REGIONE SARDEGNA

PROVINCIA DI ORISTANO

IMPIANTO EOLICO NEI COMUNI DI SENEGHE E NARBOLIA POTENZA MASSIMA IN IMMISSIONE DI 75 MW COMPRENSIVA DI SISTEMA DI ACCUMULO INTEGRATO DA 15,60 MW

ORDINE INGEGNERI PROVINCIA CAGLIARI
N. 3453 Dott. Ing. Giuseppe Frongia

OGGETTO	TITOLO
STUDIO DI IMPATTO AMBIENTALE	***ANALISI DEGLI EFFETTI DI SHADOW - FLICKERING***

PROGETTAZIONE	GRUPPO DI PROGETTAZIONE	CONTRIBUTI SPECIALISTICI
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REV.	**DATA**	**DESCRIZIONE**	**ESEG.**	**CONTR.**	**APPR.**

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iat CONSULENZA E PROGETTI		TITOLO ANALISI DEGLI EFFETTI DI SHADOW - FLICKERING	PAGINA	2 di 19

INDICE

1 CRITERI GENERALI DI ANALISI E VALUTAZIONE

Il presente elaborato è parte integrante dello Studio di impatto ambientale allegato al progetto del parco eolico composto da n. 8 aerogeneratori riferibili indicativamente al modello Siemens-Gamesa 6.6-170 (diametro del rotore di 170 m e altezza al mozzo di 125 metri), proposto dalla Sorgenia Renewables S.r.l. nei territori di Seneghe e Narbolia (Regione Sardegna – Provincia di Oristano).

Il documento esamina compiutamente il potenziale disturbo da ombreggiamento intermittente (*shadow flickering*) sui potenziali ricettori individuati nell'area interessata dal proposto impianto eolico, entro una distanza indicativa di 1000 metri dagli aerogeneratori.

A tal fine, nel seguito, si farà riferimento alla ricognizione sugli edifici esistenti eseguita nell'ambito della definizione del layout di impianto e dell'analisi ambientale, i cui risultati sono riepilogati in opportune "schede fabbricati" all'interno di apposito report allegato al progetto del parco eolico (SR-NS-RA11_Report dei fabbricati censiti).

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

2 DESCRIZIONE DEL FENOMENO

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

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

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

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

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

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

Di seguito si riassumono alcuni aspetti caratteristici del fenomeno:

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

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Sorgenia Renewables S.r.l. Via Algardi, 4 - 20148 Milano (MI) sorgeniarenewables@sorgenia.it	IMPIANTO EOLICO NEI COMUNI DI SENEGHE E NARBOLIA POTENZA MASSIMA IN IMMISSIONE DI 75 MW COMPRENSIVA DI SISTEMA DI ACCUMULO INTEGRATO DA 15,60 MW		SR-NS-RA9
	TITOLO ANALISI DEGLI EFFETTI DI SHADOW - FLICKERING	PAGINA	5 di 19

- a distanze ancora maggiori le ombre proiettate risulteranno "fuori-fuoco". Ciò non è causa di un'intensità inferiore del *shadow flickering* ma contribuisce a rendere meno distinto il fenomeno;

- all'interno di un ambiente ben illuminato le ombre svaniscono. Conseguentemente l'accensione di luci in un ambiente riduce l'incidenza del *shadow flickering*;

- schermare una finestra (con tende o quant'altro) previene il fenomeno;

- schermare un edificio (ad esempio con alberature) può rappresentare una efficace misura di mitigazione per prevenire il fenomeno.

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

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

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

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

3   INDIVIDUAZIONE DEI RICETTORI

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

L'Elaborato SR-NS-RA11-1 (Carta con individuazione dei fabbricati) riporta l'individuazione dei fabbricati censiti in accordo con la metodologia precedentemente indicata. Lo stralcio della ripresa aerea zenitale, la categoria catastale di appartenenza ed una fotografia prospettica degli edifici sono riportati nell'Elaborato SR-NS-RA11 allegato alla documentazione progettuale.

Nel caso specifico, ai fini dei calcoli di esposizione all'ombra intermittente, sono stati individuati come ricettori n. 5 fabbricati, con destinazione abitativa accertata (edifici con categoria catastale "A" e corpi di fabbrica con tipologia costruttiva equiparabile a quella residenziale), ubicati entro una distanza di 1000 m dalle postazioni eoliche.

Entro tali distanze è, infatti, ragionevole che si manifestino i più avertiti effetti di disturbo in rapporto al fattore di impatto in esame. La Tabella 1 riporta, per ciascun ricettore individuato, le relative coordinate secondo il sistema Gauss Boaga, la categoria Catastale e la distanza dal più prossimo aerogeneratore.

Tabella 1 - Fabbricati con destinazione abitativa esposti al potenziale disturbo da shadow flickering

FABBRICATO	COMUNE	GB EST	GB NORD	DISTANZA DAL PIÙ PROSSIMO WTG [M]	WTG PIÙ PROSSIMO [M]	CATEGORIA CATASTO FABBRICATI
F08	Narbolia	1463281	4435829	912	SE02	A3 - Abitazioni di tipo economico
F20	Narbolia	1462224	4434194	490	NA09	A4 - Abitazioni di tipo popolare
F35	Seneghe	1462996	4436546	551	SE02	A3 - Abitazioni di tipo economico
F49	Seneghe	1463995	4437236	525	SE08	A3 - Abitazioni di tipo economico
F59	Narbolia	1461116	4433770	800	NA10	Ente urbano

4   IPOTESI ALLA BASE DEL CALCOLO E SOGLIE DI RIFERIMENTO

4.1   Introduzione

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

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

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

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

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

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

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

— il vento deve soffiare ad una velocità superiore a 3 m/s (velocità di *cut-in* del rotore);

— presenza di luminosità solare diretta;

— l'osservatore deve risultare sufficientemente vicino alla sorgente di *shadow flickering*;

— il ricettore deve essere effettivamente esposto al campo di luce tremolante;

— l'illuminazione dell'ambiente residenziale deve essere bassa;

COMMITTENTE	OGGETTO	COD. ELABORATO	
Sorgenia Renewables S.r.l. Via Algardi, 4 - 20148 Milano (MI) sorgeniarenewables@sorgenia.it	IMPIANTO EOLICO NEI COMUNI DI SENEGHE E NARBOLIA POTENZA MASSIMA IN IMMISSIONE DI 75 MW COMPRENSIVA DI SISTEMA DI ACCUMULO INTEGRATO DA 15,60 MW		SR-NS-RA9
	TITOLO ANALISI DEGLI EFFETTI DI SHADOW - FLICKERING	PAGINA	8 di 19

— il contrasto tra luci ed ombre deve essere alto;

— non devono essere presenti schermature che ostacolino la propagazione dell'ombra (come tendaggi o alberature);

— gli individui potenzialmente soggetti ad un impatto da *shadow flickering* dovrebbero permanere esposti alla luce tremolante per un tempo sufficiente ad avvertire fastidio.

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

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

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

— l'angolo del sole sopra l'orizzonte deve essere almeno 3°;

— l'ingombro della pala della turbina eolica deve coprire almeno il 20% del disco solare.

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

— 30 ore di ombreggiamento annuale;

— 30 minuti di ombreggiamento giornaliero.

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

— gli ambienti esposti all'ombreggiamento sono occupati;

— gli occupanti sono svegli.

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

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

COMMITTENTE		OGGETTO	COD. ELABORATO	
Sorgenia Renewables S.r.l. Via Algardi, 4 - 20148 Milano (MI) sorgeniarenewables@sorgenia.it	sorgenia RENEWABLES	IMPIANTO EOLICO NEI COMUNI DI SENEGHE E NARBOLIA POTENZA MASSIMA IN IMMISSIONE DI 75 MW COMPRENSIVA DI SISTEMA DI ACCUMULO INTEGRATO DA 15,60 MW		SR-NS-RA9
iat CONSULENZA E PROGETTI		TITOLO ANALISI DEGLI EFFETTI DI SHADOW - FLICKERING	PAGINA	9 di 19

Figura 4.1: Rappresentazione schematica della proiezione dell'ombra del rotore.
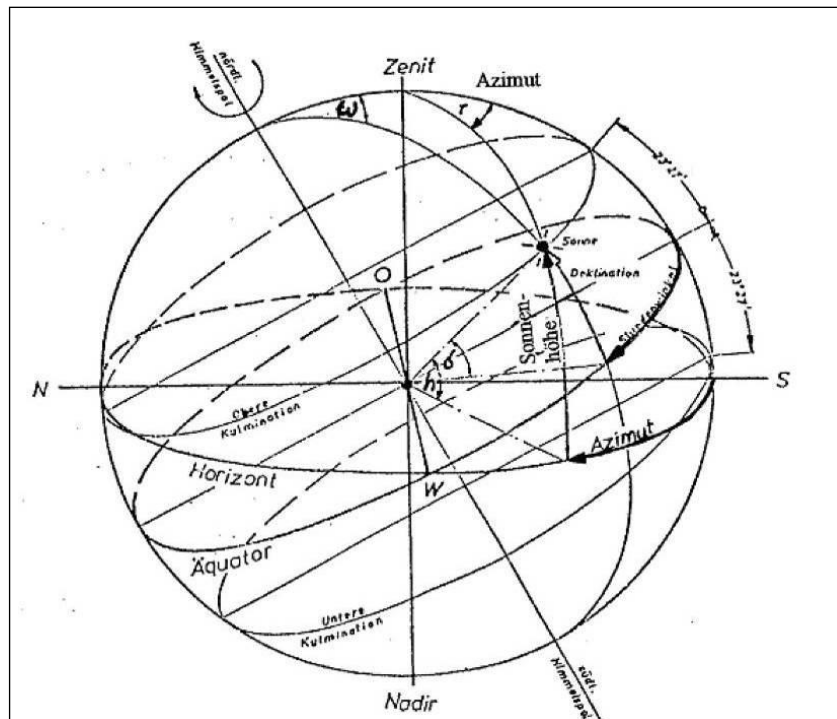
Figura 4.2: Schema dei moti terrestri e parametri di calcolo.

4.2 Lo scenario peggiore (worst case)

Questi calcoli sono basati sullo scenario più conservativo (ombra massima astronomica, ossia basata sulla posizione del sole rispetto alle WTG). Se il cielo è coperto o c'è calma di vento, o la

direzione del vento è tale da porre il piano del rotore in posizione parallela rispetto alla linea sole-edificio, la WTG non produrrà ombra, ma la sua influenza apparirà comunque nei calcoli. In altre parole, il calcolo descrive lo scenario peggiore possibile, e rappresenta quindi il massimo rischio potenziale di impatto. Per ciascun ricettore il software produce un calendario che indica i giorni ed i periodi di tempo in cui l'ombra sarà presente.

4.3   Lo scenario reale (real case)

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

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

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

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

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

− diametro del sole, D (1.390.000 km);
− distanza Terra-Sole, d (150.000.000 km);
− angolo di attacco (3°);
− coordinate geografiche e altitudine delle turbine in progetto;
− altezza al mozzo (125 m) e diametro del rotore (170 m);
− coordinate dei recettori;
− recettori considerati in modalità "serra", assumendo che vengano interessati dal fenomeno di shadow-flickering indipendentemente dall'orientamento delle finestre (ipotesi conservativa);
− modello digitale del terreno;
− eliofania del sito;
− statistica delle ore di funzionamento degli aerogeneratori in funzione delle frequenze di provenienza del vento su 12 quadranti convenzionali;
− modello di calcolo della simulazione, che tiene conto sia dell'orbita terrestre rispetto al Sole (rivoluzione), sia della rotazione rispetto al proprio asse.

COMMITTENTE	OGGETTO	COD. ELABORATO
Sorgenia Renewables S.r.l. Via Algardi, 4 - 20148 Milano (MI) sorgeniarenewables@sorgenia.it	IMPIANTO EOLICO NEI COMUNI DI SENEGHE E NARBOLIA POTENZA MASSIMA IN IMMISSIONE DI 75 MW COMPRENSIVA DI SISTEMA DI ACCUMULO INTEGRATO DA 15,60 MW	SR-NS-RA9
	TITOLO ANALISI DEGLI EFFETTI DI SHADOW - FLICKERING	**PAGINA** 11 di 19

5 RISULTATI

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

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

Con riferimento allo Scenario di progetto, le isolinee d'ombra sono state rappresentate su specifica tavola grafica, in scala adeguata alla dimensione territoriale da rappresentare, per facilitarne la lettura. La tavola è stata realizzata, pertanto, su base cartografica in scala 1:10.000 (Elaborato SR-NS-RA9-1).

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

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

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

COMMITTENTE		OGGETTO	COD. ELABORATO	
Sorgenia Renewables S.r.l. Via Algardi, 4 - 20148 Milano (MI) sorgeniarenewables@sorgenia.it	sorgenia RENEWABLES	IMPIANTO EOLICO NEI COMUNI DI SENEGHE E NARBOLIA POTENZA MASSIMA IN IMMISSIONE DI 75 MW COMPRENSIVA DI SISTEMA DI ACCUMULO INTEGRATO DA 15,60 MW		SR-NS-RA9
iat CONSULENZA E PROGETTI		TITOLO ANALISI DEGLI EFFETTI DI SHADOW - FLICKERING	PAGINA	12 di 19

6 ANALISI DEI RISULTATI

Le risultanze del calcolo modellistico atto a stimare i valori totali di potenziale interferenza da *shadow flickering* in corrispondenza dei ricettori nello scenario di progetto sono riportate in Tabella 2.

Tabella 2 - Risultati dei calcoli di ombreggiamento intermittente presso i ricettori considerati

ID	RICETTORE	Cat. Catastale	WTG SF	WTG Più prossimo	Dist. Min. WTG	h/anno SF Worst Case	h/giorno SF Worst Case	h/anno SF Real Case
1	F08	A3	SE05, SE06	SE02	912	20:08	0:34	**6:24**
2	F20	A4	-	NA09	490	0:00	0:00	**0:00**
3	F35	A3	SE02, SE03, SE05, SE06	SE02	551	233:01	1:12	**76:50**
4	F49	A3	SE02, SE03, SE04	SE08	449	85:17	0:46	**26:12**
5	F59	Ente urbano	NA10	NA10	800	36:55	0:47	**10:11**

Come si può osservare dall'esame della Tabella 2, l'incidenza dell'ombreggiamento intermittente presso i ricettori considerati nello "**scenario reale**" è al disotto del valore guida di 30 h/anno con la sola eccezione del ricettore F35, contraddistinto da un'incidenza dell'ombreggiamento intermittente di circa 77 h/anno.

Nel seguito si focalizzerà l'attenzione sulla situazione di maggiore significatività del fenomeno di SF, riferibile al fabbricato F35, pervenendo alla conclusione che può ragionevolmente escludersi che lo shadow-flickering possa rappresentare un effettivo disturbo a carico degli occupanti l'edificio considerato.

Ricettore F35

Il calendario grafico dell'ombra relativo al ricettore F35 (Figura 6.1) mostra come il fenomeno dello SF sia atteso nelle prime ore del mattino (nella fascia oraria 06:30-08:00) ad opera dell'aerogeneratore SE03 (indicativamente da maggio a metà agosto). Un ulteriore contributo è rilevabile nel pomeriggio (periodo ottobre-marzo), tra le h. 16:00 e le h. 19.00, attribuibile principalmente all'aerogeneratore SE02.

Analizzando più in dettaglio le caratteristiche del fenomeno presso il ricettore F35 si ritiene opportuno formulare le seguenti considerazioni:

COMMITTENTE	OGGETTO	COD. ELABORATO	
Sorgenia Renewables S.r.l. Via Algardi, 4 - 20148 Milano (MI) sorgeniarenewables@sorgenia.it	IMPIANTO EOLICO NEI COMUNI DI SENEGHE E NARBOLIA POTENZA MASSIMA IN IMMISSIONE DI 75 MW COMPRENSIVA DI SISTEMA DI ACCUMULO INTEGRATO DA 15,60 MW		SR-NS-RA9
	TITOLO ANALISI DEGLI EFFETTI DI SHADOW - FLICKERING	PAGINA	13 di 19

- La facciata esposta al fenomeno dello SF riferibile agli aerogeneratori SE02 e SE06 è quella rivolta a sudovest, contraddistinta da superfici fenestrate piuttosto limitate, risultando conseguentemente attenuata l'incidenza dell'ombreggiamento (Figura 6.3);

- l'incidenza del fenomeno nel prospetto nordest del fabbricato F35 (Figura 6.2), ove si rivelasse effettivamente disturbante per gli occupanti, potrebbe essere efficacemente mitigata interponendo una cortina arborea a distanza di alcuni metri dall'edificio in grado di schermare efficacemente l'azione di ombreggiamento ad opera dell'aerogeneratore SE03, circoscritta alle primissime ore del mattino.

A questo riguardo deve sottolinearsi che, 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'effettiva potenziale incidenza del fenomeno dello *shadow flickering* risulterà drasticamente più contenuta di quella prospettata dal software di simulazione e non distante dai richiamati valori guida delle Linee Guida tedesche. In ogni caso, laddove durante la fase operativa dell'impianto dovesse essere avvertito un effettivo disturbo da parte degli occupanti l'edificio F35, saranno attuate – a cura e spese della società proponente - efficaci misure di mitigazione quali la creazione di alberature perimetrali.

COMMITTENTE		OGGETTO	COD. ELABORATO	
Sorgenia Renewables S.r.l. Via Algardi, 4 - 20148 Milano (MI) sorgeniarenewables@sorgenia.it	sorgenia RENEWABLES	IMPIANTO EOLICO NEI COMUNI DI SENEGHE E NARBOLIA POTENZA MASSIMA IN IMMISSIONE DI 75 MW COMPRENSIVA DI SISTEMA DI ACCUMULO INTEGRATO DA 15,60 MW		SR-NS-RA9
	iat CONSULENZA E PROGETTI	TITOLO ANALISI DEGLI EFFETTI DI SHADOW - FLICKERING	PAGINA	14 di 19

Figura 6.1 – Calendario dell'ombra relativo al ricettore F35

Figura 6.2 – Fabbricato F35 – Vista aerea da est

Figura 6.3 – Fabbricato F35 (Vista zenitale). In evidenza la ridotta superficie fenestrata presente nel prospetto sudovest

COMMITTENTE		OGGETTO	COD. ELABORATO	
Sorgenia Renewables S.r.l. Via Algardi, 4 - 20148 Milano (MI) sorgeniarenewables@sorgenia.it	sorgenia RENEWABLES	IMPIANTO EOLICO NEI COMUNI DI SENEGHE E NARBOLIA POTENZA MASSIMA IN IMMISSIONE DI 75 MW COMPRENSIVA DI SISTEMA DI ACCUMULO INTEGRATO DA 15,60 MW		SR-NS-RA9
iat CONSULENZA E PROGETTI		TITOLO ANALISI DEGLI EFFETTI DI SHADOW - FLICKERING	PAGINA	17 di 19

7 CONCLUSIONI

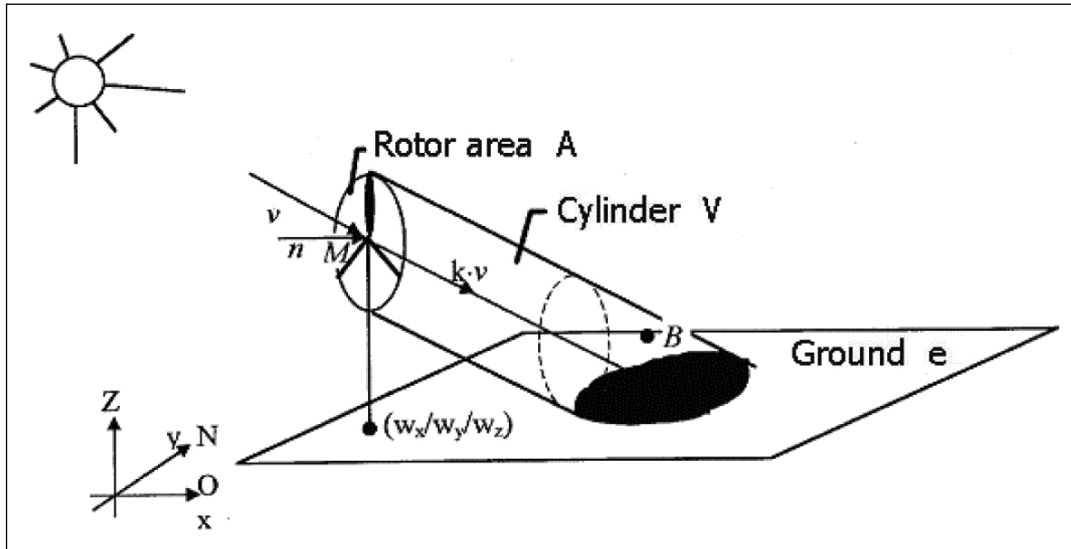Il documento ha esaminato compiutamente il potenziale disturbo da ombreggiamento intermittente (*shadow flickering*) in corrispondenza dei più prossimi fabbricati abitativi presenti nell'area interessata dal proposto parco eolico di Seneghe e Narbolia proposto Sorgenia Renewables S.r.l.

L'individuazione dei ricettori ha fatto riferimento alla ricognizione sugli edifici esistenti eseguita nell'ambito della definizione del layout di impianto e dell'analisi ambientale, i cui risultati sono riepilogati in opportune "schede fabbricati" all'interno di apposito report allegato alla documentazione progettuale.

Nel caso specifico, ai fini dei calcoli di esposizione all'ombra intermittente, sono stati individuati come ricettori n. 5 fabbricati, con destinazione abitativa accertata (edifici con categoria catastale "A" e corpi di fabbrica con tipologia costruttiva equiparabile a quella residenziale), ubicati entro una distanza di 1000 m dalle postazioni eoliche.

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

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

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

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

I risultati della simulazione modellistica hanno evidenziato come l'incidenza dell'ombreggiamento intermittente presso i ricettori considerati nello "**scenario reale**" sia al disotto del valore guida di 30 h/anno con la sola eccezione del ricettore F35, contraddistinto da un'incidenza dell'ombreggiamento intermittente di circa 77 h/anno.

Considerata la conservatività delle stime in rapporto all'effettivo manifestarsi di un disturbo per gli occupanti l'edificio (aleatorietà circa la presenza degli occupanti, necessità di un sufficiente contrasto luci-ombre, assenza di elementi schermanti quali tendaggi e/o alberature) unitamente alle specifiche caratteristiche costruttive del fabbricato, contraddistinto da una limitata superficie fenestrata nel prospetto sudovest esposto all'ombreggiamento nel periodo autunnale/invernale, è altamente verosimile che l'effettiva incidenza dello *shadow flickering* risulterà drasticamente più contenuta di quella prospettata dal software di simulazione nello scenario "real case".

Da quanto precede, nel concludere che l'effettiva potenziale incidenza del fenomeno dello shadow flickering risulterà prossima ai richiamati valori guida delle Linee Guida tedesche, si evidenzia che, laddove durante la fase operativa dell'impianto dovesse essere avvertito un effettivo disturbo da parte degli occupanti l'edificio F35, saranno attuate – a cura e spese della società proponente - efficaci misure di mitigazione quali la creazione di alberature perimetrali.

APPENDICE: REPORT DEI RISULTATI DEL CALCOLO MODELLISTICO

SHADOW - Main Result

Calculation: Real_case_Progetto_20240408
Assumptions for shadow calculations

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

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

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

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

Operational time

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

W	WNW	NW	NNW	Sum
1.268	1.274	124	26	6.374

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

人 New WTG   🌓 Shadow receptor

Scale 1:50.000

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

WTGs

	Easting	Northing	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
NA09	1.462.459	4.434.625	397,7	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
NA10	1.461.895	4.433.589	236,9	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE02	1.462.502	4.436.303	430,7	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE03	1.463.573	4.436.746	453,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE04	1.463.150	4.437.473	559,7	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE06	1.462.131	4.435.885	416,1	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE07	1.461.190	4.434.985	345,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE08	1.464.060	4.437.681	538,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8

Shadow receptor-Input

No.	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]
F08	1.463.281	4.435.829	384,5	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F20	1.462.224	4.434.194	323,3	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F35	1.462.996	4.436.546	441,2	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F49	1.463.995	4.437.236	499,1	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F59	1.461.116	4.433.770	150,8	1,2	1,4	1,2	90,0	"Green house mode"	2,6

Calculation Results

Shadow receptor
Shadow, expected values

No.	Shadow hours per year [h/year]
F08	6:24
F20	0:00
F35	76:50
F49	26:12
F59	10:11
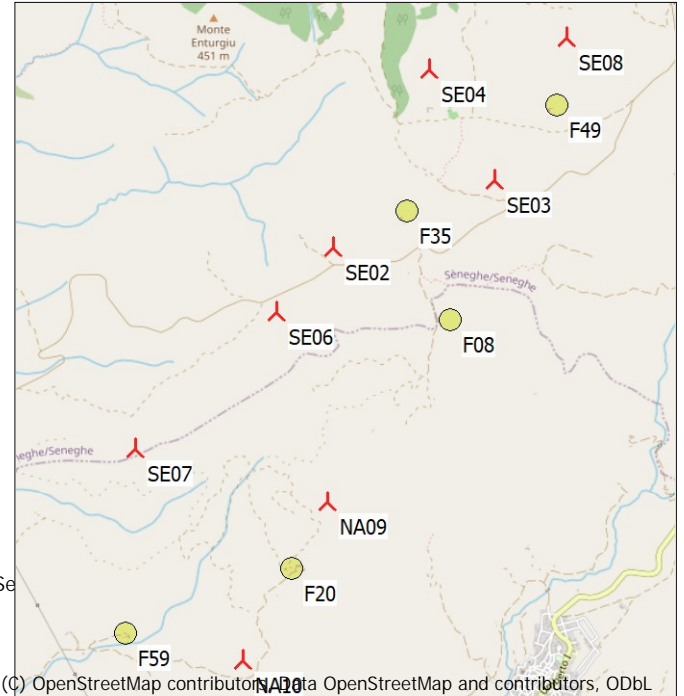
windPRO

SHADOW - Main Result

Calculation: Real_case_Progetto_20240408

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

No.	Name	Worst case [h/year]	Expected [h/year]
NA09	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (83)	0:00	0:00
NA10	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (84)	36:55	10:11
SE02	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (85)	102:19	29:39
SE03	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (86)	113:17	42:47
SE04	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (87)	69:04	22:07
SE06	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (88)	54:15	14:44
SE07	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (89)	0:00	0:00
SE08	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (90)	0:00	0:00

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: Real_case_Progetto_20240408Shadow receptor: F08 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (71)
Assumptions for shadow calculations

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

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

Operational time

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

	January	February	March		April		May	June	July	August		September		October	November	December
1	07:48 / 17:11	07:36 / 17:44	07:01 / 18:17		07:12 / 19:50	29	18:58 (SE06) / 19:27 (SE06) 06:27 / 20:20	06:00 / 20:49	06:00 / 20:59	06:23 / 20:41		06:53 / 19:59	32	18:52 (SE06) / 19:24 (SE06) 07:22 / 19:10	06:54 / 17:25	07:28 / 17:02
2	07:48 / 17:12	07:35 / 17:45	07:00 / 18:18		07:10 / 19:51	30	18:57 (SE06) / 19:27 (SE06) 06:26 / 20:21	05:59 / 20:49	06:01 / 20:59	06:24 / 20:40		06:54 / 19:58	32	18:52 (SE06) / 19:24 (SE06) 07:23 / 19:09	06:56 / 17:24	07:29 / 17:01
3	07:49 / 17:13	07:34 / 17:47	06:58 / 18:19		07:09 / 19:52	32	18:56 (SE06) / 19:28 (SE06) 06:25 / 20:22	05:59 / 20:50	06:01 / 20:59	06:25 / 20:39		06:55 / 19:56	34	18:51 (SE06) / 19:25 (SE06) 07:24 / 19:07	06:57 / 17:23	07:30 / 17:01
4	07:49 / 17:13	07:33 / 17:48	06:57 / 18:20		07:07 / 19:53	33	18:55 (SE06) / 19:28 (SE06) 06:24 / 20:23	05:58 / 20:51	06:02 / 20:59	06:26 / 20:38		06:56 / 19:55	33	18:50 (SE06) / 19:24 (SE06) 07:25 / 19:05	06:58 / 17:21	07:31 / 17:01
5	07:49 / 17:14	07:32 / 17:49	06:55 / 18:21		07:05 / 19:54	33	18:55 (SE06) / 19:28 (SE06) 06:22 / 20:24	05:58 / 20:51	06:02 / 20:59	06:27 / 20:37		06:57 / 19:53	34	18:50 (SE06) / 19:24 (SE06) 07:26 / 19:04	06:59 / 17:20	07:32 / 17:01
6	07:49 / 17:15	07:31 / 17:50	06:54 / 18:23		07:04 / 19:55	34	18:54 (SE06) / 19:28 (SE06) 06:21 / 20:25	05:58 / 20:52	06:03 / 20:58	06:28 / 20:36		06:58 / 19:51	34	18:50 (SE06) / 19:24 (SE06) 07:27 / 19:02	07:00 / 17:19	07:33 / 17:01
7	07:49 / 17:16	07:30 / 17:51	06:52 / 18:24		07:02 / 19:56	34	18:53 (SE06) / 19:27 (SE06) 06:20 / 20:26	05:58 / 20:53	06:04 / 20:58	06:29 / 20:34		06:59 / 19:50	33	18:50 (SE06) / 19:23 (SE06) 07:28 / 19:00	07:01 / 17:18	07:34 / 17:01
8	07:48 / 17:17	07:29 / 17:53	06:51 / 18:25		07:01 / 19:57	33	18:54 (SE06) / 19:27 (SE06) 06:19 / 20:27	05:57 / 20:53	06:04 / 20:58	06:30 / 20:33		07:00 / 19:48	33	18:50 (SE06) / 19:23 (SE06) 07:29 / 18:59	07:02 / 17:17	07:35 / 17:01
9	07:48 / 17:18	07:28 / 17:54	06:49 / 18:26		06:59 / 19:58	34	18:53 (SE06) / 19:27 (SE06) 06:18 / 20:28	05:57 / 20:54	06:05 / 20:58	06:31 / 20:32		07:01 / 19:46	32	18:50 (SE06) / 19:22 (SE06) 07:30 / 18:57	07:03 / 17:16	07:36 / 17:01
10	07:48 / 17:19	07:27 / 17:55	06:47 / 18:27		06:58 / 19:59	32	18:54 (SE06) / 19:26 (SE06) 06:17 / 20:29	05:57 / 20:54	06:05 / 20:57	06:32 / 20:31		07:01 / 19:45	30	18:51 (SE06) / 19:21 (SE06) 07:31 / 18:56	07:05 / 17:15	07:37 / 17:01
11	07:48 / 17:20	07:25 / 17:56	06:46 / 18:28		06:56 / 20:00	31	18:54 (SE06) / 19:25 (SE06) 06:16 / 20:30	05:57 / 20:55	06:06 / 20:57	06:33 / 20:30		07:02 / 19:43	29	18:51 (SE06) / 19:19 (SE06) 07:32 / 18:54	07:06 / 17:14	07:37 / 17:01
12	07:48 / 17:21	07:24 / 17:57	06:44 / 18:29		06:54 / 20:01	31	18:54 (SE06) / 19:25 (SE06) 06:15 / 20:31	05:57 / 20:55	06:07 / 20:56	06:34 / 20:28		07:03 / 19:42	27	18:51 (SE06) / 19:18 (SE06) 07:33 / 18:53	07:07 / 17:13	07:38 / 17:01
13	07:48 / 17:22	07:23 / 17:59	06:43 / 18:30		06:53 / 20:02	28	18:55 (SE06) / 19:23 (SE06) 06:14 / 20:32	05:57 / 20:56	06:08 / 20:56	06:35 / 20:27		07:04 / 19:40	24	18:52 (SE06) / 19:16 (SE06) 07:34 / 18:51	07:08 / 17:12	07:39 / 17:01
14	07:47 / 17:23	07:22 / 18:00	06:41 / 18:31		06:51 / 20:03	27	18:56 (SE06) / 19:23 (SE06) 06:13 / 20:33	05:57 / 20:56	06:08 / 20:55	06:36 / 20:26		07:05 / 19:38	20	18:54 (SE06) / 19:14 (SE06) 07:35 / 18:50	07:09 / 17:11	07:40 / 17:01
15	07:47 / 17:24	07:21 / 18:01	06:39 / 18:32		06:50 / 20:04	25	18:56 (SE06) / 19:21 (SE06) 06:12 / 20:34	05:57 / 20:57	06:09 / 20:55	06:37 / 20:24		07:06 / 19:37	15	18:56 (SE06) / 19:11 (SE06) 07:36 / 18:48	07:10 / 17:11	07:41 / 17:01
16	07:47 / 17:25	07:19 / 18:02	06:38 / 18:33		06:48 / 20:05	21	18:58 (SE06) / 19:19 (SE06) 06:11 / 20:35	05:57 / 20:57	06:10 / 20:54	06:38 / 20:23		07:07 / 19:35	6	19:00 (SE06) / 19:06 (SE06) 07:37 / 18:47	07:12 / 17:11	07:41 / 17:02
17	07:46 / 17:27	07:18 / 18:03	06:36 / 18:34		06:47 / 20:06	17	18:59 (SE06) / 19:16 (SE06) 06:10 / 20:36	05:57 / 20:54	06:11 / 20:54	06:39 / 20:22		07:08 / 19:33		07:38 / 18:45	07:13 / 17:09	07:42 / 17:02
18	07:46 / 17:28	07:17 / 18:05	06:35 / 18:35		06:45 / 20:07	11	19:03 (SE06) / 19:14 (SE06) 06:09 / 20:37	05:57 / 20:58	06:11 / 20:53	06:40 / 20:20		07:09 / 19:32		07:39 / 18:44	07:14 / 17:08	07:43 / 17:02
19	07:45 / 17:29	07:15 / 18:06	06:33 / 18:36		06:44 / 20:08		06:08 / 20:38	05:57 / 20:58	06:12 / 20:52	06:41 / 20:19		07:10 / 19:30		07:40 / 18:42	07:08 / 17:08	07:43 / 17:03
20	07:45 / 17:30	07:14 / 18:07	06:31 / 18:37		06:42 / 20:09		06:07 / 20:39	05:57 / 20:58	06:13 / 20:52	06:41 / 20:17		07:11 / 19:28		07:41 / 18:41	07:16 / 17:07	07:44 / 17:03
21	07:44 / 17:31	07:13 / 18:08	06:30 / 18:38		06:41 / 20:10		06:07 / 20:40	05:57 / 20:59	06:14 / 20:51	06:42 / 20:16		07:12 / 19:27		07:42 / 18:39	07:17 / 17:06	07:44 / 17:04
22	07:43 / 17:32	07:11 / 18:09	06:28 / 18:39		06:40 / 20:11		06:06 / 20:40	05:57 / 20:59	06:15 / 20:50	06:43 / 20:15		07:13 / 19:25		07:43 / 18:38	07:18 / 17:06	07:45 / 17:04
23	07:43 / 17:33	07:10 / 18:10	06:26 / 18:40		06:38 / 20:12		06:05 / 20:41	05:58 / 20:59	06:15 / 20:49	06:44 / 20:13		07:14 / 19:23		07:44 / 18:37	07:20 / 17:05	07:45 / 17:05
24	07:42 / 17:35	07:08 / 18:11	06:25 / 18:41		06:37 / 20:13		06:04 / 20:42	05:58 / 20:59	06:16 / 20:49	06:45 / 20:12		07:15 / 19:22		07:45 / 18:35	07:21 / 17:04	07:46 / 17:05
25	07:42 / 17:36	07:07 / 18:13	06:23 / 18:43		06:35 / 20:14		06:04 / 20:43	05:58 / 20:59	06:17 / 20:48	06:46 / 20:10	12	19:05 (SE06) / 19:17 (SE06) 07:16 / 19:20		06:47 / 17:34	07:22 / 17:04	07:46 / 17:06
26	07:41 / 17:37	07:06 / 18:14	06:22 / 18:44		06:34 / 20:15		06:03 / 20:44	05:58 / 20:59	06:18 / 20:47	06:47 / 20:09	17	19:02 (SE06) / 19:19 (SE06) 07:17 / 19:18		06:48 / 17:32	07:23 / 17:03	07:47 / 17:06
27	07:40 / 17:38	07:04 / 18:15	06:20 / 18:45		06:33 / 20:16		06:02 / 20:45	05:59 / 20:59	06:19 / 20:46	06:48 / 20:07	21	19:00 (SE06) / 19:21 (SE06) 07:18 / 19:17		06:49 / 17:31	07:24 / 17:03	07:47 / 17:07
28	07:39 / 17:39	07:03 / 18:16	06:18 / 18:46	14	18:07 (SE06) / 18:21 (SE06) 06:31 / 20:17		06:02 / 20:45	05:59 / 20:59	06:20 / 20:45	06:49 / 20:06	25	18:58 (SE06) / 19:23 (SE06) 07:19 / 19:15		06:50 / 17:30	07:25 / 17:02	07:47 / 17:08
29	07:38 / 17:41		06:17 / 18:47	19	19:04 (SE06) / 19:23 (SE06) 06:30 / 20:18		06:01 / 20:46	05:59 / 20:59	06:21 / 20:44	06:50 / 20:04	27	18:57 (SE06) / 19:24 (SE06) 07:20 / 19:13		06:51 / 17:29	07:26 / 17:02	07:48 / 17:08
30	07:38 / 17:42		06:15 / 18:48	24	19:01 (SE06) / 19:25 (SE06) 06:29 / 20:19		06:01 / 20:47	06:00 / 20:59	06:22 / 20:43	06:51 / 20:02	29	18:55 (SE06) / 19:24 (SE06) 07:21 / 19:12		06:52 / 17:27	07:27 / 17:09	07:48 / 17:08
31	07:37 / 17:43		06:13 / 18:49	26	19:00 (SE06) / 19:26 (SE06)		06:00 / 20:48		06:23 / 20:42	06:52 / 20:01	31	18:53 (SE06) / 19:24 (SE06)		06:53 / 17:26		07:48 / 17:10
Potential sun hours	300	299	370		397		446	449	456	426		375		346	300	291
Total, worst case				83		515				162			448			
Sun reduction				0,49		0,52				0,72			0,65			
Oper. time red.				0,73		0,73				0,73			0,73			
Wind dir. red.				0,73		0,73				0,73			0,73			
Total reduction				0,26		0,28				0,39			0,35			
Total, real				22		144				62			156			

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

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

Licensed user:
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Calculated:
08/04/2024 16:23/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_20240408Shadow receptor: F20 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (72)
Assumptions for shadow calculations

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

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

Operational time

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:36	07:01	07:12	06:27	06:00	06:00	06:24	06:53	07:22	06:54	07:28
	17:11	17:44	18:17	19:50	20:20	20:49	20:59	20:41	19:59	19:10	17:25	17:02
2	07:49	07:35	07:00	07:10	06:26	05:59	06:01	06:24	06:54	07:23	06:56	07:29
	17:12	17:45	18:18	19:51	20:21	20:49	20:59	20:40	19:58	19:09	17:24	17:01
3	07:49	07:34	06:58	07:09	06:25	05:59	06:01	06:25	06:55	07:24	06:57	07:30
	17:13	17:47	18:19	19:52	20:22	20:50	20:59	20:39	19:56	19:07	17:23	17:01
4	07:49	07:33	06:57	07:07	06:24	05:59	06:02	06:26	06:56	07:25	06:58	07:31
	17:14	17:48	18:20	19:53	20:23	20:51	20:59	20:38	19:55	19:05	17:21	17:01
5	07:49	07:32	06:55	07:05	06:23	05:58	06:03	06:27	06:57	07:26	06:59	07:32
	17:14	17:49	18:22	19:54	20:24	20:51	20:59	20:37	19:53	19:04	17:20	17:01
6	07:49	07:31	06:54	07:04	06:21	05:58	06:03	06:28	06:58	07:27	07:00	07:33
	17:15	17:50	18:23	19:55	20:25	20:52	20:58	20:36	19:51	19:02	17:19	17:01
7	07:49	07:30	06:52	07:02	06:20	05:58	06:04	06:29	06:59	07:28	07:01	07:34
	17:16	17:52	18:24	19:56	20:26	20:53	20:58	20:34	19:50	19:01	17:18	17:01
8	07:49	07:29	06:51	07:01	06:19	05:57	06:04	06:30	07:00	07:29	07:02	07:35
	17:17	17:53	18:25	19:57	20:27	20:53	20:58	20:33	19:48	18:59	17:17	17:01
9	07:48	07:28	06:49	06:59	06:18	05:57	06:05	06:31	07:01	07:30	07:04	07:36
	17:18	17:54	18:26	19:58	20:28	20:54	20:58	20:32	19:47	18:57	17:16	17:01
10	07:48	07:27	06:47	06:58	06:17	05:57	06:06	06:32	07:02	07:31	07:05	07:37
	17:19	17:55	18:27	19:59	20:29	20:54	20:57	20:31	19:45	18:56	17:15	17:01
11	07:48	07:25	06:46	06:56	06:16	05:57	06:06	06:33	07:02	07:32	07:06	07:37
	17:20	17:56	18:28	20:00	20:30	20:55	20:57	20:30	19:43	18:54	17:14	17:01
12	07:48	07:24	06:44	06:55	06:15	05:57	06:07	06:34	07:03	07:33	07:07	07:38
	17:21	17:58	18:29	20:01	20:31	20:55	20:56	20:28	19:42	18:53	17:13	17:01
13	07:48	07:23	06:43	06:53	06:14	05:57	06:08	06:35	07:04	07:34	07:08	07:39
	17:22	17:59	18:30	20:02	20:32	20:56	20:56	20:27	19:40	18:51	17:12	17:01
14	07:47	07:22	06:41	06:51	06:13	05:57	06:08	06:36	07:05	07:35	07:09	07:40
	17:23	18:00	18:31	20:03	20:33	20:56	20:55	20:26	19:38	18:50	17:11	17:01
15	07:47	07:21	06:39	06:50	06:12	05:57	06:09	06:37	07:06	07:36	07:10	07:41
	17:24	18:01	18:32	20:04	20:34	20:57	20:55	20:24	19:37	18:48	17:11	17:02
16	07:47	07:19	06:38	06:48	06:11	05:57	06:10	06:38	07:07	07:37	07:12	07:41
	17:26	18:02	18:33	20:05	20:35	20:57	20:54	20:23	19:35	18:47	17:10	17:02
17	07:46	07:18	06:36	06:47	06:10	05:57	06:11	06:39	07:08	07:38	07:13	07:42
	17:27	18:03	18:34	20:06	20:36	20:57	20:54	20:22	19:33	18:45	17:09	17:02
18	07:46	07:17	06:35	06:45	06:09	05:57	06:11	06:40	07:09	07:39	07:14	07:43
	17:28	18:05	18:35	20:07	20:37	20:58	20:53	20:20	19:32	18:44	17:08	17:02
19	07:45	07:15	06:33	06:44	06:08	05:57	06:12	06:41	07:10	07:40	07:15	07:43
	17:29	18:06	18:36	20:08	20:38	20:58	20:52	20:19	19:30	18:42	17:08	17:03
20	07:45	07:14	06:31	06:43	06:07	05:57	06:13	06:42	07:11	07:41	07:16	07:44
	17:30	18:07	18:37	20:09	20:39	20:58	20:52	20:17	19:28	18:41	17:07	17:03
21	07:44	07:13	06:30	06:41	06:07	05:57	06:14	06:43	07:12	07:42	07:17	07:44
	17:31	18:08	18:38	20:10	20:40	20:59	20:51	20:16	19:27	18:39	17:06	17:04
22	07:44	07:11	06:28	06:40	06:06	05:57	06:15	06:43	07:13	07:43	07:18	07:45
	17:32	18:09	18:39	20:11	20:40	20:59	20:50	20:15	19:25	18:38	17:06	17:04
23	07:43	07:10	06:27	06:38	06:05	05:58	06:16	06:44	07:14	07:44	07:20	07:45
	17:34	18:10	18:41	20:12	20:41	20:59	20:49	20:13	19:23	18:37	17:05	17:05
24	07:42	07:08	06:25	06:37	06:04	05:58	06:16	06:45	07:15	07:45	07:21	07:46
	17:35	18:11	18:42	20:13	20:42	20:59	20:49	20:12	19:22	18:35	17:05	17:05
25	07:42	07:07	06:23	06:35	06:04	05:58	06:17	06:46	07:16	06:47	07:22	07:46
	17:36	18:13	18:43	20:14	20:43	20:59	20:48	20:10	19:20	17:34	17:04	17:06
26	07:41	07:06	06:22	06:34	06:03	05:58	06:18	06:47	07:17	06:48	07:23	07:47
	17:37	18:14	18:44	20:15	20:44	20:59	20:47	20:09	19:18	17:33	17:04	17:06
27	07:40	07:04	06:20	06:33	06:02	05:59	06:19	06:48	07:18	06:49	07:24	07:47
	17:38	18:15	18:45	20:16	20:45	20:59	20:46	20:07	19:17	17:31	17:03	17:07
28	07:39	07:03	06:18	06:31	06:02	05:59	06:20	06:49	07:19	06:50	07:25	07:47
	17:39	18:16	18:46	20:17	20:45	20:59	20:45	20:06	19:15	17:30	17:03	17:08
29	07:38		07:17	06:30	06:01	06:00	06:21	06:50	07:20	06:51	07:26	07:48
	17:41		18:47	19:47	20:18	20:46	20:59	20:44	20:04	19:13	17:29	17:02	17:08
30	07:38		07:15	06:29	06:01	06:00	06:22	06:51	07:21	06:52	07:27	07:48
	17:42		18:48	19:48	20:19	20:47	20:59	20:43	20:03	19:12	17:27	17:02	17:09
31	07:37		07:14		06:00		06:23	06:52		06:53		07:48
	17:43		18:49		20:48		20:42	20:01		17:26		17:10
Potential sun hours	300	299	370	397	446	449	456	426	375	346	300	291
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

