



Regione Puglia
Provincia di Foggia
Comune di San Severo



Oggetto: Progetto per la realizzazione di un parco eolico della potenza di 108 MW
e relative opere di connessione
PROGETTO DEFINITIVO

Proponente:
EOS SAN SEVERO 1 s.r.l.



Parco Eolico "Del Trio"

Comune: San Severo

Fogli di mappa WTG: 124 - 123 - 130 - 133 - 136 - 138 - 141 - 137 - 121 - 122 -
111 - 112 - 120 - 119

Nome elaborato:
PEI158DT-PD_39_RELAZIONE SHADOW FLICKERING

Scala:



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Studio Tecnico:



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PREMESSA

Il seguente studio sull'evoluzione dell'ombra generata dalla realizzazione di un impianto per la produzione di energia elettrica da fonte rinnovabile eolica ha lo scopo di accertare che non si verifichino interferenze rispetto al campo visivo delle abitazioni presenti e sulla viabilità circostante e ad accertare che non si prolunghi il permanere del ghiaccio sulle carreggiate eventualmente interessate dal fenomeno dell'ombreggiamento.

Il progetto, denominato denominato "DEL TRIO", costituito da n. 18 aerogeneratori di potenza nominale di 6 MW, per una potenza complessiva dell'impianto di 108 MW e delle relative opere di connessione con la RTN.

Il progetto verrà realizzato in agro di San Severo (FG), località "Bastiola, Motta del Lupo, Falciglia, Camera, Li Calici, Predicatella, Mezzana, Casone" e con opere di connessione ricadenti nel comune di Lucera (FG), per conto della società EOS SAN SEVERO 1 S.r.l., con sede legale in Foggia, alla via Torelli, n. 22 c/o Dellisanti & Partners S.r.l. – P. Iva 04465770719 rappresentata dall'amministratore unico Tarquinio Antonio.

NORMATIVA DI RIFERIMENTO

In riferimento al fenomeno che verrà analizzato, non sono state emanate in Italia norme specifiche o linee guida che regolamentino i limiti di esposizione al fenomeno di Shadow flicker generato dall'esercizio degli impianti eolici, né tanto meno è stata definita una distanza massima oltre la quale si ritiene improbabile il verificarsi del fenomeno.

La Germania è stata il primo stato europeo ad aver formulato delle linee guida dettagliate sui limiti e le condizioni per il calcolo dell'impatto dell'ombra, normate dalla "Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen" (WEA-Shattenwurf-Hinweise).

Secondo le linee guida tedesche, il limite per il quale si genera l'impatto è fissato da due fattori:

- L'angolo del sole sull'orizzonte deve essere di almeno 3 gradi
- Le pale dell'aerogeneratore devono coprire almeno il 20% del sole.

La maggior parte dei paesi europei che successivamente hanno adottato specifiche linee guida o regolamenti in materia si sono basati sulle norme di riferimento tedesche e sui limiti di accettabilità da esse introdotti.

In assenza di una specifica normativa o linea guida, si impiegano, come buona pratica, le indicazioni contenute nelle linee guida tedesche.

Nello specifico, tali linee guida sono state introdotte nel 2002 dal comitato statale per il controllo dell'inquinamento e, da allora, sono state adottate dalla maggior parte dei Länder e sono comunemente considerate buone pratiche nella valutazione dell'impatto prodotto da un parco eolico.

In particolare, tali linee guida, stabiliscono che lo shadow flickering deve essere valutato:

- fino ad una distanza tale che il rotore copra il 20% del disco solare; a distanze superiori il fenomeno è considerato troppo diffuso da poter produrre fastidio;
- per angoli del sole sull'orizzonte superiori a 3 gradi; per angoli inferiori il fenomeno si ritiene schermato dalla presenza di edifici e/o vegetazione;
- ad un'altezza di 2 metri dal suolo;

I valori limite di accettabilità stabiliti dalle suddette linee guida sono un massimo di:

- 30 minuti al giorno;
- 30 ore all'anno.

In Italia invece si fa riferimento all'esperienza e al buon senso.

Nel presente studio, considerando la modellazione cautelativa dei recettori, si è considerato come limite massimo di esposizione, per poter definire un recettore sensibile, quello di 30 ore/anno di massima ombra nella condizione Real Case.

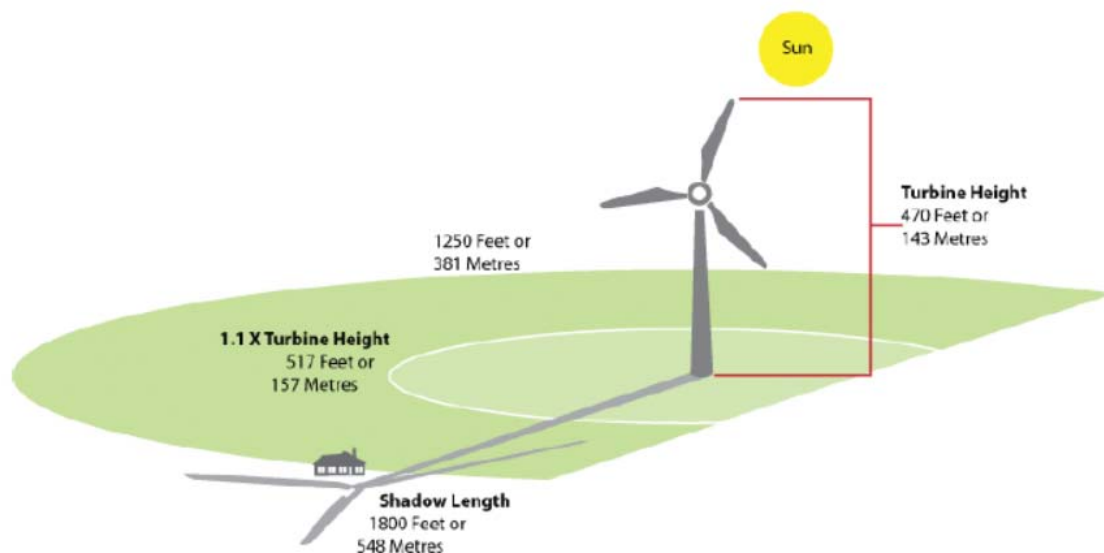
IL FENOMENO DI SHADOW FLICKERING

Gli aerogeneratori, al pari di tutte le altre strutture fortemente sviluppate in altezza, proiettano un'ombra sulle aree circostanti in presenza di irraggiamento solare diretto.

Lo *shadow flickering* (letteralmente *ombreggiamento intermittente*) consiste in una fluttuazione periodica dell'intensità luminosa osservata, causata dalla proiezione, su una superficie, dell'ombra indotta da oggetti in movimento.

Per un impianto eolico tale fenomeno è generato dalla proiezione, al suolo o su un ricevitore, dell'ombra generata dalle pale degli aerogeneratori in rotazione in presenza della luce solare.

Dal punto di vista di un ricevitore, lo *shadow flickering* si manifesta in una variazione ciclica dell'intensità luminosa; un lampeggiamento che si manifesta quando le pale del rotore tagliano la luce solare in maniera intermittente. In presenza di luce solare diretta, un ricevitore localizzato nella zona d'ombra indotta dal rotore, sarà investito da un continuo alternarsi di luce diretta ed ombra, a causa delle pale in movimento.

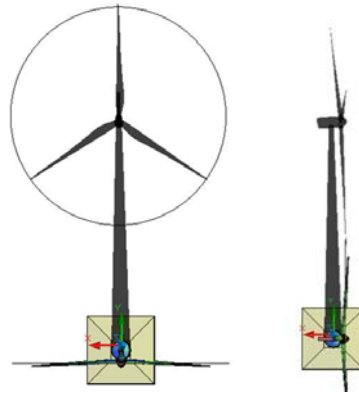


Tale fenomeno, se subito dal ricevitore per periodi di tempo prolungati, può generare un disturbo, se ci si trova nelle seguenti condizioni:

- si sia in presenza di un livello sufficiente di intensità luminosa, ossia in condizioni di cielo sereno sgombro da nubi ed in assenza di nebbia e con sole alto rispetto all'orizzonte;
- la linea ricevitore-aerogeneratore non incontri ostacoli: in presenza di vegetazione, promontori o edifici interposti l'ombra generata da questi ultimi annulla o attenua il fenomeno;
- le pale siano in movimento;
- turbina e ricevitore siano vicini: le ombre proiettate in prossimità dell'aerogeneratore risultano di maggiore intensità e nitidezza rispetto a quelle proiettate lontano. All'aumentare della distanza tra turbina e ricevitore, le pale coprono una porzione sempre più piccola del sole, inducendo un flicker di minore entità. Inoltre il fenomeno risulta di bassa entità quando l'ombra proiettata sul ricevitore

è indotta dall'estremità delle pale, mentre raggiunge il massimo dell'intensità in corrispondenza dell'attacco di pala all'hub;

- la turbina sia orientata in modo che il rotore risulti perpendicolare alla linea sole-recettore: quando il piano del rotore è perpendicolare alla linea sole-recettore, l'ombra proiettata dalle pale risulta muoversi all'interno di un "cerchio" che riferisce alla circonferenza del rotore inducendo uno shadow flickering non trascurabile; per situazioni in cui, dal punto di vista del recettore, il piano del rotore risulti essere in linea con il sole ed il recettore, l'ombra proiettata è sottile, di bassa intensità ed è caratterizzata da un rapido movimento, risultando pertanto lo shadow flickering di entità trascurabile.



L'intensità del fenomeno è definita come la differenza di luminosità che si percepisce in presenza ed in assenza di flickering in una data posizione. In definitiva, si può affermare che:

- avendo le pale una forma rastremata con lo spessore che cresce verso il mozzo; il fenomeno risulterà tanto più intenso quanto maggiore sarà la porzione di disco solare coperta dalla pala stessa e quanto minore la distanza dal ricettore;
- l'intensità del flickering sarà minima quando l'ombra prodotta è generata all'estremità delle pale;
- maggiori distanze tra generatore e ricettore determinano ombre meno nette; in tal caso l'effetto flickering risulterà meno intenso e distinto.

Rilevamenti sul campo hanno evidenziato che, per distanze superiori ai 400m tra aerogeneratore di altezza paragonabile a quella di progetto e ricettore, il fenomeno è da rilevarsi solo all'alba ed al tramonto, momenti in cui la radiazione diretta è di minore intensità.

Al di là di una certa distanza l'ombra smette di essere un problema perché il rapporto tra lo spessore della pala ed il diametro apparente del sole diventa molto piccolo.

Sebbene il fenomeno possa essere percepito anche all'esterno, esso risulta evidente e fastidioso in quegli ambienti con finestrate rivolte verso le ombre. In generale, l'area soggetta a shadow flicker non si estende oltre i 500÷1000 m dall'aerogeneratore e le zone a maggiore impatto ricadono entro i 400 m di distanza dalle macchine con durata del fenomeno dell'ordine delle 200 ore all'anno.

Il flickering, se presente, non dovrebbe superare in genere i 30/40 minuti di durata potenziale nell'arco di una giornata.

Le linee guida di alcuni paesi esteri raccomandano una velocità di flicker non superiore a 3 tagli al secondo il che, per le normali turbine a 3 pale, corrisponde ad una rotazione completa del rotore in un secondo, ossia 60 giri al minuto (60 rpm).

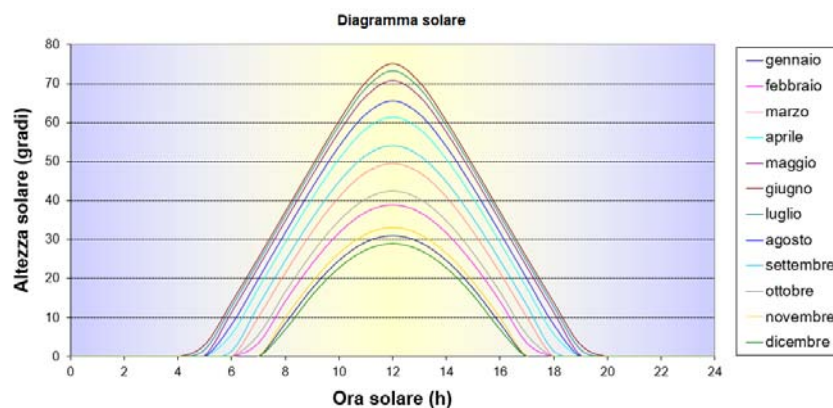
Le moderne turbine hanno in genere velocità di rotazione ben al di sotto di tale limite, aggirandosi sui 18,20 rpm a pieno regime, corrispondente a frequenze di passaggio delle pale notevolmente inferiori a quella critica.

In particolare, il modello di aerogeneratore scelto per il presente progetto lavora nel range compreso fra 4,9 e 12,6 rpm, e quindi ancora inferiore.

Una progettazione attenta a questa problematica permette di evitare lo spiacevole fenomeno di flickering semplicemente prevedendo il luogo di incidenza dell'ombra e disponendo le turbine in maniera tale che l'ombra sulle zone sensibili non superi un certo numero di ore all'anno.

A tal proposito è stato prodotto lo studio dell'evoluzione dell'ombra generata dagli aerogeneratori, eseguito grazie all'ausilio di un software che effettua analisi informative territoriali sulla base di cartografie digitali in 3D.

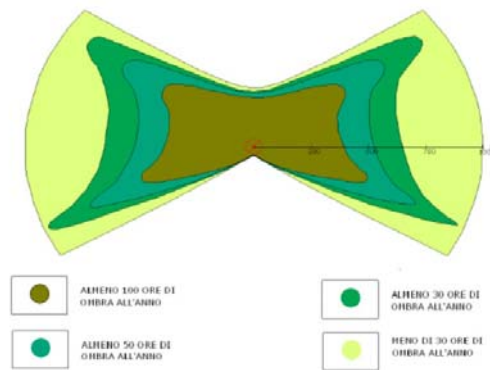
Il software ha permesso l'esecuzione dei calcoli della proiezione dell'ombra nell'arco di un intero anno solare.



Di seguito si riporta l'evoluzione annuale dell'ombra di una turbina nel caso peggiore, ossia considerando le pale sempre in rotazione e orientate sempre ortogonalmente al sole durante la sua evoluzione giornaliera.

Le ore annue di ombra sono sempre minori con l'aumentare della distanza dalla torre secondo una particolare geometria rinveniente dalla posizione geografica.

In casi particolari l'ombra arriva a proiettarsi anche a distanza di 1 km ma unicamente per pochi minuti all'anno.



Lo studio dell'ombreggiamento è finalizzato alla verifica dell'effetto flickering sui ricettori sensibili presenti nei pressi del parco eolico, considerando una distanza d'indagine di circa 2km da ogni aerogeneratore, ossia pari ad oltre 10 volte l'altezza complessiva (AGL = 180m).

DESCRIZIONE DEL PROGETTO

Il parco eolico proposto verrà realizzato nel territorio comunale di San Severo (FG), a sud-est rispetto al centro abitato e ad almeno 5,5km di distanza dall'inizio della zona P.I.P..

L'area di progetto si estende per circa 22kmq su un territorio pianeggiante, con quote che variano dai 35m ai 55m slm.



La destinazione comunale è agricola con prevalenza di seminativi, solcata da Ovest ad Est dal Torrente Triolo e ben servita da strade provinciali, comunali ed interpoderali, oltre che tagliato in

due da autostrada, ferrovia e Strada Statale n. 16 che corrono quali parallelamente in direzione Nord-Sud.

Di seguito si riportano le posizioni degli aerogeneratori nel sistema di riferimento UTM WGS 84:

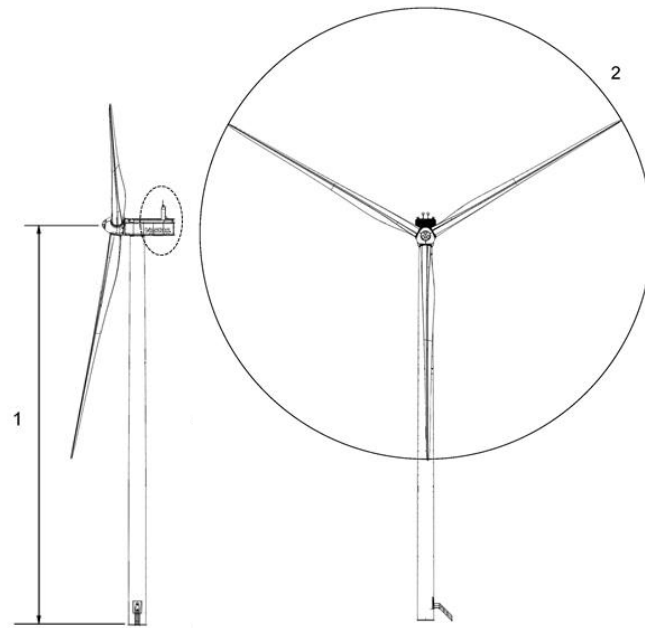
PROGETTO "DEL TRIO" - EOS SAN SEVERO 1					
WTG	Comune	Foglio	Particella	Coordinate WTG (UTM84-33N)	
				Est	Nord
S1	San Severo	124	28	535331.284	4606091.5715
S2	San Severo	124	31	536508.8485	4605664.881
S3	San Severo	123	233	537609.0354	4606150.3127
S4	San Severo	130	69	536264.9013	4603194.3729
S5	San Severo	130	45	537218.6939	4603669.9179
S6	San Severo	133	242	538113.9278	4604220.3487
S7	San Severo	136	236	541015.949	4606992.335
S8	San Severo	136	32	542031.3616	4606256.0803
S9	San Severo	138	22	542921.1191	4607330.0796
S10	San Severo	141	84	543887.0397	4607839.181
S11	San Severo	137	40	542234.9744	4608707.3585
S12	San Severo	121	77	540429.1201	4607982.9575
S13	San Severo	122	56	539528.6539	4607190.9188
S14	San Severo	111	15	537846.7078	4608790.0235
S15	San Severo	112	300	539021.4258	4609513.2183
S16	San Severo	112	292	538183.5629	4610147.7104
S17	San Severo	120	42	540204.3679	4608903.3266
S18	San Severo	119	36	541248.1045	4609517.8396

AEROGENERATORE PRESCELTO

Il modello di aerogeneratore che si prevede di installare è la turbina eolica Vestas V162-6.0 EnVentus da 6MW di potenza nominale.

L'aerogeneratore è costituito da una torre di sostegno tubolare metallica a tronco di cono, sulla cui sommità è installata la navicella con il rotore tripala avente diametro di 162m, mentre l'altezza mozzo è di 119m dal suolo.

La direzione di rotazione delle pale è in senso orario vista frontalmente.



La macchina risponde ai più alti standard qualitativi in fatto di produzione, riduzione della velocità di rotazione ed emissione di rumore (IEC 60076-1, IEC 60076-16, IEC 61936-1, IEC 62271-103, IEC 62271-1, 62271-100, 62271-102, 62271-200).

La velocità operativa va infatti da 4,9 a 12,6 rpm con una frequenza massima di 0,21 Hz e un livello di potenza sonora inferiore agli 80dB(A).

ANALISI DEL FENOMENO PER L'IMPIANTO PROPOSTO

Le simulazioni volte a verificare l'entità del fenomeno dello *shadow flickering* indotto dagli aerogeneratori che si intende installare sono state effettuate in considerazione:

- ✓ del diagramma solare riferito alla latitudine di installazione del parco;
- ✓ dell'altezza complessiva di macchina, intesa quale somma tra l'altezza del mozzo e la lunghezza di pala;
- ✓ dall'orientamento del rotore rispetto al recettore;
- ✓ della posizione del sole e quindi della proiezione dell'ombra rispetto ai ricettori;
- ✓ della posizione dei possibili recettori.

Le simulazioni inoltre sono state condotte sia in condizioni reali che in condizioni conservative, assumendo cioè:

- il cielo completamente sgombro da nubi, foschia, ecc..;
- i rotori in rotazione continua;
- l'orientamento dei rotori sempre tale da essere frontale ad i ricettori;

- il terreno piatto, privo di ostacoli;
- il sole ad un'altezza minima pari a 20° sopra l'orizzonte;
- nessun ostacolo interposto tra il recettore e la turbina eolica.

L'intensità del fenomeno è definita come la differenza di luminosità che si percepisce in presenza ed in assenza di flickering in una data posizione.

Avendo le pale una forma rastremata con lo spessore che cresce verso il mozzo, il fenomeno sarà più intenso quanto maggiore sarà la porzione di disco solare coperta dalla pala stessa e quanto minore la distanza dal ricettore. Viceversa, l'intensità del flickering sarà minima quando l'ombra prodotta è generata all'estremità delle pale.

Maggiori distanze tra generatore e ricettore determinano ombre meno nette, e pertanto l'effetto flickering risulterà meno intenso e distinto.

Il fenomeno ovviamente risulta assente sia quando il sole è oscurato da nuvole o nebbia, sia quando, in assenza di vento, le pale del generatore non sono in rotazione.

MODELLO DI CALCOLO

L'analisi dell'impatto da Shadow Flickering prodotto dal parco eolico è realizzata attraverso l'impiego di specifici applicativi che modellano il fenomeno in esame.

I pacchetti software impiegati per la progettazione di impianti eolici contengono moduli specifici per il calcolo e l'analisi del fenomeno di flickering.

L'analisi si basa sull'impiego di un modello digitale del terreno (DTM) dell'area oggetto di progettazione, sulle posizioni degli aerogeneratori con le loro effettive caratteristiche dimensionali e dei ricettori sensibili, nonché sui dati che correlano la posizione del sole nell'arco dell'anno con le condizioni operative delle turbine nello stesso arco di tempo.

Allo scopo è stato impiegato il modulo "Shadow" del software WindPRO che consente di analizzare la posizione del sole nell'arco di un anno per identificare i tempi in cui ogni turbina può proiettare ombre sulle finestre delle abitazioni vicine.

In particolare, il modello permette di:

- calcolare il potenziale per le ombre intermittenti alle finestre delle abitazioni;
- mostrare un calendario grafico degli eventi di flickering;
- mostrare un elenco dettagliato di ciascun evento di ombreggiamento (ora di inizio, di fine, durata del fenomeno, aerogeneratori coinvolti ecc...);
- creare mappe di impatto potenziale che mostrano le ore d'ombra intermittente per l'intero parco eolico o per le singole macchine (curve di isodurata) nell'arco dell'anno.

Al di là di una certa distanza, l'ombra smette di essere un problema perché il rapporto tra lo spessore della pala e il diametro del sole diminuisce considerevolmente.

In genere, l'area soggetta a shadow flicker non si estende oltre i 500m dall'aerogeneratore e le zone a maggiore impatto ricadono entro i 400 m di distanza dalle macchine, con una durata del fenomeno dell'ordine delle 200 ore all'anno.

Il flickering, se presente, per non arrecare eccessivo disturbo non dovrebbe superare in genere i 30 minuti nell'arco di una giornata.

La presente relazione ha lo scopo di stimare le aree potenzialmente interessate dal fenomeno in relazione agli aerogeneratori del presente progetto.

In particolare, la valutazione dell'impatto di shadow flickering può essere condotta attraverso l'analisi di due casi specifici:

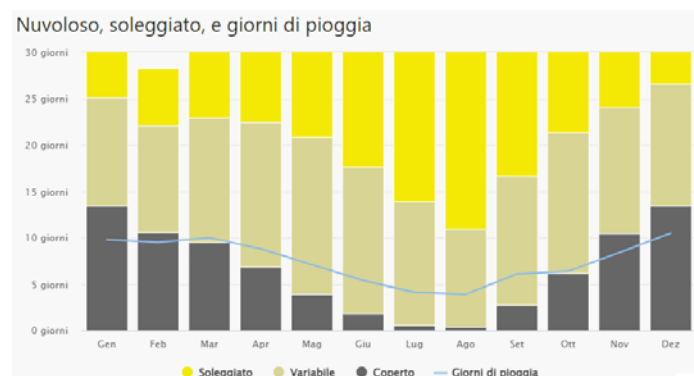
- il *worst case*, in cui viene valutata la massima durata del fenomeno, ossia quella astronomica, che corrisponde alle condizioni di cielo sempre sgombro da nubi, di rotore in movimento continuo e di perpendicolarità tra quest'ultimo ed il potenziale ricettore;
- il *real case*, in cui viene valutata la durata realistica del fenomeno, tenendo conto del soleggiamento effettivo dell'area e delle specifiche condizioni anemologiche che determinano la reale operabilità degli aerogeneratori.

Rispetto al WORST CASE, la probabilità di occorrenza del fenomeno di shadow flickering nel caso reale si riduce di circa il 50% per l'area in esame.

DATI METEO LOCALI

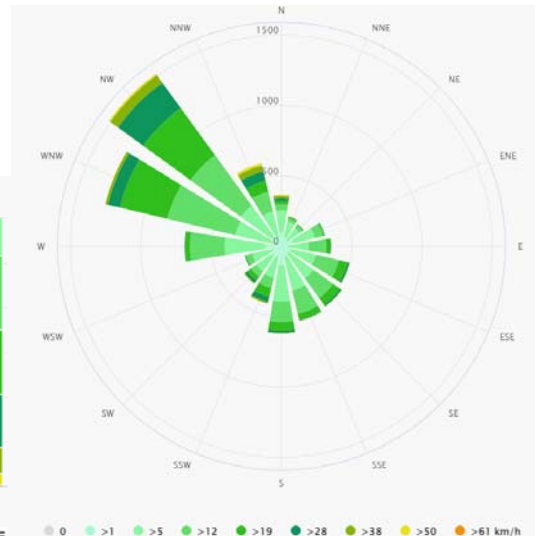
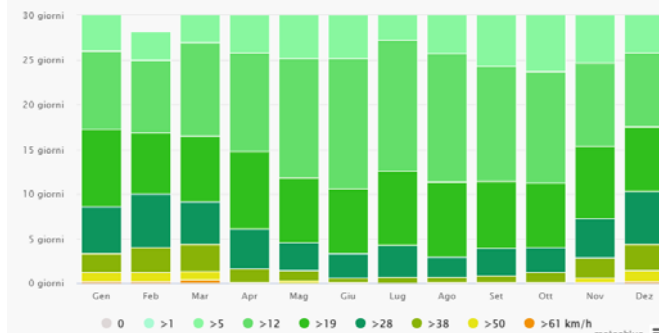
Allo scopo di effettuare un'analisi accurata e finalizzata al sito in questione, per la simulazione del fenomeno di Shadow Flickering sono stati utilizzati i dati meteorologici ottenuti dall'archivio storico del sito Meteoblue.

In particolare si è fatto riferimento ai periodi di tempo soleggiato o nuvoloso nei vari mesi dell'anno, al fine di determinare l'intensità dell'ombreggiamento.



Analogamente è stata analizzata intensità e direzione dei venti rilevati in sito, utili per simulare velocità di rotazione della macchina, direzione del rotore e tempi di fermo dovuti a venti troppo deboli.

Velocità del vento



I dati raccolti sono stati inseriti nel software di simulazione per il calcolo dell'intensità del fenomeno di Shadow flickering.

INDIVIDUAZIONE DEI RECETTORI

In Italia non esiste una normativa nazionale, nè regionale, che definisca con esattezza la corretta interpretazione da attribuire al termine recettore sensibile, con riferimento alla classificazione catastale degli stessi.

Per quanto previsto in altre norme locali, presenti sul territorio italiano, si assumono come recettori sensibili, ai fini della valutazione, rispettivamente:

– "abitazioni": i fabbricati o porzioni di fabbricati che risultino registrati al catasto Fabbricati alle categorie da A/1 a A/10 o al Catasto Terreni quali fabbricati adibiti ad abitazione e dunque provvisti dei requisiti di cui all'art. 9, comma 3 della legge 133/94 "in ogni caso tali unità immobiliari devono risultare anagraficamente sede di residenza e conformi allo strumento vigente alla data di entrata in vigore della L.R. 19 gennaio 2010 n. 1 e s.m.i.;

– "edifici": i fabbricati o porzioni di fabbricati che risultino conformi allo strumento urbanistico vigente e registrati al catasto Fabbricati alle Categorie:

- B/1 Collegi e convitti, educandati; ricoveri; orfanotrofi; ospizi; conventi; seminari; caserme;
- B/2 Case di cura ed ospedali (senza fine di lucro);
- B/5 Scuole e laboratori scientifici;
- D/4 Case di cura ed ospedali (con fine di lucro);
- D/10 Fabbricati per funzioni produttive connesse alle attività agricole, nel caso in cui essi siano e risultino sede di residenza dell'imprenditore. Tali edifici debbano risultare effettivamente sede delle suddette attività.

L'analisi è stata condotta individuando prima di tutto i fabbricati accatastati situati nell'area d'interesse. Successivamente si è passati all'indagine su ortofoto per individuare la presenza di ulteriori edifici, per poi verificarne il loro stato o eventualmente la presenza o meno di utenti all'interno.

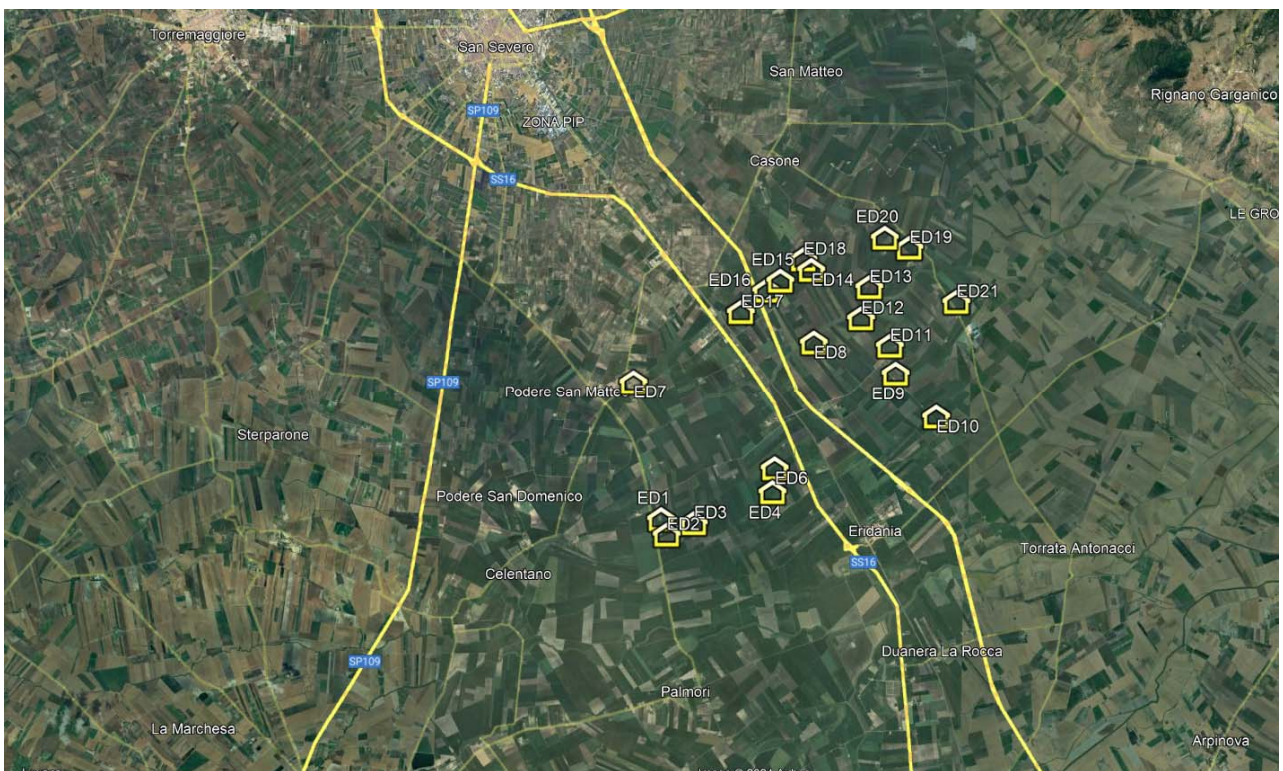
Su un campione di 21 fabbricati, la maggior parte è risultata essere locali ad uso deposito attrezzi, unità collabenti demolite o in totale abbandono.

Non è stato possibile avvicinarsi a breve distanza da alcuni edifici, in quanto collocati al centro di terreni privati non facilmente accessibili.

Il parco eolico infatti è situato in zona prettamente agricola, lontano dai centri abitati o da borghi suburbani, dove tra l'altro non sono presenti attività statiche tipo ufficio che comportino la permanenza a lungo termine di una persona in una stanza.

Presenti inoltre altri impianti rinnovabili (eolici e fotovoltaici) che però non vanno ad aggravare il fenomeno di Shadow Flickering sui recettori individuati.

Di seguito si riporta l'ortofoto con l'indicazione degli edifici analizzati e la tabella con le caratteristiche di ognuno di essi.



