COMUNE DI SERRI

PROVINCIA DEL SUD SARDEGNA

REGIONE AUTONOMA DELLA SARDEGNA

PROGETTO PARCO EOLICO " SERRI "
13 WTG - POTENZA 93,60 MW
COMUNE DI SERRI (SU)

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Sommario

1. PREMESSA

La presente relazione descrive le opere previste nel progetto per la realizzazione di un impianto per la produzione di energia elettrica da fonte rinnovabile eolica proposto dalla società Sigmanrg S.r.l.

La proposta progettuale è finalizzata alla realizzazione di un impianto eolico per la produzione di energia elettrica da fonte rinnovabile eolica, costituito da 13 aerogeneratori, ciascuno di potenza nominale pari a 7,2 MW per una potenza complessiva di 93,6 MW, da realizzarsi nel territorio comunale di Serri (SU) e delle relative opere di connessione alla Cabina Utente che si collegherà con cavidotto AT alla stazione Elettrica Terna.

Il progetto si pone come obiettivo la realizzazione di un parco eolico per la produzione di energia elettrica da immettere nella rete di trasmissione nazionale (RTN) in alta tensione. In questo scenario il parco eolico consentirà di raggiungere obiettivi più complessi fra i quali si annoverano:

- la produzione di energia elettrica da fonte rinnovabile, priva di alcuna emissione diretta o derivata nell'ambiente;
- la valorizzazione di un'area marginale rispetto alle altre fonti di sviluppo regionale con destinazione prevalente a scopo agricolo e con bassa densità antropica;
- la diffusione di know-how in materia di produzione di energia elettrica da fonte eolica, a valenza fortemente sinergica per aree con problemi occupazionali e di sviluppo.

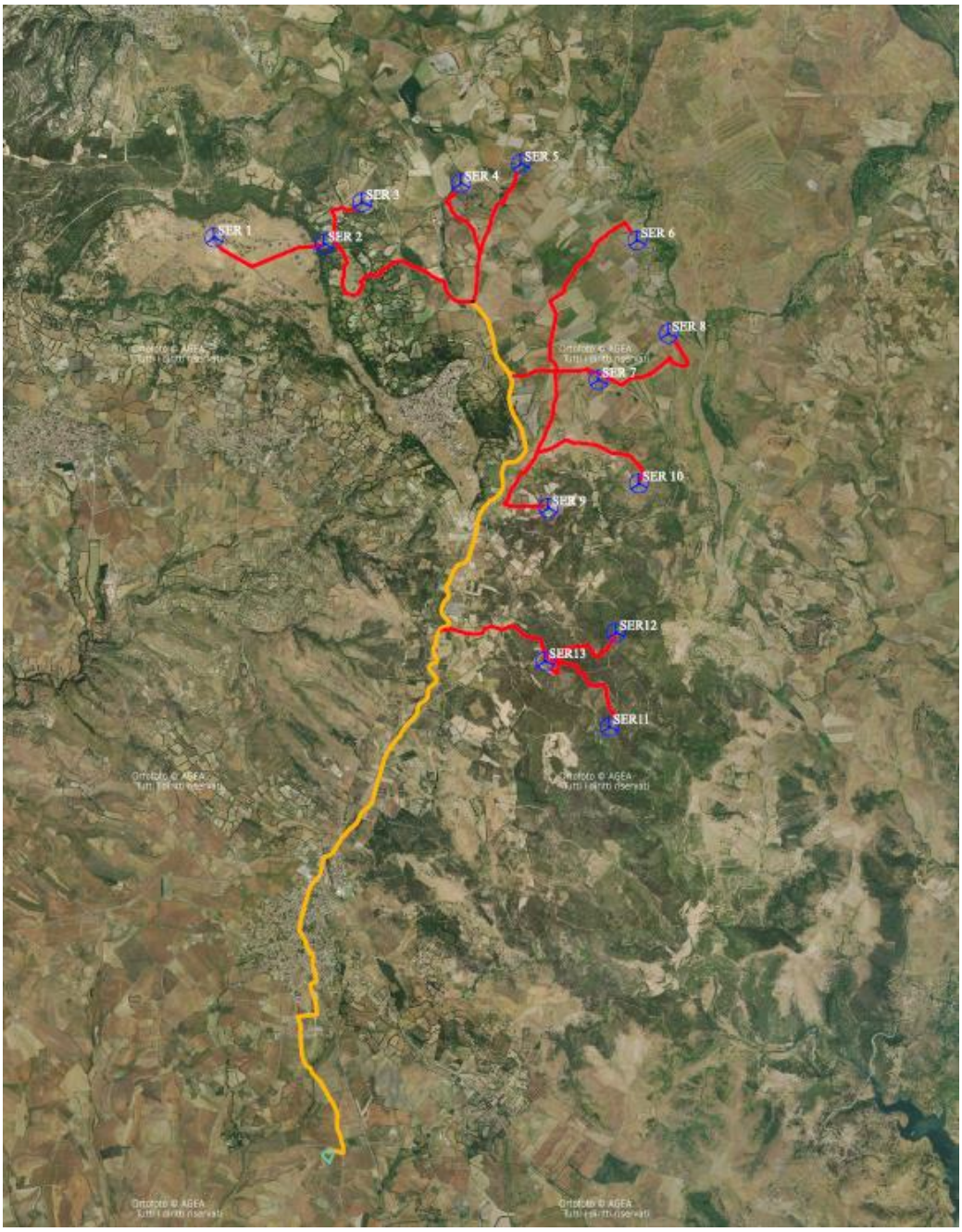

Figura 1. Inquadramento Impianto su Ortofoto

1.1. INQUADRAMENTO URBANISTICO COMUNALE

Il territorio Comunale di Serri è regolamentato da un Programma di Fabbricazione approvato in via definitiva mediante Delibera del Consiglio Comunale n.25 del 15/04/1994 e vigente a far data della pubblicazione sul BURAS n.21 del 30/06/1994.

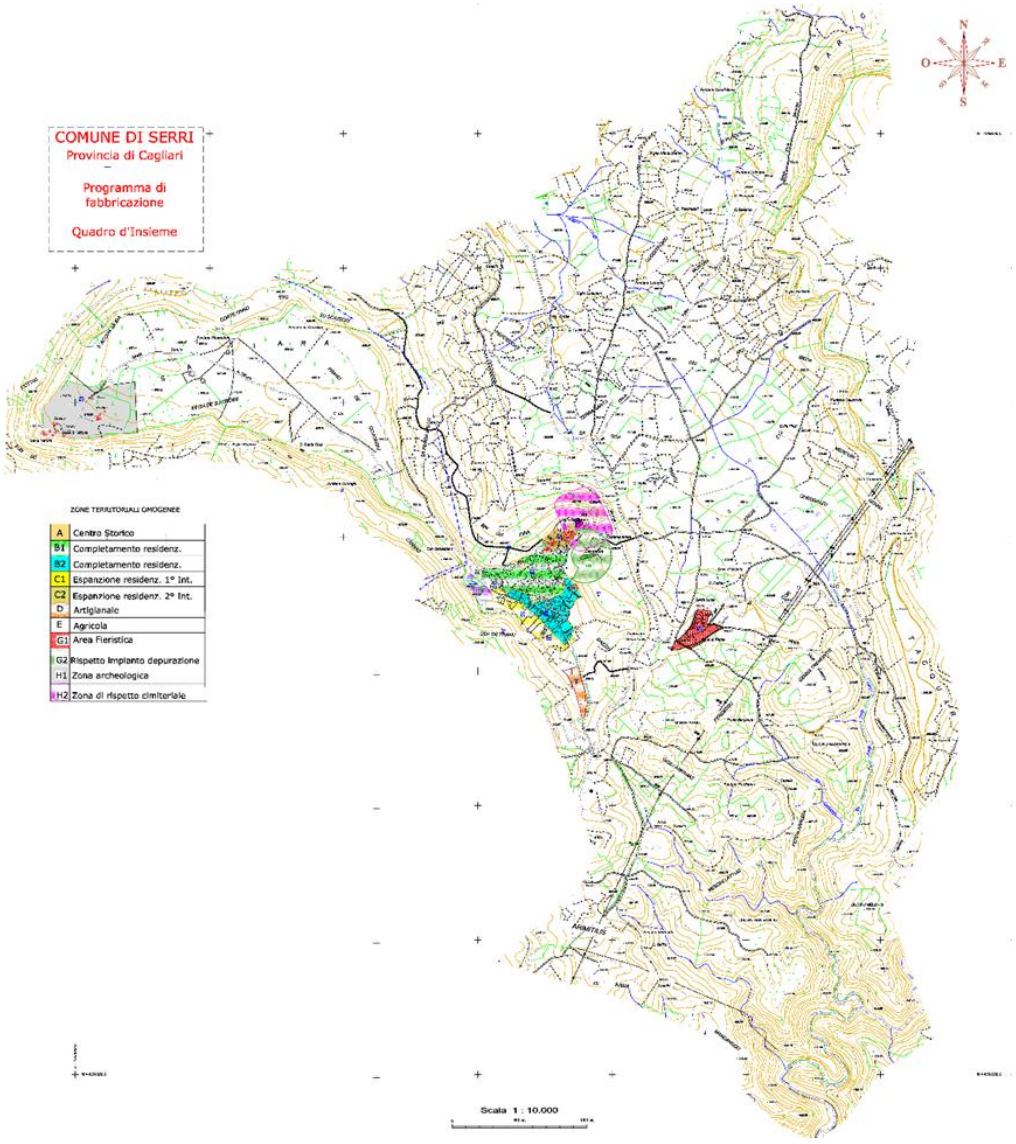

Figura 2. Inquadramento Urbanistico Comunale

Con riferimento alle disposizioni contenute nel PUC del Comune di Serri, gli SER1, SER2, SER3, SER4, SER5 SER6, SER7, SER8, SER9, SER10, SER11, SER12, SER13 ricadono all'interno della zona E - aree marginali per la produzione agricola.

Nelle Norme di Attuazione del Piano di fabbricazione, la zona agricola "E" è definita come parte del territorio extraurbano destinata alla coltivazione dei fondi, alla silvicoltura, all'allevamento del bestiame ed alle altre attività produttive connesse, ivi compreso l'agriturismo.

TURBINA	COMUNE	FOGLIO	PARTICELLA	LATITUDINE	LONGITUDINE
SER1	SERRI	1	9	39,716941°	9,119441°
SER2	SERRI	2	39	39,716365°	9,132161°
SER3	SERRI	2	7	39,720095°	9,136555°
SER4	SERRI	3	10	39,721759°	9,147951°
SER5	SERRI	4	44	39,723496°	9,154896°
SER6	SERRI	8	22	39,716634°	9,168311°
SER7	SERRI	10	13	39,704208°	9,163819°
SER8	SERRI	11	21	39,708325°	9,171903°
SER9	SERRI	12	305	39,692782°	9,157998°
SER10	SERRI	13	79	39,694946°	9,168457°
SER11	SERRI	16	8	39,673279°	9,165030°
SER12	SERRI	15	71	39,681664°	9,165793°
SER13	SERRI	14	117	39,679140°	9,157612°

2. NORME DI RIFERIMENTO E NORME DI RIFERIMENTO

- **Decreto Legislativo n. 387 del 2003**, in attuazione della Direttiva 2001/77/CE, relativa alla promozione dell'energia elettrica prodotta da fonti rinnovabili nel mercato interno dell'elettricità, che si propone, fra l'altro di promuovere un maggiore contributo delle fonti energetiche da fonti rinnovabili alla produzione di energia elettrica;
- **Decreto legislativo 3 marzo 2011, n. 28**: Attuazione della direttiva 2009/28/CE sulla promozione dell'uso dell'energia da fonti rinnovabili, recante modifica e successiva abrogazione delle direttive 2001/77/CE e 2003/30/CE;
- **D.M. 10-9-2010 - Linee guida per l'autorizzazione degli impianti alimentati da fonti rinnovabili - IL Decreto Legislativo 3 aprile 2006, n. 152** "Norme in materia ambientale" e ss.mm.ii. e in particolare:
- **D.lgs. 4/2008**, entrato in vigore il 13 febbraio 2008, recante "Ulteriori disposizioni correttive ed integrative del decreto legislativo 3 aprile 2006, n. 152, recante norme in materia ambientale". Lo stesso decreto è integrato e modificato dalla legge n.99 del 23 luglio 2009, recante "Disposizioni per lo sviluppo e l'internazionalizzazione delle imprese, nonché in materia di energia".
- **D.lgs. 29 giugno 2010, n. 128**, modifiche e integrazione al decreto legislativo del 3 Aprile 2006, n.152entrato in vigore dal 26 agosto 2010;
- **D.lgs. 4 marzo 2014, n.46**, entrato in vigore dall'11 aprile 2014;
- **D.L. 24 giugno 2014, n.9**1, misure urgenti per il settore agricolo, la tutela ambientale e l'efficientamento energetico, entrato in vigore in data 25/06/2014 e convertito con modificazioni dalla legge L. 11 agosto 2014 n.116, che hanno ulteriormente modificato e integrato il D.lgs. 152/2006 e s.m.i. o Il **D.lgs. n.104 del 16/06/2017** (Attuazione della direttiva 2014/52/UE del Parlamento europeo e del Consiglio, del 16 aprile 2014, che modifica la direttiva 2011/92/UE, concernente la valutazione dell'impatto ambientale di determinati progetti pubblici e privati, ai sensi degli articoli 1 e 14 della legge 9 luglio 2015, n. 114) recante ulteriori modifiche ed integrazioni al Dlgs 152/2006.
- **Il D.lgs. 42/2004 e ss.mm.ii** che norma i beni culturali e paesaggistici da sottoporre a tutela e conservazione individuando gli opportuni indirizzi di conservazione.
- **La Legge n. 394/91**, avente ad oggetto: «Legge Quadro sulle Aree Protette»;
- **Il DPR n. 357 dell'8 settembre 1997** "Regolamento recante attuazione della direttiva 92/43/CEE relativa alla conservazione degli habitat naturali e seminaturali, nonché della flora e della fauna selvatiche";
- **Il DM 3 aprile 2000** "Elenco dei siti di importanza comunitaria e delle zone di protezione speciali", individuati ai sensi delle direttive 92/43/CEE e 79/409/CEE, e successivi aggiornamenti;
- **Il DMA 17 ottobre 2007** – "Criteri Minimi uniformi per la definizione di misure di conservazione relative a Zone speciali di conservazione (ZSC) e a Zone di protezione speciale (ZPS)";

- **Il Programma IBA**;
- **Il PAI** Piano Stralcio per l'Assetto Idrogeologico (P.A.I.), redatto ai sensi della legge n. 183/1989 e del decreto-legge n. 180/1998, e approvato con decreto del Presidente della Regione Sardegna n. 67 del 10/07/2006
- **Il Regio Decreto Legislativo 30 dicembre 1923, n. 3267**, "Riordinamento e riforma della legislazione in materia di boschi e terreni montani".
- **Programma di Fabbricazione** pubblicato sul BURAS n.21 del 30/06/1994

L'elenco normativo è riportato soltanto a titolo di promemoria informativo; esso non è esaustivo per cui eventuali leggi o norme applicabili, anche se non citate, andranno comunque applicate.
Infine, qualora le sopra elencate norme tecniche siano modificate o aggiornate, si dovranno applicare le norme più recenti.

3. IL PROGETTO

Il layout dell'impianto eolico (con l'ubicazione degli aerogeneratori, il percorso dei cavidotti e delle opere accessorie per il collegamento alla rete elettrica nazionale) come riportato nelle tavole grafiche allegate, è stato progettato sulla base dei seguenti criteri:

- Analisi vincolistica: si è accuratamente evitato di posizionare gli aerogeneratori o le opere connesse in corrispondenza di aree vincolate.
- Distanza dagli edifici abitati o abitabili: al fine di minimizzare gli ipotetici disturbi causati dalle emissioni sonore dell'impianto in progetto, si è deciso di mantenere un buffer di almeno 1000 metri da tutti gli edifici abitati o abitabili, che come norma progettuale si ritiene ampiamente sufficiente a garantire il rispetto dei limiti di legge in materia di inquinamento acustico (v. paragrafo dedicato);
- Minimizzazione dell'apertura di nuove strade: il layout è stato progettato in modo da ridurre al minimo indispensabile la realizzazione di nuove strade, anche ottica di non eccedere nei frazionamenti dei terreni e loro proprietà.

L'impianto oggetto di studio si basa sul principio secondo il quale l'energia del vento viene captata dalle macchine eoliche che la trasformano in energia meccanica e quindi in energia elettrica per mezzo di un generatore: nel caso specifico il sistema di conversione viene denominato aerogeneratore.

La bassa densità energetica prodotta dal singolo aerogeneratore per unità di superficie comporta la necessità di progettare l'istallazione di più aerogeneratori nella stessa area.

L'impianto sarà costituito dai seguenti sistemi:

- di produzione, trasformazione e trasmissione dell'energia elettrica;
- di misura, controllo e monitoraggio della centrale;
- di sicurezza e controllo.

3.1. AEROGENERATORI

Gli aerogeneratori saranno ad asse orizzontale, costituiti da un sistema tripala, con generatore di tipo asincrono. Il tipo di aerogeneratore da utilizzare verrà scelto in fase di progettazione esecutiva dell'impianto; le dimensioni previste per l'aerogeneratore tipo e che potrebbe essere sostituito da uno ad esso analogo:

- diametro del rotore pari 162 m,
- altezza mozzo pari a 119 m,
- altezza massima al tip (punta della pala) pari a 200 m.

L'aerogeneratore eolico ad asse orizzontale è costituito da una torre tubolare in acciaio che porta alla sua sommità la navicella, all'interno della quale sono alloggiati l'albero di trasmissione lento, il moltiplicatore di giri, l'albero veloce, il generatore elettrico ed i dispositivi ausiliari. All'estremità dell'albero lento, corrispondente all'estremo anteriore della navicella, è fissato il rotore costituito da un mozzo sul quale sono montate le pale, costituite in fibra di vetro rinforzata.

La navicella può ruotare rispetto al sostegno in modo tale da tenere l'asse della macchina sempre parallela alla direzione del vento (movimento di imbardata); inoltre è dotata di un sistema di controllo del passo che, in corrispondenza di alta velocità del vento, mantiene la produzione di energia al suo valore nominale indipendentemente dalla temperatura e dalla densità dell'aria; in corrispondenza invece di bassa velocità del vento, il sistema a passo variabile e quello di controllo ottimizzano la produzione di energia scegliendo la combinazione ottimale tra velocità del rotore e angolo di orientamento delle pale in modo da avere massimo rendimento.

Il funzionamento dell'aerogeneratore è continuamente monitorato e controllato da un'unità a microprocessore.

Il parco eolico "Serri" è composto da 13 aerogeneratori dalla potenza nominale massima di 7,2 MW per una potenza complessiva di 93,6 MW.
Alcune torri verranno collegate tra di loro in entra-esci mediante cavidotto a 36 kV, tutte verranno collegate sempre mediante cavidotto interrato a 36 kV ad una cabina di raccolta e smistamento.
Lo schema di allacciamento alla RTN prevede che la sottostazione elettrica utente venga collegata in antenna ad uno stallo a 36 kV con la sezione di una nuova stazione elettrica di trasformazione Terna a 150/36 kV.
La potenza totale in immissione richiesta ai fini della connessione alla RTN risulta quindi pari 93,6 MW.

Un generatore eolico (o aerogeneratore) è una macchina elettro-meccanica costruita per trasformare l'energia posseduta dal vento sotto forma di energia cinetica (energia eolica) in energia elettrica. Le pale

dell'aerogeneratore sono l'elemento della macchina atto a trasformare il suddetto contenuto energetico posseduto dall'aria in lavoro meccanico. Successivamente tale lavoro meccanico viene convertito in energia elettrica attraverso un opportuno generatore elettrico.

Sul mercato esistono diverse tipologie di aerogeneratori, ad asse orizzontale e verticale, con rotore mono, bi o tripala, posto sopra o sottovento. Il tipo di aerogeneratore previsto per l'impianto in oggetto è il modello V162-7,2 MW della Vestas. Si tratta di un aerogeneratore ad asse orizzontale con rotore tripala e una potenza massima di 7,2 MW, le cui caratteristiche principali sono di seguito riportate:

− rotore tripala a passo variabile, di diametro 162 m, con mozzo rigido in acciaio;

− navicella in carpenteria metallica con carenatura in vetroresina e lamiera, in cui sono collocati il generatore elettrico e le apparecchiature idrauliche ed elettriche di comando e controllo;

− sostegno tubolare troncoconico in acciaio, avente altezza fino all'asse del rotore al massimo pari a 119 m.

Figura 3. Tipico aerogeneratore Vestas V162-7,2 MW

La turbina, di norma, è equipaggiata, in accordo alle disposizioni dell'ENAC (Ente Nazionale per l'Aviazione Civile), con un sistema di segnalazione notturna per la segnalazione aerea. Tale equipaggiamento di norma consiste nell'utilizzo di una luce di colore rosso intermittente da installare sull'estradosso della navicella dell'aerogeneratore.

La navicella è dotata di un sistema antincendio, che consiste di rilevatori di fumo e CO, i quali rivelano gli incendi e attivano un sistema di spegnimento ad acqua atomizzata ad alta pressione nel caso di incendi dei componenti meccanici e a gas inerte (azoto) nel caso di incendi dei componenti elettrici (cabine elettriche e trasformatore). L'aerogeneratore è dotato di un completo sistema antifulmine, in grado di proteggere da danni diretti ed indiretti sia alla struttura (interna ed esterna) che alle persone. Il fulmine viene "catturato" per mezzo di un sistema di conduttori integrati nelle pale del rotore, disposti ogni 5 metri per tutta la lunghezza della pala. Da questi, la corrente del fulmine è incanalata attraverso un sistema di conduttori a bassa impedenza fino al

sistema di messa a terra. La corrente di un eventuale fulmine è scaricata dal rotore e dalla navicella alla torre tramite collettori ad anelli e scaricatori di sovratensioni. La corrente del fulmine è infine scaricata a terra tramite un dispersore di terra. I dispositivi antifulmine previsti sono conformi agli standard della più elevata classe di protezione (Classe I), secondo lo standard internazionale IEC 61024-1 Il futuro Parco Eolico "Serri" sarà quindi composto da 13 aerogeneratori indipendenti, opportunamente disposti e collegati in relazione alla disposizione dell'impianto, dotati di generatori sincroni. Ogni generatore funzioni di controllo e protezione. Gli aerogeneratori sono collegati fra di loro mediante un cavidotto interrato interno al sito in media tensione (MT) e a loro volta sono connessi alla sottostazione elettrica utente (SSEU) mediante cavidotto interrato esterno al sito in media tensione (MT). Nella stessa sottostazione sarà ubicato il sistema di monitoraggio, comando, misura e supervisione (MCM) del parco eolico che consente di valutare in remoto il funzionamento complessivo e le prestazioni del parco eolico ai fini della sua gestione ottimale.

3.2. IL SISTEMA DI PRODUZIONE, TRASFORMAZIONE E TRASPORTO DELL'ENERGIA ELETTRICA PRODOTTA

Il modello tipo di aerogeneratore scelto avrà potenza nominale di 7.2 MW con altezza mozzo pari a 119 m e diametro rotore pari a 162 m. Questa tipologia di aerogeneratore è allo stato attuale quella ritenuto più idoneo per il sito di progetto dell'impianto.

L'area interessata dal posizionamento degli aerogeneratori ricade nel comune di Serri su una superficie a destinazione agricola. I terreni sui quali si intende realizzare il parco eolico sono tutti di proprietà privata. Il territorio è caratterizzato da un'orografia prevalentemente collinare e le posizioni delle macchine hanno un'altitudine media pari a di 550.00 m s.l.m.

Oltre che degli aerogeneratori, il progetto si compone dei seguenti elementi:

• Cavi interrati 36 kV, ubicati nel comune di Serri (SU), per il vettoriamento dell'energia elettrica prodotta dai singoli aerogeneratori verso la cabina di raccolta e smistamento e da quest'ultima verso l'edificio quadri 36 kV nella SE;

• Cabina raccolta e smistamento, ubicata nel comune di Serri (SU), di raccolta dei cavidotti a 36 kV provenienti dal parco eolico e dalla quale partirà un successivo cavidotto che verrà collegato con l'edificio quadri 36 kV nella SE;

• Edificio quadri 36 kV, ubicato nel comune di Serri (SU), contenente la cabina di raccolta dei cavidotti a 36 kV provenienti dal parco eolico in oggetto e da altri produttori, dalla quale partirà un cavidotto che verrà collegato alla stazione RTN tramite inserimento in antenna a 36 kV con la sezione a 36 kV di una nuova stazione elettrica di trasformazione Terna a 150/36 kV;

• Nuova stazione elettrica Terna di trasformazione a 150/36 kV, ubicata nel comune di Mandas (SU), da inserire in entra-esce sulla linea RTN a 150 kV "Selegas – Nurri", previa realizzazione dei raccordi della linea RTN 150 kV "S. Miali – Selegas" con la sezione 150 kV di una nuova SE di trasformazione RTN a 380/150 kV da inserire in entra – esce alla linea RTN 380 kV "Ittiri – Selargius" e previa realizzazione dei seguenti interventi di cui al Piano di Sviluppo: -

- nuova SE RTN 150 kV da realizzare presso l'attuale Cabina primaria di Goni;

- nuovo elettrodotto RTN a 150 kV "Selargius – Goni";

- rimozione delle limitazioni sulle attuali linee a 150 kV "Santu Miali – Goni" e "Santu Miali - Villasor".

3.3. CAVIDOTTI

Come già descritto i collegamenti fra gli aerogeneratori e la SSEU utente avverranno per mezzo di elettrodotti interrati. La norma tecnica italiana che fa da riferimento al corretto dimensionamento dei cavi elettrici interrati è la CEI 20-21. Secondo norma il dimensionamento è stato eseguito in base ad una conduttività termica media.

La geometria e le dimensioni dello scavo nell'intorno del cavo influenzano la capacità di smaltimento del calore disperso per effetto Joule dai cavi stessi.

Sempre secondo norma CEI 20-21, per la valutazione del calore smaltibile dai cavidotti, e quindi il loro corretto dimensionamento, è stato utilizzato un valore medio di resistività termica specifica del terreno, compreso tra gli 0,7 (°C m) /W ed i 3,0 (°C m)/W consigliati dalla norma stessa.

Per quanto riguarda la protezione meccanica dei cavidotti in a 36 kV è stata usata una guaina maggiorata, secondo quanto prescritto dalla norma CEI 11-17.

I cavidotti principali sono:

• Cavidotto 36 kV interno al parco eolico per il collegamento in entra-esci tra gli aerogeneratori (in particolare si prevede il collegamento in entra-esci degli aerogeneratori T3-T4);

• Cavidotto 36 kV interno al parco eolico per il collegamento tra gli aerogeneratori e la cabina di raccolta e smistamento;

• Cavidotto 36 kV esterno al parco eolico per il collegamento cabina di raccolta e smistamento con l'edificio quadri 36 kV nella SE;

La cabina utente, da realizzarsi nei pressi del punto di consegna, è il punto di raccolta dei cavi provenienti dal parco eolico per consentire il trasporto dell'energia prodotta fino al punto di consegna alla rete di trasmissione nazionale e riceve l'energia prodotta dagli aerogeneratori attraverso la rete di raccolta a 36 kV.

All'interno dell'area recintata della cabina utente sarà ubicato un fabbricato suddiviso in vari locali che a seconda dell'utilizzo ospiteranno i quadri AT, gli impianti BT e di controllo, gli apparecchi di misura, i servizi igienici, ecc. Inoltre sarà installata una reattanza shunt per permettere l'eventuale rifasamento delle correnti reattive.0

L'impianto di terra sarà costituito, conformemente alle prescrizioni della Norma CEI EN 50522 ed alle prescrizioni della Guida CEI 99-5, da una maglia di terra realizzata con conduttori nudi in rame elettrolitico di sezione pari a 120 mm2, interrati ad una profondità di almeno 0,7 m. Per le connessioni agli armadi verranno impiegati conduttori di sezione pari a 70 mm2. La scelta finale deriverà dai calcoli effettuati in fase di progettazione esecutiva.

La RTU sarà comandabile in locale dalla sottostazione tramite un quadro sinottico che riporterà lo stato degli organi di manovra di tutta la rete AT, i comandi, gli allarmi, le misure delle grandezze elettriche. I conduttori di terra che hanno lo scopo di collegare i collettori di terra principali e secondari ai dispersori ed i dispersori tra loro, e sono di tipo:

- Cavo in rame nudo della sezione di 95 mm2;
- Cavo in rame della sezione di 120 mm2 ricoperto in PVC;
- Conduttori di terra da 50 mm² in rame ricoperto in PVC;
- Elementi strutturali metallici inamovibili e masse estranee ammessi dal commento al paragrafo 542.3.1 della succitata norma.

In tale commento è inoltre raccomandato che i conduttori di terra abbiano un percorso breve e non siano sottoposti a sforzi meccanici.

Anche le giunzioni con il dispersore non devono danneggiare né i conduttori di terra né gli elementi del dispersore (per es. i tubi); si raccomanda che esse siano eseguite con saldatura forte od autogena o con appositi manicotti che assicurano il contatto equivalente a quello della saldatura.

Di seguito si riportano i dati di progetto utilizzati per il dimensionamento dei cavi.

Dati progetto	Valori
Tensione di rete	36 ±3x2,5
Materiale conduttore	Rame
Profondità di posa	1,2 m
Temperatura del terreno	20° C
Resistività del terreno	1,5 K*m/W
Caduta di tensione massima ammissibile per tratta	2%

La posa si realizza grazie a una perforazione guidata nel terreno mediante l'introduzione nel terreno di aste guidate da una testa di perforazione che preparano il percorso per la condotta da posare.

Le fasi principali della posa sono 3:

• Esecuzione della perforazione pilota guidata per creare il percorso del prodotto da posare;

• Passaggio con alesatore per adattare il percorso al diametro del cavo/condotta;

• Tiro del prodotto in posizione.

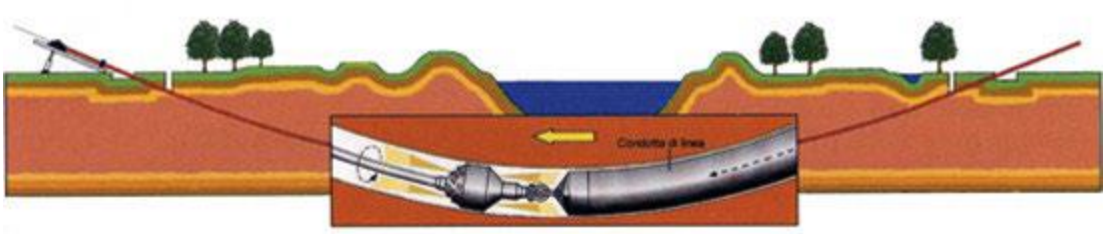

Figura 4. Tecnologia di trivellazione orizzontale controllata (TOC)

Esecuzione del foro pilota.

Questa è la prima e la più delicata delle fasi di lavoro. La trivellazione avviene mediante l'inserimento nel terreno di una serie di aste la prima delle quali collegata ad una testa orientabile che permette di essere guidata, l'asportazione del terreno in eccesso avviene per mezzo di fanghi bentonitici e vari polimeri che, passando attraverso le aste di perforazione e fuoriuscendo dalla testa, asporta il terreno facendolo defluire a ritroso lungo il foro, fino alla buca di partenza sotto forma di fango. Il sistema di perforazione ad espulsione di fanghi sopra descritto non è impiegabile per la trivellazione in materiali molto compatti e in tutti i tipi di roccia. In tali circostanze si impiegano sistemi di trivellazione a roto-percussione che consistono nell'impiego di speciali martelli pneumatici a fondo foro direzionabili, alimentati da aria compressa additivata da schiume fluide (biodegradabili). Tale sistema non garantisce però un preciso direzionamento. Estremamente più efficace e precisa è invece la perforazione idromeccanica con "mud motor", ottenuta per mezzo di uno speciale motore a turbina, azionata da una circolazione forzata di fanghi a cui è collegato un utensile che, taglia meccanicamente e con facilità le rocce. Il controllo della testa di trivellazione, generalmente avviene ad onde radio o via cavo per mezzo di una speciale sonda che alloggiata all'interno della testa ed in grado di fornire in ogni istante:

• Profondità

• Inclinazione

• Direzione sul piano orizzontale

A tale scopo, esiste una vasta gamma di strumenti disponibili per qualsiasi tipo di intervento più o meno precisi a seconda delle necessità.

4. IL FENOMENO DELLO SHADOW FLICKER

Le turbine eoliche, come tutte le strutture elevate, in condizioni soleggiate proiettano delle ombre sulle aree circostanti la loro ubicazione che variano di lunghezza, secondo l'altitudine del Sole, e la posizione, secondo l'azimuth del Sole stesso (Bearing). Nel momento in cui le pale di una turbina eolica ruotano in condizioni assolate, mentre il rotore è in movimento, esse possono intercettare la luce solare in maniera diretta, proiettando delle ombre mobili sulle aree adiacenti e causando un effetto di lampeggiamento tremulo (o sfarfallio), con conseguenti cambiamenti alternati d'intensità luminosa. Questo fenomeno è chiamato "Shadow Flicker", ovvero l'ombreggiatura intermittente del Sole da parte delle pale della turbina. Se la durata dello Shadow Flicker è eccessiva, questo effetto di sfarfallio può arrecare un disturbo visivo, legato alla percezione dell'intermittenza luce/ombra, alle abitazioni situate nelle immediate vicinanze delle aree in cui le ombre vengono proiettate, e i suoi effetti devono essere considerati nella progettazione di un parco eolico. Lo Shadow Flicker (trad.: "intermittenza dell'ombra") è un'ostruzione periodica della luce ed è il termine usato per descrivere cosa accade quando le pale rotanti di una turbina si presentano fra un osservatore e il Sole, causando un'ombra intermittente (Figura 5).

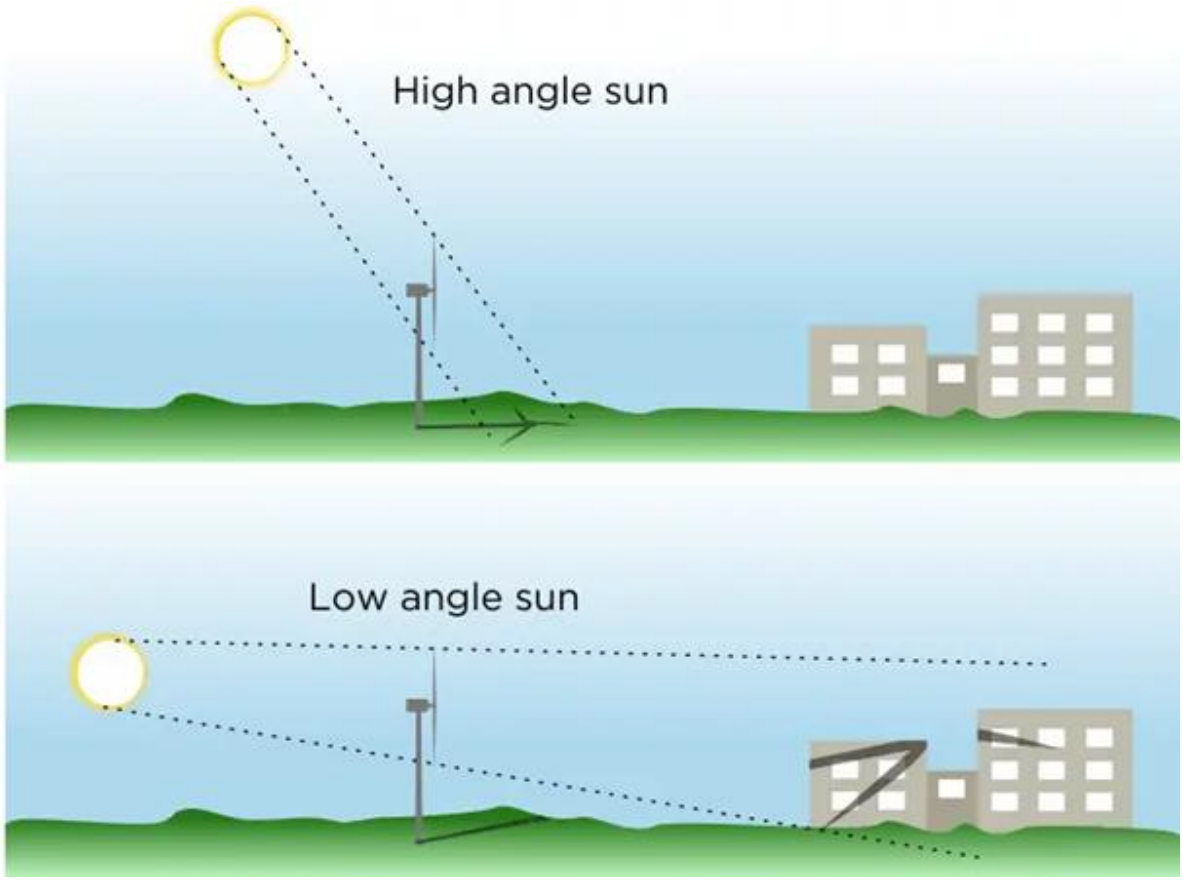

Figura 5. Lo Shadow Flicker si verifica quando le pale rotanti di una turbina si presentano fra un osservatore e il Sole, causando un'ombra intermittente

Il fenomeno si verifica quando una combinazione particolare di circostanze viene a coincidere in posizioni specifiche e in tempi particolari di un giorno e di un anno. Un esempio di Shadow Flicker con cui molta gente ha familiarità, è ciò che accade mentre si guida oltrepassando delle file di alberi spaziate regolarmente durante il tramonto, con il Sole basso dietro gli alberi. Con particolare riferimento alle turbine eoliche, lo sfarfallio avviene quando il Sole è basso nel cielo e illumina la struttura venendosi a trovandosi dietro il rotore della turbina; ciò può indurre la proiezione dell'ombra delle pale su una struttura in un fenomeno d'intermittenza, sembrando così di passare rapidamente dall'ombreggiamento alle condizioni naturali di illuminazione mentre la turbina gira. Quando un'ombra intermittente che passa rapidamente è osservata da un'apertura stretta (una finestra, un lucernaio, ecc.), questa è conosciuta come Flickering.

Per esempio, un soggetto all'interno di una struttura può percepire l'alternanza dell'ombra come una riduzione momentanea dell'intensità della luce naturale. Se i cambiamenti nei normali livelli d'intensità della luce sono alti, il Flicker può causare un fastidio percettivo. La distanza fra una turbina eolica e un ricevitore potenziale dello Shadow Flicker influisce sull'intensità delle ombre proiettate dalle pale e quindi sull'intensità di sfarfallio. Più vicino è il ricevitore alla turbina, più forte sarà lo sfarfallio. Questo dipende dal fatto che una maggiore porzione del disco solare è ostruita in maniera intermittente dalle pale che ruotano. Inoltre, lo sfarfallio è più intenso se le pale sono più vicine al mozzo della turbina e più lontane dalla punta. Per esempio, se il Sole è dietro la turbina e il ricevitore è davanti, lo sfarfallio sarà più forte quando le pale passeranno vicino al mozzo che quando passeranno vicino alla punta.

L'intensità dell'ombra proiettata diminuisce con l'aumento della distanza tra la turbina e il ricevitore, ma non in modo proporzionale. Anche la risposta umana ai livelli di luce varia in modo diverso. Per esempio, durante l'eclissi solare o al tramonto, il Sole deve essere quasi completamente coperto per far notare un cambiamento di luce all'occhio umano. Questo fenomeno riduce ulteriormente la percezione dello Shadow Flicker.

Le moderne turbine eoliche sono tipicamente delle macchine tripala che girano a una velocità tra 11 e 24 giri al minuto (RPM). Se, per esempio, la luce solare colpisce il rotore di una turbina eolica tripala che gira a 20 giri/min., la luce sfarfallerà a una frequenza di 3x20=60 sfarfalli al minuto, cioè 1 al secondo, o 1 Hertz (Hz).

Studi scientifici condotti nel Regno Unito[1] hanno dimostrato che le frequenze di sfarfallio che disturbano la vista umana sono quelle superiori ai 2,5 Hz. Questo vale per la maggior parte delle persone, comprese quelle che soffrono di epilessia. Solo una piccola percentuale di persone ha mostrato una sensibilità maggiore alle frequenze di sfarfallio tra 2,5 e 3,0 Hz. Queste frequenze sono molto più alte di quelle prodotte dalle turbine eoliche, che sono al massimo di 1 Hz. Quindi, le turbine eoliche non causano problemi di salute o sicurezza legati allo sfarfallio.

[1] Wind Turbine Shadow Flicker: What Causes This Phenomenon - Energy Follower

4.1. FENOMENI DI GLINT, FLICKER, E SHADOW

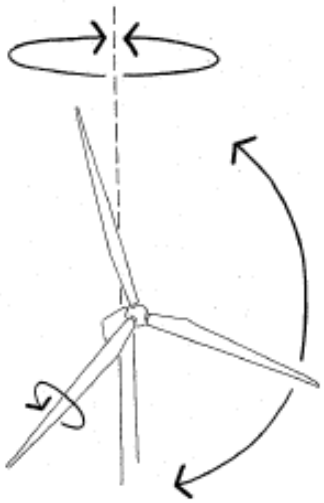

Figura 6. Le turbine eoliche, le navicelle, e le pale possono tutte adottare differenti passi, rotazioni, e orientamenti differenti.

Una ricerca sulla percezione visiva del movimento delle turbine condotta negli Stati Uniti [Thayer & Freeman, 1987], ha stabilito che: «da una parte la gente trova i rotori in movimento più attraenti di quelli statici, in questo modo il movimento è stato identificato con un effetto visivo percepito in maniera più blanda da alcuni commentatori. Mentre altrove sembra esserci consenso che il movimento renda le turbine più visibili di ciò che sarebbero al contrario». È difficile modellare o predire in maniera accurata l'impatto di questi effetti; tuttavia, si possono identificare e notare alcuni aspetti per capirne il potenziale effetto.

FENOMENO DEL GLINT

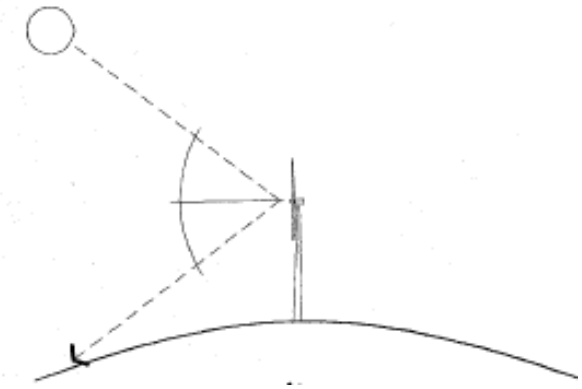

Figura 7. Il Glint è causato dal riflesso dei raggi solari sulle pale della turbina.

Il Glint è causato dal riflesso dei raggi solari sulle pale rotanti di una turbina eolica con una superficie lucida,

che può causare un effetto "lampeggiante" (Figura 7). La ricerca ha indicato che il Glint dalle superfici altamente riflettenti può essere osservato fra i 10 e i 15 km. Nel caso di una turbina eolica, assumendo che la superficie della turbina sia riflettente, ciò dipenderebbe dai seguenti fattori:

- Angolo del Sole: più il Sole è basso, più è probabile che le pale riflettano la luce verso un osservatore;
- Orientamento della turbina: se la turbina è allineata con la direzione del Sole, il Glint sarà più forte;
- Passo della pala: il passo è l'angolo tra la pala e il piano orizzontale; se il passo è basso, la pala sarà più inclinata e rifletterà più luce; Riflettività delle superfici della navicella e della pala;
- Riflettività delle superfici della navicella e della pala: se le superfici sono lucide o verniciate di colori chiari, il Glint sarà più intenso;
- Velocità di rotazione delle pale: più le pale girano veloce, più il Glint sarà frequente.

Per esempio, se una turbina ha una superficie lucida, un passo basso, una velocità di rotazione alta, e si trova in una posizione dove il Sole è basso e allineato con la turbina, il Glint sarà molto evidente.

FENOMENO DEL FLICKER

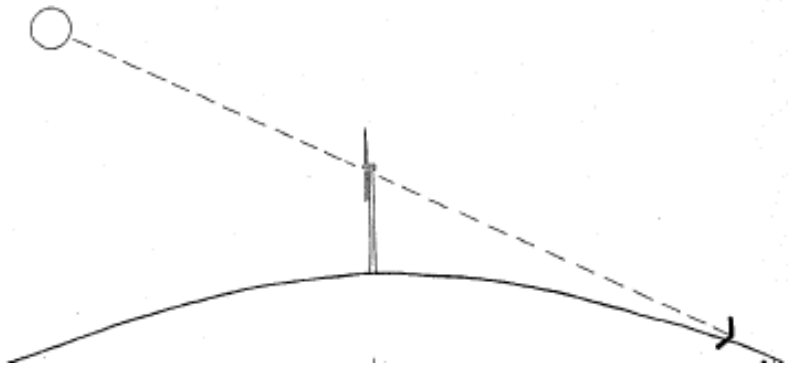

Figura 8. Il Flicker si verifica quando i raggi solari sono osservati tramite le pale rotanti di una turbina eolica.

Il Flicker si verifica quando i raggi solari vengono intercettati tramite le pale rotanti di una turbina eolica (Figura 8). Questo effetto dipende da un certo numero di fattori, quali:

- Angolo del Sole;
- Orientamento della turbina eolica;

- Passo della pala;
- Velocità di rotazione.

Questo effetto è comunemente apprezzabile quando le pale della turbina si trovano di fronte a un angolo solare basso, oltre una distanza di 350-500 metri, mentre si collima attraverso le pale.

FENOMENO DELLO SHADOW

Lo Shadow Flicker è diverso dal fenomeno stroboscopico causato dal taglio intermittente della luce solare dietro le pale rotanti delle pale eoliche. L'intensità dello Shadow Flicker è definita come la differenza o variazione di luminosità in una determinata posizione in presenza e in assenza di ombra.

Anche se i problemi causati dallo Shadow Flicker sono rari, per i siti in cui questo fenomeno può essere un problema, è necessario eseguire un'analisi per quantificarne l'effetto. L'impatto stimato dello Shadow Flicker causato da una turbina eolica dipende da numerosi fattori; la probabilità di questo avvenimento e la durata di tale effetto sono condizionati da:

- Il periodo dell'anno;
- La posizione del Sole nel cielo;
- La frequenza delle giornate con cielo sereno e poco nuvoloso (specialmente alle basse elevazioni sopra l'orizzonte);
- La direzione prevalente del vento (determina la direzione in cui si orienterà il rotore);
- I periodi e la durata del funzionamento della turbina;
- La proporzione di ore diurne durante le quali le turbine sono operative;
- L'altezza dell'hub e il diametro rotore della turbina;
- La direzione e la distanza del recettore rispetto alla/e turbina/e;
- Il terreno e il paesaggio di un'area;
- Gli ostacoli, quali gli alberi e le costruzioni, nella linea di mira, e la dimensione e la posizione di una zona di osservazione, quali una finestra o un patio.

Ogni latitudine sul globo ha la propria firma d'ombra in termini di area influenzata entro un determinato periodo di ombre da un oggetto (Figura 9). Vicino all'Equatore la firma assomiglia ad una farfalla, mentre più lontano dall'Equatore diventa più a forma di rene e vicino ai poli si trasforma quasi in un cerchio.

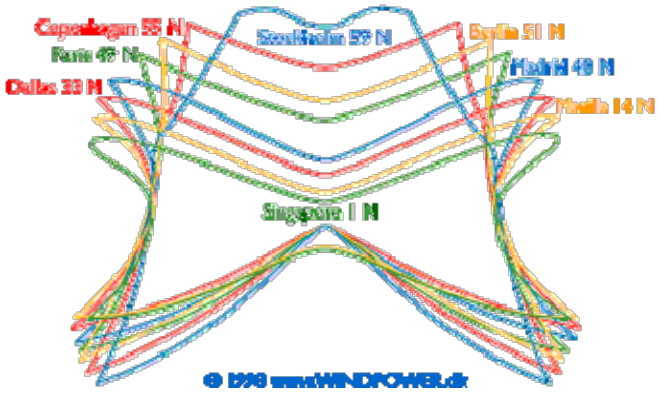

Figura 9. Firma d'ombra in termini di area influenzata al variare della latitudine

La dimensione dell'ombra del rotore e il numero dei minuti d'ombra all'anno nelle vicinanze della turbina variano in proporzione alla zona del rotore, secondo le indicazioni delle tre immagini riportate in Figura 10. Le zone rosse indicano i modelli annuali dell'ombra con più di 30 ore di ombra ("Caso peggiore") dai rotori di turbina del vento di 43 m, 53 m, e 63 m montate sulle torri da 50 m e computate per 55° di latitudine.

Figura 10. La dimensione dell'ombra del rotore e il numero dei minuti d'ombra all'anno nelle vicinanze della turbina variano in proporzione alla zona del rotore

L'altezza del mozzo di una turbina eolica è d'importanza secondaria per l'ombra dal rotore. La stessa ombra sarà estesa per una più grande zona, in modo tale che nelle vicinanze della turbina per esempio fino a 1.000 m, il numero dei minuti all'anno con le ombre diminuiranno realmente. Le quattro immagini riportate in Figura 11. mostrano l'ombra proiettata durante un anno ("Caso peggiore") da una turbina eolica con un diametro del rotore di 43 m, disposta con quattro altezze differenti del mozzo e computata per 55° di latitudine. Le zone rosse rappresentano le zone con più di 30 ore delle ombre. Se si è più lontani di circa 500-1.000 m da un rotore di una turbina eolica, esso non sembrerà tagliare la luce, ma la turbina sarà considerata come un oggetto con il sole dietro di esso. Di conseguenza, non è necessario generalmente da considerare la proiezione dell'ombra a tali distanze.

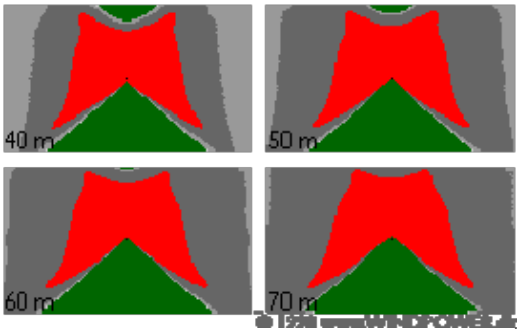

Figura 11. L'altezza del mozzo di una turbina eolica è di importanza secondaria per l'ombra dal rotore.

Quanto più l'osservatore sarà lontano dalla turbina, tanto meno pronunciato sarà l'effetto. Esistono tre diversi motivi per questo:

- Ci sono pochi periodi dell'anno in cui il Sole è abbastanza basso per proiettare un'ombra lunga;
- Quando il Sole è basso è più probabile che sia oscurato dalle nuvole sull'orizzonte o per la presenza di costruzioni e di vegetazione;
- il centro dell'ombra del rotore passa più rapidamente sopra la terra riducendo la durata dell'effetto.

A distanza, le pale non coprono il Sole ma lo mascherano solo parzialmente, sostanzialmente indebolendo l'ombra. Questo effetto si presenta in primo luogo con l'ombra dalla punta della pala, le punte in sezione sono più sottili che nel resto della pala. Le ombre dalle punte si estendono più lontano e così soltanto un effetto molto debole può essere osservato a distanza dalle turbine.

Il Report "Wind Turbine Health Impact Study: Report of Independent Expert Panel (January 2012) Prepared for: Massachusetts Department of Environmental Protection, Massachusetts Department of Public Health", al Paragrafo 3.4.b: "3.4.b. Shadow Flicker Considerations and Potential Health Effects" riporta quanto segue: «*Lo shadow flicker è causato quando accadono variazioni di intensità luminosa dalle pale rotanti delle pale eoliche, che proiettano ombre rotanti. Queste ombre si muovono sulla terra, sugli edifici e sulle strutture e variano in termini ritmo di frequenza e intensità.*

Lo shadow flicker può variare significativamente in funzione della velocità del vento e della durata, dalla posizione geografica della luce solare, e dalla distanza delle pale della turbina da strutture o edifici pertinenti.

In generale, i rami dello shadow flicker fuori dalla turbina eolica, in una caratteristica area geografica a forma di ala di farfalla declinante, presenterà quantità elevate di sfarfallio vicino alla turbina e meno sfarfallio nelle parti esterne dell'area geografica (New England Wind Energy Education Project (NEWEEP), 2011; Smedley et al., 2010).

Lo shadow flicker si verifica fino a circa 1.000 m dalla turbina eolica, ma il più forte sfarfallio è fino a circa 400 m dalla turbina, quando si verifica (NEWEEP, 2011).

Lo shadow flicker solito si verifica al mattino e alla sera, in prossimità dell'alba e del tramonto, quando le ombre sono più lunghe. Inoltre, lo shadow flicker può variare nelle diverse stagioni dell'anno a seconda della posizione geografica della turbina eolica, così che in alcuni siti lo sfarfallio si verificherà solo durante i mesi invernali, mentre in altri lo shadow flicker si verificherà durante quelli estivi.

Altri fattori che determinano percentuali di shadow flicker e intensità includono oggetti del paesaggio (ad esempio, gli alberi e le altre ombre esistenti) e modelli climatici. Ad esempio, non c'è shadow flicker nelle giornate nuvolose senza sole rispetto alle giornate di sole. Inoltre, la velocità di shadow flicker (passaggio di ombre al secondo) aumenta con la velocità del rotore (NRC, 2007). In più, quando più turbine si trovano relativamente vicine le une alle altre, si possono verificare sfarfallii combinati dalle diverse pale delle diverse turbine eoliche e, viceversa, se ci si trova su diverse aree geografiche attorno alle strutture, lo shadow flicker può verificarsi in diversi momenti della giornata sullo stesso sito dalle diverse turbine; pertanto, la progettazione preliminare della localizzazione delle turbine è molto importante (Harding et al., 2008).».

Lo Shadow Flicker è funzione di diversi fattori, compresa la posizione delle persone rispetto alla turbina eolica, la velocità e la direzione del vento, la variazione diurna variazione della luce solare, la latitudine geografica della locazione, la topografia locale, e la presenza di eventuali ostacoli (A. Nielsen, 2003).

Lo shadow flicker non è importante in siti distanti (per esempio, maggiore di 1.000 piedi da una turbina, ovvero circa 305 metri), eccetto durante la mattina e la sera, quando le ombre sono lunghe. Tuttavia, l'intensità della luce solare è anche inferiore durante la mattina e la sera; questo tende a ridurre gli effetti delle ombre e dello Shadow Flicker. La velocità dello Shadow Flicker aumenta con la velocità del rotore della turbina eolica.

FISICA DEL FENOMENO DELLO SHADOW FLICKER

Di seguito si riporta la sintesi deIl'Appendice B: "Appendix B Wind Turbines - Shadow Flicker - AB.1 Shadow Flicker and Flashing" del Report "Wind Turbine Health Impact Study: Report of Independent Expert Panel (January 2012) Prepared for Massachusetts Department of Environmental Protection, Massachusetts Department of Public Health" in merito alla fisica del fenomeno dello Shadow Flicker.

«*Il fenomeno dello shadow flicker si verifica durante un periodo limitato di tempo in un anno, a seconda dell'altitudine del sole, αs; l'altezza della turbina, H, il raggio del rotore, R, e l'altezza, la direzione, e la distanza al punto di osservazione.*

In qualsiasi momento, la massima distanza alla quale si estenderà un'ombra tremolante da una turbina eolica, sarà data da:

$$Xshadow\,,ax\ = (H + R - hview\ )/\tan(\alpha s) \qquad (1)$$

Dove hview è l'altezza del punto di osservazione.

L'altitudine solare dipende dalla latitudine, il giorno dell'anno, e il tempo come indicato nelle seguenti equazioni (Duffie e Beckman, 2006):

$$\alpha s\ = 9° - \cos^{-}[(\cos(\delta)\cos(\underline{\Phi})\cos(\omega)\omega + \sin(\delta)\sin(\underline{\Phi}))] \quad (2)$$

Dove δ= declinazione dell'asse, ø= latitudine della terra e ω= l'angolo orario. La declinazione è trovata dalla seguente equazione:

$$\delta\ =\ 2x, 4\sin(365(28 + 2)/365) \quad (3)$$

Dove n= giorno dell'anno.

L'angolo orario è trovato dalle ore da mezzogiorno (ora solare, negativa prima di mezzogiorno, positiva dopo mezzogiorno), diviso per 15 per convertirlo in gradi.

Un altro angolo rilevante è l'azimut solare. Questo indica l'angolo del sole rispetto alla direzione di riferimento determinato (generalmente il Nord) in un particolare momento. Ad esempio, il Sole è sempre nel Sud nel mezzogiorno solare, quindi la sua azimutale è di 180° in quel momento. L'azimut solare è importante poiché determina l'angolo dell'ombra della turbina eolica rispetto alla torre (vedere gli studi di Duffie e Beckman (2006) per i dettagli sul calcolo dell'azimut solare).

I siti sono tipicamente caratterizzati da grafici come quello illustrato in Figura 12 per una localizzazione in Danimarca (EWEA, 2004). Il grafico indica il numero di ore per anno di shadow flicker in funzione della direzione e della distanza (misurata in unità di altezza del mozzo). Nell'esempio mostrato, sono considerati due punti di osservazione. Uno di loro (A) è direttamente a Nord della turbina, a una distanza di 6 volte l'altezza del mozzo. L'altra (B) si trova a Sud-Est a una distanza di 7 volte l'altezza del mozzo. La Figura mostra che il primo punto di osservazione sperimenterà lo shadow flicker dalla turbina per 5 ore all'anno, mentre il secondo punto sperimenterà lo shadow flicker dalla turbina per 12 ore all'anno. (…)».

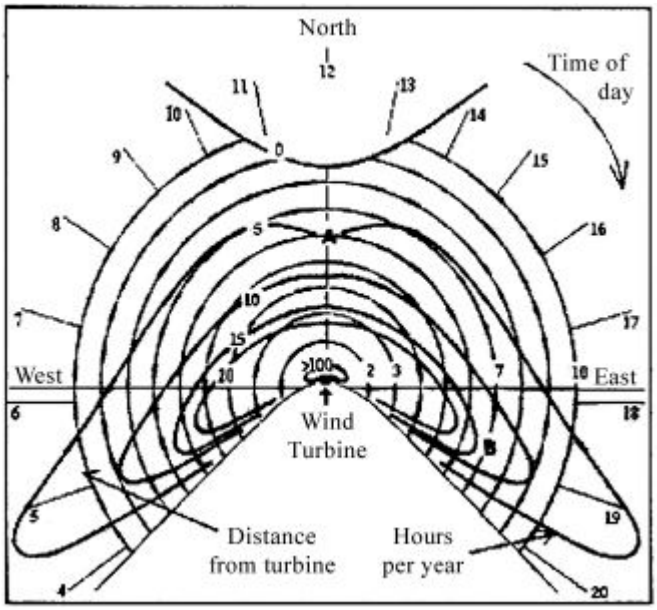

Figura 12. Diagramma dello Shadow Flicker (EWEA, 2004). A e B sono i punti di osservazione. Si noti che le equazioni assumono condizioni di cielo sereno e assenza di pioggia, nuvole, ecc.

4.2. LIMITI DI ESPOSIZIONE ALLO SHADOW FLICKER NELLA NORMATIVA INTERNAZIONALE E NELLA LETTERATURA DI SETTORE

Le pale delle turbine eoliche, ruotando, proiettano ombre in movimento che potrebbero, sotto certe condizioni, provocare il fenomeno Flicker. Una valutazione utile dello Shadow Flicker è data da Clarke (A.D Clarke, "*A case of Shadow Flicker/flashing: assessment and solution*", Techno Policy group, Open University, Walton Hall, Milton Keynes). Lo Shadow Flicker è misurato solitamente attraverso il numero di ore all'anno durante le quali una dimora sarebbe esposta al Flickering da parte delle turbine eoliche poste nelle vicinanze. Mentre questo è soprattutto un aspetto geometrico, altri fattori devono essere presi in considerazione; anche occasionalmente, quando il Sole è allineato geometricamente con la turbina e il ricettore, vari fattori possono impedire il Flicker. Per esempio, ***non è possibile che lo Shadow Flicker possa verificarsi quando il Sole non è visibile, cioè durante i giorni nuvolosi o nebbiosi, o se il rotore della turbina è fermo. Gli ostacoli situati fra una turbina eolica e l'osservatore, quali gli alberi, le colline e le costruzioni, ridurranno o elimineranno la durata e/o l'intensità dello Shadow Flicker***.

Fortunatamente, è possibile predire abbastanza esattamente la probabilità di quando e per quanto tempo si può verificare un effetto di Flicker; infatti, ricorrendo all'astronomia e alla trigonometria è possibile computare un probabile scenario "Caso peggiore" (o "Worst Case"), cioè una situazione in cui c'è sempre il Sole, il vento sta soffiando continuamente e quando il vento e il rotore della turbina seguono il Sole deviandola turbina esattamente come i movimenti del Sole.

È importante notare che gli effetti di Shadow, Flicker e Glint sono spesso descritti come causanti di un effetto stroboscopico che può causare fastidio alla gente all'interno della zona adiacente al parco eolico. Mentre questo effetto può accadere con le piccole turbine eoliche, che funzionano a più alti giri al minuto, la velocità di funzionamento delle grandi turbine tradurrebbe un effetto visivo molto più lento, limitando il potenziale fastidio.

Lo Shadow Flicker si presenta quando le pale del rotore proiettano delle ombre o delle sagome in movimento, attraverso il paesaggio o le dimore poste nelle vicinanze. La preoccupazione principale è l'impatto sulle costruzioni vicine e i possibili effetti psicologici su chi soffre di epilessia (in questo momento il 2% della popolazione del Regno Unito).

Studi europei e statunitensi di settore hanno suggerito che nello scenario "Worst Case" il limite di Shadow Flicker debba essere stabilito pari a 100 ore/anno.

Tuttavia, lo Shadow Flicker è raramente considerato un problema con riferimento ad una wind farm; esso diventa un potenziale problema solo durante i periodi in cui la gente che dimora nelle abitazioni, localizzate

nei pressi degli aerogeneratori, è sveglia, le finestre non sono oscurate (tende, infissi, ecc.) e una o più turbine eoliche sono in vista. Se una turbina eolica non è in vista durante le ore dello Shadow Flicker stimato, allora il fenomeno del Flicker passerà inosservato; perciò, non esistendo una procedura standard per la valutazione del fenomeno, non esistono delle linee guida disponibili su quanto l'esposizione all'ombreggiamento indotto possa essere accettabile, dunque il fenomeno dello Shadow Flicker non è generalmente regolato esplicitamente dalle autorità competenti per l'assetto territoriale.

5. INDAGINE E LOCALIZZAZIONE DEI POTENZIALI RICETTORI SENSIBILI

Compatibilmente con il livello di dettaglio richiesto per l'analisi dei *potenziali* Ricettori sensibili allo Shadow Flicker prodotto dall'impianto di progetto, si è proceduto all'indagine e successiva localizzazione su base cartografica di tutti gli elementi antropici ubicati entro l'Area d'indagine dello Shadow Flicker che rispondono alla descrizione di "ricettore".

Per la definizione di **"ricettore"** si è ritenuto opportuno mutuare quella fornita dal p.to 3.1.13 del Par. 3.1 "Termini e definizioni di carattere generale", Cap. 3 "TERMINI E DEFINIZIONI" della UNI/TS 11143-7:2013 "Metodo per la stima dell'impatto e del clima acustico per tipologia di sorgenti - Parte 7: Rumore degli aerogeneratori", ovvero: «***Qualsiasi edificio adibito ad "ambiente abitativo", comprese le relative aree esterne di pertinenza.***»; mentre la definizione di **"ambiente abitativo"** è quella fornita dall'art. 2 "Definizioni", comma 1., lettera b), della Legge 26 ottobre 1995, n. 447 "Legge quadro sull'inquinamento acustico" (*pubblicata su G.U.R.I. n. 254 del 30 ottobre 1995, S.O. n. 125*): «***ambiente abitativo: ogni ambiente interno ad un edificio destinato alla permanenza di persone o di comunità ed utilizzato per le diverse attività umane*** (*…Omissis…*)».

Sulla scorta di tali considerazioni, la metodologia d'indagine adottata è consistita nei seguenti *step*

operativi:

1) Su base cartografica "Ortofoto è stata indagata l'Area d'indagine dello Shadow Flicker (ottenuta dall'inviluppo delle aree buffer circolari di 1 km di raggio centrate nei n. 13 aerogeneratori di progetto modello di turbina eolica VESTAS V162-7.2 MW.

2) (**1° fase**) I ricettori sono stati individuati calcolando l'inviluppo delle circonferenze di raggio pari a 1 km con centro geometrico corrispondente alle coordinate geografiche delle turbine, precedentemente indicate (vedi Tabella 1).

Con questa modalità operativa, **all'interno dell'Area d'indagine sono stati individuati i *potenziali* Ricettori sensibili allo Shadow** Flicker (Allegato n. 1: Shadow receptor) le cui coordinate, espresse secondo la proiezione UTM WGS84 - Fuso 33, sono state successivamente riportate su base cartografica IGM (Scala: 1:25.000) in ambiente di lavoro "*Designer*" del software WindPRO 4.0.

5.1. INDAGINE E LOCALIZZAZIONE DEI POTENZIALI RICETTORI SENSIBILI

Compatibilmente con il livello di dettaglio richiesto per l'analisi dei *potenziali* Ricettori sensibili allo Shadow Flicker prodotto dall'impianto di progetto, si è proceduto all'indagine e successiva localizzazione su base cartografica di tutti gli elementi antropici ubicati entro l'Area d'indagine dello Shadow Flicker che rispondono alla descrizione di "ricettore".

Per la definizione di **"ricettore"** si è ritenuto opportuno mutuare quella fornita dal p.to 3.1.13 del Par. 3.1 "Termini e definizioni di carattere generale", Cap. 3 "TERMINI E DEFINIZIONI" della UNI/TS 11143-7:2013 "Metodo per la stima dell'impatto e del clima acustico per tipologia di sorgenti - Parte 7: Rumore degli aerogeneratori", ovvero: «***Qualsiasi edificio adibito ad "ambiente abitativo", comprese le relative aree esterne di pertinenza.***»; mentre la definizione di **"ambiente abitativo"** è quella fornita dall'art. 2 "Definizioni", comma 1., lettera b), della Legge 26 ottobre 1995, n. 447 "Legge quadro sull'inquinamento acustico" (*pubblicata su G.U.R.I. n. 254 del 30 ottobre 1995, S.O. n. 125*): «***ambiente abitativo: ogni ambiente interno ad un edificio destinato alla permanenza di persone o di comunità ed utilizzato per le diverse attività umane*** (*…Omissis…*)».

Sulla scorta di tali considerazioni, la metodologia d'indagine adottata è consistita nei seguenti *step*

operativi:

- Su base cartografica "Ortofoto è stata indagata l'Area d'indagine dello Shadow Flicker (ottenuta dall'inviluppo delle aree buffer circolari di 1.000 m di raggio centrate nei n. 13 aerogeneratori di progetto.
- (**1° fase**) All'interno della suddetta Area d'indagine sono stati individuati tutti i *potenziali* Ricettori sensibili allo Shadow Flicker rispondenti alla definizione di "ambiente abitativo" (*cfr.* art. 2 "Definizioni", comma 1., lettera b), della Legge n. 447/1995).

Con questa modalità operativa, **sono stati individuati i *potenziali* Ricettori sensibili allo Shadow Flicker,** le cui coordinate espresse secondo Allegato n. 1: Shadow receptor. Successivamente sono state riportate in ambiente di lavoro del software WindPro.

5.2. SHADOW FLICKER ANALYSIS

Questa sezione presenta le assunzioni che sono state adottate al fine di valutare il fenomeno dello Shadow Flicker indotto dall'impianto di progetto sull'area d'indagine assunta, e stimarne l'effetto sui ricettori sensibili coinvolti.

A ciascun ricettore è stata assegnata una "dimensione" o "zona di osservazione" ("*Viewing Area*") (tipicamente una singola finestra o un patio è considerata una zona di osservazione): una zona più grande aumenta la durata dello Shadow Flicker previsto; se le finestre sono più piccole o sono orientate un po' fuori dalla linea di mira, allora l'effetto dello Shadow Flicker potrebbe essere ridotto.

La presente analisi dello Shadow Flicker considera l'ipotesi del "*Worst Case Scenario*", cioè presuppone l'esposizione completa delle cosiddette "zone di osservazione" dei ricettori al fenomeno dell'ombreggiamento indotto; ovvero, nello studio si è assunto che non esista alcun genere di ostacoli che possano schermare (parzialmente o totalmente) il fenomeno, quali ad esempio alberature, edifici, ecc., localizzati lungo la linea di mira tra le "zone di osservazione" dei potenziali ricettori sensibili e i n. 13 aerogeneratori di progetto, ad eccezione dell'orografia dell'area.

In definitiva, i valori calcolati dal modello numerico (ore di ombreggiamento intermittente all'anno) sono desunti in funzione della probabilità composta di avere contemporaneamente l'occorrenza di rotore in moto (vento) e sole libero da nubi (ombre), fenomeni, questi ultimi, stocasticamente indipendenti.

Inoltre si è considerato il caso Reale, ("*Real Case Scenario*") allo scopo di pervenire a valori più realistici, prossimi al caso reale (Real case) è stato calcolato il dato di output prendendo in considerazione l'eliofania locale e le ore stimate di funzionamento dell'impianto eolico nell'arco dell'anno.

Tutte le moderne turbine eoliche sono a controllo d'imbardata, cioè il piano del rotore si orienta nel senso del vento predominante; di conseguenza, a volte il piano del rotore della turbina sarà girato di un angolo tale che l'effetto dello Shadow Flicker a una posizione particolare sarà minimizzato.

Tenendo presente che gli edifici individuati come ricettori possono essere localizzati entro l'areale in cui lo Shadow Flicker costituisce effettivamente un problema rilevante, è necessario eseguire un'indagine completa delle dimore rappresentative (comprese le posizioni e l'orientamento delle finestre, la posizione degli alberi che creano ombra, ecc.); inoltre per ogni dimora si deve supporre di operare nell'ipotesi di "Caso peggiore" ("*Worst Case Scenario*"), cioè:

- La presenza di tutte le finestre e/o lucernai identificabili come "ricettori sensibili" per tutti i layout dei fabbricati, individuate attraverso le ricognizioni fotografiche eseguite in situ;
- Ogni "apertura" è assunta orientata in direzione ortogonale alla turbina (angolo d'inclinazione verticale=

0°);

- Ogni "apertura" dovrebbe conservare le proprie dimensioni reali in termini di larghezza, lunghezza e altezza rispetto al suolo (la letteratura di settore, invece, considera già cautelative delle dimensioni di 1,00 m x 1,00 m per ciascuna "apertura");
- Nel caso di più finestre disposte su uno stesso piano si ipotizza la presenza di un'unica "apertura", di altezza massima pari a quella della finestra più alta e di lunghezza pari alla somma delle lunghezze delle singole finestre;
- Le "aperture" sono prive di tapparelle o tende che possano oscurare anche solo parzialmente la luce solare intermittente;
- Non si considera la presenza di alberi, edifici o altri elementi che possano limitare, parzialmente o totalmente, il fenomeno dello Shadow Flicker sul ricettore.

Le simulazioni condotte mediante software WindPro sono state condotte considerando l'ipotesi semplificativa (ma già abbondantemente cautelativa) per la quale tutti i ricettori sono dotati di quattro "aperture" dalle dimensioni di 1,00 m x 1,00 m, per un'altezza rispetto al suolo di 1,00 m (per una "apertura" posta al piano terra e un'altezza misurata rispetto al centro della stessa), disposte sui quattro lati edificio (direzioni pari a: 0°, 90°, 180° e 270° rispetto al Nord geografico),per cui ciascun ricettore si è supposto essere dotato di finestre su ogni lato dell'edificio ("Green House Mode").

È' importante inoltre specificare che per questo tipo di analisi si considera generalmente un'unica tipologia di *potenziali* Ricettori sensibili al fenomeno dello Shadow Flicker, ovvero ricettori "puntuali" localizzati nelle vicinanze dell'area d'impianto.

I ricettori "locali" sono invece rappresentati da agglomerati antropici (comuni, frazioni, borghi, ecc.) limitrofi al sito d'interesse, generalmente schematizzati come un unico ricettore localizzato in corrispondenza del punto del perimetro dell'agglomerato urbano più vicino all'area d'impianto.

In accordo con le Misure di mitigazione proposte alla lettera b): «**minima distanza di ciascun aerogeneratore dai centri abitati individuati dagli strumenti urbanistici vigenti non inferiore a 6 volte l'altezza massima dell'aerogeneratore**» del Paragrafo 5.3. "Misure di mitigazione", Capitolo 5. "GEOMORFOLOGIA E TERRITORIO" dell'Allegato 4 (punti 14.9, 16.3 e 16.5) "Impianti eolici: elementi per il corretto inserimento nel paesaggio e sul territorio" al D.M. 10 settembre 2010 "Linee guida per l'autorizzazione degli impianti alimentati da fonti rinnovabili. (10A11230)", i **n. 13 aerogeneratori dell'impianto di progetto distano da ciascun centro abitato più di 6 volte l'altezza massima del modello di turbina eolica impiegato ai fini dei calcoli**.

La distanza rilevante dei centri abitati dal sito d'interesse è tale da non giustificare per essi un'analisi dello Shadow Flicker, poiché sicuramente il fenomeno dello Shadow Flicker non avrà alcun effetto sui centri abitati.

Il potenziale fenomeno dello Shadow Flicker è stato dunque stimato esclusivamente con riferimento all'effetto indotto dai n. 13 aerogeneratori di progetto sui *potenziali* Ricettori sensibili "puntuali" individuati entro l'Area d'indagine dello Shadow Flicker di 1.000 m.

5.3. INDIVIDUAZIONE DEI RICETTORI

Ai fini della previsione degli impatti indotti sulle abitazioni e sugli edifici lavorativi dall'impianto eolico in progetto, sono stati censiti i ricettori presenti nel raggio di 1km dagli aerogeneratori. Distanza oltre la quale si può ipotizzare essere nullo il fenomeno di shadow flickering.

Per snellire il modello di calcolo, considerato che il software di analisi WindPRO non è in grado di tenere conto delle zone d'ombra prodotte reciprocamente da edifici ravvicinati, le quali di fatto annullano il fenomeno di shadow flickering dovuto alle turbine, nel caso di più edifici molto ravvicinati tra loro si prendono in considerazione i soli ricettori perimetrali.

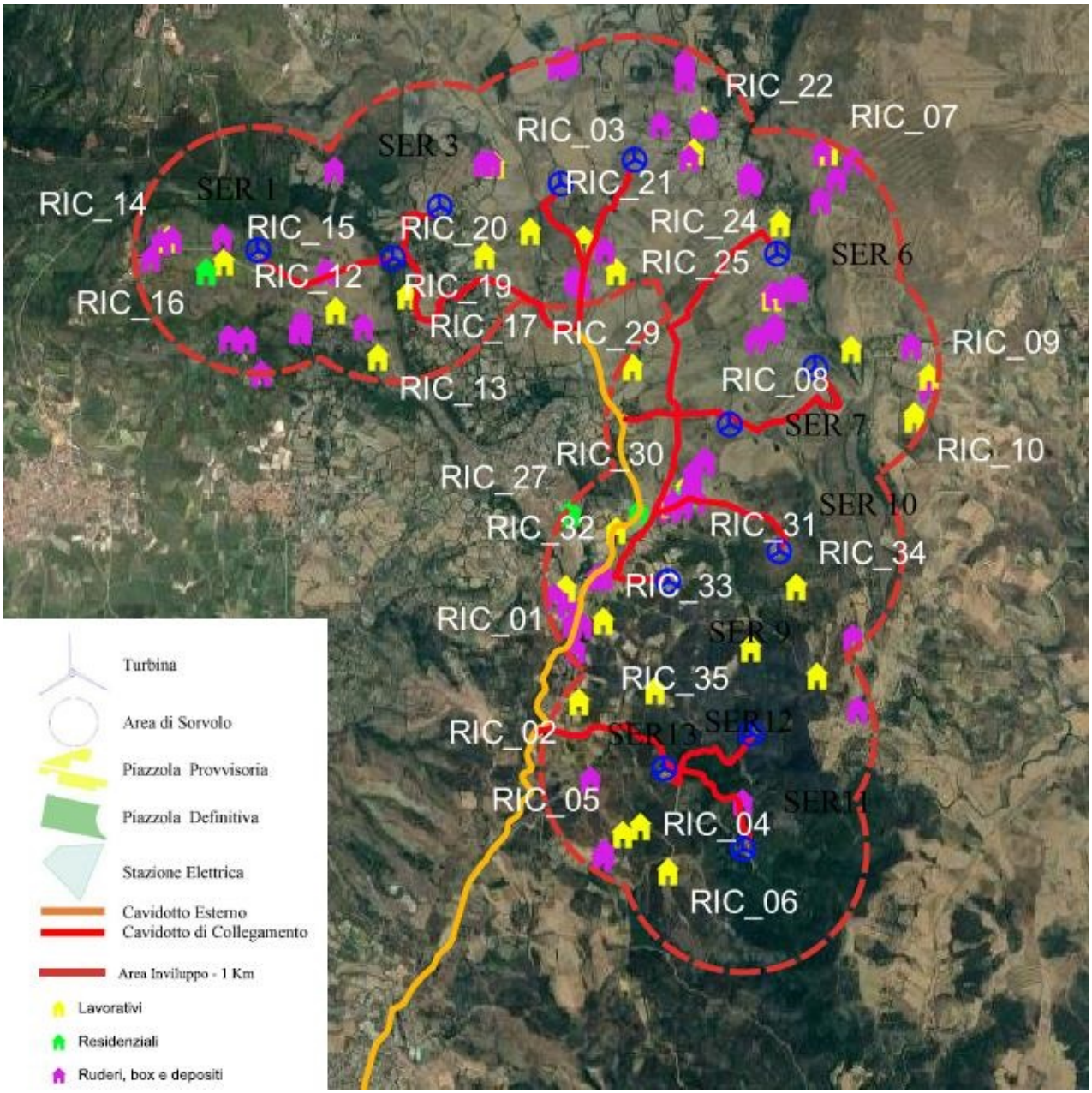

Figura 13. Censimento dei ricettori all'interno dell'ambito di studio

Sono stati quindi censiti un totale di 111 edifici, appartenenti ai Comuni di Escolca, Mandas, Nurri e Serri Figura 13, i quali risultano essere adibiti ad abitazione, edifici lavorativi o depositi agricoli/box/ruderi per lo più in stato di abbandono.

In particolare, dal censimento risultano 33 edifici lavorativi, 3 residenziale e 75 ruderi, box o depositi agricoli.

Sebbene il fenomeno possa essere percepito anche all'esterno, esso risulta evidente e fastidioso in quegli ambienti abitativi o lavorativi con finestrature che si trovano sul prolungamento della direttrice sole-turbina,

per questo motivo, si è considerato nella simulazione la presenza di finestre di altezza 1 metro e larghezza 1 metro posizionate ad altezza dal suolo di 1 metri e disposte su tutte le facciate degli edifici.

Per lo stesso motivo, seppur censiti per completezza, **sono stati esclusi dall'analisi box, depositi e ruderi** in quanto non sensibili al fenomeno indagato.

In Allegato 1 sono riportati i riferimenti geografici, Riferimenti catastali e l'uso in atto dei fabbricati.

Le celle evidenziate in tabella in giallo e verde rappresentano rispettivamente i ricettori di tipo "Lavorativo" e "Residenziale" per i quali è stata eseguita l'analisi dell'interferenza da shadow flickering in quanto a destinazione d'uso residenziale o lavorativa.

Figura 14. Esempio di identificazione dell'orientamento delle finestre dei ricettori

Data l'entità dei ricettori in studio, è stata ipotizzata una disposizione fissa delle finestre rispetto al nord pari a 0, 90, 180 e 270 gradi ("Green House Mode") Figura 14.

In questo modo sono state prese in considerazioni tutte le possibili esposizioni delle finestrature al fenomeno di shadow flickering, rendendo i risultati dell'analisi ancor più cautelativi e completi.

6. STIMA DEGLI IMPATTI

6.1. FASE DI COSTRUZIONE

Il fenomeno dello Shadow Flicker indotto dai n. 13 aerogeneratori dell'impianto di progetto sui potenziali ricettori sensibili complessivamente individuati entro l'Area d'indagine ottenuta dall'inviluppo delle aree buffer circolari di 1.000 m di raggio centrate nei n. 13 aerogeneratori di progetto sarà dovuto alla proiezione delle ombre mobili generate dalle pale in movimento; pertanto, il potenziale fenomeno dello Shadow Flicker indotto dagli aerogeneratori di progetto si potrà manifestare esclusivamente durante la fase di esercizio dell'impianto.

6.2. FASE DI ESERCIZIO

Dall'analisi del software WindPro (*vedi* **Allegato 2**) si evince che dei *potenziali* ricettori sensibili individuati entro l'Area d'indagine dello Shadow Flicker di 1.000 m di raggio, **un solo ricettore sarà potenzialmente interessato dal fenomeno dello Shadow Flicker indotto dai n. 13 aerogeneratori dell'impianto di progetto, poiché esposti allo Shadow Flicker per un numero di ore annue inferiore al "Valore limite" delle 100 ore/anno.**

6.3. CONCLUSIONI

A seguito di quanto descritto nei paragrafi precedenti si può concludere che, pur considerando una stima cautelativa, in quanto non si è tenuto conto degli effetti mitigativi dovuti al piano di rotazione delle pale non sempre ortogonale alla direttrice sole-finestra e all'eventuale presenza di ostacoli e/o vegetazione interposti tra il sole e la finestra, il fenomeno dello shadow flickering si può verificare su in condizioni superiore a 100 ore/anno:

- nel "Worst Case Scenario" per ricettori 7 dei 33 fabbricati di tipo lavorativi, per lo più lavorativi con scarsa densità abitativa durante l'anno e nessuno di tipo residenziali (come si può notare a pagina 2 e 3 dell'Allegato 2) ;
- nel "Real Case Scenario " nella colonna Expected values solo per un ricettore "RIC_14" di tipo lavorativo con scarsa densità abitativa come citato nel punto precedente.

L'incidenza di tale fenomeno sulla qualità della vita può ritenersi trascurabile in quanto, il valore di durata simulato ed atteso del fenomeno è nella maggior parte dei casi inferiore a 100 ore annue. Se si rapporta tale valore a quello di eliofania media locale dell'area si avrebbe un'incidenza percentuale del fenomeno di del tutt trascurabile.

A tali considerazioni va altresì sottolineato che:

• La velocità di rotazione della turbina è 12,1 rpm, quindi nettamente inferiore a 60 rpm, frequenza massima raccomandata al fine di ridurre al minimo i fastidi e soddisfare le condizioni di benessere.

• Il ricettore maggiormente interessato al fenomeno, ovvero quello con valore di shadow flickering maggiore ad 100 ore/anno (RIC_14), risulta essere un edifico lavorativo di categoria deposito agricolo con scarsa densità abitativa durante l'anno. Comunque, l'incidenza di tale fenomeno di poco superiore al valore di soglia, ma inferiore se si tiene conto degli effetti mitigativi citati in precedenza e di conseguenza si ritiene trascurabile.

• Le turbine in progetto sono molto lontane dai recettori, essendo le distanze comprese tra 222 m e 985 m. In tali circostanze l'effetto dell'ombra è trascurabile poiché il rapporto tra lo spessore della pala e la distanza dal recettore è molto ridotto;

• Per il fenomeno del Flicker, non esiste una procedura standard per la valutazione del fenomeno, non esistono delle linee guida disponibili su quanto l'esposizione all'ombreggiamento indotto possa essere accettabile, dunque il fenomeno dello Shadow Flicker non è generalmente regolato esplicitamente dalle autorità competenti per l'assetto territoriale

Stante tutto quanto sopra riportato è possibile concludere come l'interferenza tra la componente in esame, relativa allo Shadow flickering, sui ricettori presi in considerazione possa considerarsi trascurabile.

7. ALLEGATI

Di seguito i seguenti allegati:

- Allegato n. 1: Shadow Receptors;
- Allegato n. 2: Shadow – Main Result.

Shadow Receptors

Comune	Foglio	Particella	Ricettori	Categoria	Tipologia Ricettore	Note	Gradi Decimali	
							LONGITUDINE	LATITUDINE
Escolca	5	329	RIC_01	C/3	Lavorativi	Laboratori per arti e mestieri	39,69242	9,14844
	10	236	RIC_02	C/6	Lavorativi	Stalle, scuderie, rimesse, autorimesse (senza fine di lucro)	39,68416	9,14958
	55	6	RIC_03	E/1	Lavorativi	Stazioni per servizi di trasporto, terrestri, marittimi ed aerei	39,72331	9,14174
Mandas	4	20	RIC_04		Lavorativi	ENTE URBANO	39,67507	9,15536
	6	52	RIC_05	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,6718	9,15791
Nurri	14	42	RIC_06		Lavorativi	ENTE URBANO	39,72425	9,17312
	22	22	RIC_07	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,70981	9,17528
	34	300	RIC_08	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,70786	9,18264
	43	98	RIC_09	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,70469	9,18119
	43	100	RIC_10	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,70494	9,18119
Serri	1	48	RIC_11	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,71268	9,12671
	1	52	RIC_12	D/1	Lavorativi	Opifici	39,70924	9,13064
	1	66	RIC_13	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,71796	9,11108
	1	75	RIC_14	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,71625	9,1163
	1	76	RIC_15	Sub. 1 D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole.	39,71551	9,11461
	2	137	RIC_16	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,71376	9,13348
	3	138	RIC_17	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,7179	9,15018
	3	139	RIC_18	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,71669	9,14081
	3	140	RIC_19	Sub. 1 D/10 - Sub. 2 F/2	Lavorativi	**Sub. 1** = Fabbricati per funzioni produttive connesse alle attività agricole. **Sub. 2** = Unità collabenti	39,71851	9,14503
	4	100	RIC_20	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,7242	9,16057
	5	53	RIC_21		Lavorativi	ENTE URBANO	39,72652	9,16137
	7	135	RIC_22	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,71548	9,15321
	8	96	RIC_23	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,71898	9,16859
	8	98	RIC_24	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,71365	9,16776
	9	336	RIC_25	A/7	Residenziali	Abitazioni in villini	39,69795	9,15522
	9	1190	RIC_26	A/2	Residenziali	Abitazioni di tipo civile	39,698	9,14879
	10	98	RIC_27	B/4	Lavorativi	Uffici pubblici	39,69848	9,15826
	10	100	RIC_28	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,7085	9,15473
	10	103	RIC_29	?	Lavorativi	Edificio adibito a luogo di culto	39,69968	9,15969
	10	117	RIC_30	A/3	Residenziali	Abitazioni di tipo economico	39,69928	9,15983
	12	122	RIC_31	E/3	Lavorativi	Costruzioni e fabbricati per speciali esigenze pubbliche	39,69667	9,15316
	12	447	RIC_32		Lavorativi	ENTE URBANO	39,69009	9,15184
	13	87	RIC_33	E/3	Lavorativi	Costruzioni e fabbricati per speciali esigenze pubbliche	39,69247	9,17008
	13	196	RIC_34	E/3	Lavorativi	Costruzioni e fabbricati per speciali esigenze pubbliche	39,68807	9,1658
	13	242	RIC_35	D/10	Lavorativi	Fabbricati per funzioni produttive connesse alle attività agricole	39,68606	9,17195
	14	73	RIC_36	E/3	Lavorativi	Costruzioni e fabbricati per speciali esigenze pubbliche	39,68497	9,15678

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Giovanni Savarese/
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03/04/2024 13:05

SHADOW - Main Result

Calculation: Shadow flickering

Assumptions for shadow calculations

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

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

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

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

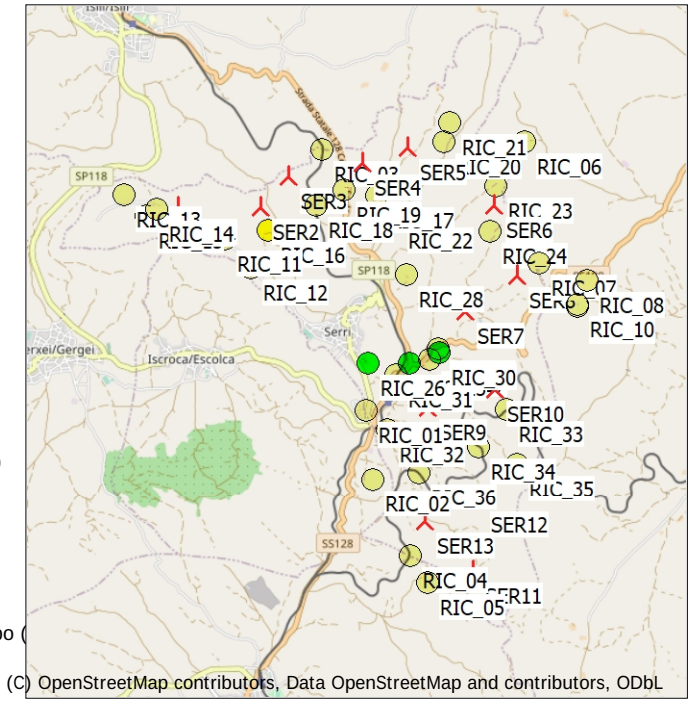
Operational hours are calculated from WTGs in calculation and wind distribution:
EMD-ConWx Meso Data, EUROPE [SAMPLE]_N39,71_E009,17 (22)

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve
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_ONLINEDATA_0.wpo (
Receptor grid resolution: 1,0 m

All coordinates are in
Geo [deg]-WGS84



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

Scale 1:100.000

New WTG Shadow receptor

WTGs

	Longitude	Latitude	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]
SER1	9,119441° E	39,716365° N	633,1	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER10	9,168457° E	39,694946° N	550,0	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER11	9,165030° E	39,673279° N	495,2	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER12	9,165793° E	39,681664° N	497,9	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER13	9,157612° E	39,679140° N	540,0	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER2	9,132161° E	39,716365° N	603,7	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER3	9,136555° E	39,720095° N	540,0	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER4	9,147951° E	39,721759° N	479,9	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER5	9,154896° E	39,723496° N	493,8	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER6	9,168311° E	39,716634° N	547,7	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER7	9,163819° E	39,704208° N	496,8	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER8	9,171903° E	39,708325° N	520,5	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5
SER9	9,157998° E	39,692782° N	560,0	VESTAS V162-7.2 7200 ...	Yes	VESTAS	V162-7.2-7.200	7.200	162,0	119,0	2.044	9,5

Shadow receptor-Input

No.	Longitude	Latitude	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
RIC_01	9,148440° E	39,692420° N	590,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_02	9,149580° E	39,684160° N	608,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_03	9,141740° E	39,723310° N	503,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_04	9,155360° E	39,675070° N	540,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_05	9,157910° E	39,671800° N	510,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_06	9,173120° E	39,724250° N	643,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_07	9,175280° E	39,709810° N	575,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_08	9,182640° E	39,707860° N	542,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_09	9,181190° E	39,704690° N	520,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_10	9,181190° E	39,704940° N	520,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_11	9,126710° E	39,712680° N	650,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_12	9,130640° E	39,709240° N	650,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_13	9,111080° E	39,717960° N	630,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0

To be continued on next page...

SHADOW - Main Result

Calculation: Shadow flickering

...continued from previous page

No.	Longitude	Latitude	Z [m]	Width [m]	Height [m]	Elevation a.g.l. [m]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
RIC_14	9,116300° E	39,716250° N	630,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_15	9,114616° E	39,715510° N	630,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_16	9,133480° E	39,713760° N	590,9	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_17	9,150180° E	39,717900° N	500,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_18	9,140810° E	39,716690° N	503,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_19	9,145030° E	39,718510° N	490,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_20	9,160570° E	39,724200° N	540,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_21	9,161370° E	39,726520° N	544,4	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_22	9,153210° E	39,715480° N	500,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_23	9,168590° E	39,718980° N	560,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_24	9,167760° E	39,713650° N	515,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_25	9,155220° E	39,697950° N	550,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_26	9,148790° E	39,698000° N	615,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_27	9,158260° E	39,698480° N	540,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_28	9,154730° E	39,708500° N	503,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_29	9,159690° E	39,699680° N	537,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_30	9,159830° E	39,699280° N	540,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_31	9,153160° E	39,696670° N	561,2	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_32	9,151840° E	39,690090° N	570,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_33	9,170080° E	39,692470° N	512,4	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_34	9,165800° E	39,688070° N	518,4	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_35	9,171950° E	39,686060° N	460,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RIC_36	9,156780° E	39,684970° N	539,9	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

	Shadow, worst case			**Shadow, expected values**
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
RIC_01	32:42	60	0:45	13:50
RIC_02	22:43	59	0:35	6:51
RIC_03	202:17	223	1:32	63:19
RIC_04	23:27	56	0:38	8:41
RIC_05	103:37	132	1:01	45:49
RIC_06	0:00	0	0:00	0:00
RIC_07	224:23	172	1:48	67:45
RIC_08	27:14	78	0:39	11:22
RIC_09	39:17	93	0:40	18:12
RIC_10	51:21	103	0:46	23:58
RIC_11	0:00	0	0:00	0:00
RIC_12	0:00	0	0:00	0:00
RIC_13	45:40	65	0:57	17:26
RIC_14	338:07	188	2:07	154:44
RIC_15	185:25	168	1:28	82:59
RIC_16	0:00	0	0:00	0:00
RIC_17	39:29	82	0:48	17:04
RIC_18	48:03	70	0:59	20:32
RIC_19	102:41	161	0:52	46:33
RIC_20	78:42	103	1:11	30:07
RIC_21	75:04	114	0:58	21:52
RIC_22	49:17	140	0:47	21:08
RIC_23	215:06	178	2:23	45:53
RIC_24	5:13	47	0:09	2:28
RIC_25	15:47	43	0:32	5:44
RIC_26	32:08	109	0:33	10:06
RIC_27	30:02	59	0:40	10:36
RIC_28	59:31	137	0:43	20:17
RIC_29	58:22	96	0:43	18:32
RIC_30	60:10	106	0:44	19:28
RIC_31	82:43	115	1:05	25:00
RIC_32	40:30	98	0:43	17:06
RIC_33	22:30	48	0:36	9:40

To be continued on next page...

