



Studio di Impatto ambientale per il parco eolico da 48,0
PROGETTO: MW "Energia Is Coris" costituito da n.9 aerogeneratori
 nei comuni di Villamassargia e Narcao

Elaborato:

Relazione sulle ombre

Codice Elaborato

VIA - R14

Scala

--

Formato elaborato

A4

PROPONENTE



Fred. Olsen Renewables

REDATTORI

Dott. Giulio Casu
 Dott.ssa Ing. Silvia Exana
 Dott. Ing. Bruno Manca
 Dott. Ing. Luca Salvadori
 Dott.ssa Ing. Alessandra Scalas

COORDINAMENTO

BIA s.r.l.
 Piazza dell'Annunziata 7
 Cagliari (CA) - 09123
 P.IVA 03983480926
 energhiabia@pec.it



Rev.	Data	Descrizione
02		
01		
00	06/2022	Emissione per validazione

Sommario

1	Introduzione.....	2
2	Metodologia.....	4
2.1	Specifiche aerogeneratori.....	4
2.2	Modello digitale di elevazione (DEM).....	4
2.3	Recettori.....	5
2.4	Eliofania e distribuzione dei venti.....	6
2.5	Effetti cumulativi.....	7
3	Risultati.....	8
3.1	Recettori.....	8
3.2	flickering.....	11
3.3	Strade.....	14
4	Conclusioni.....	17
5	Appendice.....	17

1 Introduzione

La presente relazione espone l'analisi dell'evoluzione dell'ombra giornaliera generata dalla presenza degli aerogeneratori del parco eolico proposto, denominato "Is Coris" (Comune di Villamassargia, SU), così come richiesto nell'allegato alla D.G.R n.3/17 del 16/01/09, "Studio per l'individuazione delle aree in cui ubicare gli impianti eolici. Lo studio prende in considerazione la formazione di ghiaccio sulle strade e lo sfarfallio dell'ombra (shadow flicker) sugli edifici (di seguito recettori) presenti nell'ambiente circostante al parco.

La formazione di ghiaccio costituisce un pericolo per gli utilizzatori delle strade, e si presenta tipicamente zone montane, pedemontane o appenniniche. L'analisi è limitata alle strade statali e provinciali e alle principali strade comunali che attraversano l'area vasta del parco.

Lo sfarfallio dell'ombra si presenta quando la pala di una turbina interposta tra un recettore e il sole "taglia" il fascio luminoso, producendo un alternarsi di ombra e luce. A seconda della frequenza di sfarfallio questo fenomeno può indurre attacchi epilettici su soggetti predisposti. È stato mostrato¹ che frequenze di sfarfallio inferiori a 3 Hz non pongono un rischio su soggetti fotosensitivi². Pertanto in questo studio si prenderà tale valore come riferimento.

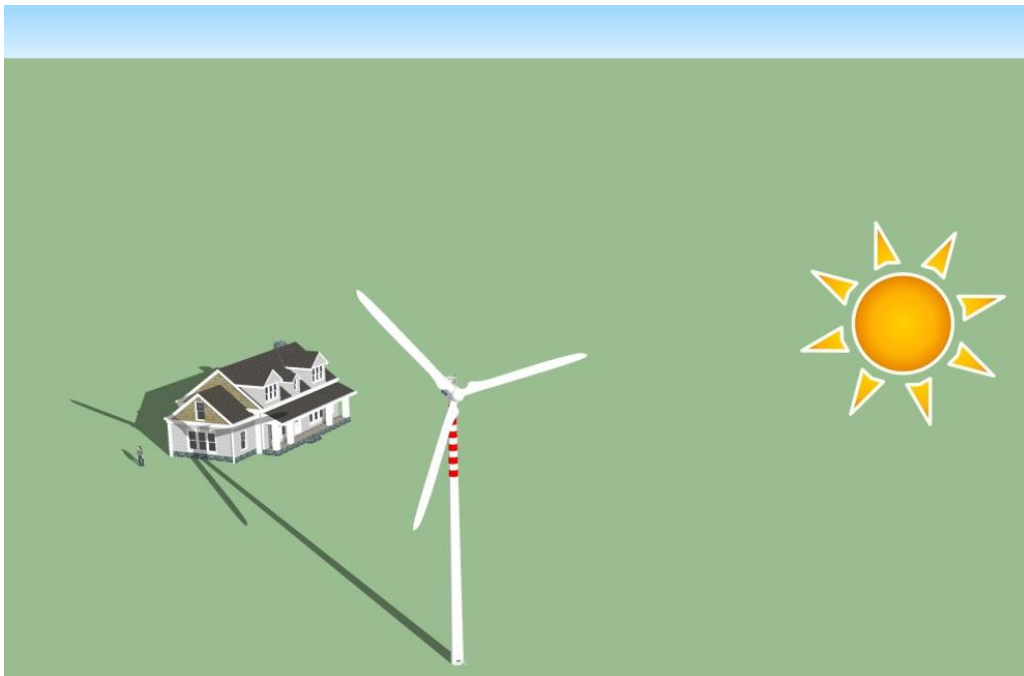


Figura 1: rappresentazione grafica del fenomeno di ombreggiamento.

¹ Harding et al doi:10.1111/j.1528-1167.2008.01563.x

² Ovvero il rischio cumulativo di attacco epilettico è inferiore a 17 persone per milione di soggetti fotosensitivi quando la frequenza di sfarfallio è inferiore a 3 Hz.

Allo stato attuale solo la Germania possiede linee-guida dettagliate sui limiti e sulle condizioni per il calcolo dell'impatto dell'ombra e sono consultabili nel documento "Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen" (WEA-Shattenwurf-Hinweise).

Una condizione necessaria affinché si verifichi il fenomeno dello sfarfallio in un dato recettore è che, da quel sito, la dimensione angolare delle pale sia paragonabile alla dimensione angolare del sole, in quanto se la dimensione relativa della pala è piccola rispetto al sole, questa non produce ombra percettibile sul recettore. Seguendo le linee guida tedesche, si pone la soglia di 1/5 come rapporto minimo tra la dimensione angolare della pala e la dimensione angolare del sole perché si possa verificare lo sfarfallio in un certo sito.

I problemi sopra esposti non sussistono qualora (linee guida tedesche):

- Il recettore subisca meno di 30 ore/anno di ombra da parte degli aerogeneratori;
- per ogni giorno dell'anno, il recettore subisca meno di 30 minuti di ombra.

Inoltre le linee guida specificano che gli ombreggiamenti diventano rilevanti solamente quando si considerano i recettori comportanti attività residenziali e lavorative stabili: "è auspicabile (che l'effetto flickering) si mantenga al di sotto delle 30 ore/anno in presenza di attività lavorative statiche, tipo ufficio, scuole, ospedali, interessate direttamente da impatto".

Questa indicazione è legata al fatto che all'interno di un edificio adibito a uffici, le postazioni di lavoro sono generalmente fisse, pertanto se l'edificio con pareti finestrate risulta prospiciente l'impianto eolico, chiaramente lo sfarfallio delle ombre oltre certi limiti può costituire un problema per quei lavoratori che si ritrovino con le loro postazioni proprio davanti alle pareti vetrate. Viceversa, lo sfarfallio diventa irrilevante per tutti i recettori di tipo non residenziale e dedicati ad attività che non richiedono un'assidua presenza in una stazione fissa, come ad esempio le attività agricole e agropastorali, nelle quali il personale addetto si muove in continuazione all'interno dei terreni per svolgere le proprie mansioni.

Le stesse considerazioni valgono per tutti i beni paesaggistici, manufatti, beni archeologici etc; i quali possono essere frequentati ma le persone devono, per natura dei luoghi, muoversi in continuazione e non stazionare ferme nello stesso punto per quantità considerevoli di tempo. L'unica eccezione vale per quei contesti nei quali delle persone devono svolgere dei lavori e/o passare del tempo in maniera continuativa in una certa posizione fissa rispetto alle turbine. In quel caso si procede ad uno studio approfondito esattamente come nel caso dei recettori residenziali.

2 Metodologia

Tramite una simulazione numerica con il software WindPro sono stati stimati il quantitativo di ombra annuale, il valore massimo di ombra giornaliera e i periodi di ombra (quali ore della giornata e quali periodi dell'anno) per ogni recettore. Queste grandezze dipendono dalla posizione dei recettori e dalla loro tipologia, dalla dimensione e posizione degli aerogeneratori, dall'eliofania, dall'orografia e dalla distribuzione dei venti.

2.1 Specifiche aerogeneratori

Il modello degli aerogeneratori è Vestas V162. Questi hanno altezza al mozzo di 125 m e altezza totale all'apice di 206 m. Le pale sono lunghe 79.35 m e possiedono larghezza massima di 4.3m. La velocità massima di rotazione del rotore è pari a 12.1 rpm.

2.2 Modello digitale di elevazione (DEM)

Il modello digitale di elevazione (DEM) utilizzato per effettuare le simulazioni con il software WindPro è quello fornito dalla Regione Sardegna³, con risoluzione 10 m. Inoltre si è ipotizzata l'altezza degli occhi di un generico osservatore pari a 1.6 m. L'orografia può determinare l'occlusione della vista degli aerogeneratori da parte dei recettori (Figura 2) ed in questi casi non viene considerato il possibile effetto di ombreggiamento.

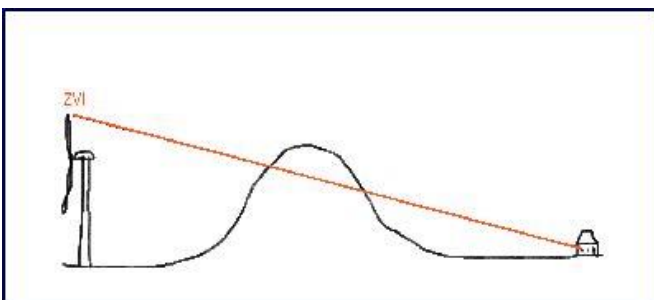


Figura 2: occlusione visiva dell'aerogeneratore rispetto al recettore, a causa dell'andamento orografico.

³ <http://www.sardegnageoportale.it/webgis2/sardegnamappe/>

2.3 Recettori

I recettori residenziali che si trovano in prossimità del parco, entro 1 km di distanza, sono riportati in tabella **Errore. L'origine riferimento non è stata trovata.** con le relative informazioni catastali e la loro localizzazione rispetto al parco. I recettori sono suddivisi per tipologia; la tipologia più rilevante è quella dei recettori residenziali (capitolo 0). In via conservativa è stato considerato il caso peggiore, ovvero che tutti i recettori siano delle serre sferiche (green house), ovvero che tutte le pareti siano trasparenti e che siano ortogonali a tutti gli aerogeneratori. In questo modo la simulazione fornisce una sovrastima degli effetti di ombra delle turbine sui recettori.

Per i recettori residenziali, se i risultati non indicano superamenti dei limiti indicati nelle linee guida, non si procede oltre, in caso contrario può essere necessario procedere a delle verifiche di dettaglio considerando le reali aperture dei ricettori (dimensioni ed orientazioni di finestre e porte). Sono presenti 5 recettori residenziali: R03, R09, R24, R28, R29.

Per i recettori non residenziali non è necessario procedere con ulteriori analisi in quanto lo shadow flickering non è impattante per questi (capitolo 0).

Tabella 1: recettori adiacenti al parco in proposta (1km).

Nome	Tipologia	E GB (m)	N GB (m)	Altitudine (m)	WTG più vicina	Distanza WTG più vicina (m)
R01	rurale - stalle - magazzini	1469633	4343371	427	WTG08	616
R02	rurale - stalle - magazzini	1470746	4342172	530	WTG09	440
R03	residenza	1470744	4343408	445	WTG09	824
R04	produttivo	1469499	4341640	494	WTG07	949
R05	rurale - stalle - magazzini	1470735	4343426	440	WTG09	841
R06	rurale - stalle - magazzini	1470960	4342269	527	WTG09	468
R07	rurale - stalle - magazzini	1469786	4343307	470	WTG08	515
R08	manufatti antropici che non prevedono presenza umana	1471043	4343472	435	WTG09	975
R09	residenza	1469799	4343260	462	WTG08	466
R10	rurale - stalle - magazzini	1470796	4342076	528	WTG09	546
R11	rurale - stalle - magazzini	1469614	4343381	416	WTG08	632
R12	rurale - stalle - magazzini	1470294	4343099	464	WTG08	533
R13	rurale - stalle - magazzini	1469596	4343366	412	WTG08	625
R14	rurale - stalle - magazzini	1470206	4343304	480	WTG08	617
R15	rurale - stalle - magazzini	1470163	4343304	473	WTG08	594
R16	produttivo	1469534	4341640	472	WTG07	954
R17	produttivo	1469547	4341665	482	WTG07	931
R18	produttivo	1470533	4342185	517	WTG09	417
R19	produttivo	1469559	4341634	461	WTG07	964
R20	produttivo	1464929	4341912	534	WTG01	396
R21	produttivo	1469068	4342014	552	WTG06	549
R22	chiese/luoghi di culto	1471621	4342718	424	WTG09	1007

Nome	Tipologia	E GB (m)	N GB (m)	Altitudine (m)	WTG più vicina	Distanza WTG più vicina (m)
R23	produttivo	1465884	4341584	527	WTG02	708
R24	residenza	1470237	4342120	527	WTG09	611
R25	manufatti antropici che non prevedono presenza umana	1471179	4341924	523	WTG09	871
R26	produttivo	1470220	4342118	526	WTG09	623
R27	rurale - stalle - magazzini	1469700	4343360	448	WTG08	585
R28	residenza	1470518	4343114	457	WTG09	532
R29	residenza	1470507	4343125	458	WTG09	545

2.4 Eliofoania e distribuzione dei venti

I problemi dovuti all'ombra degli aerogeneratori sono presenti solamente quando è presente illuminazione diretta del sole (eliofoania). I dati rilevanti nelle nostre simulazioni sono la lunghezza del dì (ovvero le ore presenti tra alba e tramonto, che non dipende dalle condizioni meteo) e le ore di illuminazione diretta. La prima varia con continuità nell'arco dell'anno, senza apprezzabili distinzioni tra le varie zone della Sardegna, mentre la seconda è variabile da zona a zona e dipende da fenomeni a grande scala che influenzano in maniera sostanzialmente uniforme l'intera superficie isolana. Di conseguenza il valore climatologico dell'eliofoania è da considerarsi lo stesso su tutta la Sardegna (fonte: ARPA Sardegna), e per questo motivo sono stati utilizzati i valori di eliofoania forniti dalla stazione meteorologica di Elmas.

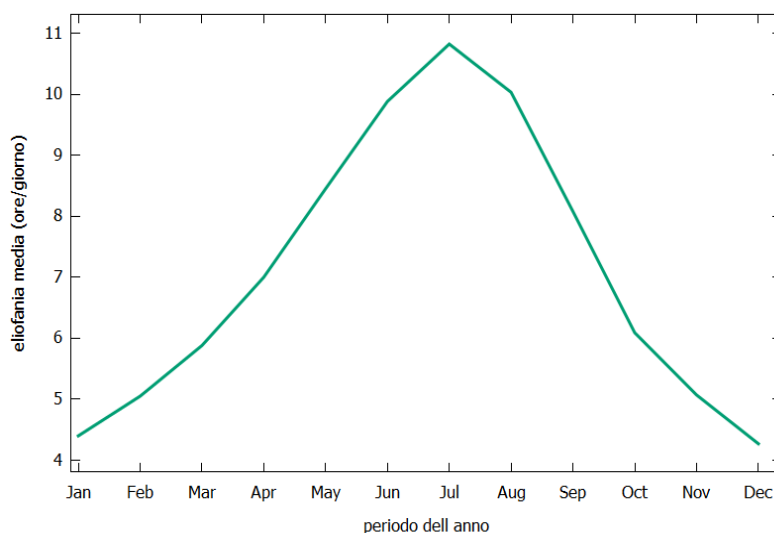


Figura 3: Eliofoania media. Dati rilevati nella stazione di Elmas (Aeronautica militare).

L'ombra che gli aerogeneratori proiettano sui recettori dipende anche dalla direzione del piano di rotazione delle pale; nello specifico, l'ombra è massima quando il piano di rotazione è perpendicolare

al recettore. L'orientamento del piano di rotazione è determinato dalla direzione del vento, quindi l'orientamento segue la distribuzione dei venti:

	N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW
ore di attività annuali	625	521	486	354	333	434	521	521	556	660	955	868

Tabella 1. Rosa dei venti. Valori scalati su un anno di attività, ovvero su un totale di 6832 ore.

Nella simulazione questo fattore è preso in considerazione, in modo da diminuire o aumentare l'ombra a seconda dell'orientamento relativo tra il piano di rotazione delle pale e i recettori. In Figura 5 è riportata la rosa dei venti in unità arbitrarie e in tabella **Errore. L'origine riferimento non è stata trovata.** la distribuzione dei venti normalizzata rispetto ad un anno di attività, ovvero al 78% di un anno, che rappresenta il tempo medio di attività del parco. Questo quantitativo di ore è quello che viene inserito come input nella simulazione per determinare la porzione di tempo nella quale una turbina ruota in una specifica direzione.

Tutte le considerazioni esposte tengono conto dei risultati delle simulazioni realistiche, ovvero simulazioni basate sull'eliofania e sulla distribuzione dei venti (a differenza della simulazione rispetto al caso peggiore in cui non se ne tiene conto).

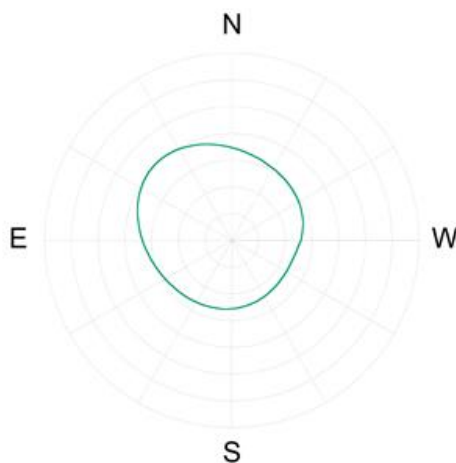


Figura 4: rosa dei venti per la località del parco in proposta in unità arbitrarie.

2.5 Effetti cumulativi

Non sono presenti altri parchi eolici nelle vicinanze del parco proposto, quindi ci si è limitati a considerare unicamente il parco proposto nelle analisi che seguono.

3 Risultati

3.1 Recettori

Nome	Tipologia	ombra (ore/anno)	massimo ombra giornaliera (min/giorno)	Giornate di ombra all'anno
R01	rurale - stalle - magazzini	31	30	83
R02	rurale - stalle - magazzini	8	10	72
R03	residenza	9	13	63
R04	produttivo	0	0	0
R05	rurale - stalle - magazzini	10	13	66
R06	rurale - stalle - magazzini	10	10	84
R07	rurale - stalle - magazzini	38	32	95
R08	manufatti antropici che non prevedono presenza umana	5	10	51
R09	residenza	45	35	95
R10	rurale - stalle - magazzini	8	10	84
R11	rurale - stalle - magazzini	30	30	83
R12	rurale - stalle - magazzini	45	28	173
R13	rurale - stalle - magazzini	32	30	89
R14	rurale - stalle - magazzini	29	22	104
R15	rurale - stalle - magazzini	29	24	101
R16	produttivo	0	0	0
R17	produttivo	0	0	0
R18	produttivo	16	12	129
R19	produttivo	0	0	0
R20	produttivo	16	14	108
R21	produttivo	14	14	99
R22	chiese/luoghi di culto	8	15	57
R23	produttivo	5	7	51
R24	residenza	9	10	81
R25	manufatti antropici che non prevedono presenza umana	3	8	42
R26	produttivo	9	10	84
R27	rurale - stalle - magazzini	30	31	83
R28	residenza	27	21	140
R29	residenza	26	21	140

Tabella 2: Ombra proiettata sui recettori. Caso realistico che tiene conto dell'eliofania e della rosa dei venti.

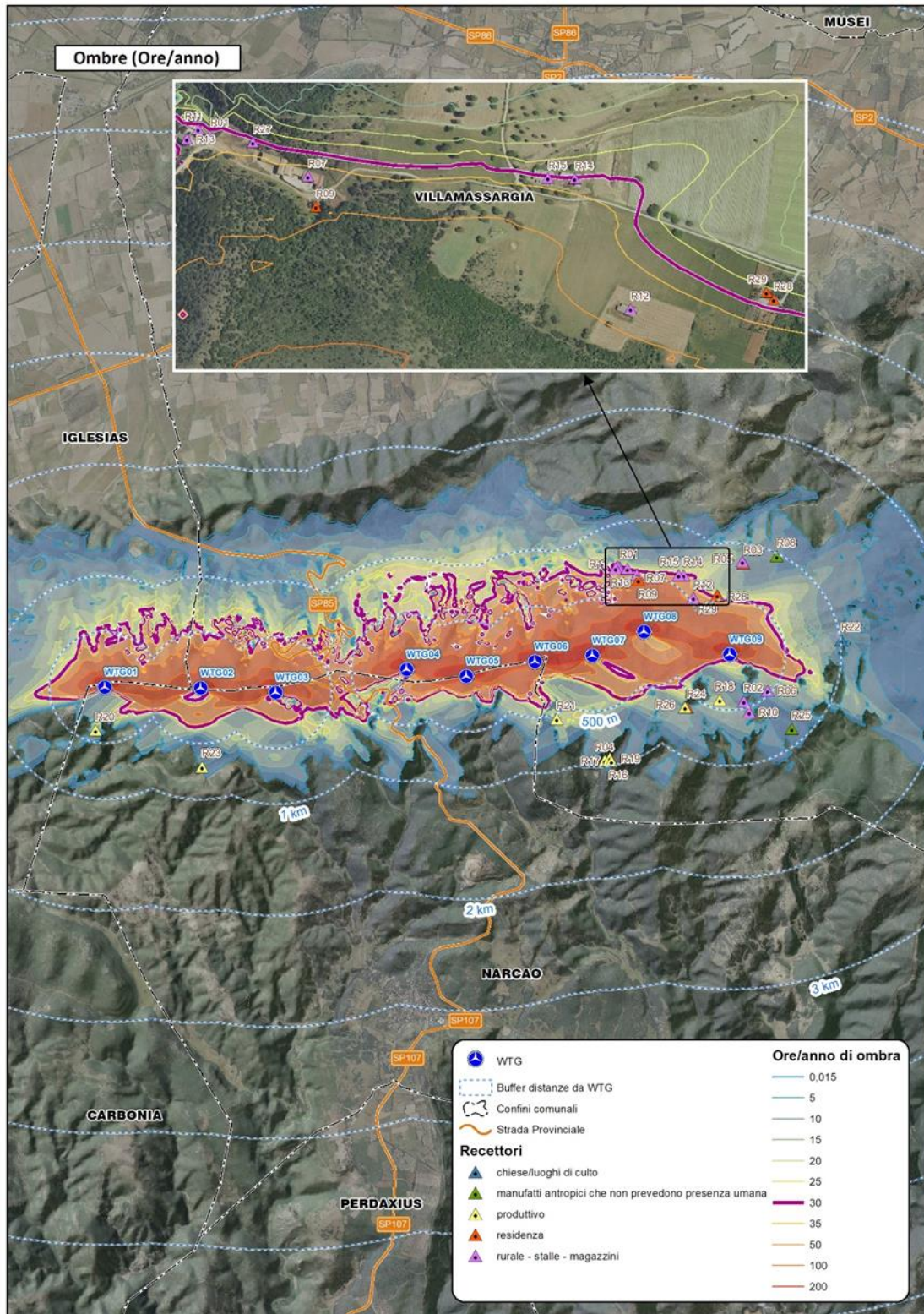


Figura 5: Ore di ombra totale all'anno su ortofoto, caso realistico che tiene conto dell'eliofania e della rosa dei venti. Sono presenti tutti i recettori. L'isolinea viola delimita al suo interno regioni con ombra >30 ore/anno e al suo esterno regioni con ombra <30 ore/anno.

In Figura 5 sono riportati i risultati della simulazione di ore totali di ombra all'anno, la zona ad alto impatto (ombra > 30 ore/anno) è delimitata dalla curva viola. I relativi valori sono tabulati in tabella Errore. L'origine riferimento non è stata trovata.. Dei recettori residenziali solamente il recettore R09

ricade nell'area con ombreggiatura maggiore di 30 ore/anno e non subisce mai un ombreggiatura maggiore di 35 minuti in un singolo giorno. I restanti recettori con con ombreggiatura > 30 ore/anno sono di tipo rurale-stalle-magazzini.

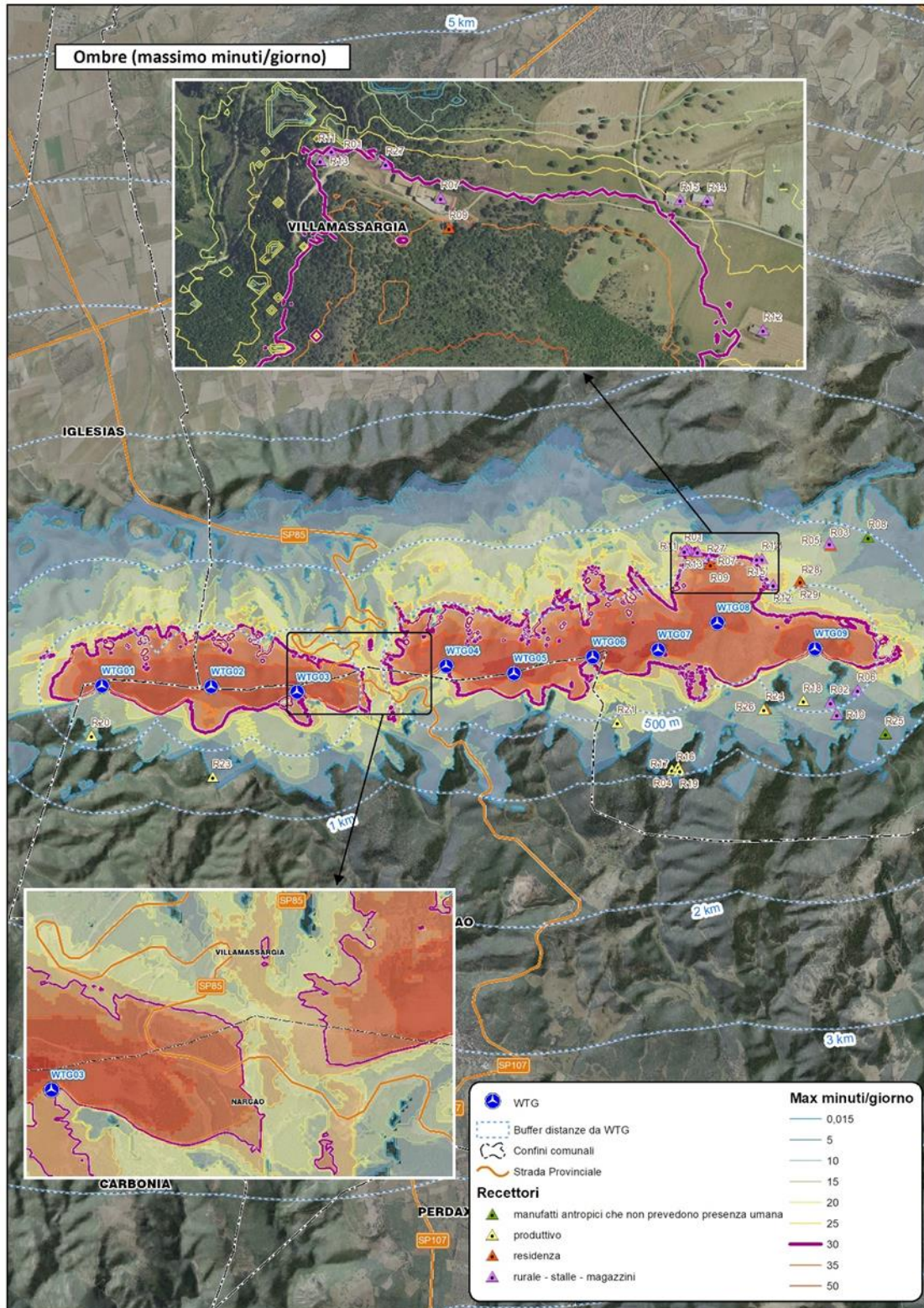


Figura 6: massimo tempo di ombreggiatura giornaliera (minuti/giorno), caso realistico che tiene conto dell'eliofania e della rosa dei venti. L'isolinea viola delimita le zone a basso impatto (ombra < 30 min/giorno) dalle zone ad alto impatto (ombra > 30 minuti/giorno).

In Figura 6 è riportato il massimo numero di minuti di ombra percepita dai recettori in un singolo giorno realisticamente; I recettori R01, R11, R13, R27, R07, R09 ricadono nella zona con ombreggiatura massima giornaliera > 30 min/giorno. Di questi solamente il recettore R09 è classificato come residenziale.

3.2 flickering

Le turbine in proposta (Vestas V162) hanno una velocità massima di rotazione pari a 12.1 rpm, ossia 0.6Hz poiché la turbina è composta di 3 pale. Affinché si verifichi il fenomeno di flickering con almeno 3Hz (soglia minima per soggetti fotosensibili, vedi capitolo 1) è necessario dunque che 4 o più turbine siano allineate rispetto ad un recettore; questo non avviene in nessun caso per i recettori considerati.

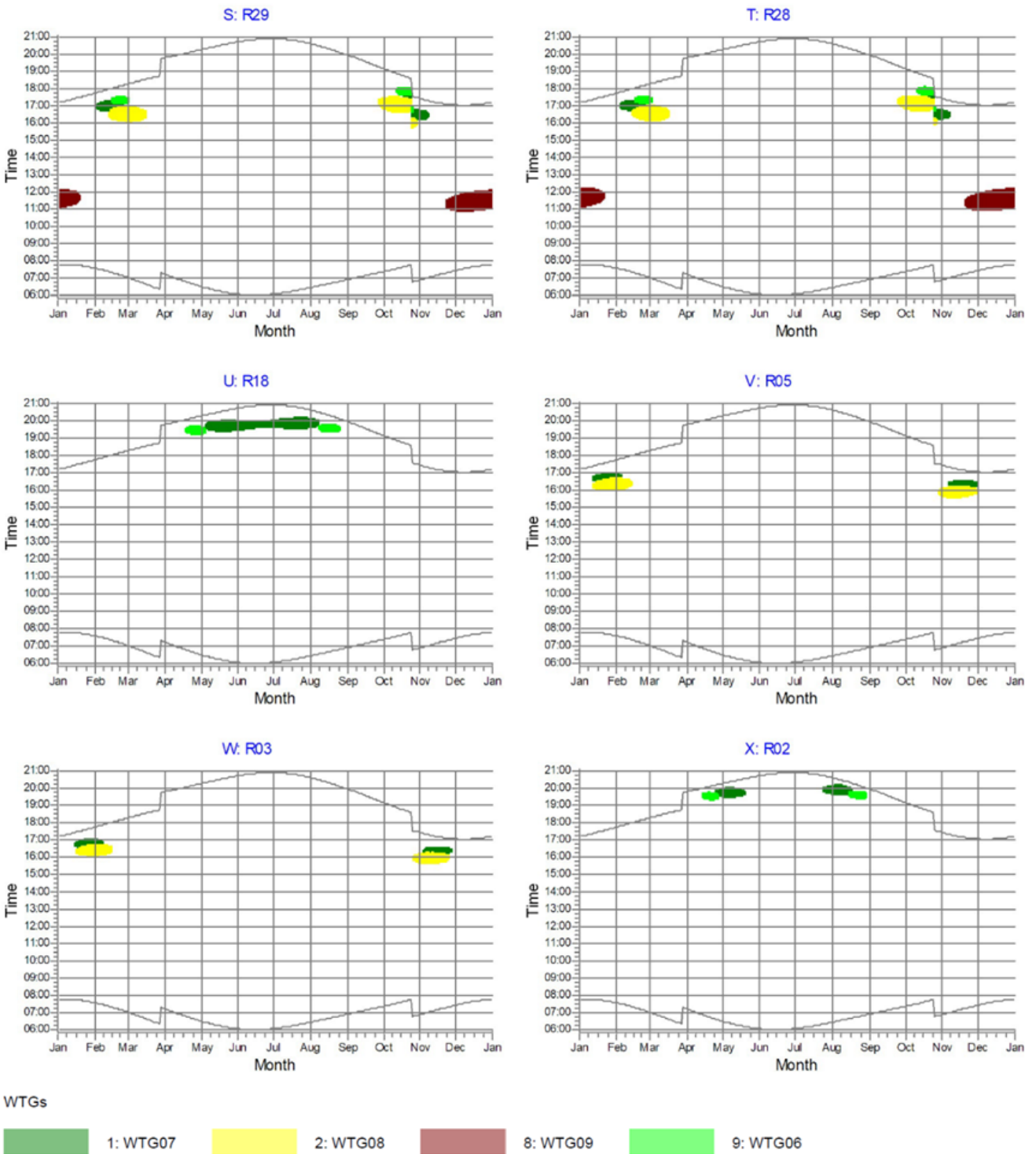


Figura 7: Calendario grafico ombre per ogni recettore nel caso peggiore, senza tenere conto di eliofania e rosa dei venti. Le linee continue indicano l'ora di alba e tramonto. Le macchie colorate indicano il periodo dell'anno e le ore nelle quali i recettori sono interessati dall'ombra di una WTG.

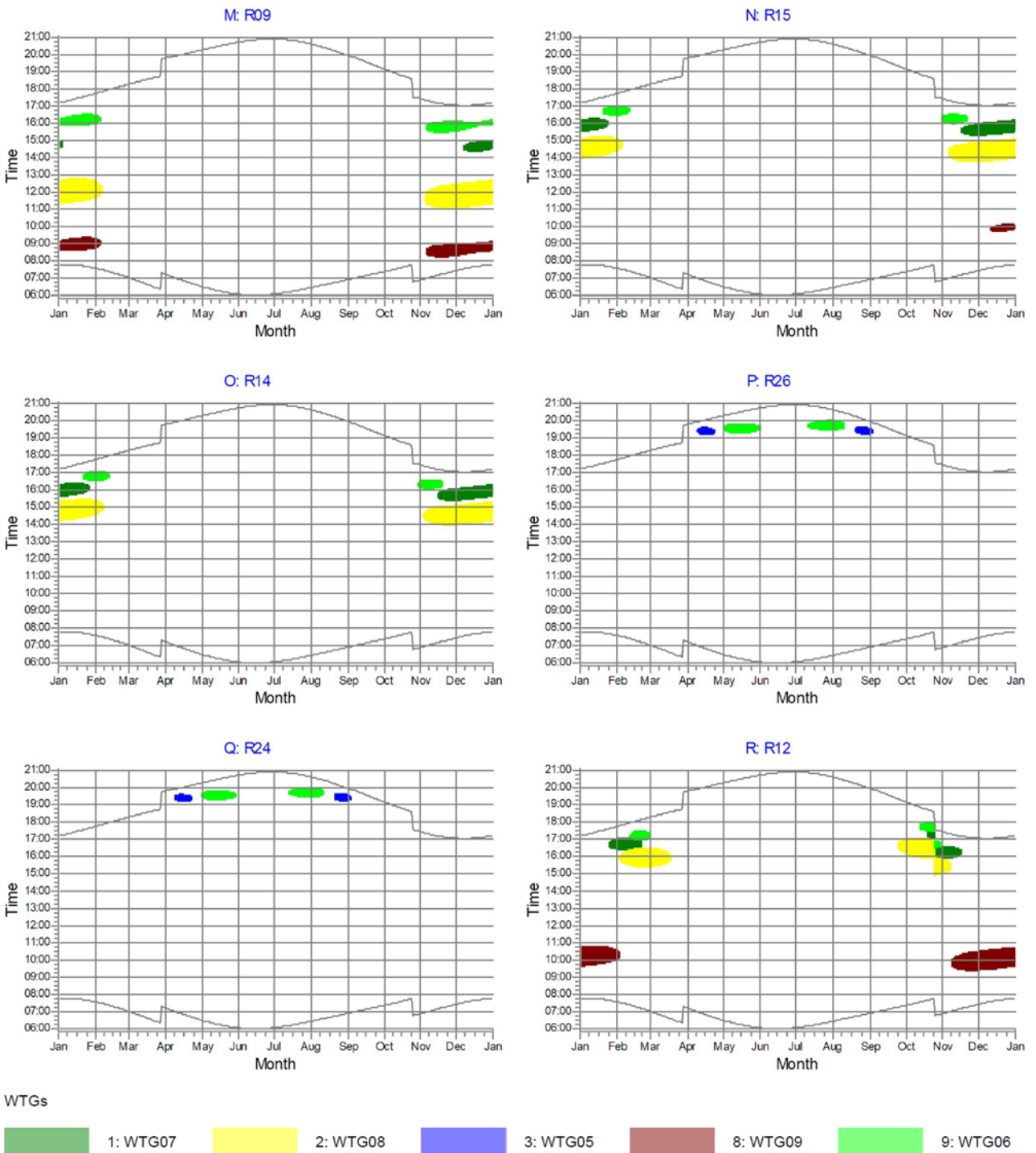


Figura 8: Calendario grafico ombre per ogni recettore nel caso peggiore. Il recettore R09 subisce ombra da WTG09 durante la mattina, da WTG08 a metà giornata e da WTG06, WTG07 la sera.

Per completezza si riporta che il gruppo di recettori R03, R05, R08 subiscono ombra contemporaneamente dalle turbine WTG007 e WTG008; mentre i recettori R28 e R29 subiscono ombra contemporaneamente dalle turbine (WTG007,WTG008) e (WTG006,WTG007), ma mai da tutte e tre (WTG006,WTG007,WTG008) contemporaneamente. Le sovrapposizioni di ombra per i recettori R28 e R29 avvengono in orari compresi tra le 16:14 e le 17:45 e mai per più di 7 minuti in

un singolo giorno. Sebbene i recettori WTG 03,05,08,28,29 subiscano contemporaneamente l'ombra di fino a 2 turbine per volta, nessuno di essi subisce un ombreggiatura annua maggiore di 30 ore/anno. Questi dati possono essere visualizzati nei valori tabulati presenti in appendice e nei calendari grafici come riportato nella Figura 7 e Figura 8, dove nelle ascisse sono presenti i diversi periodi dell'anno e nelle ordinate le ore del giorno mentre le macchie colorate indicano i periodi di ombra. Queste figure sono fatte nello scenario "worst case" ovvero quello che non tiene conto della direzione del vento, dei periodi di attività delle turbine e dell'eliofania.

Il recettore R09, che subisce un ombreggiatura annua di 45 ore/anno non subisce mai l'ombra contemporanea di più turbine, cioè solamente una turbina per volta proietta la propria ombra sul recettore R09; questo e la modesta velocità di rotazione delle pale (12.1 rpm cioè frequenza di flickering 0.6Hz) implicano che il fenomeno di flickering a 3Hz è assente per il recettore R09.

In conclusione le simulazioni indicano che nessun recettore subisce il fenomeno di flickering a 3Hz o superiore, in quanto il numero massimo di turbine che proiettano ombra contemporaneamente è 2, mentre sarebbe necessaria l'ombra contemporanea di 4 turbine allineate.

3.3 Strade

Le strade provinciali e statali sono riportate in fig.6. La strada provinciale più vicina al parco è la SP85 che lo attraversa tra la WTG03 e la WTG04. In prossimità della WTG03, al confine tra i comuni di Narcao e Villamassargia, la strada SP85 entra dentro una zona con ombreggiatura giornaliera massima > 30 min/giorno.

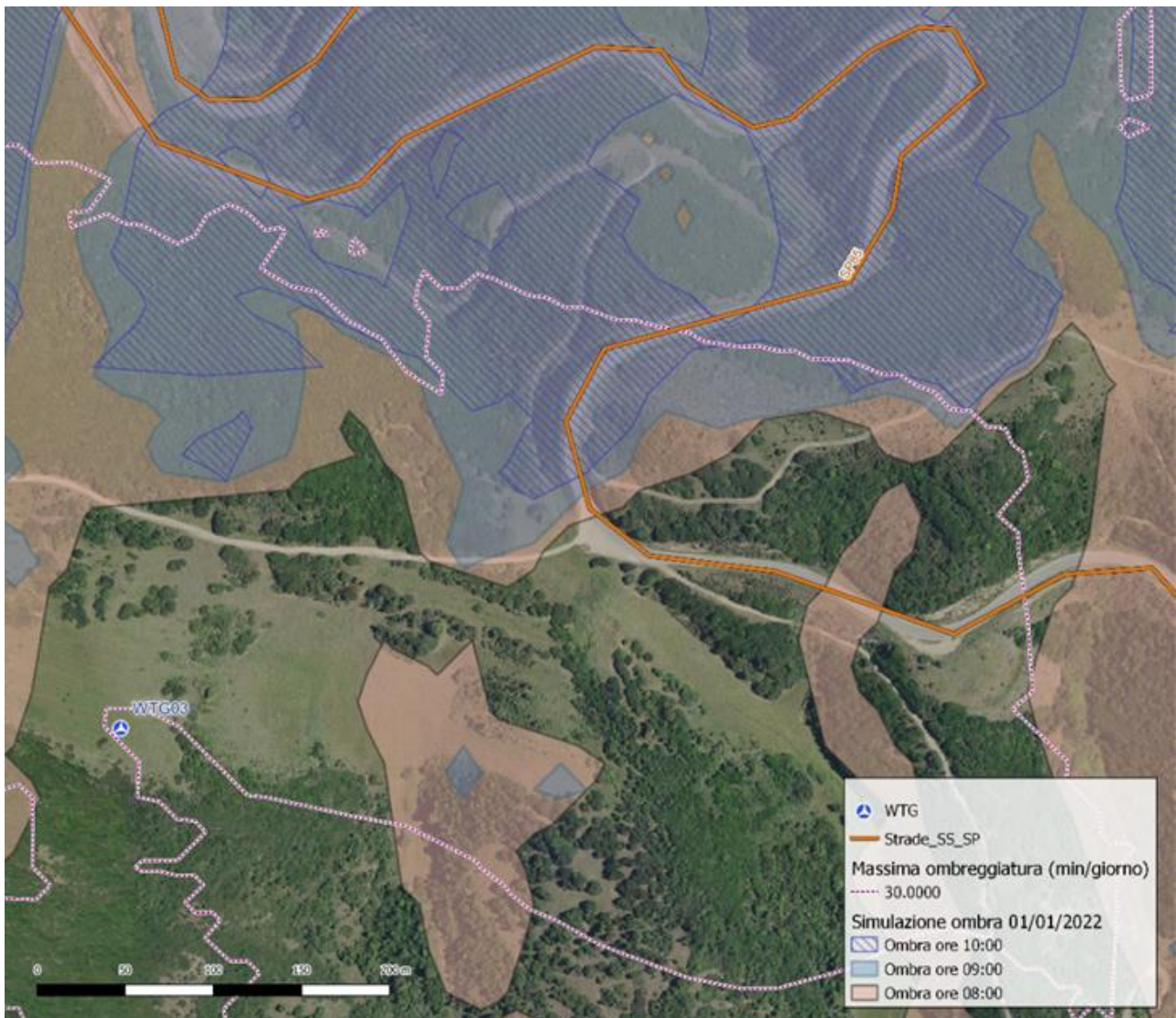


Figura 9: Simulazione ombreggiatura per strada SP85. In viola il perimetro della superficie che subisce ombreggiatura max giornaliera > 30 min/giorno a causa delle turbine del parco in proposta. Le superfici rosa, blu, tratteggiate corrispondono all'ombreggiatura dovuta al territorio (DTM, non DSM) limitrofo alle ore 08,09,10AM rispettivamente. Sono ottenute via simulazione r.sunmask.position (GRASS) impostata al 01/01/2022 e non sono dovute a nessuna WTG, ma solo al territorio circostante.

È stata eseguita una simulazione di ombreggiatura al 01/01/2022 dovuta alla conformazione del territorio circostante la strada SP85. Per questa simulazione è stato usato il DTM che non tiene conto della presenza di vegetazione e che quindi sottostima la reale ombreggiatura. Dal risultato della simulazione in Figura 9 si evince che la strada SP85 subisce un'ombreggiatura di diverse ore/giorno nelle mattine invernali. Questo elemento indica che la strada considerata subisce già una notevole quantità di ombra e che il parco apporta solamente una modesta aggiunta all'ammontare di ombra giornaliera subita.

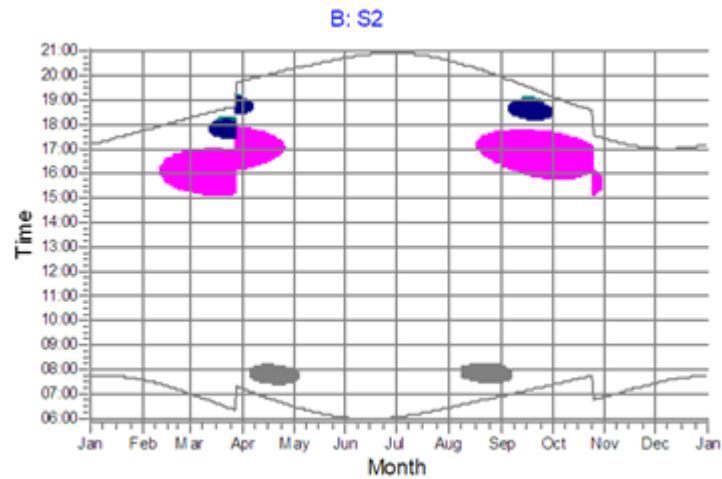


Figura 10: calendario grafico ombreggiatura delle WTG sulla SP85 nell'area dove l'ombra massima giornaliera > 30min/giorno (fig.9). In grigio WTG04, in fuxia WTG03 e in blu WTG02. Questa immagine è ricavata dallo scenario "caso peggiore", senza tenere conto di eliofania e rosa dei venti.

Inoltre notiamo dalla Figura 10 che la strada subisce quasi tutta l'ombreggiatura da parte delle turbine durante la sera, in orari compresi tra le 15:00 e le 19:00 (caso peggiore), mentre invece sono principalmente le ore mattutine che pongono un problema ai fini della formazione del ghiaccio. L'ombra della turbina WTG04 incide sulla strada durante le ore mattutine dei periodi primaverili e estivi, durante i mesi di Aprile e Agosto (Figura 10).

Infine menzioniamo che la maggior parte dell'ombreggiatura che la SP85 subisce è dovuta alla turbina WTG03, che si trova posizionata (grossomodo) ortogonalmente rispetto alla direzione del vento dominante (Figura 4) e che quindi l'area dell'ombra proiettata è minore rispetto al caso peggiore di Figura 10.

Tutti questi elementi assieme permettono di concludere che l'impatto dell'ombreggiatura sulla strada SP85 è trascurabile in quanto l'ombra delle turbine è assente durante le mattine invernali e l'ombra subita dalla strada a causa dei rilievi circostanti è notevolmente maggiore rispetto a quella proiettata dalle turbine.

4 Conclusioni

Sono presenti 5 recettori residenziali nell'intorno del parco in proposta (1 km), dei quali il recettore R09 riceve un ombreggiatura pari a 45 ore/anno, mentre i restanti subiscono una quantità inferiore a 30 ore/anno. Tra i restanti recettori (non residenziali) notiamo che R01, R07, R11, R12, R13, R27 ricadono nell'area con ombreggiatura annuale > 30 ore/anno.

I recettori R03, R05, R08 (non residenziali) e R28, R29 (residenziali), in certi periodi dell'anno, subiscono contemporaneamente ombreggiatura da massimo 2 turbine per volta, tuttavia questo genera una frequenza media di flickering di 1.2 Hz, che rimane al di sotto della soglia di frequenza 3Hz (paragrafo 1) e non superano mai l'ombreggiatura annua di 30 ore/anno. Da questo traiamo la conclusione che il fenomeno di flickering a 3Hz non si presenta in nessun recettore considerato (residenziale e non).

La strada provinciale SP85 attraversa una zona con ombreggiatura massima giornaliera > 30 min/giorno, tuttavia l'impatto creato dal parco in proposta risulta trascurabile se confrontato con la naturale ombreggiatura proiettata sulla strada dal territorio circostante (paragrafo 3.3).

5 Appendice

Si riportano in appendice il calendario grafico e tabellare per ogni recettore e per ogni turbina. Le metodologie di lettura delle tabelle e dei grafici sono state esposte nei precedenti paragrafi.

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 10:44 / 1

Licensed user:

Ing. Bruno Manca

Via Vittorio Veneto 231

IT-09028 Sestu

+390702358125

BrunoManca / ingbrunomanca@gmail.com

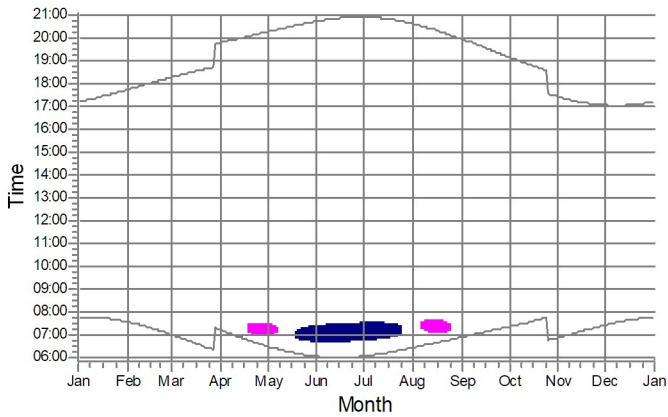
Calculated:

19/04/2022 15:00/2.8.579

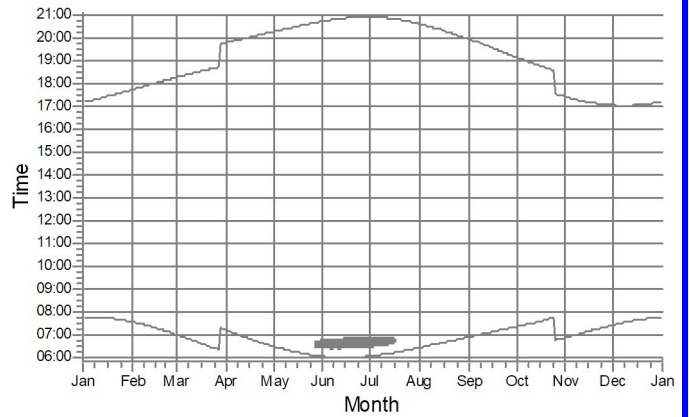
SHADOW - Calendar, graphical

Calculation: Is Coris

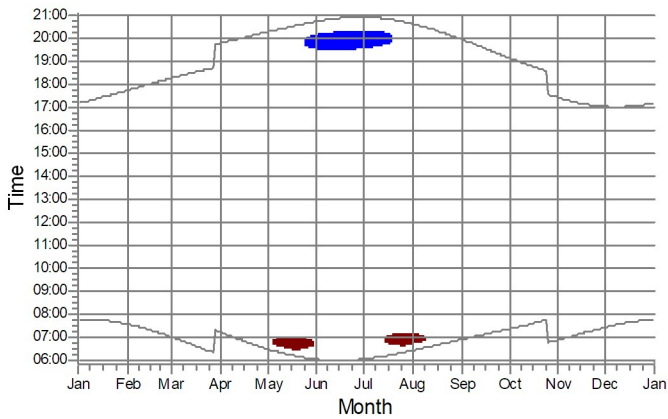
A: R20



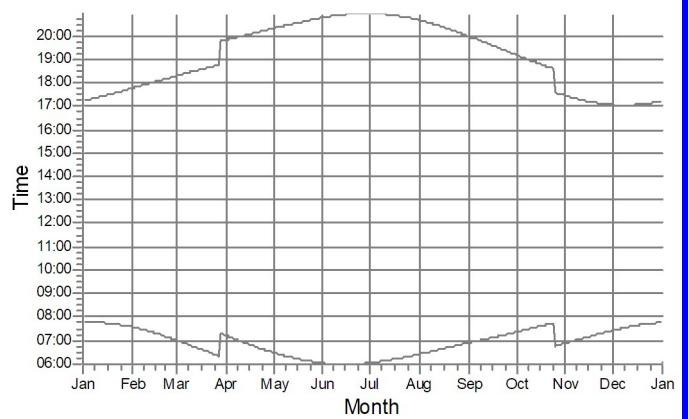
B: R23



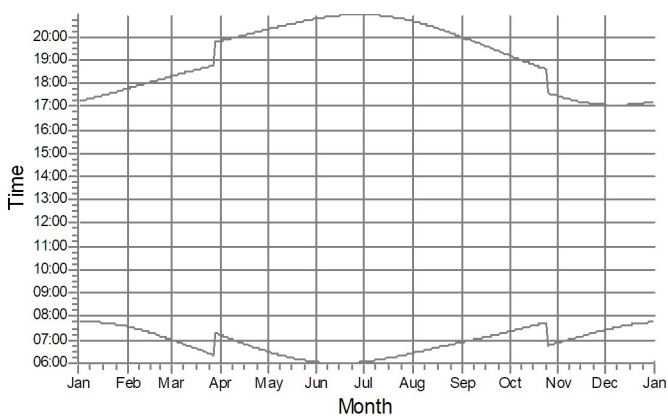
C: R21



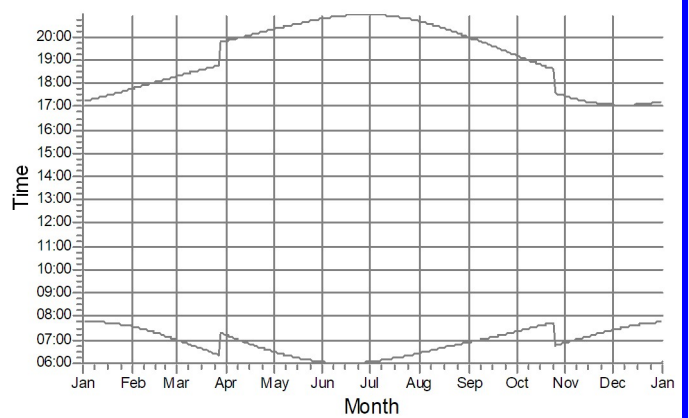
D: R04



E: R16



F: R17



WTGs

- 3: WTG05
- 4: WTG04
- 5: WTG03
- 7: WTG02
- 8: WTG09

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 10:44 / 2

Licensed user:

