



# COMUNE DI SAN SEVERO

PROVINCIA DI FOGGIA

## PROGETTO PER LA REALIZZAZIONE DI UN IMPIANTO EOLICO NELLE LOCALITA'

“Centoquaranta” e “Mezzanone”

### PROGETTO DEFINITIVO

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Em./Rev.	Data	Red./Dis.	Verificato	Approvato	Descrizione

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a cura di:

*Dott. Agronomo Rocco Iacullo*

Codice elaborato:

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Titolo:

**“VALUTAZIONE DEI POSSIBILI EFFETTI SULL’USO AGRICOLO DEL  
SUOLO CAUSATE DALLA PRESENZA DEGLI AEROGENERATORI”**

Committente:

**INNOGY ITALIA S.p.A.**

**INNOGY ITALIA S.p.A.**

**San Severo (FG)** località "Centoquaranta e Mezzanone"

Relazione integrativa: "Valutazione delle limitazioni all' uso agricolo del suolo causate dalla presenza degli aerogeneratori"

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**Relazione integrativa:  
"Valutazione delle limitazioni all'  
uso agricolo del suolo causate dalla  
presenza degli aerogeneratori"**

Impianto Eolico  
in località "Centoquaranta" e "Mezzanone"

Preparata per:  
**INNOGY ITALIA S.p.A.**

Impianto Eolico:  
**"Parco Eolico SAN SEVERO"**

In Agro di:  
**San Severo (FG)**

Preparato da:  
**STUDIO AGRONOMICO IACULLO**  
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## 1 Introduzione

Il presente documento, giusta richiesta del Ministero dell'Ambiente del 29/10/2019, analizza i possibili effetti sugli usi agricoli del suolo che possono scaturire dalla realizzazione di un Parco Eolico. Riguarda il sito individuato per la realizzazione di un Impianto Eolico di grande generazione delle opere connesse e delle infrastrutture indispensabili per la produzione di energia elettrica, costituito da **N. 12 aerogeneratori da 4,5 MW cadauno** per una potenza complessiva pari a **54 MW**. Il sito è costituito da due sottocampi composti rispettivamente da n. **7 aerogeneratori (sottocampo A) in Località: "Centoquaranta"** e n. **5 aerogeneratori (sottocampo B) in Località "Mezzanone"** nel Comune di San Severo, in Provincia di Foggia.

La relazione è stata redatta in base alle informazioni raccolte tramite sopralluoghi in sito ed in base ai dati risultanti dall'analisi dell'ombreggiamento dei suoli interessati dall'installazione dei **12 aerogeneratori**, e in base ai dati desunti da specifici documenti bibliografici presi a riferimento.

## 2 Documenti di riferimento

Le fonti di dati e informazioni a cui si è fatto riferimento per la redazione della seguente Relazione sono citati nel seguente elenco:

- Piano Paesaggistico Regionale (PPTTR) della Regione Puglia;
- Programma di Sviluppo Rurale (PSR) della Regione Puglia;
- Piano Urbanistico Generale (PUG) del Comune di San Severo
- ISTAT 6° Censimento generale dell' agricoltura anno 2010
- Relazione descrittiva del progetto
- Materiale bibliografico specifico

### 3 Ubicazione del sito

L’area su cui si intende realizzare l’impianto come detto è posta in agro del comune di San Severo è suddivisa in due sottozone, la prima (*Sottocampo A*) ad Est del centro abitato indicata col toponimo “**Centoquaranta**”, la seconda (*Sottocampo B*) a Sud Est del centro abitato indicata col toponimo “**Mezzanone**” entrambe pianeggianti a quota compresa tra 30 e 50 mt s.l.m.

È localizzata nella parte centro - settentrionale della pianura del Tavoliere di Puglia.

Il sito è facilmente raggiungibile da Foggia percorrendo la SS 16 verso San Severo e superato il torrente Triolo dopo ca km 3,00 imboccando la Sp 27, superata l’autostrada A14 si dislocano gli aerogeneratori del sottocampo B, nell’area compresa tra la Sp27, la Sp. 47 Bis, la Sp 25 e il Torrente Triolo.

Proseguendo sulla Sp. 27, superato l’incrocio con la Sp. 47 Bis a destra nell’area compresa appunto tra la Sp. 27, la Sp. 47 Bis, la Sp. 272 e il Torrente Candelaro si collocano gli aerogeneratori del sottocampo B

Figura 1. Area di Intervento



Figura 2. Ubicazione degli aerogeneratori

Sottocampo A



Sottocampo B



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## 4 Inquadramento territoriale del sito

### 4.1 Caratteristiche meteo-climatiche

Il clima del Tavoliere in cui ricade l'area di intervento, anche per effetto della barriera appenninica, è tipicamente continentale, con inverni freddi e piovosi ed estati miti.

Tranne per la fascia costiera a clima mediterraneo, le zone interne, che risentono maggiormente dell'influenza del sistema appenninico presentano una tendenza al clima continentale. Durante la stagione estiva, in generale, la temperatura media si mantiene sempre al di sotto dei 20°C. Rilevante durante tutto il corso dell'anno è l'elevato grado di umidità relativa. Le modeste precipitazioni piovose del Tavoliere, sono concentrate nel periodo da ottobre a marzo.

La piovosità media annua è pari a circa 450-500 mm, valore modesto in assoluto, con l'aggravante delle piogge che risultano concentrate per circa i 2/3 nel periodo autunno-inverno. Infatti negli ultimi anni il clima ha fatto registrare una serie di eventi inaspettati soprattutto in termini di distribuzione delle piogge e in termini di intensità, con il verificarsi di lunghi periodi di siccità, (con assenza di piogge anche durante la stagione invernale) alternati a cicli caratterizzati da precipitazioni intense e concentrate che hanno provocato esondazioni ed allagamenti causando rilevanti problemi alla gestione agronomica dei terreni e delle coltivazioni. Tutto questo ha determinato non pochi danni alle produzioni agricole, problematiche fitosanitarie oltre alla progressiva crescita dei processi di desertificazione ed erosione soprattutto nelle aree caratterizzate da terreni a consistenza limosa.

Le condizioni climatiche della zona, per quanto riguarda l'andamento delle temperature, sono favorevoli alle colture agrarie. Il clima è temperato e presenta valori medi delle massime di 35-37°C durante l'estate e valori medi delle minime intorno allo 0 °C durante l'inverno.

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## 5 Aspetti agropedologici

### 5.1 Caratteri geologici, paesaggistici agronomici e rurali

L'ambito del Tavoliere è caratterizzato dalla dominanza di vaste superfici pianeggianti coltivate prevalentemente a seminativo che si spingono fino alle propaggini collinari del Subappennino.

La delimitazione dell'ambito si è attestata sui confini naturali rappresentati dal costone garganico, dalla catena montuosa appenninica, dalla linea di costa e dalla valle dell'Ofanto.

Questi confini morfologici rappresentano la linea di demarcazione tra il paesaggio del Tavoliere e quello degli ambiti limitrofi (Sub Appennino, Gargano e Ofanto) sia da un punto di vista geo litologico (ad esempio, tra i depositi marini terrazzati della piana e il massiccio calcareo del Gargano o le Formazioni appenniniche del Subappennino), sia di uso del suolo (tra il seminativo prevalente della piana e il mosaico bosco/pascolo del Subappennino, o i pascoli del Gargano, o i vigneti della Valle dell'Ofanto), sia della struttura insediativa (tra il sistema di centri della pentapoli e il sistema lineare della Valle dell'Ofanto, o quello a ventaglio del Subappennino). Il perimetro che delimita l'ambito segue, ad Ovest, la viabilità interpodereale che circonda il mosaico agrario di San Severo e la viabilità secondaria che si sviluppa lungo il versante appenninico (all'altezza dei 400 m s.l.m.), a Sud la viabilità provinciale (SP95 e SP96) che circonda i vigneti della valle dell'Ofanto fino alla foce, a Nord-Est, la linea di costa fino a Manfredonia e la viabilità provinciale che si sviluppa ai piedi del costone garganico lungo il fiume Candelaro, a Nord, la viabilità interpodereale che circonda il lago di Lesina e il sistema di affluenti che confluiscono in esso.

Il clima del Tavoliere, per effetto dell'Appennino è tipicamente continentale, mentre andando verso est, affacciandosi sulla costa adriatica, diventa mediterraneo. Le precipitazioni, in genere non sono abbondanti.

La Pianura del Tavoliere, certamente la più vasta del Mezzogiorno, è la seconda pianura per estensione nell'Italia peninsulare dopo la Pianura Padana; si estende tra i Monti dauni a ovest, il Promontorio del Gargano e il Mare Adriatico a est, il fiume Fortore a nord e il fiume Ofanto a sud.

Questa pianura ha avuto origine da un originario fondale marino, gradualmente colmato da sedimenti sabbiosi e argillosi pliocenici e quaternari, successivamente emerso. Attualmente si configura come l'involuppo di numerose piane alluvionali variamente estese e articolate in ripiani terrazzati digradanti verso il mare, aventi altitudine media non superiore a 100 m s.l.m., separati fra loro da modeste scarpate.

A testimonianza del modellamento operato in tempi recenti dagli agenti esogeni, le

forme del paesaggio sono rappresentate da una serie di ripiani variamente estesi e degradanti verso l'Adriatico, che si raccordano tramite scarpate più o meno elevate e orientate sub parallelamente alla linea di costa attuale.

La continuità di ripiani e scarpate è interrotta da ampie incisioni con fianchi ripidi e terrazzati percorse da corsi d'acqua di origine appenninica che confluiscono in estese piane alluvionali che per coalescenza danno origine, in prossimità della costa, a vaste aree paludose, solo di recente bonificate.

Dal punto di vista geologico, questo ambito è caratterizzato da depositi clastici poco cementati accumulatisi durante il Plio-Pleistocene sui settori ribassati dell'Avampaese appulo. In questa porzione di territorio regionale i sedimenti della serie plio-calabrianiana si rinvencono fino ad una profondità variabile da 300 a 1.000 m sotto il piano campagna.

In merito ai caratteri idrografici, l'intera pianura è attraversata da vari corsi d'acqua, tra i più rilevanti della Puglia (Carapelle, Candelaro, Cervaro e Fortore), che hanno contribuito significativamente, con i loro apporti detritici, alla sua formazione.

Il limite che separa questa pianura dal Subappennino dauno è graduale e corrisponde in genere ai primi rialzi morfologici rinvenimenti delle coltre alloctone appenniniche, mentre quello con promontorio garganico è quasi sempre netto e immediato, dovuto a dislocazioni tettoniche della piattaforma calcarea.

Tutto il settore orientale prossimo al mare, che un tempo era caratterizzato dalla massiccia presenza di aree umide costiere e zone paludose, è attualmente intensamente coltivato, a seguito di un processo non sempre coerente e organizzato di diffusa bonifica.

Tutti questi corsi d'acqua sono caratterizzati da bacini di alimentazione di rilevanti estensioni, dell'ordine di alcune migliaia di km<sup>2</sup>, i quali comprendono settori altimetrici di territorio che variano da quello montuoso a quello di pianura. Nei tratti montani di questi corsi d'acqua, invece, i reticoli denotano un elevato livello di organizzazione gerarchica; nei tratti medio-vallivi le aste principali degli stessi diventano spesso le uniche aree fluviali appartenenti allo stesso bacino.

Il regime idrologico di questi corsi d'acqua è tipicamente torrentizio, caratterizzato da prolungati periodi di magra a cui si associano brevi, ma intensi eventi di piena, soprattutto nel periodo autunno-invernale. Molto limitati, e in alcuni casi del tutto assenti, sono i periodi a deflusso nullo.

Importanti sono state inoltre le numerose opere di sistemazione idraulica e di bonifica che si sono succedute, a volte con effetti contrastanti, nei corsi d'acqua del Tavoliere.

Dette opere comportano che estesi tratti dei reticoli interessati presentano un elevato

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grado di artificialità, sia nei tracciati quanto nella geometria delle sezioni, che in molti casi risultano arginate.

All'interno dell'ambito del tavoliere della Puglia, i corsi d'acqua rappresentano la più significativa e rappresentativa tipologia idrogeomorfologica presente. Poco incisi e maggiormente ramificati alle quote più elevate, tendono via via ad organizzarsi in corridoi ben delimitati e morfologicamente significativi procedendo verso le aree meno elevate dell'ambito, modificando contestualmente le specifiche tipologie di "forme di modellamento" che contribuiscono alla più evidente e intensa percezione del bene naturale.

Mentre le "ripe di erosione" sono le forme prevalenti nei settori più interni dell'ambito, testimoni delle diverse fasi di approfondimento erosivo esercitate dall'azione fluviale, queste lasciano il posto, nei tratti intermedi del corso, ai "cigli di sponda", che costituiscono di regola il limite morfologico degli alvei in modellamento attivo dei principali corsi d'acqua, e preso i quali sovente si sviluppa una diversificata vegetazione ripariale.

I tratti più prossimi al mare sono invece quasi sempre interessati dalla presenza di "argini" e altre opere di regolazione/sistemazione artificiale, che pur realizzando una necessaria azione di presidio idraulico, costituiscono spesso una detrazione alla naturalità del paesaggio.

Meno diffusi ma di auspicabile importanza paesaggistica, in particolare nei tratti interni di questo ambito, sono le forme di modellamento morfologico "a terrazzi" delle superfici dei versanti, che arricchiscono di una significativa articolazione morfologica le estese pianure presenti.

Meritevoli di considerazione e tutela ambientale sono infine le numerose e diversificate aree umide costiere, in particolare quella dell'ex lago Salpi (ora trasformata in impianto per la produzione di sale), e quella del "lago salso", sia a motivo del fondamentale ruolo di regolazione idraulica dei deflussi dei principali corsi d'acqua ivi recapitanti, sia per i connotati ecosistemici che favoriscono lo sviluppo di associazioni faunistiche e floristiche di rilevantissimo pregio.

L'ambito del Tavoliere si caratterizza per la presenza di un paesaggio fondamentalmente pianeggiante la cui grande unitarietà morfologica pone come primo elemento determinante del paesaggio rurale la tipologia colturale. Il secondo elemento risulta essere la trama agraria, questa nel Tavoliere si presenta in varie geometrie e tessiture, talvolta derivante da opere di regimazione idraulica piuttosto che da campi di tipologia colturali, ma in generale si presenta sempre come una trama poco marcata e poco caratterizzata, la cui percezione è subordinata persino alle stagioni.

Fatta questa premessa è possibile riconoscere all'interno dell'ambito del Tavoliere tre macropaesaggi: il mosaico di S. Severo la grande monocoltura seminativa che si

estende dalle propaggini subappenniniche alle saline, in prossimità della costa; e infine il mosaico di Cerignola. Paesaggio che fa un po' da limite tra il Gargano e il Tavoliere risulta essere il mosaico perifluviale del torrente Candelaro, nel suo alto corso il presente torrente non ha un'asta principale in grado di strutturare una tipologia rurale a carattere perifluviale, ma da luogo a un territorio caratterizzato da una trama agraria determinata dalla rete scolante (che va a confluire nel Candelaro) che delinea un paesaggio a prevalente coltura seminativa.

Il paesaggio rurale del Tavoliere visto dalla valle del Fortore.

Il mosaico di S. Severo, che si sviluppa in maniera grosso modo radiale al centro urbano, è in realtà un'insieme di morfotipi a sua volta molto articolati, che, in senso orario a partire da nord si identificano con le grandi estensioni di seminativo e oliveti. L'associazione di vigneto/seminativo a trama larga; caratterizzato da un suolo umido, l'oliveto a trama fitta, sia come monocoltura che come coltura prevalente.

A sud la struttura rurale, a trama relativamente fitta è resa ancora più frammentata dalla grande eterogeneità colturale che caratterizza notevolmente questo paesaggio. A est, in prossimità della fascia subappenninica si mantiene una struttura agraria caratterizzata dalla trama relativamente fitta, dove l'associazione colturale è rappresentata dal seminativo/oliveto.

Pur con queste forti differenziazioni colturali, il paesaggio si connota come un vero e proprio mosaico grazie alla complessa geometria della maglia agraria, fortemente differente rispetto alle grandi estensioni seminatrici che si trovano intorno a Foggia.

La monocoltura del seminativo, caratterizzato dalla trama impercettibile.

Il secondo macro paesaggio si sviluppa nella parte centrale dell'ambito, in cui è inclusa l'area d'intervento, si identifica per la forte prevalenza della monocoltura del seminativo, intervallata dai mosaici agricoli periurbani, che si incuneano fino alle parti più consolidate degli insediamenti urbani; di cui Foggia rappresenta l'esempio più emblematico. Questa monocoltura seminativa è caratterizzata da una trama estremamente rada e molto poco marcata che restituisce un'immagine di territorio rurale molto lineare e uniforme

La viabilità interpoderale che si perde tra le colture cerealicole, poiché la maglia è poco caratterizzata da elementi fisici significativi.

Questo fattore fa sì che anche morfotipi differenti siano in realtà molto meno percepiti, ad altezza d'uomo e risultino molto simili i vari tipi di monocoltura a seminativo, siano essi a trama fitta che a trama larga o di chiara formazione di bonifica.

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Tuttavia alcuni mosaici della Riforma, avvenuta tra le due guerre (legati in gran parte all'Opera Nazionale Combattenti), sono ancora leggibili e pertanto meritevoli di essere segnalati e descritti.

In questi mosaici infatti, è ancora possibile leggere la policoltura e comunque una certa complessità colturale, mentre in altri è leggibile solamente la loro struttura insediativa preesistente.

I torrenti Cervaro e Carapelle costituiscono due mosaici perifluviali e si incuneano nel Tavoliere per poi amalgamarsi nella struttura di bonifica circostante. Questi si caratterizzano prevalentemente grazie alla loro tessitura agraria, disegnata dai corsi d'acqua stessi più che dalle tipologie colturali ivi presente.

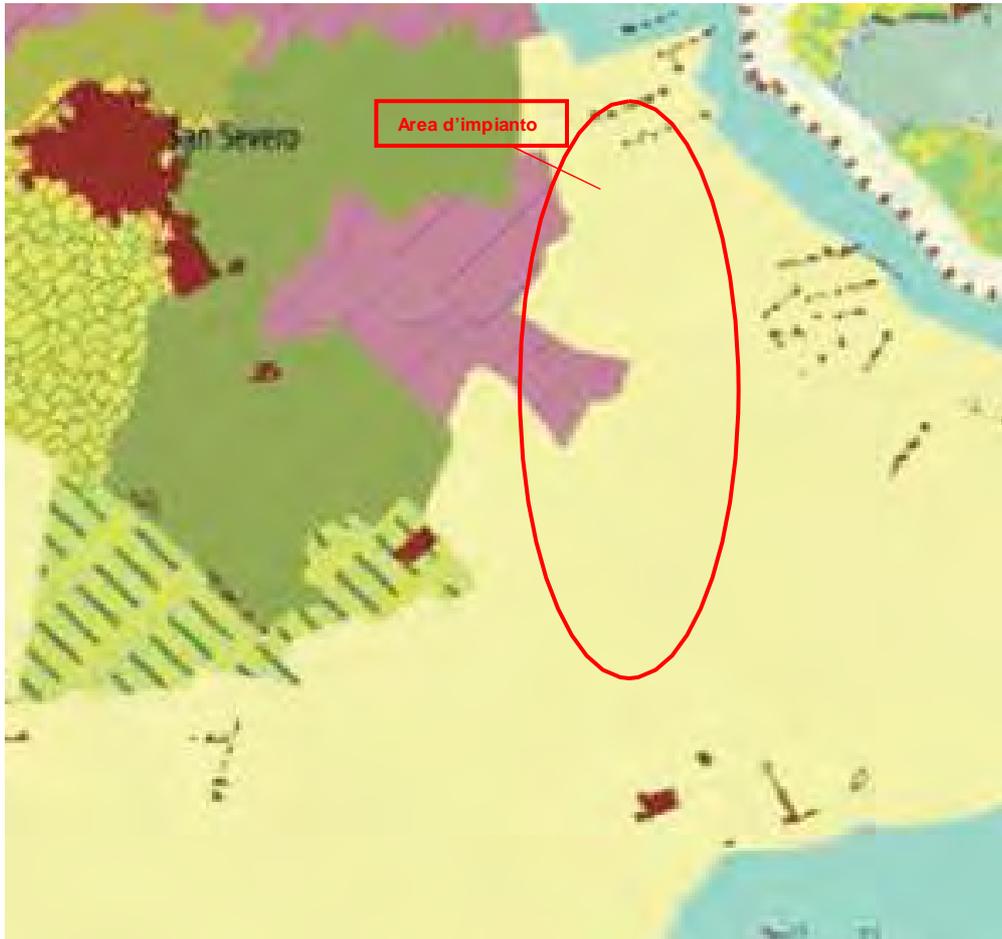
Il mosaico di Cerignola è caratterizzato dalla geometria della trama agraria che si struttura a raggiera a partire dal centro urbano, così nelle adiacenze delle urbanizzazioni periferiche si individua un ampio tessuto rurale periurbano che viene meno man mano ci si allontana, lasciando posto a una notevole complessità agricola.

Andando verso nord ovest questo mosaico tende a strutturare una tipologia colturale caratterizzata dall'associazione del vigneto con il seminativo, mentre a sud-ovest si ha prevalentemente un'associazione dell'oliveto con il seminativo che via via si struttura su di una maglia meno fitta.

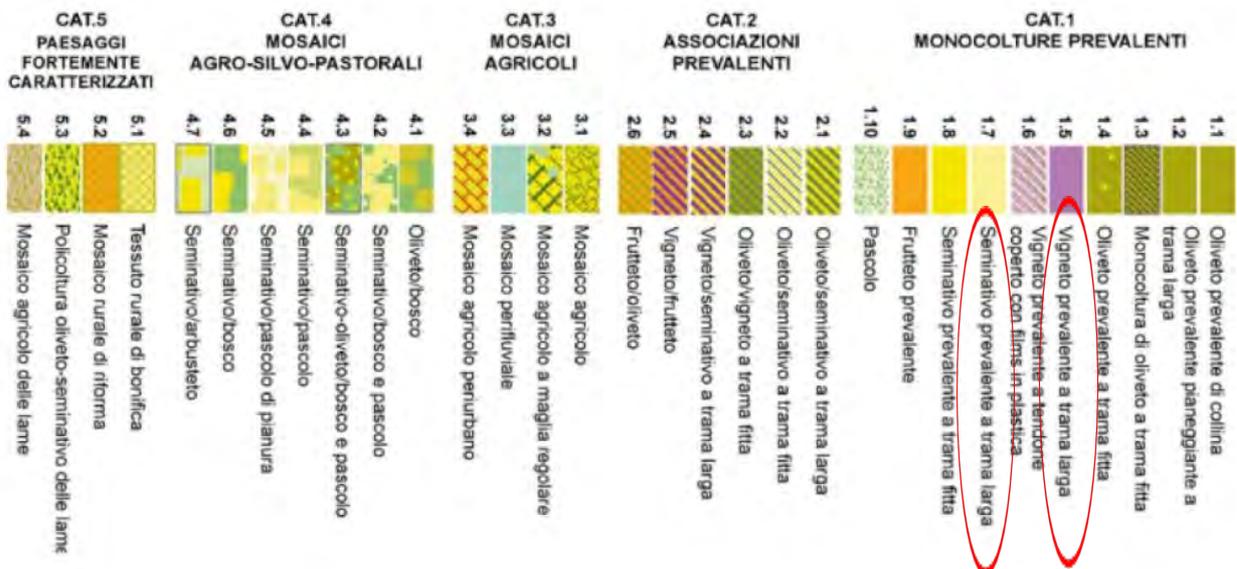
I paesaggi rurali del Tavoliere sono accumulati da un fattore caratterizzante che risulta essere la profondità e la grande estensione. La scarsa caratterizzazione della trama agraria, elemento piuttosto comune in gran parte dei paesaggi del Tavoliere esalta questa dimensione ampia, che si declina con varie sfumature a seconda dei morfotipi individuati sul territorio.