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03/04/2024 13:05

SHADOW - Main Result

Calculation: Shadow flickering

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
RIC_34	0:00	0	0:00	0:00
RIC_35	91:57	95	1:16	23:37
RIC_36	30:40	72	0:41	10:39

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

No.	Name	Worst case [h/year]	Expected [h/year]
SER1	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (1)	442:46	193:15
SER10	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (10)	139:04	48:36
SER11	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (11)	127:04	54:31
SER12	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (12)	104:53	29:11
SER13	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)	40:27	11:57
SER2	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (2)	123:56	45:23
SER3	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (3)	221:55	81:23
SER4	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (4)	94:47	35:05
SER5	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (5)	178:53	63:25
SER6	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (6)	227:16	51:02
SER7	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (7)	75:26	24:42
SER8	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (8)	311:50	106:30
SER9	VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (9)	183:47	64:44

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_01 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (1)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:45 17:10	07:33 17:43	06:59 18:15	07:10 19:47 33	07:28 (SER9) 08:01 (SER9)	06:26 20:17	05:58 20:45	05:59 20:56	06:22 20:38	06:51 19:57 44	07:11 (SER10) 07:55 (SER9)	07:19 19:08	06:51 17:23	07:25 17:00
2	07:45 17:11	07:32 17:44	06:57 18:16	07:08 19:48 35	07:26 (SER9) 08:01 (SER9)	06:25 20:18	05:58 20:46	06:00 20:56	06:23 20:37	06:52 19:55 44	07:12 (SER10) 07:56 (SER9)	07:20 19:06	06:53 17:22	07:26 17:00
3	07:45 17:11	07:31 17:45	06:56 18:17	07:07 19:49 36	07:25 (SER9) 08:01 (SER9)	06:23 20:19	05:58 20:47	06:00 20:56	06:24 20:36	06:53 19:53 43	07:13 (SER9) 07:56 (SER9)	07:21 19:05	06:54 17:21	07:27 17:00
4	07:45 17:12	07:30 17:46	06:54 18:18	07:05 19:50 37	07:23 (SER9) 08:00 (SER9)	06:22 20:20	05:57 20:47	06:01 20:55	06:25 20:35	06:54 19:52 42	07:14 (SER9) 07:56 (SER9)	07:22 19:03	06:55 17:20	07:28 17:00
5	07:45 17:13	07:29 17:47	06:53 18:19	07:03 19:51 39	07:22 (SER9) 08:01 (SER9)	06:21 20:21	05:57 20:48	06:01 20:55	06:26 20:34	06:55 19:50 41	07:15 (SER9) 07:56 (SER9)	07:23 19:02	06:56 17:19	07:29 17:00
6	07:45 17:14	07:28 17:49	06:51 18:20	07:02 19:52 40	07:20 (SER9) 08:00 (SER9)	06:20 20:22	05:57 20:48	06:02 20:55	06:27 20:32	06:56 19:49 40	07:16 (SER9) 07:56 (SER9)	07:24 19:00	06:57 17:18	07:30 16:59
7	07:45 17:15	07:27 17:50	06:50 18:22	07:00 19:53 41	07:18 (SER9) 07:59 (SER9)	06:19 20:23	05:56 20:49	06:02 20:55	06:28 20:31	06:57 19:47 39	07:17 (SER9) 07:56 (SER9)	07:25 18:58	06:58 17:17	07:31 16:59
8	07:45 17:16	07:26 17:51	06:48 18:23	06:59 19:54 42	07:17 (SER9) 07:59 (SER9)	06:18 20:24	05:56 20:50	06:03 20:54	06:29 20:30	06:58 19:46 38	07:18 (SER9) 07:56 (SER9)	07:26 18:57	06:59 17:16	07:31 16:59
9	07:45 17:17	07:25 17:52	06:46 18:24	06:57 19:55 43	07:15 (SER9) 07:58 (SER9)	06:16 20:25	05:56 20:50	06:04 20:54	06:29 20:29	06:58 19:44 36	07:18 (SER9) 07:54 (SER9)	07:27 18:55	07:00 17:15	07:32 16:59
10	07:45 17:18	07:24 17:53	06:45 18:25	06:56 19:56 44	07:14 (SER10) 07:58 (SER9)	06:15 20:26	05:56 20:51	06:04 20:54	06:30 20:28	06:59 19:42 35	07:19 (SER9) 07:54 (SER9)	07:28 18:54	07:02 17:14	07:33 16:59
11	07:45 17:19	07:22 17:55	06:43 18:26	06:54 19:57 44	07:12 (SER10) 07:56 (SER9)	06:14 20:27	05:56 20:51	06:05 20:53	06:31 20:27	07:00 19:41 33	07:20 (SER9) 07:53 (SER9)	07:29 18:52	07:03 17:13	07:34 17:00
12	07:44 17:20	07:21 17:56	06:42 18:27	06:53 19:58 45	07:11 (SER10) 07:56 (SER9)	06:13 20:28	05:56 20:52	06:06 20:53	06:32 20:25	07:01 19:39 31	07:21 (SER9) 07:52 (SER9)	07:30 18:51	07:04 17:12	07:35 17:00
13	07:44 17:21	07:20 17:57	06:40 18:28	06:51 19:59 45	07:09 (SER10) 07:54 (SER9)	06:12 20:29	05:55 20:52	06:06 20:52	06:33 20:24	07:02 19:37 30	07:22 (SER9) 07:52 (SER9)	07:31 18:49	07:05 17:11	07:36 17:00
14	07:44 17:22	07:19 17:58	06:39 18:29	06:50 20:00 45	07:08 (SER10) 07:53 (SER9)	06:11 20:30	05:55 20:53	06:07 20:52	06:34 20:23	07:03 19:36 28	07:23 (SER9) 07:51 (SER9)	07:32 18:48	07:06 17:10	07:36 17:00
15	07:44 17:23	07:18 17:59	06:37 18:30	06:48 20:01 45	07:06 (SER10) 07:51 (SER9)	06:10 20:31	05:55 20:53	06:08 20:51	06:35 20:21	07:04 19:34 25	07:24 (SER9) 07:49 (SER9)	07:33 18:46	07:07 17:09	07:37 17:00
16	07:43 17:24	07:16 18:00	06:35 18:31	06:47 20:02 43	07:05 (SER10) 07:50 (SER9)	06:09 20:32	05:55 20:54	06:09 20:51	06:36 20:20	07:05 19:32 23	07:25 (SER9) 07:48 (SER9)	07:34 18:45	07:08 17:08	07:38 17:01
17	07:43 17:25	07:15 18:02	06:34 18:32	06:45 20:03 40	07:03 (SER10) 07:48 (SER9)	06:09 20:33	05:55 20:54	06:09 20:50	06:37 20:19	07:06 19:31 21	07:26 (SER9) 07:47 (SER9)	07:35 18:43	07:10 17:08	07:38 17:01
18	07:42 17:26	07:14 18:03	06:32 18:33	06:44 20:04 36	07:02 (SER10) 07:46 (SER9)	06:08 20:33	05:56 20:54	06:10 20:50	06:38 20:17	07:07 19:29 18	07:27 (SER9) 07:45 (SER9)	07:36 18:42	07:11 17:07	07:39 17:01
19	07:42 17:27	07:13 18:04	06:31 18:34	06:42 20:05 29	07:01 (SER10) 07:42 (SER9)	06:07 20:34	05:56 20:55	06:11 20:49	06:39 20:16	07:08 19:28 15	07:27 (SER9) 07:42 (SER9)	07:37 18:40	07:12 17:06	07:40 17:02
20	07:41 17:29	07:11 18:05	06:29 18:35	06:41 20:06 12	07:27 (SER9) 07:39 (SER9)	06:06 20:35	05:56 20:55	06:12 20:48	06:40 20:14	07:09 19:26 11	07:28 (SER9) 07:39 (SER9)	07:38 18:39	07:13 17:05	07:40 17:02
21	07:41 17:30	07:10 18:06	06:27 18:36	06:39 20:07		06:05 20:36	05:56 20:55	06:12 20:48	06:41 20:13	07:10 19:24 6	07:29 (SER9) 07:35 (SER9)	07:39 18:37	07:14 17:05	07:41 17:02
22	07:40 17:31	07:08 18:07	06:26 18:37 5	06:44 (SER9) 06:49 (SER9)	06:38 20:08	06:04 20:37	05:56 20:55	06:13 20:47	06:42 20:12	07:11 19:23		07:40 18:36	07:15 17:04	07:41 17:03
23	07:40 17:32	07:07 18:08	06:24 18:38 10	06:42 (SER9) 06:52 (SER9)	06:36 20:09	06:04 20:38	05:56 20:55	06:14 20:46	06:43 20:10 12	07:31 (SER9) 07:43 (SER9)	07:12 19:21	07:42 18:35	07:16 17:04	07:42 17:03
24	07:39 17:33	07:06 18:10	06:23 18:39 14	06:41 (SER9) 06:55 (SER9)	06:35 20:10	06:03 20:39	05:57 20:56	06:15 20:45	06:44 20:09 31	07:04 (SER10) 07:47 (SER9)	07:12 19:19	07:43 18:33	07:17 17:03	07:42 17:04
25	07:38 17:34	07:04 18:11	06:21 18:40 17	06:39 (SER9) 06:56 (SER9)	06:34 20:11	06:02 20:40	05:57 20:56	06:16 20:44	06:44 20:07 37	07:05 (SER10) 07:49 (SER9)	07:13 19:18	06:44 17:32	07:18 17:03	07:43 17:05
26	07:38 17:36	07:03 18:12	06:19 18:41 20	06:38 (SER9) 06:58 (SER9)	06:32 20:12	06:02 20:40	05:57 20:56	06:17 20:44	06:45 20:06 41	07:06 (SER10) 07:51 (SER9)	07:14 19:16	06:45 17:31	07:20 17:02	07:43 17:05
27	07:37 17:37	07:01 18:13	06:18 18:42 23	06:36 (SER9) 06:59 (SER9)	06:31 20:13	06:01 20:41	05:58 20:56	06:18 20:43	06:46 20:04 43	07:07 (SER10) 07:52 (SER9)	07:15 19:14	06:46 17:29	07:21 17:02	07:44 17:06
28	07:36 17:38	07:00 18:14	06:16 18:43 25	06:34 (SER9) 06:59 (SER9)	06:30 20:14	06:01 20:42	05:58 20:56	06:18 20:42	06:47 20:03 45	07:08 (SER10) 07:53 (SER9)	07:16 19:13	06:47 17:28	07:22 17:01	07:44 17:06
29	07:35 17:39		07:15 19:44 27	07:33 (SER9) 08:00 (SER9)	06:28 20:15	06:00 20:43	05:58 20:56	06:19 20:41	06:48 20:01 45	07:09 (SER10) 07:54 (SER9)	07:17 19:11	06:48 17:27	07:23 17:01	07:44 17:07
30	07:34 17:40		07:13 19:45 29	07:31 (SER9) 08:00 (SER9)	06:27 20:16	05:59 20:44	05:59 20:56	06:20 20:40	06:49 20:00 45	07:10 (SER10) 07:55 (SER9)	07:18 19:10	06:49 17:26	07:24 17:01	07:44 17:08
31	07:34 17:41		07:11 19:46 31	07:29 (SER9) 08:00 (SER9)		05:59 20:44		06:21 20:39	06:50 19:58 45	07:10 (SER10) 07:55 (SER9)		06:50 17:24		07:45 17:09
Potential sun hours	301	299	370	397		445	448	455	425	374		347	301	292
Total, worst case			201	774					344	643				
Sun reduction			0,49	0,53					0,73	0,65				
Oper. time red.			0,91	0,91					0,91	0,91				
Wind dir. red.			0,78	0,78					0,78	0,78				
Total reduction			0,35	0,37					0,51	0,46				
Total, real			70	289					177	295				

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_02 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January			February	March			April	May	June
1	07:45		08:08 (SER13)	07:33	06:59		07:17 (SER12)	07:10	06:26	05:59
	17:10	34	08:42 (SER13)	17:43	18:15	1	07:18 (SER12)	19:47	20:17	20:45
2	07:45		08:09 (SER13)	07:32	06:57		07:16 (SER12)	07:08	06:25	05:58
	17:11	33	08:42 (SER13)	17:44	18:16	2	07:18 (SER12)	19:48	20:18	20:46
3	07:45		08:10 (SER13)	07:31	06:56		07:14 (SER12)	07:07	06:23	05:58
	17:11	32	08:42 (SER13)	17:45	18:17	3	07:17 (SER12)	19:49	20:19	20:46
4	07:45		08:11 (SER13)	07:30	06:54		07:13 (SER12)	07:05	06:22	05:57
	17:12	30	08:41 (SER13)	17:46	18:18	3	07:16 (SER12)	19:50	20:20	20:47
5	07:45		08:12 (SER13)	07:29	06:53		07:11 (SER12)	07:03	06:21	05:57
	17:13	29	08:41 (SER13)	17:47	18:19	3	07:14 (SER12)	19:51	20:21	20:48
6	07:45		08:13 (SER13)	07:28	06:51		07:10 (SER12)	07:02	06:20	05:57
	17:14	28	08:41 (SER13)	17:49	18:20	2	07:12 (SER12)	19:52	20:22	20:48
7	07:45		08:14 (SER13)	07:27	06:50			07:00	06:19	05:56
	17:15	27	08:41 (SER13)	17:50	18:22			19:53	20:23	20:49
8	07:45		08:14 (SER13)	07:26	06:48			06:59	06:18	05:56
	17:16	26	08:40 (SER13)	17:51	18:23			19:54	20:24	20:50
9	07:45		08:16 (SER13)	07:25	06:46			06:57	06:16	05:56
	17:17	23	08:39 (SER13)	17:52	18:24			19:55	20:25	20:50
10	07:45		08:18 (SER13)	07:24	06:45			06:56	06:15	05:56
	17:18	21	08:39 (SER13)	17:53	18:25			19:56	20:26	20:51
11	07:45		08:20 (SER13)	07:22	06:43			06:54	06:14	05:56
	17:19	18	08:38 (SER13)	17:55	18:26			19:57	20:27	20:51
12	07:44		08:21 (SER13)	07:21	06:42			06:53	06:13	05:56
	17:20	15	08:36 (SER13)	17:56	18:27			19:58	20:28	20:52
13	07:44		08:25 (SER13)	07:20	06:40			06:51	06:12	05:56
	17:21	9	08:34 (SER13)	17:57	18:28			19:59	20:29	20:52
14	07:44			07:19	06:39			06:50	06:11	05:55
	17:22			17:58	18:29			20:00	20:30	20:53
15	07:44			07:18	06:37			06:48	06:10	05:55
	17:23			17:59	18:30			20:01	20:31	20:53
16	07:43			07:16	06:35			06:47	06:09	05:55
	17:24			18:00	18:31			20:02	20:32	20:53
17	07:43			07:15	06:34			06:45	06:09	05:56
	17:25			18:02	18:32			20:03	20:33	20:54
18	07:42			07:14	06:32			06:44	06:08	05:56
	17:26			18:03	18:33			20:04	20:33	20:54
19	07:42			07:12	06:31			06:42	06:07	05:56
	17:28			18:04	18:34			20:05	20:34	20:54
20	07:41			07:11	06:29			06:41	06:06	05:56
	17:29			18:05	18:35			20:06	20:35	20:55
21	07:41			07:10	06:27			06:39	06:05	05:56
	17:30			18:06	18:36			20:07	20:36	20:55
22	07:40			07:08	06:26			06:38	06:04	05:56
	17:31			18:07	18:37			20:08	20:37	20:55
23	07:40			07:07	06:24			06:36	06:04	05:56
	17:32			18:08	18:38			20:09	20:38	20:55
24	07:39			07:06	06:23			06:35	06:03	05:57
	17:33			18:10	18:39			20:10	20:39	20:56
25	07:38			07:04	06:21			06:34	06:02	05:57
	17:34			18:11	18:40			20:11	20:40	20:56
26	07:38			07:03	06:19			06:32	06:02	05:57
	17:36			18:12	18:41			20:12	20:40	20:56
27	07:37			07:01	06:18			06:31	06:01	05:58
	17:37			18:13	18:42			20:13	20:41	20:56
28	07:36			07:00	06:16			06:30	06:01	05:58
	17:38			18:14	18:43			20:14	20:42	20:56
29	07:35				07:15			06:28	06:00	05:58
	17:39				19:44			20:15	20:43	20:56
30	07:34				07:13			06:27	05:59	05:59
	17:40				19:45			20:16	20:44	20:56
31	07:34				07:11				05:59	
	17:41				19:46				20:44	
Potential sun hours	301			299	370			397	445	448
Total, worst case		325				14				
Sun reduction		0,45				0,49				
Oper. time red.		0,91				0,91				
Wind dir. red.		0,73				0,79				
Total reduction		0,30				0,35				
Total, real		97				5				

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_02 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October			November			December		
1	05:59	06:22	06:51	07:19			06:51			07:25		08:02 (SER13)
	20:56	20:38	19:57	19:08			17:23			17:00	18	08:20 (SER13)
2	06:00	06:23	06:52	07:20			06:53			07:26		08:01 (SER13)
	20:56	20:37	19:55	19:06			17:22			17:00	21	08:22 (SER13)
3	06:00	06:24	06:53	07:21			06:54			07:27		08:00 (SER13)
	20:56	20:36	19:53	19:05			17:21			17:00	23	08:23 (SER13)
4	06:01	06:25	06:54	07:22			06:55			07:28		08:00 (SER13)
	20:55	20:35	19:52	19:03			17:20			17:00	25	08:25 (SER13)
5	06:01	06:26	06:55	07:23			06:56			07:29		07:59 (SER13)
	20:55	20:34	19:50	19:02			17:19			17:00	27	08:26 (SER13)
6	06:02	06:27	06:56	07:24			06:57			07:30		07:59 (SER13)
	20:55	20:32	19:49	19:00			17:18			17:00	28	08:27 (SER13)
7	06:02	06:28	06:57	07:25		07:45 (SER12)	06:58			07:31		07:59 (SER13)
	20:55	20:31	19:47	18:58	1	07:46 (SER12)	17:17			16:59	29	08:28 (SER13)
8	06:03	06:29	06:58	07:26		07:46 (SER12)	06:59			07:31		07:58 (SER13)
	20:54	20:30	19:46	18:57	3	07:49 (SER12)	17:16			16:59	30	08:28 (SER13)
9	06:04	06:29	06:58	07:27		07:47 (SER12)	07:00			07:32		07:58 (SER13)
	20:54	20:29	19:44	18:55	3	07:50 (SER12)	17:15			16:59	32	08:30 (SER13)
10	06:04	06:30	06:59	07:28		07:48 (SER12)	07:02			07:33		07:58 (SER13)
	20:54	20:28	19:42	18:54	3	07:51 (SER12)	17:14			16:59	33	08:31 (SER13)
11	06:05	06:31	07:00	07:29		07:49 (SER12)	07:03			07:34		07:58 (SER13)
	20:53	20:26	19:41	18:52	2	07:51 (SER12)	17:13			17:00	34	08:32 (SER13)
12	06:06	06:32	07:01	07:30		07:50 (SER12)	07:04			07:35		07:58 (SER13)
	20:53	20:25	19:39	18:51	2	07:52 (SER12)	17:12			17:00	35	08:33 (SER13)
13	06:06	06:33	07:02	07:31		07:51 (SER12)	07:05			07:36		07:59 (SER13)
	20:52	20:24	19:37	18:49	1	07:52 (SER12)	17:11			17:00	35	08:34 (SER13)
14	06:07	06:34	07:03	07:32			07:06			07:36		07:59 (SER13)
	20:52	20:23	19:36	18:48			17:10			17:00	35	08:34 (SER13)
15	06:08	06:35	07:04	07:33			07:07			07:37		08:00 (SER13)
	20:51	20:21	19:34	18:46			17:09			17:00	34	08:34 (SER13)
16	06:09	06:36	07:05	07:34			07:08			07:38		08:01 (SER13)
	20:51	20:20	19:32	18:45			17:08			17:01	34	08:35 (SER13)
17	06:09	06:37	07:06	07:35			07:10			07:38		08:01 (SER13)
	20:50	20:19	19:31	18:43			17:08			17:01	34	08:35 (SER13)
18	06:10	06:38	07:07	07:36			07:11			07:39		08:02 (SER13)
	20:50	20:17	19:29	18:42			17:07			17:01	34	08:36 (SER13)
19	06:11	06:39	07:08	07:37			07:12			07:40		08:02 (SER13)
	20:49	20:16	19:28	18:40			17:06			17:02	34	08:36 (SER13)
20	06:12	06:40	07:09	07:38			07:13			07:40		08:03 (SER13)
	20:48	20:14	19:26	18:39			17:05			17:02	34	08:37 (SER13)
21	06:13	06:41	07:10	07:39			07:14			07:41		08:03 (SER13)
	20:48	20:13	19:24	18:37			17:05			17:02	34	08:37 (SER13)
22	06:13	06:42	07:11	07:40			07:15			07:41		08:04 (SER13)
	20:47	20:12	19:23	18:36			17:04			17:03	34	08:38 (SER13)
23	06:14	06:43	07:11	07:41			07:16			07:42		08:04 (SER13)
	20:46	20:10	19:21	18:35			17:04			17:03	34	08:38 (SER13)
24	06:15	06:44	07:12	07:43			07:17			07:42		08:05 (SER13)
	20:45	20:09	19:19	18:33			17:03			17:04	34	08:39 (SER13)
25	06:16	06:45	07:13	06:44			07:18			07:43		08:05 (SER13)
	20:44	20:07	19:18	17:32			17:03			17:05	34	08:39 (SER13)
26	06:17	06:45	07:14	06:45			07:20			07:43		08:05 (SER13)
	20:44	20:06	19:16	17:31			17:02			17:05	34	08:39 (SER13)
27	06:18	06:46	07:15	06:46			07:21			07:43		08:06 (SER13)
	20:43	20:04	19:14	17:29			17:02			17:06	34	08:40 (SER13)
28	06:18	06:47	07:16	06:47			07:22			07:44		08:06 (SER13)
	20:42	20:03	19:13	17:28			17:01			17:06	34	08:40 (SER13)
29	06:19	06:48	07:17	06:48			07:23		08:06 (SER13)	07:44		08:06 (SER13)
	20:41	20:01	19:11	17:27			17:01	9	08:15 (SER13)	17:07	34	08:40 (SER13)
30	06:20	06:49	07:18	06:49			07:24		08:03 (SER13)	07:44		08:06 (SER13)
	20:40	20:00	19:10	17:26			17:01	15	08:18 (SER13)	17:08	35	08:41 (SER13)
31	06:21	06:50		06:50						07:45		08:07 (SER13)
	20:39	19:58		17:24						17:09	35	08:42 (SER13)
Potential sun hours	455	425	374	347			301			292		
Total, worst case					15			24			985	
Sun reduction					0,54			0,51			0,45	
Oper. time red.					0,91			0,91			0,91	
Wind dir. red.					0,79			0,73			0,73	
Total reduction					0,39			0,33			0,30	
Total, real					6			8			295	

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_03 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (3)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:45		15:31 (SER3)	07:33		15:31 (SER3)	06:59		07:18 (SER4)	07:10		07:28 (SER5)	06:26	05:58
	17:10	46	16:17 (SER3)	17:43	66	16:37 (SER3)	18:15	66	08:24 (SER4)	19:47	30	07:58 (SER5)	20:17	20:45
2	07:45		15:31 (SER3)	07:32		15:32 (SER3)	06:57		07:18 (SER4)	07:08		07:26 (SER5)	06:25	05:58
	17:10	47	16:18 (SER3)	17:44	65	16:37 (SER3)	18:16	66	08:24 (SER4)	19:48	31	07:57 (SER5)	20:18	20:46
3	07:45		15:31 (SER3)	07:31		15:32 (SER3)	06:56		07:18 (SER4)	07:07		07:25 (SER5)	06:23	05:58
	17:11	48	16:19 (SER3)	17:45	65	16:37 (SER3)	18:17	66	08:24 (SER4)	19:49	32	07:57 (SER5)	20:19	20:47
4	07:45		15:31 (SER3)	07:30		15:32 (SER3)	06:54		07:18 (SER4)	07:05		07:25 (SER5)	06:22	05:57
	17:12	49	16:20 (SER3)	17:46	65	16:37 (SER3)	18:18	66	08:24 (SER4)	19:50	31	07:56 (SER5)	20:20	20:47
5	07:45		15:31 (SER3)	07:29		15:33 (SER3)	06:53		07:18 (SER4)	07:03		07:26 (SER5)	06:21	05:57
	17:13	50	16:21 (SER3)	17:47	64	16:37 (SER3)	18:19	65	08:23 (SER4)	19:51	30	07:56 (SER5)	20:21	20:48
6	07:45		15:31 (SER3)	07:28		15:34 (SER3)	06:51		07:18 (SER4)	07:02		07:26 (SER5)	06:20	05:57
	17:14	51	16:22 (SER3)	17:49	63	16:37 (SER3)	18:20	65	08:23 (SER4)	19:52	28	07:54 (SER5)	20:22	20:49
7	07:45		15:31 (SER3)	07:27		07:46 (SER4)	06:50		07:18 (SER4)	07:00		07:26 (SER5)	06:19	05:56
	17:15	52	16:23 (SER3)	17:50	78	16:37 (SER3)	18:22	63	08:21 (SER4)	19:53	26	07:52 (SER5)	20:23	20:49
8	07:45		15:31 (SER3)	07:26		07:45 (SER4)	06:48		07:18 (SER4)	06:59		07:28 (SER5)	06:18	05:56
	17:16	53	16:24 (SER3)	17:51	81	16:36 (SER3)	18:23	62	08:20 (SER4)	19:54	23	07:51 (SER5)	20:24	20:50
9	07:45		15:30 (SER3)	07:25		07:44 (SER4)	06:46		07:19 (SER4)	06:57		07:29 (SER5)	06:16	05:56
	17:17	54	16:24 (SER3)	17:52	84	16:36 (SER3)	18:24	61	08:20 (SER4)	19:55	20	07:49 (SER5)	20:25	20:50
10	07:45		15:30 (SER3)	07:24		07:43 (SER4)	06:45		07:19 (SER4)	06:56		07:31 (SER5)	06:15	05:56
	17:18	55	16:25 (SER3)	17:53	87	16:36 (SER3)	18:25	60	08:19 (SER4)	19:56	16	07:47 (SER5)	20:26	20:51
11	07:45		15:31 (SER3)	07:23		07:42 (SER4)	06:43		07:20 (SER4)	06:54		07:34 (SER5)	06:14	05:56
	17:19	55	16:26 (SER3)	17:55	89	16:36 (SER3)	18:26	58	08:18 (SER4)	19:57	8	07:42 (SER5)	20:27	20:51
12	07:45		15:31 (SER3)	07:21		07:40 (SER4)	06:42		07:20 (SER4)	06:53			06:13	05:55
	17:20	56	16:27 (SER3)	17:56	90	16:34 (SER3)	18:27	56	08:16 (SER4)	19:58			20:28	20:52
13	07:44		15:30 (SER3)	07:20		07:39 (SER4)	06:40		07:21 (SER4)	06:51			06:12	05:55
	17:21	57	16:27 (SER3)	17:57	91	16:34 (SER3)	18:28	55	08:16 (SER4)	19:59			20:29	20:52
14	07:44		15:30 (SER3)	07:19		07:38 (SER4)	06:39		07:21 (SER4)	06:49			06:11	05:55
	17:22	58	16:28 (SER3)	17:58	92	16:33 (SER3)	18:29	53	08:14 (SER4)	20:00			20:30	20:53
15	07:44		15:30 (SER3)	07:18		07:37 (SER4)	06:37		07:22 (SER4)	06:48			06:10	05:55
	17:23	59	16:29 (SER3)	17:59	92	16:32 (SER3)	18:30	50	08:12 (SER4)	20:01			20:31	20:53
16	07:43		15:30 (SER3)	07:16		07:35 (SER4)	06:35		07:24 (SER4)	06:47			06:09	05:55
	17:24	60	16:30 (SER3)	18:00	92	16:30 (SER3)	18:31	47	08:11 (SER4)	20:02			20:32	20:54
17	07:43		15:30 (SER3)	07:15		07:34 (SER4)	06:34		07:25 (SER4)	06:45			06:08	05:55
	17:25	60	16:30 (SER3)	18:02	91	16:29 (SER3)	18:32	43	08:08 (SER4)	20:03			20:33	20:54
18	07:42		15:30 (SER3)	07:14		07:33 (SER4)	06:32		07:27 (SER4)	06:44			06:08	05:55
	17:26	61	16:31 (SER3)	18:03	91	16:28 (SER3)	18:33	40	08:07 (SER4)	20:04			20:34	20:54
19	07:42		15:30 (SER3)	07:13		07:31 (SER4)	06:31		07:28 (SER4)	06:42			06:07	05:56
	17:27	61	16:31 (SER3)	18:04	90	16:26 (SER3)	18:34	36	08:04 (SER4)	20:05			20:35	20:55
20	07:41		15:30 (SER3)	07:11		07:30 (SER4)	06:29		07:30 (SER4)	06:41			06:06	05:56
	17:29	63	16:33 (SER3)	18:05	87	16:24 (SER3)	18:35	31	08:01 (SER4)	20:06			20:35	20:55
21	07:41		15:30 (SER3)	07:10		07:29 (SER4)	06:27		06:46 (SER5)	06:39			06:05	05:56
	17:30	63	16:33 (SER3)	18:06	84	16:22 (SER3)	18:36	27	07:58 (SER4)	20:07			20:36	20:55
22	07:40		15:31 (SER3)	07:09		07:27 (SER4)	06:26		06:44 (SER5)	06:38			06:04	05:56
	17:31	63	16:34 (SER3)	18:07	79	16:19 (SER3)	18:37	23	07:52 (SER4)	20:08			20:37	20:55
23	07:40		15:30 (SER3)	07:07		07:26 (SER4)	06:24		06:42 (SER5)	06:36			06:04	05:56
	17:32	64	16:34 (SER3)	18:08	71	16:14 (SER3)	18:38	12	06:54 (SER5)	20:09			20:38	20:56
24	07:39		15:30 (SER3)	07:06		07:25 (SER4)	06:23		06:41 (SER5)	06:35			06:03	05:57
	17:33	65	16:35 (SER3)	18:10	60	08:25 (SER4)	18:39	15	06:56 (SER5)	20:10			20:39	20:56
25	07:38		15:30 (SER3)	07:04		07:23 (SER4)	06:21		06:39 (SER5)	06:34			06:02	05:57
	17:34	65	16:35 (SER3)	18:11	61	08:24 (SER4)	18:40	18	06:57 (SER5)	20:11			20:40	20:56
26	07:38		15:31 (SER3)	07:03		07:22 (SER4)	06:19		06:38 (SER5)	06:32			06:02	05:57
	17:36	65	16:36 (SER3)	18:12	63	08:25 (SER4)	18:41	20	06:58 (SER5)	20:12			20:41	20:56
27	07:37		15:31 (SER3)	07:01		07:20 (SER4)	06:18		06:36 (SER5)	06:31			06:01	05:58
	17:37	65	16:36 (SER3)	18:13	64	08:24 (SER4)	18:42	22	06:58 (SER5)	20:13			20:41	20:56
28	07:36		15:31 (SER3)	07:00		07:19 (SER4)	06:16		06:34 (SER5)	06:30			06:00	05:58
	17:38	65	16:36 (SER3)	18:14	66	08:25 (SER4)	18:43	24	06:58 (SER5)	20:14			20:42	20:56
29	07:35		15:31 (SER3)				07:15		07:33 (SER5)	06:28			06:00	05:58
	17:39	66	16:37 (SER3)				19:44	26	07:59 (SER5)	20:15			20:43	20:56
30	07:35		15:31 (SER3)				07:13		07:31 (SER5)	06:27			05:59	05:59
	17:40	66	16:37 (SER3)				19:45	27	07:58 (SER5)	20:16			20:44	20:56
31	07:34		15:31 (SER3)				07:11		07:29 (SER5)				05:59	
	17:41	66	16:37 (SER3)				19:46	29	07:58 (SER5)				20:44	
Potential sun hours	301			299			370			397			445	448
Total, worst case		1808			2171			1352			275			
Sun reduction		0,45			0,47			0,49			0,53			
Oper. time red.		0,91			0,91			0,91			0,91			
Wind dir. red.		0,61			0,69			0,78			0,78			
Total reduction		0,25			0,30			0,35			0,37			
Total, real		451			642			470			103			

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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Giovanni Savarese/
g.savarese@leonardoengineering.it.Calculate
03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_03 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (3)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July		August		September			October			November			December		
1	05:59		06:22		06:51		07:33 (SER5)	07:19		08:00 (SER4)	06:51		07:13 (SER4)	07:25		15:13 (SER3)
	20:56		20:38		19:57	8	07:41 (SER5)	19:08	56	08:56 (SER4)	17:23	87	16:06 (SER3)	17:00	55	16:08 (SER3)
2	06:00		06:23		06:52		07:29 (SER5)	07:20		07:59 (SER4)	06:53		07:14 (SER4)	07:26		15:13 (SER3)
	20:56		20:37		19:55	16	07:45 (SER5)	19:06	57	08:56 (SER4)	17:22	84	16:06 (SER3)	17:00	55	16:08 (SER3)
3	06:00		06:24		06:53		07:27 (SER5)	07:21		07:57 (SER4)	06:54		07:15 (SER4)	07:27		15:14 (SER3)
	20:56		20:36		19:54	20	07:47 (SER5)	19:05	60	08:57 (SER4)	17:21	80	16:06 (SER3)	17:00	54	16:08 (SER3)
4	06:01		06:25		06:54		07:25 (SER5)	07:22		07:57 (SER4)	06:55		07:16 (SER4)	07:28		15:15 (SER3)
	20:55		20:35		19:52	23	07:48 (SER5)	19:03	60	08:57 (SER4)	17:20	77	16:07 (SER3)	17:00	53	16:08 (SER3)
5	06:01		06:26		06:55		07:23 (SER5)	07:23		07:56 (SER4)	06:56		15:03 (SER3)	07:29		15:16 (SER3)
	20:55		20:34		19:50	26	07:49 (SER5)	19:02	62	08:58 (SER4)	17:19	64	16:07 (SER3)	17:00	52	16:08 (SER3)
6	06:02		06:27		06:56		07:22 (SER5)	07:24		07:55 (SER4)	06:57		15:04 (SER3)	07:30		15:17 (SER3)
	20:55		20:33		19:49	28	07:50 (SER5)	19:00	63	08:58 (SER4)	17:18	64	16:08 (SER3)	16:59	51	16:08 (SER3)
7	06:02		06:28		06:57		07:21 (SER5)	07:25		07:54 (SER4)	06:58		15:03 (SER3)	07:31		15:18 (SER3)
	20:55		20:31		19:47	30	07:51 (SER5)	18:58	64	08:58 (SER4)	17:17	65	16:08 (SER3)	16:59	50	16:08 (SER3)
8	06:03		06:28		06:58		07:20 (SER5)	07:26		07:54 (SER4)	06:59		15:03 (SER3)	07:32		15:19 (SER3)
	20:54		20:30		19:46	31	07:51 (SER5)	18:57	64	08:58 (SER4)	17:15	65	16:08 (SER3)	16:59	49	16:08 (SER3)
9	06:04		06:29		06:58		07:18 (SER5)	07:27		07:53 (SER4)	07:01		15:02 (SER3)	07:32		15:19 (SER3)
	20:54		20:29		19:44	32	07:50 (SER5)	18:55	65	08:58 (SER4)	17:14	66	16:08 (SER3)	16:59	48	16:07 (SER3)
10	06:04		06:30		06:59		07:19 (SER5)	07:28		07:52 (SER4)	07:02		15:02 (SER3)	07:33		15:20 (SER3)
	20:54		20:28		19:42	31	07:50 (SER5)	18:54	66	08:58 (SER4)	17:14	66	16:08 (SER3)	16:59	47	16:07 (SER3)
11	06:05		06:31		07:00		07:20 (SER5)	07:29		07:52 (SER4)	07:03		15:03 (SER3)	07:34		15:21 (SER3)
	20:53		20:27		19:41	30	07:50 (SER5)	18:52	66	08:58 (SER4)	17:13	66	16:09 (SER3)	16:59	46	16:07 (SER3)
12	06:06		06:32		07:01		07:21 (SER5)	07:30		07:52 (SER4)	07:04		15:03 (SER3)	07:35		15:22 (SER3)
	20:53		20:25		19:39	29	07:50 (SER5)	18:51	66	08:58 (SER4)	17:12	66	16:09 (SER3)	17:00	46	16:08 (SER3)
13	06:06		06:33		07:02		07:22 (SER5)	07:31		07:51 (SER4)	07:05		15:03 (SER3)	07:36		15:23 (SER3)
	20:53		20:24		19:37	28	07:50 (SER5)	18:49	67	08:58 (SER4)	17:11	65	16:08 (SER3)	17:00	45	16:08 (SER3)
14	06:07		06:34		07:03		07:23 (SER5)	07:32		07:52 (SER4)	07:06		15:03 (SER3)	07:36		15:23 (SER3)
	20:52		20:23		19:36	26	07:49 (SER5)	18:48	65	08:57 (SER4)	17:10	65	16:08 (SER3)	17:00	44	16:07 (SER3)
15	06:08		06:35		07:04		07:24 (SER5)	07:33		07:53 (SER4)	07:07		15:04 (SER3)	07:37		15:24 (SER3)
	20:51		20:21		19:34	24	07:48 (SER5)	18:46	64	08:57 (SER4)	17:09	65	16:09 (SER3)	17:00	44	16:08 (SER3)
16	06:09		06:36		07:05		07:25 (SER5)	07:34		07:54 (SER4)	07:09		15:04 (SER3)	07:38		15:25 (SER3)
	20:51		20:20		19:33	23	07:48 (SER5)	18:45	62	08:56 (SER4)	17:08	65	16:09 (SER3)	17:00	43	16:08 (SER3)
17	06:09		06:37		07:06		07:26 (SER5)	07:35		07:55 (SER4)	07:10		15:04 (SER3)	07:39		15:25 (SER3)
	20:50		20:19		19:31	21	07:47 (SER5)	18:43	61	08:56 (SER4)	17:08	65	16:09 (SER3)	17:01	43	16:08 (SER3)
18	06:10		06:38		07:07		07:27 (SER5)	07:36		07:56 (SER4)	07:11		15:04 (SER3)	07:39		15:26 (SER2)
	20:50		20:17		19:29	18	07:45 (SER5)	18:42	59	08:55 (SER4)	17:07	65	16:09 (SER3)	17:01	43	16:09 (SER3)
19	06:11		06:39		07:08		07:27 (SER5)	07:37		07:57 (SER4)	07:12		15:04 (SER3)	07:40		15:27 (SER2)
	20:49		20:16		19:28	16	07:43 (SER5)	18:40	76	16:47 (SER3)	17:06	64	16:08 (SER3)	17:01	43	16:10 (SER3)
20	06:12		06:40		07:09		07:28 (SER5)	07:38		07:59 (SER4)	07:13		15:06 (SER3)	07:40		15:27 (SER2)
	20:48		20:15		19:26	13	07:41 (SER5)	18:39	81	16:51 (SER3)	17:05	63	16:09 (SER3)	17:02	42	16:09 (SER3)
21	06:12		06:41		07:10		07:29 (SER5)	07:39		08:00 (SER4)	07:14		15:06 (SER3)	07:41		15:28 (SER2)
	20:48		20:13		19:24	21	08:36 (SER4)	18:37	85	16:54 (SER3)	17:05	63	16:09 (SER3)	17:02	42	16:10 (SER3)
22	06:13		06:42		07:11		07:30 (SER5)	07:40		08:01 (SER4)	07:15		15:06 (SER3)	07:41		15:28 (SER2)
	20:47		20:12		19:23	26	08:41 (SER4)	18:36	88	16:56 (SER3)	17:04	63	16:09 (SER3)	17:03	42	16:10 (SER3)
23	06:14		06:43		07:12		08:15 (SER4)	07:42		08:02 (SER4)	07:16		15:07 (SER3)	07:42		15:29 (SER2)
	20:46		20:10		19:21	29	08:44 (SER4)	18:35	89	16:57 (SER3)	17:04	61	16:08 (SER3)	17:03	42	16:11 (SER3)
24	06:15		06:44		07:12		08:12 (SER4)	07:43		08:03 (SER4)	07:17		15:07 (SER3)	07:42		15:29 (SER2)
	20:45		20:09		19:19	35	08:47 (SER4)	18:33	91	16:58 (SER3)	17:03	61	16:08 (SER3)	17:04	42	16:11 (SER3)
25	06:16		06:44		07:13		08:10 (SER4)	06:44		07:04 (SER4)	07:19		15:08 (SER3)	07:43		15:29 (SER2)
	20:45		20:07		19:18	39	08:49 (SER4)	17:32	91	15:59 (SER3)	17:03	60	16:08 (SER3)	17:04	43	16:12 (SER3)
26	06:17		06:45		07:14		08:08 (SER4)	06:45		07:05 (SER4)	07:20		15:08 (SER3)	07:43		15:30 (SER2)
	20:44		20:06		19:16	42	08:50 (SER4)	17:31	91	16:00 (SER3)	17:02	60	16:08 (SER3)	17:05	43	16:13 (SER3)
27	06:18		06:46		07:15		08:06 (SER4)	06:46		07:07 (SER4)	07:21		15:10 (SER3)	07:44		15:30 (SER3)
	20:43		20:04		19:14	46	08:52 (SER4)	17:29	92	16:02 (SER3)	17:02	59	16:09 (SER3)	17:06	43	16:13 (SER3)
28	06:18		06:47		07:16		08:04 (SER4)	06:47		07:08 (SER4)	07:22		15:10 (SER3)	07:44		15:30 (SER3)
	20:42		20:03		19:13	49	08:53 (SER4)	17:28	92	16:03 (SER3)	17:01	58	16:08 (SER3)	17:06	44	16:14 (SER3)
29	06:19		06:48		07:17		08:02 (SER4)	06:48		07:09 (SER4)	07:23		15:11 (SER3)	07:44		15:30 (SER3)
	20:41		20:01		19:11	52	08:54 (SER4)	17:27	91	16:04 (SER3)	17:01	57	16:08 (SER3)	17:07	44	16:14 (SER3)
30	06:20		06:49		07:18		08:01 (SER4)	06:49		07:10 (SER4)	07:24		15:12 (SER3)	07:45		15:31 (SER3)
	20:40		20:00		19:10	54	08:55 (SER4)	17:26	90	16:04 (SER3)	17:01	56	16:08 (SER3)	17:08	45	16:16 (SER3)
31	06:21		06:50					06:50		07:11 (SER4)				07:45		15:31 (SER3)
	20:39		19:58					17:24	88	16:04 (SER3)				17:09	45	16:16 (SER3)
Potential sun hours	455		425		374			347			301			292		
Total, worst case						866			2272			1965			1428	
Sun reduction						0,65			0,54			0,51			0,45	
Oper. time red.						0,91			0,91			0,91			0,91	
Wind dir. red.						0,78			0,74			0,62			0,60	
Total reduction						0,46			0,36			0,28			0,25	
Total, real						396			828			557			353	

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:
Serri

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_04 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (4)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April	May	June	July	August	September		October		November	December
1	07:45	07:33		06:58		07:17 (SER11)	07:10	06:26	05:59	05:59	06:22	06:51	07:19		07:47 (SER11)	06:51	07:25
	17:10	17:43		18:15	30	07:47 (SER11)	19:47	20:17	20:45	20:56	20:38	19:57	19:08	30	08:17 (SER11)	17:23	17:00
2	07:45	07:32		06:57		07:16 (SER11)	07:08	06:25	05:58	06:00	06:23	06:52	07:20		07:46 (SER11)	06:52	07:26
	17:11	17:44		18:16	32	07:48 (SER11)	19:48	20:18	20:46	20:56	20:37	19:55	19:06	32	08:18 (SER11)	17:22	17:00
3	07:45	07:31		06:56		07:14 (SER11)	07:07	06:23	05:58	06:00	06:24	06:53	07:21		07:44 (SER11)	06:54	07:27
	17:11	17:45		18:17	33	07:47 (SER11)	19:49	20:19	20:46	20:55	20:36	19:53	19:05	35	08:19 (SER11)	17:21	17:00
4	07:45	07:30		06:54		07:13 (SER11)	07:05	06:22	05:57	06:01	06:25	06:54	07:22		07:43 (SER11)	06:55	07:28
	17:12	17:46		18:18	34	07:47 (SER11)	19:50	20:20	20:47	20:55	20:35	19:52	19:03	37	08:20 (SER11)	17:20	17:00
5	07:45	07:29		06:53		07:11 (SER11)	07:03	06:21	05:57	06:01	06:26	06:55	07:23		07:43 (SER11)	06:56	07:29
	17:13	17:47		18:19	35	07:46 (SER11)	19:51	20:21	20:48	20:55	20:34	19:50	19:02	38	08:21 (SER11)	17:19	17:00
6	07:45	07:28		06:51		07:10 (SER11)	07:02	06:20	05:57	06:02	06:27	06:56	07:24		07:44 (SER11)	06:57	07:30
	17:14	17:49		18:20	36	07:46 (SER11)	19:52	20:22	20:48	20:55	20:32	19:49	19:00	37	08:21 (SER11)	17:18	17:00
7	07:45	07:27		06:49		07:08 (SER11)	07:00	06:19	05:56	06:02	06:28	06:57	07:25		07:45 (SER11)	06:58	07:30
	17:15	17:50		18:22	37	07:45 (SER11)	19:53	20:23	20:49	20:55	20:31	19:47	18:58	36	08:21 (SER11)	17:17	16:59
8	07:45	07:26		06:48		07:06 (SER11)	06:59	06:18	05:56	06:03	06:29	06:58	07:26		07:46 (SER11)	06:59	07:31
	17:16	17:51		18:23	37	07:43 (SER11)	19:54	20:24	20:50	20:54	20:30	19:45	18:57	36	08:22 (SER11)	17:16	16:59
9	07:45	07:25		06:46		07:05 (SER11)	06:57	06:16	05:56	06:04	06:29	06:58	07:27		07:47 (SER11)	07:00	07:32
	17:17	17:52		18:24	38	07:43 (SER11)	19:55	20:25	20:50	20:54	20:29	19:44	18:55	35	08:22 (SER11)	17:15	16:59
10	07:45	07:24		06:45		07:05 (SER11)	06:56	06:15	05:56	06:04	06:30	06:59	07:28		07:48 (SER11)	07:02	07:33
	17:18	17:53		18:25	36	07:41 (SER11)	19:56	20:26	20:51	20:54	20:28	19:42	18:54	34	08:22 (SER11)	17:14	16:59
11	07:45	07:22		06:43		07:07 (SER11)	06:54	06:14	05:56	06:05	06:31	07:00	07:29		07:49 (SER11)	07:03	07:34
	17:19	17:55		18:26	33	07:40 (SER11)	19:57	20:27	20:51	20:53	20:26	19:41	18:52	32	08:21 (SER11)	17:13	17:00
12	07:44	07:21		06:42		07:07 (SER11)	06:53	06:13	05:56	06:06	06:32	07:01	07:30		07:50 (SER11)	07:04	07:35
	17:20	17:56		18:27	31	07:38 (SER11)	19:58	20:28	20:52	20:53	20:25	19:39	18:51	31	08:21 (SER11)	17:12	17:00
13	07:44	07:20		06:40		07:08 (SER11)	06:51	06:12	05:56	06:06	06:33	07:02	07:31		07:51 (SER11)	07:05	07:35
	17:21	17:57		18:28	28	07:36 (SER11)	19:59	20:29	20:52	20:52	20:24	19:37	18:49	30	08:21 (SER11)	17:11	17:00
14	07:44	07:19		06:39		07:11 (SER11)	06:49	06:11	05:55	06:07	06:34	07:03	07:32		07:52 (SER11)	07:06	07:36
	17:22	17:58		18:29	23	07:34 (SER11)	20:00	20:30	20:53	20:52	20:23	19:36	18:48	28	08:20 (SER11)	17:10	17:00
15	07:43	07:18		06:37		07:13 (SER11)	06:48	06:10	05:55	06:08	06:35	07:04	07:33		07:53 (SER11)	07:07	07:37
	17:23	17:59		18:30	17	07:30 (SER11)	20:01	20:31	20:53	20:51	20:21	19:34	18:46	27	08:20 (SER11)	17:09	17:00
16	07:43	07:16		06:35		07:19 (SER11)	06:47	06:09	05:55	06:09	06:36	07:05	07:34		07:54 (SER11)	07:08	07:38
	17:24	18:00		18:31	6	07:25 (SER11)	20:02	20:32	20:53	20:51	20:20	19:32	18:45	25	08:19 (SER11)	17:08	17:01
17	07:43	07:15	07:34 (SER11)	06:34			06:45	06:09	05:56	06:09	06:37	07:06	07:35		07:55 (SER11)	07:10	07:38
	17:25	18:02	3 07:37 (SER11)	18:32			20:03	20:33	20:54	20:50	20:19	19:31	18:43	23	08:18 (SER11)	17:08	17:01
18	07:42	07:14	07:33 (SER11)	06:32			06:44	06:08	05:56	06:10	06:38	07:07	07:36		07:56 (SER11)	07:11	07:39
	17:26	18:03	7 07:40 (SER11)	18:33			20:04	20:33	20:54	20:50	20:17	19:29	18:42	21	08:17 (SER11)	17:07	17:01
19	07:42	07:12	07:31 (SER11)	06:31			06:42	06:07	05:56	06:11	06:39	07:08	07:37		07:57 (SER11)	07:12	07:40
	17:28	18:04	10 07:41 (SER11)	18:34			20:05	20:34	20:54	20:49	20:16	19:28	18:40	19	08:16 (SER11)	17:06	17:02
20	07:41	07:11	07:30 (SER11)	06:29			06:41	06:06	05:56	06:12	06:40	07:09	07:38		07:58 (SER11)	07:13	07:40
	17:29	18:05	13 07:43 (SER11)	18:35			20:06	20:35	20:55	20:48	20:14	19:26	18:39	17	08:15 (SER11)	17:05	17:02
21	07:41	07:10	07:29 (SER11)	06:27			06:39	06:05	05:56	06:13	06:41	07:10	07:39		08:00 (SER11)	07:14	07:41
	17:30	18:06	15 07:44 (SER11)	18:36			20:07	20:36	20:55	20:47	20:13	19:24	18:37	14	08:14 (SER11)	17:05	17:02
22	07:40	07:08	07:27 (SER11)	06:26			06:38	06:04	05:56	06:13	06:42	07:11	07:40		08:01 (SER11)	07:15	07:41
	17:31	18:07	18 07:45 (SER11)	18:37			20:08	20:37	20:55	20:47	20:12	19:23	18:36	12	08:13 (SER11)	17:04	17:03
23	07:40	07:07	07:26 (SER11)	06:24			06:36	06:04	05:56	06:14	06:43	07:11	07:41		08:02 (SER11)	07:16	07:42
	17:32	18:08	20 07:46 (SER11)	18:38			20:09	20:38	20:55	20:46	20:10	19:21	18:35	9	08:11 (SER11)	17:04	17:03
24	07:39	07:06	07:24 (SER11)	06:23			06:35	06:03	05:57	06:15	06:44	07:12	07:43		08:03 (SER11)	07:17	07:42
	17:33	18:10	22 07:46 (SER11)	18:39			20:10	20:39	20:55	20:45	20:09	19:19	18:33	6	08:09 (SER11)	17:03	17:04
25	07:38	07:04	07:23 (SER11)	06:21			06:34	06:02	05:57	06:16	06:44	07:13	06:44		07:04 (SER11)	07:18	07:43
	17:34	18:11	24 07:47 (SER11)	18:40			20:11	20:40	20:56	20:44	20:07	19:18	17:32	2	07:06 (SER11)	17:03	17:05
26	07:38	07:03	07:22 (SER11)	06:19			06:32	06:02	05:57	06:17	06:45	07:14	06:45			07:19	07:43
	17:36	18:12	26 07:48 (SER11)	18:41			20:12	20:40	20:56	20:44	20:06	19:16	17:31			17:02	17:05
27	07:37	07:01	07:20 (SER11)	06:18			06:31	06:01	05:58	06:18	06:46	07:15	06:46			07:21	07:43
	17:37	18:13	27 07:47 (SER11)	18:42			20:13	20:41	20:56	20:43	20:04	19:14	17:29			17:02	17:06
28	07:36	07:00	07:19 (SER11)	06:16			06:30	06:01	05:58	06:18	06:47	07:16	07:56 (SER11)		06:47	07:22	07:44
	17:38	18:14	29 07:48 (SER11)	18:43			20:14	20:42	20:56	20:42	20:03	19:13	14 08:10 (SER11)		17:28	17:01	17:06
29	07:35			07:15			06:28	06:00	05:58	06:19	06:48	07:17	07:52 (SER11)		06:48	07:23	07:44
	17:39			19:44			20:15	20:43	20:56	20:41	20:01	19:11	21 08:13 (SER11)		17:27	17:01	17:07
30	07:34			07:13			06:27	05:59	05:59	06:20	06:49	07:18	07:50 (SER11)		06:49	07:24	07:44
	17:40			19:45			20:16	20:44	20:56	20:40	20:00	19:10	26 08:16 (SER11)		17:26	17:01	17:08
31	07:34			07:11				05:59		06:21	06:50				06:50		07:45
	17:41			19:46				20:44		20:39	19:58				17:24		17:09
Potential sun hours	301	299		370			397	445	448	455	425	374			347	301	292
Total, worst case			214		486								61		646		
Sun reduction			0,47		0,49								0,65		0,54		
Oper. time red.			0,91		0,91								0,91		0,91		
Wind dir. red.			0,78		0,78								0,78		0,78		
Total reduction			0,34		0,35								0,46		0,39		
Total, real			72		171								28		251		

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_05 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (5)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April			May			June		
1	07:45	07:33	06:58	07:10			06:26		06:45 (SER11)	05:59		06:46 (SER11)
	17:10	17:43	18:15	19:47			20:17	54	07:39 (SER11)	20:45	47	07:33 (SER11)
2	07:45	07:32	06:57	07:08			06:25		06:44 (SER11)	05:58		06:47 (SER11)
	17:11	17:44	18:16	19:48			20:18	56	07:40 (SER11)	20:46	46	07:33 (SER11)
3	07:45	07:31	06:56	07:07			06:23		06:42 (SER11)	05:58		06:48 (SER11)
	17:11	17:45	18:17	19:49			20:19	57	07:39 (SER11)	20:46	45	07:33 (SER11)
4	07:45	07:30	06:54	07:05			06:22		06:41 (SER11)	05:57		06:48 (SER11)
	17:12	17:46	18:18	19:50			20:20	58	07:39 (SER11)	20:47	44	07:32 (SER11)
5	07:45	07:29	06:53	07:03			06:21		06:40 (SER11)	05:57		06:49 (SER11)
	17:13	17:47	18:19	19:51			20:21	59	07:39 (SER11)	20:48	43	07:32 (SER11)
6	07:45	07:28	06:51	07:02			06:20		06:39 (SER11)	05:57		06:50 (SER11)
	17:14	17:49	18:20	19:52			20:22	61	07:40 (SER11)	20:48	42	07:32 (SER11)
7	07:45	07:27	06:49	07:00			06:19		06:39 (SER11)	05:56		06:51 (SER11)
	17:15	17:50	18:22	19:53			20:23	61	07:40 (SER11)	20:49	41	07:32 (SER11)
8	07:45	07:26	06:48	06:59			06:18		06:39 (SER11)	05:56		06:50 (SER11)
	17:16	17:51	18:23	19:54			20:24	61	07:40 (SER11)	20:50	41	07:31 (SER11)
9	07:45	07:25	06:46	06:57			06:16		06:39 (SER11)	05:56		06:51 (SER11)
	17:17	17:52	18:24	19:55			20:25	61	07:40 (SER11)	20:50	39	07:30 (SER11)
10	07:45	07:24	06:45	06:56			06:15		06:39 (SER11)	05:56		06:52 (SER11)
	17:18	17:53	18:25	19:56			20:26	61	07:40 (SER11)	20:51	38	07:30 (SER11)
11	07:45	07:22	06:43	06:54			06:14		06:39 (SER11)	05:56		06:52 (SER11)
	17:19	17:55	18:26	19:57			20:27	61	07:40 (SER11)	20:51	38	07:30 (SER11)
12	07:44	07:21	06:42	06:53			06:13		06:39 (SER11)	05:56		06:53 (SER11)
	17:20	17:56	18:27	19:58			20:28	60	07:39 (SER11)	20:52	37	07:30 (SER11)
13	07:44	07:20	06:40	06:51			06:12		06:39 (SER11)	05:56		06:54 (SER11)
	17:21	17:57	18:28	19:59			20:29	60	07:39 (SER11)	20:52	36	07:30 (SER11)
14	07:44	07:19	06:39	06:49			06:11		06:39 (SER11)	05:55		06:54 (SER11)
	17:22	17:58	18:29	20:00			20:30	60	07:39 (SER11)	20:53	36	07:30 (SER11)
15	07:43	07:18	06:37	06:48			06:10		06:39 (SER11)	05:55		06:55 (SER11)
	17:23	17:59	18:30	20:01			20:31	59	07:38 (SER11)	20:53	35	07:30 (SER11)
16	07:43	07:16	06:35	06:46			06:09		06:39 (SER11)	05:55		06:55 (SER11)
	17:24	18:00	18:31	20:02			20:32	59	07:38 (SER11)	20:53	35	07:30 (SER11)
17	07:43	07:15	06:34	06:45		07:03 (SER11)	06:09		06:39 (SER11)	05:56		06:55 (SER11)
	17:25	18:02	18:32	20:03	19	07:22 (SER11)	20:32	59	07:38 (SER11)	20:54	35	07:30 (SER11)
18	07:42	07:14	06:32	06:44		07:02 (SER11)	06:08		06:40 (SER11)	05:56		06:56 (SER11)
	17:26	18:03	18:33	20:04	24	07:26 (SER11)	20:33	58	07:38 (SER11)	20:54	34	07:30 (SER11)
19	07:42	07:12	06:31	06:42		07:00 (SER11)	06:07		06:40 (SER11)	05:56		06:56 (SER11)
	17:28	18:04	18:34	20:05	28	07:28 (SER11)	20:34	58	07:38 (SER11)	20:54	34	07:30 (SER11)
20	07:41	07:11	06:29	06:41		06:59 (SER11)	06:06		06:40 (SER11)	05:56		06:57 (SER11)
	17:29	18:05	18:35	20:06	31	07:30 (SER11)	20:35	57	07:37 (SER11)	20:55	34	07:31 (SER11)
21	07:41	07:10	06:27	06:39		06:58 (SER11)	06:05		06:40 (SER11)	05:56		06:57 (SER11)
	17:30	18:06	18:36	20:07	34	07:32 (SER11)	20:36	57	07:37 (SER11)	20:55	34	07:31 (SER11)
22	07:40	07:08	06:26	06:38		06:56 (SER11)	06:04		06:42 (SER11)	05:56		06:57 (SER11)
	17:31	18:07	18:37	20:08	37	07:33 (SER11)	20:37	55	07:37 (SER11)	20:55	34	07:31 (SER11)
23	07:40	07:07	06:24	06:36		06:55 (SER11)	06:04		06:42 (SER11)	05:56		06:57 (SER11)
	17:32	18:08	18:38	20:09	39	07:34 (SER11)	20:38	54	07:36 (SER11)	20:55	34	07:31 (SER11)
24	07:39	07:06	06:23	06:35		06:54 (SER11)	06:03		06:42 (SER11)	05:57		06:58 (SER11)
	17:33	18:10	18:39	20:10	41	07:35 (SER11)	20:39	54	07:36 (SER11)	20:55	34	07:32 (SER11)
25	07:38	07:04	06:21	06:34		06:52 (SER11)	06:02		06:43 (SER11)	05:57		06:57 (SER11)
	17:34	18:11	18:40	20:11	44	07:36 (SER11)	20:40	53	07:36 (SER11)	20:56	35	07:32 (SER11)
26	07:38	07:03	06:19	06:32		06:51 (SER11)	06:02		06:43 (SER11)	05:57		06:57 (SER11)
	17:36	18:12	18:41	20:12	46	07:37 (SER11)	20:40	52	07:35 (SER11)	20:56	35	07:32 (SER11)
27	07:37	07:01	06:18	06:31		06:50 (SER11)	06:01		06:44 (SER11)	05:58		06:58 (SER11)
	17:37	18:13	18:42	20:13	48	07:38 (SER11)	20:41	51	07:35 (SER11)	20:56	35	07:33 (SER11)
28	07:36	07:00	06:16	06:30		06:48 (SER11)	06:01		06:44 (SER11)	05:58		06:57 (SER11)
	17:38	18:14	18:43	20:14	49	07:37 (SER11)	20:42	50	07:34 (SER11)	20:56	36	07:33 (SER11)
29	07:35		07:15	06:28		06:47 (SER11)	06:00		06:45 (SER11)	05:58		06:57 (SER11)
	17:39		19:44	20:15	51	07:38 (SER11)	20:43	49	07:34 (SER11)	20:56	36	07:33 (SER11)
30	07:34		07:13	06:27		06:46 (SER11)	05:59		06:45 (SER11)	05:59		06:57 (SER11)
	17:40		19:45	20:16	53	07:39 (SER11)	20:44	49	07:34 (SER11)	20:56	37	07:34 (SER11)
31	07:34		07:11				05:59		06:46 (SER11)			
	17:41		19:46				20:44	48	07:34 (SER11)			
Potential sun hours	301	299	370	397			445			448		
Total, worst case					544			1752			1130	
Sun reduction					0,53			0,59			0,66	
Oper. time red.					0,91			0,91			0,91	
Wind dir. red.					0,74			0,74			0,74	
Total reduction					0,35			0,39			0,44	
Total, real					192			689			499	

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_05 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (5)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October	November	December
1	05:59		06:57 (SER11)	06:22		06:49 (SER11)	06:51	07:19	06:51	07:25
	20:56	37	07:34 (SER11)	20:38	61	07:50 (SER11)	19:57	19:08	17:23	17:00
2	06:00		06:57 (SER11)	06:23		06:49 (SER11)	06:52	07:20	06:52	07:26
	20:56	38	07:35 (SER11)	20:37	60	07:49 (SER11)	19:55	19:06	17:22	17:00
3	06:00		06:56 (SER11)	06:24		06:49 (SER11)	06:53	07:21	06:54	07:27
	20:55	39	07:35 (SER11)	20:36	60	07:49 (SER11)	19:53	19:05	17:21	17:00
4	06:01		06:57 (SER11)	06:25		06:49 (SER11)	06:54	07:22	06:55	07:28
	20:55	40	07:37 (SER11)	20:35	60	07:49 (SER11)	19:52	19:03	17:20	17:00
5	06:01		06:56 (SER11)	06:26		06:49 (SER11)	06:55	07:23	06:56	07:29
	20:55	41	07:37 (SER11)	20:34	60	07:49 (SER11)	19:50	19:02	17:19	17:00
6	06:02		06:56 (SER11)	06:27		06:49 (SER11)	06:56	07:24	06:57	07:30
	20:55	42	07:38 (SER11)	20:32	60	07:49 (SER11)	19:49	19:00	17:18	17:00
7	06:02		06:55 (SER11)	06:28		06:49 (SER11)	06:57	07:25	06:58	07:30
	20:55	43	07:38 (SER11)	20:31	60	07:49 (SER11)	19:47	18:58	17:17	16:59
8	06:03		06:55 (SER11)	06:29		06:50 (SER11)	06:58	07:26	06:59	07:31
	20:54	44	07:39 (SER11)	20:30	59	07:49 (SER11)	19:45	18:57	17:16	16:59
9	06:04		06:55 (SER11)	06:29		06:51 (SER11)	06:58	07:27	07:00	07:32
	20:54	45	07:40 (SER11)	20:29	58	07:49 (SER11)	19:44	18:55	17:15	16:59
10	06:04		06:55 (SER11)	06:30		06:52 (SER11)	06:59	07:28	07:02	07:33
	20:54	45	07:40 (SER11)	20:28	57	07:49 (SER11)	19:42	18:54	17:14	16:59
11	06:05		06:55 (SER11)	06:31		06:53 (SER11)	07:00	07:29	07:03	07:34
	20:53	46	07:41 (SER11)	20:26	55	07:48 (SER11)	19:41	18:52	17:13	17:00
12	06:06		06:55 (SER11)	06:32		06:53 (SER11)	07:01	07:30	07:04	07:35
	20:53	47	07:42 (SER11)	20:25	54	07:47 (SER11)	19:39	18:51	17:12	17:00
13	06:06		06:54 (SER11)	06:33		06:54 (SER11)	07:02	07:31	07:05	07:35
	20:52	48	07:42 (SER11)	20:24	52	07:46 (SER11)	19:37	18:49	17:11	17:00
14	06:07		06:54 (SER11)	06:34		06:55 (SER11)	07:03	07:32	07:06	07:36
	20:52	49	07:43 (SER11)	20:23	51	07:46 (SER11)	19:36	18:48	17:10	17:00
15	06:08		06:54 (SER11)	06:35		06:56 (SER11)	07:04	07:33	07:07	07:37
	20:51	49	07:43 (SER11)	20:21	49	07:45 (SER11)	19:34	18:46	17:09	17:00
16	06:09		06:52 (SER11)	06:36		06:57 (SER11)	07:05	07:34	07:08	07:38
	20:51	51	07:43 (SER11)	20:20	47	07:44 (SER11)	19:32	18:45	17:08	17:01
17	06:09		06:52 (SER11)	06:37		06:58 (SER11)	07:06	07:35	07:09	07:38
	20:50	52	07:44 (SER11)	20:19	45	07:43 (SER11)	19:31	18:43	17:08	17:01
18	06:10		06:52 (SER11)	06:38		06:59 (SER11)	07:07	07:36	07:11	07:39
	20:50	53	07:45 (SER11)	20:17	43	07:42 (SER11)	19:29	18:42	17:07	17:01
19	06:11		06:52 (SER11)	06:39		07:00 (SER11)	07:08	07:37	07:12	07:40
	20:49	54	07:46 (SER11)	20:16	41	07:41 (SER11)	19:28	18:40	17:06	17:02
20	06:12		06:52 (SER11)	06:40		07:01 (SER11)	07:09	07:38	07:13	07:40
	20:48	54	07:46 (SER11)	20:14	39	07:40 (SER11)	19:26	18:39	17:05	17:02
21	06:13		06:51 (SER11)	06:41		07:02 (SER11)	07:10	07:39	07:14	07:41
	20:47	55	07:46 (SER11)	20:13	36	07:38 (SER11)	19:24	18:37	17:05	17:02
22	06:13		06:51 (SER11)	06:42		07:02 (SER11)	07:11	07:40	07:15	07:41
	20:47	56	07:47 (SER11)	20:12	33	07:35 (SER11)	19:23	18:36	17:04	17:03
23	06:14		06:51 (SER11)	06:43		07:03 (SER11)	07:11	07:41	07:16	07:42
	20:46	56	07:47 (SER11)	20:10	30	07:33 (SER11)	19:21	18:35	17:04	17:03
24	06:15		06:51 (SER11)	06:44		07:04 (SER11)	07:12	07:43	07:17	07:42
	20:45	57	07:48 (SER11)	20:09	27	07:31 (SER11)	19:19	18:33	17:03	17:04
25	06:16		06:51 (SER11)	06:44		07:05 (SER11)	07:13	06:44	07:18	07:43
	20:44	57	07:48 (SER11)	20:07	23	07:28 (SER11)	19:18	17:32	17:03	17:05
26	06:17		06:50 (SER11)	06:45		07:07 (SER11)	07:14	06:45	07:19	07:43
	20:44	58	07:48 (SER11)	20:06	17	07:24 (SER11)	19:16	17:31	17:02	17:05
27	06:18		06:50 (SER11)	06:46			07:15	06:46	07:21	07:43
	20:43	58	07:48 (SER11)	20:04			19:14	17:29	17:02	17:06
28	06:18		06:50 (SER11)	06:47			07:16	06:47	07:22	07:44
	20:42	59	07:49 (SER11)	20:03			19:13	17:28	17:01	17:06
29	06:19		06:50 (SER11)	06:48			07:17	06:48	07:23	07:44
	20:41	59	07:49 (SER11)	20:01			19:11	17:27	17:01	17:07
30	06:20		06:49 (SER11)	06:49			07:18	06:49	07:24	07:44
	20:40	61	07:50 (SER11)	20:00			19:10	17:26	17:01	17:08
31	06:21		06:49 (SER11)	06:50				06:50		07:45
	20:39	61	07:50 (SER11)	19:58				17:24		17:09
Potential sun hours	455			425			374	347	301	292
Total, worst case		1554			1237					
Sun reduction		0,74			0,73					
Oper. time red.		0,91			0,91					
Wind dir. red.		0,74			0,74					
Total reduction		0,49			0,49					
Total, real		765			604					

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_06 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (6)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:45	07:33	06:58	07:10	06:26	05:58	05:59	06:22	06:51	07:19	06:51	07:25
	17:09	17:43	18:15	19:47	20:17	20:45	20:56	20:38	19:57	19:08	17:23	17:00
2	07:45	07:32	06:57	07:08	06:24	05:58	06:00	06:23	06:52	07:20	06:52	07:26
	17:10	17:44	18:16	19:48	20:18	20:46	20:56	20:37	19:55	19:06	17:22	17:00
3	07:45	07:31	06:55	07:06	06:23	05:57	06:00	06:24	06:53	07:21	06:54	07:27
	17:11	17:45	18:17	19:49	20:19	20:47	20:56	20:36	19:53	19:05	17:21	17:00
4	07:45	07:30	06:54	07:05	06:22	05:57	06:01	06:25	06:54	07:22	06:55	07:28
	17:12	17:46	18:18	19:50	20:20	20:47	20:55	20:35	19:52	19:03	17:20	17:00
5	07:45	07:29	06:52	07:03	06:21	05:57	06:01	06:26	06:55	07:23	06:56	07:29
	17:13	17:47	18:19	19:51	20:21	20:48	20:55	20:34	19:50	19:01	17:19	16:59
6	07:45	07:28	06:51	07:02	06:20	05:56	06:02	06:27	06:56	07:24	06:57	07:30
	17:14	17:48	18:20	19:52	20:22	20:48	20:55	20:32	19:49	19:00	17:17	16:59
7	07:45	07:27	06:49	07:00	06:18	05:56	06:02	06:27	06:56	07:25	06:58	07:31
	17:15	17:50	18:21	19:53	20:23	20:49	20:55	20:31	19:47	18:58	17:16	16:59
8	07:45	07:26	06:48	06:59	06:17	05:56	06:03	06:28	06:57	07:26	06:59	07:31
	17:16	17:51	18:22	19:54	20:24	20:50	20:54	20:30	19:45	18:57	17:15	16:59
9	07:45	07:25	06:46	06:57	06:16	05:56	06:03	06:29	06:58	07:27	07:00	07:32
	17:17	17:52	18:24	19:55	20:25	20:50	20:54	20:29	19:44	18:55	17:14	16:59
10	07:45	07:24	06:45	06:55	06:15	05:56	06:04	06:30	06:59	07:28	07:02	07:33
	17:18	17:53	18:25	19:56	20:26	20:51	20:54	20:28	19:42	18:54	17:13	16:59
11	07:45	07:22	06:43	06:54	06:14	05:55	06:05	06:31	07:00	07:29	07:03	07:34
	17:19	17:54	18:26	19:57	20:27	20:51	20:53	20:26	19:41	18:52	17:12	16:59
12	07:44	07:21	06:42	06:52	06:13	05:55	06:05	06:32	07:01	07:30	07:04	07:35
	17:20	17:56	18:27	19:58	20:28	20:52	20:53	20:25	19:39	18:51	17:12	16:59
13	07:44	07:20	06:40	06:51	06:12	05:55	06:06	06:33	07:02	07:31	07:05	07:36
	17:21	17:57	18:28	19:59	20:29	20:52	20:52	20:24	19:37	18:49	17:11	17:00
14	07:44	07:19	06:39	06:49	06:11	05:55	06:07	06:34	07:03	07:32	07:06	07:36
	17:22	17:58	18:29	20:00	20:30	20:53	20:52	20:23	19:36	18:48	17:10	17:00
15	07:44	07:18	06:37	06:48	06:10	05:55	06:08	06:35	07:04	07:33	07:07	07:37
	17:23	17:59	18:30	20:01	20:31	20:53	20:51	20:21	19:34	18:46	17:09	17:00
16	07:43	07:16	06:35	06:46	06:09	05:55	06:08	06:36	07:05	07:34	07:08	07:38
	17:24	18:00	18:31	20:02	20:32	20:54	20:51	20:20	19:32	18:45	17:08	17:00
17	07:43	07:15	06:34	06:45	06:08	05:55	06:09	06:37	07:06	07:35	07:10	07:38
	17:25	18:01	18:32	20:03	20:33	20:54	20:50	20:19	19:31	18:43	17:07	17:01
18	07:42	07:14	06:32	06:43	06:07	05:55	06:10	06:38	07:07	07:36	07:11	07:39
	17:26	18:03	18:33	20:04	20:33	20:54	20:50	20:17	19:29	18:42	17:07	17:01
19	07:42	07:12	06:31	06:42	06:07	05:55	06:11	06:39	07:08	07:37	07:12	07:40
	17:27	18:04	18:34	20:05	20:34	20:55	20:49	20:16	19:27	18:40	17:06	17:01
20	07:41	07:11	06:29	06:41	06:06	05:56	06:11	06:40	07:09	07:38	07:13	07:40
	17:28	18:05	18:35	20:06	20:35	20:55	20:48	20:14	19:26	18:39	17:05	17:02
21	07:41	07:10	06:27	06:39	06:05	05:56	06:12	06:41	07:10	07:39	07:14	07:41
	17:30	18:06	18:36	20:07	20:36	20:55	20:48	20:13	19:24	18:37	17:05	17:02
22	07:40	07:08	06:26	06:38	06:04	05:56	06:13	06:42	07:10	07:40	07:15	07:41
	17:31	18:07	18:37	20:08	20:37	20:55	20:47	20:12	19:23	18:36	17:04	17:03
23	07:40	07:07	06:24	06:36	06:04	05:56	06:14	06:42	07:11	07:41	07:16	07:42
	17:32	18:08	18:38	20:09	20:38	20:55	20:46	20:10	19:21	18:35	17:03	17:03
24	07:39	07:06	06:22	06:35	06:03	05:56	06:15	06:43	07:12	07:43	07:17	07:42
	17:33	18:09	18:39	20:10	20:39	20:56	20:45	20:09	19:19	18:33	17:03	17:04
25	07:38	07:04	06:21	06:34	06:02	05:57	06:16	06:44	07:13	06:44	07:18	07:43
	17:34	18:11	18:40	20:11	20:40	20:56	20:44	20:07	19:18	17:32	17:02	17:04
26	07:38	07:03	06:19	06:32	06:02	05:57	06:17	06:45	07:14	06:45	07:20	07:43
	17:35	18:12	18:41	20:12	20:40	20:56	20:44	20:06	19:16	17:31	17:02	17:05
27	07:37	07:01	06:18	06:31	06:01	05:57	06:17	06:46	07:15	06:46	07:21	07:44
	17:37	18:13	18:42	20:13	20:41	20:56	20:43	20:04	19:14	17:29	17:02	17:06
28	07:36	07:00	06:16	06:30	06:00	05:58	06:18	06:47	07:16	06:47	07:22	07:44
	17:38	18:14	18:43	20:14	20:42	20:56	20:42	20:03	19:13	17:28	17:01	17:06
29	07:35		07:14	06:28	06:00	05:58	06:19	06:48	07:17	06:48	07:23	07:44
	17:39		19:44	20:15	20:43	20:56	20:41	20:01	19:11	17:27	17:01	17:07
30	07:34		07:13	06:27	05:59	05:59	06:20	06:49	07:18	06:49	07:24	07:44
	17:40		19:45	20:16	20:44	20:56	20:40	20:00	19:09	17:25	17:00	17:08
31	07:34		07:11		05:59		06:21	06:50		06:50		07:45
	17:41		19:46		20:44		20:39	19:58		17:24		17:08
Potential sun hours	301	299	370	397	445	448	455	425	374	347	301	292
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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_07 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April		May	June
1	07:45		15:47 (SER8)	07:33		15:48 (SER8)	06:58		16:01 (SER8)	07:10		06:26	05:58
	17:10	58	16:45 (SER8)	17:43	91	17:19 (SER8)	18:15	92	17:33 (SER8)	19:47		20:17	20:45
2	07:45		15:47 (SER8)	07:32		15:48 (SER8)	06:57		16:02 (SER8)	07:08		06:24	05:58
	17:10	58	16:45 (SER8)	17:44	92	17:20 (SER8)	18:16	90	17:32 (SER8)	19:48		20:18	20:46
3	07:45		15:47 (SER8)	07:31		15:48 (SER8)	06:55		16:03 (SER8)	07:06		06:23	05:58
	17:11	59	16:46 (SER8)	17:45	93	17:21 (SER8)	18:17	87	17:30 (SER8)	19:49		20:19	20:46
4	07:45		15:47 (SER8)	07:30		15:48 (SER8)	06:54		16:05 (SER8)	07:05		06:22	05:57
	17:12	60	16:47 (SER8)	17:46	95	17:23 (SER8)	18:18	84	17:29 (SER8)	19:50		20:20	20:47
5	07:45		15:47 (SER8)	07:29		15:48 (SER8)	06:52		16:06 (SER8)	07:03		06:21	05:57
	17:13	61	16:48 (SER8)	17:47	96	17:24 (SER8)	18:19	81	17:27 (SER8)	19:51		20:21	20:48
6	07:45		15:47 (SER8)	07:28		15:48 (SER8)	06:51		16:07 (SER8)	07:02		06:20	05:57
	17:14	62	16:49 (SER8)	17:49	97	17:25 (SER8)	18:20	78	17:25 (SER8)	19:52		20:22	20:48
7	07:45		15:48 (SER8)	07:27		15:48 (SER8)	06:49		16:09 (SER8)	07:00		06:19	05:56
	17:15	62	16:50 (SER8)	17:50	99	17:27 (SER8)	18:21	75	17:24 (SER8)	19:53		20:23	20:49
8	07:45		15:47 (SER8)	07:26		15:49 (SER8)	06:48		16:10 (SER8)	06:59		06:17	05:56
	17:16	63	16:50 (SER8)	17:51	99	17:28 (SER8)	18:22	72	17:22 (SER8)	19:54		20:24	20:50
9	07:45		15:47 (SER8)	07:25		15:49 (SER8)	06:46		16:12 (SER8)	06:57		06:16	05:56
	17:17	64	16:51 (SER8)	17:52	101	17:30 (SER8)	18:24	68	17:20 (SER8)	19:55		20:25	20:50
10	07:45		15:47 (SER8)	07:23		15:50 (SER8)	06:45		16:13 (SER8)	06:55		06:15	05:56
	17:18	66	16:53 (SER8)	17:53	101	17:31 (SER8)	18:25	65	17:18 (SER8)	19:56		20:26	20:51
11	07:45		15:48 (SER8)	07:22		15:49 (SER8)	06:43		16:16 (SER8)	06:54		06:14	05:56
	17:19	66	16:54 (SER8)	17:54	103	17:32 (SER8)	18:26	60	17:16 (SER8)	19:57		20:27	20:51
12	07:44		15:47 (SER8)	07:21		15:50 (SER8)	06:42		16:18 (SER8)	06:52		06:13	05:55
	17:20	67	16:54 (SER8)	17:56	103	17:33 (SER8)	18:27	55	17:13 (SER8)	19:58		20:28	20:52
13	07:44		15:48 (SER8)	07:20		15:50 (SER8)	06:40		16:20 (SER8)	06:51		06:12	05:55
	17:21	68	16:56 (SER8)	17:57	104	17:34 (SER8)	18:28	50	17:10 (SER8)	19:59		20:29	20:52
14	07:44		15:48 (SER8)	07:19		15:51 (SER8)	06:39		16:24 (SER8)	06:49		06:11	05:55
	17:22	69	16:57 (SER8)	17:58	105	17:36 (SER8)	18:29	43	17:07 (SER8)	20:00		20:30	20:53
15	07:44		15:47 (SER8)	07:18		15:51 (SER8)	06:37		16:27 (SER8)	06:48		06:10	05:55
	17:23	71	16:58 (SER8)	17:59	107	17:38 (SER8)	18:30	36	17:03 (SER8)	20:01		20:31	20:53
16	07:43		15:48 (SER8)	07:16		15:51 (SER8)	06:35		16:32 (SER8)	06:46		06:09	05:55
	17:24	72	17:00 (SER8)	18:00	107	17:38 (SER8)	18:31	27	16:59 (SER8)	20:02		20:32	20:53
17	07:43		15:47 (SER8)	07:15		15:52 (SER8)	06:34		16:39 (SER8)	06:45		06:08	05:55
	17:25	73	17:00 (SER8)	18:01	108	17:40 (SER8)	18:32	11	16:50 (SER8)	20:03		20:33	20:54
18	07:42		15:48 (SER8)	07:14		15:53 (SER8)	06:32			06:43		06:08	05:55
	17:26	74	17:02 (SER8)	18:03	108	17:41 (SER8)	18:33			20:04		20:33	20:54
19	07:42		15:47 (SER8)	07:12		15:53 (SER8)	06:31			06:42		06:07	05:56
	17:27	76	17:03 (SER8)	18:04	107	17:40 (SER8)	18:34			20:05		20:34	20:54
20	07:41		15:48 (SER8)	07:11		15:54 (SER8)	06:29			06:41		06:06	05:56
	17:28	76	17:04 (SER8)	18:05	106	17:40 (SER8)	18:35			20:06		20:35	20:55
21	07:41		15:47 (SER8)	07:10		15:55 (SER8)	06:27			06:39		06:05	05:56
	17:30	78	17:05 (SER8)	18:06	105	17:40 (SER8)	18:36			20:07		20:36	20:55
22	07:40		15:47 (SER8)	07:08		15:55 (SER8)	06:26			06:38		06:04	05:56
	17:31	79	17:06 (SER8)	18:07	104	17:39 (SER8)	18:37			20:08		20:37	20:55
23	07:40		15:48 (SER8)	07:07		15:56 (SER8)	06:24			06:36		06:04	05:56
	17:32	80	17:08 (SER8)	18:08	102	17:38 (SER8)	18:38			20:09		20:38	20:55
24	07:39		15:47 (SER8)	07:06		15:56 (SER8)	06:22			06:35		06:03	05:57
	17:33	82	17:09 (SER8)	18:09	101	17:37 (SER8)	18:39			20:10		20:39	20:56
25	07:38		15:47 (SER8)	07:04		15:57 (SER8)	06:21			06:34		06:02	05:57
	17:34	83	17:10 (SER8)	18:11	100	17:37 (SER8)	18:40			20:11		20:40	20:56
26	07:38		15:47 (SER8)	07:03		15:57 (SER8)	06:19			06:32		06:02	05:57
	17:35	84	17:11 (SER8)	18:12	98	17:35 (SER8)	18:41			20:12		20:40	20:56
27	07:37		15:48 (SER8)	07:01		15:59 (SER8)	06:18			06:31		06:01	05:57
	17:37	85	17:13 (SER8)	18:13	96	17:35 (SER8)	18:42			20:13		20:41	20:56
28	07:36		15:48 (SER8)	07:00		16:00 (SER8)	06:16			06:30		06:00	05:58
	17:38	86	17:14 (SER8)	18:14	94	17:34 (SER8)	18:43			20:14		20:42	20:56
29	07:35		15:48 (SER8)				07:14			06:28		06:00	05:58
	17:39	87	17:15 (SER8)				19:44			20:15		20:43	20:56
30	07:34		15:48 (SER8)				07:13			06:27		05:59	05:59
	17:40	88	17:16 (SER8)				19:45			20:16		20:44	20:56
31	07:34		15:47 (SER8)				07:11					05:59	
	17:41	91	17:18 (SER8)				19:46					20:44	
Potential sun hours	301			299			370			397		445	448
Total, worst case		2248			2822			1074					
Sun reduction		0,45			0,47			0,49					
Oper. time red.		0,91			0,91			0,91					
Wind dir. red.		0,68			0,68			0,68					
Total reduction		0,28			0,29			0,30					
Total, real		624			820			326					

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_07 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July		August		September			October			November			December		
1	05:59		06:22		06:51			07:19		16:59 (SER8)	06:51		15:18 (SER8)	07:25		15:30 (SER8)
	20:56		20:38		19:57			19:08	53	17:52 (SER8)	17:23	102	17:00 (SER8)	17:00	66	16:36 (SER8)
2	06:00		06:23		06:52			07:20		16:56 (SER8)	06:52		15:19 (SER8)	07:26		15:31 (SER8)
	20:56		20:37		19:55			19:06	58	17:54 (SER8)	17:22	100	16:59 (SER8)	17:00	65	16:36 (SER8)
3	06:00		06:24		06:53			07:21		16:53 (SER8)	06:54		15:19 (SER8)	07:27		15:31 (SER8)
	20:55		20:36		19:53			19:05	63	17:56 (SER8)	17:21	99	16:58 (SER8)	17:00	65	16:36 (SER8)
4	06:01		06:25		06:54			07:22		16:51 (SER8)	06:55		15:18 (SER8)	07:28		15:32 (SER8)
	20:55		20:35		19:52			19:03	66	17:57 (SER8)	17:20	98	16:56 (SER8)	17:00	63	16:35 (SER8)
5	06:01		06:26		06:55			07:23		16:48 (SER8)	06:56		15:18 (SER8)	07:29		15:33 (SER8)
	20:55		20:34		19:50			19:01	71	17:59 (SER8)	17:19	97	16:55 (SER8)	16:59	62	16:35 (SER8)
6	06:02		06:27		06:56			07:24		16:46 (SER8)	06:57		15:18 (SER8)	07:30		15:33 (SER8)
	20:55		20:32		19:49			19:00	74	18:00 (SER8)	17:17	96	16:54 (SER8)	16:59	62	16:35 (SER8)
7	06:02		06:27		06:57			07:25		16:44 (SER8)	06:58		15:19 (SER8)	07:30		15:34 (SER8)
	20:55		20:31		19:47			18:58	77	18:01 (SER8)	17:16	94	16:53 (SER8)	16:59	61	16:35 (SER8)
8	06:03		06:28		06:57			07:26		16:42 (SER8)	06:59		15:19 (SER8)	07:31		15:34 (SER8)
	20:54		20:30		19:45			18:57	80	18:02 (SER8)	17:15	93	16:52 (SER8)	16:59	60	16:34 (SER8)
9	06:04		06:29		06:58			07:27		16:40 (SER8)	07:00		15:18 (SER8)	07:32		15:35 (SER8)
	20:54		20:29		19:44			18:55	83	18:03 (SER8)	17:14	93	16:51 (SER8)	16:59	59	16:34 (SER8)
10	06:04		06:30		06:59			07:28		16:38 (SER8)	07:02		15:18 (SER8)	07:33		15:36 (SER8)
	20:54		20:28		19:42			18:54	86	18:04 (SER8)	17:13	92	16:50 (SER8)	16:59	58	16:34 (SER8)
11	06:05		06:31		07:00			07:29		16:37 (SER8)	07:03		15:18 (SER8)	07:34		15:37 (SER8)
	20:53		20:26		19:41			18:52	88	18:05 (SER8)	17:12	91	16:49 (SER8)	16:59	58	16:35 (SER8)
12	06:06		06:32		07:01			07:30		16:35 (SER8)	07:04		15:19 (SER8)	07:35		15:38 (SER8)
	20:53		20:25		19:39			18:51	91	18:06 (SER8)	17:12	89	16:48 (SER8)	17:00	57	16:35 (SER8)
13	06:06		06:33		07:02			07:31		16:34 (SER8)	07:05		15:20 (SER8)	07:36		15:37 (SER8)
	20:52		20:24		19:37			18:49	92	18:06 (SER8)	17:11	87	16:47 (SER8)	17:00	57	16:34 (SER8)
14	06:07		06:34		07:03			07:32		16:32 (SER8)	07:06		15:20 (SER8)	07:36		15:38 (SER8)
	20:52		20:23		19:36			18:48	95	18:07 (SER8)	17:10	86	16:46 (SER8)	17:00	57	16:35 (SER8)
15	06:08		06:35		07:04			07:33		16:31 (SER8)	07:07		15:20 (SER8)	07:37		15:39 (SER8)
	20:51		20:21		19:34			18:46	97	18:08 (SER8)	17:09	85	16:45 (SER8)	17:00	56	16:35 (SER8)
16	06:08		06:36		07:05			07:34		16:29 (SER8)	07:08		15:21 (SER8)	07:38		15:40 (SER8)
	20:51		20:20		19:32			18:45	99	18:08 (SER8)	17:08	84	16:45 (SER8)	17:00	56	16:36 (SER8)
17	06:09		06:37		07:06			07:35		16:28 (SER8)	07:10		15:21 (SER8)	07:38		15:40 (SER8)
	20:50		20:19		19:31			18:43	100	18:08 (SER8)	17:07	83	16:44 (SER8)	17:01	55	16:35 (SER8)
18	06:10		06:38		07:07			07:36		16:27 (SER8)	07:11		15:21 (SER8)	07:39		15:41 (SER8)
	20:50		20:17		19:29			18:42	102	18:09 (SER8)	17:07	82	16:43 (SER8)	17:01	55	16:36 (SER8)
19	06:11		06:39		07:08			07:37		16:26 (SER8)	07:12		15:22 (SER8)	07:40		15:41 (SER8)
	20:49		20:16		19:27			18:40	103	18:09 (SER8)	17:06	80	16:42 (SER8)	17:01	55	16:36 (SER8)
20	06:12		06:40		07:09			07:38		16:25 (SER8)	07:13		15:22 (SER8)	07:40		15:42 (SER8)
	20:48		20:14		19:26			18:39	104	18:09 (SER8)	17:05	79	16:41 (SER8)	17:02	55	16:37 (SER8)
21	06:12		06:41		07:10			07:39		16:25 (SER8)	07:14		15:23 (SER8)	07:41		15:42 (SER8)
	20:48		20:13		19:24			18:37	106	18:11 (SER8)	17:05	78	16:41 (SER8)	17:02	55	16:37 (SER8)
22	06:13		06:42		07:10			07:40		16:24 (SER8)	07:15		15:24 (SER8)	07:41		15:43 (SER8)
	20:47		20:12		19:23			18:36	107	18:11 (SER8)	17:04	76	16:40 (SER8)	17:03	55	16:38 (SER8)
23	06:14		06:42		07:11			07:41		16:23 (SER8)	07:16		15:24 (SER8)	07:42		15:43 (SER8)
	20:46		20:10		19:21			18:35	108	18:11 (SER8)	17:03	76	16:40 (SER8)	17:03	55	16:38 (SER8)
24	06:15		06:43		07:12			07:43		16:22 (SER8)	07:17		15:25 (SER8)	07:42		15:44 (SER8)
	20:45		20:09		19:19			18:33	108	18:10 (SER8)	17:03	74	16:39 (SER8)	17:04	55	16:39 (SER8)
25	06:16		06:44		07:13			06:44		15:21 (SER8)	07:18		15:25 (SER8)	07:43		15:44 (SER8)
	20:44		20:07		19:18			17:32	108	17:09 (SER8)	17:02	73	16:38 (SER8)	17:04	55	16:39 (SER8)
26	06:17		06:45		07:14			06:45		15:21 (SER8)	07:19		15:26 (SER8)	07:43		15:44 (SER8)
	20:44		20:06		19:16			17:31	106	17:07 (SER8)	17:02	72	16:38 (SER8)	17:05	55	16:39 (SER8)
27	06:17		06:46		07:15		17:16 (SER8)	06:46		15:20 (SER8)	07:21		15:26 (SER8)	07:43		15:45 (SER8)
	20:43		20:04		19:14	22	17:38 (SER8)	17:29	106	17:06 (SER8)	17:02	71	16:37 (SER8)	17:06	56	16:41 (SER8)
28	06:18		06:47		07:16		17:10 (SER8)	06:47		15:20 (SER8)	07:22		15:27 (SER8)	07:44		15:45 (SER8)
	20:42		20:03		19:13	33	17:43 (SER8)	17:28	105	17:05 (SER8)	17:01	69	16:36 (SER8)	17:06	56	16:41 (SER8)
29	06:19		06:48		07:17		17:06 (SER8)	06:48		15:20 (SER8)	07:23		15:29 (SER8)	07:44		15:45 (SER8)
	20:41		20:01		19:11	41	17:47 (SER8)	17:27	104	17:04 (SER8)	17:01	68	16:37 (SER8)	17:07	56	16:41 (SER8)
30	06:20		06:49		07:18		17:02 (SER8)	06:49		15:19 (SER8)	07:24		15:29 (SER8)	07:44		15:45 (SER8)
	20:40		20:00		19:09	47	17:49 (SER8)	17:25	104	17:03 (SER8)	17:00	68	16:37 (SER8)	17:08	57	16:42 (SER8)
31	06:21		06:50					06:50		15:19 (SER8)				07:45		15:46 (SER8)
	20:39		19:58					17:24	102	17:01 (SER8)				17:08	58	16:44 (SER8)
Potential sun hours	455		425		374			347			301			292		
Total, worst case						143			2846			2535			1795	
Sun reduction						0,65			0,54			0,51			0,45	
Oper. time red.						0,91			0,91			0,91			0,91	
Wind dir. red.						0,68			0,68			0,68			0,68	
Total reduction						0,40			0,33			0,31			0,28	
Total, real						57			953			786			499	

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_08 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (8)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May	June
1	07:45	07:33			06:58		17:42 (SER7)	07:10		18:58 (SER8)	06:26	05:58
	17:10	17:43			18:15	12	17:54 (SER7)	19:47	28	19:26 (SER8)	20:17	20:45
2	07:45	07:32			06:57		17:44 (SER7)	07:08		18:57 (SER8)	06:24	05:58
	17:10	17:44			18:16	11	17:55 (SER7)	19:48	30	19:27 (SER8)	20:18	20:46
3	07:45	07:31			06:55		17:45 (SER7)	07:06		18:57 (SER8)	06:23	05:57
	17:11	17:45			18:17	11	17:56 (SER7)	19:49	31	19:28 (SER8)	20:19	20:46
4	07:45	07:30			06:54		17:48 (SER7)	07:05		18:56 (SER8)	06:22	05:57
	17:12	17:46			18:18	5	17:53 (SER7)	19:50	33	19:29 (SER8)	20:20	20:47
5	07:45	07:29			06:52			07:03		18:55 (SER8)	06:21	05:57
	17:13	17:47			18:19			19:51	35	19:30 (SER8)	20:21	20:48
6	07:45	07:28			06:51			07:02		18:56 (SER8)	06:20	05:56
	17:14	17:48			18:20			19:52	35	19:31 (SER8)	20:22	20:48
7	07:45	07:27			06:49			07:00		18:55 (SER8)	06:18	05:56
	17:15	17:50			18:21			19:53	37	19:32 (SER8)	20:23	20:49
8	07:45	07:26			06:48			06:59		18:56 (SER8)	06:17	05:56
	17:16	17:51			18:22			19:54	37	19:33 (SER8)	20:24	20:50
9	07:45	07:25			06:46			06:57		18:55 (SER8)	06:16	05:56
	17:17	17:52			18:24			19:55	39	19:34 (SER8)	20:25	20:50
10	07:45	07:23			06:45			06:55		18:56 (SER8)	06:15	05:56
	17:18	17:53			18:25			19:56	38	19:34 (SER8)	20:26	20:51
11	07:45	07:22			06:43			06:54		18:56 (SER8)	06:14	05:55
	17:19	17:54			18:26			19:57	37	19:33 (SER8)	20:27	20:51
12	07:44	07:21			06:42			06:52		18:57 (SER8)	06:13	05:55
	17:20	17:56			18:27			19:58	35	19:32 (SER8)	20:28	20:52
13	07:44	07:20			06:40			06:51		18:57 (SER8)	06:12	05:55
	17:21	17:57			18:28			19:59	33	19:30 (SER8)	20:29	20:52
14	07:44	07:19			06:38			06:49		18:58 (SER8)	06:11	05:55
	17:22	17:58			18:29			20:00	32	19:30 (SER8)	20:30	20:53
15	07:43	07:18			06:37			06:48		18:59 (SER8)	06:10	05:55
	17:23	17:59			18:30			20:01	28	19:27 (SER8)	20:31	20:53
16	07:43	07:16			06:35			06:46		19:01 (SER8)	06:09	05:55
	17:24	18:00			18:31			20:02	25	19:26 (SER8)	20:32	20:53
17	07:43	07:15			06:34			06:45		19:02 (SER8)	06:08	05:55
	17:25	18:01			18:32			20:03	21	19:23 (SER8)	20:32	20:54
18	07:42	07:14			06:32			06:43		19:05 (SER8)	06:07	05:55
	17:26	18:03			18:33			20:04	16	19:21 (SER8)	20:33	20:54
19	07:42	07:12			06:30			06:42		19:08 (SER8)	06:07	05:55
	17:27	18:04			18:34			20:05	8	19:16 (SER8)	20:34	20:54
20	07:41	07:11			06:29			06:41			06:06	05:56
	17:28	18:05			18:35			20:06			20:35	20:55
21	07:41	07:10		17:43 (SER7)	06:27			06:39			06:05	05:56
	17:30	18:06	2	17:45 (SER7)	18:36			20:07			20:36	20:55
22	07:40	07:08		17:42 (SER7)	06:26			06:38			06:04	05:56
	17:31	18:07	3	17:45 (SER7)	18:37			20:08			20:37	20:55
23	07:40	07:07		17:42 (SER7)	06:24			06:36			06:04	05:56
	17:32	18:08	5	17:47 (SER7)	18:38			20:09			20:38	20:55
24	07:39	07:06		17:41 (SER7)	06:22		18:14 (SER8)	06:35			06:03	05:56
	17:33	18:09	7	17:48 (SER7)	18:39	5	18:19 (SER8)	20:10			20:39	20:55
25	07:38	07:04		17:41 (SER7)	06:21		18:10 (SER8)	06:34			06:02	05:57
	17:34	18:10	8	17:49 (SER7)	18:40	9	18:19 (SER8)	20:11			20:40	20:56
26	07:38	07:03		17:40 (SER7)	06:19		18:07 (SER8)	06:32			06:02	05:57
	17:35	18:12	10	17:50 (SER7)	18:41	13	18:20 (SER8)	20:12			20:40	20:56
27	07:37	07:01		17:41 (SER7)	06:18		18:05 (SER8)	06:31			06:01	05:57
	17:37	18:13	11	17:52 (SER7)	18:42	16	18:21 (SER8)	20:13			20:41	20:56
28	07:36	07:00		17:42 (SER7)	06:16		18:03 (SER8)	06:30			06:00	05:58
	17:38	18:14	11	17:53 (SER7)	18:43	19	18:22 (SER8)	20:14			20:42	20:56
29	07:35				07:14		19:02 (SER8)	06:28			06:00	05:58
	17:39				19:44	22	19:24 (SER8)	20:15			20:43	20:56
30	07:34				07:13		19:00 (SER8)	06:27			05:59	05:59
	17:40				19:45	24	19:24 (SER8)	20:16			20:44	20:56
31	07:34				07:11		18:59 (SER8)				05:59	
	17:41				19:46	26	19:25 (SER8)				20:44	
Potential sun hours	301	299			370			397			445	448
Total, worst case			57			173			578			
Sun reduction			0,47			0,49			0,53			
Oper. time red.			0,91			0,91			0,91			
Wind dir. red.			0,74			0,78			0,79			
Total reduction			0,32			0,35			0,38			
Total, real			18			60			219			