Ing. Bruno Manca

Via Vittorio Veneto 231

IT-09028 Sestu

+390702358125

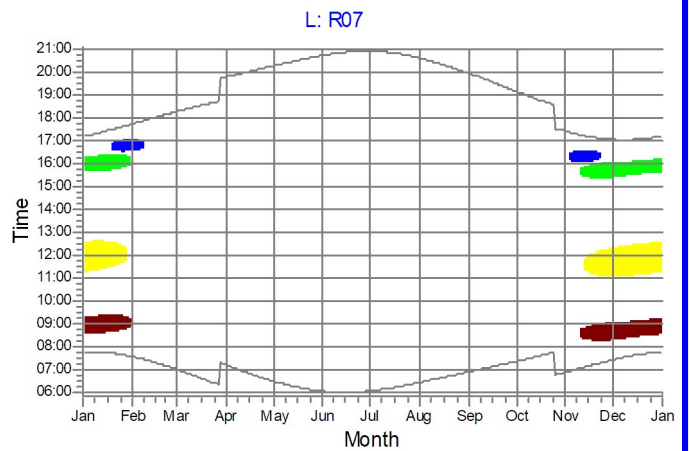
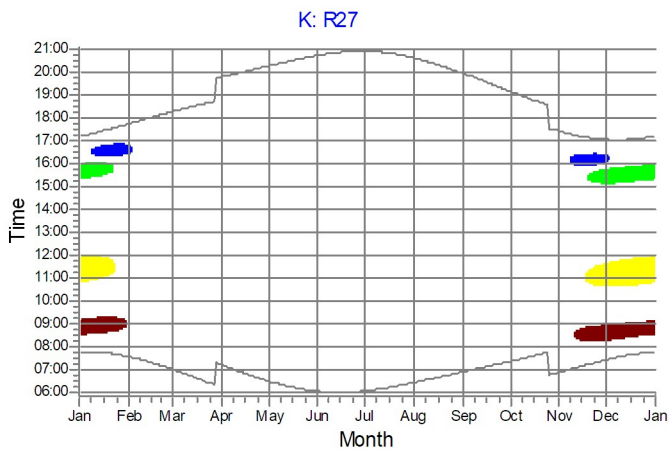
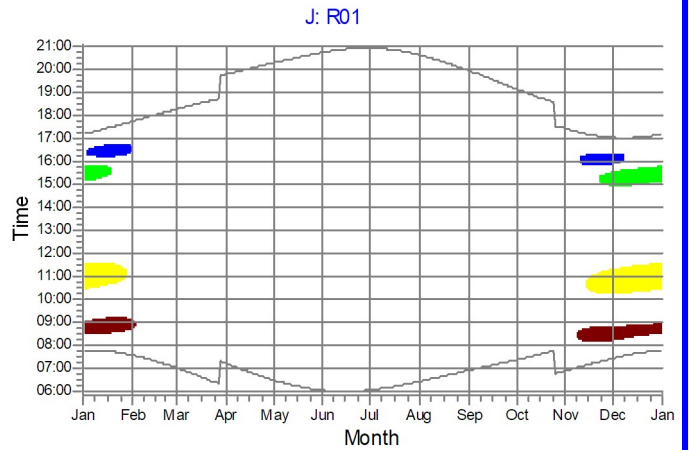
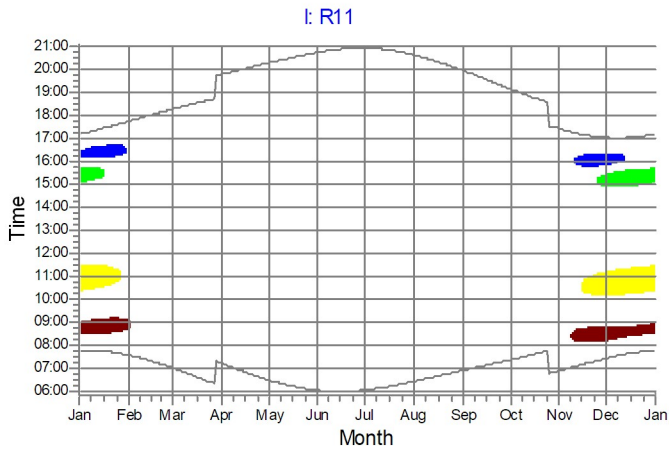
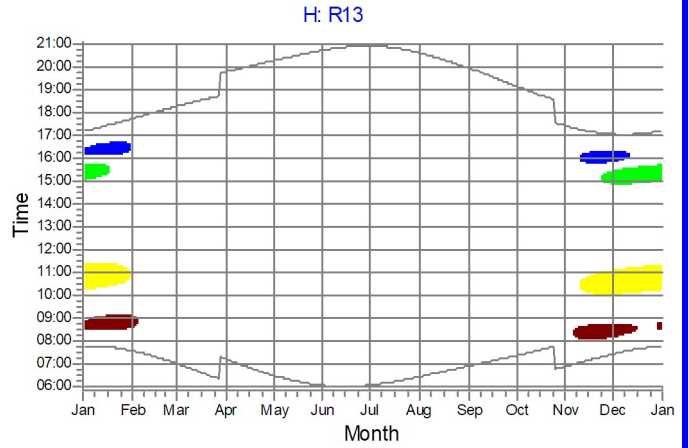
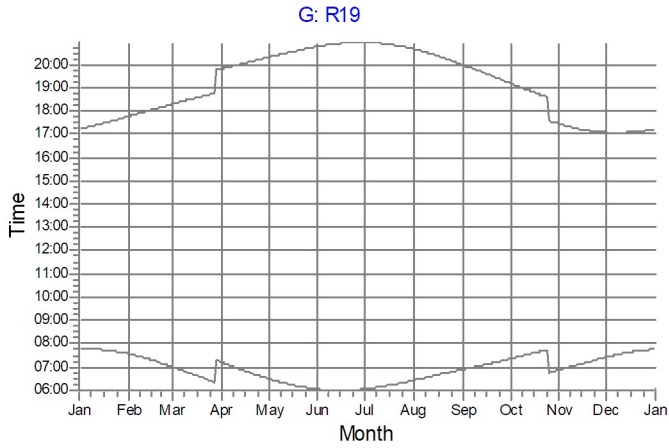
BrunoManca / ingbrunomanca@gmail.com

Calculated:

19/04/2022 15:00/2.8.579

SHADOW - Calendar, graphical

Calculation: Is Coris



WTGs



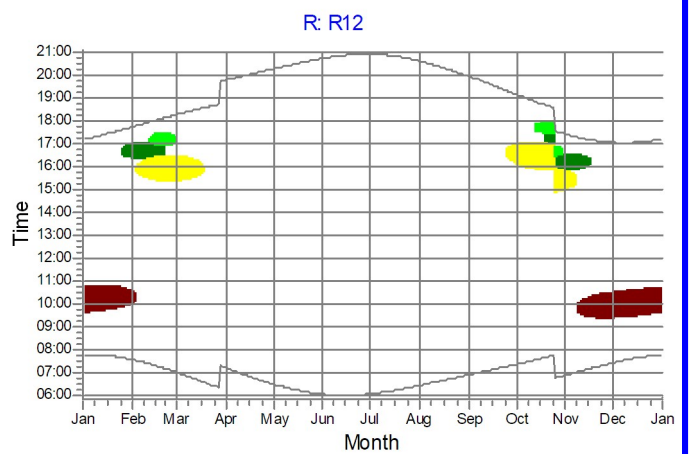
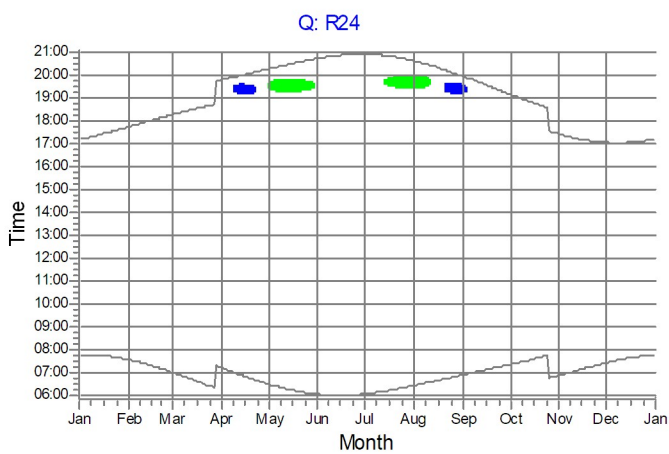
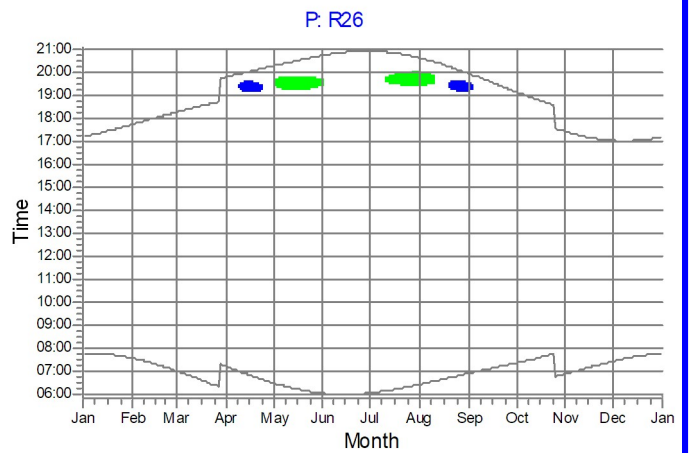
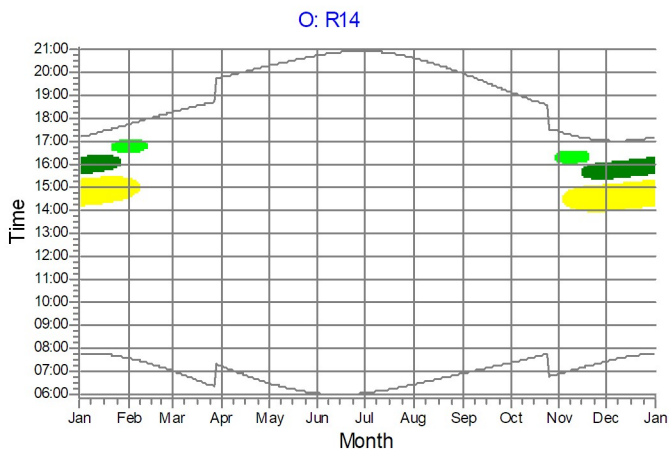
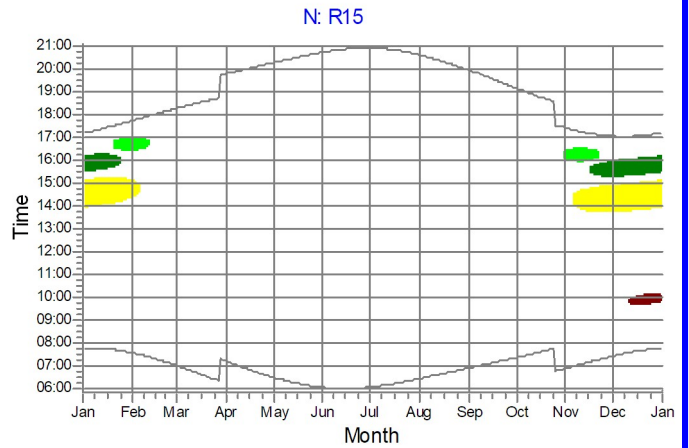
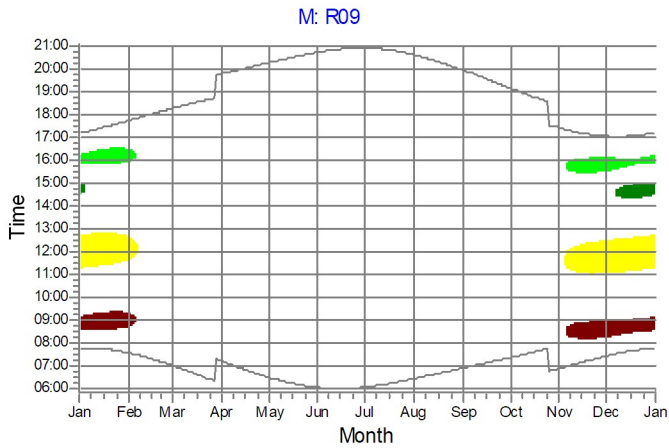
Project:
Villamassargia WindPro

Printed/Page
 20/04/2022 10:44 / 3

Licensed user:
Ing. Bruno Manca
 Via Vittorio Veneto 231
 IT-09028 Sestu
 +390702358125
 BrunoManca / ingbrunomanca@gmail.com
 Calculated:
 19/04/2022 15:00/2.8.579

SHADOW - Calendar, graphical

Calculation: Is Coris



WTGs

- 1: WTG07
- 2: WTG08
- 3: WTG05
- 8: WTG09
- 9: WTG06

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 10:44 / 4

Licensed user:

Ing. Bruno Manca

Via Vittorio Veneto 231

IT-09028 Sestu

+390702358125

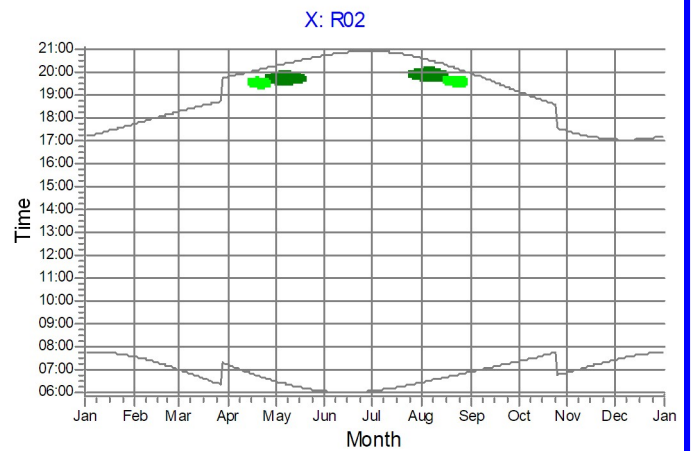
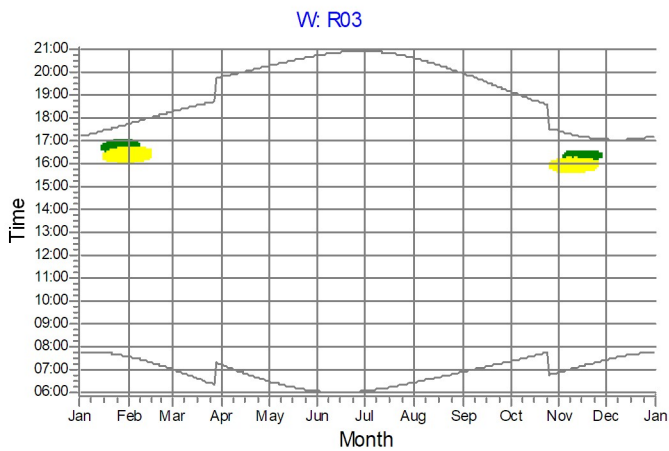
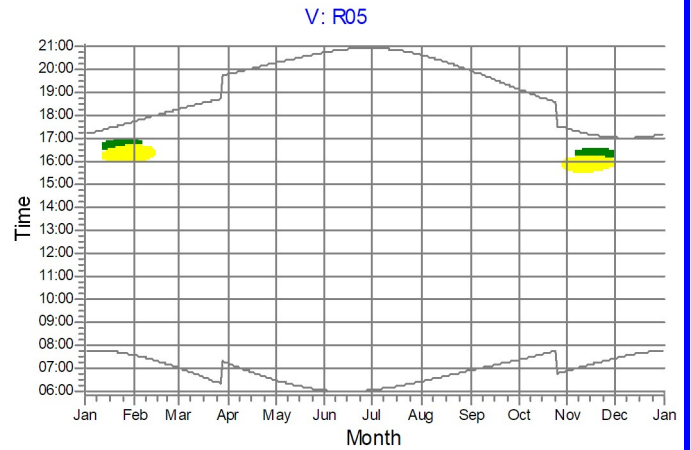
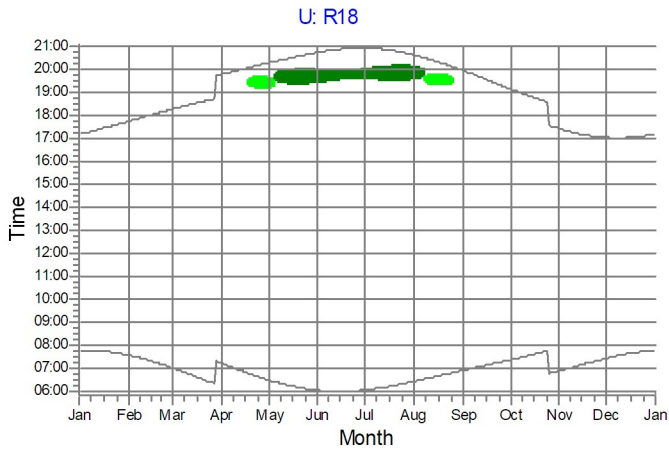
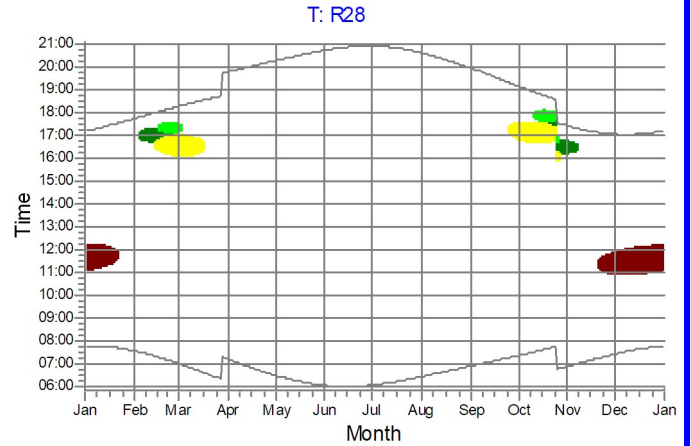
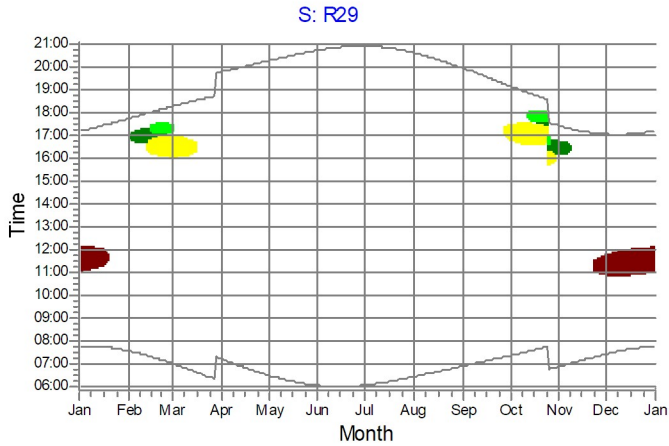
BrunoManca / ingbrunomanca@gmail.com

Calculated:

19/04/2022 15:00/2.8.579

SHADOW - Calendar, graphical

Calculation: Is Coris



WTGs

1: WTG07
 2: WTG08
 8: WTG09
 9: WTG06

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 10:44 / 5

Licensed user:

Ing. Bruno Manca

Via Vittorio Veneto 231

IT-09028 Sestu

+390702358125

BrunoManca / ingbrunomanca@gmail.com

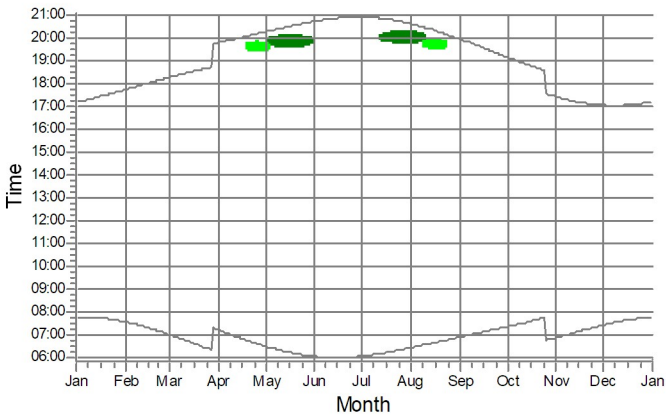
Calculated:

19/04/2022 15:00/2.8.579

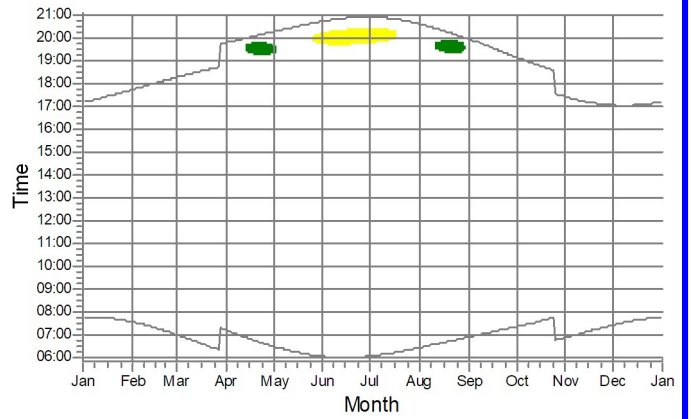
SHADOW - Calendar, graphical

Calculation: Is Coris

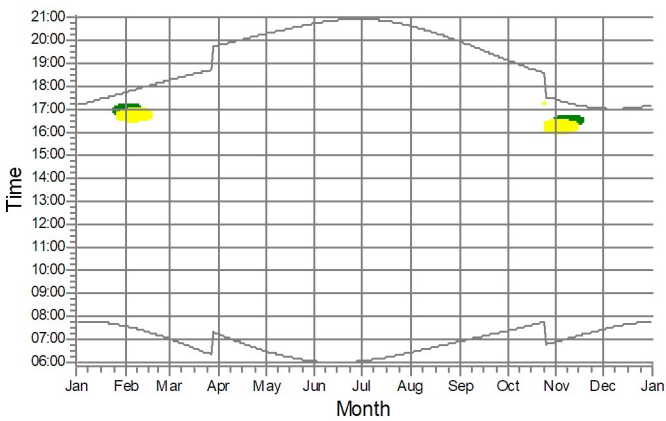
Y: R10



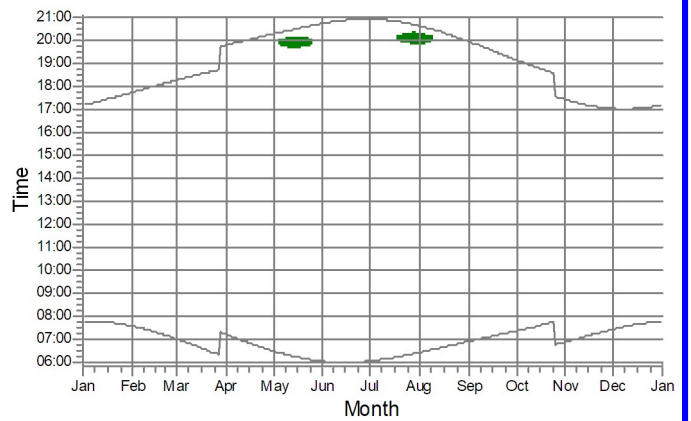
Z: R06



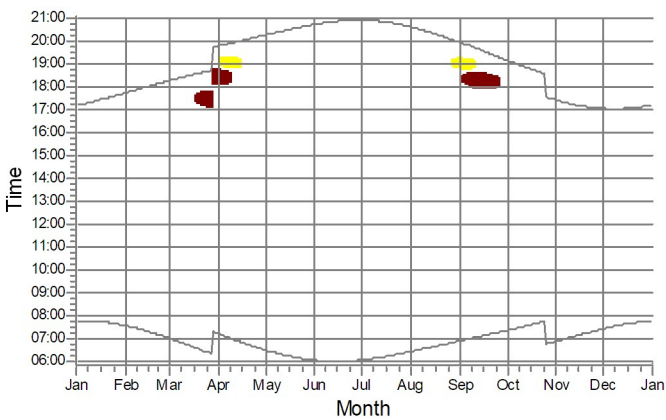
AA: R08



AB: R25



AC: R22



WTGs

- 1: WTG07
- 2: WTG08
- 8: WTG09
- 9: WTG06

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 11:09 / 1

Licensed user:

Ing. Bruno Manca

Via Vittorio Veneto 231

IT-09028 Sestu

+390702358125

BrunoManca / ingbrunomanca@gmail.com

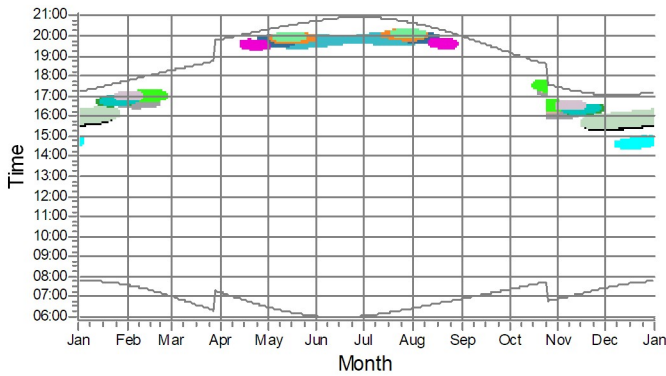
Calculated:

19/04/2022 15:00/2.8.579

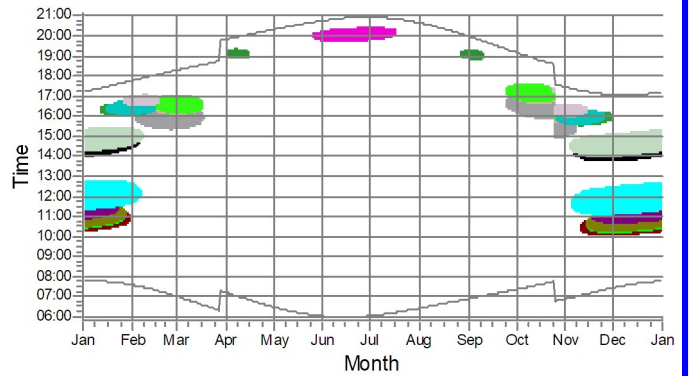
SHADOW - Calendar per WTG, graphical

Calculation: Is Coris

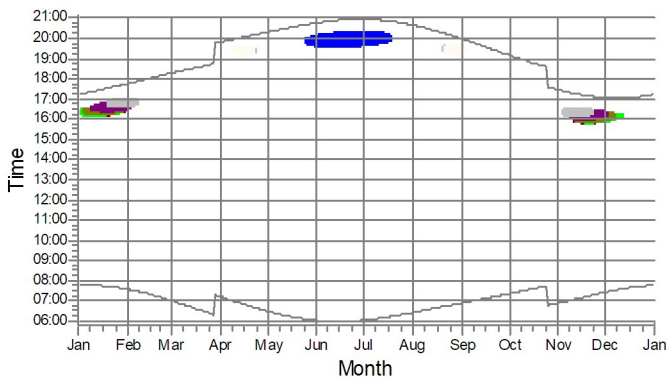
1: WTG07



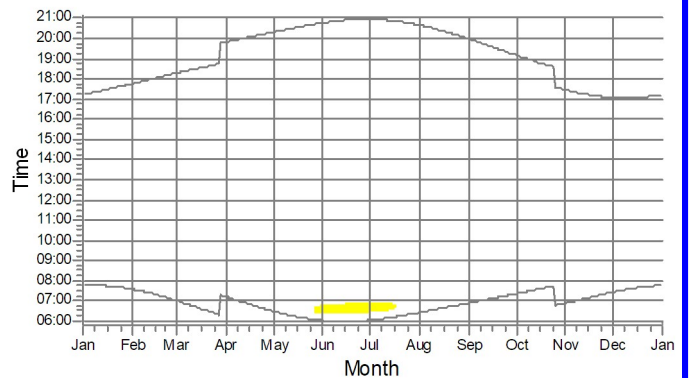
2: WTG08



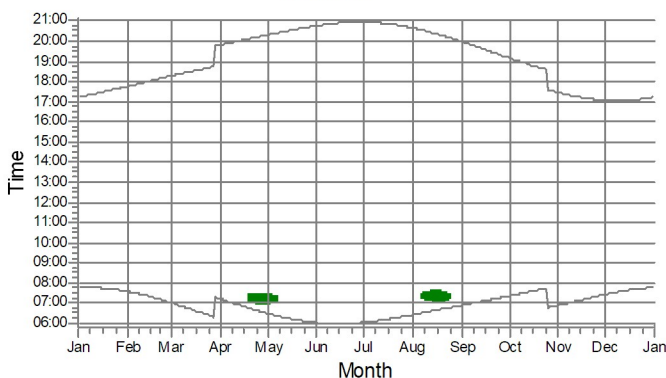
3: WTG05



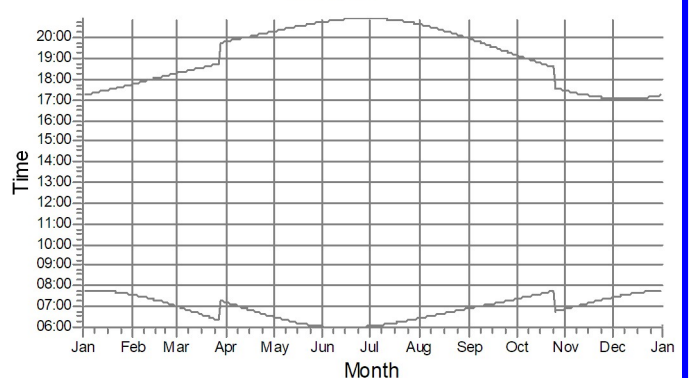
4: WTG04











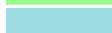








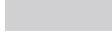

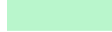





5: WTG03



6: WTG01



Shadow receptors

 A: R20	 J: R01	 O: R14	 T: R28	 Y: R10
 B: R23	 K: R27	 P: R26	 U: R18	 Z: R06
 C: R21	 L: R07	 Q: R24	 V: R05	 AA: R08
 H: R13	 M: R09	 R: R12	 W: R03	 AB: R25
 I: R11	 N: R15	 S: R29	 X: R02	 AC: R22

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 11:09 / 2

Licensed user:

Ing. Bruno Manca

Via Vittorio Veneto 231

IT-09028 Sestu

+390702358125

BrunoManca / ingbrunomanca@gmail.com

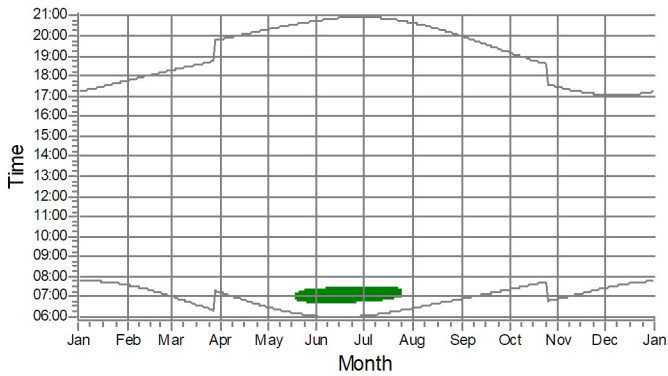
Calculated:

19/04/2022 15:00/2.8.579

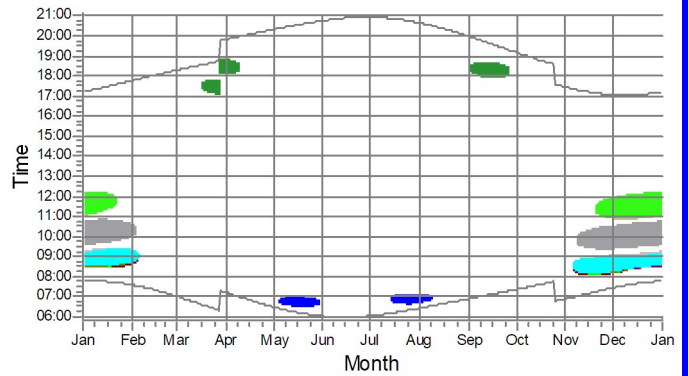
SHADOW - Calendar per WTG, graphical

Calculation: Is Coris

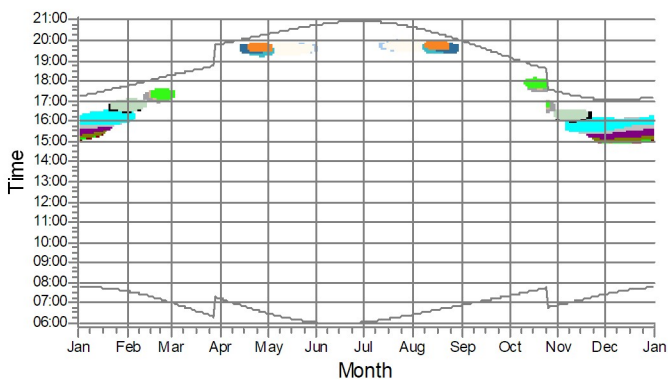
7: WTG02










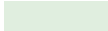



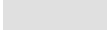
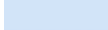






8: WTG09



9: WTG06



Shadow receptors

 A: R20	 J: R01	 N: R15	 R: R12	 X: R02
 C: R21	 K: R27	 O: R14	 S: R29	 Y: R10
 H: R13	 L: R07	 P: R26	 T: R28	 AC: R22
 I: R11	 M: R09	 Q: R24	 U: R18	

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 11:08 / 1

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 1 - WTG07

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
625 521 486 354 333 434 521 521 556 660 955 868 6.834
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:46 14:37-14:55/18 17:13 15:33-16:16/43	07:34 16:28-17:10/42 17:46	07:00 07:12 18:17 19:49	06:29 19:28-19:35/7 20:18 19:35-19:55/20	06:02 19:31-19:58/27 20:46	
2	07:46 14:38-14:54/16 17:14 15:34-16:17/43	07:33 16:27-17:10/43 17:47	06:59 07:10 18:19 19:50	06:27 19:33-19:57/24 20:19 20:46	06:01 19:31-19:58/27 20:46	
3	07:46 14:40-14:53/13 17:15 15:34-16:17/43	07:32 16:27-17:11/44 17:48	06:57 07:09 18:20 19:51	06:26 19:33-19:56/23 20:20 19:56-19:58/2	06:01 19:32-19:58/26 20:47	
4	07:46 14:42-14:52/10 17:16 15:35-16:17/42	07:31 16:27-17:10/43 17:49	06:56 07:07 18:21 19:52	06:25 19:32-19:59/27 20:21 20:48	06:01 19:33-19:58/25 20:48	
5	07:46 15:35-16:18/43 17:16	07:30 16:26-17:10/44 17:50	06:54 07:06 18:22 19:53	06:24 19:32-20:00/28 20:22 20:48	06:00 19:33-19:57/24 20:48	
6	07:46 15:36-16:18/42 17:17	07:29 16:26-17:10/44 17:52	06:53 07:04 18:23 19:54	06:23 19:32-20:01/29 20:23 20:49	06:00 19:34-19:57/23 20:49	
7	07:46 15:37-16:19/42 17:18	07:28 16:26-17:11/45 17:10-17:11/1 17:53 16:48-16:50/2	06:51 07:03 18:24 19:55	06:22 19:32-20:02/30 20:24 20:50	06:00 19:34-19:57/23 20:50	
8	07:46 15:37-16:19/42 17:19	07:27 16:26-17:11/45 17:54 17:10-17:12/2	06:50 07:01 18:25 19:56	06:21 19:32-20:03/31 20:25 20:50	06:00 19:35-19:57/22 20:50	
9	07:46 15:38-16:20/42 17:20	07:26 16:26-17:09/43 17:55 17:08-17:14/6	06:48 07:00 18:26 19:57	06:19 19:32-20:03/31 20:26 20:51	05:59 19:36-19:56/20 20:51	
10	07:46 15:38-16:19/41 17:21	07:25 16:27-17:07/40 17:56 17:06-17:15/9	06:47 06:58 18:27 19:58	06:18 19:31-20:04/33 20:27 20:51	05:59 19:36-19:55/19 20:51	
11	07:45 15:39-16:20/41 17:22	07:24 16:27-17:16/49 17:57	06:45 06:57 18:28 19:59	06:17 19:30-20:05/35 20:28 20:52	05:59 19:36-19:55/19 20:52	
12	07:45 15:40-16:21/41 17:23	07:23 16:27-17:15/48 17:59	06:44 06:55 18:29 20:00	06:16 19:29-20:06/37 20:29 20:52	05:59 19:37-19:55/18 20:52	
13	07:45 15:41-16:21/40 17:24 16:38-16:45/7	07:21 16:27-17:16/49 18:00	06:42 06:54 18:30 20:01	06:15 19:28-20:07/39 20:30 20:53	05:59 19:38-19:55/17 20:53	
14	07:45 15:41-16:21/40 17:25 16:36-16:47/11	07:20 16:28-17:16/48 18:01	06:40 06:52 18:31 20:02	06:14 19:28-20:08/40 20:31 20:53	05:59 19:38-19:55/17 20:53	
15	07:44 15:42-16:21/39 17:26 16:35-16:49/14	07:19 16:29-17:17/48 18:02	06:39 06:51 18:32 20:03	06:14 19:27-20:08/41 20:32 20:54	05:59 19:39-19:55/16 20:54	
16	07:44 15:43-16:20/37 16:49-16:50/1 17:27 16:34-16:49/15	07:18 16:30-17:17/47 18:03	06:37 06:49 18:33 20:04	06:13 19:27-19:42/15 20:33 20:54	05:59 19:39-19:54/15 20:54	
17	07:44 15:44-16:21/37 17:28 16:34-16:51/17	07:16 16:30-17:16/46 18:04	06:36 06:48 18:34 20:04	06:12 19:26-20:07/41 20:33 20:54	05:59 19:40-19:54/14 20:54	
18	07:43 15:45-16:20/35 17:30 16:33-16:52/19	07:15 16:32-17:16/44 18:05	06:34 06:46 18:35 20:05	06:11 19:24-19:44/20 20:34 20:55	05:59 19:41-19:55/14 20:55	
19	07:43 15:46-16:21/35 17:31 16:33-16:54/21	07:14 16:34-17:16/42 18:06	06:33 06:45 18:36 20:06	06:10 19:23-19:45/22 20:35 20:55	05:59 19:41-19:55/14 20:55	
20	07:42 15:47-16:20/33 17:32 16:32-16:55/23	07:13 16:35-17:15/40 18:08	06:31 06:43 18:37 20:07	06:09 19:23-19:46/23 20:36 20:55	05:59 19:41-19:55/14 20:55	
21	07:42 15:49-16:20/31 17:33 16:33-16:56/23	07:11 16:38-17:14/36 18:09	06:29 06:42 18:38 20:08	06:08 19:22-19:45/23 20:37 20:56	05:59 19:41-19:55/14 20:56	
22	07:41 15:51-16:19/28 17:34 16:32-16:57/25	07:10 16:50-17:13/23 18:10	06:28 06:41 18:39 20:09	06:08 19:22-19:45/23 20:38 20:56	06:00 19:41-19:55/14 20:56	
23	07:41 15:53-16:18/25 17:35 16:32-16:57/25	07:09 16:51-17:11/20 18:11	06:26 06:39 18:40 20:10	06:07 19:21-19:45/24 20:39 20:56	06:00 19:42-19:56/14 20:56	
24	07:40 15:56-16:17/21 17:36 16:33-16:59/26	07:07 16:53-17:10/17 18:12	06:25 06:38 18:41 20:11	06:06 19:21-19:44/23 20:40 20:56	06:00 19:42-19:56/14 20:56	
25	07:39 15:59-16:16/17 17:37 16:33-17:02/29	07:06 16:55-17:06/11 18:13	06:23 06:36 18:42 20:12	06:06 19:22-19:44/22 20:40 20:56	06:00 19:42-19:56/14 20:56	
26	07:39 16:02-16:13/11 17:39 16:33-17:04/31	07:04 18:14 18:14	06:22 06:35 18:43 20:13	06:05 19:22-19:45/23 19:45-19:52/7	06:01 19:41-19:56/15 20:56	
27	07:38 16:34-17:06/32 17:40	07:03 18:15 18:15	06:20 06:34 18:44 20:14	06:04 19:29-20:02/33 20:42 20:56	06:01 19:42-19:58/16 20:56	
28	07:37 16:32-17:08/36 17:41	07:02 18:16 18:16	06:18 06:32 18:45 20:15	06:04 19:29-20:01/32 20:43 20:56	06:01 19:41-19:58/17 20:56	
29	07:36 16:31-17:09/38 17:42		07:17 06:31 19:46 20:16	06:03 19:29-20:00/31 19:41-19:54/13	06:02 19:42-19:59/17 20:56	
30	07:36 16:30-17:09/39 17:43		07:15 06:30 19:47 20:17	06:03 19:26-19:39/13 19:39-19:55/16	06:02 19:41-19:59/18 20:56	
31	07:35 16:29-17:10/41 17:44		07:14 19:48 19:48	06:02 19:30-19:58/28 20:45		
Potential sun hours	302	300	370	396	444	446
Sum of minutes with flicker	1464	1016	0	377	1050	547

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

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

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 11:08 / 2

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 1 - WTG07

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	July	August	September	October	November	December
1	06:03 19:41-19:59/18	06:25 19:39-20:15/36	06:54 07:21	07:21 19:10	06:53 15:55-16:36/41	07:26 15:21-16:02/41
	20:56	20:39	19:58	19:10	17:26 16:35-16:43/8	17:04
2	06:03 19:41-20:00/19	06:26 19:40-20:14/34	06:54 07:22	06:54 07:22	06:54 15:56-16:39/43	07:27 15:21-16:03/42
	20:56	20:38	19:57	19:09	17:25 16:38-16:43/5	17:03
3	06:04 19:40-20:00/20	06:27 19:41-20:14/33	06:55 07:23	06:55 07:23	06:55 15:56-16:41/45	07:27 15:21-16:03/42
	20:56	20:37	19:55	19:07	17:24 16:40-16:42/2	17:03
4	06:04 19:40-20:02/22	06:28 19:42-20:13/31	06:56 07:24	06:56 07:24	06:56 15:56-16:40/44	07:28 15:21-16:03/42
	20:56	20:36	19:53	19:05	17:23	17:03
5	06:05 19:40-20:02/22	06:29 19:42-20:12/30	06:57 07:25	06:57 07:25	06:57 15:56-16:40/44	07:29 15:22-16:04/42
	20:56	20:35	19:52	19:04	17:22	17:03
6	06:05 19:40-20:03/23	06:30 19:42-20:11/29	06:58 07:26	06:58 07:26	06:58 15:56-16:40/44	07:30 15:22-16:04/42
	20:56	20:34	19:50	19:02	17:20	17:03
7	06:06 19:40-20:04/24	06:31 19:42-20:10/28	06:59 07:27	06:59 07:27	06:59 15:57-16:41/44	07:31 15:22-16:05/43
	20:55	20:32	19:49	19:01	17:19	17:03
8	06:06 19:39-20:04/25	06:32 19:42-20:09/27	07:00 07:28	07:00 07:28	07:00 15:58-16:41/43	07:32 14:31-14:40/9
	20:55	20:31	19:47	18:59	17:18	17:03 15:23-16:05/42
9	06:07 19:39-20:05/26	06:32 19:41-20:07/26	07:01 07:29	07:01 07:29	07:02 15:58-16:41/43	07:33 14:29-14:42/13
	20:55	20:30	19:46	18:58	17:17	17:03 15:23-16:06/43
10	06:08 19:38-20:05/27	06:33 19:41-20:06/25	07:02 07:30	07:02 07:30	07:03 15:59-16:41/42	07:34 14:28-14:44/16
	20:54	20:29	19:44	18:56	17:16	17:03 15:24-16:07/43
11	06:08 19:39-20:05/26	06:34 19:42-20:05/23	07:03 07:31	07:03 07:31	07:04 16:00-16:41/41	07:35 14:27-14:45/18
	20:54	20:28	19:42	18:55	17:16	17:03 15:23-16:06/43
12	06:09 19:39-20:06/27	06:35 19:36-19:45/9	07:04 07:32	07:04 07:32	07:05 16:02-16:41/39	07:35 14:26-14:46/20
	20:54	20:26 19:45-20:04/19	19:41	18:53	17:15	17:03 15:24-16:07/43
13	06:10 19:38-20:06/28	06:36 19:34-19:48/14	07:04 07:33	07:04 07:33	07:06 16:03-16:41/38	07:36 14:26-14:48/22
	20:53	20:25 19:48-20:03/15	19:39	18:52	17:14	17:03 15:25-16:07/42
14	06:10 19:38-20:07/29	06:37 19:32-19:49/17	07:05 07:34	07:05 07:34	07:07 16:04-16:40/36	07:37 14:26-14:49/23
	20:53	20:24 19:49-20:02/13	19:38	18:50	17:13	17:03 15:25-16:08/43
15	06:11 19:38-20:09/31	06:38 19:31-19:50/19	07:06 07:35	07:06 07:35	07:08 16:06-16:39/33	07:38 14:26-14:49/23
	20:52	20:23 19:50-20:01/11	19:36	18:49	17:12	17:04 15:25-16:08/43
16	06:12 19:38-20:11/33	06:39 19:30-19:51/21	07:07 07:36 17:31-17:34/3	07:07 07:36 17:31-17:34/3	07:09 15:35-15:46/11	07:38 14:26-14:50/24
	20:52	20:21 19:51-19:59/8	19:34	18:47	17:11 16:06-16:37/31	17:04 15:26-16:09/43
17	06:13 19:37-20:11/34	06:40 19:29-19:52/23	07:08 07:37 17:27-17:40/13	07:08 07:37 17:27-17:40/13	07:11 15:33-15:50/17	07:39 14:26-14:51/25
	20:51	20:20 19:52-19:58/6	19:33	18:46	17:11 16:07-16:36/29	17:04 15:27-16:09/42
18	06:13 19:37-20:12/35	06:41 19:27-19:50/23	07:09 07:38 17:24-17:42/18	07:09 07:38 17:24-17:42/18	07:12 15:30-15:51/21	07:40 14:26-14:52/26
	20:50	20:19	19:31	18:44	17:10 16:07-16:33/26	17:05 15:26-16:09/43
19	06:14 19:37-20:10/33	06:42 19:27-19:50/23	07:10 07:39 17:22-17:43/21	07:10 07:39 17:22-17:43/21	07:13 15:28-15:53/25	07:40 14:27-14:53/26
	20:50 20:10-20:13/3	20:17	19:29	18:43	17:09 16:07-16:32/25	17:05 15:27-16:10/43
20	06:15 19:38-20:13/35	06:43 19:27-19:50/23	07:11 07:40 17:12-17:19/7	07:11 07:40 17:12-17:19/7	07:14 15:26-15:54/28	07:41 14:27-14:53/26
	20:49 20:13-20:14/1	20:16	19:28	18:41 17:20-17:44/24	17:09 16:07-16:32/25	17:05 15:27-16:10/43
21	06:16 19:37-20:14/37	06:43 19:27-19:50/23	07:12 07:41 17:08-17:45/37	07:12 07:41 17:08-17:45/37	07:15 15:24-15:55/31	07:41 14:27-14:54/27
	20:48	20:14	19:26	18:40	17:08 16:08-16:31/23	17:06 15:28-16:11/43
22	06:17 19:37-20:15/38	06:44 19:27-19:50/23	07:13 07:42 17:05-17:45/40	07:13 07:42 17:05-17:45/40	07:16 15:23-15:56/33	07:42 14:27-14:54/27
	20:48	20:13	19:25	18:39	17:07 16:08-16:31/23	17:06 15:28-16:11/43
23	06:17 19:37-20:16/39	06:45 19:27-19:49/22	07:14 07:43 17:03-17:46/43	07:14 07:43 17:03-17:46/43	07:17 15:23-15:58/35	07:42 14:28-14:55/27
	20:47	20:12	19:23	18:37	17:07 16:10-16:31/21	17:07 15:29-16:12/43
24	06:18 19:37-20:17/40	06:46 19:27-19:49/22	07:14 07:44 17:01-17:46/45	07:14 07:44 17:01-17:46/45	07:18 15:23-15:58/35	07:43 14:29-14:55/26
	20:46	20:10	19:21	18:36	17:06 16:11-16:30/19	17:07 15:29-16:12/43
25	06:19 19:38-20:18/40	06:47 19:28-19:47/19	07:15 06:45 16:00-16:46/46	07:15 06:45 16:00-16:46/46	07:19 15:22-15:59/37	07:43 14:30-14:56/26
	20:45	20:09	19:20	17:35	17:06 16:12-16:29/17	17:08 15:30-16:13/43
26	06:20 19:37-20:17/40	06:48 19:27-19:45/18	07:16 06:46 15:58-16:46/48	07:16 06:46 15:58-16:46/48	07:20 15:22-15:59/37 16:28-16:29/1	07:44 14:30-14:56/26
	20:44	20:07	19:18	17:33	17:05 16:13-16:28/15	17:09 15:31-16:13/42
27	06:21 19:37-20:18/41	06:49 19:29-19:44/15	07:17 06:47 15:58-16:47/49	07:17 06:47 15:58-16:47/49	07:21 15:21-16:00/39 16:25-16:28/3	07:44 14:31-14:55/24
	20:44	20:06	19:17	17:32	17:05 16:14-16:25/11	17:09 15:31-16:14/43
28	06:22 19:38-20:18/40	06:50 19:31-19:42/11	07:18 06:48 15:58-16:46/48	07:18 06:48 15:58-16:46/48	07:22 15:21-16:01/40	07:44 14:31-14:55/24
	20:43	20:04	19:15	17:31	17:05 16:16-16:27/11	17:10 15:31-16:14/43
29	06:23 19:38-20:19/41	06:51 19:35-19:37/2	07:19 06:49 15:57-16:46/49	07:19 06:49 15:57-16:46/49	07:23 15:21-16:01/40	07:45 14:33-14:56/23
	20:42	20:03	19:13	17:30	17:04 16:18-16:25/7	17:11 15:32-16:15/43
30	06:23 19:39-20:18/39	06:52 20:01	07:20 06:50 15:56-16:45/49	07:20 06:50 15:56-16:45/49	07:25 15:21-16:02/41	07:45 14:34-14:56/22
	20:41	20:01	19:12	17:28	17:04	17:11 15:32-16:15/43
31	06:24 19:39-20:17/38	06:53 20:00	06:52 15:56-16:44/48	06:52 15:56-16:44/48		07:45 14:35-14:55/20
	20:40	20:00	17:27	17:27		17:12 15:33-16:16/43
Potential sun hours	454	425	374	347	302	293
Sum of minutes with flicker	974	721	0	588	1389	1865

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

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

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 11:08 / 3

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 2 - WTG08

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June
1	07:46 10:19-12:39/140 17:13 14:01-15:16/75	07:34 11:44-12:34/50 16:04-16:56/52 17:46 14:28-15:19/51	07:00 15:26-16:59/93 18:17	07:12 18:17 19:49	06:29 20:18 20:46	06:02 19:50-20:10/20 20:46
2	07:46 10:19-12:39/140 17:14 14:02-15:17/75	07:33 11:46-12:32/46 16:05-16:57/52 17:47 14:30-15:18/48	06:59 15:26-16:59/93 18:19	07:10 19:03-19:11/8 19:50	06:27 20:19 20:46	06:01 19:50-20:11/21 20:46
3	07:46 10:19-12:40/141 17:15 14:02-15:17/75	07:32 11:48-12:30/42 16:05-16:58/53 17:48 14:33-15:17/44	06:57 15:26-16:59/93 18:20	07:09 19:01-19:14/13 19:51	06:26 20:20 20:47	06:01 19:50-20:12/22 20:47
4	07:46 10:20-12:40/140 17:16 14:03-15:18/75	07:31 11:51-12:26/35 15:51-15:58/7 17:49 14:36-15:15/39 16:06-16:59/53	06:56 15:26-16:58/92 18:21	07:07 18:59-19:15/16 19:52	06:25 20:21 20:48	06:01 19:49-20:13/24 20:48
5	07:46 10:20-12:41/141 17:16 14:03-15:18/75	07:30 11:55-12:22/27 15:45-16:05/20 17:50 14:42-15:13/31 16:06-16:59/53	06:54 15:28-16:59/91 18:22	07:06 18:58-19:16/18 19:53	06:24 20:22 20:48	06:00 19:48-20:13/25 20:48
6	07:46 10:21-12:41/140 17:17 14:04-15:19/75	07:29 12:02-12:15/13 15:42-17:00/78 17:51 14:51-15:10/19	06:53 15:28-16:58/90 18:23	07:04 18:56-19:16/20 19:54	06:23 20:23 20:49	06:00 19:48-20:14/26 20:49
7	07:46 10:22-12:42/140 17:18 14:04-15:19/75	07:28 14:57-15:05/8 17:53 15:40-17:00/80	06:51 15:29-16:58/89 18:24	07:03 18:56-19:17/21 19:55	06:22 20:24 20:50	06:00 19:48-20:15/27 20:50
8	07:46 10:22-12:42/140 17:19 14:05-15:20/75	07:27 15:38-17:00/82 17:54	06:50 15:29-16:57/88 18:25	07:01 18:55-19:16/21 19:56	06:21 20:25 20:50	06:00 19:49-20:16/27 20:50
9	07:46 10:23-12:43/140 17:20 14:06-15:21/75	07:26 15:36-17:01/85 17:55	06:48 15:30-16:55/85 18:26	07:00 18:55-19:16/21 19:57	06:19 20:26 20:51	06:00 19:48-20:15/27 20:51
10	07:46 10:24-12:42/138 17:21 14:05-15:20/75	07:25 15:35-17:01/86 17:56	06:47 15:32-16:55/83 18:27	06:58 18:55-19:15/20 19:58	06:18 20:27 20:52	06:00 19:48-20:16/28 20:52
11	07:45 10:24-12:43/139 17:22 14:06-15:21/75	07:24 15:34-17:00/86 17:57	06:45 15:33-16:53/80 18:28	06:57 18:55-19:14/19 19:59	06:17 20:28 20:52	06:00 19:48-20:16/28 20:52
12	07:45 10:25-12:43/138 17:23 14:07-15:22/75	07:23 15:31-16:59/88 17:58	06:44 15:35-16:53/78 18:29	06:55 18:56-19:14/18 20:00	06:16 20:29 20:52	06:00 19:48-20:17/29 20:52
13	07:45 10:26-12:44/138 16:12-16:21/9 17:24 14:08-15:22/74	07:21 15:31-16:59/88 18:00	06:42 15:36-16:51/75 18:30	06:54 18:57-19:13/16 20:01	06:15 20:30 20:53	06:00 19:48-20:17/29 20:53
14	07:45 10:26-12:43/137 16:10-16:23/13 17:25 14:08-15:22/74	07:20 15:30-16:34/64 18:01 16:23-16:58/35	06:40 15:38-16:15/37 18:31 16:19-16:50/31	06:52 18:58-19:10/12 20:02	06:14 20:31 20:53	06:00 19:48-20:17/29 20:53
15	07:44 10:27-12:44/137 16:09-16:26/17 17:26 14:09-15:23/74	07:19 15:29-16:57/88 18:02 16:24-16:31/7	06:39 15:40-16:12/32 18:32 16:20-16:47/27	06:51 19:00-19:08/8 20:03	06:13 20:32 20:54	06:00 19:48-20:18/30 20:54
16	07:44 10:27-12:43/136 16:07-16:27/20 17:27 14:09-15:22/73	07:18 15:29-16:55/86 18:03	06:37 15:43-16:10/27 18:33 16:22-16:44/22	06:49 20:03 20:33	06:13 20:33 20:54	06:00 19:48-20:18/30 20:54
17	07:44 10:28-12:44/136 16:07-16:27/20 17:28 14:10-15:23/73 16:27-16:29/2	07:16 15:27-16:52/85 18:04	06:36 15:47-16:06/19 18:34 16:26-16:41/15	06:48 20:04 20:33	06:12 20:33 20:54	06:00 19:48-20:18/30 20:54
18	07:43 10:28-12:43/135 16:06-16:29/23 17:30 14:10-15:23/73 16:29-16:30/1	07:15 15:27-16:51/84 18:05	06:34 15:53-15:58/5 18:35	06:46 20:05 20:34	06:11 20:34 20:55	06:00 19:49-20:19/30 20:55
19	07:43 10:30-12:44/134 16:06-16:31/25 17:31 14:11-15:24/73	07:14 15:27-16:53/86 18:06	06:33 18:36 20:06	06:45 20:06 20:35	06:10 20:35 20:55	06:00 19:49-20:19/30 20:55
20	07:42 10:30-12:43/133 16:05-16:32/27 17:32 14:12-15:23/71	07:13 15:26-16:53/87 18:08	06:31 18:37 20:07	06:43 20:07 20:36	06:09 20:36 20:55	06:00 19:49-20:19/30 20:55
21	07:42 10:32-12:44/132 16:05-16:34/29 17:33 14:13-15:24/71	07:11 15:26-16:55/89 18:09	06:29 18:38 20:08	06:42 20:08 20:37	06:08 20:37 20:56	06:00 19:49-20:19/30 20:56
22	07:41 10:32-12:43/131 16:05-16:35/30 17:34 14:14-15:23/69	07:10 15:26-16:56/90 18:10	06:28 18:39 20:09	06:41 20:09 20:38	06:08 20:38 20:56	06:00 19:49-20:19/30 20:56
23	07:41 10:34-12:43/129 16:04-16:36/32 17:35 14:14-15:23/69	07:09 15:25-16:56/91 18:11	06:26 18:40 20:10	06:39 20:10 20:39	06:07 20:39 20:56	06:00 19:49-20:19/30 20:56
24	07:40 10:35-11:23/48 14:16-15:24/68 17:36 11:35-12:43/68 16:04-16:38/34	07:07 15:25-16:58/93 18:12	06:25 18:41 20:11	06:38 20:11 20:40	06:06 20:40 20:56	06:00 19:50-20:20/30 20:56
25	07:39 10:36-11:20/44 14:17-15:23/66 17:37 11:35-12:42/67 16:04-16:38/34	07:06 15:24-16:58/94 18:13	06:23 18:42 20:12	06:36 20:12 20:40	06:06 20:40 20:56	06:00 19:50-20:20/30 20:56
26	07:39 10:37-11:17/40 14:18-15:23/65 17:39 11:36-12:41/65 16:04-16:39/35	07:04 15:25-16:58/93 18:14	06:21 18:43 20:13	06:35 20:13 20:41	06:05 20:41 20:56	06:01 19:50-20:20/30 20:56
27	07:38 10:40-11:13/33 14:20-15:23/63 17:40 11:38-12:41/63 16:04-16:41/37	07:03 15:25-16:59/94 18:15	06:20 18:44 20:14	06:34 20:14 20:42	06:04 19:57-20:03/6 20:42	06:01 19:51-20:21/30 20:56
28	07:37 10:42-11:09/27 14:21-15:23/62 17:41 11:39-12:40/61 16:04-16:50/46	07:02 15:25-16:59/94 18:16	06:18 18:45 20:15	06:32 20:15 20:43	06:04 19:54-20:05/11 20:43	06:01 19:51-20:20/29 20:56
29	07:36 10:45-11:06/21 14:23-15:22/59 17:42 11:40-12:39/59 16:04-16:52/48	19:46	07:17 19:46 20:16	06:31 20:16 20:44	06:03 19:53-20:07/14 20:44	06:02 19:52-20:21/29 20:56
30	07:35 10:49-11:01/12 14:24-15:21/57 17:43 11:41-12:38/57 16:04-16:54/50	19:47	07:15 19:47 20:17	06:30 20:17 20:44	06:03 19:52-20:08/16 20:44	06:02 19:52-20:21/29 20:56
31	07:35 11:42-12:36/54 16:04-16:55/51 17:44 14:26-15:20/54	19:48	07:14 19:48 20:17	06:29 20:17 20:45	06:02 19:51-20:10/19 20:45	06:01 19:51-20:21/30 20:56
Potential sun hours	302	300	370	396	444	446
Sum of minutes with flicker	6645	2758	1345	231	66	839