PROGETTO EOLICO "DEL TRIO" SAN SEVERO - 108 MW						
RECETTORE	X (EST)	Y (NORD)	Z [m]	ACCATASTATO	STATO	ACCESSIBILE
ED1	535854.00	4603212.65	55	SI	DEMOLITO	SI
ED2	535998.19	4602841.41	55	SI	COLLABENTE	SI
ED3	536649.21	4603131.69	54	SI	CATEGORIA D10	SI
ED4	538547.29	4603921.45	50	SI	CATEGORIA D10	SI
ED5	538643.87	4604003.71	50	SI	EDIFICIO RURALE	SI
ED6	538567.87	4604501.90	49	SI	EDIFICIO RURALE	SI
ED7	535142.40	4606450.21	56	SI	MAGAZZINO C2	SI
ED8	539473.28	4607591.60	43	SI	MAGAZZINO C2	NO
ED9	541479.08	4606873.93	40	NO	COLLABENTE	NO
ED10	542489.63	4605837.93	40	SI	EDIFICIO RURALE	SI
ED11	541323.54	4607546.02	40	SI	COLLABENTE	SI
ED12	540608.06	4608195.56	40	NO	COLLABENTE	NO
ED13	540793.29	4608955.17	39	SI	EDIFICIO RURALE	SI
ED14	539372.67	4609339.93	42	SI	COLLABENTE	NO
ED15	538625.00	4609061.61	45	SI	MAGAZZINO C2	SI
ED16	538290.73	4608814.80	45	SI	COLLABENTE	NO
ED17	537682.17	4608283.45	47	SI	MAGAZZINO C2	NO
ED18	539174.58	4609589.22	43	NO	EDIFICIO RURALE	NO
ED19	541746.56	4609928.53	35	SI	MAGAZZINO C2	SI
ED20	541144.02	4610157.64	38	SI	EDIFICIO RURALE	SI
ED21	542918.25	4608643.18	37	SI	EDIFICIO RURALE	SI

Tra i vari ricettori analizzati sono state prese in considerazione le diverse situazioni esistenti, quali edifici abitati, accatastati ma ormai ridotti ad un cumulo di macerie o ancora esistenti ma non accatastati, e quindi abusivi.

Nella valutazione dell'impatto viene indicata la probabilità che un recettore sia interessato dal fenomeno, in termini di h (ore/anno e giorni/anno).

Nell'allegato si riportano:

1. i risultati generali (Shadow_Main result);
2. il calendario con i risultati specifici mese per mese per area e per ricettore;
3. il calendario grafico di sintesi degli impatti attesi;
4. la mappa delle ore attese per anno;
5. la mappa dei giorni attesi per anno;
6. la mappa dei massimi minuti attesi al giorno.

Si precisa che le determinazioni sono state valutate sia in **condizioni limite** (worst case calculation), al fine di valutare le condizioni peggiori possibili, a tutela delle valutazioni eseguite, che in **condizioni prossime alla realtà** (real case), al fine di analizzare coerentemente le situazioni al limite o quelle i cui risultati fossero particolarmente critici col metodo precedente.

ANALISI DEI RISULTATI OTTENUTI

La simulazione del fenomeno di shadow flickering è stata effettuata considerando le varie componenti che influenzano i risultati, ossia l'orografia del territorio, le caratteristiche dell'aerogeneratore (dimensionali e tecnologiche) e le condizioni meteo.

Dall'analisi dei risultati è emerso che rispetto ai recettori sensibili individuati, la maggior parte non viene interessata dal fenomeno, in quanto situati al di fuori del diagramma generato.

Di seguito si riporta la tabella di sintesi dei risultati ottenuti dalle simulazioni in worst case e in real case, evidenziando in giallo i casi in cui si superano le 100 ore annue.

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
A	SH1	151:54	135	1:28	87:30
B	SH2	0:00	0	0:00	0:00
C	SH3	196:28	144	1:34	122:20
D	SH4	10:40	35	0:26	5:09
E	SH5	103:28	132	1:06	65:05
F	SH6	96:08	112	1:08	38:27
G	SH7	114:26	90	1:32	53:09
H	SH8	36:34	71	0:56	15:07
I	SH9	163:34	148	1:20	102:10
J	SH10	0:00	0	0:00	0:00
K	SH11	31:10	93	0:32	18:57
L	SH12	290:56	158	2:08	97:57
M	SH13	69:48	113	1:02	37:22
N	SH14	103:32	114	1:26	65:28
O	SH15	35:12	61	0:46	15:59
P	SH16	121:10	117	1:22	68:08
Q	SH17	0:00	0	0:00	0:00
R	SH18	542:40	329	2:48	248:51
S	SH19	100:58	110	1:14	37:30
T	SH20	0:00	0	0:00	0:00
U	SH21	61:56	132	0:54	37:14

Nello specifico, il fenomeno risulta essere:

- completamente assente su **n. 4** recettori,
- al di sotto del limite delle 30 ore annue per **n. 4** recettori,
- al di sotto delle 100 ore all'anno su **n. 10** recettori,
- su **n. 3** recettori superiore alle 100 ore annue.

I recettori per i quali viene superato il limite delle 100 ore/anno risultano essere un magazzino, un'unità collabente e un edificio rurale di cui però non è dato sapere con quale frequenza sia abitato.

L'ombreggiamento indotto dagli aerogeneratori del progetto proposto sui recettori potenzialmente sensibili individuati nell'area d'influenza del parco eolico sia da ritenersi trascurabile e non produce un impatto considerevole in considerazione:

- delle condizioni di illuminazione esistenti negli orari in cui si manifesterebbe il fenomeno (dominanza di radiazione diffusa rispetto a quella diretta);

- della breve durata di accadimento del fenomeno (in genere inferiore ad un'ora);
- delle condizioni non reali considerate per l'analisi del fenomeno, ossia il verificarsi contemporaneo delle situazioni più sfavorevoli per un recettore soggetto a *shadow flickering* (concomitanza di assenza di nuvole o nebbia, rotore frontale ai recettori, rotore in movimento continuo, assenza di ostacoli, luce diretta, ecc.).

CONSIDERAZIONI FINALI

Alla luce dell'analisi effettuata, è risultato che il fenomeno di Shadow Flickering si presenta con un'intensità superiore al valore convenzionale di 30 ore annue su 13 edifici che però risultano per la maggior parte collabenti o utilizzati come fabbricati rurali.

Per gli altri recettori presi in considerazione il fenomeno è irrilevante, o gli edifici sono ormai demoliti o totalmente inagibili.

E' importante sottolineare che anche il caso realistico della simulazione del fenomeno, calcolato tenendo conto dell'eliofania locale e delle ore di funzionamento dell'impianto, rappresenta un valore cautelativo, in quanto nella stima non si è tenuto conto degli effetti di mitigazione generati dal fatto che il piano di rotazione delle pale non sempre risulta ortogonale alla direttrice sole-ricettore ed è stata trascurata l'eventuale presenza di ostacoli e/o vegetazione interposti tra il sole ed il singolo ricettore.

Il modello di aerogeneratore scelto per il presente progetto lavora nel range fra i 4,9 e i 12,6 rpm, cui corrisponde una frequenza massima di 0,21Hz, e pertanto la raccomandazione di far lavorare le macchine a velocità di rotazione inferiore ai 20 giri al minuto, equivalente ad una frequenza di molto inferiore ai 2,5Hz in cui si inizia a percepire un senso di fastidio, risulta soddisfatta a prescindere.

Questo comporterà una frequenza di passaggio dell'ombra delle pale notevolmente inferiore a quella ritenuta fastidiosa per la maggior parte degli individui e pertanto l'ombreggiamento indotto dagli aerogeneratori di progetto sui recettori potenzialmente sensibili individuati nell'area d'influenza del parco eolico è da ritenersi trascurabile e tale da non produrre un impatto considerevole.

Si ricorda infine che il limite della 30 ore annue è stato assunto dalla scrivente sulla base delle buone norme estere, ma non esiste una legge italiana che regoli di fatto le modalità di misura e i limiti di riferimento per l'analisi d'impatto del fenomeno di Shadow Flickering.

Foggia, 19/02/2024

Ing. Angela Ottavia CUONZO

ELENCO ALLEGATI

SHADOW_MAIN RESULT

Project:

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DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Main Result

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

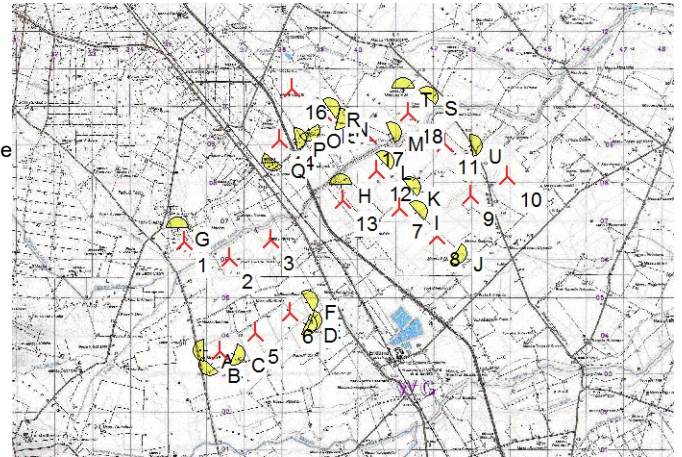
Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,65	0,67	0,70	0,73	0,77	0,85	0,90	0,95	0,83	0,75	0,72	0,65

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
350	230	210	320	370	500	510	520	650	380	300	270

W	WNW	NW	NNW	Sum
700	1 300	1 500	580	8 690



Scale 1:200 000
 ▲ New WTG ▲ Shadow receptor

WTGs

UTM WGS84 Zone: 33				WTG type							
East	North	Z	Row data/Description	Valid	Manufact.	Type	Power [kW]	Diam. [m]	Height [m]	RPM [RPM]	
1	535 331	4 606 091	53 S1	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
2	536 509	4 605 665	51 S2	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
3	537 609	4 606 150	50 S3	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
4	536 265	4 603 194	55 S4	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
5	537 218	4 603 670	52 S5	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
6	538 114	4 604 220	50 S6	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
7	541 016	4 606 992	41 S7	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
8	542 031	4 606 256	40 S8	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
9	542 921	4 607 330	37 S9	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
10	543 887	4 607 839	35 S10	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
11	542 235	4 608 707	37 S11	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
12	540 429	4 607 983	40 S12	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
13	539 528	4 607 191	44 S13	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
14	537 846	4 608 790	46 S14	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
15	539 021	4 609 513	43 S15	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
16	538 183	4 610 147	43 S16	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
17	540 204	4 608 903	40 S17	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	
18	541 248	4 609 518	37 S18	Yes	VESTAS	V162-6.0	6 000	162,0	119,0	0,0	

Shadow receptor-Input

UTM WGS84 Zone: 33										
No.	Name	East	North	Z	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	
A	SH1	535 852	4 603 217	55	3,0	1,0	1,0	-89,6	90,0	
B	SH2	536 000	4 602 839	55	2,0	1,0	1,0	-138,9	90,0	
C	SH3	536 659	4 603 115	54	4,0	1,0	1,0	-252,5	90,0	
D	SH4	538 552	4 603 921	50	5,0	1,0	1,0	-244,1	90,0	
E	SH5	538 680	4 604 003	50	4,0	1,0	1,0	-248,2	90,0	
F	SH6	538 593	4 604 514	49	2,0	1,0	1,0	61,1	90,0	
G	SH7	535 138	4 606 453	56	2,0	1,0	1,0	0,0	90,0	
H	SH8	539 471	4 607 597	43	3,0	1,0	1,0	0,0	90,0	
I	SH9	541 482	4 606 892	40	4,0	1,0	1,0	51,6	90,0	
J	SH10	542 518	4 605 795	40	3,0	1,0	1,0	-237,9	90,0	
K	SH11	541 313	4 607 520	40	3,0	1,0	1,0	46,7	90,0	
L	SH12	540 599	4 608 214	40	3,0	1,0	1,0	45,6	90,0	

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Project:

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DEL TRIO - SAN SEVERO

Calculated:

20/02/2024 11:29/2.4.0.62

SHADOW - Main Result**Calculation:** IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO

...continued from previous page

UTM WGS84 Zone: 33

No.	Name	East	North	Z	Width	Height	Height	Degrees from	Slope of
							a.g.l.	south cw	window
				[m]	[m]	[m]	[m]	[°]	[°]
M	SH13	540 798	4 608 970	39	3,0	1,0	1,0	63,5	90,0
N	SH14	539 389	4 609 348	42	2,0	1,0	1,0	-257,9	90,0
O	SH15	538 624	4 609 052	45	3,0	1,0	1,0	-209,0	90,0
P	SH16	538 287	4 608 812	45	2,0	1,0	1,0	-280,4	90,0
Q	SH17	537 695	4 608 276	47	3,0	1,0	1,0	-141,7	90,0
R	SH18	539 180	4 609 603	43	2,0	1,0	1,0	54,6	90,0
S	SH19	541 768	4 609 930	35	2,0	1,0	1,0	43,0	90,0
T	SH20	541 130	4 610 154	38	3,0	1,0	1,0	0,0	90,0
U	SH21	542 947	4 608 653	37	3,0	1,0	1,0	80,7	90,0

Calculation Results

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours per year	Shadow days per year	Max shadow hours per day	Shadow hours per year
		[h/year]	[days/year]	[h/day]	[h/year]
A	SH1	151:54	135	1:28	87:30
B	SH2	0:00	0	0:00	0:00
C	SH3	196:28	144	1:34	122:20
D	SH4	10:40	35	0:26	5:09
E	SH5	103:28	132	1:06	65:05
F	SH6	96:08	112	1:08	38:27
G	SH7	114:26	90	1:32	53:09
H	SH8	36:34	71	0:56	15:07
I	SH9	163:34	148	1:20	102:10
J	SH10	0:00	0	0:00	0:00
K	SH11	31:10	93	0:32	18:57
L	SH12	290:56	158	2:08	97:57
M	SH13	69:48	113	1:02	37:22
N	SH14	103:32	114	1:26	65:28
O	SH15	35:12	61	0:46	15:59
P	SH16	121:10	117	1:22	68:08
Q	SH17	0:00	0	0:00	0:00
R	SH18	542:40	329	2:48	248:51
S	SH19	100:58	110	1:14	37:30
T	SH20	0:00	0	0:00	0:00
U	SH21	61:56	132	0:54	37:14

Project:

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DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: A - SH1

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June		
1	07:26 16:39	07:12 17:13	06:35 17:48	06:44 19:23	07:18 (4) 08:40 (4)	05:57 19:56	06:16 (5) 08:18 (4)	05:28 20:26
2	07:26 16:40	07:11 17:15	06:34 17:49	06:42 19:24	07:16 (4) 08:40 (4)	05:56 19:57	06:15 (5) 08:17 (4)	05:27 20:27
3	07:26 16:40	07:10 17:16	06:32 17:51	06:40 19:25	07:15 (4) 08:41 (4)	05:54 19:58	06:14 (5) 08:16 (4)	05:27 20:27
4	07:26 16:41	07:09 17:17	06:30 17:52	06:39 19:26	07:15 (4) 08:41 (4)	05:53 19:59	06:13 (5) 08:15 (4)	05:26 20:28
5	07:26 16:42	07:08 17:19	06:29 17:53	06:37 19:27	07:13 (4) 08:39 (4)	05:52 20:00	06:12 (5) 08:14 (4)	05:26 20:29
6	07:26 16:43	07:06 17:20	06:27 17:54	06:35 19:29	07:14 (4) 08:40 (4)	05:51 20:01	06:10 (5) 08:12 (4)	05:26 20:29
7	07:26 16:44	07:05 17:21	06:26 17:55	06:34 19:30	07:14 (4) 08:40 (4)	05:49 20:02	06:09 (5) 08:09 (4)	05:25 20:30
8	07:26 16:45	07:04 17:22	06:24 17:56	06:32 19:31	07:12 (4) 08:38 (4)	05:48 20:03	06:08 (5) 08:08 (4)	05:25 20:31
9	07:25 16:46	07:03 17:24	06:22 17:58	06:30 19:32	07:13 (4) 08:39 (4)	05:47 20:04	06:07 (5) 08:05 (4)	05:25 20:31
10	07:25 16:47	07:02 17:25	06:21 17:59	06:29 19:33	07:11 (4) 08:39 (4)	05:46 20:05	06:06 (5) 08:04 (4)	05:25 20:32
11	07:25 16:48	07:01 17:26	06:19 18:00	06:27 19:34	07:12 (4) 08:38 (4)	05:45 20:06	06:07 (5) 08:01 (4)	05:24 20:32
12	07:25 16:49	06:59 17:27	06:17 18:01	06:25 19:35	07:12 (4) 08:38 (4)	05:44 20:07	06:08 (5) 07:58 (4)	05:24 20:33
13	07:24 16:50	06:58 17:29	06:16 18:02	06:24 19:36	07:10 (4) 08:36 (4)	05:43 20:08	06:07 (5) 07:55 (4)	05:24 20:33
14	07:24 16:52	06:57 17:30	06:14 18:03	06:22 19:37	07:11 (4) 08:37 (4)	05:41 20:09	06:08 (5) 06:28 (5)	05:24 20:34
15	07:24 16:53	06:55 17:31	06:12 18:04	06:21 19:38	07:11 (4) 08:35 (4)	05:40 20:10	06:09 (5) 06:27 (5)	05:24 20:34
16	07:23 16:54	06:54 17:32	06:11 18:06	06:20 19:39	07:12 (4) 08:34 (4)	05:39 20:11	06:10 (5) 06:26 (5)	05:24 20:35
17	07:23 16:55	06:53 17:34	06:09 18:07	06:17 19:41	07:10 (4) 08:34 (4)	05:39 20:12	06:13 (5) 06:25 (5)	05:24 20:35
18	07:22 16:56	06:51 17:35	06:07 18:08	06:16 19:42	07:11 (4) 08:33 (4)	05:38 20:13	06:14 (5) 06:22 (5)	05:24 20:35
19	07:22 16:57	06:50 17:36	06:06 18:09	06:14 19:43	07:11 (4) 08:31 (4)	05:37 20:14	05:24 20:36	05:24 20:36
20	07:21 16:59	06:49 17:37	06:04 18:10	06:13 19:44	07:12 (4) 08:32 (4)	05:36 20:15	05:24 20:36	05:24 20:36
21	07:21 17:00	06:47 17:39	06:02 18:11	06:11 19:45	07:12 (4) 08:30 (4)	05:35 20:16	05:25 20:36	05:25 20:36
22	07:20 17:01	06:46 17:40	06:01 18:12	06:10 19:46	07:13 (4) 08:29 (4)	05:34 20:17	05:25 20:36	05:25 20:36
23	07:19 17:02	06:44 17:41	05:59 18:13	06:08 19:47	07:11 (4) 08:27 (4)	05:33 20:18	05:25 20:37	05:25 20:37
24	07:19 17:03	06:43 17:42	05:57 18:14	06:07 19:48	07:12 (4) 08:28 (4)	05:33 20:19	05:25 20:37	05:25 20:37
25	07:18 17:05	06:41 17:43	05:55 18:15	06:05 19:49	07:12 (4) 08:26 (4)	05:32 20:20	05:26 20:37	05:26 20:37
26	07:17 17:06	06:40 17:45	05:54 18:17	06:04 19:50	06:23 (5) 08:25 (4)	05:31 20:21	05:26 20:37	05:26 20:37
27	07:16 17:07	06:38 17:46	05:52 18:18	06:03 19:51	06:22 (5) 08:24 (4)	05:30 20:22	05:26 20:37	05:26 20:37
28	07:15 17:08	06:37 17:47	05:50 18:19	06:01 19:52	06:20 (5) 08:22 (4)	05:30 20:23	05:27 20:37	05:27 20:37
29	07:15 17:10	06:49 19:20	06:49 19:20	06:00 19:54	06:19 (5) 08:21 (4)	05:29 20:23	05:27 20:37	05:27 20:37
30	07:14 17:11	06:47 19:21	06:47 19:21	05:58 19:55	06:18 (5) 08:20 (4)	05:29 20:24	05:27 20:37	05:27 20:37
31	07:13 17:12	06:45 19:22	06:45 19:22	07:18 (4) 08:40 (4)	05:28 20:25	05:28 20:25	05:28 20:25	05:28 20:25
Potential sun hours	296	296	369	399	450	450	454	454
Total, worst case			1148	2458			922	
Sun reduction			0,70	0,73			0,77	
Oper. time red.			0,99	0,99			0,99	
Wind dir. red.			0,72	0,72			0,69	
Total reduction			0,50	0,52			0,53	
Total, real			576	1283			486	

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: A - SH1

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December
1	05:28 20:37	05:52 20:17	06:17 (5) 19:34	06:24 19:34	07:11 (4) 18:42	06:55 16:55
2	05:28 20:37	05:53 20:16	06:18 (5) 19:32	06:25 19:32	07:10 (4) 18:41	06:56 16:54
3	05:29 20:37	05:54 20:15	06:16 (5) 19:30	06:26 19:30	07:11 (4) 18:39	06:57 16:52
4	05:29 20:36	05:55 20:14	06:17 (5) 19:29	06:27 19:29	07:10 (4) 18:37	06:58 16:51
5	05:30 20:36	05:56 20:13	06:18 (5) 19:27	06:28 19:27	07:11 (4) 18:36	06:59 16:50
6	05:31 20:36	05:57 20:12	06:19 (5) 19:25	06:29 19:25	07:10 (4) 18:34	07:00 16:49
7	05:31 20:36	05:58 20:10	06:20 (5) 19:24	06:30 19:24	07:09 (4) 18:32	06:37 16:48
8	05:32 20:35	05:59 20:09	06:21 (5) 19:22	06:31 19:22	07:10 (4) 18:31	06:38 16:47
9	05:33 20:35	06:00 20:08	06:22 (5) 19:20	06:32 19:20	07:08 (4) 18:29	06:39 16:45
10	05:33 20:34	06:01 20:07	06:23 (5) 19:18	06:33 19:18	07:09 (4) 18:27	06:40 16:44
11	05:34 20:34	06:02 20:05	06:24 (5) 19:17	06:34 19:17	07:10 (4) 18:26	06:42 16:43
12	05:35 20:34	06:03 20:04	06:25 (5) 19:15	06:35 19:15	07:09 (4) 18:24	06:43 16:42
13	05:35 20:33	06:04 20:03	06:26 (5) 19:13	06:36 19:13	07:10 (4) 18:22	06:44 16:41
14	05:36 20:33	06:05 20:01	06:27 (5) 19:12	06:37 19:12	07:09 (4) 18:21	06:45 16:41
15	05:37 20:32	06:06 20:00	06:28 (5) 19:10	06:38 19:10	07:10 (4) 18:19	06:47 16:40
16	05:38 20:31	06:07 19:58	06:29 (5) 19:08	06:39 19:08	07:11 (4) 18:18	06:48 16:39
17	05:39 20:31	06:08 19:57	06:30 (5) 19:06	06:40 19:06	07:12 (4) 18:16	06:49 16:38
18	05:39 20:30	06:09 19:55	06:31 (4) 19:05	06:41 19:05	07:13 (4) 18:15	06:50 16:37
19	05:40 20:29	06:10 19:54	06:32 (4) 19:03	06:42 19:03	07:12 (4) 18:13	06:51 16:36
20	05:41 20:29	06:11 19:53	06:33 (4) 19:01	06:43 19:01	07:13 (4) 18:12	06:53 16:36
21	05:42 20:28	06:13 19:51	06:34 (4) 18:59	06:44 18:59	07:14 (4) 18:10	06:54 16:35
22	05:43 20:27	06:14 19:49	06:35 (4) 18:58	06:45 18:58	07:15 (4) 18:09	06:55 16:34
23	05:44 20:26	06:15 19:48	06:36 (4) 18:56	06:46 18:56	07:16 (4) 18:07	06:56 16:34
24	05:45 20:25	06:16 19:46	06:37 (4) 18:54	06:47 18:54	07:17 (4) 18:06	06:57 16:33
25	05:46 20:24	06:17 (5) 19:45	06:38 (4) 18:53	06:48 18:53	07:20 (4) 17:04	06:58 16:32
26	05:46 20:24	06:23 (5) 19:43	06:18 (5) 18:51	06:49 18:51	07:21 (4) 17:03	06:59 16:32
27	05:47 20:23	06:22 (5) 19:42	06:19 (4) 18:49	06:50 18:49	07:24 (4) 17:01	07:01 16:31
28	05:48 20:22	06:21 (5) 19:40	06:36 (4) 18:47	06:51 18:47	08:08 (4) 17:00	16:31 16:35
29	05:49 20:21	06:20 (5) 19:38	06:37 (4) 18:46	06:52 18:46	07:31 (4) 16:59	07:03 16:31
30	05:50 20:20	06:19 (5) 19:37	06:38 (5) 18:44	06:53 18:44	08:01 (4) 16:57	16:31 16:30
31	05:51 20:19	06:18 (5) 19:35	06:22 (4) 18:42	06:54 18:42	07:56 (4) 16:57	16:30 16:30
Potential sun hours	461	429	375	345	297	286
Total, worst case	142	2338	2106			
Sun reduction	0,90	0,95	0,83			
Oper. time red.	0,99	0,99	0,99			
Wind dir. red.	0,66	0,71	0,72			
Total reduction	0,59	0,67	0,59			
Total, real	84	1568	1253			

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:

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: B - SH2

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26	07:12	06:35	06:44	05:57	05:28	05:28	05:52	06:24	06:55	06:30	07:05
	16:39	17:13	17:48	19:23	19:56	20:26	20:37	20:17	19:34	18:42	16:55	16:30
2	07:26	07:11	06:34	06:42	05:56	05:27	05:28	05:53	06:25	06:56	06:31	07:06
	16:40	17:15	17:49	19:24	19:57	20:27	20:37	20:16	19:32	18:41	16:54	16:30
3	07:26	07:10	06:32	06:40	05:54	05:27	05:29	05:54	06:26	06:57	06:32	07:07
	16:40	17:16	17:51	19:25	19:58	20:27	20:37	20:15	19:30	18:39	16:52	16:29
4	07:26	07:09	06:30	06:39	05:53	05:26	05:29	05:55	06:27	06:58	06:33	07:08
	16:41	17:17	17:52	19:26	19:59	20:28	20:36	20:14	19:29	18:37	16:51	16:29
5	07:26	07:08	06:29	06:37	05:52	05:26	05:30	05:56	06:28	06:59	06:34	07:09
	16:42	17:19	17:53	19:27	20:00	20:29	20:36	20:13	19:27	18:36	16:50	16:29
6	07:26	07:06	06:27	06:35	05:51	05:26	05:31	05:57	06:29	07:00	06:36	07:10
	16:43	17:20	17:54	19:29	20:01	20:29	20:36	20:12	19:25	18:34	16:49	16:29
7	07:26	07:05	06:26	06:34	05:49	05:25	05:31	05:58	06:30	07:01	06:37	07:11
	16:44	17:21	17:55	19:30	20:02	20:30	20:36	20:10	19:24	18:32	16:48	16:29
8	07:26	07:04	06:24	06:32	05:48	05:25	05:32	05:59	06:31	07:02	06:38	07:12
	16:45	17:22	17:56	19:31	20:03	20:31	20:35	20:09	19:22	18:31	16:47	16:29
9	07:25	07:03	06:22	06:30	05:47	05:25	05:33	06:00	06:32	07:03	06:39	07:13
	16:46	17:24	17:58	19:32	20:04	20:31	20:35	20:08	19:20	18:29	16:45	16:29
10	07:25	07:02	06:21	06:29	05:46	05:25	05:33	06:01	06:33	07:04	06:40	07:14
	16:47	17:25	17:59	19:33	20:05	20:32	20:34	20:07	19:18	18:27	16:44	16:29
11	07:25	07:01	06:19	06:27	05:45	05:24	05:34	06:02	06:34	07:05	06:42	07:15
	16:48	17:26	18:00	19:34	20:06	20:32	20:34	20:05	19:17	18:26	16:43	16:29
12	07:25	06:59	06:17	06:25	05:44	05:24	05:35	06:03	06:35	07:06	06:43	07:15
	16:49	17:27	18:01	19:35	20:07	20:33	20:34	20:04	19:15	18:24	16:42	16:29
13	07:24	06:58	06:16	06:24	05:43	05:24	05:35	06:04	06:36	07:07	06:44	07:16
	16:50	17:29	18:02	19:36	20:08	20:33	20:33	20:03	19:13	18:22	16:41	16:29
14	07:24	06:57	06:14	06:22	05:41	05:24	05:36	06:05	06:37	07:09	06:45	07:17
	16:52	17:30	18:03	19:37	20:09	20:34	20:33	20:01	19:12	18:21	16:41	16:29
15	07:24	06:55	06:12	06:21	05:40	05:24	05:37	06:06	06:38	07:10	06:47	07:18
	16:53	17:31	18:04	19:38	20:10	20:34	20:32	20:00	19:10	18:19	16:40	16:29
16	07:23	06:54	06:11	06:19	05:39	05:24	05:38	06:07	06:39	07:11	06:48	07:18
	16:54	17:32	18:05	19:39	20:11	20:35	20:31	19:58	19:08	18:18	16:39	16:30
17	07:23	06:53	06:09	06:17	05:39	05:24	05:39	06:08	06:40	07:12	06:49	07:19
	16:55	17:34	18:07	19:40	20:12	20:35	20:31	19:57	19:06	18:16	16:38	16:30
18	07:22	06:51	06:07	06:16	05:38	05:24	05:39	06:09	06:41	07:13	06:50	07:20
	16:56	17:35	18:08	19:42	20:13	20:35	20:30	19:55	19:05	18:15	16:37	16:30
19	07:22	06:50	06:06	06:14	05:37	05:24	05:40	06:10	06:42	07:14	06:51	07:20
	16:57	17:36	18:09	19:43	20:14	20:36	20:29	19:54	19:03	18:13	16:36	16:31
20	07:21	06:49	06:04	06:13	05:36	05:24	05:41	06:11	06:43	07:15	06:53	07:21
	16:59	17:37	18:10	19:44	20:15	20:36	20:29	19:52	19:01	18:12	16:36	16:31
21	07:21	06:47	06:02	06:11	05:35	05:25	05:42	06:13	06:44	07:17	06:54	07:22
	17:00	17:39	18:11	19:45	20:16	20:36	20:28	19:51	18:59	18:10	16:35	16:31
22	07:20	06:46	06:01	06:10	05:34	05:25	05:43	06:14	06:45	07:18	06:55	07:22
	17:01	17:40	18:12	19:46	20:17	20:36	20:27	19:49	18:58	18:09	16:34	16:32
23	07:19	06:44	05:59	06:08	05:33	05:25	05:44	06:15	06:46	07:19	06:56	07:23
	17:02	17:41	18:13	19:47	20:18	20:37	20:26	19:48	18:56	18:07	16:34	16:32
24	07:19	06:43	05:57	06:07	05:33	05:25	05:45	06:16	06:47	07:20	06:57	07:23
	17:03	17:42	18:14	19:48	20:19	20:37	20:25	19:46	18:54	18:06	16:33	16:33
25	07:18	06:41	05:55	06:05	05:32	05:26	05:46	06:17	06:48	07:21	06:58	07:24
	17:05	17:43	18:15	19:49	20:20	20:37	20:24	19:45	18:53	17:04	16:32	16:33
26	07:17	06:40	05:54	06:04	05:31	05:26	05:46	06:18	06:49	07:22	06:59	07:24
	17:06	17:45	18:17	19:50	20:21	20:37	20:24	19:43	18:51	17:03	16:32	16:34
27	07:16	06:38	05:52	06:03	05:30	05:26	05:47	06:19	06:50	07:24	07:01	07:24
	17:07	17:46	18:18	19:51	20:22	20:37	20:23	19:42	18:49	17:01	16:31	16:35
28	07:15	06:37	05:50	06:01	05:30	05:27	05:48	06:20	06:51	07:25	07:02	07:25
	17:08	17:47	18:19	19:52	20:23	20:37	20:22	19:40	18:47	17:00	16:31	16:35
29	07:15		06:49	06:00	05:29	05:27	05:49	06:21	06:52	07:26	07:03	07:25
	17:10		19:20	19:54	20:23	20:37	20:21	19:38	18:46	16:59	16:31	16:36
30	07:14		06:47	05:58	05:29	05:27	05:50	06:22	06:53	07:27	07:04	07:25
	17:11		19:21	19:55	20:24	20:37	20:20	19:37	18:44	16:57	16:30	16:37
31	07:13		06:45		05:28		05:51	06:23		06:28		07:25
	17:12		19:22		20:25		20:18	19:35		16:56		16:38
Potential sun hours	296	296	369	399	450	454	461	429	375	345	297	286
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

Project:

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: C - SH3

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June
1	07:26 16:39	07:12 17:13	06:35 17:48	06:44 19:23	05:57 19:56	17:50 (4) 19:16 (4)
2	07:26 16:40	07:11 17:15	06:34 17:49	06:42 19:24	05:56 19:57	17:51 (4) 19:17 (4)
3	07:26 16:40	07:10 17:16	06:32 17:51	06:40 19:25	05:54 19:58	17:50 (4) 19:18 (4)
4	07:26 16:41	07:09 17:17	06:30 17:52	06:38 19:26	05:53 19:59	17:49 (4) 19:19 (4)
5	07:26 16:42	07:08 17:19	06:29 17:53	06:37 19:27	05:52 20:00	17:49 (4) 19:19 (4)
6	07:26 16:43	07:06 17:20	06:27 17:54	06:35 19:29	05:51 20:01	17:48 (4) 19:18 (4)
7	07:26 16:44	07:05 17:21	06:26 17:55	06:33 19:30	05:49 20:02	17:49 (4) 19:19 (4)
8	07:26 16:45	07:04 17:22	06:24 17:56	06:32 19:31	05:48 20:03	17:48 (4) 19:20 (4)
9	07:25 16:46	07:03 17:24	06:22 17:58	06:30 19:32	05:47 20:04	17:49 (4) 19:21 (4)
10	07:25 16:47	07:02 17:25	06:21 17:59	06:29 19:33	05:46 20:05	17:48 (4) 19:20 (4)
11	07:25 16:48	07:01 17:26	06:19 18:00	06:27 19:34	05:45 20:06	17:49 (4) 19:21 (4)
12	07:25 16:49	06:59 17:27	06:17 18:01	06:25 19:35	05:44 20:07	17:48 (4) 19:20 (4)
13	07:24 16:50	06:58 17:29	06:16 18:02	06:24 19:36	05:43 20:08	17:49 (4) 19:21 (4)
14	07:24 16:52	06:57 17:30	06:14 18:03	06:22 19:37	05:41 20:09	17:48 (4) 19:20 (4)
15	07:24 16:53	06:55 17:31	06:12 18:04	06:21 19:38	05:40 20:10	17:49 (4) 19:21 (4)
16	07:23 16:54	06:54 17:32	06:11 18:05	06:19 19:39	05:39 20:11	17:48 (4) 19:22 (4)
17	07:23 16:55	06:53 17:34	06:09 18:07	06:17 19:40	05:38 20:12	17:49 (4) 19:21 (4)
18	07:22 16:56	06:51 17:35	06:07 18:08	06:16 19:42	05:38 20:13	17:48 (4) 19:20 (4)
19	07:22 16:57	06:50 17:36	06:06 18:09	06:14 19:43	05:37 20:14	17:49 (4) 19:21 (4)
20	07:21 16:59	06:49 17:37	06:04 18:10	06:13 19:44	05:36 20:15	17:49 (4) 19:21 (4)
21	07:21 17:00	06:47 17:39	06:02 18:11	06:11 19:45	05:35 20:16	17:50 (4) 19:22 (4)
22	07:20 17:01	06:46 17:40	06:00 18:12	06:10 19:46	05:34 20:17	17:49 (4) 19:21 (4)
23	07:19 17:02	06:44 17:41	05:59 18:13	06:08 19:47	05:33 20:18	17:48 (4) 19:22 (4)
24	07:19 17:03	06:43 17:42	05:57 18:14	06:07 19:48	05:32 20:19	17:50 (4) 19:22 (4)
25	07:18 17:05	06:41 17:43	05:55 18:15	06:05 19:49	05:32 20:20	17:49 (4) 19:21 (4)
26	07:17 17:06	06:40 17:45	05:54 18:17	06:04 19:50	05:31 20:21	17:50 (4) 19:22 (4)
27	07:16 17:07	06:38 17:46	05:52 18:18	06:02 19:51	05:30 20:22	17:50 (4) 19:22 (4)
28	07:15 17:08	06:37 17:47	05:50 18:19	06:01 19:52	05:30 20:23	17:51 (4) 19:21 (4)
29	07:14 17:10		06:49 19:20	06:00 19:53	05:29 20:23	17:51 (4) 19:21 (4)
30	07:14 17:11		06:47 19:21	05:58 19:55	05:29 20:24	17:52 (4) 19:22 (4)
31	07:13 17:12		06:45 19:22		05:28 20:25	17:52 (4) 19:22 (4)
Potential sun hours	296	296	369	399	450	454
Total, worst case				1254	2824	2590
Sun reduction				0,73	0,77	0,85
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,74	0,74	0,74
Total reduction				0,54	0,56	0,62
Total, real				671	1594	1614

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO **Shadow receptor:** C - SH3

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December	
1	05:28 20:37	18:01 (4) 19:27 (4)	05:52 20:17	17:59 (4) 19:31 (4)	06:24 18:31 (4)	06:29 18:42	07:05 16:30
2	05:28 20:37	17:59 (4) 19:27 (4)	05:53 20:16	17:57 (4) 19:31 (4)	06:25 19:32	06:56 18:41	07:06 16:30
3	05:29 20:37	18:00 (4) 19:28 (4)	05:54 20:15	17:58 (4) 19:30 (4)	06:26 19:30	06:57 18:39	07:07 16:29
4	05:29 20:36	18:00 (4) 19:28 (4)	05:55 20:14	17:57 (4) 19:29 (4)	06:27 19:29	06:58 18:37	07:08 16:29
5	05:30 20:36	18:01 (4) 19:27 (4)	05:56 20:13	17:58 (4) 19:30 (4)	06:28 19:27	06:59 18:35	07:09 16:29
6	05:31 20:36	17:59 (4) 19:27 (4)	05:57 20:12	17:59 (4) 19:29 (4)	06:29 19:25	07:00 18:34	07:10 16:29
7	05:31 20:36	18:00 (4) 19:28 (4)	05:58 20:10	17:58 (4) 19:28 (4)	06:30 19:24	07:01 18:32	07:11 16:29
8	05:32 20:35	18:01 (4) 19:29 (4)	05:59 20:09	17:59 (4) 19:27 (4)	06:31 19:22	07:02 18:30	07:12 16:29
9	05:33 20:35	17:59 (4) 19:29 (4)	06:00 20:08	17:58 (4) 19:28 (4)	06:32 19:20	07:03 18:29	07:13 16:29
10	05:33 20:34	18:00 (4) 19:30 (4)	06:01 20:07	17:59 (4) 19:27 (4)	06:33 19:18	07:04 18:27	07:14 16:29
11	05:34 20:34	18:01 (4) 19:29 (4)	06:02 20:05	18:00 (4) 19:26 (4)	06:34 19:17	07:05 18:26	07:15 16:29
12	05:35 20:34	17:59 (4) 19:29 (4)	06:03 20:04	17:59 (4) 19:25 (4)	06:35 19:15	07:06 18:24	07:15 16:29
13	05:35 20:33	18:00 (4) 19:30 (4)	06:04 20:03	18:00 (4) 19:24 (4)	06:36 19:13	07:07 18:22	07:16 16:29
14	05:36 20:32	17:59 (4) 19:31 (4)	06:05 20:01	18:01 (4) 19:23 (4)	06:37 19:12	07:09 18:21	07:17 16:29
15	05:37 20:32	18:00 (4) 19:30 (4)	06:06 20:00	18:00 (4) 19:22 (4)	06:38 19:10	07:10 18:19	07:18 16:29
16	05:38 20:31	18:00 (4) 19:30 (4)	06:07 19:58	18:01 (4) 19:21 (4)	06:39 19:08	07:11 18:18	07:18 16:29
17	05:39 20:31	17:59 (4) 19:31 (4)	06:08 19:57	18:02 (4) 19:20 (4)	06:40 19:06	07:12 18:16	07:19 16:30
18	05:39 20:30	18:00 (4) 19:30 (4)	06:09 19:55	18:03 (4) 19:19 (4)	06:41 19:05	07:13 18:15	07:20 16:30
19	05:40 20:29	17:59 (4) 19:31 (4)	06:10 19:54	18:02 (4) 19:18 (4)	06:42 19:03	07:14 18:13	07:20 16:30
20	05:41 20:29	18:00 (4) 19:32 (4)	06:11 19:52	18:03 (4) 19:17 (4)	06:43 19:01	07:15 18:11	07:21 16:31
21	05:42 20:28	17:59 (4) 19:31 (4)	06:12 19:51	18:04 (4) 19:16 (4)	06:44 18:59	07:16 18:10	07:22 16:31
22	05:43 20:27	17:59 (4) 19:31 (4)	06:14 19:49	18:05 (4) 19:15 (4)	06:45 18:58	07:18 18:09	07:22 16:32
23	05:44 20:26	17:58 (4) 19:32 (4)	06:15 19:48	18:06 (4) 19:12 (4)	06:46 18:56	07:19 18:07	07:23 16:32
24	05:45 20:25	17:59 (4) 19:31 (4)	06:16 19:46	18:07 (4) 19:11 (4)	06:47 18:54	07:20 18:06	07:23 16:33
25	05:46 20:24	17:58 (4) 19:32 (4)	06:17 19:45	18:10 (4) 19:08 (4)	06:48 18:53	06:21 17:04	06:58 16:33
26	05:46 20:23	17:59 (4) 19:31 (4)	06:18 19:43	18:11 (4) 19:07 (4)	06:49 18:51	06:22 17:03	06:59 16:34
27	05:47 20:23	17:58 (4) 19:32 (4)	06:19 19:42	18:12 (4) 19:04 (4)	06:50 18:49	06:23 17:01	07:01 16:35
28	05:48 20:22	17:59 (4) 19:31 (4)	06:20 19:40	18:15 (4) 19:01 (4)	06:51 18:47	06:25 17:00	07:02 16:35
29	05:49 20:21	17:58 (4) 19:32 (4)	06:21 19:38	18:16 (4) 18:58 (4)	06:52 18:46	06:26 16:59	07:03 16:36
30	05:50 20:20	17:59 (4) 19:31 (4)	06:22 19:37	18:19 (4) 18:55 (4)	06:53 18:44	06:27 16:57	07:04 16:37
31	05:51 20:18	17:58 (4) 19:32 (4)	06:23 19:35	18:24 (4) 18:50 (4)	06:54 18:45	06:28 16:56	07:05 16:38
Potential sun hours	461	429	375	345	297	286	
Total, worst case	2808	2300	12				
Sun reduction	0,90	0,95	0,83				
Oper. time red.	0,99	0,99	0,99				
Wind dir. red.	0,74	0,74	0,74				
Total reduction	0,66	0,70	0,61				
Total, real	1852	1602	7				

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:

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: D - SH4

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1300 1500 580 8690

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:25 16:39	07:12 17:13	06:35 17:48	4 17:22 (5) 19:23	06:43 19:23	05:57 19:56	05:27 20:26	05:28 20:37	05:52 20:17	06:24 19:33		07:05 16:30
2	07:26 16:39	07:11 17:15	06:33 17:49	6 17:21 (5) 19:24	06:42 19:24	05:56 19:57	05:27 20:26	05:28 20:37	05:53 20:16	06:25 19:32	26 18:18 (5)	07:06 16:29
3	07:26 16:40	07:10 17:16	06:32 17:50	12 17:17 (5) 19:25	06:40 19:25	05:54 19:58	05:26 20:27	05:29 20:36	05:54 20:15	06:26 19:30	24 18:15 (5)	07:07 16:29
4	07:26 16:41	07:09 17:17	06:30 17:52	14 17:15 (5) 19:26	06:38 19:26	05:53 19:59	05:26 20:28	05:29 20:36	05:55 20:14	06:27 19:29	24 18:14 (5)	07:08 16:29
5	07:26 16:42	07:07 17:18	06:29 17:53	16 17:16 (5) 19:27	06:37 19:27	05:52 20:00	05:26 20:29	05:30 20:36	05:56 20:13	06:28 19:27	24 18:13 (5)	07:09 16:29
6	07:26 16:43	07:06 17:20	06:27 17:54	18 17:14 (5) 19:28	06:35 19:28	05:50 20:01	05:25 20:29	05:30 20:36	05:57 20:12	06:29 19:25	20 18:10 (5)	07:10 16:29
7	07:26 16:44	07:05 17:21	06:25 17:55	20 17:32 (5) 19:30	06:33 19:30	05:49 20:02	05:25 20:30	05:31 20:35	05:58 20:10	06:30 19:23	20 18:09 (5)	07:11 16:29
8	07:25 16:45	07:04 17:22	06:24 17:56	22 17:13 (5) 19:31	06:32 19:31	05:48 20:03	05:25 20:31	05:32 20:35	05:59 20:09	06:31 19:22	16 18:06 (5)	07:12 16:28
9	07:25 16:46	07:03 17:24	06:22 17:57	22 17:13 (5) 19:32	06:30 19:32	05:47 20:04	05:25 20:31	05:32 20:35	06:00 20:08	06:32 19:20	16 18:05 (5)	07:13 16:28
10	07:25 16:47	07:02 17:25	06:21 17:59	26 17:11 (5) 19:33	06:28 19:33	05:46 20:05	05:24 20:32	05:33 20:34	06:01 20:06	06:33 19:18	14 18:04 (5)	07:14 16:28
11	07:25 16:48	07:00 17:26	06:19 18:00	26 17:12 (5) 19:34	06:27 19:34	05:45 20:06	05:24 20:32	05:34 20:34	06:02 20:05	06:34 19:17	10 18:02 (5)	07:14 16:29
12	07:25 16:49	06:59 17:27	06:17 18:01	26 17:12 (5) 19:35	06:25 19:35	05:43 20:07	05:24 20:33	05:35 20:33	06:03 20:04	06:35 19:15	7 18:01 (5)	07:15 16:29
13	07:24 16:50	06:58 17:29	06:16 18:02	26 17:12 (5) 19:36	06:24 19:36	05:42 20:08	05:24 20:33	05:35 20:33	06:04 20:02	06:36 19:13	18 18:01 (5)	07:16 16:29
14	07:24 16:51	06:57 17:30	06:14 18:03	24 17:13 (5) 19:37	06:22 19:37	05:41 20:09	05:24 20:34	05:36 20:32	06:05 20:01	06:37 19:11	18 18:01 (5)	07:17 16:29
15	07:24 16:53	06:55 17:31	06:12 18:04	20 17:15 (5) 19:38	06:20 19:38	05:40 20:10	05:24 20:34	05:37 20:32	06:06 20:00	06:38 19:10	18 18:01 (5)	07:18 16:29
16	07:23 16:54	06:54 17:32	06:11 18:05	18 17:15 (5) 19:39	06:19 19:39	05:39 20:11	05:24 20:35	05:38 20:31	06:07 19:58	06:39 19:08	18 18:01 (5)	07:19 16:29
17	07:23 16:55	06:53 17:34	06:09 18:06	14 17:18 (5) 19:40	06:17 19:40	05:38 20:12	05:24 20:35	05:38 20:31	06:08 19:57	06:40 19:06	18 18:01 (5)	07:20 16:30
18	07:22 16:56	06:51 17:35	06:07 18:08	6 17:22 (5) 19:41	06:16 19:41	05:37 20:13	05:24 20:35	05:39 20:30	06:09 19:55	06:41 19:05	18 18:01 (5)	07:21 16:30
19	07:22 16:57	06:50 17:36	06:05 18:09	6 17:28 (5) 19:42	06:14 19:42	05:36 20:14	05:24 20:36	06:10 20:29	06:42 19:54	06:43 19:03	18 18:01 (5)	07:22 16:30
20	07:21 16:58	06:48 17:37	06:04 18:10	6 17:28 (5) 19:43	06:13 19:43	05:36 20:15	05:24 20:36	06:11 20:28	06:43 19:52	06:44 19:01	18 18:01 (5)	07:23 16:31
21	07:20 17:00	06:47 17:38	06:02 18:11	6 17:28 (5) 19:44	06:11 19:44	05:35 20:16	05:24 20:36	06:12 20:28	06:44 19:51	06:45 18:59	18 18:01 (5)	07:24 16:31
22	07:20 17:01	06:46 17:40	06:00 18:12	6 17:28 (5) 19:45	06:10 19:45	05:34 20:17	05:25 20:36	06:13 20:27	06:45 19:49	06:46 18:58	18 18:01 (5)	07:25 16:32
23	07:19 17:02	06:44 17:41	05:59 18:13	6 17:28 (5) 19:46	06:08 19:46	05:33 20:18	05:25 20:37	06:14 20:26	06:46 19:48	06:47 18:56	18 18:01 (5)	07:26 16:32
24	07:18 17:03	06:43 17:42	05:57 18:14	6 17:28 (5) 19:47	06:07 19:47	05:32 20:19	05:25 20:37	06:15 20:25	06:47 19:46	06:48 18:54	18 18:01 (5)	07:27 16:33
25	07:18 17:05	06:41 17:43	05:55 18:15	6 17:28 (5) 19:48	06:05 19:48	05:32 20:20	05:25 20:37	06:16 20:24	06:48 19:45	06:49 18:52	18 18:01 (5)	07:28 16:33
26	07:17 17:06	06:40 17:45	05:54 18:16	6 17:28 (5) 19:49	06:04 19:49	05:31 20:21	05:26 20:37	06:17 20:23	06:49 19:43	06:50 18:51	12 18:13 (5)	07:29 16:34
27	07:16 17:07	06:38 17:46	05:52 18:18	6 17:28 (5) 19:50	06:02 19:50	05:30 20:22	05:26 20:37	06:19 20:22	06:50 19:42	06:51 18:49	16 18:14 (5)	07:30 16:35
28	07:15 17:08	06:37 17:47	05:50 18:19	6 17:28 (5) 19:51	06:01 19:51	05:30 20:22	05:26 20:37	06:20 20:21	06:51 19:40	06:52 18:47	20 18:15 (5)	07:31 16:35
29	07:14 17:10	06:36 17:48	05:49 18:20	6 17:28 (5) 19:52	06:00 19:52	05:29 20:23	05:27 20:37	06:21 20:20	06:52 19:38	06:53 18:46	22 18:16 (5)	07:32 16:36
30	07:14 17:11	06:35 17:49	05:48 18:21	6 17:28 (5) 19:53	05:58 19:53	05:28 20:24	05:27 20:37	06:22 20:19	06:53 19:37	06:54 18:44	24 18:18 (5)	07:33 16:37
31	07:13 17:12	06:34 17:48	05:47 18:22	6 17:28 (5) 19:54	05:57 19:54	05:27 20:25	05:26 20:37	06:23 20:18	06:54 19:35	06:55 16:56	24 18:18 (5)	07:34 16:38
Potential sun hours	296	296	369	399	450	454	461	429	375	345	297	286
Total, worst case			320						94	226		
Sun reduction			0,70						0,83	0,75		
Oper. time red.			0,99						0,99	0,99		
Wind dir. red.			0,66						0,66	0,66		
Total reduction			0,46						0,54	0,49		
Total, real			147						51	111		

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:

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DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: E - SH5

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June
1	07:25 16:39	07:12 17:13	06:35 17:48	17:12 (5) 17:26 (5)	06:43 19:23	05:57 19:56
2	07:26 16:39	07:11 17:15	06:33 17:49	17:11 (5) 17:27 (5)	06:42 19:24	05:56 19:57
3	07:26 16:40	07:10 17:16	06:32 17:50	17:11 (5) 17:29 (5)	06:40 19:25	05:54 19:58
4	07:26 16:41	07:09 17:17	06:30 17:52	17:09 (5) 17:29 (5)	06:38 19:26	05:53 19:59
5	07:26 16:42	07:07 17:18	06:29 17:53	17:10 (5) 17:32 (5)	06:37 19:27	05:52 20:00
6	07:26 16:43	07:06 17:20	06:27 17:54	17:10 (5) 17:32 (5)	06:35 19:28	05:50 20:01
7	07:26 16:44	07:05 17:21	06:25 17:55	17:10 (5) 17:32 (5)	06:33 19:30	05:49 20:02
8	07:25 16:45	07:04 17:22	06:24 17:56	17:11 (5) 17:33 (5)	06:32 19:31	05:48 20:03
9	07:25 16:46	07:03 17:24	06:22 17:57	17:11 (5) 17:33 (5)	06:30 19:32	05:47 20:04
10	07:25 16:47	07:02 17:25	06:21 17:59	17:13 (5) 17:31 (5)	06:28 19:33	05:46 20:05
11	07:25 16:48	07:00 17:26	06:19 18:00	17:14 (5) 17:30 (5)	06:27 19:34	05:45 20:06
12	07:25 16:49	06:59 17:27	06:17 18:01	17:16 (5) 17:26 (5)	06:25 19:35	05:43 20:07
13	07:24 16:50	06:58 17:29	06:16 18:02	17:16 (5) 19:36	06:24 20:08	05:42 20:08
14	07:24 16:51	06:57 17:30	06:14 18:03	19:37	06:22 20:09	05:41 20:09
15	07:24 16:53	06:55 17:31	06:12 18:04	06:20 19:38	05:40 20:10	05:40 20:10
16	07:23 16:54	06:54 17:32	06:11 18:05	06:19 19:39	05:39 20:11	05:39 20:11
17	07:23 16:55	06:53 17:34	06:09 18:06	06:17 19:40	05:38 20:12	05:38 20:12
18	07:22 16:56	06:51 17:35	06:07 18:08	06:16 19:41	05:37 20:13	05:37 20:13
19	07:22 16:57	06:50 17:36	06:05 18:09	06:14 19:43	05:36 20:14	05:36 20:14
20	07:21 16:58	06:48 17:37	06:04 18:10	06:13 19:44	05:36 20:15	05:36 20:15
21	07:20 17:00	06:47 17:38	06:02 18:11	06:11 19:45	05:35 20:16	05:35 20:16
22	07:20 17:01	06:46 17:40	06:00 18:12	06:10 19:46	05:34 20:17	05:34 20:17
23	07:19 17:02	06:44 17:41	05:59 18:13	06:08 19:47	05:33 20:18	05:33 20:18
24	07:18 17:03	06:43 17:42	05:57 18:14	06:07 19:48	05:32 20:19	05:32 20:19
25	07:18 17:05	06:41 17:43	17:18 (5) 17:22 (5)	05:55 18:15	05:32 19:49	05:25 20:20
26	07:17 17:06	06:40 17:45	4 6 17:23 (5)	05:54 18:16	05:31 19:50	05:26 20:21
27	07:16 17:07	06:38 17:46	17:13 (5) 17:23 (5)	05:52 18:18	06:02 19:51	05:26 20:22
28	07:15 17:08	06:37 17:47	17:14 (5) 17:26 (5)	05:50 18:19	06:01 19:52	05:26 20:22
29	07:14 17:10		06:48 19:20	06:00 19:53	05:29 20:23	05:27 20:23
30	07:13 17:11		06:47 19:21	05:58 19:54	05:28 20:24	05:27 20:24
31	07:13 17:12		06:45 19:22	05:58 20:25	05:28 20:25	05:27 20:25
Potential sun hours	296	296	369	399	450	454
Total, worst case		32	222		1494	1972
Sun reduction		0,67	0,70		0,77	0,85
Oper. time red.		0,99	0,99		0,99	0,99
Wind dir. red.		0,65	0,65		0,76	0,76
Total reduction		0,43	0,45		0,58	0,64
Total, real		14	101		869	1266

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO **Shadow receptor:** E - SH5

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December
1	05:28 20:37	18:53 (6) 19:57 (6)	05:52 20:17	19:02 (6) 19:50 (6)	06:24 19:33	06:54 18:42
2	05:28 20:37	18:53 (6) 19:57 (6)	05:53 20:16	19:03 (6) 19:49 (6)	06:25 19:32	06:55 18:40
3	05:29 20:36	18:52 (6) 19:58 (6)	05:54 20:15	19:04 (6) 19:48 (6)	06:26 19:30	06:57 18:39
4	05:29 20:36	18:52 (6) 19:58 (6)	05:55 20:14	19:07 (6) 19:47 (6)	06:27 19:29	06:58 18:37
5	05:30 20:36	18:53 (6) 19:59 (6)	05:56 20:13	19:08 (6) 19:46 (6)	06:28 19:27	06:59 18:35
6	05:30 20:36	18:53 (6) 19:59 (6)	05:57 20:12	19:09 (6) 19:43 (6)	06:29 19:25	07:00 18:34
7	05:31 20:35	18:54 (6) 19:58 (6)	05:58 20:10	19:12 (6) 19:42 (6)	06:30 19:23	07:01 18:32
8	05:32 20:35	18:53 (6) 19:59 (6)	05:59 20:09	19:13 (6) 19:39 (6)	06:31 19:22	07:02 18:30
9	05:32 20:35	18:53 (6) 19:59 (6)	06:00 20:08	19:16 (6) 19:36 (6)	06:32 19:20	07:03 18:29
10	05:33 20:34	18:54 (6) 19:58 (6)	06:01 20:06	19:23 (6) 19:29 (6)	06:33 19:18	07:04 18:27
11	05:34 20:34	18:55 (6) 19:59 (6)	06:02 20:05	19:29 (6) 19:17	19:18 18:25	18:27 17:05
12	05:35 20:33	18:53 (6) 19:59 (6)	06:03 20:04	19:13 (6) 19:15	06:31 19:15	07:02 18:24
13	05:35 20:33	18:54 (6) 19:58 (6)	06:04 20:02	19:16 (6) 19:13	06:32 19:13	07:03 18:22
14	05:36 20:32	18:55 (6) 19:59 (6)	06:05 20:01	19:14 (6) 19:11	06:33 19:11	07:04 18:21
15	05:37 20:32	18:56 (6) 20:00 (6)	06:06 20:00	19:15 (6) 19:10	06:34 19:10	07:05 18:19
16	05:38 20:31	18:54 (6) 19:58 (6)	06:07 19:58	19:16 (6) 19:08	06:35 19:08	07:06 18:18
17	05:38 20:31	18:55 (6) 19:59 (6)	06:08 19:57	19:17 (6) 19:06	06:36 19:06	07:07 18:16
18	05:39 20:30	18:56 (6) 19:58 (6)	06:09 19:55	19:18 (6) 19:05	06:37 19:05	07:08 18:14
19	05:40 20:29	18:57 (6) 19:59 (6)	06:10 19:54	19:19 (6) 19:03	06:38 19:03	07:09 18:13
20	05:41 20:28	18:56 (6) 19:58 (6)	06:11 19:52	19:20 (6) 19:01	06:39 19:01	07:10 18:11
21	05:42 20:28	18:56 (6) 19:58 (6)	06:12 19:51	19:21 (6) 18:59	06:40 18:59	07:11 18:10
22	05:43 20:27	18:57 (6) 19:57 (6)	06:13 19:49	19:22 (6) 18:58	06:41 18:58	07:12 18:08
23	05:44 20:26	18:58 (6) 19:58 (6)	06:14 19:48	19:23 (6) 18:56	06:42 18:56	07:13 18:07
24	05:44 20:25	18:57 (6) 19:57 (6)	06:15 19:46	19:24 (6) 18:54	06:43 18:54	07:14 18:06
25	05:45 20:24	18:58 (6) 19:56 (6)	06:16 19:45	19:25 (6) 18:52	06:44 18:52	07:15 17:04
26	05:46 20:23	18:59 (6) 19:55 (6)	06:17 19:43	19:26 (6) 18:51	06:45 18:51	07:16 17:03
27	05:47 20:22	19:00 (6) 19:56 (6)	06:19 19:42	19:27 (6) 18:49	06:46 18:49	07:17 17:01
28	05:48 20:21	19:01 (6) 19:55 (6)	06:20 19:40	19:28 (6) 18:47	06:47 18:47	07:18 17:00
29	05:49 20:20	19:02 (6) 19:54 (6)	06:21 19:38	19:29 (6) 18:46	06:48 18:46	07:19 16:59
30	05:50 20:19	19:01 (6) 19:53 (6)	06:22 19:37	19:30 (6) 18:44	06:49 18:44	07:20 16:57
31	05:51 20:18	19:01 (6) 19:51 (6)	06:23 19:35	19:31 (6) 18:43	06:50 18:43	07:21 16:56
Potential sun hours	461	429	375	345	297	286
Total, worst case	1908	332	248			
Sun reduction	0,90	0,95	0,75			
Oper. time red.	0,99	0,99	0,99			
Wind dir. red.	0,76	0,76	0,65			
Total reduction	0,68	0,72	0,49			
Total, real	1297	238	121			

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:

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO **Shadow receptor:** F - SH6

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June	
1	07:25 16:39	07:12 17:13	15:38 (6) 16:40 (6)	06:35 17:48	15:52 (6) 16:30 (6)	06:43 19:23	05:57 20:26
2	07:26 16:39	07:11 17:15	15:37 (6) 16:41 (6)	06:33 17:49	15:55 (6) 16:27 (6)	06:42 19:24	05:56 19:57
3	07:26 16:40	07:10 17:16	15:38 (6) 16:42 (6)	06:32 17:50	15:57 (6) 16:25 (6)	06:40 19:25	05:54 19:58
4	07:26 16:41	07:09 17:17	15:37 (6) 16:43 (6)	06:30 17:52	16:01 (6) 16:19 (6)	06:38 19:26	05:53 19:59
5	07:26 16:42	07:07 17:18	15:38 (6) 16:42 (6)	06:29 17:53	16:08 (6) 16:12 (6)	06:37 19:27	05:52 20:00
6	07:26 16:43	07:06 17:20	15:36 (6) 16:42 (6)	06:27 17:54	06:35 19:28	05:50 20:01	05:25 20:29
7	07:26 16:44	07:05 17:21	15:37 (6) 16:43 (6)	06:25 17:55	06:33 19:30	05:49 20:02	05:25 20:30
8	07:25 16:45	07:04 17:22	15:38 (6) 16:44 (6)	06:24 17:56	06:32 19:31	05:48 20:03	05:25 20:31
9	07:25 16:46	15:59 (6) 16:21 (5)	07:03 17:24	15:37 (6) 16:43 (6)	06:22 17:57	06:30 19:32	05:47 20:04
10	07:25 16:47	15:55 (6) 16:21 (5)	07:02 17:25	15:38 (6) 16:44 (6)	06:21 17:59	06:28 19:33	05:46 20:05
11	07:25 16:48	15:53 (6) 16:21 (5)	07:00 17:26	15:36 (6) 16:44 (6)	06:19 18:00	06:27 19:34	05:45 20:06
12	07:25 16:49	15:52 (6) 16:22 (5)	06:59 17:27	15:37 (6) 16:43 (6)	06:17 18:01	06:25 19:35	05:43 20:07
13	07:24 16:50	15:50 (6) 16:24 (5)	06:58 17:29	15:38 (6) 16:44 (6)	06:16 18:02	06:24 19:36	05:42 20:08
14	07:24 16:51	15:50 (6) 16:26 (5)	06:57 17:30	15:38 (6) 16:44 (6)	06:14 18:03	06:22 19:37	05:41 20:09
15	07:24 16:53	15:47 (6) 16:27 (5)	06:55 17:31	15:39 (6) 16:43 (6)	06:12 18:04	06:20 19:38	05:40 20:10
16	07:23 16:54	15:47 (6) 16:29 (5)	06:54 17:32	15:40 (6) 16:44 (6)	06:11 18:05	06:19 19:39	05:39 20:11
17	07:23 16:55	15:46 (6) 16:28 (5)	06:53 17:34	15:38 (6) 16:42 (6)	06:09 18:06	06:17 19:40	05:38 20:12
18	07:22 16:56	15:45 (6) 16:29 (5)	06:51 17:35	15:39 (6) 16:43 (6)	06:07 18:08	06:16 19:41	05:37 20:13
19	07:22 16:57	15:45 (6) 16:31 (5)	06:50 17:36	15:39 (6) 16:41 (6)	06:05 18:09	06:14 19:43	05:36 20:14
20	07:21 16:58	15:44 (6) 16:32 (5)	06:48 17:37	15:40 (6) 16:40 (6)	06:04 18:10	06:13 19:44	05:36 20:15
21	07:20 17:00	15:44 (6) 16:34 (5)	06:47 17:38	15:42 (6) 16:40 (6)	06:02 18:11	06:11 19:45	05:35 20:16
22	07:20 17:01	15:43 (6) 16:35 (5)	06:46 17:40	15:43 (6) 16:39 (6)	06:00 18:12	06:10 19:46	05:34 20:17
23	07:19 17:02	15:42 (6) 16:36 (5)	06:44 17:41	15:43 (6) 16:37 (6)	05:59 18:13	06:08 19:47	05:33 20:18
24	07:18 17:03	15:41 (6) 16:37 (5)	06:43 17:42	15:44 (6) 16:38 (6)	05:57 18:14	06:07 19:48	05:32 20:19
25	07:18 17:05	15:40 (6) 16:38 (5)	06:41 17:43	15:44 (6) 16:36 (6)	05:55 18:15	06:05 19:49	05:32 20:20
26	07:17 17:06	15:40 (6) 16:40 (5)	06:40 17:45	15:47 (6) 16:35 (6)	05:54 18:16	06:04 19:50	05:31 20:21
27	07:16 17:07	15:39 (6) 16:41 (5)	06:38 17:46	15:47 (6) 16:33 (6)	05:52 18:18	06:02 19:51	05:30 20:22
28	07:15 17:08	15:40 (6) 16:40 (5)	06:37 17:47	15:50 (6) 16:32 (6)	05:50 18:19	06:01 19:52	05:28 20:22
29	07:14 17:10	15:39 (6) 16:39 (6)	06:36 19:20	06:48 19:20	05:49 19:20	06:00 19:53	05:27 20:23
30	07:14 17:11	15:38 (6) 16:38 (6)	06:47 19:21	06:47 19:21	05:58 19:55	05:28 20:24	05:27 20:37
31	07:13 17:12	15:39 (6) 16:39 (6)	06:45 19:22	06:45 19:22	05:28 20:25	05:28 20:25	05:28 454
Potential sun hours	296	296	369	399	450	454	
Total, worst case	1042	1704	120				
Sun reduction	0,65	0,67	0,70				
Oper. time red.	0,99	0,99	0,99				
Wind dir. red.	0,58	0,58	0,58				
Total reduction	0,37	0,38	0,40				
Total, real	388	654	48				