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_08 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (8)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October			November	December
1	05:59	06:22			06:51		18:55 (SER8)	07:19			06:51	07:25
	20:56	20:38			19:57	37	19:32 (SER8)	19:08			17:23	17:00
2	06:00	06:23			06:52		18:54 (SER8)	07:20			06:52	07:26
	20:56	20:37			19:55	38	19:32 (SER8)	19:06			17:22	17:00
3	06:00	06:24			06:53		18:53 (SER8)	07:21			06:54	07:27
	20:55	20:36			19:53	39	19:32 (SER8)	19:05			17:21	17:00
4	06:01	06:25			06:54		18:53 (SER8)	07:22			06:55	07:28
	20:55	20:35			19:52	37	19:30 (SER8)	19:03			17:20	17:00
5	06:01	06:26			06:55		18:52 (SER8)	07:23			06:56	07:29
	20:55	20:34			19:50	37	19:29 (SER8)	19:01			17:19	16:59
6	06:02	06:27			06:56		18:52 (SER8)	07:24			06:57	07:30
	20:55	20:32			19:49	35	19:27 (SER8)	19:00			17:17	16:59
7	06:02	06:27			06:56		18:51 (SER8)	07:25			06:58	07:30
	20:55	20:31			19:47	35	19:26 (SER8)	18:58			17:16	16:59
8	06:03	06:28			06:57		18:50 (SER8)	07:26			06:59	07:31
	20:54	20:30			19:45	33	19:23 (SER8)	18:57			17:15	16:59
9	06:03	06:29			06:58		18:50 (SER8)	07:27			07:00	07:32
	20:54	20:29			19:44	32	19:22 (SER8)	18:55			17:14	16:59
10	06:04	06:30			06:59		18:50 (SER8)	07:28		18:21 (SER7)	07:02	07:33
	20:54	20:28			19:42	30	19:20 (SER8)	18:54	10	18:31 (SER7)	17:13	16:59
11	06:05	06:31			07:00		18:50 (SER8)	07:29		18:19 (SER7)	07:03	07:34
	20:53	20:26			19:41	29	19:19 (SER8)	18:52	11	18:30 (SER7)	17:12	16:59
12	06:05	06:32			07:01		18:51 (SER8)	07:30		18:17 (SER7)	07:04	07:35
	20:53	20:25			19:39	26	19:17 (SER8)	18:51	11	18:28 (SER7)	17:12	16:59
13	06:06	06:33			07:02		18:51 (SER8)	07:31		18:15 (SER7)	07:05	07:35
	20:52	20:24			19:37	25	19:16 (SER8)	18:49	12	18:27 (SER7)	17:11	17:00
14	06:07	06:34			07:03		18:52 (SER8)	07:32		18:14 (SER7)	07:06	07:36
	20:52	20:23			19:36	22	19:14 (SER8)	18:47	11	18:25 (SER7)	17:10	17:00
15	06:08	06:35			07:04		18:53 (SER8)	07:33		18:13 (SER7)	07:07	07:37
	20:51	20:21			19:34	20	19:13 (SER8)	18:46	11	18:24 (SER7)	17:09	17:00
16	06:08	06:36			07:05		18:54 (SER8)	07:34		18:13 (SER7)	07:08	07:38
	20:51	20:20			19:32	17	19:11 (SER8)	18:45	9	18:22 (SER7)	17:08	17:00
17	06:09	06:37			07:06		18:54 (SER8)	07:35		18:13 (SER7)	07:09	07:38
	20:50	20:19			19:31	14	19:08 (SER8)	18:43	7	18:20 (SER7)	17:07	17:01
18	06:10	06:38			07:07		18:56 (SER8)	07:36		18:12 (SER7)	07:11	07:39
	20:50	20:17			19:29	11	19:07 (SER8)	18:42	7	18:19 (SER7)	17:07	17:01
19	06:11	06:39			07:08		18:59 (SER8)	07:37		18:12 (SER7)	07:12	07:40
	20:49	20:16			19:27	6	19:05 (SER8)	18:40	5	18:17 (SER7)	17:06	17:01
20	06:12	06:40			07:09			07:38		18:13 (SER7)	07:13	07:40
	20:48	20:14			19:26			18:39	3	18:16 (SER7)	17:05	17:02
21	06:12	06:41			07:09			07:39		18:13 (SER7)	07:14	07:41
	20:47	20:13			19:24			18:37	1	18:14 (SER7)	17:05	17:02
22	06:13	06:42			07:10			07:40			07:15	07:41
	20:47	20:12			19:22			18:36			17:04	17:03
23	06:14	06:42			07:11			07:41			07:16	07:42
	20:46	20:10			19:21			18:35			17:03	17:03
24	06:15	06:43		19:11 (SER8)	07:12			07:42			07:17	07:42
	20:45	20:09	10	19:21 (SER8)	19:19			18:33			17:03	17:04
25	06:16	06:44		19:07 (SER8)	07:13			06:44			07:18	07:43
	20:44	20:07	17	19:24 (SER8)	19:18			17:32			17:02	17:04
26	06:17	06:45		19:04 (SER8)	07:14			06:45			07:19	07:43
	20:43	20:06	23	19:27 (SER8)	19:16			17:31			17:02	17:05
27	06:17	06:46		19:02 (SER8)	07:15			06:46			07:21	07:43
	20:43	20:04	26	19:28 (SER8)	19:14			17:29			17:02	17:06
28	06:18	06:47		19:01 (SER8)	07:16			06:47			07:22	07:44
	20:42	20:03	29	19:30 (SER8)	19:13			17:28			17:01	17:06
29	06:19	06:48		18:59 (SER8)	07:17			06:48			07:23	07:44
	20:41	20:01	32	19:31 (SER8)	19:11			17:27			17:01	17:07
30	06:20	06:49		18:57 (SER8)	07:18			06:49			07:24	07:44
	20:40	20:00	33	19:30 (SER8)	19:09			17:25			17:00	17:08
31	06:21	06:50		18:56 (SER8)				06:50				07:45
	20:39	19:58	35	19:31 (SER8)				17:24				17:08
Potential sun hours	455	425			374			347			301	292
Total, worst case			205			523			98			
Sun reduction			0,73			0,65			0,54			
Oper. time red.			0,91			0,91			0,91			
Wind dir. red.			0,79			0,79			0,74			
Total reduction			0,52			0,46			0,37			
Total, real			107			242			36			

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

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

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_09 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (9)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March			April	May			June		
1	07:45	07:33	06:58			07:10	06:26			05:58		19:50 (SER8)
	17:10	17:43	18:15			19:47	20:17			20:45	30	20:20 (SER8)
2	07:45	07:32	06:57			07:08	06:24			05:58		19:50 (SER8)
	17:10	17:44	18:16			19:48	20:18			20:46	31	20:21 (SER8)
3	07:45	07:31	06:55			07:06	06:23			05:58		19:50 (SER8)
	17:11	17:45	18:17			19:49	20:19			20:46	32	20:22 (SER8)
4	07:45	07:30	06:54			07:05	06:22			05:57		19:49 (SER8)
	17:12	17:46	18:18			19:50	20:20			20:47	33	20:22 (SER8)
5	07:45	07:29	06:52			07:03	06:21			05:57		19:49 (SER8)
	17:13	17:47	18:19			19:51	20:21			20:48	34	20:23 (SER8)
6	07:45	07:28	06:51			07:02	06:20			05:57		19:49 (SER8)
	17:14	17:48	18:20			19:52	20:22			20:48	35	20:24 (SER8)
7	07:45	07:27	06:49			07:00	06:19			05:56		19:48 (SER8)
	17:15	17:50	18:21			19:53	20:23			20:49	36	20:24 (SER8)
8	07:45	07:26	06:48			06:59	06:17			05:56		19:49 (SER8)
	17:16	17:51	18:22			19:54	20:24			20:50	36	20:25 (SER8)
9	07:45	07:25	06:46			06:57	06:16			05:56		19:49 (SER8)
	17:17	17:52	18:24			19:55	20:25			20:50	36	20:25 (SER8)
10	07:45	07:23	06:45			06:55	06:15			05:56		19:49 (SER8)
	17:18	17:53	18:25			19:56	20:26			20:51	37	20:26 (SER8)
11	07:45	07:22	06:43			06:54	06:14			05:55		19:49 (SER8)
	17:19	17:54	18:26			19:57	20:27			20:51	38	20:27 (SER8)
12	07:44	07:21	06:42			06:52	06:13			05:55		19:49 (SER8)
	17:20	17:56	18:27			19:58	20:28			20:52	38	20:27 (SER8)
13	07:44	07:20	06:40			06:51	06:12			05:55		19:49 (SER8)
	17:21	17:57	18:28			19:59	20:29			20:52	39	20:28 (SER8)
14	07:44	07:19	06:38			06:49	06:11			05:55		19:49 (SER8)
	17:22	17:58	18:29			20:00	20:30			20:53	39	20:28 (SER8)
15	07:43	07:18	06:37			06:48	06:10			05:55		19:49 (SER8)
	17:23	17:59	18:30			20:01	20:31			20:53	39	20:28 (SER8)
16	07:43	07:16	06:35		18:09 (SER7)	06:46	06:09			05:55		19:49 (SER8)
	17:24	18:00	18:31	2	18:11 (SER7)	20:02	20:32			20:53	40	20:29 (SER8)
17	07:43	07:15	06:34		18:06 (SER7)	06:45	06:08			05:55		19:50 (SER8)
	17:25	18:01	18:32	5	18:11 (SER7)	20:03	20:32			20:54	39	20:29 (SER8)
18	07:42	07:14	06:32		18:04 (SER7)	06:43	06:08			05:55		19:50 (SER8)
	17:26	18:03	18:33	8	18:12 (SER7)	20:04	20:33			20:54	39	20:29 (SER8)
19	07:42	07:12	06:31		18:04 (SER7)	06:42	06:07			05:56		19:50 (SER8)
	17:27	18:04	18:34	10	18:14 (SER7)	20:05	20:34			20:54	39	20:29 (SER8)
20	07:41	07:11	06:29		18:02 (SER7)	06:41	06:06			05:56		19:50 (SER8)
	17:28	18:05	18:35	12	18:14 (SER7)	20:06	20:35			20:55	39	20:29 (SER8)
21	07:41	07:10	06:27		18:02 (SER7)	06:39	06:05		20:05 (SER8)	05:56		19:51 (SER8)
	17:30	18:06	18:36	14	18:16 (SER7)	20:07	20:36	2	20:07 (SER8)	20:55	39	20:30 (SER8)
22	07:40	07:08	06:26		18:02 (SER7)	06:38	06:04		20:01 (SER8)	05:56		19:51 (SER8)
	17:31	18:07	18:37	14	18:16 (SER7)	20:08	20:37	12	20:13 (SER8)	20:55	39	20:30 (SER8)
23	07:40	07:07	06:24		18:01 (SER7)	06:36	06:04		19:58 (SER8)	05:56		19:51 (SER8)
	17:32	18:08	18:38	16	18:17 (SER7)	20:09	20:38	16	20:14 (SER8)	20:55	39	20:30 (SER8)
24	07:39	07:06	06:22		18:02 (SER7)	06:35	06:03		19:56 (SER8)	05:57		19:51 (SER8)
	17:33	18:09	18:39	17	18:19 (SER7)	20:10	20:39	19	20:15 (SER8)	20:55	39	20:30 (SER8)
25	07:38	07:04	06:21		18:01 (SER7)	06:34	06:02		19:55 (SER8)	05:57		19:52 (SER8)
	17:34	18:10	18:40	18	18:19 (SER7)	20:11	20:40	21	20:16 (SER8)	20:56	39	20:31 (SER8)
26	07:38	07:03	06:19		18:01 (SER7)	06:32	06:02		19:54 (SER8)	05:57		19:52 (SER8)
	17:35	18:12	18:41	19	18:20 (SER7)	20:12	20:40	22	20:16 (SER8)	20:56	39	20:31 (SER8)
27	07:37	07:01	06:18		18:03 (SER7)	06:31	06:01		19:52 (SER8)	05:57		19:51 (SER8)
	17:37	18:13	18:42	18	18:21 (SER7)	20:13	20:41	25	20:17 (SER8)	20:56	39	20:30 (SER8)
28	07:36	07:00	06:16		18:03 (SER7)	06:30	06:00		19:52 (SER8)	05:58		19:52 (SER8)
	17:38	18:14	18:43	18	18:21 (SER7)	20:14	20:42	26	20:18 (SER8)	20:56	39	20:31 (SER8)
29	07:35		07:14		19:06 (SER7)	06:28	06:00		19:51 (SER8)	05:58		19:52 (SER8)
	17:39		19:44	13	19:19 (SER7)	20:15	20:43	27	20:18 (SER8)	20:56	39	20:31 (SER8)
30	07:34		07:13		19:08 (SER7)	06:27	05:59		19:51 (SER8)	05:59		19:53 (SER8)
	17:40		19:45	7	19:15 (SER7)	20:16	20:44	28	20:19 (SER8)	20:56	38	20:31 (SER8)
31	07:34		07:11				05:59		19:51 (SER8)			
	17:41		19:46				20:44	29	20:20 (SER8)			
Potential sun hours	301	299	370			397	445			448		
Total, worst case				191				227			1118	
Sun reduction				0,49				0,59			0,66	
Oper. time red.				0,91				0,91			0,91	
Wind dir. red.				0,78				0,77			0,77	
Total reduction				0,35				0,41			0,46	
Total, real				67				94			519	

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_09 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (9)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July			August	September			October	November	December
1	05:59		19:53 (SER8)	06:22	06:51			07:19	06:51	07:25
	20:56	38	20:31 (SER8)	20:38	19:57			19:08	17:23	17:00
2	06:00		19:54 (SER8)	06:23	06:52			07:20	06:52	07:26
	20:56	37	20:31 (SER8)	20:37	19:55			19:06	17:22	17:00
3	06:00		19:54 (SER8)	06:24	06:53			07:21	06:54	07:27
	20:55	37	20:31 (SER8)	20:36	19:53			19:05	17:21	17:00
4	06:01		19:55 (SER8)	06:25	06:54			07:22	06:55	07:28
	20:55	36	20:31 (SER8)	20:35	19:52			19:03	17:20	17:00
5	06:01		19:54 (SER8)	06:26	06:55			07:23	06:56	07:29
	20:55	36	20:30 (SER8)	20:34	19:50			19:01	17:19	16:59
6	06:02		19:55 (SER8)	06:27	06:56			07:24	06:57	07:30
	20:55	35	20:30 (SER8)	20:32	19:49			19:00	17:17	16:59
7	06:02		19:55 (SER8)	06:27	06:56			07:25	06:58	07:30
	20:55	35	20:30 (SER8)	20:31	19:47			18:58	17:16	16:59
8	06:03		19:56 (SER8)	06:28	06:57			07:26	06:59	07:31
	20:54	34	20:30 (SER8)	20:30	19:45			18:57	17:15	16:59
9	06:04		19:56 (SER8)	06:29	06:58			07:27	07:00	07:32
	20:54	33	20:29 (SER8)	20:29	19:44			18:55	17:14	16:59
10	06:04		19:57 (SER8)	06:30	06:59			07:28	07:02	07:33
	20:54	32	20:29 (SER8)	20:28	19:42			18:54	17:13	16:59
11	06:05		19:58 (SER8)	06:31	07:00			07:29	07:03	07:34
	20:53	31	20:29 (SER8)	20:26	19:41			18:52	17:12	16:59
12	06:06		19:58 (SER8)	06:32	07:01			07:30	07:04	07:35
	20:53	30	20:28 (SER8)	20:25	19:39			18:51	17:12	17:00
13	06:06		19:59 (SER8)	06:33	07:02		19:00 (SER7)	07:31	07:05	07:35
	20:52	29	20:28 (SER8)	20:24	19:37	5	19:05 (SER7)	18:49	17:11	17:00
14	06:07		20:00 (SER8)	06:34	07:03		18:56 (SER7)	07:32	07:06	07:36
	20:52	28	20:28 (SER8)	20:23	19:36	13	19:09 (SER7)	18:47	17:10	17:00
15	06:08		20:01 (SER8)	06:35	07:04		18:54 (SER7)	07:33	07:07	07:37
	20:51	26	20:27 (SER8)	20:21	19:34	17	19:11 (SER7)	18:46	17:09	17:00
16	06:08		20:01 (SER8)	06:36	07:05		18:52 (SER7)	07:34	07:08	07:38
	20:51	25	20:26 (SER8)	20:20	19:32	19	19:11 (SER7)	18:45	17:08	17:00
17	06:09		20:03 (SER8)	06:37	07:06		18:50 (SER7)	07:35	07:09	07:38
	20:50	23	20:26 (SER8)	20:19	19:31	18	19:08 (SER7)	18:43	17:07	17:01
18	06:10		20:04 (SER8)	06:38	07:07		18:49 (SER7)	07:36	07:11	07:39
	20:50	22	20:26 (SER8)	20:17	19:29	18	19:07 (SER7)	18:42	17:07	17:01
19	06:11		20:06 (SER8)	06:39	07:08		18:48 (SER7)	07:37	07:12	07:40
	20:49	19	20:25 (SER8)	20:16	19:27	17	19:05 (SER7)	18:40	17:06	17:01
20	06:12		20:06 (SER8)	06:40	07:09		18:47 (SER7)	07:38	07:13	07:40
	20:48	18	20:24 (SER8)	20:14	19:26	17	19:04 (SER7)	18:39	17:05	17:02
21	06:12		20:09 (SER8)	06:41	07:09		18:47 (SER7)	07:39	07:14	07:41
	20:47	14	20:23 (SER8)	20:13	19:24	15	19:02 (SER7)	18:37	17:05	17:02
22	06:13		20:12 (SER8)	06:42	07:10		18:47 (SER7)	07:40	07:15	07:41
	20:47	9	20:21 (SER8)	20:12	19:23	14	19:01 (SER7)	18:36	17:04	17:03
23	06:14			06:42	07:11		18:47 (SER7)	07:41	07:16	07:42
	20:46			20:10	19:21	12	18:59 (SER7)	18:35	17:03	17:03
24	06:15			06:43	07:12		18:47 (SER7)	07:42	07:17	07:42
	20:45			20:09	19:19	10	18:57 (SER7)	18:33	17:03	17:04
25	06:16			06:44	07:13		18:47 (SER7)	06:44	07:18	07:43
	20:44			20:07	19:18	9	18:56 (SER7)	17:32	17:02	17:04
26	06:17			06:45	07:14		18:48 (SER7)	06:45	07:19	07:43
	20:43			20:06	19:16	6	18:54 (SER7)	17:31	17:02	17:05
27	06:17			06:46	07:15		18:49 (SER7)	06:46	07:21	07:43
	20:43			20:04	19:14	4	18:53 (SER7)	17:29	17:02	17:06
28	06:18			06:47	07:16			06:47	07:22	07:44
	20:42			20:03	19:13			17:28	17:01	17:06
29	06:19			06:48	07:17			06:48	07:23	07:44
	20:41			20:01	19:11			17:27	17:01	17:07
30	06:20			06:49	07:18			06:49	07:24	07:44
	20:40			20:00	19:09			17:25	17:00	17:08
31	06:21			06:50				06:50		07:45
	20:39			19:58				17:24		17:08
Potential sun hours	455			425	374			347	301	292
Total, worst case		627				194				
Sun reduction		0,74				0,65				
Oper. time red.		0,91				0,91				
Wind dir. red.		0,77				0,78				
Total reduction		0,52				0,46				
Total, real		324				89				

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_10 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (10)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March			April	May			June		
1	07:45	07:33	06:58			07:10	06:26			05:58		19:42 (SER8)
	17:10	17:43	18:15			19:47	20:17			20:45	38	20:20 (SER8)
2	07:45	07:32	06:57			07:08	06:24			05:58		19:42 (SER8)
	17:10	17:44	18:16			19:48	20:18			20:46	39	20:21 (SER8)
3	07:45	07:31	06:55			07:06	06:23			05:58		19:42 (SER8)
	17:11	17:45	18:17			19:49	20:19			20:46	40	20:22 (SER8)
4	07:45	07:30	06:54			07:05	06:22			05:57		19:41 (SER8)
	17:12	17:46	18:18			19:50	20:20			20:47	41	20:22 (SER8)
5	07:45	07:29	06:52			07:03	06:21			05:57		19:42 (SER8)
	17:13	17:47	18:19			19:51	20:21			20:48	41	20:23 (SER8)
6	07:45	07:28	06:51			07:02	06:20			05:57		19:42 (SER8)
	17:14	17:48	18:20			19:52	20:22			20:48	42	20:24 (SER8)
7	07:45	07:27	06:49			07:00	06:19			05:56		19:41 (SER8)
	17:15	17:50	18:21			19:53	20:23			20:49	43	20:24 (SER8)
8	07:45	07:26	06:48			06:59	06:17			05:56		19:41 (SER8)
	17:16	17:51	18:22			19:54	20:24			20:50	44	20:25 (SER8)
9	07:45	07:25	06:46			06:57	06:16			05:56		19:42 (SER8)
	17:17	17:52	18:24			19:55	20:25			20:50	43	20:25 (SER8)
10	07:45	07:23	06:45			06:55	06:15			05:56		19:42 (SER8)
	17:18	17:53	18:25			19:56	20:26			20:51	44	20:26 (SER8)
11	07:45	07:22	06:43			06:54	06:14			05:55		19:42 (SER8)
	17:19	17:54	18:26			19:57	20:27			20:51	45	20:27 (SER8)
12	07:44	07:21	06:42			06:52	06:13			05:55		19:42 (SER8)
	17:20	17:56	18:27			19:58	20:28			20:52	45	20:27 (SER8)
13	07:44	07:20	06:40			06:51	06:12			05:55		19:43 (SER8)
	17:21	17:57	18:28			19:59	20:29			20:52	45	20:28 (SER8)
14	07:44	07:19	06:38		18:06 (SER7)	06:49	06:11			05:55		19:43 (SER8)
	17:22	17:58	18:29	2	18:08 (SER7)	20:00	20:30			20:53	45	20:28 (SER8)
15	07:43	07:18	06:37		18:04 (SER7)	06:48	06:10			05:55		19:43 (SER8)
	17:23	17:59	18:30	5	18:09 (SER7)	20:01	20:31			20:53	45	20:28 (SER8)
16	07:43	07:16	06:35		18:03 (SER7)	06:46	06:09		19:56 (SER8)	05:55		19:43 (SER8)
	17:24	18:00	18:31	8	18:11 (SER7)	20:02	20:32	10	20:06 (SER8)	20:53	45	20:28 (SER8)
17	07:43	07:15	06:34		18:01 (SER7)	06:45	06:08		19:53 (SER8)	05:55		19:43 (SER8)
	17:25	18:01	18:32	10	18:11 (SER7)	20:03	20:32	16	20:09 (SER8)	20:54	45	20:28 (SER8)
18	07:42	07:14	06:32		18:00 (SER7)	06:43	06:08		19:50 (SER8)	05:55		19:43 (SER8)
	17:26	18:03	18:33	12	18:12 (SER7)	20:04	20:33	19	20:09 (SER8)	20:54	46	20:29 (SER8)
19	07:42	07:12	06:31		18:00 (SER7)	06:42	06:07		19:50 (SER8)	05:56		19:43 (SER8)
	17:27	18:04	18:34	14	18:14 (SER7)	20:05	20:34	21	20:11 (SER8)	20:54	46	20:29 (SER8)
20	07:41	07:11	06:29		17:59 (SER7)	06:41	06:06		19:48 (SER8)	05:56		19:43 (SER8)
	17:28	18:05	18:35	15	18:14 (SER7)	20:06	20:35	24	20:12 (SER8)	20:55	46	20:29 (SER8)
21	07:41	07:10	06:27		18:00 (SER7)	06:39	06:05		19:47 (SER8)	05:56		19:44 (SER8)
	17:30	18:06	18:36	16	18:16 (SER7)	20:07	20:36	25	20:12 (SER8)	20:55	46	20:30 (SER8)
22	07:40	07:08	06:26		17:59 (SER7)	06:38	06:04		19:46 (SER8)	05:56		19:44 (SER8)
	17:31	18:07	18:37	17	18:16 (SER7)	20:08	20:37	28	20:14 (SER8)	20:55	46	20:30 (SER8)
23	07:40	07:07	06:24		17:59 (SER7)	06:36	06:04		19:45 (SER8)	05:56		19:44 (SER8)
	17:32	18:08	18:38	18	18:17 (SER7)	20:09	20:38	29	20:14 (SER8)	20:55	46	20:30 (SER8)
24	07:39	07:06	06:22		18:00 (SER7)	06:35	06:03		19:44 (SER8)	05:57		19:44 (SER8)
	17:33	18:09	18:39	19	18:19 (SER7)	20:10	20:39	31	20:15 (SER8)	20:55	46	20:30 (SER8)
25	07:38	07:04	06:21		18:00 (SER7)	06:34	06:02		19:44 (SER8)	05:57		19:45 (SER8)
	17:34	18:10	18:40	19	18:19 (SER7)	20:11	20:40	32	20:16 (SER8)	20:56	45	20:30 (SER8)
26	07:38	07:03	06:19		18:01 (SER7)	06:32	06:02		19:43 (SER8)	05:57		19:45 (SER8)
	17:35	18:12	18:41	17	18:18 (SER7)	20:12	20:40	33	20:16 (SER8)	20:56	45	20:30 (SER8)
27	07:37	07:01	06:18		18:03 (SER7)	06:31	06:01		19:43 (SER8)	05:57		19:45 (SER8)
	17:37	18:13	18:42	13	18:16 (SER7)	20:13	20:41	34	20:17 (SER8)	20:56	45	20:30 (SER8)
28	07:36	07:00	06:16		18:07 (SER7)	06:30	06:00		19:43 (SER8)	05:58		19:46 (SER8)
	17:38	18:14	18:43	5	18:12 (SER7)	20:14	20:42	35	20:18 (SER8)	20:56	45	20:31 (SER8)
29	07:35		07:14			06:28	06:00		19:42 (SER8)	05:58		19:46 (SER8)
	17:39		19:44			20:15	20:43	36	20:18 (SER8)	20:56	45	20:31 (SER8)
30	07:34		07:13			06:27	05:59		19:42 (SER8)	05:59		19:46 (SER8)
	17:40		19:45			20:16	20:44	37	20:19 (SER8)	20:56	45	20:31 (SER8)
31	07:34		07:11				05:59		19:42 (SER8)			
	17:41		19:46				20:44	38	20:20 (SER8)			
Potential sun hours	301	299	370			397	445			448		
Total, worst case				190				448			1322	
Sun reduction				0,49				0,59			0,66	
Oper. time red.				0,91				0,91			0,91	
Wind dir. red.				0,78				0,78			0,78	
Total reduction				0,35				0,41			0,47	
Total, real				66				186			616	

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_10 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (10)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July			August	September			October	November	December
1	05:59		19:46 (SER8)	06:22	06:51			07:19	06:51	07:25
	20:56	45	20:31 (SER8)	20:38	19:57			19:08	17:23	17:00
2	06:00		19:47 (SER8)	06:23	06:52			07:20	06:52	07:26
	20:56	44	20:31 (SER8)	20:37	19:55			19:06	17:22	17:00
3	06:00		19:47 (SER8)	06:24	06:53			07:21	06:54	07:27
	20:55	44	20:31 (SER8)	20:36	19:53			19:05	17:21	17:00
4	06:01		19:48 (SER8)	06:25	06:54			07:22	06:55	07:28
	20:55	43	20:31 (SER8)	20:35	19:52			19:03	17:20	17:00
5	06:01		19:47 (SER8)	06:26	06:55			07:23	06:56	07:29
	20:55	43	20:30 (SER8)	20:34	19:50			19:01	17:19	16:59
6	06:02		19:48 (SER8)	06:27	06:56			07:24	06:57	07:30
	20:55	42	20:30 (SER8)	20:32	19:49			19:00	17:17	16:59
7	06:02		19:48 (SER8)	06:27	06:56			07:25	06:58	07:30
	20:55	42	20:30 (SER8)	20:31	19:47			18:58	17:16	16:59
8	06:03		19:49 (SER8)	06:28	06:57			07:26	06:59	07:31
	20:54	41	20:30 (SER8)	20:30	19:45			18:57	17:15	16:59
9	06:04		19:48 (SER8)	06:29	06:58			07:27	07:00	07:32
	20:54	41	20:29 (SER8)	20:29	19:44			18:55	17:14	16:59
10	06:04		19:49 (SER8)	06:30	06:59			07:28	07:02	07:33
	20:54	40	20:29 (SER8)	20:28	19:42			18:54	17:13	16:59
11	06:05		19:50 (SER8)	06:31	07:00			07:29	07:03	07:34
	20:53	39	20:29 (SER8)	20:26	19:41			18:52	17:12	16:59
12	06:06		19:49 (SER8)	06:32	07:01			07:30	07:04	07:35
	20:53	39	20:28 (SER8)	20:25	19:39			18:51	17:12	17:00
13	06:06		19:50 (SER8)	06:33	07:02			07:31	07:05	07:35
	20:52	38	20:28 (SER8)	20:24	19:37			18:49	17:11	17:00
14	06:07		19:51 (SER8)	06:34	07:03			07:32	07:06	07:36
	20:52	37	20:28 (SER8)	20:23	19:36			18:47	17:10	17:00
15	06:08		19:52 (SER8)	06:35	07:04			07:33	07:07	07:37
	20:51	35	20:27 (SER8)	20:21	19:34			18:46	17:09	17:00
16	06:08		19:52 (SER8)	06:36	07:05		18:53 (SER7)	07:34	07:08	07:38
	20:51	34	20:26 (SER8)	20:20	19:32	12	19:05 (SER7)	18:45	17:08	17:00
17	06:09		19:52 (SER8)	06:37	07:06		18:50 (SER7)	07:35	07:09	07:38
	20:50	34	20:26 (SER8)	20:19	19:31	16	19:06 (SER7)	18:43	17:07	17:01
18	06:10		19:53 (SER8)	06:38	07:07		18:48 (SER7)	07:36	07:11	07:39
	20:50	33	20:26 (SER8)	20:17	19:29	19	19:07 (SER7)	18:42	17:07	17:01
19	06:11		19:54 (SER8)	06:39	07:08		18:47 (SER7)	07:37	07:12	07:40
	20:49	31	20:25 (SER8)	20:16	19:27	18	19:05 (SER7)	18:40	17:06	17:01
20	06:12		19:54 (SER8)	06:40	07:09		18:46 (SER7)	07:38	07:13	07:40
	20:48	30	20:24 (SER8)	20:14	19:26	18	19:04 (SER7)	18:39	17:05	17:02
21	06:12		19:55 (SER8)	06:41	07:09		18:45 (SER7)	07:39	07:14	07:41
	20:47	28	20:23 (SER8)	20:13	19:24	17	19:02 (SER7)	18:37	17:05	17:02
22	06:13		19:57 (SER8)	06:42	07:10		18:44 (SER7)	07:40	07:15	07:41
	20:47	26	20:23 (SER8)	20:12	19:23	17	19:01 (SER7)	18:36	17:04	17:03
23	06:14		19:58 (SER8)	06:42	07:11		18:44 (SER7)	07:41	07:16	07:42
	20:46	24	20:22 (SER8)	20:10	19:21	15	18:59 (SER7)	18:35	17:03	17:03
24	06:15		19:59 (SER8)	06:43	07:12		18:43 (SER7)	07:42	07:17	07:42
	20:45	23	20:22 (SER8)	20:09	19:19	14	18:57 (SER7)	18:33	17:03	17:04
25	06:16		20:00 (SER8)	06:44	07:13		18:43 (SER7)	06:44	07:18	07:43
	20:44	20	20:20 (SER8)	20:07	19:18	13	18:56 (SER7)	17:32	17:02	17:04
26	06:17		20:02 (SER8)	06:45	07:14		18:44 (SER7)	06:45	07:19	07:43
	20:43	18	20:20 (SER8)	20:06	19:16	10	18:54 (SER7)	17:31	17:02	17:05
27	06:17		20:05 (SER8)	06:46	07:15		18:44 (SER7)	06:46	07:21	07:43
	20:43	14	20:19 (SER8)	20:04	19:14	9	18:53 (SER7)	17:29	17:02	17:06
28	06:18		20:09 (SER8)	06:47	07:16		18:45 (SER7)	06:47	07:22	07:44
	20:42	6	20:15 (SER8)	20:03	19:13	6	18:51 (SER7)	17:28	17:01	17:06
29	06:19			06:48	07:17		18:46 (SER7)	06:48	07:23	07:44
	20:41			20:01	19:11	3	18:49 (SER7)	17:27	17:01	17:07
30	06:20			06:49	07:18			06:49	07:24	07:44
	20:40			20:00	19:09			17:25	17:00	17:08
31	06:21			06:50				06:50		07:45
	20:39			19:58				17:24		17:08
Potential sun hours	455			425	374			347	301	292
Total, worst case		934				187				
Sun reduction		0,74				0,65				
Oper. time red.		0,91				0,91				
Wind dir. red.		0,78				0,78				
Total reduction		0,52				0,46				
Total, real		485				86				

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

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

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SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_11 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (11)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:45	07:33	06:59	07:10	06:26	05:59	05:59	06:22	06:51	07:19	06:52	07:25
	17:10	17:43	18:15	19:47	20:17	20:45	20:56	20:38	19:57	19:08	17:23	17:00
2	07:45	07:32	06:57	07:08	06:25	05:58	06:00	06:23	06:52	07:20	06:53	07:26
	17:11	17:44	18:16	19:48	20:18	20:46	20:56	20:37	19:55	19:06	17:22	17:00
3	07:45	07:31	06:56	07:07	06:23	05:58	06:00	06:24	06:53	07:21	06:54	07:27
	17:11	17:45	18:17	19:49	20:19	20:47	20:56	20:36	19:54	19:05	17:21	17:00
4	07:45	07:30	06:54	07:05	06:22	05:57	06:01	06:25	06:54	07:22	06:55	07:28
	17:12	17:46	18:18	19:50	20:20	20:47	20:56	20:35	19:52	19:03	17:20	17:00
5	07:45	07:29	06:53	07:03	06:21	05:57	06:01	06:26	06:55	07:23	06:56	07:29
	17:13	17:47	18:19	19:51	20:21	20:48	20:55	20:34	19:50	19:02	17:19	17:00
6	07:45	07:28	06:51	07:02	06:20	05:57	06:02	06:27	06:56	07:24	06:57	07:30
	17:14	17:49	18:21	19:52	20:22	20:49	20:55	20:33	19:49	19:00	17:18	17:00
7	07:45	07:27	06:50	07:00	06:19	05:56	06:02	06:28	06:57	07:25	06:58	07:31
	17:15	17:50	18:22	19:53	20:23	20:49	20:55	20:31	19:47	18:58	17:17	16:59
8	07:45	07:26	06:48	06:59	06:18	05:56	06:03	06:29	06:58	07:26	06:59	07:32
	17:16	17:51	18:23	19:54	20:24	20:50	20:55	20:30	19:46	18:57	17:16	16:59
9	07:45	07:25	06:47	06:57	06:16	05:56	06:04	06:30	06:59	07:27	07:01	07:32
	17:17	17:52	18:24	19:55	20:25	20:50	20:54	20:29	19:44	18:55	17:15	16:59
10	07:45	07:24	06:45	06:56	06:15	05:56	06:04	06:30	06:59	07:28	07:02	07:33
	17:18	17:53	18:25	19:56	20:26	20:51	20:54	20:28	19:42	18:54	17:14	16:59
11	07:45	07:23	06:43	06:54	06:14	05:56	06:05	06:31	07:00	07:29	07:03	07:34
	17:19	17:55	18:26	19:57	20:27	20:51	20:53	20:27	19:41	18:52	17:13	17:00
12	07:45	07:21	06:42	06:53	06:13	05:56	06:06	06:32	07:01	07:30	07:04	07:35
	17:20	17:56	18:27	19:58	20:28	20:52	20:53	20:25	19:39	18:51	17:12	17:00
13	07:44	07:20	06:40	06:51	06:12	05:56	06:06	06:33	07:02	07:31	07:05	07:36
	17:21	17:57	18:28	19:59	20:29	20:52	20:53	20:24	19:38	18:49	17:11	17:00
14	07:44	07:19	06:39	06:50	06:11	05:55	06:07	06:34	07:03	07:32	07:06	07:36
	17:22	17:58	18:29	20:00	20:30	20:53	20:52	20:23	19:36	18:48	17:10	17:00
15	07:44	07:18	06:37	06:48	06:10	05:55	06:08	06:35	07:04	07:33	07:07	07:37
	17:23	17:59	18:30	20:01	20:31	20:53	20:52	20:21	19:34	18:46	17:09	17:00
16	07:43	07:16	06:36	06:47	06:09	05:55	06:09	06:36	07:05	07:34	07:09	07:38
	17:24	18:00	18:31	20:02	20:32	20:54	20:51	20:20	19:33	18:45	17:08	17:01
17	07:43	07:15	06:34	06:45	06:09	05:56	06:09	06:37	07:06	07:35	07:10	07:39
	17:25	18:02	18:32	20:03	20:33	20:54	20:50	20:19	19:31	18:43	17:08	17:01
18	07:43	07:14	06:32	06:44	06:08	05:56	06:10	06:38	07:07	07:36	07:11	07:39
	17:26	18:03	18:33	20:04	20:34	20:54	20:50	20:17	19:29	18:42	17:07	17:01
19	07:42	07:13	06:31	06:42	06:07	05:56	06:11	06:39	07:08	07:37	07:12	07:40
	17:28	18:04	18:34	20:05	20:35	20:55	20:49	20:16	19:28	18:40	17:06	17:02
20	07:42	07:11	06:29	06:41	06:06	05:56	06:12	06:40	07:09	07:38	07:13	07:40
	17:29	18:05	18:35	20:06	20:35	20:55	20:48	20:15	19:26	18:39	17:05	17:02
21	07:41	07:10	06:28	06:39	06:05	05:56	06:13	06:41	07:10	07:39	07:14	07:41
	17:30	18:06	18:36	20:07	20:36	20:55	20:48	20:13	19:24	18:38	17:05	17:02
22	07:40	07:09	06:26	06:38	06:04	05:56	06:13	06:42	07:11	07:41	07:15	07:42
	17:31	18:07	18:37	20:08	20:37	20:55	20:47	20:12	19:23	18:36	17:04	17:03
23	07:40	07:07	06:24	06:36	06:04	05:56	06:14	06:43	07:12	07:42	07:16	07:42
	17:32	18:08	18:38	20:09	20:38	20:56	20:46	20:10	19:21	18:35	17:04	17:03
24	07:39	07:06	06:23	06:35	06:03	05:57	06:15	06:44	07:13	07:43	07:18	07:42
	17:33	18:10	18:39	20:10	20:39	20:56	20:45	20:09	19:19	18:33	17:03	17:04
25	07:38	07:04	06:21	06:34	06:02	05:57	06:16	06:45	07:13	06:44	07:19	07:43
	17:34	18:11	18:40	20:11	20:40	20:56	20:45	20:07	19:18	17:32	17:03	17:05
26	07:38	07:03	06:19	06:32	06:02	05:57	06:17	06:45	07:14	06:45	07:20	07:43
	17:36	18:12	18:41	20:12	20:41	20:56	20:44	20:06	19:16	17:31	17:02	17:05
27	07:37	07:02	06:18	06:31	06:01	05:58	06:18	06:46	07:15	06:46	07:21	07:44
	17:37	18:13	18:42	20:13	20:41	20:56	20:43	20:04	19:15	17:29	17:02	17:06
28	07:36	07:00	06:16	06:30	06:01	05:58	06:19	06:47	07:16	06:47	07:22	07:44
	17:38	18:14	18:43	20:14	20:42	20:56	20:42	20:03	19:13	17:28	17:01	17:06
29	07:35		07:15	06:28	06:00	05:58	06:19	06:48	07:17	06:48	07:23	07:44
	17:39		19:44	20:15	20:43	20:56	20:41	20:01	19:11	17:27	17:01	17:07
30	07:35		07:13	06:27	05:59	05:59	06:20	06:49	07:18	06:49	07:24	07:45
	17:40		19:45	20:16	20:44	20:56	20:40	20:00	19:10	17:26	17:01	17:08
31	07:34		07:11		05:59		06:21	06:50		06:50		07:45
	17:42		19:46		20:45		20:39	19:58		17:24		17:09
Potential sun hours	301	299	370	397	445	448	455	425	374	347	301	292
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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_12 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (12)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:45	07:33	06:59	07:10	06:26	05:59	05:59	06:22	06:51	07:19	06:52	07:25
	17:10	17:43	18:15	19:47	20:17	20:45	20:56	20:38	19:57	19:08	17:23	17:00
2	07:45	07:32	06:57	07:08	06:25	05:58	06:00	06:23	06:52	07:20	06:53	07:26
	17:11	17:44	18:16	19:48	20:18	20:46	20:56	20:37	19:55	19:06	17:22	17:00
3	07:45	07:31	06:56	07:07	06:23	05:58	06:00	06:24	06:53	07:21	06:54	07:27
	17:11	17:45	18:17	19:49	20:19	20:47	20:56	20:36	19:54	19:05	17:21	17:00
4	07:45	07:30	06:54	07:05	06:22	05:57	06:01	06:25	06:54	07:22	06:55	07:28
	17:12	17:46	18:18	19:50	20:20	20:47	20:55	20:35	19:52	19:03	17:20	17:00
5	07:45	07:29	06:53	07:03	06:21	05:57	06:01	06:26	06:55	07:23	06:56	07:29
	17:13	17:47	18:19	19:51	20:21	20:48	20:55	20:34	19:50	19:02	17:19	17:00
6	07:45	07:28	06:51	07:02	06:20	05:57	06:02	06:27	06:56	07:24	06:57	07:30
	17:14	17:49	18:21	19:52	20:22	20:49	20:55	20:33	19:49	19:00	17:18	17:00
7	07:45	07:27	06:50	07:00	06:19	05:56	06:02	06:28	06:57	07:25	06:58	07:31
	17:15	17:50	18:22	19:53	20:23	20:49	20:55	20:31	19:47	18:58	17:17	16:59
8	07:45	07:26	06:48	06:59	06:18	05:56	06:03	06:29	06:58	07:26	06:59	07:32
	17:16	17:51	18:23	19:54	20:24	20:50	20:54	20:30	19:46	18:57	17:16	16:59
9	07:45	07:25	06:47	06:57	06:16	05:56	06:04	06:30	06:59	07:27	07:01	07:32
	17:17	17:52	18:24	19:55	20:25	20:50	20:54	20:29	19:44	18:55	17:15	16:59
10	07:45	07:24	06:45	06:56	06:15	05:56	06:04	06:30	06:59	07:28	07:02	07:33
	17:18	17:53	18:25	19:56	20:26	20:51	20:54	20:28	19:42	18:54	17:14	16:59
11	07:45	07:23	06:43	06:54	06:14	05:56	06:05	06:31	07:00	07:29	07:03	07:34
	17:19	17:55	18:26	19:57	20:27	20:51	20:53	20:27	19:41	18:52	17:13	17:00
12	07:45	07:21	06:42	06:53	06:13	05:56	06:06	06:32	07:01	07:30	07:04	07:35
	17:20	17:56	18:27	19:58	20:28	20:52	20:53	20:25	19:39	18:51	17:12	17:00
13	07:44	07:20	06:40	06:51	06:12	05:55	06:06	06:33	07:02	07:31	07:05	07:36
	17:21	17:57	18:28	19:59	20:29	20:52	20:53	20:24	19:37	18:49	17:11	17:00
14	07:44	07:19	06:39	06:50	06:11	05:55	06:07	06:34	07:03	07:32	07:06	07:36
	17:22	17:58	18:29	20:00	20:30	20:53	20:52	20:23	19:36	18:48	17:10	17:00
15	07:44	07:18	06:37	06:48	06:10	05:55	06:08	06:35	07:04	07:33	07:07	07:37
	17:23	17:59	18:30	20:01	20:31	20:53	20:51	20:21	19:34	18:46	17:09	17:00
16	07:43	07:16	06:36	06:47	06:09	05:55	06:09	06:36	07:05	07:34	07:09	07:38
	17:24	18:00	18:31	20:02	20:32	20:54	20:51	20:20	19:33	18:45	17:08	17:01
17	07:43	07:15	06:34	06:45	06:09	05:56	06:09	06:37	07:06	07:35	07:10	07:39
	17:25	18:02	18:32	20:03	20:33	20:54	20:50	20:19	19:31	18:43	17:08	17:01
18	07:42	07:14	06:32	06:44	06:08	05:56	06:10	06:38	07:07	07:36	07:11	07:39
	17:26	18:03	18:33	20:04	20:34	20:54	20:50	20:17	19:29	18:42	17:07	17:01
19	07:42	07:13	06:31	06:42	06:07	05:56	06:11	06:39	07:08	07:37	07:12	07:40
	17:28	18:04	18:34	20:05	20:35	20:55	20:49	20:16	19:28	18:40	17:06	17:02
20	07:41	07:11	06:29	06:41	06:06	05:56	06:12	06:40	07:09	07:38	07:13	07:40
	17:29	18:05	18:35	20:06	20:35	20:55	20:48	20:15	19:26	18:39	17:05	17:02
21	07:41	07:10	06:27	06:39	06:05	05:56	06:13	06:41	07:10	07:39	07:14	07:41
	17:30	18:06	18:36	20:07	20:36	20:55	20:48	20:13	19:24	18:38	17:05	17:02
22	07:40	07:09	06:26	06:38	06:04	05:56	06:13	06:42	07:11	07:41	07:15	07:41
	17:31	18:07	18:37	20:08	20:37	20:55	20:47	20:12	19:23	18:36	17:04	17:03
23	07:40	07:07	06:24	06:36	06:04	05:56	06:14	06:43	07:12	07:42	07:16	07:42
	17:32	18:08	18:38	20:09	20:38	20:56	20:46	20:10	19:21	18:35	17:04	17:03
24	07:39	07:06	06:23	06:35	06:03	05:57	06:15	06:44	07:13	07:43	07:17	07:42
	17:33	18:10	18:39	20:10	20:39	20:56	20:45	20:09	19:19	18:33	17:03	17:04
25	07:38	07:04	06:21	06:34	06:02	05:57	06:16	06:45	07:13	06:44	07:19	07:43
	17:34	18:11	18:40	20:11	20:40	20:56	20:45	20:07	19:18	17:32	17:03	17:05
26	07:38	07:03	06:19	06:32	06:02	05:57	06:17	06:45	07:14	06:45	07:20	07:43
	17:36	18:12	18:41	20:12	20:41	20:56	20:44	20:06	19:16	17:31	17:02	17:05
27	07:37	07:02	06:18	06:31	06:01	05:58	06:18	06:46	07:15	06:46	07:21	07:44
	17:37	18:13	18:42	20:13	20:41	20:56	20:43	20:04	19:15	17:29	17:02	17:06
28	07:36	07:00	06:16	06:30	06:01	05:58	06:19	06:47	07:16	06:47	07:22	07:44
	17:38	18:14	18:43	20:14	20:42	20:56	20:42	20:03	19:13	17:28	17:01	17:06
29	07:35		07:15	06:28	06:00	05:58	06:19	06:48	07:17	06:48	07:23	07:44
	17:39		19:44	20:15	20:43	20:56	20:41	20:01	19:11	17:27	17:01	17:07
30	07:35		07:13	06:27	05:59	05:59	06:20	06:49	07:18	06:49	07:24	07:45
	17:40		19:45	20:16	20:44	20:56	20:40	20:00	19:10	17:26	17:01	17:08
31	07:34		07:11		05:59		06:21	06:50		06:50		07:45
	17:42		19:46		20:44		20:39	19:58		17:24		17:09
Potential sun hours	301	299	370	397	445	448	455	425	374	347	301	292
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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_13 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (13)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April	May	June	July	August	September		October		November	December
1	07:45	07:33		06:59		07:18 (SER1)	07:10	06:26	05:59	05:59	06:22	06:51	07:19		07:39 (SER2)	06:52	07:25
	17:10	17:43		18:15	44	08:02 (SER1)	19:47	20:17	20:45	20:56	20:38	19:57	19:08	56	08:41 (SER1)	17:23	17:00
2	07:45	07:32		06:57		07:17 (SER1)	07:08	06:25	05:58	06:00	06:23	06:52	07:20		07:40 (SER2)	06:53	07:26
	17:11	17:44		18:16	46	08:03 (SER1)	19:48	20:18	20:46	20:56	20:37	19:55	19:06	54	08:41 (SER1)	17:22	17:00
3	07:45	07:31		06:56		07:16 (SER1)	07:07	06:23	05:58	06:00	06:24	06:53	07:21		07:41 (SER2)	06:54	07:27
	17:11	17:45		18:17	47	08:03 (SER1)	19:49	20:19	20:47	20:56	20:36	19:54	19:05	53	08:41 (SER1)	17:21	17:00
4	07:45	07:30		06:54		07:16 (SER1)	07:05	06:22	05:57	06:01	06:25	06:54	07:22		07:51 (SER1)	06:55	07:28
	17:12	17:46		18:18	48	08:04 (SER1)	19:50	20:20	20:47	20:56	20:35	19:52	19:03	50	08:41 (SER1)	17:20	17:00
5	07:45	07:29		06:53		07:15 (SER1)	07:04	06:21	05:57	06:01	06:26	06:55	07:23		07:51 (SER1)	06:56	07:29
	17:13	17:48		18:20	48	08:03 (SER1)	19:51	20:21	20:48	20:55	20:34	19:50	19:02	49	08:40 (SER1)	17:19	17:00
6	07:45	07:28		06:51		07:15 (SER1)	07:02	06:20	05:57	06:02	06:27	06:56	07:24		07:50 (SER1)	06:57	07:30
	17:14	17:49		18:21	49	08:04 (SER1)	19:52	20:22	20:49	20:55	20:33	19:49	19:00	50	08:40 (SER1)	17:18	17:00
7	07:45	07:27		06:50		07:14 (SER1)	07:00	06:19	05:56	06:03	06:28	06:57	07:25		07:50 (SER1)	06:58	07:31
	17:15	17:50		18:22	49	08:03 (SER1)	19:53	20:23	20:49	20:55	20:32	19:47	18:59	50	08:40 (SER1)	17:17	17:00
8	07:45	07:26		06:48		07:14 (SER1)	06:59	06:18	05:56	06:03	06:29	06:58	07:26		07:50 (SER1)	07:00	07:32
	17:16	17:51		18:23	50	08:04 (SER1)	19:54	20:24	20:50	20:55	20:30	19:46	18:57	49	08:39 (SER1)	17:16	16:59
9	07:45	07:25		06:47		07:13 (SER1)	06:57	06:17	05:56	06:04	06:30	06:59	07:27		07:50 (SER1)	07:01	07:33
	17:17	17:52		18:24	50	08:03 (SER1)	19:55	20:25	20:50	20:54	20:29	19:44	18:55	48	08:38 (SER1)	17:15	16:59
10	07:45	07:24		06:45		07:03 (SER2)	06:56	06:15	05:56	06:04	06:31	07:00	07:28		07:50 (SER1)	07:02	07:33
	17:18	17:53		18:25	51	08:02 (SER1)	19:56	20:26	20:51	20:54	20:28	19:42	18:54	48	08:38 (SER1)	17:14	17:00
11	07:45	07:23		06:43		07:02 (SER2)	06:54	06:14	05:56	06:05	06:31	07:00	07:29		07:51 (SER1)	07:03	07:34
	17:19	17:55		18:26	53	08:02 (SER1)	19:57	20:27	20:52	20:54	20:27	19:41	18:52	46	08:37 (SER1)	17:13	17:00
12	07:45	07:21		06:42		07:00 (SER2)	06:53	06:13	05:56	06:06	06:32	07:01	07:30		07:51 (SER1)	07:04	07:35
	17:20	17:56		18:27	54	08:01 (SER1)	19:58	20:28	20:52	20:53	20:25	19:39	18:51	45	08:36 (SER1)	17:12	17:00
13	07:44	07:20		06:40		06:59 (SER2)	06:51	06:12	05:56	06:06	06:33	07:02	07:31		07:52 (SER1)	07:05	07:36
	17:21	17:57		18:28	56	08:01 (SER1)	19:59	20:29	20:53	20:53	20:24	19:38	18:49	43	08:35 (SER1)	17:11	17:00
14	07:44	07:19		06:39		06:57 (SER2)	06:50	06:11	05:56	06:07	06:34	07:03	07:32		07:52 (SER1)	07:06	07:37
	17:22	17:58		18:29	56	08:00 (SER1)	20:00	20:30	20:53	20:52	20:23	19:36	18:48	42	08:34 (SER1)	17:10	17:00
15	07:44	07:18		06:37		06:55 (SER2)	06:48	06:10	05:55	06:08	06:35	07:04	07:33		07:53 (SER1)	07:08	07:37
	17:23	17:59		18:30	57	07:59 (SER1)	20:01	20:31	20:53	20:52	20:22	19:34	18:46	39	08:32 (SER1)	17:09	17:00
16	07:43	07:17		06:36		06:54 (SER2)	06:47	06:10	05:56	06:09	06:36	07:05	07:34		07:54 (SER1)	07:09	07:38
	17:24	18:01		18:31	56	07:58 (SER1)	20:02	20:32	20:54	20:51	20:20	19:33	18:45	36	08:30 (SER1)	17:08	17:01
17	07:43	07:15		06:34		06:52 (SER2)	06:45	06:09	05:56	06:09	06:37	07:06	07:35		07:55 (SER1)	07:10	07:39
	17:25	18:02		18:32	55	07:57 (SER1)	20:03	20:33	20:54	20:50	20:19	19:31	18:43	34	08:29 (SER1)	17:08	17:01
18	07:43	07:14		06:32		06:51 (SER2)	06:44	06:08	05:56	06:10	06:38	07:07	07:36		07:57 (SER1)	07:11	07:39
	17:26	18:03		18:33	53	07:56 (SER1)	20:04	20:34	20:54	20:50	20:17	19:29	18:42	30	08:27 (SER1)	17:07	17:01
19	07:42	07:13		06:31		06:49 (SER2)	06:42	06:07	05:56	06:11	06:39	07:08	08:15 (SER1)		07:37	08:00 (SER1)	07:12	07:40
	17:28	18:04		18:34	51	07:54 (SER1)	20:05	20:35	20:55	20:49	20:16	19:28	11	08:26 (SER1)	18:40	25	08:25 (SER1)	17:06	17:02
20	07:42	07:11		06:29		06:49 (SER2)	06:41	06:06	05:56	06:12	06:40	07:09	08:10 (SER1)		07:38	08:03 (SER1)	07:13	07:41
	17:29	18:05		18:35	45	07:52 (SER1)	20:06	20:36	20:55	20:49	20:15	19:26	20	08:30 (SER1)	18:39	19	08:22 (SER1)	17:06	17:02
21	07:41	07:10		07:35 (SER1)		07:19 (SER1)	06:39	06:05	05:56	06:13	06:41	07:10	08:06 (SER1)		07:40	08:07 (SER1)	07:14	07:41
	17:30	18:06	13	07:48 (SER1)		07:50 (SER1)	20:07	20:36	20:55	20:48	20:13	19:24	26	08:32 (SER1)	18:38	10	08:17 (SER1)	17:05	17:02
22	07:40	07:09		07:30 (SER1)		07:20 (SER1)	06:38	06:05	05:56	06:13	06:42	07:11	08:04 (SER1)		07:41		07:15	07:42
	17:31	18:07	21	07:51 (SER1)		07:47 (SER1)	20:08	20:37	20:55	20:47	20:12	19:23	30	08:34 (SER1)	18:36		17:04	17:03
23	07:40	07:07		07:28 (SER1)		07:23 (SER1)	06:37	06:04	05:56	06:14	06:43	07:12	07:35 (SER2)		07:42		07:16	07:42
	17:32	18:09	26	07:54 (SER1)		07:45 (SER1)	20:09	20:38	20:56	20:46	20:10	19:21	41	08:36 (SER1)	18:35		17:04	17:03
24	07:39	07:06		07:26 (SER1)		07:26 (SER1)	06:35	06:03	05:57	06:15	06:44	07:13	07:32 (SER2)		07:43		07:18	07:43
	17:33	18:10	31	07:57 (SER1)		07:40 (SER1)	20:10	20:39	20:56	20:45	20:09	19:19	49	08:37 (SER1)	18:33		17:03	17:04
25	07:39	07:04		07:23 (SER1)			06:34	06:02	05:57	06:16	06:45	07:14	07:33 (SER2)		06:44		07:19	07:43
	17:34	18:11	35	07:58 (SER1)			20:11	20:40	20:56	20:45	20:07	19:18	53	08:38 (SER1)	17:32		17:03	17:05
26	07:38	07:03		07:22 (SER1)			06:32	06:02	05:57	06:17	06:46	07:14	07:34 (SER2)		06:45		07:20	07:43
	17:36	18:12	37	07:59 (SER1)			20:12	20:41	20:56	20:44	20:06	19:16	54	08:39 (SER1)	17:31		17:02	17:05
27	07:37	07:02		07:20 (SER1)			06:31	06:01	05:58	06:18	06:46	07:15	07:35 (SER2)		06:46		07:21	07:44
	17:37	18:13	40	08:00 (SER1)			20:13	20:41	20:56	20:43	20:04	19:15	55	08:39 (SER1)	17:30		17:02	17:06
28	07:36	07:00		07:19 (SER1)			06:30	06:01	05:58	06:19	06:47	07:16	07:36 (SER2)		06:47		07:22	07:44
	17:38	18:14	42	08:01 (SER1)			20:14	20:42	20:56	20:42	20:03	19:13	56	08:40 (SER1)	17:28		17:01	17:07
29	07:36						06:28	06:00	05:58	06:19	06:48	07:17	07:37 (SER2)		06:48		07:23	07:44
	17:39						20:15	20:43	20:56	20:41	20:01	19:11	56	08:40 (SER1)	17:27		17:01	17:07
30	07:35						06:27	06:00	05:59	06:20	06:49	07:18	07:38 (SER2)		06:49		07:24	07:45
	17:40						20:16	20:44	20:56	20:40	20:00	19:10	56	08:41 (SER1)	17:26		17:01	17:08
31	07:34							05:59		06:21	06:50				06:50			07:45
	17:42							20:45		20:39	19:58				17:25			17:09
Potential sun hours	301	299		370		397	445	448	455	425	374		347		301	292		
Total, worst case		245		1112							507		876					
Sun reduction		0,47		0,49							0,65		0,54					
Oper. time red.		0,91		0,91							0,91		0,91					
Wind dir. red.		0,78		0,78							0,79		0,78					
Total reduction		0,34		0,35							0,46		0,39					
Total, real		82		390							234		340					

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_14 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (14)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January		February		March			April			May			June		
1	07:45		07:33		06:59			07:10		07:28 (SER2)	06:26		07:25 (SER1)	05:59		07:26 (SER1)
	17:10		17:43		18:15			19:47	102	09:18 (SER1)	20:17	125	09:30 (SER1)	20:45	115	09:21 (SER1)
2	07:45		07:32		06:57			07:08		07:26 (SER2)	06:25		07:24 (SER1)	05:58		07:26 (SER1)
	17:11		17:44		18:16			19:48	106	09:19 (SER1)	20:18	126	09:30 (SER1)	20:46	115	09:21 (SER1)
3	07:45		07:31		06:56			07:07		07:28 (SER2)	06:23		07:23 (SER1)	05:58		07:27 (SER1)
	17:11		17:45		18:17			19:49	106	09:21 (SER1)	20:19	126	09:29 (SER1)	20:47	114	09:21 (SER1)
4	07:45		07:30		06:54			07:05		07:29 (SER2)	06:22		07:23 (SER1)	05:57		07:27 (SER1)
	17:12		17:46		18:18			19:50	106	09:22 (SER1)	20:20	126	09:29 (SER1)	20:47	113	09:20 (SER1)
5	07:45		07:29		06:53			07:04		07:32 (SER2)	06:21		07:23 (SER1)	05:57		07:27 (SER1)
	17:13		17:48		18:20			19:51	104	09:24 (SER1)	20:21	126	09:29 (SER1)	20:48	113	09:20 (SER1)
6	07:45		07:28		06:51			07:02		07:48 (SER1)	06:20		07:23 (SER1)	05:57		07:28 (SER1)
	17:14		17:49		18:21			19:52	96	09:24 (SER1)	20:22	125	09:28 (SER1)	20:49	113	09:21 (SER1)
7	07:45		07:27		06:50			07:00		07:46 (SER1)	06:19		07:23 (SER1)	05:56		07:28 (SER1)
	17:15		17:50		18:22			19:53	100	09:26 (SER1)	20:23	125	09:28 (SER1)	20:49	113	09:21 (SER1)
8	07:45		07:26		06:48			06:59		07:44 (SER1)	06:18		07:23 (SER1)	05:56		07:29 (SER1)
	17:16		17:51		18:23			19:54	102	09:26 (SER1)	20:24	125	09:28 (SER1)	20:50	112	09:21 (SER1)
9	07:45		07:25		06:47			06:57		07:42 (SER1)	06:17		07:23 (SER1)	05:56		07:28 (SER1)
	17:17		17:52		18:24			19:55	105	09:27 (SER1)	20:25	125	09:28 (SER1)	20:50	112	09:20 (SER1)
10	07:45		07:24		06:45			06:56		07:42 (SER1)	06:15		07:23 (SER1)	05:56		07:29 (SER1)
	17:18		17:53		18:25			19:56	106	09:28 (SER1)	20:26	124	09:27 (SER1)	20:51	111	09:20 (SER1)
11	07:45		07:23		06:43			06:54		07:40 (SER1)	06:14		07:23 (SER1)	05:56		07:29 (SER1)
	17:19		17:55		18:26			19:57	108	09:28 (SER1)	20:27	124	09:27 (SER1)	20:52	111	09:20 (SER1)
12	07:45		07:21		06:42			06:53		07:39 (SER1)	06:13		07:23 (SER1)	05:56		07:30 (SER1)
	17:20		17:56		18:27			19:58	110	09:29 (SER1)	20:28	124	09:27 (SER1)	20:52	110	09:20 (SER1)
13	07:44		07:20		06:40			06:51		07:37 (SER1)	06:12		07:23 (SER1)	05:56		07:30 (SER1)
	17:21		17:57		18:28			19:59	112	09:29 (SER1)	20:29	123	09:26 (SER1)	20:52	110	09:20 (SER1)
14	07:44		07:19		06:39			06:50		07:36 (SER1)	06:11		07:23 (SER1)	05:55		07:30 (SER1)
	17:22		17:58		18:29			20:00	114	09:30 (SER1)	20:30	123	09:26 (SER1)	20:53	110	09:20 (SER1)
15	07:44		07:18		06:37			06:48		07:35 (SER1)	06:10		07:22 (SER1)	05:55		07:30 (SER1)
	17:23		17:59		18:30			20:01	115	09:30 (SER1)	20:31	123	09:25 (SER1)	20:53	110	09:20 (SER1)
16	07:43		07:17		06:36			06:47		07:34 (SER1)	06:10		07:22 (SER1)	05:55		07:31 (SER1)
	17:24		18:01		18:31			20:02	117	09:31 (SER1)	20:32	123	09:25 (SER1)	20:54	110	09:21 (SER1)
17	07:43		07:15		06:34			06:45		07:33 (SER1)	06:09		07:22 (SER1)	05:56		07:31 (SER1)
	17:25		18:02		18:32			20:03	117	09:30 (SER1)	20:33	122	09:24 (SER1)	20:54	110	09:21 (SER1)
18	07:43		07:14		06:32			06:44		07:32 (SER1)	06:08		07:23 (SER1)	05:56		07:31 (SER1)
	17:26		18:03		18:33			20:04	119	09:31 (SER1)	20:34	122	09:25 (SER1)	20:54	110	09:21 (SER1)
19	07:42		07:13		06:31			06:42		07:32 (SER1)	06:07		07:23 (SER1)	05:56		07:31 (SER1)
	17:28		18:04		18:34			20:05	120	09:32 (SER1)	20:35	121	09:24 (SER1)	20:55	110	09:21 (SER1)
20	07:42		07:11		06:29		06:47 (SER2)	06:41		07:30 (SER1)	06:06		07:23 (SER1)	05:56		07:32 (SER1)
	17:29		18:05		18:35	1	06:48 (SER2)	20:06	121	09:31 (SER1)	20:35	121	09:24 (SER1)	20:55	110	09:22 (SER1)
21	07:41		07:10		06:28		06:46 (SER2)	06:39		06:58 (SER3)	06:05		07:23 (SER1)	05:56		07:32 (SER1)
	17:30		18:06		18:36	4	06:50 (SER2)	20:07	122	09:31 (SER1)	20:36	120	09:23 (SER1)	20:55	110	09:22 (SER1)
22	07:40		07:09		06:26		06:44 (SER2)	06:38		06:56 (SER3)	06:05		07:24 (SER1)	05:56		07:32 (SER1)
	17:31		18:07		18:37	7	06:51 (SER2)	20:08	124	09:31 (SER1)	20:37	119	09:23 (SER1)	20:55	110	09:22 (SER1)
23	07:40		07:07		06:24		06:43 (SER2)	06:37		06:55 (SER3)	06:04		07:24 (SER1)	05:56		07:32 (SER1)
	17:32		18:08		18:38	10	06:53 (SER2)	20:09	125	09:31 (SER1)	20:38	119	09:23 (SER1)	20:56	110	09:22 (SER1)
24	07:39		07:06		06:23		06:41 (SER2)	06:35		06:54 (SER3)	06:03		07:24 (SER1)	05:57		07:33 (SER1)
	17:33		18:10		18:39	30	07:49 (SER1)	20:10	126	09:31 (SER1)	20:39	118	09:22 (SER1)	20:56	110	09:23 (SER1)
25	07:39		07:04		06:21		06:39 (SER2)	06:34		06:52 (SER3)	06:02		07:24 (SER1)	05:57		07:33 (SER1)
	17:34		18:11		18:40	48	07:57 (SER1)	20:11	126	09:31 (SER1)	20:40	119	09:23 (SER1)	20:56	110	09:23 (SER1)
26	07:38		07:03		06:19		06:38 (SER2)	06:32		06:51 (SER3)	06:02		07:24 (SER1)	05:57		07:33 (SER1)
	17:36		18:12		18:41	60	08:02 (SER1)	20:12	126	09:31 (SER1)	20:41	118	09:22 (SER1)	20:56	110	09:23 (SER1)
27	07:37		07:02		06:18		06:36 (SER2)	06:31		07:26 (SER1)	06:01		07:25 (SER1)	05:58		07:34 (SER1)
	17:37		18:13		18:42	70	08:06 (SER1)	20:13	125	09:31 (SER1)	20:41	117	09:22 (SER1)	20:56	110	09:24 (SER1)
28	07:36		07:00		06:16		06:34 (SER2)	06:30		07:25 (SER1)	06:01		07:25 (SER1)	05:58		07:33 (SER1)
	17:38		18:14		18:43	77	08:08 (SER1)	20:14	125	09:30 (SER1)	20:42	117	09:22 (SER1)	20:56	110	09:23 (SER1)
29	07:36				07:15		07:33 (SER2)	06:28		07:25 (SER1)	06:00		07:26 (SER1)	05:58		07:33 (SER1)
	17:39				19:44	86	09:12 (SER1)	20:15	125	09:30 (SER1)	20:43	116	09:22 (SER1)	20:56	110	09:23 (SER1)
30	07:35				07:13		07:31 (SER2)	06:27		07:25 (SER1)	05:59		07:25 (SER1)	05:59		07:34 (SER1)
	17:40				19:45	92	09:14 (SER1)	20:16	125	09:30 (SER1)	20:44	116	09:21 (SER1)	20:56	110	09:24 (SER1)
31	07:34				07:11		07:30 (SER2)				05:59		07:26 (SER1)			
	17:42				19:46	96	09:16 (SER1)				20:45	115	09:21 (SER1)			
Potential sun hours	301		299		370			397			445			448		
Total, worst case						581			3435			3773			3332	
Sun reduction						0,49			0,53			0,59			0,66	
Oper. time red.						0,91			0,91			0,91			0,91	
Wind dir. red.						0,78			0,78			0,78			0,78	
Total reduction						0,35			0,37			0,42			0,47	
Total, real						203			1287			1574			1562	

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_14 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (14)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	05:59	07:33 (SER1)	06:22	07:33 (SER1)	06:51	07:39 (SER1)	07:19	06:52	07:25
	20:56 111	09:24 (SER1)	20:38 124	09:37 (SER1)	19:57 108	09:27 (SER1)	19:08	17:23	17:00
2	06:00	07:34 (SER1)	06:23	07:33 (SER1)	06:52	07:40 (SER1)	07:20	06:53	07:26
	20:56 111	09:25 (SER1)	20:37 125	09:38 (SER1)	19:55 106	09:26 (SER1)	19:06	17:22	17:00
3	06:00	07:34 (SER1)	06:24	07:32 (SER1)	06:53	07:40 (SER1)	07:21	06:54	07:27
	20:56 111	09:25 (SER1)	20:36 125	09:37 (SER1)	19:54 105	09:25 (SER1)	19:05	17:21	17:00
4	06:01	07:34 (SER1)	06:25	07:32 (SER1)	06:54	07:41 (SER1)	07:22	06:55	07:28
	20:56 112	09:26 (SER1)	20:35 125	09:37 (SER1)	19:52 102	09:23 (SER1)	19:03	17:20	17:00
5	06:01	07:34 (SER1)	06:26	07:33 (SER1)	06:55	07:42 (SER1)	07:23	06:56	07:29
	20:55 112	09:26 (SER1)	20:34 125	09:38 (SER1)	19:50 100	09:22 (SER1)	19:02	17:19	17:00
6	06:02	07:34 (SER1)	06:27	07:33 (SER1)	06:56	07:44 (SER1)	07:24	06:57	07:30
	20:55 113	09:27 (SER1)	20:33 125	09:38 (SER1)	19:49 97	09:21 (SER1)	19:00	17:18	17:00
7	06:03	07:34 (SER1)	06:28	07:33 (SER1)	06:57	07:27 (SER2)	07:25	06:58	07:31
	20:55 112	09:26 (SER1)	20:32 125	09:38 (SER1)	19:47 104	09:19 (SER1)	18:59	17:17	16:59
8	06:03	07:34 (SER1)	06:29	07:33 (SER1)	06:58	07:24 (SER2)	07:26	07:00	07:32
	20:55 113	09:27 (SER1)	20:30 125	09:38 (SER1)	19:46 106	09:17 (SER1)	18:57	17:16	16:59
9	06:04	07:34 (SER1)	06:30	07:33 (SER1)	06:59	07:22 (SER2)	07:27	07:01	07:33
	20:54 114	09:28 (SER1)	20:29 126	09:39 (SER1)	19:44 107	09:15 (SER1)	18:55	17:15	16:59
10	06:04	07:34 (SER1)	06:30	07:33 (SER1)	07:00	07:19 (SER2)	07:28	07:02	07:33
	20:54 114	09:28 (SER1)	20:28 126	09:39 (SER1)	19:42 106	09:12 (SER1)	18:54	17:14	17:00
11	06:05	07:34 (SER1)	06:31	07:33 (SER1)	07:00	07:20 (SER2)	07:29	07:03	07:34
	20:53 115	09:29 (SER1)	20:27 126	09:39 (SER1)	19:41 102	09:10 (SER1)	18:52	17:13	17:00
12	06:06	07:34 (SER1)	06:32	07:33 (SER1)	07:01	07:21 (SER2)	07:30	07:04	07:35
	20:53 115	09:29 (SER1)	20:25 126	09:39 (SER1)	19:39 97	09:08 (SER1)	18:51	17:12	17:00
13	06:06	07:34 (SER1)	06:33	07:32 (SER1)	07:02	07:22 (SER2)	07:31	07:05	07:36
	20:53 115	09:29 (SER1)	20:24 126	09:38 (SER1)	19:38 92	09:05 (SER1)	18:49	17:11	17:00
14	06:07	07:34 (SER1)	06:34	07:33 (SER1)	07:03	07:23 (SER2)	07:32	07:06	07:37
	20:52 116	09:30 (SER1)	20:23 125	09:38 (SER1)	19:36 86	09:02 (SER1)	18:48	17:10	17:00
15	06:08	07:34 (SER1)	06:35	07:33 (SER1)	07:04	07:24 (SER2)	07:33	07:07	07:37
	20:52 117	09:31 (SER1)	20:22 125	09:38 (SER1)	19:34 80	08:59 (SER1)	18:46	17:09	17:00
16	06:09	07:34 (SER1)	06:36	07:33 (SER1)	07:05	07:25 (SER2)	07:34	07:09	07:38
	20:51 117	09:31 (SER1)	20:20 125	09:38 (SER1)	19:33 72	08:56 (SER1)	18:45	17:08	17:01
17	06:09	07:34 (SER1)	06:37	06:58 (SER3)	07:06	07:26 (SER2)	07:35	07:10	07:39
	20:50 117	09:31 (SER1)	20:19 127	09:38 (SER1)	19:31 62	08:51 (SER1)	18:43	17:08	17:01
18	06:10	07:34 (SER1)	06:38	06:59 (SER3)	07:07	07:27 (SER2)	07:36	07:11	07:39
	20:50 118	09:32 (SER1)	20:17 125	09:37 (SER1)	19:29 50	08:46 (SER1)	18:42	17:07	17:01
19	06:11	07:34 (SER1)	06:39	07:00 (SER3)	07:08	07:28 (SER2)	07:37	07:12	07:40
	20:49 118	09:32 (SER1)	20:16 126	09:37 (SER1)	19:28 35	08:39 (SER1)	18:40	17:06	17:02
20	06:12	07:34 (SER1)	06:40	07:01 (SER3)	07:09	07:28 (SER2)	07:38	07:13	07:40
	20:48 119	09:33 (SER1)	20:15 125	09:37 (SER1)	19:26 10	07:38 (SER2)	18:39	17:06	17:02
21	06:13	07:33 (SER1)	06:41	07:02 (SER3)	07:10	07:29 (SER2)	07:40	07:14	07:41
	20:48 120	09:33 (SER1)	20:13 124	09:37 (SER1)	19:24 8	07:37 (SER2)	18:38	17:05	17:02
22	06:13	07:33 (SER1)	06:42	07:03 (SER3)	07:11	07:30 (SER2)	07:41	07:15	07:42
	20:47 120	09:33 (SER1)	20:12 122	09:36 (SER1)	19:23 5	07:35 (SER2)	18:36	17:04	17:03
23	06:14	07:34 (SER1)	06:43	07:34 (SER1)	07:12	07:31 (SER2)	07:42	07:16	07:42
	20:46 120	09:34 (SER1)	20:10 121	09:35 (SER1)	19:21 2	07:33 (SER2)	18:35	17:04	17:03
24	06:15	07:34 (SER1)	06:44	07:35 (SER1)	07:13		07:43	07:18	07:43
	20:45 120	09:34 (SER1)	20:09 119	09:34 (SER1)	19:19		18:33	17:03	17:04
25	06:16	07:34 (SER1)	06:45	07:35 (SER1)	07:14		06:44	07:19	07:43
	20:45 121	09:35 (SER1)	20:07 119	09:34 (SER1)	19:18		17:32	17:03	17:05
26	06:17	07:34 (SER1)	06:46	07:36 (SER1)	07:14		06:45	07:20	07:43
	20:44 122	09:36 (SER1)	20:06 117	09:33 (SER1)	19:16		17:31	17:02	17:05
27	06:18	07:33 (SER1)	06:46	07:36 (SER1)	07:15		06:46	07:21	07:44
	20:43 122	09:35 (SER1)	20:04 116	09:32 (SER1)	19:15		17:29	17:02	17:06
28	06:19	07:33 (SER1)	06:47	07:37 (SER1)	07:16		06:47	07:22	07:44
	20:42 123	09:36 (SER1)	20:03 115	09:32 (SER1)	19:13		17:28	17:01	17:07
29	06:19	07:33 (SER1)	06:48	07:37 (SER1)	07:17		06:48	07:23	07:44
	20:41 123	09:36 (SER1)	20:01 114	09:31 (SER1)	19:11		17:27	17:01	17:07
30	06:20	07:33 (SER1)	06:49	07:38 (SER1)	07:18		06:49	07:24	07:45
	20:40 123	09:36 (SER1)	20:00 112	09:30 (SER1)	19:10		17:26	17:01	17:08
31	06:21	07:33 (SER1)	06:50	07:39 (SER1)			06:50		07:45
	20:39 124	09:37 (SER1)	19:58 110	09:29 (SER1)			17:25		17:09
Potential sun hours	455		425		374		347	301	292
Total, worst case	3628		3796		1742				
Sun reduction	0,74		0,73		0,65				
Oper. time red.	0,91		0,91		0,91				
Wind dir. red.	0,78		0,78		0,78				
Total reduction	0,52		0,52		0,46				
Total, real	1894		1965		800				

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_15 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (15)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January		February		March			April			May			June		
1	07:45		07:33		06:59			07:10		07:28 (SER2)	06:26		06:58 (SER1)	05:59		06:53 (SER1)
	17:10		17:43		18:15			19:47	13	07:41 (SER2)	20:17	79	08:17 (SER1)	20:45	86	08:19 (SER1)
2	07:45		07:32		06:57			07:08		07:26 (SER2)	06:25		06:58 (SER1)	05:58		06:54 (SER1)
	17:11		17:44		18:16			19:48	15	07:41 (SER2)	20:18	80	08:18 (SER1)	20:46	85	08:19 (SER1)
3	07:45		07:31		06:56			07:07		07:25 (SER2)	06:23		06:56 (SER1)	05:58		06:54 (SER1)
	17:11		17:45		18:17			19:49	16	07:41 (SER2)	20:19	82	08:18 (SER1)	20:47	85	08:19 (SER1)
4	07:45		07:30		06:54			07:05		07:23 (SER2)	06:22		06:56 (SER1)	05:57		06:54 (SER1)
	17:12		17:46		18:18			19:50	17	07:40 (SER2)	20:20	82	08:18 (SER1)	20:47	85	08:19 (SER1)
5	07:45		07:29		06:53			07:04		07:22 (SER2)	06:21		06:55 (SER1)	05:57		06:55 (SER1)
	17:13		17:48		18:20			19:51	18	07:40 (SER2)	20:21	83	08:18 (SER1)	20:48	84	08:19 (SER1)
6	07:45		07:28		06:51			07:02		07:20 (SER2)	06:20		06:55 (SER1)	05:57		06:55 (SER1)
	17:14		17:49		18:21			19:52	18	07:38 (SER2)	20:22	84	08:19 (SER1)	20:49	84	08:19 (SER1)
7	07:45		07:27		06:50			07:00		07:19 (SER2)	06:19		06:54 (SER1)	05:56		06:56 (SER1)
	17:15		17:50		18:22			19:53	18	07:37 (SER2)	20:23	85	08:19 (SER1)	20:49	84	08:20 (SER1)
8	07:45		07:26		06:48			06:59		07:18 (SER2)	06:18		06:54 (SER1)	05:56		06:56 (SER1)
	17:16		17:51		18:23			19:54	17	07:35 (SER2)	20:24	85	08:19 (SER1)	20:50	84	08:20 (SER1)
9	07:45		07:25		06:47			06:57		07:19 (SER2)	06:17		06:54 (SER1)	05:56		06:55 (SER1)
	17:17		17:52		18:24			19:55	14	07:33 (SER2)	20:25	86	08:20 (SER1)	20:50	84	08:19 (SER1)
10	07:45		07:24		06:45			06:56		07:22 (SER2)	06:15		06:53 (SER1)	05:56		06:56 (SER1)
	17:18		17:53		18:25			19:56	8	07:30 (SER2)	20:26	87	08:20 (SER1)	20:51	83	08:19 (SER1)
11	07:45		07:23		06:43			06:54			06:14		06:53 (SER1)	05:56		06:56 (SER1)
	17:19		17:55		18:26			19:57			20:27	87	08:20 (SER1)	20:52	83	08:19 (SER1)
12	07:45		07:21		06:42			06:53			06:13		06:53 (SER1)	05:56		06:57 (SER1)
	17:20		17:56		18:27			19:58			20:28	87	08:20 (SER1)	20:52	82	08:19 (SER1)
13	07:44		07:20		06:40			06:51			06:12		06:52 (SER1)	05:56		06:57 (SER1)
	17:21		17:57		18:28			19:59			20:29	88	08:20 (SER1)	20:52	83	08:20 (SER1)
14	07:44		07:19		06:39			06:50		07:35 (SER1)	06:11		06:52 (SER1)	05:55		06:57 (SER1)
	17:22		17:58		18:29			20:00	13	07:48 (SER1)	20:30	88	08:20 (SER1)	20:53	83	08:20 (SER1)
15	07:44		07:18		06:37			06:48		07:28 (SER1)	06:10		06:52 (SER1)	05:55		06:57 (SER1)
	17:23		17:59		18:30			20:01	26	07:54 (SER1)	20:31	88	08:20 (SER1)	20:53	83	08:20 (SER1)
16	07:43		07:17		06:36			06:47		07:24 (SER1)	06:10		06:52 (SER1)	05:56		06:58 (SER1)
	17:24		18:01		18:31			20:02	34	07:58 (SER1)	20:32	87	08:19 (SER1)	20:54	82	08:20 (SER1)
17	07:43		07:15		06:34			06:45		07:20 (SER1)	06:09		06:51 (SER1)	05:56		06:58 (SER1)
	17:25		18:02		18:32			20:03	41	08:01 (SER1)	20:33	88	08:19 (SER1)	20:54	82	08:20 (SER1)
18	07:43		07:14		06:32			06:44		07:17 (SER1)	06:08		06:52 (SER1)	05:56		06:58 (SER1)
	17:26		18:03		18:33			20:04	46	08:03 (SER1)	20:34	88	08:20 (SER1)	20:54	82	08:20 (SER1)
19	07:42		07:13		06:31			06:42		07:15 (SER1)	06:07		06:52 (SER1)	05:56		06:58 (SER1)
	17:28		18:04		18:34			20:05	51	08:06 (SER1)	20:35	88	08:20 (SER1)	20:55	82	08:20 (SER1)
20	07:42		07:11		06:29			06:41		07:13 (SER1)	06:06		06:52 (SER1)	05:56		06:59 (SER1)
	17:29		18:05		18:35			20:06	54	08:07 (SER1)	20:35	88	08:20 (SER1)	20:55	82	08:21 (SER1)
21	07:41		07:10		06:28			06:39		07:11 (SER1)	06:05		06:51 (SER1)	05:56		06:59 (SER1)
	17:30		18:06		18:36			20:07	58	08:09 (SER1)	20:36	88	08:19 (SER1)	20:55	82	08:21 (SER1)
22	07:40		07:09		06:26			06:38		07:09 (SER1)	06:05		06:52 (SER1)	05:56		06:59 (SER1)
	17:31		18:07		18:37			20:08	61	08:10 (SER1)	20:37	88	08:20 (SER1)	20:55	82	08:21 (SER1)
23	07:40		07:07		06:24			06:37		07:07 (SER1)	06:04		06:52 (SER1)	05:56		06:59 (SER1)
	17:32		18:09		18:38			20:09	64	08:11 (SER1)	20:38	88	08:20 (SER1)	20:56	82	08:21 (SER1)
24	07:39		07:06		06:23			06:35		07:06 (SER1)	06:03		06:52 (SER1)	05:57		07:00 (SER1)
	17:33		18:10		18:39			20:10	67	08:13 (SER1)	20:39	87	08:19 (SER1)	20:56	82	08:22 (SER1)
25	07:39		07:04		06:21			06:34		06:52 (SER3)	06:02		06:52 (SER1)	05:57		07:00 (SER1)
	17:34		18:11		18:40			20:11	70	08:13 (SER1)	20:40	88	08:20 (SER1)	20:56	82	08:22 (SER1)
26	07:38		07:03		06:19			06:32		06:51 (SER3)	06:02		06:52 (SER1)	05:57		07:00 (SER1)
	17:36		18:12		18:41			20:12	72	08:14 (SER1)	20:41	87	08:19 (SER1)	20:56	82	08:22 (SER1)
27	07:37		07:02		06:18		06:36 (SER2)	06:31		06:50 (SER3)	06:01		06:53 (SER1)	05:58		07:01 (SER1)
	17:37		18:13		18:42	2	06:38 (SER2)	20:13	74	08:15 (SER1)	20:41	87	08:20 (SER1)	20:56	82	08:23 (SER1)
28	07:36		07:00		06:16		06:34 (SER2)	06:30		06:48 (SER3)	06:01		06:53 (SER1)	05:58		07:00 (SER1)
	17:38		18:14		18:43	5	06:39 (SER2)	20:14	76	08:15 (SER1)	20:42	86	08:19 (SER1)	20:56	83	08:23 (SER1)
29	07:36				07:15		07:33 (SER2)	06:28		07:00 (SER1)	06:00		06:53 (SER1)	05:58		07:00 (SER1)
	17:39				19:44	8	07:41 (SER2)	20:15	76	08:16 (SER1)	20:43	87	08:20 (SER1)	20:56	83	08:23 (SER1)
30	07:35				07:13		07:31 (SER2)	06:27		06:59 (SER1)	06:00		06:53 (SER1)	05:59		07:01 (SER1)
	17:40				19:45	10	07:41 (SER2)	20:16	78	08:17 (SER1)	20:44	86	08:19 (SER1)	20:56	82	08:23 (SER1)
31	07:34				07:11		07:30 (SER2)				05:59		06:54 (SER1)			
	17:42				19:46	12	07:42 (SER2)				20:45	85	08:19 (SER1)			
Potential sun hours	301		299		370			397			445			448		
Total, worst case						37			1115			2667			2490	
Sun reduction						0,49			0,53			0,59			0,66	
Oper. time red.						0,91			0,91			0,91			0,91	
Wind dir. red.						0,78			0,75			0,75			0,75	
Total reduction						0,35			0,36			0,40			0,45	
Total, real						13			402			1063			1115	

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_15 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (15)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November	December
1	05:59		07:00 (SER1)	06:22		07:03 (SER1)	06:51			07:19	06:52	07:25
	20:56	83	08:23 (SER1)	20:38	87	08:30 (SER1)	19:57			19:08	17:23	17:00
2	06:00		07:01 (SER1)	06:23		07:04 (SER1)	06:52		07:20 (SER2)	07:20	06:53	07:26
	20:56	83	08:24 (SER1)	20:37	86	08:30 (SER1)	19:55	8	07:28 (SER2)	19:06	17:22	17:00
3	06:00		07:01 (SER1)	06:24		07:03 (SER1)	06:53		07:17 (SER2)	07:21	06:54	07:27
	20:56	83	08:24 (SER1)	20:36	86	08:29 (SER1)	19:54	14	07:31 (SER2)	19:05	17:21	17:00
4	06:01		07:01 (SER1)	06:25		07:03 (SER1)	06:54		07:15 (SER2)	07:22	06:55	07:28
	20:56	84	08:25 (SER1)	20:35	86	08:29 (SER1)	19:52	17	07:32 (SER2)	19:03	17:20	17:00
5	06:01		07:01 (SER1)	06:26		07:04 (SER1)	06:55		07:15 (SER2)	07:23	06:56	07:29
	20:55	84	08:25 (SER1)	20:34	85	08:29 (SER1)	19:50	18	07:33 (SER2)	19:02	17:19	17:00
6	06:02		07:01 (SER1)	06:27		07:04 (SER1)	06:56		07:16 (SER2)	07:24	06:57	07:30
	20:55	84	08:25 (SER1)	20:33	85	08:29 (SER1)	19:49	18	07:34 (SER2)	19:00	17:18	17:00
7	06:03		07:01 (SER1)	06:28		07:05 (SER1)	06:57		07:17 (SER2)	07:25	06:58	07:31
	20:55	84	08:25 (SER1)	20:32	83	08:28 (SER1)	19:47	18	07:35 (SER2)	18:59	17:17	17:00
8	06:03		07:01 (SER1)	06:29		07:05 (SER1)	06:58		07:18 (SER2)	07:26	07:00	07:32
	20:55	85	08:26 (SER1)	20:30	83	08:28 (SER1)	19:46	17	07:35 (SER2)	18:57	17:16	16:59
9	06:04		07:02 (SER1)	06:30		07:06 (SER1)	06:59		07:19 (SER2)	07:27	07:01	07:33
	20:54	85	08:27 (SER1)	20:29	82	08:28 (SER1)	19:44	16	07:35 (SER2)	18:55	17:15	16:59
10	06:04		07:01 (SER1)	06:30		07:06 (SER1)	07:00		07:19 (SER2)	07:28	07:02	07:33
	20:54	85	08:26 (SER1)	20:28	81	08:27 (SER1)	19:42	15	07:34 (SER2)	18:54	17:14	17:00
11	06:05		07:02 (SER1)	06:31		07:07 (SER1)	07:00		07:20 (SER2)	07:29	07:03	07:34
	20:53	85	08:27 (SER1)	20:27	80	08:27 (SER1)	19:41	13	07:33 (SER2)	18:52	17:13	17:00
12	06:06		07:02 (SER1)	06:32		07:07 (SER1)	07:01		07:21 (SER2)	07:30	07:04	07:35
	20:53	86	08:28 (SER1)	20:25	79	08:26 (SER1)	19:39	12	07:33 (SER2)	18:51	17:12	17:00
13	06:06		07:01 (SER1)	06:33		07:07 (SER1)	07:02		07:22 (SER2)	07:31	07:05	07:36
	20:53	86	08:27 (SER1)	20:24	77	08:24 (SER1)	19:38	10	07:32 (SER2)	18:49	17:11	17:00
14	06:07		07:02 (SER1)	06:34		07:08 (SER1)	07:03		07:23 (SER2)	07:32	07:06	07:37
	20:52	86	08:28 (SER1)	20:23	75	08:23 (SER1)	19:36	8	07:31 (SER2)	18:48	17:10	17:00
15	06:08		07:02 (SER1)	06:35		06:56 (SER3)	07:04		07:24 (SER2)	07:33	07:07	07:37
	20:52	86	08:28 (SER1)	20:22	76	08:23 (SER1)	19:34	6	07:30 (SER2)	18:46	17:09	17:00
16	06:09		07:02 (SER1)	06:36		06:57 (SER3)	07:05		07:25 (SER2)	07:34	07:09	07:38
	20:51	87	08:29 (SER1)	20:20	74	08:22 (SER1)	19:33	3	07:28 (SER2)	18:45	17:08	17:01
17	06:09		07:02 (SER1)	06:37		06:58 (SER3)	07:06			07:35	07:10	07:39
	20:50	86	08:28 (SER1)	20:19	72	08:21 (SER1)	19:31			18:43	17:08	17:01
18	06:10		07:02 (SER1)	06:38		06:59 (SER3)	07:07			07:36	07:11	07:39
	20:50	87	08:29 (SER1)	20:17	69	08:19 (SER1)	19:29			18:42	17:07	17:01
19	06:11		07:02 (SER1)	06:39		07:12 (SER1)	07:08			07:37	07:12	07:40
	20:49	87	08:29 (SER1)	20:16	66	08:18 (SER1)	19:28			18:40	17:06	17:02
20	06:12		07:02 (SER1)	06:40		07:13 (SER1)	07:09			07:38	07:13	07:40
	20:48	88	08:30 (SER1)	20:15	64	08:17 (SER1)	19:26			18:39	17:06	17:02
21	06:13		07:02 (SER1)	06:41		07:15 (SER1)	07:10			07:40	07:14	07:41
	20:48	87	08:29 (SER1)	20:13	60	08:15 (SER1)	19:24			18:38	17:05	17:02
22	06:13		07:02 (SER1)	06:42		07:16 (SER1)	07:11			07:41	07:15	07:42
	20:47	88	08:30 (SER1)	20:12	57	08:13 (SER1)	19:23			18:36	17:04	17:03
23	06:14		07:02 (SER1)	06:43		07:17 (SER1)	07:12			07:42	07:16	07:42
	20:46	88	08:30 (SER1)	20:10	54	08:11 (SER1)	19:21			18:35	17:04	17:03
24	06:15		07:02 (SER1)	06:44		07:18 (SER1)	07:13			07:43	07:18	07:43
	20:45	88	08:30 (SER1)	20:09	50	08:08 (SER1)	19:19			18:33	17:03	17:04
25	06:16		07:03 (SER1)	06:45		07:21 (SER1)	07:14			06:44	07:19	07:43
	20:45	88	08:31 (SER1)	20:07	45	08:06 (SER1)	19:18			17:32	17:03	17:05
26	06:17		07:03 (SER1)	06:46		07:23 (SER1)	07:14			06:45	07:20	07:43
	20:44	88	08:31 (SER1)	20:06	40	08:03 (SER1)	19:16			17:31	17:02	17:05
27	06:18		07:02 (SER1)	06:46		07:26 (SER1)	07:15			06:46	07:21	07:44
	20:43	88	08:30 (SER1)	20:04	34	08:00 (SER1)	19:15			17:30	17:02	17:06
28	06:19		07:02 (SER1)	06:47		07:30 (SER1)	07:16			06:47	07:22	07:44
	20:42	88	08:30 (SER1)	20:03	26	07:56 (SER1)	19:13			17:28	17:01	17:07
29	06:19		07:03 (SER1)	06:48		07:36 (SER1)	07:17			06:48	07:23	07:44
	20:41	87	08:30 (SER1)	20:01	13	07:49 (SER1)	19:11			17:27	17:01	17:07
30	06:20		07:03 (SER1)	06:49			07:18			06:49	07:24	07:45
	20:40	87	08:30 (SER1)	20:00			19:10			17:26	17:01	17:08
31	06:21		07:03 (SER1)	06:50						06:50		07:45
	20:39	87	08:30 (SER1)	19:58						17:25		17:09
Potential sun hours	455			425			374			347	301	292
Total, worst case		2668			1955			193				
Sun reduction		0,74			0,73			0,65				
Oper. time red.		0,91			0,91			0,91				
Wind dir. red.		0,75			0,75			0,78				
Total reduction		0,50			0,49			0,46				
Total, real		1331			967			88				

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_16 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (16)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:45	07:33	06:59	07:10	06:26	05:58	05:59	06:22	06:51	07:19	06:52	07:25
	17:10	17:43	18:15	19:47	20:17	20:45	20:56	20:38	19:57	19:08	17:23	17:00
2	07:45	07:32	06:57	07:08	06:25	05:58	06:00	06:23	06:52	07:20	06:53	07:26
	17:11	17:44	18:16	19:48	20:18	20:46	20:56	20:37	19:55	19:06	17:22	17:00
3	07:45	07:31	06:56	07:07	06:23	05:58	06:00	06:24	06:53	07:21	06:54	07:27
	17:11	17:45	18:17	19:49	20:19	20:47	20:56	20:36	19:54	19:05	17:21	17:00
4	07:45	07:30	06:54	07:05	06:22	05:57	06:01	06:25	06:54	07:22	06:55	07:28
	17:12	17:46	18:18	19:50	20:20	20:47	20:55	20:35	19:52	19:03	17:20	17:00
5	07:45	07:29	06:53	07:03	06:21	05:57	06:01	06:26	06:55	07:23	06:56	07:29
	17:13	17:47	18:19	19:51	20:21	20:48	20:55	20:34	19:50	19:02	17:19	17:00
6	07:45	07:28	06:51	07:02	06:20	05:57	06:02	06:27	06:56	07:24	06:57	07:30
	17:14	17:49	18:21	19:52	20:22	20:49	20:55	20:33	19:49	19:00	17:18	16:59
7	07:45	07:27	06:50	07:00	06:19	05:56	06:02	06:28	06:57	07:25	06:58	07:31
	17:15	17:50	18:22	19:53	20:23	20:49	20:55	20:31	19:47	18:58	17:17	16:59
8	07:45	07:26	06:48	06:59	06:18	05:56	06:03	06:29	06:58	07:26	06:59	07:32
	17:16	17:51	18:23	19:54	20:24	20:50	20:55	20:30	19:46	18:57	17:16	16:59
9	07:45	07:25	06:47	06:57	06:16	05:56	06:04	06:29	06:59	07:27	07:01	07:32
	17:17	17:52	18:24	19:55	20:25	20:50	20:54	20:29	19:44	18:55	17:15	16:59
10	07:45	07:24	06:45	06:56	06:15	05:56	06:04	06:30	06:59	07:28	07:02	07:33
	17:18	17:53	18:25	19:56	20:26	20:51	20:54	20:28	19:42	18:54	17:14	16:59
11	07:45	07:23	06:43	06:54	06:14	05:56	06:05	06:31	07:00	07:29	07:03	07:34
	17:19	17:55	18:26	19:57	20:27	20:51	20:53	20:27	19:41	18:52	17:13	17:00
12	07:45	07:21	06:42	06:53	06:13	05:56	06:06	06:32	07:01	07:30	07:04	07:35
	17:20	17:56	18:27	19:58	20:28	20:52	20:53	20:25	19:39	18:51	17:12	17:00
13	07:44	07:20	06:40	06:51	06:12	05:55	06:06	06:33	07:02	07:31	07:05	07:36
	17:21	17:57	18:28	19:59	20:29	20:52	20:53	20:24	19:37	18:49	17:11	17:00
14	07:44	07:19	06:39	06:50	06:11	05:55	06:07	06:34	07:03	07:32	07:06	07:36
	17:22	17:58	18:29	20:00	20:30	20:53	20:52	20:23	19:36	18:48	17:10	17:00
15	07:44	07:18	06:37	06:48	06:10	05:55	06:08	06:35	07:04	07:33	07:07	07:37
	17:23	17:59	18:30	20:01	20:31	20:53	20:51	20:21	19:34	18:46	17:09	17:00
16	07:43	07:16	06:35	06:47	06:09	05:55	06:09	06:36	07:05	07:34	07:09	07:38
	17:24	18:00	18:31	20:02	20:32	20:54	20:51	20:20	19:33	18:45	17:08	17:01
17	07:43	07:15	06:34	06:45	06:09	05:55	06:09	06:37	07:06	07:35	07:10	07:39
	17:25	18:02	18:32	20:03	20:33	20:54	20:50	20:19	19:31	18:43	17:08	17:01
18	07:42	07:14	06:32	06:44	06:08	05:56	06:10	06:38	07:07	07:36	07:11	07:39
	17:26	18:03	18:33	20:04	20:34	20:54	20:50	20:17	19:29	18:42	17:07	17:01
19	07:42	07:13	06:31	06:42	06:07	05:56	06:11	06:39	07:08	07:37	07:12	07:40
	17:27	18:04	18:34	20:05	20:35	20:55	20:49	20:16	19:28	18:40	17:06	17:02
20	07:41	07:11	06:29	06:41	06:06	05:56	06:12	06:40	07:09	07:38	07:13	07:40
	17:29	18:05	18:35	20:06	20:35	20:55	20:48	20:15	19:26	18:39	17:05	17:02
21	07:41	07:10	06:27	06:39	06:05	05:56	06:13	06:41	07:10	07:39	07:14	07:41
	17:30	18:06	18:36	20:07	20:36	20:55	20:48	20:13	19:24	18:38	17:05	17:02
22	07:40	07:09	06:26	06:38	06:04	05:56	06:13	06:42	07:11	07:41	07:15	07:41
	17:31	18:07	18:37	20:08	20:37	20:55	20:47	20:12	19:23	18:36	17:04	17:03
23	07:40	07:07	06:24	06:36	06:04	05:56	06:14	06:43	07:12	07:42	07:16	07:42
	17:32	18:08	18:38	20:09	20:38	20:56	20:46	20:10	19:21	18:35	17:04	17:03
24	07:39	07:06	06:23	06:35	06:03	05:57	06:15	06:44	07:13	07:43	07:17	07:42
	17:33	18:10	18:39	20:10	20:39	20:56	20:45	20:09	19:19	18:33	17:03	17:04
25	07:38	07:04	06:21	06:34	06:02	05:57	06:16	06:45	07:13	06:44	07:19	07:43
	17:34	18:11	18:40	20:11	20:40	20:56	20:45	20:07	19:18	17:32	17:03	17:05
26	07:38	07:03	06:19	06:32	06:02	05:57	06:17	06:45	07:14	06:45	07:20	07:43
	17:36	18:12	18:41	20:12	20:41	20:56	20:44	20:06	19:16	17:31	17:02	17:05
27	07:37	07:02	06:18	06:31	06:01	05:58	06:18	06:46	07:15	06:46	07:21	07:44
	17:37	18:13	18:42	20:13	20:41	20:56	20:43	20:04	19:14	17:29	17:02	17:06
28	07:36	07:00	06:16	06:30	06:01	05:58	06:18	06:47	07:16	06:47	07:22	07:44
	17:38	18:14	18:43	20:14	20:42	20:56	20:42	20:03	19:13	17:28	17:01	17:06
29	07:35		07:15	06:28	06:00	05:58	06:19	06:48	07:17	06:48	07:23	07:44
	17:39		19:44	20:15	20:43	20:56	20:41	20:01	19:11	17:27	17:01	17:07
30	07:35		07:13	06:27	05:59	05:59	06:20	06:49	07:18	06:49	07:24	07:45
	17:40		19:45	20:16	20:44	20:56	20:40	20:00	19:10	17:26	17:01	17:08
31	07:34		07:11		05:59		06:21	06:50		06:50		07:45
	17:41		19:46		20:44		20:39	19:58		17:24		17:09
Potential sun hours	301	299	370	397	445	448	455	425	374	347	301	292
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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_17 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (17)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May		June
1	07:45	07:33	06:59		07:10		06:26		19:12 (SER3) 05:58
	17:10	17:43	18:15		19:47		20:17	30	19:42 (SER3) 20:45
2	07:45	07:32	06:57		07:08		06:25		19:12 (SER3) 05:58
	17:10	17:44	18:16		19:48		20:18	29	19:41 (SER3) 20:46
3	07:45	07:31	06:56		07:07		06:23		19:12 (SER3) 05:58
	17:11	17:45	18:17		19:49		20:19	28	19:40 (SER3) 20:47
4	07:45	07:30	06:54		07:05		06:22		19:13 (SER3) 05:57
	17:12	17:46	18:18		19:50		20:20	27	19:40 (SER3) 20:47
5	07:45	07:29	06:53		07:03		06:21		19:14 (SER3) 05:57
	17:13	17:47	18:19		19:51		20:21	25	19:39 (SER3) 20:48
6	07:45	07:28	06:51		07:02		06:20		19:15 (SER3) 05:57
	17:14	17:49	18:20		19:52		20:22	23	19:38 (SER3) 20:49
7	07:45	07:27	06:50		07:00		06:19		19:16 (SER3) 05:56
	17:15	17:50	18:22		19:53		20:23	21	19:37 (SER3) 20:49
8	07:45	07:26	06:48		06:59		06:17		19:18 (SER3) 05:56
	17:16	17:51	18:23		19:54		20:24	17	19:35 (SER3) 20:50
9	07:45	07:25	06:46		06:57		06:16		19:20 (SER3) 05:56
	17:17	17:52	18:24		19:55		20:25	13	19:33 (SER3) 20:50
10	07:45	07:24	06:45		06:56		06:15		19:23 (SER3) 05:56
	17:18	17:53	18:25		19:56		20:26	7	19:30 (SER3) 20:51
11	07:45	07:22	06:43		06:54		06:14		05:56
	17:19	17:55	18:26		19:57		20:27		20:51
12	07:45	07:21	06:42		06:52		06:13		05:55
	17:20	17:56	18:27		19:58		20:28		20:52
13	07:44	07:20	06:40	07:02 (SER6)	06:51		06:12		05:55
	17:21	17:57	18:28	7 07:09 (SER6)	19:59		20:29		20:52
14	07:44	07:19	06:39	06:58 (SER6)	06:49		06:11		05:55
	17:22	17:58	18:29	17 17:54 (SER2)	20:00		20:30		20:53
15	07:44	07:18	06:37	06:55 (SER6)	06:48		06:10		05:55
	17:23	17:59	18:30	30 17:57 (SER2)	20:01		20:31		20:53
16	07:43	07:16	06:35	06:54 (SER6)	06:46		19:26 (SER3)	06:09	05:55
	17:24	18:00	18:31	37 18:00 (SER2)	20:02	8	19:34 (SER3)	20:32	20:54
17	07:43	07:15	06:34	06:53 (SER6)	06:45		19:21 (SER3)	06:08	05:55
	17:25	18:02	18:32	41 18:01 (SER2)	20:03	16	19:37 (SER3)	20:33	20:54
18	07:42	07:14	06:32	06:53 (SER6)	06:44		19:19 (SER3)	06:08	05:55
	17:26	18:03	18:33	43 18:02 (SER2)	20:04	20	19:39 (SER3)	20:34	20:54
19	07:42	07:13	06:31	06:51 (SER6)	06:42		19:17 (SER3)	06:07	05:56
	17:27	18:04	18:34	47 18:02 (SER2)	20:05	23	19:40 (SER3)	20:34	20:55
20	07:41	07:11	06:29	06:51 (SER6)	06:41		19:16 (SER3)	06:06	05:56
	17:29	18:05	18:35	47 18:02 (SER2)	20:06	25	19:41 (SER3)	20:35	20:55
21	07:41	07:10	06:27	06:51 (SER6)	06:39		19:15 (SER3)	06:05	05:56
	17:30	18:06	18:36	48 18:02 (SER2)	20:07	27	19:42 (SER3)	20:36	20:55
22	07:40	07:08	06:26	06:51 (SER6)	06:38		19:14 (SER3)	06:04	05:56
	17:31	18:07	18:37	46 18:01 (SER2)	20:08	28	19:42 (SER3)	20:37	20:55
23	07:40	07:07	06:24	06:50 (SER6)	06:36		19:13 (SER3)	06:04	05:56
	17:32	18:08	18:38	45 18:00 (SER2)	20:09	30	19:43 (SER3)	20:38	20:55
24	07:39	07:06	06:23	06:52 (SER6)	06:35		19:13 (SER3)	06:03	05:57
	17:33	18:09	18:39	42 18:00 (SER2)	20:10	31	19:44 (SER3)	20:39	20:56
25	07:38	07:04	06:21	06:52 (SER6)	06:34		19:12 (SER3)	06:02	05:57
	17:34	18:11	18:40	39 17:59 (SER2)	20:11	31	19:43 (SER3)	20:40	20:56
26	07:38	07:03	06:19	06:54 (SER6)	06:32		19:12 (SER3)	06:02	05:57
	17:35	18:12	18:41	33 17:58 (SER2)	20:12	31	19:43 (SER3)	20:41	20:56
27	07:37	07:01	06:18	06:55 (SER6)	06:31		19:12 (SER3)	06:01	05:58
	17:37	18:13	18:42	27 17:56 (SER2)	20:13	32	19:44 (SER3)	20:41	20:56
28	07:36	07:00	06:16	17:42 (SER2)	06:30		19:11 (SER3)	06:00	05:58
	17:38	18:14	18:43	11 17:53 (SER2)	20:14	32	19:43 (SER3)	20:42	20:56
29	07:35		07:15		06:28		19:11 (SER3)	06:00	05:58
	17:39		19:44		20:15	32	19:43 (SER3)	20:43	20:56
30	07:35		07:13		06:27		19:12 (SER3)	05:59	05:59
	17:40		19:45		20:16	31	19:43 (SER3)	20:44	20:56
31	07:34		07:11					05:59	
	17:41		19:46					20:44	
Potential sun hours	301	299	370		397		445		448
Total, worst case			560		397		220		
Sun reduction			0,49		0,53		0,59		
Oper. time red.			0,91		0,91		0,91		
Wind dir. red.			0,78		0,79		0,79		
Total reduction			0,35		0,38		0,42		
Total, real			196		150		93		

