REGIONE SARDEGNA

PROVINCIA DI ORISTANO

IMPIANTO EOLICO NEI COMUNI DI BAULADU E PAULILATINO

POTENZA MASSIMA IN IMMISSIONE DI 70,80 MW
COMPRENSIVA DI SISTEMA DI ACCUMULO INTEGRATO DA 15 MW

ORDINE INGEGNERI PROVINCIA CAGLIARI
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OGGETTO	TITOLO
STUDIO DI IMPATTO AMBIENTALE	***ANALISI DEGLI EFFETTI DI SHADOW-FLICKERING***

A CURA DI

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INDICE

1 CRITERI GENERALI DI ANALISI E VALUTAZIONE

Il presente elaborato è parte integrante dello Studio di impatto ambientale allegato al progetto del parco eolico composto da n. 9 aerogeneratori riferibili indicativamente al modello Siemens-Gamesa 6.6-170 (diametro del rotore di 170 m e altezza al mozzo di 125 metri), proposto dalla Sorgenia Renewables S.r.l. nei territori di Bauladu e Paulilatino (Regione Sardegna – Provincia di Oristano).

Il documento esamina compiutamente il potenziale disturbo da ombreggiamento intermittente (*shadow flickering*) sui potenziali ricettori individuati nell'area interessata dal proposto impianto eolico, 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 (SR-BP-RA11_ 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 del fenomeno;

- 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 efficace 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 SR-BP-RA11-1 (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 SR-BP-RA11 allegato alla documentazione progettuale.

Nel caso specifico, ai fini dei calcoli di esposizione all'ombra intermittente, sono stati individuati come ricettori n. 5 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 avertiti effetti di disturbo in rapporto al fattore di impatto in esame. La Tabella 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 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
F06	Bauladu	1476821	4432468	892	BA01	A4 - Abitazioni di tipo popolare
F07	Bauladu	1476821	4432468	936	BA01	A4 - Abitazioni di tipo popolare
F14	Bauladu	1476821	4432468	766	BA03	A4 - Abitazioni di tipo popolare A3 - Abitazioni di tipo economico
F35	Paulilatino	1476821	4432468	522	PA07	A4 - Abitazioni di tipo popolare
F66	Paulilatino	1476821	4432468	784	PA08	A4 - Abitazioni di tipo popolare

4 IPOTESI ALLA BASE DEL CALCOLO E SOGLIE DI RIFERIMENTO

4.1 Introduzione

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 ostacolino 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 prudenziale 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.

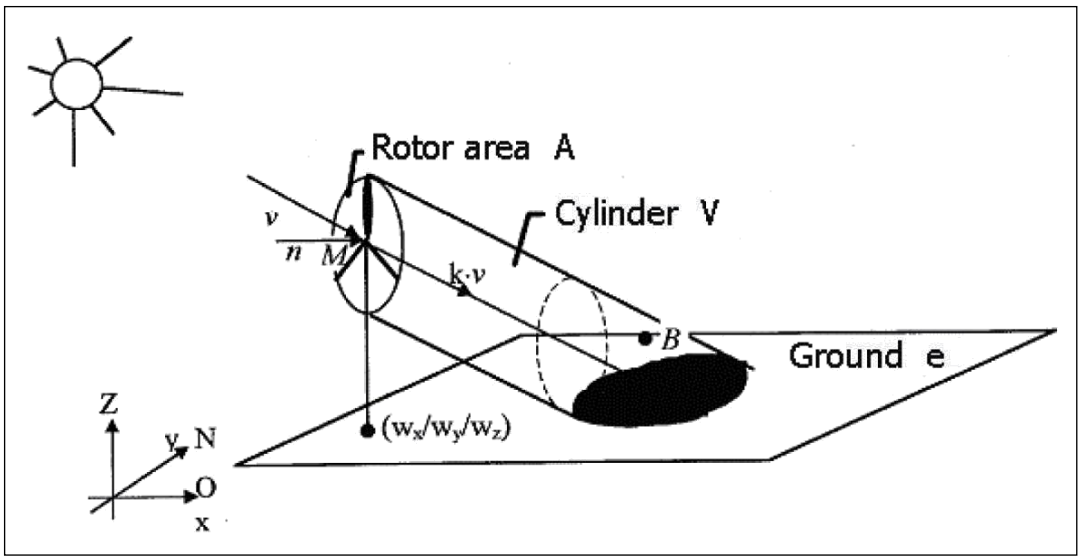

Figura 4.1: Rappresentazione schematica della proiezione dell'ombra del rotore.

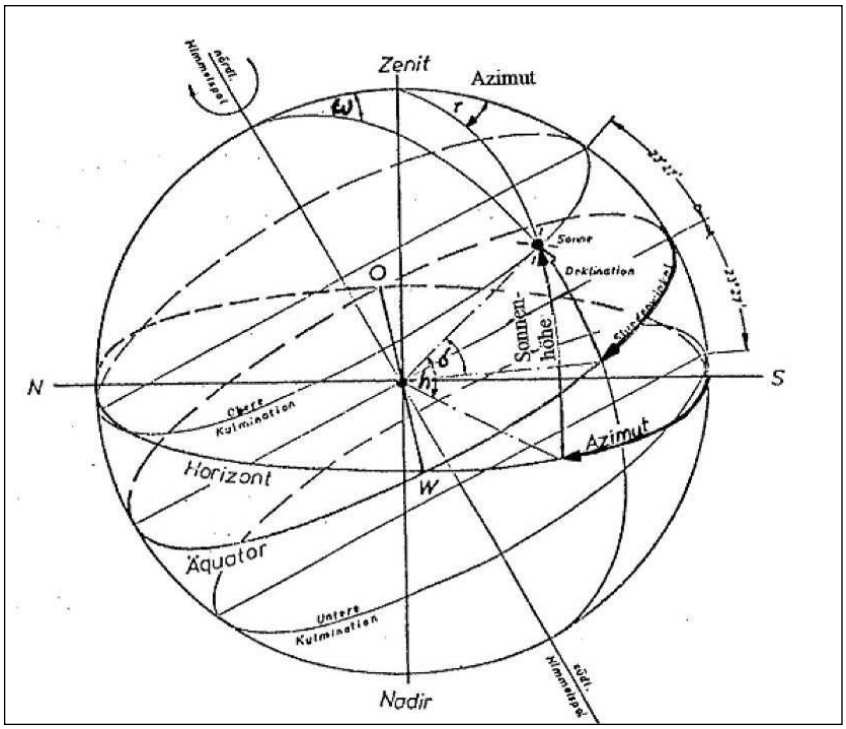

Figura 4.2: Schema dei moti terrestri e parametri di calcolo.

4.2 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.

4.3 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 (170 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 SR-BP-RA9-1).

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 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 2.

Tabella 2 - 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	F06	A4	BA2, BA3	BA01	892	26:06:00	00:28	**5:43:00**
2	F07	A4	BA2, BA3	BA01	936	28:43:00	00:29	**5:59:00**
3	F14	A4/A3	BA3, PA6, PA7	BA03	766	129:54:00	1:12	**24:44:00**
4	F35	A4	PA7, PA8	PA07	522	72:55:00	1:07	**15:45:00**
5	F66	A4	PA8	PA08	784	57:42:00	0:52	**15:50:00**

Come si può osservare dall'esame della Tabella 6.1, l'incidenza dell'ombreggiamento intermittente presso i ricettori considerati nello "**scenario reale**" è sempre al disotto del valore guida di 30 h/anno con valori oscillanti tra 5:43 h/anno (F06) e 24:44 h/anno (F14).

Nel seguito si riporta, a mero titolo illustrativo, il calendario dell'ombra riferito al ricettore potenzialmente più esposto al fenomeno dello *shadow-flickering* ad opera degli aerogeneratori BA03, PA06 e PA09. Come si può notare l'ombreggiamento sarà limitato alle prime ore del mattino e, in virtù della minima incidenza annua e del ristretto arco temporale giornaliero in cui lo stesso si manifesterà, è ragionevolmente da escludere ogni effetto di disturbo sugli occupanti l'edificio.

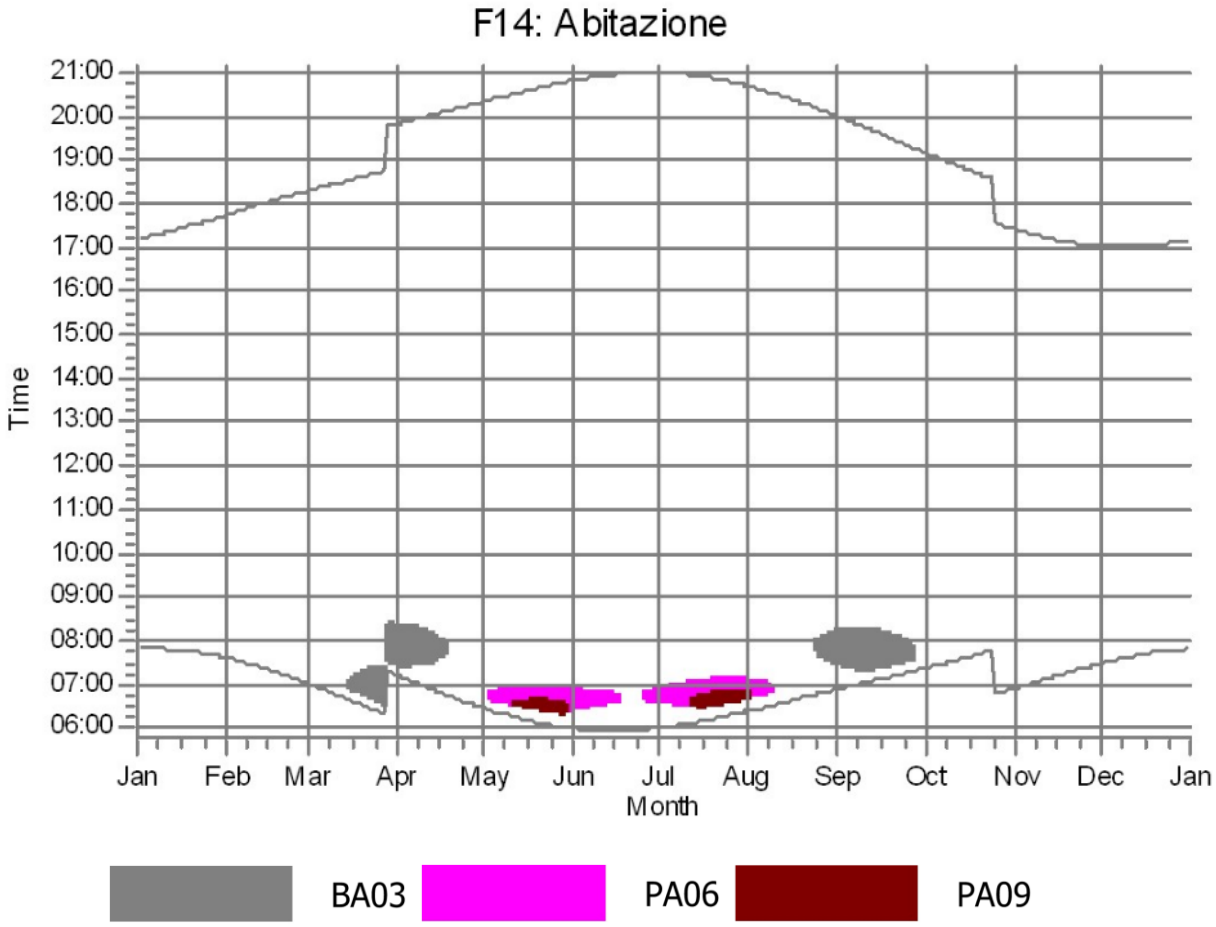

Figura 3 – Calendario dell'ombra relativo al ricettore F14

7 CONCLUSIONI

Il documento ha esaminato compiutamente il potenziale disturbo da ombreggiamento intermittente (*shadow flickering*) in corrispondenza dei più prossimi fabbricati abitativi presenti nell'area interessata dal proposto parco eolico di Bauladu e Paulilatino proposto Sorgenia Renewables S.r.l.

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.

Nel caso specifico, ai fini dei calcoli di esposizione all'ombra intermittente, sono stati individuati come ricettori n. 5 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'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 *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.

I risultati della simulazione modellistica hanno evidenziato come l'incidenza dell'ombreggiamento intermittente presso i ricettori considerati nello "**scenario reale**" sia sempre al disotto del valore guida di 30 h/anno con valori oscillanti tra 5:43 h/anno (F06) e 24:44 h/anno (F14).

Considerata la conservatività delle stime in rapporto all'effettivo manifestarsi di un disturbo per gli occupanti gli edifici (aleatorietà circa la presenza degli occupanti l'edificio, presenza di un sufficiente contrasto luci-ombre, assenza di elementi schermanti quali tendaggi e/o alberature) è altamente verosimile che l'effettiva incidenza dello *shadow flickering* risulterà comunque più contenuta di quella prospettata dal software di simulazione nello scenario "real case".

Da quanto precede si può concludere con ragionevole certezza che il potenziale disturbo associato al fenomeno di *shadow-flickering* risulterà inferiore alla soglia di significatività in

corrispondenza di tutti i ricettori individuati entro una distanza di 1000 metri dagli aerogeneratori in progetto.

APPENDICE: REPORT DEI RISULTATI DEL CALCOLO MODELLISTICO

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Main Result

Calculation: Real_case_Progetto_2022_10_17_rev

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) [ALGHERO]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

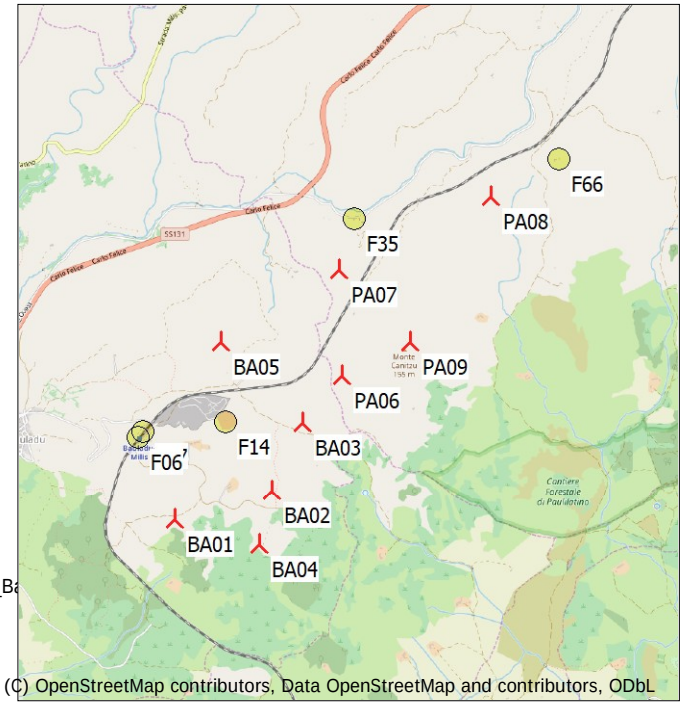
Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
143	449	956	390	293	208	72	65	111	260	286	449

W	WNW	NW	NNW	Sum
1.268	1.274	124	26	6.374

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_Sorgenia_Ba
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)



Scale 1:75.000
New WTG
Shadow receptor

WTGs

	Easting	Northing	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
BA01	1.473.670	4.429.289	193,9	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.2-170-6.200	6.200	170,0	125,0	2.040	8,8
BA02	1.474.641	4.429.568	182,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.2-170-6.200	6.200	170,0	125,0	2.040	8,8
BA03	1.474.947	4.430.242	174,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.2-170-6.200	6.200	170,0	125,0	2.040	8,8
BA04	1.474.515	4.429.043	177,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.2-170-6.200	6.200	170,0	125,0	2.040	8,8
BA05	1.474.140	4.431.052	150,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.2-170-6.200	6.200	170,0	125,0	2.040	8,8
PA06	1.475.342	4.430.709	170,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.2-170-6.200	6.200	170,0	125,0	2.040	8,8
PA07	1.475.313	4.431.755	168,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.2-170-6.200	6.200	170,0	125,0	2.040	8,8
PA08	1.476.821	4.432.468	190,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.2-170-6.200	6.200	170,0	125,0	2.040	8,8
PA09	1.476.014	4.431.041	157,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.2-170-6.200	6.200	170,0	125,0	2.040	8,8

Shadow receptor-Input

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]
F06	Abitazione	1.473.318	4.430.108	169,7	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F07	Abitazione	1.473.360	4.430.171	168,3	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F14	Abitazione	1.474.181	4.430.253	192,3	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F35	Abitazione	1.475.469	4.432.252	100,0	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F66	Abitazione	1.477.505	4.432.850	200,0	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]
F06	Abitazione	5:43
F07	Abitazione	5:59
F14	Abitazione	24:44
F35	Abitazione	15:45
F66	Abitazione	15:50

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Main Result

Calculation: Real_case_Progetto_2022_10_17_rev

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

No.	Name	Worst case [h/year]	Expected [h/year]
BA01	Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (44)	0:00	0:00
BA02	Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (46)	21:47	4:47
BA03	Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (47)	45:19	14:30
BA04	Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (45)	0:00	0:00
BA05	Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (49)	0:00	0:00
PA06	Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (48)	29:18	11:34
PA07	Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (50)	56:23	10:12
PA08	Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (52)	74:14	21:45
PA09	Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (51)	5:18	2:04

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.

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_2022_10_17_revShadow receptor: F06 - Abitazione

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January	February		March		April		May	June
1	07:48	07:35		07:01		07:11		07:30 (BA03)	06:27	05:59
	17:11	17:44		18:17		19:49	9	07:39 (BA03)	20:20	20:48
2	07:48	07:34		06:59		07:10		07:28 (BA03)	06:26	05:59
	17:11	17:45		18:18		19:50	12	07:40 (BA03)	20:21	20:49
3	07:48	07:33		06:58		07:08		07:26 (BA03)	06:25	05:59
	17:12	17:46		18:19		19:51	14	07:40 (BA03)	20:22	20:49
4	07:48	07:32		07:52 (BA02)	06:56	07:07		07:25 (BA03)	06:23	05:58
	17:13	17:47	6	07:58 (BA02)	18:20	19:52	16	07:41 (BA03)	20:23	20:50
5	07:48	07:31		07:51 (BA02)	06:55	07:05		07:23 (BA03)	06:22	05:58
	17:14	17:49	9	08:00 (BA02)	18:21	19:53	18	07:41 (BA03)	20:24	20:51
6	07:48	07:30		07:50 (BA02)	06:53	07:03		07:22 (BA03)	06:21	05:58
	17:15	17:50	12	08:02 (BA02)	18:22	19:54	19	07:41 (BA03)	20:25	20:51
7	07:48	07:29		07:49 (BA02)	06:52	07:02		07:20 (BA03)	06:20	05:57
	17:16	17:51	15	08:04 (BA02)	18:23	19:55	20	07:40 (BA03)	20:26	20:52
8	07:48	07:28		07:48 (BA02)	06:50	07:00		07:18 (BA03)	06:19	05:57
	17:17	17:52	17	08:05 (BA02)	18:24	19:56	21	07:39 (BA03)	20:27	20:53
9	07:48	07:27		07:46 (BA02)	06:48	06:59		07:17 (BA03)	06:18	05:57
	17:18	17:53	19	08:05 (BA02)	18:25	19:57	22	07:39 (BA03)	20:28	20:53
10	07:48	07:26		07:45 (BA02)	06:47	06:57		07:16 (BA03)	06:16	05:57
	17:19	17:55	21	08:06 (BA02)	18:26	19:58	22	07:38 (BA03)	20:29	20:54
11	07:47	07:25		07:44 (BA02)	06:45	06:56		07:17 (BA03)	06:15	05:56
	17:20	17:56	23	08:07 (BA02)	18:27	19:59	20	07:37 (BA03)	20:30	20:54
12	07:47	07:24		07:43 (BA02)	06:44	06:54		07:18 (BA03)	06:14	05:56
	17:21	17:57	25	08:08 (BA02)	18:29	20:00	17	07:35 (BA03)	20:31	20:55
13	07:47	07:22		07:42 (BA02)	06:42	06:52		07:20 (BA03)	06:13	05:56
	17:22	17:58	26	08:08 (BA02)	18:30	20:01	14	07:34 (BA03)	20:31	20:55
14	07:47	07:21		07:40 (BA02)	06:41	06:51		07:21 (BA03)	06:12	05:56
	17:23	17:59	27	08:07 (BA02)	18:31	20:02	10	07:31 (BA03)	20:32	20:56
15	07:46	07:20		07:40 (BA02)	06:39	06:49			06:11	05:56
	17:24	18:01	28	08:08 (BA02)	18:32	20:03			20:33	20:56
16	07:46	07:19		07:40 (BA02)	06:37	06:48			06:10	05:56
	17:25	18:02	28	08:08 (BA02)	18:33	20:04			20:34	20:56
17	07:46	07:17		07:40 (BA02)	06:36	06:46			06:10	05:56
	17:26	18:03	27	08:07 (BA02)	18:34	20:05			20:35	20:57
18	07:45	07:16		07:41 (BA02)	06:34	06:45			06:09	05:56
	17:27	18:04	25	08:06 (BA02)	18:35	20:06			20:36	20:57
19	07:45	07:15		07:42 (BA02)	06:32	06:44			06:08	05:56
	17:28	18:05	24	08:06 (BA02)	18:36	20:07			20:37	20:57
20	07:44	07:13		07:42 (BA02)	06:31	06:42			06:07	05:57
	17:30	18:06	22	08:04 (BA02)	18:37	20:08			20:38	20:58
21	07:44	07:12		07:44 (BA02)	06:29	06:41			06:06	05:57
	17:31	18:08	19	08:03 (BA02)	18:38	20:09			20:39	20:58
22	07:43	07:11		07:46 (BA02)	06:28	06:39			06:05	05:57
	17:32	18:09	16	08:02 (BA02)	18:39	20:10			20:40	20:58
23	07:42	07:09		07:47 (BA02)	06:26	06:38			06:05	05:57
	17:33	18:10	11	07:58 (BA02)	18:40	20:11			20:41	20:58
24	07:42	07:08			06:24	06:36			06:04	05:57
	17:34	18:11			18:41	20:12			20:42	20:58
25	07:41	07:06			06:23	06:35			06:03	05:58
	17:35	18:12			18:42	20:13			20:42	20:59
26	07:40	07:05			06:21	06:34			06:03	05:58
	17:37	18:13			18:43	20:15			20:43	20:59
27	07:39	07:04			06:19	06:32			06:02	05:58
	17:38	18:14			18:44	20:16			20:44	20:59
28	07:39	07:02			06:18	06:31			06:01	05:59
	17:39	18:16			18:45	20:17			20:45	20:59
29	07:38				07:16	06:30			06:01	05:59
	17:40				19:46	20:18			20:46	20:59
30	07:37				07:15		07:33 (BA03)	06:28	06:00	06:00
	17:41				19:47	1	07:34 (BA03)	20:19	20:46	20:59
31	07:36				07:13		07:31 (BA03)		06:00	
	17:43				19:48	6	07:37 (BA03)		20:47	
Potential sun hours	300	299		370		397		446	449	
Total, worst case			400		7		234			
Sun reduction			0,45		0,49		0,52			
Oper. time red.			0,73		0,73		0,73			
Wind dir. red.			0,63		0,77		0,77			
Total reduction			0,20		0,27		0,29			
Total, real			82		2		68			