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

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

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 11:08 / 4

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 2 - WTG08

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	July	August	September	October	November	December
1	06:03 19:52-20:20/28 20:56	06:25 20:39	06:54 18:55-19:14/19 19:58	07:21 16:14-17:31/77 19:10	06:53 15:04-16:29/85 17:26	07:26 10:06-12:25/139 17:04 13:48-15:03/75
2	06:03 19:53-20:21/28 20:56	06:26 20:38	06:54 18:53-19:13/20 19:57	07:22 16:12-17:31/79 19:08	06:54 15:06-16:30/84 17:25	07:27 10:06-12:25/139 17:03 13:48-15:03/75
3	06:04 19:53-20:20/27 20:56	06:27 20:37	06:55 18:52-19:13/21 19:55	07:23 16:10-17:32/82 19:07	06:55 15:08-16:30/82 17:24	07:27 10:06-12:26/140 17:03 13:49-15:04/75
4	06:04 19:54-20:21/27 20:56	06:28 20:36	06:56 18:52-19:13/21 19:53	07:24 16:08-17:33/85 19:05	06:56 14:26-14:36/10 17:23 15:10-16:30/80	07:28 10:06-12:26/140 17:03 13:49-15:04/75
5	06:05 19:54-20:20/26 20:56	06:29 20:35	06:57 18:52-19:13/21 19:52	07:25 16:07-17:33/86 19:04	06:57 11:31-11:46/15 15:12-16:30/78 17:22 14:20-14:41/21	07:29 10:07-12:27/140 17:03 13:49-15:05/76
6	06:05 19:54-20:20/26 20:56	06:30 20:33	06:58 18:52-19:12/20 19:50	07:26 16:05-17:33/88 19:02	06:58 11:25-11:53/28 15:16-15:34/18 17:20 14:11-14:43/32 15:36-16:29/53	07:30 10:07-12:27/140 17:03 13:50-15:05/75
7	06:06 19:55-20:21/26 20:55	06:31 20:32	06:59 18:53-19:11/18 19:49	07:27 16:04-17:33/89 19:01	06:59 11:22-11:58/36 15:24-15:28/4 17:19 14:07-14:46/39 15:37-16:30/53	07:31 10:08-12:28/140 17:03 13:50-15:05/75
8	06:06 19:55-20:20/25 20:55	06:31 20:31	07:00 18:54-19:10/16 19:47	07:28 16:03-17:33/90 18:59	07:00 11:19-12:01/42 15:36-16:29/53 17:18 14:04-14:48/44	07:32 10:08-12:28/140 17:03 13:51-15:06/75
9	06:07 19:56-20:20/24 20:55	06:32 20:30	07:01 18:55-19:08/13 19:46	07:29 16:02-17:33/91 18:58	07:02 11:17-12:03/46 15:36-16:28/52 17:17 14:01-14:49/48	07:33 10:08-12:29/141 17:03 13:51-15:06/75
10	06:08 19:57-20:19/22 20:54	06:33 20:29	07:02 18:56-19:04/8 19:44	07:30 16:00-17:33/93 18:56	07:03 11:15-12:05/50 15:35-16:27/52 17:16 13:59-14:50/51	07:34 10:09-12:29/140 17:03 13:52-15:07/75
11	06:08 19:58-20:19/21 20:54	06:34 20:28	07:03 19:42	07:31 16:00-17:33/93 18:55	07:04 11:13-12:07/54 15:35-16:26/51 17:16 13:57-14:51/54	07:35 10:09-12:29/140 17:03 13:51-15:06/75
12	06:09 19:59-20:18/19 20:53	06:35 20:26	07:04 19:41	07:32 15:59-17:32/93 18:53	07:05 10:20-10:34/14 13:56-14:53/57 17:15 11:13-12:10/57 15:36-16:26/50	07:35 10:09-12:30/141 17:03 13:52-15:07/75
13	06:10 19:59-20:17/18 20:53	06:36 20:25	07:04 19:39	07:33 15:58-17:32/94 18:52	07:06 10:16-10:38/22 13:54-14:54/60 17:14 11:12-12:11/59 15:36-16:24/48	07:36 10:10-12:30/140 17:03 13:53-15:08/75
14	06:10 20:01-20:16/15 20:53	06:37 20:24	07:05 19:38	07:34 15:57-17:31/94 18:50	07:07 10:14-10:41/27 13:53-14:55/62 17:13 11:11-12:12/61 15:36-16:22/46	07:37 10:11-12:31/140 17:03 13:53-15:08/75
15	06:11 20:03-20:15/12 20:52	06:38 20:23	07:06 19:36	07:35 15:57-17:30/93 18:49	07:08 10:12-10:45/33 13:52-14:55/63 17:12 11:10-12:13/63 15:36-16:13/37	07:38 10:10-12:31/141 17:04 13:53-15:08/75
16	06:12 20:05-20:14/9 20:51	06:39 20:21	07:07 19:34	07:36 15:56-17:30/94 18:47	07:09 10:10-10:50/40 13:51-14:56/65 17:11 11:09-12:14/65 15:37-16:12/35	07:38 10:11-12:32/141 17:04 13:54-15:09/75
17	06:13 20:51	06:40 20:20	07:08 19:33	07:37 15:57-17:30/93 18:46	07:11 10:10-10:54/44 13:51-14:57/66 17:11 11:09-12:16/67 15:38-16:12/34	07:39 10:12-12:32/140 17:04 13:55-15:10/75
18	06:13 20:50	06:41 20:19	07:09 19:31	07:38 15:57-17:29/92 18:44	07:12 10:09-10:57/48 13:50-14:58/68 17:10 11:09-12:17/68 15:38-16:12/34	07:40 10:12-12:32/140 17:05 13:55-15:09/74
19	06:14 20:50	06:42 20:17	07:10 19:29	07:39 15:56-17:28/92 18:43	07:13 10:08-12:18/130 15:39-16:11/32 17:09 13:49-14:58/69	07:40 10:13-12:33/140 17:05 13:55-15:10/75
20	06:15 20:49	06:43 20:16	07:11 19:28	07:40 15:56-17:26/90 18:41	07:14 10:07-12:18/131 15:40-16:10/30 17:09 13:49-14:58/69	07:41 10:13-12:33/140 17:05 13:55-15:10/75
21	06:16 20:48	06:43 20:14	07:12 19:26	07:41 15:56-17:25/89 18:40	07:15 10:07-12:19/132 15:40-16:09/29 17:08 13:48-14:59/71	07:41 10:13-12:34/141 17:06 13:56-15:11/75
22	06:17 20:48	06:44 20:13	07:13 19:25	07:42 15:56-17:23/87 18:39	07:16 10:06-12:19/133 15:41-16:08/27 17:07 13:48-14:59/71	07:42 10:13-12:34/141 17:06 13:56-15:11/75
23	06:17 20:47	06:45 20:12	07:14 19:23	07:43 15:56-17:22/86 18:37	07:17 10:07-12:21/134 15:43-16:09/26 17:07 13:49-15:01/72	07:42 10:15-12:35/140 17:07 13:57-15:12/75
24	06:18 20:46	06:46 20:10	07:14 19:21	07:44 15:57-17:20/83 18:36 17:19-17:20/1	07:18 10:06-12:21/135 15:44-16:07/23 17:06 13:48-15:01/73 16:07-16:08/1	07:43 10:15-12:35/140 17:07 13:57-15:12/75
25	06:19 20:45	06:47 20:09	07:15 19:20	06:45 14:57-16:23/86 17:35	07:19 10:06-12:22/136 15:45-16:05/20 17:06 13:48-15:01/73 16:05-16:07/2	07:43 10:16-12:36/140 17:08 13:59-15:13/74
26	06:20 20:44	06:48 20:07	07:16 16:31-16:47/16 19:18 17:10-17:22/12	06:46 14:58-16:25/87 17:33	07:20 10:06-12:22/136 15:46-16:06/20 17:05 13:48-15:01/73	07:44 10:16-12:36/140 17:09 13:59-15:13/74
27	06:21 20:44	06:49 20:06	07:17 16:26-16:50/24 19:16 17:05-17:26/21	06:47 14:59-16:27/88 17:32 15:52-16:02/10	07:21 10:06-12:23/137 15:48-16:05/17 17:05 13:48-15:02/74	07:44 10:16-12:37/141 17:09 13:59-15:14/75
28	06:22 20:43	06:50 19:01-19:09/8 20:04	07:18 16:23-16:53/30 19:15 17:02-17:28/26	06:48 15:00-16:05/65 17:31 15:53-16:28/35	07:22 10:06-12:23/137 15:50-16:04/14 17:05 13:48-15:02/74	07:44 10:16-12:37/141 17:10 13:59-15:14/75
29	06:22 20:42	06:51 18:58-19:11/13 20:03	07:19 16:20-16:54/34 19:13 17:00-17:29/29	06:49 15:01-16:29/88 17:30	07:23 10:06-12:24/138 15:52-16:02/10 17:04 13:48-15:02/74	07:45 10:17-12:38/141 17:11 14:00-15:15/75
30	06:23 20:41	06:52 18:57-19:13/16 20:01	07:20 16:16-16:55/39 19:12 16:57-17:30/33	06:50 15:01-16:29/88 17:28	07:25 10:06-12:24/138 17:04 13:48-15:03/75	07:45 10:18-12:38/140 17:11 14:00-15:15/75
31	06:24 20:40	06:53 18:55-19:14/19 20:00		06:52 15:03-16:29/86 17:27		07:45 10:18-12:39/141 17:12 14:01-15:16/75
Potential sun hours	454	425	374	347	302	293
Sum of minutes with flicker	353	56	441	2744	5444	6671

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

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

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 11:08 / 5

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 3 - WTG05

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June
1	07:46 16:18-16:22/4 17:13	07:34 16:33-17:00/27 17:46	07:00 18:18	07:12 19:49	06:29 20:18	06:02 19:39-20:07/28 20:46
2	07:46 16:17-16:24/7 17:14	07:33 16:36-17:00/24 17:47	06:59 18:19	07:10 19:50	06:28 20:19	06:02 19:38-20:08/30 20:46
3	07:46 16:16-16:26/10 17:15	07:32 16:40-17:00/20 17:48	06:57 18:20	07:09 19:51	06:26 20:20	06:01 19:38-20:09/31 20:47
4	07:46 16:16-16:27/11 17:16	07:31 16:41-16:59/18 17:49	06:56 18:21	07:07 19:52	06:25 20:21	06:01 19:38-20:10/32 20:48
5	07:46 16:15-16:28/13 17:17	07:30 16:42-16:58/16 17:50	06:54 18:22	07:06 19:53	06:24 20:22	06:00 19:37-20:10/33 20:48
6	07:46 16:15-16:29/14 17:17	07:29 16:44-16:57/13 17:52	06:53 18:23	07:04 19:54	06:23 20:23	06:00 19:37-20:10/33 20:49
7	07:46 16:15-16:31/16 17:18	07:28 16:46-16:55/9 17:53	06:51 18:24	07:03 19:55	06:22 20:24	06:00 19:37-20:11/34 20:50
8	07:46 16:15-16:32/17 17:19	07:27 17:54	06:50 18:25	07:01 19:56	06:21 20:25	06:00 19:37-20:12/35 20:50
9	07:46 16:15-16:34/19 17:20	07:26 17:55	06:48 18:26	07:00 19:57	06:20 20:26	05:59 19:37-20:13/36 20:51
10	07:46 16:15-16:35/20 17:21	07:25 17:56	06:47 18:27	06:58 19:22-19:29/7 19:58	06:18 20:27	05:59 19:36-20:12/36 20:51
11	07:45 16:14-16:37/23 17:22	07:24 17:57	06:45 18:28	06:57 19:20-19:32/12 19:59	06:17 20:28	05:59 19:36-20:13/37 20:52
12	07:45 16:15-16:39/24 17:23	07:23 17:59	06:44 18:29	06:55 19:18-19:32/14 20:00	06:16 20:29	05:59 19:36-20:13/37 20:52
13	07:45 16:15-16:41/26 17:24	07:21 18:00	06:42 18:30	06:54 19:17-19:34/17 20:01	06:15 20:30	05:59 19:36-20:14/38 20:53
14	07:45 16:14-16:42/28 17:25	07:20 18:01	06:41 18:31	06:52 19:16-19:34/18 20:02	06:14 20:31	05:59 19:36-20:14/38 20:53
15	07:44 16:15-16:43/28 17:26	07:19 18:02	06:39 18:32	06:51 19:15-19:34/19 20:03	06:14 20:32	05:59 19:36-20:14/38 20:54
16	07:44 16:14-16:44/30 17:27	07:18 18:03	06:37 18:33	06:49 19:14-19:34/20 20:04	06:13 20:33	05:59 19:36-20:15/39 20:54
17	07:44 16:15-16:45/30 17:29	07:17 18:04	06:36 18:34	06:48 19:15-19:34/19 20:05	06:12 20:33	05:59 19:36-20:15/39 20:54
18	07:43 16:15-16:45/30 17:30	07:15 18:05	06:34 18:35	06:46 19:14-19:33/19 20:06	06:11 20:34	05:59 19:37-20:16/39 20:55
19	07:43 16:15-16:47/32 17:31	07:14 18:07	06:33 18:36	06:45 19:15-19:32/17 20:07	06:10 20:35	05:59 19:37-20:16/39 20:55
20	07:42 16:15-16:50/35 17:32	07:13 18:08	06:31 18:37	06:43 19:16-19:32/16 20:07	06:09 20:36	05:59 19:37-20:16/39 20:55
21	07:42 16:16-16:53/37 17:33	07:11 18:09	06:30 18:38	06:42 19:16-19:30/14 20:08	06:09 20:37	06:00 19:37-20:16/39 20:56
22	07:41 16:16-16:54/38 17:34	07:10 18:10	06:28 18:39	06:41 19:18-19:28/10 20:09	06:08 20:38	06:00 19:37-20:16/39 20:56
23	07:41 16:17-16:55/38 17:35	07:09 18:11	06:26 18:40	06:39 19:21-19:25/4 20:10	06:07 20:39	06:00 19:38-20:17/39 20:56
24	07:40 16:18-16:57/39 17:36	07:07 18:12	06:25 18:41	06:38 20:11	06:06 20:40	06:00 19:38-20:17/39 20:56
25	07:39 16:18-16:58/40 17:38	07:06 18:13	06:23 18:42	06:36 20:12	06:06 19:50-19:54/4 20:40	06:01 19:38-20:17/39 20:56
26	07:39 16:19-16:58/39 17:39	07:04 18:14	06:22 18:43	06:35 20:13	06:05 19:46-19:58/12 20:41	06:01 19:39-20:18/39 20:56
27	07:38 16:21-17:00/39 17:40	07:03 18:15	06:20 18:44	06:34 20:14	06:04 19:44-20:01/17 20:42	06:01 19:39-20:17/38 20:56
28	07:37 16:22-17:00/38 17:41	07:02 18:16	06:18 18:45	06:33 20:15	06:04 19:42-20:02/20 20:43	06:02 19:39-20:17/38 20:56
29	07:36 16:23-17:00/37 17:42		07:17 19:46	06:31 20:16	06:03 19:42-20:04/22 20:44	06:02 19:40-20:18/38 20:56
30	07:36 16:25-17:00/35 17:43		07:15 19:47	06:30 20:17	06:03 19:40-20:05/25 20:44	06:02 19:40-20:17/37 20:56
31	07:35 16:29-17:00/31 17:45		07:14 19:48		06:02 19:40-20:06/26 20:45	
Potential sun hours	302	300	370	396	444	446
Sum of minutes with flicker	828	127	0	206	126	1096

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 11:08 / 6

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 3 - WTG05

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	July		August		September		October		November		December	
1	06:03	19:41-20:18/37	06:25	20:39	06:54	19:19-19:31/12	07:21	19:10	06:53	17:26	07:26	15:56-16:19/23
	20:56		20:39		19:58		19:10		17:26		17:04	
2	06:03	19:41-20:17/36	06:26	20:38	06:55	19:21-19:28/7	07:22	19:09	06:54	17:25	07:27	15:57-16:17/20
	20:56		20:38		19:57		19:09		17:25		17:03	
3	06:04	19:41-20:17/36	06:27	20:37	06:55		07:23	19:07	06:55	17:24	07:28	15:58-16:17/19
	20:56		20:37		19:55		19:07		17:24		17:03	
4	06:04	19:42-20:17/35	06:28	20:36	06:56		07:24	19:05	06:56	16:16-16:25/9	07:29	15:59-16:16/17
	20:56		20:36		19:54		19:05		17:23		17:03	
5	06:05	19:43-20:18/35	06:29	20:35	06:57		07:25	19:04	06:57	16:13-16:27/14	07:29	16:00-16:16/16
	20:56		20:35		19:52		19:04		17:22		17:03	
6	06:05	19:43-20:17/34	06:30	20:34	06:58		07:26	19:02	06:58	16:12-16:28/16	07:30	16:01-16:16/15
	20:56		20:34		19:50		19:02		17:21		17:03	
7	06:06	19:44-20:17/33	06:31	20:33	06:59		07:27	19:01	06:59	16:12-16:30/18	07:31	16:02-16:15/13
	20:55		20:32		19:49		19:01		17:19		17:03	
8	06:07	19:44-20:16/32	06:32	20:31	07:00		07:28	18:59	07:00	16:11-16:31/20	07:32	16:04-16:15/11
	20:55		20:31		19:47		18:59		17:18		17:03	
9	06:07	19:45-20:16/31	06:32	20:30	07:01		07:29	18:58	07:02	16:07-16:31/24	07:33	16:05-16:15/10
	20:55		20:30		19:46		18:58		17:18		17:03	
10	06:08	19:46-20:16/30	06:33	20:29	07:02		07:30	18:56	07:03	16:04-16:31/27	07:34	16:07-16:14/7
	20:54		20:29		19:44		18:56		17:17		17:03	
11	06:08	19:46-20:15/29	06:34	20:28	07:03		07:31	18:55	07:04	16:00-16:31/31	07:35	16:08-16:13/5
	20:54		20:28		19:42		18:55		17:16		17:03	
12	06:09	19:48-20:15/27	06:35	20:26	07:04		07:32	18:53	07:05	15:57-16:32/35	07:35	
	20:54		20:26		19:41		18:53		17:15		17:03	
13	06:10	19:49-20:14/25	06:36	20:25	07:05		07:33	18:52	07:06	15:55-16:32/37	07:36	
	20:53		20:25		19:39		18:52		17:14		17:03	
14	06:11	19:49-20:13/24	06:37	20:24	07:05		07:34	18:50	07:07	15:54-16:32/38	07:37	
	20:53		20:24		19:38		18:50		17:13		17:03	
15	06:11	19:51-20:12/21	06:38	20:23	07:06		07:35	18:49	07:08	15:53-16:32/39	07:38	
	20:52		20:23		19:36		18:49		17:12		17:04	
16	06:12	19:53-20:11/18	06:39	20:21	07:07		07:36	18:47	07:09	15:52-16:31/39	07:38	
	20:52		20:21		19:34		18:47		17:11		17:04	
17	06:13	19:54-20:08/14	06:40	20:20	07:08		07:37	18:46	07:11	15:52-16:32/40	07:39	
	20:51		20:20		19:33		18:46		17:11		17:04	
18	06:13	19:57-20:06/9	06:41	20:19	07:09		07:38	18:44	07:12	15:52-16:31/39	07:40	
	20:50		20:19		19:31		18:44		17:10		17:05	
19	06:14		06:42	19:25-19:31/6	07:10		07:39	18:43	07:13	15:52-16:30/38	07:40	
	20:50		20:17		19:30		18:43		17:09		17:05	
20	06:15		06:43	19:25-19:31/6	07:11		07:40	18:41	07:14	15:51-16:29/38	07:41	
	20:49		20:16		19:28		18:41		17:09		17:05	
21	06:16		06:44	19:22-19:33/11	07:12		07:41	18:40	07:15	15:51-16:28/37	07:42	
	20:48		20:14		19:26		18:40		17:08		17:06	
22	06:17		06:44	19:21-19:35/14	07:13		07:42	18:39	07:16	15:51-16:26/35	07:42	
	20:48		20:13		19:25		18:39		17:07		17:06	
23	06:17		06:45	19:20-19:36/16	07:14		07:43	18:37	07:17	15:52-16:24/32	07:43	
	20:47		20:12		19:23		18:37		17:07		17:07	
24	06:18		06:46	19:19-19:36/17	07:15		07:44	18:36	07:18	15:53-16:24/31	07:43	
	20:46		20:10		19:21		18:36		17:06		17:07	
25	06:19		06:47	19:18-19:37/19	07:15		06:45	17:35	07:19	15:53-16:23/30	07:43	
	20:45		20:09		19:20		17:35		17:06		17:08	
26	06:20		06:48	19:17-19:36/19	07:16		06:46	17:33	07:20	15:53-16:23/30	07:44	
	20:44		20:07		19:18		17:33		17:05		17:09	
27	06:21		06:49	19:16-19:35/19	07:17		06:47	17:32	07:21	15:54-16:22/28	07:44	
	20:44		20:06		19:17		17:32		17:05		17:09	
28	06:22		06:50	19:16-19:35/19	07:18		06:48	17:31	07:23	15:54-16:22/28	07:45	
	20:43		20:04		19:15		17:31		17:05		17:10	
29	06:23		06:51	19:17-19:34/17	07:19		06:49	17:30	07:24	15:55-16:21/26	07:45	
	20:42		20:03		19:13		17:30		17:04		17:11	
30	06:23		06:52	19:17-19:34/17	07:20		06:51	17:28	07:25	15:56-16:20/24	07:45	
	20:41		20:01		19:12		17:28		17:04		17:11	
31	06:24		06:53	19:18-19:32/14			06:52	17:27			07:45	
	20:40		20:00				17:27				17:12	
Potential sun hours	454	425	374	19	0	803	156					
Sum of minutes with flicker	506	188	19	0	803	156						

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

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

Project:
Villamassargia WindPro

Printed/Page
 20/04/2022 11:08 / 7

Licensed user:
Ing. Bruno Manca
 Via Vittorio Veneto 231
 IT-09028 Sestu
 +390702358125
 BrunoManca / ingbrunomanca@gmail.com
 Calculated:
 19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 4 - WTG04

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
 625 521 486 354 333 434 521 521 556 660 955 868 6.834
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:46	07:34	07:00	07:12	06:29	06:02	06:28-06:42/14	06:03	06:31-06:51/20	06:25	06:54	07:21	06:53	07:26
	17:13	17:46	18:18	19:49	20:18	20:46	20:46	20:56	20:39	19:58	19:10	17:26	17:04	
2	07:46	07:33	06:59	07:11	06:28	06:02	06:27-06:42/15	06:03	06:31-06:50/19	06:26	06:55	07:22	06:54	07:27
	17:14	17:47	18:19	19:50	20:19	20:47	20:47	20:56	20:38	19:57	19:09	17:25	17:03	
3	07:46	07:32	06:57	07:09	06:26	06:01	06:27-06:43/16	06:04	06:32-06:51/19	06:27	06:55	07:23	06:55	07:28
	17:15	17:48	18:20	19:51	20:20	20:47	20:47	20:56	20:37	19:55	19:07	17:24	17:03	
4	07:46	07:31	06:56	07:07	06:25	06:01	06:27-06:44/17	06:04	06:32-06:50/18	06:28	06:56	07:24	06:56	07:29
	17:16	17:49	18:21	19:52	20:21	20:48	20:48	20:56	20:36	19:54	19:05	17:23	17:03	
5	07:46	07:30	06:54	07:06	06:24	06:00	06:27-06:44/17	06:05	06:32-06:51/19	06:29	06:57	07:25	06:57	07:29
	17:17	17:50	18:22	19:53	20:22	20:49	20:49	20:56	20:35	19:52	19:04	17:22	17:03	
6	07:46	07:29	06:53	07:04	06:23	06:00	06:26-06:44/18	06:05	06:32-06:50/18	06:30	06:58	07:26	06:58	07:30
	17:17	17:52	18:23	19:54	20:23	20:49	20:49	20:56	20:34	19:50	19:02	17:21	17:03	
7	07:46	07:28	06:51	07:03	06:22	06:00	06:26-06:45/19	06:06	06:33-06:51/18	06:31	06:59	07:27	06:59	07:31
	17:18	17:53	18:24	19:55	20:24	20:50	20:50	20:55	20:32	19:49	19:01	17:20	17:03	
8	07:46	07:27	06:50	07:01	06:21	06:00	06:27-06:45/18	06:07	06:33-06:50/17	06:32	07:00	07:28	07:01	07:32
	17:19	17:54	18:25	19:56	20:25	20:50	20:50	20:55	20:31	19:47	18:59	17:19	17:03	
9	07:46	07:26	06:48	07:00	06:20	06:00	06:27-06:46/19	06:07	06:34-06:50/16	06:33	07:01	07:29	07:02	07:33
	17:20	17:55	18:26	19:57	20:26	20:51	20:51	20:55	20:30	19:46	18:58	17:18	17:03	
10	07:46	07:25	06:47	06:58	06:19	05:59	06:27-06:46/19	06:08	06:35-06:50/15	06:33	07:02	07:30	07:03	07:34
	17:21	17:56	18:27	19:58	20:27	20:51	20:51	20:54	20:29	19:44	18:56	17:17	17:03	
11	07:45	07:24	06:45	06:57	06:17	05:59	06:27-06:46/19	06:08	06:35-06:50/15	06:34	07:03	07:31	07:04	07:35
	17:22	17:57	18:28	19:59	20:28	20:52	20:52	20:54	20:28	19:42	18:55	17:16	17:03	
12	07:45	07:23	06:44	06:55	06:16	05:59	06:26-06:46/20	06:09	06:36-06:49/13	06:35	07:04	07:32	07:05	07:36
	17:23	17:59	18:29	20:00	20:29	20:52	20:52	20:54	20:26	19:41	18:53	17:15	17:03	
13	07:45	07:21	06:42	06:54	06:15	05:59	06:27-06:46/19	06:10	06:37-06:49/12	06:36	07:05	07:33	07:06	07:36
	17:24	18:00	18:30	20:01	20:30	20:53	20:53	20:53	20:25	19:39	18:52	17:14	17:03	
14	07:45	07:20	06:41	06:52	06:15	05:59	06:27-06:46/19	06:11	06:37-06:48/11	06:37	07:05	07:34	07:07	07:37
	17:25	18:01	18:31	20:02	20:31	20:53	20:53	20:53	20:24	19:38	18:50	17:13	17:03	
15	07:44	07:19	06:39	06:51	06:14	05:59	06:27-06:47/20	06:11	06:39-06:47/8	06:38	07:06	07:35	07:08	07:38
	17:26	18:02	18:32	20:03	20:32	20:54	20:54	20:52	20:23	19:36	18:49	17:12	17:04	
16	07:44	07:18	06:37	06:49	06:13	05:59	06:28-06:48/20	06:12	06:42-06:45/3	06:39	07:07	07:36	07:09	07:38
	17:27	18:03	18:33	20:04	20:33	20:54	20:54	20:52	20:21	19:34	18:47	17:11	17:04	
17	07:44	07:17	06:36	06:48	06:12	05:59	06:28-06:48/20	06:13	06:40	07:08	07:37	07:11	07:39	
	17:29	18:04	18:34	20:05	20:34	20:54	20:54	20:51	20:20	19:33	18:46	17:11	17:04	
18	07:43	07:15	06:34	06:46	06:11	05:59	06:28-06:48/20	06:14	06:41	07:09	07:38	07:12	07:40	
	17:30	18:05	18:35	20:06	20:34	20:55	20:55	20:50	20:19	19:31	18:44	17:10	17:05	
19	07:43	07:14	06:33	06:45	06:10	05:59	06:28-06:48/20	06:14	06:42	07:10	07:39	07:13	07:40	
	17:31	18:07	18:36	20:07	20:35	20:55	20:55	20:50	20:17	19:30	18:43	17:09	17:05	
20	07:42	07:13	06:31	06:43	06:09	05:59	06:28-06:48/20	06:15	06:43	07:11	07:40	07:14	07:41	
	17:32	18:08	18:37	20:08	20:36	20:55	20:55	20:49	20:16	19:28	18:42	17:09	17:05	
21	07:42	07:11	06:30	06:42	06:09	06:00	06:28-06:48/20	06:16	06:44	07:12	07:41	07:15	07:42	
	17:33	18:09	18:38	20:08	20:37	20:56	20:56	20:48	20:14	19:26	18:40	17:08	17:06	
22	07:41	07:10	06:28	06:41	06:08	06:00	06:28-06:48/20	06:17	06:44	07:13	07:42	07:16	07:42	
	17:34	18:10	18:39	20:09	20:38	20:56	20:56	20:48	20:13	19:25	18:39	17:07	17:06	
23	07:41	07:09	06:26	06:39	06:07	06:00	06:29-06:49/20	06:17	06:45	07:14	07:43	07:17	07:43	
	17:35	18:11	18:40	20:10	20:39	20:56	20:56	20:47	20:12	19:23	18:37	17:07	17:07	
24	07:40	07:07	06:25	06:38	06:06	06:00	06:29-06:49/20	06:18	06:46	07:15	07:44	07:18	07:43	
	17:36	18:12	18:41	20:11	20:40	20:56	20:56	20:46	20:10	19:21	18:36	17:06	17:07	
25	07:39	07:06	06:23	06:37	06:06	06:01	06:29-06:49/20	06:19	06:47	07:15	07:45	07:19	07:43	
	17:38	18:13	18:42	20:12	20:40	20:56	20:56	20:45	20:09	19:20	17:35	17:06	17:08	
26	07:39	07:04	06:22	06:35	06:05	06:01	06:30-06:50/20	06:20	06:48	07:16	07:46	07:20	07:44	
	17:39	18:14	18:43	20:13	20:41	20:56	20:56	20:44	20:07	19:18	17:33	17:05	17:09	
27	07:38	07:03	06:20	06:34	06:04	06:01	06:30-06:50/20	06:21	06:49	07:17	07:47	07:21	07:44	
	17:40	18:15	18:44	20:14	20:42	20:56	20:56	20:44	20:06	19:17	17:32	17:05	17:09	
28	07:37	07:02	06:18	06:33	06:04	06:02	06:30-06:49/19	06:22	06:50	07:18	07:48	07:23	07:45	
	17:41	18:16	18:45	20:15	20:43	20:56	20:56	20:43	20:04	19:15	17:31	17:05	17:10	
29	07:36		07:17	06:31	06:03	06:02	06:31-06:50/19	06:23	06:51	07:19	07:49	07:24	07:45	
	17:42		19:46	20:16	20:44	20:56	20:56	20:42	20:03	19:13	17:30	17:04	17:11	
30	07:36		07:15	06:30	06:03	06:02	06:30-06:50/20	06:23	06:52	07:20	07:50	07:25	07:45	
	17:43		19:47	20:17	20:44	20:56	20:56	20:41	20:01	19:12	17:28	17:04	17:11	
31	07:35		07:14		06:02	06:28-06:41/13		06:24	06:53		06:52		07:45	
	17:45		19:48		20:45			20:40	20:00		17:27		17:12	
Potential sun hours	302	300	370	396	444	446	446	454	425	374	347	302	293	
Sum of minutes with flicker	0	0	0	0	40	446	567	241	0	0	0	0	0	

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

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

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 11:08 / 8

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 5 - WTG03

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:46	07:34	07:00	07:12	06:29	07:04-07:24/20	06:02	06:03	06:25	06:54	07:21	06:53	07:26	
	17:13	17:46	18:18	19:49	20:18	20:18	20:46	20:56	20:39	19:58	19:10	17:26	17:04	
2	07:46	07:33	06:59	07:11	06:28	07:04-07:23/19	06:02	06:03	06:26	06:55	07:22	06:54	07:27	
	17:14	17:47	18:19	19:50	20:19	20:19	20:47	20:56	20:38	19:57	19:09	17:25	17:04	
3	07:46	07:32	06:57	07:09	06:26	07:05-07:22/17	06:01	06:04	06:27	06:56	07:23	06:55	07:28	
	17:15	17:48	18:20	19:51	20:20	20:20	20:47	20:56	20:37	19:55	19:07	17:24	17:03	
4	07:46	07:31	06:56	07:07	06:25	07:06-07:20/14	06:01	06:04	06:28	06:56	07:24	06:56	07:29	
	17:16	17:49	18:21	19:52	20:21	20:21	20:48	20:56	20:36	19:54	19:05	17:23	17:03	
5	07:46	07:30	06:54	07:06	06:24	07:08-07:19/11	06:01	06:05	06:29	06:57	07:25	06:57	07:30	
	17:17	17:50	18:22	19:53	20:22	20:22	20:49	20:56	20:35	19:52	19:04	17:22	17:03	
6	07:46	07:29	06:53	07:04	06:23	07:10-07:16/6	06:00	06:05	06:30	06:58	07:26	06:58	07:30	
	17:17	17:52	18:23	19:54	20:23	20:23	20:49	20:56	20:34	19:50	19:02	17:21	17:03	
7	07:46	07:28	06:51	07:03	06:22	06:22	06:00	06:06	06:31	07:19-07:27/8	06:59	07:27	06:59	07:31
	17:18	17:53	18:24	19:55	20:24	20:24	20:50	20:55	20:32	19:49	19:01	17:20	17:03	
8	07:46	07:27	06:50	07:01	06:21	06:21	06:00	06:07	06:32	07:17-07:29/12	07:00	07:28	07:01	07:32
	17:19	17:54	18:25	19:56	20:25	20:25	20:50	20:55	20:31	19:47	18:59	17:19	17:03	
9	07:46	07:26	06:48	07:00	06:20	06:20	06:00	06:07	06:33	07:15-07:31/16	07:01	07:29	07:02	07:33
	17:20	17:55	18:26	19:57	20:26	20:26	20:51	20:55	20:30	19:46	18:58	17:18	17:03	
10	07:46	07:25	06:47	06:58	06:19	06:19	05:59	06:08	06:33	07:14-07:32/18	07:02	07:30	07:03	07:34
	17:21	17:56	18:27	19:58	20:27	20:27	20:51	20:54	20:29	19:44	18:56	17:17	17:03	
11	07:46	07:24	06:45	06:57	06:18	06:18	05:59	06:09	06:34	07:12-07:32/20	07:03	07:31	07:04	07:35
	17:22	17:57	18:28	19:59	20:28	20:28	20:52	20:54	20:28	19:43	18:55	17:16	17:03	
12	07:45	07:23	06:44	06:55	06:17	06:17	05:59	06:09	06:35	07:11-07:32/21	07:04	07:32	07:05	07:36
	17:23	17:59	18:29	20:00	20:29	20:29	20:52	20:54	20:26	19:41	18:53	17:15	17:03	
13	07:45	07:21	06:42	06:54	06:16	06:16	05:59	06:10	06:36	07:11-07:33/22	07:05	07:33	07:06	07:36
	17:24	18:00	18:30	20:01	20:30	20:30	20:53	20:53	20:25	19:39	18:52	17:14	17:03	
14	07:45	07:20	06:41	06:52	06:15	06:15	05:59	06:11	06:37	07:10-07:33/23	07:05	07:34	07:07	07:37
	17:25	18:01	18:31	20:02	20:31	20:31	20:53	20:53	20:24	19:38	18:50	17:13	17:04	
15	07:44	07:19	06:39	06:51	06:14	06:14	05:59	06:11	06:38	07:10-07:33/23	07:06	07:35	07:08	07:38
	17:26	18:02	18:32	20:03	20:32	20:32	20:54	20:52	20:23	19:36	18:49	17:12	17:04	
16	07:44	07:18	06:37	06:49	06:13	06:13	05:59	06:12	06:39	07:10-07:33/23	07:07	07:36	07:10	07:39
	17:28	18:03	18:33	20:04	20:33	20:33	20:54	20:52	20:21	19:34	18:47	17:12	17:04	
17	07:44	07:17	06:36	06:48	06:12	06:12	05:59	06:13	06:40	07:10-07:33/23	07:08	07:37	07:11	07:39
	17:29	18:04	18:34	20:05	20:34	20:34	20:55	20:51	20:20	19:33	18:46	17:11	17:04	
18	07:43	07:15	06:34	06:46	06:11	06:11	05:59	06:14	06:41	07:10-07:33/23	07:09	07:38	07:12	07:40
	17:30	18:05	18:35	20:06	20:34	20:34	20:55	20:50	20:19	19:31	18:44	17:10	17:05	
19	07:43	07:14	06:33	06:45	07:12-07:20/8	06:10	05:59	06:14	06:42	07:11-07:32/21	07:10	07:39	07:13	07:40
	17:31	18:07	18:36	20:07	20:35	20:35	20:55	20:50	20:17	19:30	18:43	17:09	17:05	
20	07:42	07:13	06:31	06:43	07:09-07:23/14	06:09	05:59	06:15	06:43	07:10-07:30/20	07:11	07:40	07:14	07:41
	17:32	18:08	18:37	20:08	20:36	20:36	20:55	20:49	20:16	19:28	18:42	17:09	17:06	
21	07:42	07:11	06:30	06:42	07:07-07:23/16	06:09	06:00	06:16	06:44	07:11-07:29/18	07:12	07:41	07:15	07:42
	17:33	18:09	18:38	20:09	20:37	20:37	20:56	20:48	20:15	19:26	18:40	17:08	17:06	
22	07:41	07:10	06:28	06:41	07:06-07:25/19	06:08	06:00	06:17	06:45	07:12-07:28/16	07:13	07:42	07:16	07:42
	17:34	18:10	18:39	20:10	20:38	20:38	20:56	20:48	20:13	19:25	18:39	17:08	17:06	
23	07:41	07:09	06:26	06:39	07:05-07:26/21	06:07	06:00	06:18	06:45	07:14-07:26/12	07:14	07:43	07:17	07:43
	17:35	18:11	18:40	20:11	20:39	20:39	20:56	20:47	20:12	19:23	18:37	17:07	17:07	
24	07:40	07:07	06:25	06:38	07:04-07:25/21	06:06	06:00	06:18	06:46	07:16-07:23/7	07:15	07:44	07:18	07:43
	17:36	18:12	18:41	20:11	20:40	20:40	20:56	20:46	20:10	19:21	18:36	17:06	17:08	
25	07:39	07:06	06:23	06:37	07:03-07:26/23	06:06	06:01	06:19	06:47	07:16	06:45	07:19	07:44	
	17:38	18:13	18:42	20:12	20:40	20:40	20:56	20:45	20:09	19:20	17:35	17:06	17:08	
26	07:39	07:05	06:22	06:35	07:03-07:26/23	06:05	06:01	06:20	06:48	07:16	06:46	07:20	07:44	
	17:39	18:14	18:43	20:13	20:41	20:41	20:56	20:45	20:07	19:18	17:34	17:05	17:09	
27	07:38	07:03	06:20	06:34	07:03-07:26/23	06:05	06:01	06:21	06:49	07:17	06:47	07:22	07:44	
	17:40	18:15	18:44	20:14	20:42	20:42	20:57	20:44	20:06	19:17	17:32	17:05	17:09	
28	07:37	07:02	06:18	06:33	07:03-07:25/22	06:04	06:02	06:22	06:50	07:18	06:48	07:23	07:45	
	17:41	18:17	18:45	20:15	20:43	20:43	20:57	20:43	20:04	19:15	17:31	17:05	17:10	
29	07:36	07:17	06:31	07:03-07:25/22	06:03	06:03	06:02	06:23	06:51	07:19	06:50	07:24	07:45	
	17:42	18:18	18:46	20:16	20:44	20:44	20:57	20:42	20:03	19:13	17:30	17:04	17:11	
30	07:36	07:15	06:30	07:03-07:25/22	06:03	06:03	06:02	06:24	06:52	07:20	06:51	07:25	07:45	
	17:43	18:19	18:47	20:17	20:44	20:44	20:57	20:41	20:01	19:12	17:29	17:04	17:11	
31	07:35	07:14	06:29	06:42	06:02	06:02	06:02	06:24	06:53	07:21	06:52	07:26	07:45	
	17:45	18:20	18:48	20:18	20:45	20:45	20:57	20:40	20:00	19:11	17:27	17:01	17:12	
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293	0	
Sum of minutes with flicker	0	0	0	234	87	0	0	326	0	0	0	0	0	

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 11:08 / 9

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 6 - WTG01

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625 521 486 354 333 434 521 521 556 660 955 868 6.834
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:46	07:34	07:00	07:12	06:29	06:02	06:03	06:25	06:54	07:21	06:53	07:26
	17:13	17:46	18:18	19:49	20:18	20:46	20:57	20:39	19:58	19:10	17:26	17:04
2	07:46	07:33	06:59	07:11	06:28	06:02	06:03	06:26	06:55	07:22	06:54	07:27
	17:14	17:47	18:19	19:50	20:19	20:47	20:56	20:38	19:57	19:09	17:25	17:04
3	07:46	07:32	06:57	07:09	06:26	06:01	06:04	06:27	06:56	07:23	06:55	07:28
	17:15	17:48	18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	17:03
4	07:46	07:31	06:56	07:08	06:25	06:01	06:04	06:28	06:56	07:24	06:56	07:29
	17:16	17:49	18:21	19:52	20:21	20:48	20:56	20:36	19:54	19:06	17:23	17:03
5	07:46	07:30	06:54	07:06	06:24	06:01	06:05	06:29	06:57	07:25	06:57	07:30
	17:17	17:51	18:22	19:53	20:22	20:49	20:56	20:35	19:52	19:04	17:22	17:03
6	07:46	07:29	06:53	07:04	06:23	06:00	06:06	06:30	06:58	07:26	06:58	07:31
	17:18	17:52	18:23	19:54	20:23	20:49	20:56	20:34	19:51	19:02	17:21	17:03
7	07:46	07:28	06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	07:00	07:31
	17:18	17:53	18:24	19:55	20:24	20:50	20:55	20:33	19:49	19:01	17:20	17:03
8	07:46	07:27	06:50	07:01	06:21	06:00	06:07	06:32	07:00	07:28	07:01	07:32
	17:19	17:54	18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:19	17:03
9	07:46	07:26	06:48	07:00	06:20	06:00	06:07	06:33	07:01	07:29	07:02	07:33
	17:20	17:55	18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:58	17:18	17:03
10	07:46	07:25	06:47	06:58	06:19	05:59	06:08	06:34	07:02	07:30	07:03	07:34
	17:21	17:56	18:27	19:58	20:27	20:52	20:55	20:29	19:44	18:56	17:17	17:03
11	07:46	07:24	06:45	06:57	06:18	05:59	06:09	06:34	07:03	07:31	07:04	07:35
	17:22	17:58	18:28	19:59	20:28	20:52	20:54	20:28	19:43	18:55	17:16	17:03
12	07:45	07:23	06:44	06:55	06:17	05:59	06:09	06:35	07:04	07:32	07:05	07:36
	17:23	17:59	18:29	20:00	20:29	20:53	20:54	20:27	19:41	18:53	17:15	17:03
13	07:45	07:22	06:42	06:54	06:16	05:59	06:10	06:36	07:05	07:33	07:06	07:36
	17:24	18:00	18:30	20:01	20:30	20:53	20:53	20:25	19:39	18:52	17:14	17:03
14	07:45	07:20	06:41	06:52	06:15	05:59	06:11	06:37	07:06	07:34	07:07	07:37
	17:25	18:01	18:31	20:02	20:31	20:53	20:53	20:24	19:38	18:50	17:13	17:04
15	07:45	07:19	06:39	06:51	06:14	05:59	06:11	06:38	07:06	07:35	07:08	07:38
	17:27	18:02	18:32	20:03	20:32	20:54	20:52	20:23	19:36	18:49	17:12	17:04
16	07:44	07:18	06:38	06:49	06:13	05:59	06:12	06:39	07:07	07:36	07:10	07:39
	17:28	18:03	18:33	20:04	20:33	20:54	20:52	20:21	19:35	18:47	17:12	17:04
17	07:44	07:17	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	07:11	07:39
	17:29	18:04	18:34	20:05	20:34	20:55	20:51	20:20	19:33	18:46	17:11	17:04
18	07:43	07:15	06:34	06:46	06:11	05:59	06:14	06:41	07:09	07:38	07:12	07:40
	17:30	18:06	18:35	20:06	20:35	20:55	20:51	20:19	19:31	18:44	17:10	17:05
19	07:43	07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	07:13	07:41
	17:31	18:07	18:36	20:07	20:35	20:55	20:50	20:17	19:30	18:43	17:09	17:05
20	07:42	07:13	06:31	06:44	06:09	06:00	06:15	06:43	07:11	07:40	07:14	07:41
	17:32	18:08	18:37	20:08	20:36	20:56	20:49	20:16	19:28	18:42	17:09	17:06
21	07:42	07:11	06:30	06:42	06:09	06:00	06:16	06:44	07:12	07:41	07:15	07:42
	17:33	18:09	18:38	20:09	20:37	20:56	20:49	20:15	19:26	18:40	17:08	17:06
22	07:41	07:10	06:28	06:41	06:08	06:00	06:17	06:45	07:13	07:42	07:16	07:42
	17:34	18:10	18:39	20:10	20:38	20:56	20:48	20:13	19:25	18:39	17:08	17:07
23	07:41	07:09	06:26	06:39	06:07	06:00	06:18	06:46	07:14	07:43	07:17	07:43
	17:35	18:11	18:40	20:11	20:39	20:56	20:47	20:12	19:23	18:38	17:07	17:07
24	07:40	07:07	06:25	06:38	06:07	06:00	06:18	06:46	07:15	07:44	07:18	07:43
	17:37	18:12	18:41	20:12	20:40	20:56	20:46	20:10	19:22	18:36	17:07	17:08
25	07:39	07:06	06:23	06:37	06:06	06:01	06:19	06:47	07:16	07:45	07:19	07:44
	17:38	18:13	18:42	20:13	20:41	20:56	20:45	20:09	19:20	17:35	17:06	17:08
26	07:39	07:05	06:22	06:35	06:05	06:01	06:20	06:48	07:17	07:46	07:21	07:44
	17:39	18:14	18:43	20:14	20:41	20:57	20:45	20:07	19:18	17:34	17:06	17:09
27	07:38	07:03	06:20	06:34	06:05	06:01	06:21	06:49	07:17	07:47	07:22	07:44
	17:40	18:16	18:44	20:14	20:42	20:57	20:44	20:06	19:17	17:32	17:05	17:09
28	07:37	07:02	06:19	06:33	06:04	06:02	06:22	06:50	07:18	07:48	07:23	07:45
	17:41	18:17	18:45	20:15	20:43	20:57	20:43	20:04	19:15	17:31	17:05	17:10
29	07:37		07:17	06:31	06:04	06:02	06:23	06:51	07:19	07:49	07:24	07:45
	17:42		19:46	20:16	20:44	20:57	20:42	20:03	19:13	17:30	17:04	17:11
30	07:36		07:15	06:30	06:03	06:03	06:24	06:52	07:20	07:50	07:25	07:45
	17:44		19:47	20:17	20:44	20:57	20:41	20:01	19:12	17:29	17:04	17:11
31	07:35		07:14		06:03		06:24	06:53		07:51	07:26	07:45
	17:45		19:48		20:45		20:40	20:00		17:27		17:12
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Project:
Villamassargia WindPro

Printed/Page
 20/04/2022 11:08 / 10

Licensed user:
Ing. Bruno Manca
 Via Vittorio Veneto 231
 IT-09028 Sestu
 +390702358125
 BrunoManca / ingbrunomanca@gmail.com
 Calculated:
 19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 7 - WTG02

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
 625 521 486 354 333 434 521 521 556 660 955 868 6.834
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:46	07:34	07:00	07:12	06:29	06:02	06:45-07:19/34	06:03	06:49-07:27/38	06:25	06:54	07:21	06:53	07:26
	17:13	17:46	18:18	19:49	20:18	20:46	20:46	20:56	20:39	19:58	19:10	17:26	17:04	
2	07:46	07:33	06:59	07:11	06:28	06:02	06:45-07:19/34	06:03	06:49-07:27/38	06:26	06:55	07:22	06:54	07:27
	17:14	17:47	18:19	19:50	20:19	20:47	20:47	20:56	20:38	19:57	19:09	17:25	17:04	
3	07:46	07:32	06:57	07:09	06:26	06:01	06:45-07:20/35	06:04	06:50-07:27/37	06:27	06:56	07:23	06:55	07:28
	17:15	17:48	18:20	19:51	20:20	20:47	20:47	20:56	20:37	19:55	19:07	17:24	17:03	
4	07:46	07:31	06:56	07:07	06:25	06:01	06:45-07:20/35	06:04	06:50-07:27/37	06:28	06:56	07:24	06:56	07:29
	17:16	17:49	18:21	19:52	20:21	20:48	20:48	20:56	20:36	19:54	19:06	17:23	17:03	
5	07:46	07:30	06:54	07:06	06:24	06:01	06:45-07:21/36	06:05	06:51-07:27/36	06:29	06:57	07:25	06:57	07:30
	17:17	17:51	18:22	19:53	20:22	20:49	20:49	20:56	20:35	19:52	19:04	17:22	17:03	
6	07:46	07:29	06:53	07:04	06:23	06:00	06:44-07:21/37	06:05	06:50-07:27/37	06:30	06:58	07:26	06:58	07:30
	17:18	17:52	18:23	19:54	20:23	20:49	20:49	20:56	20:34	19:51	19:02	17:21	17:03	
7	07:46	07:28	06:51	07:03	06:22	06:00	06:45-07:21/36	06:06	06:51-07:27/36	06:31	06:59	07:27	06:59	07:31
	17:18	17:53	18:24	19:55	20:24	20:50	20:50	20:55	20:33	19:49	19:01	17:20	17:03	
8	07:46	07:27	06:50	07:01	06:21	06:00	06:45-07:22/37	06:07	06:51-07:27/36	06:32	07:00	07:28	07:01	07:32
	17:19	17:54	18:25	19:56	20:25	20:50	20:50	20:55	20:31	19:47	18:59	17:19	17:03	
9	07:46	07:26	06:48	07:00	06:20	06:00	06:45-07:22/37	06:07	06:52-07:27/35	06:33	07:01	07:29	07:02	07:33
	17:20	17:55	18:26	19:57	20:26	20:51	20:51	20:55	20:30	19:46	18:58	17:18	17:03	
10	07:46	07:25	06:47	06:58	06:19	06:59	06:45-07:23/38	06:08	06:53-07:27/34	06:34	07:02	07:30	07:03	07:34
	17:21	17:56	18:27	19:58	20:27	20:52	20:52	20:54	20:29	19:44	18:56	17:17	17:03	
11	07:46	07:24	06:45	06:57	06:18	06:59	06:45-07:23/38	06:09	06:52-07:27/35	06:34	07:03	07:31	07:04	07:35
	17:22	17:58	18:28	19:59	20:28	20:52	20:52	20:54	20:28	19:43	18:55	17:16	17:03	
12	07:45	07:23	06:44	06:55	06:17	06:59	06:45-07:23/38	06:09	06:53-07:27/34	06:35	07:04	07:32	07:05	07:36
	17:23	17:59	18:29	20:00	20:29	20:53	20:53	20:54	20:27	19:41	18:53	17:15	17:03	
13	07:45	07:22	06:42	06:54	06:16	06:59	06:45-07:23/38	06:10	06:54-07:27/33	06:36	07:05	07:33	07:06	07:36
	17:24	18:00	18:30	20:01	20:30	20:53	20:53	20:53	20:25	19:39	18:52	17:14	17:03	
14	07:45	07:20	06:41	06:52	06:15	06:59	06:45-07:23/38	06:11	06:54-07:26/32	06:37	07:06	07:34	07:07	07:37
	17:25	18:01	18:31	20:02	20:31	20:53	20:53	20:53	20:24	19:38	18:50	17:13	17:04	
15	07:45	07:19	06:39	06:51	06:14	06:59	06:46-07:24/38	06:11	06:55-07:26/31	06:38	07:06	07:35	07:08	07:38
	17:26	18:02	18:32	20:03	20:32	20:54	20:54	20:52	20:23	19:36	18:49	17:12	17:04	
16	07:44	07:18	06:38	06:49	06:13	06:59	06:46-07:24/38	06:12	06:56-07:26/30	06:39	07:07	07:36	07:10	07:39
	17:28	18:03	18:33	20:04	20:33	20:54	20:54	20:52	20:21	19:34	18:47	17:12	17:04	
17	07:44	07:17	06:36	06:48	06:12	06:59	06:46-07:24/38	06:13	06:57-07:25/28	06:40	07:08	07:37	07:11	07:39
	17:29	18:04	18:34	20:05	20:34	20:55	20:55	20:51	20:20	19:33	18:46	17:11	17:04	
18	07:43	07:15	06:34	06:46	06:11	06:59	06:46-07:25/39	06:14	06:57-07:24/27	06:41	07:09	07:38	07:12	07:40
	17:30	18:06	18:35	20:06	20:34	20:55	20:55	20:50	20:19	19:31	18:44	17:10	17:05	
19	07:43	07:14	06:33	06:45	06:10	06:59	06:46-07:25/39	06:14	06:58-07:23/25	06:42	07:10	07:39	07:13	07:40
	17:31	18:07	18:36	20:07	20:35	20:55	20:55	20:50	20:17	19:30	18:43	17:09	17:05	
20	07:42	07:13	06:31	06:44	06:09	06:59	06:46-07:25/39	06:15	07:00-07:23/23	06:43	07:11	07:40	07:14	07:41
	17:32	18:08	18:37	20:08	20:36	20:55	20:55	20:49	20:16	19:28	18:42	17:09	17:06	
21	07:42	07:11	06:30	06:42	06:09	06:59	06:46-07:25/39	06:16	07:01-07:22/21	06:44	07:12	07:41	07:15	07:42
	17:33	18:09	18:38	20:09	20:37	20:56	20:56	20:48	20:15	19:26	18:40	17:08	17:06	
22	07:41	07:10	06:28	06:41	06:08	06:59	06:47-07:26/39	06:17	07:02-07:20/18	06:45	07:13	07:42	07:16	07:42
	17:34	18:10	18:39	20:10	20:38	20:56	20:56	20:48	20:13	19:25	18:39	17:08	17:06	
23	07:41	07:09	06:26	06:39	06:07	06:59	06:47-07:26/39	06:18	07:04-07:18/14	06:45	07:14	07:43	07:17	07:43
	17:35	18:11	18:40	20:11	20:39	20:56	20:56	20:47	20:12	19:23	18:37	17:07	17:07	
24	07:40	07:07	06:25	06:38	06:06	06:59	06:47-07:26/39	06:18	07:07-07:15/8	06:46	07:15	07:44	07:18	07:43
	17:36	18:12	18:41	20:12	20:40	20:56	20:56	20:46	20:10	19:22	18:36	17:06	17:08	
25	07:39	07:06	06:23	06:37	06:06	06:59	06:47-07:25/38	06:19	06:47	07:16	06:45	07:19	07:44	
	17:38	18:13	18:42	20:12	20:41	20:56	20:56	20:45	20:09	19:20	17:35	17:06	17:08	
26	07:39	07:05	06:22	06:35	06:05	06:59	06:48-07:26/38	06:20	06:48	07:16	06:46	07:21	07:44	
	17:39	18:14	18:43	20:13	20:41	20:56	20:56	20:45	20:07	19:18	17:34	17:06	17:09	
27	07:38	07:03	06:20	06:34	06:05	06:59	06:48-07:26/38	06:21	06:49	07:17	06:47	07:22	07:44	
	17:40	18:15	18:44	20:14	20:42	20:57	20:57	20:44	20:06	19:17	17:32	17:05	17:09	
28	07:37	07:02	06:18	06:33	06:04	06:59	06:48-07:26/38	06:22	06:50	07:18	06:48	07:23	07:45	
	17:41	18:17	18:45	20:15	20:43	20:57	20:57	20:43	20:04	19:15	17:31	17:05	17:10	
29	07:36		07:17	06:31	06:03	06:59	06:49-07:27/38	06:23	06:51	07:19	06:50	07:24	07:45	
	17:42		19:46	20:16	20:44	20:57	20:57	20:42	20:03	19:13	17:30	17:04	17:11	
30	07:36		07:15	06:30	06:03	06:59	06:49-07:26/37	06:24	06:52	07:20	06:51	07:25	07:45	
	17:43		19:47	20:17	20:44	20:57	20:57	20:41	20:01	19:12	17:29	17:04	17:11	
31	07:35		07:14		06:02	06:45-07:18/33		06:24	06:53		06:52		07:45	
	17:45		19:48		20:45			20:40	20:00		17:27		17:12	
Potential sun hours	302	300	370	396	444	446	446	454	425	374	347	302	293	0
Sum of minutes with flicker	0	0	0	0	303	1125	723	0	0	0	0	0	0	0