Secondo elemento qualificante e caratterizzante il paesaggio risulta essere il sistema idrografico, che, partendo da un sistema fitto, ramificato e poco inciso tende via via a organizzarsi su una serie di corridoi ramificati. Particolarmente riconoscibili sono i paesaggi della bonifica e in taluni casi quelli della riforma agraria.

**Figura 3. Stralcio dell'Elaborato 3.2.7 "Le morfologie rurali" della proposta di Piano Paesaggistico Regionale (PPTTR) della Regione Puglia (scala 1:150.000)**



**LegendaFigura3**



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## 5.2 Inquadramento ex ante la realizzazione dal parco eolico nella classificazione della capacità d'uso ai fini agro-silvo-pastorali dei suoli interessati

La classificazione della capacità d'uso dei suoli ha lo scopo di fornire una serie di indicazioni utili e prontamente comprensibili per il miglior uso del territorio per fini agro-silvo-pastorali da un punto di vista produttivo, consentendo la salvaguardia dei suoli agronomicamente più adatti, preservandoli in sede di pianificazione territoriale da altri usi.

La metodologia di riferimento è la "Land Capability Classification" (LCC), elaborata nel 1961 dal Soil Conservation Service del Dipartimento dell'Agricoltura degli Stati Uniti d'America (USDA) e finalizzata a valutare le potenzialità produttive dei suoli per utilizzazioni di tipo agro-silvo-pastorale- sulla base di una gestione sostenibile, cioè conservativa della stessa risorsa suolo.

Tale interpretazione viene effettuata in base sia alle caratteristiche intrinseche del suolo (profondità, pietrosità, fertilità), che a quelle dell'ambiente (pendenza, rischio di erosione, inondabilità, limitazioni climatiche), ed ha come obiettivo l'individuazione dei suoli agronomicamente più pregiati e quindi più adatti all'attività agricola.

Il metodo non considera la potenzialità dei suoli rispetto ad usi particolari o a specifiche colture, ma assegna ad ogni tipo pedologico una capacità d'uso generica che tiene conto di tutti i suoi parametri permanenti e non modificabili da interventi antropici.

La LCC prevede l'uso di otto classi principali, indicate da numeri romani, e in successive sottoclassi che possono essere introdotte in base al tipo delle limitazioni che ostacolano le pratiche agro-silvo-pastorali.

Delle otto classi solo le prime quattro, pur presentando limitazioni crescenti, vengono indicate come adatte all'uso agricolo; le classi dalla quinta alla settima non sono adatte a tale attività, ma sono destinate al pascolo e alla forestazione; la classe ottava comprende suoli da destinarsi esclusivamente a fini ricreativi, estetici, naturalistici.

Le descrizioni delle classi sono le seguenti: (Stalling 1957).

### Classe I

I suoli di questa classe hanno poche o nessuna limitazione o rischi di danno. Hanno una elevata potenzialità produttiva e possono essere coltivati facilmente attraverso una normale tecnica colturale. Sono profondi, fertili, facilmente lavorabili e quasi livellati. Non sono soggetti a pericoli d'inondazione, ma possono subire leggere erosioni e modeste perdite in fertilità. I suoli di Classe I coltivati richiedono pratiche ed

interventi per conservare fertilità e struttura (concimazioni, sovesci, rotazioni, ammendamenti, etc.).

## Classe II

In questa classe sono soggetti a moderate limitazioni d'uso e presentano deboli rischi di danno. Sono sempre dei suoli che possono essere coltivati con le normali pratiche agronomiche. Differiscono da quelli di Classe I perché hanno leggere pendenze, sono soggetti a moderata erosione, occasionali inondazioni o richiedono qualche opera di drenaggio. Possono essere necessarie pratiche speciali per la conservazione del suolo e dalle acque (rotazione, etc. ).

## Classe III

I suoli della III classe sono soggetti a severe limitazioni se il loro uso è la coltivazione. Elevati sono poi i rischi di danni dal punto di vista della conservazione conseguente al loro uso. Sono suoli moderatamente buoni che possono essere utilizzati regolarmente con la coltura ma richiedono appropriate rotazioni ed interventi. I suoli sono su pendenze moderatamente elevate, soggetti ad erosione più severa e con una minor fertilità. La Classe III ha maggiori limitazioni ed è più soggetta a rischi della Classe II e tali limitazioni riducono la scelta delle colture od ostacolano le operazioni agricole. Questi suoli richiedono sistemi colturali che prevedano una adeguata copertura vegetale per proteggere il suolo e per mantenere e preservare la struttura. Quasi sempre è necessaria una combinazione di pratiche per assicurare la difesa del territorio.

## Classe IV

È composta da suoli che hanno limitazioni assai permanenti con elevati pericoli se sono coltivati. I suoli non sono molto buoni e possono essere coltivati occasionalmente se si prendono misure adeguate. Dovrebbero essere utilizzati prevalentemente a prato o con vegetazione permanente. I suoli sono con forti pendenze e con severa erosione e sono idonei ad una limitata gamma di colture. Altre volte possono avere una profondità limitata e bassa fertilità. L'uso più idoneo è il prato stabile o naturale e solo occasionalmente possono coltivarsi con colture a righe.

## Classe V

I suoli della Classe V dovrebbero essere mantenuti con vegetazione permanente ed

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utilizzati con il pascolo o con le foreste. Essi presentano poche o nessuna limitazioni permanenti ma la coltivazione non è facile a causa delle pietrosità, rocciosità, idromorfia od altre limitazioni. Il territorio è quasi livellato e soggetto a modesta erosione (idrica ed eolica) se gestito correttamente. Il pascolo deve essere regolato per non distruggere la copertura vegetale.

#### ClasseVI

Il pascolo o la foresta dovrebbe essere l'uso più idoneo per questa classe ed in tale caso il pericolo è modesto. Presentano limitazioni permanenti ma moderate e non sono idonei per le coltivazioni. Sono infatti su pendenza rilevanti e sono poco profondi. Il pascolo deve essere regolato.

#### ClasseVII

In questa classe i suoli sono soggetti a limitazioni assai severe a forti pericoli quando sono usati con il pascolo o con la foresta. Sono su pendenze assai elevate, erosioni, paludosi, molto sottili ad elevata pietrosità e rocciosità. Sono poco idonei per il pascolo e le foreste e devono essere utilizzati con cura. La loro gestione deve estremamente oculata.

#### ClasseVIII

Le aree inserite nella classe VIII sono troppo accidentate per essere utilizzate con foreste o pascoli. Sono destinate quindi alla ricreazione, a riserve naturali, a riserve di acqua etc.. Poiché le classi di capacità d'uso individuano ambiti territoriali che possono presentare limitazioni non necessariamente dello stesso tipo, possono rientrare nella stessa classe suoli anche molto diversi tra loro.

Le sottoclassi individuano il tipo di limitazione tramite delle lettere:

- s = limitazioni legate a caratteristiche negative del suolo come l'abbondante pietrosità, la scarsa profondità, la sfavorevole tessitura e lavorabilità ed altre;
- w = limitazioni legate all'eccesso di acqua, dentro e sopra il suolo, che interferisce con il normale sviluppo delle colture;
- e = limitazioni legate al rischio di erosione ed alla pendenza;
- c = limitazioni legate a sfavorevoli condizioni climatiche.

Di seguito un esempio di tabella interpretativa utilizzabile per l'attribuzione delle classi di capacità del suolo.

**Tabella 3. Tabella interpretativa utilizzabile per l'attribuzione delle classi di capacità del suolo**

Classe	Tessitura	Prof.(m)	Scheletro (%)	Rocciosità (%)	Drenaggio	Rischio di erosione	Pendenza (%)	A.W.C. (mm)	Limitazioni legate alla fessurazione	Reazione	Carbonati totali (%)	Salinità (mS/cm)	Interferenze climatiche
I	F-FS-FA- FL-FSA- FLA	>15	<5	<2	Da buono a mediocre	Assente o molto debole	<13	>150	Nessuna	Neutra sub alcalina	<10	<0.5	Nessuna o molto lievi
II	SF-AS-AL	1.5-1	5-15	<2	Rapido	Debole	14-20	150-100	Moderate	Subacida subalcalina	10-40	<0.5	Molto lievi
III	L-A	1-0.5	15-35	<2	Lento	Moderato	14-20	100-50	Severe	Acida	>40	0.6-1	Forti
IV	S	0.5-0.2	35-70	2-10	lento	Forte	21-35	<50	Severe	Acida	>40	1-2	Forti
V	S	0.5-0.2	35-70	2-10	Molto lento o impedito	Assente	21-35	<50	Severe	Acida	>40	1-2	Forti
VI	S	0.5-0.2	>70	11-25	Molto lento o impedito	Molto forte	36-60	<50	Severe	Acida	>40	>2	Molto forti
VII	S	<0.2	>70	26-90	Molto lento o impedito	Molto forte	>60	<50	Severe	Acida	>40	>2	Molto forti
VIII	S	<0.2	>70	>90	Molto lento o impedito	Molto forte	>60	<50	Severe	Acida	>40	>2	Molto forti

Le tabelle di interpretazione vengono utilizzate considerando la cosiddetta "legge del minimo": la capacità d'uso non viene determinata dalla media dei caratteri pedologici, ma dal parametro considerato come più limitante.

Per quanto riguarda poi l’attribuzione di queste limitazioni alle classi di capacità d’uso, viene riportata di seguito l’apposita tabella, che fa riferimento a quanto previsto dalla metodologia standard, specificando il significato della lettera relativa alla limitazione di uso del suolo e del numero che accompagna la definizione delle classi:

<b>Tabella 4. Tabella di attribuzione delle limitazioni alle classi di capacità d’uso</b>			
<b>S</b>	<b>Limitazioni di suolo</b>	1	Profondità per le radici
		2	Lavorabilità
		3	Pietrosità
		4	Fertilità
<b>W</b>	<b>Limitazioni idriche</b>	1	Disponibilità di ossigeno
		2	Rischio di inondazione
<b>E</b>	<b>Limitazioni stazionali</b>	1	Pendenza
		2	Erosione

La **Tabella 5** descrive i principali parametri correlati alla capacità d’uso dei suoli:

<b>Tabella 5. Descrizione dei principali parametri correlati alla capacità d’uso dei suoli</b>	
<b>Parametro</b>	<b>Descrizione</b>
Profondità per le radici	La profondità utile dei suoli individua lo spessore di suolo biologicamente attivo, esplorabile e utilizzabile dalle piante per trarne acqua ed elementi nutritivi. La profondità utile, espressa in centimetri, è definita come distanza tra la superficie e la base del profilo che costituisce un ostacolo alla penetrazione della maggior parte delle radici (roccia madre, orizzonte indurito, strato eccessivamente ghiaioso o sabbioso, falda acquifera).I suoli più profondi sono solitamente ubicati in pianura e in collina, mentre in montagna i frequenti affioramenti rocciosi riducono lo spessore esplorabile dalle radici. Anche in area pianeggiante e collinare, tuttavia, possono essere riscontrate tipologie pedologiche caratterizzate da scarsa profondità utile, soprattutto a causa delle ghiaie, falda affiorante o presenza di orizzonti fortemente induriti.
Lavorabilità	La lavorabilità è la resistenza che offre il suolo alla penetrazione di un corpo solido come la vanga, la zappa, il vomere. (A. Giordano – Pedologia,1999 – Utet). La valutazione di questo parametro è assai utile in quanto permette di evidenziare eventuali condizionamenti nella scelta delle macchine agricole e di individuare limiti che possono derivare dal ridotto arco temporale nel quale effettuare le lavorazioni senza creare danni rilevanti al suolo.
Pietrosità	La pietrosità di un suolo può essere intesa come “pietrosità superficiale” (percentuale della superficie coperta da elementi litici di dimensioni superiori a 2 mm) o come “pietrosità intrinseca” (percentuale in volume di un suolo, derivata dalla media ponderata degli orizzonti all’interno della sezione di controllo, occupata da elementi litici di dimensioni superiori a 2 mm). All’interno della tabella la pietrosità può essere intesa sia con la prima che con la seconda accezione. E’ peraltro evidente che uno strato ghiaioso (pietoso) che supera abbondantemente il 35% in volume Una percentuale ridotta di pietre (purché di dimensioni non eccessive) non può essere considerata limitante; tuttavia se il volume occupato cresce percentualmente in modo notevole vi sono una serie di effetti negativi collegabili essenzialmente a due aspetti. Il primo riguarda la maggiore difficoltà nelle lavorazioni, il secondo è strettamente collegato alla minore capacità del suolo di trattenere l’acqua e al minore volume esplorabile dalle radici, con effetti evidenti sulle minori possibilità colturali e sul difficile

**Tabella 5. Descrizione dei principali parametri correlati alla capacità d’uso dei suoli**

<b>Parametro</b>	<b>Descrizione</b>
	sostentamento idrico della vegetazione.
Fertilità	La fertilità è un uno degli argomenti più controversi e complessi, sul quale da decenni si confrontano chimici agrari, agronomi, pedologi, tecnici delle associazioni di categoria e conduttori delle aziende. Per la definizione della capacità d’uso dei suoli si è optato di utilizzare un modo semplice e immediato per dare una valutazione sommaria di questa importantissima variabile. Di seguito è riportata la tabella di interpretazione utilizzata.
Rischio di inondazione	Tra tutte le variabili considerate è, con buona probabilità, la più difficile da valutare e utilizzare senza commettere errori grossolani. Vi sono infatti alcune criticità di cui tener conto. Definire se l’inondabilità è maggiore o minore ad un tempo di ritorno di 6 anni richiede una serie di dati che spesso non è disponibile.  La creazione di arginature artificiali può modificare nettamente la situazione.
Pendenza	Tra i parametri presi in considerazione nella definizione della capacità d’uso dei suoli la pendenza è da attribuire ai caratteri morfologici più che pedologici, anche se evidentemente, come noto, il tipo di morfologia condiziona – e non poco – la genesi e l’evoluzione dei suoli. Questo importante parametro ambientale viene considerato all’interno della metodologia poiché le possibilità e la facilità di meccanizzazione delle pratiche colturali dipendono direttamente dal grado di pendenza degli appezzamenti.
Erosione	L’erosione viene definita come l’asportazione di parte del suolo in conseguenza di fenomeni naturali, quali pioggia, vento e ghiaccio. Processi erosivi intensi asportano gli strati superficiali del suolo (nei quali è contenuto il maggior tasso di fertilità), riducono la capacità di ritenuta idrica diminuendo le riserve per periodi di siccità e innescano importanti fenomeni di degrado che possono condurre alla desertificazione. Nella valutazione utilizzata all’interno della tabella di definizione della capacità d’uso dei suoli si parla però di “rischio di erosione”. Il concetto di “rischio” è assai importante, in quanto definisce la probabilità più o meno elevata che si verifichino i fenomeni erosivi e mette tale probabilità in stretto collegamento con la possibile gravità di tali fenomeni. In estrema sintesi si può affermare che il rischio di erosione dipenda dai seguenti fattori: <ul style="list-style-type: none"> <li>– natura dei suoli,</li> <li>– morfologia,</li> <li>– uso del suolo o tipo di vegetazione presente,</li> <li>– caratteristiche climatiche.</li> </ul>

Nel seguito si descrivono i principali parametri per il sito in esame, in base a quanto desunto dall’esame visivo del sopralluogo e alla bibliografia di riferimento consultata.

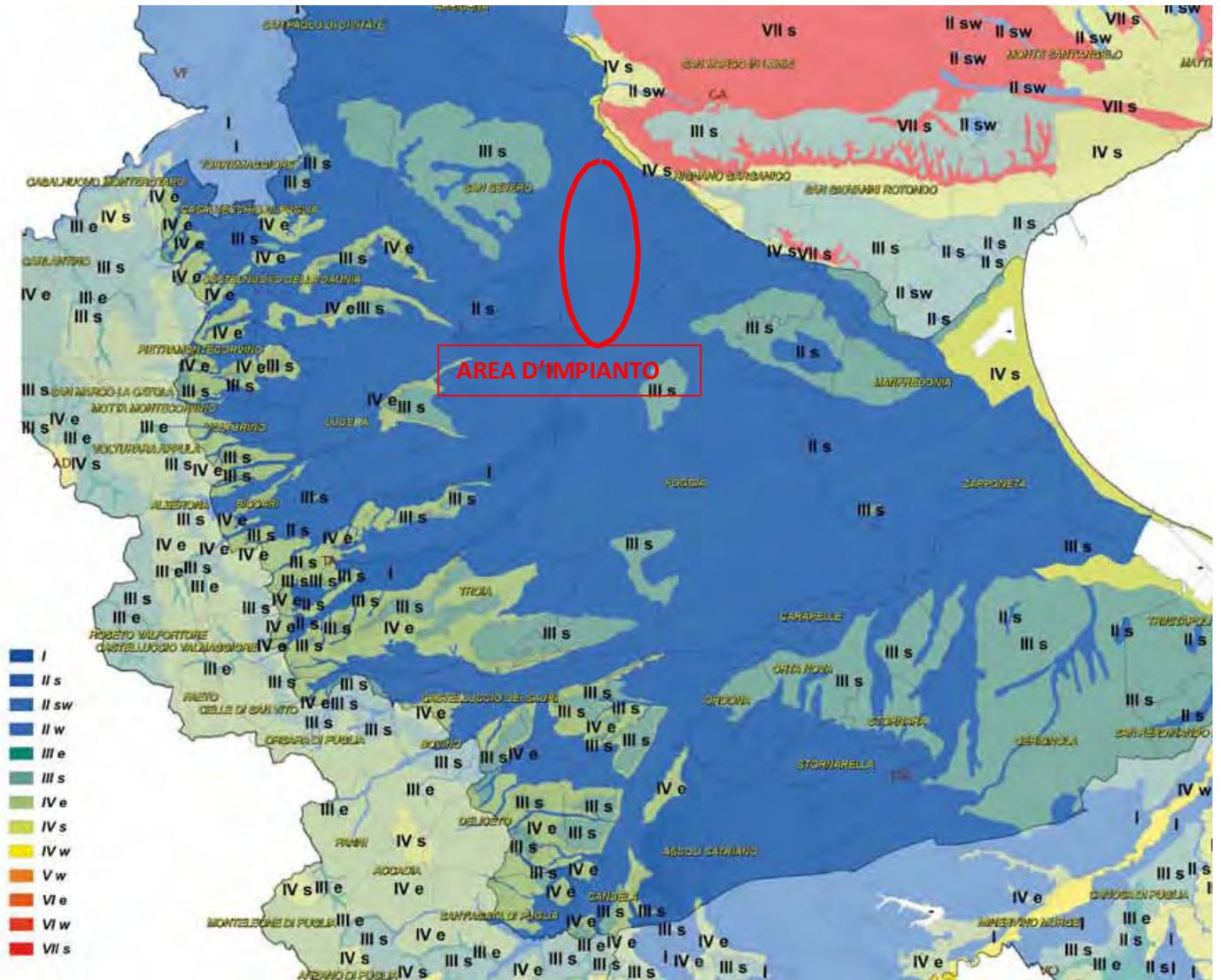
**Tabella 6. Risultati del sopralluogo condotto presso il sito**

<b>Parametro</b>	<b>Descrizione</b>
Profondità per le radici	Trattasi di terreni alluvionali pianeggianti e sub-pianeggianti che garantiscono un discreto strato di suolo attivo per la vegetazione.
Lavorabilità	La lavorabilità dei suoli risulta da discreta a buona, soprattutto in corrispondenza dei seminativi soggetti ad irrigazione. La lavorabilità è inoltre facilitata laddove la pietrosità è scarsa e caratterizzata da pietrisco di dimensioni dell’ordine del centimetro.
Pietrosità	I terreni ricadenti all’interno del sito presentano talvolta ciottoli arrotondati di natura calcarea, di dimensioni da decimetriche (dimensioni variabili a pochi centimetri a circa 15 cm massimi). Tali caratteristiche di pietrosità non sono tuttavia tali da inficiare la fertilità e la lavorabilità dei suoli.
Fertilità	I terreni ricadenti all’interno del sito presentano un elevato grado di fertilità. Trattasi sostanzialmente di terreni alluvionali con discreto contenuto di materia organica e di elementi minerali, che quindi ben si prestano alle pratiche agricole.
Rischio di inondazione	In base a quanto desunto dalla Tavola 1.3.2 “ <i>Carta morfologica generale</i> ” del Piano Urbanistico Generale (PUG) di San Severo, il sito di impianto non risulta interessato da aree di pericolosità idraulica, né da aree vincolate (aree a pericolosità geomorfologica, idraulica ed aree a rischio R2 e R4) dal Piano di Assetto Idrogeologico dell’Autorità di Bacino – Regione Puglia.
Pendenza	Giacitura sostanzialmente pianeggiante (inferiore al 10%).
Erosione	Il rischio di erosione risulta trascurabile data la giacitura sostanzialmente pianeggiante dei terreni e dall’assenza di aree interessate da pericolosità idraulica. La presenza di impluvi nel sito di impianto non determina rischio di erosione in virtù della presenza di una ricca vegetazione ripariale.

Dall’analisi delle informazioni desunte dal sopralluogo in campo, si può concludere che le caratteristiche del suolo presente nel sito non presentano rilevanti limitazioni che ostacolano le pratiche agricole e sono dunque riconducibili alla Classe I

Tale conclusione è confermata anche dagli strumenti di pianificazione regionale come illustrato nella seguente Figura.

Figura 10. Stralcio della Carta della Capacità di Uso del Suolo desunta dalla proposta di Piano Paesaggistico Regionale (PPTTR) della Regione Puglia (scala 1:150.000)



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## **6 Valutazione ex-post di possibili alterazioni negative delle condizioni degli elementi caratterizzanti la classe di inquadramento ex-ante della capacità d'uso dei suoli ai fini agro-silvo-pastorali**

Analizzando nel dettaglio i singoli elementi che portano a collocare nella Classe I i suoli interessati dalla realizzazione dell'impianto in progetto, si rileva che, fatto salvo per le piccole superfici interessate dalla costruzione dei manufatti edili destinati a sorreggere le strutture degli aerogeneratori e quelle destinate alla realizzazione ex novo della viabilità a servizio degli stessi, complessivamente per ha 4,15, sul resto dell'area d'interesse non è ipotizzabile alcuna interferenza legata alla loro presenza ed al loro funzionamento in grado di alterare gli aspetti sopra dettagliati relativi a: Profondità per le radici, Lavorabilità, Pietrosità, Fertilità, Rischio di inondazione, Pendenza ed Erosione, che non possono che rimanere inalterati. Va considerato inoltre che la viabilità di servizio da realizzare ex novo, che occuperà circa 3,7 ha (allegati 1 e 2), per le aziende agricole dell'area interessata, costituisce un infittimento della rete viaria esistente, che a fronte della sottrazione di una quantità poco rilevante di suolo all'uso agricolo, costituisce un importante potenziamento infrastrutturale in grado di incidere positivamente sui costi di produzione connessi alla movimentazione delle merci e di conseguenza sul bilancio aziendale e proporzionalmente sul valore degli stessi terreni. Pertanto si può ritenere che per le aziende agricole interessate l'irrisoria perdita di superficie coltivabile è certamente compensata da tali benefici.