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

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

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_2022_10_17_revShadow receptor: F06 - Abitazione

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	July		August			September			October			November			December	
1	06:00		06:23			06:53		07:16 (BA03)	07:21			06:54		07:15 (BA02)	07:28	
	20:59		20:41			19:59	20	07:36 (BA03)	19:10			17:25	21	07:36 (BA02)	17:01	
2	06:01		06:24			06:53		07:15 (BA03)	07:22			06:55		07:16 (BA02)	07:29	
	20:59		20:39			19:57	22	07:37 (BA03)	19:08			17:23	19	07:35 (BA02)	17:01	
3	06:01		06:25			06:54		07:15 (BA03)	07:23			06:56		07:17 (BA02)	07:30	
	20:58		20:38			19:56	22	07:37 (BA03)	19:06			17:22	17	07:34 (BA02)	17:01	
4	06:02		06:26			06:55		07:16 (BA03)	07:24			06:57		07:19 (BA02)	07:31	
	20:58		20:37			19:54	21	07:37 (BA03)	19:05			17:21	15	07:34 (BA02)	17:01	
5	06:02		06:27			06:56		07:17 (BA03)	07:25			06:58		07:20 (BA02)	07:31	
	20:58		20:36			19:52	20	07:37 (BA03)	19:03			17:20	12	07:32 (BA02)	17:00	
6	06:03		06:28			06:57		07:17 (BA03)	07:26			07:00		07:21 (BA02)	07:32	
	20:58		20:35			19:51	19	07:36 (BA03)	19:02			17:19	9	07:30 (BA02)	17:00	
7	06:03		06:29			06:58		07:18 (BA03)	07:27			07:01		07:22 (BA02)	07:33	
	20:58		20:34			19:49	18	07:36 (BA03)	19:00			17:18	5	07:27 (BA02)	17:00	
8	06:04		06:30			06:59		07:19 (BA03)	07:28			07:02			07:34	
	20:57		20:33			19:48	16	07:35 (BA03)	18:58			17:17			17:00	
9	06:05		06:31			07:00		07:20 (BA03)	07:29			07:03			07:35	
	20:57		20:31			19:46	14	07:34 (BA03)	18:57			17:16			17:00	
10	06:05		06:32			07:01		07:21 (BA03)	07:30			07:04			07:36	
	20:57		20:30			19:44	12	07:33 (BA03)	18:55			17:15			17:00	
11	06:06		06:33			07:02		07:22 (BA03)	07:31			07:05			07:37	
	20:56		20:29			19:43	10	07:32 (BA03)	18:54			17:14			17:00	
12	06:07		06:33			07:03		07:23 (BA03)	07:32			07:06			07:38	
	20:56		20:28			19:41	7	07:30 (BA03)	18:52			17:13			17:01	
13	06:07		06:34			07:04		07:24 (BA03)	07:33			07:08			07:38	
	20:55		20:26			19:39	2	07:26 (BA03)	18:51			17:12			17:01	
14	06:08		06:35			07:05			07:34			07:09			07:39	
	20:55		20:25			19:38			18:49			17:11			17:01	
15	06:09		06:36			07:06			07:35			07:10			07:40	
	20:54		20:24			19:36			18:48			17:10			17:01	
16	06:09		06:37			07:07			07:36			07:11			07:41	
	20:54		20:22			19:34			18:46			17:09			17:01	
17	06:10		06:38			07:08			07:37			07:12			07:41	
	20:53		20:21			19:33			18:45			17:09			17:02	
18	06:11		06:39			07:09			07:38		08:23 (BA02)	07:13			07:42	
	20:52		20:20			19:31			18:43	4	08:27 (BA02)	17:08			17:02	
19	06:12		06:40			07:10			07:39		08:18 (BA02)	07:14			07:43	
	20:52		20:18			19:29			18:42	13	08:31 (BA02)	17:07			17:02	
20	06:13		06:41			07:10			07:41		08:16 (BA02)	07:16			07:43	
	20:51		20:17			19:28			18:40	17	08:33 (BA02)	17:06			17:03	
21	06:13		06:42			07:11			07:42		08:14 (BA02)	07:17			07:44	
	20:50		20:15			19:26			18:39	20	08:34 (BA02)	17:06			17:03	
22	06:14		06:43			07:12			07:43		08:12 (BA02)	07:18			07:44	
	20:50		20:14			19:25			18:38	23	08:35 (BA02)	17:05			17:04	
23	06:15		06:44			07:13			07:44		08:11 (BA02)	07:19			07:45	
	20:49		20:13			19:23			18:36	25	08:36 (BA02)	17:05			17:04	
24	06:16		06:45			07:14			07:45		08:10 (BA02)	07:20			07:45	
	20:48		20:11			19:21			18:35	26	08:36 (BA02)	17:04			17:05	
25	06:17		06:46			07:15			06:46		07:10 (BA02)	07:21			07:46	
	20:47		20:10			19:20			17:33	27	07:37 (BA02)	17:04			17:05	
26	06:18		06:47			07:16			06:47		07:10 (BA02)	07:22			07:46	
	20:46		20:08			19:18			17:32	27	07:37 (BA02)	17:03			17:06	
27	06:19		06:48			07:17			06:48		07:09 (BA02)	07:23			07:46	
	20:45		20:07			19:16			17:31	28	07:37 (BA02)	17:03			17:07	
28	06:19		06:49			07:18			06:49		07:10 (BA02)	07:24			07:47	
	20:44		20:05			19:15			17:29	27	07:37 (BA02)	17:02			17:07	
29	06:20		06:50		07:22 (BA03)	07:19			06:50		07:11 (BA02)	07:25			07:47	
	20:44		20:03	10	07:32 (BA03)	19:13			17:28	26	07:37 (BA02)	17:02			17:08	
30	06:21		06:51		07:20 (BA03)	07:20			06:52		07:13 (BA02)	07:26			07:47	
	20:43		20:02	14	07:34 (BA03)	19:11			17:27	24	07:37 (BA02)	17:02			17:09	
31	06:22		06:52		07:18 (BA03)				06:53		07:14 (BA02)				07:47	
	20:42		20:00	17	07:35 (BA03)				17:26	23	07:37 (BA02)				17:10	
Potential sun hours	456		426			374			346			300			291	
Total, worst case				41			203			310			98			
Sun reduction				0,72			0,65			0,57			0,48			
Oper. time red.				0,73			0,73			0,73			0,73			
Wind dir. red.				0,77			0,77			0,63			0,63			
Total reduction				0,40			0,36			0,26			0,22			
Total, real				16			74			81			22			

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)

Licensed user:
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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_2022_10_17_revShadow receptor: F07 - Abitazione

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January			February			March			April			May	June
1	07:48			07:35		07:55 (BA02)	07:01			07:11		07:30 (BA03)	06:27	05:59
	17:11			17:44	18	08:13 (BA02)	18:17			19:49	19	07:49 (BA03)	20:20	20:48
2	07:48			07:34		07:54 (BA02)	06:59			07:10		07:28 (BA03)	06:26	05:59
	17:11			17:45	20	08:14 (BA02)	18:18			19:50	20	07:48 (BA03)	20:21	20:49
3	07:48			07:33		07:53 (BA02)	06:58			07:08		07:26 (BA03)	06:25	05:59
	17:12			17:46	22	08:15 (BA02)	18:19			19:51	22	07:48 (BA03)	20:22	20:49
4	07:48			07:32		07:52 (BA02)	06:56			07:07		07:25 (BA03)	06:23	05:58
	17:13			17:47	24	08:16 (BA02)	18:20			19:52	23	07:48 (BA03)	20:23	20:50
5	07:48			07:31		07:51 (BA02)	06:55			07:05		07:23 (BA03)	06:22	05:58
	17:14			17:49	25	08:16 (BA02)	18:21			19:53	24	07:47 (BA03)	20:24	20:51
6	07:48			07:30		07:50 (BA02)	06:53			07:03		07:24 (BA03)	06:21	05:58
	17:15			17:50	27	08:17 (BA02)	18:22			19:54	22	07:46 (BA03)	20:25	20:51
7	07:48			07:29		07:49 (BA02)	06:52			07:02		07:24 (BA03)	06:20	05:57
	17:16			17:51	28	08:17 (BA02)	18:23			19:55	21	07:45 (BA03)	20:26	20:52
8	07:48			07:28		07:48 (BA02)	06:50			07:00		07:25 (BA03)	06:19	05:57
	17:17			17:52	29	08:17 (BA02)	18:24			19:56	18	07:43 (BA03)	20:27	20:53
9	07:48			07:27		07:48 (BA02)	06:48			06:59		07:27 (BA03)	06:18	05:57
	17:18			17:53	28	08:16 (BA02)	18:25			19:57	14	07:41 (BA03)	20:28	20:53
10	07:48			07:26		07:48 (BA02)	06:47			06:57		07:28 (BA03)	06:16	05:57
	17:19			17:55	28	08:16 (BA02)	18:26			19:58	10	07:38 (BA03)	20:29	20:54
11	07:47			07:25		07:49 (BA02)	06:45			06:56			06:15	05:56
	17:20			17:56	27	08:16 (BA02)	18:27			19:59			20:30	20:54
12	07:47			07:24		07:50 (BA02)	06:44			06:54			06:14	05:56
	17:21			17:57	26	08:16 (BA02)	18:29			20:00			20:31	20:55
13	07:47			07:22		07:51 (BA02)	06:42			06:52			06:13	05:56
	17:22			17:58	24	08:15 (BA02)	18:30			20:01			20:31	20:55
14	07:47			07:21		07:51 (BA02)	06:41			06:51			06:12	05:56
	17:23			17:59	23	08:14 (BA02)	18:31			20:02			20:32	20:56
15	07:46			07:20		07:52 (BA02)	06:39			06:49			06:11	05:56
	17:24			18:01	21	08:13 (BA02)	18:32			20:03			20:33	20:56
16	07:46			07:19		07:54 (BA02)	06:37			06:48			06:10	05:56
	17:25			18:02	17	08:11 (BA02)	18:33			20:04			20:34	20:56
17	07:46			07:17		07:56 (BA02)	06:36			06:46			06:10	05:56
	17:26			18:03	12	08:08 (BA02)	18:34			20:05			20:35	20:57
18	07:45			07:16		08:01 (BA02)	06:34			06:45			06:09	05:56
	17:27			18:04	2	08:03 (BA02)	18:35			20:06			20:36	20:57
19	07:45			07:15			06:32			06:43			06:08	05:56
	17:28			18:05			18:36			20:07			20:37	20:57
20	07:44			07:13			06:31			06:42			06:07	05:57
	17:30			18:06			18:37			20:08			20:38	20:58
21	07:44			07:12			06:29			06:41			06:06	05:57
	17:31			18:08			18:38			20:09			20:39	20:58
22	07:43			07:11			06:28			06:39			06:05	05:57
	17:32			18:09			18:39			20:10			20:40	20:58
23	07:42			07:09			06:26			06:38			06:05	05:57
	17:33			18:10			18:40			20:11			20:41	20:58
24	07:42			07:08			06:24			06:36			06:04	05:57
	17:34			18:11			18:41			20:12			20:42	20:58
25	07:41			07:06			06:23			06:35			06:03	05:58
	17:35			18:12			18:42			20:13			20:42	20:59
26	07:40			07:05			06:21		06:39 (BA03)	06:34			06:03	05:58
	17:37			18:13			18:43	3	06:42 (BA03)	20:15			20:43	20:59
27	07:39		07:59 (BA02)	07:04			06:19		06:38 (BA03)	06:32			06:02	05:58
	17:38	4	08:03 (BA02)	18:14			18:44	7	06:45 (BA03)	20:16			20:44	20:59
28	07:39		07:59 (BA02)	07:02			06:18		06:36 (BA03)	06:31			06:01	05:59
	17:39	8	08:07 (BA02)	18:15			18:45	10	06:46 (BA03)	20:17			20:45	20:59
29	07:38		07:58 (BA02)				07:16		07:34 (BA03)	06:30			06:01	05:59
	17:40	11	08:09 (BA02)				19:46	13	07:47 (BA03)	20:18			20:46	20:59
30	07:37		07:57 (BA02)				07:15		07:33 (BA03)	06:28			06:00	06:00
	17:41	14	08:11 (BA02)				19:47	15	07:48 (BA03)	20:19			20:46	20:59
31	07:36		07:56 (BA02)				07:13		07:31 (BA03)				06:00	
	17:43	16	08:12 (BA02)				19:48	17	07:48 (BA03)				20:47	
Potential sun hours	300			299			370			397			446	449
Total, worst case		53			401			65			193			
Sun reduction		0,40			0,45			0,49			0,52			
Oper. time red.		0,73			0,73			0,73			0,73			
Wind dir. red.		0,61			0,61			0,76			0,76			
Total reduction		0,18			0,20			0,27			0,29			
Total, real		9			79			17			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)

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_2022_10_17_revShadow receptor: F07 - Abitazione

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	July	August	September			October			November			December
1	06:00	06:23	06:53			07:21			06:54		07:18 (BA02)	07:28
	20:59	20:41	19:59			19:10			17:25	28	07:46 (BA02)	17:01
2	06:01	06:24	06:53		07:27 (BA03)	07:22			06:55		07:18 (BA02)	07:29
	20:59	20:39	19:57	10	07:37 (BA03)	19:08			17:23	28	07:46 (BA02)	17:01
3	06:01	06:25	06:54		07:25 (BA03)	07:23			06:56		07:17 (BA02)	07:30
	20:58	20:38	19:56	14	07:39 (BA03)	19:06			17:22	29	07:46 (BA02)	17:01
4	06:02	06:26	06:55		07:23 (BA03)	07:24			06:57		07:19 (BA02)	07:31
	20:58	20:37	19:54	18	07:41 (BA03)	19:05			17:21	28	07:47 (BA02)	17:01
5	06:02	06:27	06:56		07:21 (BA03)	07:25			06:58		07:20 (BA02)	07:31
	20:58	20:36	19:52	21	07:42 (BA03)	19:03			17:20	26	07:46 (BA02)	17:00
6	06:03	06:28	06:57		07:19 (BA03)	07:26			07:00		07:21 (BA02)	07:32
	20:58	20:35	19:51	22	07:41 (BA03)	19:02			17:19	25	07:46 (BA02)	17:00
7	06:03	06:29	06:58		07:18 (BA03)	07:27			07:01		07:22 (BA02)	07:33
	20:58	20:34	19:49	24	07:42 (BA03)	19:00			17:18	23	07:45 (BA02)	17:00
8	06:04	06:30	06:59		07:19 (BA03)	07:28			07:02		07:24 (BA02)	07:34
	20:57	20:33	19:48	23	07:42 (BA03)	18:58			17:17	22	07:46 (BA02)	17:00
9	06:05	06:31	07:00		07:20 (BA03)	07:29			07:03		07:25 (BA02)	07:35
	20:57	20:31	19:46	22	07:42 (BA03)	18:57			17:16	20	07:45 (BA02)	17:00
10	06:05	06:32	07:01		07:21 (BA03)	07:30			07:04		07:26 (BA02)	07:36
	20:57	20:30	19:44	21	07:42 (BA03)	18:55			17:15	18	07:44 (BA02)	17:00
11	06:06	06:33	07:02		07:22 (BA03)	07:31			07:05		07:27 (BA02)	07:37
	20:56	20:29	19:43	19	07:41 (BA03)	18:54			17:14	16	07:43 (BA02)	17:00
12	06:07	06:33	07:03		07:23 (BA03)	07:32			07:06		07:28 (BA02)	07:38
	20:56	20:28	19:41	17	07:40 (BA03)	18:52			17:13	14	07:42 (BA02)	17:01
13	06:07	06:34	07:04		07:24 (BA03)	07:33			07:08		07:30 (BA02)	07:38
	20:55	20:26	19:39	16	07:40 (BA03)	18:51			17:12	11	07:41 (BA02)	17:01
14	06:08	06:35	07:05		07:25 (BA03)	07:34			07:09		07:31 (BA02)	07:39
	20:55	20:25	19:38	13	07:38 (BA03)	18:49			17:11	8	07:39 (BA02)	17:01
15	06:09	06:36	07:06		07:26 (BA03)	07:35			07:10		07:32 (BA02)	07:40
	20:54	20:24	19:36	11	07:37 (BA03)	18:48			17:10	4	07:36 (BA02)	17:01
16	06:09	06:37	07:07		07:27 (BA03)	07:36			07:11			07:41
	20:54	20:22	19:34	8	07:35 (BA03)	18:46			17:09			17:01
17	06:10	06:38	07:08		07:27 (BA03)	07:37			07:12			07:41
	20:53	20:21	19:33	4	07:31 (BA03)	18:45			17:09			17:02
18	06:11	06:39	07:09			07:38			07:13			07:42
	20:52	20:20	19:31			18:43			17:08			17:02
19	06:12	06:40	07:10			07:39			07:14			07:43
	20:52	20:18	19:29			18:42			17:07			17:02
20	06:13	06:41	07:10			07:41			07:16			07:43
	20:51	20:17	19:28			18:40			17:06			17:03
21	06:13	06:42	07:11			07:42			07:17			07:44
	20:50	20:15	19:26			18:39			17:06			17:03
22	06:14	06:43	07:12			07:43			07:18			07:44
	20:50	20:14	19:25			18:38			17:05			17:04
23	06:15	06:44	07:13			07:44			07:19			07:45
	20:49	20:13	19:23			18:36			17:05			17:04
24	06:16	06:45	07:14			07:45		08:28 (BA02)	07:20			07:45
	20:48	20:11	19:21			18:35	7	08:35 (BA02)	17:04			17:05
25	06:17	06:46	07:15			06:46		07:26 (BA02)	07:21			07:46
	20:47	20:10	19:20			17:33	14	07:40 (BA02)	17:04			17:05
26	06:18	06:47	07:16			06:47		07:23 (BA02)	07:22			07:46
	20:46	20:08	19:18			17:32	18	07:41 (BA02)	17:03			17:06
27	06:19	06:48	07:17			06:48		07:22 (BA02)	07:23			07:46
	20:45	20:07	19:16			17:31	21	07:43 (BA02)	17:03			17:07
28	06:19	06:49	07:18			06:49		07:20 (BA02)	07:24			07:47
	20:44	20:05	19:15			17:29	23	07:43 (BA02)	17:02			17:07
29	06:20	06:50	07:19			06:50		07:19 (BA02)	07:25			07:47
	20:44	20:03	19:13			17:28	25	07:44 (BA02)	17:02			17:08
30	06:21	06:51	07:20			06:52		07:19 (BA02)	07:26			07:47
	20:43	20:02	19:11			17:27	27	07:46 (BA02)	17:02			17:09
31	06:22	06:52				06:53		07:19 (BA02)				07:47
	20:42	20:00				17:26	27	07:46 (BA02)				17:10
Potential sun hours	456	426	374			346			300			291
Total, worst case				263			162			300		
Sun reduction				0,65			0,57			0,48		
Oper. time red.				0,73			0,73			0,73		
Wind dir. red.				0,76			0,61			0,61		
Total reduction				0,36			0,25			0,21		
Total, real				94			41			64		

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

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

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_2022_10_17_revShadow receptor: F14 - Abitazione