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

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

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 11:08 / 11

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 8 - WTG09

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June
1	07:46 08:34-09:11/37 11:06-12:10/64	07:34 08:41-09:13/32	07:00	07:12 18:10-18:44/34	06:29	06:02
	17:13 09:40-10:42/62	17:46 10:06-10:30/24	18:17	19:49	20:18	20:46
2	07:46 08:34-09:11/37 11:07-12:10/63	07:33 08:42-09:11/29	06:59	07:10 18:10-18:43/33	06:27	06:01
	17:14 09:40-10:43/63	17:47 10:10-10:26/16	18:18	19:50	20:19	20:46
3	07:46 08:34-09:12/38 11:08-12:10/62	07:32 08:44-09:10/26	06:57	07:09 18:11-18:43/32	06:26	06:01
	17:15 09:40-10:43/63	17:48	18:20	19:51	20:20	20:47
4	07:46 08:34-09:12/38 11:09-12:10/61	07:31 08:48-09:07/19	06:56	07:07 18:11-18:41/30	06:25	06:01
	17:16 09:41-10:43/62	17:49	18:21	19:52	20:21	20:48
5	07:46 08:34-09:13/39 11:09-12:10/61	07:30 08:58-09:03/5	06:54	07:06 18:13-18:41/28	06:24 06:43-06:47/4	06:00
	17:16 09:41-10:44/63	17:50	18:22	19:53	20:22	20:48
6	07:46 08:34-09:13/39 11:10-12:10/60	07:29	06:53	07:04 18:13-18:39/26	06:23 06:42-06:49/7	06:00
	17:17 09:42-10:44/62	17:51	18:23	19:54	20:23	20:49
7	07:46 08:33-09:14/41 11:11-12:10/59	07:28	06:51	07:03 18:15-18:37/22	06:22 06:41-06:51/10	06:00
	17:18 09:43-10:45/62	17:53	18:24	19:55	20:24	20:50
8	07:46 08:33-09:15/42 11:13-12:10/57	07:27	06:50	07:01 18:17-18:34/17	06:21 06:40-06:52/12	06:00
	17:19 09:43-10:45/62	17:54	18:25	19:56	20:25	20:50
9	07:46 08:33-09:15/42 11:14-12:10/56	07:26	06:48	07:00 18:20-18:31/11	06:19 06:39-06:52/13	05:59
	17:20 09:44-10:45/61	17:55	18:26	19:57	20:26	20:51
10	07:46 08:34-09:15/41 11:14-12:09/55	07:25	06:47	06:58	06:18 06:38-06:53/15	05:59
	17:21 09:44-10:45/61	17:56	18:27	19:58	20:27	20:51
11	07:45 08:33-09:16/43 11:16-12:09/53	07:24	06:45	06:56	06:17 06:37-06:53/16	05:59
	17:22 09:44-10:45/61	17:57	18:28	19:59	20:28	20:52
12	07:45 08:33-09:17/44 11:17-12:09/52	07:22	06:44	06:55	06:16 06:36-06:54/18	05:59
	17:23 09:45-10:46/61	17:58	18:29	20:00	20:29	20:52
13	07:45 08:33-09:17/44 11:19-12:08/49	07:21	06:42	06:53	06:15 06:35-06:54/19	05:59
	17:24 09:46-10:46/60	18:00	18:30	20:01	20:30	20:53
14	07:45 08:32-09:17/45 11:20-12:07/47	07:20	06:40	06:52	06:14 06:34-06:54/20	05:59
	17:25 09:46-10:45/59	18:01	18:31	20:02	20:31	20:53
15	07:44 08:33-09:18/45 11:22-12:06/44	07:19	06:39	06:51	06:13 06:33-06:54/21	05:59
	17:26 09:47-10:46/59	18:02	18:32	20:02	20:32	20:54
16	07:44 08:32-09:17/45 11:23-12:05/42	07:18	06:37	06:49	06:13 06:32-06:54/22	05:59
	17:27 09:47-10:45/58	18:03	18:33	20:03	20:32	20:54
17	07:44 08:33-09:18/45 11:26-12:04/38	07:16	06:36	06:48	06:12 06:31-06:53/22	05:59
	17:28 09:48-10:45/57	18:04	18:34	20:04	20:33	20:54
18	07:43 08:32-09:18/46 11:27-12:01/34	07:15	06:34 17:26-17:36/10	06:46	06:11 06:31-06:54/23	05:59
	17:30 09:48-10:45/57	18:05	18:35	20:05	20:34	20:55
19	07:43 08:33-09:18/45 11:30-12:00/30	07:14	06:33 17:23-17:40/17	06:45	06:10 06:31-06:53/22	05:59
	17:31 09:50-10:45/55	18:06	18:36	20:06	20:35	20:55
20	07:42 08:33-09:18/45 11:33-11:57/24	07:13	06:31 17:20-17:42/22	06:43	06:09 06:31-06:53/22	05:59
	17:32 09:50-10:44/54	18:08	18:37	20:07	20:36	20:55
21	07:42 08:34-09:18/44 11:38-11:53/15	07:11	06:29 17:17-17:43/26	06:42	06:08 06:31-06:52/21	05:59
	17:33 09:51-10:45/54	18:09	18:38	20:08	20:37	20:55
22	07:41 08:34-09:18/44	07:10	06:28 17:16-17:44/28	06:40	06:08 06:32-06:52/20	06:00
	17:34 09:52-10:44/52	18:10	18:39	20:09	20:38	20:56
23	07:40 08:35-09:17/42	07:09	06:26 17:14-17:45/31	06:39	06:07 06:33-06:52/19	06:00
	17:35 09:52-10:43/51	18:11	18:40	20:10	20:39	20:56
24	07:40 08:35-09:17/42	07:07	06:25 17:14-17:46/32	06:38	06:06 06:34-06:52/18	06:00
	17:36 09:54-10:43/49	18:12	18:41	20:11	20:39	20:56
25	07:39 08:35-09:17/42	07:06	06:23 17:12-17:46/34	06:36	06:06 06:35-06:50/15	06:00
	17:37 09:55-10:42/47	18:13	18:42	20:12	20:40	20:56
26	07:39 08:35-09:16/41	07:04	06:21 17:11-17:46/35	06:35	06:05 06:35-06:49/14	06:01
	17:39 09:56-10:40/44	18:14	18:43	20:13	20:41	20:56
27	07:38 08:36-09:17/41	07:03	06:20 17:11-17:46/35	06:34	06:04 06:37-06:49/12	06:01
	17:40 09:58-10:40/42	18:15	18:44	20:14	20:42	20:56
28	07:37 08:37-09:16/39	07:02	06:18 17:10-17:46/36	06:32	06:04 06:38-06:47/9	06:01
	17:41 09:59-10:39/40	18:16	18:45	20:15	20:43	20:56
29	07:36 08:38-09:15/37		07:17 18:11-18:46/35	06:31	06:03 06:41-06:45/4	06:02
	17:42 10:00-10:37/37		19:46	20:16	20:43	20:56
30	07:35 08:38-09:15/37		07:15 18:10-18:45/35	06:30	06:03	06:02
	17:43 10:02-10:35/33		19:47	20:17	20:44	20:56
31	07:35 08:39-09:14/35		07:14 18:11-18:45/34		06:02	
	17:44 10:04-10:33/29		19:48		20:45	
Potential sun hours	302	300	370	396	444	446
Sum of minutes with flicker	3991	151	410	233	398	0

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

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

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 11:08 / 12

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 8 - WTG09

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	July	August	September	October	November	December
1	06:03	06:25 06:47-07:04/17	06:54	07:21	06:53	07:25 08:15-08:58/43 10:58-11:51/53
	20:56	20:39	19:58	19:10	17:26	17:04 09:26-10:27/61
2	06:03	06:26 06:47-07:03/16	06:54	07:22	06:54	07:26 08:16-08:58/42 10:57-11:52/55
	20:56	20:38	19:57	19:08	17:25	17:03 09:27-10:28/61
3	06:04	06:27 06:48-07:03/15	06:55 18:17-18:28/11	07:23	06:55	07:27 08:16-08:59/43 10:57-11:53/56
	20:56	20:37	19:55	19:07	17:24	17:03 09:27-10:28/61
4	06:04	06:28 06:49-07:02/13	06:56 18:14-18:31/17	07:24	06:56	07:28 08:17-08:59/42 10:57-11:54/57
	20:56	20:36	19:53	19:05	17:23	17:03 09:27-10:29/62
5	06:05	06:29 06:50-07:01/11	06:57 18:11-18:33/22	07:25	06:57	07:29 08:18-08:59/41 10:57-11:55/58
	20:56	20:35	19:52	19:04	17:21	17:03 09:28-10:30/62
6	06:05	06:30 06:51-07:00/9	06:58 18:10-18:35/25	07:26	06:58 08:27-08:34/7	07:30 08:20-09:00/40 10:56-11:56/60
	20:55	20:33	19:50	19:02	17:20	17:03 09:28-10:30/62
7	06:06	06:31 06:52-06:58/6	06:59 18:08-18:36/28	07:27	06:59 08:19-08:38/19	07:31 08:21-09:00/39 10:57-11:57/60
	20:55	20:32	19:49	19:01	17:19	17:03 09:28-10:31/63
8	06:06	06:31 06:53-06:56/3	07:00 18:07-18:36/29	07:28	07:00 08:15-08:41/26	07:32 08:22-09:00/38 10:57-11:58/61
	20:55	20:31	19:47	18:59	17:18	17:03 09:29-10:31/62
9	06:07	06:32	07:01 18:05-18:37/32	07:29	07:02 08:13-08:42/29	07:33 08:23-09:01/38 10:57-11:59/62
	20:55	20:30	19:46	18:58	17:17 09:40-09:58/18	17:03 09:29-10:32/63
10	06:08	06:33	07:02 18:03-18:36/33	07:30	07:03 08:11-08:44/33	07:34 08:24-09:01/37 10:57-12:00/63
	20:54	20:29	19:44	18:56	17:16 09:37-10:01/24	17:03 09:30-10:33/63
11	06:08	06:34	07:03 18:03-18:37/34	07:31	07:04 08:10-08:45/35	07:35 08:24-09:01/37 10:56-12:00/64
	20:54	20:28	19:42	18:54	17:16 09:35-10:04/29	17:03 09:30-10:32/62
12	06:09	06:35	07:03 18:02-18:37/35	07:32	07:05 08:10-08:47/37	07:35 08:25-09:01/36 10:57-12:01/64
	20:53	20:26	19:41	18:53	17:15 09:34-10:07/33	17:03 09:30-10:33/63
13	06:10	06:36	07:04 18:01-18:37/36	07:33	07:06 08:10-08:47/37	07:36 08:26-09:02/36 10:57-12:02/65
	20:53	20:25	19:39	18:51	17:14 09:32-10:09/37	17:03 09:31-10:34/63
14	06:10	06:37	07:05 18:01-18:36/35	07:34	07:07 08:09-08:48/39	07:37 08:27-09:02/35 10:58-12:03/65
	20:53	20:24	19:38	18:50	17:13 09:31-10:11/40	17:03 09:32-10:35/63
15	06:11 06:48-06:55/7	06:38	07:06 18:01-18:36/35	07:35	07:08 08:08-08:49/41	07:38 08:27-09:02/35 10:57-12:03/66
	20:52	20:22	19:36	18:49	17:12 09:30-10:12/42	17:04 09:31-10:34/63
16	06:12 06:47-06:57/10	06:39	07:07 18:00-18:36/36	07:36	07:09 08:08-08:49/41	07:38 08:28-09:03/35 10:58-12:04/66
	20:51	20:21	19:34	18:47	17:11 09:29-10:13/44	17:04 09:32-10:35/63
17	06:13 06:45-06:58/13	06:40	07:08 18:00-18:35/35	07:37	07:10 08:09-08:51/42	07:39 08:29-09:03/34 10:59-12:05/66
	20:51	20:20	19:33	18:46	17:11 09:29-10:16/47	17:04 09:33-10:36/63
18	06:13 06:44-06:59/15	06:41	07:09 18:00-18:33/33	07:38	07:12 08:09-08:51/42	07:40 08:29-09:03/34 10:58-12:05/67
	20:50	20:18	19:31	18:44	17:10 09:28-10:17/49	17:05 09:33-10:36/63
19	06:14 06:44-07:01/17	06:42	07:10 18:00-18:32/32	07:39	07:13 08:09-08:52/43	07:40 08:30-09:04/34 10:59-12:05/66
	20:50	20:17	19:29	18:43	17:09 09:27-10:18/51	17:05 09:34-10:37/63
20	06:15 06:43-07:02/19	06:43	07:11 18:00-18:31/31	07:40	07:14 08:09-08:53/44	07:41 08:30-09:04/34 10:59-12:05/66
	20:49	20:16	19:28	18:41	17:09 09:27-10:19/52	17:05 09:34-10:37/63
21	06:16 06:42-07:01/19	06:43	07:12 18:01-18:30/29	07:41	07:15 08:09-08:53/44 11:13-11:28/15	07:41 08:31-09:05/34 11:00-12:06/66
	20:48	20:14	19:26	18:40	17:08 09:26-10:20/54	17:06 09:35-10:38/63
22	06:17 06:42-07:02/20	06:44	07:13 18:02-18:28/26	07:42	07:16 08:09-08:54/45 11:09-11:33/24	07:42 08:31-09:05/34 11:00-12:06/66
	20:48	20:13	19:25	18:39	17:07 09:26-10:20/54	17:06 09:35-10:38/63
23	06:17 06:42-07:03/21	06:45	07:14 18:03-18:26/23	07:43	07:17 08:10-08:55/45 11:07-11:37/30	07:42 08:32-09:06/34 11:01-12:07/66
	20:47	20:11	19:23	18:37	17:07 09:27-10:22/55	17:07 09:36-10:39/63
24	06:18 06:42-07:04/22	06:46	07:14 18:05-18:24/19	07:44	07:18 08:10-08:56/46 11:05-11:39/34	07:43 08:32-09:06/34 11:01-12:07/66
	20:46	20:10	19:21	18:36	17:06 09:26-10:23/57	17:07 09:36-10:39/63
25	06:19 06:41-07:04/23	06:47	07:15 18:08-18:21/13	06:45	07:19 08:11-08:56/45 11:04-11:42/38	07:43 08:33-09:07/34 11:02-12:08/66
	20:45	20:09	19:20	17:35	17:06 09:26-10:23/57	17:08 09:37-10:40/63
26	06:20 06:41-07:04/23	06:48	07:16	06:46	07:20 08:11-08:56/45 11:03-11:43/40	07:44 08:33-09:07/34 11:03-12:09/66
	20:44	20:07	19:18	17:33	17:05 09:26-10:24/58	17:08 09:37-10:40/63
27	06:21 06:42-07:04/22	06:49	07:17	06:47	07:21 08:12-08:57/45 11:01-11:45/44	07:44 08:33-09:07/34 11:03-12:09/66
	20:44	20:06	19:16	17:32	17:05 09:26-10:25/59	17:09 09:37-10:40/63
28	06:22 06:43-07:04/21	06:50	07:18	06:48	07:22 08:12-08:57/45 11:00-11:47/47	07:44 08:33-09:08/35 11:03-12:09/66
	20:43	20:04	19:15	17:31	17:05 09:26-10:25/59	17:10 09:37-10:40/63
29	06:22 06:44-07:04/20	06:51	07:19	06:49	07:23 08:13-08:57/44 10:59-11:48/49	07:45 08:34-09:09/35 11:05-12:10/65
	20:42	20:03	19:13	17:30	17:04 09:26-10:26/60	17:10 09:39-10:41/62
30	06:23 06:45-07:04/19	06:52	07:20	06:50	07:24 08:14-08:58/44 10:58-11:49/51	07:45 08:34-09:09/35 11:05-12:10/65
	20:41	20:01	19:12	17:28	17:04 09:26-10:27/61	17:11 09:39-10:42/63
31	06:24 06:46-07:04/18	06:53		06:52		07:45 08:34-09:10/36 11:06-12:10/64
	20:40	20:00		17:27		17:12 09:39-10:42/63
Potential sun hours	454	425	374	347	302	293
Sum of minutes with flicker	309	90	649	0	2375	5035

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

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

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 11:08 / 13

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 9 - WTG06

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June
1	07:46 15:07-16:12/65 17:13	07:34 16:03-16:27/24 17:46 16:32-17:01/29	07:00 17:14-17:28/14 18:17	07:12 19:49	06:29 19:18-19:45/27 20:18	06:02 20:46
2	07:46 15:07-16:13/66 17:14	07:33 16:04-16:25/21 17:47 16:32-17:01/29	06:59 17:16-17:25/9 18:19	07:10 19:50	06:28 19:19-19:43/24 20:19	06:01 20:46
3	07:46 15:08-16:14/66 17:15	07:32 16:06-16:24/18 17:48 16:33-17:01/28	06:57 18:20	07:09 19:51	06:26 19:21-19:42/21 20:20	06:01 20:47
4	07:46 15:09-16:15/66 17:16	07:31 16:09-16:22/13 17:49 16:33-17:01/28	06:56 18:21	07:07 19:52	06:25 19:23-19:34/11 20:21	06:01 20:48
5	07:46 15:10-16:16/66 17:16	07:30 16:13-16:18/5 17:50 16:34-17:01/27	06:54 18:22	07:06 19:53	06:24 19:24-19:44/20 20:22	06:00 20:48
6	07:46 15:10-16:17/67 17:17	07:29 16:35-17:01/26 17:52	06:53 18:23	07:04 19:54	06:23 19:23-19:45/22 20:23	06:00 20:49
7	07:46 15:11-16:18/67 17:18	07:28 16:36-17:00/24 17:53	06:51 18:24	07:03 19:55	06:22 19:23-19:46/23 20:24	06:00 20:50
8	07:46 15:12-16:20/68 17:19	07:27 16:37-17:00/23 17:54	06:50 18:25	07:01 19:56	06:21 19:22-19:47/25 20:25	06:00 20:50
9	07:46 15:13-16:21/68 17:20	07:26 16:39-16:59/20 17:55	06:48 18:26	07:00 19:57	06:20 19:22-19:47/25 20:26	05:59 20:51
10	07:46 15:15-16:21/66 17:21	07:25 16:41-16:58/17 17:56	06:47 18:27	06:58 19:58	06:18 19:21-19:48/27 20:27	05:59 20:51
11	07:45 15:15-16:22/67 17:22	07:24 16:44-16:56/12 17:57	06:45 18:28	06:57 19:59	06:17 19:21-19:48/27 20:28	05:59 20:52
12	07:45 15:17-16:23/66 17:23	07:23 16:48-16:51/3 17:59 17:11-17:13/2	06:44 18:29	06:55 20:00	06:16 19:21-19:48/27 20:29	05:59 20:52
13	07:45 15:18-16:24/66 17:24	07:21 17:07-17:18/11 18:00	06:42 18:30	06:54 20:01	06:15 19:20-19:48/28 20:30	05:59 20:53
14	07:45 15:19-16:24/65 17:25	07:20 17:05-17:21/16 18:01	06:41 18:31	06:52 19:31-19:39/8 20:02	06:14 19:20-19:48/28 20:31	05:59 20:53
15	07:44 15:21-16:25/64 17:26	07:19 17:04-17:22/18 18:02	06:39 18:32	06:51 19:29-19:41/12 20:03	06:14 19:20-19:48/28 20:32	05:59 20:54
16	07:44 15:23-16:25/62 17:27	07:18 17:03-17:25/22 18:03	06:37 18:33	06:49 19:26-19:42/16 20:04	06:13 19:20-19:48/28 20:33	05:59 20:54
17	07:44 15:26-16:26/60 17:29	07:16 17:01-17:27/26 18:04	06:36 18:34	06:48 19:26-19:43/17 20:05	06:12 19:20-19:47/27 20:33	05:59 20:54
18	07:43 15:31-16:27/56 17:30	07:15 17:01-17:28/27 18:05	06:34 18:35	06:46 19:24-19:43/19 20:05	06:11 19:21-19:48/27 20:34	05:59 20:55
19	07:43 15:39-16:28/49 17:31	07:14 17:01-17:30/29 18:07	06:33 18:36	06:45 19:24-19:42/18 20:06 19:42-19:43/1	06:10 19:21-19:48/27 20:35	05:59 20:55
20	07:42 15:40-16:28/48 17:32	07:13 17:00-17:30/30 18:08	06:31 18:37	06:43 19:23-19:45/22 20:07	06:09 19:22-19:47/25 20:36	05:59 20:55
21	07:42 15:43-16:29/46 17:33	07:11 17:00-17:31/31 18:09	06:29 18:38	06:42 19:20-19:46/26 20:08	06:08 19:22-19:46/24 20:37	06:00 20:56
22	07:41 15:46-16:28/42 17:34	07:10 17:01-17:32/31 18:10	06:28 18:39	06:41 19:20-19:48/28 20:09	06:08 19:23-19:46/23 20:38	06:00 20:56
23	07:41 15:52-16:28/36 17:35	07:09 17:01-17:32/31 18:11	06:26 18:40	06:39 19:18-19:47/29 20:10	06:07 19:23-19:46/23 20:39	06:00 20:56
24	07:40 15:53-16:29/36 17:36	07:07 17:02-17:32/30 18:12	06:25 18:41	06:38 19:18-19:48/30 20:11	06:06 19:24-19:44/20 20:40	06:00 20:56
25	07:39 15:54-16:29/35 17:38	07:06 17:02-17:31/29 18:13	06:23 18:42	06:36 19:18-19:49/31 20:12	06:06 19:25-19:44/19 20:40	06:00 20:56
26	07:39 15:55-16:29/34 17:39	07:04 17:03-17:31/28 18:14	06:22 18:43	06:35 19:18-19:49/31 20:13	06:05 19:25-19:43/18 20:41	06:01 20:56
27	07:38 15:57-16:30/33 17:40	07:03 17:05-17:31/26 18:15	06:20 18:44	06:34 19:17-19:48/31 20:14	06:04 19:27-19:43/16 20:42	06:01 20:56
28	07:37 15:58-16:29/31 17:41	07:02 17:07-17:29/22 18:16	06:18 18:45	06:33 19:17-19:48/31 20:15	06:04 19:27-19:41/14 20:43	06:02 20:56
29	07:36 16:00-16:29/29 17:42	07:01 16:33-16:59/26 18:17	06:17 19:46	06:31 19:18-19:47/29 20:16	06:03 19:29-19:39/10 20:44	06:02 20:56
30	07:36 16:01-16:28/27 17:43	07:00 16:32-17:00/28 18:18	06:16 19:47	06:30 19:18-19:47/29 20:17	06:03 19:30-19:40/10 20:44	06:02 20:56
31	07:35 16:02-16:27/25 17:44	06:59 16:02-16:27/25 18:19	06:15 19:48	06:29 19:17-19:46/28 20:18	06:02 19:33-19:39/6 20:45	06:01 20:56
Potential sun hours	302	300	370	396	444	446
Sum of minutes with flicker	1875	756	23	408	699	0

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

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

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 11:08 / 14

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar per WTG

Calculation: Is CorisWTG: 9 - WTG06

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	July	August	September	October	November	December
1	06:03 20:56	06:25 19:30-19:58/28 20:39	06:54 07:21 19:58 19:10	06:53 16:09-16:27/18	07:26 14:57-16:04/67	17:26 17:04
2	06:03 20:56	06:26 19:31-19:57/26 20:38	06:54 07:22 19:57 19:09	06:54 16:08-16:29/21	07:27 14:57-16:04/67	17:25 17:03
3	06:04 20:56	06:27 19:31-19:57/26 20:37	06:55 07:23 19:55 19:07	06:55 16:07-16:30/23	07:28 14:57-16:04/67	17:24 17:03
4	06:04 20:56	06:28 19:31-19:57/26 20:36	06:56 07:24 19:54 19:05	06:56 16:05-16:30/25	07:28 14:56-16:04/68	17:23 17:03
5	06:05 20:56	06:29 19:32-19:56/24 20:35	06:57 07:25 19:52 19:04	06:57 16:04-16:31/27	07:29 14:56-16:04/68	17:22 17:03
6	06:05 20:56	06:30 19:33-19:55/22 20:34	06:58 07:26 19:50 19:02	06:58 15:42-15:49/7	07:30 14:57-16:03/66	17:20 16:04-16:31/27
7	06:06 20:55	06:31 19:33-19:55/22 20:32	06:59 07:27 19:49 19:01	06:59 15:39-15:53/14	07:31 14:57-16:03/66	17:19 16:04-16:32/28
8	06:07 20:55	06:32 19:35-19:42/7 20:31 19:41-19:54/13	07:00 07:28 19:47 18:59	07:00 15:37-15:55/18	07:32 14:57-16:03/66	17:18 16:04-16:32/28
9	06:07 20:55	06:32 19:31-19:42/11 19:48-19:51/3 20:30 19:35-19:49/14	07:01 07:29 19:46 18:58	07:01 15:35-15:56/21	07:33 14:57-16:03/66	17:17 16:03-16:32/29
10	06:08 20:54	06:33 19:29-19:51/22 20:29	07:02 07:30 19:44 18:56	07:02 15:34-15:58/24	07:34 14:58-16:03/65	17:17 16:03-16:31/28
11	06:08 20:54	06:34 19:28-19:53/25 20:28	07:03 07:31 17:52-17:56/4 19:42 18:55	07:03 15:33-15:58/25	07:35 14:57-16:02/65	17:16 16:03-16:31/28
12	06:09 19:42-19:46/4 20:54	06:35 19:27-19:54/27 20:26	07:04 07:32 17:48-17:59/11 19:41 18:53	07:04 15:33-16:00/27	07:35 14:57-16:02/65	17:15 16:04-16:32/28
13	06:10 19:39-19:48/9 20:53	06:36 19:26-19:55/29 20:25	07:04 07:33 17:42-18:01/19 19:39 18:52	07:05 15:32-16:01/29	07:36 14:58-16:03/65	17:14 16:05-16:31/26
14	06:10 19:38-19:45/7 20:53 19:45-19:50/5	06:37 19:25-19:55/30 20:24	07:05 07:34 17:38-18:02/24 19:38 18:50	07:06 15:30-16:01/31	07:37 14:59-16:04/65	17:13 16:05-16:31/26
15	06:11 19:37-19:49/12 20:52 19:49-19:51/2	06:38 19:25-19:55/30 20:23	07:06 07:35 17:36-18:02/26 19:36 18:49	07:07 15:29-16:02/33	07:38 14:58-16:03/65	17:12 16:05-16:30/25
16	06:12 19:37-19:51/14 20:52 19:51-19:53/2	06:39 19:25-19:56/31 20:21	07:07 07:36 17:34-18:03/29 19:34 18:47	07:08 15:28-16:02/34	07:38 14:59-16:03/64	17:11 16:06-16:29/23
17	06:13 19:35-19:52/17 20:51 19:52-19:53/1	06:40 19:25-19:56/31 20:20	07:08 07:37 17:34-18:04/30 19:33 18:46	07:09 15:28-16:03/35	07:39 15:00-16:03/63	17:11 16:08-16:29/21
18	06:13 19:35-19:53/18 20:50 19:53-19:54/1	06:41 19:24-19:54/30 20:19	07:09 07:38 17:33-18:03/30 19:31 18:44	07:10 15:27-16:03/36	07:40 14:59-16:03/64	17:10 16:09-16:27/18
19	06:14 19:34-19:54/20 20:50 19:54-19:55/1	06:42 19:24-19:54/30 20:17	07:10 07:39 17:32-18:03/31 19:29 18:43	07:11 15:27-16:03/36	07:40 15:00-16:03/63	17:09 16:10-16:26/16
20	06:15 19:34-19:56/22 20:49	06:43 19:24-19:53/29 20:16	07:11 07:40 17:31-18:03/32 19:28 18:41	07:12 15:21-16:03/42	07:41 15:00-16:03/63	17:09 16:11-16:24/13
21	06:16 19:33-19:55/22 20:48 19:55-19:56/1	06:44 19:25-19:52/27 20:14	07:12 07:41 17:31-18:02/31 19:26 18:40	07:13 15:18-16:04/46	07:41 15:01-16:03/62	17:08 16:13-16:22/9
22	06:17 19:32-19:56/24 20:48 19:56-19:57/1	06:44 19:25-19:51/26 20:13	07:13 07:42 17:31-18:01/30 19:25 18:39	07:14 15:16-16:04/48	07:42 15:01-16:03/62	17:07 16:03-16:06/3
23	06:17 19:32-19:57/25 20:47	06:45 19:27-19:49/22 20:12	07:14 07:43 17:31-17:59/28 19:23 18:37	07:15 15:16-16:05/49	07:43 15:02-16:05/63	17:07 16:05-16:07/2
24	06:18 19:32-19:58/26 20:46	06:46 19:28-19:47/19 20:10	07:15 07:44 17:31-17:58/27 19:21 18:36	07:16 15:09-16:05/56	07:43 15:02-16:05/63	17:07 16:05-16:07/2
25	06:19 19:32-19:58/26 20:45	06:47 19:28-19:47/19 20:09	07:15 06:45 16:31-16:56/25 19:20 17:35	07:17 15:04-16:04/60	07:43 15:03-16:06/63	17:06 16:06-16:08/2
26	06:20 19:31-19:58/27 20:44	06:48 19:28-19:45/17 20:07	07:16 06:46 16:32-16:53/21 19:18 17:33	07:18 15:02-16:04/62	07:44 15:04-16:07/63	17:05 16:07-16:08/1
27	06:21 19:31-19:58/27 20:44	06:49 19:28-19:44/16 20:06	07:17 06:47 16:34-16:52/18 19:17 17:32	07:19 15:00-16:04/64	07:44 15:04-16:08/64	17:05 16:08-16:09/1
28	06:22 19:31-19:58/27 20:43	06:50 19:30-19:42/12 20:04	07:18 06:48 16:35-16:50/15 19:15 17:31	07:20 14:59-16:04/65	07:45 15:04-16:08/64	17:05 16:08-16:09/1
29	06:23 19:31-19:59/28 20:42	06:51 19:32-19:40/8 20:03	07:19 06:49 16:37-16:47/10 19:13 17:30	07:21 14:58-16:04/66	07:45 15:05-16:10/65	17:04 17:11
30	06:23 19:31-19:59/28 20:41	06:52 20:01	07:20 06:50 16:16-16:22/6 19:12 17:28	07:22 14:58-16:04/66	07:45 15:06-16:11/65	17:04 17:11
31	06:24 19:31-19:59/28 20:40	06:53 20:00	06:52 16:13-16:25/12 17:27	07:45 15:06-16:11/65	07:45 15:06-16:11/65	17:12
Potential sun hours	454	425	374	347	302	293
Sum of minutes with flicker	425	693	0	459	1481	2029

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 1

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: A - R20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625 521 486 354 333 434 521 521 556 660 955 868 6.834
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December				
1	07:46	07:34	07:00	07:12	06:29	07:04 (5)	06:02	06:45 (7)	06:03	06:49 (7)	06:25	06:54	07:21	06:53	07:26	
	17:13	17:46	18:18	19:49	20:18	20:24 (5)	20:46	07:19 (7)	20:57	07:27 (7)	20:39	19:58	19:10	17:26	17:04	
2	07:46	07:33	06:59	07:11	06:28	07:04 (5)	06:02	06:45 (7)	06:03	06:49 (7)	06:26	06:55	07:22	06:54	07:27	
	17:14	17:47	18:19	19:50	20:19	20:23 (5)	20:47	07:19 (7)	20:56	07:27 (7)	20:38	19:57	19:09	17:25	17:04	
3	07:46	07:32	06:57	07:09	06:26	07:05 (5)	06:01	06:45 (7)	06:04	06:50 (7)	06:27	06:56	07:23	06:55	07:28	
	17:15	17:48	18:20	19:51	20:20	20:22 (5)	20:47	07:20 (7)	20:56	07:27 (7)	20:37	19:55	19:07	17:24	17:03	
4	07:46	07:31	06:56	07:08	06:25	07:06 (5)	06:01	06:45 (7)	06:04	06:50 (7)	06:28	06:57	07:24	06:56	07:29	
	17:16	17:49	18:21	19:52	20:21	20:20 (5)	20:48	07:20 (7)	20:56	07:27 (7)	20:36	19:54	19:06	17:23	17:03	
5	07:46	07:30	06:54	07:06	06:24	07:08 (5)	06:01	06:45 (7)	06:05	06:51 (7)	06:29	06:57	07:25	06:57	07:30	
	17:17	17:51	18:22	19:53	20:22	20:22 (5)	20:49	07:21 (7)	20:56	07:27 (7)	20:35	19:52	19:04	17:22	17:03	
6	07:46	07:29	06:53	07:04	06:23	07:10 (5)	06:00	06:44 (7)	06:06	06:50 (7)	06:30	06:58	07:26	06:58	07:31	
	17:18	17:52	18:23	19:54	20:23	20:23 (5)	20:49	07:21 (7)	20:56	07:27 (7)	20:34	19:51	19:02	17:21	17:03	
7	07:46	07:28	06:51	07:03	06:22	07:06 (5)	06:00	06:45 (7)	06:06	06:51 (7)	06:31	06:59	07:27	07:00	07:31	
	17:19	17:53	18:24	19:55	20:24	20:24 (5)	20:50	07:21 (7)	20:55	07:27 (7)	20:33	19:51	19:01	17:20	17:03	
8	07:46	07:27	06:50	07:01	06:21	07:05 (5)	06:00	06:45 (7)	06:07	06:51 (7)	06:32	06:57	07:28	07:01	07:32	
	17:19	17:54	18:25	19:56	20:25	20:25 (5)	20:50	07:22 (7)	20:55	07:27 (7)	20:31	19:52	19:01	17:19	17:03	
9	07:46	07:26	06:48	07:00	06:20	07:16 (5)	06:00	06:45 (7)	06:07	06:52 (7)	06:33	07:15 (5)	07:01	07:29	07:02	07:33
	17:20	17:55	18:26	19:57	20:26	20:26 (5)	20:51	07:22 (7)	20:55	07:27 (7)	20:30	19:51	19:01	17:18	17:03	
10	07:46	07:25	06:47	06:58	06:19	07:14 (5)	06:00	06:45 (7)	06:08	06:53 (7)	06:34	07:14 (5)	07:02	07:30	07:03	07:34
	17:21	17:56	18:27	19:58	20:27	20:27 (5)	20:52	07:23 (7)	20:54	07:27 (7)	20:29	19:52	19:01	17:17	17:03	
11	07:46	07:24	06:45	06:57	06:18	07:12 (5)	06:00	06:45 (7)	06:09	06:52 (7)	06:34	07:12 (5)	07:03	07:31	07:04	07:35
	17:22	17:58	18:28	19:59	20:28	20:28 (5)	20:52	07:23 (7)	20:54	07:27 (7)	20:28	19:51	19:01	17:16	17:03	
12	07:45	07:23	06:44	06:55	06:17	07:16 (5)	06:00	06:45 (7)	06:09	06:53 (7)	06:35	07:11 (5)	07:04	07:32	07:05	07:36
	17:23	17:59	18:29	20:00	20:29	20:29 (5)	20:53	07:23 (7)	20:54	07:27 (7)	20:27	19:51	19:01	17:15	17:03	
13	07:45	07:22	06:42	06:54	06:16	07:19 (5)	06:00	06:45 (7)	06:10	06:54 (7)	06:36	07:11 (5)	07:05	07:33	07:06	07:36
	17:24	18:00	18:30	20:01	20:30	20:30 (5)	20:53	07:23 (7)	20:53	07:27 (7)	20:25	19:52	19:01	17:14	17:03	
14	07:45	07:20	06:41	06:52	06:15	07:18 (5)	06:00	06:45 (7)	06:11	06:54 (7)	06:37	07:10 (5)	07:06	07:34	07:07	07:37
	17:25	18:01	18:31	20:02	20:31	20:31 (5)	20:53	07:23 (7)	20:53	07:26 (7)	20:24	19:51	19:01	17:13	17:04	
15	07:45	07:19	06:39	06:51	06:14	07:22 (5)	06:00	06:46 (7)	06:11	06:55 (7)	06:38	07:10 (5)	07:06	07:35	07:08	07:38
	17:27	18:02	18:32	20:03	20:32	20:32 (5)	20:54	07:24 (7)	20:52	07:26 (7)	20:23	19:51	19:01	17:12	17:04	
16	07:44	07:18	06:38	06:49	06:13	07:25 (5)	06:00	06:46 (7)	06:12	06:56 (7)	06:39	07:10 (5)	07:07	07:36	07:10	07:39
	17:28	18:03	18:33	20:04	20:33	20:33 (5)	20:54	07:24 (7)	20:52	07:26 (7)	20:21	19:51	19:01	17:11	17:04	
17	07:44	07:17	06:36	06:48	06:12	07:26 (5)	06:00	06:46 (7)	06:13	06:57 (7)	06:40	07:10 (5)	07:08	07:37	07:11	07:39
	17:29	18:04	18:34	20:05	20:34	20:34 (5)	20:55	07:24 (7)	20:51	07:25 (7)	20:20	19:51	19:01	17:11	17:04	
18	07:43	07:15	06:34	06:46	06:11	07:27 (5)	06:00	06:46 (7)	06:14	06:57 (7)	06:41	07:10 (5)	07:09	07:38	07:12	07:40
	17:30	18:06	18:35	20:06	20:35	20:35 (5)	20:55	07:25 (7)	20:51	07:24 (7)	20:19	19:51	19:01	17:10	17:05	
19	07:43	07:14	06:33	06:45	06:10	07:28 (5)	06:00	06:46 (7)	06:14	06:58 (7)	06:42	07:11 (5)	07:10	07:39	07:13	07:41
	17:31	18:07	18:36	20:07	20:36	20:36 (5)	20:55	07:25 (7)	20:50	07:23 (7)	20:17	19:51	19:01	17:09	17:05	
20	07:42	07:13	06:31	06:44	06:09	07:29 (5)	06:00	06:46 (7)	06:15	07:00 (7)	06:43	07:10 (5)	07:11	07:40	07:14	07:41
	17:32	18:08	18:37	20:08	20:37	20:37 (5)	20:55	07:25 (7)	20:49	07:23 (7)	20:16	19:51	19:01	17:09	17:06	
21	07:42	07:11	06:30	06:42	06:09	07:30 (5)	06:00	06:46 (7)	06:16	07:01 (7)	06:44	07:11 (5)	07:12	07:41	07:15	07:42
	17:33	18:09	18:38	20:09	20:38	20:38 (5)	20:56	07:25 (7)	20:49	07:22 (7)	20:15	19:51	19:01	17:08	17:06	
22	07:41	07:10	06:28	06:41	06:08	07:31 (5)	06:00	06:47 (7)	06:17	07:02 (7)	06:45	07:12 (5)	07:13	07:42	07:16	07:42
	17:34	18:10	18:39	20:10	20:39	20:39 (5)	20:56	07:26 (7)	20:48	07:20 (7)	20:13	19:51	19:01	17:08	17:07	
23	07:41	07:09	06:26	06:39	06:07	07:32 (5)	06:00	06:47 (7)	06:18	07:04 (7)	06:46	07:14 (5)	07:14	07:43	07:17	07:43
	17:35	18:11	18:40	20:11	20:40	20:40 (5)	20:56	07:26 (7)	20:47	07:18 (7)	20:12	19:51	19:01	17:07	17:07	
24	07:40	07:07	06:25	06:38	06:07	07:33 (5)	06:00	06:47 (7)	06:18	07:07 (7)	06:46	07:16 (5)	07:15	07:44	07:18	07:43
	17:37	18:12	18:41	20:12	20:41	20:41 (5)	20:56	07:26 (7)	20:46	07:15 (7)	20:10	19:51	19:01	17:07	17:08	
25	07:39	07:06	06:23	06:37	06:06	07:34 (5)	06:00	06:47 (7)	06:19	07:15 (7)	06:47	07:16 (5)	07:16	07:45	07:19	07:44
	17:38	18:13	18:42	20:13	20:42	20:42 (5)	20:56	07:25 (7)	20:45	07:16 (7)	20:09	19:51	19:01	17:06	17:08	
26	07:39	07:05	06:22	06:35	06:05	07:35 (5)	06:00	06:48 (7)	06:20	07:17 (7)	06:48	07:17 (5)	07:16	07:46	07:21	07:44
	17:39	18:14	18:43	20:14	20:43	20:43 (5)	20:57	07:26 (7)	20:45	07:18 (7)	20:09	19:51	19:01	17:06	17:09	
27	07:38	07:03	06:20	06:34	06:05	07:36 (5)	06:00	06:47 (7)	06:21	07:18 (7)	06:49	07:18 (5)	07:17	07:47	07:22	07:44
	17:40	18:16	18:44	20:14	20:43	20:43 (5)	20:57	07:26 (7)	20:44	07:19 (7)	20:06	19:51	19:01	17:05	17:09	
28	07:37	07:02	06:19	06:33	06:04	07:37 (5)	06:00	06:48 (7)	06:22	07:20 (7)	06:46	07:19 (5)	07:18	07:48	07:23	07:45
	17:41	18:17	18:45	20:15	20:44	20:44 (5)	20:57	07:27 (7)	20:43	07:20 (7)	20:04	19:51	19:01	17:05	17:10	
29	07:37	07:01	06:17	06:31	06:04	07:38 (5)	06:00	06:49 (7)	06:23	07:21 (7)	06:23	07:20 (5)	07:19	07:50	07:24	07:45
	17:42	18:18	18:46	20:16	20:45	20:45 (5)	20:57	07:27 (7)	20:42	07:21 (7)	20:03	19:51	19:01	17:04	17:11	
30	07:36	07:00	06:15	06:30	06:03	07:39 (5)	06:00	06:49 (7)	06:24	07:22 (7)	06:24	07:21 (5)	07:20	07:51	07:25	07:45
	17:44	18:20	18:48	20:17	20:46	20:46 (5)	20:57	07:28 (7)	20:41	07:22 (7)	20:01	19:51	19:01	17:04	17:12	
31	07:35	07:00	06:14	06:29	06:03	07:40 (5)	06:00	06:45 (7)	06:25	07:23 (7)	06:25	07:22 (5)	07:21	07:52	07:26	07:45
	17:45	18:21	18:49	20:18	20:47	20:47 (5)	20:57	07:29 (7)	20:41	07:23 (7)	20:01	19:51	19:01	17:04	17:12	
Potential sun hours	302	300	370	396	444	444	446	454	454	424	374	347	302	293		
Total, worst case				234	390	390	1125	723	326							
Sun reduction				0,53	0,59	0,66	0,66	0,74	0,73							
Oper. time red.				0,78	0,78	0,78	0,78	0,78	0,78							
Wind dir. red.				0,63	0,63	0,62	0,62	0,62	0,63							
Total reduction				0,26	0,29	0,32	0,32	0,36	0,36							
Total, real				61	112	112	364	261	117							

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 2

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: B - R23

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December				
1	07:46	07:34	07:00	07:12	06:29	06:02	06:28 (4)	06:03	06:31 (4)	06:25	06:54	07:21	06:53	07:26		
	17:13	17:46	18:18	19:49	20:18	20:46	06:42 (4)	20:56	20	06:51 (4)	20:39	19:58	19:10	17:26	17:04	
2	07:46	07:33	06:59	07:11	06:28	06:02	06:27 (4)	06:03	06:31 (4)	06:26	06:55	07:22	06:54	07:27		
	17:14	17:47	18:19	19:50	20:19	20:47	06:42 (4)	20:56	19	06:50 (4)	20:38	19:57	19:09	17:25	17:04	
3	07:46	07:32	06:57	07:09	06:26	06:01	06:27 (4)	06:04	06:32 (4)	06:27	06:56	07:23	06:55	07:28		
	17:15	17:48	18:20	19:51	20:20	20:47	06:43 (4)	20:56	19	06:51 (4)	20:37	19:55	19:07	17:24	17:03	
4	07:46	07:31	06:56	07:07	06:25	06:01	06:27 (4)	06:04	06:32 (4)	06:28	06:56	07:24	06:56	07:29		
	17:16	17:49	18:21	19:52	20:21	20:48	06:44 (4)	20:56	18	06:50 (4)	20:36	19:54	19:06	17:23	17:03	
5	07:46	07:30	06:54	07:06	06:24	06:01	06:27 (4)	06:05	06:32 (4)	06:29	06:57	07:25	06:57	07:30		
	17:17	17:51	18:22	19:53	20:22	20:49	06:44 (4)	20:56	19	06:51 (4)	20:35	19:52	19:04	17:22	17:03	
6	07:46	07:29	06:53	07:04	06:23	06:00	06:26 (4)	06:05	06:32 (4)	06:30	06:58	07:26	06:58	07:30		
	17:18	17:52	18:23	19:54	20:23	20:49	06:44 (4)	20:56	18	06:50 (4)	20:34	19:51	19:02	17:21	17:03	
7	07:46	07:28	06:51	07:03	06:22	06:00	06:26 (4)	06:06	06:33 (4)	06:31	06:59	07:27	06:59	07:31		
	17:18	17:53	18:24	19:55	20:24	20:50	06:45 (4)	20:55	18	06:51 (4)	20:33	19:49	19:01	17:20	17:03	
8	07:46	07:27	06:50	07:01	06:21	06:00	06:27 (4)	06:07	06:33 (4)	06:32	07:00	07:28	07:01	07:32		
	17:19	17:54	18:25	19:56	20:25	20:50	06:45 (4)	20:55	17	06:50 (4)	20:31	19:47	18:59	17:19	17:03	
9	07:46	07:26	06:48	07:00	06:20	06:00	06:27 (4)	06:07	06:34 (4)	06:33	07:01	07:29	07:02	07:33		
	17:20	17:55	18:26	19:57	20:26	20:51	06:46 (4)	20:55	16	06:50 (4)	20:30	19:46	18:58	17:18	17:03	
10	07:46	07:25	06:47	06:58	06:19	05:59	06:27 (4)	06:08	06:35 (4)	06:34	07:02	07:30	07:03	07:34		
	17:21	17:56	18:27	19:58	20:27	20:51	06:46 (4)	20:54	15	06:50 (4)	20:29	19:44	18:56	17:17	17:03	
11	07:46	07:24	06:45	06:57	06:18	05:59	06:27 (4)	06:09	06:35 (4)	06:34	07:03	07:31	07:04	07:35		
	17:22	17:58	18:28	19:59	20:28	20:52	06:46 (4)	20:54	15	06:50 (4)	20:28	19:43	18:55	17:16	17:03	
12	07:45	07:23	06:44	06:55	06:17	05:59	06:26 (4)	06:09	06:36 (4)	06:35	07:04	07:32	07:05	07:36		
	17:23	17:59	18:29	20:00	20:29	20:52	06:46 (4)	20:54	13	06:49 (4)	20:27	19:41	18:53	17:15	17:03	
13	07:45	07:22	06:42	06:54	06:16	05:59	06:27 (4)	06:10	06:37 (4)	06:36	07:05	07:33	07:06	07:36		
	17:24	18:00	18:30	20:01	20:30	20:53	06:46 (4)	20:53	12	06:49 (4)	20:25	19:39	18:52	17:14	17:03	
14	07:45	07:20	06:41	06:52	06:15	05:59	06:27 (4)	06:11	06:37 (4)	06:37	07:06	07:34	07:07	07:37		
	17:25	18:01	18:31	20:02	20:31	20:53	06:46 (4)	20:53	11	06:48 (4)	20:24	19:38	18:50	17:13	17:04	
15	07:44	07:19	06:39	06:51	06:14	05:59	06:27 (4)	06:11	06:39 (4)	06:38	07:06	07:35	07:08	07:38		
	17:27	18:02	18:32	20:03	20:32	20:54	06:47 (4)	20:52	8	06:47 (4)	20:23	19:36	18:49	17:12	17:04	
16	07:44	07:18	06:38	06:49	06:13	05:59	06:28 (4)	06:12	06:42 (4)	06:39	07:07	07:36	07:10	07:39		
	17:28	18:03	18:33	20:04	20:33	20:54	06:48 (4)	20:52	3	06:45 (4)	20:21	19:34	18:47	17:12	17:04	
17	07:44	07:17	06:36	06:48	06:12	05:59	06:28 (4)	06:13	06:40	07:08	07:37	07:11	07:39			
	17:29	18:04	18:34	20:05	20:34	20:55	06:48 (4)	20:51	20	06:48 (4)	20:20	19:33	18:46	17:11	17:04	
18	07:43	07:15	06:34	06:46	06:11	05:59	06:28 (4)	06:14	06:41	07:09	07:38	07:12	07:40			
	17:30	18:06	18:35	20:06	20:34	20:55	06:48 (4)	20:50	20	06:48 (4)	20:19	19:31	18:44	17:10	17:05	
19	07:43	07:14	06:33	06:45	06:10	05:59	06:28 (4)	06:14	06:42	07:10	07:39	07:13	07:40			
	17:31	18:07	18:36	20:07	20:35	20:55	06:48 (4)	20:50	20	06:48 (4)	20:17	19:30	18:43	17:09	17:05	
20	07:42	07:13	06:31	06:44	06:09	06:00	06:28 (4)	06:15	06:43	07:11	07:40	07:14	07:41			
	17:32	18:08	18:37	20:08	20:36	20:55	06:48 (4)	20:49	20	06:48 (4)	20:16	19:28	18:42	17:09	17:06	
21	07:42	07:11	06:30	06:42	06:09	06:00	06:28 (4)	06:16	06:44	07:12	07:41	07:15	07:42			
	17:33	18:09	18:38	20:09	20:37	20:56	06:48 (4)	20:48	20	06:48 (4)	20:15	19:26	18:40	17:08	17:06	
22	07:41	07:10	06:28	06:41	06:08	06:00	06:28 (4)	06:17	06:45	07:13	07:42	07:16	07:42			
	17:34	18:10	18:39	20:10	20:38	20:56	06:48 (4)	20:48	20	06:48 (4)	20:13	19:25	18:39	17:08	17:06	
23	07:41	07:09	06:26	06:39	06:07	06:00	06:29 (4)	06:18	06:45	07:14	07:43	07:17	07:43			
	17:35	18:11	18:40	20:11	20:39	20:56	06:49 (4)	20:47	20	06:49 (4)	20:12	19:23	18:37	17:07	17:07	
24	07:40	07:07	06:25	06:38	06:06	06:00	06:29 (4)	06:18	06:46	07:15	07:44	07:18	07:43			
	17:37	18:12	18:41	20:12	20:40	20:56	06:49 (4)	20:46	20	06:49 (4)	20:10	19:22	18:36	17:06	17:08	
25	07:39	07:06	06:23	06:37	06:06	06:01	06:29 (4)	06:19	06:47	07:16	07:45	07:19	07:44			
	17:38	18:13	18:42	20:12	20:40	20:56	06:49 (4)	20:45	20	06:49 (4)	20:09	19:20	17:35	17:06	17:08	
26	07:39	07:05	06:22	06:35	06:05	06:01	06:30 (4)	06:20	06:48	07:16	07:46	07:21	07:44			
	17:39	18:14	18:43	20:13	20:41	20:56	06:50 (4)	20:45	20	06:50 (4)	20:07	19:18	17:34	17:06	17:09	
27	07:38	07:03	06:20	06:34	06:05	06:01	06:30 (4)	06:21	06:49	07:17	07:47	07:22	07:44			
	17:40	18:15	18:44	20:14	20:42	20:57	06:50 (4)	20:44	20	06:50 (4)	20:06	19:17	17:32	17:05	17:09	
28	07:37	07:02	06:19	06:33	06:04	06:02	06:30 (4)	06:22	06:50	07:18	07:48	07:23	07:45			
	17:41	18:17	18:45	20:15	20:43	7	06:37 (4)	20:57	19	06:49 (4)	20:43	20:04	19:15	17:31	17:05	17:10
29	07:36	07:01	06:31	06:03	06:30 (4)	06:02	06:31 (4)	06:23	06:51	07:19	07:50	07:24	07:45			
	17:42	19:46	20:16	20:44	9	06:39 (4)	20:57	19	06:50 (4)	20:42	20:03	19:13	17:30	17:04	17:11	
30	07:36	07:15	06:30	06:03	06:29 (4)	06:02	06:30 (4)	06:24	06:52	07:20	07:51	07:25	07:45			
	17:43	19:47	20:17	20:44	11	06:40 (4)	20:57	20	06:50 (4)	20:41	20:01	19:12	17:29	17:04	17:11	
31	07:35	07:14	06:29	06:02	06:28 (4)	06:02	06:28 (4)	06:24	06:53	07:21	07:52	07:26	07:45			
	17:45	19:48	20:18	20:45	13	06:41 (4)	20:58	20	06:50 (4)	20:40	20:00	17:27	17:12	17:12	17:12	
Potential sun hours	302	300	370	396	444	446	454	424	374	347	302	293				
Total, worst case					40	567	241									
Sun reduction					0,59	0,66	0,74									
Oper. time red.					0,78	0,78	0,78									
Wind dir. red.					0,63	0,63	0,63									
Total reduction					0,29	0,32	0,36									
Total, real					12	184	87									

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 3

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: C - R21

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:46 17:13	07:34 17:46	07:00 18:17	07:12 19:49	06:29 20:18	06:02 20:46	19:39 (3) 20:07 (3)	06:03 20:56	19:41 (3) 20:18 (3)	06:25 20:39	07:04 (8) 19:58	07:21 19:10	06:53 17:26
2	07:46 17:14	07:33 17:47	06:59 18:19	07:10 19:50	06:28 20:19	06:01 20:46	19:38 (3) 20:08 (3)	06:03 20:56	19:41 (3) 20:17 (3)	06:26 20:38	06:47 (8) 19:57	07:22 19:09	06:54 17:25
3	07:46 17:15	07:32 17:48	06:57 18:20	07:09 19:51	06:26 20:20	06:01 20:47	19:38 (3) 20:09 (3)	06:04 20:56	19:41 (3) 20:17 (3)	06:27 20:37	06:48 (8) 19:55	07:23 19:07	06:55 17:24
4	07:46 17:16	07:31 17:49	06:56 18:21	07:07 19:52	06:25 20:21	06:01 20:48	19:38 (3) 20:10 (3)	06:04 20:56	19:42 (3) 20:17 (3)	06:28 20:36	06:49 (8) 19:54	07:24 19:05	06:56 17:23
5	07:46 17:16	07:30 17:50	06:54 18:22	07:06 19:53	06:24 20:22	06:00 20:48	19:37 (3) 20:10 (3)	06:05 20:56	19:43 (3) 20:18 (3)	06:29 20:35	06:50 (8) 19:52	07:25 19:04	06:57 17:22
6	07:46 17:17	07:29 17:52	06:53 18:23	07:04 19:54	06:23 20:23	06:00 20:49	19:37 (3) 20:10 (3)	06:05 20:56	19:43 (3) 20:17 (3)	06:30 20:34	06:51 (8) 19:50	07:26 19:02	06:58 17:20
7	07:46 17:18	07:28 17:53	06:51 18:24	07:03 19:55	06:22 20:24	06:00 20:50	19:37 (3) 20:11 (3)	06:06 20:55	19:44 (3) 20:17 (3)	06:31 20:32	06:52 (8) 19:49	07:27 19:01	06:59 17:19
8	07:46 17:19	07:27 17:54	06:50 18:25	07:01 19:56	06:21 20:25	06:00 20:50	19:37 (3) 20:12 (3)	06:07 20:55	19:44 (3) 20:16 (3)	06:32 20:31	06:53 (8) 19:47	07:28 18:59	07:00 17:18
9	07:46 17:20	07:26 17:55	06:48 18:26	07:00 19:57	06:20 20:26	06:00 20:51	19:37 (3) 20:13 (3)	06:07 20:55	19:45 (3) 20:16 (3)	06:32 20:30	07:01 19:46	07:29 18:58	07:02 17:17
10	07:46 17:21	07:25 17:56	06:47 18:27	06:58 19:58	06:18 20:27	06:00 20:51	19:36 (3) 20:12 (3)	06:08 20:54	19:46 (3) 20:16 (3)	06:33 20:29	07:02 19:44	07:30 18:56	07:03 17:17
11	07:46 17:22	07:24 17:57	06:45 18:28	06:57 19:59	06:17 20:28	06:00 20:52	19:36 (3) 20:13 (3)	06:08 20:54	19:46 (3) 20:15 (3)	06:34 20:28	07:03 19:42	07:31 18:55	07:04 17:16
12	07:46 17:23	07:23 17:59	06:44 18:29	06:55 20:00	06:16 20:29	06:00 20:52	19:36 (3) 20:13 (3)	06:09 20:54	19:48 (3) 20:15 (3)	06:35 20:26	07:04 19:41	07:32 18:53	07:05 17:15
13	07:46 17:24	07:21 18:00	06:42 18:30	06:54 20:01	06:15 20:30	06:00 20:53	19:36 (3) 20:14 (3)	06:10 20:53	19:49 (3) 20:14 (3)	06:36 20:25	07:04 19:39	07:33 18:52	07:06 17:14
14	07:46 17:25	07:20 18:01	06:41 18:31	06:52 20:02	06:14 20:31	06:00 20:53	19:36 (3) 20:14 (3)	06:10 20:53	19:49 (3) 20:13 (3)	06:37 20:24	07:05 19:38	07:34 18:50	07:07 17:13
15	07:46 17:26	07:19 18:02	06:39 18:32	06:51 20:03	06:14 20:32	06:00 20:54	19:36 (3) 20:14 (3)	06:11 20:52	06:48 (8) 20:23	06:38 20:23	07:06 19:36	07:35 18:49	07:08 17:12
16	07:46 17:27	07:18 18:03	06:37 18:33	06:49 20:04	06:13 20:33	06:00 20:54	19:36 (3) 20:15 (3)	06:12 20:52	06:47 (8) 20:21	06:39 20:21	07:07 19:34	07:36 18:47	07:09 17:11
17	07:46 17:28	07:16 18:04	06:36 18:34	06:48 20:05	06:12 20:33	06:00 20:54	19:36 (3) 20:15 (3)	06:13 20:51	06:45 (8) 20:20	06:40 20:20	07:08 19:33	07:37 18:46	07:11 17:10
18	07:46 17:29	07:15 18:05	06:34 18:35	06:46 20:05	06:11 20:34	06:00 20:55	19:37 (3) 20:16 (3)	06:13 20:50	06:44 (8) 20:19	06:41 20:19	07:09 19:31	07:38 18:44	07:12 17:10
19	07:46 17:30	07:14 18:06	06:33 18:36	06:45 20:06	06:10 20:35	06:00 20:55	19:37 (3) 20:16 (3)	06:14 20:50	06:44 (8) 20:17	06:42 20:17	07:10 19:29	07:39 18:43	07:13 17:09
20	07:46 17:31	07:13 18:07	06:31 18:37	06:43 20:07	06:09 20:36	06:00 20:55	19:37 (3) 20:16 (3)	06:15 20:49	06:43 (8) 20:16	06:43 20:16	07:11 19:28	07:40 18:41	07:14 17:09
21	07:46 17:32	07:11 18:08	06:29 18:37	06:42 20:07	06:08 20:36	06:00 20:55	19:37 (3) 20:16 (3)	06:16 20:48	06:42 (8) 20:16	06:44 20:16	07:12 19:28	07:41 18:41	07:15 17:09
22	07:46 17:33	07:10 18:09	06:28 18:38	06:41 20:08	06:08 20:37	06:00 20:56	19:37 (3) 20:16 (3)	06:17 20:48	06:42 (8) 20:14	06:44 20:14	07:13 19:26	07:42 18:40	07:16 17:08
23	07:46 17:34	07:09 18:10	06:26 18:39	06:39 20:09	06:07 20:38	06:00 20:56	19:38 (3) 20:16 (3)	06:17 20:48	06:42 (8) 20:13	06:45 20:13	07:14 19:25	07:43 18:39	07:17 17:07
24	07:46 17:35	07:07 18:11	06:25 18:40	06:38 20:10	06:06 20:39	06:00 20:56	19:38 (3) 20:17 (3)	06:18 20:47	06:42 (8) 20:12	06:46 20:12	07:14 19:23	07:44 18:37	07:18 17:07
25	07:46 17:36	07:06 18:12	06:23 18:41	06:36 20:11	06:06 20:40	06:00 20:56	19:38 (3) 20:17 (3)	06:19 20:46	06:41 (8) 20:10	06:47 20:10	07:15 19:21	07:45 18:36	07:19 17:06
26	07:46 17:37	07:04 18:13	06:22 18:42	06:35 20:12	06:05 20:40	06:00 20:56	19:39 (3) 20:17 (3)	06:20 20:45	06:41 (8) 20:09	06:48 20:09	07:16 19:20	07:46 17:35	07:20 17:06
27	07:46 17:38	07:03 18:14	06:20 18:43	06:34 20:13	06:04 20:41	06:00 20:56	19:39 (3) 20:18 (3)	06:21 20:44	06:42 (8) 20:07	06:49 20:07	07:17 19:18	07:47 17:33	07:21 17:05
28	07:46 17:40	07:02 18:15	06:18 18:44	06:33 20:14	06:04 20:42	06:00 20:56	19:39 (3) 20:17 (3)	06:22 20:44	06:43 (8) 20:06	06:50 20:06	07:18 19:17	07:48 17:32	07:22 17:05
29	07:46 17:41	07:02 18:16	06:18 18:45	06:33 20:15	06:04 20:43	06:00 20:56	19:39 (3) 20:17 (3)	06:23 20:43	06:44 (8) 20:04	06:51 20:04	07:19 19:15	07:49 17:31	07:23 17:05
30	07:46 17:42	07:02 18:17	06:18 18:46	06:33 20:16	06:04 20:44	06:00 20:56	19:39 (3) 20:18 (3)	06:23 20:42	06:45 (8) 20:03	06:52 20:03	07:20 19:13	07:50 17:30	07:25 17:04
31	07:46 17:43	07:03 18:18	06:19 18:47	06:34 20:17	06:04 20:45	06:00 20:56	19:39 (3) 20:17 (3)	06:24 20:41	06:46 (8) 20:01	06:53 20:01	07:21 19:12	07:51 17:28	07:26 17:04
Potential sun hours	302	300	370	396	444	446	454	424	374	347	302	293	
Total, worst case					524	1096	815	90					
Sun reduction					0,59	0,66	0,74	0,73					
Oper. time red.					0,78	0,78	0,78	0,78					
Wind dir. red.					0,63	0,67	0,65	0,62					
Total reduction					0,29	0,34	0,37	0,36					
Total, real					153	377	305	32					

