



PROGETTO DI COSTRUZIONE ED ESERCIZIO DI UN
IMPIANTO EOLICO DELLA POTENZA DI 99 MW
DENOMINATO "OLVINDITTA" DA REALIZZARSI NEL
COMUNE DI ALA' DEI SARDI (SS) CON LE RELATIVE OPERE
DI CONNESSIONE ELETTRICHE

ANALISI DEGLI EFFETTI DI SHADOW-FLICKERING

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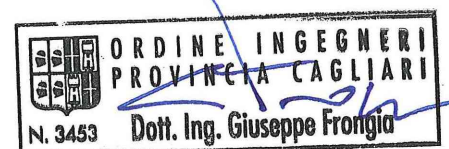
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1 Criteri generali di analisi e valutazione

Il presente elaborato, facente parte integrante dello Studio di impatto ambientale allegato al progetto del parco eolico denominato “Olvinditta”, proposto dalla Repsol Alà dei Sardi S.r.l., detenuta da Repsol Renovables SA, nel territorio di Alà dei Sardi (SS), esamina compiutamente il potenziale disturbo da ombreggiamento intermittente (*shadow flickering*) sui potenziali ricettori individuati nell’area interessata dal proposto impianto, entro una distanza indicativa di 1000 metri dagli aerogeneratori.

A tal fine, nel seguito, si farà riferimento alla ricognizione sugli edifici esistenti eseguita nell’ambito della definizione del layout di impianto e dell’analisi ambientale, i cui risultati sono riepilogati in opportune “schede fabbricati” all’interno di apposito report allegato al progetto del parco eolico (Elaborato WIND006-RA11_Report 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, allorché le ombre proiettate sono sufficientemente lunghe. Per le stesse ragioni il tremolio dell’ombra è un fenomeno particolarmente avvertito nelle regioni del nord Europa (Germania, Danimarca, ecc.) piuttosto che alle latitudini del Mediterraneo.

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

Di seguito si riassumono alcuni aspetti caratteristici del fenomeno:

- la pala delle turbine eoliche è stretta in corrispondenza dell’estremità più esterna ed assume progressivamente maggiore larghezza verso la giunzione con il mozzo. Quando una turbina è posizionata sufficientemente vicino ad un ricettore, cosicché la porzione più larga della pala oscura una porzione maggiore del campo visivo (o meglio del disco solare), l’intensità di *shadow flickering* aumenterà. A distanze maggiori l’intensità del fenomeno sarà minore in quanto le pale copriranno una porzione inferiore del disco solare;
- l’intensità del *shadow flickering* è più bassa quando l’ombra che intercetta un ricettore si origina dall’estremità esterna del rotore (minore spessore della pala). L’intensità aumenterà allorché l’ombra si muove lungo lo sviluppo della pala fino ad arrivare ad un massimo in corrispondenza del mozzo; a tal punto l’intensità diminuisce quando l’ombra si sposta verso l’estremità della pala opposta;
- bassi impatti da *shadow flickering* sono generalmente indicativi di grandi distanze tra turbine e ricettore e ombre incidenti originate dalle estremità del rotore;

situazioni di precaria visibilità determineranno modeste intensità di *S. flickering*;

- a distanze ancora maggiori le ombre proiettate risulteranno “fuori-fuoco”. Ciò non è causa di un’intensità inferiore del *shadow flickering* ma contribuisce a rendere meno distinto il fenomeno;
- all’interno di un ambiente ben illuminato le ombre svaniscono. Conseguentemente l’accensione di luci in un ambiente riduce l’incidenza del *shadow flickering*;
- schermare una finestra (con tende o quant’altro) previene il fenomeno;
- schermare un edificio (ad esempio con alberature) può rappresentare una misura di mitigazione per prevenire il fenomeno.

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

Nel caso specifico, considerando un rotore del diametro indicativo di 172 metri con una velocità massima nominale di rotazione di circa 12 RPM si avrà una frequenza di passo pari a circa 0,6 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 WIND006-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 WIND006-RA11 allegato alla documentazione progettuale.

Nel caso specifico, ai fini dei calcoli di esposizione all'ombra intermittente ed entro una distanza di 1000 m dalle postazioni eoliche, sono stati individuati come potenziali ricettori n. 14 fabbricati, aventi destinazione abitativa accertata (edifici con categoria catastale “A”) e un luogo di culto (F313 - Chiesa Santu Juanne de Sos Sonorcolos).

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

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

ID	Fabbricato	Comune	GB Est	GB Nord	Distanza dal più prossimo WTG [m]	WTG più prossimo [m]	Categoria Catasto Fabbricati
1	F008	ALA' DEI SARDI	1530796	4501224	483	T01	A04
2	F060	ALA' DEI SARDI	1531024	4497401	538	T12	A04
3	F167	ALA' DEI SARDI	1530950	4500002	726	T04	A04-C02
4	F173	ALA' DEI SARDI	1530982	4501501	632	T01	A04
5	F215	ALA' DEI SARDI	1527716	4498938	992	T10	A03
6	F279	ALA' DEI SARDI	1533053	4498732	343	T07	A04
7	F287	ALA' DEI SARDI	1532980	4498360	720	T07	A04 - C02
8	F292	ALA' DEI SARDI	1532867	4498320	795	T07	A03 - C02
9	F295	ALA' DEI SARDI	1531234	4500318	690	T04	A04 - C02
10	F313	ALA' DEI SARDI	1533080	4498211	846	T07	Pascolo
11	F315	ALA' DEI SARDI	1532977	4498215	860	T07	A04
12	F322	ALA' DEI SARDI	1533034	4498131	931	T07	A04
13	F351	ALA' DEI SARDI	1532859	4498282	833	T07	A03 - C02

4 Ipotesi alla base del calcolo e soglie di riferimento

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

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

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

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

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

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

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

- il vento deve soffiare ad una velocità superiore a 3 m/s (velocità di *cut-in* del rotore);
- presenza di luminosità solare diretta;
- l’osservatore deve risultare sufficientemente vicino alla sorgente di *shadow flickering*;
- il ricettore deve essere effettivamente esposto al campo di luce tremolante;
- l’illuminazione dell’ambiente residenziale deve essere bassa;
- il contrasto tra luci ed ombre deve essere alto;
- non devono essere presenti schermature che 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;
- 0 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.

peggiore possibile, e rappresenta quindi il massimo rischio potenziale di impatto. Per ciascun ricettore il software produce un calendario che indica i giorni ed i periodi di tempo in cui l’ombra sarà presente.

4.2 Lo scenario reale (*real case*)

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

1. Statistica delle ore di funzionamento. È il periodo in cui le turbine saranno operative per ciascuna direzione di provenienza del vento nel corso dell’anno.

2. Statistica dell’eliofania. È la percentuale di ore di sole durante il dì (dall’alba al tramonto). Questa varia notevolmente da luogo a luogo, e si rende opportuno utilizzare, pertanto, una statistica proveniente da stazioni di misura vicine al sito.

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

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

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

5 Risultati

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

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

Con riferimento allo Scenario di progetto *worst case*, 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 *WIND002-RA9-1_Carta delle ore/anno di ombreggiamento intermittente*).

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

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

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

6 Analisi e post-elaborazione dei risultati

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

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

RICETTORE	Cat. Catastale	WTG SF	WTG Più prossimo	Dist. Min. WTG	h/anno SF	h/giorno	h/anno
					Worst Case	SF Worst Case	SF Real Case
F008	A04	T01-T02	T01	483	144:54:00	01:17	50:45:00
F060	A04	T11-T12- T13-T14- T15	T12	538	217:14:00	01:35	69:55:00
F167	A04-C02	T03-T04- T05	T04	726	112:32:00	00:55	31:28:00
F173	A04	T01-T02	T01	632	116:05:00	01:01	36:02:00
F215	A03	T11	T10	992	06:18	00:19	01:42
F279	A04	T12	T07	343	03:50	00:13	00:56
F287	A04 - C02	T12	T07	720	16:29	00:24	04:26
F292	A03 - C02	T06-T12	T07	795	27:43:00	00:26	07:47
F295	A04 - C02	T03-T04- T05	T04	690	26:12:00	00:46	06:46
F313	Pascolo	T12-T15	T07	846	17:37	00:24	04:47
F315	A04	T12	T07	860	13:53	00:26	03:52
F322	A04	T12-T15	T07	931	22:56	00:25	06:12
F351	A03 - C02	T06-T12	T07	833	26:28:00	00:27	07:34
F353	A04	T06-T12	T07	884	38:17:00	00:29	10:30

Come si può osservare dall’esame della Tabella 6.1, l’incidenza dell’ombreggiamento intermittente presso i ricettori considerati nello “scenario reale” è prevalentemente al disotto del valore guida di 30 h/anno. Fanno eccezione n. 4 fabbricati su 14 totali (F008, F060, F167, F173) presso i quali l’incidenza

dell’ombreggiamento intermittente presenta una durata variabile tra 69:55 h/anno (F060) e 31:28 h/anno (F167).

Nei restanti fabbricati il potenziale effetto di shadow-flickering è da ritenersi del tutto trascurabile, risultando abbondantemente al di sotto della soglia guida con valori compresi tra 1:30 h/anno e 10:30 h/anno.

Nel seguito si procederà ad esaminare singolarmente le potenziali situazioni di maggiore incidenza del fenomeno di SF, riferibili ai fabbricati F008, F060, F167 e F173, pervenendo alla conclusione che può ragionevolmente escludersi che lo shadow-flickering possa rappresentare un effettivo disturbo a carico degli occupanti gli edifici considerati.

Ricettore F008

Il calendario grafico dell’ombra relativo al ricettore F008 (Figura 6.1) mostra come il fenomeno dello SF sia atteso nel pomeriggio dei mesi autunnali e invernali ad opera dell’aerogeneratore T02 (nella fascia oraria 16:00-18:00) nonché, nel periodo estivo (fascia oraria 19:00-20:00), ad opera dell’aerogeneratore T01.

Analizzando più in dettaglio le caratteristiche del fenomeno presso il ricettore F008 si ritiene opportuno formulare le seguenti considerazioni:

- L’ombreggiamento intermittente presso il ricettore F008, complessivamente pari a 50 h/anno, è prevalentemente attribuibile all’aerogeneratore T01 (oltre 31 h/anno – 63% circa del totale);
- La facciata maggiormente esposta al fenomeno dello SF riferibile all’aerogeneratore T01 è quella nordovest, efficacemente schermata da una fitta cortina arborea;
- risulta conseguentemente drasticamente attenuata l’incidenza dell’ombreggiamento apportato dall’aerogeneratore T01 (Figura 6.2);
- Inoltre, affinché il fenomeno sia percepito come un disturbo da parte degli occupanti l’edificio tutte le seguenti circostanze dovrebbero essere verificate:
 - o Presenza degli occupanti presso l’ambiente esposto all’ombreggiamento;
 - o Elevato contrasto luci/ombre (assenza di schermature nelle finestre)
 - o gli individui potenzialmente soggetti ad un impatto da *shadow flickering* dovrebbero permanere esposti alla luce tremolante per un tempo sufficiente ad avvertire fastidio.

Tutto ciò considerato è ragionevole affermare che l’effettivo potenziale disturbo da *shadow flickering* risulterà significativamente più contenuto di quello prospettato dal software di simulazione, tale da potersi ricondurre ai predetti “valori guida” di 30 h/anno e da non arrecare apprezzabili disturbi agli occupanti l’edificio in esame.

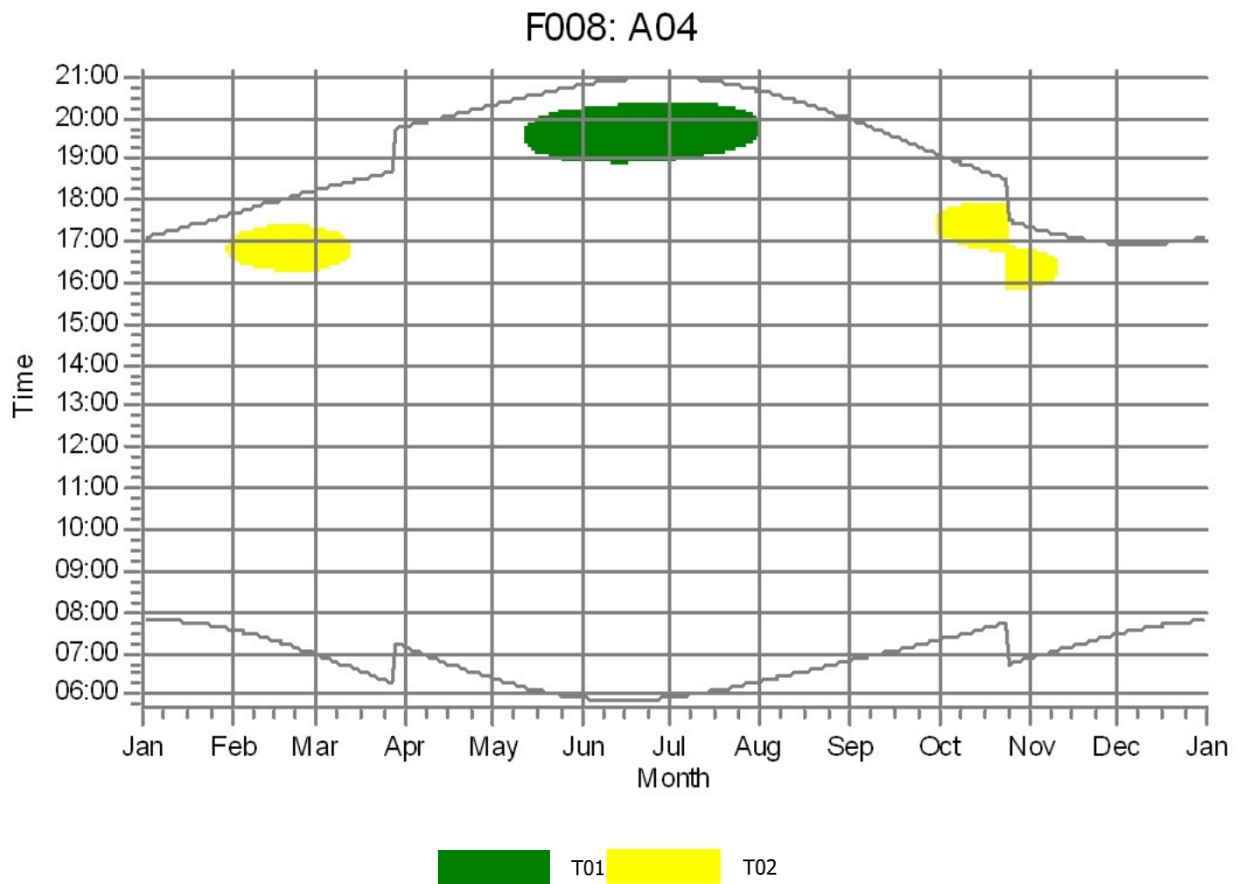


Figura 6.1 – Calendario dell'ombra relativo al ricettore F008



Figura 6.2 – Posizionamento del ricettore F008 rispetto all'aerogeneratore T01. In evidenza, con sfumatura bianca, le isolinee d'ombra. Si nota come l'esistente barriera arborea esercita un efficace effetto schermante sul potenziale ombreggiamento intermittente riferibile, in particolare, all'aerogeneratore T01, posizionato a nordovest

Ricettore F060

Il calendario grafico dell'ombra relativo al ricettore F060 (Figura 6.3) evidenzia come il fenomeno dello SF sia atteso nel primo mattino (nella fascia oraria 06:30-9:00) dei mesi invernali e primaverili/tardo estivi ad opera degli aerogeneratori T15 e T12 rispettivamente nonché, nel periodo estivo e autunnale, nella fascia pomeridiana e serale (indicativamente dalle 17:00 alle 20:30), ad opera degli aerogeneratori T13, T11 e T14.

Analizzando più in dettaglio le caratteristiche del fenomeno presso il ricettore F060 si ritiene opportuno formulare le seguenti considerazioni:

- L'ombreggiamento intermittente presso il ricettore F060, complessivamente pari a 69:55 h/anno nello scenario *real case*, è prevalentemente attribuibile agli aerogeneratori T12 e T15 (oltre 30 h/anno – 48% circa del totale);
- La facciata maggiormente esposta al fenomeno dello SF riferibile ai suddetti aerogeneratori è quella est, efficacemente schermata da una fitta cortina arborea;
- risulta conseguentemente drasticamente attenuata l'incidenza dell'ombreggiamento apportato dagli aerogeneratori T12 e T15 (Figura 6.4);

- Inoltre, affinché il fenomeno sia percepito come un disturbo da parte degli occupanti l’edificio tutte le seguenti circostanze dovrebbero essere verificate:
 - o Presenza degli occupanti presso l’ambiente esposto all’ombreggiamento;
 - o Elevato contrasto luci/ombre (assenza di schermature nelle finestre)
 - o gli individui potenzialmente soggetti ad un impatto da *shadow flickering* dovrebbero permanere esposti alla luce tremolante per un tempo sufficiente ad avvertire fastidio.

Tutto ciò considerato è ragionevole affermare che l’effettivo potenziale disturbo da *shadow flickering* risulterà significativamente più contenuto di quello prospettato dal software di simulazione, tale da potersi ricondurre ai predetti “valori guida” di 30 h/anno e da non arrecare apprezzabili disturbi agli occupanti l’edificio in esame.

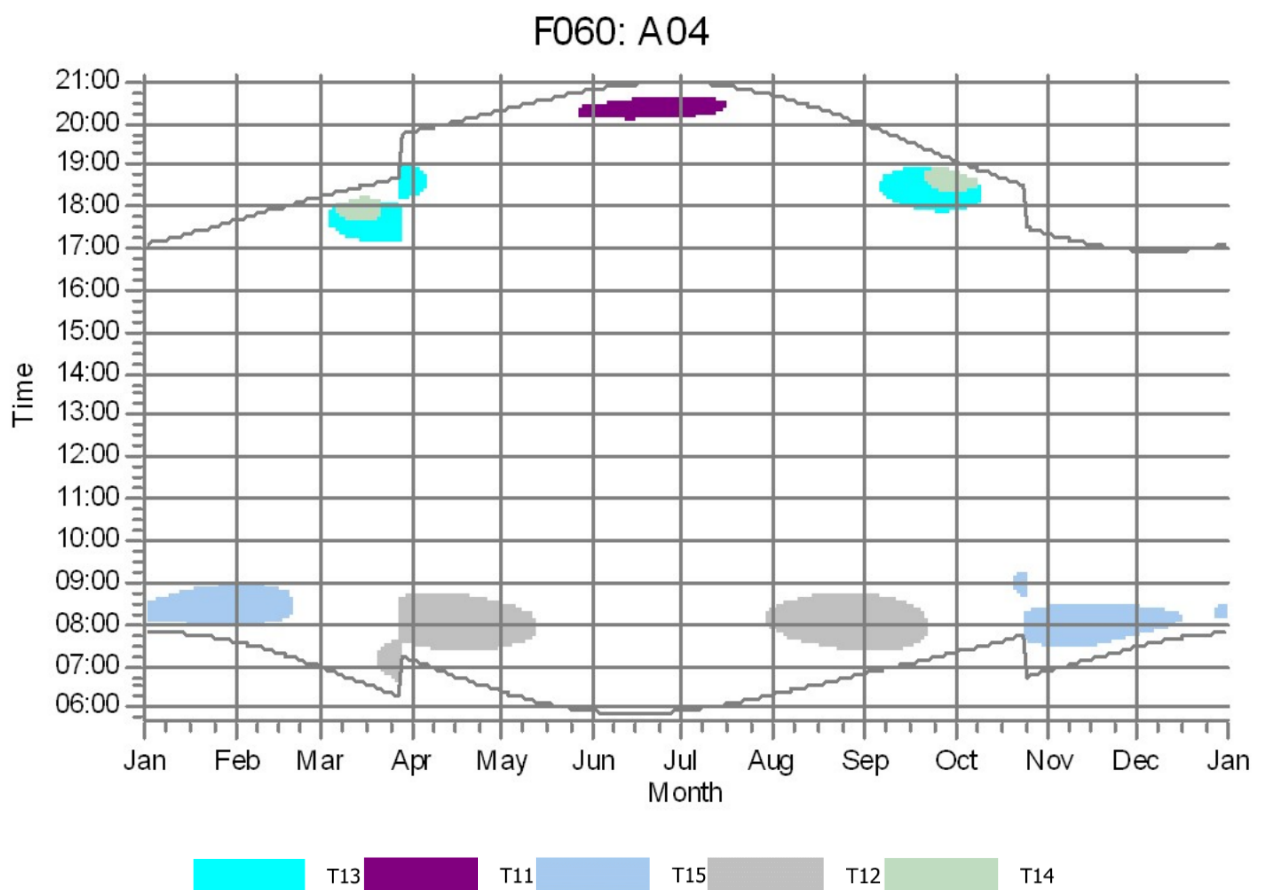


Figura 6.3 – Calendario dell’ombra relativo al ricevitore F060

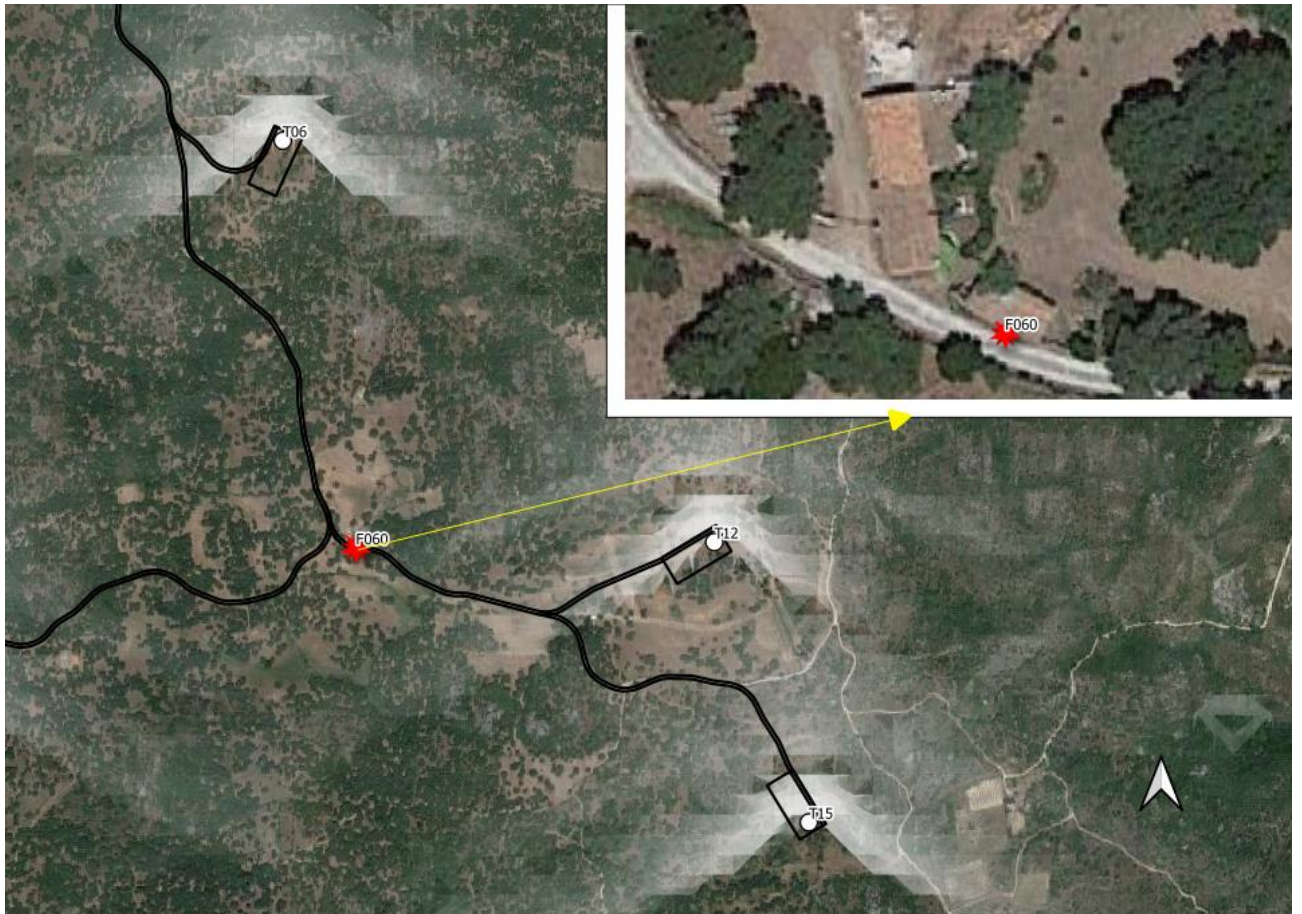


Figura 6.4 - Posizionamento del ricevitore F060 rispetto agli aerogeneratori T12 e T15. In evidenza, con sfumatura bianca, le isolinee d'ombra. Si nota come l'esistente barriera arborea che circonda l'edificio esercita un efficace effetto schermante sul potenziale ombreggiamento intermittente riferibile, in particolare, ai predetti aerogeneratori, posizionati ad est/sudest

Ricettori F167 e F173

Come riportato in *Tabella 6.1*, l'incidenza dello SF nello scenario *real case* presso i ricettori in esame è leggermente superiore alla soglia guida, stimandosi circa 31 h/anno presso il ricevitore F167 e circa 36 h/anno presso il ricevitore F173.

Come desumibile dalle immagini seguenti, valutato che i suddetti edifici sono circondanti da una fitta vegetazione arborea capace di schermare efficacemente l'ombra proiettata dagli aerogeneratori potenzialmente disturbanti (T03, T04 e T05 per il ricevitore F167 e T01 e T02 per il ricevitore F173); considerata altresì la bassa probabilità del concomitante verificarsi delle circostanze, più sopra richiamate, richieste affinché lo SF sia percepito come un disturbo (presenza degli occupanti presso l'ambiente esposto all'ombreggiamento, elevato contrasto luci/ombre con assenza di schermature nelle finestre, permanenza degli occupanti nei locali per un tempo sufficiente ad avvertire fastidio), si può, anche in questo caso, ragionevolmente ritenere che l'effettivo potenziale disturbo da *shadow flickering* risulterà significativamente più contenuto di quello prospettato dal software di simulazione, tale da potersi ricondurre ai predetti “valori guida” di 30 h/anno e da non arrecare apprezzabili disturbi agli occupanti gli edifici in esame.

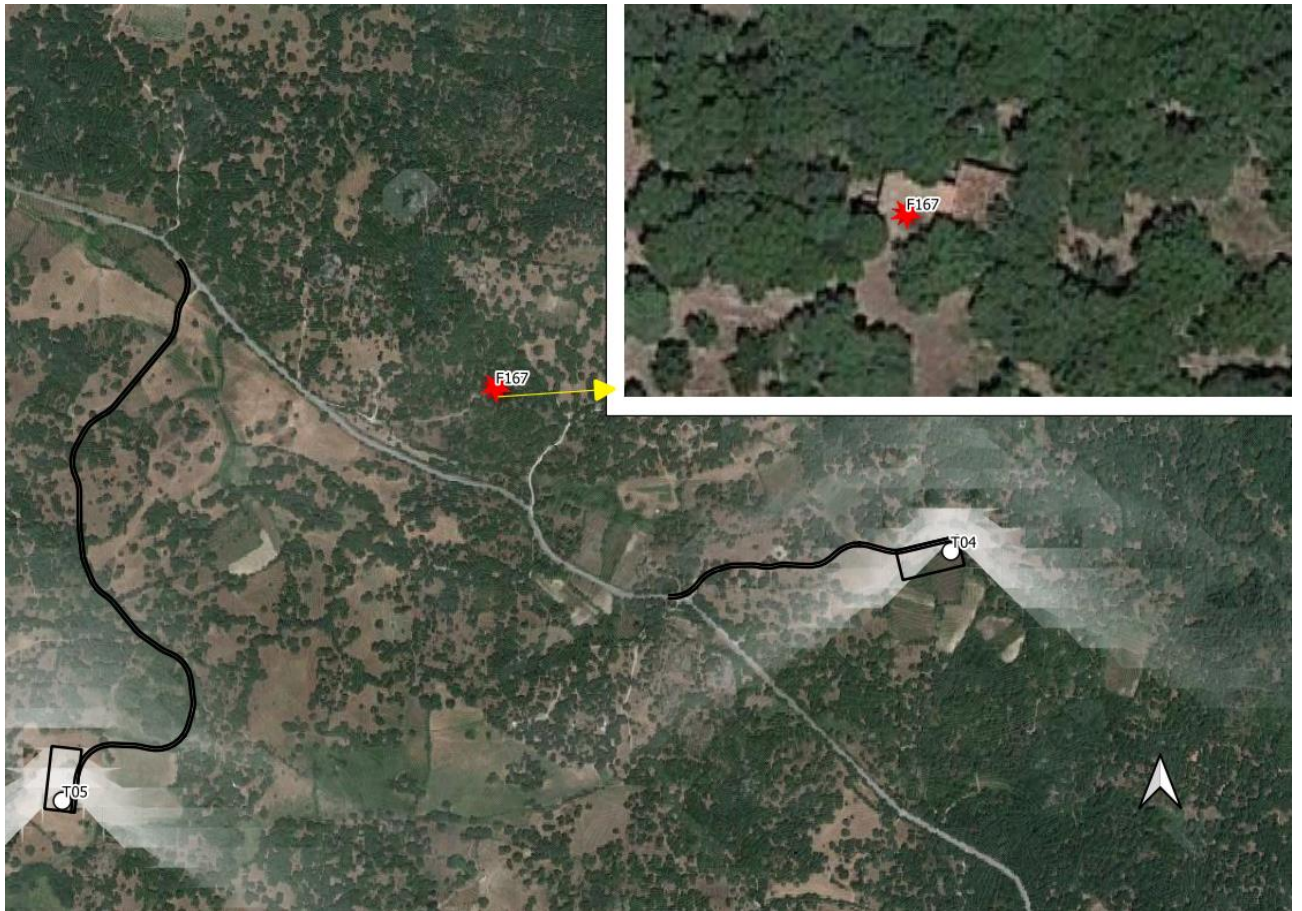


Figura 6.5 - Posizionamento del ricevitore F167 rispetto ai più prossimi aerogeneratori. In evidenza, con sfumatura bianca, le isolinee d'ombra. Si nota come l'esistente barriera arborea che circonda l'edificio è in grado di esercitare un efficace effetto schermante sul potenziale ombreggiamento intermittente.

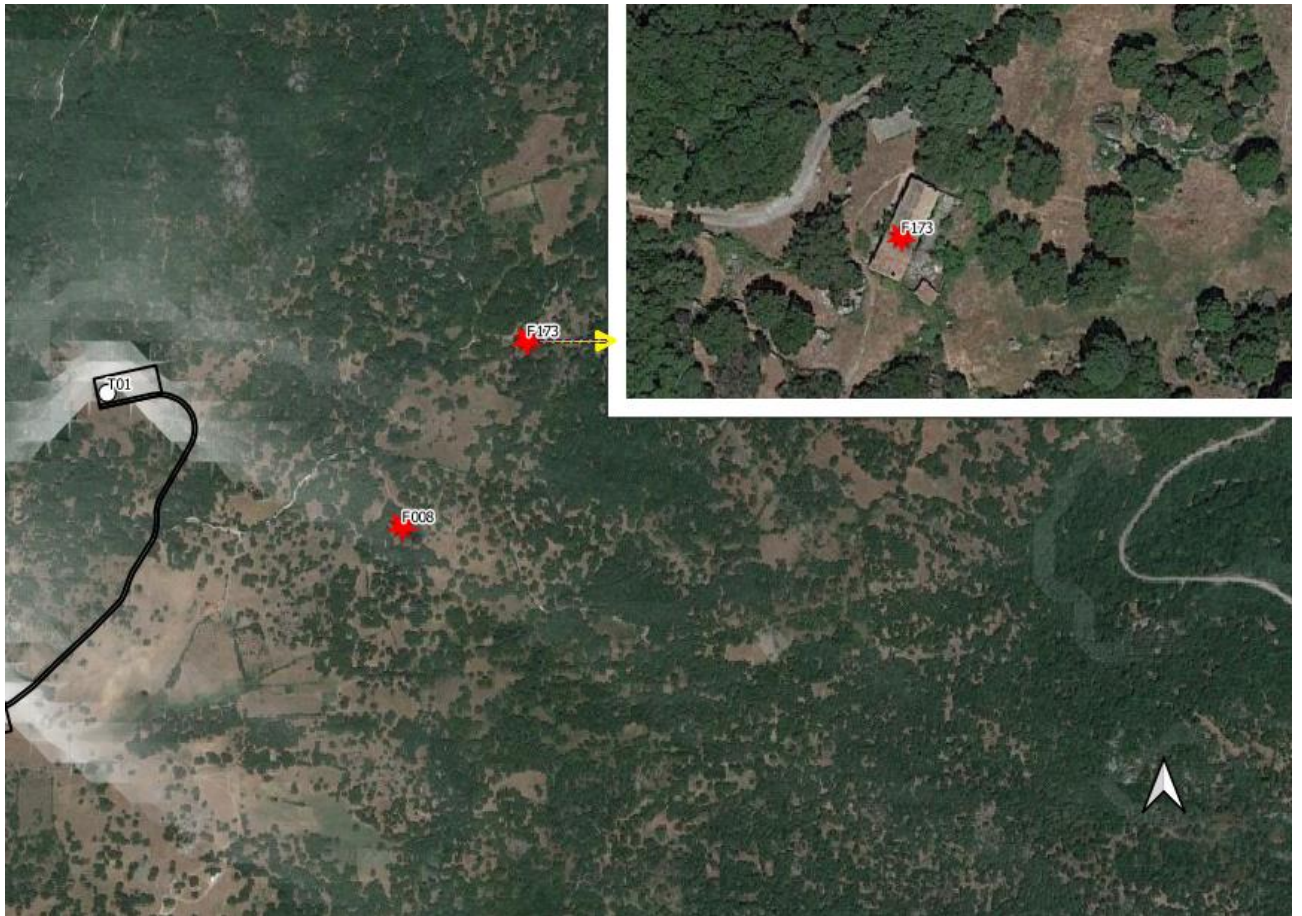


Figura 6.6 - Posizionamento del ricevitore F173 rispetto ai più prossimi aerogeneratori. In evidenza, con sfumatura bianca, le isolinee d'ombra. Si nota come l'esistente barriera arborea che circonda l'edificio è in grado di esercitare un efficace effetto schermante sul potenziale ombreggiamento intermittente.

7 Conclusioni

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

Ai fini dei calcoli di esposizione all’ombra intermittente ed entro una distanza di 1000 m dalle postazioni eoliche, sono stati individuati come potenziali ricettori n. 14 fabbricati, aventi destinazione abitativa accertata (edifici con categoria catastale “A”) e un luogo di culto (F313 - Chiesa Santu Juanne de Sos Sonorcolos).

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

L’incidenza dell’ombreggiamento intermittente presso i ricettori considerati nello “scenario reale” è prevalentemente al di sotto del valore guida di 30 h/anno. Fanno eccezione n. 4 fabbricati su 14 totali (F008, F060, F167, F173) presso i quali l’incidenza dell’ombreggiamento intermittente presenta una durata variabile tra 69:55 h/anno (F060) e 31:28 h/anno (F167).

In riferimento a questi ultimi fabbricati gli approfondimenti condotti hanno riconosciuto la presenza di elementi naturali (cortine arboree), non considerati dal modello di calcolo, in grado di esercitare un efficace effetto schermante rispetto all’azione di ombreggiamento attribuibile agli aerogeneratori.

In definitiva, 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 tutto 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.

Peraltro, laddove durante la fase operativa dell’impianto dovesse essere avvertito un effettivo disturbo da parte degli occupanti gli edifici più esposti, saranno attuate – a cura e spese della società proponente - efficaci misure di mitigazione quali la creazione e/o il rafforzamento di alberature perimetrali.

SHADOW - Main Result

Calculation: Real_case_Progetto_20231109

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) [OLBIA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

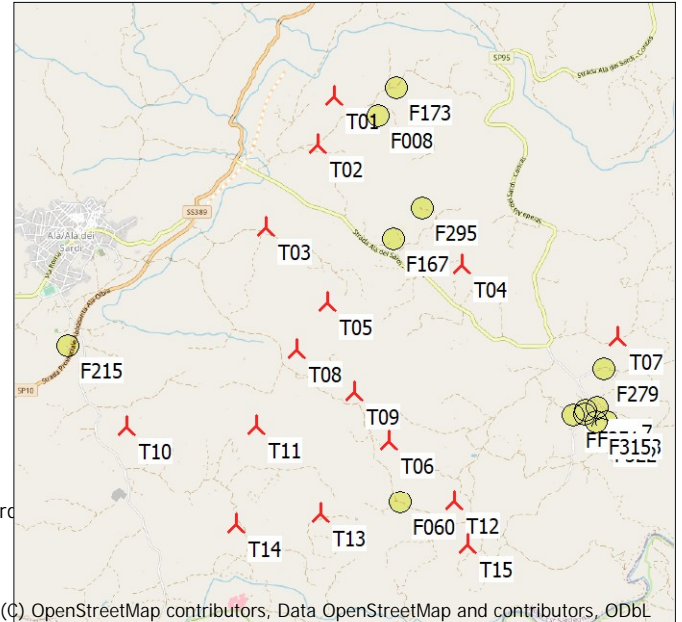
Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

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_Ala Dei Sardi
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Italian Gauss-Boaga west-ROMA40 (IT-peninsular <±4m)

WTGs

	Easting	Northing	Z	Row data/Description	WTG type		Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.					Calculation distance [m]	RPM [RPM]
			[m]									
T01	1.530.355	4.501.422	581,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T02	1.530.193	4.500.934	600,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T03	1.529.675	4.500.123	636,1	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T04	1.531.633	4.499.755	581,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T05	1.530.299	4.499.380	631,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T06	1.530.914	4.498.012	670,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T07	1.533.179	4.499.051	574,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T08	1.529.990	4.498.909	665,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T09	1.530.566	4.498.492	658,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T10	1.528.308	4.498.143	660,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T11	1.529.591	4.498.159	677,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T12	1.531.561	4.497.409	661,9	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T13	1.530.240	4.497.283	662,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T14	1.529.395	4.497.181	660,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T15	1.531.703	4.496.989	650,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	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]
F008	A04	1.530.796	4.501.224	583,6	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F060	A04	1.531.024	4.497.401	661,8	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F167	A04-C02	1.530.950	4.500.002	616,2	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F173	A04	1.530.982	4.501.501	560,0	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F215	A03	1.527.716	4.498.938	660,0	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F279	A04	1.533.053	4.498.732	582,2	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F287	A04 - C02	1.532.980	4.498.360	572,7	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F292	A03 - C02	1.532.867	4.498.320	580,8	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F295	A04 - C02	1.531.234	4.500.318	590,0	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F313	Pascolo	1.533.080	4.498.211	585,6	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F315	A04	1.532.977	4.498.215	583,4	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F322	A04	1.533.034	4.498.131	598,6	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F351	A03 - C02	1.532.859	4.498.282	584,9	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F353	A04	1.532.751	4.498.278	596,4	1,2	1,4	1,2	90,0	"Green house mode"	2,6

Project:

Progetto_Ala Dei Sardi

Licensed user:

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

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 16:52/3.4.415

SHADOW - Main Result

Calculation: Real_case_Progetto_20231109

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
F008	A04	50:45
F060	A04	69:55
F167	A04-C02	31:28
F173	A04	36:02
F215	A03	1:42
F279	A04	0:56
F287	A04 - C02	4:26
F292	A03 - C02	7:47
F295	A04 - C02	6:46
F313	Pascolo	4:47
F315	A04	3:52
F322	A04	6:12
F351	A03 - C02	7:34
F353	A04	10:30

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

No.	Name		Worst case [h/year]	Expected [h/year]
T01	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (29)	145:42	53:21
T02	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (30)	110:49	31:46
T03	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (31)	27:52	9:44
T04	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (32)	57:53	15:27
T05	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (33)	46:28	11:32
T06	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (34)	8:38	2:52
T07	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (35)	0:00	0:00
T08	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (36)	0:00	0:00
T09	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (37)	0:00	0:00
T10	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (38)	0:00	0:00
T11	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (39)	18:58	6:29
T12	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (40)	157:10	51:42
T13	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (41)	40:39	13:38
T14	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (42)	7:46	2:34
T15	Siemens Gamesa SG 6.6-172!!	6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (43)	76:50	18:42

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.

Project:

Progetto_Ala Dei Sardi

Licensed user:

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

Via Santa Margherita 4

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+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 16:52/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_20231109Shadow receptor: F008 - A04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	January	February	March	April	May	June	
1	07:47 17:06	07:34 17:40	16:41 (T02) 16:58 (T02)	06:59 18:13	16:22 (T02) 17:16 (T02)	07:08 19:47	06:23 20:18
2	07:47 17:07	07:33 17:41	16:38 (T02) 17:01 (T02)	06:57 18:14	16:24 (T02) 17:16 (T02)	07:07 19:48	06:22 20:19
3	07:47 17:08	07:32 17:42	16:36 (T02) 17:04 (T02)	06:55 18:16	16:24 (T02) 17:15 (T02)	07:05 19:49	06:21 20:20
4	07:47 17:08	07:31 17:43	16:34 (T02) 17:06 (T02)	06:54 18:17	16:25 (T02) 17:14 (T02)	07:03 19:50	06:19 20:21
5	07:47 17:09	07:30 17:45	16:32 (T02) 17:08 (T02)	06:52 18:18	16:26 (T02) 17:12 (T02)	07:02 19:51	06:18 20:22
6	07:47 17:10	07:29 17:46	16:31 (T02) 17:10 (T02)	06:51 18:19	16:28 (T02) 17:12 (T02)	07:00 19:52	06:17 20:23
7	07:47 17:11	07:28 17:47	16:29 (T02) 17:10 (T02)	06:49 18:20	16:28 (T02) 17:10 (T02)	06:59 19:53	06:16 20:24
8	07:47 17:12	07:27 17:48	16:28 (T02) 17:12 (T02)	06:48 18:21	16:29 (T02) 17:08 (T02)	06:57 19:54	06:15 20:25
9	07:47 17:13	07:26 17:50	16:27 (T02) 17:13 (T02)	06:46 18:22	16:32 (T02) 17:06 (T02)	06:55 19:55	06:13 20:26
10	07:47 17:14	07:24 17:51	16:26 (T02) 17:15 (T02)	06:44 18:23	16:34 (T02) 17:03 (T02)	06:54 19:56	06:12 20:27
11	07:47 17:15	07:23 17:52	16:26 (T02) 17:16 (T02)	06:43 18:25	16:37 (T02) 17:01 (T02)	06:52 19:57	06:11 20:28
12	07:46 17:16	07:22 17:53	16:24 (T02) 17:16 (T02)	06:41 18:26	16:40 (T02) 16:57 (T02)	06:51 19:58	06:10 20:29
13	07:46 17:17	07:21 17:55	16:24 (T02) 17:17 (T02)	06:40 18:27	06:49 19:59	06:09 20:30	19:28 (T01) 20:55
14	07:46 17:18	07:20 17:56	16:23 (T02) 17:18 (T02)	06:38 18:28	06:48 20:00	06:08 20:31	19:23 (T01) 20:55
15	07:45 17:20	07:18 17:57	16:23 (T02) 17:19 (T02)	06:36 18:29	06:46 20:01	06:07 20:32	19:19 (T01) 20:55
16	07:45 17:21	07:17 17:58	16:22 (T02) 17:18 (T02)	06:35 18:30	06:44 20:02	06:06 20:33	19:17 (T01) 20:56
17	07:45 17:22	07:16 17:59	16:22 (T02) 17:19 (T02)	06:33 18:31	06:43 20:04	06:05 20:34	19:14 (T01) 20:56
18	07:44 17:23	07:14 18:01	16:22 (T02) 17:20 (T02)	06:31 18:32	06:41 20:05	06:04 20:35	19:13 (T01) 20:57
19	07:44 17:24	07:13 18:02	16:21 (T02) 17:19 (T02)	06:30 18:33	06:40 20:06	06:03 20:36	19:11 (T01) 20:57
20	07:43 17:25	07:12 18:03	16:22 (T02) 17:20 (T02)	06:28 18:34	06:38 20:07	06:03 20:37	19:10 (T01) 20:57
21	07:42 17:26	07:10 18:04	16:21 (T02) 17:19 (T02)	06:27 18:35	06:37 20:08	06:02 20:38	19:08 (T01) 20:57
22	07:42 17:28	07:09 18:05	16:21 (T02) 17:20 (T02)	06:25 18:36	06:35 20:09	06:01 20:39	19:08 (T01) 20:58
23	07:41 17:29	07:07 18:06	16:21 (T02) 17:19 (T02)	06:23 18:37	06:34 20:10	06:00 20:40	19:07 (T01) 20:58
24	07:41 17:30	07:06 18:08	16:21 (T02) 17:19 (T02)	06:22 18:38	06:33 20:11	05:59 20:41	19:05 (T01) 20:58
25	07:40 17:31	07:04 18:09	16:21 (T02) 17:18 (T02)	06:20 18:39	06:31 20:12	05:59 20:42	19:05 (T01) 20:58
26	07:39 17:32	07:03 18:10	16:22 (T02) 17:18 (T02)	06:18 18:41	06:30 20:13	05:58 20:42	19:04 (T01) 20:58
27	07:38 17:34	07:02 18:11	16:22 (T02) 17:17 (T02)	06:17 18:42	06:28 20:14	05:57 20:43	19:03 (T01) 20:58
28	07:37 17:35	07:00 18:12	16:22 (T02) 17:17 (T02)	06:15 18:43	06:27 20:15	05:57 20:44	19:03 (T01) 20:58
29	07:37 17:36			07:13 19:44	06:26 20:16	05:56 20:45	19:02 (T01) 20:58
30	07:36 17:37			07:12 19:45	06:24 20:17	05:56 20:46	19:02 (T01) 20:58
31	07:35 17:39	16:49 (T02) 16:50 (T02)		07:10 19:46		05:55 20:46	19:01 (T01) 20:58
Potential sun hours	298	298	370	398	447	451	
Total, worst case	1	1364	481		943	2256	
Sun reduction	0,40	0,43	0,47		0,58	0,67	
Oper. time red.	0,83	0,83	0,83		0,83	0,83	
Wind dir. red.	0,75	0,75	0,75		0,68	0,68	
Total reduction	0,25	0,27	0,29		0,33	0,38	
Total, real	0	367	141		308	848	

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F008 - A04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	July	August	September	October	November	December					
1	05:55	19:04 (T01)	06:19	06:49	07:19	17:21 (T02)	06:52	15:56 (T02)	07:27		
	20:58	76 20:20 (T01)	20:39	19:57	19:07	12 17:33 (T02)	17:21	48 16:44 (T02)	16:57		
2	05:56	19:04 (T01)	06:20	06:50	07:20	17:16 (T02)	06:53	15:57 (T02)	07:28		
	20:58	75 20:19 (T01)	20:38	19:55	19:05	21 17:37 (T02)	17:19	46 16:43 (T02)	16:57		
3	05:56	19:05 (T01)	06:21	06:51	07:21	17:12 (T02)	06:55	15:58 (T02)	07:29		
	20:58	75 20:20 (T01)	20:37	19:54	19:03	28 17:40 (T02)	17:18	44 16:42 (T02)	16:56		
4	05:57	19:05 (T01)	06:22	06:52	07:22	17:10 (T02)	06:56	15:59 (T02)	07:30		
	20:58	74 20:19 (T01)	20:36	19:52	19:02	33 17:43 (T02)	17:17	41 16:40 (T02)	16:56		
5	05:57	19:06 (T01)	06:23	06:53	07:23	17:08 (T02)	06:57	16:01 (T02)	07:31		
	20:57	73 20:19 (T01)	20:35	19:50	19:00	36 17:44 (T02)	17:16	38 16:39 (T02)	16:56		
6	05:58	19:06 (T01)	06:24	06:54	07:24	17:06 (T02)	06:58	16:02 (T02)	07:32		
	20:57	73 20:19 (T01)	20:34	19:49	18:59	40 17:46 (T02)	17:15	36 16:38 (T02)	16:56		
7	05:59	19:06 (T01)	06:25	06:55	07:25	17:04 (T02)	06:59	16:04 (T02)	07:33		
	20:57	73 20:19 (T01)	20:33	19:47	18:57	43 17:47 (T02)	17:14	32 16:36 (T02)	16:56		
8	05:59	19:07 (T01)	06:26	06:56	07:26	17:02 (T02)	07:00	16:06 (T02)	07:33		
	20:57	72 20:19 (T01)	20:31	19:45	18:55	46 17:48 (T02)	17:13	28 16:34 (T02)	16:56		
9	06:00	19:07 (T01)	06:27	06:57	07:27	17:01 (T02)	07:02	16:09 (T02)	07:34		
	20:56	71 20:18 (T01)	20:30	19:44	18:54	47 17:48 (T02)	17:12	23 16:32 (T02)	16:56		
10	06:00	19:08 (T01)	06:28	06:58	07:28	16:59 (T02)	07:03	16:12 (T02)	07:35		
	20:56	70 20:18 (T01)	20:29	19:42	18:52	50 17:49 (T02)	17:11	16 16:28 (T02)	16:56		
11	06:01	19:09 (T01)	06:29	06:59	07:29	16:58 (T02)	07:04		07:36		
	20:55	69 20:18 (T01)	20:28	19:40	18:51	51 17:49 (T02)	17:10		16:56		
12	06:02	19:09 (T01)	06:29	07:00	07:30	16:57 (T02)	07:05		07:37		
	20:55	68 20:17 (T01)	20:26	19:39	18:49	53 17:50 (T02)	17:09		16:56		
13	06:03	19:10 (T01)	06:30	07:01	07:31	16:56 (T02)	07:06		07:38		
	20:54	67 20:17 (T01)	20:25	19:37	18:47	54 17:50 (T02)	17:08		16:56		
14	06:03	19:11 (T01)	06:31	07:02	07:32	16:55 (T02)	07:07		07:38		
	20:54	66 20:17 (T01)	20:24	19:35	18:46	55 17:50 (T02)	17:07		16:56		
15	06:04	19:11 (T01)	06:32	07:03	07:33	16:54 (T02)	07:09		07:39		
	20:53	65 20:16 (T01)	20:22	19:34	18:44	56 17:50 (T02)	17:06		16:56		
16	06:05	19:12 (T01)	06:33	07:04	07:34	16:54 (T02)	07:10		07:40		
	20:53	64 20:16 (T01)	20:21	19:32	18:43	57 17:51 (T02)	17:05		16:57		
17	06:06	19:13 (T01)	06:34	07:05	07:35	16:53 (T02)	07:11		07:41		
	20:52	62 20:15 (T01)	20:19	19:30	18:41	58 17:51 (T02)	17:04		16:57		
18	06:06	19:14 (T01)	06:35	07:06	07:36	16:53 (T02)	07:12		07:41		
	20:52	61 20:15 (T01)	20:18	19:29	18:40	58 17:51 (T02)	17:04		16:57		
19	06:07	19:15 (T01)	06:36	07:07	07:37	16:52 (T02)	07:13		07:42		
	20:51	59 20:14 (T01)	20:17	19:27	18:38	59 17:51 (T02)	17:03		16:58		
20	06:08	19:16 (T01)	06:37	07:08	07:39	16:52 (T02)	07:14		07:42		
	20:50	56 20:12 (T01)	20:15	19:25	18:37	58 17:50 (T02)	17:02		16:58		
21	06:09	19:17 (T01)	06:38	07:09	07:40	16:51 (T02)	07:16		07:43		
	20:49	55 20:12 (T01)	20:14	19:24	18:35	59 17:50 (T02)	17:02		16:59		
22	06:10	19:18 (T01)	06:39	07:10	07:41	16:51 (T02)	07:17		07:44		
	20:49	53 20:11 (T01)	20:12	19:22	18:34	58 17:49 (T02)	17:01		16:59		
23	06:11	19:20 (T01)	06:40	07:11	07:42	16:52 (T02)	07:18		07:44		
	20:48	50 20:10 (T01)	20:11	19:20	18:33	58 17:50 (T02)	17:00		17:00		
24	06:12	19:21 (T01)	06:41	07:12	07:43	16:52 (T02)	07:19		07:44		
	20:47	48 20:09 (T01)	20:09	19:19	18:31	57 17:49 (T02)	17:00		17:00		
25	06:12	19:23 (T01)	06:42	07:13	06:44	15:52 (T02)	07:20		07:45		
	20:46	44 20:07 (T01)	20:08	19:17	17:30	57 16:49 (T02)	16:59		17:01		
26	06:13	19:24 (T01)	06:43	07:14	06:45	15:52 (T02)	07:21		07:45		
	20:45	41 20:05 (T01)	20:06	19:15	17:28	56 16:48 (T02)	16:59		17:01		
27	06:14	19:26 (T01)	06:44	07:15	06:46	15:52 (T02)	07:22		07:46		
	20:44	37 20:03 (T01)	20:05	19:13	17:27	55 16:47 (T02)	16:58		17:02		
28	06:15	19:28 (T01)	06:45	07:16	06:48	15:53 (T02)	07:23		07:46		
	20:43	33 20:01 (T01)	20:03	19:12	17:26	54 16:47 (T02)	16:58		17:03		
29	06:16	19:31 (T01)	06:46	07:17	06:49	15:54 (T02)	07:25		07:46		
	20:42	27 19:58 (T01)	20:02	19:10	17:24	52 16:46 (T02)	16:57		17:03		
30	06:17	19:35 (T01)	06:47	07:18	06:50	15:54 (T02)	07:26		07:47		
	20:41	19 19:54 (T01)	20:00	19:08	17:23	51 16:45 (T02)	16:57		17:04		
31	06:18		06:48		06:51	15:55 (T02)			07:47		
	20:40		19:58		17:22	49 16:44 (T02)			17:05		
Potential sun hours	458		427		375		346		299		289
Total, worst case	1776				1521		352				
Sun reduction	0,75				0,56		0,48				
Oper. time red.	0,83				0,83		0,83				
Wind dir. red.	0,68				0,75		0,75				
Total reduction	0,42				0,35		0,30				
Total, real	749				526		105				

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F060 - A04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

		January		February		March		April		May		June	
1	07:47	08:10 (T15)	07:34	08:02 (T15)	06:58			07:08	07:38 (T12)	06:23		07:31 (T12)	05:55
	17:06	15	08:25 (T15)	17:40	52	08:54 (T15)	18:13		19:47	93	18:53 (T13)	20:18	54
2	07:47	08:09 (T15)	07:33	08:02 (T15)	06:57			07:07	07:36 (T12)	06:22		07:32 (T12)	05:54
	17:07	17	08:26 (T15)	17:41	52	08:54 (T15)	18:15		19:48	90	18:50 (T13)	20:19	52
3	07:47	08:09 (T15)	07:32	08:02 (T15)	06:55			07:05	07:34 (T12)	06:21		07:33 (T12)	05:54
	17:08	19	08:28 (T15)	17:42	52	08:54 (T15)	18:16		19:49	89	18:48 (T13)	20:20	50
4	07:47	08:09 (T15)	07:31	08:03 (T15)	06:54			07:03	07:34 (T12)	06:19		07:34 (T12)	05:54
	17:09	20	08:29 (T15)	17:44	51	08:54 (T15)	18:17		19:50	84	18:45 (T13)	20:21	48
5	07:47	08:09 (T15)	07:30	08:03 (T15)	06:52		17:38 (T13)	07:02	07:32 (T12)	06:18		07:36 (T12)	05:53
	17:09	22	08:31 (T15)	17:45	51	08:54 (T15)	18:18	11	17:49 (T13)	19:51	74	18:39 (T13)	20:22
6	07:47	08:09 (T15)	07:29	08:03 (T15)	06:51			07:00	07:32 (T12)	06:17		07:36 (T12)	05:53
	17:10	23	08:32 (T15)	17:46	50	08:53 (T15)	18:19	20	17:54 (T13)	19:52	68	18:40 (T12)	20:23
7	07:47	08:09 (T15)	07:28	08:03 (T15)	06:49			06:59	07:31 (T12)	06:16		07:38 (T12)	05:53
	17:11	25	08:34 (T15)	17:47	49	08:52 (T15)	18:20	29	17:59 (T14)	19:53	69	18:40 (T12)	20:24
8	07:47	08:09 (T15)	07:27	08:04 (T15)	06:48			06:57	07:30 (T12)	06:15		07:39 (T12)	05:52
	17:12	26	08:35 (T15)	17:48	48	08:52 (T15)	18:21	33	18:00 (T14)	19:54	70	18:40 (T12)	20:25
9	07:47	08:08 (T15)	07:25	08:05 (T15)	06:46			06:55	07:30 (T12)	06:13		07:41 (T12)	05:52
	17:13	28	08:36 (T15)	17:50	47	08:52 (T15)	18:22	36	18:02 (T14)	19:55	70	18:40 (T12)	20:26
10	07:47	08:08 (T15)	07:24	08:06 (T15)	06:44			06:54	07:29 (T12)	06:12		07:43 (T12)	05:52
	17:14	29	08:37 (T15)	17:51	45	08:51 (T15)	18:23	38	18:02 (T14)	19:56	71	18:40 (T12)	20:27
11	07:46	08:08 (T15)	07:23	08:07 (T15)	06:43			06:52	07:29 (T12)	06:11		07:46 (T12)	05:52
	17:15	31	08:39 (T15)	17:52	44	08:51 (T15)	18:25	41	18:03 (T14)	19:57	71	18:40 (T12)	20:28
12	07:46	08:08 (T15)	07:22	08:07 (T15)	06:41			06:51	07:28 (T12)	06:10		07:50 (T12)	05:52
	17:16	32	08:40 (T15)	17:53	42	08:49 (T15)	18:26	44	18:05 (T14)	19:58	71	18:39 (T12)	20:29
13	07:46	08:07 (T15)	07:21	08:08 (T15)	06:40			06:49	07:28 (T12)	06:09		08:04 (T12)	05:52
	17:17	34	08:41 (T15)	17:55	40	08:48 (T15)	18:27	46	18:06 (T14)	19:59	72	18:40 (T12)	20:30
14	07:46	08:07 (T15)	07:19	08:10 (T15)	06:38			06:48	07:27 (T12)	06:08		08:08	05:52
	17:19	35	08:42 (T15)	17:56	37	08:47 (T15)	18:28	48	18:07 (T14)	20:00	72	18:39 (T12)	20:31
15	07:45	08:06 (T15)	07:18	08:10 (T15)	06:36			06:46	07:27 (T12)	06:07		08:09	05:52
	17:20	37	08:43 (T15)	17:57	35	08:45 (T15)	18:29	50	18:08 (T14)	20:01	72	18:39 (T12)	20:32
16	07:45	08:06 (T15)	07:17	08:12 (T15)	06:35			06:44	07:27 (T12)	06:06		08:10	05:52
	17:21	38	08:44 (T15)	17:58	32	08:44 (T15)	18:30	52	18:09 (T14)	20:02	71	18:38 (T12)	20:33
17	07:44	08:05 (T15)	07:16	08:14 (T15)	06:33			06:43	07:27 (T12)	06:05		08:11	05:52
	17:22	40	08:45 (T15)	17:59	28	08:42 (T15)	18:31	52	18:09 (T14)	20:03	71	18:38 (T12)	20:34
18	07:44	08:05 (T15)	07:14	08:16 (T15)	06:31			06:41	07:26 (T12)	06:04		08:12	05:52
	17:23	41	08:46 (T15)	18:01	23	08:39 (T15)	18:32	52	18:08 (T14)	20:05	71	18:37 (T12)	20:35
19	07:43	08:04 (T15)	07:13	08:20 (T15)	06:30			06:40	07:27 (T12)	06:03		08:13	05:52
	17:24	43	08:47 (T15)	18:02	16	08:36 (T15)	18:33	51	18:06 (T14)	20:06	70	18:37 (T12)	20:36
20	07:43	08:04 (T15)	07:12	08:28 (T15)	06:28			06:38	07:26 (T12)	06:03		08:14	05:52
	17:25	44	08:48 (T15)	18:03			18:34	49	18:05 (T13)	20:07	70	18:36 (T12)	20:37
21	07:42	08:03 (T15)	07:10	08:34 (T15)	06:26			06:37	07:27 (T12)	06:02		08:15	05:52
	17:27	45	08:48 (T15)	18:04			18:35	49	18:04 (T13)	20:08	68	18:35 (T12)	20:38
22	07:42	08:02 (T15)	07:09	08:35 (T15)	06:25			06:36	07:26 (T12)	06:01		08:16	05:52
	17:28	47	08:49 (T15)	18:05			18:36	61	18:03 (T13)	20:09	68	18:34 (T12)	20:39
23	07:41	08:02 (T15)	07:07	08:36 (T15)	06:23			06:34	07:27 (T12)	06:00		08:17	05:52
	17:29	48	08:50 (T15)	18:06			18:37	72	18:03 (T13)	20:10	67	18:34 (T12)	20:40
24	07:40	08:02 (T15)	07:06	08:37 (T15)	06:22			06:33	07:27 (T12)	06:00		08:18	05:53
	17:30	49	08:51 (T15)	18:08			18:38	80	18:03 (T13)	20:11	65	18:32 (T12)	20:41
25	07:40	08:01 (T15)	07:04	08:38 (T15)	06:20			06:31	07:28 (T12)	05:59		08:19	05:53
	17:31	50	08:51 (T15)	18:09			18:39	83	18:01 (T13)	20:12	64	18:32 (T12)	20:41
26	07:39	08:01 (T15)	07:03	08:39 (T15)	06:18			06:30	07:28 (T12)	05:58		08:20	05:53
	17:32	50	08:51 (T15)	18:10			18:41	87	18:01 (T13)	20:13	63	18:31 (T12)	20:42
27	07:38	08:01 (T15)	07:01	08:40 (T15)	06:17			06:28	07:28 (T12)	05:58		08:21	05:54
	17:34	51	08:52 (T15)	18:11			18:42	90	18:00 (T13)	20:14	61	18:29 (T12)	20:43
28	07:37	08:02 (T15)	07:00	08:41 (T15)	06:15			06:27	07:29 (T12)	05:57		08:22	05:54
	17:35	51	08:53 (T15)	18:12			18:43	92	17:58 (T13)	20:15	60	18:29 (T12)	20:44
29	07:37	08:02 (T15)		08:42 (T15)	07:13			06:26	07:30 (T12)	05:56		20:15 (T11)	05:54
	17:36	51	08:53 (T15)		19:44	94	18:58 (T13)	20:16	08:28 (T12)	20:45	5	20:20 (T11)	20:58
30	07:36	08:02 (T15)		08:43 (T15)	07:12			06:24	07:31 (T12)	05:56		20:14 (T11)	05:55
	17:37	51	08:53 (T15)		19:45	94	18:56 (T13)	20:17	08:27 (T12)	20:46	7	20:21 (T11)	20:58
31	07:35	08:02 (T15)		08:44 (T15)	07:10			06:23	07:32 (T12)	05:55		20:12 (T11)	05:55
	17:39	52	08:54 (T15)		19:46	94	18:54 (T13)		20:46	9	20:21 (T11)		199
Potential sun hours	299		298		370			398		447		451	
Total, worst case	1144		794		1548			2119		483		545	
Sun reduction	0,40		0,43		0,47			0,51		0,58		0,67	
Oper. time red.	0,83		0,83		0,83			0,83		0,83		0,83	
Wind dir. red.	0,65		0,65		0,74			0,74		0,73		0,67	
Total reduction	0,22		0,23		0,29			0,31		0,35		0,37	
Total, real	247		185		443			650		169		199	

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F060 - A04

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

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	July	August	September	October	November	December						
1	05:55	20:14 (T11)	06:19	07:59 (T12)	06:49	07:28 (T12)	07:19	17:59 (T13)	06:52	07:34 (T15)	07:27	07:50 (T15)
	20:58	19 20:33 (T11)	20:39	17 08:16 (T12)	19:57	71 08:39 (T12)	19:07	45 18:44 (T14)	17:21	46 08:20 (T15)	16:57	31 08:21 (T15)
2	05:56	20:14 (T11)	06:20	07:56 (T12)	06:50	07:28 (T12)	07:20	18:00 (T13)	06:53	07:35 (T15)	07:28	07:51 (T15)
	20:58	18 20:32 (T11)	20:38	24 08:20 (T12)	19:55	71 08:39 (T12)	19:05	42 18:42 (T14)	17:20	47 08:22 (T15)	16:57	29 08:20 (T15)
3	05:56	20:15 (T11)	06:21	07:53 (T12)	06:51	07:28 (T12)	07:21	18:01 (T13)	06:54	07:34 (T15)	07:29	07:52 (T15)
	20:58	18 20:33 (T11)	20:37	29 08:22 (T12)	19:54	70 08:38 (T12)	19:03	40 18:41 (T14)	17:18	48 08:22 (T15)	16:56	28 08:20 (T15)
4	05:57	20:15 (T11)	06:22	07:51 (T12)	06:52	07:28 (T12)	07:22	18:02 (T13)	06:56	07:33 (T15)	07:30	07:53 (T15)
	20:57	17 20:32 (T11)	20:36	33 08:24 (T12)	19:52	70 08:38 (T12)	19:02	37 18:39 (T14)	17:17	49 08:22 (T15)	16:56	26 08:19 (T15)
5	05:57	20:16 (T11)	06:23	07:49 (T12)	06:53	07:27 (T12)	07:23	18:04 (T13)	06:57	07:33 (T15)	07:31	07:54 (T15)
	20:57	16 20:32 (T11)	20:35	37 08:26 (T12)	19:50	69 08:36 (T12)	19:00	34 18:38 (T14)	17:16	49 08:22 (T15)	16:56	25 08:19 (T15)
6	05:58	20:16 (T11)	06:24	07:47 (T12)	06:54	07:27 (T12)	07:24	18:06 (T13)	06:58	07:33 (T15)	07:31	07:55 (T15)
	20:57	16 20:32 (T11)	20:34	40 08:27 (T12)	19:49	68 08:35 (T12)	18:59	30 18:36 (T14)	17:15	51 08:24 (T15)	16:56	24 08:19 (T15)
7	05:59	20:17 (T11)	06:25	07:45 (T12)	06:55	07:28 (T12)	07:25	18:08 (T13)	06:59	07:33 (T15)	07:32	07:56 (T15)
	20:57	15 20:32 (T11)	20:32	43 08:28 (T12)	19:47	73 18:33 (T13)	18:57	25 18:35 (T14)	17:14	51 08:24 (T15)	16:56	22 08:18 (T15)
8	05:59	20:18 (T11)	06:26	07:44 (T12)	06:56	07:28 (T12)	07:26	18:11 (T13)	07:00	07:32 (T15)	07:33	07:57 (T15)
	20:56	14 20:32 (T11)	20:31	46 08:30 (T12)	19:45	84 18:39 (T13)	18:55	16 18:27 (T13)	17:13	52 08:24 (T15)	16:56	21 08:18 (T15)
9	06:00	20:18 (T11)	06:27	07:43 (T12)	06:57	07:28 (T12)	07:27	18:12 (T13)	07:02	07:33 (T15)	07:34	07:58 (T15)
	20:56	13 20:31 (T11)	20:30	48 08:31 (T12)	19:44	88 18:41 (T13)	18:54		17:12	52 08:25 (T15)	16:56	19 08:17 (T15)
10	06:01	20:19 (T11)	06:28	07:41 (T12)	06:58	07:29 (T12)	07:28		07:03	07:33 (T15)	07:35	07:59 (T15)
	20:56	12 20:31 (T11)	20:29	51 08:32 (T12)	19:42	91 18:43 (T13)	18:52		17:11	52 08:25 (T15)	16:56	18 08:17 (T15)
11	06:01	20:20 (T11)	06:29	07:40 (T12)	06:59	07:30 (T12)	07:29		07:04	07:33 (T15)	07:36	08:00 (T15)
	20:55	11 20:31 (T11)	20:28	53 08:33 (T12)	19:40	92 18:45 (T13)	18:51		17:10	51 08:24 (T15)	16:56	15 08:15 (T15)
12	06:02	20:20 (T11)	06:30	07:39 (T12)	07:00	07:30 (T12)	07:30		07:05	07:33 (T15)	07:37	08:01 (T15)
	20:55	10 20:30 (T11)	20:26	55 08:34 (T12)	19:39	94 18:46 (T13)	18:49		17:09	51 08:24 (T15)	16:56	14 08:15 (T15)
13	06:03	20:22 (T11)	06:31	07:38 (T12)	07:01	07:31 (T12)	07:31		07:06	07:34 (T15)	07:38	08:03 (T15)
	20:54	8 20:30 (T11)	20:25	57 08:35 (T12)	19:37	95 18:47 (T13)	18:47		17:08	51 08:25 (T15)	16:56	11 08:14 (T15)
14	06:03	20:24 (T11)	06:32	07:37 (T12)	07:02	07:32 (T12)	07:32		07:07	07:34 (T15)	07:38	08:06 (T15)
	20:54	5 20:29 (T11)	20:24	59 08:36 (T12)	19:35	94 18:48 (T13)	18:46		17:07	51 08:25 (T15)	16:56	7 08:13 (T15)
15	06:04	20:26 (T11)	06:32	07:37 (T12)	07:03	07:33 (T12)	07:33		07:09	07:34 (T15)	07:39	08:08 (T15)
	20:53	2 20:28 (T11)	20:22	60 08:37 (T12)	19:34	94 18:49 (T13)	18:44		17:06	51 08:25 (T15)	16:57	2 08:10 (T15)
16	06:05		06:33	07:36 (T12)	07:04	07:35 (T12)	07:34		07:10	07:34 (T15)	07:40	
	20:53		20:21	61 08:37 (T12)	19:32	91 18:49 (T13)	18:43		17:05	50 08:24 (T15)	16:57	
17	06:06		06:34	07:35 (T12)	07:05	07:36 (T12)	07:35		07:11	07:35 (T15)	07:40	
	20:52		20:19	63 08:38 (T12)	19:30	89 18:49 (T13)	18:41		17:04	50 08:25 (T15)	16:57	
18	06:07		06:35	07:34 (T12)	07:06	07:38 (T12)	07:36		07:12	07:36 (T15)	07:41	
	20:51		20:18	65 08:39 (T12)	19:29	86 18:50 (T13)	18:40		17:04	49 08:25 (T15)	16:57	
19	06:07		06:36	07:33 (T12)	07:07	07:41 (T12)	07:37		07:13	07:36 (T15)	07:42	
	20:51		20:17	66 08:39 (T12)	19:27	81 18:50 (T13)	18:38		17:03	48 08:24 (T15)	16:58	
20	06:08		06:37	07:33 (T12)	07:08	07:44 (T12)	07:39		07:14	07:37 (T15)	07:42	
	20:50		20:15	67 08:40 (T12)	19:25	74 18:50 (T13)	18:37		17:02	47 08:24 (T15)	16:58	
21	06:09		06:38	07:31 (T12)	07:09	07:48 (T12)	07:40		07:16	07:38 (T15)	07:43	
	20:49		20:14	68 08:39 (T12)	19:24	66 18:50 (T13)	18:35		17:02	45 08:23 (T15)	16:59	
22	06:10		06:39	07:31 (T12)	07:10	18:00 (T13)	07:41	08:53 (T15)	07:17	07:40 (T15)	07:43	
	20:49		20:12	68 08:39 (T12)	19:22	49 18:49 (T13)	18:34	9 09:02 (T15)	17:01	44 08:24 (T15)	16:59	
23	06:11		06:40	07:30 (T12)	07:11	17:59 (T13)	07:42	08:49 (T15)	07:18	07:41 (T15)	07:44	
	20:48		20:11	70 08:40 (T12)	19:20	49 18:48 (T13)	18:33	19 09:08 (T15)	17:00	43 08:24 (T15)	17:00	
24	06:12		06:41	07:30 (T12)	07:12	17:59 (T13)	07:43	08:46 (T15)	07:19	07:42 (T15)	07:44	
	20:47		20:09	70 08:40 (T12)	19:18	50 18:49 (T14)	18:31	24 09:10 (T15)	17:00	41 08:23 (T15)	17:00	
25	06:12		06:42	07:29 (T12)	07:13	17:58 (T13)	06:44	07:43 (T15)	07:20	07:43 (T15)	07:45	
	20:46		20:08	71 08:40 (T12)	19:17	52 18:50 (T14)	17:30	29 08:12 (T15)	16:59	40 08:23 (T15)	17:01	
26	06:13		06:43	07:29 (T12)	07:14	17:58 (T13)	06:45	07:41 (T15)	07:21	07:44 (T15)	07:45	
	20:45		20:06	71 08:40 (T12)	19:15	52 18:50 (T14)	17:28	33 08:14 (T15)	16:59	38 08:22 (T15)	17:01	
27	06:14		06:44	07:29 (T12)	07:15	17:58 (T13)	06:46	07:40 (T15)	07:22	07:46 (T15)	07:46	
	20:44		20:05	71 08:40 (T12)	19:13	53 18:51 (T14)	17:27	35 08:15 (T15)	16:58	37 08:23 (T15)	17:02	
28	06:15		06:45	07:28 (T12)	07:16	17:58 (T13)	06:48	07:39 (T15)	07:23	07:47 (T15)	07:46	
	20:43		20:03	72 08:40 (T12)	19:12	51 18:49 (T14)	17:26	38 08:17 (T15)	16:58	35 08:22 (T15)	17:03	
29	06:16		06:46	07:28 (T12)	07:17	17:59 (T13)	06:49	07:38 (T15)	07:24	07:48 (T15)	07:46	08:13 (T15)
	20:42		20:02	72 08:40 (T12)	19:10	48 18:47 (T14)	17:25	40 08:18 (T15)	16:58	34 08:22 (T15)	17:03	6 08:19 (T15)
30	06:17		06:47	07:28 (T12)	07:18	17:59 (T13)	06:50	07:36 (T15)	07:25	07:49 (T15)	07:46	08:12 (T15)
	20:41		20:00	72 08:40 (T12)	19:08	47 18:46 (T14)	17:23	43 08:19 (T15)	16:57	32 08:21 (T15)	17:04	9 08:21 (T15)
31	06:18	08:04 (T12)	06:48	07:28 (T12)			06:51	07:35 (T15)			07:47	08:11 (T15)
	20:40	7 08:11 (T12)	19:58	71 08:39 (T12)			17:22	45 08:20 (T15)			17:05	12 08:23 (T15)
Potential sun hours	458		427		375		346		299		289	
Total, worst case		201		1750		2162		584		1385		319
Sun reduction		0,75		0,72		0,64		0,56		0,48		0,41
Oper. time red.		0,83		0,83		0,83		0,83		0,83		0,83
Wind dir. red.		0,67		0,74		0,74		0,69		0,65		0,65
Total reduction		0,41		0,44		0,39		0,32		0,26		0,22
Total, real		83		762		842		185		359		71