Day in month	Sun rise (hh:mm)		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)

windPRO

SHADOW - Calendar

Calculation: Real_case_Progetto_20240408 Shadow receptor: F35 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (73)
Assumptions for shadow calculations

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

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

Operational time

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

January

Day	Sun rise	Sun set	First flicker (WTG)	Min	Last flicker (WTG)
1	07:48	17:11	16:08 (SE06)	37	16:45 (SE06)
2	07:49	17:12	16:08 (SE06)	38	16:46 (SE06)
3	07:49	17:13	16:09 (SE06)	37	16:46 (SE06)
4	07:49	17:13	16:09 (SE06)	38	16:47 (SE06)
5	07:49	17:14	16:10 (SE06)	37	16:47 (SE06)
6	07:49	17:15	16:11 (SE06)	36	16:47 (SE06)
7	07:49	17:16	16:11 (SE06)	37	16:48 (SE06)
8	07:49	17:17	16:12 (SE06)	36	16:48 (SE06)
9	07:48	17:18	16:13 (SE06)	35	16:48 (SE06)
10	07:48	17:19	16:14 (SE06)	35	16:49 (SE06)
11	07:48	17:20	16:14 (SE06)	34	16:48 (SE06)
12	07:48	17:21	16:15 (SE06)	33	16:48 (SE06)
13	07:48	17:22	16:17 (SE06)	31	16:48 (SE06)
14	07:47	17:23	16:17 (SE06)	31	16:48 (SE06)
15	07:47	17:24	16:19 (SE06)	29	16:48 (SE06)
16	07:47	17:25	16:19 (SE06)	28	16:47 (SE06)
17	07:46	17:27	16:21 (SE06)	26	16:47 (SE06)
18	07:46	17:28	16:22 (SE06)	32	16:54 (SE02)
19	07:45	17:29	16:24 (SE06)	35	16:59 (SE02)
20	07:45	17:30	16:25 (SE06)	37	17:02 (SE02)
21	07:44	17:31	16:28 (SE06)	37	17:05 (SE02)
22	07:44	17:32	16:32 (SE02)	35	17:07 (SE02)
23	07:43	17:33	16:33 (SE02)	36	17:09 (SE02)
24	07:42	17:35	16:31 (SE02)	39	17:10 (SE02)
25	07:42	17:36	16:31 (SE02)	41	17:12 (SE02)
26	07:41	17:37	16:29 (SE02)	44	17:13 (SE02)
27	07:40	17:38	16:28 (SE02)	46	17:14 (SE02)
28	07:39	17:39	16:27 (SE02)	48	17:15 (SE02)
29	07:39	17:41	16:26 (SE02)	50	17:16 (SE02)
30	07:38	17:42	16:26 (SE02)	53	17:19 (SE02)
31	07:37	17:43	16:25 (SE02)	55	17:20 (SE02)

February

Day	Sun rise	Sun set	First flicker (WTG)	Min	Last flicker (WTG)
1	07:36	17:44	16:24 (SE02)	57	17:21 (SE02)
2	07:35	17:45	16:24 (SE02)	58	17:22 (SE02)
3	07:34	17:47	16:23 (SE02)	61	17:24 (SE02)
4	07:33	17:48	16:23 (SE02)	62	17:25 (SE02)
5	07:32	17:49	16:22 (SE02)	64	17:26 (SE02)
6	07:31	17:50	16:21 (SE02)	65	17:26 (SE02)
7	07:30	17:51	16:20 (SE02)	67	17:27 (SE02)
8	07:29	17:53	16:20 (SE02)	67	17:27 (SE02)
9	07:28	17:54	16:20 (SE02)	68	17:28 (SE02)
10	07:27	17:55	16:20 (SE02)	69	17:29 (SE02)
11	07:25	17:56	16:20 (SE02)	69	17:29 (SE02)
12	07:24	17:57	16:19 (SE02)	70	17:29 (SE02)
13	07:23	17:59	16:19 (SE02)	70	17:29 (SE02)
14	07:22	18:00	16:19 (SE02)	71	17:30 (SE02)
15	07:21	18:01	16:19 (SE02)	71	17:30 (SE02)
16	07:19	18:02	16:18 (SE02)	72	17:30 (SE02)
17	07:18	18:03	16:19 (SE02)	71	17:30 (SE02)
18	07:17	18:05	16:19 (SE02)	71	17:30 (SE02)
19	07:15	18:06	16:19 (SE02)	70	17:29 (SE02)
20	07:14	18:07	16:19 (SE02)	70	17:29 (SE02)
21	07:13	18:08	16:20 (SE02)	70	17:30 (SE02)
22	07:11	18:09	16:20 (SE02)	69	17:29 (SE02)
23	07:10	18:10	16:20 (SE02)	69	17:29 (SE02)
24	07:08	18:11	16:20 (SE02)	68	17:28 (SE02)
25	07:07	18:13	16:21 (SE02)	66	17:27 (SE02)
26	07:06	18:14	16:21 (SE02)	65	17:26 (SE02)
27	07:04	18:15	16:22 (SE02)	64	17:26 (SE02)
28	07:03	18:16	16:22 (SE02)	62	17:24 (SE02)

March

Day	Sun rise	Sun set	First flicker (WTG)	Min	Last flicker (WTG)
1	07:01	18:17	16:24 (SE02)	60	17:24 (SE02)
2	07:00	18:18	16:24 (SE02)	58	17:22 (SE02)
3	06:58	18:19	16:26 (SE02)	56	17:22 (SE02)
4	06:57	18:20	16:23 (SE02)	54	17:25 (SE02)
5	06:55	18:21	16:22 (SE02)	51	17:26 (SE02)
6	06:54	18:23	16:21 (SE02)	48	17:26 (SE02)
7	06:52	18:24	16:20 (SE02)	44	17:27 (SE02)
8	06:51	18:25	16:20 (SE02)	40	17:27 (SE02)
9	06:49	18:26	16:20 (SE02)	35	17:28 (SE02)
10	06:47	18:27	16:20 (SE02)	30	17:29 (SE02)
11	06:46	18:28	16:20 (SE02)	22	17:29 (SE02)
12	06:44	18:29	16:19 (SE02)	10	16:58 (SE02)
13	06:43	18:30			
14	06:41	18:31			
15	06:39	18:32			
16	06:38	18:33			
17	06:36	18:34			
18	06:35	18:35			
19	06:33	18:36			
20	06:31	18:37			
21	06:30	18:38			
22	06:28	18:39			
23	06:26	18:40			
24	06:25	18:41			
25	06:23	18:43			
26	06:22	18:44			
27	06:20	18:45			
28	06:18	18:46			
29	07:17	19:47			
30	07:15	19:48			
31	07:13	19:49			

April

Day	Sun rise	Sun set
1	07:12	19:50
2	07:10	19:51
3	07:09	19:52
4	07:07	19:53
5	07:05	19:54
6	07:04	19:55
7	07:02	19:56
8	07:01	19:57
9	06:59	19:58
10	06:58	19:59
11	06:56	20:00
12	06:54	20:01
13	06:53	20:02
14	06:51	20:03
15	06:50	20:04
16	06:48	20:05
17	06:47	20:06
18	06:45	20:07
19	06:44	20:08
20	06:42	20:09
21	06:41	20:10
22	06:40	20:11
23	06:38	20:12
24	06:37	20:13
25	06:35	20:14
26	06:34	20:15
27	06:33	20:16
28	06:31	20:17
29	06:30	20:18
30	06:29	20:19

May

Day	Sun rise	Sun set	First flicker (WTG)	Min	Last flicker (WTG)
1	06:27	20:20	07:05 (SE03)	13	07:18 (SE03)
2	06:26	20:21	07:00 (SE03)	22	07:22 (SE03)
3	06:25	20:22	06:57 (SE03)	28	07:25 (SE03)
4	06:24	20:23	06:55 (SE03)	33	07:28 (SE03)
5	06:22	20:24	06:53 (SE03)	37	07:30 (SE03)
6	06:21	20:25	06:51 (SE03)	41	07:32 (SE03)
7	06:20	20:26	06:49 (SE03)	43	07:32 (SE03)
8	06:19	20:27	06:47 (SE03)	46	07:33 (SE03)
9	06:18	20:28	06:46 (SE03)	49	07:35 (SE03)
10	06:17	20:29	06:45 (SE03)	51	07:36 (SE03)
11	06:16	20:30	06:44 (SE03)	52	07:36 (SE03)
12	06:15	20:31	06:43 (SE03)	54	07:37 (SE03)
13	06:14	20:32	06:42 (SE03)	56	07:38 (SE03)
14	06:13	20:33	06:41 (SE03)	57	07:38 (SE03)
15	06:12	20:34	06:42 (SE03)	58	07:40 (SE03)
16	06:11	20:35	06:41 (SE03)	59	07:40 (SE03)
17	06:10	20:36	06:40 (SE03)	61	07:41 (SE03)
18	06:09	20:37	06:40 (SE03)	61	07:41 (SE03)
19	06:08	20:38	06:39 (SE03)	62	07:41 (SE03)
20	06:07	20:39	06:40 (SE03)	62	07:42 (SE03)
21	06:07	20:40	06:39 (SE03)	63	07:42 (SE03)
22	06:06	20:40	06:38 (SE03)	65	07:43 (SE03)
23	06:05	20:41	06:38 (SE03)	64	07:42 (SE03)
24	06:04	20:42	06:38 (SE03)	65	07:43 (SE03)
25	06:04	20:43	06:38 (SE03)	65	07:43 (SE03)
26	06:03	20:44	06:38 (SE03)	66	07:44 (SE03)
27	06:02	20:45	06:38 (SE03)	66	07:44 (SE03)
28	06:02	20:46	06:37 (SE03)	67	07:44 (SE03)
29	06:01	20:46	06:38 (SE03)	66	07:44 (SE03)
30	06:01	20:47	06:38 (SE03)	67	07:45 (SE03)
31	06:00	20:48	06:38 (SE03)	67	07:45 (SE03)

June

Day	Sun rise	Sun set	First flicker (WTG)	Min	Last flicker (WTG)
1	06:00	20:49	06:38 (SE03)	67	07:45 (SE03)
2	05:59	20:49	06:38 (SE03)	67	07:45 (SE03)
3	05:59	20:50	06:38 (SE03)	67	07:45 (SE03)
4	05:58	20:51	06:39 (SE03)	67	07:46 (SE03)
5	05:58	20:51	06:38 (SE03)	67	07:45 (SE03)
6	05:58	20:52	06:38 (SE03)	68	07:46 (SE03)
7	05:58	20:53	06:39 (SE03)	67	07:46 (SE03)
8	05:57	20:53	06:39 (SE03)	67	07:46 (SE03)
9	05:57	20:54	06:39 (SE03)	68	07:47 (SE03)
10	05:57	20:54	06:39 (SE03)	67	07:46 (SE03)
11	05:57	20:55	06:39 (SE03)	67	07:46 (SE03)
12	05:57	20:55	06:39 (SE03)	68	07:47 (SE03)
13	05:57	20:56	06:40 (SE03)	67	07:47 (SE03)
14	05:57	20:56	06:40 (SE03)	67	07:47 (SE03)
15	05:57	20:57	06:40 (SE03)	67	07:47 (SE03)
16	05:57	20:57	06:40 (SE03)	67	07:47 (SE03)
17	05:57	20:58	06:40 (SE03)	67	07:48 (SE03)
18	05:57	20:58	06:41 (SE03)	67	07:49 (SE03)
19	05:57	20:58	06:42 (SE03)	67	07:49 (SE03)
20	05:57	20:59	06:42 (SE03)	67	07:49 (SE03)
21	05:57	20:59	06:38 (SE03)	67	07:49 (SE03)
22	05:57	20:59	06:38 (SE03)	67	07:49 (SE03)
23	05:57	20:59	06:38 (SE03)	67	07:50 (SE03)
24	05:58	20:59	06:38 (SE03)	67	07:49 (SE03)
25	05:58	20:59	06:38 (SE03)	67	07:49 (SE03)
26	05:58	20:59	06:38 (SE03)	67	07:49 (SE03)
27	05:59	20:59	06:38 (SE03)	67	07:50 (SE03)
28	05:59	20:59	06:37 (SE03)	67	07:50 (SE03)
29	05:59	20:59	06:38 (SE03)	67	07:51 (SE03)
30	06:00	20:59	06:38 (SE03)	68	07:51 (SE03)

Monthly summary

	January	February	March	April	May	June
Potential sun hours	300	299	370	397	446	449
Total, worst case	1166	1876	508		1666	2014
Sun reduction	0,40	0,45	0,49		0,57	0,66
Oper. time red.	0,73	0,73	0,73		0,73	0,73
Wind dir. red.	0,81	0,82	0,82		0,81	0,81
Total reduction	0,23	0,27	0,29		0,34	0,39
Total, real	272	499	147		563	786

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: Real_case_Progetto_20240408Shadow receptor: F35 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (73)
Assumptions for shadow calculations

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

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

Operational time

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

	July			August			September	October			November			December		
1	06:00		06:43 (SE03)	06:23		06:54 (SE03)	06:53	07:22			06:54		15:50 (SE02)	07:28		15:56 (SE06)
	20:59	67	07:50 (SE03)	20:41	54	07:48 (SE03)	19:59	19:10			17:25	68	16:58 (SE02)	17:02	34	16:30 (SE06)
2	06:01		06:44 (SE03)	06:24		06:55 (SE03)	06:54	07:23		17:22 (SE02)	06:56		15:50 (SE02)	07:29		15:56 (SE06)
	20:59	67	07:51 (SE03)	20:40	52	07:47 (SE03)	19:58	19:09	18	17:40 (SE02)	17:24	68	16:58 (SE02)	17:01	35	16:31 (SE06)
3	06:01		06:44 (SE03)	06:25		06:56 (SE03)	06:55	07:24		17:17 (SE02)	06:57		15:50 (SE02)	07:30		15:56 (SE06)
	20:59	67	07:51 (SE03)	20:39	50	07:46 (SE03)	19:56	19:07	27	17:44 (SE02)	17:23	67	16:57 (SE02)	17:01	35	16:31 (SE06)
4	06:02		06:44 (SE03)	06:26		06:57 (SE03)	06:56	07:25		17:14 (SE02)	06:58		15:50 (SE02)	07:31		15:56 (SE06)
	20:59	68	07:52 (SE03)	20:38	48	07:45 (SE03)	19:55	19:05	32	17:46 (SE02)	17:21	66	16:56 (SE02)	17:01	36	16:32 (SE06)
5	06:02		06:45 (SE03)	06:27		06:58 (SE03)	06:57	07:26		17:11 (SE02)	06:59		15:51 (SE02)	07:32		15:57 (SE06)
	20:59	67	07:52 (SE03)	20:37	46	07:44 (SE03)	19:53	19:04	38	17:49 (SE02)	17:20	65	16:56 (SE02)	17:01	36	16:33 (SE06)
6	06:03		06:45 (SE03)	06:28		07:00 (SE03)	06:58	07:27		17:08 (SE02)	07:00		15:52 (SE02)	07:33		15:57 (SE06)
	20:58	67	07:52 (SE03)	20:36	42	07:42 (SE03)	19:51	19:02	42	17:50 (SE02)	17:19	64	16:56 (SE02)	17:01	36	16:33 (SE06)
7	06:04		06:45 (SE03)	06:29		07:01 (SE03)	06:59	07:28		17:06 (SE02)	07:01		15:53 (SE02)	07:34		15:57 (SE06)
	20:58	67	07:52 (SE03)	20:35	40	07:41 (SE03)	19:50	19:00	46	17:52 (SE02)	17:18	62	16:55 (SE02)	17:01	37	16:34 (SE06)
8	06:04		06:45 (SE03)	06:30		07:02 (SE03)	07:00	07:29		17:04 (SE02)	07:02		15:53 (SE02)	07:35		15:57 (SE06)
	20:58	67	07:52 (SE03)	20:33	36	07:38 (SE03)	19:48	18:59	49	17:53 (SE02)	17:17	60	16:53 (SE02)	17:01	38	16:35 (SE06)
9	06:05		06:45 (SE03)	06:31		07:04 (SE03)	07:01	07:30		17:02 (SE02)	07:04		15:54 (SE02)	07:36		15:58 (SE06)
	20:58	68	07:53 (SE03)	20:32	32	07:36 (SE03)	19:47	18:57	52	17:54 (SE02)	17:16	58	16:52 (SE02)	17:01	37	16:35 (SE06)
10	06:05		06:46 (SE03)	06:32		07:06 (SE03)	07:01	07:31		17:00 (SE02)	07:05		15:55 (SE02)	07:37		15:58 (SE06)
	20:57	67	07:53 (SE03)	20:31	27	07:33 (SE03)	19:45	18:56	55	17:55 (SE02)	17:15	57	16:52 (SE02)	17:01	38	16:36 (SE06)
11	06:06		06:45 (SE03)	06:33		07:10 (SE03)	07:02	07:32		17:00 (SE02)	07:06		15:56 (SE02)	07:37		15:59 (SE06)
	20:57	68	07:53 (SE03)	20:30	20	07:30 (SE03)	19:43	18:54	57	17:57 (SE02)	17:14	55	16:51 (SE02)	17:01	37	16:36 (SE06)
12	06:07		06:46 (SE03)	06:34		07:15 (SE03)	07:03	07:33		16:58 (SE02)	07:07		15:57 (SE02)	07:38		15:58 (SE06)
	20:56	67	07:53 (SE03)	20:28	9	07:24 (SE03)	19:42	18:53	59	17:57 (SE02)	17:13	52	16:49 (SE02)	17:01	37	16:35 (SE06)
13	06:08		06:47 (SE03)	06:35			07:04	07:34		16:57 (SE02)	07:08		15:58 (SE02)	07:39		15:59 (SE06)
	20:56	66	07:53 (SE03)	20:27			19:40	18:51	61	17:58 (SE02)	17:12	50	16:48 (SE02)	17:01	37	16:36 (SE06)
14	06:08		06:46 (SE03)	06:36			07:05	07:35		16:56 (SE02)	07:09		16:00 (SE02)	07:40		15:59 (SE06)
	20:55	67	07:53 (SE03)	20:26			19:38	18:50	62	17:58 (SE02)	17:11	48	16:48 (SE02)	17:01	37	16:36 (SE06)
15	06:09		06:47 (SE03)	06:37			07:06	07:36		16:54 (SE02)	07:11		16:01 (SE02)	07:41		16:00 (SE06)
	20:55	66	07:53 (SE03)	20:24			19:37	18:48	65	17:59 (SE02)	17:11	46	16:47 (SE02)	17:01	37	16:37 (SE06)
16	06:10		06:47 (SE03)	06:38			07:07	07:37		16:53 (SE02)	07:12		16:02 (SE02)	07:41		16:00 (SE06)
	20:54	66	07:53 (SE03)	20:23			19:35	18:47	66	17:59 (SE02)	17:10	44	16:46 (SE02)	17:02	36	16:36 (SE06)
17	06:11		06:48 (SE03)	06:39			07:08	07:38		16:52 (SE02)	07:13		16:04 (SE02)	07:42		16:01 (SE06)
	20:54	66	07:54 (SE03)	20:22			19:33	18:45	67	17:59 (SE02)	17:09	41	16:45 (SE02)	17:02	36	16:37 (SE06)
18	06:11		06:47 (SE03)	06:40			07:09	07:39		16:52 (SE02)	07:14		16:05 (SE02)	07:43		16:02 (SE06)
	20:53	66	07:53 (SE03)	20:20			19:32	18:44	67	17:59 (SE02)	17:08	39	16:44 (SE02)	17:02	35	16:37 (SE06)
19	06:12		06:48 (SE03)	06:41			07:10	07:40		16:51 (SE02)	07:15		16:08 (SE02)	07:43		16:01 (SE06)
	20:52	65	07:53 (SE03)	20:19			19:30	18:42	68	17:59 (SE02)	17:08	36	16:44 (SE02)	17:03	36	16:37 (SE06)
20	06:13		06:48 (SE03)	06:42			07:11	07:41		16:50 (SE02)	07:16		16:07 (SE02)	07:44		16:02 (SE06)
	20:52	65	07:53 (SE03)	20:17			19:28	18:41	69	17:59 (SE02)	17:07	35	16:42 (SE02)	17:03	36	16:38 (SE06)
21	06:14		06:49 (SE03)	06:42			07:12	07:42		16:50 (SE02)	07:17		16:03 (SE06)	07:44		16:02 (SE06)
	20:51	64	07:53 (SE03)	20:16			19:27	18:39	70	18:00 (SE02)	17:06	37	16:40 (SE02)	17:04	36	16:38 (SE06)
22	06:15		06:49 (SE03)	06:43			07:13	07:43		16:50 (SE02)	07:18		16:01 (SE06)	07:45		16:03 (SE06)
	20:50	64	07:53 (SE03)	20:15			19:25	18:38	70	18:00 (SE02)	17:06	37	16:38 (SE02)	17:04	36	16:39 (SE06)
23	06:15		06:49 (SE03)	06:44			07:14	07:44		16:49 (SE02)	07:20		16:00 (SE06)	07:45		16:03 (SE06)
	20:49	63	07:52 (SE03)	20:13			19:23	18:37	71	18:00 (SE02)	17:05	35	16:35 (SE02)	17:05	36	16:39 (SE06)
24	06:16		06:49 (SE03)	06:45			07:15	07:45		16:49 (SE02)	07:21		16:00 (SE06)	07:46		16:04 (SE06)
	20:49	63	07:52 (SE03)	20:12			19:22	18:35	71	15:48 (SE02)	17:04	32	16:32 (SE02)	17:05	36	16:40 (SE06)
25	06:17		06:50 (SE03)	06:46			07:16	06:47		17:00 (SE02)	07:22		15:59 (SE06)	07:46		16:04 (SE06)
	20:48	62	07:52 (SE03)	20:10			19:20	17:34	72	15:48 (SE02)	17:04	26	16:25 (SE06)	17:06	36	16:40 (SE06)
26	06:18		06:51 (SE03)	06:47			07:17	06:48		16:59 (SE02)	07:23		15:58 (SE06)	07:47		16:05 (SE06)
	20:47	60	07:51 (SE03)	20:09			19:18	17:32	71	15:48 (SE02)	17:03	28	16:26 (SE06)	17:06	36	16:41 (SE06)
27	06:19		06:51 (SE03)	06:48			07:18	06:49		16:59 (SE02)	07:24		15:58 (SE06)	07:47		16:05 (SE06)
	20:46	60	07:51 (SE03)	20:07			19:17	17:31	71	17:00 (SE02)	17:03	29	16:27 (SE06)	17:07	36	16:41 (SE06)
28	06:20		06:52 (SE03)	06:49			07:19	06:50		15:49 (SE02)	07:25		15:57 (SE06)	07:47		16:06 (SE06)
	20:45	59	07:51 (SE03)	20:06			19:15	17:30	70	16:59 (SE02)	17:03	31	16:28 (SE06)	17:08	36	16:42 (SE06)
29	06:21		06:53 (SE03)	06:50			07:20	06:51		15:49 (SE02)	07:26		15:57 (SE06)	07:48		16:06 (SE06)
	20:44	57	07:50 (SE03)	20:04			19:13	17:29	70	16:59 (SE02)	17:02	31	16:28 (SE06)	17:08	37	16:43 (SE06)
30	06:22		06:52 (SE03)	06:51			07:21	06:52		15:49 (SE02)	07:27		15:57 (SE06)	07:48		16:07 (SE06)
	20:43	57	07:49 (SE03)	20:02			19:12	17:27	69	16:58 (SE02)	17:02	32	16:29 (SE06)	17:09	36	16:43 (SE06)
31	06:23		06:53 (SE03)	06:52				06:53		15:49 (SE02)				07:48		16:07 (SE06)
	20:42	55	07:48 (SE03)	20:01				17:26	69	16:58 (SE02)				17:10	37	16:44 (SE06)

	July		August		September	October		November		December	
Potential sun hours	456		426		375	346		300		291	
Total, worst case		1998		456		1774		1399		1124	
Sun reduction	0,74		0,72			0,57		0,48		0,42	
Oper. time red.	0,73		0,73			0,73		0,73		0,73	
Wind dir. red.	0,81		0,81			0,82		0,81		0,80	
Total reduction	0,44		0,43			0,34		0,29		0,24	
Total, real		873		194		603		399		274	

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)

Project:
Progetto_Sorgenia Seneghe-Narbolia

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:
08/04/2024 16:23/3.4.415

SHADOW - Calendar

Calculation: Real_case_Progetto_20240408Shadow receptor: F49 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (74)
Assumptions for shadow calculations

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

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

Operational time

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

	January			February	March	April			May			June		
1	07:48		15:31 (SE03)	07:36	07:01	07:12			06:27		19:10 (SE04)	06:00		19:06 (SE04)
	17:11	24	16:45 (SE02)	17:44	18:17	19:50			20:20	29	19:39 (SE04)	20:49	40	19:46 (SE04)
2	07:49		15:33 (SE03)	07:35	07:00	07:10			06:26		19:09 (SE04)	05:59		19:06 (SE04)
	17:12	22	16:46 (SE02)	17:45	18:18	19:51			20:21	31	19:40 (SE04)	20:49	39	19:45 (SE04)
3	07:49		15:35 (SE03)	07:34	06:58	07:09			06:25		19:07 (SE04)	05:59		19:07 (SE04)
	17:12	19	16:47 (SE02)	17:47	18:19	19:52			20:22	35	19:42 (SE04)	20:50	38	19:45 (SE04)
4	07:49		15:38 (SE03)	07:33	06:57	07:07			06:24		19:06 (SE04)	05:58		19:08 (SE04)
	17:13	13	16:47 (SE02)	17:48	18:20	19:53			20:23	37	19:43 (SE04)	20:51	37	19:45 (SE04)
5	07:49		16:43 (SE02)	07:32	06:55	07:05			06:22		19:06 (SE04)	05:58		19:08 (SE04)
	17:14	5	16:48 (SE02)	17:49	18:21	19:54			20:24	38	19:44 (SE04)	20:51	36	19:44 (SE04)
6	07:49		16:44 (SE02)	07:31	06:54	07:04			06:21		19:05 (SE04)	05:58		19:09 (SE04)
	17:15	5	16:49 (SE02)	17:50	18:23	19:55			20:25	39	19:44 (SE04)	20:52	36	19:45 (SE04)
7	07:49		16:45 (SE02)	07:30	06:52	07:02			06:20		19:03 (SE04)	05:57		19:09 (SE04)
	17:16	6	16:51 (SE02)	17:51	18:24	19:56			20:26	41	19:44 (SE04)	20:53	36	19:45 (SE04)
8	07:49		16:45 (SE02)	07:29	06:50	07:01			06:19		19:03 (SE04)	05:57		19:10 (SE04)
	17:17	7	16:52 (SE02)	17:53	18:25	19:57			20:27	42	19:45 (SE04)	20:53	35	19:45 (SE04)
9	07:48		16:46 (SE02)	07:28	06:49	06:59			06:18		19:02 (SE04)	05:57		19:11 (SE04)
	17:18	7	16:53 (SE02)	17:54	18:26	19:58			20:28	43	19:45 (SE04)	20:54	34	19:45 (SE04)
10	07:48		16:47 (SE02)	07:27	06:47	06:57			06:17		19:02 (SE04)	05:57		19:10 (SE04)
	17:19	7	16:54 (SE02)	17:55	18:27	19:59			20:29	44	19:46 (SE04)	20:54	34	19:44 (SE04)
11	07:48		16:47 (SE02)	07:25	06:46	06:56			06:16		19:02 (SE04)	05:57		19:11 (SE04)
	17:20	8	16:55 (SE02)	17:56	18:28	20:00			20:30	44	19:46 (SE04)	20:55	33	19:44 (SE04)
12	07:48		16:48 (SE02)	07:24	06:44	06:54			06:15		19:01 (SE04)	05:57		19:11 (SE04)
	17:21	8	16:56 (SE02)	17:57	18:29	20:01			20:31	45	19:46 (SE04)	20:55	33	19:44 (SE04)
13	07:48		16:49 (SE02)	07:23	06:43	06:53			06:14		19:01 (SE04)	05:57		19:12 (SE04)
	17:22	9	16:58 (SE02)	17:59	18:30	20:02			20:32	45	19:46 (SE04)	20:56	32	19:44 (SE04)
14	07:47		16:49 (SE02)	07:22	06:41	06:51			06:13		19:01 (SE04)	05:56		19:12 (SE04)
	17:23	9	16:58 (SE02)	18:00	18:31	20:03			20:33	45	19:46 (SE04)	20:56	32	19:44 (SE04)
15	07:47		16:51 (SE02)	07:21	06:39	06:50			06:12		19:02 (SE04)	05:56		19:13 (SE04)
	17:24	9	17:00 (SE02)	18:01	18:32	20:04			20:34	45	19:47 (SE04)	20:57	31	19:44 (SE04)
16	07:47		16:51 (SE02)	07:19	06:38	06:48			06:11		19:01 (SE04)	05:56		19:13 (SE04)
	17:25	9	17:00 (SE02)	18:02	18:33	20:05			20:35	46	19:47 (SE04)	20:57	31	19:44 (SE04)
17	07:46		16:53 (SE02)	07:18	06:36	06:47			06:10		19:01 (SE04)	05:57		19:13 (SE04)
	17:27	9	17:02 (SE02)	18:03	18:34	20:06			20:36	46	19:47 (SE04)	20:57	31	19:44 (SE04)
18	07:46		16:54 (SE02)	07:17	06:35	06:45			06:09		19:01 (SE04)	05:57		19:14 (SE04)
	17:28	9	17:03 (SE02)	18:04	18:35	20:07			20:37	46	19:47 (SE04)	20:58	30	19:44 (SE04)
19	07:45		16:56 (SE02)	07:15	06:33	06:44			06:08		19:01 (SE04)	05:57		19:15 (SE04)
	17:29	8	17:04 (SE02)	18:06	18:36	20:08			20:38	46	19:47 (SE04)	20:58	30	19:45 (SE04)
20	07:45		16:59 (SE02)	07:14	06:31	06:42			06:07		19:01 (SE04)	05:57		19:15 (SE04)
	17:30	5	17:04 (SE02)	18:07	18:37	20:09			20:39	46	19:47 (SE04)	20:58	30	19:45 (SE04)
21	07:44				07:13	06:30	06:41		06:06		19:02 (SE04)	05:57		19:15 (SE04)
	17:31				18:08	18:38	20:10		20:40	45	19:47 (SE04)	20:59	30	19:45 (SE04)
22	07:44				07:11	06:28	06:40		06:06		19:02 (SE04)	05:57		19:15 (SE04)
	17:32				18:09	18:39	20:11		20:40	45	19:47 (SE04)	20:59	30	19:45 (SE04)
23	07:43				07:10	06:26	06:38		06:05		19:02 (SE04)	05:57		19:15 (SE04)
	17:33				18:10	18:40	20:12		20:41	44	19:46 (SE04)	20:59	30	19:45 (SE04)
24	07:42				07:08	06:25	06:37		06:04		19:03 (SE04)	05:58		19:16 (SE04)
	17:35				18:11	18:41	20:13		20:42	44	19:47 (SE04)	20:59	30	19:46 (SE04)
25	07:42				07:07	06:23	06:35		06:04		19:03 (SE04)	05:58		19:16 (SE04)
	17:36				18:13	18:42	20:14		20:43	43	19:46 (SE04)	20:59	30	19:46 (SE04)
26	07:41				07:06	06:22	06:34		06:03		19:04 (SE04)	05:58		19:15 (SE04)
	17:37				18:14	18:43	20:15		20:44	43	19:47 (SE04)	20:59	31	19:46 (SE04)
27	07:40				07:04	06:20	06:33		06:02		19:04 (SE04)	05:59		19:16 (SE04)
	17:38				18:15	18:45	20:16		20:45	42	19:46 (SE04)	20:59	31	19:47 (SE04)
28	07:39				07:03	06:18	06:31	19:18 (SE04)	06:02		19:04 (SE04)	05:59		19:16 (SE04)
	17:39				18:16	18:46	20:17	14	19:32 (SE04)	20:45	42	19:46 (SE04)	20:59	31	19:47 (SE04)
29	07:38					07:17	06:30	19:15 (SE04)	06:01		19:05 (SE04)	05:59		19:16 (SE04)
	17:41					19:47	20:18	21	19:36 (SE04)	20:46	41	19:46 (SE04)	20:59	32	19:48 (SE04)
30	07:38					07:15	06:29	19:13 (SE04)	06:01		19:05 (SE04)	06:00		19:16 (SE04)
	17:42					19:48	20:19	25	19:38 (SE04)	20:47	40	19:45 (SE04)	20:59	32	19:48 (SE04)
31	07:37					07:13			06:00		19:05 (SE04)			
	17:43					19:49			20:48	41	19:46 (SE04)			
Potential sun hours	300				299	370	397		446			449		
Total, worst case		198						60	1303				985	
Sun reduction		0,40						0,52	0,57				0,66	
Oper. time red.		0,73						0,73	0,73				0,73	
Wind dir. red.		0,79						0,66	0,66				0,66	
Total reduction		0,23						0,25	0,28				0,32	
Total, real		46						15	364				318	

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: Real_case_Progetto_20240408Shadow receptor: F49 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (74)
Assumptions for shadow calculations

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

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

Operational time

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

	July			August			September	October		November			December		
1	06:00		19:15 (SE04)	06:23		19:12 (SE04)	06:53	07:22		06:54			07:28		16:29 (SE02)
	20:59	33	19:48 (SE04)	20:41	45	19:57 (SE04)	19:59	19:10		17:25			17:02	8	16:37 (SE02)
2	06:01		19:16 (SE04)	06:24		19:12 (SE04)	06:54	07:23		06:55			07:29		16:29 (SE02)
	20:59	33	19:49 (SE04)	20:40	44	19:56 (SE04)	19:58	19:08		17:24			17:01	7	16:36 (SE02)
3	06:01		19:15 (SE04)	06:25		19:13 (SE04)	06:55	07:24		06:57			07:30		16:29 (SE02)
	20:59	34	19:49 (SE04)	20:39	43	19:56 (SE04)	19:56	19:07		17:22			17:01	7	16:36 (SE02)
4	06:02		19:15 (SE04)	06:26		19:13 (SE04)	06:56	07:25		06:58			07:31		16:29 (SE02)
	20:59	35	19:50 (SE04)	20:38	43	19:56 (SE04)	19:55	19:05		17:21			17:01	7	16:36 (SE02)
5	06:02		19:15 (SE04)	06:27		19:14 (SE04)	06:57	07:25		06:59			07:32		16:30 (SE02)
	20:59	35	19:50 (SE04)	20:37	41	19:55 (SE04)	19:53	19:04		17:20			17:01	6	16:36 (SE02)
6	06:03		19:15 (SE04)	06:28		19:14 (SE04)	06:58	07:27		07:00			07:33		16:30 (SE02)
	20:58	36	19:51 (SE04)	20:36	41	19:55 (SE04)	19:51	19:02		17:19			17:01	6	16:36 (SE02)
7	06:04		19:15 (SE04)	06:29		19:15 (SE04)	06:59	07:28		07:01			07:34		16:30 (SE02)
	20:58	37	19:52 (SE04)	20:34	39	19:54 (SE04)	19:50	19:00		17:18			17:01	6	16:36 (SE02)
8	06:04		19:14 (SE04)	06:30		19:15 (SE04)	07:00	07:29		07:02			07:35		15:27 (SE03)
	20:58	37	19:51 (SE04)	20:33	37	19:52 (SE04)	19:48	18:59		17:17			17:01	13	16:36 (SE02)
9	06:05		19:15 (SE04)	06:31		19:15 (SE04)	07:00	07:30		07:04			07:36		15:24 (SE03)
	20:58	37	19:52 (SE04)	20:32	36	19:51 (SE04)	19:46	18:57		17:16			17:01	19	16:36 (SE02)
10	06:05		19:15 (SE04)	06:32		19:16 (SE04)	07:01	07:31		07:05			07:37		15:23 (SE03)
	20:57	38	19:53 (SE04)	20:31	34	19:50 (SE04)	19:45	18:56		17:15			17:01	22	16:36 (SE02)
11	06:06		19:14 (SE04)	06:33		19:18 (SE04)	07:02	07:32		07:06			07:37		15:23 (SE03)
	20:57	39	19:53 (SE04)	20:30	31	19:49 (SE04)	19:43	18:54		17:14			17:01	22	16:36 (SE02)
12	06:07		19:14 (SE04)	06:34		19:19 (SE04)	07:03	07:33		07:07			07:38		15:21 (SE03)
	20:56	40	19:54 (SE04)	20:28	28	19:47 (SE04)	19:42	18:53		17:13			17:01	25	16:35 (SE02)
13	06:07		19:14 (SE04)	06:35		19:21 (SE04)	07:04	07:34		07:08			07:39		15:21 (SE03)
	20:56	40	19:54 (SE04)	20:27	24	19:45 (SE04)	19:40	18:51		17:12			17:01	27	16:36 (SE02)
14	06:08		19:13 (SE04)	06:36		19:23 (SE04)	07:05	07:35		07:09			07:40		15:21 (SE03)
	20:55	41	19:54 (SE04)	20:26	20	19:43 (SE04)	19:38	18:50		17:11			17:01	27	16:36 (SE02)
15	06:09		19:13 (SE04)	06:37		19:26 (SE04)	07:06	07:36		07:10			07:41		15:21 (SE03)
	20:55	42	19:55 (SE04)	20:24	13	19:39 (SE04)	19:37	18:48		17:11			17:01	28	16:37 (SE02)
16	06:10		19:13 (SE04)	06:38				07:07	07:37	07:12			07:41		15:20 (SE03)
	20:54	43	19:56 (SE04)	20:23				19:35	18:47	17:10			17:02	30	16:36 (SE02)
17	06:10		19:13 (SE04)	06:39				07:08	07:38	07:13			07:42		15:21 (SE03)
	20:54	43	19:56 (SE04)	20:22				19:33	18:45	17:09			17:02	30	16:37 (SE02)
18	06:11		19:12 (SE04)	06:40				07:09	07:39	07:14			07:43		15:21 (SE03)
	20:53	44	19:56 (SE04)	20:20				19:32	18:44	17:08			17:02	30	16:37 (SE02)
19	06:12		19:12 (SE04)	06:40				07:10	07:40	07:15			07:43		15:21 (SE03)
	20:52	44	19:56 (SE04)	20:19				19:30	18:42	17:07			17:03	30	16:37 (SE02)
20	06:13		19:12 (SE04)	06:41				07:11	07:41	07:16			07:44		15:22 (SE03)
	20:52	45	19:57 (SE04)	20:17				19:28	18:41	17:07			17:03	30	16:38 (SE02)
21	06:14		19:12 (SE04)	06:42				07:12	07:42	07:17			07:44		15:21 (SE03)
	20:51	45	19:57 (SE04)	20:16				19:27	18:39	17:06			17:04	31	16:38 (SE02)
22	06:15		19:11 (SE04)	06:43				07:13	07:43	07:18		16:35 (SE02)	07:45		15:22 (SE03)
	20:50	46	19:57 (SE04)	20:15				19:25	18:38	17:06	5	16:40 (SE02)	17:04	31	16:39 (SE02)
23	06:15		19:12 (SE04)	06:44				07:14	07:44	07:20		16:32 (SE02)	07:45		15:23 (SE03)
	20:49	45	19:57 (SE04)	20:13				19:23	18:36	17:05	8	16:40 (SE02)	17:04	30	16:39 (SE02)
24	06:16		19:12 (SE04)	06:45				07:15	07:45	07:21		16:32 (SE02)	07:46		15:23 (SE03)
	20:49	45	19:57 (SE04)	20:12				19:22	18:35	17:04	9	16:41 (SE02)	17:05	30	16:39 (SE02)
25	06:17		19:12 (SE04)	06:46				07:16	06:46	07:22		16:31 (SE02)	07:46		15:24 (SE03)
	20:48	45	19:57 (SE04)	20:10				19:20	17:34	17:04	9	16:40 (SE02)	17:06	30	16:40 (SE02)
26	06:18		19:12 (SE04)	06:47				07:17	06:48	07:23		16:30 (SE02)	07:47		15:24 (SE03)
	20:47	46	19:58 (SE04)	20:09				19:18	17:32	17:03	9	16:39 (SE02)	17:06	31	16:41 (SE02)
27	06:19		19:12 (SE04)	06:48				07:18	06:49	07:24		16:30 (SE02)	07:47		15:25 (SE03)
	20:46	46	19:58 (SE04)	20:07				19:17	17:31	17:03	9	16:39 (SE02)	17:07	30	16:41 (SE02)
28	06:20		19:12 (SE04)	06:49				07:19	06:50	07:25		16:29 (SE02)	07:47		15:27 (SE03)
	20:45	46	19:58 (SE04)	20:06				19:15	17:30	17:03	9	16:38 (SE02)	17:08	28	16:42 (SE02)
29	06:21		19:11 (SE04)	06:50				07:20	06:51	07:26		16:29 (SE02)	07:48		15:28 (SE03)
	20:44	46	19:57 (SE04)	20:04				19:13	17:29	17:02	9	16:38 (SE02)	17:08	27	16:43 (SE02)
30	06:22		19:11 (SE04)	06:51				07:21	06:52	07:27		16:29 (SE02)	07:48		15:28 (SE03)
	20:43	46	19:57 (SE04)	20:02				19:12	17:27	17:02	8	16:37 (SE02)	17:09	27	16:43 (SE02)
31	06:22		19:12 (SE04)	06:52					06:53				07:48		15:30 (SE03)
	20:42	45	19:57 (SE04)	20:01					17:26				17:10	25	16:44 (SE02)
Potential sun hours	456			426			375	346		300			291		
Total, worst case		1277			519						75			700	
Sun reduction		0,74			0,72						0,48			0,42	
Oper. time red.		0,73			0,73						0,73			0,73	
Wind dir. red.		0,66			0,66						0,81			0,76	
Total reduction		0,36			0,35						0,29			0,23	
Total, real		461			183						22			164	