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January	February	March			April			May			June		
1	07:48	07:35	07:01			07:11		07:30 (BA03)	06:27			05:59		06:27 (PA06)
	17:11	17:44	18:17			19:49	50	08:20 (BA03)	20:20			20:48	24	06:51 (PA06)
2	07:48	07:34	06:59			07:10		07:29 (BA03)	06:26			05:59		06:28 (PA06)
	17:11	17:45	18:18			19:50	51	08:20 (BA03)	20:21			20:49	23	06:51 (PA06)
3	07:48	07:33	06:58			07:08		07:28 (BA03)	06:25			05:58		06:29 (PA06)
	17:12	17:46	18:19			19:51	51	08:19 (BA03)	20:22			20:49	22	06:51 (PA06)
4	07:48	07:32	06:56			07:07		07:29 (BA03)	06:23		06:42 (PA06)	05:58		06:29 (PA06)
	17:13	17:47	18:20			19:52	50	08:19 (BA03)	20:23	4	06:46 (PA06)	20:50	21	06:50 (PA06)
5	07:48	07:31	06:55			07:05		07:28 (BA03)	06:22		06:41 (PA06)	05:58		06:30 (PA06)
	17:14	17:49	18:21			19:53	50	08:18 (BA03)	20:24	7	06:48 (PA06)	20:51	20	06:50 (PA06)
6	07:48	07:30	06:53			07:03		07:29 (BA03)	06:21		06:40 (PA06)	05:57		06:31 (PA06)
	17:15	17:50	18:22			19:54	48	08:17 (BA03)	20:25	9	06:49 (PA06)	20:51	19	06:50 (PA06)
7	07:48	07:29	06:52			07:02		07:29 (BA03)	06:20		06:39 (PA06)	05:57		06:32 (PA06)
	17:16	17:51	18:23			19:55	47	08:16 (BA03)	20:26	12	06:51 (PA06)	20:52	18	06:50 (PA06)
8	07:48	07:28	06:50			07:00		07:29 (BA03)	06:19		06:38 (PA06)	05:57		06:32 (PA06)
	17:17	17:52	18:24			19:56	46	08:15 (BA03)	20:27	14	06:52 (PA06)	20:53	17	06:49 (PA06)
9	07:48	07:27	06:48			06:59		07:30 (BA03)	06:18		06:37 (PA06)	05:57		06:33 (PA06)
	17:18	17:53	18:25			19:57	44	08:14 (BA03)	20:28	15	06:52 (PA06)	20:53	15	06:48 (PA06)
10	07:48	07:26	06:47			06:57		07:30 (BA03)	06:16		06:36 (PA06)	05:57		06:34 (PA06)
	17:19	17:55	18:26			19:58	42	08:12 (BA03)	20:29	17	06:53 (PA06)	20:54	14	06:48 (PA06)
11	07:47	07:25	06:45			06:56		07:31 (BA03)	06:15		06:35 (PA06)	05:56		06:35 (PA06)
	17:20	17:56	18:27			19:59	41	08:12 (BA03)	20:30	18	06:53 (PA06)	20:54	12	06:47 (PA06)
12	07:47	07:24	06:44			06:54		07:32 (BA03)	06:14		06:34 (PA09)	05:56		06:36 (PA06)
	17:21	17:57	18:28			20:00	38	08:10 (BA03)	20:30	20	06:54 (PA06)	20:55	11	06:47 (PA06)
13	07:47	07:22	06:42			06:52		07:33 (BA03)	06:13		06:33 (PA09)	05:56		06:37 (PA06)
	17:22	17:58	18:30			20:01	35	08:08 (BA03)	20:31	21	06:54 (PA06)	20:55	9	06:46 (PA06)
14	07:47	07:21	06:40			06:51		07:34 (BA03)	06:12		06:32 (PA09)	05:56		06:38 (PA06)
	17:23	17:59	18:31			20:02	32	08:06 (BA03)	20:32	22	06:54 (PA06)	20:56	8	06:46 (PA06)
15	07:46	07:20	06:39			06:49		07:36 (BA03)	06:11		06:31 (PA09)	05:56		06:39 (PA06)
	17:24	18:01	18:32			20:03	28	08:04 (BA03)	20:33	23	06:54 (PA06)	20:56	6	06:45 (PA06)
16	07:46	07:19	06:37		06:56 (BA03)	06:48		07:38 (BA03)	06:10		06:30 (PA09)	05:56		06:40 (PA06)
	17:25	18:02	18:33	8	07:04 (BA03)	20:04	23	08:01 (BA03)	20:34	24	06:54 (PA06)	20:56	4	06:44 (PA06)
17	07:45	07:17	06:36		06:54 (BA03)	06:46		07:41 (BA03)	06:10		06:29 (PA09)	05:56		
	17:26	18:03	18:34	15	07:09 (BA03)	20:05	17	07:58 (BA03)	20:35	25	06:54 (PA06)	20:57		
18	07:45	07:16	06:34		06:52 (BA03)	06:45		07:46 (BA03)	06:09		06:29 (PA09)	05:56		
	17:27	18:04	18:35	19	07:11 (BA03)	20:06	6	07:52 (BA03)	20:36	26	06:55 (PA06)	20:57		
19	07:45	07:15	06:32		06:51 (BA03)	06:43			06:08		06:28 (PA09)	05:56		
	17:28	18:05	18:36	23	07:14 (BA03)	20:07			20:37	27	06:55 (PA06)	20:57		
20	07:44	07:13	06:31		06:49 (BA03)	06:42			06:07		06:27 (PA09)	05:57		
	17:30	18:06	18:37	26	07:15 (BA03)	20:08			20:38	28	06:55 (PA06)	20:58		
21	07:43	07:12	06:29		06:48 (BA03)	06:41			06:06		06:26 (PA09)	05:57		
	17:31	18:08	18:38	29	07:17 (BA03)	20:09			20:39	28	06:54 (PA06)	20:58		
22	07:43	07:11	06:28		06:46 (BA03)	06:39			06:05		06:26 (PA09)	05:57		
	17:32	18:09	18:39	32	07:18 (BA03)	20:10			20:40	29	06:55 (PA06)	20:58		
23	07:42	07:09	06:26		06:44 (BA03)	06:38			06:05		06:25 (PA09)	05:57		
	17:33	18:10	18:40	35	07:19 (BA03)	20:11			20:41	29	06:54 (PA06)	20:58		
24	07:42	07:08	06:24		06:43 (BA03)	06:36			06:04		06:24 (PA09)	05:57		
	17:34	18:11	18:41	37	07:20 (BA03)	20:12			20:42	30	06:54 (PA06)	20:58		
25	07:41	07:06	06:23		06:41 (BA03)	06:35			06:03		06:24 (PA09)	05:58		
	17:35	18:12	18:42	39	07:20 (BA03)	20:13			20:42	30	06:54 (PA06)	20:59		
26	07:40	07:05	06:21		06:39 (BA03)	06:34			06:03		06:23 (PA09)	05:58		06:43 (PA06)
	17:37	18:13	18:43	41	07:20 (BA03)	20:14			20:43	31	06:54 (PA06)	20:59	3	06:46 (PA06)
27	07:39	07:04	06:19		06:38 (BA03)	06:32			06:02		06:23 (PA09)	05:58		06:41 (PA06)
	17:38	18:14	18:44	43	07:21 (BA03)	20:15			20:44	31	06:54 (PA06)	20:59	6	06:47 (PA06)
28	07:39	07:02	06:18		06:36 (BA03)	06:31			06:01		06:22 (PA09)	05:59		06:41 (PA06)
	17:39	18:15	18:45	45	07:21 (BA03)	20:16			20:45	31	06:53 (PA06)	20:59	7	06:48 (PA06)
29	07:38		07:16		07:34 (BA03)	06:30			06:01		06:23 (PA09)	05:59		06:40 (PA06)
	17:40		19:46	46	08:20 (BA03)	20:18			20:46	30	06:53 (PA06)	20:59	9	06:49 (PA06)
30	07:37		07:15		07:33 (BA03)	06:28			06:00		06:24 (PA09)	06:00		06:40 (PA06)
	17:41		19:47	48	08:21 (BA03)	20:19			20:46	28	06:52 (PA06)	20:59	11	06:51 (PA06)
31	07:36		07:13		07:31 (BA03)				06:00		06:26 (PA06)			
	17:43		19:48	49	08:20 (BA03)				20:47	26	06:52 (PA06)			
Potential sun hours	300	299	370			397			446			449		
Total, worst case				535			699			635			279	
Sun reduction				0,49			0,52			0,57			0,66	
Oper. time red.				0,73			0,73			0,73			0,73	
Wind dir. red.				0,74			0,74			0,81			0,81	
Total reduction				0,26			0,28			0,34			0,39	
Total, real				141			197			215			109	

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)

Licensed user:
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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_2022_10_17_revShadow receptor: F14 - Abitazione

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	July			August			September			October	November	December
1	06:00		06:39 (PA06)	06:23		06:45 (PA09)	06:52		07:30 (BA03)	07:21	06:54	07:27
	20:59	12	06:51 (PA06)	20:41	19	07:04 (PA06)	19:59	41	08:11 (BA03)	19:10	17:24	17:01
2	06:00		06:39 (PA06)	06:24		06:46 (PA06)	06:53		07:29 (BA03)	07:22	06:55	07:29
	20:59	14	06:53 (PA06)	20:39	18	07:04 (PA06)	19:57	42	08:11 (BA03)	19:08	17:23	17:01
3	06:01		06:38 (PA06)	06:25		06:47 (PA06)	06:54		07:28 (BA03)	07:23	06:56	07:29
	20:58	15	06:53 (PA06)	20:38	16	07:03 (PA06)	19:56	44	08:12 (BA03)	19:06	17:22	17:01
4	06:02		06:38 (PA06)	06:26		06:47 (PA06)	06:55		07:27 (BA03)	07:24	06:57	07:30
	20:58	16	06:54 (PA06)	20:37	15	07:02 (PA06)	19:54	46	08:13 (BA03)	19:05	17:21	17:01
5	06:02		06:37 (PA06)	06:27		06:48 (PA06)	06:56		07:26 (BA03)	07:25	06:58	07:31
	20:58	18	06:55 (PA06)	20:36	13	07:01 (PA06)	19:52	47	08:13 (BA03)	19:03	17:20	17:00
6	06:03		06:37 (PA06)	06:28		06:49 (PA06)	06:57		07:24 (BA03)	07:26	06:59	07:32
	20:58	19	06:56 (PA06)	20:35	11	07:00 (PA06)	19:51	48	08:12 (BA03)	19:02	17:19	17:00
7	06:03		06:36 (PA06)	06:29		06:50 (PA06)	06:58		07:24 (BA03)	07:27	07:01	07:33
	20:58	20	06:56 (PA06)	20:34	9	06:59 (PA06)	19:49	49	08:13 (BA03)	19:00	17:18	17:00
8	06:04		06:36 (PA06)	06:30		06:51 (PA06)	06:59		07:23 (BA03)	07:28	07:02	07:34
	20:57	21	06:57 (PA06)	20:33	6	06:57 (PA06)	19:48	50	08:13 (BA03)	18:58	17:17	17:00
9	06:04		06:36 (PA06)	06:31		06:52 (PA06)	07:00		07:22 (BA03)	07:29	07:03	07:35
	20:57	22	06:58 (PA06)	20:31	3	06:55 (PA06)	19:46	51	08:13 (BA03)	18:57	17:16	17:00
10	06:05		06:35 (PA06)	06:32			07:01		07:22 (BA03)	07:30	07:04	07:36
	20:56	23	06:58 (PA06)	20:30			19:44	51	08:13 (BA03)	18:55	17:15	17:00
11	06:06		06:35 (PA06)	06:32			07:02		07:22 (BA03)	07:31	07:05	07:37
	20:56	24	06:59 (PA06)	20:29			19:43	51	08:13 (BA03)	18:54	17:14	17:00
12	06:06		06:35 (PA06)	06:33			07:03		07:23 (BA03)	07:32	07:06	07:38
	20:56	25	07:00 (PA06)	20:28			19:41	49	08:12 (BA03)	18:52	17:13	17:00
13	06:07		06:33 (PA09)	06:34			07:04		07:24 (BA03)	07:33	07:08	07:38
	20:55	27	07:00 (PA06)	20:26			19:39	48	08:12 (BA03)	18:51	17:12	17:01
14	06:08		06:32 (PA09)	06:35			07:05		07:25 (BA03)	07:34	07:09	07:39
	20:55	29	07:01 (PA06)	20:25			19:38	46	08:11 (BA03)	18:49	17:11	17:01
15	06:09		06:31 (PA09)	06:36			07:06		07:26 (BA03)	07:35	07:10	07:40
	20:54	31	07:02 (PA06)	20:24			19:36	45	08:11 (BA03)	18:48	17:10	17:01
16	06:09		06:31 (PA09)	06:37			07:07		07:27 (BA03)	07:36	07:11	07:41
	20:54	31	07:02 (PA06)	20:22			19:34	43	08:10 (BA03)	18:46	17:09	17:01
17	06:10		06:32 (PA09)	06:38			07:08		07:27 (BA03)	07:37	07:12	07:41
	20:53	31	07:03 (PA06)	20:21			19:33	41	08:08 (BA03)	18:45	17:09	17:02
18	06:11		06:33 (PA09)	06:39			07:09		07:28 (BA03)	07:38	07:13	07:42
	20:52	30	07:03 (PA06)	20:20			19:31	39	08:07 (BA03)	18:43	17:08	17:02
19	06:12		06:34 (PA09)	06:40			07:09		07:29 (BA03)	07:39	07:14	07:43
	20:52	30	07:04 (PA06)	20:18			19:29	37	08:06 (BA03)	18:42	17:07	17:02
20	06:13		06:35 (PA09)	06:41			07:10		07:30 (BA03)	07:40	07:16	07:43
	20:51	30	07:05 (PA06)	20:17			19:28	35	08:05 (BA03)	18:40	17:06	17:03
21	06:13		06:35 (PA09)	06:42			07:11		07:31 (BA03)	07:42	07:17	07:44
	20:50	29	07:04 (PA06)	20:15			19:26	33	08:04 (BA03)	18:39	17:06	17:03
22	06:14		06:36 (PA09)	06:43			07:12		07:32 (BA03)	07:43	07:18	07:44
	20:50	29	07:05 (PA06)	20:14			19:24	30	08:02 (BA03)	18:37	17:05	17:04
23	06:15		06:37 (PA09)	06:44			07:13		07:33 (BA03)	07:44	07:19	07:45
	20:49	28	07:05 (PA06)	20:12			19:23	27	08:00 (BA03)	18:36	17:05	17:04
24	06:16		06:38 (PA09)	06:45			07:14		07:34 (BA03)	07:45	07:20	07:45
	20:48	27	07:05 (PA06)	20:11			19:21	24	07:58 (BA03)	18:35	17:04	17:05
25	06:17		06:39 (PA09)	06:46		07:49 (BA03)	07:15		07:35 (BA03)	06:46	07:21	07:46
	20:47	27	07:06 (PA06)	20:10	8	07:57 (BA03)	19:20	21	07:56 (BA03)	17:33	17:04	17:05
26	06:18		06:40 (PA09)	06:47		07:42 (BA03)	07:16		07:36 (BA03)	06:47	07:22	07:46
	20:46	26	07:06 (PA06)	20:08	19	08:01 (BA03)	19:18	17	07:53 (BA03)	17:32	17:03	17:06
27	06:19		06:40 (PA09)	06:48		07:39 (BA03)	07:17		07:37 (BA03)	06:48	07:23	07:46
	20:45	25	07:05 (PA06)	20:07	24	08:03 (BA03)	19:16	11	07:48 (BA03)	17:31	17:03	17:07
28	06:19		06:41 (PA09)	06:49		07:37 (BA03)	07:18			06:49	07:24	07:47
	20:44	24	07:05 (PA06)	20:05	28	08:05 (BA03)	19:15			17:29	17:02	17:07
29	06:20		06:42 (PA09)	06:50		07:35 (BA03)	07:19			06:50	07:25	07:47
	20:44	23	07:05 (PA06)	20:03	32	08:07 (BA03)	19:13			17:28	17:02	17:08
30	06:21		06:43 (PA09)	06:51		07:33 (BA03)	07:20			06:52	07:26	07:47
	20:43	22	07:05 (PA06)	20:02	35	08:08 (BA03)	19:11			17:27	17:02	17:09
31	06:22		06:44 (PA09)	06:52		07:32 (BA03)				06:53		07:47
	20:42	21	07:05 (PA06)	20:00	38	08:10 (BA03)				17:26		17:09
Potential sun hours	456			426			374			346	300	291
Total, worst case		749			294			1066				
Sun reduction		0,74			0,72			0,65				
Oper. time red.		0,73			0,73			0,73				
Wind dir. red.		0,81			0,77			0,74				
Total reduction		0,44			0,40			0,35				
Total, real		328			119			376				

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)

Licensed user:
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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_2022_10_17_revShadow receptor: F35 - Abitazione

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January			February	March	April			May			June
1	07:48		13:10 (PA07)	07:35	07:01	07:11			06:27		07:14 (PA08)	05:59
	17:10	64	14:14 (PA07)	17:44	18:16	19:49			20:20	22	07:36 (PA08)	20:48
2	07:48		13:11 (PA07)	07:34	06:59	07:10			06:26		07:16 (PA08)	05:59
	17:11	63	14:14 (PA07)	17:45	18:18	19:50			20:21	19	07:35 (PA08)	20:49
3	07:48		13:12 (PA07)	07:33	06:58	07:08			06:24		07:16 (PA08)	05:58
	17:12	62	14:14 (PA07)	17:46	18:19	19:51			20:22	16	07:32 (PA08)	20:49
4	07:48		13:12 (PA07)	07:32	06:56	07:06			06:23		07:18 (PA08)	05:58
	17:13	62	14:14 (PA07)	17:47	18:20	19:52			20:23	12	07:30 (PA08)	20:50
5	07:48		13:13 (PA07)	07:31	06:55	07:05			06:22		07:23 (PA08)	05:58
	17:14	61	14:14 (PA07)	17:49	18:21	19:53			20:24	3	07:26 (PA08)	20:51
6	07:48		13:15 (PA07)	07:30	06:53	07:03			06:21			05:57
	17:15	60	14:15 (PA07)	17:50	18:22	19:54			20:25			20:51
7	07:48		13:15 (PA07)	07:29	06:51	07:02			06:20			05:57
	17:16	59	14:14 (PA07)	17:51	18:23	19:55			20:26			20:52
8	07:48		13:16 (PA07)	07:28	06:50	07:00			06:19			05:57
	17:17	58	14:14 (PA07)	17:52	18:24	19:56			20:27			20:53
9	07:48		13:17 (PA07)	07:27	06:48	06:59			06:17			05:57
	17:18	57	14:14 (PA07)	17:53	18:25	19:57			20:28			20:53
10	07:48		13:19 (PA07)	07:26	06:47	06:57			06:16			05:56
	17:19	55	14:14 (PA07)	17:55	18:26	19:58			20:29			20:54
11	07:47		13:20 (PA07)	07:25	06:45	06:55			06:15			05:56
	17:20	54	14:14 (PA07)	17:56	18:27	19:59			20:29			20:54
12	07:47		13:21 (PA07)	07:24	06:44	06:54			06:14			05:56
	17:21	52	14:13 (PA07)	17:57	18:28	20:00			20:30			20:55
13	07:47		13:23 (PA07)	07:22	06:42	06:52			06:13			05:56
	17:22	49	14:12 (PA07)	17:58	18:29	20:01			20:31			20:55
14	07:47		13:25 (PA07)	07:21	06:40	06:51		07:24 (PA08)	06:12			05:56
	17:23	47	14:12 (PA07)	17:59	18:31	20:02	9	07:33 (PA08)	20:32			20:56
15	07:46		13:26 (PA07)	07:20	06:39	06:49		07:21 (PA08)	06:11			05:56
	17:24	45	14:11 (PA07)	18:00	18:32	20:03	16	07:37 (PA08)	20:33			20:56
16	07:46		13:29 (PA07)	07:19	06:37	06:48		07:18 (PA08)	06:10			05:56
	17:25	41	14:10 (PA07)	18:02	18:33	20:04	20	07:38 (PA08)	20:34			20:56
17	07:45		13:30 (PA07)	07:17	06:36	06:46		07:17 (PA08)	06:09			05:56
	17:26	39	14:09 (PA07)	18:03	18:34	20:05	22	07:39 (PA08)	20:35			20:57
18	07:45		13:33 (PA07)	07:16	06:34	06:45		07:15 (PA08)	06:09			05:56
	17:27	35	14:08 (PA07)	18:04	18:35	20:06	25	07:40 (PA08)	20:36			20:57
19	07:45		13:36 (PA07)	07:15	06:32	06:43		07:15 (PA08)	06:08			05:56
	17:28	30	14:06 (PA07)	18:05	18:36	20:07	26	07:41 (PA08)	20:37			20:57
20	07:44		13:39 (PA07)	07:13	06:31	06:42		07:13 (PA08)	06:07			05:56
	17:29	24	14:03 (PA07)	18:06	18:37	20:08	27	07:40 (PA08)	20:38			20:58
21	07:43		13:44 (PA07)	07:12	06:29	06:40		07:13 (PA08)	06:06			05:57
	17:31	16	14:00 (PA07)	18:07	18:38	20:09	28	07:41 (PA08)	20:39			20:58
22	07:43			07:11	06:28	06:39		07:13 (PA08)	06:05			05:57
	17:32			18:09	18:39	20:10	28	07:41 (PA08)	20:40			20:58
23	07:42			07:09	06:26	06:38		07:12 (PA08)	06:05			05:57
	17:33			18:10	18:40	20:11	29	07:41 (PA08)	20:41			20:58
24	07:42			07:08	06:24	06:36		07:12 (PA08)	06:04			05:57
	17:34			18:11	18:41	20:12	29	07:41 (PA08)	20:42			20:58
25	07:41			07:06	06:23	06:35		07:12 (PA08)	06:03			05:58
	17:35			18:12	18:42	20:13	29	07:41 (PA08)	20:42			20:59
26	07:40			07:05	06:21	06:33		07:12 (PA08)	06:02			05:58
	17:36			18:13	18:43	20:14	28	07:40 (PA08)	20:43			20:59
27	07:39			07:04	06:19	06:32		07:12 (PA08)	06:02			05:58
	17:38			18:14	18:44	20:15	28	07:40 (PA08)	20:44			20:59
28	07:39			07:02	06:18	06:31		07:13 (PA08)	06:01			05:59
	17:39			18:15	18:45	20:16	26	07:39 (PA08)	20:45			20:59
29	07:38				07:16	06:29		07:12 (PA08)	06:01			05:59
	17:40				19:46	20:17	26	07:38 (PA08)	20:46			20:59
30	07:37				07:15	06:28		07:13 (PA08)	06:00			05:59
	17:41				19:47	20:18	24	07:37 (PA08)	20:46			20:59
31	07:36				07:13				06:00			
	17:42				19:48				20:47			
Potential sun hours	300			299	370	397			446			449
Total, worst case		1033					420			72		
Sun reduction		0,40					0,52			0,57		
Oper. time red.		0,73					0,73			0,73		
Wind dir. red.		0,59					0,78			0,78		
Total reduction		0,17					0,29			0,32		
Total, real		174					122			23		

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

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

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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_2022_10_17_revShadow receptor: F35 - Abitazione