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

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

SHADOW - Calendar

Calculation: Real_case_Progetto_20231109Shadow receptor: F167 - A04-C02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	January		February		March		April		May		June	
1	07:47	15:29 (T05)	07:34		06:59		07:25 (T04)	07:08		06:23		05:55
	17:06	46 16:15 (T05)	17:40		18:13		52 08:17 (T04)	19:47		20:18		20:47
2	07:47	15:29 (T05)	07:33		06:57		07:26 (T04)	07:07		19:17 (T03)		06:22
	17:07	46 16:15 (T05)	17:41		18:14		50 08:16 (T04)	19:48	6	20:19		20:48
3	07:47	15:30 (T05)	07:32		06:55	07:52 (T04)	07:26 (T04)	07:05		19:12 (T03)		06:21
	17:08	45 16:15 (T05)	17:42	6	18:16	07:58 (T04)	49 08:15 (T04)	19:49	14	20:20		20:49
4	07:47	15:30 (T05)	07:31		06:54	07:51 (T04)	07:28 (T04)	07:03		19:10 (T03)		06:19
	17:08	46 16:16 (T05)	17:43	11	18:17	08:02 (T04)	46 08:14 (T04)	19:50	19	20:21		20:49
5	07:47	15:31 (T05)	07:30		06:52	07:50 (T04)	07:28 (T04)	07:02		19:08 (T03)		06:18
	17:09	45 16:16 (T05)	17:45	15	18:18	08:05 (T04)	45 08:13 (T04)	19:51	21	20:22		20:50
6	07:47	15:32 (T05)	07:29		06:51	07:49 (T04)	07:30 (T04)	07:00		19:07 (T03)		06:17
	17:10	45 16:17 (T05)	17:46	19	18:19	08:08 (T04)	42 08:12 (T04)	19:52	24	20:23		20:51
7	07:47	15:32 (T05)	07:28		06:49	07:47 (T04)	07:30 (T04)	06:59		19:05 (T03)		06:16
	17:11	45 16:17 (T05)	17:47	22	18:20	08:09 (T04)	40 08:10 (T04)	19:53	27	20:24		20:51
8	07:47	15:33 (T05)	07:27		06:48	07:46 (T04)	07:31 (T04)	06:57		19:04 (T03)		06:15
	17:12	44 16:17 (T05)	17:48	25	18:21	08:11 (T04)	36 08:07 (T04)	19:54	28	20:25		20:52
9	07:47	15:34 (T05)	07:26		06:46	07:45 (T04)	07:33 (T04)	06:55		19:03 (T03)		06:13
	17:13	44 16:18 (T05)	17:50	27	18:22	08:12 (T04)	33 08:06 (T04)	19:55	30	20:26		20:52
10	07:47	15:34 (T05)	07:24		06:44	07:44 (T04)	07:35 (T04)	06:54		19:02 (T03)		06:12
	17:14	43 16:17 (T05)	17:51	30	18:23	08:14 (T04)	28 08:03 (T04)	19:56	31	20:27		20:53
11	07:47	15:35 (T05)	07:23		06:43	07:43 (T04)	07:38 (T04)	06:52		19:02 (T03)		06:11
	17:15	42 16:17 (T05)	17:52	32	18:25	08:15 (T04)	22 08:00 (T04)	19:57	31	20:28		20:54
12	07:46	15:36 (T05)	07:22		06:41	07:41 (T04)	07:42 (T04)	06:51		19:01 (T03)		06:10
	17:16	42 16:18 (T05)	17:53	35	18:26	08:16 (T04)	13 07:55 (T04)	19:58	32	20:29		20:54
13	07:46	15:37 (T05)	07:21		06:40	07:40 (T04)		06:49		19:02 (T03)		06:09
	17:17	40 16:17 (T05)	17:55	37	18:27	08:17 (T04)		19:59	31	20:30		20:55
14	07:46	15:38 (T05)	07:20		06:38	07:39 (T04)		06:48		19:01 (T03)		06:08
	17:19	39 16:17 (T05)	17:56	39	18:28	08:18 (T04)		20:00	31	20:31		20:55
15	07:45	15:38 (T05)	07:18		06:36	07:38 (T04)		06:46		19:01 (T03)		06:07
	17:20	39 16:17 (T05)	17:57	41	18:29	08:19 (T04)		20:01	30	20:32		20:55
16	07:45	15:40 (T05)	07:17		06:35	07:36 (T04)		06:44		19:02 (T03)		06:06
	17:21	37 16:17 (T05)	17:58	43	18:30	08:19 (T04)		20:02	29	20:33		20:56
17	07:44	15:40 (T05)	07:16		06:33	07:35 (T04)		06:43		19:02 (T03)		06:05
	17:22	36 16:16 (T05)	17:59	44	18:31	08:19 (T04)		20:03	27	20:34		20:56
18	07:44	15:42 (T05)	07:14		06:31	07:33 (T04)		06:41		19:03 (T03)		06:04
	17:23	34 16:16 (T05)	18:01	46	18:32	08:19 (T04)		20:05	26	20:35		20:56
19	07:44	15:43 (T05)	07:13		06:30	07:32 (T04)		06:40		19:04 (T03)		06:03
	17:24	32 16:15 (T05)	18:02	48	18:33	08:20 (T04)		20:06	24	20:36		20:57
20	07:43	15:45 (T05)	07:12		06:28	07:31 (T04)		06:38		19:04 (T03)		06:03
	17:25	30 16:15 (T05)	18:03	49	18:34	08:20 (T04)		20:07	22	20:37		20:57
21	07:42	15:46 (T05)	07:10		06:27	07:29 (T04)		06:37		19:06 (T03)		06:02
	17:26	28 16:14 (T05)	18:04	51	18:35	08:20 (T04)		20:08	18	20:38		20:57
22	07:42	15:47 (T05)	07:09		06:25	07:28 (T04)		06:35		19:08 (T03)		06:01
	17:28	26 16:13 (T05)	18:05	52	18:36	08:20 (T04)		20:09	13	20:39		20:58
23	07:41	15:50 (T05)	07:07		06:23	07:26 (T04)		06:34		19:12 (T03)		06:00
	17:29	22 16:12 (T05)	18:06	54	18:37	08:20 (T04)		20:10	5	20:40		20:58
24	07:40	15:52 (T05)	07:06		06:22	07:25 (T04)		06:33		19:17 (T03)		05:59
	17:30	18 16:10 (T05)	18:08	55	18:38	08:20 (T04)		20:11		20:41		20:58
25	07:40	15:55 (T05)	07:04		06:20	07:24 (T04)		06:31		19:12 (T03)		05:59
	17:31	12 16:07 (T05)	18:09	55	18:39	08:19 (T04)		20:12		20:42		20:58
26	07:39		07:03		06:18	07:25 (T04)		06:30		19:12 (T03)		05:58
	17:32		18:10	54	18:41	08:19 (T04)		20:13		20:43		20:58
27	07:38		07:02		06:17	07:25 (T04)		06:28		19:12 (T03)		05:57
	17:34		18:11	53	18:42	08:18 (T04)		20:14		20:44		20:58
28	07:37		07:00		06:15	07:26 (T04)		06:27		19:12 (T03)		05:57
	17:35		18:12	52	18:43	08:18 (T04)		20:15		20:45		20:58
29	07:37				06:13			06:26		19:12 (T03)		05:56
	17:36				19:44			20:16		20:46		20:58
30	07:36				07:12			06:24		19:12 (T03)		05:56
	17:37				19:45			20:17		20:47		20:58
31	07:35				07:10					19:12 (T03)		05:55
	17:39				19:46					20:48		20:58
Potential sun hours	299		298		370		398		447		451	
Total, worst case	926		995		456		519					
Sun reduction	0,40		0,43		0,47		0,51					
Oper. time red.	0,83		0,83		0,83		0,83					
Wind dir. red.	0,71		0,68		0,68		0,72					
Total reduction	0,24		0,25		0,27		0,30					
Total, real	220		244		122		158					

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

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

Progetto_Ala Dei Sardi

Licensed user:

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

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 16:52/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_20231109Shadow receptor: F167 - A04-C02

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	July	August	September	October	November	December				
1	05:55 20:58	06:19 20:39	06:49 19:57	19:01 (T03) 19:32 (T03)	07:19 19:07	08:24 (T04) 08:31 (T04)	06:52 17:21	07:14 (T04) 07:43 (T04)	07:27 16:57	15:17 (T05) 15:59 (T05)
2	05:56 20:58	06:20 20:38	06:50 19:55	19:01 (T03) 19:32 (T03)	07:20 19:05	08:17 (T04) 08:36 (T04)	06:53 17:19	07:15 (T04) 07:42 (T04)	07:28 16:57	15:17 (T05) 16:00 (T05)
3	05:56 20:58	06:21 20:37	06:51 19:54	19:01 (T03) 19:31 (T03)	07:21 19:03	08:14 (T04) 08:39 (T04)	06:55 17:18	07:16 (T04) 07:40 (T04)	07:29 16:56	15:17 (T05) 16:01 (T05)
4	05:57 20:58	06:22 20:36	06:52 19:52	19:02 (T03) 19:30 (T03)	07:22 19:02	08:12 (T04) 08:43 (T04)	06:56 17:17	07:17 (T04) 07:38 (T04)	07:30 16:56	15:17 (T05) 16:01 (T05)
5	05:57 20:57	06:23 20:35	06:53 19:50	19:01 (T03) 19:28 (T03)	07:23 19:00	08:10 (T04) 08:44 (T04)	06:57 17:16	07:19 (T04) 07:37 (T04)	07:31 16:56	15:18 (T05) 16:02 (T05)
6	05:58 20:57	06:24 20:34	06:54 19:49	19:02 (T03) 19:26 (T03)	07:24 18:59	08:08 (T04) 08:46 (T04)	06:58 17:15	07:20 (T04) 07:35 (T04)	07:32 16:56	15:18 (T05) 16:03 (T05)
7	05:59 20:57	06:25 20:33	06:55 19:47	19:03 (T03) 19:25 (T03)	07:25 18:57	08:06 (T04) 08:47 (T04)	06:59 17:14	07:21 (T04) 07:32 (T04)	07:32 16:56	15:18 (T05) 16:03 (T05)
8	05:59 20:57	06:26 20:31	06:56 19:45	19:04 (T03) 19:23 (T03)	07:26 18:55	08:04 (T04) 08:48 (T04)	07:00 17:13	07:22 (T04) 07:27 (T04)	07:33 16:56	15:18 (T05) 16:04 (T05)
9	06:00 20:56	06:27 20:30	06:57 19:44	19:06 (T03) 19:21 (T03)	07:27 18:54	08:03 (T04) 08:49 (T04)	07:02 17:12	07:02 16:56	07:34 16:05	15:19 (T05) 16:05 (T05)
10	06:00 20:56	06:28 20:29	06:58 19:42	19:10 (T03) 19:17 (T03)	07:28 18:52	08:02 (T04) 08:49 (T04)	07:03 17:11	07:03 16:56	07:35 16:05	15:19 (T05) 16:05 (T05)
11	06:01 20:55	06:29 20:28	06:59 19:40	07:29 18:51	08:00 (T04) 08:50 (T04)	07:04 17:10	07:04 16:56	07:36 16:05	07:36 16:05	15:19 (T05) 16:05 (T05)
12	06:02 20:55	06:30 20:26	07:00 19:39	07:30 18:49	07:59 (T04) 08:50 (T04)	07:05 17:09	07:05 16:56	07:37 16:06	07:37 16:06	15:19 (T05) 16:06 (T05)
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	07:59 (T04) 08:50 (T04)	07:06 17:08	07:06 16:56	07:38 16:06	07:38 16:06	15:20 (T05) 16:06 (T05)
14	06:03 20:54	06:31 20:24	07:02 19:35	07:32 18:46	07:58 (T04) 08:51 (T04)	07:07 17:07	07:07 16:56	07:38 16:06	07:38 16:06	15:20 (T05) 16:07 (T05)
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	07:57 (T04) 08:51 (T04)	07:09 17:06	07:09 16:56	07:39 16:06	07:39 16:06	15:21 (T05) 16:08 (T05)
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	07:56 (T04) 08:51 (T04)	07:10 17:05	07:10 16:57	07:40 16:07	07:40 16:07	15:21 (T05) 16:08 (T05)
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	07:57 (T04) 08:51 (T04)	07:11 17:04	07:11 15:29 (T05)	07:41 16:07	07:41 16:07	15:22 (T05) 16:09 (T05)
18	06:06 20:52	06:35 20:18	07:06 19:29	07:36 18:40	07:57 (T04) 08:51 (T04)	07:12 17:04	07:12 15:44 (T05)	07:41 16:07	07:41 16:07	15:21 (T05) 16:08 (T05)
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	07:58 (T04) 08:51 (T04)	07:13 17:03	07:13 15:24 (T05)	07:42 16:08	07:42 16:08	15:22 (T05) 16:09 (T05)
20	06:08 20:50	06:37 20:15	07:08 19:25	19:17 (T03) 19:24 (T03)	07:38 18:37	07:39 17:02	07:39 15:22 (T05)	07:42 16:08	07:42 16:08	15:23 (T05) 16:10 (T05)
21	06:09 20:49	06:38 20:14	07:09 19:24	19:12 (T03) 19:26 (T03)	07:39 19:24	07:40 18:35	07:40 15:22 (T05)	07:43 16:09	07:43 16:09	15:23 (T05) 16:10 (T05)
22	06:10 20:49	06:39 20:12	07:10 19:23	19:10 (T03) 19:28 (T03)	07:40 19:22	07:41 18:34	07:41 15:21 (T05)	07:43 16:10	07:43 16:10	15:24 (T05) 16:11 (T05)
23	06:11 20:48	06:40 20:11	07:11 19:22	19:08 (T03) 19:30 (T03)	07:41 19:20	07:42 18:33	07:42 15:20 (T05)	07:44 16:11	07:44 16:11	15:24 (T05) 16:11 (T05)
24	06:12 20:47	06:41 20:09	07:12 19:21	19:07 (T03) 19:31 (T03)	07:42 19:19	07:43 18:31	07:43 15:19 (T05)	07:44 16:11	07:44 16:11	15:24 (T05) 16:11 (T05)
25	06:12 20:46	06:42 20:08	07:13 19:20	19:05 (T03) 19:32 (T03)	07:43 19:17	06:44 17:30	07:05 (T04) 07:49 (T04)	07:45 16:59	07:45 15:54 (T05)	15:25 (T05) 16:12 (T05)
26	06:13 20:45	06:43 20:06	07:14 19:19	19:04 (T03) 19:32 (T03)	07:44 19:15	06:45 17:28	07:06 (T04) 07:48 (T04)	07:45 16:59	07:45 15:55 (T05)	15:26 (T05) 16:12 (T05)
27	06:14 20:44	06:44 20:05	07:15 19:18	19:03 (T03) 19:32 (T03)	07:15 19:13	06:46 17:27	07:07 (T04) 07:47 (T04)	07:46 16:58	07:46 15:57 (T05)	15:26 (T05) 16:13 (T05)
28	06:15 20:43	06:45 20:03	07:16 19:17	19:03 (T03) 19:33 (T03)	07:16 19:12	06:48 17:26	07:09 (T04) 07:47 (T04)	07:46 16:58	07:46 15:57 (T05)	15:27 (T05) 16:14 (T05)
29	06:16 20:42	06:46 20:02	07:17 19:16	19:02 (T03) 19:33 (T03)	07:17 19:10	06:49 17:24	07:10 (T04) 07:46 (T04)	07:46 16:57	07:46 15:58 (T05)	15:27 (T05) 16:14 (T05)
30	06:17 20:41	06:47 20:00	07:18 19:15	19:02 (T03) 19:33 (T03)	07:18 19:08	06:50 17:23	07:11 (T04) 07:45 (T04)	07:46 16:57	07:46 15:59 (T05)	15:28 (T05) 16:14 (T05)
31	06:18 20:40	06:48 19:58	07:19 19:14	19:01 (T03) 19:33 (T03)	07:19 19:08	06:51 17:22	07:12 (T04) 07:44 (T04)	07:47 17:05	07:47 17:05	15:28 (T05) 16:14 (T05)
Potential sun hours	458	427	375	346	299	289				
Total, worst case		293	234	1317	585	1427				
Sun reduction		0,72	0,64	0,56	0,48	0,41				
Oper. time red.		0,83	0,83	0,83	0,83	0,83				
Wind dir. red.		0,72	0,72	0,68	0,71	0,71				
Total reduction		0,43	0,38	0,32	0,28	0,25				
Total, real		126	90	415	165	350				

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

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

SHADOW - Calendar

Calculation: Real_case_Progetto_20231109Shadow receptor: F173 - A04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	January		February		March		April		May		June	
1	07:47	16:05 (T02)	07:34	16:07 (T02)	06:59		07:08	17:58 (T01)	06:23		05:55	
	17:06	21 16:26 (T02)	17:40	16:47 (T02)	18:13		19:47	60 18:58 (T01)	20:18		20:47	
2	07:47	16:05 (T02)	07:33	16:07 (T02)	06:57		07:07	17:57 (T01)	06:22		05:54	
	17:07	22 16:27 (T02)	17:41	16:46 (T02)	18:14		19:48	60 18:57 (T01)	20:19		20:48	
3	07:47	16:05 (T02)	07:32	16:08 (T02)	06:55		07:05	17:57 (T01)	06:21		05:54	
	17:08	23 16:28 (T02)	17:42	16:46 (T02)	18:16		19:49	59 18:56 (T01)	20:20		20:49	
4	07:47	16:05 (T02)	07:31	16:09 (T02)	06:54		07:03	17:58 (T01)	06:19		05:53	
	17:08	24 16:29 (T02)	17:43	16:46 (T02)	18:17		19:50	58 18:56 (T01)	20:21		20:49	
5	07:47	16:05 (T02)	07:30	16:10 (T02)	06:52		07:02	17:58 (T01)	06:18		05:53	
	17:09	26 16:31 (T02)	17:45	16:45 (T02)	18:18		19:51	57 18:55 (T01)	20:22		20:50	
6	07:47	16:04 (T02)	07:29	16:11 (T02)	06:51		07:00	17:59 (T01)	06:17		05:53	
	17:10	28 16:32 (T02)	17:46	16:44 (T02)	18:19		19:52	55 18:54 (T01)	20:23		20:51	
7	07:47	16:04 (T02)	07:28	16:12 (T02)	06:49		06:59	17:59 (T01)	06:16		05:52	
	17:11	29 16:33 (T02)	17:47	16:43 (T02)	18:20		19:53	54 18:53 (T01)	20:24		20:51	
8	07:47	16:04 (T02)	07:27	16:13 (T02)	06:48		06:57	17:59 (T01)	06:15		05:52	
	17:12	30 16:34 (T02)	17:48	16:42 (T02)	18:21		19:54	53 18:52 (T01)	20:25		20:52	
9	07:47	16:05 (T02)	07:26	16:15 (T02)	06:46		06:55	18:00 (T01)	06:13		05:52	
	17:13	30 16:35 (T02)	17:50	16:40 (T02)	18:22		19:55	51 18:51 (T01)	20:26		20:52	
10	07:47	16:04 (T02)	07:24	16:17 (T02)	06:44		06:54	18:00 (T01)	06:12		05:52	
	17:14	32 16:36 (T02)	17:51	16:39 (T02)	18:23		19:56	50 18:50 (T01)	20:27		20:53	
11	07:47	16:04 (T02)	07:23	16:20 (T02)	06:43		06:52	18:02 (T01)	06:11		05:52	
	17:15	33 16:37 (T02)	17:52	16:36 (T02)	18:25	12	17:40 (T01)	19:57	47	18:49 (T01)	20:28	20:54
12	07:46	16:04 (T02)	07:22	16:24 (T02)	06:41		06:51	17:22 (T01)	06:10		05:52	
	17:16	34 16:38 (T02)	17:53	16:31 (T02)	18:26	22	17:44 (T01)	19:58	45	18:47 (T01)	20:29	20:54
13	07:46	16:03 (T02)	07:21	06:40			06:49	17:18 (T01)	06:09		05:51	
	17:17	35 16:38 (T02)	17:54	18:27	29	17:47 (T01)	19:59	42	18:46 (T01)	20:30	20:55	
14	07:46	16:03 (T02)	07:20	06:38			06:47	17:15 (T01)	06:08		05:51	
	17:18	37 16:40 (T02)	17:56	18:28	35	17:50 (T01)	20:00	39	18:44 (T01)	20:31	20:55	
15	07:45	16:03 (T02)	07:18	06:36			06:46	17:13 (T01)	06:07		05:51	
	17:20	37 16:40 (T02)	17:57	18:29	38	17:51 (T01)	20:01	35	18:41 (T01)	20:32	20:55	
16	07:45	16:03 (T02)	07:17	06:35			06:44	17:10 (T01)	06:06		05:51	
	17:21	38 16:41 (T02)	17:58	18:30	43	17:53 (T01)	20:02	32	18:40 (T01)	20:33	20:56	
17	07:45	16:03 (T02)	07:16	06:33			06:43	17:09 (T01)	06:05		05:51	
	17:22	38 16:41 (T02)	17:59	18:31	45	17:54 (T01)	20:04	27	18:37 (T01)	20:34	20:56	
18	07:44	16:03 (T02)	07:14	06:31			06:41	17:07 (T01)	06:04		05:52	
	17:23	40 16:43 (T02)	18:01	18:32	48	17:55 (T01)	20:05	20	18:34 (T01)	20:35	20:57	
19	07:44	16:03 (T02)	07:13	06:30			06:40	17:05 (T01)	06:03		05:52	
	17:24	40 16:43 (T02)	18:02	18:33	51	17:56 (T01)	20:06	10	18:29 (T01)	20:36	20:57	
20	07:43	16:03 (T02)	07:12	06:28			06:38	17:05 (T01)	06:03		05:52	
	17:25	41 16:44 (T02)	18:03	18:34	52	17:57 (T01)	20:07		20:37		20:57	
21	07:42	16:03 (T02)	07:10	06:26			06:37	17:03 (T01)	06:02		05:52	
	17:26	41 16:44 (T02)	18:04	18:35	54	17:57 (T01)	20:08		20:38		20:57	
22	07:42	16:03 (T02)	07:09	06:25			06:35	17:02 (T01)	06:01		05:52	
	17:28	41 16:44 (T02)	18:05	18:36	55	17:57 (T01)	20:09		20:39		20:58	
23	07:41	16:04 (T02)	07:07	06:23			06:34	17:02 (T01)	06:00		05:52	
	17:29	42 16:46 (T02)	18:06	18:37	57	17:59 (T01)	20:10		20:40		20:58	
24	07:41	16:04 (T02)	07:06	06:22			06:33	17:01 (T01)	05:59		05:53	
	17:30	42 16:46 (T02)	18:08	18:38	57	17:58 (T01)	20:11		20:41		20:58	
25	07:40	16:04 (T02)	07:04	06:20			06:31	16:59 (T01)	05:59		05:53	
	17:31	42 16:46 (T02)	18:09	18:39	59	17:58 (T01)	20:12		20:42		20:58	
26	07:39	16:04 (T02)	07:03	06:18			06:30	17:00 (T01)	05:58		05:53	
	17:32	42 16:46 (T02)	18:10	18:41	59	17:59 (T01)	20:13		20:42		20:58	
27	07:38	16:05 (T02)	07:02	06:17			06:28	16:59 (T01)	05:57		05:54	
	17:34	42 16:47 (T02)	18:11	18:42	60	17:59 (T01)	20:14		20:43		20:58	
28	07:37	16:05 (T02)	07:00	06:15			06:27	16:58 (T01)	05:57		05:54	
	17:35	42 16:47 (T02)	18:12	18:43	60	17:58 (T01)	20:15		20:44		20:58	
29	07:37	16:05 (T02)		07:13			06:26	17:58 (T01)	05:56		05:54	
	17:36	42 16:47 (T02)		19:44	61	18:59 (T01)	20:16		20:45		20:58	
30	07:36	16:06 (T02)		07:12			06:24	17:58 (T01)	05:56		05:55	
	17:37	41 16:47 (T02)		19:45	60	18:58 (T01)	20:17		20:46		20:58	
31	07:35	16:06 (T02)		07:10				17:57 (T01)	05:55			
	17:39	41 16:47 (T02)		19:46	60	18:57 (T01)			20:46			
Potential sun hours	298		298		370		398		447		451	
Total, worst case	1096		352		1017		854					
Sun reduction	0,40		0,43		0,47		0,51					
Oper. time red.	0,83		0,83		0,83		0,83					
Wind dir. red.	0,74		0,74		0,74		0,74					
Total reduction	0,24		0,26		0,29		0,31					
Total, real	268		93		293		264					

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F173 - A04

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	July	August	September	October	November	December				
1	05:55 20:58	06:19 20:39	06:49 19:57	18:01 (T01) 18:48 (T01)	07:19 19:07	17:59 (T01) 18:24 (T01)	06:52 17:21	15:47 (T02) 16:09 (T02)	07:27 16:57	15:46 (T02) 16:19 (T02)
2	05:56 20:58	06:20 20:38	06:50 19:55	17:59 (T01) 18:49 (T01)	07:20 19:05	18:02 (T01) 18:20 (T01)	06:53 17:19	15:45 (T02) 16:10 (T02)	07:28 16:56	15:47 (T02) 16:19 (T02)
3	05:56 20:58	06:21 20:37	06:51 19:54	17:58 (T01) 18:49 (T01)	07:21 19:03		06:55 17:18	15:43 (T02) 16:12 (T02)	07:29 16:56	15:48 (T02) 16:18 (T02)
4	05:57 20:58	06:22 20:36	06:52 19:52	17:57 (T01) 18:50 (T01)	07:22 19:02		06:56 17:17	15:41 (T02) 16:13 (T02)	07:30 16:56	15:48 (T02) 16:18 (T02)
5	05:57 20:57	06:23 20:35	06:53 19:50	17:55 (T01) 18:49 (T01)	07:23 19:00		06:57 17:16	15:41 (T02) 16:14 (T02)	07:31 16:56	15:49 (T02) 16:18 (T02)
6	05:58 20:57	06:24 20:34	06:54 19:49	17:54 (T01) 18:49 (T01)	07:24 18:59		06:58 17:15	15:40 (T02) 16:15 (T02)	07:32 16:56	15:50 (T02) 16:18 (T02)
7	05:59 20:57	06:25 20:33	06:55 19:47	17:53 (T01) 18:50 (T01)	07:25 18:57		06:59 17:14	15:39 (T02) 16:16 (T02)	07:33 16:56	15:52 (T02) 16:18 (T02)
8	05:59 20:57	06:26 20:31	06:56 19:45	17:52 (T01) 18:50 (T01)	07:26 18:55		07:00 17:13	15:38 (T02) 16:16 (T02)	07:33 16:56	15:53 (T02) 16:17 (T02)
9	06:00 20:56	06:27 20:30	06:57 19:44	17:51 (T01) 18:50 (T01)	07:27 18:54		07:02 17:12	15:38 (T02) 16:17 (T02)	07:34 16:56	15:54 (T02) 16:17 (T02)
10	06:00 20:56	06:28 20:29	06:58 19:42	17:51 (T01) 18:50 (T01)	07:28 18:52		07:03 17:11	15:38 (T02) 16:18 (T02)	07:35 16:56	15:55 (T02) 16:17 (T02)
11	06:01 20:55	06:28 20:28	06:59 19:40	17:50 (T01) 18:50 (T01)	07:29 18:51		07:04 17:10	15:37 (T02) 16:18 (T02)	07:36 16:56	15:56 (T02) 16:17 (T02)
12	06:02 20:55	06:29 20:26	07:00 19:39	17:49 (T01) 18:50 (T01)	07:30 18:49		07:05 17:09	15:37 (T02) 16:18 (T02)	07:37 16:56	15:57 (T02) 16:16 (T02)
13	06:03 20:54	06:30 20:25	07:01 19:37	17:49 (T01) 18:49 (T01)	07:31 18:47		07:06 17:08	15:37 (T02) 16:19 (T02)	07:38 16:56	15:58 (T02) 16:16 (T02)
14	06:03 20:54	06:31 20:24	07:02 19:35	17:48 (T01) 18:49 (T01)	07:32 18:46		07:07 17:07	15:37 (T02) 16:19 (T02)	07:38 16:56	15:59 (T02) 16:16 (T02)
15	06:04 20:53	06:32 20:22	07:03 19:34	17:48 (T01) 18:48 (T01)	07:33 18:44		07:09 17:06	15:37 (T02) 16:19 (T02)	07:39 16:56	16:00 (T02) 16:17 (T02)
16	06:05 20:53	06:33 20:21	07:04 19:32	17:48 (T01) 18:48 (T01)	07:34 18:43		07:10 17:05	15:37 (T02) 16:19 (T02)	07:40 16:57	16:01 (T02) 16:16 (T02)
17	06:06 20:52	06:34 20:19	07:05 19:30	17:48 (T01) 18:47 (T01)	07:35 18:41		07:11 17:04	15:38 (T02) 16:20 (T02)	07:41 16:57	16:02 (T02) 16:16 (T02)
18	06:06 20:52	06:35 20:18	07:06 19:29	17:48 (T01) 18:47 (T01)	07:36 18:40		07:12 17:04	15:38 (T02) 16:20 (T02)	07:41 16:57	16:02 (T02) 16:16 (T02)
19	06:07 20:51	06:36 20:17	07:07 19:27	17:48 (T01) 18:46 (T01)	07:37 18:38		07:13 17:03	15:38 (T02) 16:20 (T02)	07:42 16:58	16:03 (T02) 16:16 (T02)
20	06:08 20:50	06:37 20:15	07:08 19:25	17:48 (T01) 18:45 (T01)	07:39 18:37		07:14 17:02	15:38 (T02) 16:19 (T02)	07:42 16:58	16:05 (T02) 16:17 (T02)
21	06:09 20:49	06:38 20:14	07:09 19:24	17:48 (T01) 18:44 (T01)	07:40 18:35		07:16 17:02	15:39 (T02) 16:20 (T02)	07:43 16:59	16:05 (T02) 16:17 (T02)
22	06:10 20:49	06:39 20:12	07:10 19:22	17:48 (T01) 18:43 (T01)	07:41 18:34		07:17 17:01	15:39 (T02) 16:20 (T02)	07:44 16:59	16:06 (T02) 16:18 (T02)
23	06:11 20:48	06:40 20:11	07:11 19:20	17:48 (T01) 18:41 (T01)	07:42 18:33		07:18 17:00	15:40 (T02) 16:20 (T02)	07:44 17:00	16:06 (T02) 16:18 (T02)
24	06:11 20:47	06:41 20:09	18:21 (T01) 18:33 (T01)	07:12 19:19	17:48 (T01) 18:31		07:19 17:00	15:40 (T02) 16:20 (T02)	07:44 17:00	16:06 (T02) 16:18 (T02)
25	06:12 20:46	06:42 20:08	18:16 (T01) 18:37 (T01)	07:13 19:17	17:49 (T01) 17:30		07:20 16:59	15:41 (T02) 16:19 (T02)	07:45 17:01	16:06 (T02) 16:19 (T02)
26	06:13 20:45	06:43 20:06	18:13 (T01) 18:40 (T01)	07:14 19:15	17:50 (T01) 17:28		07:21 16:59	15:41 (T02) 16:19 (T02)	07:45 17:01	16:06 (T02) 16:20 (T02)
27	06:14 20:44	06:44 20:05	18:10 (T01) 18:42 (T01)	07:15 19:13	17:51 (T01) 17:27		07:22 16:58	15:43 (T02) 16:20 (T02)	07:46 17:02	16:06 (T02) 16:21 (T02)
28	06:15 20:43	06:45 20:03	18:08 (T01) 18:43 (T01)	07:16 19:12	17:53 (T01) 17:26		07:23 16:58	15:43 (T02) 16:20 (T02)	07:46 17:03	16:07 (T02) 16:22 (T02)
29	06:16 20:42	06:46 20:02	18:06 (T01) 18:45 (T01)	07:17 19:10	17:54 (T01) 17:24		07:25 16:57	15:44 (T02) 16:19 (T02)	07:46 17:03	16:06 (T02) 16:23 (T02)
30	06:17 20:41	06:47 20:00	18:04 (T01) 18:46 (T01)	07:18 19:08	17:56 (T01) 17:23	15:53 (T02) 16:02 (T02)	07:26 16:57	15:45 (T02) 16:19 (T02)	07:46 17:04	16:06 (T02) 16:24 (T02)
31	06:18 20:40	06:48 19:58	18:02 (T01) 18:47 (T01)	07:19 375	18:28 (T01) 17:22	16:02 (T02) 16:06 (T02)	16:57 17	16:19 (T02) 17:05	17:04 17:05	16:24 (T02) 16:25 (T02)
Potential sun hours	458	427			346		299		289	
Total, worst case			253	1600		69	1128			596
Sun reduction			0,72	0,64		0,56	0,48			0,42
Oper. time red.			0,83	0,83		0,83				0,83
Wind dir. red.			0,74	0,74		0,74				0,74
Total reduction			0,44	0,39		0,34	0,29			0,25
Total, real			111	628		23	331			151

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F215 - A03

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:47 17:06	07:34 17:40	06:59 18:14	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	06:52 17:21	07:14 (T11) 16:57
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	06:22 20:19	05:54 20:48	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	06:53 17:20	07:15 (T11) 16:57
3	07:47 17:08	07:32 17:42	06:56 18:16	07:05 19:49	06:21 20:20	05:54 20:49	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:04	06:55 17:18	07:16 (T11) 16:56
4	07:47 17:09	07:31 17:44	07:51 (T11) 07:55 (T11)	06:54 18:17	07:04 19:50	06:19 20:21	05:54 20:49	05:57 20:58	06:22 20:36	06:52 19:52	07:22 19:02	06:56 17:17
5	07:47 17:10	07:30 17:45	07:50 (T11) 07:57 (T11)	06:53 18:18	07:02 19:51	06:18 20:22	05:53 20:50	05:58 20:57	06:23 20:35	06:53 19:50	07:23 19:00	06:57 17:16
6	07:47 17:11	07:29 17:46	07:49 (T11) 07:58 (T11)	06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:51	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	06:58 17:15
7	07:47 17:11	07:28 17:47	07:48 (T11) 07:59 (T11)	06:49 18:20	06:59 19:53	06:16 20:24	05:53 20:51	05:59 20:57	06:25 20:33	06:55 19:47	07:25 18:57	06:59 17:14
8	07:47 17:12	07:27 17:49	07:46 (T11) 07:59 (T11)	06:48 18:21	06:57 19:54	06:15 20:25	05:52 20:52	05:59 20:57	06:26 20:31	06:56 19:46	07:26 18:56	07:01 17:13
9	07:47 17:13	07:26 17:50	07:45 (T11) 08:00 (T11)	06:46 18:22	06:56 19:55	06:14 20:26	05:52 20:53	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	07:02 17:12
10	07:47 17:14	07:25 17:51	07:44 (T11) 08:00 (T11)	06:45 18:24	06:54 19:56	06:12 20:27	05:52 20:53	06:01 20:56	06:28 20:29	06:58 19:42	07:28 18:52	07:03 17:11
11	07:47 17:15	07:23 17:52	07:43 (T11) 08:01 (T11)	06:43 18:25	06:52 19:57	06:11 20:28	05:52 20:54	06:01 20:55	06:29 20:28	06:59 19:41	07:29 18:51	07:04 17:10
12	07:46 17:17	07:22 17:53	07:42 (T11) 08:01 (T11)	06:41 18:26	06:51 19:58	06:10 20:29	05:52 20:54	06:02 20:55	06:30 20:26	07:00 19:39	07:30 18:49	07:05 17:09
13	07:46 17:18	07:21 17:55	07:41 (T11) 08:00 (T11)	06:40 18:27	06:49 19:59	06:09 20:30	05:52 20:55	06:03 20:55	06:31 20:25	07:01 19:37	07:31 18:48	07:06 17:08
14	07:46 17:19	07:20 17:56	07:42 (T11) 07:59 (T11)	06:38 18:28	06:48 19:59	06:08 20:31	05:52 20:55	06:04 20:54	06:32 20:24	07:02 19:36	07:32 18:46	07:07 17:07
15	07:45 17:20	07:18 17:57	07:43 (T11) 07:59 (T11)	06:37 18:29	06:46 20:02	06:07 20:32	05:52 20:56	06:04 20:53	06:33 20:22	07:03 19:34	07:33 18:45	07:09 17:06
16	07:45 17:21	07:17 17:58	07:43 (T11) 07:57 (T11)	06:35 18:30	06:45 20:03	06:06 20:33	05:52 20:56	06:05 20:53	06:34 20:21	07:04 19:32	07:34 18:43	07:10 17:05
17	07:45 17:22	07:16 18:00	07:46 (T11) 07:55 (T11)	06:33 18:31	06:43 20:04	06:05 20:34	05:52 20:56	06:06 20:52	06:35 20:20	07:05 19:30	07:35 18:41	07:11 17:05
18	07:44 17:23	07:14 18:01	07:47 (T11) 08:00 (T11)	06:32 18:32	06:42 20:05	06:04 20:35	05:52 20:57	06:07 20:52	06:36 20:18	07:06 19:29	07:36 18:40	07:12 17:04
19	07:44 17:24	07:13 18:02	07:47 (T11) 08:00 (T11)	06:30 18:33	06:40 20:06	06:04 20:36	05:52 20:57	06:07 20:51	06:37 20:17	07:07 19:27	07:38 18:39	07:13 17:03
20	07:43 17:25	07:12 18:03	07:47 (T11) 08:00 (T11)	06:28 18:34	06:39 20:07	06:03 20:37	05:52 20:57	06:08 20:50	06:38 20:15	07:08 19:25	07:39 18:37	07:15 17:02
21	07:43 17:27	07:10 18:04	07:47 (T11) 08:00 (T11)	06:27 18:35	06:37 20:08	06:02 20:38	05:52 20:57	06:09 20:50	06:38 20:14	07:09 19:24	07:40 18:36	07:16 17:02
22	07:42 17:28	07:09 18:05	07:47 (T11) 08:00 (T11)	06:25 18:36	06:36 20:09	06:01 20:39	05:52 20:58	06:10 20:49	06:39 20:12	07:10 19:22	07:41 18:34	07:17 17:01
23	07:41 17:29	07:07 18:07	07:47 (T11) 08:00 (T11)	06:23 18:38	06:34 20:10	06:00 20:40	05:53 20:58	06:11 20:48	06:40 20:11	07:11 19:20	07:42 18:33	07:18 17:00
24	07:41 17:30	07:06 18:08	07:47 (T11) 08:00 (T11)	06:22 18:39	06:33 20:11	06:00 20:41	05:53 20:58	06:12 20:47	06:41 20:09	07:12 19:19	07:43 18:31	07:19 17:00
25	07:40 17:31	07:05 18:09	07:47 (T11) 08:00 (T11)	06:20 18:40	06:31 20:12	05:59 20:42	05:53 20:58	06:13 20:46	06:42 20:08	07:13 19:17	07:44 17:30	07:20 16:59
26	07:39 17:33	07:03 18:10	07:47 (T11) 08:00 (T11)	06:18 18:41	06:30 20:13	05:58 20:42	05:53 20:58	06:13 20:45	06:43 20:06	07:14 19:15	07:45 17:29	07:13 (T11) 16:59
27	07:38 17:34	07:02 18:11	07:47 (T11) 08:00 (T11)	06:17 18:42	06:29 20:14	05:58 20:43	05:54 20:58	06:14 20:44	06:44 20:05	07:15 19:14	07:47 17:27	07:12 (T11) 16:58
28	07:38 17:35	07:00 18:12	07:47 (T11) 08:00 (T11)	06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:58	06:15 20:44	06:45 20:03	07:16 19:12	07:48 17:26	07:11 (T11) 16:58
29	07:37 17:36	07:02 18:13	07:47 (T11) 08:00 (T11)	06:13 18:44	06:26 20:16	05:56 20:45	05:55 20:58	06:16 20:43	06:46 20:02	07:17 19:10	07:49 17:25	07:10 (T11) 16:58
30	07:36 17:37	07:06 18:14	07:47 (T11) 08:00 (T11)	06:11 18:45	06:25 20:17	05:55 20:46	05:55 20:58	06:17 20:42	06:47 20:00	07:18 19:09	07:50 17:23	07:11 (T11) 16:57
31	07:35 17:39	07:07 18:16	07:47 (T11) 08:00 (T11)	06:09 18:46	06:25 20:18	05:54 20:47	05:54 20:58	06:18 20:41	06:48 19:59	07:19 17:22	07:51 17:29	07:12 (T11) 16:57
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Total, worst case		187								116		75
Sun reduction		0,43								0,56		0,48
Oper. time red.		0,83								0,83		0,83
Wind dir. red.		0,68								0,68		0,68
Total reduction		0,24								0,31		0,27
Total, real		46								36		20

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

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

SHADOW - Calendar

Calculation: Real_case_Progetto_20231109Shadow receptor: F279 - A04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

		January	February	March	April	May	June	July	August	September	October	November	December		
1	07:47		07:34	06:58	07:08	06:23	05:55	05:55	06:19	06:49	07:18	06:52	07:26		
	17:06	6 16:05 (T12)	17:40	18:13	19:47	20:18	20:47	20:58	20:39	19:57	19:07	17:21	16:57		
2	07:47		07:33	06:57	07:07	06:22	05:54	05:56	06:20	06:50	07:19	06:53	07:27		
	17:07		17:41	18:14	19:48	20:19	20:48	20:58	20:38	19:55	19:05	17:19	16:56		
3	07:47		07:32	06:55	07:05	06:20	05:54	05:56	06:21	06:51	07:20	06:54	07:28		
	17:08		17:42	18:16	19:49	20:20	20:48	20:58	20:37	19:53	19:03	17:18	16:56		
4	07:47		07:31	06:54	07:03	06:19	05:53	05:57	06:22	06:52	07:21	06:56	07:29		
	17:08		17:43	18:17	19:50	20:21	20:49	20:57	20:36	19:52	19:02	17:17	16:56		
5	07:47		07:30	06:52	07:02	06:18	05:53	05:57	06:23	06:53	07:23	06:57	07:30		
	17:09		17:45	18:18	19:51	20:22	20:50	20:57	20:35	19:50	19:00	17:16	16:56		
6	07:47		07:29	06:51	07:00	06:17	05:53	05:58	06:24	06:54	07:24	06:58	07:31		
	17:10		17:46	18:19	19:52	20:23	20:50	20:57	20:34	19:49	18:58	17:15	16:56		
7	07:47		07:28	06:49	06:58	06:16	05:52	05:58	06:25	06:55	07:25	06:59	07:32		
	17:11		17:47	18:20	19:53	20:24	20:51	20:57	20:32	19:47	18:57	17:14	16:56		
8	07:47		07:27	06:48	06:57	06:14	05:52	05:59	06:26	06:56	07:26	07:00	07:33		
	17:12		17:48	18:21	19:54	20:25	20:52	20:56	20:31	19:45	18:55	17:13	16:56		
9	07:47		07:25	06:46	06:55	06:13	05:52	06:00	06:26	06:57	07:27	07:01	07:34		
	17:13		17:50	18:22	19:55	20:26	20:52	20:56	20:30	19:44	18:54	17:12	16:56		
10	07:47		07:24	06:44	06:54	06:12	05:52	06:00	06:27	06:58	07:28	07:03	07:35		
	17:14		17:51	18:23	19:56	20:27	20:53	20:56	20:29	19:42	18:52	17:11	16:56		
11	07:46		07:23	06:43	06:52	06:11	05:52	06:01	06:28	06:59	07:29	07:04	07:36		15:56 (T12)
	17:15		17:52	18:24	19:57	20:28	20:53	20:55	20:27	19:40	18:50	17:10	16:56	4	16:00 (T12)
12	07:46		07:22	06:41	06:51	06:10	05:52	06:02	06:29	07:00	07:30	07:05	07:37		15:55 (T12)
	17:16		17:53	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	16:56	7	16:02 (T12)
13	07:46		07:21	06:40	06:49	06:09	05:51	06:03	06:30	07:01	07:31	07:06	07:37		15:55 (T12)
	17:17		17:54	18:27	19:59	20:30	20:54	20:54	20:25	19:37	18:47	17:08	16:56	9	16:04 (T12)
14	07:46		07:19	06:38	06:47	06:08	05:51	06:03	06:31	07:02	07:32	07:07	07:38		15:55 (T12)
	17:18		17:56	18:28	20:00	20:31	20:55	20:54	20:23	19:35	18:46	17:07	16:56	10	16:05 (T12)
15	07:45		07:18	06:36	06:46	06:07	05:51	06:04	06:32	07:03	07:33	07:08	07:39		15:54 (T12)
	17:20		17:57	18:29	20:01	20:32	20:55	20:53	20:22	19:34	18:44	17:06	16:56	11	16:05 (T12)
16	07:45		07:17	06:35	06:44	06:06	05:51	06:05	06:33	07:04	07:34	07:10	07:40		15:55 (T12)
	17:21		17:58	18:30	20:02	20:33	20:56	20:53	20:21	19:32	18:43	17:05	16:57	11	16:06 (T12)
17	07:44		07:16	06:33	06:43	06:05	05:51	06:06	06:34	07:05	07:35	07:11	07:40		15:55 (T12)
	17:22		17:59	18:31	20:03	20:34	20:56	20:52	20:19	19:30	18:41	17:04	16:57	12	16:07 (T12)
18	07:44		07:14	06:31	06:41	06:04	05:51	06:06	06:35	07:06	07:36	07:12	07:41		15:55 (T12)
	17:23		18:00	18:32	20:04	20:35	20:56	20:51	20:18	19:29	18:40	17:04	16:57	12	16:07 (T12)
19	07:43		07:13	06:30	06:40	06:03	05:52	06:07	06:36	07:07	07:37	07:13	07:42		15:56 (T12)
	17:24		18:02	18:33	20:05	20:36	20:57	20:51	20:17	19:27	18:38	17:03	16:58	12	16:08 (T12)
20	07:43		07:11	06:28	06:38	06:03	05:52	06:08	06:37	07:07	07:38	07:14	07:42		15:55 (T12)
	17:25		18:03	18:34	20:07	20:37	20:57	20:50	20:15	19:25	18:37	17:02	16:58	13	16:08 (T12)
21	07:42		07:10	06:26	06:37	06:02	05:52	06:09	06:38	07:08	07:40	07:15	07:43		15:56 (T12)
	17:26		18:04	18:35	20:08	20:38	20:57	20:49	20:14	19:23	18:35	17:01	16:59	13	16:09 (T12)
22	07:42		07:09	06:25	06:35	06:01	05:52	06:10	06:39	07:09	07:41	07:17	07:43		15:56 (T12)
	17:28		18:05	18:36	20:09	20:39	20:57	20:48	20:12	19:22	18:34	17:01	16:59	13	16:09 (T12)
23	07:41		07:07	06:23	06:34	06:00	05:52	06:11	06:40	07:10	07:42	07:18	07:44		15:57 (T12)
	17:29		18:06	18:37	20:10	20:40	20:58	20:48	20:11	19:20	18:33	17:00	17:00	13	16:10 (T12)
24	07:40		07:06	06:21	06:33	05:59	05:53	06:11	06:41	07:11	07:43	07:19	07:44		15:58 (T12)
	17:30		18:08	18:38	20:11	20:40	20:58	20:47	20:09	19:18	18:31	17:00	17:00	12	16:10 (T12)
25	07:40		07:04	06:20	06:31	05:59	05:53	06:12	06:42	07:12	06:44	07:20	07:45		15:59 (T12)
	17:31		18:09	18:39	20:12	20:41	20:58	20:46	20:08	19:17	17:30	16:59	17:01	12	16:11 (T12)
26	07:39		07:03	06:18	06:30	05:58	05:53	06:13	06:43	07:13	06:45	07:21	07:45		15:59 (T12)
	17:32		18:10	18:40	20:13	20:42	20:58	20:45	20:06	19:15	17:28	16:59	17:01	12	16:11 (T12)
27	07:38		07:01	06:16	06:28	05:57	05:54	06:14	06:44	07:14	06:46	07:22	07:45		16:00 (T12)
	17:34		18:11	18:41	20:14	20:43	20:58	20:44	20:05	19:13	17:27	16:58	17:02	11	16:11 (T12)
28	07:37		07:00	06:15	06:27	05:57	05:54	06:15	06:45	07:15	06:47	07:23	07:46		16:00 (T12)
	17:35		18:12	18:43	20:15	20:44	20:58	20:43	20:03	19:12	17:26	16:58	17:03	11	16:11 (T12)
29	07:36			07:13	06:26	05:56	05:54	06:16	06:46	07:16	06:49	07:24	07:46		16:02 (T12)
	17:36			19:44	20:16	20:45	20:58	20:42	20:01	19:10	17:24	16:57	17:03	10	16:12 (T12)
30	07:36			07:12	06:24	05:56	05:55	06:17	06:47	07:17	06:50	07:25	07:46		16:03 (T12)
	17:37			19:45	20:17	20:45	20:58	20:41	20:00	19:08	17:23	16:57	17:04	9	16:12 (T12)
31	07:35			07:10		05:55		06:18	06:48		06:51		07:47		16:04 (T12)
	17:38			19:46		20:46		20:40	19:58		17:22		17:05	7	16:11 (T12)
Potential sun hours		299	298	370	398	447	451	458	427	375	346	299	289		
Total, worst case		6												224	
Sun reduction		0,40												0,41	
Oper. time red.		0,83												0,83	
Wind dir. red.		0,72												0,72	
Total reduction		0,24												0,25	
Total, real		1												55	

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

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

Project:

Progetto_Ala Dei Sardi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
10/11/2023 16:52/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_20231109Shadow receptor: F287 - A04 - C02

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

Table with columns for months (January to December) and rows for days (1 to 31). Each cell contains a time range (e.g., 07:47-17:06) and a shadow reduction value. Summary rows at the bottom show 'Potential sun hours', 'Total, worst case', 'Sun reduction', 'Oper. time red.', 'Wind dir. red.', 'Total reduction', and 'Total, real'.

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

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

Project:

Progetto_Ala Dei Sardi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
 Via Santa Margherita 4
 IT-09124 Cagliari
 +39 070 658297
 Giuseppe Frongia / direttore@iatprogetti.it
 Calculated:
 10/11/2023 16:52/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_20231109Shadow receptor: F292 - A03 - C02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	January	February	March	April	May	June
1	07:47 17:06	16:24 (T12) 16:26 (T12)	07:34 17:40	16:31 (T12) 16:41 (T12)	06:58 18:13	07:08 19:47
2	07:47 17:07	16:22 (T12) 16:29 (T12)	07:33 17:41	06:57 18:14	19:48	06:23 19:55
3	07:47 17:08	16:22 (T12) 16:31 (T12)	07:32 17:42	06:55 18:16	19:49	06:20 20:20
4	07:47 17:08	16:21 (T12) 16:32 (T12)	07:31 17:43	06:54 18:17	19:50	06:19 20:21
5	07:47 17:09	16:21 (T12) 16:34 (T12)	07:30 17:45	06:52 18:18	19:51	06:18 20:22
6	07:47 17:10	16:20 (T12) 16:35 (T12)	07:29 17:46	06:51 18:19	19:52	06:17 20:23
7	07:47 17:11	16:20 (T12) 16:36 (T12)	07:28 17:47	06:49 18:20	19:53	06:16 20:24
8	07:47 17:12	16:20 (T12) 16:38 (T12)	07:27 17:48	06:48 18:21	19:54	06:14 20:25
9	07:47 17:13	16:19 (T12) 16:38 (T12)	07:25 17:50	06:46 18:22	19:55	06:13 20:26
10	07:47 17:14	16:19 (T12) 16:39 (T12)	07:24 17:51	06:44 18:23	19:56	06:12 20:27
11	07:46 17:15	16:19 (T12) 16:40 (T12)	07:23 17:52	06:43 18:24	19:57	06:11 20:28
12	07:46 17:16	16:19 (T12) 16:43 (T12)	07:22 17:53	06:41 18:26	19:58	06:10 20:29
13	07:46 17:17	16:19 (T12) 16:42 (T12)	07:21 17:54	06:40 18:27	19:59	06:09 20:30
14	07:46 17:18	16:19 (T12) 16:43 (T12)	07:19 17:56	06:38 18:28	20:00	06:08 20:31
15	07:45 17:20	16:19 (T12) 16:43 (T12)	07:18 17:57	06:36 18:29	20:01	06:07 20:32
16	07:45 17:21	16:19 (T12) 16:44 (T12)	07:17 17:58	06:35 18:30	20:02	06:06 20:33
17	07:44 17:22	16:19 (T12) 16:44 (T12)	07:16 17:59	06:33 18:31	20:03	06:05 20:34
18	07:44 17:23	16:20 (T12) 16:45 (T12)	07:14 18:00	06:31 18:32	20:04	06:04 20:35
19	07:43 17:24	16:19 (T12) 16:45 (T12)	07:13 18:02	06:30 18:33	20:05	06:03 20:36
20	07:43 17:25	16:20 (T12) 16:46 (T12)	07:11 18:03	06:28 18:34	20:06	06:03 20:37
21	07:42 17:26	16:20 (T12) 16:46 (T12)	07:10 18:04	06:26 18:35	20:07	06:02 20:38
22	07:42 17:28	16:20 (T12) 16:46 (T12)	07:09 18:05	06:25 18:36	20:08	06:01 20:39
23	07:41 17:29	16:21 (T12) 16:47 (T12)	07:07 18:06	06:23 18:37	20:09	06:00 20:40
24	07:40 17:30	16:22 (T12) 16:47 (T12)	07:06 18:08	06:21 18:38	20:10	05:59 20:41
25	07:40 17:31	16:22 (T12) 16:47 (T12)	07:04 18:09	06:20 18:39	20:11	05:59 20:42
26	07:39 17:32	16:22 (T12) 16:46 (T12)	07:03 18:10	06:18 18:40	20:12	05:58 20:43
27	07:38 17:34	16:23 (T12) 16:46 (T12)	07:01 18:11	06:16 18:41	20:13	05:57 20:44
28	07:37 17:35	16:24 (T12) 16:45 (T12)	07:00 18:12	06:15 18:43	20:14	05:57 20:45
29	07:36 17:36	16:26 (T12) 16:46 (T12)		07:13 19:44	20:15	05:56 20:46
30	07:36 17:37	16:27 (T12) 16:45 (T12)		07:12 19:45	20:16	05:56 20:47
31	07:35 17:38	16:29 (T12) 16:43 (T12)		07:10 19:46	20:17	05:55 20:48
Potential sun hours	299	298	370	398	447	451
Total, worst case	618	10	198			
Sun reduction	0,40	0,43	0,47			
Oper. time red.	0,83	0,83	0,83			
Wind dir. red.	0,74	0,74	0,74			
Total reduction	0,25	0,26	0,29			
Total, real	152	3	57			

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F292 - A03 - C02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	July	August	September	October	November	December
1	05:55 20:58	06:19 20:39	06:49 19:57	07:18 19:07	18:20 (T06) 18:39 (T06)	06:52 17:21
2	05:56 20:58	06:20 20:38	06:50 19:55	07:19 19:05	18:20 (T06) 18:37 (T06)	06:53 17:19
3	05:56 20:58	06:21 20:37	06:51 19:53	07:20 19:03	18:21 (T06) 18:36 (T06)	06:54 17:18
4	05:57 20:57	06:22 20:36	06:52 19:52	07:21 19:02	18:22 (T06) 18:34 (T06)	06:56 17:17
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	18:24 (T06) 18:31 (T06)	06:57 17:16
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	06:58 17:15	07:31 16:56
7	05:59 20:57	06:25 20:32	06:55 19:47	07:25 18:57	06:59 17:14	07:32 16:56
8	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55	07:00 17:13	07:33 16:56
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	07:01 17:12	16:06 (T12) 16:07 (T12)
10	06:00 20:56	06:27 20:29	06:58 19:42	07:28 18:52	07:03 17:11	16:02 (T12) 16:12 (T12)
11	06:01 20:55	06:28 20:27	06:59 19:40	07:29 18:50	07:04 17:10	15:59 (T12) 16:14 (T12)
12	06:02 20:55	06:29 20:26	07:00 19:39	07:30 18:49	07:05 17:09	15:58 (T12) 16:16 (T12)
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	07:06 17:08	15:58 (T12) 16:18 (T12)
14	06:03 20:54	06:31 20:23	07:02 19:35	07:32 18:46	07:07 17:07	15:57 (T12) 16:18 (T12)
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	07:08 17:06	15:56 (T12) 16:19 (T12)
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	07:10 17:05	15:55 (T12) 16:19 (T12)
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	07:11 17:04	15:55 (T12) 16:20 (T12)
18	06:06 20:51	06:35 20:18	07:06 19:29	07:36 18:40	07:12 17:04	15:55 (T12) 16:21 (T12)
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	07:13 17:03	15:55 (T12) 16:21 (T12)
20	06:08 20:50	06:37 20:15	07:08 19:25	07:38 18:37	07:14 17:02	15:55 (T12) 16:21 (T12)
21	06:09 20:49	06:38 20:14	07:08 19:23	07:40 18:35	07:15 17:01	15:55 (T12) 16:21 (T12)
22	06:10 20:48	06:39 20:12	07:09 19:22	07:41 18:34	07:17 17:01	15:56 (T12) 16:22 (T12)
23	06:11 20:48	06:40 20:11	07:10 19:20	07:42 18:33	07:18 17:00	15:56 (T12) 16:22 (T12)
24	06:11 20:47	06:41 20:09	07:11 19:18	07:43 18:31	07:19 17:00	15:57 (T12) 16:22 (T12)
25	06:12 20:46	06:42 20:08	07:12 19:17	07:44 18:30	07:20 16:59	15:57 (T12) 16:22 (T12)
26	06:13 20:45	06:43 20:06	07:13 19:15	07:45 18:29	07:21 16:59	15:57 (T12) 16:22 (T12)
27	06:14 20:44	06:44 20:05	07:14 19:13	07:46 18:28	07:22 16:58	15:58 (T12) 16:22 (T12)
28	06:15 20:43	06:45 20:03	07:15 19:12	07:47 18:27	07:23 16:58	15:59 (T12) 16:23 (T12)
29	06:16 20:42	06:46 20:01	07:16 19:10	07:49 18:26	07:24 16:57	16:00 (T12) 16:23 (T12)
30	06:17 20:41	06:47 20:00	07:17 19:08	07:50 18:25	07:25 16:57	16:01 (T12) 16:23 (T12)
31	06:18 20:40	06:48 19:58	07:18 19:07	07:51 18:24	07:26 16:56	16:02 (T12) 16:23 (T12)
Potential sun hours	458	427	375	346	299	289
Total, worst case			133	70		153
Sun reduction			0,64	0,56		0,41
Oper. time red.			0,83	0,83		0,83
Wind dir. red.			0,74	0,74		0,74
Total reduction			0,39	0,34		0,25
Total, real			52	24	142	39

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F295 - A04 - C02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

January		February		March		April		May		June	
1	07:47	09:33 (T04)	07:34	06:58		07:08	06:23	05:55			
	17:06	28 15:58 (T05)	17:40	18:13		19:47	20:18	20:47			
2	07:47	09:35 (T04)	07:33	06:57		07:07	06:22	05:54			
	17:07	22 15:57 (T05)	17:41	18:14		19:48	20:19	20:48			
3	07:47	09:37 (T04)	07:32	06:55		07:05	06:21	05:54			
	17:08	15 15:56 (T05)	17:42	18:16		19:49	20:20	20:49			
4	07:47		07:31	06:54		07:03	06:19	05:53			
	17:08		17:43	18:17		19:50	20:21	20:49			
5	07:47		07:30	06:52		07:02	06:18	05:53			
	17:09		17:45	18:18		19:51	20:22	20:50			
6	07:47		07:29	06:51		07:00	06:17	05:53			
	17:10		17:46	18:19		19:52	20:23	20:51			
7	07:47		07:28	06:49		06:59	06:16	05:52			
	17:11		17:47	18:20		19:53	20:24	20:51			
8	07:47		07:27	06:48		06:57	06:15	05:52			
	17:12		17:48	18:21		19:54	20:25	20:52			
9	07:47		07:26	06:46		06:55	06:13	05:52			
	17:13		17:50	18:22		19:55	20:26	20:52			
10	07:47		07:24	06:44		06:54	06:12	05:52			
	17:14		17:51	18:23		19:56	20:27	20:53			
11	07:47		07:23	06:43	12 17:49 (T03)	06:52	06:11	05:52			
	17:15		17:52	18:24		19:57	20:28	20:54			
12	07:46		07:22	06:41	16 18:01 (T03)	06:51	06:10	05:52			
	17:16		17:53	18:26		17:47 (T03)	06:51	06:10	05:52		
13	07:46		07:21	06:40	16 18:03 (T03)	06:49	06:09	05:51			
	17:17		17:54	18:27	19 18:04 (T03)	06:47	06:08	05:51			
14	07:46		07:19	06:38	17 18:04 (T03)	06:47	06:08	05:51			
	17:18		17:56	18:28	22 18:06 (T03)	06:47	06:08	05:51			
15	07:45		07:18	06:36	22 18:06 (T03)	06:46	06:07	05:51			
	17:20		17:57	18:29	24 18:06 (T03)	06:46	06:07	05:51			
16	07:45		07:17	06:35	24 18:06 (T03)	06:44	06:06	05:51			
	17:21		17:58	18:30	25 18:06 (T03)	06:44	06:06	05:51			
17	07:44		07:16	06:33	25 18:06 (T03)	06:43	06:05	05:51			
	17:22		17:59	18:31	25 18:06 (T03)	06:43	06:05	05:51			
18	07:44		07:14	06:31	25 18:06 (T03)	06:41	06:04	05:52			
	17:23		18:01	18:32	25 18:06 (T03)	06:41	06:04	05:52			
19	07:44		07:13	06:30	25 18:05 (T03)	06:40	06:03	05:52			
	17:24		18:02	18:33	25 18:05 (T03)	06:40	06:03	05:52			
20	07:43		07:12	06:28	24 18:05 (T03)	06:38	06:03	05:52			
	17:25		18:03	18:34	24 18:05 (T03)	06:38	06:03	05:52			
21	07:42		07:10	06:26	24 18:05 (T03)	06:37	06:02	05:52			
	17:26		18:04	18:35	23 18:04 (T03)	06:37	06:02	05:52			
22	07:42		07:09	06:25	23 18:04 (T03)	06:35	06:01	05:52			
	17:28		18:05	18:36	22 18:03 (T03)	06:35	06:01	05:52			
23	07:41		07:07	06:23	22 18:03 (T03)	06:34	06:00	05:52			
	17:29		18:06	18:37	20 18:02 (T03)	06:34	06:00	05:52			
24	07:40		07:06	06:22	20 18:02 (T03)	06:33	06:00	05:52			
	17:30		18:08	18:38	17 18:00 (T03)	06:33	06:00	05:52			
25	07:40		07:04	06:20	17 18:00 (T03)	06:31	05:59	05:53			
	17:31		18:09	18:39	12 17:57 (T03)	06:31	05:59	05:53			
26	07:39		07:03	06:18		20:12	20:41	20:58			
	17:32		18:10	18:41		06:30	05:58	05:53			
27	07:38		07:01	06:17		20:13	20:42	20:58			
	17:34		18:11	18:42		06:28	05:57	05:54			
28	07:37		07:00	06:15		20:14	20:43	20:58			
	17:35		18:12	18:43		06:27	05:57	05:54			
29	07:37			07:13		20:15	20:44	20:58			
	17:36			19:44		06:26	05:56	05:54			
30	07:36			07:12		20:16	20:45	20:58			
	17:37			19:45		06:24	05:56	05:55			
31	07:35			07:10		20:17	20:46	20:58			
	17:39			19:46			20:46				
Potential sun hours	299		298	370		398	447	451			
Total, worst case	65			311							
Sun reduction	0,40			0,47							
Oper. time red.	0,83			0,83							
Wind dir. red.	0,62			0,74							
Total reduction	0,20			0,28							
Total, real	13			88							

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F295 - A04 - C02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	July	August	September	October	November	December			
1	05:55	06:19	06:49	07:19	18:25 (T03)	06:52	07:27		
	20:58	20:39	19:57	19:07	17	18:42 (T03)	17:21	16:57	
2	05:56	06:20	06:50	07:20	18:26 (T03)	06:53	07:28		
	20:58	20:38	19:55	19:05	14	18:40 (T03)	17:19	16:57	
3	05:56	06:21	06:51	07:21	18:29 (T03)	06:54	07:29		
	20:58	20:37	19:54	19:03	8	18:37 (T03)	17:18	16:56	
4	05:57	06:22	06:52	07:22		06:56	07:30		
	20:58	20:36	19:52	19:02		17:17	16:56		
5	05:57	06:23	06:53	07:23		06:57	07:31		
	20:57	20:35	19:50	19:00		17:16	16:56		
6	05:58	06:24	06:54	07:24		06:58	07:32		
	20:57	20:34	19:49	18:59		17:15	16:56		
7	05:59	06:25	06:55	07:25		06:59	07:32		
	20:57	20:33	19:47	18:57		17:14	16:56		
8	05:59	06:26	06:56	07:26		07:00	07:33		
	20:56	20:31	19:45	18:55		17:13	16:56		
9	06:00	06:27	06:57	07:27		07:02	07:34		
	20:56	20:30	19:44	18:54		17:12	16:56	13	15:45 (T05)
10	06:00	06:28	06:58	07:28		07:03	07:35		09:25 (T04)
	20:56	20:29	19:42	18:52		17:11	16:56	21	15:47 (T05)
11	06:01	06:29	06:59	07:29		07:04	07:36		09:23 (T04)
	20:55	20:28	19:40	18:51		17:10	16:56	28	15:48 (T05)
12	06:02	06:29	07:00	07:30		07:05	07:37		09:22 (T04)
	20:55	20:26	19:39	18:49		17:09	16:56	32	15:49 (T05)
13	06:03	06:30	07:01	07:31		07:06	07:38		09:22 (T04)
	20:54	20:25	19:37	18:47		17:08	16:56	34	15:50 (T05)
14	06:03	06:31	07:02	07:32		07:07	07:38		09:22 (T04)
	20:54	20:24	19:35	18:46		17:07	16:56	38	15:52 (T05)
15	06:04	06:32	07:03	07:33		07:09	07:39		09:21 (T04)
	20:53	20:22	19:34	18:44		17:06	16:56	40	15:52 (T05)
16	06:05	06:33	07:04	07:34		07:10	07:40		09:21 (T04)
	20:53	20:21	19:32	18:43		17:05	16:57	42	15:53 (T05)
17	06:06	06:34	07:05	07:35		07:11	07:40		09:22 (T04)
	20:52	20:19	19:30	18:41		17:04	16:57	43	15:54 (T05)
18	06:06	06:35	07:06	18:34 (T03)	07:36	07:12	07:41		09:21 (T04)
	20:52	20:18	19:29	18:44 (T03)	18:40	17:04	16:57	44	15:54 (T05)
19	06:07	06:36	07:07	18:31 (T03)	07:37	07:13	07:42		09:22 (T04)
	20:51	20:17	19:27	18:47 (T03)	18:38	17:03	16:58	44	15:55 (T05)
20	06:08	06:37	07:08	18:29 (T03)	07:39	07:14	07:42		09:23 (T04)
	20:50	20:15	19:25	18:48 (T03)	18:37	17:02	16:58	44	15:56 (T05)
21	06:09	06:38	07:09	18:28 (T03)	07:40	07:16	07:43		09:22 (T04)
	20:49	20:14	19:24	18:49 (T03)	18:35	17:02	16:59	46	15:56 (T05)
22	06:10	06:39	07:10	18:25 (T03)	07:41	07:17	07:43		09:23 (T04)
	20:49	20:12	19:22	18:48 (T03)	18:34	17:01	16:59	46	15:57 (T05)
23	06:11	06:40	07:11	18:24 (T03)	07:42	07:18	07:44		09:23 (T04)
	20:48	20:11	19:20	18:48 (T03)	18:33	17:00	17:00	45	15:57 (T05)
24	06:12	06:41	07:12	18:24 (T03)	07:43	07:19	07:44		09:24 (T04)
	20:47	20:09	19:18	18:48 (T03)	18:31	17:00	17:00	44	15:57 (T05)
25	06:12	06:42	07:13	18:23 (T03)	06:44	07:20	07:45		09:25 (T04)
	20:46	20:08	19:17	18:48 (T03)	17:30	16:59	17:01	44	15:58 (T05)
26	06:13	06:43	07:13	18:23 (T03)	06:45	07:21	07:45		09:25 (T04)
	20:45	20:06	19:15	18:48 (T03)	17:28	16:59	17:01	44	15:58 (T05)
27	06:14	06:44	07:14	18:23 (T03)	06:46	07:22	07:46		09:26 (T04)
	20:44	20:05	19:13	18:47 (T03)	17:27	16:58	17:02	42	15:58 (T05)
28	06:15	06:45	07:15	18:23 (T03)	06:48	07:23	07:46		09:28 (T04)
	20:43	20:03	19:12	18:46 (T03)	17:26	16:58	17:03	40	15:59 (T05)
29	06:16	06:46	07:17	18:23 (T03)	06:49	07:24	07:46		09:28 (T04)
	20:42	20:02	19:10	18:45 (T03)	17:24	16:57	17:03	39	15:59 (T05)
30	06:17	06:47	07:18	18:24 (T03)	06:50	07:26	07:46		09:29 (T04)
	20:41	20:00	19:08	18:44 (T03)	17:23	16:57	17:04	36	15:59 (T05)
31	06:18	06:48		06:51			07:47		09:31 (T04)
	20:40	19:58		17:22			17:05	32	15:58 (T05)
Potential sun hours	458	427	375	346		299	289		
Total, worst case			276		39			881	
Sun reduction			0,64		0,56			0,42	
Oper. time red.			0,83		0,83			0,83	
Wind dir. red.			0,74		0,74			0,62	
Total reduction			0,39		0,34			0,21	
Total, real			107		13			185	

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F313 - Pascolo

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	January	February	March	April	May	June		
1	07:47	16:03 (T15)	07:34	16:49 (T12)	06:58	07:08	06:23	05:55
	17:06	10 16:13 (T15)	17:40	21 17:10 (T12)	18:13	19:47	20:18	20:47
2	07:47	16:04 (T15)	07:33	16:49 (T12)	06:57	07:07	06:22	05:54
	17:07	9 16:13 (T15)	17:41	22 17:11 (T12)	18:14	19:48	20:19	20:48
3	07:47	16:05 (T15)	07:32	16:48 (T12)	06:55	07:05	06:20	05:54
	17:08	7 16:12 (T15)	17:42	23 17:11 (T12)	18:16	19:49	20:20	20:48
4	07:47	16:09 (T15)	07:31	16:48 (T12)	06:54	07:03	06:19	05:53
	17:08	1 16:10 (T15)	17:43	24 17:12 (T12)	18:17	19:50	20:21	20:49
5	07:47		07:30	16:48 (T12)	06:52	07:02	06:18	05:53
	17:09		17:45	24 17:12 (T12)	18:18	19:51	20:22	20:50
6	07:47		07:29	16:48 (T12)	06:51	07:00	06:17	05:53
	17:10		17:46	23 17:11 (T12)	18:19	19:52	20:23	20:50
7	07:47		07:28	16:48 (T12)	06:49	06:58	06:16	05:52
	17:11		17:47	24 17:12 (T12)	18:20	19:53	20:24	20:51
8	07:47		07:27	16:48 (T12)	06:48	06:57	06:14	05:52
	17:12		17:48	24 17:12 (T12)	18:21	19:54	20:25	20:52
9	07:47		07:25	16:49 (T12)	06:46	06:55	06:13	05:52
	17:13		17:50	22 17:11 (T12)	18:22	19:55	20:26	20:52
10	07:47		07:24	16:50 (T12)	06:44	06:54	06:12	05:52
	17:14		17:51	21 17:11 (T12)	18:23	19:56	20:27	20:53
11	07:46		07:23	16:51 (T12)	06:43	06:52	06:11	05:52
	17:15		17:52	20 17:11 (T12)	18:24	19:57	20:28	20:53
12	07:46		07:22	16:52 (T12)	06:41	06:51	06:10	05:52
	17:16		17:53	17 17:09 (T12)	18:26	19:58	20:29	20:54
13	07:46		07:21	16:53 (T12)	06:40	06:49	06:09	05:51
	17:17		17:54	14 17:07 (T12)	18:27	19:59	20:30	20:54
14	07:46		07:19	16:56 (T12)	06:38	06:47	06:08	05:51
	17:18		17:56	9 17:05 (T12)	18:28	20:00	20:31	20:55
15	07:45		07:18		06:36	06:46	06:07	05:51
	17:20		17:57		18:29	20:01	20:32	20:55
16	07:45		07:17		06:35	06:44	06:06	05:51
	17:21		17:58		18:30	20:02	20:33	20:56
17	07:44		07:15		06:33	06:43	06:05	05:51
	17:22		17:59		18:31	20:03	20:34	20:56
18	07:44		07:14		06:31	06:41	06:04	05:52
	17:23		18:00		18:32	20:04	20:35	20:56
19	07:43		07:13		06:30	06:40	06:03	05:52
	17:24		18:02		18:33	20:05	20:36	20:57
20	07:43		07:11		06:28	06:38	06:03	05:52
	17:25		18:03		18:34	20:07	20:37	20:57
21	07:42		07:10		06:26	06:37	06:02	05:52
	17:26		18:04		18:35	20:08	20:38	20:57
22	07:42		07:09		06:25	06:35	06:01	05:52
	17:28		18:05		18:36	20:09	20:39	20:57
23	07:41		07:07		06:23	06:34	06:00	05:52
	17:29		18:06		18:37	20:10	20:40	20:58
24	07:40		07:06		06:21	06:33	05:59	05:53
	17:30		18:08		18:38	20:11	20:40	20:58
25	07:40		07:04		06:20	06:31	05:59	05:53
	17:31		18:09		18:39	20:12	20:41	20:58
26	07:39		07:03		06:18	06:30	05:58	05:53
	17:32		18:10		18:40	20:13	20:42	20:58
27	07:38	16:55 (T12)	07:01		06:16	06:28	05:57	05:54
	17:34	6 17:01 (T12)	18:11		18:41	20:14	20:43	20:58
28	07:37	16:52 (T12)	07:00		06:15	06:27	05:57	05:54
	17:35	12 17:04 (T12)	18:12		18:43	20:15	20:44	20:58
29	07:36	16:52 (T12)			07:13	06:26	05:56	05:54
	17:36	14 17:06 (T12)			19:44	20:16	20:45	20:58
30	07:36	16:51 (T12)			07:12	06:24	05:56	05:55
	17:37	17 17:08 (T12)			19:45	20:17	20:45	20:58
31	07:35	16:50 (T12)			07:10		05:55	
	17:38	19 17:09 (T12)			19:46		20:46	
Potential sun hours	299		298		370	398	447	451
Total, worst case	95		288					
Sun reduction	0,40		0,43					
Oper. time red.	0,83		0,83					
Wind dir. red.	0,74		0,75					
Total reduction	0,25		0,27					
Total, real	23		77					