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:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 4

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: D - R04

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:46	07:34	07:00	07:12	06:29	06:02	06:03	06:25	06:54	07:21	06:53	07:25
	17:13	17:46	18:17	19:49	20:18	20:46	20:56	20:39	19:58	19:10	17:26	17:04
2	07:46	07:33	06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	07:26
	17:14	17:47	18:19	19:50	20:19	20:46	20:56	20:38	19:57	19:09	17:25	17:03
3	07:46	07:32	06:57	07:09	06:26	06:01	06:04	06:27	06:55	07:23	06:55	07:27
	17:15	17:48	18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	17:03
4	07:46	07:31	06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	07:28
	17:16	17:49	18:21	19:52	20:21	20:48	20:56	20:36	19:53	19:05	17:23	17:03
5	07:46	07:30	06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	07:29
	17:16	17:50	18:22	19:53	20:22	20:48	20:56	20:35	19:52	19:04	17:22	17:03
6	07:46	07:29	06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	07:30
	17:17	17:52	18:23	19:54	20:23	20:49	20:55	20:33	19:50	19:02	17:20	17:03
7	07:46	07:28	06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	07:31
	17:18	17:53	18:24	19:55	20:24	20:50	20:55	20:32	19:49	19:01	17:19	17:03
8	07:46	07:27	06:50	07:01	06:21	06:00	06:07	06:32	07:00	07:28	07:00	07:32
	17:19	17:54	18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:18	17:03
9	07:46	07:26	06:48	07:00	06:19	05:59	06:07	06:32	07:01	07:29	07:02	07:33
	17:20	17:55	18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:58	17:17	17:03
10	07:46	07:25	06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	07:34
	17:21	17:56	18:27	19:58	20:27	20:51	20:54	20:29	19:44	18:56	17:17	17:03
11	07:45	07:24	06:45	06:57	06:17	05:59	06:08	06:34	07:03	07:31	07:04	07:35
	17:22	17:57	18:28	19:59	20:28	20:52	20:54	20:28	19:42	18:55	17:16	17:03
12	07:45	07:23	06:44	06:55	06:16	05:59	06:09	06:35	07:04	07:32	07:05	07:35
	17:23	17:59	18:29	20:00	20:29	20:52	20:53	20:26	19:41	18:53	17:15	17:03
13	07:45	07:21	06:42	06:54	06:15	05:59	06:10	06:36	07:04	07:33	07:06	07:36
	17:24	18:00	18:30	20:01	20:30	20:53	20:53	20:25	19:39	18:52	17:14	17:03
14	07:45	07:20	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	07:07	07:37
	17:25	18:01	18:31	20:02	20:31	20:53	20:53	20:24	19:38	18:50	17:13	17:03
15	07:44	07:19	06:39	06:51	06:14	05:59	06:11	06:38	07:06	07:35	07:08	07:38
	17:26	18:02	18:32	20:03	20:32	20:54	20:52	20:23	19:36	18:49	17:12	17:04
16	07:44	07:18	06:37	06:49	06:13	05:59	06:12	06:39	07:07	07:36	07:09	07:38
	17:27	18:03	18:33	20:04	20:32	20:54	20:51	20:21	19:34	18:47	17:11	17:04
17	07:44	07:16	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	07:11	07:39
	17:28	18:04	18:34	20:04	20:33	20:54	20:51	20:20	19:33	18:46	17:11	17:04
18	07:43	07:15	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	07:12	07:40
	17:30	18:05	18:35	20:05	20:34	20:55	20:50	20:19	19:31	18:44	17:10	17:05
19	07:43	07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	07:13	07:40
	17:31	18:06	18:36	20:06	20:35	20:55	20:50	20:17	19:29	18:43	17:09	17:05
20	07:42	07:13	06:31	06:43	06:09	05:59	06:15	06:43	07:11	07:40	07:14	07:41
	17:32	18:08	18:37	20:07	20:36	20:55	20:49	20:16	19:28	18:41	17:09	17:05
21	07:42	07:11	06:29	06:42	06:08	06:00	06:16	06:43	07:12	07:41	07:15	07:41
	17:33	18:09	18:38	20:08	20:37	20:56	20:48	20:14	19:26	18:40	17:08	17:06
22	07:41	07:10	06:28	06:41	06:08	06:00	06:17	06:44	07:13	07:42	07:16	07:42
	17:34	18:10	18:39	20:09	20:38	20:56	20:48	20:13	19:25	18:39	17:07	17:06
23	07:41	07:09	06:26	06:39	06:07	06:00	06:17	06:45	07:14	07:43	07:17	07:42
	17:35	18:11	18:40	20:10	20:39	20:56	20:47	20:12	19:23	18:37	17:07	17:07
24	07:40	07:07	06:25	06:38	06:06	06:00	06:18	06:46	07:14	07:44	07:18	07:43
	17:36	18:12	18:41	20:11	20:39	20:56	20:46	20:10	19:21	18:36	17:06	17:07
25	07:39	07:06	06:23	06:36	06:06	06:00	06:19	06:47	07:15	06:45	07:19	07:43
	17:37	18:13	18:42	20:12	20:40	20:56	20:45	20:09	19:20	17:35	17:06	17:08
26	07:39	07:04	06:22	06:35	06:05	06:01	06:20	06:48	07:16	06:46	07:20	07:44
	17:39	18:14	18:43	20:13	20:41	20:56	20:44	20:07	19:18	17:33	17:05	17:09
27	07:38	07:03	06:20	06:34	06:04	06:01	06:21	06:49	07:17	06:47	07:21	07:44
	17:40	18:15	18:44	20:14	20:42	20:56	20:44	20:06	19:17	17:32	17:05	17:09
28	07:37	07:02	06:18	06:33	06:04	06:02	06:22	06:50	07:18	06:48	07:22	07:44
	17:41	18:16	18:45	20:15	20:43	20:56	20:43	20:04	19:15	17:31	17:05	17:10
29	07:36		07:17	06:31	06:03	06:02	06:23	06:51	07:19	06:49	07:23	07:45
	17:42		19:46	20:16	20:43	20:56	20:42	20:03	19:13	17:30	17:04	17:11
30	07:35		07:15	06:30	06:03	06:02	06:23	06:52	07:20	06:50	07:24	07:45
	17:43		19:47	20:17	20:44	20:56	20:41	20:01	19:12	17:28	17:04	17:11
31	07:35		07:14		06:02	06:02	06:24	06:53		06:52		07:45
	17:44		19:48		20:45	20:40	20:40	20:00		17:27		17:12
Potential sun hours	302	300	370	396	444	446	454	424	374	347	302	293
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)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 10:44 / 5

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: E - R16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:46	07:34	07:00	07:12	06:29	06:02	06:03	06:25	06:54	07:21	06:53	07:25
	17:13	17:46	18:17	19:49	20:18	20:46	20:56	20:39	19:58	19:10	17:26	17:04
2	07:46	07:33	06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	07:26
	17:14	17:47	18:19	19:50	20:19	20:46	20:56	20:38	19:57	19:09	17:25	17:03
3	07:46	07:32	06:57	07:09	06:26	06:01	06:04	06:27	06:55	07:23	06:55	07:27
	17:15	17:48	18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	17:03
4	07:46	07:31	06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	07:28
	17:16	17:49	18:21	19:52	20:21	20:48	20:56	20:36	19:53	19:05	17:23	17:03
5	07:46	07:30	06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	07:29
	17:16	17:50	18:22	19:53	20:22	20:48	20:56	20:35	19:52	19:04	17:22	17:03
6	07:46	07:29	06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	07:30
	17:17	17:52	18:23	19:54	20:23	20:49	20:55	20:33	19:50	19:02	17:20	17:03
7	07:46	07:28	06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	07:31
	17:18	17:53	18:24	19:55	20:24	20:50	20:55	20:32	19:49	19:01	17:19	17:03
8	07:46	07:27	06:50	07:01	06:21	06:00	06:07	06:32	07:00	07:28	07:00	07:32
	17:19	17:54	18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:18	17:03
9	07:46	07:26	06:48	07:00	06:19	05:59	06:07	06:32	07:01	07:29	07:02	07:33
	17:20	17:55	18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:58	17:17	17:03
10	07:46	07:25	06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	07:34
	17:21	17:56	18:27	19:58	20:27	20:51	20:54	20:29	19:44	18:56	17:17	17:03
11	07:45	07:24	06:45	06:57	06:17	05:59	06:08	06:34	07:03	07:31	07:04	07:35
	17:22	17:57	18:28	19:59	20:28	20:52	20:54	20:28	19:42	18:55	17:16	17:03
12	07:45	07:23	06:44	06:55	06:16	05:59	06:09	06:35	07:04	07:32	07:05	07:35
	17:23	17:59	18:29	20:00	20:29	20:52	20:53	20:26	19:41	18:53	17:15	17:03
13	07:45	07:21	06:42	06:54	06:15	05:59	06:10	06:36	07:04	07:33	07:06	07:36
	17:24	18:00	18:30	20:01	20:30	20:53	20:53	20:25	19:39	18:52	17:14	17:03
14	07:45	07:20	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	07:07	07:37
	17:25	18:01	18:31	20:02	20:31	20:53	20:53	20:24	19:38	18:50	17:13	17:03
15	07:44	07:19	06:39	06:51	06:14	05:59	06:11	06:38	07:06	07:35	07:08	07:38
	17:26	18:02	18:32	20:03	20:32	20:54	20:52	20:23	19:36	18:49	17:12	17:04
16	07:44	07:18	06:37	06:49	06:13	05:59	06:12	06:39	07:07	07:36	07:09	07:38
	17:27	18:03	18:33	20:03	20:32	20:54	20:51	20:21	19:34	18:47	17:11	17:04
17	07:44	07:16	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	07:11	07:39
	17:28	18:04	18:34	20:04	20:33	20:54	20:51	20:20	19:33	18:46	17:11	17:04
18	07:43	07:15	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	07:12	07:40
	17:30	18:05	18:35	20:05	20:34	20:55	20:50	20:19	19:31	18:44	17:10	17:05
19	07:43	07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	07:13	07:40
	17:31	18:06	18:36	20:06	20:35	20:55	20:50	20:17	19:29	18:43	17:09	17:05
20	07:42	07:13	06:31	06:43	06:09	05:59	06:15	06:43	07:11	07:40	07:14	07:41
	17:32	18:08	18:37	20:07	20:36	20:55	20:49	20:16	19:28	18:41	17:09	17:05
21	07:42	07:11	06:29	06:42	06:08	06:00	06:16	06:43	07:12	07:41	07:15	07:41
	17:33	18:09	18:38	20:08	20:37	20:56	20:48	20:14	19:26	18:40	17:08	17:06
22	07:41	07:10	06:28	06:41	06:08	06:00	06:17	06:44	07:13	07:42	07:16	07:42
	17:34	18:10	18:39	20:09	20:38	20:56	20:48	20:13	19:25	18:39	17:07	17:06
23	07:41	07:09	06:26	06:39	06:07	06:00	06:17	06:45	07:14	07:43	07:17	07:42
	17:35	18:11	18:40	20:10	20:39	20:56	20:47	20:12	19:23	18:37	17:07	17:07
24	07:40	07:07	06:25	06:38	06:06	06:00	06:18	06:46	07:14	07:44	07:18	07:43
	17:36	18:12	18:41	20:11	20:39	20:56	20:46	20:10	19:21	18:36	17:06	17:07
25	07:39	07:06	06:23	06:36	06:06	06:00	06:19	06:47	07:15	06:45	07:19	07:43
	17:37	18:13	18:42	20:12	20:40	20:56	20:45	20:09	19:20	17:35	17:06	17:08
26	07:39	07:04	06:22	06:35	06:05	06:01	06:20	06:48	07:16	06:46	07:20	07:44
	17:39	18:14	18:43	20:13	20:41	20:56	20:44	20:07	19:18	17:33	17:05	17:09
27	07:38	07:03	06:20	06:34	06:04	06:01	06:21	06:49	07:17	06:47	07:21	07:44
	17:40	18:15	18:44	20:14	20:42	20:56	20:44	20:06	19:17	17:32	17:05	17:09
28	07:37	07:02	06:18	06:33	06:04	06:02	06:22	06:50	07:18	06:48	07:22	07:44
	17:41	18:16	18:45	20:15	20:43	20:56	20:43	20:04	19:15	17:31	17:05	17:10
29	07:36		07:17	06:31	06:03	06:02	06:23	06:51	07:19	06:49	07:23	07:45
	17:42		19:46	20:16	20:43	20:56	20:42	20:03	19:13	17:30	17:04	17:11
30	07:35		07:15	06:30	06:03	06:02	06:23	06:52	07:20	06:50	07:24	07:45
	17:43		19:47	20:17	20:44	20:56	20:41	20:01	19:12	17:28	17:04	17:11
31	07:35		07:14		06:02	06:02	06:24	06:53		06:52		07:45
	17:44		19:48		20:45	20:40	20:40	20:00		17:27		17:12
Potential sun hours	302	300	370	396	444	446	454	424	374	347	302	293
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)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 6

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: F - R17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625 521 486 354 333 434 521 521 556 660 955 868 6.834
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:46	07:34	07:00	07:12	06:29	06:02	06:03	06:25	06:54	07:21	06:53	07:25
	17:13	17:46	18:17	19:49	20:18	20:46	20:56	20:39	19:58	19:10	17:26	17:04
2	07:46	07:33	06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	07:26
	17:14	17:47	18:19	19:50	20:19	20:46	20:56	20:38	19:57	19:09	17:25	17:03
3	07:46	07:32	06:57	07:09	06:26	06:01	06:04	06:27	06:55	07:23	06:55	07:27
	17:15	17:48	18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	17:03
4	07:46	07:31	06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	07:28
	17:16	17:49	18:21	19:52	20:21	20:48	20:56	20:36	19:53	19:05	17:23	17:03
5	07:46	07:30	06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	07:29
	17:16	17:50	18:22	19:53	20:22	20:48	20:56	20:35	19:52	19:04	17:22	17:03
6	07:46	07:29	06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	07:30
	17:17	17:52	18:23	19:54	20:23	20:49	20:55	20:33	19:50	19:02	17:20	17:03
7	07:46	07:28	06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	07:31
	17:18	17:53	18:24	19:55	20:24	20:50	20:55	20:32	19:49	19:01	17:19	17:03
8	07:46	07:27	06:50	07:01	06:21	06:00	06:07	06:32	07:00	07:28	07:00	07:32
	17:19	17:54	18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:18	17:03
9	07:46	07:26	06:48	07:00	06:19	05:59	06:07	06:32	07:01	07:29	07:02	07:33
	17:20	17:55	18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:58	17:17	17:03
10	07:46	07:25	06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	07:34
	17:21	17:56	18:27	19:58	20:27	20:51	20:54	20:29	19:44	18:56	17:17	17:03
11	07:45	07:24	06:45	06:57	06:17	05:59	06:08	06:34	07:03	07:31	07:04	07:35
	17:22	17:57	18:28	19:59	20:28	20:52	20:54	20:28	19:42	18:55	17:16	17:03
12	07:45	07:23	06:44	06:55	06:16	05:59	06:09	06:35	07:04	07:32	07:05	07:35
	17:23	17:59	18:29	20:00	20:29	20:52	20:53	20:26	19:41	18:53	17:15	17:03
13	07:45	07:21	06:42	06:54	06:15	05:59	06:10	06:36	07:04	07:33	07:06	07:36
	17:24	18:00	18:30	20:01	20:30	20:53	20:53	20:25	19:39	18:52	17:14	17:03
14	07:45	07:20	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	07:07	07:37
	17:25	18:01	18:31	20:02	20:31	20:53	20:53	20:24	19:38	18:50	17:13	17:03
15	07:44	07:19	06:39	06:51	06:14	05:59	06:11	06:38	07:06	07:35	07:08	07:38
	17:26	18:02	18:32	20:03	20:32	20:54	20:52	20:23	19:36	18:49	17:12	17:04
16	07:44	07:18	06:37	06:49	06:13	05:59	06:12	06:39	07:07	07:36	07:09	07:38
	17:27	18:03	18:33	20:03	20:32	20:54	20:51	20:21	19:34	18:47	17:11	17:04
17	07:44	07:16	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	07:11	07:39
	17:28	18:04	18:34	20:04	20:33	20:54	20:51	20:20	19:33	18:46	17:11	17:04
18	07:43	07:15	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	07:12	07:40
	17:30	18:05	18:35	20:05	20:34	20:55	20:50	20:19	19:31	18:44	17:10	17:05
19	07:43	07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	07:13	07:40
	17:31	18:06	18:36	20:06	20:35	20:55	20:50	20:17	19:29	18:43	17:09	17:05
20	07:42	07:13	06:31	06:43	06:09	05:59	06:15	06:43	07:11	07:40	07:14	07:41
	17:32	18:08	18:37	20:07	20:36	20:55	20:49	20:16	19:28	18:41	17:09	17:05
21	07:42	07:11	06:29	06:42	06:08	06:00	06:16	06:43	07:12	07:41	07:15	07:41
	17:33	18:09	18:38	20:08	20:37	20:56	20:48	20:14	19:26	18:40	17:08	17:06
22	07:41	07:10	06:28	06:41	06:08	06:00	06:17	06:44	07:13	07:42	07:16	07:42
	17:34	18:10	18:39	20:09	20:38	20:56	20:48	20:13	19:25	18:39	17:07	17:06
23	07:41	07:09	06:26	06:39	06:07	06:00	06:17	06:45	07:14	07:43	07:17	07:42
	17:35	18:11	18:40	20:10	20:39	20:56	20:47	20:12	19:23	18:37	17:07	17:07
24	07:40	07:07	06:25	06:38	06:06	06:00	06:18	06:46	07:14	07:44	07:18	07:43
	17:36	18:12	18:41	20:11	20:39	20:56	20:46	20:10	19:21	18:36	17:06	17:07
25	07:39	07:06	06:23	06:36	06:06	06:00	06:19	06:47	07:15	06:45	07:19	07:43
	17:37	18:13	18:42	20:12	20:40	20:56	20:45	20:09	19:20	17:35	17:06	17:08
26	07:39	07:04	06:22	06:35	06:05	06:01	06:20	06:48	07:16	06:46	07:20	07:44
	17:39	18:14	18:43	20:13	20:41	20:56	20:44	20:07	19:18	17:33	17:05	17:09
27	07:38	07:03	06:20	06:34	06:04	06:01	06:21	06:49	07:17	06:47	07:21	07:44
	17:40	18:15	18:44	20:14	20:42	20:56	20:44	20:06	19:16	17:32	17:05	17:09
28	07:37	07:02	06:18	06:33	06:04	06:02	06:22	06:50	07:18	06:48	07:22	07:44
	17:41	18:16	18:45	20:15	20:43	20:56	20:43	20:04	19:15	17:31	17:05	17:10
29	07:36		07:17	06:31	06:03	06:02	06:23	06:51	07:19	06:49	07:23	07:45
	17:42		19:46	20:16	20:43	20:56	20:42	20:03	19:13	17:30	17:04	17:11
30	07:35		07:15	06:30	06:03	06:02	06:23	06:52	07:20	06:50	07:24	07:45
	17:43		19:47	20:17	20:44	20:56	20:41	20:01	19:12	17:28	17:04	17:11
31	07:35		07:14		06:02	06:02	06:24	06:53		06:52		07:45
	17:44		19:48		20:45	20:40	20:40	20:00		17:27		17:12
Potential sun hours	302	300	370	396	444	446	454	424	374	347	302	293
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)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 7

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: G - R19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625 521 486 354 333 434 521 521 556 660 955 868 6.834
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:46	07:34	07:00	07:12	06:29	06:02	06:03	06:25	06:54	07:21	06:53	07:25
	17:13	17:46	18:17	19:49	20:18	20:46	20:56	20:39	19:58	19:10	17:26	17:04
2	07:46	07:33	06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	07:26
	17:14	17:47	18:19	19:50	20:19	20:46	20:56	20:38	19:57	19:09	17:25	17:03
3	07:46	07:32	06:57	07:09	06:26	06:01	06:04	06:27	06:55	07:23	06:55	07:27
	17:15	17:48	18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	17:03
4	07:46	07:31	06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	07:28
	17:16	17:49	18:21	19:52	20:21	20:48	20:56	20:36	19:53	19:05	17:23	17:03
5	07:46	07:30	06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	07:29
	17:16	17:50	18:22	19:53	20:22	20:48	20:56	20:35	19:52	19:04	17:22	17:03
6	07:46	07:29	06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	07:30
	17:17	17:52	18:23	19:54	20:23	20:49	20:55	20:33	19:50	19:02	17:20	17:03
7	07:46	07:28	06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	07:31
	17:18	17:53	18:24	19:55	20:24	20:50	20:55	20:32	19:49	19:01	17:19	17:03
8	07:46	07:27	06:50	07:01	06:21	06:00	06:07	06:32	07:00	07:28	07:00	07:32
	17:19	17:54	18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:18	17:03
9	07:46	07:26	06:48	07:00	06:19	05:59	06:07	06:32	07:01	07:29	07:02	07:33
	17:20	17:55	18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:58	17:17	17:03
10	07:46	07:25	06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	07:34
	17:21	17:56	18:27	19:58	20:27	20:51	20:54	20:29	19:44	18:56	17:17	17:03
11	07:45	07:24	06:45	06:57	06:17	05:59	06:08	06:34	07:03	07:31	07:04	07:35
	17:22	17:57	18:28	19:59	20:28	20:52	20:54	20:28	19:42	18:55	17:16	17:03
12	07:45	07:23	06:44	06:55	06:16	05:59	06:09	06:35	07:04	07:32	07:05	07:35
	17:23	17:59	18:29	20:00	20:29	20:52	20:53	20:26	19:41	18:53	17:15	17:03
13	07:45	07:21	06:42	06:54	06:15	05:59	06:10	06:36	07:04	07:33	07:06	07:36
	17:24	18:00	18:30	20:01	20:30	20:53	20:53	20:25	19:39	18:52	17:14	17:03
14	07:45	07:20	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	07:07	07:37
	17:25	18:01	18:31	20:02	20:31	20:53	20:53	20:24	19:38	18:50	17:13	17:03
15	07:44	07:19	06:39	06:51	06:14	05:59	06:11	06:38	07:06	07:35	07:08	07:38
	17:26	18:02	18:32	20:03	20:32	20:54	20:52	20:23	19:36	18:49	17:12	17:04
16	07:44	07:18	06:37	06:49	06:13	05:59	06:12	06:39	07:07	07:36	07:09	07:38
	17:27	18:03	18:33	20:03	20:32	20:54	20:51	20:21	19:34	18:47	17:11	17:04
17	07:44	07:16	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	07:11	07:39
	17:28	18:04	18:34	20:04	20:33	20:54	20:51	20:20	19:33	18:46	17:11	17:04
18	07:43	07:15	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	07:12	07:40
	17:30	18:05	18:35	20:05	20:34	20:55	20:50	20:18	19:31	18:44	17:10	17:05
19	07:43	07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	07:13	07:40
	17:31	18:06	18:36	20:06	20:35	20:55	20:50	20:17	19:29	18:43	17:09	17:05
20	07:42	07:13	06:31	06:43	06:09	05:59	06:15	06:43	07:11	07:40	07:14	07:41
	17:32	18:08	18:37	20:07	20:36	20:55	20:49	20:16	19:28	18:41	17:09	17:05
21	07:42	07:11	06:29	06:42	06:08	06:00	06:16	06:43	07:12	07:41	07:15	07:41
	17:33	18:09	18:38	20:08	20:37	20:56	20:48	20:14	19:26	18:40	17:08	17:06
22	07:41	07:10	06:28	06:41	06:08	06:00	06:17	06:44	07:13	07:42	07:16	07:42
	17:34	18:10	18:39	20:09	20:38	20:56	20:48	20:13	19:25	18:39	17:07	17:06
23	07:41	07:09	06:26	06:39	06:07	06:00	06:17	06:45	07:14	07:43	07:17	07:42
	17:35	18:11	18:40	20:10	20:39	20:56	20:47	20:12	19:23	18:37	17:07	17:07
24	07:40	07:07	06:25	06:38	06:06	06:00	06:18	06:46	07:14	07:44	07:18	07:43
	17:36	18:12	18:41	20:11	20:39	20:56	20:46	20:10	19:21	18:36	17:06	17:07
25	07:39	07:06	06:23	06:36	06:06	06:00	06:19	06:47	07:15	06:45	07:19	07:43
	17:37	18:13	18:42	20:12	20:40	20:56	20:45	20:09	19:20	17:35	17:06	17:08
26	07:39	07:04	06:22	06:35	06:05	06:01	06:20	06:48	07:16	06:46	07:20	07:44
	17:39	18:14	18:43	20:13	20:41	20:56	20:44	20:07	19:18	17:33	17:05	17:09
27	07:38	07:03	06:20	06:34	06:04	06:01	06:21	06:49	07:17	06:47	07:21	07:44
	17:40	18:15	18:44	20:14	20:42	20:56	20:44	20:06	19:16	17:32	17:05	17:09
28	07:37	07:02	06:18	06:33	06:04	06:02	06:22	06:50	07:18	06:48	07:22	07:44
	17:41	18:16	18:45	20:15	20:43	20:56	20:43	20:04	19:15	17:31	17:05	17:10
29	07:36		07:17	06:31	06:03	06:02	06:23	06:51	07:19	06:49	07:23	07:45
	17:42		19:46	20:16	20:43	20:56	20:42	20:03	19:13	17:30	17:04	17:11
30	07:35		07:15	06:30	06:03	06:02	06:23	06:52	07:20	06:50	07:24	07:45
	17:43		19:47	20:17	20:44	20:56	20:41	20:01	19:12	17:28	17:04	17:11
31	07:35		07:14		06:02	06:02	06:24	06:53		06:52		07:45
	17:44		19:48		20:45	20:40	20:40	20:00		17:27		17:12
Potential sun hours	302	300	370	396	444	446	454	424	374	347	302	293
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)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 8

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: H - R13

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December				
1	07:46	08:35 (8) 07:34	08:41 (8) 07:00	07:12	06:29	06:02	06:03	06:25	06:54	07:21	06:53	07:26	08:15 (8)			
	17:13	15:39 (9) 17:46	09:01 (8) 18:17	19:49	20:18	20:46	20:56	20:39	19:58	19:10	17:26	17:04	125	16:16 (3)		
2	07:46	08:35 (8) 07:33	08:42 (8) 06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	07:27	08:16 (8)			
	17:14	16:22 (3) 17:47	08:59 (8) 18:19	19:50	20:19	20:46	20:56	20:38	19:57	19:08	17:25	17:03	125	16:16 (3)		
3	07:46	08:34 (8) 07:32	08:44 (8) 06:57	07:09	06:26	06:01	06:04	06:27	06:55	07:23	06:55	07:28	08:16 (8)			
	17:15	16:24 (3) 17:48	08:57 (8) 18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	17:03	124	16:15 (3)		
4	07:46	08:34 (8) 07:31	08:48 (8) 06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	07:28	08:17 (8)			
	17:16	16:26 (3) 17:49	08:53 (8) 18:21	19:52	20:21	20:48	20:56	20:36	19:53	19:05	17:23	17:03	125	16:15 (3)		
5	07:46	08:34 (8) 07:30	06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	07:29	08:18 (8)			
	17:16	16:27 (3) 17:50	18:22	19:53	20:22	20:48	20:56	20:35	19:52	19:04	17:22	17:03	124	16:15 (3)		
6	07:46	08:34 (8) 07:29	06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	07:30	08:20 (8)			
	17:17	16:28 (3) 17:51	18:23	19:54	20:23	20:49	20:56	20:34	19:50	19:02	17:20	17:03	119	16:15 (3)		
7	07:46	08:33 (8) 07:28	06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	07:31	08:21 (8)			
	17:18	16:30 (3) 17:53	18:24	19:55	20:24	20:50	20:55	20:32	19:49	19:01	17:19	6	08:19 (8)	07:31	117	16:14 (3)
8	07:46	08:33 (8) 07:27	06:50	07:01	06:21	06:00	06:06	06:31	07:00	07:28	07:00	07:32	08:22 (8)			
	17:19	16:31 (3) 17:54	18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:18	13	08:28 (8)	07:31	116	16:14 (3)
9	07:46	08:33 (8) 07:26	06:48	07:00	06:19	05:59	06:07	06:32	07:01	07:29	07:02	07:33	08:23 (8)			
	17:20	16:32 (3) 17:55	18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:58	17:17	17	08:30 (8)	07:33	113	16:13 (3)
10	07:46	08:34 (8) 07:25	06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	07:34	08:25 (8)			
	17:21	16:33 (3) 17:56	18:27	19:58	20:27	20:51	20:54	20:29	19:44	18:56	17:16	21	08:32 (8)	07:33	107	16:12 (3)
11	07:45	08:33 (8) 07:24	06:45	06:57	06:17	05:59	06:08	06:34	07:03	07:31	07:04	07:35	08:25 (8)			
	17:22	16:34 (3) 17:57	18:28	19:59	20:28	20:52	20:54	20:28	19:42	18:55	17:16	25	16:02 (3)	07:35	103	15:29 (9)
12	07:45	08:33 (8) 07:23	06:44	06:55	06:16	05:59	06:09	06:35	07:04	07:32	07:05	07:36	08:26 (8)			
	17:23	16:35 (3) 17:58	18:29	20:00	20:29	20:52	20:54	20:26	19:41	18:53	17:15	49	16:07 (3)	07:35	103	15:30 (9)
13	07:45	08:33 (8) 07:21	06:42	06:54	06:15	05:59	06:10	06:36	07:04	07:33	07:06	07:37	08:28 (8)			
	17:24	16:36 (3) 18:00	18:30	20:01	20:30	20:53	20:53	20:25	19:39	18:52	17:14	61	16:09 (3)	07:36	100	15:31 (9)
14	07:45	08:32 (8) 07:20	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	07:07	07:38	08:30 (8)			
	17:25	16:36 (3) 18:01	18:31	20:02	20:31	20:53	20:53	20:24	19:38	18:50	17:13	70	16:10 (3)	07:36	98	15:32 (9)
15	07:44	08:33 (8) 07:19	06:39	06:51	06:13	05:59	06:11	06:38	07:06	07:35	07:08	07:39	08:32 (8)			
	17:26	16:37 (3) 18:02	18:32	20:03	20:32	20:54	20:52	20:23	19:36	18:49	17:12	77	16:11 (3)	07:36	96	15:32 (9)
16	07:44	08:32 (8) 07:18	06:37	06:49	06:13	05:59	06:12	06:39	07:07	07:36	07:09	07:40	10:11 (2)			
	17:27	16:37 (3) 18:03	18:33	20:04	20:33	20:54	20:52	20:21	19:34	18:47	17:11	84	16:12 (3)	07:36	93	15:32 (9)
17	07:44	08:33 (8) 07:16	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	07:11	07:41	10:12 (2)			
	17:28	16:38 (3) 18:04	18:34	20:04	20:33	20:54	20:51	20:20	19:33	18:46	17:11	88	16:13 (3)	07:36	92	15:33 (9)
18	07:43	08:32 (8) 07:15	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	07:12	07:42	10:12 (2)			
	17:30	16:38 (3) 18:05	18:35	20:05	20:34	20:55	20:50	20:19	19:31	18:44	17:10	91	16:14 (3)	07:36	93	15:33 (9)
19	07:43	08:33 (8) 07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	07:13	07:43	10:13 (2)			
	17:31	16:39 (3) 18:06	18:36	20:06	20:35	20:55	20:50	20:17	19:29	18:43	17:09	95	16:14 (3)	07:36	93	15:34 (9)
20	07:42	08:33 (8) 07:13	06:31	06:43	06:09	05:59	06:15	06:43	07:11	07:40	07:14	07:44	10:13 (2)			
	17:32	16:39 (3) 18:08	18:37	20:07	20:36	20:55	20:49	20:16	19:28	18:41	17:09	99	16:15 (3)	07:36	93	15:34 (9)
21	07:42	08:34 (8) 07:11	06:29	06:42	06:08	05:59	06:16	06:43	07:12	07:41	07:15	07:45	10:13 (2)			
	17:33	16:40 (3) 18:09	18:38	20:08	20:37	20:56	20:48	20:14	19:26	18:40	17:08	100	16:15 (3)	07:36	94	15:35 (9)
22	07:41	08:34 (8) 07:10	06:28	06:41	06:08	06:00	06:17	06:44	07:13	07:42	07:16	07:46	10:13 (2)			
	17:34	16:40 (3) 18:10	18:39	20:09	20:38	20:56	20:48	20:13	19:25	18:39	17:07	102	16:15 (3)	07:36	94	15:35 (9)
23	07:41	08:35 (8) 07:09	06:26	06:39	06:07	06:00	06:17	06:45	07:14	07:43	07:17	07:47	10:15 (2)			
	17:35	16:40 (3) 18:11	18:40	20:10	20:39	20:56	20:47	20:12	19:23	18:37	17:07	103	16:16 (3)	07:36	93	15:36 (9)
24	07:40	08:35 (8) 07:07	06:25	06:38	06:06	06:00	06:18	06:46	07:14	07:44	07:18	07:48	10:15 (2)			
	17:36	16:40 (3) 18:12	18:41	20:11	20:40	20:56	20:46	20:10	19:21	18:36	17:06	104	16:16 (3)	07:36	93	15:36 (9)
25	07:39	08:35 (8) 07:06	06:23	06:36	06:06	06:00	06:19	06:47	07:15	07:45	07:19	07:49	10:16 (2)			
	17:37	16:40 (3) 18:13	18:42	20:12	20:40	20:56	20:45	20:09	19:20	17:35	17:06	112	16:16 (3)	07:36	93	15:37 (9)
26	07:39	08:35 (8) 07:04	06:21	06:35	06:05	06:01	06:20	06:48	07:16	07:46	07:20	07:50	10:16 (2)			
	17:39	16:39 (3) 18:14	18:43	20:13	20:41	20:56	20:44	20:07	19:18	17:33	17:05	118	16:16 (3)	07:36	92	15:37 (9)
27	07:38	08:36 (8) 07:03	06:20	06:34	06:04	06:01	06:21	06:49	07:17	07:47	07:21	07:51	10:16 (2)			
	17:40	16:39 (3) 18:15	18:44	20:14	20:42	20:56	20:44	20:06	19:16	17:32	17:05	120	16:16 (3)	07:36	93	15:37 (9)
28	07:37	08:37 (8) 07:02	06:18	06:32	06:04	06:01	06:22	06:50	07:18	07:48	07:22	07:52	10:16 (2)			
	17:41	16:38 (3) 18:16	18:45	20:15	20:43	20:56	20:43	20:04	19:15	17:31	17:05	124	16:16 (3)	07:36	93	15:37 (9)
29	07:36	08:38 (8)	07:17	06:31	06:03	06:02	06:22	06:51	07:19	07:49	07:24	07:54	10:16 (2)			
	17:42	16:37 (3)	19:46	20:16	20:44	20:56	20:42	20:03	19:13	17:30	17:04	125	16:16 (3)	07:36	98	15:39 (9)
30	07:36	08:38 (8)	07:15	06:30	06:03	06:02	06:23	06:52	07:20	07:50	07:25	07:55	10:16 (2)			
	17:43	16:35 (3)	19:47	20:17	20:44	20:56	20:41	20:01	19:12	17:28	17:04	124	16:16 (3)	07:36	100	15:39 (9)
31	07:35	08:39 (8)	07:14	06:29	06:02	06:02	06:24	06:53	07:21	07:51	07:26	07:56	10:16 (2)			
	17:44	16:34 (3)	19:48	20:18	20:45	20:56	20:40	20:00	19:11	17:27	17:03	124	16:16 (3)	07:36	101	15:39 (9)
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293	3203			
Total, worst case	3164	55											3203			
Sun reduction	0,45	0,47											0,45			
Oper. time red.	0,78	0,78											0,78			
Wind dir. red.	0,65	0,67											0,64			
Total reduction	0,23	0,24											0,23			
Total, real	719	13											722			

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

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

Project:
Villamassargia WindPro

Printed/Page
 20/04/2022 10:44 / 9

Licensed user:
Ing. Bruno Manca
 Via Vittorio Veneto 231
 IT-09028 Sestu
 +390702358125
 BrunoManca / ingbrunomanca@gmail.com
 Calculated:
 19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: I - R11

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:46	08:34 (8) 07:34	08:48 (8) 07:00	07:12	06:29	06:02	06:03	06:25	06:54	07:21	06:53	07:26
	17:13	16:22 (3) 17:46	09:00 (8) 18:17	19:49	20:18	20:46	20:56	20:39	19:58	19:10	17:26	17:04
2	07:46	08:34 (8) 07:33	06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	07:27
	17:14	16:24 (3) 17:47	18:19	19:50	20:19	20:46	20:56	20:38	19:57	19:08	17:25	17:03
3	07:46	08:34 (8) 07:32	06:57	07:09	06:26	06:01	06:04	06:27	06:55	07:23	06:55	07:28
	17:15	16:26 (3) 17:48	18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	17:03
4	07:46	08:34 (8) 07:31	06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	07:28
	17:16	16:27 (3) 17:49	18:21	19:52	20:21	20:48	20:56	20:36	19:53	19:05	17:23	17:03
5	07:46	08:34 (8) 07:30	06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	07:29
	17:16	16:28 (3) 17:50	18:22	19:53	20:22	20:48	20:56	20:35	19:52	19:04	17:22	17:03
6	07:46	08:34 (8) 07:29	06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	07:30
	17:17	16:29 (3) 17:51	18:23	19:54	20:23	20:49	20:56	20:34	19:50	19:02	17:20	17:03
7	07:46	08:34 (8) 07:28	06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	07:31
	17:18	16:31 (3) 17:53	18:24	19:55	20:24	20:50	20:55	20:32	19:49	19:01	17:19	17:03
8	07:46	08:34 (8) 07:27	06:50	07:01	06:21	06:00	06:06	06:31	07:00	07:28	07:00	07:32
	17:19	16:32 (3) 17:54	18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:18	17:03
9	07:46	08:35 (8) 07:26	06:48	07:00	06:19	05:59	06:07	06:32	07:01	07:29	07:02	08:23 (8) 07:33
	17:20	16:33 (3) 17:55	18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:58	17:17	3 08:26 (8) 17:03
10	07:46	08:35 (8) 07:25	06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	08:19 (8) 07:34
	17:21	16:34 (3) 17:56	18:27	19:58	20:27	20:51	20:54	20:29	19:44	18:56	17:16	12 08:31 (8) 17:03
11	07:45	08:34 (8) 07:24	06:45	06:57	06:17	05:59	06:08	06:34	07:03	07:31	07:04	08:16 (8) 07:35
	17:22	16:34 (3) 17:57	18:28	19:59	20:28	20:52	20:54	20:28	19:42	18:55	17:16	17 08:33 (8) 17:03
12	07:45	08:35 (8) 07:23	06:44	06:55	06:16	05:59	06:09	06:35	07:04	07:32	07:05	08:16 (8) 07:35
	17:23	16:35 (3) 17:58	18:29	20:00	20:29	20:52	20:54	20:26	19:41	18:53	17:15	24 16:05 (3) 17:03
13	07:45	08:35 (8) 07:21	06:42	06:54	06:15	05:59	06:10	06:36	07:04	07:33	07:06	08:15 (8) 07:36
	17:24	16:36 (3) 18:00	18:30	20:01	20:30	20:53	20:53	20:25	19:39	18:52	17:14	33 16:08 (3) 17:03
14	07:45	08:35 (8) 07:20	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	07:07	08:14 (8) 07:37
	17:25	16:36 (3) 18:01	18:31	20:02	20:31	20:53	20:53	20:24	19:38	18:50	17:13	38 16:10 (3) 17:03
15	07:44	08:35 (8) 07:19	06:39	06:51	06:13	05:59	06:11	06:38	07:06	07:35	07:08	08:13 (8) 07:38
	17:26	16:37 (3) 18:02	18:32	20:03	20:32	20:54	20:52	20:23	19:36	18:49	17:12	42 16:11 (3) 17:04
16	07:44	08:35 (8) 07:18	06:37	06:49	06:13	05:59	06:12	06:39	07:07	07:36	07:09	08:12 (8) 07:38
	17:27	16:37 (3) 18:03	18:33	20:04	20:33	20:54	20:52	20:21	19:34	18:47	17:11	62 16:12 (3) 17:04
17	07:44	08:35 (8) 07:16	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	07:11	08:13 (8) 07:39
	17:28	16:38 (3) 18:04	18:34	20:04	20:33	20:54	20:51	20:20	19:33	18:46	17:11	71 16:13 (3) 17:04
18	07:43	08:35 (8) 07:15	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	07:12	08:12 (8) 07:40
	17:30	16:38 (3) 18:05	18:35	20:05	20:34	20:55	20:50	20:19	19:31	18:44	17:10	78 16:14 (3) 17:05
19	07:43	08:36 (8) 07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	07:13	08:12 (8) 07:40
	17:31	16:39 (3) 18:06	18:36	20:06	20:35	20:55	20:50	20:17	19:29	18:43	17:09	83 16:14 (3) 17:05
20	07:42	08:36 (8) 07:13	06:31	06:43	06:09	05:59	06:15	06:43	07:11	07:40	07:14	08:12 (8) 07:41
	17:32	16:39 (3) 18:08	18:37	20:07	20:36	20:55	20:49	20:16	19:28	18:41	17:09	88 16:15 (3) 17:05
21	07:42	08:37 (8) 07:11	06:29	06:42	06:08	05:59	06:16	06:43	07:12	07:41	07:15	08:12 (8) 07:41
	17:33	16:40 (3) 18:09	18:38	20:08	20:37	20:56	20:48	20:14	19:26	18:40	17:08	91 16:15 (3) 17:06
22	07:41	08:37 (8) 07:10	06:28	06:41	06:08	06:00	06:17	06:44	07:13	07:42	07:16	08:12 (8) 07:42
	17:34	16:40 (3) 18:10	18:39	20:09	20:38	20:56	20:48	20:13	19:25	18:39	17:07	93 16:15 (3) 17:06
23	07:41	08:37 (8) 07:09	06:26	06:39	06:07	06:00	06:17	06:45	07:14	07:43	07:17	08:13 (8) 07:43
	17:35	16:40 (3) 18:11	18:40	20:10	20:39	20:56	20:47	20:12	19:23	18:37	17:07	95 16:16 (3) 17:07
24	07:40	08:38 (8) 07:07	06:25	06:38	06:06	06:00	06:18	06:46	07:14	07:44	07:18	08:13 (8) 07:43
	17:36	16:40 (3) 18:12	18:41	20:11	20:40	20:56	20:46	20:10	19:21	18:36	17:06	98 16:16 (3) 17:07
25	07:39	08:39 (8) 07:06	06:23	06:36	06:06	06:00	06:19	06:47	07:15	06:45	07:19	08:13 (8) 07:43
	17:37	16:39 (3) 18:13	18:42	20:12	20:40	20:56	20:45	20:09	19:20	17:35	17:06	100 16:16 (3) 17:08
26	07:39	08:39 (8) 07:04	06:21	06:35	06:05	06:01	06:20	06:48	07:16	06:46	07:20	08:14 (8) 07:44
	17:39	16:39 (3) 18:14	18:43	20:13	20:41	20:56	20:44	20:07	19:18	17:33	17:05	105 16:16 (3) 17:09
27	07:38	08:41 (8) 07:03	06:20	06:34	06:04	06:01	06:21	06:49	07:17	06:47	07:21	08:14 (8) 07:44
	17:40	16:39 (3) 18:15	18:44	20:14	20:42	20:56	20:44	20:06	19:16	17:32	17:05	113 16:16 (3) 17:09
28	07:37	08:42 (8) 07:02	06:18	06:32	06:04	06:01	06:22	06:50	07:18	06:48	07:22	08:15 (8) 07:44
	17:41	16:38 (3) 18:16	18:45	20:15	20:43	20:56	20:43	20:04	19:15	17:31	17:05	116 16:16 (3) 17:10
29	07:36	08:43 (8)	07:17	06:31	06:03	06:02	06:22	06:51	07:19	06:49	07:24	08:15 (8) 07:45
	17:42	16:36 (3)	19:46	20:16	20:44	20:56	20:42	20:03	19:13	17:30	17:04	120 16:16 (3) 17:11
30	07:36	08:44 (8)	07:15	06:30	06:03	06:02	06:23	06:52	07:20	06:50	07:25	08:16 (8) 07:45
	17:43	16:33 (3)	19:47	20:17	20:44	20:56	20:41	20:01	19:12	17:28	17:04	119 16:16 (3) 17:11
31	07:35	08:46 (8)	07:14	06:02	06:02	06:02	06:24	06:53	07:20	06:52	07:20	07:45
	17:44	16:32 (8)	19:48	20:18	20:45	20:40	20:40	20:00	17:27	17:27	17:04	110 15:40 (9)
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293
Total, worst case	2912	12									1601	3488
Sun reduction	0,45	0,47									0,50	0,45
Oper. time red.	0,78	0,78									0,78	0,78
Wind dir. red.	0,64	0,66									0,65	0,64
Total reduction	0,23	0,24									0,25	0,23
Total, real	660	3									407	786

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 10

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: J - R01

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:46	08:34 (8) 07:34	08:48 (8) 07:00	07:12	06:29	06:02	06:03	06:25	06:54	07:21	06:53	07:26
	17:13	15:45 (9) 17:46	09:01 (8) 18:17	19:49	20:18	20:46	20:56	20:39	19:58	19:10	17:26	17:04
2	07:46	08:34 (8) 07:33	08:53 (8) 06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	07:27
	17:14	15:45 (9) 17:47	08:56 (8) 18:19	19:50	20:19	20:46	20:56	20:38	19:57	19:08	17:25	17:03
3	07:46	08:34 (8) 07:32	06:57	07:09	06:26	06:01	06:04	06:27	06:55	07:23	06:55	07:28
	17:15	15:45 (9) 17:48	18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	17:03
4	07:46	08:34 (8) 07:31	06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	07:28
	17:16	15:46 (9) 17:49	18:21	19:52	20:21	20:48	20:56	20:36	19:53	19:05	17:23	17:03
5	07:46	08:34 (8) 07:30	06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	07:29
	17:16	15:46 (9) 17:50	18:22	19:53	20:22	20:48	20:56	20:35	19:52	19:04	17:22	17:03
6	07:46	08:34 (8) 07:29	06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	07:30
	17:17	16:29 (3) 17:51	18:23	19:54	20:23	20:49	20:56	20:34	19:50	19:02	17:20	17:03
7	07:46	08:35 (8) 07:28	06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	07:31
	17:18	16:31 (3) 17:53	18:24	19:55	20:24	20:50	20:55	20:32	19:49	19:01	17:19	17:03
8	07:46	08:35 (8) 07:27	06:50	07:01	06:21	06:00	06:06	06:31	07:00	07:28	07:00	07:32
	17:19	16:32 (3) 17:54	18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:18	17:03
9	07:46	08:35 (8) 07:26	06:48	07:00	06:19	05:59	06:07	06:32	07:01	07:29	07:02	08:23 (8) 07:33
	17:20	16:34 (3) 17:55	18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:58	17:17	5 08:28 (8) 17:03
10	07:46	08:35 (8) 07:25	06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	08:19 (8) 07:34
	17:21	16:35 (3) 17:56	18:27	19:58	20:27	20:51	20:54	20:29	19:44	18:56	17:16	13 08:32 (8) 17:03
11	07:45	08:35 (8) 07:24	06:45	06:57	06:17	05:59	06:08	06:34	07:03	07:31	07:04	08:17 (8) 07:35
	17:22	16:35 (3) 17:57	18:28	19:59	20:28	20:52	20:54	20:28	19:42	18:55	17:16	25 16:08 (3) 17:03
12	07:45	08:35 (8) 07:23	06:44	06:55	06:16	05:59	06:09	06:35	07:04	07:32	07:05	08:17 (8) 07:35
	17:23	16:37 (3) 17:58	18:29	20:00	20:29	20:52	20:54	20:26	19:41	18:53	17:15	31 16:11 (3) 17:03
13	07:45	08:36 (8) 07:21	06:42	06:54	06:15	05:59	06:10	06:36	07:04	07:33	07:06	08:15 (8) 07:36
	17:24	16:38 (3) 18:00	18:30	20:01	20:30	20:53	20:53	20:25	19:39	18:52	17:14	38 16:12 (3) 17:03
14	07:45	08:36 (8) 07:20	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	07:07	08:14 (8) 07:37
	17:25	16:38 (3) 18:01	18:31	20:02	20:31	20:53	20:53	20:24	19:38	18:50	17:13	42 16:13 (3) 17:03
15	07:44	08:36 (8) 07:19	06:39	06:51	06:13	05:59	06:11	06:38	07:06	07:35	07:08	08:14 (8) 07:38
	17:26	16:39 (3) 18:02	18:32	20:03	20:32	20:54	20:52	20:23	19:36	18:49	17:12	55 16:14 (3) 17:04
16	07:44	08:36 (8) 07:18	06:37	06:49	06:13	05:59	06:12	06:39	07:07	07:36	07:09	08:13 (8) 07:38
	17:27	16:39 (3) 18:03	18:33	20:04	20:33	20:54	20:52	20:21	19:34	18:47	17:11	68 16:15 (3) 17:04
17	07:44	08:36 (8) 07:16	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	07:11	08:13 (8) 07:39
	17:28	16:40 (3) 18:04	18:34	20:04	20:33	20:54	20:51	20:20	19:33	18:46	17:11	76 16:16 (3) 17:04
18	07:43	08:36 (8) 07:15	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	07:12	08:13 (8) 07:40
	17:30	16:40 (3) 18:05	18:35	20:05	20:34	20:55	20:50	20:19	19:31	18:44	17:10	83 16:17 (3) 17:05
19	07:43	08:37 (8) 07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	07:13	08:13 (8) 07:40
	17:31	16:41 (3) 18:06	18:36	20:06	20:35	20:55	20:50	20:17	19:29	18:43	17:09	87 16:17 (3) 17:05
20	07:42	08:37 (8) 07:13	06:31	06:43	06:09	05:59	06:15	06:43	07:11	07:40	07:14	08:13 (8) 07:41
	17:32	16:41 (3) 18:08	18:37	20:07	20:36	20:55	20:49	20:16	19:28	18:41	17:09	91 16:17 (3) 17:05
21	07:42	08:38 (8) 07:11	06:29	06:42	06:08	05:59	06:16	06:43	07:12	07:41	07:15	08:13 (8) 07:41
	17:33	16:42 (3) 18:09	18:38	20:08	20:37	20:56	20:48	20:14	19:26	18:40	17:08	93 16:17 (3) 17:06
22	07:41	08:38 (8) 07:10	06:28	06:41	06:08	06:00	06:17	06:44	07:13	07:42	07:16	08:13 (8) 07:42
	17:34	16:42 (3) 18:10	18:39	20:09	20:38	20:56	20:48	20:13	19:25	18:39	17:07	96 16:17 (3) 17:06
23	07:41	08:38 (8) 07:09	06:26	06:39	06:07	06:00	06:17	06:45	07:14	07:43	07:17	08:14 (8) 07:42
	17:35	16:42 (3) 18:11	18:40	20:10	20:39	20:56	20:47	20:12	19:23	18:37	17:07	98 16:18 (3) 17:07
24	07:40	08:39 (8) 07:07	06:25	06:38	06:06	06:00	06:18	06:46	07:14	07:44	07:18	08:14 (8) 07:43
	17:36	16:43 (3) 18:12	18:41	20:11	20:40	20:56	20:46	20:10	19:21	18:36	17:06	108 16:18 (3) 17:07
25	07:39	08:39 (8) 07:06	06:23	06:36	06:06	06:00	06:19	06:47	07:15	06:45	07:19	08:14 (8) 07:43
	17:37	16:42 (3) 18:13	18:42	20:12	20:40	20:56	20:45	20:09	19:20	17:35	17:06	114 16:18 (3) 17:08
26	07:39	08:40 (8) 07:04	06:21	06:35	06:05	06:01	06:20	06:48	07:16	06:46	07:20	08:14 (8) 07:44
	17:39	16:42 (3) 18:14	18:43	20:13	20:41	20:56	20:44	20:07	19:18	17:33	17:05	119 16:18 (3) 17:09
27	07:38	08:42 (8) 07:03	06:20	06:34	06:04	06:01	06:21	06:49	07:17	06:47	07:21	08:15 (8) 07:44
	17:40	16:42 (3) 18:15	18:44	20:14	20:42	20:56	20:44	20:06	19:16	17:32	17:05	121 16:18 (3) 17:09
28	07:37	08:42 (8) 07:02	06:18	06:32	06:04	06:01	06:22	06:50	07:18	06:48	07:22	08:15 (8) 07:44
	17:41	16:41 (3) 18:16	18:45	20:15	20:43	20:56	20:43	20:04	19:15	17:31	17:05	123 16:18 (3) 17:10
29	07:36	08:43 (8) 07:01	06:17	06:31	06:03	06:02	06:22	06:51	07:19	06:49	07:24	08:16 (8) 07:45
	17:42	16:40 (3) 18:17	18:46	20:16	20:44	20:56	20:42	20:03	19:13	17:30	17:04	124 16:18 (3) 17:11
30	07:36	08:45 (8) 07:00	07:15	06:30	06:03	06:02	06:23	06:52	07:20	06:50	07:25	08:16 (8) 07:45
	17:43	16:39 (3) 18:18	18:47	20:17	20:44	20:56	20:41	20:01	19:12	17:28	17:04	127 16:18 (3) 17:11
31	07:35	08:46 (8) 06:59	07:14	06:32	06:02	06:02	06:24	06:53	07:21	06:52	07:26	07:45
	17:44	16:37 (3) 18:19	18:48	20:18	20:45	20:40	20:40	20:00	17:27	17:27	17:04	127 16:18 (3) 17:11
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293
Total, worst case	3045	16									1737	3562
Sun reduction	0,45	0,47									0,50	0,45
Oper. time red.	0,78	0,78									0,78	0,78
Wind dir. red.	0,64	0,66									0,64	0,64
Total reduction	0,23	0,24									0,25	0,22
Total, real	688	4									440	801