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: F - SH6

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December
1	05:28	05:52	06:24	06:54	06:29	15:07 (6) 07:05 15:35 (6)
	20:37	20:17	19:33	18:42	16:55	16:13 (6) 16:30 26 16:05 (5)
2	05:28	05:53	06:25	06:55	06:31	15:06 (6) 07:06 15:38 (6)
	20:37	20:16	19:32	18:40	16:53	16:12 (6) 16:29 18 16:04 (5)
3	05:29	05:54	06:26	06:57	06:32	15:06 (6) 07:07 15:43 (6)
	20:36	20:15	19:30	18:39	16:52	16:12 (6) 16:29 10 16:05 (5)
4	05:29	05:55	06:27	06:58	06:33	15:07 (6) 07:08 15:07 (6)
	20:36	20:14	19:29	18:37	16:51	16:13 (6) 16:29 66 16:13 (6) 16:29
5	05:30	05:56	06:28	06:59	06:34	15:06 (6) 07:09 15:06 (6) 07:09
	20:36	20:13	19:27	18:35	16:50	16:12 (6) 16:29 66 16:12 (6) 16:29
6	05:30	05:57	06:29	07:00	06:35	15:08 (6) 07:10 15:08 (6) 07:10
	20:36	20:12	19:25	18:34	16:49	64 16:12 (6) 16:29 64 16:12 (6) 16:29
7	05:31	05:58	06:30	07:01	06:37	15:07 (6) 07:11 15:07 (6) 07:11
	20:36	20:10	19:23	18:32	16:48	64 16:11 (6) 16:28 64 16:11 (6) 16:28
8	05:32	05:59	06:31	07:02	06:38	15:08 (6) 07:12 15:08 (6) 07:12
	20:35	20:09	19:22	18:30	16:46	64 16:12 (6) 16:28 64 16:12 (6) 16:28
9	05:32	06:00	06:32	07:03	16:37 (6) 06:39	15:08 (6) 07:13 15:08 (6) 07:13
	20:35	20:08	19:20	18:29	16:45	64 16:12 (6) 16:28 64 16:12 (6) 16:28
10	05:33	06:01	06:33	07:04	16:32 (6) 06:40	15:09 (6) 07:14 15:09 (6) 07:14
	20:34	20:06	19:18	18:27	24 16:56 (6) 16:44	62 16:11 (6) 16:28 62 16:11 (6) 16:28
11	05:34	06:02	06:34	07:05	16:30 (6) 06:42	15:10 (6) 07:15 15:10 (6) 07:15
	20:34	20:05	19:17	18:25	30 17:00 (6) 16:43	60 16:10 (6) 16:28 60 16:10 (6) 16:28
12	05:34	06:03	06:35	07:06	16:27 (6) 06:43	15:10 (6) 07:15 15:10 (6) 07:15
	20:33	20:04	19:15	18:24	34 17:01 (6) 16:42	60 16:10 (6) 16:29 60 16:10 (6) 16:29
13	05:35	06:04	06:36	07:07	16:24 (6) 06:44	15:11 (6) 07:16 15:11 (6) 07:16
	20:33	20:02	19:13	18:22	40 17:04 (6) 16:41	60 16:11 (5) 16:29 60 16:11 (5) 16:29
14	05:36	06:05	06:37	07:08	16:21 (6) 06:45	15:12 (6) 07:17 15:12 (6) 07:17
	20:32	20:01	19:11	18:21	44 17:05 (6) 16:40	60 16:12 (5) 16:29 60 16:12 (5) 16:29
15	05:37	06:06	06:38	07:10	16:20 (6) 06:46	15:11 (6) 07:18 15:11 (6) 07:18
	20:32	20:00	19:10	18:19	46 17:06 (6) 16:39	62 16:13 (5) 16:29 62 16:13 (5) 16:29
16	05:38	06:07	06:39	07:11	16:17 (6) 06:48	15:13 (6) 07:18 15:13 (6) 07:18
	20:31	19:58	19:08	18:18	50 17:07 (6) 16:39	60 16:13 (5) 16:29 60 16:13 (5) 16:29
17	05:38	06:08	06:40	07:12	16:17 (6) 06:49	15:14 (6) 07:19 15:14 (6) 07:19
	20:31	19:57	19:06	18:16	52 17:09 (6) 16:38	58 16:12 (5) 16:30 58 16:12 (5) 16:30
18	05:39	06:09	06:41	07:13	16:16 (6) 06:50	15:15 (6) 07:20 15:15 (6) 07:20
	20:30	19:55	19:05	18:14	54 17:10 (6) 16:37	56 16:11 (5) 16:30 56 16:11 (5) 16:30
19	05:40	06:10	06:42	07:14	16:13 (6) 06:51	15:17 (6) 07:20 15:17 (6) 07:20
	20:29	19:54	19:03	18:13	56 17:09 (6) 16:36	54 16:11 (5) 16:30 54 16:11 (5) 16:30
20	05:41	06:11	06:43	07:15	16:12 (6) 06:52	15:18 (6) 07:21 15:18 (6) 07:21
	20:28	19:52	19:01	18:11	58 17:10 (6) 16:35	52 16:10 (5) 16:31 52 16:10 (5) 16:31
21	05:42	06:12	06:44	07:16	16:11 (6) 06:54	15:19 (6) 07:22 15:19 (6) 07:22
	20:28	19:51	18:59	18:10	60 17:11 (6) 16:35	50 16:09 (5) 16:31 50 16:09 (5) 16:31
22	05:43	06:13	06:45	07:18	16:11 (6) 06:55	15:20 (6) 07:22 15:20 (6) 07:22
	20:27	19:49	18:58	18:08	60 17:11 (6) 16:34	48 16:08 (5) 16:32 48 16:08 (5) 16:32
23	05:44	06:14	06:46	07:19	16:10 (6) 06:56	15:22 (6) 07:23 15:22 (6) 07:23
	20:26	19:48	18:56	18:07	62 17:12 (6) 16:33	46 16:08 (5) 16:32 46 16:08 (5) 16:32
24	05:44	06:15	06:47	07:20	16:09 (6) 06:57	15:23 (6) 07:23 15:23 (6) 07:23
	20:25	19:46	18:54	18:06	64 17:13 (6) 16:33	44 16:07 (5) 16:33 44 16:07 (5) 16:33
25	05:45	06:16	06:48	06:21	15:08 (6) 06:58	15:24 (6) 07:23 15:24 (6) 07:23
	20:24	19:45	18:52	17:04	64 16:12 (6) 16:32	42 16:06 (5) 16:33 42 16:06 (5) 16:33
26	05:46	06:17	06:49	06:22	15:08 (6) 06:59	15:25 (6) 07:24 15:25 (6) 07:24
	20:23	19:43	18:51	17:03	66 16:14 (6) 16:32	42 16:07 (5) 16:34 42 16:07 (5) 16:34
27	05:47	06:19	06:50	06:23	15:07 (6) 07:01	15:26 (6) 07:24 15:26 (6) 07:24
	20:22	19:42	18:49	17:01	66 16:13 (6) 16:31	40 16:06 (5) 16:35 40 16:06 (5) 16:35
28	05:48	06:20	06:51	06:25	15:08 (6) 07:02	15:30 (6) 07:25 15:30 (6) 07:25
	20:22	19:40	18:47	17:00	64 16:12 (6) 16:31	36 16:06 (5) 16:35 36 16:06 (5) 16:35
29	05:49	06:21	06:52	06:26	15:07 (6) 07:03	15:31 (6) 07:25 15:31 (6) 07:25
	20:21	19:38	18:46	16:59	66 16:13 (6) 16:30	34 16:05 (5) 16:36 34 16:05 (5) 16:36
30	05:50	06:22	06:53	06:27	15:07 (6) 07:04	15:34 (6) 07:25 15:34 (6) 07:25
	20:19	19:37	18:44	16:57	66 16:13 (6) 16:30	28 16:04 (5) 16:37 28 16:04 (5) 16:37
31	05:51	06:23	06:54	06:28	15:06 (6) 07:05	15:37 (6) 07:25 15:37 (6) 07:25
	20:18	19:35	18:42	16:56	68 16:14 (6) 16:31	16:38 16:38
Potential sun hours	461	429	375	345	297	286
Total, worst case				1208	1640	54
Sun reduction				0,75	0,72	0,65
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,58	0,58	0,58
Total reduction				0,43	0,41	0,37
Total, real				519	677	20

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated: 20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: G - SH7

Assumptions for shadow calculations Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Table with 13 columns for months (Jan-Dec) and 14 rows for assumptions: Maximum distance for influence (2 000 m), Minimum sun height over horizon for influence (3 °), Day step for calculation (1 days), Time step for calculation (2 minutes), and Sun shine probabilities (Jan: 0.65, Feb: 0.67, Mar: 0.70, Apr: 0.73, May: 0.77, Jun: 0.85, Jul: 0.90, Aug: 0.95, Sep: 0.83, Oct: 0.75, Nov: 0.72, Dec: 0.65).

Main shadow calculation table with 13 columns (Jan-Dec), 14 rows of daily data (sun rise/set, minutes with flicker), and a summary table at the bottom for potential sun hours and various reductions.

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

Matrix layout table with 5 columns: Day in month, Sun rise (hh:mm), Sun set (hh:mm), Minutes with flicker, and First/Last time (hh:mm) with flicker (WTG causing flicker).

Project:

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:

20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO

Shadow receptor: H - SH8

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time table with columns N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW, Sum and values 350, 230, 210, 320, 370, 500, 510, 520, 650, 380, 300, 270, 700, 1300, 1500, 580, 8690

Main shadow calculation table with columns for months (January to December) and rows for sun hours, sun reduction, and wind direction reduction. Includes summary rows for 'Total, worst case', 'Sun reduction', 'Oper. time red.', 'Wind dir. red.', 'Total reduction', and 'Total, real'.

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

Matrix layout table with columns: 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:

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: I - SH9

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December					
1	05:28	18:18 (7)	05:52	18:14 (7)	06:23	19:02 (13)	06:54	06:29	07:05		
	20:37	68 19:26 (7)	20:17	19:34 (7)	19:33	8 19:10 (13)	18:42	16:55	16:29		
2	05:28	18:19 (7)	05:53	18:15 (7)	06:24	19:03 (13)	06:55	06:31	07:06		
	20:37	68 19:27 (7)	20:16	19:33 (7)	19:32	6 19:09 (13)	18:40	16:53	16:29		
3	05:29	18:19 (7)	05:54	18:14 (7)	06:26	19:02 (13)	06:56	06:32	07:07		
	20:36	68 19:27 (7)	20:15	19:34 (7)	19:30	4 19:06 (13)	18:39	16:52	16:29		
4	05:29	18:18 (7)	05:55	18:15 (7)	06:27		06:57	06:33	07:08		
	20:36	70 19:28 (7)	20:14	19:33 (7)	19:28		18:37	16:51	16:29		
5	05:30	18:19 (7)	05:56	18:14 (7)	06:28		06:59	06:34	07:09		
	20:36	70 19:29 (7)	20:13	19:34 (7)	19:27		18:35	16:50	16:29		
6	05:30	18:19 (7)	05:57	18:15 (7)	06:29		07:00	06:35	07:10		
	20:36	70 19:29 (7)	20:11	19:33 (7)	19:25		18:34	16:48	16:28		
7	05:31	18:20 (7)	05:58	18:16 (7)	06:30		07:01	06:37	07:11		
	20:35	70 19:30 (7)	20:10	19:32 (7)	19:23		18:32	16:47	16:28		
8	05:32	18:18 (7)	05:59	18:15 (7)	06:31		07:02	06:38	07:12		
	20:35	72 19:30 (7)	20:09	19:33 (7)	19:22		18:30	16:46	16:28		
9	05:32	18:19 (7)	06:00	18:16 (7)	06:32		07:03	06:39	07:13		
	20:35	70 19:29 (7)	20:08	19:32 (7)	19:20		18:29	16:45	16:28		
10	05:33	18:18 (7)	06:01	18:15 (7)	06:33		07:04	06:40	07:14		
	20:34	72 19:30 (7)	20:06	19:31 (7)	19:18		18:27	16:44	16:28		
11	05:34	18:18 (7)	06:02	18:16 (7)	06:34		07:05	06:41	07:14		
	20:34	72 19:30 (7)	20:05	19:30 (7)	19:17		18:25	16:43	16:28		
12	05:34	18:19 (7)	06:03	18:15 (7)	06:35		07:06	06:43	07:15		
	20:33	72 19:31 (7)	20:04	19:29 (7)	19:15		18:24	16:42	16:28		
13	05:35	18:18 (7)	06:04	18:16 (7)	06:36		07:07	06:44	07:16		
	20:33	74 19:32 (7)	20:02	19:30 (7)	19:13		18:22	16:41	16:29		
14	05:36	18:19 (7)	06:05	18:17 (7)	06:37		07:08	06:45	07:17		
	20:32	74 19:33 (7)	20:01	19:29 (7)	19:11		18:21	16:40	16:29		
15	05:37	18:17 (7)	06:06	18:16 (7)	06:38		07:09	06:46	07:18		
	20:32	74 19:31 (7)	20:00	19:28 (7)	19:10		18:19	16:39	16:29		
16	05:37	18:18 (7)	06:07	18:17 (7)	06:39		07:11	06:48	07:18		
	20:31	74 19:32 (7)	19:58	19:27 (7)	19:08		18:17	16:38	16:29		
17	05:38	18:17 (7)	06:08	18:18 (7)	06:40		07:12	06:49	07:19		
	20:31	76 19:33 (7)	19:57	19:26 (7)	19:06		18:16	16:38	16:29		
18	05:39	18:18 (7)	06:09	18:19 (7)	06:41		07:13	06:50	07:20		
	20:30	76 19:34 (7)	19:55	19:25 (7)	19:04		18:14	16:37	16:30		
19	05:40	18:17 (7)	06:10	18:20 (7)	06:42		07:14	06:51	07:20		
	20:29	76 19:33 (7)	19:54	19:24 (7)	19:03		18:13	16:36	16:30		
20	05:41	18:17 (7)	06:11	18:21 (7)	06:43		07:15	06:52	07:21		
	20:28	76 19:33 (7)	19:52	19:21 (7)	19:01		18:11	16:35	16:31		
21	05:42	18:16 (7)	06:12	18:20 (7)	06:44		07:16	06:54	07:21		
	20:28	78 19:34 (7)	19:51	19:20 (7)	18:59		18:10	16:35	16:31		
22	05:42	18:17 (7)	06:13	18:23 (7)	06:45		07:17	06:55	07:22		
	20:27	76 19:33 (7)	19:49	19:19 (7)	18:57		18:08	16:34	16:31		
23	05:43	18:16 (7)	06:14	18:24 (7)	06:46		07:19	06:56	07:22		
	20:26	78 19:34 (7)	19:48	19:18 (7)	18:56		18:07	16:33	16:32		
24	05:44	18:17 (7)	06:15	18:25 (7)	06:47		07:20	06:57	07:23		
	20:25	78 19:35 (7)	19:46	19:19 (13)	18:54		18:05	16:33	16:33		
25	05:45	18:16 (7)	06:16	18:26 (7)	06:48		06:21	06:58	07:23		
	20:24	78 19:34 (7)	19:45	19:20 (13)	18:52		17:04	16:32	16:33		
26	05:46	18:17 (7)	06:17	18:27 (7)	06:49		06:22	06:59	07:24		
	20:23	78 19:35 (7)	19:43	19:21 (13)	18:51		17:03	16:32	16:34		
27	05:47	18:16 (7)	06:18	18:30 (7)	06:50		06:23	07:00	07:24		
	20:22	78 19:34 (7)	19:41	19:18 (13)	18:49		17:01	16:31	16:34		
28	05:48	18:17 (7)	06:19	18:33 (7)	06:51		06:25	07:02	07:24		
	20:21	78 19:35 (7)	19:40	19:17 (13)	18:47		17:00	16:31	16:35		
29	05:49	18:15 (7)	06:20	18:35 (7)	06:52		06:26	07:03	07:25		
	20:20	80 19:35 (7)	19:38	19:15 (13)	18:45		16:58	16:30	16:36		
30	05:50	18:14 (7)	06:21	18:40 (7)	06:53		06:27	07:04	07:25		
	20:19	80 19:34 (7)	19:37	19:14 (13)	18:44		16:57	16:30	16:37		
31	05:51	18:15 (7)	06:22	19:01 (13)			06:28		07:25		
	20:18	80 19:35 (7)	19:35	19:11 (13)			16:56		16:37		
Potential sun hours	461		429		375		345		297		286
Total, worst case	2304		1972		18						
Sun reduction	0,90		0,95		0,83						
Oper. time red.	0,99		0,99		0,99						
Wind dir. red.	0,74		0,74		0,73						
Total reduction	0,66		0,70		0,61						
Total, real	1525		1378		11						

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: J - SH10

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:25 16:38	07:11 17:13	06:35 17:48	06:43 19:23	05:57 19:55	05:27 20:26	05:27 20:37	05:52 20:17	06:23 19:33	06:54 18:42	06:29 16:54	07:05 16:29
2	07:25 16:39	07:10 17:14	06:33 17:49	06:42 19:24	05:55 19:57	05:27 20:26	05:28 20:36	05:53 20:16	06:24 19:32	06:55 18:40	06:30 16:53	07:06 16:29
3	07:26 16:40	07:09 17:16	06:32 17:50	06:40 19:25	05:54 19:58	05:26 20:27	05:29 20:36	05:54 20:15	06:25 19:30	06:56 18:39	06:32 16:52	07:07 16:29
4	07:26 16:41	07:08 17:17	06:30 17:51	06:38 19:26	05:53 19:59	05:26 20:28	05:29 20:36	05:55 20:14	06:26 19:28	06:57 18:37	06:33 16:51	07:08 16:29
5	07:26 16:42	07:07 17:18	06:28 17:53	06:37 19:27	05:51 20:00	05:25 20:28	05:30 20:36	05:56 20:13	06:28 19:27	06:58 18:35	06:34 16:50	07:09 16:29
6	07:26 16:43	07:06 17:19	06:27 17:54	06:35 19:28	05:50 20:01	05:25 20:29	05:30 20:36	05:57 20:11	06:29 19:25	07:00 18:34	06:35 16:48	07:10 16:28
7	07:25 16:44	07:05 17:21	06:25 17:55	06:33 19:29	05:49 20:02	05:25 20:30	05:31 20:35	05:58 20:10	06:30 19:23	07:01 18:32	06:37 16:47	07:11 16:28
8	07:25 16:45	07:04 17:22	06:24 17:56	06:32 19:30	05:48 20:03	05:25 20:30	05:31 20:35	05:59 20:09	06:31 19:22	07:02 18:30	06:38 16:46	07:12 16:28
9	07:25 16:46	07:03 17:23	06:22 17:57	06:30 19:32	05:47 20:04	05:24 20:31	05:32 20:35	06:00 20:08	06:32 19:20	07:03 18:29	06:39 16:45	07:13 16:28
10	07:25 16:47	07:02 17:25	06:20 17:58	06:28 19:33	05:45 20:05	05:24 20:32	05:33 20:34	06:01 20:06	06:33 19:18	07:04 18:27	06:40 16:44	07:13 16:28
11	07:25 16:48	07:00 17:26	06:19 18:00	06:27 19:34	05:44 20:06	05:24 20:32	05:34 20:34	06:02 20:05	06:34 19:16	07:05 18:25	06:41 16:43	07:14 16:28
12	07:24 16:49	06:59 17:27	06:17 18:01	06:25 19:35	05:43 20:07	05:24 20:33	05:34 20:33	06:03 20:04	06:35 19:15	07:06 18:24	06:43 16:42	07:15 16:28
13	07:24 16:50	06:58 17:28	06:15 18:02	06:23 19:36	05:42 20:08	05:24 20:33	05:35 20:33	06:04 20:02	06:36 19:13	07:07 18:22	06:44 16:41	07:16 16:28
14	07:24 16:51	06:56 17:30	06:14 18:03	06:22 19:37	05:41 20:09	05:24 20:34	05:36 20:32	06:05 20:01	06:37 19:11	07:08 18:20	06:45 16:40	07:17 16:29
15	07:23 16:52	06:55 17:31	06:12 18:04	06:20 19:38	05:40 20:10	05:24 20:34	05:37 20:32	06:06 19:59	06:38 19:10	07:09 18:19	06:46 16:39	07:18 16:29
16	07:23 16:53	06:54 17:32	06:10 18:05	06:19 19:39	05:39 20:11	05:24 20:34	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	06:47 16:38	07:18 16:29
17	07:23 16:55	06:52 17:33	06:09 18:06	06:17 19:40	05:38 20:12	05:24 20:35	05:38 20:30	06:08 19:57	06:40 19:06	07:12 18:16	06:49 16:38	07:19 16:29
18	07:22 16:56	06:51 17:35	06:07 18:07	06:16 19:41	05:37 20:13	05:24 20:35	05:39 20:30	06:09 19:55	06:41 19:04	07:13 18:14	06:50 16:37	07:20 16:30
19	07:22 16:57	06:50 17:36	06:05 18:09	06:14 19:42	05:36 20:14	05:24 20:35	05:40 20:29	06:10 19:54	06:42 19:03	07:14 18:13	06:51 16:36	07:20 16:30
20	07:21 16:58	06:48 17:37	06:04 18:10	06:12 19:43	05:35 20:15	05:24 20:36	05:41 20:28	06:11 19:52	06:43 19:01	07:15 18:11	06:52 16:35	07:21 16:31
21	07:20 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:35 20:16	05:24 20:36	05:42 20:28	06:12 19:51	06:44 18:59	07:16 18:10	06:53 16:35	07:21 16:31
22	07:20 17:01	06:45 17:39	06:00 18:12	06:09 19:46	05:34 20:17	05:24 20:36	05:42 20:27	06:13 19:49	06:45 18:57	07:17 18:08	06:55 16:34	07:22 16:31
23	07:19 17:02	06:44 17:41	05:58 18:13	06:08 19:47	05:33 20:18	05:25 20:36	05:43 20:26	06:14 19:48	06:46 18:56	07:19 18:07	06:56 16:33	07:22 16:32
24	07:18 17:03	06:42 17:42	05:57 18:14	06:06 19:48	05:32 20:19	05:25 20:37	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:05	06:57 16:33	07:23 16:33
25	07:18 17:04	06:41 17:43	05:55 18:15	06:05 19:49	05:31 20:20	05:25 20:37	05:45 20:24	06:16 19:45	06:48 18:52	06:21 17:04	06:58 16:32	07:23 16:33
26	07:17 17:06	06:39 17:44	05:53 18:16	06:04 19:50	05:30 20:21	05:25 20:37	05:46 20:23	06:17 19:43	06:49 18:51	06:22 17:02	06:59 16:32	07:24 16:34
27	07:16 17:07	06:38 17:46	05:52 18:17	06:02 19:51	05:30 20:21	05:26 20:37	05:47 20:22	06:18 19:41	06:50 18:49	06:23 17:01	07:00 16:31	07:24 16:34
28	07:15 17:08	06:36 17:47	05:50 18:18	06:01 19:52	05:29 20:22	05:26 20:37	05:48 20:21	06:19 19:40	06:51 18:47	06:24 17:00	07:01 16:31	07:24 16:35
29	07:14 17:09		06:48 19:20	05:59 19:53	05:29 20:23	05:27 20:37	05:49 20:20	06:20 19:38	06:52 18:45	06:26 16:58	07:03 16:30	07:25 16:36
30	07:13 17:11		06:47 19:21	05:58 19:54	05:28 20:24	05:27 20:37	05:50 20:19	06:21 19:37	06:53 18:44	06:27 16:57	07:04 16:30	07:25 16:37
31	07:12 17:12		06:45 19:22		05:28 20:25	05:28 20:37	05:51 20:18	06:22 19:35	06:22 16:56	06:28 16:56	06:30 16:37	07:25 16:37
Potential sun hours	296	296	369	399	450	454	461	429	375	345	297	286
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

Project:

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:

20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO

Shadow receptor: K - SH11

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June
1	07:25 16:38	07:12 17:13	06:35 17:48	06:43 19:23	05:57 19:56	05:27 20:26
2	07:26 16:39	07:11 17:14	06:33 17:49	06:42 19:24	05:55 19:57	05:27 20:26
3	07:26 16:40	07:10 17:16	06:32 17:50	17:25 (13) 06:40	05:54 19:58	05:26 20:27
4	07:26 16:41	07:08 17:17	06:30 17:51	17:23 (13) 06:38	05:53 19:59	05:26 20:28
5	07:26 16:42	07:07 17:18	06:29 17:53	17:22 (13) 06:37	05:51 20:00	05:25 20:29
6	07:26 16:43	07:06 17:19	06:27 17:54	17:22 (13) 06:35	05:50 20:01	05:25 20:29
7	07:26 16:44	07:05 17:21	06:25 17:55	17:20 (13) 06:33	05:49 20:02	05:25 20:30
8	07:25 16:45	07:04 17:22	06:24 17:56	17:21 (13) 06:32	05:48 20:03	05:25 20:31
9	07:25 16:46	07:03 17:23	06:22 17:57	17:21 (13) 06:30	05:47 20:04	05:24 20:31
10	07:25 16:47	07:02 17:25	06:20 17:58	17:21 (13) 06:28	05:45 20:05	05:24 20:32
11	07:25 16:48	07:00 17:26	06:19 18:00	17:22 (13) 06:27	05:44 20:06	05:24 20:32
12	07:25 16:49	06:59 17:27	06:17 18:01	17:22 (13) 06:25	05:43 20:07	05:24 20:33
13	07:24 16:50	06:58 17:28	06:15 18:02	17:22 (13) 06:23	05:42 20:08	05:24 20:33
14	07:24 16:51	06:57 17:30	06:14 18:03	17:27 (13) 06:22	05:41 20:09	05:24 20:34
15	07:24 16:52	06:55 17:31	06:12 18:04	06:20 19:38	05:40 20:10	05:24 20:34
16	07:23 16:53	06:54 17:32	06:10 18:05	06:19 19:39	05:39 20:11	05:24 20:35
17	07:23 16:55	06:53 17:33	06:09 18:06	06:17 19:40	05:38 20:12	05:24 20:35
18	07:22 16:56	06:51 17:35	06:07 18:07	06:16 19:41	05:37 20:13	05:24 20:35
19	07:22 16:57	06:50 17:36	06:05 18:09	06:14 19:42	05:36 20:14	05:24 20:36
20	07:21 16:58	06:48 17:37	06:04 18:10	06:12 19:44	05:35 20:15	05:24 20:36
21	07:20 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:35 20:16	05:24 20:36
22	07:20 17:01	06:45 17:40	06:00 18:12	06:09 19:46	05:34 20:17	05:24 20:36
23	07:19 17:02	06:44 17:41	05:59 18:13	06:08 19:47	05:33 20:18	19:48 (12) 05:25
24	07:18 17:03	06:43 17:42	05:57 18:14	06:06 19:48	05:32 20:19	4 19:52 (12) 05:25
25	07:18 17:04	06:41 17:43	05:55 18:15	06:05 19:49	05:31 20:20	8 19:53 (12) 05:25
26	07:17 17:06	06:40 17:44	05:53 18:16	06:04 19:50	05:31 20:21	12 19:55 (12) 05:25
27	07:16 17:07	06:38 17:46	05:52 18:17	06:02 19:51	05:30 20:22	16 19:56 (12) 05:26
28	07:15 17:08	06:36 17:47	05:50 18:18	06:01 19:52	05:29 20:22	18 19:57 (12) 05:26
29	07:14 17:09		06:48 19:20	05:59 19:53	05:29 20:23	20 19:58 (12) 05:27
30	07:13 17:11		06:47 19:21	05:58 19:54	05:28 20:24	20 19:58 (12) 05:27
31	07:13 17:12		06:45 19:22	05:28 20:25	05:28 20:25	20 19:58 (12) 05:27
Potential sun hours	296	296	369	399	450	454
Total, worst case			138		136	914
Sun reduction			0,70		0,77	0,85
Oper. time red.			0,99		0,99	0,99
Wind dir. red.			0,66		0,77	0,77
Total reduction			0,46		0,58	0,64
Total, real			63		79	587

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO **Shadow receptor:** K - SH11

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December
1	05:27 20:37	19:38 (12) 20:10 (12)	05:52 20:17	06:23 19:33	06:54 18:42	07:05 16:29
2	05:28 20:37	19:39 (12) 20:11 (12)	05:53 20:16	06:24 19:32	06:55 18:40	07:06 16:29
3	05:29 20:36	19:39 (12) 20:09 (12)	05:54 20:15	06:26 19:30	06:56 18:39	07:07 16:29
4	05:29 20:36	19:40 (12) 20:10 (12)	05:55 20:14	06:27 19:28	06:57 18:37	07:08 16:29
5	05:30 20:36	19:41 (12) 20:11 (12)	05:56 20:13	06:28 19:27	06:59 18:35	07:09 16:29
6	05:30 20:36	19:41 (12) 20:09 (12)	05:57 20:11	06:29 19:25	07:00 18:34	07:10 16:28
7	05:31 20:35	19:42 (12) 20:10 (12)	06:30 20:10	07:01 19:23	07:01 18:32	07:11 16:28
8	05:31 20:35	19:42 (12) 20:08 (12)	06:31 20:09	07:02 19:22	07:02 18:30	07:12 16:28
9	05:32 20:35	19:43 (12) 20:09 (12)	06:32 20:08	07:03 19:20	07:03 18:29	07:13 16:28
10	05:33 20:34	19:44 (12) 20:08 (12)	06:33 20:06	07:04 19:18	07:04 18:27	07:14 16:28
11	05:34 20:34	19:44 (12) 20:08 (12)	06:34 20:05	07:05 19:17	07:05 18:25	07:14 16:28
12	05:34 20:33	19:45 (12) 20:07 (12)	06:35 20:04	07:06 19:15	07:06 18:24	07:15 16:28
13	05:35 20:33	19:46 (12) 20:08 (12)	06:36 20:02	07:07 19:13	07:07 18:22	07:16 16:28
14	05:36 20:32	19:47 (12) 20:07 (12)	06:37 20:01	07:08 19:11	07:08 18:21	07:17 16:29
15	05:37 20:32	19:47 (12) 20:05 (12)	06:38 20:00	07:09 19:10	07:09 18:19	07:18 16:29
16	05:37 20:31	19:48 (12) 20:06 (12)	06:39 19:58	07:10 19:08	07:11 18:17	07:18 16:29
17	05:38 20:31	19:49 (12) 20:05 (12)	06:40 19:57	07:12 18:16	07:12 18:16	07:19 16:29
18	05:39 20:30	19:52 (12) 20:04 (12)	06:41 19:55	07:13 18:14	07:13 18:14	4 14:15 (7) 14:10 (7) 6 14:16 (7)
19	05:40 20:29	19:53 (12) 20:05 (12)	06:42 19:54	07:14 18:13	07:14 18:13	6 14:17 (7) 8 14:18 (7)
20	05:41 20:28	19:55 (12) 20:03 (12)	06:43 19:52	07:15 18:11	07:15 18:11	8 14:19 (7) 10 14:19 (7)
21	05:42 20:28	19:56 (12) 19:51	06:44 18:59	07:16 18:10	07:16 18:10	10 14:19 (7)
22	05:42 20:27	19:57 (12) 19:49	06:45 18:58	07:17 18:08	07:17 18:08	10 14:20 (7)
23	05:43 20:26	19:58 (12) 19:48	06:46 18:56	07:19 18:07	07:19 18:07	10 14:20 (7)
24	05:44 20:25	19:59 (12) 19:46	06:47 18:54	07:20 18:05	07:20 18:05	10 14:21 (7)
25	05:45 20:24	20:00 (12) 19:45	06:48 18:52	07:21 18:04	07:21 18:04	10 14:21 (7)
26	05:46 20:23	20:01 (12) 19:43	06:49 18:51	07:22 18:03	07:22 18:03	8 14:21 (7) 4 14:19 (7)
27	05:47 20:22	20:02 (12) 19:41	06:50 18:49	07:23 18:02	07:23 18:02	07:24 16:34
28	05:48 20:21	20:03 (12) 19:40	06:51 18:47	07:24 18:01	07:24 18:01	07:24 16:35
29	05:49 20:20	20:04 (12) 19:38	06:52 18:45	07:25 18:00	07:25 18:00	07:25 16:36
30	05:50 20:19	20:05 (12) 19:37	06:53 18:44	18:03 (13) 18:15 (13)	06:27 16:57	07:25 16:37
31	05:51 20:18	20:06 (12) 19:35	06:54 18:43	18:16 (13) 18:16 (13)	06:28 16:56	07:25 16:37
Potential sun hours	461	429	375	345	297	286
Total, worst case	458		12	132		80
Sun reduction	0,90		0,83	0,75		0,65
Oper. time red.	0,99		0,99	0,99		0,99
Wind dir. red.	0,77		0,66	0,66		0,49
Total reduction	0,68		0,54	0,49		0,32
Total, real	312		7	65		25