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F313 - Pascolo

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	July	August	September	October	November	December
1	05:55	06:19	06:49	07:18	06:52	16:19 (T12) 07:26
	20:58	20:39	19:57	19:07	17:21	21 16:40 (T12) 16:57
2	05:56	06:20	06:50	07:19	06:53	16:19 (T12) 07:27
	20:58	20:38	19:55	19:05	17:19	22 16:41 (T12) 16:56
3	05:56	06:21	06:51	07:20	06:54	16:18 (T12) 07:28
	20:58	20:37	19:53	19:03	17:18	23 16:41 (T12) 16:56
4	05:57	06:22	06:52	07:21	06:56	16:18 (T12) 07:29
	20:57	20:36	19:52	19:02	17:17	23 16:41 (T12) 16:56
5	05:57	06:23	06:53	07:22	06:57	16:17 (T12) 07:30
	20:57	20:35	19:50	19:00	17:16	24 16:41 (T12) 16:56
6	05:58	06:24	06:54	07:24	06:58	16:18 (T12) 07:31
	20:57	20:34	19:49	18:58	17:15	24 16:42 (T12) 16:56
7	05:59	06:25	06:55	07:25	06:59	16:18 (T12) 07:32
	20:57	20:32	19:47	18:57	17:14	24 16:42 (T12) 16:56
8	05:59	06:26	06:56	07:26	07:00	16:18 (T12) 07:33
	20:56	20:31	19:45	18:55	17:13	23 16:41 (T12) 16:56
9	06:00	06:27	06:57	07:27	07:01	16:19 (T12) 07:34
	20:56	20:30	19:44	18:54	17:12	21 16:40 (T12) 16:56
						6 15:55 (T15) 16:01 (T15)
10	06:00	06:27	06:58	07:28	07:03	16:20 (T12) 07:35
	20:56	20:29	19:42	18:52	17:11	21 16:41 (T12) 16:56
						9 15:53 (T15) 16:02 (T15)
11	06:01	06:28	06:59	07:29	07:04	16:21 (T12) 07:36
	20:55	20:27	19:40	18:50	17:10	19 16:40 (T12) 16:56
						10 15:53 (T15) 16:03 (T15)
12	06:02	06:29	07:00	07:30	07:05	16:22 (T12) 07:37
	20:55	20:26	19:39	18:49	17:09	17 16:39 (T12) 16:56
						11 15:53 (T15) 16:04 (T15)
13	06:03	06:30	07:01	07:31	07:06	16:23 (T12) 07:37
	20:54	20:25	19:37	18:47	17:08	14 16:37 (T12) 16:56
						12 15:53 (T15) 16:05 (T15)
14	06:03	06:31	07:02	07:32	07:07	16:25 (T12) 07:38
	20:54	20:23	19:35	18:46	17:07	11 16:36 (T12) 16:56
						14 15:53 (T15) 16:07 (T15)
15	06:04	06:32	07:03	07:33	07:08	16:28 (T12) 07:39
	20:53	20:22	19:34	18:44	17:06	5 16:33 (T12) 16:56
						14 15:53 (T15) 16:07 (T15)
16	06:05	06:33	07:04	07:34	07:10	07:40
	20:53	20:21	19:32	18:43	17:05	15 16:57 16:08 (T15)
						15 15:54 (T15) 16:09 (T15)
17	06:06	06:34	07:05	07:35	07:11	07:40
	20:52	20:19	19:30	18:41	17:04	15 16:57 16:09 (T15)
						15 15:53 (T15) 16:09 (T15)
18	06:06	06:35	07:06	07:36	07:12	07:41
	20:51	20:18	19:29	18:40	17:04	16 16:57 16:09 (T15)
						16 15:54 (T15) 16:10 (T15)
19	06:07	06:36	07:07	07:37	07:13	07:42
	20:51	20:16	19:27	18:38	17:03	16 16:58 16:10 (T15)
						16 15:54 (T15) 16:10 (T15)
20	06:08	06:37	07:07	07:38	07:14	07:42
	20:50	20:15	19:25	18:37	17:02	16 16:58 16:10 (T15)
						16 15:55 (T15) 16:11 (T15)
21	06:09	06:38	07:08	07:40	07:15	07:43
	20:49	20:14	19:23	18:35	17:01	16 16:59 16:11 (T15)
						16 15:55 (T15) 16:11 (T15)
22	06:10	06:39	07:09	07:41	07:17	07:43
	20:48	20:12	19:22	18:34	17:01	16 16:59 16:11 (T15)
						16 15:56 (T15) 16:12 (T15)
23	06:11	06:40	07:10	07:42	07:18	07:44
	20:48	20:11	19:20	18:33	17:00	16 17:00 16:12 (T15)
						16 15:56 (T15) 16:12 (T15)
24	06:11	06:41	07:11	07:43	07:19	07:44
	20:47	20:09	19:18	18:31	17:00	16 17:00 16:12 (T15)
						16 15:57 (T15) 16:13 (T15)
25	06:12	06:42	07:12	06:44	07:20	07:45
	20:46	20:08	19:17	17:30	16:59	17:01 16:13 (T15)
						16 15:57 (T15) 16:13 (T15)
26	06:13	06:43	07:13	06:45	07:21	07:45
	20:45	20:06	19:15	17:28	16:59	17:01 16:13 (T15)
						16 15:58 (T15) 16:13 (T15)
27	06:14	06:44	07:14	06:46	07:22	07:45
	20:44	20:05	19:13	17:27	16:58	17:02 15:58 (T15)
						15 16:13 (T15) 16:13 (T15)
28	06:15	06:45	07:15	06:47	16:24 (T12) 07:23	07:46
	20:43	20:03	19:12	17:26	11 16:35 (T12) 16:58	17:03 15:58 (T15)
						15 16:13 (T15) 16:13 (T15)
29	06:16	06:46	07:16	06:49	16:23 (T12) 07:24	07:46
	20:42	20:01	19:10	17:24	15 16:38 (T12) 16:57	17:03 16:00 (T15)
						14 16:14 (T15) 16:14 (T15)
30	06:17	06:47	07:17	06:50	16:21 (T12) 07:25	07:46
	20:41	20:00	19:08	17:23	18 16:39 (T12) 16:57	17:04 16:01 (T15)
						13 16:14 (T15) 16:14 (T15)
31	06:18	06:48	07:18	06:51	16:20 (T12) 07:26	07:47
	20:40	19:58	17:22	19 16:39 (T12) 17:22	19 16:39 (T12) 17:22	17:05 16:01 (T15)
						12 16:13 (T15) 16:13 (T15)
Potential sun hours	458	427	375	346	299	289
Total, worst case				63	292	319
Sun reduction				0,56	0,48	0,41
Oper. time red.				0,83	0,83	0,83
Wind dir. red.				0,75	0,75	0,72
Total reduction				0,34	0,30	0,25
Total, real				22	87	79

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

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

Progetto_Ala Dei Sardi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
 Via Santa Margherita 4
 IT-09124 Cagliari
 +39 070 658297
 Giuseppe Frongia / direttore@iatprogetti.it
 Calculated:
 10/11/2023 16:52/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_20231109Shadow receptor: F315 - A04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	January	February	March	April	May	June	July	August	September	October	November	December
1 07:47	07:34	16:40 (T12)	06:58	07:08	06:23	05:55	05:55	06:19	06:49	07:18	06:52	16:14 (T12) 07:26
2 07:47	07:33	25 17:05 (T12)	18:13	19:47	20:18	20:47	20:58	20:39	19:57	19:07	17:21	17:21 16:31 (T12) 16:57
3 07:47	07:32	26 17:06 (T12)	18:14	19:48	20:19	20:48	20:58	20:38	19:55	19:05	17:19	17:19 16:33 (T12) 16:56
4 07:47	07:31	25 17:06 (T12)	18:16	19:49	20:20	20:48	20:58	20:37	19:53	19:03	17:18	17:18 16:34 (T12) 16:56
5 07:47	07:30	25 17:06 (T12)	18:17	19:50	20:21	20:49	20:57	20:36	19:52	19:02	17:17	17:17 16:34 (T12) 16:56
6 07:47	07:29	25 17:06 (T12)	18:18	19:51	20:22	20:50	20:57	20:35	19:50	19:00	17:16	17:16 16:35 (T12) 16:56
7 07:47	07:28	24 17:05 (T12)	18:19	19:52	20:23	20:50	20:57	20:34	19:49	18:59	17:15	17:15 16:36 (T12) 16:56
8 07:47	07:27	22 17:04 (T12)	18:20	19:53	20:24	20:51	20:57	20:32	19:47	18:57	17:14	17:14 16:36 (T12) 16:56
9 07:47	07:25	21 17:04 (T12)	18:21	19:54	20:25	20:52	20:56	20:31	19:45	18:55	17:13	17:13 16:36 (T12) 16:56
10 07:47	07:24	19 17:03 (T12)	18:22	19:55	20:26	20:52	20:56	20:30	19:44	18:54	17:12	17:12 16:35 (T12) 16:56
11 07:46	07:23	16 17:02 (T12)	18:23	19:56	20:27	20:53	20:56	20:29	19:42	18:52	17:11	17:11 16:36 (T12) 16:56
12 07:46	07:22	13 17:01 (T12)	18:24	19:57	20:28	20:53	20:55	20:27	19:40	18:50	17:10	17:10 16:36 (T12) 16:56
13 07:46	07:21	7 16:57 (T12)	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09 16:35 (T12) 16:56
14 07:46	07:19	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09	16:35 (T12) 16:56
15 07:45	07:18	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09	16:35 (T12) 16:56
16 07:45	07:17	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09	16:35 (T12) 16:56
17 07:44	07:16	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09	16:35 (T12) 16:56
18 07:44	07:14	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09	16:35 (T12) 16:56
19 07:43	07:13	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09	16:35 (T12) 16:56
20 07:43	07:12	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09	16:35 (T12) 16:56
21 07:42	07:11	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09	16:35 (T12) 16:56
22 07:42	07:10	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09	16:35 (T12) 16:56
23 07:41	8 16:47 (T12)	07:07	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09 16:35 (T12) 16:56
24 07:40	12 16:57 (T12)	07:06	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09 16:35 (T12) 16:56
25 07:40	16 16:43 (T12)	07:04	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09 16:35 (T12) 16:56
26 07:39	18 16:42 (T12)	07:03	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09 16:35 (T12) 16:56
27 07:38	20 17:01 (T12)	07:01	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09 16:35 (T12) 16:56
28 07:37	21 16:41 (T12)	07:00	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09 16:35 (T12) 16:56
29 07:36	23 17:04 (T12)	06:59	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09 16:35 (T12) 16:56
30 07:36	23 17:04 (T12)	06:59	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09 16:35 (T12) 16:56
31 07:35	25 17:05 (T12)	06:58	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	17:09 16:35 (T12) 16:56
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Total, worst case	166	248								23	396	
Sun reduction	0.40	0.43								0.56	0.48	
Oper. time red.	0.83	0.83								0.83	0.83	
Wind dir. red.	0.74	0.74								0.74	0.74	
Total reduction	0.25	0.27								0.34	0.30	
Total, real	41	66								8	118	

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F322 - A04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	January	February	March	April	May	June					
1	07:47	16:02 (T15)	07:34	16:58 (T12)	06:58	07:08	06:23	05:55			
	17:06	18	16:20 (T15)	17:40	14	17:12 (T12)	18:13	19:47	20:18	20:47	
2	07:47	16:03 (T15)	07:33	16:57 (T12)	06:57	07:07	06:22	05:54			
	17:07	18	16:21 (T15)	17:41	16	17:13 (T12)	18:14	19:48	20:19	20:48	
3	07:47	16:04 (T15)	07:32	16:56 (T12)	06:55	07:05	06:20	05:54			
	17:08	17	16:21 (T15)	17:42	19	17:15 (T12)	18:16	19:49	20:20	20:48	
4	07:47	16:05 (T15)	07:31	16:55 (T12)	06:54	07:03	06:19	05:53			
	17:08	16	16:21 (T15)	17:43	21	17:16 (T12)	18:17	19:50	20:21	20:49	
5	07:47	16:06 (T15)	07:30	16:55 (T12)	06:52	07:02	06:18	05:53			
	17:09	14	16:20 (T15)	17:45	22	17:17 (T12)	18:18	19:51	20:22	20:50	
6	07:47	16:07 (T15)	07:29	16:53 (T12)	06:51	07:00	06:17	05:53			
	17:10	13	16:20 (T15)	17:46	24	17:17 (T12)	18:19	19:52	20:23	20:50	
7	07:47	16:09 (T15)	07:28	16:53 (T12)	06:49	06:58	06:16	05:52			
	17:11	11	16:20 (T15)	17:47	24	17:17 (T12)	18:20	19:53	20:24	20:51	
8	07:47	16:11 (T15)	07:27	16:53 (T12)	06:48	06:57	06:14	05:52			
	17:12	8	16:19 (T15)	17:48	25	17:18 (T12)	18:21	19:54	20:25	20:52	
9	07:47	16:13 (T15)	07:25	16:53 (T12)	06:46	06:55	06:13	05:52			
	17:13	3	16:16 (T15)	17:50	25	17:18 (T12)	18:22	19:55	20:26	20:52	
10	07:47		07:24	16:54 (T12)	06:44	06:54	06:12	05:52			
	17:14		17:51	24	17:18 (T12)	18:23	19:56	20:27	20:53		
11	07:46		07:23	16:54 (T12)	06:43	06:52	06:11	05:52			
	17:15		17:52	24	17:18 (T12)	18:24	19:57	20:28	20:53		
12	07:46		07:22	16:54 (T12)	06:41	06:51	06:10	05:52			
	17:16		17:53	23	17:17 (T12)	18:26	19:58	20:29	20:54		
13	07:46		07:21	16:54 (T12)	06:40	06:49	06:09	05:51			
	17:17		17:54	23	17:17 (T12)	18:27	19:59	20:30	20:54		
14	07:46		07:19	16:56 (T12)	06:38	06:47	06:08	05:51			
	17:18		17:56	21	17:17 (T12)	18:28	20:00	20:31	20:55		
15	07:45		07:18	16:56 (T12)	06:36	06:46	06:07	05:51			
	17:20		17:57	19	17:15 (T12)	18:29	20:01	20:32	20:55		
16	07:45		07:17	16:58 (T12)	06:35	06:44	06:06	05:51			
	17:21		17:58	16	17:14 (T12)	18:30	20:02	20:33	20:56		
17	07:44		07:15	17:00 (T12)	06:33	06:43	06:05	05:51			
	17:22		17:59	12	17:12 (T12)	18:31	20:03	20:34	20:56		
18	07:44		07:14	17:03 (T12)	06:31	06:41	06:04	05:52			
	17:23		18:00	5	17:08 (T12)	18:32	20:04	20:35	20:56		
19	07:43		07:13		06:30	06:40	06:03	05:52			
	17:24		18:02		18:33	20:05	20:36	20:57			
20	07:43		07:11		06:28	06:38	06:03	05:52			
	17:25		18:03		18:34	20:07	20:37	20:57			
21	07:42		07:10		06:26	06:37	06:02	05:52			
	17:26		18:04		18:35	20:08	20:38	20:57			
22	07:42		07:09		06:25	06:35	06:01	05:52			
	17:28		18:05		18:36	20:09	20:39	20:57			
23	07:41		07:07		06:23	06:34	06:00	05:52			
	17:29		18:06		18:37	20:10	20:40	20:58			
24	07:40		07:06		06:21	06:33	05:59	05:53			
	17:30		18:08		18:38	20:11	20:40	20:58			
25	07:40		07:04		06:20	06:31	05:59	05:53			
	17:31		18:09		18:39	20:12	20:41	20:58			
26	07:39		07:03		06:18	06:30	05:58	05:53			
	17:32		18:10		18:40	20:13	20:42	20:58			
27	07:38		07:01		06:16	06:28	05:57	05:54			
	17:34		18:11		18:41	20:14	20:43	20:58			
28	07:37		07:00		06:15	06:27	05:57	05:54			
	17:35		18:12		18:43	20:15	20:44	20:58			
29	07:36				07:13	06:26	05:56	05:54			
	17:36				19:44	20:16	20:45	20:58			
30	07:36				07:12	06:24	05:56	05:55			
	17:37				19:45	20:17	20:45	20:58			
31	07:35	17:01 (T12)			07:10		05:55				
	17:38	8	17:09 (T12)		19:46		20:46				
Potential sun hours	299		298		370		398		447		451
Total, worst case	126		357								
Sun reduction	0,40		0,43								
Oper. time red.	0,83		0,83								
Wind dir. red.	0,73		0,75								
Total reduction	0,24		0,27								
Total, real	30		95								

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F322 - A04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	July	August	September	October	November	December
1	05:55	06:19	06:49	07:18	06:52	16:22 (T12) 07:26
	20:58	20:39	19:57	19:07	17:21	25 16:47 (T12) 16:57
2	05:56	06:20	06:50	07:19	06:53	16:23 (T12) 07:27
	20:58	20:38	19:55	19:05	17:19	25 16:48 (T12) 16:56
3	05:56	06:21	06:51	07:20	06:54	16:23 (T12) 07:28
	20:58	20:37	19:53	19:03	17:18	24 16:47 (T12) 16:56
4	05:57	06:22	06:52	07:21	06:56	16:23 (T12) 07:29
	20:57	20:36	19:52	19:02	17:17	24 16:47 (T12) 16:56
5	05:57	06:23	06:53	07:23	06:57	16:23 (T12) 07:30
	20:57	20:35	19:50	19:00	17:16	23 16:46 (T12) 16:56
6	05:58	06:24	06:54	07:24	06:58	16:25 (T12) 07:31
	20:57	20:34	19:49	18:58	17:15	22 16:47 (T12) 16:56
7	05:59	06:25	06:55	07:25	06:59	16:25 (T12) 07:32
	20:57	20:32	19:47	18:57	17:14	21 16:46 (T12) 16:56
8	05:59	06:26	06:56	07:26	07:00	16:26 (T12) 07:33
	20:56	20:31	19:45	18:55	17:13	18 16:44 (T12) 16:56
9	06:00	06:27	06:57	07:27	07:01	16:27 (T12) 07:34
	20:56	20:30	19:44	18:54	17:12	16 16:43 (T12) 16:56
10	06:00	06:27	06:58	07:28	07:03	16:29 (T12) 07:35
	20:56	20:29	19:42	18:52	17:11	13 16:42 (T12) 16:56
11	06:01	06:28	06:59	07:29	07:04	16:32 (T12) 07:36
	20:55	20:27	19:40	18:50	17:10	8 16:40 (T12) 16:56
12	06:02	06:29	07:00	07:30	07:05	07:37
	20:55	20:26	19:39	18:49	17:09	18 16:11 (T15)
13	06:03	06:30	07:01	07:31	07:06	07:37
	20:54	20:25	19:37	18:47	17:08	19 16:12 (T15)
14	06:03	06:31	07:02	07:32	07:07	07:38
	20:54	20:23	19:35	18:46	17:07	19 16:13 (T15)
15	06:04	06:32	07:03	07:33	07:08	07:39
	20:53	20:22	19:34	18:44	17:06	20 16:13 (T15)
16	06:05	06:33	07:04	07:34	07:10	07:40
	20:53	20:21	19:32	18:43	17:05	20 16:14 (T15)
17	06:06	06:34	07:05	07:35	07:11	07:40
	20:52	20:19	19:30	18:41	17:04	21 16:15 (T15)
18	06:06	06:35	07:06	07:36	07:12	07:41
	20:51	20:18	19:29	18:40	17:04	21 16:15 (T15)
19	06:07	06:36	07:07	07:37	07:13	07:42
	20:51	20:16	19:27	18:38	17:03	21 16:16 (T15)
20	06:08	06:37	07:07	07:38	07:14	07:42
	20:50	20:15	19:25	18:37	17:02	21 16:16 (T15)
21	06:09	06:38	07:08	07:40	07:15	07:43
	20:49	20:14	19:23	18:35	17:01	21 16:17 (T15)
22	06:10	06:39	07:09	07:41	07:17	07:43
	20:48	20:12	19:22	18:34	17:01	21 16:17 (T15)
23	06:11	06:40	07:10	07:42	07:18	07:44
	20:48	20:11	19:20	18:33	17:00	21 16:18 (T15)
24	06:11	06:41	07:11	07:43	17:32 (T12) 07:19	07:44
	20:47	20:09	19:18	18:31	8 17:40 (T12) 17:00	21 16:18 (T15)
25	06:12	06:42	07:12	06:44	16:29 (T12) 07:20	07:45
	20:46	20:08	19:17	17:30	14 16:43 (T12) 16:59	21 16:19 (T15)
26	06:13	06:43	07:13	06:45	16:27 (T12) 07:21	07:45
	20:45	20:06	19:15	17:28	17 16:44 (T12) 16:59	21 16:19 (T15)
27	06:14	06:44	07:14	06:46	16:25 (T12) 07:22	07:45
	20:44	20:05	19:13	17:27	20 16:45 (T12) 16:58	20 16:19 (T15)
28	06:15	06:45	07:15	06:47	16:24 (T12) 07:23	07:46
	20:43	20:03	19:12	17:26	22 16:46 (T12) 16:58	20 16:19 (T15)
29	06:16	06:46	07:16	06:49	16:24 (T12) 07:24	07:46
	20:42	20:01	19:10	17:24	23 16:47 (T12) 16:57	20 16:20 (T15)
30	06:17	06:47	07:17	06:50	16:23 (T12) 07:25	07:46
	20:41	20:00	19:08	17:23	24 16:47 (T12) 16:57	19 16:20 (T15)
31	06:18	06:48	07:18	06:51	16:23 (T12) 07:26	07:47
	20:40	19:58	17:22	24 16:47 (T12) 17:05	19 16:20 (T15)	
Potential sun hours	458	427	375	346	299	289
Total, worst case				152	219	522
Sun reduction				0,56	0,48	0,41
Oper. time red.				0,83	0,83	0,83
Wind dir. red.				0,75	0,75	0,72
Total reduction				0,34	0,30	0,25
Total, real				52	65	130

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F351 - A03 - C02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	January	February	March	April	May	June
1	07:47 17:06	07:34 17:40	16:30 (T12) 16:49 (T12)	06:58 18:13	07:08 19:47	06:23 20:18
2	07:47 17:07	07:33 17:41	16:31 (T12) 16:47 (T12)	06:57 18:14	07:07 19:48	06:22 20:19
3	07:47 17:08	07:32 17:42	16:33 (T12) 16:46 (T12)	06:55 18:16	07:05 19:49	06:20 20:20
4	07:47 17:08	07:31 17:43	16:37 (T12) 16:43 (T12)	06:54 18:17	07:03 19:50	06:19 20:21
5	07:47 17:09	07:30 17:45	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:50
6	07:47 17:10	07:29 17:46	06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:50
7	07:47 17:11	16:29 (T12) 16:34 (T12)	07:28 17:47	06:49 18:20	06:58 19:53	06:16 20:24
8	07:47 17:12	5 16:39 (T12) 16:37 (T12)	07:27 17:48	06:48 18:21	06:57 19:54	20:24 20:25
9	07:47 17:13	10 16:38 (T12) 16:26 (T12)	07:25 17:50	06:46 18:22	06:55 19:55	06:13 20:26
10	07:47 17:14	12 16:35 (T12) 16:25 (T12)	07:24 17:51	06:44 18:23	06:54 17:52 (T06) 17:55 (T06)	06:12 20:27
11	07:46 17:15	14 16:41 (T12) 16:25 (T12)	07:23 17:52	06:43 18:24	06:52 17:48 (T06) 17:59 (T06)	06:11 20:28
12	07:46 17:16	16 16:44 (T12) 16:41 (T12)	07:22 17:53	06:41 18:26	06:51 17:46 (T06) 18:01 (T06)	06:10 20:29
13	07:46 17:17	17 16:24 (T12) 16:43 (T12)	07:21 17:54	06:40 18:27	06:49 17:44 (T06) 18:01 (T06)	06:09 20:30
14	07:46 17:18	19 16:24 (T12) 16:44 (T12)	07:19 17:56	06:38 18:28	06:47 17:43 (T06) 18:02 (T06)	06:08 20:31
15	07:45 17:20	20 16:23 (T12) 16:45 (T12)	07:18 17:57	06:36 18:29	06:46 17:43 (T06) 18:02 (T06)	06:07 20:32
16	07:45 17:21	22 16:23 (T12) 16:46 (T12)	07:17 17:58	06:35 18:30	06:44 17:42 (T06) 18:02 (T06)	06:06 20:33
17	07:44 17:22	23 16:23 (T12) 16:46 (T12)	07:16 17:59	06:33 18:31	06:43 17:42 (T06) 18:02 (T06)	06:05 20:34
18	07:44 17:23	23 16:23 (T12) 16:48 (T12)	07:14 18:00	06:31 18:32	06:41 17:42 (T06) 18:01 (T06)	06:04 20:35
19	07:43 17:24	25 16:23 (T12) 16:48 (T12)	07:13 18:02	06:30 18:33	06:40 17:42 (T06) 18:00 (T06)	06:03 20:36
20	07:43 17:25	25 16:23 (T12) 16:49 (T12)	07:11 18:03	06:28 18:34	06:38 17:43 (T06) 18:00 (T06)	06:03 20:37
21	07:42 17:26	26 16:23 (T12) 16:49 (T12)	07:10 18:04	06:26 18:35	06:37 17:44 (T06) 17:58 (T06)	06:02 20:38
22	07:42 17:28	26 16:23 (T12) 16:50 (T12)	07:09 18:05	06:25 18:36	06:35 17:46 (T06) 17:55 (T06)	06:01 20:39
23	07:41 17:29	27 16:24 (T12) 16:51 (T12)	07:07 18:06	06:23 18:37	06:34 20:09 20:10	06:00 20:40
24	07:40 17:30	27 16:24 (T12) 16:51 (T12)	07:06 18:08	06:21 18:38	06:33 20:11 20:12	05:59 20:41
25	07:40 17:31	27 16:24 (T12) 16:51 (T12)	07:04 18:09	06:20 18:39	06:31 20:12 20:13	05:59 20:42
26	07:39 17:32	26 16:24 (T12) 16:50 (T12)	07:03 18:10	06:18 18:40	06:30 20:13 20:14	05:58 20:43
27	07:38 17:34	26 16:25 (T12) 16:50 (T12)	07:01 18:11	06:16 18:41	06:28 20:14 20:15	05:57 20:44
28	07:37 17:35	25 16:25 (T12) 16:50 (T12)	07:00 18:12	06:15 18:43	06:27 20:15 20:16	05:57 20:45
29	07:36 17:36	25 16:27 (T12) 16:51 (T12)	07:00 18:12	06:13 18:44	06:26 20:16 20:17	05:56 20:46
30	07:36 17:37	24 16:28 (T12) 16:50 (T12)	07:00 18:12	06:12 19:45	06:24 20:17 20:18	05:55 20:47
31	07:35 17:38	22 16:29 (T12) 16:49 (T12)	07:00 18:12	06:11 19:46	06:23 20:18 20:19	05:54 20:48
Potential sun hours	299	298	370	398	447	451
Total, worst case	533	54	201			
Sun reduction	0,40	0,43	0,47			
Oper. time red.	0,83	0,83	0,83			
Wind dir. red.	0,74	0,74	0,74			
Total reduction	0,25	0,27	0,29			
Total, real	131	14	58			

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

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

SHADOW - Calendar

Calculation: Real_case_Progetto_20231109Shadow receptor: F351 - A03 - C02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	July	August	September	October	November	December		
1	05:55 20:58	06:19 20:39	06:49 19:57	07:18 19:07	18:24 (T06) 18:40 (T06)	06:52 17:21	07:26 16:57	16:07 (T12) 16:23 (T12)
2	05:56 20:58	06:20 20:38	06:50 19:55	07:19 19:05	18:25 (T06) 18:38 (T06)	06:53 17:19	07:27 16:56	16:08 (T12) 16:22 (T12)
3	05:56 20:58	06:21 20:37	06:51 19:53	07:20 19:03	18:27 (T06) 18:35 (T06)	06:54 17:18	07:28 16:56	16:09 (T12) 16:22 (T12)
4	05:57 20:57	06:22 20:36	06:52 19:52	07:21 19:02	06:56 17:17	06:57 17:16	07:29 16:56	16:11 (T12) 16:21 (T12)
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	06:57 17:16	06:58 17:15	07:30 16:56	16:13 (T12) 16:19 (T12)
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	06:58 17:15	06:59 17:14	07:31 16:56	16:14 (T12) 16:56
7	05:59 20:57	06:25 20:32	06:55 19:47	07:25 18:57	06:59 17:14	16:06 (T12) 16:13 (T12)	07:32 16:56	16:56
8	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55	07:00 17:13	16:03 (T12) 16:16 (T12)	07:33 16:56	16:56
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	07:01 17:12	16:01 (T12) 16:17 (T12)	07:34 16:56	16:56
10	06:00 20:56	06:27 20:29	06:58 19:42	07:28 18:52	07:03 17:11	16:01 (T12) 16:20 (T12)	07:35 16:56	16:56
11	06:01 20:55	06:28 20:27	06:59 19:40	07:29 18:50	07:04 17:10	15:59 (T12) 16:20 (T12)	07:36 16:56	16:56
12	06:02 20:55	06:29 20:26	07:00 19:39	07:30 18:49	07:05 17:09	15:58 (T12) 16:21 (T12)	07:37 16:56	16:56
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	07:06 17:08	15:59 (T12) 16:23 (T12)	07:37 16:56	16:56
14	06:03 20:54	06:31 20:23	07:02 19:35	07:32 18:46	07:07 17:07	15:58 (T12) 16:23 (T12)	07:38 16:56	16:56
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	07:08 17:06	15:58 (T12) 16:23 (T12)	07:39 16:56	16:56
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	07:10 17:05	15:57 (T12) 16:23 (T12)	07:40 16:57	16:57
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	07:11 17:04	15:57 (T12) 16:24 (T12)	07:40 16:57	16:57
18	06:06 20:51	06:35 20:18	07:06 19:29	07:36 18:40	07:12 17:04	15:58 (T12) 16:25 (T12)	07:41 16:57	16:57
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	07:13 17:03	15:58 (T12) 16:25 (T12)	07:42 16:58	16:58
20	06:08 20:50	06:37 20:15	07:08 19:25	07:38 18:37	07:14 17:02	15:58 (T12) 16:25 (T12)	07:42 16:58	16:58
21	06:09 20:49	06:38 20:14	07:08 19:23	18:32 (T06) 18:39 (T06)	07:40 18:35	15:58 (T12) 16:24 (T12)	07:43 16:59	16:59
22	06:10 20:48	06:39 20:12	07:09 19:22	18:29 (T06) 18:41 (T06)	07:41 18:34	15:59 (T12) 16:25 (T12)	07:43 16:59	16:59
23	06:11 20:48	06:40 20:11	07:10 19:20	18:27 (T06) 18:43 (T06)	07:42 18:33	16:00 (T12) 16:25 (T12)	07:44 17:00	17:00
24	06:11 20:47	06:41 20:09	07:11 19:18	18:26 (T06) 18:43 (T06)	07:43 18:31	16:00 (T12) 16:25 (T12)	07:44 17:00	17:00
25	06:12 20:46	06:42 20:08	07:12 19:17	18:25 (T06) 18:44 (T06)	06:44 17:30	16:01 (T12) 16:25 (T12)	07:45 17:01	17:01
26	06:13 20:45	06:43 20:06	07:13 19:15	18:24 (T06) 18:44 (T06)	06:45 17:28	16:01 (T12) 16:24 (T12)	07:45 17:01	17:01
27	06:14 20:44	06:44 20:05	07:14 19:13	18:23 (T06) 18:44 (T06)	06:46 17:27	16:02 (T12) 16:24 (T12)	07:45 17:02	17:02
28	06:15 20:43	06:45 20:03	07:15 19:12	18:23 (T06) 18:43 (T06)	06:47 17:26	16:04 (T12) 16:24 (T12)	07:46 17:03	17:03
29	06:16 20:42	06:46 20:01	07:16 19:10	18:23 (T06) 18:42 (T06)	06:49 17:24	16:05 (T12) 16:24 (T12)	07:46 17:03	17:03
30	06:17 20:41	06:47 20:00	07:17 19:08	18:23 (T06) 18:41 (T06)	06:50 17:23	16:06 (T12) 16:24 (T12)	07:46 17:04	17:04
31	06:18 20:40	06:48 19:58	07:18 19:07	06:51 17:22	06:51 17:22	16:06 (T12) 16:24 (T12)	07:46 17:04	17:04
Potential sun hours	458	427	375	346	299	289		
Total, worst case			169	37	535	59		
Sun reduction			0,64	0,56	0,48	0,41		
Oper. time red.			0,83	0,83	0,83	0,83		
Wind dir. red.			0,74	0,74	0,74	0,74		
Total reduction			0,39	0,34	0,29	0,25		
Total, real			66	13	158	15		

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F353 - A04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	January	February	March	April	May	June
1	07:47 17:06	16:11 (T12) 16:32 (T12)	07:34 17:40	06:58 18:13	07:08 19:47	05:55 20:18
2	07:47 17:07	16:11 (T12) 16:33 (T12)	07:33 17:41	06:57 18:14	07:07 19:48	05:54 20:19
3	07:47 17:08	16:11 (T12) 16:33 (T12)	07:32 17:42	06:55 18:16	07:05 19:49	05:54 20:18
4	07:47 17:08	16:11 (T12) 16:34 (T12)	07:31 17:43	06:54 18:17	07:03 19:50	05:53 20:19
5	07:47 17:09	16:11 (T12) 16:35 (T12)	07:30 17:45	06:52 18:18	07:02 19:51	05:53 20:20
6	07:47 17:10	16:11 (T12) 16:36 (T12)	07:29 17:46	06:51 18:19	07:00 19:52	05:53 20:20
7	07:47 17:11	16:12 (T12) 16:37 (T12)	07:28 17:47	06:49 18:20	06:59 19:53	05:52 20:21
8	07:47 17:12	16:12 (T12) 16:38 (T12)	07:27 17:48	06:48 18:21	06:57 19:54	05:52 20:22
9	07:47 17:13	16:11 (T12) 16:38 (T12)	07:25 17:50	06:46 18:22	17:52 (T06) 17:55 (T06)	06:55 19:55
10	07:47 17:14	16:12 (T12) 16:38 (T12)	07:24 17:51	06:44 18:23	17:47 (T06) 17:59 (T06)	06:54 19:56
11	07:46 17:15	16:12 (T12) 16:39 (T12)	07:23 17:52	06:43 18:24	17:45 (T06) 18:00 (T06)	06:52 19:57
12	07:46 17:16	16:13 (T12) 16:40 (T12)	07:22 17:53	06:41 18:26	17:44 (T06) 18:01 (T06)	06:51 19:58
13	07:46 17:17	16:12 (T12) 16:40 (T12)	07:21 17:54	06:40 18:27	17:42 (T06) 18:02 (T06)	06:49 19:59
14	07:46 17:18	16:13 (T12) 16:41 (T12)	07:19 17:56	06:38 18:28	17:41 (T06) 18:02 (T06)	06:47 20:00
15	07:45 17:20	16:13 (T12) 16:41 (T12)	07:18 17:57	06:36 18:29	17:41 (T06) 18:02 (T06)	06:46 20:01
16	07:45 17:21	16:13 (T12) 16:42 (T12)	07:17 17:58	06:35 18:30	17:40 (T06) 18:02 (T06)	06:44 20:02
17	07:44 17:22	16:13 (T12) 16:42 (T12)	07:16 17:59	06:33 18:31	17:41 (T06) 18:02 (T06)	06:43 20:03
18	07:44 17:23	16:14 (T12) 16:43 (T12)	07:14 18:00	06:31 18:32	17:41 (T06) 18:01 (T06)	06:41 20:04
19	07:43 17:24	16:14 (T12) 16:43 (T12)	07:13 18:02	06:30 18:33	17:41 (T06) 17:59 (T06)	06:40 20:05
20	07:43 17:25	16:15 (T12) 16:43 (T12)	07:11 18:03	06:28 18:34	17:42 (T06) 17:59 (T06)	06:38 20:07
21	07:42 17:26	16:16 (T12) 16:43 (T12)	07:10 18:04	06:26 18:35	17:43 (T06) 17:56 (T06)	06:37 20:08
22	07:42 17:28	16:16 (T12) 16:43 (T12)	07:09 18:05	06:25 18:36	17:46 (T06) 17:53 (T06)	06:35 20:09
23	07:41 17:29	16:17 (T12) 16:43 (T12)	07:07 18:06	06:23 18:37	17:53 (T06) 18:00 (T06)	06:34 20:10
24	07:40 17:30	16:18 (T12) 16:43 (T12)	07:06 18:08	06:21 18:38	18:00 (T06) 18:01 (T06)	06:33 20:11
25	07:40 17:31	16:18 (T12) 16:42 (T12)	07:04 18:09	06:20 18:39	18:02 (T06) 18:03 (T06)	06:31 20:12
26	07:39 17:32	16:19 (T12) 16:42 (T12)	07:03 18:10	06:18 18:40	18:04 (T06) 18:05 (T06)	06:30 20:13
27	07:38 17:34	16:20 (T12) 16:41 (T12)	07:01 18:11	06:16 18:41	18:06 (T06) 18:07 (T06)	06:28 20:14
28	07:37 17:35	16:22 (T12) 16:40 (T12)	07:00 18:12	06:15 18:43	18:08 (T06) 18:09 (T06)	06:27 20:15
29	07:36 17:36	16:24 (T12) 16:39 (T12)	07:13 19:44	07:13 19:44	18:10 (T06) 18:11 (T06)	06:26 20:16
30	07:36 17:37	16:26 (T12) 16:37 (T12)	07:12 19:45	07:12 19:45	18:12 (T06) 18:13 (T06)	06:24 20:17
31	07:35 17:38		07:10 19:46	07:10 19:46	18:14 (T06) 18:15 (T06)	05:55 20:18
Potential sun hours	299	298	370	398	447	451
Total, worst case	740		227			
Sun reduction	0,40		0,47			
Oper. time red.	0,83		0,83			
Wind dir. red.	0,74		0,74			
Total reduction	0,24		0,29			
Total, real	181		65			

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

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

Calculation: Real_case_Progetto_20231109Shadow receptor: F353 - A04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

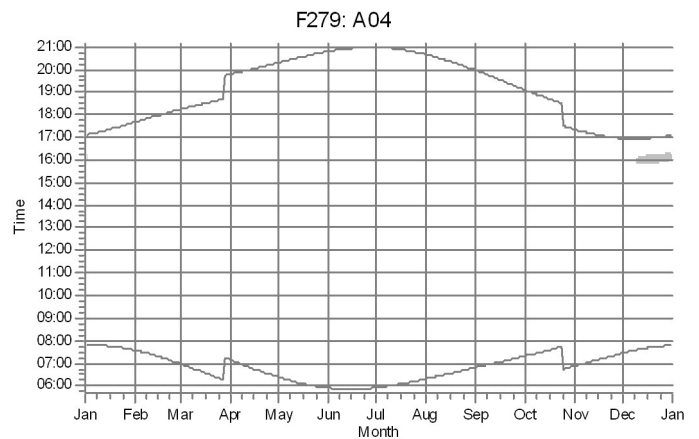
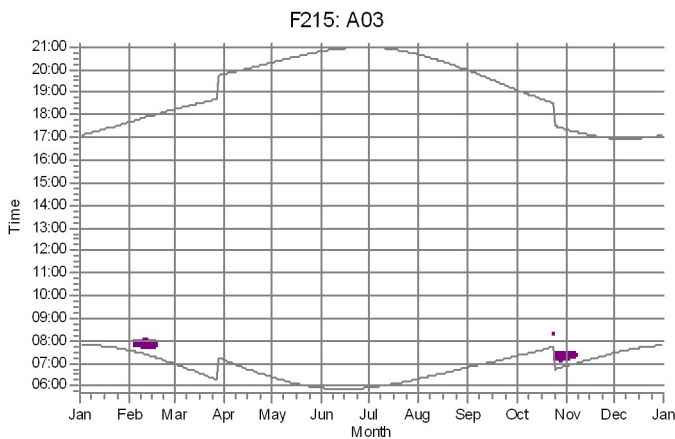
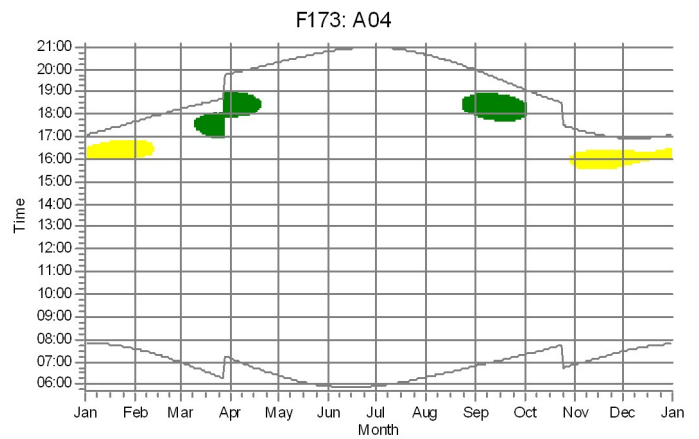
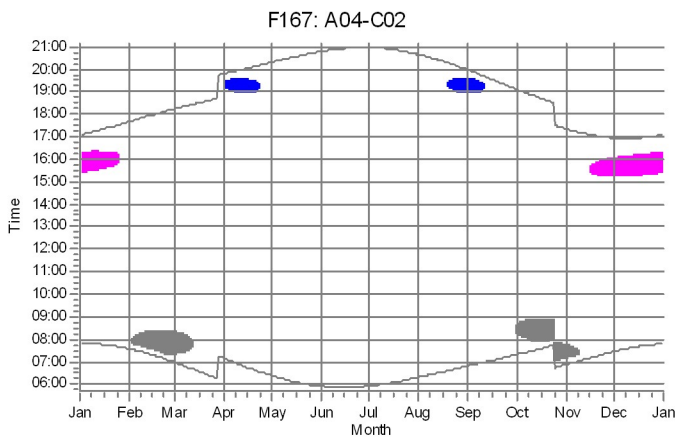
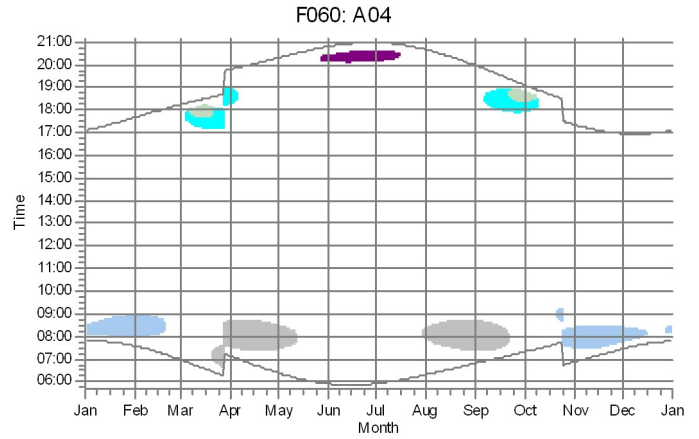
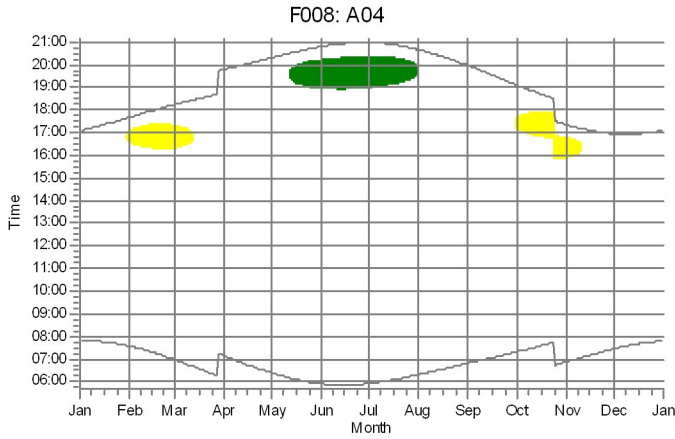
N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	July	August	September	October	November	December
1	05:55 20:58	06:19 20:39	06:49 19:57	07:18 19:07	18:22 (T06) 18:40 (T06)	06:52 17:21
2	05:56 20:58	06:20 20:38	06:50 19:55	07:19 19:05	18:23 (T06) 18:39 (T06)	06:53 17:19
3	05:56 20:58	06:21 20:37	06:51 19:53	07:20 19:03	18:24 (T06) 18:37 (T06)	06:54 17:18
4	05:57 20:57	06:22 20:36	06:52 19:52	07:21 19:02	18:26 (T06) 18:34 (T06)	06:56 17:17
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	06:57 17:16	07:30 16:56
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	06:58 17:15	07:31 16:56
7	05:59 20:57	06:25 20:32	06:55 19:47	07:25 18:57	06:59 17:14	07:32 16:56
8	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55	07:00 17:13	07:33 16:56
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	07:01 17:12	07:34 16:56
10	06:00 20:56	06:27 20:29	06:58 19:42	07:28 18:52	07:03 17:11	07:35 16:56
11	06:01 20:55	06:28 20:27	06:59 19:40	07:29 18:51	07:04 17:10	16:02 (T12) 16:04 (T12)
12	06:02 20:55	06:29 20:26	07:00 19:39	07:30 18:49	07:05 17:09	15:57 (T12) 16:08 (T12)
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	07:06 17:08	15:56 (T12) 16:11 (T12)
14	06:03 20:54	06:31 20:23	07:02 19:35	07:32 18:46	07:07 17:07	15:54 (T12) 16:13 (T12)
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	07:08 17:06	15:53 (T12) 16:14 (T12)
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	07:10 17:05	15:52 (T12) 16:15 (T12)
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	07:11 17:04	15:52 (T12) 16:16 (T12)
18	06:06 20:51	06:35 20:18	07:06 19:29	07:36 18:40	07:12 17:04	15:52 (T12) 16:17 (T12)
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	07:13 17:03	15:51 (T12) 16:17 (T12)
20	06:08 20:50	06:37 20:15	07:08 19:25	07:38 18:37	07:14 17:02	15:51 (T12) 16:18 (T12)
21	06:09 20:49	06:38 20:14	07:08 19:23	18:33 (T06) 18:37 (T06)	07:15 17:01	15:51 (T12) 16:18 (T12)
22	06:10 20:48	06:39 20:12	07:09 19:22	18:28 (T06) 18:40 (T06)	07:17 17:01	15:51 (T12) 16:19 (T12)
23	06:11 20:48	06:40 20:11	07:10 19:20	18:26 (T06) 18:42 (T06)	07:18 17:00	15:51 (T12) 16:20 (T12)
24	06:11 20:47	06:41 20:09	07:11 19:18	18:25 (T06) 18:43 (T06)	07:19 17:00	15:51 (T12) 16:20 (T12)
25	06:12 20:46	06:42 20:08	07:12 19:17	18:24 (T06) 18:43 (T06)	07:20 16:59	15:51 (T12) 16:20 (T12)
26	06:13 20:45	06:43 20:06	07:13 19:15	18:23 (T06) 18:43 (T06)	07:21 16:59	15:51 (T12) 16:20 (T12)
27	06:14 20:44	06:44 20:05	07:14 19:13	18:22 (T06) 18:43 (T06)	07:22 16:58	15:52 (T12) 16:20 (T12)
28	06:15 20:43	06:45 20:03	07:15 19:12	18:22 (T06) 18:43 (T06)	07:23 16:58	15:53 (T12) 16:21 (T12)
29	06:16 20:42	06:46 20:01	07:16 19:10	18:21 (T06) 18:42 (T06)	07:24 16:57	15:53 (T12) 16:21 (T12)
30	06:17 20:41	06:47 20:00	07:17 19:08	18:21 (T06) 18:41 (T06)	07:25 16:57	15:54 (T12) 16:21 (T12)
31	06:18 20:40	06:48 19:58	07:18 19:07	06:51 17:22		07:47 17:05
Potential sun hours	458	427	375	346	299	289
Total, worst case			172	55	475	628
Sun reduction			0,64	0,56	0,48	0,41
Oper. time red.			0,83	0,83	0,83	0,83
Wind dir. red.			0,74	0,74	0,74	0,74
Total reduction			0,39	0,34	0,29	0,25
Total, real			67	19	139	159











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

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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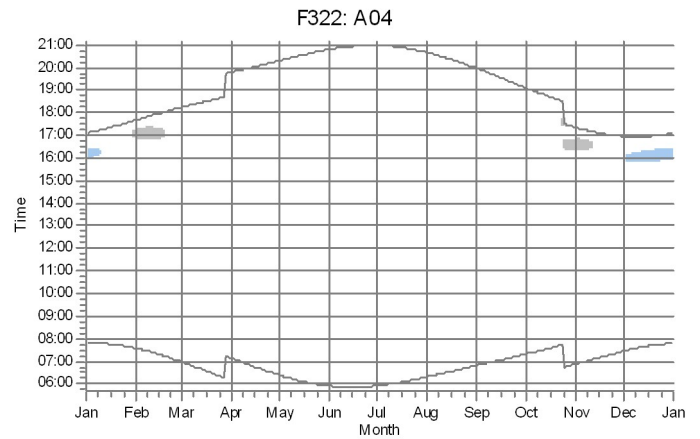
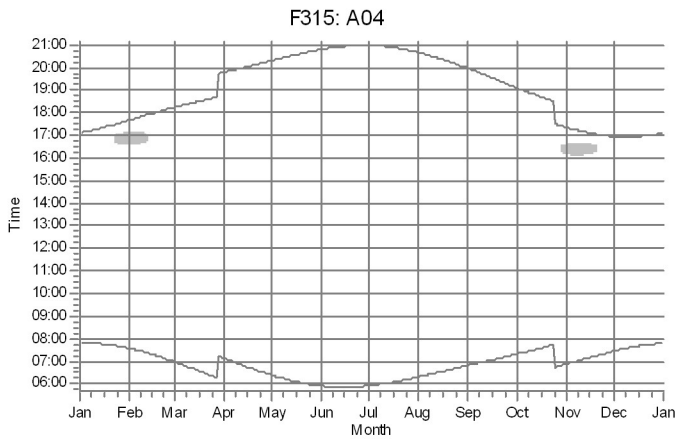
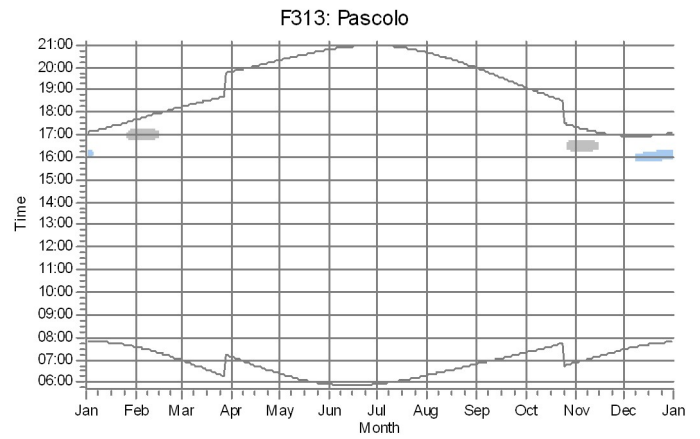
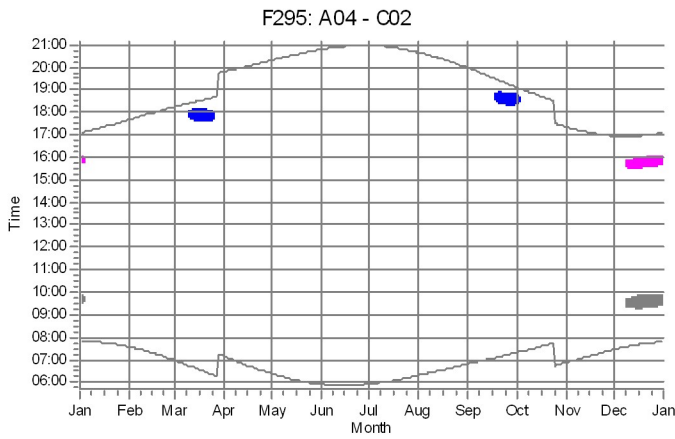
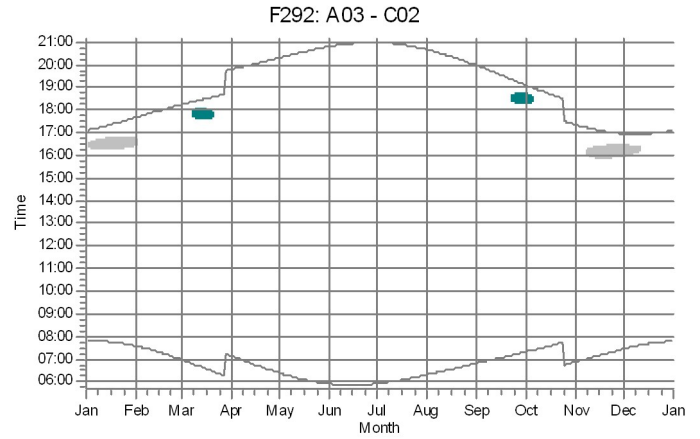
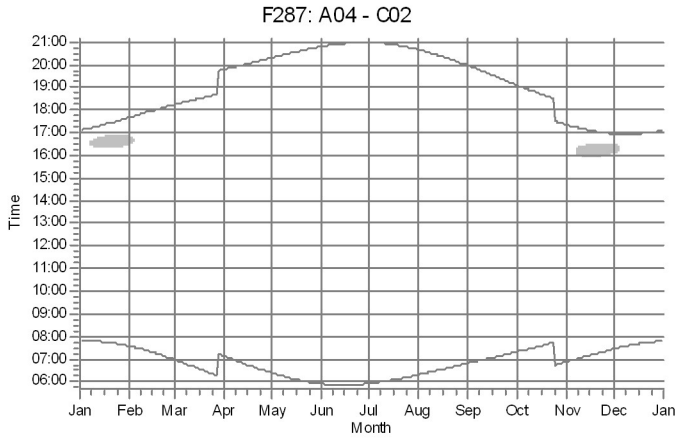
SHADOW - Calendar, graphical
 Calculation: Real_case_Progetto_20231109



WTGs

- | | | | |
|---|--|---|--|
|  | T01: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (29) |  | T11: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (39) |
|  | T02: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (30) |  | T12: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (40) |
|  | T03: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (31) |  | T13: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (41) |
|  | T04: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (32) |  | T14: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (42) |
|  | T05: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (33) |  | T15: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (43) |

SHADOW - Calendar, graphical
 Calculation: Real_case_Progetto_20231109



WTGs

- | | |
|--|---|
| <ul style="list-style-type: none"> T03: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (31) T04: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (32) T05: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (33) | <ul style="list-style-type: none"> T06: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (34) T12: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (40) T15: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (43) |
|--|---|

Project:

Progetto_Ala Dei Sardi

Licensed user:

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

Via Santa Margherita 4

IT-09124 Cagliari

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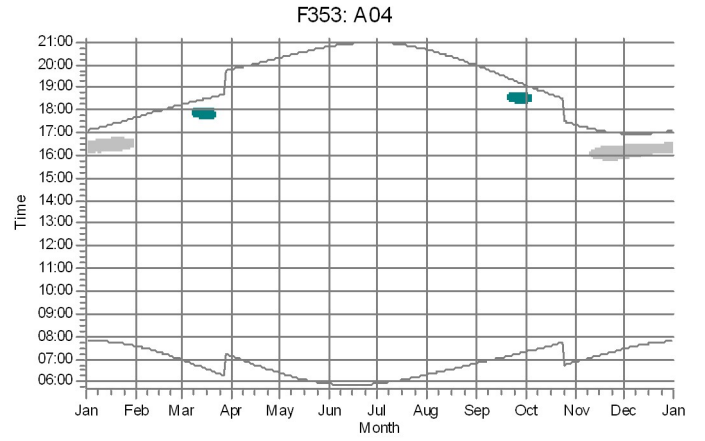
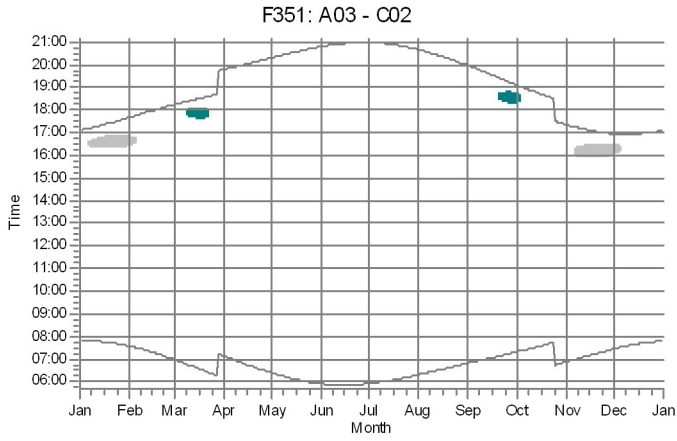
Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 16:52/3.4.415

SHADOW - Calendar, graphical

Calculation: Real_case_Progetto_20231109



WTGs

T06: Siemens Gamesa SG 6.6-172!! 6600 172.0 !0! hub: 135,0 m (TOT: 221,0 m) (34)

T12: Siemens Gamesa SG 6.6-172!! 6600 172.0 !0! hub: 135,0 m (TOT: 221,0 m) (40)

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T01 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (29) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	17:58-18:58/60 19:47	06:23 20:18
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	17:57-18:57/60 19:48	06:22 20:19
3	07:47 17:08	07:32 17:42	06:55 18:16	07:05 19:49	17:57-18:56/59 19:49	06:21 20:20
4	07:47 17:08	07:31 17:43	06:54 18:17	07:03 19:50	17:58-18:56/58 19:50	06:19 20:21
5	07:47 17:09	07:30 17:45	06:52 18:18	07:02 19:51	17:58-18:55/57 19:51	06:18 20:22
6	07:47 17:10	07:29 17:46	06:51 18:19	07:00 19:52	17:59-18:54/55 19:52	06:17 20:23
7	07:47 17:11	07:28 17:47	06:49 18:20	06:59 19:53	17:59-18:53/54 19:53	06:16 20:24
8	07:47 17:12	07:27 17:48	06:48 18:21	06:57 19:54	17:59-18:52/53 19:54	06:15 20:25
9	07:47 17:13	07:26 17:50	06:46 18:22	06:55 19:55	18:00-18:51/51 19:55	06:13 20:26
10	07:47 17:14	07:24 17:51	06:44 18:23	06:54 19:56	18:00-18:50/50 19:56	06:12 20:27
11	07:47 17:15	07:23 17:52	06:43 18:25	06:52 19:57	18:02-18:49/47 19:57	06:11 20:28
12	07:46 17:16	07:22 17:53	06:41 18:26	06:51 19:58	18:02-18:47/45 19:58	06:10 20:29
13	07:46 17:17	07:21 17:55	06:40 18:27	06:49 19:59	18:04-18:46/42 19:59	06:09 20:30
14	07:46 17:19	07:20 17:56	06:38 18:28	06:48 20:00	18:05-18:44/39 20:00	06:08 20:31
15	07:45 17:20	07:18 17:57	06:36 18:29	06:46 20:01	18:06-18:41/35 20:01	06:07 20:32
16	07:45 17:21	07:17 17:58	06:35 18:30	06:44 20:03	18:08-18:40/32 20:03	06:06 20:33
17	07:45 17:22	07:16 17:59	06:33 18:31	06:43 20:04	18:10-18:37/27 20:04	06:05 20:34
18	07:44 17:23	07:14 18:01	06:31 18:32	06:41 20:05	18:14-18:34/20 20:05	06:04 20:35
19	07:44 17:24	07:13 18:02	06:30 18:33	06:40 20:06	18:19-18:29/10 20:06	06:03 20:36
20	07:43 17:25	07:12 18:03	06:28 18:34	06:38 20:07		06:03 20:37
21	07:42 17:26	07:10 18:04	06:27 18:35	06:37 20:08	17:03-17:57/54 20:08	06:02 20:38
22	07:42 17:28	07:09 18:05	06:25 18:36	06:35 20:09	17:02-17:57/55 20:09	06:01 20:39
23	07:41 17:29	07:07 18:06	06:23 18:37	06:34 20:10	17:02-17:59/57 20:10	06:00 20:40
24	07:41 17:30	07:06 18:08	06:22 18:38	06:33 20:11	17:01-17:58/57 20:11	05:59 20:41
25	07:40 17:31	07:04 18:09	06:20 18:40	06:31 20:12	16:59-17:58/59 20:12	05:59 20:42
26	07:39 17:32	07:03 18:10	06:18 18:41	06:30 20:13	17:00-17:59/59 20:13	05:58 20:42
27	07:38 17:34	07:02 18:11	06:17 18:42	06:28 20:14	16:59-17:59/60 20:14	05:57 20:43
28	07:37 17:35	07:00 18:12	06:15 18:43	06:27 20:15	16:58-17:58/60 20:15	05:57 20:44
29	07:37 17:36		07:13 19:44	06:26 20:16	17:58-18:59/61 20:16	05:56 20:45
30	07:36 17:37		07:12 19:45	06:24 20:17	17:58-18:58/60 20:17	05:56 20:46
31	07:35 17:39		07:10 19:46		17:57-18:57/60 19:46	05:55 20:46
Potential sun hours	298	298	370	398	447	451
Sum of minutes with flicker	0	0	1017	854	943	2256

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T01 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (29) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	July	August	September	October	November	December
1	05:55 19:04-20:20/76 20:58	06:19 20:39	06:49 18:01-18:48/47 19:57	07:19 17:59-18:24/25 19:07	06:52 17:21	07:27 16:57
2	05:56 19:04-20:19/75 20:58	06:20 20:38	06:50 17:59-18:49/50 19:55	07:20 18:02-18:20/18 19:05	06:53 17:19	07:28 16:57
3	05:56 19:05-20:20/75 20:58	06:21 20:37	06:51 17:58-18:49/51 19:54	07:21 19:04	06:55 17:18	07:29 16:56
4	05:57 19:05-20:19/74 20:58	06:22 20:36	06:52 17:57-18:50/53 19:52	07:22 19:02	06:56 17:17	07:30 16:56
5	05:57 19:06-20:19/73 20:57	06:23 20:35	06:53 17:55-18:49/54 19:50	07:23 19:00	06:57 17:16	07:31 16:56
6	05:58 19:06-20:19/73 20:57	06:24 20:34	06:54 17:54-18:49/55 19:49	07:24 18:59	06:58 17:15	07:32 16:56
7	05:59 19:06-20:19/73 20:57	06:25 20:33	06:55 17:53-18:50/57 19:47	07:25 18:57	06:59 17:14	07:33 16:56
8	05:59 19:07-20:19/72 20:57	06:26 20:31	06:56 17:52-18:50/58 19:45	07:26 18:55	07:00 17:13	07:33 16:56
9	06:00 19:07-20:18/71 20:56	06:27 20:30	06:57 17:51-18:50/59 19:44	07:27 18:54	07:02 17:12	07:34 16:56
10	06:00 19:08-20:18/70 20:56	06:28 20:29	06:58 17:51-18:50/59 19:42	07:28 18:52	07:03 17:11	07:35 16:56
11	06:01 19:09-20:18/69 20:55	06:29 20:28	06:59 17:50-18:50/60 19:40	07:29 18:51	07:04 17:10	07:36 16:56
12	06:02 19:09-20:17/68 20:55	06:30 20:26	07:00 17:49-18:50/61 19:39	07:30 18:49	07:05 17:09	07:37 16:56
13	06:03 19:10-20:17/67 20:54	06:30 20:25	07:01 17:49-18:49/60 19:37	07:31 18:47	07:06 17:08	07:38 16:56
14	06:03 19:11-20:17/66 20:54	06:31 20:24	07:02 17:48-18:49/61 19:35	07:32 18:46	07:07 17:07	07:38 16:56
15	06:04 19:11-20:16/65 20:53	06:32 20:22	07:03 17:48-18:48/60 19:34	07:33 18:44	07:09 17:06	07:39 16:56
16	06:05 19:12-20:16/64 20:53	06:33 20:21	07:04 17:48-18:48/60 19:32	07:34 18:43	07:10 17:05	07:40 16:57
17	06:06 19:13-20:15/62 20:52	06:34 20:20	07:05 17:48-18:47/59 19:30	07:35 18:41	07:11 17:04	07:41 16:57
18	06:06 19:14-20:15/61 20:52	06:35 20:18	07:06 17:48-18:47/59 19:29	07:36 18:40	07:12 17:04	07:41 16:57
19	06:07 19:15-20:14/59 20:51	06:36 20:17	07:07 17:48-18:46/58 19:27	07:37 18:38	07:13 17:03	07:42 16:58
20	06:08 19:16-20:12/56 20:50	06:37 20:15	07:08 17:48-18:45/57 19:25	07:39 18:37	07:14 17:02	07:42 16:58
21	06:09 19:17-20:12/55 20:49	06:38 20:14	07:09 17:48-18:44/56 19:24	07:40 18:35	07:16 17:02	07:43 16:59
22	06:10 19:18-20:11/53 20:49	06:39 20:12	07:10 17:48-18:43/55 19:22	07:41 18:34	07:17 17:01	07:44 16:59
23	06:11 19:20-20:10/50 20:48	06:40 20:11	07:11 17:48-18:41/53 19:20	07:42 18:33	07:18 17:00	07:44 17:00
24	06:12 19:21-20:09/48 20:47	06:41 18:21-18:33/12 20:09	07:12 17:48-18:39/51 19:19	07:43 18:31	07:19 17:00	07:44 17:00
25	06:12 19:23-20:07/44 20:46	06:42 18:16-18:37/21 20:08	07:13 17:49-18:38/49 19:17	06:44 17:30	07:20 16:59	07:45 17:01
26	06:13 19:24-20:05/41 20:45	06:43 18:13-18:40/27 20:06	07:14 17:50-18:36/46 19:15	06:45 17:28	07:21 16:59	07:45 17:01
27	06:14 19:26-20:03/37 20:44	06:44 18:10-18:42/32 20:05	07:15 17:51-18:35/44 19:13	06:46 17:27	07:22 16:58	07:46 17:02
28	06:15 19:28-20:01/33 20:43	06:45 18:08-18:43/35 20:03	07:16 17:53-18:33/40 19:12	06:48 17:26	07:23 16:58	07:46 17:03
29	06:16 19:31-19:58/27 20:42	06:46 18:06-18:45/39 20:02	07:17 17:54-18:30/36 19:10	06:49 17:24	07:25 16:57	07:46 17:03
30	06:17 19:35-19:54/19 20:41	06:47 18:04-18:46/42 20:00	07:18 17:56-18:28/32 19:08	06:50 17:23	07:26 16:57	07:47 17:04
31	06:18 20:40	06:48 18:02-18:47/45 19:58		06:51 17:22		07:47 17:05
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	1776	253	1600	43	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T02 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (30) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June
1	07:47 16:05-16:26/21 17:06	07:34 16:07-16:58/51 17:40	06:59 16:22-17:16/54 18:13	07:08 19:47	06:23 20:18	05:55 20:47
2	07:47 16:05-16:27/22 17:07	07:33 16:07-17:01/54 17:41	06:57 16:24-17:16/52 18:15	07:07 19:48	06:22 20:19	05:54 20:48
3	07:47 16:05-16:28/23 17:08	07:32 16:08-17:04/56 17:42	06:55 16:24-17:15/51 18:16	07:05 19:49	06:21 20:20	05:54 20:49
4	07:47 16:05-16:29/24 17:09	07:31 16:09-17:06/57 17:43	06:54 16:25-17:14/49 18:17	07:03 19:50	06:19 20:21	05:53 20:49
5	07:47 16:05-16:31/26 17:09	07:30 16:10-17:08/58 17:45	06:52 16:26-17:12/46 18:18	07:02 19:51	06:18 20:22	05:53 20:50
6	07:47 16:04-16:32/28 17:10	07:29 16:11-17:10/59 17:46	06:51 16:28-17:12/44 18:19	07:00 19:52	06:17 20:23	05:53 20:51
7	07:47 16:04-16:33/29 17:11	07:28 16:12-17:10/58 17:47	06:49 16:28-17:10/42 18:20	06:59 19:53	06:16 20:24	05:53 20:51
8	07:47 16:04-16:34/30 17:12	07:27 16:13-17:12/59 17:48	06:48 16:29-17:08/39 18:21	06:57 19:54	06:15 20:25	05:52 20:52
9	07:47 16:05-16:35/30 17:13	07:26 16:15-17:13/58 17:50	06:46 16:32-17:06/34 18:22	06:55 19:55	06:13 20:26	05:52 20:53
10	07:47 16:04-16:36/32 17:14	07:24 16:17-17:15/58 17:51	06:45 16:34-17:03/29 18:23	06:54 19:56	06:12 20:27	05:52 20:53
11	07:47 16:04-16:37/33 17:15	07:23 16:20-17:16/56 17:52	06:43 16:37-17:01/24 18:25	06:52 19:57	06:11 20:28	05:52 20:54
12	07:46 16:04-16:38/34 17:16	07:22 16:24-17:16/52 17:53	06:41 16:40-16:57/17 18:26	06:51 19:58	06:10 20:29	05:52 20:54
13	07:46 16:03-16:38/35 17:17	07:21 16:24-17:17/53 17:55	06:40 18:27	06:49 19:59	06:09 20:30	05:52 20:55
14	07:46 16:03-16:40/37 17:19	07:20 16:23-17:18/55 17:56	06:38 18:28	06:48 20:00	06:08 20:31	05:51 20:55
15	07:45 16:03-16:40/37 17:20	07:18 16:23-17:19/56 17:57	06:36 18:29	06:46 20:01	06:07 20:32	05:51 20:55
16	07:45 16:03-16:41/38 17:21	07:17 16:22-17:18/56 17:58	06:35 18:30	06:44 20:03	06:06 20:33	05:51 20:56
17	07:45 16:03-16:41/38 17:22	07:16 16:22-17:19/57 17:59	06:33 18:31	06:43 20:04	06:05 20:34	05:51 20:56
18	07:44 16:03-16:43/40 17:23	07:14 16:22-17:20/58 18:01	06:31 18:32	06:41 20:05	06:04 20:35	05:52 20:57
19	07:44 16:03-16:43/40 17:24	07:13 16:21-17:19/58 18:02	06:30 18:33	06:40 20:06	06:03 20:36	05:52 20:57
20	07:43 16:03-16:44/41 17:25	07:12 16:22-17:20/58 18:03	06:28 18:34	06:38 20:07	06:03 20:37	05:52 20:57
21	07:42 16:03-16:44/41 17:26	07:10 16:21-17:19/58 18:04	06:27 18:35	06:37 20:08	06:02 20:38	05:52 20:57
22	07:42 16:03-16:44/41 17:28	07:09 16:21-17:20/59 18:05	06:25 18:36	06:36 20:09	06:01 20:39	05:52 20:58
23	07:41 16:04-16:46/42 17:29	07:07 16:21-17:19/58 18:06	06:23 18:37	06:34 20:10	06:00 20:40	05:52 20:58
24	07:41 16:04-16:46/42 17:30	07:06 16:21-17:19/58 18:08	06:22 18:38	06:33 20:11	05:59 20:41	05:53 20:58
25	07:40 16:04-16:46/42 17:31	07:04 16:21-17:18/57 18:09	06:20 18:40	06:31 20:12	05:59 20:42	05:53 20:58
26	07:39 16:04-16:46/42 17:32	07:03 16:22-17:18/56 18:10	06:18 18:41	06:30 20:13	05:58 20:42	05:53 20:58
27	07:38 16:05-16:47/42 17:34	07:02 16:22-17:17/55 18:11	06:17 18:42	06:28 20:14	05:57 20:43	05:54 20:58
28	07:37 16:05-16:47/42 17:35	07:00 16:22-17:17/55 18:12	06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:58
29	07:37 16:05-16:47/42 17:36		07:13 19:44	06:26 20:16	05:56 20:45	05:54 20:58
30	07:36 16:06-16:47/41 17:37		07:12 19:45	06:24 20:17	05:56 20:46	05:55 20:58
31	07:35 16:06-16:47/41 17:39	16:49-16:50/1	07:10 19:46		05:55 20:46	
Potential sun hours	298	298	370	398	447	451
Sum of minutes with flicker	1097	1583	481	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T02 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (30)
 Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	July	August	September	October	November	December
1	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	17:21-17:33/12 17:21	06:52 15:47-16:44/57 16:57
2	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	17:16-17:37/21 17:20	06:53 15:45-16:43/58 16:57
3	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:04	17:12-17:40/28 17:18	06:55 15:43-16:42/59 16:56
4	05:57 20:58	06:22 20:36	06:52 19:52	07:22 19:02	17:10-17:43/33 17:17	06:56 15:41-16:40/59 16:56
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	17:08-17:44/36 17:16	06:57 15:41-16:39/58 16:56
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	17:06-17:46/40 17:15	06:58 15:40-16:38/58 16:56
7	05:59 20:57	06:25 20:33	06:55 19:47	07:25 18:57	17:04-17:47/43 17:14	06:59 15:39-16:36/57 16:56
8	05:59 20:57	06:26 20:31	06:56 19:45	07:26 18:55	17:02-17:48/46 17:13	07:00 15:38-16:34/56 16:56
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	17:01-17:48/47 17:12	07:02 15:38-16:32/54 16:56
10	06:00 20:56	06:28 20:29	06:58 19:42	07:28 18:52	16:59-17:49/50 17:11	07:03 15:38-16:28/50 16:56
11	06:01 20:55	06:29 20:28	06:59 19:40	07:29 18:51	16:58-17:49/51 17:10	07:04 15:37-16:18/41 16:56
12	06:02 20:55	06:30 20:26	07:00 19:39	07:30 18:49	16:57-17:50/53 17:09	07:05 15:37-16:18/41 16:56
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	16:56-17:50/54 17:08	07:06 15:37-16:19/42 16:56
14	06:03 20:54	06:31 20:24	07:02 19:35	07:32 18:46	16:55-17:50/55 17:07	07:07 15:37-16:19/42 16:56
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	16:54-17:50/56 17:06	07:09 15:37-16:19/42 16:56
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	16:54-17:51/57 17:05	07:10 15:37-16:19/42 16:57
17	06:06 20:52	06:34 20:20	07:05 19:30	07:35 18:41	16:53-17:51/58 17:04	07:11 15:38-16:20/42 16:57
18	06:06 20:52	06:35 20:18	07:06 19:29	07:36 18:40	16:53-17:51/58 17:04	07:12 15:38-16:20/42 16:57
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	16:52-17:51/59 17:03	07:13 15:38-16:20/42 16:58
20	06:08 20:50	06:37 20:15	07:08 19:25	07:39 18:37	16:52-17:50/58 17:02	07:14 15:38-16:19/41 16:58
21	06:09 20:49	06:38 20:14	07:09 19:24	07:40 18:35	16:51-17:50/59 17:02	07:16 15:39-16:20/41 16:59
22	06:10 20:49	06:39 20:12	07:10 19:22	07:41 18:34	16:51-17:49/58 17:01	07:17 15:39-16:20/41 16:59
23	06:11 20:48	06:40 20:11	07:11 19:20	07:42 18:33	16:52-17:50/58 17:00	07:18 15:40-16:20/40 17:00
24	06:12 20:47	06:41 20:09	07:12 19:19	07:43 18:31	16:52-17:49/57 17:00	07:19 15:40-16:20/40 17:00
25	06:12 20:46	06:42 20:08	07:13 19:17	07:44 17:30	15:52-16:49/57 16:59	07:20 15:41-16:19/38 17:01
26	06:13 20:45	06:43 20:06	07:14 19:15	07:45 17:28	15:52-16:48/56 16:59	07:21 15:41-16:19/38 17:01
27	06:14 20:44	06:44 20:05	07:15 19:13	07:46 17:27	15:52-16:47/55 16:58	07:22 15:43-16:20/37 17:02
28	06:15 20:43	06:45 20:03	07:16 19:12	07:48 17:26	15:53-16:47/54 16:58	07:23 15:43-16:20/37 17:03
29	06:16 20:42	06:46 20:02	07:17 19:10	07:49 17:25	15:54-16:46/52 16:57	07:25 15:44-16:19/35 17:03
30	06:17 20:41	06:47 20:00	07:18 19:08	07:50 17:23	15:53-16:45/52 16:57	07:26 15:45-16:19/34 17:04
31	06:18 20:40	06:48 19:58		07:51 17:22	15:49-16:44/55	07:47 16:06-16:25/19 17:05
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	0	0	0	1528	1364	596