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: Real_case_Progetto_20240408 Shadow receptor: F59 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (75)
Assumptions for shadow calculations

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

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

Operational time

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

	January	February	March		April		May	June	July	August	September		October		November	December
1	07:48 17:11	07:36 17:44	07:01 18:17		07:12 19:50	28 09:00 (NA10)	08:32 (NA10) 20:20	06:28 20:49	06:00 20:59	06:01 20:41	06:24 19:59		07:22 19:10	40 08:12 (NA10) 08:52 (NA10)	06:54 17:25	07:28 17:02
2	07:49 17:12	07:35 17:46	07:00 18:18		07:10 19:51	24 08:58 (NA10)	08:34 (NA10) 20:21	06:26 20:49	05:59 20:59	06:01 20:40	06:25 19:58		07:23 19:09	38 08:13 (NA10) 08:51 (NA10)	06:56 17:24	07:29 17:02
3	07:49 17:13	07:34 17:47	06:58 18:19		07:09 19:52	18 08:54 (NA10)	08:36 (NA10) 20:22	06:25 20:50	05:59 20:59	06:02 20:39	06:25 19:56		07:24 19:07	35 08:14 (NA10) 08:49 (NA10)	06:57 17:23	07:30 17:01
4	07:49 17:14	07:33 17:48	06:57 18:20		07:07 19:53	9 08:49 (NA10)	08:40 (NA10) 20:23	06:24 20:51	05:59 20:59	06:02 20:38	06:26 19:55		07:25 19:05	33 08:15 (NA10) 08:48 (NA10)	06:58 17:22	07:31 17:01
5	07:49 17:14	07:32 17:49	06:55 18:22		07:06 19:54		06:23 20:24	05:58 20:51	06:03 20:59	06:27 20:37	06:57 19:53		07:26 19:04	30 08:16 (NA10) 08:46 (NA10)	06:59 17:20	07:32 17:01
6	07:49 17:15	07:31 17:50	06:54 18:23	15 07:47 (NA10) 08:02 (NA10)	07:04 19:55		06:21 20:25	05:58 20:52	06:03 20:58	06:28 20:36	06:58 19:51		07:27 19:02	25 08:18 (NA10) 08:43 (NA10)	07:00 17:19	07:33 17:01
7	07:49 17:16	07:30 17:52	06:52 18:24	22 07:44 (NA10) 08:06 (NA10)	07:02 19:56		06:20 20:26	05:58 20:53	06:04 20:58	06:29 20:35	06:59 19:50		07:28 19:01	19 08:21 (NA10) 08:40 (NA10)	07:01 17:18	07:34 17:01
8	07:48 17:17	07:29 17:53	06:51 18:25	27 07:41 (NA10) 08:08 (NA10)	07:01 19:57		06:19 20:27	05:57 20:53	06:04 20:58	06:30 20:33	07:00 19:48	7 08:36 (NA10) 08:43 (NA10)	07:30 18:59	10 08:25 (NA10) 08:35 (NA10)	07:02 17:17	07:35 17:01
9	07:48 17:18	07:28 17:54	06:49 18:26	31 07:39 (NA10) 08:10 (NA10)	06:59 19:58		06:18 20:28	05:57 20:54	06:05 20:58	06:31 20:32	07:01 19:47	17 08:31 (NA10) 08:48 (NA10)	07:30 18:57		07:04 17:16	07:36 17:01
10	07:48 17:19	07:27 17:55	06:47 18:27	34 07:37 (NA10) 08:11 (NA10)	06:58 19:59		06:17 20:29	05:57 20:54	06:06 20:57	06:32 20:31	07:02 19:45	23 08:28 (NA10) 08:51 (NA10)	07:31 18:56		07:05 17:15	07:37 17:01
11	07:48 17:20	07:25 17:56	06:46 18:28	37 07:35 (NA10) 08:12 (NA10)	06:56 20:00		06:16 20:30	05:57 20:55	06:06 20:57	06:33 20:30	07:03 19:43	28 08:25 (NA10) 08:53 (NA10)	07:32 18:54		07:06 17:14	07:37 17:01
12	07:48 17:21	07:24 17:58	06:44 18:29	39 07:34 (NA10) 08:13 (NA10)	06:55 20:01		06:15 20:31	05:57 20:56	06:07 20:56	06:34 20:28	07:03 19:42	31 08:22 (NA10) 08:53 (NA10)	07:33 18:53		07:07 17:13	07:38 17:01
13	07:48 17:22	07:23 17:59	06:43 18:30	42 07:32 (NA10) 08:14 (NA10)	06:53 20:02		06:14 20:32	05:57 20:56	06:08 20:56	06:35 20:27	07:04 19:40	34 08:21 (NA10) 08:55 (NA10)	07:34 18:51		07:08 17:12	07:39 17:01
14	07:47 17:23	07:22 18:00	06:41 18:31	43 07:32 (NA10) 08:15 (NA10)	06:51 20:03		06:13 20:33	05:57 20:56	06:08 20:55	06:36 20:26	07:05 19:38	37 08:19 (NA10) 08:56 (NA10)	07:35 18:50		07:09 17:12	07:40 17:01
15	07:47 17:25	07:21 18:01	06:40 18:32	45 07:30 (NA10) 08:15 (NA10)	06:50 20:04		06:12 20:34	05:57 20:57	06:09 20:55	06:37 20:24	07:06 19:37	39 08:18 (NA10) 08:57 (NA10)	07:36 18:48		07:11 17:11	07:41 17:02
16	07:47 17:26	07:19 18:02	06:38 18:33	45 07:29 (NA10) 08:14 (NA10)	06:48 20:05		06:11 20:35	05:57 20:57	06:10 20:54	06:38 20:23	07:07 19:35	40 08:17 (NA10) 08:57 (NA10)	07:37 18:47		07:12 17:10	07:41 17:02
17	07:46 17:27	07:18 18:03	06:36 18:34	46 07:29 (NA10) 08:15 (NA10)	06:47 20:06		06:10 20:36	05:57 20:57	06:11 20:54	06:39 20:22	07:08 19:33	42 08:16 (NA10) 08:58 (NA10)	07:38 18:45		07:13 17:09	07:42 17:02
18	07:46 17:28	07:17 18:05	06:35 18:35	47 07:28 (NA10) 08:15 (NA10)	06:45 20:07		06:09 20:37	05:57 20:58	06:11 20:53	06:40 20:20	07:09 19:32	43 08:15 (NA10) 08:58 (NA10)	07:39 18:44		07:14 17:08	07:43 17:03
19	07:45 17:29	07:15 18:06	06:33 18:36	47 07:27 (NA10) 08:14 (NA10)	06:44 20:08		06:08 20:38	05:57 20:58	06:12 20:52	06:41 20:19	07:10 19:30	45 08:14 (NA10) 08:59 (NA10)	07:40 18:42		07:15 17:08	07:43 17:03
20	07:45 17:30	07:14 18:07	06:31 18:37	47 07:28 (NA10) 08:14 (NA10)	06:43 20:09		06:07 20:39	05:57 20:58	06:13 20:52	06:42 20:17	07:11 19:28	46 08:13 (NA10) 08:59 (NA10)	07:41 18:41		07:16 17:07	07:44 17:03
21	07:44 17:31	07:13 18:08	06:28 18:38	47 07:27 (NA10) 08:14 (NA10)	06:41 20:10		06:07 20:40	05:57 20:59	06:14 20:51	06:43 20:16	07:12 19:27	46 08:13 (NA10) 08:59 (NA10)	07:42 18:39		07:17 17:06	07:44 17:04
22	07:43 17:32	07:11 18:09	06:28 18:40	47 07:26 (NA10) 08:13 (NA10)	06:40 20:11		06:06 20:40	05:57 20:59	06:15 20:50	06:44 20:15	07:13 19:25	47 08:12 (NA10) 08:59 (NA10)	07:43 18:38		07:19 17:06	07:45 17:04
23	07:42 17:34	07:10 18:10	06:27 18:41	46 07:27 (NA10) 08:13 (NA10)	06:38 20:12		06:05 20:41	05:58 20:59	06:16 20:49	06:44 20:13	07:14 19:23	47 08:12 (NA10) 08:59 (NA10)	07:44 18:37		07:20 17:05	07:45 17:05
24	07:42 17:35	07:09 18:12	06:25 18:42	44 07:27 (NA10) 08:11 (NA10)	06:37 20:13		06:04 20:42	05:58 20:59	06:16 20:49	06:45 20:12	07:15 19:22	46 08:12 (NA10) 08:58 (NA10)	06:47 18:35		07:21 17:05	07:46 17:05
25	07:42 17:36	07:07 18:13	06:23 18:43	44 07:27 (NA10) 08:11 (NA10)	06:35 20:14		06:04 20:43	05:58 20:59	06:17 20:48	06:46 20:10	07:16 19:20	46 08:12 (NA10) 08:58 (NA10)	06:47 17:34		07:22 17:04	07:46 17:06
26	07:41 17:37	07:06 18:14	06:22 18:44	43 07:27 (NA10) 08:10 (NA10)	06:34 20:15		06:03 20:44	05:59 20:59	06:18 20:47	06:47 20:09	07:17 19:18	47 08:10 (NA10) 08:57 (NA10)	06:48 17:33		07:23 17:04	07:47 17:06
27	07:40 17:38	07:04 18:15	06:20 18:45	41 07:27 (NA10) 08:08 (NA10)	06:33 20:16		06:02 20:45	05:59 20:59	06:19 20:46	06:48 20:07	07:18 19:17	45 08:11 (NA10) 08:56 (NA10)	06:49 17:31		07:24 17:03	07:47 17:07
28	07:39 17:40	07:03 18:16	06:18 18:46	40 07:28 (NA10) 08:08 (NA10)	06:31 20:17		06:02 20:46	05:59 20:59	06:20 20:45	06:49 20:06	07:19 19:15	44 08:11 (NA10) 08:55 (NA10)	06:50 17:30		07:25 17:03	07:47 17:08
29	07:39 17:41		07:17 19:47	37 08:29 (NA10) 09:06 (NA10)	06:30 20:18		06:01 20:46	06:00 20:59	06:21 20:44	06:50 20:04	07:20 19:14	43 08:11 (NA10) 08:54 (NA10)	06:51 17:29		07:26 17:02	07:48 17:08
30	07:38 17:42		07:15 19:48	35 08:29 (NA10) 09:04 (NA10)	06:29 20:19		06:01 20:47	06:00 20:59	06:22 20:43	06:51 20:03	07:21 19:12	42 08:11 (NA10) 08:53 (NA10)	06:52 17:27		07:27 17:02	07:48 17:09
31	07:37 17:43		07:14 19:49	31 08:31 (NA10) 09:02 (NA10)			06:00 20:48		06:23 20:42	06:52 20:01			06:53 17:26			07:48 17:10
Potential sun hours	300	299	370		397		446	449	456	426	375		346		300	291
Total, worst case			1021			79					885			230		
Sun reduction			0,49			0,52					0,65			0,57		
Oper. time red.			0,73			0,73					0,73			0,73		
Wind dir. red.			0,67			0,67					0,67			0,67		
Total reduction			0,24			0,26					0,32			0,28		
Total, real			243			20					283			65		

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)

Project:
Progetto_Sorgenia Seneghe-Narbolia

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:
08/04/2024 16:23/3.4.415

SHADOW - Calendar, graphical
Calculation: Real_case_Progetto_20240408

F08: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (71)

F20: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (72)

F35: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (73)

F49: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (74)

F59: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (75)

WTGs

▮ (yellow)	NA10: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (84)
▮ (blue)	SE02: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (85)
▮ (grey)	SE03: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (86)
▮ (magenta)	SE04: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (87)
▮ (teal)	SE06: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (88)

Project:
Progetto_Sorgenia Seneghe-Narbolia

Licensed user:
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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
08/04/2024 16:23/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20240408WTG: NA09 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (83)
Assumptions for shadow calculations

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

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

Operational time

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:36	07:01	07:12	06:27	06:00	06:00	06:24	06:53	07:22	06:54	07:28
	17:11	17:44	18:17	19:50	20:20	20:49	20:59	20:41	19:59	19:10	17:25	17:02
2	07:49	07:35	07:00	07:10	06:26	05:59	06:01	06:24	06:54	07:23	06:56	07:29
	17:12	17:45	18:18	19:51	20:21	20:49	20:59	20:40	19:58	19:09	17:24	17:01
3	07:49	07:34	06:58	07:09	06:25	05:59	06:01	06:25	06:55	07:24	06:57	07:30
	17:13	17:47	18:19	19:52	20:22	20:50	20:59	20:39	19:56	19:07	17:23	17:01
4	07:49	07:33	06:57	07:07	06:24	05:59	06:02	06:26	06:56	07:25	06:58	07:31
	17:13	17:48	18:20	19:53	20:23	20:51	20:59	20:38	19:55	19:05	17:21	17:01
5	07:49	07:32	06:55	07:05	06:23	05:58	06:02	06:27	06:57	07:26	06:59	07:32
	17:14	17:49	18:21	19:54	20:24	20:51	20:59	20:37	19:53	19:04	17:20	17:01
6	07:49	07:31	06:54	07:04	06:21	05:58	06:03	06:28	06:58	07:27	07:00	07:33
	17:15	17:50	18:23	19:55	20:25	20:52	20:58	20:36	19:51	19:02	17:19	17:01
7	07:49	07:30	06:52	07:02	06:20	05:58	06:04	06:29	06:59	07:28	07:01	07:34
	17:16	17:52	18:24	19:56	20:26	20:53	20:58	20:34	19:50	19:01	17:18	17:01
8	07:49	07:29	06:51	07:01	06:19	05:57	06:04	06:30	07:00	07:29	07:02	07:35
	17:17	17:53	18:25	19:57	20:27	20:53	20:58	20:33	19:48	18:59	17:17	17:01
9	07:48	07:28	06:49	06:59	06:18	05:57	06:05	06:31	07:01	07:30	07:04	07:36
	17:18	17:54	18:26	19:58	20:28	20:54	20:58	20:32	19:47	18:57	17:16	17:01
10	07:48	07:27	06:47	06:58	06:17	05:57	06:06	06:32	07:02	07:31	07:05	07:37
	17:19	17:55	18:27	19:59	20:29	20:54	20:57	20:31	19:45	18:56	17:15	17:01
11	07:48	07:25	06:46	06:56	06:16	05:57	06:06	06:33	07:02	07:32	07:06	07:37
	17:20	17:56	18:28	20:00	20:30	20:55	20:57	20:30	19:43	18:54	17:14	17:01
12	07:48	07:24	06:44	06:54	06:15	05:57	06:07	06:34	07:03	07:33	07:07	07:38
	17:21	17:58	18:29	20:01	20:31	20:55	20:56	20:28	19:42	18:53	17:13	17:01
13	07:48	07:23	06:43	06:53	06:14	05:57	06:08	06:35	07:04	07:34	07:08	07:39
	17:22	17:59	18:30	20:02	20:32	20:56	20:56	20:27	19:40	18:51	17:12	17:01
14	07:47	07:22	06:41	06:51	06:13	05:57	06:08	06:36	07:05	07:35	07:09	07:40
	17:23	18:00	18:31	20:03	20:33	20:56	20:55	20:26	19:38	18:50	17:11	17:01
15	07:47	07:21	06:39	06:50	06:12	05:57	06:09	06:37	07:06	07:36	07:10	07:41
	17:24	18:01	18:32	20:04	20:34	20:57	20:55	20:24	19:37	18:48	17:11	17:02
16	07:47	07:19	06:38	06:48	06:11	05:57	06:10	06:38	07:07	07:37	07:12	07:41
	17:26	18:02	18:33	20:05	20:35	20:57	20:54	20:23	19:35	18:47	17:10	17:02
17	07:46	07:18	06:36	06:47	06:10	05:57	06:11	06:39	07:08	07:38	07:13	07:42
	17:27	18:03	18:34	20:06	20:36	20:57	20:54	20:22	19:33	18:45	17:09	17:02
18	07:46	07:17	06:35	06:45	06:09	05:57	06:11	06:40	07:09	07:39	07:14	07:43
	17:28	18:05	18:35	20:07	20:37	20:58	20:53	20:20	19:32	18:44	17:08	17:02
19	07:45	07:15	06:33	06:44	06:08	05:57	06:12	06:41	07:10	07:40	07:15	07:43
	17:29	18:06	18:36	20:08	20:38	20:58	20:52	20:19	19:30	18:42	17:08	17:03
20	07:45	07:14	06:31	06:42	06:07	05:57	06:13	06:42	07:11	07:41	07:16	07:44
	17:30	18:07	18:37	20:09	20:39	20:58	20:52	20:17	19:28	18:41	17:07	17:03
21	07:44	07:13	06:30	06:41	06:07	05:57	06:14	06:43	07:12	07:42	07:17	07:44
	17:31	18:08	18:38	20:10	20:40	20:59	20:51	20:16	19:27	18:39	17:06	17:04
22	07:44	07:11	06:28	06:40	06:06	05:57	06:15	06:43	07:13	07:43	07:18	07:45
	17:32	18:09	18:39	20:11	20:40	20:59	20:50	20:15	19:25	18:38	17:06	17:04
23	07:43	07:10	06:27	06:38	06:05	05:58	06:16	06:44	07:14	07:44	07:20	07:45
	17:34	18:10	18:40	20:12	20:41	20:59	20:49	20:13	19:23	18:37	17:05	17:05
24	07:42	07:08	06:25	06:37	06:04	05:58	06:16	06:45	07:15	07:45	07:21	07:46
	17:35	18:11	18:42	20:13	20:42	20:59	20:49	20:12	19:22	18:35	17:05	17:05
25	07:42	07:07	06:23	06:35	06:04	05:58	06:17	06:46	07:16	06:47	07:22	07:46
	17:36	18:13	18:43	20:14	20:43	20:59	20:48	20:10	19:20	17:34	17:04	17:06
26	07:41	07:06	06:22	06:34	06:03	05:58	06:18	06:47	07:17	06:48	07:23	07:47
	17:37	18:14	18:44	20:15	20:44	20:59	20:47	20:09	19:18	17:33	17:04	17:06
27	07:40	07:04	06:20	06:33	06:02	05:59	06:19	06:48	07:18	06:49	07:24	07:47
	17:38	18:15	18:45	20:16	20:45	20:59	20:46	20:07	19:17	17:31	17:03	17:07
28	07:39	07:03	06:18	06:31	06:02	05:59	06:20	06:49	07:19	06:50	07:25	07:47
	17:39	18:16	18:46	20:17	20:45	20:59	20:45	20:06	19:15	17:30	17:03	17:08
29	07:38		07:17	06:30	06:01	06:00	06:21	06:50	07:20	06:51	07:26	07:48
	17:41		19:47	20:18	20:46	20:59	20:44	20:04	19:13	17:29	17:02	17:08
30	07:38		07:15	06:29	06:01	06:00	06:22	06:51	07:21	06:52	07:27	07:48
	17:42		19:48	20:19	20:47	20:59	20:43	20:02	19:12	17:27	17:02	17:09
31	07:37		07:14		06:00		06:23	06:52		06:53		07:48
	17:43		19:49		20:48		20:42	20:01		17:26		17:10
Potential sun hours	300	299	370	397	446	449	456	426	375	346	300	291
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Project:
Progetto_Sorgenia Seneghe-Narbolia

Licensed user:
I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
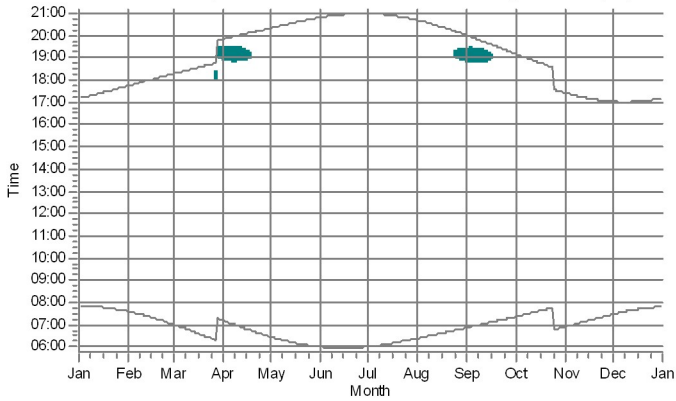Giuseppe Frongia / direttore@iatprogetti.it
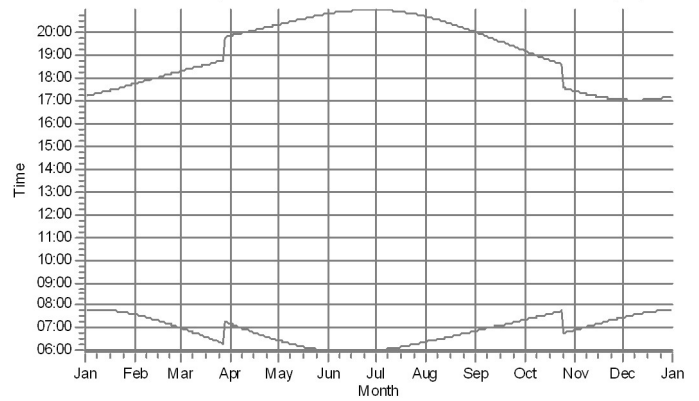Calculated:
08/04/2024 16:23/3.4.415

SHADOW - Calendar per WTG

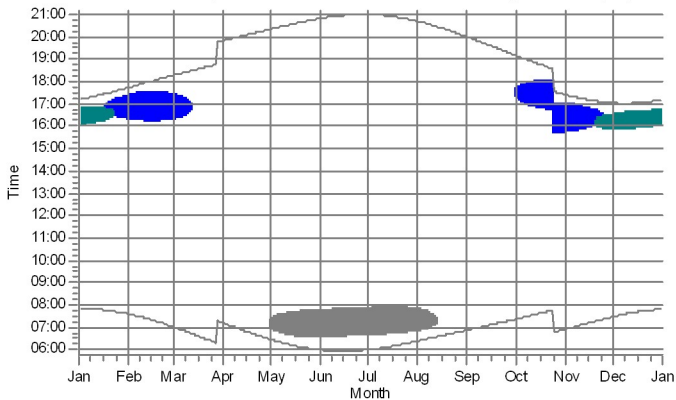Calculation: Real_case_Progetto_20240408WTG: NA10 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (84)
Assumptions for shadow calculations

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

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

Operational time

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

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48 / 17:11	07:36 / 17:44	07:01 / 18:17	07:12 08:32-09:00/28 / 19:50	06:28 / 20:20	06:00 / 20:49	06:00 / 20:59	06:24 / 20:41	06:53 / 19:59	07:22 08:12-08:52/40 / 19:10	06:54 / 17:25	07:28 / 17:02
2	07:48 / 17:12	07:35 / 17:46	07:00 / 18:18	07:10 08:34-08:58/24 / 19:51	06:26 / 20:21	06:01 / 20:49	06:01 / 20:59	06:25 / 20:40	06:54 / 19:58	07:23 08:13-08:51/38 / 19:09	06:56 / 17:24	07:29 / 17:01
3	07:49 / 17:13	07:34 / 17:47	06:58 / 18:19	07:09 08:36-08:54/18 / 19:52	06:25 / 20:22	05:59 / 20:50	06:01 / 20:59	06:25 / 20:39	06:55 / 19:56	07:24 08:14-08:49/35 / 19:07	06:57 / 17:23	07:30 / 17:01
4	07:49 / 17:14	07:33 / 17:48	06:57 / 18:20	07:07 08:40-08:49/9 / 19:53	06:24 / 20:23	05:59 / 20:51	06:02 / 20:59	06:26 / 20:38	06:56 / 19:55	07:25 08:15-08:48/33 / 19:05	06:58 / 17:21	07:31 / 17:01
5	07:49 / 17:14	07:32 / 17:49	06:55 / 18:22	07:06 / 19:54	06:23 / 20:24	05:58 / 20:51	06:03 / 20:59	06:27 / 20:37	06:57 / 19:53	07:26 08:16-08:46/30 / 19:04	06:59 / 17:20	07:32 / 17:01
6	07:49 / 17:15	07:31 / 17:50	06:54 07:47-08:02/15 / 18:23	07:04 / 19:55	06:21 / 20:25	05:58 / 20:52	06:03 / 20:58	06:28 / 20:36	06:58 / 19:51	07:27 08:18-08:43/25 / 19:02	07:00 / 17:19	07:33 / 17:01
7	07:49 / 17:16	07:30 / 17:52	06:52 07:44-08:06/22 / 18:24	07:02 / 19:56	06:20 / 20:26	05:58 / 20:53	06:04 / 20:58	06:29 / 20:34	06:59 / 19:50	07:28 08:21-08:40/19 / 19:01	07:01 / 17:18	07:34 / 17:01
8	07:49 / 17:17	07:29 / 17:53	06:51 07:41-08:08/27 / 18:25	07:01 / 19:57	06:19 / 20:27	05:57 / 20:53	06:04 / 20:58	06:30 / 20:33	07:00 08:36-08:43/7 / 19:48	07:29 08:25-08:35/10 / 18:59	07:02 / 17:17	07:35 / 17:01
9	07:48 / 17:18	07:28 / 17:54	06:49 07:39-08:10/31 / 18:26	06:59 / 19:58	06:18 / 20:28	05:57 / 20:54	06:05 / 20:58	06:31 / 20:32	07:01 08:31-08:48/17 / 19:47	07:30 / 18:57	07:04 / 17:16	07:36 / 17:01
10	07:48 / 17:19	07:27 / 17:55	06:47 07:37-08:11/34 / 18:27	06:58 / 19:59	06:17 / 20:29	05:57 / 20:54	06:06 / 20:57	06:32 / 20:31	07:02 08:28-08:51/23 / 19:45	07:31 / 18:56	07:05 / 17:15	07:37 / 17:01
11	07:48 / 17:20	07:25 / 17:56	06:46 07:35-08:12/37 / 18:28	06:56 / 20:00	06:16 / 20:30	05:57 / 20:55	06:06 / 20:57	06:33 / 20:30	07:02 08:25-08:53/28 / 19:43	07:32 / 18:54	07:06 / 17:14	07:37 / 17:01
12	07:48 / 17:21	07:24 / 17:58	06:44 07:34-08:13/39 / 18:29	06:55 / 20:01	06:15 / 20:31	05:57 / 20:55	06:07 / 20:56	06:34 / 20:28	07:03 08:22-08:53/31 / 19:42	07:33 / 18:53	07:07 / 17:13	07:38 / 17:01
13	07:48 / 17:22	07:23 / 17:59	06:43 07:32-08:14/42 / 18:30	06:53 / 20:02	06:14 / 20:32	05:57 / 20:56	06:08 / 20:56	06:35 / 20:27	07:04 08:21-08:55/34 / 19:40	07:34 / 18:51	07:08 / 17:12	07:39 / 17:01
14	07:47 / 17:23	07:22 / 18:00	06:41 07:32-08:15/43 / 18:31	06:51 / 20:03	06:13 / 20:33	05:57 / 20:56	06:08 / 20:55	06:36 / 20:26	07:05 08:19-08:56/37 / 19:38	07:35 / 18:50	07:09 / 17:12	07:40 / 17:01
15	07:47 / 17:24	07:21 / 18:01	06:39 07:30-08:15/45 / 18:32	06:50 / 20:04	06:12 / 20:34	05:57 / 20:57	06:09 / 20:55	06:37 / 20:24	07:06 08:18-08:57/39 / 19:37	07:36 / 18:48	07:11 / 17:11	07:41 / 17:02
16	07:47 / 17:26	07:19 / 18:02	06:38 07:29-08:14/45 / 18:33	06:48 / 20:05	06:11 / 20:35	05:57 / 20:57	06:10 / 20:54	06:38 / 20:23	07:07 08:17-08:57/40 / 19:35	07:37 / 18:47	07:12 / 17:10	07:41 / 17:02
17	07:46 / 17:27	07:18 / 18:03	06:36 07:29-08:15/46 / 18:34	06:47 / 20:06	06:10 / 20:36	05:57 / 20:57	06:11 / 20:54	06:39 / 20:22	07:08 08:16-08:58/42 / 19:33	07:38 / 18:45	07:13 / 17:09	07:42 / 17:02
18	07:46 / 17:28	07:17 / 18:05	06:35 07:28-08:15/47 / 18:35	06:45 / 20:07	06:09 / 20:37	05:57 / 20:58	06:11 / 20:53	06:40 / 20:20	07:09 08:15-08:58/43 / 19:32	07:39 / 18:44	07:14 / 17:08	07:43 / 17:02
19	07:45 / 17:29	07:15 / 18:06	06:33 07:27-08:14/47 / 18:36	06:44 / 20:08	06:08 / 20:38	05:57 / 20:58	06:12 / 20:52	06:41 / 20:19	07:10 08:14-08:59/45 / 19:30	07:40 / 18:42	07:15 / 17:08	07:43 / 17:03
20	07:45 / 17:30	07:14 / 18:07	06:31 07:28-08:14/46 / 18:37	06:43 / 20:09	06:07 / 20:39	05:57 / 20:58	06:13 / 20:52	06:42 / 20:17	07:11 08:13-08:59/46 / 19:28	07:41 / 18:41	07:16 / 17:07	07:44 / 17:03
21	07:44 / 17:31	07:13 / 18:08	06:30 07:27-08:14/47 / 18:38	06:41 / 20:10	06:07 / 20:40	05:57 / 20:59	06:14 / 20:51	06:43 / 20:16	07:12 08:13-08:59/46 / 19:27	07:42 / 18:39	07:17 / 17:06	07:44 / 17:04
22	07:44 / 17:32	07:11 / 18:09	06:28 07:26-08:13/47 / 18:39	06:40 / 20:11	06:06 / 20:40	05:57 / 20:59	06:15 / 20:50	06:44 / 20:15	07:13 08:12-08:59/47 / 19:25	07:43 / 18:38	07:18 / 17:06	07:45 / 17:04
23	07:43 / 17:34	07:10 / 18:10	06:27 07:27-08:13/46 / 18:41	06:38 / 20:12	06:05 / 20:41	05:58 / 20:59	06:16 / 20:49	06:44 / 20:13	07:14 08:12-08:59/47 / 19:23	07:44 / 18:37	07:20 / 17:05	07:45 / 17:05
24	07:42 / 17:35	07:08 / 18:12	06:25 07:27-08:11/44 / 18:42	06:37 / 20:13	06:04 / 20:42	05:58 / 20:59	06:16 / 20:49	06:45 / 20:12	07:15 08:12-08:58/46 / 19:22	07:45 / 18:35	07:21 / 17:05	07:46 / 17:05
25	07:42 / 17:36	07:07 / 18:13	06:23 07:27-08:11/44 / 18:43	06:35 / 20:14	06:04 / 20:43	05:58 / 20:59	06:17 / 20:48	06:46 / 20:10	07:16 08:12-08:58/46 / 19:20	06:47 / 17:34	07:22 / 17:04	07:46 / 17:06
26	07:41 / 17:37	07:06 / 18:14	06:22 07:27-08:10/43 / 18:44	06:34 / 20:15	06:03 / 20:44	05:58 / 20:59	06:18 / 20:47	06:47 / 20:09	07:17 08:10-08:57/47 / 19:18	06:48 / 17:33	07:23 / 17:04	07:47 / 17:06
27	07:40 / 17:38	07:04 / 18:15	06:20 07:27-08:08/41 / 18:45	06:33 / 20:16	06:02 / 20:45	05:59 / 20:59	06:19 / 20:46	06:48 / 20:07	07:18 08:11-08:56/45 / 19:17	06:49 / 17:31	07:24 / 17:03	07:47 / 17:07
28	07:39 / 17:39	07:03 / 18:16	06:18 07:28-08:08/40 / 18:46	06:31 / 20:17	06:02 / 20:45	05:59 / 20:59	06:20 / 20:45	06:49 / 20:06	07:19 08:11-08:55/44 / 19:15	06:50 / 17:30	07:25 / 17:03	07:47 / 17:08
29	07:39 / 17:41		07:17 08:29-09:06/37 / 19:47	06:30 / 20:18	06:01 / 20:46	06:00 / 20:59	06:21 / 20:44	06:50 / 20:04	07:20 08:11-08:54/43 / 19:13	06:51 / 17:29	07:26 / 17:02	07:48 / 17:08
30	07:38 / 17:42		07:15 08:29-09:04/35 / 19:48	06:29 / 20:19	06:01 / 20:47	06:00 / 20:59	06:22 / 20:43	06:51 / 20:03	07:21 08:11-08:53/42 / 19:12	06:52 / 17:27	07:27 / 17:02	07:48 / 17:09
31	07:37 / 17:43		07:14 08:31-09:02/31 / 19:49		06:00 / 20:48		06:23 / 20:42	06:52 / 20:01		06:53 / 17:26		07:48 / 17:10
Potential sun hours	300	299	370	397	446	449	456	426	375	346	300	291
Sum of minutes with flicker	0	0	1021	79	0	0	0	0	885	230	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_Sorgenia Seneghe-Narbolia

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:
08/04/2024 16:23/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20240408WTG: SE02 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (85)
Assumptions for shadow calculations

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

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

Operational time

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

Day	January		February		March		April	May	June
1	07:48 / 17:11	16:42-16:45/3	07:36 / 17:44	16:24-17:21/57	07:01 / 18:17	16:24-17:24/60	07:12 / 19:50	06:27 / 20:20	06:00 / 20:49
2	07:49 / 17:12	16:42-16:46/4	07:35 / 17:45	16:24-17:22/58	07:00 / 18:18	16:24-17:22/58	07:10 / 19:51	06:26 / 20:21	05:59 / 20:49
3	07:49 / 17:13	16:42-16:47/5	07:34 / 17:47	16:23-17:24/61	06:58 / 18:19	16:26-17:22/56	07:09 / 19:52	06:25 / 20:22	05:59 / 20:50
4	07:49 / 17:13	16:43-16:47/4	07:33 / 17:48	16:23-17:25/62	06:57 / 18:20	16:26-17:20/54	07:07 / 19:53	06:24 / 20:23	05:58 / 20:51
5	07:49 / 17:14	16:43-16:48/5	07:32 / 17:49	16:22-17:26/64	06:55 / 18:21	16:28-17:19/51	07:05 / 19:54	06:23 / 20:24	05:58 / 20:51
6	07:49 / 17:15	16:44-16:49/5	07:31 / 17:50	16:21-17:26/65	06:54 / 18:23	16:29-17:17/48	07:04 / 19:55	06:21 / 20:25	05:58 / 20:52
7	07:49 / 17:16	16:45-16:51/6	07:30 / 17:51	16:20-17:27/67	06:52 / 18:24	16:31-17:15/44	07:02 / 19:56	06:20 / 20:26	05:58 / 20:53
8	07:49 / 17:17	16:45-16:52/7	07:29 / 17:53	16:20-17:27/67	06:51 / 18:25	16:33-17:13/40	07:01 / 19:57	06:19 / 20:27	05:57 / 20:53
9	07:48 / 17:18	16:46-16:53/7	07:28 / 17:54	16:20-17:28/68	06:49 / 18:26	16:35-17:10/35	06:59 / 19:58	06:18 / 20:28	05:57 / 20:54
10	07:48 / 17:19	16:47-16:54/7	07:27 / 17:55	16:20-17:29/69	06:47 / 18:27	16:38-17:08/30	06:58 / 19:59	06:17 / 20:29	05:57 / 20:54
11	07:48 / 17:20	16:47-16:55/8	07:25 / 17:56	16:20-17:29/69	06:46 / 18:28	16:41-17:03/22	06:56 / 20:00	06:16 / 20:30	05:57 / 20:55
12	07:48 / 17:21	16:48-16:56/8	07:24 / 17:57	16:19-17:29/70	06:44 / 18:29	16:48-16:58/10	06:54 / 20:01	06:15 / 20:31	05:57 / 20:55
13	07:48 / 17:22	16:49-16:58/9	07:23 / 17:59	16:19-17:29/70	06:43 / 18:30		06:53 / 20:02	06:14 / 20:32	05:57 / 20:56
14	07:47 / 17:23	16:49-16:58/9	07:22 / 18:00	16:19-17:30/71	06:41 / 18:31		06:51 / 20:03	06:13 / 20:33	05:57 / 20:56
15	07:47 / 17:24	16:51-17:00/9	07:21 / 18:01	16:19-17:30/71	06:39 / 18:32		06:50 / 20:04	06:12 / 20:34	05:57 / 20:57
16	07:47 / 17:26	16:51-17:00/9	07:19 / 18:02	16:18-17:30/72	06:38 / 18:33		06:48 / 20:05	06:11 / 20:35	05:57 / 20:57
17	07:46 / 17:27	16:53-17:02/9	07:18 / 18:03	16:19-17:30/71	06:36 / 18:34		06:47 / 20:06	06:10 / 20:36	05:57 / 20:57
18	07:46 / 17:28	16:45-17:03/18	07:17 / 18:05	16:19-17:30/71	06:35 / 18:35		06:45 / 20:07	06:09 / 20:37	05:57 / 20:58
19	07:45 / 17:29	16:41-17:04/23	07:15 / 18:06	16:19-17:29/70	06:33 / 18:36		06:44 / 20:08	06:08 / 20:38	05:57 / 20:58
20	07:45 / 17:30	16:38-17:04/26	07:14 / 18:07	16:19-17:29/70	06:31 / 18:37		06:42 / 20:09	06:07 / 20:39	05:57 / 20:58
21	07:44 / 17:31	16:37-17:05/28	07:13 / 18:08	16:20-17:30/70	06:30 / 18:38		06:41 / 20:10	06:07 / 20:40	05:57 / 20:59
22	07:44 / 17:32	16:34-17:07/33	07:11 / 18:09	16:20-17:29/69	06:28 / 18:39		06:40 / 20:11	06:06 / 20:40	05:57 / 20:59
23	07:43 / 17:33	16:33-17:09/36	07:10 / 18:10	16:20-17:29/69	06:26 / 18:40		06:38 / 20:12	06:05 / 20:41	05:58 / 20:59
24	07:42 / 17:35	16:31-17:10/39	07:08 / 18:11	16:20-17:28/68	06:25 / 18:42		06:37 / 20:13	06:04 / 20:42	05:58 / 20:59
25	07:42 / 17:36	16:31-17:12/41	07:07 / 18:13	16:21-17:27/66	06:23 / 18:43		06:35 / 20:14	06:04 / 20:43	05:58 / 20:59
26	07:41 / 17:37	16:29-17:13/44	07:06 / 18:14	16:21-17:26/65	06:22 / 18:44		06:34 / 20:15	06:03 / 20:44	05:58 / 20:59
27	07:40 / 17:38	16:28-17:14/46	07:04 / 18:15	16:22-17:26/64	06:20 / 18:45		06:33 / 20:16	06:02 / 20:45	05:59 / 20:59
28	07:39 / 17:39	16:27-17:15/48	07:03 / 18:16	16:22-17:24/62	06:18 / 18:46		06:31 / 20:17	06:02 / 20:46	05:59 / 20:59
29	07:39 / 17:41	16:26-17:16/50			07:17 / 19:47		06:30 / 20:18	06:01 / 20:46	06:00 / 20:59
30	07:38 / 17:42	16:26-17:19/53			07:15 / 19:48		06:29 / 20:19	06:01 / 20:47	06:00 / 20:59
31	07:37 / 17:43	16:25-17:20/55			07:13 / 19:49			06:00 / 20:48	
Potential sun hours	300		299		370		397	446	449
Sum of minutes with flicker	654		1876		508		0	0	0

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

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

Project:
Progetto_Sorgenia Seneghe-Narbolia

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:
08/04/2024 16:23/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20240408WTG: SE02 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (85)
Assumptions for shadow calculations