Un elemento importante da considerare, che non è contemplato nella caratterizzazione effettuata secondo i parametri della "Land Capability Classification" (LCC), del Soil Conservation Service del Dipartimento dell'Agricoltura degli Stati Uniti d'America (USDA), anche perché il metodo risale al 1961, è l'ombreggiamento. Tale parametro va verificato perché potenzialmente in grado di influenzare e se particolarmente intenso, in grado di ridurre la fruibilità e quindi l'uso agricolo del suolo, in quanto condiziona la fotosintesi clorofilliana, processo biologico alla base della vita delle piante, da cui dipende la produzione delle biomasse e di conseguenza quella agricola. In questo caso l'ombreggiamento è correlato all'azione schermante sulla propagazione della radiazione solare, indispensabile alla reazione fotosintetica, causata dalla presenza fisica degli aerogeneratori,

La verifica da eseguire consiste quindi nella valutazione del grado di ombreggiamento sull'area d'interesse e se è tale da comprometterne la produttività agricola.

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## 7 Analisi sugli effetti dell'ombreggiamento del terreno causato dalla presenza degli aerogeneratori

Al fine di valutare l'ombreggiamento causato dalla proiezione delle sagome delle strutture costituenti gli aerogeneratori sul territorio circostante è stata effettuata una elaborazione utilizzando un software dedicato che processa i calcoli con i seguenti assunti di base 8 allegato 3):

- ✓ Max distanza di influenza a perdersi nell'orizzonte
- ✓ Angolazione minima di 3° tra il sole e l'orizzonte misurato alla base dell'elemento ombreggiante al di sotto del quale il programma esclude i dati di calcolo
- ✓ Intervallo giornaliero di calcolo 1gg
- ✓ Intervallo temporale di calcolo 2min
- ✓ Il sole splenda tutto il giorno e tutti i giorni dall'alba al tramonto
- ✓ La turbina è sempre perpendicolare alla linea tra la torre e il sole
- ✓ La turbina è sempre in rotazione.
- ✓ Altezza max di ciascun aerogeneratore m 157,00
- ✓ Diametro delle pale sul rotore 145 m.

La diffrazione ovviamente annulla l'ombra proiettata a grandi distanze, che quindi in tali aree, spazzate dalla proiezione degli aerogeneratori è da considerarsi nulla. Ne consegue che la zona effettivamente considerabile in ombra è quella prossima alla base delle torri, per il cui studio viene suddivisa idealmente in quattro quadranti di forma semicircolare dove è possibile rilevare l'ombra "solida", cioè un oscuramento netto e visibile rispetto all'area circostante.

Osservando i risultati dell'elaborazione rileviamo che di queste aree semicircolari che circondano la base delle torri non tutte vengono interessate dall'ombra, in genere solo due, max tre di esse fanno registrare ombreggiamento.

Considerando tra tutte le semiaree quelle dove la durata della permanenza dell'ombra è maggiore ed insiste per quasi tutti i mesi dell'anno, cosa questa che si riscontra solo per poche, tra tutte quelle studiate, si evidenzia che, nel peggiore dei casi, la durata max dell'ombreggiamento non supera le 3,15 h giornaliere, in fascia oraria in cui il sole è alto e quindi quando l'intensità della radiazione è elevata e comunque diffratta dalle zone scoperte circostanti, che risulta quindi sufficiente a non interrompere l'attività

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fotosintetica delle piante presenti, inoltre per il resto della giornata queste aree rimangono scoperte e pienamente irradiate e di conseguenza in piena funzionalità.

Ne consegue pertanto che la presenza delle torri non provoca in nessuna zona dell'area d'interesse del parco eolico ombreggiamento di intensità e durata tale da limitare lo sviluppo della vegetazione.

Inoltre, da osservazioni effettuate al piede di torri eoliche installate da diverso tempo, non si riscontrano e non sono mai state riscontrate aree dove lo sviluppo vegetativo delle colture in atto risultasse visibilmente depresso a causa dell'ombra proiettata dalla torre e quindi si distinguessero da quanto possibile osservare tutto intorno.

Da tutto quanto sopra si deduce che l'ombra non diffratta proiettata dalle torri eoliche non è in grado di limitare l'attività fotosintetica delle colture e pertanto non è in grado di limitare in alcun modo l'uso del suolo a scopi agro-silvo-pastorali.

Tanto si doveva

Il tecnico

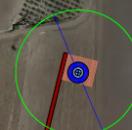
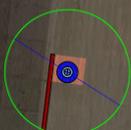
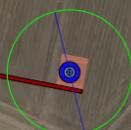
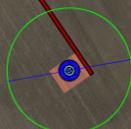
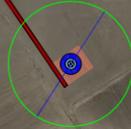
Dott. Agr. Rocco Iacullo



CAMPO A



CAMPO B



Project:  
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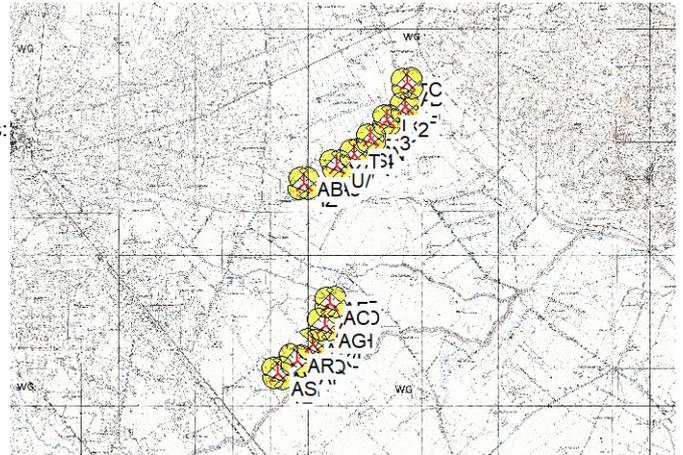
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### SHADOW - Main Result

Calculation: SHADOW\_NORDEX

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



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	542,521	4,616,396	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3
2	542,474	4,615,759	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3
3	541,986	4,615,413	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3
4	541,572	4,614,919	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3
5	541,119	4,614,505	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3
6	540,671	4,614,194	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3
7	539,804	4,613,733	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3
8	540,482	4,610,555	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3
9	540,360	4,609,958	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3
10	540,035	4,609,450	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3
11	539,615	4,609,016	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3
12	539,120	4,608,684	0	NORDEX N149 45000 149.0 !-! hub: 145.0 m Yes	Yes	NORDEX	N149	45,000	149.0	145.0	12.3

#### Shadow receptor-Input

UTM WGS84 Zone: 33

No.	East	North	Z	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]
A	542,419	4,616,260	31	1.0	1.0	1.0	-160.0	90.0
B	542,650	4,616,261	31	1.0	1.0	1.0	-220.0	90.0
C	542,636	4,616,511	31	1.0	1.0	1.0	45.0	90.0
D	542,392	4,616,490	31	1.0	1.0	1.0	-45.0	90.0
E	542,393	4,615,610	31	1.0	1.0	1.0	-160.0	90.0
F	542,568	4,615,623	30	1.0	1.0	1.0	-220.0	90.0
G	542,561	4,615,854	31	1.0	1.0	1.0	45.0	90.0
H	542,372	4,615,847	28	1.0	1.0	1.0	-45.0	90.0
I	541,918	4,615,278	31	1.0	1.0	1.0	-160.0	90.0
J	542,067	4,615,285	31	1.0	1.0	1.0	-220.0	90.0
K	542,060	4,615,501	31	1.0	1.0	1.0	45.0	90.0
L	541,918	4,615,508	31	1.0	1.0	1.0	-45.0	90.0
M	541,491	4,614,817	31	1.0	1.0	1.0	-160.0	90.0
N	541,674	4,614,810	31	1.0	1.0	1.0	-220.0	90.0
O	541,661	4,615,007	31	1.0	1.0	1.0	45.0	90.0
P	541,498	4,614,993	31	1.0	1.0	1.0	-45.0	90.0
Q	541,051	4,614,404	33	1.0	1.0	1.0	-160.0	90.0
R	541,220	4,614,383	32	1.0	1.0	1.0	-220.0	90.0

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**SHADOW - Main Result****Calculation:** SHADOW\_NORDEX

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**UTM WGS84 Zone: 33**

No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window
			[m]	[m]	[m]	[m]	[°]	[°]
S	541,200	4,614,620	31	1.0	1.0	1.0	45.0	90.0
T	541,044	4,614,593	31	1.0	1.0	1.0	-45.0	90.0
U	540,583	4,614,078	36	1.0	1.0	1.0	-160.0	90.0
V	540,787	4,614,078	35	1.0	1.0	1.0	-220.0	90.0
W	540,746	4,614,322	34	1.0	1.0	1.0	45.0	90.0
X	540,529	4,614,316	35	1.0	1.0	1.0	-45.0	90.0
Y	539,689	4,613,584	39	1.0	1.0	1.0	-160.0	90.0
Z	539,919	4,613,570	38	1.0	1.0	1.0	-220.0	90.0
AA	539,906	4,613,855	38	1.0	1.0	1.0	45.0	90.0
AB	539,696	4,613,861	39	1.0	1.0	1.0	-45.0	90.0
AC	540,380	4,610,439	37	1.0	1.0	1.0	-160.0	90.0
AD	540,638	4,610,433	36	1.0	1.0	1.0	-220.0	90.0
AE	540,617	4,610,697	36	1.0	1.0	1.0	45.0	90.0
AF	540,380	4,610,683	36	1.0	1.0	1.0	-45.0	90.0
AG	540,258	4,609,836	40	1.0	1.0	1.0	-160.0	90.0
AH	540,495	4,609,823	38	1.0	1.0	1.0	-220.0	90.0
AI	540,455	4,610,107	38	1.0	1.0	1.0	45.0	90.0
AJ	540,177	4,610,121	39	1.0	1.0	1.0	-45.0	90.0
AK	539,933	4,609,321	42	1.0	1.0	1.0	-160.0	90.0
AL	540,150	4,609,301	41	1.0	1.0	1.0	-220.0	90.0
AM	540,123	4,609,558	41	1.0	1.0	1.0	45.0	90.0
AN	539,919	4,609,579	41	1.0	1.0	1.0	45.0	90.0
AO	539,499	4,608,888	43	1.0	1.0	1.0	-160.0	90.0
AP	539,743	4,608,874	42	1.0	1.0	1.0	-220.0	90.0
AQ	539,737	4,609,138	42	1.0	1.0	1.0	45.0	90.0
AR	539,459	4,609,172	43	1.0	1.0	1.0	-45.0	90.0
AS	539,012	4,608,555	44	1.0	1.0	1.0	-160.0	90.0
AT	539,235	4,608,542	44	1.0	1.0	1.0	-220.0	90.0
AU	539,215	4,608,833	44	1.0	1.0	1.0	45.0	90.0
AV	538,978	4,608,820	44	1.0	1.0	1.0	-45.0	90.0

**Calculation Results****Shadow, worst case**

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
A	0:00	0	0:00
B	0:00	0	0:00
C	539:46	272	2:54
D	510:16	260	2:54
E	0:00	0	0:00
F	80:18	150	0:56
G	767:36	365	3:22
H	675:50	365	3:12
I	0:00	0	0:00
J	71:12	118	0:54
K	777:48	365	3:34
L	852:22	365	3:32
M	0:00	0	0:00
N	65:38	110	0:56
O	769:18	365	3:24
P	820:46	355	3:46
Q	0:00	0	0:00
R	63:50	103	0:58
S	726:16	277	3:32
T	811:54	365	3:34
U	0:00	0	0:00
V	17:16	45	0:34

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Calculated:

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**SHADOW - Main Result****Calculation:** SHADOW\_NORDEX*...continued from previous page***Shadow, worst case**

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
W	635:38	246	3:20
X	573:50	365	2:38
Y	1:56	21	0:08
Z	0:00	0	0:00
AA	589:16	253	3:02
AB	597:12	331	2:58
AC	0:00	0	0:00
AD	0:00	0	0:00
AE	455:58	223	2:36
AF	561:28	243	2:58
AG	0:00	0	0:00
AH	56:50	109	0:44
AI	503:56	211	2:52
AJ	346:08	195	2:12
AK	0:00	0	0:00
AL	67:20	109	0:58
AM	732:20	284	3:22
AN	330:44	208	2:00
AO	0:00	0	0:00
AP	45:20	68	0:54
AQ	605:40	247	3:00
AR	473:12	280	2:26
AS	0:00	0	0:00
AT	0:00	0	0:00
AU	510:16	207	2:56
AV	560:40	344	2:38

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### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: A - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:38	07:12 17:13	06:35 17:48	06:43 19:23	05:56 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	06:41 19:24	05:55 19:57	05:26 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 17:15	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	06:26 19:28	06:57 18:37	06:33 16:51	07:08 16:28
5	07:26 16:42	07:08 17:18	06:29 17:53	06:36 19:27	05:51 20:00	05:25 20:29	05:29 20:36	05:56 20:13	06:27 19:27	06:59 18:35	06:34 16:49	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	06:28 19:25	07:00 18:33	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	06:29 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	06:31 19:31	05:48 20:03	05:24 20:31	05:31 20:35	05:59 20:09	06:30 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	05:46 20:04	05:24 20:31	05:32 20:35	06:00 20:08	06:31 19:20	07:03 18:28	06:39 16:45	07:13 16:28
10	07:25 16:47	07:02 17:24	06:20 17:58	06:28 19:33	05:45 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	07:00 17:26	06:19 17:59	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	05:23 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 17:29	06:14 18:03	06:22 19:37	05:41 20:09	05:23 20:34	05:35 20:33	06:05 20:01	06:37 19:11	07:08 18:20	06:45 16:40	07:17 16:28
15	07:24 16:52	06:55 17:31	06:12 18:04	06:20 19:38	05:40 20:10	05:23 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	05:23 20:35	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	06:48 16:38	07:19 16:29
17	07:23 16:54	06:53 17:33	06:09 18:06	06:17 19:40	05:38 20:12	05:23 20:35	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	06:49 16:37	07:19 16:29
18	07:22 16:56	06:51 17:34	06:07 18:07	06:15 19:41	05:37 20:13	05:23 20:35	05:39 20:30	06:09 19:55	06:41 19:04	07:13 18:14	06:50 16:36	07:20 16:29
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	07:21 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	05:40 20:29	06:11 19:52	06:43 19:01	07:15 18:11	06:53 16:35	07:21 16:30
21	07:21 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:34 20:16	05:24 20:36	05:41 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 17:00	06:46 17:39	06:00 18:12	06:09 19:46	05:33 20:17	05:24 20:37	05:42 20:27	06:13 19:49	06:45 18:57	07:18 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	05:24 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	07:19 17:03	06:43 17:42	05:57 18:14	06:06 19:48	05:32 20:19	05:24 20:37	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:05	06:57 16:32	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	07:24 16:33
26	07:17 17:05	06:40 17:44	05:53 18:16	06:03 19:50	05:30 20:21	05:25 20:37	05:46 20:24	06:17 19:43	06:49 18:51	06:22 17:02	07:00 16:31	07:24 16:33
27	07:16 17:07	06:38 17:45	05:52 18:17	06:02 19:51	05:30 20:22	05:25 20:37	05:47 20:23	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 18:18	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 16:30	07:25 16:35
29	07:14 17:09		06:48 19:20	05:59 19:53	05:28 20:23	05:26 20:37	05:49 20:21	06:20 19:38	06:52 18:45	06:26 16:58	07:03 16:30	07:25 16:35
30	07:14 17:10		06:47 19:21	05:58 19:55	05:28 20:24	05:27 20:37	05:50 20:20	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		05:27 20:25		05:51 20:19	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	296	286
Total, worst case												

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)

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**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** B - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

**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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:38	07:12 17:13	06:35 17:48	06:43 19:23	05:56 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	06:41 19:24	05:55 19:57	05:26 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 17:15	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	06:26 19:28	06:57 18:37	06:33 16:51	07:08 16:28
5	07:26 16:42	07:08 17:18	06:29 17:53	06:36 19:27	05:51 20:00	05:25 20:29	05:29 20:36	05:56 20:13	06:27 19:27	06:59 18:35	06:34 16:49	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	06:28 19:25	07:00 18:33	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	06:29 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	06:31 19:31	05:48 20:03	05:24 20:31	05:31 20:35	05:59 20:09	06:30 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	05:46 20:04	05:24 20:31	05:32 20:35	06:00 20:08	06:31 19:20	07:03 18:28	06:39 16:45	07:13 16:28
10	07:25 16:47	07:02 17:24	06:20 17:58	06:28 19:33	05:45 20:05	05:24 20:32	05:33 20:35	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 17:59	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	05:23 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	05:23 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 17:29	06:14 18:03	06:22 19:37	05:41 20:09	05:23 20:34	05:35 20:33	06:05 20:01	06:37 19:11	07:08 18:20	06:45 16:40	07:17 16:28
15	07:24 16:52	06:55 17:31	06:12 18:04	06:20 19:38	05:40 20:10	05:23 20:34	05:36 20:32	06:06 20:00	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	06:18 19:39	05:39 20:11	05:23 20:35	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	06:48 16:38	07:19 16:29
17	07:23 16:54	06:53 17:33	06:09 18:06	06:17 19:40	05:38 20:12	05:23 20:35	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	06:49 16:37	07:19 16:29
18	07:22 16:56	06:51 17:34	06:07 18:07	06:15 19:41	05:37 20:13	05:23 20:35	05:39 20:30	06:09 19:55	06:41 19:04	07:13 18:14	06:50 16:36	07:20 16:29
19	07:22 16:57	06:50 17:36	06:05 18:09	06:14 19:43	05:36 20:14	05:23 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	06:48 17:37	06:04 18:10	06:12 19:44	05:35 20:15	05:24 20:36	05:40 20:29	06:11 19:52	06:43 19:01	07:15 18:11	06:52 16:35	07:21 16:30
21	07:21 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:34 20:16	05:24 20:36	05:41 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 17:00	06:46 17:39	06:00 18:12	06:09 19:46	05:33 20:17	05:24 20:37	05:42 20:27	06:13 19:49	06:45 18:57	07:18 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	05:24 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	07:19 17:03	06:43 17:42	05:57 18:14	06:06 19:48	05:32 20:19	05:24 20:37	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:05	06:57 16:32	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	07:24 16:33
26	07:17 17:05	06:40 17:44	05:53 18:16	06:03 19:50	05:30 20:21	05:25 20:37	05:46 20:24	06:17 19:43	06:49 18:51	06:22 17:02	06:59 16:31	07:24 16:33
27	07:16 17:07	06:38 17:45	05:52 18:17	06:02 19:51	05:30 20:22	05:25 20:37	05:47 20:23	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 18:18	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 16:30	07:25 16:35
29	07:14 17:09		06:48 19:20	05:59 19:53	05:28 20:23	05:26 20:37	05:49 20:21	06:20 19:38	06:52 18:45	06:26 16:58	07:03 16:30	07:25 16:35
30	07:14 17:10		06:47 19:21	05:58 19:55	05:28 20:24	05:27 20:37	05:50 20:20	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		05:27 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	296	286
Total, worst case												

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: C - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26 16:38	13:52 (1) 14:56 (1)	07:12 17:13	13:26 (1) 15:40 (1)	06:35 17:48	13:06 (1) 15:58 (1)
2	07:26 16:39	13:52 (1) 14:58 (1)	07:11 17:14	13:25 (1) 15:41 (1)	06:33 17:49	13:06 (1) 15:58 (1)
3	07:26 16:40	13:52 (1) 14:58 (1)	07:10 17:15	13:26 (1) 15:42 (1)	06:32 17:50	13:05 (1) 15:57 (1)
4	07:26 16:41	13:50 (1) 15:00 (1)	07:09 17:17	13:25 (1) 15:43 (1)	06:30 17:51	13:05 (1) 15:57 (1)
5	07:26 16:42	13:50 (1) 15:02 (1)	07:08 17:18	13:24 (1) 15:44 (1)	06:29 17:53	13:06 (1) 15:58 (1)
6	07:26 16:43	13:50 (1) 15:04 (1)	07:06 17:19	13:22 (1) 15:44 (1)	06:27 17:54	13:04 (1) 15:58 (1)
7	07:26 16:44	13:50 (1) 15:04 (1)	07:05 17:21	13:21 (1) 15:45 (1)	06:25 17:55	13:04 (1) 15:58 (1)
8	07:26 16:45	13:48 (1) 15:06 (1)	07:04 17:22	13:20 (1) 15:46 (1)	06:24 17:56	13:05 (1) 15:57 (1)
9	07:25 16:46	13:48 (1) 15:08 (1)	07:03 17:23	13:19 (1) 15:47 (1)	06:22 17:57	13:05 (1) 15:57 (1)
10	07:25 16:47	13:47 (1) 15:09 (1)	07:02 17:24	13:20 (1) 15:50 (1)	06:20 17:58	13:03 (1) 15:57 (1)
11	07:25 16:48	13:47 (1) 15:11 (1)	07:00 17:26	13:18 (1) 15:50 (1)	06:19 17:59	13:04 (1) 15:58 (1)
12	07:25 16:49	13:45 (1) 15:13 (1)	06:59 17:27	13:17 (1) 15:51 (1)	06:17 18:01	13:04 (1) 15:56 (1)
13	07:24 16:50	13:44 (1) 15:14 (1)	06:58 17:28	13:16 (1) 15:52 (1)	06:15 18:02	13:04 (1) 15:56 (1)
14	07:24 16:51	13:44 (1) 15:16 (1)	06:57 17:29	13:16 (1) 15:52 (1)	06:14 18:03	13:05 (1) 15:57 (1)
15	07:24 16:52	13:43 (1) 15:17 (1)	06:55 17:31	13:15 (1) 15:53 (1)	06:12 18:04	13:05 (1) 15:55 (1)
16	07:23 16:53	13:41 (1) 15:19 (1)	06:54 17:32	13:14 (1) 15:54 (1)	06:10 18:05	13:05 (1) 15:55 (1)
17	07:23 16:54	13:40 (1) 15:20 (1)	06:53 17:33	13:14 (1) 15:54 (1)	06:09 18:06	13:05 (1) 15:55 (1)
18	07:22 16:56	13:40 (1) 15:22 (1)	06:51 17:34	13:13 (1) 15:55 (1)	06:07 18:07	13:06 (1) 15:54 (1)
19	07:22 16:57	13:39 (1) 15:23 (1)	06:50 17:36	13:11 (1) 15:55 (1)	06:05 18:09	13:08 (1) 15:54 (1)
20	07:21 16:58	13:38 (1) 15:24 (1)	06:48 17:37	13:12 (1) 15:56 (1)	06:04 18:10	13:08 (1) 15:54 (1)
21	07:21 16:59	13:38 (1) 15:26 (1)	06:47 17:38	13:10 (1) 15:54 (1)	06:02 18:11	13:09 (1) 15:53 (1)
22	07:20 17:00	13:37 (1) 15:27 (1)	06:46 17:39	13:11 (1) 15:55 (1)	06:00 18:12	13:09 (1) 15:53 (1)
23	07:19 17:02	13:36 (1) 15:28 (1)	06:44 17:41	13:09 (1) 15:55 (1)	05:58 18:13	13:11 (1) 15:53 (1)
24	07:19 17:03	13:33 (1) 15:29 (1)	06:43 17:42	13:08 (1) 15:56 (1)	05:57 18:14	13:11 (1) 15:51 (1)
25	07:18 17:04	13:33 (1) 15:31 (1)	06:41 17:43	13:08 (1) 15:56 (1)	05:55 18:15	13:14 (1) 15:52 (1)
26	07:17 17:05	13:32 (1) 15:32 (1)	06:40 17:44	13:07 (1) 15:57 (1)	05:53 18:16	13:14 (1) 15:50 (1)
27	07:16 17:07	13:31 (1) 15:35 (1)	06:38 17:45	13:07 (1) 15:57 (1)	05:52 18:17	13:16 (1) 15:50 (1)
28	07:15 17:08	13:30 (1) 15:36 (1)	06:36 17:47	13:06 (1) 15:58 (1)	05:50 18:18	13:19 (1) 15:49 (1)
29	07:14 17:09	13:29 (1) 15:37 (1)	06:35 17:48	13:05 (1) 15:59 (1)	05:48 18:19	14:19 (1) 15:49 (1)
30	07:14 17:10	13:28 (1) 15:38 (1)	06:34 17:49	13:04 (1) 15:59 (1)	05:47 18:20	14:21 (1) 15:49 (1)
31	07:13 17:12	13:27 (1) 15:39 (1)	06:33 17:50	13:03 (1) 15:59 (1)	05:46 18:21	14:23 (1) 15:49 (1)
Potential sun hours	296	296	369	399	450	454
Total, worst case	3008	4342	5134	2908	158	

