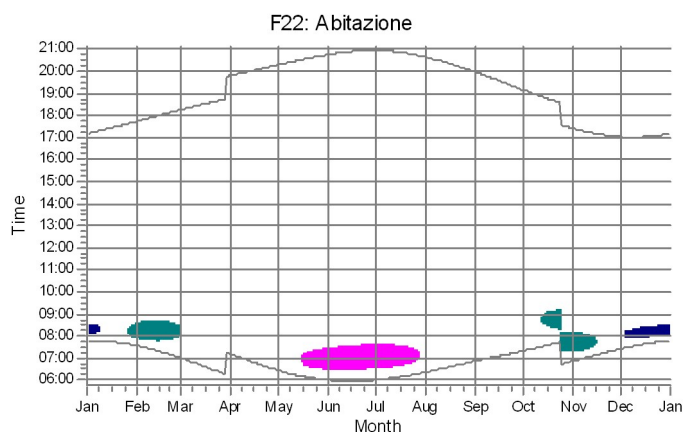
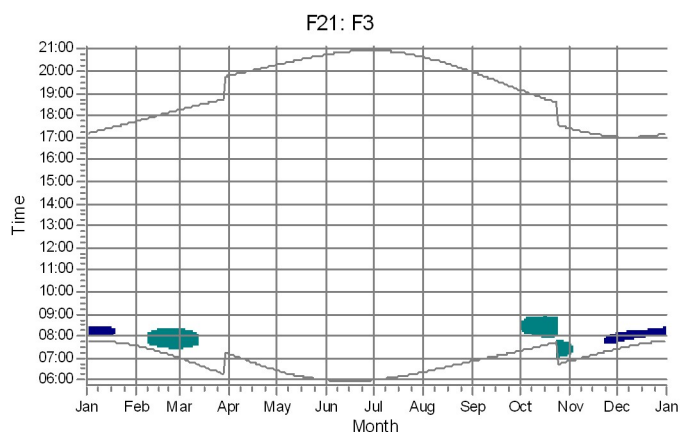
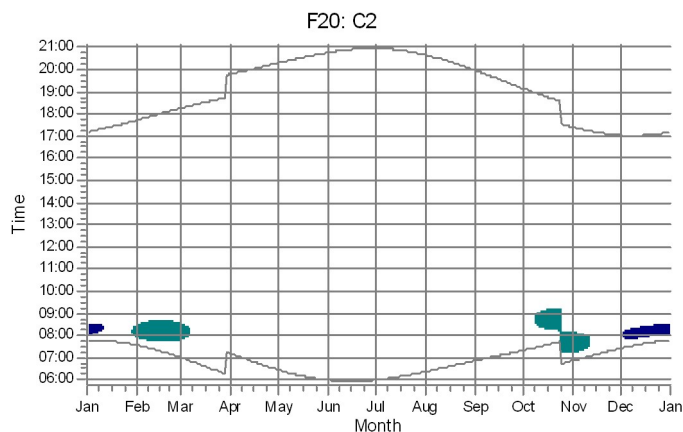
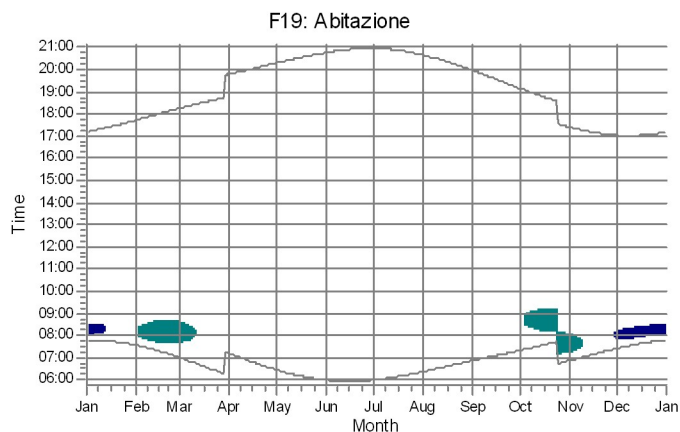
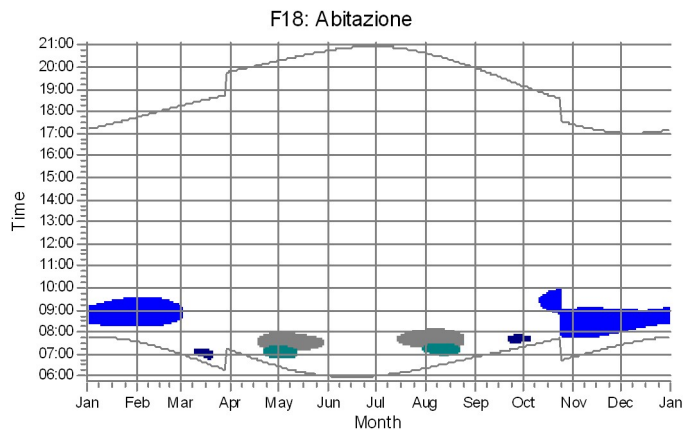
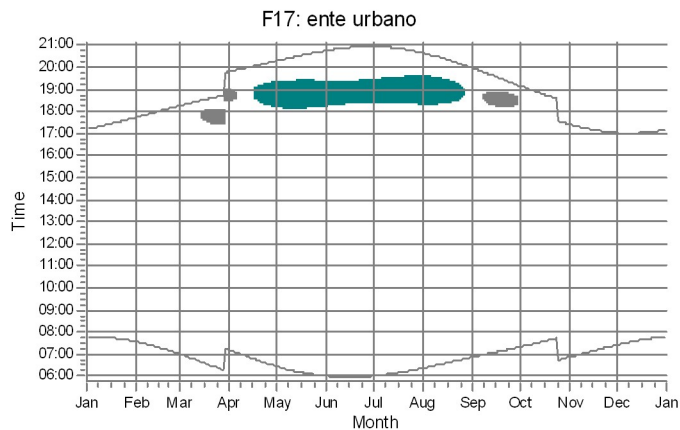


WTGs

- V1: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (8)
- V3: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (6)
- V4: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (5)
- V6: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (3)
- V7: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (2)

SHADOW - Calendar, graphical

Calculation: Progetto_2022_03_15

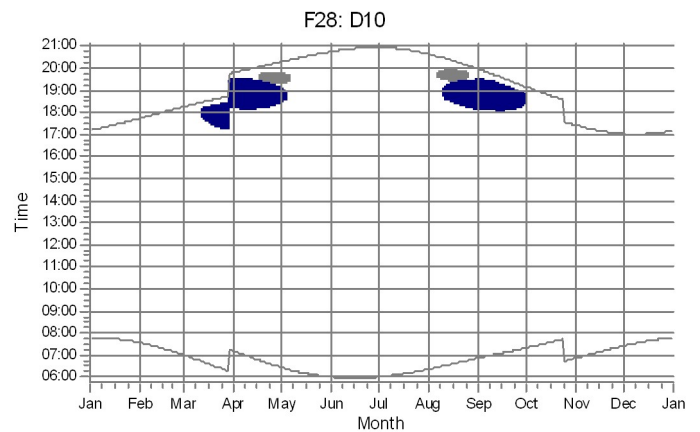
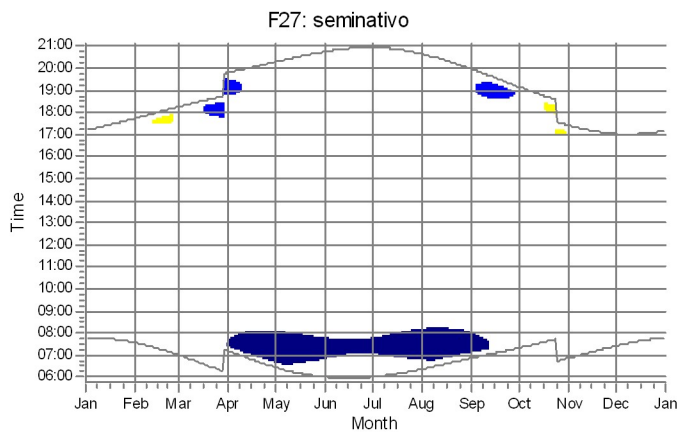
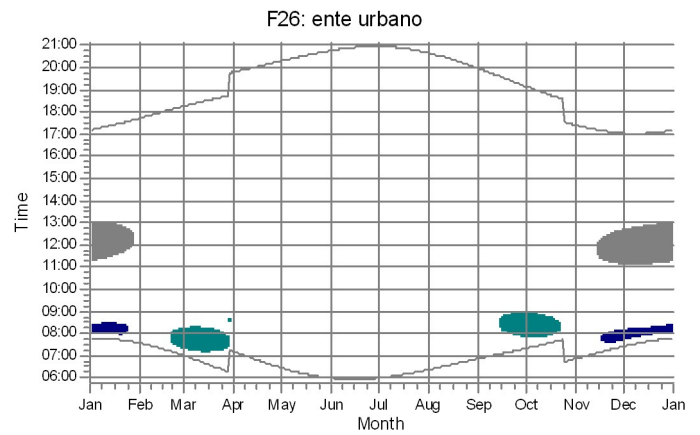
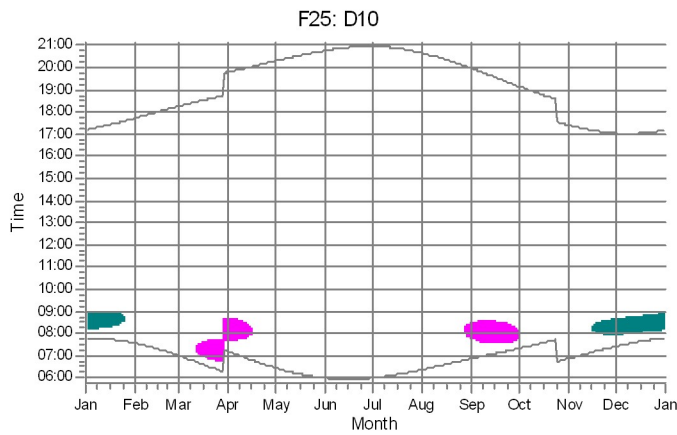
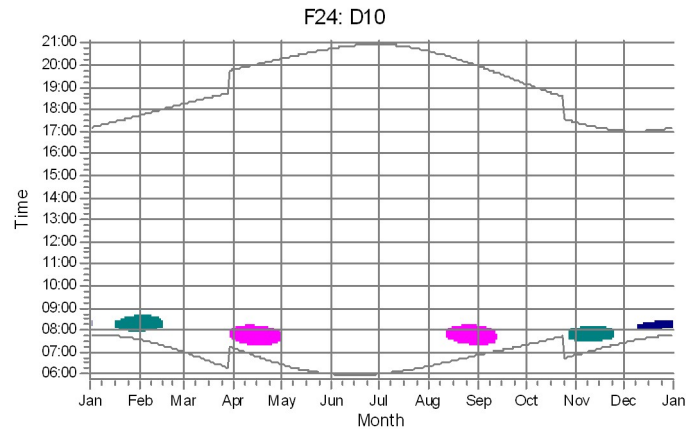
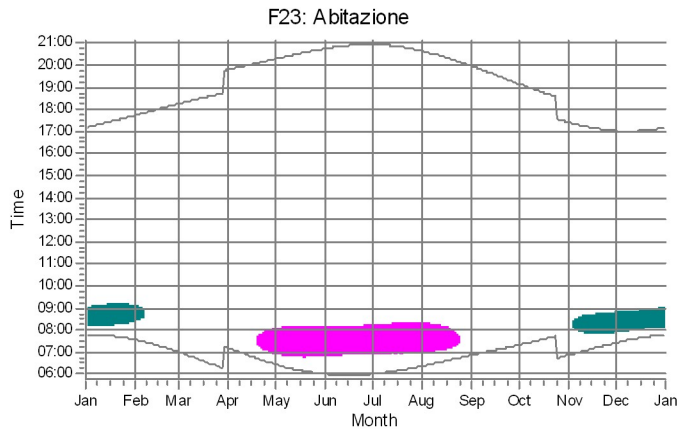


WTGs

- V3: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (6)
- V4: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (5)
- V5: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (4)
- V6: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (3)
- V7: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (2)

SHADOW - Calendar, graphical

Calculation: Progetto_2022_03_15



WTGs

- V2: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (7)
- V3: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (6)
- V4: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (5)
- V5: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (4)
- V6: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (3)
- V7: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (2)

Project:

Progetto_GRV Villanovafranca

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

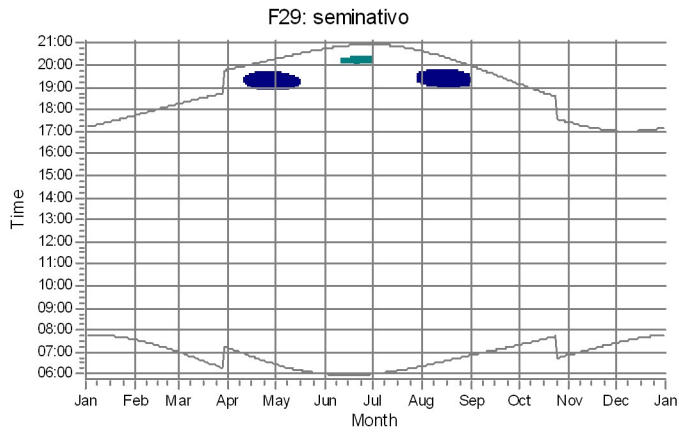
Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

15/03/2022 11:20/3.4.415

SHADOW - Calendar, graphical

Calculation: Progetto_2022_03_15



WTGs



V6: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (3)

V7: Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (2)

SHADOW - Calendar per WTG

Calculation: Progetto_2022_03_15WTG: V1 - Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (8)
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 607 505 420 506 599 570 495 488 555 624 686 669 6.724

| | January | February | March | April | May | June |
|-----------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|----------------|----------------|
| 1 | 07:45 09:02-10:24/82 17:10 | 07:33 09:09-10:36/87 17:43 | 06:59 18:16 | 07:10 17:41-18:46/65 19:48 | 06:27 20:17 | 05:59 20:45 |
| 2 | 07:45 09:02-10:25/83 17:11 | 07:32 09:09-10:36/87 17:45 | 06:58 18:17 | 07:09 17:41-18:46/65 19:49 | 06:25 20:18 | 05:59 20:46 |
| 3 | 07:45 09:02-10:25/83 17:12 | 07:31 09:09-10:36/87 17:46 | 06:56 18:18 | 07:07 17:41-18:45/64 19:50 | 06:24 20:19 | 05:58 20:47 |
| 4 | 07:46 09:02-10:26/84 17:13 | 07:30 09:10-10:35/85 17:47 | 06:55 18:19 | 07:06 17:42-18:45/63 19:51 | 06:23 20:20 | 05:58 20:48 |
| 5 | 07:46 09:03-10:26/83 17:14 | 07:29 09:10-10:35/85 17:48 | 06:53 18:20 | 07:04 17:42-18:44/62 19:52 | 06:22 20:21 | 05:58 20:48 |
| 6 | 07:46 09:03-10:27/84 17:15 | 07:28 09:11-10:35/84 17:49 | 06:52 18:21 | 07:02 17:43-18:43/60 19:53 | 06:20 20:22 | 05:57 20:49 |
| 7 | 07:46 09:03-10:28/85 17:16 | 07:27 09:11-10:34/83 17:51 | 06:50 17:14-17:25/11 18:22 | 07:01 17:43-18:42/59 19:54 | 06:19 20:23 | 05:57 20:49 |
| 8 | 07:45 09:04-10:29/85 17:17 | 07:26 09:11-10:33/82 17:52 | 06:48 17:08-17:31/23 18:23 | 06:59 17:43-18:40/57 19:55 | 06:18 20:24 | 05:57 20:50 |
| 9 | 07:45 09:04-10:29/85 17:18 | 07:25 09:12-10:32/80 17:53 | 06:47 17:04-17:34/30 18:24 | 06:58 17:45-18:40/55 19:56 | 06:17 20:25 | 05:57 20:51 |
| 10 | 07:45 09:04-10:29/85 17:19 | 07:24 09:12-10:31/79 17:54 | 06:45 17:01-17:38/37 18:25 | 06:56 17:45-18:38/53 19:57 | 06:16 20:26 | 05:57 20:51 |
| 11 | 07:45 09:04-10:30/86 17:20 | 07:23 09:13-10:31/78 17:55 | 06:44 16:58-17:39/41 18:26 | 06:55 17:47-18:37/50 19:58 | 06:15 20:27 | 05:56 20:52 |
| 12 | 07:45 09:04-10:31/87 17:21 | 07:22 09:14-10:30/76 17:56 | 06:42 16:57-17:41/44 18:27 | 06:53 17:47-18:35/48 19:59 | 06:14 20:28 | 05:56 20:52 |
| 13 | 07:45 09:04-10:31/87 17:22 | 07:21 09:15-10:29/74 17:58 | 06:41 16:54-17:42/48 18:28 | 06:52 17:49-18:34/45 20:00 | 06:13 20:29 | 05:56 20:53 |
| 14 | 07:44 09:05-10:32/87 17:23 | 07:19 09:15-10:27/72 17:59 | 06:39 16:52-17:43/51 18:29 | 06:50 17:50-18:32/42 20:01 | 06:12 20:30 | 05:56 20:53 |
| 15 | 07:44 09:05-10:33/88 17:24 | 07:18 09:16-10:26/70 18:00 | 06:38 16:51-17:45/54 18:30 | 06:49 17:52-18:30/38 20:02 | 06:11 20:31 | 05:56 20:53 |
| 16 | 07:44 09:05-10:33/88 17:25 | 07:17 09:17-10:25/68 18:01 | 06:36 16:50-17:45/55 18:32 | 06:47 17:53-18:28/35 20:03 | 06:10 20:32 | 05:56 20:54 |
| 17 | 07:43 09:05-10:34/89 17:26 | 07:16 09:18-10:22/64 18:02 | 06:34 16:49-17:47/58 18:33 | 06:46 17:56-18:26/30 20:04 | 06:09 20:33 | 05:56 20:54 |
| 18 | 07:43 09:05-10:34/89 17:27 | 07:14 09:19-10:21/62 18:03 | 06:33 16:47-17:47/60 18:34 | 06:44 17:58-18:22/24 20:05 | 06:08 20:34 | 05:56 20:55 |
| 19 | 07:42 09:06-10:35/89 17:28 | 07:13 09:21-10:19/58 18:04 | 06:31 16:46-17:47/61 18:35 | 06:43 18:02-18:19/17 20:06 | 06:08 20:35 | 05:56 20:55 |
| 20 | 07:42 09:06-10:34/88 17:29 | 07:12 09:21-10:16/55 18:06 | 06:30 16:46-17:48/62 18:36 | 06:41 20:07 | 06:07 20:36 | 05:57 20:55 |
| 21 | 07:41 09:05-10:34/89 17:30 | 07:10 09:23-10:14/51 18:07 | 06:28 16:44-17:48/64 18:37 | 06:40 20:08 | 06:06 20:37 | 05:57 20:55 |
| 22 | 07:41 09:06-10:35/89 17:32 | 07:09 09:25-10:12/47 18:08 | 06:26 16:44-17:49/65 18:38 | 06:38 20:09 | 06:05 20:37 | 05:57 20:56 |
| 23 | 07:40 09:06-10:35/89 17:33 | 07:08 09:27-10:09/42 18:09 | 06:25 16:43-17:49/66 18:39 | 06:37 20:10 | 06:04 20:38 | 05:57 20:56 |
| 24 | 07:39 09:06-10:35/89 17:34 | 07:06 09:30-10:06/36 18:10 | 06:23 16:42-17:48/66 18:40 | 06:36 20:11 | 06:04 20:39 | 05:57 20:56 |
| 25 | 07:39 09:07-10:36/89 17:35 | 07:05 09:32-10:01/29 18:11 | 06:22 16:43-17:49/66 18:41 | 06:34 20:12 | 06:03 20:40 | 05:58 20:56 |
| 26 | 07:38 09:07-10:36/89 17:36 | 07:03 09:37-09:56/19 18:12 | 06:20 16:42-17:49/67 18:42 | 06:33 20:13 | 06:02 20:41 | 05:58 20:56 |
| 27 | 07:37 09:07-10:36/89 17:37 | 07:02 18:13 | 06:18 16:41-17:48/67 18:43 | 06:32 20:14 | 06:02 20:42 | 05:58 20:56 |
| 28 | 07:37 09:07-10:36/89 17:39 | 07:00 18:15 | 06:17 16:41-17:48/67 18:44 | 06:30 20:15 | 06:01 20:42 | 05:59 20:56 |
| 29 | 07:36 09:07-10:36/89 17:40 | | 07:15 17:41-18:48/67 19:45 | 06:29 20:16 | 06:01 20:43 | 05:59 20:56 |
| 30 | 07:35 09:08-10:37/89 17:41 | | 07:14 17:41-18:48/67 19:46 | 06:28 20:17 | 06:00 20:44 | 06:00 20:56 |
| 31 | 07:34 09:08-10:37/89 17:42 | | 07:12 17:41-18:47/66 19:47 | | 06:00 20:45 | |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Sum of minutes with flicker | 2696 | 1740 | 1363 | 932 | 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: Progetto_2022_03_15WTG: V1 - Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (8)
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 607 505 420 506 599 570 495 488 555 624 686 669 6.724