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

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

Operational time

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

Day	July	August	September	October	November	December
1	06:00 / 20:59	06:23 / 20:41	06:53 / 19:59	07:22 / 19:10	06:54 15:50-16:58/68 / 17:25	07:28 16:29-16:37/8 / 17:02
2	06:01 / 20:59	06:24 / 20:40	06:54 / 19:58	07:23 17:22-17:40/18 / 19:09	06:56 15:50-16:58/68 / 17:24	07:29 16:29-16:36/7 / 17:01
3	06:01 / 20:59	06:25 / 20:39	06:55 / 19:56	07:24 17:17-17:44/27 / 19:07	06:57 15:50-16:57/67 / 17:23	07:30 16:29-16:36/7 / 17:01
4	06:02 / 20:59	06:26 / 20:38	06:56 / 19:55	07:25 17:14-17:46/32 / 19:05	06:58 15:50-16:56/66 / 17:21	07:31 16:29-16:36/7 / 17:01
5	06:02 / 20:59	06:27 / 20:37	06:57 / 19:53	07:26 17:11-17:49/38 / 19:04	06:59 15:51-16:56/65 / 17:20	07:32 16:30-16:36/6 / 17:01
6	06:03 / 20:58	06:28 / 20:36	06:58 / 19:51	07:27 17:08-17:50/42 / 19:02	07:00 15:52-16:56/64 / 17:19	07:33 16:30-16:36/6 / 17:01
7	06:04 / 20:58	06:29 / 20:35	06:59 / 19:50	07:28 17:06-17:52/46 / 19:01	07:01 15:53-16:55/62 / 17:18	07:34 16:30-16:36/6 / 17:01
8	06:04 / 20:58	06:30 / 20:33	07:00 / 19:48	07:29 17:04-17:53/49 / 18:59	07:02 15:53-16:53/60 / 17:17	07:35 16:31-16:36/5 / 17:01
9	06:05 / 20:58	06:31 / 20:32	07:01 / 19:47	07:30 17:02-17:54/52 / 18:57	07:04 15:54-16:52/58 / 17:16	07:36 16:31-16:36/5 / 17:01
10	06:06 / 20:57	06:32 / 20:31	07:01 / 19:45	07:31 17:00-17:55/55 / 18:56	07:05 15:55-16:52/57 / 17:15	07:37 16:32-16:36/4 / 17:01
11	06:06 / 20:57	06:33 / 20:30	07:02 / 19:43	07:32 17:00-17:57/57 / 18:54	07:06 15:56-16:51/55 / 17:14	07:37 16:33-16:36/3 / 17:01
12	06:07 / 20:56	06:34 / 20:28	07:03 / 19:42	07:33 16:58-17:57/59 / 18:53	07:07 15:57-16:49/52 / 17:13	07:38 16:32-16:35/3 / 17:01
13	06:08 / 20:56	06:35 / 20:27	07:04 / 19:40	07:34 16:57-17:58/61 / 18:51	07:08 15:58-16:48/50 / 17:12	07:39 16:33-16:36/3 / 17:01
14	06:08 / 20:55	06:36 / 20:26	07:05 / 19:38	07:35 16:56-17:58/62 / 18:50	07:09 16:00-16:48/48 / 17:11	07:40 16:34-16:36/2 / 17:01
15	06:09 / 20:55	06:37 / 20:24	07:06 / 19:37	07:36 16:54-17:59/65 / 18:48	07:11 16:01-16:47/46 / 17:11	07:41 16:35-16:37/2 / 17:01
16	06:10 / 20:54	06:38 / 20:23	07:07 / 19:35	07:37 16:53-17:59/66 / 18:47	07:12 16:02-16:46/44 / 17:10	07:41 16:34-16:36/2 / 17:02
17	06:11 / 20:54	06:39 / 20:22	07:08 / 19:33	07:38 16:52-17:59/67 / 18:45	07:13 16:04-16:45/41 / 17:09	07:42 16:35-16:37/2 / 17:02
18	06:11 / 20:53	06:40 / 20:20	07:09 / 19:32	07:39 16:52-17:59/67 / 18:44	07:14 16:05-16:44/39 / 17:08	07:43 16:36-16:37/1 / 17:02
19	06:12 / 20:52	06:41 / 20:19	07:10 / 19:30	07:40 16:51-17:59/68 / 18:42	07:15 16:08-16:44/36 / 17:08	07:43 16:36-16:37/1 / 17:03
20	06:13 / 20:52	06:42 / 20:17	07:11 / 19:28	07:41 16:50-17:59/69 / 18:41	07:16 16:09-16:42/33 / 17:07	07:44 16:37-16:38/1 / 17:03
21	06:14 / 20:51	06:42 / 20:16	07:12 / 19:27	07:42 16:50-18:00/70 / 18:39	07:17 16:12-16:40/28 / 17:06	07:44 16:37-16:38/1 / 17:04
22	06:15 / 20:50	06:43 / 20:15	07:13 / 19:25	07:43 16:50-18:00/70 / 18:38	07:18 16:14-16:40/26 / 17:06	07:45 16:38-16:39/1 / 17:04
23	06:15 / 20:49	06:44 / 20:13	07:14 / 19:23	07:44 16:49-18:00/71 / 18:37	07:20 16:17-16:40/23 / 17:05	07:45 16:38-16:39/1 / 17:05
24	06:16 / 20:49	06:45 / 20:12	07:15 / 19:22	07:45 16:49-18:00/71 / 18:35	07:21 16:22-16:41/19 / 17:04	07:46 16:38-16:39/1 / 17:05
25	06:17 / 20:48	06:46 / 20:10	07:16 / 19:20	06:47 15:48-17:00/72 / 17:34	07:22 16:31-16:40/9 / 17:04	07:46 16:39-16:40/1 / 17:06
26	06:18 / 20:47	06:47 / 20:09	07:17 / 19:18	06:48 15:48-16:59/71 / 17:33	07:23 16:30-16:39/9 / 17:03	07:47 16:39-16:41/2 / 17:06
27	06:19 / 20:46	06:48 / 20:07	07:18 / 19:17	06:49 15:49-17:00/71 / 17:31	07:24 16:30-16:39/9 / 17:03	07:47 16:39-16:41/2 / 17:07
28	06:20 / 20:45	06:49 / 20:06	07:19 / 19:15	06:50 15:49-16:59/70 / 17:30	07:25 16:29-16:38/9 / 17:03	07:47 16:40-16:42/2 / 17:08
29	06:21 / 20:44	06:50 / 20:04	07:20 / 19:13	06:51 15:49-16:59/70 / 17:29	07:26 16:29-16:38/9 / 17:02	07:48 16:41-16:43/2 / 17:08
30	06:22 / 20:43	06:51 / 20:03	07:21 / 19:12	06:52 15:49-16:58/69 / 17:27	07:27 16:29-16:37/8 / 17:02	07:48 16:41-16:43/2 / 17:09
31	06:23 / 20:42	06:52 / 20:01		06:53 15:49-16:58/69 / 17:26		07:48 16:41-16:44/3 / 17:10
Potential sun hours	456	426	375	346	300	291
Sum of minutes with flicker	0	0	0	1774	1228	99

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_Sorgenia Seneghe-Narbolia

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:
08/04/2024 16:23/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20240408WTG: SE03 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (86)
Assumptions for shadow calculations

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

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

Operational time

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

	January	February	March	April	May		June
1	07:48 15:31-15:52/21 17:11	07:36 17:44	07:01 18:17	07:12 19:50	06:27 07:05-07:18/13 20:20		06:00 06:38-07:45/67 20:49
2	07:49 15:33-15:51/18 17:12	07:35 17:45	07:00 18:18	07:10 19:51	06:26 07:00-07:22/22 20:21		05:59 06:38-07:45/67 20:49
3	07:49 15:35-15:49/14 17:13	07:34 17:47	06:58 18:19	07:09 19:52	06:25 06:57-07:25/28 20:22		05:59 06:38-07:45/67 20:50
4	07:49 15:38-15:47/9 17:13	07:33 17:48	06:57 18:20	07:07 19:53	06:24 06:55-07:28/33 20:23		05:58 06:39-07:46/67 20:51
5	07:49 17:14	07:32 17:49	06:55 18:21	07:05 19:54	06:22 06:53-07:30/37 20:24		05:58 06:38-07:45/67 20:51
6	07:49 17:15	07:31 17:50	06:54 18:23	07:04 19:55	06:21 06:51-07:32/41 20:25		05:58 06:38-07:46/68 20:52
7	07:49 17:16	07:30 17:51	06:52 18:24	07:02 19:56	06:20 06:49-07:32/43 20:26		05:58 06:39-07:46/67 20:53
8	07:49 17:17	07:29 17:53	06:50 18:25	07:01 19:57	06:19 06:47-07:33/46 20:27		05:57 06:39-07:46/67 20:53
9	07:48 17:18	07:28 17:54	06:49 18:26	06:59 19:58	06:18 06:46-07:35/49 20:28		05:57 06:39-07:47/68 20:54
10	07:48 17:19	07:27 17:55	06:47 18:27	06:58 19:59	06:17 06:45-07:36/51 20:29		05:57 06:39-07:46/67 20:54
11	07:48 17:20	07:25 17:56	06:46 18:28	06:56 20:00	06:16 06:44-07:36/52 20:30		05:57 06:39-07:46/67 20:55
12	07:48 17:21	07:24 17:57	06:44 18:29	06:54 20:01	06:15 06:43-07:37/54 20:31		05:57 06:39-07:47/68 20:55
13	07:48 17:22	07:23 17:59	06:43 18:30	06:53 20:02	06:14 06:42-07:38/56 20:32		05:57 06:40-07:47/67 20:56
14	07:47 17:23	07:22 18:00	06:41 18:31	06:51 20:03	06:13 06:41-07:38/57 20:33		05:56 06:40-07:47/67 20:56
15	07:47 17:24	07:21 18:01	06:39 18:32	06:50 20:04	06:12 06:42-07:40/58 20:34		05:56 06:40-07:47/67 20:57
16	07:47 17:25	07:19 18:02	06:38 18:33	06:48 20:05	06:11 06:41-07:40/59 20:35		05:56 06:40-07:47/67 20:57
17	07:46 17:27	07:18 18:03	06:36 18:34	06:47 20:06	06:10 06:40-07:41/61 20:36		05:57 06:40-07:47/67 20:57
18	07:46 17:28	07:17 18:04	06:35 18:35	06:45 20:07	06:09 06:40-07:41/61 20:37		05:57 06:41-07:48/67 20:58
19	07:45 17:29	07:15 18:06	06:33 18:36	06:44 20:08	06:08 06:39-07:41/62 20:38		05:57 06:42-07:49/67 20:58
20	07:45 17:30	07:14 18:07	06:31 18:37	06:42 20:09	06:07 06:40-07:42/62 20:39		05:57 06:42-07:49/67 20:58
21	07:44 17:31	07:13 18:08	06:30 18:38	06:41 20:10	06:06 06:39-07:42/63 20:40		05:57 06:42-07:49/67 20:59
22	07:44 17:32	07:11 18:09	06:28 18:39	06:40 20:11	06:06 06:38-07:43/65 20:40		05:57 06:42-07:49/67 20:59
23	07:43 17:33	07:10 18:10	06:26 18:40	06:38 20:12	06:05 06:38-07:42/64 20:41		05:57 06:43-07:50/67 20:59
24	07:42 17:35	07:08 18:11	06:25 18:41	06:37 20:13	06:04 06:38-07:43/65 20:42		05:58 06:42-07:49/67 20:59
25	07:42 17:36	07:07 18:13	06:23 18:42	06:35 20:14	06:04 06:38-07:43/65 20:43		05:58 06:42-07:49/67 20:59
26	07:41 17:37	07:06 18:14	06:22 18:44	06:34 20:15	06:03 06:38-07:44/66 20:44		05:58 06:42-07:49/67 20:59
27	07:40 17:38	07:04 18:15	06:20 18:45	06:33 20:16	06:02 06:38-07:44/66 20:45		05:59 06:43-07:50/67 20:59
28	07:39 17:39	07:03 18:16	06:18 18:46	06:31 20:17	06:02 06:37-07:44/67 20:45		05:59 06:43-07:50/67 20:59
29	07:38 17:41		07:17 19:47	06:30 20:18	06:01 06:38-07:44/66 20:46		05:59 06:44-07:51/67 20:59
30	07:38 17:42		07:15 19:48	06:29 20:19	06:01 06:38-07:45/67 20:47		06:00 06:43-07:51/68 20:59
31	07:37 17:43		07:13 19:49		06:00 06:38-07:45/67 20:48		
Potential sun hours	300	299	370	397	446		449
Sum of minutes with flicker	62	0	0	0	1666		2014

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

windPRO

Project:
Progetto_Sorgenia Seneghe-Narbolia

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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
08/04/2024 16:23/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20240408WTG: SE03 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (86)
Assumptions for shadow calculations

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

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

Operational time

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

	July		August		September	October	November	December	
1	06:00	06:43-07:50/67	06:23	06:54-07:48/54	06:53	07:22	06:54	07:28	
	20:59		20:41		19:59	19:10	17:25	17:02	
2	06:01	06:44-07:51/67	06:24	06:55-07:47/52	06:54	07:23	06:56	07:29	
	20:59		20:40		19:58	19:09	17:24	17:01	
3	06:01	06:44-07:51/67	06:25	06:56-07:46/50	06:55	07:24	06:57	07:30	
	20:59		20:39		19:56	19:07	17:23	17:01	
4	06:02	06:44-07:52/68	06:26	06:57-07:45/48	06:56	07:25	06:58	07:31	
	20:59		20:38		19:55	19:05	17:21	17:01	
5	06:02	06:45-07:52/67	06:27	06:58-07:44/46	06:57	07:26	06:59	07:32	
	20:59		20:37		19:53	19:04	17:20	17:01	
6	06:03	06:45-07:52/67	06:28	07:00-07:42/42	06:58	07:27	07:00	07:33	
	20:58		20:36		19:51	19:02	17:19	17:01	
7	06:04	06:45-07:52/67	06:29	07:01-07:41/40	06:59	07:28	07:01	07:34	
	20:58		20:34		19:50	19:00	17:18	17:01	
8	06:04	06:45-07:52/67	06:30	07:02-07:38/36	07:00	07:29	07:02	07:35	15:27-15:35/8
	20:58		20:33		19:48	18:59	17:17	17:01	
9	06:05	06:45-07:53/68	06:31	07:04-07:36/32	07:00	07:30	07:04	07:36	15:24-15:38/14
	20:58		20:32		19:46	18:57	17:16	17:01	
10	06:05	06:46-07:53/67	06:32	07:06-07:33/27	07:01	07:31	07:05	07:37	15:23-15:41/18
	20:57		20:31		19:45	18:56	17:15	17:01	
11	06:06	06:45-07:53/68	06:33	07:10-07:30/20	07:02	07:32	07:06	07:37	15:23-15:42/19
	20:57		20:30		19:43	18:54	17:14	17:01	
12	06:07	06:46-07:53/67	06:34	07:15-07:24/9	07:03	07:33	07:07	07:38	15:21-15:43/22
	20:56		20:28		19:42	18:53	17:13	17:01	
13	06:08	06:47-07:53/66	06:35		07:04	07:34	07:08	07:39	15:21-15:45/24
	20:56		20:27		19:40	18:51	17:12	17:01	
14	06:08	06:46-07:53/67	06:36		07:05	07:35	07:09	07:40	15:21-15:46/25
	20:55		20:26		19:38	18:50	17:11	17:01	
15	06:09	06:47-07:53/66	06:37		07:06	07:36	07:10	07:41	15:21-15:47/26
	20:55		20:24		19:37	18:48	17:11	17:01	
16	06:10	06:47-07:53/66	06:38		07:07	07:37	07:12	07:41	15:20-15:48/28
	20:54		20:23		19:35	18:47	17:10	17:02	
17	06:11	06:48-07:54/66	06:39		07:08	07:38	07:13	07:42	15:21-15:49/28
	20:54		20:22		19:33	18:45	17:09	17:02	
18	06:11	06:47-07:53/66	06:40		07:09	07:39	07:14	07:43	15:21-15:50/29
	20:53		20:20		19:32	18:44	17:08	17:02	
19	06:12	06:48-07:53/65	06:41		07:10	07:40	07:15	07:43	15:21-15:50/29
	20:52		20:19		19:30	18:42	17:07	17:03	
20	06:13	06:48-07:53/65	06:41		07:11	07:41	07:16	07:44	15:22-15:51/29
	20:52		20:17		19:28	18:41	17:07	17:03	
21	06:14	06:49-07:53/64	06:42		07:12	07:42	07:17	07:44	15:21-15:51/30
	20:51		20:16		19:27	18:39	17:06	17:04	
22	06:15	06:49-07:53/64	06:43		07:13	07:43	07:18	07:45	15:22-15:52/30
	20:50		20:15		19:25	18:38	17:06	17:04	
23	06:15	06:49-07:52/63	06:44		07:14	07:44	07:20	07:45	15:23-15:52/29
	20:49		20:13		19:23	18:37	17:05	17:05	
24	06:16	06:49-07:52/63	06:45		07:15	07:45	07:21	07:46	15:23-15:52/29
	20:49		20:12		19:22	18:35	17:04	17:05	
25	06:17	06:50-07:52/62	06:46		07:16	06:47	07:22	07:46	15:24-15:53/29
	20:48		20:10		19:20	17:34	17:04	17:06	
26	06:18	06:51-07:51/60	06:47		07:17	06:48	07:23	07:47	15:24-15:53/29
	20:47		20:09		19:18	17:32	17:03	17:06	
27	06:19	06:51-07:51/60	06:48		07:18	06:49	07:24	07:47	15:25-15:53/28
	20:46		20:07		19:17	17:31	17:03	17:07	
28	06:20	06:52-07:51/59	06:49		07:19	06:50	07:25	07:47	15:27-15:53/26
	20:45		20:06		19:15	17:30	17:03	17:08	
29	06:21	06:53-07:50/57	06:50		07:20	06:51	07:26	07:48	15:28-15:53/25
	20:44		20:04		19:13	17:29	17:02	17:08	
30	06:22	06:52-07:49/57	06:51		07:21	06:52	07:27	07:48	15:28-15:53/25
	20:43		20:02		19:12	17:27	17:02	17:09	
31	06:23	06:53-07:48/55	06:52			06:53		07:48	15:30-15:52/22
	20:42		20:01			17:26		17:10	
Potential sun hours	456		426		375	346	300	291	
Sum of minutes with flicker		1998		456	0	0	0	601	

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

windPRO

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Progetto_Sorgenia Seneghe-Narbolia

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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
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SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20240408WTG: SE04 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (87)
Assumptions for shadow calculations

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

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

Operational time

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48 17:11	07:36 17:44	07:01 18:17	07:12 19:50	06:27 19:10-19:39/29 20:20	06:00 19:06-19:46/40 20:49	06:00 19:15-19:48/33 20:59	06:23 19:12-19:57/45 20:41	06:53 19:59	07:22 19:10	06:54 17:25	07:28 17:02
2	07:49 17:12	07:35 17:45	07:00 18:18	07:10 19:51	06:26 19:09-19:40/31 20:21	05:59 19:06-19:45/39 20:49	06:01 19:16-19:49/33 20:59	06:24 19:12-19:56/44 20:40	06:54 19:58	07:23 19:09	06:56 17:24	07:29 17:01
3	07:49 17:13	07:34 17:47	06:58 18:19	07:09 19:52	06:25 19:07-19:42/35 20:22	05:59 19:07-19:45/38 20:50	06:01 19:15-19:49/34 20:59	06:25 19:13-19:56/43 20:39	06:55 19:56	07:24 19:07	06:57 17:23	07:30 17:01
4	07:49 17:13	07:33 17:48	06:57 18:20	07:07 19:53	06:24 19:06-19:43/37 20:23	05:58 19:08-19:45/37 20:51	06:02 19:15-19:50/35 20:59	06:26 19:13-19:56/43 20:38	06:56 19:55	07:25 19:05	06:58 17:21	07:31 17:01
5	07:49 17:14	07:32 17:49	06:55 18:21	07:05 19:54	06:22 19:06-19:44/38 20:24	05:58 19:08-19:44/36 20:51	06:02 19:15-19:50/35 20:59	06:27 19:14-19:55/41 20:37	06:57 19:53	07:26 19:04	06:59 17:20	07:32 17:01
6	07:49 17:15	07:31 17:50	06:54 18:23	07:04 19:55	06:21 19:05-19:44/39 20:25	05:58 19:09-19:45/36 20:52	06:03 19:15-19:51/36 20:58	06:28 19:14-19:55/41 20:36	06:58 19:51	07:27 19:02	07:00 17:19	07:33 17:01
7	07:49 17:16	07:30 17:51	06:52 18:24	07:02 19:56	06:20 19:03-19:44/41 20:26	05:58 19:09-19:45/36 20:53	06:04 19:15-19:52/37 20:58	06:29 19:15-19:54/39 20:35	06:59 19:50	07:28 19:00	07:01 17:18	07:34 17:01
8	07:49 17:17	07:29 17:53	06:51 18:25	07:01 19:57	06:19 19:03-19:45/42 20:27	05:57 19:10-19:45/35 20:53	06:04 19:14-19:51/37 20:58	06:30 19:15-19:52/37 20:33	07:00 19:48	07:29 18:59	07:02 17:17	07:35 17:01
9	07:48 17:18	07:28 17:54	06:49 18:26	06:59 19:58	06:18 19:02-19:45/43 20:28	05:57 19:11-19:45/34 20:54	06:05 19:15-19:52/37 20:58	06:31 19:15-19:51/36 20:32	07:01 19:47	07:30 18:57	07:04 17:16	07:36 17:01
10	07:48 17:19	07:27 17:55	06:47 18:27	06:58 19:59	06:17 19:02-19:46/44 20:29	05:57 19:10-19:44/34 20:54	06:05 19:15-19:53/38 20:57	06:32 19:16-19:50/34 20:31	07:01 19:45	07:31 18:56	07:05 17:15	07:37 17:01
11	07:48 17:20	07:25 17:56	06:46 18:28	06:56 20:00	06:16 19:02-19:46/44 20:30	05:57 19:11-19:44/33 20:57	06:06 19:14-19:53/39 20:57	06:33 19:18-19:49/31 20:30	07:02 19:43	07:32 18:54	07:06 17:14	07:37 17:01
12	07:48 17:21	07:24 17:57	06:44 18:29	06:54 20:01	06:15 19:01-19:46/45 20:31	05:57 19:11-19:44/33 20:56	06:07 19:14-19:54/40 20:56	06:34 19:19-19:47/28 20:28	07:03 19:42	07:33 18:53	07:07 17:13	07:38 17:01
13	07:48 17:22	07:23 17:59	06:43 18:30	06:53 20:02	06:14 19:01-19:46/45 20:32	05:56 19:12-19:44/32 20:56	06:08 19:14-19:54/40 20:56	06:35 19:21-19:45/24 20:27	07:04 19:40	07:34 18:51	07:08 17:12	07:39 17:01
14	07:47 17:23	07:22 18:00	06:41 18:31	06:51 20:03	06:13 19:01-19:46/45 20:33	05:56 19:12-19:44/32 20:55	06:08 19:13-19:54/41 20:55	06:36 19:23-19:43/20 20:26	07:05 19:38	07:35 18:50	07:09 17:11	07:40 17:01
15	07:47 17:24	07:21 18:01	06:39 18:32	06:50 20:04	06:12 19:02-19:47/45 20:34	05:56 19:13-19:44/31 20:55	06:09 19:13-19:55/42 20:54	06:37 19:26-19:39/13 20:24	07:06 19:37	07:36 18:48	07:11 17:11	07:41 17:01
16	07:47 17:25	07:19 18:02	06:38 18:33	06:48 20:05	06:11 19:01-19:47/46 20:35	05:56 19:13-19:44/31 20:57	06:10 19:13-19:56/43 20:54	06:38	07:07 19:35	07:37 18:47	07:12 17:10	07:41 17:02
17	07:46 17:27	07:18 18:03	06:36 18:34	06:47 20:06	06:10 19:01-19:47/46 20:36	05:57 19:13-19:44/31 20:57	06:11 19:13-19:56/43 20:54	06:39 20:22	07:08 19:33	07:38 18:45	07:13 17:09	07:42 17:02
18	07:46 17:28	07:17 18:05	06:35 18:35	06:45 20:07	06:09 19:01-19:47/46 20:37	05:57 19:14-19:44/30 20:58	06:11 19:12-19:56/44 20:53	06:40 20:20	07:09 19:32	07:39 18:44	07:14 17:08	07:43 17:02
19	07:45 17:29	07:15 18:06	06:33 18:36	06:44 20:08	06:08 19:01-19:47/46 20:38	05:57 19:15-19:45/30 20:58	06:12 19:12-19:56/44 20:52	06:41 20:19	07:10 19:30	07:40 18:42	07:15 17:07	07:43 17:03
20	07:45 17:30	07:14 18:07	06:31 18:37	06:42 20:09	06:07 19:01-19:47/46 20:39	05:57 19:15-19:45/30 20:58	06:13 19:12-19:57/45 20:52	06:41 20:17	07:11 19:28	07:41 18:41	07:16 17:07	07:44 17:03
21	07:44 17:31	07:13 18:08	06:30 18:38	06:41 20:10	06:06 19:02-19:47/45 20:40	05:57 19:15-19:45/30 20:59	06:14 19:12-19:57/45 20:51	06:42 20:16	07:12 19:27	07:42 18:39	07:17 17:06	07:44 17:04
22	07:44 17:32	07:11 18:09	06:28 18:39	06:40 20:11	06:06 19:02-19:47/45 20:40	05:57 19:15-19:45/30 20:59	06:15 19:11-19:57/46 20:50	06:43 20:15	07:13 19:25	07:43 18:38	07:18 17:06	07:45 17:04
23	07:43 17:33	07:10 18:10	06:26 18:40	06:38 20:12	06:05 19:02-19:46/44 20:41	05:57 19:15-19:45/30 20:59	06:15 19:12-19:57/45 20:49	06:44 20:13	07:14 19:23	07:44 18:37	07:20 17:05	07:45 17:05
24	07:42 17:35	07:08 18:11	06:25 18:41	06:37 20:13	06:04 19:03-19:47/44 20:42	05:58 19:16-19:46/30 20:59	06:16 19:12-19:57/45 20:49	06:45 20:12	07:15 19:22	07:45 18:35	07:21 17:04	07:46 17:05
25	07:42 17:36	07:07 18:13	06:23 18:43	06:35 20:14	06:04 19:03-19:46/43 20:43	05:58 19:16-19:46/30 20:59	06:17 19:12-19:57/45 20:48	06:46 20:10	07:16 19:20	06:47 17:34	07:22 17:04	07:46 17:06
26	07:41 17:37	07:06 18:14	06:22 18:44	06:34 20:15	06:03 19:04-19:47/43 20:44	05:58 19:15-19:46/31 20:59	06:18 19:12-19:58/46 20:47	06:47 20:09	07:17 19:18	06:48 17:32	07:23 17:03	07:47 17:06
27	07:40 17:38	07:04 18:15	06:20 18:45	06:33 20:16	06:02 19:04-19:46/42 20:45	05:59 19:16-19:47/31 20:59	06:19 19:12-19:58/46 20:46	06:48 20:07	07:18 19:17	06:49 17:31	07:24 17:03	07:47 17:07
28	07:39 17:39	07:03 18:16	06:18 18:47	06:31 19:18-19:32/14 20:17	06:02 19:04-19:46/42 20:46	05:59 19:16-19:47/31 20:45	06:20 19:12-19:58/46 20:45	06:49 20:06	07:19 19:15	06:50 17:30	07:25 17:03	07:47 17:08
29	07:39 17:41		07:17 19:47	06:30 19:15-19:36/21 20:18	06:01 19:05-19:46/41 20:46	05:59 19:16-19:48/32 20:44	06:21 19:11-19:57/46 20:44	06:50 20:04	07:20 19:13	06:51 17:29	07:26 17:02	07:48 17:08
30	07:38 17:42		07:15 19:48	06:29 19:13-19:38/25 20:19	06:01 19:05-19:45/40 20:47	06:00 19:16-19:48/32 20:59	06:22 19:11-19:57/46 20:43	06:51 20:02	07:21 19:12	06:52 17:27	07:27 17:02	07:48 17:09
31	07:37 17:43		07:13 19:49		06:00 19:05-19:46/41 20:48		06:23 19:12-19:57/45 20:42	06:52 20:01		06:53 17:26		07:48 17:10
Potential sun hours	300	299	370	397	446	449	456	426	375	346	300	291
Sum of minutes with flicker	0	0	0	60	1303	985	1277	519	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

Project:
Progetto_Sorgenia Seneghe-Narbolia

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:
08/04/2024 16:23/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20240408WTG: SE06 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (88)
Assumptions for shadow calculations

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

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

Operational time

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

	January		February	March		April		May	June
1	07:48	16:08-16:45/37	07:36	07:01		07:12	18:58-19:27/29	06:27	06:00
	17:11		17:44	18:17		19:50		20:20	20:49
2	07:49	16:08-16:46/38	07:35	07:00		07:10	18:57-19:27/30	06:26	05:59
	17:12		17:45	18:18		19:51		20:21	20:49
3	07:49	16:09-16:46/37	07:34	06:58		07:09	18:56-19:28/32	06:25	05:59
	17:13		17:47	18:19		19:52		20:22	20:50
4	07:49	16:09-16:47/38	07:33	06:57		07:07	18:55-19:28/33	06:24	05:59
	17:13			18:20		19:53		20:23	20:51
5	07:49	16:10-16:47/37	07:32	06:55		07:05	18:55-19:28/33	06:23	05:58
	17:14			18:22		19:54		20:24	20:51
6	07:49	16:11-16:47/36	07:31	06:54		07:04	18:54-19:28/34	06:21	05:58
	17:15			18:23		19:55		20:25	20:52
7	07:49	16:11-16:48/37	07:30	06:52		07:02	18:53-19:27/34	06:20	05:58
	17:16		17:52	18:24		19:56		20:26	20:53
8	07:49	16:12-16:48/36	07:29	06:51		07:01	18:54-19:27/33	06:19	05:57
	17:17		17:53	18:25		19:57		20:27	20:53
9	07:48	16:13-16:48/35	07:28	06:49		06:59	18:53-19:27/34	06:18	05:57
	17:18		17:54	18:26		19:58		20:28	20:54
10	07:48	16:14-16:49/35	07:27	06:47		06:58	18:54-19:26/32	06:17	05:57
	17:19		17:55	18:27		19:59		20:29	20:54
11	07:48	16:14-16:48/34	07:25	06:46		06:56	18:54-19:25/31	06:16	05:57
	17:20		17:56	18:28		20:00		20:30	20:55
12	07:48	16:15-16:48/33	07:24	06:44		06:54	18:54-19:25/31	06:15	05:55
	17:21		17:58	18:29		20:01		20:31	20:55
13	07:48	16:17-16:48/31	07:23	06:43		06:53	18:55-19:23/28	06:14	05:57
	17:22		17:59	18:30		20:02		20:32	20:56
14	07:47	16:17-16:48/31	07:22	06:41		06:51	18:56-19:23/27	06:13	05:57
	17:23		18:00	18:31		20:03		20:33	20:56
15	07:47	16:19-16:48/29	07:21	06:39		06:50	18:56-19:21/25	06:12	05:57
	17:24		18:01	18:32		20:04		20:34	20:57
16	07:47	16:19-16:47/28	07:19	06:38		06:48	18:58-19:19/21	06:11	05:57
	17:26		18:02	18:33		20:05		20:35	20:57
17	07:46	16:21-16:47/26	07:18	06:36		06:47	18:59-19:16/17	06:10	05:57
	17:27		18:03	18:34		20:06		20:36	20:57
18	07:46	16:22-16:45/23	07:17	06:35		06:45	19:03-19:14/11	06:09	05:57
	17:28		18:05	18:35		20:07		20:37	20:58
19	07:45	16:24-16:45/21	07:15	06:33		06:44		06:08	05:57
	17:29		18:06	18:36		20:08		20:38	20:58
20	07:45	16:25-16:44/19	07:14	06:31		06:42		06:07	05:57
	17:30		18:07	18:37		20:09		20:39	20:58
21	07:44	16:28-16:42/14	07:13	06:30		06:41		06:07	05:57
	17:31		18:08	18:38		20:10		20:40	20:59
22	07:44	16:32-16:39/7	07:11	06:28		06:40		06:06	05:57
	17:32		18:09	18:39		20:11		20:40	20:59
23	07:43		07:10	06:27		06:38		06:05	05:58
	17:34		18:10	18:41		20:12		20:41	20:59
24	07:42		07:08	06:25		06:37		06:04	05:58
	17:35		18:11	18:42		20:13		20:42	20:59
25	07:42		07:07	06:23		06:35		06:04	05:58
	17:36		18:13	18:43		20:14		20:43	20:59
26	07:41		07:06	06:22		06:34		06:03	05:58
	17:37		18:14	18:44		20:15		20:44	20:59
27	07:40		07:04	06:20		06:33		06:02	05:59
	17:38		18:15	18:45		20:16		20:45	20:59
28	07:39		07:03	06:18	18:07-18:21/14	06:31		06:02	05:59
	17:39		18:16	18:46		20:17		20:46	20:59
29	07:39			07:17	19:04-19:23/19	06:30		06:01	06:00
	17:41			19:47		20:18		20:46	20:59
30	07:38			07:15	19:01-19:25/24	06:29		06:01	06:00
	17:42			19:48		20:19		20:47	20:59
31	07:37			07:14	19:00-19:26/26			06:00	
	17:43			19:49				20:48	
Potential sun hours	300		299	370		397		446	449
Sum of minutes with flicker	662		0	83		515		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_Sorgenia Seneghe-Narbolia

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:
08/04/2024 16:23/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20240408WTG: SE06 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (88)
Assumptions for shadow calculations

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

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

Operational time

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

Day	July	August	September	October	November	December
1	06:00 / 20:59	06:24 / 20:41	06:53 18:52-19:24/32 / 19:59	07:22 / 19:10	06:54 / 17:25	07:28 15:56-16:30/34 / 17:02
2	06:01 / 20:59	06:24 / 20:40	06:54 18:52-19:24/32 / 19:58	07:23 / 19:09	06:56 / 17:24	07:29 15:56-16:31/35 / 17:01
3	06:01 / 20:59	06:25 / 20:39	06:55 18:51-19:25/34 / 19:56	07:24 / 19:07	06:57 / 17:23	07:30 15:56-16:31/35 / 17:01
4	06:02 / 20:59	06:26 / 20:38	06:56 18:51-19:24/33 / 19:55	07:25 / 19:05	06:58 / 17:21	07:31 15:56-16:32/36 / 17:01
5	06:02 / 20:59	06:27 / 20:37	06:57 18:50-19:24/34 / 19:53	07:26 / 19:04	06:59 / 17:20	07:32 15:57-16:33/36 / 17:01
6	06:03 / 20:58	06:28 / 20:36	06:58 18:50-19:24/34 / 19:51	07:27 / 19:02	07:00 / 17:19	07:33 15:57-16:33/36 / 17:01
7	06:04 / 20:58	06:29 / 20:35	06:59 18:50-19:23/33 / 19:50	07:28 / 19:01	07:01 / 17:18	07:34 15:57-16:34/37 / 17:01
8	06:04 / 20:58	06:30 / 20:33	07:00 18:50-19:23/33 / 19:48	07:29 / 18:59	07:02 / 17:17	07:35 15:57-16:35/38 / 17:01
9	06:05 / 20:58	06:31 / 20:32	07:01 18:50-19:22/32 / 19:47	07:30 / 18:57	07:04 / 17:16	07:36 15:58-16:35/37 / 17:01
10	06:06 / 20:57	06:32 / 20:31	07:02 18:51-19:21/30 / 19:45	07:31 / 18:56	07:05 / 17:15	07:37 15:58-16:36/38 / 17:01
11	06:06 / 20:57	06:33 / 20:30	07:02 18:50-19:19/29 / 19:43	07:32 / 18:54	07:06 / 17:14	07:37 15:59-16:36/37 / 17:01
12	06:07 / 20:56	06:34 / 20:28	07:03 18:51-19:18/27 / 19:42	07:33 / 18:53	07:07 / 17:13	07:38 15:58-16:35/37 / 17:01
13	06:08 / 20:56	06:35 / 20:27	07:04 18:52-19:16/24 / 19:40	07:34 / 18:51	07:08 / 17:12	07:39 15:59-16:36/37 / 17:01
14	06:08 / 20:55	06:36 / 20:26	07:05 18:54-19:14/20 / 19:38	07:35 / 18:50	07:09 / 17:11	07:40 15:59-16:36/37 / 17:01
15	06:09 / 20:55	06:37 / 20:24	07:06 18:56-19:11/15 / 19:37	07:36 / 18:48	07:11 / 17:11	07:41 16:00-16:37/37 / 17:01
16	06:10 / 20:54	06:38 / 20:23	07:07 19:00-19:06/6 / 19:35	07:37 / 18:47	07:12 / 17:10	07:41 16:00-16:36/36 / 17:02
17	06:11 / 20:54	06:39 / 20:22	07:08 / 19:33	07:38 / 18:45	07:13 / 17:09	07:42 16:01-16:37/36 / 17:02
18	06:11 / 20:53	06:40 / 20:20	07:09 / 19:32	07:39 / 18:44	07:14 / 17:08	07:43 16:02-16:37/35 / 17:02
19	06:12 / 20:52	06:41 / 20:19	07:10 / 19:30	07:40 / 18:42	07:15 / 17:08	07:43 16:01-16:37/36 / 17:03
20	06:13 / 20:52	06:42 / 20:17	07:11 / 19:28	07:41 / 18:41	07:16 16:07-16:14/7 / 17:07	07:44 16:02-16:38/36 / 17:03
21	06:14 / 20:51	06:43 / 20:16	07:12 / 19:27	07:42 / 18:39	07:17 16:03-16:17/14 / 17:06	07:44 16:02-16:38/36 / 17:04
22	06:15 / 20:50	06:43 / 20:15	07:13 / 19:25	07:43 / 18:38	07:19 16:01-16:20/19 / 17:06	07:45 16:03-16:39/36 / 17:04
23	06:15 / 20:49	06:44 / 20:13	07:14 / 19:23	07:44 / 18:37	07:20 16:00-16:21/21 / 17:05	07:45 16:03-16:39/36 / 17:05
24	06:16 / 20:49	06:45 / 20:12	07:15 / 19:22	07:45 / 18:35	07:21 16:00-16:23/23 / 17:04	07:46 16:04-16:40/36 / 17:05
25	06:17 / 20:48	06:46 19:05-19:17/12 / 20:10	07:16 / 19:20	06:47 / 17:34	07:22 15:59-16:25/26 / 17:04	07:46 16:04-16:40/36 / 17:06
26	06:18 / 20:47	06:47 19:02-19:19/17 / 20:09	07:17 / 19:18	06:48 / 17:33	07:23 15:58-16:26/28 / 17:04	07:47 16:05-16:41/36 / 17:06
27	06:19 / 20:46	06:48 19:00-19:21/21 / 20:07	07:18 / 19:17	06:49 / 17:31	07:24 15:58-16:27/29 / 17:03	07:47 16:05-16:41/36 / 17:07
28	06:20 / 20:45	06:49 18:58-19:23/25 / 20:06	07:19 / 19:15	06:50 / 17:30	07:25 15:57-16:28/31 / 17:03	07:47 16:06-16:42/36 / 17:08
29	06:21 / 20:44	06:50 18:57-19:24/27 / 20:04	07:20 / 19:13	06:51 / 17:29	07:26 15:57-16:28/31 / 17:02	07:48 16:06-16:43/37 / 17:08
30	06:22 / 20:43	06:51 18:55-19:24/29 / 20:03	07:21 / 19:12	06:52 / 17:27	07:27 15:57-16:29/32 / 17:02	07:48 16:07-16:43/36 / 17:09
31	06:23 / 20:42	06:52 18:53-19:24/31 / 20:01		06:53 / 17:26		07:48 16:07-16:44/37 / 17:10
Potential sun hours	456	426	375	346	300	291
Sum of minutes with flicker	0	162	448	0	261	1124

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_20240408WTG: SE07 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (89)
Assumptions for shadow calculations

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

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

Operational time

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:36	07:01	07:12	06:28	06:00	06:00	06:24	06:53	07:22	06:54	07:28
	17:11	17:44	18:17	19:50	20:20	20:49	20:59	20:41	19:59	19:10	17:25	17:02
2	07:49	07:35	07:00	07:10	06:26	05:59	06:01	06:25	06:54	07:23	06:56	07:29
	17:12	17:46	18:18	19:51	20:21	20:49	20:59	20:40	19:58	19:09	17:24	17:01
3	07:49	07:34	06:58	07:09	06:25	05:59	06:01	06:25	06:55	07:24	06:57	07:30
	17:13	17:47	18:19	19:52	20:22	20:50	20:59	20:39	19:56	19:07	17:23	17:01
4	07:49	07:33	06:57	07:07	06:24	05:59	06:02	06:26	06:56	07:25	06:58	07:31
	17:14	17:48	18:20	19:53	20:23	20:51	20:59	20:38	19:55	19:05	17:22	17:01
5	07:49	07:32	06:55	07:06	06:23	05:58	06:03	06:27	06:57	07:26	06:59	07:32
	17:14	17:49	18:22	19:54	20:24	20:51	20:59	20:37	19:53	19:04	17:20	17:01
6	07:49	07:31	06:54	07:04	06:21	05:58	06:03	06:28	06:58	07:27	07:00	07:33
	17:15	17:50	18:23	19:55	20:25	20:52	20:59	20:36	19:51	19:02	17:19	17:01
7	07:49	07:30	06:52	07:02	06:20	05:58	06:04	06:29	06:59	07:28	07:01	07:34
	17:16	17:52	18:24	19:56	20:26	20:53	20:58	20:35	19:50	19:01	17:18	17:01
8	07:49	07:29	06:51	07:01	06:19	05:57	06:04	06:30	07:00	07:29	07:02	07:35
	17:17	17:53	18:25	19:57	20:27	20:53	20:58	20:33	19:48	18:59	17:17	17:01
9	07:48	07:28	06:49	06:59	06:18	05:57	06:05	06:31	07:01	07:30	07:04	07:36
	17:18	17:54	18:26	19:58	20:28	20:54	20:58	20:32	19:47	18:57	17:16	17:01
10	07:48	07:27	06:47	06:58	06:17	05:57	06:06	06:32	07:02	07:31	07:05	07:37
	17:19	17:55	18:27	19:59	20:29	20:54	20:57	20:31	19:45	18:56	17:15	17:01
11	07:48	07:25	06:46	06:56	06:16	05:57	06:06	06:33	07:03	07:32	07:06	07:38
	17:20	17:56	18:28	20:00	20:30	20:55	20:57	20:30	19:43	18:54	17:14	17:01
12	07:48	07:24	06:44	06:55	06:15	05:57	06:07	06:34	07:03	07:33	07:07	07:38
	17:21	17:58	18:29	20:01	20:31	20:55	20:56	20:28	19:42	18:53	17:13	17:01
13	07:48	07:23	06:43	06:53	06:14	05:57	06:08	06:35	07:04	07:34	07:08	07:39
	17:22	17:59	18:30	20:02	20:32	20:56	20:56	20:27	19:40	18:51	17:12	17:01
14	07:47	07:22	06:41	06:51	06:13	05:57	06:08	06:36	07:05	07:35	07:09	07:40
	17:23	18:00	18:31	20:03	20:33	20:56	20:55	20:26	19:38	18:50	17:12	17:01
15	07:47	07:21	06:40	06:50	06:12	05:57	06:09	06:37	07:06	07:36	07:11	07:41
	17:24	18:01	18:32	20:04	20:34	20:57	20:55	20:24	19:37	18:48	17:11	17:02
16	07:47	07:19	06:38	06:48	06:11	05:57	06:10	06:38	07:07	07:37	07:12	07:41
	17:26	18:02	18:33	20:05	20:35	20:57	20:54	20:23	19:35	18:47	17:10	17:02
17	07:46	07:18	06:36	06:47	06:10	05:57	06:11	06:39	07:08	07:38	07:13	07:42
	17:27	18:03	18:34	20:06	20:36	20:57	20:54	20:22	19:33	18:45	17:09	17:02
18	07:46	07:17	06:35	06:45	06:09	05:57	06:11	06:40	07:09	07:39	07:14	07:43
	17:28	18:05	18:35	20:07	20:37	20:58	20:53	20:20	19:32	18:44	17:08	17:02
19	07:45	07:15	06:33	06:44	06:08	05:57	06:12	06:41	07:10	07:40	07:15	07:43
	17:29	18:06	18:36	20:08	20:38	20:58	20:52	20:19	19:30	18:42	17:08	17:03
20	07:45	07:14	06:31	06:43	06:07	05:57	06:13	06:42	07:11	07:41	07:16	07:44
	17:30	18:07	18:37	20:09	20:39	20:58	20:52	20:18	19:28	18:41	17:07	17:03
21	07:44	07:13	06:30	06:41	06:07	05:57	06:14	06:43	07:12	07:42	07:17	07:44
	17:31	18:08	18:38	20:10	20:40	20:59	20:51	20:16	19:27	18:39	17:06	17:04
22	07:44	07:11	06:28	06:40	06:06	05:57	06:15	06:44	07:13	07:43	07:19	07:45
	17:32	18:09	18:40	20:11	20:40	20:59	20:50	20:15	19:25	18:38	17:06	17:04
23	07:43	07:10	06:27	06:38	06:05	05:58	06:16	06:44	07:14	07:44	07:20	07:45
	17:34	18:10	18:41	20:12	20:41	20:59	20:49	20:13	19:23	18:37	17:05	17:05
24	07:42	07:09	06:25	06:37	06:04	05:58	06:16	06:45	07:15	07:45	07:21	07:46
	17:35	18:12	18:42	20:13	20:42	20:59	20:49	20:12	19:22	18:35	17:05	17:05
25	07:42	07:07	06:23	06:35	06:04	05:58	06:17	06:46	07:16	06:47	07:22	07:46
	17:36	18:13	18:43	20:14	20:43	20:59	20:48	20:10	19:20	17:34	17:04	17:06
26	07:41	07:06	06:22	06:34	06:03	05:58	06:18	06:47	07:17	06:48	07:23	07:47
	17:37	18:14	18:44	20:15	20:44	20:59	20:47	20:09	19:18	17:33	17:04	17:06
27	07:40	07:04	06:20	06:33	06:02	05:59	06:19	06:48	07:18	06:49	07:24	07:47
	17:38	18:15	18:45	20:16	20:45	20:59	20:46	20:07	19:17	17:31	17:03	17:07
28	07:39	07:03	06:18	06:31	06:02	05:59	06:20	06:49	07:19	06:50	07:25	07:47
	17:39	18:16	18:46	20:17	20:46	20:59	20:45	20:06	19:15	17:30	17:03	17:08
29	07:39		07:17	06:30	06:01	06:00	06:21	06:50	07:20	06:51	07:26	07:48
	17:41		19:47	20:18	20:46	20:59	20:44	20:04	19:14	17:29	17:02	17:08
30	07:38		07:15	06:29	06:01	06:00	06:22	06:51	07:21	06:52	07:27	07:48
	17:42		19:48	20:19	20:47	20:59	20:43	20:03	19:12	17:27	17:02	17:09
31	07:37		07:14		06:00		06:23	06:52		06:53		07:48
	17:43		19:49		20:48		20:42	20:01		17:26		17:10
Potential sun hours	300	299	370	397	446	449	456	426	375	346	300	291
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