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: C - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December				
1	05:27 20:37	05:52 20:17	06:23 19:33	14:44 (1) 16:36 (1)	06:54 18:42	13:42 (1) 16:35 (1)	06:29 16:54	12:49 (1) 15:17 (1)	07:05 16:29	13:29 (1) 14:53 (1)
2	05:28 20:37	05:53 20:16	06:24 19:32	14:41 (1) 16:37 (1)	06:55 18:40	13:44 (1) 16:36 (1)	06:31 16:53	12:49 (1) 15:17 (1)	07:06 16:29	13:30 (1) 14:52 (1)
3	05:28 20:37	05:54 20:15	06:25 19:30	14:38 (1) 16:36 (1)	06:56 18:39	13:43 (1) 16:35 (1)	06:32 16:52	12:50 (1) 15:16 (1)	07:07 16:29	13:31 (1) 14:51 (1)
4	05:29 20:36	05:55 20:14	06:26 19:28	14:37 (1) 16:37 (1)	06:57 18:37	13:42 (1) 16:34 (1)	06:33 16:51	12:51 (1) 15:15 (1)	07:08 16:28	13:32 (1) 14:50 (1)
5	05:29 20:36	05:56 20:13	06:27 19:27	14:34 (1) 16:38 (1)	06:59 18:35	13:41 (1) 16:35 (1)	06:34 16:49	12:52 (1) 15:14 (1)	07:09 16:28	13:35 (1) 14:49 (1)
6	05:30 20:36	05:57 20:12	06:28 19:25	14:31 (1) 16:37 (1)	07:00 18:33	13:40 (1) 16:34 (1)	06:35 16:48	12:54 (1) 15:14 (1)	07:10 16:28	13:36 (1) 14:50 (1)
7	05:31 20:36	05:58 20:10	06:29 19:23	14:28 (1) 16:38 (1)	07:01 18:32	13:41 (1) 16:33 (1)	06:37 16:47	12:55 (1) 15:13 (1)	07:11 16:28	13:37 (1) 14:49 (1)
8	05:31 20:35	05:59 20:09	06:30 19:22	14:25 (1) 16:39 (1)	07:02 18:30	13:40 (1) 16:32 (1)	06:38 16:46	12:56 (1) 15:12 (1)	07:12 16:28	13:38 (1) 14:48 (1)
9	05:32 20:35	06:00 20:08	06:31 19:20	14:22 (1) 16:38 (1)	07:03 18:28	13:39 (1) 16:33 (1)	06:39 16:45	12:56 (1) 15:12 (1)	07:13 16:28	13:41 (1) 14:47 (1)
10	05:33 20:35	06:01 20:07	06:33 19:18	14:21 (1) 16:39 (1)	07:04 18:27	13:40 (1) 16:32 (1)	06:40 16:44	12:57 (1) 15:11 (1)	07:14 16:28	13:42 (1) 14:48 (1)
11	05:33 20:34	06:02 20:05	06:34 19:17	14:18 (1) 16:38 (1)	07:05 18:25	13:39 (1) 16:31 (1)	06:42 16:43	12:58 (1) 15:10 (1)	07:15 16:28	13:43 (1) 14:47 (1)
12	05:34 20:34	06:03 20:04	06:35 19:15	14:15 (1) 16:39 (1)	07:06 18:24	13:39 (1) 16:31 (1)	06:43 16:42	13:00 (1) 15:10 (1)	07:15 16:28	13:44 (1) 14:46 (1)
13	05:35 20:33	06:04 20:02	06:36 19:13	14:12 (1) 16:38 (1)	07:07 18:22	13:40 (1) 16:30 (1)	06:44 16:41	13:01 (1) 15:09 (1)	07:16 16:28	13:46 (1) 14:46 (1)
14	05:35 20:33	06:05 20:01	06:37 19:11	14:11 (1) 16:39 (1)	07:08 18:20	13:39 (1) 16:29 (1)	06:45 16:40	13:02 (1) 15:08 (1)	07:17 16:28	13:47 (1) 14:45 (1)
15	05:36 20:32	06:06 20:00	06:38 19:10	14:08 (1) 16:38 (1)	07:10 18:19	13:40 (1) 16:30 (1)	06:46 16:39	13:04 (1) 15:08 (1)	07:18 16:29	13:48 (1) 14:46 (1)
16	05:37 20:31	06:07 19:58	06:39 19:08	14:05 (1) 16:39 (1)	07:11 18:17	13:39 (1) 16:29 (1)	06:48 16:38	13:05 (1) 15:05 (1)	07:19 16:29	13:49 (1) 14:45 (1)
17	05:38 20:31	06:08 19:57	06:40 19:06	14:04 (1) 16:38 (1)	07:12 18:16	13:40 (1) 16:28 (1)	06:49 16:37	13:06 (1) 15:04 (1)	07:19 16:29	13:49 (1) 14:45 (1)
18	05:39 20:30	06:09 19:55	06:41 19:04	14:01 (1) 16:39 (1)	07:13 18:14	13:40 (1) 16:28 (1)	06:50 16:36	13:07 (1) 15:03 (1)	07:20 16:29	13:52 (1) 14:46 (1)
19	05:40 20:29	06:10 19:54	06:42 19:03	14:00 (1) 16:38 (1)	07:14 18:13	13:41 (1) 16:27 (1)	06:51 16:36	13:11 (1) 15:03 (1)	07:21 16:30	13:52 (1) 14:44 (1)
20	05:40 20:29	06:11 19:52	06:43 19:01	13:57 (1) 16:39 (1)	07:15 18:11	13:40 (1) 16:26 (1)	06:52 16:35	13:12 (1) 15:02 (1)	07:21 16:30	13:53 (1) 14:45 (1)
21	05:41 20:28	06:12 19:51	06:44 18:59	13:56 (1) 16:38 (1)	07:16 18:10	13:41 (1) 16:25 (1)	06:54 16:34	13:13 (1) 15:01 (1)	07:22 16:31	13:54 (1) 14:46 (1)
22	05:42 20:27	06:13 19:49	06:45 18:57	13:53 (1) 16:39 (1)	07:18 18:08	13:43 (1) 16:25 (1)	06:55 16:34	13:14 (1) 15:00 (1)	07:22 16:31	13:54 (1) 14:46 (1)
23	05:43 20:26	06:14 19:48	06:46 18:56	13:52 (1) 16:38 (1)	07:19 18:07	13:42 (1) 16:24 (1)	06:56 16:33	13:16 (1) 15:00 (1)	07:23 16:32	13:54 (1) 14:46 (1)
24	05:44 20:25	06:15 19:46	06:47 18:54	13:51 (1) 16:37 (1)	07:20 18:05	13:43 (1) 16:23 (1)	06:57 16:32	13:17 (1) 15:00 (1)	07:23 16:32	13:55 (1) 14:47 (1)
25	05:45 20:24	06:16 19:45	06:48 18:52	13:50 (1) 16:38 (1)	06:21 17:04	12:44 (1) 15:22 (1)	06:58 16:32	13:18 (1) 14:58 (1)	07:24 16:33	13:55 (1) 14:49 (1)
26	05:46 20:24	06:17 19:43	06:49 18:51	13:49 (1) 16:37 (1)	06:22 17:02	12:44 (1) 15:22 (1)	06:59 16:31	13:19 (1) 14:57 (1)	07:24 16:33	13:53 (1) 14:49 (1)
27	05:47 20:23	06:18 19:42	06:50 18:49	13:46 (1) 16:36 (1)	06:23 17:01	12:45 (1) 15:21 (1)	07:01 16:31	13:23 (1) 14:57 (1)	07:24 16:34	13:54 (1) 14:50 (1)
28	05:48 20:22	06:19 19:40	06:51 18:47	13:45 (1) 16:37 (1)	06:25 17:00	12:46 (1) 15:20 (1)	07:02 16:30	13:24 (1) 14:56 (1)	07:25 16:35	13:54 (1) 14:52 (1)
29	05:49 20:21	06:20 19:38	06:52 18:45	13:44 (1) 16:36 (1)	06:26 16:58	12:45 (1) 15:19 (1)	07:03 16:30	13:25 (1) 14:55 (1)	07:25 16:35	13:54 (1) 14:52 (1)
30	05:50 20:20	06:21 19:37	06:53 18:44	13:43 (1) 16:35 (1)	06:27 16:57	12:47 (1) 15:19 (1)	07:04 16:30	13:26 (1) 14:54 (1)	07:25 16:36	13:54 (1) 14:54 (1)
31	05:51 20:18	06:22 19:35	06:54 18:44	13:42 (1) 16:35 (1)	06:28 16:56	12:48 (1) 15:18 (1)	07:04 16:30	13:27 (1) 14:54 (1)	07:25 16:36	13:54 (1) 14:54 (1)
Potential sun hours	461	429	375	345	296	286				
Total, worst case		1698	4450	5150	3610	1928				

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: D - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June				
1	07:26 16:38	07:12 17:13	08:38 (1) 10:14 (1)	06:35 17:48	08:06 (1) 10:48 (1)	06:43 19:23	08:52 (1) 11:32 (1)	05:56 19:56	09:00 (1) 10:32 (1)	05:27 20:26
2	07:26 16:39	07:11 17:14	08:37 (1) 10:15 (1)	06:33 17:49	08:06 (1) 10:48 (1)	06:41 19:24	08:52 (1) 11:30 (1)	05:55 19:57	09:01 (1) 10:31 (1)	05:26 20:27
3	07:26 16:40	07:10 17:15	08:36 (1) 10:18 (1)	06:32 17:50	08:05 (1) 10:49 (1)	06:40 19:25	08:52 (1) 11:28 (1)	05:54 19:58	09:01 (1) 10:29 (1)	05:26 20:27
4	07:26 16:41	07:09 17:17	08:33 (1) 10:19 (1)	06:30 17:51	08:05 (1) 10:49 (1)	06:38 19:26	08:51 (1) 11:27 (1)	05:53 19:59	09:02 (1) 10:28 (1)	05:26 20:28
5	07:26 16:42	07:08 17:18	08:32 (1) 10:22 (1)	06:29 17:53	08:04 (1) 10:50 (1)	06:36 19:27	08:51 (1) 11:25 (1)	05:51 20:00	09:03 (1) 10:25 (1)	05:25 20:29
6	07:26 16:43	07:06 17:19	08:30 (1) 10:22 (1)	06:27 17:54	08:02 (1) 10:50 (1)	06:35 19:28	08:51 (1) 11:23 (1)	05:50 20:01	09:04 (1) 10:24 (1)	05:25 20:29
7	07:26 16:44	07:05 17:21	08:29 (1) 10:25 (1)	06:25 17:55	08:02 (1) 10:50 (1)	06:33 19:29	08:52 (1) 11:20 (1)	05:49 20:02	09:05 (1) 10:23 (1)	05:25 20:30
8	07:26 16:45	07:04 17:22	08:28 (1) 10:26 (1)	06:24 17:56	08:01 (1) 10:51 (1)	06:31 19:31	08:52 (1) 11:18 (1)	05:48 20:03	09:05 (1) 10:21 (1)	05:24 20:31
9	07:25 16:46	07:03 17:23	08:27 (1) 10:29 (1)	06:22 17:57	08:01 (1) 10:51 (1)	06:30 19:32	08:52 (1) 11:16 (1)	05:46 20:04	09:06 (1) 10:18 (1)	05:24 20:31
10	07:25 16:47	07:02 17:24	08:26 (1) 10:30 (1)	06:20 17:58	07:59 (1) 10:51 (1)	06:28 19:33	08:53 (1) 11:15 (1)	05:45 20:05	09:07 (1) 10:17 (1)	05:24 20:32
11	07:25 16:48	07:00 17:26	08:24 (1) 10:30 (1)	06:19 17:59	08:00 (1) 10:52 (1)	06:27 19:34	08:51 (1) 11:11 (1)	05:44 20:06	09:08 (1) 10:16 (1)	05:24 20:32
12	07:25 16:49	06:59 17:27	08:23 (1) 10:33 (1)	06:17 18:01	08:00 (1) 10:50 (1)	06:25 19:35	08:52 (1) 11:10 (1)	05:43 20:07	09:09 (1) 10:15 (1)	05:23 20:33
13	07:24 16:50	06:58 17:28	08:22 (1) 10:34 (1)	06:15 18:02	07:58 (1) 10:50 (1)	06:23 19:36	08:52 (1) 11:08 (1)	05:42 20:08	09:10 (1) 10:12 (1)	05:23 20:33
14	07:24 16:51	06:57 17:29	08:20 (1) 10:34 (1)	06:14 18:03	07:59 (1) 10:51 (1)	06:22 19:37	08:52 (1) 11:06 (1)	05:41 20:09	09:11 (1) 10:11 (1)	05:23 20:34
15	07:24 16:52	06:55 17:31	08:19 (1) 10:37 (1)	06:12 18:04	07:57 (1) 10:51 (1)	06:20 19:38	08:53 (1) 11:03 (1)	05:40 20:10	09:12 (1) 10:10 (1)	05:23 20:34
16	07:23 16:53	06:54 17:32	08:20 (1) 10:38 (1)	06:10 18:05	07:57 (1) 10:49 (1)	06:19 19:39	08:53 (1) 11:01 (1)	05:39 20:11	09:13 (1) 10:07 (1)	05:23 20:35
17	07:23 16:54	06:53 17:33	08:18 (1) 10:38 (1)	06:09 18:06	07:57 (1) 10:49 (1)	06:17 19:40	08:54 (1) 11:00 (1)	05:38 20:12	09:14 (1) 10:06 (1)	05:23 20:35
18	07:22 16:56	06:51 17:34	08:17 (1) 10:41 (1)	06:07 18:07	07:56 (1) 10:50 (1)	06:15 19:41	08:54 (1) 11:00 (1)	05:37 20:13	09:16 (1) 10:06 (1)	05:23 20:35
19	07:22 16:57	09:11 (1) 09:33 (1)	06:50 17:36	08:15 (1) 10:41 (1)	06:05 18:09	07:56 (1) 19:43	08:55 (1) 11:00 (1)	05:36 20:14	09:19 (1) 10:03 (1)	05:23 20:36
20	07:21 16:58	09:06 (1) 09:38 (1)	06:48 17:37	08:14 (1) 10:42 (1)	06:04 18:10	07:54 (1) 19:44	08:53 (1) 11:00 (1)	05:35 20:15	09:20 (1) 10:02 (1)	05:24 20:36
21	07:21 16:59	09:02 (1) 09:44 (1)	06:47 17:38	08:14 (1) 10:42 (1)	06:02 18:11	07:55 (1) 19:45	08:54 (1) 11:00 (1)	05:34 20:16	09:21 (1) 10:01 (1)	05:24 20:36
22	07:20 17:00	08:59 (1) 09:47 (1)	06:46 17:39	08:13 (1) 10:45 (1)	06:00 18:12	07:55 (1) 19:46	08:54 (1) 11:00 (1)	05:33 20:17	09:22 (1) 09:58 (1)	05:24 20:37
23	07:19 17:02	08:56 (1) 09:50 (1)	06:44 17:41	08:11 (1) 10:45 (1)	05:58 18:13	07:53 (1) 19:47	08:55 (1) 11:00 (1)	05:33 20:18	09:24 (1) 09:58 (1)	05:24 20:37
24	07:19 17:03	08:53 (1) 09:53 (1)	06:43 17:42	08:10 (1) 10:46 (1)	05:57 18:14	07:53 (1) 19:48	08:55 (1) 11:00 (1)	05:32 20:19	09:25 (1) 09:55 (1)	05:24 20:37
25	07:18 17:04	08:51 (1) 09:57 (1)	06:41 17:43	08:10 (1) 10:46 (1)	05:55 18:15	07:54 (1) 19:49	08:56 (1) 11:00 (1)	05:31 20:20	09:28 (1) 09:52 (1)	05:25 20:37
26	07:17 17:05	08:50 (1) 10:00 (1)	06:40 17:44	08:09 (1) 10:47 (1)	05:53 18:16	07:54 (1) 19:50	08:57 (1) 11:00 (1)	05:30 20:21	09:30 (1) 09:50 (1)	05:25 20:37
27	07:16 17:07	08:47 (1) 10:03 (1)	06:38 17:45	08:07 (1) 10:47 (1)	05:52 18:17	07:52 (1) 19:51	08:57 (1) 11:00 (1)	05:30 20:22	09:33 (1) 09:47 (1)	05:25 20:37
28	07:15 17:08	08:46 (1) 10:04 (1)	06:36 17:47	08:08 (1) 10:48 (1)	05:50 18:18	07:53 (1) 19:52	08:58 (1) 11:00 (1)	05:29 20:23		05:26 20:37
29	07:14 17:09	08:43 (1) 10:07 (1)		06:48 19:20	08:53 (1) 11:37 (1)	05:59 19:53	08:59 (1) 11:00 (1)	05:28 20:23		05:26 20:37
30	07:14 17:10	08:42 (1) 10:10 (1)		06:47 19:21	08:53 (1) 11:35 (1)	05:58 19:55	08:59 (1) 11:00 (1)	05:28 20:24		05:27 20:37
31	07:13 17:12	08:39 (1) 10:11 (1)		06:45 19:22	08:51 (1) 11:33 (1)			05:27 20:25		
Potential sun hours	296	296	369	399	450	454				
Total, worst case	812	3724	5232	3872	1568					