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_17 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (17)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October	November	December
1	05:59	06:22			06:51			07:19	06:51	07:25
	20:56	20:38			19:57			19:08	17:23	17:00
2	06:00	06:23			06:52			07:20	06:53	07:26
	20:56	20:37			19:55			19:06	17:22	17:00
3	06:00	06:24		19:31 (SER3)	06:53			07:21	06:54	07:27
	20:56	20:36	10	19:41 (SER3)	19:54			19:05	17:21	17:00
4	06:01	06:25		19:29 (SER3)	06:54			07:22	06:55	07:28
	20:55	20:35	15	19:44 (SER3)	19:52			19:03	17:20	17:00
5	06:01	06:26		19:27 (SER3)	06:55			07:23	06:56	07:29
	20:55	20:34	18	19:45 (SER3)	19:50			19:02	17:19	17:00
6	06:02	06:27		19:25 (SER3)	06:56			07:24	06:57	07:30
	20:55	20:33	22	19:47 (SER3)	19:49			19:00	17:18	16:59
7	06:02	06:28		19:24 (SER3)	06:57			07:25	06:58	07:31
	20:55	20:31	24	19:48 (SER3)	19:47			18:58	17:16	16:59
8	06:03	06:28		19:23 (SER3)	06:58			07:26	06:59	07:31
	20:54	20:30	26	19:49 (SER3)	19:46			18:57	17:15	16:59
9	06:04	06:29		19:22 (SER3)	06:58			07:27	07:01	07:32
	20:54	20:29	28	19:50 (SER3)	19:44			18:55	17:14	16:59
10	06:04	06:30		19:22 (SER3)	06:59			07:28	07:02	07:33
	20:54	20:28	28	19:50 (SER3)	19:42			18:54	17:13	16:59
11	06:05	06:31		19:20 (SER3)	07:00			07:29	07:03	07:34
	20:53	20:27	30	19:50 (SER3)	19:41			18:52	17:13	16:59
12	06:06	06:32		19:20 (SER3)	07:01			07:30	07:04	07:35
	20:53	20:25	30	19:50 (SER3)	19:39			18:51	17:12	17:00
13	06:06	06:33		19:19 (SER3)	07:02			07:31	07:05	07:36
	20:52	20:24	31	19:50 (SER3)	19:37			18:49	17:11	17:00
14	06:07	06:34		19:19 (SER3)	07:03			07:32	07:06	07:36
	20:52	20:23	31	19:50 (SER3)	19:36			18:48	17:10	17:00
15	06:08	06:35		19:19 (SER3)	07:04		18:33 (SER2)	07:33	07:07	07:37
	20:51	20:21	32	19:51 (SER3)	19:34	10	18:43 (SER2)	18:46	17:09	17:00
16	06:08	06:36		19:19 (SER3)	07:05		07:45 (SER6)	07:34	07:08	07:38
	20:51	20:20	31	19:50 (SER3)	19:32	24	18:45 (SER2)	18:45	17:08	17:00
17	06:09	06:37		19:19 (SER3)	07:06		07:42 (SER6)	07:35	07:10	07:38
	20:50	20:19	31	19:50 (SER3)	19:31	33	18:46 (SER2)	18:43	17:07	17:01
18	06:10	06:38		19:19 (SER3)	07:07		07:40 (SER6)	07:36	07:11	07:39
	20:50	20:17	31	19:50 (SER3)	19:29	38	18:47 (SER2)	18:42	17:07	17:01
19	06:11	06:39		19:19 (SER3)	07:08		07:38 (SER6)	07:37	07:12	07:40
	20:49	20:16	30	19:49 (SER3)	19:28	41	18:46 (SER2)	18:40	17:06	17:01
20	06:12	06:40		19:19 (SER3)	07:09		07:37 (SER6)	07:38	07:13	07:40
	20:48	20:15	30	19:49 (SER3)	19:26	45	18:47 (SER2)	18:39	17:05	17:02
21	06:12	06:41		19:19 (SER3)	07:10		07:36 (SER6)	07:39	07:14	07:41
	20:48	20:13	28	19:47 (SER3)	19:24	47	18:47 (SER2)	18:37	17:05	17:02
22	06:13	06:42		19:19 (SER3)	07:11		07:35 (SER6)	07:40	07:15	07:41
	20:47	20:12	27	19:46 (SER3)	19:23	47	18:46 (SER2)	18:36	17:04	17:03
23	06:14	06:43		19:20 (SER3)	07:11		07:35 (SER6)	07:42	07:16	07:42
	20:46	20:10	25	19:45 (SER3)	19:21	47	18:46 (SER2)	18:35	17:04	17:03
24	06:15	06:44		19:21 (SER3)	07:12		07:35 (SER6)	07:43	07:17	07:42
	20:45	20:09	23	19:44 (SER3)	19:19	45	18:45 (SER2)	18:33	17:03	17:04
25	06:16	06:44		19:22 (SER3)	07:13		07:35 (SER6)	06:44	07:19	07:43
	20:45	20:07	20	19:42 (SER3)	19:18	44	18:44 (SER2)	17:32	17:03	17:04
26	06:17	06:45		19:24 (SER3)	07:14		07:35 (SER6)	06:45	07:20	07:43
	20:44	20:06	15	19:39 (SER3)	19:16	42	18:43 (SER2)	17:31	17:02	17:05
27	06:18	06:46		19:28 (SER3)	07:15		07:36 (SER6)	06:46	07:21	07:44
	20:43	20:04	8	19:36 (SER3)	19:14	38	18:42 (SER2)	17:29	17:02	17:06
28	06:18	06:47			07:16		07:36 (SER6)	06:47	07:22	07:44
	20:42	20:03			19:13	33	18:40 (SER2)	17:28	17:01	17:06
29	06:19	06:48			07:17		07:38 (SER6)	06:48	07:23	07:44
	20:41	20:01			19:11	24	18:37 (SER2)	17:27	17:01	17:07
30	06:20	06:49			07:18		07:40 (SER6)	06:49	07:24	07:44
	20:40	20:00			19:10	10	07:50 (SER6)	17:26	17:01	17:08
31	06:21	06:50						06:50		07:45
	20:39	19:58						17:24		17:09
Potential sun hours	455	425			374			347	301	292
Total, worst case			624			568				
Sun reduction			0,73			0,65				
Oper. time red.			0,91			0,91				
Wind dir. red.			0,79			0,78				
Total reduction			0,52			0,46				
Total, real			326			261				

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_18 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (18)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April			May	June	July	August			September			October	November	December
1	07:45	07:33	06:59		07:10		18:11 (SER2)	06:26	05:58	05:59	06:22			06:51		18:02 (SER2)	07:19	06:51	07:25
	17:10	17:43	18:15		19:47	57	19:11 (SER1)	20:17	20:45	20:56	20:38			19:57	48	18:50 (SER2)	19:08	17:23	17:00
2	07:45	07:32	06:57		07:08		18:09 (SER2)	06:25	05:58	06:00	06:23			06:52		18:02 (SER2)	07:20	06:53	07:26
	17:10	17:44	18:16		19:48	59	19:10 (SER1)	20:18	20:46	20:56	20:37			19:55	47	18:49 (SER2)	19:06	17:22	17:00
3	07:45	07:31	06:56		07:07		18:08 (SER2)	06:23	05:58	06:00	06:24			06:53		18:01 (SER2)	07:21	06:54	07:27
	17:11	17:45	18:17		19:49	59	19:09 (SER1)	20:19	20:47	20:56	20:36			19:54	48	18:49 (SER2)	19:05	17:21	17:00
4	07:45	07:30	06:54		07:05		18:07 (SER2)	06:22	05:57	06:01	06:25			06:54		18:01 (SER2)	07:22	06:55	07:28
	17:12	17:46	18:18		19:50	58	19:07 (SER1)	20:20	20:47	20:55	20:35			19:52	47	18:48 (SER2)	19:03	17:20	17:00
5	07:45	07:29	06:53		07:03		18:07 (SER2)	06:21	05:57	06:01	06:26			06:55		18:01 (SER2)	07:23	06:56	07:29
	17:13	17:47	18:19		19:51	56	19:06 (SER1)	20:21	20:48	20:55	20:34			19:50	47	18:48 (SER2)	19:02	17:19	17:00
6	07:45	07:28	06:51		07:02		18:05 (SER2)	06:20	05:57	06:02	06:27			06:56		18:01 (SER2)	07:24	06:57	07:30
	17:14	17:49	18:20		19:52	52	19:02 (SER1)	20:22	20:49	20:55	20:33			19:49	51	18:58 (SER1)	19:00	17:18	16:59
7	07:45	07:27	06:50		07:00		18:04 (SER2)	06:19	05:56	06:02	06:28			06:57		18:02 (SER2)	07:25	06:58	07:31
	17:15	17:50	18:22		19:53	47	18:51 (SER2)	20:23	20:49	20:55	20:31			19:47	56	19:01 (SER1)	18:58	17:17	16:59
8	07:45	07:26	06:48		06:59		18:04 (SER2)	06:18	05:56	06:03	06:29			06:58		18:02 (SER2)	07:26	06:59	07:32
	17:16	17:51	18:23		19:54	47	18:51 (SER2)	20:24	20:50	20:54	20:30			19:46	58	19:02 (SER1)	18:57	17:15	16:59
9	07:45	07:25	06:46		06:57		18:03 (SER2)	06:16	05:56	06:04	06:29			06:58		18:01 (SER2)	07:27	07:01	07:32
	17:17	17:52	18:24		19:55	48	18:51 (SER2)	20:25	20:50	20:54	20:29			19:44	59	19:02 (SER1)	18:55	17:14	16:59
10	07:45	07:24	06:45		06:56		18:04 (SER2)	06:15	05:56	06:04	06:30			06:59		18:02 (SER2)	07:28	07:02	07:33
	17:18	17:53	18:25		19:56	47	18:51 (SER2)	20:26	20:51	20:54	20:28			19:42	59	19:03 (SER1)	18:54	17:14	16:59
11	07:45	07:23	06:43		06:54		18:03 (SER2)	06:14	05:56	06:05	06:31			07:00		18:03 (SER2)	07:29	07:03	07:34
	17:19	17:55	18:26		19:57	48	18:51 (SER2)	20:27	20:51	20:53	20:27			19:41	58	19:03 (SER1)	18:52	17:13	17:00
12	07:45	07:21	06:42		06:53		18:03 (SER2)	06:13	05:56	06:06	06:32			07:01		18:04 (SER2)	07:30	07:04	07:35
	17:20	17:56	18:27		19:58	48	18:51 (SER2)	20:28	20:52	20:53	20:25			19:39	55	19:03 (SER1)	18:51	17:12	17:00
13	07:44	07:20	06:40		06:51		18:03 (SER2)	06:12	05:55	06:06	06:33			07:02		18:05 (SER2)	07:31	07:05	07:36
	17:21	17:57	18:28		19:59	47	18:50 (SER2)	20:29	20:52	20:52	20:24			19:37	53	19:03 (SER1)	18:49	17:11	17:00
14	07:44	07:19	06:39		06:50		18:03 (SER2)	06:11	05:55	06:07	06:34			07:03		18:07 (SER2)	07:32	07:06	07:36
	17:22	17:58	18:29		20:00	47	18:50 (SER2)	20:30	20:53	20:52	20:23			19:36	48	19:02 (SER1)	18:48	17:10	17:00
15	07:44	07:18	06:37		06:48		18:03 (SER2)	06:10	05:55	06:08	06:35		18:27 (SER2)	07:04		18:09 (SER2)	07:33	07:07	07:37
	17:23	17:59	18:30		20:01	46	18:49 (SER2)	20:31	20:53	20:51	20:21	10	18:37 (SER2)	19:34	41	19:01 (SER1)	18:46	17:09	17:00
16	07:43	07:16	06:35		06:47		18:04 (SER2)	06:09	05:55	06:09	06:36		18:23 (SER2)	07:05		18:12 (SER2)	07:34	07:09	07:38
	17:24	18:00	18:31		20:02	45	18:49 (SER2)	20:32	20:54	20:51	20:20	17	18:40 (SER2)	19:33	34	19:00 (SER1)	18:45	17:08	17:00
17	07:43	07:15	06:34		06:45		18:04 (SER2)	06:09	05:55	06:09	06:37		18:20 (SER2)	07:06		18:19 (SER2)	07:35	07:10	07:39
	17:25	18:02	18:32		20:03	43	18:47 (SER2)	20:33	20:54	20:50	20:19	23	18:43 (SER2)	19:31	17	18:59 (SER1)	18:43	17:08	17:01
18	07:42	07:14	06:32		06:44		18:04 (SER2)	06:08	05:56	06:10	06:38		18:18 (SER2)	07:07		18:46 (SER1)	07:36	07:11	07:39
	17:26	18:03	18:33		20:04	43	18:47 (SER2)	20:34	20:54	20:50	20:17	27	18:45 (SER2)	19:29	10	18:56 (SER1)	18:42	17:07	17:01
19	07:42	07:13	06:31		06:42		18:05 (SER2)	06:07	05:56	06:11	06:39		18:16 (SER2)	07:08			07:37	07:12	07:40
	17:27	18:04	18:34		20:05	41	18:46 (SER2)	20:34	20:55	20:49	20:16	30	18:46 (SER2)	19:28			18:40	17:06	17:02
20	07:41	07:11	06:29		06:41		18:06 (SER2)	06:06	05:56	06:12	06:40		18:14 (SER2)	07:09			07:38	07:13	07:40
	17:29	18:05	18:35		20:06	39	18:45 (SER2)	20:35	20:55	20:48	20:15	33	18:47 (SER2)	19:26			18:39	17:05	17:02
21	07:41	07:10	06:27		06:39		18:07 (SER2)	06:05	05:56	06:12	06:41		18:13 (SER2)	07:10			07:39	07:14	07:41
	17:30	18:06	18:36		20:07	37	18:44 (SER2)	20:36	20:55	20:48	20:13	35	18:48 (SER2)	19:24			18:37	17:05	17:02
22	07:40	07:09	06:26		06:38		18:07 (SER2)	06:04	05:56	06:13	06:42		18:11 (SER2)	07:11			07:40	07:15	07:41
	17:31	18:07	18:37		20:08	35	18:42 (SER2)	20:37	20:55	20:47	20:12	37	18:48 (SER2)	19:23			18:36	17:04	17:03
23	07:40	07:07	06:24		06:36		18:09 (SER2)	06:04	05:56	06:14	06:43		18:09 (SER2)	07:12			07:42	07:16	07:42
	17:32	18:08	18:38		20:09	32	18:41 (SER2)	20:38	20:56	20:46	20:10	40	18:49 (SER2)	19:21			18:35	17:04	17:03
24	07:39	07:06	06:23		06:35		18:10 (SER2)	06:03	05:57	06:15	06:44		18:08 (SER2)	07:12			07:43	07:17	07:42
	17:33	18:10	18:39		20:10	30	18:40 (SER2)	20:39	20:56	20:45	20:09	42	18:50 (SER2)	19:19			18:33	17:03	17:04
25	07:38	07:04	06:21		17:58 (SER1)		18:11 (SER2)	06:02	05:57	06:16	06:44		18:07 (SER2)	07:13			06:44	07:19	07:43
	17:34	18:11	18:40	9	18:07 (SER1)		18:37 (SER2)	20:40	20:56	20:45	20:07	43	18:50 (SER2)	19:18			17:32	17:03	17:04
26	07:38	07:03	06:19		17:56 (SER1)		18:14 (SER2)	06:02	05:57	06:17	06:45		18:06 (SER2)	07:14			06:45	07:20	07:43
	17:36	18:12	18:41	14	18:10 (SER1)		18:36 (SER2)	20:41	20:56	20:44	20:06	44	18:50 (SER2)	19:16			17:31	17:02	17:05
27	07:37	07:01	06:18		17:23 (SER2)		18:17 (SER2)	06:01	05:58	06:18	06:46		18:06 (SER2)	07:15			06:46	07:21	07:44
	17:37	18:13	18:42	33	18:11 (SER1)		18:33 (SER2)	20:41	20:56	20:43	20:04	45	18:51 (SER2)	19:14			17:29	17:02	17:06
28	07:36	07:00	06:16		17:19 (SER2)		18:21 (SER2)	06:00	05:58	06:18	06:47		18:05 (SER2)	07:16			06:47	07:22	07:44
	17:38	18:14	18:43	41	18:11 (SER1)		18:27 (SER2)	20:42	20:56	20:42	20:03	46	18:51 (SER2)	19:13			17:28	17:01	17:06
29	07:35		07:15		18:17 (SER2)			06:00	05:58	06:19	06:48		18:04 (SER2)	07:17			06:48	07:23	07:44
	17:39		19:44	48	19:12 (SER1)			20:43	20:56	20:41	20:01	47	18:51 (SER2)	19:11			17:27	17:01	17:07
30	07:35		07:13		18:14 (SER2)			05:59	05:59	06:20	06:49		18:04 (SER2)	07:18			06:49	07:24	07:45
	17:40		19:45	52	19:11 (SER1)			20:44	20:56	20:40	20:00	47	18:51 (SER2)	19:10			17:26	17:01	17:08
31	07:34		07:11		18:13 (SER2)			05:59		06:21	06:50		18:02 (SER2)				06:50		17:45
	17:41		19:46	55	19:12 (SER1)			20:44		20:39	19:58	48	18:50 (SER2)				17:24		17:09
Potential sun hours	301	299	370		397			445	448	455	425			374			347	301	292
Total, worst case				252		1181						614			836				
Sun reduction				0,49		0,53						0,73			0,65				
Oper. time red.				0,91		0,91						0,91			0,91				
Wind dir. red.				0,78		0,78						0,78			0,78				
Total reduction				0,35		0,37						0,52			0,46				
Total, real				88		443						318			384				

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_19 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (19)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January		February		March			April			May			June		
1	07:45		07:33		06:59			07:10			06:26		18:54 (SER3)	05:58		18:55 (SER3)
	17:10		17:43		18:15			19:47			20:17	42	19:36 (SER3)	20:45	41	19:36 (SER3)
2	07:45		07:32		06:57			07:08			06:25		18:52 (SER3)	05:58		18:56 (SER3)
	17:10		17:44		18:16			19:48			20:18	44	19:36 (SER3)	20:46	40	19:36 (SER3)
3	07:45		07:31		06:56			07:07			06:23		18:52 (SER3)	05:58		18:57 (SER3)
	17:11		17:45		18:17			19:49			20:19	45	19:37 (SER3)	20:47	39	19:36 (SER3)
4	07:45		07:30		06:54			07:05			06:22		18:51 (SER3)	05:57		18:57 (SER3)
	17:12		17:46		18:18			19:50			20:20	46	19:37 (SER3)	20:47	38	19:35 (SER3)
5	07:45		07:29		06:53			07:03			06:21		18:51 (SER3)	05:57		18:58 (SER3)
	17:13		17:47		18:19			19:51			20:21	47	19:38 (SER3)	20:48	37	19:35 (SER3)
6	07:45		07:28		06:51		17:25 (SER2)	07:02			06:20		18:50 (SER3)	05:57		18:59 (SER3)
	17:14		17:49		18:20	8	17:33 (SER2)	19:52			20:22	48	19:38 (SER3)	20:49	36	19:35 (SER3)
7	07:45		07:27		06:50		17:20 (SER2)	07:00			06:19		18:50 (SER3)	05:56		19:00 (SER3)
	17:15		17:50		18:22	16	17:36 (SER2)	19:53			20:23	49	19:39 (SER3)	20:49	35	19:35 (SER3)
8	07:45		07:26		06:48		17:17 (SER2)	06:59			06:18		18:50 (SER3)	05:56		19:00 (SER3)
	17:16		17:51		18:23	20	17:37 (SER2)	19:54			20:24	49	19:39 (SER3)	20:50	34	19:34 (SER3)
9	07:45		07:25		06:46		17:16 (SER2)	06:57			06:16		18:49 (SER3)	05:56		19:00 (SER3)
	17:17		17:52		18:24	23	17:39 (SER2)	19:55			20:25	50	19:39 (SER3)	20:50	34	19:34 (SER3)
10	07:45		07:24		06:45		17:14 (SER2)	06:56			06:15		18:49 (SER3)	05:56		19:01 (SER3)
	17:18		17:53		18:25	26	17:40 (SER2)	19:56			20:26	51	19:40 (SER3)	20:51	33	19:34 (SER3)
11	07:45		07:22		06:43		17:13 (SER2)	06:54			06:14		18:49 (SER3)	05:56		19:02 (SER3)
	17:19		17:55		18:26	28	17:41 (SER2)	19:57			20:27	51	19:40 (SER3)	20:51	32	19:34 (SER3)
12	07:45		07:21		06:42		07:00 (SER6)	06:53			06:13		18:49 (SER3)	05:55		19:02 (SER3)
	17:20		17:56		18:27	38	17:41 (SER2)	19:58			20:28	51	19:40 (SER3)	20:52	32	19:34 (SER3)
13	07:44		07:20		06:40		06:59 (SER6)	06:51			06:12		18:49 (SER3)	05:55		19:03 (SER3)
	17:21		17:57		18:28	42	17:42 (SER2)	19:59			20:29	51	19:40 (SER3)	20:52	31	19:34 (SER3)
14	07:44		07:19		06:39		06:57 (SER6)	06:49			06:11		18:49 (SER3)	05:55		19:03 (SER3)
	17:22		17:58		18:29	46	17:42 (SER2)	20:00			20:30	51	19:40 (SER3)	20:53	31	19:34 (SER3)
15	07:44		07:18		06:37		06:55 (SER6)	06:48			06:10		18:49 (SER3)	05:55		19:04 (SER3)
	17:23		17:59		18:30	49	17:42 (SER2)	20:01			20:31	50	19:39 (SER3)	20:53	30	19:34 (SER3)
16	07:43		07:16		06:35		06:54 (SER6)	06:46			06:09		18:49 (SER3)	05:55		19:04 (SER3)
	17:24		18:00		18:31	50	17:42 (SER2)	20:02			20:32	50	19:39 (SER3)	20:54	30	19:34 (SER3)
17	07:43		07:15		06:34		06:53 (SER6)	06:45			06:08		18:49 (SER3)	05:55		19:05 (SER3)
	17:25		18:02		18:32	51	17:41 (SER2)	20:03			20:33	50	19:39 (SER3)	20:54	29	19:34 (SER3)
18	07:42		07:14		06:32		06:54 (SER6)	06:44			06:08		18:50 (SER3)	05:56		19:05 (SER3)
	17:26		18:03		18:33	49	17:41 (SER2)	20:04			20:34	50	19:40 (SER3)	20:54	28	19:33 (SER3)
19	07:42		07:13		06:31		06:53 (SER6)	06:42			06:07		18:50 (SER3)	05:56		19:05 (SER3)
	17:27		18:04		18:34	48	17:40 (SER2)	20:05			20:34	49	19:39 (SER3)	20:55	28	19:33 (SER3)
20	07:41		07:11		06:29		06:53 (SER6)	06:41			06:06		18:50 (SER3)	05:56		19:06 (SER3)
	17:29		18:05		18:35	45	17:39 (SER2)	20:06			20:35	49	19:39 (SER3)	20:55	28	19:34 (SER3)
21	07:41		07:10		06:27		06:55 (SER6)	06:39			06:05		18:50 (SER3)	05:56		19:06 (SER3)
	17:30		18:06		18:36	41	17:39 (SER2)	20:07			20:36	48	19:38 (SER3)	20:55	28	19:34 (SER3)
22	07:40		07:09		06:26		06:56 (SER6)	06:38			06:04		18:51 (SER3)	05:56		19:06 (SER3)
	17:31		18:07		18:37	36	17:37 (SER2)	20:08			20:37	48	19:39 (SER3)	20:55	28	19:34 (SER3)
23	07:40		07:07		06:24		17:12 (SER2)	06:36		19:10 (SER3)	06:04		18:51 (SER3)	05:56		19:06 (SER3)
	17:32		18:08		18:38	23	17:35 (SER2)	20:09	12	19:22 (SER3)	20:38	47	19:38 (SER3)	20:56	28	19:34 (SER3)
24	07:39		07:06		06:23		17:14 (SER2)	06:35		19:06 (SER3)	06:03		18:51 (SER3)	05:57		19:06 (SER3)
	17:33		18:10		18:39	20	17:34 (SER2)	20:10	20	19:26 (SER3)	20:39	47	19:38 (SER3)	20:56	28	19:34 (SER3)
25	07:38		07:04		06:21		17:16 (SER2)	06:34		19:03 (SER3)	06:02		18:52 (SER3)	05:57		19:07 (SER3)
	17:34		18:11		18:40	15	17:31 (SER2)	20:11	25	19:28 (SER3)	20:40	46	19:38 (SER3)	20:56	28	19:35 (SER3)
26	07:38		07:03		06:19		17:21 (SER2)	06:32		19:01 (SER3)	06:02		18:52 (SER3)	05:57		19:06 (SER3)
	17:36		18:12		18:41	5	17:26 (SER2)	20:12	29	19:30 (SER3)	20:41	46	19:38 (SER3)	20:56	30	19:36 (SER3)
27	07:37		07:01		06:18			06:31		18:59 (SER3)	06:01		18:53 (SER3)	05:58		19:06 (SER3)
	17:37		18:13		18:42			20:13	33	19:32 (SER3)	20:41	45	19:38 (SER3)	20:56	30	19:36 (SER3)
28	07:36		07:00		06:16			06:30		18:57 (SER3)	06:00		18:53 (SER3)	05:58		19:07 (SER3)
	17:38		18:14		18:43			20:14	36	19:33 (SER3)	20:42	44	19:37 (SER3)	20:56	30	19:37 (SER3)
29	07:35				07:15			06:28		18:56 (SER3)	06:00		18:54 (SER3)	05:58		19:06 (SER3)
	17:39				19:44			20:15	38	19:34 (SER3)	20:43	43	19:37 (SER3)	20:56	31	19:37 (SER3)
30	07:35				07:13			06:27		18:55 (SER3)	05:59		18:54 (SER3)	05:59		19:07 (SER3)
	17:40				19:45			20:16	40	19:35 (SER3)	20:44	43	19:37 (SER3)	20:56	31	19:38 (SER3)
31	07:34				07:11						05:59		18:55 (SER3)			
	17:41				19:46						20:44	42	19:37 (SER3)			
Potential sun hours	301		299		370			397			445			448		
Total, worst case						679			233			1472			958	
Sun reduction						0,49			0,53			0,59			0,66	
Oper. time red.						0,91			0,91			0,91			0,91	
Wind dir. red.						0,76			0,78			0,78			0,78	
Total reduction						0,34			0,38			0,42			0,47	
Total, real						230			88			616			451	

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_19 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (19)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	05:59		19:06 (SER3)	06:22		19:00 (SER3)	06:51			07:19		07:39 (SER6)	06:51	07:25
	20:56	32	19:38 (SER3)	20:38	50	19:50 (SER3)	19:57			19:08	40	18:21 (SER2)	17:23	17:00
2	06:00		19:06 (SER3)	06:23		18:59 (SER3)	06:52			07:20		07:40 (SER6)	06:53	07:26
	20:56	33	19:39 (SER3)	20:37	50	19:49 (SER3)	19:55			19:06	35	18:20 (SER2)	17:22	17:00
3	06:00		19:06 (SER3)	06:24		18:59 (SER3)	06:53			07:21		17:52 (SER2)	06:54	07:27
	20:56	33	19:39 (SER3)	20:36	50	19:49 (SER3)	19:54			19:05	27	18:19 (SER2)	17:21	17:00
4	06:01		19:06 (SER3)	06:25		18:59 (SER3)	06:54			07:22		17:53 (SER2)	06:55	07:28
	20:55	34	19:40 (SER3)	20:35	50	19:49 (SER3)	19:52			19:03	25	18:18 (SER2)	17:20	17:00
5	06:01		19:05 (SER3)	06:26		18:59 (SER3)	06:55			07:23		17:54 (SER2)	06:56	07:29
	20:55	35	19:40 (SER3)	20:34	50	19:49 (SER3)	19:50			19:02	22	18:16 (SER2)	17:19	17:00
6	06:02		19:05 (SER3)	06:27		19:00 (SER3)	06:56			07:24		17:55 (SER2)	06:57	07:30
	20:55	36	19:41 (SER3)	20:33	48	19:48 (SER3)	19:49			19:00	19	18:14 (SER2)	17:18	16:59
7	06:02		19:05 (SER3)	06:28		19:00 (SER3)	06:57			07:25		17:58 (SER2)	06:58	07:31
	20:55	36	19:41 (SER3)	20:31	48	19:48 (SER3)	19:47			18:58	12	18:10 (SER2)	17:17	16:59
8	06:03		19:05 (SER3)	06:28		19:00 (SER3)	06:58			07:26			06:59	07:32
	20:54	37	19:42 (SER3)	20:30	48	19:48 (SER3)	19:46			18:57			17:15	16:59
9	06:04		19:05 (SER3)	06:29		19:01 (SER3)	06:58			07:27			07:01	07:32
	20:54	38	19:43 (SER3)	20:29	46	19:47 (SER3)	19:44			18:55			17:14	16:59
10	06:04		19:04 (SER3)	06:30		19:01 (SER3)	06:59			07:28			07:02	07:33
	20:54	39	19:43 (SER3)	20:28	45	19:46 (SER3)	19:42			18:54			17:14	16:59
11	06:05		19:04 (SER3)	06:31		19:01 (SER3)	07:00			07:29			07:03	07:34
	20:53	40	19:44 (SER3)	20:27	43	19:44 (SER3)	19:41			18:52			17:13	16:59
12	06:06		19:04 (SER3)	06:32		19:02 (SER3)	07:01			07:30			07:04	07:35
	20:53	41	19:45 (SER3)	20:25	42	19:44 (SER3)	19:39			18:51			17:12	17:00
13	06:06		19:03 (SER3)	06:33		19:03 (SER3)	07:02			07:31			07:05	07:36
	20:52	42	19:45 (SER3)	20:24	40	19:43 (SER3)	19:37			18:49			17:11	17:00
14	06:07		19:03 (SER3)	06:34		19:04 (SER3)	07:03			07:32			07:06	07:36
	20:52	42	19:45 (SER3)	20:23	37	19:41 (SER3)	19:36			18:48			17:10	17:00
15	06:08		19:03 (SER3)	06:35		19:05 (SER3)	07:04			07:33			07:07	07:37
	20:51	43	19:46 (SER3)	20:21	35	19:40 (SER3)	19:34			18:46			17:09	17:00
16	06:09		19:02 (SER3)	06:36		19:06 (SER3)	07:05			07:34			07:09	07:38
	20:51	44	19:46 (SER3)	20:20	33	19:39 (SER3)	19:33			18:45			17:08	17:00
17	06:09		19:02 (SER3)	06:37		19:08 (SER3)	07:06			07:35			07:10	07:39
	20:50	45	19:47 (SER3)	20:19	29	19:37 (SER3)	19:31			18:43			17:08	17:01
18	06:10		19:02 (SER3)	06:38		19:10 (SER3)	07:07		18:05 (SER2)	07:36			07:11	07:39
	20:50	45	19:47 (SER3)	20:17	24	19:34 (SER3)	19:29	13	18:18 (SER2)	18:42			17:07	17:01
19	06:11		19:02 (SER3)	06:39		19:13 (SER3)	07:08		18:01 (SER2)	07:37			07:12	07:40
	20:49	46	19:48 (SER3)	20:16	18	19:31 (SER3)	19:28	18	18:19 (SER2)	18:40			17:06	17:01
20	06:12		19:01 (SER3)	06:40		19:17 (SER3)	07:09		17:59 (SER2)	07:38			07:13	07:40
	20:48	47	19:48 (SER3)	20:15	10	19:27 (SER3)	19:26	22	18:21 (SER2)	18:39			17:05	17:02
21	06:12		19:01 (SER3)	06:41			07:10		07:42 (SER6)	07:39			07:14	07:41
	20:48	47	19:48 (SER3)	20:13			19:24	33	18:22 (SER2)	18:37			17:05	17:02
22	06:13		19:01 (SER3)	06:42			07:11		07:40 (SER6)	07:40			07:15	07:41
	20:47	48	19:49 (SER3)	20:12			19:23	39	18:23 (SER2)	18:36			17:04	17:03
23	06:14		19:01 (SER3)	06:43			07:12		07:38 (SER6)	07:42			07:16	07:42
	20:46	48	19:49 (SER3)	20:10			19:21	44	18:23 (SER2)	18:35			17:04	17:03
24	06:15		19:00 (SER3)	06:44			07:12		07:37 (SER6)	07:43			07:17	07:42
	20:45	50	19:50 (SER3)	20:09			19:19	48	18:24 (SER2)	18:33			17:03	17:04
25	06:16		19:00 (SER3)	06:44			07:13		07:36 (SER6)	06:44			07:19	07:43
	20:45	50	19:50 (SER3)	20:07			19:18	49	18:24 (SER2)	17:32			17:03	17:04
26	06:17		18:59 (SER3)	06:45			07:14		07:36 (SER6)	06:45			07:20	07:43
	20:44	50	19:49 (SER3)	20:06			19:16	50	18:24 (SER2)	17:31			17:02	17:05
27	06:18		18:59 (SER3)	06:46			07:15		07:35 (SER6)	06:46			07:21	07:44
	20:43	51	19:50 (SER3)	20:04			19:14	52	18:24 (SER2)	17:29			17:02	17:06
28	06:18		18:59 (SER3)	06:47			07:16		07:36 (SER6)	06:47			07:22	07:44
	20:42	51	19:50 (SER3)	20:03			19:13	49	18:23 (SER2)	17:28			17:01	17:06
29	06:19		18:59 (SER3)	06:48			07:17		07:37 (SER6)	06:48			07:23	07:44
	20:41	51	19:50 (SER3)	20:01			19:11	47	18:23 (SER2)	17:27			17:01	17:07
30	06:20		18:59 (SER3)	06:49			07:18		07:38 (SER6)	06:49			07:24	07:44
	20:40	51	19:50 (SER3)	20:00			19:10	44	18:22 (SER2)	17:26			17:01	17:08
31	06:21		19:00 (SER3)	06:50						06:50				07:45
	20:39	50	19:50 (SER3)	19:58						17:24				17:09
Potential sun hours	455			425			374			347			301	292
Total, worst case		1335			796			508			180			
Sun reduction		0,74			0,73			0,65			0,54			
Oper. time red.		0,91			0,91			0,91			0,91			
Wind dir. red.		0,78			0,78			0,76			0,75			
Total reduction		0,52			0,52			0,45			0,37			
Total, real		700			414			227			67			

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_20 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (20)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April		May	June
1	07:45	07:33		06:59		17:18 (SER5)	07:10	18:13 (SER5)	06:26	05:58
	17:10	17:43		18:15	36	17:54 (SER5)	19:47	54	19:07 (SER5)	20:17	20:45
2	07:45	07:32		06:57		17:17 (SER5)	07:08	18:13 (SER5)	06:24	05:58
	17:10	17:44		18:16	38	17:55 (SER5)	19:48	52	19:05 (SER5)	20:18	20:46
3	07:45	07:31		06:56		17:15 (SER5)	07:06	18:15 (SER5)	06:23	05:58
	17:11	17:45		18:17	41	17:56 (SER5)	19:49	49	19:04 (SER5)	20:19	20:47
4	07:45	07:30		06:54		17:14 (SER5)	07:05	18:17 (SER5)	06:22	05:57
	17:12	17:46		18:18	44	17:58 (SER5)	19:50	44	19:01 (SER5)	20:20	20:47
5	07:45	07:29		06:53		17:13 (SER5)	07:03	18:18 (SER5)	06:21	05:57
	17:13	17:47		18:19	45	17:58 (SER5)	19:51	41	18:59 (SER5)	20:21	20:48
6	07:45	07:28		06:51		17:12 (SER5)	07:02	18:21 (SER5)	06:20	05:57
	17:14	17:49		18:20	48	18:00 (SER5)	19:52	35	18:56 (SER5)	20:22	20:49
7	07:45	07:27		06:49		17:11 (SER5)	07:00	18:23 (SER5)	06:19	05:56
	17:15	17:50		18:21	50	18:01 (SER5)	19:53	30	18:53 (SER5)	20:23	20:49
8	07:45	07:26		06:48		17:10 (SER5)	06:59	18:27 (SER5)	06:17	05:56
	17:16	17:51		18:23	51	18:01 (SER5)	19:54	22	18:49 (SER5)	20:24	20:50
9	07:45	07:25		06:46		17:10 (SER5)	06:57	18:32 (SER5)	06:16	05:56
	17:17	17:52		18:24	53	18:03 (SER5)	19:55	11	18:43 (SER5)	20:25	20:50
10	07:45	07:24		06:45		17:09 (SER5)	06:56		06:15	05:56
	17:18	17:53		18:25	55	18:04 (SER5)	19:56		20:26	20:51
11	07:45	07:22		06:43		17:09 (SER5)	06:54		06:14	05:56
	17:19	17:54		18:26	56	18:05 (SER5)	19:57		20:27	20:51
12	07:45	07:21		06:42		17:08 (SER5)	06:52		06:13	05:55
	17:20	17:56		18:27	58	18:06 (SER5)	19:58		20:28	20:52
13	07:44	07:20		06:40		17:08 (SER5)	06:51		06:12	05:55
	17:21	17:57		18:28	60	18:08 (SER5)	19:59		20:29	20:52
14	07:44	07:19		06:39		17:07 (SER5)	06:49		06:11	05:55
	17:22	17:58		18:29	61	18:08 (SER5)	20:00		20:30	20:53
15	07:44	07:18		06:37		17:06 (SER5)	06:48		06:10	05:55
	17:23	17:59		18:30	63	18:09 (SER5)	20:01		20:31	20:53
16	07:43	07:16		06:35		17:07 (SER5)	06:46		06:09	05:55
	17:24	18:00		18:31	64	18:11 (SER5)	20:02		20:32	20:54
17	07:43	07:15		06:34		17:06 (SER5)	06:45		06:08	05:55
	17:25	18:01		18:32	65	18:11 (SER5)	20:03		20:33	20:54
18	07:42	07:14	17:39 (SER4)	06:32		17:06 (SER5)	06:43		06:08	05:55
	17:26	18:03	2 17:41 (SER4)	18:33	66	18:12 (SER5)	20:04		20:34	20:54
19	07:42	07:13	17:37 (SER4)	06:31		17:06 (SER5)	06:42		06:07	05:56
	17:27	18:04	5 17:42 (SER4)	18:34	68	18:14 (SER5)	20:05		20:34	20:55
20	07:41	07:11	17:37 (SER4)	06:29		17:06 (SER5)	06:41		06:06	05:56
	17:28	18:05	6 17:43 (SER5)	18:35	68	18:14 (SER5)	20:06		20:35	20:55
21	07:41	07:10	17:36 (SER5)	06:27		17:07 (SER5)	06:39		06:05	05:56
	17:30	18:06	9 17:45 (SER5)	18:36	69	18:16 (SER5)	20:07		20:36	20:55
22	07:40	07:08	17:32 (SER5)	06:26		17:06 (SER5)	06:38		06:04	05:56
	17:31	18:07	13 17:45 (SER5)	18:37	70	18:16 (SER5)	20:08		20:37	20:55
23	07:40	07:07	17:29 (SER5)	06:24		17:06 (SER5)	06:36		06:04	05:56
	17:32	18:08	18 17:47 (SER5)	18:38	71	18:17 (SER5)	20:09		20:38	20:55
24	07:39	07:06	17:26 (SER5)	06:23		17:07 (SER5)	06:35		06:03	05:57
	17:33	18:09	22 17:48 (SER5)	18:39	70	18:17 (SER5)	20:10		20:39	20:56
25	07:38	07:04	17:24 (SER5)	06:21		17:07 (SER5)	06:34		06:02	05:57
	17:34	18:11	25 17:49 (SER5)	18:40	69	18:16 (SER5)	20:11		20:40	20:56
26	07:38	07:03	17:23 (SER5)	06:19		17:07 (SER5)	06:32		06:02	05:57
	17:35	18:12	28 17:51 (SER5)	18:41	67	18:14 (SER5)	20:12		20:40	20:56
27	07:37	07:01	17:21 (SER5)	06:18		17:08 (SER5)	06:31		06:01	05:57
	17:37	18:13	31 17:52 (SER5)	18:42	66	18:14 (SER5)	20:13		20:41	20:56
28	07:36	07:00	17:20 (SER5)	06:16		17:09 (SER5)	06:30		06:00	05:58
	17:38	18:14	33 17:53 (SER5)	18:43	64	18:13 (SER5)	20:14		20:42	20:56
29	07:35			07:14		18:10 (SER5)	06:28		06:00	05:58
	17:39			19:44	62	19:12 (SER5)	20:15		20:43	20:56
30	07:35			07:13		18:10 (SER5)	06:27		05:59	05:59
	17:40			19:45	60	19:10 (SER5)	20:16		20:44	20:56
31	07:34			07:11		18:11 (SER5)			05:59	
	17:41			19:46	57	19:08 (SER5)			20:44	
Potential sun hours	301	299		370		397		445	448
Total, worst case		192		1815		338			
Sun reduction		0,47		0,49		0,53			
Oper. time red.		0,91		0,91		0,91			
Wind dir. red.		0,75		0,76		0,76			
Total reduction		0,32		0,34		0,37			
Total, real		62		617		124			

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_20 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (20)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September			October			November	December
1	05:59	06:22	06:51			07:19		17:47 (SER5)	06:51	07:25
	20:56	20:38	19:57			19:08	59	18:46 (SER5)	17:23	17:00
2	06:00	06:23	06:52			07:20		17:47 (SER5)	06:53	07:26
	20:56	20:37	19:55			19:06	57	18:44 (SER5)	17:22	17:00
3	06:00	06:24	06:53		18:30 (SER5)	07:21		17:47 (SER5)	06:54	07:27
	20:56	20:36	19:53	11	18:41 (SER5)	19:05	56	18:43 (SER5)	17:21	17:00
4	06:01	06:25	06:54		18:24 (SER5)	07:22		17:47 (SER5)	06:55	07:28
	20:55	20:35	19:52	22	18:46 (SER5)	19:03	54	18:41 (SER5)	17:20	17:00
5	06:01	06:26	06:55		18:20 (SER5)	07:23		17:47 (SER5)	06:56	07:29
	20:55	20:34	19:50	30	18:50 (SER5)	19:01	53	18:40 (SER5)	17:19	16:59
6	06:02	06:27	06:56		18:17 (SER5)	07:24		17:48 (SER5)	06:57	07:30
	20:55	20:33	19:49	35	18:52 (SER5)	19:00	50	18:38 (SER5)	17:17	16:59
7	06:02	06:27	06:57		18:14 (SER5)	07:25		17:48 (SER5)	06:58	07:31
	20:55	20:31	19:47	40	18:54 (SER5)	18:58	48	18:36 (SER5)	17:16	16:59
8	06:03	06:28	06:57		18:12 (SER5)	07:26		17:48 (SER5)	06:59	07:31
	20:54	20:30	19:45	44	18:56 (SER5)	18:57	47	18:35 (SER5)	17:15	16:59
9	06:04	06:29	06:58		18:09 (SER5)	07:27		17:49 (SER5)	07:00	07:32
	20:54	20:29	19:44	48	18:57 (SER5)	18:55	44	18:33 (SER5)	17:14	16:59
10	06:04	06:30	06:59		18:07 (SER5)	07:28		17:49 (SER5)	07:02	07:33
	20:54	20:28	19:42	51	18:58 (SER5)	18:54	43	18:32 (SER5)	17:13	16:59
11	06:05	06:31	07:00		18:05 (SER5)	07:29		17:50 (SER5)	07:03	07:34
	20:53	20:27	19:41	54	18:59 (SER5)	18:52	40	18:30 (SER5)	17:12	16:59
12	06:06	06:32	07:01		18:03 (SER5)	07:30		17:51 (SER5)	07:04	07:35
	20:53	20:25	19:39	57	19:00 (SER5)	18:51	37	18:28 (SER5)	17:12	17:00
13	06:06	06:33	07:02		18:02 (SER5)	07:31		17:52 (SER5)	07:05	07:36
	20:52	20:24	19:37	59	19:01 (SER5)	18:49	35	18:27 (SER5)	17:11	17:00
14	06:07	06:34	07:03		18:00 (SER5)	07:32		17:53 (SER5)	07:06	07:36
	20:52	20:23	19:36	62	19:02 (SER5)	18:48	32	18:25 (SER5)	17:10	17:00
15	06:08	06:35	07:04		17:59 (SER5)	07:33		17:54 (SER5)	07:07	07:37
	20:51	20:21	19:34	64	19:03 (SER5)	18:46	29	18:23 (SER5)	17:09	17:00
16	06:08	06:36	07:05		17:58 (SER5)	07:34		17:55 (SER5)	07:08	07:38
	20:51	20:20	19:32	65	19:03 (SER5)	18:45	27	18:22 (SER5)	17:08	17:00
17	06:09	06:37	07:06		17:57 (SER5)	07:35		17:57 (SER5)	07:10	07:38
	20:50	20:19	19:31	67	19:04 (SER5)	18:43	23	18:20 (SER5)	17:07	17:01
18	06:10	06:38	07:07		17:55 (SER5)	07:36		17:58 (SER5)	07:11	07:39
	20:50	20:17	19:29	68	19:03 (SER5)	18:42	21	18:19 (SER5)	17:07	17:01
19	06:11	06:39	07:08		17:54 (SER5)	07:37		18:01 (SER5)	07:12	07:40
	20:49	20:16	19:28	69	19:03 (SER5)	18:40	16	18:17 (SER5)	17:06	17:01
20	06:12	06:40	07:09		17:53 (SER5)	07:38		18:03 (SER5)	07:13	07:40
	20:48	20:14	19:26	71	19:04 (SER5)	18:39	13	18:16 (SER5)	17:05	17:02
21	06:12	06:41	07:10		17:52 (SER5)	07:39		18:07 (SER4)	07:14	07:41
	20:48	20:13	19:24	70	19:02 (SER5)	18:37	8	18:15 (SER5)	17:05	17:02
22	06:13	06:42	07:11		17:51 (SER5)	07:40		18:08 (SER4)	07:15	07:41
	20:47	20:12	19:23	70	19:01 (SER5)	18:36	5	18:13 (SER4)	17:04	17:03
23	06:14	06:43	07:11		17:50 (SER5)	07:42		18:08 (SER4)	07:16	07:42
	20:46	20:10	19:21	69	18:59 (SER5)	18:35	4	18:12 (SER4)	17:04	17:03
24	06:15	06:43	07:12		17:50 (SER5)	07:43		18:09 (SER4)	07:17	07:42
	20:45	20:09	19:19	67	18:57 (SER5)	18:33	1	18:10 (SER4)	17:03	17:04
25	06:16	06:44	07:13		17:49 (SER5)	06:44			07:19	07:43
	20:44	20:07	19:18	67	18:56 (SER5)	17:32			17:02	17:04
26	06:17	06:45	07:14		17:49 (SER5)	06:45			07:20	07:43
	20:44	20:06	19:16	65	18:54 (SER5)	17:31			17:02	17:05
27	06:17	06:46	07:15		17:48 (SER5)	06:46			07:21	07:44
	20:43	20:04	19:14	65	18:53 (SER5)	17:29			17:02	17:06
28	06:18	06:47	07:16		17:48 (SER5)	06:47			07:22	07:44
	20:42	20:03	19:13	63	18:51 (SER5)	17:28			17:01	17:06
29	06:19	06:48	07:17		17:48 (SER5)	06:48			07:23	07:44
	20:41	20:01	19:11	61	18:49 (SER5)	17:27			17:01	17:07
30	06:20	06:49	07:18		17:47 (SER5)	06:49			07:24	07:44
	20:40	20:00	19:10	61	18:48 (SER5)	17:26			17:01	17:08
31	06:21	06:50				06:50				07:45
	20:39	19:58				17:24				17:09
Potential sun hours	455	425	374			347			301	292
Total, worst case				1575			802			
Sun reduction				0,65			0,54			
Oper. time red.				0,91			0,91			
Wind dir. red.				0,76			0,76			
Total reduction				0,45			0,37			
Total, real				705			300			

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

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

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_21 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (21)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June
1	07:45		16:17 (SER5)	07:33		16:25 (SER5)	06:59	07:10	06:26	05:58
	17:10	27	16:44 (SER5)	17:43	54	17:19 (SER5)	18:15	19:47	20:17	20:45
2	07:45		16:17 (SER5)	07:32		16:25 (SER5)	06:57	07:08	06:24	05:58
	17:10	28	16:45 (SER5)	17:44	55	17:20 (SER5)	18:16	19:48	20:18	20:46
3	07:45		16:17 (SER5)	07:31		16:26 (SER5)	06:56	07:06	06:23	05:58
	17:11	29	16:46 (SER5)	17:45	55	17:21 (SER5)	18:17	19:49	20:19	20:47
4	07:45		16:18 (SER5)	07:30		16:27 (SER5)	06:54	07:05	06:22	05:57
	17:12	29	16:47 (SER5)	17:46	56	17:23 (SER4)	18:18	19:50	20:20	20:47
5	07:45		16:18 (SER5)	07:29		16:28 (SER5)	06:53	07:03	06:21	05:57
	17:13	30	16:48 (SER5)	17:47	56	17:24 (SER4)	18:19	19:51	20:21	20:48
6	07:45		16:18 (SER5)	07:28		16:29 (SER5)	06:51	07:02	06:20	05:57
	17:14	31	16:49 (SER5)	17:49	56	17:25 (SER4)	18:20	19:52	20:22	20:49
7	07:45		16:19 (SER5)	07:27		16:30 (SER5)	06:49	07:00	06:19	05:56
	17:15	31	16:50 (SER5)	17:50	57	17:27 (SER4)	18:21	19:53	20:23	20:49
8	07:45		16:18 (SER5)	07:26		16:31 (SER5)	06:48	06:59	06:17	05:56
	17:16	32	16:50 (SER5)	17:51	57	17:28 (SER4)	18:23	19:54	20:24	20:50
9	07:45		16:18 (SER5)	07:25		16:32 (SER5)	06:46	06:57	06:16	05:56
	17:17	33	16:51 (SER5)	17:52	58	17:30 (SER4)	18:24	19:55	20:25	20:50
10	07:45		16:19 (SER5)	07:24		16:34 (SER5)	06:45	06:56	06:15	05:56
	17:18	34	16:53 (SER5)	17:53	57	17:31 (SER4)	18:25	19:56	20:26	20:51
11	07:45		16:19 (SER5)	07:22		16:36 (SER5)	06:43	06:54	06:14	05:56
	17:19	35	16:54 (SER5)	17:54	55	17:32 (SER4)	18:26	19:57	20:27	20:51
12	07:45		16:19 (SER5)	07:21		16:37 (SER5)	06:42	06:52	06:13	05:55
	17:20	35	16:54 (SER5)	17:56	48	17:30 (SER4)	18:27	19:58	20:28	20:52
13	07:44		16:19 (SER5)	07:20		16:39 (SER5)	06:40	06:51	06:12	05:55
	17:21	37	16:56 (SER5)	17:57	32	17:11 (SER5)	18:28	19:59	20:29	20:52
14	07:44		16:20 (SER5)	07:19		16:41 (SER5)	06:39	06:49	06:11	05:55
	17:22	37	16:57 (SER5)	17:58	28	17:09 (SER5)	18:29	20:00	20:30	20:53
15	07:44		16:19 (SER5)	07:18		16:45 (SER5)	06:37	06:48	06:10	05:55
	17:23	39	16:58 (SER5)	17:59	22	17:07 (SER5)	18:30	20:01	20:31	20:53
16	07:43		16:20 (SER5)	07:16		16:48 (SER5)	06:35	06:46	06:09	05:55
	17:24	39	16:59 (SER5)	18:00	14	17:02 (SER5)	18:31	20:02	20:32	20:54
17	07:43		16:19 (SER5)	07:15			06:34	06:45	06:08	05:55
	17:25	41	17:00 (SER5)	18:01			18:32	20:03	20:33	20:54
18	07:42		16:20 (SER5)	07:14			06:32	06:43	06:08	05:55
	17:26	42	17:02 (SER5)	18:03			18:33	20:04	20:34	20:54
19	07:42		16:20 (SER5)	07:13			06:31	06:42	06:07	05:56
	17:27	43	17:03 (SER5)	18:04			18:34	20:05	20:34	20:55
20	07:41		16:21 (SER5)	07:11			06:29	06:41	06:06	05:56
	17:28	43	17:04 (SER5)	18:05			18:35	20:06	20:35	20:55
21	07:41		16:21 (SER5)	07:10			06:27	06:39	06:05	05:56
	17:30	44	17:05 (SER5)	18:06			18:36	20:07	20:36	20:55
22	07:40		16:21 (SER5)	07:08			06:26	06:38	06:04	05:56
	17:31	45	17:06 (SER5)	18:07			18:37	20:08	20:37	20:55
23	07:40		16:21 (SER5)	07:07			06:24	06:36	06:04	05:56
	17:32	47	17:08 (SER5)	18:08			18:38	20:09	20:38	20:55
24	07:39		16:21 (SER5)	07:06			06:23	06:35	06:03	05:57
	17:33	48	17:09 (SER5)	18:09			18:39	20:10	20:39	20:56
25	07:38		16:22 (SER5)	07:04			06:21	06:34	06:02	05:57
	17:34	48	17:10 (SER5)	18:11			18:40	20:11	20:40	20:56
26	07:38		16:23 (SER5)	07:03			06:19	06:32	06:02	05:57
	17:35	49	17:12 (SER5)	18:12			18:41	20:12	20:40	20:56
27	07:37		16:23 (SER5)	07:01			06:18	06:31	06:01	05:57
	17:37	50	17:13 (SER5)	18:13			18:42	20:13	20:41	20:56
28	07:36		16:23 (SER5)	07:00			06:16	06:30	06:00	05:58
	17:38	51	17:14 (SER5)	18:14			18:43	20:14	20:42	20:56
29	07:35		16:23 (SER5)				07:14	06:28	06:00	05:58
	17:39	52	17:15 (SER5)				19:44	20:15	20:43	20:56
30	07:35		16:24 (SER5)				07:13	06:27	05:59	05:59
	17:40	52	17:16 (SER5)				19:45	20:16	20:44	20:56
31	07:34		16:24 (SER5)				07:11		05:59	
	17:41	54	17:18 (SER5)				19:46		20:44	
Potential sun hours	301			299			370	397	445	448
Total, worst case		1235			760					
Sun reduction		0,45			0,47					
Oper. time red.		0,91			0,91					
Wind dir. red.		0,67			0,68					
Total reduction		0,28			0,29					
Total, real		340			220					

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: Shadow flickering **Shadow receptor:** RIC_21 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (21)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October			November			December		
1	05:59	06:22	06:51	07:19			06:51		16:03 (SER5)	07:25		16:01 (SER5)
	20:56	20:38	19:57	19:08			17:23	57	17:00 (SER4)	17:00	35	16:36 (SER5)
2	06:00	06:23	06:52	07:20			06:53		16:02 (SER5)	07:26		16:02 (SER5)
	20:56	20:37	19:55	19:06			17:22	57	16:59 (SER4)	17:00	34	16:36 (SER5)
3	06:00	06:24	06:53	07:21			06:54		16:01 (SER5)	07:27		16:02 (SER5)
	20:56	20:36	19:53	19:05			17:21	57	16:58 (SER4)	17:00	33	16:35 (SER5)
4	06:01	06:25	06:54	07:22			06:55		16:00 (SER5)	07:28		16:03 (SER5)
	20:55	20:35	19:52	19:03			17:20	56	16:56 (SER4)	17:00	32	16:35 (SER5)
5	06:01	06:26	06:55	07:23			06:56		15:59 (SER5)	07:29		16:04 (SER5)
	20:55	20:34	19:50	19:01			17:19	56	16:55 (SER4)	16:59	31	16:35 (SER5)
6	06:02	06:27	06:56	07:24			06:57		15:58 (SER5)	07:30		16:04 (SER5)
	20:55	20:33	19:49	19:00			17:17	56	16:54 (SER4)	16:59	31	16:35 (SER5)
7	06:02	06:27	06:57	07:25			06:58		15:58 (SER5)	07:31		16:05 (SER5)
	20:55	20:31	19:47	18:58			17:16	55	16:53 (SER4)	16:59	30	16:35 (SER5)
8	06:03	06:28	06:57	07:26			06:59		15:57 (SER5)	07:31		16:06 (SER5)
	20:54	20:30	19:45	18:57			17:15	55	16:52 (SER5)	16:59	29	16:35 (SER5)
9	06:04	06:29	06:58	07:27			07:00		15:56 (SER5)	07:32		16:06 (SER5)
	20:54	20:29	19:44	18:55			17:14	55	16:51 (SER5)	16:59	28	16:34 (SER5)
10	06:04	06:30	06:59	07:28			07:02		15:56 (SER5)	07:33		16:06 (SER5)
	20:54	20:28	19:42	18:54			17:13	54	16:50 (SER5)	16:59	28	16:34 (SER5)
11	06:05	06:31	07:00	07:29			07:03		15:56 (SER5)	07:34		16:07 (SER5)
	20:53	20:27	19:41	18:52			17:12	53	16:49 (SER5)	16:59	27	16:34 (SER5)
12	06:06	06:32	07:01	07:30			07:04		15:56 (SER5)	07:35		16:08 (SER5)
	20:53	20:25	19:39	18:51			17:12	52	16:48 (SER5)	17:00	27	16:35 (SER5)
13	06:06	06:33	07:02	07:31			07:05		15:55 (SER5)	07:36		16:09 (SER5)
	20:52	20:24	19:37	18:49			17:11	52	16:47 (SER5)	17:00	26	16:35 (SER5)
14	06:07	06:34	07:03	07:32			07:06		15:55 (SER5)	07:36		16:09 (SER5)
	20:52	20:23	19:36	18:48			17:10	51	16:46 (SER5)	17:00	26	16:35 (SER5)
15	06:08	06:35	07:04	07:33			07:07		15:55 (SER5)	07:37		16:10 (SER5)
	20:51	20:21	19:34	18:46			17:09	50	16:45 (SER5)	17:00	25	16:35 (SER5)
16	06:08	06:36	07:05	07:34			07:08		15:56 (SER5)	07:38		16:11 (SER5)
	20:51	20:20	19:32	18:45			17:08	49	16:45 (SER5)	17:00	25	16:36 (SER5)
17	06:09	06:37	07:06	07:35			07:10		15:56 (SER5)	07:38		16:10 (SER5)
	20:50	20:19	19:31	18:43			17:07	48	16:44 (SER5)	17:01	25	16:35 (SER5)
18	06:10	06:38	07:07	07:36			07:11		15:55 (SER5)	07:39		16:11 (SER5)
	20:50	20:17	19:29	18:42			17:07	48	16:43 (SER5)	17:01	25	16:36 (SER5)
19	06:11	06:39	07:08	07:37			07:12		15:55 (SER5)	07:40		16:12 (SER5)
	20:49	20:16	19:28	18:40			17:06	47	16:42 (SER5)	17:01	25	16:37 (SER5)
20	06:12	06:40	07:09	07:38			07:13		15:56 (SER5)	07:40		16:12 (SER5)
	20:48	20:14	19:26	18:39			17:05	45	16:41 (SER5)	17:02	25	16:37 (SER5)
21	06:12	06:41	07:10	07:39			07:14		15:57 (SER5)	07:41		16:13 (SER5)
	20:48	20:13	19:24	18:37			17:05	44	16:41 (SER5)	17:02	24	16:37 (SER5)
22	06:13	06:42	07:11	07:40			07:15		15:57 (SER5)	07:41		16:13 (SER5)
	20:47	20:12	19:23	18:36			17:04	43	16:40 (SER5)	17:03	24	16:37 (SER5)
23	06:14	06:43	07:11	07:42			07:16		15:57 (SER5)	07:42		16:13 (SER5)
	20:46	20:10	19:21	18:35			17:04	43	16:40 (SER5)	17:03	25	16:38 (SER5)
24	06:15	06:43	07:12	07:43			07:17		15:57 (SER5)	07:42		16:14 (SER5)
	20:45	20:09	19:19	18:33			17:03	42	16:39 (SER5)	17:04	25	16:39 (SER5)
25	06:16	06:44	07:13	06:44			07:19		15:57 (SER5)	07:43		16:14 (SER5)
	20:44	20:07	19:18	17:32			17:02	41	16:38 (SER5)	17:04	25	16:39 (SER5)
26	06:17	06:45	07:14	06:45		16:17 (SER5)	07:20		15:58 (SER5)	07:43		16:15 (SER5)
	20:44	20:06	19:16	17:31	16	16:33 (SER5)	17:02	40	16:38 (SER5)	17:05	25	16:40 (SER5)
27	06:17	06:46	07:15	06:46		16:14 (SER5)	07:21		15:58 (SER5)	07:44		16:16 (SER5)
	20:43	20:04	19:14	17:29	23	16:37 (SER5)	17:02	39	16:37 (SER5)	17:06	24	16:40 (SER5)
28	06:18	06:47	07:16	06:47		16:11 (SER5)	07:22		16:00 (SER5)	07:44		16:16 (SER5)
	20:42	20:03	19:13	17:28	29	16:40 (SER5)	17:01	37	16:37 (SER5)	17:06	25	16:41 (SER5)
29	06:19	06:48	07:17	06:48		16:08 (SER5)	07:23		16:00 (SER5)	07:44		16:16 (SER5)
	20:41	20:01	19:11	17:27	38	16:56 (SER4)	17:01	37	16:37 (SER5)	17:07	25	16:41 (SER5)
30	06:20	06:49	07:18	06:49		16:06 (SER5)	07:24		16:01 (SER5)	07:44		16:17 (SER5)
	20:40	20:00	19:10	17:26	50	17:00 (SER4)	17:01	35	16:36 (SER5)	17:08	26	16:43 (SER5)
31	06:21	06:50		06:50		16:04 (SER5)				07:45		16:17 (SER5)
	20:39	19:58		17:24	57	17:01 (SER4)				17:08	27	16:44 (SER5)
Potential sun hours	455	425	374	347			301			292		
Total, worst case					213			1454			842	
Sun reduction					0,54			0,51			0,45	
Oper. time red.					0,91			0,91			0,91	
Wind dir. red.					0,67			0,67			0,67	
Total reduction					0,33			0,31			0,28	
Total, real					71			449			232	

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_22 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (22)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April			May			June		
1	07:45			07:33		07:52 (SER8)	06:59	07:10		19:09 (SER2)	06:26			05:58		
	17:10			17:43	18	08:10 (SER8)	18:15	19:47	9	19:18 (SER2)	20:17			20:45		
2	07:45			07:32		07:51 (SER8)	06:57	07:08		19:06 (SER2)	06:25			05:58		
	17:10			17:44	19	08:10 (SER8)	18:16	19:48	14	19:20 (SER2)	20:18			20:46		
3	07:45			07:31		07:50 (SER8)	06:56	07:07		19:05 (SER2)	06:23			05:58		
	17:11			17:45	20	08:10 (SER8)	18:17	19:49	17	19:22 (SER2)	20:19			20:47		
4	07:45			07:30		07:49 (SER8)	06:54	07:05		07:29 (SER6)	06:22		19:49 (SER3)	05:57		
	17:12			17:46	21	08:10 (SER8)	18:18	19:50	30	19:22 (SER2)	20:20	6	19:55 (SER3)	20:47		
5	07:45			07:29		07:50 (SER8)	06:53	07:03		07:26 (SER6)	06:21		19:46 (SER3)	05:57		
	17:13			17:47	20	08:10 (SER8)	18:19	19:51	37	19:23 (SER2)	20:21	12	19:58 (SER3)	20:48		
6	07:45			07:28		07:51 (SER8)	06:51	07:02		07:24 (SER6)	06:20		19:44 (SER3)	05:57		
	17:14			17:49	19	08:10 (SER8)	18:20	19:52	40	19:22 (SER2)	20:22	15	19:59 (SER3)	20:49		
7	07:45			07:27		07:52 (SER8)	06:50	07:00		07:22 (SER6)	06:19		19:43 (SER3)	05:56		
	17:15			17:50	17	08:09 (SER8)	18:21	19:53	44	19:22 (SER2)	20:23	17	20:00 (SER3)	20:49		
8	07:45			07:26		07:53 (SER8)	06:48	06:59		07:21 (SER6)	06:17		19:42 (SER3)	05:56		
	17:16			17:51	15	08:08 (SER8)	18:23	19:54	45	19:22 (SER2)	20:24	19	20:01 (SER3)	20:50		
9	07:45			07:25		07:55 (SER8)	06:46	06:57		07:19 (SER6)	06:16		19:41 (SER3)	05:56		
	17:17			17:52	11	08:06 (SER8)	18:24	19:55	47	19:21 (SER2)	20:25	21	20:02 (SER3)	20:50		
10	07:45			07:24		08:00 (SER8)	06:45	06:56		07:19 (SER6)	06:15		19:41 (SER3)	05:56		
	17:18			17:53	2	08:02 (SER8)	18:25	19:56	47	19:21 (SER2)	20:26	22	20:03 (SER3)	20:51		
11	07:45			07:22			06:43	06:54		07:18 (SER6)	06:14		19:40 (SER3)	05:56		
	17:19			17:55			18:26	19:57	45	19:19 (SER2)	20:27	24	20:04 (SER3)	20:51		
12	07:45			07:21			06:42	06:52		07:18 (SER6)	06:13		19:40 (SER3)	05:55		
	17:20			17:56			18:27	19:58	43	19:18 (SER2)	20:28	25	20:05 (SER3)	20:52		
13	07:44			07:20			06:40	06:51		07:17 (SER6)	06:12		19:39 (SER3)	05:55		
	17:21			17:57			18:28	19:59	39	19:15 (SER2)	20:29	26	20:05 (SER3)	20:52		
14	07:44			07:19			06:39	06:49		07:17 (SER6)	06:11		19:39 (SER3)	05:55		
	17:22			17:58			18:29	20:00	31	19:11 (SER2)	20:30	26	20:05 (SER3)	20:53		
15	07:44			07:18			06:37	06:48		07:17 (SER6)	06:10		19:39 (SER3)	05:55		
	17:23			17:59			18:30	20:01	28	07:45 (SER6)	20:31	26	20:05 (SER3)	20:53		
16	07:43			07:16			06:35	06:46		07:17 (SER6)	06:09		19:39 (SER3)	05:55		
	17:24			18:00			18:31	20:02	28	07:45 (SER6)	20:32	26	20:05 (SER3)	20:54		
17	07:43			07:15			06:34	06:45		07:17 (SER6)	06:08		19:39 (SER3)	05:55		
	17:25			18:02			18:32	20:03	26	07:43 (SER6)	20:33	25	20:04 (SER3)	20:54		
18	07:42			07:14			06:32	06:44		07:18 (SER6)	06:08		19:40 (SER3)	05:55		
	17:26			18:03			18:33	20:04	25	07:43 (SER6)	20:34	25	20:05 (SER3)	20:54		
19	07:42			07:13			06:31	06:42		07:18 (SER6)	06:07		19:40 (SER3)	05:56		
	17:27			18:04			18:34	20:05	23	07:41 (SER6)	20:34	25	20:05 (SER3)	20:55		
20	07:41			07:11			06:29	06:41		07:20 (SER6)	06:06		19:40 (SER3)	05:56		
	17:29			18:05			18:35	20:06	20	07:40 (SER6)	20:35	24	20:04 (SER3)	20:55		
21	07:41			07:10			06:27	06:39		07:22 (SER6)	06:05		19:40 (SER3)	05:56		
	17:30			18:06			18:36	20:07	16	07:38 (SER6)	20:36	24	20:04 (SER3)	20:55		
22	07:40			07:08			06:26	06:38		07:23 (SER6)	06:04		19:41 (SER3)	05:56		
	17:31			18:07			18:37	20:08	12	07:35 (SER6)	20:37	23	20:04 (SER3)	20:55		
23	07:40		08:00 (SER8)	07:07			06:24	06:36			06:04		19:41 (SER3)	05:56		
	17:32	1	08:01 (SER8)	18:08			18:38	20:09			20:38	22	20:03 (SER3)	20:55		
24	07:39		07:59 (SER8)	07:06			06:23	06:35			06:03		19:42 (SER3)	05:57		
	17:33	4	08:03 (SER8)	18:09			18:39	20:10			20:39	20	20:02 (SER3)	20:56		
25	07:38		07:58 (SER8)	07:04			06:21	06:34			06:02		19:43 (SER3)	05:57		
	17:34	7	08:05 (SER8)	18:11			18:40	20:11			20:40	19	20:02 (SER3)	20:56		
26	07:38		07:58 (SER8)	07:03			06:19	06:32			06:02		19:43 (SER3)	05:57		
	17:35	9	08:07 (SER8)	18:12			18:41	20:12			20:40	18	20:01 (SER3)	20:56		
27	07:37		07:57 (SER8)	07:01			06:18	06:31			06:01		19:45 (SER3)	05:58		
	17:37	11	08:08 (SER8)	18:13			18:42	20:13			20:41	16	20:01 (SER3)	20:56		
28	07:36		07:56 (SER8)	07:00			06:16	06:30			06:00		19:45 (SER3)	05:58		
	17:38	13	08:09 (SER8)	18:14			18:43	20:14			20:42	15	20:00 (SER3)	20:56		
29	07:35		07:55 (SER8)				07:15	06:28			06:00		19:47 (SER3)	05:58		
	17:39	14	08:09 (SER8)				19:44	20:15			20:43	13	20:00 (SER3)	20:56		
30	07:35		07:54 (SER8)				07:13	06:27			05:59		19:48 (SER3)	05:59		
	17:40	16	08:10 (SER8)				19:45	20:16			20:44	10	19:58 (SER3)	20:56		
31	07:34		07:53 (SER8)				07:11				05:59		19:51 (SER3)			
	17:41	17	08:10 (SER8)				19:46				20:44	5	19:56 (SER3)			
Potential sun hours	301			299			370	397			445			448		
Total, worst case		92			162				666			549				
Sun reduction		0,45			0,47				0,53			0,59				
Oper. time red.		0,91			0,91				0,91			0,91				
Wind dir. red.		0,77			0,77				0,78			0,78				
Total reduction		0,32			0,33				0,37			0,42				
Total, real		29			54				249			229				

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_22 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (22)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November			December
1	05:59			06:22		19:50 (SER3)	06:51		07:17 (SER6)	07:19	06:51		07:27 (SER8)	07:25
	20:56			20:38	25	20:15 (SER3)	19:57	45	19:18 (SER2)	19:08	17:23	5	07:32 (SER8)	17:00
2	06:00			06:23		19:50 (SER3)	06:52		07:17 (SER6)	07:20	06:53		07:25 (SER8)	07:26
	20:56			20:37	23	20:13 (SER3)	19:55	47	19:19 (SER2)	19:06	17:22	11	07:36 (SER8)	17:00
3	06:00			06:24		19:50 (SER3)	06:53		07:17 (SER6)	07:21	06:54		07:23 (SER8)	07:27
	20:56			20:36	23	20:13 (SER3)	19:53	47	19:19 (SER2)	19:05	17:21	15	07:38 (SER8)	17:00
4	06:01			06:25		19:51 (SER3)	06:54		07:18 (SER6)	07:22	06:55		07:22 (SER8)	07:28
	20:55			20:35	21	20:12 (SER3)	19:52	45	19:19 (SER2)	19:03	17:20	17	07:39 (SER8)	17:00
5	06:01			06:26		19:52 (SER3)	06:55		07:19 (SER6)	07:23	06:56		07:21 (SER8)	07:29
	20:55			20:34	19	20:11 (SER3)	19:50	44	19:19 (SER2)	19:02	17:19	19	07:40 (SER8)	17:00
6	06:02			06:27		19:53 (SER3)	06:56		07:20 (SER6)	07:24	06:57		07:20 (SER8)	07:30
	20:55			20:33	17	20:10 (SER3)	19:49	40	19:18 (SER2)	19:00	17:18	20	07:40 (SER8)	16:59
7	06:02			06:28		19:55 (SER3)	06:57		07:21 (SER6)	07:25	06:58		07:20 (SER8)	07:31
	20:55			20:31	14	20:09 (SER3)	19:47	37	19:18 (SER2)	18:58	17:16	21	07:41 (SER8)	16:59
8	06:03			06:28		19:57 (SER3)	06:58		07:23 (SER6)	07:26	06:59		07:21 (SER8)	07:31
	20:54			20:30	10	20:07 (SER3)	19:46	31	19:17 (SER2)	18:57	17:15	20	07:41 (SER8)	16:59
9	06:04			06:29		20:01 (SER3)	06:58		18:58 (SER2)	07:27	07:01		07:22 (SER8)	07:32
	20:54			20:29	1	20:02 (SER3)	19:44	17	19:15 (SER2)	18:55	17:14	19	07:41 (SER8)	16:59
10	06:04			06:30			06:59		18:59 (SER2)	07:28	07:02		07:23 (SER8)	07:33
	20:54			20:28			19:42	14	19:13 (SER2)	18:54	17:13	18	07:41 (SER8)	16:59
11	06:05			06:31			07:00		19:01 (SER2)	07:29	07:03		07:25 (SER8)	07:34
	20:53			20:27			19:41	10	19:11 (SER2)	18:52	17:13	17	07:42 (SER8)	16:59
12	06:06		20:00 (SER3)	06:32			07:01			07:30	07:04		07:26 (SER8)	07:35
	20:53	3	20:03 (SER3)	20:25			19:39			18:51	17:12	16	07:42 (SER8)	17:00
13	06:06		19:57 (SER3)	06:33			07:02			07:31	07:05		07:27 (SER8)	07:36
	20:52	8	20:05 (SER3)	20:24			19:37			18:49	17:11	14	07:41 (SER8)	17:00
14	06:07		19:56 (SER3)	06:34			07:03			07:32	07:06		07:28 (SER8)	07:36
	20:52	11	20:07 (SER3)	20:23			19:36			18:48	17:10	13	07:41 (SER8)	17:00
15	06:08		19:55 (SER3)	06:35			07:04			07:33	07:07		07:29 (SER8)	07:37
	20:51	14	20:09 (SER3)	20:21			19:34			18:46	17:09	11	07:40 (SER8)	17:00
16	06:08		19:54 (SER3)	06:36			07:05			07:34	07:08		07:31 (SER8)	07:38
	20:51	15	20:09 (SER3)	20:20			19:32			18:45	17:08	9	07:40 (SER8)	17:00
17	06:09		19:53 (SER3)	06:37			07:06			07:35	07:10		07:32 (SER8)	07:38
	20:50	17	20:10 (SER3)	20:19			19:31			18:43	17:07	7	07:39 (SER8)	17:01
18	06:10		19:53 (SER3)	06:38			07:07			07:36	07:11		07:33 (SER8)	07:39
	20:50	18	20:11 (SER3)	20:17			19:29			18:42	17:07	4	07:37 (SER8)	17:01
19	06:11		19:52 (SER3)	06:39			07:08			07:37	07:12		07:34 (SER8)	07:40
	20:49	20	20:12 (SER3)	20:16			19:28			18:40	17:06	1	07:35 (SER8)	17:01
20	06:12		19:51 (SER3)	06:40		07:33 (SER6)	07:09			07:38	07:13			07:40
	20:48	21	20:12 (SER3)	20:15	4	07:37 (SER6)	19:26			18:39	17:05			17:02
21	06:12		19:51 (SER3)	06:41		07:27 (SER6)	07:10			07:39	07:14			07:41
	20:48	22	20:13 (SER3)	20:13	13	07:40 (SER6)	19:24			18:37	17:05			17:02
22	06:13		19:51 (SER3)	06:42		07:25 (SER6)	07:11			07:40	07:15			07:41
	20:47	23	20:14 (SER3)	20:12	17	07:42 (SER6)	19:23			18:36	17:04			17:03
23	06:14		19:50 (SER3)	06:43		07:23 (SER6)	07:11			07:42	07:16			07:42
	20:46	24	20:14 (SER3)	20:10	21	07:44 (SER6)	19:21			18:35	17:04			17:03
24	06:15		19:50 (SER3)	06:44		07:22 (SER6)	07:12			07:43	07:17			07:42
	20:45	25	20:15 (SER3)	20:09	23	07:45 (SER6)	19:19			18:33	17:03			17:04
25	06:16		19:50 (SER3)	06:44		07:21 (SER6)	07:13			06:44	07:19			07:43
	20:44	25	20:15 (SER3)	20:07	25	07:46 (SER6)	19:18			17:32	17:03			17:04
26	06:17		19:49 (SER3)	06:45		07:20 (SER6)	07:14			06:45	07:20			07:43
	20:44	26	20:15 (SER3)	20:06	26	07:46 (SER6)	19:16			17:31	17:02			17:05
27	06:18		19:49 (SER3)	06:46		07:19 (SER6)	07:15			06:46	07:21			07:44
	20:43	26	20:15 (SER3)	20:04	28	07:47 (SER6)	19:14			17:29	17:02			17:06
28	06:18		19:49 (SER3)	06:47		07:19 (SER6)	07:16			06:47	07:22			07:44
	20:42	26	20:15 (SER3)	20:03	28	07:47 (SER6)	19:13			17:28	17:01			17:06
29	06:19		19:50 (SER3)	06:48		07:18 (SER6)	07:17			06:48	07:23			07:44
	20:41	25	20:15 (SER3)	20:01	33	19:13 (SER2)	19:11			17:27	17:01			17:07
30	06:20		19:50 (SER3)	06:49		07:18 (SER6)	07:18			06:49	07:24			07:44
	20:40	25	20:15 (SER3)	20:00	40	19:16 (SER2)	19:10			17:26	17:01			17:08
31	06:21		19:50 (SER3)	06:50		07:17 (SER6)				06:50				07:45
	20:39	25	20:15 (SER3)	19:58	44	19:17 (SER2)				17:24				17:09
Potential sun hours	455			425			374			347	301			292
Total, worst case		399			455			377				257		
Sun reduction		0,74			0,73			0,65				0,51		
Oper. time red.		0,91			0,91			0,91				0,91		
Wind dir. red.		0,78			0,78			0,78				0,77		
Total reduction		0,52			0,52			0,46				0,35		
Total, real		209			234			173				91		

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_23 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (23)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April			May			June		
1	07:45		11:37 (SER6)	07:33		12:11 (SER6)	06:58	07:10			06:26			05:58		20:05 (SER5)
	17:10	142	13:59 (SER6)	17:43	98	13:49 (SER6)	18:15	19:47			20:17			20:45	16	20:21 (SER5)
2	07:45		11:38 (SER6)	07:32		12:14 (SER6)	06:57	07:08			06:24			05:58		20:06 (SER5)
	17:10	141	13:59 (SER6)	17:44	93	13:47 (SER6)	18:16	19:48			20:18			20:46	16	20:22 (SER5)
3	07:45		11:39 (SER6)	07:31		12:17 (SER6)	06:56	07:06			06:23			05:58		20:07 (SER5)
	17:11	141	14:00 (SER6)	17:45	88	13:45 (SER6)	18:17	19:49			20:19			20:47	16	20:23 (SER5)
4	07:45		11:39 (SER6)	07:30		12:20 (SER6)	06:54	07:05			06:22			05:57		20:08 (SER5)
	17:12	141	14:00 (SER6)	17:46	83	13:43 (SER6)	18:18	19:50			20:20			20:47	13	20:21 (SER5)
5	07:45		11:40 (SER6)	07:29		12:24 (SER6)	06:52	07:03			06:21			05:57		20:09 (SER5)
	17:13	140	14:00 (SER6)	17:47	76	13:40 (SER6)	18:19	19:51			20:21			20:48	11	20:20 (SER5)
6	07:45		11:41 (SER6)	07:28		12:28 (SER6)	06:51	07:02			06:20			05:57		20:11 (SER5)
	17:14	139	14:00 (SER6)	17:49	69	13:37 (SER6)	18:20	19:52			20:22			20:48	8	20:19 (SER5)
7	07:45		11:41 (SER6)	07:27		12:34 (SER6)	06:49	07:00			06:19			05:56		20:13 (SER5)
	17:15	140	14:01 (SER6)	17:50	59	13:33 (SER6)	18:21	19:53			20:23			20:49	4	20:17 (SER5)
8	07:45		11:41 (SER6)	07:26		12:40 (SER6)	06:48	06:59			06:17		20:00 (SER5)	05:56		
	17:16	139	14:00 (SER6)	17:51	48	13:28 (SER6)	18:23	19:54			20:24	1	20:01 (SER5)	20:50		
9	07:45		11:42 (SER6)	07:25		12:51 (SER6)	06:46	06:57			06:16		20:00 (SER5)	05:56		
	17:17	138	14:00 (SER6)	17:52	29	13:20 (SER6)	18:24	19:55			20:25	2	20:02 (SER5)	20:50		
10	07:45		11:43 (SER6)	07:24			06:45	06:55			06:15		19:59 (SER5)	05:56		
	17:18	138	14:01 (SER6)	17:53			18:25	19:56			20:26	4	20:03 (SER5)	20:51		
11	07:45		11:44 (SER6)	07:22			06:43	06:54		19:35 (SER4)	06:14		19:59 (SER5)	05:56		
	17:19	137	14:01 (SER6)	17:54			18:26	19:57	1	19:36 (SER4)	20:27	5	20:04 (SER5)	20:51		
12	07:44		11:44 (SER6)	07:21			06:42	06:52		19:36 (SER4)	06:13		19:58 (SER5)	05:55		
	17:20	136	14:00 (SER6)	17:56			18:27	19:58	1	19:37 (SER4)	20:28	7	20:05 (SER5)	20:52		
13	07:44		11:46 (SER6)	07:20			06:40	06:51		19:35 (SER4)	06:12		19:58 (SER5)	05:55		
	17:21	135	14:01 (SER6)	17:57			18:28	19:59	2	19:37 (SER4)	20:29	8	20:06 (SER5)	20:52		
14	07:44		11:47 (SER6)	07:19			06:39	06:49		19:36 (SER4)	06:11		19:58 (SER5)	05:55		
	17:22	134	14:01 (SER6)	17:58			18:29	20:00	3	19:39 (SER4)	20:30	9	20:07 (SER5)	20:53		
15	07:44		11:47 (SER6)	07:18			06:37	06:48		19:36 (SER4)	06:10		19:57 (SER5)	05:55		
	17:23	133	14:00 (SER6)	17:59			18:30	20:01	3	19:39 (SER4)	20:31	10	20:07 (SER5)	20:53		
16	07:43		11:49 (SER6)	07:16			06:35	06:46		19:37 (SER4)	06:09		19:57 (SER5)	05:55		
	17:24	132	14:01 (SER6)	18:00			18:31	20:02	4	19:41 (SER4)	20:32	11	20:08 (SER5)	20:54		
17	07:43		11:49 (SER6)	07:15			06:34	06:45		19:38 (SER4)	06:08		19:57 (SER5)	05:55		
	17:25	131	14:00 (SER6)	18:01			18:32	20:03	3	19:41 (SER4)	20:33	12	20:09 (SER5)	20:54		
18	07:42		11:50 (SER6)	07:14			06:32	06:43		19:41 (SER4)	06:08		19:57 (SER5)	05:55		
	17:26	130	14:00 (SER6)	18:03			18:33	20:04	2	19:43 (SER4)	20:33	12	20:09 (SER5)	20:54		
19	07:42		11:51 (SER6)	07:12			06:31	06:42			06:07		19:58 (SER5)	05:56		
	17:27	129	14:00 (SER6)	18:04			18:34	20:05			20:34	13	20:11 (SER5)	20:55		
20	07:41		11:53 (SER6)	07:11			06:29	06:41			06:06		19:58 (SER5)	05:56		
	17:28	127	14:00 (SER6)	18:05			18:35	20:06			20:35	14	20:12 (SER5)	20:55		
21	07:41		11:53 (SER6)	07:10			06:27	06:39			06:05		19:58 (SER5)	05:56		
	17:30	126	13:59 (SER6)	18:06			18:36	20:07			20:36	14	20:12 (SER5)	20:55		
22	07:40		11:54 (SER6)	07:08			06:26	06:38			06:04		19:59 (SER5)	05:56		
	17:31	124	13:58 (SER6)	18:07			18:37	20:08			20:37	15	20:14 (SER5)	20:55		
23	07:40		11:56 (SER6)	07:07			06:24	06:36			06:04		19:59 (SER5)	05:56		
	17:32	122	13:58 (SER6)	18:08			18:38	20:09			20:38	15	20:14 (SER5)	20:55		
24	07:39		11:57 (SER6)	07:06			06:23	06:35			06:03		19:59 (SER5)	05:57		
	17:33	121	13:58 (SER6)	18:09			18:39	20:10			20:39	16	20:15 (SER5)	20:56		
25	07:38		11:58 (SER6)	07:04			06:21	06:34			06:02		20:00 (SER5)	05:57		
	17:34	119	13:57 (SER6)	18:11			18:40	20:11			20:40	16	20:16 (SER5)	20:56		
26	07:38		12:01 (SER6)	07:03			06:19	06:32			06:02		20:00 (SER5)	05:57		
	17:35	116	13:57 (SER6)	18:12			18:41	20:12			20:40	16	20:16 (SER5)	20:56		
27	07:37		12:02 (SER6)	07:01			06:18	06:31			06:01		20:01 (SER5)	05:57		
	17:37	114	13:56 (SER6)	18:13			18:42	20:13			20:41	17	20:18 (SER5)	20:56		
28	07:36		12:03 (SER6)	07:00			06:16	06:30			06:00		20:02 (SER5)	05:58		
	17:38	111	13:54 (SER6)	18:14			18:43	20:14			20:42	16	20:18 (SER5)	20:56		
29	07:35		12:05 (SER6)				07:14	06:28			06:00		20:03 (SER5)	05:58		
	17:39	108	13:53 (SER6)				19:44	20:15			20:43	16	20:19 (SER5)	20:56		
30	07:34		12:07 (SER6)				07:13	06:27			05:59		20:03 (SER5)	05:59		
	17:40	105	13:52 (SER6)				19:45	20:16			20:44	16	20:19 (SER5)	20:56		
31	07:34		12:09 (SER6)				07:11				05:59		20:04 (SER5)			
	17:41	102	13:51 (SER6)				19:46				20:44	16	20:20 (SER5)			
Potential sun hours	301			299			370	397			445			448		
Total, worst case		3991			643				19			281			84	
Sun reduction		0,45			0,47				0,53			0,59			0,66	
Oper. time red.		0,91			0,91				0,91			0,91			0,91	
Wind dir. red.		0,47			0,47				0,79			0,78			0,78	
Total reduction		0,19			0,20				0,37			0,41			0,46	
Total, real		763			128				7			115			39	

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_23 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (23)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November			December		
1	05:59			06:22		20:08 (SER5)	06:51		19:34 (SER4)	07:19	06:51			07:25		11:26 (SER6)
	20:56			20:38	6	20:14 (SER5)	19:57	1	19:35 (SER4)	19:08	17:23			17:00	137	13:43 (SER6)
2	06:00			06:23		20:08 (SER5)	06:52			07:20	06:53		12:18 (SER6)	07:26		11:26 (SER6)
	20:56			20:37	5	20:13 (SER5)	19:55			19:06	17:22	34	12:52 (SER6)	17:00	138	13:44 (SER6)
3	06:00			06:24		20:09 (SER5)	06:53			07:21	06:54		12:09 (SER6)	07:27		11:26 (SER6)
	20:56			20:36	4	20:13 (SER5)	19:53			19:05	17:21	50	12:59 (SER6)	17:00	138	13:44 (SER6)
4	06:01			06:25		20:10 (SER5)	06:54			07:22	06:55		12:02 (SER6)	07:28		11:26 (SER6)
	20:55			20:35	2	20:12 (SER5)	19:52			19:03	17:20	62	13:04 (SER6)	17:00	139	13:45 (SER6)
5	06:01			06:26		20:10 (SER5)	06:55			07:23	06:56		11:57 (SER6)	07:29		11:27 (SER6)
	20:55			20:34	1	20:11 (SER5)	19:50			19:01	17:19	70	13:07 (SER6)	16:59	139	13:46 (SER6)
6	06:02		20:18 (SER5)	06:27			06:56			07:24	06:57		11:53 (SER6)	07:30		11:27 (SER6)
	20:55	7	20:25 (SER5)	20:32			19:49			19:00	17:17	78	13:11 (SER6)	16:59	139	13:46 (SER6)
7	06:02		20:16 (SER5)	06:27			06:57			07:25	06:58		11:50 (SER6)	07:31		11:27 (SER6)
	20:55	10	20:26 (SER5)	20:31			19:47			18:58	17:16	84	13:14 (SER6)	16:59	140	13:47 (SER6)
8	06:03		20:15 (SER5)	06:28			06:57			07:26	06:59		11:47 (SER6)	07:31		11:26 (SER6)
	20:54	13	20:28 (SER5)	20:30			19:45			18:57	17:15	89	13:16 (SER6)	16:59	141	13:47 (SER6)
9	06:04		20:14 (SER5)	06:29			06:58			07:27	07:00		11:44 (SER6)	07:32		11:27 (SER6)
	20:54	14	20:28 (SER5)	20:29			19:44			18:55	17:14	94	13:18 (SER6)	16:59	141	13:48 (SER6)
10	06:04		20:14 (SER5)	06:30			06:59			07:28	07:02		11:42 (SER6)	07:33		11:27 (SER6)
	20:54	15	20:29 (SER5)	20:28			19:42			18:54	17:13	98	13:20 (SER6)	16:59	141	13:48 (SER6)
11	06:05		20:13 (SER5)	06:31			07:00			07:29	07:03		11:41 (SER6)	07:34		11:27 (SER6)
	20:53	16	20:29 (SER5)	20:26			19:41			18:52	17:12	102	13:23 (SER6)	16:59	142	13:49 (SER6)
12	06:06		20:12 (SER5)	06:32			07:01			07:30	07:04		11:39 (SER6)	07:35		11:28 (SER6)
	20:53	16	20:28 (SER5)	20:25			19:39			18:51	17:12	105	13:24 (SER6)	17:00	142	13:50 (SER6)
13	06:06		20:12 (SER5)	06:33			07:02			07:31	07:05		11:37 (SER6)	07:36		11:28 (SER6)
	20:52	16	20:28 (SER5)	20:24			19:37			18:49	17:11	108	13:25 (SER6)	17:00	143	13:51 (SER6)
14	06:07		20:11 (SER5)	06:34			07:03			07:32	07:06		11:35 (SER6)	07:36		11:28 (SER6)
	20:52	17	20:28 (SER5)	20:23			19:36			18:48	17:10	111	13:26 (SER6)	17:00	143	13:51 (SER6)
15	06:08		20:11 (SER5)	06:35			07:04			07:33	07:07		11:34 (SER6)	07:37		11:29 (SER6)
	20:51	17	20:28 (SER5)	20:21			19:34			18:46	17:09	114	13:28 (SER6)	17:00	142	13:51 (SER6)
16	06:08		20:10 (SER5)	06:36			07:05			07:34	07:08		11:34 (SER6)	07:38		11:29 (SER6)
	20:51	16	20:26 (SER5)	20:20			19:32			18:45	17:08	116	13:30 (SER6)	17:00	143	13:52 (SER6)
17	06:09		20:10 (SER5)	06:37			07:06			07:35	07:10		11:32 (SER6)	07:38		11:29 (SER6)
	20:50	16	20:26 (SER5)	20:19			19:31			18:43	17:07	119	13:31 (SER6)	17:01	143	13:52 (SER6)
18	06:10		20:10 (SER5)	06:38			07:07			07:36	07:11		11:31 (SER6)	07:39		11:30 (SER6)
	20:50	16	20:26 (SER5)	20:17			19:29			18:42	17:07	121	13:32 (SER6)	17:01	143	13:53 (SER6)
19	06:11		20:10 (SER5)	06:39			07:08			07:37	07:12		11:30 (SER6)	07:40		11:30 (SER6)
	20:49	15	20:25 (SER5)	20:16			19:27			18:40	17:06	122	13:32 (SER6)	17:01	143	13:53 (SER6)
20	06:12		20:09 (SER5)	06:40			07:09			07:38	07:13		11:29 (SER6)	07:40		11:31 (SER6)
	20:48	15	20:24 (SER5)	20:14			19:26			18:39	17:05	124	13:33 (SER6)	17:02	143	13:54 (SER6)
21	06:12		20:08 (SER5)	06:41			07:10			07:39	07:14		11:29 (SER6)	07:41		11:32 (SER6)
	20:48	15	20:23 (SER5)	20:13			19:24			18:37	17:05	126	13:35 (SER6)	17:02	143	13:55 (SER6)
22	06:13		20:08 (SER5)	06:42			07:10			07:40	07:15		11:29 (SER6)	07:41		11:32 (SER6)
	20:47	15	20:23 (SER5)	20:12			19:23			18:36	17:04	127	13:36 (SER6)	17:03	143	13:55 (SER6)
23	06:14		20:08 (SER5)	06:42			07:11			07:41	07:16		11:28 (SER6)	07:42		11:32 (SER6)
	20:46	14	20:22 (SER5)	20:10			19:21			18:35	17:03	129	13:37 (SER6)	17:03	143	13:55 (SER6)
24	06:15		20:08 (SER5)	06:43			07:12			07:43	07:17		11:28 (SER6)	07:42		11:33 (SER6)
	20:45	14	20:22 (SER5)	20:09			19:19			18:33	17:03	129	13:37 (SER6)	17:04	143	13:56 (SER6)
25	06:16		20:07 (SER5)	06:44		19:43 (SER4)	07:13			06:44	07:18		11:27 (SER6)	07:43		11:33 (SER6)
	20:44	13	20:20 (SER5)	20:07	2	19:45 (SER4)	19:18			17:32	17:02	131	13:38 (SER6)	17:04	143	13:56 (SER6)
26	06:17		20:08 (SER5)	06:45		19:41 (SER4)	07:14			06:45	07:20		11:27 (SER6)	07:43		11:34 (SER6)
	20:44	12	20:20 (SER5)	20:06	3	19:44 (SER4)	19:16			17:31	17:02	132	13:39 (SER6)	17:05	143	13:57 (SER6)
27	06:17		20:08 (SER5)	06:46		19:39 (SER4)	07:15			06:46	07:21		11:26 (SER6)	07:44		11:34 (SER6)
	20:43	11	20:19 (SER5)	20:04	4	19:43 (SER4)	19:14			17:29	17:02	133	13:39 (SER6)	17:06	143	13:57 (SER6)
28	06:18		20:08 (SER5)	06:47		19:38 (SER4)	07:16			06:47	07:22		11:27 (SER6)	07:44		11:35 (SER6)
	20:42	10	20:18 (SER5)	20:03	3	19:41 (SER4)	19:13			17:28	17:01	134	13:41 (SER6)	17:06	142	13:57 (SER6)
29	06:19		20:08 (SER5)	06:48		19:37 (SER4)	07:17			06:48	07:23		11:27 (SER6)	07:44		11:35 (SER6)
	20:41	10	20:18 (SER5)	20:01	3	19:40 (SER4)	19:11			17:27	17:01	135	13:42 (SER6)	17:07	142	13:57 (SER6)
30	06:20		20:08 (SER5)	06:49		19:35 (SER4)	07:18			06:49	07:24		11:27 (SER6)	07:44		11:35 (SER6)
	20:40	9	20:17 (SER5)	20:00	2	19:37 (SER4)	19:09			17:26	17:00	135	13:42 (SER6)	17:08	143	13:58 (SER6)
31	06:21		20:09 (SER5)	06:50		19:35 (SER4)				06:50				07:45		11:37 (SER6)
	20:39	7	20:16 (SER5)	19:58	1	19:36 (SER4)				17:24				17:08	142	13:59 (SER6)
Potential sun hours	455			425			374			347	301			292		
Total, worst case		349			36			1				3112			4390	
Sun reduction		0,74			0,73			0,65				0,51			0,45	
Oper. time red.		0,91			0,91			0,91				0,91			0,91	
Wind dir. red.		0,78			0,78			0,79				0,47			0,47	
Total reduction		0,51			0,51			0,46				0,21			0,19	
Total, real		179			18			0				664			840	