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Calculated:
08/04/2024 16:23/3.4.415

SHADOW - Calendar per WTG

Calculation: Real_case_Progetto_20240408WTG: SE08 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (90)
Assumptions for shadow calculations

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

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

Operational time

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48 / 17:11	07:36 / 17:44	07:01 / 18:17	07:12 / 19:50	06:27 / 20:20	06:00 / 20:49	06:00 / 20:59	06:23 / 20:41	06:53 / 19:59	07:22 / 19:10	06:54 / 17:25	07:28 / 17:02
2	07:49 / 17:12	07:35 / 17:45	07:00 / 18:18	07:10 / 19:51	06:26 / 20:21	05:59 / 20:49	06:01 / 20:59	06:24 / 20:40	06:54 / 19:58	07:23 / 19:08	06:56 / 17:24	07:29 / 17:01
3	07:49 / 17:12	07:34 / 17:47	06:58 / 18:19	07:09 / 19:52	06:25 / 20:22	05:59 / 20:50	06:01 / 20:59	06:25 / 20:39	06:55 / 19:56	07:24 / 19:07	06:57 / 17:22	07:30 / 17:01
4	07:49 / 17:13	07:33 / 17:48	06:57 / 18:20	07:07 / 19:53	06:24 / 20:23	05:58 / 20:51	06:02 / 20:59	06:26 / 20:38	06:56 / 19:55	07:24 / 19:05	06:58 / 17:21	07:31 / 17:01
5	07:49 / 17:14	07:32 / 17:49	06:55 / 18:21	07:05 / 19:54	06:22 / 20:24	05:58 / 20:51	06:02 / 20:59	06:27 / 20:37	06:57 / 19:53	07:25 / 19:04	06:59 / 17:20	07:32 / 17:01
6	07:49 / 17:15	07:31 / 17:50	06:54 / 18:22	07:04 / 19:55	06:21 / 20:25	05:58 / 20:52	06:03 / 20:58	06:28 / 20:36	06:58 / 19:51	07:27 / 19:02	07:00 / 17:19	07:33 / 17:01
7	07:49 / 17:16	07:30 / 17:51	06:52 / 18:24	07:02 / 19:56	06:20 / 20:26	05:57 / 20:53	06:03 / 20:58	06:29 / 20:34	06:59 / 19:50	07:28 / 19:00	07:01 / 17:18	07:34 / 17:01
8	07:49 / 17:17	07:29 / 17:53	06:50 / 18:25	07:01 / 19:57	06:19 / 20:27	05:57 / 20:53	06:04 / 20:58	06:30 / 20:33	07:00 / 19:48	07:29 / 18:59	07:02 / 17:17	07:35 / 17:01
9	07:48 / 17:18	07:28 / 17:54	06:49 / 18:26	06:59 / 19:58	06:18 / 20:28	05:57 / 20:54	06:05 / 20:58	06:31 / 20:32	07:00 / 19:46	07:30 / 18:57	07:04 / 17:16	07:36 / 17:01
10	07:48 / 17:19	07:27 / 17:55	06:47 / 18:27	06:57 / 19:59	06:17 / 20:29	05:57 / 20:54	06:05 / 20:57	06:32 / 20:31	07:01 / 19:45	07:31 / 18:56	07:05 / 17:15	07:37 / 17:01
11	07:48 / 17:20	07:25 / 17:56	06:46 / 18:28	06:56 / 20:00	06:16 / 20:30	05:57 / 20:55	06:06 / 20:57	06:33 / 20:30	07:02 / 19:43	07:32 / 18:54	07:06 / 17:14	07:37 / 17:01
12	07:48 / 17:21	07:24 / 17:57	06:44 / 18:29	06:54 / 20:01	06:15 / 20:31	05:57 / 20:55	06:07 / 20:56	06:34 / 20:28	07:03 / 19:42	07:33 / 18:53	07:07 / 17:13	07:38 / 17:01
13	07:48 / 17:22	07:23 / 17:59	06:43 / 18:30	06:53 / 20:02	06:14 / 20:32	05:56 / 20:56	06:07 / 20:56	06:35 / 20:27	07:04 / 19:40	07:34 / 18:51	07:08 / 17:12	07:39 / 17:01
14	07:47 / 17:23	07:22 / 18:00	06:41 / 18:31	06:51 / 20:03	06:13 / 20:33	05:56 / 20:56	06:08 / 20:55	06:36 / 20:26	07:05 / 19:38	07:35 / 18:50	07:09 / 17:11	07:40 / 17:01
15	07:47 / 17:24	07:21 / 18:01	06:39 / 18:32	06:50 / 20:04	06:12 / 20:34	05:56 / 20:57	06:09 / 20:55	06:37 / 20:24	07:06 / 19:37	07:36 / 18:48	07:10 / 17:10	07:41 / 17:01
16	07:47 / 17:25	07:19 / 18:02	06:38 / 18:33	06:48 / 20:05	06:11 / 20:35	05:56 / 20:57	06:10 / 20:54	06:38 / 20:23	07:07 / 19:35	07:37 / 18:47	07:12 / 17:10	07:41 / 17:02
17	07:46 / 17:27	07:18 / 18:03	06:36 / 18:34	06:47 / 20:06	06:10 / 20:36	05:56 / 20:57	06:10 / 20:54	06:39 / 20:22	07:08 / 19:33	07:38 / 18:45	07:13 / 17:09	07:42 / 17:02
18	07:46 / 17:28	07:17 / 18:04	06:35 / 18:35	06:45 / 20:07	06:09 / 20:37	05:57 / 20:58	06:11 / 20:53	06:40 / 20:20	07:09 / 19:32	07:39 / 18:44	07:14 / 17:08	07:43 / 17:02
19	07:45 / 17:29	07:15 / 18:06	06:33 / 18:36	06:44 / 20:08	06:08 / 20:38	05:57 / 20:58	06:12 / 20:52	06:40 / 20:19	07:10 / 19:30	07:40 / 18:42	07:15 / 17:07	07:43 / 17:03
20	07:45 / 17:30	07:14 / 18:07	06:31 / 18:37	06:42 / 20:09	06:07 / 20:39	05:57 / 20:58	06:13 / 20:52	06:41 / 20:17	07:11 / 19:28	07:41 / 18:41	07:16 / 17:07	07:44 / 17:03
21	07:44 / 17:31	07:13 / 18:08	06:30 / 18:38	06:41 / 20:10	06:06 / 20:40	05:57 / 20:59	06:14 / 20:51	06:42 / 20:16	07:12 / 19:27	07:42 / 18:39	07:17 / 17:06	07:44 / 17:03
22	07:44 / 17:32	07:11 / 18:09	06:28 / 18:39	06:40 / 20:11	06:06 / 20:40	05:57 / 20:59	06:15 / 20:50	06:43 / 20:15	07:13 / 19:25	07:43 / 18:38	07:18 / 17:05	07:45 / 17:04
23	07:43 / 17:33	07:10 / 18:10	06:26 / 18:40	06:38 / 20:12	06:05 / 20:41	05:57 / 20:59	06:15 / 20:49	06:44 / 20:13	07:14 / 19:23	07:44 / 18:36	07:20 / 17:05	07:45 / 17:04
24	07:42 / 17:35	07:08 / 18:11	06:25 / 18:41	06:37 / 20:13	06:04 / 20:42	05:58 / 20:59	06:16 / 20:49	06:45 / 20:12	07:15 / 19:22	07:45 / 18:35	07:21 / 17:04	07:46 / 17:05
25	07:42 / 17:36	07:07 / 18:13	06:23 / 18:42	06:35 / 20:14	06:04 / 20:43	05:58 / 20:59	06:17 / 20:48	06:46 / 20:10	07:16 / 19:20	06:47 / 17:34	07:22 / 17:04	07:46 / 17:06
26	07:41 / 17:37	07:06 / 18:14	06:22 / 18:43	06:34 / 20:15	06:03 / 20:44	05:58 / 20:59	06:18 / 20:47	06:47 / 20:09	07:17 / 19:18	06:48 / 17:32	07:23 / 17:03	07:47 / 17:06
27	07:40 / 17:38	07:04 / 18:15	06:20 / 18:45	06:33 / 20:16	06:02 / 20:45	05:59 / 20:59	06:19 / 20:46	06:48 / 20:07	07:18 / 19:17	06:49 / 17:31	07:24 / 17:03	07:47 / 17:07
28	07:39 / 17:39	07:03 / 18:16	06:18 / 18:46	06:31 / 20:17	06:02 / 20:45	05:59 / 20:59	06:20 / 20:45	06:49 / 20:06	07:19 / 19:15	06:50 / 17:30	07:25 / 17:03	07:47 / 17:08
29	07:38 / 17:41		06:17 / 19:47	06:30 / 20:18	06:01 / 20:46	05:59 / 20:59	06:21 / 20:44	06:50 / 20:04	07:20 / 19:13	06:51 / 17:29	07:26 / 17:02	07:48 / 17:08
30	07:38 / 17:42		07:15 / 19:48	06:29 / 20:19	06:01 / 20:47	06:00 / 20:59	06:22 / 20:43	06:51 / 20:02	07:21 / 19:12	06:52 / 17:27	07:27 / 17:02	07:48 / 17:09
31	07:37 / 17:43		07:13 / 19:49		06:00 / 20:48		06:22 / 20:42	06:52 / 20:01		06:53 / 17:26		07:48 / 17:10
Potential sun hours	300	299	370	397	446	449	456	426	375	346	300	291
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

SHADOW - Calendar per WTG, graphical
Calculation: Real_case_Progetto_20240408

NA09: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

NA10: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

SE02: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

SE03: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

SE04: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

SE06: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

Shadow receptors

🟩	F08: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (71)
🟦	F35: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (73)
⬜	F49: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (74)
🟪	F59: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (75)

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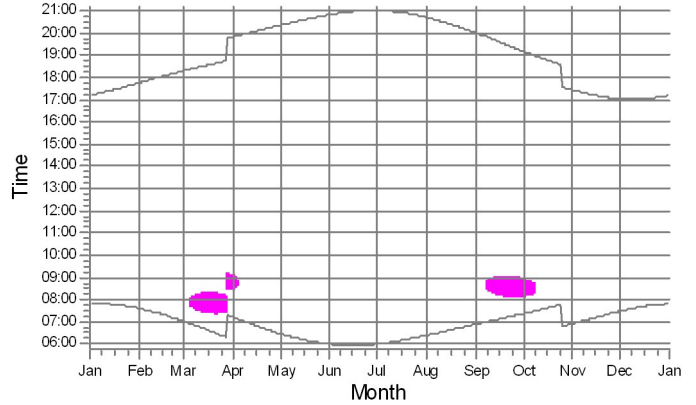Calculated:
08/04/2024 16:23/3.4.415

SHADOW - Calendar per WTG, graphical
Calculation: Real_case_Progetto_20240408

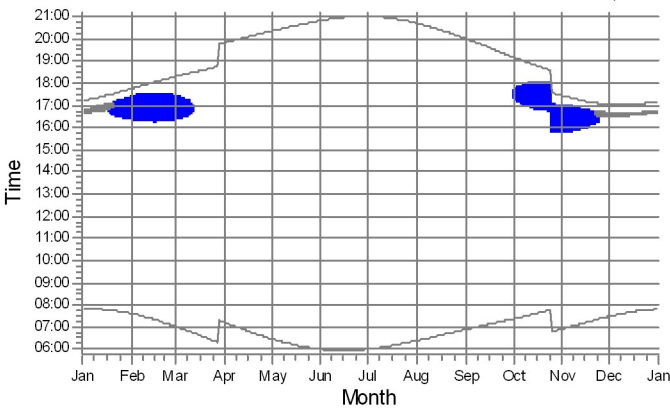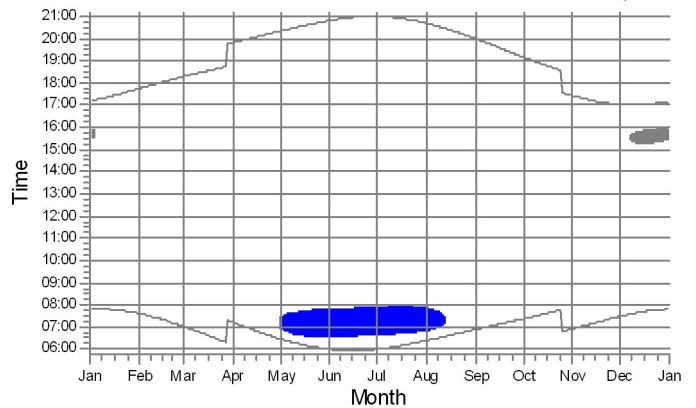SE07: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2   SE08: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2
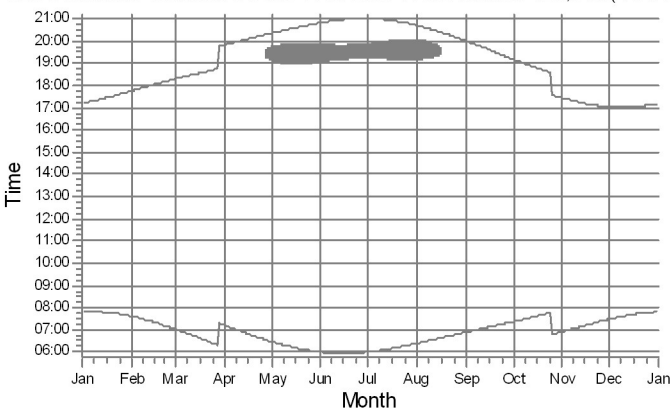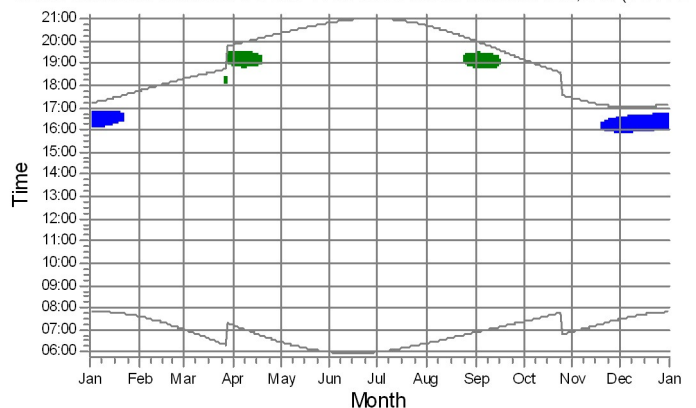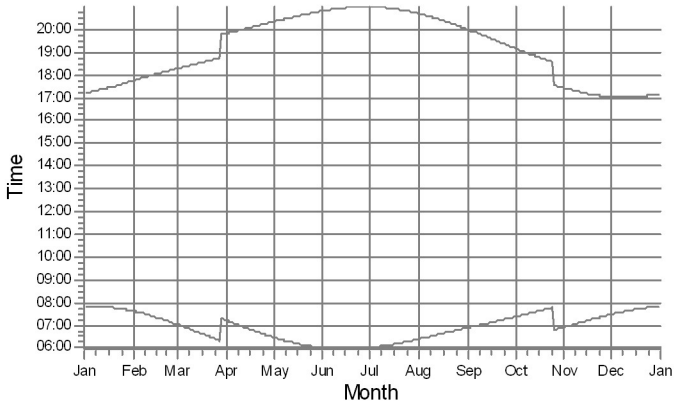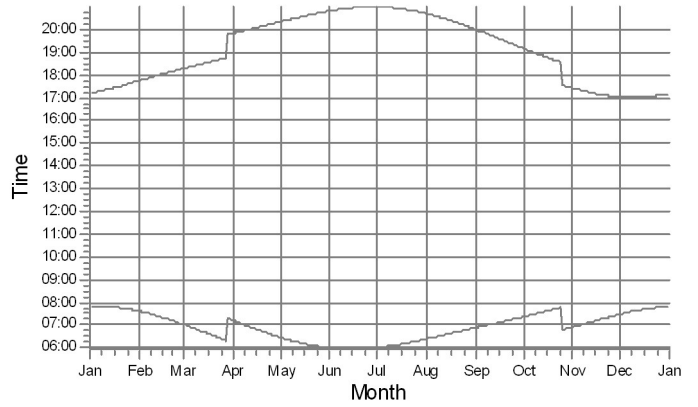
Shadow receptors

SHADOW - Main Result

Calculation: Progetto_Worst_case_20240408
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_Sorgenia Se
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

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

Scale 1:75.000

⅄ New WTG   🌑 Shadow receptor

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

WTGs

	Easting	Northing	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
NA09	1.462.459	4.434.625	397,7	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
NA10	1.461.895	4.433.589	236,9	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE02	1.462.502	4.436.303	430,7	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE03	1.463.573	4.436.746	453,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE04	1.463.150	4.437.473	559,7	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE06	1.462.131	4.435.885	416,1	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE07	1.461.190	4.434.985	345,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8
SE08	1.464.060	4.437.681	538,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.6-170!!-6.600	6.600	170,0	125,0	2.040	8,8

Shadow receptor-Input

No.	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]
F08	1.463.281	4.435.829	384,5	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F20	1.462.224	4.434.194	323,3	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F35	1.462.996	4.436.546	441,2	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F49	1.463.995	4.437.236	499,1	1,2	1,4	1,2	90,0	"Green house mode"	2,6
F59	1.461.116	4.433.770	150,8	1,2	1,4	1,2	90,0	"Green house mode"	2,6

Calculation Results

Shadow receptor
 Shadow, worst case

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
F08	20:08	45	0:34
F20	0:00	0	0:00
F35	233:01	266	1:12
F49	85:17	170	0:46
F59	36:55	61	0:47

SHADOW - Main Result

Calculation: Progetto_Worst_case_20240408

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

No.	Name	Worst case [h/year]
NA09	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (83)	0:00
NA10	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (84)	36:55
SE02	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (85)	102:19
SE03	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (86)	113:17
SE04	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (87)	69:04
SE06	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (88)	54:15
SE07	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (89)	0:00
SE08	Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (90)	0:00

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_Worst_case_20240408Shadow receptor: F08 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (71)

Assumptions for shadow calculations

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

	January	February	March		April			May	June	July	August		September		October	November	December
1	07:48	07:36	07:01		07:12		18:58 (SE06)	06:27	06:00	06:00	06:23		06:53	18:52 (SE06)	07:22	06:54	07:28
	17:11	17:44	18:17		19:50	29	19:27 (SE06)	20:20	20:49	20:59	20:41		19:59	32 19:24 (SE06)	19:10	17:25	17:02
2	07:48	07:35	07:00		07:10		18:57 (SE06)	06:26	05:59	06:01	06:24		06:54	18:52 (SE06)	07:23	06:56	07:29
	17:12	17:45	18:18		19:51	30	19:27 (SE06)	20:21	20:49	20:59	20:40		19:58	32 19:24 (SE06)	19:09	17:24	17:01
3	07:49	07:34	06:58		07:09		18:56 (SE06)	06:25	05:59	06:01	06:25		06:55	18:51 (SE06)	07:24	06:57	07:30
	17:13	17:47	18:19		19:52	32	19:28 (SE06)	20:22	20:50	20:59	20:39		19:56	34 19:25 (SE06)	19:07	17:23	17:01
4	07:49	07:33	06:57		07:07		18:55 (SE06)	06:24	05:58	06:02	06:26		06:56	18:51 (SE06)	07:25	06:58	07:31
	17:13	17:48	18:20		19:53	33	19:28 (SE06)	20:23	20:51	20:59	20:38		19:55	33 19:24 (SE06)	19:05	17:21	17:01
5	07:49	07:32	06:55		07:05		18:55 (SE06)	06:22	05:58	06:02	06:27		06:57	18:50 (SE06)	07:26	06:59	07:32
	17:14	17:49	18:21		19:54	33	19:28 (SE06)	20:24	20:51	20:59	20:37		19:53	34 19:24 (SE06)	19:04	17:20	17:01
6	07:49	07:31	06:54		07:04		18:54 (SE06)	06:21	05:58	06:03	06:28		06:58	18:50 (SE06)	07:27	07:00	07:33
	17:15	17:50	18:23		19:55	34	19:28 (SE06)	20:25	20:52	20:58	20:36		19:51	34 19:24 (SE06)	19:02	17:19	17:01
7	07:49	07:30	06:52		07:02		18:53 (SE06)	06:20	05:58	06:04	06:29		06:59	18:50 (SE06)	07:28	07:01	07:34
	17:16	17:51	18:24		19:56	34	19:27 (SE06)	20:26	20:53	20:58	20:34		19:50	33 19:23 (SE06)	19:00	17:18	17:01
8	07:49	07:29	06:51		07:01		18:54 (SE06)	06:19	05:57	06:04	06:30		07:00	18:50 (SE06)	07:29	07:02	07:35
	17:17	17:53	18:25		19:57	33	19:27 (SE06)	20:27	20:58	20:58	20:33		19:48	33 19:23 (SE06)	18:59	17:17	17:01
9	07:48	07:28	06:49		06:59		18:53 (SE06)	06:18	05:57	06:05	06:31		07:01	18:50 (SE06)	07:30	07:04	07:36
	17:19	17:54	18:26		19:58	34	19:27 (SE06)	20:28	20:54	20:58	20:32		19:46	32 19:22 (SE06)	18:57	17:16	17:01
10	07:48	07:27	06:47		06:58		18:54 (SE06)	06:17	05:57	06:05	06:32		07:01	18:51 (SE06)	07:31	07:05	07:37
	17:19	17:55	18:27		19:59	32	19:26 (SE06)	20:29	20:54	20:57	20:31		19:45	30 19:21 (SE06)	18:56	17:15	17:01
11	07:48	07:25	06:46		06:56		18:54 (SE06)	06:16	05:57	06:06	06:33		07:02	18:50 (SE06)	07:32	07:06	07:37
	17:20	17:56	18:28		20:00	31	19:25 (SE06)	20:30	20:55	20:57	20:30		19:43	29 19:19 (SE06)	18:54	17:14	17:01
12	07:48	07:24	06:44		06:54		18:54 (SE06)	06:15	05:57	06:07	06:34		07:03	18:51 (SE06)	07:33	07:07	07:38
	17:21	17:57	18:29		20:01	31	19:25 (SE06)	20:31	20:55	20:56	20:28		19:42	27 19:18 (SE06)	18:53	17:13	17:01
13	07:48	07:23	06:43		06:53		18:54 (SE06)	06:14	05:57	06:08	06:35		07:04	18:52 (SE06)	07:34	07:08	07:39
	17:22	17:59	18:30		20:02	28	19:23 (SE06)	20:32	20:56	20:56	20:27		19:40	24 19:16 (SE06)	18:51	17:12	17:01
14	07:47	07:22	06:41		06:51		18:56 (SE06)	06:13	05:57	06:08	06:36		07:05	18:56 (SE06)	07:35	07:09	07:40
	17:23	18:00	18:31		20:03	27	19:23 (SE06)	20:33	20:56	20:55	20:26		19:38	20 19:14 (SE06)	18:50	17:11	17:01
15	07:47	07:21	06:39		06:50		18:56 (SE06)	06:12	05:57	06:09	06:37		07:06	18:56 (SE06)	07:36	07:10	07:41
	17:24	18:01	18:32		20:04	25	19:21 (SE06)	20:34	20:57	20:55	20:24		19:37	15 19:11 (SE06)	18:48	17:11	17:01
16	07:46	07:19	06:38		06:48		18:59 (SE06)	06:11	05:57	06:10	06:38		07:07	19:00 (SE06)	07:37	07:12	07:41
	17:25	18:02	18:33		20:05	21	19:19 (SE06)	20:35	20:57	20:54	20:23		19:35	6 19:06 (SE06)	18:47	17:10	17:02
17	07:46	07:18	06:36		06:47		18:59 (SE06)	06:10	05:57	06:11	06:39		07:08		07:38	17:13	07:42
	17:27	18:03	18:34		20:06	17	19:16 (SE06)	20:36	20:57	20:54	20:22		19:33		18:45	17:09	17:02
18	07:45	07:17	06:35		06:45		19:03 (SE06)	06:09	05:57	06:11	06:40		07:09		07:39	17:08	07:43
	17:28	18:05	18:35		20:07	11	19:14 (SE06)	20:37	20:58	20:53	20:20		19:32		18:44	17:08	17:02
19	07:45	07:15	06:33		06:44			06:08	05:57	06:12	06:41		07:10		07:40	07:15	07:43
	17:29	18:06	18:36		20:08			20:38	20:58	20:52	20:19		19:30		18:42	17:08	17:03
20	07:45	07:14	06:31		06:42			06:07	05:57	06:13	06:41		07:11		07:41	07:16	07:44
	17:30	18:07	18:37		20:09			20:39	20:58	20:52	20:17		19:28		18:41	17:07	17:03
21	07:44	07:13	06:30		06:41			06:07	05:57	06:14	06:42		07:12		07:42	07:17	07:44
	17:31	18:08	18:38		20:10			20:40	20:59	20:51	20:16		19:27		18:39	17:06	17:04
22	07:44	07:11	06:28		06:40			06:06	05:57	06:15	06:43		07:13		07:43	07:18	07:45
	17:32	18:09	18:39		20:11			20:40	20:59	20:50	20:15		19:25		18:38	17:06	17:04
23	07:43	07:10	06:26		06:38			06:05	05:58	06:15	06:44		07:14		07:44	07:20	07:45
	17:33	18:10	18:40		20:12			20:41	20:59	20:49	20:13		19:23		18:37	17:05	17:05
24	07:42	07:08	06:25		06:37			06:04	05:58	06:16	06:45		07:15		07:45	07:21	07:46
	17:35	18:11	18:41		20:13			20:42	20:59	20:49	20:12		19:22		18:35	17:04	17:05
25	07:42	07:07	06:23		06:35			06:04	05:58	06:17	06:46		19:05 (SE06)	07:16	06:47	07:22	07:46
	17:36	18:13	18:43		20:14			20:43	20:59	20:48	20:10	12	19:17 (SE06)	19:20	17:34	17:04	17:06
26	07:41	07:06	06:22		06:34			06:03	05:58	06:18	06:47		19:02 (SE06)	07:17	06:48	07:23	07:47
	17:37	18:14	18:44		20:15			20:44	20:59	20:47	20:09	17	19:19 (SE06)	19:18	17:32	17:03	17:06
27	07:40	07:04	06:20		06:33			06:02	05:59	06:19	06:48		19:00 (SE06)	07:18	06:49	07:24	07:47
	17:38	18:15	18:45		20:16			20:45	20:59	20:46	20:07	21	19:21 (SE06)	19:17	17:31	17:03	17:07
28	07:39	07:03	06:18		18:07 (SE06)	06:31		06:02	05:59	06:20	06:49		18:58 (SE06)	07:19	06:50	07:25	07:47
	17:39	18:16	18:46	14	18:21 (SE06)	20:17		20:45	20:59	20:45	20:06	25	19:23 (SE06)	19:15	17:30	17:03	17:08
29	07:38		07:17		19:04 (SE06)	06:30		06:01	05:59	06:21	06:50		18:57 (SE06)	07:20	06:51	07:26	07:48
	17:41		19:47	19	19:23 (SE06)	20:18		20:46	20:59	20:44	20:04	27	19:24 (SE06)	19:13	17:29	17:02	17:08
30	07:38		07:15		19:01 (SE06)	06:29		06:01	06:00	06:22	06:51		18:55 (SE06)	07:21	06:52	07:27	07:48
	17:42		19:48	24	19:25 (SE06)	20:19		20:47	20:59	20:43	20:02	29	19:24 (SE06)	19:12	17:27	17:02	17:09
31	07:37		07:13		19:00 (SE06)			06:00		06:23	06:52		18:53 (SE06)		06:53		07:48
	17:43		19:49	26	19:26 (SE06)			20:48		20:42	20:01	31	19:24 (SE06)		17:26		17:10
Potential sun hours	300	299	370		397			446	449	456	426		375		346	300	291
Total, worst case				83		515						162	448				

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_Worst_case_20240408Shadow receptor: F20 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (72)
Assumptions for shadow calculations
The calculated times are "worst case" given by the following assumptions:
    The sun is shining all the day, from sunrise to sunset
    The rotor plane is always perpendicular to the line from the WTG to the sun
    The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:36	07:01	07:12	06:27	06:00	06:00	06:24	06:53	07:22	06:54	07:28
	17:11	17:44	18:17	19:50	20:20	20:49	20:59	20:41	19:59	19:10	17:25	17:02
2	07:49	07:35	07:00	07:10	06:26	05:59	06:01	06:24	06:54	07:23	06:56	07:29
	17:12	17:45	18:18	19:51	20:21	20:49	20:59	20:40	19:58	19:09	17:24	17:01
3	07:49	07:34	06:58	07:09	06:25	05:59	06:01	06:25	06:55	07:24	06:57	07:30
	17:13	17:47	18:19	19:52	20:22	20:50	20:59	20:39	19:56	19:07	17:23	17:01
4	07:49	07:33	06:57	07:07	06:24	05:59	06:02	06:26	06:56	07:25	06:58	07:31
	17:14	17:48	18:20	19:53	20:23	20:51	20:59	20:38	19:55	19:05	17:21	17:01
5	07:49	07:32	06:55	07:05	06:23	05:58	06:03	06:27	06:57	07:26	06:59	07:32
	17:14	17:49	18:22	19:54	20:24	20:51	20:59	20:37	19:53	19:04	17:20	17:01
6	07:49	07:31	06:54	07:04	06:21	05:58	06:03	06:28	06:58	07:27	07:00	07:33
	17:15	17:50	18:23	19:55	20:25	20:52	20:58	20:36	19:51	19:02	17:19	17:01
7	07:49	07:30	06:52	07:02	06:20	05:58	06:04	06:29	06:59	07:28	07:01	07:34
	17:16	17:52	18:24	19:56	20:26	20:53	20:58	20:34	19:50	19:01	17:18	17:01
8	07:49	07:29	06:51	07:01	06:19	05:57	06:04	06:30	07:00	07:29	07:02	07:35
	17:17	17:53	18:25	19:57	20:27	20:53	20:58	20:33	19:48	18:59	17:17	17:01
9	07:48	07:28	06:49	06:59	06:18	05:57	06:05	06:31	07:01	07:30	07:04	07:36
	17:18	17:54	18:26	19:58	20:28	20:54	20:58	20:32	19:47	18:57	17:16	17:01
10	07:48	07:27	06:47	06:58	06:17	05:57	06:06	06:32	07:02	07:31	07:05	07:37
	17:19	17:55	18:27	19:59	20:29	20:54	20:57	20:31	19:45	18:56	17:15	17:01
11	07:48	07:25	06:46	06:56	06:16	05:57	06:06	06:33	07:02	07:32	07:06	07:37
	17:20	17:56	18:28	20:00	20:30	20:55	20:57	20:30	19:43	18:54	17:14	17:01
12	07:48	07:24	06:44	06:55	06:15	05:57	06:07	06:34	07:03	07:33	07:07	07:38
	17:21	17:58	18:29	20:01	20:31	20:55	20:56	20:28	19:42	18:53	17:13	17:01
13	07:48	07:23	06:43	06:53	06:14	05:57	06:08	06:35	07:04	07:34	07:08	07:39
	17:22	17:59	18:30	20:02	20:32	20:56	20:56	20:27	19:40	18:51	17:12	17:01
14	07:47	07:22	06:41	06:51	06:13	05:57	06:08	06:36	07:05	07:35	07:09	07:40
	17:23	18:00	18:31	20:03	20:33	20:56	20:55	20:26	19:38	18:50	17:11	17:01
15	07:47	07:21	06:39	06:50	06:12	05:57	06:09	06:37	07:06	07:36	07:10	07:41
	17:24	18:01	18:32	20:04	20:34	20:57	20:55	20:24	19:37	18:48	17:11	17:02
16	07:47	07:19	06:38	06:48	06:11	05:57	06:10	06:38	07:07	07:37	07:12	07:41
	17:26	18:02	18:33	20:05	20:35	20:57	20:54	20:23	19:35	18:47	17:10	17:02
17	07:46	07:18	06:36	06:47	06:10	05:57	06:11	06:39	07:08	07:38	07:13	07:42
	17:27	18:03	18:34	20:06	20:36	20:57	20:54	20:22	19:33	18:45	17:09	17:02
18	07:46	07:17	06:35	06:45	06:09	05:57	06:11	06:40	07:09	07:39	07:14	07:43
	17:28	18:05	18:35	20:07	20:37	20:58	20:53	20:20	19:32	18:44	17:08	17:02
19	07:45	07:15	06:33	06:44	06:08	05:57	06:12	06:41	07:10	07:40	07:15	07:43
	17:29	18:06	18:36	20:08	20:38	20:58	20:52	20:19	19:30	18:42	17:08	17:03
20	07:45	07:14	06:31	06:43	06:07	05:57	06:13	06:42	07:11	07:41	07:16	07:44
	17:30	18:07	18:37	20:09	20:39	20:58	20:52	20:17	19:28	18:41	17:07	17:03
21	07:44	07:13	06:30	06:41	06:07	05:57	06:14	06:43	07:12	07:42	07:17	07:44
	17:31	18:08	18:38	20:10	20:40	20:59	20:51	20:16	19:27	18:39	17:06	17:04
22	07:44	07:11	06:28	06:40	06:06	05:57	06:15	06:43	07:13	07:43	07:18	07:45
	17:32	18:09	18:39	20:11	20:40	20:59	20:50	20:15	19:25	18:38	17:06	17:04
23	07:43	07:10	06:27	06:38	06:05	05:58	06:16	06:44	07:14	07:44	07:20	07:45
	17:34	18:10	18:41	20:12	20:41	20:59	20:49	20:13	19:23	18:37	17:05	17:05
24	07:42	07:08	06:25	06:37	06:04	05:58	06:16	06:45	07:15	07:45	07:21	07:46
	17:35	18:11	18:42	20:13	20:42	20:59	20:49	20:12	19:22	18:35	17:05	17:05
25	07:42	07:07	06:23	06:35	06:04	05:58	06:17	06:46	07:16	06:47	07:22	07:46
	17:36	18:13	18:43	20:14	20:43	20:59	20:48	20:10	19:20	17:34	17:04	17:06
26	07:41	07:06	06:22	06:34	06:03	05:58	06:18	06:47	07:17	06:48	07:23	07:47
	17:37	18:14	18:44	20:15	20:44	20:59	20:47	20:09	19:18	17:33	17:04	17:06
27	07:40	07:04	06:20	06:33	06:02	05:59	06:19	06:48	07:18	06:49	07:24	07:47
	17:38	18:15	18:45	20:16	20:45	20:59	20:46	20:07	19:17	17:31	17:03	17:07
28	07:39	07:03	06:18	06:31	06:02	05:59	06:20	06:49	07:19	06:50	07:25	07:47
	17:39	18:16	18:46	20:17	20:45	20:59	20:45	20:06	19:15	17:30	17:03	17:08
29	07:38		07:17	06:30	06:01	06:00	06:21	06:50	07:20	06:51	07:26	07:48
	17:41		19:47	20:18	20:46	20:59	20:44	20:04	19:13	17:29	17:02	17:08
30	07:38		07:15	06:29	06:01	06:00	06:22	06:51	07:21	06:52	07:27	07:48
	17:42		19:48	20:19	20:47	20:59	20:43	20:03	19:12	17:27	17:02	17:09
31	07:37		07:14		06:00		06:23	06:52		06:53		07:48
	17:43		19:49		20:48		20:42	20:01		17:26		17:10
Potential sun hours	300	299	370	397	446	449	456	426	375	346	300	291
Total, worst case												

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

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

Project:
Progetto_Sorgenia Seneghe-Narbolia

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:
08/04/2024 16:25/3.4.415

SHADOW - Calendar

Calculation: Progetto_Worst_case_20240408Shadow receptor: F35 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (73)
Assumptions for shadow calculations
The calculated times are "worst case" given by the following assumptions:
  The sun is shining all the day, from sunrise to sunset
  The rotor plane is always perpendicular to the line from the WTG to the sun
  The WTG is always operating

	January			February			March			April		May			June	
1	07:48		16:08 (SE06)	07:36		16:24 (SE02)	07:01		16:24 (SE02)	07:12		06:27		07:05 (SE03)	06:00		06:38 (SE03)
	17:11	37	16:45 (SE06)	17:44	57	17:21 (SE02)	18:17	60	17:24 (SE02)	19:50	20:20	13	07:18 (SE03)	20:49	67	07:45 (SE03)
2	07:49		16:08 (SE06)	07:35		16:24 (SE02)	07:00		16:24 (SE02)	07:10		06:26		07:00 (SE03)	05:59		06:38 (SE03)
	17:12	38	16:46 (SE06)	17:45	58	17:22 (SE02)	18:18	58	17:22 (SE02)	19:51	20:21	22	07:22 (SE03)	20:49	67	07:45 (SE03)
3	07:49		16:09 (SE06)	07:34		16:23 (SE02)	06:58		16:24 (SE02)	07:09		06:25		06:57 (SE03)	05:59		06:38 (SE03)
	17:13	37	16:46 (SE06)	17:47	61	17:24 (SE02)	18:19	56	17:22 (SE02)	19:52	20:22	28	07:25 (SE03)	20:50	67	07:45 (SE03)
4	07:49		16:09 (SE06)	07:33		16:23 (SE02)	06:57		16:26 (SE02)	07:07		06:24		06:55 (SE03)	05:58		06:39 (SE03)
	17:13	38	16:47 (SE06)	17:48	62	17:25 (SE02)	18:20	54	17:20 (SE02)	19:53	20:23	33	07:28 (SE03)	20:51	67	07:46 (SE03)
5	07:49		16:10 (SE06)	07:32		16:22 (SE02)	06:55		16:28 (SE02)	07:05		06:22		06:53 (SE03)	05:58		06:38 (SE03)
	17:14	37	16:47 (SE06)	17:49	64	17:26 (SE02)	18:21	51	17:19 (SE02)	19:54	20:24	37	07:30 (SE03)	20:51	67	07:45 (SE03)
6	07:49		16:11 (SE06)	07:31		16:21 (SE02)	06:54		16:29 (SE02)	07:04		06:21		06:51 (SE03)	05:58		06:38 (SE03)
	17:15	36	16:47 (SE06)	17:50	65	17:26 (SE02)	18:23	48	17:17 (SE02)	19:55	20:25	41	07:32 (SE03)	20:52	68	07:46 (SE03)
7	07:49		16:11 (SE06)	07:30		16:20 (SE02)	06:52		16:31 (SE02)	07:02		06:20		06:49 (SE03)	05:58		06:39 (SE03)
	17:16	37	16:48 (SE06)	17:51	67	17:27 (SE02)	18:24	44	17:15 (SE02)	19:56	20:26	43	07:32 (SE03)	20:53	67	07:46 (SE03)
8	07:49		16:12 (SE06)	07:29		16:20 (SE02)	06:51		16:33 (SE02)	07:01		06:19		06:47 (SE03)	05:57		06:39 (SE03)
	17:17	36	16:48 (SE06)	17:53	67	17:27 (SE02)	18:25	40	17:13 (SE02)	19:57	20:27	46	07:33 (SE03)	20:53	67	07:46 (SE03)
9	07:48		16:13 (SE06)	07:28		16:20 (SE02)	06:49		16:35 (SE02)	06:59		06:18		06:46 (SE03)	05:57		06:39 (SE03)
	17:18	35	16:48 (SE06)	17:54	68	17:28 (SE02)	18:26	35	17:10 (SE02)	19:58	20:28	49	07:35 (SE03)	20:54	68	07:47 (SE03)
10	07:48		16:14 (SE06)	07:27		16:20 (SE02)	06:47		16:38 (SE02)	06:58		06:17		06:45 (SE03)	05:57		06:39 (SE03)
	17:19	35	16:49 (SE06)	17:55	69	17:29 (SE02)	18:27	30	17:08 (SE02)	19:59	20:29	51	07:36 (SE03)	20:54	67	07:46 (SE03)
11	07:48		16:14 (SE06)	07:25		16:20 (SE02)	06:46		16:41 (SE02)	06:56		06:16		06:44 (SE03)	05:57		06:39 (SE03)
	17:20	34	16:48 (SE06)	17:56	69	17:29 (SE02)	18:28	22	17:03 (SE02)	20:00	20:30	52	07:36 (SE03)	20:55	67	07:46 (SE03)
12	07:48		16:15 (SE06)	07:24		16:19 (SE02)	06:44		16:48 (SE02)	06:54		06:15		06:43 (SE03)	05:57		06:39 (SE03)
	17:21	33	16:48 (SE06)	17:57	70	17:29 (SE02)	18:29	10	16:58 (SE02)	20:01	20:31	54	07:37 (SE03)	20:55	68	07:47 (SE03)
13	07:48		16:17 (SE06)	07:23		16:19 (SE02)	06:43			06:53		06:14		06:42 (SE03)	05:57		06:40 (SE03)
	17:22	31	16:48 (SE06)	17:59	70	17:29 (SE02)	18:30		20:02	20:32	56	07:38 (SE03)	20:56	67	07:47 (SE03)
14	07:47		16:17 (SE06)	07:22		16:19 (SE02)	06:41			06:51		06:13		06:41 (SE03)	05:57		06:40 (SE03)
	17:23	31	16:48 (SE06)	18:00	71	17:30 (SE02)	18:31		20:03	20:33	57	07:38 (SE03)	20:56	67	07:47 (SE03)
15	07:47		16:19 (SE06)	07:21		16:19 (SE02)	06:39			06:50		06:12		06:42 (SE03)	05:57		06:40 (SE03)
	17:24	29	16:48 (SE06)	18:01	71	17:30 (SE02)	18:32		20:04	20:34	58	07:40 (SE03)	20:57	67	07:47 (SE03)
16	07:47		16:19 (SE06)	07:19		16:18 (SE02)	06:38			06:48		06:11		06:41 (SE03)	05:57		06:40 (SE03)
	17:25	28	16:47 (SE06)	18:02	72	17:30 (SE02)	18:33		20:05	20:35	59	07:40 (SE03)	20:57	67	07:47 (SE03)
17	07:46		16:21 (SE06)	07:18		16:19 (SE02)	06:36			06:47		06:10		06:40 (SE03)	05:57		06:40 (SE03)
	17:27	26	16:47 (SE06)	18:03	71	17:30 (SE02)	18:34		20:06	20:36	61	07:41 (SE03)	20:57	67	07:47 (SE03)
18	07:46		16:22 (SE06)	07:17		16:19 (SE02)	06:35			06:45		06:09		06:40 (SE03)	05:57		06:41 (SE03)
	17:28	32	16:54 (SE02)	18:05	71	17:30 (SE02)	18:35		20:07	20:37	61	07:41 (SE03)	20:58	67	07:48 (SE03)
19	07:45		16:24 (SE06)	07:15		16:19 (SE02)	06:33			06:44		06:08		06:39 (SE03)	05:57		06:42 (SE03)
	17:29	35	16:59 (SE02)	18:06	70	17:29 (SE02)	18:36		20:08	20:38	62	07:41 (SE03)	20:58	67	07:49 (SE03)
20	07:45		16:25 (SE02)	07:14		16:19 (SE02)	06:31			06:42		06:07		06:40 (SE03)	05:57		06:42 (SE03)
	17:30	37	17:02 (SE02)	18:07	70	17:29 (SE02)	18:37		20:09	20:39	62	07:42 (SE03)	20:58	67	07:49 (SE03)
21	07:44		16:28 (SE06)	07:13		16:20 (SE02)	06:30			06:41		06:07		06:39 (SE03)	05:57		06:42 (SE03)
	17:31	37	17:05 (SE02)	18:08	70	17:30 (SE02)	18:38		20:10	20:40	63	07:42 (SE03)	20:59	67	07:49 (SE03)
22	07:44		16:32 (SE06)	07:11		16:20 (SE02)	06:28			06:40		06:06		06:38 (SE03)	05:57		06:42 (SE03)
	17:32	35	17:07 (SE02)	18:09	69	17:29 (SE02)	18:39		20:11	20:40	65	07:43 (SE03)	20:59	67	07:49 (SE03)
23	07:43		16:33 (SE02)	07:10		16:20 (SE02)	06:26			06:38		06:05		06:38 (SE03)	05:57		06:43 (SE03)
	17:33	36	17:09 (SE02)	18:10	69	17:29 (SE02)	18:40		20:12	20:41	64	07:42 (SE03)	20:59	67	07:50 (SE03)
24	07:42		16:31 (SE02)	07:08		16:20 (SE02)	06:25			06:37		06:04		06:38 (SE03)	05:58		06:42 (SE03)
	17:35	39	17:10 (SE02)	18:11	68	17:28 (SE02)	18:41		20:13	20:42	65	07:43 (SE03)	20:59	67	07:49 (SE03)
25	07:42		16:31 (SE02)	07:07		16:21 (SE02)	06:23			06:35		06:04		06:38 (SE03)	05:58		06:42 (SE03)
	17:36	41	17:12 (SE02)	18:13	66	17:27 (SE02)	18:43		20:14	20:43	65	07:43 (SE03)	20:59	67	07:49 (SE03)
26	07:41		16:29 (SE02)	07:06		16:21 (SE02)	06:22			06:34		06:03		06:38 (SE03)	05:58		06:42 (SE03)
	17:37	44	17:13 (SE02)	18:14	65	17:26 (SE02)	18:44		20:15	20:44	66	07:44 (SE03)	20:59	67	07:49 (SE03)
27	07:40		16:28 (SE02)	07:04		16:22 (SE02)	06:20			06:33		06:02		06:38 (SE03)	05:59		06:43 (SE03)
	17:38	46	17:14 (SE02)	18:15	64	17:26 (SE02)	18:45		20:16	20:45	66	07:44 (SE03)	20:59	67	07:50 (SE03)
28	07:39		16:27 (SE02)	07:03		16:22 (SE02)	06:18			06:31		06:02		06:37 (SE03)	05:59		06:43 (SE03)
	17:39	48	17:15 (SE02)	18:16	62	17:24 (SE02)	18:46		20:17	20:46	67	07:44 (SE03)	20:59	67	07:50 (SE03)
29	07:39		16:26 (SE02)				07:17			06:30		06:01		06:38 (SE03)	05:59		06:44 (SE03)
	17:41	50	17:16 (SE02)				19:47			20:18	20:46	66	07:44 (SE03)	20:59	67	07:51 (SE03)
30	07:38		16:26 (SE02)				07:15			06:29		06:01		06:38 (SE03)	06:00		06:43 (SE03)
	17:42	53	17:19 (SE02)				19:48			20:19	20:47	67	07:45 (SE03)	20:59	68	07:51 (SE03)
31	07:37		16:25 (SE02)				07:13					06:00		06:38 (SE03)			
	17:43	55	17:20 (SE02)				19:49					20:48	67	07:45 (SE03)			
Potential sun hours	300			299			370			397		446			449		
Total, worst case		1166			1876			508					1666			2014	