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: L - SH12

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June			
1	07:25 16:38	13:20 (12) 15:22 (12)	07:12 17:13	13:30 (12) 15:36 (12)	06:35 17:48	14:00 (12) 15:20 (12)	06:43 19:23	05:57 19:56	05:27 20:26
2	07:26 16:39	13:22 (12) 15:22 (12)	07:11 17:14	13:29 (12) 15:35 (12)	06:33 17:49	14:02 (12) 15:16 (12)	06:42 19:24	05:55 19:57	05:27 20:26
3	07:26 16:40	13:22 (12) 15:22 (12)	07:10 17:16	13:30 (12) 15:36 (12)	06:32 17:50	14:05 (12) 15:15 (12)	06:40 19:25	05:54 19:58	05:26 20:27
4	07:26 16:41	13:22 (12) 15:24 (12)	07:09 17:17	13:31 (12) 15:35 (12)	06:30 17:52	14:07 (12) 15:13 (12)	06:38 19:26	05:53 19:59	05:26 20:28
5	07:26 16:42	13:22 (12) 15:24 (12)	07:07 17:18	13:32 (12) 15:36 (12)	06:29 17:53	14:12 (12) 15:12 (12)	06:37 19:27	05:52 20:00	05:25 20:29
6	07:26 16:43	13:22 (12) 15:24 (12)	07:06 17:20	13:32 (12) 15:34 (12)	06:27 17:54	14:14 (12) 15:08 (12)	06:35 19:28	05:50 20:01	05:25 20:29
7	07:26 16:44	13:24 (12) 15:26 (12)	07:05 17:21	13:33 (12) 15:35 (12)	06:25 17:55	14:18 (12) 15:06 (12)	06:33 19:29	05:49 20:02	05:25 20:30
8	07:25 16:45	13:24 (12) 15:26 (12)	07:04 17:22	13:32 (12) 15:34 (12)	06:24 17:56	14:23 (12) 15:03 (12)	06:32 19:31	05:48 20:03	05:25 20:31
9	07:25 16:46	13:23 (12) 15:25 (12)	07:03 17:23	13:33 (12) 15:35 (12)	06:22 17:57	14:27 (12) 14:59 (12)	06:30 19:32	05:47 20:04	05:24 20:31
10	07:25 16:47	13:23 (12) 15:27 (12)	07:02 17:25	13:33 (12) 15:33 (12)	06:20 17:58	14:35 (12) 14:51 (12)	06:28 19:33	05:46 20:05	05:24 20:32
11	07:25 16:48	13:25 (12) 15:27 (12)	07:00 17:26	13:34 (12) 15:34 (12)	06:19 18:00		06:27 19:34	05:44 20:06	05:24 20:32
12	07:25 16:49	13:24 (12) 15:28 (12)	06:59 17:27	13:35 (12) 15:33 (12)	06:17 18:01		06:25 19:35	05:43 20:07	05:24 20:33
13	07:24 16:50	13:24 (12) 15:28 (12)	06:58 17:28	13:36 (12) 15:34 (12)	06:15 18:02		06:23 19:36	05:42 20:08	05:24 20:33
14	07:24 16:51	13:26 (12) 15:30 (12)	06:57 17:30	13:38 (12) 15:32 (12)	06:14 18:03		06:22 19:37	05:41 20:09	05:24 20:34
15	07:24 16:52	13:25 (12) 15:29 (12)	06:55 17:31	13:39 (12) 15:33 (12)	06:12 18:04		06:20 19:38	05:40 20:10	05:24 20:34
16	07:23 16:54	13:25 (12) 15:31 (12)	06:54 17:32	13:40 (12) 15:32 (12)	06:10 18:05		06:19 19:39	05:39 20:11	05:24 20:35
17	07:23 16:55	13:26 (12) 15:30 (12)	06:53 17:33	13:40 (12) 15:32 (12)	06:09 18:06		06:17 19:40	05:38 20:12	05:24 20:35
18	07:22 16:56	13:25 (12) 15:31 (12)	06:51 17:35	13:41 (12) 15:31 (12)	06:07 18:08		06:16 19:41	05:37 20:13	05:24 20:35
19	07:22 16:57	13:25 (12) 15:31 (12)	06:50 17:36	13:43 (12) 15:29 (12)	06:05 18:09		06:14 19:43	05:36 20:14	05:24 20:36
20	07:21 16:58	13:26 (12) 15:32 (12)	06:48 17:37	13:44 (12) 15:30 (12)	06:04 18:10		06:12 19:44	05:35 20:15	05:24 20:36
21	07:20 16:59	13:26 (12) 15:32 (12)	06:47 17:38	13:46 (12) 15:28 (12)	06:02 18:11		06:11 19:45	05:35 20:16	05:24 20:36
22	07:20 17:01	13:27 (12) 15:33 (12)	06:46 17:40	13:47 (12) 15:27 (12)	06:00 18:12		06:09 19:46	05:34 20:17	05:24 20:36
23	07:19 17:02	13:26 (12) 15:34 (12)	06:44 17:41	13:49 (12) 15:27 (12)	05:59 18:13		06:08 19:47	05:33 20:18	05:25 20:37
24	07:18 17:03	13:27 (12) 15:33 (12)	06:43 17:42	13:50 (12) 15:26 (12)	05:57 18:14		06:07 19:48	05:32 20:19	05:25 20:37
25	07:18 17:04	13:26 (12) 15:34 (12)	06:41 17:43	13:52 (12) 15:24 (12)	05:55 18:15		06:05 19:49	05:31 20:20	05:25 20:37
26	07:17 17:06	13:28 (12) 15:34 (12)	06:40 17:44	13:53 (12) 15:23 (12)	05:53 18:16		06:04 19:50	05:31 20:21	05:25 20:37
27	07:16 17:07	13:29 (12) 15:35 (12)	06:38 17:46	13:55 (12) 15:21 (12)	05:52 18:17		06:02 19:51	05:30 20:22	05:26 20:37
28	07:15 17:08	13:28 (12) 15:34 (12)	06:36 17:47	13:58 (12) 15:20 (12)	05:50 18:19		06:01 19:52	05:29 20:22	05:26 20:37
29	07:14 17:09	13:29 (12) 15:35 (12)			06:48 19:20		05:59 19:53	05:29 20:23	05:27 20:37
30	07:13 17:11	13:28 (12) 15:36 (12)			06:47 19:21		05:58 19:54	05:28 20:24	05:27 20:37
31	07:13 17:12	13:29 (12) 15:35 (12)			06:45 19:22			05:28 20:25	
Potential sun hours	296	296	369	399	450	454			
Total, worst case	3856	3110	540						
Sun reduction	0,65	0,67	0,70						
Oper. time red.	0,99	0,99	0,99						
Wind dir. red.	0,50	0,50	0,50						
Total reduction	0,32	0,33	0,34						
Total, real	1233	1025	186						

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: L - SH12

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December
1	05:28 20:37	05:52 20:17	06:23 19:33	06:54 18:42	06:29 16:55	13:03 (12) 07:05 15:03 (12) 16:30
2	05:28 20:37	05:53 20:16	06:25 19:32	06:55 18:40	06:31 16:53	13:02 (12) 07:06 15:04 (12) 16:29
3	05:29 20:37	05:54 20:15	06:26 19:30	06:56 18:39	06:32 16:52	13:02 (12) 07:07 15:04 (12) 16:29
4	05:29 20:36	05:55 20:14	06:27 19:28	06:57 18:37	15:08 (12) 16:51	06:33 16:51 15:05 (12) 16:29
5	05:30 20:36	05:56 20:13	06:28 19:27	06:59 18:35	15:01 (12) 16:50	06:34 16:50 15:04 (12) 16:29
6	05:30 20:36	05:57 20:12	06:29 19:25	07:00 18:34	14:56 (12) 16:48	06:35 16:48 15:06 (12) 16:28
7	05:31 20:36	05:58 20:10	06:30 19:23	07:01 18:32	14:51 (12) 16:47	06:37 16:47 15:05 (12) 16:28
8	05:32 20:35	05:59 20:09	06:31 19:22	07:02 18:30	14:48 (12) 16:46	06:38 16:46 13:00 (12) 16:28
9	05:32 20:35	06:00 20:08	06:32 19:20	07:03 18:29	14:43 (12) 16:45	06:39 16:45 13:00 (12) 16:28
10	05:33 20:34	06:01 20:06	06:33 19:18	07:04 18:27	14:40 (12) 16:44	06:40 16:44 13:01 (12) 16:28
11	05:34 20:34	06:02 20:05	06:34 19:17	07:05 18:25	14:38 (12) 16:43	06:42 16:43 15:07 (12) 16:28
12	05:34 20:33	06:03 20:04	06:35 19:15	07:06 18:24	14:35 (12) 16:42	06:43 16:42 13:00 (12) 16:28
13	05:35 20:33	06:04 20:02	06:36 19:13	07:07 18:22	14:32 (12) 16:41	06:44 16:41 13:01 (12) 16:29
14	05:36 20:32	06:05 20:01	06:37 19:11	07:08 18:21	14:29 (12) 16:40	06:45 16:40 13:00 (12) 16:29
15	05:37 20:32	06:06 20:00	06:38 19:10	07:10 18:19	14:28 (12) 16:39	06:46 16:39 12:59 (12) 16:29
16	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	14:25 (12) 16:38	06:48 16:38 13:01 (12) 16:29
17	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	14:22 (12) 16:38	06:49 16:38 13:00 (12) 16:29
18	05:39 20:30	06:09 19:55	06:41 19:04	07:13 18:14	14:22 (12) 16:37	06:50 16:37 15:08 (12) 16:30
19	05:40 20:29	06:10 19:54	06:42 19:03	07:14 18:13	14:19 (12) 16:36	06:51 16:36 13:01 (12) 16:30
20	05:41 20:28	06:11 19:52	06:43 19:01	07:15 18:11	14:18 (12) 16:35	06:52 16:35 13:02 (12) 16:31
21	05:42 20:28	06:12 19:51	06:44 18:59	07:16 18:10	14:15 (12) 16:35	06:54 16:35 13:01 (12) 16:31
22	05:42 20:27	06:13 19:49	06:45 18:58	07:18 18:08	14:15 (12) 16:34	06:55 16:34 13:02 (12) 16:31
23	05:43 20:26	06:14 19:48	06:46 18:56	07:19 18:07	14:12 (12) 16:33	06:56 16:33 13:02 (12) 16:32
24	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:05	14:11 (12) 16:33	06:57 16:33 15:08 (12) 16:33
25	05:45 20:24	06:16 19:45	06:48 18:52	06:21 17:04	13:10 (12) 16:32	06:58 16:32 13:04 (12) 16:33
26	05:46 20:23	06:17 19:43	06:49 18:51	06:22 17:03	13:10 (12) 16:32	06:59 16:32 13:03 (12) 16:34
27	05:47 20:22	06:18 19:42	06:50 18:49	06:23 17:01	13:07 (12) 16:31	07:01 16:31 13:04 (12) 16:34
28	05:48 20:21	06:19 19:40	06:51 18:47	06:25 17:00	13:06 (12) 16:31	07:02 16:31 13:06 (12) 16:35
29	05:49 20:20	06:20 19:38	06:52 18:45	06:26 16:58	13:05 (12) 16:30	07:03 16:30 13:05 (12) 16:36
30	05:50 20:19	06:21 19:37	06:53 18:44	06:27 16:57	13:05 (12) 16:30	07:04 16:30 13:06 (12) 16:37
31	05:51 20:18	06:22 19:35	06:54 18:42	06:28 16:56	13:04 (12) 16:30	07:25 16:30 13:07 (12) 16:38
Potential sun hours	461	429	375	345	297	286
Total, worst case				2468	3752	3730
Sun reduction				0,75	0,72	0,65
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,50	0,50	0,50
Total reduction				0,37	0,35	0,32
Total, real				911	1329	1193

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:

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: M - SH13

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June	
1	07:26 16:38	07:12 17:13	06:35 17:48	06:43 19:23	17:44 (17) 18:42 (17)	05:57 19:56	
2	07:26 16:39	07:11 17:14	06:33 17:49	06:42 19:24	17:44 (17) 18:42 (17)	05:55 19:57	
3	07:26 16:40	07:10 17:16	06:32 17:50	06:40 19:25	17:43 (17) 18:41 (17)	05:54 19:58	
4	07:26 16:41	07:09 17:17	06:30 17:51	06:38 19:26	17:43 (17) 18:41 (17)	05:53 19:59	
5	07:26 16:42	07:07 17:18	06:29 17:53	06:37 19:27	17:45 (17) 18:39 (17)	05:51 20:00	
6	07:26 16:43	07:06 17:19	06:27 17:54	06:35 19:28	17:46 (17) 18:38 (17)	05:50 20:01	
7	07:26 16:44	07:05 17:21	06:25 17:55	06:33 19:29	17:46 (17) 18:38 (17)	05:49 20:02	
8	07:25 16:45	07:04 17:22	06:24 17:56	06:32 19:31	17:46 (17) 18:36 (17)	05:48 20:03	
9	07:25 16:46	07:03 17:23	06:22 17:57	17:11 (17) 17:25 (17)	06:30 19:32	05:47 20:04	
10	07:25 16:47	07:02 17:25	06:20 17:58	17:07 (17) 17:29 (17)	06:28 19:33	05:45 20:05	
11	07:25 16:48	07:00 17:26	06:19 18:00	17:04 (17) 17:34 (17)	06:27 19:34	05:44 20:06	
12	07:25 16:49	06:59 17:27	06:17 18:01	17:00 (17) 17:36 (17)	06:25 19:35	05:43 20:07	
13	07:24 16:50	06:58 17:28	06:15 18:02	16:58 (17) 17:36 (17)	06:23 19:36	05:42 20:08	
14	07:24 16:51	06:57 17:30	06:14 18:03	16:57 (17) 17:39 (17)	06:22 19:37	05:41 20:09	
15	07:24 16:52	06:55 17:31	06:12 18:04	16:55 (17) 17:39 (17)	06:20 19:38	05:40 20:10	
16	07:23 16:53	06:54 17:32	06:10 18:05	16:53 (17) 17:41 (17)	06:19 19:39	05:39 20:11	
17	07:23 16:55	06:53 17:33	06:09 18:06	16:52 (17) 17:42 (17)	06:17 19:40	05:38 20:12	
18	07:22 16:56	06:51 17:35	06:07 18:07	16:50 (17) 17:42 (17)	06:16 19:41	05:37 20:13	
19	07:22 16:57	06:50 17:36	06:05 18:09	16:48 (17) 17:44 (17)	06:14 19:43	05:36 20:14	
20	07:21 16:58	06:48 17:37	06:04 18:10	16:48 (17) 17:44 (17)	06:12 19:44	05:35 20:15	
21	07:20 16:59	06:47 17:38	06:02 18:11	16:47 (17) 17:45 (17)	06:11 19:45	05:35 20:16	
22	07:20 17:01	06:46 17:40	06:00 18:12	16:47 (17) 17:45 (17)	06:09 19:46	05:34 20:17	
23	07:19 17:02	06:44 17:41	05:59 18:13	16:45 (17) 17:45 (17)	06:08 19:47	05:33 20:18	
24	07:18 17:03	06:43 17:42	05:57 18:14	16:46 (17) 17:46 (17)	06:06 19:48	05:32 20:19	
25	07:18 17:04	06:41 17:43	05:55 18:15	16:44 (17) 17:44 (17)	06:05 19:49	05:31 20:20	
26	07:17 17:06	06:40 17:44	05:53 18:16	16:44 (17) 17:44 (17)	06:04 19:50	19:23 (15) 19:27 (15)	05:31 20:21
27	07:16 17:07	06:38 17:46	05:52 18:17	16:44 (17) 17:44 (17)	06:02 19:51	19:21 (15) 19:27 (15)	05:30 20:22
28	07:15 17:08	06:36 17:47	05:50 18:19	16:43 (17) 17:45 (17)	06:01 19:52	19:22 (15) 19:28 (15)	05:29 20:22
29	07:14 17:09		06:48 19:20	17:43 (17) 18:43 (17)	05:59 19:53	19:21 (15) 19:31 (15)	05:29 20:23
30	07:13 17:11		06:47 19:21	17:43 (17) 18:43 (17)	05:58 19:54	19:19 (15) 19:31 (15)	05:28 20:24
31	07:13 17:12		06:45 19:22	17:44 (17) 18:44 (17)		05:28 20:25	20:25
Potential sun hours	296	296	369	399	450	454	
Total, worst case			1146	780	148		
Sun reduction			0,70	0,73	0,77		
Oper. time red.			0,99	0,99	0,99		
Wind dir. red.			0,68	0,69	0,76		
Total reduction			0,47	0,50	0,58		
Total, real			544	388	85		

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

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

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DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO **Shadow receptor:** M - SH13

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December
1	05:27	05:52	06:23	17:48 (17)	06:54	17:38 (17)
	20:37	20:17	19:33	42 18:30 (17)	18:42	36 18:14 (17)
2	05:28	05:53	19:35 (15)	06:24	17:45 (17)	06:55
	20:37	20:16	8 19:43 (15)	19:32	46 18:31 (17)	18:40
3	05:28	05:54	19:34 (15)	06:26	17:44 (17)	06:56
	20:37	20:15	12 19:46 (15)	19:30	48 18:32 (17)	18:39
4	05:29	05:55	19:33 (15)	06:27	17:43 (17)	06:57
	20:36	20:14	14 19:47 (15)	19:28	50 18:33 (17)	18:37
5	05:30	05:56	19:32 (15)	06:28	17:42 (17)	06:59
	20:36	20:13	16 19:48 (15)	19:27	52 18:34 (17)	18:35
6	05:30	05:57	19:31 (15)	06:29	17:41 (17)	07:00
	20:36	20:12	16 19:47 (15)	19:25	52 18:33 (17)	18:34
7	05:31	05:58	19:30 (15)	06:30	17:40 (17)	07:01
	20:36	20:10	16 19:46 (15)	19:23	54 18:34 (17)	18:32
8	05:31	05:59	19:29 (15)	06:31	17:39 (17)	07:02
	20:35	20:09	16 19:45 (15)	19:22	56 18:35 (17)	18:30
9	05:32	06:00	19:28 (15)	06:32	17:38 (17)	07:03
	20:35	20:08	16 19:44 (15)	19:20	56 18:34 (17)	18:29
10	05:33	06:01	19:29 (15)	06:33	17:37 (17)	07:04
	20:34	20:06	14 19:43 (15)	19:18	58 18:35 (17)	18:27
11	05:34	06:02	19:28 (15)	06:34	17:36 (17)	07:05
	20:34	20:05	14 19:42 (15)	19:17	58 18:34 (17)	18:25
12	05:34	06:03	19:29 (15)	06:35	17:35 (17)	07:06
	20:34	20:04	12 19:41 (15)	19:15	60 18:35 (17)	18:24
13	05:35	06:04	19:28 (15)	06:36	17:34 (17)	07:07
	20:33	20:02	10 19:38 (15)	19:13	60 18:34 (17)	18:22
14	05:36	06:05	19:29 (15)	06:37	17:33 (17)	07:08
	20:32	20:01	8 19:37 (15)	19:11	62 18:35 (17)	18:21
15	05:37	06:06	19:30 (15)	06:38	17:32 (17)	07:10
	20:32	20:00	6 19:36 (15)	19:10	62 18:34 (17)	18:19
16	05:37	06:07	19:29 (15)	06:39	17:33 (17)	07:11
	20:31	19:58	6 19:35 (15)	19:08	60 18:33 (17)	18:17
17	05:38	06:08	19:32 (15)	06:40	17:32 (17)	07:12
	20:31	19:57	4 19:36 (15)	19:06	60 18:32 (17)	18:16
18	05:39	06:09	06:41	17:31 (17)	07:13	06:50
	20:30	19:55	19:04	62 18:33 (17)	18:14	16:37
19	05:40	06:10	06:42	17:32 (17)	07:14	06:51
	20:29	19:54	19:03	60 18:32 (17)	18:13	16:36
20	05:41	06:11	06:43	17:31 (17)	07:15	06:52
	20:29	19:52	19:01	60 18:31 (17)	18:11	16:35
21	05:42	06:12	06:44	17:32 (17)	07:16	06:54
	20:28	19:51	18:59	58 18:30 (17)	18:10	16:35
22	05:42	06:13	06:45	17:31 (17)	07:18	06:55
	20:27	19:49	18:58	58 18:29 (17)	18:08	16:34
23	05:43	06:14	06:46	17:32 (17)	07:19	06:56
	20:26	19:48	18:56	56 18:28 (17)	18:07	16:33
24	05:44	06:15	06:47	17:31 (17)	07:20	06:57
	20:25	19:46	18:54	56 18:27 (17)	18:05	16:33
25	05:45	06:16	06:48	17:32 (17)	06:21	06:58
	20:24	19:45	18:52	54 18:26 (17)	17:04	16:32
26	05:46	06:17	18:05 (17)	06:49	17:33 (17)	06:22
	20:23	19:43	14 18:19 (17)	18:51	52 18:25 (17)	17:03
27	05:47	06:18	18:00 (17)	06:50	17:34 (17)	06:23
	20:22	19:42	22 18:22 (17)	18:49	48 18:22 (17)	17:01
28	05:48	06:19	17:57 (17)	06:51	17:35 (17)	06:25
	20:22	19:40	28 18:25 (17)	18:47	46 18:21 (17)	17:00
29	05:49	06:20	17:54 (17)	06:52	17:36 (17)	06:26
	20:21	19:38	34 18:28 (17)	18:45	44 18:20 (17)	16:58
30	05:50	06:21	17:52 (17)	06:53	17:37 (17)	06:27
	20:19	19:37	36 18:28 (17)	18:44	40 18:17 (17)	16:57
31	05:51	06:22	17:49 (17)	06:54	16:56	06:28
	20:18	19:35	40 18:29 (17)	16:56	345	297
Potential sun hours	461	429	375	345	297	286
Total, worst case		362	1630	122		
Sun reduction		0,95	0,83	0,75		
Oper. time red.		0,99	0,99	0,99		
Wind dir. red.		0,72	0,68	0,68		
Total reduction		0,68	0,56	0,51		
Total, real		246	917	62		

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

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

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DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO **Shadow receptor:** N - SH14

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June
1	07:26 16:38	07:12 17:13	06:35 17:48	06:43 19:23	05:57 19:56	05:27 20:26
2	07:26 16:39	07:11 17:14	06:33 17:49	06:42 19:24	05:55 19:57	05:27 20:27
3	07:26 16:40	07:10 17:16	06:32 17:50	06:40 19:25	05:54 19:58	05:26 20:27
4	07:26 16:41	07:09 17:17	06:30 17:52	06:38 19:26	05:53 19:59	05:26 20:28
5	07:26 16:42	07:08 17:18	06:29 17:53	06:37 19:27	05:52 20:00	05:26 20:29
6	07:26 16:43	07:06 17:20	06:27 17:54	06:35 19:28	05:50 20:01	05:25 20:29
7	07:26 16:44	07:05 17:21	06:25 17:55	06:33 19:30	05:49 20:02	05:25 20:30
8	07:26 16:45	07:04 17:22	06:24 17:56	06:32 19:31	05:48 20:03	05:25 20:31
9	07:25 16:46	07:03 17:23	06:22 17:57	06:30 19:32	05:47 20:04	05:24 20:31
10	07:25 16:47	07:02 17:25	06:21 17:59	06:28 19:33	05:46 20:05	05:24 20:32
11	07:25 16:48	07:01 17:26	17:00 (14) 18:00	06:19 19:34	05:44 20:06	19:03 (15) 20:32
12	07:25 16:49	06:59 17:27	4 17:04 (14) 18:01	06:17 19:35	05:43 20:07	8 19:11 (15) 20:33
13	07:24 16:50	06:58 17:28	4 17:03 (14) 18:02	06:16 19:36	05:42 20:08	22 19:17 (15) 20:33
14	07:24 16:51	06:57 17:30	8 17:06 (14) 18:03	06:14 19:37	05:41 20:09	30 19:22 (15) 20:34
15	07:24 16:52	06:55 17:31	10 17:06 (14) 18:04	06:12 19:38	05:40 20:10	36 19:26 (15) 20:34
16	07:23 16:54	06:54 17:32	12 17:07 (14) 18:05	06:11 19:39	05:39 20:11	40 18:47 (15) 20:35
17	07:23 16:55	06:53 17:33	14 17:10 (14) 18:06	06:10 19:40	05:38 20:12	46 18:44 (15) 20:35
18	07:22 16:56	06:51 17:35	16 17:11 (14) 18:07	06:09 19:41	05:37 20:13	48 19:31 (15) 20:35
19	07:22 16:57	06:50 17:36	16 17:11 (14) 18:08	06:08 19:42	05:36 20:14	54 19:34 (15) 20:35
20	07:21 16:58	06:48 17:37	18 17:13 (14) 18:09	06:07 19:43	05:35 20:15	56 19:35 (15) 20:36
21	07:21 16:59	06:47 17:38	20 17:14 (14) 18:10	06:06 19:44	05:34 20:16	58 18:38 (15) 20:36
22	07:20 17:01	06:46 17:40	22 17:16 (14) 18:11	06:05 19:45	05:33 20:17	60 18:37 (15) 20:36
23	07:19 17:02	06:44 17:41	22 17:17 (14) 18:12	06:04 19:46	05:32 20:18	62 18:37 (15) 20:36
24	07:19 17:03	06:43 17:42	18 17:15 (14) 18:13	06:03 19:47	05:31 20:19	66 18:34 (15) 20:35
25	07:18 17:04	06:41 17:43	16 17:14 (14) 18:14	06:02 19:48	05:30 20:20	68 19:41 (15) 20:37
26	07:17 17:06	06:40 17:44	10 17:10 (14) 18:15	06:01 19:49	05:29 20:21	70 18:33 (15) 20:37
27	07:16 17:07	06:38 17:46	05:54 18:16	06:00 19:50	05:28 20:22	70 19:43 (15) 20:37
28	07:15 17:08	06:37 17:47	05:52 18:17	06:00 19:51	05:27 20:23	72 18:31 (15) 20:37
29	07:14 17:09		05:50 18:19	06:01 19:52	05:26 20:24	74 18:31 (15) 20:37
30	07:14 17:11		05:48 19:20	06:01 19:53	05:25 20:25	74 19:45 (15) 20:37
31	07:13 17:12		06:45 19:22	05:58 20:25	05:24 20:26	76 18:30 (15) 20:37
Potential sun hours	296	296	369	399	450	454
Total, worst case		210			1168	2522
Sun reduction		0,67			0,77	0,85
Oper. time red.		0,99			0,99	0,99
Wind dir. red.		0,63			0,77	0,77
Total reduction		0,42			0,58	0,64
Total, real		88			682	1625

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: N - SH14

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December
1	05:28 20:37	18:32 (15) 19:56 (15)	05:52 20:17	19:08 (15) 19:26 (15)	06:24 19:33	06:54 18:42
2	05:28 20:37	18:33 (15) 19:57 (15)	05:53 20:16	19:33 19:32	06:25 18:40	06:55 18:40
3	05:29 20:37	18:33 (15) 19:57 (15)	05:54 20:15	19:30 19:30	06:26 18:39	06:56 18:39
4	05:29 20:36	18:34 (15) 19:56 (15)	05:55 20:14	19:29 19:29	06:27 18:37	06:58 18:37
5	05:30 20:36	18:35 (15) 19:57 (15)	05:56 20:13	19:27 19:27	06:28 18:35	06:59 18:35
6	05:30 20:36	18:35 (15) 19:57 (15)	05:57 20:12	19:25 19:25	06:29 18:34	07:00 18:34
7	05:31 20:36	18:36 (15) 19:56 (15)	05:58 20:10	19:23 19:23	06:30 18:32	07:01 18:32
8	05:32 20:35	18:36 (15) 19:56 (15)	05:59 20:09	19:22 19:22	06:31 18:30	07:02 18:30
9	05:32 20:35	18:37 (15) 19:55 (15)	06:00 20:08	19:20 19:20	06:32 18:29	07:03 18:29
10	05:33 20:34	18:38 (15) 19:56 (15)	06:01 20:07	19:18 19:18	06:33 18:27	07:04 18:27
11	05:34 20:34	18:36 (15) 19:54 (15)	06:02 20:05	19:17 19:17	06:34 18:25	07:05 18:25
12	05:34 20:34	18:37 (15) 19:55 (15)	06:03 20:04	19:15 19:15	06:35 18:24	07:06 18:24
13	05:35 20:33	18:38 (15) 19:54 (15)	06:04 20:02	19:13 19:13	06:36 18:22	07:07 18:22
14	05:36 20:33	18:39 (15) 19:55 (15)	06:05 20:01	19:11 19:11	06:37 18:21	07:08 18:21
15	05:37 20:32	18:39 (15) 19:53 (15)	06:06 20:00	19:10 19:10	06:38 18:19	07:09 18:19
16	05:37 20:31	18:40 (15) 19:52 (15)	06:07 19:58	19:08 19:08	06:39 18:17	07:10 18:17
17	05:38 20:31	18:41 (15) 19:53 (15)	06:08 19:57	19:06 19:06	06:40 18:16	07:11 18:16
18	05:39 20:30	18:42 (15) 19:52 (15)	06:09 19:55	19:05 19:05	06:41 18:14	07:12 18:14
19	05:40 20:29	18:43 (15) 19:51 (15)	06:10 19:54	19:03 19:03	06:42 18:13	07:13 18:13
20	05:41 20:29	18:43 (15) 19:49 (15)	06:11 19:52	19:01 19:01	06:43 18:11	07:14 18:11
21	05:42 20:28	18:46 (15) 19:48 (15)	06:12 19:51	18:59 18:59	06:44 18:10	07:15 18:10
22	05:43 20:27	18:47 (15) 19:47 (15)	06:13 19:49	18:58 18:58	06:45 18:08	07:16 18:08
23	05:43 20:26	18:48 (15) 19:48 (15)	06:14 19:48	18:56 18:56	06:46 18:07	07:17 18:07
24	05:44 20:25	18:49 (15) 19:45 (15)	06:15 19:46	18:54 18:54	06:47 18:05	07:18 18:05
25	05:45 20:24	18:50 (15) 19:44 (15)	06:16 19:45	18:52 18:52	06:48 17:04	07:19 17:04
26	05:46 20:24	18:53 (15) 19:43 (15)	06:17 19:43	18:51 18:51	06:49 17:03	07:20 17:03
27	05:47 20:23	18:54 (15) 19:42 (15)	06:18 19:42	18:49 18:49	06:50 17:01	07:21 17:01
28	05:48 20:22	18:57 (15) 19:39 (15)	06:19 19:40	18:47 18:47	06:51 17:00	07:22 17:00
29	05:49 20:21	18:57 (15) 19:37 (15)	06:20 19:38	18:46 18:46	06:52 16:58	07:23 16:58
30	05:50 20:20	19:00 (15) 19:34 (15)	06:21 19:37	18:44 18:44	06:53 16:57	07:24 16:57
31	05:51 20:18	19:03 (15) 19:31 (15)	06:23 19:35	18:44 18:44	06:54 16:56	07:25 16:56
Potential sun hours	461	429	375	345	297	286
Total, worst case	2078	18			216	
Sun reduction	0,90	0,95			0,75	
Oper. time red.	0,99	0,99			0,99	
Wind dir. red.	0,77	0,77			0,63	
Total reduction	0,68	0,72			0,47	
Total, real	1418	13			102	