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	July	August			September	October	November			December		
1	06:00	06:23			06:52	07:21	06:54			07:27		13:03 (PA07)
	20:59	20:40			19:59	19:10	17:24			17:01	53	13:56 (PA07)
2	06:00	06:24			06:53	07:22	06:55			07:28		13:02 (PA07)
	20:59	20:39			19:57	19:08	17:23			17:01	55	13:57 (PA07)
3	06:01	06:25			06:54	07:23	06:56			07:29		13:01 (PA07)
	20:58	20:38			19:56	19:06	17:22			17:01	57	13:58 (PA07)
4	06:01	06:26			06:55	07:24	06:57			07:30		13:01 (PA07)
	20:58	20:37			19:54	19:05	17:21			17:00	58	13:59 (PA07)
5	06:02	06:27			06:56	07:25	06:58			07:31		13:01 (PA07)
	20:58	20:36			19:52	19:03	17:20			17:00	59	14:00 (PA07)
6	06:03	06:28			06:57	07:26	06:59			07:32		13:01 (PA07)
	20:58	20:35			19:51	19:02	17:19			17:00	60	14:01 (PA07)
7	06:03	06:29			06:58	07:27	07:01			07:33		13:00 (PA07)
	20:58	20:34			19:49	19:00	17:18			17:00	60	14:00 (PA07)
8	06:04	06:30		07:30 (PA08)	06:59	07:28	07:02			07:34		13:00 (PA07)
	20:57	20:33	8	07:38 (PA08)	19:48	18:58	17:17			17:00	61	14:01 (PA07)
9	06:04	06:30		07:27 (PA08)	07:00	07:29	07:03			07:35		13:00 (PA07)
	20:57	20:31	14	07:41 (PA08)	19:46	18:57	17:16			17:00	62	14:02 (PA07)
10	06:05	06:31		07:25 (PA08)	07:01	07:30	07:04			07:36		13:00 (PA07)
	20:56	20:30	18	07:43 (PA08)	19:44	18:55	17:15			17:00	63	14:03 (PA07)
11	06:06	06:32		07:24 (PA08)	07:02	07:31	07:05			07:37		13:00 (PA07)
	20:56	20:29	20	07:44 (PA08)	19:43	18:54	17:14			17:00	64	14:04 (PA07)
12	06:06	06:33		07:23 (PA08)	07:03	07:32	07:06			07:38		13:00 (PA07)
	20:56	20:28	22	07:45 (PA08)	19:41	18:52	17:13			17:00	65	14:05 (PA07)
13	06:07	06:34		07:22 (PA08)	07:04	07:33	07:08			07:38		13:00 (PA07)
	20:55	20:26	24	07:46 (PA08)	19:39	18:51	17:12			17:01	65	14:05 (PA07)
14	06:08	06:35		07:20 (PA08)	07:05	07:34	07:09			07:39		13:00 (PA07)
	20:55	20:25	26	07:46 (PA08)	19:38	18:49	17:11			17:01	66	14:06 (PA07)
15	06:09	06:36		07:19 (PA08)	07:06	07:35	07:10			07:40		13:01 (PA07)
	20:54	20:24	27	07:46 (PA08)	19:36	18:48	17:10			17:01	66	14:07 (PA07)
16	06:09	06:37		07:19 (PA08)	07:07	07:36	07:11			07:41		13:01 (PA07)
	20:54	20:22	27	07:46 (PA08)	19:34	18:46	17:09			17:01	67	14:08 (PA07)
17	06:10	06:38		07:18 (PA08)	07:08	07:37	07:12			07:41		13:01 (PA07)
	20:53	20:21	29	07:47 (PA08)	19:33	18:45	17:08			17:02	66	14:07 (PA07)
18	06:11	06:39		07:18 (PA08)	07:08	07:38	07:13			07:42		13:02 (PA07)
	20:52	20:20	29	07:47 (PA08)	19:31	18:43	17:08			17:02	66	14:08 (PA07)
19	06:12	06:40		07:18 (PA08)	07:09	07:39	07:14			07:43		13:02 (PA07)
	20:52	20:18	29	07:47 (PA08)	19:29	18:42	17:07			17:02	66	14:08 (PA07)
20	06:12	06:41		07:18 (PA08)	07:10	07:40	07:16			07:43		13:02 (PA07)
	20:51	20:17	29	07:47 (PA08)	19:28	18:40	17:06			17:03	67	14:09 (PA07)
21	06:13	06:42		07:18 (PA08)	07:11	07:42	07:17		13:20 (PA07)	07:44		13:02 (PA07)
	20:50	20:15	28	07:46 (PA08)	19:26	18:39	17:06	15	13:35 (PA07)	17:03	67	14:09 (PA07)
22	06:14	06:43		07:18 (PA08)	07:12	07:43	07:18		13:16 (PA07)	07:44		13:03 (PA07)
	20:50	20:14	28	07:46 (PA08)	19:24	18:37	17:05	24	13:40 (PA07)	17:04	67	14:10 (PA07)
23	06:15	06:44		07:18 (PA08)	07:13	07:44	07:19		13:13 (PA07)	07:45		13:03 (PA07)
	20:49	20:12	27	07:45 (PA08)	19:23	18:36	17:04	30	13:43 (PA07)	17:04	67	14:10 (PA07)
24	06:16	06:45		07:19 (PA08)	07:14	07:45	07:20		13:10 (PA07)	07:45		13:05 (PA07)
	20:48	20:11	25	07:44 (PA08)	19:21	18:35	17:04	35	13:45 (PA07)	17:05	66	14:11 (PA07)
25	06:17	06:46		07:18 (PA08)	07:15	06:46	07:21		13:08 (PA07)	07:46		13:05 (PA07)
	20:47	20:09	24	07:42 (PA08)	19:19	17:33	17:03	39	13:47 (PA07)	17:05	66	14:11 (PA07)
26	06:18	06:47		07:19 (PA08)	07:16	06:47	07:22		13:07 (PA07)	07:46		13:05 (PA07)
	20:46	20:08	22	07:41 (PA08)	19:18	17:32	17:03	41	13:48 (PA07)	17:06	66	14:11 (PA07)
27	06:18	06:48		07:20 (PA08)	07:17	06:48	07:23		13:05 (PA07)	07:46		13:06 (PA07)
	20:45	20:06	20	07:40 (PA08)	19:16	17:31	17:03	45	13:50 (PA07)	17:06	66	14:12 (PA07)
28	06:19	06:49		07:22 (PA08)	07:18	06:49	07:24		13:04 (PA07)	07:47		13:07 (PA07)
	20:44	20:05	15	07:37 (PA08)	19:15	17:29	17:02	47	13:51 (PA07)	17:07	66	14:13 (PA07)
29	06:20	06:50		07:19 (PA08)	07:19	06:50	07:25		13:03 (PA07)	07:47		13:07 (PA07)
	20:43	20:03	9	07:34 (PA08)	19:13	17:28	17:02	49	13:52 (PA07)	17:08	66	14:13 (PA07)
30	06:21	06:51			07:20	06:51	07:26		13:03 (PA07)	07:47		13:08 (PA07)
	20:43	20:02			19:11	17:27	17:01	52	13:55 (PA07)	17:09	65	14:13 (PA07)
31	06:22	06:51				06:53				07:47		13:09 (PA07)
	20:42	20:00				17:26				17:09	65	14:14 (PA07)
Potential sun hours	456	426			374	346	300			291		
Total, worst case			500					377			1973	
Sun reduction			0,72					0,48			0,42	
Oper. time red.			0,73					0,73			0,73	
Wind dir. red.			0,78					0,59			0,59	
Total reduction			0,40					0,20			0,18	
Total, real			201					77			348	

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

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

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_2022_10_17_revShadow receptor: F66 - Abitazione

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January			February			March	April	May	June
1	07:48			07:35		16:28 (PA08)	07:00	07:11	06:27	05:59
	17:10			17:44	51	17:19 (PA08)	18:16	19:49	20:19	20:48
2	07:48			07:34		16:28 (PA08)	06:59	07:10	06:26	05:59
	17:11			17:45	52	17:20 (PA08)	18:18	19:50	20:20	20:49
3	07:48			07:33		16:28 (PA08)	06:57	07:08	06:24	05:58
	17:12			17:46	52	17:20 (PA08)	18:19	19:51	20:21	20:49
4	07:48			07:32		16:28 (PA08)	06:56	07:06	06:23	05:58
	17:13			17:47	52	17:20 (PA08)	18:20	19:52	20:22	20:50
5	07:48			07:31		16:29 (PA08)	06:54	07:05	06:22	05:58
	17:14			17:48	51	17:20 (PA08)	18:21	19:53	20:23	20:51
6	07:48			07:30		16:29 (PA08)	06:53	07:03	06:21	05:57
	17:15			17:50	51	17:20 (PA08)	18:22	19:54	20:24	20:51
7	07:48		16:41 (PA08)	07:29		16:30 (PA08)	06:51	07:02	06:20	05:57
	17:16	9	16:50 (PA08)	17:51	50	17:20 (PA08)	18:23	19:55	20:25	20:52
8	07:48		16:39 (PA08)	07:28		16:29 (PA08)	06:50	07:00	06:18	05:57
	17:17	12	16:51 (PA08)	17:52	50	17:19 (PA08)	18:24	19:56	20:26	20:52
9	07:48		16:38 (PA08)	07:27		16:30 (PA08)	06:48	06:58	06:17	05:57
	17:18	14	16:52 (PA08)	17:53	49	17:19 (PA08)	18:25	19:57	20:27	20:53
10	07:48		16:37 (PA08)	07:26		16:30 (PA08)	06:47	06:57	06:16	05:56
	17:19	17	16:54 (PA08)	17:54	49	17:19 (PA08)	18:26	19:58	20:28	20:54
11	07:47		16:35 (PA08)	07:25		16:31 (PA08)	06:45	06:55	06:15	05:56
	17:20	19	16:54 (PA08)	17:56	48	17:19 (PA08)	18:27	19:59	20:29	20:54
12	07:47		16:35 (PA08)	07:23		16:32 (PA08)	06:44	06:54	06:14	05:56
	17:21	20	16:55 (PA08)	17:57	46	17:18 (PA08)	18:28	20:00	20:30	20:55
13	07:47		16:34 (PA08)	07:22		16:32 (PA08)	06:42	06:52	06:13	05:56
	17:22	23	16:57 (PA08)	17:58	45	17:17 (PA08)	18:29	20:01	20:31	20:55
14	07:47		16:33 (PA08)	07:21		16:33 (PA08)	06:40	06:51	06:12	05:56
	17:23	24	16:57 (PA08)	17:59	44	17:17 (PA08)	18:30	20:02	20:32	20:56
15	07:46		16:33 (PA08)	07:20		16:35 (PA08)	06:39	06:49	06:11	05:56
	17:24	26	16:59 (PA08)	18:00	41	17:16 (PA08)	18:31	20:03	20:33	20:56
16	07:46		16:33 (PA08)	07:19		16:36 (PA08)	06:37	06:48	06:10	05:56
	17:25	27	17:00 (PA08)	18:02	39	17:15 (PA08)	18:33	20:04	20:34	20:56
17	07:45		16:32 (PA08)	07:17		16:37 (PA08)	06:36	06:46	06:09	05:56
	17:26	29	17:01 (PA08)	18:03	36	17:13 (PA08)	18:34	20:05	20:35	20:57
18	07:45		16:32 (PA08)	07:16		16:38 (PA08)	06:34	06:45	06:08	05:56
	17:27	31	17:03 (PA08)	18:04	34	17:12 (PA08)	18:35	20:06	20:36	20:57
19	07:44		16:31 (PA08)	07:15		16:41 (PA08)	06:32	06:43	06:08	05:56
	17:28	33	17:04 (PA08)	18:05	29	17:10 (PA08)	18:36	20:07	20:37	20:57
20	07:44		16:30 (PA08)	07:13		16:42 (PA08)	06:31	06:42	06:07	05:56
	17:29	34	17:04 (PA08)	18:06	26	17:08 (PA08)	18:37	20:08	20:38	20:58
21	07:43		16:30 (PA08)	07:12		16:45 (PA08)	06:29	06:40	06:06	05:56
	17:31	36	17:06 (PA08)	18:07	20	17:05 (PA08)	18:38	20:09	20:39	20:58
22	07:43		16:29 (PA08)	07:11		16:49 (PA08)	06:27	06:39	06:05	05:57
	17:32	38	17:07 (PA08)	18:09	11	17:00 (PA08)	18:39	20:10	20:40	20:58
23	07:42		16:29 (PA08)	07:09			06:26	06:38	06:04	05:57
	17:33	39	17:08 (PA08)	18:10			18:40	20:11	20:41	20:58
24	07:42		16:29 (PA08)	07:08			06:24	06:36	06:04	05:57
	17:34	41	17:10 (PA08)	18:11			18:41	20:12	20:41	20:58
25	07:41		16:29 (PA08)	07:06			06:23	06:35	06:03	05:57
	17:35	42	17:11 (PA08)	18:12			18:42	20:13	20:42	20:58
26	07:40		16:28 (PA08)	07:05			06:21	06:33	06:02	05:58
	17:36	44	17:12 (PA08)	18:13			18:43	20:14	20:43	20:59
27	07:39		16:28 (PA08)	07:03			06:19	06:32	06:02	05:58
	17:38	45	17:13 (PA08)	18:14			18:44	20:15	20:44	20:59
28	07:39		16:29 (PA08)	07:02			06:18	06:31	06:01	05:59
	17:39	46	17:15 (PA08)	18:15			18:45	20:16	20:45	20:59
29	07:38		16:28 (PA08)				07:16	06:29	06:01	05:59
	17:40	49	17:17 (PA08)				19:46	20:17	20:46	20:59
30	07:37		16:28 (PA08)				07:14	06:28	06:00	05:59
	17:41	50	17:18 (PA08)				19:47	20:18	20:46	20:59
31	07:36		16:28 (PA08)				07:13		06:00	
	17:42	51	17:19 (PA08)				19:48		20:47	
Potential sun hours	300			299			370	397	446	449
Total, worst case		799			926					
Sun reduction		0,40			0,45					
Oper. time red.		0,73			0,73					
Wind dir. red.		0,81			0,81					
Total reduction		0,24			0,27					
Total, real		188			246					

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

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

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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_2022_10_17_revShadow receptor: F66 - Abitazione

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	July		August		September		October			November			December		
1	06:00		06:23		06:52		07:21			06:54		16:00 (PA08)	07:27		16:18 (PA08)
	20:59		20:40		19:59		19:09			17:24	49	16:49 (PA08)	17:01	19	16:37 (PA08)
2	06:00		06:24		06:53		07:22			06:55		15:59 (PA08)	07:28		16:20 (PA08)
	20:58		20:39		19:57		19:08			17:23	50	16:49 (PA08)	17:01	17	16:37 (PA08)
3	06:01		06:25		06:54		07:23			06:56		15:59 (PA08)	07:29		16:22 (PA08)
	20:58		20:38		19:55		19:06			17:22	50	16:49 (PA08)	17:01	14	16:36 (PA08)
4	06:01		06:26		06:55		07:24			06:57		15:58 (PA08)	07:30		16:24 (PA08)
	20:58		20:37		19:54		19:05			17:21	51	16:49 (PA08)	17:00	12	16:36 (PA08)
5	06:02		06:27		06:56		07:25			06:58		15:59 (PA08)	07:31		16:27 (PA08)
	20:58		20:36		19:52		19:03			17:20	51	16:50 (PA08)	17:00	9	16:36 (PA08)
6	06:02		06:28		06:57		07:26			06:59		15:59 (PA08)	07:32		
	20:58		20:35		19:51		19:01			17:19	51	16:50 (PA08)	17:00		
7	06:03		06:28		06:58		07:27			07:01		15:58 (PA08)	07:33		
	20:57		20:34		19:49		19:00			17:18	52	16:50 (PA08)	17:00		
8	06:04		06:29		06:59		07:28			07:02		15:58 (PA08)	07:34		
	20:57		20:33		19:47		18:58			17:16	52	16:50 (PA08)	17:00		
9	06:04		06:30		07:00		07:29			07:03		15:59 (PA08)	07:35		
	20:57		20:31		19:46		18:57			17:15	52	16:51 (PA08)	17:00		
10	06:05		06:31		07:01		07:30			07:04		15:59 (PA08)	07:36		
	20:56		20:30		19:44		18:55			17:14	51	16:50 (PA08)	17:00		
11	06:06		06:32		07:02		07:31			07:05		15:59 (PA08)	07:37		
	20:56		20:29		19:43		18:54			17:14	51	16:50 (PA08)	17:00		
12	06:06		06:33		07:03		07:32			07:06		15:59 (PA08)	07:37		
	20:56		20:28		19:41		18:52			17:13	50	16:49 (PA08)	17:00		
13	06:07		06:34		07:04		07:33			07:07		16:00 (PA08)	07:38		
	20:55		20:26		19:39		18:50			17:12	48	16:48 (PA08)	17:00		
14	06:08		06:35		07:05		07:34			07:09		16:01 (PA08)	07:39		
	20:55		20:25		19:38		18:49			17:11	46	16:47 (PA08)	17:01		
15	06:08		06:36		07:06		07:35			07:10		16:01 (PA08)	07:40		
	20:54		20:24		19:36		18:47			17:10	45	16:46 (PA08)	17:01		
16	06:09		06:37		07:06		07:36			07:11		16:01 (PA08)	07:40		
	20:53		20:22		19:34		18:46			17:09	44	16:45 (PA08)	17:01		
17	06:10		06:38		07:07		07:37			07:12		16:02 (PA08)	07:41		
	20:53		20:21		19:33		18:44			17:08	42	16:44 (PA08)	17:01		
18	06:11		06:39		07:08		07:38			07:13		16:03 (PA08)	07:42		
	20:52		20:20		19:31		18:43			17:08	41	16:44 (PA08)	17:02		
19	06:12		06:40		07:09		07:39			07:14		16:04 (PA08)	07:42		
	20:52		20:18		19:29		18:42			17:07	39	16:43 (PA08)	17:02		
20	06:12		06:41		07:10		07:40		17:19 (PA08)	07:15		16:04 (PA08)	07:43		
	20:51		20:17		19:28		18:40	14	17:33 (PA08)	17:06	38	16:42 (PA08)	17:03		
21	06:13		06:42		07:11		07:41		17:15 (PA08)	07:17		16:05 (PA08)	07:44		
	20:50		20:15		19:26		18:39	22	17:37 (PA08)	17:06	36	16:41 (PA08)	17:03		
22	06:14		06:43		07:12		07:43		17:12 (PA08)	07:18		16:06 (PA08)	07:44		
	20:49		20:14		19:24		18:37	27	17:39 (PA08)	17:05	34	16:40 (PA08)	17:03		
23	06:15		06:44		07:13		07:44		17:10 (PA08)	07:19		16:08 (PA08)	07:45		
	20:49		20:12		19:23		18:36	31	17:41 (PA08)	17:04	33	16:41 (PA08)	17:04		
24	06:16		06:45		07:14		07:45		17:08 (PA08)	07:20		16:09 (PA08)	07:45		
	20:48		20:11		19:21		18:35	34	17:42 (PA08)	17:04	31	16:40 (PA08)	17:05		
25	06:17		06:46		07:15		06:46		16:06 (PA08)	07:21		16:10 (PA08)	07:45		
	20:47		20:09		19:19		17:33	37	16:43 (PA08)	17:03	29	16:39 (PA08)	17:05		
26	06:17		06:47		07:16		06:47		16:05 (PA08)	07:22		16:11 (PA08)	07:46		
	20:46		20:08		19:18		17:32	40	16:45 (PA08)	17:03	28	16:39 (PA08)	17:06		
27	06:18		06:48		07:17		06:48		16:04 (PA08)	07:23		16:12 (PA08)	07:46		
	20:45		20:06		19:16		17:31	42	16:46 (PA08)	17:02	26	16:38 (PA08)	17:06		
28	06:19		06:49		07:18		06:49		16:03 (PA08)	07:24		16:13 (PA08)	07:47		
	20:44		20:05		19:14		17:29	43	16:46 (PA08)	17:02	24	16:37 (PA08)	17:07		
29	06:20		06:49		07:19		06:50		16:02 (PA08)	07:25		16:14 (PA08)	07:47		
	20:43		20:03		19:13		17:28	45	16:47 (PA08)	17:02	23	16:37 (PA08)	17:08		
30	06:21		06:50		07:20		06:51		16:01 (PA08)	07:26		16:16 (PA08)	07:47		
	20:42		20:02		19:11		17:27	46	16:47 (PA08)	17:01	20	16:36 (PA08)	17:08		
31	06:22		06:51				06:53		16:01 (PA08)				07:47		
	20:41		20:00				17:25	48	16:49 (PA08)				17:09		
Potential sun hours	456		426		374		346			300			291		
Total, worst case								429			1237			71	
Sun reduction								0,57			0,48			0,42	
Oper. time red.								0,73			0,73			0,73	
Wind dir. red.								0,81			0,81			0,81	
Total reduction								0,34			0,29			0,25	
Total, real								146			354			18	

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

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

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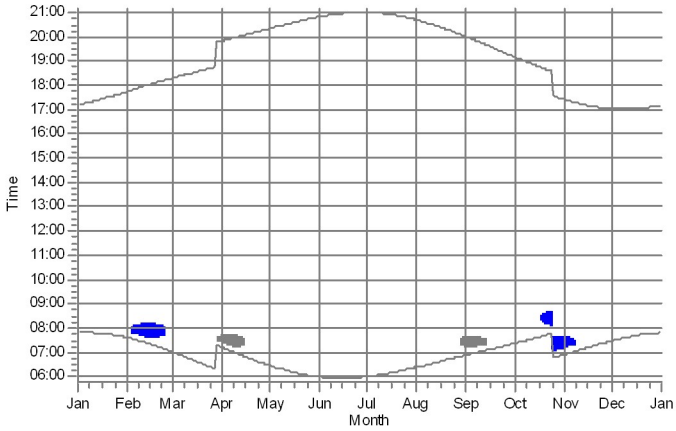
Calculated:
30/11/2022 09:30/3.4.415

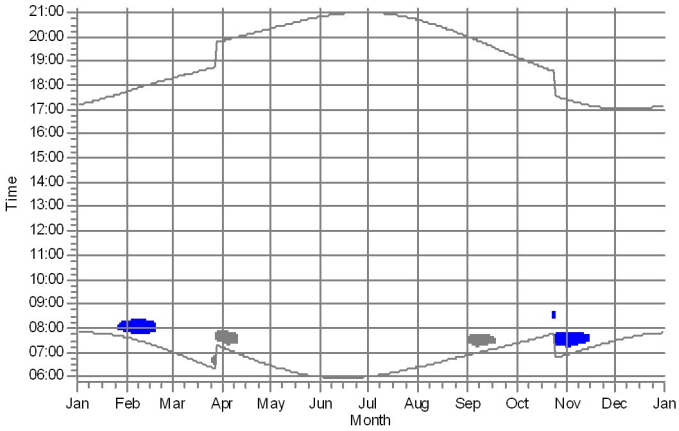
SHADOW - Calendar, graphical

Calculation: Real_case_Progetto_2022_10_17_rev

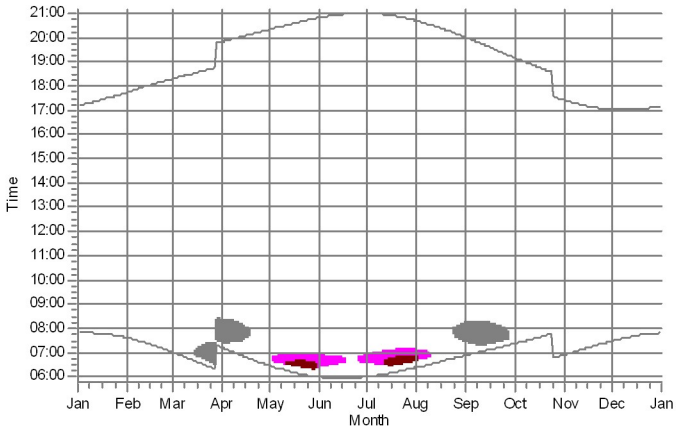
F06: Abitazione



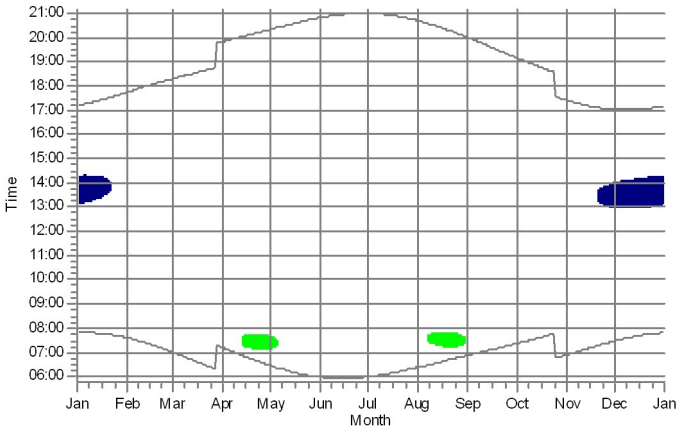
F07: Abitazione



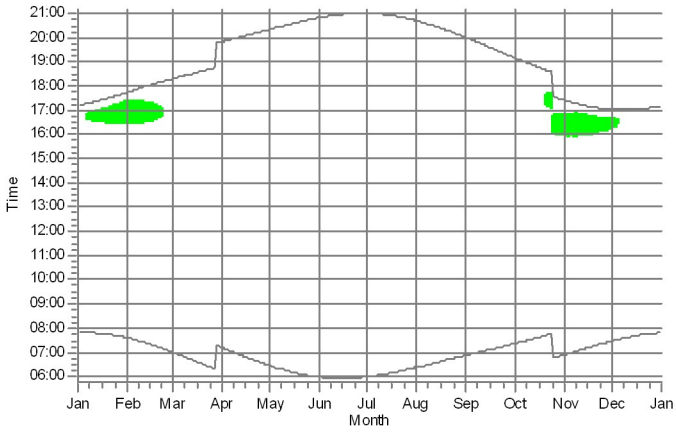
F14: Abitazione



F35: Abitazione



F66: Abitazione



WTGs

BA02: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (46)
BA03: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (47)
PA06: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (48)
PA07: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (50)
PA09: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (51)
PA08: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (52)