| | July | August | September | October | November | December |
|-----------------------------|----------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| 1 | 06:00 20:56 | 06:23 20:38 | 06:52 17:46-18:36/50 19:57 | 07:20 17:35-18:21/46 19:09 | 06:52 08:42-10:01/79 17:24 | 07:25 08:46-10:12/86 17:01 |
| 2 | 06:01 20:56 | 06:24 20:37 | 06:53 17:44-18:37/53 19:56 | 07:21 17:36-18:19/43 19:07 | 06:53 08:41-10:02/81 17:23 | 07:26 08:47-10:12/85 17:01 |
| 3 | 06:01 20:56 | 06:25 20:36 | 06:54 17:43-18:38/55 19:54 | 07:22 17:38-18:16/38 19:05 | 06:54 08:41-10:02/81 17:22 | 07:27 08:47-10:12/85 17:01 |
| 4 | 06:02 20:56 | 06:26 20:35 | 06:54 17:42-18:38/56 19:52 | 07:23 17:40-18:13/33 19:04 | 06:55 08:40-10:03/83 17:20 | 07:28 08:48-10:13/85 17:00 |
| 5 | 06:02 20:55 | 06:26 20:34 | 06:55 17:39-18:38/59 19:51 | 07:24 17:43-18:10/27 19:02 | 06:56 08:41-10:05/84 17:19 | 07:29 08:48-10:13/85 17:00 |
| 6 | 06:03 20:55 | 06:27 20:33 | 06:56 17:38-18:38/60 19:49 | 07:25 17:47-18:05/18 19:01 | 06:57 08:40-10:05/85 17:18 | 07:30 08:49-10:13/84 17:00 |
| 7 | 06:03 20:55 | 06:28 20:32 | 06:57 17:37-18:39/62 19:48 | 07:26 17:47-18:05/18 18:59 | 06:59 08:40-10:05/85 17:17 | 07:31 08:50-10:13/83 17:00 |
| 8 | 06:04 20:55 | 06:29 20:31 | 06:58 17:36-18:39/63 19:46 | 07:27 17:47-18:05/18 18:57 | 07:00 08:39-10:06/87 17:16 | 07:32 08:50-10:14/84 17:00 |
| 9 | 06:04 20:54 | 06:30 20:29 | 06:59 17:35-18:39/64 19:44 | 07:27 17:47-18:05/18 18:56 | 07:01 08:40-10:07/87 17:15 | 07:33 08:51-10:14/83 17:00 |
| 10 | 06:05 20:54 | 06:31 20:28 | 07:00 17:35-18:39/64 19:43 | 07:28 17:47-18:05/18 18:54 | 07:02 08:40-10:07/87 17:14 | 07:33 08:51-10:14/83 17:00 |
| 11 | 06:06 20:54 | 06:32 20:27 | 07:01 17:34-18:39/65 19:41 | 07:29 17:47-18:05/18 18:53 | 07:03 08:39-10:07/88 17:13 | 07:34 08:52-10:14/82 17:00 |
| 12 | 06:06 20:53 | 06:33 20:26 | 07:02 17:33-18:39/66 19:38 | 07:31 17:47-18:05/18 18:51 | 07:04 08:39-10:08/89 17:12 | 07:35 08:53-10:15/82 17:00 |
| 13 | 06:07 20:53 | 06:34 20:24 | 07:03 17:33-18:39/66 19:38 | 07:32 17:47-18:05/18 18:50 | 07:05 08:39-10:08/89 17:11 | 07:36 08:53-10:15/82 17:01 |
| 14 | 06:08 20:52 | 06:35 20:23 | 07:04 17:31-18:38/67 19:36 | 07:33 17:47-18:05/18 18:48 | 07:07 08:40-10:09/89 17:11 | 07:37 08:54-10:16/82 17:01 |
| 15 | 06:09 20:52 | 06:36 20:22 | 07:05 17:31-18:38/67 19:35 | 07:34 10:14-10:22/8 18:47 | 07:08 08:40-10:09/89 17:10 | 07:37 08:54-10:15/81 17:01 |
| 16 | 06:09 20:51 | 06:37 20:20 | 07:06 17:30-18:37/67 19:33 | 07:35 10:07-10:31/24 18:45 | 07:09 08:40-10:09/89 17:09 | 07:38 08:55-10:16/81 17:01 |
| 17 | 06:10 20:51 | 06:38 20:19 | 07:06 17:30-18:37/67 19:31 | 07:36 10:03-10:35/32 18:44 | 07:10 08:40-10:09/89 17:08 | 07:39 08:56-10:17/81 17:02 |
| 18 | 06:11 20:50 | 06:39 20:18 | 07:07 17:30-18:36/66 19:30 | 07:37 10:00-10:39/39 18:42 | 07:11 08:40-10:09/89 17:08 | 07:39 08:56-10:16/80 17:02 |
| 19 | 06:12 20:49 | 06:40 20:16 | 07:08 17:30-18:36/66 19:28 | 07:38 09:58-10:41/43 18:41 | 07:12 08:41-10:10/89 17:07 | 07:40 08:57-10:17/80 17:02 |
| 20 | 06:12 20:49 | 06:40 20:15 | 07:09 17:30-18:35/65 19:26 | 07:39 09:55-10:44/49 18:40 | 07:13 08:41-10:10/89 17:06 | 07:41 08:57-10:17/80 17:03 |
| 21 | 06:13 20:48 | 06:41 20:14 | 07:10 17:30-18:34/64 19:25 | 07:40 09:53-10:46/53 18:38 | 07:14 08:41-10:10/89 17:06 | 07:41 08:58-10:18/80 17:03 |
| 22 | 06:14 20:47 | 06:42 20:12 | 07:11 17:30-18:34/64 19:23 | 07:41 09:52-10:48/56 18:37 | 07:16 08:42-10:11/89 17:05 | 07:42 08:58-10:18/80 17:04 |
| 23 | 06:15 20:46 | 06:43 20:11 | 07:12 17:30-18:33/63 19:22 | 07:42 09:50-10:49/59 18:35 | 07:17 08:42-10:11/89 17:04 | 07:42 08:59-10:19/80 17:04 |
| 24 | 06:16 20:46 | 06:44 18:05-18:23/18 20:09 | 07:13 17:30-18:32/62 19:20 | 07:43 09:48-10:51/63 18:34 | 07:18 08:42-10:11/89 17:04 | 07:43 08:59-10:19/80 17:05 |
| 25 | 06:17 20:45 | 06:45 18:01-18:26/25 20:08 | 07:14 17:30-18:30/60 19:18 | 06:44 08:48-09:53/65 17:33 | 07:19 08:43-10:12/89 17:03 | 07:43 09:00-10:20/80 17:05 |
| 26 | 06:17 20:44 | 06:46 17:58-18:29/31 20:06 | 07:15 17:30-18:29/59 19:17 | 06:45 08:47-09:55/68 17:31 | 07:20 08:44-10:12/88 17:03 | 07:43 09:00-10:21/81 17:06 |
| 27 | 06:18 20:43 | 06:47 17:55-18:30/35 20:05 | 07:16 17:31-18:27/56 19:15 | 06:46 08:46-09:56/70 17:30 | 07:21 08:44-10:12/88 17:02 | 07:44 09:00-10:21/81 17:07 |
| 28 | 06:19 20:42 | 06:48 17:53-18:31/38 20:03 | 07:17 17:31-18:26/55 19:13 | 06:47 08:45-09:57/72 17:29 | 07:22 08:45-10:12/87 17:02 | 07:44 09:00-10:21/81 17:07 |
| 29 | 06:20 20:41 | 06:49 17:51-18:33/42 20:02 | 07:18 17:32-18:24/52 19:12 | 06:49 08:44-09:58/74 17:28 | 07:23 08:45-10:12/87 17:02 | 07:44 09:01-10:23/82 17:08 |
| 30 | 06:21 20:40 | 06:50 17:49-18:34/45 20:00 | 07:19 17:33-18:23/50 19:10 | 06:50 08:43-09:59/76 17:26 | 07:24 08:46-10:12/86 17:01 | 07:45 09:01-10:23/82 17:09 |
| 31 | 06:22 20:39 | 06:51 17:47-18:35/48 19:59 | | 06:51 08:43-10:00/77 17:25 | | 07:45 09:01-10:23/82 17:09 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Sum of minutes with flicker | 0 | 282 | 1833 | 1133 | 2609 | 2543 |

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

| | | | | |
|--------------|------------------|---------------------------------|--------------------------------|----------------------|
| Day in month | Sun rise (hh:mm) | First time (hh:mm) with flicker | Last time (hh:mm) 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: Progetto_2022_03_15WTG: V2 - Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (7)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time table with columns N, NNE, ENE, E, ESE, SSE, S, SSW, WSW, W, WNW, NNW, Sum and values: 607 505 420 506 599 570 495 488 555 624 686 669 6.724

Main shadow calendar table with columns for months January to December and rows for each day (1-31) showing sunrise, sunset, and shadow start/end times.

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_2022_03_15WTG: V3 - Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (6)
 Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|-------|-------|------|------|------|------|
| 4,40 | 5,05 | 5,88 | 7,00 | 8,45 | 9,88 | 10,82 | 10,03 | 8,08 | 6,09 | 5,07 | 4,27 |

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|-----------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| 1 | 07:45 08:25-09:04/39 17:10 | 07:33 08:19-09:30/71 17:43 | 06:59 08:44-09:00/16 18:16 | 07:10 18:52-19:25/33 19:48 | 06:26 19:41-19:55/14 20:17 | 05:59 07:35-07:51/16 20:45 |
| 2 | 07:45 08:24-09:05/41 17:11 | 07:32 08:19-09:30/71 17:45 | 06:58 07:27-08:01/34 18:17 | 07:09 18:53-19:25/32 19:49 | 06:25 19:40-19:56/16 20:18 | 05:59 07:38-07:47/9 20:46 |
| 3 | 07:45 08:24-09:06/42 17:12 | 07:31 08:19-09:30/71 17:46 | 06:56 07:26-08:02/36 18:18 | 07:07 18:53-19:23/30 19:50 | 06:24 19:39-19:57/18 20:19 | 05:58 19:39-19:57/18 20:47 |
| 4 | 07:46 08:24-09:07/43 17:13 | 07:30 08:19-09:30/71 17:47 | 06:55 07:25-08:02/37 18:19 | 07:06 18:54-19:23/29 19:51 | 06:23 19:38-19:58/20 20:20 | 05:58 19:38-19:58/20 20:48 |
| 5 | 07:46 08:24-09:08/44 17:14 | 07:29 08:19-09:30/71 17:48 | 06:53 07:25-08:02/37 18:20 | 07:04 18:55-19:20/25 19:52 | 06:22 19:37-19:59/22 20:21 | 05:58 19:37-19:59/22 20:48 |
| 6 | 07:46 08:24-09:09/45 17:15 | 07:28 08:20-09:30/70 17:49 | 06:52 07:24-08:02/38 18:21 | 07:02 18:56-19:18/22 19:53 | 06:20 19:37-20:00/23 20:22 | 05:57 19:37-20:00/23 20:49 |
| 7 | 07:46 08:24-09:10/46 17:16 | 07:27 08:20-09:30/70 17:50 | 06:50 07:24-08:02/38 18:22 | 07:01 18:59-19:16/17 19:54 | 06:19 19:36-19:59/23 20:23 | 05:57 19:36-19:59/23 20:49 |
| 8 | 07:45 08:24-09:11/47 17:17 | 07:26 08:19-09:29/70 17:52 | 06:48 07:24-08:02/38 18:23 | 06:59 19:01-19:12/11 19:55 | 06:18 19:36-19:59/23 20:24 | 05:57 19:36-19:59/23 20:50 |
| 9 | 07:45 08:24-09:13/49 17:18 | 07:25 08:19-09:29/70 17:53 | 06:47 07:23-08:01/38 18:24 | 06:58 07:30-08:17/47 19:56 | 06:17 19:36-19:59/23 20:25 | 05:57 19:36-19:59/23 20:51 |
| 10 | 07:45 08:23-09:13/50 17:19 | 07:24 08:20-09:29/69 17:54 | 06:45 07:24-08:01/37 18:25 | 06:56 07:28-08:15/47 19:57 | 06:16 19:36-19:59/23 20:26 | 05:57 19:36-19:59/23 20:51 |
| 11 | 07:45 08:23-09:14/51 17:20 | 07:23 08:20-09:29/69 17:55 | 06:44 07:23-08:00/37 18:26 | 06:55 07:28-08:14/46 19:58 | 06:15 19:36-19:59/23 20:27 | 05:56 19:36-19:59/23 20:52 |
| 12 | 07:45 08:23-09:15/52 17:21 | 07:22 08:21-09:29/68 17:56 | 06:42 07:24-07:59/35 18:27 | 06:53 07:27-08:11/44 19:59 | 06:14 19:36-19:58/22 20:28 | 05:56 19:36-19:58/22 20:52 |
| 13 | 07:45 08:22-09:16/54 17:22 | 07:20 08:22-09:29/67 17:58 | 06:41 07:24-07:58/34 18:28 | 06:52 07:26-08:10/44 20:00 | 06:13 19:36-19:58/22 20:29 | 05:56 19:36-19:58/22 20:53 |
| 14 | 07:44 08:22-09:17/55 17:23 | 07:19 08:21-09:27/66 17:59 | 06:39 07:24-07:56/32 18:29 | 06:50 07:25-08:09/44 20:01 | 06:12 19:38-19:58/20 20:30 | 05:56 19:38-19:58/20 20:53 |
| 15 | 07:44 08:22-09:19/57 17:24 | 07:18 08:22-09:27/65 18:00 | 06:38 07:26-07:56/30 18:30 | 06:49 07:25-08:09/44 20:02 | 06:11 19:38-19:58/20 20:31 | 05:56 19:38-19:58/20 20:53 |
| 16 | 07:44 08:21-09:19/58 17:25 | 07:17 08:23-09:26/63 18:01 | 06:36 07:26-07:53/27 18:31 | 06:47 07:25-08:08/43 20:03 | 06:10 19:39-19:57/18 20:32 | 05:56 19:39-19:57/18 20:54 |
| 17 | 07:43 08:21-09:20/59 17:26 | 07:16 08:23-09:25/62 18:02 | 06:34 18:07-18:12/5 18:32 | 06:46 07:25-08:08/43 20:04 | 06:09 19:40-19:56/16 20:33 | 05:56 19:40-19:56/16 20:54 |
| 18 | 07:43 08:21-09:21/60 17:27 | 07:14 08:24-09:24/60 18:03 | 06:33 18:03-18:13/10 18:34 | 06:44 07:25-08:08/43 20:05 | 06:08 19:41-19:54/13 20:34 | 05:56 19:41-19:54/13 20:55 |
| 19 | 07:42 08:21-09:22/61 17:28 | 07:13 08:25-09:23/58 18:04 | 06:31 18:01-18:14/13 18:35 | 06:43 07:24-08:07/43 20:06 | 06:07 19:42-19:53/11 20:35 | 05:56 19:42-19:53/11 20:55 |
| 20 | 07:42 08:20-09:23/63 17:29 | 07:12 08:25-09:21/56 18:06 | 06:30 17:59-18:15/16 18:36 | 06:41 07:25-08:07/42 20:07 | 06:07 19:45-19:51/6 20:36 | 05:57 19:45-19:51/6 20:55 |
| 21 | 07:41 08:20-09:23/63 17:30 | 07:10 08:27-09:20/53 18:07 | 06:28 17:57-18:16/19 18:37 | 06:40 07:25-08:05/40 20:08 | 06:06 20:37 | 05:57 20:37 |
| 22 | 07:41 08:20-09:24/64 17:32 | 07:09 08:28-09:19/51 18:08 | 06:26 17:56-18:16/20 18:38 | 06:38 07:25-08:05/40 20:09 | 06:05 20:37 | 05:57 20:37 |
| 23 | 07:40 08:20-09:25/65 17:33 | 07:08 08:29-09:17/48 18:09 | 06:25 17:55-18:18/23 18:39 | 06:37 07:26-08:05/39 20:10 | 06:04 20:38 | 05:57 20:38 |
| 24 | 07:39 08:19-09:25/66 17:34 | 07:06 08:30-09:15/45 18:10 | 06:23 17:54-18:19/25 18:40 | 06:36 07:26-08:03/37 20:11 | 06:04 20:39 | 05:57 20:39 |
| 25 | 07:39 08:20-09:27/67 17:35 | 07:05 08:31-09:13/42 18:11 | 06:22 17:54-18:20/26 18:41 | 06:34 07:27-08:02/35 20:11 | 06:03 20:40 | 05:58 20:40 |
| 26 | 07:38 08:19-09:27/68 17:36 | 07:03 08:34-09:11/37 18:12 | 06:20 17:53-18:21/28 18:42 | 06:33 07:28-08:01/33 20:12 | 06:02 20:41 | 05:58 20:41 |
| 27 | 07:37 08:19-09:27/68 17:37 | 07:02 08:37-09:08/31 18:13 | 06:18 17:52-18:21/29 18:43 | 06:32 07:28-07:59/31 20:13 | 06:02 20:42 | 05:58 20:42 |
| 28 | 07:36 08:19-09:28/69 17:39 | 07:00 08:39-09:04/25 18:15 | 06:17 17:52-18:23/31 18:44 | 06:30 07:30-07:58/28 20:14 | 06:01 20:42 | 05:59 20:42 |
| 29 | 07:36 08:19-09:28/69 17:40 | | 07:15 18:52-19:24/32 19:45 | 06:29 07:31-07:56/25 20:15 | 06:01 20:43 | 05:59 20:43 |
| 30 | 07:35 08:19-09:29/70 17:41 | | 07:13 18:52-19:25/33 19:46 | 06:28 19:43-19:53/10 20:16 | 06:00 20:44 | 06:00 20:44 |
| 31 | 07:34 08:19-09:30/71 17:42 | | 07:12 18:52-19:26/34 19:47 | 07:33 07:55/22 20:16 | 06:00 20:45 | 06:00 20:45 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Sum of minutes with flicker | 1756 | 1783 | 1294 | 1414 | 401 | 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: Progetto_2022_03_15WTG: V3 - Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (6)
 Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 607 505 420 506 599 570 495 488 555 624 686 669 6.724