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_24 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (24)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:45	07:33	06:58	07:10	06:26	05:58	20:17 (SER4) 05:59	20:23 (SER4) 06:22	06:51	07:19	06:51	07:25
	17:10	17:43	18:15	19:47	20:17	20:45 4	20:21 (SER4) 20:56 8	20:31 (SER4) 20:38	19:57	19:08	17:23	17:00
2	07:45	07:32	06:57	07:08	06:24	05:58	20:17 (SER4) 06:00	20:24 (SER4) 06:23	06:52	07:20	06:52	07:26
	17:10	17:44	18:16	19:48	20:18	20:46 5	20:22 (SER4) 20:56 7	20:31 (SER4) 20:37	19:55	19:06	17:22	17:00
3	07:45	07:31	06:56	07:06	06:23	05:58	20:18 (SER4) 06:00	20:23 (SER4) 06:24	06:53	07:21	06:54	07:27
	17:11	17:45	18:17	19:49	20:19	20:46 5	20:23 (SER4) 20:56 8	20:31 (SER4) 20:36	19:53	19:05	17:21	17:00
4	07:45	07:30	06:54	07:05	06:22	05:57	20:17 (SER4) 06:01	20:24 (SER4) 06:25	06:54	07:22	06:55	07:28
	17:12	17:46	18:18	19:50	20:20	20:47 5	20:22 (SER4) 20:55 7	20:31 (SER4) 20:35	19:52	19:03	17:20	17:00
5	07:45	07:29	06:52	07:03	06:21	05:57	20:18 (SER4) 06:01	20:24 (SER4) 06:26	06:55	07:23	06:56	07:29
	17:13	17:47	18:19	19:51	20:21	20:48 5	20:23 (SER4) 20:55 6	20:30 (SER4) 20:34	19:50	19:01	17:19	16:59
6	07:45	07:28	06:51	07:02	06:20	05:57	20:18 (SER4) 06:02	20:24 (SER4) 06:27	06:56	07:24	06:57	07:30
	17:14	17:49	18:20	19:52	20:22	20:48 6	20:24 (SER4) 20:55 7	20:31 (SER4) 20:32	19:49	19:00	17:17	16:59
7	07:45	07:27	06:49	07:00	06:19	05:56	20:17 (SER4) 06:02	20:24 (SER4) 06:27	06:57	07:25	06:58	07:31
	17:15	17:50	18:21	19:53	20:23	20:49 7	20:24 (SER4) 20:55 6	20:30 (SER4) 20:31	19:47	18:58	17:16	16:59
8	07:45	07:26	06:48	06:59	06:17	05:56	20:18 (SER4) 06:03	20:24 (SER4) 06:28	06:57	07:26	06:59	07:31
	17:16	17:51	18:23	19:54	20:24	20:50 7	20:25 (SER4) 20:54 6	20:30 (SER4) 20:30	19:45	18:57	17:15	16:59
9	07:45	07:25	06:46	06:57	06:16	05:56	20:18 (SER4) 06:04	20:25 (SER4) 06:29	06:58	07:27	07:00	07:32
	17:17	17:52	18:24	19:55	20:25	20:50 7	20:25 (SER4) 20:54 5	20:30 (SER4) 20:29	19:44	18:55	17:14	16:59
10	07:45	07:24	06:45	06:56	06:15	05:56	20:18 (SER4) 06:04	20:25 (SER4) 06:30	06:59	07:28	07:02	07:33
	17:18	17:53	18:25	19:56	20:26	20:51 8	20:26 (SER4) 20:54 4	20:29 (SER4) 20:28	19:42	18:54	17:13	16:59
11	07:45	07:22	06:43	06:54	06:14	05:56	20:19 (SER4) 06:05	20:25 (SER4) 06:31	07:00	07:29	07:03	07:34
	17:19	17:54	18:26	19:57	20:27	20:51 8	20:27 (SER4) 20:53 4	20:29 (SER4) 20:26	19:41	18:52	17:12	16:59
12	07:44	07:21	06:42	06:52	06:13	05:55	20:19 (SER4) 06:06	20:25 (SER4) 06:32	07:01	07:30	07:04	07:35
	17:20	17:56	18:27	19:58	20:28	20:52 8	20:27 (SER4) 20:53 3	20:28 (SER4) 20:25	19:39	18:51	17:12	17:00
13	07:44	07:20	06:40	06:51	06:12	05:55	20:19 (SER4) 06:06	20:26 (SER4) 06:33	07:02	07:31	07:05	07:36
	17:21	17:57	18:28	19:59	20:29	20:52 9	20:28 (SER4) 20:52 2	20:28 (SER4) 20:24	19:37	18:49	17:11	17:00
14	07:44	07:19	06:39	06:49	06:11	05:55	20:20 (SER4) 06:07	20:26 (SER4) 06:34	07:03	07:32	07:06	07:36
	17:22	17:58	18:29	20:00	20:30	20:53 8	20:28 (SER4) 20:52 2	20:28 (SER4) 20:23	19:36	18:48	17:10	17:00
15	07:44	07:18	06:37	06:48	06:10	05:55	20:20 (SER4) 06:08	06:35	07:04	07:33	07:07	07:37
	17:23	17:59	18:30	20:01	20:31	20:53 8	20:28 (SER4) 20:51	20:21	19:34	18:46	17:09	17:00
16	07:43	07:16	06:35	06:46	06:09	05:55	20:20 (SER4) 06:08	06:36	07:05	07:34	07:08	07:38
	17:24	18:00	18:31	20:02	20:32	20:54 9	20:29 (SER4) 20:51	20:20	19:32	18:45	17:08	17:00
17	07:43	07:15	06:34	06:45	06:08	05:55	20:20 (SER4) 06:09	06:37	07:06	07:35	07:10	07:38
	17:25	18:01	18:32	20:03	20:33	20:54 9	20:29 (SER4) 20:50	20:19	19:31	18:43	17:07	17:01
18	07:42	07:14	06:32	06:43	06:08	05:55	20:20 (SER4) 06:10	06:38	07:07	07:36	07:11	07:39
	17:26	18:03	18:33	20:04	20:33	20:54 9	20:29 (SER4) 20:50	20:17	19:29	18:42	17:07	17:01
19	07:42	07:12	06:31	06:42	06:07	05:56	20:20 (SER4) 06:11	06:39	07:08	07:37	07:12	07:40
	17:27	18:04	18:34	20:05	20:34	20:54 9	20:29 (SER4) 20:49	20:16	19:27	18:40	17:06	17:01
20	07:41	07:11	06:29	06:41	06:06	05:56	20:20 (SER4) 06:12	06:40	07:09	07:38	07:13	07:40
	17:28	18:05	18:35	20:06	20:35	20:55 9	20:29 (SER4) 20:48	20:14	19:26	18:39	17:05	17:02
21	07:41	07:10	06:27	06:39	06:05	05:56	20:21 (SER4) 06:12	06:41	07:10	07:39	07:14	07:41
	17:30	18:06	18:36	20:07	20:36	20:55 9	20:30 (SER4) 20:48	20:13	19:24	18:37	17:05	17:02
22	07:40	07:08	06:26	06:38	06:04	05:56	20:21 (SER4) 06:13	06:42	07:10	07:40	07:15	07:41
	17:31	18:07	18:37	20:08	20:37	20:55 9	20:30 (SER4) 20:47	20:12	19:23	18:36	17:04	17:03
23	07:40	07:07	06:24	06:36	06:04	05:56	20:21 (SER4) 06:14	06:43	07:11	07:41	07:16	07:42
	17:32	18:08	18:38	20:09	20:38	20:55 9	20:30 (SER4) 20:46	20:10	19:21	18:35	17:04	17:03
24	07:39	07:06	06:23	06:35	06:03	05:57	20:21 (SER4) 06:15	06:43	07:12	07:43	07:17	07:42
	17:33	18:09	18:39	20:10	20:39	20:56 9	20:30 (SER4) 20:45	20:09	19:19	18:33	17:03	17:04
25	07:38	07:04	06:21	06:34	06:02	05:57	20:22 (SER4) 06:16	06:44	07:13	06:44	07:18	07:43
	17:34	18:11	18:40	20:11	20:40	20:56 9	20:31 (SER4) 20:44	20:07	19:18	17:32	17:02	17:04
26	07:38	07:03	06:19	06:32	06:02	05:57	20:22 (SER4) 06:17	06:45	07:14	06:45	07:20	07:43
	17:35	18:12	18:41	20:12	20:40	20:56 9	20:31 (SER4) 20:44	20:06	19:16	17:31	17:02	17:05
27	07:37	07:01	06:18	06:31	06:01	05:57	20:22 (SER4) 06:17	06:46	07:15	06:46	07:21	07:44
	17:37	18:13	18:42	20:13	20:41	20:56 9	20:31 (SER4) 20:43	20:04	19:14	17:29	17:02	17:06
28	07:36	07:00	06:16	06:30	06:00	05:58	20:23 (SER4) 06:18	06:47	07:16	06:47	07:22	07:44
	17:38	18:14	18:43	20:14	20:42	20:56 8	20:31 (SER4) 20:42	20:03	19:13	17:28	17:01	17:06
29	07:35		07:14	06:28	06:00 20:18 (SER4)	05:58	20:22 (SER4) 06:19	06:48	07:17	06:48	07:23	07:44
	17:39		19:44	20:15	20:43 1 20:19 (SER4)	20:56 9	20:31 (SER4) 20:41	20:01	19:11	17:27	17:01	17:07
30	07:34		07:13	06:27	05:59 20:17 (SER4)	05:59	20:23 (SER4) 06:20	06:49	07:18	06:49	07:24	07:44
	17:40		19:45	20:16	20:44 2 20:19 (SER4)	20:56 8	20:31 (SER4) 20:40	20:00	19:09	17:26	17:01	17:08
31	07:34		07:11		05:59 20:18 (SER4)		06:21	06:50		06:50		07:45
	17:41		19:46		20:44 2 20:20 (SER4)		20:39	19:58		17:24		17:09
Potential sun hours	301	299	370	397	445	448	455	425	374	347	301	292
Total, worst case					5	233	75					
Sun reduction					0,59	0,66	0,74					
Oper. time red.					0,91	0,91	0,91					
Wind dir. red.					0,77	0,77	0,77					
Total reduction					0,41	0,46	0,52					
Total, real					2	108	39					

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_25 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (25)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April	May	June	July	August	September	October		November	December
1	07:45	07:33		06:59		07:20 (SER10)	07:10	06:26	05:58	05:59	06:22	06:51	07:19		06:51	07:25
	17:10	17:43		18:15	31	07:51 (SER10)	19:47	20:17	20:45	20:56	20:38	19:57	19:08		17:23	17:00
2	07:45	07:32		06:57		07:21 (SER10)	07:08	06:25	05:58	06:00	06:23	06:52	07:20		06:53	07:26
	17:10	17:44		18:16	29	07:50 (SER10)	19:48	20:18	20:46	20:56	20:37	19:55	19:06		17:22	17:00
3	07:45	07:31		06:56		07:21 (SER10)	07:07	06:23	05:58	06:00	06:24	06:53	07:21		06:54	07:27
	17:11	17:45		18:17	28	07:49 (SER10)	19:49	20:19	20:46	20:56	20:36	19:53	19:05		17:21	17:00
4	07:45	07:30		06:54		07:23 (SER10)	07:05	06:22	05:57	06:01	06:25	06:54	07:22		06:55	07:28
	17:12	17:46		18:18	25	07:48 (SER10)	19:50	20:20	20:47	20:55	20:35	19:52	19:03		17:20	17:00
5	07:45	07:29		06:53		07:23 (SER10)	07:03	06:21	05:57	06:01	06:26	06:55	07:23		06:56	07:29
	17:13	17:47		18:19	23	07:46 (SER10)	19:51	20:21	20:48	20:55	20:34	19:50	19:02		17:19	17:00
6	07:45	07:28		06:51		07:25 (SER10)	07:02	06:20	05:57	06:02	06:27	06:56	07:24	08:05 (SER10)	06:57	07:30
	17:14	17:49		18:20	20	07:45 (SER10)	19:52	20:22	20:48	20:55	20:32	19:49	19:00	11 08:16 (SER10)	17:18	16:59
7	07:45	07:27		06:49		07:27 (SER10)	07:00	06:19	05:56	06:02	06:28	06:57	07:25	08:02 (SER10)	06:58	07:31
	17:15	17:50		18:22	14	07:41 (SER10)	19:53	20:23	20:49	20:55	20:31	19:47	18:58	17 08:19 (SER10)	17:17	16:59
8	07:45	07:26		06:48		07:31 (SER10)	06:59	06:18	05:56	06:03	06:28	06:58	07:26	08:00 (SER10)	06:59	07:31
	17:16	17:51		18:23	5	07:36 (SER10)	19:54	20:24	20:50	20:54	20:30	19:46	18:57	21 08:21 (SER10)	17:15	16:59
9	07:45	07:25		06:46			06:57	06:16	05:56	06:04	06:29	06:58	07:27	07:58 (SER10)	07:00	07:32
	17:17	17:52		18:24			19:55	20:25	20:50	20:54	20:29	19:44	18:55	24 08:22 (SER10)	17:14	16:59
10	07:45	07:24		06:45			06:56	06:15	05:56	06:04	06:30	06:59	07:28	07:57 (SER10)	07:02	07:33
	17:18	17:53		18:25			19:56	20:26	20:51	20:54	20:28	19:42	18:54	26 08:23 (SER10)	17:14	16:59
11	07:45	07:22		06:43			06:54	06:14	05:56	06:05	06:31	07:00	07:29	07:55 (SER10)	07:03	07:34
	17:19	17:55		18:26			19:57	20:27	20:51	20:53	20:26	19:41	18:52	29 08:24 (SER10)	17:13	17:00
12	07:44	07:21		06:42			06:52	06:13	05:56	06:06	06:32	07:01	07:30	07:54 (SER10)	07:04	07:35
	17:20	17:56		18:27			19:58	20:28	20:52	20:53	20:25	19:39	18:51	30 08:24 (SER10)	17:12	17:00
13	07:44	07:20		06:40			06:51	06:12	05:55	06:06	06:33	07:02	07:31	07:54 (SER10)	07:05	07:36
	17:21	17:57		18:28			19:59	20:29	20:52	20:52	20:24	19:37	18:49	30 08:24 (SER10)	17:11	17:00
14	07:44	07:19		06:39			06:49	06:11	05:55	06:07	06:34	07:03	07:32	07:53 (SER10)	07:06	07:36
	17:22	17:58		18:29			20:00	20:30	20:53	20:52	20:23	19:36	18:48	31 08:24 (SER10)	17:10	17:00
15	07:44	07:18	07:37 (SER10)	06:37			06:48	06:10	05:55	06:08	06:35	07:04	07:33	07:53 (SER10)	07:07	07:37
	17:23	17:59	2 07:39 (SER10)	18:30			20:01	20:31	20:53	20:51	20:21	19:34	18:46	31 08:24 (SER10)	17:09	17:00
16	07:43	07:16	07:35 (SER10)	06:35			06:46	06:09	05:55	06:09	06:36	07:05	07:34	07:54 (SER10)	07:08	07:38
	17:24	18:00	8 07:43 (SER10)	18:31			20:02	20:32	20:54	20:51	20:20	19:32	18:45	30 08:24 (SER10)	17:08	17:00
17	07:43	07:15	07:34 (SER10)	06:34			06:45	06:09	05:55	06:09	06:37	07:06	07:35	07:55 (SER10)	07:10	07:38
	17:25	18:02	12 07:46 (SER10)	18:32			20:03	20:33	20:54	20:50	20:19	19:31	18:43	29 08:24 (SER10)	17:08	17:01
18	07:42	07:14	07:33 (SER10)	06:32			06:44	06:08	05:56	06:10	06:38	07:07	07:36	07:56 (SER10)	07:11	07:39
	17:26	18:03	15 07:48 (SER10)	18:33			20:04	20:33	20:54	20:50	20:17	19:29	18:42	27 08:23 (SER10)	17:07	17:01
19	07:42	07:12	07:31 (SER10)	06:31			06:42	06:07	05:56	06:11	06:39	07:08	07:37	07:57 (SER10)	07:12	07:40
	17:27	18:04	18 07:49 (SER10)	18:34			20:05	20:34	20:54	20:49	20:16	19:28	18:40	25 08:22 (SER10)	17:06	17:02
20	07:41	07:11	07:30 (SER10)	06:29			06:41	06:06	05:56	06:12	06:40	07:09	07:38	07:58 (SER10)	07:13	07:40
	17:29	18:05	20 07:50 (SER10)	18:35			20:06	20:35	20:55	20:48	20:14	19:26	18:39	24 08:22 (SER10)	17:05	17:02
21	07:41	07:10	07:29 (SER10)	06:27			06:39	06:05	05:56	06:12	06:41	07:10	07:39	08:00 (SER10)	07:14	07:41
	17:30	18:06	22 07:51 (SER10)	18:36			20:07	20:36	20:55	20:48	20:13	19:24	18:37	22 08:22 (SER10)	17:05	17:02
22	07:40	07:08	07:27 (SER10)	06:26			06:38	06:04	05:56	06:13	06:42	07:11	07:40	08:01 (SER10)	07:15	07:41
	17:31	18:07	24 07:51 (SER10)	18:37			20:08	20:37	20:55	20:47	20:12	19:23	18:36	19 08:20 (SER10)	17:04	17:03
23	07:40	07:07	07:26 (SER10)	06:24			06:36	06:04	05:56	06:14	06:43	07:11	07:41	08:02 (SER10)	07:16	07:42
	17:32	18:08	26 07:52 (SER10)	18:38			20:09	20:38	20:55	20:46	20:10	19:21	18:35	17 08:19 (SER10)	17:04	17:03
24	07:39	07:06	07:24 (SER10)	06:23			06:35	06:03	05:57	06:15	06:44	07:12	07:43	08:03 (SER10)	07:17	07:42
	17:33	18:09	28 07:52 (SER10)	18:39			20:10	20:39	20:56	20:45	20:09	19:19	18:33	14 08:17 (SER10)	17:03	17:04
25	07:38	07:04	07:23 (SER10)	06:21			06:34	06:02	05:57	06:16	06:44	07:13	06:44	07:04 (SER10)	07:18	07:43
	17:34	18:11	29 07:52 (SER10)	18:40			20:11	20:40	20:56	20:44	20:07	19:18	17:32	11 07:15 (SER10)	17:03	17:04
26	07:38	07:03	07:22 (SER10)	06:19			06:32	06:02	05:57	06:17	06:45	07:14	06:45	07:05 (SER10)	07:20	07:43
	17:36	18:12	30 07:52 (SER10)	18:41			20:12	20:40	20:56	20:44	20:06	19:16	17:31	7 07:12 (SER10)	17:02	17:05
27	07:37	07:01	07:20 (SER10)	06:18			06:31	06:01	05:58	06:18	06:46	07:15	06:46		07:21	07:44
	17:37	18:13	32 07:52 (SER10)	18:42			20:13	20:41	20:56	20:43	20:04	19:14	17:29		17:02	17:06
28	07:36	07:00	07:21 (SER10)	06:16			06:30	06:00	05:58	06:18	06:47	07:16	06:47		07:22	07:44
	17:38	18:14	31 07:52 (SER10)	18:43			20:14	20:42	20:56	20:42	20:03	19:13	17:28		17:01	17:06
29	07:35			07:15			06:28	06:00	05:58	06:19	06:48	07:17	06:48		07:23	07:44
	17:39			19:44			20:15	20:43	20:56	20:41	20:01	19:11	17:27		17:01	17:07
30	07:34			07:13			06:27	05:59	05:59	06:20	06:49	07:18	06:49		07:24	07:44
	17:40			19:45			20:16	20:44	20:56	20:40	20:00	19:10	17:26		17:01	17:08
31	07:34			07:11				05:59		06:21	06:50		06:50			07:45
	17:41			19:46				20:44		20:39	19:58		17:24			17:09
Potential sun hours	301	299		370			397	445	448	455	425	374	347		301	292
Total, worst case			297		175									475		
Sun reduction			0,47		0,49									0,54		
Oper. time red.			0,91		0,91									0,91		
Wind dir. red.			0,78		0,78									0,78		
Total reduction			0,34		0,35									0,39		
Total, real			100		61									184		

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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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_26 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (26)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April	May	June		
1	07:45	08:07 (SER9)	07:33		06:59	07:17 (SER10)	07:10	06:26	05:58		
	17:10	30 08:37 (SER9)	17:43		18:15	4 07:21 (SER10)	19:47	20:17	20:45		
2	07:45	08:07 (SER9)	07:32		06:57	07:16 (SER10)	07:08	06:25	05:58		
	17:10	31 08:38 (SER9)	17:44		18:16	5 07:21 (SER10)	19:48	20:18	20:46		
3	07:45	08:07 (SER9)	07:31		06:56	07:14 (SER10)	07:07	06:23	05:58		
	17:11	31 08:38 (SER9)	17:45		18:17	6 07:20 (SER10)	19:49	20:19	20:47		
4	07:45	08:07 (SER9)	07:30		06:54	07:13 (SER10)	07:05	06:22	05:57		
	17:12	31 08:38 (SER9)	17:46		18:18	7 07:20 (SER10)	19:50	20:20	20:47		
5	07:45	08:07 (SER9)	07:29		06:53	07:11 (SER10)	07:03	06:21	05:57		
	17:13	31 08:38 (SER9)	17:47		18:19	8 07:19 (SER10)	19:51	20:21	20:48		
6	07:45	08:07 (SER9)	07:28		06:51	07:10 (SER10)	07:02	06:20	05:57		
	17:14	32 08:39 (SER9)	17:49		18:20	8 07:18 (SER10)	19:52	20:22	20:48		
7	07:45	08:07 (SER9)	07:27		06:50	07:08 (SER10)	07:00	06:19	05:56		
	17:15	32 08:39 (SER9)	17:50		18:22	7 07:15 (SER10)	19:53	20:23	20:49		
8	07:45	08:06 (SER9)	07:26		06:48	07:07 (SER10)	06:59	06:18	05:56		
	17:16	32 08:38 (SER9)	17:51		18:23	3 07:10 (SER10)	19:54	20:24	20:50		
9	07:45	08:06 (SER9)	07:25		06:46		06:57	06:16	05:56		06:17 (SER7)
	17:17	33 08:39 (SER9)	17:52		18:24		19:55	20:25	20:50	1	06:18 (SER7)
10	07:45	08:06 (SER9)	07:24		06:45		06:56	06:15	05:56		06:17 (SER7)
	17:18	33 08:39 (SER9)	17:53		18:25		19:56	20:26	20:51	1	06:18 (SER7)
11	07:45	08:06 (SER9)	07:22		06:43		06:54	06:14	05:56		06:17 (SER7)
	17:19	33 08:39 (SER9)	17:55		18:26		19:57	20:27	20:51	1	06:18 (SER7)
12	07:44	08:05 (SER9)	07:21		06:42		06:53	06:13	05:56		06:17 (SER7)
	17:20	33 08:38 (SER9)	17:56		18:27		19:58	20:28	20:52	1	06:18 (SER7)
13	07:44	08:06 (SER9)	07:20		06:40		06:51	06:12	05:55		06:17 (SER7)
	17:21	32 08:38 (SER9)	17:57		18:28		19:59	20:29	20:52	1	06:18 (SER7)
14	07:44	08:07 (SER9)	07:19		06:39		06:49	06:11	05:55		06:17 (SER7)
	17:22	31 08:38 (SER9)	17:58		18:29		20:00	20:30	20:53	1	06:18 (SER7)
15	07:44	08:08 (SER9)	07:18		06:37		06:48	06:10	05:55		06:17 (SER7)
	17:23	29 08:37 (SER9)	17:59		18:30		20:01	20:31	20:53	1	06:18 (SER7)
16	07:43	08:10 (SER9)	07:16		06:35		06:47	06:09	05:55		06:17 (SER7)
	17:24	27 08:37 (SER9)	18:00		18:31		20:02	20:32	20:54	1	06:18 (SER7)
17	07:43	08:10 (SER9)	07:15		06:34		06:45	06:09	05:55		06:17 (SER7)
	17:25	26 08:36 (SER9)	18:02		18:32		20:03	20:33	20:54	1	06:18 (SER7)
18	07:42	08:12 (SER9)	07:14		06:32		06:44	06:08	05:56		06:17 (SER7)
	17:26	24 08:36 (SER9)	18:03		18:33		20:04	20:34	20:54	1	06:18 (SER7)
19	07:42	08:14 (SER9)	07:13		06:31		06:42	06:07	05:56		06:17 (SER7)
	17:27	20 08:34 (SER9)	18:04		18:34		20:05	20:34	20:55	1	06:18 (SER7)
20	07:41	08:16 (SER9)	07:11		06:29		06:41	06:06	05:56		06:18 (SER7)
	17:29	18 08:34 (SER9)	18:05		18:35		20:06	20:35	20:55	1	06:19 (SER7)
21	07:41	08:18 (SER9)	07:10		06:27		06:39	06:05	05:56		06:18 (SER7)
	17:30	13 08:31 (SER9)	18:06		18:36		20:07	20:36	20:55	1	06:19 (SER7)
22	07:40	08:23 (SER9)	07:08		06:26		06:38	06:04	05:56		06:18 (SER7)
	17:31	3 08:26 (SER9)	18:07		18:37		20:08	20:37	20:55	1	06:19 (SER7)
23	07:40		07:07		06:24		06:36	06:04	05:56		06:18 (SER7)
	17:32		18:08		18:38		20:09	20:38	20:55	1	06:19 (SER7)
24	07:39		07:06		06:23		06:35	06:03	05:57		06:19 (SER7)
	17:33		18:10		18:39		20:10	20:39	20:56	1	06:20 (SER7)
25	07:38		07:04		06:21		06:34	06:02	05:57		06:19 (SER7)
	17:34		18:11		18:40		20:11	20:40	20:56	1	06:20 (SER7)
26	07:38		07:03		06:19		06:32	06:02	05:57		06:19 (SER7)
	17:36		18:12		18:41		20:12	20:40	20:56	1	06:20 (SER7)
27	07:37		07:01	07:20 (SER10)	06:18		06:31	06:01	05:58		06:20 (SER7)
	17:37		18:13	1 07:21 (SER10)	18:42		20:13	20:41	20:56	1	06:21 (SER7)
28	07:36		07:00	07:19 (SER10)	06:16		06:30	06:00	05:58		06:20 (SER7)
	17:38		18:14	3 07:22 (SER10)	18:43		20:14	20:42	20:56	1	06:21 (SER7)
29	07:35				07:15		06:28	06:00	05:58		06:20 (SER7)
	17:39				19:44		20:15	20:43	20:56	1	06:21 (SER7)
30	07:35				07:13		06:27	05:59	05:59		06:21 (SER7)
	17:40				19:45		20:16	20:44	20:56	1	06:22 (SER7)
31	07:34				07:11			05:59			
	17:41				19:46			20:44			
Potential sun hours	301		299		370		397	445	448		
Total, worst case		605		4		48				22	
Sun reduction		0,45		0,47		0,49				0,66	
Oper. time red.		0,91		0,91		0,91				0,91	
Wind dir. red.		0,74		0,79		0,79				0,69	
Total reduction		0,30		0,34		0,35				0,41	
Total, real		184		1		17				9	

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: Shadow flickering **Shadow receptor:** RIC_26 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (26)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	05:59		06:21 (SER7)	06:22			06:51			07:19			06:51			07:25		07:48 (SER9)
	20:56	1	06:22 (SER7)	20:38			19:57			19:08			17:23			17:00	33	08:21 (SER9)
2	06:00		06:22 (SER7)	06:23			06:52			07:20			06:53			07:26		07:49 (SER9)
	20:56	1	06:23 (SER7)	20:37			19:55			19:06			17:22			17:00	33	08:22 (SER9)
3	06:00		06:22 (SER7)	06:24			06:53			07:21			06:54			07:27		07:50 (SER9)
	20:56	1	06:23 (SER7)	20:36			19:53			19:05			17:21			17:00	33	08:23 (SER9)
4	06:01		06:23 (SER7)	06:25			06:54			07:22			06:55			07:28		07:51 (SER9)
	20:55	1	06:24 (SER7)	20:35			19:52			19:03			17:20			17:00	32	08:23 (SER9)
5	06:01			06:26			06:55			07:23			06:56			07:29		07:52 (SER9)
	20:55			20:34			19:50			19:02			17:19			17:00	32	08:24 (SER9)
6	06:02			06:27			06:56			07:24		07:44 (SER10)	06:57			07:30		07:53 (SER9)
	20:55			20:33			19:49			19:00	6	07:50 (SER10)	17:18			16:59	32	08:25 (SER9)
7	06:02			06:28			06:57			07:25		07:45 (SER10)	06:58			07:31		07:54 (SER9)
	20:55			20:31			19:47			18:58	7	07:52 (SER10)	17:17			16:59	31	08:25 (SER9)
8	06:03			06:29			06:58			07:26		07:46 (SER10)	06:59			07:31		07:54 (SER9)
	20:54			20:30			19:46			18:57	8	07:54 (SER10)	17:16			16:59	31	08:25 (SER9)
9	06:04			06:29			06:58			07:27		07:47 (SER10)	07:00			07:32		07:55 (SER9)
	20:54			20:29			19:44			18:55	7	07:54 (SER10)	17:15			16:59	31	08:26 (SER9)
10	06:04			06:30			06:59			07:28		07:48 (SER10)	07:02			07:33		07:56 (SER9)
	20:54			20:28			19:42			18:54	7	07:55 (SER10)	17:14			16:59	31	08:27 (SER9)
11	06:05			06:31			07:00			07:29		07:49 (SER10)	07:03			07:34		07:57 (SER9)
	20:53			20:27			19:41			18:52	6	07:55 (SER10)	17:13			17:00	30	08:27 (SER9)
12	06:06			06:32			07:01			07:30		07:50 (SER10)	07:04			07:35		07:58 (SER9)
	20:53			20:25			19:39			18:51	5	07:55 (SER10)	17:12			17:00	30	08:28 (SER9)
13	06:06			06:33			07:02			07:31		07:51 (SER10)	07:05			07:36		07:59 (SER9)
	20:52			20:24			19:37			18:49	4	07:55 (SER10)	17:11			17:00	30	08:29 (SER9)
14	06:07			06:34			07:03			07:32		07:52 (SER10)	07:06			07:36		07:59 (SER9)
	20:52			20:23			19:36			18:48	2	07:54 (SER10)	17:10			17:00	30	08:29 (SER9)
15	06:08			06:35			07:04			07:33			07:07			07:37		08:00 (SER9)
	20:51			20:21			19:34			18:46			17:09			17:00	30	08:30 (SER9)
16	06:09			06:36			07:05			07:34			07:08			07:38		08:01 (SER9)
	20:51			20:20			19:32			18:45			17:08			17:01	29	08:30 (SER9)
17	06:09			06:37			07:06			07:35			07:10			07:38		08:01 (SER9)
	20:50			20:19			19:31			18:43			17:08			17:01	29	08:30 (SER9)
18	06:10			06:38			07:07			07:36			07:11			07:39		08:02 (SER9)
	20:50			20:17			19:29			18:42			17:07			17:01	29	08:31 (SER9)
19	06:11			06:39			07:08			07:37			07:12			07:40		08:02 (SER9)
	20:49			20:16			19:28			18:40			17:06			17:02	29	08:31 (SER9)
20	06:12			06:40			07:09			07:38			07:13		07:58 (SER9)	07:40		08:03 (SER9)
	20:48			20:14			19:26			18:39			17:05	3	08:01 (SER9)	17:02	29	08:32 (SER9)
21	06:12			06:41			07:10			07:39			07:14		07:54 (SER9)	07:41		08:04 (SER9)
	20:48			20:13			19:24			18:37			17:05	13	08:07 (SER9)	17:02	29	08:33 (SER9)
22	06:13			06:42			07:11			07:40			07:15		07:52 (SER9)	07:41		08:04 (SER9)
	20:47			20:12			19:23			18:36			17:04	18	08:10 (SER9)	17:03	29	08:33 (SER9)
23	06:14			06:43			07:11			07:42			07:16		07:51 (SER9)	07:42		08:04 (SER9)
	20:46			20:10			19:21			18:35			17:04	20	08:11 (SER9)	17:03	29	08:33 (SER9)
24	06:15			06:44			07:12			07:43			07:17		07:49 (SER9)	07:42		08:05 (SER9)
	20:45			20:09			19:19			18:33			17:03	24	08:13 (SER9)	17:04	29	08:34 (SER9)
25	06:16			06:44			07:13			06:44			07:18		07:48 (SER9)	07:43		08:05 (SER9)
	20:44			20:07			19:18			17:32			17:03	26	08:14 (SER9)	17:05	29	08:34 (SER9)
26	06:17			06:45			07:14			06:45			07:20		07:48 (SER9)	07:43		08:06 (SER9)
	20:44			20:06			19:16			17:31			17:02	27	08:15 (SER9)	17:05	29	08:35 (SER9)
27	06:18			06:46			07:15			06:46			07:21		07:47 (SER9)	07:44		08:06 (SER9)
	20:43			20:04			19:14			17:29			17:02	29	08:16 (SER9)	17:06	29	08:35 (SER9)
28	06:18			06:47			07:16			06:47			07:22		07:47 (SER9)	07:44		08:06 (SER9)
	20:42			20:03			19:13			17:28			17:01	31	08:18 (SER9)	17:06	30	08:36 (SER9)
29	06:19			06:48			07:17			06:48			07:23		07:47 (SER9)	07:44		08:06 (SER9)
	20:41			20:01			19:11			17:27			17:01	32	08:19 (SER9)	17:07	30	08:36 (SER9)
30	06:20			06:49			07:18			06:49			07:24		07:47 (SER9)	07:44		08:06 (SER9)
	20:40			20:00			19:10			17:26			17:01	33	08:20 (SER9)	17:08	30	08:36 (SER9)
31	06:21			06:50						06:50						07:45		08:07 (SER9)
	20:39			19:58						17:24						17:09	30	08:37 (SER9)
Potential sun hours	455			425			374			347			301			292		
Total, worst case		4									52			256			937	
Sun reduction		0,74									0,54			0,51			0,45	
Oper. time red.		0,91									0,91			0,91			0,91	
Wind dir. red.		0,69									0,79			0,74			0,74	
Total reduction		0,46									0,39			0,34			0,30	
Total, real		2									20			87			286	

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_27 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (27)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May	June	July	August	September	October	November	December
1	07:45		07:33	07:52 (SER10)	06:58	07:10	06:26	05:58	05:59	06:22	06:51	07:19	06:51	07:14 (SER10) 07:25
	17:10		17:43 22	08:14 (SER10)	18:15	19:47	20:17	20:45	20:56	20:38	19:57	19:08	17:23 38	07:52 (SER10) 17:00
2	07:45		07:32	07:51 (SER10)	06:57	07:08	06:25	05:58	06:00	06:23	06:52	07:20	06:53	07:15 (SER10) 07:26
	17:10		17:44 25	08:16 (SER10)	18:16	19:48	20:18	20:46	20:56	20:37	19:55	19:06	17:22 38	07:53 (SER10) 17:00
3	07:45		07:31	07:50 (SER10)	06:56	07:07	06:23	05:58	06:00	06:24	06:53	07:21	06:54	07:15 (SER10) 07:27
	17:11		17:45 27	08:17 (SER10)	18:17	19:49	20:19	20:46	20:56	20:36	19:53	19:05	17:21 37	07:52 (SER10) 17:00
4	07:45		07:30	07:49 (SER10)	06:54	07:05	06:22	05:57	06:01	06:25	06:54	07:22	06:55	07:16 (SER10) 07:28
	17:12		17:46 30	08:19 (SER10)	18:18	19:50	20:20	20:47	20:55	20:35	19:52	19:03	17:20 35	07:51 (SER10) 17:00
5	07:45		07:29	07:48 (SER10)	06:53	07:03	06:21	05:57	06:01	06:26	06:55	07:23	06:56	07:17 (SER10) 07:29
	17:13		17:47 32	08:20 (SER10)	18:19	19:51	20:21	20:48	20:55	20:34	19:50	19:02	17:19 33	07:50 (SER10) 17:00
6	07:45		07:28	07:47 (SER10)	06:51	07:02	06:20	05:57	06:02	06:27	06:56	07:24	06:57	07:18 (SER10) 07:30
	17:14		17:49 34	08:21 (SER10)	18:20	19:52	20:22	20:48	20:55	20:32	19:49	19:00	17:18 31	07:49 (SER10) 16:59
7	07:45		07:27	07:46 (SER10)	06:49	07:00	06:19	05:56	06:02	06:28	06:57	07:25	06:58	07:20 (SER10) 07:31
	17:15		17:50 36	08:22 (SER10)	18:21	19:53	20:23	20:49	20:55	20:31	19:47	18:58	17:16 29	07:49 (SER10) 16:59
8	07:45		07:26	07:45 (SER10)	06:48	06:59	06:17	05:56	06:03	06:28	06:58	07:26	06:59	07:21 (SER10) 07:31
	17:16		17:51 37	08:22 (SER10)	18:23	19:54	20:24	20:50	20:54	20:30	19:45	18:57	17:15 27	07:48 (SER10) 16:59
9	07:45		07:25	07:45 (SER10)	06:46	06:57	06:16	05:56	06:04	06:29	06:58	07:27	07:00	07:22 (SER10) 07:32
	17:17		17:52 38	08:23 (SER10)	18:24	19:55	20:25	20:50	20:54	20:29	19:44	18:55	17:14 25	07:47 (SER10) 16:59
10	07:45		07:24	07:45 (SER10)	06:45	06:56	06:15	05:56	06:04	06:30	06:59	07:28	07:02	07:23 (SER10) 07:33
	17:18		17:53 39	08:24 (SER10)	18:25	19:56	20:26	20:51	20:54	20:28	19:42	18:54	17:13 22	07:45 (SER10) 16:59
11	07:45		07:22	07:45 (SER10)	06:43	06:54	06:14	05:56	06:05	06:31	07:00	07:29	07:03	07:25 (SER10) 07:34
	17:19		17:55 39	08:24 (SER10)	18:26	19:57	20:27	20:51	20:53	20:26	19:41	18:52	17:13 19	07:44 (SER10) 16:59
12	07:44		07:21	07:44 (SER10)	06:42	06:52	06:13	05:55	06:06	06:32	07:01	07:30	07:04	07:27 (SER10) 07:35
	17:20		17:56 39	08:23 (SER10)	18:27	19:58	20:28	20:52	20:53	20:25	19:39	18:51	17:12 15	07:42 (SER10) 17:00
13	07:44		07:20	07:44 (SER10)	06:40	06:51	06:12	05:55	06:06	06:33	07:02	07:31	07:05	07:31 (SER10) 07:36
	17:21		17:57 40	08:24 (SER10)	18:28	19:59	20:29	20:52	20:52	20:24	19:37	18:49	17:11 7	07:38 (SER10) 17:00
14	07:44		07:19	07:44 (SER10)	06:39	06:49	06:11	05:55	06:07	06:34	07:03	07:32	07:06	07:36
	17:22		17:58 40	08:24 (SER10)	18:29	20:00	20:30	20:53	20:52	20:23	19:36	18:48	17:10	17:00
15	07:44		07:18	07:45 (SER10)	06:37	06:48	06:10	05:55	06:08	06:35	07:04	07:33	08:31 (SER10)	07:07 07:37
	17:23		17:59 39	08:24 (SER10)	18:30	20:01	20:31	20:53	20:51	20:21	19:34	18:46 9	08:40 (SER10)	17:09 17:00
16	07:43		07:16	07:44 (SER10)	06:35	06:46	06:09	05:55	06:09	06:36	07:05	07:34	08:26 (SER10)	07:08 07:38
	17:24		18:00 39	08:23 (SER10)	18:31	20:02	20:32	20:53	20:51	20:20	19:32	18:45 17	08:43 (SER10)	17:08 17:00
17	07:43		07:15	07:45 (SER10)	06:34	06:45	06:08	05:55	06:09	06:37	07:06	07:35	08:23 (SER10)	07:10 07:38
	17:25		18:02 38	08:23 (SER10)	18:32	20:03	20:33	20:54	20:50	20:19	19:31	18:43 23	08:46 (SER10)	17:07 17:01
18	07:42		07:14	07:45 (SER10)	06:32	06:44	06:08	05:56	06:10	06:38	07:07	07:36	08:21 (SER10)	07:11 07:39
	17:26		18:03 38	08:23 (SER10)	18:33	20:04	20:33	20:54	20:50	20:17	19:29	18:42 26	08:47 (SER10)	17:07 17:01
19	07:42		07:12	07:45 (SER10)	06:31	06:42	06:07	05:56	06:11	06:39	07:08	07:37	08:20 (SER10)	07:12 07:40
	17:27		18:04 36	08:21 (SER10)	18:34	20:05	20:34	20:54	20:49	20:16	19:28	18:40 28	08:48 (SER10)	17:06 17:02
20	07:41		07:11	07:46 (SER10)	06:29	06:41	06:06	05:56	06:12	06:40	07:09	07:38	08:18 (SER10)	07:13 07:40
	17:29		18:05 35	08:21 (SER10)	18:35	20:06	20:35	20:55	20:48	20:14	19:26	18:39 31	08:49 (SER10)	17:05 17:02
21	07:41		07:10	07:47 (SER10)	06:27	06:39	06:05	05:56	06:12	06:41	07:10	07:39	08:18 (SER10)	07:14 07:41
	17:30		18:06 33	08:20 (SER10)	18:36	20:07	20:36	20:55	20:48	20:13	19:24	18:37 33	08:51 (SER10)	17:05 17:02
22	07:40		07:08	07:48 (SER10)	06:26	06:38	06:04	05:56	06:13	06:42	07:11	07:40	08:17 (SER10)	07:15 07:41
	17:31		18:07 30	08:18 (SER10)	18:37	20:08	20:37	20:55	20:47	20:12	19:23	18:36 35	08:52 (SER10)	17:04 17:03
23	07:40		07:07	07:49 (SER10)	06:24	06:36	06:04	05:56	06:14	06:43	07:11	07:41	08:16 (SER10)	07:16 07:42
	17:32		18:08 28	08:17 (SER10)	18:38	20:09	20:38	20:55	20:46	20:10	19:21	18:35 36	08:52 (SER10)	17:04 17:03
24	07:39		07:06	07:50 (SER10)	06:23	06:35	06:03	05:57	06:15	06:44	07:12	07:43	08:15 (SER10)	07:17 07:42
	17:33		18:09 25	08:15 (SER10)	18:39	20:10	20:39	20:56	20:45	20:09	19:19	18:33 38	08:53 (SER10)	17:03 17:04
25	07:38		07:04	07:53 (SER10)	06:21	06:34	06:02	05:57	06:16	06:44	07:13	06:44	07:14 (SER10)	07:18 07:43
	17:34		18:11 20	08:13 (SER10)	18:40	20:11	20:40	20:56	20:44	20:07	19:18	17:32 39	07:53 (SER10)	17:03 17:04
26	07:38		07:03	07:56 (SER10)	06:19	06:32	06:02	05:57	06:17	06:45	07:14	06:45	07:14 (SER10)	07:20 07:43
	17:36		18:12 15	08:11 (SER10)	18:41	20:12	20:40	20:56	20:44	20:06	19:16	17:31 39	07:53 (SER10)	17:02 17:05
27	07:37		07:01		06:18	06:31	06:01	05:58	06:18	06:46	07:15	06:46	07:13 (SER10)	07:21 07:44
	17:37		18:13		18:42	20:13	20:41	20:56	20:43	20:04	19:14	17:29 40	07:53 (SER10)	17:02 17:06
28	07:36		07:00		06:16	06:30	06:00	05:58	06:18	06:47	07:16	06:47	07:14 (SER10)	07:22 07:44
	17:38		18:14		18:43	20:14	20:42	20:56	20:42	20:03	19:13	17:28 40	07:54 (SER10)	17:01 17:06
29	07:35	07:59 (SER10)			07:15	06:28	06:00	05:58	06:19	06:48	07:17	06:48	07:14 (SER10)	07:23 07:44
	17:39 7	08:06 (SER10)			19:44	20:15	20:43	20:56	20:41	20:01	19:11	17:27 39	07:53 (SER10)	17:01 17:07
30	07:34	07:55 (SER10)			07:13	06:27	05:59	05:59	06:20	06:49	07:18	06:49	07:14 (SER10)	07:24 07:44
	17:40 15	08:10 (SER10)			19:45	20:16	20:44	20:56	20:40	20:00	19:10	17:26 39	07:53 (SER10)	17:01 17:08
31	07:34	07:53 (SER10)			07:11		05:59		06:21	06:50		06:50	07:14 (SER10)	07:45
	17:41 19	08:12 (SER10)			19:46		20:44		20:39	19:58		17:24 39	07:53 (SER10)	17:09
Potential sun hours	301		299		370	397	445	448	455	425	374	347	301	292
Total, worst case	41		854									551	356	
Sun reduction	0,45		0,47									0,54	0,51	
Oper. time red.	0,91		0,91									0,91	0,91	
Wind dir. red.	0,78		0,78									0,78	0,78	
Total reduction	0,32		0,33									0,38	0,36	
Total, real	13		285									212	127	

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_28 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (28)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:45		08:07 (SER7)	07:33		08:02 (SER7)	06:59			07:10		07:35 (SER8)	06:26	05:58
	17:10	17	08:24 (SER7)	17:43	40	08:42 (SER7)	18:15			19:47	21	07:56 (SER8)	20:17	20:45
2	07:45		08:07 (SER7)	07:32		08:02 (SER7)	06:57			07:08		07:35 (SER8)	06:25	05:58
	17:10	18	08:25 (SER7)	17:44	39	08:41 (SER7)	18:16			19:48	19	07:54 (SER8)	20:18	20:46
3	07:45		08:07 (SER7)	07:31		08:03 (SER7)	06:56			07:07		07:37 (SER8)	06:23	05:58
	17:11	19	08:26 (SER7)	17:45	38	08:41 (SER7)	18:17			19:49	15	07:52 (SER8)	20:19	20:47
4	07:45		08:07 (SER7)	07:30		08:04 (SER7)	06:54			07:05		07:39 (SER8)	06:22	05:57
	17:12	20	08:27 (SER7)	17:46	36	08:40 (SER7)	18:18			19:50	10	07:49 (SER8)	20:20	20:47
5	07:45		08:07 (SER7)	07:29		08:05 (SER7)	06:53			07:03			06:21	05:57
	17:13	21	08:28 (SER7)	17:47	35	08:40 (SER7)	18:19			19:51			20:21	20:48
6	07:45		08:07 (SER7)	07:28		08:06 (SER7)	06:51			07:02			06:20	05:57
	17:14	22	08:29 (SER7)	17:49	33	08:39 (SER7)	18:20			19:52			20:22	20:49
7	07:45		08:07 (SER7)	07:27		08:07 (SER7)	06:50			07:00			06:19	05:56
	17:15	23	08:30 (SER7)	17:50	31	08:38 (SER7)	18:21			19:53			20:23	20:49
8	07:45		08:06 (SER7)	07:26		08:09 (SER7)	06:48			06:59			06:17	05:56
	17:16	24	08:30 (SER7)	17:51	28	08:37 (SER7)	18:23			19:54			20:24	20:50
9	07:45		08:06 (SER7)	07:25		08:11 (SER7)	06:46			06:57			06:16	05:56
	17:17	26	08:32 (SER7)	17:52	24	08:35 (SER7)	18:24			19:55			20:25	20:50
10	07:45		08:06 (SER7)	07:24		08:13 (SER7)	06:45			06:56			06:15	05:56
	17:18	27	08:33 (SER7)	17:53	20	08:33 (SER7)	18:25			19:56			20:26	20:51
11	07:45		08:06 (SER7)	07:22		08:16 (SER7)	06:43			06:54			06:14	05:56
	17:19	28	08:34 (SER7)	17:55	15	08:31 (SER7)	18:26			19:57			20:27	20:51
12	07:44		08:05 (SER7)	07:21			06:42			06:52			06:13	05:55
	17:20	29	08:34 (SER7)	17:56			18:27			19:58			20:28	20:52
13	07:44		08:05 (SER7)	07:20			06:40			06:51			06:12	05:55
	17:21	30	08:35 (SER7)	17:57			18:28			19:59			20:29	20:52
14	07:44		08:05 (SER7)	07:19			06:39			06:49			06:11	05:55
	17:22	31	08:36 (SER7)	17:58			18:29			20:00			20:30	20:53
15	07:44		08:04 (SER7)	07:18			06:37			06:48			06:10	05:55
	17:23	33	08:37 (SER7)	17:59			18:30			20:01			20:31	20:53
16	07:43		08:04 (SER7)	07:16			06:35			06:46			06:09	05:55
	17:24	34	08:38 (SER7)	18:00			18:31			20:02			20:32	20:54
17	07:43		08:03 (SER7)	07:15			06:34			06:45			06:08	05:55
	17:25	35	08:38 (SER7)	18:02			18:32			20:03			20:33	20:54
18	07:42		08:03 (SER7)	07:14			06:32			06:44			06:08	05:55
	17:26	36	08:39 (SER7)	18:03			18:33			20:04			20:34	20:54
19	07:42		08:02 (SER7)	07:13			06:31			06:42			06:07	05:56
	17:27	37	08:39 (SER7)	18:04			18:34			20:05			20:34	20:55
20	07:41		08:02 (SER7)	07:11			06:29		06:47 (SER8)	06:41			06:06	05:56
	17:29	38	08:40 (SER7)	18:05			18:35	7	06:54 (SER8)	20:06			20:35	20:55
21	07:41		08:01 (SER7)	07:10			06:27		06:46 (SER8)	06:39			06:05	05:56
	17:30	40	08:41 (SER7)	18:06			18:36	11	06:57 (SER8)	20:07			20:36	20:55
22	07:40		08:00 (SER7)	07:08			06:26		06:44 (SER8)	06:38			06:04	05:56
	17:31	41	08:41 (SER7)	18:07			18:37	14	06:58 (SER8)	20:08			20:37	20:55
23	07:40		08:00 (SER7)	07:07			06:24		06:42 (SER8)	06:36			06:04	05:56
	17:32	42	08:42 (SER7)	18:08			18:38	16	06:58 (SER8)	20:09			20:38	20:55
24	07:39		07:59 (SER7)	07:06			06:23		06:41 (SER8)	06:35			06:03	05:57
	17:33	43	08:42 (SER7)	18:09			18:39	18	06:59 (SER8)	20:10			20:39	20:56
25	07:38		07:59 (SER7)	07:04			06:21		06:39 (SER8)	06:34			06:02	05:57
	17:34	43	08:42 (SER7)	18:11			18:40	20	06:59 (SER8)	20:11			20:40	20:56
26	07:38		08:00 (SER7)	07:03			06:19		06:38 (SER8)	06:32			06:02	05:57
	17:35	43	08:43 (SER7)	18:12			18:41	22	07:00 (SER8)	20:12			20:40	20:56
27	07:37		08:00 (SER7)	07:01			06:18		06:36 (SER8)	06:31			06:01	05:58
	17:37	43	08:43 (SER7)	18:13			18:42	24	07:00 (SER8)	20:13			20:41	20:56
28	07:36		08:00 (SER7)	07:00			06:16		06:34 (SER8)	06:30			06:00	05:58
	17:38	43	08:43 (SER7)	18:14			18:43	25	06:59 (SER8)	20:14			20:42	20:56
29	07:35		08:00 (SER7)				07:15		07:34 (SER8)	06:28			06:00	05:58
	17:39	43	08:43 (SER7)				19:44	25	07:59 (SER8)	20:15			20:43	20:56
30	07:35		08:01 (SER7)				07:13		07:34 (SER8)	06:27			05:59	05:59
	17:40	41	08:42 (SER7)				19:45	24	07:58 (SER8)	20:16			20:44	20:56
31	07:34		08:01 (SER7)				07:11		07:34 (SER8)				05:59	
	17:41	41	08:42 (SER7)				19:46	22	07:56 (SER8)				20:44	
Potential sun hours	301			299			370			397			445	448
Total, worst case		1011			339			228			65			
Sun reduction		0,45			0,47			0,49			0,53			
Oper. time red.		0,91			0,91			0,91			0,91			
Wind dir. red.		0,76			0,76			0,79			0,79			
Total reduction		0,31			0,33			0,35			0,38			
Total, real		315			110			80			25			

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_28 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (28)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July		August		September			October			November			December		
1	05:59		06:22		06:51			07:19			06:51		07:41 (SER7)	07:25		07:48 (SER7)
	20:56		20:38		19:57			19:08			17:23	22	08:03 (SER7)	17:00	28	08:16 (SER7)
2	06:00		06:23		06:52			07:20			06:53		07:40 (SER7)	07:26		07:49 (SER7)
	20:56		20:37		19:55			19:06			17:22	25	08:05 (SER7)	17:00	27	08:16 (SER7)
3	06:00		06:24		06:53			07:21			06:54		07:38 (SER7)	07:27		07:50 (SER7)
	20:56		20:36		19:53			19:05			17:21	29	08:07 (SER7)	17:00	26	08:16 (SER7)
4	06:01		06:25		06:54			07:22			06:55		07:37 (SER7)	07:28		07:51 (SER7)
	20:55		20:35		19:52			19:03			17:20	31	08:08 (SER7)	17:00	24	08:15 (SER7)
5	06:01		06:26		06:55			07:23			06:56		07:36 (SER7)	07:29		07:52 (SER7)
	20:55		20:34		19:50			19:02			17:19	33	08:09 (SER7)	17:00	23	08:15 (SER7)
6	06:02		06:27		06:56			07:24			06:57		07:35 (SER7)	07:30		07:53 (SER7)
	20:55		20:33		19:49			19:00			17:18	35	08:10 (SER7)	16:59	22	08:15 (SER7)
7	06:02		06:28		06:57			07:25			06:58		07:35 (SER7)	07:31		07:54 (SER7)
	20:55		20:31		19:47			18:58			17:16	36	08:11 (SER7)	16:59	21	08:15 (SER7)
8	06:03		06:28		06:58		07:35 (SER8)	07:26			06:59		07:34 (SER7)	07:31		07:54 (SER7)
	20:54		20:30		19:46	9	07:44 (SER8)	18:57			17:15	38	08:12 (SER7)	16:59	20	08:14 (SER7)
9	06:04		06:29		06:58		07:31 (SER8)	07:27			07:00		07:33 (SER7)	07:32		07:55 (SER7)
	20:54		20:29		19:44	14	07:45 (SER8)	18:55			17:14	39	08:12 (SER7)	16:59	19	08:14 (SER7)
10	06:04		06:30		06:59		07:29 (SER8)	07:28			07:02		07:33 (SER7)	07:33		07:56 (SER7)
	20:54		20:28		19:42	18	07:47 (SER8)	18:54			17:13	40	08:13 (SER7)	16:59	18	08:14 (SER7)
11	06:05		06:31		07:00		07:27 (SER8)	07:29			07:03		07:33 (SER7)	07:34		07:57 (SER7)
	20:53		20:27		19:41	21	07:48 (SER8)	18:52			17:13	41	08:14 (SER7)	16:59	17	08:14 (SER7)
12	06:06		06:32		07:01		07:26 (SER8)	07:30			07:04		07:33 (SER7)	07:35		07:58 (SER7)
	20:53		20:25		19:39	22	07:48 (SER8)	18:51			17:12	41	08:14 (SER7)	17:00	16	08:14 (SER7)
13	06:06		06:33		07:02		07:25 (SER8)	07:31			07:05		07:32 (SER7)	07:36		07:59 (SER7)
	20:52		20:24		19:37	24	07:49 (SER8)	18:49			17:11	43	08:15 (SER7)	17:00	16	08:15 (SER7)
14	06:07		06:34		07:03		07:24 (SER8)	07:32			07:06		07:32 (SER7)	07:36		07:59 (SER7)
	20:52		20:23		19:36	25	07:49 (SER8)	18:48			17:10	43	08:15 (SER7)	17:00	15	08:14 (SER7)
15	06:08		06:35		07:04		07:24 (SER8)	07:33			07:07		07:32 (SER7)	07:37		08:00 (SER7)
	20:51		20:21		19:34	25	07:49 (SER8)	18:46			17:09	43	08:15 (SER7)	17:00	14	08:14 (SER7)
16	06:08		06:36		07:05		07:25 (SER8)	07:34			07:08		07:33 (SER7)	07:38		08:01 (SER7)
	20:51		20:20		19:32	24	07:49 (SER8)	18:45			17:08	43	08:16 (SER7)	17:00	14	08:15 (SER7)
17	06:09		06:37		07:06		07:26 (SER8)	07:35			07:10		07:33 (SER7)	07:38		08:01 (SER7)
	20:50		20:19		19:31	22	07:48 (SER8)	18:43			17:07	43	08:16 (SER7)	17:01	13	08:14 (SER7)
18	06:10		06:38		07:07		07:27 (SER8)	07:36			07:11		07:33 (SER7)	07:39		08:02 (SER7)
	20:50		20:17		19:29	21	07:48 (SER8)	18:42			17:07	43	08:16 (SER7)	17:01	13	08:15 (SER7)
19	06:11		06:39		07:08		07:27 (SER8)	07:37			07:12		07:34 (SER7)	07:40		08:02 (SER7)
	20:49		20:16		19:28	19	07:46 (SER8)	18:40			17:06	42	08:16 (SER7)	17:01	12	08:14 (SER7)
20	06:12		06:40		07:09		07:28 (SER8)	07:38			07:13		07:35 (SER7)	07:40		08:03 (SER7)
	20:48		20:14		19:26	17	07:45 (SER8)	18:39			17:05	41	08:16 (SER7)	17:02	12	08:15 (SER7)
21	06:12		06:41		07:10		07:29 (SER8)	07:39			07:14		07:37 (SER7)	07:41		08:04 (SER7)
	20:48		20:13		19:24	14	07:43 (SER8)	18:37			17:05	40	08:17 (SER7)	17:02	12	08:16 (SER7)
22	06:13		06:42		07:11		07:30 (SER8)	07:40			07:15		07:38 (SER7)	07:41		08:04 (SER7)
	20:47		20:12		19:23	12	07:42 (SER8)	18:36			17:04	38	08:16 (SER7)	17:03	12	08:16 (SER7)
23	06:14		06:43		07:11		07:31 (SER8)	07:42			07:16		07:39 (SER7)	07:42		08:04 (SER7)
	20:46		20:10		19:21	8	07:39 (SER8)	18:35			17:04	37	08:16 (SER7)	17:03	12	08:16 (SER7)
24	06:15		06:44		07:12			07:43			07:17		07:40 (SER7)	07:42		08:05 (SER7)
	20:45		20:09		19:19			18:33			17:03	36	08:16 (SER7)	17:04	12	08:17 (SER7)
25	06:16		06:44		07:13			06:44			07:18		07:41 (SER7)	07:43		08:05 (SER7)
	20:44		20:07		19:18			17:32			17:03	35	08:16 (SER7)	17:04	12	08:17 (SER7)
26	06:17		06:45		07:14			06:45			07:20		07:42 (SER7)	07:43		08:06 (SER7)
	20:44		20:06		19:16			17:31			17:02	34	08:16 (SER7)	17:05	13	08:19 (SER7)
27	06:18		06:46		07:15			06:46			07:21		07:43 (SER7)	07:44		08:06 (SER7)
	20:43		20:04		19:14			17:29			17:02	33	08:16 (SER7)	17:06	13	08:19 (SER7)
28	06:18		06:47		07:16			06:47			07:22		07:45 (SER7)	07:44		08:06 (SER7)
	20:42		20:03		19:13			17:28			17:01	31	08:16 (SER7)	17:06	14	08:20 (SER7)
29	06:19		06:48		07:17			06:48			07:23		07:46 (SER7)	07:44		08:06 (SER7)
	20:41		20:01		19:11			17:27			17:01	30	08:16 (SER7)	17:07	15	08:21 (SER7)
30	06:20		06:49		07:18			06:49		07:49 (SER7)	07:24		07:47 (SER7)	07:44		08:06 (SER7)
	20:40		20:00		19:10			17:26	7	07:56 (SER7)	17:01	29	08:16 (SER7)	17:08	15	08:21 (SER7)
31	06:21		06:50					06:50		07:44 (SER7)				07:45		08:07 (SER7)
	20:39		19:58					17:24	16	08:00 (SER7)				17:09	16	08:23 (SER7)
Potential sun hours	455		425		374			347			301			292		
Total, worst case						295			23			1094			516	
Sun reduction						0,65			0,54			0,51			0,45	
Oper. time red.						0,91			0,91			0,91			0,91	
Wind dir. red.						0,79			0,76			0,76			0,76	
Total reduction						0,46			0,38			0,35			0,31	
Total, real						136			9			381			161	

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_29 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (29)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June
1	07:45		08:08 (SER10)	07:33		08:20 (SER10)	06:58	07:10	06:26	05:58
	17:10	37	08:45 (SER10)	17:43	32	08:52 (SER10)	18:15	19:47	20:17	20:45
2	07:45		08:08 (SER10)	07:32		08:21 (SER10)	06:57	07:08	06:25	05:58
	17:10	37	08:45 (SER10)	17:44	30	08:51 (SER10)	18:16	19:48	20:18	20:46
3	07:45		08:09 (SER10)	07:31		08:22 (SER10)	06:56	07:07	06:23	05:58
	17:11	37	08:46 (SER10)	17:45	28	08:50 (SER10)	18:17	19:49	20:19	20:46
4	07:45		08:09 (SER10)	07:30		08:24 (SER10)	06:54	07:05	06:22	05:57
	17:12	38	08:47 (SER10)	17:46	24	08:48 (SER10)	18:18	19:50	20:20	20:47
5	07:45		08:09 (SER10)	07:29		08:26 (SER10)	06:53	07:03	06:21	05:57
	17:13	38	08:47 (SER10)	17:47	21	08:47 (SER10)	18:19	19:51	20:21	20:48
6	07:45		08:09 (SER10)	07:28		08:29 (SER10)	06:51	07:02	06:20	05:57
	17:14	39	08:48 (SER10)	17:49	15	08:44 (SER10)	18:20	19:52	20:22	20:48
7	07:45		08:10 (SER10)	07:27		08:34 (SER10)	06:49	07:00	06:19	05:56
	17:15	39	08:49 (SER10)	17:50	5	08:39 (SER10)	18:21	19:53	20:23	20:49
8	07:45		08:09 (SER10)	07:26			06:48	06:59	06:17	05:56
	17:16	40	08:49 (SER10)	17:51			18:23	19:54	20:24	20:50
9	07:45		08:09 (SER10)	07:25			06:46	06:57	06:16	05:56
	17:17	41	08:50 (SER10)	17:52			18:24	19:55	20:25	20:50
10	07:45		08:10 (SER10)	07:24			06:45	06:56	06:15	05:56
	17:18	40	08:50 (SER10)	17:53			18:25	19:56	20:26	20:51
11	07:45		08:10 (SER10)	07:22			06:43	06:54	06:14	05:56
	17:19	41	08:51 (SER10)	17:55			18:26	19:57	20:27	20:51
12	07:44		08:10 (SER10)	07:21			06:42	06:52	06:13	05:55
	17:20	41	08:51 (SER10)	17:56			18:27	19:58	20:28	20:52
13	07:44		08:10 (SER10)	07:20			06:40	06:51	06:12	05:55
	17:21	42	08:52 (SER10)	17:57			18:28	19:59	20:29	20:52
14	07:44		08:11 (SER10)	07:19			06:39	06:49	06:11	05:55
	17:22	42	08:53 (SER10)	17:58			18:29	20:00	20:30	20:53
15	07:44		08:10 (SER10)	07:18			06:37	06:48	06:10	05:55
	17:23	43	08:53 (SER10)	17:59			18:30	20:01	20:31	20:53
16	07:43		08:11 (SER10)	07:16			06:35	06:46	06:09	05:55
	17:24	43	08:54 (SER10)	18:00			18:31	20:02	20:32	20:53
17	07:43		08:11 (SER10)	07:15			06:34	06:45	06:08	05:55
	17:25	43	08:54 (SER10)	18:02			18:32	20:03	20:33	20:54
18	07:42		08:12 (SER10)	07:14			06:32	06:44	06:08	05:56
	17:26	43	08:55 (SER10)	18:03			18:33	20:04	20:33	20:54
19	07:42		08:11 (SER10)	07:12			06:31	06:42	06:07	05:56
	17:27	43	08:54 (SER10)	18:04			18:34	20:05	20:34	20:54
20	07:41		08:12 (SER10)	07:11			06:29	06:41	06:06	05:56
	17:29	43	08:55 (SER10)	18:05			18:35	20:06	20:35	20:55
21	07:41		08:12 (SER10)	07:10			06:27	06:39	06:05	05:56
	17:30	43	08:55 (SER10)	18:06			18:36	20:07	20:36	20:55
22	07:40		08:12 (SER10)	07:08			06:26	06:38	06:04	05:56
	17:31	43	08:55 (SER10)	18:07			18:37	20:08	20:37	20:55
23	07:40		08:14 (SER10)	07:07			06:24	06:36	06:04	05:56
	17:32	42	08:56 (SER10)	18:08			18:38	20:09	20:38	20:55
24	07:39		08:14 (SER10)	07:06			06:23	06:35	06:03	05:57
	17:33	41	08:55 (SER10)	18:09			18:39	20:10	20:39	20:56
25	07:38		08:14 (SER10)	07:04			06:21	06:34	06:02	05:57
	17:34	41	08:55 (SER10)	18:11			18:40	20:11	20:40	20:56
26	07:38		08:15 (SER10)	07:03			06:19	06:32	06:02	05:57
	17:35	41	08:56 (SER10)	18:12			18:41	20:12	20:40	20:56
27	07:37		08:16 (SER10)	07:01			06:18	06:31	06:01	05:58
	17:37	39	08:55 (SER10)	18:13			18:42	20:13	20:41	20:56
28	07:36		08:16 (SER10)	07:00			06:16	06:30	06:00	05:58
	17:38	39	08:55 (SER10)	18:14			18:43	20:14	20:42	20:56
29	07:35		08:17 (SER10)				07:14	06:28	06:00	05:58
	17:39	37	08:54 (SER10)				19:44	20:15	20:43	20:56
30	07:34		08:18 (SER10)				07:13	06:27	05:59	05:59
	17:40	36	08:54 (SER10)				19:45	20:16	20:44	20:56
31	07:34		08:19 (SER10)				07:11		05:59	
	17:41	34	08:53 (SER10)				19:46		20:44	
Potential sun hours	301			299			370	397	445	448
Total, worst case		1246			155					
Sun reduction		0,45			0,47					
Oper. time red.		0,91			0,91					
Wind dir. red.		0,75			0,75					
Total reduction		0,31			0,32					
Total, real		383			50					

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_29 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (29)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November			December		
1	05:59	06:22	06:51	07:19	06:51			07:25		07:52 (SER10)
	20:56	20:38	19:57	19:08	17:23			17:00	41	08:33 (SER10)
2	06:00	06:23	06:52	07:20	06:53			07:26		07:53 (SER10)
	20:56	20:37	19:55	19:06	17:22			17:00	41	08:34 (SER10)
3	06:00	06:24	06:53	07:21	06:54			07:27		07:53 (SER10)
	20:56	20:36	19:53	19:05	17:21			17:00	41	08:34 (SER10)
4	06:01	06:25	06:54	07:22	06:55		08:02 (SER10)	07:28		07:54 (SER10)
	20:55	20:35	19:52	19:03	17:20	8	08:10 (SER10)	17:00	40	08:34 (SER10)
5	06:01	06:26	06:55	07:23	06:56		07:58 (SER10)	07:29		07:55 (SER10)
	20:55	20:34	19:50	19:02	17:19	16	08:14 (SER10)	17:00	39	08:34 (SER10)
6	06:02	06:27	06:56	07:24	06:57		07:55 (SER10)	07:30		07:55 (SER10)
	20:55	20:32	19:49	19:00	17:18	22	08:17 (SER10)	16:59	39	08:34 (SER10)
7	06:02	06:28	06:57	07:25	06:58		07:54 (SER10)	07:31		07:56 (SER10)
	20:55	20:31	19:47	18:58	17:16	26	08:20 (SER10)	16:59	39	08:35 (SER10)
8	06:03	06:28	06:58	07:26	06:59		07:53 (SER10)	07:31		07:56 (SER10)
	20:54	20:30	19:45	18:57	17:15	28	08:21 (SER10)	16:59	38	08:34 (SER10)
9	06:04	06:29	06:58	07:27	07:00		07:52 (SER10)	07:32		07:57 (SER10)
	20:54	20:29	19:44	18:55	17:14	30	08:22 (SER10)	16:59	37	08:34 (SER10)
10	06:04	06:30	06:59	07:28	07:02		07:50 (SER10)	07:33		07:57 (SER10)
	20:54	20:28	19:42	18:54	17:13	33	08:23 (SER10)	16:59	37	08:34 (SER10)
11	06:05	06:31	07:00	07:29	07:03		07:50 (SER10)	07:34		07:58 (SER10)
	20:53	20:26	19:41	18:52	17:13	35	08:25 (SER10)	16:59	37	08:35 (SER10)
12	06:06	06:32	07:01	07:30	07:04		07:50 (SER10)	07:35		07:59 (SER10)
	20:53	20:25	19:39	18:51	17:12	36	08:26 (SER10)	17:00	36	08:35 (SER10)
13	06:06	06:33	07:02	07:31	07:05		07:49 (SER10)	07:36		08:00 (SER10)
	20:52	20:24	19:37	18:49	17:11	37	08:26 (SER10)	17:00	36	08:36 (SER10)
14	06:07	06:34	07:03	07:32	07:06		07:48 (SER10)	07:36		08:00 (SER10)
	20:52	20:23	19:36	18:48	17:10	39	08:27 (SER10)	17:00	35	08:35 (SER10)
15	06:08	06:35	07:04	07:33	07:07		07:48 (SER10)	07:37		08:01 (SER10)
	20:51	20:21	19:34	18:46	17:09	39	08:27 (SER10)	17:00	35	08:36 (SER10)
16	06:08	06:36	07:05	07:34	07:08		07:48 (SER10)	07:38		08:02 (SER10)
	20:51	20:20	19:32	18:45	17:08	41	08:29 (SER10)	17:00	34	08:36 (SER10)
17	06:09	06:37	07:06	07:35	07:10		07:48 (SER10)	07:38		08:02 (SER10)
	20:50	20:19	19:31	18:43	17:07	41	08:29 (SER10)	17:01	34	08:36 (SER10)
18	06:10	06:38	07:07	07:36	07:11		07:48 (SER10)	07:39		08:03 (SER10)
	20:50	20:17	19:29	18:42	17:07	41	08:29 (SER10)	17:01	34	08:37 (SER10)
19	06:11	06:39	07:08	07:37	07:12		07:48 (SER10)	07:40		08:03 (SER10)
	20:49	20:16	19:28	18:40	17:06	42	08:30 (SER10)	17:01	34	08:37 (SER10)
20	06:12	06:40	07:09	07:38	07:13		07:47 (SER10)	07:40		08:04 (SER10)
	20:48	20:14	19:26	18:39	17:05	43	08:30 (SER10)	17:02	34	08:38 (SER10)
21	06:12	06:41	07:10	07:39	07:14		07:48 (SER10)	07:41		08:04 (SER10)
	20:48	20:13	19:24	18:37	17:05	43	08:31 (SER10)	17:02	33	08:37 (SER10)
22	06:13	06:42	07:11	07:40	07:15		07:48 (SER10)	07:41		08:05 (SER10)
	20:47	20:12	19:23	18:36	17:04	43	08:31 (SER10)	17:03	33	08:38 (SER10)
23	06:14	06:43	07:11	07:41	07:16		07:49 (SER10)	07:42		08:05 (SER10)
	20:46	20:10	19:21	18:35	17:04	42	08:31 (SER10)	17:03	34	08:39 (SER10)
24	06:15	06:44	07:12	07:43	07:17		07:49 (SER10)	07:42		08:06 (SER10)
	20:45	20:09	19:19	18:33	17:03	43	08:32 (SER10)	17:04	34	08:40 (SER10)
25	06:16	06:44	07:13	06:44	07:18		07:49 (SER10)	07:43		08:06 (SER10)
	20:44	20:07	19:18	17:32	17:03	43	08:32 (SER10)	17:04	34	08:40 (SER10)
26	06:17	06:45	07:14	06:45	07:20		07:49 (SER10)	07:43		08:06 (SER10)
	20:44	20:06	19:16	17:31	17:02	43	08:32 (SER10)	17:05	34	08:40 (SER10)
27	06:18	06:46	07:15	06:46	07:21		07:49 (SER10)	07:43		08:07 (SER10)
	20:43	20:04	19:14	17:29	17:02	43	08:32 (SER10)	17:06	34	08:41 (SER10)
28	06:18	06:47	07:16	06:47	07:22		07:51 (SER10)	07:44		08:07 (SER10)
	20:42	20:03	19:13	17:28	17:01	42	08:33 (SER10)	17:06	35	08:42 (SER10)
29	06:19	06:48	07:17	06:48	07:23		07:51 (SER10)	07:44		08:07 (SER10)
	20:41	20:01	19:11	17:27	17:01	42	08:33 (SER10)	17:07	35	08:42 (SER10)
30	06:20	06:49	07:18	06:49	07:24		07:52 (SER10)	07:44		08:07 (SER10)
	20:40	20:00	19:10	17:26	17:01	41	08:33 (SER10)	17:08	36	08:43 (SER10)
31	06:21	06:50		06:50				07:45		08:08 (SER10)
	20:39	19:58		17:24				17:09	36	08:44 (SER10)
Potential sun hours	455	425	374	347	301			292		
Total, worst case						982			1119	
Sun reduction						0,51			0,45	
Oper. time red.						0,91			0,91	
Wind dir. red.						0,75			0,75	
Total reduction						0,34			0,31	
Total, real						336			344	

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_30 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (30)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June
1	07:45		08:07 (SER10)	07:33		08:10 (SER10)	06:58	07:10	06:26	05:58
	17:10	28	08:35 (SER10)	17:43	41	08:51 (SER10)	18:15	19:47	20:17	20:45
2	07:45		08:07 (SER10)	07:32		08:10 (SER10)	06:57	07:08	06:25	05:58
	17:10	29	08:36 (SER10)	17:44	41	08:51 (SER10)	18:16	19:48	20:18	20:46
3	07:45		08:07 (SER10)	07:31		08:11 (SER10)	06:56	07:07	06:23	05:58
	17:11	30	08:37 (SER10)	17:45	39	08:50 (SER10)	18:17	19:49	20:19	20:46
4	07:45		08:07 (SER10)	07:30		08:12 (SER10)	06:54	07:05	06:22	05:57
	17:12	31	08:38 (SER10)	17:46	37	08:49 (SER10)	18:18	19:50	20:20	20:47
5	07:45		08:07 (SER10)	07:29		08:13 (SER10)	06:53	07:03	06:21	05:57
	17:13	31	08:38 (SER10)	17:47	36	08:49 (SER10)	18:19	19:51	20:21	20:48
6	07:45		08:07 (SER10)	07:28		08:14 (SER10)	06:51	07:02	06:20	05:57
	17:14	32	08:39 (SER10)	17:49	34	08:48 (SER10)	18:20	19:52	20:22	20:48
7	07:45		08:07 (SER10)	07:27		08:16 (SER10)	06:49	07:00	06:19	05:56
	17:15	33	08:40 (SER10)	17:50	31	08:47 (SER10)	18:21	19:53	20:23	20:49
8	07:45		08:06 (SER10)	07:26		08:17 (SER10)	06:48	06:59	06:17	05:56
	17:16	35	08:41 (SER10)	17:51	29	08:46 (SER10)	18:23	19:54	20:24	20:50
9	07:45		08:06 (SER10)	07:25		08:19 (SER10)	06:46	06:57	06:16	05:56
	17:17	36	08:42 (SER10)	17:52	25	08:44 (SER10)	18:24	19:55	20:25	20:50
10	07:45		08:06 (SER10)	07:24		08:21 (SER10)	06:45	06:56	06:15	05:56
	17:18	37	08:43 (SER10)	17:53	21	08:42 (SER10)	18:25	19:56	20:26	20:51
11	07:45		08:07 (SER10)	07:22		08:24 (SER10)	06:43	06:54	06:14	05:56
	17:19	37	08:44 (SER10)	17:55	15	08:39 (SER10)	18:26	19:57	20:27	20:51
12	07:44		08:06 (SER10)	07:21		08:30 (SER10)	06:42	06:52	06:13	05:55
	17:20	38	08:44 (SER10)	17:56	2	08:32 (SER10)	18:27	19:58	20:28	20:52
13	07:44		08:06 (SER10)	07:20			06:40	06:51	06:12	05:55
	17:21	39	08:45 (SER10)	17:57			18:28	19:59	20:29	20:52
14	07:44		08:07 (SER10)	07:19			06:39	06:49	06:11	05:55
	17:22	39	08:46 (SER10)	17:58			18:29	20:00	20:30	20:53
15	07:44		08:06 (SER10)	07:18			06:37	06:48	06:10	05:55
	17:23	40	08:46 (SER10)	17:59			18:30	20:01	20:31	20:53
16	07:43		08:06 (SER10)	07:16			06:35	06:46	06:09	05:55
	17:24	41	08:47 (SER10)	18:00			18:31	20:02	20:32	20:53
17	07:43		08:06 (SER10)	07:15			06:34	06:45	06:08	05:55
	17:25	42	08:48 (SER10)	18:02			18:32	20:03	20:33	20:54
18	07:42		08:06 (SER10)	07:14			06:32	06:44	06:08	05:56
	17:26	43	08:49 (SER10)	18:03			18:33	20:04	20:33	20:54
19	07:42		08:06 (SER10)	07:12			06:31	06:42	06:07	05:56
	17:27	43	08:49 (SER10)	18:04			18:34	20:05	20:34	20:54
20	07:41		08:07 (SER10)	07:11			06:29	06:41	06:06	05:56
	17:29	43	08:50 (SER10)	18:05			18:35	20:06	20:35	20:55
21	07:41		08:06 (SER10)	07:10			06:27	06:39	06:05	05:56
	17:30	44	08:50 (SER10)	18:06			18:36	20:07	20:36	20:55
22	07:40		08:06 (SER10)	07:08			06:26	06:38	06:04	05:56
	17:31	44	08:50 (SER10)	18:07			18:37	20:08	20:37	20:55
23	07:40		08:07 (SER10)	07:07			06:24	06:36	06:04	05:56
	17:32	44	08:51 (SER10)	18:08			18:38	20:09	20:38	20:55
24	07:39		08:07 (SER10)	07:06			06:23	06:35	06:03	05:57
	17:33	44	08:51 (SER10)	18:09			18:39	20:10	20:39	20:56
25	07:38		08:07 (SER10)	07:04			06:21	06:34	06:02	05:57
	17:34	44	08:51 (SER10)	18:11			18:40	20:11	20:40	20:56
26	07:38		08:08 (SER10)	07:03			06:19	06:32	06:02	05:57
	17:35	44	08:52 (SER10)	18:12			18:41	20:12	20:40	20:56
27	07:37		08:08 (SER10)	07:01			06:18	06:31	06:01	05:58
	17:37	44	08:52 (SER10)	18:13			18:42	20:13	20:41	20:56
28	07:36		08:08 (SER10)	07:00			06:16	06:30	06:00	05:58
	17:38	44	08:52 (SER10)	18:14			18:43	20:14	20:42	20:56
29	07:35		08:09 (SER10)				07:14	06:28	06:00	05:58
	17:39	43	08:52 (SER10)				19:44	20:15	20:43	20:56
30	07:34		08:09 (SER10)				07:13	06:27	05:59	05:59
	17:40	43	08:52 (SER10)				19:45	20:16	20:44	20:56
31	07:34		08:09 (SER10)				07:11		05:59	
	17:41	42	08:51 (SER10)				19:46		20:44	
Potential sun hours	301			299			370	397	445	448
Total, worst case		1207			351					
Sun reduction		0,45			0,47					
Oper. time red.		0,91			0,91					
Wind dir. red.		0,75			0,75					
Total reduction		0,31			0,32					
Total, real		374			114					

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

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

Project:
Serri

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_30 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (30)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October			November			December		
1	05:59		06:22		06:51		07:19			06:51		07:50 (SER10)	07:25		07:49 (SER10)
	20:56		20:38		19:57		19:08			17:23	21	08:11 (SER10)	17:00	37	08:26 (SER10)
2	06:00		06:23		06:52		07:20			06:53		07:48 (SER10)	07:26		07:49 (SER10)
	20:56		20:37		19:55		19:06			17:22	26	08:14 (SER10)	17:00	37	08:26 (SER10)
3	06:00		06:24		06:53		07:21			06:54		07:47 (SER10)	07:27		07:50 (SER10)
	20:56		20:36		19:53		19:05			17:21	29	08:16 (SER10)	17:00	36	08:26 (SER10)
4	06:01		06:25		06:54		07:22			06:55		07:45 (SER10)	07:28		07:51 (SER10)
	20:55		20:35		19:52		19:03			17:20	32	08:17 (SER10)	17:00	35	08:26 (SER10)
5	06:01		06:26		06:55		07:23			06:56		07:44 (SER10)	07:29		07:52 (SER10)
	20:55		20:34		19:50		19:02			17:19	34	08:18 (SER10)	17:00	34	08:26 (SER10)
6	06:02		06:27		06:56		07:24			06:57		07:43 (SER10)	07:30		07:53 (SER10)
	20:55		20:32		19:49		19:00			17:18	36	08:19 (SER10)	16:59	33	08:26 (SER10)
7	06:02		06:28		06:57		07:25			06:58		07:43 (SER10)	07:31		07:54 (SER10)
	20:55		20:31		19:47		18:58			17:16	37	08:20 (SER10)	16:59	32	08:26 (SER10)
8	06:03		06:28		06:58		07:26			06:59		07:42 (SER10)	07:31		07:54 (SER10)
	20:54		20:30		19:45		18:57			17:15	39	08:21 (SER10)	16:59	31	08:25 (SER10)
9	06:04		06:29		06:58		07:27			07:00		07:41 (SER10)	07:32		07:55 (SER10)
	20:54		20:29		19:44		18:55			17:14	40	08:21 (SER10)	16:59	30	08:25 (SER10)
10	06:04		06:30		06:59		07:28			07:02		07:41 (SER10)	07:33		07:56 (SER10)
	20:54		20:28		19:42		18:54			17:13	41	08:22 (SER10)	16:59	29	08:25 (SER10)
11	06:05		06:31		07:00		07:29			07:03		07:41 (SER10)	07:34		07:57 (SER10)
	20:53		20:26		19:41		18:52			17:13	42	08:23 (SER10)	16:59	28	08:25 (SER10)
12	06:06		06:32		07:01		07:30			07:04		07:41 (SER10)	07:35		07:58 (SER10)
	20:53		20:25		19:39		18:51			17:12	43	08:24 (SER10)	17:00	27	08:25 (SER10)
13	06:06		06:33		07:02		07:31			07:05		07:40 (SER10)	07:36		07:59 (SER10)
	20:52		20:24		19:37		18:49			17:11	44	08:24 (SER10)	17:00	26	08:25 (SER10)
14	06:07		06:34		07:03		07:32			07:06		07:40 (SER10)	07:36		07:59 (SER10)
	20:52		20:23		19:36		18:48			17:10	44	08:24 (SER10)	17:00	26	08:25 (SER10)
15	06:08		06:35		07:04		07:33			07:07		07:40 (SER10)	07:37		08:00 (SER10)
	20:51		20:21		19:34		18:46			17:09	44	08:24 (SER10)	17:00	25	08:25 (SER10)
16	06:08		06:36		07:05		07:34			07:08		07:41 (SER10)	07:38		08:01 (SER10)
	20:51		20:20		19:32		18:45			17:08	44	08:25 (SER10)	17:00	25	08:26 (SER10)
17	06:09		06:37		07:06		07:35			07:10		07:41 (SER10)	07:38		08:02 (SER10)
	20:50		20:19		19:31		18:43			17:07	44	08:25 (SER10)	17:01	23	08:25 (SER10)
18	06:10		06:38		07:07		07:36			07:11		07:41 (SER10)	07:39		08:03 (SER10)
	20:50		20:17		19:29		18:42			17:07	44	08:25 (SER10)	17:01	23	08:26 (SER10)
19	06:11		06:39		07:08		07:37			07:12		07:41 (SER10)	07:40		08:03 (SER10)
	20:49		20:16		19:28		18:40			17:06	44	08:25 (SER10)	17:01	23	08:26 (SER10)
20	06:12		06:40		07:09		07:38			07:13		07:41 (SER10)	07:40		08:04 (SER10)
	20:48		20:14		19:26		18:39			17:05	44	08:25 (SER10)	17:02	22	08:26 (SER10)
21	06:12		06:41		07:10		07:39			07:14		07:42 (SER10)	07:41		08:04 (SER10)
	20:48		20:13		19:24		18:37			17:05	44	08:26 (SER10)	17:02	22	08:26 (SER10)
22	06:13		06:42		07:11		07:40			07:15		07:43 (SER10)	07:41		08:05 (SER10)
	20:47		20:12		19:23		18:36			17:04	43	08:26 (SER10)	17:03	22	08:27 (SER10)
23	06:14		06:43		07:11		07:41			07:16		07:43 (SER10)	07:42		08:05 (SER10)
	20:46		20:10		19:21		18:35			17:04	43	08:26 (SER10)	17:03	22	08:27 (SER10)
24	06:15		06:44		07:12		07:43			07:17		07:43 (SER10)	07:42		08:06 (SER10)
	20:45		20:09		19:19		18:33			17:03	43	08:26 (SER10)	17:04	22	08:28 (SER10)
25	06:16		06:44		07:13		06:44			07:18		07:44 (SER10)	07:43		08:06 (SER10)
	20:44		20:07		19:18		17:32			17:03	42	08:26 (SER10)	17:04	23	08:29 (SER10)
26	06:17		06:45		07:14		06:45			07:20		07:44 (SER10)	07:43		08:06 (SER10)
	20:44		20:06		19:16		17:31			17:02	42	08:26 (SER10)	17:05	23	08:29 (SER10)
27	06:18		06:46		07:15		06:46			07:21		07:45 (SER10)	07:43		08:07 (SER10)
	20:43		20:04		19:14		17:29			17:02	40	08:25 (SER10)	17:06	23	08:30 (SER10)
28	06:18		06:47		07:16		06:47			07:22		07:47 (SER10)	07:44		08:06 (SER10)
	20:42		20:03		19:13		17:28			17:01	39	08:26 (SER10)	17:06	25	08:31 (SER10)
29	06:19		06:48		07:17		06:48			07:23		07:47 (SER10)	07:44		08:06 (SER10)
	20:41		20:01		19:11		17:27			17:01	39	08:26 (SER10)	17:07	26	08:32 (SER10)
30	06:20		06:49		07:18		06:49		07:57 (SER10)	07:24		07:48 (SER10)	07:44		08:06 (SER10)
	20:40		20:00		19:10		17:26	7	08:04 (SER10)	17:01	38	08:26 (SER10)	17:08	26	08:32 (SER10)
31	06:21		06:50				06:50		07:52 (SER10)				07:45		08:07 (SER10)
	20:39		19:58				17:24	17	08:09 (SER10)				17:09	27	08:34 (SER10)
Potential sun hours	455		425		374		347			301			292		
Total, worst case								24			1185			843	
Sun reduction								0,54			0,51			0,45	
Oper. time red.								0,91			0,91			0,91	
Wind dir. red.								0,75			0,75			0,75	
Total reduction								0,37			0,35			0,31	
Total, real								9			410			262	

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

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

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_31 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (31)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January			February	March			April	May	June
1	07:45		08:39 (SER9)	07:33	06:59			07:10	06:26	05:58
	17:10	64	09:43 (SER9)	17:43	18:15			19:47	20:17	20:45
2	07:45		08:39 (SER9)	07:32	06:57			07:08	06:25	05:58
	17:10	64	09:43 (SER9)	17:44	18:16			19:48	20:18	20:46
3	07:45		08:40 (SER9)	07:31	06:56			07:07	06:23	05:58
	17:11	64	09:44 (SER9)	17:45	18:17			19:49	20:19	20:47
4	07:45		08:41 (SER9)	07:30	06:54		07:13 (SER10)	07:05	06:22	05:57
	17:12	63	09:44 (SER9)	17:46	18:18	5	07:18 (SER10)	19:50	20:20	20:47
5	07:45		08:41 (SER9)	07:29	06:53		07:11 (SER10)	07:03	06:21	05:57
	17:13	63	09:44 (SER9)	17:47	18:19	9	07:20 (SER10)	19:51	20:21	20:48
6	07:45		08:42 (SER9)	07:28	06:51		07:10 (SER10)	07:02	06:20	05:57
	17:14	63	09:45 (SER9)	17:49	18:20	11	07:21 (SER10)	19:52	20:22	20:48
7	07:45		08:43 (SER9)	07:27	06:50		07:08 (SER10)	07:00	06:19	05:56
	17:15	62	09:45 (SER9)	17:50	18:22	14	07:22 (SER10)	19:53	20:23	20:49
8	07:45		08:43 (SER9)	07:26	06:48		07:06 (SER10)	06:59	06:18	05:56
	17:16	61	09:44 (SER9)	17:51	18:23	16	07:22 (SER10)	19:54	20:24	20:50
9	07:45		08:43 (SER9)	07:25	06:46		07:05 (SER10)	06:57	06:16	05:56
	17:17	61	09:44 (SER9)	17:52	18:24	18	07:23 (SER10)	19:55	20:25	20:50
10	07:45		08:44 (SER9)	07:24	06:45		07:03 (SER10)	06:56	06:15	05:56
	17:18	61	09:45 (SER9)	17:53	18:25	20	07:23 (SER10)	19:56	20:26	20:51
11	07:45		08:45 (SER9)	07:22	06:43		07:02 (SER10)	06:54	06:14	05:56
	17:19	60	09:45 (SER9)	17:55	18:26	21	07:23 (SER10)	19:57	20:27	20:51
12	07:44		08:45 (SER9)	07:21	06:42		07:00 (SER10)	06:53	06:13	05:56
	17:20	59	09:44 (SER9)	17:56	18:27	23	07:23 (SER10)	19:58	20:28	20:52
13	07:44		08:46 (SER9)	07:20	06:40		06:59 (SER10)	06:51	06:12	05:55
	17:21	59	09:45 (SER9)	17:57	18:28	24	07:23 (SER10)	19:59	20:29	20:52
14	07:44		08:48 (SER9)	07:19	06:39		06:57 (SER10)	06:49	06:11	05:55
	17:22	57	09:45 (SER9)	17:58	18:29	25	07:22 (SER10)	20:00	20:30	20:53
15	07:44		08:48 (SER9)	07:18	06:37		06:55 (SER10)	06:48	06:10	05:55
	17:23	56	09:44 (SER9)	17:59	18:30	26	07:21 (SER10)	20:01	20:31	20:53
16	07:43		08:49 (SER9)	07:16	06:35		06:55 (SER10)	06:46	06:09	05:55
	17:24	55	09:44 (SER9)	18:00	18:31	25	07:20 (SER10)	20:02	20:32	20:54
17	07:43		08:50 (SER9)	07:15	06:34		06:56 (SER10)	06:45	06:09	05:55
	17:25	53	09:43 (SER9)	18:02	18:32	22	07:18 (SER10)	20:03	20:33	20:54
18	07:42		08:51 (SER9)	07:14	06:32		06:56 (SER10)	06:44	06:08	05:56
	17:26	53	09:44 (SER9)	18:03	18:33	20	07:16 (SER10)	20:04	20:33	20:54
19	07:42		08:52 (SER9)	07:12	06:31		06:59 (SER10)	06:42	06:07	05:56
	17:27	51	09:43 (SER9)	18:04	18:34	16	07:15 (SER10)	20:05	20:34	20:54
20	07:41		08:53 (SER9)	07:11	06:29		07:01 (SER10)	06:41	06:06	05:56
	17:29	50	09:43 (SER9)	18:05	18:35	10	07:11 (SER10)	20:06	20:35	20:55
21	07:41		08:54 (SER9)	07:10	06:27			06:39	06:05	05:56
	17:30	48	09:42 (SER9)	18:06	18:36			20:07	20:36	20:55
22	07:40		08:55 (SER9)	07:08	06:26			06:38	06:04	05:56
	17:31	45	09:40 (SER9)	18:07	18:37			20:08	20:37	20:55
23	07:40		08:57 (SER9)	07:07	06:24			06:36	06:04	05:56
	17:32	43	09:40 (SER9)	18:08	18:38			20:09	20:38	20:55
24	07:39		08:58 (SER9)	07:06	06:23			06:35	06:03	05:57
	17:33	41	09:39 (SER9)	18:09	18:39			20:10	20:39	20:56
25	07:38		08:59 (SER9)	07:04	06:21			06:34	06:02	05:57
	17:34	38	09:37 (SER9)	18:11	18:40			20:11	20:40	20:56
26	07:38		09:02 (SER9)	07:03	06:19			06:32	06:02	05:57
	17:36	35	09:37 (SER9)	18:12	18:41			20:12	20:40	20:56
27	07:37		09:03 (SER9)	07:01	06:18			06:31	06:01	05:58
	17:37	32	09:35 (SER9)	18:13	18:42			20:13	20:41	20:56
28	07:36		09:06 (SER9)	07:00	06:16			06:30	06:00	05:58
	17:38	27	09:33 (SER9)	18:14	18:43			20:14	20:42	20:56
29	07:35		09:08 (SER9)		07:15			06:28	06:00	05:58
	17:39	22	09:30 (SER9)		19:44			20:15	20:43	20:56
30	07:34		09:13 (SER9)		07:13			06:27	05:59	05:59
	17:40	13	09:26 (SER9)		19:45			20:16	20:44	20:56
31	07:34				07:11				05:59	
	17:41				19:46				20:44	
Potential sun hours	301			299	370			397	445	448
Total, worst case		1523				305				
Sun reduction		0,45				0,49				
Oper. time red.		0,91				0,91				
Wind dir. red.		0,69				0,79				
Total reduction		0,28				0,35				
Total, real		432				108				