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_2022_10_17_revWTG: BA01 - Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (44)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:35	07:01	07:11	06:27	05:59	06:00	06:23	06:53	07:21	06:54	07:27
	17:11	17:44	18:17	19:49	20:20	20:48	20:59	20:41	19:59	19:10	17:25	17:01
2	07:48	07:34	06:59	07:10	06:26	05:59	06:01	06:24	06:53	07:22	06:55	07:29
	17:11	17:45	18:18	19:50	20:21	20:49	20:59	20:39	19:57	19:08	17:23	17:01
3	07:48	07:33	06:58	07:08	06:25	05:59	06:01	06:25	06:54	07:23	06:56	07:29
	17:12	17:46	18:19	19:51	20:22	20:49	20:58	20:38	19:56	19:06	17:22	17:01
4	07:48	07:32	06:56	07:07	06:23	05:58	06:02	06:26	06:55	07:24	06:57	07:30
	17:13	17:47	18:20	19:52	20:23	20:50	20:58	20:37	19:54	19:05	17:21	17:01
5	07:48	07:31	06:55	07:05	06:22	05:58	06:02	06:27	06:56	07:25	06:58	07:31
	17:14	17:49	18:21	19:53	20:24	20:51	20:58	20:36	19:52	19:03	17:20	17:01
6	07:48	07:30	06:53	07:03	06:21	05:58	06:03	06:28	06:57	07:26	06:59	07:32
	17:15	17:50	18:22	19:54	20:25	20:51	20:58	20:35	19:51	19:02	17:19	17:00
7	07:48	07:29	06:52	07:02	06:20	05:57	06:03	06:29	06:58	07:27	07:01	07:33
	17:16	17:51	18:23	19:55	20:26	20:52	20:58	20:34	19:49	19:00	17:18	17:00
8	07:48	07:28	06:50	07:00	06:19	05:57	06:04	06:30	06:59	07:28	07:02	07:34
	17:17	17:52	18:24	19:56	20:27	20:53	20:57	20:33	19:48	18:58	17:17	17:00
9	07:48	07:27	06:48	06:59	06:18	05:57	06:05	06:31	07:00	07:29	07:03	07:35
	17:18	17:53	18:25	19:57	20:28	20:53	20:57	20:31	19:46	18:57	17:16	17:00
10	07:48	07:26	06:47	06:57	06:16	05:57	06:05	06:32	07:01	07:30	07:04	07:36
	17:19	17:55	18:26	19:58	20:29	20:54	20:56	20:30	19:44	18:55	17:15	17:00
11	07:47	07:25	06:45	06:56	06:15	05:56	06:06	06:33	07:02	07:31	07:05	07:37
	17:20	17:56	18:27	19:59	20:30	20:54	20:56	20:29	19:43	18:54	17:14	17:00
12	07:47	07:24	06:44	06:54	06:14	05:56	06:07	06:33	07:03	07:32	07:06	07:38
	17:21	17:57	18:29	20:00	20:30	20:55	20:56	20:28	19:41	18:52	17:13	17:01
13	07:47	07:22	06:42	06:52	06:13	05:56	06:07	06:34	07:04	07:33	07:08	07:38
	17:22	17:58	18:30	20:01	20:31	20:55	20:55	20:26	19:39	18:51	17:12	17:01
14	07:47	07:21	06:41	06:51	06:12	05:56	06:08	06:35	07:05	07:34	07:09	07:39
	17:23	17:59	18:31	20:02	20:32	20:56	20:55	20:25	19:38	18:49	17:11	17:01
15	07:46	07:20	06:39	06:49	06:11	05:56	06:09	06:36	07:06	07:35	07:10	07:40
	17:24	18:01	18:32	20:03	20:33	20:56	20:54	20:24	19:36	18:48	17:10	17:01
16	07:46	07:19	06:37	06:48	06:10	05:56	06:09	06:37	07:07	07:36	07:11	07:41
	17:25	18:02	18:33	20:04	20:34	20:56	20:54	20:22	19:34	18:46	17:09	17:01
17	07:45	07:17	06:36	06:46	06:10	05:56	06:10	06:38	07:08	07:37	07:12	07:41
	17:26	18:03	18:34	20:05	20:35	20:57	20:53	20:21	19:33	18:45	17:09	17:02
18	07:45	07:16	06:34	06:45	06:09	05:56	06:11	06:39	07:09	07:38	07:13	07:42
	17:27	18:04	18:35	20:06	20:36	20:57	20:52	20:20	19:31	18:43	17:08	17:02
19	07:45	07:15	06:32	06:43	06:08	05:56	06:12	06:40	07:09	07:39	07:14	07:43
	17:28	18:05	18:36	20:07	20:37	20:57	20:52	20:18	19:29	18:42	17:07	17:02
20	07:44	07:13	06:31	06:42	06:07	05:57	06:13	06:41	07:10	07:41	07:16	07:43
	17:30	18:06	18:37	20:08	20:38	20:58	20:51	20:17	19:28	18:40	17:06	17:03
21	07:43	07:12	06:29	06:41	06:06	05:57	06:13	06:42	07:11	07:42	07:17	07:44
	17:31	18:08	18:38	20:09	20:39	20:58	20:50	20:15	19:26	18:39	17:06	17:03
22	07:43	07:11	06:28	06:39	06:05	05:57	06:14	06:43	07:12	07:43	07:18	07:44
	17:32	18:09	18:39	20:10	20:40	20:58	20:50	20:14	19:24	18:38	17:05	17:04
23	07:42	07:09	06:26	06:38	06:05	05:57	06:15	06:44	07:13	07:44	07:19	07:45
	17:33	18:10	18:40	20:11	20:41	20:58	20:49	20:12	19:23	18:36	17:05	17:04
24	07:42	07:08	06:24	06:36	06:04	05:57	06:16	06:45	07:14	07:45	07:20	07:45
	17:34	18:11	18:41	20:12	20:42	20:58	20:48	20:11	19:21	18:35	17:04	17:05
25	07:41	07:06	06:23	06:35	06:03	05:58	06:17	06:46	07:15	06:46	07:21	07:46
	17:35	18:12	18:42	20:13	20:42	20:59	20:47	20:10	19:20	17:33	17:04	17:05
26	07:40	07:05	06:21	06:34	06:03	05:58	06:18	06:47	07:16	06:47	07:22	07:46
	17:37	18:13	18:43	20:14	20:43	20:59	20:46	20:08	19:18	17:32	17:03	17:06
27	07:39	07:04	06:19	06:32	06:02	05:58	06:19	06:48	07:17	06:48	07:23	07:46
	17:38	18:14	18:44	20:15	20:44	20:59	20:45	20:07	19:16	17:31	17:03	17:07
28	07:39	07:02	06:18	06:31	06:01	05:59	06:19	06:49	07:18	06:49	07:24	07:47
	17:39	18:15	18:45	20:17	20:45	20:59	20:44	20:05	19:15	17:29	17:02	17:07
29	07:38		07:16	06:30	06:01	05:59	06:20	06:50	07:19	06:50	07:25	07:47
	17:40		19:46	20:18	20:46	20:59	20:44	20:03	19:13	17:28	17:02	17:08
30	07:37		07:15	06:28	06:00	06:00	06:21	06:51	07:20	06:52	07:26	07:47
	17:41		19:47	20:19	20:46	20:59	20:43	20:02	19:11	17:27	17:02	17:09
31	07:36		07:13		06:00		06:22	06:52		06:53		07:47
	17:43		19:48		20:47		20:42	20:00		17:26		17:10
Potential sun hours	300	299	370	397	446	449	456	426	374	346	300	291
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_2022_10_17_revWTG: BA02 - Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (46)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:35 07:55-08:13/18	07:01	07:11	06:27	05:59	06:00	06:23	06:52	07:21	06:54 07:15-07:46/31	07:27
	17:11	17:44	18:17	19:49	20:19	20:48	20:59	20:40	19:59	19:10	17:24	17:01
2	07:48	07:34 07:54-08:14/20	06:59	07:10	06:26	05:59	06:00	06:24	06:53	07:22	06:55 07:16-07:46/30	07:28
	17:11	17:45	18:18	19:50	20:21	20:49	20:58	20:39	19:57	19:08	17:23	17:01
3	07:48	07:33 07:53-08:15/22	06:58	07:08	06:24	05:58	06:01	06:25	06:54	07:23	06:56 07:17-07:46/29	07:29
	17:12	17:46	18:19	19:51	20:22	20:49	20:58	20:38	19:56	19:06	17:22	17:01
4	07:48	07:32 07:52-08:16/24	06:56	07:07	06:23	05:58	06:02	06:26	06:55	07:24	06:57 07:19-07:47/28	07:30
	17:13	17:47	18:20	19:52	20:23	20:50	20:58	20:37	19:54	19:05	17:21	17:01
5	07:48	07:31 07:51-08:16/25	06:55	07:05	06:22	05:58	06:02	06:27	06:56	07:25	06:58 07:20-07:46/26	07:31
	17:14	17:49	18:21	19:53	20:24	20:51	20:58	20:36	19:52	19:03	17:20	17:00
6	07:48	07:30 07:50-08:17/27	06:53	07:03	06:21	05:57	06:03	06:28	06:57	07:26	06:59 07:21-07:46/25	07:32
	17:15	17:50	18:22	19:54	20:25	20:51	20:58	20:35	19:51	19:02	17:19	17:00
7	07:48	07:29 07:49-08:17/28	06:51	07:02	06:20	05:57	06:03	06:29	06:58	07:27	07:01 07:22-07:45/23	07:33
	17:16	17:51	18:23	19:55	20:26	20:52	20:57	20:34	19:49	19:00	17:18	17:00
8	07:48	07:28 07:48-08:17/29	06:50	07:00	06:19	05:57	06:04	06:30	06:59	07:28	07:02 07:24-07:46/22	07:34
	17:17	17:52	18:24	19:56	20:27	20:52	20:57	20:33	19:48	18:58	17:17	17:00
9	07:48	07:27 07:46-08:16/30	06:48	06:59	06:18	05:57	06:04	06:31	07:00	07:29	07:03 07:25-07:45/20	07:35
	17:18	17:53	18:25	19:57	20:28	20:53	20:57	20:31	19:46	18:57	17:16	17:00
10	07:48	07:26 07:45-08:16/31	06:47	06:57	06:16	05:57	06:05	06:32	07:01	07:30	07:04 07:26-07:44/18	07:36
	17:19	17:55	18:26	19:58	20:28	20:54	20:56	20:30	19:44	18:55	17:15	17:00
11	07:47	07:25 07:44-08:16/32	06:45	06:56	06:15	05:56	06:06	06:32	07:02	07:31	07:05 07:27-07:43/16	07:37
	17:20	17:56	18:27	19:59	20:29	20:54	20:56	20:29	19:43	18:54	17:14	17:00
12	07:47	07:24 07:43-08:16/33	06:44	06:54	06:14	05:56	06:06	06:33	07:03	07:32	07:06 07:28-07:42/14	07:38
	17:21	17:57	18:28	20:00	20:30	20:55	20:56	20:28	19:41	18:52	17:13	17:00
13	07:47	07:22 07:42-08:15/33	06:42	06:52	06:13	05:56	06:07	06:34	07:04	07:33	07:08 07:30-07:41/11	07:38
	17:22	17:58	18:30	20:01	20:31	20:55	20:55	20:26	19:39	18:51	17:12	17:01
14	07:47	07:21 07:40-08:14/34	06:40	06:51	06:12	05:56	06:08	06:35	07:05	07:34	07:09 07:31-07:39/8	07:39
	17:23	17:59	18:31	20:02	20:32	20:56	20:55	20:25	19:38	18:49	17:11	17:01
15	07:46	07:20 07:40-08:13/33	06:39	06:49	06:11	05:56	06:09	06:36	07:06	07:35	07:10 07:32-07:36/4	07:40
	17:24	18:01	18:32	20:03	20:33	20:56	20:54	20:24	19:36	18:48	17:10	17:01
16	07:46	07:19 07:40-08:11/31	06:37	06:48	06:10	05:56	06:09	06:37	07:07	07:36	07:11	07:41
	17:25	18:02	18:33	20:04	20:34	20:56	20:54	20:22	19:34	18:46	17:09	17:01
17	07:45	07:17 07:40-08:08/28	06:36	06:46	06:10	05:56	06:10	06:38	07:08	07:37	07:12	07:41
	17:26	18:03	18:34	20:05	20:35	20:57	20:53	20:21	19:33	18:45	17:09	17:02
18	07:45	07:16 07:41-08:06/25	06:34	06:45	06:09	05:56	06:11	06:39	07:09	07:38 08:23-08:27/4	07:13	07:42
	17:27	18:04	18:35	20:06	20:36	20:57	20:52	20:20	19:31	18:43	17:08	17:02
19	07:45	07:15 07:42-08:06/24	06:32	06:43	06:08	05:56	06:12	06:40	07:09	07:39 08:18-08:31/13	07:14	07:42
	17:28	18:05	18:36	20:07	20:37	20:57	20:52	20:18	19:29	18:42	17:07	17:02
20	07:44	07:13 07:42-08:04/22	06:31	06:42	06:07	05:57	06:13	06:41	07:10	07:40 08:16-08:33/17	07:16	07:43
	17:30	18:06	18:37	20:08	20:38	20:58	20:51	20:17	19:28	18:40	17:06	17:03
21	07:43	07:12 07:44-08:03/19	06:29	06:41	06:06	05:57	06:13	06:42	07:11	07:42 08:14-08:34/20	07:17	07:44
	17:31	18:08	18:38	20:09	20:39	20:58	20:50	20:15	19:26	18:39	17:06	17:03
22	07:43	07:11 07:46-08:02/16	06:28	06:39	06:05	05:57	06:14	06:43	07:12	07:43 08:12-08:35/23	07:18	07:44
	17:32	18:09	18:39	20:10	20:40	20:58	20:50	20:14	19:24	18:37	17:05	17:04
23	07:42	07:09 07:47-07:58/11	06:26	06:38	06:05	05:57	06:15	06:44	07:13	07:44 08:11-08:36/25	07:19	07:45
	17:33	18:10	18:40	20:11	20:41	20:58	20:49	20:12	19:23	18:36	17:05	17:04
24	07:42	07:08	06:24	06:36	06:04	05:57	06:16	06:45	07:14	07:45 08:10-08:36/26	07:20	07:45
	17:34	18:11	18:41	20:12	20:41	20:58	20:48	20:11	19:21	18:35	17:04	17:05
25	07:41	07:06	06:23	06:35	06:03	05:58	06:17	06:46	07:15	06:46 07:10-07:40/30	07:21	07:46
	17:35	18:12	18:42	20:13	20:42	20:59	20:47	20:09	19:19	17:33	17:04	17:05
26	07:40	07:05	06:21	06:34	06:03	05:58	06:18	06:47	07:16	06:47 07:10-07:41/31	07:22	07:46
	17:37	18:13	18:43	20:14	20:43	20:59	20:46	20:08	19:18	17:32	17:03	17:06
27	07:39 07:59-08:03/4	07:04	06:19	06:32	06:02	05:58	06:19	06:48	07:17	06:48 07:09-07:43/34	07:23	07:46
	17:38	18:14	18:44	20:15	20:44	20:59	20:45	20:06	19:16	17:31	17:03	17:07
28	07:39 07:59-08:07/8	07:02	06:18	06:31	06:01	05:59	06:19	06:49	07:18	06:49 07:10-07:43/33	07:24	07:47
	17:39	18:15	18:45	20:16	20:45	20:59	20:44	20:05	19:15	17:29	17:02	17:07
29	07:38 07:58-08:09/11		07:16	06:30	06:01	05:59	06:20	06:50	07:19	06:50 07:11-07:44/33	07:25	07:47
	17:40		19:46	20:17	20:46	20:59	20:43	20:03	19:13	17:28	17:02	17:08
30	07:37 07:57-08:11/14		07:15	06:28	06:00	06:00	06:21	06:51	07:20	06:51 07:13-07:46/33	07:26	07:47
	17:41		19:47	20:18	20:46	20:59	20:42	20:02	19:11	17:27	17:02	17:09
31	07:36 07:56-08:12/16		07:13		06:00		06:22	06:52		06:53 07:14-07:46/32		07:47
	17:43		19:48		20:47		20:41	20:00		17:26		17:09
Potential sun hours	300	299	370	397	446	449	456	426	374	346	300	291
Sum of minutes with flicker	53	595	0	0	0	0	0	0	0	354	305	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