| | July | August | September | October | November | December |
|-----------------------------|-------------------------------|--|---|---|-------------------------------|-------------------------------|
| 1 | 06:00 20:56 | 06:23 19:47-20:09/22 20:38 | 06:52 07:27-08:13/46 19:57 | 07:20 08:03-08:38/35 19:08 | 06:52 07:50-08:59/69 17:24 | 07:25 08:05-08:56/51 17:01 |
| 2 | 06:00 20:56 | 06:24 19:46-20:09/23 20:37 | 06:53 07:27-08:14/47 19:56 | 07:21 08:02-08:38/36 19:07 | 06:53 07:49-08:59/70 17:23 | 07:26 08:06-08:56/50 17:01 |
| 3 | 06:01 20:56 | 06:25 19:46-20:10/24 20:36 | 06:53 07:28-08:15/47 19:54 | 07:22 08:01-08:38/37 19:05 | 06:54 07:49-08:59/70 17:22 | 07:27 08:07-08:56/49 17:01 |
| 4 | 06:01 20:56 | 06:25 19:46-20:10/24 20:35 | 06:54 18:59-19:10/11 19:52 07:28-08:15/47 19:04 | 07:23 08:01-08:38/37 19:04 | 06:55 07:49-08:59/70 17:20 | 07:28 08:08-08:55/47 17:00 |
| 5 | 06:02 20:55 | 06:26 19:46-20:10/24 20:34 | 06:55 18:55-19:12/17 19:51 07:28-08:15/47 19:02 | 07:24 08:00-08:38/38 19:02 | 06:56 07:49-09:00/71 17:19 | 07:29 08:09-08:55/46 17:00 |
| 6 | 06:03 20:55 | 06:27 19:47-20:10/23 20:33 | 06:56 18:52-19:14/22 19:49 07:29-08:15/46 19:01 | 07:24 08:00-08:38/38 19:01 | 06:57 07:49-09:00/71 17:18 | 07:30 08:10-08:55/45 17:00 |
| 7 | 06:03 20:55 | 06:28 19:46-20:08/22 20:32 | 06:57 18:50-19:15/25 19:48 07:31-08:15/44 18:59 | 07:25 08:00-08:38/38 18:59 | 06:59 07:49-09:00/71 17:17 | 07:31 08:11-08:55/44 17:00 |
| 8 | 06:04 20:55 | 06:29 19:46-20:07/21 20:31 | 06:58 18:49-19:17/28 19:46 07:32-08:15/43 18:57 | 07:26 08:00-08:37/37 18:57 | 07:00 07:49-09:00/71 17:16 | 07:32 08:12-08:55/43 17:00 |
| 9 | 06:04 20:54 | 06:30 19:47-20:06/19 20:29 | 06:59 18:47-19:17/30 19:44 07:35-08:15/40 18:56 | 07:27 08:00-08:37/37 18:56 | 07:01 07:50-09:01/71 17:15 | 07:33 08:13-08:55/42 17:00 |
| 10 | 06:05 20:54 | 06:31 19:48-20:05/17 20:28 | 07:00 18:46-19:18/32 19:43 07:36-08:15/39 18:54 | 07:28 08:00-08:36/36 18:54 | 07:02 07:50-09:01/71 17:14 | 07:33 08:14-08:55/41 17:00 |
| 11 | 06:06 20:54 | 06:32 19:49-20:04/15 20:27 07:46-07:57/11 | 07:01 18:45-19:18/33 19:41 07:36-08:15/39 18:53 | 07:29 08:00-08:35/35 18:53 | 07:03 07:50-09:00/70 17:13 | 07:34 08:15-08:54/39 17:00 |
| 12 | 06:06 20:53 | 06:33 19:50-20:03/13 20:26 07:43-08:01/18 | 07:02 18:44-19:18/34 19:40 07:36-08:14/38 18:51 | 07:30 09:21-09:28/7 08:01-08:34/33 17:12 | 07:04 07:50-09:00/70 17:12 | 07:35 08:16-08:54/38 17:00 |
| 13 | 06:07 20:53 | 06:34 19:52-20:01/9 20:24 07:40-08:03/23 | 07:03 18:43-19:17/34 19:38 07:36-08:14/38 18:50 | 07:31 09:14-09:35/21 08:01-08:33/32 17:11 | 07:05 07:50-09:00/70 17:11 | 07:36 08:17-08:54/37 17:01 |
| 14 | 06:08 20:52 | 06:35 07:38-08:05/27 20:23 | 07:04 18:42-19:14/32 19:36 07:35-08:12/37 18:48 | 07:33 09:10-09:38/28 08:02-08:31/29 17:11 | 07:07 07:52-09:01/69 17:11 | 07:37 08:18-08:54/36 17:01 |
| 15 | 06:09 20:52 | 06:36 07:37-08:06/29 20:22 | 07:05 18:41-19:12/31 19:35 07:36-08:11/35 18:47 | 07:34 09:07-09:41/34 08:03-08:29/26 17:10 | 07:08 07:52-09:00/68 17:10 | 07:37 08:18-08:54/36 17:01 |
| 16 | 06:09 20:51 | 06:37 07:36-08:07/31 20:20 | 07:06 18:41-19:11/30 19:33 07:36-08:10/34 18:45 | 07:35 09:06-09:44/38 08:06-08:28/22 17:09 | 07:09 07:52-09:00/68 17:09 | 07:38 08:19-08:54/35 17:01 |
| 17 | 06:10 20:51 | 06:38 07:34-08:08/34 20:19 | 07:06 18:41-19:09/28 19:31 07:37-08:09/32 18:44 | 07:36 09:03-09:46/43 08:08-08:26/18 17:08 | 07:10 07:53-09:00/67 17:08 | 07:39 08:21-08:54/33 17:02 |
| 18 | 06:11 20:50 | 06:39 07:32-08:08/36 20:18 | 07:07 18:41-19:08/27 19:30 07:38-08:08/30 18:42 | 07:37 09:01-09:48/47 08:12-08:21/9 17:07 | 07:11 07:53-08:59/66 17:07 | 07:39 08:21-08:54/33 17:02 |
| 19 | 06:12 20:49 | 06:39 07:31-08:09/38 20:16 | 07:08 18:41-19:06/25 19:28 07:39-08:06/27 18:41 | 07:38 09:00-09:49/49 18:41 | 07:12 07:55-09:00/65 17:07 | 07:40 08:22-08:55/33 17:02 |
| 20 | 06:12 20:49 | 06:40 07:31-08:09/38 20:15 | 07:09 18:41-19:05/24 19:26 07:40-08:04/24 18:39 | 07:39 08:58-09:50/52 18:39 | 07:13 07:55-08:59/64 17:06 | 07:41 08:22-08:55/33 17:03 |
| 21 | 06:13 20:48 | 06:41 07:30-08:10/40 20:13 | 07:10 18:42-19:03/21 19:25 07:42-08:01/19 18:38 | 07:40 08:57-09:51/54 18:38 | 07:14 07:56-08:59/63 17:05 | 07:41 08:23-08:55/32 17:03 |
| 22 | 06:14 20:47 | 06:42 07:29-08:10/41 20:12 | 07:11 18:42-19:02/20 19:23 07:46-07:57/11 18:37 | 07:41 08:56-09:52/56 18:37 | 07:16 07:56-08:59/63 17:05 | 07:42 08:23-08:55/32 17:04 |
| 23 | 06:15 20:46 | 06:43 07:29-08:11/42 20:11 | 07:12 18:43-19:00/17 19:21 18:35 | 07:42 08:54-09:53/59 18:35 | 07:17 07:57-08:58/61 17:04 | 07:42 08:24-08:56/32 17:04 |
| 24 | 06:16 19:53-20:02/9 20:46 | 06:44 07:28-08:11/43 20:09 | 07:13 18:43-18:57/14 19:20 08:18-08:28/10 18:34 | 07:43 08:53-09:54/61 18:34 | 07:18 07:58-08:58/60 17:04 | 07:43 08:24-08:57/33 17:05 |
| 25 | 06:17 19:52-20:04/12 20:45 | 06:45 07:28-08:11/43 20:08 | 07:14 18:45-18:56/11 19:18 08:14-08:32/18 17:33 | 06:44 07:53-08:56/63 17:33 | 07:19 07:59-08:58/59 17:03 | 07:43 08:25-08:58/33 17:05 |
| 26 | 06:17 19:51-20:05/14 20:44 | 06:46 07:28-08:11/43 20:06 | 07:15 18:47-18:54/7 19:17 08:10-08:33/23 17:31 | 06:45 07:52-08:56/64 17:31 | 07:20 08:00-08:58/58 17:03 | 07:43 08:25-08:58/33 17:06 |
| 27 | 06:18 19:50-20:07/17 20:43 | 06:47 07:27-08:11/44 20:05 | 07:16 18:51-18:53/2 19:15 08:08-08:34/26 17:30 | 06:46 07:52-08:57/65 17:30 | 07:21 08:01-08:58/57 17:02 | 07:44 08:24-08:59/35 17:06 |
| 28 | 06:19 19:49-20:08/19 20:42 | 06:48 07:26-08:10/44 20:03 | 07:17 08:07-08:36/29 19:13 | 06:47 07:51-08:57/66 17:29 | 07:22 08:02-08:57/55 17:02 | 07:44 08:24-08:59/35 17:07 |
| 29 | 06:20 19:49-20:08/19 20:41 | 06:49 07:26-08:09/43 20:02 | 07:18 08:05-08:36/31 19:12 | 06:48 07:50-08:57/67 17:27 | 07:23 08:03-08:57/54 17:02 | 07:44 08:25-09:01/36 17:08 |
| 30 | 06:21 19:47-20:08/21 20:40 | 06:50 07:26-08:10/44 20:00 | 07:19 08:04-08:37/33 19:10 | 06:50 07:50-08:58/68 17:26 | 07:24 08:04-08:57/53 17:01 | 07:45 08:25-09:02/37 17:09 |
| 31 | 06:22 19:47-20:09/22 20:39 | 06:51 07:27-08:11/44 19:59 | 06:51 07:27-08:11/44 19:59 | 06:51 07:50-08:59/69 17:25 | 07:25 08:05-09:00/70 17:00 | 07:45 08:25-09:03/38 17:09 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Sum of minutes with flicker | 133 | 1012 | 1535 | 1584 | 1965 | 1187 |