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 11

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: K - R27

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:46	08:35 (8) 07:34	16:33 (3) 07:00	07:12	06:29	06:02	06:03	06:25	06:54	07:21	06:53	07:26	08:20 (8)	
2	07:46	08:36 (8) 07:33	16:36 (3) 06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	07:27	08:21 (8)	
3	07:46	08:36 (8) 07:32	16:43 (3) 18:19	07:09	06:26	06:01	06:04	06:27	06:55	07:23	06:55	07:28	08:21 (8)	
4	07:46	08:36 (8) 07:31	18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	17:03	117	15:43 (9)
5	07:46	08:36 (8) 07:30	18:21	19:52	20:21	20:48	20:56	20:36	19:53	19:05	17:23	17:03	118	15:44 (9)
6	07:46	08:37 (8) 07:29	18:22	19:53	20:22	20:48	20:56	20:35	19:52	19:04	17:22	17:03	120	15:44 (9)
7	07:46	08:37 (8) 07:28	18:23	19:54	20:23	20:49	20:56	20:34	19:50	19:02	17:20	17:03	121	15:45 (9)
8	07:46	08:37 (8) 07:27	18:24	19:55	20:24	20:50	20:55	20:32	19:49	19:01	17:19	17:03	120	15:45 (9)
9	07:46	08:38 (8) 07:26	18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:18	17:03	121	15:46 (9)
10	07:46	08:38 (8) 07:25	18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:58	17:17	17:03	121	15:47 (9)
11	07:46	08:38 (8) 07:24	18:27	19:58	20:27	20:51	20:54	20:29	19:44	18:56	17:16	17:03	121	15:47 (9)
12	07:46	08:39 (8) 07:23	18:28	19:59	20:28	20:52	20:54	20:28	19:42	18:55	17:16	17:03	122	15:47 (9)
13	07:46	08:39 (8) 07:22	18:29	20:00	20:29	20:52	20:54	20:26	19:41	18:53	17:15	17:03	122	15:48 (9)
14	07:46	08:40 (8) 07:21	18:30	20:01	20:30	20:53	20:53	20:25	19:39	18:52	17:14	17:03	122	15:48 (9)
15	07:46	08:40 (8) 07:20	18:31	20:02	20:31	20:53	20:53	20:24	19:38	18:50	17:13	17:03	122	15:49 (9)
16	07:46	08:40 (8) 07:19	18:32	20:03	20:32	20:54	20:52	20:23	19:36	18:49	17:12	17:03	122	15:49 (9)
17	07:46	08:41 (8) 07:18	18:33	20:04	20:33	20:54	20:52	20:21	19:34	18:47	17:11	17:03	122	15:50 (9)
18	07:46	08:41 (8) 07:17	18:34	20:04	20:33	20:54	20:51	20:20	19:33	18:46	17:11	17:03	122	15:51 (9)
19	07:46	08:42 (8) 07:16	18:35	20:05	20:34	20:55	20:50	20:19	19:31	18:44	17:10	17:03	120	15:50 (9)
20	07:46	08:42 (8) 07:15	18:36	20:06	20:35	20:55	20:50	20:17	19:29	18:43	17:09	17:03	121	15:51 (9)
21	07:46	08:42 (8) 07:14	18:37	20:07	20:36	20:55	20:49	20:16	19:28	18:41	17:09	17:03	121	15:51 (9)
22	07:46	08:43 (8) 07:13	18:38	20:08	20:37	20:56	20:48	20:14	19:26	18:40	17:08	17:03	122	15:52 (9)
23	07:46	08:43 (8) 07:12	18:39	20:09	20:38	20:56	20:48	20:13	19:25	18:39	17:07	17:03	122	15:52 (9)
24	07:46	08:44 (8) 07:11	18:40	20:10	20:39	20:56	20:47	20:12	19:23	18:37	17:07	17:03	121	15:53 (9)
25	07:46	08:44 (8) 07:10	18:41	20:11	20:40	20:56	20:46	20:10	19:21	18:36	17:06	17:03	121	15:53 (9)
26	07:46	08:45 (8) 07:09	18:42	20:12	20:41	20:56	20:45	20:09	19:20	18:35	17:06	17:03	120	15:54 (9)
27	07:46	08:45 (8) 07:08	18:43	20:13	20:42	20:56	20:44	20:08	19:19	18:34	17:05	17:03	120	15:54 (9)
28	07:46	08:46 (8) 07:07	18:44	20:14	20:43	20:56	20:44	20:06	19:18	18:33	17:05	17:03	122	15:55 (9)
29	07:46	08:46 (8) 07:06	18:45	20:15	20:44	20:56	20:43	20:04	19:17	18:32	17:04	17:03	122	15:55 (9)
30	07:46	08:47 (8) 07:05	18:46	20:16	20:45	20:56	20:42	20:03	19:16	18:31	17:04	17:03	122	15:56 (9)
31	07:46	08:47 (8) 07:04	18:47	20:17	20:46	20:56	20:41	20:01	19:15	18:30	17:04	17:03	122	15:56 (9)
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293	123	15:57 (9)
Total, worst case	2906	19									1604		3753	
Sun reduction	0,45	0,47									0,50		0,45	
Oper. time red.	0,78	0,78									0,78		0,78	
Wind dir. red.	0,63	0,62									0,63		0,63	
Total reduction	0,22	0,23									0,25		0,22	
Total, real	647	4									399		832	

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 14

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: N - R15

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:46	14:01 (2) 07:34	14:28 (2) 07:00	07:12	06:29	06:02	06:03	06:25	06:54	07:21	06:53	16:09 (9) 07:26	13:48 (2)	
	17:13	101 16:11 (1) 17:46	62 16:58 (9) 18:17	19:49	20:18	20:46	20:56	20:39	19:58	19:10	17:26	13 16:22 (9) 17:04	97 15:56 (1)	
2	07:46	14:02 (2) 07:33	14:30 (2) 06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	16:08 (9) 07:27	13:48 (2)	
	17:14	99 16:11 (1) 17:47	58 16:58 (9) 18:18	19:50	20:19	20:46	20:56	20:38	19:57	19:08	17:25	16 16:24 (9) 17:03	98 15:56 (1)	
3	07:46	14:02 (2) 07:32	14:33 (2) 06:57	07:09	06:26	06:01	06:04	06:28	06:55	07:23	06:55	16:07 (9) 07:27	13:49 (2)	
	17:15	100 16:11 (1) 17:48	52 16:58 (9) 18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	19 16:26 (9) 17:03	98 15:57 (1)	
4	07:46	14:03 (2) 07:31	14:36 (2) 06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	16:05 (9) 07:28	13:49 (2)	
	17:16	99 16:12 (1) 17:49	46 16:58 (9) 18:21	19:52	20:21	20:48	20:56	20:36	19:53	19:05	17:23	21 16:26 (9) 17:03	99 15:57 (1)	
5	07:46	14:03 (2) 07:30	14:42 (2) 06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	16:04 (9) 07:29	13:49 (2)	
	17:16	100 16:12 (1) 17:50	34 16:57 (9) 18:22	19:53	20:22	20:48	20:56	20:35	19:52	19:04	17:21	23 16:27 (9) 17:03	99 15:58 (1)	
6	07:46	14:04 (2) 07:29	16:35 (9) 06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	14:11 (2) 07:30	13:50 (2)	
	17:17	99 16:13 (1) 17:51	22 16:57 (9) 18:23	19:54	20:23	20:49	20:56	20:33	19:50	19:02	17:20	35 16:27 (9) 17:03	99 15:59 (1)	
7	07:46	14:04 (2) 07:28	16:36 (9) 06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	14:07 (2) 07:31	13:50 (2)	
	17:18	99 16:13 (1) 17:53	20 16:56 (9) 18:24	19:55	20:24	20:50	20:55	20:32	19:49	19:01	17:19	46 16:29 (9) 17:03	100 15:59 (1)	
8	07:46	14:05 (2) 07:27	16:37 (9) 06:50	07:01	06:21	06:00	06:06	06:31	07:00	07:28	07:00	14:04 (2) 07:32	13:51 (2)	
	17:19	98 16:13 (1) 17:54	19 16:56 (9) 18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:18	52 16:29 (9) 17:03	99 16:00 (1)	
9	07:46	14:06 (2) 07:26	16:39 (9) 06:48	07:00	06:19	05:59	06:07	06:32	07:01	07:29	07:02	14:01 (2) 07:33	13:51 (2)	
	17:20	98 16:14 (1) 17:55	15 16:54 (9) 18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:58	17:17	58 16:29 (9) 17:03	100 16:00 (1)	
10	07:46	14:05 (2) 07:25	16:41 (9) 06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	13:59 (2) 07:34	13:52 (2)	
	17:21	98 16:13 (1) 17:56	12 16:53 (9) 18:27	19:58	20:27	20:51	20:54	20:29	19:44	18:56	17:16	62 16:29 (9) 17:03	100 16:01 (1)	
11	07:45	14:06 (2) 07:24	16:45 (9) 06:45	06:56	06:17	05:59	06:08	06:34	07:03	07:31	07:04	13:57 (2) 07:35	13:51 (2)	
	17:22	97 16:14 (1) 17:57	4 16:49 (9) 18:28	19:59	20:28	20:52	20:54	20:28	19:42	18:54	17:16	65 16:29 (9) 17:03	101 16:01 (1)	
12	07:45	14:07 (2) 07:23	16:44	06:55	06:16	05:59	06:09	06:35	07:04	07:32	07:05	13:56 (2) 07:35	09:47 (9)	
	17:23	96 16:14 (1) 17:58	18:29	20:00	20:29	20:52	20:53	20:26	19:41	18:53	17:15	67 16:29 (9) 17:03	105 16:01 (1)	
13	07:45	14:08 (2) 07:21	06:42	06:53	06:15	05:59	06:10	06:36	07:04	07:33	07:06	13:54 (2) 07:36	09:46 (8)	
	17:24	94 16:14 (1) 18:00	18:30	20:01	20:30	20:53	20:53	20:25	19:39	18:51	17:14	69 16:29 (9) 17:03	108 16:02 (1)	
14	07:45	14:08 (2) 07:20	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	07:07	13:53 (2) 07:37	09:45 (8)	
	17:25	94 16:14 (1) 18:01	18:31	20:02	20:31	20:53	20:53	20:24	19:38	18:50	17:13	71 16:29 (9) 17:03	113 16:03 (1)	
15	07:44	14:09 (2) 07:19	06:39	06:51	06:13	05:59	06:11	06:38	07:06	07:35	07:08	13:52 (2) 07:38	09:44 (8)	
	17:26	93 16:14 (1) 18:02	18:32	20:03	20:32	20:54	20:52	20:23	19:36	18:49	17:12	72 16:28 (9) 17:04	114 16:03 (1)	
16	07:44	14:09 (2) 07:18	06:37	06:49	06:13	05:59	06:12	06:39	07:07	07:36	07:09	13:51 (2) 07:38	09:44 (8)	
	17:27	90 16:13 (1) 18:03	18:33	20:03	20:33	20:54	20:51	20:21	19:34	18:47	17:11	71 16:27 (9) 17:04	115 16:03 (1)	
17	07:44	14:10 (2) 07:16	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	07:11	13:51 (2) 07:39	09:44 (8)	
	17:28	90 16:14 (1) 18:04	18:34	20:04	20:33	20:54	20:51	20:20	19:33	18:46	17:11	72 16:28 (9) 17:04	115 16:04 (1)	
18	07:43	14:10 (2) 07:15	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	07:12	13:50 (2) 07:40	09:44 (8)	
	17:30	87 16:13 (1) 18:05	18:35	20:05	20:34	20:55	20:50	20:18	19:31	18:44	17:10	83 16:27 (9) 17:05	116 16:04 (1)	
19	07:43	14:11 (2) 07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	07:13	13:49 (2) 07:40	09:44 (8)	
	17:31	86 16:13 (1) 18:06	18:36	20:06	20:35	20:55	20:50	20:17	19:29	18:43	17:09	86 16:26 (9) 17:05	119 16:05 (1)	
20	07:42	14:12 (2) 07:13	06:31	06:43	06:09	05:59	06:15	06:43	07:11	07:40	07:14	13:49 (2) 07:41	09:44 (8)	
	17:32	83 16:12 (1) 18:08	18:37	20:07	20:36	20:55	20:49	20:16	19:28	18:41	17:09	88 16:24 (9) 17:05	119 16:05 (1)	
21	07:42	14:13 (2) 07:11	06:29	06:42	06:08	05:59	06:16	06:43	07:12	07:41	07:15	13:48 (2) 07:41	09:45 (8)	
	17:33	89 16:47 (9) 18:09	18:38	20:08	20:37	20:56	20:48	20:14	19:26	18:40	17:08	89 16:22 (9) 17:06	119 16:06 (1)	
22	07:41	14:14 (2) 07:10	06:28	06:40	06:08	06:00	06:17	06:44	07:13	07:42	07:16	13:48 (2) 07:42	09:45 (8)	
	17:34	88 16:49 (9) 18:10	18:39	20:09	20:38	20:56	20:48	20:13	19:25	18:39	17:07	83 15:48 (1) 17:06	119 16:06 (1)	
23	07:41	14:14 (2) 07:09	06:26	06:39	06:07	06:00	06:17	06:45	07:14	07:43	07:17	13:49 (2) 07:42	09:46 (8)	
	17:35	86 16:51 (9) 18:11	18:40	20:10	20:39	20:56	20:47	20:12	19:23	18:37	17:07	85 15:50 (1) 17:07	119 16:07 (1)	
24	07:40	14:16 (2) 07:07	06:25	06:38	06:06	06:00	06:18	06:46	07:14	07:44	07:18	13:48 (2) 07:43	09:46 (8)	
	17:36	83 16:53 (9) 18:12	18:41	20:11	20:40	20:56	20:46	20:10	19:21	18:36	17:06	88 15:51 (1) 17:07	119 16:07 (1)	
25	07:39	14:17 (2) 07:06	06:23	06:36	06:06	06:00	06:19	06:47	07:15	06:45	07:19	13:48 (2) 07:43	09:48 (8)	
	17:37	72 16:54 (9) 18:13	18:42	20:12	20:40	20:56	20:45	20:09	19:20	17:35	17:06	90 15:52 (1) 17:08	117 16:08 (1)	
26	07:39	14:18 (2) 07:04	06:21	06:35	06:05	06:01	06:20	06:48	07:16	06:46	07:20	13:48 (2) 07:44	09:48 (8)	
	17:39	71 16:54 (9) 18:14	18:43	20:13	20:41	20:56	20:44	20:07	19:18	17:33	17:05	90 15:52 (1) 17:08	115 16:08 (1)	
27	07:38	14:20 (2) 07:03	06:20	06:34	06:04	06:01	06:21	06:49	07:17	06:47	07:21	13:48 (2) 07:44	09:49 (8)	
	17:40	72 16:56 (9) 18:15	18:44	20:14	20:42	20:56	20:44	20:06	19:16	17:32	17:05	93 15:53 (1) 17:09	115 16:08 (1)	
28	07:37	14:21 (2) 07:02	06:18	06:32	06:04	06:01	06:22	06:50	07:18	06:48	07:22	13:48 (2) 07:44	09:50 (8)	
	17:41	71 16:57 (9) 18:16	18:45	20:15	20:43	20:56	20:43	20:04	19:15	17:31	17:05	94 15:54 (1) 17:10	113 16:08 (1)	
29	07:36	14:23 (2) 07:01	07:17	06:31	06:03	06:02	06:22	06:51	07:19	06:49	07:23	13:48 (2) 07:45	09:52 (8)	
	17:42	68 16:57 (9) 18:17	19:46	20:16	20:44	20:56	20:42	20:03	19:13	17:30	17:04	94 15:54 (1) 17:11	113 16:10 (1)	
30	07:35	14:24 (2) 07:00	07:15	06:30	06:03	06:02	06:23	06:52	07:20	06:50	07:25	13:48 (2) 07:45	09:53 (8)	
	17:43	67 16:57 (9) 18:18	19:47	20:17	20:44	20:56	20:41	20:01	19:12	17:28	17:04	96 15:55 (1) 17:11	111 16:10 (1)	
31	07:35	14:26 (2) 07:00	07:14	06:29	06:02	06:02	06:24	06:53	07:21	06:52	06:52	16:13 (9) 07:45	09:55 (8)	
	17:44	65 16:58 (9) 18:19	19:48	20:18	20:45	20:56	20:40	20:00	19:11	17:27	6 16:19 (9) 07:45	107 16:10 (1)		
Potential sun hours	302	300	370	396	444	446	454	425	374	347	6	302	1991	293
Total, worst case	2733	344									6		1991	3381
Sun reduction	0,45	0,47									0,54		0,50	0,45
Oper. time red.	0,78	0,78									0,78		0,78	0,78
Wind dir. red.	0,61	0,62												

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 15

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: O - R14

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:46	14:16 (2) 07:34	14:39 (2) 07:00	07:12	06:29	06:02	06:03	06:25	06:54	07:21	06:53	16:11 (9) 07:26	14:03 (2)	
2	07:46	14:17 (2) 07:33	14:40 (2) 06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	16:10 (9) 07:26	14:03 (2)	
3	07:46	14:17 (2) 07:32	14:42 (2) 06:57	07:09	06:26	06:01	06:04	06:28	06:55	07:23	06:55	16:09 (9) 07:27	14:03 (2)	
4	07:46	14:18 (2) 07:31	14:45 (2) 06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	14:26 (2) 07:28	14:04 (2)	
5	07:46	14:18 (2) 07:30	14:48 (2) 06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	14:20 (2) 07:29	14:04 (2)	
6	07:46	14:19 (2) 07:29	14:51 (2) 06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	14:17 (2) 07:30	14:05 (2)	
7	07:46	14:19 (2) 07:28	14:57 (2) 06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	14:15 (2) 07:31	14:05 (2)	
8	07:46	14:20 (2) 07:27	16:39 (9) 06:50	07:01	06:21	06:00	06:06	06:31	07:00	07:28	07:00	16:32 (9) 17:03	14:06 (2)	
9	07:46	14:20 (2) 07:26	16:40 (9) 06:48	07:00	06:19	05:59	06:07	06:32	07:01	07:29	07:02	14:11 (2) 07:33	14:06 (2)	
10	07:46	14:20 (2) 07:25	16:42 (9) 06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	14:09 (2) 07:34	14:07 (2)	
11	07:45	14:21 (2) 07:24	16:44 (9) 06:45	06:56	06:17	05:59	06:08	06:34	07:03	07:31	07:04	14:08 (2) 07:35	14:06 (2)	
12	07:45	14:21 (2) 07:22	16:56 (9) 06:44	06:55	06:16	05:59	06:09	06:35	07:04	07:32	07:05	14:08 (2) 07:35	14:07 (2)	
13	07:45	14:22 (2) 07:21	16:51 (9) 06:42	06:53	06:15	05:59	06:10	06:36	07:04	07:33	07:06	14:06 (2) 07:36	14:08 (2)	
14	07:45	14:22 (2) 07:20	18:30	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	17:14	14:05 (2) 07:37	14:09 (2)
15	07:44	14:23 (2) 07:19	18:31	06:39	06:51	06:13	05:59	06:11	06:38	07:06	07:35	17:13	14:05 (2) 07:38	14:08 (2)
16	07:44	14:23 (2) 07:18	18:32	06:37	06:49	06:13	05:59	06:12	06:39	07:07	07:36	17:12	14:04 (2) 07:39	14:09 (2)
17	07:44	14:24 (2) 07:17	18:33	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	17:11	14:04 (2) 07:40	14:10 (2)
18	07:43	14:24 (2) 07:15	18:34	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	17:11	14:03 (2) 07:41	14:11 (2)
19	07:43	14:25 (2) 07:14	18:35	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	17:10	14:03 (2) 07:42	14:12 (2)
20	07:43	14:25 (2) 07:13	18:36	06:32	06:44	06:09	05:59	06:15	06:43	07:11	07:40	17:09	14:02 (2) 07:43	14:13 (2)
21	07:42	14:26 (2) 07:12	18:37	06:31	06:43	06:08	05:59	06:16	06:44	07:12	07:41	17:08	14:02 (2) 07:44	14:14 (2)
22	07:42	14:27 (2) 07:11	18:38	06:29	06:42	06:08	05:59	06:16	06:45	07:13	07:42	17:07	14:02 (2) 07:45	14:15 (2)
23	07:41	14:28 (2) 07:10	18:39	06:28	06:41	06:07	05:59	06:17	06:46	07:14	07:43	17:06	14:02 (2) 07:46	14:16 (2)
24	07:41	14:29 (2) 07:09	18:40	06:26	06:39	06:07	05:59	06:17	06:46	07:14	07:43	17:05	14:02 (2) 07:47	14:17 (2)
25	07:40	14:30 (2) 07:08	18:41	06:25	06:38	06:06	05:59	06:18	06:46	07:15	07:44	17:04	14:02 (2) 07:48	14:18 (2)
26	07:39	14:31 (2) 07:07	18:42	06:23	06:36	06:06	05:59	06:19	06:47	07:16	07:45	17:03	14:02 (2) 07:49	14:19 (2)
27	07:39	14:32 (2) 07:06	18:43	06:21	06:35	06:05	05:59	06:20	06:48	07:17	07:46	17:02	14:02 (2) 07:50	14:20 (2)
28	07:38	14:33 (2) 07:05	18:44	06:20	06:34	06:04	05:59	06:21	06:49	07:18	07:47	17:01	14:02 (2) 07:51	14:21 (2)
29	07:37	14:34 (2) 07:04	18:45	06:18	06:32	06:04	05:59	06:22	06:50	07:19	07:48	17:00	14:02 (2) 07:52	14:22 (2)
30	07:36	14:35 (2) 07:03	18:46	06:17	06:31	06:03	05:59	06:23	06:51	07:20	07:49	16:59	14:02 (2) 07:53	14:23 (2)
31	07:35	14:36 (2) 07:02	18:47	06:16	06:30	06:03	05:59	06:24	06:52	07:21	07:50	16:58	14:02 (2) 07:54	14:24 (2)
Potential sun hours	302	300	370	396	444	446	454	425	374	347	18	302	293	
Total, worst case	2738	436									2108		2967	
Sun reduction	0,45	0,47									0,54		0,45	
Oper. time red.	0,78	0,78									0,78		0,78	
Wind dir. red.	0,61	0,62									0,61		0,61	
Total reduction	0,21	0,23									0,26		0,21	
Total, real	588	99									507		636	

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 16

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: P - R26

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December								
1	07:46	07:34	07:00	07:12	06:29	06:02	06:03	06:25	19:31 (9)	06:54	07:21	06:53	07:25							
	17:13	17:46	18:17	19:49	20:18	20:46	20:56	20:39	27	19:58 (9)	19:58	10	19:30 (3)	19:10	17:26	17:04				
2	07:46	07:33	06:59	07:10	06:27	06:01	06:03	06:26	19:31 (9)	06:54	19:23 (3)	07:22	06:54	07:26						
	17:14	17:47	18:18	19:50	20:19	20:46	20:56	20:38	26	19:57 (9)	19:57	3	19:28 (3)	19:08	17:25	17:03				
3	07:46	07:32	06:57	07:09	06:26	19:30 (9)	06:01	06:27	19:32 (9)	06:55	07:23	06:55	07:27							
	17:15	17:48	18:20	19:51	20:20	9	19:39 (9)	20:47	20:37	25	19:57 (9)	19:55	19:07	17:24	17:03					
4	07:46	07:31	06:56	07:07	06:25	19:28 (9)	06:01	06:28	19:32 (9)	06:56	07:24	06:56	07:28							
	17:16	17:49	18:21	19:52	20:21	14	19:42 (9)	20:48	20:36	25	19:57 (9)	19:53	19:05	17:23	17:03					
5	07:46	07:30	06:54	07:06	06:24	19:26 (9)	06:00	06:29	19:33 (9)	06:57	07:25	06:57	07:29							
	17:16	17:50	18:22	19:53	20:22	18	19:44 (9)	20:48	20:35	23	19:56 (9)	19:52	19:04	17:22	17:03					
6	07:46	07:29	06:53	07:04	06:23	19:25 (9)	06:00	06:30	19:34 (9)	06:58	07:26	06:58	07:30							
	17:17	17:51	18:23	19:54	20:23	20	19:45 (9)	20:49	20:33	21	19:55 (9)	19:50	19:02	17:20	17:03					
7	07:46	07:28	06:51	07:03	06:22	19:24 (9)	06:00	06:31	19:35 (9)	06:59	07:27	06:59	07:31							
	17:18	17:53	18:24	19:55	20:24	22	19:46 (9)	20:50	20:32	19	19:54 (9)	19:49	19:01	17:19	17:03					
8	07:46	07:27	06:50	07:01	06:21	19:23 (9)	06:00	06:31	19:36 (9)	07:00	07:28	07:00	07:32							
	17:19	17:54	18:25	19:56	20:25	24	19:47 (9)	20:50	20:31	17	19:53 (9)	19:47	18:59	17:18	17:03					
9	07:46	07:26	06:48	07:00	06:19	19:22 (9)	05:59	06:07	19:37 (9)	07:01	07:29	07:02	07:33							
	17:20	17:55	18:26	19:57	20:26	25	19:47 (9)	20:51	20:30	13	19:50 (9)	19:46	18:58	17:17	17:03					
10	07:46	07:25	06:47	06:58	19:24 (3)	06:18	19:22 (9)	05:59	06:33	19:40 (9)	07:02	07:30	07:03	07:34						
	17:21	17:56	18:27	19:58	3	19:27 (3)	20:27	26	19:48 (9)	20:51	20:54	20:29	7	19:47 (9)	19:44	18:56	17:16	17:03		
11	07:45	07:24	06:45	06:57	19:21 (3)	06:17	19:21 (9)	05:59	06:34	19:47 (9)	07:03	07:31	07:04	07:35						
	17:22	17:57	18:28	19:59	10	19:31 (3)	20:28	27	19:48 (9)	20:52	20:54	20:28	19:42	18:55	17:16	17:03				
12	07:45	07:22	06:44	06:55	19:18 (3)	06:16	19:21 (9)	05:59	06:09	19:42 (9)	06:35	07:04	07:32	07:05	07:35					
	17:23	17:58	18:29	20:00	14	19:32 (3)	20:29	27	19:48 (9)	20:52	20:53	4	19:46 (9)	20:26	18:53	17:15	17:03			
13	07:45	07:21	06:42	06:53	19:17 (3)	06:15	19:21 (9)	05:59	06:10	19:39 (9)	06:36	07:04	07:33	07:06	07:36					
	17:24	18:00	18:30	20:01	17	19:34 (3)	20:30	27	19:48 (9)	20:53	20:53	9	19:48 (9)	20:25	19:39	18:51	17:14	17:03		
14	07:45	07:20	06:40	06:52	19:16 (3)	06:14	19:21 (9)	05:59	06:10	19:38 (9)	06:37	07:05	07:34	07:07	07:37					
	17:25	18:01	18:31	20:02	18	19:34 (3)	20:31	27	19:48 (9)	20:53	20:53	12	19:50 (9)	20:24	19:38	18:50	17:13	17:03		
15	07:44	07:19	06:39	06:51	19:16 (3)	06:13	19:20 (9)	05:59	06:11	19:37 (9)	06:38	07:06	07:35	07:08	07:38					
	17:26	18:02	18:32	20:02	18	19:34 (3)	20:32	28	19:48 (9)	20:54	20:52	14	19:51 (9)	20:22	19:36	18:49	17:12	17:04		
16	07:44	07:18	06:37	06:49	19:15 (3)	06:13	19:20 (9)	05:59	06:12	19:37 (9)	06:39	07:07	07:36	07:09	07:38					
	17:27	18:03	18:33	20:03	19	19:34 (3)	20:32	28	19:48 (9)	20:54	20:51	16	19:53 (9)	20:21	19:34	18:47	17:11	17:04		
17	07:44	07:16	06:36	06:48	19:15 (3)	06:12	19:20 (9)	05:59	06:13	19:35 (9)	06:40	07:08	07:37	07:10	07:39					
	17:28	18:04	18:34	20:04	19	19:34 (3)	20:33	27	19:47 (9)	20:54	20:51	18	19:53 (9)	20:20	19:33	18:46	17:11	17:04		
18	07:43	07:15	06:34	06:46	19:14 (3)	06:11	19:21 (9)	05:59	06:13	19:35 (9)	06:41	07:09	07:38	07:12	07:40					
	17:30	18:05	18:35	20:05	19	19:33 (3)	20:34	27	19:48 (9)	20:55	20:50	19	19:54 (9)	20:18	19:31	18:44	17:10	17:05		
19	07:43	07:14	06:33	06:45	19:15 (3)	06:10	19:21 (9)	05:59	06:14	19:34 (9)	06:42	07:10	07:39	07:13	07:40					
	17:31	18:06	18:36	20:06	17	19:32 (3)	20:35	27	19:48 (9)	20:55	20:50	21	19:55 (9)	20:17	19:29	18:43	17:09	17:05		
20	07:42	07:13	06:31	06:43	19:16 (3)	06:09	19:22 (9)	05:59	06:15	19:34 (9)	06:43	19:25 (3)	07:11	19:29	07:40	07:14	07:41			
	17:32	18:08	18:37	20:07	16	19:32 (3)	20:36	25	19:47 (9)	20:55	20:49	22	19:56 (9)	20:16	6	19:31 (3)	19:28	18:41	17:09	17:05
21	07:42	07:11	06:29	06:42	19:16 (3)	06:08	19:22 (9)	05:59	06:16	19:33 (9)	06:43	19:22 (3)	07:12	19:22	07:41	07:15	07:41			
	17:33	18:09	18:38	20:08	14	19:30 (3)	20:37	24	19:46 (9)	20:56	20:48	23	19:56 (9)	20:14	11	19:33 (3)	19:26	18:40	17:08	17:06
22	07:41	07:10	06:28	06:41	19:18 (3)	06:08	19:23 (9)	06:00	06:17	19:32 (9)	06:44	19:21 (3)	07:13	19:21	07:42	07:16	07:42			
	17:34	18:10	18:39	20:09	10	19:28 (3)	20:38	24	19:47 (9)	20:56	20:48	25	19:57 (9)	20:13	14	19:35 (3)	19:25	18:39	17:07	17:06
23	07:40	07:09	06:26	06:39	19:21 (3)	06:07	19:23 (9)	06:00	06:17	19:32 (9)	06:45	19:20 (3)	07:14	19:20	07:43	07:17	07:42			
	17:35	18:11	18:40	20:10	4	19:25 (3)	20:39	23	19:46 (9)	20:56	20:47	25	19:57 (9)	20:11	16	19:36 (3)	19:23	18:37	17:07	17:07
24	07:40	07:07	06:25	06:38	06:06	06:00	19:24 (9)	06:00	06:18	19:32 (9)	06:46	19:19 (3)	07:14	19:19	07:44	07:18	07:43			
	17:36	18:12	18:41	20:11	20:39	21	19:45 (9)	20:56	20:46	26	19:58 (9)	20:10	17	19:36 (3)	19:21	18:36	17:06	17:07		
25	07:39	07:06	06:23	06:36	06:06	06:00	19:25 (9)	06:00	06:19	19:32 (9)	06:47	19:18 (3)	07:15	19:18	06:45	07:19	07:43			
	17:37	18:13	18:42	20:12	20:40	20	19:45 (9)	20:56	20:45	26	19:58 (9)	20:09	19	19:37 (3)	19:20	17:35	17:06	17:08		
26	07:39	07:04	06:21	06:35	06:05	06:00	19:25 (9)	06:01	06:20	19:31 (9)	06:48	19:17 (3)	07:16	19:17	06:46	07:20	07:44			
	17:39	18:14	18:43	20:13	20:41	19	19:44 (9)	20:56	20:44	27	19:58 (9)	20:07	19	19:36 (3)	19:18	17:33	17:05	17:09		
27	07:38	07:03	06:20	06:34	06:04	06:00	19:27 (9)	06:01	06:21	19:31 (9)	06:49	19:16 (3)	07:17	19:16	06:47	07:21	07:44			
	17:40	18:15	18:44	20:14	20:42	17	19:44 (9)	20:56	20:44	27	19:58 (9)	20:06	19	19:35 (3)	19:16	17:32	17:05	17:09		
28	07:37	07:02	06:18	06:32	06:04	06:00	19:27 (9)	06:01	06:22	19:31 (9)	06:50	19:17 (3)	07:18	19:17	06:48	07:22	07:44			
	17:41	18:16	18:45	20:15	20:43	16	19:43 (9)	20:56	20:43	27	19:58 (9)	20:04	18	19:35 (3)	19:15	17:31	17:05	17:10		
29	07:36	07:17	06:31	06:45	06:03	06:00	19:29 (9)	06:02	06:22	19:31 (9)	06:51	19:17 (3)	07:19	19:17	06:49	07:23	07:45			
	17:42	18:17	18:46	20:16	20:43	13	19:42 (9)	20:56	20:42	28	19:59 (9)	20:03	17	19:34 (3)	19:13	17:30	17:04	17:11		
30	07:35	07:15	06:30	06:44	06:03	06:00	19:30 (9)	06:02	06:23	19:31 (9)	06:52	19:17 (3)	07:20	19:17	06:50	07:24	07:45			
	17:43	18:18	18:47	20:17	20:44	10	19:40 (9)	20:56	20:41	28	19:59 (9)	20:01	16	19:33 (3)	19:12	17:28	17:04	17:11		
31	07:35	07:14	06:29	06:43	06:02	06:00	19:33 (9)	06:01	06:24	19:31 (9)	06:53	19:18 (3)	07:21	19:18	06:52	07:25	07:45			
	17:44	18:19	18:48	20:18	20:45	6	19:39 (9)	20:56	20:40	28	19:59 (9)	20:00	14	19:32 (3)	19:11	17:27	17:03	17:12		
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293								
Total, worst case				198	621	425	389	13												
Sun reduction				0,53	0,59	0,74	0,73	0,65												
Oper. time red.				0,78	0,78	0,78	0,78	0,78												
Wind dir. red.				0,65	0,65	0,65	0													

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 17

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: Q - R24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625 521 486 354 333 434 521 521 556 660 955 868 6.834
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December						
1	07:46	07:34	07:00	07:12	06:29	06:02	06:03	06:25	19:30 (9)	06:54	19:19 (3)	07:21	06:53	07:25				
	17:13	17:46	18:17	19:49	20:18	20:46	20:56	20:39	27	19:57 (9)	19:58	12	19:31 (3)	19:10	17:26	17:04		
2	07:46	07:33	06:59	07:10	06:27	06:01	06:03	06:26	19:31 (9)	06:54	19:21 (3)	07:22	06:54	07:26				
	17:14	17:47	18:18	19:50	20:19	8	19:38 (9)	20:46	20:56	20:38	26	19:57 (9)	19:57	19:08	17:25	17:03		
3	07:46	07:32	06:57	07:09	06:26	06:00	06:01	06:27	19:31 (9)	06:55	19:28 (3)	07:23	06:55	07:27				
	17:15	17:48	18:20	19:51	20:20	13	19:41 (9)	20:47	20:56	20:37	26	19:57 (9)	19:55	19:07	17:24	17:03		
4	07:46	07:31	06:56	07:07	06:25	06:01	06:01	06:28	19:31 (9)	06:56	19:24 (3)	07:24	06:56	07:28				
	17:16	17:49	18:21	19:52	20:21	17	19:43 (9)	20:48	20:56	20:36	26	19:57 (9)	19:53	19:05	17:23	17:03		
5	07:46	07:30	06:54	07:06	06:24	06:00	06:00	06:29	19:32 (9)	06:57	19:29 (3)	07:25	06:57	07:29				
	17:16	17:50	18:22	19:53	20:22	20	19:44 (9)	20:48	20:56	20:35	24	19:56 (9)	19:52	19:04	17:21	17:03		
6	07:46	07:29	06:53	07:04	06:23	06:00	06:00	06:30	19:33 (9)	06:58	19:33 (9)	07:26	06:58	07:30				
	17:17	17:51	18:23	19:54	20:23	22	19:45 (9)	20:49	20:55	20:33	22	19:55 (9)	19:50	19:02	17:20	17:03		
7	07:46	07:28	06:51	07:03	06:22	06:00	06:00	06:31	19:33 (9)	06:59	19:33 (9)	07:27	06:59	07:31				
	17:18	17:53	18:24	19:55	20:24	23	19:46 (9)	20:50	20:55	20:32	22	19:55 (9)	19:49	19:01	17:19	17:03		
8	07:46	07:27	06:50	07:01	06:21	06:00	06:00	06:31	19:35 (9)	07:00	19:35 (9)	07:28	07:00	07:32				
	17:19	17:54	18:25	19:56	20:25	25	19:47 (9)	20:50	20:55	20:31	19	19:54 (9)	19:47	18:59	17:18	17:03		
9	07:46	07:26	06:48	07:00	06:19	06:00	06:00	06:32	19:35 (9)	07:01	19:35 (9)	07:29	07:02	07:33				
	17:20	17:55	18:26	19:57	20:26	25	19:47 (9)	20:51	20:55	20:30	16	19:51 (9)	19:46	18:58	17:17	17:03		
10	07:46	07:25	06:47	06:58	7	19:22 (3)	06:18	06:33	19:37 (9)	07:02	19:37 (9)	07:30	07:03	07:34				
	17:21	17:56	18:27	19:58	7	19:29 (3)	20:27	20:29	12	19:49 (9)	19:44	18:56	17:16	17:03				
11	07:45	07:24	06:45	06:57	19:20 (3)	06:17	19:21 (9)	06:34	19:40 (9)	07:03	19:40 (9)	07:31	07:04	07:35				
	17:22	17:57	18:28	19:59	12	19:32 (3)	20:28	20:28	6	19:46 (9)	19:42	18:54	17:16	17:03				
12	07:45	07:22	06:44	06:55	19:18 (3)	06:16	19:21 (9)	06:35	19:37 (9)	07:04	19:37 (9)	07:32	07:05	07:35				
	17:23	17:58	18:29	20:00	14	19:32 (3)	20:29	20:26	20:26	19:41	19:41	18:53	17:15	17:03				
13	07:45	07:21	06:42	06:53	19:17 (3)	06:15	19:20 (9)	06:36	19:36 (9)	07:04	19:36 (9)	07:33	07:06	07:36				
	17:24	18:00	18:30	20:01	17	19:34 (3)	20:30	20:25	20:25	19:39	19:39	18:51	17:14	17:03				
14	07:45	07:20	06:40	06:52	19:16 (3)	06:14	19:20 (9)	06:37	19:43 (9)	06:37	19:43 (9)	07:34	07:07	07:37				
	17:25	18:01	18:31	20:02	17	19:33 (3)	20:31	20:53	2	19:44 (9)	20:24	19:38	18:50	17:13	17:03			
15	07:44	07:19	06:39	06:51	19:15 (3)	06:13	19:20 (9)	06:38	19:40 (9)	06:38	19:40 (9)	07:35	07:08	07:38				
	17:26	18:02	18:32	20:02	19	19:34 (3)	20:32	20:22	8	19:48 (9)	20:22	19:36	18:49	17:12	17:04			
16	07:44	07:18	06:37	06:49	19:14 (3)	06:13	19:20 (9)	06:39	19:38 (9)	06:39	19:38 (9)	07:36	07:09	07:38				
	17:27	18:03	18:33	20:03	19	19:33 (3)	20:32	20:51	12	19:50 (9)	20:21	19:34	18:47	17:11	17:04			
17	07:44	07:16	06:36	06:48	19:15 (3)	06:12	19:20 (9)	06:40	19:37 (9)	06:40	19:37 (9)	07:37	07:10	07:39				
	17:28	18:04	18:34	20:04	18	19:33 (3)	20:33	20:51	14	19:51 (9)	20:20	19:33	18:46	17:11	17:04			
18	07:43	07:15	06:34	06:46	19:14 (3)	06:11	19:22 (9)	06:41	19:36 (9)	06:41	19:36 (9)	07:38	07:12	07:40				
	17:30	18:05	18:35	20:05	18	19:32 (3)	20:34	20:50	16	19:52 (9)	20:18	19:31	18:44	17:10	17:05			
19	07:43	07:14	06:33	06:45	19:15 (3)	06:10	19:22 (9)	06:42	19:35 (9)	06:42	19:35 (9)	07:39	07:13	07:40				
	17:31	18:06	18:36	20:06	17	19:32 (3)	20:35	20:50	18	19:53 (9)	20:17	19:29	18:43	17:09	17:05			
20	07:42	07:13	06:31	06:43	19:16 (3)	06:09	19:22 (9)	06:43	19:35 (9)	06:43	19:35 (9)	07:40	07:14	07:41				
	17:32	18:08	18:37	20:07	15	19:31 (3)	20:36	20:49	20	19:55 (9)	20:16	19:28	18:41	17:09	17:05			
21	07:42	07:11	06:29	06:42	19:17 (3)	06:08	19:22 (9)	06:44	19:33 (9)	06:43	19:33 (9)	07:41	07:15	07:41				
	17:33	18:09	18:38	20:08	12	19:29 (3)	20:37	20:48	21	19:54 (9)	20:14	9	19:32 (3)	19:26	18:40	17:08	17:06	
22	07:41	07:10	06:28	06:41	19:19 (3)	06:08	19:24 (9)	06:45	19:33 (9)	06:44	19:33 (9)	07:42	07:16	07:42				
	17:34	18:10	18:39	20:09	8	19:27 (3)	20:38	20:48	22	19:55 (9)	20:13	13	19:34 (3)	19:25	18:39	17:07	17:06	
23	07:40	07:09	06:26	06:39	06:07	06:00	19:24 (9)	06:46	19:33 (9)	06:45	19:33 (9)	07:43	07:17	07:42				
	17:35	18:11	18:40	20:10	20:39	21	19:45 (9)	20:56	20:47	23	19:56 (9)	20:11	15	19:35 (3)	19:23	18:37	17:07	17:07
24	07:40	07:07	06:25	06:38	06:06	06:00	19:24 (9)	06:46	19:32 (9)	06:46	19:32 (9)	07:44	07:18	07:43				
	17:36	18:12	18:41	20:11	20:39	19	19:43 (9)	20:56	20:46	25	19:57 (9)	20:10	17	19:36 (3)	19:21	18:36	17:06	17:07
25	07:39	07:06	06:23	06:36	06:06	06:00	19:26 (9)	06:47	19:32 (9)	06:47	19:32 (9)	07:45	07:19	07:43				
	17:37	18:13	18:42	20:12	20:40	17	19:43 (9)	20:56	20:45	25	19:57 (9)	20:09	18	19:38 (3)	19:20	17:35	17:06	17:08
26	07:39	07:04	06:21	06:35	06:05	06:00	19:27 (9)	06:48	19:31 (9)	06:48	19:31 (9)	07:46	07:20	07:44				
	17:39	18:14	18:43	20:13	20:41	15	19:42 (9)	20:56	20:44	26	19:57 (9)	20:07	18	19:35 (3)	19:18	17:33	17:05	17:09
27	07:38	07:03	06:20	06:34	06:04	06:00	19:28 (9)	06:49	19:31 (9)	06:49	19:31 (9)	07:47	07:21	07:44				
	17:40	18:15	18:44	20:14	20:42	14	19:42 (9)	20:56	20:44	26	19:57 (9)	20:06	19	19:35 (3)	19:16	17:32	17:05	17:09
28	07:37	07:02	06:18	06:32	06:04	06:00	19:30 (9)	06:50	19:31 (9)	06:50	19:31 (9)	07:48	07:22	07:44				
	17:41	18:16	18:45	20:15	20:43	10	19:40 (9)	20:56	20:43	27	19:58 (9)	20:04	19	19:35 (3)	19:15	17:31	17:05	17:10
29	07:36	07:17	06:31	06:45	06:03	06:00	19:32 (9)	06:52	19:31 (9)	06:51	19:31 (9)	07:49	07:23	07:45				
	17:42	18:17	18:46	20:16	20:43	6	19:38 (9)	20:56	20:42	27	19:58 (9)	20:03	17	19:34 (3)	19:13	17:30	17:04	17:11
30	07:35	07:15	06:30	06:44	06:03	06:00	19:31 (9)	06:52	19:31 (9)	06:52	19:31 (9)	07:50	07:24	07:45				
	17:43	18:18	18:47	20:17	20:44	27	19:58 (9)	20:01	20:41	27	19:58 (9)	20:01	17	19:34 (3)	19:12	17:28	17:04	17:11
31	07:35	07:14	06:29	06:43	06:02	06:00	19:31 (9)	06:53	19:31 (9)	06:53	19:31 (9)	07:51	07:25	07:45				
	17:44	18:19	18:48	20:18	20:45	27	19:58 (9)	20:00	20:40	27	19:58 (9)	20:00	14	19:32 (3)	19:11	17:27	17:04	17:12
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293						
Total, worst case				193	590		366	402	19									
Sun reduction				0,53	0,59		0,74	0,73	0,65									
Oper. time red.				0,78	0,78		0,78	0,78	0,78									
Wind dir. red.				0,65	0,65		0,65	0,65	0,65									
Total reduction				0,27	0,30		0,37	0,37	0,33									
Total, real				52	176		137	149	6									

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 18

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: R - R12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June
1	07:46	09:40 (8) 07:34	10:06 (8) 07:00	15:26 (2) 07:12	06:29	06:02
	17:13	62 10:42 (8) 17:46	54 16:58 (1) 18:17	62 16:28 (2) 19:49	20:18	20:46
2	07:46	09:40 (8) 07:33	10:10 (8) 06:59	15:26 (2) 07:10	06:27	06:01
	17:14	63 10:43 (8) 17:47	48 16:59 (1) 18:18	61 16:27 (2) 19:50	20:19	20:46
3	07:46	09:40 (8) 07:32	16:27 (1) 06:57	15:26 (2) 07:09	06:26	06:01
	17:15	63 10:43 (8) 17:48	33 17:00 (1) 18:20	61 16:27 (2) 19:51	20:20	20:47
4	07:46	09:41 (8) 07:31	15:51 (2) 06:56	15:26 (2) 07:07	06:25	06:01
	17:16	62 10:43 (8) 17:49	40 17:00 (1) 18:21	60 16:26 (2) 19:52	20:21	20:48
5	07:46	09:41 (8) 07:30	15:45 (2) 06:54	15:28 (2) 07:06	06:24	06:00
	17:16	63 10:44 (8) 17:50	55 17:01 (1) 18:22	58 16:26 (2) 19:53	20:22	20:48
6	07:46	09:42 (8) 07:29	15:42 (2) 06:53	15:28 (2) 07:04	06:23	06:00
	17:17	62 10:44 (8) 17:51	61 17:01 (1) 18:23	56 16:24 (2) 19:54	20:23	20:49
7	07:46	09:43 (8) 07:28	15:40 (2) 06:51	15:29 (2) 07:03	06:22	06:00
	17:18	62 10:45 (8) 17:53	67 17:02 (1) 18:24	55 16:24 (2) 19:55	20:24	20:50
8	07:46	09:43 (8) 07:27	15:38 (2) 06:50	15:29 (2) 07:01	06:21	06:00
	17:19	62 10:45 (8) 17:54	71 17:02 (1) 18:25	54 16:23 (2) 19:56	20:25	20:50
9	07:46	09:44 (8) 07:26	15:36 (2) 06:48	15:30 (2) 07:00	06:19	05:59
	17:20	61 10:45 (8) 17:55	75 17:02 (1) 18:26	51 16:21 (2) 19:57	20:26	20:51
10	07:46	09:44 (8) 07:25	15:35 (2) 06:47	15:32 (2) 06:58	06:18	05:59
	17:21	61 10:45 (8) 17:56	78 17:03 (1) 18:27	49 16:21 (2) 19:58	20:27	20:51
11	07:45	09:44 (8) 07:24	15:34 (2) 06:45	15:33 (2) 06:56	06:17	05:59
	17:22	61 10:45 (8) 17:57	81 17:03 (1) 18:28	46 16:19 (2) 19:59	20:28	20:52
12	07:45	09:45 (8) 07:22	15:31 (2) 06:44	15:35 (2) 06:55	06:16	05:59
	17:23	61 10:46 (8) 17:58	85 17:13 (9) 18:29	43 16:18 (2) 20:00	20:29	20:52
13	07:45	09:46 (8) 07:21	15:31 (2) 06:42	15:36 (2) 06:53	06:15	05:59
	17:24	60 10:46 (8) 18:00	96 17:18 (9) 18:30	40 16:16 (2) 20:01	20:30	20:53
14	07:45	09:46 (8) 07:20	15:30 (2) 06:40	15:38 (2) 06:52	06:14	05:59
	17:25	59 10:45 (8) 18:01	101 17:21 (9) 18:31	37 16:15 (2) 20:02	20:31	20:53
15	07:44	09:47 (8) 07:19	15:29 (2) 06:39	15:40 (2) 06:51	06:13	05:59
	17:26	59 10:46 (8) 18:02	104 17:22 (9) 18:32	32 16:12 (2) 20:03	20:32	20:54
16	07:44	09:47 (8) 07:18	15:29 (2) 06:37	15:43 (2) 06:49	06:13	05:59
	17:27	58 10:45 (8) 18:03	107 17:24 (9) 18:33	27 16:10 (2) 20:03	20:32	20:54
17	07:44	09:48 (8) 07:16	15:27 (2) 06:36	15:47 (2) 06:48	06:12	05:59
	17:28	57 10:45 (8) 18:04	110 17:24 (9) 18:34	19 16:06 (2) 20:04	20:33	20:54
18	07:43	09:48 (8) 07:15	15:27 (2) 06:34	15:53 (2) 06:46	06:11	05:59
	17:30	57 10:45 (8) 18:05	108 17:24 (9) 18:35	5 15:58 (2) 20:05	20:34	20:55
19	07:43	09:50 (8) 07:14	15:27 (2) 06:33	06:45	06:10	05:59
	17:31	55 10:45 (8) 18:06	106 17:25 (9) 18:36	20:06	20:35	20:55
20	07:42	09:50 (8) 07:13	15:26 (2) 06:31	06:43	06:09	05:59
	17:32	54 10:44 (8) 18:08	104 17:25 (9) 18:37	20:07	20:36	20:55
21	07:42	09:51 (8) 07:11	15:26 (2) 06:29	06:42	06:08	05:59
	17:33	54 10:45 (8) 18:09	99 17:25 (9) 18:38	20:08	20:37	20:56
22	07:41	09:52 (8) 07:10	15:26 (2) 06:28	06:40	06:08	06:00
	17:34	52 10:44 (8) 18:10	86 17:25 (9) 18:39	20:09	20:38	20:56
23	07:41	09:52 (8) 07:09	15:25 (2) 06:26	06:39	06:07	06:00
	17:35	51 10:43 (8) 18:11	85 17:24 (9) 18:40	20:10	20:39	20:56
24	07:40	09:54 (8) 07:07	15:25 (2) 06:25	06:38	06:06	06:00
	17:36	49 10:43 (8) 18:12	85 17:24 (9) 18:41	20:11	20:39	20:56
25	07:39	09:55 (8) 07:06	15:24 (2) 06:23	06:36	06:06	06:00
	17:37	47 10:42 (8) 18:13	83 17:22 (9) 18:42	20:12	20:40	20:56
26	07:39	09:56 (8) 07:04	15:25 (2) 06:21	06:35	06:05	06:01
	17:39	56 16:48 (1) 18:14	81 17:21 (9) 18:43	20:13	20:41	20:56
27	07:38	09:58 (8) 07:03	15:25 (2) 06:20	06:34	06:04	06:01
	17:40	59 16:51 (1) 18:15	78 17:20 (9) 18:44	20:14	20:42	20:56
28	07:37	09:59 (8) 07:02	15:25 (2) 06:18	06:32	06:04	06:01
	17:41	61 16:53 (1) 18:16	72 17:17 (9) 18:45	20:15	20:43	20:56
29	07:36	10:00 (8)	07:17	06:31	06:03	06:02
	17:42	60 16:54 (1)	19:46	20:16	20:43	20:56
30	07:35	10:02 (8)	07:15	06:30	06:03	06:02
	17:43	59 16:56 (1)	19:47	20:17	20:44	20:56
31	07:35	10:04 (8)	07:14	06:29	06:02	
	17:44	57 16:57 (1)	19:48	20:45	444	446
Potential sun hours	302	300	370	396	444	446
Total, worst case	1807	2253	816			
Sun reduction	0,45	0,47	0,49			
Oper. time red.	0,78	0,78	0,78			
Wind dir. red.	0,66	0,62	0,62			
Total reduction	0,23	0,23	0,24			
Total, real	422	517	194			

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 20

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: S - R29

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625 521 486 354 333 434 521 521 556 660 955 868 6.834
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	
1	07:46	11:06 (8) 07:34	07:00	16:09 (2) 07:12	06:29	06:02	
	17:13	58 12:04 (8) 17:46		18:17	56 17:24 (9) 19:49	20:18 20:46	
2	07:46	11:07 (8) 07:33	06:59	16:08 (2) 07:10	06:27	06:01	
	17:14	57 12:04 (8) 17:47		18:18	48 16:56 (2) 19:50	20:19 20:46	
3	07:46	11:08 (8) 07:32	16:54 (1) 06:57	16:09 (2) 07:09	06:26	06:01	
	17:15	56 12:04 (8) 17:48	8 17:02 (1) 18:20	47 16:56 (2) 19:51	20:20	20:47	
4	07:46	11:09 (8) 07:31	16:51 (1) 06:56	16:08 (2) 07:07	06:25	06:01	
	17:16	55 12:04 (8) 17:49	15 17:06 (1) 18:21	47 16:55 (2) 19:52	20:21	20:48	
5	07:46	11:09 (8) 07:30	16:50 (1) 06:54	16:09 (2) 07:06	06:24	06:00	
	17:16	55 12:04 (8) 17:50	18 17:08 (1) 18:22	46 16:55 (2) 19:53	20:22	20:48	
6	07:46	11:10 (8) 07:29	16:48 (1) 06:53	16:09 (2) 07:04	06:23	06:00	
	17:17	53 12:03 (8) 17:51	21 17:09 (1) 18:23	45 16:54 (2) 19:54	20:23	20:49	
7	07:46	11:11 (8) 07:28	16:47 (1) 06:51	16:10 (2) 07:03	06:22	06:00	
	17:18	52 12:03 (8) 17:53	24 17:11 (1) 18:24	44 16:54 (2) 19:55	20:24	20:50	
8	07:46	11:13 (8) 07:27	16:47 (1) 06:50	16:10 (2) 07:01	06:20	06:00	
	17:19	50 12:03 (8) 17:54	25 17:12 (1) 18:25	42 16:52 (2) 19:56	20:25	20:50	
9	07:46	11:14 (8) 07:26	16:46 (1) 06:48	16:11 (2) 07:00	06:19	05:59	
	17:20	49 12:03 (8) 17:55	27 17:13 (1) 18:26	40 16:51 (2) 19:57	20:26	20:51	
10	07:46	11:14 (8) 07:25	16:46 (1) 06:47	16:12 (2) 06:58	06:18	05:59	
	17:21	48 12:02 (8) 17:56	28 17:14 (1) 18:27	38 16:50 (2) 19:58	20:27	20:51	
11	07:45	11:16 (8) 07:24	16:45 (1) 06:45	16:13 (2) 06:56	06:17	05:59	
	17:22	45 12:01 (8) 17:57	29 17:14 (1) 18:28	35 16:48 (2) 19:59	20:28	20:52	
12	07:45	11:17 (8) 07:22	16:44 (1) 06:44	16:15 (2) 06:55	06:16	05:59	
	17:23	44 12:01 (8) 17:58	30 17:14 (1) 18:29	32 16:47 (2) 20:00	20:29	20:52	
13	07:45	11:19 (8) 07:21	16:27 (2) 06:42	16:16 (2) 06:53	06:15	05:59	
	17:24	41 12:00 (8) 18:00	41 17:14 (1) 18:30	29 16:45 (2) 20:01	20:30	20:53	
14	07:45	11:20 (8) 07:20	16:23 (2) 06:40	16:19 (2) 06:52	06:14	05:59	
	17:25	39 11:59 (8) 18:01	51 17:15 (1) 18:31	24 16:43 (2) 20:02	20:31	20:53	
15	07:44	11:22 (8) 07:19	16:20 (2) 06:39	16:21 (2) 06:51	06:13	05:59	
	17:26	36 11:58 (8) 18:02	55 17:15 (1) 18:32	18 16:39 (2) 20:02	20:32	20:54	
16	07:44	11:23 (8) 07:18	16:18 (2) 06:37	16:26 (2) 06:49	06:13	05:59	
	17:27	33 11:56 (8) 18:03	66 17:25 (9) 18:33	8 16:34 (2) 20:03	20:32	20:54	
17	07:44	11:26 (8) 07:16	16:16 (2) 06:36		06:48	06:12 05:59	
	17:28	28 11:54 (8) 18:04	71 17:27 (9) 18:34		20:04	20:33 20:54	
18	07:43	11:29 (8) 07:15	16:15 (2) 06:34		06:46	06:11 05:59	
	17:30	22 11:51 (8) 18:05	73 17:28 (9) 18:35		20:05	20:34 20:55	
19	07:43	11:34 (8) 07:14	16:14 (2) 06:33		06:45	06:10 05:59	
	17:31	13 11:47 (8) 18:06	76 17:30 (9) 18:36		20:06	20:35 20:55	
20	07:42		16:12 (2) 06:31		06:43	06:09 05:59	
	17:32		78 17:30 (9) 18:37		20:07	20:36 20:55	
21	07:42		16:12 (2) 06:29		06:42	06:08 05:59	
	17:33		79 17:31 (9) 18:38		20:08	20:37 20:56	
22	07:41		16:11 (2) 06:28		06:40	06:08 06:00	
	17:34		80 17:31 (9) 18:39		20:09	20:38 20:56	
23	07:41		16:10 (2) 06:26		06:39	06:07 06:00	
	17:35		78 17:30 (9) 18:40		20:10	20:39 20:56	
24	07:40		16:10 (2) 06:25		06:38	06:06 06:00	
	17:36		76 17:31 (9) 18:41		20:11	20:39 20:56	
25	07:39		16:09 (2) 06:23		06:36	06:06 06:00	
	17:37		66 17:29 (9) 18:42		20:12	20:40 20:56	
26	07:39		16:09 (2) 06:21		06:35	06:05 06:01	
	17:39		66 17:29 (9) 18:43		20:13	20:41 20:56	
27	07:38		16:09 (2) 06:20		06:34	06:04 06:01	
	17:40		65 17:28 (9) 18:44		20:14	20:42 20:56	
28	07:37		16:08 (2) 06:18		06:32	06:04 06:01	
	17:41		62 17:26 (9) 18:45		20:15	20:43 20:56	
29	07:36				06:31	06:03 06:02	
	17:42				20:16	20:43 20:56	
30	07:35				06:30	06:03 06:02	
	17:43				20:17	20:44 20:56	
31	07:35					06:02	
	17:44					20:45	
Potential sun hours	302	300	370	396	444	446	
Total, worst case	834	1308	599				
Sun reduction	0,45	0,47	0,49				
Oper. time red.	0,78	0,78	0,78				
Wind dir. red.	0,64	0,63	0,63				
Total reduction	0,23	0,23	0,24				
Total, real	188	301	144				