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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:
30/11/2022 09:30/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_2022_10_17_revWTG: BA03 - Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (47)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:35	07:01	07:11 07:30-08:20/50	06:27	05:59	06:00	06:23	06:52 07:16-08:11/55	07:21	06:54	07:27
	17:10	17:44	18:17	19:49	20:19	20:48	20:59	20:40	19:59	19:10	17:24	17:01
2	07:48	07:34	06:59	07:10 07:28-08:20/52	06:26	05:59	06:00	06:24	06:53 07:15-08:11/56	07:22	06:55	07:28
	17:11	17:45	18:18	19:50	20:21	20:49	20:58	20:39	19:57	19:08	17:23	17:01
3	07:48	07:33	06:58	07:08 07:26-08:19/53	06:24	05:58	06:01	06:25	06:54 07:15-08:12/57	07:23	06:56	07:29
	17:12	17:46	18:19	19:51	20:22	20:49	20:58	20:38	19:56	19:06	17:22	17:01
4	07:48	07:32	06:56	07:07 07:25-08:19/54	06:23	05:58	06:01	06:26	06:55 07:16-08:13/57	07:24	06:57	07:30
	17:13	17:47	18:20	19:52	20:23	20:50	20:58	20:37	19:54	19:05	17:21	17:01
5	07:48	07:31	06:55	07:05 07:23-08:18/55	06:22	05:58	06:02	06:27	06:56 07:17-08:13/56	07:25	06:58	07:31
	17:14	17:49	18:21	19:53	20:24	20:51	20:58	20:36	19:52	19:03	17:20	17:00
6	07:48	07:30	06:53	07:03 07:22-08:17/55	06:21	05:57	06:03	06:28	06:57 07:17-08:12/55	07:26	06:59	07:32
	17:15	17:50	18:22	19:54	20:25	20:51	20:58	20:35	19:51	19:02	17:19	17:00
7	07:48	07:29	06:51	07:02 07:20-08:16/56	06:20	05:57	06:03	06:29	06:58 07:18-08:13/55	07:27	07:01	07:33
	17:16	17:51	18:23	19:55	20:26	20:52	20:57	20:34	19:49	19:00	17:18	17:00
8	07:48	07:28	06:50	07:00 07:18-08:15/57	06:19	05:57	06:04	06:30	06:59 07:19-08:13/54	07:28	07:02	07:34
	17:17	17:52	18:24	19:56	20:27	20:52	20:57	20:33	19:48	18:58	17:17	17:00
9	07:48	07:27	06:48	06:59 07:17-08:14/57	06:17	05:57	06:04	06:31	07:00 07:20-08:13/53	07:29	07:03	07:35
	17:18	17:53	18:25	19:57	20:28	20:53	20:57	20:31	19:46	18:57	17:16	17:00
10	07:48	07:26	06:47	06:57 07:16-08:12/56	06:16	05:57	06:05	06:31	07:01 07:21-08:13/52	07:30	07:04	07:36
	17:19	17:55	18:26	19:58	20:28	20:54	20:56	20:30	19:44	18:55	17:15	17:00
11	07:47	07:25	06:45	06:55 07:17-08:12/55	06:15	05:56	06:06	06:32	07:02 07:22-08:13/51	07:31	07:05	07:37
	17:20	17:56	18:27	19:59	20:29	20:54	20:56	20:29	19:43	18:54	17:14	17:00
12	07:47	07:24	06:44	06:54 07:18-08:10/52	06:14	05:56	06:06	06:33	07:03 07:23-08:12/49	07:32	07:06	07:38
	17:21	17:57	18:28	20:00	20:30	20:55	20:56	20:28	19:41	18:52	17:13	17:00
13	07:47	07:22	06:42	06:52 07:20-08:08/48	06:13	05:56	06:07	06:34	07:04 07:24-08:12/48	07:33	07:08	07:38
	17:22	17:58	18:30	20:01	20:31	20:55	20:55	20:26	19:39	18:51	17:12	17:01
14	07:47	07:21	06:40	06:51 07:34-08:06/32	06:12	05:56	06:08	06:35	07:05 07:25-08:11/46	07:34	07:09	07:39
	17:23	17:59	18:31	20:02 07:21-07:31/10	20:32	20:56	20:55	20:25	19:38	18:49	17:11	17:01
15	07:46	07:20	06:39	06:49 07:36-08:04/28	06:11	05:56	06:09	06:36	07:06 07:26-08:11/45	07:35	07:10	07:40
	17:24	18:01	18:32	20:03	20:33	20:56	20:54	20:24	19:36	18:48	17:10	17:01
16	07:46	07:19	06:37 06:56-07:04/8	06:48 07:38-08:01/23	06:10	05:56	06:09	06:37	07:07 07:27-08:10/43	07:36	07:11	07:41
	17:25	18:02	18:33	20:04	20:34	20:56	20:54	20:22	19:34	18:46	17:09	17:01
17	07:45	07:17	06:36 06:54-07:09/15	06:46 07:41-07:58/17	06:09	05:56	06:10	06:38	07:08 07:27-08:08/41	07:37	07:12	07:41
	17:26	18:03	18:34	20:05	20:35	20:57	20:53	20:21	19:33	18:45	17:09	17:02
18	07:45	07:16	06:34 06:52-07:11/19	06:45 07:46-07:52/6	06:09	05:56	06:11	06:39	07:08 07:28-08:07/39	07:38	07:13	07:42
	17:27	18:04	18:35	20:06	20:36	20:57	20:52	20:20	19:31	18:43	17:08	17:02
19	07:45	07:15	06:32 06:51-07:14/23	06:43	06:08	05:56	06:12	06:40	07:09 07:29-08:06/37	07:39	07:14	07:42
	17:28	18:05	18:36	20:07	20:37	20:57	20:52	20:18	19:29	18:42	17:07	17:02
20	07:44	07:13	06:31 06:49-07:15/26	06:42	06:07	05:57	06:13	06:41	07:10 07:30-08:05/35	07:40	07:16	07:43
	17:30	18:06	18:37	20:08	20:38	20:58	20:51	20:17	19:28	18:40	17:06	17:03
21	07:43	07:12	06:29 06:48-07:17/29	06:41	06:06	05:57	06:13	06:42	07:11 07:31-08:04/33	07:42	07:17	07:44
	17:31	18:08	18:38	20:09	20:39	20:58	20:50	20:15	19:26	18:39	17:06	17:03
22	07:43	07:11	06:28 06:46-07:18/32	06:39	06:05	05:57	06:14	06:43	07:12 07:32-08:02/30	07:43	07:18	07:44
	17:32	18:09	18:39	20:10	20:40	20:58	20:50	20:14	19:24	18:37	17:05	17:04
23	07:42	07:09	06:26 06:44-07:19/35	06:38	06:05	05:57	06:15	06:44	07:13 07:33-08:00/27	07:44	07:19	07:45
	17:33	18:10	18:40	20:11	20:41	20:58	20:49	20:12	19:23	18:36	17:05	17:04
24	07:42	07:08	06:24 06:43-07:20/37	06:36	06:04	05:57	06:16	06:45	07:14 07:34-07:58/24	07:45	07:20	07:45
	17:34	18:11	18:41	20:12	20:41	20:58	20:48	20:11	19:21	18:35	17:04	17:05
25	07:41	07:06	06:23 06:41-07:20/39	06:35	06:03	05:58	06:17	06:46 07:49-07:57/8	07:15 07:35-07:56/21	06:46	07:21	07:46
	17:35	18:12	18:42	20:13	20:42	20:59	20:47	20:09	19:19	17:33	17:04	17:05
26	07:40	07:05	06:21 06:39-07:20/41	06:34	06:03	05:58	06:18	06:47 07:42-08:01/19	07:16 07:36-07:53/17	06:47	07:22	07:46
	17:37	18:13	18:43	20:14	20:43	20:59	20:46	20:08	19:18	17:32	17:03	17:06
27	07:39	07:04	06:19 06:38-07:21/43	06:32	06:02	05:58	06:19	06:48 07:39-08:03/24	07:17 07:37-07:48/11	06:48	07:23	07:46
	17:38	18:14	18:44	20:15	20:44	20:59	20:45	20:06	19:16	17:31	17:03	17:07
28	07:39	07:02	06:18 06:36-07:21/45	06:31	06:01	05:59	06:19	06:49 07:37-08:05/28	07:18	06:49	07:24	07:47
	17:39	18:15	18:45	20:16	20:45	20:59	20:44	20:05	19:15	17:29	17:02	17:07
29	07:38		07:16 07:34-08:20/46	06:30	06:01	05:59	06:20	06:50 07:35-08:07/32	07:19	06:50	07:25	07:47
	17:40		19:46	20:17	20:46	20:59	20:43	20:03 07:22-07:32/10	19:13	17:28	17:02	17:08
30	07:37		07:15 07:33-08:21/48	06:28	06:00	06:00	06:21	06:51 07:20-08:08/48	07:20	06:51	07:26	07:47
	17:41		19:47	20:18	20:46	20:59	20:42	20:02	19:11	17:27	17:02	17:09
31	07:36		07:13 07:31-08:20/49		06:00		06:22	06:52 07:18-08:10/52		06:53		07:47
	17:43		19:48		20:47		20:41	20:00		17:26		17:09
Potential sun hours	300	299	370	397	446	449	456	426	374	346	300	291
Sum of minutes with flicker	0	0	535	816	0	0	0	221	1147	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

Licensed user:
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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_2022_10_17_revWTG: BA04 - Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (45)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:35	07:01	07:11	06:27	05:59	06:00	06:23	06:52	07:21	06:54	07:27
	17:11	17:44	18:17	19:49	20:19	20:48	20:59	20:40	19:59	19:10	17:24	17:01
2	07:48	07:34	06:59	07:10	06:26	05:59	06:01	06:24	06:53	07:22	06:55	07:28
	17:11	17:45	18:18	19:50	20:21	20:49	20:58	20:39	19:57	19:08	17:23	17:01
3	07:48	07:33	06:58	07:08	06:25	05:58	06:01	06:25	06:54	07:23	06:56	07:29
	17:12	17:46	18:19	19:51	20:22	20:49	20:58	20:38	19:56	19:06	17:22	17:01
4	07:48	07:32	06:56	07:07	06:23	05:58	06:02	06:26	06:55	07:24	06:57	07:30
	17:13	17:47	18:20	19:52	20:23	20:50	20:58	20:37	19:54	19:05	17:21	17:01
5	07:48	07:31	06:55	07:05	06:22	05:58	06:02	06:27	06:56	07:25	06:58	07:31
	17:14	17:49	18:21	19:53	20:24	20:51	20:58	20:36	19:52	19:03	17:20	17:00
6	07:48	07:30	06:53	07:03	06:21	05:57	06:03	06:28	06:57	07:26	06:59	07:32
	17:15	17:50	18:22	19:54	20:25	20:51	20:58	20:35	19:51	19:02	17:19	17:00
7	07:48	07:29	06:51	07:02	06:20	05:57	06:03	06:29	06:58	07:27	07:01	07:33
	17:16	17:51	18:23	19:55	20:26	20:52	20:57	20:34	19:49	19:00	17:18	17:00
8	07:48	07:28	06:50	07:00	06:19	05:57	06:04	06:30	06:59	07:28	07:02	07:34
	17:17	17:52	18:24	19:56	20:27	20:52	20:57	20:33	19:48	18:58	17:17	17:00
9	07:48	07:27	06:48	06:59	06:18	05:57	06:04	06:31	07:00	07:29	07:03	07:35
	17:18	17:53	18:25	19:57	20:28	20:53	20:57	20:31	19:46	18:57	17:16	17:00
10	07:48	07:26	06:47	06:57	06:16	05:57	06:05	06:32	07:01	07:30	07:04	07:36
	17:19	17:55	18:26	19:58	20:28	20:54	20:56	20:30	19:44	18:55	17:15	17:00
11	07:47	07:25	06:45	06:56	06:15	05:56	06:06	06:32	07:02	07:31	07:05	07:37
	17:20	17:56	18:27	19:59	20:29	20:54	20:56	20:29	19:43	18:54	17:14	17:00
12	07:47	07:24	06:44	06:54	06:14	05:56	06:06	06:33	07:03	07:32	07:06	07:38
	17:21	17:57	18:28	20:00	20:30	20:55	20:56	20:28	19:41	18:52	17:13	17:01
13	07:47	07:22	06:42	06:52	06:13	05:56	06:07	06:34	07:04	07:33	07:08	07:38
	17:22	17:58	18:30	20:01	20:31	20:55	20:55	20:26	19:39	18:51	17:12	17:01
14	07:47	07:21	06:40	06:51	06:12	05:56	06:08	06:35	07:05	07:34	07:09	07:39
	17:23	17:59	18:31	20:02	20:32	20:56	20:55	20:25	19:38	18:49	17:11	17:01
15	07:46	07:20	06:39	06:49	06:11	05:56	06:09	06:36	07:06	07:35	07:10	07:40
	17:24	18:01	18:32	20:03	20:33	20:56	20:54	20:24	19:36	18:48	17:10	17:01
16	07:46	07:19	06:37	06:48	06:10	05:56	06:09	06:37	07:07	07:36	07:11	07:41
	17:25	18:02	18:33	20:04	20:34	20:56	20:54	20:22	19:34	18:46	17:09	17:01
17	07:45	07:17	06:36	06:46	06:10	05:56	06:10	06:38	07:08	07:37	07:12	07:41
	17:26	18:03	18:34	20:05	20:35	20:57	20:53	20:21	19:33	18:45	17:09	17:02
18	07:45	07:16	06:34	06:45	06:09	05:56	06:11	06:39	07:09	07:38	07:13	07:42
	17:27	18:04	18:35	20:06	20:36	20:57	20:52	20:20	19:31	18:43	17:08	17:02
19	07:44	07:15	06:32	06:43	06:08	05:56	06:12	06:40	07:09	07:39	07:14	07:42
	17:28	18:05	18:36	20:07	20:37	20:57	20:52	20:18	19:29	18:42	17:07	17:02
20	07:44	07:13	06:31	06:42	06:07	05:57	06:13	06:41	07:10	07:40	07:16	07:43
	17:30	18:06	18:37	20:08	20:38	20:58	20:51	20:17	19:28	18:40	17:06	17:03
21	07:43	07:12	06:29	06:41	06:06	05:57	06:13	06:42	07:11	07:42	07:17	07:44
	17:31	18:08	18:38	20:09	20:39	20:58	20:50	20:15	19:26	18:39	17:06	17:03
22	07:43	07:11	06:28	06:39	06:05	05:57	06:14	06:43	07:12	07:43	07:18	07:44
	17:32	18:09	18:39	20:10	20:40	20:58	20:49	20:14	19:24	18:37	17:05	17:04
23	07:42	07:09	06:26	06:38	06:05	05:57	06:15	06:44	07:13	07:44	07:19	07:45
	17:33	18:10	18:40	20:11	20:41	20:58	20:49	20:12	19:23	18:36	17:05	17:04
24	07:42	07:08	06:24	06:36	06:04	05:57	06:16	06:45	07:14	07:45	07:20	07:45
	17:34	18:11	18:41	20:12	20:41	20:58	20:48	20:11	19:21	18:35	17:04	17:05
25	07:41	07:06	06:23	06:35	06:03	05:58	06:17	06:46	07:15	06:46	07:21	07:46
	17:35	18:12	18:42	20:13	20:42	20:59	20:47	20:09	19:19	17:33	17:04	17:05
26	07:40	07:05	06:21	06:34	06:03	05:58	06:18	06:47	07:16	06:47	07:22	07:46
	17:37	18:13	18:43	20:14	20:43	20:59	20:46	20:08	19:18	17:32	17:03	17:06
27	07:39	07:04	06:19	06:32	06:02	05:58	06:19	06:48	07:17	06:48	07:23	07:46
	17:38	18:14	18:44	20:15	20:44	20:59	20:45	20:06	19:16	17:31	17:03	17:07
28	07:39	07:02	06:18	06:31	06:01	05:59	06:19	06:49	07:18	06:49	07:24	07:47
	17:39	18:15	18:45	20:16	20:45	20:59	20:44	20:05	19:15	17:29	17:02	17:07
29	07:38		07:16	06:30	06:01	05:59	06:20	06:50	07:19	06:50	07:25	07:47
	17:40		19:46	20:17	20:46	20:59	20:43	20:03	19:13	17:28	17:02	17:08
30	07:37		07:15	06:28	06:00	06:00	06:21	06:51	07:20	06:51	07:26	07:47
	17:41		19:47	20:18	20:46	20:59	20:42	20:02	19:11	17:27	17:02	17:09
31	07:36		07:13		06:00		06:22	06:52		06:53		07:47
	17:43		19:48		20:47		20:41	20:00		17:26		17:09
Potential sun hours	300	299	370	397	446	449	456	426	374	346	300	291
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_2022_10_17_revWTG: BA05 - Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (49)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:35	07:01	07:11	06:27	05:59	06:00	06:23	06:52	07:21	06:54	07:28
	17:10	17:44	18:17	19:49	20:20	20:48	20:59	20:41	19:59	19:10	17:24	17:01
2	07:48	07:34	06:59	07:10	06:26	05:59	06:00	06:24	06:53	07:22	06:55	07:29
	17:11	17:45	18:18	19:50	20:21	20:49	20:59	20:39	19:57	19:08	17:23	17:01
3	07:48	07:33	06:58	07:08	06:24	05:58	06:01	06:25	06:54	07:23	06:56	07:30
	17:12	17:46	18:19	19:51	20:22	20:49	20:58	20:38	19:56	19:06	17:22	17:01
4	07:48	07:32	06:56	07:07	06:23	05:58	06:01	06:26	06:55	07:24	06:57	07:30
	17:13	17:47	18:20	19:52	20:23	20:50	20:58	20:37	19:54	19:05	17:21	17:01
5	07:48	07:31	06:55	07:05	06:22	05:58	06:02	06:27	06:56	07:25	06:58	07:31
	17:14	17:49	18:21	19:53	20:24	20:51	20:58	20:36	19:52	19:03	17:20	17:00
6	07:48	07:30	06:53	07:03	06:21	05:57	06:03	06:28	06:57	07:26	07:00	07:32
	17:15	17:50	18:22	19:54	20:25	20:51	20:58	20:35	19:51	19:02	17:19	17:00
7	07:48	07:29	06:52	07:02	06:20	05:57	06:03	06:29	06:58	07:27	07:01	07:33
	17:16	17:51	18:23	19:55	20:26	20:52	20:58	20:34	19:49	19:00	17:18	17:00
8	07:48	07:28	06:50	07:00	06:19	05:57	06:04	06:30	06:59	07:28	07:02	07:34
	17:17	17:52	18:24	19:56	20:27	20:53	20:57	20:33	19:48	18:58	17:17	17:00
9	07:48	07:27	06:48	06:59	06:17	05:57	06:04	06:31	07:00	07:29	07:03	07:35
	17:18	17:53	18:25	19:57	20:28	20:53	20:57	20:31	19:46	18:57	17:16	17:00
10	07:48	07:26	06:47	06:57	06:16	05:57	06:05	06:32	07:01	07:30	07:04	07:36
	17:19	17:55	18:26	19:58	20:29	20:54	20:57	20:30	19:44	18:55	17:15	17:00
11	07:47	07:25	06:45	06:56	06:15	05:56	06:06	06:32	07:02	07:31	07:05	07:37
	17:20	17:56	18:27	19:59	20:30	20:54	20:56	20:29	19:43	18:54	17:14	17:00
12	07:47	07:24	06:44	06:54	06:14	05:56	06:06	06:33	07:03	07:32	07:06	07:38
	17:21	17:57	18:28	20:00	20:30	20:55	20:56	20:28	19:41	18:52	17:13	17:00
13	07:47	07:22	06:42	06:52	06:13	05:56	06:07	06:34	07:04	07:33	07:08	07:38
	17:22	17:58	18:30	20:01	20:31	20:55	20:55	20:26	19:39	18:51	17:12	17:01
14	07:47	07:21	06:41	06:51	06:12	05:56	06:08	06:35	07:05	07:34	07:09	07:39
	17:23	17:59	18:31	20:02	20:32	20:56	20:55	20:25	19:38	18:49	17:11	17:01
15	07:46	07:20	06:39	06:49	06:11	05:56	06:09	06:36	07:06	07:35	07:10	07:40
	17:24	18:01	18:32	20:03	20:33	20:56	20:54	20:24	19:36	18:48	17:10	17:01
16	07:46	07:19	06:37	06:48	06:10	05:56	06:09	06:37	07:07	07:36	07:11	07:41
	17:25	18:02	18:33	20:04	20:34	20:56	20:54	20:22	19:34	18:46	17:09	17:01
17	07:45	07:17	06:36	06:46	06:09	05:56	06:10	06:38	07:08	07:37	07:12	07:41
	17:26	18:03	18:34	20:05	20:35	20:57	20:53	20:21	19:33	18:45	17:09	17:02
18	07:45	07:16	06:34	06:45	06:09	05:56	06:11	06:39	07:09	07:38	07:13	07:42
	17:27	18:04	18:35	20:06	20:36	20:57	20:52	20:20	19:31	18:43	17:08	17:02
19	07:45	07:15	06:32	06:43	06:08	05:56	06:12	06:40	07:09	07:39	07:14	07:43
	17:28	18:05	18:36	20:07	20:37	20:57	20:52	20:18	19:29	18:42	17:07	17:02
20	07:44	07:13	06:31	06:42	06:07	05:57	06:13	06:41	07:10	07:41	07:16	07:43
	17:30	18:06	18:37	20:08	20:38	20:58	20:51	20:17	19:28	18:40	17:06	17:03
21	07:43	07:12	06:29	06:41	06:06	05:57	06:13	06:42	07:11	07:42	07:17	07:44
	17:31	18:08	18:38	20:09	20:39	20:58	20:50	20:15	19:26	18:39	17:06	17:03
22	07:43	07:11	06:28	06:39	06:05	05:57	06:14	06:43	07:12	07:43	07:18	07:44
	17:32	18:09	18:39	20:10	20:40	20:58	20:50	20:14	19:24	18:37	17:05	17:04
23	07:42	07:09	06:26	06:38	06:05	05:57	06:15	06:44	07:13	07:44	07:19	07:45
	17:33	18:10	18:40	20:11	20:41	20:58	20:49	20:12	19:23	18:36	17:05	17:04
24	07:42	07:08	06:24	06:36	06:04	05:57	06:16	06:45	07:14	07:45	07:20	07:45
	17:34	18:11	18:41	20:12	20:42	20:58	20:48	20:11	19:21	18:35	17:04	17:05
25	07:41	07:06	06:23	06:35	06:03	05:58	06:17	06:46	07:15	06:46	07:21	07:46
	17:35	18:12	18:42	20:13	20:42	20:59	20:47	20:10	19:20	17:33	17:04	17:05
26	07:40	07:05	06:21	06:34	06:03	05:58	06:18	06:47	07:16	06:47	07:22	07:46
	17:37	18:13	18:43	20:14	20:43	20:59	20:46	20:08	19:18	17:32	17:03	17:06
27	07:39	07:04	06:19	06:32	06:02	05:58	06:19	06:48	07:17	06:48	07:23	07:46
	17:38	18:14	18:44	20:15	20:44	20:59	20:45	20:07	19:16	17:31	17:03	17:07
28	07:39	07:02	06:18	06:31	06:01	05:59	06:19	06:49	07:18	06:49	07:24	07:47
	17:39	18:15	18:45	20:17	20:45	20:59	20:44	20:05	19:15	17:29	17:02	17:07
29	07:38		07:16	06:30	06:01	05:59	06:20	06:50	07:19	06:50	07:25	07:47
	17:40		19:46	20:18	20:46	20:59	20:44	20:03	19:13	17:28	17:02	17:08
30	07:37		07:15	06:28	06:00	06:00	06:21	06:51	07:20	06:52	07:26	07:47
	17:41		19:47	20:19	20:46	20:59	20:43	20:02	19:11	17:27	17:02	17:09
31	07:36		07:13		06:00		06:22	06:52		06:53		07:47
	17:43		19:48		20:47		20:42	20:00		17:26		17:09
Potential sun hours	300	299	370	397	446	449	456	426	374	346	300	291
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_2022_10_17_revWTG: PA06 - Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (48)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:35	07:01	07:11	06:27	05:59 06:27-06:51/24	06:00 06:39-06:51/12	06:23 06:45-07:04/19	06:52	07:21	06:54	07:27
	17:10	17:44	18:17	19:49	20:19	20:48	20:59	20:40	19:59	19:10	17:24	17:01
2	07:48	07:34	06:59	07:10	06:26	05:59 06:28-06:51/23	06:00 06:39-06:53/14	06:24 06:46-07:04/18	06:53	07:22	06:55	07:28
	17:11	17:45	18:18	19:50	20:20	20:49	20:58	20:39	19:57	19:08	17:23	17:01
3	07:48	07:33	06:58	07:08	06:24	05:58 06:29-06:51/22	06:01 06:38-06:53/15	06:25 06:47-07:03/16	06:54	07:23	06:56	07:29
	17:12	17:46	18:19	19:51	20:22	20:49	20:58	20:38	19:56	19:06	17:22	17:01
4	07:48	07:32	06:56	07:06	06:23 06:42-06:46/4	05:58 06:29-06:50/21	06:01 06:38-06:54/16	06:26 06:47-07:02/15	06:55	07:24	06:57	07:30
	17:13	17:47	18:20	19:52	20:23	20:50	20:58	20:37	19:54	19:05	17:21	17:01
5	07:48	07:31	06:55	07:05	06:22 06:41-06:48/7	05:58 06:30-06:50/20	06:02 06:37-06:55/18	06:27 06:48-07:01/13	06:56	07:25	06:58	07:31
	17:14	17:49	18:21	19:53	20:24	20:51	20:58	20:36	19:52	19:03	17:20	17:00
6	07:48	07:30	06:53	07:03	06:21 06:40-06:49/9	05:57 06:31-06:50/19	06:03 06:37-06:56/19	06:28 06:49-07:00/11	06:57	07:26	06:59	07:32
	17:15	17:50	18:22	19:54	20:25	20:51	20:58	20:35	19:51	19:02	17:19	17:00
7	07:48	07:29	06:51	07:02	06:20 06:39-06:51/12	05:57 06:32-06:50/18	06:03 06:36-06:56/20	06:29 06:50-06:59/9	06:58	07:27	07:01	07:33
	17:16	17:51	18:23	19:55	20:26	20:52	20:57	20:34	19:49	19:00	17:18	17:00
8	07:48	07:28	06:50	07:00	06:19 06:38-06:52/14	05:57 06:32-06:49/17	06:04 06:36-06:57/21	06:30 06:51-06:57/6	06:59	07:28	07:02	07:34
	17:17	17:52	18:24	19:56	20:27	20:52	20:57	20:33	19:48	18:58	17:17	17:00
9	07:48	07:27	06:48	06:59	06:17 06:37-06:52/15	05:57 06:33-06:48/15	06:04 06:36-06:58/22	06:31 06:52-06:55/3	07:00	07:29	07:03	07:35
	17:18	17:53	18:25	19:57	20:27	20:53	20:57	20:31	19:46	18:57	17:16	17:00
10	07:48	07:26	06:47	06:57	06:16 06:36-06:53/17	05:56 06:34-06:48/14	06:05 06:35-06:58/23	06:31	07:01	07:30	07:04	07:36
	17:19	17:55	18:26	19:58	20:28	20:54	20:56	20:30	19:44	18:55	17:15	17:00
11	07:47	07:25	06:45	06:55	06:15 06:35-06:53/18	05:56 06:35-06:47/12	06:06 06:35-06:59/24	06:32	07:02	07:31	07:05	07:37
	17:20	17:56	18:27	19:59	20:29	20:54	20:56	20:29	19:43	18:54	17:14	17:00
12	07:47	07:24	06:44	06:54	06:14 06:34-06:54/20	05:56 06:36-06:47/11	06:06 06:35-07:00/25	06:33	07:03	07:32	07:06	07:38
	17:21	17:57	18:28	20:00	20:30	20:55	20:56	20:28	19:41	18:52	17:13	17:00
13	07:47	07:22	06:42	06:52	06:13 06:33-06:54/21	05:56 06:37-06:46/9	06:07 06:34-07:00/26	06:34	07:04	07:33	07:08	07:38
	17:22	17:58	18:30	20:01	20:31	20:55	20:55	20:26	19:39	18:51	17:12	17:01
14	07:47	07:21	06:40	06:51	06:12 06:32-06:54/22	05:56 06:38-06:46/8	06:08 06:34-07:01/27	06:35	07:05	07:34	07:09	07:39
	17:23	17:59	18:31	20:02	20:32	20:56	20:55	20:25	19:38	18:49	17:11	17:01
15	07:46	07:20	06:39	06:49	06:11 06:31-06:54/23	05:56 06:39-06:45/6	06:09 06:34-07:02/28	06:36	07:06	07:35	07:10	07:40
	17:24	18:01	18:32	20:03	20:33	20:56	20:54	20:24	19:36	18:48	17:10	17:01
16	07:46	07:19	06:37	06:48	06:10 06:30-06:54/24	05:56 06:40-06:44/4	06:09 06:33-07:02/29	06:37	07:07	07:36	07:11	07:41
	17:25	18:02	18:33	20:04	20:34	20:56	20:54	20:22	19:34	18:46	17:09	17:01
17	07:45	07:17	06:36	06:46	06:09 06:29-06:54/25	05:56	06:10 06:33-07:03/30	06:38	07:08	07:37	07:12	07:41
	17:26	18:03	18:34	20:05	20:35	20:57	20:53	20:21	19:33	18:45	17:09	17:02
18	07:45	07:16	06:34	06:45	06:09 06:29-06:55/26	05:56	06:11 06:33-07:03/30	06:39	07:08	07:38	07:13	07:42
	17:27	18:04	18:35	20:06	20:36	20:57	20:52	20:20	19:31	18:43	17:08	17:02
19	07:44	07:15	06:32	06:43	06:08 06:28-06:55/27	05:56	06:12 06:34-07:04/30	06:40	07:09	07:39	07:14	07:42
	17:28	18:05	18:36	20:07	20:37	20:57	20:52	20:18	19:29	18:42	17:07	17:02
20	07:44	07:13	06:31	06:42	06:07 06:27-06:55/28	05:56	06:12 06:35-07:05/30	06:41	07:10	07:40	07:16	07:43
	17:30	18:06	18:37	20:08	20:38	20:58	20:51	20:17	19:28	18:40	17:06	17:03
21	07:43	07:12	06:29	06:40	06:06 06:26-06:54/28	05:57	06:13 06:35-07:04/29	06:42	07:11	07:42	07:17	07:44
	17:31	18:07	18:38	20:09	20:39	20:58	20:50	20:15	19:26	18:39	17:06	17:03
22	07:43	07:11	06:28	06:39	06:05 06:26-06:55/29	05:57	06:14 06:36-07:05/29	06:43	07:12	07:43	07:18	07:44
	17:32	18:09	18:39	20:10	20:40	20:58	20:49	20:14	19:24	18:37	17:05	17:04
23	07:42	07:09	06:26	06:38	06:05 06:25-06:54/29	05:57	06:15 06:37-07:05/28	06:44	07:13	07:44	07:19	07:45
	17:33	18:10	18:40	20:11	20:41	20:58	20:49	20:12	19:23	18:36	17:05	17:04
24	07:42	07:08	06:24	06:36	06:04 06:24-06:54/30	05:57	06:16 06:38-07:05/27	06:45	07:14	07:45	07:20	07:45
	17:34	18:11	18:41	20:12	20:41	20:58	20:48	20:11	19:21	18:35	17:04	17:05
25	07:41	07:06	06:23	06:35	06:03 06:24-06:54/30	05:58	06:17 06:39-07:06/27	06:46	07:15	06:46	07:21	07:46
	17:35	18:12	18:42	20:13	20:42	20:59	20:47	20:09	19:19	17:33	17:03	17:05
26	07:40	07:05	06:21	06:34	06:03 06:23-06:54/31	05:58 06:43-06:46/3	06:18 06:40-07:06/26	06:47	07:16	06:47	07:22	07:46
	17:37	18:13	18:43	20:14	20:43	20:59	20:46	20:08	19:18	17:32	17:03	17:06
27	07:39	07:04	06:19	06:32	06:02 06:24-06:54/30	05:58 06:41-06:47/6	06:18 06:40-07:05/25	06:48	07:17	06:48	07:23	07:46
	17:38	18:14	18:44	20:15	20:44	20:59	20:45	20:06	19:16	17:31	17:03	17:07
28	07:39	07:02	06:18	06:31	06:01 06:24-06:53/29	05:59 06:41-06:48/7	06:19 06:41-07:05/24	06:49	07:18	06:49	07:24	07:47
	17:39	18:15	18:45	20:16	20:45	20:59	20:44	20:05	19:15	17:29	17:02	17:07
29	07:38		07:16	06:30	06:01 06:25-06:53/28	05:59 06:40-06:49/9	06:20 06:42-07:05/23	06:50	07:19	06:50	07:25	07:47
	17:40		19:46	20:17	20:46	20:59	20:43	20:03	19:13	17:28	17:02	17:08
30	07:37		07:15	06:28	06:00 06:25-06:52/27	05:59 06:40-06:51/11	06:21 06:43-07:05/22	06:51	07:20	06:51	07:26	07:47
	17:41		19:47	20:18	20:46	20:59	20:42	20:02	19:11	17:27	17:01	17:09
31	07:36		07:13		06:00 06:26-06:52/26		06:22 06:44-07:05/21	06:51		06:53		07:47
	17:43		19:48		20:47		20:41	20:00		17:26		17:09
Potential sun hours	300	299	370	397	446	449	456	426	374	346	300	291
Sum of minutes with flicker	0	0	0	0	629	279	740	110	0	0	0	0