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: P - SH16

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June
1	07:26 16:38	07:12 17:13	06:35 17:48	06:43	17:32 (14)	05:57 18:34 (14)
2	07:26 16:39	07:11 17:15	06:33 17:49	06:42	17:30 (14)	05:55 17:39 (14)
3	07:26 16:40	07:10 17:16	06:32 17:50	06:40	17:31 (14)	05:54 17:40 (14)
4	07:26 16:41	07:09 17:17	06:30 17:52	06:38	17:29 (14)	05:53 17:41 (14)
5	07:26 16:42	07:08 17:18	06:29 17:53	06:37	17:29 (14)	05:52 17:43 (14)
6	07:26 16:43	07:06 17:20	06:27 17:54	06:35	17:30 (14)	05:50 17:44 (14)
7	07:26 16:44	07:05 17:21	06:25 17:55	06:33	17:28 (14)	05:49 17:47 (14)
8	07:26 16:45	07:04 17:22	06:24 17:56	06:32	17:28 (14)	05:48 17:48 (14)
9	07:25 16:46	07:03 17:23	06:22 17:57	06:30	17:29 (14)	05:47 17:51 (14)
10	07:25 16:47	07:02 17:25	06:21 17:59	06:28	17:27 (14)	05:46 17:54 (14)
11	07:25 16:48	07:01 17:26	06:19 18:00	06:27	17:27 (14)	05:44 17:57 (14)
12	07:25 16:49	06:59 17:27	06:17 18:01	06:25	17:28 (14)	05:43 20:33
13	07:24 16:50	06:58 17:29	06:16 18:02	06:24	17:28 (14)	05:42 20:33
14	07:24 16:51	06:57 17:30	06:14 18:03	06:22	17:27 (14)	05:41 20:34
15	07:24 16:52	06:55 17:31	06:12 18:04	17:11 (14)	06:20	05:40 20:34
16	07:23 16:54	06:54 17:32	06:11 18:05	17:03 (14)	06:19	05:39 20:35
17	07:23 16:55	06:53 17:34	06:09 18:06	17:27 (14)	06:17	05:38 20:35
18	07:22 16:56	06:51 17:35	06:07 18:08	17:30 (14)	06:16	05:37 20:35
19	07:22 16:57	06:50 17:36	06:05 18:09	16:52 (14)	06:14	05:36 20:36
20	07:21 16:58	06:49 17:37	06:04 18:10	17:36 (14)	06:13	05:36 20:36
21	07:21 17:00	06:47 17:38	06:02 18:11	16:49 (14)	06:11	05:35 20:36
22	07:20 17:01	06:46 17:40	06:00 18:12	17:39 (14)	06:10	05:34 20:36
23	07:19 17:02	06:44 17:41	05:59 18:13	16:45 (14)	06:08	05:33 20:37
24	07:19 17:03	06:43 17:42	05:57 18:14	17:43 (14)	06:07	05:32 20:37
25	07:18 17:04	06:41 17:43	05:55 18:15	16:44 (14)	06:05	05:32 20:37
26	07:17 17:06	06:40 17:44	05:54 18:16	17:44 (14)	06:04	05:31 20:37
27	07:16 17:07	06:38 17:46	05:52 18:18	16:37 (14)	06:02	05:30 20:37
28	07:15 17:08	06:37 17:47	05:50 18:19	17:47 (14)	06:01	05:29 20:37
29	07:15 17:09		06:48 19:20	17:35 (14)	06:00	05:29 20:37
30	07:14 17:11		06:47 19:21	18:47 (14)	05:58	05:28 20:37
31	07:13 17:12		06:45 19:22	17:33 (14)	05:55	05:28 20:25
Potential sun hours	296	296	369	399	450	454
Total, worst case			924	2246		442
Sun reduction			0,70	0,73		0,77
Oper. time red.			0,99	0,99		0,99
Wind dir. red.			0,70	0,70		0,70
Total reduction			0,49	0,51		0,54
Total, real			449	1139		237

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO **Shadow receptor:** P - SH16

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December		
1	05:28 20:37	05:52 20:17	10 18:10 (14) 18:20 (14)	06:24 19:34	80 17:27 (14) 18:47 (14)	06:54 18:42	06:29 16:55	07:05 16:30
2	05:28 20:37	05:53 20:16	20 18:05 (14) 18:25 (14)	06:25 19:32	82 17:26 (14) 18:48 (14)	06:55 18:40	06:31 16:53	07:06 16:29
3	05:29 20:37	05:54 20:15	26 18:02 (14) 18:28 (14)	06:26 19:30	80 17:26 (14) 18:46 (14)	06:57 18:39	06:32 16:52	07:07 16:29
4	05:29 20:36	05:55 20:14	32 17:59 (14) 18:31 (14)	06:27 19:29	80 17:25 (14) 18:45 (14)	06:58 18:37	06:33 16:51	07:08 16:29
5	05:30 20:36	05:56 20:13	36 17:58 (14) 18:34 (14)	06:28 19:27	82 17:24 (14) 18:46 (14)	06:59 18:35	06:34 16:50	07:09 16:29
6	05:30 20:36	05:57 20:12	40 17:55 (14) 18:35 (14)	06:29 19:25	80 17:25 (14) 18:45 (14)	07:00 18:34	06:36 16:49	07:10 16:28
7	05:31 20:36	05:58 20:10	42 17:54 (14) 18:36 (14)	06:30 19:24	80 17:24 (14) 18:44 (14)	07:01 18:32	06:37 16:47	07:11 16:28
8	05:32 20:35	05:59 20:09	46 17:51 (14) 18:37 (14)	06:31 19:22	80 17:23 (14) 18:43 (14)	07:02 18:30	06:38 16:46	07:12 16:28
9	05:32 20:35	06:00 20:08	50 17:50 (14) 18:40 (14)	06:32 19:20	78 17:24 (14) 18:42 (14)	07:03 18:29	06:39 16:45	07:13 16:28
10	05:33 20:35	06:01 20:07	52 17:49 (14) 18:41 (14)	06:33 19:18	78 17:23 (14) 18:41 (14)	07:04 18:27	06:40 16:44	07:14 16:28
11	05:34 20:34	06:02 20:05	56 17:46 (14) 18:42 (14)	06:34 19:17	76 17:24 (14) 18:40 (14)	07:05 18:25	06:42 16:43	07:15 16:28
12	05:34 20:34	06:03 20:04	58 17:45 (14) 18:43 (14)	06:35 19:15	76 17:23 (14) 18:39 (14)	07:06 18:24	06:43 16:42	07:15 16:28
13	05:35 20:33	06:04 20:03	60 17:44 (14) 18:44 (14)	06:36 19:13	74 17:24 (14) 18:38 (14)	07:07 18:22	06:44 16:41	07:16 16:29
14	05:36 20:33	06:05 20:01	62 17:43 (14) 18:45 (14)	06:37 19:12	72 17:25 (14) 18:37 (14)	07:09 18:21	06:45 16:40	07:17 16:29
15	05:37 20:32	06:06 20:00	62 17:42 (14) 18:44 (14)	06:38 19:10	72 17:24 (14) 18:36 (14)	07:10 18:19	06:47 16:39	07:18 16:29
16	05:37 20:31	06:07 19:58	64 17:41 (14) 18:45 (14)	06:39 19:08	70 17:25 (14) 18:35 (14)	07:11 18:17	06:48 16:39	07:19 16:29
17	05:38 20:31	06:08 19:57	66 17:40 (14) 18:46 (14)	06:40 19:06	68 17:26 (14) 18:34 (14)	07:12 18:16	06:49 16:38	07:19 16:30
18	05:39 20:30	06:09 19:55	68 17:39 (14) 18:47 (14)	06:41 19:05	66 17:27 (14) 18:33 (14)	07:13 18:14	06:50 16:37	07:20 16:30
19	05:40 20:29	06:10 19:54	70 17:38 (14) 18:48 (14)	06:42 19:03	62 17:28 (14) 18:30 (14)	07:14 18:13	06:51 16:36	07:21 16:30
20	05:41 20:29	06:11 19:52	70 17:37 (14) 18:47 (14)	06:43 19:01	60 17:29 (14) 18:29 (14)	07:15 18:11	06:53 16:35	07:21 16:31
21	05:42 20:28	06:12 19:51	72 17:36 (14) 18:48 (14)	06:44 18:59	56 17:30 (14) 18:26 (14)	07:16 18:10	06:54 16:35	07:22 16:31
22	05:43 20:27	06:13 19:49	74 17:35 (14) 18:49 (14)	06:45 18:58	54 17:31 (14) 18:25 (14)	07:18 18:08	06:55 16:34	07:22 16:32
23	05:43 20:26	06:14 19:48	74 17:34 (14) 18:48 (14)	06:46 18:56	50 17:32 (14) 18:22 (14)	07:19 18:07	06:56 16:33	07:23 16:32
24	05:44 20:25	06:15 19:46	76 17:33 (14) 18:49 (14)	06:47 18:54	44 17:35 (14) 18:19 (14)	07:20 18:05	06:57 16:33	07:23 16:33
25	05:45 20:24	06:16 19:45	76 17:32 (14) 18:48 (14)	06:48 18:52	42 17:36 (14) 18:18 (14)	06:21 17:04	06:58 16:32	07:24 16:33
26	05:46 20:24	06:17 19:43	78 17:31 (14) 18:49 (14)	06:49 18:51	34 17:39 (14) 18:13 (14)	06:22 17:03	07:00 16:32	07:24 16:34
27	05:47 20:23	06:18 19:42	78 17:30 (14) 18:48 (14)	06:50 18:49	28 17:42 (14) 18:10 (14)	06:23 17:01	07:01 16:31	07:24 16:34
28	05:48 20:22	06:19 19:40	80 17:29 (14) 18:49 (14)	06:51 18:47	16 17:47 (14) 18:03 (14)	06:25 17:00	07:02 16:31	07:25 16:35
29	05:49 20:21	06:21 19:38	80 17:28 (14) 18:48 (14)	06:52 18:46		06:26 16:59	07:03 16:30	07:25 16:36
30	05:50 20:20	06:22 19:37	80 17:29 (14) 18:49 (14)	06:53 18:44		06:27 16:57	07:04 16:30	07:25 16:37
31	05:51 20:19	06:23 19:35	80 17:28 (14) 18:48 (14)			06:28 16:56	07:25 16:37	
Potential sun hours	461	429	375	345	297	286		
Total, worst case		1838		1820				
Sun reduction		0,95		0,83				
Oper. time red.		0,99		0,99				
Wind dir. red.		0,70		0,70				
Total reduction		0,66		0,58				
Total, real		1213		1050				

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: Q - SH17

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:39	07:12 17:13	06:35 17:48	06:43 19:23	05:57 19:56	05:27 20:26	05:28 20:37	05:52 20:17	06:24 19:34	06:54 18:42	06:30 16:55	07:05 16:30
2	07:26 16:39	07:11 17:15	06:34 17:49	06:42 19:24	05:56 19:57	05:27 20:27	05:28 20:37	05:53 20:16	06:25 19:32	06:56 18:40	06:31 16:53	07:06 16:29
3	07:26 16:40	07:10 17:16	06:32 17:50	06:40 19:25	05:54 19:58	05:26 20:27	05:29 20:37	05:54 20:15	06:26 19:30	06:57 18:39	06:32 16:52	07:07 16:29
4	07:26 16:41	07:09 17:17	06:30 17:52	06:38 19:26	05:53 19:59	05:26 20:28	05:29 20:36	05:55 20:14	06:27 19:29	06:58 18:37	06:33 16:51	07:08 16:29
5	07:26 16:42	07:08 17:18	06:29 17:53	06:37 19:27	05:52 20:00	05:26 20:29	05:30 20:36	05:56 20:13	06:28 19:27	06:59 18:35	06:34 16:50	07:09 16:29
6	07:26 16:43	07:06 17:20	06:27 17:54	06:35 19:28	05:50 20:01	05:25 20:29	05:30 20:36	05:57 20:12	06:29 19:25	07:00 18:34	06:36 16:49	07:10 16:29
7	07:26 16:44	07:05 17:21	06:26 17:55	06:33 19:30	05:49 20:02	05:25 20:30	05:31 20:36	05:58 20:10	06:30 19:24	07:01 18:32	06:37 16:47	07:11 16:28
8	07:26 16:45	07:04 17:22	06:24 17:56	06:32 19:31	05:48 20:03	05:25 20:31	05:32 20:35	05:59 20:09	06:31 19:22	07:02 18:30	06:38 16:46	07:12 16:28
9	07:25 16:46	07:03 17:23	06:22 17:57	06:30 19:32	05:47 20:04	05:24 20:31	05:32 20:35	06:00 20:08	06:32 19:20	07:03 18:29	06:39 16:45	07:13 16:28
10	07:25 16:47	07:02 17:25	06:21 17:59	06:28 19:33	05:46 20:05	05:24 20:32	05:33 20:35	06:01 20:07	06:33 19:18	07:04 18:27	06:40 16:44	07:14 16:28
11	07:25 16:48	07:01 17:26	06:19 18:00	06:27 19:34	05:45 20:06	05:24 20:32	05:34 20:34	06:02 20:05	06:34 19:17	07:05 18:25	06:42 16:43	07:15 16:28
12	07:25 16:49	06:59 17:27	06:17 18:01	06:25 19:35	05:43 20:07	05:24 20:33	05:34 20:34	06:03 20:04	06:35 19:15	07:06 18:24	06:43 16:42	07:15 16:29
13	07:24 16:50	06:58 17:29	06:16 18:02	06:24 19:36	05:42 20:08	05:24 20:33	05:35 20:33	06:04 20:03	06:36 19:13	07:07 18:22	06:44 16:41	07:16 16:29
14	07:24 16:51	06:57 17:30	06:14 18:03	06:22 19:37	05:41 20:09	05:24 20:34	05:36 20:33	06:05 20:01	06:37 19:12	07:09 18:21	06:45 16:40	07:17 16:29
15	07:24 16:53	06:55 17:31	06:12 18:04	06:20 19:38	05:40 20:10	05:24 20:34	05:37 20:32	06:06 20:00	06:38 19:10	07:10 18:19	06:47 16:39	07:18 16:29
16	07:23 16:54	06:54 17:32	06:11 18:05	06:19 19:39	05:39 20:11	05:24 20:35	05:38 20:31	06:07 19:58	06:39 19:08	07:11 18:18	06:48 16:39	07:19 16:29
17	07:23 16:55	06:53 17:34	06:09 18:07	06:17 19:40	05:38 20:12	05:24 20:35	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	06:49 16:38	07:19 16:30
18	07:22 16:56	06:51 17:35	06:07 18:08	06:16 19:42	05:37 20:13	05:24 20:35	05:39 20:30	06:09 19:55	06:41 19:05	07:13 18:14	06:50 16:37	07:20 16:30
19	07:22 16:57	06:50 17:36	06:06 18:09	06:14 19:43	05:36 20:14	05:24 20:36	05:40 20:29	06:10 19:54	06:42 19:03	07:14 18:13	06:51 16:36	07:21 16:30
20	07:21 16:58	06:49 17:37	06:04 18:10	06:13 19:44	05:36 20:15	05:24 20:36	05:41 20:29	06:11 19:52	06:43 19:01	07:15 18:11	06:53 16:35	07:21 16:31
21	07:21 17:00	06:47 17:38	06:02 18:11	06:11 19:45	05:35 20:16	05:24 20:36	05:42 20:28	06:12 19:51	06:44 18:59	07:16 18:10	06:54 16:35	07:22 16:31
22	07:20 17:01	06:46 17:40	06:00 18:12	06:10 19:46	05:34 20:17	05:24 20:37	05:43 20:27	06:13 19:49	06:45 18:58	07:18 18:08	06:55 16:34	07:22 16:32
23	07:19 17:02	06:44 17:41	05:59 18:13	06:08 19:47	05:33 20:18	05:25 20:37	05:44 20:26	06:14 19:48	06:46 18:56	07:19 18:07	06:56 16:33	07:23 16:32
24	07:19 17:03	06:43 17:42	05:57 18:14	06:07 19:48	05:32 20:19	05:25 20:37	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:06	06:57 16:33	07:23 16:33
25	07:18 17:04	06:41 17:43	05:55 18:15	06:05 19:49	05:32 20:20	05:25 20:37	05:45 20:24	06:16 19:45	06:48 18:52	06:21 17:04	06:58 16:32	07:24 16:33
26	07:17 17:06	06:40 17:45	05:54 18:16	06:04 19:50	05:31 20:21	05:26 20:37	05:46 20:24	06:17 19:43	06:49 18:51	06:22 17:03	07:00 16:32	07:24 16:34
27	07:16 17:07	06:38 17:46	05:52 18:18	06:02 19:51	05:30 20:22	05:26 20:37	05:47 20:23	06:19 19:42	06:50 18:49	06:24 17:01	07:01 16:31	07:24 16:35
28	07:15 17:08	06:37 17:47	05:50 18:19	06:01 19:52	05:30 20:23	05:26 20:37	05:48 20:22	06:20 19:40	06:51 18:47	06:25 17:00	07:02 16:31	07:25 16:35
29	07:15 17:09		06:49 19:20	06:00 19:54	05:29 20:23	05:27 20:37	05:49 20:21	06:21 19:38	06:52 18:46	06:26 16:59	07:03 16:30	07:25 16:36
30	07:14 17:11		06:47 19:21	05:58 19:55	05:28 20:24	05:27 20:37	05:50 20:20	06:22 19:37	06:53 18:44	06:27 16:57	07:04 16:30	07:25 16:37
31	07:13 17:12		06:45 19:22		05:28 20:25		05:51 20:19	06:23 19:35		06:28 16:56		07:25 16:37
Potential sun hours	296	296	369	399	450	454	461	429	375	345	297	286
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

Project:

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: R - SH18

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1300 1500 580 8690

	January	February	March	April	May	June
1	07:26 16:38	07:12 17:13	14:54 (15) 06:35	14:04 (15) 06:43	14:54 (15) 05:57	15:28 (15) 05:27
2	07:26 16:39	07:11 17:14	14:51 (15) 06:33	14:03 (15) 06:42	14:54 (15) 05:55	15:29 (15) 05:27
3	07:26 16:40	07:10 17:16	14:48 (15) 06:32	14:01 (15) 06:40	14:57 (15) 05:54	15:30 (15) 05:26
4	07:26 16:41	07:09 17:17	14:45 (15) 06:30	13:59 (15) 06:38	14:57 (15) 05:53	15:32 (15) 05:26
5	07:26 16:42	07:08 17:18	14:42 (15) 06:29	14:00 (15) 06:37	14:57 (15) 05:52	15:33 (15) 05:26
6	07:26 16:43	07:06 17:20	14:38 (15) 06:27	13:58 (15) 06:35	14:58 (15) 05:50	15:34 (15) 05:25
7	07:26 16:44	07:05 17:21	14:37 (15) 06:25	13:58 (15) 06:33	15:00 (15) 05:49	15:35 (15) 05:25
8	07:26 16:45	07:04 17:22	14:34 (15) 06:24	13:57 (15) 06:32	15:00 (15) 05:48	15:36 (15) 05:25
9	07:25 16:46	16:18 (14) 07:03	14:33 (15) 06:22	13:55 (15) 06:30	15:01 (15) 05:47	15:39 (15) 05:24
10	07:25 16:47	16:22 (14) 07:02	14:32 (15) 06:21	13:55 (15) 06:28	15:03 (15) 05:46	15:40 (15) 05:24
11	07:25 16:48	16:21 (14) 07:01	14:28 (15) 06:19	13:54 (15) 06:27	15:03 (15) 05:44	15:41 (15) 05:24
12	07:25 16:49	16:17 (14) 06:59	14:27 (15) 06:17	13:54 (15) 06:25	15:04 (15) 05:43	15:42 (15) 05:24
13	07:24 16:50	16:23 (14) 07:27	14:27 (15) 06:16	13:54 (15) 06:24	15:06 (15) 05:42	15:42 (15) 05:24
14	07:24 16:51	16:24 (14) 07:28	14:26 (15) 06:16	13:52 (15) 06:24	15:06 (15) 05:42	15:42 (15) 05:24
15	07:24 16:52	16:16 (14) 06:57	14:24 (15) 06:14	13:53 (15) 06:22	15:07 (15) 05:41	15:44 (15) 05:24
16	07:23 16:53	16:26 (14) 07:30	14:21 (15) 06:12	13:53 (15) 06:20	15:07 (15) 05:40	15:45 (15) 05:24
17	07:23 16:54	16:15 (14) 06:55	14:21 (15) 06:12	13:53 (15) 06:20	15:07 (15) 05:40	15:45 (15) 05:24
18	07:22 16:56	16:27 (14) 07:31	14:19 (15) 06:10	13:52 (15) 06:18	15:08 (15) 05:39	15:46 (15) 05:24
19	07:22 16:57	16:14 (14) 06:53	14:18 (15) 06:09	13:52 (15) 06:17	15:10 (15) 05:38	15:47 (15) 05:24
20	07:21 16:58	16:28 (14) 07:33	14:17 (15) 06:07	13:52 (15) 06:16	15:12 (15) 05:37	15:50 (15) 05:24
21	07:21 16:59	16:30 (14) 07:35	14:15 (15) 06:05	13:50 (15) 06:14	15:13 (15) 05:36	15:51 (15) 05:24
22	07:20 17:01	16:15 (14) 06:50	14:15 (15) 06:05	13:50 (15) 06:14	15:13 (15) 05:36	15:51 (15) 05:24
23	07:19 17:02	16:31 (14) 07:36	14:14 (15) 06:04	13:50 (15) 06:13	15:13 (15) 05:35	15:52 (15) 05:24
24	07:19 17:03	16:16 (14) 06:47	14:12 (15) 06:02	13:51 (15) 06:11	15:16 (15) 05:35	15:53 (15) 05:24
25	07:18 17:04	16:34 (14) 07:38	14:11 (15) 06:00	13:51 (15) 06:10	15:17 (15) 05:34	15:55 (15) 05:24
26	07:17 17:06	16:15 (14) 06:46	14:11 (15) 06:00	13:51 (15) 06:10	15:17 (15) 05:34	15:55 (15) 05:24
27	07:16 17:07	16:35 (14) 07:40	14:10 (15) 05:58	13:51 (15) 06:08	15:17 (15) 05:33	15:56 (15) 05:25
28	07:15 17:08	16:16 (14) 06:44	14:09 (15) 05:59	13:51 (15) 06:08	15:17 (15) 05:33	15:56 (15) 05:25
29	07:14 17:09	16:36 (14) 07:41	14:08 (15) 05:55	13:52 (15) 06:05	15:20 (15) 05:31	15:57 (15) 05:25
30	07:14 17:11	16:17 (14) 06:41	14:08 (15) 05:55	13:52 (15) 06:05	15:20 (15) 05:31	15:57 (15) 05:25
31	07:13 17:12	16:39 (14) 07:43	14:07 (15) 05:54	13:52 (15) 06:04	15:21 (15) 05:31	15:58 (15) 05:25
Potential sun hours	296	296	369	399	450	454
Total, worst case	454	3124	5046	4156	2442	1330
Sun reduction	0,65	0,67	0,70	0,73	0,77	0,85
Oper. time red.	0,99	0,99	0,99	0,99	0,99	0,99
Wind dir. red.	0,58	0,59	0,59	0,59	0,59	0,68
Total reduction	0,37	0,39	0,41	0,43	0,45	0,57
Total, real	170	1222	2063	1772	1103	758

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:

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: R - SH18

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1300 1500 580 8690

	July	August	September	October	November	December					
1	05:28 20:37	16:22 (15) 20:17	05:52 20:17	15:52 (15) 06:24	06:24 15:03 (15)	06:54 17:17 (15)	06:29 16:55	14:01 (15) 07:05	07:05 16:30	4	15:59 (14) 16:03 (14)
2	05:28 20:37	16:23 (15) 20:16	05:53 20:16	15:49 (15) 06:25	06:25 15:01 (15)	06:55 17:29 (15)	06:31 18:40	14:34 (15) 16:53	14:03 (15) 16:29	4	16:00 (14) 16:04 (14)
3	05:29 20:37	16:21 (15) 20:15	05:54 20:15	15:48 (15) 06:26	06:26 14:58 (15)	06:57 17:30 (15)	06:32 18:39	14:33 (15) 16:52	14:06 (15) 16:29	4	16:01 (14) 16:05 (14)
4	05:29 20:36	16:20 (15) 20:14	05:55 20:14	15:47 (15) 06:27	06:27 14:57 (15)	06:58 17:29 (15)	06:33 18:37	14:34 (15) 16:51	14:07 (15) 16:29		
5	05:30 20:36	16:21 (15) 20:13	05:56 20:13	15:46 (15) 06:28	06:28 14:56 (15)	06:59 17:30 (15)	06:34 18:35	14:33 (15) 16:50	14:10 (15) 16:29		
6	05:30 20:36	16:19 (15) 20:12	05:57 20:12	15:45 (15) 06:29	06:29 14:53 (15)	07:00 17:29 (15)	06:36 18:34	14:34 (15) 16:49	14:12 (15) 16:28		
7	05:31 20:36	16:18 (15) 20:10	05:58 20:10	15:44 (15) 06:30	06:30 14:52 (15)	07:01 17:28 (15)	06:37 18:32	14:33 (15) 16:47	14:15 (15) 16:28		
8	05:32 20:35	16:16 (15) 20:09	05:59 20:09	15:41 (15) 06:31	06:31 14:51 (15)	07:02 17:29 (15)	06:38 18:30	14:34 (15) 16:46	14:18 (15) 16:28		
9	05:32 20:35	16:17 (15) 20:08	06:00 20:08	15:40 (15) 06:32	06:32 14:50 (15)	07:03 17:28 (15)	06:39 18:29	14:35 (15) 16:45	14:22 (15) 16:28		
10	05:33 20:35	16:16 (15) 20:07	06:01 20:07	15:39 (15) 06:33	06:33 14:47 (15)	07:04 17:29 (15)	06:40 18:27	14:34 (15) 16:44	14:25 (15) 16:28		
11	05:34 20:34	16:14 (15) 20:05	06:02 20:05	15:38 (15) 06:34	06:34 14:46 (15)	07:05 17:28 (15)	06:42 18:25	14:36 (15) 16:43	14:28 (15) 16:28		
12	05:34 20:34	16:13 (15) 20:04	06:03 20:04	15:35 (15) 06:35	06:35 14:45 (15)	07:06 17:27 (15)	06:43 18:24	14:37 (15) 16:42	14:34 (15) 16:28		
13	05:35 20:33	16:12 (15) 20:03	06:04 20:03	15:34 (15) 06:36	06:36 14:44 (15)	07:07 17:26 (15)	06:44 18:22	14:36 (15) 16:41	14:41 (15) 16:29		
14	05:36 20:33	16:13 (15) 20:01	06:05 20:01	15:33 (15) 06:37	06:37 14:43 (15)	07:08 17:25 (15)	06:45 18:21	14:37 (15) 16:40	15:50 (14) 16:29		
15	05:37 20:32	16:11 (15) 20:00	06:06 20:00	15:32 (15) 06:38	06:38 14:42 (15)	07:10 17:26 (15)	06:46 18:19	14:38 (15) 16:39	15:50 (14) 16:29		
16	05:37 20:31	16:10 (15) 19:58	06:07 19:58	15:29 (15) 06:39	06:39 14:41 (15)	07:11 17:27 (15)	06:48 18:17	14:39 (15) 16:38	15:51 (14) 16:29		
17	05:38 20:31	16:09 (15) 19:57	06:08 19:57	15:28 (15) 06:40	06:40 14:40 (15)	07:12 17:26 (15)	06:49 18:16	14:41 (15) 16:38	15:50 (14) 16:29		
18	05:39 20:30	16:08 (15) 19:55	06:09 19:55	15:27 (15) 06:41	06:41 14:39 (15)	07:13 17:25 (15)	06:50 18:14	14:40 (15) 16:37	15:49 (14) 16:30		
19	05:40 20:29	16:07 (15) 19:54	06:10 19:54	15:24 (15) 06:42	06:42 14:38 (15)	07:14 17:24 (15)	06:51 18:13	14:41 (15) 16:36	15:51 (14) 16:30		
20	05:41 20:29	16:05 (15) 19:52	06:11 19:52	15:23 (15) 06:43	06:43 14:37 (15)	07:15 17:23 (15)	06:53 18:11	14:42 (15) 16:35	15:50 (14) 16:31		
21	05:42 20:28	16:04 (15) 19:51	06:12 19:51	15:22 (15) 06:44	06:44 14:36 (15)	07:16 17:22 (15)	06:54 18:10	14:43 (15) 16:34	15:51 (14) 16:31		
22	05:43 20:27	16:03 (15) 19:49	06:13 19:49	15:19 (15) 06:45	06:45 14:35 (15)	07:18 17:23 (15)	06:55 18:08	14:45 (15) 16:34	15:52 (14) 16:31		
23	05:43 20:26	16:02 (15) 19:48	06:14 19:48	15:18 (15) 06:46	06:46 14:34 (15)	07:19 17:22 (15)	06:56 18:07	14:46 (15) 16:33	15:52 (14) 16:32		
24	05:44 20:25	16:01 (15) 19:46	06:15 19:46	15:17 (15) 06:47	06:47 14:33 (15)	07:20 17:21 (15)	06:57 18:05	14:47 (15) 16:33	15:53 (14) 16:33		
25	05:45 20:24	16:00 (15) 19:45	06:16 19:45	15:14 (15) 06:48	06:48 14:34 (15)	07:21 17:22 (15)	06:58 18:04	14:48 (15) 16:32	15:54 (14) 16:33		
26	05:46 20:24	15:59 (15) 19:43	06:17 19:43	15:13 (15) 06:49	06:49 14:33 (15)	07:22 17:21 (15)	06:59 18:03	14:49 (15) 16:32	15:53 (14) 16:34		
27	05:47 20:23	15:58 (15) 19:42	06:18 19:42	15:12 (15) 06:50	06:50 14:34 (15)	07:23 17:20 (15)	07:00 18:01	14:50 (15) 16:31	15:54 (14) 16:34		
28	05:48 20:22	15:57 (15) 19:40	06:19 19:40	15:09 (15) 06:51	06:51 14:33 (15)	07:24 17:19 (15)	07:01 18:00	14:51 (15) 16:31	15:56 (14) 16:35		
29	05:49 20:21	15:55 (15) 19:38	06:20 19:38	15:08 (15) 06:52	06:52 14:32 (15)	07:25 17:18 (15)	07:02 18:00	14:52 (15) 16:30	15:57 (14) 16:36		
30	05:50 20:20	15:54 (15) 19:37	06:21 19:37	15:07 (15) 06:53	06:53 14:34 (15)	07:26 17:18 (15)	07:03 18:00	14:53 (15) 16:30	15:58 (14) 16:37		
31	05:51 20:19	15:53 (15) 19:35	06:23 19:35	15:04 (15) 06:54	06:54 14:35 (15)	07:27 17:17 (15)	07:04 18:00	14:54 (15) 16:30	16:04 (14) 16:37		
Potential sun hours	461	429	375	345	297	286					
Total, worst case	1910	3638	4860	4336	1252	12					
Sun reduction	0,90	0,95	0,83	0,75	0,72	0,65					
Oper. time red.	0,99	0,99	0,99	0,99	0,99	0,99					
Wind dir. red.	0,61	0,59	0,59	0,59	0,59	0,58					
Total reduction	0,55	0,55	0,48	0,44	0,42	0,37					
Total, real	1042	2018	2356	1899	524	4					

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:

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: S - SH19

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June		
1	07:25 16:38	15:16 (18) 16:12 (17)	07:12 17:13	54 15:26 (18)	06:35 17:48	06:43 19:23	05:57 19:56	05:27 20:26
2	07:26 16:39	15:16 (18) 16:12 (17)	07:11 17:14	52 15:27 (18)	06:33 17:49	06:42 19:24	05:55 19:57	05:27 20:26
3	07:26 16:40	15:16 (18) 16:12 (17)	07:10 17:16	50 15:28 (18)	06:32 17:50	06:40 19:25	05:54 19:58	05:26 20:27
4	07:26 16:41	15:16 (18) 16:14 (17)	07:09 17:17	50 15:29 (18)	06:30 17:51	06:38 19:26	05:53 19:59	05:26 20:28
5	07:26 16:42	15:16 (18) 16:14 (17)	07:07 17:18	48 15:29 (18)	06:29 17:53	06:37 19:27	05:51 20:00	05:25 20:29
6	07:26 16:43	15:18 (18) 16:16 (17)	07:06 17:19	46 15:30 (18)	06:27 17:54	06:35 19:28	05:50 20:01	05:25 20:29
7	07:26 16:44	15:18 (18) 16:18 (17)	07:05 17:21	44 15:31 (18)	06:25 17:55	06:33 19:29	05:49 20:02	05:25 20:30
8	07:25 16:45	15:18 (18) 16:18 (17)	07:04 17:22	42 15:32 (18)	06:24 17:56	06:32 19:30	05:48 20:03	05:24 20:31
9	07:25 16:46	15:17 (18) 16:19 (17)	07:03 17:23	38 15:35 (18)	06:22 17:57	06:30 19:32	05:47 20:04	05:24 20:31
10	07:25 16:47	15:17 (18) 16:21 (17)	07:02 17:25	36 15:35 (18)	06:20 17:58	06:28 19:33	05:45 20:05	05:24 20:32
11	07:25 16:48	15:19 (18) 16:21 (17)	07:00 17:26	32 15:38 (18)	06:19 18:00	06:27 19:34	05:44 20:06	05:24 20:32
12	07:25 16:49	15:18 (18) 16:22 (17)	06:59 17:27	28 15:41 (18)	06:17 18:01	06:25 19:35	05:43 20:07	05:24 20:33
13	07:24 16:50	15:18 (18) 16:24 (17)	06:58 17:28	22 15:44 (18)	06:15 18:02	06:23 19:36	05:42 20:08	05:24 20:33
14	07:24 16:51	15:20 (18) 16:26 (17)	06:57 17:30	14 16:02 (18)	06:14 18:03	06:22 19:37	05:41 20:09	05:24 20:34
15	07:24 16:52	15:19 (18) 16:27 (17)	06:55 17:31	06:12 18:04	06:20 19:38	06:40 20:10	05:40 20:10	05:24 20:34
16	07:23 16:53	15:19 (18) 16:27 (17)	06:54 17:32	06:10 18:05	06:19 19:39	06:39 20:11	05:39 20:11	05:24 20:35
17	07:23 16:55	15:20 (18) 16:28 (17)	06:53 17:33	06:09 18:06	06:17 19:40	06:38 20:12	05:38 20:12	05:24 20:35
18	07:22 16:56	15:19 (18) 16:29 (17)	06:51 17:35	06:07 18:07	06:15 19:41	06:37 20:13	05:37 20:13	05:24 20:35
19	07:22 16:57	15:19 (18) 16:31 (17)	06:50 17:36	06:05 18:09	06:14 19:42	06:36 20:14	05:36 20:14	05:24 20:36
20	07:21 16:58	15:20 (18) 16:32 (17)	06:48 17:37	06:04 18:10	06:12 19:44	06:35 20:15	05:35 20:15	05:24 20:36
21	07:20 16:59	15:20 (18) 16:34 (17)	06:47 17:38	06:02 18:11	06:11 19:45	06:34 20:16	05:34 20:16	05:24 20:36
22	07:20 17:01	15:21 (18) 16:34 (17)	06:45 17:39	06:00 18:12	06:09 19:46	06:34 20:17	05:34 20:17	05:24 20:36
23	07:19 17:02	15:20 (18) 16:32 (17)	06:44 17:41	05:59 18:13	06:08 19:47	06:33 20:18	05:33 20:18	05:24 20:37
24	07:18 17:03	15:21 (18) 16:31 (17)	06:43 17:42	05:57 18:14	06:06 19:48	06:32 20:19	05:32 20:19	05:25 20:37
25	07:18 17:04	15:22 (18) 16:28 (17)	06:41 17:43	05:55 18:15	06:05 19:49	06:31 20:20	05:31 20:20	05:25 20:37
26	07:17 17:05	15:22 (18) 16:20 (18)	06:40 17:44	05:53 18:16	06:04 19:50	06:31 20:21	05:31 20:21	05:25 20:37
27	07:16 17:07	15:23 (18) 16:21 (18)	06:38 17:46	05:52 18:17	06:02 19:51	06:30 20:22	05:30 20:22	05:26 20:37
28	07:15 17:08	15:24 (18) 16:20 (18)	06:36 17:47	05:50 18:18	06:01 19:52	06:29 20:22	05:29 20:22	05:26 20:37
29	07:14 17:09	15:23 (18) 16:19 (18)	06:36 17:47	06:48 19:20	05:59 19:53	06:29 20:23	05:29 20:23	05:26 20:37
30	07:13 17:11	15:24 (18) 16:20 (18)	06:36 17:47	06:47 19:21	05:58 19:54	06:28 20:24	05:28 20:24	05:27 20:37
31	07:13 17:12	15:25 (18) 16:19 (18)	06:36 17:47	06:45 19:22	06:45 20:25	06:28 20:25	05:28 20:25	05:27 20:37
Potential sun hours	296	296	369	399	450	454		
Total, worst case	1956	556						
Sun reduction	0,65	0,67						
Oper. time red.	0,99	0,99						
Wind dir. red.	0,56	0,55						
Total reduction	0,36	0,37						
Total, real	701	205						

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: S - SH19

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December
1	05:27	05:52	06:23	06:54	06:29	15:05 (18) 07:05
	20:37	20:17	19:33	18:42	16:54	36 15:41 (18) 16:29 62 16:03 (17)
2	05:28	05:53	06:24	06:55	06:31	15:04 (18) 07:06 15:00 (18)
	20:37	20:16	19:32	18:40	16:53	38 15:42 (18) 16:29 64 16:04 (17)
3	05:28	05:54	06:25	06:56	06:32	15:02 (18) 07:07 15:01 (18)
	20:36	20:15	19:30	18:39	16:52	42 15:44 (18) 16:29 62 16:03 (17)
4	05:29	05:55	06:26	06:57	06:33	15:01 (18) 07:08 15:02 (18)
	20:36	20:14	19:28	18:37	16:51	44 15:45 (18) 16:29 60 16:02 (17)
5	05:30	05:56	06:27	06:59	06:34	15:00 (18) 07:09 15:03 (18)
	20:36	20:13	19:27	18:35	16:50	46 15:46 (18) 16:28 60 16:03 (17)
6	05:30	05:57	06:29	07:00	06:35	15:00 (18) 07:10 15:04 (18)
	20:36	20:11	19:25	18:34	16:48	48 15:48 (18) 16:28 58 16:02 (17)
7	05:31	05:58	06:30	07:01	06:37	14:59 (18) 07:11 15:03 (18)
	20:36	20:10	19:23	18:32	16:47	50 15:49 (18) 16:28 60 16:03 (17)
8	05:31	05:59	06:31	07:02	06:38	14:58 (18) 07:12 15:04 (18)
	20:35	20:09	19:22	18:30	16:46	50 15:48 (18) 16:28 58 16:02 (17)
9	05:32	06:00	06:32	07:03	06:39	14:58 (18) 07:13 15:05 (18)
	20:35	20:08	19:20	18:29	16:45	52 15:50 (18) 16:28 58 16:03 (17)
10	05:33	06:01	06:33	07:04	06:40	14:57 (18) 07:14 15:06 (18)
	20:34	20:06	19:18	18:27	16:44	54 15:51 (18) 16:28 56 16:02 (17)
11	05:33	06:02	06:34	07:05	06:42	14:56 (18) 07:15 15:07 (18)
	20:34	20:05	19:17	18:25	16:43	54 15:50 (18) 16:28 56 16:03 (17)
12	05:34	06:03	06:35	07:06	06:43	14:56 (18) 07:15 15:07 (18)
	20:33	20:04	19:15	18:24	16:42	56 15:52 (18) 16:28 54 16:03 (17)
13	05:35	06:04	06:36	07:07	06:44	14:55 (18) 07:16 15:08 (18)
	20:33	20:02	19:13	18:22	16:41	56 15:51 (18) 16:28 54 16:04 (17)
14	05:36	06:05	06:37	07:08	06:45	14:56 (18) 07:17 15:09 (18)
	20:32	20:01	19:11	18:20	16:40	56 15:52 (18) 16:29 54 16:05 (17)
15	05:36	06:06	06:38	07:09	06:46	14:55 (18) 07:18 15:10 (18)
	20:32	20:00	19:10	18:19	16:39	58 15:53 (18) 16:29 50 16:00 (18)
16	05:37	06:07	06:39	07:11	06:48	14:55 (18) 07:18 15:08 (18)
	20:31	19:58	19:08	18:17	16:38	58 15:53 (18) 16:29 50 15:58 (18)
17	05:38	06:08	06:40	07:12	06:49	14:56 (18) 07:19 15:09 (18)
	20:31	19:57	19:06	18:16	16:37	66 16:02 (17) 16:29 50 15:59 (18)
18	05:39	06:09	06:41	07:13	06:50	14:55 (18) 07:20 15:10 (18)
	20:30	19:55	19:04	18:14	16:37	70 16:05 (17) 16:30 50 16:00 (18)
19	05:40	06:10	06:42	07:14	06:51	14:55 (18) 07:20 15:10 (18)
	20:29	19:54	19:03	18:13	16:36	72 16:07 (17) 16:30 50 16:00 (18)
20	05:41	06:11	06:43	07:15	06:52	14:56 (18) 07:21 15:11 (18)
	20:28	19:52	19:01	18:11	16:35	72 16:08 (17) 16:30 50 16:01 (18)
21	05:41	06:12	06:44	07:16	06:54	14:55 (18) 07:22 15:11 (18)
	20:28	19:51	18:59	18:10	16:34	74 16:09 (17) 16:31 50 16:01 (18)
22	05:42	06:13	06:45	07:17	06:55	14:56 (18) 07:22 15:12 (18)
	20:27	19:49	18:57	18:08	16:34	72 16:08 (17) 16:31 50 16:02 (18)
23	05:43	06:14	06:46	07:19	06:56	14:56 (18) 07:23 15:12 (18)
	20:26	19:48	18:56	18:07	16:33	72 16:08 (17) 16:32 50 16:02 (18)
24	05:44	06:15	06:47	07:20	06:57	14:57 (18) 07:23 15:13 (18)
	20:25	19:46	18:54	18:05	16:33	70 16:07 (17) 16:32 50 16:03 (18)
25	05:45	06:16	06:48	06:21	06:58	14:58 (18) 07:23 15:13 (18)
	20:24	19:45	18:52	17:04	16:32	68 16:06 (17) 16:33 50 16:03 (18)
26	05:46	06:17	06:49	06:22	06:59	14:57 (18) 07:24 15:13 (18)
	20:23	19:43	18:51	17:02	16:31	68 16:05 (17) 16:34 50 16:03 (18)
27	05:47	06:18	06:50	06:23	07:01	14:58 (18) 07:24 15:14 (18)
	20:22	19:41	18:49	17:01	16:31	68 16:06 (17) 16:34 50 16:04 (18)
28	05:48	06:19	06:51	06:25	15:16 (18) 07:02	15:00 (18) 07:25 15:16 (18)
	20:21	19:40	18:47	17:00	16:31	66 16:06 (17) 16:35 50 16:06 (18)
29	05:49	06:20	06:52	06:26	15:11 (18) 07:03	14:59 (18) 07:25 15:16 (18)
	20:20	19:38	18:45	16:58	24 15:35 (18) 16:30	66 16:05 (17) 16:36 54 16:12 (17)
30	05:50	06:21	06:53	06:27	15:09 (18) 07:04	15:00 (18) 07:25 15:16 (18)
	20:19	19:37	18:44	16:57	30 15:39 (18) 16:30	64 16:04 (17) 16:36 54 16:12 (17)
31	05:51	06:22	06:54	06:28	15:08 (18) 07:05	15:00 (18) 07:25 15:16 (18)
	20:18	19:35	16:56	32 15:40 (18)	16:37	54 16:12 (17)
Potential sun hours	461	429	375	345	297	286
Total, worst case				102	1766	1678
Sun reduction				0,75	0,72	0,65
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,55	0,56	0,56
Total reduction				0,41	0,40	0,36
Total, real				42	701	601

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: T - SH20

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:38	07:12 17:13	06:35 17:48	06:43 19:23	05:57 19:56	05:27 20:26	05:27 20:37	05:52 20:17	06:23 19:33	06:54 18:42	06:29 16:54	07:05 16:29
2	07:26 16:39	07:11 17:14	06:33 17:49	06:42 19:24	05:55 19:57	05:27 20:27	05:28 20:37	05:53 20:16	06:24 19:32	06:55 18:40	06:31 16:53	07:06 16:29
3	07:26 16:40	07:10 17:16	06:32 17:50	06:40 19:25	05:54 19:58	05:26 20:27	05:28 20:37	05:54 20:15	06:25 19:30	06:56 18:39	06:32 16:52	07:07 16:29
4	07:26 16:41	07:09 17:17	06:30 17:51	06:38 19:26	05:53 19:59	05:26 20:28	05:29 20:36	05:55 20:14	06:27 19:28	06:57 18:37	06:33 16:51	07:08 16:29
5	07:26 16:42	07:07 17:18	06:29 17:53	06:37 19:27	05:51 20:00	05:25 20:29	05:30 20:36	05:56 20:13	06:28 19:27	06:59 18:35	06:34 16:50	07:09 16:28
6	07:26 16:43	07:06 17:19	06:27 17:54	06:35 19:28	05:50 20:01	05:25 20:29	05:30 20:36	05:57 20:12	06:29 19:25	07:00 18:34	06:35 16:48	07:10 16:28
7	07:26 16:44	07:05 17:21	06:25 17:55	06:33 19:29	05:49 20:02	05:25 20:30	05:31 20:36	05:58 20:10	06:30 19:23	07:01 18:32	06:37 16:47	07:11 16:28
8	07:26 16:45	07:04 17:22	06:24 17:56	06:32 19:31	05:48 20:03	05:24 20:31	05:31 20:35	05:59 20:09	06:31 19:22	07:02 18:30	06:38 16:46	07:12 16:28
9	07:25 16:46	07:03 17:23	06:22 17:57	06:30 19:32	05:47 20:04	05:24 20:31	05:32 20:35	06:00 20:08	06:32 19:20	07:03 18:29	06:39 16:45	07:13 16:28
10	07:25 16:47	07:02 17:25	06:20 17:58	06:28 19:33	05:45 20:05	05:24 20:32	05:33 20:34	06:01 20:06	06:33 19:18	07:04 18:27	06:40 16:44	07:14 16:28
11	07:25 16:48	07:00 17:26	06:19 18:00	06:27 19:34	05:44 20:06	05:24 20:32	05:33 20:34	06:02 20:05	06:34 19:17	07:05 18:25	06:42 16:43	07:15 16:28
12	07:25 16:49	06:59 17:27	06:17 18:01	06:25 19:35	05:43 20:07	05:24 20:33	05:34 20:34	06:03 20:04	06:35 19:15	07:06 18:24	06:43 16:42	07:15 16:28
13	07:24 16:50	06:58 17:28	06:15 18:02	06:23 19:36	05:42 20:08	05:24 20:33	05:35 20:33	06:04 20:02	06:36 19:13	07:07 18:22	06:44 16:41	07:16 16:28
14	07:24 16:51	06:57 17:30	06:14 18:03	06:22 19:37	05:41 20:09	05:24 20:34	05:36 20:32	06:05 20:01	06:37 19:11	07:08 18:20	06:45 16:40	07:17 16:29
15	07:24 16:52	06:55 17:31	06:12 18:04	06:20 19:38	05:40 20:10	05:24 20:34	05:36 20:32	06:06 20:00	06:38 19:10	07:10 18:19	06:46 16:39	07:18 16:29
16	07:23 16:53	06:54 17:32	06:10 18:05	06:19 19:39	05:39 20:11	05:24 20:35	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	06:48 16:38	07:18 16:29
17	07:23 16:55	06:53 17:33	06:09 18:06	06:17 19:40	05:38 20:12	05:24 20:35	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	06:49 16:38	07:19 16:29
18	07:22 16:56	06:51 17:35	06:07 18:07	06:16 19:41	05:37 20:13	05:24 20:35	05:39 20:30	06:09 19:55	06:41 19:04	07:13 18:14	06:50 16:37	07:20 16:30
19	07:22 16:57	06:50 17:36	06:05 18:09	06:14 19:43	05:36 20:14	05:24 20:36	05:40 20:29	06:10 19:54	06:42 19:03	07:14 18:13	06:51 16:36	07:20 16:30
20	07:21 16:58	06:48 17:37	06:04 18:10	06:12 19:44	05:35 20:15	05:24 20:36	05:41 20:29	06:11 19:52	06:43 19:01	07:15 18:11	06:52 16:35	07:21 16:30
21	07:20 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:34 20:16	05:24 20:36	05:42 20:28	06:12 19:51	06:44 18:59	07:16 18:10	06:54 16:34	07:22 16:31
22	07:20 17:01	06:46 17:40	06:00 18:12	06:09 19:46	05:34 20:17	05:24 20:36	05:42 20:27	06:13 19:49	06:45 18:58	07:18 18:08	06:55 16:34	07:22 16:31
23	07:19 17:02	06:44 17:41	05:59 18:13	06:08 19:47	05:33 20:18	05:24 20:37	05:43 20:26	06:14 19:48	06:46 18:56	07:19 18:07	06:56 16:33	07:23 16:32
24	07:18 17:03	06:43 17:42	05:57 18:14	06:06 19:48	05:32 20:19	05:25 20:37	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:05	06:57 16:33	07:23 16:32
25	07:18 17:04	06:41 17:43	05:55 18:15	06:05 19:49	05:31 20:20	05:25 20:37	05:45 20:24	06:16 19:45	06:48 18:52	06:21 17:04	06:58 16:32	07:23 16:33
26	07:17 17:05	06:40 17:44	05:53 18:16	06:04 19:50	05:30 20:21	05:25 20:37	05:46 20:23	06:17 19:43	06:49 18:51	06:22 17:02	06:59 16:31	07:24 16:34
27	07:16 17:07	06:38 17:46	05:52 18:17	06:02 19:51	05:30 20:22	05:26 20:37	05:47 20:22	06:18 19:42	06:50 18:49	06:23 17:01	07:01 16:31	07:24 16:34
28	07:15 17:08	06:36 17:47	05:50 18:19	06:01 19:52	05:29 20:23	05:26 20:37	05:48 20:22	06:19 19:40	06:51 18:47	06:25 17:00	07:02 16:31	07:25 16:35
29	07:14 17:09		06:48 19:20	05:59 19:53	05:29 20:23	05:27 20:37	05:49 20:21	06:20 19:38	06:52 18:45	06:26 16:58	07:03 16:30	07:25 16:36
30	07:14 17:11		06:47 19:21	05:58 19:54	05:28 20:24	05:27 20:37	05:50 20:19	06:21 19:37	06:53 18:44	06:27 16:57	07:04 16:30	07:25 16:36
31	07:13 17:12		06:45 19:22		05:28 20:25		05:51 20:18	06:22 19:35		06:28 16:56		07:25 16:37
Potential sun hours	296	296	369	399	450	454	461	429	375	345	297	286
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

Project:

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DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: U - SH21

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	January	February	March	April	May	June
1	07:25 16:38	07:11 17:13	06:35 17:48	06:43 19:23	18:30 (11) 19:02 (11)	05:57 19:55
2	07:26 16:39	07:10 17:14	06:33 17:49	06:41 19:24	18:28 (11) 19:02 (11)	05:55 19:57
3	07:26 16:40	07:09 17:16	06:32 17:50	06:40 19:25	18:26 (11) 19:02 (11)	05:54 19:58
4	07:26 16:41	07:08 17:17	06:30 17:51	06:38 19:26	18:25 (11) 19:05 (11)	05:53 19:59
5	07:26 16:42	07:07 17:18	06:28 17:53	06:36 19:27	18:23 (11) 19:05 (11)	05:51 20:00
6	07:26 16:43	07:06 17:19	06:27 17:54	06:35 19:28	18:21 (11) 19:05 (11)	05:50 20:01
7	07:26 16:44	07:05 17:21	06:25 17:55	06:33 19:29	18:20 (11) 19:08 (11)	05:49 20:02
8	07:25 16:45	07:04 17:22	06:24 17:56	06:31 19:30	18:20 (11) 19:08 (11)	05:48 20:03
9	07:25 16:46	07:03 17:23	06:22 17:57	06:30 19:32	18:18 (11) 19:08 (11)	05:47 20:04
10	07:25 16:47	07:02 17:24	06:20 17:58	06:28 19:33	18:19 (11) 19:09 (11)	05:45 20:05
11	07:25 16:48	07:00 17:26	06:19 17:59	06:27 19:34	18:17 (11) 19:09 (11)	05:44 20:06
12	07:25 16:49	06:59 17:27	06:17 18:01	06:25 19:35	18:18 (11) 19:08 (11)	05:43 20:07
13	07:24 16:50	06:58 17:28	06:15 18:02	06:23 19:36	18:16 (11) 19:08 (11)	05:42 20:08
14	07:24 16:51	06:57 17:30	06:14 18:03	06:22 19:37	18:16 (11) 19:08 (11)	05:41 20:09
15	07:23 16:52	06:55 17:31	06:12 18:04	06:20 19:38	18:15 (11) 19:09 (11)	05:40 20:10
16	07:23 16:53	06:54 17:32	06:10 18:05	06:19 19:39	18:15 (11) 19:07 (11)	05:39 20:11
17	07:23 16:55	06:52 17:33	06:09 18:06	06:17 19:40	18:16 (11) 19:08 (11)	05:38 20:12
18	07:22 16:56	06:51 17:35	06:07 18:07	06:15 19:41	18:16 (11) 19:06 (11)	05:37 20:13
19	07:22 16:57	06:50 17:36	06:05 18:09	06:14 19:42	18:17 (11) 19:07 (11)	05:36 20:14
20	07:21 16:58	06:48 17:37	06:04 18:10	06:12 19:44	18:15 (11) 19:05 (11)	05:35 20:15
21	07:20 16:59	06:47 17:38	06:02 18:11	06:11 19:45	18:16 (11) 19:06 (11)	05:34 20:16
22	07:20 17:01	06:45 17:39	06:00 18:12	06:09 19:46	18:16 (11) 19:04 (11)	05:34 20:17
23	07:19 17:02	06:44 17:41	05:58 18:13	06:08 19:47	18:17 (11) 19:03 (11)	05:33 20:18
24	07:18 17:03	06:42 17:42	05:57 18:14	06:06 19:48	18:17 (11) 19:03 (11)	05:32 20:19
25	07:18 17:04	06:41 17:43	05:55 18:15	06:05 19:49	18:18 (11) 19:02 (11)	05:31 20:20
26	07:17 17:05	06:39 17:44	05:53 18:16	06:04 19:50	18:19 (11) 19:01 (11)	05:31 20:21
27	07:16 17:07	06:38 17:45	05:52 18:17	06:02 19:51	18:19 (11) 18:59 (11)	05:30 20:22
28	07:15 17:08	06:36 17:47	05:50 18:18	06:01 19:52	18:22 (11) 18:58 (11)	05:29 20:22
29	07:14 17:09		06:48 19:20	05:59 18:53 (11)	18:23 (11) 18:57 (11)	05:29 20:23
30	07:13 17:10		06:47 19:21	05:58 18:53 (11)	18:23 (11) 18:57 (11)	05:28 20:23
31	07:12 17:12		06:45 19:22	05:57 18:53 (11)	18:23 (11) 18:55 (11)	05:28 20:24
Potential sun hours	296	296	369	399	450	454
Total, worst case			62	1356		440
Sun reduction			0,70	0,73		0,85
Oper. time red.			0,99	0,99		0,99
Wind dir. red.			0,73	0,73		0,77
Total reduction			0,50	0,53		0,65
Total, real			31	712		284

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

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

Printed/Page

DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO Shadow receptor: U - SH21

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 2 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,65 0,67 0,70 0,73 0,77 0,85 0,90 0,95 0,83 0,75 0,72 0,65

Operational time
 N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 350 230 210 320 370 500 510 520 650 380 300 270 700 1 300 1 500 580 8 690

	July	August	September	October	November	December			
1	05:27	19:56 (18)	05:52	06:23	18:16 (11)	06:54	06:29	07:05	
	20:37	14 20:10 (18)	20:17	19:33	52 19:08 (11)	18:42	16:54	16:29	
2	05:28	19:55 (18)	05:53	06:24	18:17 (11)	06:55	06:30	07:06	
	20:37	16 20:11 (18)	20:16	19:32	50 19:07 (11)	18:40	16:53	16:29	
3	05:28	19:55 (18)	05:54	06:25	18:16 (11)	06:56	06:32	07:07	
	20:36	14 20:09 (18)	20:15	19:30	50 19:06 (11)	18:39	16:52	16:29	
4	05:29	19:56 (18)	05:55	06:26	18:17 (11)	06:57	06:33	07:08	
	20:36	14 20:10 (18)	20:14	19:28	48 19:05 (11)	18:37	16:51	16:29	
5	05:30	19:56 (18)	05:56	06:27	18:16 (11)	06:58	06:34	07:09	
	20:36	14 20:10 (18)	20:13	19:27	48 19:04 (11)	18:35	16:50	16:28	
6	05:30	19:57 (18)	05:57	06:28	18:17 (11)	07:00	06:35	07:10	
	20:36	12 20:09 (18)	20:11	19:25	44 19:01 (11)	18:33	16:48	16:28	
7	05:31	19:56 (18)	05:58	06:29	18:18 (11)	07:01	06:37	07:11	
	20:35	14 20:10 (18)	20:10	19:23	42 19:00 (11)	18:32	16:47	16:28	
8	05:31	19:56 (18)	05:59	06:31	18:19 (11)	07:02	06:38	07:12	
	20:35	12 20:08 (18)	20:09	19:22	40 18:59 (11)	18:30	16:46	16:28	
9	05:32	19:57 (18)	06:00	18:42 (11)	06:32	18:20 (11)	07:03	06:39	07:13
	20:35	12 20:09 (18)	20:08	14 18:56 (11)	19:20	36 18:56 (11)	18:29	16:45	16:28
10	05:33	19:58 (18)	06:01	18:39 (11)	06:33	18:21 (11)	07:04	06:40	07:14
	20:34	10 20:08 (18)	20:06	20 18:59 (11)	19:18	34 18:55 (11)	18:27	16:44	16:28
11	05:33	19:56 (18)	06:02	18:36 (11)	06:34	18:22 (11)	07:05	06:41	07:14
	20:34	12 20:08 (18)	20:05	26 19:02 (11)	19:16	32 18:54 (11)	18:25	16:43	16:28
12	05:34	19:57 (18)	06:03	18:33 (11)	06:35	18:23 (11)	07:06	06:43	07:15
	20:33	10 20:07 (18)	20:04	30 19:03 (11)	19:15	28 18:51 (11)	18:24	16:42	16:28
13	05:35	19:58 (18)	06:04	18:32 (11)	06:36	18:26 (11)	07:07	06:44	07:16
	20:33	10 20:08 (18)	20:02	32 19:04 (11)	19:13	22 18:48 (11)	18:22	16:41	16:28
14	05:36	19:59 (18)	06:05	18:31 (11)	06:37	18:29 (11)	07:08	06:45	07:17
	20:32	8 20:07 (18)	20:01	34 19:05 (11)	19:11	16 18:45 (11)	18:20	16:40	16:29
15	05:36	19:59 (18)	06:06	18:28 (11)	06:38		07:09	06:46	07:18
	20:32	6 20:05 (18)	20:00	38 19:06 (11)	19:10		18:19	16:39	16:29
16	05:37	19:58 (18)	06:07	18:27 (11)	06:39		07:11	06:48	07:18
	20:31	8 20:06 (18)	19:58	40 19:07 (11)	19:08		18:17	16:38	16:29
17	05:38	19:59 (18)	06:08	18:26 (11)	06:40		07:12	06:49	07:19
	20:31	6 20:05 (18)	19:57	42 19:08 (11)	19:06		18:16	16:37	16:29
18	05:39	20:00 (18)	06:09	18:25 (11)	06:41		07:13	06:50	07:20
	20:30	4 20:04 (18)	19:55	44 19:09 (11)	19:04		18:14	16:37	16:30
19	05:40	20:00 (18)	06:10	18:24 (11)	06:42		07:14	06:51	07:20
	20:29	4 20:04 (18)	19:54	46 19:10 (11)	19:03		18:13	16:36	16:30
20	05:41	20:01 (18)	06:11	18:23 (11)	06:43		07:15	06:52	07:21
	20:28	4 20:05 (18)	19:52	46 19:09 (11)	19:01		18:11	16:35	16:30
21	05:41		06:12	18:22 (11)	06:44		07:16	06:53	07:21
	20:28		19:51	48 19:10 (11)	18:59		18:10	16:34	16:31
22	05:42		06:13	18:21 (11)	06:45		07:17	06:55	07:22
	20:27		19:49	50 19:11 (11)	18:57		18:08	16:34	16:31
23	05:43		06:14	18:20 (11)	06:46		07:19	06:56	07:22
	20:26		19:48	50 19:10 (11)	18:56		18:07	16:33	16:32
24	05:44		06:15	18:19 (11)	06:47		07:20	06:57	07:23
	20:25		19:46	52 19:11 (11)	18:54		18:05	16:33	16:32
25	05:45		06:16	18:19 (11)	06:48		06:21	06:58	07:23
	20:24		19:45	50 19:09 (11)	18:52		17:04	16:32	16:33
26	05:46		06:17	18:18 (11)	06:49		06:22	06:59	07:24
	20:23		19:43	52 19:10 (11)	18:51		17:02	16:31	16:34
27	05:47		06:18	18:17 (11)	06:50		06:23	07:00	07:24
	20:22		19:41	52 19:09 (11)	18:49		17:01	16:31	16:34
28	05:48		06:19	18:16 (11)	06:51		06:24	07:02	07:24
	20:21		19:40	54 19:10 (11)	18:47		17:00	16:31	16:35
29	05:49		06:20	18:17 (11)	06:52		06:26	07:03	07:25
	20:20		19:38	52 19:09 (11)	18:45		16:58	16:30	16:36
30	05:50		06:21	18:16 (11)	06:53		06:27	07:04	07:25
	20:19		19:37	52 19:08 (11)	18:44		16:57	16:30	16:36
31	05:51		06:22	18:17 (11)			06:28		07:25
	20:18		19:35	50 19:07 (11)			16:56		16:37
Potential sun hours	461	429	375	345	297	286			
Total, worst case	204	974	542						
Sun reduction	0,90	0,95	0,83						
Oper. time red.	0,99	0,99	0,99						
Wind dir. red.	0,77	0,73	0,73						
Total reduction	0,68	0,68	0,60						
Total, real	140	666	324						

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

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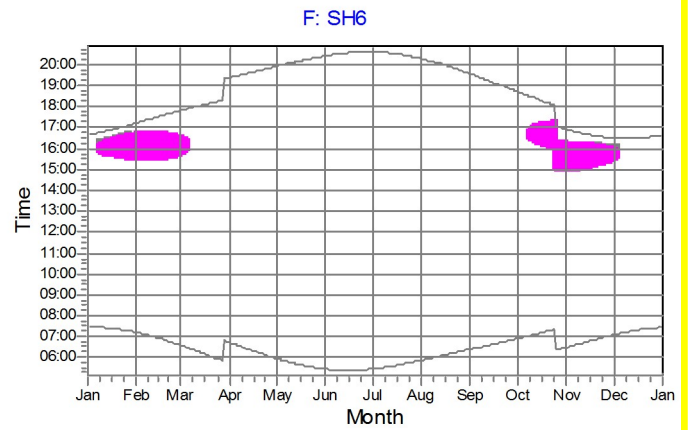
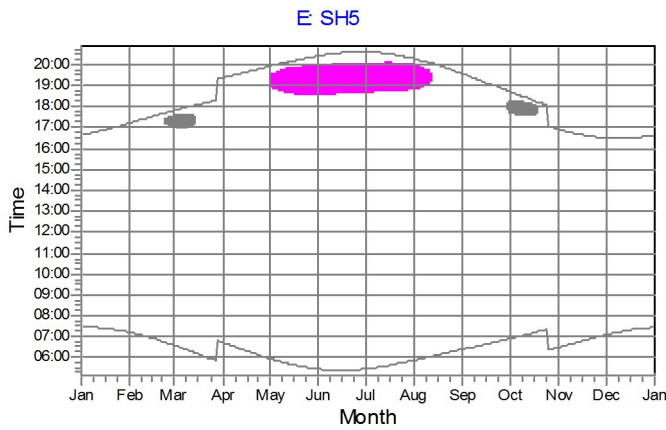
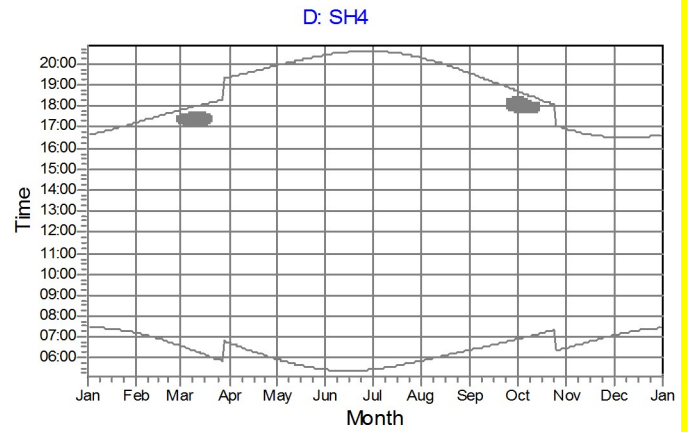
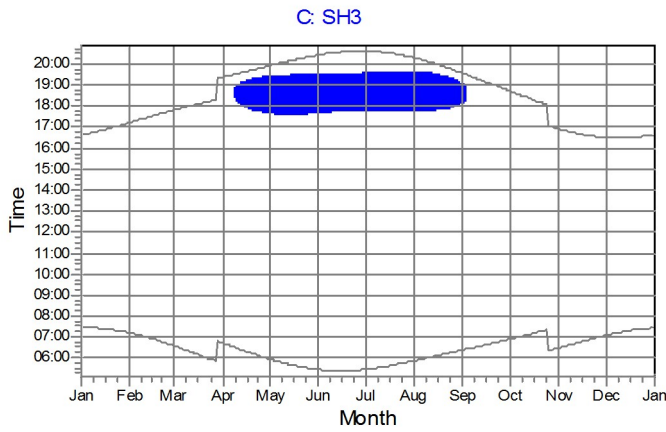
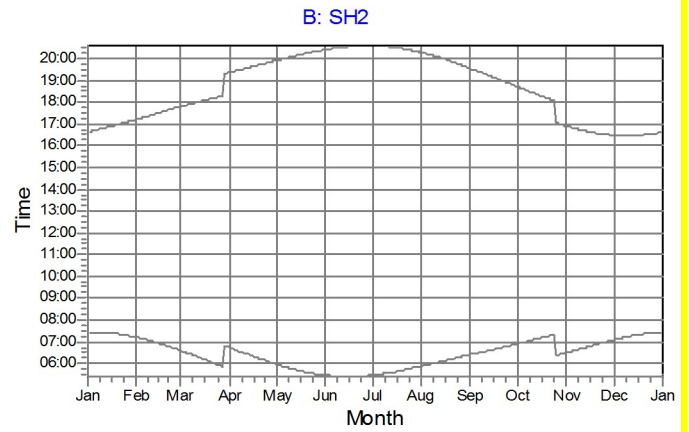
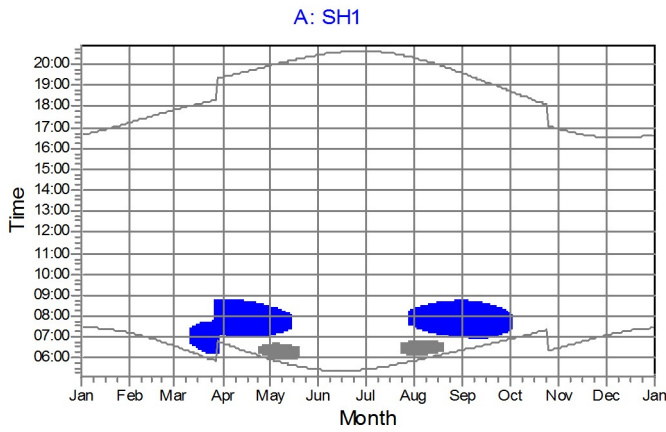
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DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar, graphical