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

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) 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: Progetto_2022_03_15WTG: V4 - Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (5)
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 607 505 420 506 599 570 495 488 555 624 686 669 6.724

| | January | February | March | April | May | June |
|-----------------------------|-------------------------------|-------------------------------|--|--|--|-------------------------------|
| 1 | 07:45 11:22-12:56/94 17:10 | 07:33 17:43 | 06:59 17:24-17:43/19 18:16 | 07:10 18:31-18:55/24 19:48 18:57-19:11/14 | 06:26 19:23-19:43/20 20:17 07:11-07:54/43 | 05:59 06:37-07:11/34 20:45 |
| 2 | 07:45 11:23-12:56/93 17:11 | 07:32 17:44 | 06:57 17:21-17:45/24 18:17 | 07:09 18:33-18:53/20 19:49 19:01-19:08/7 | 06:25 19:24-19:43/19 20:18 07:11-07:54/43 | 05:59 06:38-07:10/32 20:46 |
| 3 | 07:45 11:24-12:56/92 17:12 | 07:31 17:46 | 06:56 17:19-17:47/28 18:18 | 07:07 18:35-18:50/15 19:50 | 06:24 19:25-19:41/16 20:19 07:11-07:55/44 | 05:58 06:37-07:09/32 20:47 |
| 4 | 07:46 11:24-12:56/92 17:13 | 07:30 17:47 | 06:55 17:17-17:47/30 18:19 | 07:06 18:39-18:47/8 19:51 | 06:23 19:26-19:40/14 20:20 07:11-07:55/44 | 05:58 06:37-07:08/31 20:48 |
| 5 | 07:46 11:25-12:56/91 17:14 | 07:29 17:48 | 06:53 17:16-17:48/32 18:20 | 07:04 19:52 | 06:22 19:28-19:38/10 06:59-07:06/7 20:21 07:11-07:55/44 | 05:58 06:38-07:07/29 20:48 |
| 6 | 07:46 11:26-12:56/90 17:15 | 07:28 17:49 | 06:51 17:15-17:49/34 18:21 | 07:02 19:53 | 06:20 07:11-07:55/44 20:22 06:56-07:09/13 | 05:57 06:38-07:07/29 20:49 |
| 7 | 07:46 11:27-12:56/89 17:16 | 07:27 17:50 | 06:50 17:14-17:49/35 18:22 | 07:01 19:54 | 06:19 06:54-07:54/60 20:23 | 05:57 06:37-07:06/29 20:49 |
| 8 | 07:45 11:28-12:56/88 17:17 | 07:26 17:52 | 06:48 17:14-17:50/36 18:23 | 06:59 19:55 | 06:18 06:52-07:53/61 20:24 | 05:57 06:38-07:07/29 20:50 |
| 9 | 07:45 11:29-12:56/87 17:18 | 07:25 17:53 | 06:47 17:13-17:50/37 18:24 | 06:58 19:56 | 06:17 06:51-07:53/62 20:25 | 05:57 06:38-07:07/29 20:51 |
| 10 | 07:45 11:29-12:55/86 17:19 | 07:24 17:54 | 06:45 17:13-17:50/37 18:25 | 06:56 19:57 | 06:16 06:50-07:53/63 20:26 | 05:56 06:38-07:08/30 20:51 |
| 11 | 07:45 11:31-12:55/84 17:20 | 07:23 17:55 | 06:44 17:12-17:50/38 18:26 | 06:55 19:58 | 06:15 06:49-07:52/63 20:27 | 05:56 06:38-07:08/30 20:52 |
| 12 | 07:45 11:32-12:55/83 17:21 | 07:22 17:56 | 06:42 17:12-17:50/38 18:27 | 06:53 19:59 | 06:14 06:49-07:52/63 20:28 | 05:56 06:39-07:08/29 20:52 |
| 13 | 07:45 11:32-12:54/82 17:22 | 07:20 17:58 | 06:41 17:12-17:53/41 18:28 | 06:52 20:00 | 06:13 06:49-07:52/63 20:29 | 05:56 06:39-07:08/29 20:53 |
| 14 | 07:44 11:34-12:54/80 17:23 | 07:19 17:59 | 06:39 17:12-17:55/43 18:29 | 06:50 20:01 | 06:12 06:49-07:51/62 20:30 | 05:56 06:39-07:09/30 20:53 |
| 15 | 07:44 11:35-12:54/79 17:24 | 07:18 18:00 | 06:37 17:12-17:57/45 18:30 | 06:49 07:24-07:36/12 20:02 | 06:11 06:48-07:51/63 20:31 | 05:56 06:39-07:09/30 20:53 |
| 16 | 07:44 11:36-12:53/77 17:25 | 07:17 18:01 | 06:36 17:12-17:57/45 18:31 | 06:47 07:21-07:37/16 20:03 | 06:10 06:48-07:50/62 20:32 | 05:56 06:39-07:09/30 20:54 |
| 17 | 07:43 11:38-12:52/74 17:26 | 07:16 18:02 | 06:34 17:13-17:59/46 18:32 | 06:46 07:19-07:39/20 20:04 | 06:09 06:48-07:49/61 20:33 | 05:56 06:40-07:09/29 20:54 |
| 18 | 07:43 11:39-12:51/72 17:27 | 07:14 18:03 | 06:33 17:14-18:00/46 18:33 | 06:44 19:32-19:39/7 20:05 07:18-07:41/23 | 06:08 06:48-07:48/60 20:34 | 05:56 06:40-07:09/29 20:55 |
| 19 | 07:42 11:41-12:50/69 17:28 | 07:13 18:04 | 06:31 17:14-18:00/46 18:35 18:03-18:13/10 | 06:43 19:29-19:42/13 20:05 07:17-07:42/25 | 06:07 06:48-07:47/59 20:35 | 05:56 06:40-07:09/29 20:55 |
| 20 | 07:42 11:43-12:49/66 17:29 | 07:12 18:06 | 06:30 17:16-18:15/59 18:36 | 06:41 19:27-19:44/17 20:06 07:16-07:46/30 | 06:07 07:16-07:47/31 20:36 06:47-07:15/28 | 05:56 06:40-07:09/29 20:55 |
| 21 | 07:41 11:44-12:47/63 17:30 | 07:10 18:07 | 06:28 17:17-18:16/59 18:37 | 06:40 19:25-19:44/19 20:07 07:15-07:47/32 | 06:06 07:17-07:46/29 20:37 06:44-07:15/31 | 05:57 06:41-07:10/29 20:55 |
| 22 | 07:41 11:47-12:46/59 17:32 | 07:09 18:08 | 06:26 17:19-18:16/57 18:38 | 06:38 19:25-19:45/20 20:08 07:14-07:49/35 | 06:05 07:17-07:45/28 20:37 06:42-07:15/33 | 05:57 06:41-07:10/29 20:56 |
| 23 | 07:40 11:49-12:43/54 17:33 | 07:08 18:09 | 06:25 17:24-18:18/54 18:39 | 06:37 19:23-19:45/22 20:09 07:14-07:51/37 | 06:04 07:19-07:45/26 20:38 06:42-07:15/33 | 05:57 06:41-07:10/29 20:56 |
| 24 | 07:39 11:51-12:40/49 17:34 | 07:06 18:10 | 06:23 17:28-18:18/50 18:40 | 06:36 19:23-19:46/23 20:10 07:13-07:51/38 | 06:04 07:20-07:43/23 20:39 06:40-07:14/34 | 05:57 06:41-07:10/29 20:56 |
| 25 | 07:39 11:55-12:38/43 17:35 | 07:05 18:11 | 06:21 17:28-18:19/51 18:41 | 06:34 19:23-19:46/23 20:11 07:14-07:52/38 | 06:03 07:21-07:41/20 20:40 06:39-07:14/35 | 05:58 06:42-07:11/29 20:56 |
| 26 | 07:38 11:59-12:34/35 17:36 | 07:03 18:12 | 06:20 17:28-18:18/50 18:42 | 06:33 19:22-19:45/23 20:12 07:14-07:53/39 | 06:02 07:23-07:41/18 20:41 06:39-07:14/35 | 05:58 06:42-07:11/29 20:56 |
| 27 | 07:37 12:05-12:28/23 17:37 | 07:02 18:13 | 06:18 17:28-18:17/49 18:43 | 06:32 19:22-19:46/24 20:13 07:13-07:53/40 | 06:02 07:25-07:38/13 20:42 06:38-07:13/35 | 05:58 06:41-07:11/30 20:56 |
| 28 | 07:36 17:39 17:39 | 07:00 17:26-17:40/14 18:14 | 06:17 17:29-18:17/48 18:44 | 06:30 19:22-19:45/23 20:14 07:13-07:54/41 | 06:01 07:28-07:36/8 20:42 06:39-07:13/34 | 05:59 06:42-07:12/30 20:56 |
| 29 | 07:36 17:40 17:40 | | 07:15 18:29-19:16/47 19:45 | 06:29 19:22-19:45/23 20:15 07:13-07:54/41 | 06:01 06:38-07:12/34 20:43 | 05:59 06:42-07:11/29 20:56 |
| 30 | 07:35 17:41 17:41 | | 07:13 18:31-19:15/44 19:46 | 06:28 19:22-19:44/22 20:16 07:12-07:55/43 | 06:00 06:38-07:12/34 20:44 | 05:59 06:42-07:11/29 20:56 |
| 31 | 07:34 17:42 | | 07:12 18:31-19:13/42 19:47 | | 06:00 06:37-07:11/34 20:45 | |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Sum of minutes with flicker | 1994 | 14 | 1320 | 857 | 1759 | 890 |

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

| | | | | |
|--------------|------------------|---------------------------------|--------------------------------|----------------------|
| Day in month | Sun rise (hh:mm) | First time (hh:mm) with flicker | Last time (hh:mm) 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: Progetto_2022_03_15WTG: V4 - Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (5)
 Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 607 505 420 506 599 570 495 488 555 624 686 669 6.724