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T03 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (31) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Assumptions for shadow calculations
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:01-19:32/31	07:19 18:25-18:42/17	06:52 17:21	07:27 16:57
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	06:22 20:19	05:54 20:48	05:56 20:58	06:20 20:38	06:50 19:01-19:32/31	07:20 18:26-18:40/14	06:53 17:20	07:28 16:57
3	07:47 17:08	07:32 17:42	06:56 18:16	07:05 19:49	06:21 20:20	05:54 20:49	05:56 20:58	06:21 20:37	06:51 19:01-19:31/30	07:21 18:29-18:37/8	06:55 17:18	07:29 16:56
4	07:47 17:09	07:31 17:44	06:54 18:17	07:03 19:50	06:19 20:21	05:54 20:49	05:57 20:58	06:22 20:36	06:52 19:02-19:30/28	07:22 19:02	06:56 17:17	07:30 16:56
5	07:47 17:09	07:30 17:45	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:50	05:57 20:57	06:23 20:35	06:53 19:01-19:28/27	07:23 19:00	06:57 17:16	07:31 16:56
6	07:47 17:10	07:29 17:46	06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:51	05:58 20:57	06:24 20:34	06:54 19:02-19:26/24	07:24 18:59	06:58 17:15	07:32 16:56
7	07:47 17:11	07:28 17:47	06:49 18:20	06:59 19:53	06:16 20:24	05:53 20:51	05:59 20:57	06:25 20:33	06:55 19:03-19:25/22	07:25 18:57	06:59 17:14	07:33 16:56
8	07:47 17:12	07:27 17:48	06:48 18:21	06:57 19:54	06:15 20:25	05:52 20:52	05:59 20:57	06:26 20:31	06:56 19:04-19:23/19	07:26 18:55	07:00 17:13	07:33 16:56
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10	07:47 17:14	07:24 17:51	06:45 18:23	06:54 19:56	06:12 20:27	05:52 20:53	06:01 20:56	06:28 20:29	06:58 19:10-19:17/7	07:28 18:52	07:03 17:11	07:35 16:56
11	07:47 17:15	07:23 17:52	06:43 18:25	06:52 19:57	06:11 20:28	05:52 20:54	06:01 20:55	06:29 20:28	06:59 19:40	07:29 18:51	07:04 17:10	07:36 16:56
12	07:46 17:16	07:22 17:53	06:41 18:26	06:51 19:58	06:10 20:29	05:52 20:54	06:02 20:55	06:30 20:26	07:00 19:39	07:30 18:49	07:05 17:09	07:37 16:56
13	07:46 17:17	07:21 17:55	06:40 18:27	06:49 19:59	06:09 20:30	05:52 20:55	06:03 20:54	06:31 20:25	07:01 19:37	07:31 18:48	07:06 17:08	07:38 16:56
14	07:46 17:19	07:20 17:56	06:38 18:28	06:48 20:00	06:08 20:31	05:52 20:55	06:03 20:54	06:32 20:24	07:02 19:35	07:32 18:46	07:08 17:07	07:38 16:56
15	07:45 17:20	07:18 17:57	06:36 18:29	06:46 20:01	06:07 20:32	05:51 20:55	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	07:09 17:06	07:39 16:57
16	07:45 17:21	07:17 17:58	06:35 18:30	06:44 20:03	06:06 20:33	05:51 20:56	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	07:10 17:05	07:40 16:57
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19	07:44 17:24	07:13 18:02	06:30 18:33	06:40 20:06	06:03 20:36	05:52 20:57	06:07 20:51	06:36 20:17	07:07 19:27	07:38 18:38	07:13 17:03	07:42 16:58
20	07:43 17:25	07:12 18:03	06:28 18:34	06:38 20:07	06:03 20:37	05:52 20:57	06:08 20:50	06:37 20:15	07:08 19:25	07:39 18:37	07:15 17:02	07:42 16:58
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23	07:41 17:29	07:07 18:06	06:23 18:37	06:34 20:10	06:00 20:40	05:52 20:58	06:11 20:48	06:40 20:11	07:11 19:20	07:42 18:33	07:18 17:00	07:44 17:00
24	07:41 17:30	07:06 18:08	06:22 18:38	06:33 20:11	06:00 20:41	05:53 20:58	06:12 20:47	06:41 20:09	07:12 19:19	07:43 18:31	07:19 17:00	07:44 17:00
25	07:40 17:31	07:05 18:09	06:20 18:40	06:31 20:12	05:59 20:42	05:53 20:58	06:12 20:46	06:42 20:08	07:13 19:17	07:44 17:30	07:20 16:59	07:45 17:01
26	07:39 17:32	07:03 18:10	06:18 18:41	06:30 20:13	05:58 20:42	05:53 20:58	06:13 20:45	06:43 20:06	07:14 19:15	07:45 17:29	07:21 16:59	07:45 17:01
27	07:38 17:34	07:02 18:11	06:17 18:42	06:28 20:14	05:58 20:43	05:54 20:58	06:14 20:44	06:44 20:05	07:15 19:14	07:46 17:27	07:22 16:58	07:46 17:02
28	07:38 17:35	07:00 18:12	06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:58	06:15 20:43	06:45 20:03	07:16 19:12	07:47 17:26	07:23 16:58	07:46 17:03
29	07:37 17:36		07:13 19:44	06:26 20:16	05:56 20:45	05:54 20:58	06:16 20:42	06:46 20:02	07:17 19:10	07:49 17:25	07:25 16:58	07:46 17:03
30	07:36 17:37		07:12 19:45	06:24 20:17	05:56 20:46	05:55 20:58	06:17 20:41	06:47 20:00	07:18 19:09	07:50 17:23	07:26 16:57	07:47 17:04
31	07:35 17:39		07:10 19:46		05:55 20:46		06:18 20:40	06:48 19:58	07:19 17:22	06:51 17:22		07:47 17:05
Potential sun hours	299	298	311	398	447	451	458	427	375	510	346	299
Sum of minutes with flicker	0	0	311	519	447	0	0	293	510	39	0	289

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T04 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (32) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June
1	07:47 09:33-09:49/16 17:06	07:34 17:40	06:58 07:25-08:17/52 18:13	07:08 19:47	06:23 20:18	05:55 20:47
2	07:47 09:35-09:48/13 17:07	07:33 17:41	06:57 07:26-08:16/50 18:14	07:07 19:48	06:22 20:19	05:54 20:48
3	07:47 09:37-09:46/9 17:08	07:32 07:52-07:58/6 17:42	06:55 07:26-08:15/49 18:16	07:05 19:49	06:21 20:20	05:54 20:49
4	07:47 17:08	07:31 07:51-08:02/11 17:43	06:54 07:28-08:14/46 18:17	07:03 19:50	06:19 20:21	05:53 20:49
5	07:47 17:09	07:30 07:50-08:05/15 17:45	06:52 07:28-08:13/45 18:18	07:02 19:51	06:18 20:22	05:53 20:50
6	07:47 17:10	07:29 07:49-08:08/19 17:46	06:51 07:30-08:12/42 18:19	07:00 19:52	06:17 20:23	05:53 20:51
7	07:47 17:11	07:28 07:47-08:09/22 17:47	06:49 07:30-08:10/40 18:20	06:59 19:53	06:16 20:24	05:52 20:51
8	07:47 17:12	07:27 07:46-08:11/25 17:48	06:48 07:31-08:07/36 18:21	06:57 19:54	06:15 20:25	05:52 20:52
9	07:47 17:13	07:26 07:45-08:12/27 17:50	06:46 07:33-08:06/33 18:22	06:55 19:55	06:13 20:26	05:52 20:52
10	07:47 17:14	07:24 07:44-08:14/30 17:51	06:44 07:35-08:03/28 18:23	06:54 19:56	06:12 20:27	05:52 20:53
11	07:46 17:15	07:23 07:43-08:15/32 17:52	06:43 07:38-08:00/22 18:24	06:52 19:57	06:11 20:28	05:52 20:53
12	07:46 17:16	07:22 07:41-08:16/35 17:53	06:41 07:42-07:55/13 18:26	06:51 19:58	06:10 20:29	05:52 20:54
13	07:46 17:17	07:21 07:40-08:17/37 17:54	06:40 18:27	06:49 19:59	06:09 20:30	05:51 20:54
14	07:46 17:18	07:19 07:39-08:18/39 17:56	06:38 18:28	06:47 20:00	06:08 20:31	05:51 20:55
15	07:45 17:20	07:18 07:38-08:19/41 17:57	06:36 18:29	06:46 20:01	06:07 20:32	05:51 20:55
16	07:45 17:21	07:17 07:36-08:19/43 17:58	06:35 18:30	06:44 20:02	06:06 20:33	05:51 20:56
17	07:44 17:22	07:16 07:35-08:19/44 17:59	06:33 18:31	06:43 20:03	06:05 20:34	05:51 20:56
18	07:44 17:23	07:14 07:33-08:19/46 18:01	06:31 18:32	06:41 20:05	06:04 20:35	05:52 20:56
19	07:43 17:24	07:13 07:32-08:20/48 18:02	06:30 18:33	06:40 20:06	06:03 20:36	05:52 20:57
20	07:43 17:25	07:12 07:31-08:20/49 18:03	06:28 18:34	06:38 20:07	06:03 20:37	05:52 20:57
21	07:42 17:26	07:10 07:29-08:20/51 18:04	06:26 18:35	06:37 20:08	06:02 20:38	05:52 20:57
22	07:42 17:28	07:09 07:28-08:20/52 18:05	06:25 18:36	06:35 20:09	06:01 20:39	05:52 20:57
23	07:41 17:29	07:07 07:26-08:20/54 18:06	06:23 18:37	06:34 20:10	06:00 20:40	05:52 20:58
24	07:40 17:30	07:06 07:25-08:20/55 18:08	06:22 18:38	06:33 20:11	05:59 20:41	05:53 20:58
25	07:40 17:31	07:04 07:24-08:19/55 18:09	06:20 18:39	06:31 20:12	05:59 20:41	05:53 20:58
26	07:39 17:32	07:03 07:25-08:19/54 18:10	06:18 18:40	06:30 20:13	05:58 20:42	05:53 20:58
27	07:38 17:34	07:01 07:25-08:18/53 18:11	06:17 18:42	06:28 20:14	05:57 20:43	05:54 20:58
28	07:37 17:35	07:00 07:26-08:18/52 18:12	06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:58
29	07:37 17:36		07:13 19:44	06:26 20:16	05:56 20:45	05:54 20:58
30	07:36 17:37		07:12 19:45	06:24 20:17	05:56 20:46	05:55 20:58
31	07:35 17:39		07:10 19:46		05:55 20:46	
Potential sun hours	299	298	370	398	447	451
Sum of minutes with flicker	38	995	456	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T04 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (32)
 Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	July	August	September	October	November	December
1	05:55 20:58	06:19 20:39	06:49 19:57	07:18 19:07	08:24-08:31/7	06:52 07:14-07:43/29 17:21
2	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	08:17-08:36/19	06:53 07:15-07:42/27 17:19
3	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:03	08:14-08:39/25	06:54 07:16-07:40/24 17:18
4	05:57 20:58	06:22 20:36	06:52 19:52	07:22 19:02	08:12-08:43/31	06:56 07:17-07:38/21 17:17
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	08:10-08:44/34	06:57 07:19-07:37/18 17:16
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	08:08-08:46/38	06:58 07:20-07:35/15 17:15
7	05:59 20:57	06:25 20:33	06:55 19:47	07:25 18:57	08:06-08:47/41	06:59 07:21-07:32/11 17:14
8	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55	08:04-08:48/44	07:00 07:22-07:27/5 17:13
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	08:03-08:49/46	07:02 17:12
10	06:00 20:56	06:28 20:29	06:58 19:42	07:28 18:52	08:02-08:49/47	07:03 17:11
11	06:01 20:55	06:28 20:28	06:59 19:40	07:29 18:51	08:00-08:50/50	07:04 17:10
12	06:02 20:55	06:29 20:26	07:00 19:39	07:30 18:49	07:59-08:50/51	07:05 17:09
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	07:59-08:50/51	07:06 17:08
14	06:03 20:54	06:31 20:24	07:02 19:35	07:32 18:46	07:58-08:51/53	07:07 17:07
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	07:57-08:51/54	07:09 17:06
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	07:56-08:51/55	07:10 17:05
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	07:57-08:51/54	07:11 17:04
18	06:06 20:51	06:35 20:18	07:06 19:29	07:36 18:40	07:57-08:51/54	07:12 17:04
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	07:58-08:51/53	07:13 17:03
20	06:08 20:50	06:37 20:15	07:08 19:25	07:39 18:37	07:59-08:51/52	07:14 17:02
21	06:09 20:49	06:38 20:14	07:09 19:24	07:40 18:35	08:00-08:50/50	07:16 17:02
22	06:10 20:49	06:39 20:12	07:10 19:22	07:41 18:34	08:01-08:50/49	07:17 17:01
23	06:11 20:48	06:40 20:11	07:11 19:20	07:42 18:33	08:03-08:50/47	07:18 17:00
24	06:12 20:47	06:41 20:09	07:11 19:18	07:43 18:31	08:04-08:50/46	07:19 17:00
25	06:12 20:46	06:42 20:08	07:12 19:17	07:44 17:30	07:05-07:49/44	07:20 16:59
26	06:13 20:45	06:43 20:06	07:13 19:15	07:45 17:28	07:06-07:48/42	07:21 16:59
27	06:14 20:44	06:44 20:05	07:14 19:13	07:46 17:27	07:07-07:47/40	07:22 16:58
28	06:15 20:43	06:45 20:03	07:15 19:12	07:48 17:26	07:09-07:47/38	07:23 16:58
29	06:16 20:42	06:46 20:02	07:16 19:10	07:49 17:24	07:10-07:46/36	07:24 16:57
30	06:17 20:41	06:47 20:00	07:17 19:08	07:50 17:23	07:11-07:45/34	07:25 16:57
31	06:18 20:40	06:48 19:58		07:51 17:22	07:12-07:44/32	
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	0	0	0	1317	150	517

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T05 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (33)
Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

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

Progetto_Ala Dei Sardi

Licensed user:

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

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 16:52/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T06 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (34) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:47 17:06	07:34 17:40	06:58 18:13	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	18:20-18:40/20	06:52 17:21	07:27 16:57
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	06:22 20:19	05:54 20:48	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	18:20-18:39/19	06:53 17:20	07:28 16:57
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Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289	
Sum of minutes with flicker	0	0	257	0	0	0	0	0	187	74	0	0	

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T07 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (35)
 Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:47 17:06	07:34 17:40	06:58 18:13	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:18 19:07	06:52 17:21	07:26 16:57
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Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T08 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (36) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	06:52 17:21	07:27 16:57
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	06:22 20:19	05:54 20:48	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	06:53 17:20	07:28 16:57
3	07:47 17:08	07:32 17:42	06:55 18:16	07:05 19:49	06:21 20:20	05:54 20:49	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:04	06:55 17:18	07:29 16:56
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5	07:47 17:09	07:30 17:45	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:50	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	06:57 17:16	07:31 16:56
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Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T09 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (37) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	06:52 17:21	07:27 16:57
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Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T10 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (38)
 Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	06:52 17:21	07:27 16:57
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18	07:44 17:23	07:14 18:01	06:32 18:32	06:42 20:05	06:04 20:35	05:52 20:57	06:07 20:52	06:36 20:18	07:06 19:29	07:36 18:40	07:12 17:04	07:41 16:58
19	07:44 17:24	07:13 18:02	06:30 18:33	06:40 20:06	06:04 20:36	05:52 20:57	06:07 20:51	06:37 20:17	07:07 19:27	07:37 18:38	07:13 17:03	07:42 16:58
20	07:43 17:25	07:12 18:03	06:28 18:34	06:39 20:07	06:03 20:37	05:52 20:57	06:08 20:50	06:38 20:15	07:08 19:25	07:39 18:37	07:15 17:02	07:42 16:58
21	07:42 17:27	07:10 18:04	06:27 18:35	06:37 20:08	06:02 20:38	05:52 20:57	06:09 20:49	06:38 20:14	07:09 19:24	07:40 18:36	07:16 17:02	07:43 16:59
22	07:42 17:28	07:09 18:05	06:25 18:36	06:36 20:09	06:01 20:39	05:52 20:58	06:10 20:49	06:39 20:12	07:10 19:22	07:41 18:34	07:17 17:01	07:44 16:59
23	07:41 17:29	07:07 18:07	06:23 18:37	06:34 20:10	06:00 20:40	05:53 20:58	06:11 20:48	06:40 20:11	07:11 19:20	07:42 18:33	07:18 17:00	07:44 17:00
24	07:41 17:30	07:06 18:08	06:22 18:39	06:33 20:11	06:00 20:41	05:53 20:58	06:12 20:47	06:41 20:09	07:12 19:19	07:43 18:31	07:19 17:00	07:44 17:00
25	07:40 17:31	07:05 18:09	06:20 18:40	06:31 20:12	06:01 20:42	05:53 20:58	06:13 20:46	06:42 20:08	07:13 19:17	06:44 17:30	07:20 16:59	07:45 17:01
26	07:39 17:33	07:03 18:10	06:18 18:41	06:30 20:13	06:01 20:42	05:53 20:58	06:13 20:45	06:43 20:06	07:14 19:15	06:45 17:29	07:21 16:59	07:45 17:02
27	07:38 17:34	07:02 18:11	06:17 18:42	06:29 20:14	06:01 20:43	05:54 20:58	06:14 20:44	06:44 20:05	07:15 19:14	06:47 17:27	07:22 16:58	07:46 17:02
28	07:38 17:35	07:00 18:12	06:15 18:43	06:27 20:15	06:01 20:44	05:54 20:58	06:15 20:43	06:45 20:03	07:16 19:12	06:48 17:26	07:23 16:58	07:46 17:03
29	07:37 17:36	07:01 19:44	06:13 19:44	06:26 20:16	06:01 20:45	05:55 20:58	06:16 20:43	06:46 20:02	07:17 19:10	06:49 17:25	07:25 16:58	07:46 17:04
30	07:36 17:37	07:02 19:45	06:12 19:45	06:25 20:17	06:01 20:46	05:55 20:58	06:17 20:42	06:47 20:00	07:18 19:09	06:50 17:23	07:26 16:57	07:47 17:04
31	07:35 17:39	07:03 19:46	06:11 19:46	06:24 20:18	06:00 20:46	05:55 20:58	06:18 20:40	06:48 19:58	07:19 17:22	06:51 17:22	07:27 17:05	07:47 17:05
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T11 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (39)
 Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,87	4,61	5,62	6,73	8,36	10,04	11,06	9,91	8,03	6,21	4,80	3,87

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
357	453	363	393	516	335	617	408	584	2.307	719	194	7.246

	January	February	March	April	May	June	
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	06:23 20:18	05:55 20:47	20:12-20:22/10
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	06:22 20:19	05:54 20:48	20:12-20:23/11
3	07:47 17:08	07:32 17:42	06:56 18:16	07:05 19:49	06:21 20:20	05:54 20:49	20:11-20:23/12
4	07:47 17:09	07:31 17:44	06:54 18:17	07:04 19:50	06:19 20:21	05:54 20:49	20:11-20:24/13
5	07:47 17:10	07:30 17:45	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:50	20:11-20:25/14
6	07:47 17:10	07:29 17:46	06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:51	20:10-20:25/15
7	07:47 17:11	07:28 17:47	06:49 18:20	06:59 19:53	06:16 20:24	05:53 20:51	20:10-20:26/16
8	07:47 17:12	07:27 17:49	06:48 18:21	06:57 19:54	06:15 20:25	05:52 20:52	20:10-20:27/17
9	07:47 17:13	07:26 17:50	06:46 18:22	06:55 19:55	06:14 20:26	05:52 20:52	20:10-20:27/17
10	07:47 17:14	07:24 17:51	06:45 18:23	06:54 19:56	06:12 20:27	05:52 20:53	20:10-20:28/18
11	07:47 17:15	07:23 17:52	06:43 18:25	06:52 19:57	06:11 20:28	05:52 20:54	20:10-20:29/19
12	07:46 17:16	07:22 17:53	06:41 18:26	06:51 19:58	06:10 20:29	05:52 20:54	20:10-20:29/19
13	07:46 17:18	07:21 17:55	06:40 18:27	06:49 19:59	06:09 20:30	05:52 20:55	20:09-20:29/20
14	07:46 17:19	07:20 17:56	06:38 18:28	06:48 20:00	06:08 20:31	05:52 20:55	20:09-20:29/20
15	07:45 17:20	07:18 17:57	06:36 18:29	06:46 20:01	06:07 20:32	05:52 20:55	20:11-20:31/20
16	07:45 17:21	07:17 17:58	06:35 18:30	06:45 20:02	06:06 20:33	05:52 20:56	20:11-20:31/20
17	07:45 17:22	07:16 17:59	06:33 18:31	06:43 20:04	06:05 20:34	05:52 20:56	20:11-20:31/20
18	07:44 17:23	07:14 18:01	06:32 18:32	06:41 20:05	06:04 20:35	05:52 20:56	20:11-20:31/20
19	07:44 17:24	07:13 18:02	06:30 18:33	06:40 20:06	06:04 20:36	05:52 20:57	20:11-20:32/21
20	07:43 17:25	07:12 18:03	06:28 18:34	06:39 20:07	06:03 20:37	05:52 20:57	20:11-20:32/21
21	07:42 17:27	07:10 18:04	06:27 18:35	06:37 20:08	06:02 20:38	05:52 20:57	20:11-20:32/21
22	07:42 17:28	07:09 18:05	06:25 18:36	06:36 20:09	06:01 20:39	05:52 20:58	20:11-20:32/21
23	07:41 17:29	07:07 18:07	06:23 18:37	06:34 20:10	06:00 20:40	05:53 20:58	20:12-20:33/21
24	07:40 17:30	07:06 18:08	06:22 18:38	06:33 20:11	06:00 20:41	05:53 20:58	20:12-20:32/20
25	07:40 17:31	07:04 18:09	06:20 18:40	06:31 20:12	05:59 20:42	05:53 20:58	20:12-20:32/20
26	07:39 17:33	07:03 18:10	06:18 18:41	06:30 20:13	05:58 20:42	05:53 20:58	20:13-20:33/20
27	07:38 17:34	07:02 18:11	06:17 18:42	06:29 20:14	05:58 20:43	05:54 20:58	20:13-20:33/20
28	07:37 17:35	07:00 18:12	06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:58	20:12-20:32/20
29	07:37 17:36		07:13 19:44	06:26 20:16	05:56 20:45	05:55 20:58	20:15-20:20/5
30	07:36 17:37		07:12 19:45	06:25 20:17	05:56 20:46	05:55 20:58	20:14-20:21/7
31	07:35 17:39		07:10 19:46		05:55 20:46		20:12-20:21/9
Potential sun hours	299	298	370	398	447	451	545
Sum of minutes with flicker	0	187	0	0	21		

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T11 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (39)
 Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	July	August	September	October	November	December
1	05:55 20:14-20:33/19	06:19	06:49	07:19	06:52 07:14-07:30/16	07:27
	20:58	20:39	19:57	19:07	17:21	16:57
2	05:56 20:14-20:32/18	06:20	06:50	07:20	06:53 07:15-07:30/15	07:28
	20:58	20:38	19:55	19:05	17:20	16:57
3	05:56 20:15-20:33/18	06:21	06:51	07:21	06:55 07:16-07:29/13	07:29
	20:58	20:37	19:54	19:04	17:18	16:56
4	05:57 20:15-20:32/17	06:22	06:52	07:22	06:56 07:17-07:28/11	07:30
	20:58	20:36	19:52	19:02	17:17	16:56
5	05:57 20:16-20:32/16	06:23	06:53	07:23	06:57 07:19-07:28/9	07:31
	20:57	20:35	19:50	19:00	17:16	16:56
6	05:58 20:16-20:32/16	06:24	06:54	07:24	06:58 07:20-07:27/7	07:32
	20:57	20:34	19:49	18:59	17:15	16:56
7	05:59 20:17-20:32/15	06:25	06:55	07:25	06:59 07:21-07:25/4	07:32
	20:57	20:33	19:47	18:57	17:14	16:56
8	05:59 20:18-20:32/14	06:26	06:56	07:26	07:00	07:33
	20:57	20:31	19:45	18:55	17:13	16:56
9	06:00 20:18-20:31/13	06:27	06:57	07:27	07:02	07:34
	20:56	20:30	19:44	18:54	17:12	16:56
10	06:01 20:19-20:31/12	06:28	06:58	07:28	07:03	07:35
	20:56	20:29	19:42	18:52	17:11	16:56
11	06:01 20:20-20:31/11	06:29	06:59	07:29	07:04	07:36
	20:55	20:28	19:40	18:51	17:10	16:56
12	06:02 20:20-20:30/10	06:30	07:00	07:30	07:05	07:37
	20:55	20:26	19:39	18:49	17:09	16:56
13	06:03 20:22-20:30/8	06:31	07:01	07:31	07:06	07:38
	20:54	20:25	19:37	18:48	17:08	16:56
14	06:03 20:24-20:29/5	06:32	07:02	07:32	07:07	07:38
	20:54	20:24	19:35	18:46	17:07	16:56
15	06:04 20:26-20:28/2	06:33	07:03	07:33	07:09	07:39
	20:53	20:22	19:34	18:44	17:06	16:57
16	06:05	06:34	07:04	07:34	07:10	07:40
	20:53	20:21	19:32	18:43	17:05	16:57
17	06:06	06:34	07:05	07:35	07:11	07:41
	20:52	20:19	19:30	18:41	17:05	16:57
18	06:07	06:35	07:06	07:36	07:12	07:41
	20:52	20:18	19:29	18:40	17:04	16:57
19	06:07	06:36	07:07	07:37	07:13	07:42
	20:51	20:17	19:27	18:38	17:03	16:58
20	06:08	06:37	07:08	07:39	07:14	07:42
	20:50	20:15	19:25	18:37	17:02	16:58
21	06:09	06:38	07:09	07:40	07:16	07:43
	20:49	20:14	19:24	18:36	17:02	16:59
22	06:10	06:39	07:10	07:41	07:17	07:43
	20:49	20:12	19:22	18:34	17:01	16:59
23	06:11	06:40	07:11	07:42	07:18	07:44
	20:48	20:11	19:20	18:33	17:00	17:00
24	06:12	06:41	07:12	07:43 08:19-08:21/2	07:19	07:44
	20:47	20:09	19:19	18:31	17:00	17:00
25	06:13	06:42	07:13	06:44 07:15-07:25/10	07:20	07:45
	20:46	20:08	19:17	17:30	16:59	17:01
26	06:13	06:43	07:14	06:45 07:13-07:27/14	07:21	07:45
	20:45	20:06	19:15	17:29	16:59	17:01
27	06:14	06:44	07:15	06:46 07:12-07:29/17	07:22	07:46
	20:44	20:05	19:14	17:27	16:58	17:02
28	06:15	06:45	07:16	06:48 07:11-07:29/18	07:23	07:46
	20:43	20:03	19:12	17:26	16:58	17:03
29	06:16	06:46	07:17	06:49 07:10-07:29/19	07:24	07:46
	20:42	20:02	19:10	17:25	16:58	17:03
30	06:17	06:47	07:18	06:50 07:11-07:30/19	07:26	07:46
	20:41	20:00	19:09	17:23	16:57	17:04
31	06:18	06:48		06:51 07:12-07:29/17		07:47
	20:40	19:58		17:22		17:05
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	194	0	0	116	75	0

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T12 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (40) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June
1	07:47 16:05-16:32/27 17:06	07:34 16:30-17:12/42 17:40	06:58 18:13	07:08 07:38-08:38/60 19:47	06:23 07:31-08:25/54 20:18	05:55 20:47
2	07:47 16:11-16:33/22 17:07	07:33 16:31-17:13/42 17:41	06:57 18:14	07:07 07:36-08:38/62 19:48	06:22 07:32-08:24/52 20:19	05:54 20:48
3	07:47 16:11-16:33/22 17:08	07:32 16:33-17:15/42 17:42	06:55 18:16	07:05 07:34-08:38/64 19:49	06:21 07:33-08:23/50 20:20	05:54 20:48
4	07:47 16:11-16:34/23 17:09	07:31 16:37-17:16/39 17:43	06:54 18:17	07:03 07:34-08:40/66 19:50	06:19 07:34-08:22/48 20:21	05:54 20:49
5	07:47 16:11-16:35/24 17:09	07:30 16:41-17:17/36 17:45	06:52 18:18	07:02 07:32-08:39/67 19:51	06:18 07:36-08:21/45 20:22	05:53 20:50
6	07:47 16:11-16:36/25 17:10	07:29 16:41-17:17/36 17:46	06:51 18:19	07:00 07:32-08:40/68 19:52	06:17 07:36-08:18/42 20:23	05:53 20:51
7	07:47 16:12-16:37/25 17:11	07:28 16:42-17:17/35 17:47	06:49 18:20	06:59 07:31-08:40/69 19:53	06:16 07:38-08:17/39 20:24	05:53 20:51
8	07:47 16:12-16:38/26 17:12	07:27 16:43-17:18/35 17:48	06:48 18:21	06:57 07:30-08:40/70 19:54	06:15 07:39-08:15/36 20:25	05:52 20:52
9	07:47 16:11-16:38/27 17:13	07:25 16:44-17:18/34 17:50	06:46 18:22	06:55 07:30-08:40/70 19:55	06:13 07:41-08:13/32 20:26	05:52 20:52
10	07:47 16:12-16:39/27 17:14	07:24 16:46-17:18/32 17:51	06:44 18:23	06:54 07:29-08:40/71 19:56	06:12 07:43-08:11/28 20:27	05:52 20:53
11	07:46 16:12-16:41/29 17:15	07:23 16:48-17:18/30 17:52	06:43 18:24	06:52 07:29-08:40/71 19:57	06:11 07:46-08:08/22 20:28	05:52 20:53
12	07:46 16:13-16:41/28 17:16	07:22 16:50-17:17/27 17:53	06:41 18:26	06:51 07:28-08:39/71 19:58	06:10 07:50-08:04/14 20:29	05:52 20:54
13	07:46 16:12-16:43/31 17:17	07:21 16:53-17:17/24 17:55	06:40 18:27	06:49 07:28-08:40/72 19:59	06:09 06:09 20:30	05:52 20:54
14	07:46 16:13-16:44/31 17:19	07:19 16:56-17:17/21 17:56	06:38 18:28	06:48 07:27-08:39/72 20:00	06:08 20:31	05:51 20:55
15	07:45 16:13-16:45/32 17:20	07:18 16:56-17:15/19 17:57	06:36 18:29	06:46 07:27-08:39/72 20:01	06:07 20:32	05:51 20:55
16	07:45 16:13-16:46/33 17:21	07:17 16:58-17:14/16 17:58	06:35 18:30	06:44 07:27-08:38/71 20:02	06:06 20:33	05:51 20:56
17	07:44 16:13-16:46/33 17:22	07:16 17:00-17:12/12 17:59	06:33 18:31	06:43 07:27-08:38/71 20:03	06:05 20:34	05:52 20:56
18	07:44 16:14-16:48/34 17:23	07:14 17:03-17:08/5 18:01	06:31 18:32	06:41 07:26-08:37/71 20:04	06:04 20:35	05:52 20:56
19	07:43 16:14-16:48/34 17:24	07:13 18:02 18:33	06:30 18:33	06:40 07:27-08:37/70 20:06	06:03 20:36	05:52 20:57
20	07:43 16:15-16:49/34 17:25	07:12 18:03 18:34	06:28 18:34	06:38 07:26-08:36/70 20:07	06:03 20:37	05:52 20:57
21	07:42 16:16-16:49/33 17:26	07:10 18:04 18:35	06:26 18:35	06:37 07:27-08:35/68 20:08	06:02 20:38	05:52 20:57
22	07:42 16:16-16:50/34 17:28	07:09 18:05 18:36	06:25 07:04-07:17/13 18:36	06:35 07:26-08:34/68 20:09	06:01 20:39	05:52 20:57
23	07:41 16:17-16:55/38 17:29	07:07 18:06 18:37	06:23 06:59-07:23/24 18:37	06:34 07:27-08:34/67 20:10	06:00 20:40	05:52 20:58
24	07:40 16:18-16:57/39 17:30	07:06 18:08 18:38	06:22 06:54-07:26/32 18:38	06:33 07:27-08:32/65 20:11	05:59 20:41	05:53 20:58
25	07:40 16:18-16:59/41 17:31	07:04 18:09 18:39	06:20 06:51-07:28/37 18:39	06:31 07:28-08:32/64 20:12	05:59 20:41	05:53 20:58
26	07:39 16:19-17:00/41 17:32	07:03 18:10 18:40	06:18 06:49-07:31/42 18:40	06:30 07:28-08:31/63 20:13	05:58 20:42	05:53 20:58
27	07:38 16:20-17:01/41 17:34	07:01 18:11 18:42	06:17 06:46-07:32/46 18:42	06:28 07:28-08:29/61 20:14	05:57 20:43	05:54 20:58
28	07:37 16:22-17:04/42 17:35	07:00 18:12 18:43	06:15 06:44-07:34/50 18:43	06:27 07:29-08:29/60 20:15	05:57 20:44	05:54 20:58
29	07:37 16:24-17:06/42 17:36		07:13 07:42-08:35/53 19:44	06:26 07:30-08:28/58 20:16	05:56 20:45	05:54 20:58
30	07:36 16:26-17:08/42 17:37		07:12 07:40-08:36/56 19:45	06:24 07:31-08:27/56 20:17	05:56 20:46	05:55 20:58
31	07:35 16:29-17:09/40 17:39		07:10 07:38-08:37/59 19:46		05:55 20:46	
Potential sun hours	299	298	370	398	447	451
Sum of minutes with flicker	1000	527	412	2008	462	0

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

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

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T12 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (40) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	July	August	September	October	November	December
1	05:55 20:58	06:19 07:59-08:16/17 20:39	06:49 07:28-08:39/71 19:57	07:18 19:07	06:52 16:14-16:47/33 17:21	07:26 15:54-16:23/29 16:57
2	05:56 20:58	06:20 07:56-08:20/24 20:38	06:50 07:28-08:39/71 19:55	07:20 19:05	06:53 16:14-16:48/34 17:20	07:28 15:55-16:22/27 16:57
3	05:56 20:58	06:21 07:53-08:22/29 20:37	06:51 07:28-08:38/70 19:54	07:21 19:03	06:54 16:12-16:47/35 17:18	07:29 15:55-16:22/27 16:56
4	05:57 20:57	06:22 07:51-08:24/33 20:36	06:52 07:28-08:38/70 19:52	07:22 19:02	06:56 16:12-16:47/35 17:17	07:30 15:56-16:22/26 16:56
5	05:57 20:57	06:23 07:49-08:26/37 20:35	06:53 07:27-08:36/69 19:50	07:23 19:00	06:57 16:11-16:46/35 17:16	07:30 15:57-16:22/25 16:56
6	05:58 20:57	06:24 07:47-08:27/40 20:34	06:54 07:27-08:35/68 19:49	07:24 18:59	06:58 16:11-16:47/36 17:15	07:31 15:58-16:22/24 16:56
7	05:59 20:57	06:25 07:45-08:28/43 20:32	06:55 07:28-08:35/67 19:47	07:25 18:57	06:59 16:06-16:46/40 17:14	07:32 15:58-16:22/24 16:56
8	05:59 20:56	06:26 07:44-08:30/46 20:31	06:56 07:28-08:34/66 19:45	07:26 18:55	07:00 16:03-16:44/41 17:13	07:33 15:59-16:22/23 16:56
9	06:00 20:56	06:27 07:43-08:31/48 20:30	06:57 07:28-08:33/65 19:44	07:27 18:54	07:01 16:01-16:43/42 17:12	07:34 16:00-16:22/22 16:56
10	06:01 20:56	06:28 07:41-08:32/51 20:29	06:58 07:29-08:32/63 19:42	07:28 18:52	07:03 16:01-16:42/41 17:11	07:35 16:01-16:23/22 16:56
11	06:01 20:55	06:29 07:40-08:33/53 20:27	06:59 07:30-08:30/60 19:40	07:29 18:51	07:04 15:59-16:40/41 17:10	07:36 16:01-16:22/21 16:56
12	06:02 20:55	06:30 07:39-08:34/55 20:26	07:00 07:30-08:29/59 19:39	07:30 18:49	07:05 15:57-16:39/42 17:09	07:37 15:55-16:22/27 16:56
13	06:03 20:54	06:30 07:38-08:35/57 20:25	07:01 07:31-08:28/57 19:37	07:31 18:47	07:06 15:56-16:37/41 17:08	07:38 15:55-16:23/28 16:56
14	06:03 20:54	06:31 07:37-08:36/59 20:24	07:02 07:32-08:26/54 19:35	07:32 18:46	07:07 15:54-16:36/42 17:07	07:38 15:55-16:23/28 16:56
15	06:04 20:53	06:32 07:37-08:37/60 20:22	07:03 07:33-08:24/51 19:34	07:33 18:44	07:09 15:53-16:34/41 17:06	07:39 15:54-16:22/28 16:57
16	06:05 20:53	06:33 07:36-08:37/61 20:21	07:04 07:35-08:22/47 19:32	07:34 18:43	07:10 15:52-16:33/41 17:05	07:40 15:55-16:23/28 16:57
17	06:06 20:52	06:34 07:35-08:38/63 20:19	07:05 07:36-08:20/44 19:30	07:35 18:41	07:11 15:52-16:32/40 17:04	07:40 15:55-16:24/29 16:57
18	06:06 20:51	06:35 07:34-08:39/65 20:18	07:06 07:38-08:17/39 19:29	07:36 18:40	07:12 15:52-16:31/39 17:04	07:41 15:55-16:23/28 16:57
19	06:07 20:51	06:36 07:33-08:39/66 20:17	07:07 07:41-08:14/33 19:27	07:37 18:38	07:13 15:51-16:29/38 17:03	07:42 15:56-16:24/28 16:58
20	06:08 20:50	06:37 07:33-08:40/67 20:15	07:08 07:44-08:10/26 19:25	07:38 18:37	07:14 15:51-16:25/34 17:02	07:42 15:55-16:24/29 16:58
21	06:09 20:49	06:38 07:31-08:39/68 20:14	07:09 07:48-08:05/17 19:24	07:40 18:35	07:16 15:51-16:24/33 17:02	07:43 15:56-16:25/29 16:59
22	06:10 20:49	06:39 07:31-08:39/68 20:12	07:10 19:22	07:41 18:34	07:17 15:51-16:25/34 17:01	07:43 15:56-16:25/29 16:59
23	06:11 20:48	06:40 07:30-08:40/70 20:11	07:11 19:20	07:42 18:33	07:18 15:51-16:25/34 17:00	07:44 15:57-16:26/29 17:00
24	06:12 20:47	06:41 07:30-08:40/70 20:09	07:12 19:18	07:43 17:32-17:40/8 18:31	07:19 15:51-16:25/34 17:00	07:44 15:58-16:26/28 17:00
25	06:12 20:46	06:42 07:29-08:40/71 20:08	07:12 19:17	06:44 16:29-16:43/14 17:30	07:20 15:51-16:25/34 16:59	07:45 15:59-16:27/28 17:01
26	06:13 20:45	06:43 07:29-08:40/71 20:06	07:13 19:15	06:45 16:27-16:44/17 17:28	07:21 15:51-16:24/33 16:59	07:45 15:59-16:27/28 17:01
27	06:14 20:44	06:44 07:29-08:40/71 20:05	07:14 19:13	06:46 16:25-16:45/20 17:27	07:22 15:52-16:24/32 16:58	07:45 16:00-16:28/28 17:02
28	06:15 20:43	06:45 07:28-08:40/72 20:03	07:15 19:12	06:47 16:24-16:46/22 17:26	07:23 15:53-16:24/31 16:58	07:46 16:00-16:28/28 17:03
29	06:16 20:42	06:46 07:28-08:40/72 20:01	07:16 19:10	06:49 16:23-16:47/24 17:24	07:24 15:53-16:24/31 16:57	07:46 16:02-16:30/28 17:03
30	06:17 20:41	06:47 07:28-08:40/72 20:00	07:17 19:08	06:50 16:19-16:47/28 17:23	07:25 15:54-16:24/30 16:57	07:46 16:03-16:30/27 17:04
31	06:18 20:40	08:04-08:11/7 19:58	06:48 07:28-08:39/71 19:58	07:17 17:22	06:51 16:16-16:47/31 17:22	07:47 16:04-16:31/27 17:05
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	7	1750	1167	164	1097	836

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

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

Project:

Progetto_Ala Dei Sardi

Licensed user:

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

Via Santa Margherita 4

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+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 16:52/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T13 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (41) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	18:20-18:53/33 20:18	06:23 20:47	05:55 20:58	05:55 20:39	06:19 19:57	06:49 19:07	07:19 19:07	17:59-18:42/43 17:21	06:52 16:57
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	18:22-18:50/28 20:19	06:22 20:48	05:54 20:58	05:56 20:38	06:20 19:55	06:50 19:05	07:20 19:05	18:00-18:40/40 17:20	06:53 16:57
3	07:47 17:08	07:32 17:42	06:55 18:16	07:05 19:49	18:23-18:48/25 20:20	06:21 20:49	05:54 20:58	05:56 20:37	06:21 19:54	06:51 19:04	07:21 19:04	18:01-18:39/38 17:18	06:54 16:56
4	07:47 17:09	07:31 17:44	06:54 18:17	07:03 19:50	18:27-18:45/18 20:21	06:19 20:49	05:54 20:58	05:57 20:36	06:22 19:52	06:52 19:02	07:22 19:02	18:02-18:37/35 17:17	06:56 16:56
5	07:47 17:10	07:30 17:45	06:52 18:18	07:02 19:51	18:32-18:39/7 20:22	06:18 20:50	05:53 20:57	05:57 20:35	06:23 19:50	06:53 19:00	07:23 19:00	18:04-18:36/32 17:16	06:57 16:56
6	07:47 17:10	07:29 17:46	06:51 18:19	07:00 19:52	17:34-17:54/20 20:23	07:00 20:23	05:51 20:57	05:58 20:34	06:24 19:49	06:54 18:59	07:24 18:59	18:06-18:34/28 17:15	06:58 16:56
7	07:47 17:11	07:28 17:47	06:49 18:20	06:59 19:53	17:30-17:56/26 20:24	06:59 20:24	05:53 20:57	05:59 20:33	06:25 19:47	06:55 18:57	18:27-18:33/6 18:57	18:08-18:31/23 17:14	06:59 16:56
8	07:47 17:12	07:27 17:48	06:48 18:21	06:57 19:54	17:27-17:58/31 20:25	06:57 20:25	05:52 20:56	05:59 20:31	06:26 19:45	06:56 18:21	18:21-18:39/18 18:55	18:11-18:27/16 17:13	07:00 16:56
9	07:47 17:13	07:26 17:50	06:46 18:22	06:55 19:55	17:26-18:00/34 20:26	06:55 20:26	05:52 20:56	06:00 20:30	06:27 19:44	06:57 18:18	18:18-41/23 18:54	07:27 17:12	07:02 16:56
10	07:47 17:14	07:24 17:51	06:44 18:23	06:54 19:56	17:24-18:01/37 20:27	06:54 20:27	05:52 20:53	06:01 20:29	06:28 19:42	06:58 18:15	18:15-18:43/28 18:52	07:28 17:11	07:03 16:56
11	07:46 17:15	07:23 17:52	06:43 18:25	06:52 19:57	17:22-18:01/39 20:28	06:52 20:28	05:52 20:53	06:01 20:28	06:29 19:40	06:59 18:13	18:13-18:45/32 18:51	07:29 17:10	07:04 16:56
12	07:46 17:16	07:22 17:53	06:41 18:26	06:51 19:58	17:21-18:03/42 20:29	06:51 20:29	05:52 20:54	06:02 20:26	06:30 19:39	07:00 18:11	18:11-18:46/35 18:49	07:30 17:09	07:05 16:56
13	07:46 17:18	07:21 17:55	06:40 18:27	06:49 19:59	17:20-18:03/43 20:30	06:49 20:30	05:52 20:54	06:03 20:25	06:31 19:37	07:01 18:09	18:09-18:47/38 18:47	07:31 17:08	07:06 16:56
14	07:46 17:19	07:19 17:56	06:38 18:28	06:48 20:00	17:19-18:04/45 20:31	06:48 20:31	05:52 20:55	06:03 20:24	06:32 19:35	07:02 18:08	18:08-18:48/40 18:46	07:32 17:07	07:07 16:56
15	07:45 17:20	07:18 17:57	06:36 18:29	06:46 20:01	17:18-18:04/46 20:32	06:46 20:32	05:52 20:55	06:04 20:22	06:33 19:34	07:03 18:06	18:06-18:49/43 18:44	07:33 17:06	07:09 16:57
16	07:45 17:21	07:17 17:58	06:35 18:30	06:44 20:02	17:17-18:04/47 20:33	06:44 20:33	05:52 20:56	06:05 20:21	06:34 19:32	07:04 18:05	18:05-18:49/44 18:43	07:34 17:05	07:10 16:57
17	07:44 17:22	07:16 17:59	06:33 18:31	06:43 20:04	17:17-18:05/48 20:34	06:43 20:34	05:52 20:56	06:06 20:22	06:34 19:30	07:05 18:04	18:04-18:49/45 18:41	07:35 17:05	07:11 16:57
18	07:44 17:23	07:14 18:01	06:31 18:32	06:41 20:05	17:16-18:05/49 20:35	06:41 20:35	05:52 20:56	06:07 20:21	06:35 19:29	07:06 18:03	18:03-18:50/47 18:40	07:36 17:04	07:12 16:57
19	07:43 17:24	07:13 18:02	06:30 18:33	06:40 20:06	17:15-18:04/49 20:36	06:40 20:36	05:52 20:57	06:07 20:17	06:36 19:27	07:07 18:02	18:02-18:50/48 18:38	07:37 17:03	07:13 16:58
20	07:43 17:25	07:12 18:03	06:28 18:34	06:38 20:07	17:16-18:05/49 20:37	06:38 20:37	05:52 20:57	06:08 20:15	06:37 19:25	07:08 18:02	18:02-18:50/48 18:37	07:39 17:02	07:14 16:58
21	07:42 17:27	07:10 18:04	06:27 18:35	06:37 20:08	17:15-18:04/49 20:38	06:37 20:38	05:52 20:57	06:09 20:14	06:38 19:24	07:09 18:01	18:01-18:50/49 18:35	07:40 17:02	07:16 16:59
22	07:42 17:28	07:09 18:05	06:25 18:36	06:36 20:09	17:15-18:03/48 20:39	06:36 20:39	05:52 20:57	06:10 20:12	06:39 19:22	07:10 18:00	18:00-18:49/49 18:34	07:41 17:01	07:17 16:59
23	07:41 17:29	07:07 18:06	06:23 18:37	06:34 20:10	17:15-18:03/48 20:40	06:34 20:40	05:53 20:58	06:11 20:11	06:40 19:20	07:11 17:59	17:59-18:48/49 18:33	07:42 17:00	07:18 16:59
24	07:40 17:30	07:06 18:08	06:22 18:38	06:33 20:11	17:15-18:03/48 20:41	06:33 20:41	05:53 20:58	06:12 20:11	06:41 19:19	07:12 17:59	17:59-18:48/49 18:31	07:43 17:00	07:19 16:59
25	07:40 17:31	07:04 18:09	06:20 18:40	06:31 20:12	17:15-18:01/46 20:42	06:31 20:42	05:53 20:58	06:13 20:11	06:42 19:17	07:13 17:58	17:58-18:47/49 18:30	07:44 16:59	07:20 17:01
26	07:39 17:33	07:03 18:10	06:18 18:41	06:30 20:13	17:16-18:01/45 20:43	06:30 20:43	05:53 20:58	06:13 20:11	06:43 19:15	07:14 17:58	17:58-18:47/49 18:29	07:45 16:59	07:21 17:01
27	07:38 17:34	07:02 18:11	06:17 18:42	06:29 20:14	17:16-18:00/44 20:44	06:29 20:44	05:53 20:58	06:14 20:11	06:44 19:14	07:15 17:58	17:58-18:46/48 18:28	07:46 16:58	07:22 17:02
28	07:37 17:35	07:00 18:12	06:15 18:43	06:27 20:15	17:16-17:58/42 20:45	06:27 20:45	05:54 20:58	06:15 20:12	06:45 19:12	07:16 17:58	17:58-18:45/47 18:27	07:47 16:58	07:23 17:03
29	07:37 17:36	07:00 18:12	06:15 18:43	06:27 20:15	17:16-17:58/42 20:45	06:27 20:45	05:54 20:58	06:15 20:12	06:45 19:12	07:16 17:58	17:58-18:45/47 18:27	07:47 16:58	07:23 17:03
30	07:36 17:37	07:00 18:12	06:15 18:43	06:27 20:15	17:16-17:58/42 20:45	06:27 20:45	05:54 20:58	06:15 20:12	06:45 19:12	07:16 17:58	17:58-18:45/47 18:27	07:47 16:58	07:23 17:03
31	07:35 17:39	07:00 18:12	06:15 18:43	06:27 20:15	17:16-17:58/42 20:45	06:27 20:45	05:54 20:58	06:15 20:12	06:45 19:12	07:16 17:58	17:58-18:45/47 18:27	07:47 16:58	07:23 17:03
	Potential sun hours	299	298	370	398	447	451	458	427	375	346	255	289
	Sum of minutes with flicker	0	0	1100	111	0	0	0	0	973	346	255	0

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

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

Project:

Progetto_Ala Dei Sardi

Licensed user:

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

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 16:52/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T14 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (42) Sunshine probability S (Average daily sunshine hours) [OLBIA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	18:26-18:44/18	06:52 17:21	07:27 16:57
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	06:22 20:19	05:54 20:48	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	18:26-18:42/16	06:53 17:20	07:28 16:57
3	07:47 17:08	07:32 17:42	06:56 18:16	07:05 19:49	06:21 20:20	05:54 20:49	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:04	18:26-18:41/15	06:55 17:18	07:29 16:56
4	07:47 17:09	07:31 17:44	06:54 18:17	07:04 19:50	06:19 20:21	05:54 20:49	05:57 20:58	06:22 20:36	06:52 19:52	07:22 19:02	18:27-18:39/12	06:56 17:17	07:30 16:56
5	07:47 17:10	07:30 17:45	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:50	05:58 20:57	06:23 20:35	06:53 19:50	07:23 19:00	18:29-18:38/9	06:57 17:16	07:31 16:56
6	07:47 17:10	07:29 17:46	06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:51	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	18:30-18:36/6	06:58 17:15	07:32 16:56
7	07:47 17:11	07:28 17:47	06:49 18:20	17:55-17:59/4	06:59 19:53	06:16 20:24	05:53 20:51	05:59 20:57	06:25 20:33	06:55 19:47	18:33-18:35/2	06:59 17:14	07:32 16:56
8	07:47 17:12	07:27 17:49	06:48 18:21	17:52-18:00/8	06:57 19:54	06:15 20:25	05:52 20:52	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55	07:00 17:13	07:33 16:56
9	07:47 17:13	07:26 17:50	06:46 18:22	17:51-18:02/11	06:55 19:55	06:14 20:26	05:52 20:52	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	07:02 17:12	07:34 16:56
10	07:47 17:14	07:24 17:51	06:45 18:24	17:49-18:02/13	06:54 19:56	06:12 20:27	05:52 20:53	06:01 20:56	06:28 20:29	06:58 19:42	07:28 18:52	07:03 17:11	07:35 16:56
11	07:47 17:15	07:23 17:52	06:43 18:25	17:48-18:03/15	06:52 19:57	06:11 20:28	05:52 20:54	06:01 20:55	06:29 20:28	06:59 19:40	07:29 18:51	07:04 17:10	07:36 16:56
12	07:46 17:17	07:22 17:53	06:41 18:26	17:48-18:05/17	06:51 19:58	06:10 20:29	05:52 20:54	06:02 20:55	06:20 20:26	07:00 19:39	07:30 18:49	07:05 17:09	07:37 16:56
13	07:46 17:18	07:21 17:55	06:40 18:27	17:47-18:06/19	06:49 19:59	06:09 20:30	05:52 20:55	06:03 20:54	06:31 20:25	07:01 19:37	07:31 18:48	07:06 17:08	07:38 16:56
14	07:46 17:19	07:20 17:56	06:38 18:28	17:47-18:07/20	06:48 20:00	06:08 20:31	05:52 20:55	06:03 20:54	06:32 20:24	07:02 19:35	07:32 18:46	07:07 17:07	07:38 16:56
15	07:45 17:20	07:18 17:57	06:36 18:29	17:47-18:08/21	06:46 20:01	06:07 20:32	05:52 20:55	06:04 20:53	06:33 20:22	07:03 19:34	07:33 18:44	07:09 17:06	07:39 16:57
16	07:45 17:21	07:17 17:58	06:35 18:30	17:46-18:09/23	06:45 20:02	06:06 20:33	05:52 20:56	06:05 20:53	06:34 20:21	07:04 19:32	07:34 18:43	07:10 17:05	07:40 16:57
17	07:44 17:22	07:16 17:59	06:33 18:31	17:47-18:09/22	06:43 20:04	06:05 20:34	05:52 20:56	06:06 20:52	06:35 20:19	07:05 19:30	07:35 18:41	07:11 17:05	07:40 16:57
18	07:44 17:23	07:14 18:01	06:32 18:32	17:48-18:08/20	06:42 20:05	06:04 20:35	05:52 20:56	06:07 20:52	06:36 20:18	07:06 19:29	07:36 18:40	07:12 17:04	07:41 16:58
19	07:44 17:24	07:13 18:02	06:30 18:33	17:48-18:06/18	06:40 20:06	06:04 20:36	05:52 20:57	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	07:13 17:03	07:42 16:58
20	07:43 17:25	07:12 18:03	06:28 18:34	17:51-18:04/13	06:39 20:07	06:03 20:37	05:52 20:57	06:08 20:50	06:37 20:15	07:08 19:25	07:39 18:37	07:14 17:02	07:42 16:58
21	07:42 17:27	07:10 18:04	06:27 18:35	17:53-18:00/7	06:37 20:08	06:02 20:38	05:52 20:57	06:09 20:49	06:38 20:14	07:09 19:24	07:40 18:36	07:16 17:02	07:43 16:59
22	07:42 17:28	07:09 18:05	06:25 18:36	06:36 20:09	06:01 20:39	05:52 20:58	06:10 20:49	06:39 20:12	07:10 19:22	18:41-18:44/3	07:41 18:34	07:17 17:01	07:43 16:59
23	07:41 17:29	07:07 18:07	06:23 18:37	06:34 20:10	06:00 20:40	05:53 20:58	06:11 20:48	06:40 20:11	07:11 19:20	18:35-18:47/12	07:42 18:33	07:18 17:00	07:44 17:00
24	07:40 17:30	07:06 18:08	06:22 18:38	06:33 20:11	06:00 20:41	05:53 20:58	06:12 20:47	06:41 20:09	07:12 19:19	18:32-18:49/17	07:43 18:31	07:19 17:00	07:44 17:00
25	07:40 17:31	07:04 18:09	06:20 18:40	06:31 20:12	05:59 20:41	05:53 20:58	06:13 20:46	06:42 20:08	07:13 19:17	18:31-18:50/19	06:44 17:30	07:20 16:59	07:45 17:01
26	07:39 17:33	07:03 18:10	06:18 18:41	06:30 20:13	05:58 20:42	05:53 20:58	06:13 20:45	06:43 20:06	07:14 19:15	18:29-18:50/21	06:45 17:29	07:21 16:59	07:45 17:01
27	07:38 17:34	07:02 18:11	06:17 18:42	06:29 20:14	05:58 20:43	05:54 20:58	06:14 20:44	06:44 20:05	07:15 19:14	18:28-18:51/23	06:46 17:27	07:22 16:58	07:46 17:02
28	07:37 17:35	07:00 18:12	06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:58	06:15 20:43	06:45 20:03	07:16 19:12	18:27-18:49/22	06:48 17:26	07:23 16:58	07:46 17:03
29	07:37 17:36	07:00 19:44	06:15 19:44	06:27 20:16	05:57 20:45	05:54 20:58	06:15 20:42	06:45 20:02	07:16 19:10	18:27-18:47/20	06:48 17:25	07:24 16:58	07:46 17:04
30	07:36 17:37	07:00 19:45	06:15 19:45	06:27 20:17	05:57 20:46	05:54 20:58	06:15 20:41	06:45 20:00	07:16 19:09	18:26-18:46/20	06:48 17:23	07:25 16:57	07:46 17:04
31	07:35 17:39	07:00 19:46	06:15 19:46	06:27 20:46	05:57 20:46	05:54 20:58	06:15 20:40	06:45 19:58	07:16 17:22	18:27-18:47/20	06:48 17:22	07:25 17:05	07:46 17:05
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289	
Sum of minutes with flicker	0	0	231	0	0	0	0	0	157	78	0	0	

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

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

Project:

Progetto_Ala Dei Sardi

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Calculated:
10/11/2023 16:52/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20231109WTG: T15 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (43)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [OLBIA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,87 4,61 5,62 6,73 8,36 10,04 11,06 9,91 8,03 6,21 4,80 3,87

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
357 453 363 393 516 335 617 408 584 2.307 719 194 7.246

Table with columns for months (January to December) and rows for each day (1-31) showing sunrise, sunset, and shadow flicker times.

Potential sun hours 299 298 370 398 447 451 458 427 375 346 315 299 1385 289
Sum of minutes with flicker 1262 794 0 0 447 0 0 0 0 0 315 1385 854

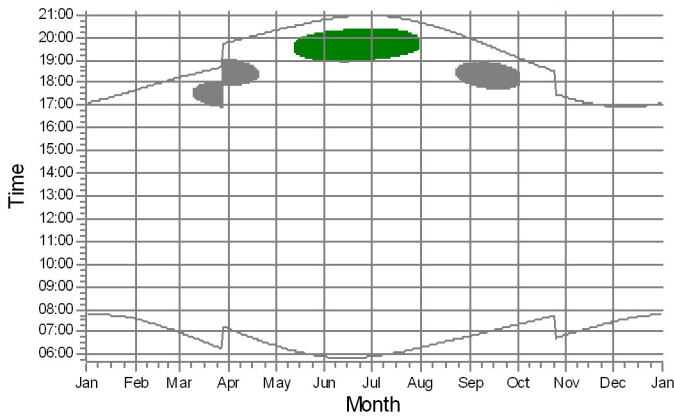
Table layout: For each day in each month the following matrix apply

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

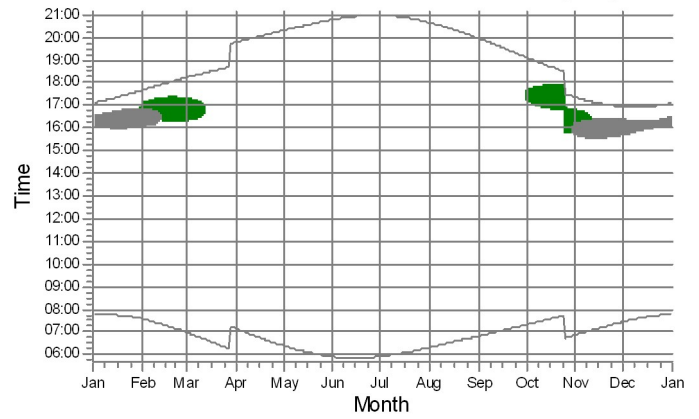
SHADOW - Calendar per WTG, graphical

Calculation: Real_case_Progetto_20231109

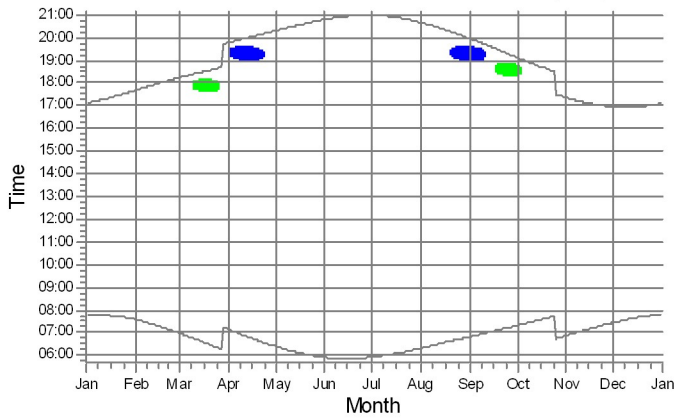
T01: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



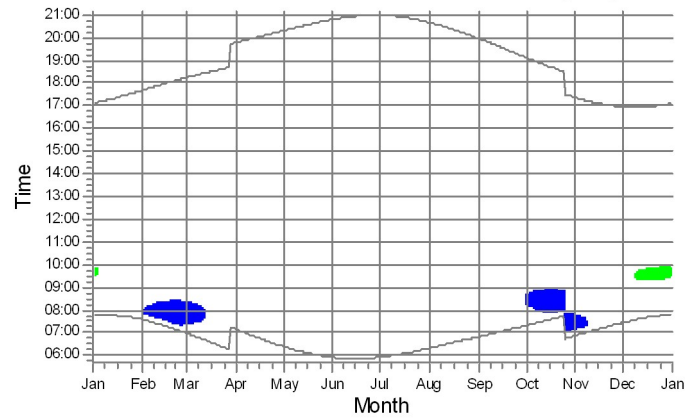
T02: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



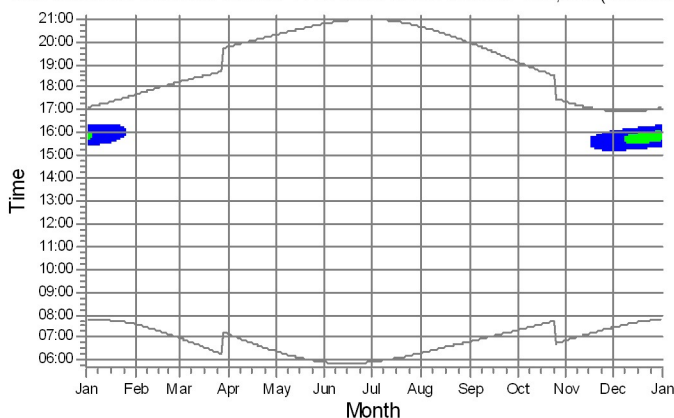
T03: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



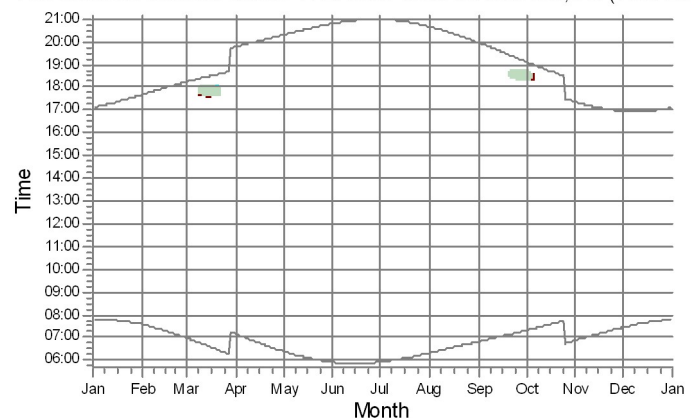
T04: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22








T05: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



T06: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



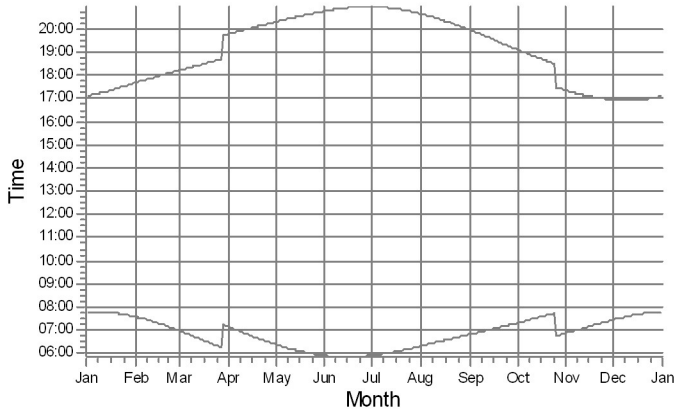
Shadow receptors

	F008: A04		F173: A04		F295: A04 - C02		F353: A04
	F167: A04-C02		F292: A03 - C02		F351: A03 - C02		

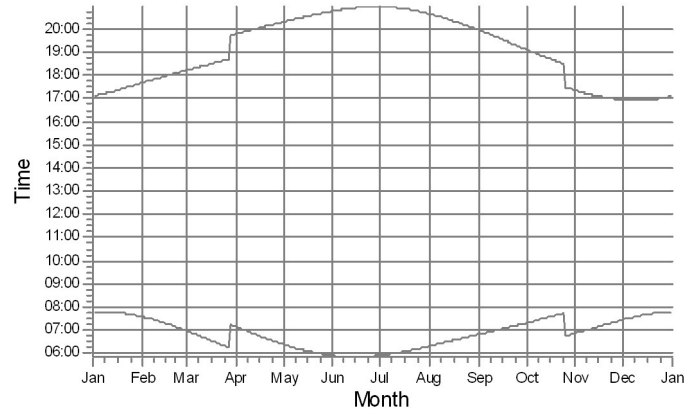
SHADOW - Calendar per WTG, graphical

Calculation: Real_case_Progetto_20231109

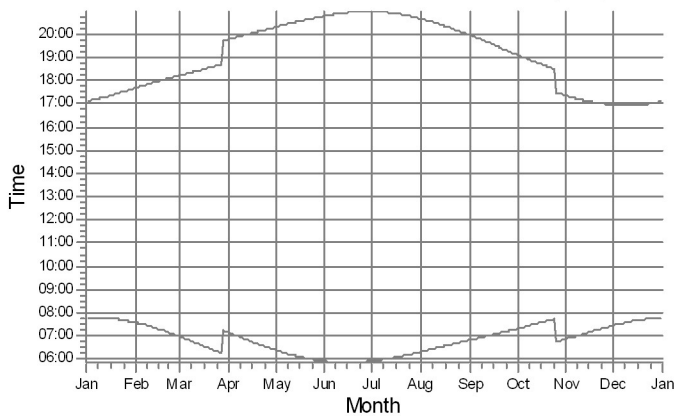
T07: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



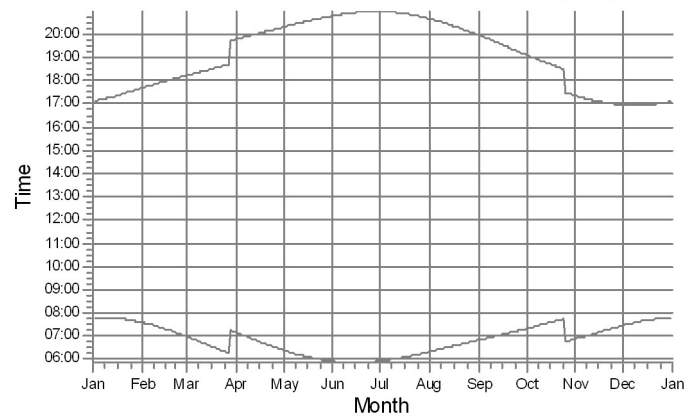
T08: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



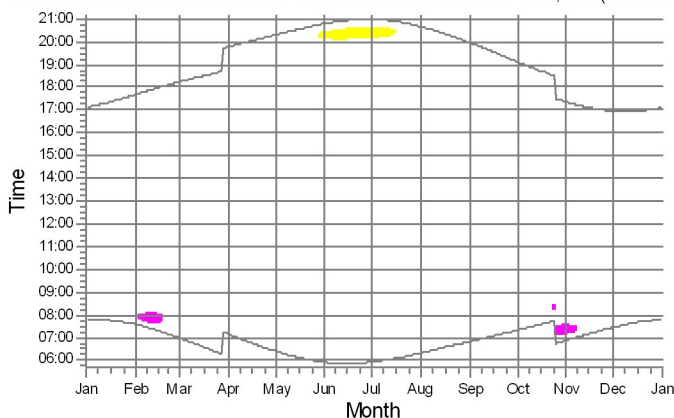
T09: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



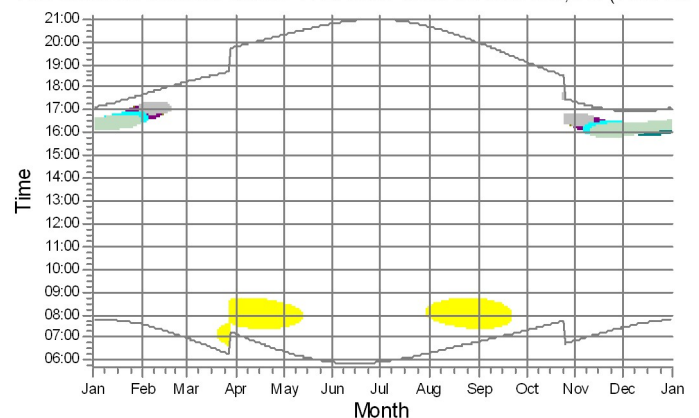
T10: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22













T11: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



T12: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



Shadow receptors

 F060: A04	 F287: A04 - C02	 F315: A04	 F353: A04
 F215: A03	 F292: A03 - C02	 F322: A04	
 F279: A04	 F313: Pascolo	 F351: A03 - C02	

Project:

Progetto_Ala Dei Sardi

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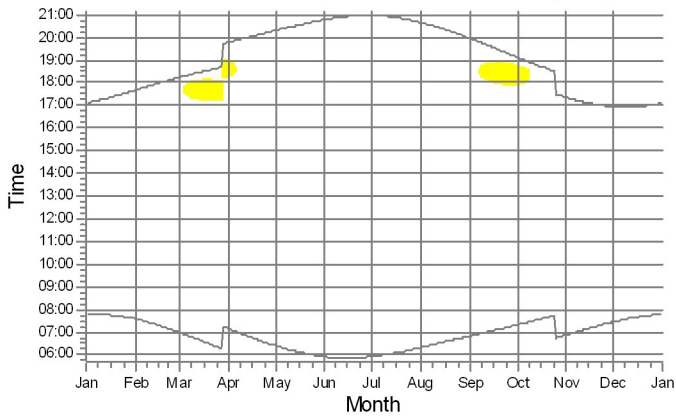
Calculated:

10/11/2023 16:52/3.4.415

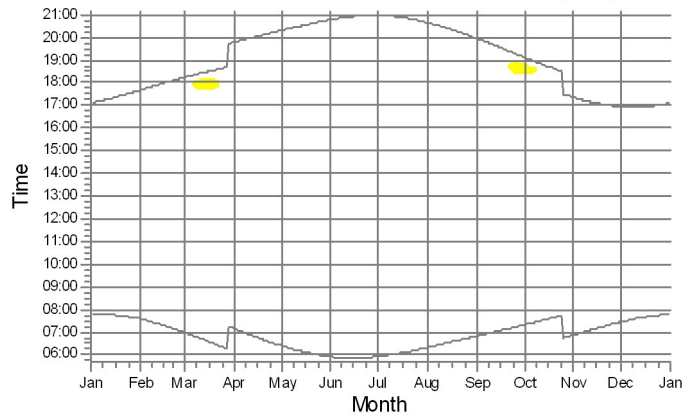
SHADOW - Calendar per WTG, graphical

Calculation: Real_case_Progetto_20231109

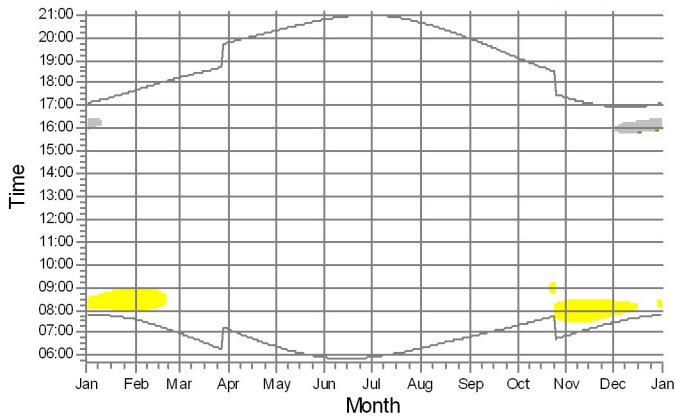
T13: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



T14: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



T15: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



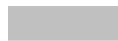
Shadow receptors



F060: A04



F313: Pascolo



F322: A04

SHADOW - Main Result

Calculation: Progetto_20231109

Assumptions for shadow calculations

Maximum distance for influence

Calculate only when more than 20 % of sun is covered by the blade

Please look in WTG table

Minimum sun height over horizon for influence 3 °

Day step for calculation 1 days

Time step for calculation 1 minutes

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

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

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

The WTG is always operating

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

Height contours used: Height Contours: CONTOURLINE_Progetto_Ala Dei Sardi

Obstacles used in calculation

Eye height for map: 1,5 m

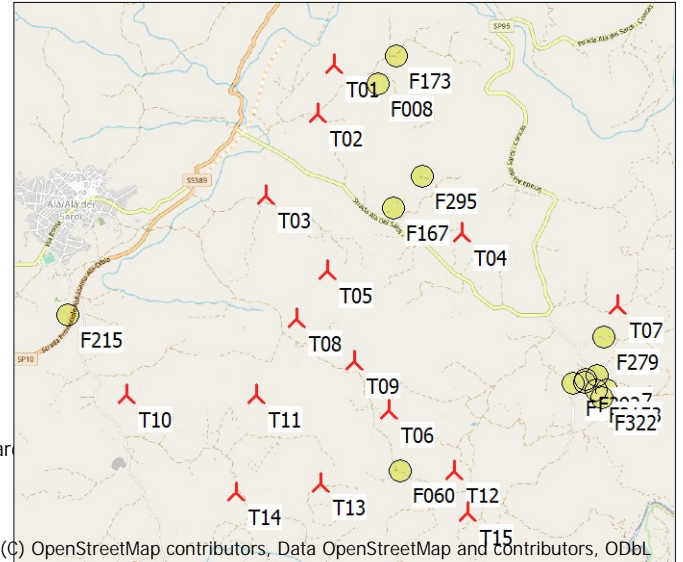
Grid resolution: 1,0 m

All coordinates are in

Italian Gauss-Boaga west-ROMA40 (IT-peninsular $\pm 4m$)

WTGs

	Easting	Northing	Z	Row data/Description	WTG type		Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.					Calculation distance [m]	RPM [RPM]
			[m]									
T01	1.530.355	4.501.422	581,4	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T02	1.530.193	4.500.934	600,0	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T03	1.529.675	4.500.123	636,1	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T04	1.531.633	4.499.755	581,5	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T05	1.530.299	4.499.380	631,3	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T06	1.530.914	4.498.012	670,0	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T07	1.533.179	4.499.051	574,2	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T08	1.529.990	4.498.909	665,0	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T09	1.530.566	4.498.492	658,0	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T10	1.528.308	4.498.143	660,0	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T11	1.529.591	4.498.159	677,8	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T12	1.531.561	4.497.409	661,9	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T13	1.530.240	4.497.283	662,4	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T14	1.529.395	4.497.181	660,0	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8
T15	1.531.703	4.496.989	650,0	Siemens Gamesa SG ...Yes	Yes	Siemens Gamesa	SG 6.6-172!!-6.600	6.600	172,0	135,0	2.040	8,8



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

Scale 1:75.000

New WTG

Shadow receptor

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]
F008	A04	1.530.796	4.501.224	583,6	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F060	A04	1.531.024	4.497.401	661,8	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F167	A04-C02	1.530.950	4.500.002	616,2	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F173	A04	1.530.982	4.501.501	560,0	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F215	A03	1.527.716	4.498.938	660,0	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F279	A04	1.533.053	4.498.732	582,2	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F287	A04 - C02	1.532.980	4.498.360	572,7	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F292	A03 - C02	1.532.867	4.498.320	580,8	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F295	A04 - C02	1.531.234	4.500.318	590,0	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F313	Pascolo	1.533.080	4.498.211	585,6	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F315	A04	1.532.977	4.498.215	583,4	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F322	A04	1.533.034	4.498.131	598,6	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F351	A03 - C02	1.532.859	4.498.282	584,9	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F353	A04	1.532.751	4.498.278	596,4	1,2	1,4	1,2	90,0	"Green house mode"	2,6

Project:

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Calculated:

10/11/2023 15:28/3.4.415

SHADOW - Main Result

Calculation: Progetto_20231109

Calculation Results

Shadow receptor

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]
		Shadow hours per year [h/year]	Shadow days per year [days/year]	
F008	A04	144:54	161	1:17
F060	A04	217:14	295	1:35
F167	A04-C02	112:32	191	0:55
F173	A04	116:05	186	1:01
F215	A03	6:18	29	0:19
F279	A04	3:50	22	0:13
F287	A04 - C02	16:29	54	0:24
F292	A03 - C02	27:43	90	0:26
F295	A04 - C02	26:12	57	0:46
F313	Pascolo	17:37	65	0:24
F315	A04	13:53	42	0:26
F322	A04	22:56	76	0:25
F351	A03 - C02	26:28	84	0:27
F353	A04	38:17	109	0:29

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

No.	Name	Worst case [h/year]
T01	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (29)	145:42
T02	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (30)	110:49
T03	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (31)	27:52
T04	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (32)	57:53
T05	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (33)	46:28
T06	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (34)	8:38
T07	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (35)	0:00
T08	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (36)	0:00
T09	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (37)	0:00
T10	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (38)	0:00
T11	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (39)	18:58
T12	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (40)	157:10
T13	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (41)	40:39
T14	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (42)	7:46
T15	Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (43)	76:50

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

SHADOW - Calendar

Calculation: Progetto_20231109Shadow receptor: F008 - A04

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June						
1	07:47	07:34	16:41 (T02)	06:59	16:22 (T02)	07:08	06:23	05:55	19:01 (T01)			
	17:06	17:40	17	16:58 (T02)	18:13	54	17:16 (T02)	19:47	20:18	69	20:10 (T01)	
2	07:47	07:33	16:38 (T02)	06:57	16:24 (T02)	07:07	06:22	05:54	19:01 (T01)			
	17:07	17:41	23	17:01 (T02)	18:14	52	17:16 (T02)	19:48	20:19	70	20:11 (T01)	
3	07:47	07:32	16:36 (T02)	06:55	16:24 (T02)	07:05	06:21	05:54	19:00 (T01)			
	17:08	17:42	28	17:04 (T02)	18:16	51	17:15 (T02)	19:49	20:20	71	20:11 (T01)	
4	07:47	07:31	16:34 (T02)	06:54	16:25 (T02)	07:03	06:19	05:53	19:00 (T01)			
	17:08	17:43	32	17:06 (T02)	18:17	49	17:14 (T02)	19:50	20:21	72	20:12 (T01)	
5	07:47	07:30	16:32 (T02)	06:52	16:26 (T02)	07:02	06:18	05:53	19:00 (T01)			
	17:09	17:45	36	17:08 (T02)	18:18	46	17:12 (T02)	19:51	20:22	73	20:13 (T01)	
6	07:47	07:29	16:31 (T02)	06:51	16:28 (T02)	07:00	06:17	05:53	19:00 (T01)			
	17:10	17:46	39	17:10 (T02)	18:19	44	17:12 (T02)	19:52	20:23	72	20:12 (T01)	
7	07:47	07:28	16:29 (T02)	06:49	16:28 (T02)	06:59	06:16	05:52	19:00 (T01)			
	17:11	17:47	41	17:10 (T02)	18:20	42	17:10 (T02)	19:53	20:24	73	20:13 (T01)	
8	07:47	07:27	16:28 (T02)	06:48	16:29 (T02)	06:57	06:15	05:52	19:00 (T01)			
	17:12	17:48	44	17:12 (T02)	18:21	39	17:08 (T02)	19:54	20:25	74	20:14 (T01)	
9	07:47	07:26	16:27 (T02)	06:46	16:32 (T02)	06:55	06:13	05:52	19:00 (T01)			
	17:13	17:50	46	17:13 (T02)	18:22	34	17:06 (T02)	19:55	20:26	74	20:14 (T01)	
10	07:47	07:24	16:26 (T02)	06:44	16:34 (T02)	06:54	06:12	05:52	19:00 (T01)			
	17:14	17:51	49	17:15 (T02)	18:23	29	17:03 (T02)	19:56	20:27	75	20:15 (T01)	
11	07:47	07:23	16:26 (T02)	06:43	16:37 (T02)	06:52	06:11	05:52	19:00 (T01)			
	17:15	17:52	50	17:16 (T02)	18:25	24	17:01 (T02)	19:57	20:28	75	20:15 (T01)	
12	07:46	07:22	16:24 (T02)	06:41	16:40 (T02)	06:51	06:10	05:52	18:59 (T01)			
	17:16	17:53	52	17:16 (T02)	18:26	17	16:57 (T02)	19:58	20:29	76	20:15 (T01)	
13	07:46	07:21	16:24 (T02)	06:40	06:49	06:09	06:09	19:28 (T01)	05:51	18:59 (T01)		
	17:17	17:55	53	17:17 (T02)	18:27	19:59	20:30	12	19:40 (T01)	20:55	76	20:15 (T01)
14	07:46	07:20	16:23 (T02)	06:38	06:48	06:08	06:08	19:23 (T01)	05:51	18:59 (T01)		
	17:18	17:56	55	17:18 (T02)	18:28	20:00	20:31	22	19:45 (T01)	20:55	77	20:16 (T01)
15	07:45	07:18	16:23 (T02)	06:36	06:46	06:07	06:07	19:19 (T01)	05:51	18:59 (T01)		
	17:20	17:57	56	17:19 (T02)	18:29	20:01	20:32	30	19:49 (T01)	20:55	77	20:16 (T01)
16	07:45	07:17	16:22 (T02)	06:35	06:44	06:06	06:06	19:17 (T01)	05:51	19:00 (T01)		
	17:21	17:58	56	17:18 (T02)	18:30	20:02	20:33	34	19:51 (T01)	20:56	76	20:16 (T01)
17	07:45	07:16	16:22 (T02)	06:33	06:43	06:05	06:05	19:14 (T01)	05:51	19:01 (T01)		
	17:22	17:59	57	17:19 (T02)	18:31	20:04	20:34	39	19:53 (T01)	20:56	77	20:18 (T01)
18	07:44	07:14	16:22 (T02)	06:31	06:41	06:04	06:04	19:13 (T01)	05:52	19:01 (T01)		
	17:23	18:01	58	17:20 (T02)	18:32	20:05	20:35	43	19:56 (T01)	20:57	77	20:18 (T01)
19	07:44	07:13	16:21 (T02)	06:30	06:40	06:03	06:03	19:11 (T01)	05:52	19:01 (T01)		
	17:24	18:02	58	17:19 (T02)	18:33	20:06	20:36	46	19:57 (T01)	20:57	77	20:18 (T01)
20	07:43	07:12	16:22 (T02)	06:28	06:38	06:03	06:03	19:10 (T01)	05:52	19:01 (T01)		
	17:25	18:03	58	17:20 (T02)	18:34	20:07	20:37	49	19:59 (T01)	20:57	77	20:18 (T01)
21	07:42	07:10	16:21 (T02)	06:27	06:37	06:02	06:02	19:08 (T01)	05:52	19:01 (T01)		
	17:26	18:04	58	17:19 (T02)	18:35	20:08	20:38	52	20:00 (T01)	20:57	77	20:18 (T01)
22	07:42	07:09	16:21 (T02)	06:25	06:35	06:01	06:01	19:08 (T01)	05:52	19:01 (T01)		
	17:28	18:05	59	17:20 (T02)	18:36	20:09	20:39	54	20:02 (T01)	20:58	77	20:18 (T01)
23	07:41	07:07	16:21 (T02)	06:23	06:34	06:00	06:00	19:07 (T01)	05:52	19:02 (T01)		
	17:29	18:06	58	17:19 (T02)	18:37	20:10	20:40	56	20:03 (T01)	20:58	77	20:19 (T01)
24	07:41	07:06	16:21 (T02)	06:22	06:33	05:59	05:59	19:05 (T01)	05:53	19:02 (T01)		
	17:30	18:08	58	17:19 (T02)	18:38	20:11	20:41	58	20:03 (T01)	20:58	77	20:19 (T01)
25	07:40	07:04	16:21 (T02)	06:20	06:31	05:59	05:59	19:05 (T01)	05:53	19:02 (T01)		
	17:31	18:09	57	17:18 (T02)	18:39	20:12	20:42	60	20:05 (T01)	20:58	77	20:19 (T01)
26	07:39	07:03	16:22 (T02)	06:18	06:30	05:58	05:58	19:04 (T01)	05:53	19:03 (T01)		
	17:32	18:10	56	17:18 (T02)	18:41	20:13	20:42	61	20:05 (T01)	20:58	76	20:19 (T01)
27	07:38	07:02	16:22 (T02)	06:17	06:28	05:57	05:57	19:03 (T01)	05:54	19:02 (T01)		
	17:34	18:11	55	17:17 (T02)	18:42	20:14	20:43	63	20:06 (T01)	20:58	77	20:19 (T01)
28	07:37	07:00	16:22 (T02)	06:15	06:27	05:57	05:57	19:03 (T01)	05:54	19:02 (T01)		
	17:35	18:12	55	17:17 (T02)	18:43	20:15	20:44	64	20:07 (T01)	20:58	77	20:19 (T01)
29	07:37			07:13	06:26	05:56	05:56	19:02 (T01)	05:54	19:03 (T01)		
	17:36			19:44	20:16	20:45	20:45	65	20:07 (T01)	20:58	77	20:20 (T01)
30	07:36			07:12	06:24	05:56	05:56	19:02 (T01)	05:55	19:03 (T01)		
	17:37			19:45	20:17	20:46	20:46	67	20:09 (T01)	20:58	76	20:19 (T01)
31	07:35	16:49 (T02)		07:10		05:55	05:55	19:01 (T01)				
	17:39	16:50 (T02)		19:46		20:46	20:46	68	20:09 (T01)			
Potential sun hours	298	1		370		398	447		451			
Total, worst case	1		1364		481		943		2256			

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

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

Calculation: Progetto_20231109Shadow receptor: F008 - A04

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December
1	05:55 20:58	19:04 (T01) 20:20 (T01)	06:19 20:39	06:49 19:57	07:19 19:07	17:21 (T02) 17:33 (T02)
2	05:56 20:58	19:04 (T01) 20:19 (T01)	06:20 20:38	06:50 19:55	07:20 19:05	17:16 (T02) 17:19
3	05:56 20:58	19:05 (T01) 20:20 (T01)	06:21 20:37	06:51 19:54	07:21 19:03	17:12 (T02) 17:18
4	05:57 20:58	19:05 (T01) 20:19 (T01)	06:22 20:36	06:52 19:52	07:22 19:02	17:10 (T02) 17:17
5	05:57 20:57	19:06 (T01) 20:19 (T01)	06:23 20:35	06:53 19:50	07:23 19:00	17:08 (T02) 17:16
6	05:58 20:57	19:06 (T01) 20:19 (T01)	06:24 20:34	06:54 19:49	07:24 18:59	17:06 (T02) 17:15
7	05:59 20:57	19:06 (T01) 20:19 (T01)	06:25 20:33	06:55 19:47	07:25 18:57	17:04 (T02) 17:14
8	05:59 20:57	19:07 (T01) 20:19 (T01)	06:26 20:31	06:56 19:45	07:26 18:55	17:02 (T02) 17:13
9	06:00 20:56	19:07 (T01) 20:18 (T01)	06:27 20:30	06:57 19:44	07:27 18:54	17:01 (T02) 17:12
10	06:00 20:56	19:08 (T01) 20:18 (T01)	06:28 20:29	06:58 19:42	07:28 18:52	16:59 (T02) 17:11
11	06:01 20:55	19:09 (T01) 20:18 (T01)	06:29 20:28	06:59 19:40	07:29 18:51	16:58 (T02) 17:10
12	06:02 20:55	19:09 (T01) 20:17 (T01)	06:29 20:26	07:00 19:39	07:30 18:49	16:57 (T02) 17:09
13	06:03 20:54	19:10 (T01) 20:17 (T01)	06:30 20:25	07:01 19:37	07:31 18:47	16:56 (T02) 17:08
14	06:03 20:54	19:11 (T01) 20:17 (T01)	06:31 20:24	07:02 19:35	07:32 18:46	16:55 (T02) 17:07
15	06:04 20:53	19:11 (T01) 20:16 (T01)	06:32 20:22	07:03 19:34	07:33 18:44	16:54 (T02) 17:06
16	06:05 20:53	19:12 (T01) 20:16 (T01)	06:33 20:21	07:04 19:32	07:34 18:43	16:54 (T02) 17:05
17	06:06 20:52	19:13 (T01) 20:15 (T01)	06:34 20:19	07:05 19:30	07:35 18:41	16:53 (T02) 17:04
18	06:06 20:52	19:14 (T01) 20:15 (T01)	06:35 20:18	07:06 19:29	07:36 18:40	16:53 (T02) 17:04
19	06:07 20:51	19:15 (T01) 20:14 (T01)	06:36 20:17	07:07 19:27	07:37 18:38	16:52 (T02) 17:03
20	06:08 20:50	19:16 (T01) 20:12 (T01)	06:37 20:15	07:08 19:25	07:39 18:37	16:52 (T02) 17:02
21	06:09 20:49	19:17 (T01) 20:12 (T01)	06:38 20:14	07:09 19:24	07:40 18:35	16:51 (T02) 17:02
22	06:10 20:49	19:18 (T01) 20:11 (T01)	06:39 20:12	07:10 19:22	07:41 18:34	16:51 (T02) 17:01
23	06:11 20:48	19:20 (T01) 20:10 (T01)	06:40 20:11	07:11 19:20	07:42 18:33	16:52 (T02) 17:00
24	06:12 20:47	19:21 (T01) 20:09 (T01)	06:41 20:09	07:12 19:19	07:43 18:31	16:52 (T02) 17:00
25	06:12 20:46	19:23 (T01) 20:07 (T01)	06:42 20:08	07:13 19:17	07:44 17:30	15:52 (T02) 16:59
26	06:13 20:45	19:24 (T01) 20:05 (T01)	06:43 20:06	07:14 19:15	06:45 17:28	15:52 (T02) 16:59
27	06:14 20:44	19:25 (T01) 20:03 (T01)	06:44 20:05	07:15 19:13	06:46 17:27	15:52 (T02) 16:58
28	06:15 20:43	19:28 (T01) 20:01 (T01)	06:45 20:03	07:16 19:12	06:48 17:26	15:53 (T02) 16:58
29	06:16 20:42	19:31 (T01) 19:58 (T01)	06:46 20:02	07:17 19:10	06:49 17:24	15:54 (T02) 16:57
30	06:17 20:41	19:35 (T01) 19:54 (T01)	06:47 20:00	07:18 19:08	06:50 17:23	15:54 (T02) 16:57
31	06:18 20:40		06:48 19:58		06:51 17:22	15:55 (T02) 16:44 (T02)
Potential sun hours	458	427	375	346	299	289
Total, worst case	1776			1521	352	

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

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

Calculation: Progetto_20231109Shadow receptor: F060 - A04

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June
1	07:47 17:06	08:10 (T15) 07:34	08:02 (T15) 06:58	07:08	07:38 (T12) 06:23	07:31 (T12) 05:55
2	07:47 17:07	08:09 (T15) 07:33	08:02 (T15) 06:57	07:07	07:36 (T12) 06:22	07:32 (T12) 05:54
3	07:47 17:08	08:26 (T15) 17:41	08:54 (T15) 18:15	19:48	18:50 (T13) 20:19	08:24 (T12) 20:48
4	07:47 17:09	08:09 (T15) 07:31	08:02 (T15) 06:55	07:05	07:34 (T12) 06:21	07:33 (T12) 05:54
5	07:47 17:09	08:28 (T15) 17:42	08:54 (T15) 18:16	19:49	18:48 (T13) 20:20	08:23 (T12) 20:49
6	07:47 17:10	08:09 (T15) 07:31	08:03 (T15) 06:54	07:03	07:34 (T12) 06:19	07:34 (T12) 05:54
7	07:47 17:11	08:29 (T15) 17:44	08:54 (T15) 18:17	19:50	18:45 (T13) 20:21	08:22 (T12) 20:49
8	07:47 17:12	08:09 (T15) 07:30	08:03 (T15) 06:52	07:02	07:32 (T12) 06:18	07:36 (T12) 05:53
9	07:47 17:13	08:31 (T15) 17:45	08:54 (T15) 18:18	17:38 (T13)	18:39 (T13) 20:22	08:21 (T12) 20:50
10	07:47 17:14	08:09 (T15) 07:29	08:03 (T15) 06:51	07:00	07:32 (T12) 06:17	07:36 (T12) 05:53
11	07:46 17:15	08:32 (T15) 17:46	08:53 (T15) 18:19	17:54 (T13)	18:40 (T12) 20:23	08:18 (T12) 20:51
12	07:46 17:16	08:09 (T15) 07:28	08:03 (T15) 06:49	06:59	07:31 (T12) 06:16	07:38 (T12) 05:53
13	07:46 17:17	08:34 (T15) 17:47	08:52 (T15) 18:20	17:59 (T14)	18:40 (T12) 20:24	08:17 (T12) 20:51
14	07:46 17:19	08:09 (T15) 07:27	08:04 (T15) 06:48	06:57	07:30 (T12) 06:15	07:39 (T12) 05:52
15	07:46 17:20	08:35 (T15) 17:48	08:52 (T15) 18:21	18:00 (T14)	18:40 (T12) 20:25	08:15 (T12) 20:52
16	07:46 17:21	08:08 (T15) 07:25	08:05 (T15) 06:46	06:55	07:30 (T12) 06:13	07:41 (T12) 05:52
17	07:46 17:22	08:36 (T15) 17:50	08:52 (T15) 18:22	18:02 (T14)	18:40 (T12) 20:26	08:13 (T12) 20:52
18	07:46 17:23	08:08 (T15) 07:24	08:06 (T15) 06:44	06:54	07:29 (T12) 06:12	07:43 (T12) 05:52
19	07:46 17:24	08:37 (T15) 17:51	08:51 (T15) 18:23	18:02 (T14)	18:40 (T12) 20:27	08:11 (T12) 20:53
20	07:46 17:25	08:08 (T15) 07:23	08:07 (T15) 06:43	06:52	07:29 (T12) 06:11	07:46 (T12) 05:52
21	07:46 17:26	08:39 (T15) 17:52	08:51 (T15) 18:25	18:03 (T14)	18:40 (T12) 20:28	08:08 (T12) 20:53
22	07:46 17:27	08:08 (T15) 07:22	08:07 (T15) 06:41	06:51	07:28 (T12) 06:10	07:50 (T12) 05:52
23	07:46 17:28	08:40 (T15) 17:53	08:49 (T15) 18:26	18:05 (T14)	18:39 (T12) 20:29	08:04 (T12) 20:54
24	07:46 17:29	08:07 (T15) 07:21	08:08 (T15) 06:40	06:49	07:28 (T12) 06:09	05:52
25	07:46 17:30	08:41 (T15) 17:55	08:48 (T15) 18:27	18:06 (T14)	18:40 (T12) 20:30	20:54
26	07:46 17:31	08:07 (T15) 07:19	08:10 (T15) 06:38	06:48	07:27 (T12) 06:08	20:09 (T11)
27	07:46 17:32	08:42 (T15) 17:56	08:47 (T15) 18:28	18:07 (T14)	18:39 (T12) 20:31	20:29 (T11)
28	07:46 17:33	08:06 (T15) 07:18	08:10 (T15) 06:36	06:46	07:27 (T12) 06:07	20:11 (T11)
29	07:46 17:34	08:43 (T15) 17:57	08:45 (T15) 18:29	18:08 (T14)	18:39 (T12) 20:32	20:31 (T11)
30	07:46 17:35	08:06 (T15) 07:17	08:12 (T15) 06:35	06:44	07:27 (T12) 06:06	20:11 (T11)
31	07:46 17:36	08:44 (T15) 17:58	08:44 (T15) 18:30	18:09 (T14)	18:38 (T12) 20:33	20:31 (T11)
Potential sun hours	299	298	370	398	447	451
Total, worst case	1144	794	1548	2119	483	545

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

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

Calculation: Progetto_20231109Shadow receptor: F060 - A04

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December
1	05:55 20:14 (T11)	06:19 20:33 (T11)	07:59 (T12) 06:49 08:16 (T12)	07:28 (T12) 07:19 19:07	17:59 (T13) 06:52 07:34 (T15)	07:27 07:50 (T15)
2	05:56 20:58	20:14 (T11) 20:38	07:56 (T12) 06:50 08:24 (T12)	07:28 (T12) 07:20 19:05	18:00 (T13) 06:53 07:35 (T15)	07:28 07:51 (T15)
3	05:56 20:58	20:15 (T11) 20:37	07:53 (T12) 06:51 08:22 (T12)	07:28 (T12) 07:21 19:03	18:01 (T13) 06:54 07:34 (T15)	07:29 07:52 (T15)
4	05:57 20:57	20:33 (T11) 20:36	08:22 (T12) 19:54 07:51 (T12)	07:28 (T12) 07:22 19:02	18:02 (T13) 06:56 07:33 (T15)	07:30 07:53 (T15)
5	05:57 20:57	20:15 (T11) 20:34	08:24 (T12) 19:52 07:49 (T12)	07:28 (T12) 19:02 07:23	18:39 (T14) 06:56 07:33 (T15)	07:30 07:54 (T15)
6	05:58 20:57	20:16 (T11) 20:34	06:53 19:50 07:47 (T12)	07:27 (T12) 19:00 07:24	18:04 (T13) 06:57 07:33 (T15)	07:31 07:55 (T15)
7	05:58 20:57	20:32 (T11) 20:34	07:26 (T12) 19:50 08:27 (T12)	07:27 (T12) 19:00 18:59	18:38 (T14) 17:16 08:22 (T15)	16:56 07:54 (T15)
8	05:59 20:56	20:17 (T11) 20:31	06:25 19:49 07:45 (T12)	06:55 19:47 07:28 (T12)	18:08 (T13) 06:59 17:15	07:32 07:56 (T15)
9	06:00 20:56	20:32 (T11) 20:30	08:28 (T12) 19:47 07:44 (T12)	19:47 73 07:28 (T12)	18:35 (T14) 18:57 07:26	16:56 07:33 (T15)
10	06:01 20:56	20:18 (T11) 20:30	06:26 19:45 08:30 (T12)	06:56 84 18:39 (T13)	07:00 16 18:27 (T13)	07:33 (T15)
11	06:01 20:56	20:32 (T11) 20:30	06:27 19:44 08:31 (T12)	06:57 88 18:41 (T13)	07:02 17:12 08:25 (T15)	07:34 (T15)
12	06:01 20:56	20:31 (T11) 20:29	06:28 19:42 07:41 (T12)	06:58 91 18:43 (T13)	07:03 52 08:25 (T15)	07:35 (T15)
13	06:01 20:55	20:31 (T11) 20:28	06:29 19:42 07:40 (T12)	06:59 92 18:45 (T13)	07:04 51 08:24 (T15)	07:36 (T15)
14	06:03 20:54	20:30 (T11) 20:24	06:30 19:40 08:33 (T12)	07:00 94 18:46 (T13)	07:05 51 08:24 (T15)	07:37 (T15)
15	06:03 20:54	20:30 (T11) 20:24	06:31 19:39 07:38 (T12)	07:01 95 18:47 (T13)	07:06 51 08:25 (T15)	07:38 (T15)
16	06:03 20:54	20:24 (T11) 20:24	06:32 19:37 08:36 (T12)	07:02 94 18:48 (T13)	07:07 51 08:25 (T15)	07:38 (T15)
17	06:04 20:53	20:29 (T11) 20:22	06:32 19:35 07:37 (T12)	07:03 94 18:49 (T13)	07:09 51 08:25 (T15)	07:39 (T15)
18	06:05 20:53	20:28 (T11) 06:33	06:33 19:34 08:37 (T12)	07:04 94 18:49 (T13)	07:10 51 08:25 (T15)	07:40 (T15)
19	06:06 20:52	20:21 (T11) 06:34	07:04 19:30 08:38 (T12)	07:04 89 18:49 (T13)	07:11 50 08:24 (T15)	07:40 (T15)
20	06:07 20:51	20:19 (T11) 06:35	07:05 19:30 07:34 (T12)	07:05 89 18:49 (T13)	07:11 50 08:25 (T15)	07:40 (T15)
21	06:07 20:51	20:18 (T11) 06:36	07:06 19:29 08:39 (T12)	07:06 86 18:50 (T13)	07:12 49 08:25 (T15)	07:41 (T15)
22	06:08 20:50	20:17 (T11) 06:37	07:07 19:27 07:33 (T12)	07:07 81 18:50 (T13)	07:13 48 08:24 (T15)	07:42 (T15)
23	06:09 20:49	20:16 (T11) 06:38	07:08 19:25 08:39 (T12)	07:08 74 18:50 (T13)	07:14 47 08:24 (T15)	07:42 (T15)
24	06:10 20:49	20:15 (T11) 06:39	07:09 19:25 07:31 (T12)	07:09 66 18:50 (T13)	07:16 45 08:23 (T15)	07:43 (T15)
25	06:11 20:48	20:14 (T11) 06:40	07:10 19:24 08:39 (T12)	07:10 66 18:50 (T13)	07:17 45 08:23 (T15)	07:43 (T15)
26	06:12 20:47	20:12 (T11) 06:40	07:11 19:22 07:30 (T12)	07:11 49 18:49 (T13)	07:17 44 08:24 (T15)	07:43 (T15)
27	06:12 20:47	20:11 (T11) 06:41	07:12 19:20 08:40 (T12)	07:12 49 18:48 (T13)	07:18 43 08:24 (T15)	07:44 (T15)
28	06:13 20:46	20:09 (T11) 06:42	07:13 19:18 07:30 (T12)	07:13 50 18:49 (T13)	07:19 41 08:23 (T15)	07:44 (T15)
29	06:13 20:45	20:08 (T11) 06:43	07:14 19:17 08:40 (T12)	07:14 52 18:50 (T14)	07:20 40 08:23 (T15)	07:45 (T15)
30	06:14 20:44	20:07 (T11) 06:43	07:15 19:15 07:29 (T12)	07:15 52 18:50 (T14)	07:21 38 08:14 (T15)	07:45 (T15)
31	06:14 20:44	20:06 (T11) 06:44	07:16 19:13 08:40 (T12)	07:16 53 18:51 (T14)	07:22 37 08:15 (T15)	07:46 (T15)
Potential sun hours	458	427	375	346	299	289
Total, worst case	201	1750	2162	584	1385	319

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

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

SHADOW - Calendar

Calculation: Progetto_20231109Shadow receptor: F167 - A04-C02

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	
1	07:47 17:06 46	15:29 (T05) 16:15 (T05) 17:40	07:34 17:40	06:59 18:13 52	07:25 (T04) 08:17 (T04) 19:47	07:08 20:18 20:47	
2	07:47 17:07 46	15:29 (T05) 16:15 (T05) 17:41	07:33 17:41	06:57 18:14 50	07:26 (T04) 08:16 (T04) 19:48	07:07 19:48 20:19 20:48	
3	07:47 17:08 45	15:30 (T05) 16:15 (T05) 17:42	07:32 17:42 6	07:52 (T04) 07:58 (T04) 18:16	06:55 18:16 49	07:05 08:15 (T04) 19:49	6 19:23 (T03) 20:19 20:48
4	07:47 17:08 46	15:30 (T05) 16:16 (T05) 17:43	07:31 17:43 11	07:51 (T04) 08:02 (T04) 18:17	06:54 18:17 46	07:03 08:14 (T04) 19:50	19 19:10 (T03) 19:29 (T03) 20:21 20:49
5	07:47 17:09 45	15:31 (T05) 16:16 (T05) 17:45	07:30 17:45 15	07:50 (T04) 08:05 (T04) 18:18	06:52 18:18 45	07:02 08:13 (T04) 19:51	21 19:08 (T03) 19:29 (T03) 20:22 20:50
6	07:47 17:10 45	15:32 (T05) 16:17 (T05) 17:46	07:29 17:46 19	07:49 (T04) 08:08 (T04) 18:19	06:51 18:19 42	07:00 08:12 (T04) 19:52	24 19:07 (T03) 19:31 (T03) 20:23 20:51
7	07:47 17:11 45	15:32 (T05) 16:17 (T05) 17:47	07:28 17:47 22	07:47 (T04) 08:09 (T04) 18:20	06:49 18:20 40	06:59 08:10 (T04) 19:53	27 19:05 (T03) 19:32 (T03) 20:24 20:51
8	07:47 17:12 44	15:33 (T05) 16:17 (T05) 17:48	07:27 17:48 25	07:46 (T04) 08:11 (T04) 18:21	06:48 18:21 36	06:57 08:07 (T04) 19:54	28 19:04 (T03) 19:32 (T03) 20:25 20:52
9	07:47 17:13 44	15:34 (T05) 16:18 (T05) 17:50	07:26 17:50 27	07:45 (T04) 08:12 (T04) 18:22	06:46 18:22 33	06:55 08:06 (T04) 19:55	30 19:03 (T03) 19:33 (T03) 20:26 20:52
10	07:47 17:14 43	15:34 (T05) 16:17 (T05) 17:51	07:24 17:51 30	07:44 (T04) 08:14 (T04) 18:23	06:44 18:23 28	06:54 08:03 (T04) 19:56	31 19:02 (T03) 19:33 (T03) 20:27 20:53
11	07:47 17:15 42	15:35 (T05) 16:17 (T05) 17:52	07:23 17:52 32	07:43 (T04) 08:15 (T04) 18:25	06:43 18:25 22	06:52 08:00 (T04) 19:57	31 19:02 (T03) 19:33 (T03) 20:28 20:54
12	07:46 17:16 42	15:36 (T05) 16:18 (T05) 17:53	07:22 17:53 35	07:41 (T04) 08:16 (T04) 18:26	06:41 18:26 13	06:51 07:55 (T04) 19:58	32 19:01 (T03) 19:33 (T03) 20:29 20:54
13	07:46 17:17 40	15:37 (T05) 16:17 (T05) 17:55	07:21 17:55 37	07:40 (T04) 08:17 (T04) 18:27	06:40 18:27 31	06:49 19:59	31 19:02 (T03) 19:33 (T03) 20:30 20:55
14	07:46 17:19 39	15:38 (T05) 16:17 (T05) 17:56	07:20 17:56 39	07:39 (T04) 08:18 (T04) 18:28	06:38 18:28 31	06:48 20:00	31 19:01 (T03) 19:32 (T03) 20:31 20:55
15	07:45 17:20 39	15:38 (T05) 16:17 (T05) 17:57	07:18 17:57 41	07:38 (T04) 08:19 (T04) 18:29	06:36 18:29 30	06:46 20:01	30 19:01 (T03) 19:31 (T03) 20:32 20:55
16	07:45 17:21 37	15:40 (T05) 16:17 (T05) 17:58	07:17 17:58 43	07:36 (T04) 08:19 (T04) 18:30	06:35 18:30 29	06:44 20:02	29 19:02 (T03) 19:31 (T03) 20:33 20:56
17	07:44 17:22 36	15:40 (T05) 16:16 (T05) 17:59	07:16 17:59 44	07:35 (T04) 08:19 (T04) 18:31	06:33 18:31 27	06:43 20:03	27 19:02 (T03) 19:29 (T03) 20:34 20:56
18	07:44 17:23 34	15:42 (T05) 16:16 (T05) 18:01	07:14 18:01 46	07:33 (T04) 08:19 (T04) 18:32	06:31 18:32 26	06:41 20:05	26 19:03 (T03) 19:29 (T03) 20:35 20:56
19	07:44 17:24 32	15:43 (T05) 16:15 (T05) 18:02	07:13 18:02 48	07:32 (T04) 08:20 (T04) 18:33	06:30 18:33 24	06:40 20:06	24 19:04 (T03) 19:28 (T03) 20:36 20:57
20	07:43 17:25 30	15:45 (T05) 16:15 (T05) 18:03	07:12 18:03 49	07:31 (T04) 08:20 (T04) 18:34	06:28 18:34 22	06:38 20:07	22 19:04 (T03) 19:26 (T03) 20:37 20:57
21	07:42 17:26 28	15:46 (T05) 16:14 (T05) 18:04	07:10 18:04 51	07:29 (T04) 08:20 (T04) 18:35	06:27 18:35 18	06:37 20:08	18 19:06 (T03) 19:24 (T03) 20:38 20:57
22	07:42 17:28 26	15:47 (T05) 16:13 (T05) 18:05	07:09 18:05 52	07:28 (T04) 08:20 (T04) 18:36	06:25 18:36 13	06:35 20:09	13 19:08 (T03) 19:21 (T03) 20:39 20:58
23	07:41 17:29 22	15:50 (T05) 16:12 (T05) 18:06	07:07 18:06 54	07:26 (T04) 08:20 (T04) 18:37	06:23 18:37 5	06:34 20:10	5 19:12 (T03) 19:17 (T03) 20:40 20:58
24	07:40 17:30 18	15:52 (T05) 16:10 (T05) 18:08	07:06 18:08 55	07:25 (T04) 08:20 (T04) 18:38	06:22 18:38 25	06:33 20:11	25 19:09 (T03) 19:22 (T03) 20:41 20:58
25	07:40 17:31 12	15:55 (T05) 16:07 (T05) 18:09	07:04 18:09 55	07:24 (T04) 08:19 (T04) 18:39	06:20 18:39 20	06:20 20:12	20 19:11 (T03) 19:24 (T03) 20:42 20:58
26	07:39 17:32	16:07 (T05) 18:10 54	07:03 18:10 54	07:25 (T04) 08:19 (T04) 18:41	06:18 18:41 19	06:30 20:13	19 19:12 (T03) 19:25 (T03) 20:43 20:58
27	07:38 17:34	18:11 53	07:02 18:11 53	07:25 (T04) 08:18 (T04) 18:42	06:17 18:42 18	06:28 20:14	18 19:13 (T03) 19:26 (T03) 20:44 20:58
28	07:37 17:35	18:12 52	07:00 18:12 52	07:26 (T04) 08:18 (T04) 18:43	06:15 18:43 17	06:27 20:15	17 19:14 (T03) 19:27 (T03) 20:45 20:58
29	07:37 17:36				07:13 19:44 16	06:26 20:16	16 19:15 (T03) 19:28 (T03) 20:46 20:58
30	07:36 17:37				07:12 19:45 15	06:24 20:17	15 19:16 (T03) 19:29 (T03) 20:47 20:58
31	07:35 17:39				07:10 19:46 14		14 19:17 (T03) 19:30 (T03) 20:48 20:58
Potential sun hours	299	298	370	398	447	451	
Total, worst case	926	995	456	519	447	451	

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

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

Calculation: Progetto_20231109Shadow receptor: F167 - A04-C02

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December				
1	05:55 20:58	06:19 20:39	06:49 19:57	19:01 (T03) 31 19:32 (T03)	07:19 19:07	08:24 (T04) 7 08:31 (T04)	06:52 29 07:43 (T04)	07:14 (T04) 16:57	07:27 42 15:59 (T05)	15:17 (T05)
2	05:56 20:58	06:20 20:38	06:50 19:55	19:01 (T03) 31 19:32 (T03)	07:20 19:05	08:17 (T04) 19 08:36 (T04)	06:53 27 07:42 (T04)	07:15 (T04) 16:57	07:28 43 16:00 (T05)	15:17 (T05)
3	05:56 20:58	06:21 20:37	06:51 19:54	19:01 (T03) 30 19:31 (T03)	07:21 19:03	08:14 (T04) 25 08:39 (T04)	06:55 24 07:40 (T04)	07:16 (T04) 16:56	07:29 44 16:01 (T05)	15:17 (T05)
4	05:57 20:58	06:22 20:36	06:52 19:52	19:02 (T03) 28 19:30 (T03)	07:22 19:02	08:12 (T04) 31 08:43 (T04)	06:56 21 07:38 (T04)	07:17 (T04) 16:56	07:30 44 16:01 (T05)	15:17 (T05)
5	05:57 20:57	06:23 20:35	06:53 19:50	19:01 (T03) 27 19:28 (T03)	07:23 19:00	08:10 (T04) 34 08:44 (T04)	06:57 18 07:37 (T04)	07:19 (T04) 16:56	07:31 44 16:02 (T05)	15:18 (T05)
6	05:58 20:57	06:24 20:34	06:54 19:49	19:02 (T03) 24 19:26 (T03)	07:24 18:59	08:08 (T04) 38 08:46 (T04)	06:58 15 07:35 (T04)	07:20 (T04) 16:56	07:32 45 16:03 (T05)	15:18 (T05)
7	05:59 20:57	06:25 20:33	06:55 19:47	19:03 (T03) 22 19:25 (T03)	07:25 18:57	08:06 (T04) 41 08:47 (T04)	06:59 11 07:32 (T04)	07:21 (T04) 16:56	07:32 45 16:03 (T05)	15:18 (T05)
8	05:59 20:57	06:26 20:31	06:56 19:45	19:04 (T03) 19 19:23 (T03)	07:26 18:55	08:04 (T04) 44 08:48 (T04)	07:00 5 07:27 (T04)	07:22 (T04) 16:56	07:33 46 16:04 (T05)	15:18 (T05)
9	06:00 20:56	06:27 20:30	06:57 19:44	19:06 (T03) 15 19:21 (T03)	07:27 18:54	08:03 (T04) 46 08:49 (T04)	07:02 17:12	07:34 16:56	07:34 46 16:05 (T05)	15:19 (T05)
10	06:00 20:56	06:28 20:29	06:58 19:42	19:10 (T03) 7 19:17 (T03)	07:28 18:52	08:02 (T04) 47 08:49 (T04)	07:03 17:11	07:35 16:56	07:35 46 16:05 (T05)	15:19 (T05)
11	06:01 20:55	06:29 20:28	06:59 19:40	07:29 18:51	07:29 50 08:50 (T04)	08:00 (T04) 17:10	07:04 16:56	07:36 46 16:05 (T05)	07:36 15:19 (T05)	15:19 (T05)
12	06:02 20:55	06:30 20:26	07:00 19:39	07:30 18:49	07:30 51 08:50 (T04)	07:05 17:09	07:37 16:56	07:37 47 16:06 (T05)	07:37 15:20 (T05)	15:19 (T05)
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	07:31 51 08:50 (T04)	07:06 17:08	07:38 16:56	07:38 46 16:06 (T05)	07:38 15:20 (T05)	15:19 (T05)
14	06:03 20:54	06:31 20:24	07:02 19:35	07:32 18:46	07:32 53 08:51 (T04)	07:07 17:07	07:39 16:56	07:38 47 16:07 (T05)	07:38 15:20 (T05)	15:20 (T05)
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	07:33 54 08:51 (T04)	07:09 17:06	07:39 16:56	07:39 47 16:08 (T05)	07:39 15:21 (T05)	15:21 (T05)
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	07:34 55 08:51 (T04)	07:10 17:05	07:40 16:57	07:40 47 16:08 (T05)	07:40 15:21 (T05)	15:21 (T05)
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	07:35 54 08:51 (T04)	07:11 17:04	07:41 15:29 (T05)	07:41 47 16:09 (T05)	07:41 15:22 (T05)	15:22 (T05)
18	06:06 20:52	06:35 20:18	07:06 19:29	07:36 18:40	07:36 54 08:51 (T04)	07:12 17:04	07:42 18 15:44 (T05)	07:41 47 16:08 (T05)	07:41 15:21 (T05)	15:21 (T05)
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	07:37 53 08:51 (T04)	07:13 17:03	07:42 22 15:46 (T05)	07:42 47 16:09 (T05)	07:42 15:22 (T05)	15:22 (T05)
20	06:08 20:50	06:37 20:15	07:08 19:25	07:38 18:37	07:38 52 08:51 (T04)	07:14 17:02	07:43 26 15:48 (T05)	07:43 47 16:10 (T05)	07:43 15:23 (T05)	15:23 (T05)
21	06:09 20:49	06:38 20:14	07:09 19:24	07:39 18:35	07:39 50 08:50 (T04)	07:15 17:02	07:44 28 15:50 (T05)	07:43 47 16:10 (T05)	07:43 15:23 (T05)	15:23 (T05)
22	06:10 20:49	06:39 20:12	07:10 19:22	07:41 18:34	07:41 49 08:50 (T04)	07:17 17:01	07:45 30 15:51 (T05)	07:43 47 16:11 (T05)	07:43 15:24 (T05)	15:24 (T05)
23	06:11 20:48	06:40 20:11	07:11 19:20	07:42 18:33	07:42 47 08:50 (T04)	07:18 17:00	07:46 32 15:52 (T05)	07:44 47 16:11 (T05)	07:44 15:24 (T05)	15:24 (T05)
24	06:12 20:47	06:41 20:09	07:12 19:19	07:43 18:31	07:43 46 08:50 (T04)	07:19 17:00	07:47 34 15:53 (T05)	07:44 47 16:11 (T05)	07:44 15:25 (T05)	15:25 (T05)
25	06:12 20:46	06:42 20:08	07:13 19:17	07:44 17:30	07:44 44 07:49 (T04)	07:20 16:59	07:48 36 15:54 (T05)	07:45 47 16:12 (T05)	07:45 15:26 (T05)	15:26 (T05)
26	06:13 20:45	06:43 20:06	07:14 19:15	07:45 17:28	07:45 42 07:48 (T04)	07:21 16:59	07:49 37 15:55 (T05)	07:45 46 16:12 (T05)	07:45 15:26 (T05)	15:26 (T05)
27	06:14 20:44	06:44 20:05	07:15 19:13	07:46 17:27	07:46 40 07:47 (T04)	07:22 16:58	07:50 39 15:57 (T05)	07:46 47 16:13 (T05)	07:46 15:27 (T05)	15:27 (T05)
28	06:15 20:43	06:45 20:03	07:16 19:12	07:47 17:26	07:47 38 07:47 (T04)	07:23 16:58	07:51 39 15:57 (T05)	07:46 47 16:14 (T05)	07:46 15:27 (T05)	15:27 (T05)
29	06:16 20:42	06:46 20:02	07:17 19:10	07:48 17:24	07:48 36 07:46 (T04)	07:24 16:57	07:52 40 15:58 (T05)	07:46 47 16:14 (T05)	07:46 15:28 (T05)	15:28 (T05)
30	06:17 20:41	06:47 20:00	07:18 19:08	07:49 17:23	07:49 34 07:45 (T04)	07:26 16:57	07:53 42 15:59 (T05)	07:46 46 16:14 (T05)	07:46 15:28 (T05)	15:28 (T05)
31	06:18 20:40	06:48 19:58	07:19 19:07	07:50 17:22	07:50 32 07:44 (T04)	07:27 16:57	07:54 42 15:59 (T05)	07:47 46 16:14 (T05)	07:47 15:28 (T05)	15:28 (T05)
Potential sun hours	458	427	375	346	299	585	289	1427		
Total, worst case		293	234	1317						

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

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

Calculation: Progetto_20231109Shadow receptor: F173 - A04

Assumptions for shadow calculations

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

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

January			February			March			April			May			June		
1	07:47		16:05 (T02)	07:34		16:07 (T02)	06:59		07:08		17:58 (T01)	06:23		05:55			
	17:06	21	16:26 (T02)	17:40		16:47 (T02)	18:13		19:47	60	18:58 (T01)	20:18		20:47			
2	07:47		16:05 (T02)	07:33		16:07 (T02)	06:57		07:07		17:57 (T01)	06:22		05:54			
	17:07	22	16:27 (T02)	17:41	39	16:46 (T02)	18:14		19:48	60	18:57 (T01)	20:19		20:48			
3	07:47		16:05 (T02)	07:32		16:08 (T02)	06:55		07:05		17:57 (T01)	06:21		05:54			
	17:08	23	16:28 (T02)	17:42	38	16:46 (T02)	18:16		19:49	59	18:56 (T01)	20:20		20:49			
4	07:47		16:05 (T02)	07:31		16:09 (T02)	06:54		07:03		17:58 (T01)	06:19		05:53			
	17:08	24	16:29 (T02)	17:43	37	16:46 (T02)	18:17		19:50	58	18:56 (T01)	20:21		20:49			
5	07:47		16:05 (T02)	07:30		16:10 (T02)	06:52		07:02		17:58 (T01)	06:18		05:53			
	17:09	26	16:31 (T02)	17:45	35	16:45 (T02)	18:18		19:51	57	18:55 (T01)	20:22		20:50			
6	07:47		16:04 (T02)	07:29		16:11 (T02)	06:51		07:00		17:59 (T01)	06:17		05:53			
	17:10	28	16:32 (T02)	17:46	33	16:44 (T02)	18:19		19:52	55	18:54 (T01)	20:23		20:51			
7	07:47		16:04 (T02)	07:28		16:12 (T02)	06:49		06:59		17:59 (T01)	06:16		05:52			
	17:11	29	16:33 (T02)	17:47	31	16:43 (T02)	18:20		19:53	54	18:53 (T01)	20:24		20:51			
8	07:47		16:04 (T02)	07:27		16:13 (T02)	06:48		06:57		17:59 (T01)	06:15		05:52			
	17:12	30	16:34 (T02)	17:48	29	16:42 (T02)	18:21		19:54	53	18:52 (T01)	20:25		20:52			
9	07:47		16:05 (T02)	07:26		16:15 (T02)	06:46		06:55		18:00 (T01)	06:13		05:52			
	17:13	30	16:35 (T02)	17:50	25	16:40 (T02)	18:22		19:55	51	18:51 (T01)	20:26		20:52			
10	07:47		16:04 (T02)	07:24		16:17 (T02)	06:44		06:54		18:00 (T01)	06:12		05:52			
	17:14	32	16:36 (T02)	17:51	22	16:39 (T02)	18:23		19:56	50	18:50 (T01)	20:27		20:53			
11	07:47		16:04 (T02)	07:23		16:20 (T02)	06:43		17:28 (T01)	06:52	18:02 (T01)	06:11		05:52			
	17:15	33	16:37 (T02)	17:52	16	16:36 (T02)	18:25	12	17:40 (T01)	19:57	18:49 (T01)	20:28		20:54			
12	07:46		16:04 (T02)	07:22		16:24 (T02)	06:41		17:22 (T01)	06:51	18:02 (T01)	06:10		05:52			
	17:16	34	16:38 (T02)	17:53	7	16:31 (T02)	18:26	22	17:44 (T01)	19:58	18:47 (T01)	20:29		20:54			
13	07:46		16:03 (T02)	07:21			06:40		17:18 (T01)	06:49	18:04 (T01)	06:09		05:51			
	17:17	35	16:38 (T02)	17:54			18:27	29	17:47 (T01)	19:59	18:46 (T01)	20:30		20:55			
14	07:46		16:03 (T02)	07:20			06:38		17:15 (T01)	06:47	18:05 (T01)	06:08		05:51			
	17:18	37	16:40 (T02)	17:56			18:28	35	17:50 (T01)	20:00	18:44 (T01)	20:31		20:55			
15	07:45		16:03 (T02)	07:18			06:36		17:13 (T01)	06:46	18:06 (T01)	06:07		05:51			
	17:20	37	16:40 (T02)	17:57			18:29	38	17:51 (T01)	20:01	18:41 (T01)	20:32		20:55			
16	07:45		16:03 (T02)	07:17			06:35		17:10 (T01)	06:44	18:08 (T01)	06:06		05:51			
	17:21	38	16:41 (T02)	17:58			18:30	43	17:53 (T01)	20:02	18:40 (T01)	20:33		20:56			
17	07:45		16:03 (T02)	07:16			06:33		17:09 (T01)	06:43	18:10 (T01)	06:05		05:51			
	17:22	38	16:41 (T02)	17:59			18:31	45	17:54 (T01)	20:04	18:37 (T01)	20:34		20:56			
18	07:44		16:03 (T02)	07:14			06:31		17:07 (T01)	06:41	18:14 (T01)	06:04		05:52			
	17:23	40	16:43 (T02)	18:01			18:32	48	17:55 (T01)	20:05	18:34 (T01)	20:35		20:57			
19	07:44		16:03 (T02)	07:13			06:30		17:05 (T01)	06:40	18:19 (T01)	06:03		05:52			
	17:24	40	16:43 (T02)	18:02			18:33	51	17:56 (T01)	20:06	18:29 (T01)	20:36		20:57			
20	07:43		16:03 (T02)	07:12			06:28		17:05 (T01)	06:38		06:03		05:52			
	17:25	41	16:44 (T02)	18:03			18:34	52	17:57 (T01)	20:07		20:37		20:57			
21	07:42		16:03 (T02)	07:10			06:26		17:03 (T01)	06:37		06:02		05:52			
	17:26	41	16:44 (T02)	18:04			18:35	54	17:57 (T01)	20:08		20:38		20:57			
22	07:42		16:03 (T02)	07:09			06:25		17:02 (T01)	06:35		06:01		05:52			
	17:28	41	16:44 (T02)	18:05			18:36	55	17:57 (T01)	20:09		20:39		20:58			
23	07:41		16:04 (T02)	07:07			06:23		17:02 (T01)	06:34		06:00		05:52			
	17:29	42	16:46 (T02)	18:06			18:37	57	17:59 (T01)	20:10		20:40		20:58			
24	07:41		16:04 (T02)	07:06			06:22		17:01 (T01)	06:33		05:59		05:53			
	17:30	42	16:46 (T02)	18:08			18:38	57	17:58 (T01)	20:11		20:41		20:58			
25	07:40		16:04 (T02)	07:04			06:20		16:59 (T01)	06:31		05:59		05:53			
	17:31	42	16:46 (T02)	18:09			18:39	59	17:58 (T01)	20:12		20:42		20:58			
26	07:39		16:04 (T02)	07:03			06:18		17:00 (T01)	06:30		05:58		05:53			
	17:32	42	16:46 (T02)	18:10			18:41	59	17:59 (T01)	20:13		20:42		20:58			
27	07:38		16:05 (T02)	07:02			06:17		16:59 (T01)	06:28		05:57		05:54			
	17:34	42	16:47 (T02)	18:11			18:42	60	17:59 (T01)	20:14		20:43		20:58			
28	07:37		16:05 (T02)	07:00			06:15		16:58 (T01)	06:27		05:57		05:54			
	17:35	42	16:47 (T02)	18:12			18:43	60	17:58 (T01)	20:15		20:44		20:58			
29	07:37		16:05 (T02)				07:13		17:58 (T01)	06:26		05:56		05:54			
	17:36	42	16:47 (T02)				19:44	61	18:59 (T01)	20:16		20:45		20:58			
30	07:36		16:06 (T02)				07:12		17:58 (T01)	06:24		05:56		05:55			
	17:37	41	16:47 (T02)				19:45	60	18:58 (T01)	20:17		20:46		20:58			
31	07:35		16:06 (T02)				07:10		17:57 (T01)			05:55					
	17:39	41	16:47 (T02)				19:46	60	18:57 (T01)			20:46					
Potential sun hours	298		298			370			398		854		447	451			
Total, worst case	1096		352			1017			854								

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

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

SHADOW - Calendar

Calculation: Progetto_20231109Shadow receptor: F173 - A04

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December					
1	05:55	06:19	06:49	18:01 (T01)	07:19	17:59 (T01)	06:52	15:47 (T02)	07:27	15:46 (T02)	
	20:58	20:39	19:57	47 18:48 (T01)	19:07	25 18:24 (T01)	17:21	22 16:09 (T02)	16:57	33 16:19 (T02)	
2	05:56	06:20	06:50	17:59 (T01)	07:20	18:02 (T01)	06:53	15:45 (T02)	07:28	15:47 (T02)	
	20:58	20:38	19:55	50 18:49 (T01)	19:05	18 18:20 (T01)	17:19	25 16:10 (T02)	16:56	32 16:19 (T02)	
3	05:56	06:21	06:51	17:58 (T01)	07:21		06:55	15:43 (T02)	07:29	15:48 (T02)	
	20:58	20:37	19:54	51 18:49 (T01)	19:03		17:18	29 16:12 (T02)	16:56	30 16:18 (T02)	
4	05:57	06:22	06:52	17:57 (T01)	07:22		06:56	15:41 (T02)	07:30	15:48 (T02)	
	20:58	20:36	19:52	53 18:50 (T01)	19:02		17:17	32 16:13 (T02)	16:56	30 16:18 (T02)	
5	05:57	06:23	06:53	17:55 (T01)	07:23		06:57	15:41 (T02)	07:31	15:49 (T02)	
	20:57	20:35	19:50	54 18:49 (T01)	19:00		17:16	33 16:14 (T02)	16:56	29 16:18 (T02)	
6	05:58	06:24	06:54	17:54 (T01)	07:24		06:58	15:40 (T02)	07:32	15:50 (T02)	
	20:57	20:34	19:49	55 18:49 (T01)	18:59		17:15	35 16:15 (T02)	16:56	28 16:18 (T02)	
7	05:59	06:25	06:55	17:53 (T01)	07:25		06:59	15:39 (T02)	07:33	15:52 (T02)	
	20:57	20:33	19:47	57 18:50 (T01)	18:57		17:14	37 16:16 (T02)	16:56	26 16:18 (T02)	
8	05:59	06:26	06:56	17:52 (T01)	07:26		07:00	15:38 (T02)	07:33	15:53 (T02)	
	20:57	20:31	19:45	58 18:50 (T01)	18:55		17:13	38 16:16 (T02)	16:56	24 16:17 (T02)	
9	06:00	06:27	06:57	17:51 (T01)	07:27		07:02	15:38 (T02)	07:34	15:54 (T02)	
	20:56	20:30	19:44	59 18:50 (T01)	18:54		17:12	39 16:17 (T02)	16:56	23 16:17 (T02)	
10	06:00	06:28	06:58	17:51 (T01)	07:28		07:03	15:38 (T02)	07:35	15:55 (T02)	
	20:56	20:29	19:42	59 18:50 (T01)	18:52		17:11	40 16:18 (T02)	16:56	22 16:17 (T02)	
11	06:01	06:28	06:59	17:50 (T01)	07:29		07:04	15:37 (T02)	07:36	15:56 (T02)	
	20:55	20:28	19:40	60 18:50 (T01)	18:51		17:10	41 16:18 (T02)	16:56	21 16:17 (T02)	
12	06:02	06:29	07:00	17:49 (T01)	07:30		07:05	15:37 (T02)	07:37	15:57 (T02)	
	20:55	20:26	19:39	61 18:50 (T01)	18:49		17:09	41 16:18 (T02)	16:56	19 16:16 (T02)	
13	06:03	06:30	07:01	17:49 (T01)	07:31		07:06	15:37 (T02)	07:38	15:58 (T02)	
	20:54	20:25	19:37	60 18:49 (T01)	18:47		17:08	42 16:19 (T02)	16:56	18 16:16 (T02)	
14	06:03	06:31	07:02	17:48 (T01)	07:32		07:07	15:37 (T02)	07:38	15:59 (T02)	
	20:54	20:24	19:35	61 18:49 (T01)	18:46		17:07	42 16:19 (T02)	16:56	17 16:16 (T02)	
15	06:04	06:32	07:03	17:48 (T01)	07:33		07:09	15:37 (T02)	07:39	16:00 (T02)	
	20:53	20:22	19:34	60 18:48 (T01)	18:44		17:06	42 16:19 (T02)	16:56	17 16:17 (T02)	
16	06:05	06:33	07:04	17:48 (T01)	07:34		07:10	15:37 (T02)	07:40	16:01 (T02)	
	20:53	20:21	19:32	60 18:48 (T01)	18:43		17:05	42 16:19 (T02)	16:57	15 16:16 (T02)	
17	06:06	06:34	07:05	17:48 (T01)	07:35		07:11	15:38 (T02)	07:41	16:02 (T02)	
	20:52	20:19	19:30	59 18:47 (T01)	18:41		17:04	42 16:20 (T02)	16:57	14 16:16 (T02)	
18	06:06	06:35	07:06	17:48 (T01)	07:36		07:12	15:38 (T02)	07:41	16:02 (T02)	
	20:52	20:18	19:29	59 18:47 (T01)	18:40		17:04	42 16:20 (T02)	16:57	14 16:16 (T02)	
19	06:07	06:36	07:07	17:48 (T01)	07:37		07:13	15:38 (T02)	07:42	16:03 (T02)	
	20:51	20:17	19:27	58 18:46 (T01)	18:38		17:03	42 16:20 (T02)	16:58	13 16:16 (T02)	
20	06:08	06:37	07:08	17:48 (T01)	07:39		07:14	15:38 (T02)	07:42	16:05 (T02)	
	20:50	20:15	19:25	57 18:45 (T01)	18:37		17:02	41 16:19 (T02)	16:58	12 16:17 (T02)	
21	06:09	06:38	07:09	17:48 (T01)	07:40		07:16	15:39 (T02)	07:43	16:05 (T02)	
	20:49	20:14	19:24	56 18:44 (T01)	18:35		17:02	41 16:20 (T02)	16:59	12 16:17 (T02)	
22	06:10	06:39	07:10	17:48 (T01)	07:41		07:17	15:39 (T02)	07:44	16:06 (T02)	
	20:49	20:12	19:22	55 18:43 (T01)	18:34		17:01	41 16:20 (T02)	16:59	12 16:18 (T02)	
23	06:11	06:40	07:11	17:48 (T01)	07:42		07:18	15:40 (T02)	07:44	16:06 (T02)	
	20:48	20:11	19:20	53 18:41 (T01)	18:33		17:00	40 16:20 (T02)	17:00	12 16:18 (T02)	
24	06:11	06:41	07:12	17:48 (T01)	07:43		07:19	15:40 (T02)	07:44	16:06 (T02)	
	20:47	20:09	12 18:33 (T01)	19:19	51 18:39 (T01)	18:31	17:00	40 16:20 (T02)	17:00	12 16:18 (T02)	
25	06:12	06:42	18:16 (T01)	07:13	17:49 (T01)	06:44	07:20	15:41 (T02)	07:45	16:06 (T02)	
	20:46	20:08	21 18:37 (T01)	19:17	49 18:38 (T01)	17:30	16:59	38 16:19 (T02)	17:01	13 16:19 (T02)	
26	06:13	06:43	18:13 (T01)	07:14	17:50 (T01)	06:45	07:21	15:41 (T02)	07:45	16:06 (T02)	
	20:45	20:06	27 18:40 (T01)	19:15	46 18:36 (T01)	17:28	16:59	38 16:19 (T02)	17:01	14 16:20 (T02)	
27	06:14	06:44	18:10 (T01)	07:15	17:51 (T01)	06:46	07:22	15:43 (T02)	07:46	16:06 (T02)	
	20:44	20:05	32 18:42 (T01)	19:13	44 18:35 (T01)	17:27	16:58	37 16:20 (T02)	17:02	15 16:21 (T02)	
28	06:15	06:45	18:08 (T01)	07:16	17:53 (T01)	06:48	07:23	15:43 (T02)	07:46	16:07 (T02)	
	20:43	20:03	35 18:43 (T01)	19:12	40 18:33 (T01)	17:26	16:58	37 16:20 (T02)	17:03	15 16:22 (T02)	
29	06:16	06:46	18:06 (T01)	07:17	17:54 (T01)	06:49	07:25	15:44 (T02)	07:46	16:06 (T02)	
	20:42	20:02	39 18:45 (T01)	19:10	36 18:30 (T01)	17:24	16:57	35 16:19 (T02)	17:03	17 16:23 (T02)	
30	06:17	06:47	18:04 (T01)	07:18	17:56 (T01)	06:50	07:26	15:45 (T02)	07:46	16:06 (T02)	
	20:41	20:00	42 18:46 (T01)	19:08	32 18:28 (T01)	17:23	9 15:53 (T02)	16:57	34 16:19 (T02)	17:04	18 16:24 (T02)
31	06:18	06:48	18:02 (T01)			06:51	15:49 (T02)			07:47	16:06 (T02)
	20:40	19:58	45 18:47 (T01)			17:22	17 16:06 (T02)			17:05	19 16:25 (T02)
Potential sun hours	458	427	375	346	299	289					
Total, worst case		253	1600	69	1128	596					

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

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

Progetto_Ala Dei Sardi

Licensed user:

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

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Calculated:

10/11/2023 15:28/3.4.415

SHADOW - Calendar

Calculation: Progetto_20231109Shadow receptor: F215 - A03

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December				
1	07:47	07:34	06:59	07:08	06:23	05:55	05:55	06:19	06:49	07:19	06:52	07:14 (T11)	07:27			
	17:06	17:40	18:14	19:47	20:18	20:47	20:58	20:39	19:57	19:07	17:21	16	07:30 (T11)	16:57		
2	07:47	07:33	06:57	07:07	06:22	05:54	05:56	06:20	06:50	07:20	06:53	07:15 (T11)	07:28			
	17:07	17:41	18:15	19:48	20:19	20:48	20:58	20:38	19:55	19:05	17:20	15	07:30 (T11)	16:57		
3	07:47	07:32	06:56	07:05	06:21	05:54	05:56	06:21	06:51	07:21	06:55	07:16 (T11)	07:29			
	17:08	17:42	18:16	19:49	20:20	20:49	20:58	20:37	19:54	19:04	17:18	13	07:29 (T11)	16:56		
4	07:47	07:31	07:51 (T11)	06:54	07:04	06:19	05:54	05:57	06:22	06:52	07:22	06:56	07:17 (T11)	07:30		
	17:09	17:44	4	07:55 (T11)	18:17	19:50	20:21	20:49	20:58	20:36	19:52	19:02	17:17	11	07:28 (T11)	16:56
5	07:47	07:30	07:50 (T11)	06:53	07:02	06:18	05:53	05:58	06:23	06:53	07:23	06:57	07:19 (T11)	07:31		
	17:10	17:45	7	07:57 (T11)	18:18	19:51	20:22	20:50	20:57	20:35	19:50	19:00	17:16	9	07:28 (T11)	16:56
6	07:47	07:29	07:49 (T11)	06:51	07:00	06:17	05:53	05:58	06:24	06:54	07:24	06:58	07:20 (T11)	07:32		
	17:11	17:46	9	07:58 (T11)	18:19	19:52	20:23	20:51	20:57	20:34	19:49	18:59	17:15	7	07:27 (T11)	16:56
7	07:47	07:28	07:48 (T11)	06:49	06:59	06:16	05:53	05:59	06:25	06:55	07:25	06:59	07:21 (T11)	07:33		
	17:11	17:47	11	07:59 (T11)	18:20	19:53	20:24	20:51	20:57	20:33	19:47	18:57	17:14	4	07:25 (T11)	16:56
8	07:47	07:27	07:46 (T11)	06:48	06:57	06:15	05:52	05:59	06:26	06:56	07:26	07:01			07:34	
	17:12	17:49	13	07:59 (T11)	18:21	19:54	20:25	20:52	20:57	20:31	19:46	18:56	17:13		16:56	
9	07:47	07:26	07:45 (T11)	06:46	06:56	06:14	05:52	06:00	06:27	06:57	07:27	07:02			07:34	
	17:13	17:50	15	08:00 (T11)	18:22	19:55	20:26	20:53	20:56	20:30	19:44	18:54	17:12		16:56	
10	07:47	07:25	07:44 (T11)	06:45	06:54	06:12	05:52	06:01	06:28	06:58	07:28	07:03			07:35	
	17:14	17:51	16	08:00 (T11)	18:24	19:56	20:27	20:53	20:56	20:29	19:42	18:52	17:11		16:56	
11	07:47	07:23	07:43 (T11)	06:43	06:52	06:11	05:52	06:01	06:29	06:59	07:29	07:04			07:36	
	17:15	17:52	18	08:01 (T11)	18:25	19:57	20:28	20:54	20:55	20:28	19:41	18:51	17:10		16:56	
12	07:46	07:22	07:42 (T11)	06:41	06:51	06:10	05:52	06:02	06:30	07:00	07:30	07:05			07:37	
	17:17	17:53	19	08:01 (T11)	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09		16:56	
13	07:46	07:21	07:41 (T11)	06:40	06:49	06:09	05:52	06:03	06:31	07:01	07:31	07:06			07:38	
	17:18	17:55	19	08:00 (T11)	18:27	19:59	20:30	20:55	20:55	20:25	19:37	18:48	17:08		16:56	
14	07:46	07:20	07:42 (T11)	06:38	06:48	06:08	05:52	06:04	06:32	07:02	07:32	07:08			07:38	
	17:19	17:56	17	07:59 (T11)	18:28	20:01	20:31	20:55	20:54	20:24	19:36	18:46	17:07		16:56	
15	07:45	07:18	07:43 (T11)	06:37	06:46	06:07	05:52	06:04	06:33	07:03	07:33	07:09			07:39	
	17:20	17:57	16	07:59 (T11)	18:29	20:02	20:32	20:56	20:53	20:22	19:34	18:45	17:06		16:57	
16	07:45	07:17	07:43 (T11)	06:35	06:45	06:06	05:52	06:05	06:34	07:04	07:34	07:10			07:40	
	17:21	17:58	14	07:57 (T11)	18:30	20:03	20:33	20:56	20:53	20:21	19:32	18:43	17:05		16:57	
17	07:45	07:16	07:46 (T11)	06:33	06:43	06:05	05:52	06:06	06:35	07:05	07:35	07:11			07:41	
	17:22	18:00	9	07:55 (T11)	18:31	20:04	20:34	20:56	20:52	20:20	19:30	18:41	17:05		16:57	
18	07:44	07:14		06:32	06:42	06:04	05:52	06:07	06:36	07:06	07:36	07:12			07:41	
	17:23	18:01		18:32	20:05	20:35	20:57	20:52	20:18	19:29	18:40	17:04			16:58	
19	07:44	07:13		06:30	06:40	06:04	05:52	06:07	06:37	07:07	07:38	07:13			07:42	
	17:24	18:02		18:33	20:06	20:36	20:57	20:51	20:17	19:27	18:39	17:03			16:58	
20	07:43	07:12		06:28	06:39	06:03	05:52	06:08	06:38	07:08	07:39	07:15			07:42	
	17:25	18:03		18:34	20:07	20:37	20:57	20:50	20:15	19:25	18:37	17:02			16:58	
21	07:43	07:10		06:27	06:37	06:02	05:52	06:09	06:38	07:09	07:40	07:16			07:43	
	17:27	18:04		18:35	20:08	20:38	20:57	20:50	20:14	19:24	18:36	17:02			16:59	
22	07:42	07:09		06:25	06:36	06:01	05:52	06:10	06:39	07:10	07:41	07:17			07:44	
	17:28	18:05		18:36	20:09	20:39	20:58	20:49	20:12	19:22	18:34	17:01			16:59	
23	07:41	07:07		06:23	06:34	06:00	05:53	06:11	06:40	07:11	07:42	07:18			07:44	
	17:29	18:07		18:38	20:10	20:40	20:58	20:48	20:11	19:20	18:33	17:00			17:00	
24	07:41	07:06		06:22	06:33	06:00	05:53	06:12	06:41	07:12	07:43	07:19			07:45	
	17:30	18:08		18:39	20:11	20:41	20:58	20:47	20:09	19:19	18:31	2	08:21 (T11)	17:00	17:00	
25	07:40	07:05		06:20	06:31	05:59	05:53	06:13	06:42	07:13	06:44	07:15 (T11)	07:20		07:45	
	17:31	18:09		18:40	20:12	20:42	20:58	20:46	20:08	19:17	17:30	10	07:25 (T11)	16:59	17:01	
26	07:39	07:03		06:18	06:30	05:58	05:53	06:13	06:43	07:14	06:45	07:13 (T11)	07:21		07:45	
	17:33	18:10		18:41	20:13	20:42	20:58	20:45	20:06	19:15	17:29	14	07:27 (T11)	16:59	17:02	
27	07:38	07:02		06:17	06:29	05:58	05:54	06:14	06:44	07:15	06:47	07:12 (T11)	07:22		07:46	
	17:34	18:11		18:42	20:14	20:43	20:58	20:44	20:05	19:14	17:27	17	07:29 (T11)	16:58	17:02	
28	07:38	07:00		06:15	06:27	05:57	05:54	06:15	06:45	07:16	06:48	07:11 (T11)	07:24		07:46	
	17:35	18:12		18:43	20:15	20:44	20:58	20:44	20:03	19:12	17:26	18	07:29 (T11)	16:58	17:03	
29	07:37			07:13	06:26	05:56	05:55	06:16	06:46	07:17	06:49	19	07:10 (T11)	07:25	07:46	
	17:36			19:44	20:16	20:45	20:58	20:43	20:02	19:10	17:25	19	07:29 (T11)	16:58	17:04	
30	07:36			07:12	06:25	05:56	05:55	06:17	06:47	07:18	06:50	19	07:11 (T11)	07:26	07:47	
	17:37			19:45	20:17	20:46	20:58	20:42	20:00	19:09	17:23	19	07:30 (T11)	16:57	17:04	
31	07:35			07:10	06:25	05:55	05:54	06:18	06:48	07:19	06:51	17	07:12 (T11)	07:27	07:47	
	17:39			19:46	20:17	20:47	20:41	20:41	19:59	17:22	17	07:29 (T11)	16:57		17:05	
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	75			289	
Total, worst case		187									116					