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO



WTGs



Project:

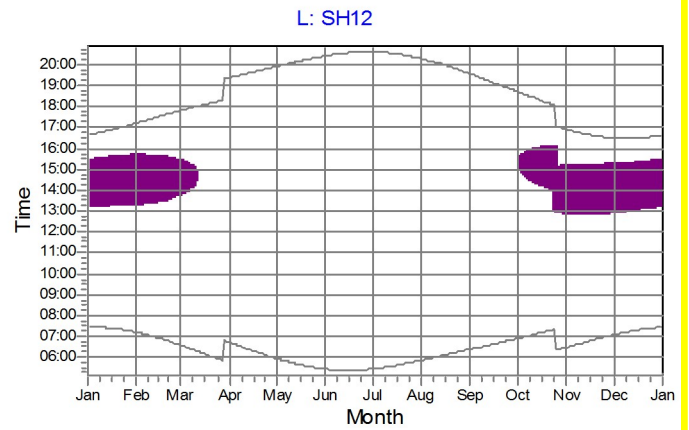
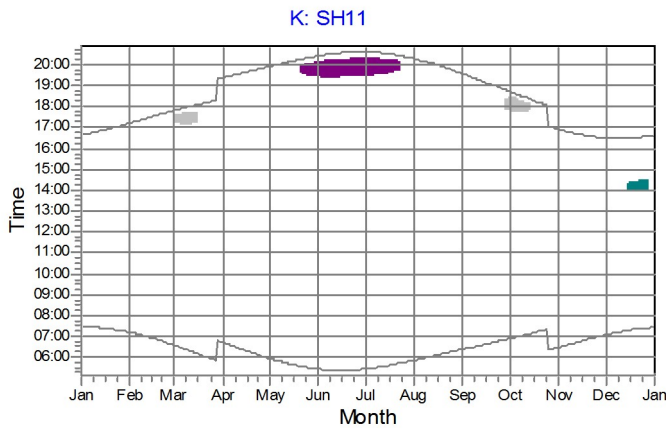
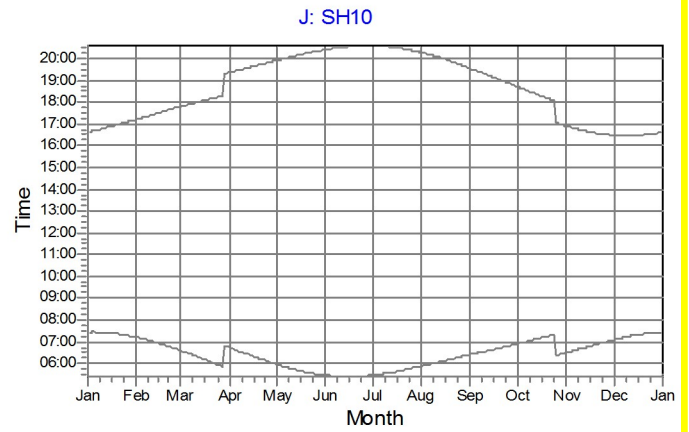
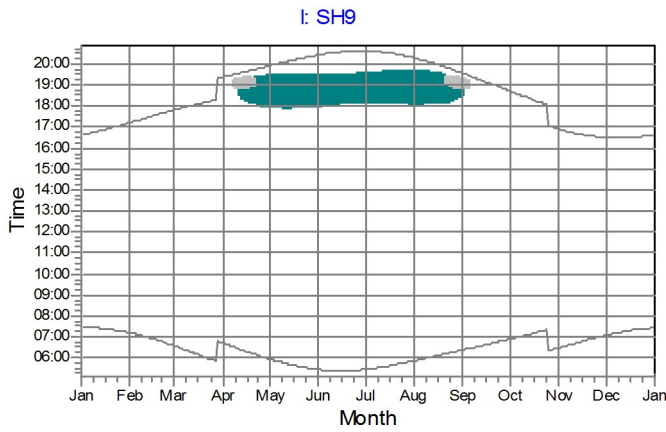
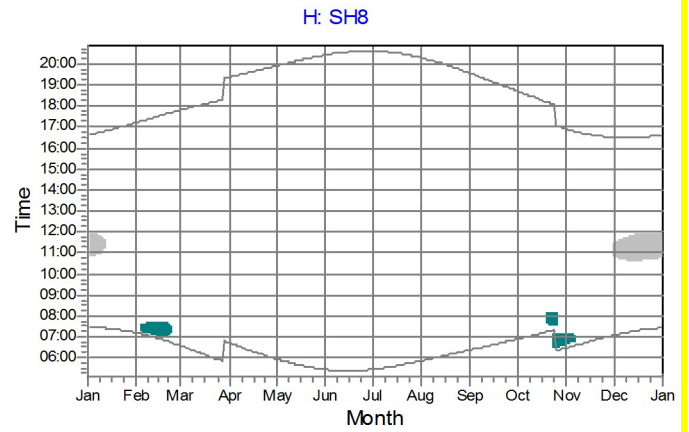
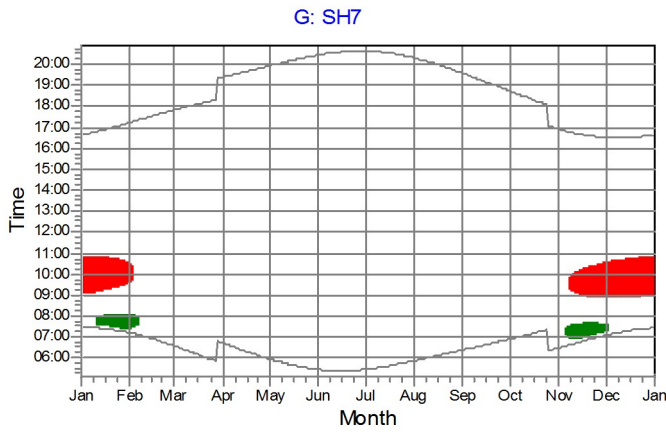
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DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar, graphical

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO



WTGs

- S1
- S2
- S7
- S12
- S13

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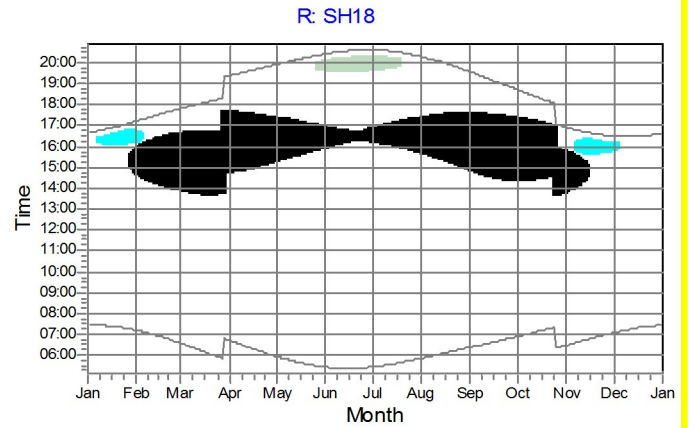
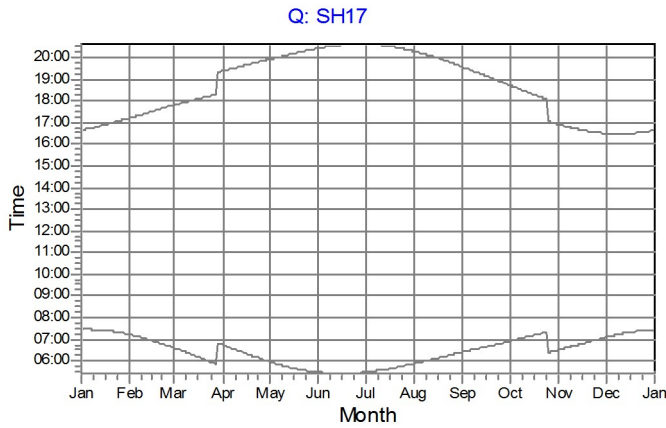
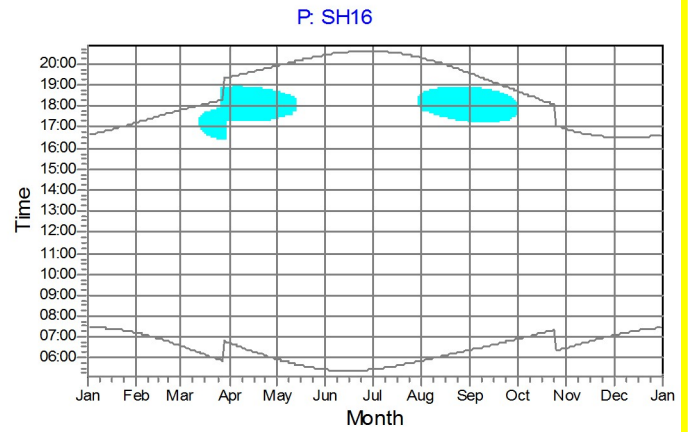
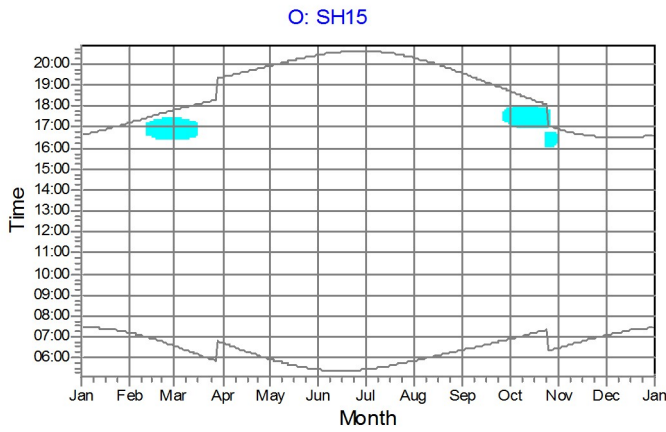
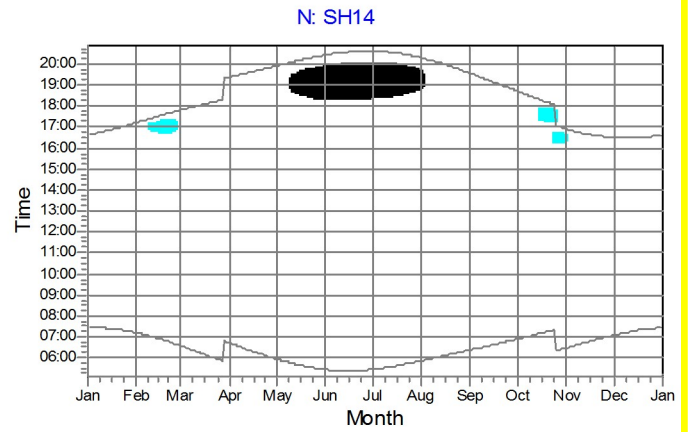
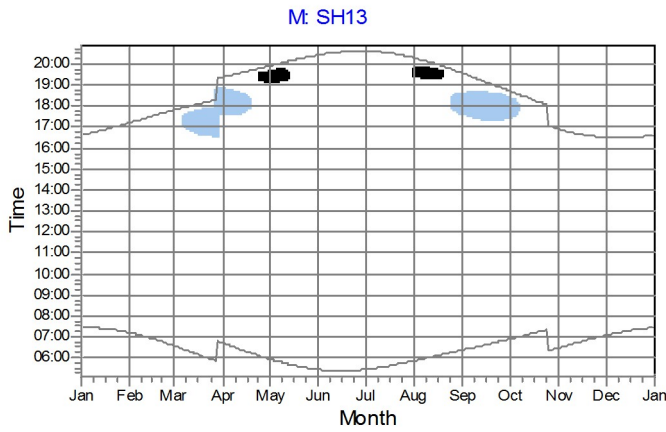
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DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar, graphical

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO



WTGs



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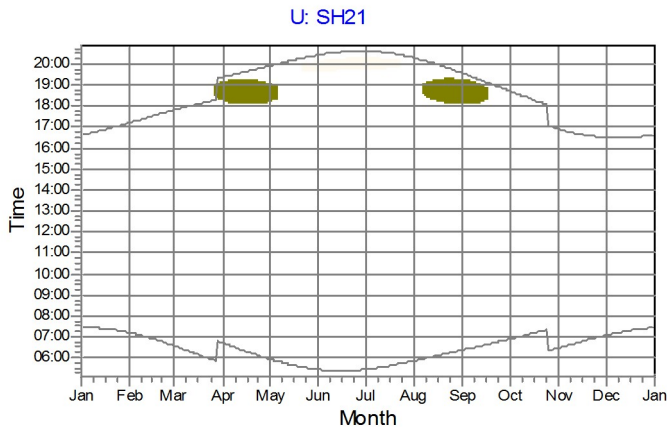
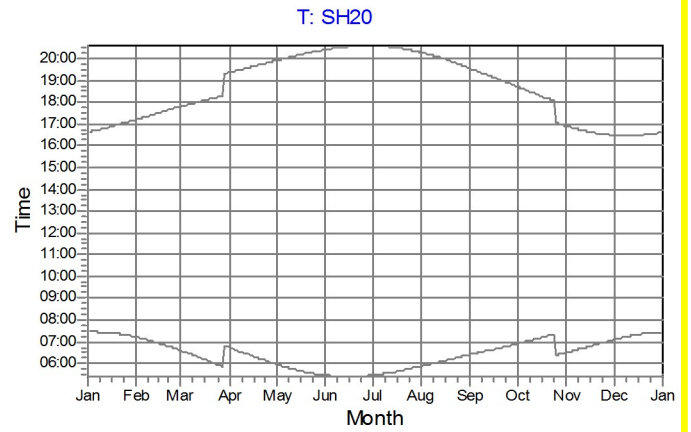
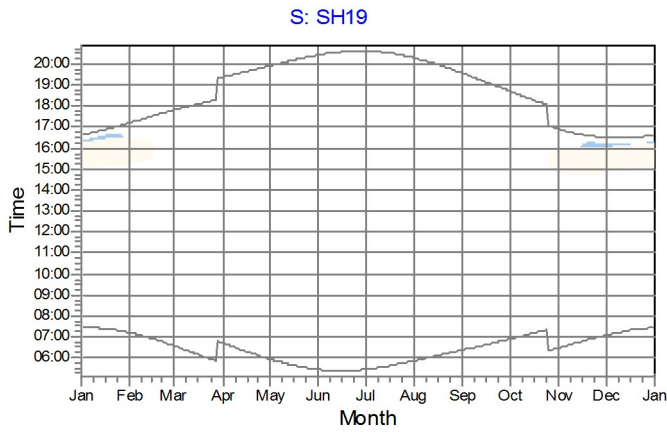
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DEL TRIO - SAN SEVERO

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - Calendar, graphical

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO



WTGs

S11

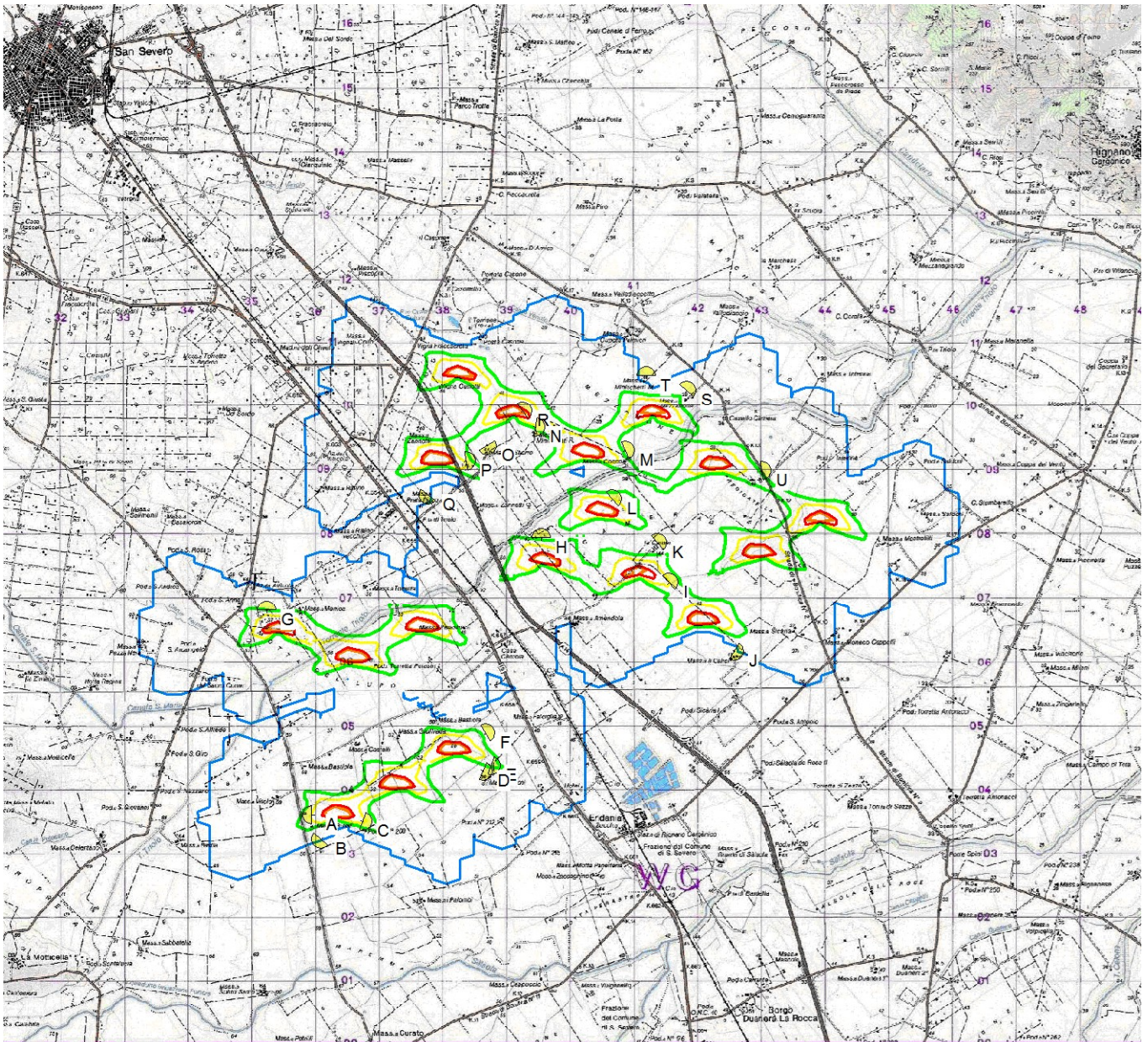
S17

S18

SHADOW - IGM DEL TR_SS

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO

File: IGM DEL TR_SS.bmi



Map: IGM DEL TR_SS , Print scale 1:100 000, Map center UTM WGS84 Zone: 33 East: 539 937 North: 4 606 703

Shadow receptor

Isolines showing shadow in Shadow hours per year. Real value calculation.

— 0	— 50	— 100	— 250	— 215
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Project:

DEL TRIO - SAN SEVERO

Printed/Page

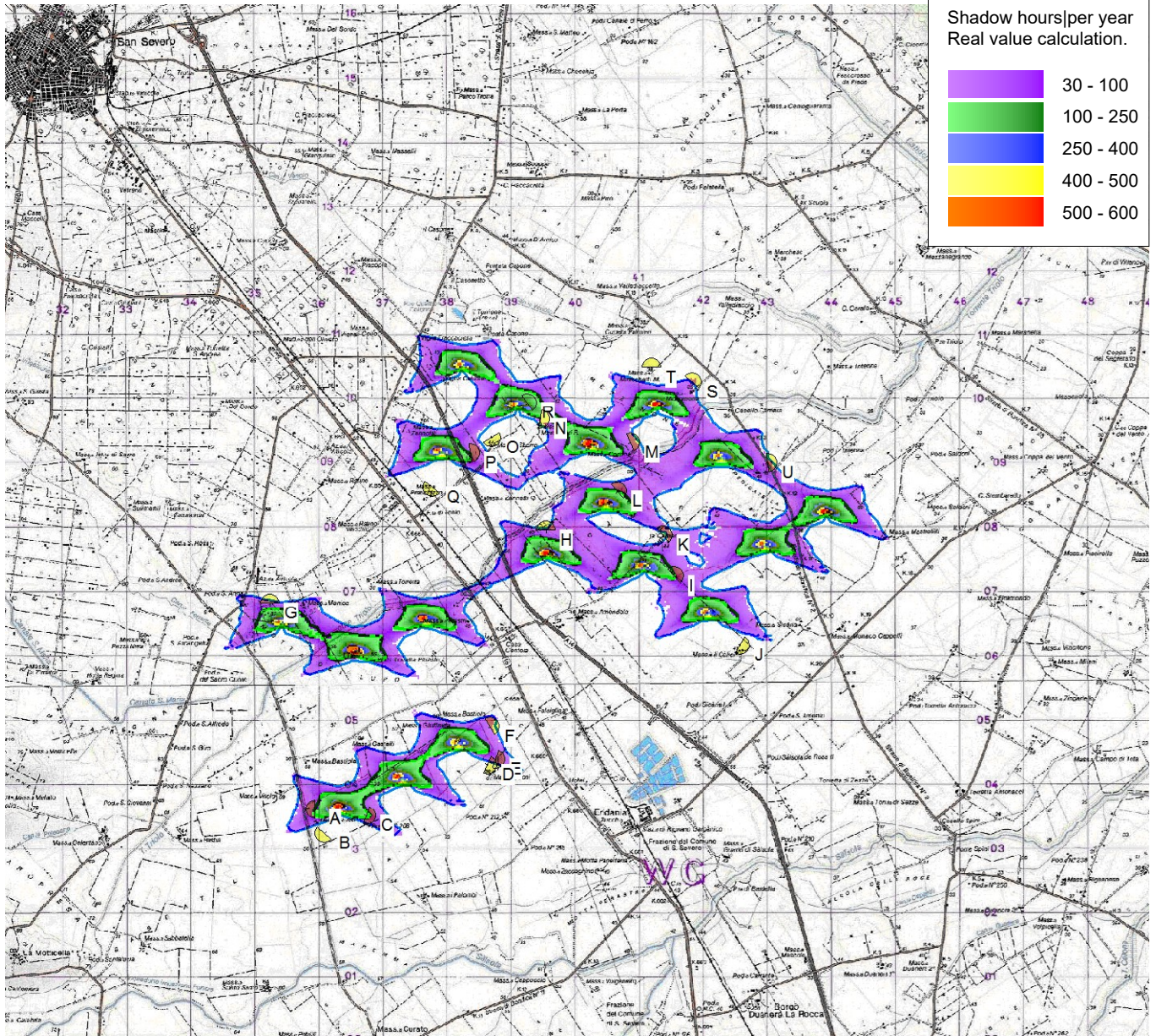
Calculated:

20/02/2024 11:29/2.4.0.62

SHADOW - IGM DEL TR_SS

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO

File: IGM DEL TR_SS.bmi



Map: IGM DEL TR_SS , Print scale 1:100 000, Map center UTM WGS84 Zone: 33 East: 539 937 North: 4 606 703

Shadow receptor

Isolines showing shadow in Shadow hours|per year. Real value calculation.

30 100 250 400 500

Project:

DEL TRIO - SAN SEVERO

Printed/Page

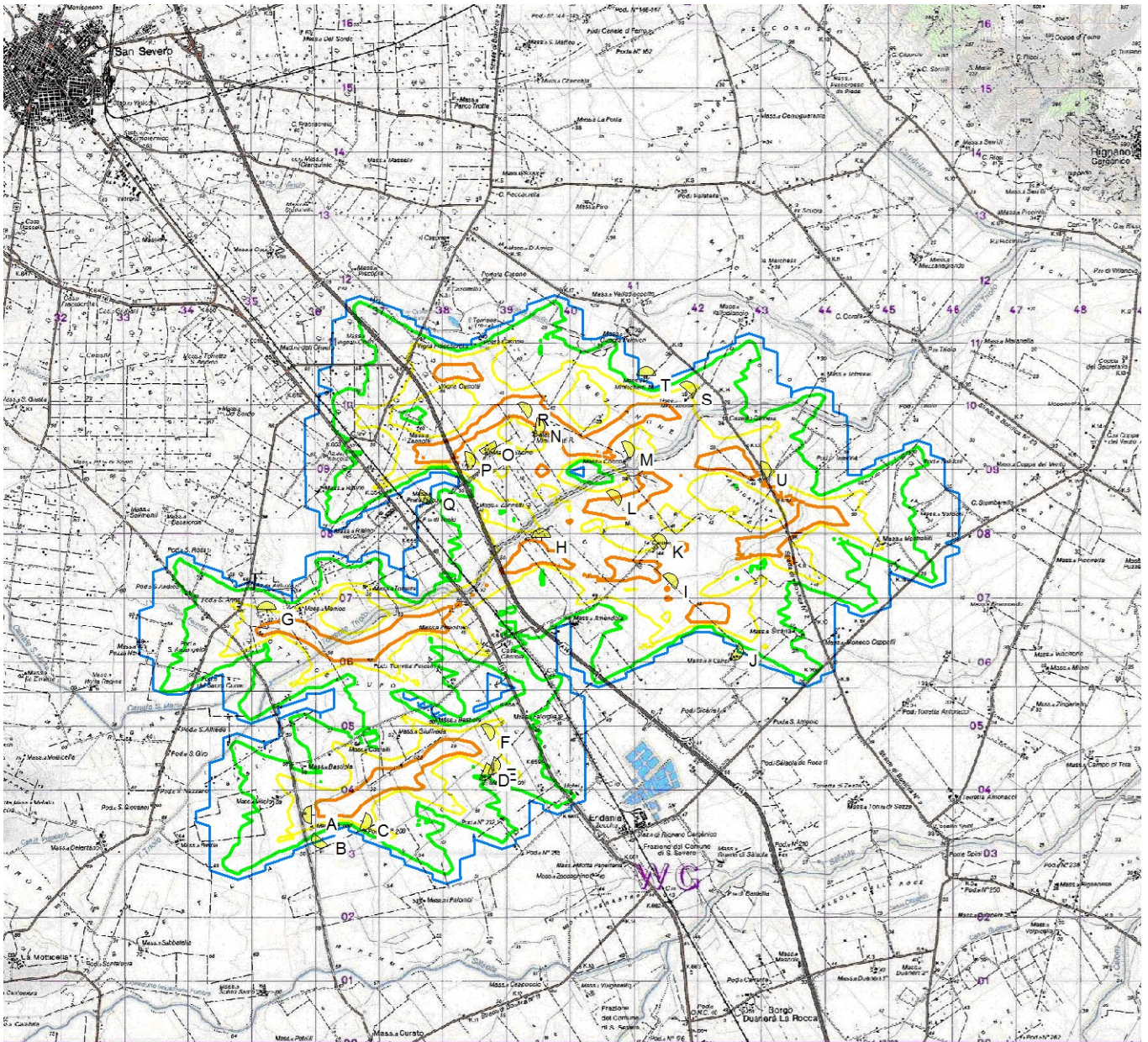
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20/02/2024 11:29/2.4.0.62

SHADOW - IGM DEL TR_SS

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO

File: IGM DEL TR_SS.bmi



Map: IGM DEL TR_SS , Print scale 1:100 000, Map center UTM WGS84 Zone: 33 East: 539 937 North: 4 606 703

Shadow receptor

Isolines showing shadow in Shadow daysper year. Real value calculation.

—	0	—	30	—	90	—	180	—	365
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Project:
DEL TRIO - SAN SEVERO

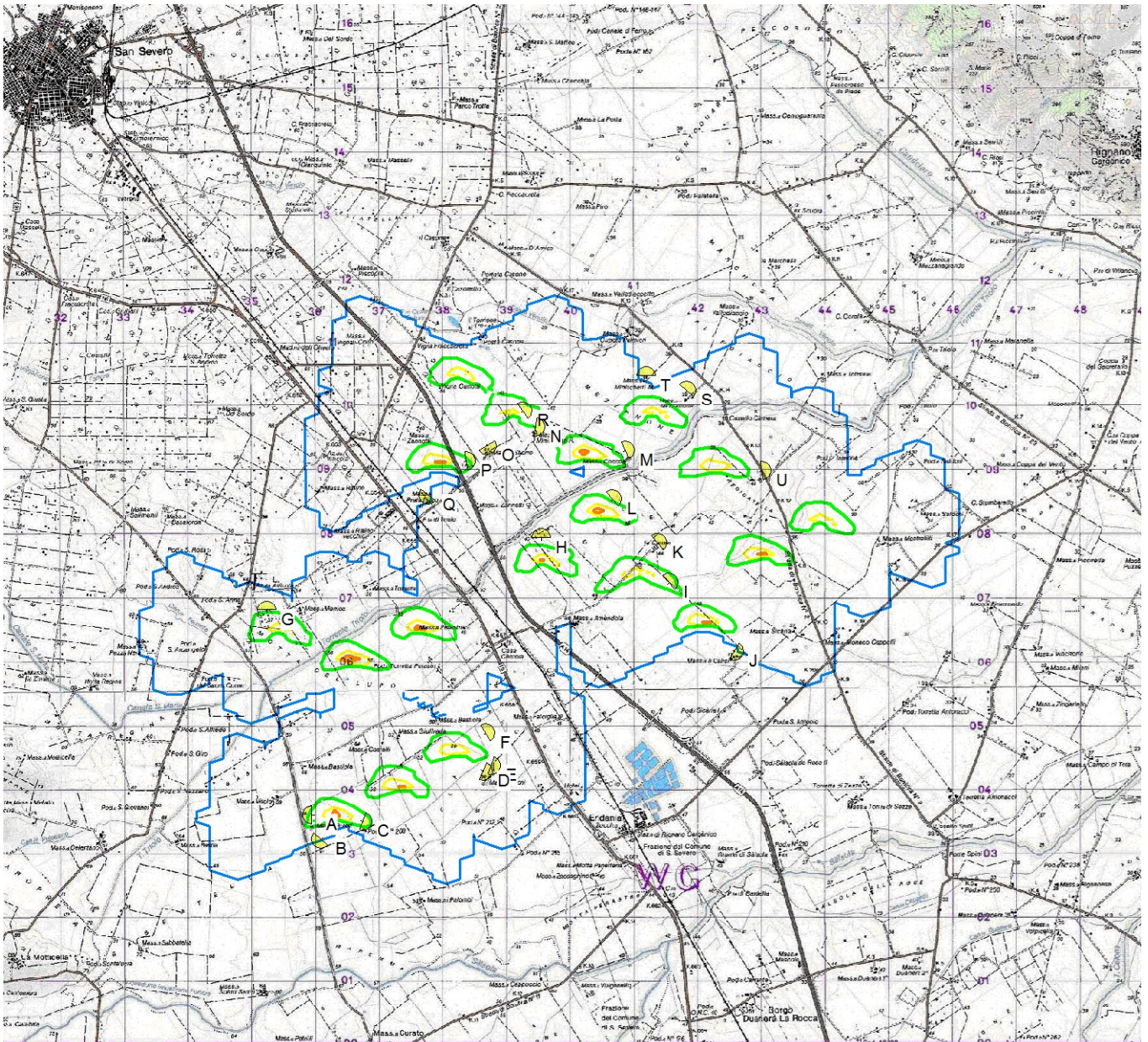
Printed/Page

Calculated:
20/02/2024 11:29/2.4.0.62

SHADOW - IGM DEL TR_SS

Calculation: IMPATTO SHADOW FLICKERING PROGETTO "DEL TRIO" - SAN SEVERO

File: IGM DEL TR_SS.bmi



Map: IGM DEL TR_SS , Print scale 1:100 000, Map center UTM WGS84 Zone: 33 East: 539 937 North: 4 606 703

Shadow receptor

Isolines showing shadow in Max shadow minutes per day. Real value calculation.

—	0	—	50	—	100	—	150	—	215
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