| | July | August | September | October | November | December |
|-----------------------------|--|--|--|-------------------------------|-------------------------------|-------------------------------|
| 1 | 06:00 06:43-07:12/29 20:56 | 06:23 06:59-08:02/63 20:38 | 06:52 19:57 | 07:20 17:51-18:29/38 19:08 | 06:52 17:24 | 07:25 11:13-12:37/84 17:01 |
| 2 | 06:00 06:42-07:12/30 20:56 | 06:24 07:00-08:03/63 20:37 | 06:53 19:55 | 07:21 17:51-18:28/37 19:07 | 06:53 17:23 | 07:26 11:12-12:38/86 17:01 |
| 3 | 06:01 06:43-07:12/29 20:56 | 06:25 07:01-08:03/62 20:36 | 06:53 19:54 | 07:22 17:50-18:28/38 19:05 | 06:54 17:21 | 07:27 11:12-12:39/87 17:01 |
| 4 | 06:01 06:43-07:12/29 20:56 | 06:25 07:02-08:04/62 20:35 | 06:54 19:52 | 07:23 17:50-18:27/37 19:04 | 06:55 17:20 | 07:28 11:12-12:40/88 17:00 |
| 5 | 06:02 06:43-07:13/30 20:55 | 06:26 07:03-08:04/61 20:34 | 06:55 19:51 | 07:23 17:50-18:27/37 19:02 | 06:56 17:19 | 07:29 11:12-12:41/89 17:00 |
| 6 | 06:03 06:44-07:13/29 20:55 | 06:27 07:04-08:04/60 20:33 | 06:56 19:49 | 07:24 17:50-18:26/36 19:00 | 06:57 17:18 | 07:30 11:12-12:42/90 17:00 |
| 7 | 06:03 06:44-07:13/29 20:55 | 06:28 19:40-19:44/4 07:06-07:18/12 20:32 07:20-08:04/44 | 06:57 19:48 | 07:25 17:50-18:25/35 18:59 | 06:59 17:17 | 07:31 11:12-12:43/91 17:00 |
| 8 | 06:04 06:45-07:14/29 20:55 | 06:29 19:36-19:47/11 07:09-07:13/4 20:31 07:19-08:03/44 | 06:58 18:34-18:40/6 19:46 | 07:26 17:51-18:24/33 18:57 | 07:00 17:16 | 07:32 11:12-12:44/92 17:00 |
| 9 | 06:04 06:44-07:15/31 20:54 | 06:30 19:35-19:49/14 20:29 07:19-08:03/44 | 06:59 18:29-18:44/15 19:44 | 07:27 17:52-18:23/31 18:56 | 07:01 17:15 | 07:33 11:13-12:45/92 17:00 |
| 10 | 06:05 06:45-07:17/32 20:54 | 06:31 19:33-19:51/18 20:28 07:19-08:03/44 | 07:00 18:27-18:46/19 19:43 | 07:28 17:52-18:21/29 18:54 | 07:02 17:14 | 07:33 11:12-12:45/93 17:00 |
| 11 | 06:06 06:46-07:18/32 20:54 | 06:32 19:32-19:51/19 20:27 07:20-08:03/43 | 07:01 18:25-18:48/23 19:41 | 07:29 17:54-18:19/25 18:53 | 07:03 17:13 | 07:34 11:12-12:46/94 17:00 |
| 12 | 06:06 06:45-07:19/34 20:53 | 06:33 19:31-19:52/21 20:26 07:20-08:03/43 | 07:02 18:23-19:05/42 19:40 | 07:30 17:55-18:17/22 18:51 | 07:04 17:12 | 07:35 11:13-12:46/93 17:00 |
| 13 | 06:07 06:46-07:20/34 20:53 | 06:34 19:31-19:53/22 20:24 07:20-08:02/42 | 07:03 18:21-19:05/44 19:38 | 07:31 17:57-18:15/18 18:50 | 07:05 17:11 | 07:36 11:13-12:47/94 17:00 |
| 14 | 06:08 06:47-07:21/34 20:52 | 06:35 19:30-19:53/23 20:23 07:20-08:02/42 | 07:04 18:20-19:06/46 19:36 | 07:33 18:01-18:10/9 18:48 | 07:07 17:11 | 07:37 11:14-12:48/94 17:01 |
| 15 | 06:08 07:38-07:43/5 20:52 06:47-07:21/34 | 06:36 19:30-19:53/23 20:22 07:21-08:01/40 | 07:05 18:19-19:06/47 19:35 | 07:34 18:47 | 07:08 11:38-12:01/23 17:10 | 07:37 11:13-12:48/95 17:01 |
| 16 | 06:09 07:35-07:47/12 20:51 06:47-07:22/35 | 06:37 19:30-19:53/23 20:20 07:21-08:01/40 | 07:05 18:18-19:07/49 19:33 | 07:35 18:45 | 07:09 11:32-12:07/35 17:09 | 07:38 11:14-12:49/95 17:01 |
| 17 | 06:10 07:33-07:49/16 20:51 06:48-07:23/35 | 06:38 19:28-19:52/24 20:19 07:21-08:00/39 | 07:06 18:17-19:06/49 19:31 | 07:36 18:44 | 07:10 11:28-12:11/43 17:08 | 07:39 11:15-12:50/95 17:02 |
| 18 | 06:11 07:32-07:51/19 20:50 06:49-07:24/35 | 06:39 19:28-19:52/24 20:18 07:19-07:58/39 | 07:07 18:16-19:06/50 19:30 | 07:37 18:42 | 07:11 11:25-12:14/49 17:07 | 07:39 11:14-12:50/96 17:02 |
| 19 | 06:12 07:30-07:52/22 20:49 06:49-07:23/34 | 06:39 19:29-19:51/22 20:16 07:19-07:57/38 | 07:08 18:15-19:06/51 19:28 | 07:38 18:41 | 07:12 11:24-12:18/54 17:07 | 07:40 11:15-12:51/96 17:02 |
| 20 | 06:12 07:29-07:53/24 20:49 06:51-07:24/33 | 06:40 19:29-19:51/22 20:15 07:19-07:55/36 | 07:09 18:13-19:05/52 19:26 | 07:39 18:39 | 07:13 11:22-12:21/59 17:06 | 07:41 11:15-12:51/96 17:03 |
| 21 | 06:13 07:28-07:55/27 20:48 06:52-07:25/33 | 06:41 19:30-19:50/20 20:13 07:19-07:54/35 | 07:10 18:07-19:03/56 19:25 | 07:40 18:38 | 07:14 11:20-12:23/63 17:05 | 07:41 11:16-12:52/96 17:03 |
| 22 | 06:14 07:28-07:56/28 20:47 06:54-07:25/31 | 06:42 19:30-19:49/19 20:12 07:20-07:52/32 | 07:11 18:03-19:02/59 19:23 | 07:41 18:37 | 07:16 11:19-12:25/66 17:05 | 07:42 11:16-12:52/96 17:04 |
| 23 | 06:15 07:27-07:57/30 20:46 06:56-07:26/30 | 06:43 19:31-19:47/16 20:11 07:20-07:49/29 | 07:12 18:01-19:00/59 19:21 | 07:42 18:35 | 07:17 11:17-12:26/69 17:04 | 07:42 11:17-12:53/96 17:04 |
| 24 | 06:16 06:58-07:57/59 20:46 | 06:44 19:33-19:45/12 20:09 07:21-07:45/24 | 07:13 17:58-18:44/46 19:20 18:46-18:57/11 | 07:43 18:34 | 07:18 11:16-12:28/72 17:04 | 07:43 11:17-12:53/96 17:05 |
| 25 | 06:16 06:58-07:58/60 20:45 | 06:45 19:36-19:42/6 20:08 07:21-07:43/22 | 07:14 17:57-18:43/46 19:18 18:50-18:53/3 | 06:44 17:33 | 07:19 11:16-12:30/74 17:03 | 07:43 11:17-12:53/96 17:05 |
| 26 | 06:17 06:58-07:59/61 20:44 | 06:46 07:22-07:42/20 20:06 | 07:15 17:55-18:41/46 19:17 | 06:45 17:31 | 07:20 11:15-12:32/77 17:03 | 07:43 11:19-12:54/95 17:06 |
| 27 | 06:18 06:58-08:00/62 20:43 | 06:47 07:24-07:40/16 20:05 | 07:16 17:54-18:39/45 19:15 | 06:46 17:30 | 07:21 11:15-12:33/78 17:02 | 07:44 11:19-12:54/95 17:06 |
| 28 | 06:19 06:59-08:01/62 20:42 | 06:48 07:25-07:36/11 20:03 | 07:17 17:53-18:38/45 19:13 | 06:47 17:29 | 07:22 11:14-12:34/80 17:02 | 07:44 11:19-12:54/95 17:07 |
| 29 | 06:20 06:59-08:02/63 20:41 | 06:49 20:02 | 07:18 17:52-18:36/44 19:12 | 06:48 17:27 | 07:23 11:13-12:35/82 17:02 | 07:44 11:21-12:55/94 17:08 |
| 30 | 06:21 06:59-08:02/63 20:40 | 06:50 20:00 | 07:19 17:52-18:33/41 19:10 | 06:50 17:26 | 07:24 11:13-12:36/83 17:01 | 07:45 11:21-12:55/94 17:09 |
| 31 | 06:22 06:59-08:02/63 20:39 | 06:51 19:59 | | 06:51 17:25 | | 07:45 11:22-12:55/93 17:09 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Sum of minutes with flicker | 1407 | 1497 | 1014 | 425 | 1007 | 2886 |

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

| Day in month | Sun rise (hh:mm) | First time (hh:mm) with flicker | Last time (hh:mm) 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: Progetto_2022_03_15WTG: V5 - Siemens Gamesa SG 6.0-170 6000 170.0 IO! hub: 115,0 m (TOT: 200,0 m) (4)
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

| N | NNE | ENE | E | ESE | SSE | S | SSW | WSW | W | WNW | NNW | Sum |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 607 | 505 | 420 | 506 | 599 | 570 | 495 | 488 | 555 | 624 | 686 | 669 | 6.724 |

| | January | February | March | April | May | June |
|-----------------------------|----------------|----------------|----------------|----------------|-------------------------|----------------|
| 1 | 07:45 17:10 | 07:33 17:43 | 06:59 18:16 | 07:10 19:48 | 07:41-08:37/56 19:48 | 06:26 20:17 |
| 2 | 07:45 17:11 | 07:32 17:44 | 06:57 18:17 | 07:09 19:49 | 07:38-08:37/59 19:49 | 06:25 20:18 |
| 3 | 07:45 17:12 | 07:31 17:46 | 06:56 18:18 | 07:07 19:50 | 07:35-08:36/61 19:50 | 06:24 20:19 |
| 4 | 07:46 17:13 | 07:30 17:47 | 06:55 18:19 | 07:05 19:51 | 07:34-08:35/61 19:51 | 06:23 20:20 |
| 5 | 07:46 17:14 | 07:29 17:48 | 06:53 18:20 | 07:04 19:52 | 07:32-08:34/62 19:52 | 06:22 20:21 |
| 6 | 07:46 17:15 | 07:28 17:49 | 06:51 18:21 | 07:02 19:53 | 07:31-08:33/62 19:53 | 06:20 20:22 |
| 7 | 07:46 17:16 | 07:27 17:50 | 06:50 18:22 | 07:01 19:54 | 07:29-08:32/63 19:54 | 06:19 20:23 |
| 8 | 07:45 17:17 | 07:26 17:52 | 06:48 18:23 | 06:59 19:55 | 07:28-08:30/62 19:55 | 06:18 20:24 |
| 9 | 07:45 17:17 | 07:25 17:53 | 06:47 18:24 | 06:58 19:56 | 07:27-08:29/62 19:56 | 06:17 20:25 |
| 10 | 07:45 17:18 | 07:24 17:54 | 06:45 18:25 | 06:56 19:57 | 07:26-08:27/61 19:57 | 06:16 20:26 |
| 11 | 07:45 17:19 | 07:23 17:55 | 06:44 18:26 | 06:55 19:58 | 07:26-08:26/60 19:58 | 06:15 20:27 |
| 12 | 07:45 17:21 | 07:22 17:56 | 06:42 18:27 | 06:53 19:59 | 07:25-08:23/58 19:59 | 06:14 20:28 |
| 13 | 07:45 17:22 | 07:20 17:57 | 06:41 18:28 | 06:52 20:00 | 07:25-08:21/56 20:00 | 06:13 20:29 |
| 14 | 07:44 17:23 | 07:19 17:59 | 06:39 18:29 | 06:50 20:01 | 07:24-08:17/53 20:01 | 06:12 20:30 |
| 15 | 07:44 17:24 | 07:18 18:00 | 06:37 18:30 | 06:49 20:02 | 07:24-08:13/49 20:02 | 06:11 20:31 |
| 16 | 07:44 17:25 | 07:17 18:01 | 06:36 18:31 | 06:47 20:02 | 07:23-08:06/43 20:02 | 06:10 20:32 |
| 17 | 07:43 17:26 | 07:16 18:02 | 06:34 18:32 | 06:46 20:03 | 07:24-08:06/42 20:03 | 06:09 20:33 |
| 18 | 07:43 17:27 | 07:14 18:03 | 06:33 18:33 | 06:44 20:04 | 07:23-08:05/42 20:04 | 06:08 20:34 |
| 19 | 07:42 17:28 | 07:13 18:04 | 06:31 18:34 | 06:43 20:05 | 07:24-08:05/41 20:05 | 06:07 20:35 |
| 20 | 07:42 17:29 | 07:12 18:06 | 06:30 18:36 | 06:41 20:06 | 07:24-08:04/40 20:06 | 06:06 20:36 |
| 21 | 07:41 17:30 | 07:10 18:07 | 06:28 18:37 | 06:40 20:07 | 07:19-08:03/44 20:07 | 06:06 20:37 |
| 22 | 07:41 17:31 | 07:09 18:08 | 06:26 18:38 | 06:38 20:08 | 07:16-08:02/46 20:08 | 06:05 20:37 |
| 23 | 07:40 17:33 | 07:08 18:09 | 06:25 18:39 | 06:37 20:09 | 07:12-08:01/49 20:09 | 06:04 20:38 |
| 24 | 07:39 17:34 | 07:06 18:10 | 06:23 18:40 | 06:36 20:10 | 07:10-08:00/50 20:10 | 06:04 20:39 |
| 25 | 07:39 17:35 | 07:05 18:11 | 06:21 18:41 | 06:34 20:11 | 07:08-07:59/51 20:11 | 06:03 20:40 |
| 26 | 07:38 17:36 | 07:03 18:12 | 06:20 18:42 | 06:33 20:12 | 07:07-07:57/50 20:12 | 06:02 20:41 |
| 27 | 07:37 17:37 | 07:02 18:13 | 06:18 18:43 | 06:32 20:13 | 07:04-07:55/51 20:13 | 06:02 20:42 |
| 28 | 07:36 17:38 | 07:00 18:14 | 06:17 18:44 | 06:30 20:14 | 07:03-07:57/54 20:14 | 06:01 20:42 |
| 29 | 07:36 17:40 | | 07:15 19:45 | 06:29 20:15 | 07:02-07:58/56 20:15 | 06:01 20:43 |
| 30 | 07:35 17:41 | | 07:13 19:46 | 06:28 20:16 | 07:00-07:58/58 20:16 | 06:00 20:44 |
| 31 | 07:34 17:42 | | 07:12 19:47 | | | 06:00 20:45 |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 |
| Sum of minutes with flicker | 0 | 0 | 782 | 1602 | 2398 | 2789 |