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

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

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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_2022_10_17_revWTG: PA07 - Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (50)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48 13:10-14:14/64	07:35	07:01	07:11	06:27	05:59	06:00	06:23	06:52	07:21	06:54	07:27 13:03-13:56/53
	17:10	17:44	18:17	19:49	20:20	20:48	20:59	20:40	19:59	19:10	17:24	17:01
2	07:48 13:11-14:14/63	07:34	06:59	07:10	06:26	05:59	06:00	06:24	06:53	07:22	06:55	07:28 13:02-13:57/55
	17:11	17:45	18:18	19:50	20:21	20:49	20:59	20:39	19:57	19:08	17:23	17:01
3	07:48 13:12-14:14/62	07:33	06:58	07:08	06:24	05:58	06:01	06:25	06:54	07:23	06:56	07:29 13:01-13:58/57
	17:12	17:46	18:19	19:51	20:22	20:49	20:58	20:38	19:56	19:06	17:22	17:01
4	07:48 13:12-14:14/62	07:32	06:56	07:06	06:23	05:58	06:01	06:26	06:55	07:24	06:57	07:30 13:01-13:59/58
	17:13	17:47	18:20	19:52	20:23	20:50	20:58	20:37	19:54	19:05	17:21	17:01
5	07:48 13:13-14:14/61	07:31	06:55	07:05	06:22	05:58	06:02	06:27	06:56	07:25	06:58	07:31 13:01-14:00/59
	17:14	17:49	18:21	19:53	20:24	20:51	20:58	20:36	19:52	19:03	17:20	17:00
6	07:48 13:15-14:15/60	07:30	06:53	07:03	06:21	05:57	06:03	06:28	06:57	07:26	06:59	07:32 13:01-14:01/60
	17:15	17:50	18:22	19:54	20:25	20:51	20:58	20:35	19:51	19:02	17:19	17:00
7	07:48 13:15-14:14/59	07:29	06:51	07:02	06:20	05:57	06:03	06:29	06:58	07:27	07:01	07:33 13:00-14:00/60
	17:16	17:51	18:23	19:55	20:26	20:52	20:57	20:34	19:49	19:00	17:18	17:00
8	07:48 13:16-14:14/58	07:28	06:50	07:00	06:19	05:57	06:04	06:30	06:59	07:28	07:02	07:34 13:00-14:01/61
	17:17	17:52	18:24	19:56	20:27	20:53	20:57	20:33	19:48	18:58	17:17	17:00
9	07:48 13:17-14:14/57	07:27	06:48	06:59	06:17	05:57	06:04	06:31	07:00	07:29	07:03	07:35 13:00-14:02/62
	17:18	17:53	18:25	19:57	20:28	20:53	20:57	20:31	19:46	18:57	17:16	17:00
10	07:48 13:19-14:14/55	07:26	06:47	06:57	06:16	05:56	06:05	06:31	07:01	07:30	07:04	07:36 13:00-14:03/63
	17:19	17:55	18:26	19:58	20:29	20:54	20:56	20:30	19:44	18:55	17:15	17:00
11	07:47 13:20-14:14/54	07:25	06:45	06:55	06:15	05:56	06:06	06:32	07:02	07:31	07:05	07:37 13:00-14:04/64
	17:20	17:56	18:27	19:59	20:29	20:54	20:56	20:29	19:43	18:54	17:14	17:00
12	07:47 13:21-14:13/52	07:24	06:44	06:54	06:14	05:56	06:06	06:33	07:03	07:32	07:06	07:38 13:00-14:05/65
	17:21	17:57	18:28	20:00	20:30	20:55	20:56	20:28	19:41	18:52	17:13	17:00
13	07:47 13:23-14:12/49	07:22	06:42	06:52	06:13	05:56	06:07	06:34	07:04	07:33	07:08	07:38 13:00-14:05/65
	17:22	17:58	18:29	20:01	20:31	20:55	20:55	20:26	19:39	18:51	17:12	17:01
14	07:47 13:25-14:12/47	07:21	06:40	06:51	06:12	05:56	06:08	06:35	07:05	07:34	07:09	07:39 13:00-14:06/66
	17:23	17:59	18:31	20:02	20:32	20:56	20:55	20:25	19:38	18:49	17:11	17:01
15	07:46 13:26-14:11/45	07:20	06:39	06:49	06:11	05:56	06:09	06:36	07:06	07:35	07:10	07:40 13:01-14:07/66
	17:24	18:00	18:32	20:03	20:33	20:56	20:54	20:24	19:36	18:48	17:10	17:01
16	07:46 13:29-14:10/41	07:19	06:37	06:48	06:10	05:56	06:09	06:37	07:07	07:36	07:11	07:41 13:01-14:08/67
	17:25	18:02	18:33	20:04	20:34	20:56	20:54	20:22	19:34	18:46	17:09	17:01
17	07:45 13:30-14:09/39	07:17	06:36	06:46	06:09	05:56	06:10	06:38	07:08	07:37	07:12	07:41 13:01-14:07/66
	17:26	18:03	18:34	20:05	20:35	20:57	20:53	20:21	19:33	18:45	17:08	17:02
18	07:45 13:33-14:08/35	07:16	06:34	06:45	06:09	05:56	06:11	06:39	07:08	07:38	07:13	07:42 13:02-14:08/66
	17:27	18:04	18:35	20:06	20:36	20:57	20:52	20:20	19:31	18:43	17:08	17:02
19	07:45 13:36-14:06/30	07:15	06:32	06:43	06:08	05:56	06:12	06:40	07:09	07:39	07:14	07:42 13:02-14:08/66
	17:28	18:05	18:36	20:07	20:37	20:57	20:52	20:18	19:29	18:42	17:07	17:02
20	07:44 13:39-14:03/24	07:13	06:31	06:42	06:07	05:56	06:12	06:41	07:10	07:40	07:16	07:43 13:02-14:09/67
	17:30	18:06	18:37	20:08	20:38	20:58	20:51	20:17	19:28	18:40	17:06	17:03
21	07:43 13:44-14:00/16	07:12	06:29	06:40	06:06	05:57	06:13	06:42	07:11	07:42	07:17 13:20-13:35/15	07:44 13:02-14:09/67
	17:31	18:07	18:38	20:09	20:39	20:58	20:50	20:15	19:26	18:39	17:06	17:03
22	07:43	07:11	06:28	06:39	06:05	05:57	06:14	06:43	07:12	07:43	07:18 13:16-13:40/24	07:44 13:03-14:10/67
	17:32	18:09	18:39	20:10	20:40	20:58	20:50	20:14	19:24	18:37	17:05	17:04
23	07:42	07:09	06:26	06:38	06:05	05:57	06:15	06:44	07:13	07:44	07:19 13:13-13:43/30	07:45 13:03-14:10/67
	17:33	18:10	18:40	20:11	20:41	20:58	20:49	20:12	19:23	18:36	17:05	17:04
24	07:42	07:08	06:24	06:36	06:04	05:57	06:16	06:45	07:14	07:45	07:20 13:10-13:45/35	07:45 13:05-14:11/66
	17:34	18:11	18:41	20:12	20:41	20:58	20:48	20:11	19:21	18:35	17:04	17:05
25	07:41	07:06	06:23	06:35	06:03	05:58	06:17	06:46	07:15	06:46	07:21 13:08-13:47/39	07:46 13:05-14:11/66
	17:35	18:12	18:42	20:13	20:42	20:59	20:47	20:09	19:19	17:33	17:03	17:05
26	07:40	07:05	06:21	06:33	06:02	05:58	06:18	06:47	07:16	06:47	07:22 13:07-13:48/41	07:46 13:05-14:11/66
	17:37	18:13	18:43	20:14	20:43	20:59	20:46	20:08	19:18	17:32	17:03	17:06
27	07:39	07:04	06:19	06:32	06:02	05:58	06:18	06:48	07:17	06:48	07:23 13:05-13:50/45	07:46 13:06-14:12/66
	17:38	18:14	18:44	20:15	20:44	20:59	20:45	20:06	19:16	17:31	17:03	17:07
28	07:39	07:02	06:18	06:31	06:01	05:59	06:19	06:49	07:18	06:49	07:24 13:04-13:51/47	07:47 13:07-14:13/66
	17:39	18:15	18:45	20:16	20:45	20:59	20:44	20:05	19:15	17:29	17:02	17:07
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	17:40		19:46	20:17	20:46	20:59	20:43	20:03	19:13	17:28	17:02	17:08
30	07:37		07:15	06:28	06:00	05:59	06:21	06:51	07:20	06:51	07:26 13:03-13:55/52	07:47 13:08-14:13/65
	17:41		19:47	20:18	20:46	20:59	20:43	20:02	19:11	17:27	17:01	17:09
31	07:36		07:13		06:00		06:22	06:51		06:53		07:47 13:09-14:14/65
	17:43		19:48		20:47		20:42	20:00		17:26		17:09
Potential sun hours	300	299	370	397	446	449	456	426	374	346	300	291
Sum of minutes with flicker	1033	0	0	0	0	0	0	0	0	0	377	1973

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

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

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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_2022_10_17_revWTG: PA08 - Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (52)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January	February	March	April	May	June
1	07:48	07:35 16:28-17:19/51	07:01	07:11	06:27 07:14-07:36/22	05:59
	17:10	17:44	18:16	19:49	20:19	20:48
2	07:48	07:34 16:28-17:20/52	06:59	07:10	06:26 07:16-07:35/19	05:59
	17:11	17:45	18:18	19:50	20:20	20:49
3	07:48	07:33 16:28-17:20/52	06:58	07:08	06:24 07:16-07:32/16	05:58
	17:12	17:46	18:19	19:51	20:21	20:49
4	07:48	07:32 16:28-17:20/52	06:56	07:06	06:23 07:18-07:30/12	05:58
	17:13	17:47	18:20	19:52	20:22	20:50
5	07:48	07:31 16:29-17:20/51	06:54	07:05	06:22 07:23-07:26/3	05:58
	17:14	17:48	18:21	19:53	20:23	20:51
6	07:48	07:30 16:29-17:20/51	06:53	07:03	06:21	05:57
	17:15	17:50	18:22	19:54	20:24	20:51
7	07:48 16:41-16:50/9	07:29 16:30-17:20/50	06:51	07:02	06:20	05:57
	17:16	17:51	18:23	19:55	20:25	20:52
8	07:48 16:39-16:51/12	07:28 16:29-17:19/50	06:50	07:00	06:18	05:57
	17:17	17:52	18:24	19:56	20:26	20:52
9	07:48 16:38-16:52/14	07:27 16:30-17:19/49	06:48	06:58	06:17	05:57
	17:18	17:53	18:25	19:57	20:27	20:53
10	07:48 16:37-16:54/17	07:26 16:30-17:19/49	06:47	06:57	06:16	05:56
	17:19	17:54	18:26	19:58	20:28	20:54
11	07:47 16:35-16:54/19	07:25 16:31-17:19/48	06:45	06:55	06:15	05:56
	17:20	17:56	18:27	19:59	20:29	20:54
12	07:47 16:35-16:55/20	07:24 16:32-17:18/46	06:44	06:54	06:14	05:56
	17:21	17:57	18:28	20:00	20:30	20:55
13	07:47 16:34-16:57/23	07:22 16:32-17:17/45	06:42	06:52	06:13	05:56
	17:22	17:58	18:29	20:01	20:31	20:55
14	07:47 16:33-16:57/24	07:21 16:33-17:17/44	06:40	06:51 07:24-07:33/9	06:12	05:56
	17:23	17:59	18:30	20:02	20:32	20:56
15	07:46 16:33-16:59/26	07:20 16:35-17:16/41	06:39	06:49 07:21-07:37/16	06:11	05:56
	17:24	18:00	18:32	20:03	20:33	20:56
16	07:46 16:33-17:00/27	07:19 16:36-17:15/39	06:37	06:48 07:18-07:38/20	06:10	05:56
	17:25	18:02	18:33	20:04	20:34	20:56
17	07:45 16:32-17:01/29	07:17 16:37-17:13/36	06:36	06:46 07:17-07:39/22	06:09	05:56
	17:26	18:03	18:34	20:05	20:35	20:57
18	07:45 16:32-17:03/31	07:16 16:38-17:12/34	06:34	06:45 07:15-07:40/25	06:08	05:56
	17:27	18:04	18:35	20:06	20:36	20:57
19	07:44 16:31-17:04/33	07:15 16:41-17:10/29	06:32	06:43 07:15-07:41/26	06:08	05:56
	17:28	18:05	18:36	20:07	20:37	20:57
20	07:44 16:30-17:04/34	07:13 16:42-17:08/26	06:31	06:42 07:13-07:40/27	06:07	05:56
	17:29	18:06	18:37	20:08	20:38	20:58
21	07:43 16:30-17:06/36	07:12 16:45-17:05/20	06:29	06:40 07:13-07:41/28	06:06	05:57
	17:31	18:07	18:38	20:09	20:39	20:58
22	07:43 16:29-17:07/38	07:11 16:49-17:00/11	06:27	06:39 07:13-07:41/28	06:05	05:57
	17:32	18:09	18:39	20:10	20:40	20:58
23	07:42 16:29-17:08/39	07:09	06:26	06:38 07:12-07:41/29	06:04	05:57
	17:33	18:10	18:40	20:11	20:41	20:58
24	07:42 16:29-17:10/41	07:08	06:24	06:36 07:12-07:41/29	06:04	05:57
	17:34	18:11	18:41	20:12	20:41	20:58
25	07:41 16:29-17:11/42	07:06	06:23	06:35 07:12-07:41/29	06:03	05:58
	17:35	18:12	18:42	20:13	20:42	20:59
26	07:40 16:28-17:12/44	07:05	06:21	06:33 07:12-07:40/28	06:02	05:58
	17:36	18:13	18:43	20:14	20:43	20:59
27	07:39 16:28-17:13/45	07:03	06:19	06:32 07:12-07:40/28	06:02	05:58
	17:38	18:14	18:44	20:15	20:44	20:59
28	07:39 16:29-17:15/46	07:02	06:18	06:31 07:13-07:39/26	06:01	05:59
	17:39	18:15	18:45	20:16	20:45	20:59
29	07:38 16:28-17:17/49		07:16	06:29 07:12-07:38/26	06:01	05:59
	17:40		19:46	20:17	20:46	20:59
30	07:37 16:28-17:18/50		07:14	06:28 07:13-07:37/24	06:00	05:59
	17:41		19:47	20:18	20:46	20:59
31	07:36 16:28-17:19/51		07:13		06:00	
	17:42		19:48		20:47	
Potential sun hours	300	299	370	397	446	449
Sum of minutes with flicker	799	926	0	420	72	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