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 21

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: S - R29

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	July	August	September	October	November	December								
1	06:03	06:25	06:54	07:21	16:54 (2)	06:53								
	20:56	20:39	19:58	19:10	17:25 (2)	17:26								
2	06:03	06:26	06:54	07:22	16:52 (2)	06:54								
	20:56	20:38	19:57	19:08	17:26 (2)	17:25								
3	06:04	06:27	06:55	07:23	16:51 (2)	06:55								
	20:56	20:37	19:55	19:07	17:27 (2)	17:24								
4	06:04	06:28	06:56	07:24	16:49 (2)	06:56								
	20:56	20:36	19:53	19:05	17:28 (2)	17:23								
5	06:05	06:29	06:57	07:25	16:48 (2)	06:57								
	20:56	20:35	19:52	19:04	17:28 (2)	17:21								
6	06:05	06:30	06:58	07:26	16:46 (2)	06:58								
	20:55	20:33	19:50	19:02	17:29 (2)	17:20								
7	06:06	06:31	06:59	07:27	16:45 (2)	06:59								
	20:55	20:32	19:49	19:01	17:29 (2)	17:19								
8	06:06	06:31	07:00	07:28	16:44 (2)	07:00								
	20:55	20:31	19:47	18:59	17:29 (2)	17:18								
9	06:07	06:32	07:01	07:29	16:43 (2)	07:02								
	20:55	20:30	19:46	18:58	17:29 (2)	17:17								
10	06:08	06:33	07:02	07:30	16:43 (2)	07:03								
	20:54	20:29	19:44	18:56	17:29 (2)	17:16								
11	06:08	06:34	07:03	07:31	16:42 (2)	07:04								
	20:54	20:28	19:42	18:54	17:29 (2)	17:16								
12	06:09	06:35	07:03	07:32	16:41 (2)	07:05								
	20:53	20:26	19:41	18:53	17:55 (9)	17:15								
13	06:10	06:36	07:04	07:33	16:41 (2)	07:06								
	20:53	20:25	19:39	18:51	17:58 (9)	17:14								
14	06:10	06:37	07:05	07:34	16:41 (2)	07:07								
	20:53	20:24	19:38	18:50	17:59 (9)	17:13								
15	06:11	06:38	07:06	07:35	16:40 (2)	07:08								
	20:52	20:22	19:36	18:49	18:00 (9)	17:12								
16	06:12	06:39	07:07	07:36	16:40 (2)	07:09								
	20:51	20:21	19:34	18:47	18:01 (9)	17:11								
17	06:13	06:40	07:08	07:37	16:41 (2)	07:10								
	20:51	20:20	19:33	18:46	18:02 (9)	17:11								
18	06:13	06:41	07:09	07:38	16:41 (2)	07:12								
	20:50	20:18	19:31	18:44	18:02 (9)	17:10								
19	06:14	06:42	07:10	07:39	16:42 (2)	07:13								
	20:50	20:17	19:29	18:43	18:02 (9)	17:09								
20	06:15	06:42	07:11	07:40	16:42 (2)	07:14								
	20:49	20:16	19:28	18:41	18:02 (9)	17:09								
21	06:16	06:43	07:12	07:41	16:42 (2)	07:15								
	20:48	20:14	19:26	18:40	18:01 (9)	17:08								
22	06:17	06:44	07:13	07:42	16:43 (2)	07:16								
	20:48	20:13	19:25	18:39	18:00 (9)	17:07								
23	06:17	06:45	07:14	07:43	16:44 (2)	07:17								
	20:47	20:11	19:23	18:37	17:59 (9)	17:07								
24	06:18	06:46	07:14	07:44	16:45 (2)	07:18								
	20:46	20:10	19:21	18:36	17:58 (9)	17:06								
25	06:19	06:47	07:15	06:45	15:46 (2)	07:19								
	20:45	20:09	19:20	17:35	16:56 (9)	17:06								
26	06:20	06:48	07:16	06:46	15:48 (2)	07:20								
	20:44	20:07	19:18	17:33	16:53 (9)	17:05								
27	06:21	06:49	07:17	06:47	15:51 (2)	07:21								
	20:44	20:06	19:16	17:32	16:45 (1)	17:05								
28	06:22	06:50	07:18	17:04 (2)	06:48	15:53 (2)	07:22							
	20:43	20:04	19:15	15	17:19 (2)	17:31	49	16:44 (1)	17:04	39	11:39 (8)	17:10	59	12:02 (8)
29	06:22	06:51	07:19	17:01 (2)	06:49	15:58 (2)	07:23	10:59 (8)	07:45	11:05 (8)				
	20:42	20:03	19:13	21	17:22 (2)	17:30	39	16:44 (1)	17:04	41	11:40 (8)	17:10	59	12:04 (8)
30	06:23	06:52	07:20	16:57 (2)	06:50	16:14 (1)	07:24	10:58 (8)	07:45	11:05 (8)				
	20:41	20:01	19:12	27	17:24 (2)	17:28	30	16:44 (1)	17:04	44	11:42 (8)	17:11	59	12:04 (8)
31	06:24	06:53		06:52		16:14 (1)		07:45						11:06 (8)
	20:40	20:00		17:27	29	16:43 (1)		17:12					58	12:04 (8)
Potential sun hours	454	425	374	347		302		293						
Total, worst case			63	1702		417		1762						
Sun reduction			0,65	0,54		0,50		0,45						
Oper. time red.			0,78	0,78		0,78		0,78						
Wind dir. red.			0,63	0,63		0,63		0,64						
Total reduction			0,32	0,27		0,25		0,23						
Total, real			20	452		104		397						

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 22

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: T - R28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June		
1	07:46 17:13	11:09 (8) 12:10 (8)	07:34 17:46	07:00 18:17	16:12 (2) 17:28 (9)	07:12 19:49	06:29 20:18	06:02 20:46
2	07:46 17:14	11:09 (8) 12:10 (8)	07:33 17:47	06:59 18:18	16:11 (2) 17:25 (9)	07:10 19:50	06:27 20:19	06:01 20:46
3	07:46 17:15	11:10 (8) 12:10 (8)	07:32 17:48	06:57 18:20	16:12 (2) 16:59 (2)	07:09 19:51	06:26 20:20	06:01 20:47
4	07:46 17:16	11:11 (8) 12:10 (8)	07:31 17:49	06:56 18:21	16:11 (2) 16:58 (2)	07:07 19:52	06:25 20:21	06:01 20:48
5	07:46 17:16	11:11 (8) 12:10 (8)	07:30 17:50	16:55 (1) 17:06 (1)	06:54 18:22	06:54 19:53	06:24 20:22	06:00 20:48
6	07:46 17:17	11:12 (8) 12:10 (8)	07:29 17:51	16:53 (1) 17:09 (1)	06:53 18:23	07:04 19:54	06:23 20:23	06:00 20:49
7	07:46 17:18	11:13 (8) 12:10 (8)	07:28 17:53	16:51 (1) 17:11 (1)	06:51 18:24	07:03 19:55	06:22 20:24	06:00 20:50
8	07:46 17:19	11:14 (8) 12:10 (8)	07:27 17:54	16:50 (1) 17:12 (1)	06:50 18:25	07:01 19:56	06:20 20:25	06:00 20:50
9	07:46 17:20	11:16 (8) 12:10 (8)	07:26 17:55	16:49 (1) 17:14 (1)	06:48 18:26	07:00 19:57	06:19 20:26	05:59 20:51
10	07:46 17:21	11:16 (8) 12:09 (8)	07:25 17:56	16:49 (1) 17:15 (1)	06:47 18:27	06:58 19:58	06:18 20:27	05:59 20:51
11	07:45 17:22	11:17 (8) 12:09 (8)	07:24 17:57	16:48 (1) 17:16 (1)	06:45 18:28	06:56 19:59	06:17 20:28	05:59 20:52
12	07:45 17:23	11:18 (8) 12:09 (8)	07:22 17:58	16:47 (1) 17:15 (1)	06:44 18:29	06:55 20:00	06:16 20:29	05:59 20:52
13	07:45 17:24	11:20 (8) 12:08 (8)	07:21 18:00	16:47 (1) 17:16 (1)	06:42 18:30	06:53 20:01	06:15 20:30	05:59 20:53
14	07:45 17:25	11:21 (8) 12:07 (8)	07:20 18:01	16:47 (1) 17:16 (1)	06:40 18:31	06:52 20:02	06:14 20:31	05:59 20:53
15	07:44 17:26	11:23 (8) 12:06 (8)	07:19 18:02	16:31 (2) 17:17 (1)	06:39 18:32	06:51 20:02	06:13 20:32	05:59 20:54
16	07:44 17:27	11:24 (8) 12:05 (8)	07:18 18:03	16:27 (2) 17:17 (1)	06:37 18:33	06:49 20:03	06:13 20:32	05:59 20:54
17	07:44 17:28	11:26 (8) 12:04 (8)	07:16 18:04	16:24 (2) 17:26 (9)	06:36 18:34	06:48 20:04	06:12 20:33	05:59 20:54
18	07:43 17:30	11:27 (8) 12:01 (8)	07:15 18:05	16:22 (2) 17:28 (9)	06:34 18:35	06:46 20:05	06:11 20:34	05:59 20:55
19	07:43 17:31	11:30 (8) 12:00 (8)	07:14 18:06	16:20 (2) 17:30 (9)	06:33 18:36	06:45 20:06	06:10 20:35	05:59 20:55
20	07:42 17:32	11:33 (8) 11:57 (8)	07:13 18:08	16:18 (2) 17:30 (9)	06:31 18:37	06:43 20:07	06:09 20:36	05:59 20:55
21	07:42 17:33	11:38 (8) 11:53 (8)	07:11 18:09	16:17 (2) 17:31 (9)	06:29 18:38	06:42 20:08	06:08 20:37	05:59 20:56
22	07:41 17:34	11:40 (8) 18:10	07:10 18:10	16:16 (2) 17:32 (9)	06:28 18:39	06:40 20:09	06:08 20:38	06:00 20:56
23	07:41 17:35	11:41 (8) 07:09	18:11 16:15 (2)	17:32 (9) 18:40	18:39 16:26	06:39 20:10	06:07 20:39	06:00 20:56
24	07:40 17:36	11:42 (8) 07:07	18:12 16:14 (2)	17:32 (9) 18:41	18:40 16:25	06:38 20:11	06:06 20:39	06:00 20:56
25	07:39 17:37	11:43 (8) 07:06	18:13 16:13 (2)	17:32 (9) 18:42	18:41 16:23	06:36 20:12	06:06 20:40	06:00 20:56
26	07:39 17:39	11:44 (8) 07:04	18:14 16:13 (2)	17:31 (9) 18:43	18:42 16:21	06:35 20:13	06:05 20:41	06:01 20:56
27	07:38 17:40	11:45 (8) 07:03	18:15 16:13 (2)	17:31 (9) 18:44	18:43 16:20	06:34 20:14	06:04 20:42	06:01 20:56
28	07:37 17:41	11:46 (8) 07:02	18:16 16:12 (2)	17:29 (9) 18:45	18:44 16:18	06:32 20:15	06:04 20:43	06:01 20:56
29	07:36 17:42	11:47 (8) 07:01	18:17 16:11 (2)	17:28 (9) 18:46	18:45 16:17	06:31 20:16	06:03 20:43	06:02 20:56
30	07:35 17:43	11:48 (8) 07:00	18:18 16:10 (2)	17:27 (9) 18:47	18:46 16:16	06:30 20:17	06:03 20:44	06:02 20:56
31	07:35 17:44	11:49 (8) 06:59	18:19 16:09 (2)	17:26 (9) 18:48	18:47 16:15	06:29 20:18	06:02 20:45	06:02 20:56
Potential sun hours	302	300	370	396	444	446		
Total, worst case	1000	1164	683					
Sun reduction	0,45	0,47	0,49					
Oper. time red.	0,78	0,78	0,78					
Wind dir. red.	0,64	0,63	0,63					
Total reduction	0,23	0,23	0,24					
Total, real	225	268	165					

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

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

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 10:44 / 23

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: T - R28

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	July	August	September	October	November	December
1	06:03 20:56	06:25 20:39	06:54 19:58	07:21 19:10	06:53 17:31 (2)	07:25 16:43 (1)
2	06:03 20:56	06:26 20:38	06:54 19:57	07:22 19:08	06:54 17:31 (2)	07:26 16:43 (1)
3	06:04 20:56	06:27 20:37	06:55 19:55	07:23 19:07	06:55 17:32 (2)	07:27 16:42 (1)
4	06:04 20:56	06:28 20:36	06:56 19:53	07:24 19:05	06:56 17:33 (2)	07:28 16:40 (1)
5	06:05 20:56	06:29 20:35	06:57 19:52	07:25 19:04	06:57 17:33 (2)	07:29 16:38 (1)
6	06:05 20:55	06:30 20:33	06:58 19:50	07:26 19:02	06:58 17:33 (2)	07:30 16:36 (1)
7	06:06 20:55	06:31 20:32	06:59 19:49	07:27 19:01	06:59 17:33 (2)	07:31 16:35 (1)
8	06:06 20:55	06:31 20:31	07:00 19:47	07:28 18:59	07:00 17:33 (2)	07:32 16:34 (1)
9	06:07 20:55	06:32 20:30	07:01 19:46	07:29 18:58	07:02 17:33 (2)	07:33 16:33 (1)
10	06:08 20:54	06:33 20:29	07:02 19:44	07:30 18:56	07:03 17:33 (2)	07:34 16:32 (1)
11	06:08 20:54	06:34 20:28	07:03 19:42	07:31 18:54	07:04 17:56 (9)	07:35 16:31 (1)
12	06:09 20:53	06:35 20:26	07:03 19:41	07:32 18:53	07:05 17:59 (9)	07:35 16:30 (1)
13	06:10 20:53	06:36 20:25	07:04 19:39	07:33 18:51	07:06 18:01 (9)	07:36 16:29 (1)
14	06:10 20:53	06:37 20:24	07:05 19:38	07:34 18:50	07:07 18:02 (9)	07:37 16:28 (1)
15	06:11 20:52	06:38 20:22	07:06 19:36	07:35 18:49	07:08 18:02 (9)	07:38 16:27 (1)
16	06:12 20:51	06:39 20:21	07:07 19:34	07:36 18:47	07:09 18:03 (9)	07:38 16:26 (1)
17	06:13 20:51	06:40 20:20	07:08 19:33	07:37 18:46	07:10 18:04 (9)	07:39 16:25 (1)
18	06:13 20:50	06:41 20:18	07:09 19:31	07:38 18:44	07:12 18:03 (9)	07:40 16:24 (1)
19	06:14 20:50	06:42 20:17	07:10 19:29	07:39 18:43	07:13 18:03 (9)	07:40 16:23 (1)
20	06:15 20:49	06:42 20:16	07:11 19:28	07:40 18:41	07:14 18:03 (9)	07:41 16:22 (1)
21	06:16 20:48	06:43 20:14	07:12 19:26	07:41 18:40	07:15 18:02 (9)	07:41 16:21 (1)
22	06:17 20:48	06:44 20:13	07:13 19:25	07:42 18:39	07:16 18:01 (9)	07:42 16:20 (1)
23	06:17 20:47	06:45 20:11	07:14 19:23	07:43 18:37	07:17 17:59 (9)	07:42 16:19 (1)
24	06:18 20:46	06:46 20:10	07:14 19:21	07:44 18:36	07:18 17:58 (9)	07:43 16:18 (1)
25	06:19 20:45	06:47 20:09	07:15 19:20	07:45 18:35	07:19 17:57 (9)	07:43 16:17 (1)
26	06:20 20:44	06:48 20:07	07:16 19:18	07:46 17:10 (2)	07:20 17:22 (2)	07:44 16:16 (1)
27	06:21 20:44	06:49 20:06	07:17 19:16	07:47 17:05 (2)	07:21 17:26 (2)	07:44 16:15 (1)
28	06:22 20:43	06:50 20:04	07:18 19:15	07:48 17:02 (2)	07:22 17:28 (2)	07:44 16:14 (1)
29	06:22 20:42	06:51 20:03	07:19 19:13	07:49 17:00 (2)	07:23 17:29 (2)	07:45 16:13 (1)
30	06:23 20:41	06:52 20:01	07:20 19:12	07:50 16:57 (2)	07:24 17:30 (2)	07:45 16:12 (1)
31	06:24 20:40	06:53 20:00		07:52 17:27	07:25 16:44 (1)	07:45 16:11 (1)
Potential sun hours	454	425	374	347	302	293
Total, worst case			121	1644	484	1891
Sun reduction			0,65	0,54	0,50	0,45
Oper. time red.			0,78	0,78	0,78	0,78
Wind dir. red.			0,63	0,63	0,64	0,64
Total reduction			0,32	0,27	0,25	0,23
Total, real			38	437	121	426

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:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 24

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: U - R18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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 17:13 17:14	07:34 17:46 17:47	07:00 18:17 18:18	07:12 19:49 19:50	06:29 20:18 20:19	19:18 (9) 19:37 (9) 19:19 (9)	06:02 20:46 20:46	19:31 (1) 20:56 20:56	19:41 (1) 20:39 20:26	19:39 (1) 20:35 20:26	06:53 19:10 19:08	07:25 17:26 17:25
2	07:46 17:14 17:15	07:33 17:47 17:48	06:57 18:18 18:20	07:09 19:50 19:51	06:26 20:20 20:20	19:21 (9) 19:34 (9) 19:34 (9)	06:01 20:47 20:47	19:32 (1) 20:56 20:56	19:41 (1) 20:38 20:26	19:40 (1) 20:37 20:28	06:55 19:08 19:07	07:23 17:24 17:03
3	07:46 17:16 17:17	07:31 17:49 17:50	06:56 18:21 18:22	07:07 19:52 19:53	06:25 20:21 20:22	19:23 (9) 19:32 (9) 19:46 (1)	06:01 20:48 20:48	19:33 (1) 20:56 20:56	19:42 (1) 20:36 20:23	19:40 (1) 20:36 20:30	06:56 19:05 19:05	07:24 17:23 17:03
4	07:46 17:16 17:17	07:30 17:49 17:51	06:54 18:22 18:23	07:06 19:54 19:54	06:24 20:22 20:23	19:41 (1) 19:46 (1) 19:50 (1)	06:00 20:48 20:49	19:33 (1) 20:56 20:56	19:43 (1) 20:29 20:13	19:40 (1) 20:31 20:23	06:57 19:05 19:05	07:25 17:23 17:03
5	07:46 17:17 17:18	07:29 17:51 17:52	06:53 18:23 18:24	07:04 19:54 19:55	06:23 20:23 20:24	19:37 (1) 19:50 (1) 19:52 (1)	06:00 20:49 20:50	19:34 (1) 20:55 20:55	19:40 (1) 20:30 20:13	19:45 (1) 19:50 (1) 19:59 (1)	06:58 19:04 19:04	07:26 17:20 17:03
6	07:46 17:17 17:19	07:27 17:51 17:54	06:50 18:23 18:25	07:01 19:54 19:56	06:21 20:25 20:25	19:33 (1) 19:54 (1) 19:54 (1)	06:00 20:50 20:50	19:35 (1) 20:55 20:55	19:39 (1) 20:31 20:31	19:35 (9) 19:47 19:47	07:00 19:01 18:59	07:28 17:19 17:03
7	07:46 17:18 17:20	07:27 17:54 17:55	06:48 18:25 18:26	07:00 19:56 19:57	06:19 20:26 20:26	19:32 (1) 19:55 (1) 19:31 (1)	05:59 20:51 20:51	19:36 (1) 20:55 20:55	19:39 (1) 20:32 20:29	19:31 (9) 19:42 19:29	07:01 19:04 19:04	07:29 17:18 17:03
8	07:46 17:20 17:21	07:26 17:55 17:56	06:48 18:26 18:27	07:00 19:57 19:58	06:19 20:26 20:27	19:32 (1) 19:55 (1) 19:31 (1)	05:59 20:51 20:51	19:36 (1) 20:55 20:54	19:39 (1) 20:33 20:29	19:31 (9) 19:42 19:29	07:01 19:04 19:04	07:29 17:18 17:03
9	07:46 17:21 17:22	07:26 17:56 17:57	06:48 18:27 18:28	07:00 19:58 19:59	06:17 20:27 20:28	19:30 (1) 19:55 (1) 19:29 (1)	05:59 20:52 20:52	19:36 (1) 20:54 20:54	19:38 (1) 20:34 20:26	19:28 (9) 19:45 19:45	07:03 19:04 19:04	07:31 17:16 17:03
10	07:46 17:22 17:23	07:26 17:57 17:58	06:45 18:28 18:29	06:56 19:59 20:00	06:16 20:28 20:29	19:29 (1) 19:58 (1) 19:28 (1)	05:59 20:53 20:53	19:37 (1) 20:53 20:53	19:39 (1) 20:35 20:26	19:27 (9) 19:42 19:28	07:03 19:03 19:03	07:32 17:15 17:03
11	07:46 17:23 17:24	07:26 17:58 18:00	06:42 18:29 18:30	06:53 20:00 20:01	06:15 20:30 20:30	19:28 (1) 19:58 (1) 19:28 (1)	05:59 20:53 20:53	19:38 (1) 20:53 20:53	19:38 (1) 20:25 20:16	19:26 (9) 19:46 19:25	07:04 19:39 19:39	07:33 17:14 17:03
12	07:46 17:24 17:25	07:26 18:00 18:01	06:40 18:30 18:31	06:52 20:01 20:02	06:14 20:31 20:31	19:28 (1) 19:58 (1) 19:27 (1)	05:59 20:53 20:53	19:38 (1) 20:53 20:53	19:38 (1) 20:24 20:16	19:25 (9) 19:38 19:25	07:05 19:38 19:38	07:34 17:13 17:03
13	07:46 17:25 17:26	07:26 18:01 18:02	06:39 18:31 18:32	06:51 20:02 20:02	06:13 20:32 20:32	19:27 (1) 19:58 (1) 19:27 (1)	05:59 20:54 20:54	19:39 (1) 20:52 20:52	19:38 (1) 20:22 20:14	19:25 (9) 19:36 19:25	07:06 19:36 19:36	07:35 17:12 17:04
14	07:46 17:26 17:27	07:26 18:02 18:03	06:39 18:32 18:33	06:51 20:02 20:03	06:13 20:32 20:32	19:27 (1) 19:58 (1) 19:27 (1)	05:59 20:54 20:54	19:39 (1) 20:52 20:52	19:38 (1) 20:22 20:14	19:25 (9) 19:36 19:25	07:06 19:36 19:36	07:35 17:12 17:04
15	07:46 17:27 17:28	07:26 18:03 18:04	06:37 18:33 18:34	06:49 20:03 20:04	06:13 20:33 20:33	19:27 (1) 19:58 (1) 19:26 (1)	05:59 20:54 20:54	19:40 (1) 20:51 20:51	19:37 (1) 20:20 20:12	19:25 (9) 19:33 19:25	07:07 19:33 19:33	07:36 17:11 17:04
16	07:46 17:28 17:29	07:26 18:04 18:05	06:36 18:34 18:35	06:48 20:04 20:05	06:12 20:33 19:28 (9)	19:26 (1) 19:58 (1) 19:27 (1)	05:59 20:54 20:55	19:41 (1) 20:51 20:50	19:37 (1) 20:20 20:12	19:25 (9) 19:33 19:25	07:08 19:33 19:33	07:37 17:11 17:04
17	07:46 17:29 17:30	07:26 18:05 18:06	06:34 18:35 18:36	06:46 20:05 20:06	06:11 19:24 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:50	19:37 (1) 20:18 20:10	19:24 (9) 19:31 19:24	07:09 19:31 19:31	07:38 17:10 17:05
18	07:46 17:30 17:31	07:26 18:06 18:07	06:33 18:36 18:37	06:45 20:06 20:07	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
19	07:46 17:31 17:32	07:26 18:07 18:08	06:33 18:37 18:38	06:45 20:07 20:08	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
20	07:46 17:32 17:33	07:26 18:08 18:09	06:33 18:38 18:39	06:45 20:08 20:09	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
21	07:46 17:33 17:34	07:26 18:09 18:10	06:33 18:39 18:40	06:45 20:09 20:10	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
22	07:46 17:34 17:35	07:26 18:10 18:11	06:33 18:40 18:41	06:45 20:10 20:11	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
23	07:46 17:35 17:36	07:26 18:11 18:12	06:33 18:41 18:42	06:45 20:11 20:12	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
24	07:46 17:36 17:37	07:26 18:12 18:13	06:33 18:42 18:43	06:45 20:12 20:13	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
25	07:46 17:37 17:38	07:26 18:13 18:14	06:33 18:43 18:44	06:45 20:13 20:14	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
26	07:46 17:38 17:39	07:26 18:14 18:15	06:33 18:44 18:45	06:45 20:14 20:15	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
27	07:46 17:39 17:40	07:26 18:15 18:16	06:33 18:45 18:46	06:45 20:15 20:16	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
28	07:46 17:40 17:41	07:26 18:16 18:17	06:33 18:46 18:47	06:45 20:16 20:17	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
29	07:46 17:41 17:42	07:26 18:17 18:18	06:33 18:47 18:48	06:45 20:17 20:18	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
30	07:46 17:42 17:43	07:26 18:18 18:19	06:33 18:48 18:49	06:45 20:18 20:19	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
31	07:46 17:43 17:44	07:26 18:19 18:20	06:33 18:49 18:50	06:45 20:19 20:20	06:12 19:23 (9)	19:27 (1) 19:59 (1) 19:27 (1)	05:59 20:55 20:55	19:41 (1) 20:50 20:49	19:37 (1) 20:17 20:09	19:24 (9) 19:29 19:24	07:10 19:31 19:31	07:39 17:09 17:05
Potential sun hours	302	300	370	396	444	803	547	454	425	374	302	293
Total, worst case				240	803	547	866	450				
Sun reduction				0,53	0,59	0,66	0,74	0,73				
Oper. time red.				0,78	0,78	0,78	0,78	0,78				
Wind dir. red.				0,65	0,65	0,65	0,65	0,65				
Total reduction				0,27	0,30	0,34	0,38	0,37				
Total, real				64	242	185	327	167				

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 25

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: V - R05

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:46	07:34	16:04 (2) 07:00	07:12	06:29	06:02	06:03	06:25	06:53	07:21	06:53	15:41 (2) 07:25	
2	17:13	17:46	16:56 (1) 18:17	19:49	20:18	20:46	20:56	20:39	19:58	19:10	17:26	23 16:04 (2) 17:04	
3	07:46	07:33	16:05 (2) 06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	15:40 (2) 07:26	
4	17:14	17:47	16:56 (1) 18:18	19:50	20:19	20:46	20:56	20:38	19:57	19:08	17:25	26 16:06 (2) 17:03	
5	07:46	07:32	16:05 (2) 06:57	07:09	06:26	06:01	06:04	06:27	06:55	07:23	06:55	15:39 (2) 07:27	
6	17:15	17:48	16:55 (1) 18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	28 16:07 (2) 17:03	
7	07:46	07:31	16:06 (2) 06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	15:38 (2) 07:28	
8	17:15	17:49	16:53 (1) 18:21	19:52	20:21	20:48	20:56	20:36	19:53	19:05	17:23	30 16:08 (2) 17:03	
9	07:46	07:30	16:06 (2) 06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	15:37 (2) 07:29	
10	17:16	17:50	16:50 (1) 18:22	19:53	20:22	20:48	20:56	20:35	19:52	19:04	17:21	31 16:08 (2) 17:03	
11	07:46	07:29	16:07 (2) 06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	15:36 (2) 07:30	
12	17:17	17:51	16:38 (2) 18:23	19:54	20:23	20:49	20:55	20:33	19:50	19:02	17:20	41 16:21 (1) 17:03	
13	07:46	07:28	16:08 (2) 06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	15:37 (2) 07:31	
14	17:18	17:53	16:38 (2) 18:24	19:55	20:24	20:50	20:55	20:32	19:49	19:01	17:19	46 16:24 (1) 17:03	
15	07:46	07:27	16:09 (2) 06:50	07:01	06:20	06:00	06:06	06:31	07:00	07:28	07:00	15:36 (2) 07:32	
16	17:19	17:54	16:37 (2) 18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:18	50 16:26 (1) 17:03	
17	07:46	07:26	16:11 (2) 06:48	07:00	06:19	05:59	06:07	06:32	07:01	07:29	07:02	15:36 (2) 07:33	
18	17:20	17:55	16:36 (2) 18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:58	17:17	51 16:27 (1) 17:03	
19	07:46	07:25	16:12 (2) 06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	15:35 (2) 07:34	
20	17:21	17:56	16:35 (2) 18:27	19:58	20:27	20:51	20:54	20:29	19:44	18:56	17:16	52 16:27 (1) 17:03	
21	07:46	07:24	16:14 (2) 06:45	06:56	06:17	05:59	06:08	06:34	07:03	07:31	07:04	15:35 (2) 07:35	
22	17:22	17:57	16:34 (2) 18:28	19:59	20:28	20:52	20:54	20:28	19:42	18:54	17:15	53 16:28 (1) 17:03	
23	07:46	07:22	16:16 (2) 06:44	06:55	06:16	05:59	06:09	06:35	07:03	07:32	07:05	15:36 (2) 07:35	
24	17:23	17:58	16:31 (2) 18:29	20:00	20:29	20:52	20:53	20:26	19:41	18:53	17:15	53 16:29 (1) 17:03	
25	07:46	07:21	16:21 (2) 06:42	06:53	06:15	05:59	06:10	06:36	07:04	07:33	07:06	15:36 (2) 07:36	
26	17:24	16	16:45 (1) 18:00	18:30	20:01	20:30	20:53	20:25	19:39	18:51	17:14	54 16:30 (1) 17:03	
27	07:46	07:20	16:10 (2) 07:20	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	15:37 (2) 07:37	
28	17:25	24	16:47 (1) 18:01	18:31	20:02	20:31	20:53	20:24	19:38	18:50	17:13	54 16:30 (1) 17:03	
29	07:46	07:19	16:09 (2) 07:19	06:39	06:50	06:13	05:59	06:11	06:38	07:06	07:35	15:36 (2) 07:38	
30	17:26	31	16:49 (1) 18:02	18:32	20:02	20:32	20:54	20:22	19:36	18:49	17:12	54 16:30 (1) 17:04	
31	07:46	07:18	16:07 (2) 07:18	06:37	06:49	06:13	05:59	06:12	06:39	07:07	07:36	15:37 (2) 07:38	
32	17:27	36	16:50 (1) 18:03	18:33	20:03	20:32	20:54	20:21	19:34	18:47	17:11	53 16:30 (1) 17:04	
33	07:46	07:17	16:07 (2) 07:16	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	15:38 (2) 07:39	
34	17:28	39	16:51 (1) 18:04	18:34	20:04	20:33	20:54	20:20	19:33	18:46	17:11	53 16:31 (1) 17:04	
35	07:46	07:16	16:06 (2) 07:15	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	15:38 (2) 07:40	
36	17:29	43	16:52 (1) 18:05	18:35	20:05	20:34	20:55	20:20	19:31	18:44	17:10	53 16:31 (1) 17:04	
37	07:46	07:15	16:06 (2) 07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	15:39 (2) 07:40	
38	17:31	45	16:53 (1) 18:06	18:36	20:06	20:35	20:55	20:20	19:29	18:43	17:09	52 16:31 (1) 17:05	
39	07:46	07:14	16:05 (2) 07:13	06:31	06:43	06:09	05:59	06:15	06:42	07:11	07:40	15:40 (2) 07:41	
40	17:32	49	16:54 (1) 18:08	18:37	20:07	20:36	20:55	20:49	19:28	18:41	17:08	51 16:31 (1) 17:05	
41	07:46	07:13	16:05 (2) 07:11	06:29	06:42	06:08	05:59	06:16	06:43	07:12	07:41	15:40 (2) 07:41	
42	17:33	50	16:55 (1) 18:09	18:38	20:08	20:37	20:56	20:48	19:26	18:40	17:08	50 16:30 (1) 17:06	
43	07:46	07:12	16:05 (2) 07:10	06:28	06:40	06:08	06:00	06:17	06:44	07:13	07:42	15:41 (2) 07:42	
44	17:34	51	16:56 (1) 18:10	18:39	20:09	20:38	20:56	20:48	19:25	18:39	17:07	49 16:30 (1) 17:06	
45	07:46	07:11	16:04 (2) 07:09	06:26	06:39	06:07	06:00	06:17	06:45	07:13	07:43	15:43 (2) 07:42	
46	17:35	52	16:56 (1) 18:11	18:40	20:10	20:39	20:56	20:47	19:23	18:37	17:07	47 16:31 (1) 17:07	
47	07:46	07:10	16:04 (2) 07:07	06:25	06:38	06:06	06:00	06:18	06:46	07:14	07:44	15:44 (2) 07:43	
48	17:36	53	16:57 (1) 18:12	18:41	20:11	20:39	20:56	20:46	19:21	18:36	17:06	43 16:30 (1) 17:07	
49	07:46	07:09	16:04 (2) 07:06	06:23	06:36	06:06	06:00	06:19	06:47	07:15	06:45	15:45 (2) 07:43	
50	17:37	53	16:57 (1) 18:13	18:42	20:12	20:40	20:56	20:45	19:20	17:35	17:06	39 16:29 (1) 17:08	
51	07:46	07:08	16:04 (2) 07:04	06:21	06:35	06:05	06:01	06:20	06:48	07:16	06:46	15:46 (2) 07:44	
52	17:38	53	16:57 (1) 18:14	18:43	20:13	20:41	20:56	20:44	19:18	17:33	17:05	36 16:29 (1) 17:08	
53	07:46	07:07	16:04 (2) 07:03	06:20	06:34	06:04	06:01	06:21	06:49	07:17	06:47	15:48 (2) 07:44	
54	17:40	54	16:58 (1) 18:15	18:44	20:14	20:42	20:56	20:44	19:16	17:32	17:05	31 16:28 (1) 17:09	
55	07:46	07:06	16:04 (2) 07:02	06:18	06:32	06:04	06:01	06:22	06:50	07:18	06:48	15:50 (2) 07:44	
56	17:41	54	16:58 (1) 18:16	18:45	20:15	20:43	20:56	20:43	19:15	17:31	17:04	25 16:27 (1) 17:10	
57	07:46	07:05	16:04 (2)	07:17	06:31	06:03	06:02	06:22	06:51	07:19	06:49	15:52 (2) 07:45	
58	17:42	54	16:58 (1)	19:46	20:16	20:43	20:56	20:42	19:13	17:30	9 15:58 (2) 17:04	17 16:25 (1) 17:10	
59	07:46	07:04	16:04 (2)	07:15	06:30	06:03	06:02	06:23	06:52	07:20	06:50	15:45 (2) 07:24	07:45
60	17:43	53	16:57 (1)	19:47	20:17	20:44	20:56	20:41	19:12	17:28	16 16:01 (2) 17:04	17:11	
61	07:46	07:03	16:04 (2)	07:14	06:30	06:02	06:02	06:24	06:53	06:52	15:43 (2)	07:45	
62	17:44	53	16:57 (1)	19:48	20:18	20:45	20:56	20:40	19:12	17:27	20 16:03 (2)	17:12	
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293	
Total, worst case	863	416								45	1245		
Sun reduction	0,45	0,47								0,54	0,50		
Oper. time red.	0,78	0,78								0,78	0,78		
Wind dir. red.	0,62	0,62								0,62	0,62		
Total reduction	0,22	0,23								0,26	0,24		
Total, real	188	95								12	303		

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 26

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: W - R03

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December						
1	07:46	07:34	16:07 (2)	07:00	07:12	06:29	06:02	06:03	06:25	06:53	07:21	06:53	15:41 (2)	07:25				
	17:13	17:46	53	17:00 (1)	18:17	19:49	20:18	20:46	20:56	20:39	19:58	17:26	29	16:10 (2)	17:04			
2	07:46	07:33	16:08 (2)	06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	15:41 (2)	07:26				
	17:14	17:47	51	16:59 (1)	18:18	19:50	20:19	20:46	20:56	20:38	19:57	17:25	30	16:11 (2)	17:03			
3	07:46	07:32	16:08 (2)	06:57	07:09	06:26	06:01	06:04	06:27	06:55	07:23	06:55	15:40 (2)	07:27				
	17:15	17:48	51	16:59 (1)	18:20	19:51	20:20	20:47	20:56	20:37	19:55	17:24	32	16:12 (2)	17:03			
4	07:46	07:31	16:08 (2)	06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	15:39 (2)	07:28				
	17:15	17:49	50	16:58 (1)	18:21	19:52	20:21	20:48	20:56	20:36	19:53	17:23	38	16:22 (1)	17:03			
5	07:46	07:30	16:09 (2)	06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	15:39 (2)	07:29				
	17:16	17:50	47	16:56 (1)	18:22	19:53	20:22	20:48	20:56	20:35	19:52	17:21	45	16:25 (1)	17:03			
6	07:46	07:29	16:09 (2)	06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	15:38 (2)	07:30				
	17:17	17:51	44	16:55 (1)	18:23	19:54	20:23	20:49	20:55	20:33	19:50	17:20	49	16:27 (1)	17:03			
7	07:46	07:28	16:10 (2)	06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	15:39 (2)	07:31				
	17:18	17:53	34	16:50 (1)	18:24	19:55	20:24	20:50	20:55	20:32	19:49	17:19	50	16:29 (1)	17:03			
8	07:46	07:27	16:11 (2)	06:50	07:01	06:20	06:00	06:06	06:31	07:00	07:28	07:00	15:39 (2)	07:32				
	17:19	17:54	31	16:42 (2)	18:25	19:56	20:25	20:50	20:55	20:31	19:47	17:18	51	16:30 (1)	17:03			
9	07:46	07:26	16:12 (2)	06:48	07:00	06:19	05:59	06:07	06:32	07:01	07:29	07:02	15:38 (2)	07:33				
	17:20	17:55	29	16:41 (2)	18:26	19:57	20:26	20:51	20:55	20:30	19:46	17:17	52	16:30 (1)	17:03			
10	07:46	07:25	16:13 (2)	06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	15:38 (2)	07:34				
	17:21	17:56	28	16:41 (2)	18:27	19:58	20:27	20:51	20:54	20:29	19:44	17:16	53	16:31 (1)	17:03			
11	07:45	07:24	16:14 (2)	06:45	06:56	06:17	05:59	06:08	06:34	07:03	07:31	07:04	15:38 (2)	07:35				
	17:22	17:57	26	16:40 (2)	18:28	19:59	20:28	20:52	20:54	20:28	19:42	17:15	53	16:31 (1)	17:03			
12	07:45	07:22	16:15 (2)	06:44	06:55	06:16	05:59	06:09	06:35	07:03	07:32	07:05	15:40 (2)	07:35				
	17:23	17:58	23	16:38 (2)	18:29	20:00	20:29	20:52	20:53	20:26	19:41	17:15	52	16:32 (1)	17:03			
13	07:45	07:21	16:17 (2)	06:42	06:53	06:15	05:59	06:10	06:36	07:04	07:33	07:06	15:40 (2)	07:36				
	17:24	18:00	20	16:37 (2)	18:30	20:01	20:30	20:53	20:53	20:25	19:39	17:14	52	16:32 (1)	17:03			
14	07:45	07:20	16:19 (2)	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	07:07	15:40 (2)	07:37				
	17:25	18:01	15	16:34 (2)	18:31	20:02	20:31	20:53	20:53	20:24	19:38	17:13	52	16:32 (1)	17:03			
15	07:44	07:19	16:24 (2)	06:39	06:50	06:13	05:59	06:11	06:38	07:06	07:35	07:08	15:40 (2)	07:38				
	17:26	18:02	7	16:31 (2)	18:32	20:02	20:32	20:54	20:52	20:22	19:36	17:12	52	16:32 (1)	17:04			
16	07:44	16:40 (1)	07:18	06:37	06:49	06:13	05:59	06:12	06:39	07:07	07:36	07:09	15:41 (2)	07:38				
	17:27	8	16:48 (1)	18:03	18:33	20:03	20:32	20:54	20:51	20:21	19:34	17:11	51	16:32 (1)	17:04			
17	07:44	16:16 (2)	07:16	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	07:10	15:43 (2)	07:39				
	17:28	22	16:51 (1)	18:04	18:34	20:04	20:33	20:54	20:51	20:20	19:33	17:11	50	16:33 (1)	17:04			
18	07:43	16:14 (2)	07:15	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	07:12	15:43 (2)	07:40				
	17:29	29	16:52 (1)	18:05	18:35	20:05	20:34	20:55	20:50	20:18	19:31	17:10	50	16:33 (1)	17:04			
19	07:43	16:13 (2)	07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	07:13	15:44 (2)	07:40				
	17:31	35	16:54 (1)	18:06	18:36	20:06	20:35	20:55	20:50	20:17	19:29	17:09	48	16:32 (1)	17:05			
20	07:42	16:11 (2)	07:13	06:31	06:43	06:09	05:59	06:15	06:42	07:11	07:40	07:14	15:45 (2)	07:41				
	17:32	40	16:55 (1)	18:08	18:37	20:07	20:36	20:55	20:49	20:16	19:28	17:08	47	16:32 (1)	17:05			
21	07:42	16:11 (2)	07:11	06:29	06:42	06:08	05:59	06:16	06:43	07:12	07:41	07:15	15:46 (2)	07:41				
	17:33	43	16:56 (1)	18:09	18:38	20:08	20:37	20:56	20:48	20:14	19:26	17:08	43	16:31 (1)	17:06			
22	07:41	16:10 (2)	07:10	06:28	06:40	06:08	06:00	06:17	06:44	07:13	07:42	07:16	15:47 (2)	07:42				
	17:34	47	16:57 (1)	18:10	18:39	20:09	20:38	20:56	20:48	20:13	19:25	17:07	40	16:31 (1)	17:06			
23	07:41	16:09 (2)	07:09	06:26	06:39	06:07	06:00	06:17	06:45	07:13	07:43	07:17	15:50 (2)	07:42				
	17:35	48	16:57 (1)	18:11	18:40	20:10	20:39	20:56	20:47	20:11	19:23	17:07	35	16:31 (1)	17:07			
24	07:40	16:09 (2)	07:07	06:25	06:38	06:06	06:00	06:18	06:46	07:14	07:44	07:18	15:52 (2)	07:43				
	17:36	50	16:59 (1)	18:12	18:41	20:11	20:39	20:56	20:46	20:10	19:21	17:06	29	16:30 (1)	17:07			
25	07:39	16:09 (2)	07:06	06:23	06:36	06:06	06:00	06:19	06:47	07:15	06:45	07:19	15:54 (2)	07:43				
	17:37	50	16:59 (1)	18:13	18:42	20:12	20:40	20:56	20:45	20:09	19:20	17:06	22	16:29 (1)	17:08			
26	07:39	16:08 (2)	07:04	06:21	06:35	06:05	06:01	06:20	06:48	07:16	06:46	07:20	16:19 (1)	07:44				
	17:39	51	16:59 (1)	18:14	18:43	20:13	20:41	20:56	20:44	20:07	19:18	17:05	8	16:27 (1)	17:08			
27	07:38	16:08 (2)	07:03	06:20	06:34	06:04	06:01	06:21	06:49	07:17	06:47	15:52 (2)	07:21	16:23 (1)	07:44			
	17:40	52	17:00 (1)	18:15	18:44	20:14	20:42	20:56	20:44	20:06	19:16	17:32	10	16:02 (2)	17:05	2	16:24 (1)	17:09
28	07:37	16:08 (2)	07:02	06:18	06:32	06:04	06:01	06:22	06:50	07:18	06:48	15:48 (2)	07:22	07:44				
	17:41	52	17:00 (1)	18:16	18:45	20:15	20:43	20:56	20:43	20:04	19:15	17:31	17	16:05 (2)	17:04	17:10		
29	07:36	16:08 (2)		07:17	06:31	06:03	06:02	06:22	06:51	07:19	06:49	15:46 (2)	07:23	07:45				
	17:42	52	17:00 (1)		19:46	20:16	20:43	20:56	20:42	20:03	19:13	17:30	21	16:07 (2)	17:04	17:10		
30	07:35	16:08 (2)		07:15	06:30	06:03	06:02	06:23	06:52	07:20	06:50	15:44 (2)	07:24	07:45				
	17:43	52	17:00 (1)		19:47	20:17	20:44	20:56	20:41	20:01	19:12	17:28	24	16:08 (2)	17:04	17:11		
31	07:35	16:07 (2)		07:14	06:30	06:02	06:02	06:24	06:53	07:21	06:52	15:43 (2)		07:45				
	17:44	53	17:00 (1)		19:48	20:18	20:45	20:57	20:40	20:00	17:27	26	16:09 (2)	17:12				
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	1115	293					
Total, worst case	684	509									98	1115						
Sun reduction	0,45	0,47									0,54	0,50						
Oper. time red.	0,78	0,78									0,78	0,78						
Wind dir. red.	0,62	0,62									0,62	0,62						
Total reduction	0,22	0,23									0,26	0,24						
Total, real	149	116									26	272						

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:

Villamassargia WindPro

Printed/Page

20/04/2022 10:44 / 27

Licensed user:

Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: X - R02

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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	07:34	07:00	07:12	06:29	19:34 (1)	06:02	06:03	06:25	19:43 (1)	06:54	07:21	06:53	07:25						
	17:13	17:46	18:17	19:49	20:18	19:55 (1)	20:46	20:56	20:39	24	20:07 (1)	19:58	19:10	17:26	17:04					
2	07:46	07:33	06:59	07:10	06:27	19:33 (1)	06:01	06:03	06:26	19:43 (1)	06:54	07:22	06:54	07:26						
	17:14	17:47	18:18	19:50	20:19	19:57 (1)	20:46	20:56	20:38	25	20:08 (1)	19:57	19:08	17:25	17:03					
3	07:46	07:32	06:57	07:09	06:26	19:33 (1)	06:01	06:04	06:27	19:42 (1)	06:55	07:23	06:55	07:27						
	17:15	17:48	18:20	19:51	20:20	19:58 (1)	20:47	20:56	20:37	26	20:08 (1)	19:55	19:07	17:24	17:03					
4	07:46	07:31	06:56	07:07	06:25	19:32 (1)	06:01	06:04	06:28	19:42 (1)	06:56	07:24	06:56	07:28						
	17:16	17:49	18:21	19:52	20:21	19:59 (1)	20:48	20:56	20:36	27	20:09 (1)	19:53	19:05	17:23	17:03					
5	07:46	07:30	06:54	07:06	06:24	19:32 (1)	06:00	06:05	06:29	19:42 (1)	06:57	07:25	06:57	07:29						
	17:16	17:50	18:22	19:53	20:22	19:59 (1)	20:48	20:56	20:35	27	20:09 (1)	19:52	19:04	17:21	17:03					
6	07:46	07:29	06:53	07:04	06:23	19:32 (1)	06:00	06:05	06:30	19:42 (1)	06:58	07:26	06:58	07:30						
	17:17	17:51	18:23	19:54	20:23	19:59 (1)	20:49	20:55	20:33	27	20:09 (1)	19:50	19:02	17:20	17:03					
7	07:46	07:28	06:51	07:03	06:22	19:32 (1)	06:00	06:06	06:31	19:42 (1)	06:59	07:27	06:59	07:31						
	17:18	17:53	18:24	19:55	20:24	19:59 (1)	20:50	20:55	20:32	27	20:09 (1)	19:49	19:01	17:19	17:03					
8	07:46	07:27	06:50	07:01	06:21	19:32 (1)	06:00	06:06	06:31	19:42 (1)	07:00	07:28	07:00	07:32						
	17:19	17:54	18:25	19:56	20:25	19:59 (1)	20:50	20:55	20:31	27	20:09 (1)	19:47	18:59	17:18	17:03					
9	07:46	07:26	06:48	07:00	06:19	19:33 (1)	05:59	06:07	06:32	19:41 (1)	07:01	07:29	07:01	07:33						
	17:20	17:55	18:26	19:57	20:26	19:59 (1)	20:51	20:55	20:30	26	20:07 (1)	19:46	18:58	17:17	17:03					
10	07:46	07:25	06:47	06:58	06:18	19:33 (1)	05:59	06:08	06:33	19:41 (1)	07:02	07:30	07:03	07:34						
	17:21	17:56	18:27	19:58	20:27	19:59 (1)	20:51	20:54	20:29	25	20:06 (1)	19:44	18:56	17:16	17:03					
11	07:45	07:24	06:45	06:56	06:17	19:33 (1)	05:59	06:08	06:34	19:42 (1)	07:03	07:31	07:04	07:35						
	17:22	17:57	18:28	19:59	20:28	19:58 (1)	20:52	20:54	20:28	23	20:05 (1)	19:42	18:54	17:16	17:03					
12	07:45	07:22	06:44	06:55	06:16	19:34 (1)	05:59	06:09	06:35	19:42 (1)	07:03	07:32	07:05	07:35						
	17:23	17:58	18:29	20:00	20:29	19:58 (1)	20:52	20:53	20:26	22	20:04 (1)	19:41	18:53	17:15	17:03					
13	07:45	07:21	06:42	06:53	06:15	19:34 (1)	05:59	06:10	06:36	19:43 (1)	07:04	07:33	07:06	07:36						
	17:24	18:00	18:30	20:01	20:30	19:57 (1)	20:53	20:53	20:25	20	20:03 (1)	19:39	18:51	17:14	17:03					
14	07:45	07:20	06:40	06:52	8	19:31 (9)	06:14	06:10	06:37	19:44 (1)	07:05	07:34	07:07	07:37						
	17:25	18:01	18:31	20:01	8	19:39 (9)	20:31	20:52	20:24	18	20:02 (1)	19:37	18:50	17:13	17:03					
15	07:44	07:19	06:39	06:51	19:29 (9)	06:13	06:13	06:11	06:38	18	20:01 (1)	07:06	07:35	07:08	07:38					
	17:26	18:02	18:32	20:02	12	19:41 (9)	20:32	20:52	20:22	16	20:01 (1)	19:36	18:49	17:12	17:04					
16	07:44	07:18	06:37	06:49	19:26 (9)	06:13	06:13	06:12	06:39	19:35 (9)	07:07	07:36	07:09	07:38						
	17:27	18:03	18:33	20:03	16	19:42 (9)	20:32	20:51	20:21	21	19:59 (1)	19:34	18:47	17:11	17:04					
17	07:44	07:16	06:36	06:48	19:26 (9)	06:12	06:12	06:13	06:40	19:33 (9)	07:08	07:37	07:10	07:39						
	17:28	18:04	18:34	20:04	17	19:43 (9)	20:33	20:51	20:20	21	19:58 (1)	19:33	18:46	17:11	17:04					
18	07:43	07:15	06:34	06:46	19:24 (9)	06:11	06:11	06:13	06:41	19:30 (9)	07:09	07:38	07:12	07:40						
	17:30	18:05	18:35	20:05	19	19:43 (9)	20:34	20:50	20:18	16	19:46 (9)	19:31	18:44	17:10	17:05					
19	07:43	07:14	06:33	06:45	19:24 (9)	06:10	06:10	06:14	06:42	19:29 (9)	07:10	07:39	07:13	07:40						
	17:31	18:06	18:36	20:06	19	19:43 (9)	20:35	20:50	20:17	18	19:47 (9)	19:29	18:43	17:09	17:05					
20	07:42	07:13	06:31	06:43	19:24 (9)	06:09	06:09	06:15	06:43	19:29 (9)	07:11	07:40	07:14	07:41						
	17:32	18:08	18:37	20:07	20	19:44 (9)	20:36	20:55	20:16	18	19:47 (9)	19:28	18:41	17:09	17:05					
21	07:42	07:11	06:29	06:42	19:23 (9)	06:08	06:08	06:16	06:43	19:28 (9)	07:12	07:41	07:15	07:41						
	17:33	18:09	18:38	20:08	20	19:43 (9)	20:37	20:55	20:14	20	19:48 (9)	19:26	18:40	17:08	17:06					
22	07:41	07:10	06:28	06:40	19:23 (9)	06:08	06:08	06:17	06:44	19:28 (9)	07:13	07:42	07:16	07:42						
	17:34	18:10	18:39	20:09	20	19:43 (9)	20:38	20:56	20:13	20	19:48 (9)	19:25	18:39	17:07	17:06					
23	07:40	07:09	06:26	06:39	19:23 (9)	06:07	06:07	06:17	06:45	19:28 (9)	07:13	07:43	07:17	07:42						
	17:35	18:11	18:40	20:10	19	19:42 (9)	20:39	20:56	20:11	20	19:48 (9)	19:23	18:37	17:07	17:07					
24	07:40	07:07	06:25	06:38	19:24 (9)	06:06	06:06	06:18	06:46	19:28 (9)	07:14	07:44	07:18	07:43						
	17:36	18:12	18:41	20:11	17	19:41 (9)	20:39	20:56	20:10	19	19:47 (9)	19:21	18:36	17:06	17:07					
25	07:39	07:06	06:23	06:36	19:25 (9)	06:06	06:06	06:19	06:47	19:28 (9)	07:15	07:45	07:19	07:43						
	17:37	18:13	18:42	20:12	15	19:40 (9)	20:40	20:56	20:45	8	20:00 (1)	20:09	19:19	17:47	17:08					
26	07:39	07:04	06:21	06:35	19:26 (9)	06:05	06:05	06:20	06:48	19:28 (9)	07:16	07:46	07:20	07:44						
	17:39	18:14	18:43	20:13	23	19:52 (1)	20:41	20:56	20:44	13	20:02 (1)	20:07	17:19	17:33	17:05	17:08				
27	07:38	07:03	06:20	06:34	19:27 (9)	06:04	06:04	06:21	06:49	19:48 (1)	06:49	07:17	07:47	07:21	07:44					
	17:40	18:15	18:44	20:14	22	19:52 (1)	20:42	20:56	20:43	15	20:03 (1)	20:06	16	19:44 (9)	19:16	17:32	17:05	17:09		
28	07:37	07:02	06:18	06:32	19:37 (1)	06:04	06:04	06:22	06:50	19:47 (1)	06:50	07:18	07:48	07:22	07:44					
	17:41	18:16	18:45	20:15	16	19:53 (1)	20:43	20:56	20:43	18	20:05 (1)	20:04	12	19:42 (9)	19:15	17:31	17:05	17:10		
29	07:36		07:17	06:31	19:36 (1)	06:03	06:03	06:22	06:51	19:46 (1)	06:51	07:19	07:49	07:23	07:45					
	17:42		19:46	20:16	18	19:54 (1)	20:43	20:56	20:42	20	20:06 (1)	20:03	8	19:40 (9)	19:13	17:30	17:04	17:11		
30	07:35		07:15	06:30	19:35 (1)	06:03	06:03	06:23	06:52	19:45 (1)	06:52	07:20	07:50	07:24	07:45					
	17:43		19:47	20:17	20	19:55 (1)	20:44	20:56	20:41	22	20:07 (1)	20:01	19:12	17:28	17:04	17:11	17:11	17:11		
31	07:35		07:14		06:02			06:24	06:53	19:45 (1)	06:53		06:51	07:45	07:45					
	17:44		19:48		20:45			20:40	20:00	23	20:08 (1)		17:27	17:12	17:12	17:12	17:12	17:12		
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293								
Total, worst case				301	417			605												
Sun reduction				0,53	0,59			0,73												
Oper. time red.				0,78	0,78			0,78												
Wind dir. red.				0,65	0,65			0,65												
Total reduction				0,27	0,30			0,37												
Total, real				81	124			44												