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

| Day in month | Sun rise (hh:mm) | First time (hh:mm) with flicker | Last time (hh:mm) 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: Progetto_2022_03_15WTG: V5 - Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (4)
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 607 505 420 506 599 570 495 488 555 624 686 669 6.724

| | July | August | September | October | November | December |
|-----------------------------|-------------------------------|-------------------------------|-------------------------------|----------------|----------------|----------------|
| 1 | 06:00 06:36-08:09/93 20:56 | 06:23 07:02-08:14/72 20:38 | 06:52 07:25-08:25/60 19:57 | 07:20 19:08 | 06:52 17:24 | 07:25 17:01 |
| 2 | 06:00 06:36-08:09/93 20:56 | 06:24 07:03-08:14/71 20:37 | 06:52 07:25-08:26/61 19:55 | 07:21 19:07 | 06:53 17:23 | 07:26 17:01 |
| 3 | 06:01 06:37-08:10/93 20:56 | 06:24 07:03-08:14/71 20:36 | 06:53 07:25-08:27/62 19:54 | 07:22 19:05 | 06:54 17:21 | 07:27 17:01 |
| 4 | 06:01 06:37-08:10/93 20:56 | 06:25 07:04-08:14/70 20:35 | 06:54 07:26-08:28/62 19:52 | 07:23 19:04 | 06:55 17:20 | 07:28 17:00 |
| 5 | 06:02 06:38-08:11/93 20:55 | 06:26 07:04-08:13/69 20:34 | 06:55 07:25-08:28/63 19:51 | 07:23 19:02 | 06:56 17:19 | 07:29 17:00 |
| 6 | 06:02 06:38-08:10/92 20:55 | 06:27 07:05-08:13/68 20:33 | 06:56 07:26-08:29/63 19:49 | 07:24 19:00 | 06:57 17:18 | 07:30 17:00 |
| 7 | 06:03 06:39-08:11/92 20:55 | 06:28 07:05-08:12/67 20:32 | 06:57 07:27-08:29/62 19:48 | 07:25 18:59 | 06:59 17:17 | 07:31 17:00 |
| 8 | 06:04 06:39-08:12/93 20:55 | 06:29 07:05-08:11/66 20:31 | 06:58 07:28-08:30/62 19:46 | 07:26 18:57 | 07:00 17:16 | 07:32 17:00 |
| 9 | 06:04 06:39-08:12/93 20:54 | 06:30 07:06-08:10/64 20:29 | 06:59 07:29-08:30/61 19:44 | 07:27 18:56 | 07:01 17:15 | 07:33 17:00 |
| 10 | 06:05 06:40-08:12/92 20:54 | 06:31 07:06-08:10/64 20:28 | 07:00 07:31-08:30/59 19:43 | 07:28 18:54 | 07:02 17:14 | 07:33 17:00 |
| 11 | 06:06 06:41-08:13/92 20:54 | 06:32 07:07-08:09/62 20:27 | 07:01 07:34-08:30/56 19:41 | 07:29 18:53 | 07:03 17:13 | 07:34 17:00 |
| 12 | 06:06 06:41-08:13/92 20:53 | 06:33 07:08-08:08/60 20:26 | 07:02 07:38-08:30/52 19:39 | 07:30 18:51 | 07:04 17:12 | 07:35 17:00 |
| 13 | 06:07 06:42-08:13/91 20:53 | 06:34 07:09-08:07/58 20:24 | 07:03 07:39-08:30/51 19:38 | 07:31 18:50 | 07:05 17:11 | 07:36 17:00 |
| 14 | 06:08 06:43-08:14/91 20:52 | 06:35 07:10-08:06/56 20:23 | 07:04 07:38-08:29/51 19:36 | 07:32 18:48 | 07:07 17:11 | 07:37 17:01 |
| 15 | 06:08 06:43-08:13/90 20:52 | 06:36 07:11-08:04/53 20:22 | 07:05 07:37-08:29/52 19:35 | 07:34 18:47 | 07:08 17:10 | 07:37 17:01 |
| 16 | 06:09 06:44-08:14/90 20:51 | 06:37 07:12-08:03/51 20:20 | 07:05 07:37-08:28/51 19:33 | 07:35 18:45 | 07:09 17:09 | 07:38 17:01 |
| 17 | 06:10 06:45-08:14/89 20:51 | 06:38 07:13-08:04/51 20:19 | 07:06 07:37-08:28/51 19:31 | 07:36 18:44 | 07:10 17:08 | 07:39 17:01 |
| 18 | 06:11 06:46-08:15/89 20:50 | 06:38 07:14-08:05/51 20:18 | 07:07 07:37-08:27/50 19:30 | 07:37 18:42 | 07:11 17:07 | 07:39 17:02 |
| 19 | 06:11 06:46-08:14/88 20:49 | 06:39 07:16-08:06/50 20:16 | 07:08 07:37-08:27/50 19:28 | 07:38 18:41 | 07:12 17:07 | 07:40 17:02 |
| 20 | 06:12 06:47-08:15/88 20:49 | 06:40 07:19-08:06/47 20:15 | 07:09 07:38-08:26/48 19:26 | 07:39 18:39 | 07:13 17:06 | 07:41 17:03 |
| 21 | 06:13 06:49-08:15/86 20:48 | 06:41 07:21-08:07/46 20:13 | 07:10 07:38-08:25/47 19:25 | 07:40 18:38 | 07:14 17:05 | 07:41 17:03 |
| 22 | 06:14 06:50-08:15/85 20:47 | 06:42 07:25-08:08/43 20:12 | 07:11 07:39-08:24/45 19:23 | 07:41 18:37 | 07:16 17:05 | 07:42 17:04 |
| 23 | 06:15 06:52-08:16/84 20:46 | 06:43 07:28-08:08/40 20:11 | 07:12 07:39-08:23/44 19:21 | 07:42 18:35 | 07:17 17:04 | 07:42 17:04 |
| 24 | 06:16 06:53-08:15/82 20:46 | 06:44 07:28-08:09/41 20:09 | 07:13 07:40-08:21/41 19:20 | 07:43 18:34 | 07:18 17:04 | 07:43 17:05 |
| 25 | 06:16 06:55-08:15/80 20:45 | 06:45 07:27-08:09/42 20:08 | 07:14 07:40-08:19/39 19:18 | 06:44 17:33 | 07:19 17:03 | 07:43 17:05 |
| 26 | 06:17 06:57-08:15/78 20:44 | 06:46 07:27-08:09/42 20:06 | 07:15 07:41-08:17/36 19:17 | 06:45 17:31 | 07:20 17:03 | 07:43 17:06 |
| 27 | 06:18 07:01-08:15/74 20:43 | 06:47 07:25-08:08/43 20:05 | 07:16 07:43-08:15/32 19:15 | 06:46 17:30 | 07:21 17:02 | 07:44 17:06 |
| 28 | 06:19 07:02-08:16/74 20:42 | 06:48 07:25-08:14/49 20:03 | 07:17 07:45-08:12/27 19:13 | 06:47 17:29 | 07:22 17:02 | 07:44 17:07 |
| 29 | 06:20 07:02-08:16/74 20:41 | 06:49 07:25-08:18/53 20:02 | 07:18 07:47-08:09/22 19:12 | 06:48 17:27 | 07:23 17:02 | 07:44 17:08 |
| 30 | 06:21 07:02-08:15/73 20:40 | 06:50 07:25-08:21/56 20:00 | 07:19 07:51-08:04/13 19:10 | 06:50 17:26 | 07:24 17:01 | 07:45 17:09 |
| 31 | 06:22 07:02-08:14/72 20:39 | 06:51 07:25-08:23/58 19:59 | | 06:51 17:25 | | 07:45 17:09 |
| Potential sun hours | 455 | 425 | 374 | 347 | 301 | 292 |
| Sum of minutes with flicker | 2689 | 1734 | 1473 | 0 | 0 | 0 |

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

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

Project:

Progetto_GRV Villanovafranca

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

15/03/2022 11:20/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_2022_03_15WTG: V7 - Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (2)
Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
607 505 420 506 599 570 495 488 555 624 686 669 6.724

| | January | February | March | April | May | June | |
|-----------------------------|--|-------------------------------------|-------|--|--|-------------------------------|--|
| 1 | 07:45 08:07-08:27/20 17:10 15:40-16:42/62 | 07:33 17:43 06:59 18:16 | | 07:10 18:14-19:26/72 19:48 07:28-07:31/3 | 06:26 18:31-19:36/65 20:17 06:45-07:59/74 | 05:59 06:55-07:44/49 20:45 | |
| 2 | 07:45 08:07-08:27/20 17:11 15:40-16:42/62 | 07:32 17:44 06:57 18:17 | | 07:09 18:15-19:28/73 19:49 07:27-07:39/12 | 06:25 18:35-19:36/61 20:18 06:44-07:59/75 | 05:59 06:56-07:43/47 20:46 | |
| 3 | 07:45 08:07-08:27/20 17:12 15:41-16:43/62 | 07:31 17:46 06:56 18:18 | | 07:07 18:14-19:28/74 19:49 07:25-07:43/18 | 06:24 18:57-19:36/39 20:19 18:39-18:53/14 | 05:58 06:56-07:42/46 20:47 | |
| 4 | 07:45 08:07-08:28/21 17:13 15:42-16:43/61 | 07:30 17:47 06:54 18:19 | | 07:05 18:14-19:29/75 19:50 07:24-07:46/22 | 06:23 18:57-19:35/38 20:20 06:42-07:59/77 | 05:58 06:57-07:42/45 20:47 | |
| 5 | 07:46 08:07-08:28/21 17:14 15:42-16:43/61 | 07:29 17:48 06:53 18:20 | | 07:04 18:13-19:29/76 19:51 07:22-07:48/26 | 06:22 18:58-19:35/37 20:21 06:41-07:59/78 | 05:58 06:58-07:42/44 20:48 | |
| 6 | 07:46 08:07-08:28/21 17:15 15:43-16:44/61 | 07:28 17:49 06:51 18:21 | | 07:02 18:12-19:28/76 19:52 07:20-07:49/29 | 06:20 18:58-19:33/35 20:22 06:40-07:58/78 | 05:57 06:59-07:40/41 20:49 | |
| 7 | 07:45 08:07-08:27/20 17:16 15:44-16:44/60 | 07:27 17:50 06:50 18:22 | | 07:01 18:13-19:28/75 19:53 07:19-07:52/33 | 06:19 18:58-19:32/34 20:23 06:39-07:57/78 | 05:57 07:00-07:40/40 20:49 | |
| 8 | 07:45 08:07-08:27/20 17:17 15:44-16:44/60 | 07:26 17:52 06:48 18:23 | | 06:59 18:12-19:28/76 19:54 07:17-07:53/36 | 06:18 18:59-19:31/32 20:24 06:40-07:57/77 | 05:57 07:01-07:40/39 20:50 | |
| 9 | 07:45 08:07-08:27/20 17:17 15:44-16:44/60 | 07:25 17:53 06:47 18:24 | | 06:58 18:13-19:28/75 19:55 07:16-07:54/38 | 06:17 19:00-19:30/30 20:25 06:40-07:56/76 | 05:57 07:02-07:39/37 20:51 | |
| 10 | 07:45 08:06-08:26/20 17:18 15:45-16:44/59 | 07:24 17:54 06:45 07:04-07:06/2 | | 06:56 18:12-19:27/75 19:56 07:14-07:55/41 | 06:16 19:01-19:29/28 20:26 06:40-07:56/76 | 05:56 07:02-07:39/37 20:51 | |
| 11 | 07:45 08:06-08:25/19 17:19 15:46-16:45/59 | 07:23 17:55 06:44 07:02-07:07/5 | | 06:55 18:13-19:27/74 19:57 07:13-07:51/44 | 06:15 19:03-19:28/25 20:27 06:41-07:55/74 | 05:56 07:03-07:39/36 20:52 | |
| 12 | 07:45 08:06-08:24/18 17:21 15:47-16:45/58 | 07:22 17:56 06:42 07:01-07:08/7 | | 06:53 18:13-19:26/73 19:58 07:11-07:57/46 | 06:14 19:04-19:26/22 20:28 06:41-07:55/74 | 05:56 07:04-07:39/35 20:52 | |
| 13 | 07:44 08:05-08:24/19 17:22 15:47-16:44/57 | 07:20 17:57 06:41 17:50-18:05/15 | | 06:52 18:13-19:28/75 19:59 07:10-07:58/48 | 06:13 19:06-19:24/18 20:29 06:41-07:54/73 | 05:56 07:05-07:38/33 20:53 | |
| 14 | 07:44 08:05-08:24/19 17:23 15:48-16:45/57 | 07:19 17:59 06:39 17:44-18:08/24 | | 06:50 18:13-19:30/77 20:00 07:08-07:58/50 | 06:12 19:09-19:23/14 20:30 06:43-07:55/72 | 05:56 07:06-07:38/32 20:53 | |
| 15 | 07:44 08:05-08:25/20 17:24 15:50-16:45/55 | 07:18 18:00 06:37 17:41-18:10/29 | | 06:49 18:14-19:32/78 20:01 07:07-07:59/52 | 06:11 19:14-19:18/4 20:31 06:43-07:54/71 | 05:56 07:06-07:38/32 20:53 | |
| 16 | 07:43 08:04-08:24/20 17:25 15:50-16:44/54 | 07:17 18:01 06:36 17:37-18:11/34 | | 06:47 18:14-19:33/79 20:02 07:05-07:59/54 | 06:10 06:43-07:53/70 20:32 | 05:56 07:07-07:37/30 20:54 | |
| 17 | 07:43 08:04-08:24/20 17:26 15:51-16:45/54 | 07:15 18:02 06:34 17:35-18:12/37 | | 06:46 18:15-19:35/80 20:03 07:04-08:00/56 | 06:09 06:44-07:52/68 20:33 | 05:56 07:07-07:37/30 20:54 | |
| 18 | 07:43 08:03-08:23/20 17:27 15:52-16:44/52 | 07:14 18:03 06:33 17:32-18:13/41 | | 06:44 18:15-19:35/80 20:04 07:02-08:00/58 | 06:08 06:44-07:52/68 20:34 | 05:56 07:08-07:37/29 20:54 | |
| 19 | 07:42 08:03-08:23/20 17:28 15:53-16:44/51 | 07:13 18:04 06:31 17:30-18:14/44 | | 06:43 18:16-19:36/80 20:05 07:01-08:00/59 | 06:07 06:44-07:51/67 20:35 | 05:56 07:08-07:37/29 20:55 | |
| 20 | 07:42 08:02-08:22/20 17:29 15:54-16:43/49 | 07:12 18:06 06:29 17:28-18:15/47 | | 06:41 18:17-19:37/80 20:06 07:00-08:01/61 | 06:07 06:46-07:51/65 20:36 | 05:56 07:08-07:37/29 20:55 | |
| 21 | 07:41 08:03-08:21/18 17:30 15:55-16:43/48 | 07:10 18:07 06:28 17:26-18:16/50 | | 06:40 18:17-19:37/80 20:07 06:58-08:01/63 | 06:06 06:46-07:50/64 20:36 | 05:57 07:08-07:37/29 20:55 | |
| 22 | 07:41 08:06-08:21/15 17:31 15:57-16:43/46 | 07:09 18:08 06:26 17:24-18:16/52 | | 06:38 18:18-19:38/80 20:08 06:57-08:01/64 | 06:05 06:47-07:49/62 20:37 | 05:57 07:09-07:38/29 20:55 | |
| 23 | 07:40 08:08-08:19/11 17:33 15:58-16:42/44 | 07:07 18:09 06:25 17:23-18:18/55 | | 06:37 18:19-19:37/78 20:09 06:55-08:00/65 | 06:04 06:48-07:49/61 20:38 | 05:57 07:09-07:38/29 20:56 | |
| 24 | 07:39 08:12-08:14/2 17:34 15:59-16:41/42 | 07:06 18:10 06:23 17:22-18:19/57 | | 06:36 18:20-19:38/78 20:10 06:54-08:01/67 | 06:04 06:48-07:48/60 20:39 | 05:57 07:09-07:38/29 20:56 | |
| 25 | 07:39 16:01-16:40/39 17:35 18:11 | 07:05 18:11 06:21 17:21-18:20/59 | | 06:34 18:21-19:38/77 20:11 06:53-08:01/68 | 06:03 06:49-07:47/58 20:40 | 05:58 07:08-07:38/30 20:56 | |
| 26 | 07:38 16:03-16:39/36 17:36 18:12 | 07:03 18:12 06:20 17:20-18:21/61 | | 06:33 18:22-19:37/75 20:12 06:52-08:01/69 | 06:02 06:50-07:47/57 20:41 | 05:58 07:09-07:39/30 20:56 | |
| 27 | 07:37 16:04-16:38/34 17:37 18:13 | 07:02 18:13 06:18 17:18-18:21/63 | | 06:32 18:24-19:37/73 20:13 06:50-08:00/70 | 06:02 06:50-07:46/56 20:42 | 05:58 07:08-07:40/32 20:56 | |
| 28 | 07:36 16:06-16:36/30 17:38 18:14 | 07:00 18:14 06:17 17:18-18:23/65 | | 06:30 18:26-19:38/72 20:14 06:49-08:00/71 | 06:01 06:52-07:46/54 20:42 | 05:59 07:09-07:41/32 20:56 | |
| 29 | 07:36 16:09-16:34/25 17:40 19:45 | | | 06:29 18:28-19:38/70 20:15 06:48-08:01/73 | 06:01 06:52-07:45/53 20:43 | 05:59 07:08-07:41/33 20:56 | |
| 30 | 07:35 16:12-16:31/19 17:41 19:46 | | | 06:28 18:29-19:36/67 20:16 06:46-08:00/74 | 06:00 06:53-07:45/52 20:44 | 05:59 07:07-07:41/34 20:56 | |
| 31 | 07:34 16:18-16:27/9 17:42 19:47 | | | | 06:00 06:53-07:44/51 20:45 | | |
| Potential sun hours | 301 | 299 | 370 | 397 | 445 | 448 | |
| Sum of minutes with flicker | 1970 | 0 | 1048 | 3743 | 2591 | 1047 | |