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_Worst_case_20240408Shadow receptor: F35 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (73)
Assumptions for shadow calculations
The calculated times are "worst case" given by the following assumptions:
   The sun is shining all the day, from sunrise to sunset
   The rotor plane is always perpendicular to the line from the WTG to the sun
   The WTG is always operating

	July			August			September	October			November			December		
1	06:00		06:43 (SE03)	06:23		06:54 (SE03)	06:53	07:22			06:54		15:50 (SE02)	07:28		15:56 (SE06)
	20:59	67	07:50 (SE03)	20:41	54	07:48 (SE03)	19:59	19:10			17:25	68	16:58 (SE02)	17:02	34	16:30 (SE06)
2	06:01		06:44 (SE03)	06:24		06:55 (SE03)	06:54	07:23		17:22 (SE02)	06:56		15:50 (SE02)	07:29		15:56 (SE06)
	20:59	67	07:51 (SE03)	20:40	52	07:47 (SE03)	19:58	19:09	18	17:40 (SE02)	17:24	68	16:58 (SE02)	17:01	35	16:31 (SE06)
3	06:01		06:44 (SE03)	06:25		06:56 (SE03)	06:55	07:24		17:17 (SE02)	06:57		16:57 (SE02)	07:30		15:56 (SE06)
	20:59	67	07:51 (SE03)	20:39	50	07:46 (SE03)	19:56	19:07	27	17:44 (SE02)	17:23	67	16:57 (SE02)	17:01	35	16:31 (SE06)
4	06:02		06:44 (SE03)	06:26		06:57 (SE03)	06:56	07:25		17:14 (SE02)	06:58		15:50 (SE02)	07:31		15:56 (SE06)
	20:59	68	07:52 (SE03)	20:38	48	07:45 (SE03)	19:55	19:05	32	17:46 (SE02)	17:21	66	16:56 (SE02)	17:01	36	16:32 (SE06)
5	06:02		06:45 (SE03)	06:27		06:58 (SE03)	06:57	07:26		17:11 (SE02)	06:59		15:51 (SE02)	07:32		15:57 (SE06)
	20:59	67	07:52 (SE03)	20:37	46	07:44 (SE03)	19:53	19:04	38	17:49 (SE02)	17:20	65	16:56 (SE02)	17:01	36	16:33 (SE06)
6	06:03		06:45 (SE03)	06:28		07:00 (SE03)	06:58	07:27		17:08 (SE02)	07:00		15:52 (SE02)	07:33		15:57 (SE06)
	20:58	67	07:52 (SE03)	20:36	42	07:42 (SE03)	19:51	19:02	42	17:50 (SE02)	17:19	64	16:56 (SE02)	17:01	36	16:33 (SE06)
7	06:04		06:45 (SE03)	06:29		07:01 (SE03)	06:59	07:28		17:06 (SE02)	07:01		15:53 (SE02)	07:34		15:57 (SE06)
	20:58	67	07:52 (SE03)	20:35	40	07:41 (SE03)	19:50	19:00	46	17:52 (SE02)	17:18	62	16:55 (SE02)	17:01	37	16:34 (SE06)
8	06:04		06:45 (SE03)	06:30		07:02 (SE03)	07:00	07:29		17:04 (SE02)	07:02		15:53 (SE02)	07:35		15:57 (SE06)
	20:58	67	07:52 (SE03)	20:33	36	07:38 (SE03)	19:48	18:59	49	17:53 (SE02)	17:17	60	16:53 (SE02)	17:01	38	16:35 (SE06)
9	06:05		06:45 (SE03)	06:31		07:04 (SE03)	07:01	07:30		17:02 (SE02)	07:04		15:54 (SE02)	07:36		15:58 (SE06)
	20:58	68	07:53 (SE03)	20:32	32	07:36 (SE03)	19:47	18:57	52	17:54 (SE02)	17:16	58	16:52 (SE02)	17:01	37	16:35 (SE06)
10	06:05		06:46 (SE03)	06:32		07:06 (SE03)	07:01	07:31		17:00 (SE02)	07:05		15:55 (SE02)	07:37		15:58 (SE06)
	20:57	67	07:53 (SE03)	20:31	27	07:33 (SE03)	19:45	18:56	55	17:55 (SE02)	17:15	57	16:52 (SE02)	17:01	38	16:36 (SE06)
11	06:06		06:45 (SE03)	06:33		07:10 (SE03)	07:02	07:32		17:00 (SE02)	07:06		15:56 (SE02)	07:37		15:59 (SE06)
	20:57	68	07:53 (SE03)	20:30	20	07:30 (SE03)	19:43	18:54	57	17:57 (SE02)	17:14	55	16:51 (SE02)	17:01	37	16:36 (SE06)
12	06:07		06:46 (SE03)	06:34		07:15 (SE03)	07:03	07:33		16:58 (SE02)	07:07		15:57 (SE02)	07:38		15:58 (SE06)
	20:56	67	07:53 (SE03)	20:28	9	07:24 (SE03)	19:42	18:53	59	17:57 (SE02)	17:13	52	16:49 (SE02)	17:01	37	16:35 (SE06)
13	06:08		06:47 (SE03)	06:35			07:04	07:34		16:57 (SE02)	07:08		15:58 (SE02)	07:39		15:59 (SE06)
	20:56	66	07:53 (SE03)	20:27			19:40	18:51	61	17:58 (SE02)	17:12	50	16:48 (SE02)	17:01	37	16:36 (SE06)
14	06:08		06:46 (SE03)	06:36			07:05	07:35		16:56 (SE02)	07:09		16:00 (SE02)	07:40		15:59 (SE06)
	20:55	67	07:53 (SE03)	20:26			19:38	18:50	62	17:58 (SE02)	17:11	48	16:48 (SE02)	17:01	37	16:36 (SE06)
15	06:09		06:47 (SE03)	06:37			07:06	07:36		16:54 (SE02)	07:11		16:01 (SE02)	07:41		16:00 (SE06)
	20:55	66	07:53 (SE03)	20:24			19:37	18:48	65	17:59 (SE02)	17:11	46	16:47 (SE02)	17:01	37	16:37 (SE06)
16	06:10		06:47 (SE03)	06:38			07:07	07:37		16:53 (SE02)	07:12		16:02 (SE02)	07:41		16:00 (SE06)
	20:54	66	07:53 (SE03)	20:23			19:35	18:47	66	17:59 (SE02)	17:10	44	16:46 (SE02)	17:02	36	16:36 (SE06)
17	06:11		06:48 (SE03)	06:39			07:08	07:38		16:52 (SE02)	07:13		16:04 (SE02)	07:42		16:01 (SE06)
	20:54	66	07:54 (SE03)	20:22			19:33	18:45	67	17:59 (SE02)	17:09	41	16:45 (SE02)	17:02	36	16:37 (SE06)
18	06:11		06:47 (SE03)	06:40			07:09	07:39		16:52 (SE02)	07:14		16:05 (SE02)	07:43		16:02 (SE06)
	20:53	66	07:53 (SE03)	20:20			19:32	18:44	67	17:59 (SE02)	17:08	39	16:44 (SE02)	17:02	35	16:37 (SE06)
19	06:12		06:48 (SE03)	06:41			07:10	07:40		16:51 (SE02)	07:15		16:08 (SE02)	07:43		16:01 (SE06)
	20:52	65	07:53 (SE03)	20:19			19:30	18:42	68	17:59 (SE02)	17:08	36	16:44 (SE02)	17:03	36	16:37 (SE06)
20	06:13		06:48 (SE03)	06:42			07:11	07:41		16:50 (SE02)	07:16		16:07 (SE06)	07:44		16:02 (SE06)
	20:52	65	07:53 (SE03)	20:17			19:28	18:41	69	17:59 (SE02)	17:07	35	16:42 (SE02)	17:03	36	16:38 (SE06)
21	06:14		06:49 (SE03)	06:42			07:12	07:42		16:50 (SE02)	07:17		16:03 (SE06)	07:44		16:02 (SE06)
	20:51	64	07:53 (SE03)	20:16			19:27	18:39	70	18:00 (SE02)	17:06	37	16:40 (SE02)	17:04	36	16:38 (SE06)
22	06:15		06:49 (SE03)	06:43			07:13	07:43		16:50 (SE02)	07:18		16:01 (SE06)	07:45		16:03 (SE06)
	20:50	64	07:53 (SE03)	20:15			19:25	18:38	70	18:00 (SE02)	17:06	37	16:38 (SE02)	17:04	36	16:39 (SE06)
23	06:15		06:49 (SE03)	06:44			07:14	07:44		16:49 (SE02)	07:20		16:00 (SE06)	07:45		16:03 (SE06)
	20:49	63	07:52 (SE03)	20:13			19:23	18:37	71	18:00 (SE02)	17:05	35	16:35 (SE02)	17:05	36	16:39 (SE06)
24	06:16		06:49 (SE03)	06:45			07:15	07:45		16:49 (SE02)	07:21		16:00 (SE06)	07:46		16:04 (SE06)
	20:49	63	07:52 (SE03)	20:12			19:22	18:35	71	18:00 (SE02)	17:04	32	16:32 (SE06)	17:05	36	16:40 (SE06)
25	06:17		06:50 (SE03)	06:46			07:16	06:47		15:48 (SE02)	07:22		15:59 (SE06)	07:46		16:04 (SE06)
	20:48	62	07:52 (SE03)	20:10			19:20	17:34	72	17:00 (SE02)	17:04	26	16:25 (SE06)	17:06	36	16:40 (SE06)
26	06:18		06:51 (SE03)	06:47			07:17	06:48		15:48 (SE02)	07:23		15:58 (SE06)	07:47		16:05 (SE06)
	20:47	60	07:51 (SE03)	20:09			19:18	17:32	71	16:59 (SE02)	17:03	28	16:26 (SE06)	17:06	36	16:41 (SE06)
27	06:19		06:51 (SE03)	06:48			07:18	06:49		15:49 (SE02)	07:24		15:58 (SE06)	07:47		16:05 (SE06)
	20:46	60	07:51 (SE03)	20:07			19:17	17:31	71	17:00 (SE02)	17:03	29	16:27 (SE06)	17:07	36	16:41 (SE06)
28	06:20		06:52 (SE03)	06:49			07:19	06:50		15:49 (SE02)	07:25		15:57 (SE06)	07:47		16:06 (SE06)
	20:45	59	07:51 (SE03)	20:06			19:15	17:30	70	16:59 (SE02)	17:03	31	16:28 (SE06)	17:08	36	16:42 (SE06)
29	06:21		06:53 (SE03)	06:50			07:20	06:51		15:49 (SE02)	07:26		15:57 (SE06)	07:48		16:06 (SE06)
	20:44	57	07:50 (SE03)	20:04			19:13	17:29	70	16:59 (SE02)	17:02	31	16:28 (SE06)	17:08	37	16:43 (SE06)
30	06:22		06:52 (SE03)	06:51			07:21	06:52		15:49 (SE02)	07:27		15:57 (SE06)	07:48		16:07 (SE06)
	20:43	57	07:49 (SE03)	20:02			19:12	17:27	69	16:58 (SE02)	17:02	32	16:29 (SE06)	17:09	36	16:43 (SE06)
31	06:23		06:53 (SE03)	06:52				06:53		15:49 (SE02)				07:48		16:07 (SE06)
	20:42	55	07:48 (SE03)	20:01				17:26	69	16:58 (SE02)				17:10	37	16:44 (SE06)
Potential sun hours	456			426			375	346			300			291		
Total, worst case		1998			456				1774			1399			1124	

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)

Project:
Progetto_Sorgenia Seneghe-Narbolia

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:
08/04/2024 16:25/3.4.415

SHADOW - Calendar

Calculation: Progetto_Worst_case_20240408Shadow receptor: F49 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (74)
Assumptions for shadow calculations
The calculated times are "worst case" given by the following assumptions:
   The sun is shining all the day, from sunrise to sunset
   The rotor plane is always perpendicular to the line from the WTG to the sun
   The WTG is always operating

Day	January (rise/set)	Jan min	Jan flicker (first/last)	February	March	April (rise/set)	Apr min	Apr flicker (first/last)	May (rise/set)	May min	May flicker (first/last)	June (rise/set)	Jun min	Jun flicker (first/last)
1	07:48 / 17:11	24	15:31 (SE03) / 16:45 (SE02)	07:36 / 17:44	07:01 / 18:17	07:12 / 19:50			06:27 / 20:20	29	19:10 (SE04) / 19:39 (SE04)	06:00 / 20:49	40	19:06 (SE04) / 19:46 (SE04)
2	07:49 / 17:12	22	15:33 (SE03) / 16:46 (SE02)	07:35 / 17:45	07:00 / 18:18	07:10 / 19:51			06:26 / 20:21	31	19:09 (SE04) / 19:40 (SE04)	05:59 / 20:49	39	19:06 (SE04) / 19:45 (SE04)
3	07:49 / 17:12	19	15:35 (SE03) / 16:47 (SE02)	07:34 / 17:47	06:58 / 18:19	07:09 / 19:52			06:25 / 20:22	35	19:07 (SE04) / 19:42 (SE04)	05:59 / 20:50	38	19:07 (SE04) / 19:45 (SE04)
4	07:49 / 17:13	13	15:38 (SE03) / 16:47 (SE02)	07:33 / 17:48	06:57 / 18:20	07:07 / 19:53			06:24 / 20:23	37	19:06 (SE04) / 19:43 (SE04)	05:58 / 20:51	37	19:08 (SE04) / 19:45 (SE04)
5	07:49 / 17:14	5	16:43 (SE02) / 16:48 (SE02)	07:32 / 17:49	06:55 / 18:21	07:05 / 19:54			06:22 / 20:24	38	19:06 (SE04) / 19:44 (SE04)	05:58 / 20:51	36	19:09 (SE04) / 19:44 (SE04)
6	07:49 / 17:15	5	16:44 (SE02) / 16:49 (SE02)	07:31 / 17:50	06:54 / 18:23	07:04 / 19:55			06:21 / 20:25	39	19:05 (SE04) / 19:44 (SE04)	05:58 / 20:52	36	19:09 (SE04) / 19:45 (SE04)
7	07:49 / 17:16	6	16:45 (SE02) / 16:51 (SE02)	07:30 / 17:51	06:52 / 18:24	07:02 / 19:56			06:20 / 20:26	41	19:03 (SE04) / 19:44 (SE04)	05:57 / 20:53	36	19:09 (SE04) / 19:45 (SE04)
8	07:49 / 17:17	7	16:45 (SE02) / 16:52 (SE02)	07:29 / 17:53	06:50 / 18:25	07:01 / 19:57			06:19 / 20:27	42	19:03 (SE04) / 19:45 (SE04)	05:57 / 20:53	35	19:10 (SE04) / 19:45 (SE04)
9	07:48 / 17:18	7	16:46 (SE02) / 16:53 (SE02)	07:28 / 17:54	06:49 / 18:26	06:59 / 19:58			06:18 / 20:28	43	19:02 (SE04) / 19:45 (SE04)	05:57 / 20:54	34	19:11 (SE04) / 19:45 (SE04)
10	07:48 / 17:19	7	16:47 (SE02) / 16:54 (SE02)	07:27 / 17:55	06:47 / 18:27	06:57 / 19:59			06:17 / 20:29	44	19:02 (SE04) / 19:46 (SE04)	05:57 / 20:54	34	19:10 (SE04) / 19:44 (SE04)
11	07:48 / 17:20	8	16:47 (SE02) / 16:55 (SE02)	07:25 / 17:56	06:46 / 18:28	06:56 / 20:00			06:16 / 20:30	44	19:02 (SE04) / 19:46 (SE04)	05:57 / 20:55	33	19:11 (SE04) / 19:44 (SE04)
12	07:48 / 17:21	8	16:48 (SE02) / 16:56 (SE02)	07:24 / 17:57	06:44 / 18:29	06:54 / 20:01			06:15 / 20:31	45	19:01 (SE04) / 19:46 (SE04)	05:57 / 20:55	33	19:11 (SE04) / 19:44 (SE04)
13	07:48 / 17:22	9	16:49 (SE02) / 16:58 (SE02)	07:23 / 17:59	06:43 / 18:30	06:53 / 20:02			06:14 / 20:32	45	19:01 (SE04) / 19:46 (SE04)	05:57 / 20:56	32	19:12 (SE04) / 19:44 (SE04)
14	07:47 / 17:23	9	16:49 (SE02) / 16:58 (SE02)	07:22 / 18:00	06:41 / 18:31	06:51 / 20:03			06:13 / 20:33	45	19:01 (SE04) / 19:46 (SE04)	05:56 / 20:56	32	19:12 (SE04) / 19:44 (SE04)
15	07:47 / 17:24	9	16:51 (SE02) / 17:00 (SE02)	07:21 / 18:01	06:39 / 18:32	06:50 / 20:04			06:12 / 20:34	45	19:02 (SE04) / 19:47 (SE04)	05:56 / 20:57	31	19:13 (SE04) / 19:44 (SE04)
16	07:47 / 17:25	9	16:51 (SE02) / 17:00 (SE02)	07:19 / 18:02	06:38 / 18:33	06:48 / 20:05			06:11 / 20:35	46	19:01 (SE04) / 19:47 (SE04)	05:56 / 20:57	31	19:13 (SE04) / 19:44 (SE04)
17	07:46 / 17:27	9	16:53 (SE02) / 17:02 (SE02)	07:18 / 18:03	06:36 / 18:34	06:47 / 20:06			06:10 / 20:36	46	19:01 (SE04) / 19:47 (SE04)	05:57 / 20:57	31	19:13 (SE04) / 19:44 (SE04)
18	07:46 / 17:28	9	16:54 (SE02) / 17:03 (SE02)	07:17 / 18:04	06:35 / 18:35	06:45 / 20:07			06:09 / 20:37	46	19:01 (SE04) / 19:47 (SE04)	05:57 / 20:58	30	19:14 (SE04) / 19:44 (SE04)
19	07:45 / 17:29	8	16:56 (SE02) / 17:04 (SE02)	07:15 / 18:06	06:33 / 18:36	06:44 / 20:08			06:08 / 20:38	46	19:01 (SE04) / 19:47 (SE04)	05:57 / 20:58	30	19:15 (SE04) / 19:45 (SE04)
20	07:45 / 17:30	5	16:59 (SE02) / 17:04 (SE02)	07:14 / 18:07	06:31 / 18:37	06:42 / 20:09			06:07 / 20:39	46	19:01 (SE04) / 19:47 (SE04)	05:57 / 20:58	30	19:15 (SE04) / 19:45 (SE04)
21	07:44 / 17:31			07:13 / 18:08	06:30 / 18:38	06:41 / 20:10			06:06 / 20:40	45	19:02 (SE04) / 19:47 (SE04)	05:57 / 20:59	30	19:15 (SE04) / 19:45 (SE04)
22	07:44 / 17:32			07:11 / 18:09	06:28 / 18:39	06:40 / 20:11			06:06 / 20:40	45	19:02 (SE04) / 19:47 (SE04)	05:57 / 20:59	30	19:15 (SE04) / 19:45 (SE04)
23	07:43 / 17:33			07:10 / 18:10	06:26 / 18:40	06:38 / 20:12			06:05 / 20:41	44	19:02 (SE04) / 19:46 (SE04)	05:58 / 20:59	30	19:15 (SE04) / 19:45 (SE04)
24	07:42 / 17:35			07:08 / 18:11	06:25 / 18:41	06:37 / 20:13			06:04 / 20:42	44	19:03 (SE04) / 19:47 (SE04)	05:58 / 20:59	30	19:16 (SE04) / 19:46 (SE04)
25	07:42 / 17:36			07:07 / 18:13	06:23 / 18:42	06:35 / 20:14			06:04 / 20:43	43	19:03 (SE04) / 19:46 (SE04)	05:58 / 20:59	30	19:16 (SE04) / 19:46 (SE04)
26	07:41 / 17:37			07:06 / 18:14	06:22 / 18:43	06:34 / 20:15			06:03 / 20:44	43	19:04 (SE04) / 19:47 (SE04)	05:58 / 20:59	31	19:15 (SE04) / 19:46 (SE04)
27	07:40 / 17:38			07:04 / 18:15	06:20 / 18:45	06:33 / 20:16			06:02 / 20:45	42	19:04 (SE04) / 19:46 (SE04)	05:59 / 20:59	31	19:16 (SE04) / 19:47 (SE04)
28	07:39 / 17:39			07:03 / 18:16	06:18 / 18:46	06:31 / 20:17	14	19:18 (SE04) / 19:32 (SE04)	06:02 / 20:45	42	19:04 (SE04) / 19:46 (SE04)	05:59 / 20:59	31	19:16 (SE04) / 19:47 (SE04)
29	07:38 / 17:41				07:17 / 19:47	06:30 / 20:18	21	19:15 (SE04) / 19:36 (SE04)	06:01 / 20:46	41	19:05 (SE04) / 19:46 (SE04)	05:59 / 20:59	32	19:16 (SE04) / 19:48 (SE04)
30	07:38 / 17:42				07:15 / 19:48	06:29 / 20:19	25	19:13 (SE04) / 19:38 (SE04)	06:01 / 20:47	40	19:05 (SE04) / 19:45 (SE04)	06:00 / 20:59	32	19:16 (SE04) / 19:48 (SE04)
31	07:37 / 17:43				07:13 / 19:49				06:00 / 20:48	41	19:05 (SE04) / 19:46 (SE04)			
Potential sun hours	300			299	370	397			446			449		
Total, worst case	198					60			1303			985		

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)

Project:
Progetto_Sorgenia Seneghe-Narbolia

Licensed user:
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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar

Calculation: Progetto_Worst_case_20240408Shadow receptor: F49 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (74)
Assumptions for shadow calculations
The calculated times are "worst case" given by the following assumptions:
    The sun is shining all the day, from sunrise to sunset
    The rotor plane is always perpendicular to the line from the WTG to the sun
    The WTG is always operating

	July			August			September	October		November			December		
1	06:00		19:15 (SE04)	06:23		19:12 (SE04)	06:53	07:22		06:54			07:28		16:29 (SE02)
	20:59	33	19:48 (SE04)	20:41	45	19:57 (SE04)	19:59	19:10		17:25			17:02	8	16:37 (SE02)
2	06:01		19:16 (SE04)	06:24		19:12 (SE04)	06:54	07:23		06:55			07:29		16:29 (SE02)
	20:59	33	19:49 (SE04)	20:40	44	19:56 (SE04)	19:58	19:08		17:24			17:01	7	16:36 (SE02)
3	06:01		19:15 (SE04)	06:25		19:13 (SE04)	06:55	07:24		06:57			07:30		16:29 (SE02)
	20:59	34	19:49 (SE04)	20:39	43	19:56 (SE04)	19:56	19:07		17:22			17:01	7	16:36 (SE02)
4	06:02		19:15 (SE04)	06:26		19:13 (SE04)	06:56	07:25		06:58			07:31		16:29 (SE02)
	20:59	35	19:50 (SE04)	20:38	43	19:56 (SE04)	19:55	19:05		17:21			17:01	7	16:36 (SE02)
5	06:02		19:15 (SE04)	06:27		19:14 (SE04)	06:57	07:25		06:59			07:32		16:30 (SE02)
	20:59	35	19:50 (SE04)	20:37	41	19:55 (SE04)	19:53	19:04		17:20			17:01	6	16:36 (SE02)
6	06:03		19:15 (SE04)	06:28		19:14 (SE04)	06:58	07:27		07:00			07:33		16:30 (SE02)
	20:58	36	19:51 (SE04)	20:36	41	19:55 (SE04)	19:52	19:02		17:19			17:01	6	16:36 (SE02)
7	06:04		19:15 (SE04)	06:29		19:15 (SE04)	06:59	07:28		07:01			07:34		16:30 (SE02)
	20:58	37	19:52 (SE04)	20:34	39	19:54 (SE04)	19:50	19:00		17:18			17:01	6	16:36 (SE02)
8	06:04		19:14 (SE04)	06:30		19:15 (SE04)	07:00	07:29		07:02			07:35		15:27 (SE03)
	20:58	37	19:51 (SE04)	20:33	37	19:52 (SE04)	19:48	18:59		17:17			17:01	13	16:36 (SE02)
9	06:05		19:15 (SE04)	06:31		19:15 (SE04)	07:00	07:30		07:04			07:36		15:24 (SE03)
	20:58	37	19:52 (SE04)	20:32	36	19:51 (SE04)	19:46	18:57		17:16			17:01	19	16:36 (SE02)
10	06:05		19:15 (SE04)	06:32		19:16 (SE04)	07:01	07:31		07:05			07:37		15:23 (SE03)
	20:57	38	19:53 (SE04)	20:31	34	19:50 (SE04)	19:45	18:56		17:15			17:01	22	16:36 (SE02)
11	06:06		19:14 (SE04)	06:33		19:18 (SE04)	07:02	07:32		07:06			07:37		15:23 (SE03)
	20:57	39	19:53 (SE04)	20:30	31	19:49 (SE04)	19:43	18:54		17:14			17:01	22	16:36 (SE02)
12	06:07		19:14 (SE04)	06:34		19:19 (SE04)	07:03	07:33		07:07			07:38		15:21 (SE03)
	20:56	40	19:54 (SE04)	20:28	28	19:47 (SE04)	19:42	18:53		17:13			17:01	25	16:35 (SE02)
13	06:07		19:14 (SE04)	06:35		19:21 (SE04)	07:04	07:34		07:08			07:39		15:21 (SE03)
	20:56	40	19:54 (SE04)	20:27	24	19:45 (SE04)	19:40	18:51		17:12			17:01	27	16:36 (SE02)
14	06:08		19:13 (SE04)	06:36		19:23 (SE04)	07:05	07:35		07:09			07:40		15:21 (SE03)
	20:55	41	19:54 (SE04)	20:26	20	19:43 (SE04)	19:38	18:50		17:11			17:01	27	16:36 (SE02)
15	06:09		19:13 (SE04)	06:37		19:26 (SE04)	07:06	07:36		07:10			07:41		15:21 (SE03)
	20:55	42	19:55 (SE04)	20:24	13	19:39 (SE04)	19:37	18:48		17:11			17:01	28	16:37 (SE02)
16	06:10		19:13 (SE04)	06:38				07:07	07:37		07:12			07:41		15:20 (SE03)
	20:54	43	19:56 (SE04)	20:23			19:35	18:47		17:10			17:02	30	16:36 (SE02)
17	06:10		19:13 (SE04)	06:39			07:08	07:38		07:13			07:42		15:21 (SE03)
	20:54	43	19:56 (SE04)	20:22			19:33	18:45		17:09			17:02	30	16:37 (SE02)
18	06:11		19:12 (SE04)	06:40			07:09	07:39		07:14			07:43		15:21 (SE03)
	20:53	44	19:56 (SE04)	20:20			19:32	18:44		17:08			17:02	30	16:37 (SE02)
19	06:12		19:12 (SE04)	06:40			07:10	07:40		07:15			07:43		15:21 (SE03)
	20:52	44	19:56 (SE04)	20:19			19:30	18:42		17:07			17:03	30	16:37 (SE02)
20	06:13		19:12 (SE04)	06:41			07:11	07:41		07:16			07:44		15:22 (SE03)
	20:52	45	19:57 (SE04)	20:17			19:28	18:41		17:07			17:03	30	16:38 (SE02)
21	06:14		19:12 (SE04)	06:42			07:12	07:42		07:17			07:44		15:21 (SE03)
	20:51	45	19:57 (SE04)	20:16			19:27	18:39		17:06			17:04	31	16:38 (SE02)
22	06:15		19:11 (SE04)	06:43			07:13	07:43		07:18		16:35 (SE02)	07:45		15:22 (SE03)
	20:50	46	19:57 (SE04)	20:15			19:25	18:38	5	16:40 (SE02)	17:06		17:04	31	16:39 (SE02)
23	06:15		19:12 (SE04)	06:44			07:14	07:44		07:20		16:32 (SE02)	07:45		15:23 (SE03)
	20:49	45	19:57 (SE04)	20:13			19:23	18:36	8	16:40 (SE02)	17:05		17:04	30	16:39 (SE02)
24	06:16		19:12 (SE04)	06:45			07:15	07:45		07:21		16:32 (SE02)	07:46		15:23 (SE03)
	20:49	45	19:57 (SE04)	20:12			19:22	18:35	9	16:41 (SE02)	17:05		17:05	30	16:39 (SE02)
25	06:17		19:12 (SE04)	06:46			07:16	06:46		07:22		16:31 (SE02)	07:46		15:24 (SE03)
	20:48	45	19:57 (SE04)	20:10			19:20	17:34	9	16:40 (SE02)	17:04		17:06	30	16:40 (SE02)
26	06:18		19:12 (SE04)	06:47			07:17	06:48		07:23		16:30 (SE02)	07:47		15:24 (SE03)
	20:47	46	19:58 (SE04)	20:09			19:18	17:32	9	16:39 (SE02)	17:03		17:06	31	16:41 (SE02)
27	06:19		19:12 (SE04)	06:48			07:18	06:49		07:24		16:30 (SE02)	07:47		15:25 (SE03)
	20:46	46	19:58 (SE04)	20:07			19:17	17:31	9	16:39 (SE02)	17:03		17:07	30	16:41 (SE02)
28	06:20		19:12 (SE04)	06:49			07:19	06:50		07:25		16:29 (SE02)	07:47		15:27 (SE03)
	20:45	46	19:58 (SE04)	20:06			19:15	17:30	9	16:38 (SE02)	17:03		17:08	28	16:42 (SE02)
29	06:21		19:11 (SE04)	06:50			07:20	06:51		07:26		16:29 (SE02)	07:48		15:28 (SE03)
	20:44	46	19:57 (SE04)	20:04			19:13	17:29	9	16:38 (SE02)	17:02		17:08	27	16:43 (SE02)
30	06:22		19:11 (SE04)	06:51			07:21	06:52		07:27		16:29 (SE02)	07:48		15:28 (SE03)
	20:43	46	19:57 (SE04)	20:02			19:12	17:27	8	16:37 (SE02)	17:02		17:09	27	16:43 (SE02)
31	06:22		19:12 (SE04)	06:52				06:53					07:48		15:30 (SE03)
	20:42	45	19:57 (SE04)	20:01				17:26					17:10	25	16:44 (SE02)
Potential sun hours	456			426			375	346		300			291		
Total, worst case		1277			519						75			700	

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)

Project:
Progetto_Sorgenia Seneghe-Narbolia

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Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar

Calculation: Progetto_Worst_case_20240408 Shadow receptor: F59 - Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (75)

Assumptions for shadow calculations

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

	January	February	March		April		May	June	July	August	September		October		November	December
1	07:48	07:36	07:01		07:12		08:32 (NA10)	06:28	06:00	06:01	06:24	06:53		07:22		08:12 (NA10) 06:54	07:28
	17:11	17:44	18:17		19:50	28	09:00 (NA10)	20:20	20:49	20:59	20:41	19:59		19:10	40	08:52 (NA10) 17:25	17:02
2	07:49	07:35	07:00		07:10		08:34 (NA10)	06:26	05:59	06:01	06:25	06:54		07:23		08:13 (NA10) 06:56	07:29
	17:12	17:46	18:18		19:51	24	08:58 (NA10)	20:21	20:49	20:59	20:40	19:58		19:09	38	08:51 (NA10) 17:24	17:02
3	07:49	07:34	06:58		07:09		08:36 (NA10)	06:25	05:59	06:02	06:25	06:55		07:24		08:14 (NA10) 06:57	07:30
	17:13	17:47	18:19		19:52	18	08:54 (NA10)	20:22	20:50	20:59	20:39	19:56		19:07	35	08:49 (NA10) 17:23	17:01
4	07:49	07:33	06:57		07:07		08:40 (NA10)	06:24	05:59	06:02	06:26	06:56		07:25		08:15 (NA10) 06:58	07:31
	17:14	17:48	18:20		19:53	9	08:49 (NA10)	20:23	20:51	20:59	20:38	19:55		19:05	33	08:48 (NA10) 17:22	17:01
5	07:49	07:32	06:55		07:06			06:23	05:58	06:03	06:27	06:57		07:26		08:16 (NA10) 06:59	07:32
	17:14	17:49	18:22		19:54			20:24	20:51	20:59	20:37	19:53		19:04	30	08:18 (NA10) 07:00	17:01
6	07:49	07:31	06:54		07:47 (NA10) 07:04			06:21	05:58	06:03	06:28	06:58		07:27		08:18 (NA10) 07:00	07:33
	17:15	17:50	18:23	15	08:02 (NA10) 19:55			20:25	20:52	20:58	20:36	19:51		19:02	25	08:43 (NA10) 17:19	17:01
7	07:49	07:30	06:52		07:44 (NA10) 07:02			06:20	05:58	06:04	06:29	06:59		07:28		08:21 (NA10) 07:01	07:34
	17:16	17:52	18:24	22	08:06 (NA10) 19:56			20:26	20:53	20:58	20:35	19:50		19:01	19	08:40 (NA10) 17:18	17:01
8	07:49	07:29	06:51		07:41 (NA10) 07:01			06:19	05:57	06:04	06:30	07:00	08:36 (NA10)	07:29		08:25 (NA10) 07:02	07:35
	17:17	17:53	18:25	27	08:08 (NA10) 19:57			20:27	20:53	20:58	20:33	19:48	7	08:43 (NA10) 18:59	10	08:35 (NA10) 17:17	17:01
9	07:48	07:28	06:49		07:39 (NA10) 06:59			06:18	05:57	06:05	06:31	07:01	08:31 (NA10)	07:30		07:04	07:36
	17:18	17:54	18:26	31	08:10 (NA10) 19:58			20:28	20:54	20:58	20:32	19:47	17	08:48 (NA10) 18:57		17:16	17:01
10	07:48	07:27	06:47		07:37 (NA10) 06:58			06:17	05:57	06:06	06:32	07:02	08:28 (NA10)	07:31		07:05	07:37
	17:19	17:55	18:27	34	08:11 (NA10) 19:59			20:29	20:54	20:57	20:31	19:45	23	08:51 (NA10) 18:56		17:15	17:01
11	07:48	07:25	06:46		07:35 (NA10) 06:56			06:16	05:57	06:06	06:33	07:03	08:25 (NA10)	07:32		07:06	07:37
	17:48	17:56	18:28	37	08:12 (NA10) 20:00			20:30	20:55	20:57	20:30	19:43	28	08:53 (NA10) 18:54		17:14	17:01
12	07:48	07:24	06:44		07:32 (NA10) 06:55			06:15	05:57	06:07	06:34	07:04	08:22 (NA10)	07:33		07:07	07:38
	17:21	17:58	18:29	39	08:13 (NA10) 20:01			20:31	20:55	20:56	20:28	19:42	31	08:53 (NA10) 18:53		17:13	17:01
13	07:47	07:23	06:43		07:32 (NA10) 06:53			06:14	05:57	06:08	06:35	07:04	08:21 (NA10)	07:34		07:08	07:39
	17:22	17:59	18:30	42	08:14 (NA10) 20:02			20:32	20:56	20:56	20:27	19:40	34	08:55 (NA10) 18:51		17:12	17:01
14	07:47	07:22	06:41		07:32 (NA10) 06:51			06:13	05:57	06:08	06:36	07:05	08:19 (NA10)	07:35		07:09	07:40
	17:23	18:00	18:31	43	08:15 (NA10) 20:03			20:33	20:56	20:55	20:26	19:38	37	08:56 (NA10) 18:50		17:12	17:01
15	07:47	07:21	06:40		07:30 (NA10) 06:50			06:12	05:57	06:09	06:37	07:06	08:18 (NA10)	07:36		07:11	07:41
	17:25	18:01	18:32	45	08:15 (NA10) 20:04			20:34	20:57	20:55	20:24	19:37	39	08:57 (NA10) 18:48		17:11	17:02
16	07:47	07:19	06:38		07:29 (NA10) 06:48			06:11	05:57	06:10	06:38	07:07	08:17 (NA10)	07:37		07:12	07:41
	17:26	18:02	18:33	45	08:14 (NA10) 20:05			20:35	20:57	20:54	20:23	19:35	40	08:57 (NA10) 18:47		17:10	17:02
17	07:46	07:18	06:36		07:29 (NA10) 06:47			06:10	05:57	06:11	06:39	07:08	08:16 (NA10)	07:38		07:13	07:42
	17:27	18:03	18:34	46	08:15 (NA10) 20:06			20:36	20:57	20:54	20:22	19:33	42	08:58 (NA10) 18:45		17:09	17:02
18	07:46	07:17	06:35		07:28 (NA10) 06:45			06:09	05:57	06:11	06:40	07:09	08:15 (NA10)	07:39		07:14	07:43
	17:28	18:05	18:35	47	08:15 (NA10) 20:07			20:37	20:58	20:53	20:20	19:32	43	08:58 (NA10) 18:44		17:08	17:03
19	07:45	07:15	06:33		07:27 (NA10) 06:44			06:08	05:57	06:12	06:41	07:10	08:14 (NA10)	07:40		07:15	07:43
	17:29	18:06	18:36	47	08:14 (NA10) 20:08			20:38	20:58	20:52	20:19	19:30	45	08:59 (NA10) 18:42		17:08	17:03
20	07:45	07:14	06:31		07:28 (NA10) 06:43			06:07	05:57	06:13	06:42	07:11	08:13 (NA10)	07:41		07:16	07:44
	17:31	18:07	18:37	46	08:14 (NA10) 20:09			20:39	20:58	20:52	20:17	19:28	46	08:59 (NA10) 18:41		17:07	17:03
21	07:44	07:13	06:30		07:27 (NA10) 06:41			06:07	05:57	06:14	06:43	07:12	08:13 (NA10)	07:42		07:17	07:44
	17:32	18:08	18:38	47	08:14 (NA10) 20:10			20:40	20:59	20:51	20:16	19:27	46	08:59 (NA10) 18:39		17:06	17:04
22	07:44	07:11	06:28		07:26 (NA10) 06:40			06:06	05:57	06:15	06:44	07:13	08:12 (NA10)	07:43		07:19	07:45
	17:34	18:09	18:40	47	08:13 (NA10) 20:11			20:40	20:59	20:50	20:15	19:25	47	08:59 (NA10) 18:38		17:06	17:04
23	07:43	07:10	06:27		07:27 (NA10) 06:38			06:05	05:58	06:16	06:44	07:14	08:12 (NA10)	07:44		07:20	07:45
	17:35	18:10	18:41	46	08:13 (NA10) 20:12			20:41	20:59	20:49	20:13	19:23	47	08:59 (NA10) 18:37		17:05	17:05
24	07:42	07:09	06:25		07:27 (NA10) 06:37			06:04	05:58	06:16	06:45	07:15	08:12 (NA10)	07:45		07:21	07:46
	17:36	18:12	18:42	44	08:11 (NA10) 20:13			20:42	20:59	20:49	20:12	19:22	46	08:58 (NA10) 18:35		17:05	17:06
25	07:42	07:07	06:23		07:27 (NA10) 06:35			06:04	05:58	06:17	06:46	07:16	08:12 (NA10)	06:47		07:22	07:46
	17:36	18:13	18:43	44	08:11 (NA10) 20:14			20:43	20:59	20:48	20:10	19:20	46	08:58 (NA10) 17:34		17:04	17:06
26	07:41	07:06	06:22		07:27 (NA10) 06:34			06:03	05:59	06:18	06:47	07:17	08:10 (NA10)	06:48		07:23	07:47
	17:37	18:14	18:44	43	08:10 (NA10) 20:15			20:44	20:59	20:47	20:09	19:18	47	08:57 (NA10) 17:33		17:04	17:06
27	07:40	07:04	06:20		07:27 (NA10) 06:33			06:02	05:59	06:19	06:48	07:17	08:11 (NA10)	06:49		07:24	07:47
	17:38	18:15	18:45	41	08:08 (NA10) 20:16			20:45	20:59	20:46	20:07	19:17	45	08:56 (NA10) 17:31		17:03	17:07
28	07:39	07:03	06:18		07:28 (NA10) 06:31			06:02	05:59	06:20	06:49	07:18	08:11 (NA10)	06:50		07:25	07:47
	17:40	18:16	18:46	40	08:08 (NA10) 20:17			20:46	20:59	20:45	20:06	19:15	44	08:55 (NA10) 17:30		17:03	17:08
29	07:39		06:17		08:29 (NA10) 06:30			06:01	06:00	06:21	06:50	07:19	08:11 (NA10)	06:51		07:26	07:48
	17:41		19:47	37	09:06 (NA10) 20:18			20:46	20:59	20:44	20:04	19:14	43	08:54 (NA10) 17:29		17:02	17:08
30	07:38		06:15		08:29 (NA10) 06:29			06:01	06:00	06:22	06:51	07:21	08:11 (NA10)	06:52		07:27	07:48
	17:42		19:48	35	09:04 (NA10) 20:19			20:47	20:59	20:43	20:03	19:12	42	08:53 (NA10) 17:27		17:02	17:09
31	07:37		06:14		08:31 (NA10)				06:00	06:23	06:52			06:53			07:48
	17:43		19:49	31	09:02 (NA10)				20:48		20:42	20:01		17:26			17:10
Potential sun hours	300	299	370		397		446	449	456	426	375		346		300	291
Total, worst case				1021		79						885		230		