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:  
OMBRA

Printed/Page  
24/04/2020 08:06 / 6

Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: D - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December
1	05:27	05:52	09:20 (1) 06:23	08:50 (1) 06:54	08:38 (1) 06:29	07:55 (1) 07:05
	20:37	20:17	66 10:26 (1) 19:33	140 11:10 (1) 18:42	172 11:30 (1) 16:54	124 09:59 (1) 16:29
2	05:28	05:53	09:19 (1) 06:24	08:49 (1) 06:55	08:38 (1) 06:31	07:57 (1) 07:06
	20:37	20:16	68 10:27 (1) 19:32	144 11:13 (1) 18:40	172 11:30 (1) 16:53	120 09:57 (1) 16:29
3	05:28	05:54	09:18 (1) 06:25	08:50 (1) 06:56	08:39 (1) 06:32	07:58 (1) 07:07
	20:37	20:15	70 10:28 (1) 19:30	144 11:14 (1) 18:39	170 11:29 (1) 16:52	118 09:56 (1) 16:29
4	05:29	05:55	09:17 (1) 06:26	08:49 (1) 06:57	08:38 (1) 06:33	07:59 (1) 07:08
	20:36	20:14	72 10:29 (1) 19:28	146 11:15 (1) 18:37	170 11:28 (1) 16:51	116 09:55 (1) 16:28
5	05:29	05:56	09:16 (1) 06:27	08:48 (1) 06:59	08:39 (1) 06:34	08:00 (1) 07:09
	20:36	20:13	76 10:32 (1) 19:27	148 11:16 (1) 18:35	170 11:29 (1) 16:49	112 09:52 (1) 16:28
6	05:30	05:57	09:15 (1) 06:28	08:47 (1) 07:00	08:38 (1) 06:35	08:02 (1) 07:10
	20:36	20:12	78 10:33 (1) 19:25	152 11:19 (1) 18:33	170 11:28 (1) 16:48	110 09:52 (1) 16:28
7	05:31	05:58	09:14 (1) 06:29	08:46 (1) 07:01	08:39 (1) 06:37	08:03 (1) 07:11
	20:36	20:10	80 10:34 (1) 19:23	154 11:20 (1) 18:32	168 11:27 (1) 16:47	106 09:49 (1) 16:28
8	05:31	05:59	09:13 (1) 06:30	08:47 (1) 07:02	08:38 (1) 06:38	08:06 (1) 07:12
	20:35	20:09	82 10:35 (1) 19:22	154 11:21 (1) 18:30	168 11:26 (1) 16:46	102 09:48 (1) 16:28
9	05:32	06:00	09:12 (1) 06:31	08:46 (1) 07:03	08:39 (1) 06:39	08:08 (1) 07:13
	20:35	20:08	86 10:38 (1) 19:20	156 11:22 (1) 18:28	166 11:25 (1) 16:45	98 09:46 (1) 16:28
10	05:33	06:01	09:11 (1) 06:33	08:45 (1) 07:04	08:38 (1) 06:40	08:09 (1) 07:14
	20:35	20:07	88 10:39 (1) 19:18	158 11:23 (1) 18:27	166 11:24 (1) 16:44	96 09:45 (1) 16:28
11	05:33	06:02	09:10 (1) 06:34	08:44 (1) 07:05	08:40 (1) 06:42	08:10 (1) 07:15
	20:34	20:05	90 10:40 (1) 19:17	160 11:24 (1) 18:25	164 11:24 (1) 16:43	92 09:44 (1) 16:28
12	05:34	06:03	09:09 (1) 06:35	08:43 (1) 07:06	08:39 (1) 06:43	08:12 (1) 07:16
	20:34	20:04	92 10:41 (1) 19:15	162 11:25 (1) 18:24	164 11:23 (1) 16:42	88 09:42 (1) 16:28
13	05:35	06:04	09:08 (1) 06:36	08:44 (1) 07:07	08:40 (1) 06:44	08:15 (1) 07:16
	20:33	20:02	96 10:44 (1) 19:13	162 11:26 (1) 18:22	162 11:22 (1) 16:41	84 09:39 (1) 16:28
14	05:35	06:05	09:07 (1) 06:37	08:43 (1) 07:08	08:41 (1) 06:45	08:18 (1) 07:17
	20:33	20:01	98 10:45 (1) 19:11	164 11:27 (1) 18:20	160 11:21 (1) 16:40	78 09:36 (1) 16:28
15	05:36	06:06	09:06 (1) 06:38	08:42 (1) 07:10	08:40 (1) 06:46	08:20 (1) 07:18
	20:32	20:00	100 10:46 (1) 19:10	166 11:28 (1) 18:19	160 11:20 (1) 16:39	76 09:36 (1) 16:29
16	05:37	09:46 (1) 06:07	09:05 (1) 06:39	08:41 (1) 07:11	08:41 (1) 06:48	08:23 (1) 07:19
	20:31	8 09:54 (1) 19:58	102 10:47 (1) 19:08	168 11:29 (1) 18:17	158 11:19 (1) 16:38	70 09:33 (1) 16:29
17	05:38	09:41 (1) 06:08	09:04 (1) 06:40	08:42 (1) 07:12	08:43 (1) 06:49	08:24 (1) 07:19
	20:31	18 09:59 (1) 19:57	106 10:50 (1) 19:06	168 11:30 (1) 18:16	156 11:19 (1) 16:37	66 09:30 (1) 16:29
18	05:39	09:40 (1) 06:09	09:03 (1) 06:41	08:41 (1) 07:13	08:42 (1) 06:50	08:27 (1) 07:20
	20:30	22 10:02 (1) 19:55	108 10:51 (1) 19:04	168 11:29 (1) 18:14	154 11:16 (1) 16:36	60 09:27 (1) 16:29
19	05:40	09:36 (1) 06:10	09:02 (1) 06:42	08:40 (1) 07:14	08:43 (1) 06:51	08:31 (1) 07:21
	20:29	28 10:04 (1) 19:54	110 10:52 (1) 19:03	170 11:30 (1) 18:13	152 11:15 (1) 16:36	54 09:25 (1) 16:30
20	05:40	09:35 (1) 06:11	09:01 (1) 06:43	08:41 (1) 07:15	08:44 (1) 06:53	08:34 (1) 07:21
	20:29	30 10:05 (1) 19:52	112 10:53 (1) 19:01	170 11:31 (1) 18:11	150 11:14 (1) 16:35	48 09:22 (1) 16:30
21	05:41	09:34 (1) 06:12	09:00 (1) 06:44	08:40 (1) 07:16	08:45 (1) 06:54	08:37 (1) 07:22
	20:28	34 10:08 (1) 19:51	116 10:56 (1) 18:59	172 11:32 (1) 18:10	148 11:13 (1) 16:34	42 09:19 (1) 16:31
22	05:42	09:31 (1) 06:13	08:58 (1) 06:45	08:39 (1) 07:18	08:45 (1) 06:55	08:42 (1) 07:22
	20:27	38 10:09 (1) 19:49	118 10:56 (1) 18:57	172 11:31 (1) 18:08	148 11:13 (1) 16:34	32 09:14 (1) 16:31
23	05:43	09:30 (1) 06:14	08:57 (1) 06:46	08:40 (1) 07:19	08:46 (1) 06:56	08:48 (1) 07:23
	20:26	42 10:12 (1) 19:48	120 10:57 (1) 18:56	172 11:32 (1) 18:07	146 11:12 (1) 16:33	22 09:10 (1) 16:32
24	05:44	09:29 (1) 06:15	08:56 (1) 06:47	08:39 (1) 07:20	08:47 (1) 06:57	07:23
	20:25	44 10:13 (1) 19:46	122 10:58 (1) 18:54	172 11:31 (1) 18:05	142 11:09 (1) 16:32	16:32
25	05:45	09:28 (1) 06:16	08:57 (1) 06:48	08:38 (1) 06:21	07:48 (1) 06:58	07:24
	20:24	48 10:16 (1) 19:45	124 11:01 (1) 18:52	174 11:32 (1) 17:04	140 10:08 (1) 16:32	16:33
26	05:46	09:26 (1) 06:17	08:56 (1) 06:49	08:39 (1) 06:22	07:50 (1) 07:00	07:24
	20:24	50 10:16 (1) 19:43	126 11:02 (1) 18:51	172 11:31 (1) 17:02	138 10:08 (1) 16:31	16:33
27	05:47	09:25 (1) 06:18	08:55 (1) 06:50	08:38 (1) 06:23	07:49 (1) 07:01	07:24
	20:23	52 10:17 (1) 19:42	128 11:03 (1) 18:49	174 11:32 (1) 17:01	136 10:05 (1) 16:31	16:34
28	05:48	09:24 (1) 06:19	08:54 (1) 06:51	08:39 (1) 06:25	07:50 (1) 07:02	07:25
	20:22	56 10:20 (1) 19:40	130 11:04 (1) 18:47	172 11:31 (1) 17:00	134 10:04 (1) 16:30	16:35
29	05:49	09:23 (1) 06:20	08:53 (1) 06:52	08:38 (1) 06:26	07:51 (1) 07:03	07:25
	20:21	58 10:21 (1) 19:38	134 11:07 (1) 18:45	172 11:30 (1) 16:58	132 10:03 (1) 16:30	16:35
30	05:50	09:22 (1) 06:21	08:52 (1) 06:53	08:37 (1) 06:27	07:53 (1) 07:04	07:25
	20:20	60 10:22 (1) 19:37	136 11:08 (1) 18:44	174 11:31 (1) 16:57	130 10:03 (1) 16:30	16:36
31	05:51	09:21 (1) 06:22	08:51 (1)	06:28	07:54 (1)	07:25
	20:19	62 10:23 (1) 19:35	138 11:09 (1)	16:56	126 10:00 (1)	16:37
Potential sun hours	461	429	375	345	296	286
Total, worst case	650	3172	4880	4792	1914	

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: E - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:38	07:12 17:13	06:35 17:48	06:43 19:23	05:56 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	06:41 19:24	05:55 19:57	05:26 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 17:15	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	06:26 19:28	06:57 18:37	06:33 16:51	07:08 16:28
5	07:26 16:42	07:08 17:18	06:29 17:53	06:36 19:27	05:51 20:00	05:25 20:29	05:29 20:36	05:56 20:13	06:27 19:27	06:59 18:35	06:34 16:49	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	06:28 19:25	07:00 18:33	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	06:29 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	06:31 19:31	05:48 20:03	05:24 20:31	05:31 20:35	05:59 20:09	06:30 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	05:46 20:04	05:24 20:31	05:32 20:35	06:00 20:08	06:32 19:20	07:03 18:28	06:39 16:45	07:13 16:28
10	07:25 16:47	07:02 17:24	06:20 17:58	06:28 19:33	05:45 20:05	05:24 20:32	05:33 20:35	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 17:59	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	05:23 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 17:29	06:14 18:03	06:22 19:37	05:41 20:09	05:23 20:34	05:35 20:33	06:05 20:01	06:37 19:11	07:08 18:20	06:45 16:40	07:17 16:28
15	07:24 16:52	06:55 17:31	06:12 18:04	06:20 19:38	05:40 20:10	05:23 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	05:23 20:35	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	06:48 16:38	07:19 16:29
17	07:23 16:54	06:53 17:33	06:09 18:06	06:17 19:40	05:38 20:12	05:23 20:35	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	06:49 16:37	07:19 16:29
18	07:22 16:56	06:51 17:34	06:07 18:07	06:15 19:41	05:37 20:13	05:23 20:35	05:39 20:30	06:09 19:55	06:41 19:04	07:13 18:14	06:50 16:37	07:20 16:29
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	07:21 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	05:40 20:29	06:11 19:52	06:43 19:01	07:15 18:11	06:52 16:35	07:21 16:30
21	07:21 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:34 20:16	05:24 20:36	05:41 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 17:00	06:46 17:39	06:00 18:12	06:09 19:46	05:33 20:17	05:24 20:37	05:42 20:27	06:13 19:49	06:45 18:57	07:18 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	05:24 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	07:19 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 16:32	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	07:24 16:33
26	07:17 17:05	06:40 17:44	05:53 18:16	06:03 19:50	05:30 20:21	05:25 20:37	05:46 20:24	06:17 19:43	06:49 18:51	06:22 17:02	06:59 16:31	07:24 16:33
27	07:16 17:07	06:38 17:45	05:52 18:17	06:02 19:51	05:30 20:22	05:25 20:37	05:47 20:23	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 18:18	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 16:30	07:25 16:35
29	07:14 17:09		06:48 19:20	05:59 19:53	05:29 20:23	05:26 20:37	05:49 20:21	06:20 19:38	06:52 18:45	06:26 16:58	07:03 16:30	07:25 16:35
30	07:14 17:10		06:47 19:21	05:58 19:55	05:28 20:24	05:27 20:37	05:50 20:20	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		05:27 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	296	286
Total, worst case												

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:  
**OMBRA**

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24/04/2020 08:06 / 8

Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** F - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

**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

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

	January	February	March	April	May	June
1	07:26 16:38	15:52 (4) 16:10 (4)	07:12 17:13	06:35 17:48	16:20 (3) 17:14 (3)	06:43 19:23
2	07:26 16:39	15:52 (4) 16:12 (4)	07:11 17:14	06:33 17:49	16:20 (3) 17:14 (3)	06:41 19:24
3	07:26 16:40	15:52 (4) 16:12 (4)	07:10 17:15	06:32 17:50	16:19 (3) 17:15 (3)	06:40 19:25
4	07:26 16:41	15:52 (4) 16:14 (4)	07:09 17:17	06:30 17:51	16:19 (3) 17:13 (3)	06:38 19:26
5	07:26 16:42	15:52 (4) 16:14 (4)	07:07 17:18	06:29 17:53	16:20 (3) 17:14 (3)	06:36 19:27
6	07:26 16:43	15:54 (4) 16:16 (4)	07:06 17:19	06:27 17:54	16:20 (3) 17:12 (3)	06:35 19:28
7	07:26 16:44	15:54 (4) 16:16 (4)	07:05 17:21	06:25 17:55	16:20 (3) 17:12 (3)	06:33 19:29
8	07:26 16:45	15:54 (4) 16:18 (4)	07:04 17:22	06:24 17:56	16:21 (3) 17:11 (3)	06:31 19:31
9	07:25 16:46	15:54 (4) 16:20 (4)	07:03 17:23	06:22 17:57	16:21 (3) 17:11 (3)	06:30 19:32
10	07:25 16:47	15:55 (4) 16:19 (4)	07:02 17:24	06:20 17:58	16:21 (3) 17:09 (3)	06:28 19:33
11	07:25 16:48	15:55 (4) 16:21 (4)	07:00 17:26	06:19 17:59	16:22 (3) 17:08 (3)	06:27 19:34
12	07:25 16:49	15:55 (4) 16:23 (4)	06:59 17:27	16:41 (3) 18:01	06:17 17:08 (3)	06:25 19:35
13	07:24 16:50	15:56 (4) 16:24 (4)	06:58 17:28	16:36 (3) 18:02	06:15 17:06 (3)	06:23 19:36
14	07:24 16:51	15:56 (4) 16:24 (4)	06:57 17:29	16:34 (3) 18:03	06:14 17:05 (3)	06:22 19:37
15	07:24 16:52	15:55 (4) 16:25 (4)	06:55 17:31	16:31 (3) 18:04	06:12 17:03 (3)	06:20 19:38
16	07:23 16:53	15:57 (4) 16:27 (4)	06:54 17:32	16:30 (3) 18:05	06:10 16:29 (3)	06:19 19:39
17	07:23 16:54	15:56 (4) 16:26 (4)	06:53 17:33	16:28 (3) 18:06	06:09 16:57 (3)	06:17 19:40
18	07:22 16:56	15:58 (4) 16:28 (4)	06:51 17:34	16:27 (3) 18:07	06:07 16:54 (3)	06:15 19:41
19	07:22 16:57	15:59 (4) 16:27 (4)	06:50 17:36	16:25 (3) 18:09	06:05 16:40 (3)	06:14 19:43
20	07:21 16:58	15:58 (4) 16:26 (4)	06:48 17:37	16:26 (3) 18:10	06:04 16:48 (3)	06:12 19:44
21	07:21 16:59	16:00 (4) 16:28 (4)	06:47 17:38	16:24 (3) 18:11	06:11 19:45	06:11 20:16
22	07:20 17:00	16:01 (4) 16:27 (4)	06:46 17:39	16:23 (3) 18:12	06:09 19:46	06:09 20:17
23	07:19 17:02	16:02 (4) 16:26 (4)	06:44 17:41	16:23 (3) 18:13	06:08 19:47	06:08 20:18
24	07:19 17:03	16:01 (4) 16:25 (4)	06:43 17:42	16:22 (3) 18:14	06:06 19:48	06:06 20:19
25	07:18 17:04	16:03 (4) 16:25 (4)	06:41 17:43	16:20 (3) 18:15	06:05 19:49	06:05 20:20
26	07:17 17:05	16:06 (4) 16:24 (4)	06:40 17:44	16:21 (3) 18:16	06:03 19:50	06:03 20:21
27	07:16 17:07	16:07 (4) 16:23 (4)	06:38 17:45	16:21 (3) 18:17	06:02 19:51	06:02 20:22
28	07:15 17:08	16:08 (4) 16:22 (4)	06:36 17:47	16:20 (3) 18:18	06:01 19:52	06:01 20:23
29	07:14 17:09	16:13 (4) 16:19 (4)	06:48 19:20	06:48 19:21	05:59 19:53	05:28 20:23
30	07:14 17:10		06:47 19:21	06:47 19:21	05:58 19:55	05:28 20:24
31	07:13 17:12		06:45 19:22	06:45 19:22	05:57 20:25	05:27 20:25
Potential sun hours	296	296	369	399	450	454
Total, worst case	684	726	814			

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: F - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

#### 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

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

	July	August	September	October	November	December								
1	05:27	05:52	06:23	06:54	17:02 (3)	06:29	07:05	15:37 (4)						
	20:37	20:17	19:33	18:42	44	17:46 (3)	16:54	16:29	26	16:03 (4)				
2	05:28	05:53	06:24	06:55	17:02 (3)	06:31	07:06	15:38 (4)						
	20:37	20:16	19:32	18:40	46	17:48 (3)	16:53	16:29	24	16:02 (4)				
3	05:28	05:54	06:25	06:56	17:01 (3)	06:32	07:07	15:37 (4)						
	20:37	20:15	19:30	18:39	46	17:47 (3)	16:52	16:29	26	16:03 (4)				
4	05:29	05:55	06:26	06:57	17:00 (3)	06:33	07:08	15:38 (4)						
	20:36	20:14	19:28	18:37	48	17:48 (3)	16:51	16:28	24	16:02 (4)				
5	05:29	05:56	06:27	06:59	16:57 (3)	06:34	07:09	15:39 (4)						
	20:36	20:13	19:27	18:35	52	17:49 (3)	16:49	16:28	24	16:03 (4)				
6	05:30	05:57	06:28	07:00	16:56 (3)	06:35	07:10	15:40 (4)						
	20:36	20:12	19:25	18:33	52	17:48 (3)	16:48	16:28	22	16:02 (4)				
7	05:31	05:58	06:29	07:01	16:55 (3)	06:37	07:11	15:39 (4)						
	20:36	20:10	19:23	18:32	54	17:49 (3)	16:47	16:28	22	16:01 (4)				
8	05:31	05:59	06:30	07:02	16:56 (3)	06:38	07:12	15:40 (4)						
	20:35	20:09	19:22	18:30	52	17:48 (3)	16:46	16:28	22	16:02 (4)				
9	05:32	06:00	06:31	07:03	16:55 (3)	06:39	07:13	15:41 (4)						
	20:35	20:08	19:20	18:28	54	17:49 (3)	16:45	16:28	20	16:01 (4)				
10	05:33	06:01	06:33	07:04	16:54 (3)	06:40	07:14	15:42 (4)						
	20:35	20:06	19:18	18:27	54	17:48 (3)	16:44	16:28	20	16:02 (4)				
11	05:33	06:02	06:34	07:05	16:53 (3)	06:42	07:15	15:43 (4)						
	20:34	20:05	19:17	18:25	54	17:47 (3)	16:43	16:28	18	16:01 (4)				
12	05:34	06:03	06:35	07:06	16:53 (3)	06:43	07:15	15:44 (5)						
	20:34	20:04	19:15	18:24	56	17:49 (3)	16:42	16:28	18	16:02 (5)				
13	05:35	06:04	06:36	07:07	16:54 (3)	06:44	15:43 (4)	07:16	15:44 (5)					
	20:33	20:02	19:13	18:22	54	17:48 (3)	16:41	8	15:51 (4)	16:28	18	16:02 (5)		
14	05:35	06:05	06:37	07:08	16:53 (3)	06:45	15:40 (4)	07:17	15:45 (5)					
	20:33	20:01	19:11	18:20	54	17:47 (3)	16:40	14	15:54 (4)	16:28	16	16:01 (5)		
15	05:36	06:06	06:38	07:09	16:52 (3)	06:46	15:40 (4)	07:18	15:44 (4)					
	20:32	20:00	19:10	18:19	54	17:46 (3)	16:39	16	15:56 (4)	16:29	18	16:02 (4)		
16	05:37	06:07	06:39	07:11	16:53 (3)	06:48	15:39 (4)	07:19	15:45 (4)					
	20:31	19:58	19:08	18:17	52	17:45 (3)	16:38	18	15:57 (4)	16:29	18	16:03 (4)		
17	05:38	06:08	06:40	07:12	16:52 (3)	06:49	15:36 (4)	07:19	15:45 (5)					
	20:31	19:57	19:06	18:16	52	17:44 (3)	16:37	22	15:58 (4)	16:29	18	16:03 (5)		
18	05:39	06:09	06:41	07:13	16:54 (3)	06:50	15:35 (4)	07:20	15:46 (5)					
	20:30	19:55	19:04	18:14	52	17:46 (3)	16:36	24	15:59 (4)	16:29	18	16:04 (5)		
19	05:40	06:10	06:42	07:14	16:53 (3)	06:51	15:37 (4)	07:21	15:46 (5)					
	20:29	19:54	19:03	18:13	52	17:45 (3)	16:36	24	16:01 (4)	16:30	16	16:02 (5)		
20	05:40	06:11	06:43	07:15	16:54 (3)	06:52	15:36 (4)	07:21	15:47 (5)					
	20:29	19:52	19:01	18:11	50	17:44 (3)	16:35	26	16:02 (4)	16:30	16	16:03 (5)		
21	05:41	06:12	06:44	07:16	16:55 (3)	06:54	15:35 (4)	07:22	15:47 (5)					
	20:28	19:51	18:59	18:10	46	17:41 (3)	16:34	28	16:03 (4)	16:31	16	16:03 (5)		
22	05:42	06:13	06:45	07:18	16:55 (3)	06:55	15:34 (4)	07:22	15:48 (5)					
	20:27	19:49	18:57	18:08	46	17:41 (3)	16:34	28	16:02 (4)	16:31	16	16:04 (5)		
23	05:43	06:14	06:46	07:19	16:56 (3)	06:56	15:36 (4)	07:23	15:48 (5)					
	20:26	19:48	18:56	18:07	44	17:40 (3)	16:33	28	16:04 (4)	16:32	16	16:04 (5)		
24	05:44	06:15	06:47	07:20	16:57 (3)	06:57	15:35 (4)	07:23	15:49 (5)					
	20:25	19:46	18:54	18:05	42	17:39 (3)	16:32	30	16:05 (4)	16:32	16	16:05 (5)		
25	05:45	06:16	06:48	17:18 (3)	06:21	15:58 (3)	06:58	15:34 (4)	07:24	15:49 (5)				
	20:24	19:45	18:52	18	17:36 (3)	17:04	38	16:36 (3)	16:32	30	16:04 (4)	16:33	16	16:05 (5)
26	05:46	06:17	06:49	17:15 (3)	06:22	16:00 (3)	06:59	15:35 (4)	07:24	15:49 (5)				
	20:24	19:43	18:51	24	17:39 (3)	17:02	36	16:36 (3)	16:31	30	16:05 (4)	16:33	18	16:07 (5)
27	05:47	06:18	06:50	17:12 (3)	06:23	16:03 (3)	07:01	15:34 (4)	07:24	15:50 (4)				
	20:23	19:42	18:49	28	17:40 (3)	17:01	30	16:33 (3)	16:31	30	16:04 (4)	16:34	18	16:08 (4)
28	05:48	06:19	06:51	17:09 (3)	06:25	16:04 (3)	07:02	15:36 (4)	07:25	15:50 (4)				
	20:22	19:40	18:47	34	17:43 (3)	17:00	28	16:32 (3)	16:30	30	16:06 (4)	16:35	18	16:08 (4)
29	05:49	06:20	06:52	17:06 (3)	06:26	16:07 (3)	07:03	15:37 (4)	07:25	15:50 (4)				
	20:21	19:38	18:45	38	17:44 (3)	16:58	22	16:29 (3)	16:30	28	16:05 (4)	16:35	18	16:08 (4)
30	05:50	06:21	06:53	17:05 (3)	06:27	16:11 (3)	07:04	15:36 (4)	07:25	15:52 (5)				
	20:20	19:37	18:44	40	17:45 (3)	16:57	14	16:25 (3)	16:30	28	16:04 (4)	16:36	18	16:10 (5)
31	05:51	06:22	06:54	17:06 (3)	06:28	16:12 (3)	07:05	15:37 (4)	07:25	15:52 (5)				
	20:18	19:35	18:42	42	17:46 (3)	16:58	12	16:26 (3)	16:30	26	16:05 (4)	16:37	18	16:10 (5)
Potential sun hours	461	429	375	345	296	286								
Total, worst case			182	1378	442	592								

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:  
**OMBRA**

Printed/Page  
24/04/2020 08:06 / 10

Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** G - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