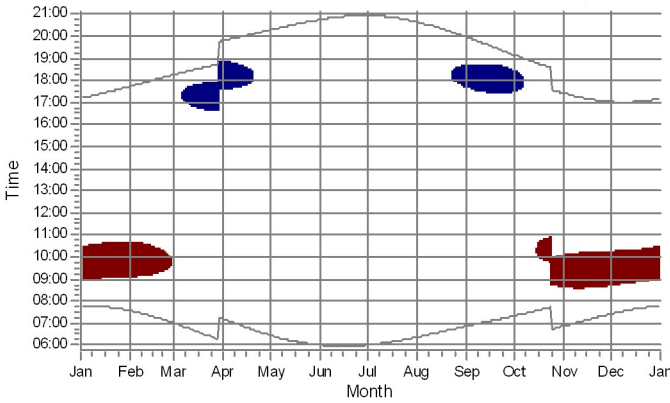
Table layout: For each day in each month the following matrix apply

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

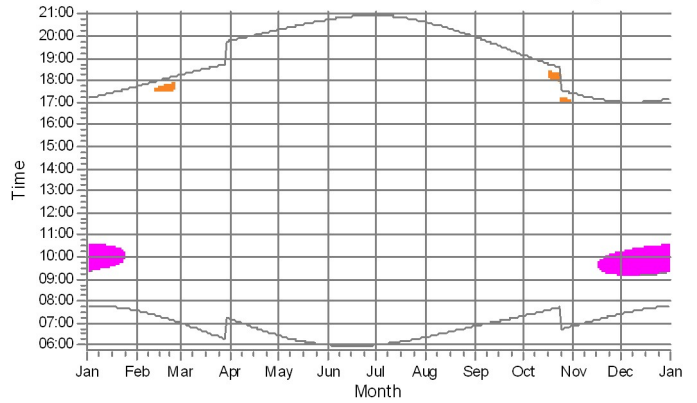
SHADOW - Calendar per WTG, graphical

Calculation: Progetto_2022_03_15

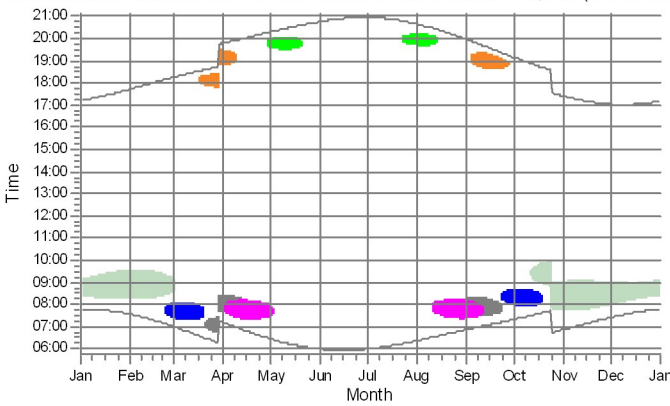
V1: Siemens Gamesa SG 6.0-170 6000 170.0 !O!hub: 115,0 m (TOT: 200,0)



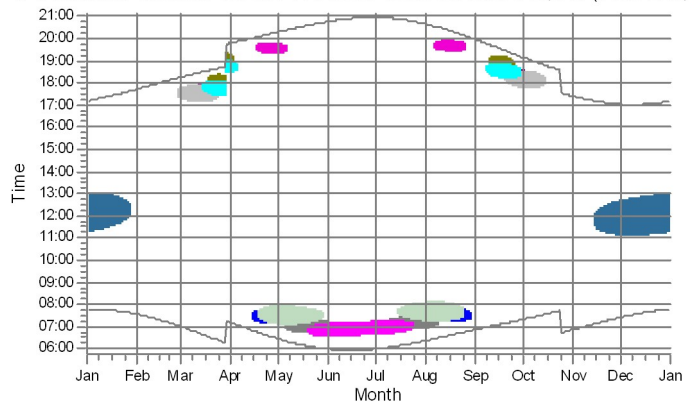
V2: Siemens Gamesa SG 6.0-170 6000 170.0 !O!hub: 115,0 m (TOT: 200,0)



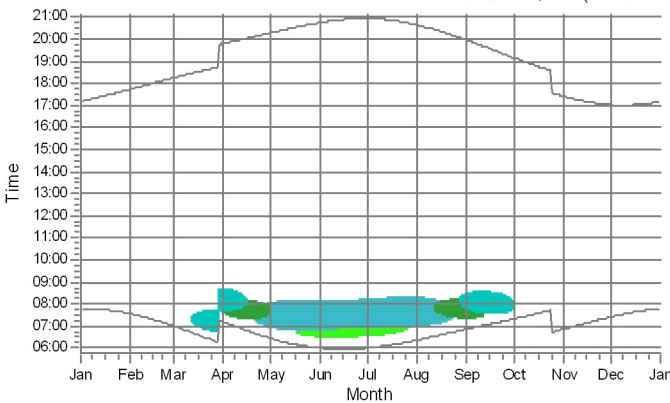
V3: Siemens Gamesa SG 6.0-170 6000 170.0 !O!hub: 115,0 m (TOT: 200,0)



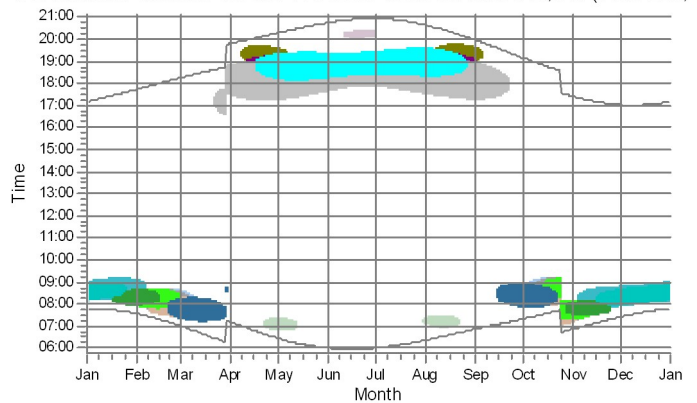
V4: Siemens Gamesa SG 6.0-170 6000 170.0 !O!hub: 115,0 m (TOT: 200,0)





V5: Siemens Gamesa SG 6.0-170 6000 170.0 !O!hub: 115,0 m (TOT: 200,0)



V6: Siemens Gamesa SG 6.0-170 6000 170.0 !O!hub: 115,0 m (TOT: 200,0)



Shadow receptors

| | | | | | | | |
|---|-----------------|---|------------------|---|-----------------|---|------------------|
|  | F03: Abitazione |  | F14: Abitazione |  | F20: C2 |  | F26: ente urbano |
|  | F04: seminativo |  | F15: ente urbano |  | F21: F3 |  | F27: seminativo |
|  | F05: Abitazione |  | F16: uliveto |  | F22: Abitazione |  | F28: D10 |
|  | F07: D10 |  | F17: ente urbano |  | F23: Abitazione |  | F29: seminativo |
|  | F10: area fab |  | F18: Abitazione |  | F24: D10 | | |
|  | F13: seminativo |  | F19: Abitazione |  | F25: D10 | | |

Project:

Progetto_GRV Villanovafranca

Licensed user:

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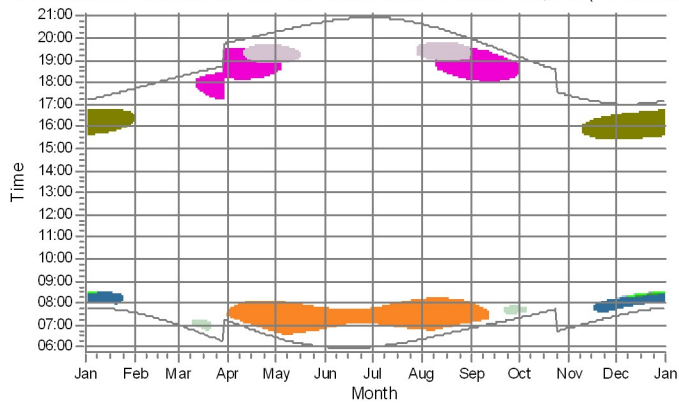
Calculated:

15/03/2022 11:20/3.4.415

SHADOW - Calendar per WTG, graphical

Calculation: Progetto_2022_03_15

V7: Siemens Gamesa SG 6.0-170 6000 170.0 !O! hub: 115,0 m (TOT: 200,1



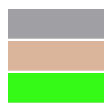
Shadow receptors



F14: Abitazione

F18: Abitazione

F19: Abitazione



F20: C2

F21: F3

F22: Abitazione



F24: D10

F26: ente urbano

F27: seminativo



F28: D10

F29: seminativo