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_31 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (31)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September			October			November			December		
1	05:59	06:22	06:51			07:19		07:39 (SER10)	06:51			07:25		08:27 (SER9)
	20:56	20:38	19:57			19:08	23	08:02 (SER10)	17:23			17:00	60	09:27 (SER9)
2	06:00	06:23	06:52			07:20		07:40 (SER10)	06:53			07:26		08:27 (SER9)
	20:56	20:37	19:55			19:06	22	08:02 (SER10)	17:22			17:00	61	09:28 (SER9)
3	06:00	06:24	06:53			07:21		07:41 (SER10)	06:54			07:27		08:27 (SER9)
	20:56	20:36	19:53			19:05	20	08:01 (SER10)	17:21			17:00	61	09:28 (SER9)
4	06:01	06:25	06:54			07:22		07:42 (SER10)	06:55			07:28		08:28 (SER9)
	20:55	20:35	19:52			19:03	19	08:01 (SER10)	17:20			17:00	61	09:29 (SER9)
5	06:01	06:26	06:55			07:23		07:43 (SER10)	06:56			07:29		08:28 (SER9)
	20:55	20:34	19:50			19:02	17	08:00 (SER10)	17:19			17:00	62	09:30 (SER9)
6	06:02	06:27	06:56			07:24		07:44 (SER10)	06:57			07:30		08:28 (SER9)
	20:55	20:32	19:49			19:00	15	07:59 (SER10)	17:18			16:59	63	09:31 (SER9)
7	06:02	06:28	06:57			07:25		07:45 (SER10)	06:58			07:31		08:28 (SER9)
	20:55	20:31	19:47			18:58	13	07:58 (SER10)	17:17			16:59	63	09:31 (SER9)
8	06:03	06:29	06:58			07:26		07:46 (SER10)	06:59			07:31		08:28 (SER9)
	20:54	20:30	19:46			18:57	10	07:56 (SER10)	17:15			16:59	63	09:31 (SER9)
9	06:04	06:29	06:58			07:27		07:47 (SER10)	07:00			07:32		08:28 (SER9)
	20:54	20:29	19:44			18:55	7	07:54 (SER10)	17:14			16:59	64	09:32 (SER9)
10	06:04	06:30	06:59			07:28		07:48 (SER10)	07:02			07:33		08:29 (SER9)
	20:54	20:28	19:42			18:54	3	07:51 (SER10)	17:14			16:59	63	09:32 (SER9)
11	06:05	06:31	07:00			07:29			07:03			07:34		08:29 (SER9)
	20:53	20:26	19:41			18:52			17:13			17:00	64	09:33 (SER9)
12	06:06	06:32	07:01			07:30			07:04		08:44 (SER9)	07:35		08:30 (SER9)
	20:53	20:25	19:39			18:51			17:12	14	08:58 (SER9)	17:00	64	09:34 (SER9)
13	06:06	06:33	07:02			07:31			07:05		08:40 (SER9)	07:36		08:30 (SER9)
	20:52	20:24	19:37			18:49			17:11	22	09:02 (SER9)	17:00	65	09:35 (SER9)
14	06:07	06:34	07:03			07:32			07:06		08:37 (SER9)	07:36		08:30 (SER9)
	20:52	20:23	19:36			18:48			17:10	28	09:05 (SER9)	17:00	65	09:35 (SER9)
15	06:08	06:35	07:04			07:33			07:07		08:35 (SER9)	07:37		08:30 (SER9)
	20:51	20:21	19:34			18:46			17:09	32	09:07 (SER9)	17:00	65	09:35 (SER9)
16	06:09	06:36	07:05			07:34			07:08		08:35 (SER9)	07:38		08:31 (SER9)
	20:51	20:20	19:32			18:45			17:08	35	09:10 (SER9)	17:01	65	09:36 (SER9)
17	06:09	06:37	07:06			07:35			07:10		08:33 (SER9)	07:38		08:31 (SER9)
	20:50	20:19	19:31			18:43			17:08	38	09:11 (SER9)	17:01	65	09:36 (SER9)
18	06:10	06:38	07:07			07:36			07:11		08:32 (SER9)	07:39		08:32 (SER9)
	20:50	20:17	19:29			18:42			17:07	41	09:13 (SER9)	17:01	65	09:37 (SER9)
19	06:11	06:39	07:08			07:37			07:12		08:31 (SER9)	07:40		08:32 (SER9)
	20:49	20:16	19:28			18:40			17:06	43	09:14 (SER9)	17:02	65	09:37 (SER9)
20	06:12	06:40	07:09			07:38			07:13		08:30 (SER9)	07:40		08:33 (SER9)
	20:48	20:14	19:26			18:39			17:05	45	09:15 (SER9)	17:02	65	09:38 (SER9)
21	06:12	06:41	07:10			07:39			07:14		08:30 (SER9)	07:41		08:33 (SER9)
	20:48	20:13	19:24			18:37			17:05	48	09:18 (SER9)	17:02	65	09:38 (SER9)
22	06:13	06:42	07:11			07:40			07:15		08:29 (SER9)	07:41		08:34 (SER9)
	20:47	20:12	19:23			18:36			17:04	50	09:19 (SER9)	17:03	65	09:39 (SER9)
23	06:14	06:43	07:11		07:46 (SER10)	07:41			07:16		08:29 (SER9)	07:42		08:34 (SER9)
	20:46	20:10	19:21	9	07:55 (SER10)	18:35			17:04	51	09:20 (SER9)	17:03	65	09:39 (SER9)
24	06:15	06:44	07:12		07:43 (SER10)	07:43			07:17		08:28 (SER9)	07:42		08:35 (SER9)
	20:45	20:09	19:19	15	07:58 (SER10)	18:33			17:03	53	09:21 (SER9)	17:04	65	09:40 (SER9)
25	06:16	06:44	07:13		07:40 (SER10)	06:44			07:18		08:28 (SER9)	07:43		08:35 (SER9)
	20:44	20:07	19:18	19	07:59 (SER10)	17:32			17:03	53	09:21 (SER9)	17:05	65	09:40 (SER9)
26	06:17	06:45	07:14		07:39 (SER10)	06:45			07:20		08:27 (SER9)	07:43		08:36 (SER9)
	20:44	20:06	19:16	21	08:00 (SER10)	17:31			17:02	55	09:22 (SER9)	17:05	65	09:41 (SER9)
27	06:18	06:46	07:15		07:37 (SER10)	06:46			07:21		08:27 (SER9)	07:44		08:36 (SER9)
	20:43	20:04	19:14	24	08:01 (SER10)	17:29			17:02	56	09:23 (SER9)	17:06	65	09:41 (SER9)
28	06:18	06:47	07:16		07:36 (SER10)	06:47			07:22		08:28 (SER9)	07:44		08:36 (SER9)
	20:42	20:03	19:13	26	08:02 (SER10)	17:28			17:01	57	09:25 (SER9)	17:06	65	09:41 (SER9)
29	06:19	06:48	07:17		07:37 (SER10)	06:48			07:23		08:27 (SER9)	07:44		08:37 (SER9)
	20:41	20:01	19:11	25	08:02 (SER10)	17:27			17:01	59	09:26 (SER9)	17:07	65	09:42 (SER9)
30	06:20	06:49	07:18		07:38 (SER10)	06:49			07:24		08:27 (SER9)	07:44		08:37 (SER9)
	20:40	20:00	19:10	24	08:02 (SER10)	17:26			17:01	59	09:26 (SER9)	17:08	65	09:42 (SER9)
31	06:21	06:50				06:50						07:45		08:38 (SER9)
	20:39	19:58				17:24						17:09	65	09:43 (SER9)
Potential sun hours	455	425	374			347			301			292		
Total, worst case				163			149			839			1984	
Sun reduction				0,65			0,54			0,51			0,45	
Oper. time red.				0,91			0,91			0,91			0,91	
Wind dir. red.				0,79			0,79			0,69			0,69	
Total reduction				0,46			0,39			0,32			0,28	
Total, real				75			58			265			563	

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

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

Licensed user:
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Giovanni Savarese/
g.savarese@leonardoengineering.it.Calculate
03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_32 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (32)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:45	07:33	06:59	07:10	06:26	05:58	06:20 (SER9)	05:59	06:21 (SER9)	06:22	06:44 (SER10)	06:51	07:19	06:51	07:25
	17:10	17:43	18:15	19:47	20:17	20:45	28 06:48 (SER9)	20:56	40 07:01 (SER9)	20:38	16 07:00 (SER10)	19:57	19:08	17:23	17:00
2	07:45	07:32	06:57	07:08	06:25	05:58	06:19 (SER9)	06:00	06:22 (SER9)	06:23	06:44 (SER10)	06:52	07:20	06:53	07:26
	17:10	17:44	18:16	19:48	20:18	20:46	30 06:49 (SER9)	20:56	40 07:02 (SER9)	20:37	15 06:59 (SER10)	19:55	19:06	17:22	17:00
3	07:45	07:31	06:56	07:07	06:23	06:42 (SER10)	05:58	06:19 (SER9)	06:00	06:22 (SER9)	06:24	06:45 (SER10)	06:53	07:21	06:54	07:27
	17:11	17:45	18:17	19:49	20:19	2 06:44 (SER10)	20:46	32 06:51 (SER9)	20:56	39 07:01 (SER9)	20:36	14 06:59 (SER10)	19:53	19:05	17:21	17:00
4	07:45	07:30	06:54	07:05	06:22	06:41 (SER10)	05:57	06:18 (SER9)	06:01	06:23 (SER9)	06:25	06:46 (SER10)	06:54	07:22	06:55	07:28
	17:12	17:46	18:18	19:50	20:20	4 06:45 (SER10)	20:47	33 06:51 (SER9)	20:55	38 07:01 (SER9)	20:35	12 06:58 (SER10)	19:52	19:03	17:20	17:00
5	07:45	07:29	06:53	07:03	06:21	06:40 (SER10)	05:57	06:18 (SER9)	06:01	06:23 (SER9)	06:26	06:47 (SER10)	06:55	07:23	06:56	07:29
	17:13	17:47	18:19	19:51	20:21	6 06:46 (SER10)	20:48	35 06:53 (SER9)	20:55	37 07:00 (SER9)	20:34	11 06:58 (SER10)	19:50	19:02	17:19	17:00
6	07:45	07:28	06:51	07:02	06:20	06:39 (SER10)	05:57	06:18 (SER9)	06:02	06:24 (SER9)	06:27	06:48 (SER10)	06:56	07:24	06:57	07:30
	17:14	17:49	18:20	19:52	20:22	8 06:47 (SER10)	20:48	36 06:54 (SER9)	20:55	36 07:00 (SER9)	20:32	9 06:57 (SER10)	19:49	19:00	17:18	16:59
7	07:45	07:27	06:50	07:00	06:19	06:38 (SER10)	05:56	06:18 (SER9)	06:02	06:24 (SER9)	06:28	06:49 (SER10)	06:57	07:25	06:58	07:31
	17:15	17:50	18:22	19:53	20:23	10 06:48 (SER10)	20:49	37 06:55 (SER9)	20:55	35 06:59 (SER9)	20:31	8 06:57 (SER10)	19:47	18:58	17:17	16:59
8	07:45	07:26	06:48	06:59	06:18	06:37 (SER10)	05:56	06:17 (SER9)	06:03	06:25 (SER9)	06:29	06:50 (SER10)	06:58	07:26	06:59	07:31
	17:16	17:51	18:23	19:54	20:24	12 06:49 (SER10)	20:50	38 06:55 (SER9)	20:54	34 06:59 (SER9)	20:30	6 06:56 (SER10)	19:46	18:57	17:16	16:59
9	07:45	07:25	06:46	06:57	06:16	06:36 (SER10)	05:56	06:17 (SER9)	06:04	06:26 (SER9)	06:29	06:51 (SER10)	06:58	07:27	07:00	07:32
	17:17	17:52	18:24	19:55	20:25	13 06:49 (SER10)	20:50	39 06:56 (SER9)	20:54	33 06:59 (SER9)	20:29	3 06:54 (SER10)	19:44	18:55	17:15	16:59
10	07:45	07:24	06:45	06:56	06:15	06:35 (SER10)	05:56	06:17 (SER9)	06:04	06:26 (SER9)	06:30	06:52 (SER10)	06:59	07:28	07:02	07:33
	17:18	17:53	18:25	19:56	20:26	14 06:49 (SER10)	20:51	39 06:56 (SER9)	20:54	31 06:57 (SER9)	20:28	1 06:53 (SER10)	19:42	18:54	17:14	16:59
11	07:45	07:22	06:43	06:54	06:14	06:34 (SER10)	05:56	06:17 (SER9)	06:05	06:27 (SER9)	06:31		07:00	07:29	07:03	07:34
	17:19	17:55	18:26	19:57	20:27	15 06:49 (SER10)	20:51	40 06:57 (SER9)	20:53	29 06:56 (SER9)	20:26		19:41	18:52	17:13	17:00
12	07:44	07:21	06:42	06:53	06:13	06:33 (SER10)	05:56	06:17 (SER9)	06:06	06:29 (SER9)	06:32		07:01	07:30	07:04	07:35
	17:20	17:56	18:27	19:58	20:28	16 06:49 (SER10)	20:52	41 06:58 (SER9)	20:53	26 06:55 (SER9)	20:25		19:39	18:51	17:12	17:00
13	07:44	07:20	06:40	06:51	06:12	06:32 (SER10)	05:55	06:17 (SER9)	06:06	06:30 (SER9)	06:33		07:02	07:31	07:05	07:36
	17:21	17:57	18:28	19:59	20:29	17 06:49 (SER10)	20:52	41 06:58 (SER9)	20:52	23 06:53 (SER9)	20:24		19:37	18:49	17:11	17:00
14	07:44	07:19	06:39	06:49	06:11	06:31 (SER10)	05:55	06:17 (SER9)	06:07	06:33 (SER9)	06:34		07:03	07:32	07:06	07:36
	17:22	17:58	18:29	20:00	20:30	18 06:49 (SER10)	20:53	42 06:59 (SER9)	20:52	19 06:52 (SER9)	20:23		19:36	18:48	17:10	17:00
15	07:44	07:18	06:37	06:48	06:10	06:30 (SER10)	05:55	06:17 (SER9)	06:08	06:36 (SER9)	06:35		07:04	07:33	07:07	07:37
	17:23	17:59	18:30	20:01	20:31	19 06:49 (SER10)	20:53	42 06:59 (SER9)	20:51	13 06:49 (SER9)	20:21		19:34	18:46	17:09	17:00
16	07:43	07:16	06:35	06:47	06:09	06:29 (SER10)	05:55	06:17 (SER9)	06:09		06:36		07:05	07:34	07:08	07:38
	17:24	18:00	18:31	20:02	20:32	19 06:48 (SER10)	20:53	43 07:00 (SER9)	20:51		20:20		19:32	18:45	17:08	17:01
17	07:43	07:15	06:34	06:45	06:09	06:28 (SER10)	05:55	06:17 (SER9)	06:09	06:43 (SER10)	06:37		07:06	07:35	07:10	07:38
	17:25	18:02	18:32	20:03	20:33	20 06:48 (SER10)	20:54	43 07:00 (SER9)	20:50	6 06:49 (SER10)	20:19		19:31	18:43	17:08	17:01
18	07:42	07:14	06:32	06:44	06:08	06:28 (SER10)	05:56	06:17 (SER9)	06:10	06:41 (SER10)	06:38		07:07	07:36	07:11	07:39
	17:26	18:03	18:33	20:04	20:33	20 06:48 (SER10)	20:54	43 07:00 (SER9)	20:50	10 06:51 (SER10)	20:17		19:29	18:42	17:07	17:01
19	07:42	07:12	06:31	06:42	06:07	06:27 (SER10)	05:56	06:17 (SER9)	06:11	06:40 (SER10)	06:39		07:08	07:37	07:12	07:40
	17:27	18:04	18:34	20:05	20:34	20 06:47 (SER10)	20:54	43 07:00 (SER9)	20:49	13 06:53 (SER10)	20:16		19:28	18:40	17:06	17:02
20	07:41	07:11	06:29	06:41	06:06	06:26 (SER10)	05:56	06:18 (SER9)	06:12	06:39 (SER10)	06:40		07:09	07:38	07:13	07:40
	17:29	18:05	18:35	20:06	20:35	21 06:47 (SER10)	20:55	43 07:01 (SER9)	20:48	15 06:54 (SER10)	20:14		19:26	18:39	17:05	17:02
21	07:41	07:10	06:27	06:39	06:05	06:26 (SER10)	05:56	06:18 (SER9)	06:12	06:37 (SER10)	06:41		07:10	07:39	07:14	07:41
	17:30	18:06	18:36	20:07	20:36	20 06:46 (SER10)	20:55	43 07:01 (SER9)	20:48	18 06:55 (SER10)	20:13		19:24	18:37	17:05	17:02
22	07:40	07:08	06:26	06:38	06:04	06:28 (SER10)	05:56	06:18 (SER9)	06:13	06:37 (SER10)	06:42		07:11	07:40	07:15	07:41
	17:31	18:07	18:37	20:08	20:37	18 06:46 (SER10)	20:55	43 07:01 (SER9)	20:47	19 06:56 (SER10)	20:12		19:23	18:36	17:04	17:03
23	07:40	07:07	06:24	06:36	06:04	06:28 (SER10)	05:56	06:18 (SER9)	06:14	06:36 (SER10)	06:43		07:11	07:41	07:16	07:42
	17:32	18:08	18:38	20:09	20:38	17 06:45 (SER10)	20:55	43 07:01 (SER9)	20:46	21 06:57 (SER10)	20:10		19:21	18:35	17:04	17:03
24	07:39	07:06	06:23	06:35	06:03	06:29 (SER10)	05:57	06:19 (SER9)	06:15	06:37 (SER10)	06:44		07:12	07:43	07:17	07:42
	17:33	18:10	18:39	20:10	20:39	14 06:43 (SER10)	20:56	43 07:02 (SER9)	20:45	21 06:58 (SER10)	20:09		19:19	18:33	17:03	17:04
25	07:38	07:04	06:21	06:34	06:02	06:31 (SER10)	05:57	06:19 (SER9)	06:16	06:38 (SER10)	06:44		07:13	06:44	07:18	07:43
	17:34	18:11	18:40	20:11	20:40	12 06:43 (SER10)	20:56	43 07:02 (SER9)	20:44	20 06:58 (SER10)	20:07		19:18	17:32	17:03	17:05
26	07:38	07:03	06:19	06:32	06:02	06:32 (SER10)	05:57	06:19 (SER9)	06:17	06:38 (SER10)	06:45		07:14	06:45	07:20	07:43
	17:36	18:12	18:41	20:12	20:40	9 06:41 (SER10)	20:56	43 07:02 (SER9)	20:44	20 06:58 (SER10)	20:06		19:16	17:31	17:02	17:05
27	07:37	07:01	06:18	06:31	06:01		05:58	06:20 (SER9)	06:18	06:39 (SER10)	06:46		07:15	06:46	07:21	07:44
	17:37	18:13	18:42	20:13	20:41		20:56	42 07:02 (SER9)	20:43	20 06:59 (SER10)	20:04		19:14	17:29	17:02	17:06
28	07:36	07:00	06:16	06:30	06:01	06:29 (SER9)	05:58	06:20 (SER9)	06:18	06:40 (SER10)	06:47		07:16	06:47	07:22	07:44
	17:38	18:14	18:43	20:14	20:42	9 06:38 (SER9)	20:56	42 07:02 (SER9)	20:42	19 06:59 (SER10)	20:03		19:13	17:28	17:01	17:06
29	07:35		07:15	06:28	06:00	06:26 (SER9)	05:58	06:20 (SER9)	06:19	06:41 (SER10)	06:48		07:17	06:48	07:23	07:44
	17:39		19:44	20:15	20:43	16 06:42 (SER9)	20:56	41 07:01 (SER9)	20:41	18 06:59 (SER10)	20:01		19:11	17:27	17:01	17:07
30	07:34		07:13	06:27	05:59	06:23 (SER9)	05:59	06:21 (SER9)	06:20	06:42 (SER10)	06:49		07:18	06:49	07:24	07:44
	17:40		19:45	20:16	20:44	21 06:44 (SER9)	20:56	41 07:02 (SER9)	20:40	18 07:00 (SER10)	20:00		19:10	17:26	17:01	17:08
31	07:34		07:11		05:59	06:22 (SER9)			06:21	06:43 (SER10)	06:50			06:50		07:45
	17:41		19:46		20:44	25 06:47 (SER9)			20:39	17 07:00 (SER10)	19:58			17:24		17:09
Potential sun hours	301	299	370	397	445	448	455	425	374	347	301	292
Total, worst case					415	1192	728	95				
Sun reduction					0,59	0,66	0,74	0,73				
Oper. time red.					0,91	0,91	0,91	0,91				
Wind dir. red.					0,71	0,68	0,69	0,72				
Total reduction					0,38	0,41	0,46	0,48				
Total, real					158	486	338	45				

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_33 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (33)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May	June	July	August		September		October	November	December
1	07:45	07:33	06:58		07:10		18:50 (SER9)	06:26	05:58	05:59	06:22		06:51	18:43 (SER9)	07:19	06:51	07:25
	17:10	17:43	18:15		19:47	28	19:18 (SER9)	20:17	20:45	20:56	20:38		19:57	34 19:17 (SER9)	19:08	17:23	17:00
2	07:45	07:32	06:57		07:08		18:48 (SER9)	06:24	05:58	06:00	06:23		06:52	18:42 (SER9)	07:20	06:52	07:26
	17:10	17:44	18:16		19:48	31	19:19 (SER9)	20:18	20:46	20:56	20:37		19:55	35 19:17 (SER9)	19:06	17:22	17:00
3	07:45	07:31	06:55		07:06		18:48 (SER9)	06:23	05:58	06:00	06:24		06:53	18:42 (SER9)	07:21	06:54	07:27
	17:11	17:45	18:17		19:49	32	19:20 (SER9)	20:19	20:46	20:55	20:36		19:53	35 19:17 (SER9)	19:05	17:21	17:00
4	07:45	07:30	06:54		07:05		18:46 (SER9)	06:22	05:57	06:01	06:25		06:54	18:41 (SER9)	07:22	06:55	07:28
	17:12	17:46	18:18		19:50	34	19:20 (SER9)	20:20	20:47	20:55	20:35		19:52	36 19:17 (SER9)	19:03	17:20	17:00
5	07:45	07:29	06:52		07:03		18:45 (SER9)	06:21	05:57	06:01	06:26		06:55	18:41 (SER9)	07:23	06:56	07:29
	17:13	17:47	18:19		19:51	35	19:20 (SER9)	20:21	20:48	20:55	20:34		19:50	36 19:17 (SER9)	19:01	17:19	17:00
6	07:45	07:28	06:51		07:02		18:45 (SER9)	06:20	05:57	06:02	06:27		06:56	18:41 (SER9)	07:24	06:57	07:30
	17:14	17:49	18:20		19:52	35	19:20 (SER9)	20:22	20:48	20:55	20:32		19:49	35 19:16 (SER9)	19:00	17:18	16:59
7	07:45	07:27	06:49		07:00		18:44 (SER9)	06:19	05:56	06:02	06:28		06:57	18:41 (SER9)	07:25	06:58	07:30
	17:15	17:50	18:21		19:53	36	19:20 (SER9)	20:23	20:49	20:55	20:31		19:47	35 19:16 (SER9)	18:58	17:16	16:59
8	07:45	07:26	06:48		06:59		18:44 (SER9)	06:17	05:56	06:03	06:28		06:57	18:40 (SER9)	07:26	06:59	07:31
	17:16	17:51	18:23		19:54	36	19:20 (SER9)	20:24	20:50	20:54	20:30		19:45	34 19:14 (SER9)	18:57	17:15	16:59
9	07:45	07:25	06:46		06:57		18:44 (SER9)	06:16	05:56	06:04	06:29		06:58	18:41 (SER9)	07:27	07:00	07:32
	17:17	17:52	18:24		19:55	35	19:19 (SER9)	20:25	20:50	20:54	20:29		19:44	32 19:13 (SER9)	18:55	17:14	16:59
10	07:45	07:23	06:45		06:56		18:44 (SER9)	06:15	05:56	06:04	06:30		06:59	18:41 (SER9)	07:28	07:02	07:33
	17:18	17:53	18:25		19:56	35	19:19 (SER9)	20:26	20:51	20:54	20:28		19:42	31 19:12 (SER9)	18:54	17:13	16:59
11	07:45	07:22	06:43		06:54		18:44 (SER9)	06:14	05:56	06:05	06:31		07:00	18:42 (SER9)	07:29	07:03	07:34
	17:19	17:54	18:26		19:57	34	19:18 (SER9)	20:27	20:51	20:53	20:26		19:41	29 19:11 (SER9)	18:52	17:13	16:59
12	07:44	07:21	06:42		06:52		18:45 (SER9)	06:13	05:55	06:06	06:32		07:01	18:43 (SER9)	07:30	07:04	07:35
	17:20	17:56	18:27		19:58	33	19:18 (SER9)	20:28	20:52	20:53	20:25		19:39	26 19:09 (SER9)	18:51	17:12	17:00
13	07:44	07:20	06:40		06:51		18:44 (SER9)	06:12	05:55	06:06	06:33		07:02	18:44 (SER9)	07:31	07:05	07:35
	17:21	17:57	18:28		19:59	33	19:17 (SER9)	20:29	20:52	20:52	20:24		19:37	23 19:07 (SER9)	18:49	17:11	17:00
14	07:44	07:19	06:39		06:49		18:45 (SER9)	06:11	05:55	06:07	06:34		07:03	18:46 (SER9)	07:32	07:06	07:36
	17:22	17:58	18:29		20:00	31	19:16 (SER9)	20:30	20:53	20:52	20:23		19:36	19 19:05 (SER9)	18:48	17:10	17:00
15	07:43	07:18	06:37		06:48		18:46 (SER9)	06:10	05:55	06:08	06:35		07:04	18:49 (SER9)	07:33	07:07	07:37
	17:23	17:59	18:30		20:01	29	19:15 (SER9)	20:31	20:53	20:51	20:21		19:34	12 19:01 (SER9)	18:46	17:09	17:00
16	07:43	07:16	06:35		06:46		18:47 (SER9)	06:09	05:55	06:08	06:36		07:05		07:34	07:08	07:38
	17:24	18:00	18:31		20:02	27	19:14 (SER9)	20:32	20:53	20:51	20:20		19:32		18:45	17:08	17:00
17	07:43	07:15	06:34		06:45		18:47 (SER9)	06:08	05:55	06:09	06:37		07:06		07:35	07:09	07:38
	17:25	18:01	18:32		20:03	25	19:12 (SER9)	20:32	20:54	20:50	20:19		19:31		18:43	17:07	17:01
18	07:42	07:14	06:32		06:43		18:49 (SER9)	06:08	05:55	06:10	06:38		07:07		07:36	07:11	07:39
	17:26	18:03	18:33		20:04	21	19:10 (SER9)	20:33	20:54	20:50	20:17		19:29		18:42	17:07	17:01
19	07:42	07:12	06:31		06:42		18:51 (SER9)	06:07	05:56	06:11	06:39		07:08		07:37	07:12	07:40
	17:27	18:04	18:34		20:05	16	19:07 (SER9)	20:34	20:54	20:49	20:16		19:27		18:40	17:06	17:01
20	07:41	07:11	06:29		06:41		18:55 (SER9)	06:06	05:56	06:12	06:40		07:09		07:38	07:13	07:40
	17:29	18:05	18:35		20:06	9	19:04 (SER9)	20:35	20:55	20:48	20:14		19:26		18:39	17:05	17:02
21	07:41	07:10	06:27		06:39			06:05	05:56	06:12	06:41		07:10		07:39	07:14	07:41
	17:30	18:06	18:36		20:07			20:36	20:55	20:47	20:13		19:24		18:37	17:05	17:02
22	07:40	07:08	06:26		06:38			06:04	05:56	06:13	06:42		07:10		07:40	07:15	07:41
	17:31	18:07	18:37		20:08			20:37	20:55	20:47	20:12		19:23		18:36	17:04	17:03
23	07:40	07:07	06:24		06:36			06:04	05:56	06:14	06:43	18:58 (SER9)	07:11		07:41	07:16	07:42
	17:32	18:08	18:38		20:09			20:38	20:55	20:46	20:10	10 19:08 (SER9)	19:21		18:35	17:04	17:03
24	07:39	07:06	06:23		06:35			06:03	05:57	06:15	06:43	18:54 (SER9)	07:12		07:43	07:17	07:42
	17:33	18:09	18:39		20:10			20:39	20:55	20:45	20:09	17 19:11 (SER9)	19:19		18:33	17:03	17:04
25	07:38	07:04	06:21		06:34			06:02	05:57	06:16	06:44	18:52 (SER9)	07:13		06:44	07:18	07:43
	17:34	18:11	18:40		20:11			20:40	20:56	20:44	20:07	21 19:13 (SER9)	19:18		17:32	17:03	17:04
26	07:38	07:03	06:19		06:32			06:02	05:57	06:17	06:45	18:50 (SER9)	07:14		06:45	07:19	07:43
	17:35	18:12	18:41		20:12			20:40	20:56	20:44	20:06	25 19:15 (SER9)	19:16		17:31	17:02	17:05
27	07:37	07:01	06:18		06:31			06:01	05:58	06:18	06:46	18:49 (SER9)	07:15		06:46	07:21	07:43
	17:37	18:13	18:42		20:13			20:41	20:56	20:43	20:04	27 19:16 (SER9)	19:14		17:29	17:02	17:06
28	07:36	07:00	06:16	18:00 (SER9)	06:30			06:00	05:58	06:18	06:47	18:47 (SER9)	07:16		06:47	07:22	07:44
	17:38	18:14	18:43	10 18:10 (SER9)	20:14			20:42	20:56	20:42	20:03	30 19:17 (SER9)	19:13		17:28	17:01	17:06
29	07:35		07:14	18:57 (SER9)	06:28			06:00	05:58	06:19	06:48	18:46 (SER9)	07:17		06:48	07:23	07:44
	17:39		19:44	17 19:14 (SER9)	20:15			20:43	20:56	20:41	20:01	31 19:17 (SER9)	19:11		17:27	17:01	17:07
30	07:34		07:13	18:54 (SER9)	06:27			05:59	05:59	06:20	06:49	18:44 (SER9)	07:18		06:49	07:24	07:44
	17:40		19:45	22 19:16 (SER9)	20:16			20:44	20:56	20:40	20:00	33 19:17 (SER9)	19:09		17:26	17:01	17:08
31	07:34		07:11	18:51 (SER9)				05:59		06:21	06:50	18:43 (SER9)			06:50		07:45
	17:41		19:46	26 19:17 (SER9)				20:44		20:39	19:58	34 19:17 (SER9)			17:24		17:09
Potential sun hours	301	299	370		397		445	448	455	425		374		347	301	292
Total, worst case				75		595					228		452			
Sun reduction				0,49		0,53					0,73		0,65			
Oper. time red.				0,91		0,91					0,91		0,91			
Wind dir. red.				0,79		0,79					0,79		0,79			
Total reduction				0,35		0,38					0,52		0,46			
Total, real				26		225					119		209			

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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_34 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (34)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:45	07:33	06:58	07:10	06:26	05:58	05:59	06:22	06:51	07:19	06:51	07:25
	17:10	17:43	18:15	19:47	20:17	20:45	20:56	20:38	19:57	19:08	17:23	17:00
2	07:45	07:32	06:57	07:08	06:25	05:58	06:00	06:23	06:52	07:20	06:52	07:26
	17:10	17:44	18:16	19:48	20:18	20:46	20:56	20:37	19:55	19:06	17:22	17:00
3	07:45	07:31	06:55	07:06	06:23	05:58	06:00	06:24	06:53	07:21	06:54	07:27
	17:11	17:45	18:17	19:49	20:19	20:46	20:55	20:36	19:53	19:05	17:21	17:00
4	07:45	07:30	06:54	07:05	06:22	05:57	06:01	06:25	06:54	07:22	06:55	07:28
	17:12	17:46	18:18	19:50	20:20	20:47	20:55	20:35	19:52	19:03	17:20	17:00
5	07:45	07:29	06:52	07:03	06:21	05:57	06:01	06:26	06:55	07:23	06:56	07:29
	17:13	17:47	18:19	19:51	20:21	20:48	20:55	20:34	19:50	19:01	17:19	17:00
6	07:45	07:28	06:51	07:02	06:20	05:57	06:02	06:27	06:56	07:24	06:57	07:30
	17:14	17:49	18:20	19:52	20:22	20:48	20:55	20:32	19:49	19:00	17:18	16:59
7	07:45	07:27	06:49	07:00	06:19	05:56	06:02	06:28	06:57	07:25	06:58	07:30
	17:15	17:50	18:21	19:53	20:23	20:49	20:55	20:31	19:47	18:58	17:16	16:59
8	07:45	07:26	06:48	06:59	06:17	05:56	06:03	06:28	06:57	07:26	06:59	07:31
	17:16	17:51	18:23	19:54	20:24	20:50	20:54	20:30	19:45	18:57	17:15	16:59
9	07:45	07:25	06:46	06:57	06:16	05:56	06:04	06:29	06:58	07:27	07:00	07:32
	17:17	17:52	18:24	19:55	20:25	20:50	20:54	20:29	19:44	18:55	17:14	16:59
10	07:45	07:23	06:45	06:56	06:15	05:56	06:04	06:30	06:59	07:28	07:02	07:33
	17:18	17:53	18:25	19:56	20:26	20:51	20:54	20:28	19:42	18:54	17:13	16:59
11	07:45	07:22	06:43	06:54	06:14	05:56	06:05	06:31	07:00	07:29	07:03	07:34
	17:19	17:55	18:26	19:57	20:27	20:51	20:53	20:26	19:41	18:52	17:13	16:59
12	07:44	07:21	06:42	06:52	06:13	05:56	06:06	06:32	07:01	07:30	07:04	07:35
	17:20	17:56	18:27	19:58	20:28	20:52	20:53	20:25	19:39	18:51	17:12	17:00
13	07:44	07:20	06:40	06:51	06:12	05:55	06:06	06:33	07:02	07:31	07:05	07:35
	17:21	17:57	18:28	19:59	20:29	20:52	20:52	20:24	19:37	18:49	17:11	17:00
14	07:44	07:19	06:39	06:49	06:11	05:55	06:07	06:34	07:03	07:32	07:06	07:36
	17:22	17:58	18:29	20:00	20:30	20:53	20:52	20:23	19:36	18:48	17:10	17:00
15	07:43	07:18	06:37	06:48	06:10	05:55	06:08	06:35	07:04	07:33	07:07	07:37
	17:23	17:59	18:30	20:01	20:31	20:53	20:51	20:21	19:34	18:46	17:09	17:00
16	07:43	07:16	06:35	06:46	06:09	05:55	06:09	06:36	07:05	07:34	07:08	07:38
	17:24	18:00	18:31	20:02	20:32	20:53	20:51	20:20	19:32	18:45	17:08	17:00
17	07:43	07:15	06:34	06:45	06:08	05:55	06:09	06:37	07:06	07:35	07:09	07:38
	17:25	18:02	18:32	20:03	20:33	20:54	20:50	20:19	19:31	18:43	17:07	17:01
18	07:42	07:14	06:32	06:44	06:08	05:56	06:10	06:38	07:07	07:36	07:11	07:39
	17:26	18:03	18:33	20:04	20:33	20:54	20:50	20:17	19:29	18:42	17:07	17:01
19	07:42	07:12	06:31	06:42	06:07	05:56	06:11	06:39	07:08	07:37	07:12	07:40
	17:27	18:04	18:34	20:05	20:34	20:54	20:49	20:16	19:27	18:40	17:06	17:02
20	07:41	07:11	06:29	06:41	06:06	05:56	06:12	06:40	07:09	07:38	07:13	07:40
	17:29	18:05	18:35	20:06	20:35	20:55	20:48	20:14	19:26	18:39	17:05	17:02
21	07:41	07:10	06:27	06:39	06:05	05:56	06:12	06:41	07:10	07:39	07:14	07:41
	17:30	18:06	18:36	20:07	20:36	20:55	20:47	20:13	19:24	18:37	17:05	17:02
22	07:40	07:08	06:26	06:38	06:04	05:56	06:13	06:42	07:10	07:40	07:15	07:41
	17:31	18:07	18:37	20:08	20:37	20:55	20:47	20:12	19:23	18:36	17:04	17:03
23	07:40	07:07	06:24	06:36	06:04	05:56	06:14	06:43	07:11	07:41	07:16	07:42
	17:32	18:08	18:38	20:09	20:38	20:55	20:46	20:10	19:21	18:35	17:04	17:03
24	07:39	07:06	06:23	06:35	06:03	05:57	06:15	06:43	07:12	07:43	07:17	07:42
	17:33	18:09	18:39	20:10	20:39	20:55	20:45	20:09	19:19	18:33	17:03	17:04
25	07:38	07:04	06:21	06:34	06:02	05:57	06:16	06:44	07:13	06:44	07:18	07:43
	17:34	18:11	18:40	20:11	20:40	20:56	20:44	20:07	19:18	17:32	17:03	17:04
26	07:38	07:03	06:19	06:32	06:02	05:57	06:17	06:45	07:14	06:45	07:19	07:43
	17:35	18:12	18:41	20:12	20:40	20:56	20:44	20:06	19:16	17:31	17:02	17:05
27	07:37	07:01	06:18	06:31	06:01	05:58	06:18	06:46	07:15	06:46	07:21	07:43
	17:37	18:13	18:42	20:13	20:41	20:56	20:43	20:04	19:14	17:29	17:02	17:06
28	07:36	07:00	06:16	06:30	06:00	05:58	06:18	06:47	07:16	06:47	07:22	07:44
	17:38	18:14	18:43	20:14	20:42	20:56	20:42	20:03	19:13	17:28	17:01	17:06
29	07:35		07:14	06:28	06:00	05:58	06:19	06:48	07:17	06:48	07:23	07:44
	17:39		19:44	20:15	20:43	20:56	20:41	20:01	19:11	17:27	17:01	17:07
30	07:34		07:13	06:27	05:59	05:59	06:20	06:49	07:18	06:49	07:24	07:44
	17:40		19:45	20:16	20:44	20:56	20:40	20:00	19:09	17:26	17:01	17:08
31	07:34		07:11		05:59		06:21	06:50		06:50		07:45
	17:41		19:46		20:44		20:39	19:58		17:24		17:09
Potential sun hours	301	299	370	397	445	448	455	425	374	347	301	292
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)

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_35 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (35)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June
1	07:45		15:22 (SER12)	07:33		15:44 (SER12)	06:58	07:10	06:26	05:58
	17:10	54	16:16 (SER12)	17:43	55	16:57 (SER13)	18:15	19:47	20:17	20:45
2	07:45		15:22 (SER12)	07:32		15:46 (SER12)	06:57	07:08	06:24	05:58
	17:10	55	16:17 (SER12)	17:44	51	16:57 (SER13)	18:16	19:48	20:18	20:46
3	07:45		15:23 (SER12)	07:31		15:48 (SER12)	06:55	07:06	06:23	05:58
	17:11	54	16:17 (SER12)	17:45	44	16:56 (SER13)	18:17	19:49	20:19	20:46
4	07:45		15:23 (SER12)	07:30		15:52 (SER12)	06:54	07:05	06:22	05:57
	17:12	55	16:18 (SER12)	17:46	36	16:55 (SER13)	18:18	19:50	20:20	20:47
5	07:45		15:24 (SER12)	07:29		15:57 (SER12)	06:52	07:03	06:21	05:57
	17:13	54	16:18 (SER12)	17:47	23	16:54 (SER13)	18:19	19:51	20:21	20:48
6	07:45		15:24 (SER12)	07:28		16:41 (SER13)	06:51	07:02	06:20	05:57
	17:14	55	16:19 (SER12)	17:49	11	16:52 (SER13)	18:20	19:52	20:22	20:48
7	07:45		15:24 (SER12)	07:27			06:49	07:00	06:19	05:56
	17:15	54	16:18 (SER12)	17:50			18:21	19:53	20:23	20:49
8	07:45		15:24 (SER12)	07:26			06:48	06:59	06:17	05:56
	17:16	55	16:19 (SER12)	17:51			18:23	19:54	20:24	20:50
9	07:45		15:25 (SER12)	07:25			06:46	06:57	06:16	05:56
	17:17	55	16:20 (SER12)	17:52			18:24	19:55	20:25	20:50
10	07:45		15:26 (SER12)	07:23			06:45	06:56	06:15	05:56
	17:18	54	16:20 (SER12)	17:53			18:25	19:56	20:26	20:51
11	07:45		15:26 (SER12)	07:22			06:43	06:54	06:14	05:56
	17:19	55	16:21 (SER12)	17:54			18:26	19:57	20:27	20:51
12	07:44		15:26 (SER12)	07:21			06:42	06:52	06:13	05:55
	17:20	60	16:43 (SER13)	17:56			18:27	19:58	20:28	20:52
13	07:44		15:27 (SER12)	07:20			06:40	06:51	06:12	05:55
	17:21	65	16:46 (SER13)	17:57			18:28	19:59	20:29	20:52
14	07:44		15:28 (SER12)	07:19			06:39	06:49	06:11	05:55
	17:22	67	16:48 (SER13)	17:58			18:29	20:00	20:30	20:53
15	07:43		15:28 (SER12)	07:18			06:37	06:48	06:10	05:55
	17:23	69	16:49 (SER13)	17:59			18:30	20:01	20:31	20:53
16	07:43		15:29 (SER12)	07:16			06:35	06:46	06:09	05:55
	17:24	71	16:51 (SER13)	18:00			18:31	20:02	20:32	20:53
17	07:43		15:29 (SER12)	07:15			06:34	06:45	06:08	05:55
	17:25	72	16:51 (SER13)	18:01			18:32	20:03	20:32	20:54
18	07:42		15:30 (SER12)	07:14			06:32	06:43	06:08	05:55
	17:26	73	16:53 (SER13)	18:03			18:33	20:04	20:33	20:54
19	07:42		15:30 (SER12)	07:12			06:31	06:42	06:07	05:56
	17:27	74	16:53 (SER13)	18:04			18:34	20:05	20:34	20:54
20	07:41		15:31 (SER12)	07:11			06:29	06:41	06:06	05:56
	17:29	76	16:55 (SER13)	18:05			18:35	20:06	20:35	20:55
21	07:41		15:32 (SER12)	07:10			06:27	06:39	06:05	05:56
	17:30	74	16:55 (SER13)	18:06			18:36	20:07	20:36	20:55
22	07:40		15:32 (SER12)	07:08			06:26	06:38	06:04	05:56
	17:31	76	16:56 (SER13)	18:07			18:37	20:08	20:37	20:55
23	07:40		15:34 (SER12)	07:07			06:24	06:36	06:04	05:56
	17:32	74	16:57 (SER13)	18:08			18:38	20:09	20:38	20:55
24	07:39		15:34 (SER12)	07:06			06:22	06:35	06:03	05:57
	17:33	74	16:57 (SER13)	18:09			18:39	20:10	20:39	20:55
25	07:38		15:35 (SER12)	07:04			06:21	06:34	06:02	05:57
	17:34	72	16:57 (SER13)	18:11			18:40	20:11	20:40	20:56
26	07:38		15:36 (SER12)	07:03			06:19	06:32	06:02	05:57
	17:35	71	16:57 (SER13)	18:12			18:41	20:12	20:40	20:56
27	07:37		15:37 (SER12)	07:01			06:18	06:31	06:01	05:58
	17:37	70	16:58 (SER13)	18:13			18:42	20:13	20:41	20:56
28	07:36		15:38 (SER12)	07:00			06:16	06:30	06:00	05:58
	17:38	68	16:58 (SER13)	18:14			18:43	20:14	20:42	20:56
29	07:35		15:40 (SER12)				07:14	06:28	06:00	05:58
	17:39	65	16:58 (SER13)				19:44	20:15	20:43	20:56
30	07:34		15:41 (SER12)				07:13	06:27	05:59	05:59
	17:40	63	16:58 (SER13)				19:45	20:16	20:43	20:56
31	07:34		15:42 (SER12)				07:11		05:59	
	17:41	60	16:58 (SER13)				19:46		20:44	
Potential sun hours	301			299			370	397	445	448
Total, worst case		1994			220					
Sun reduction		0,45			0,47					
Oper. time red.		0,91			0,91					
Wind dir. red.		0,60			0,63					
Total reduction		0,25			0,27					
Total, real		495			59					

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

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

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_35 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (35)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November			December		
1	05:59	06:22	06:51	07:19	06:51			07:25		15:08 (SER12)
	20:56	20:38	19:57	19:08	17:23			17:00	55	16:03 (SER12)
2	06:00	06:23	06:52	07:20	06:52			07:26		15:09 (SER12)
	20:56	20:37	19:55	19:06	17:22			17:00	54	16:03 (SER12)
3	06:00	06:24	06:53	07:21	06:54			07:27		15:09 (SER12)
	20:55	20:36	19:53	19:05	17:21			17:00	55	16:04 (SER12)
4	06:01	06:25	06:54	07:22	06:55		16:15 (SER13)	07:28		15:09 (SER12)
	20:55	20:35	19:52	19:03	17:20	3	16:18 (SER13)	17:00	55	16:04 (SER12)
5	06:01	06:26	06:55	07:23	06:56		16:11 (SER13)	07:29		15:10 (SER12)
	20:55	20:34	19:50	19:01	17:19	11	16:22 (SER13)	17:00	54	16:04 (SER12)
6	06:02	06:27	06:56	07:24	06:57		15:26 (SER12)	07:30		15:10 (SER12)
	20:55	20:32	19:49	19:00	17:18	26	16:24 (SER13)	16:59	55	16:05 (SER12)
7	06:02	06:28	06:57	07:25	06:58		15:22 (SER12)	07:30		15:10 (SER12)
	20:55	20:31	19:47	18:58	17:16	37	16:26 (SER13)	16:59	54	16:04 (SER12)
8	06:03	06:28	06:57	07:26	06:59		15:19 (SER12)	07:31		15:10 (SER12)
	20:54	20:30	19:45	18:57	17:15	45	16:27 (SER13)	16:59	55	16:05 (SER12)
9	06:04	06:29	06:58	07:27	07:00		15:17 (SER12)	07:32		15:11 (SER12)
	20:54	20:29	19:44	18:55	17:14	51	16:28 (SER13)	16:59	54	16:05 (SER12)
10	06:04	06:30	06:59	07:28	07:02		15:15 (SER12)	07:33		15:11 (SER12)
	20:54	20:28	19:42	18:54	17:13	56	16:28 (SER13)	16:59	55	16:06 (SER12)
11	06:05	06:31	07:00	07:29	07:03		15:13 (SER12)	07:34		15:12 (SER12)
	20:53	20:26	19:41	18:52	17:13	60	16:29 (SER13)	16:59	54	16:06 (SER12)
12	06:06	06:32	07:01	07:30	07:04		15:13 (SER12)	07:35		15:13 (SER12)
	20:53	20:25	19:39	18:51	17:12	63	16:30 (SER13)	17:00	54	16:07 (SER12)
13	06:06	06:33	07:02	07:31	07:05		15:11 (SER12)	07:35		15:12 (SER12)
	20:52	20:24	19:37	18:49	17:11	66	16:30 (SER13)	17:00	55	16:07 (SER12)
14	06:07	06:34	07:03	07:32	07:06		15:10 (SER12)	07:36		15:13 (SER12)
	20:52	20:23	19:36	18:48	17:10	68	16:30 (SER13)	17:00	54	16:07 (SER12)
15	06:08	06:35	07:04	07:33	07:07		15:09 (SER12)	07:37		15:14 (SER12)
	20:51	20:21	19:34	18:46	17:09	70	16:30 (SER13)	17:00	54	16:08 (SER12)
16	06:08	06:36	07:05	07:34	07:08		15:10 (SER12)	07:38		15:15 (SER12)
	20:51	20:20	19:32	18:45	17:08	71	16:31 (SER13)	17:00	54	16:09 (SER12)
17	06:09	06:37	07:06	07:35	07:09		15:09 (SER12)	07:38		15:15 (SER12)
	20:50	20:19	19:31	18:43	17:07	72	16:31 (SER13)	17:01	54	16:09 (SER12)
18	06:10	06:38	07:07	07:36	07:11		15:08 (SER12)	07:39		15:16 (SER12)
	20:50	20:17	19:29	18:42	17:07	74	16:31 (SER13)	17:01	53	16:09 (SER12)
19	06:11	06:39	07:08	07:37	07:12		15:08 (SER12)	07:40		15:15 (SER12)
	20:49	20:16	19:27	18:40	17:06	74	16:31 (SER13)	17:01	54	16:09 (SER12)
20	06:12	06:40	07:09	07:38	07:13		15:07 (SER12)	07:40		15:16 (SER12)
	20:48	20:14	19:26	18:39	17:05	76	16:31 (SER13)	17:02	54	16:10 (SER12)
21	06:12	06:41	07:10	07:39	07:14		15:07 (SER12)	07:41		15:16 (SER12)
	20:47	20:13	19:24	18:37	17:05	74	16:30 (SER13)	17:02	54	16:10 (SER12)
22	06:13	06:42	07:10	07:40	07:15		15:07 (SER12)	07:41		15:17 (SER12)
	20:47	20:12	19:23	18:36	17:04	76	16:31 (SER13)	17:03	54	16:11 (SER12)
23	06:14	06:43	07:11	07:41	07:16		15:07 (SER12)	07:42		15:17 (SER12)
	20:46	20:10	19:21	18:35	17:04	74	16:30 (SER13)	17:03	54	16:11 (SER12)
24	06:15	06:43	07:12	07:42	07:17		15:07 (SER12)	07:42		15:18 (SER12)
	20:45	20:09	19:19	18:33	17:03	73	16:30 (SER13)	17:04	54	16:12 (SER12)
25	06:16	06:44	07:13	06:44	07:18		15:07 (SER12)	07:43		15:19 (SER12)
	20:44	20:07	19:18	17:32	17:03	72	16:29 (SER13)	17:04	53	16:12 (SER12)
26	06:17	06:45	07:14	06:45	07:19		15:07 (SER12)	07:43		15:19 (SER12)
	20:43	20:06	19:16	17:31	17:02	71	16:29 (SER13)	17:05	53	16:12 (SER12)
27	06:18	06:46	07:15	06:46	07:21		15:07 (SER12)	07:43		15:20 (SER12)
	20:43	20:04	19:14	17:29	17:02	69	16:28 (SER13)	17:06	54	16:14 (SER12)
28	06:18	06:47	07:16	06:47	07:22		15:07 (SER12)	07:44		15:20 (SER12)
	20:42	20:03	19:13	17:28	17:01	68	16:27 (SER13)	17:06	54	16:14 (SER12)
29	06:19	06:48	07:17	06:48	07:23		15:07 (SER12)	07:44		15:20 (SER12)
	20:41	20:01	19:11	17:27	17:01	65	16:26 (SER13)	17:07	54	16:14 (SER12)
30	06:20	06:49	07:18	06:49	07:24		15:08 (SER12)	07:44		15:20 (SER12)
	20:40	20:00	19:09	17:26	17:01	60	16:25 (SER13)	17:08	54	16:14 (SER12)
31	06:21	06:50		06:50				07:45		15:21 (SER12)
	20:39	19:58		17:24				17:09	54	16:15 (SER12)
Potential sun hours	455	425	374	347	301			292		
Total, worst case						1625			1678	
Sun reduction						0,51			0,45	
Oper. time red.						0,91			0,91	
Wind dir. red.						0,61			0,59	
Total reduction						0,28			0,24	
Total, real						457			406	

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

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

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03/04/2024 13:05

SHADOW - Calendar

Calculation: Shadow flickering **Shadow receptor:** RIC_36 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (36)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May	June	July	August	September	October		November		December
1	07:45		07:33		07:52 (SER12)	06:58	07:10	06:26	05:58	05:59	06:22	06:51	07:19		06:51		07:12 (SER12)	07:25
	17:10		17:43	29	08:21 (SER12)	18:15	19:47	20:17	20:45	20:56	20:38	19:57	19:08		17:23	39	07:51 (SER12)	17:00
2	07:45		07:32		07:51 (SER12)	06:57	07:08	06:25	05:58	06:00	06:23	06:52	07:20		06:52		07:14 (SER12)	07:26
	17:10		17:44	30	08:21 (SER12)	18:16	19:48	20:18	20:46	20:56	20:37	19:55	19:06		17:22	38	07:52 (SER12)	17:00
3	07:45		07:31		07:50 (SER12)	06:56	07:07	06:23	05:58	06:00	06:24	06:53	07:21		06:54		07:15 (SER12)	07:27
	17:11		17:45	31	08:21 (SER12)	18:17	19:49	20:19	20:46	20:55	20:36	19:53	19:05		17:21	37	07:52 (SER12)	17:00
4	07:45		07:30		07:49 (SER12)	06:54	07:05	06:22	05:57	06:01	06:25	06:54	07:22		06:55		07:16 (SER12)	07:28
	17:12		17:46	33	08:22 (SER12)	18:18	19:50	20:20	20:47	20:55	20:35	19:52	19:03		17:20	36	07:52 (SER12)	17:00
5	07:45		07:29		07:48 (SER12)	06:53	07:03	06:21	05:57	06:01	06:26	06:55	07:23		06:56		07:17 (SER12)	07:29
	17:13		17:47	34	08:22 (SER12)	18:19	19:51	20:21	20:48	20:55	20:34	19:50	19:02		17:19	35	07:52 (SER12)	17:00
6	07:45		07:28		07:47 (SER12)	06:51	07:02	06:20	05:57	06:02	06:27	06:56	07:24		06:57		07:18 (SER12)	07:30
	17:14		17:49	35	08:22 (SER12)	18:20	19:52	20:22	20:48	20:55	20:32	19:49	19:00		17:18	34	07:52 (SER12)	16:59
7	07:45		07:27		07:46 (SER12)	06:49	07:00	06:19	05:56	06:02	06:28	06:57	07:25		06:58		07:20 (SER12)	07:30
	17:15		17:50	36	08:22 (SER12)	18:22	19:53	20:23	20:49	20:55	20:31	19:47	18:58		17:17	32	07:52 (SER12)	16:59
8	07:45		07:26		07:45 (SER12)	06:48	06:59	06:18	05:56	06:03	06:29	06:58	07:26		06:59		07:21 (SER12)	07:31
	17:16		17:51	37	08:22 (SER12)	18:23	19:54	20:24	20:50	20:54	20:30	19:45	18:57		17:15	31	07:52 (SER12)	16:59
9	07:45		07:25		07:44 (SER12)	06:46	06:57	06:16	05:56	06:04	06:29	06:58	07:27		07:00		07:22 (SER12)	07:32
	17:17		17:52	38	08:22 (SER12)	18:24	19:55	20:25	20:50	20:54	20:29	19:44	18:55		17:14	30	07:52 (SER12)	16:59
10	07:45		07:24		07:43 (SER12)	06:45	06:56	06:15	05:56	06:04	06:30	06:59	07:28		07:02		07:23 (SER12)	07:33
	17:18		17:53	39	08:22 (SER12)	18:25	19:56	20:26	20:51	20:54	20:28	19:42	18:54		17:14	29	07:52 (SER12)	16:59
11	07:45		07:22		07:42 (SER12)	06:43	06:54	06:14	05:56	06:05	06:31	07:00	07:29		07:03		07:25 (SER12)	07:34
	17:19		17:55	40	08:22 (SER12)	18:26	19:57	20:27	20:51	20:53	20:26	19:41	18:52		17:13	27	07:52 (SER12)	17:00
12	07:44		07:21		07:40 (SER12)	06:42	06:53	06:13	05:56	06:06	06:32	07:01	07:30		07:04		07:26 (SER12)	07:35
	17:20		17:56	40	08:20 (SER12)	18:27	19:58	20:28	20:52	20:53	20:25	19:39	18:51		17:12	26	07:52 (SER12)	17:00
13	07:44		07:20		07:40 (SER12)	06:40	06:51	06:12	05:55	06:06	06:33	07:02	07:31		07:05		07:27 (SER12)	07:36
	17:21		17:57	40	08:20 (SER12)	18:28	19:59	20:29	20:52	20:52	20:24	19:37	18:49		17:11	24	07:51 (SER12)	17:00
14	07:44		07:19		07:41 (SER12)	06:39	06:49	06:11	05:55	06:07	06:34	07:03	07:32		07:06		07:28 (SER12)	07:36
	17:22		17:58	38	08:19 (SER12)	18:29	20:00	20:30	20:53	20:52	20:23	19:36	18:48		17:10	23	07:51 (SER12)	17:00
15	07:44		07:18		07:42 (SER12)	06:37	06:48	06:10	05:55	06:08	06:35	07:04	07:33		07:07		07:29 (SER12)	07:37
	17:23		17:59	36	08:18 (SER12)	18:30	20:01	20:31	20:53	20:51	20:21	19:34	18:46		17:09	21	07:50 (SER12)	17:00
16	07:43		07:16		07:42 (SER12)	06:35	06:46	06:09	05:55	06:09	06:36	07:05	07:34		07:08		07:31 (SER12)	07:38
	17:24		18:00	35	08:17 (SER12)	18:31	20:02	20:32	20:53	20:51	20:20	19:32	18:45		17:08	19	07:50 (SER12)	17:01
17	07:43	08:03 (SER12)	07:15		07:44 (SER12)	06:34	06:45	06:09	05:55	06:09	06:37	07:06	07:35		07:10		07:32 (SER12)	07:38
	17:25	2 08:05 (SER12)	18:02	31	08:15 (SER12)	18:32	20:03	20:33	20:54	20:50	20:19	19:31	18:43		17:08	18	07:50 (SER12)	17:01
18	07:42	08:03 (SER12)	07:14		07:46 (SER12)	06:32	06:44	06:08	05:56	06:10	06:38	07:07	07:36		07:11		07:33 (SER12)	07:39
	17:26	4 08:07 (SER12)	18:03	28	08:14 (SER12)	18:33	20:04	20:33	20:54	20:50	20:17	19:29	18:42		17:07	16	07:49 (SER12)	17:01
19	07:42	08:02 (SER12)	07:12		07:47 (SER12)	06:31	06:42	06:07	05:56	06:11	06:39	07:08	07:37		07:12		07:34 (SER12)	07:40
	17:27	6 08:08 (SER12)	18:04	24	08:11 (SER12)	18:34	20:05	20:34	20:54	20:49	20:16	19:28	18:40		17:06	14	07:48 (SER12)	17:02
20	07:41	08:02 (SER12)	07:11		07:50 (SER12)	06:29	06:41	06:06	05:56	06:12	06:40	07:09	07:38		07:13		07:35 (SER12)	07:40
	17:29	8 08:10 (SER12)	18:05	19	08:09 (SER12)	18:35	20:06	20:35	20:55	20:48	20:14	19:26	18:39		17:05	12	07:47 (SER12)	17:02
21	07:41	08:01 (SER12)	07:10		07:54 (SER12)	06:27	06:39	06:05	05:56	06:12	06:41	07:10	07:39	08:23 (SER12)	07:14		07:37 (SER12)	07:41
	17:30	10 08:11 (SER12)	18:06	11	08:05 (SER12)	18:36	20:07	20:36	20:55	20:48	20:13	19:24	18:37	15 08:38 (SER12)	17:05	10	07:47 (SER12)	17:02
22	07:40	08:00 (SER12)	07:08			06:26	06:38	06:04	05:56	06:13	06:42	07:11	07:40	08:20 (SER12)	07:15		07:38 (SER12)	07:41
	17:31	12 08:12 (SER12)	18:07			18:37	20:08	20:37	20:55	20:47	20:12	19:23	18:36	21 08:41 (SER12)	17:04	8	07:46 (SER12)	17:03
23	07:40	08:00 (SER12)	07:07			06:24	06:36	06:04	05:56	06:14	06:43	07:11	07:41	08:17 (SER12)	07:16		07:39 (SER12)	07:42
	17:32	14 08:14 (SER12)	18:08			18:38	20:09	20:38	20:55	20:46	20:10	19:21	18:35	26 08:43 (SER12)	17:04	6	07:45 (SER12)	17:03
24	07:39	07:59 (SER12)	07:06			06:23	06:35	06:03	05:57	06:15	06:44	07:12	07:43	08:15 (SER12)	07:17		07:40 (SER12)	07:42
	17:33	16 08:15 (SER12)	18:09			18:39	20:10	20:39	20:56	20:45	20:09	19:19	18:33	29 08:44 (SER12)	17:03	4	07:44 (SER12)	17:04
25	07:38	07:58 (SER12)	07:04			06:21	06:34	06:02	05:57	06:16	06:44	07:13	06:44	07:13 (SER12)	07:18		07:41 (SER12)	07:43
	17:34	18 08:16 (SER12)	18:11			18:40	20:11	20:40	20:56	20:44	20:07	19:18	17:32	32 07:45 (SER12)	17:03	2	07:43 (SER12)	17:05
26	07:38	07:57 (SER12)	07:03			06:19	06:32	06:02	05:57	06:17	06:45	07:14	06:45	07:12 (SER12)	07:19			07:43
	17:36	20 08:17 (SER12)	18:12			18:41	20:12	20:40	20:56	20:44	20:06	19:16	17:31	35 07:47 (SER12)	17:02			17:05
27	07:37	07:57 (SER12)	07:01			06:18	06:31	06:01	05:58	06:18	06:46	07:15	06:46	07:10 (SER12)	07:21			07:43
	17:37	21 08:18 (SER12)	18:13			18:42	20:13	20:41	20:56	20:43	20:04	19:14	17:29	37 07:47 (SER12)	17:02			17:06
28	07:36	07:56 (SER12)	07:00			06:16	06:30	06:00	05:58	06:18	06:47	07:16	06:47	07:10 (SER12)	07:22			07:44
	17:38	23 08:19 (SER12)	18:14			18:43	20:14	20:42	20:56	20:42	20:03	19:13	17:28	39 07:49 (SER12)	17:01			17:06
29	07:35	07:55 (SER12)				07:15	06:28	06:00	05:58	06:19	06:48	07:17	06:48	07:09 (SER12)	07:23			07:44
	17:39	24 08:19 (SER12)				19:44	20:15	20:43	20:56	20:41	20:01	19:11	17:27	41 07:50 (SER12)	17:01			17:07
30	07:34	07:54 (SER12)				07:13	06:27	05:59	05:59	06:20	06:49	07:18	06:49	07:10 (SER12)	07:24			07:44
	17:40	26 08:20 (SER12)				19:45	20:16	20:44	20:56	20:40	20:00	19:10	17:26	40 07:50 (SER12)	17:01			17:08
31	07:34	07:53 (SER12)				07:11		05:59		06:21	06:50		06:50	07:11 (SER12)				07:45
	17:41	27 08:20 (SER12)				19:46		20:44		20:39	19:58		17:24	39 07:50 (SER12)				17:09
Potential sun hours	301		299		370	397	445	448	455	425	374	347		301				292
Total, worst case		231		684									354		571			
Sun reduction		0,45		0,47									0,54		0,51			
Oper. time red.		0,91		0,91									0,91		0,91			
Wind dir. red.		0,78		0,78									0,78		0,78			
Total reduction		0,32		0,33									0,38		0,36			
Total, real		74		227									136		203			

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)

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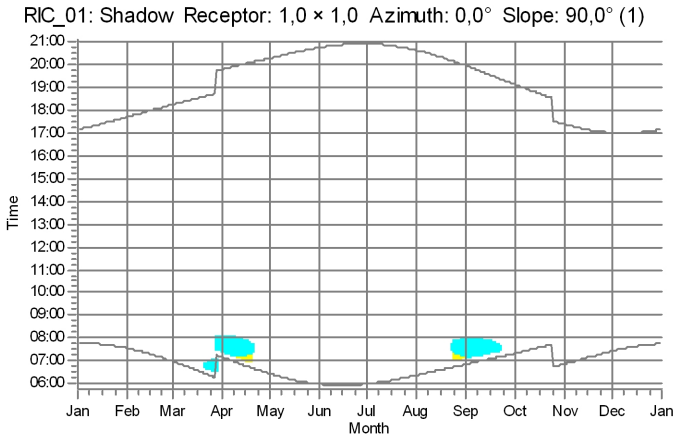
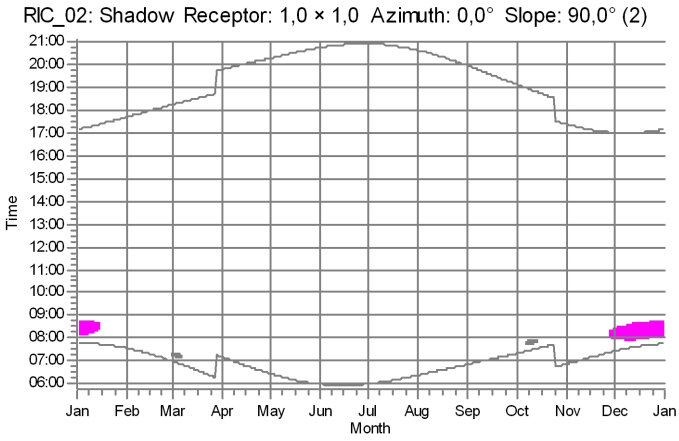
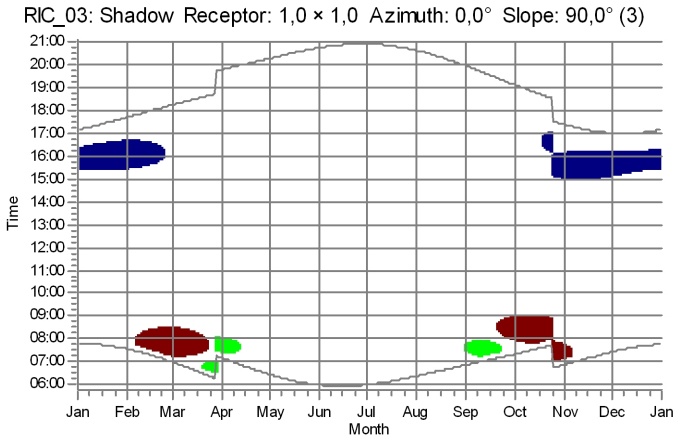
03/04/2024 13:05

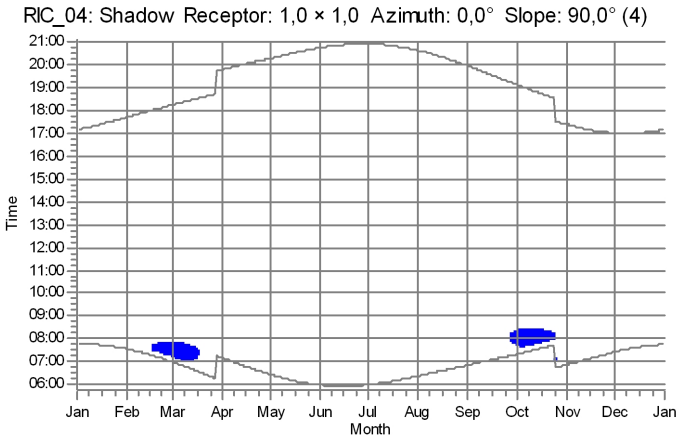
SHADOW - Calendar, graphical

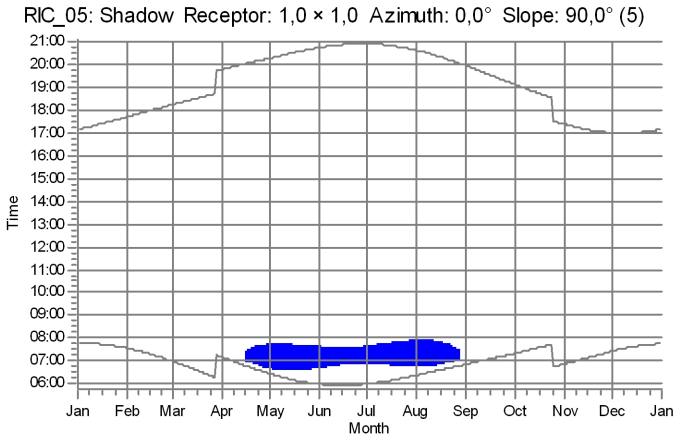
Calculation: Shadow flickering

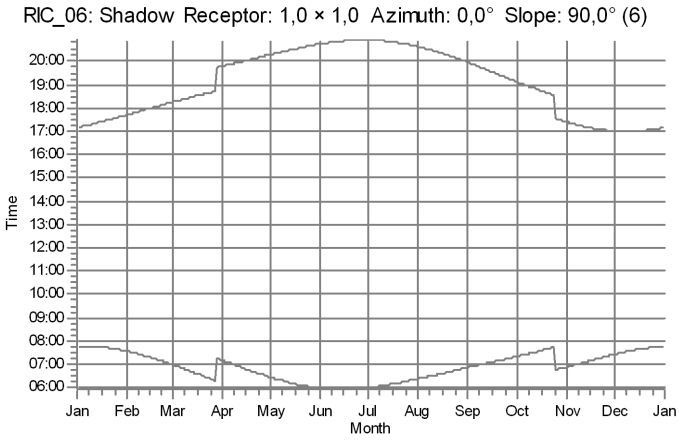












WTGs

- SER10: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (10)
- SER11: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (11)
- SER12: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (12)
- SER13: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
- SER2: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (2)
- SER3: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (3)
- SER4: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (4)
- SER5: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (5)
- SER9: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (9)

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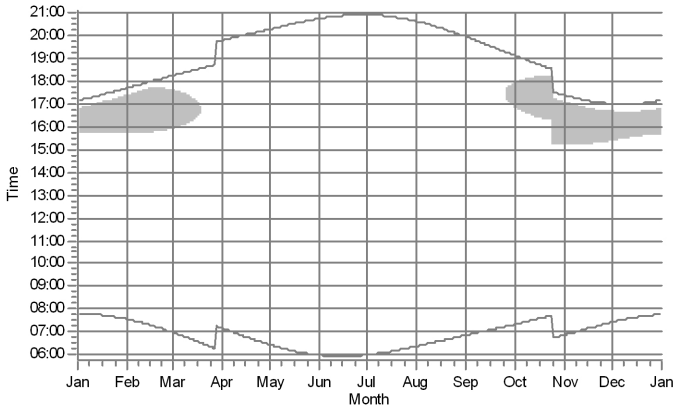
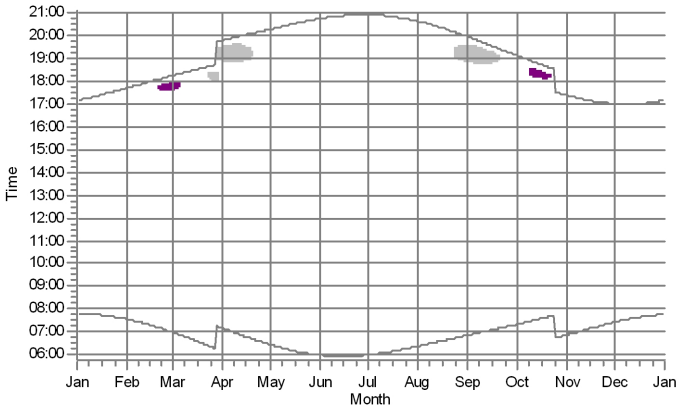
SHADOW - Calendar, graphical

Calculation: Shadow flickering

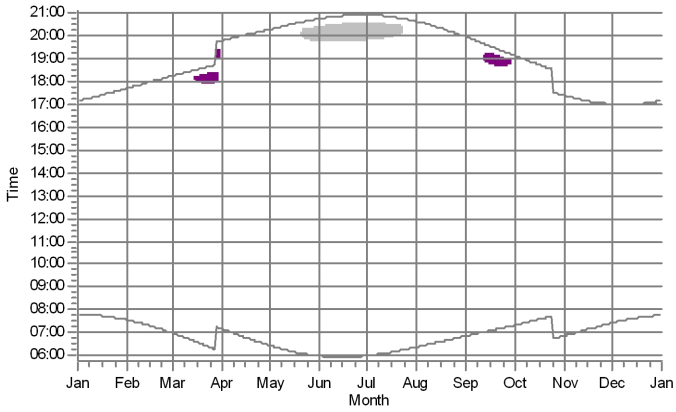
RIC_07: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7)



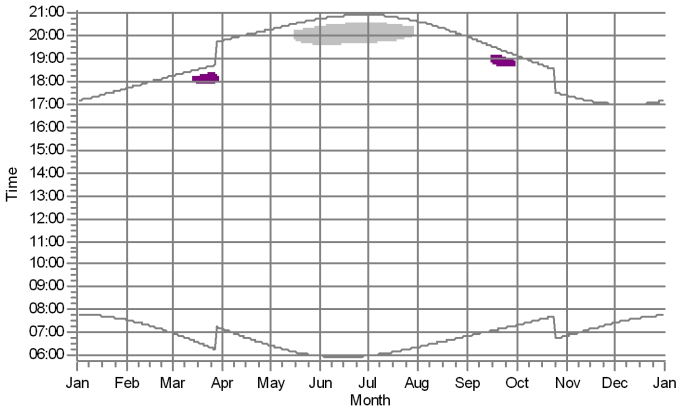
RIC_08: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (8)



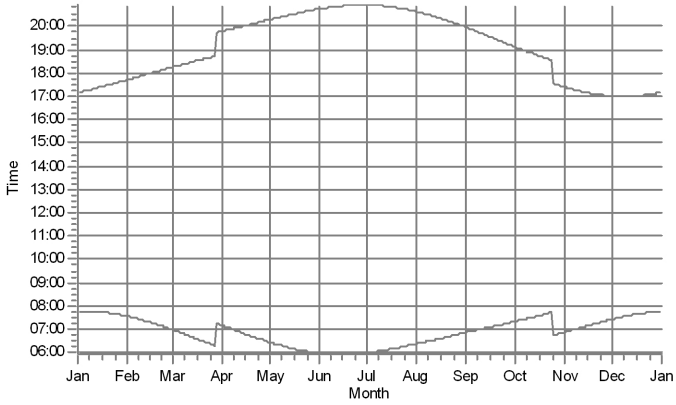
RIC_09: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (9)



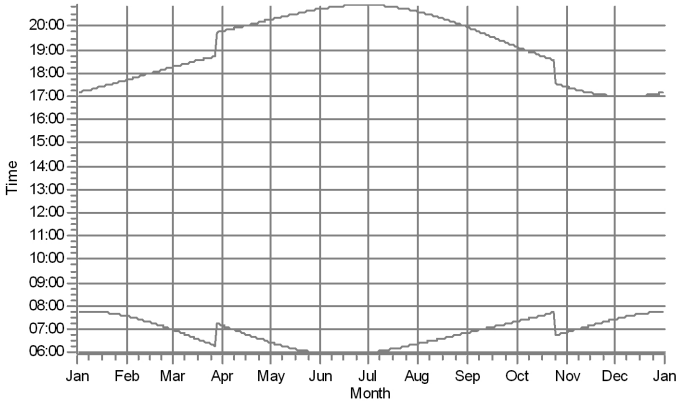
RIC_10: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (10)



RIC_11: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (11)



RIC_12: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (12)



WTGs

SER7: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (7)

SER8: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (8)

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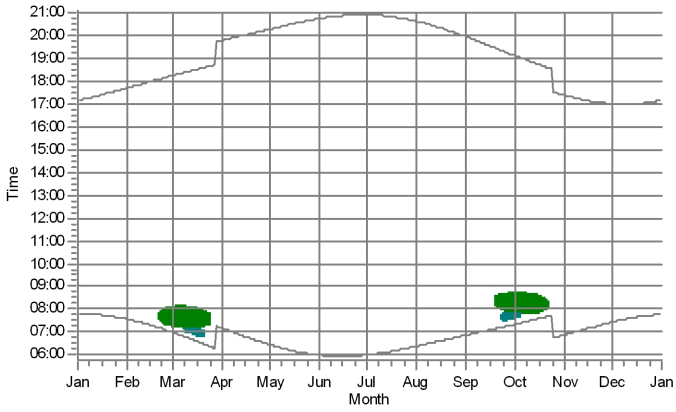
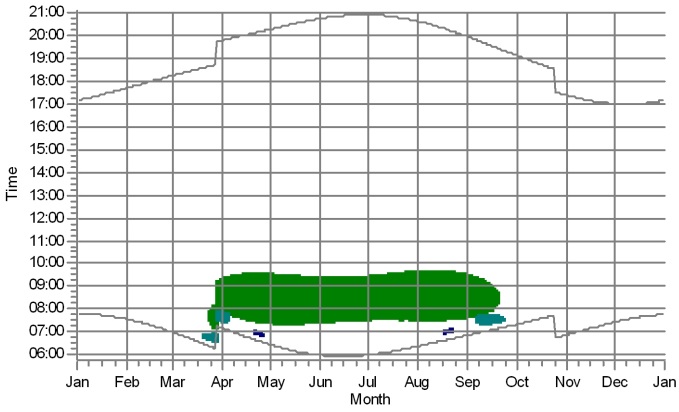
SHADOW - Calendar, graphical

Calculation: Shadow flickering

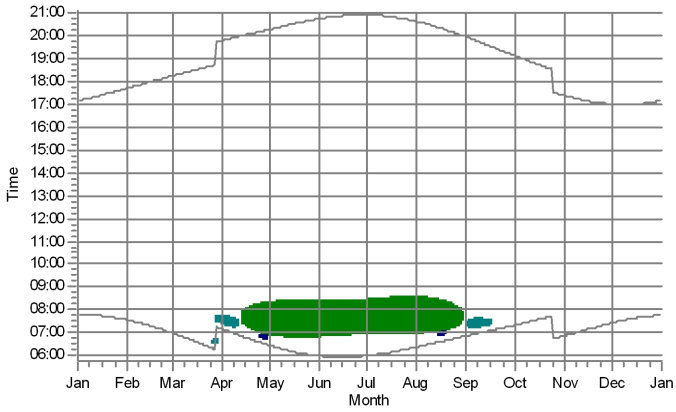
RIC_13: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (13)



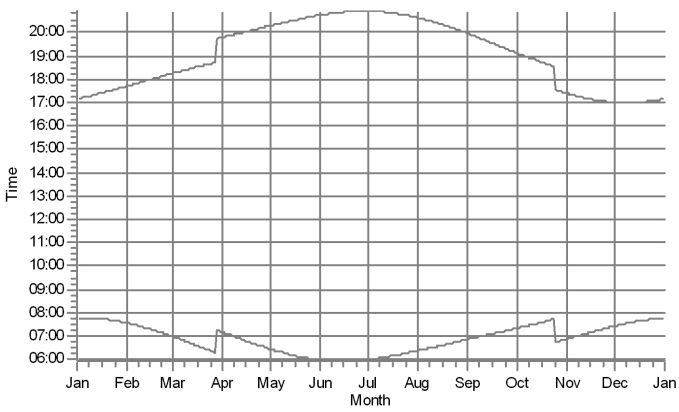
RIC_14: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (14)



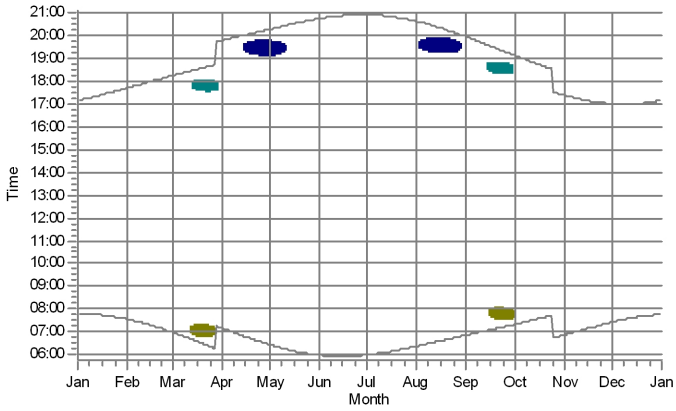
RIC_15: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (15)



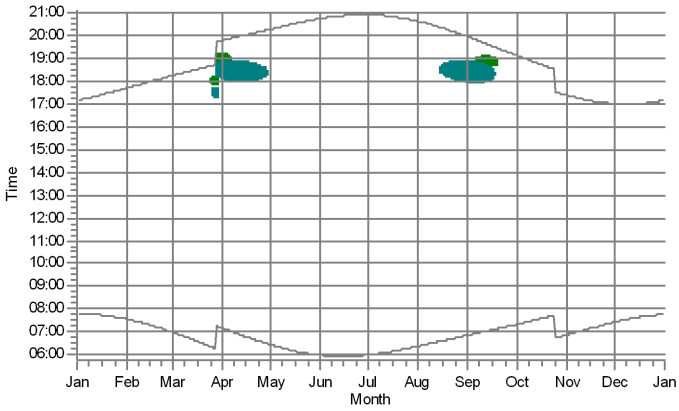
RIC_16: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (16)



RIC_17: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (17)



RIC_18: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (18)



WTGs

SER1: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (1)
SER2: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (2)
SER3: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (3)
SER6: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (6)

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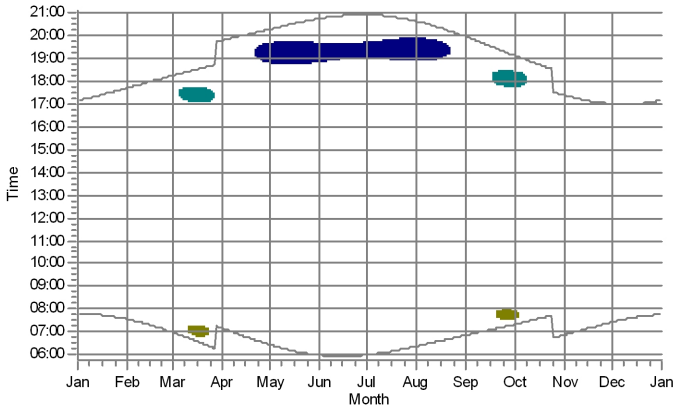
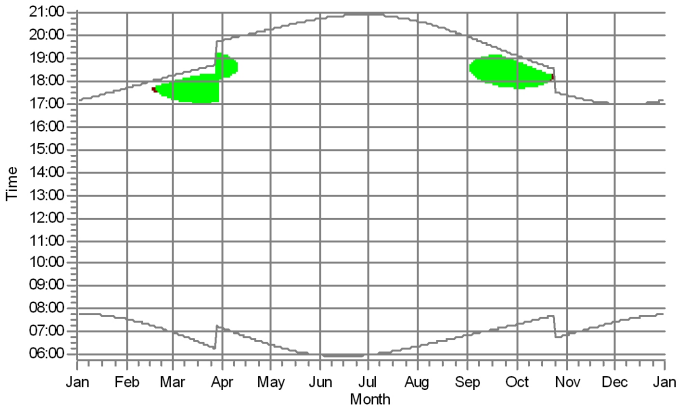
SHADOW - Calendar, graphical

Calculation: Shadow flickering

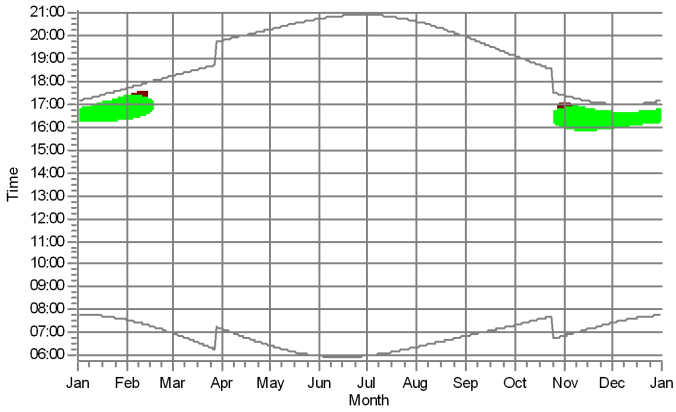
RIC_19: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (19)



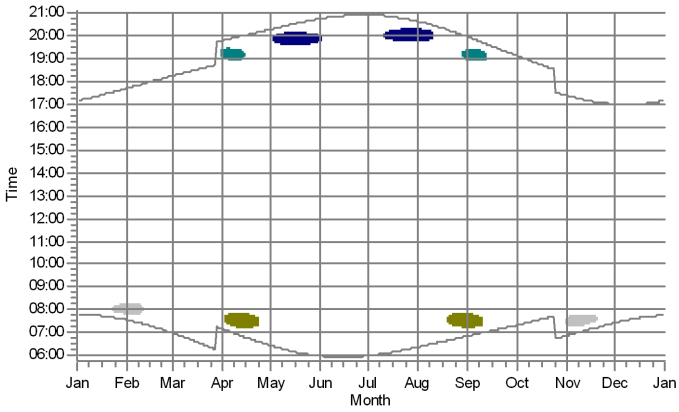
RIC_20: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (20)



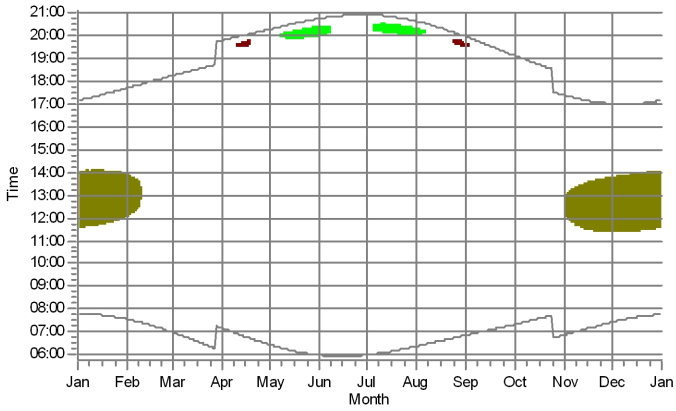
RIC_21: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (21)



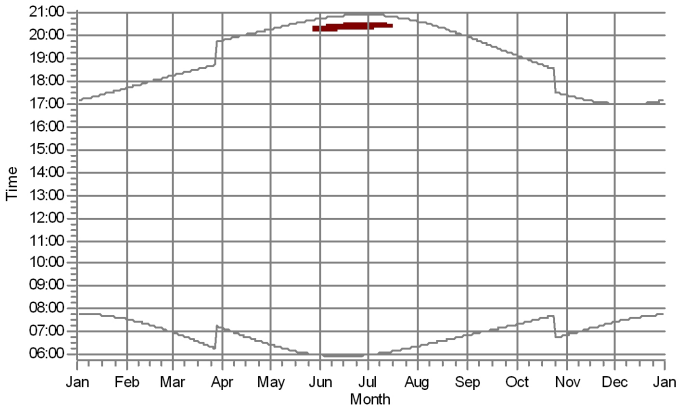
RIC_22: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (22)



RIC_23: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (23)



RIC_24: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (24)



WTGs

SER2: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (2)
SER3: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (3)
SER4: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (4)
SER5: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (5)
SER6: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (6)
SER8: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (8)

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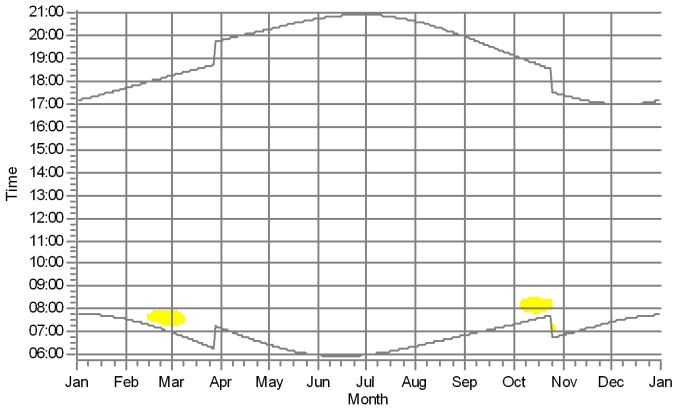
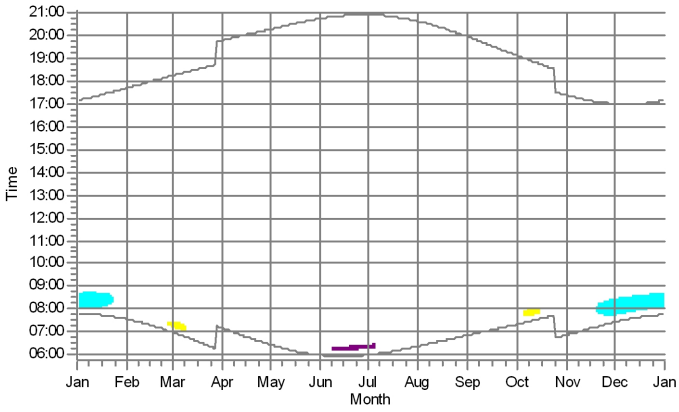
SHADOW - Calendar, graphical

Calculation: Shadow flickering

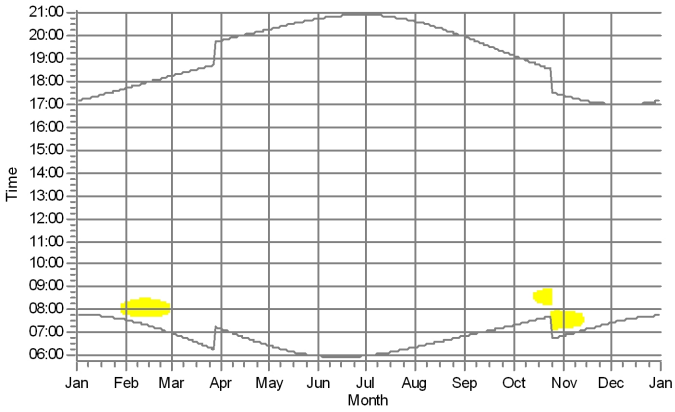
RIC_25: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (25)



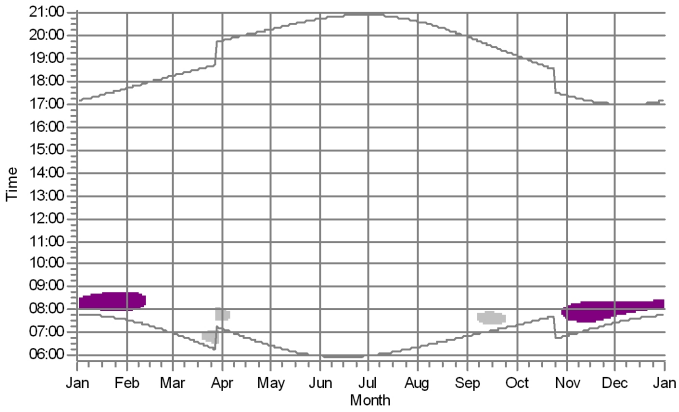
RIC_26: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (26)



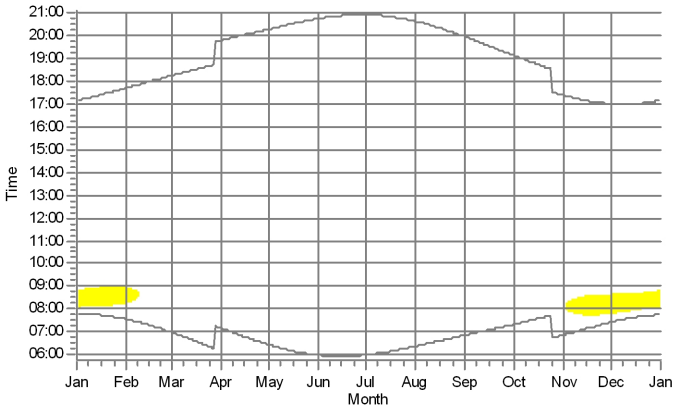
RIC_27: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (27)



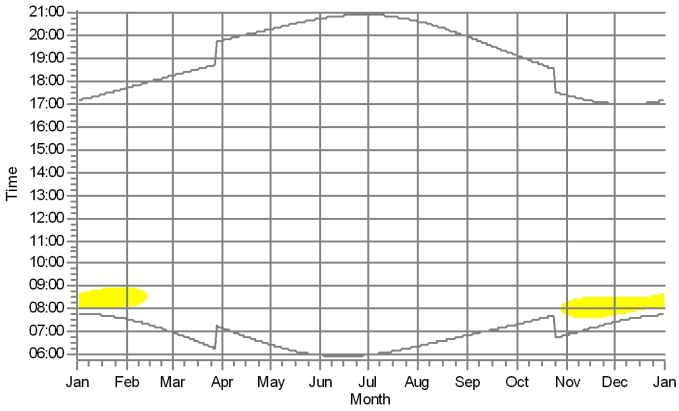
RIC_28: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (28)



RIC_29: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (29)



RIC_30: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (30)



WTGs

SER10: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (10)

SER7: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (7)

SER8: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (8)

SER9: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (9)

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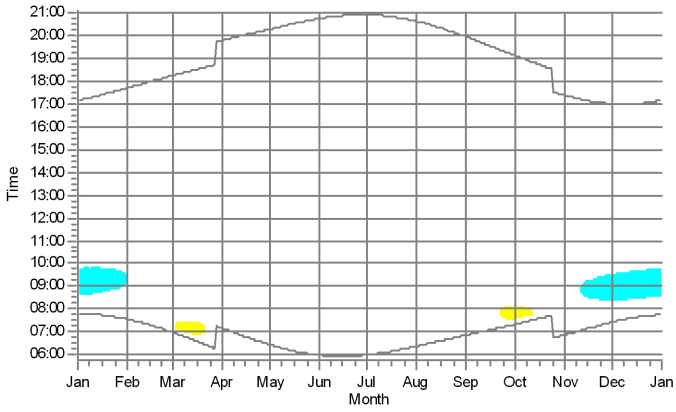
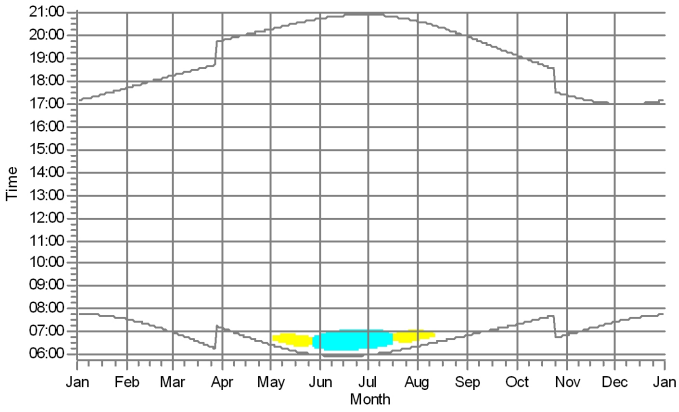
SHADOW - Calendar, graphical

Calculation: Shadow flickering

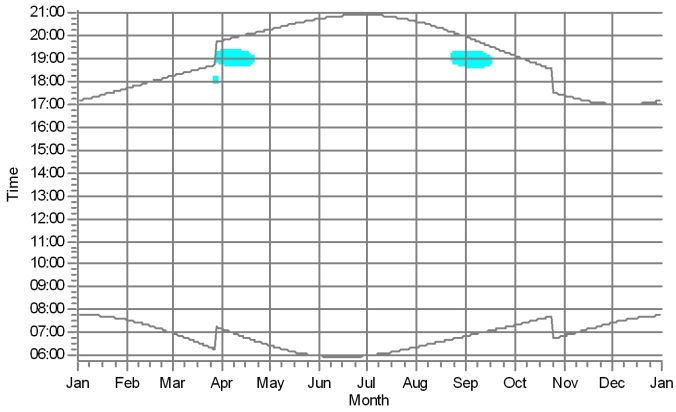
RIC_31: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (31)



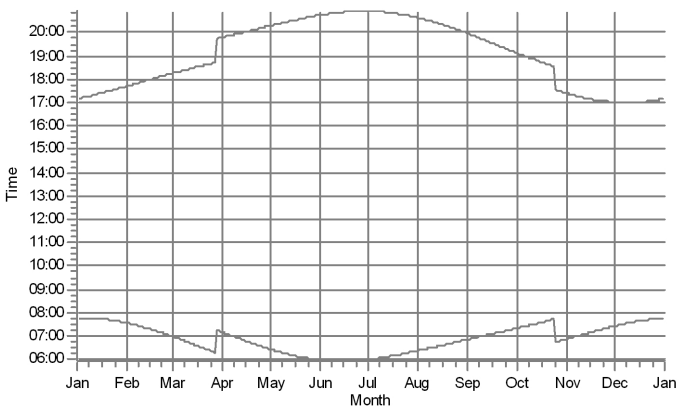
RIC_32: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (32)



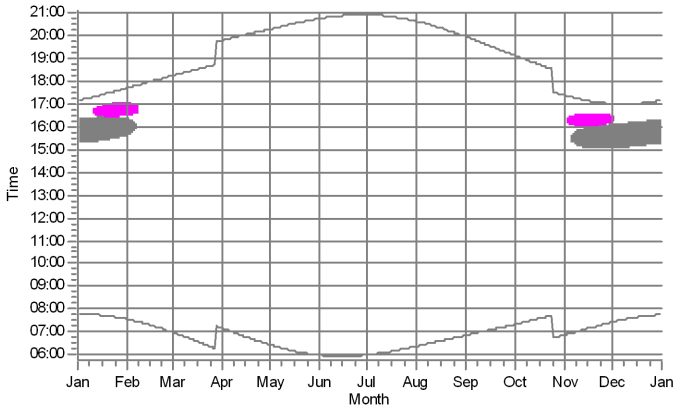
RIC_33: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (33)



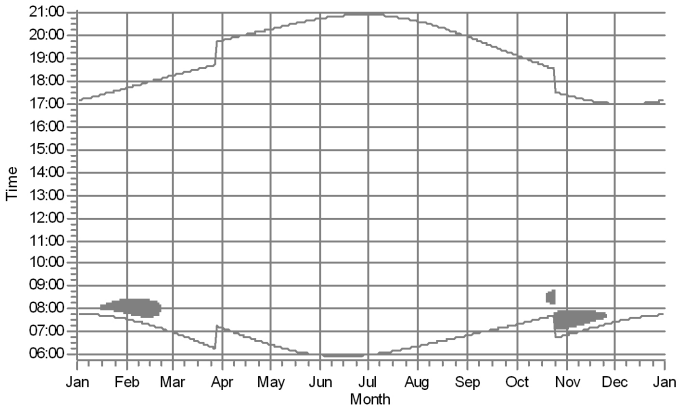
RIC_34: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (34)



RIC_35: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (35)



RIC_36: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (36)



WTGs

SER10: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (10)
SER12: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (12)
SER13: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
SER9: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (9)