**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

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

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

	January	February	March	April	May	June
1	07:26	15:26 (3) 07:12	13:10 (2) 06:35	12:40 (2) 06:43	13:28 (2) 05:56	14:36 (2) 05:27
	16:38 44	16:10 (3) 17:13 172	16:20 (3) 17:48 186	15:46 (2) 19:23 194	16:42 (2) 19:56 108	16:24 (2) 20:26 50
2	07:26	14:00 (2) 07:11	13:09 (2) 06:33	12:38 (2) 06:41	13:28 (2) 05:55	14:37 (2) 05:26
	16:39 56	16:10 (3) 17:14 172	16:19 (3) 17:49 188	15:46 (2) 19:24 194	16:42 (2) 19:57 106	16:23 (2) 20:27 48
3	07:26	13:56 (2) 07:10	13:08 (2) 06:32	12:37 (2) 06:40	13:28 (2) 05:54	14:39 (2) 05:26
	16:40 66	16:10 (3) 17:15 172	16:18 (3) 17:50 188	15:45 (2) 19:25 194	16:42 (2) 19:58 104	16:23 (2) 20:27 48
4	07:26	13:54 (2) 07:09	13:07 (2) 06:30	12:37 (2) 06:38	13:31 (2) 05:53	14:40 (2) 05:26
	16:41 72	16:12 (3) 17:17 176	16:19 (3) 17:51 188	15:45 (2) 19:26 190	16:41 (2) 19:59 102	16:22 (2) 20:28 44
5	07:26	13:52 (2) 07:07	13:06 (2) 06:29	12:36 (2) 06:36	13:33 (2) 05:51	14:43 (2) 05:25
	16:42 76	16:12 (3) 17:18 174	16:18 (3) 17:53 190	15:46 (2) 19:27 188	16:41 (2) 20:00 98	16:21 (2) 20:29 42
6	07:26	13:50 (2) 07:06	13:04 (2) 06:27	12:34 (2) 06:35	13:33 (2) 05:50	14:44 (2) 05:25
	16:43 84	16:14 (3) 17:19 172	16:14 (3) 17:54 192	15:46 (2) 19:28 186	16:39 (2) 20:01 96	16:20 (2) 20:29 42
7	07:26	13:48 (2) 07:05	13:03 (2) 06:25	12:34 (2) 06:33	13:36 (2) 05:49	14:45 (2) 05:25
	16:44 88	16:14 (3) 17:21 170	16:13 (3) 17:55 192	15:46 (2) 19:29 184	16:40 (2) 20:02 96	16:21 (2) 20:30 40
8	07:26	13:46 (2) 07:04	13:02 (2) 06:24	12:33 (2) 06:31	13:38 (2) 05:48	14:48 (2) 05:24
	16:45 94	16:14 (3) 17:22 172	16:12 (3) 17:56 194	15:47 (2) 19:31 180	16:38 (2) 20:03 92	16:20 (2) 20:31 40
9	07:25	13:44 (2) 07:03	13:01 (2) 06:22	12:33 (2) 06:30	13:40 (2) 05:46	14:48 (2) 05:24
	16:46 100	16:16 (3) 17:23 166	16:09 (3) 17:57 194	15:47 (2) 19:32 178	16:38 (2) 20:04 90	16:18 (2) 20:31 38
10	07:25	13:41 (2) 07:02	13:00 (2) 06:20	12:31 (2) 06:28	13:45 (2) 05:45	14:49 (2) 05:24
	16:47 104	16:15 (3) 17:24 158	16:04 (3) 17:58 196	15:47 (2) 19:33 174	16:39 (2) 20:05 88	16:17 (2) 20:32 38
11	07:25	13:41 (2) 07:00	12:58 (2) 06:19	12:32 (2) 06:27	13:47 (2) 05:44	14:50 (2) 05:24
	16:48 108	16:17 (3) 17:26 154	15:32 (2) 17:59 196	15:48 (2) 19:34 170	16:37 (2) 20:06 86	16:16 (2) 20:32 36
12	07:25	13:39 (2) 06:59	12:57 (2) 06:17	12:30 (2) 06:25	13:50 (2) 05:43	14:53 (2) 05:24
	16:49 112	16:17 (3) 17:27 156	15:33 (2) 18:01 198	15:48 (2) 19:35 168	16:38 (2) 20:07 82	16:15 (2) 20:33 36
13	07:24	13:36 (2) 06:58	12:56 (2) 06:15	12:30 (2) 06:23	13:52 (2) 05:42	14:54 (2) 05:23
	16:50 118	16:18 (3) 17:28 158	15:34 (2) 18:02 196	15:46 (2) 19:36 164	16:36 (2) 20:08 82	16:16 (2) 20:33 36
14	07:24	13:36 (2) 06:57	12:54 (2) 06:14	12:29 (2) 06:22	13:56 (2) 05:41	14:55 (2) 05:23
	16:51 120	16:18 (3) 17:29 162	15:36 (2) 18:03 198	15:47 (2) 19:37 160	16:36 (2) 20:09 80	16:15 (2) 20:34 34
15	07:24	13:33 (2) 06:55	12:53 (2) 06:12	12:29 (2) 06:20	13:59 (2) 05:40	14:56 (2) 05:23
	16:52 126	16:19 (3) 17:31 164	15:37 (2) 18:04 198	15:47 (2) 19:38 156	16:35 (2) 20:10 78	16:14 (2) 20:34 34
16	07:23	13:33 (2) 06:54	12:54 (2) 06:10	12:27 (2) 06:19	14:01 (2) 05:39	14:57 (2) 05:23
	16:53 128	16:19 (3) 17:32 164	15:38 (2) 18:05 200	15:47 (2) 19:39 152	16:33 (2) 20:11 76	16:13 (2) 20:35 34
17	07:23	13:30 (2) 06:53	12:52 (2) 06:09	12:27 (2) 06:17	14:04 (2) 05:38	14:58 (2) 05:23
	16:54 134	16:20 (3) 17:33 166	15:38 (2) 18:06 200	15:47 (2) 19:40 150	16:34 (2) 20:12 74	16:12 (2) 20:35 34
18	07:22	13:30 (2) 06:51	12:51 (2) 06:07	12:28 (2) 06:15	14:08 (2) 05:37	15:00 (2) 05:23
	16:56 136	16:20 (3) 17:34 168	15:39 (2) 18:07 200	15:48 (2) 19:41 144	16:32 (2) 20:13 72	16:12 (2) 20:35 34
19	07:22	13:29 (2) 06:50	12:49 (2) 06:05	12:26 (2) 06:14	14:11 (2) 05:36	15:01 (2) 05:24
	16:57 138	16:21 (3) 17:36 170	15:39 (2) 18:09 200	15:46 (2) 19:43 142	16:33 (2) 20:14 70	16:11 (2) 20:36 32
20	07:21	13:26 (2) 06:48	12:48 (2) 06:04	12:26 (2) 06:12	14:13 (2) 05:35	15:02 (2) 05:24
	16:58 144	16:20 (3) 17:37 172	15:40 (2) 18:10 200	15:46 (2) 19:44 138	16:31 (2) 20:15 68	16:10 (2) 20:36 32
21	07:21	13:26 (2) 06:47	12:46 (2) 06:02	12:25 (2) 06:11	14:16 (2) 05:34	15:03 (2) 05:24
	16:59 146	16:22 (3) 17:38 174	15:40 (2) 18:11 202	15:47 (2) 19:45 136	16:32 (2) 20:16 66	16:09 (2) 20:36 32
22	07:20	13:23 (2) 06:46	12:47 (2) 06:00	12:25 (2) 06:09	14:18 (2) 05:33	15:04 (2) 05:24
	17:00 148	16:21 (3) 17:39 174	15:41 (2) 18:12 202	15:47 (2) 19:46 132	16:30 (2) 20:17 66	16:10 (2) 20:37 32
23	07:19	13:22 (2) 06:44	12:45 (2) 05:58	12:25 (2) 06:08	14:19 (2) 05:33	15:06 (2) 05:24
	17:02 154	16:22 (3) 17:41 176	15:41 (2) 18:13 200	15:45 (2) 19:47 130	16:29 (2) 20:18 64	16:10 (2) 20:37 32
24	07:19	13:21 (2) 06:43	12:44 (2) 05:57	12:25 (2) 06:06	14:21 (2) 05:32	15:07 (2) 05:25
	17:03 154	16:21 (3) 17:42 178	15:42 (2) 18:14 200	15:45 (2) 19:48 128	16:29 (2) 20:19 62	16:09 (2) 20:37 34
25	07:18	13:21 (2) 06:41	12:42 (2) 05:55	12:26 (2) 06:05	14:24 (2) 05:31	15:08 (2) 05:25
	17:04 158	16:23 (3) 17:43 180	15:42 (2) 18:15 200	15:46 (2) 19:49 124	16:28 (2) 20:20 60	16:08 (2) 20:37 34
26	07:17	13:18 (2) 06:40	12:43 (2) 05:53	12:24 (2) 06:03	14:27 (2) 05:30	15:10 (2) 05:25
	17:05 160	16:22 (3) 17:44 182	15:45 (2) 18:16 200	15:44 (2) 19:50 120	16:27 (2) 20:21 58	16:08 (2) 20:37 34
27	07:16	13:17 (2) 06:38	12:41 (2) 05:52	12:24 (2) 06:02	14:27 (2) 05:30	15:09 (2) 05:25
	17:07 162	16:21 (3) 17:45 184	15:45 (2) 18:17 200	15:44 (2) 19:51 120	16:27 (2) 20:22 58	16:07 (2) 20:37 34
28	07:15	13:16 (2) 06:36	12:40 (2) 05:50	12:25 (2) 06:01	14:30 (2) 05:29	15:11 (2) 05:26
	17:08 164	16:22 (3) 17:47 186	15:46 (2) 18:18 200	15:45 (2) 19:52 116	16:26 (2) 20:23 56	16:07 (2) 20:37 34
29	07:14	13:15 (2) 06:35	12:39 (2) 05:49	12:24 (2) 06:00	14:33 (2) 05:28	15:12 (2) 05:26
	17:09 166	16:21 (3) 17:48 188	15:46 (2) 18:19 200	15:46 (2) 19:53 112	16:25 (2) 20:24 54	16:06 (2) 20:37 36
30	07:14	13:14 (2) 06:34	12:38 (2) 05:48	12:23 (2) 05:59	14:36 (2) 05:27	15:13 (2) 05:26
	17:10 166	16:20 (3) 17:49 190	15:46 (2) 18:20 200	15:46 (2) 19:54 108	16:25 (2) 20:25 52	16:05 (2) 20:37 36
31	07:13	13:11 (2) 06:33	12:37 (2) 05:47	12:22 (2) 05:58	14:39 (2) 05:26	15:14 (2) 05:27
	17:12 172	16:21 (3) 17:50 192	15:46 (2) 18:21 200	15:46 (2) 19:55 104	16:25 (2) 20:26 50	16:04 (2) 20:37 36
Potential sun hours	296	296	369	399	450	454
Total, worst case	3798	4772	6092	4636	2396	1110

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:  
**OMBRA**

Printed/Page  
24/04/2020 08:06 / 11

Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** G - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

**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

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

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

	July	August	September	October	November	December
1	05:27 20:37	15:28 (2) 05:52	05:02 (2) 06:23	13:46 (2) 06:54	13:08 (2) 06:29	12:29 (2) 07:05
2	05:28 20:37	15:27 (2) 05:53	15:01 (2) 06:24	13:43 (2) 06:55	13:10 (2) 06:31	12:31 (2) 07:06
3	05:28 20:37	15:27 (2) 05:54	15:00 (2) 06:25	13:38 (2) 06:56	13:09 (2) 06:32	12:32 (2) 07:07
4	05:29 20:36	16:05 (2) 20:16	16:27 (2) 19:32	174 16:37 (2)	184 16:32 (2)	196 16:26 (2)
5	05:29 20:36	15:26 (2) 05:55	14:57 (2) 06:26	13:35 (2) 06:57	13:10 (2) 06:33	12:33 (2) 07:08
6	05:30 20:36	16:06 (2) 20:14	16:29 (2) 19:28	180 16:35 (2)	194 16:24 (2)	172 16:51
7	05:31 20:36	15:26 (2) 05:56	14:56 (2) 06:27	13:32 (2) 06:59	13:09 (2) 06:34	12:34 (2) 07:09
8	05:31 20:35	16:06 (2) 20:13	16:30 (2) 19:27	184 16:36 (2)	196 16:25 (2)	174 16:49
9	05:32 20:35	15:25 (2) 05:57	14:55 (2) 06:28	13:29 (2) 07:00	13:10 (2) 06:35	12:36 (2) 07:10
10	05:33 20:35	16:07 (2) 20:12	16:29 (2) 19:25	186 16:35 (2)	194 16:24 (2)	174 16:48
11	05:33 20:34	15:25 (2) 05:58	14:54 (2) 06:29	13:28 (2) 07:01	13:11 (2) 06:37	12:37 (2) 07:11
12	05:34 20:34	16:07 (2) 20:10	16:30 (2) 19:23	188 16:36 (2)	192 16:23 (2)	176 16:47
13	05:35 20:33	15:24 (2) 05:59	14:51 (2) 06:30	13:25 (2) 07:02	13:10 (2) 06:38	12:38 (2) 07:12
14	05:35 20:33	16:08 (2) 20:09	16:31 (2) 19:22	190 16:35 (2)	192 16:22 (2)	172 16:46
15	05:36 20:32	15:25 (2) 06:00	14:50 (2) 06:31	13:24 (2) 07:03	13:11 (2) 06:39	12:40 (2) 07:13
16	05:37 20:31	16:09 (2) 20:08	16:32 (2) 19:20	192 16:36 (2)	190 16:21 (2)	172 16:45
17	05:38 20:31	15:23 (2) 06:01	14:47 (2) 06:33	13:21 (2) 07:04	13:10 (2) 06:40	12:41 (2) 07:14
18	05:39 20:30	16:11 (2) 20:06	16:31 (2) 19:18	194 16:35 (2)	190 16:20 (2)	172 16:44
19	05:40 20:29	15:22 (2) 06:02	14:46 (2) 06:34	13:20 (2) 07:05	13:11 (2) 06:42	12:42 (2) 07:15
20	05:41 20:29	16:12 (2) 20:05	16:32 (2) 19:17	194 16:34 (2)	188 16:19 (2)	172 16:43
21	05:42 20:28	15:23 (2) 06:03	14:43 (2) 06:35	13:19 (2) 07:06	13:13 (2) 06:43	12:46 (2) 07:15
22	05:43 20:27	16:13 (2) 20:04	16:33 (2) 19:15	196 16:35 (2)	186 16:19 (2)	166 16:42
23	05:44 20:27	15:22 (2) 06:04	14:42 (2) 06:36	13:18 (2) 07:07	13:12 (2) 06:44	12:47 (2) 07:16
24	05:45 20:26	16:14 (2) 20:02	16:34 (2) 19:13	196 16:34 (2)	186 16:18 (2)	166 16:41
25	05:46 20:25	15:20 (2) 06:05	14:39 (2) 06:37	13:15 (2) 07:08	13:13 (2) 06:45	12:48 (2) 07:17
26	05:47 20:24	16:14 (2) 20:01	16:33 (2) 19:11	200 16:35 (2)	184 16:17 (2)	164 16:40
27	05:48 20:23	15:21 (2) 06:06	14:38 (2) 06:38	13:14 (2) 07:10	13:14 (2) 06:46	12:50 (2) 07:18
28	05:49 20:22	16:15 (2) 20:00	16:34 (2) 19:10	200 16:34 (2)	182 16:16 (2)	162 16:39
29	05:50 20:21	15:22 (2) 06:07	14:35 (2) 06:39	13:15 (2) 07:11	13:15 (2) 06:48	12:51 (2) 07:19
30	05:51 20:20	16:16 (2) 19:58	16:35 (2) 19:08	198 16:33 (2)	180 16:15 (2)	160 16:38
31	05:52 20:19	15:19 (2) 06:08	14:32 (2) 06:40	13:14 (2) 07:12	13:14 (2) 06:49	12:54 (2) 07:19
Potential sun hours	461	429	375	345	296	286
Total, worst case	1772	3774	5820	5556	4614	1716

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:  
OMBRA

Printed/Page  
24/04/2020 08:06 / 12

Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** H - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

**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

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

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

	January	February	March	April	May	June										
1	07:26 16:38	14:34 (3) 15:18 (3)	07:12 17:13	92	09:04 (2) 10:36 (2)	06:35 17:48	08:26 (2) 11:18 (2)	06:43 19:23	188	09:08 (2) 12:16 (2)	05:56 19:56	118	09:10 (2) 11:08 (2)	05:27 20:26	64	09:27 (2) 10:31 (2)
2	07:26 16:39	14:34 (3) 15:18 (3)	07:11 17:14	98	09:01 (2) 10:39 (2)	06:33 17:49	08:26 (2) 11:18 (2)	06:41 19:24	186	09:08 (2) 12:14 (2)	05:55 19:57	114	09:11 (2) 11:05 (2)	05:26 20:27	62	09:28 (2) 10:30 (2)
3	07:26 16:40	14:34 (3) 15:18 (3)	07:10 17:15	100	09:00 (2) 10:40 (2)	06:32 17:50	08:25 (2) 11:19 (2)	06:40 19:25	184	09:08 (2) 12:12 (2)	05:54 19:58	114	09:09 (2) 11:03 (2)	05:26 20:27	60	09:30 (2) 10:30 (2)
4	07:26 16:41	14:36 (3) 15:18 (3)	07:09 17:17	104	08:59 (2) 10:43 (2)	06:30 17:51	08:25 (2) 11:19 (2)	06:38 19:26	184	09:07 (2) 12:11 (2)	05:53 19:59	112	09:10 (2) 11:02 (2)	05:26 20:28	60	09:29 (2) 10:29 (2)
5	07:26 16:42	14:36 (3) 15:18 (3)	07:08 17:18	108	08:56 (2) 10:44 (2)	06:29 17:53	08:24 (2) 11:20 (2)	06:36 19:27	182	09:07 (2) 12:09 (2)	05:51 20:00	110	09:11 (2) 11:01 (2)	05:25 20:29	58	09:31 (2) 10:29 (2)
6	07:26 16:43	14:38 (3) 15:18 (3)	07:06 17:19	112	08:54 (2) 10:46 (2)	06:27 17:54	08:22 (2) 11:20 (2)	06:35 19:28	180	09:07 (2) 12:07 (2)	05:50 20:01	106	09:12 (2) 10:58 (2)	05:25 20:29	58	09:32 (2) 10:29 (2)
7	07:26 16:44	14:38 (3) 15:18 (3)	07:05 17:21	116	08:53 (2) 10:49 (2)	06:25 17:55	08:22 (2) 11:20 (2)	06:33 19:29	180	09:06 (2) 12:06 (2)	05:49 20:02	104	09:13 (2) 10:57 (2)	05:25 20:30	58	09:32 (2) 10:29 (2)
8	07:26 16:45	14:38 (3) 15:18 (3)	07:04 17:22	118	08:52 (2) 10:50 (2)	06:24 17:56	08:21 (2) 11:21 (2)	06:31 19:31	178	09:06 (2) 12:04 (2)	05:48 20:03	104	09:12 (2) 10:56 (2)	05:24 20:31	56	09:32 (2) 10:28 (2)
9	07:25 16:46	14:40 (3) 15:18 (3)	07:03 17:23	122	08:51 (2) 10:53 (2)	06:22 17:57	08:21 (2) 11:23 (2)	06:30 19:32	174	09:06 (2) 12:00 (2)	05:46 20:04	102	09:12 (2) 10:54 (2)	05:24 20:31	56	09:32 (2) 10:28 (2)
10	07:25 16:47	14:39 (3) 15:19 (3)	07:02 17:24	124	08:50 (2) 10:54 (2)	06:20 17:58	08:19 (2) 11:23 (2)	06:28 19:33	172	09:07 (2) 11:59 (2)	05:45 20:05	100	09:13 (2) 10:53 (2)	05:24 20:32	54	09:34 (2) 10:28 (2)
11	07:25 16:48	14:41 (3) 15:19 (3)	07:00 17:26	128	08:48 (2) 10:56 (2)	06:19 17:59	08:20 (2) 11:24 (2)	06:27 19:34	168	09:07 (2) 11:55 (2)	05:44 20:06	96	09:14 (2) 10:50 (2)	05:24 20:32	54	09:34 (2) 10:28 (2)
12	07:25 16:49	14:41 (3) 15:19 (3)	06:59 17:27	132	08:45 (2) 10:57 (2)	06:17 18:01	08:18 (2) 11:24 (2)	06:25 19:35	168	09:06 (2) 11:54 (2)	05:43 20:07	94	09:15 (2) 10:49 (2)	05:24 20:33	54	09:34 (2) 10:28 (2)
13	07:24 16:50	14:42 (3) 15:18 (3)	06:58 17:28	136	08:44 (2) 11:00 (2)	06:15 18:02	08:18 (2) 11:24 (2)	06:23 19:36	164	09:06 (2) 11:50 (2)	05:42 20:08	94	09:14 (2) 10:48 (2)	05:23 20:33	54	09:34 (2) 10:28 (2)
14	07:24 16:51	14:44 (3) 15:18 (3)	06:57 17:29	136	08:44 (2) 11:00 (2)	06:14 18:03	08:17 (2) 11:25 (2)	06:22 19:37	162	09:06 (2) 11:48 (2)	05:41 20:09	92	09:15 (2) 10:47 (2)	05:23 20:34	52	09:36 (2) 10:28 (2)
15	07:24 16:52	14:43 (3) 15:17 (3)	06:55 17:31	138	08:43 (2) 11:01 (2)	06:12 18:04	08:17 (2) 11:23 (2)	06:20 19:38	158	09:07 (2) 11:45 (2)	05:40 20:10	90	09:16 (2) 10:46 (2)	05:23 20:34	52	09:36 (2) 10:28 (2)
16	07:23 16:53	14:43 (3) 15:17 (3)	06:54 17:32	142	08:42 (2) 11:04 (2)	06:10 18:05	08:16 (2) 11:23 (2)	06:19 19:39	156	09:05 (2) 11:41 (2)	05:39 20:11	88	09:17 (2) 10:45 (2)	05:23 20:35	52	09:36 (2) 10:28 (2)
17	07:23 16:54	14:46 (3) 15:18 (3)	06:53 17:33	144	08:40 (2) 11:04 (2)	06:09 18:06	08:15 (2) 11:23 (2)	06:17 19:40	154	09:06 (2) 11:40 (2)	05:38 20:12	86	09:18 (2) 10:44 (2)	05:23 20:35	52	09:36 (2) 10:28 (2)
18	07:22 16:56	14:48 (3) 15:18 (3)	06:51 17:34	148	08:39 (2) 11:07 (2)	06:07 18:07	08:14 (2) 11:24 (2)	06:15 19:41	150	09:06 (2) 11:36 (2)	05:37 20:13	84	09:18 (2) 10:42 (2)	05:23 20:35	52	09:36 (2) 10:28 (2)
19	07:22 16:57	14:47 (3) 15:17 (3)	06:50 17:36	150	08:37 (2) 11:07 (2)	06:05 18:09	08:14 (2) 11:24 (2)	06:14 19:43	148	09:07 (2) 11:35 (2)	05:36 20:14	82	09:19 (2) 10:41 (2)	05:24 20:36	52	09:36 (2) 10:28 (2)
20	07:21 16:58	14:48 (3) 15:16 (3)	06:48 17:37	152	08:36 (2) 11:08 (2)	06:04 18:10	08:12 (2) 11:24 (2)	06:12 19:44	144	09:07 (2) 11:31 (2)	05:35 20:15	80	09:20 (2) 10:40 (2)	05:24 20:36	52	09:36 (2) 10:28 (2)
21	07:21 16:59	09:36 (2) 15:16 (3)	06:47 17:38	156	08:34 (2) 11:10 (2)	06:02 18:11	08:13 (2) 11:25 (2)	06:11 19:45	144	09:06 (2) 11:30 (2)	05:34 20:16	80	09:19 (2) 10:39 (2)	05:24 20:36	52	09:37 (2) 10:29 (2)
22	07:20 17:00	09:31 (2) 15:17 (3)	06:46 17:39	156	08:35 (2) 11:11 (2)	06:00 18:12	08:13 (2) 11:23 (2)	06:09 19:46	140	09:06 (2) 11:26 (2)	05:33 20:17	78	09:20 (2) 10:38 (2)	05:24 20:37	52	09:37 (2) 10:29 (2)
23	07:19 17:02	09:26 (2) 15:16 (3)	06:44 17:41	158	08:33 (2) 11:11 (2)	05:58 18:13	08:11 (2) 11:23 (2)	06:08 19:47	138	09:07 (2) 11:25 (2)	05:33 20:18	76	09:22 (2) 10:38 (2)	05:24 20:37	52	09:37 (2) 10:29 (2)
24	07:19 17:03	09:21 (2) 15:15 (3)	06:43 17:42	160	08:32 (2) 11:12 (2)	05:57 18:14	08:11 (2) 11:23 (2)	06:06 19:48	134	09:07 (2) 11:21 (2)	05:32 20:19	74	09:23 (2) 10:37 (2)	05:25 20:37	52	09:37 (2) 10:29 (2)
25	07:18 17:04	09:19 (2) 15:15 (3)	06:41 17:43	164	08:30 (2) 11:14 (2)	05:55 18:15	08:10 (2) 11:22 (2)	06:05 19:49	132	09:08 (2) 11:20 (2)	05:31 20:20	74	09:22 (2) 10:36 (2)	05:25 20:37	52	09:38 (2) 10:30 (2)
26	07:17 17:05	09:16 (2) 15:14 (3)	06:40 17:44	164	08:31 (2) 11:15 (2)	05:53 18:16	08:10 (2) 11:22 (2)	06:03 19:50	128	09:09 (2) 11:17 (2)	05:30 20:21	72	09:24 (2) 10:36 (2)	05:25 20:37	52	09:38 (2) 10:30 (2)
27	07:16 17:07	09:13 (2) 15:13 (3)	06:38 17:45	166	08:29 (2) 11:15 (2)	05:52 18:17	08:10 (2) 11:20 (2)	06:02 19:51	128	09:07 (2) 11:15 (2)	05:30 20:22	70	09:25 (2) 10:35 (2)	05:25 20:37	52	09:38 (2) 10:30 (2)
28	07:15 17:08	09:12 (2) 15:14 (3)	06:36 17:47	168	08:28 (2) 11:16 (2)	05:50 18:18	08:09 (2) 11:21 (2)	06:01 19:52	126	09:08 (2) 11:14 (2)	05:29 20:23	70	09:26 (2) 10:35 (2)	05:26 20:37	52	09:39 (2) 10:31 (2)
29	07:14 17:09	09:09 (2) 15:13 (3)	06:48 17:48	190	06:48 19:20	09:09 (2) 12:19 (2)	05:59 19:53	122	09:09 (2) 11:11 (2)	05:29 20:23	68	09:27 (2) 10:34 (2)	05:26 20:37	54	09:39 (2) 10:31 (2)	
30	07:14 17:10	09:06 (2) 15:14 (3)	06:47 17:49	190	06:47 19:21	09:09 (2) 12:19 (2)	05:58 19:55	120	09:09 (2) 11:09 (2)	05:28 20:24	66	09:28 (2) 10:32 (2)	05:27 20:37	54	09:38 (2) 10:32 (2)	
31	07:13 17:12	09:05 (2) 10:33 (2)	06:45 19:22	190	06:45 19:22	09:07 (2) 12:17 (2)	05:57 19:52	120	09:09 (2) 11:09 (2)	05:27 20:25	64	09:27 (2) 10:31 (2)				
Potential sun hours	296	296	369	399	450	454										
Total, worst case	1576	3792	5750	4692	2762	1636										