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, graphical

Calculation: Progetto_Worst_case_20240408

F08: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (71)
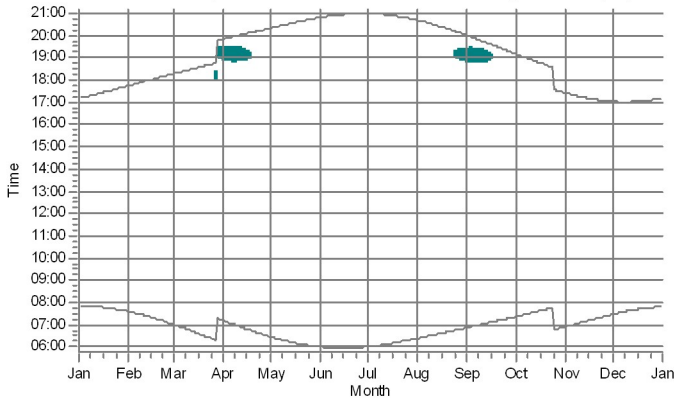
F20: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (72)

F35: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (73)

F49: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (74)
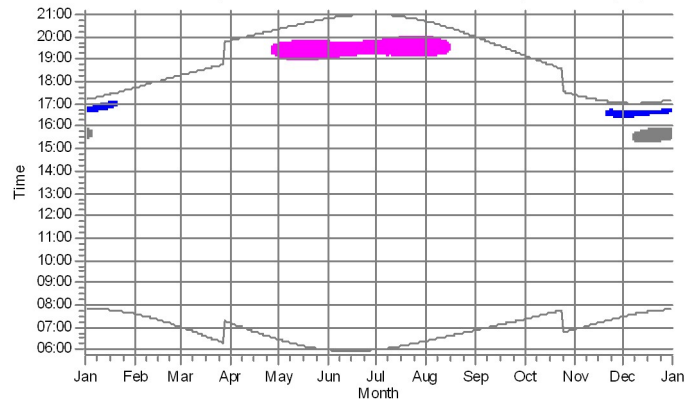
F59: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (75)
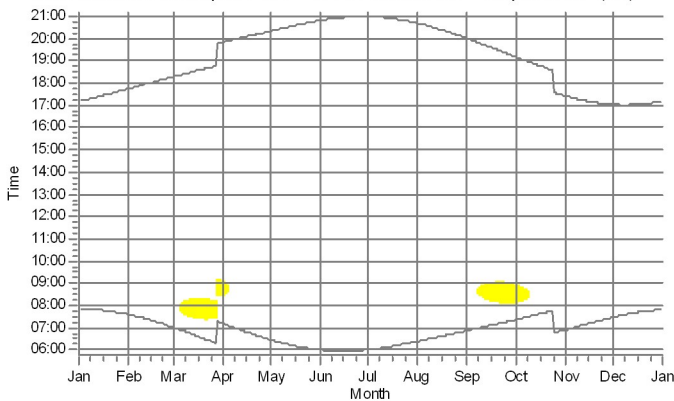
WTGs

NA10: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (84)
SE02: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (85)
SE03: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (86)
SE04: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (87)
SE06: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (88)

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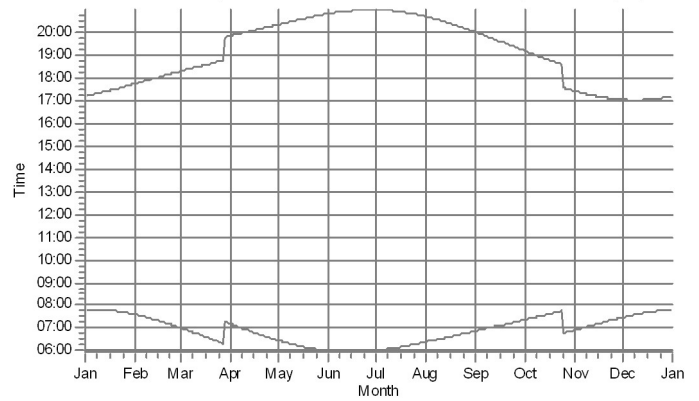Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar per WTG

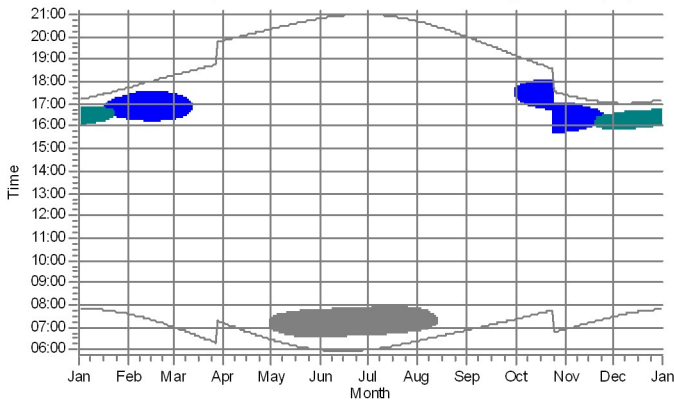Calculation: Progetto_Worst_case_20240408WTG: NA09 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (83)

Assumptions for shadow calculations

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:36	07:01	07:12	06:27	06:00	06:00	06:24	06:53	07:22	06:54	07:28
	17:11	17:44	18:17	19:50	20:20	20:49	20:59	20:41	19:59	19:10	17:25	17:02
2	07:49	07:35	07:00	07:10	06:26	05:59	06:01	06:24	06:54	07:23	06:56	07:29
	17:12	17:45	18:18	19:51	20:21	20:49	20:59	20:40	19:58	19:09	17:24	17:01
3	07:49	07:34	06:58	07:09	06:25	05:59	06:01	06:25	06:55	07:24	06:57	07:30
	17:13	17:47	18:19	19:52	20:22	20:50	20:59	20:39	19:56	19:07	17:23	17:01
4	07:49	07:33	06:57	07:07	06:24	05:59	06:02	06:26	06:56	07:25	06:58	07:31
	17:13	17:48	18:20	19:53	20:23	20:51	20:59	20:38	19:55	19:05	17:21	17:01
5	07:49	07:32	06:55	07:05	06:23	05:58	06:02	06:27	06:57	07:26	06:59	07:32
	17:14	17:49	18:21	19:54	20:24	20:51	20:59	20:37	19:53	19:04	17:20	17:01
6	07:49	07:31	06:54	07:04	06:21	05:58	06:03	06:28	06:58	07:27	07:00	07:33
	17:15	17:50	18:23	19:55	20:25	20:52	20:58	20:36	19:51	19:02	17:19	17:01
7	07:49	07:30	06:52	07:02	06:20	05:58	06:04	06:29	06:59	07:28	07:01	07:34
	17:16	17:52	18:24	19:56	20:26	20:53	20:58	20:34	19:50	19:01	17:18	17:01
8	07:49	07:29	06:51	07:01	06:19	05:57	06:04	06:30	07:00	07:29	07:02	07:35
	17:17	17:53	18:25	19:57	20:27	20:53	20:58	20:33	19:48	18:59	17:17	17:01
9	07:48	07:28	06:49	06:59	06:18	05:57	06:05	06:31	07:01	07:30	07:04	07:36
	17:18	17:54	18:26	19:58	20:28	20:54	20:58	20:32	19:47	18:57	17:16	17:01
10	07:48	07:27	06:47	06:58	06:17	05:57	06:06	06:32	07:02	07:31	07:05	07:37
	17:19	17:55	18:27	19:59	20:29	20:54	20:57	20:31	19:45	18:56	17:15	17:01
11	07:48	07:25	06:46	06:56	06:16	05:57	06:06	06:33	07:02	07:32	07:06	07:37
	17:20	17:56	18:28	20:00	20:30	20:55	20:57	20:30	19:43	18:54	17:14	17:01
12	07:48	07:24	06:44	06:54	06:15	05:57	06:07	06:34	07:03	07:33	07:07	07:38
	17:21	17:58	18:29	20:01	20:31	20:55	20:56	20:28	19:42	18:53	17:13	17:01
13	07:47	07:23	06:43	06:53	06:14	05:57	06:08	06:35	07:04	07:34	07:08	07:39
	17:22	17:59	18:30	20:02	20:32	20:56	20:56	20:27	19:40	18:51	17:12	17:01
14	07:47	07:22	06:41	06:51	06:13	05:57	06:08	06:36	07:05	07:35	07:09	07:40
	17:23	18:00	18:31	20:03	20:33	20:56	20:55	20:26	19:38	18:50	17:11	17:01
15	07:47	07:21	06:39	06:50	06:12	05:57	06:09	06:37	07:06	07:36	07:10	07:41
	17:24	18:01	18:32	20:04	20:34	20:57	20:55	20:24	19:37	18:48	17:11	17:02
16	07:47	07:19	06:38	06:48	06:11	05:57	06:10	06:38	07:07	07:37	07:12	07:41
	17:26	18:02	18:33	20:05	20:35	20:57	20:54	20:23	19:35	18:47	17:10	17:02
17	07:46	07:18	06:36	06:47	06:10	05:57	06:11	06:39	07:08	07:38	07:13	07:42
	17:27	18:03	18:34	20:06	20:36	20:57	20:54	20:22	19:33	18:45	17:09	17:02
18	07:46	07:17	06:35	06:45	06:09	05:57	06:11	06:40	07:09	07:39	07:14	07:43
	17:28	18:05	18:35	20:07	20:37	20:58	20:53	20:20	19:32	18:44	17:08	17:02
19	07:45	07:15	06:33	06:44	06:08	05:57	06:12	06:41	07:10	07:40	07:15	07:43
	17:29	18:06	18:36	20:08	20:38	20:52	20:52	20:19	19:30	18:42	17:08	17:03
20	07:45	07:14	06:31	06:42	06:07	05:57	06:13	06:42	07:11	07:41	07:16	07:44
	17:30	18:07	18:37	20:09	20:39	20:58	20:52	20:17	19:28	18:41	17:07	17:03
21	07:44	07:13	06:30	06:41	06:07	05:57	06:14	06:43	07:12	07:42	07:17	07:44
	17:31	18:08	18:38	20:10	20:40	20:59	20:51	20:16	19:27	18:39	17:06	17:04
22	07:44	07:11	06:28	06:40	06:06	05:57	06:15	06:43	07:13	07:43	07:18	07:45
	17:32	18:09	18:39	20:11	20:40	20:59	20:50	20:15	19:25	18:38	17:06	17:04
23	07:43	07:10	06:27	06:38	06:05	05:58	06:16	06:44	07:14	07:44	07:20	07:45
	17:34	18:10	18:40	20:12	20:41	20:59	20:49	20:13	19:23	18:37	17:05	17:05
24	07:42	07:08	06:25	06:37	06:04	05:58	06:16	06:45	07:15	07:45	07:21	07:46
	17:35	18:11	18:42	20:13	20:42	20:59	20:49	20:12	19:22	18:35	17:05	17:05
25	07:42	07:07	06:23	06:35	06:04	05:58	06:17	06:46	07:16	06:47	07:22	07:46
	17:36	18:13	18:43	20:14	20:43	20:59	20:48	20:10	19:20	17:34	17:04	17:06
26	07:41	07:06	06:22	06:34	06:03	05:58	06:18	06:47	07:17	06:48	07:23	07:47
	17:37	18:14	18:44	20:15	20:44	20:59	20:47	20:09	19:18	17:33	17:04	17:06
27	07:40	07:04	06:20	06:33	06:02	05:59	06:19	06:48	07:18	06:49	07:24	07:47
	17:38	18:15	18:45	20:16	20:45	20:59	20:46	20:07	19:17	17:31	17:03	17:07
28	07:39	07:03	06:18	06:31	06:02	05:59	06:20	06:49	07:19	06:50	07:25	07:47
	17:39	18:16	18:46	20:17	20:45	20:59	20:45	20:06	19:15	17:30	17:03	17:08
29	07:38		07:17	06:30	06:01	06:00	06:21	06:50	07:20	06:51	07:26	07:48
	17:41		19:47	20:18	20:46	20:59	20:44	20:04	19:13	17:29	17:02	17:08
30	07:38		07:15	06:29	06:01	06:00	06:22	06:51	07:21	06:52	07:27	07:48
	17:42		19:48	20:19	20:47	20:59	20:43	20:02	19:12	17:27	17:02	17:09
31	07:37		07:14		06:00		06:23	06:52		06:53		07:48
	17:43		19:49		20:48		20:42	20:01		17:26		17:10
Potential sun hours	300	299	370	397	446	449	456	426	375	346	300	291
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Project:
Progetto_Sorgenia Seneghe-Narbolia

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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_Worst_case_20240408WTG: NA10 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (84)

Assumptions for shadow calculations

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

	January	February	March		April		May	June	July	August	September		October		November	December
1	07:48	07:36	07:01		07:12 08:32-09:00/28		06:28	06:00	06:00	06:24	06:53		07:22 08:12-08:52/40		06:54	07:28
	17:11	17:44	18:17		19:50		20:20	20:49	20:59	20:41	19:59		19:10		17:25	17:02
2	07:48	07:35	07:00		07:10 08:34-08:58/24		06:26	05:59	06:01	06:25	06:54		07:23 08:13-08:51/38		06:56	07:29
	17:12	17:46	18:18		19:51		20:21	20:49	20:59	20:40	19:58		19:09		17:24	17:01
3	07:49	07:34	06:58		07:09 08:36-08:54/18		06:25	05:59	06:01	06:25	06:55		07:24 08:14-08:49/35		06:57	07:30
	17:13	17:47	18:19		19:52		20:22	20:50	20:59	20:39	19:56		19:07		17:23	17:01
4	07:49	07:33	06:57		07:07 08:40-08:49/9		06:24	05:59	06:02	06:26	06:56		07:25 08:15-08:48/33		06:58	07:31
	17:14	17:48	18:20		19:53		20:23	20:51	20:59	20:38	19:55		19:05		17:21	17:01
5	07:49	07:32	06:55		07:06		06:23	05:58	06:03	06:27	06:57		07:26 08:16-08:46/30		06:59	07:32
	17:14	17:49	18:22		19:54		20:24	20:51	20:59	20:37	19:53		19:04		17:20	17:01
6	07:49	07:31	06:54 07:47-08:02/15		07:04		06:21	05:58	06:03	06:28	06:58		07:27 08:18-08:43/25		07:00	07:33
	17:15	17:50	18:23		19:55		20:25	20:52	20:58	20:36	19:51		19:02		17:19	17:01
7	07:49	07:30	06:52 07:44-08:06/22		07:02		06:20	05:58	06:04	06:29	06:59		07:28 08:21-08:40/19		07:01	07:34
	17:16	17:52	18:24		19:56		20:26	20:53	20:58	20:34	19:50		19:01		17:18	17:01
8	07:49	07:29	06:51 07:41-08:08/27		07:01		06:19	05:57	06:04	06:30	07:00 08:36-08:43/7		07:29 08:25-08:35/10		07:02	07:35
	17:17	17:53	18:25		19:57		20:27	20:53	20:58	20:33	19:48		18:59		17:17	17:01
9	07:48	07:28	06:49 07:39-08:10/31		06:59		06:18	05:57	06:05	06:31	07:01 08:31-08:48/17		07:30		07:04	07:36
	17:18	17:54	18:26		19:58		20:28	20:54	20:58	20:32	19:47		18:57		17:16	17:01
10	07:48	07:27	06:47 07:37-08:11/34		06:58		06:17	05:57	06:06	06:32	07:02 08:28-08:51/23		07:31		07:05	07:37
	17:19	17:55	18:27		19:59		20:29	20:54	20:57	20:31	19:45		18:56		17:15	17:01
11	07:48	07:25	06:46 07:35-08:12/37		06:56		06:16	05:57	06:06	06:33	07:02 08:25-08:53/28		07:32		07:06	07:37
	17:20	17:56	18:28		20:00		20:30	20:55	20:57	20:30	19:43		18:54		17:14	17:01
12	07:48	07:24	06:44 07:34-08:13/39		06:55		06:15	05:57	06:07	06:34	07:03 08:22-08:53/31		07:33		07:07	07:38
	17:21	17:58	18:29		20:01		20:31	20:55	20:56	20:28	19:42		18:53		17:13	17:01
13	07:48	07:23	06:43 07:32-08:14/42		06:53		06:14	05:57	06:08	06:35	07:04 08:21-08:55/34		07:34		07:08	07:39
	17:22	17:59	18:30		20:02		20:32	20:56	20:56	20:27	19:40		18:51		17:12	17:01
14	07:47	07:22	06:41 07:32-08:15/43		06:51		06:13	05:57	06:08	06:36	07:05 08:19-08:56/37		07:35		07:09	07:40
	17:23	18:00	18:31		20:03		20:33	20:56	20:55	20:26	19:38		18:50		17:12	17:01
15	07:47	07:21	06:39 07:30-08:15/45		06:50		06:12	05:57	06:09	06:37	07:06 08:18-08:57/39		07:36		07:11	07:41
	17:24	18:01	18:32		20:04		20:34	20:57	20:55	20:24	19:37		18:48		17:11	17:02
16	07:47	07:19	06:38 07:29-08:14/45		06:48		06:11	05:57	06:10	06:38	07:07 08:17-08:57/40		07:37		07:12	07:41
	17:26	18:02	18:33		20:05		20:35	20:57	20:54	20:23	19:35		18:47		17:10	17:02
17	07:46	07:18	06:36 07:29-08:15/46		06:47		06:10	05:57	06:11	06:39	07:08 08:16-08:58/42		07:38		07:13	07:42
	17:27	18:03	18:34		20:06		20:36	20:57	20:54	20:22	19:33		18:45		17:09	17:02
18	07:46	07:17	06:35 07:28-08:15/47		06:45		06:09	05:57	06:11	06:40	07:09 08:15-08:58/43		07:39		07:14	07:43
	17:28	18:05	18:35		20:07		20:37	20:58	20:53	20:20	19:32		18:44		17:08	17:02
19	07:45	07:15	06:33 07:27-08:14/47		06:44		06:08	05:57	06:12	06:41	07:10 08:14-08:59/45		07:40		07:15	07:43
	17:29	18:06	18:36		20:08		20:38	20:58	20:52	20:19	19:30		18:42		17:08	17:03
20	07:45	07:14	06:31 07:28-08:14/46		06:43		06:07	05:57	06:13	06:42	07:11 08:13-08:59/46		07:41		07:16	07:44
	17:30	18:07	18:37		20:09		20:39	20:58	20:52	20:17	19:28		18:41		17:07	17:03
21	07:44	07:13	06:30 07:27-08:14/47		06:41		06:07	05:57	06:14	06:43	07:12 08:13-08:59/46		07:42		07:17	07:44
	17:31	18:08	18:38		20:10		20:40	20:59	20:51	20:16	19:27		18:39		17:06	17:04
22	07:44	07:11	06:28 07:26-08:13/47		06:40		06:06	05:57	06:15	06:44	07:13 08:12-08:59/47		07:43		07:18	07:45
	17:32	18:09	18:39		20:11		20:40	20:59	20:50	20:15	19:25		18:38		17:06	17:04
23	07:43	07:10	06:27 07:27-08:13/46		06:38		06:05	05:58	06:16	06:44	07:14 08:12-08:59/47		07:44		07:20	07:45
	17:34	18:10	18:41		20:12		20:41	20:59	20:49	20:13	19:23		18:37		17:05	17:05
24	07:42	07:08	06:25 07:27-08:11/44		06:37		06:04	05:58	06:16	06:45	07:15 08:12-08:58/46		07:45		07:21	07:46
	17:35	18:12	18:42		20:13		20:42	20:59	20:49	20:12	19:22		18:35		17:05	17:05
25	07:42	07:07	06:23 07:27-08:11/44		06:35		06:04	05:58	06:17	06:46	07:16 08:12-08:58/46		06:47		07:22	07:46
	17:36	18:13	18:43		20:14		20:43	20:59	20:48	20:10	19:20		17:34		17:04	17:06
26	07:41	07:06	06:22 07:27-08:10/43		06:34		06:03	05:58	06:18	06:47	07:17 08:10-08:57/47		06:48		07:23	07:47
	17:37	18:14	18:44		20:15		20:44	20:59	20:47	20:09	19:18		17:33		17:04	17:06
27	07:40	07:04	06:20 07:27-08:08/41		06:33		06:02	05:59	06:19	06:48	07:18 08:11-08:56/45		06:49		07:24	07:47
	17:38	18:15	18:45		20:16		20:45	20:59	20:46	20:07	19:17		17:31		17:03	17:07
28	07:39	07:03	06:18 07:28-08:08/40		06:31		06:02	05:59	06:20	06:49	07:19 08:11-08:55/44		06:50		07:25	07:47
	17:39	18:16	18:46		20:17		20:45	20:59	20:45	20:06	19:15		17:30		17:03	17:08
29	07:39		07:17 08:29-09:06/37		06:30		06:01	06:00	06:21	06:50	07:20 08:11-08:54/43		06:51		07:26	07:48
	17:41		19:47		20:18		20:46	20:59	20:44	20:04	19:13		17:29		17:02	17:08
30	07:38		07:15 08:29-09:04/35		06:29		06:01	06:00	06:22	06:51	07:21 08:11-08:53/42		06:52		07:27	07:48
	17:42		19:48		20:19		20:47	20:59	20:43	20:03	19:12		17:27		17:02	17:09
31	07:37		07:14 08:31-09:02/31				06:00		06:23	06:52			06:53			07:48
	17:43		19:49				20:48		20:42	20:01			17:26			17:10
Potential sun hours	300	299	370		397		446	449	456	426	375		346		300	291
Sum of minutes with flicker	0	0	1021		79		0	0	0	0	885		230		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_Sorgenia Seneghe-Narbolia

Licensed user:
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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_Worst_case_20240408WTG: SE02 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (85)

Assumptions for shadow calculations

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

	January		February		March		April	May	June
1	07:48	16:42-16:45/3	07:36	16:24-17:21/57	07:01	16:24-17:24/60	07:12	06:27	06:00
	17:11		17:44		18:17		19:50	20:20	20:49
2	07:49	16:42-16:46/4	07:35	16:24-17:22/58	07:00	16:24-17:22/58	07:10	06:26	05:59
	17:12		17:45		18:18		19:51	20:21	20:49
3	07:49	16:42-16:47/5	07:34	16:23-17:24/61	06:58	16:26-17:22/56	07:09	06:25	05:59
	17:13		17:47		18:19		19:52	20:22	20:50
4	07:49	16:43-16:47/4	07:33	16:23-17:25/62	06:57	16:26-17:20/54	07:07	06:24	05:58
	17:13		17:48		18:20		19:53	20:23	20:51
5	07:49	16:43-16:48/5	07:32	16:22-17:26/64	06:55	16:28-17:19/51	07:05	06:23	05:58
	17:14		17:49		18:21		19:54	20:24	20:51
6	07:49	16:44-16:49/5	07:31	16:21-17:26/65	06:54	16:29-17:17/48	07:04	06:21	05:58
	17:15		17:50		18:23		19:55	20:25	20:52
7	07:49	16:45-16:51/6	07:30	16:20-17:27/67	06:52	16:31-17:15/44	07:02	06:20	05:58
	17:16		17:51		18:24		19:56	20:26	20:53
8	07:49	16:45-16:52/7	07:29	16:20-17:27/67	06:51	16:33-17:13/40	07:01	06:19	05:57
	17:17		17:53		18:25		19:57	20:27	20:53
9	07:48	16:46-16:53/7	07:28	16:20-17:28/68	06:49	16:35-17:10/35	06:59	06:18	05:57
	17:18		17:54		18:26		19:58	20:28	20:54
10	07:48	16:47-16:54/7	07:27	16:20-17:29/69	06:47	16:38-17:08/30	06:58	06:17	05:57
	17:19		17:55		18:27		19:59	20:29	20:54
11	07:48	16:47-16:55/8	07:25	16:20-17:29/69	06:46	16:41-17:03/22	06:56	06:16	05:57
	17:20		17:56		18:28		20:00	20:30	20:55
12	07:48	16:48-16:56/8	07:24	16:19-17:29/70	06:44	16:48-16:58/10	06:54	06:15	05:57
	17:21		17:57		18:29		20:01	20:31	20:55
13	07:48	16:49-16:58/9	07:23	16:19-17:29/70	06:43		06:53	06:14	05:57
	17:22		17:59		18:30		20:02	20:32	20:56
14	07:47	16:49-16:58/9	07:22	16:19-17:30/71	06:41		06:51	06:13	05:57
	17:23		18:00		18:31		20:03	20:33	20:56
15	07:47	16:51-17:00/9	07:21	16:19-17:30/71	06:39		06:50	06:12	05:57
	17:24		18:01		18:32		20:04	20:34	20:57
16	07:47	16:51-17:00/9	07:19	16:18-17:30/72	06:38		06:48	06:11	05:57
	17:26		18:02		18:33		20:05	20:35	20:57
17	07:46	16:53-17:02/9	07:18	16:19-17:30/71	06:36		06:47	06:10	05:57
	17:27		18:03		18:34		20:06	20:36	20:57
18	07:46	16:45-17:03/18	07:17	16:19-17:30/71	06:35		06:45	06:09	05:57
	17:28		18:05		18:35		20:07	20:37	20:58
19	07:45	16:41-17:04/23	07:15	16:19-17:29/70	06:33		06:44	06:08	05:57
	17:29		18:06		18:36		20:08	20:38	20:58
20	07:45	16:38-17:04/26	07:14	16:19-17:29/70	06:31		06:42	06:07	05:57
	17:30		18:07		18:37		20:09	20:39	20:58
21	07:44	16:37-17:05/28	07:13	16:20-17:30/70	06:30		06:41	06:07	05:57
	17:31		18:08		18:38		20:10	20:40	20:59
22	07:44	16:34-17:07/33	07:11	16:20-17:29/69	06:28		06:40	06:06	05:57
	17:32		18:09		18:39		20:11	20:40	20:59
23	07:43	16:33-17:09/36	07:10	16:20-17:29/69	06:26		06:38	06:05	05:58
	17:33		18:10		18:40		20:12	20:41	20:59
24	07:42	16:31-17:10/39	07:08	16:20-17:28/68	06:25		06:37	06:04	05:58
	17:35		18:11		18:42		20:13	20:42	20:59
25	07:42	16:31-17:12/41	07:07	16:21-17:27/66	06:23		06:35	06:04	05:58
	17:36		18:13		18:43		20:14	20:43	20:59
26	07:41	16:29-17:13/44	07:06	16:21-17:26/65	06:22		06:34	06:03	05:58
	17:37		18:14		18:44		20:15	20:44	20:59
27	07:40	16:28-17:14/46	07:04	16:22-17:26/64	06:20		06:33	06:02	05:59
	17:38		18:15		18:45		20:16	20:45	20:59
28	07:39	16:27-17:15/48	07:03	16:22-17:24/62	06:18		06:31	06:02	05:59
	17:39		18:16		18:46		20:17	20:46	20:59
29	07:39	16:26-17:16/50			07:17		06:30	06:01	06:00
	17:41				19:47		20:18	20:46	20:59
30	07:38	16:26-17:19/53			07:15		06:29	06:01	06:00
	17:42				19:48		20:19	20:47	20:59
31	07:37	16:25-17:20/55			07:13			06:00	
	17:43				19:49			20:48	
Potential sun hours	300		299		370		397	446	449
Sum of minutes with flicker		654		1876		508	0	0	0

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

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

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Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_Worst_case_20240408WTG: SE02 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (85)

Assumptions for shadow calculations

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

	July	August	September	October		November		December	
1	06:00	06:23	06:53	07:22		06:54	15:50-16:58/68	07:28	16:29-16:37/8
	20:59	20:41	19:59	19:10		17:25		17:02	
2	06:01	06:24	06:54	07:23	17:22-17:40/18	06:56	15:50-16:58/68	07:29	16:29-16:36/7
	20:59	20:40	19:58	19:09		17:24		17:01	
3	06:01	06:25	06:55	07:24	17:17-17:44/27	06:57	15:50-16:57/67	07:30	16:29-16:36/7
	20:59	20:39	19:56	19:07		17:23		17:01	
4	06:02	06:26	06:56	07:25	17:14-17:46/32	06:58	15:50-16:56/66	07:31	16:29-16:36/7
	20:59	20:38	19:55	19:05		17:21		17:01	
5	06:02	06:27	06:57	07:26	17:11-17:49/38	06:59	15:51-16:56/65	07:32	16:30-16:36/6
	20:59	20:37	19:53	19:04		17:20		17:01	
6	06:03	06:28	06:58	07:27	17:08-17:50/42	07:00	15:52-16:56/64	07:33	16:30-16:36/6
	20:58	20:36	19:51	19:02		17:19		17:01	
7	06:04	06:29	06:59	07:28	17:06-17:52/46	07:01	15:53-16:55/62	07:34	16:30-16:36/6
	20:58	20:35	19:50	19:01		17:18		17:01	
8	06:04	06:30	07:00	07:29	17:04-17:53/49	07:02	15:53-16:53/60	07:35	16:31-16:36/5
	20:58	20:33	19:48	18:59		17:17		17:01	
9	06:05	06:31	07:01	07:30	17:02-17:54/52	07:04	15:54-16:52/58	07:36	16:31-16:36/5
	20:58	20:32	19:47	18:57		17:16		17:01	
10	06:06	06:32	07:01	07:31	17:00-17:55/55	07:05	15:55-16:52/57	07:37	16:32-16:36/4
	20:57	20:31	19:45	18:56		17:15		17:01	
11	06:06	06:33	07:02	07:32	17:00-17:57/57	07:06	15:56-16:51/55	07:37	16:33-16:36/3
	20:57	20:30	19:43	18:54		17:14		17:01	
12	06:07	06:34	07:03	07:33	16:58-17:57/59	07:07	15:57-16:49/52	07:38	16:32-16:35/3
	20:56	20:28	19:42	18:53		17:13		17:01	
13	06:08	06:35	07:04	07:34	16:57-17:58/61	07:08	15:58-16:48/50	07:39	16:33-16:36/3
	20:56	20:27	19:40	18:51		17:12		17:01	
14	06:08	06:36	07:05	07:35	16:56-17:58/62	07:09	16:00-16:48/48	07:40	16:34-16:36/2
	20:55	20:26	19:38	18:50		17:11		17:01	
15	06:09	06:37	07:06	07:36	16:54-17:59/65	07:11	16:01-16:47/46	07:41	16:35-16:37/2
	20:55	20:24	19:37	18:48		17:11		17:01	
16	06:10	06:38	07:07	07:37	16:53-17:59/66	07:12	16:02-16:46/44	07:41	16:34-16:36/2
	20:54	20:23	19:35	18:47		17:10		17:02	
17	06:11	06:39	07:08	07:38	16:52-17:59/67	07:13	16:04-16:45/41	07:42	16:35-16:37/2
	20:54	20:22	19:33	18:45		17:09		17:02	
18	06:11	06:40	07:09	07:39	16:52-17:59/67	07:14	16:05-16:44/39	07:43	16:36-16:37/1
	20:53	20:20	19:32	18:44		17:08		17:02	
19	06:12	06:41	07:10	07:40	16:51-17:59/68	07:15	16:08-16:44/36	07:43	16:36-16:37/1
	20:52	20:19	19:30	18:42		17:08		17:03	
20	06:13	06:42	07:11	07:41	16:50-17:59/69	07:16	16:09-16:42/33	07:44	16:37-16:38/1
	20:52	20:17	19:28	18:41		17:07		17:03	
21	06:14	06:42	07:12	07:42	16:50-18:00/70	07:17	16:12-16:40/28	07:44	16:37-16:38/1
	20:51	20:16	19:27	18:39		17:06		17:04	
22	06:15	06:43	07:13	07:43	16:50-18:00/70	07:18	16:14-16:40/26	07:45	16:38-16:39/1
	20:50	20:15	19:25	18:38		17:06		17:04	
23	06:15	06:44	07:14	07:44	16:49-18:00/71	07:20	16:17-16:40/23	07:45	16:38-16:39/1
	20:49	20:13	19:23	18:37		17:05		17:05	
24	06:16	06:45	07:15	07:45	16:49-18:00/71	07:21	16:22-16:41/19	07:46	16:38-16:39/1
	20:49	20:12	19:22	18:35		17:04		17:05	
25	06:17	06:46	07:16	06:47	15:48-17:00/72	07:22	16:31-16:40/9	07:46	16:39-16:40/1
	20:48	20:10	19:20	17:34		17:04		17:06	
26	06:18	06:47	07:17	06:48	15:48-16:59/71	07:23	16:30-16:39/9	07:47	16:39-16:41/2
	20:47	20:09	19:18	17:33		17:03		17:06	
27	06:19	06:48	07:18	06:49	15:49-17:00/71	07:24	16:30-16:39/9	07:47	16:39-16:41/2
	20:46	20:07	19:17	17:31		17:03		17:07	
28	06:20	06:49	07:19	06:50	15:49-16:59/70	07:25	16:29-16:38/9	07:47	16:40-16:42/2
	20:45	20:06	19:15	17:30		17:03		17:08	
29	06:21	06:50	07:20	06:51	15:49-16:59/70	07:26	16:29-16:38/9	07:48	16:41-16:43/2
	20:44	20:04	19:13	17:29		17:02		17:08	
30	06:22	06:51	07:21	06:52	15:49-16:58/69	07:27	16:29-16:37/8	07:48	16:41-16:43/2
	20:43	20:03	19:12	17:27		17:02		17:09	
31	06:23	06:52		06:53	15:49-16:58/69			07:48	16:41-16:44/3
	20:42	20:01		17:26				17:10	
Potential sun hours	456	426	375	346		300		291	
Sum of minutes with flicker	0	0	0	1774		1228		99	

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_Worst_case_20240408WTG: SE03 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (86)

Assumptions for shadow calculations

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

	January		February	March		April		May		June
1	07:48	15:31-15:52/21	07:36	07:01		07:12		06:27	07:05-07:18/13	06:00	06:38-07:45/67
	17:11		17:44	18:17		19:50		20:20		20:49	
2	07:49	15:33-15:51/18	07:35	07:00		07:10		06:26	07:00-07:22/22	05:59	06:38-07:45/67
	17:12		17:45	18:18		19:51		20:21		20:49	
3	07:49	15:35-15:49/14	07:34	06:58		07:09		06:25	06:57-07:25/28	05:59	06:38-07:45/67
	17:13		17:47	18:19		19:52		20:22		20:50	
4	07:49	15:38-15:47/9	07:33	06:57		07:07		06:24	06:55-07:28/33	05:58	06:39-07:46/67
	17:13		17:48	18:20		19:53		20:23		20:51	
5	07:49		07:32	06:55		07:05		06:22	06:53-07:30/37	05:58	06:38-07:45/67
	17:14		17:49	18:21		19:54		20:24		20:51	
6	07:49		07:31	06:54		07:04		06:21	06:51-07:32/41	05:58	06:38-07:46/68
	17:15		17:50	18:23		19:55		20:25		20:52	
7	07:49		07:30	06:52		07:02		06:20	06:49-07:32/43	05:58	06:39-07:46/67
	17:16		17:51	18:24		19:56		20:26		20:53	
8	07:49		07:29	06:50		07:01		06:19	06:47-07:33/46	05:57	06:39-07:46/67
	17:17		17:53	18:25		19:57		20:27		20:53	
9	07:48		07:28	06:49		06:59		06:18	06:46-07:35/49	05:57	06:39-07:47/68
	17:18		17:54	18:26		19:58		20:28		20:54	
10	07:48		07:27	06:47		06:58		06:17	06:45-07:36/51	05:57	06:39-07:46/67
	17:19		17:55	18:27		19:59		20:29		20:54	
11	07:48		07:25	06:46		06:56		06:16	06:44-07:36/52	05:57	06:39-07:46/67
	17:20		17:56	18:28		20:00		20:30		20:55	
12	07:48		07:24	06:44		06:54		06:15	06:43-07:37/54	05:57	06:39-07:47/68
	17:21		17:57	18:29		20:01		20:31		20:55	
13	07:48		07:23	06:43		06:53		06:14	06:42-07:38/56	05:57	06:40-07:47/67
	17:22		17:59	18:30		20:02		20:32		20:56	
14	07:47		07:22	06:41		06:51		06:13	06:41-07:38/57	05:56	06:40-07:47/67
	17:23		18:00	18:31		20:03		20:33		20:56	
15	07:47		07:21	06:39		06:50		06:12	06:42-07:40/58	05:56	06:40-07:47/67
	17:24		18:01	18:32		20:04		20:34		20:57	
16	07:47		07:19	06:38		06:48		06:11	06:41-07:40/59	05:56	06:40-07:47/67
	17:25		18:02	18:33		20:05		20:35		20:57	
17	07:46		07:18	06:36		06:47		06:10	06:40-07:41/61	05:57	06:40-07:47/67
	17:27		18:03	18:34		20:06		20:36		20:57	
18	07:46		07:17	06:35		06:45		06:09	06:40-07:41/61	05:57	06:41-07:48/67
	17:28		18:04	18:35		20:07		20:37		20:58	
19	07:45		07:15	06:33		06:44		06:08	06:39-07:41/62	05:57	06:42-07:49/67
	17:29		18:06	18:36		20:08		20:38		20:58	
20	07:45		07:14	06:31		06:42		06:07	06:40-07:42/62	05:57	06:42-07:49/67
	17:30		18:07	18:37		20:09		20:39		20:58	
21	07:44		07:13	06:30		06:41		06:06	06:39-07:42/63	05:57	06:42-07:49/67
	17:31		18:08	18:38		20:10		20:40		20:59	
22	07:44		07:11	06:28		06:40		06:06	06:38-07:43/65	05:57	06:42-07:49/67
	17:32		18:09	18:39		20:11		20:40		20:59	
23	07:43		07:10	06:26		06:38		06:05	06:38-07:42/64	05:57	06:43-07:50/67
	17:33		18:10	18:40		20:12		20:41		20:59	
24	07:42		07:08	06:25		06:37		06:04	06:38-07:43/65	05:58	06:42-07:49/67
	17:35		18:11	18:41		20:13		20:42		20:59	
25	07:42		07:07	06:23		06:35		06:04	06:38-07:43/65	05:58	06:42-07:49/67
	17:36		18:13	18:42		20:14		20:43		20:59	
26	07:41		07:06	06:22		06:34		06:03	06:38-07:44/66	05:58	06:42-07:49/67
	17:37		18:14	18:44		20:15		20:44		20:59	
27	07:40		07:04	06:20		06:33		06:02	06:38-07:44/66	05:59	06:43-07:50/67
	17:38		18:15	18:45		20:16		20:45		20:59	
28	07:39		07:03	06:18		06:31		06:02	06:37-07:44/67	05:59	06:43-07:50/67
	17:39		18:16	18:46		20:17		20:45		20:59	
29	07:38			07:17		06:30		06:01	06:38-07:44/66	05:59	06:44-07:51/67
	17:41			19:47		20:18		20:46		20:59	
30	07:38			07:15		06:29		06:01	06:38-07:45/67	06:00	06:43-07:51/68
	17:42			19:48		20:19		20:47		20:59	
31	07:37			07:13				06:00	06:38-07:45/67		
	17:43			19:49				20:48			
Potential sun hours	300		299	370		397		446		449	
Sum of minutes with flicker	62		0	0		0		1666		2014	

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_Sorgenia Seneghe-Narbolia

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Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_Worst_case_20240408WTG: SE03 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (86)
Assumptions for shadow calculations
The calculated times are "worst case" given by the following assumptions:
   The sun is shining all the day, from sunrise to sunset
   The rotor plane is always perpendicular to the line from the WTG to the sun
   The WTG is always operating

	July	August	September	October	November	December
1	06:00 06:43-07:50/67 20:59	06:23 06:54-07:48/54 20:41	06:53 19:59	07:22 19:10	06:54 17:25	07:28 17:02
2	06:01 06:44-07:51/67 20:59	06:24 06:55-07:47/52 20:40	06:54 19:58	07:23 19:09	06:56 17:24	07:29 17:01
3	06:01 06:44-07:51/67 20:59	06:25 06:56-07:46/50 20:39	06:55 19:56	07:24 19:07	06:57 17:23	07:30 17:01
4	06:02 06:44-07:52/68 20:59	06:26 06:57-07:45/48 20:38	06:56 19:55	07:25 19:05	06:58 17:21	07:31 17:01
5	06:02 06:45-07:52/67 20:59	06:27 06:58-07:44/46 20:37	06:57 19:53	07:26 19:04	06:59 17:20	07:32 17:01
6	06:03 06:45-07:52/67 20:58	06:28 07:00-07:42/42 20:36	06:58 19:51	07:27 19:02	07:00 17:19	07:33 17:01
7	06:04 06:45-07:52/67 20:58	06:29 07:01-07:41/40 20:34	06:59 19:50	07:28 19:00	07:01 17:18	07:34 17:01
8	06:04 06:45-07:52/67 20:58	06:30 07:02-07:38/36 20:33	07:00 19:48	07:29 18:59	07:02 17:17	07:35 15:27-15:35/8 17:01
9	06:05 06:45-07:53/68 20:58	06:31 07:04-07:36/32 20:32	07:00 19:46	07:30 18:57	07:04 17:16	07:36 15:24-15:38/14 17:01
10	06:05 06:46-07:53/67 20:57	06:32 07:06-07:33/27 20:31	07:01 19:45	07:31 18:56	07:05 17:15	07:37 15:23-15:41/18 17:01
11	06:06 06:45-07:53/68 20:57	06:33 07:10-07:30/20 20:30	07:02 19:43	07:32 18:54	07:06 17:14	07:37 15:23-15:42/19 17:01
12	06:07 06:46-07:53/67 20:56	06:34 07:15-07:24/9 20:28	07:03 19:42	07:33 18:53	07:07 17:13	07:38 15:21-15:43/22 17:01
13	06:08 06:47-07:53/66 20:56	06:35 20:27	07:04 19:40	07:34 18:51	07:08 17:12	07:39 15:21-15:45/24 17:01
14	06:08 06:46-07:53/67 20:55	06:36 20:26	07:05 19:38	07:35 18:50	07:09 17:11	07:40 15:21-15:46/25 17:01
15	06:09 06:47-07:53/66 20:55	06:37 20:24	07:06 19:37	07:36 18:48	07:10 17:11	07:41 15:21-15:47/26 17:01
16	06:10 06:47-07:53/66 20:54	06:38 20:23	07:07 19:35	07:37 18:47	07:12 17:10	07:41 15:20-15:48/28 17:02
17	06:11 06:48-07:54/66 20:54	06:39 20:22	07:08 19:33	07:38 18:45	07:13 17:09	07:42 15:21-15:49/28 17:02
18	06:11 06:47-07:53/66 20:53	06:40 20:20	07:09 19:32	07:39 18:44	07:14 17:08	07:43 15:21-15:50/29 17:02
19	06:12 06:48-07:53/65 20:52	06:41 20:19	07:10 19:30	07:40 18:42	07:15 17:07	07:43 15:21-15:50/29 17:03
20	06:13 06:48-07:53/65 20:52	06:41 20:17	07:11 19:28	07:41 18:41	07:16 17:07	07:44 15:22-15:51/29 17:03
21	06:14 06:49-07:53/64 20:51	06:42 20:16	07:12 19:27	07:42 18:39	07:17 17:06	07:44 15:21-15:51/30 17:04
22	06:15 06:49-07:53/64 20:50	06:43 20:15	07:13 19:25	07:43 18:38	07:18 17:06	07:45 15:22-15:52/30 17:04
23	06:15 06:49-07:52/63 20:49	06:44 20:13	07:14 19:23	07:44 18:37	07:20 17:05	07:45 15:23-15:52/29 17:05
24	06:16 06:49-07:52/63 20:49	06:45 20:12	07:15 19:22	07:45 18:35	07:21 17:04	07:46 15:23-15:52/29 17:05
25	06:17 06:50-07:52/62 20:48	06:46 20:10	07:16 19:20	06:47 17:34	07:22 17:04	07:46 15:24-15:53/29 17:06
26	06:18 06:51-07:51/60 20:47	06:47 20:09	07:17 19:18	06:48 17:32	07:23 17:03	07:47 15:24-15:53/29 17:06
27	06:19 06:51-07:51/60 20:46	06:48 20:07	07:18 19:17	06:49 17:31	07:24 17:03	07:47 15:25-15:53/28 17:07
28	06:20 06:52-07:51/59 20:45	06:49 20:06	07:19 19:15	06:50 17:30	07:25 17:03	07:47 15:27-15:53/26 17:08
29	06:21 06:53-07:50/57 20:44	06:50 20:04	07:20 19:13	06:51 17:29	07:26 17:02	07:48 15:28-15:53/25 17:08
30	06:22 06:52-07:49/57 20:43	06:51 20:02	07:21 19:12	06:52 17:27	07:27 17:02	07:48 15:28-15:53/25 17:09
31	06:23 06:53-07:48/55 20:42	06:52 20:01		06:53 17:26		07:48 15:30-15:52/22 17:10
Potential sun hours	456	426	375	346	300	291
Sum of minutes with flicker	1998	456	0	0	0	601