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

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

Project:

Progetto_Ala Dei Sardi

Licensed user:

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

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 15:28/3.4.415

SHADOW - Calendar

Calculation: Progetto_20231109Shadow receptor: F279 - A04

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:47	16:05 (T12)	07:34	06:58	07:08	06:23	05:55	05:55	06:19	06:49	07:18	06:52	07:26
	17:06	6 16:11 (T12)	17:40	18:13	19:47	20:18	20:47	20:58	20:39	19:57	19:07	17:21	16:57
2	07:47		07:33	06:57	07:07	06:22	05:54	05:56	06:20	06:50	07:19	06:53	07:27
	17:07		17:41	18:14	19:48	20:19	20:48	20:58	20:38	19:55	19:05	17:19	16:56
3	07:47		07:32	06:55	07:05	06:20	05:54	05:56	06:21	06:51	07:20	06:54	07:28
	17:08		17:42	18:16	19:49	20:20	20:48	20:58	20:37	19:53	19:03	17:18	16:56
4	07:47		07:31	06:54	07:03	06:19	05:53	05:57	06:22	06:52	07:21	06:56	07:29
	17:08		17:43	18:17	19:50	20:21	20:49	20:57	20:36	19:52	19:02	17:17	16:56
5	07:47		07:30	06:52	07:02	06:18	05:53	05:57	06:23	06:53	07:23	06:57	07:30
	17:09		17:45	18:18	19:51	20:22	20:50	20:57	20:35	19:50	19:00	17:16	16:56
6	07:47		07:29	06:51	07:00	06:17	05:53	05:58	06:24	06:54	07:24	06:58	07:31
	17:10		17:46	18:19	19:52	20:23	20:50	20:57	20:34	19:49	18:58	17:15	16:56
7	07:47		07:28	06:49	06:58	06:16	05:52	05:58	06:25	06:55	07:25	06:59	07:32
	17:11		17:47	18:20	19:53	20:24	20:51	20:57	20:32	19:47	18:57	17:14	16:56
8	07:47		07:27	06:48	06:57	06:14	05:52	05:59	06:26	06:56	07:26	07:00	07:33
	17:12		17:48	18:21	19:54	20:25	20:52	20:56	20:31	19:45	18:55	17:13	16:56
9	07:47		07:25	06:46	06:55	06:13	05:52	06:00	06:26	06:57	07:27	07:01	07:34
	17:13		17:50	18:22	19:55	20:26	20:52	20:56	20:30	19:44	18:54	17:12	16:56
10	07:47		07:24	06:44	06:54	06:12	05:52	06:00	06:27	06:58	07:28	07:03	07:35
	17:14		17:51	18:23	19:56	20:27	20:53	20:56	20:29	19:42	18:52	17:11	16:56
11	07:46		07:23	06:43	06:52	06:11	05:52	06:01	06:28	06:59	07:29	07:04	07:36
	17:15		17:52	18:24	19:57	20:28	20:53	20:55	20:27	19:40	18:50	17:10	16:56
12	07:46		07:22	06:41	06:51	06:10	05:52	06:02	06:29	07:00	07:30	07:05	07:37
	17:16		17:53	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	16:56
13	07:46		07:21	06:40	06:49	06:09	05:51	06:03	06:30	07:01	07:31	07:06	07:37
	17:17		17:54	18:27	19:59	20:30	20:54	20:54	20:25	19:37	18:47	17:08	16:56
14	07:46		07:19	06:38	06:47	06:08	05:51	06:03	06:31	07:02	07:32	07:07	07:38
	17:18		17:56	18:28	20:00	20:31	20:55	20:54	20:23	19:35	18:46	17:07	16:56
15	07:45		07:18	06:36	06:46	06:07	05:51	06:04	06:32	07:03	07:33	07:08	07:39
	17:20		17:57	18:29	20:01	20:32	20:55	20:53	20:22	19:34	18:44	17:06	16:56
16	07:45		07:17	06:35	06:44	06:06	05:51	06:05	06:33	07:04	07:34	07:10	07:40
	17:21		17:58	18:30	20:02	20:33	20:56	20:53	20:21	19:32	18:43	17:05	16:57
17	07:44		07:16	06:33	06:43	06:05	05:51	06:06	06:34	07:05	07:35	07:11	07:40
	17:22		17:59	18:31	20:03	20:34	20:56	20:52	20:19	19:30	18:41	17:04	16:57
18	07:44		07:14	06:31	06:41	06:04	05:51	06:06	06:35	07:06	07:36	07:12	07:41
	17:23		18:00	18:32	20:04	20:35	20:56	20:51	20:18	19:29	18:40	17:04	16:57
19	07:43		07:13	06:30	06:40	06:03	05:52	06:07	06:36	07:07	07:37	07:13	07:42
	17:24		18:02	18:33	20:05	20:36	20:57	20:51	20:17	19:27	18:38	17:03	16:58
20	07:43		07:11	06:28	06:38	06:03	05:52	06:08	06:37	07:07	07:38	07:14	07:42
	17:25		18:03	18:34	20:07	20:37	20:57	20:50	20:15	19:25	18:37	17:02	16:58
21	07:42		07:10	06:26	06:37	06:02	05:52	06:09	06:38	07:08	07:40	07:15	07:43
	17:26		18:04	18:35	20:08	20:38	20:57	20:49	20:14	19:23	18:35	17:01	16:59
22	07:42		07:09	06:25	06:35	06:01	05:52	06:10	06:39	07:09	07:41	07:17	07:43
	17:28		18:05	18:36	20:09	20:39	20:57	20:48	20:12	19:22	18:34	17:01	16:59
23	07:41		07:07	06:23	06:34	06:00	05:52	06:11	06:40	07:10	07:42	07:18	07:44
	17:29		18:06	18:37	20:10	20:40	20:58	20:48	20:11	19:20	18:33	17:00	17:00
24	07:40		07:06	06:21	06:33	05:59	05:53	06:11	06:41	07:11	07:43	07:19	07:44
	17:30		18:08	18:38	20:11	20:40	20:58	20:47	20:09	19:18	18:31	17:00	17:00
25	07:40		07:04	06:20	06:31	05:59	05:53	06:12	06:42	07:12	06:44	07:20	07:45
	17:31		18:09	18:39	20:12	20:41	20:58	20:46	20:08	19:17	17:30	16:59	17:01
26	07:39		07:03	06:18	06:30	05:58	05:53	06:13	06:43	07:13	06:45	07:21	07:45
	17:32		18:10	18:40	20:13	20:42	20:58	20:45	20:06	19:15	17:28	16:59	17:01
27	07:38		07:01	06:16	06:28	05:57	05:54	06:14	06:44	07:14	06:46	07:22	07:45
	17:34		18:11	18:41	20:14	20:43	20:58	20:44	20:05	19:13	17:27	16:58	17:02
28	07:37		07:00	06:15	06:27	05:57	05:54	06:15	06:45	07:15	06:47	07:23	07:46
	17:35		18:12	18:43	20:15	20:44	20:58	20:43	20:03	19:12	17:26	16:58	17:03
29	07:36			07:13	06:26	05:56	05:54	06:16	06:46	07:16	06:49	07:24	07:46
	17:36			19:44	20:16	20:45	20:58	20:42	20:01	19:10	17:24	16:57	17:03
30	07:36			07:12	06:24	05:56	05:55	06:17	06:47	07:17	06:50	07:25	07:46
	17:37			19:45	20:17	20:45	20:58	20:41	20:00	19:08	17:23	16:57	17:04
31	07:35			07:10		05:55		06:18	06:48		06:51		07:47
	17:38			19:46		20:46		20:40	19:58		17:22		17:05
Potential sun hours	299		298	370	398	447	451	458	427	375	346	299	289
Total, worst case	6												224

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

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

SHADOW - Calendar

Calculation: Progetto_20231109Shadow receptor: F287 - A04 - C02
 Assumptions for shadow calculations

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

	January	February	March	April	May	June	July	August	September	October	November	December			
1	07:47	07:34	16:33 (T12)	06:58	07:08	06:23	05:55	05:55	06:19	06:49	07:18	06:52	07:26	16:09 (T12)	
2	07:47	07:33	16:35 (T12)	06:57	07:07	06:22	05:54	05:56	06:20	06:50	07:19	06:53	07:27	16:10 (T12)	
3	07:47	17:41	16:46 (T12)	18:14	19:48	20:19	20:48	20:58	20:38	19:55	19:05	17:19	16:56	12	16:22 (T12)
4	07:47	17:42	16:40 (T12)	18:16	19:49	20:20	20:48	20:58	20:37	19:53	19:03	17:18	16:56	9	16:21 (T12)
5	07:47	17:43	16:41 (T12)	18:16	19:50	20:21	20:49	20:57	20:36	19:52	19:02	17:17	16:56	4	16:19 (T12)
6	07:47	17:43	16:41 (T12)	18:16	19:51	20:22	20:50	20:57	20:35	19:50	19:00	17:16	16:56		
7	07:47	17:43	16:41 (T12)	18:16	19:51	20:22	20:50	20:57	20:35	19:50	19:00	17:16	16:56		
8	07:47	17:43	16:41 (T12)	18:16	19:51	20:22	20:50	20:57	20:35	19:50	19:00	17:16	16:56		
9	07:47	17:43	16:41 (T12)	18:16	19:51	20:22	20:50	20:57	20:35	19:50	19:00	17:16	16:56		
10	07:47	17:43	16:41 (T12)	18:16	19:51	20:22	20:50	20:57	20:35	19:50	19:00	17:16	16:56		
11	07:46	16:27 (T12)	17:52	06:43	06:52	06:11	05:52	06:01	06:28	06:59	07:29	07:04	16:02 (T12)	07:36	
12	07:46	16:26 (T12)	17:52	06:41	06:51	06:10	05:52	06:02	06:29	07:00	07:30	07:05	16:01 (T12)	07:37	
13	07:46	16:26 (T12)	17:52	06:40	06:50	06:09	05:51	06:03	06:30	07:01	07:31	07:06	16:00 (T12)	07:37	
14	07:46	16:26 (T12)	17:52	06:38	06:47	06:08	05:51	06:03	06:31	07:02	07:32	07:07	16:00 (T12)	07:38	
15	07:45	16:25 (T12)	17:51	06:36	06:46	06:07	05:51	06:04	06:32	07:03	07:33	07:08	16:00 (T12)	07:39	
16	07:45	16:25 (T12)	17:51	06:35	06:45	06:06	05:51	06:05	06:33	07:04	07:34	07:10	16:00 (T12)	07:40	
17	07:44	16:25 (T12)	17:51	06:33	06:43	06:05	05:51	06:06	06:34	07:05	07:35	07:11	16:00 (T12)	07:41	
18	07:44	16:25 (T12)	17:51	06:31	06:41	06:04	05:52	06:06	06:35	07:06	07:36	07:12	16:00 (T12)	07:42	
19	07:43	16:25 (T12)	17:51	06:30	06:40	06:03	05:52	06:07	06:36	07:07	07:37	07:13	16:00 (T12)	07:43	
20	07:43	16:25 (T12)	17:51	06:28	06:38	06:03	05:52	06:08	06:37	07:08	07:38	07:14	16:00 (T12)	07:44	
21	07:42	16:25 (T12)	17:51	06:26	06:37	06:02	05:52	06:09	06:38	07:09	07:40	07:15	16:00 (T12)	07:45	
22	07:42	16:25 (T12)	17:51	06:25	06:36	06:01	05:52	06:10	06:39	07:10	07:41	07:16	16:00 (T12)	07:46	
23	07:41	16:25 (T12)	17:51	06:23	06:34	06:00	05:52	06:11	06:40	07:11	07:42	07:17	16:00 (T12)	07:47	
24	07:40	16:26 (T12)	17:50	06:21	06:33	05:59	05:53	06:11	06:41	07:12	07:43	07:18	16:00 (T12)	07:48	
25	07:40	16:26 (T12)	17:50	06:20	06:31	05:59	05:53	06:12	06:42	07:13	07:44	07:19	16:00 (T12)	07:49	
26	07:39	16:27 (T12)	17:50	06:18	06:30	05:58	05:53	06:13	06:43	07:14	07:45	07:20	16:00 (T12)	07:50	
27	07:38	16:27 (T12)	17:50	06:16	06:28	05:57	05:54	06:14	06:44	07:15	07:46	07:21	16:00 (T12)	07:51	
28	07:37	16:28 (T12)	17:50	06:15	06:27	05:57	05:54	06:15	06:45	07:16	07:47	07:22	16:00 (T12)	07:52	
29	07:36	16:29 (T12)	17:50	06:13	06:26	05:56	05:54	06:16	06:46	07:17	07:48	07:23	16:00 (T12)	07:53	
30	07:36	16:30 (T12)	17:50	06:12	06:25	05:55	05:54	06:17	06:47	07:18	07:49	07:24	16:00 (T12)	07:54	
31	07:35	16:31 (T12)	17:50	06:11	06:24	05:55	05:54	06:18	06:48	07:19	07:50	07:25	16:00 (T12)	07:55	
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	457	289	39	
Total, worst case	467	26													

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

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

Calculation: Progetto_20231109Shadow receptor: F292 - A03 - C02

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June
1	07:47 17:06	16:24 (T12) 16:26 (T12)	07:34 17:40	16:31 (T12) 16:41 (T12)	06:58 18:13	07:08 18:13
2	07:47 17:07	16:22 (T12) 16:29 (T12)	07:33 17:41	06:57 18:14	07:07 19:48	06:22 20:19
3	07:47 17:08	16:22 (T12) 16:31 (T12)	07:32 17:42	06:55 18:16	07:05 19:49	06:20 20:20
4	07:47 17:08	16:21 (T12) 16:32 (T12)	07:31 17:43	06:54 18:17	07:03 19:50	06:19 20:21
5	07:47 17:09	16:21 (T12) 16:34 (T12)	07:30 17:45	06:52 18:18	07:02 19:51	06:18 20:22
6	07:47 17:10	16:20 (T12) 16:35 (T12)	07:29 17:46	06:51 18:19	07:00 19:52	06:17 20:23
7	07:47 17:11	16:20 (T12) 16:36 (T12)	07:28 17:47	06:49 18:20	06:58 19:53	06:16 20:24
8	07:47 17:12	16:20 (T12) 16:38 (T12)	07:27 17:48	06:48 18:21	06:57 19:54	06:14 20:25
9	07:47 17:13	16:19 (T12) 16:38 (T12)	07:25 17:50	06:46 18:22	17:46 (T06) 17:57 (T06)	06:55 19:55
10	07:47 17:14	16:19 (T12) 16:39 (T12)	07:24 17:51	06:44 18:23	17:44 (T06) 17:58 (T06)	06:54 19:56
11	07:46 17:15	16:19 (T12) 16:40 (T12)	07:23 17:52	06:43 18:24	17:42 (T06) 17:59 (T06)	06:52 19:57
12	07:46 17:16	16:19 (T12) 16:40 (T12)	07:22 17:53	06:41 18:26	17:41 (T06) 18:00 (T06)	06:51 19:58
13	07:46 17:17	16:19 (T12) 16:42 (T12)	07:21 17:54	06:40 18:27	17:40 (T06) 18:00 (T06)	06:49 19:59
14	07:46 17:18	16:19 (T12) 16:43 (T12)	07:19 17:56	06:38 18:28	17:39 (T06) 17:59 (T06)	06:47 20:00
15	07:45 17:20	16:19 (T12) 16:43 (T12)	07:18 17:57	06:36 18:29	17:40 (T06) 18:00 (T06)	06:46 20:01
16	07:45 17:21	16:19 (T12) 16:44 (T12)	07:17 17:58	06:35 18:30	17:39 (T06) 17:59 (T06)	06:44 20:02
17	07:44 17:22	16:19 (T12) 16:44 (T12)	07:16 17:59	06:33 18:31	17:40 (T06) 17:58 (T06)	06:43 20:03
18	07:44 17:23	16:20 (T12) 16:45 (T12)	07:14 18:00	06:31 18:32	17:41 (T06) 17:57 (T06)	06:41 20:04
19	07:43 17:24	16:19 (T12) 16:45 (T12)	07:13 18:02	06:30 18:33	17:41 (T06) 17:55 (T06)	06:40 20:05
20	07:43 17:25	16:20 (T12) 16:46 (T12)	07:11 18:03	06:28 18:34	17:44 (T06) 17:53 (T06)	06:38 20:07
21	07:42 17:26	16:20 (T12) 16:46 (T12)	07:10 18:04	06:26 18:35	20:07 20:08	20:37 20:38
22	07:42 17:28	16:20 (T12) 16:46 (T12)	07:09 18:05	06:25 18:36	06:37 20:09	20:02 20:39
23	07:41 17:29	16:21 (T12) 16:47 (T12)	07:07 18:06	06:23 18:37	06:34 20:10	06:00 20:40
24	07:40 17:30	16:22 (T12) 16:47 (T12)	07:06 18:08	06:21 18:38	06:33 20:11	05:59 20:40
25	07:40 17:31	16:22 (T12) 16:47 (T12)	07:04 18:09	06:20 18:39	06:31 20:12	05:59 20:41
26	07:39 17:32	16:22 (T12) 16:46 (T12)	07:03 18:10	06:18 18:40	06:30 20:13	05:58 20:42
27	07:38 17:34	16:23 (T12) 16:46 (T12)	07:01 18:11	06:16 18:41	06:28 20:14	05:57 20:43
28	07:37 17:35	16:24 (T12) 16:45 (T12)	07:00 18:12	06:15 18:43	06:27 20:15	05:57 20:44
29	07:36 17:36	16:26 (T12) 16:46 (T12)	07:00 18:12	06:13 18:43	06:26 20:16	05:56 20:45
30	07:36 17:37	16:27 (T12) 16:45 (T12)	07:00 18:11	06:12 18:41	06:24 20:17	05:56 20:45
31	07:35 17:38	16:29 (T12) 16:43 (T12)	07:00 18:12	06:10 18:40	20:17 20:18	05:55 20:46
Potential sun hours	299	298	370	398	447	451
Total, worst case	618	10	198			

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

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

Calculation: Progetto_20231109Shadow receptor: F292 - A03 - C02

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December			
1	05:55 20:58	06:19 20:39	06:49 19:57	07:18 19:07	18:20 (T06) 18:39 (T06)	06:52 17:21	07:26 16:57	16:01 (T12) 21 16:22 (T12)	
2	05:56 20:58	06:20 20:38	06:50 19:55	07:19 19:05	18:20 (T06) 18:37 (T06)	06:53 17:19	07:27 16:56	16:02 (T12) 20 16:22 (T12)	
3	05:56 20:58	06:21 20:37	06:51 19:53	07:20 19:03	18:21 (T06) 18:36 (T06)	06:54 17:18	07:28 16:56	16:03 (T12) 19 16:22 (T12)	
4	05:57 20:57	06:22 20:36	06:52 19:52	07:21 19:02	18:22 (T06) 18:34 (T06)	06:56 17:17	07:29 16:56	16:04 (T12) 18 16:22 (T12)	
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	18:24 (T06) 18:31 (T06)	06:57 17:16	07:30 16:56	16:05 (T12) 16 16:21 (T12)	
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	07:27 17:15	06:58 17:15	07:31 16:56	16:06 (T12) 15 16:21 (T12)	
7	05:59 20:57	06:25 20:32	06:55 19:47	07:25 18:57	06:59 17:14	06:59 17:14	07:32 16:56	16:08 (T12) 13 16:21 (T12)	
8	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55	07:00 17:13	07:00 17:13	07:33 16:56	16:09 (T12) 11 16:20 (T12)	
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	07:01 17:12	07:01 17:12	16:06 (T12) 16:07 (T12)	07:34 16:56	16:10 (T12) 10 16:20 (T12)
10	06:00 20:56	06:27 20:29	06:58 19:42	07:28 18:52	07:03 17:11	07:03 17:11	16:02 (T12) 16:12 (T12)	07:35 16:56	16:11 (T12) 7 16:18 (T12)
11	06:01 20:55	06:28 20:27	06:59 19:40	07:29 18:50	07:04 17:10	07:04 17:10	15:59 (T12) 16:14 (T12)	07:36 16:56	16:14 (T12) 3 16:17 (T12)
12	06:02 20:55	06:29 20:26	07:00 19:39	07:30 18:49	07:05 17:09	07:05 17:09	15:58 (T12) 16:16 (T12)	07:37 16:56	
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	07:06 17:08	07:06 17:08	15:58 (T12) 16:18 (T12)	07:37 16:56	
14	06:03 20:54	06:31 20:23	07:02 19:35	07:32 18:46	07:07 17:07	07:07 17:07	15:57 (T12) 16:18 (T12)	07:38 16:56	
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	07:08 17:06	07:08 17:06	15:56 (T12) 16:19 (T12)	07:39 16:56	
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	07:10 17:05	07:10 17:05	15:55 (T12) 16:19 (T12)	07:40 16:57	
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	07:11 17:04	07:11 17:04	15:55 (T12) 16:20 (T12)	07:40 16:57	
18	06:06 20:51	06:35 20:18	07:06 19:29	07:36 18:40	07:12 17:04	07:12 17:04	15:55 (T12) 16:21 (T12)	07:41 16:57	
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	07:13 17:03	07:13 17:03	15:55 (T12) 16:21 (T12)	07:42 16:58	
20	06:08 20:50	06:37 20:15	07:08 19:25	07:38 18:37	07:14 17:02	07:14 17:02	15:55 (T12) 16:21 (T12)	07:42 16:58	
21	06:09 20:49	06:38 20:14	07:08 19:23	07:40 18:35	07:15 17:01	07:15 17:01	15:55 (T12) 16:21 (T12)	07:43 16:59	
22	06:10 20:48	06:39 20:12	07:09 19:22	07:41 18:34	07:17 17:01	07:17 17:01	15:56 (T12) 16:22 (T12)	07:43 16:59	
23	06:11 20:48	06:40 20:11	07:10 19:20	18:28 (T06) 18:36 (T06)	07:42 18:33	07:42 18:33	15:56 (T12) 16:22 (T12)	07:44 17:00	
24	06:11 20:47	06:41 20:09	07:11 19:18	18:25 (T06) 18:38 (T06)	07:43 18:31	07:43 18:31	15:57 (T12) 16:22 (T12)	07:44 17:00	
25	06:12 20:46	06:42 20:08	07:12 19:17	18:23 (T06) 18:39 (T06)	06:44 17:30	06:44 17:30	15:57 (T12) 16:22 (T12)	07:45 17:01	
26	06:13 20:45	06:43 20:06	07:13 19:15	18:22 (T06) 18:40 (T06)	06:45 17:28	06:45 17:28	15:57 (T12) 16:22 (T12)	07:45 17:01	
27	06:14 20:44	06:44 20:05	07:14 19:13	18:21 (T06) 18:40 (T06)	06:46 17:27	06:46 17:27	15:58 (T12) 16:22 (T12)	07:45 17:02	
28	06:15 20:43	06:45 20:03	07:15 19:12	18:20 (T06) 18:40 (T06)	06:47 17:26	06:47 17:26	15:59 (T12) 16:23 (T12)	07:46 17:03	
29	06:16 20:42	06:46 20:01	07:16 19:10	18:20 (T06) 18:40 (T06)	06:49 17:24	06:49 17:24	16:00 (T12) 16:23 (T12)	07:46 17:03	
30	06:17 20:41	06:47 20:00	07:17 19:08	18:20 (T06) 18:39 (T06)	06:50 17:23	06:50 17:23	16:01 (T12) 16:23 (T12)	07:46 17:04	
31	06:18 20:40	06:48 19:58		06:51 17:22				07:47 17:05	
Potential sun hours	458	427	375	346	299	289			
Total, worst case			133	70	481	153			

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

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

Calculation: Progetto_20231109Shadow receptor: F295 - A04 - C02

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June
1	07:47 17:06	09:33 (T04) 15:58 (T05)	07:34 17:40	06:58 18:13	07:08 19:47	06:23 20:18
2	07:47 17:07	09:35 (T04) 15:57 (T05)	07:33 17:41	06:57 18:14	07:07 19:48	06:22 20:19
3	07:47 17:08	09:37 (T04) 15:56 (T05)	07:32 17:42	06:55 18:16	07:05 19:49	06:21 20:20
4	07:47 17:08		07:31 17:43	06:54 18:17	07:03 19:50	06:19 20:21
5	07:47 17:09		07:30 17:45	06:52 18:18	07:02 19:51	06:18 20:22
6	07:47 17:10		07:29 17:46	06:51 18:19	07:00 19:52	06:17 20:23
7	07:47 17:11		07:28 17:47	06:49 18:20	06:59 19:53	06:16 20:24
8	07:47 17:12		07:27 17:48	06:48 18:21	06:57 19:54	06:15 20:25
9	07:47 17:13		07:26 17:50	06:46 18:22	06:55 19:55	06:13 20:26
10	07:47 17:14		07:24 17:51	06:44 18:23	06:54 19:56	06:12 20:27
11	07:47 17:15		07:23 17:52	06:43 18:24	17:49 (T03) 18:01 (T03)	06:11 20:28
12	07:46 17:16		07:22 17:53	06:41 18:26	17:47 (T03) 18:03 (T03)	06:10 20:29
13	07:46 17:17		07:21 17:54	06:40 18:27	17:45 (T03) 18:04 (T03)	06:09 20:30
14	07:46 17:18		07:19 17:56	06:38 18:28	17:44 (T03) 18:06 (T03)	06:08 20:31
15	07:45 17:20		07:18 17:57	06:36 18:29	17:42 (T03) 18:06 (T03)	06:07 20:32
16	07:45 17:21		07:17 17:58	06:35 18:30	17:41 (T03) 18:06 (T03)	06:06 20:33
17	07:44 17:22		07:16 17:59	06:33 18:31	17:41 (T03) 18:06 (T03)	06:05 20:34
18	07:44 17:23		07:14 18:01	06:31 18:32	17:41 (T03) 18:06 (T03)	06:04 20:35
19	07:44 17:24		07:13 18:02	06:30 18:33	17:40 (T03) 18:05 (T03)	06:03 20:36
20	07:43 17:25		07:12 18:03	06:28 18:34	17:41 (T03) 18:05 (T03)	06:03 20:37
21	07:42 17:26		07:10 18:04	06:26 18:35	17:41 (T03) 18:04 (T03)	06:02 20:38
22	07:42 17:28		07:09 18:05	06:25 18:36	17:41 (T03) 18:03 (T03)	06:01 20:39
23	07:41 17:29		07:07 18:06	06:23 18:37	17:42 (T03) 18:02 (T03)	06:00 20:40
24	07:40 17:30		07:06 18:08	06:22 18:38	17:43 (T03) 18:00 (T03)	05:59 20:41
25	07:40 17:31		07:04 18:09	06:20 18:39	17:45 (T03) 17:57 (T03)	05:59 20:41
26	07:39 17:32		07:03 18:10	06:18 18:41		06:30 20:42
27	07:38 17:34		07:01 18:11	06:17 18:42		06:28 20:43
28	07:37 17:35		07:00 18:12	06:15 18:43		06:27 20:44
29	07:37 17:36			07:13 19:44		06:26 20:45
30	07:36 17:37			07:12 19:45		06:24 20:46
31	07:35 17:39			07:10 19:46		06:24 20:46
Potential sun hours	299	298	300	300	398	447
Total, worst case	65		311			451

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

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

Calculation: Progetto_20231109Shadow receptor: F295 - A04 - C02

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December	
1	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	18:25 (T03) 18:42 (T03)	06:52 17:21	07:27 16:57
2	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	18:26 (T03) 18:40 (T03)	06:53 17:19	07:28 16:57
3	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:03	18:29 (T03) 18:37 (T03)	06:54 17:18	07:29 16:56
4	05:57 20:58	06:22 20:36	06:52 19:52	07:22 19:02		06:56 17:17	07:30 16:56
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00		06:57 17:16	07:31 16:56
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59		06:58 17:15	07:32 16:56
7	05:59 20:57	06:25 20:33	06:55 19:47	07:25 18:57		06:59 17:14	07:32 16:56
8	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55		07:00 17:13	07:33 16:56
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54		07:02 17:12	07:34 16:56
10	06:00 20:56	06:28 20:29	06:58 19:42	07:28 18:52		07:03 17:11	07:35 16:56
11	06:01 20:55	06:29 20:28	06:59 19:40	07:29 18:51		07:04 17:10	07:36 16:56
12	06:02 20:55	06:29 20:26	07:00 19:39	07:30 18:49		07:05 17:09	07:37 16:56
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47		07:06 17:08	07:38 16:56
14	06:03 20:54	06:31 20:24	07:02 19:35	07:32 18:46		07:07 17:07	07:38 16:56
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44		07:09 17:06	07:39 16:56
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43		07:10 17:05	07:40 16:57
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41		07:11 17:04	07:40 16:57
18	06:06 20:52	06:35 20:18	07:06 19:29	18:34 (T03) 18:44 (T03)	07:36 18:40	07:12 17:04	07:41 16:57
19	06:07 20:51	06:36 20:17	07:07 19:27	18:31 (T03) 18:47 (T03)	07:37 18:38	07:13 17:03	07:42 16:58
20	06:08 20:50	06:37 20:15	07:08 19:25	18:29 (T03) 18:48 (T03)	07:39 18:37	07:14 17:02	07:42 16:58
21	06:09 20:49	06:38 20:14	07:09 19:24	18:28 (T03) 18:49 (T03)	07:40 18:35	07:16 17:02	07:43 16:59
22	06:10 20:49	06:39 20:12	07:10 19:22	18:25 (T03) 18:48 (T03)	07:41 18:34	07:17 17:01	07:43 16:59
23	06:11 20:48	06:40 20:11	07:11 19:20	18:24 (T03) 18:48 (T03)	07:42 18:33	07:18 17:00	07:44 17:00
24	06:12 20:47	06:41 20:09	07:12 19:18	18:24 (T03) 18:48 (T03)	07:43 18:31	07:19 17:00	07:44 17:00
25	06:12 20:46	06:42 20:08	07:13 19:17	18:23 (T03) 18:48 (T03)	06:44 17:30	07:20 16:59	07:45 17:01
26	06:13 20:45	06:43 20:06	07:13 19:15	18:23 (T03) 18:48 (T03)	06:45 17:28	07:21 16:59	07:45 17:01
27	06:14 20:44	06:44 20:05	07:14 19:13	18:23 (T03) 18:47 (T03)	06:46 17:27	07:22 16:58	07:46 17:02
28	06:15 20:43	06:45 20:03	07:15 19:12	18:23 (T03) 18:46 (T03)	06:48 17:26	07:23 16:58	07:46 17:03
29	06:16 20:42	06:46 20:02	07:17 19:10	18:23 (T03) 18:45 (T03)	06:49 17:24	07:24 16:57	07:46 17:03
30	06:17 20:41	06:47 20:00	07:18 19:08	18:24 (T03) 18:44 (T03)	06:50 17:23	07:26 16:57	07:46 17:04
31	06:18 20:40	06:48 19:58			06:51 17:22		07:47 17:05
Potential sun hours	458	427	375	346	299	289	881
Total, worst case			276	39			

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

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

Calculation: Progetto_20231109Shadow receptor: F313 - Pascolo

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June		
1	07:47 17:06	16:03 (T15) 16:13 (T15)	07:34 17:40	16:49 (T12) 17:10 (T12)	06:58 18:13	07:08 19:47	06:23 20:18	05:55 20:47
2	07:47 17:07	16:04 (T15) 16:13 (T15)	07:33 17:41	16:49 (T12) 17:11 (T12)	06:57 18:14	07:07 19:48	06:22 20:19	05:54 20:48
3	07:47 17:08	16:05 (T15) 16:12 (T15)	07:32 17:42	16:48 (T12) 17:11 (T12)	06:55 18:16	07:05 19:49	06:20 20:20	05:54 20:48
4	07:47 17:08	16:09 (T15) 16:10 (T15)	07:31 17:43	16:48 (T12) 17:12 (T12)	06:54 18:17	07:03 19:50	06:19 20:21	05:53 20:49
5	07:47 17:09		07:30 17:45	16:48 (T12) 17:12 (T12)	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:50
6	07:47 17:10		07:29 17:46	16:48 (T12) 17:11 (T12)	06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:50
7	07:47 17:11		07:28 17:47	16:48 (T12) 17:12 (T12)	06:49 18:20	06:58 19:53	06:16 20:24	05:52 20:51
8	07:47 17:12		07:27 17:48	16:48 (T12) 17:12 (T12)	06:48 18:21	06:57 19:54	06:14 20:25	05:52 20:52
9	07:47 17:13		07:25 17:50	16:49 (T12) 17:11 (T12)	06:46 18:22	06:55 19:55	06:13 20:26	05:52 20:52
10	07:47 17:14		07:24 17:51	16:50 (T12) 17:11 (T12)	06:44 18:23	06:54 19:56	06:12 20:27	05:52 20:53
11	07:46 17:15		07:23 17:52	16:51 (T12) 17:11 (T12)	06:43 18:24	06:52 19:57	06:11 20:28	05:52 20:53
12	07:46 17:16		07:22 17:53	16:52 (T12) 17:09 (T12)	06:41 18:26	06:51 19:58	06:10 20:29	05:52 20:54
13	07:46 17:17		07:21 17:54	16:53 (T12) 17:07 (T12)	06:40 18:27	06:49 19:59	06:09 20:30	05:51 20:54
14	07:46 17:18		07:19 17:56	16:56 (T12) 17:05 (T12)	06:38 18:28	06:47 20:00	06:08 20:31	05:51 20:55
15	07:45 17:20		07:18 17:57		06:36 18:29	06:46 20:01	06:07 20:32	05:51 20:55
16	07:45 17:21		07:17 17:58		06:35 18:30	06:44 20:02	06:06 20:33	05:51 20:56
17	07:44 17:22		07:15 17:59		06:33 18:31	06:43 20:03	06:05 20:34	05:51 20:56
18	07:44 17:23		07:14 18:00		06:31 18:32	06:41 20:04	06:04 20:35	05:52 20:56
19	07:43 17:24		07:13 18:02		06:30 18:33	06:40 20:05	06:03 20:36	05:52 20:57
20	07:43 17:25		07:11 18:03		06:28 18:34	06:38 20:07	06:03 20:37	05:52 20:57
21	07:42 17:26		07:10 18:04		06:26 18:35	06:37 20:08	06:02 20:38	05:52 20:57
22	07:42 17:28		07:09 18:05		06:25 18:36	06:35 20:09	06:01 20:39	05:52 20:57
23	07:41 17:29		07:07 18:06		06:23 18:37	06:34 20:10	06:00 20:40	05:52 20:58
24	07:40 17:30		07:06 18:08		06:21 18:38	06:33 20:11	05:59 20:40	05:53 20:58
25	07:40 17:31		07:04 18:09		06:20 18:39	06:31 20:12	05:59 20:41	05:53 20:58
26	07:39 17:32		07:03 18:10		06:18 18:40	06:30 20:13	05:58 20:42	05:53 20:58
27	07:38 17:34	16:55 (T12) 17:01 (T12)	07:01 18:11		06:16 18:41	06:28 20:14	05:57 20:43	05:54 20:58
28	07:37 17:35	16:52 (T12) 17:04 (T12)	07:00 18:12		06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:58
29	07:36 17:36	16:52 (T12) 17:06 (T12)			07:13 19:44	06:26 20:16	05:56 20:45	05:54 20:58
30	07:36 17:37	16:51 (T12) 17:08 (T12)			07:12 19:45	06:24 20:17	05:56 20:45	05:55 20:58
31	07:35 17:38	16:50 (T12) 17:09 (T12)			07:10 19:46		05:55 20:46	
Potential sun hours	299		298		370	398	447	451
Total, worst case	95		288					

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

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

Calculation: Progetto_20231109Shadow receptor: F313 - Pascolo

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October		November		December		
1	05:55 20:58	06:19 20:39	06:49 19:57	07:18 19:07		06:52 17:21	21	16:19 (T12) 16:40 (T12)	07:26 16:57	
2	05:56 20:58	06:20 20:38	06:50 19:55	07:19 19:05		06:53 17:19	22	16:19 (T12) 16:41 (T12)	07:27 16:56	
3	05:56 20:58	06:21 20:37	06:51 19:53	07:20 19:03		06:54 17:18	23	16:18 (T12) 16:41 (T12)	07:28 16:56	
4	05:57 20:57	06:22 20:36	06:52 19:52	07:21 19:02		06:56 17:17	23	16:18 (T12) 16:41 (T12)	07:29 16:56	
5	05:57 20:57	06:23 20:35	06:53 19:50	07:22 19:00		06:57 17:16	24	16:17 (T12) 16:41 (T12)	07:30 16:56	
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:58		06:58 17:15	24	16:18 (T12) 16:42 (T12)	07:31 16:56	
7	05:59 20:57	06:25 20:32	06:55 19:47	07:25 18:57		06:59 17:14	24	16:18 (T12) 16:42 (T12)	07:32 16:56	
8	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55		07:00 17:13	23	16:18 (T12) 16:41 (T12)	07:33 16:56	
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54		07:01 17:12	21	16:19 (T12) 16:40 (T12)	07:34 16:56	6 15:55 (T15) 16:01 (T15)
10	06:00 20:56	06:27 20:29	06:58 19:42	07:28 18:52		07:03 17:11	21	16:20 (T12) 16:41 (T12)	07:35 16:56	9 15:53 (T15) 16:02 (T15)
11	06:01 20:55	06:28 20:27	06:59 19:40	07:29 18:50		07:04 17:10	19	16:21 (T12) 16:40 (T12)	07:36 16:56	10 15:53 (T15) 16:03 (T15)
12	06:02 20:55	06:29 20:26	07:00 19:39	07:30 18:49		07:05 17:09	17	16:22 (T12) 16:39 (T12)	07:37 16:56	11 15:53 (T15) 16:04 (T15)
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47		07:06 17:08	14	16:23 (T12) 16:37 (T12)	07:37 16:56	12 15:53 (T15) 16:05 (T15)
14	06:03 20:54	06:31 20:23	07:02 19:35	07:32 18:46		07:07 17:07	11	16:25 (T12) 16:36 (T12)	07:38 16:56	14 15:53 (T15) 16:07 (T15)
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44		07:08 17:06	5	16:28 (T12) 16:33 (T12)	07:39 16:56	14 15:53 (T15) 16:07 (T15)
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43		07:10 17:05		07:40 16:57	07:40 16:57	15 15:53 (T15) 16:08 (T15)
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41		07:11 17:04		07:40 16:57	07:40 16:57	15 15:54 (T15) 16:09 (T15)
18	06:06 20:51	06:35 20:18	07:06 19:29	07:36 18:40		07:12 17:04		07:41 16:57	07:41 16:57	15 15:53 (T15) 16:09 (T15)
19	06:07 20:51	06:36 20:16	07:07 19:27	07:37 18:38		07:13 17:03		07:42 16:58	07:42 16:58	16 15:54 (T15) 16:10 (T15)
20	06:08 20:50	06:37 20:15	07:07 19:25	07:38 18:37		07:14 17:02		07:42 16:58	07:42 16:58	16 15:54 (T15) 16:10 (T15)
21	06:09 20:49	06:38 20:14	07:08 19:23	07:40 18:35		07:15 17:01		07:43 16:59	07:43 16:59	16 15:55 (T15) 16:11 (T15)
22	06:10 20:48	06:39 20:12	07:09 19:22	07:41 18:34		07:17 17:01		07:43 16:59	07:43 16:59	16 15:55 (T15) 16:11 (T15)
23	06:11 20:48	06:40 20:11	07:10 19:20	07:42 18:33		07:18 17:00		07:44 17:00	07:44 17:00	16 15:56 (T15) 16:12 (T15)
24	06:11 20:47	06:41 20:09	07:11 19:18	07:43 18:31		07:19 17:00		07:44 17:00	07:44 17:00	16 15:56 (T15) 16:12 (T15)
25	06:12 20:46	06:42 20:08	07:12 19:17	06:44 17:30		07:20 16:59		07:45 17:01	07:45 17:01	16 15:57 (T15) 16:13 (T15)
26	06:13 20:45	06:43 20:06	07:13 19:15	06:45 17:28		07:21 16:59		07:45 17:01	07:45 17:01	16 15:57 (T15) 16:13 (T15)
27	06:14 20:44	06:44 20:05	07:14 19:13	06:46 17:27		07:22 16:58		07:45 17:02	07:45 17:02	16 15:58 (T15) 16:13 (T15)
28	06:15 20:43	06:45 20:03	07:15 19:12	06:47 17:26	11 16:24 (T12)	07:23 16:58		07:46 17:03	07:46 17:03	15 15:58 (T15) 16:13 (T15)
29	06:16 20:42	06:46 20:01	07:16 19:10	06:49 17:24	15 16:38 (T12)	07:24 16:57		07:46 17:03	07:46 17:03	15 16:00 (T15) 16:14 (T15)
30	06:17 20:41	06:47 20:00	07:17 19:08	06:50 17:23	18 16:39 (T12)	07:25 16:57		07:46 17:04	07:46 17:04	14 16:01 (T15) 16:14 (T15)
31	06:18 20:40	06:48 19:58		06:51 17:22	19 16:39 (T12)			07:47 17:05	07:47 17:05	13 16:01 (T15) 16:13 (T15)
Potential sun hours	458	427	375	346		299		289		
Total, worst case				63		292		319		

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

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

Progetto_Ala Dei Sardi

Licensed user:

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

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 15:28/3.4.415

SHADOW - Calendar

Calculation: Progetto_20231109Shadow receptor: F315 - A04

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:47	07:34	16:40 (T12)	06:58	07:08	06:23	05:55	05:55	06:19	06:49	07:18	06:52	16:14 (T12)	07:26
	17:06	17:40	25 17:05 (T12)	18:13	19:47	20:18	20:47	20:58	20:39	19:57	19:07	17:21	17 16:31 (T12)	16:57
2	07:47	07:33	16:40 (T12)	06:57	07:07	06:22	05:54	05:56	06:20	06:50	07:19	06:53	16:14 (T12)	07:27
	17:07	17:41	26 17:06 (T12)	18:14	19:48	20:19	20:48	20:58	20:38	19:55	19:05	17:19	19 16:33 (T12)	16:56
3	07:47	07:32	16:41 (T12)	06:55	07:05	06:20	05:54	05:56	06:21	06:51	07:20	06:54	16:12 (T12)	07:28
	17:08	17:42	25 17:06 (T12)	18:16	19:49	20:20	20:48	20:58	20:37	19:53	19:03	17:18	22 16:34 (T12)	16:56
4	07:47	07:31	16:41 (T12)	06:54	07:03	06:19	05:53	05:57	06:22	06:52	07:21	06:56	16:12 (T12)	07:29
	17:08	17:43	25 17:06 (T12)	18:17	19:50	20:21	20:49	20:57	20:36	19:52	19:02	17:17	22 16:34 (T12)	16:56
5	07:47	07:30	16:41 (T12)	06:52	07:02	06:18	05:53	05:57	06:23	06:53	07:23	06:57	16:11 (T12)	07:30
	17:09	17:45	25 17:06 (T12)	18:18	19:51	20:22	20:50	20:57	20:35	19:50	19:00	17:16	24 16:35 (T12)	16:56
6	07:47	07:29	16:41 (T12)	06:51	07:00	06:17	05:53	05:58	06:24	06:54	07:24	06:58	16:11 (T12)	07:31
	17:10	17:46	24 17:05 (T12)	18:19	19:52	20:23	20:50	20:57	20:34	19:49	18:59	17:15	25 16:36 (T12)	16:56
7	07:47	07:28	16:42 (T12)	06:49	06:58	06:16	05:52	05:59	06:25	06:55	07:25	06:59	16:11 (T12)	07:32
	17:11	17:47	22 17:04 (T12)	18:20	19:53	20:24	20:51	20:57	20:32	19:47	18:57	17:14	25 16:36 (T12)	16:56
8	07:47	07:27	16:43 (T12)	06:48	06:57	06:14	05:52	05:59	06:26	06:56	07:26	07:00	16:10 (T12)	07:33
	17:12	17:48	21 17:04 (T12)	18:21	19:54	20:25	20:52	20:56	20:31	19:45	18:55	17:13	26 16:36 (T12)	16:56
9	07:47	07:25	16:44 (T12)	06:46	06:55	06:13	05:52	06:00	06:27	06:57	07:27	07:01	16:10 (T12)	07:34
	17:13	17:50	19 17:03 (T12)	18:22	19:55	20:26	20:52	20:56	20:30	19:44	18:54	17:12	25 16:35 (T12)	16:56
10	07:47	07:24	16:46 (T12)	06:44	06:54	06:12	05:52	06:00	06:27	06:58	07:28	07:03	16:11 (T12)	07:35
	17:14	17:51	16 17:02 (T12)	18:23	19:56	20:27	20:53	20:56	20:29	19:42	18:52	17:11	25 16:36 (T12)	16:56
11	07:46	07:23	16:48 (T12)	06:43	06:52	06:11	05:52	06:01	06:28	06:59	07:29	07:04	16:11 (T12)	07:36
	17:15	17:52	13 17:01 (T12)	18:24	19:57	20:28	20:53	20:55	20:27	19:40	18:50	17:10	25 16:36 (T12)	16:56
12	07:46	07:22	16:50 (T12)	06:41	06:51	06:10	05:52	06:02	06:29	07:00	07:30	07:05	16:12 (T12)	07:37
	17:16	17:53	7 16:57 (T12)	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	23 16:35 (T12)	16:56
13	07:46	07:21	16:40 (T12)	06:40	06:49	06:09	05:51	06:03	06:30	07:01	07:31	07:06	16:12 (T12)	07:37
	17:17	17:54	18:27	19:59	20:30	20:54	20:54	20:25	20:37	18:47	17:08	23 16:35 (T12)	16:56	07:38
14	07:46	07:19	16:38 (T12)	06:47	06:08	05:51	06:03	06:31	07:02	07:32	07:07	07:07	16:14 (T12)	07:38
	17:18	17:56	18:28	20:00	20:31	20:55	20:54	20:23	19:35	18:46	17:07	21 16:35 (T12)	16:56	07:39
15	07:45	07:18	16:36 (T12)	06:46	06:07	05:51	06:04	06:32	07:03	07:33	07:08	07:08	16:14 (T12)	07:39
	17:20	17:57	18:29	20:01	20:32	20:55	20:53	20:22	19:34	18:44	17:06	20 16:34 (T12)	16:56	07:40
16	07:45	07:17	16:35 (T12)	06:44	06:06	05:51	06:05	06:33	07:04	07:34	07:10	17:06	16:15 (T12)	07:40
	17:21	17:58	18:30	20:02	20:33	20:56	20:53	20:21	19:32	18:43	17:05	18 16:33 (T12)	16:57	07:41
17	07:44	07:16	16:33 (T12)	06:43	06:05	05:51	06:06	06:34	07:05	07:35	07:11	17:12	16:16 (T12)	07:40
	17:22	17:59	18:31	20:03	20:34	20:56	20:52	20:19	19:30	18:41	17:04	16 16:32 (T12)	16:57	07:41
18	07:44	07:14	16:31 (T12)	06:41	06:04	05:52	06:06	06:35	07:06	07:36	07:12	17:04	16:19 (T12)	07:41
	17:23	18:00	18:32	20:04	20:35	20:56	20:51	20:18	19:29	18:40	17:04	12 16:31 (T12)	16:57	07:42
19	07:43	07:13	16:30 (T12)	06:40	06:03	05:52	06:07	06:36	07:07	07:37	07:13	17:02	16:21 (T12)	07:42
	17:24	18:02	18:33	20:05	20:36	20:57	20:51	20:16	19:27	18:38	17:03	8 16:29 (T12)	16:58	07:43
20	07:43	07:11	16:28 (T12)	06:38	06:03	05:52	06:08	06:37	07:08	07:38	07:14	17:02	16:15 (T12)	07:44
	17:25	18:03	18:34	20:07	20:37	20:57	20:50	20:15	19:25	18:37	17:02	16:16 (T12)	16:58	07:45
21	07:42	07:10	16:26 (T12)	06:37	06:02	05:52	06:09	06:38	07:08	07:40	07:15	17:01	16:16 (T12)	07:43
	17:26	18:04	18:35	20:08	20:38	20:57	20:49	20:14	19:23	18:35	17:01	16:17 (T12)	16:59	07:44
22	07:42	07:09	16:25 (T12)	06:35	06:01	05:52	06:10	06:39	07:09	07:41	07:17	17:01	16:17 (T12)	07:43
	17:28	18:05	18:36	20:09	20:39	20:57	20:48	20:12	19:22	18:34	17:01	16:18 (T12)	16:59	07:44
23	07:41	16:47 (T12)	07:07	06:23	06:34	06:00	05:52	06:11	06:40	07:10	07:42	07:18	16:18 (T12)	07:44
	17:29	8 16:55 (T12)	18:06	18:37	20:10	20:40	20:58	20:48	20:11	19:20	18:33	17:00	16:19 (T12)	07:45
24	07:40	16:45 (T12)	07:06	06:21	06:33	05:59	05:53	06:11	06:41	07:11	07:43	07:19	16:19 (T12)	07:44
	17:30	12 16:57 (T12)	18:08	18:38	20:11	20:40	20:58	20:47	20:09	19:18	18:31	17:00	16:20 (T12)	07:45
25	07:40	16:43 (T12)	07:04	06:20	06:31	05:59	05:53	06:12	06:42	07:12	07:44	07:20	16:20 (T12)	07:45
	17:31	16 16:59 (T12)	18:09	18:39	20:12	20:41	20:58	20:46	20:08	19:17	17:30	16:59	16:21 (T12)	07:46
26	07:39	16:42 (T12)	07:03	06:18	06:30	05:58	05:53	06:13	06:43	07:13	07:45	07:21	16:22 (T12)	07:45
	17:32	18 17:00 (T12)	18:10	18:40	20:13	20:42	20:58	20:45	20:06	19:15	17:28	16:59	16:23 (T12)	07:46
27	07:38	16:41 (T12)	07:01	06:16	06:28	05:57	05:54	06:14	06:44	07:14	07:46	07:22	16:24 (T12)	07:45
	17:34	20 17:01 (T12)	18:11	18:41	20:14	20:43	20:58	20:44	20:05	19:13	17:27	16:58	16:25 (T12)	07:46
28	07:37	16:41 (T12)	07:00	06:15	06:27	05:57	05:54	06:15	06:45	07:15	07:47	07:23	16:26 (T12)	07:46
	17:35	21 17:02 (T12)	18:12	18:43	20:15	20:44	20:58	20:43	20:03	19:12	17:26	16:58	16:27 (T12)	07:47
29	07:36	16:41 (T12)	07:00	07:13	06:26	05:56	05:54	06:16	06:46	07:16	07:46	07:24	16:28 (T12)	07:46
	17:36	23 17:04 (T12)	18:13	19:44	20:16	20:45	20:58	20:42	20:01	19:10	17:24	16:57	16:29 (T12)	07:47
30	07:36	16:41 (T12)	07:00	07:12	06:24	05:56	05:55	06:17	06:47	07:17	07:47	07:25	16:30 (T12)	07:46
	17:37	23 17:04 (T12)	18:14	19:45	20:17	20:45	20:58	20:41	20:00	19:08	17:23	9 16:28 (T12)	16:57	07:47
31	07:35	16:40 (T12)	07:00	07:10	06:22	05:55	05:54	06:18	06:48	07:18	07:48	07:24	16:31 (T12)	07:47
	17:38	25 17:05 (T12)	18:15	19:46	20:18	20:46	20:40	20:40	19:58	19:08	17:22	14 16:30 (T12)	16:58	07:48
Potential sun hours	299	298	370	398	447	451	458	427	375	346	23	299	396	289
Total, worst case	166	248	370	398	447	451	458	427	375	346	23	299	396	289

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

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

Calculation: Progetto_20231109Shadow receptor: F322 - A04

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June		
1	07:47 17:06	16:02 (T15) 16:20 (T15)	07:34 17:40	16:58 (T12) 17:12 (T12)	06:58 18:13	07:08 19:47	06:23 20:18	05:55 20:47
2	07:47 17:07	16:03 (T15) 16:21 (T15)	07:33 17:41	16:57 (T12) 17:13 (T12)	06:57 18:14	07:07 19:48	06:22 20:19	05:54 20:48
3	07:47 17:08	16:04 (T15) 16:21 (T15)	07:32 17:42	16:56 (T12) 17:15 (T12)	06:55 18:16	07:05 19:49	06:20 20:20	05:54 20:48
4	07:47 17:08	16:05 (T15) 16:21 (T15)	07:31 17:43	16:55 (T12) 17:16 (T12)	06:54 18:17	07:03 19:50	06:19 20:21	05:53 20:49
5	07:47 17:09	16:06 (T15) 16:20 (T15)	07:30 17:45	16:55 (T12) 17:17 (T12)	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:50
6	07:47 17:10	16:07 (T15) 16:20 (T15)	07:29 17:46	16:53 (T12) 17:17 (T12)	06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:50
7	07:47 17:11	16:09 (T15) 16:20 (T15)	07:28 17:47	16:53 (T12) 17:17 (T12)	06:49 18:20	06:58 19:53	06:16 20:24	05:52 20:51
8	07:47 17:12	16:11 (T15) 16:19 (T15)	07:27 17:48	16:53 (T12) 17:18 (T12)	06:48 18:21	06:57 19:54	06:14 20:25	05:52 20:52
9	07:47 17:13	16:13 (T15) 16:16 (T15)	07:25 17:50	16:53 (T12) 17:18 (T12)	06:46 18:22	06:55 19:55	06:13 20:26	05:52 20:52
10	07:47 17:14		07:24 17:51	16:54 (T12) 17:18 (T12)	06:44 18:23	06:54 19:56	06:12 20:27	05:52 20:53
11	07:46 17:15		07:23 17:52	16:54 (T12) 17:18 (T12)	06:43 18:24	06:52 19:57	06:11 20:28	05:52 20:53
12	07:46 17:16		07:22 17:53	16:54 (T12) 17:17 (T12)	06:41 18:26	06:51 19:58	06:10 20:29	05:52 20:54
13	07:46 17:17		07:21 17:54	16:54 (T12) 17:17 (T12)	06:40 18:27	06:49 19:59	06:09 20:30	05:51 20:54
14	07:46 17:18		07:19 17:56	16:56 (T12) 17:17 (T12)	06:38 18:28	06:47 20:00	06:08 20:31	05:51 20:55
15	07:45 17:20		07:18 17:57	16:56 (T12) 17:15 (T12)	06:36 18:29	06:46 20:01	06:07 20:32	05:51 20:55
16	07:45 17:21		07:17 17:58	16:58 (T12) 17:14 (T12)	06:35 18:30	06:44 20:02	06:06 20:33	05:51 20:56
17	07:44 17:22		07:15 17:59	17:00 (T12) 17:12 (T12)	06:33 18:31	06:43 20:03	06:05 20:34	05:51 20:56
18	07:44 17:23		07:14 18:00	17:03 (T12) 17:08 (T12)	06:31 18:32	06:41 20:04	06:04 20:35	05:52 20:56
19	07:43 17:24		07:13 18:02		06:30 18:33	06:40 20:05	06:03 20:36	05:52 20:57
20	07:43 17:25		07:11 18:03		06:28 18:34	06:38 20:07	06:03 20:37	05:52 20:57
21	07:42 17:26		07:10 18:04		06:26 18:35	06:37 20:08	06:02 20:38	05:52 20:57
22	07:42 17:28		07:09 18:05		06:25 18:36	06:35 20:09	06:01 20:39	05:52 20:57
23	07:41 17:29		07:07 18:06		06:23 18:37	06:34 20:10	06:00 20:40	05:52 20:58
24	07:40 17:30		07:06 18:08		06:21 18:38	06:33 20:11	05:59 20:40	05:53 20:58
25	07:40 17:31		07:04 18:09		06:20 18:39	06:31 20:12	05:59 20:41	05:53 20:58
26	07:39 17:32		07:03 18:10		06:18 18:40	06:30 20:13	05:58 20:42	05:53 20:58
27	07:38 17:34		07:01 18:11		06:16 18:41	06:28 20:14	05:57 20:43	05:54 20:58
28	07:37 17:35		07:00 18:12		06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:58
29	07:36 17:36				07:13 19:44	06:26 20:16	05:56 20:45	05:54 20:58
30	07:36 17:37				07:12 19:45	06:24 20:17	05:56 20:45	05:55 20:58
31	07:35 17:38	17:01 (T12) 17:09 (T12)			07:10 19:46		05:55 20:46	
Potential sun hours	299		298	370	398	447	451	
Total, worst case	126		357					

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

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

Calculation: Progetto_20231109Shadow receptor: F322 - A04

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December	
1	05:55 20:58	06:19 20:39	06:49 19:57	07:18 19:07	06:52 17:21	16:22 (T12) 16:47 (T12)	07:26 16:57
2	05:56 20:58	06:20 20:38	06:50 19:55	07:19 19:05	06:53 17:19	16:23 (T12) 16:48 (T12)	07:27 16:56
3	05:56 20:58	06:21 20:37	06:51 19:53	07:20 19:03	06:54 17:18	16:23 (T12) 16:47 (T12)	07:28 16:56
4	05:57 20:57	06:22 20:36	06:52 19:52	07:21 19:02	06:56 17:17	16:23 (T12) 16:47 (T12)	07:29 16:56
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	06:57 17:16	16:23 (T12) 16:46 (T12)	07:30 16:56
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:58	06:58 17:15	16:25 (T12) 16:47 (T12)	07:31 16:56
7	05:59 20:57	06:25 20:32	06:55 19:47	07:25 18:57	06:59 17:14	16:25 (T12) 16:46 (T12)	07:32 16:56
8	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55	07:00 17:13	16:26 (T12) 16:44 (T12)	07:33 16:56
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	07:01 17:12	16:27 (T12) 16:43 (T12)	07:34 16:56
10	06:00 20:56	06:27 20:29	06:58 19:42	07:28 18:52	07:03 17:11	16:29 (T12) 16:42 (T12)	07:35 16:56
11	06:01 20:55	06:28 20:27	06:59 19:40	07:29 18:50	07:04 17:10	16:32 (T12) 16:40 (T12)	07:36 16:56
12	06:02 20:55	06:29 20:26	07:00 19:39	07:30 18:49	07:05 17:09	16:37 16:56	07:37 16:56
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	07:06 17:08	16:37 16:56	07:37 16:56
14	06:03 20:54	06:31 20:23	07:02 19:35	07:32 18:46	07:07 17:07	16:38 16:56	07:38 16:56
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	07:08 17:06	16:39 16:56	07:39 16:56
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	07:10 17:05	16:40 16:57	07:40 16:57
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	07:11 17:04	16:40 16:57	07:40 16:57
18	06:06 20:51	06:35 20:18	07:06 19:29	07:36 18:40	07:12 17:04	16:41 16:57	07:41 16:57
19	06:07 20:51	06:36 20:16	07:07 19:27	07:37 18:38	07:13 17:03	16:42 16:58	07:42 16:58
20	06:08 20:50	06:37 20:15	07:07 19:25	07:38 18:37	07:14 17:02	16:42 16:58	07:42 16:58
21	06:09 20:49	06:38 20:14	07:08 19:23	07:40 18:35	07:15 17:01	16:43 16:59	07:43 16:59
22	06:10 20:48	06:39 20:12	07:09 19:22	07:41 18:34	07:17 17:01	16:43 16:59	07:43 16:59
23	06:11 20:48	06:40 20:11	07:10 19:20	07:42 18:33	07:18 17:00	16:44 17:00	07:44 17:00
24	06:11 20:47	06:41 20:09	07:11 19:18	07:43 18:31	17:32 (T12) 17:40 (T12)	16:44 16:29 (T12)	17:00 17:00
25	06:12 20:46	06:42 20:08	07:12 19:17	06:44 17:30	16:29 (T12) 16:43 (T12)	16:59 16:59	17:00 17:01
26	06:13 20:45	06:43 20:06	07:13 19:15	06:45 17:28	16:27 (T12) 16:44 (T12)	16:59 16:59	17:01 17:01
27	06:14 20:44	06:44 20:05	07:14 19:13	06:46 17:27	16:25 (T12) 16:45 (T12)	16:59 16:58	17:02 17:02
28	06:15 20:43	06:45 20:03	07:15 19:12	06:47 17:26	16:24 (T12) 16:46 (T12)	16:59 16:58	17:03 17:03
29	06:16 20:42	06:46 20:01	07:16 19:10	06:49 17:24	16:24 (T12) 16:47 (T12)	16:59 16:57	17:03 17:03
30	06:17 20:41	06:47 20:00	07:17 19:08	06:50 17:23	16:23 (T12) 16:47 (T12)	16:57 16:57	17:04 17:04
31	06:18 20:40	06:48 19:58	07:18 19:06	06:51 17:22	16:23 (T12) 16:47 (T12)	16:57 16:57	17:04 17:05
Potential sun hours	458	427	375	346	299	219	289
Total, worst case				152	219		522

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

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

Calculation: Progetto_20231109Shadow receptor: F351 - A03 - C02

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	
1	07:47 17:06	07:34 17:40	16:30 (T12) 18:13	06:58 18:13	07:08 19:47	06:23 20:18	05:55 20:47
2	07:47 17:07	07:33 17:41	16:31 (T12) 18:14	06:57 18:14	07:07 19:48	06:22 20:19	05:54 20:48
3	07:47 17:08	07:32 17:42	16:33 (T12) 18:16	06:55 18:16	07:05 19:49	06:20 20:20	05:54 20:48
4	07:47 17:08	07:31 17:43	16:37 (T12) 18:17	06:54 18:17	07:03 19:50	06:19 20:21	05:53 20:49
5	07:47 17:09	07:30 17:45	16:43 (T12) 18:18	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:50
6	07:47 17:10	07:29 17:46		06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:50
7	07:47 17:11	16:29 (T12) 17:47	07:28 17:47	06:49 18:20	06:58 19:53	06:16 20:24	05:52 20:51
8	07:47 17:12	16:27 (T12) 17:48	07:27 17:48	06:48 18:21	06:57 19:54	06:14 20:25	05:52 20:52
9	07:47 17:13	16:26 (T12) 17:50	07:25 17:50	06:46 18:22	06:55 19:55	06:13 20:26	05:52 20:52
10	07:47 17:14	16:25 (T12) 17:51	07:24 17:51	06:44 18:23	17:52 (T06) 19:56	06:54 20:27	06:12 20:53
11	07:46 17:15	16:25 (T12) 17:52	07:23 17:52	06:43 18:24	17:55 (T06) 19:57	06:52 20:28	06:11 20:53
12	07:46 17:16	16:24 (T12) 17:53	07:22 17:53	06:41 18:26	17:48 (T06) 19:58	06:51 20:29	06:10 20:54
13	07:46 17:17	16:24 (T12) 17:54	07:21 17:54	06:40 18:27	17:46 (T06) 19:59	06:49 20:30	06:09 20:54
14	07:46 17:18	16:24 (T12) 17:56	07:19 17:56	06:38 18:28	17:43 (T06) 20:00	06:47 20:31	06:08 20:55
15	07:45 17:20	16:23 (T12) 17:57	07:18 17:57	06:36 18:29	18:02 (T06) 20:01	06:46 20:32	06:07 20:55
16	07:45 17:21	16:23 (T12) 17:58	07:17 17:58	06:35 18:30	17:42 (T06) 20:02	06:44 20:33	06:06 20:56
17	07:44 17:22	16:23 (T12) 17:59	07:16 17:59	06:33 18:31	17:42 (T06) 20:03	06:43 20:34	06:05 20:56
18	07:44 17:23	16:23 (T12) 18:00	07:14 18:00	06:31 18:32	17:42 (T06) 20:04	06:41 20:35	06:04 20:56
19	07:43 17:24	16:23 (T12) 18:02	07:13 18:02	06:30 18:33	17:42 (T06) 20:05	06:40 20:36	06:03 20:57
20	07:43 17:25	16:23 (T12) 18:03	07:11 18:03	06:28 18:34	17:43 (T06) 20:07	06:38 20:37	06:03 20:57
21	07:42 17:26	16:23 (T12) 18:04	07:10 18:04	06:26 18:35	17:44 (T06) 20:08	06:37 20:38	06:02 20:57
22	07:42 17:28	16:23 (T12) 18:05	07:09 18:05	06:25 18:36	17:46 (T06) 20:09	06:35 20:39	06:01 20:57
23	07:41 17:29	16:24 (T12) 18:06	07:07 18:06	06:23 18:37	17:55 (T06) 20:10	06:34 20:40	06:00 20:58
24	07:40 17:30	16:24 (T12) 18:08	07:06 18:08	06:21 18:38	20:11 20:11	06:33 20:40	05:59 20:58
25	07:40 17:31	16:24 (T12) 18:09	07:04 18:09	06:20 18:39	06:31 20:12	06:31 20:41	05:59 20:58
26	07:39 17:32	16:24 (T12) 18:10	07:03 18:10	06:18 18:40	06:30 20:13	06:30 20:42	05:58 20:58
27	07:38 17:34	16:25 (T12) 18:11	07:01 18:11	06:16 18:41	06:28 20:14	06:28 20:43	05:57 20:58
28	07:37 17:35	16:25 (T12) 18:12	07:00 18:12	06:15 18:43	06:27 20:15	06:27 20:44	05:57 20:58
29	07:36 17:36	16:27 (T12) 18:12	06:59 18:12	06:13 18:44	06:26 20:16	06:26 20:45	05:56 20:58
30	07:36 17:37	16:28 (T12) 18:12	06:58 18:12	06:12 18:45	06:24 20:17	06:24 20:45	05:55 20:58
31	07:35 17:38	16:29 (T12) 18:12	06:57 18:12	06:10 18:46	06:23 20:17	06:23 20:46	05:54 20:58
Potential sun hours	299	298	370	398	447	451	
Total, worst case	533	54	201				

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

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

Calculation: Progetto_20231109Shadow receptor: F351 - A03 - C02

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December		
1	05:55 20:58	06:19 20:39	06:49 19:57	07:18 19:07	18:24 (T06) 18:40 (T06)	06:52 17:21	07:26 16:57	16:07 (T12) 16:23 (T12)
2	05:56 20:58	06:20 20:38	06:50 19:55	07:19 19:05	18:25 (T06) 18:38 (T06)	06:53 17:19	07:27 16:56	16:08 (T12) 16:22 (T12)
3	05:56 20:58	06:21 20:37	06:51 19:53	07:20 19:03	18:27 (T06) 18:35 (T06)	06:54 17:18	07:28 16:56	16:09 (T12) 16:22 (T12)
4	05:57 20:57	06:22 20:36	06:52 19:52	07:21 19:02		06:56 17:17	07:29 16:56	16:11 (T12) 16:21 (T12)
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00		06:57 17:16	07:30 16:56	16:13 (T12) 16:19 (T12)
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59		06:58 17:15	07:31 16:56	
7	05:59 20:57	06:25 20:32	06:55 19:47	07:25 18:57		06:59 17:14	16:06 (T12) 16:13 (T12)	07:32 16:56
8	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55		07:00 17:13	16:03 (T12) 16:16 (T12)	07:33 16:56
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54		07:01 17:12	16:01 (T12) 16:17 (T12)	07:34 16:56
10	06:00 20:56	06:27 20:29	06:58 19:42	07:28 18:52		07:03 17:11	16:01 (T12) 16:20 (T12)	07:35 16:56
11	06:01 20:55	06:28 20:27	06:59 19:40	07:29 18:50		07:04 17:10	15:59 (T12) 16:20 (T12)	07:36 16:56
12	06:02 20:55	06:29 20:26	07:00 19:39	07:30 18:49		07:05 17:09	15:58 (T12) 16:21 (T12)	07:37 16:56
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47		07:06 17:08	15:59 (T12) 16:23 (T12)	07:37 16:56
14	06:03 20:54	06:31 20:23	07:02 19:35	07:32 18:46		07:07 17:07	15:58 (T12) 16:23 (T12)	07:38 16:56
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44		07:08 17:06	15:58 (T12) 16:23 (T12)	07:39 16:56
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43		07:10 17:05	15:57 (T12) 16:23 (T12)	07:40 16:57
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41		07:11 17:04	15:57 (T12) 16:24 (T12)	07:40 16:57
18	06:06 20:51	06:35 20:18	07:06 19:29	07:36 18:40		07:12 17:04	15:58 (T12) 16:25 (T12)	07:41 16:57
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38		07:13 17:03	15:58 (T12) 16:25 (T12)	07:42 16:58
20	06:08 20:50	06:37 20:15	07:08 19:25	07:38 18:37		07:14 17:02	15:58 (T12) 16:25 (T12)	07:42 16:58
21	06:09 20:49	06:38 20:14	07:08 19:23	18:32 (T06) 18:39 (T06)	07:40 18:35	07:15 17:01	15:58 (T12) 16:24 (T12)	07:43 16:59
22	06:10 20:48	06:39 20:12	07:09 19:22	18:29 (T06) 18:41 (T06)	07:41 18:34	07:17 17:01	15:59 (T12) 16:25 (T12)	07:43 16:59
23	06:11 20:48	06:40 20:11	07:10 19:20	18:27 (T06) 18:43 (T06)	07:42 18:33	07:18 17:00	16:00 (T12) 16:25 (T12)	07:44 17:00
24	06:11 20:47	06:41 20:09	07:11 19:18	18:26 (T06) 18:43 (T06)	07:43 18:31	07:19 17:00	16:00 (T12) 16:25 (T12)	07:44 17:00
25	06:12 20:46	06:42 20:08	07:12 19:17	18:25 (T06) 18:44 (T06)	06:44 17:30	07:20 16:59	16:01 (T12) 16:25 (T12)	07:45 17:01
26	06:13 20:45	06:43 20:06	07:13 19:15	18:24 (T06) 18:43 (T06)	06:45 17:28	07:21 16:59	16:01 (T12) 16:24 (T12)	07:45 17:01
27	06:14 20:44	06:44 20:05	07:14 19:13	18:23 (T06) 18:44 (T06)	06:46 17:27	07:22 16:58	16:02 (T12) 16:24 (T12)	07:45 17:02
28	06:15 20:43	06:45 20:03	07:15 19:12	18:23 (T06) 18:43 (T06)	06:47 17:26	07:23 16:58	16:04 (T12) 16:24 (T12)	07:46 17:03
29	06:16 20:42	06:46 20:01	07:16 19:10	18:23 (T06) 18:42 (T06)	06:49 17:24	07:24 16:57	16:05 (T12) 16:24 (T12)	07:46 17:03
30	06:17 20:41	06:47 20:00	07:17 19:08	18:23 (T06) 18:41 (T06)	06:50 17:23	07:25 16:57	16:06 (T12) 16:24 (T12)	07:46 17:04
31	06:18 20:40	06:48 19:58			06:51 17:22			07:47 17:05
Potential sun hours	458	427	375	346	299	289		
Total, worst case			169	37	535	59		

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

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

Calculation: Progetto_20231109Shadow receptor: F353 - A04

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June		
1	07:47	16:11 (T12)	07:34	06:58	07:08	06:23	05:55	
	17:06	21 16:32 (T12)	17:40	18:13	19:47	20:18	20:47	
2	07:47	16:11 (T12)	07:33	06:57	07:07	06:22	05:54	
	17:07	22 16:33 (T12)	17:41	18:14	19:48	20:19	20:48	
3	07:47	16:11 (T12)	07:32	06:55	07:05	06:20	05:54	
	17:08	22 16:33 (T12)	17:42	18:16	19:49	20:20	20:48	
4	07:47	16:11 (T12)	07:31	06:54	07:03	06:19	05:53	
	17:08	23 16:34 (T12)	17:43	18:17	19:50	20:21	20:49	
5	07:47	16:11 (T12)	07:30	06:52	07:02	06:18	05:53	
	17:09	24 16:35 (T12)	17:45	18:18	19:51	20:22	20:50	
6	07:47	16:11 (T12)	07:29	06:51	07:00	06:17	05:53	
	17:10	25 16:36 (T12)	17:46	18:19	19:52	20:23	20:50	
7	07:47	16:12 (T12)	07:28	06:49	06:59	06:16	05:52	
	17:11	25 16:37 (T12)	17:47	18:20	19:53	20:24	20:51	
8	07:47	16:12 (T12)	07:27	06:48	06:57	06:14	05:52	
	17:12	26 16:38 (T12)	17:48	18:21	19:54	20:25	20:52	
9	07:47	16:11 (T12)	07:25	06:46	17:52 (T06)	06:55	06:13	05:52
	17:13	27 16:38 (T12)	17:50	18:22	3 17:55 (T06)	19:55	20:26	20:52
10	07:47	16:12 (T12)	07:24	06:44	17:47 (T06)	06:54	06:12	05:52
	17:14	26 16:38 (T12)	17:51	18:23	12 17:59 (T06)	19:56	20:27	20:53
11	07:46	16:12 (T12)	07:23	06:43	17:45 (T06)	06:52	06:11	05:52
	17:15	27 16:39 (T12)	17:52	18:24	15 18:00 (T06)	19:57	20:28	20:53
12	07:46	16:13 (T12)	07:22	06:41	17:44 (T06)	06:51	06:10	05:52
	17:16	27 16:40 (T12)	17:53	18:26	17 18:01 (T06)	19:58	20:29	20:54
13	07:46	16:12 (T12)	07:21	06:40	17:42 (T06)	06:49	06:09	05:51
	17:17	28 16:40 (T12)	17:54	18:27	20 18:02 (T06)	19:59	20:30	20:54
14	07:46	16:13 (T12)	07:19	06:38	17:41 (T06)	06:47	06:08	05:51
	17:18	28 16:41 (T12)	17:56	18:28	21 18:02 (T06)	20:00	20:31	20:55
15	07:45	16:13 (T12)	07:18	06:36	17:41 (T06)	06:46	06:07	05:51
	17:20	28 16:41 (T12)	17:57	18:29	21 18:02 (T06)	20:01	20:32	20:55
16	07:45	16:13 (T12)	07:17	06:35	17:40 (T06)	06:44	06:06	05:51
	17:21	29 16:42 (T12)	17:58	18:30	22 18:02 (T06)	20:02	20:33	20:56
17	07:44	16:13 (T12)	07:16	06:33	17:41 (T06)	06:43	06:05	05:51
	17:22	29 16:42 (T12)	17:59	18:31	21 18:02 (T06)	20:03	20:34	20:56
18	07:44	16:14 (T12)	07:14	06:31	17:41 (T06)	06:41	06:04	05:52
	17:23	29 16:43 (T12)	18:00	18:32	20 18:01 (T06)	20:04	20:35	20:56
19	07:43	16:14 (T12)	07:13	06:30	17:41 (T06)	06:40	06:03	05:52
	17:24	29 16:43 (T12)	18:02	18:33	18 17:59 (T06)	20:05	20:36	20:57
20	07:43	16:15 (T12)	07:11	06:28	17:42 (T06)	06:38	06:03	05:52
	17:25	28 16:43 (T12)	18:03	18:34	17 17:59 (T06)	20:07	20:37	20:57
21	07:42	16:16 (T12)	07:10	06:26	17:43 (T06)	06:37	06:02	05:52
	17:26	27 16:43 (T12)	18:04	18:35	13 17:56 (T06)	20:08	20:38	20:57
22	07:42	16:16 (T12)	07:09	06:25	17:46 (T06)	06:35	06:01	05:52
	17:28	27 16:43 (T12)	18:05	18:36	7 17:53 (T06)	20:09	20:39	20:57
23	07:41	16:17 (T12)	07:07	06:23		06:34	06:00	05:52
	17:29	26 16:43 (T12)	18:06	18:37		20:10	20:40	20:58
24	07:40	16:18 (T12)	07:06	06:21		06:33	05:59	05:53
	17:30	25 16:43 (T12)	18:08	18:38		20:11	20:40	20:58
25	07:40	16:18 (T12)	07:04	06:20		06:31	05:59	05:53
	17:31	24 16:42 (T12)	18:09	18:39		20:12	20:41	20:58
26	07:39	16:19 (T12)	07:03	06:18		06:30	05:58	05:53
	17:32	23 16:42 (T12)	18:10	18:40		20:13	20:42	20:58
27	07:38	16:20 (T12)	07:01	06:16		06:28	05:57	05:54
	17:34	21 16:41 (T12)	18:11	18:41		20:14	20:43	20:58
28	07:37	16:22 (T12)	07:00	06:15		06:27	05:57	05:54
	17:35	18 16:40 (T12)	18:12	18:43		20:15	20:44	20:58
29	07:36	16:24 (T12)		07:13		06:26	05:56	05:54
	17:36	15 16:39 (T12)		19:44		20:16	20:45	20:58
30	07:36	16:26 (T12)		07:12		06:24	05:56	05:55
	17:37	11 16:37 (T12)		19:45		20:17	20:45	20:58
31	07:35			07:10			05:55	
	17:38			19:46			20:46	
Potential sun hours	299		298		398		447	451
Total, worst case	740			227				