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:  
**OMBRA**

Printed/Page  
24/04/2020 08:06 / 13

Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** H - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

**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

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

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

	July	August	September	October	November	December										
1	05:27 20:37	09:38 (2) 20:17	05:52 96	09:24 (2) 11:00 (2)	06:23 19:33	170	09:04 (2) 11:54 (2)	06:54 18:42	186	08:56 (2) 12:02 (2)	06:29 16:54	124	08:19 (2) 10:23 (2)	07:05 16:29	38	14:23 (3) 15:01 (3)
2	05:28 20:37	09:39 (2) 20:16	05:53 96	09:25 (2) 11:01 (2)	06:24 19:32	172	09:05 (2) 11:57 (2)	06:55 18:40	184	08:58 (2) 12:02 (2)	06:31 16:53	120	08:21 (2) 10:21 (2)	07:06 16:29	40	14:22 (3) 15:02 (3)
3	05:28 20:37	09:37 (2) 20:15	05:54 100	09:24 (2) 11:04 (2)	06:25 19:30	174	09:04 (2) 11:58 (2)	06:56 18:39	184	08:57 (2) 12:01 (2)	06:32 16:52	118	08:22 (2) 10:20 (2)	07:07 16:29	40	14:23 (3) 15:03 (3)
4	05:29 20:36	09:38 (2) 20:14	05:55 102	09:23 (2) 11:05 (2)	06:26 19:28	178	09:03 (2) 12:01 (2)	06:57 18:37	182	08:58 (2) 12:00 (2)	06:33 16:51	114	08:23 (2) 10:17 (2)	07:08 16:28	40	14:22 (3) 15:02 (3)
5	05:29 20:36	09:38 (2) 20:13	05:56 104	09:22 (2) 11:06 (2)	06:27 19:27	178	09:04 (2) 12:02 (2)	06:59 18:35	182	08:57 (2) 11:59 (2)	06:34 16:49	112	08:24 (2) 10:16 (2)	07:09 16:28	40	14:23 (3) 15:03 (3)
6	05:30 20:36	09:37 (2) 20:12	05:57 106	09:21 (2) 11:07 (2)	06:28 19:25	180	09:03 (2) 12:03 (2)	07:00 18:33	180	08:58 (2) 11:58 (2)	06:35 16:48	108	08:26 (2) 10:14 (2)	07:10 16:28	40	14:24 (3) 15:04 (3)
7	05:31 20:36	09:37 (2) 20:10	05:58 106	09:22 (2) 11:08 (2)	06:29 19:23	182	09:02 (2) 12:04 (2)	07:01 18:32	178	08:59 (2) 11:57 (2)	06:37 16:47	104	08:29 (2) 10:13 (2)	07:11 16:28	42	14:23 (3) 15:05 (3)
8	05:31 20:35	09:36 (2) 20:09	05:59 110	09:21 (2) 11:11 (2)	06:30 19:22	184	09:01 (2) 12:05 (2)	07:02 18:30	178	08:58 (2) 11:56 (2)	06:38 16:46	100	08:30 (2) 10:10 (2)	07:12 16:28	42	14:24 (3) 15:06 (3)
9	05:32 20:35	09:37 (2) 20:08	06:00 112	09:20 (2) 11:12 (2)	06:32 19:20	184	09:02 (2) 12:06 (2)	07:03 18:28	176	08:59 (2) 11:55 (2)	06:39 16:45	96	08:32 (2) 10:08 (2)	07:13 16:28	42	14:25 (3) 15:07 (3)
10	05:33 20:35	09:35 (2) 20:07	06:01 114	09:19 (2) 11:13 (2)	06:33 19:18	186	09:01 (2) 12:07 (2)	07:04 18:27	176	08:58 (2) 11:54 (2)	06:40 16:44	92	08:35 (2) 10:07 (2)	07:14 16:28	44	14:24 (3) 15:08 (3)
11	05:33 20:34	09:36 (2) 20:05	06:02 116	09:18 (2) 11:14 (2)	06:34 19:17	188	09:00 (2) 12:08 (2)	07:05 18:25	172	08:59 (2) 11:51 (2)	06:42 16:43	88	08:36 (2) 10:04 (2)	07:15 16:28	44	14:25 (3) 15:09 (3)
12	05:34 20:34	09:35 (2) 20:04	06:03 120	09:17 (2) 11:17 (2)	06:35 19:15	188	09:01 (2) 12:09 (2)	07:06 18:24	170	09:01 (2) 11:51 (2)	06:43 16:42	86	08:40 (2) 10:02 (2)	07:15 16:28	44	14:26 (3) 15:10 (3)
13	05:35 20:33	09:36 (2) 20:02	06:04 120	09:18 (2) 11:18 (2)	06:36 19:13	190	09:00 (2) 12:10 (2)	07:07 18:22	170	09:00 (2) 11:50 (2)	06:44 16:41	88	08:41 (2) 10:03 (2)	07:16 16:28	46	14:24 (3) 15:10 (3)
14	05:35 20:33	09:34 (2) 20:01	06:05 122	09:17 (2) 11:19 (2)	06:37 19:11	190	08:59 (2) 12:09 (2)	07:08 18:20	168	09:01 (2) 11:49 (2)	06:45 16:40	86	08:44 (2) 10:03 (2)	07:17 16:28	46	14:25 (3) 15:11 (3)
15	05:36 20:32	09:33 (2) 20:00	06:06 126	09:16 (2) 11:22 (2)	06:38 19:10	190	09:00 (2) 12:10 (2)	07:10 18:19	166	09:02 (2) 11:48 (2)	06:46 16:39	84	08:46 (2) 10:03 (2)	07:18 16:29	44	14:26 (3) 15:10 (3)
16	05:37 20:31	09:34 (2) 19:58	06:07 128	09:15 (2) 11:23 (2)	06:39 19:08	190	08:59 (2) 12:09 (2)	07:11 18:17	164	09:01 (2) 11:45 (2)	06:48 16:38	80	08:49 (2) 10:03 (2)	07:19 16:29	44	14:27 (3) 15:11 (3)
17	05:38 20:31	09:33 (2) 19:57	06:08 130	09:14 (2) 11:24 (2)	06:40 19:06	192	08:58 (2) 12:10 (2)	07:12 18:16	162	09:03 (2) 11:45 (2)	06:49 16:37	76	08:52 (2) 10:04 (2)	07:19 16:29	44	14:27 (3) 15:11 (3)
18	05:39 20:30	09:34 (2) 19:55	06:09 132	09:15 (2) 11:27 (2)	06:41 19:04	190	08:59 (2) 12:09 (2)	07:13 18:14	160	09:04 (2) 11:44 (2)	06:50 16:37	72	08:55 (2) 10:04 (2)	07:20 16:29	44	14:28 (3) 15:12 (3)
19	05:40 20:29	09:32 (2) 19:54	06:10 134	09:14 (2) 11:28 (2)	06:42 19:03	192	08:58 (2) 12:10 (2)	07:14 18:13	158	09:05 (2) 11:43 (2)	06:51 16:36	66	09:01 (2) 10:05 (2)	07:21 16:30	44	14:28 (3) 15:12 (3)
20	05:40 20:29	09:31 (2) 19:52	06:11 138	09:13 (2) 11:31 (2)	06:43 19:01	192	08:57 (2) 12:09 (2)	07:15 18:11	156	09:04 (2) 11:40 (2)	06:52 16:35	58	09:06 (2) 10:06 (2)	07:21 16:30	44	14:29 (3) 15:13 (3)
21	05:41 20:28	09:32 (2) 19:51	06:12 140	09:12 (2) 11:32 (2)	06:44 18:59	190	08:58 (2) 12:08 (2)	07:16 18:10	154	09:05 (2) 11:39 (2)	06:54 16:34	46	09:11 (2) 10:07 (2)	07:22 16:31	44	14:30 (3) 15:14 (3)
22	05:42 20:27	09:31 (2) 19:49	06:13 144	09:11 (2) 11:35 (2)	06:45 18:57	192	08:57 (2) 12:09 (2)	07:18 18:08	152	09:07 (2) 11:39 (2)	06:55 16:34	28	09:12 (2) 10:08 (2)	07:23 16:31	44	14:30 (3) 15:14 (3)
23	05:43 20:26	09:30 (2) 19:48	06:14 144	09:11 (2) 11:35 (2)	06:46 18:56	190	08:58 (2) 12:08 (2)	07:19 18:07	148	09:08 (2) 11:36 (2)	06:56 16:33	30	09:13 (2) 10:09 (2)	07:24 16:32	44	14:30 (3) 15:14 (3)
24	05:44 20:25	09:29 (2) 19:46	06:15 148	09:10 (2) 11:38 (2)	06:47 18:54	190	08:57 (2) 12:07 (2)	07:20 18:05	146	09:09 (2) 11:35 (2)	06:57 16:32	30	09:14 (2) 10:10 (2)	07:25 16:32	44	14:31 (3) 15:15 (3)
25	05:45 20:24	09:30 (2) 19:45	06:16 150	09:09 (2) 11:39 (2)	06:48 18:52	190	08:56 (2) 12:06 (2)	07:21 17:04	144	08:10 (2) 10:34 (2)	06:58 16:32	32	09:15 (2) 10:11 (2)	07:24 16:33	44	14:31 (3) 15:15 (3)
26	05:46 20:24	09:28 (2) 19:43	06:17 154	09:08 (2) 11:42 (2)	06:49 18:51	190	08:57 (2) 12:07 (2)	07:22 17:02	140	08:12 (2) 10:32 (2)	06:59 16:31	32	09:16 (2) 10:12 (2)	07:24 16:33	44	14:31 (3) 15:15 (3)
27	05:47 20:23	09:27 (2) 19:42	06:18 156	09:07 (2) 11:43 (2)	06:50 18:49	190	08:56 (2) 12:06 (2)	07:23 17:01	138	08:13 (2) 10:31 (2)	07:01 16:31	34	09:17 (2) 10:13 (2)	07:24 16:34	44	14:32 (3) 15:16 (3)
28	05:48 20:22	09:26 (2) 19:40	06:19 158	09:08 (2) 11:46 (2)	06:51 18:47	188	08:57 (2) 12:05 (2)	07:24 17:00	136	08:14 (2) 10:30 (2)	07:02 16:30	34	09:18 (2) 10:14 (2)	07:25 16:35	44	14:32 (3) 15:16 (3)
29	05:49 20:21	09:27 (2) 19:38	06:20 162	09:07 (2) 11:49 (2)	06:52 18:45	188	08:56 (2) 12:04 (2)	07:25 16:58	134	08:13 (2) 10:27 (2)	07:03 16:30	36	09:19 (2) 10:15 (2)	07:25 16:35	46	14:32 (3) 15:18 (3)
30	05:50 20:20	09:26 (2) 19:37	06:21 164	09:06 (2) 11:50 (2)	06:53 18:44	186	08:57 (2) 12:03 (2)	07:26 16:57	132	08:15 (2) 10:27 (2)	07:04 16:30	38	09:20 (2) 10:16 (2)	07:25 16:36	46	14:32 (3) 15:18 (3)
31	05:51 20:18	09:25 (2) 19:35	06:22 168	09:05 (2) 11:53 (2)	06:54 18:43	186	08:58 (2) 12:02 (2)	07:27 16:56	126	08:18 (2) 10:24 (2)	07:05 16:30	38	09:21 (2) 10:17 (2)	07:25 16:37	44	14:33 (3) 15:18 (3)
Potential sun hours	461	429	375	345	296	2212	1340									
Total, worst case	2204	4000	5584	5002	2212	1340										

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:  
OMBRA

Printed/Page  
24/04/2020 08:06 / 14

Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: I - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:38	07:12 17:13	06:35 17:48	06:43 19:23	05:56 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	05:26 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 17:15	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	06:26 19:28	06:57 18:37	06:33 16:51	07:08 16:28
5	07:26 16:42	07:08 17:18	06:29 17:53	06:36 19:27	05:51 20:00	05:25 20:29	05:29 20:36	05:56 20:13	06:27 19:27	06:59 18:35	06:34 16:49	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	06:28 19:25	07:00 18:33	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	06:29 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	06:31 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	05:46 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 17:24	06:20 17:58	06:28 19:33	05:45 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	07:00 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	05:23 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 17:29	06:14 18:03	06:22 19:37	05:41 20:09	05:23 20:34	05:36 20:33	06:05 20:01	06:37 19:11	07:08 18:20	06:45 16:40	07:17 16:28
15	07:24 16:52	06:55 17:31	06:12 18:04	06:20 19:38	05:40 20:10	05:23 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	05:23 20:35	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	06:48 16:38	07:19 16:29
17	07:23 16:54	06:53 17:33	06:09 18:06	06:17 19:40	05:38 20:12	05:23 20:35	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	06:49 16:37	07:19 16:29
18	07:22 16:56	06:51 17:34	06:07 18:07	06:15 19:41	05:37 20:13	05:23 20:35	05:39 20:30	06:09 19:55	06:41 19:04	07:13 18:14	06:50 16:37	07:20 16:29
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	07:21 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	05:40 20:29	06:11 19:52	06:43 19:01	07:15 18:11	06:53 16:35	07:21 16:30
21	07:21 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:34 20:16	05:24 20:36	05:41 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 17:00	06:46 17:39	06:00 18:12	06:09 19:46	05:33 20:17	05:24 20:37	05:42 20:27	06:13 19:49	06:45 18:57	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	07:19 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 16:32	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	07:21 17:04	06:58 16:32	07:24 16:33
26	07:17 17:05	06:40 17:44	05:53 18:16	06:03 19:50	05:30 20:21	05:25 20:37	05:46 20:24	06:17 19:43	06:49 18:51	07:22 17:02	07:00 16:31	07:24 16:33
27	07:16 17:07	06:38 17:45	05:52 18:17	06:02 19:51	05:30 20:22	05:26 20:37	05:47 20:23	06:18 19:42	06:50 18:49	07:23 17:01	07:01 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 20:23	05:26 20:37	05:48 20:22	06:19 19:40	06:51 18:47	07:24 17:00	07:02 16:30	07:25 16:35
29	07:14 17:09		06:48 19:20	05:59 19:53	05:29 20:23	05:26 20:37	05:49 20:21	06:20 19:38	06:52 18:45	07:25 16:58	07:03 16:30	07:25 16:36
30	07:14 17:10		06:47 19:21	05:58 19:55	05:28 20:24	05:27 20:37	05:50 20:20	06:21 19:37	06:53 18:44	07:26 16:57	07:04 16:30	07:25 16:36
31	07:13 17:12		06:45 19:22		05:27 20:25		05:51 20:19	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	296	286
Total, worst case												

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:  
**OMBRA**

Printed/Page  
24/04/2020 08:06 / 15

Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: J - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:38	15:44 (5) 07:12	15:36 (4) 06:35	06:43 05:56	05:56 05:27	05:27 05:27	05:27 05:52	05:52 06:23	06:23 06:54	06:54 06:29	15:05 (4) 07:05	07:05 15:27 (5)
2	07:26 16:39	15:44 (5) 07:11	15:35 (4) 06:33	06:41 05:55	05:55 05:26	05:26 05:28	05:28 05:53	05:53 06:24	06:24 06:55	06:55 06:31	15:05 (4) 07:06	07:06 15:28 (5)
3	07:26 16:40	15:44 (5) 07:10	15:34 (4) 06:32	06:40 05:54	05:54 05:26	05:26 05:28	05:28 05:54	05:54 06:25	06:25 06:56	06:56 06:32	15:04 (4) 07:07	07:07 15:29 (5)
4	07:26 16:41	15:44 (5) 07:09	15:33 (4) 06:30	06:38 05:53	05:53 05:26	05:26 05:29	05:29 05:55	05:55 06:26	06:26 06:57	06:57 06:33	15:03 (4) 07:08	07:08 15:30 (5)
5	07:26 16:42	15:44 (5) 07:08	15:32 (4) 06:29	06:36 05:51	05:51 05:25	05:25 05:29	05:29 05:56	05:56 06:27	06:27 06:59	06:59 06:34	15:02 (4) 07:09	07:09 15:31 (5)
6	07:26 16:43	15:44 (5) 07:06	15:32 (4) 06:27	06:35 05:50	05:50 05:25	05:25 05:30	05:30 05:57	05:57 06:28	06:28 07:00	07:00 06:35	15:02 (4) 07:10	07:10 15:30 (5)
7	07:26 16:44	15:46 (5) 07:04	15:33 (4) 06:25	06:33 05:49	05:49 05:25	05:25 05:31	05:31 05:58	05:58 06:29	06:29 07:01	07:01 06:37	15:03 (4) 07:11	07:11 15:31 (5)
8	07:26 16:45	15:46 (5) 07:03	15:34 (4) 06:24	06:31 05:48	05:48 05:24	05:24 05:31	05:31 05:59	05:59 06:31	06:31 07:02	07:02 06:38	15:04 (4) 07:12	07:12 15:32 (5)
9	07:25 16:46	15:46 (5) 07:03	15:35 (4) 06:22	06:30 05:46	05:46 05:24	05:24 05:32	05:32 06:00	06:00 06:32	06:32 07:03	07:03 06:39	15:06 (4) 07:13	07:13 15:33 (5)
10	07:25 16:47	15:45 (5) 07:02	15:38 (4) 06:20	06:28 05:45	05:45 05:24	05:24 05:33	05:33 06:01	06:01 06:33	06:33 07:04	07:04 06:40	15:07 (4) 07:14	07:14 15:34 (5)
11	07:25 16:48	15:45 (5) 07:00	15:38 (4) 06:19	06:27 05:44	05:44 05:24	05:24 05:33	05:33 06:02	06:02 06:34	06:34 07:05	07:05 06:42	15:08 (4) 07:15	07:15 15:35 (5)
12	07:25 16:49	15:45 (5) 06:59	15:39 (4) 06:17	06:25 05:43	05:43 05:24	05:24 05:34	05:34 06:03	06:03 06:35	06:35 07:06	07:06 06:43	15:08 (4) 07:15	07:15 15:36 (5)
13	07:24 16:50	15:44 (4) 06:58	15:42 (4) 06:15	06:23 05:42	05:42 05:23	05:23 05:35	05:35 06:04	06:04 06:36	06:36 07:07	07:07 06:44	15:09 (4) 07:16	07:16 15:36 (5)
14	07:24 16:51	15:44 (4) 06:57	15:42 (4) 06:14	06:22 05:41	05:41 05:23	05:23 05:36	05:36 06:05	06:05 06:37	06:37 07:08	07:08 06:45	15:10 (4) 07:17	07:17 15:37 (5)
15	07:24 16:52	15:43 (4) 06:55	15:45 (4) 06:12	06:20 05:40	05:40 05:23	05:23 05:36	05:36 06:06	06:06 06:38	06:38 07:10	07:10 06:46	15:12 (4) 07:18	07:18 15:38 (5)
16	07:23 16:53	15:45 (4) 06:54	15:45 (4) 06:10	06:19 05:39	05:39 05:23	05:23 05:37	05:37 06:07	06:07 06:39	06:39 07:11	07:11 06:48	15:13 (4) 07:19	07:19 15:39 (5)
17	07:23 16:54	15:44 (4) 06:53	15:44 (4) 06:09	06:17 05:38	05:38 05:23	05:23 05:38	05:38 06:08	06:08 06:40	06:40 07:12	07:12 06:49	15:14 (4) 07:19	07:19 15:39 (5)
18	07:22 16:56	15:44 (4) 06:51	15:44 (4) 06:07	06:15 05:37	05:37 05:23	05:23 05:39	05:39 06:09	06:09 06:41	06:41 07:13	07:13 06:50	15:15 (4) 07:20	07:20 15:40 (5)
19	07:22 16:57	15:43 (4) 06:50	15:45 (4) 06:05	06:14 05:36	05:36 05:24	05:24 05:40	05:40 06:10	06:10 06:42	06:42 07:14	07:14 06:51	15:15 (4) 07:21	07:21 15:40 (5)
20	07:21 16:58	15:42 (4) 06:48	15:46 (4) 06:04	06:12 05:35	05:35 05:24	05:24 05:40	05:40 06:11	06:11 06:43	06:43 07:15	07:15 06:52	15:16 (4) 07:21	07:21 15:41 (5)
21	07:21 16:59	15:42 (4) 06:47	15:46 (4) 06:03	06:11 05:34	05:34 05:24	05:24 05:41	05:41 06:12	06:12 06:44	06:44 07:16	07:16 06:54	15:17 (4) 07:22	07:22 15:42 (5)
22	07:20 17:00	15:41 (4) 06:46	15:47 (4) 06:02	06:11 05:34	05:34 05:24	05:24 05:41	05:41 06:12	06:12 06:44	06:44 07:16	07:16 06:54	15:17 (4) 07:22	07:22 15:42 (5)
23	07:19 17:01	15:40 (4) 06:44	15:48 (4) 06:01	06:10 05:33	05:33 05:24	05:24 05:41	05:41 06:12	06:12 06:44	06:44 07:16	07:16 06:54	15:17 (4) 07:22	07:22 15:42 (5)
24	07:19 17:03	15:40 (4) 06:43	15:48 (4) 06:01	06:10 05:33	05:33 05:24	05:24 05:41	05:41 06:12	06:12 06:44	06:44 07:16	07:16 06:54	15:17 (4) 07:22	07:22 15:42 (5)
25	07:18 17:04	15:41 (4) 06:41	15:49 (4) 06:00	06:09 05:33	05:33 05:24	05:24 05:41	05:41 06:12	06:12 06:44	06:44 07:16	07:16 06:54	15:17 (4) 07:22	07:22 15:42 (5)
26	07:17 17:05	15:40 (4) 06:40	15:49 (4) 06:00	06:09 05:33	05:33 05:24	05:24 05:41	05:41 06:12	06:12 06:44	06:44 07:16	07:16 06:54	15:17 (4) 07:22	07:22 15:42 (5)
27	07:16 17:07	15:40 (4) 06:39	15:49 (4) 06:00	06:09 05:33	05:33 05:24	05:24 05:41	05:41 06:12	06:12 06:44	06:44 07:16	07:16 06:54	15:17 (4) 07:22	07:22 15:42 (5)
28	07:15 17:08	15:39 (4) 06:38	15:49 (4) 06:00	06:09 05:33	05:33 05:24	05:24 05:41	05:41 06:12	06:12 06:44	06:44 07:16	07:16 06:54	15:17 (4) 07:22	07:22 15:42 (5)
29	07:14 17:09	15:38 (4) 06:36	15:49 (4) 06:00	06:09 05:33	05:33 05:24	05:24 05:41	05:41 06:12	06:12 06:44	06:44 07:16	07:16 06:54	15:17 (4) 07:22	07:22 15:42 (5)
30	07:14 17:10	15:37 (4) 06:35	15:49 (4) 06:00	06:09 05:33	05:33 05:24	05:24 05:41	05:41 06:12	06:12 06:44	06:44 07:16	07:16 06:54	15:17 (4) 07:22	07:22 15:42 (5)
31	07:13 17:12	15:36 (4) 06:34	15:49 (4) 06:00	06:09 05:33	05:33 05:24	05:24 05:41	05:41 06:12	06:12 06:44	06:44 07:16	07:16 06:54	15:17 (4) 07:22	07:22 15:42 (5)
Potential sun hours	296	296	369	399	450	454	461	429	375	345	296	286
Total, worst case	1142	752	369	399	450	454	461	429	375	345	296	286