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 28

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: Y - R10

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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 17:13	07:34 17:46	07:00 18:17	07:12 19:49	06:29 20:18	19:30 (9) 20:46	06:02 20:56	06:03 20:56	06:25 20:39	19:51 (1) 20:15 (1)	06:53 19:58	07:21 19:10	06:53 17:26
2	07:46 17:14	07:33 17:47	06:59 18:18	07:10 19:50	06:27 20:19	19:32 (9) 20:46	06:01 20:56	06:03 20:56	06:26 20:38	19:51 (1) 20:14 (1)	06:54 19:57	07:22 19:08	06:54 17:25
3	07:46 17:15	07:32 17:48	06:57 18:20	07:09 19:51	06:26 20:20	19:34 (9) 20:47	06:01 20:56	06:04 20:56	06:27 20:37	19:52 (1) 20:14 (1)	06:55 19:55	07:23 19:07	06:55 17:24
4	07:46 17:16	07:31 17:49	06:56 18:21	07:07 19:52	06:25 20:21	19:48 (1) 20:48	06:01 20:56	06:04 20:56	06:28 20:36	19:52 (1) 20:13 (1)	06:56 19:53	07:24 19:05	06:56 17:23
5	07:46 17:16	07:30 17:50	06:54 18:22	07:06 19:53	06:24 20:22	19:46 (1) 20:48	06:00 20:56	06:05 20:56	06:29 20:35	19:53 (1) 20:12 (1)	06:57 19:52	07:25 19:04	06:57 17:21
6	07:46 17:17	07:29 17:51	06:53 18:23	07:04 19:54	06:23 20:23	19:45 (1) 20:49	06:00 20:55	06:05 20:55	06:30 20:33	19:54 (1) 20:11 (1)	06:58 19:50	07:26 19:02	06:58 17:20
7	07:46 17:18	07:28 17:53	06:51 18:24	07:03 19:55	06:22 20:24	19:44 (1) 20:50	06:00 20:55	06:06 20:55	06:31 20:32	19:55 (1) 20:10 (1)	06:59 19:49	07:27 19:01	06:59 17:19
8	07:46 17:19	07:27 17:54	06:50 18:25	07:01 19:56	06:21 20:25	19:43 (1) 20:50	06:00 20:55	06:06 20:55	06:31 20:31	19:57 (1) 20:09 (1)	07:00 19:47	07:28 18:59	07:00 17:18
9	07:46 17:20	07:26 17:55	06:48 18:26	07:00 19:57	06:19 20:26	19:42 (1) 20:51	06:07 20:55	06:07 20:55	06:32 20:30	19:46 (9) 20:07 (1)	07:01 19:46	07:29 18:58	07:01 17:17
10	07:46 17:21	07:25 17:56	06:47 18:27	06:58 19:58	06:18 20:27	19:42 (1) 20:51	06:08 20:54	06:08 20:54	06:33 20:29	19:42 (9) 19:51 (9)	07:02 19:44	07:30 18:56	07:03 17:16
11	07:45 17:22	07:24 17:57	06:45 18:28	06:56 19:59	06:17 20:28	19:41 (1) 20:52	06:08 20:54	06:08 20:54	06:34 20:28	19:40 (9) 19:53 (9)	07:03 19:42	07:31 18:54	07:04 17:16
12	07:45 17:23	07:22 17:58	06:44 18:29	06:55 20:00	06:16 20:29	19:41 (1) 20:52	06:09 20:53	06:09 20:53	06:35 20:26	19:39 (9) 19:54 (9)	07:03 19:41	07:32 18:53	07:05 17:15
13	07:45 17:24	07:21 18:00	06:42 18:30	06:53 20:01	06:15 20:30	19:41 (1) 20:53	06:10 20:53	06:10 20:53	06:36 20:25	19:38 (9) 20:05 (1)	07:04 19:39	07:33 18:51	07:06 17:14
14	07:45 17:25	07:20 18:01	06:40 18:31	06:52 20:01	06:14 20:31	19:40 (1) 20:53	06:10 20:52	06:10 20:52	06:37 20:24	19:37 (9) 19:55 (9)	07:05 19:37	07:34 18:50	07:07 17:13
15	07:44 17:26	07:19 18:02	06:39 18:32	06:51 20:02	06:13 20:32	19:40 (1) 20:54	06:11 20:51	06:11 20:51	06:38 20:22	19:37 (9) 19:55 (9)	07:06 19:36	07:35 18:49	07:08 17:12
16	07:44 17:27	07:18 18:03	06:37 18:33	06:49 20:03	06:13 20:32	19:40 (1) 20:54	06:12 20:51	06:12 20:51	06:39 20:21	19:36 (9) 19:56 (9)	07:07 19:34	07:36 18:47	07:09 17:11
17	07:44 17:28	07:16 18:04	06:36 18:34	06:48 20:04	06:12 20:33	19:40 (1) 20:54	06:13 20:51	06:13 20:51	06:40 20:20	19:35 (9) 19:56 (9)	07:08 19:33	07:37 18:46	07:10 17:11
18	07:43 17:30	07:15 18:05	06:34 18:35	06:46 20:05	06:11 20:34	19:41 (1) 20:55	06:13 20:50	06:13 20:50	06:41 20:18	19:35 (9) 19:54 (9)	07:09 19:31	07:38 18:44	07:12 17:10
19	07:43 17:31	07:14 18:06	06:33 18:36	06:45 20:06	06:10 20:35	19:41 (1) 20:55	06:14 20:50	06:14 20:50	06:42 20:17	19:35 (9) 19:54 (9)	07:10 19:29	07:39 18:43	07:13 17:09
20	07:42 17:32	07:13 18:08	06:31 18:37	06:43 20:07	06:09 20:36	19:35 (9) 20:55	06:09 20:49	06:15 20:49	06:43 20:16	19:36 (9) 19:53 (9)	07:11 19:28	07:40 18:41	07:14 17:09
21	07:42 17:33	07:11 18:09	06:29 18:38	06:42 20:08	06:08 20:37	19:33 (9) 20:55	06:08 20:48	06:16 20:48	06:43 20:14	19:37 (9) 19:52 (9)	07:12 19:26	07:41 18:40	07:15 17:08
22	07:41 17:34	07:10 18:10	06:28 18:39	06:40 20:09	06:08 20:38	19:32 (9) 20:56	06:08 20:48	06:17 20:48	06:44 20:13	19:38 (9) 19:51 (9)	07:13 19:25	07:42 18:39	07:16 17:07
23	07:40 17:35	07:09 18:11	06:26 18:40	06:39 20:10	06:07 20:39	19:30 (9) 20:56	06:07 20:47	06:17 20:47	06:45 20:11	19:39 (9) 19:49 (9)	07:13 19:23	07:43 18:37	07:17 17:07
24	07:40 17:36	07:07 18:12	06:25 18:41	06:38 20:11	06:06 20:39	19:30 (9) 20:56	06:06 20:46	06:18 20:46	06:46 20:10	19:52 (1) 20:16 (1)	06:46 19:21	07:44 18:36	07:18 17:06
25	07:39 17:37	07:06 18:13	06:23 18:42	06:36 20:12	06:06 20:40	19:29 (9) 20:56	06:06 20:45	06:19 20:45	06:47 20:09	19:52 (1) 20:17 (1)	06:47 19:20	07:15 17:35	07:19 17:06
26	07:38 17:38	07:04 18:14	06:21 18:43	06:35 20:13	06:05 20:41	19:29 (9) 20:56	06:05 20:44	06:20 20:44	06:48 20:07	19:51 (1) 20:16 (1)	06:48 19:18	07:16 17:33	07:20 17:05
27	07:38 17:40	07:03 18:15	06:20 18:44	06:34 20:14	06:04 20:42	19:29 (9) 20:56	06:04 20:43	06:21 20:43	06:49 20:06	19:51 (1) 20:17 (1)	06:49 19:16	07:17 17:32	07:21 17:05
28	07:37 17:41	07:02 18:16	06:18 18:45	06:32 20:15	06:04 20:43	19:29 (9) 20:56	06:04 20:43	06:22 20:43	06:50 20:04	19:51 (1) 20:17 (1)	06:50 19:15	07:18 17:31	07:22 17:05
29	07:36 17:42	07:01 18:46	06:17 19:46	06:31 20:16	06:03 20:43	19:29 (9) 20:56	06:03 20:42	06:22 20:42	06:51 20:03	19:51 (1) 20:17 (1)	06:51 19:13	07:19 17:30	07:23 17:04
30	07:35 17:43	07:00 19:47	06:15 20:17	06:30 20:44	06:03 20:44	19:30 (9) 20:56	06:03 20:44	06:23 20:41	06:52 20:01	19:51 (1) 20:17 (1)	06:52 19:12	07:20 17:28	07:24 17:04
31	07:35 17:44	07:00 19:48	06:14 20:17	06:30 20:44	06:03 20:45	19:30 (9) 20:56	06:03 20:45	06:23 20:40	06:52 20:00	19:51 (1) 20:17 (1)	06:53 19:12	07:21 17:27	07:25 17:12
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293	
Total, worst case				189	582		386	387					
Sun reduction				0,53	0,59		0,74	0,73					
Oper. time red.				0,78	0,78		0,78	0,78					
Wind dir. red.				0,65	0,65		0,66	0,65					
Total reduction				0,27	0,30		0,38	0,37					
Total, real				50	176		146	144					

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:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 29

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: Z - R06

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELIMA 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
625 521 486 354 333 434 521 521 556 660 955 868 6.834
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	07:34	07:00	07:12	06:29	19:28 (1)	06:02	19:50 (2)	06:03	19:52 (2)	06:25	06:53	07:21	06:53	07:25			
	17:13	17:46	18:17	19:49	20:18	6 19:34 (1)	20:46	20	20:10 (2)	20:56	20	19:58	19:10	17:26	17:04			
2	07:46	07:33	06:59	07:10	06:27	06:01	06:27	19:50 (2)	06:03	19:53 (2)	06:26	06:54	07:22	06:54	07:26			
	17:14	17:47	18:18	19:50	20:19	20:46	21	20:11 (2)	20:56	28	20:21 (2)	20:38	19:57	19:08	17:25	17:03		
3	07:46	07:32	06:57	07:09	06:26	06:01	06:26	19:50 (2)	06:04	19:53 (2)	06:27	06:55	07:23	06:55	07:27			
	17:15	17:48	18:20	19:51	20:20	20:47	22	20:12 (2)	20:56	27	20:20 (2)	20:37	19:55	19:07	17:24	17:03		
4	07:46	07:31	06:56	07:07	06:25	06:01	06:25	19:49 (2)	06:04	19:54 (2)	06:28	06:56	07:24	06:56	07:28			
	17:16	17:49	18:21	19:52	20:21	20:48	24	20:13 (2)	20:56	27	20:21 (2)	20:36	19:53	19:05	17:23	17:03		
5	07:46	07:30	06:54	07:06	06:24	06:00	06:24	19:48 (2)	06:05	19:54 (2)	06:29	06:57	07:25	06:57	07:29			
	17:16	17:50	18:22	19:53	20:22	20:48	25	20:13 (2)	20:56	26	20:20 (2)	20:35	19:52	19:04	17:21	17:03		
6	07:46	07:29	06:53	07:04	06:23	06:00	06:23	19:48 (2)	06:05	19:54 (2)	06:30	06:58	07:26	06:58	07:30			
	17:17	17:51	18:23	19:54	20:23	20:49	26	20:14 (2)	20:55	26	20:20 (2)	20:33	19:50	19:02	17:20	17:03		
7	07:46	07:28	06:51	07:03	06:22	06:00	06:22	19:48 (2)	06:06	19:55 (2)	06:31	06:59	07:27	06:59	07:31			
	17:18	17:53	18:24	19:55	20:24	20:50	27	20:15 (2)	20:55	26	20:21 (2)	20:32	19:49	19:01	17:19	17:03		
8	07:46	07:27	06:50	07:01	06:20	06:00	06:20	19:49 (2)	06:05	19:55 (2)	06:31	07:00	07:28	07:00	07:32			
	17:19	17:54	18:25	19:56	20:25	20:50	27	20:16 (2)	20:55	25	20:20 (2)	20:31	19:47	18:59	17:18	17:03		
9	07:46	07:26	06:48	07:00	06:19	06:59	06:19	19:48 (2)	06:07	19:56 (2)	06:32	07:01	07:29	07:01	07:33			
	17:20	17:55	18:26	19:57	20:26	20:51	27	20:15 (2)	20:55	24	20:20 (2)	20:30	19:46	18:58	17:17	17:03		
10	07:46	07:25	06:47	06:58	06:18	06:59	06:18	19:48 (2)	06:08	19:57 (2)	06:33	07:02	07:30	07:03	07:34			
	17:21	17:56	18:27	19:58	20:27	20:51	28	20:16 (2)	20:54	22	20:19 (2)	20:29	19:44	18:56	17:16	17:03		
11	07:45	07:24	06:45	06:56	06:17	06:59	06:17	19:48 (2)	06:08	19:58 (2)	06:34	07:03	07:31	07:04	07:35			
	17:22	17:57	18:28	19:59	20:28	20:52	28	20:16 (2)	20:54	21	20:19 (2)	20:28	19:42	18:54	17:16	17:03		
12	07:45	07:22	06:44	06:55	06:16	06:59	06:16	19:48 (2)	06:09	19:59 (2)	06:35	07:03	07:32	07:05	07:35			
	17:23	17:58	18:29	20:00	20:29	20:52	29	20:17 (2)	20:53	19	20:18 (2)	20:26	8 19:44 (1)	19:41	18:53	17:15	17:03	
13	07:45	07:21	06:42	06:53	06:15	06:59	06:15	19:48 (2)	06:10	19:59 (2)	06:36	07:05	07:33	07:06	07:36			
	17:24	18:00	18:30	20:01	20:30	20:53	29	20:17 (2)	20:53	18	20:17 (2)	20:25	13 19:47 (1)	19:39	18:51	17:14	17:03	
14	07:45	07:20	06:40	06:52	19:33 (1)	06:14	06:59	19:48 (2)	06:10	20:01 (2)	06:37	19:32 (1)	07:05	07:34	07:07	07:37		
	17:25	18:01	18:31	20:01	4 19:37 (1)	20:31	20:53	29	20:17 (2)	20:52	15	20:16 (2)	20:24	16 19:48 (1)	19:37	18:50	17:13	17:03
15	07:44	07:19	06:39	06:50	19:29 (1)	06:13	06:59	19:48 (2)	06:11	20:03 (2)	06:38	19:31 (1)	07:06	07:35	07:08	07:38		
	17:26	18:02	18:32	20:02	12 19:41 (1)	20:32	20:54	30	20:18 (2)	20:52	12	20:15 (2)	20:22	18 19:49 (1)	19:36	18:49	17:12	17:04
16	07:44	07:18	06:37	06:49	19:27 (1)	06:13	06:59	19:48 (2)	06:12	20:05 (2)	06:39	19:30 (1)	07:07	07:36	07:09	07:38		
	17:27	18:03	18:33	20:03	15 19:42 (1)	20:32	20:54	30	20:18 (2)	20:51	9 20:14 (2)	20:21	20 19:50 (1)	19:34	18:47	17:11	17:04	
17	07:44	07:16	06:36	06:48	19:25 (1)	06:12	06:59	19:48 (2)	06:13	06:40	06:40	19:29 (1)	07:08	07:37	07:10	07:39		
	17:28	18:04	18:34	20:04	18 19:43 (1)	20:33	20:54	30	20:18 (2)	20:51	20:20	22 19:51 (1)	19:33	18:46	17:11	17:04		
18	07:43	07:15	06:34	06:46	19:24 (1)	06:11	06:59	19:49 (2)	06:13	06:41	06:41	19:27 (1)	07:09	07:38	07:12	07:40		
	17:30	18:05	18:35	20:05	20 19:44 (1)	20:34	20:55	30	20:19 (2)	20:50	20:18	23 19:50 (1)	19:31	18:44	17:10	17:05		
19	07:43	07:14	06:33	06:45	19:23 (1)	06:10	06:59	19:49 (2)	06:14	06:42	06:42	19:27 (1)	07:10	07:39	07:13	07:40		
	17:31	18:06	18:36	20:06	22 19:45 (1)	20:35	20:55	30	20:19 (2)	20:50	20:17	23 19:50 (1)	19:29	18:43	17:09	17:05		
20	07:42	07:13	06:31	06:43	19:23 (1)	06:09	06:59	19:49 (2)	06:15	06:42	06:42	19:27 (1)	07:11	07:40	07:14	07:41		
	17:32	18:08	18:37	20:07	23 19:46 (1)	20:36	20:55	30	20:19 (2)	20:49	20:16	23 19:50 (1)	19:28	18:41	17:09	17:05		
21	07:42	07:11	06:29	06:42	19:22 (1)	06:08	06:59	19:49 (2)	06:16	06:43	06:43	19:27 (1)	07:12	07:41	07:15	07:41		
	17:33	18:09	18:38	20:08	23 19:45 (1)	20:37	20:55	30	20:19 (2)	20:48	20:14	23 19:50 (1)	19:26	18:40	17:08	17:06		
22	07:41	07:10	06:28	06:40	19:22 (1)	06:08	06:00	19:49 (2)	06:17	06:44	06:44	19:27 (1)	07:13	07:42	07:16	07:42		
	17:34	18:10	18:39	20:09	23 19:45 (1)	20:38	20:56	30	20:19 (2)	20:48	20:13	23 19:50 (1)	19:25	18:39	17:07	17:06		
23	07:40	07:09	06:26	06:39	19:21 (1)	06:07	06:00	19:49 (2)	06:17	06:45	06:45	19:27 (1)	07:13	07:43	07:17	07:42		
	17:35	18:11	18:40	20:10	24 19:45 (1)	20:39	20:56	30	20:19 (2)	20:47	20:11	22 19:49 (1)	19:23	18:37	17:07	17:07		
24	07:40	07:07	06:25	06:38	19:21 (1)	06:06	06:00	19:50 (2)	06:18	06:46	06:46	19:27 (1)	07:14	07:44	07:18	07:43		
	17:36	18:12	18:41	20:11	23 19:44 (1)	20:39	20:56	30	20:20 (2)	20:46	20:10	22 19:49 (1)	19:21	18:36	17:06	17:07		
25	07:39	07:06	06:23	06:36	19:22 (1)	06:06	06:00	19:50 (2)	06:19	06:47	06:47	19:28 (1)	07:15	06:45	07:19	07:43		
	17:37	18:13	18:42	20:12	22 19:44 (1)	20:40	20:56	30	20:20 (2)	20:45	20:09	19 19:47 (1)	19:20	17:35	17:06	17:08		
26	07:38	07:04	06:21	06:35	19:22 (1)	06:05	06:01	19:50 (2)	06:20	06:48	06:48	19:27 (1)	07:16	06:46	07:20	07:44		
	17:39	18:14	18:43	20:13	22 19:44 (1)	20:41	20:56	30	20:20 (2)	20:44	20:07	18 19:45 (1)	19:18	17:33	17:05	17:08		
27	07:38	07:03	06:20	06:34	19:22 (1)	06:04	06:01	19:51 (2)	06:21	06:49	06:49	19:29 (1)	07:17	06:47	07:21	07:44		
	17:40	18:15	18:44	20:14	20 19:42 (1)	20:42	6 20:03 (2)	20:56	30	20:21 (2)	20:43	20:06	15 19:44 (1)	19:16	17:32	17:05	17:09	
28	07:37	07:02	06:18	06:32	19:23 (1)	06:04	06:01	19:52 (2)	06:22	06:50	06:50	19:31 (1)	07:18	06:48	07:22	07:44		
	17:41	18:16	18:45	20:15	18 19:41 (1)	20:43	11 20:05 (2)	20:56	29	20:20 (2)	20:43	20:04	11 19:42 (1)	19:15	17:31	17:04	17:10	
29	07:36	07:17	06:31	06:43	19:25 (1)	06:03	06:01	19:52 (2)	06:23	06:51	06:51	19:35 (1)	07:19	06:49	07:23	07:45		
	17:42	18:17	18:46	20:16	15 19:40 (1)	20:43	14 20:07 (2)	20:56	29	20:21 (2)	20:42	20:03	2 19:37 (1)	19:13	17:30	17:04	17:10	
30	07:35	07:15	06:30	06:42	19:26 (1)	06:03	06:01	19:52 (2)	06:23	06:52	06:52	19:37 (1)	07:20	06:50	07:24	07:45		
	17:43	18:18	18:47	20:17	12 19:38 (1)	20:44	16 20:08 (2)	20:56	29	20:21 (2)	20:41	20:01	19:12	17:28	17:04	17:11	17:11	
31	07:35	07:14	06:29	06:41	19:25 (1)	06:02	06:02	19:51 (2)	06:24	06:53	06:53	19:37 (1)	07:21	06:51	07:25	07:45		
	17:44	18:19	18:48	20:18	19 20:10 (2)	20:45	20:40	20:40	20:40	20:00	20:00	17:27	17:27	17:04	17:12	17:12	17:12	
Potential sun hours	302	300	370	396	444	446	446	454	454	425	425	374	347	302	293	293	293	293
Total, worst case				316	72	839	839	353	321									
Sun reduction				0,53	0,59	0,66	0,66	0,74	0,73									
Oper. time red.				0,78	0,78	0,78	0,78	0,78	0,78									
Wind dir. red.				0,65	0,65	0,67	0,67	0,67	0,65									
Total reduction				0,27														

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 30

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: AA - R08

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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

	January	February	March	April	May	June	July	August	September	October	November	December				
1	07:46	07:34	16:35 (2)	07:00	07:12	06:29	06:02	06:03	06:25	06:53	07:21	06:53	16:02 (2)	07:25		
	17:13	17:46	35	17:10 (1)	18:17	19:49	20:18	20:46	20:56	20:39	19:58	19:10	17:26	32	16:34 (1)	17:04
2	07:46	07:33	16:34 (2)	06:59	07:10	06:27	06:01	06:03	06:26	06:54	07:22	06:54	16:03 (2)	07:26		
	17:14	17:47	36	17:10 (1)	18:18	19:50	20:19	20:46	20:56	20:38	19:57	19:08	17:25	34	16:37 (1)	17:03
3	07:46	07:32	16:33 (2)	06:57	07:09	06:26	06:01	06:04	06:27	06:55	07:23	06:55	16:03 (2)	07:27		
	17:15	17:48	38	17:11 (1)	18:20	19:51	20:20	20:47	20:56	20:37	19:55	19:07	17:24	36	16:39 (1)	17:03
4	07:46	07:31	16:33 (2)	06:56	07:07	06:25	06:01	06:04	06:28	06:56	07:24	06:56	16:02 (2)	07:28		
	17:15	17:49	37	17:10 (1)	18:21	19:52	20:21	20:48	20:56	20:36	19:53	19:05	17:23	37	16:39 (1)	17:03
5	07:46	07:30	16:33 (2)	06:54	07:06	06:24	06:00	06:05	06:29	06:57	07:25	06:57	16:02 (2)	07:29		
	17:16	17:50	37	17:10 (1)	18:22	19:53	20:22	20:48	20:56	20:35	19:52	19:04	17:21	38	16:40 (1)	17:03
6	07:46	07:29	16:33 (2)	06:53	07:04	06:23	06:00	06:05	06:30	06:58	07:26	06:58	16:03 (2)	07:30		
	17:17	17:51	37	17:10 (1)	18:23	19:54	20:23	20:49	20:55	20:33	19:50	19:02	17:20	37	16:40 (1)	17:03
7	07:46	07:28	16:33 (2)	06:51	07:03	06:22	06:00	06:06	06:31	06:59	07:27	06:59	16:04 (2)	07:31		
	17:18	17:53	36	17:09 (1)	18:24	19:55	20:24	20:50	20:55	20:32	19:49	19:01	17:19	37	16:41 (1)	17:03
8	07:46	07:27	16:33 (2)	06:50	07:01	06:20	06:00	06:06	06:31	07:00	07:28	07:00	16:04 (2)	07:32		
	17:19	17:54	36	17:09 (1)	18:25	19:56	20:25	20:50	20:55	20:31	19:47	18:59	17:18	37	16:41 (1)	17:03
9	07:46	07:26	16:33 (2)	06:48	06:59	06:19	05:59	06:07	06:32	07:01	07:29	07:02	16:05 (2)	07:33		
	17:20	17:55	34	17:07 (1)	18:26	19:57	20:26	20:51	20:55	20:30	19:46	18:57	17:17	36	16:41 (1)	17:03
10	07:46	07:25	16:34 (2)	06:47	06:58	06:18	05:59	06:08	06:33	07:02	07:30	07:03	16:06 (2)	07:34		
	17:21	17:56	31	17:05 (1)	18:27	19:58	20:27	20:51	20:54	20:29	19:44	18:56	17:16	35	16:41 (1)	17:03
11	07:45	07:24	16:34 (2)	06:45	06:56	06:17	05:59	06:08	06:34	07:03	07:31	07:04	16:06 (2)	07:35		
	17:22	17:57	26	17:00 (2)	18:28	19:59	20:28	20:52	20:54	20:28	19:42	18:54	17:15	35	16:41 (1)	17:03
12	07:45	07:22	16:34 (2)	06:44	06:55	06:16	05:59	06:09	06:35	07:03	07:32	07:05	16:09 (2)	07:35		
	17:23	17:58	25	16:59 (2)	18:29	20:00	20:29	20:52	20:53	20:26	19:41	18:53	17:15	32	16:41 (1)	17:03
13	07:45	07:21	16:35 (2)	06:42	06:53	06:15	05:59	06:10	06:36	07:04	07:33	07:06	16:10 (2)	07:36		
	17:24	18:00	24	16:59 (2)	18:30	20:01	20:30	20:53	20:53	20:25	19:39	18:51	17:14	31	16:41 (1)	17:03
14	07:45	07:20	16:36 (2)	06:40	06:52	06:14	05:59	06:10	06:37	07:05	07:34	07:07	16:13 (2)	07:37		
	17:25	18:01	22	16:58 (2)	18:31	20:01	20:31	20:53	20:53	20:24	19:37	18:50	17:13	25	16:40 (1)	17:03
15	07:44	07:19	16:38 (2)	06:39	06:50	06:13	05:59	06:11	06:38	07:06	07:35	07:08	16:25 (1)	07:38		
	17:26	18:02	19	16:57 (2)	18:32	20:02	20:32	20:54	20:52	20:22	19:36	18:48	17:12	14	16:39 (1)	17:04
16	07:44	07:18	16:39 (2)	06:37	06:49	06:12	05:59	06:12	06:39	07:07	07:36	07:09	16:26 (1)	07:38		
	17:27	18:03	16	16:55 (2)	18:33	20:03	20:32	20:54	20:51	20:21	19:34	18:47	17:11	11	16:37 (1)	17:04
17	07:44	07:16	16:42 (2)	06:36	06:48	06:12	05:59	06:13	06:40	07:08	07:37	07:10	16:29 (1)	07:39		
	17:28	18:04	10	16:52 (2)	18:34	20:04	20:33	20:54	20:51	20:20	19:33	18:46	17:11	7	16:36 (1)	17:04
18	07:43	07:15	06:34	06:46	06:11	05:59	06:13	06:41	07:09	07:38	07:12	07:12	16:30 (1)	07:40		
	17:29	18:05	18:35	20:05	20:34	20:55	20:50	20:18	19:31	18:44	17:10	17:10	17:04	17:04		
19	07:43	07:14	06:33	06:45	06:10	05:59	06:14	06:42	07:10	07:39	07:13	07:13	16:30 (1)	07:40		
	17:31	18:06	18:36	20:06	20:35	20:55	20:50	20:17	19:29	18:43	17:09	17:09	17:05	17:05		
20	07:42	07:13	06:31	06:43	06:09	05:59	06:15	06:42	07:11	07:40	07:14	07:14	16:30 (1)	07:41		
	17:32	18:08	18:37	20:07	20:36	20:55	20:49	20:16	19:28	18:41	17:08	17:08	17:05	17:05		
21	07:42	07:11	06:29	06:42	06:08	05:59	06:16	06:43	07:12	07:41	07:15	07:15	16:30 (1)	07:41		
	17:33	18:09	18:38	20:08	20:37	20:56	20:48	20:14	19:26	18:40	17:08	17:08	17:06	17:06		
22	07:41	07:10	06:28	06:40	06:08	06:00	06:16	06:44	07:13	07:42	07:16	07:16	16:30 (1)	07:42		
	17:34	18:10	18:39	20:09	20:38	20:56	20:48	20:13	19:25	18:39	17:07	17:07	17:06	17:06		
23	07:40	07:09	06:26	06:39	06:07	06:00	06:17	06:45	07:13	07:43	07:17	07:17	16:30 (1)	07:42		
	17:35	18:11	18:40	20:10	20:39	20:56	20:47	20:11	19:23	18:37	17:07	17:07	17:07	17:07		
24	07:40	07:07	06:25	06:38	06:06	06:00	06:18	06:46	07:14	07:44	07:18	07:18	16:30 (1)	07:43		
	17:36	18:12	18:41	20:11	20:39	20:56	20:46	20:10	19:21	18:36	2	17:16 (2)	17:06	17:06		
25	07:39	7	16:55 (1)	07:06	06:23	06:36	06:06	06:00	06:19	06:47	07:15	06:45	16:11 (2)	07:19	07:43	
	17:37	17:02 (1)	18:13	18:42	20:12	20:40	20:56	20:45	20:09	19:20	17:35	12	16:23 (2)	17:06	17:08	
26	07:39	16:53 (1)	07:04	06:21	06:35	06:05	06:01	06:20	06:48	07:16	06:46	06:46	16:08 (2)	07:20	07:44	
	17:39	11	17:04 (1)	18:14	18:43	20:13	20:41	20:56	20:44	20:07	19:18	17:33	17	16:25 (2)	17:05	17:08
27	07:38	16:52 (1)	07:03	06:20	06:34	06:04	06:01	06:21	06:49	07:17	06:47	06:47	16:07 (2)	07:21	07:44	
	17:40	14	17:06 (1)	18:15	18:44	20:14	20:42	20:56	20:44	20:06	19:16	17:32	20	16:27 (2)	17:05	17:09
28	07:37	16:41 (2)	07:02	06:18	06:32	06:04	06:01	06:22	06:50	07:18	06:48	06:48	16:06 (2)	07:22	07:44	
	17:41	25	17:08 (1)	18:16	18:45	20:15	20:43	20:56	20:43	20:04	19:15	17:31	22	16:28 (2)	17:04	17:10
29	07:36	16:38 (2)	07:01	06:17	06:31	06:03	06:02	06:22	06:51	07:19	06:49	06:49	16:05 (2)	07:23	07:45	
	17:42	31	17:09 (1)	18:17	19:46	20:16	20:43	20:56	20:42	20:03	19:13	17:30	24	16:29 (2)	17:04	17:10
30	07:35	16:37 (2)	07:00	06:15	06:30	06:03	06:02	06:23	06:52	07:20	06:50	06:50	16:04 (2)	07:24	07:45	
	17:43	32	17:09 (1)	18:17	19:47	20:17	20:44	20:56	20:41	20:01	19:12	17:28	25	16:29 (2)	17:04	17:11
31	07:35	16:35 (2)	07:00	06:14	06:29	06:02	06:02	06:24	06:53	07:21	06:52	06:52	16:03 (2)	07:25	07:45	
	17:44	35	17:10 (1)	18:18	19:48	20:18	20:45	20:57	20:40	20:00	17:27	26	16:29 (2)	17:12	17:12	
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293				
Total, worst case	155	499								148	514					
Sun reduction	0,45	0,47								0,54	0,50					
Oper. time red.	0,78	0,78								0,78	0,78					
Wind dir. red.	0,63	0,62								0,62	0,63					
Total reduction	0,22	0,23								0,27	0,25					
Total, real	34	115								39	126					

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:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 31

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: AB - R25

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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 17:13	07:34 17:46	07:00 18:17	07:12 19:49	06:29 20:18	06:02 20:46	06:03 20:56	06:25 20:39	17 19:58 (1)	06:53 19:10	07:21 17:26	06:53 17:04
2	07:46 17:14	07:33 17:47	06:59 18:18	07:10 19:50	06:27 20:19	06:01 20:46	06:03 20:56	06:26 20:38	16 20:14 (1)	06:54 19:57	07:22 19:08	06:54 17:25
3	07:46 17:15	07:32 17:48	06:57 18:20	07:09 19:51	06:26 20:20	06:01 20:47	06:04 20:56	06:27 20:37	16 20:14 (1)	06:55 19:55	07:23 19:07	06:55 17:24
4	07:46 17:16	07:31 17:49	06:56 18:21	07:07 19:52	06:25 20:21	06:01 20:48	06:04 20:56	06:28 20:36	14 20:13 (1)	06:56 19:53	07:24 19:05	06:56 17:23
5	07:46 17:16	07:30 17:50	06:54 18:22	07:06 19:53	06:24 20:22	19:54 (1) 20:00 (1)	06:00 20:48	06:05 20:56	12 20:12 (1)	06:57 19:52	07:25 19:04	06:57 17:21
6	07:46 17:17	07:29 17:51	06:53 18:23	07:04 19:54	06:23 20:23	19:52 (1) 20:01 (1)	06:00 20:49	06:05 20:55	10 20:11 (1)	06:58 19:50	07:26 19:02	06:58 17:20
7	07:46 17:18	07:28 17:53	06:51 18:24	07:03 19:55	06:22 20:24	19:51 (1) 20:02 (1)	06:00 20:50	06:06 20:55	8 20:10 (1)	06:59 19:49	07:27 19:01	06:59 17:19
8	07:46 17:19	07:27 17:54	06:50 18:25	07:01 19:56	06:20 20:25	19:50 (1) 20:03 (1)	06:00 20:50	06:06 20:55	5 20:09 (1)	07:00 19:47	07:28 18:59	07:00 17:18
9	07:46 17:20	07:26 17:55	06:48 18:26	07:00 19:57	06:19 20:26	19:49 (1) 20:03 (1)	06:07 20:51	06:32 20:55	07:01 19:46	07:29 18:58	07:01 17:17	07:33 17:03
10	07:46 17:21	07:25 17:56	06:47 18:27	06:58 19:58	06:18 20:27	19:49 (1) 20:04 (1)	06:08 20:51	06:33 20:54	07:02 19:44	07:30 18:56	07:03 17:16	07:34 17:03
11	07:45 17:22	07:24 17:57	06:45 18:28	06:56 19:59	06:17 20:28	19:48 (1) 20:05 (1)	06:08 20:52	06:34 20:54	07:03 19:42	07:31 18:54	07:04 17:16	07:35 17:03
12	07:45 17:23	07:22 17:58	06:44 18:29	06:55 20:00	06:16 20:29	19:48 (1) 20:06 (1)	06:09 20:52	06:35 20:26	07:03 19:41	07:32 18:53	07:05 17:15	07:35 17:03
13	07:45 17:24	07:21 18:00	06:42 18:30	06:53 20:00	06:15 20:30	19:48 (1) 20:07 (1)	06:10 20:53	06:36 20:25	07:04 19:39	07:33 18:51	07:06 17:14	07:36 17:03
14	07:45 17:25	07:20 18:01	06:40 18:31	06:52 20:01	06:14 20:31	19:48 (1) 20:08 (1)	06:10 20:52	06:37 20:24	07:05 19:37	07:34 18:50	07:07 17:13	07:37 17:03
15	07:44 17:26	07:19 18:02	06:39 18:32	06:50 20:02	06:13 20:32	19:48 (1) 20:08 (1)	06:09 20:52	06:11 20:22	07:06 19:36	07:35 18:48	07:08 17:12	07:38 17:04
16	07:44 17:27	07:18 18:03	06:37 18:33	06:49 20:03	06:13 20:32	19:48 (1) 20:08 (1)	06:09 20:54	06:12 20:21	07:07 19:34	07:36 18:47	07:09 17:11	07:38 17:04
17	07:44 17:28	07:16 18:04	06:36 18:34	06:48 20:04	06:12 20:33	19:48 (1) 20:07 (1)	06:13 20:54	06:40 20:20	07:08 19:33	07:37 18:46	07:10 17:11	07:39 17:04
18	07:43 17:30	07:15 18:05	06:34 18:35	06:46 20:05	06:11 20:34	19:49 (1) 20:07 (1)	06:13 20:50	06:41 20:18	07:09 19:31	07:38 18:44	07:12 17:10	07:40 17:05
19	07:43 17:31	07:14 18:06	06:33 18:36	06:45 20:06	06:10 20:35	19:49 (1) 20:07 (1)	06:14 20:50	06:42 20:17	07:10 19:29	07:39 18:43	07:13 17:09	07:40 17:05
20	07:42 17:32	07:13 18:08	06:31 18:37	06:43 20:07	06:09 20:36	19:50 (1) 20:06 (1)	06:15 20:49	06:42 20:16	8 20:12 (1)	06:42 19:28	07:14 18:41	07:41 17:05
21	07:42 17:33	07:11 18:09	06:29 18:38	06:42 20:08	06:08 20:37	19:50 (1) 20:05 (1)	06:16 20:48	06:43 20:14	11 20:13 (1)	06:43 19:26	07:15 18:40	07:41 17:06
22	07:41 17:34	07:10 18:10	06:28 18:39	06:40 20:09	06:08 20:38	19:52 (1) 20:04 (1)	06:17 20:48	06:44 20:13	07:13 19:25	07:42 18:39	07:16 17:07	07:42 17:06
23	07:40 17:35	07:08 18:11	06:26 18:40	06:39 20:10	06:07 20:39	19:53 (1) 20:03 (1)	06:17 20:47	06:45 20:11	14 20:15 (1)	06:45 19:23	07:17 18:37	07:42 17:07
24	07:40 17:36	07:07 18:12	06:25 18:41	06:38 20:11	06:06 20:39	19:55 (1) 20:01 (1)	06:18 20:46	06:46 20:10	15 20:16 (1)	06:46 19:21	07:18 18:36	07:43 17:07
25	07:39 17:37	07:06 18:13	06:23 18:42	06:36 20:12	06:06 20:40	20:01 (1) 20:06 (1)	06:19 20:45	06:47 20:09	17 20:17 (1)	06:47 19:20	07:19 18:35	07:43 17:08
26	07:38 17:39	07:04 18:14	06:21 18:43	06:35 20:13	06:05 20:41	06:01 20:56	06:20 20:44	06:48 20:07	18 20:17 (1)	06:48 19:18	07:20 17:33	07:44 17:05
27	07:38 17:40	07:03 18:15	06:20 18:44	06:34 20:14	06:04 20:42	06:01 20:56	06:21 20:43	06:49 20:06	20 20:18 (1)	06:49 19:16	07:21 17:32	07:44 17:09
28	07:37 17:41	07:01 18:16	06:18 18:45	06:32 20:15	06:04 20:43	06:01 20:56	06:22 20:43	06:50 20:04	20 20:18 (1)	06:50 19:15	07:22 17:31	07:44 17:10
29	07:36 17:42	07:00 19:46	06:17 20:16	06:31 20:43	06:03 20:43	06:02 20:56	06:22 20:42	06:51 20:03	21 20:19 (1)	06:51 19:13	07:23 17:30	07:45 17:10
30	07:35 17:43	07:00 19:47	06:15 20:17	06:30 20:44	06:03 20:44	06:02 20:56	06:23 20:41	06:52 20:01	20 20:18 (1)	06:52 19:12	07:24 17:28	07:45 17:11
31	07:35 17:44	07:00 19:48	06:14 20:45	06:29 20:45	06:02 20:45	06:02 20:40	06:24 20:40	06:53 20:00	19 20:17 (1)	06:53 19:27	07:25 17:27	07:45 17:12
Potential sun hours	302	300	370	396	444	446	454	424	374	347	302	293
Total, worst case					296		203	98				
Sun reduction					0,59		0,74	0,73				
Oper. time red.					0,78		0,78	0,78				
Wind dir. red.					0,66		0,66	0,66				
Total reduction					0,30		0,38	0,38				
Total, real					90		77	37				

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:44 / 32

Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Calendar

Calculation: Is CorisShadow receptor: AC - R22

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
625	521	486	354	333	434	521	521	556	660	955	868	6.834

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 17:13	07:34 17:46	07:00 18:17	07:12 19:49	18:10 (8) 20:18	06:29 20:46	06:03 20:56	06:25 20:39	06:53 19:58	18:55 (2) 19:14 (2)	07:21 19:10	06:53 17:26
2	07:46 17:14	07:33 17:47	06:59 18:18	07:10 19:50	18:10 (8) 20:19	06:27 20:46	06:01 20:56	06:26 20:38	06:54 19:57	18:53 (2) 19:13 (2)	07:22 19:08	06:54 17:25
3	07:46 17:15	07:32 17:48	06:57 18:19	07:09 19:51	18:11 (8) 20:20	06:26 20:47	06:01 20:56	06:27 20:37	06:55 19:55	18:17 (8) 19:13 (2)	07:23 19:07	06:55 17:24
4	07:46 17:15	07:31 17:49	06:56 18:21	07:07 19:52	18:11 (8) 20:21	06:25 20:48	06:01 20:56	06:28 20:36	06:56 19:53	18:14 (8) 19:13 (2)	07:24 19:05	06:56 17:23
5	07:46 17:16	07:30 17:50	06:54 18:22	07:06 19:53	18:13 (8) 20:22	06:24 20:48	06:00 20:56	06:29 20:35	06:57 19:52	18:11 (8) 19:13 (2)	07:25 19:04	06:57 17:21
6	07:46 17:17	07:29 17:51	06:53 18:23	07:04 19:54	18:13 (8) 20:23	06:23 20:49	06:00 20:55	06:30 20:33	06:58 19:50	18:10 (8) 19:12 (2)	07:26 19:02	06:58 17:20
7	07:46 17:18	07:28 17:53	06:51 18:24	07:03 19:55	18:15 (8) 20:24	06:22 20:50	06:00 20:55	06:31 20:32	06:59 19:49	18:08 (8) 19:11 (2)	07:27 19:01	06:59 17:19
8	07:46 17:19	07:27 17:54	06:50 18:25	07:01 19:56	18:17 (8) 20:25	06:20 20:50	06:00 20:55	06:31 20:31	07:00 19:47	18:07 (8) 19:10 (2)	07:28 18:59	07:00 17:18
9	07:46 17:20	07:26 17:55	06:48 18:26	06:59 19:57	18:20 (8) 20:26	06:19 20:51	05:59 20:55	06:32 20:30	07:01 19:45	18:05 (8) 19:08 (2)	07:29 18:57	07:01 17:17
10	07:46 17:21	07:25 17:56	06:47 18:27	06:58 19:58	18:55 (2) 20:27	06:18 20:51	05:59 20:54	06:33 20:29	07:02 19:44	18:03 (8) 19:04 (2)	07:30 18:56	07:03 17:16
11	07:45 17:22	07:24 17:57	06:45 18:28	06:56 19:59	18:55 (2) 20:28	06:17 20:52	06:08 20:54	06:34 20:28	07:03 19:42	18:03 (8) 18:37 (8)	07:31 18:54	07:04 17:15
12	07:45 17:23	07:22 17:58	06:43 18:29	06:55 20:00	18:56 (2) 20:29	06:16 20:52	05:59 20:53	06:35 20:26	07:03 19:41	18:02 (8) 18:37 (8)	07:32 18:53	07:05 17:15
13	07:45 17:24	07:21 18:00	06:42 18:30	06:53 20:00	18:57 (2) 20:30	06:15 20:53	05:59 20:53	06:36 20:25	07:04 19:39	18:01 (8) 18:37 (8)	07:33 18:51	07:06 17:14
14	07:45 17:25	07:20 18:01	06:40 18:31	06:52 20:01	18:58 (2) 20:31	06:14 20:53	05:59 20:52	06:37 20:24	07:05 19:37	18:01 (8) 18:36 (8)	07:34 18:50	07:07 17:13
15	07:44 17:26	07:19 18:02	06:39 18:32	06:50 20:02	19:00 (2) 20:32	06:13 20:54	05:59 20:52	06:38 20:22	07:06 19:36	18:01 (8) 18:36 (8)	07:35 18:48	07:08 17:12
16	07:44 17:27	07:18 18:03	06:37 18:33	06:49 20:03	19:08 (2) 20:32	06:12 20:54	05:59 20:51	06:39 20:21	07:07 19:34	18:00 (8) 18:36 (8)	07:36 18:47	07:09 17:11
17	07:44 17:28	07:16 18:04	06:36 18:34	06:48 20:04	06:12 20:33	05:59 20:54	06:13 20:51	06:40 20:20	07:08 19:33	18:00 (8) 18:35 (8)	07:37 18:46	07:10 17:11
18	07:43 17:29	07:15 18:05	06:34 18:35	06:46 20:05	17:26 (8) 17:36 (8)	06:46 20:05	05:59 20:50	06:41 20:18	07:09 19:31	18:00 (8) 18:33 (8)	07:38 18:44	07:12 17:10
19	07:43 17:31	07:14 18:06	06:33 18:36	06:45 20:06	17:23 (8) 17:40 (8)	06:45 20:06	05:59 20:50	06:42 20:17	07:10 19:29	18:00 (8) 18:32 (8)	07:39 18:43	07:13 17:09
20	07:42 17:32	07:13 18:07	06:31 18:37	06:43 20:07	17:20 (8) 17:42 (8)	06:43 20:07	05:59 20:55	06:42 20:16	07:11 19:28	18:00 (8) 18:31 (8)	07:40 18:41	07:14 17:08
21	07:42 17:33	07:11 18:09	06:29 18:38	06:42 20:08	17:17 (8) 17:43 (8)	06:42 20:08	05:59 20:55	06:43 20:14	07:12 19:26	18:01 (8) 18:30 (8)	07:41 18:40	07:15 17:06
22	07:41 17:34	07:10 18:10	06:28 18:39	06:40 20:09	17:16 (8) 17:44 (8)	06:40 20:09	06:00 20:56	06:44 20:13	07:13 19:24	18:02 (8) 18:28 (8)	07:42 18:39	07:16 17:07
23	07:40 17:35	07:08 18:11	06:26 18:40	06:39 20:10	17:14 (8) 17:45 (8)	06:39 20:10	06:07 20:56	06:45 20:11	07:13 19:23	18:03 (8) 18:26 (8)	07:43 18:37	07:17 17:07
24	07:40 17:36	07:07 18:12	06:25 18:41	06:38 20:11	17:14 (8) 17:46 (8)	06:38 20:11	06:06 20:56	06:46 20:10	07:14 19:21	18:05 (8) 18:24 (8)	07:44 18:36	07:18 17:06
25	07:39 17:37	07:06 18:13	06:23 18:42	06:36 20:12	17:12 (8) 17:46 (8)	06:36 20:12	06:06 20:56	06:47 20:09	07:15 19:20	18:08 (8) 18:21 (8)	06:45 17:35	07:19 17:06
26	07:38 17:39	07:04 18:14	06:21 18:43	06:35 20:13	17:11 (8) 17:46 (8)	06:35 20:13	06:05 20:56	06:48 20:07	07:16 19:18	18:00 (8) 18:22 (8)	06:46 17:33	07:20 17:05
27	07:38 17:40	07:03 18:15	06:20 18:44	06:34 20:14	17:11 (8) 17:46 (8)	06:34 20:14	06:04 20:56	06:49 20:06	07:17 19:16	18:00 (8) 18:58 (2)	06:47 17:32	07:21 17:05
28	07:37 17:41	07:01 18:16	06:18 18:45	06:32 20:15	17:10 (8) 18:45 (8)	06:32 20:15	06:04 20:56	06:50 20:04	07:18 19:15	19:01 (2) 19:09 (2)	06:48 17:31	07:22 17:04
29	07:36 17:42	07:00 18:46	06:17 19:46	06:31 20:16	18:11 (8) 18:46 (8)	06:31 20:16	06:03 20:56	06:51 20:03	07:19 19:13	18:58 (2) 19:11 (2)	06:49 17:29	07:23 17:04
30	07:35 17:43	07:00 18:45	06:16 19:47	06:30 20:17	18:10 (8) 18:45 (8)	06:30 20:17	06:03 20:56	06:52 20:01	07:20 19:12	18:57 (2) 19:13 (2)	06:50 17:28	07:24 17:04
31	07:35 17:44	07:00 19:48	06:15 18:45 (8)	06:29 20:18	18:11 (8) 18:45 (8)	06:29 20:18	06:02 20:45	06:53 20:00	07:21 19:14 (2)	18:55 (2) 19:14 (2)	06:51 17:27	07:25 17:12
Potential sun hours	302	300	370	396	444	446	454	425	374	347	302	293
Total, worst case			410	464				56	826			
Sun reduction			0.49	0.53				0.73	0.65			
Oper. time red.			0.78	0.78				0.78	0.78			
Wind dir. red.			0.64	0.65				0.65	0.64			
Total reduction			0.25	0.27				0.37	0.32			
Total, real			101	124				21	268			

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

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

Project:
Villamassargia WindPro

Printed/Page
20/04/2022 10:42 / 1
Licensed user:
Ing. Bruno Manca
Via Vittorio Veneto 231
IT-09028 Sestu
+390702358125
BrunoManca / ingbrunomanca@gmail.com
Calculated:
19/04/2022 15:00/2.8.579

SHADOW - Main Result

Calculation: Is Coris

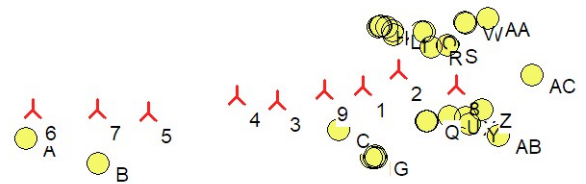
Assumptions for shadow calculations

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

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

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

Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
625 521 486 354 333 434 521 521 556 660 955 868 6.834
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: lineeLivello Villamassargia rev1.wpo (Z
Obstacles used in calculation
Eye height: 1,5 m
Grid resolution: 10,0 m

Scale 1:100.000
New WTG Shadow receptor

WTGs

WTG type	Italian Gauss-Boaga west-ROMA40 (IT-peninsular <=4m)			Row data/Description	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
	East	North	Z [m]								Calculation distance [m]	RPM [RPM]
1	1.469.390	4.342.583	557,0	WTG07	Yes	VESTAS	V162-5.600	5.600	162,0	125,0	2.044	0,0
2	1.469.855	4.342.797	580,0	WTG08	Yes	VESTAS	V162-5.600	5.600	162,0	125,0	2.044	0,0
3	1.468.256	4.342.397	595,1	WTG05	Yes	VESTAS	V162-5.600	5.600	162,0	125,0	2.044	0,0
4	1.467.722	4.342.457	600,0	WTG04	Yes	VESTAS	V162-5.600	5.600	162,0	125,0	2.044	0,0
5	1.466.548	4.342.250	575,2	WTG03	Yes	VESTAS	V162-5.600	5.600	162,0	125,0	2.044	0,0
6	1.465.014	4.342.298	603,7	WTG01	Yes	VESTAS	V162-5.600	5.600	162,0	125,0	2.044	0,0
7	1.465.873	4.342.292	573,2	WTG02	Yes	VESTAS	V162-5.600	5.600	162,0	125,0	2.044	0,0
8	1.470.622	4.342.593	560,2	WTG09	Yes	VESTAS	V162-5.600	5.600	162,0	125,0	2.044	0,0
9	1.468.875	4.342.527	595,6	WTG06	Yes	VESTAS	V162-5.600	5.600	162,0	125,0	2.044	0,0

Shadow receptor-Input

No.	Name	Italian Gauss-Boaga west-ROMA40 (IT-peninsular <=4m)			Width [m]	Height [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode	
		East	North	Z [m]						
A	R20	1.464.929	4.341.912	492,5	1,0	1,0	1,0	0,0	90,0	"Green house mode"
B	R23	1.465.884	4.341.584	506,4	1,0	1,0	1,0	0,0	90,0	"Green house mode"
C	R21	1.469.068	4.342.014	550,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
D	R04	1.469.499	4.341.640	439,3	1,0	1,0	1,0	0,0	90,0	"Green house mode"
E	R16	1.469.534	4.341.640	434,7	1,0	1,0	1,0	0,0	90,0	"Green house mode"
F	R17	1.469.547	4.341.665	441,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
G	R19	1.469.559	4.341.634	435,7	1,0	1,0	1,0	0,0	90,0	"Green house mode"
H	R13	1.469.596	4.343.366	439,5	1,0	1,0	1,0	0,0	90,0	"Green house mode"
I	R11	1.469.614	4.343.381	440,4	1,0	1,0	1,0	0,0	90,0	"Green house mode"
J	R01	1.469.633	4.343.371	441,9	1,0	1,0	1,0	0,0	90,0	"Green house mode"
K	R27	1.469.700	4.343.360	451,2	1,0	1,0	1,0	0,0	90,0	"Green house mode"
L	R07	1.469.786	4.343.307	460,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
M	R09	1.469.799	4.343.260	460,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
N	R15	1.470.163	4.343.304	467,9	1,0	1,0	1,0	0,0	90,0	"Green house mode"
O	R14	1.470.206	4.343.304	468,7	1,0	1,0	1,0	0,0	90,0	"Green house mode"
P	R26	1.470.220	4.342.118	490,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
Q	R24	1.470.237	4.342.120	490,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
R	R12	1.470.294	4.343.099	467,2	1,0	1,0	1,0	0,0	90,0	"Green house mode"

To be continued on next page...

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 10:42 / 2

Licensed user:

Ing. Bruno Manca

Via Vittorio Veneto 231

IT-09028 Sestu

+390702358125

BrunoManca / ingbrunomanca@gmail.com

Calculated:

19/04/2022 15:00/2.8.579

SHADOW - Main Result**Calculation: Is Coris**

...continued from previous page

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

No.	Name	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
				[m]	[m]	[m]	[m]	[°]	[°]	
S	R29	1.470.507	4.343.125	458,5	1,0	1,0	1,0	0,0	90,0	"Green house mode"
T	R28	1.470.518	4.343.114	458,2	1,0	1,0	1,0	0,0	90,0	"Green house mode"
U	R18	1.470.533	4.342.185	500,2	1,0	1,0	1,0	0,0	90,0	"Green house mode"
V	R05	1.470.735	4.343.426	455,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
W	R03	1.470.744	4.343.408	455,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
X	R02	1.470.746	4.342.172	535,6	1,0	1,0	1,0	0,0	90,0	"Green house mode"
Y	R10	1.470.796	4.342.076	530,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
Z	R06	1.470.960	4.342.269	516,9	1,0	1,0	1,0	0,0	90,0	"Green house mode"
AA	R08	1.471.043	4.343.472	442,4	1,0	1,0	1,0	0,0	90,0	"Green house mode"
AB	R25	1.471.179	4.341.924	523,2	1,0	1,0	1,0	0,0	90,0	"Green house mode"
AC	R22	1.471.621	4.342.718	430,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"

Calculation Results

Shadow receptor

Shadow, expected values

No.	Name	Shadow hours per year [h/year]
A	R20	15:14
B	R23	4:42
C	R21	14:27
D	R04	0:00
E	R16	0:00
F	R17	0:00
G	R19	0:00
H	R13	32:25
I	R11	30:55
J	R01	32:12
K	R27	31:22
L	R07	38:29
M	R09	45:47
N	R15	31:18
O	R14	30:35
P	R26	9:06
Q	R24	8:39
R	R12	44:58
S	R29	26:45
T	R28	28:00
U	R18	16:25
V	R05	9:57
W	R03	9:22
X	R02	7:53
Y	R10	8:35
Z	R06	10:50
AA	R08	5:14
AB	R25	3:23
AC	R22	8:33

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	WTG07	166:30	44:47
2	WTG08	459:53	110:41
3	WTG05	67:35	19:55
4	WTG04	14:08	4:42
5	WTG03	10:47	3:22
6	WTG01	0:00	0:00
7	WTG02	35:51	11:51

To be continued on next page...

Project:

Villamassargia WindPro

Printed/Page

20/04/2022 10:42 / 3

Licensed user:

Ing. Bruno Manca

Via Vittorio Veneto 231

IT-09028 Sestu

+390702358125

BrunoManca / ingbrunomanca@gmail.com

Calculated:

19/04/2022 15:00/2.8.579

SHADOW - Main Result

Calculation: Is Coris

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
8	WTG09	227:21	55:36
9	WTG06	147:28	37:56