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

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

Calculation: Progetto_20231109Shadow receptor: F353 - A04

Assumptions for shadow calculations

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

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

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

The WTG is always operating

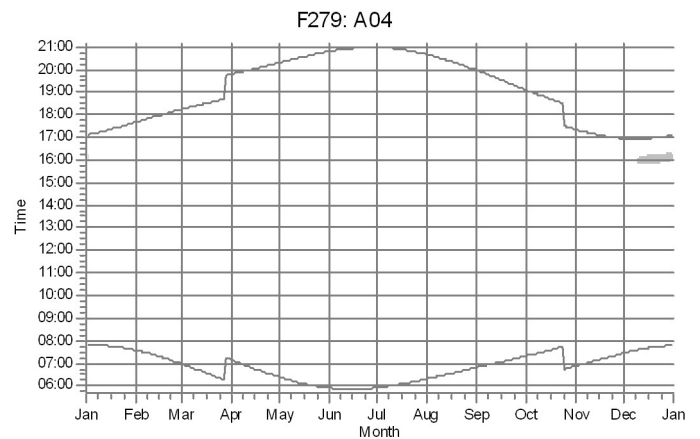
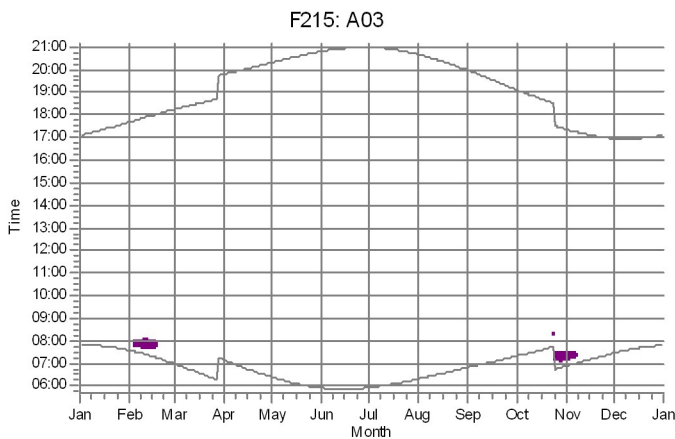
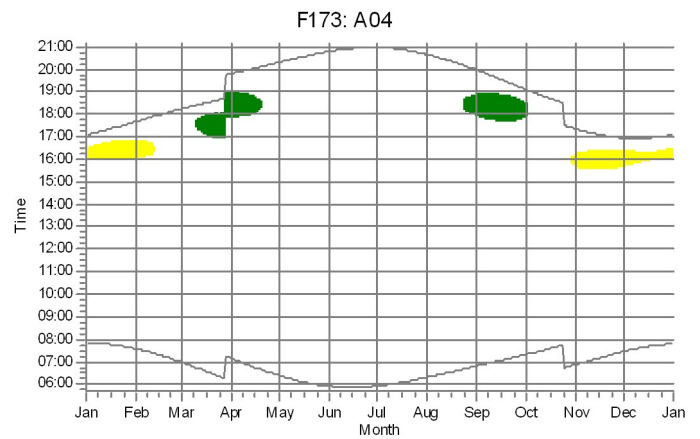
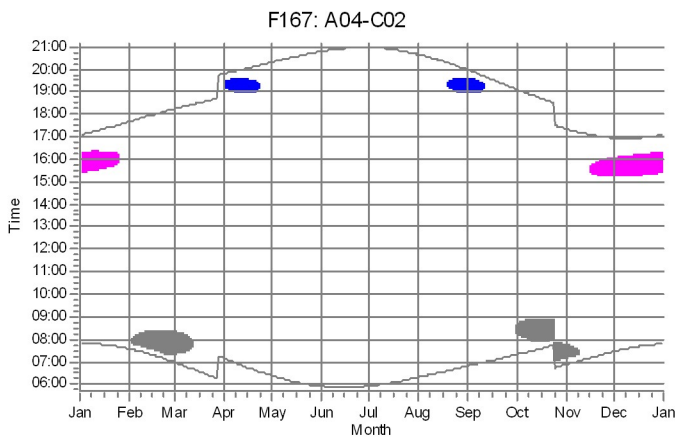
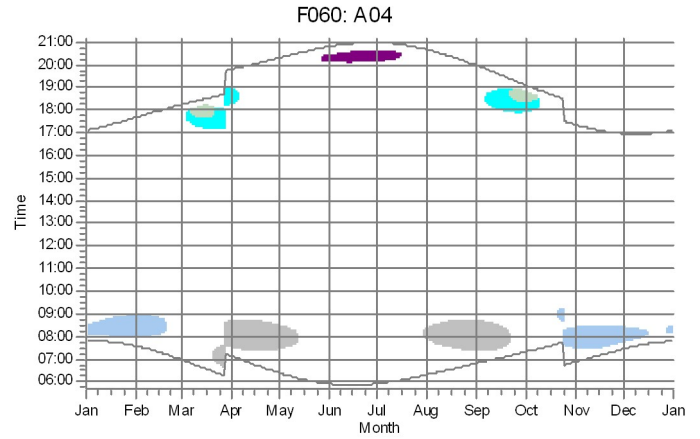
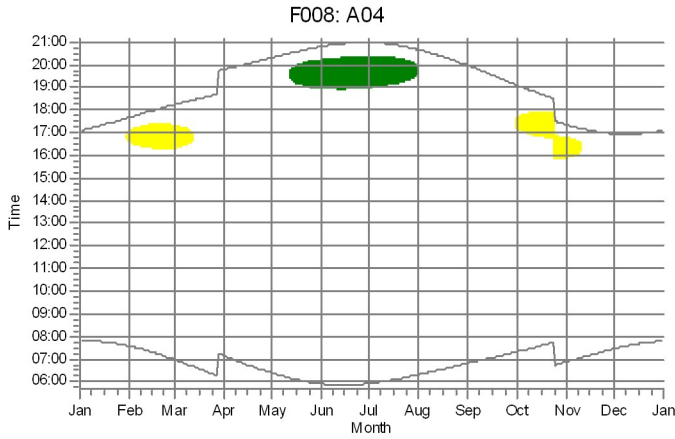
	July	August	September	October	November	December			
1	05:55 20:58	06:19 20:39	06:49 19:57	07:18 19:07	18:22 (T06) 18:40 (T06)	06:52 17:21	07:26 16:57	15:54 (T12) 16:21 (T12)	
2	05:56 20:58	06:20 20:38	06:50 19:55	07:19 19:05	18:23 (T06) 18:39 (T06)	06:53 17:19	07:27 16:56	15:55 (T12) 16:22 (T12)	
3	05:56 20:58	06:21 20:37	06:51 19:53	07:20 19:03	18:24 (T06) 18:37 (T06)	06:54 17:18	07:28 16:56	15:55 (T12) 16:22 (T12)	
4	05:57 20:57	06:22 20:36	06:52 19:52	07:21 19:02	18:26 (T06) 18:34 (T06)	06:56 17:17	07:29 16:56	15:56 (T12) 16:22 (T12)	
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	18:34 (T06) 18:34 (T06)	06:57 17:16	07:30 16:56	15:57 (T12) 16:22 (T12)	
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	18:34 (T06) 18:34 (T06)	06:58 17:15	07:31 16:56	15:58 (T12) 16:22 (T12)	
7	05:59 20:57	06:25 20:32	06:55 19:47	07:25 18:57	18:34 (T06) 18:34 (T06)	06:59 17:14	07:32 16:56	15:58 (T12) 16:22 (T12)	
8	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55	18:34 (T06) 18:34 (T06)	07:00 17:13	07:33 16:56	15:59 (T12) 16:22 (T12)	
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	18:34 (T06) 18:34 (T06)	07:01 17:12	07:34 16:56	16:00 (T12) 16:22 (T12)	
10	06:00 20:56	06:27 20:29	06:58 19:42	07:28 18:52	18:34 (T06) 18:34 (T06)	07:03 17:11	07:35 16:56	16:01 (T12) 16:22 (T12)	
11	06:01 20:55	06:28 20:27	06:59 19:40	07:29 18:51	18:34 (T06) 18:34 (T06)	07:04 17:10	16:02 (T12) 16:04 (T12)	07:36 16:56	16:01 (T12) 16:22 (T12)
12	06:02 20:55	06:29 20:26	07:00 19:39	07:30 18:49	18:34 (T06) 18:34 (T06)	07:05 17:09	2 16:04 (T12) 15:57 (T12)	07:37 07:37	21 16:22 (T12) 16:02 (T12)
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	18:34 (T06) 18:34 (T06)	07:06 17:08	11 16:08 (T12) 15:56 (T12)	07:37 07:37	20 16:22 (T12) 16:03 (T12)
14	06:03 20:54	06:31 20:23	07:02 19:35	07:32 18:46	18:34 (T06) 18:34 (T06)	07:07 17:07	15 16:11 (T12) 15:54 (T12)	07:38 07:38	20 16:22 (T12) 16:04 (T12)
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	18:34 (T06) 18:34 (T06)	07:08 17:06	19 16:13 (T12) 15:53 (T12)	07:39 07:39	19 16:23 (T12) 16:04 (T12)
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	18:34 (T06) 18:34 (T06)	07:10 17:05	21 16:14 (T12) 15:52 (T12)	07:40 07:40	18 16:22 (T12) 16:05 (T12)
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	18:34 (T06) 18:34 (T06)	07:11 17:04	23 16:15 (T12) 15:52 (T12)	07:40 07:41	18 16:06 (T12) 16:24 (T12)
18	06:06 20:51	06:35 20:18	07:06 19:29	07:36 18:40	18:34 (T06) 18:34 (T06)	07:12 17:04	24 16:16 (T12) 15:52 (T12)	07:41 07:41	18 16:24 (T12) 16:06 (T12)
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	18:34 (T06) 18:34 (T06)	07:13 17:03	25 16:17 (T12) 15:51 (T12)	07:42 07:42	17 16:23 (T12) 16:07 (T12)
20	06:08 20:50	06:37 20:15	07:08 19:25	07:38 18:37	18:34 (T06) 18:34 (T06)	07:14 17:02	26 16:17 (T12) 15:51 (T12)	07:42 07:42	17 16:24 (T12) 16:07 (T12)
21	06:09 20:49	06:38 20:14	07:08 19:23	07:40 18:35	18:33 (T06) 18:37 (T06)	07:15 17:01	27 16:18 (T12) 15:51 (T12)	07:43 07:43	17 16:24 (T12) 16:08 (T12)
22	06:10 20:48	06:39 20:12	07:09 19:22	07:41 18:34	18:28 (T06) 18:40 (T06)	07:17 17:01	28 16:18 (T12) 16:19 (T12)	07:43 07:43	17 16:25 (T12) 16:08 (T12)
23	06:11 20:48	06:40 20:11	07:10 19:20	07:42 18:33	18:26 (T06) 18:42 (T06)	07:18 17:00	28 16:19 (T12) 15:51 (T12)	07:44 07:44	17 16:25 (T12) 16:09 (T12)
24	06:11 20:47	06:41 20:09	07:11 19:18	07:43 18:31	18:25 (T06) 18:43 (T06)	07:19 17:00	29 16:20 (T12) 15:51 (T12)	07:44 07:44	17 16:26 (T12) 16:09 (T12)
25	06:12 20:46	06:42 20:08	07:12 19:17	07:44 18:30	18:24 (T06) 18:43 (T06)	07:20 16:59	29 16:20 (T12) 15:51 (T12)	07:45 07:45	17 16:27 (T12) 16:10 (T12)
26	06:13 20:45	06:43 20:06	07:13 19:15	07:45 18:28	18:23 (T06) 18:43 (T06)	07:21 16:59	29 16:20 (T12) 15:52 (T12)	07:45 07:45	17 16:27 (T12) 16:10 (T12)
27	06:14 20:44	06:44 20:05	07:14 19:13	07:46 18:27	18:22 (T06) 18:43 (T06)	07:22 16:58	29 16:20 (T12) 15:52 (T12)	07:45 07:45	17 16:27 (T12) 16:10 (T12)
28	06:15 20:43	06:45 20:03	07:15 19:12	07:47 18:26	18:22 (T06) 18:43 (T06)	07:23 16:58	28 16:20 (T12) 15:53 (T12)	07:46 07:46	18 16:28 (T12) 16:10 (T12)
29	06:16 20:42	06:46 20:01	07:16 19:10	07:49 18:24	18:21 (T06) 18:42 (T06)	07:24 16:57	28 16:21 (T12) 15:53 (T12)	07:46 07:46	18 16:28 (T12) 16:11 (T12)
30	06:17 20:41	06:47 20:00	07:17 19:08	07:50 18:21	18:21 (T06) 18:41 (T06)	07:25 16:57	28 16:21 (T12) 15:54 (T12)	07:46 07:46	19 16:30 (T12) 16:11 (T12)
31	06:18 20:40	06:48 19:58		07:51 17:22				07:47 17:05	20 16:31 (T12)
Potential sun hours	458	427	375	346	55	299	475	289	628
Total, worst case			172						

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

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

Calculation: Progetto_20231109



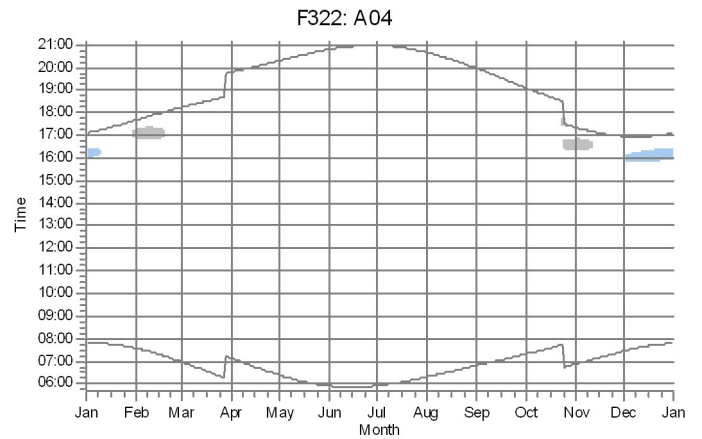
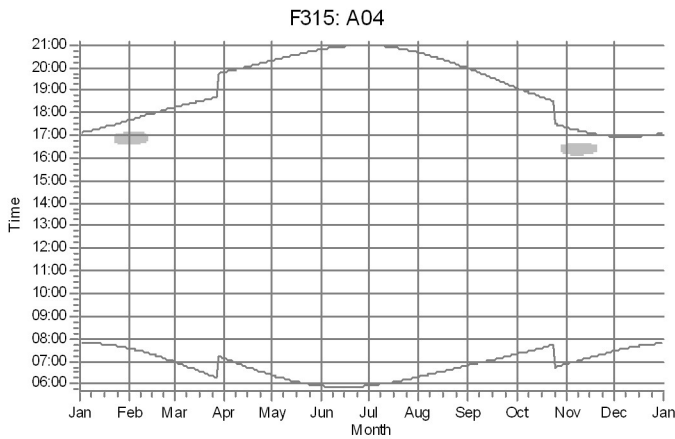
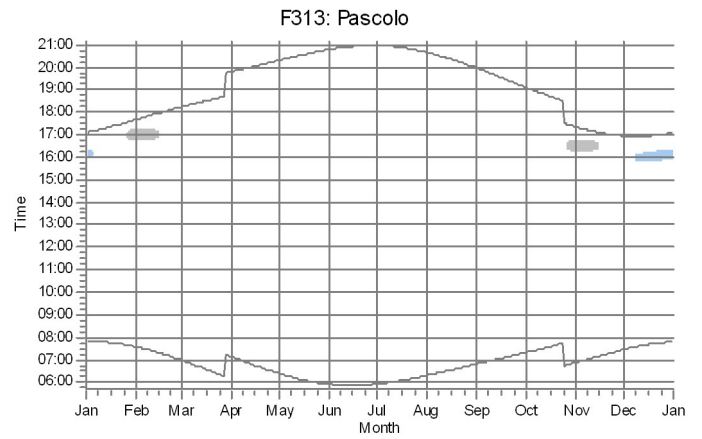
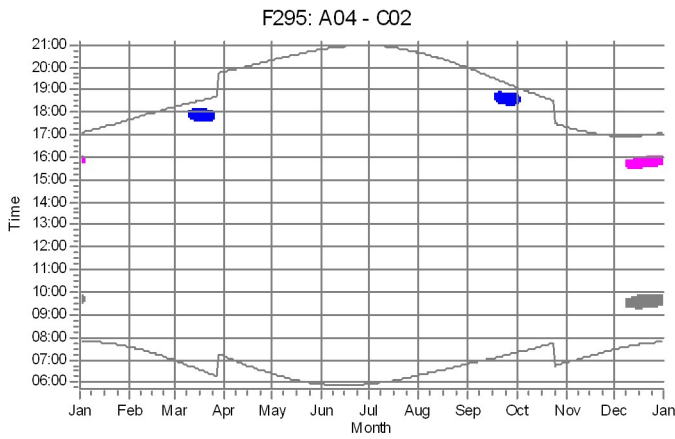
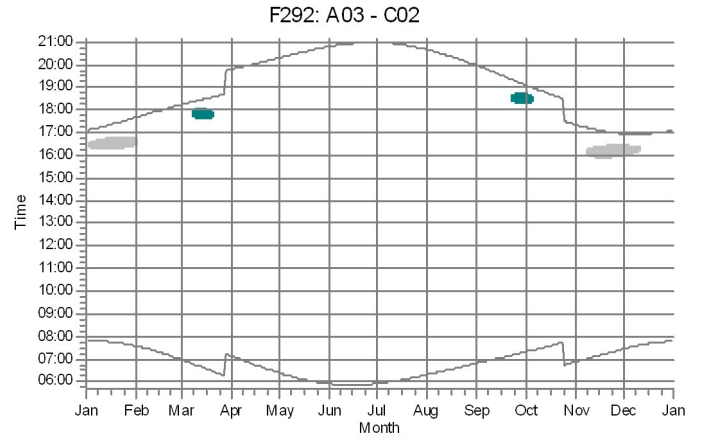
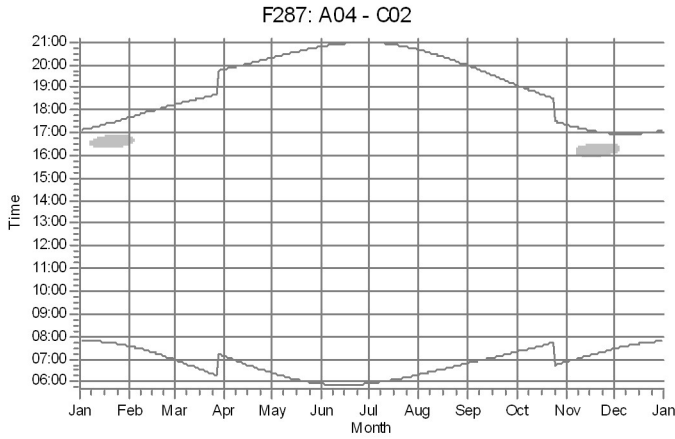
WTGs

- T01: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (29)
- T02: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (30)
- T03: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (31)
- T04: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (32)
- T05: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (33)

- T11: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (39)
- T12: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (40)
- T13: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (41)
- T14: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (42)
- T15: Siemens Gamesa SG 6.6-172!! 6600 172.0 IO! hub: 135,0 m (TOT: 221,0 m) (43)

SHADOW - Calendar, graphical

Calculation: Progetto_20231109



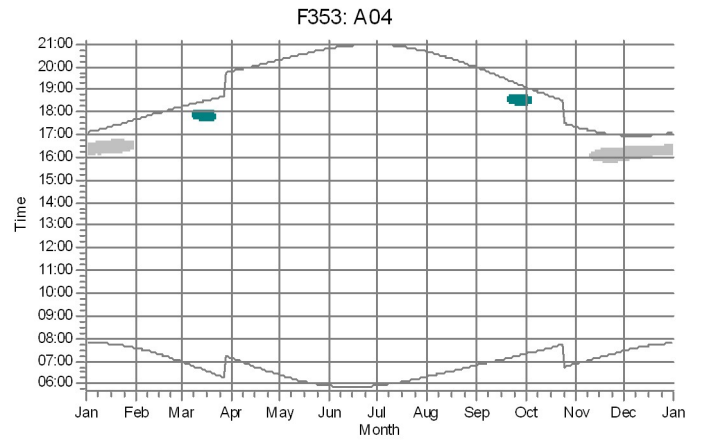
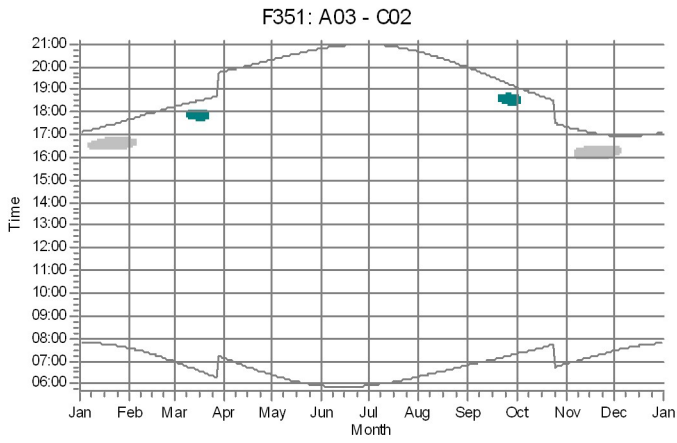
WTGs

- T03: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (31)
- T04: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (32)
- T05: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (33)

- T06: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (34)
- T12: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (40)
- T15: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (43)

SHADOW - Calendar, graphical

Calculation: Progetto_20231109



WTGs

T06: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (34)

T12: Siemens Gamesa SG 6.6-172!! 6600 172.0 !OI! hub: 135,0 m (TOT: 221,0 m) (40)

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T01 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (29)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	17:58-18:58/60 20:18	06:23 20:47
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	17:57-18:57/60 20:19	06:22 20:48
3	07:47 17:08	07:32 17:42	06:55 18:16	07:05 19:49	17:57-18:56/59 20:20	06:21 20:49
4	07:47 17:08	07:31 17:43	06:54 18:17	07:03 19:50	17:58-18:56/58 20:21	06:19 20:49
5	07:47 17:09	07:30 17:45	06:52 18:18	07:02 19:51	17:58-18:55/57 20:22	06:18 20:50
6	07:47 17:10	07:29 17:46	06:51 18:19	07:00 19:52	17:59-18:54/55 20:23	06:17 20:51
7	07:47 17:11	07:28 17:47	06:49 18:20	06:59 19:53	17:59-18:53/54 20:24	06:16 20:51
8	07:47 17:12	07:27 17:48	06:48 18:21	06:57 19:54	17:59-18:52/53 20:25	06:15 20:52
9	07:47 17:13	07:26 17:50	06:46 18:22	06:55 19:55	18:00-18:51/51 20:26	06:13 20:53
10	07:47 17:14	07:24 17:51	06:44 18:23	06:54 19:56	18:00-18:50/50 20:27	06:12 20:53
11	07:47 17:15	07:23 17:52	06:43 18:25	06:52 19:57	18:02-18:49/47 20:28	06:11 20:54
12	07:46 17:16	07:22 17:53	06:41 18:26	06:51 19:58	18:02-18:47/45 20:29	06:10 20:54
13	07:46 17:17	07:21 17:55	06:40 18:27	06:49 19:59	18:04-18:46/42 20:30	06:09 20:55
14	07:46 17:19	07:20 17:56	06:38 18:28	06:48 20:00	18:05-18:44/39 20:31	06:08 20:55
15	07:45 17:20	07:18 17:57	06:36 18:29	06:46 20:01	18:06-18:41/35 20:32	06:07 20:55
16	07:45 17:21	07:17 17:58	06:35 18:30	06:44 20:03	18:08-18:40/32 20:33	06:06 20:56
17	07:45 17:22	07:16 17:59	06:33 18:31	06:43 20:04	18:10-18:37/27 20:34	06:05 20:56
18	07:44 17:23	07:14 18:01	06:31 18:32	06:41 20:05	18:14-18:34/20 20:35	06:04 20:57
19	07:44 17:24	07:13 18:02	06:30 18:33	06:40 20:06	18:19-18:29/10 20:36	06:03 20:57
20	07:43 17:25	07:12 18:03	06:28 18:34	06:38 20:07	19:10-19:59/49 20:37	06:03 20:57
21	07:42 17:26	07:10 18:04	06:27 18:35	06:37 20:08	19:08-20:00/52 20:38	06:02 20:57
22	07:42 17:28	07:09 18:05	06:25 18:36	06:35 20:09	19:08-20:02/54 20:39	06:01 20:58
23	07:41 17:29	07:07 18:06	06:23 18:37	06:34 20:10	19:07-20:03/56 20:40	06:00 20:58
24	07:41 17:30	07:06 18:08	06:22 18:38	06:33 20:11	19:05-20:03/58 20:41	05:59 20:58
25	07:40 17:31	07:04 18:09	06:20 18:40	06:31 20:12	19:05-20:05/60 20:42	05:58 20:58
26	07:39 17:32	07:03 18:10	06:18 18:41	06:30 20:13	19:04-20:05/61 20:42	05:58 20:58
27	07:38 17:34	07:02 18:11	06:17 18:42	06:28 20:14	19:03-20:06/63 20:43	05:57 20:58
28	07:37 17:35	07:00 18:12	06:15 18:43	06:27 20:15	19:03-20:07/64 20:44	05:57 20:58
29	07:37 17:36		07:13 19:44	06:26 20:16	19:02-20:07/65 20:45	05:56 20:58
30	07:36 17:37		07:12 19:45	06:24 20:17	19:02-20:09/67 20:46	05:55 20:58
31	07:35 17:39		07:10 19:46		19:01-20:09/68 20:46	
Potential sun hours	298	298	370	398	447	451
Sum of minutes with flicker	0	0	1017	854	943	2256

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T01 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (29)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December
1	05:55 19:04-20:20/76 20:58	06:19 20:39	06:49 18:01-18:48/47 19:57	07:19 17:59-18:24/25 19:07	06:52 17:21	07:27 16:57
2	05:56 19:04-20:19/75 20:58	06:20 20:38	06:50 17:59-18:49/50 19:55	07:20 18:02-18:20/18 19:05	06:53 17:19	07:28 16:57
3	05:56 19:05-20:20/75 20:58	06:21 20:37	06:51 17:58-18:49/51 19:54	07:21 19:04	06:55 17:18	07:29 16:56
4	05:57 19:05-20:19/74 20:58	06:22 20:36	06:52 17:57-18:50/53 19:52	07:22 19:02	06:56 17:17	07:30 16:56
5	05:57 19:06-20:19/73 20:57	06:23 20:35	06:53 17:55-18:49/54 19:50	07:23 19:00	06:57 17:16	07:31 16:56
6	05:58 19:06-20:19/73 20:57	06:24 20:34	06:54 17:54-18:49/55 19:49	07:24 18:59	06:58 17:15	07:32 16:56
7	05:59 19:06-20:19/73 20:57	06:25 20:33	06:55 17:53-18:50/57 19:47	07:25 18:57	06:59 17:14	07:33 16:56
8	05:59 19:07-20:19/72 20:57	06:26 20:31	06:56 17:52-18:50/58 19:45	07:26 18:55	07:00 17:13	07:33 16:56
9	06:00 19:07-20:18/71 20:56	06:27 20:30	06:57 17:51-18:50/59 19:44	07:27 18:54	07:02 17:12	07:34 16:56
10	06:00 19:08-20:18/70 20:56	06:28 20:29	06:58 17:51-18:50/59 19:42	07:28 18:52	07:03 17:11	07:35 16:56
11	06:01 19:09-20:18/69 20:55	06:29 20:28	06:59 17:50-18:50/60 19:40	07:29 18:51	07:04 17:10	07:36 16:56
12	06:02 19:09-20:17/68 20:55	06:30 20:26	07:00 17:49-18:50/61 19:39	07:30 18:49	07:05 17:09	07:37 16:56
13	06:03 19:10-20:17/67 20:54	06:30 20:25	07:01 17:49-18:49/60 19:37	07:31 18:47	07:06 17:08	07:38 16:56
14	06:03 19:11-20:17/66 20:54	06:31 20:24	07:02 17:48-18:49/61 19:35	07:32 18:46	07:07 17:07	07:38 16:56
15	06:04 19:11-20:16/65 20:53	06:32 20:22	07:03 17:48-18:48/60 19:34	07:33 18:44	07:09 17:06	07:39 16:56
16	06:05 19:12-20:16/64 20:53	06:33 20:21	07:04 17:48-18:48/60 19:32	07:34 18:43	07:10 17:05	07:40 16:57
17	06:06 19:13-20:15/62 20:52	06:34 20:20	07:05 17:48-18:47/59 19:30	07:35 18:41	07:11 17:04	07:41 16:57
18	06:06 19:14-20:15/61 20:52	06:35 20:18	07:06 17:48-18:47/59 19:29	07:36 18:40	07:12 17:04	07:41 16:57
19	06:07 19:15-20:14/59 20:51	06:36 20:17	07:07 17:48-18:46/58 19:27	07:37 18:38	07:13 17:03	07:42 16:58
20	06:08 19:16-20:12/56 20:50	06:37 20:15	07:08 17:48-18:45/57 19:25	07:39 18:37	07:14 17:02	07:42 16:58
21	06:09 19:17-20:12/55 20:49	06:38 20:14	07:09 17:48-18:44/56 19:24	07:40 18:35	07:16 17:02	07:43 16:59
22	06:10 19:18-20:11/53 20:49	06:39 20:12	07:10 17:48-18:43/55 19:22	07:41 18:34	07:17 17:01	07:44 16:59
23	06:11 19:20-20:10/50 20:48	06:40 20:11	07:11 17:48-18:41/53 19:20	07:42 18:33	07:18 17:00	07:44 17:00
24	06:12 19:21-20:09/48 20:47	06:41 18:21-18:33/12 20:09	07:12 17:48-18:39/51 19:19	07:43 18:31	07:19 17:00	07:44 17:00
25	06:12 19:23-20:07/44 20:46	06:42 18:16-18:37/21 20:08	07:13 17:49-18:38/49 19:17	06:44 17:30	07:20 16:59	07:45 17:01
26	06:13 19:24-20:05/41 20:45	06:43 18:13-18:40/27 20:06	07:14 17:50-18:36/46 19:15	06:45 17:28	07:21 16:59	07:45 17:01
27	06:14 19:26-20:03/37 20:44	06:44 18:10-18:42/32 20:05	07:15 17:51-18:35/44 19:13	06:46 17:27	07:22 16:58	07:46 17:02
28	06:15 19:28-20:01/33 20:43	06:45 18:08-18:43/35 20:03	07:16 17:53-18:33/40 19:12	06:48 17:26	07:23 16:58	07:46 17:03
29	06:16 19:31-19:58/27 20:42	06:46 18:06-18:45/39 20:02	07:17 17:54-18:30/36 19:10	06:49 17:24	07:25 16:57	07:46 17:03
30	06:17 19:35-19:54/19 20:41	06:47 18:04-18:46/42 20:00	07:18 17:56-18:28/32 19:08	06:50 17:23	07:26 16:57	07:47 17:04
31	06:18 20:40	06:48 18:02-18:47/45 19:58		06:51 17:22		07:47 17:05
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	1776	253	1600	43	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T02 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (30)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June
1	07:47 16:05-16:26/21 17:06	07:34 16:07-16:58/51 17:40	06:59 16:22-17:16/54 18:13	07:08 18:13	06:23 19:47 20:18	05:55 20:47
2	07:47 16:05-16:27/22 17:07	07:33 16:07-17:01/54 17:41	06:57 16:24-17:16/52 18:15	07:07 19:48	06:22 20:19 20:48	05:54 20:48
3	07:47 16:05-16:28/23 17:08	07:32 16:08-17:04/56 17:42	06:55 16:24-17:15/51 18:16	07:05 19:49	06:21 20:20 20:49	05:54 20:49
4	07:47 16:05-16:29/24 17:09	07:31 16:09-17:06/57 17:43	06:54 16:25-17:14/49 18:17	07:03 19:50	06:19 20:21 20:49	05:53 20:49
5	07:47 16:05-16:31/26 17:09	07:30 16:10-17:08/58 17:45	06:52 16:26-17:12/46 18:18	07:02 19:51	06:18 20:22 20:50	05:53 20:50
6	07:47 16:04-16:32/28 17:10	07:29 16:11-17:10/59 17:46	06:51 16:28-17:12/44 18:19	07:00 19:52	06:17 20:23 20:51	05:53 20:51
7	07:47 16:04-16:33/29 17:11	07:28 16:12-17:10/58 17:47	06:49 16:28-17:10/42 18:20	06:59 19:53	06:16 20:24 20:51	05:53 20:51
8	07:47 16:04-16:34/30 17:12	07:27 16:13-17:12/59 17:48	06:48 16:29-17:08/39 18:21	06:57 19:54	06:15 20:25 20:52	05:52 20:52
9	07:47 16:05-16:35/30 17:13	07:26 16:15-17:13/58 17:50	06:46 16:32-17:06/34 18:22	06:55 19:55	06:13 20:26 20:53	05:52 20:53
10	07:47 16:04-16:36/32 17:14	07:24 16:17-17:15/58 17:51	06:45 16:34-17:03/29 18:23	06:54 19:56	06:12 20:27 20:53	05:52 20:53
11	07:47 16:04-16:37/33 17:15	07:23 16:20-17:16/56 17:52	06:43 16:37-17:01/24 18:25	06:52 19:57	06:11 20:28 20:54	05:52 20:54
12	07:46 16:04-16:38/34 17:16	07:22 16:24-17:16/52 17:53	06:41 16:40-16:57/17 18:26	06:51 19:58	06:10 20:29 20:54	05:52 20:54
13	07:46 16:03-16:38/35 17:17	07:21 16:24-17:17/53 17:55	06:40 18:27	06:49 20:00	06:09 20:31 20:55	05:52 20:55
14	07:46 16:03-16:40/37 17:19	07:20 16:23-17:18/55 17:56	06:38 18:28	06:48 20:01	06:08 20:32 20:55	05:51 20:55
15	07:45 16:03-16:40/37 17:20	07:18 16:23-17:19/56 17:57	06:36 18:29	06:46 20:02	06:07 20:33 20:56	05:51 20:56
16	07:45 16:03-16:41/38 17:21	07:17 16:22-17:18/56 17:58	06:35 18:30	06:44 20:03	06:06 20:33 20:56	05:51 20:56
17	07:45 16:03-16:41/38 17:22	07:16 16:22-17:19/57 17:59	06:33 18:31	06:43 20:04	06:05 20:34 20:56	05:51 20:56
18	07:44 16:03-16:43/40 17:23	07:14 16:22-17:20/58 18:01	06:31 18:32	06:41 20:05	06:04 20:35 20:57	05:52 20:57
19	07:44 16:03-16:43/40 17:24	07:13 16:21-17:19/58 18:02	06:30 18:33	06:40 20:06	06:03 20:36 20:57	05:52 20:57
20	07:43 16:03-16:44/41 17:25	07:12 16:22-17:20/58 18:03	06:28 18:34	06:38 20:07	06:03 20:37 20:57	05:52 20:57
21	07:42 16:03-16:44/41 17:26	07:10 16:21-17:19/58 18:04	06:27 18:35	06:37 20:08	06:02 20:38 20:57	05:52 20:57
22	07:42 16:03-16:44/41 17:28	07:09 16:21-17:20/59 18:05	06:25 18:36	06:36 20:09	06:01 20:39 20:58	05:52 20:58
23	07:41 16:04-16:46/42 17:29	07:07 16:21-17:19/58 18:06	06:23 18:37	06:34 20:10	06:00 20:40 20:58	05:52 20:58
24	07:41 16:04-16:46/42 17:30	07:06 16:21-17:19/58 18:08	06:22 18:38	06:33 20:11	05:59 20:41 20:58	05:53 20:58
25	07:40 16:04-16:46/42 17:31	07:04 16:21-17:18/57 18:09	06:20 18:40	06:31 20:12	05:59 20:42 20:58	05:53 20:58
26	07:39 16:04-16:46/42 17:32	07:03 16:22-17:18/56 18:10	06:18 18:41	06:30 20:13	05:58 20:42 20:58	05:53 20:58
27	07:38 16:05-16:47/42 17:34	07:02 16:22-17:17/55 18:11	06:17 18:42	06:28 20:14	05:57 20:43 20:58	05:54 20:58
28	07:37 16:05-16:47/42 17:35	07:00 16:22-17:17/55 18:12	06:15 18:43	06:27 20:15	05:57 20:44 20:58	05:54 20:58
29	07:37 16:05-16:47/42 17:36		07:13 19:44	06:26 20:16	05:56 20:45 20:58	05:54 20:58
30	07:36 16:06-16:47/41 17:37		07:12 19:45	06:24 20:17	05:56 20:46 20:58	05:55 20:58
31	07:35 16:06-16:47/41 17:39		07:10 19:46		05:55 20:46	
Potential sun hours	298	298	370	398	447	451
Sum of minutes with flicker	1097	1583	481	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T02 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (30)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December			
1	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	17:21-17:33/12 17:21	06:52 17:21	15:47-16:44/57 17:21	07:27 16:57	15:46-16:19/33 16:57
2	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	17:16-17:37/21 17:20	06:53 17:20	15:45-16:43/58 17:20	07:28 16:57	15:47-16:19/32 16:57
3	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:04	17:12-17:40/28 19:04	06:55 17:18	15:43-16:42/59 17:18	07:29 16:56	15:48-16:18/30 16:56
4	05:57 20:58	06:22 20:36	06:52 19:52	07:22 19:02	17:10-17:43/33 19:02	06:56 17:17	15:41-16:40/59 17:17	07:30 16:56	15:48-16:18/30 16:56
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	17:08-17:44/36 19:00	06:57 17:16	15:41-16:39/58 17:16	07:31 16:56	15:49-16:18/29 16:56
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	17:06-17:46/40 18:59	06:58 17:15	15:40-16:38/58 17:15	07:32 16:56	15:50-16:18/28 16:56
7	05:59 20:57	06:25 20:33	06:55 19:47	07:25 18:57	17:04-17:47/43 18:57	06:59 17:14	15:39-16:36/57 17:14	07:33 16:56	15:52-16:18/26 16:56
8	05:59 20:57	06:26 20:31	06:56 19:45	07:26 18:55	17:02-17:48/46 18:55	07:00 17:13	15:38-16:34/56 17:13	07:33 16:56	15:53-16:17/24 16:56
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	17:01-17:48/47 18:54	07:02 17:12	15:38-16:32/54 17:12	07:34 16:56	15:54-16:17/23 16:56
10	06:00 20:56	06:28 20:29	06:58 19:42	07:28 18:52	16:59-17:49/50 18:52	07:03 17:11	15:38-16:28/50 17:11	07:35 16:56	15:55-16:17/22 16:56
11	06:01 20:55	06:29 20:28	06:59 19:40	07:29 18:51	16:58-17:49/51 18:51	07:04 17:10	15:37-16:18/41 17:10	07:36 16:56	15:56-16:17/21 16:56
12	06:02 20:55	06:30 20:26	07:00 19:39	07:30 18:49	16:57-17:50/53 18:49	07:05 17:09	15:37-16:18/41 17:09	07:37 16:56	15:57-16:16/19 16:56
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	16:56-17:50/54 18:47	07:06 17:08	15:37-16:19/42 17:08	07:38 16:56	15:58-16:16/18 16:56
14	06:03 20:54	06:31 20:24	07:02 19:35	07:32 18:46	16:55-17:50/55 18:46	07:07 17:07	15:37-16:19/42 17:07	07:38 16:56	15:59-16:16/17 16:56
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	16:54-17:50/56 18:44	07:09 17:06	15:37-16:19/42 17:06	07:39 16:56	16:00-16:17/17 16:56
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	16:54-17:51/57 18:43	07:10 17:05	15:37-16:19/42 17:05	07:40 16:57	16:01-16:16/15 16:57
17	06:06 20:52	06:34 20:20	07:05 19:30	07:35 18:41	16:53-17:51/58 18:41	07:11 17:04	15:38-16:20/42 17:04	07:41 16:57	16:02-16:16/14 16:57
18	06:06 20:52	06:35 20:18	07:06 19:29	07:36 18:40	16:53-17:51/58 18:40	07:12 17:04	15:38-16:20/42 17:04	07:41 16:57	16:02-16:16/14 16:57
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	16:52-17:51/59 18:38	07:13 17:03	15:38-16:20/42 17:03	07:42 16:58	16:03-16:16/13 16:58
20	06:08 20:50	06:37 20:15	07:08 19:25	07:39 18:37	16:52-17:50/58 18:37	07:14 17:02	15:38-16:19/41 17:02	07:42 16:58	16:05-16:17/12 16:58
21	06:09 20:49	06:38 20:14	07:09 19:24	07:40 18:35	16:51-17:50/59 18:35	07:16 17:02	15:39-16:20/41 17:02	07:43 16:59	16:05-16:17/12 16:59
22	06:10 20:49	06:39 20:12	07:10 19:22	07:41 18:34	16:51-17:49/58 18:34	07:17 17:01	15:39-16:20/41 17:01	07:44 16:59	16:06-16:18/12 16:59
23	06:11 20:48	06:40 20:11	07:11 19:20	07:42 18:33	16:52-17:50/58 18:33	07:18 17:00	15:40-16:20/40 17:00	07:44 17:00	16:06-16:18/12 17:00
24	06:12 20:47	06:41 20:09	07:12 19:19	07:43 18:31	16:52-17:49/57 18:31	07:19 17:00	15:40-16:20/40 17:00	07:44 17:00	16:06-16:18/12 17:00
25	06:12 20:46	06:42 20:08	07:13 19:17	07:44 17:30	15:52-16:49/57 17:30	07:20 16:59	15:41-16:19/38 16:59	07:45 17:01	16:06-16:19/13 17:01
26	06:13 20:45	06:43 20:06	07:14 19:15	07:45 17:28	15:52-16:48/56 17:28	07:21 16:59	15:41-16:19/38 16:59	07:45 17:01	16:06-16:20/14 17:01
27	06:14 20:44	06:44 20:05	07:15 19:13	07:46 17:27	15:52-16:47/55 17:27	07:22 16:58	15:43-16:20/37 16:58	07:46 17:02	16:06-16:21/15 17:02
28	06:15 20:43	06:45 20:03	07:16 19:12	07:48 17:26	15:53-16:47/54 17:26	07:23 16:58	15:43-16:20/37 16:58	07:46 17:03	16:07-16:22/15 17:03
29	06:16 20:42	06:46 20:02	07:17 19:10	07:49 17:25	15:54-16:46/52 17:25	07:25 16:57	15:44-16:19/35 16:57	07:46 17:03	16:06-16:23/17 17:03
30	06:17 20:41	06:47 20:00	07:18 19:08	07:50 17:23	15:53-16:45/52 17:23	07:26 16:57	15:45-16:19/34 16:57	07:47 17:04	16:06-16:24/18 17:04
31	06:18 20:40	06:48 19:58		07:51 17:22	15:49-16:44/55 17:22			07:47 17:05	16:06-16:25/19 17:05
Potential sun hours	458	427	375	346	299	289			
Sum of minutes with flicker	0	0	0	1528	1364	596			

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T03 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (31)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:47	07:34	06:59	07:08	06:23	05:55	05:55	06:19	06:49	19:01-19:32/31	07:19	18:25-18:42/17	06:52	07:27
	17:06	17:40	18:13	19:47	20:18	20:47	20:58	20:39	19:57	19:01-19:32/31	19:07	18:25-18:42/17	17:21	16:57
2	07:47	07:33	06:57	07:07	19:17-19:23/6	06:22	05:54	05:56	06:20	19:01-19:32/31	07:20	18:26-18:40/14	06:53	07:28
	17:07	17:41	18:15	19:48	20:19	20:48	20:58	20:38	19:55	19:05	19:05	18:26-18:40/14	17:20	16:57
3	07:47	07:32	06:56	07:05	19:12-19:26/14	06:21	05:54	05:56	06:21	19:01-19:31/30	07:21	18:29-18:37/8	06:55	07:29
	17:08	17:42	18:16	19:49	20:20	20:49	20:58	20:37	19:54	19:04	19:04	18:29-18:37/8	17:18	16:56
4	07:47	07:31	06:54	07:03	19:10-19:29/19	06:19	05:54	05:57	06:22	19:02-19:30/28	07:22	18:29-18:37/8	06:56	07:30
	17:09	17:44	18:17	19:50	20:21	20:49	20:58	20:36	19:52	19:02-19:30/28	19:02	18:29-18:37/8	17:17	16:56
5	07:47	07:30	06:52	07:02	19:08-19:29/21	06:18	05:53	05:57	06:23	19:01-19:28/27	07:23	18:29-18:37/8	06:57	07:31
	17:09	17:45	18:18	19:51	20:22	20:50	20:57	20:35	19:50	19:00	19:00	18:29-18:37/8	17:16	16:56
6	07:47	07:29	06:51	07:00	19:07-19:31/24	06:17	05:53	05:58	06:24	19:02-19:26/24	07:24	18:29-18:37/8	06:58	07:32
	17:10	17:46	18:19	19:52	20:23	20:51	20:57	20:34	19:49	18:59	18:59	18:29-18:37/8	17:15	16:56
7	07:47	07:28	06:49	06:59	19:05-19:32/27	06:16	05:53	05:59	06:25	19:03-19:25/22	07:25	18:29-18:37/8	06:59	07:33
	17:11	17:47	18:20	19:53	20:24	20:51	20:57	20:33	19:47	18:57	18:57	18:29-18:37/8	17:14	16:56
8	07:47	07:27	06:48	06:57	19:04-19:32/28	06:15	05:52	05:59	06:26	19:04-19:23/19	07:26	18:29-18:37/8	07:00	07:33
	17:12	17:48	18:21	19:54	20:25	20:52	20:57	20:31	19:45	18:55	18:55	18:29-18:37/8	17:13	16:56
9	07:47	07:26	06:46	06:55	19:03-19:33/30	06:13	05:52	06:00	06:27	19:06-19:21/15	07:27	18:29-18:37/8	07:02	07:34
	17:13	17:50	18:22	19:55	20:26	20:53	20:56	20:30	19:44	18:54	18:54	18:29-18:37/8	17:12	16:56
10	07:47	07:24	06:45	06:54	19:02-19:33/31	06:12	05:52	06:01	06:28	19:10-19:17/7	07:28	18:29-18:37/8	07:03	07:35
	17:14	17:51	18:23	19:56	20:27	20:53	20:56	20:29	19:42	18:52	18:52	18:29-18:37/8	17:11	16:56
11	07:47	07:23	06:43	06:52	19:02-19:33/31	06:11	05:52	06:01	06:29	19:09-19:17/7	07:29	18:29-18:37/8	07:04	07:36
	17:15	17:52	18:25	19:57	20:28	20:54	20:55	20:28	19:40	18:51	18:51	18:29-18:37/8	17:10	16:56
12	07:46	07:22	06:41	06:51	19:01-19:33/32	06:10	05:52	06:02	06:30	19:09-19:17/7	07:30	18:29-18:37/8	07:05	07:37
	17:16	17:53	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	18:49	18:29-18:37/8	17:09	16:56
13	07:46	07:21	06:40	06:49	19:02-19:33/31	06:09	05:52	06:03	06:31	19:09-19:17/7	07:31	18:29-18:37/8	07:06	07:38
	17:17	17:55	18:27	19:59	20:30	20:55	20:54	20:25	19:37	18:48	18:48	18:29-18:37/8	17:08	16:56
14	07:46	07:20	06:38	06:48	19:01-19:32/31	06:08	05:52	06:03	06:32	19:09-19:17/7	07:32	18:29-18:37/8	07:08	07:38
	17:19	17:56	18:28	20:00	20:31	20:55	20:54	20:24	19:35	18:46	18:46	18:29-18:37/8	17:07	16:56
15	07:45	07:18	06:36	06:46	19:01-19:31/30	06:07	05:51	06:04	06:32	19:09-19:17/7	07:33	18:29-18:37/8	07:09	07:39
	17:20	17:57	18:29	20:01	20:32	20:55	20:53	20:22	19:34	18:44	18:44	18:29-18:37/8	17:06	16:57
16	07:45	07:17	06:35	06:44	19:02-19:31/29	06:06	05:51	06:05	06:33	19:09-19:17/7	07:34	18:29-18:37/8	07:10	07:40
	17:21	17:58	18:30	20:03	20:33	20:56	20:53	20:21	19:32	18:43	18:43	18:29-18:37/8	17:05	16:57
17	07:45	07:16	06:33	06:43	19:02-19:29/27	06:05	05:52	06:06	06:34	19:09-19:17/7	07:35	18:29-18:37/8	07:11	07:41
	17:22	17:59	18:31	20:04	20:34	20:56	20:52	20:20	19:30	18:41	18:41	18:29-18:37/8	17:04	16:57
18	07:44	07:14	06:32	06:41	19:03-19:29/26	06:04	05:52	06:07	06:35	19:09-19:17/7	07:36	18:29-18:37/8	07:12	07:41
	17:23	18:01	18:32	20:05	20:35	20:57	20:52	20:18	19:29	18:40	18:40	18:29-18:37/8	17:04	16:57
19	07:44	07:13	06:30	06:40	19:04-19:28/24	06:03	05:52	06:07	06:36	19:09-19:17/7	07:37	18:29-18:37/8	07:13	07:42
	17:24	18:02	18:33	20:06	20:36	20:57	20:51	20:17	19:27	18:38	18:38	18:29-18:37/8	17:03	16:58
20	07:43	07:12	06:28	06:38	19:04-19:26/22	06:03	05:52	06:08	06:37	19:17-19:24/7	07:39	18:29-18:37/8	07:15	07:42
	17:25	18:03	18:34	20:07	20:37	20:57	20:50	20:15	19:25	18:37	18:37	18:29-18:37/8	17:02	16:58
21	07:42	07:10	06:27	06:37	19:06-19:24/18	06:02	05:52	06:09	06:38	19:12-19:26/14	07:40	18:29-18:37/8	07:16	07:43
	17:27	18:04	18:35	20:08	20:38	20:57	20:49	20:14	19:24	18:35	18:35	18:29-18:37/8	17:02	16:59
22	07:42	07:09	06:25	06:36	19:08-19:21/13	06:01	05:52	06:10	06:39	19:10-19:28/18	07:41	18:29-18:37/8	07:17	07:44
	17:28	18:05	18:36	20:09	20:39	20:58	20:49	20:12	19:22	18:34	18:34	18:29-18:37/8	17:01	16:59
23	07:41	07:07	06:23	06:34	19:12-19:17/5	06:00	05:52	06:11	06:40	19:08-19:30/22	07:42	18:29-18:37/8	07:18	07:44
	17:29	18:06	18:37	20:10	20:40	20:58	20:48	20:11	19:20	18:33	18:33	18:29-18:37/8	17:00	17:00
24	07:41	07:06	06:22	06:33	17:43-18:00/17	06:00	05:53	06:12	06:41	19:07-19:31/24	07:43	18:29-18:37/8	07:19	07:44
	17:30	18:08	18:38	20:11	20:41	20:58	20:47	20:09	19:19	18:31	18:31	18:29-18:37/8	17:00	17:00
25	07:40	07:05	06:20	06:31	17:45-17:57/12	06:01	05:59	06:12	06:42	19:05-19:32/27	07:44	18:29-18:37/8	07:20	07:45
	17:31	18:09	18:40	20:12	20:42	20:58	20:46	20:08	19:17	18:30	18:30	18:29-18:37/8	16:59	17:01
26	07:39	07:03	06:18	06:30	17:45-17:57/12	06:00	05:58	06:13	06:43	19:04-19:32/28	07:45	18:29-18:37/8	07:21	07:45
	17:32	18:10	18:41	20:13	20:42	20:58	20:45	20:06	19:15	18:32	18:32	18:29-18:37/8	16:59	17:01
27	07:38	07:02	06:17	06:28	17:45-17:57/12	06:00	05:58	06:14	06:44	19:03-19:32/29	07:46	18:29-18:37/8	07:22	07:46
	17:34	18:11	18:42	20:14	20:43	20:58	20:44	20:05	19:14	18:33	18:33	18:29-18:37/8	16:58	17:02
28	07:38	07:00	06:15	06:27	17:45-17:57/12	06:00	05:57	06:15	06:45	19:03-19:33/30	07:47	18:29-18:37/8	07:23	07:46
	17:35	18:12	18:43	20:15	20:44	20:58	20:43	20:03	19:12	18:34	18:34	18:29-18:37/8	16:58	17:03
29	07:37	07:00	06:13	06:26	17:45-17:57/12	06:00	05:56	06:16	06:46	19:02-19:33/31	07:48	18:29-18:37/8	07:25	07:46
	17:36	18:13	18:44	20:16	20:45	20:58	20:42	20:02	19:10	17:25	17:25	18:29-18:37/8	16:58	17:03
30	07:36	07:00	06:12	06:24	17:45-17:57/12	06:00	05:55	06:17	06:47	19:02-19:33/31	07:49	18:29-18:37/8	07:26	07:47
	17:37	18:14	18:45	20:17	20:46	20:58	20:41	20:00	19:09	17:23	17:23	18:29-18:37/8	16:57	17:04
31	07:35	07:00	06:10	06:24	17:45-17:57/12	06:00	05:55	06:18	06:48	19:01-19:33/32	07:50	18:29-18:37/8	07:27	07:47
	17:39	18:16	18:46	20:18	20:46	20:58	20:40	19:58	19:09	17:22	17:22	18:29-18:37/8	16:55	17:05
Potential sun hours	299	298	370	398	447	451	458	427	375	510	346	39	299	289
Sum of minutes with flicker	0	0	311	519	447	0	0	0	293	510	346	39	0	289

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T04 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (32)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June
1	07:47 09:33-09:49/16 17:06	07:34 17:40	06:58 07:25-08:17/52 18:13	07:08 19:47	06:23 20:18	05:55 20:47
2	07:47 09:35-09:48/13 17:07	07:33 17:41	06:57 07:26-08:16/50 18:14	07:07 19:48	06:22 20:19	05:54 20:48
3	07:47 09:37-09:46/9 17:08	07:32 07:52-07:58/6 17:42	06:55 07:26-08:15/49 18:16	07:05 19:49	06:21 20:20	05:54 20:49
4	07:47 17:08	07:31 07:51-08:02/11 17:43	06:54 07:28-08:14/46 18:17	07:03 19:50	06:19 20:21	05:53 20:49
5	07:47 17:09	07:30 07:50-08:05/15 17:45	06:52 07:28-08:13/45 18:18	07:02 19:51	06:18 20:22	05:53 20:50
6	07:47 17:10	07:29 07:49-08:08/19 17:46	06:51 07:30-08:12/42 18:19	07:00 19:52	06:17 20:23	05:53 20:51
7	07:47 17:11	07:28 07:47-08:09/22 17:47	06:49 07:30-08:10/40 18:20	06:59 19:53	06:16 20:24	05:52 20:51
8	07:47 17:12	07:27 07:46-08:11/25 17:48	06:48 07:31-08:07/36 18:21	06:57 19:54	06:15 20:25	05:52 20:52
9	07:47 17:13	07:26 07:45-08:12/27 17:50	06:46 07:33-08:06/33 18:22	06:55 19:55	06:13 20:26	05:52 20:52
10	07:47 17:14	07:24 07:44-08:14/30 17:51	06:44 07:35-08:03/28 18:23	06:54 19:56	06:12 20:27	05:52 20:53
11	07:46 17:15	07:23 07:43-08:15/32 17:52	06:43 07:38-08:00/22 18:24	06:52 19:57	06:11 20:28	05:52 20:53
12	07:46 17:16	07:22 07:41-08:16/35 17:53	06:41 07:42-07:55/13 18:26	06:51 19:58	06:10 20:29	05:52 20:54
13	07:46 17:17	07:21 07:40-08:17/37 17:54	06:40 18:27	06:49 19:59	06:09 20:30	05:51 20:54
14	07:46 17:18	07:19 07:39-08:18/39 17:56	06:38 18:28	06:47 20:00	06:08 20:31	05:51 20:55
15	07:45 17:20	07:18 07:38-08:19/41 17:57	06:36 18:29	06:46 20:01	06:07 20:32	05:51 20:55
16	07:45 17:21	07:17 07:36-08:19/43 17:58	06:35 18:30	06:44 20:02	06:06 20:33	05:51 20:56
17	07:44 17:22	07:16 07:35-08:19/44 17:59	06:33 18:31	06:43 20:03	06:05 20:34	05:51 20:56
18	07:44 17:23	07:14 07:33-08:19/46 18:01	06:31 18:32	06:41 20:05	06:04 20:35	05:52 20:56
19	07:43 17:24	07:13 07:32-08:20/48 18:02	06:30 18:33	06:40 20:06	06:03 20:36	05:52 20:57
20	07:43 17:25	07:12 07:31-08:20/49 18:03	06:28 18:34	06:38 20:07	06:03 20:37	05:52 20:57
21	07:42 17:26	07:10 07:29-08:20/51 18:04	06:26 18:35	06:37 20:08	06:02 20:38	05:52 20:57
22	07:42 17:28	07:09 07:28-08:20/52 18:05	06:25 18:36	06:35 20:09	06:01 20:39	05:52 20:57
23	07:41 17:29	07:07 07:26-08:20/54 18:06	06:23 18:37	06:34 20:10	06:00 20:40	05:52 20:58
24	07:40 17:30	07:06 07:25-08:20/55 18:08	06:22 18:38	06:33 20:11	05:59 20:41	05:53 20:58
25	07:40 17:31	07:04 07:24-08:19/55 18:09	06:20 18:39	06:31 20:12	05:59 20:41	05:53 20:58
26	07:39 17:32	07:03 07:25-08:19/54 18:10	06:18 18:40	06:30 20:13	05:58 20:42	05:53 20:58
27	07:38 17:34	07:01 07:25-08:18/53 18:11	06:17 18:42	06:28 20:14	05:57 20:43	05:54 20:58
28	07:37 17:35	07:00 07:26-08:18/52 18:12	06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:58
29	07:37 17:36		07:13 19:44	06:26 20:16	05:56 20:45	05:54 20:58
30	07:36 17:37		07:12 19:45	06:24 20:17	05:56 20:46	05:55 20:58
31	07:35 17:39		07:10 19:46		05:55 20:46	
Potential sun hours	299	298	370	398	447	451
Sum of minutes with flicker	38	995	456	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T04 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (32)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December
1	05:55 20:58	06:19 20:39	06:49 19:57	07:18 19:07	08:24-08:31/7 17:21	06:52 17:16
2	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	08:17-08:36/19 17:19	06:53 16:57
3	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:03	08:14-08:39/25 17:18	06:54 16:56
4	05:57 20:58	06:22 20:36	06:52 19:52	07:22 19:02	08:12-08:43/31 17:17	06:56 16:56
5	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	08:10-08:44/34 17:16	06:57 16:56
6	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	08:08-08:46/38 17:15	06:58 16:56
7	05:59 20:57	06:25 20:33	06:55 19:47	07:25 18:57	08:06-08:47/41 17:14	06:59 16:56
8	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55	08:04-08:48/44 17:13	07:00 16:56
9	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	08:03-08:49/46 17:12	07:02 16:56
10	06:00 20:56	06:28 20:29	06:58 19:42	07:28 18:52	08:02-08:49/47 17:11	07:03 16:56
11	06:01 20:55	06:28 20:28	06:59 19:40	07:29 18:51	08:00-08:50/50 17:10	07:04 16:56
12	06:02 20:55	06:29 20:26	07:00 19:39	07:30 18:49	07:59-08:50/51 17:09	07:05 16:56
13	06:03 20:54	06:30 20:25	07:01 19:37	07:31 18:47	07:59-08:50/51 17:08	07:06 16:56
14	06:03 20:54	06:31 20:24	07:02 19:35	07:32 18:46	07:58-08:51/53 17:07	07:07 16:56
15	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	07:57-08:51/54 17:06	07:09 16:56
16	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	07:56-08:51/55 17:05	07:10 16:57
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	07:57-08:51/54 17:04	07:11 16:57
18	06:06 20:51	06:35 20:18	07:06 19:29	07:36 18:40	07:57-08:51/54 17:04	07:12 16:57
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	07:58-08:51/53 17:03	07:13 16:58
20	06:08 20:50	06:37 20:15	07:08 19:25	07:39 18:37	07:59-08:51/52 17:02	07:14 16:58
21	06:09 20:49	06:38 20:14	07:09 19:24	07:40 18:35	08:00-08:50/50 17:02	07:16 16:59
22	06:10 20:49	06:39 20:12	07:10 19:22	07:41 18:34	08:01-08:50/49 17:01	07:17 16:59
23	06:11 20:48	06:40 20:11	07:11 19:20	07:42 18:33	08:03-08:50/47 17:00	07:18 17:00
24	06:12 20:47	06:41 20:09	07:11 19:18	07:43 18:31	08:04-08:50/46 17:00	07:19 17:00
25	06:12 20:46	06:42 20:08	07:12 19:17	07:44 17:30	07:05-07:49/44 16:59	07:20 16:59
26	06:13 20:45	06:43 20:06	07:13 19:15	07:45 17:28	07:06-07:48/42 16:59	07:21 17:01
27	06:14 20:44	06:44 20:05	07:14 19:13	07:46 17:27	07:07-07:47/40 16:58	07:22 17:02
28	06:15 20:43	06:45 20:03	07:15 19:12	07:47 17:26	07:09-07:47/38 16:58	07:23 17:03
29	06:16 20:42	06:46 20:02	07:16 19:10	07:48 17:24	07:10-07:46/36 16:57	07:24 17:03
30	06:17 20:41	06:47 20:00	07:17 19:08	07:49 17:23	07:11-07:45/34 16:57	07:25 17:04
31	06:18 20:40	06:48 19:58		07:50 17:22	07:12-07:44/32	07:26 17:05
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	0	0	0	1317	150	517

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T05 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (33)
Assumptions for shadow calculations

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

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

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

Progetto_Ala Dei Sardi

Licensed user:

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

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 15:28/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T06 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (34)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:47 17:06	07:34 17:40	06:58 18:13	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	18:20-18:40/20	06:52 17:21	07:27 16:57
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	06:22 20:19	05:54 20:48	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	18:20-18:39/19	06:53 17:20	07:28 16:57
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Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289	
Sum of minutes with flicker	0	0	257	0	0	0	0	0	187	74	0	0	