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SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER1 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (1)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April		May		June	
1	07:45	07:33		06:59	07:18-08:02/44	07:10	18:51-19:11/20	06:26	06:58-09:30/152	05:59	06:53-09:21/148
	17:10	17:43		18:15		19:47	07:58-09:18/80	20:17		20:45	
2	07:45	07:32		06:57	07:17-08:03/46	07:08	18:51-19:10/19	06:25	06:58-09:30/152	05:58	06:54-09:21/147
	17:11	17:44		18:16		19:48	07:55-09:19/84	20:18		20:46	
3	07:45	07:31		06:56	07:16-08:03/47	07:07	18:52-19:09/17	06:23	06:56-09:29/153	05:58	06:54-09:21/147
	17:11	17:45		18:17		19:49	07:54-09:21/87	20:19		20:47	
4	07:45	07:30		06:54	07:16-08:04/48	07:05	18:52-19:07/15	06:22	06:56-09:29/153	05:57	06:54-09:20/146
	17:12	17:46		18:18		19:50	07:51-09:22/91	20:20		20:47	
5	07:45	07:29		06:53	07:15-08:03/48	07:03	18:54-19:06/12	06:21	06:55-09:29/154	05:57	06:55-09:20/145
	17:13	17:48		18:19		19:51	07:50-09:24/94	20:21		20:48	
6	07:45	07:28		06:51	07:15-08:04/49	07:02	18:56-19:02/6	06:20	06:55-09:28/153	05:57	06:55-09:21/146
	17:14	17:49		18:21		19:52	07:48-09:24/96	20:22		20:49	
7	07:45	07:27		06:50	07:14-08:03/49	07:00	07:46-09:26/100	06:19	06:54-09:28/154	05:56	06:56-09:21/145
	17:15	17:50		18:22		19:53		20:23		20:49	
8	07:45	07:26		06:48	07:14-08:04/50	06:59	07:44-09:26/102	06:18	06:54-09:28/154	05:56	06:56-09:21/145
	17:16	17:51		18:23		19:54		20:24		20:50	
9	07:45	07:25		06:47	07:13-08:03/50	06:57	07:42-09:27/105	06:17	06:54-09:28/154	05:56	06:55-09:20/145
	17:17	17:52		18:24		19:55		20:25		20:50	
10	07:45	07:24		06:45	07:13-08:02/49	06:56	07:42-09:28/106	06:15	06:53-09:27/154	05:56	06:56-09:20/144
	17:18	17:53		18:25		19:56		20:26		20:51	
11	07:45	07:23		06:43	07:13-08:02/49	06:54	07:40-09:28/108	06:14	06:53-09:27/154	05:56	06:56-09:20/144
	17:19	17:55		18:26		19:57		20:27		20:52	
12	07:45	07:21		06:42	07:13-08:01/48	06:53	07:39-09:29/110	06:13	06:53-09:27/154	05:56	06:57-09:20/143
	17:20	17:56		18:27		19:58		20:28		20:52	
13	07:44	07:20		06:40	07:13-08:01/48	06:51	07:37-09:29/112	06:12	06:52-09:26/154	05:56	06:57-09:20/143
	17:21	17:57		18:28		19:59		20:29		20:52	
14	07:44	07:19		06:39	07:13-08:00/47	06:50	07:35-09:30/115	06:11	06:52-09:26/154	05:55	06:57-09:20/143
	17:22	17:58		18:29		20:00		20:30		20:53	
15	07:44	07:18		06:37	07:13-07:59/46	06:48	07:28-09:30/122	06:10	06:52-09:25/153	05:55	06:57-09:20/143
	17:23	17:59		18:30		20:01		20:31		20:53	
16	07:43	07:17		06:36	07:14-07:58/44	06:47	07:24-09:31/127	06:09	06:52-09:25/153	05:55	06:58-09:21/143
	17:24	18:00		18:31		20:02		20:32		20:54	
17	07:43	07:15		06:34	07:14-07:57/43	06:45	07:20-09:30/130	06:09	06:51-09:24/153	05:56	06:58-09:21/143
	17:25	18:02		18:32		20:03		20:33		20:54	
18	07:43	07:14		06:32	07:16-07:56/40	06:44	07:17-09:31/134	06:08	06:52-09:25/153	05:56	06:58-09:21/143
	17:26	18:03		18:33		20:04		20:34		20:54	
19	07:42	07:13		06:31	07:16-07:54/38	06:42	07:15-09:32/137	06:07	06:52-09:24/152	05:56	06:58-09:21/143
	17:28	18:04		18:34		20:05		20:35		20:55	
20	07:42	07:11		06:29	07:17-07:52/35	06:41	07:13-09:31/138	06:06	06:52-09:24/152	05:56	06:59-09:22/143
	17:29	18:05		18:35		20:06		20:35		20:55	
21	07:41	07:10	07:35-07:48/13	06:28	07:19-07:50/31	06:39	07:11-09:31/140	06:05	06:51-09:23/152	05:56	06:59-09:22/143
	17:30	18:06		18:36		20:07		20:36		20:55	
22	07:40	07:09	07:30-07:51/21	06:26	07:20-07:47/27	06:38	07:09-09:31/142	06:05	06:52-09:23/151	05:56	06:59-09:22/143
	17:31	18:07		18:37		20:08		20:37		20:55	
23	07:40	07:07	07:28-07:54/26	06:24	07:23-07:45/22	06:37	07:07-09:31/144	06:04	06:52-09:23/151	05:56	06:59-09:22/143
	17:32	18:08		18:38		20:09		20:38		20:56	
24	07:39	07:06	07:26-07:57/31	06:23	07:26-07:49/23	06:35	07:06-09:31/145	06:03	06:52-09:22/150	05:57	07:00-09:23/143
	17:33	18:10		18:39		20:10		20:39		20:56	
25	07:39	07:04	07:23-07:58/35	06:21	17:58-18:07/9	06:34	07:04-09:31/147	06:02	06:52-09:23/151	05:57	07:00-09:23/143
	17:34	18:11		18:40	07:23-07:57/34	20:11		20:40		20:56	
26	07:38	07:03	07:22-07:59/37	06:19	17:56-18:10/14	06:32	07:03-09:31/148	06:02	06:52-09:22/150	05:57	07:00-09:23/143
	17:36	18:12		18:41	07:18-08:02/44	20:12		20:41		20:56	
27	07:37	07:02	07:20-08:00/40	06:18	17:54-18:11/17	06:31	07:02-09:31/149	06:01	06:53-09:22/149	05:58	07:01-09:24/143
	17:37	18:13		18:42	07:13-08:06/53	20:13		20:41		20:56	
28	07:36	07:00	07:19-08:01/42	06:16	17:53-18:11/18	06:30	07:00-09:30/150	06:01	06:53-09:22/149	05:58	07:00-09:23/143
	17:38	18:14		18:43	07:09-08:08/59	20:14		20:42		20:56	
29	07:35			07:15	18:52-19:12/20	06:28	07:00-09:30/150	06:00	06:53-09:22/149	05:58	07:00-09:23/143
	17:39			19:44	08:06-09:12/66	20:15		20:43		20:56	
30	07:35			07:13	18:51-19:11/20	06:27	06:59-09:30/151	05:59	06:53-09:21/148	05:59	07:01-09:24/143
	17:40			19:45	08:03-09:14/71	20:16		20:44		20:56	
31	07:34			07:11	18:52-19:12/20			05:59	06:54-09:21/147		
	17:42			19:46	08:01-09:16/75			20:45			
Potential sun hours	301	299		370		397		445		448	
Sum of minutes with flicker	0	245		1541		3733		4712		4319	

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: Shadow flickering **WTG:** SER1 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (1)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:59 07:00-09:24/144 20:56	06:22 07:03-09:37/154 20:38	06:51 07:39-09:27/108 19:57	07:19 07:52-08:41/49 19:08	06:52 17:23	07:25 17:00
2	06:00 07:01-09:25/144 20:56	06:23 07:04-09:38/154 20:37	06:52 07:40-09:26/106 19:55	07:20 07:52-08:41/49 19:06	06:53 17:22	07:26 17:00
3	06:00 07:01-09:25/144 20:56	06:24 07:03-09:37/154 20:36	06:53 07:40-09:25/105 19:54	07:21 07:51-08:41/50 19:05	06:54 17:21	07:27 17:00
4	06:01 07:01-09:26/145 20:56	06:25 07:03-09:37/154 20:35	06:54 07:41-09:23/102 19:52	07:22 07:51-08:41/50 19:03	06:55 17:20	07:28 17:00
5	06:01 07:01-09:26/145 20:55	06:26 07:04-09:38/154 20:34	06:55 07:42-09:22/100 19:50	07:23 07:51-08:40/49 19:02	06:56 17:19	07:29 17:00
6	06:02 07:01-09:27/146 20:55	06:27 07:04-09:38/154 20:33	06:56 18:53-18:58/5 19:49 07:44-09:21/97	07:24 07:50-08:40/50 19:00	06:57 17:18	07:30 17:00
7	06:02 07:01-09:26/145 20:55	06:28 07:05-09:38/153 20:32	06:57 18:49-19:01/12 19:47 07:45-09:19/94	07:25 07:50-08:40/50 18:58	06:58 17:17	07:31 16:59
8	06:03 07:01-09:27/146 20:55	06:29 07:05-09:38/153 20:30	06:58 18:47-19:02/15 19:46 07:46-09:17/91	07:26 07:50-08:39/49 18:57	06:59 17:16	07:32 16:59
9	06:04 07:02-09:28/146 20:54	06:30 07:06-09:39/153 20:29	06:59 18:45-19:02/17 19:44 07:47-09:15/88	07:27 07:50-08:38/48 18:55	07:01 17:15	07:32 16:59
10	06:04 07:01-09:28/147 20:54	06:30 07:06-09:39/153 20:28	07:00 18:44-19:03/19 19:42 07:48-09:12/84	07:28 07:50-08:38/48 18:54	07:02 17:14	07:33 17:00
11	06:05 07:02-09:29/147 20:53	06:31 07:07-09:39/152 20:27	07:00 18:43-19:03/20 19:41 07:50-09:10/80	07:29 07:51-08:37/46 18:52	07:03 17:13	07:34 17:00
12	06:06 07:02-09:29/147 20:53	06:32 07:07-09:39/152 20:25	07:01 18:43-19:03/20 19:39 07:52-09:08/76	07:30 07:51-08:36/45 18:51	07:04 17:12	07:35 17:00
13	06:06 07:01-09:29/148 20:53	06:33 07:07-09:38/151 20:24	07:02 18:42-19:03/21 19:38 07:54-09:05/71	07:31 07:52-08:35/43 18:49	07:05 17:11	07:36 17:00
14	06:07 07:02-09:30/148 20:52	06:34 07:08-09:38/150 20:23	07:03 18:42-19:02/20 19:36 07:56-09:02/66	07:32 07:52-08:34/42 18:48	07:06 17:10	07:37 17:00
15	06:08 07:02-09:31/149 20:52	06:35 07:08-09:38/150 20:22	07:04 18:43-19:01/18 19:34 07:58-08:59/61	07:33 07:53-08:32/39 18:46	07:07 17:09	07:37 17:00
16	06:09 07:02-09:31/149 20:51	06:36 07:09-09:38/149 20:20	07:05 18:43-19:00/17 19:33 08:01-08:56/55	07:34 07:54-08:30/36 18:45	07:09 17:08	07:38 17:01
17	06:09 07:02-09:31/149 20:50	06:37 07:10-09:38/148 20:19	07:06 18:44-18:59/15 19:31 08:05-08:51/46	07:35 07:55-08:29/34 18:43	07:10 17:08	07:39 17:01
18	06:10 07:02-09:32/150 20:50	06:38 07:11-09:37/146 20:17	07:07 18:46-18:56/10 19:29 08:10-08:46/36	07:36 07:57-08:27/30 18:42	07:11 17:07	07:39 17:01
19	06:11 07:02-09:32/150 20:49	06:39 07:12-09:37/145 20:16	07:08 08:15-08:39/24 19:28	07:37 08:00-08:25/25 18:40	07:12 17:06	07:40 17:02
20	06:12 07:02-09:33/151 20:48	06:40 07:13-09:37/144 20:15	07:09 08:10-08:30/20 19:26	07:38 08:03-08:22/19 18:39	07:13 17:06	07:40 17:02
21	06:13 07:02-09:33/151 20:48	06:41 07:15-09:37/142 20:13	07:10 08:06-08:32/26 19:24	07:40 08:07-08:17/10 18:38	07:14 17:05	07:41 17:02
22	06:13 07:02-09:33/151 20:47	06:42 07:16-09:36/140 20:12	07:11 08:04-08:34/30 19:23	07:41 18:36	07:15 17:04	07:42 17:03
23	06:14 07:02-09:34/152 20:46	06:43 07:17-09:35/138 20:10	07:12 08:02-08:36/34 19:21	07:42 18:35	07:16 17:04	07:42 17:03
24	06:15 07:02-09:34/152 20:45	06:44 07:18-09:34/136 20:09	07:13 08:00-08:37/37 19:19	07:43 18:33	07:18 17:03	07:43 17:04
25	06:16 07:03-09:35/152 20:45	06:45 07:21-09:34/133 20:07	07:14 07:58-08:38/40 19:18	06:44 17:32	07:19 17:03	07:43 17:05
26	06:17 07:03-09:36/153 20:44	06:46 07:23-09:33/130 20:06	07:14 07:57-08:39/42 19:16	06:45 17:31	07:20 17:02	07:43 17:05
27	06:18 07:02-09:35/153 20:43	06:46 07:26-09:32/126 20:04	07:15 07:56-08:39/43 19:15	06:46 17:29	07:21 17:02	07:44 17:06
28	06:19 07:02-09:36/154 20:42	06:47 07:30-09:32/122 20:03	07:16 07:55-08:40/45 19:13	06:47 17:28	07:22 17:01	07:44 17:07
29	06:19 07:03-09:36/153 20:41	06:48 07:36-09:31/115 20:01	07:17 07:54-08:40/46 19:11	06:48 17:27	07:23 17:01	07:44 17:07
30	06:20 07:03-09:36/153 20:40	06:49 07:38-09:30/112 20:00	07:18 07:53-08:41/48 19:10	06:49 17:26	07:24 17:01	07:45 17:08
31	06:21 07:03-09:37/154 20:39	06:50 07:39-09:29/110 19:58		06:50 17:24		07:45 17:09
Potential sun hours	455	425	374	347	301	292
Sum of minutes with flicker	4618	4427	2110	861	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER10 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (10)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:45 08:07-08:45/38 17:10	07:33 07:52-08:52/60 17:43	06:58 07:17-07:51/34 18:15	07:10 19:47	06:26 20:17	05:58 20:45
2	07:45 08:07-08:45/38 17:10	07:32 07:51-08:51/60 17:44	06:57 07:16-07:50/34 18:16	07:08 19:48	06:24 20:18	05:58 20:46
3	07:45 08:07-08:46/39 17:11	07:31 07:50-08:50/60 17:45	06:55 07:14-07:20/6 18:17 07:21-07:49/28	07:06 19:49	06:23 06:42-06:44/2 20:19	05:58 20:46
4	07:45 08:07-08:47/40 17:12	07:30 07:49-08:49/60 17:46	06:54 07:13-07:20/7 18:18 07:23-07:48/25	07:05 19:50	06:22 06:41-06:45/4 20:20	05:57 20:47
5	07:45 08:07-08:47/40 17:13	07:29 07:48-08:49/61 17:47	06:52 07:11-07:20/9 18:19 07:23-07:46/23	07:03 19:51	06:21 06:40-06:46/6 20:21	05:57 20:48
6	07:45 08:07-08:48/41 17:14	07:28 07:47-08:48/61 17:49	06:51 07:10-07:21/11 18:20 07:25-07:45/20	07:02 19:52	06:20 06:39-06:47/8 20:22	05:57 20:48
7	07:45 08:07-08:49/42 17:15	07:27 07:46-08:47/61 17:50	06:49 07:08-07:22/14 18:21 07:27-07:41/14	07:00 19:53	06:19 06:38-06:48/10 20:23	05:56 20:49
8	07:45 08:06-08:49/43 17:16	07:26 07:45-08:46/61 17:51	06:48 07:06-07:22/16 18:23 07:31-07:36/5	06:59 07:17-07:18/1 19:54	06:17 06:37-06:49/12 20:24	05:56 20:50
9	07:45 08:06-08:50/44 17:17	07:25 07:45-08:44/59 17:52	06:46 07:05-07:23/18 18:24	06:57 07:15-07:18/3 19:55	06:16 06:36-06:49/13 20:25	05:56 20:50
10	07:45 08:06-08:50/44 17:18	07:23 07:45-08:42/57 17:53	06:45 07:03-07:23/20 18:25	06:56 07:14-07:19/5 19:56	06:15 06:35-06:49/14 20:26	05:56 20:51
11	07:45 08:07-08:51/44 17:19	07:22 07:45-08:39/54 17:54	06:43 07:02-07:23/21 18:26	06:54 07:12-07:19/7 19:57	06:14 06:34-06:49/15 20:27	05:56 20:51
12	07:44 08:06-08:51/45 17:20	07:21 08:30-08:32/2 17:56 07:44-08:23/39	06:42 07:00-07:23/23 18:27	06:52 07:11-07:19/8 19:58	06:13 06:33-06:49/16 20:28	05:55 20:52
13	07:44 08:06-08:52/46 17:21	07:20 07:44-08:24/40 17:57	06:40 06:59-07:23/24 18:28	06:51 07:09-07:18/9 19:59	06:12 06:32-06:49/17 20:29	05:55 20:52
14	07:44 08:07-08:53/46 17:22	07:19 07:44-08:24/40 17:58	06:39 06:57-07:22/25 18:29	06:49 07:08-07:18/10 20:00	06:11 06:31-06:49/18 20:30	05:55 20:53
15	07:44 08:06-08:53/47 17:23	07:18 07:45-08:24/39 17:59 07:37-07:39/2	06:37 06:55-07:21/26 18:30	06:48 07:06-07:17/11 20:01	06:10 06:30-06:49/19 20:31	05:55 20:53
16	07:43 08:06-08:54/48 17:24	07:16 07:44-08:23/39 18:00 07:35-07:43/8	06:35 06:55-07:20/25 18:31	06:46 07:05-07:17/12 20:02	06:09 06:29-06:48/19 20:32	05:55 20:53
17	07:43 08:06-08:54/48 17:25	07:15 07:34-08:23/49 18:01	06:34 06:56-07:18/22 18:32	06:45 07:03-07:15/12 20:03	06:08 06:28-06:48/20 20:33	05:55 20:54
18	07:42 08:06-08:55/49 17:26	07:14 07:33-08:23/50 18:03	06:32 06:56-07:16/20 18:33	06:43 07:02-07:14/12 20:04	06:08 06:28-06:48/20 20:33	05:55 20:54
19	07:42 08:06-08:54/48 17:27	07:12 07:31-08:21/50 18:04	06:31 06:59-07:15/16 18:34	06:42 07:01-07:11/10 20:05	06:07 06:27-06:47/20 20:34	05:56 20:54
20	07:41 08:07-08:55/48 17:29	07:11 07:30-08:21/51 18:05	06:29 07:01-07:11/10 18:35	06:41 20:06	06:06 06:26-06:47/21 20:35	05:56 20:55
21	07:41 08:06-08:55/49 17:30	07:10 07:29-08:20/51 18:06	06:27 18:36	06:39 20:07	06:05 06:26-06:46/20 20:36	05:56 20:55
22	07:40 08:06-08:55/49 17:31	07:08 07:27-08:18/51 18:07	06:26 18:37	06:38 20:08	06:04 06:28-06:46/18 20:37	05:56 20:55
23	07:40 08:07-08:56/49 17:32	07:07 07:26-08:17/51 18:08	06:24 18:38	06:36 20:09	06:04 06:28-06:45/17 20:38	05:56 20:55
24	07:39 08:07-08:55/48 17:33	07:06 07:24-08:15/51 18:09	06:23 18:39	06:35 20:10	06:03 06:29-06:43/14 20:39	05:57 20:55
25	07:38 08:07-08:55/48 17:34	07:04 07:53-08:13/20 18:11 07:23-07:52/29	06:21 18:40	06:34 20:11	06:02 06:31-06:43/12 20:40	05:57 20:56
26	07:38 08:08-08:56/48 17:35	07:03 07:56-08:11/15 18:12 07:22-07:52/30	06:19 18:41	06:32 20:12	06:02 06:32-06:41/9 20:40	05:57 20:56
27	07:37 08:08-08:55/47 17:37	07:01 07:20-07:52/32 18:13	06:18 18:42	06:31 20:13	06:01 20:41	05:58 20:56
28	07:36 08:08-08:55/47 17:38	07:00 07:19-07:52/33 18:14	06:16 18:43	06:30 20:14	06:00 20:42	05:58 20:56
29	07:35 08:09-08:54/45 17:39 07:59-08:06/7		07:14 19:44	06:28 20:15	06:00 20:43	05:58 20:56
30	07:34 07:55-08:54/59 17:40		07:13 19:45	06:27 20:16	05:59 20:44	05:59 20:56
31	07:34 07:53-08:53/60 17:41		07:11 19:46		05:59 20:44	
Potential sun hours	301	299	370	397	445	448
Sum of minutes with flicker	1434	1426	496	100	344	0

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

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

Licensed user:
LEONARDO ENGINEERING S.R.L.
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IT-81100 Caserta

Giovanni Savarese/
g.savarese@leonardoengineering.it.Calculate
03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER10 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (10)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:59 20:56	06:22 06:44-07:00/16 20:38	06:51 07:11-07:18/7 19:57	07:19 07:39-08:02/23 19:08	06:51 07:14-08:11/57 17:23	07:25 07:49-08:33/44 17:00
2	06:00 20:56	06:23 06:44-06:59/15 20:37	06:52 07:12-07:17/5 19:55	07:20 07:40-08:02/22 19:06	06:52 07:15-08:14/59 17:22	07:26 07:49-08:34/45 17:00
3	06:00 20:55	06:24 06:45-06:59/14 20:36	06:53 07:13-07:16/3 19:53	07:21 07:41-08:01/20 19:05	06:54 07:15-08:16/61 17:21	07:27 07:50-08:34/44 17:00
4	06:01 20:55	06:25 06:46-06:58/12 20:35	06:54 07:14-07:15/1 19:52	07:22 07:42-08:01/19 19:03	06:55 07:16-08:17/61 17:20	07:28 07:51-08:34/43 17:00
5	06:01 20:55	06:26 06:47-06:58/11 20:34	06:55 19:50	07:23 07:43-08:00/17 19:01	06:56 07:17-08:18/61 17:19	07:29 07:52-08:34/42 17:00
6	06:02 20:55	06:27 06:48-06:57/9 20:32	06:56 19:49	07:24 07:44-07:59/15 19:00 08:05-08:16/11	06:57 07:18-08:19/61 17:18	07:30 07:53-08:34/41 16:59
7	06:02 20:55	06:28 06:49-06:57/8 20:31	06:57 19:47	07:25 07:45-07:58/13 18:58 08:02-08:19/17	06:58 07:20-08:20/60 17:16	07:30 07:54-08:35/41 16:59
8	06:03 20:54	06:28 06:50-06:56/6 20:30	06:57 19:45	07:26 07:46-07:56/10 18:57 08:00-08:21/21	06:59 07:21-08:21/60 17:15	07:31 07:54-08:34/40 16:59
9	06:04 20:54	06:29 06:51-06:54/3 20:29	06:58 19:44	07:27 07:47-07:54/7 18:55 07:58-08:22/24	07:00 07:22-08:22/60 17:14	07:32 07:55-08:34/39 16:59
10	06:04 20:54	06:30 06:52-06:53/1 20:28	06:59 19:42	07:28 07:48-07:55/7 18:54 07:57-08:23/26	07:02 07:23-08:23/60 17:13	07:33 07:56-08:34/38 16:59
11	06:05 20:53	06:31 20:26	07:00 19:41	07:29 07:49-08:24/35 18:52	07:03 07:25-08:25/60 17:13	07:34 07:57-08:35/38 16:59
12	06:06 20:53	06:32 20:25	07:01 19:39	07:30 07:50-08:24/34 18:51	07:04 07:27-08:26/59 17:12	07:35 07:58-08:35/37 17:00
13	06:06 20:52	06:33 20:24	07:02 19:37	07:31 07:51-08:24/33 18:49	07:05 07:40-08:26/46 17:11 07:31-07:38/7	07:35 07:59-08:36/37 17:00
14	06:07 20:52	06:34 20:23	07:03 19:36	07:32 07:52-08:24/32 18:48	07:06 07:40-08:27/47 17:10	07:36 07:59-08:35/36 17:00
15	06:08 20:51	06:35 20:21	07:04 19:34	07:33 08:31-08:40/9 18:46 07:53-08:24/31	07:07 07:40-08:27/47 17:09	07:37 08:00-08:36/36 17:00
16	06:08 20:51	06:36 20:20	07:05 19:32	07:34 08:26-08:43/17 18:45 07:54-08:24/30	07:08 07:41-08:29/48 17:08	07:38 08:01-08:36/35 17:00
17	06:09 06:43-06:49/6 20:50	06:37 20:19	07:06 19:31	07:35 07:55-08:46/51 18:43	07:10 07:41-08:29/48 17:07	07:38 08:02-08:36/34 17:01
18	06:10 06:41-06:51/10 20:50	06:38 20:17	07:07 19:29	07:36 07:56-08:47/51 18:42	07:11 07:41-08:29/48 17:07	07:39 08:03-08:37/34 17:01
19	06:11 06:40-06:53/13 20:49	06:39 20:16	07:08 19:27	07:37 07:57-08:48/51 18:40	07:12 07:41-08:30/49 17:06	07:40 08:03-08:37/34 17:01
20	06:12 06:39-06:54/15 20:48	06:40 20:14	07:09 19:26	07:38 07:58-08:49/51 18:39	07:13 07:41-08:30/49 17:05	07:40 08:04-08:38/34 17:02
21	06:12 06:37-06:55/18 20:48	06:41 20:13	07:10 19:24	07:39 08:00-08:51/51 18:37	07:14 07:42-08:31/49 17:05	07:41 08:04-08:37/33 17:02
22	06:13 06:37-06:56/19 20:47	06:42 20:12	07:10 19:23	07:40 08:01-08:52/51 18:36	07:15 07:43-08:31/48 17:04	07:41 08:05-08:38/33 17:03
23	06:14 06:36-06:57/21 20:46	06:43 20:10	07:11 07:46-07:55/9 19:21	07:41 08:02-08:52/50 18:35	07:16 07:43-08:31/48 17:04	07:42 08:05-08:39/34 17:03
24	06:15 06:37-06:58/21 20:45	06:43 07:04-07:15/11 20:09	07:12 07:43-07:58/15 19:19	07:43 08:03-08:53/50 18:33	07:17 07:43-08:32/49 17:03	07:42 08:06-08:40/34 17:04
25	06:16 06:38-06:58/20 20:44	06:44 07:05-07:17/12 20:07	07:13 07:40-07:59/19 19:18	06:44 07:04-07:53/49 17:32	07:18 07:44-08:32/48 17:03	07:43 08:06-08:40/34 17:04
26	06:17 06:38-06:58/20 20:44	06:45 07:06-07:18/12 20:06	07:14 07:39-08:00/21 19:16	06:45 07:14-07:53/39 17:31 07:05-07:12/7	07:19 07:44-08:32/48 17:02	07:43 08:06-08:40/34 17:05
27	06:18 06:39-06:59/20 20:43	06:46 07:07-07:19/12 20:04	07:15 07:37-08:01/24 19:14	06:46 07:13-07:53/40 17:29	07:21 07:45-08:32/47 17:02	07:43 08:07-08:41/34 17:06
28	06:18 06:40-06:59/19 20:42	06:47 07:08-07:19/11 20:03	07:16 07:36-08:02/26 19:13	06:47 07:14-07:54/40 17:28	07:22 07:47-08:33/46 17:01	07:44 08:06-08:42/36 17:06
29	06:19 06:41-06:59/18 20:41	06:48 07:09-07:19/10 20:01	07:17 07:37-08:02/25 19:11	06:48 07:14-07:53/39 17:27	07:23 07:47-08:33/46 17:01	07:44 08:06-08:42/36 17:07
30	06:20 06:42-07:00/18 20:40	06:49 07:10-07:19/9 20:00	07:18 07:38-08:02/24 19:09	06:49 07:57-08:04/7 17:26 07:14-07:53/39	07:24 07:48-08:33/45 17:01	07:44 08:06-08:43/37 17:08
31	06:21 06:43-07:00/17 20:39	06:50 07:10-07:18/8 19:58	 	06:50 07:14-08:09/55 17:24	 	07:45 08:07-08:44/37 17:09
Potential sun hours	455	425	374	347	301	292
Sum of minutes with flicker	255	180	179	1194	1582	1154

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: Shadow flickering **WTG:** SER11 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (11)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April		May		June	
1	07:45	07:33		06:58	07:17-07:47/30	07:10		06:26	06:45-07:39/54	05:58	06:46-07:33/47
	17:10	17:43		18:15		19:47		20:17		20:45	
2	07:45	07:32		06:57	07:16-07:48/32	07:08		06:25	06:44-07:40/56	05:58	06:47-07:33/46
	17:10	17:44		18:16		19:48		20:18		20:46	
3	07:45	07:31		06:55	07:14-07:47/33	07:07		06:23	06:42-07:39/57	05:58	06:48-07:33/45
	17:11	17:45		18:17		19:49		20:19		20:46	
4	07:45	07:30		06:54	07:13-07:47/34	07:05		06:22	06:41-07:39/58	05:57	06:48-07:32/44
	17:12	17:46		18:18		19:50		20:20		20:47	
5	07:45	07:29		06:52	07:11-07:46/35	07:03		06:21	06:40-07:39/59	05:57	06:49-07:32/43
	17:13	17:47		18:19		19:51		20:21		20:48	
6	07:45	07:28		06:51	07:10-07:46/36	07:02		06:20	06:39-07:40/61	05:57	06:50-07:32/42
	17:14	17:49		18:20		19:52		20:22		20:48	
7	07:45	07:27		06:49	07:08-07:45/37	07:00		06:19	06:39-07:40/61	05:56	06:51-07:32/41
	17:15	17:50		18:21		19:53		20:23		20:49	
8	07:45	07:26		06:48	07:06-07:43/37	06:59		06:18	06:39-07:40/61	05:56	06:50-07:31/41
	17:16	17:51		18:23		19:54		20:24		20:50	
9	07:45	07:25		06:46	07:05-07:43/38	06:57		06:16	06:39-07:40/61	05:56	06:51-07:30/39
	17:17	17:52		18:24		19:55		20:25		20:50	
10	07:45	07:23		06:45	07:05-07:41/36	06:56		06:15	06:39-07:40/61	05:56	06:52-07:30/38
	17:18	17:53		18:25		19:56		20:26		20:51	
11	07:45	07:22		06:43	07:07-07:40/33	06:54		06:14	06:39-07:40/61	05:56	06:52-07:30/38
	17:19	17:55		18:26		19:57		20:27		20:51	
12	07:44	07:21		06:42	07:07-07:38/31	06:52		06:13	06:39-07:39/60	05:56	06:53-07:30/37
	17:20	17:56		18:27		19:58		20:28		20:52	
13	07:44	07:20		06:40	07:08-07:36/28	06:51		06:12	06:39-07:39/60	05:55	06:54-07:30/36
	17:21	17:57		18:28		19:59		20:29		20:52	
14	07:44	07:19		06:39	07:11-07:34/23	06:49		06:11	06:39-07:39/60	05:55	06:54-07:30/36
	17:22	17:58		18:29		20:00		20:30		20:53	
15	07:43	07:18		06:37	07:13-07:30/17	06:48		06:10	06:39-07:38/59	05:55	06:55-07:30/35
	17:23	17:59		18:30		20:01		20:31		20:53	
16	07:43	07:16		06:35	07:19-07:25/6	06:46		06:09	06:39-07:38/59	05:55	06:55-07:30/35
	17:24	18:00		18:31		20:02		20:32		20:53	
17	07:43	07:15	07:34-07:37/3	06:34		06:45	07:03-07:22/19	06:09	06:39-07:38/59	05:55	06:55-07:30/35
	17:25	18:02		18:32		20:03		20:32		20:54	
18	07:42	07:14	07:33-07:40/7	06:32		06:44	07:02-07:26/24	06:08	06:40-07:38/58	05:56	06:56-07:30/34
	17:26	18:03		18:33		20:04		20:33		20:54	
19	07:42	07:12	07:31-07:41/10	06:31		06:42	07:00-07:28/28	06:07	06:40-07:38/58	05:56	06:56-07:30/34
	17:27	18:04		18:34		20:05		20:34		20:54	
20	07:41	07:11	07:30-07:43/13	06:29		06:41	06:59-07:30/31	06:06	06:40-07:37/57	05:56	06:57-07:31/34
	17:29	18:05		18:35		20:06		20:35		20:55	
21	07:41	07:10	07:29-07:44/15	06:27		06:39	06:58-07:32/34	06:05	06:40-07:37/57	05:56	06:57-07:31/34
	17:30	18:06		18:36		20:07		20:36		20:55	
22	07:40	07:08	07:27-07:45/18	06:26		06:38	06:56-07:33/37	06:04	06:42-07:37/55	05:56	06:57-07:31/34
	17:31	18:07		18:37		20:08		20:37		20:55	
23	07:40	07:07	07:26-07:46/20	06:24		06:36	06:55-07:34/39	06:04	06:42-07:36/54	05:56	06:57-07:31/34
	17:32	18:08		18:38		20:09		20:38		20:55	
24	07:39	07:06	07:24-07:46/22	06:23		06:35	06:54-07:35/41	06:03	06:42-07:36/54	05:57	06:58-07:32/34
	17:33	18:09		18:39		20:10		20:39		20:55	
25	07:38	07:04	07:23-07:47/24	06:21		06:34	06:52-07:36/44	06:02	06:43-07:36/53	05:57	06:57-07:32/35
	17:34	18:11		18:40		20:11		20:40		20:56	
26	07:38	07:03	07:22-07:48/26	06:19		06:32	06:51-07:37/46	06:02	06:43-07:35/52	05:57	06:57-07:32/35
	17:36	18:12		18:41		20:12		20:40		20:56	
27	07:37	07:01	07:20-07:47/27	06:18		06:31	06:50-07:38/48	06:01	06:44-07:35/51	05:58	06:58-07:33/35
	17:37	18:13		18:42		20:13		20:41		20:56	
28	07:36	07:00	07:19-07:48/29	06:16		06:30	06:48-07:37/49	06:00	06:44-07:34/50	05:58	06:57-07:33/36
	17:38	18:14		18:43		20:14		20:42		20:56	
29	07:35			07:14		06:28	06:47-07:38/51	06:00	06:45-07:34/49	05:58	06:57-07:33/36
	17:39			19:44		20:15		20:43		20:56	
30	07:34			07:13		06:27	06:46-07:39/53	05:59	06:45-07:34/49	05:59	06:57-07:34/37
	17:40			19:45		20:16		20:43		20:56	
31	07:34			07:11				05:59	06:46-07:34/48		
	17:41			19:46				20:44			
Potential sun hours	301	299		370		397		445		448	
Sum of minutes with flicker	0	214		486		544		1752		1130	

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

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

Licensed user:
LEONARDO ENGINEERING S.R.L.
Viale Lamberti 29
IT-81100 Caserta

Giovanni Savarese/
g.savarese@leonardoengineering.it.Calculate
03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER11 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (11)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:59 06:57-07:34/37	06:22 06:49-07:50/61	06:51	07:19 07:47-08:17/30	06:51	07:25
	20:56	20:38	19:57	19:08	17:23	17:00
2	06:00 06:57-07:35/38	06:23 06:49-07:49/60	06:52	07:20 07:46-08:18/32	06:52	07:26
	20:56	20:37	19:55	19:06	17:22	17:00
3	06:00 06:56-07:35/39	06:24 06:49-07:49/60	06:53	07:21 07:44-08:19/35	06:54	07:27
	20:55	20:36	19:53	19:05	17:21	17:00
4	06:01 06:57-07:37/40	06:25 06:49-07:49/60	06:54	07:22 07:43-08:20/37	06:55	07:28
	20:55	20:35	19:52	19:03	17:20	17:00
5	06:01 06:56-07:37/41	06:26 06:49-07:49/60	06:55	07:23 07:43-08:21/38	06:56	07:29
	20:55	20:34	19:50	19:01	17:19	17:00
6	06:02 06:56-07:38/42	06:27 06:49-07:49/60	06:56	07:24 07:44-08:21/37	06:57	07:30
	20:55	20:32	19:49	19:00	17:18	16:59
7	06:02 06:55-07:38/43	06:28 06:49-07:49/60	06:57	07:25 07:45-08:21/36	06:58	07:30
	20:55	20:31	19:47	18:58	17:17	16:59
8	06:03 06:55-07:39/44	06:29 06:50-07:49/59	06:57	07:26 07:46-08:22/36	06:59	07:31
	20:54	20:30	19:45	18:57	17:15	16:59
9	06:04 06:55-07:40/45	06:29 06:51-07:49/58	06:58	07:27 07:47-08:22/35	07:00	07:32
	20:54	20:29	19:44	18:55	17:14	16:59
10	06:04 06:55-07:40/45	06:30 06:52-07:49/57	06:59	07:28 07:48-08:22/34	07:02	07:33
	20:54	20:28	19:42	18:54	17:14	16:59
11	06:05 06:55-07:41/46	06:31 06:53-07:48/55	07:00	07:29 07:49-08:21/32	07:03	07:34
	20:53	20:26	19:41	18:52	17:13	17:00
12	06:06 06:55-07:42/47	06:32 06:53-07:47/54	07:01	07:30 07:50-08:21/31	07:04	07:35
	20:53	20:25	19:39	18:51	17:12	17:00
13	06:06 06:54-07:42/48	06:33 06:54-07:46/52	07:02	07:31 07:51-08:21/30	07:05	07:35
	20:52	20:24	19:37	18:49	17:11	17:00
14	06:07 06:54-07:43/49	06:34 06:55-07:46/51	07:03	07:32 07:52-08:20/28	07:06	07:36
	20:52	20:23	19:36	18:48	17:10	17:00
15	06:08 06:54-07:43/49	06:35 06:56-07:45/49	07:04	07:33 07:53-08:20/27	07:07	07:37
	20:51	20:21	19:34	18:46	17:09	17:00
16	06:09 06:52-07:43/51	06:36 06:57-07:44/47	07:05	07:34 07:54-08:19/25	07:08	07:38
	20:51	20:20	19:32	18:45	17:08	17:01
17	06:09 06:52-07:44/52	06:37 06:58-07:43/45	07:06	07:35 07:55-08:18/23	07:09	07:38
	20:50	20:19	19:31	18:43	17:08	17:01
18	06:10 06:52-07:45/53	06:38 06:59-07:42/43	07:07	07:36 07:56-08:17/21	07:11	07:39
	20:49	20:17	19:29	18:42	17:07	17:01
19	06:11 06:52-07:46/54	06:39 07:00-07:41/41	07:08	07:37 07:57-08:16/19	07:12	07:40
	20:49	20:16	19:27	18:40	17:06	17:02
20	06:12 06:52-07:46/54	06:40 07:01-07:40/39	07:09	07:38 07:58-08:15/17	07:13	07:40
	20:48	20:14	19:26	18:39	17:05	17:02
21	06:12 06:51-07:46/55	06:41 07:02-07:38/36	07:10	07:39 08:00-08:14/14	07:14	07:41
	20:47	20:13	19:24	18:37	17:05	17:02
22	06:13 06:51-07:47/56	06:42 07:02-07:35/33	07:10	07:40 08:01-08:13/12	07:15	07:41
	20:47	20:12	19:23	18:36	17:04	17:03
23	06:14 06:51-07:47/56	06:43 07:03-07:33/30	07:11	07:41 08:02-08:11/9	07:16	07:42
	20:46	20:10	19:21	18:35	17:04	17:03
24	06:15 06:51-07:48/57	06:44 07:04-07:31/27	07:12	07:42 08:03-08:09/6	07:17	07:42
	20:45	20:09	19:19	18:33	17:03	17:04
25	06:16 06:51-07:48/57	06:44 07:05-07:28/23	07:13	06:44 07:04-07:06/2	07:18	07:43
	20:44	20:07	19:18	17:32	17:03	17:05
26	06:17 06:50-07:48/58	06:45 07:07-07:24/17	07:14	06:45	07:19	07:43
	20:43	20:06	19:16	17:31	17:02	17:05
27	06:18 06:50-07:48/58	06:46	07:15	06:46	07:20	07:43
	20:43	20:04	19:14	17:29	17:02	17:06
28	06:18 06:50-07:49/59	06:47	07:16 07:56-08:10/14	06:47	07:22	07:44
	20:42	20:03	19:13	17:28	17:01	17:06
29	06:19 06:50-07:49/59	06:48	07:17 07:52-08:13/21	06:48	07:23	07:44
	20:41	20:01	19:11	17:27	17:01	17:07
30	06:20 06:49-07:50/61	06:49	07:18 07:50-08:16/26	06:49	07:24	07:44
	20:40	20:00	19:10	17:26	17:01	17:08
31	06:21 06:49-07:50/61	06:50		06:50		07:45
	20:39	19:58		17:24		17:09
Potential sun hours	455	425	374	347	301	292
Sum of minutes with flicker	1554	1237	61	646	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER12 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (12)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:45 15:22-16:16/54	07:33 07:52-08:21/29	06:58 07:17-07:18/1	07:10	06:26	05:58
	17:10	17:43 15:44-16:16/32	18:15	19:47	20:17	20:45
2	07:45 15:22-16:17/55	07:32 07:51-08:21/30	06:57 07:16-07:18/2	07:08	06:25	05:58
	17:10	17:44 15:46-16:14/28	18:16	19:48	20:18	20:46
3	07:45 15:23-16:17/54	07:31 07:50-08:21/31	06:55 07:14-07:17/3	07:06	06:23	05:58
	17:11	17:45 15:48-16:12/24	18:17	19:49	20:19	20:46
4	07:45 15:23-16:18/55	07:30 07:49-08:22/33	06:54 07:13-07:16/3	07:05	06:22	05:57
	17:12	17:46 15:52-16:10/18	18:18	19:50	20:20	20:47
5	07:45 15:24-16:18/54	07:29 07:48-08:22/34	06:52 07:11-07:14/3	07:03	06:21	05:57
	17:13	17:47 15:57-16:05/8	18:19	19:51	20:21	20:48
6	07:45 15:24-16:19/55	07:28 07:47-08:22/35	06:51 07:10-07:12/2	07:02	06:20	05:57
	17:14	17:49	18:20	19:52	20:22	20:48
7	07:45 15:24-16:18/54	07:27 07:46-08:22/36	06:49	07:00	06:19	05:56
	17:15	17:50	18:21	19:53	20:23	20:49
8	07:45 15:24-16:19/55	07:26 07:45-08:22/37	06:48	06:59	06:17	05:56
	17:16	17:51	18:23	19:54	20:24	20:50
9	07:45 15:25-16:20/55	07:25 07:44-08:22/38	06:46	06:57	06:16	05:56
	17:17	17:52	18:24	19:55	20:25	20:50
10	07:45 15:26-16:20/54	07:23 07:43-08:22/39	06:45	06:56	06:15	05:56
	17:18	17:53	18:25	19:56	20:26	20:51
11	07:45 15:26-16:21/55	07:22 07:42-08:22/40	06:43	06:54	06:14	05:56
	17:19	17:55	18:26	19:57	20:27	20:51
12	07:44 15:26-16:20/54	07:21 07:40-08:20/40	06:42	06:52	06:13	05:56
	17:20	17:56	18:27	19:58	20:28	20:52
13	07:44 15:27-16:21/54	07:20 07:40-08:20/40	06:40	06:51	06:12	05:55
	17:21	17:57	18:28	19:59	20:29	20:52
14	07:44 15:28-16:22/54	07:19 07:41-08:19/38	06:39	06:49	06:11	05:55
	17:22	17:58	18:29	20:00	20:30	20:53
15	07:43 15:28-16:21/53	07:18 07:42-08:18/36	06:37	06:48	06:10	05:55
	17:23	17:59	18:30	20:01	20:31	20:53
16	07:43 15:29-16:22/53	07:16 07:42-08:17/35	06:35	06:46	06:09	05:55
	17:24	18:00	18:31	20:02	20:32	20:53
17	07:43 08:03-08:05/2	07:15 07:44-08:15/31	06:34	06:45	06:09	05:55
	17:25 15:29-16:22/53	18:02	18:32	20:03	20:32	20:54
18	07:42 08:03-08:07/4	07:14 07:46-08:14/28	06:32	06:44	06:08	05:56
	17:26 15:30-16:22/52	18:03	18:33	20:04	20:33	20:54
19	07:42 08:02-08:08/6	07:12 07:47-08:11/24	06:31	06:42	06:07	05:56
	17:27 15:30-16:22/52	18:04	18:34	20:05	20:34	20:54
20	07:41 08:02-08:10/8	07:11 07:50-08:09/19	06:29	06:41	06:06	05:56
	17:29 15:31-16:23/52	18:05	18:35	20:06	20:35	20:55
21	07:41 08:01-08:11/10	07:10 07:54-08:05/11	06:27	06:39	06:05	05:56
	17:30 15:32-16:22/50	18:06	18:36	20:07	20:36	20:55
22	07:40 08:00-08:12/12	07:08	06:26	06:38	06:04	05:56
	17:31 15:32-16:22/50	18:07	18:37	20:08	20:37	20:55
23	07:40 08:00-08:14/14	07:07	06:24	06:36	06:04	05:56
	17:32 15:34-16:22/48	18:08	18:38	20:09	20:38	20:55
24	07:39 07:59-08:15/16	07:06	06:23	06:35	06:03	05:57
	17:33 15:34-16:22/48	18:09	18:39	20:10	20:39	20:55
25	07:38 07:58-08:16/18	07:04	06:21	06:34	06:02	05:57
	17:34 15:35-16:21/46	18:11	18:40	20:11	20:40	20:56
26	07:38 07:57-08:17/20	07:03	06:19	06:32	06:02	05:57
	17:36 15:36-16:21/45	18:12	18:41	20:12	20:40	20:56
27	07:37 07:57-08:18/21	07:01	06:18	06:31	06:01	05:58
	17:37 15:37-16:21/44	18:13	18:42	20:13	20:41	20:56
28	07:36 07:56-08:19/23	07:00	06:16	06:30	06:00	05:58
	17:38 15:38-16:20/42	18:14	18:43	20:14	20:42	20:56
29	07:35 07:55-08:19/24		07:14	06:28	06:00	05:58
	17:39 15:40-16:19/39		19:44	20:15	20:43	20:56
30	07:34 07:54-08:20/26		07:13	06:27	05:59	05:59
	17:40 15:41-16:18/37		19:45	20:16	20:44	20:56
31	07:34 07:53-08:20/27		07:11		05:59	
	17:41 15:42-16:17/35		19:46		20:44	
Potential sun hours	301	299	370	397	445	448
Sum of minutes with flicker	1792	794	14	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER12 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (12)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October		November		December	
1	05:59	06:22	06:51	07:19		06:51	07:12-07:51/39	07:25	15:08-16:03/55
	20:56	20:38	19:57	19:08		17:23		17:00	
2	06:00	06:23	06:52	07:20		06:52	07:14-07:52/38	07:26	15:09-16:03/54
	20:56	20:37	19:55	19:06		17:22		17:00	
3	06:00	06:24	06:53	07:21		06:54	07:15-07:52/37	07:27	15:09-16:04/55
	20:55	20:36	19:53	19:05		17:21		17:00	
4	06:01	06:25	06:54	07:22		06:55	07:16-07:52/36	07:28	15:09-16:04/55
	20:55	20:35	19:52	19:03		17:20		17:00	
5	06:01	06:26	06:55	07:23		06:56	07:17-07:52/35	07:29	15:10-16:04/54
	20:55	20:34	19:50	19:01		17:19		17:00	
6	06:02	06:27	06:56	07:24		06:57	07:18-07:52/34	07:30	15:10-16:05/55
	20:55	20:32	19:49	19:00		17:18	15:26-15:36/10	16:59	
7	06:02	06:28	06:57	07:25	07:45-07:46/1	06:58	07:20-07:52/32	07:30	15:10-16:04/54
	20:55	20:31	19:47	18:58		17:16	15:22-15:41/19	16:59	
8	06:03	06:28	06:57	07:26	07:46-07:49/3	06:59	07:21-07:52/31	07:31	15:10-16:05/55
	20:54	20:30	19:45	18:57		17:15	15:19-15:43/24	16:59	
9	06:04	06:29	06:58	07:27	07:47-07:50/3	07:00	07:22-07:52/30	07:32	15:11-16:05/54
	20:54	20:29	19:44	18:55		17:14	15:17-15:45/28	16:59	
10	06:04	06:30	06:59	07:28	07:48-07:51/3	07:02	07:23-07:52/29	07:33	15:11-16:06/55
	20:54	20:28	19:42	18:54		17:13	15:15-15:47/32	16:59	
11	06:05	06:31	07:00	07:29	07:49-07:51/2	07:03	07:25-07:52/27	07:34	15:12-16:06/54
	20:53	20:26	19:41	18:52		17:13	15:13-15:48/35	17:00	
12	06:06	06:32	07:01	07:30	07:50-07:52/2	07:04	07:26-07:52/26	07:35	15:13-16:07/54
	20:53	20:25	19:39	18:51		17:12	15:13-15:50/37	17:00	
13	06:06	06:33	07:02	07:31	07:51-07:52/1	07:05	07:27-07:51/24	07:35	15:12-16:07/55
	20:52	20:24	19:37	18:49		17:11	15:11-15:51/40	17:00	
14	06:07	06:34	07:03	07:32		07:06	07:28-07:51/23	07:36	15:13-16:07/54
	20:52	20:23	19:36	18:48		17:10	15:10-15:52/42	17:00	
15	06:08	06:35	07:04	07:33		07:07	07:29-07:50/21	07:37	15:14-16:08/54
	20:51	20:21	19:34	18:46		17:09	15:09-15:53/44	17:00	
16	06:09	06:36	07:05	07:34		07:08	07:31-07:50/19	07:38	15:15-16:09/54
	20:51	20:20	19:32	18:45		17:08	15:10-15:55/45	17:00	
17	06:09	06:37	07:06	07:35		07:09	07:32-07:50/18	07:38	15:15-16:09/54
	20:50	20:19	19:31	18:43		17:08	15:09-15:55/46	17:01	
18	06:10	06:38	07:07	07:36		07:11	07:33-07:49/16	07:39	15:16-16:09/53
	20:50	20:17	19:29	18:42		17:07	15:08-15:56/48	17:01	
19	06:11	06:39	07:08	07:37		07:12	07:34-07:48/14	07:40	15:15-16:09/54
	20:49	20:16	19:27	18:40		17:06	15:08-15:56/48	17:02	
20	06:12	06:40	07:09	07:38		07:13	07:35-07:47/12	07:40	15:16-16:10/54
	20:48	20:14	19:26	18:39		17:05	15:07-15:57/50	17:02	
21	06:12	06:41	07:10	07:39	08:23-08:38/15	07:14	07:37-07:47/10	07:41	15:16-16:10/54
	20:47	20:13	19:24	18:37		17:05	15:07-15:57/50	17:02	
22	06:13	06:42	07:10	07:40	08:20-08:41/21	07:15	07:38-07:46/8	07:41	15:17-16:11/54
	20:47	20:12	19:23	18:36		17:04	15:07-15:59/52	17:03	
23	06:14	06:43	07:11	07:41	08:17-08:43/26	07:16	07:39-07:45/6	07:42	15:17-16:11/54
	20:46	20:10	19:21	18:35		17:04	15:07-15:59/52	17:03	
24	06:15	06:44	07:12	07:43	08:15-08:44/29	07:17	07:40-07:44/4	07:42	15:18-16:12/54
	20:45	20:09	19:19	18:33		17:03	15:07-15:59/52	17:04	
25	06:16	06:44	07:13	06:44	07:13-07:45/32	07:18	07:41-07:43/2	07:43	15:19-16:12/53
	20:44	20:07	19:18	17:32		17:03	15:07-16:00/53	17:05	
26	06:17	06:45	07:14	06:45	07:12-07:47/35	07:19	15:07-16:00/53	07:43	15:19-16:12/53
	20:43	20:06	19:16	17:31		17:02		17:05	
27	06:18	06:46	07:15	06:46	07:10-07:47/37	07:21	15:07-16:00/53	07:43	15:20-16:14/54
	20:43	20:04	19:14	17:29		17:02		17:06	
28	06:18	06:47	07:16	06:47	07:10-07:49/39	07:22	15:07-16:01/54	07:44	15:20-16:14/54
	20:42	20:03	19:13	17:28		17:01		17:06	
29	06:19	06:48	07:17	06:48	07:09-07:50/41	07:23	15:07-16:01/54	07:44	15:20-16:14/54
	20:41	20:01	19:11	17:27		17:01		17:07	
30	06:20	06:49	07:18	06:49	07:10-07:50/40	07:24	15:08-16:02/54	07:44	15:20-16:14/54
	20:40	20:00	19:10	17:26		17:01		17:08	
31	06:21	06:50		06:50	07:11-07:50/39			07:45	15:21-16:15/54
	20:39	19:58		17:24				17:09	
Potential sun hours	455	425	374	347		301		292	
Sum of minutes with flicker	0	0	0	369		1646		1678	

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

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

Licensed user:
LEONARDO ENGINEERING S.R.L.
Viale Lamberti 29
IT-81100 Caserta

Giovanni Savarese/
g.savarese@leonardoengineering.it.Calculate
03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER13 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:45 08:08-08:42/34	07:33 16:34-16:57/23	06:58	07:10	06:26	05:58	05:59	06:22	06:51	07:19	06:51	07:25 08:02-08:20/18
	17:10	17:43	18:15	19:47	20:17	20:45	20:56	20:38	19:57	19:08	17:23	17:00
2	07:45 08:09-08:42/33	07:32 16:34-16:57/23	06:57	07:08	06:25	05:58	06:00	06:23	06:52	07:20	06:52	07:26 08:01-08:22/21
	17:11	17:44	18:16	19:48	20:18	20:46	20:56	20:37	19:55	19:06	17:22	17:00
3	07:45 08:10-08:42/32	07:31 16:36-16:56/20	06:56	07:07	06:23	05:58	06:00	06:24	06:53	07:21	06:54	07:27 08:00-08:23/23
	17:11	17:45	18:17	19:49	20:19	20:46	20:55	20:36	19:53	19:05	17:21	17:00
4	07:45 08:11-08:41/30	07:30 16:37-16:55/18	06:54	07:05	06:22	05:57	06:01	06:25	06:54	07:22	06:55 16:15-16:18/3	07:28 08:00-08:25/25
	17:12	17:46	18:18	19:50	20:20	20:47	20:55	20:35	19:52	19:03	17:20	17:00
5	07:45 08:12-08:41/29	07:29 16:39-16:54/15	06:53	07:03	06:21	05:57	06:01	06:26	06:55	07:23	06:56 16:11-16:22/11	07:29 07:59-08:26/27
	17:13	17:47	18:19	19:51	20:21	20:48	20:55	20:34	19:50	19:02	17:19	17:00
6	07:45 08:13-08:41/28	07:28 16:41-16:52/11	06:51	07:02	06:20	05:57	06:02	06:27	06:56	07:24	06:57 16:08-16:24/16	07:30 07:59-08:27/28
	17:14	17:49	18:20	19:52	20:22	20:48	20:55	20:32	19:49	19:00	17:18	16:59
7	07:45 08:14-08:41/27	07:27	06:49	07:00	06:19	05:56	06:02	06:28	06:57	07:25	06:58 16:08-16:26/18	07:30 07:59-08:28/29
	17:15	17:50	18:22	19:53	20:23	20:49	20:55	20:31	19:47	18:58	17:17	16:59
8	07:45 08:14-08:40/26	07:26	06:48	06:59	06:18	05:56	06:03	06:29	06:58	07:26	06:59 16:06-16:27/21	07:31 07:58-08:28/30
	17:16	17:51	18:23	19:54	20:24	20:50	20:54	20:30	19:45	18:57	17:16	16:59
9	07:45 08:16-08:39/23	07:25	06:46	06:57	06:16	05:56	06:04	06:29	06:58	07:27	07:00 16:05-16:28/23	07:32 07:58-08:30/32
	17:17	17:52	18:24	19:55	20:25	20:50	20:54	20:29	19:44	18:55	17:15	16:59
10	07:45 08:18-08:39/21	07:24	06:45	06:56	06:15	05:56	06:04	06:30	06:59	07:28	07:02 16:04-16:28/24	07:33 07:58-08:31/33
	17:18	17:53	18:25	19:56	20:26	20:51	20:54	20:28	19:42	18:54	17:14	16:59
11	07:45 08:20-08:38/18	07:22	06:43	06:54	06:14	05:56	06:05	06:31	07:00	07:29	07:03 16:04-16:29/25	07:34 07:58-08:32/34
	17:19	17:55	18:26	19:57	20:27	20:51	20:53	20:26	19:41	18:52	17:13	17:00
12	07:44 16:37-16:43/6	07:21	06:42	06:53	06:13	05:56	06:06	06:32	07:01	07:30	07:04 16:04-16:30/26	07:35 07:58-08:33/35
	17:20 08:21-08:36/15	17:56	18:27	19:58	20:28	20:52	20:53	20:25	19:39	18:51	17:12	17:00
13	07:44 16:35-16:46/11	07:20	06:40	06:51	06:12	05:55	06:06	06:33	07:02	07:31	07:05 16:04-16:30/26	07:35 07:59-08:34/35
	17:21 08:25-08:34/9	17:57	18:28	19:59	20:29	20:52	20:52	20:24	19:37	18:49	17:11	17:00
14	07:44 16:35-16:48/13	07:19	06:39	06:49	06:11	05:55	06:07	06:34	07:03	07:32	07:06 16:04-16:30/26	07:36 07:59-08:34/35
	17:22	17:58	18:29	20:00	20:30	20:53	20:52	20:23	19:36	18:48	17:10	17:00
15	07:44 16:33-16:49/16	07:18	06:37	06:48	06:10	05:55	06:08	06:35	07:04	07:33	07:07 16:04-16:30/26	07:37 08:00-08:34/34
	17:23	17:59	18:30	20:01	20:31	20:53	20:51	20:21	19:34	18:46	17:09	17:00
16	07:43 16:33-16:51/18	07:16	06:35	06:46	06:09	05:55	06:09	06:36	07:05	07:34	07:08 16:05-16:31/26	07:38 08:01-08:35/34
	17:24	18:00	18:31	20:02	20:32	20:53	20:51	20:20	19:32	18:45	17:08	17:01
17	07:43 16:32-16:51/19	07:15	06:34	06:45	06:09	05:55	06:09	06:37	07:06	07:35	07:10 16:05-16:31/26	07:38 08:01-08:35/34
	17:25	18:02	18:32	20:03	20:33	20:54	20:50	20:19	19:31	18:43	17:08	17:01
18	07:42 16:32-16:53/21	07:14	06:32	06:44	06:08	05:56	06:10	06:38	07:07	07:36	07:11 16:05-16:31/26	07:39 08:02-08:36/34
	17:26	18:03	18:33	20:04	20:33	20:54	20:50	20:17	19:29	18:42	17:07	17:01
19	07:42 16:31-16:53/22	07:12	06:31	06:42	06:07	05:56	06:11	06:39	07:08	07:37	07:12 16:05-16:31/26	07:40 08:02-08:36/34
	17:27	18:04	18:34	20:05	20:34	20:54	20:49	20:16	19:28	18:40	17:06	17:02
20	07:41 16:31-16:55/24	07:11	06:29	06:41	06:06	05:56	06:12	06:40	07:09	07:38	07:13 16:05-16:31/26	07:40 08:03-08:37/34
	17:29	18:05	18:35	20:06	20:35	20:55	20:48	20:14	19:26	18:39	17:05	17:02
21	07:41 16:31-16:55/24	07:10	06:27	06:39	06:05	05:56	06:12	06:41	07:10	07:39	07:14 16:06-16:30/24	07:41 08:03-08:37/34
	17:30	18:06	18:36	20:07	20:36	20:55	20:48	20:13	19:24	18:37	17:05	17:02
22	07:40 16:30-16:56/26	07:08	06:26	06:38	06:04	05:56	06:13	06:42	07:11	07:40	07:15 16:07-16:31/24	07:41 08:04-08:38/34
	17:31	18:07	18:37	20:08	20:37	20:55	20:47	20:12	19:23	18:36	17:04	17:03
23	07:40 16:31-16:57/26	07:07	06:24	06:36	06:04	05:56	06:14	06:43	07:11	07:41	07:16 16:08-16:30/22	07:42 08:04-08:38/34
	17:32	18:08	18:38	20:09	20:38	20:55	20:46	20:10	19:21	18:35	17:04	17:03
24	07:39 16:31-16:57/26	07:06	06:23	06:35	06:03	05:57	06:15	06:44	07:12	07:43	07:17 16:09-16:30/21	07:42 08:05-08:39/34
	17:33	18:09	18:39	20:10	20:39	20:55	20:45	20:09	19:19	18:33	17:03	17:04
25	07:38 16:31-16:57/26	07:04	06:21	06:34	06:02	05:57	06:16	06:44	07:13	06:44	07:18 16:10-16:29/19	07:43 08:05-08:39/34
	17:34	18:11	18:40	20:11	20:40	20:56	20:44	20:07	19:18	17:32	17:03	17:05
26	07:38 16:31-16:57/26	07:03	06:19	06:32	06:02	05:57	06:17	06:45	07:14	06:45	07:19 16:11-16:29/18	07:43 08:05-08:39/34
	17:36	18:12	18:41	20:12	20:40	20:56	20:44	20:06	19:16	17:31	17:02	17:05
27	07:37 16:32-16:58/26	07:01	06:18	06:31	06:01	05:58	06:18	06:46	07:15	06:46	07:21 16:12-16:28/16	07:43 08:06-08:40/34
	17:37	18:13	18:42	20:13	20:41	20:56	20:43	20:04	19:14	17:29	17:02	17:06
28	07:36 16:32-16:58/26	07:00	06:16	06:30	06:01	05:58	06:18	06:47	07:16	06:47	07:22 16:13-16:27/14	07:44 08:06-08:40/34
	17:38	18:14	18:43	20:14	20:42	20:56	20:42	20:03	19:13	17:28	17:01	17:06
29	07:35 16:32-16:58/26		07:15	06:28	06:00	05:58	06:19	06:48	07:17	06:48	07:23 16:15-16:26/11	07:44 08:06-08:40/34
	17:39		19:44	20:15	20:43	20:56	20:41	20:01	19:11	17:27	17:01 08:06-08:15/9	17:07
30	07:34 16:32-16:58/26		07:13	06:27	05:59	05:59	06:20	06:49	07:18	06:49	07:24 16:19-16:25/6	07:44 08:06-08:41/35
	17:40		19:45	20:16	20:44	20:56	20:40	20:00	19:10	17:26	17:01 08:03-08:18/15	17:08
31	07:34 16:33-16:58/25		07:11		05:59		06:21	06:50		06:50		07:45 08:07-08:42/35
	17:41		19:46		20:44		20:39	19:58		17:24		17:09
Potential sun hours	301	299	370	397	445	448	455	425	374	347	301	292
Sum of minutes with flicker	758	110	0	0	0	0	0	0	0	0	574	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-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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03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER2 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (2)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:45 15:33-16:08/35	07:33	06:59	07:10 19:09-19:18/9 07:28-07:50/22	06:26	05:58
	17:10	17:43	18:15	19:47 18:11-18:48/37	20:17	20:45
2	07:45 15:34-16:09/35	07:32	06:57	07:08 19:06-19:20/14 07:26-07:48/22	06:25	05:58
	17:10	17:44	18:16	19:48 18:09-18:49/40	20:18	20:46
3	07:45 15:34-16:09/35	07:31	06:56	07:07 19:05-19:22/17 07:25-07:47/22	06:23	05:58
	17:11	17:45	18:17	19:49 18:08-18:50/42	20:19	20:47
4	07:45 15:35-16:10/35	07:30	06:54	07:05 19:03-19:22/19 07:23-07:44/21	06:22	05:57
	17:12	17:46	18:18	19:50 18:07-18:50/43	20:20	20:47
5	07:45 15:35-16:10/35	07:29	06:53	07:03 19:03-19:23/20 07:22-07:42/20	06:21	05:57
	17:13	17:47	18:19	19:51 18:07-18:51/44	20:21	20:48
6	07:45 15:36-16:10/34	07:28	06:51 17:25-17:33/8	07:02 19:02-19:22/20 07:20-07:38/18	06:20	05:57
	17:14	17:49	18:21	19:52 18:05-18:51/46	20:22	20:49
7	07:45 15:37-16:11/34	07:27	06:50 17:20-17:36/16	07:00 19:01-19:22/21 07:19-07:37/18	06:19	05:56
	17:15	17:50	18:22	19:53 18:04-18:51/47	20:23	20:49
8	07:45 15:37-16:11/34	07:26	06:48 17:17-17:37/20	06:59 19:02-19:22/20 07:18-07:35/17	06:18	05:56
	17:16	17:51	18:23	19:54 18:04-18:51/47	20:24	20:50
9	07:45 15:37-16:11/34	07:25	06:47 17:16-17:39/23	06:57 19:01-19:21/20 07:19-07:33/14	06:16	05:56
	17:17	17:52	18:24	19:55 18:03-18:51/48	20:25	20:50
10	07:45 15:38-16:11/33	07:24	06:45 17:14-17:40/26	06:56 19:02-19:21/19 07:22-07:30/8	06:15	05:56
	17:18	17:53	18:25 07:03-07:05/2	19:56 18:04-18:51/47	20:26	20:51
11	07:45 15:39-16:11/32	07:23	06:43 17:13-17:41/28	06:54 19:02-19:19/17	06:14	05:56
	17:19	17:55	18:26 07:02-07:06/4	19:57 18:03-18:51/48	20:27	20:51
12	07:45 15:40-16:12/32	07:21	06:42 17:12-17:41/29	06:53 19:04-19:18/14	06:13	05:56
	17:20	17:56	18:27 07:00-07:06/6	19:58 18:03-18:51/48	20:28	20:52
13	07:44 15:40-16:11/31	07:20	06:40 17:12-17:42/30	06:51 19:05-19:15/10	06:12	05:55
	17:21	17:57	18:28 06:59-07:07/8	19:59 18:03-18:50/47	20:29	20:52
14	07:44 15:41-16:12/31	07:19	06:39 17:10-17:42/32 06:57-07:06/9	06:50 19:09-19:11/2	06:11	05:55
	17:22	17:58	18:29 17:50-17:54/4	20:00 18:03-18:50/47	20:30	20:53
15	07:44 15:42-16:11/29	07:18	06:37 17:10-17:42/32 06:55-07:06/11	06:48 18:03-18:49/46	06:10	05:55
	17:23	17:59	18:30 17:45-17:57/12	20:01	20:31	20:53
16	07:43 15:43-16:11/28	07:16	06:35 17:10-17:42/32 06:54-07:06/12	06:47 18:04-18:49/45	06:09	05:55
	17:24	18:00	18:31 17:43-18:00/17	20:02	20:32	20:54
17	07:43 15:43-16:10/27	07:15	06:34 17:09-18:01/52	06:45 18:04-18:47/43	06:09	05:55
	17:25	18:02	18:32 06:52-07:04/12	20:03	20:33	20:54
18	07:42 15:45-16:10/25	07:14	06:32 17:10-18:02/52	06:44 18:04-18:47/43	06:08	05:56
	17:26	18:03	18:33 06:51-07:04/13	20:04	20:34	20:54
19	07:42 15:46-16:09/23	07:13	06:31 17:10-18:02/52	06:42 18:05-18:46/41	06:07	05:56
	17:27	18:04	18:34 06:49-07:02/13	20:05	20:35	20:55
20	07:42 15:48-16:09/21	07:11	06:29 17:10-18:02/52 06:49-06:59/10	06:41 18:06-18:45/39	06:06	05:56
	17:29	18:05	18:35 06:47-06:48/1	20:06	20:35	20:55
21	07:41 15:49-16:08/19	07:10	06:27 17:11-18:02/51	06:39 18:07-18:44/37	06:05	05:56
	17:30	18:06	18:36 06:46-06:50/4	20:07	20:36	20:55
22	07:40 15:52-16:07/15	07:09	06:26 17:11-17:37/26 06:44-06:51/7	06:38 18:07-18:42/35	06:04	05:56
	17:31	18:07	18:37 17:38-18:01/23	20:08	20:37	20:55
23	07:40 15:55-16:05/10	07:07	06:24 17:12-17:35/23 06:43-06:53/10	06:36 18:09-18:41/32	06:04	05:56
	17:32	18:08	18:38 17:37-18:00/23	20:09	20:38	20:56
24	07:39	07:06	06:23 17:14-17:34/20 06:41-06:53/12	06:35 18:10-18:40/30	06:03	05:57
	17:33	18:10	18:39 17:38-18:00/22	20:10	20:39	20:56
25	07:38	07:04	06:21 17:16-17:31/15 06:39-06:53/14	06:34 18:11-18:37/26	06:02	05:57
	17:34	18:11	18:40 17:38-17:59/21	20:11	20:40	20:56
26	07:38	07:03	06:19 17:21-17:26/5 06:38-06:54/16	06:32 18:14-18:36/22	06:02	05:57
	17:36	18:12	18:41 17:40-17:58/18	20:12	20:41	20:56
27	07:37	07:02	06:18 17:23-17:39/16 06:36-06:53/17	06:31 18:17-18:33/16	06:01	05:58
	17:37	18:13	18:42 17:40-17:56/16	20:13	20:41	20:56
28	07:36	07:00	06:16 17:19-17:53/34	06:30 18:21-18:27/6	06:01	05:58
	17:38	18:14	18:43 06:34-06:52/18	20:14	20:42	20:56
29	07:35		07:15 18:17-18:45/28	06:28	06:00	05:58
	17:39		19:44 07:33-07:53/20	20:15	20:43	20:56
30	07:35		07:13 18:14-18:46/32	06:27	05:59	05:59
	17:40		19:45 07:31-07:52/21	20:16	20:44	20:56
31	07:34		07:11 18:13-18:48/35		05:59	
	17:41		19:46 07:30-07:51/21		20:44	
Potential sun hours	301	299	370	397	445	448
Sum of minutes with flicker	667	0	1186	1496	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER2 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (2)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:59	06:22	06:51 19:01-19:18/17	07:19 17:51-18:21/30	06:52	07:25 15:21-15:53/32
	20:56	20:38	19:57 18:02-18:50/48	19:08 07:39-07:46/7	17:23	17:00
2	06:00	06:23	06:52 19:00-19:19/19 07:20-07:28/8	07:20 17:51-18:20/29	06:53	07:26 15:21-15:54/33
	20:56	20:37	19:55 18:02-18:49/47	19:06 07:40-07:45/5	17:22	17:00
3	06:00	06:24	06:53 18:59-19:19/20 07:17-07:31/14	07:21 17:52-18:19/27	06:54	07:27 15:21-15:55/34
	20:56	20:36	19:54 18:01-18:49/48	19:05 07:41-07:44/3	17:21	17:00
4	06:01	06:25	06:54 18:59-19:19/20 07:15-07:32/17	07:22 17:53-18:18/25	06:55	07:28 15:21-15:55/34
	20:56	20:35	19:52 18:01-18:48/47	19:03	17:20	17:00
5	06:01	06:26	06:55 18:58-19:19/21 07:15-07:33/18	07:23 17:54-18:16/22	06:56	07:29 15:22-15:56/34
	20:55	20:34	19:50 18:01-18:48/47	19:02	17:19	17:00
6	06:02	06:27	06:56 18:58-19:18/20 07:16-07:34/18	07:24 17:55-18:14/19	06:57	07:30 15:22-15:56/34
	20:55	20:33	19:49 18:01-18:47/46	19:00	17:18	16:59
7	06:02	06:28	06:57 18:58-19:18/20 07:17-07:37/20	07:25 17:58-18:10/12	06:58	07:31 15:22-15:57/35
	20:55	20:31	19:47 18:02-18:46/44	18:58	17:17	16:59
8	06:03	06:29	06:58 18:58-19:17/19 07:18-07:39/21	07:26	06:59	07:32 15:23-15:58/35
	20:55	20:30	19:46 18:02-18:45/43	18:57	17:16	16:59
9	06:04	06:29	06:59 18:58-19:15/17 07:19-07:41/22	07:27	07:01	07:32 15:22-15:57/35
	20:54	20:29	19:44 18:01-18:43/42	18:55	17:15	16:59
10	06:04	06:30	06:59 18:59-19:13/14 07:19-07:41/22	07:28	07:02	07:33 15:23-15:58/35
	20:54	20:28	19:42 18:02-18:42/40	18:54	17:14	16:59
11	06:05	06:31	07:00 19:01-19:11/10 07:20-07:42/22	07:29	07:03	07:34 15:23-15:58/35
	20:53	20:27	19:41 18:03-18:41/38	18:52	17:13	17:00
12	06:06	06:32	07:01 18:04-18:39/35	07:30	07:04	07:35 15:24-15:59/35
	20:53	20:25	19:39 07:21-07:42/21	18:51	17:12	17:00
13	06:06	06:33	07:02 18:05-18:37/32	07:31	07:05	07:36 15:25-16:00/35
	20:53	20:24	19:37 07:22-07:43/21	18:49	17:11	17:00
14	06:07	06:34	07:03 18:07-18:35/28	07:32	07:06	07:36 15:24-16:00/36
	20:52	20:23	19:36 07:23-07:43/20	18:48	17:10	17:00
15	06:08	06:35 18:27-18:37/10	07:04 18:09-18:32/23 07:24-07:43/19	07:33	07:07	07:37 15:25-16:00/35
	20:52	20:21	19:34 18:33-18:43/10	18:46	17:09	17:00
16	06:09	06:36 18:23-18:40/17	07:05 18:12-18:29/17 07:25-07:42/17	07:34	07:09	07:38 15:26-16:01/35
	20:51	20:20	19:33 18:30-18:45/15	18:45	17:08	17:01
17	06:09	06:37 18:20-18:43/23	07:06 18:19-18:21/2 07:26-07:42/16	07:35	07:10	07:39 15:26-16:01/35
	20:50	20:19	19:31 18:28-18:46/18	18:43	17:08	17:01
18	06:10	06:38 18:18-18:45/27	07:07 18:05-18:18/13 07:27-07:41/14	07:36	07:11	07:39 15:26-16:02/36
	20:50	20:17	19:29 18:27-18:47/20	18:42	17:07	17:01
19	06:11	06:39 18:16-18:46/30	07:08 18:01-18:19/18 07:28-07:40/12	07:37	07:12 15:29-15:39/10	07:40 15:27-16:03/36
	20:49	20:16	19:28 18:25-18:46/21	18:40	17:06	17:02
20	06:12	06:40 18:14-18:47/33	07:09 17:59-18:21/22 07:28-07:38/10	07:38	07:13 15:27-15:42/15	07:40 15:27-16:03/36
	20:48	20:15	19:26 18:24-18:47/23	18:39	17:05	17:02
21	06:12	06:41 18:13-18:48/35	07:10 17:57-18:22/25 07:29-07:37/8	07:39	07:14 15:25-15:44/19	07:41 15:28-16:03/35
	20:48	20:13	19:24 18:23-18:47/24	18:38	17:05	17:02
22	06:13	06:42 18:11-18:48/37	07:11 17:56-18:46/50	07:41	07:15 15:24-15:45/21	07:42 15:28-16:03/35
	20:47	20:12	19:23 07:30-07:35/5	18:36	17:04	17:03
23	06:14	06:43 18:09-18:49/40	07:12 17:54-18:46/52 07:35-07:42/7	07:42	07:16 15:23-15:46/23	07:42 15:29-16:04/35
	20:46	20:10	19:21 07:31-07:33/2	18:35	17:04	17:03
24	06:15	06:44 18:08-18:50/42	07:13 17:53-18:45/52	07:43	07:18 15:22-15:47/25	07:42 15:29-16:05/36
	20:45	20:09	19:19 07:32-07:44/12	18:33	17:03	17:04
25	06:16	06:45 18:07-18:50/43	07:13 17:53-18:44/51	06:44	07:19 15:22-15:48/26	07:43 15:29-16:05/36
	20:45	20:07	19:18 07:33-07:46/13	17:32	17:03	17:05
26	06:17	06:45 18:06-18:50/44	07:14 17:52-18:43/51	06:45	07:20 15:21-15:49/28	07:43 15:30-16:06/36
	20:44	20:06	19:16 07:34-07:46/12	17:31	17:02	17:05
27	06:18	06:46 18:06-18:51/45	07:15 17:51-18:42/51	06:46	07:21 15:22-15:51/29	07:44 15:31-16:06/35
	20:43	20:04	19:15 07:35-07:47/12	17:29	17:02	17:06
28	06:18	06:47 18:05-18:51/46	07:16 17:51-18:23/32 07:36-07:47/11	06:47	07:22 15:21-15:52/31	07:44 15:31-16:06/35
	20:42	20:03	19:13 18:26-18:40/14	17:28	17:01	17:06
29	06:19	06:48 19:09-19:13/4	07:17 17:51-18:23/32 07:37-07:47/10	06:48	07:23 15:21-15:52/31	07:44 15:31-16:06/35
	20:41	20:01 18:04-18:51/47	19:11 18:28-18:37/9	17:27	17:01	17:07
30	06:20	06:49 19:05-19:16/11	07:18 17:51-18:22/31	06:49	07:24 15:21-15:53/32	07:45 15:32-16:08/36
	20:40	20:00 18:04-18:51/47	19:10 07:38-07:46/8	17:26	17:01	17:08
31	06:21	06:50 19:02-19:17/15		06:50		07:45 15:33-16:08/35
	20:39	19:58 18:02-18:50/48		17:24		17:09
Potential sun hours	455	425	374	347	301	292
Sum of minutes with flicker	0	644	1890	179	290	1084

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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03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER3 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (3)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April		May		June	
1	07:45	15:31-16:17/46	07:33	15:31-16:37/66	06:59	07:10		06:26	18:54-19:42/48	05:58	18:55-19:36/41
	17:10		17:43		18:15	19:47		20:17		20:45	
2	07:45	15:31-16:18/47	07:32	15:32-16:37/65	06:57	07:08		06:25	18:52-19:41/49	05:58	18:56-19:36/40
	17:10		17:44		18:16	19:48		20:18		20:46	
3	07:45	15:31-16:19/48	07:31	15:32-16:37/65	06:56	07:07		06:23	18:52-19:40/48	05:58	18:57-19:36/39
	17:11		17:45		18:17	19:49		20:19		20:47	
4	07:45	15:31-16:20/49	07:30	15:32-16:37/65	06:54	07:05		06:22	19:49-19:55/6	05:57	18:57-19:35/38
	17:12		17:46		18:18	19:50		20:20	18:51-19:40/49	20:47	
5	07:45	15:31-16:21/50	07:29	15:33-16:37/64	06:53	07:03		06:21	19:46-19:58/12	05:57	18:58-19:35/37
	17:13		17:47		18:19	19:51		20:21	18:51-19:39/48	20:48	
6	07:45	15:31-16:22/51	07:28	15:34-16:37/63	06:51	07:02		06:20	19:44-19:59/15	05:57	18:59-19:35/36
	17:14		17:49		18:20	19:52		20:22	18:50-19:38/48	20:49	
7	07:45	15:31-16:23/52	07:27	15:34-16:37/63	06:50	07:00		06:19	19:43-20:00/17	05:56	19:00-19:35/35
	17:15		17:50		18:22	19:53		20:23	18:50-19:39/49	20:49	
8	07:45	15:31-16:24/53	07:26	15:35-16:36/61	06:48	06:59		06:18	19:42-20:01/19	05:56	19:00-19:34/34
	17:16		17:51		18:23	19:54		20:24	18:50-19:39/49	20:50	
9	07:45	15:30-16:24/54	07:25	15:36-16:36/60	06:46	06:57		06:16	19:41-20:02/21	05:56	19:00-19:34/34
	17:17		17:52		18:24	19:55		20:25	18:49-19:39/50	20:50	
10	07:45	15:30-16:25/55	07:24	15:37-16:36/59	06:45	06:56		06:15	19:41-20:03/22	05:56	19:01-19:34/33
	17:18		17:53		18:25	19:56		20:26	18:49-19:40/51	20:51	
11	07:45	15:31-16:26/55	07:23	15:38-16:36/58	06:43	06:54		06:14	18:49-20:04/75	05:56	19:02-19:34/32
	17:19		17:55		18:26	19:57		20:27		20:51	
12	07:45	15:31-16:27/56	07:21	15:38-16:34/56	06:42	06:53		06:13	18:49-20:05/76	05:56	19:02-19:34/32
	17:20		17:56		18:27	19:58		20:28		20:52	
13	07:44	15:30-16:27/57	07:20	15:39-16:34/55	06:40	06:51		06:12	18:49-20:05/76	05:55	19:03-19:34/31
	17:21		17:57		18:28	19:59		20:29		20:52	
14	07:44	15:30-16:28/58	07:19	15:40-16:33/53	06:39	06:50		06:11	18:49-20:05/76	05:55	19:03-19:34/31
	17:22		17:58		18:29	20:00		20:30		20:53	
15	07:44	15:30-16:29/59	07:18	15:42-16:32/50	06:37	06:48		06:10	18:49-20:05/76	05:55	19:04-19:34/30
	17:23		17:59		18:30	20:01		20:31		20:53	
16	07:43	15:30-16:30/60	07:16	15:42-16:30/48	06:35	06:47	19:26-19:34/8	06:09	18:49-20:05/76	05:55	19:04-19:34/30
	17:24		18:00		18:31	20:02		20:32		20:54	
17	07:43	15:30-16:30/60	07:15	15:44-16:29/45	06:34	06:45	19:21-19:37/16	06:09	18:49-20:04/75	05:55	19:05-19:34/29
	17:25		18:02		18:32	20:03		20:33		20:54	
18	07:42	15:30-16:31/61	07:14	15:46-16:28/42	06:32	06:44	19:19-19:39/20	06:08	18:50-20:05/75	05:56	19:05-19:33/28
	17:26		18:03		18:33	20:04		20:34		20:54	
19	07:42	15:30-16:31/61	07:13	15:47-16:26/39	06:31	06:42	19:17-19:40/23	06:07	19:40-20:05/25	05:56	19:05-19:33/28
	17:27		18:04		18:34	20:05		20:35	18:50-19:39/49	20:55	
20	07:41	15:30-16:33/63	07:11	15:50-16:24/34	06:29	06:41	19:16-19:41/25	06:06	19:40-20:04/24	05:56	19:06-19:34/28
	17:29		18:05		18:35	20:06		20:35	18:50-19:39/49	20:55	
21	07:41	15:30-16:33/63	07:10	15:53-16:22/29	06:27	06:39	19:15-19:42/27	06:05	19:40-20:04/24	05:56	19:06-19:34/28
	17:30		18:06		18:36	20:07	06:58-06:59/1	20:36	18:50-19:38/48	20:55	
22	07:40	15:31-16:34/63	07:09	15:56-16:19/23	06:26	06:38	19:14-19:42/28	06:04	19:41-20:04/23	05:56	19:06-19:34/28
	17:31		18:07		18:37	20:08	06:56-06:58/2	20:37	18:51-19:39/48	20:55	
23	07:40	15:30-16:34/64	07:07	16:01-16:14/13	06:24	06:36	19:10-19:43/33	06:04	19:41-20:03/22	05:56	19:06-19:34/28
	17:32		18:08		18:38	20:09	06:55-06:57/2	20:38	18:51-19:38/47	20:56	
24	07:39	15:30-16:35/65	07:06		06:23	06:35	19:06-19:44/38	06:03	19:42-20:02/20	05:57	19:06-19:34/28
	17:33		18:10		18:39	20:10	06:54-06:57/3	20:39	18:51-19:38/47	20:56	
25	07:38	15:30-16:35/65	07:04		06:21	06:34	19:03-19:43/40	06:02	19:43-20:02/19	05:57	19:07-19:35/28
	17:34		18:11		18:40	20:11	06:52-06:54/2	20:40	18:52-19:38/46	20:56	
26	07:38	15:31-16:36/65	07:03		06:19	06:32	19:01-19:43/42	06:02	19:43-20:01/18	05:57	19:06-19:36/30
	17:36		18:12		18:41	20:12	06:51-06:52/1	20:41	18:52-19:38/46	20:56	
27	07:37	15:31-16:36/65	07:02		06:18	06:31	18:59-19:44/45	06:01	19:45-20:01/16	05:58	19:06-19:36/30
	17:37		18:13		18:42	20:13	06:50-06:51/1	20:41	18:53-19:38/45	20:56	
28	07:36	15:31-16:36/65	07:00		06:16	06:30	18:57-19:43/46	06:00	19:45-20:00/15	05:58	19:07-19:37/30
	17:38		18:14		18:43	20:14	06:48-06:49/1	20:42	18:53-19:37/44	20:56	
29	07:35	15:31-16:37/66			07:15	06:28	18:56-19:43/47	06:00	19:47-20:00/13	05:58	19:06-19:37/31
	17:39				19:44	20:15		20:43	18:54-19:37/43	20:56	
30	07:35	15:31-16:37/66			07:13	06:27	18:55-19:43/48	05:59	19:48-19:58/10	05:59	19:07-19:38/31
	17:40				19:45	20:16		20:44	18:54-19:37/43	20:56	
31	07:34	15:31-16:37/66			07:11			05:59	19:51-19:56/5		
	17:41				19:46			20:44	18:55-19:37/42		
Potential sun hours	301		299		370	397		445		448	
Sum of minutes with flicker	1808		1176		0	499		2037		958	

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

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

Licensed user:
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Giovanni Savarese/
g.savarese@leonardoengineering.it.Calculate
03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER3 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (3)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July		August		September	October		November		December	
1	05:59	19:06-19:38/32	06:22	19:00-20:15/75	06:51	07:19		06:52	15:06-16:06/60	07:25	15:13-16:08/55
	20:56		20:38		19:57	19:08		17:23		17:00	
2	06:00	19:06-19:39/33	06:23	19:50-20:13/23	06:52	07:20		06:53	15:05-16:06/61	07:26	15:13-16:08/55
	20:56		20:37	18:59-19:49/50	19:55	19:06		17:22		17:00	
3	06:00	19:06-19:39/33	06:24	19:50-20:13/23	06:53	07:21		06:54	15:05-16:06/61	07:27	15:14-16:08/54
	20:56		20:36	18:59-19:49/50	19:54	19:05		17:21		17:00	
4	06:01	19:06-19:40/34	06:25	19:51-20:12/21	06:54	07:22		06:55	15:04-16:07/63	07:28	15:15-16:08/53
	20:56		20:35	18:59-19:49/50	19:52	19:03		17:20		17:00	
5	06:01	19:05-19:40/35	06:26	19:52-20:11/19	06:55	07:23		06:56	15:03-16:07/64	07:29	15:16-16:08/52
	20:55		20:34	18:59-19:49/50	19:50	19:02		17:19		17:00	
6	06:02	19:05-19:41/36	06:27	19:53-20:10/17	06:56	07:24		06:57	15:04-16:08/64	07:30	15:17-16:08/51
	20:55		20:33	19:00-19:48/48	19:49	19:00		17:18		16:59	
7	06:02	19:05-19:41/36	06:28	19:55-20:09/14	06:57	07:25		06:58	15:03-16:08/65	07:31	15:18-16:08/50
	20:55		20:31	19:00-19:48/48	19:47	18:58		17:17		16:59	
8	06:03	19:05-19:42/37	06:29	19:57-20:07/10	06:58	07:26		06:59	15:03-16:08/65	07:32	15:19-16:08/49
	20:55		20:30	19:00-19:49/49	19:46	18:57		17:16		16:59	
9	06:04	19:05-19:43/38	06:29	20:01-20:02/1	06:59	07:27		07:01	15:02-16:08/66	07:32	15:19-16:07/48
	20:54		20:29	19:01-19:50/49	19:44	18:55		17:15		16:59	
10	06:04	19:04-19:43/39	06:30	19:01-19:50/49	06:59	07:28		07:02	15:02-16:08/66	07:33	15:20-16:07/47
	20:54		20:28		19:42	18:54		17:14		16:59	
11	06:05	19:04-19:44/40	06:31	19:01-19:50/49	07:00	07:29		07:03	15:03-16:09/66	07:34	15:21-16:07/46
	20:53		20:27		19:41	18:52		17:13		17:00	
12	06:06	20:00-20:03/3	06:32	19:02-19:50/48	07:01	07:30		07:04	15:03-16:09/66	07:35	15:22-16:08/46
	20:53	19:04-19:45/41	20:25		19:39	18:51		17:12		17:00	
13	06:06	19:57-20:05/8	06:33	19:03-19:50/47	07:02	07:31		07:05	15:03-16:08/65	07:36	15:23-16:08/45
	20:53	19:03-19:45/42	20:24		19:37	18:49		17:11		17:00	
14	06:07	19:56-20:07/11	06:34	19:04-19:50/46	07:03	07:32		07:06	15:03-16:08/65	07:36	15:23-16:07/44
	20:52	19:03-19:45/42	20:23		19:36	18:48		17:10		17:00	
15	06:08	19:55-20:09/14	06:35	19:05-19:51/46	07:04	07:33		07:07	15:04-16:09/65	07:37	15:24-16:08/44
	20:52	19:03-19:46/43	20:21	06:56-06:57/1	19:34	18:46		17:09		17:00	
16	06:09	19:54-20:09/15	06:36	19:06-19:50/44	07:05	07:34		07:09	15:04-16:09/65	07:38	15:25-16:08/43
	20:51	19:02-19:46/44	20:20	06:57-06:58/1	19:33	18:45		17:08		17:00	
17	06:09	19:53-20:10/17	06:37	19:08-19:50/42	07:06	07:35		07:10	15:04-16:09/65	07:39	15:25-16:08/43
	20:50	19:02-19:47/45	20:19	06:58-07:00/2	19:31	18:43		17:08		17:01	
18	06:10	19:53-20:11/18	06:38	19:10-19:50/40	07:07	07:36		07:11	15:04-16:09/65	07:39	15:26-16:09/43
	20:50	19:02-19:47/45	20:17	06:59-07:01/2	19:29	18:42		17:07		17:01	
19	06:11	19:52-20:12/20	06:39	19:13-19:49/36	07:08	07:37	16:29-16:47/18	07:12	15:04-16:08/64	07:40	15:27-16:10/43
	20:49	19:02-19:48/46	20:16	07:00-07:03/3	19:28	18:40		17:06		17:02	
20	06:12	19:51-20:12/21	06:40	19:17-19:49/32	07:09	07:38	16:26-16:51/25	07:13	15:06-16:09/63	07:40	15:27-16:09/42
	20:48	19:01-19:48/47	20:15	07:01-07:03/2	19:26	18:39		17:05		17:02	
21	06:12	19:51-20:13/22	06:41	19:19-19:47/28	07:10	07:39	16:23-16:54/31	07:14	15:06-16:09/63	07:41	15:28-16:10/42
	20:48	19:01-19:48/47	20:13	07:02-07:04/2	19:24	18:37		17:05		17:02	
22	06:13	19:51-20:14/23	06:42	19:19-19:46/27	07:11	07:41	16:20-16:56/36	07:15	15:06-16:09/63	07:42	15:28-16:10/42
	20:47	19:01-19:49/48	20:12	07:03-07:04/1	19:23	18:36		17:04		17:03	
23	06:14	19:50-20:14/24	06:43	19:20-19:45/25	07:12	07:42	16:18-16:57/39	07:16	15:07-16:08/61	07:42	15:29-16:11/42
	20:46	19:01-19:49/48	20:10		19:21	18:35		17:04		17:03	
24	06:15	19:00-20:15/75	06:44	19:21-19:44/23	07:12	07:43	16:15-16:58/43	07:17	15:07-16:08/61	07:42	15:29-16:11/42
	20:45		20:09		19:19	18:33		17:03		17:04	
25	06:16	19:00-20:15/75	06:45	19:22-19:42/20	07:13	06:44	15:14-15:59/45	07:19	15:08-16:08/60	07:43	15:29-16:12/43
	20:45		20:07		19:18	17:32		17:03		17:05	
26	06:17	18:59-20:15/76	06:45	19:24-19:39/15	07:14	06:45	15:12-16:00/48	07:20	15:08-16:08/60	07:43	15:30-16:13/43
	20:44		20:06		19:16	17:31		17:02		17:05	
27	06:18	18:59-20:15/76	06:46	19:28-19:36/8	07:15	06:46	15:11-16:02/51	07:21	15:10-16:09/59	07:44	15:30-16:13/43
	20:43		20:04		19:14	17:29		17:02		17:06	
28	06:18	18:59-20:15/76	06:47		07:16	06:47	15:10-16:03/53	07:22	15:10-16:08/58	07:44	15:30-16:14/44
	20:42		20:03		19:13	17:28		17:01		17:06	
29	06:19	18:59-20:15/76	06:48		07:17	06:48	15:09-16:04/55	07:23	15:11-16:08/57	07:44	15:30-16:14/44
	20:41		20:01		19:11	17:27		17:01		17:07	
30	06:20	18:59-20:15/76	06:49		07:18	06:49	15:07-16:04/57	07:24	15:12-16:08/56	07:45	15:31-16:16/45
	20:40		20:00		19:10	17:26		17:01		17:08	
31	06:21	19:00-20:15/75	06:50			06:50	15:06-16:04/58			07:45	15:31-16:16/45
	20:39		19:58			17:24				17:09	
Potential sun hours	455		425		374	347		301		292	
Sum of minutes with flicker		1732		1236		0	559		1882		1428

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: Shadow flickering **WTG:** SER4 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (4)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:45 17:10	07:33 17:07-17:19/12 17:43	06:59 17:34-17:54/20 18:15 07:18-08:24/66	07:10 19:47	06:26 20:17	05:58 20:17-20:21/4 20:45
2	07:45 17:10	07:32 17:08-17:20/12 17:44	06:57 17:35-17:55/20 18:16 07:18-08:24/66	07:08 19:48	06:25 20:18	05:58 20:17-20:22/5 20:46
3	07:45 17:11	07:31 17:08-17:21/13 17:45	06:56 17:35-17:56/21 18:17 07:18-08:24/66	07:07 19:49	06:23 20:19	05:58 20:18-20:23/5 20:47
4	07:45 17:12	07:30 17:08-17:23/15 17:46	06:54 17:36-17:58/22 18:18 07:18-08:24/66	07:05 19:50	06:22 20:20	05:57 20:17-20:22/5 20:47
5	07:45 17:13	07:29 17:09-17:24/15 17:47	06:53 17:37-17:58/21 18:19 07:18-08:23/65	07:03 19:51	06:21 20:21	05:57 20:18-20:23/5 20:48
6	07:45 17:14	07:28 17:10-17:25/15 17:49	06:51 17:39-18:00/21 18:20 07:18-08:23/65	07:02 19:52	06:20 20:22	05:57 20:18-20:24/6 20:49
7	07:45 17:15	07:27 17:10-17:27/17 17:50 07:46-08:01/15	06:50 17:40-17:58/18 18:22 07:18-08:21/63	07:00 19:53	06:19 20:23	05:56 20:17-20:24/7 20:49
8	07:45 17:16	07:26 17:11-17:28/17 17:51 07:45-08:05/20	06:48 17:43-17:54/11 18:23 07:18-08:20/62	06:59 19:54	06:17 20:24	05:56 20:18-20:25/7 20:50
9	07:45 17:17	07:25 17:13-17:30/17 17:52 07:44-08:08/24	06:46 07:19-08:20/61 18:24	06:57 19:55	06:16 20:25	05:56 20:18-20:25/7 20:50
10	07:45 17:18	07:24 17:14-17:31/17 17:53 07:43-08:11/28	06:45 07:19-08:19/60 18:25	06:56 19:56	06:15 20:26	05:56 20:18-20:26/8 20:51
11	07:45 17:19	07:22 17:16-17:32/16 17:55 07:42-08:13/31	06:43 07:20-08:18/58 18:26	06:54 19:35-19:36/1 19:57	06:14 20:27	05:56 20:19-20:27/8 20:51
12	07:45 17:20	07:21 17:18-17:30/12 17:56 07:40-08:14/34	06:42 07:20-08:16/56 18:27	06:53 19:36-19:37/1 19:58	06:13 20:28	05:55 20:19-20:27/8 20:52
13	07:44 17:21	07:20 07:39-08:15/36 17:57	06:40 07:21-08:16/55 18:28	06:51 19:35-19:37/2 19:59	06:12 20:29	05:55 20:19-20:28/9 20:52
14	07:44 17:22	07:19 07:38-08:17/39 17:58	06:39 07:21-08:14/53 18:29	06:49 19:36-19:39/3 20:00	06:11 20:30	05:55 20:20-20:28/8 20:53
15	07:44 17:23	07:18 07:37-08:19/42 17:59	06:37 07:22-08:12/50 18:30	06:48 19:36-19:39/3 20:01	06:10 20:31	05:55 20:20-20:28/8 20:53
16	07:43 17:24	07:16 07:35-08:19/44 18:00	06:35 07:24-08:11/47 18:31	06:46 19:37-19:41/4 20:02	06:09 20:32	05:55 20:20-20:29/9 20:54
17	07:43 17:25	07:15 07:34-08:20/46 18:02	06:34 07:25-08:08/43 18:32	06:45 19:38-19:41/3 20:03	06:08 20:33	05:55 20:20-20:29/9 20:54
18	07:42 17:26	07:14 17:39-17:41/2 18:03 07:33-08:22/49	06:32 07:27-08:07/40 18:33	06:44 19:41-19:43/2 20:04	06:08 20:34	05:55 20:20-20:29/9 20:54
19	07:42 17:27	07:13 17:37-17:42/5 18:04 07:31-08:22/51	06:31 07:28-08:04/36 18:34	06:42 20:05	06:07 20:34	05:56 20:20-20:29/9 20:55
20	07:41 17:29	07:11 17:37-17:43/6 18:05 07:30-08:23/53	06:29 07:30-08:01/31 18:35	06:41 20:06	06:06 20:35	05:56 20:20-20:29/9 20:55
21	07:41 17:30	07:10 17:36-17:45/9 18:06 07:29-08:24/55	06:27 07:33-07:58/25 18:36	06:39 20:07	06:05 20:36	05:56 20:21-20:30/9 20:55
22	07:40 17:31	07:09 17:35-17:45/10 18:07 07:27-08:23/56	06:26 07:37-07:52/15 18:37	06:38 20:08	06:04 20:37	05:56 20:21-20:30/9 20:55
23	07:40 17:32	07:07 17:35-17:47/12 18:08 07:26-08:24/58	06:24 18:38	06:36 20:09	06:04 20:38	05:56 20:21-20:30/9 20:56
24	07:39 17:33	07:06 17:34-17:48/14 18:09 07:25-08:25/60	06:23 18:39	06:35 20:10	06:03 20:39	05:57 20:21-20:30/9 20:56
25	07:38 17:08-17:10/2 17:34	07:04 17:34-17:49/15 18:11 07:23-08:24/61	06:21 18:40	06:34 20:11	06:02 20:40	05:57 20:22-20:31/9 20:56
26	07:38 17:08-17:12/4 17:35	07:03 17:34-17:51/17 18:12 07:22-08:25/63	06:19 18:41	06:32 20:12	06:02 20:41	05:57 20:22-20:31/9 20:56
27	07:37 17:08-17:13/5 17:37	07:01 17:34-17:52/18 18:13 07:20-08:24/64	06:18 18:42	06:31 20:13	06:01 20:41	05:58 20:22-20:31/9 20:56
28	07:36 17:08-17:14/6 17:38	07:00 17:34-17:53/19 18:14 07:19-08:25/66	06:16 18:43	06:30 20:14	06:00 20:42	05:58 20:23-20:31/8 20:56
29	07:35 17:07-17:15/8 17:39		07:15 19:44	06:28 20:15	06:00 20:18-20:19/1 20:43	05:58 20:22-20:31/9 20:56
30	07:35 17:07-17:16/9 17:40		07:13 19:45	06:27 20:16	05:59 20:17-20:19/2 20:44	05:59 20:23-20:31/8 20:56
31	07:34 17:07-17:18/11 17:41		07:11 19:46		05:59 20:18-20:20/2 20:44	
Potential sun hours	301	299	370	397	445	448
Sum of minutes with flicker	45	1300	1303	19	5	233