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_2022_10_17_revWTG: PA08 - Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (52)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	July	August	September	October	November	December
1	06:00	06:23	06:52	07:21	06:54 16:00-16:49/49	07:27 16:18-16:37/19
	20:59	20:40	19:59	19:10	17:24	17:01
2	06:00	06:24	06:53	07:22	06:55 15:59-16:49/50	07:28 16:20-16:37/17
	20:58	20:39	19:57	19:08	17:23	17:01
3	06:01	06:25	06:54	07:23	06:56 15:59-16:49/50	07:29 16:22-16:36/14
	20:58	20:38	19:56	19:06	17:22	17:01
4	06:01	06:26	06:55	07:24	06:57 15:58-16:49/51	07:30 16:24-16:36/12
	20:58	20:37	19:54	19:05	17:21	17:00
5	06:02	06:27	06:56	07:25	06:58 15:59-16:50/51	07:31 16:27-16:36/9
	20:58	20:36	19:52	19:03	17:20	17:00
6	06:02	06:28	06:57	07:26	06:59 15:59-16:50/51	07:32
	20:58	20:35	19:51	19:01	17:19	17:00
7	06:03	06:29	06:58	07:27	07:01 15:58-16:50/52	07:33
	20:57	20:34	19:49	19:00	17:18	17:00
8	06:04	06:29 07:30-07:38/8	06:59	07:28	07:02 15:58-16:50/52	07:34
	20:57	20:33	19:47	18:58	17:16	17:00
9	06:04	06:30 07:27-07:41/14	07:00	07:29	07:03 15:59-16:51/52	07:35
	20:57	20:31	19:46	18:57	17:15	17:00
10	06:05	06:31 07:25-07:43/18	07:01	07:30	07:04 15:59-16:50/51	07:36
	20:56	20:30	19:44	18:55	17:14	17:00
11	06:06	06:32 07:24-07:44/20	07:02	07:31	07:05 15:59-16:50/51	07:37
	20:56	20:29	19:43	18:54	17:14	17:00
12	06:06	06:33 07:23-07:45/22	07:03	07:32	07:06 15:59-16:49/50	07:38
	20:56	20:28	19:41	18:52	17:13	17:00
13	06:07	06:34 07:22-07:46/24	07:04	07:33	07:07 16:00-16:48/48	07:38
	20:55	20:26	19:39	18:51	17:12	17:00
14	06:08	06:35 07:20-07:46/26	07:05	07:34	07:09 16:01-16:47/46	07:39
	20:55	20:25	19:38	18:49	17:11	17:01
15	06:08	06:36 07:19-07:46/27	07:06	07:35	07:10 16:01-16:46/45	07:40
	20:54	20:24	19:36	18:47	17:10	17:01
16	06:09	06:37 07:19-07:46/27	07:06	07:36	07:11 16:01-16:45/44	07:40
	20:54	20:22	19:34	18:46	17:09	17:01
17	06:10	06:38 07:18-07:47/29	07:07	07:37	07:12 16:02-16:44/42	07:41
	20:53	20:21	19:33	18:45	17:08	17:01
18	06:11	06:39 07:18-07:47/29	07:08	07:38	07:13 16:03-16:44/41	07:42
	20:52	20:20	19:31	18:43	17:08	17:02
19	06:12	06:40 07:18-07:47/29	07:09	07:39	07:14 16:04-16:43/39	07:42
	20:52	20:18	19:29	18:42	17:07	17:02
20	06:12	06:41 07:18-07:47/29	07:10	07:40 17:19-17:33/14	07:15 16:04-16:42/38	07:43
	20:51	20:17	19:28	18:40	17:06	17:03
21	06:13	06:42 07:18-07:46/28	07:11	07:41 17:15-17:37/22	07:17 16:05-16:41/36	07:44
	20:50	20:15	19:26	18:39	17:06	17:03
22	06:14	06:43 07:18-07:46/28	07:12	07:43 17:12-17:39/27	07:18 16:06-16:40/34	07:44
	20:49	20:14	19:24	18:37	17:05	17:04
23	06:15	06:44 07:18-07:45/27	07:13	07:44 17:10-17:41/31	07:19 16:08-16:41/33	07:45
	20:49	20:12	19:23	18:36	17:04	17:04
24	06:16	06:45 07:19-07:44/25	07:14	07:45 17:08-17:42/34	07:20 16:09-16:40/31	07:45
	20:48	20:11	19:21	18:35	17:04	17:05
25	06:17	06:46 07:18-07:42/24	07:15	06:46 16:06-16:43/37	07:21 16:10-16:39/29	07:46
	20:47	20:09	19:19	17:33	17:03	17:05
26	06:17	06:47 07:19-07:41/22	07:16	06:47 16:05-16:45/40	07:22 16:11-16:39/28	07:46
	20:46	20:08	19:18	17:32	17:03	17:06
27	06:18	06:48 07:20-07:40/20	07:17	06:48 16:04-16:46/42	07:23 16:12-16:38/26	07:46
	20:45	20:06	19:16	17:31	17:02	17:06
28	06:19	06:49 07:22-07:37/15	07:18	06:49 16:03-16:46/43	07:24 16:13-16:37/24	07:47
	20:44	20:05	19:14	17:29	17:02	17:07
29	06:20	06:49 07:25-07:34/9	07:19	06:50 16:02-16:47/45	07:25 16:14-16:37/23	07:47
	20:43	20:03	19:13	17:28	17:02	17:08
30	06:21	06:50	07:20	06:51 16:01-16:47/46	07:26 16:16-16:36/20	07:47
	20:42	20:02	19:11	17:27	17:01	17:09
31	06:22	06:51		06:53 16:01-16:49/48		07:47
	20:41	20:00		17:26		17:09
Potential sun hours	456	426	374	346	300	291
Sum of minutes with flicker	0	500	0	429	1237	71

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

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

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Calculated:
30/11/2022 09:30/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_2022_10_17_revWTG: PA09 - Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (51)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
143	449	956	390	293	208	72	65	111	260	286	449	1.268	1.274	124	26	6.374

	January	February	March	April	May		June	July		August		September	October	November	December
1	07:48	07:35	07:01	07:11	06:27		05:59	06:00		06:23	06:45-06:46/1	06:52	07:21	06:54	07:27
	17:10	17:44	18:16	19:49	20:19		20:48	20:59		20:40		19:59	19:10	17:24	17:01
2	07:48	07:34	06:59	07:10	06:26		05:59	06:00		06:24		06:53	07:22	06:55	07:28
	17:11	17:45	18:18	19:50	20:20		20:49	20:58		20:39		19:57	19:08	17:23	17:01
3	07:48	07:33	06:58	07:08	06:24		05:58	06:01		06:25		06:54	07:23	06:56	07:29
	17:12	17:46	18:19	19:51	20:21		20:49	20:58		20:38		19:56	19:06	17:22	17:01
4	07:48	07:32	06:56	07:06	06:23		05:58	06:01		06:26		06:55	07:24	06:57	07:30
	17:13	17:47	18:20	19:52	20:22		20:50	20:58		20:37		19:54	19:05	17:21	17:00
5	07:48	07:31	06:55	07:05	06:22		05:58	06:02		06:27		06:56	07:25	06:58	07:31
	17:14	17:49	18:21	19:53	20:23		20:51	20:58		20:36		19:52	19:03	17:20	17:00
6	07:48	07:30	06:53	07:03	06:21		05:57	06:03		06:28		06:57	07:26	06:59	07:32
	17:15	17:50	18:22	19:54	20:24		20:51	20:58		20:35		19:51	19:02	17:19	17:00
7	07:48	07:29	06:51	07:02	06:20		05:57	06:03		06:29		06:58	07:27	07:01	07:33
	17:16	17:51	18:23	19:55	20:25		20:52	20:57		20:34		19:49	19:00	17:18	17:00
8	07:48	07:28	06:50	07:00	06:19		05:57	06:04		06:30		06:59	07:28	07:02	07:34
	17:17	17:52	18:24	19:56	20:26		20:52	20:57		20:33		19:47	18:58	17:17	17:00
9	07:48	07:27	06:48	06:59	06:17		05:57	06:04		06:30		07:00	07:29	07:03	07:35
	17:18	17:53	18:25	19:57	20:27		20:53	20:57		20:31		19:46	18:57	17:16	17:00
10	07:48	07:26	06:47	06:57	06:16		05:56	06:05		06:31		07:01	07:30	07:04	07:36
	17:19	17:55	18:26	19:58	20:28		20:54	20:56		20:30		19:44	18:55	17:15	17:00
11	07:47	07:25	06:45	06:55	06:15		05:56	06:06		06:32		07:02	07:31	07:05	07:37
	17:20	17:56	18:27	19:59	20:29		20:54	20:56		20:29		19:43	18:54	17:14	17:00
12	07:47	07:24	06:44	06:54	06:14	06:34-06:35/1	05:56	06:06		06:33		07:03	07:32	07:06	07:38
	17:21	17:57	18:28	20:00	20:30		20:55	20:56		20:28		19:41	18:52	17:13	17:00
13	07:47	07:22	06:42	06:52	06:13	06:33-06:36/3	05:56	06:07	06:33-06:38/5	06:34		07:04	07:33	07:07	07:38
	17:22	17:58	18:29	20:01	20:31		20:55	20:55		20:26		19:39	18:51	17:12	17:01
14	07:47	07:21	06:40	06:51	06:12	06:32-06:36/4	05:56	06:08	06:32-06:40/8	06:35		07:05	07:34	07:09	07:39
	17:23	17:59	18:31	20:02	20:32		20:56	20:55		20:25		19:38	18:49	17:11	17:01
15	07:46	07:20	06:39	06:49	06:11	06:31-06:36/5	05:56	06:09	06:31-06:42/11	06:36		07:06	07:35	07:10	07:40
	17:24	18:00	18:32	20:03	20:33		20:56	20:54		20:24		19:36	18:48	17:10	17:01
16	07:46	07:19	06:37	06:48	06:10	06:30-06:36/6	05:56	06:09	06:31-06:42/11	06:37		07:07	07:36	07:11	07:40
	17:25	18:02	18:33	20:04	20:34		20:56	20:54		20:22		19:34	18:46	17:09	17:01
17	07:45	07:17	06:36	06:46	06:09	06:29-06:36/7	05:56	06:10	06:32-06:43/11	06:38		07:07	07:37	07:12	07:41
	17:26	18:03	18:34	20:05	20:35		20:57	20:53		20:21		19:33	18:45	17:08	17:02
18	07:45	07:16	06:34	06:45	06:09	06:29-06:37/8	05:56	06:11	06:33-06:44/11	06:39		07:08	07:38	07:13	07:42
	17:27	18:04	18:35	20:06	20:36		20:57	20:52		20:20		19:31	18:43	17:08	17:02
19	07:44	07:15	06:32	06:43	06:08	06:28-06:37/9	05:56	06:12	06:34-06:45/11	06:40		07:09	07:39	07:14	07:42
	17:28	18:05	18:36	20:07	20:37		20:57	20:52		20:18		19:29	18:42	17:07	17:02
20	07:44	07:13	06:31	06:42	06:07	06:27-06:37/10	05:56	06:12	06:35-06:46/11	06:41		07:10	07:40	07:15	07:43
	17:29	18:06	18:37	20:08	20:38		20:58	20:51		20:17		19:28	18:40	17:06	17:03
21	07:43	07:12	06:29	06:40	06:06	06:26-06:36/10	05:57	06:13	06:35-06:46/11	06:42		07:11	07:41	07:17	07:44
	17:31	18:07	18:38	20:09	20:39		20:58	20:50		20:15		19:26	18:39	17:06	17:03
22	07:43	07:11	06:27	06:39	06:05	06:26-06:37/11	05:57	06:14	06:36-06:46/10	06:43		07:12	07:43	07:18	07:44
	17:32	18:09	18:39	20:10	20:40		20:58	20:49		20:14		19:24	18:37	17:05	17:04
23	07:42	07:09	06:26	06:38	06:05	06:25-06:36/11	05:57	06:15	06:37-06:47/10	06:44		07:13	07:44	07:19	07:45
	17:33	18:10	18:40	20:11	20:41		20:58	20:49		20:12		19:23	18:36	17:05	17:04
24	07:42	07:08	06:24	06:36	06:04	06:24-06:35/11	05:57	06:16	06:38-06:47/9	06:45		07:14	07:45	07:20	07:45
	17:34	18:11	18:41	20:12	20:41		20:58	20:48		20:11		19:21	18:35	17:04	17:05
25	07:41	07:06	06:23	06:35	06:03	06:24-06:35/11	05:58	06:17	06:39-06:48/9	06:46		07:15	06:46	07:21	07:46
	17:35	18:12	18:42	20:13	20:42		20:59	20:47		20:09		19:19	17:33	17:03	17:05
26	07:40	07:05	06:21	06:33	06:02	06:23-06:34/11	05:58	06:18	06:40-06:48/8	06:47		07:16	06:47	07:22	07:46
	17:36	18:13	18:43	20:14	20:43		20:59	20:46		20:08		19:18	17:32	17:03	17:06
27	07:39	07:03	06:19	06:32	06:02	06:23-06:34/11	05:58	06:18	06:40-06:47/7	06:48		07:17	06:48	07:23	07:46
	17:38	18:14	18:44	20:15	20:44		20:59	20:45		20:06		19:16	17:31	17:03	17:06
28	07:39	07:02	06:18	06:31	06:01	06:22-06:33/11	05:59	06:19	06:41-06:47/6	06:49		07:18	06:49	07:24	07:47
	17:39	18:15	18:45	20:16	20:45		20:59	20:44		20:05		19:14	17:29	17:02	17:07
29	07:38		07:16	06:29	06:01	06:23-06:33/10	05:59	06:20	06:42-06:47/5	06:50		07:19	06:50	07:25	07:47
	17:40		19:46	20:17	20:46		20:59	20:43		20:03		19:13	17:28	17:02	17:08
30	07:37		07:14	06:28	06:00	06:24-06:31/7	05:59	06:21	06:43-06:47/4	06:50		07:20	06:51	07:26	07:47
	17:41		19:47	20:18	20:46		20:59	20:42		20:02		19:11	17:27	17:01	17:09
31	07:36		07:13		06:00			06:22	06:44-06:46/2	06:51			06:53		07:47
	17:42		19:48		20:47			20:41		20:00			17:26		17:09
Potential sun hours	300	299	370	397	446		449	456		426		374	346	300	291
Sum of minutes with flicker	0	0	0	0	157		0	160		1		0	0	0	0

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

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

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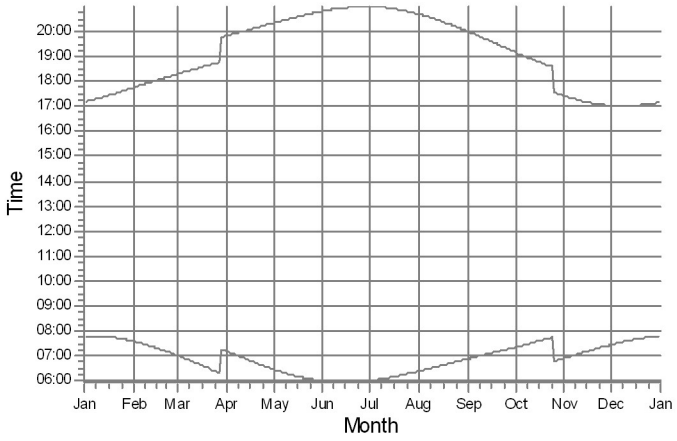
Calculated:
30/11/2022 09:30/3.4.415

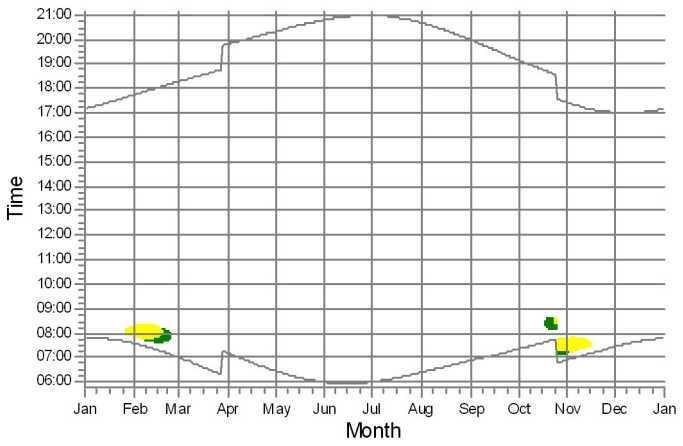
SHADOW - Calendar per WTG, graphical

Calculation: Real_case_Progetto_2022_10_17_rev

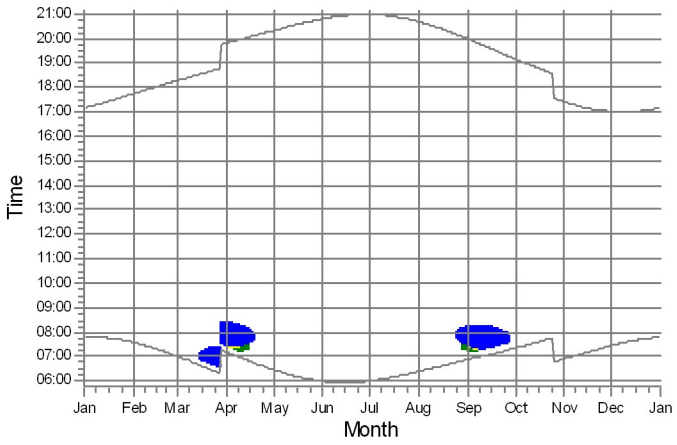
BA01: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 2



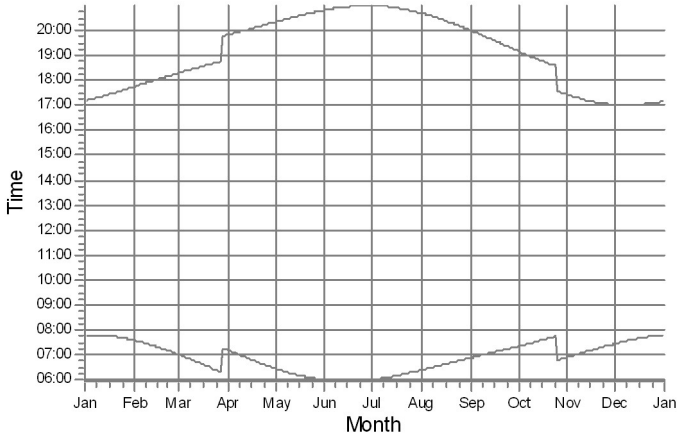
BA02: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 2



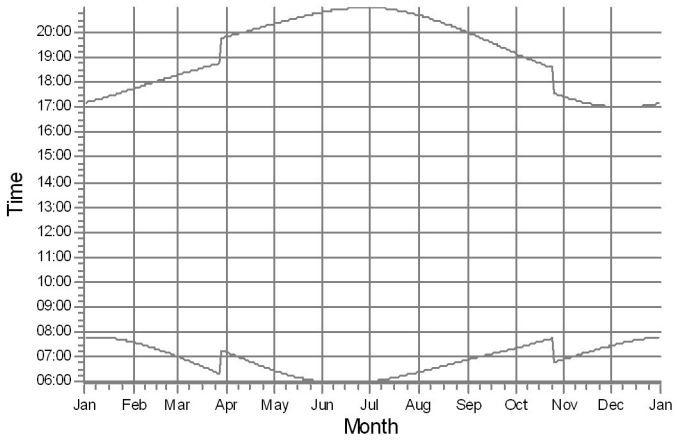
BA03: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 2



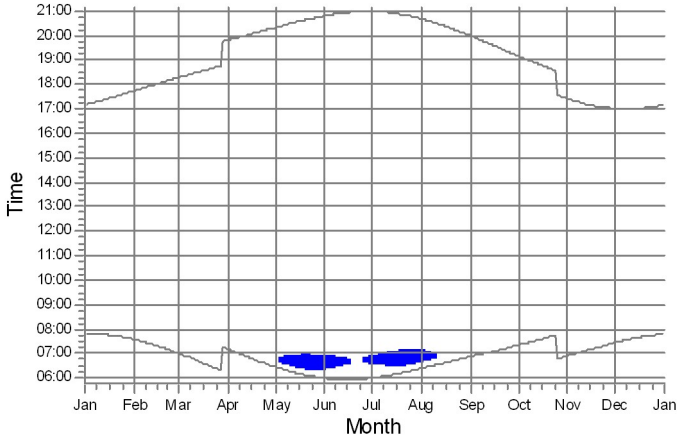
BA04: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 2



BA05: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 2



PA06: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 21



Shadow receptors

F06: Abitazione

F07: Abitazione

F14: Abitazione

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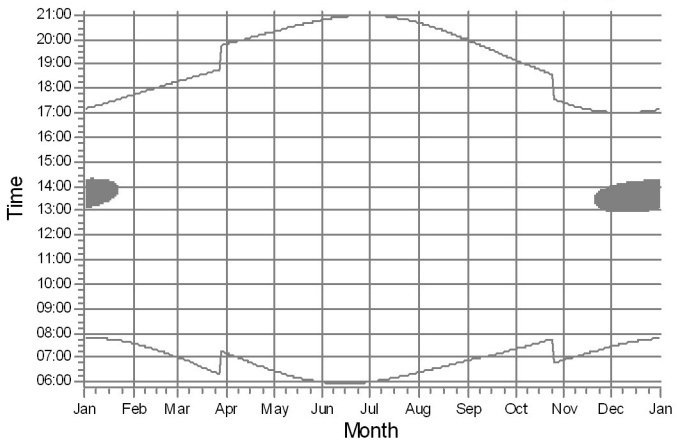
Calculated:
30/11/2022 09:30/3.4.415

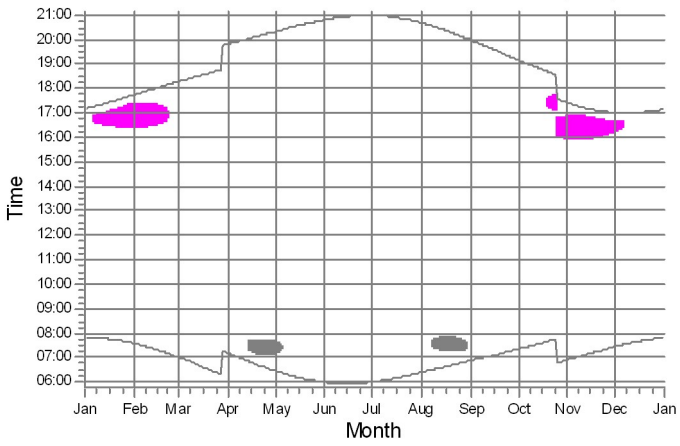
SHADOW - Calendar per WTG, graphical

Calculation: Real_case_Progetto_2022_10_17_rev

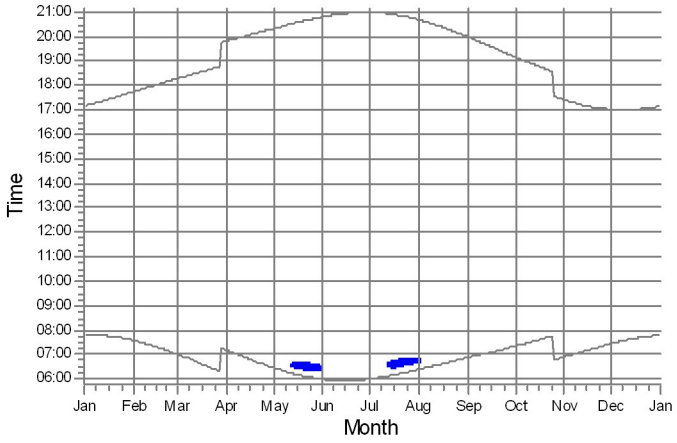
PA07: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 21



PA08: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 21



PA09: Siemens Gamesa SG 6.2-170 6200 170.0 !O! hub: 125,0 m (TOT: 21



Shadow receptors

F14: Abitazione F35: Abitazione F66: Abitazione