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T07 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (35)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:47	07:34	06:58	07:08	06:23	05:55	05:55	06:19	06:49	07:18	06:52	07:26
	17:06	17:40	18:13	19:47	20:18	20:47	20:58	20:39	19:57	19:07	17:21	16:57
2	07:47	07:33	06:57	07:07	06:22	05:54	05:56	06:20	06:50	07:19	06:53	07:27
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	17:08	17:42	18:16	19:49	20:20	20:48	20:58	20:37	19:53	19:03	17:18	16:56
4	07:47	07:31	06:54	07:03	06:19	05:53	05:57	06:22	06:52	07:21	06:56	07:29
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	17:36		19:44	20:16	20:45	20:58	20:42	20:01	19:10	17:24	16:57	17:03
30	07:36		07:12	06:24	05:56	05:55	06:17	06:47	07:17	06:50	07:25	07:46
	17:37		19:45	20:17	20:45	20:58	20:41	20:00	19:08	17:23	16:57	17:04
31	07:35		07:10		05:55		06:18	06:48		06:51		07:47
	17:38		19:46		20:46		20:40	19:58		17:22		17:05
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T08 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (36)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:47	07:34	06:59	07:08	06:23	05:55	05:55	06:19	06:49	07:19	06:52	07:27
	17:06	17:40	18:13	19:47	20:18	20:47	20:58	20:39	19:57	19:07	17:21	16:57
2	07:47	07:33	06:57	07:07	06:22	05:54	05:56	06:20	06:50	07:20	06:53	07:28
	17:07	17:41	18:15	19:48	20:19	20:48	20:58	20:38	19:55	19:05	17:20	16:57
3	07:47	07:32	06:55	07:05	06:21	05:54	05:56	06:21	06:51	07:21	06:55	07:29
	17:08	17:42	18:16	19:49	20:20	20:49	20:58	20:37	19:54	19:04	17:18	16:56
4	07:47	07:31	06:54	07:03	06:19	05:54	05:57	06:22	06:52	07:22	06:56	07:30
	17:09	17:44	18:17	19:50	20:21	20:49	20:58	20:36	19:52	19:02	17:17	16:56
5	07:47	07:30	06:52	07:02	06:18	05:53	05:57	06:23	06:53	07:23	06:57	07:31
	17:09	17:45	18:18	19:51	20:22	20:50	20:57	20:35	19:50	19:00	17:16	16:56
6	07:47	07:29	06:51	07:00	06:17	05:53	05:58	06:24	06:54	07:24	06:58	07:32
	17:10	17:46	18:19	19:52	20:23	20:51	20:57	20:34	19:49	18:59	17:15	16:56
7	07:47	07:28	06:49	06:59	06:16	05:53	05:59	06:25	06:55	07:25	06:59	07:32
	17:11	17:47	18:20	19:53	20:24	20:51	20:57	20:33	19:47	18:57	17:14	16:56
8	07:47	07:27	06:48	06:57	06:15	05:52	05:59	06:26	06:56	07:26	07:00	07:33
	17:12	17:48	18:21	19:54	20:25	20:52	20:57	20:31	19:45	18:55	17:13	16:56
9	07:47	07:26	06:46	06:55	06:13	05:52	06:00	06:27	06:57	07:27	07:02	07:34
	17:13	17:50	18:22	19:55	20:26	20:52	20:56	20:30	19:44	18:54	17:12	16:56
10	07:47	07:24	06:45	06:54	06:12	05:52	06:01	06:28	06:58	07:28	07:03	07:35
	17:14	17:51	18:23	19:56	20:27	20:53	20:56	20:29	19:42	18:52	17:11	16:56
11	07:47	07:23	06:43	06:52	06:11	05:52	06:01	06:29	06:59	07:29	07:04	07:36
	17:15	17:52	18:25	19:57	20:28	20:54	20:55	20:28	19:40	18:51	17:10	16:56
12	07:46	07:22	06:41	06:51	06:10	05:52	06:02	06:30	07:00	07:30	07:05	07:37
	17:16	17:53	18:26	19:58	20:29	20:54	20:55	20:26	19:39	18:49	17:09	16:56
13	07:46	07:21	06:40	06:49	06:09	05:52	06:03	06:31	07:01	07:31	07:06	07:38
	17:17	17:55	18:27	19:59	20:30	20:55	20:54	20:25	19:37	18:47	17:08	16:56
14	07:46	07:20	06:38	06:48	06:08	05:52	06:03	06:32	07:02	07:32	07:07	07:38
	17:19	17:56	18:28	20:00	20:31	20:55	20:54	20:24	19:35	18:46	17:07	16:56
15	07:45	07:18	06:36	06:46	06:07	05:52	06:04	06:33	07:03	07:33	07:09	07:39
	17:20	17:57	18:29	20:01	20:32	20:55	20:53	20:22	19:34	18:44	17:06	16:57
16	07:45	07:17	06:35	06:44	06:06	05:52	06:05	06:33	07:04	07:34	07:10	07:40
	17:21	17:58	18:30	20:02	20:33	20:56	20:53	20:21	19:32	18:43	17:05	16:57
17	07:45	07:16	06:33	06:43	06:05	05:52	06:06	06:34	07:05	07:35	07:11	07:41
	17:22	17:59	18:31	20:04	20:34	20:56	20:52	20:19	19:30	18:41	17:04	16:57
18	07:44	07:14	06:31	06:41	06:04	05:52	06:07	06:35	07:06	07:36	07:12	07:41
	17:23	18:01	18:32	20:05	20:35	20:56	20:52	20:18	19:29	18:40	17:04	16:57
19	07:44	07:13	06:30	06:40	06:03	05:52	06:07	06:36	07:07	07:37	07:13	07:42
	17:24	18:02	18:33	20:06	20:36	20:57	20:51	20:17	19:27	18:38	17:03	16:58
20	07:43	07:12	06:28	06:38	06:03	05:52	06:08	06:37	07:08	07:39	07:14	07:42
	17:25	18:03	18:34	20:07	20:37	20:57	20:50	20:15	19:25	18:37	17:02	16:58
21	07:42	07:10	06:27	06:37	06:02	05:52	06:09	06:38	07:09	07:40	07:16	07:43
	17:27	18:04	18:35	20:08	20:38	20:57	20:49	20:14	19:24	18:35	17:02	16:59
22	07:42	07:09	06:25	06:36	06:01	05:52	06:10	06:39	07:10	07:41	07:17	07:43
	17:28	18:05	18:36	20:09	20:39	20:58	20:49	20:12	19:22	18:34	17:01	16:59
23	07:41	07:07	06:23	06:34	06:00	05:52	06:11	06:40	07:11	07:42	07:18	07:44
	17:29	18:06	18:37	20:10	20:40	20:58	20:48	20:11	19:20	18:33	17:00	17:00
24	07:40	07:06	06:22	06:33	06:00	05:53	06:12	06:41	07:12	07:43	07:19	07:44
	17:30	18:08	18:38	20:11	20:41	20:58	20:47	20:09	19:19	18:31	17:00	17:00
25	07:40	07:04	06:20	06:31	05:59	05:53	06:12	06:42	07:13	06:44	07:20	07:45
	17:31	18:09	18:40	20:12	20:42	20:58	20:46	20:08	19:17	17:30	16:59	17:01
26	07:39	07:03	06:18	06:30	05:58	05:53	06:13	06:43	07:14	06:45	07:21	07:45
	17:33	18:10	18:41	20:13	20:42	20:58	20:45	20:06	19:15	17:29	16:59	17:01
27	07:38	07:02	06:17	06:28	05:58	05:54	06:14	06:44	07:15	06:46	07:22	07:46
	17:34	18:11	18:42	20:14	20:43	20:58	20:44	20:05	19:14	17:27	16:58	17:02
28	07:37	07:00	06:15	06:27	05:57	05:54	06:15	06:45	07:16	06:48	07:23	07:46
	17:35	18:12	18:43	20:15	20:44	20:58	20:43	20:03	19:12	17:26	16:58	17:03
29	07:37		07:13	06:26	05:56	05:54	06:16	06:46	07:17	06:49	07:24	07:46
	17:36		19:44	20:16	20:45	20:58	20:42	20:02	19:10	17:25	16:58	17:03
30	07:36		07:12	06:24	05:56	05:55	06:17	06:47	07:18	06:50	07:26	07:46
	17:37		19:45	20:17	20:46	20:58	20:41	20:00	19:09	17:23	16:57	17:04
31	07:35		07:10		05:55		06:18	06:48		06:51		07:47
	17:39		19:46		20:46		20:40	19:58		17:22		17:05
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T09 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (37)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	06:52 17:21	07:27 16:57
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	06:22 20:19	05:54 20:48	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	06:53 17:20	07:28 16:57
3	07:47 17:08	07:32 17:42	06:55 18:16	07:05 19:49	06:21 20:20	05:54 20:49	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:04	06:54 17:18	07:29 16:56
4	07:47 17:09	07:31 17:44	06:54 18:17	07:03 19:50	06:19 20:21	05:54 20:49	05:57 20:58	06:22 20:36	06:52 19:52	07:22 19:02	06:56 17:17	07:30 16:56
5	07:47 17:09	07:30 17:45	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:50	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	06:57 17:16	07:31 16:56
6	07:47 17:10	07:29 17:46	06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:51	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	06:58 17:15	07:32 16:56
7	07:47 17:11	07:28 17:47	06:49 18:20	06:59 19:53	06:16 20:24	05:53 20:51	05:59 20:57	06:25 20:33	06:55 19:47	07:25 18:57	06:59 17:14	07:32 16:56
8	07:47 17:12	07:27 17:48	06:48 18:21	06:57 19:54	06:15 20:25	05:52 20:52	05:59 20:56	06:26 20:31	06:56 19:45	07:26 18:55	07:00 17:13	07:33 16:56
9	07:47 17:13	07:26 17:50	06:46 18:22	06:55 19:55	06:13 20:26	05:52 20:52	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	07:02 17:12	07:34 16:56
10	07:47 17:14	07:24 17:51	06:44 18:23	06:54 19:56	06:12 20:27	05:52 20:53	06:01 20:56	06:28 20:29	06:58 19:42	07:28 18:52	07:03 17:11	07:35 16:56
11	07:47 17:15	07:23 17:52	06:43 18:25	06:52 19:57	06:11 20:28	05:52 20:54	06:01 20:55	06:29 20:28	06:59 19:40	07:29 18:51	07:04 17:10	07:36 16:56
12	07:46 17:16	07:22 17:53	06:41 18:26	06:51 19:58	06:10 20:29	05:52 20:54	06:02 20:55	06:30 20:26	07:00 19:39	07:30 18:49	07:05 17:09	07:37 16:56
13	07:46 17:17	07:21 17:55	06:40 18:27	06:49 19:59	06:09 20:30	05:52 20:54	06:03 20:54	06:31 20:25	07:01 19:37	07:31 18:47	07:06 17:08	07:38 16:56
14	07:46 17:19	07:20 17:56	06:38 18:28	06:48 20:00	06:08 20:31	05:52 20:55	06:03 20:54	06:32 20:24	07:02 19:35	07:32 18:46	07:07 17:07	07:38 16:56
15	07:45 17:20	07:18 17:57	06:36 18:29	06:46 20:01	06:07 20:32	05:51 20:55	06:04 20:53	06:32 20:22	07:03 19:34	07:33 18:44	07:09 17:06	07:39 16:57
16	07:45 17:21	07:17 17:58	06:35 18:30	06:44 20:02	06:06 20:33	05:52 20:56	06:05 20:53	06:33 20:21	07:04 19:32	07:34 18:43	07:10 17:05	07:40 16:57
17	07:44 17:22	07:16 17:59	06:33 18:31	06:43 20:03	06:05 20:34	05:52 20:56	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	07:11 17:04	07:40 16:57
18	07:44 17:23	07:14 18:01	06:31 18:32	06:41 20:05	06:04 20:35	05:52 20:56	06:07 20:51	06:35 20:18	07:06 19:29	07:36 18:40	07:12 17:04	07:41 16:57
19	07:43 17:24	07:13 18:02	06:30 18:33	06:40 20:06	06:03 20:36	05:52 20:57	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	07:13 17:03	07:42 16:58
20	07:43 17:25	07:12 18:03	06:28 18:34	06:38 20:07	06:03 20:37	05:52 20:57	06:08 20:50	06:37 20:15	07:08 19:25	07:39 18:37	07:14 17:02	07:42 16:58
21	07:42 17:27	07:10 18:04	06:27 18:35	06:37 20:08	06:02 20:38	05:52 20:57	06:09 20:49	06:38 20:14	07:09 19:24	07:40 18:35	07:16 17:02	07:43 16:59
22	07:42 17:28	07:09 18:05	06:25 18:36	06:36 20:09	06:01 20:39	05:52 20:57	06:10 20:49	06:39 20:12	07:10 19:22	07:41 18:34	07:17 17:01	07:43 16:59
23	07:41 17:29	07:07 18:06	06:23 18:37	06:34 20:10	06:00 20:40	05:52 20:58	06:11 20:48	06:40 20:11	07:11 19:20	07:42 18:33	07:18 17:00	07:44 17:00
24	07:40 17:30	07:06 18:08	06:22 18:38	06:33 20:11	06:00 20:41	05:53 20:58	06:12 20:47	06:41 20:09	07:12 19:19	07:43 18:31	07:19 17:00	07:44 17:00
25	07:40 17:31	07:04 18:09	06:20 18:39	06:31 20:12	05:59 20:41	05:53 20:58	06:12 20:46	06:42 20:08	07:13 19:17	07:44 17:30	07:20 16:59	07:45 17:01
26	07:39 17:32	07:03 18:10	06:18 18:41	06:30 20:13	05:58 20:42	05:53 20:58	06:13 20:45	06:43 20:06	07:14 19:15	07:45 17:28	07:21 16:59	07:45 17:01
27	07:38 17:34	07:02 18:11	06:17 18:42	06:28 20:14	05:58 20:43	05:54 20:58	06:14 20:44	06:44 20:05	07:15 19:13	07:46 17:27	07:22 16:58	07:46 17:02
28	07:37 17:35	07:00 18:12	06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:58	06:15 20:43	06:45 20:03	07:16 19:12	07:47 17:26	07:23 16:58	07:46 17:03
29	07:37 17:36		07:13 19:44	06:26 20:16	05:56 20:45	05:54 20:58	06:16 20:42	06:46 20:02	07:17 19:10	07:49 17:25	07:24 16:58	07:46 17:03
30	07:36 17:37		07:12 19:45	06:24 20:17	05:56 20:46	05:55 20:58	06:17 20:41	06:47 20:00	07:18 19:08	07:50 17:23	07:26 16:57	07:46 17:04
31	07:35 17:39		07:10 19:46		05:55 20:46		06:18 20:40	06:48 19:58		06:51 17:22		07:47 17:05
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T10 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (38)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	06:52 17:21	07:27 16:57
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	06:22 20:19	05:54 20:48	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	06:53 17:20	07:28 16:57
3	07:47 17:08	07:32 17:42	06:56 18:16	07:05 19:49	06:21 20:20	05:54 20:49	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:04	06:55 17:18	07:29 16:56
4	07:47 17:09	07:31 17:44	06:54 18:17	07:04 19:50	06:19 20:21	05:54 20:49	05:57 20:58	06:22 20:36	06:52 19:52	07:22 19:02	06:56 17:17	07:30 16:56
5	07:47 17:10	07:30 17:45	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:50	05:58 20:57	06:23 20:35	06:53 19:50	07:23 19:00	06:57 17:16	07:31 16:56
6	07:47 17:11	07:29 17:46	06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:51	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	06:58 17:15	07:32 16:56
7	07:47 17:11	07:28 17:47	06:49 18:20	06:59 19:53	06:16 20:24	05:53 20:51	05:59 20:57	06:25 20:33	06:55 19:47	07:25 18:57	06:59 17:14	07:33 16:56
8	07:47 17:12	07:27 17:49	06:48 18:21	06:57 19:54	06:15 20:25	05:52 20:52	05:59 20:57	06:26 20:31	06:56 19:46	07:26 18:55	07:00 17:13	07:33 16:56
9	07:47 17:13	07:26 17:50	06:46 18:22	06:56 19:55	06:14 20:26	05:52 20:53	06:00 20:56	06:27 20:30	06:57 19:44	07:27 18:54	07:02 17:12	07:34 16:56
10	07:47 17:14	07:24 17:51	06:45 18:24	06:54 19:56	06:12 20:27	05:52 20:53	06:01 20:56	06:28 20:29	06:58 19:42	07:28 18:52	07:03 17:11	07:35 16:56
11	07:47 17:15	07:23 17:52	06:43 18:25	06:52 19:57	06:11 20:28	05:52 20:54	06:01 20:55	06:29 20:28	06:59 19:41	07:29 18:51	07:04 17:10	07:36 16:56
12	07:46 17:17	07:22 17:53	06:41 18:26	06:51 19:58	06:10 20:29	05:52 20:54	06:02 20:55	06:30 20:26	07:00 19:39	07:30 18:49	07:05 17:09	07:37 16:56
13	07:46 17:18	07:21 17:55	06:40 18:27	06:49 19:59	06:09 20:30	05:52 20:55	06:03 20:54	06:31 20:25	07:01 19:37	07:31 18:48	07:06 17:08	07:38 16:56
14	07:46 17:19	07:20 17:56	06:38 18:28	06:48 20:00	06:08 20:31	05:52 20:55	06:04 20:54	06:32 20:24	07:02 19:35	07:32 18:46	07:08 17:07	07:38 16:56
15	07:45 17:20	07:18 17:57	06:36 18:29	06:46 20:02	06:07 20:32	05:52 20:55	06:04 20:53	06:33 20:22	07:03 19:34	07:33 18:45	07:09 17:06	07:39 16:57
16	07:45 17:21	07:17 17:58	06:35 18:30	06:45 20:03	06:06 20:33	05:52 20:56	06:05 20:53	06:34 20:21	07:04 19:32	07:34 18:43	07:10 17:05	07:40 16:57
17	07:45 17:22	07:16 17:59	06:33 18:31	06:43 20:04	06:05 20:34	05:52 20:56	06:06 20:52	06:35 20:20	07:05 19:30	07:35 18:41	07:11 17:05	07:41 16:57
18	07:44 17:23	07:14 18:01	06:32 18:32	06:42 20:05	06:04 20:35	05:52 20:57	06:07 20:52	06:36 20:18	07:06 19:29	07:36 18:40	07:12 17:04	07:41 16:58
19	07:44 17:24	07:13 18:02	06:30 18:33	06:40 20:06	06:04 20:36	05:52 20:57	06:07 20:51	06:37 20:17	07:07 19:27	07:38 18:38	07:13 17:03	07:42 16:58
20	07:43 17:25	07:12 18:03	06:28 18:34	06:39 20:07	06:03 20:37	05:52 20:57	06:08 20:50	06:38 20:15	07:08 19:25	07:39 18:37	07:15 17:02	07:42 16:58
21	07:42 17:27	07:10 18:04	06:27 18:35	06:37 20:08	06:02 20:38	05:52 20:57	06:09 20:49	06:38 20:14	07:09 19:24	07:40 18:36	07:16 17:02	07:43 16:59
22	07:42 17:28	07:09 18:05	06:25 18:36	06:36 20:09	06:01 20:39	05:52 20:58	06:10 20:49	06:39 20:12	07:10 19:22	07:41 18:34	07:17 17:01	07:44 16:59
23	07:41 17:29	07:07 18:07	06:23 18:37	06:34 20:10	06:00 20:40	05:53 20:58	06:11 20:48	06:40 20:11	07:11 19:20	07:42 18:33	07:18 17:00	07:44 17:00
24	07:41 17:30	07:06 18:08	06:22 18:39	06:33 20:11	06:00 20:41	05:53 20:58	06:12 20:47	06:41 20:09	07:12 19:19	07:43 18:31	07:19 17:00	07:44 17:00
25	07:40 17:31	07:05 18:09	06:20 18:40	06:31 20:12	05:59 20:42	05:53 20:58	06:13 20:46	06:42 20:08	07:13 19:17	06:44 17:30	07:20 16:59	07:45 17:01
26	07:39 17:33	07:03 18:10	06:18 18:41	06:30 20:13	05:58 20:42	05:53 20:58	06:13 20:45	06:43 20:06	07:14 19:15	06:45 17:29	07:21 16:59	07:45 17:02
27	07:38 17:34	07:02 18:11	06:17 18:42	06:29 20:14	05:58 20:43	05:54 20:58	06:14 20:44	06:44 20:05	07:15 19:14	06:47 17:27	07:22 16:58	07:46 17:02
28	07:38 17:35	07:00 18:12	06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:58	06:15 20:43	06:45 20:03	07:16 19:12	06:48 17:26	07:23 16:58	07:46 17:03
29	07:37 17:36		07:13 19:44	06:26 20:16	05:56 20:45	05:55 20:58	06:16 20:43	06:46 20:02	07:17 19:10	06:49 17:25	07:25 16:58	07:46 17:04
30	07:36 17:37		07:12 19:45	06:25 20:17	05:56 20:46	05:55 20:58	06:17 20:42	06:47 20:00	07:18 19:09	06:50 17:23	07:26 16:57	07:47 17:04
31	07:35 17:39		07:10 19:46		05:55 20:46		06:18 20:40	06:48 19:58		06:51 17:22		07:47 17:05
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T11 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (39)
 Assumptions for shadow calculations

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

	January	February	March	April	May	June
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	06:23 20:18	05:55 20:12-20:22/10 20:47
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	06:22 20:19	05:54 20:12-20:23/11 20:48
3	07:47 17:08	07:32 17:42	06:56 18:16	07:05 19:49	06:21 20:20	05:54 20:11-20:23/12 20:49
4	07:47 17:09	07:31 07:51-07:55/4 17:44	06:54 18:17	07:04 19:50	06:19 20:21	05:54 20:11-20:24/13 20:49
5	07:47 17:10	07:30 07:50-07:57/7 17:45	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:11-20:25/14 20:50
6	07:47 17:10	07:29 07:49-07:58/9 17:46	06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:10-20:25/15 20:51
7	07:47 17:11	07:28 07:48-07:59/11 17:47	06:49 18:20	06:59 19:53	06:16 20:24	05:53 20:10-20:26/16 20:51
8	07:47 17:12	07:27 07:46-07:59/13 17:49	06:48 18:21	06:57 19:54	06:15 20:25	05:52 20:10-20:27/17 20:52
9	07:47 17:13	07:26 07:45-08:00/15 17:50	06:46 18:22	06:55 19:55	06:14 20:26	05:52 20:10-20:27/17 20:52
10	07:47 17:14	07:24 07:44-08:00/16 17:51	06:45 18:23	06:54 19:56	06:12 20:27	05:52 20:10-20:28/18 20:53
11	07:47 17:15	07:23 07:43-08:01/18 17:52	06:43 18:25	06:52 19:57	06:11 20:28	05:52 20:10-20:29/19 20:54
12	07:46 17:16	07:22 07:42-08:01/19 17:53	06:41 18:26	06:51 19:58	06:10 20:29	05:52 20:10-20:29/19 20:54
13	07:46 17:18	07:21 07:41-08:00/19 17:55	06:40 18:27	06:49 19:59	06:09 20:30	05:52 20:09-20:29/20 20:55
14	07:46 17:19	07:20 07:42-07:59/17 17:56	06:38 18:28	06:48 20:00	06:08 20:31	05:52 20:09-20:29/20 20:55
15	07:45 17:20	07:18 07:43-07:59/16 17:57	06:36 18:29	06:46 20:01	06:07 20:32	05:52 20:11-20:31/20 20:55
16	07:45 17:21	07:17 07:43-07:57/14 17:58	06:35 18:30	06:45 20:02	06:06 20:33	05:52 20:11-20:31/20 20:56
17	07:45 17:22	07:16 07:46-07:55/9 17:59	06:33 18:31	06:43 20:04	06:05 20:34	05:52 20:11-20:31/20 20:56
18	07:44 17:23	07:14 18:01	06:32 18:32	06:41 20:05	06:04 20:35	05:52 20:11-20:31/20 20:56
19	07:44 17:24	07:13 18:02	06:30 18:33	06:40 20:06	06:04 20:36	05:52 20:11-20:32/21 20:57
20	07:43 17:25	07:12 18:03	06:28 18:34	06:39 20:07	06:03 20:37	05:52 20:11-20:32/21 20:57
21	07:42 17:27	07:10 18:04	06:27 18:35	06:37 20:08	06:02 20:38	05:52 20:11-20:32/21 20:57
22	07:42 17:28	07:09 18:05	06:25 18:36	06:36 20:09	06:01 20:39	05:52 20:11-20:32/21 20:58
23	07:41 17:29	07:07 18:07	06:23 18:37	06:34 20:10	06:00 20:40	05:53 20:12-20:33/21 20:58
24	07:40 17:30	07:06 18:08	06:22 18:38	06:33 20:11	06:00 20:41	05:53 20:12-20:32/20 20:58
25	07:40 17:31	07:04 18:09	06:20 18:40	06:31 20:12	05:59 20:42	05:53 20:12-20:32/20 20:58
26	07:39 17:33	07:03 18:10	06:18 18:41	06:30 20:13	05:58 20:42	05:53 20:13-20:33/20 20:58
27	07:38 17:34	07:02 18:11	06:17 18:42	06:29 20:14	05:58 20:43	05:54 20:13-20:33/20 20:58
28	07:37 17:35	07:00 18:12	06:15 18:43	06:27 20:15	05:57 20:44	05:54 20:12-20:32/20 20:58
29	07:37 17:36		07:13 19:44	06:26 20:16	05:56 20:15-20:20/5 20:45	05:55 20:13-20:33/20 20:58
30	07:36 17:37		07:12 19:45	06:25 20:17	05:56 20:14-20:21/7 20:46	05:55 20:13-20:32/19 20:58
31	07:35 17:39		07:10 19:46		05:55 20:12-20:21/9 20:46	
Potential sun hours	299	298	370	398	447	451
Sum of minutes with flicker	0	187	0	0	21	545

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T11 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (39)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December
1	05:55 20:14-20:33/19 20:58	06:19 20:39	06:49 19:57	07:19 19:07	06:52 07:14-07:30/16 17:21	07:27 16:57
2	05:56 20:14-20:32/18 20:58	06:20 20:38	06:50 19:55	07:20 19:05	06:53 07:15-07:30/15 17:20	07:28 16:57
3	05:56 20:15-20:33/18 20:58	06:21 20:37	06:51 19:54	07:21 19:04	06:55 07:16-07:29/13 17:18	07:29 16:56
4	05:57 20:15-20:32/17 20:58	06:22 20:36	06:52 19:52	07:22 19:02	06:56 07:17-07:28/11 17:17	07:30 16:56
5	05:57 20:16-20:32/16 20:57	06:23 20:35	06:53 19:50	07:23 19:00	06:57 07:19-07:28/9 17:16	07:31 16:56
6	05:58 20:16-20:32/16 20:57	06:24 20:34	06:54 19:49	07:24 18:59	06:58 07:20-07:27/7 17:15	07:32 16:56
7	05:59 20:17-20:32/15 20:57	06:25 20:33	06:55 19:47	07:25 18:57	06:59 07:21-07:25/4 17:14	07:32 16:56
8	05:59 20:18-20:32/14 20:57	06:26 20:31	06:56 19:45	07:26 18:55	07:00 17:13	07:33 16:56
9	06:00 20:18-20:31/13 20:56	06:27 20:30	06:57 19:44	07:27 18:54	07:02 17:12	07:34 16:56
10	06:01 20:19-20:31/12 20:56	06:28 20:29	06:58 19:42	07:28 18:52	07:03 17:11	07:35 16:56
11	06:01 20:20-20:31/11 20:55	06:29 20:28	06:59 19:40	07:29 18:51	07:04 17:10	07:36 16:56
12	06:02 20:20-20:30/10 20:55	06:30 20:26	07:00 19:39	07:30 18:49	07:05 17:09	07:37 16:56
13	06:03 20:22-20:30/8 20:54	06:31 20:25	07:01 19:37	07:31 18:48	07:06 17:08	07:38 16:56
14	06:03 20:24-20:29/5 20:54	06:32 20:24	07:02 19:35	07:32 18:46	07:07 17:07	07:38 16:56
15	06:04 20:26-20:28/2 20:53	06:33 20:22	07:03 19:34	07:33 18:44	07:09 17:06	07:39 16:57
16	06:05 20:53	06:34 20:21	07:04 19:32	07:34 18:43	07:10 17:05	07:40 16:57
17	06:06 20:52	06:34 20:19	07:05 19:30	07:35 18:41	07:11 17:05	07:41 16:57
18	06:07 20:52	06:35 20:18	07:06 19:29	07:36 18:40	07:12 17:04	07:41 16:57
19	06:07 20:51	06:36 20:17	07:07 19:27	07:37 18:38	07:13 17:03	07:42 16:58
20	06:08 20:50	06:37 20:15	07:08 19:25	07:39 18:37	07:14 17:02	07:42 16:58
21	06:09 20:49	06:38 20:14	07:09 19:24	07:40 18:36	07:16 17:02	07:43 16:59
22	06:10 20:49	06:39 20:12	07:10 19:22	07:41 18:34	07:17 17:01	07:43 16:59
23	06:11 20:48	06:40 20:11	07:11 19:20	07:42 18:33	07:18 17:00	07:44 17:00
24	06:12 20:47	06:41 20:09	07:12 19:19	07:43 08:19-08:21/2 18:31	07:19 17:00	07:44 17:00
25	06:13 20:46	06:42 20:08	07:13 19:17	06:44 07:15-07:25/10 17:30	07:20 16:59	07:45 17:01
26	06:13 20:45	06:43 20:06	07:14 19:15	06:45 07:13-07:27/14 17:29	07:21 16:59	07:45 17:01
27	06:14 20:44	06:44 20:05	07:15 19:14	06:46 07:12-07:29/17 17:27	07:22 16:58	07:46 17:02
28	06:15 20:43	06:45 20:03	07:16 19:12	06:48 07:11-07:29/18 17:26	07:23 16:58	07:46 17:03
29	06:16 20:42	06:46 20:02	07:17 19:10	06:49 07:10-07:29/19 17:25	07:24 16:58	07:46 17:03
30	06:17 20:41	06:47 20:00	07:18 19:09	06:50 07:11-07:30/19 17:23	07:26 16:57	07:46 17:04
31	06:18 20:40	06:48 19:58		06:51 07:12-07:29/17 17:22		07:47 17:05
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	194	0	0	116	75	0

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T12 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (40)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June
1	07:47 16:05-16:32/27 17:06	07:34 16:30-17:12/42 17:40	06:58 18:13	07:08 07:38-08:38/60 19:47	06:23 07:31-08:25/54 20:18	05:55 20:47
2	07:47 16:11-16:33/22 17:07	07:33 16:31-17:13/42 17:41	06:57 18:14	07:07 07:36-08:38/62 19:48	06:22 07:32-08:24/52 20:19	05:54 20:48
3	07:47 16:11-16:33/22 17:08	07:32 16:33-17:15/42 17:42	06:55 18:16	07:05 07:34-08:38/64 19:49	06:21 07:33-08:23/50 20:20	05:54 20:48
4	07:47 16:11-16:34/23 17:09	07:31 16:37-17:16/39 17:43	06:54 18:17	07:03 07:34-08:40/66 19:50	06:19 07:34-08:22/48 20:21	05:54 20:49
5	07:47 16:11-16:35/24 17:09	07:30 16:41-17:17/36 17:45	06:52 18:18	07:02 07:32-08:39/67 19:51	06:18 07:36-08:21/45 20:22	05:53 20:50
6	07:47 16:11-16:36/25 17:10	07:29 16:41-17:17/36 17:46	06:51 18:19	07:00 07:32-08:40/68 19:52	06:17 07:36-08:18/42 20:23	05:53 20:51
7	07:47 16:12-16:37/25 17:11	07:28 16:42-17:17/35 17:47	06:49 18:20	06:59 07:31-08:40/69 19:53	06:16 07:38-08:17/39 20:24	05:53 20:51
8	07:47 16:12-16:38/26 17:12	07:27 16:43-17:18/35 17:48	06:48 18:21	06:57 07:30-08:40/70 19:54	06:15 07:39-08:15/36 20:25	05:52 20:52
9	07:47 16:11-16:38/27 17:13	07:25 16:44-17:18/34 17:50	06:46 18:22	06:55 07:30-08:40/70 19:55	06:13 07:41-08:13/32 20:26	05:52 20:52
10	07:47 16:12-16:39/27 17:14	07:24 16:46-17:18/32 17:51	06:44 18:23	06:54 07:29-08:40/71 19:56	06:12 07:43-08:11/28 20:27	05:52 20:53
11	07:46 16:12-16:41/29 17:15	07:23 16:48-17:18/30 17:52	06:43 18:24	06:52 07:29-08:40/71 19:57	06:11 07:46-08:08/22 20:28	05:52 20:53
12	07:46 16:13-16:41/28 17:16	07:22 16:50-17:17/27 17:53	06:41 18:26	06:51 07:28-08:39/71 19:58	06:10 07:50-08:04/14 20:29	05:52 20:54
13	07:46 16:12-16:43/31 17:17	07:21 16:53-17:17/24 17:55	06:40 18:27	06:49 07:28-08:40/72 19:59	06:09 20:30	05:52 20:54
14	07:46 16:13-16:44/31 17:19	07:19 16:56-17:17/21 17:56	06:38 18:28	06:48 07:27-08:39/72 20:00	06:08 20:31	05:51 20:55
15	07:45 16:13-16:45/32 17:20	07:18 16:56-17:15/19 17:57	06:36 18:29	06:46 07:27-08:39/72 20:01	06:07 20:32	05:51 20:55
16	07:45 16:13-16:46/33 17:21	07:17 16:58-17:14/16 17:58	06:35 18:30	06:44 07:27-08:38/71 20:02	06:06 20:33	05:51 20:56
17	07:44 16:13-16:46/33 17:22	07:16 17:00-17:12/12 17:59	06:33 18:31	06:43 07:27-08:38/71 20:03	06:05 20:34	05:52 20:56
18	07:44 16:14-16:48/34 17:23	07:14 17:03-17:08/5 18:01	06:31 18:32	06:41 07:26-08:37/71 20:04	06:04 20:35	05:52 20:56
19	07:43 16:14-16:48/34 17:24	07:13 18:02	06:30 18:33	06:40 07:27-08:37/70 20:06	06:03 20:36	05:52 20:57
20	07:43 16:15-16:49/34 17:25	07:12 18:03	06:28 18:34	06:38 07:26-08:36/70 20:07	06:03 20:37	05:52 20:57
21	07:42 16:16-16:49/33 17:26	07:10 18:04	06:26 18:35	06:37 07:27-08:35/68 20:08	06:02 20:38	05:52 20:57
22	07:42 16:16-16:50/34 17:28	07:09 18:05	06:25 18:36	06:35 07:26-08:34/68 20:09	06:01 20:39	05:52 20:57
23	07:41 16:17-16:55/38 17:29	07:07 18:06	06:23 18:37	06:34 07:27-08:34/67 20:10	06:00 20:40	05:52 20:58
24	07:40 16:18-16:57/39 17:30	07:06 18:08	06:22 18:38	06:33 06:54-07:26/32 20:11	05:59 20:41	05:53 20:58
25	07:40 16:18-16:59/41 17:31	07:04 18:09	06:20 18:39	06:31 06:51-07:28/37 20:12	05:59 20:41	05:53 20:58
26	07:39 16:19-17:00/41 17:32	07:03 18:10	06:18 18:40	06:30 06:49-07:31/42 20:13	05:58 20:42	05:53 20:58
27	07:38 16:20-17:01/41 17:34	07:01 18:11	06:17 18:42	06:28 06:46-07:32/46 20:14	05:57 20:43	05:54 20:58
28	07:37 16:22-17:04/42 17:35	07:00 18:12	06:15 18:43	06:27 06:44-07:34/50 20:15	05:57 20:44	05:54 20:58
29	07:37 16:24-17:06/42 17:36		07:13 19:44	06:26 07:42-08:35/53 20:16	05:56 20:45	05:54 20:58
30	07:36 16:26-17:08/42 17:37		07:12 19:45	06:24 07:40-08:36/56 20:17	05:56 20:46	05:55 20:58
31	07:35 16:29-17:09/40 17:39		07:10 19:46		05:55 20:46	
Potential sun hours	299	298	370	398	447	451
Sum of minutes with flicker	1000	527	412	2008	462	0

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T12 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (40)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	July	August	September	October	November	December
1	05:55 20:58	06:19 07:59-08:16/17 20:39	06:49 07:28-08:39/71 19:57	07:18 19:07	06:52 16:14-16:47/33 17:21	07:26 15:54-16:23/29 16:57
2	05:56 20:58	06:20 07:56-08:20/24 20:38	06:50 07:28-08:39/71 19:55	07:20 19:05	06:53 16:14-16:48/34 17:20	07:28 15:55-16:22/27 16:57
3	05:56 20:58	06:21 07:53-08:22/29 20:37	06:51 07:28-08:38/70 19:54	07:21 19:03	06:54 16:12-16:47/35 17:18	07:29 15:55-16:22/27 16:56
4	05:57 20:57	06:22 07:51-08:24/33 20:36	06:52 07:28-08:38/70 19:52	07:22 19:02	06:56 16:12-16:47/35 17:17	07:30 15:56-16:22/26 16:56
5	05:57 20:57	06:23 07:49-08:26/37 20:35	06:53 07:27-08:36/69 19:50	07:23 19:00	06:57 16:11-16:46/35 17:16	07:30 15:57-16:22/25 16:56
6	05:58 20:57	06:24 07:47-08:27/40 20:34	06:54 07:27-08:35/68 19:49	07:24 18:59	06:58 16:11-16:47/36 17:15	07:31 15:58-16:22/24 16:56
7	05:59 20:57	06:25 07:45-08:28/43 20:32	06:55 07:28-08:35/67 19:47	07:25 18:57	06:59 16:06-16:46/40 17:14	07:32 15:58-16:22/24 16:56
8	05:59 20:56	06:26 07:44-08:30/46 20:31	06:56 07:28-08:34/66 19:45	07:26 18:55	07:00 16:03-16:44/41 17:13	07:33 15:59-16:22/23 16:56
9	06:00 20:56	06:27 07:43-08:31/48 20:30	06:57 07:28-08:33/65 19:44	07:27 18:54	07:01 16:01-16:43/42 17:12	07:34 16:00-16:22/22 16:56
10	06:01 20:56	06:28 07:41-08:32/51 20:29	06:58 07:29-08:32/63 19:42	07:28 18:52	07:03 16:01-16:42/41 17:11	07:35 16:01-16:23/22 16:56
11	06:01 20:55	06:29 07:40-08:33/53 20:27	06:59 07:30-08:30/60 19:40	07:29 18:51	07:04 15:59-16:40/41 17:10	07:36 16:01-16:22/21 16:56
12	06:02 20:55	06:30 07:39-08:34/55 20:26	07:00 07:30-08:29/59 19:39	07:30 18:49	07:05 15:57-16:39/42 17:09	07:37 15:55-16:22/27 16:56
13	06:03 20:54	06:30 07:38-08:35/57 20:25	07:01 07:31-08:28/57 19:37	07:31 18:47	07:06 15:56-16:37/41 17:08	07:38 15:55-16:23/28 16:56
14	06:03 20:54	06:31 07:37-08:36/59 20:24	07:02 07:32-08:26/54 19:35	07:32 18:46	07:07 15:54-16:36/42 17:07	07:38 15:55-16:23/28 16:56
15	06:04 20:53	06:32 07:37-08:37/60 20:22	07:03 07:33-08:24/51 19:34	07:33 18:44	07:09 15:53-16:34/41 17:06	07:39 15:54-16:22/28 16:57
16	06:05 20:53	06:33 07:36-08:37/61 20:21	07:04 07:35-08:22/47 19:32	07:34 18:43	07:10 15:52-16:33/41 17:05	07:40 15:55-16:23/28 16:57
17	06:06 20:52	06:34 07:35-08:38/63 20:19	07:05 07:36-08:20/44 19:30	07:35 18:41	07:11 15:52-16:32/40 17:04	07:40 15:55-16:24/29 16:57
18	06:06 20:51	06:35 07:34-08:39/65 20:18	07:06 07:38-08:17/39 19:29	07:36 18:40	07:12 15:52-16:31/39 17:04	07:41 15:55-16:23/28 16:57
19	06:07 20:51	06:36 07:33-08:39/66 20:17	07:07 07:41-08:14/33 19:27	07:37 18:38	07:13 15:51-16:29/38 17:03	07:42 15:56-16:24/28 16:58
20	06:08 20:50	06:37 07:33-08:40/67 20:15	07:08 07:44-08:10/26 19:25	07:38 18:37	07:14 15:51-16:25/34 17:02	07:42 15:55-16:24/29 16:58
21	06:09 20:49	06:38 07:31-08:39/68 20:14	07:09 07:48-08:05/17 19:24	07:40 18:35	07:16 15:51-16:24/33 17:02	07:43 15:56-16:25/29 16:59
22	06:10 20:49	06:39 07:31-08:39/68 20:12	07:10 19:22	07:41 18:34	07:17 15:51-16:25/34 17:01	07:43 15:56-16:25/29 16:59
23	06:11 20:48	06:40 07:30-08:40/70 20:11	07:11 19:20	07:42 18:33	07:18 15:51-16:25/34 17:00	07:44 15:57-16:26/29 17:00
24	06:12 20:47	06:41 07:30-08:40/70 20:09	07:12 19:18	07:43 17:32-17:40/8 18:31	07:19 15:51-16:25/34 17:00	07:44 15:58-16:26/28 17:00
25	06:12 20:46	06:42 07:29-08:40/71 20:08	07:12 19:17	06:44 16:29-16:43/14 17:30	07:20 15:51-16:25/34 16:59	07:45 15:59-16:27/28 17:01
26	06:13 20:45	06:43 07:29-08:40/71 20:06	07:13 19:15	06:45 16:27-16:44/17 17:28	07:21 15:51-16:24/33 16:59	07:45 15:59-16:27/28 17:01
27	06:14 20:44	06:44 07:29-08:40/71 20:05	07:14 19:13	06:46 16:25-16:45/20 17:27	07:22 15:52-16:24/32 16:58	07:45 16:00-16:28/28 17:02
28	06:15 20:43	06:45 07:28-08:40/72 20:03	07:15 19:12	06:47 16:24-16:46/22 17:26	07:23 15:53-16:24/31 16:58	07:46 16:00-16:28/28 17:03
29	06:16 20:42	06:46 07:28-08:40/72 20:01	07:16 19:10	06:49 16:23-16:47/24 17:24	07:24 15:53-16:24/31 16:57	07:46 16:02-16:30/28 17:03
30	06:17 20:41	06:47 07:28-08:40/72 20:00	07:17 19:08	06:50 16:19-16:47/28 17:23	07:25 15:54-16:24/30 16:57	07:46 16:03-16:30/27 17:04
31	06:18 20:40	08:04-08:11/7 06:48 07:28-08:39/71 19:58		06:51 16:16-16:47/31 17:22		07:47 16:04-16:31/27 17:05
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	7	1750	1167	164	1097	836

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

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

Project:

Progetto_Ala Dei Sardi

Licensed user:

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Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 15:28/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T13 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (41)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	18:20-18:53/33 20:18	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	17:59-18:42/43 17:21	06:52 16:57	07:27 16:57
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	18:22-18:50/28 20:19	06:22 20:19	05:54 20:48	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	18:00-18:40/40 17:20	06:53 16:57	07:28 16:57
3	07:47 17:08	07:32 17:42	06:55 18:16	07:05 19:49	18:23-18:48/25 20:20	06:21 20:20	05:54 20:49	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:04	18:01-18:39/38 17:18	06:54 16:56	07:29 16:56
4	07:47 17:09	07:31 17:44	06:54 18:17	07:03 19:50	18:27-18:45/18 20:21	06:19 20:21	05:54 20:49	05:57 20:58	06:22 20:36	06:52 19:52	07:22 19:02	18:02-18:37/35 17:17	06:56 16:56	07:30 16:56
5	07:47 17:10	07:30 17:45	06:52 18:18	07:02 19:51	18:32-18:39/7 20:22	06:18 20:22	05:53 20:50	05:57 20:57	06:23 20:35	06:53 19:50	07:23 19:00	18:04-18:36/32 17:16	06:57 16:56	07:31 16:56
6	07:47 17:10	07:29 17:46	06:51 18:19	07:00 19:52	17:34-17:54/20 20:23	07:00 20:23	05:53 20:51	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	18:06-18:34/28 17:15	06:58 16:56	07:32 16:56
7	07:47 17:11	07:28 17:47	06:49 18:20	06:59 19:53	17:30-17:56/26 20:24	06:59 20:24	05:53 20:51	05:59 20:57	06:25 20:33	06:55 19:47	18:27-18:33/6 18:57	18:08-18:31/23 17:14	06:59 16:56	07:32 16:56
8	07:47 17:12	07:27 17:48	06:48 18:21	06:57 19:54	17:27-17:58/31 20:25	06:57 20:25	05:52 20:52	05:59 20:56	06:26 20:31	06:56 19:45	18:21-18:39/18 18:55	18:11-18:27/16 17:13	07:00 16:56	07:33 16:56
9	07:47 17:13	07:26 17:50	06:46 18:22	06:55 19:55	17:26-18:00/34 20:26	06:55 20:26	05:52 20:52	06:00 20:56	06:27 20:30	06:57 19:44	18:18-18:41/23 18:54	07:27 17:12	07:02 16:56	07:34 16:56
10	07:47 17:14	07:24 17:51	06:44 18:23	06:54 19:56	17:24-18:01/37 20:27	06:54 20:27	05:52 20:53	06:01 20:56	06:28 20:29	06:58 19:42	18:15-18:43/28 18:52	07:28 17:11	07:03 16:56	07:35 16:56
11	07:46 17:15	07:23 17:52	06:43 18:25	06:52 19:57	17:22-18:01/39 20:28	06:52 20:28	05:52 20:53	06:01 20:55	06:29 20:28	06:59 19:40	18:13-18:45/32 18:51	07:29 17:10	07:04 16:56	07:36 16:56
12	07:46 17:16	07:22 17:53	06:41 18:26	06:51 19:58	17:21-18:03/42 20:29	06:51 20:29	05:52 20:54	06:02 20:55	06:30 20:26	07:00 19:39	18:11-18:46/35 18:49	07:30 17:09	07:05 16:56	07:37 16:56
13	07:46 17:18	07:21 17:55	06:40 18:27	06:49 19:59	17:20-18:03/43 20:30	06:49 20:30	05:52 20:54	06:03 20:54	06:31 20:25	07:01 19:37	18:09-18:47/38 18:47	07:31 17:08	07:06 16:56	07:38 16:56
14	07:46 17:19	07:19 17:56	06:38 18:28	06:48 20:00	17:19-18:04/45 20:00	06:48 20:31	05:52 20:55	06:03 20:54	06:32 20:24	07:02 19:35	18:08-18:48/40 18:46	07:32 17:07	07:07 16:56	07:38 16:56
15	07:45 17:20	07:18 17:57	06:36 18:29	06:46 20:01	17:18-18:04/46 20:01	06:46 20:32	05:52 20:55	06:04 20:53	06:33 20:22	07:03 19:34	18:06-18:49/43 18:44	07:33 17:06	07:09 16:57	07:39 16:57
16	07:45 17:21	07:17 17:58	06:35 18:30	06:44 20:02	17:17-18:04/47 20:02	06:44 20:33	05:52 20:56	06:05 20:53	06:34 20:21	07:04 19:32	18:05-18:49/44 18:43	07:34 17:05	07:10 16:57	07:40 16:57
17	07:44 17:22	07:16 17:59	06:33 18:31	06:43 20:04	17:17-18:05/48 20:04	06:43 20:34	05:52 20:56	06:06 20:52	06:34 20:19	07:05 19:30	18:04-18:49/45 18:41	07:35 17:05	07:11 16:57	07:40 16:57
18	07:44 17:23	07:14 18:01	06:31 18:32	06:41 20:05	17:16-18:05/49 20:05	06:41 20:35	05:52 20:56	06:07 20:51	06:35 20:18	07:06 19:29	18:03-18:50/47 18:40	07:36 17:04	07:12 16:57	07:41 16:57
19	07:43 17:24	07:13 18:02	06:30 18:33	06:40 20:06	17:15-18:04/49 20:06	06:40 20:36	05:52 20:57	06:07 20:51	06:36 20:17	07:07 19:27	18:02-18:50/48 18:38	07:37 17:03	07:13 16:58	07:42 16:58
20	07:43 17:25	07:12 18:03	06:28 18:34	06:38 20:07	17:16-18:05/49 20:07	06:38 20:37	05:52 20:57	06:08 20:50	06:37 20:15	07:08 19:25	18:02-18:50/48 18:37	07:39 17:02	07:14 16:58	07:42 16:58
21	07:42 17:27	07:10 18:04	06:27 18:35	06:37 20:08	17:15-18:04/49 20:08	06:37 20:38	05:52 20:57	06:09 20:49	06:38 20:14	07:09 19:24	18:01-18:50/49 18:35	07:40 17:02	07:16 16:59	07:43 16:59
22	07:42 17:28	07:09 18:05	06:25 18:36	06:36 20:09	17:15-18:03/48 20:09	06:36 20:39	05:52 20:57	06:10 20:49	06:39 20:12	07:10 19:22	18:00-18:49/49 18:34	07:41 17:01	07:17 16:59	07:43 16:59
23	07:41 17:29	07:07 18:06	06:23 18:37	06:34 20:10	17:15-18:03/48 20:10	06:34 20:40	05:53 20:58	06:11 20:48	06:40 20:11	07:11 19:20	17:59-18:48/49 18:33	07:42 17:00	07:18 16:59	07:44 17:00
24	07:40 17:30	07:06 18:08	06:22 18:38	06:33 20:11	17:15-18:03/48 20:11	06:33 20:41	05:53 20:58	06:12 20:47	06:41 20:09	07:12 19:19	17:59-18:48/49 18:31	07:43 17:00	07:19 16:59	07:44 17:00
25	07:40 17:31	07:04 18:09	06:20 18:40	06:31 20:12	17:15-18:01/46 20:12	06:31 20:41	05:59 20:58	06:13 20:46	06:42 20:08	07:13 19:17	17:58-18:47/49 17:30	07:44 16:59	07:20 16:59	07:45 17:01
26	07:39 17:33	07:03 18:10	06:18 18:41	06:30 20:13	17:16-18:01/45 20:13	06:30 20:42	05:58 20:58	06:13 20:45	06:43 20:06	07:14 19:15	17:58-18:47/49 17:29	07:45 16:59	07:21 16:59	07:45 17:01
27	07:38 17:34	07:02 18:11	06:17 18:42	06:29 20:14	17:16-18:00/44 20:14	06:29 20:43	05:58 20:58	06:14 20:44	06:44 20:05	07:15 19:14	17:58-18:46/48 17:27	07:46 16:58	07:22 16:58	07:46 17:02
28	07:37 17:35	07:00 18:12	06:15 18:43	06:27 20:15	17:16-17:58/42 20:15	06:27 20:44	05:57 20:58	06:15 20:43	06:45 20:03	07:16 19:12	17:58-18:45/47 17:26	07:47 16:58	07:23 16:58	07:46 17:03
29	07:37 17:36	07:00 19:44	07:13 19:44	06:26 20:16	18:17-18:58/41 20:16	06:26 20:45	05:56 20:58	06:16 20:42	06:46 20:02	07:17 19:10	17:59-18:44/45 17:25	07:48 16:58	07:24 16:58	07:46 17:03
30	07:36 17:37	07:00 19:45	07:12 19:45	06:24 20:17	18:18-18:56/38 20:17	06:24 20:46	05:56 20:58	06:17 20:41	06:47 20:00	07:18 19:08	17:59-18:43/44 17:23	07:49 16:57	07:26 16:57	07:46 17:04
31	07:35 17:39	07:00 19:46	07:10 19:46	06:23 20:18	18:19-18:54/35 20:18	06:23 20:46	05:55 20:58	06:18 20:40	06:48 19:58	07:19 19:08	18:00-18:42/43 17:22	07:50 17:05	07:27 16:59	07:47 17:05
Potential sun hours	299	298	370	398	447	451	458	427	375	973	255	299	289	0
Sum of minutes with flicker	0	0	1100	111	0	0	0	0	0	973	255	0	289	0

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

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

Project:

Progetto_Ala Dei Sardi

Licensed user:

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Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

10/11/2023 15:28/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T14 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (42)

Assumptions for shadow calculations

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

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

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

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:47 17:06	07:34 17:40	06:59 18:13	07:08 19:47	06:23 20:18	05:55 20:47	05:55 20:58	06:19 20:39	06:49 19:57	07:19 19:07	18:26-18:44/18	06:52 17:21	07:27 16:57
2	07:47 17:07	07:33 17:41	06:57 18:15	07:07 19:48	06:22 20:19	05:54 20:48	05:56 20:58	06:20 20:38	06:50 19:55	07:20 19:05	18:26-18:42/16	06:53 17:20	07:28 16:57
3	07:47 17:08	07:32 17:42	06:56 18:16	07:05 19:49	06:21 20:20	05:54 20:49	05:56 20:58	06:21 20:37	06:51 19:54	07:21 19:04	18:26-18:41/15	06:55 17:18	07:29 16:56
4	07:47 17:09	07:31 17:44	06:54 18:17	07:04 19:50	06:19 20:21	05:54 20:49	05:57 20:58	06:22 20:36	06:52 19:52	07:22 19:02	18:27-18:39/12	06:56 17:17	07:30 16:56
5	07:47 17:10	07:30 17:45	06:52 18:18	07:02 19:51	06:18 20:22	05:53 20:50	05:58 20:57	06:23 20:35	06:53 19:50	07:23 19:00	18:29-18:38/9	06:57 17:16	07:31 16:56
6	07:47 17:10	07:29 17:46	06:51 18:19	07:00 19:52	06:17 20:23	05:53 20:51	05:58 20:57	06:24 20:34	06:54 19:49	07:24 18:59	18:30-18:36/6	06:58 17:15	07:32 16:56
7	07:47 17:11	07:28 17:47	06:49 18:20	17:55-17:59/4	06:59 19:53	06:16 20:24	05:53 20:51	05:59 20:57	06:25 20:33	06:55 19:47	18:33-18:35/2	06:59 17:14	07:32 16:56
8	07:47 17:12	07:27 17:49	06:48 18:21	17:52-18:00/8	06:57 19:54	06:15 20:25	05:52 20:52	05:59 20:56	06:26 20:31	06:56 19:45		07:00 18:55	07:33 17:13
9	07:47 17:13	07:26 17:50	06:46 18:22	17:51-18:02/11	06:55 19:55	06:14 20:26	05:52 20:52	06:00 20:56	06:27 20:30	06:57 19:44		07:02 18:54	07:34 17:12
10	07:47 17:14	07:24 17:51	06:45 18:24	17:49-18:02/13	06:54 19:56	06:12 20:27	05:52 20:53	06:01 20:56	06:28 20:29	06:58 19:42		07:03 18:52	07:35 17:11
11	07:47 17:15	07:23 17:52	06:43 18:25	17:48-18:03/15	06:52 19:57	06:11 20:28	05:52 20:54	06:01 20:55	06:29 20:28	06:59 19:40		07:04 18:51	07:36 17:10
12	07:46 17:17	07:22 17:53	06:41 18:26	17:48-18:05/17	06:51 19:58	06:10 20:29	05:52 20:54	06:02 20:55	06:30 20:26	07:00 19:39		07:05 18:49	07:37 17:09
13	07:46 17:18	07:21 17:55	06:40 18:27	17:47-18:06/19	06:49 19:59	06:09 20:30	05:52 20:55	06:03 20:54	06:31 20:25	07:01 19:37		07:06 18:48	07:38 17:08
14	07:46 17:19	07:20 17:56	06:38 18:28	17:47-18:07/20	06:48 20:00	06:08 20:31	05:52 20:55	06:03 20:54	06:32 20:24	07:02 19:35		07:07 18:46	07:38 17:07
15	07:45 17:20	07:18 17:57	06:36 18:29	17:47-18:08/21	06:46 20:01	06:07 20:32	05:52 20:55	06:04 20:53	06:33 20:22	07:03 19:34		07:09 18:44	07:39 17:06
16	07:45 17:21	07:17 17:58	06:35 18:30	17:46-18:09/23	06:45 20:02	06:06 20:33	05:52 20:56	06:05 20:53	06:34 20:21	07:04 19:32		07:10 18:43	07:40 17:05
17	07:44 17:22	07:16 17:59	06:33 18:31	17:47-18:09/22	06:43 20:04	06:05 20:34	05:52 20:56	06:06 20:52	06:35 20:19	07:05 19:30		07:11 18:41	07:40 17:05
18	07:44 17:23	07:14 18:01	06:32 18:32	17:48-18:08/20	06:42 20:05	06:04 20:35	05:52 20:56	06:07 20:52	06:36 20:18	07:06 19:29		07:12 18:40	07:41 17:04
19	07:44 17:24	07:13 18:02	06:30 18:33	17:48-18:06/18	06:40 20:06	06:04 20:36	05:52 20:57	06:07 20:51	06:36 20:17	07:07 19:27		07:13 18:38	07:42 17:03
20	07:43 17:25	07:12 18:03	06:28 18:34	17:51-18:04/13	06:39 20:07	06:03 20:37	05:52 20:57	06:08 20:50	06:37 20:15	07:08 19:25		07:14 18:37	07:42 17:02
21	07:42 17:27	07:10 18:04	06:27 18:35	17:53-18:00/7	06:37 20:08	06:02 20:38	05:52 20:57	06:09 20:49	06:38 20:14	07:09 19:24		07:16 18:36	07:43 17:02
22	07:42 17:28	07:09 18:05	06:25 18:36		06:36 20:09	06:01 20:39	05:52 20:58	06:10 20:49	06:39 20:12	18:41-18:44/3		07:17 18:34	07:43 17:01
23	07:41 17:29	07:07 18:07	06:23 18:37		06:34 20:10	06:00 20:40	05:53 20:58	06:11 20:48	06:40 20:11	18:35-18:47/12		07:18 18:33	07:44 17:00
24	07:40 17:30	07:06 18:08	06:22 18:38		06:33 20:11	06:00 20:41	05:53 20:58	06:12 20:47	06:41 20:09	18:32-18:49/17		07:19 18:31	07:44 17:00
25	07:40 17:31	07:04 18:09	06:20 18:40		06:31 20:12	05:59 20:41	05:53 20:58	06:13 20:46	06:42 20:08	18:31-18:50/19		07:20 17:30	07:45 17:01
26	07:39 17:33	07:03 18:10	06:18 18:41		06:30 20:13	05:58 20:42	05:53 20:58	06:13 20:45	06:43 20:06	18:29-18:50/21		07:21 17:29	07:45 17:01
27	07:38 17:34	07:02 18:11	06:17 18:42		06:29 20:14	05:58 20:43	05:54 20:58	06:14 20:44	06:44 20:05	18:28-18:51/23		07:22 17:27	07:46 17:02
28	07:37 17:35	07:00 18:12	06:15 18:43		06:27 20:15	05:57 20:44	05:54 20:58	06:15 20:43	06:45 20:03	18:27-18:49/22		07:23 17:26	07:46 17:03
29	07:37 17:36		07:13 19:44		06:26 20:16	05:56 20:45	05:55 20:58	06:16 20:42	06:46 20:02	18:27-18:47/20		07:24 17:25	07:46 17:04
30	07:36 17:37		07:12 19:45		06:25 20:17	05:56 20:46	05:55 20:58	06:17 20:41	06:47 20:00	18:26-18:46/20		07:26 17:23	07:46 17:04
31	07:35 17:39		07:10 19:46			05:55 20:46		06:18 20:40	06:48 19:58			06:51 17:22	07:47 17:05
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289	
Sum of minutes with flicker	0	0	231	0	0	0	0	0	157	78	0	0	

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

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

SHADOW - Calendar per WTG

Calculation: Progetto_20231109WTG: T15 - Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 221,0 m) (43)
 Assumptions for shadow calculations

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:47 16:02-16:20/18	07:34 08:02-08:54/52	06:58 07:08	06:23 07:08	05:55 06:23	05:55 06:19	06:19 06:49	06:19 06:49	07:18		06:52 07:34-08:20/46	07:26 07:50-08:21/31
2	07:47 16:03-16:21/18	07:33 08:02-08:54/52	06:57 07:07	06:22 07:07	05:54 06:22	05:54 06:20	06:20 06:50	06:20 06:50	07:20		06:53 07:35-08:22/47	07:27 07:51-08:20/29
3	07:47 16:04-16:21/17	07:32 08:02-08:54/52	06:55 07:05	06:21 07:05	05:54 06:21	05:54 06:21	06:21 06:51	06:21 06:51	07:21		06:54 07:34-08:22/48	07:29 15:57-16:00/3
4	07:47 16:05-16:21/16	07:31 08:03-08:54/51	06:54 07:03	06:19 07:03	05:54 06:19	05:54 06:22	06:22 06:52	06:22 06:52	07:22		06:56 07:33-08:22/49	07:30 15:55-16:03/8
5	07:47 16:06-16:20/14	07:30 08:03-08:54/51	06:52 07:02	06:18 07:02	05:53 06:18	05:53 06:23	06:23 06:53	06:23 06:53	07:23		06:57 07:33-08:22/49	07:30 15:54-16:05/11
6	07:47 16:07-16:20/13	07:29 08:03-08:53/50	06:51 07:00	06:17 07:00	05:53 06:17	05:53 06:24	06:24 06:54	06:24 06:54	07:24		06:58 07:33-08:24/51	07:31 15:53-16:06/13
7	07:47 16:09-16:20/11	07:28 08:03-08:52/49	06:49 07:00	06:16 07:00	05:53 06:16	05:53 06:25	06:25 06:55	06:25 06:55	07:25		06:59 07:33-08:24/51	07:32 15:53-16:07/14
8	07:47 16:11-16:19/8	07:27 08:04-08:52/48	06:48 07:00	06:15 07:00	05:52 06:15	05:52 06:26	06:26 06:56	06:26 06:56	07:26		07:00 07:32-08:24/52	07:33 15:53-16:09/16
9	07:47 16:13-16:16/3	07:25 08:05-08:52/47	06:46 07:00	06:13 07:00	05:52 06:13	05:52 06:27	06:27 06:57	06:27 06:57	07:27		07:01 07:33-08:25/52	07:34 15:53-16:10/17
10	07:47 08:08-08:37/29	07:24 08:06-08:51/45	06:44 07:00	06:12 07:00	05:52 06:12	05:52 06:01	06:01 06:28	06:01 06:28	07:28		07:03 07:33-08:25/52	07:35 15:52-16:10/18
11	07:46 08:08-08:39/31	07:23 08:07-08:51/44	06:43 07:00	06:11 07:00	05:52 06:11	05:52 06:01	06:01 06:29	06:01 06:29	07:29		07:04 07:33-08:24/51	07:36 15:52-16:10/18
12	07:46 08:08-08:40/32	07:22 08:07-08:49/42	06:41 07:00	06:10 07:00	05:52 06:10	05:52 06:02	06:02 06:30	06:02 06:30	07:30		07:05 07:33-08:24/51	07:37 15:53-16:11/18
13	07:46 08:07-08:41/34	07:21 08:08-08:48/40	06:40 07:00	06:09 07:00	05:52 06:09	05:52 06:03	06:03 06:31	06:03 06:31	07:31		07:06 07:34-08:25/51	07:38 15:53-16:12/19
14	07:46 08:07-08:42/35	07:19 08:10-08:47/37	06:38 07:00	06:08 07:00	05:52 06:08	05:52 06:03	06:03 06:31	06:03 06:31	07:31		07:07 07:34-08:25/51	07:39 15:53-16:13/20
15	07:45 08:06-08:43/37	07:18 08:10-08:45/35	06:36 07:00	06:07 07:00	05:51 06:07	05:51 06:04	06:04 06:32	06:04 06:32	07:32		07:09 07:34-08:25/51	07:41 15:53-16:13/20
16	07:45 08:06-08:44/38	07:17 08:12-08:44/32	06:35 07:00	06:06 07:00	05:51 06:06	05:51 06:05	06:05 06:33	06:05 06:33	07:33		07:10 07:34-08:24/50	07:40 15:53-16:14/21
17	07:44 08:05-08:45/40	07:16 08:14-08:42/28	06:33 07:00	06:05 07:00	05:52 06:05	05:52 06:06	06:06 06:34	06:06 06:34	07:34		07:11 07:35-08:25/50	07:40 15:54-16:15/21
18	07:44 08:05-08:46/41	07:14 08:16-08:39/23	06:31 07:00	06:04 07:00	05:52 06:04	05:52 06:06	06:06 06:35	06:06 06:35	07:35		07:12 07:36-08:25/49	07:41 15:53-16:15/22
19	07:43 08:04-08:47/43	07:13 08:20-08:36/16	06:30 07:00	06:03 07:00	05:52 06:03	05:52 06:07	06:07 06:36	06:07 06:36	07:36		07:13 07:36-08:24/48	07:42 15:54-16:16/22
20	07:43 08:04-08:48/44	07:11 08:03-08:48/44	06:28 07:00	06:03 07:00	05:52 06:03	05:52 06:08	06:08 06:37	06:08 06:37	07:37		07:14 07:37-08:24/47	07:42 15:54-16:16/22
21	07:42 08:03-08:48/45	07:10 08:04-08:48/45	06:26 07:00	06:02 07:00	05:52 06:02	05:52 06:09	06:09 06:38	06:09 06:38	07:38		07:15 07:38-08:23/45	07:43 15:55-16:17/22
22	07:42 08:02-08:49/47	07:09 08:05-08:49/47	06:25 07:00	06:01 07:00	05:52 06:01	05:52 06:10	06:10 06:39	06:10 06:39	07:39	08:53-09:02/9	07:17 07:40-08:24/44	07:43 15:55-16:17/22
23	07:41 08:02-08:50/48	07:07 08:06-08:50/48	06:23 07:00	06:00 07:00	05:52 06:00	05:52 06:11	06:11 06:40	06:11 06:40	07:40	08:49-09:08/19	07:18 07:41-08:24/43	07:44 15:56-16:18/22
24	07:40 08:02-08:51/49	07:06 08:07-08:51/49	06:22 07:00	06:00 07:00	05:53 06:00	05:53 06:12	06:12 06:41	06:12 06:41	07:41	08:46-09:10/24	07:19 07:42-08:23/41	07:44 15:56-16:18/22
25	07:40 08:01-08:51/50	07:04 08:08-08:51/50	06:20 07:00	06:00 07:00	05:53 06:00	05:53 06:12	06:12 06:42	06:12 06:42	07:42	07:43-08:12/29	07:20 07:43-08:23/40	07:45 15:57-16:19/22
26	07:39 08:01-08:51/50	07:03 08:09-08:51/50	06:18 07:00	06:00 07:00	05:53 06:00	05:53 06:13	06:13 06:43	06:13 06:43	07:43	07:41-08:14/33	07:21 07:44-08:22/38	07:45 15:57-16:19/22
27	07:38 08:01-08:52/51	07:01 08:10-08:52/51	06:17 07:00	06:01 07:00	05:54 06:01	05:54 06:14	06:14 06:44	06:14 06:44	07:44	07:40-08:15/35	07:22 07:46-08:23/37	07:45 15:58-16:19/21
28	07:37 08:02-08:53/51	07:00 08:11-08:53/51	06:15 07:00	06:02 07:00	05:54 06:02	05:54 06:15	06:15 06:45	06:15 06:45	07:45	07:39-08:17/38	07:23 07:47-08:22/35	07:46 15:58-16:19/21
29	07:37 08:02-08:53/51	07:00 08:12-08:53/51	06:14 07:00	06:03 07:00	05:54 06:03	05:54 06:16	06:16 06:46	06:16 06:46	07:46	07:38-08:18/40	07:24 07:48-08:22/34	07:46 16:00-16:20/20
30	07:36 08:02-08:53/51	07:00 08:13-08:53/51	06:13 07:00	06:04 07:00	05:55 06:04	05:55 06:17	06:17 06:47	06:17 06:47	07:47	07:36-08:19/43	07:25 07:49-08:21/32	07:46 16:01-16:20/19
31	07:35 08:02-08:54/52	07:00 08:14-08:54/52	06:12 07:00	06:05 07:00	05:55 06:05	05:55 06:18	06:18 06:48	06:18 06:48	07:48	07:35-08:20/45	07:26 07:49-08:21/31	07:46 16:01-16:20/19
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Sum of minutes with flicker	1262	794	0	0	0	0	0	0	0	315	1385	854

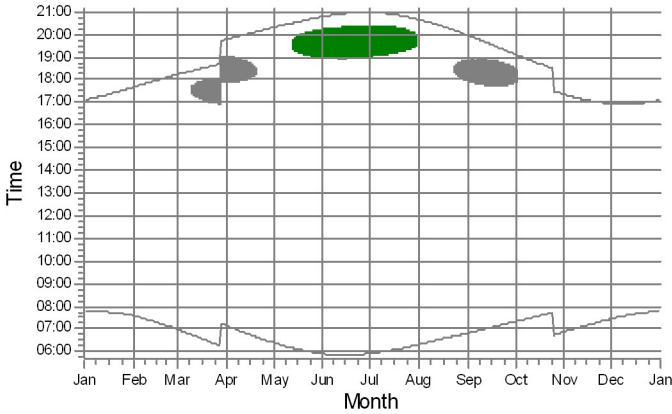
Table layout: For each day in each month the following matrix apply

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

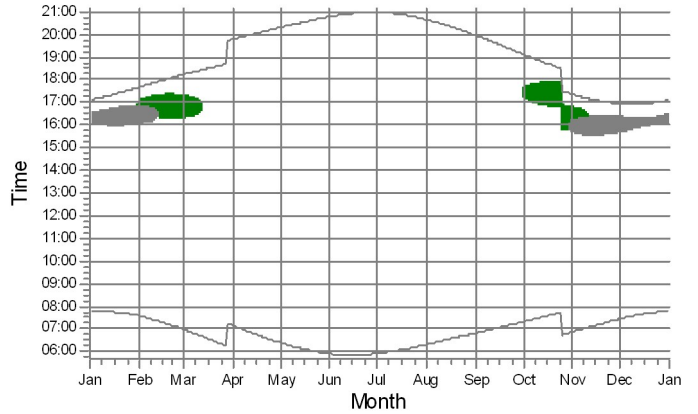
SHADOW - Calendar per WTG, graphical

Calculation: Progetto_20231109

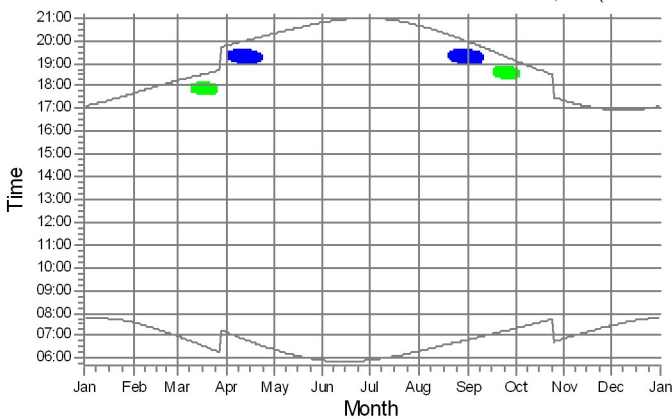
T01: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



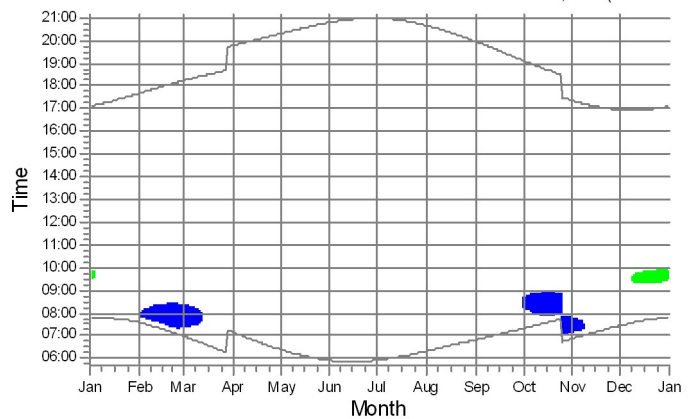
T02: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



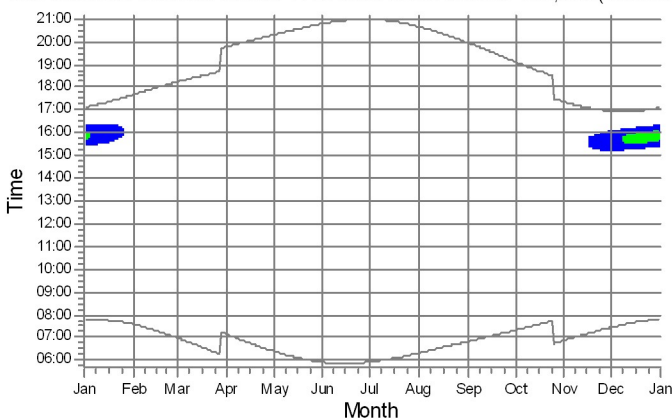
T03: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



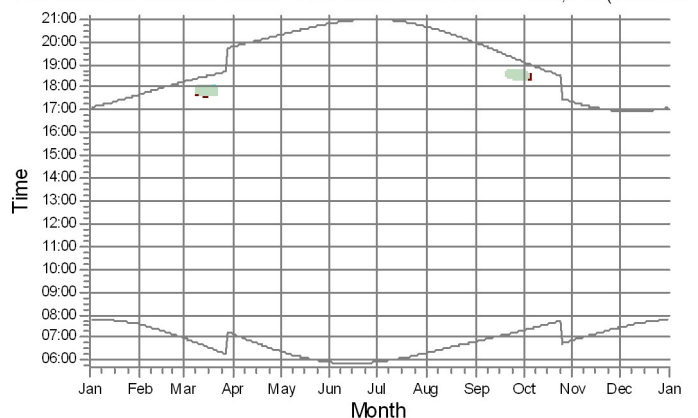
T04: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22







T05: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



T06: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



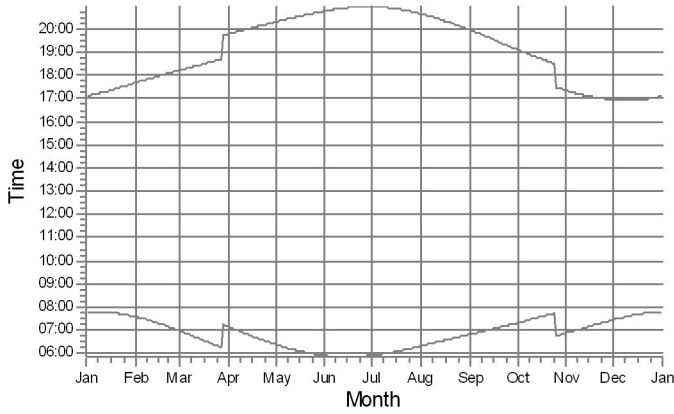
Shadow receptors

 F008: A04	 F173: A04	 F295: A04 - C02	 F353: A04
 F167: A04-C02	 F292: A03 - C02	 F351: A03 - C02	

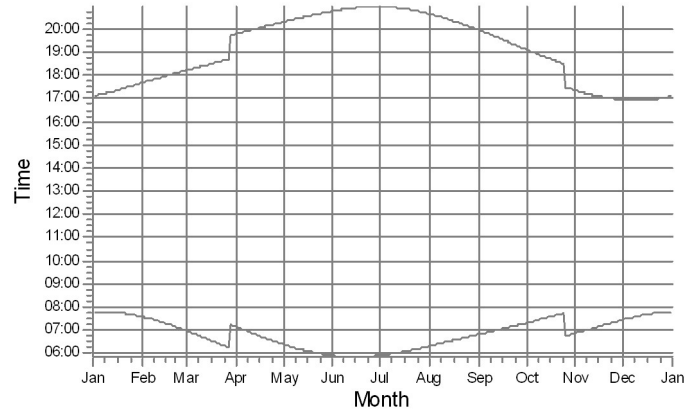
SHADOW - Calendar per WTG, graphical

Calculation: Progetto_20231109

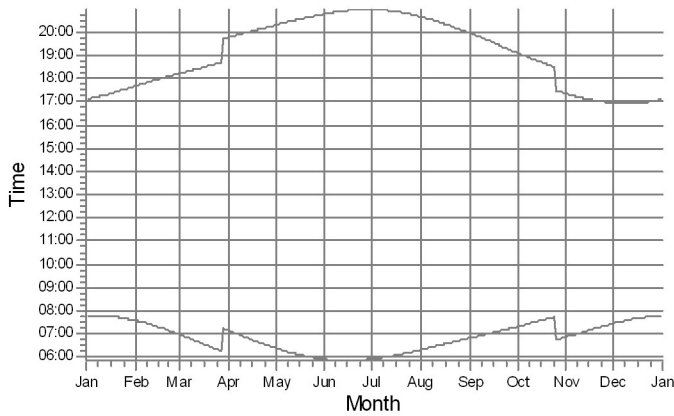
T07: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



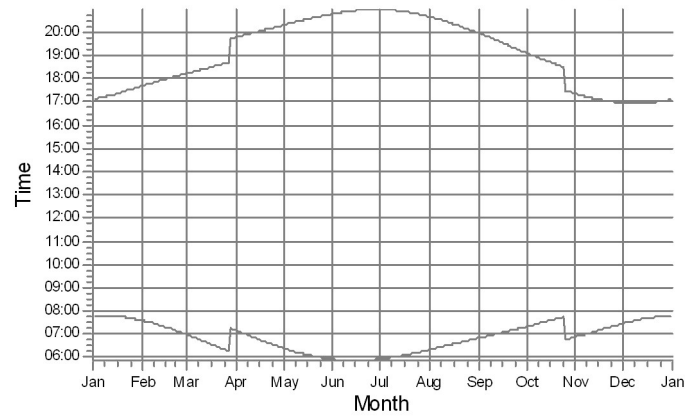
T08: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



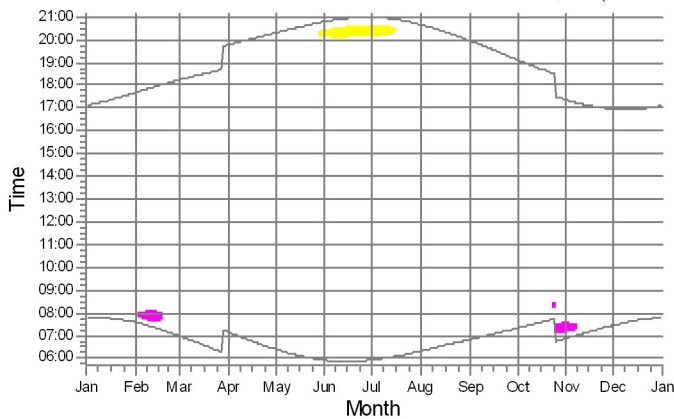
T09: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



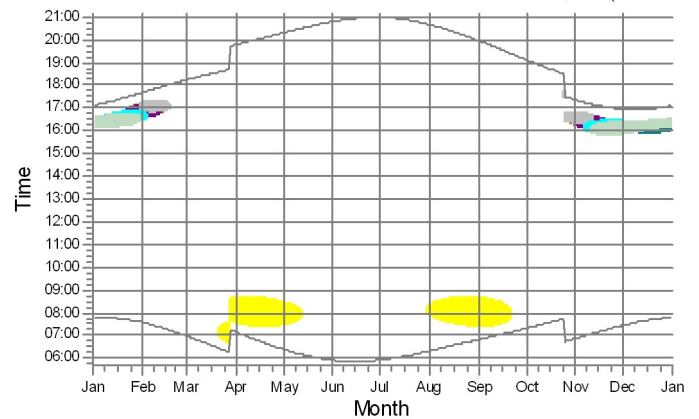
T10: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22













T11: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



T12: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



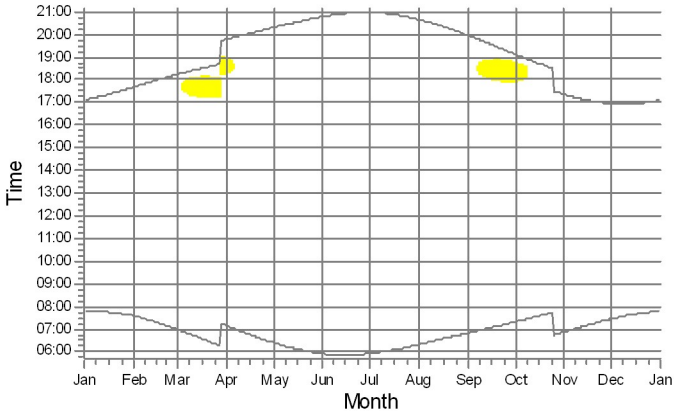
Shadow receptors

 F060: A04	 F287: A04 - C02	 F315: A04	 F353: A04
 F215: A03	 F292: A03 - C02	 F322: A04	
 F279: A04	 F313: Pascolo	 F351: A03 - C02	

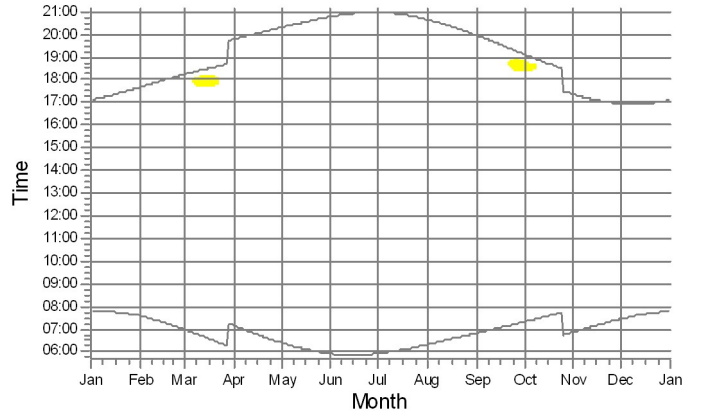
SHADOW - Calendar per WTG, graphical

Calculation: Progetto_20231109

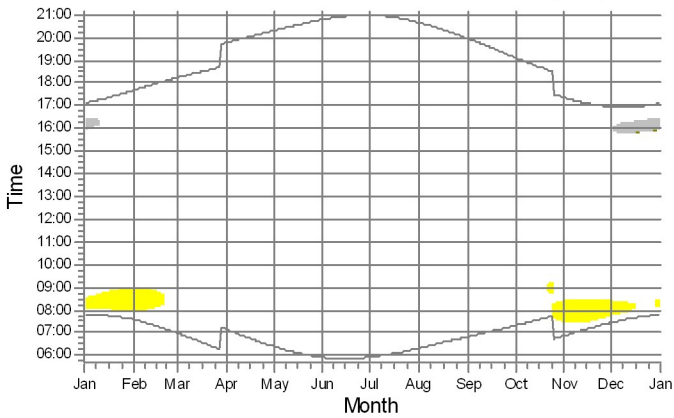
T13: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



T14: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



T15: Siemens Gamesa SG 6.6-172!! 6600 172.0 !O! hub: 135,0 m (TOT: 22



Shadow receptors

 F060: A04  F313: Pascolo  F322: A04