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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03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER4 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (4)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:59 20:23-20:31/8	06:22	06:51 19:34-19:35/1	07:19 08:00-08:56/56	06:51 16:43-17:00/17	07:25
	20:56	20:38	19:57	19:08	17:23 07:13-07:40/27	17:00
2	06:00 20:24-20:31/7	06:23	06:52	07:20 07:59-08:56/57	06:53 16:42-16:59/17	07:26
	20:56	20:37	19:55	19:06	17:22 07:14-07:37/23	17:00
3	06:00 20:23-20:31/8	06:24	06:53	07:21 07:57-08:57/60	06:54 16:41-16:58/17	07:27
	20:56	20:36	19:54	19:05	17:21 07:15-07:34/19	17:00
4	06:01 20:24-20:31/7	06:25	06:54	07:22 07:57-08:57/60	06:55 16:40-16:56/16	07:28
	20:55	20:35	19:52	19:03	17:20 07:16-07:30/14	17:00
5	06:01 20:24-20:30/6	06:26	06:55	07:23 18:23-18:29/6	06:56 16:39-16:55/16	07:29
	20:55	20:34	19:50	19:02 07:56-08:58/62	17:19	17:00
6	06:02 20:24-20:31/7	06:27	06:56	07:24 18:18-18:33/15	06:57 16:39-16:54/15	07:30
	20:55	20:33	19:49	19:00 07:55-08:58/63	17:18	16:59
7	06:02 20:24-20:30/6	06:28	06:57	07:25 18:16-18:36/20	06:58 16:39-16:53/14	07:31
	20:55	20:31	19:47	18:58 07:54-08:58/64	17:16	16:59
8	06:03 20:24-20:30/6	06:28	06:58	07:26 18:13-18:35/22	06:59 16:39-16:52/13	07:32
	20:54	20:30	19:46	18:57 07:54-08:58/64	17:15	16:59
9	06:04 20:25-20:30/5	06:29	06:58	07:27 18:12-18:33/21	07:01 16:38-16:51/13	07:32
	20:54	20:29	19:44	18:55 07:53-08:58/65	17:14	16:59
10	06:04 20:25-20:29/4	06:30	06:59	07:28 18:10-18:32/22	07:02 16:38-16:50/12	07:33
	20:54	20:28	19:42	18:54 07:52-08:58/66	17:13	16:59
11	06:05 20:25-20:29/4	06:31	07:00	07:29 18:09-18:30/21	07:03 16:39-16:49/10	07:34
	20:53	20:27	19:41	18:52 07:52-08:58/66	17:13	16:59
12	06:06 20:25-20:28/3	06:32	07:01	07:30 18:08-18:28/20	07:04 16:39-16:48/9	07:35
	20:53	20:25	19:39	18:51 07:52-08:58/66	17:12	17:00
13	06:06 20:26-20:28/2	06:33	07:02	07:31 18:07-18:27/20	07:05 16:39-16:47/8	07:36
	20:52	20:24	19:37	18:49 07:51-08:58/67	17:11	17:00
14	06:07 20:26-20:28/2	06:34	07:03	07:32 18:07-18:25/18	07:06 16:40-16:46/6	07:36
	20:52	20:23	19:36	18:48 07:52-08:57/65	17:10	17:00
15	06:08	06:35	07:04	07:33 18:06-18:23/17	07:07 16:40-16:45/5	07:37
	20:51	20:21	19:34	18:46 07:53-08:57/64	17:09	17:00
16	06:08	06:36	07:05	07:34 18:06-18:22/16	07:09 16:41-16:45/4	07:38
	20:51	20:20	19:33	18:45 07:54-08:56/62	17:08	17:00
17	06:09	06:37	07:06	07:35 18:06-18:20/14	07:10 16:42-16:44/2	07:39
	20:50	20:19	19:31	18:43 07:55-08:56/61	17:07	17:01
18	06:10	06:38	07:07	07:36 18:05-18:19/14	07:11	07:39
	20:50	20:17	19:29	18:42 07:56-08:55/59	17:07	17:01
19	06:11	06:39	07:08	07:37 18:06-18:17/11	07:12	07:40
	20:49	20:16	19:28	18:40 07:57-08:55/58	17:06	17:01
20	06:12	06:40	07:09	07:38 18:06-18:16/10	07:13	07:40
	20:48	20:15	19:26	18:39 07:59-08:55/56	17:05	17:02
21	06:12	06:41	07:10 08:24-08:36/12	07:39 18:07-18:15/8	07:14	07:41
	20:48	20:13	19:24	18:37 08:00-08:54/54	17:05	17:02
22	06:13	06:42	07:11 08:19-08:41/22	07:40 18:08-18:13/5	07:15	07:41
	20:47	20:12	19:23	18:36 08:01-08:53/52	17:04	17:03
23	06:14	06:43	07:11 08:15-08:44/29	07:42 18:08-18:12/4	07:16	07:42
	20:46	20:10	19:21	18:35 08:02-08:52/50	17:04	17:03
24	06:15	06:44	07:12 08:12-08:47/35	07:43 18:09-18:10/1	07:17	07:42
	20:45	20:09	19:19	18:33 08:03-08:51/48	17:03	17:04
25	06:16	06:44 19:43-19:45/2	07:13 08:10-08:49/39	06:44 07:04-07:50/46	07:19	07:43
	20:45	20:07	19:18	17:32	17:03	17:04
26	06:17	06:45 19:41-19:44/3	07:14 08:08-08:50/42	06:45 07:05-07:48/43	07:20	07:43
	20:44	20:06	19:16	17:31	17:02	17:05
27	06:18	06:46 19:39-19:43/4	07:15 08:06-08:52/46	06:46 07:07-07:48/41	07:21	07:44
	20:43	20:04	19:14	17:29	17:02	17:06
28	06:18	06:47 19:38-19:41/3	07:16 08:04-08:53/49	06:47 07:08-07:47/39	07:22	07:44
	20:42	20:03	19:13	17:28	17:01	17:06
29	06:19	06:48 19:37-19:40/3	07:17 08:02-08:54/52	06:48 16:52-16:56/4	07:23	07:44
	20:41	20:01	19:11	17:27 07:09-07:45/36	17:01	17:07
30	06:20	06:49 19:35-19:37/2	07:18 08:01-08:55/54	06:49 16:47-17:00/13	07:24	07:44
	20:40	20:00	19:10	17:26 07:10-07:43/33	17:01	17:08
31	06:21	06:50 19:35-19:36/1		06:50 16:45-17:01/16		07:45
	20:39	19:58		17:24 07:11-07:41/30		17:09
Potential sun hours	455	425	374	347	301	292
Sum of minutes with flicker	75	18	381	2031	277	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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03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER5 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (5)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:45 16:17-16:44/27 17:10	07:33 16:25-17:19/54 17:43	06:59 17:18-17:54/36 18:15	07:10 18:13-19:07/54 19:47 07:28-07:58/30	06:26 20:17	05:58 20:05-20:21/16 20:45
2	07:45 16:17-16:45/28 17:10	07:32 16:25-17:20/55 17:44	06:57 17:17-17:55/38 18:16	07:08 18:13-19:05/52 19:48 07:26-07:57/31	06:24 20:18	05:58 20:06-20:22/16 20:46
3	07:45 16:17-16:46/29 17:11	07:31 16:26-17:21/55 17:45	06:56 17:15-17:56/41 18:17	07:07 18:15-19:04/49 19:49 07:25-07:57/32	06:23 20:19	05:58 20:07-20:23/16 20:47
4	07:45 16:18-16:47/29 17:12	07:30 16:27-17:21/54 17:46	06:54 17:14-17:58/44 18:18	07:05 18:17-19:01/44 19:50 07:25-07:56/31	06:22 20:20	05:57 20:08-20:21/13 20:47
5	07:45 16:18-16:48/30 17:13	07:29 16:28-17:20/52 17:47	06:53 17:13-17:58/45 18:19	07:03 18:18-18:59/41 19:51 07:26-07:56/30	06:21 20:21	05:57 20:09-20:20/11 20:48
6	07:45 16:18-16:49/31 17:14	07:28 16:29-17:20/51 17:49	06:51 17:12-18:00/48 18:20	07:02 18:21-18:56/35 19:52 07:26-07:54/28	06:20 20:22	05:57 20:11-20:19/8 20:49
7	07:45 16:19-16:50/31 17:15	07:27 16:30-17:19/49 17:50	06:50 17:11-18:01/50 18:21	07:00 18:23-18:53/30 19:53 07:26-07:52/26	06:19 20:23	05:56 20:13-20:17/4 20:49
8	07:45 16:18-16:50/32 17:16	07:26 16:31-17:19/48 17:51	06:48 17:10-18:01/51 18:23	06:59 18:27-18:49/22 19:54 07:28-07:51/23	06:17 20:00-20:01/1 20:24	05:56 20:50
9	07:45 16:18-16:51/33 17:17	07:25 16:32-17:18/46 17:52	06:46 17:10-18:03/53 18:24	06:57 18:32-18:43/11 19:55 07:29-07:49/20	06:16 20:00-20:02/2 20:25	05:56 20:50
10	07:45 16:19-16:53/34 17:18	07:24 16:34-17:17/43 17:53	06:45 17:09-18:04/55 18:25	06:56 07:31-07:47/16 19:56	06:15 19:59-20:03/4 20:26	05:56 20:51
11	07:45 16:19-16:54/35 17:19	07:22 16:36-17:15/39 17:54	06:43 17:09-18:05/56 18:26	06:54 07:34-07:42/8 19:57	06:14 19:59-20:04/5 20:27	05:56 20:51
12	07:45 16:19-16:54/35 17:20	07:21 16:37-17:13/36 17:56	06:42 17:08-18:06/58 18:27	06:52 19:58	06:13 19:58-20:05/7 20:28	05:55 20:52
13	07:44 16:19-16:56/37 17:21	07:20 16:39-17:11/32 17:57	06:40 17:08-18:08/60 18:28	06:51 19:59	06:12 19:58-20:06/8 20:29	05:55 20:52
14	07:44 16:20-16:57/37 17:22	07:19 16:41-17:09/28 17:58	06:39 17:07-18:08/61 18:29	06:49 20:00	06:11 19:58-20:07/9 20:30	05:55 20:53
15	07:44 16:19-16:58/39 17:23	07:18 16:45-17:07/22 17:59	06:37 17:06-18:09/63 18:30	06:48 20:01	06:10 19:57-20:07/10 20:31	05:55 20:53
16	07:43 16:20-16:59/39 17:24	07:16 16:48-17:02/14 18:00	06:35 17:07-18:11/64 18:31	06:46 20:02	06:09 19:57-20:08/11 20:32	05:55 20:54
17	07:43 16:19-17:00/41 17:25	07:15 18:01	06:34 17:06-18:11/65 18:32	06:45 20:03	06:08 19:57-20:09/12 20:33	05:55 20:54
18	07:42 16:20-17:02/42 17:26	07:14 18:03	06:32 17:06-18:12/66 18:33	06:43 20:04	06:08 19:57-20:09/12 20:34	05:55 20:54
19	07:42 16:20-17:03/43 17:27	07:13 18:04	06:31 17:06-18:14/68 18:34	06:42 20:05	06:07 19:58-20:11/13 20:34	05:56 20:55
20	07:41 16:21-17:04/43 17:29	07:11 17:41-17:43/2 18:05	06:29 17:06-18:14/68 18:35	06:41 20:06	06:06 19:58-20:12/14 20:35	05:56 20:55
21	07:41 16:21-17:05/44 17:30	07:10 17:36-17:45/9 18:06	06:27 17:07-18:16/69 18:36 06:46-06:48/2	06:39 20:07	06:05 19:58-20:12/14 20:36	05:56 20:55
22	07:40 16:21-17:06/45 17:31	07:08 17:32-17:45/13 18:07	06:26 17:06-18:16/70 18:37 06:44-06:52/8	06:38 20:08	06:04 19:59-20:14/15 20:37	05:56 20:55
23	07:40 16:21-17:08/47 17:32	07:07 17:29-17:47/18 18:08	06:24 17:06-18:17/71 18:38 06:42-06:54/12	06:36 20:09	06:04 19:59-20:14/15 20:38	05:56 20:55
24	07:39 16:21-17:09/48 17:33	07:06 17:26-17:48/22 18:09	06:23 17:07-18:17/70 18:39 06:41-06:56/15	06:35 20:10	06:03 19:59-20:15/16 20:39	05:57 20:56
25	07:38 16:22-17:10/48 17:34	07:04 17:24-17:49/25 18:11	06:21 17:07-18:16/69 18:40 06:39-06:57/18	06:34 20:11	06:02 20:00-20:16/16 20:40	05:57 20:56
26	07:38 16:23-17:12/49 17:35	07:03 17:23-17:51/28 18:12	06:19 17:07-18:14/67 18:41 06:38-06:58/20	06:32 20:12	06:02 20:00-20:16/16 20:41	05:57 20:56
27	07:37 16:23-17:13/50 17:37	07:01 17:21-17:52/31 18:13	06:18 17:08-18:14/66 18:42 06:36-06:58/22	06:31 20:13	06:01 20:01-20:18/17 20:41	05:58 20:56
28	07:36 16:23-17:14/51 17:38	07:00 17:20-17:53/33 18:14	06:16 17:09-18:13/64 18:43 06:34-06:58/24	06:30 20:14	06:00 20:02-20:18/16 20:42	05:58 20:56
29	07:35 16:23-17:15/52 17:39		07:15 18:10-19:12/62 19:44 07:33-07:59/26	06:28 20:15	06:00 20:03-20:19/16 20:43	05:58 20:56
30	07:35 16:24-17:16/52 17:40		07:13 18:10-19:10/60 19:45 07:31-07:58/27	06:27 20:16	05:59 20:03-20:19/16 20:44	05:59 20:56
31	07:34 16:24-17:18/54 17:41		07:11 18:11-19:08/57 19:46 07:29-07:58/29		05:59 20:04-20:20/16 20:44	
Potential sun hours	301	299	370	397	445	448
Sum of minutes with flicker	1235	859	2018	613	281	84

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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03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER5 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (5)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:59 20:56	06:22 20:08-20:14/6 20:38	06:51 07:33-07:41/8 19:57	07:19 17:47-18:46/59 19:08	06:51 16:03-16:46/43 17:23	07:25 16:01-16:36/35 17:00
2	06:00 20:56	06:23 20:08-20:13/5 20:37	06:52 07:29-07:45/16 19:55	07:20 17:47-18:44/57 19:06	06:53 16:02-16:48/46 17:22	07:26 16:02-16:36/34 17:00
3	06:00 20:56	06:24 20:09-20:13/4 20:36	06:53 18:30-18:41/11 19:53 07:27-07:47/20	07:21 17:47-18:43/56 19:05	06:54 16:01-16:48/47 17:21	07:27 16:02-16:35/33 17:00
4	06:01 20:55	06:25 20:10-20:12/2 20:35	06:54 18:24-18:46/22 19:52 07:25-07:48/23	07:22 17:47-18:41/54 19:03	06:55 16:00-16:49/49 17:20	07:28 16:03-16:35/32 17:00
5	06:01 20:55	06:26 20:10-20:11/1 20:34	06:55 18:20-18:50/30 19:50 07:23-07:49/26	07:23 17:47-18:40/53 19:02	06:56 15:59-16:50/51 17:19	07:29 16:04-16:35/31 16:59
6	06:02 20:18-20:25/7 20:55	06:27 20:33	06:56 18:17-18:52/35 19:49 07:22-07:50/28	07:24 17:48-18:38/50 19:00	06:57 15:58-16:50/52 17:18	07:30 16:04-16:35/31 16:59
7	06:02 20:16-20:26/10 20:55	06:28 20:31	06:57 18:14-18:54/40 19:47 07:21-07:51/30	07:25 17:48-18:36/48 18:58	06:58 15:58-16:52/54 17:16	07:31 16:05-16:35/30 16:59
8	06:03 20:15-20:28/13 20:54	06:28 20:30	06:58 18:12-18:56/44 19:46 07:20-07:51/31	07:26 17:48-18:35/47 18:57	06:59 15:57-16:52/55 17:15	07:31 16:06-16:35/29 16:59
9	06:04 20:14-20:28/14 20:54	06:29 20:29	06:58 18:09-18:57/48 19:44 07:18-07:50/32	07:27 17:49-18:33/44 18:55	07:01 15:56-16:51/55 17:14	07:32 16:06-16:34/28 16:59
10	06:04 20:14-20:29/15 20:54	06:30 20:28	06:59 18:07-18:58/51 19:42 07:19-07:50/31	07:28 17:49-18:32/43 18:54	07:02 15:56-16:50/54 17:13	07:33 16:06-16:34/28 16:59
11	06:05 20:13-20:29/16 20:53	06:31 20:27	07:00 18:05-18:59/54 19:41 07:20-07:50/30	07:29 17:50-18:30/40 18:52	07:03 15:56-16:49/53 17:13	07:34 16:07-16:34/27 16:59
12	06:06 20:12-20:28/16 20:53	06:32 20:25	07:01 18:03-19:00/57 19:39 07:21-07:50/29	07:30 17:51-18:28/37 18:51	07:04 15:56-16:48/52 17:12	07:35 16:08-16:35/27 17:00
13	06:06 20:12-20:28/16 20:52	06:33 20:24	07:02 18:02-19:01/59 19:37 07:22-07:50/28	07:31 17:52-18:27/35 18:49	07:05 15:55-16:47/52 17:11	07:36 16:09-16:35/26 17:00
14	06:07 20:11-20:28/17 20:52	06:34 20:23	07:03 18:00-19:02/62 19:36 07:23-07:49/26	07:32 17:53-18:25/32 18:48	07:06 15:55-16:46/51 17:10	07:36 16:09-16:35/26 17:00
15	06:08 20:11-20:28/17 20:51	06:35 20:21	07:04 17:59-19:03/64 19:34 07:24-07:48/24	07:33 17:54-18:23/29 18:46	07:07 15:55-16:45/50 17:09	07:37 16:10-16:35/25 17:00
16	06:08 20:10-20:26/16 20:51	06:36 20:20	07:05 17:58-19:03/65 19:32 07:25-07:48/23	07:34 17:55-18:22/27 18:45	07:08 15:56-16:45/49 17:08	07:38 16:11-16:36/25 17:00
17	06:09 20:10-20:26/16 20:50	06:37 20:19	07:06 17:57-19:04/67 19:31 07:26-07:47/21	07:35 17:57-18:20/23 18:43	07:10 15:56-16:44/48 17:07	07:38 16:10-16:35/25 17:01
18	06:10 20:10-20:26/16 20:50	06:38 20:17	07:07 17:55-19:03/68 19:29 07:27-07:45/18	07:36 17:58-18:19/21 18:42	07:11 15:55-16:43/48 17:07	07:39 16:11-16:36/25 17:01
19	06:11 20:10-20:25/15 20:49	06:39 20:16	07:08 17:54-19:03/69 19:28 07:27-07:43/16	07:37 18:01-18:17/16 18:40	07:12 15:55-16:42/47 17:06	07:40 16:12-16:37/25 17:01
20	06:12 20:09-20:24/15 20:48	06:40 20:15	07:09 17:53-19:04/71 19:26 07:28-07:41/13	07:38 18:03-18:16/13 18:39	07:13 15:56-16:41/45 17:05	07:40 16:12-16:37/25 17:02
21	06:12 20:08-20:23/15 20:48	06:41 20:13	07:10 17:52-19:02/70 19:24 07:29-07:38/9	07:39 18:08-18:15/7 18:37	07:14 15:57-16:41/44 17:05	07:41 16:13-16:37/24 17:02
22	06:13 20:08-20:23/15 20:47	06:42 20:12	07:11 17:51-19:01/70 19:23 07:30-07:34/4	07:40 18:36	07:15 15:57-16:40/43 17:04	07:41 16:13-16:37/24 17:03
23	06:14 20:08-20:22/14 20:46	06:43 20:10	07:11 17:50-18:59/69 19:21	07:42 18:35	07:16 15:57-16:40/43 17:04	07:42 16:13-16:38/25 17:03
24	06:15 20:08-20:22/14 20:45	06:43 20:09	07:12 17:50-18:57/67 19:19	07:43 18:33	07:17 15:57-16:39/42 17:03	07:42 16:14-16:39/25 17:04
25	06:16 20:07-20:20/13 20:45	06:44 20:07	07:13 17:49-18:56/67 19:18	06:44 17:32	07:19 15:57-16:38/41 17:03	07:43 16:14-16:39/25 17:04
26	06:17 20:08-20:20/12 20:44	06:45 20:06	07:14 17:49-18:54/65 19:16	06:45 16:17-16:33/16 17:31	07:20 15:58-16:38/40 17:02	07:43 16:15-16:40/25 17:05
27	06:17 20:08-20:19/11 20:43	06:46 20:04	07:15 17:48-18:53/65 19:14	06:46 16:14-16:37/23 17:29	07:21 15:58-16:37/39 17:02	07:44 16:16-16:40/24 17:06
28	06:18 20:08-20:18/10 20:42	06:47 20:03	07:16 17:48-18:51/63 19:13	06:47 16:11-16:40/29 17:28	07:22 16:00-16:37/37 17:01	07:44 16:16-16:41/25 17:06
29	06:19 20:08-20:18/10 20:41	06:48 20:01	07:17 17:48-18:49/61 19:11	06:48 16:08-16:42/34 17:27	07:23 16:00-16:37/37 17:01	07:44 16:16-16:41/25 17:07
30	06:20 20:08-20:17/9 20:40	06:49 20:00	07:18 17:47-18:48/61 19:10	06:49 16:06-16:43/37 17:26	07:24 16:01-16:36/35 17:01	07:44 16:17-16:43/26 17:08
31	06:21 20:09-20:16/7 20:39	06:50 19:58		06:50 16:04-16:45/41 17:24		07:45 16:17-16:44/27 17:09
Potential sun hours	455	425	374	347	301	292
Sum of minutes with flicker	349	18	2061	971	1402	842

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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SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER6 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (6)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:45 11:37-13:59/142	07:33 12:11-13:49/98	06:58	07:10	06:26	05:58
	17:10	17:43	18:15	19:47	20:17	20:45
2	07:45 11:38-13:59/141	07:32 12:14-13:47/93	06:57	07:08	06:24	05:58
	17:10	17:44	18:16	19:48	20:18	20:46
3	07:45 11:39-14:00/141	07:31 12:17-13:45/88	06:56	07:06	06:23	05:58
	17:11	17:45	18:17	19:49	20:19	20:47
4	07:45 11:39-14:00/141	07:30 12:20-13:43/83	06:54	07:05 07:29-07:40/11	06:22	05:57
	17:12	17:46	18:18	19:50	20:20	20:47
5	07:45 11:40-14:00/140	07:29 12:24-13:40/76	06:52	07:03 07:26-07:43/17	06:21	05:57
	17:13	17:47	18:19	19:51	20:21	20:48
6	07:45 11:41-14:00/139	07:28 12:28-13:37/69	06:51	07:02 07:24-07:44/20	06:20	05:57
	17:14	17:49	18:20	19:52	20:22	20:48
7	07:45 11:41-14:01/140	07:27 12:34-13:33/59	06:49	07:00 07:22-07:45/23	06:19	05:56
	17:15	17:50	18:21	19:53	20:23	20:49
8	07:45 11:41-14:00/139	07:26 12:40-13:28/48	06:48	06:59 07:21-07:46/25	06:17	05:56
	17:16	17:51	18:23	19:54	20:24	20:50
9	07:45 11:42-14:00/138	07:25 12:51-13:20/29	06:46	06:57 07:19-07:46/27	06:16	05:56
	17:17	17:52	18:24	19:55	20:25	20:50
10	07:45 11:43-14:01/138	07:24	06:45	06:55 07:19-07:47/28	06:15	05:56
	17:18	17:53	18:25	19:56	20:26	20:51
11	07:45 11:44-14:01/137	07:22	06:43	06:54 07:18-07:46/28	06:14	05:56
	17:19	17:54	18:26	19:57	20:27	20:51
12	07:44 11:44-14:00/136	07:21	06:42 07:00-07:09/9	06:52 07:18-07:47/29	06:13	05:55
	17:20	17:56	18:27	19:58	20:28	20:52
13	07:44 11:46-14:01/135	07:20	06:40 06:59-07:11/12	06:51 07:17-07:46/29	06:12	05:55
	17:21	17:57	18:28	19:59	20:29	20:52
14	07:44 11:47-14:01/134	07:19	06:39 06:57-07:11/14	06:49 07:17-07:46/29	06:11	05:55
	17:22	17:58	18:29	20:00	20:30	20:53
15	07:44 11:47-14:00/133	07:18	06:37 06:55-07:13/18	06:48 07:17-07:45/28	06:10	05:55
	17:23	17:59	18:30	20:01	20:31	20:53
16	07:43 11:49-14:01/132	07:16	06:35 06:54-07:14/20	06:46 07:17-07:45/28	06:09	05:55
	17:24	18:00	18:31	20:02	20:32	20:54
17	07:43 11:49-14:00/131	07:15	06:34 06:53-07:14/21	06:45 07:17-07:43/26	06:08	05:55
	17:25	18:01	18:32	20:03	20:33	20:54
18	07:42 11:50-14:00/130	07:14	06:32 06:53-07:15/22	06:43 07:18-07:43/25	06:08	05:55
	17:26	18:03	18:33	20:04	20:33	20:54
19	07:42 11:51-14:00/129	07:12	06:31 06:51-07:15/24	06:42 07:18-07:41/23	06:07	05:56
	17:27	18:04	18:34	20:05	20:34	20:55
20	07:41 11:53-14:00/127	07:11	06:29 06:51-07:14/23	06:41 07:20-07:40/20	06:06	05:56
	17:28	18:05	18:35	20:06	20:35	20:55
21	07:41 11:53-13:59/126	07:10	06:27 06:51-07:15/24	06:39 07:22-07:38/16	06:05	05:56
	17:30	18:06	18:36	20:07	20:36	20:55
22	07:40 11:54-13:58/124	07:08	06:26 06:51-07:14/23	06:38 07:23-07:35/12	06:04	05:56
	17:31	18:07	18:37	20:08	20:37	20:55
23	07:40 11:56-13:58/122	07:07	06:24 06:50-07:12/22	06:36	06:04	05:56
	17:32	18:08	18:38	20:09	20:38	20:55
24	07:39 11:57-13:58/121	07:06	06:23 06:52-07:12/20	06:35	06:03	05:57
	17:33	18:09	18:39	20:10	20:39	20:56
25	07:38 11:58-13:57/119	07:04	06:21 06:52-07:10/18	06:34	06:02	05:57
	17:34	18:11	18:40	20:11	20:40	20:56
26	07:38 12:01-13:57/116	07:03	06:19 06:54-07:09/15	06:32	06:02	05:57
	17:35	18:12	18:41	20:12	20:40	20:56
27	07:37 12:02-13:56/114	07:01	06:18 06:55-07:06/11	06:31	06:01	05:57
	17:37	18:13	18:42	20:13	20:41	20:56
28	07:36 12:03-13:54/111	07:00	06:16	06:30	06:00	05:58
	17:38	18:14	18:43	20:14	20:42	20:56
29	07:35 12:05-13:53/108		07:14	06:28	06:00	05:58
	17:39		19:44	20:15	20:43	20:56
30	07:34 12:07-13:52/105		07:13	06:27	05:59	05:59
	17:40		19:45	20:16	20:44	20:56
31	07:34 12:09-13:51/102		07:11		05:59	
	17:41		19:46		20:44	
Potential sun hours	301	299	370	397	445	448
Sum of minutes with flicker	3991	643	296	444	0	0

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

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

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER6 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (6)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October		November		December	
1	05:59	06:22		06:51	07:17-07:45/28	07:19	07:39-07:49/10	06:51		07:25	11:26-13:43/137
	20:56	20:38		19:57		19:08		17:23		17:00	
2	06:00	06:23		06:52	07:17-07:45/28	07:20	07:40-07:46/6	06:52	12:18-12:52/34	07:26	11:26-13:44/138
	20:56	20:37		19:55		19:06		17:22		17:00	
3	06:00	06:24		06:53	07:17-07:44/27	07:21		06:54	12:09-12:59/50	07:27	11:26-13:44/138
	20:56	20:36		19:53		19:05		17:21		17:00	
4	06:01	06:25		06:54	07:18-07:43/25	07:22		06:55	12:02-13:04/62	07:28	11:26-13:45/139
	20:55	20:35		19:52		19:03		17:20		17:00	
5	06:01	06:26		06:55	07:19-07:42/23	07:23		06:56	11:57-13:07/70	07:29	11:27-13:46/139
	20:55	20:34		19:50		19:01		17:19		16:59	
6	06:02	06:27		06:56	07:20-07:40/20	07:24		06:57	11:53-13:11/78	07:30	11:27-13:46/139
	20:55	20:32		19:49		19:00		17:17		16:59	
7	06:02	06:27		06:57	07:21-07:38/17	07:25		06:58	11:50-13:14/84	07:31	11:27-13:47/140
	20:55	20:31		19:47		18:58		17:16		16:59	
8	06:03	06:28		06:57	07:23-07:35/12	07:26		06:59	11:47-13:16/89	07:31	11:26-13:47/141
	20:54	20:30		19:45		18:57		17:15		16:59	
9	06:04	06:29		06:58		07:27		07:00	11:44-13:18/94	07:32	11:27-13:48/141
	20:54	20:29		19:44		18:55		17:14		16:59	
10	06:04	06:30		06:59		07:28		07:02	11:42-13:20/98	07:33	11:27-13:48/141
	20:54	20:28		19:42		18:54		17:13		16:59	
11	06:05	06:31		07:00		07:29		07:03	11:41-13:23/102	07:34	11:27-13:49/142
	20:53	20:26		19:41		18:52		17:12		16:59	
12	06:06	06:32		07:01		07:30		07:04	11:39-13:24/105	07:35	11:28-13:50/142
	20:53	20:25		19:39		18:51		17:12		17:00	
13	06:06	06:33		07:02		07:31		07:05	11:37-13:25/108	07:36	11:28-13:51/143
	20:52	20:24		19:37		18:49		17:11		17:00	
14	06:07	06:34		07:03		07:32		07:06	11:35-13:26/111	07:36	11:28-13:51/143
	20:52	20:23		19:36		18:48		17:10		17:00	
15	06:08	06:35		07:04		07:33		07:07	11:34-13:28/114	07:37	11:29-13:51/142
	20:51	20:21		19:34		18:46		17:09		17:00	
16	06:08	06:36		07:05	07:45-07:54/9	07:34		07:08	11:34-13:30/116	07:38	11:29-13:52/143
	20:51	20:20		19:32		18:45		17:08		17:00	
17	06:09	06:37		07:06	07:42-07:57/15	07:35		07:10	11:32-13:31/119	07:38	11:29-13:52/143
	20:50	20:19		19:31		18:43		17:07		17:01	
18	06:10	06:38		07:07	07:40-07:58/18	07:36		07:11	11:31-13:32/121	07:39	11:30-13:53/143
	20:50	20:17		19:29		18:42		17:07		17:01	
19	06:11	06:39		07:08	07:38-07:58/20	07:37		07:12	11:30-13:32/122	07:40	11:30-13:53/143
	20:49	20:16		19:27		18:40		17:06		17:01	
20	06:12	06:40	07:33-07:37/4	07:09	07:37-07:59/22	07:38		07:13	11:29-13:33/124	07:40	11:31-13:54/143
	20:48	20:14		19:26		18:39		17:05		17:02	
21	06:12	06:41	07:27-07:40/13	07:10	07:36-07:59/23	07:39		07:14	11:29-13:35/126	07:41	11:32-13:55/143
	20:48	20:13		19:24		18:37		17:05		17:02	
22	06:13	06:42	07:25-07:42/17	07:10	07:35-07:59/24	07:40		07:15	11:29-13:36/127	07:41	11:32-13:55/143
	20:47	20:12		19:23		18:36		17:04		17:03	
23	06:14	06:43	07:23-07:44/21	07:11	07:35-07:59/24	07:41		07:16	11:28-13:37/129	07:42	11:32-13:55/143
	20:46	20:10		19:21		18:35		17:03		17:03	
24	06:15	06:43	07:22-07:45/23	07:12	07:35-07:58/23	07:43		07:17	11:28-13:37/129	07:42	11:33-13:56/143
	20:45	20:09		19:19		18:33		17:03		17:04	
25	06:16	06:44	07:21-07:46/25	07:13	07:35-07:58/23	06:44		07:18	11:27-13:38/131	07:43	11:33-13:56/143
	20:44	20:07		19:18		17:32		17:02		17:04	
26	06:17	06:45	07:20-07:46/26	07:14	07:35-07:57/22	06:45		07:20	11:27-13:39/132	07:43	11:34-13:57/143
	20:44	20:06		19:16		17:31		17:02		17:05	
27	06:17	06:46	07:19-07:47/28	07:15	07:35-07:56/21	06:46		07:21	11:26-13:39/133	07:44	11:34-13:57/143
	20:43	20:04		19:14		17:29		17:02		17:06	
28	06:18	06:47	07:19-07:47/28	07:16	07:36-07:55/19	06:47		07:22	11:27-13:41/134	07:44	11:35-13:57/142
	20:42	20:03		19:13		17:28		17:01		17:06	
29	06:19	06:48	07:18-07:47/29	07:17	07:37-07:53/16	06:48		07:23	11:27-13:42/135	07:44	11:35-13:57/142
	20:41	20:01		19:11		17:27		17:01		17:07	
30	06:20	06:49	07:18-07:47/29	07:18	07:38-07:51/13	06:49		07:24	11:27-13:42/135	07:44	11:35-13:58/143
	20:40	20:00		19:09		17:26		17:01		17:08	
31	06:21	06:50	07:17-07:46/29			06:50				07:45	11:37-13:59/142
	20:39	19:58				17:24				17:09	
Potential sun hours	455	425		374		347		301		292	
Sum of minutes with flicker	0	272		472		16		3112		4390	

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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03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER7 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (7)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	
1	07:45 08:07-08:24/17	07:33 08:02-08:42/40	06:58 17:42-17:54/12	07:10	06:26	05:58	
	17:10 16:35-16:45/10	17:43	18:15	19:47	20:17	20:45	
2	07:45 08:07-08:25/18	07:32 08:02-08:41/39	06:57 17:44-17:55/11	07:08	06:24	05:58	
	17:10 16:35-16:45/10	17:44	18:16	19:48	20:18	20:46	
3	07:45 08:07-08:26/19	07:31 08:03-08:41/38	06:56 17:45-17:56/11	07:06	06:23	05:58	
	17:11 16:35-16:46/11	17:45	18:17	19:49	20:19	20:46	
4	07:45 08:07-08:27/20	07:30 08:04-08:40/36	06:54 17:48-17:53/5	07:05	06:22	05:57	
	17:12 16:36-16:47/11	17:46	18:18	19:50	20:20	20:47	
5	07:45 08:07-08:28/21	07:29 08:05-08:40/35	06:53	07:03	06:21	05:57	
	17:13 16:36-16:48/12	17:47	18:19	19:51	20:21	20:48	
6	07:45 08:07-08:29/22	07:28 08:06-08:39/33	06:51	07:02	06:20	05:57	
	17:14 16:37-16:49/12	17:49	18:20	19:52	20:22	20:48	
7	07:45 08:07-08:30/23	07:27 08:07-08:38/31	06:49	07:00	06:19	05:56	
	17:15 16:38-16:50/12	17:50	18:21	19:53	20:23	20:49	
8	07:45 08:06-08:30/24	07:26 08:09-08:37/28	06:48	06:59	06:17	05:56	
	17:16 16:37-16:50/13	17:51	18:23	19:54	20:24	20:50	
9	07:45 08:06-08:32/26	07:25 08:11-08:35/24	06:46	06:57	06:16	05:56	06:17-06:18/1
	17:17 16:38-16:51/13	17:52	18:24	19:55	20:25	20:50	
10	07:45 08:06-08:33/27	07:24 08:13-08:33/20	06:45	06:56	06:15	05:56	06:17-06:18/1
	17:18 16:39-16:53/14	17:53	18:25	19:56	20:26	20:51	
11	07:45 08:06-08:34/28	07:22 08:16-08:31/15	06:43	06:54	06:14	05:56	06:17-06:18/1
	17:19 16:40-16:54/14	17:54	18:26	19:57	20:27	20:51	
12	07:44 08:05-08:34/29	07:21	06:42	06:52	06:13	05:55	06:17-06:18/1
	17:20 16:40-16:54/14	17:56	18:27	19:58	20:28	20:52	
13	07:44 08:05-08:35/30	07:20	06:40	06:51	06:12	05:55	06:17-06:18/1
	17:21 16:41-16:56/15	17:57	18:28	19:59	20:29	20:52	
14	07:44 08:05-08:36/31	07:19	06:39 18:06-18:08/2	06:49	06:11	05:55	06:17-06:18/1
	17:22 16:42-16:57/15	17:58	18:29	20:00	20:30	20:53	
15	07:44 08:04-08:37/33	07:18	06:37 18:04-18:09/5	06:48	06:10	05:55	06:17-06:18/1
	17:23 16:42-16:58/16	17:59	18:30	20:01	20:31	20:53	
16	07:43 08:04-08:38/34	07:16	06:35 18:03-18:11/8	06:46	06:09	05:55	06:17-06:18/1
	17:24 16:43-17:00/17	18:00	18:31	20:02	20:32	20:53	
17	07:43 08:03-08:38/35	07:15	06:34 18:01-18:11/10	06:45	06:08	05:55	06:17-06:18/1
	17:25 16:43-17:00/17	18:01	18:32	20:03	20:33	20:54	
18	07:42 08:03-08:39/36	07:14	06:32 18:00-18:12/12	06:43	06:08	05:55	06:17-06:18/1
	17:26 16:45-17:02/17	18:03	18:33	20:04	20:33	20:54	
19	07:42 08:02-08:39/37	07:12	06:31 18:00-18:14/14	06:42	06:07	05:56	06:17-06:18/1
	17:27 16:46-17:03/17	18:04	18:34	20:05	20:34	20:54	
20	07:41 08:02-08:40/38	07:11	06:29 17:59-18:14/15	06:41	06:06	05:56	06:18-06:19/1
	17:29 16:47-17:04/17	18:05	18:35	20:06	20:35	20:55	
21	07:41 08:01-08:41/40	07:10 17:43-17:45/2	06:27 18:00-18:16/16	06:39	06:05	05:56	06:18-06:19/1
	17:30 16:48-17:05/17	18:06	18:36	20:07	20:36	20:55	
22	07:40 08:00-08:41/41	07:08 17:42-17:45/3	06:26 17:59-18:16/17	06:38	06:04	05:56	06:18-06:19/1
	17:31 16:49-17:06/17	18:07	18:37	20:08	20:37	20:55	
23	07:40 08:00-08:42/42	07:07 17:42-17:47/5	06:24 17:59-18:17/18	06:36	06:04	05:56	06:18-06:19/1
	17:32 16:52-17:08/16	18:08	18:38	20:09	20:38	20:55	
24	07:39 07:59-08:42/43	07:06 17:41-17:48/7	06:23 18:00-18:19/19	06:35	06:03	05:57	06:19-06:20/1
	17:33 16:54-17:07/13	18:09	18:39	20:10	20:39	20:56	
25	07:38 07:59-08:42/43	07:04 17:41-17:49/8	06:21 18:00-18:19/19	06:34	06:02	05:57	06:19-06:20/1
	17:34 16:58-17:03/5	18:11	18:40	20:11	20:40	20:56	
26	07:38 08:00-08:43/43	07:03 17:40-17:50/10	06:19 18:01-18:20/19	06:32	06:02	05:57	06:19-06:20/1
	17:35	18:12	18:41	20:12	20:40	20:56	
27	07:37 08:00-08:43/43	07:01 17:41-17:52/11	06:18 18:03-18:21/18	06:31	06:01	05:58	06:20-06:21/1
	17:37	18:13	18:42	20:13	20:41	20:56	
28	07:36 08:00-08:43/43	07:00 17:42-17:53/11	06:16 18:03-18:21/18	06:30	06:00	05:58	06:20-06:21/1
	17:38	18:14	18:43	20:14	20:42	20:56	
29	07:35 08:00-08:43/43		07:14 19:06-19:19/13	06:28	06:00	05:58	06:20-06:21/1
	17:39		19:44	20:15	20:43	20:56	
30	07:34 08:01-08:42/41		07:13 19:08-19:15/7	06:27	05:59	05:59	06:21-06:22/1
	17:40		19:45	20:16	20:44	20:56	
31	07:34 08:01-08:42/41		07:11		05:59		
	17:41		19:46		20:44		
Potential sun hours	301	299	370	397	445	448	
Sum of minutes with flicker	1356	396	269	0	0	22	

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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03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER7 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (7)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July		August	September		October		November		December	
1	05:59	06:21-06:22/1	06:22	06:51		07:19		06:51	07:41-08:03/22	07:25	07:48-08:16/28
	20:56		20:38	19:57		19:08		17:23		17:00	16:22-16:36/14
2	06:00	06:22-06:23/1	06:23	06:52		07:20		06:52	07:40-08:05/25	07:26	07:49-08:16/27
	20:56		20:37	19:55		19:06		17:22		17:00	16:22-16:36/14
3	06:00	06:22-06:23/1	06:24	06:53		07:21		06:54	07:38-08:07/29	07:27	07:50-08:16/26
	20:56		20:36	19:53		19:05		17:21		17:00	16:22-16:36/14
4	06:01	06:23-06:24/1	06:25	06:54		07:22		06:55	07:37-08:08/31	07:28	07:51-08:15/24
	20:55		20:35	19:52		19:03		17:20		17:00	16:22-16:35/13
5	06:01		06:26	06:55		07:23		06:56	07:36-08:09/33	07:29	07:52-08:15/23
	20:55		20:34	19:50		19:01		17:19		17:00	16:23-16:35/12
6	06:02		06:27	06:56		07:24		06:57	07:35-08:10/35	07:30	07:53-08:15/22
	20:55		20:32	19:49		19:00		17:18		16:59	16:23-16:35/12
7	06:02		06:28	06:57		07:25		06:58	07:35-08:11/36	07:31	07:54-08:15/21
	20:55		20:31	19:47		18:58		17:16		16:59	16:23-16:35/12
8	06:03		06:28	06:57		07:26		06:59	07:34-08:12/38	07:31	07:54-08:14/20
	20:54		20:30	19:45		18:57		17:15		16:59	16:23-16:34/11
9	06:04		06:29	06:58		07:27		07:00	07:33-08:12/39	07:32	07:55-08:14/19
	20:54		20:29	19:44		18:55		17:14		16:59	16:23-16:34/11
10	06:04		06:30	06:59		07:28	18:21-18:31/10	07:02	07:33-08:13/40	07:33	07:56-08:14/18
	20:54		20:28	19:42		18:54		17:13		16:59	16:24-16:34/10
11	06:05		06:31	07:00		07:29	18:19-18:30/11	07:03	07:33-08:14/41	07:34	07:57-08:14/17
	20:53		20:26	19:41		18:52		17:13		16:59	16:25-16:35/10
12	06:06		06:32	07:01		07:30	18:17-18:28/11	07:04	07:33-08:14/41	07:35	07:58-08:14/16
	20:53		20:25	19:39		18:51		17:12		17:00	16:25-16:35/10
13	06:06		06:33	07:02	19:00-19:05/5	07:31	18:15-18:27/12	07:05	07:32-08:15/43	07:36	07:59-08:15/16
	20:52		20:24	19:37		18:49		17:11		17:00	16:25-16:34/9
14	06:07		06:34	07:03	18:56-19:09/13	07:32	18:14-18:25/11	07:06	07:32-08:15/43	07:36	07:59-08:14/15
	20:52		20:23	19:36		18:48		17:10		17:00	16:26-16:35/9
15	06:08		06:35	07:04	18:54-19:11/17	07:33	18:13-18:24/11	07:07	07:32-08:15/43	07:37	08:00-08:14/14
	20:51		20:21	19:34		18:46		17:09		17:00	16:26-16:35/9
16	06:08		06:36	07:05	18:52-19:11/19	07:34	18:13-18:22/9	07:08	07:33-08:16/43	07:38	08:01-08:15/14
	20:51		20:20	19:32		18:45		17:08		17:00	16:27-16:36/9
17	06:09		06:37	07:06	18:50-19:08/18	07:35	18:13-18:20/7	07:10	07:33-08:16/43	07:38	08:01-08:14/13
	20:50		20:19	19:31		18:43		17:07	16:32-16:37/5	17:01	16:27-16:35/8
18	06:10		06:38	07:07	18:48-19:07/19	07:36	18:12-18:19/7	07:11	07:33-08:16/43	07:39	08:02-08:15/13
	20:50		20:17	19:29		18:42		17:07	16:28-16:41/13	17:01	16:28-16:36/8
19	06:11		06:39	07:08	18:47-19:05/18	07:37	18:12-18:17/5	07:12	07:34-08:16/42	07:40	08:02-08:14/12
	20:49		20:16	19:28		18:40		17:06	16:26-16:42/16	17:01	16:28-16:36/8
20	06:12		06:40	07:09	18:46-19:04/18	07:38	18:13-18:16/3	07:13	07:35-08:16/41	07:40	08:03-08:15/12
	20:48		20:14	19:26		18:39		17:05	16:24-16:41/17	17:02	16:29-16:37/8
21	06:12		06:41	07:10	18:45-19:02/17	07:39	18:13-18:14/1	07:14	07:37-08:17/40	07:41	08:04-08:16/12
	20:48		20:13	19:24		18:37		17:05	16:24-16:41/17	17:02	16:29-16:37/8
22	06:13		06:42	07:10	18:44-19:01/17	07:40		07:15	07:38-08:16/38	07:41	08:04-08:16/12
	20:47		20:12	19:23		18:36		17:04	16:23-16:40/17	17:03	16:30-16:38/8
23	06:14		06:43	07:11	18:44-18:59/15	07:41		07:16	07:39-08:16/37	07:42	08:04-08:16/12
	20:46		20:10	19:21		18:35		17:04	16:23-16:40/17	17:03	16:30-16:38/8
24	06:15		06:43	07:12	18:43-18:57/14	07:43		07:17	07:40-08:16/36	07:42	08:05-08:17/12
	20:45		20:09	19:19		18:33		17:03	16:22-16:39/17	17:04	16:31-16:39/8
25	06:16		06:44	07:13	18:43-18:56/13	06:44		07:18	07:41-08:16/35	07:43	08:05-08:17/12
	20:44		20:07	19:18		17:32		17:03	16:22-16:38/16	17:04	16:31-16:39/8
26	06:17		06:45	07:14	18:44-18:54/10	06:45		07:20	07:42-08:16/34	07:43	08:06-08:19/13
	20:44		20:06	19:16		17:31		17:02	16:21-16:38/17	17:05	16:31-16:39/8
27	06:18		06:46	07:15	18:44-18:53/9	06:46		07:21	07:43-08:16/33	07:43	08:06-08:19/13
	20:43		20:04	19:14		17:29		17:02	16:21-16:37/16	17:06	16:32-16:41/9
28	06:18		06:47	07:16	18:45-18:51/6	06:47		07:22	07:45-08:16/31	07:44	08:06-08:20/14
	20:42		20:03	19:13		17:28		17:01	16:21-16:36/15	17:06	16:32-16:41/9
29	06:19		06:48	07:17	18:46-18:49/3	06:48		07:23	07:46-08:16/30	07:44	08:06-08:21/15
	20:41		20:01	19:11		17:27		17:01	16:22-16:37/15	17:07	16:33-16:41/8
30	06:20		06:49	07:18		06:49	07:49-07:56/7	07:24	07:47-08:16/29	07:44	08:06-08:21/15
	20:40		20:00	19:10		17:26		17:01	16:22-16:37/15	17:08	16:33-16:42/9
31	06:21		06:50			06:50	07:44-08:00/16			07:45	08:07-08:23/16
	20:39		19:58			17:24				17:09	16:34-16:44/10
Potential sun hours	455		425	374		347		301		292	
Sum of minutes with flicker	4		0	231		121		1307		820	

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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03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER8 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (8)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:45 15:47-16:45/58 17:10	07:33 07:52-08:10/18 17:43 15:48-17:19/91	06:58 16:01-17:33/92 18:15	07:10 07:35-07:56/21 19:47 18:58-19:26/28	06:26	05:58 19:42-20:20/38 20:45
2	07:45 15:47-16:45/58 17:10	07:32 07:51-08:10/19 17:44 15:48-17:20/92	06:57 16:02-17:32/90 18:16	07:08 07:35-07:54/19 19:48 18:57-19:27/30	06:24 20:18	05:58 19:42-20:21/39 20:46
3	07:45 15:47-16:46/59 17:11	07:31 07:50-08:10/20 17:45 15:48-17:21/93	06:55 16:03-17:30/87 18:17	07:06 07:37-07:52/15 19:49 18:57-19:28/31	06:23 20:19	05:58 19:42-20:22/40 20:46
4	07:45 15:47-16:47/60 17:12	07:30 07:49-08:10/21 17:46 15:48-17:23/95	06:54 16:05-17:29/84 18:18	07:05 07:39-07:49/10 19:50 18:56-19:29/33	06:22 20:20	05:57 19:41-20:22/41 20:47
5	07:45 15:47-16:48/61 17:13	07:29 07:50-08:10/20 17:47 15:48-17:24/96	06:52 16:06-17:27/81 18:19	07:03 18:55-19:30/35 19:51	06:21 20:21	05:57 19:42-20:23/41 20:48
6	07:45 15:47-16:49/62 17:14	07:28 07:51-08:10/19 17:49 15:48-17:25/97	06:51 16:07-17:25/78 18:20	07:02 18:56-19:31/35 19:52	06:20 20:22	05:57 19:42-20:24/42 20:48
7	07:45 15:48-16:50/62 17:15	07:27 07:52-08:09/17 17:50 15:48-17:27/99	06:49 16:09-17:24/75 18:21	07:00 18:55-19:32/37 19:53	06:19 20:23	05:56 19:41-20:24/43 20:49
8	07:45 15:47-16:50/63 17:16	07:26 07:53-08:08/15 17:51 15:49-17:28/99	06:48 16:10-17:22/72 18:22	06:59 18:56-19:33/37 19:54	06:17 20:24	05:56 19:41-20:25/44 20:50
9	07:45 15:47-16:51/64 17:17	07:25 07:55-08:06/11 17:52 15:49-17:30/101	06:46 16:12-17:20/68 18:24	06:57 18:55-19:34/39 19:55	06:16 20:25	05:56 19:42-20:25/43 20:50
10	07:45 15:47-16:53/66 17:18	07:24 08:00-08:02/2 17:53 15:50-17:31/101	06:45 16:13-17:18/65 18:25	06:55 18:56-19:34/38 19:56	06:15 20:26	05:56 19:42-20:26/44 20:51
11	07:45 15:48-16:54/66 17:19	07:22 15:49-17:32/103 17:54	06:43 16:16-17:16/60 18:26	06:54 18:56-19:33/37 19:57	06:14 20:27	05:56 19:42-20:27/45 20:51
12	07:44 15:47-16:54/67 17:20	07:21 15:50-17:33/103 17:56	06:42 16:18-17:13/55 18:27	06:52 18:57-19:32/35 19:58	06:13 20:28	05:55 19:42-20:27/45 20:52
13	07:44 15:48-16:56/68 17:21	07:20 15:50-17:34/104 17:57	06:40 16:20-17:10/50 18:28	06:51 18:57-19:30/33 19:59	06:12 20:29	05:55 19:43-20:28/45 20:52
14	07:44 15:48-16:57/69 17:22	07:19 15:51-17:36/105 17:58	06:39 16:24-17:07/43 18:29	06:49 18:58-19:30/32 20:00	06:11 20:30	05:55 19:43-20:28/45 20:53
15	07:44 15:47-16:58/71 17:23	07:18 15:51-17:38/107 17:59	06:37 16:27-17:03/36 18:30	06:48 18:59-19:27/28 20:01	06:10 20:31	05:55 19:43-20:28/45 20:53
16	07:43 15:48-17:00/72 17:24	07:16 15:51-17:38/107 18:00	06:35 16:32-16:59/27 18:31	06:46 19:01-19:26/25 20:02	06:09 19:56-20:06/10 20:32	05:55 19:43-20:29/46 20:53
17	07:43 15:47-17:00/73 17:25	07:15 15:52-17:40/108 18:01	06:34 16:39-16:50/11 18:32	06:45 19:02-19:23/21 20:03	06:08 19:53-20:09/16 20:33	05:55 19:43-20:29/46 20:54
18	07:42 15:48-17:02/74 17:26	07:14 15:53-17:41/108 18:03	06:32 18:33	06:43 19:05-19:21/16 20:04	06:08 19:50-20:09/19 20:33	05:55 19:43-20:29/46 20:54
19	07:42 15:47-17:03/76 17:27	07:12 15:53-17:40/107 18:04	06:31 18:34	06:42 19:08-19:16/8 20:05	06:07 19:50-20:11/21 20:34	05:56 19:43-20:29/46 20:54
20	07:41 15:48-17:04/76 17:28	07:11 15:54-17:40/106 18:05	06:29 06:47-06:54/7 18:35	06:41 20:06	06:06 19:48-20:12/24 20:35	05:56 19:43-20:29/46 20:55
21	07:41 15:47-17:05/78 17:30	07:10 15:55-17:40/105 18:06	06:27 06:46-06:57/11 18:36	06:39 20:07	06:05 19:47-20:12/25 20:36	05:56 19:44-20:30/46 20:55
22	07:40 15:47-17:06/79 17:31	07:08 15:55-17:39/104 18:07	06:26 06:44-06:58/14 18:37	06:38 20:08	06:04 19:46-20:14/28 20:37	05:56 19:44-20:30/46 20:55
23	07:40 08:00-08:01/1 17:32 15:48-17:08/80	07:07 15:56-17:38/102 18:08	06:24 06:42-06:58/16 18:38	06:36 20:09	06:04 19:45-20:14/29 20:38	05:56 19:44-20:30/46 20:55
24	07:39 07:59-08:03/4 17:33 15:47-17:09/82	07:06 15:56-17:37/101 18:09	06:22 06:41-06:59/18 18:39 18:14-18:19/5	06:35 20:10	06:03 19:44-20:15/31 20:39	05:57 19:44-20:30/46 20:56
25	07:38 07:58-08:05/7 17:34 15:47-17:10/83	07:04 15:57-17:37/100 18:11	06:21 06:39-06:59/20 18:40 18:10-18:19/9	06:34 20:11	06:02 19:44-20:16/32 20:40	05:57 19:45-20:31/46 20:56
26	07:38 07:58-08:07/9 17:35 15:47-17:11/84	07:03 15:57-17:35/98 18:12	06:19 06:38-07:00/22 18:41 18:07-18:20/13	06:32 20:12	06:02 19:43-20:16/33 20:40	05:57 19:45-20:31/46 20:56
27	07:37 07:57-08:08/11 17:37 15:48-17:13/85	07:01 15:59-17:35/96 18:13	06:18 06:36-07:00/24 18:42 18:05-18:21/16	06:31 20:13	06:01 19:43-20:17/34 20:41	05:57 19:45-20:30/45 20:56
28	07:36 07:56-08:09/13 17:38 15:48-17:14/86	07:00 16:00-17:34/94 18:14	06:16 06:34-06:59/25 18:43 18:03-18:22/19	06:30 20:14	06:00 19:43-20:18/35 20:42	05:58 19:46-20:31/45 20:56
29	07:35 07:55-08:09/14 17:39 15:48-17:15/87		07:14 07:34-07:59/25 19:44 19:02-19:24/22	06:28 20:15	06:00 19:42-20:18/36 20:43	05:58 19:46-20:31/45 20:56
30	07:34 07:54-08:10/16 17:40 15:48-17:16/88		07:13 07:34-07:58/24 19:45 19:00-19:24/24	06:27 20:16	05:59 19:42-20:19/37 20:44	05:59 19:46-20:31/45 20:56
31	07:34 07:53-08:10/17 17:41 15:47-17:18/91		07:11 07:34-07:56/22 19:46 18:59-19:25/26		05:59 19:42-20:20/38 20:44	
Potential sun hours	301	299	370	397	445	448
Sum of minutes with flicker	2340	2984	1436	643	448	1326

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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03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER8 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (8)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:59 19:46-20:31/45 20:56	06:22 20:38	06:51 18:55-19:32/37 19:57	07:19 16:59-17:52/53 19:08	06:51 07:27-07:32/5 17:23 15:18-17:00/102	07:25 15:30-16:36/66 17:00
2	06:00 19:47-20:31/44 20:56	06:23 20:37	06:52 18:54-19:32/38 19:55	07:20 16:56-17:54/58 19:06	06:52 07:25-07:36/11 17:22 15:19-16:59/100	07:26 15:31-16:36/65 17:00
3	06:00 19:47-20:31/44 20:55	06:24 20:36	06:53 18:53-19:32/39 19:53	07:21 16:53-17:56/63 19:05	06:54 07:23-07:38/15 17:21 15:19-16:58/99	07:27 15:31-16:36/65 17:00
4	06:01 19:48-20:31/43 20:55	06:25 20:35	06:54 18:53-19:30/37 19:52	07:22 16:51-17:57/66 19:03	06:55 07:22-07:39/17 17:20 15:18-16:56/98	07:28 15:32-16:35/63 17:00
5	06:01 19:47-20:30/43 20:55	06:26 20:34	06:55 18:52-19:29/37 19:50	07:23 16:48-17:59/71 19:01	06:56 07:21-07:40/19 17:19 15:18-16:55/97	07:29 15:33-16:35/62 16:59
6	06:02 19:48-20:30/42 20:55	06:27 20:32	06:56 18:52-19:27/35 19:49	07:24 16:46-18:00/74 19:00	06:57 07:20-07:40/20 17:17 15:18-16:54/96	07:30 15:33-16:35/62 16:59
7	06:02 19:48-20:30/42 20:55	06:27 20:31	06:57 18:51-19:26/35 19:47	07:25 16:44-18:01/77 18:58	06:58 07:20-07:41/21 17:16 15:19-16:53/94	07:30 15:34-16:35/61 16:59
8	06:03 19:49-20:30/41 20:54	06:28 20:30	06:57 07:35-07:44/9 19:45 18:50-19:23/33	07:26 16:42-18:02/80 18:57	06:59 07:21-07:41/20 17:15 15:19-16:52/93	07:31 15:34-16:34/60 16:59
9	06:04 19:48-20:29/41 20:54	06:29 20:29	06:58 07:31-07:45/14 19:44 18:50-19:22/32	07:27 16:40-18:03/83 18:55	07:00 07:22-07:41/19 17:14 15:18-16:51/93	07:32 15:35-16:34/59 16:59
10	06:04 19:49-20:29/40 20:54	06:30 20:28	06:59 07:29-07:47/18 19:42 18:50-19:20/30	07:28 16:38-18:04/86 18:54	07:02 07:23-07:41/18 17:13 15:18-16:50/92	07:33 15:36-16:34/58 16:59
11	06:05 19:50-20:29/39 20:53	06:31 20:26	07:00 07:27-07:48/21 19:41 18:50-19:19/29	07:29 16:37-18:05/88 18:52	07:03 07:25-07:42/17 17:12 15:18-16:49/91	07:34 15:37-16:35/58 16:59
12	06:06 19:49-20:28/39 20:53	06:32 20:25	07:01 07:26-07:48/22 19:39 18:51-19:17/26	07:30 16:35-18:06/91 18:51	07:04 07:26-07:42/16 17:12 15:19-16:48/89	07:35 15:38-16:35/57 17:00
13	06:06 19:50-20:28/38 20:52	06:33 20:24	07:02 07:25-07:49/24 19:37 18:51-19:16/25	07:31 16:34-18:06/92 18:49	07:05 07:27-07:41/14 17:11 15:20-16:47/87	07:36 15:37-16:34/57 17:00
14	06:07 19:51-20:28/37 20:52	06:34 20:23	07:03 07:24-07:49/25 19:36 18:52-19:14/22	07:32 16:32-18:07/95 18:48	07:06 07:28-07:41/13 17:10 15:20-16:46/86	07:36 15:38-16:35/57 17:00
15	06:08 19:52-20:27/35 20:51	06:35 20:21	07:04 07:24-07:49/25 19:34 18:53-19:13/20	07:33 16:31-18:08/97 18:46	07:07 07:29-07:40/11 17:09 15:20-16:45/85	07:37 15:39-16:35/56 17:00
16	06:08 19:52-20:26/34 20:51	06:36 20:20	07:05 07:25-07:49/24 19:32 18:54-19:11/17	07:34 16:29-18:08/99 18:45	07:08 07:31-07:40/9 17:08 15:21-16:45/84	07:38 15:40-16:36/56 17:00
17	06:09 19:52-20:26/34 20:50	06:37 20:19	07:06 07:26-07:48/22 19:31 18:54-19:08/14	07:35 16:28-18:08/100 18:43	07:10 07:32-07:39/7 17:07 15:21-16:44/83	07:38 15:40-16:35/55 17:01
18	06:10 19:53-20:26/33 20:50	06:38 20:17	07:07 07:27-07:48/21 19:29 18:56-19:07/11	07:36 16:27-18:09/102 18:42	07:11 07:33-07:37/4 17:07 15:21-16:43/82	07:39 15:41-16:36/55 17:01
19	06:11 19:54-20:25/31 20:49	06:39 20:16	07:08 07:27-07:46/19 19:27 18:59-19:05/6	07:37 16:26-18:09/103 18:40	07:12 07:34-07:35/1 17:06 15:22-16:42/80	07:40 15:41-16:36/55 17:01
20	06:12 19:54-20:24/30 20:48	06:40 20:14	07:09 07:28-07:45/17 19:26	07:38 16:25-18:09/104 18:39	07:13 15:22-16:41/79 17:05	07:40 15:42-16:37/55 17:02
21	06:12 19:55-20:23/28 20:48	06:41 20:13	07:10 07:29-07:43/14 19:24	07:39 16:25-18:11/106 18:37	07:14 15:23-16:41/78 17:05	07:41 15:42-16:37/55 17:02
22	06:13 19:57-20:23/26 20:47	06:42 20:12	07:10 07:30-07:42/12 19:23	07:40 16:24-18:11/107 18:36	07:15 15:24-16:40/76 17:04	07:41 15:43-16:38/55 17:03
23	06:14 19:58-20:22/24 20:46	06:43 20:10	07:11 07:31-07:39/8 19:21	07:41 16:23-18:11/108 18:35	07:16 15:24-16:40/76 17:04	07:42 15:43-16:38/55 17:03
24	06:15 19:59-20:22/23 20:45	06:43 19:11-19:21/10 20:09	07:12 19:19	07:43 16:22-18:10/108 18:33	07:17 15:25-16:39/74 17:03	07:42 15:44-16:39/55 17:04
25	06:16 20:00-20:20/20 20:44	06:44 19:07-19:24/17 20:07	07:13 19:18	06:44 15:21-17:09/108 17:32	07:18 15:25-16:38/73 17:02	07:43 15:44-16:39/55 17:04
26	06:17 20:02-20:20/18 20:44	06:45 19:04-19:27/23 20:06	07:14 19:16	06:45 15:21-17:07/106 17:31	07:19 15:26-16:38/72 17:02	07:43 15:44-16:39/55 17:05
27	06:17 20:05-20:19/14 20:43	06:46 19:02-19:28/26 20:04	07:15 17:16-17:38/22 19:14	06:46 15:20-17:06/106 17:29	07:21 15:26-16:37/71 17:02	07:43 15:45-16:41/56 17:06
28	06:18 20:09-20:15/6 20:42	06:47 19:01-19:30/29 20:03	07:16 17:10-17:43/33 19:13	06:47 15:20-17:05/105 17:28	07:22 15:27-16:36/69 17:01	07:44 15:45-16:41/56 17:06
29	06:19 20:41	06:48 18:59-19:31/32 20:01	07:17 17:06-17:47/41 19:11	06:48 15:20-17:04/104 17:27	07:23 15:29-16:37/68 17:01	07:44 15:45-16:41/56 17:07
30	06:20 20:40	06:49 18:57-19:30/33 20:00	07:18 17:02-17:49/47 19:09	06:49 15:19-17:03/104 17:26	07:24 15:29-16:37/68 17:01	07:44 15:45-16:42/57 17:08
31	06:21 20:39	06:50 18:56-19:31/35 19:58		06:50 15:19-17:01/102 17:24		07:45 15:46-16:44/58 17:09
Potential sun hours	455	425	374	347	301	292
Sum of minutes with flicker	934	205	961	2846	2792	1795

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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03/04/2024 13:05

SHADOW - Calendar per WTG

Calculation: Shadow flickering **WTG:** SER9 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (9)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:45 08:39-09:43/64	07:33	06:58	07:10 18:50-19:18/28	06:26	05:58 06:20-06:48/28
	17:10 08:07-08:37/30	17:43	18:15	19:47 07:28-08:01/33	20:17	20:45
2	07:45 08:39-09:43/64	07:32	06:57	07:08 18:48-19:19/31	06:25	05:58 06:19-06:49/30
	17:10 08:07-08:38/31	17:44	18:16	19:48 07:26-08:01/35	20:18	20:46
3	07:45 08:40-09:44/64	07:31	06:56	07:07 18:48-19:20/32	06:23	05:58 06:19-06:51/32
	17:11 08:07-08:38/31	17:45	18:17	19:49 07:25-08:01/36	20:19	20:46
4	07:45 08:41-09:44/63	07:30	06:54	07:05 18:46-19:20/34	06:22	05:57 06:18-06:51/33
	17:12 08:07-08:38/31	17:46	18:18	19:50 07:23-08:00/37	20:20	20:47
5	07:45 08:41-09:44/63	07:29	06:53	07:03 18:45-19:20/35	06:21	05:57 06:18-06:53/35
	17:13 08:07-08:38/31	17:47	18:19	19:51 07:22-08:01/39	20:21	20:48
6	07:45 08:42-09:45/63	07:28	06:51	07:02 18:45-19:20/35	06:20	05:57 06:18-06:54/36
	17:14 08:07-08:39/32	17:49	18:20	19:52 07:20-08:00/40	20:22	20:48
7	07:45 08:43-09:45/62	07:27	06:49	07:00 18:44-19:20/36	06:19	05:56 06:18-06:55/37
	17:15 08:07-08:39/32	17:50	18:21	19:53 07:18-07:59/41	20:23	20:49
8	07:45 08:43-09:44/61	07:26	06:48	06:59 18:44-19:20/36	06:18	05:56 06:17-06:55/38
	17:16 08:06-08:38/32	17:51	18:23	19:54 07:17-07:59/42	20:24	20:50
9	07:45 08:43-09:44/61	07:25	06:46	06:57 18:44-19:19/35	06:16	05:56 06:17-06:56/39
	17:17 08:06-08:39/33	17:52	18:24	19:55 07:15-07:58/43	20:25	20:50
10	07:45 08:44-09:45/61	07:24	06:45	06:56 18:44-19:19/35	06:15	05:56 06:17-06:56/39
	17:18 08:06-08:39/33	17:53	18:25	19:56 07:15-07:58/43	20:26	20:51
11	07:45 08:45-09:45/60	07:22	06:43	06:54 18:44-19:18/34	06:14	05:56 06:17-06:57/40
	17:19 08:06-08:39/33	17:55	18:26	19:57 07:15-07:56/41	20:27	20:51
12	07:44 08:45-09:44/59	07:21	06:42	06:52 18:45-19:18/33	06:13	05:56 06:17-06:58/41
	17:20 08:05-08:38/33	17:56	18:27	19:58 07:16-07:56/40	20:28	20:52
13	07:44 08:46-09:45/59	07:20	06:40	06:51 18:44-19:17/33	06:12	05:55 06:17-06:58/41
	17:21 08:06-08:38/32	17:57	18:28	19:59 07:16-07:54/38	20:29	20:52
14	07:44 08:48-09:45/57	07:19	06:39	06:49 18:45-19:16/31	06:11	05:55 06:17-06:59/42
	17:22 08:07-08:38/31	17:58	18:29	20:00 07:17-07:53/36	20:30	20:53
15	07:44 08:48-09:44/56	07:18	06:37	06:48 18:46-19:15/29	06:10	05:55 06:17-06:59/42
	17:23 08:08-08:37/29	17:59	18:30	20:01 07:17-07:51/34	20:31	20:53
16	07:43 08:49-09:44/55	07:16	06:35	06:46 18:47-19:14/27	06:09	05:55 06:17-07:00/43
	17:24 08:10-08:37/27	18:00	18:31	20:02 07:19-07:50/31	20:32	20:53
17	07:43 08:50-09:43/53	07:15	06:34	06:45 18:47-19:12/25	06:09	05:55 06:17-07:00/43
	17:25 08:10-08:36/26	18:02	18:32	20:03 07:20-07:48/28	20:33	20:54
18	07:42 08:51-09:44/53	07:14	06:32	06:44 18:49-19:10/21	06:08	05:56 06:17-07:00/43
	17:26 08:12-08:36/24	18:03	18:33	20:04 07:22-07:46/24	20:33	20:54
19	07:42 08:52-09:43/51	07:12	06:31	06:42 18:51-19:07/16	06:07	05:56 06:17-07:00/43
	17:27 08:14-08:34/20	18:04	18:34	20:05 07:23-07:42/19	20:34	20:54
20	07:41 08:53-09:43/50	07:11	06:29	06:41 18:55-19:04/9	06:06	05:56 06:18-07:01/43
	17:29 08:16-08:34/18	18:05	18:35	20:06 07:27-07:39/12	20:35	20:55
21	07:41 08:54-09:42/48	07:10	06:27	06:39	06:05	05:56 06:18-07:01/43
	17:30 08:18-08:31/13	18:06	18:36	20:07	20:36	20:55
22	07:40 08:55-09:40/45	07:08	06:26 06:44-06:49/5	06:38	06:04	05:56 06:18-07:01/43
	17:31 08:23-08:26/3	18:07	18:37	20:08	20:37	20:55
23	07:40 08:57-09:40/43	07:07	06:24 06:42-06:52/10	06:36	06:04	05:56 06:18-07:01/43
	17:32	18:08	18:38	20:09	20:38	20:55
24	07:39 08:58-09:39/41	07:06	06:23 06:41-06:55/14	06:35	06:03	05:57 06:19-07:02/43
	17:33	18:09	18:39	20:10	20:39	20:56
25	07:38 08:59-09:37/38	07:04	06:21 06:39-06:56/17	06:34	06:02	05:57 06:19-07:02/43
	17:34	18:11	18:40	20:11	20:40	20:56
26	07:38 09:02-09:37/35	07:03	06:19 06:38-06:58/20	06:32	06:02	05:57 06:19-07:02/43
	17:36	18:12	18:41	20:12	20:40	20:56
27	07:37 09:03-09:35/32	07:01	06:18 06:36-06:59/23	06:31	06:01	05:58 06:20-07:02/42
	17:37	18:13	18:42	20:13	20:41	20:56
28	07:36 09:06-09:33/27	07:00	06:16 18:00-18:10/10	06:30	06:00 06:29-06:38/9	05:58 06:20-07:02/42
	17:38	18:14	18:43 06:34-06:59/25	20:14	20:42	20:56
29	07:35 09:08-09:30/22		07:15 18:57-19:14/17	06:28	06:00 06:26-06:42/16	05:58 06:20-07:01/41
	17:39		19:44 07:33-08:00/27	20:15	20:43	20:56
30	07:34 09:13-09:26/13		07:13 18:54-19:16/22	06:27	05:59 06:23-06:44/21	05:59 06:21-07:02/41
	17:40		19:45 07:31-08:00/29	20:16	20:44	20:56
31	07:34		07:11 18:51-19:17/26		05:59 06:22-06:47/25	
	17:41		19:46 07:29-08:00/31		20:44	
Potential sun hours	301	299	370	397	445	448
Sum of minutes with flicker	2128	0	276	1287	71	1192

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: Shadow flickering **WTG:** SER9 - VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (9)

Assumptions for shadow calculations

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

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

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
341	270	407	828	925	321	271	338	424	828	1.949	1.046	7.949

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:59 06:21-07:01/40	06:22	06:51 18:43-19:17/34	07:19	06:51	07:25 08:27-09:27/60
	20:56	20:38	19:57 07:14-07:55/41	19:08	17:23	17:00 07:48-08:21/33
2	06:00 06:22-07:02/40	06:23	06:52 18:42-19:17/35	07:20	06:52	07:26 08:27-09:28/61
	20:56	20:37	19:55 07:13-07:56/43	19:06	17:22	17:00 07:49-08:22/33
3	06:00 06:22-07:01/39	06:24	06:53 18:42-19:17/35	07:21	06:54	07:27 08:27-09:28/61
	20:55	20:36	19:53 07:13-07:56/43	19:05	17:21	17:00 07:50-08:23/33
4	06:01 06:23-07:01/38	06:25	06:54 18:41-19:17/36	07:22	06:55	07:28 08:28-09:29/61
	20:55	20:35	19:52 07:14-07:56/42	19:03	17:20	17:00 07:51-08:23/32
5	06:01 06:23-07:00/37	06:26	06:55 18:41-19:17/36	07:23	06:56	07:29 08:28-09:30/62
	20:55	20:34	19:50 07:15-07:56/41	19:02	17:19	17:00 07:52-08:24/32
6	06:02 06:24-07:00/36	06:27	06:56 18:41-19:16/35	07:24	06:57	07:30 08:28-09:31/63
	20:55	20:32	19:49 07:16-07:56/40	19:00	17:18	16:59 07:53-08:25/32
7	06:02 06:24-06:59/35	06:28	06:57 18:41-19:16/35	07:25	06:58	07:30 08:28-09:31/63
	20:55	20:31	19:47 07:17-07:56/39	18:58	17:17	16:59 07:54-08:25/31
8	06:03 06:25-06:59/34	06:28	06:58 18:40-19:14/34	07:26	06:59	07:31 08:28-09:31/63
	20:54	20:30	19:45 07:18-07:56/38	18:57	17:15	16:59 07:54-08:25/31
9	06:04 06:26-06:59/33	06:29	06:58 18:41-19:13/32	07:27	07:00	07:32 08:28-09:32/64
	20:54	20:29	19:44 07:18-07:54/36	18:55	17:14	16:59 07:55-08:26/31
10	06:04 06:26-06:57/31	06:30	06:59 18:41-19:12/31	07:28	07:02	07:33 08:29-09:32/63
	20:54	20:28	19:42 07:19-07:54/35	18:54	17:14	16:59 07:56-08:27/31
11	06:05 06:27-06:56/29	06:31	07:00 18:42-19:11/29	07:29	07:03	07:34 08:29-09:33/64
	20:53	20:26	19:41 07:20-07:53/33	18:52	17:13	17:00 07:57-08:27/30
12	06:06 06:29-06:55/26	06:32	07:01 18:43-19:09/26	07:30	07:04 08:44-08:58/14	07:35 08:30-09:34/64
	20:53	20:25	19:39 07:21-07:52/31	18:51	17:12	17:00 07:58-08:28/30
13	06:06 06:30-06:53/23	06:33	07:02 18:44-19:07/23	07:31	07:05 08:40-09:02/22	07:36 08:30-09:35/65
	20:52	20:24	19:37 07:22-07:52/30	18:49	17:11	17:00 07:59-08:29/30
14	06:07 06:33-06:52/19	06:34	07:03 18:46-19:05/19	07:32	07:06 08:37-09:05/28	07:36 08:30-09:35/65
	20:52	20:23	19:36 07:23-07:51/28	18:48	17:10	17:00 07:59-08:29/30
15	06:08 06:36-06:49/13	06:35	07:04 18:49-19:01/12	07:33	07:07 08:35-09:07/32	07:37 08:00-09:35/95
	20:51	20:21	19:34 07:24-07:49/25	18:46	17:09	17:00
16	06:09	06:36	07:05 07:25-07:48/23	07:34	07:08 08:35-09:10/35	07:38 08:31-09:36/65
	20:51	20:20	19:32	18:45	17:08	17:00 08:01-08:30/29
17	06:09	06:37	07:06 07:26-07:47/21	07:35	07:10 08:33-09:11/38	07:38 08:31-09:36/65
	20:50	20:19	19:31	18:43	17:08	17:01 08:01-08:30/29
18	06:10	06:38	07:07 07:27-07:45/18	07:36	07:11 08:32-09:13/41	07:39 08:32-09:37/65
	20:50	20:17	19:29	18:42	17:07	17:01 08:02-08:31/29
19	06:11	06:39	07:08 07:27-07:42/15	07:37	07:12 08:31-09:14/43	07:40 08:32-09:37/65
	20:49	20:16	19:28	18:40	17:06	17:02 08:02-08:31/29
20	06:12	06:40	07:09 07:28-07:39/11	07:38	07:13 08:30-09:15/45	07:40 08:33-09:38/65
	20:48	20:14	19:26	18:39	17:05 07:58-08:01/3	17:02 08:03-08:32/29
21	06:12	06:41	07:10 07:29-07:35/6	07:39	07:14 08:30-09:18/48	07:41 08:04-09:38/94
	20:48	20:13	19:24	18:37	17:05 07:54-08:07/13	17:02
22	06:13	06:42	07:11	07:40	07:15 08:29-09:19/50	07:41 08:34-09:39/65
	20:47	20:12	19:23	18:36	17:04 07:52-08:10/18	17:03 08:04-08:33/29
23	06:14	06:43 18:58-19:08/10	07:11	07:41	07:16 08:29-09:20/51	07:42 08:34-09:39/65
	20:46	20:10 07:31-07:43/12	19:21	18:35	17:04 07:51-08:11/20	17:03 08:04-08:33/29
24	06:15	06:44 18:54-19:11/17	07:12	07:43	07:17 08:28-09:21/53	07:42 08:35-09:40/65
	20:45	20:09 07:27-07:47/20	19:19	18:33	17:03 07:49-08:13/24	17:04 08:05-08:34/29
25	06:16	06:44 18:52-19:13/21	07:13	06:44	07:18 08:28-09:21/53	07:43 08:35-09:40/65
	20:44	20:07 07:24-07:49/25	19:18	17:32	17:03 07:48-08:14/26	17:05 08:05-08:34/29
26	06:17	06:45 18:50-19:15/25	07:14	06:45	07:20 08:27-09:22/55	07:43 08:36-09:41/65
	20:44	20:06 07:22-07:51/29	19:16	17:31	17:02 07:48-08:15/27	17:05 08:06-08:35/29
27	06:18	06:46 18:49-19:16/27	07:15	06:46	07:21 08:27-09:23/56	07:43 08:36-09:41/65
	20:43	20:04 07:21-07:52/31	19:14	17:29	17:02 07:47-08:16/29	17:06 08:06-08:35/29
28	06:18	06:47 18:47-19:17/30	07:16	06:47	07:22 08:28-09:25/57	07:44 08:06-09:41/95
	20:42	20:03 07:19-07:53/34	19:13	17:28	17:01 07:47-08:18/31	17:06
29	06:19	06:48 18:46-19:17/31	07:17	06:48	07:23 08:27-09:26/59	07:44 08:37-09:42/65
	20:41	20:01 07:18-07:54/36	19:11	17:27	17:01 07:47-08:19/32	17:07 08:06-08:36/30
30	06:20	06:49 18:44-19:17/33	07:18	06:49	07:24 08:27-09:26/59	07:44 08:37-09:42/65
	20:40	20:00 07:17-07:55/38	19:10	17:26	17:01 07:47-08:20/33	17:08 08:06-08:36/30
31	06:21	06:50 18:43-19:17/34		06:50		07:45 08:38-09:43/65
	20:39	19:58 07:15-07:55/40		17:24		17:09 08:07-08:37/30
Potential sun hours	455	425	374	347	301	292
Sum of minutes with flicker	473	493	1091	0	1095	2921

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

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

Licensed user:
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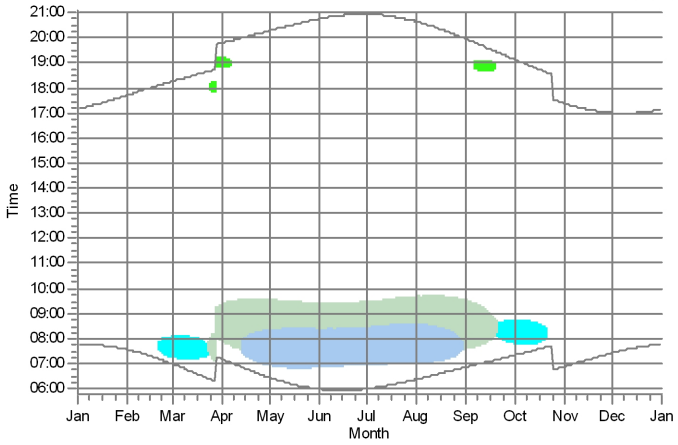
03/04/2024 13:05

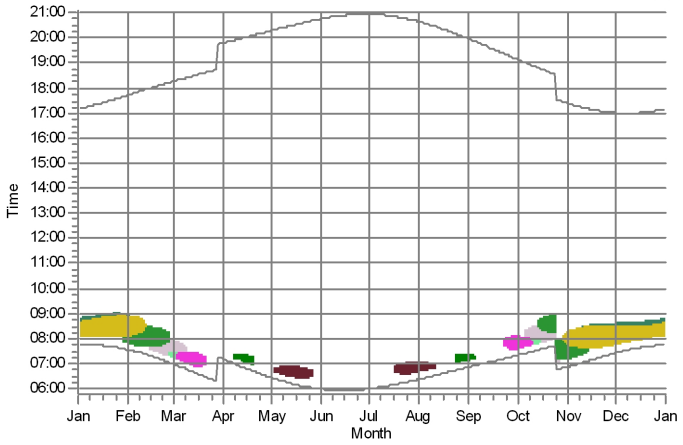
SHADOW - Calendar per WTG, graphical

Calculation: Shadow flickering

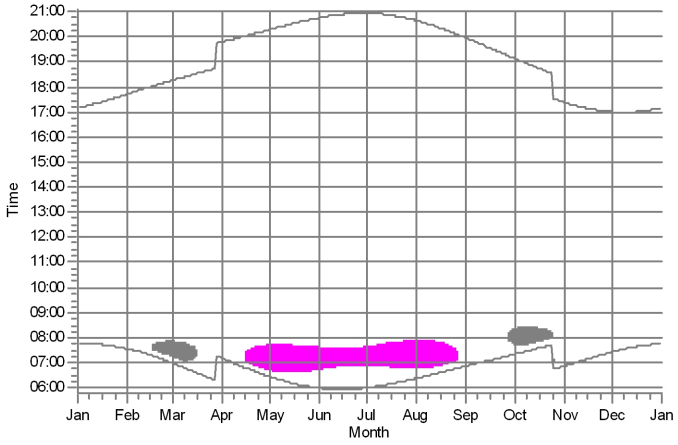
SER1: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (1)



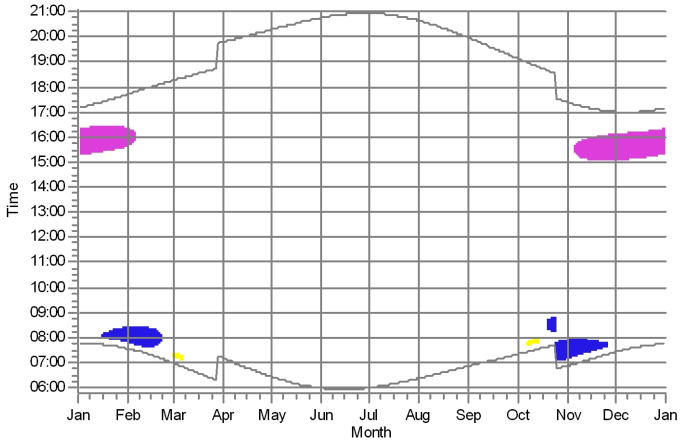
SER10: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (1



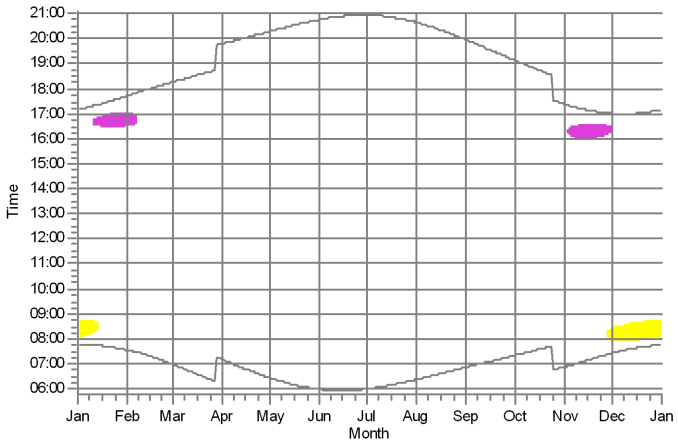
SER11: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (1



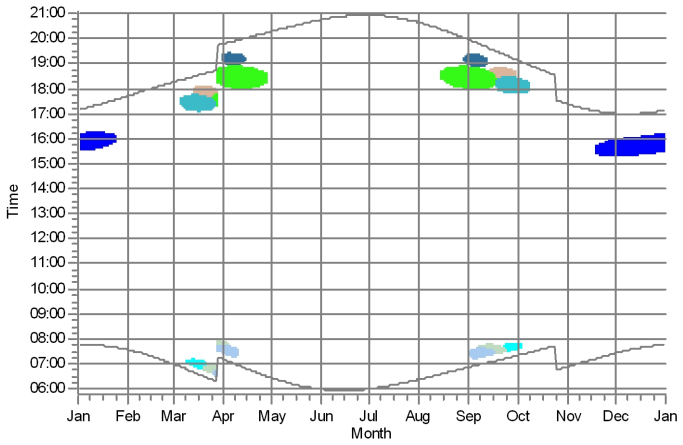
SER12: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (1



SER13: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (1



SER2: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (2)



Shadow receptors

- RIC_01: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (1)
- RIC_02: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2)
- RIC_03: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (3)
- RIC_04: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (4)
- RIC_05: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (5)
- RIC_13: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (13)
- RIC_14: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (14)
- RIC_15: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (15)
- RIC_17: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (17)
- RIC_18: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (18)
- RIC_19: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (19)
- RIC_22: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (22)
- RIC_25: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (25)
- RIC_26: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (26)
- RIC_27: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (27)
- RIC_29: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (29)
- RIC_30: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (30)
- RIC_31: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (31)
- RIC_32: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (32)
- RIC_35: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (35)
- RIC_36: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (36)

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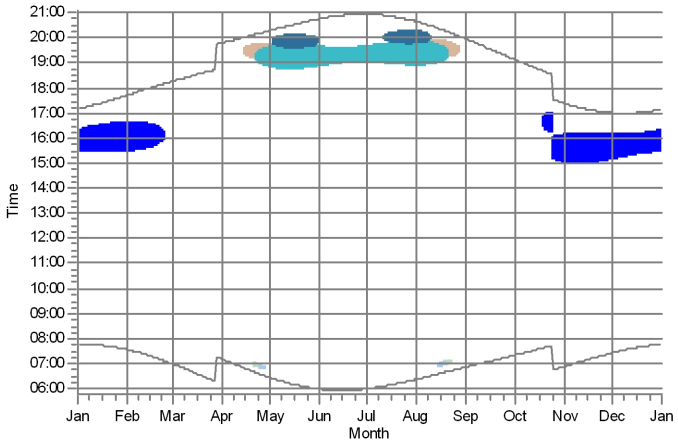
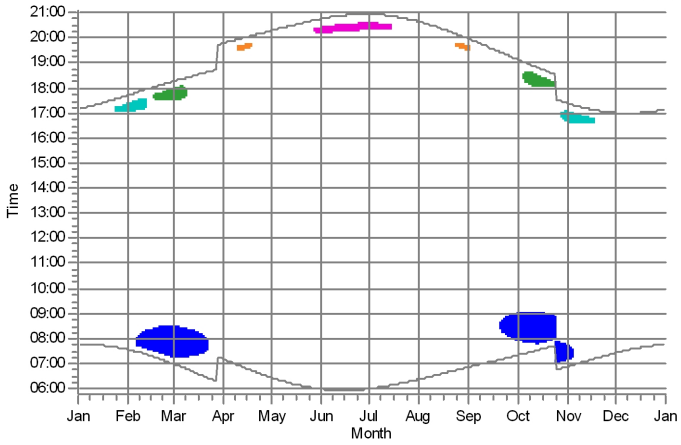
SHADOW - Calendar per WTG, graphical

Calculation: Shadow flickering

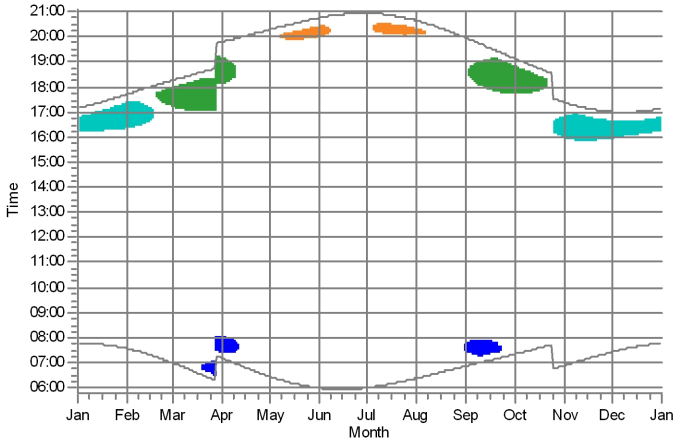
SER3: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (3)



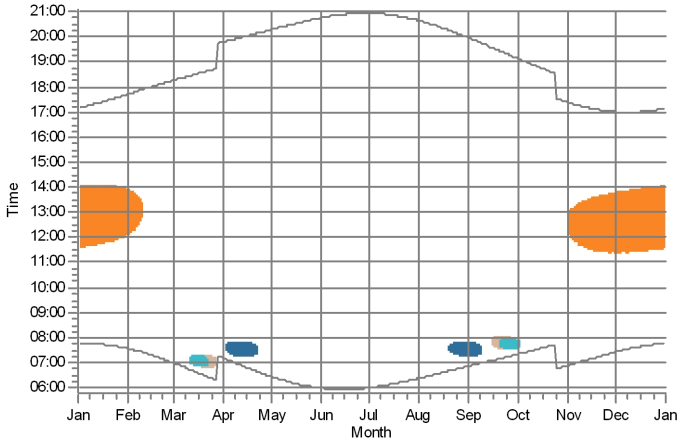
SER4: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (4)



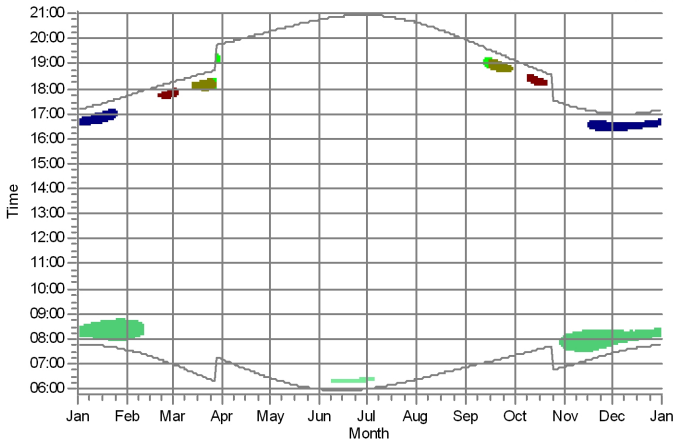
SER5: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (5)



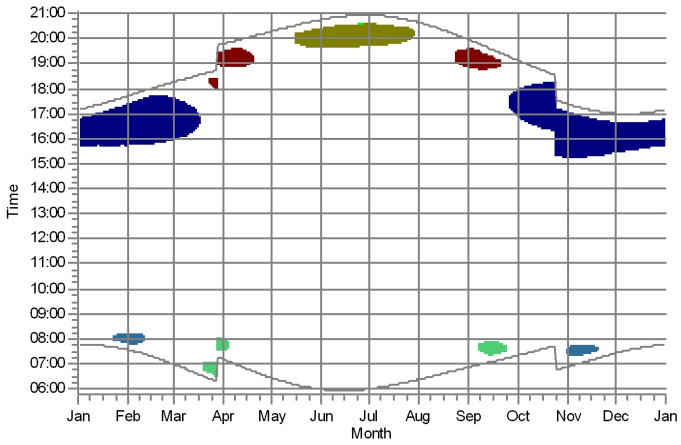
SER6: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (6)



SER7: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (7)



SER8: VESTAS V162-7.2 7200 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (8)



Shadow receptors

- RIC_03: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (3)
- RIC_07: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7)
- RIC_08: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (8)
- RIC_09: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (9)
- RIC_10: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (10)
- RIC_14: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (14)
- RIC_15: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (15)
- RIC_17: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (17)
- RIC_19: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (19)
- RIC_20: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (20)
- RIC_21: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (21)
- RIC_22: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (22)
- RIC_23: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (23)
- RIC_24: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (24)
- RIC_26: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (26)
- RIC_28: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (28)

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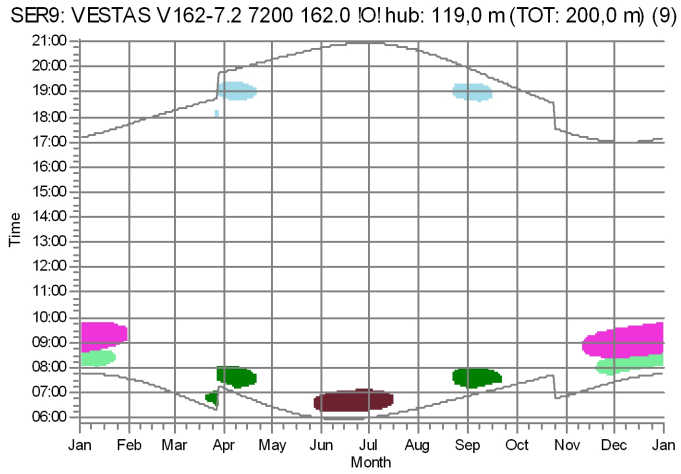
SHADOW - Calendar per WTG, graphical

Calculation: Shadow flickering



Shadow receptors

RIC_01: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (1)
RIC_26: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (26)
RIC_31: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (31)
RIC_32: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (32)
RIC_33: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (33)

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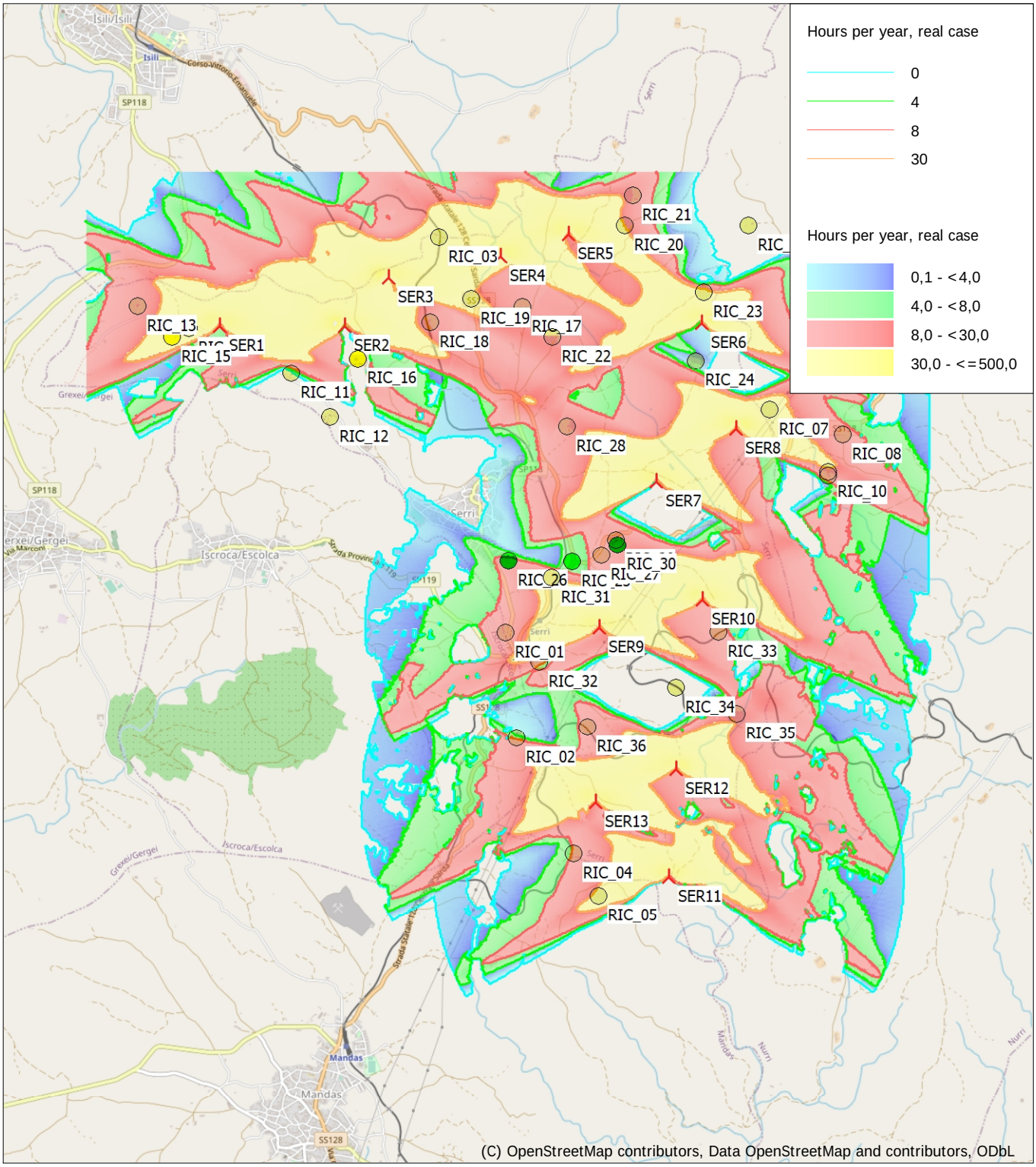
SHADOW - Map

Calculation: Shadow flickering



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:50.000, Map center Geo WGS84 East: 9,149548° E North: 39,696102° N

New WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_ONLINEDATA_0.wpo (1)

Time step: 2 minutes, Day step: 3 days, Map resolution: 10 m, Visibility resolution: 5 m, Eye height: 1,5 m