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

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

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Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_Worst_case_20240408WTG: SE04 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (87)

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

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:36	07:01	07:12	06:27 19:10-19:39/29	06:00 19:06-19:46/40	06:00 19:15-19:48/33	06:23 19:12-19:57/45	06:53	07:22	06:54	07:28
	17:11	17:44	18:17	19:50	20:20	20:49	20:59	20:41	19:59	19:10	17:25	17:02
2	07:49	07:35	07:00	07:10	06:26 19:09-19:40/31	05:59 19:06-19:45/39	06:01 19:16-19:49/33	06:24 19:12-19:56/44	06:54	07:23	06:56	07:29
	17:12	17:45	18:18	19:51	20:21	20:49	20:59	20:40	19:58	19:09	17:24	17:01
3	07:49	07:34	06:58	07:09	06:25 19:07-19:42/35	05:59 19:07-19:45/38	06:01 19:15-19:49/34	06:25 19:13-19:56/43	06:55	07:24	06:57	07:30
	17:13	17:47	18:19	19:52	20:22	20:50	20:59	20:39	19:56	19:07	17:23	17:01
4	07:49	07:33	06:57	07:07	06:24 19:06-19:43/37	05:58 19:08-19:45/37	06:02 19:15-19:50/35	06:26 19:13-19:56/43	06:56	07:25	06:58	07:31
	17:13	17:48	18:20	19:53	20:23	20:51	20:59	20:38	19:55	19:05	17:21	17:01
5	07:49	07:32	06:55	07:05	06:22 19:06-19:44/38	05:58 19:08-19:44/36	06:02 19:15-19:50/35	06:27 19:14-19:55/41	06:57	07:26	06:59	07:32
	17:14	17:49	18:21	19:54	20:24	20:51	20:59	20:37	19:53	19:04	17:20	17:01
6	07:49	07:31	06:54	07:04	06:21 19:05-19:44/39	05:58 19:09-19:45/36	06:03 19:15-19:51/36	06:28 19:14-19:55/41	06:58	07:27	07:00	07:33
	17:15	17:50	18:23	19:55	20:25	20:52	20:58	20:36	19:51	19:02	17:19	17:01
7	07:49	07:30	06:52	07:02	06:20 19:03-19:44/41	05:58 19:09-19:45/36	06:04 19:15-19:52/37	06:29 19:15-19:54/39	06:59	07:28	07:01	07:34
	17:16	17:51	18:24	19:56	20:26	20:52	20:58	20:35	19:50	19:00	17:18	17:01
8	07:49	07:29	06:51	07:01	06:19 19:03-19:45/42	05:57 19:10-19:45/35	06:04 19:14-19:51/37	06:30 19:15-19:52/37	07:00	07:29	07:02	07:35
	17:18	17:53	18:25	19:57	20:27	20:53	20:58	20:33	19:48	18:59	17:17	17:01
9	07:48	07:28	06:49	06:59	06:18 19:02-19:45/43	05:57 19:11-19:45/34	06:05 19:15-19:52/37	06:31 19:15-19:51/36	07:01	07:30	07:04	07:36
	17:19	17:54	18:26	19:58	20:28	20:54	20:58	20:32	19:47	18:57	17:16	17:01
10	07:48	07:27	06:47	06:58	06:17 19:02-19:46/44	05:57 19:10-19:44/34	06:05 19:15-19:53/38	06:32 19:16-19:50/34	07:01	07:31	07:05	07:37
	17:20	17:56	18:28	19:59	20:29	20:54	20:57	20:30	19:45	18:56	17:15	17:01
11	07:48	07:25	06:46	06:56	06:16 19:02-19:46/44	05:57 19:11-19:44/33	06:06 19:14-19:53/39	06:33 19:18-19:49/31	07:02	07:32	07:06	07:37
	17:20	17:56	18:28	20:00	20:30	20:55	20:57	20:30	19:43	18:54	17:14	17:01
12	07:48	07:24	06:44	06:54	06:15 19:01-19:46/45	05:57 19:11-19:44/33	06:07 19:14-19:54/40	06:34 19:19-19:47/28	07:03	07:33	07:07	07:38
	17:21	17:57	18:29	20:01	20:31	20:55	20:56	20:28	19:42	18:53	17:13	17:01
13	07:48	07:23	06:43	06:53	06:14 19:01-19:46/45	05:56 19:12-19:44/32	06:08 19:14-19:54/40	06:35 19:21-19:45/24	07:04	07:34	07:08	07:39
	17:22	17:59	18:30	20:02	20:32	20:56	20:56	20:27	19:40	18:51	17:12	17:01
14	07:47	07:22	06:41	06:51	06:13 19:01-19:46/45	05:56 19:12-19:44/32	06:08 19:13-19:54/41	06:36 19:23-19:43/20	07:05	07:35	07:09	07:40
	17:23	18:00	18:31	20:03	20:33	20:56	20:55	20:26	19:38	18:50	17:11	17:01
15	07:47	07:21	06:39	06:50	06:12 19:02-19:47/45	05:56 19:13-19:44/31	06:09 19:13-19:55/42	06:37 19:26-19:39/13	07:06	07:36	07:11	07:41
	17:24	18:01	18:32	20:04	20:34	20:57	20:55	20:24	19:37	18:48	17:11	17:01
16	07:47	07:19	06:38	06:48	06:11 19:01-19:47/46	05:56 19:13-19:44/31	06:10 19:13-19:56/43	06:38	07:07	07:37	07:12	07:41
	17:25	18:02	18:33	20:05	20:35	20:57	20:54	20:23	19:35	18:47	17:10	17:02
17	07:46	07:18	06:36	06:47	06:10 19:01-19:47/46	05:57 19:13-19:44/31	06:11 19:13-19:56/43	06:39	07:08	07:38	07:13	07:42
	17:27	18:03	18:34	20:06	20:36	20:57	20:54	20:22	19:33	18:45	17:09	17:02
18	07:46	07:17	06:35	06:45	06:09 19:01-19:47/46	05:57 19:14-19:44/30	06:11 19:12-19:56/44	06:40	07:09	07:39	07:14	07:43
	17:28	18:05	18:35	20:07	20:37	20:58	20:53	20:20	19:32	18:44	17:08	17:02
19	07:45	07:15	06:33	06:44	06:08 19:01-19:47/46	05:57 19:15-19:45/30	06:12 19:12-19:56/44	06:41	07:10	07:40	07:15	07:43
	17:29	18:06	18:36	20:08	20:38	20:52	20:52	20:19	19:30	18:42	17:07	17:03
20	07:45	07:14	06:31	06:42	06:07 19:01-19:47/46	05:57 19:15-19:45/30	06:13 19:12-19:57/45	06:41	07:11	07:41	07:16	07:44
	17:30	18:07	18:37	20:09	20:39	20:52	20:52	20:17	19:28	18:41	17:07	17:03
21	07:44	07:13	06:30	06:41	06:06 19:02-19:47/45	05:57 19:15-19:45/30	06:14 19:12-19:57/45	06:42	07:12	07:42	07:17	07:44
	17:31	18:08	18:38	20:10	20:40	20:51	20:51	20:16	19:27	18:39	17:06	17:04
22	07:44	07:11	06:28	06:40	06:06 19:02-19:47/45	05:57 19:15-19:45/30	06:15 19:11-19:57/46	06:43	07:13	07:43	07:18	07:45
	17:32	18:09	18:39	20:11	20:40	20:50	20:50	20:15	19:25	18:38	17:06	17:04
23	07:43	07:10	06:26	06:38	06:05 19:02-19:46/44	05:57 19:15-19:45/30	06:15 19:12-19:57/45	06:44	07:14	07:44	07:20	07:45
	17:33	18:10	18:40	20:12	20:41	20:49	20:49	20:13	19:23	18:37	17:05	17:05
24	07:42	07:08	06:25	06:37	06:04 19:03-19:47/44	05:58 19:16-19:46/30	06:16 19:12-19:57/45	06:45	07:15	07:45	07:21	07:46
	17:35	18:11	18:41	20:13	20:42	20:59	20:49	20:12	19:22	18:35	17:04	17:05
25	07:42	07:07	06:23	06:35	06:04 19:03-19:46/43	05:58 19:16-19:46/30	06:17 19:12-19:57/45	06:46	07:16	06:47	07:22	07:46
	17:36	18:13	18:43	20:14	20:43	20:59	20:48	20:11	19:20	17:34	17:04	17:06
26	07:41	07:06	06:22	06:34	06:03 19:04-19:47/43	05:58 19:15-19:46/31	06:18 19:12-19:58/46	06:47	07:17	06:48	07:23	07:47
	17:37	18:14	18:44	20:15	20:44	20:59	20:47	20:09	19:18	17:32	17:03	17:06
27	07:40	07:04	06:20	06:33	06:02 19:04-19:46/42	05:59 19:16-19:47/31	06:19 19:12-19:58/46	06:48	07:18	06:49	07:24	07:47
	17:38	18:15	18:45	20:16	20:45	20:59	20:46	20:07	19:17	17:31	17:03	17:07
28	07:39	07:03	06:18	06:31 19:18-19:32/14	06:02 19:04-19:46/42	05:59 19:16-19:47/31	06:20 19:12-19:58/46	06:49	07:19	06:50	07:25	07:47
	17:39	18:16	18:46	20:17	20:46	20:59	20:45	20:06	19:15	17:30	17:03	17:08
29	07:39		07:17	06:30 19:15-19:36/21	06:01 19:05-19:46/41	05:59 19:16-19:48/32	06:21 19:11-19:57/46	06:50	07:20	06:51	07:26	07:48
	17:41		19:47	20:18	20:46	20:59	20:44	20:04	19:13	17:29	17:02	17:08
30	07:38		07:15	06:29 19:13-19:38/25	06:01 19:05-19:45/40	06:00 19:16-19:48/32	06:22 19:11-19:57/46	06:51	07:21	06:52	07:27	07:48
	17:42		19:48	20:19	20:47	20:59	20:43	20:02	19:12	17:27	17:02	17:09
31	07:37		07:13		06:00 19:05-19:46/41		06:23 19:12-19:57/45	06:52		06:53		07:48
	17:43		19:49		20:48		20:42	20:01		17:26		17:10
Potential sun hours	300	299	370	397	446	449	456	426	375	346	300	291
Sum of minutes with flicker	0	0	0	60	1303	985	1277	519	0	0	0	0

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

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

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Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_Worst_case_20240408WTG: SE06 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (88)

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	07:48 16:08-16:45/37		07:36	07:01		07:12 18:58-19:27/29		06:27	06:00
	17:11		17:44	18:17		19:50		20:20	20:49
2	07:49 16:08-16:46/38		07:35	07:00		07:10 18:57-19:27/30		06:26	05:59
	17:12		17:45	18:18		19:51		20:21	20:49
3	07:49 16:09-16:46/37		07:34	06:58		07:09 18:56-19:28/32		06:25	05:59
	17:13		17:47	18:19		19:52		20:22	20:50
4	07:49 16:09-16:47/38		07:33	06:57		07:07 18:55-19:28/33		06:24	05:59
	17:13		17:48	18:20		19:53		20:23	20:51
5	07:49 16:10-16:47/37		07:32	06:55		07:05 18:55-19:28/33		06:23	05:58
	17:14		17:49	18:22		19:54		20:24	20:51
6	07:49 16:11-16:47/36		07:31	06:54		07:04 18:54-19:28/34		06:21	05:58
	17:15		17:50	18:23		19:55		20:25	20:52
7	07:49 16:11-16:48/37		07:30	06:52		07:02 18:53-19:27/34		06:20	05:58
	17:16		17:52	18:24		19:56		20:26	20:53
8	07:49 16:12-16:48/36		07:29	06:51		07:01 18:54-19:27/33		06:19	05:57
	17:17		17:53	18:25		19:57		20:27	20:53
9	07:48 16:13-16:48/35		07:28	06:49		06:59 18:53-19:27/34		06:18	05:57
	17:18		17:54	18:26		19:58		20:28	20:54
10	07:48 16:14-16:49/35		07:27	06:47		06:58 18:54-19:26/32		06:17	05:57
	17:19		17:55	18:27		19:59		20:29	20:54
11	07:48 16:14-16:48/34		07:25	06:46		06:56 18:54-19:25/31		06:16	05:57
	17:20		17:56	18:28		20:00		20:30	20:55
12	07:48 16:15-16:48/33		07:24	06:44		06:54 18:54-19:25/31		06:15	05:57
	17:21		17:58	18:29		20:01		20:31	20:55
13	07:48 16:17-16:48/31		07:23	06:43		06:53 18:55-19:23/28		06:14	05:57
	17:22		17:59	18:30		20:02		20:32	20:56
14	07:47 16:17-16:48/31		07:22	06:41		06:51 18:56-19:23/27		06:13	05:57
	17:23		18:00	18:31		20:03		20:33	20:56
15	07:47 16:19-16:48/29		07:21	06:39		06:50 18:56-19:21/25		06:12	05:57
	17:24		18:01	18:32		20:04		20:34	20:57
16	07:47 16:19-16:47/28		07:19	06:38		06:48 18:58-19:19/21		06:11	05:57
	17:26		18:02	18:33		20:05		20:35	20:57
17	07:46 16:21-16:47/26		07:18	06:36		06:47 18:59-19:16/17		06:10	05:57
	17:27		18:03	18:34		20:06		20:36	20:57
18	07:46 16:22-16:45/23		07:17	06:35		06:45 19:03-19:14/11		06:09	05:57
	17:28		18:05	18:35		20:07		20:37	20:58
19	07:45 16:24-16:45/21		07:15	06:33		06:44		06:08	05:57
	17:29		18:06	18:36		20:08		20:38	20:58
20	07:45 16:25-16:44/19		07:14	06:31		06:42		06:07	05:57
	17:30		18:07	18:37		20:09		20:39	20:58
21	07:44 16:28-16:42/14		07:13	06:30		06:41		06:07	05:57
	17:31		18:08	18:38		20:10		20:40	20:59
22	07:44 16:32-16:39/7		07:11	06:28		06:40		06:06	05:57
	17:32		18:09	18:39		20:11		20:40	20:59
23	07:43		07:10	06:27		06:38		06:05	05:58
	17:34		18:10	18:41		20:12		20:41	20:59
24	07:42		07:08	06:25		06:37		06:04	05:58
	17:35		18:11	18:42		20:13		20:42	20:59
25	07:42		07:07	06:23		06:35		06:04	05:58
	17:36		18:13	18:43		20:14		20:43	20:59
26	07:41		07:06	06:22		06:34		06:03	05:58
	17:37		18:14	18:44		20:15		20:44	20:59
27	07:40		07:04	06:20		06:33		06:02	05:59
	17:38		18:15	18:45		20:16		20:45	20:59
28	07:39		07:03	06:18 18:07-18:21/14		06:31		06:02	05:59
	17:39		18:16	18:46		20:17		20:46	20:59
29	07:39			07:17 19:04-19:23/19		06:30		06:01	06:00
	17:41			19:47		20:18		20:46	20:59
30	07:38			07:15 19:01-19:25/24		06:29		06:01	06:00
	17:42			19:48		20:19		20:47	20:59
31	07:37			07:14 19:00-19:26/26				06:00	
	17:43			19:49				20:48	
Potential sun hours	300		299	370		397		446	449
Sum of minutes with flicker	662		0	83		515		0	0

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

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

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Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_Worst_case_20240408WTG: SE06 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (88)
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	06:00 / 20:59	06:24 / 20:41	06:53 18:52-19:24/32 / 19:59	07:22 / 19:10	06:54 / 17:25	07:28 15:56-16:30/34 / 17:02
2	06:01 / 20:59	06:24 / 20:40	06:54 18:52-19:24/32 / 19:58	07:23 / 19:09	06:56 / 17:24	07:29 15:56-16:31/35 / 17:01
3	06:01 / 20:59	06:25 / 20:39	06:55 18:51-19:25/34 / 19:56	07:24 / 19:07	06:57 / 17:23	07:30 15:56-16:31/35 / 17:01
4	06:02 / 20:59	06:26 / 20:38	06:56 18:51-19:24/33 / 19:55	07:25 / 19:05	06:58 / 17:21	07:31 15:56-16:32/36 / 17:01
5	06:02 / 20:59	06:27 / 20:37	06:57 18:50-19:24/34 / 19:53	07:26 / 19:04	06:59 / 17:20	07:32 15:57-16:33/36 / 17:01
6	06:03 / 20:58	06:28 / 20:36	06:58 18:50-19:24/34 / 19:51	07:27 / 19:02	07:00 / 17:19	07:33 15:57-16:33/36 / 17:01
7	06:04 / 20:58	06:29 / 20:35	06:59 18:50-19:23/33 / 19:50	07:28 / 19:01	07:01 / 17:18	07:34 15:57-16:34/37 / 17:01
8	06:04 / 20:58	06:30 / 20:33	07:00 18:50-19:23/33 / 19:48	07:29 / 18:59	07:02 / 17:17	07:35 15:57-16:35/38 / 17:01
9	06:05 / 20:58	06:31 / 20:32	07:01 18:50-19:22/32 / 19:47	07:30 / 18:57	07:04 / 17:16	07:36 15:58-16:35/37 / 17:01
10	06:06 / 20:57	06:32 / 20:31	07:02 18:51-19:21/30 / 19:45	07:31 / 18:56	07:05 / 17:15	07:37 15:58-16:36/38 / 17:01
11	06:06 / 20:57	06:33 / 20:30	07:02 18:50-19:19/29 / 19:43	07:32 / 18:54	07:06 / 17:14	07:37 15:59-16:36/37 / 17:01
12	06:07 / 20:56	06:34 / 20:28	07:03 18:51-19:18/27 / 19:42	07:33 / 18:53	07:07 / 17:13	07:38 15:58-16:35/37 / 17:01
13	06:08 / 20:56	06:35 / 20:27	07:04 18:52-19:16/24 / 19:40	07:34 / 18:51	07:08 / 17:12	07:39 15:59-16:36/37 / 17:01
14	06:08 / 20:55	06:36 / 20:26	07:05 18:54-19:14/20 / 19:38	07:35 / 18:50	07:09 / 17:11	07:40 15:59-16:36/37 / 17:01
15	06:09 / 20:55	06:37 / 20:24	07:06 18:56-19:11/15 / 19:37	07:36 / 18:48	07:11 / 17:11	07:41 16:00-16:37/37 / 17:01
16	06:10 / 20:54	06:38 / 20:23	07:07 19:00-19:06/6 / 19:35	07:37 / 18:47	07:12 / 17:10	07:41 16:00-16:36/36 / 17:02
17	06:11 / 20:54	06:39 / 20:22	07:08 / 19:33	07:38 / 18:45	07:13 / 17:09	07:42 16:01-16:37/36 / 17:02
18	06:11 / 20:53	06:40 / 20:20	07:09 / 19:32	07:39 / 18:44	07:14 / 17:08	07:43 16:02-16:37/35 / 17:02
19	06:12 / 20:52	06:41 / 20:19	07:10 / 19:30	07:40 / 18:42	07:15 / 17:08	07:43 16:01-16:37/36 / 17:03
20	06:13 / 20:52	06:42 / 20:17	07:11 / 19:28	07:41 / 18:41	07:16 16:07-16:14/7 / 17:07	07:44 16:02-16:38/36 / 17:03
21	06:14 / 20:51	06:43 / 20:16	07:12 / 19:27	07:42 / 18:39	07:17 16:03-16:17/14 / 17:06	07:44 16:02-16:38/36 / 17:04
22	06:15 / 20:50	06:43 / 20:15	07:13 / 19:25	07:43 / 18:38	07:19 16:01-16:20/19 / 17:06	07:45 16:03-16:39/36 / 17:04
23	06:15 / 20:49	06:44 / 20:13	07:14 / 19:23	07:44 / 18:37	07:20 16:00-16:21/21 / 17:05	07:45 16:03-16:39/36 / 17:05
24	06:16 / 20:49	06:45 / 20:12	07:15 / 19:22	07:45 / 18:35	07:21 16:00-16:23/23 / 17:04	07:46 16:04-16:40/36 / 17:05
25	06:17 / 20:48	06:46 19:05-19:17/12 / 20:10	07:16 / 19:20	06:47 / 17:34	07:22 15:59-16:25/26 / 17:04	07:46 16:04-16:40/36 / 17:06
26	06:18 / 20:47	06:47 19:02-19:19/17 / 20:09	07:17 / 19:18	06:48 / 17:33	07:23 15:58-16:26/28 / 17:04	07:47 16:05-16:41/36 / 17:06
27	06:19 / 20:46	06:48 19:00-19:21/21 / 20:07	07:18 / 19:17	06:49 / 17:31	07:24 15:58-16:27/29 / 17:03	07:47 16:05-16:41/36 / 17:07
28	06:20 / 20:45	06:49 18:58-19:23/25 / 20:06	07:19 / 19:15	06:50 / 17:30	07:25 15:57-16:28/31 / 17:03	07:47 16:06-16:42/36 / 17:08
29	06:21 / 20:44	06:50 18:57-19:24/27 / 20:04	07:20 / 19:13	06:51 / 17:29	07:26 15:57-16:28/31 / 17:02	07:48 16:06-16:43/37 / 17:08
30	06:22 / 20:43	06:51 18:55-19:24/29 / 20:03	07:21 / 19:12	06:52 / 17:27	07:27 15:57-16:29/32 / 17:02	07:48 16:07-16:43/36 / 17:09
31	06:23 / 20:42	06:52 18:53-19:24/31 / 20:01		06:53 / 17:26		07:48 16:07-16:44/37 / 17:10
Potential sun hours	456	426	375	346	300	291
Sum of minutes with flicker	0	162	448	0	261	1124

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

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

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Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_Worst_case_20240408WTG: SE07 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (89)

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	07:48	07:36	07:01	07:12	06:28	06:00	06:00	06:24	06:53	07:22	06:54	07:28
	17:11	17:44	18:17	19:50	20:20	20:49	20:59	20:41	19:59	19:10	17:25	17:02
2	07:49	07:35	07:00	07:10	06:26	05:59	06:01	06:25	06:54	07:23	06:56	07:29
	17:12	17:46	18:18	19:51	20:21	20:49	20:59	20:40	19:58	19:09	17:24	17:01
3	07:49	07:34	06:58	07:09	06:25	05:59	06:01	06:25	06:55	07:24	06:57	07:30
	17:13	17:47	18:19	19:52	20:22	20:50	20:59	20:39	19:56	19:07	17:23	17:01
4	07:49	07:33	06:57	07:07	06:24	05:59	06:02	06:26	06:56	07:25	06:58	07:31
	17:14	17:48	18:20	19:53	20:23	20:51	20:59	20:38	19:55	19:05	17:22	17:01
5	07:49	07:32	06:55	07:06	06:23	05:58	06:03	06:27	06:57	07:26	06:59	07:32
	17:14	17:49	18:22	19:54	20:24	20:51	20:59	20:37	19:53	19:04	17:20	17:01
6	07:49	07:31	06:54	07:04	06:21	05:58	06:03	06:28	06:58	07:27	07:00	07:33
	17:15	17:50	18:23	19:55	20:25	20:52	20:59	20:36	19:51	19:02	17:19	17:01
7	07:49	07:30	06:52	07:02	06:20	05:58	06:04	06:29	06:59	07:28	07:01	07:34
	17:16	17:52	18:24	19:56	20:26	20:53	20:58	20:35	19:50	19:01	17:18	17:01
8	07:49	07:29	06:51	07:01	06:19	05:57	06:04	06:30	07:00	07:29	07:02	07:35
	17:17	17:53	18:25	19:57	20:27	20:53	20:58	20:33	19:48	18:59	17:17	17:01
9	07:48	07:28	06:49	06:59	06:18	05:57	06:05	06:31	07:01	07:30	07:04	07:36
	17:18	17:54	18:26	19:58	20:28	20:54	20:58	20:32	19:47	18:57	17:16	17:01
10	07:48	07:27	06:47	06:58	06:17	05:57	06:06	06:32	07:02	07:31	07:05	07:37
	17:19	17:55	18:27	19:59	20:29	20:54	20:57	20:31	19:45	18:56	17:15	17:01
11	07:48	07:25	06:46	06:56	06:16	05:57	06:06	06:33	07:03	07:32	07:06	07:38
	17:20	17:56	18:28	20:00	20:30	20:55	20:57	20:30	19:43	18:54	17:14	17:01
12	07:48	07:24	06:44	06:55	06:15	05:57	06:07	06:34	07:03	07:33	07:07	07:38
	17:21	17:58	18:29	20:01	20:31	20:55	20:56	20:28	19:42	18:53	17:13	17:01
13	07:47	07:23	06:43	06:53	06:14	05:57	06:08	06:35	07:04	07:34	07:08	07:39
	17:22	17:59	18:30	20:02	20:32	20:56	20:56	20:27	19:40	18:51	17:12	17:01
14	07:47	07:22	06:41	06:51	06:13	05:57	06:08	06:36	07:05	07:35	07:09	07:40
	17:23	18:00	18:31	20:03	20:33	20:56	20:55	20:26	19:38	18:50	17:12	17:01
15	07:47	07:21	06:40	06:50	06:12	05:57	06:09	06:37	07:06	07:36	07:11	07:41
	17:24	18:01	18:32	20:04	20:34	20:57	20:55	20:24	19:37	18:48	17:11	17:02
16	07:47	07:19	06:38	06:48	06:11	05:57	06:10	06:38	07:07	07:37	07:12	07:41
	17:26	18:02	18:33	20:05	20:35	20:57	20:54	20:23	19:35	18:47	17:10	17:02
17	07:46	07:18	06:36	06:47	06:10	05:57	06:11	06:39	07:08	07:38	07:13	07:42
	17:27	18:03	18:34	20:06	20:36	20:57	20:54	20:22	19:33	18:45	17:09	17:02
18	07:46	07:17	06:35	06:45	06:09	05:57	06:11	06:40	07:09	07:39	07:14	07:43
	17:28	18:05	18:35	20:07	20:37	20:58	20:53	20:20	19:32	18:44	17:08	17:02
19	07:45	07:15	06:33	06:44	06:08	05:57	06:12	06:41	07:10	07:40	07:15	07:43
	17:29	18:06	18:36	20:08	20:38	20:58	20:52	20:19	19:30	18:42	17:08	17:03
20	07:45	07:14	06:31	06:43	06:07	05:57	06:13	06:42	07:11	07:41	07:16	07:44
	17:30	18:07	18:37	20:09	20:39	20:58	20:52	20:18	19:28	18:41	17:07	17:03
21	07:44	07:13	06:30	06:41	06:07	05:57	06:14	06:43	07:12	07:42	07:17	07:44
	17:31	18:08	18:38	20:10	20:40	20:59	20:51	20:16	19:27	18:39	17:06	17:04
22	07:44	07:11	06:28	06:40	06:06	05:57	06:15	06:44	07:13	07:43	07:19	07:45
	17:32	18:09	18:40	20:11	20:40	20:59	20:50	20:15	19:25	18:38	17:06	17:04
23	07:43	07:10	06:27	06:38	06:05	05:58	06:16	06:44	07:14	07:44	07:20	07:45
	17:34	18:10	18:41	20:12	20:41	20:59	20:49	20:13	19:23	18:37	17:05	17:05
24	07:42	07:09	06:25	06:37	06:04	05:58	06:16	06:45	07:15	07:45	07:21	07:46
	17:35	18:12	18:42	20:13	20:42	20:59	20:49	20:12	19:22	18:35	17:05	17:05
25	07:42	07:07	06:23	06:35	06:04	05:58	06:17	06:46	07:16	06:47	07:22	07:46
	17:36	18:13	18:43	20:14	20:43	20:59	20:48	20:10	19:20	17:34	17:04	17:06
26	07:41	07:06	06:22	06:34	06:03	05:58	06:18	06:47	07:17	06:48	07:23	07:47
	17:37	18:14	18:44	20:15	20:44	20:59	20:47	20:09	19:18	17:33	17:04	17:06
27	07:40	07:04	06:20	06:33	06:02	05:59	06:19	06:48	07:18	06:49	07:24	07:47
	17:38	18:15	18:45	20:16	20:45	20:59	20:46	20:07	19:17	17:31	17:03	17:07
28	07:39	07:03	06:18	06:31	06:02	05:59	06:20	06:49	07:19	06:50	07:25	07:47
	17:39	18:16	18:46	20:17	20:46	20:59	20:45	20:06	19:15	17:30	17:03	17:08
29	07:39		07:17	06:30	06:01	06:00	06:21	06:50	07:20	06:51	07:26	07:48
	17:41		19:47	20:18	20:46	20:59	20:44	20:04	19:14	17:29	17:02	17:08
30	07:38		07:15	06:29	06:01	06:00	06:22	06:51	07:21	06:52	07:27	07:48
	17:42		19:48	20:19	20:47	20:59	20:43	20:03	19:12	17:27	17:02	17:09
31	07:37		07:14		06:00		06:23	06:52		06:53		07:48
	17:43		19:49		20:48		20:42	20:01		17:26		17:10
Potential sun hours	300	299	370	397	446	449	456	426	375	346	300	291
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

windPRO

Project:

Progetto_Sorgenia Seneghe-Narbolia

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Calculated:
08/04/2024 16:25/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_Worst_case_20240408WTG: SE08 - Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 210,0 m) (90)

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

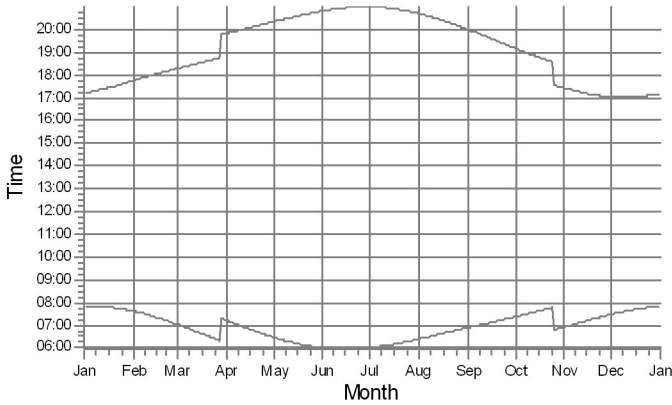|	January	February	March	April	May	June	July	August	September	October	November	December
1	07:48	07:36	07:01	07:12	06:27	06:00	06:00	06:23	06:53	07:22	06:54	07:28
	17:11	17:44	18:17	19:50	20:20	20:49	20:59	20:41	19:59	19:10	17:25	17:02
2	07:49	07:35	07:00	07:10	06:26	05:59	06:01	06:24	06:54	07:23	06:56	07:29
	17:12	17:45	18:18	19:51	20:21	20:49	20:59	20:40	19:58	19:08	17:24	17:01
3	07:49	07:34	06:58	07:09	06:25	05:59	06:01	06:25	06:55	07:24	06:57	07:30
	17:12	17:47	18:19	19:52	20:22	20:50	20:59	20:39	19:56	19:07	17:22	17:01
4	07:49	07:33	06:57	07:07	06:24	05:58	06:02	06:26	06:56	07:24	06:58	07:31
	17:13	17:48	18:20	19:53	20:23	20:51	20:59	20:38	19:55	19:05	17:21	17:01
5	07:49	07:32	06:55	07:05	06:22	05:58	06:02	06:27	06:57	07:25	06:59	07:32
	17:14	17:49	18:21	19:54	20:24	20:51	20:59	20:37	19:53	19:04	17:20	17:01
6	07:49	07:31	06:54	07:04	06:21	05:58	06:03	06:28	06:58	07:27	07:00	07:33
	17:15	17:50	18:22	19:55	20:25	20:52	20:58	20:36	19:51	19:02	17:19	17:01
7	07:49	07:30	06:52	07:02	06:20	05:57	06:03	06:29	06:59	07:28	07:01	07:34
	17:16	17:51	18:24	19:56	20:26	20:53	20:58	20:34	19:50	19:00	17:18	17:01
8	07:49	07:29	06:50	07:01	06:19	05:57	06:04	06:30	07:00	07:29	07:02	07:35
	17:17	17:53	18:25	19:57	20:27	20:53	20:58	20:33	19:48	18:59	17:17	17:01
9	07:48	07:28	06:49	06:59	06:18	05:57	06:05	06:31	07:00	07:30	07:04	07:36
	17:18	17:54	18:26	19:58	20:28	20:54	20:58	20:32	19:46	18:57	17:16	17:01
10	07:48	07:27	06:47	06:57	06:17	05:57	06:05	06:32	07:01	07:31	07:05	07:37
	17:19	17:55	18:27	19:59	20:29	20:54	20:57	20:31	19:45	18:56	17:15	17:01
11	07:48	07:25	06:46	06:56	06:16	05:57	06:06	06:33	07:02	07:32	07:06	07:37
	17:20	17:56	18:28	20:00	20:30	20:55	20:57	20:30	19:43	18:54	17:14	17:01
12	07:48	07:24	06:44	06:54	06:15	05:57	06:07	06:34	07:03	07:33	07:07	07:38
	17:21	17:57	18:29	20:01	20:31	20:55	20:56	20:28	19:42	18:53	17:13	17:01
13	07:48	07:23	06:43	06:53	06:14	05:56	06:07	06:35	07:04	07:34	07:08	07:39
	17:22	17:59	18:30	20:02	20:32	20:56	20:56	20:27	19:40	18:51	17:12	17:01
14	07:47	07:22	06:41	06:51	06:13	05:56	06:08	06:36	07:05	07:35	07:09	07:40
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19	07:45	07:15	06:33	06:44	06:08	05:57	06:12	06:40	07:10	07:40	07:15	07:43
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22	07:44	07:11	06:28	06:40	06:06	05:57	06:15	06:43	07:13	07:43	07:18	07:45
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23	07:43	07:10	06:26	06:38	06:05	05:57	06:15	06:44	07:14	07:44	07:20	07:45
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24	07:42	07:08	06:25	06:37	06:04	05:58	06:16	06:45	07:15	07:45	07:21	07:46
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26	07:41	07:06	06:22	06:34	06:03	05:58	06:18	06:47	07:17	06:48	07:23	07:47
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27	07:40	07:04	06:20	06:33	06:02	05:59	06:19	06:48	07:18	06:49	07:24	07:47
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28	07:39	07:03	06:18	06:31	06:02	05:59	06:20	06:49	07:19	06:50	07:25	07:47
	17:39	18:16	18:46	20:17	20:45	20:59	20:45	20:06	19:15	17:30	17:03	17:08
29	07:38		07:17	06:30	06:01	05:59	06:21	06:50	07:20	06:51	07:26	07:48
	17:41		19:47	20:18	20:46	20:59	20:44	20:04	19:13	17:29	17:02	17:08
30	07:38		07:15	06:29	06:01	06:00	06:22	06:51	07:21	06:52	07:27	07:48
	17:42		19:48	20:19	20:47	20:59	20:43	20:02	19:12	17:27	17:02	17:09
31	07:37		07:13		06:00		06:22	06:52		06:53		07:48
	17:43		19:49		20:48		20:42	20:01		17:26		17:10
Potential sun hours	300	299	370	397	446	449	456	426	375	346	300	291
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

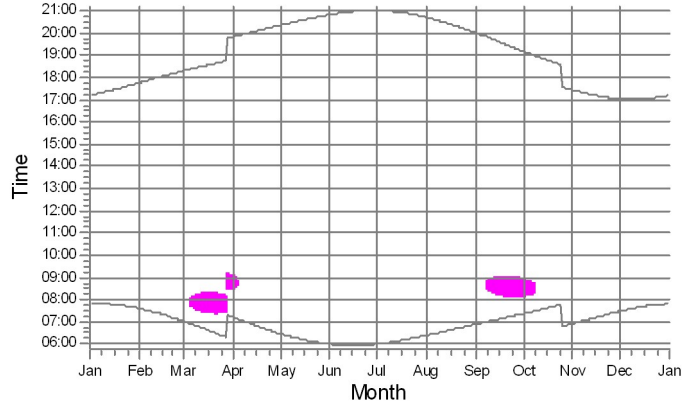| Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG, graphical
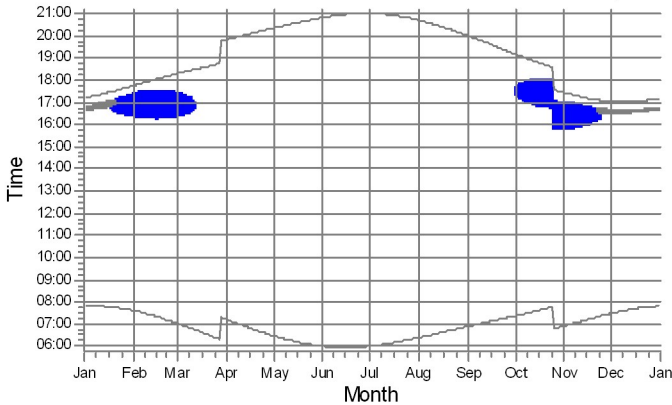Calculation: Progetto_Worst_case_20240408

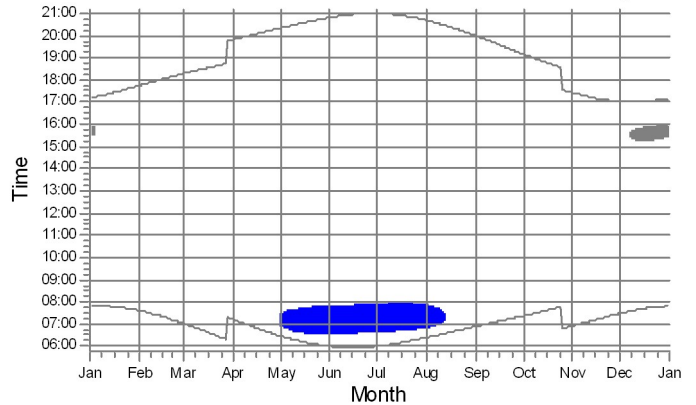NA09: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

NA10: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2
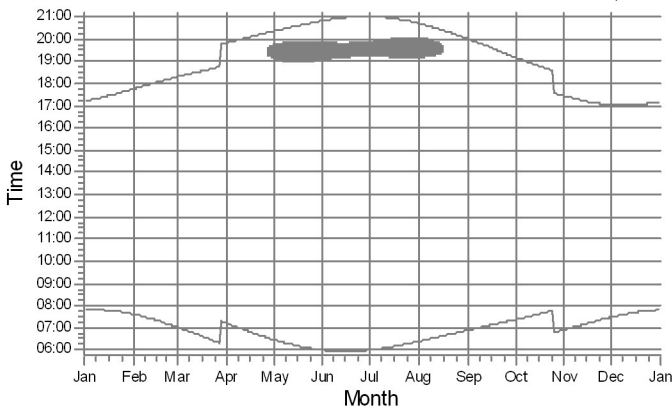
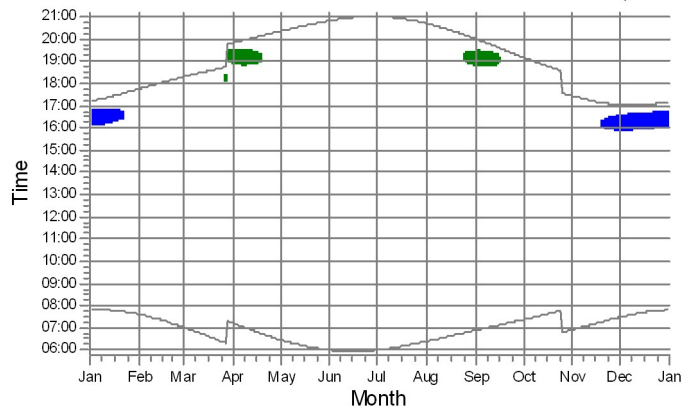SE02: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

SE03: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

SE04: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

SE06: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

Shadow receptors

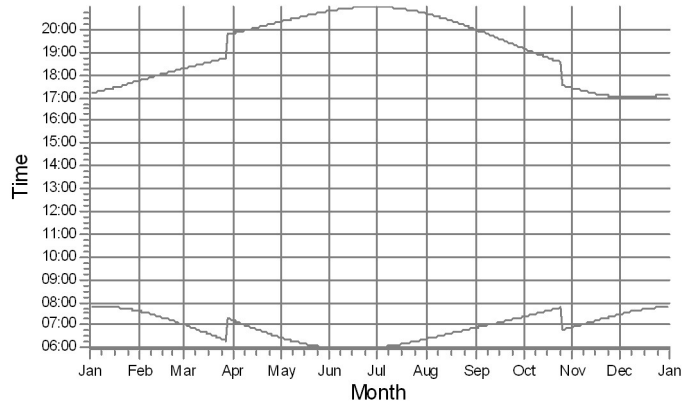|	
🟩	F08: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (71)
🟦	F35: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (73)
⬜	F49: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (74)
🟪	F59: Shadow Receptor: 1,2 × 1,4 Azimuth: 0,0° Slope: 90,0° (75)

SHADOW - Calendar per WTG, graphical
Calculation: Progetto_Worst_case_20240408

SE07: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

SE08: Siemens Gamesa SG 6.6-170!! 6600 170.0 !O! hub: 125,0 m (TOT: 2

Shadow receptors