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:  
OMBRA

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24/04/2020 08:06 / 16

Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: K - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26 16:38	14:54 (4) 17:13	13:00 (3) 17:48	12:24 (3) 19:23	13:02 (3) 19:56	14:12 (3) 20:26
2	07:26 16:39	14:54 (4) 17:14	12:57 (3) 17:49	12:24 (3) 19:24	13:02 (3) 19:57	14:15 (3) 20:27
3	07:26 16:40	14:56 (4) 17:15	12:56 (3) 17:50	12:23 (3) 19:25	13:00 (3) 19:58	14:15 (3) 20:28
4	07:26 16:41	14:58 (4) 17:17	12:55 (3) 17:51	12:21 (3) 19:26	13:01 (3) 19:59	14:18 (3) 20:29
5	07:26 16:42	15:00 (4) 17:18	12:54 (3) 17:53	12:20 (3) 19:27	13:01 (3) 20:00	14:19 (3) 20:30
6	07:26 16:43	15:16 (4) 17:19	12:52 (3) 17:54	12:20 (3) 19:28	13:01 (3) 20:01	14:22 (3) 20:31
7	07:26 16:44	15:16 (4) 17:21	12:51 (3) 17:55	12:18 (3) 19:29	13:02 (3) 20:02	14:23 (3) 20:32
8	07:26 16:45	15:14 (4) 17:22	12:50 (3) 17:56	12:17 (3) 19:31	13:02 (3) 20:03	14:26 (3) 20:33
9	07:25 16:46	14:12 (3) 17:23	12:49 (3) 17:57	12:17 (3) 19:32	13:02 (3) 20:04	14:26 (3) 20:34
10	07:25 16:47	13:40 (3) 17:24	12:48 (3) 17:58	12:15 (3) 19:33	13:03 (3) 20:05	14:27 (3) 20:35
11	07:25 16:48	13:35 (3) 17:25	12:46 (3) 17:59	12:16 (3) 19:34	13:03 (3) 20:06	14:30 (3) 20:36
12	07:25 16:49	13:33 (3) 17:26	12:46 (3) 18:00	12:16 (3) 19:34	13:03 (3) 20:06	14:30 (3) 20:36
13	07:24 16:50	13:33 (3) 17:27	12:45 (3) 18:01	12:14 (3) 19:35	13:06 (3) 20:07	14:31 (3) 20:37
14	07:24 16:51	13:30 (3) 17:28	12:44 (3) 18:02	12:12 (3) 19:36	13:08 (3) 20:08	14:32 (3) 20:38
15	07:24 16:52	13:28 (3) 17:29	12:43 (3) 18:03	12:13 (3) 19:37	13:10 (3) 20:09	14:33 (3) 20:39
16	07:24 16:53	14:30 (3) 17:30	12:41 (3) 18:04	12:11 (3) 19:38	13:13 (3) 20:10	14:34 (3) 20:40
17	07:23 16:54	13:25 (3) 17:31	12:40 (3) 18:05	12:11 (3) 19:39	13:17 (3) 20:11	14:37 (3) 20:41
18	07:23 16:55	14:35 (3) 17:32	12:38 (3) 18:06	12:09 (3) 19:40	13:22 (3) 20:12	14:38 (3) 20:42
19	07:23 16:56	13:22 (3) 17:33	12:38 (3) 18:07	12:09 (3) 19:41	13:22 (3) 20:13	14:38 (3) 20:43
20	07:22 16:57	14:38 (3) 17:34	12:37 (3) 18:08	12:10 (3) 19:42	13:26 (3) 20:14	14:40 (3) 20:44
21	07:22 16:58	13:19 (3) 17:35	12:35 (3) 18:09	12:08 (3) 19:43	13:31 (3) 20:15	14:41 (3) 20:45
22	07:20 16:59	14:43 (3) 17:36	12:34 (3) 18:10	12:08 (3) 19:44	13:37 (3) 20:16	14:42 (3) 20:46
23	07:19 17:00	13:16 (3) 17:37	12:34 (3) 18:11	12:07 (3) 19:45	13:42 (3) 20:17	14:43 (3) 20:47
24	07:19 17:01	14:48 (3) 17:38	12:33 (3) 18:12	12:07 (3) 19:46	13:46 (3) 20:18	14:44 (3) 20:48
25	07:18 17:02	13:12 (3) 17:39	12:31 (3) 18:13	12:05 (3) 19:47	13:49 (3) 20:19	14:44 (3) 20:49
26	07:18 17:03	14:50 (3) 17:40	12:30 (3) 18:14	12:05 (3) 19:48	13:53 (3) 20:20	14:45 (3) 20:50
27	07:17 17:04	13:09 (3) 17:41	12:28 (3) 18:15	12:04 (3) 19:49	13:56 (3) 20:21	14:46 (3) 20:51
28	07:17 17:05	14:55 (3) 17:42	12:28 (3) 18:16	12:04 (3) 19:50	13:59 (3) 20:22	14:48 (3) 20:52
29	07:16 17:06	13:08 (3) 17:43	12:29 (3) 18:17	12:04 (3) 19:51	13:59 (3) 20:23	14:48 (3) 20:53
30	07:16 17:07	14:56 (3) 17:44	12:27 (3) 18:18	12:02 (3) 19:52	14:01 (3) 20:24	14:47 (3) 20:54
31	07:15 17:08	13:07 (3) 17:45	12:27 (3) 18:19	12:02 (3) 19:53	14:03 (3) 20:25	14:47 (3) 20:55
Potential sun hours	296	296	369	399	450	454
Total, worst case	2142	4502	6366	5488	3028	1982

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:  
**OMBRA**

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24/04/2020 08:06 / 17

Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** K - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

**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

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

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

	July	August	September	October	November	December
1	05:27	15:02 (3) 05:52	14:40 (3) 06:23	13:02 (3) 06:54	12:52 (3) 06:29	12:17 (3) 07:05
2	05:28	15:03 (3) 05:53	14:39 (3) 06:24	13:01 (3) 06:55	12:54 (3) 06:31	12:19 (3) 07:06
3	05:28	15:03 (3) 05:54	14:38 (3) 06:25	13:00 (3) 06:56	12:53 (3) 06:32	12:20 (3) 07:07
4	05:29	15:02 (3) 05:55	14:37 (3) 06:26	12:59 (3) 06:57	12:54 (3) 06:33	12:21 (3) 07:08
5	05:29	15:02 (3) 05:56	14:34 (3) 06:27	12:58 (3) 06:59	12:55 (3) 06:34	12:22 (3) 07:09
6	05:30	15:03 (3) 05:57	14:33 (3) 06:28	12:57 (3) 07:00	12:54 (3) 06:35	12:24 (3) 07:10
7	05:31	15:02 (3) 05:58	14:30 (3) 06:29	12:56 (3) 07:01	12:55 (3) 06:37	12:25 (3) 07:11
8	05:31	15:02 (3) 05:59	14:29 (3) 06:30	12:55 (3) 07:02	12:56 (3) 06:38	12:26 (3) 07:12
9	05:32	15:01 (3) 06:00	14:26 (3) 06:32	12:54 (3) 07:03	12:55 (3) 06:39	12:28 (3) 07:13
10	05:33	15:01 (3) 06:01	14:25 (3) 06:33	12:53 (3) 07:04	12:56 (3) 06:40	12:31 (3) 07:14
11	05:33	15:00 (3) 06:02	14:22 (3) 06:34	12:54 (3) 07:05	12:58 (3) 06:42	12:32 (3) 07:15
12	05:34	14:59 (3) 06:03	14:21 (3) 06:35	12:53 (3) 07:06	12:57 (3) 06:43	12:34 (3) 07:15
13	05:35	15:00 (3) 06:04	14:18 (3) 06:36	12:52 (3) 07:07	12:58 (3) 06:44	12:35 (3) 07:16
14	05:36	14:58 (3) 06:05	14:15 (3) 06:37	12:53 (3) 07:08	12:59 (3) 06:45	12:36 (3) 07:17
15	05:36	14:57 (3) 06:06	14:12 (3) 06:38	12:52 (3) 07:10	13:00 (3) 06:46	12:40 (3) 07:18
16	05:37	14:56 (3) 06:07	14:09 (3) 06:39	12:53 (3) 07:11	12:59 (3) 06:48	12:41 (3) 07:19
17	05:38	14:57 (3) 06:08	14:06 (3) 06:40	12:52 (3) 07:12	13:01 (3) 06:49	12:42 (3) 07:19
18	05:39	14:56 (3) 06:09	14:03 (3) 06:41	12:51 (3) 07:13	13:02 (3) 06:50	12:45 (3) 07:20
19	05:40	14:54 (3) 06:10	13:58 (3) 06:42	12:52 (3) 07:14	13:03 (3) 06:51	12:47 (3) 07:21
20	05:40	14:55 (3) 06:11	13:55 (3) 06:43	12:51 (3) 07:15	13:04 (3) 06:53	12:48 (3) 07:21
21	05:41	14:54 (3) 06:12	13:50 (3) 06:44	12:52 (3) 07:16	13:05 (3) 06:54	12:51 (3) 07:22
22	05:42	14:53 (3) 06:13	13:45 (3) 06:45	12:51 (3) 07:18	13:05 (3) 06:55	12:52 (3) 07:22
23	05:43	14:52 (3) 06:14	13:40 (3) 06:46	12:52 (3) 07:19	13:06 (3) 06:56	12:56 (3) 07:23
24	05:44	14:51 (3) 06:15	13:34 (3) 06:47	12:51 (3) 07:20	13:07 (3) 06:57	12:57 (3) 07:23
25	05:45	14:50 (3) 06:16	13:29 (3) 06:48	12:52 (3) 07:21	13:08 (3) 06:58	13:00 (3) 07:24
26	05:46	14:48 (3) 06:17	13:22 (3) 06:49	12:51 (3) 07:22	13:09 (3) 07:00	13:03 (3) 07:24
27	05:47	14:47 (3) 06:18	13:17 (3) 06:50	12:52 (3) 07:23	13:10 (3) 07:01	13:05 (3) 07:24
28	05:48	14:46 (3) 06:19	13:14 (3) 06:51	12:51 (3) 07:25	13:11 (3) 07:02	13:08 (3) 07:25
29	05:49	14:45 (3) 06:20	13:09 (3) 06:52	12:52 (3) 07:26	13:12 (3) 07:03	13:11 (3) 07:25
30	05:50	14:44 (3) 06:21	13:06 (3) 06:53	12:53 (3) 07:27	13:13 (3) 07:04	13:12 (3) 07:25
31	05:51	14:43 (3) 06:22	13:05 (3) 06:54	12:54 (3) 07:28	13:14 (3) 07:05	13:13 (3) 07:25
Potential sun hours	461	429	375	345	296	286
Total, worst case	2498	4566	6326	5662	3226	882

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:  
OMBRA

Printed/Page  
24/04/2020 08:06 / 18

Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: L - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	January		February		March		April		May		June							
1	07:26	09:44 (3)	07:12	09:18 (3)	06:35	08:56 (3)	06:43	09:42 (3)	05:56	09:46 (3)	05:27	05:55 (2)						
	16:38	70	10:54 (3)	17:13	146	11:44 (3)	17:48	196	12:12 (3)	19:23	210	13:12 (3)	19:56	108	11:34 (3)	20:26	104	10:55 (3)
2	07:26	09:44 (3)	07:11	09:17 (3)	06:33	08:54 (3)	06:42	09:42 (3)	05:55	09:45 (3)	05:26	05:54 (2)						
	16:39	72	10:56 (3)	17:14	148	11:45 (3)	17:49	198	12:12 (3)	19:24	210	13:12 (3)	19:57	106	11:31 (3)	20:27	106	10:54 (3)
3	07:26	09:44 (3)	07:10	09:18 (3)	06:32	08:55 (3)	06:40	09:42 (3)	05:54	09:45 (3)	05:26	05:54 (2)						
	16:40	72	10:56 (3)	17:15	148	11:46 (3)	17:50	198	12:13 (3)	19:25	208	13:10 (3)	19:58	104	11:29 (3)	20:27	102	10:52 (3)
4	07:26	09:44 (3)	07:09	09:17 (3)	06:30	08:53 (3)	06:38	09:41 (3)	05:53	09:46 (3)	05:26	05:54 (2)						
	16:41	74	10:58 (3)	17:17	152	11:49 (3)	17:51	200	12:13 (3)	19:26	210	13:11 (3)	19:59	100	11:26 (3)	20:28	104	10:52 (3)
5	07:26	09:42 (3)	07:08	09:16 (3)	06:29	08:54 (3)	06:36	09:41 (3)	05:51	09:47 (3)	05:25	05:53 (2)						
	16:42	78	11:00 (3)	17:18	154	11:50 (3)	17:53	200	12:14 (3)	19:27	208	13:09 (3)	20:00	98	11:25 (3)	20:29	102	10:51 (3)
6	07:26	09:42 (3)	07:06	09:14 (3)	06:27	08:52 (3)	06:35	09:41 (3)	05:50	09:48 (3)	05:25	05:55 (2)						
	16:43	80	11:02 (3)	17:19	156	11:50 (3)	17:54	202	12:14 (3)	19:28	208	13:09 (3)	20:01	96	11:24 (3)	20:29	100	10:51 (3)
7	07:26	09:42 (3)	07:05	09:13 (3)	06:25	08:52 (3)	06:33	09:42 (3)	05:49	09:49 (3)	05:25	05:55 (2)						
	16:44	82	11:04 (3)	17:21	158	11:51 (3)	17:55	202	12:14 (3)	19:29	206	13:08 (3)	20:02	92	11:21 (3)	20:30	102	10:51 (3)
8	07:26	09:40 (3)	07:04	09:12 (3)	06:24	08:53 (3)	06:31	09:42 (3)	05:48	09:48 (3)	05:24	05:54 (2)						
	16:45	86	11:06 (3)	17:22	160	11:52 (3)	17:56	202	12:15 (3)	19:31	204	13:06 (3)	20:03	92	11:20 (3)	20:31	100	10:50 (3)
9	07:25	09:40 (3)	07:03	09:11 (3)	06:22	08:51 (3)	06:30	09:40 (3)	05:46	09:48 (3)	05:24	05:54 (2)						
	16:46	88	11:08 (3)	17:23	164	11:55 (3)	17:57	204	12:15 (3)	19:32	204	13:04 (3)	20:04	90	11:18 (3)	20:31	100	10:50 (3)
10	07:25	09:39 (3)	07:02	09:12 (3)	06:20	08:51 (3)	06:28	09:41 (3)	05:45	09:49 (3)	05:24	05:54 (2)						
	16:47	90	11:09 (3)	17:24	164	11:56 (3)	17:58	204	12:15 (3)	19:33	202	13:03 (3)	20:05	86	11:15 (3)	20:32	98	10:50 (3)
11	07:25	09:39 (3)	07:00	09:10 (3)	06:19	08:50 (3)	06:27	09:41 (3)	05:44	09:49 (3)	05:24	05:54 (2)						
	16:48	92	11:11 (3)	17:26	166	11:56 (3)	18:00	206	12:16 (3)	19:34	198	12:59 (3)	20:06	88	11:14 (3)	20:32	98	10:50 (3)
12	07:25	09:37 (3)	06:59	09:09 (3)	06:17	08:50 (3)	06:25	09:42 (3)	05:43	09:49 (3)	05:24	05:54 (2)						
	16:49	96	11:13 (3)	17:27	168	11:57 (3)	18:01	206	12:16 (3)	19:35	196	12:58 (3)	20:07	88	11:13 (3)	20:33	100	10:50 (3)
13	07:24	09:36 (3)	06:58	09:08 (3)	06:15	08:48 (3)	06:23	09:42 (3)	05:42	09:49 (3)	05:23	05:54 (2)						
	16:50	98	11:14 (3)	17:28	170	11:58 (3)	18:02	208	12:16 (3)	19:36	190	12:52 (3)	20:08	104	11:12 (3)	20:33	98	10:50 (3)
14	07:24	09:36 (3)	06:57	09:08 (3)	06:14	08:49 (3)	06:22	09:40 (3)	05:41	09:49 (3)	05:23	05:56 (2)						
	16:51	100	11:16 (3)	17:29	172	12:00 (3)	18:03	208	12:17 (3)	19:37	188	12:48 (3)	20:09	106	11:09 (3)	20:34	96	10:50 (3)
15	07:24	09:35 (3)	06:55	09:07 (3)	06:12	08:49 (3)	06:20	09:41 (3)	05:40	09:49 (3)	05:23	05:56 (2)						
	16:52	102	11:17 (3)	17:31	174	12:01 (3)	18:04	208	12:17 (3)	19:38	180	12:41 (3)	20:10	106	11:08 (3)	20:34	96	10:50 (3)
16	07:23	09:35 (3)	06:54	09:06 (3)	06:10	08:47 (3)	06:19	09:41 (3)	05:39	09:49 (3)	05:23	05:56 (2)						
	16:53	104	11:19 (3)	17:32	176	12:02 (3)	18:05	208	12:15 (3)	19:39	172	12:33 (3)	20:11	108	11:07 (3)	20:35	96	10:50 (3)
17	07:23	09:32 (3)	06:53	09:04 (3)	06:09	08:47 (3)	06:17	09:42 (3)	05:38	09:49 (3)	05:23	05:56 (2)						
	16:54	108	11:20 (3)	17:33	178	12:02 (3)	18:06	208	12:15 (3)	19:40	166	12:28 (3)	20:12	108	11:06 (3)	20:35	96	10:50 (3)
18	07:22	09:32 (3)	06:51	09:05 (3)	06:07	08:46 (3)	06:15	09:42 (3)	05:37	09:49 (3)	05:23	05:56 (2)						
	16:56	110	11:22 (3)	17:34	178	12:03 (3)	18:07	210	12:16 (3)	19:41	158	12:20 (3)	20:13	110	11:06 (3)	20:35	96	10:50 (3)
19	07:22	09:31 (3)	06:50	09:03 (3)	06:05	08:46 (3)	06:14	09:43 (3)	05:36	09:49 (3)	05:24	05:56 (2)						
	16:57	112	11:23 (3)	17:36	182	12:05 (3)	18:09	210	12:16 (3)	19:43	152	12:15 (3)	20:14	110	11:05 (3)	20:36	94	10:50 (3)
20	07:21	09:30 (3)	06:48	09:02 (3)	06:04	08:46 (3)	06:12	09:41 (3)	05:35	09:49 (3)	05:24	05:56 (2)						
	16:58	114	11:24 (3)	17:37	184	12:06 (3)	18:10	210	12:16 (3)	19:44	148	12:09 (3)	20:15	110	11:04 (3)	20:36	94	10:50 (3)
21	07:21	09:30 (3)	06:47	09:02 (3)	06:02	08:45 (3)	06:11	09:42 (3)	05:34	09:49 (3)	05:24	05:57 (2)						
	16:59	118	11:28 (3)	17:38	184	12:06 (3)	18:11	212	12:17 (3)	19:45	144	12:06 (3)	20:16	110	11:01 (3)	20:36	94	10:51 (3)
22	07:20	09:29 (3)	06:46	09:01 (3)	06:00	08:45 (3)	06:09	09:42 (3)	05:33	09:49 (3)	05:24	05:57 (2)						
	17:00	120	11:29 (3)	17:39	186	12:07 (3)	18:12	212	12:17 (3)	19:46	138	12:00 (3)	20:17	110	11:00 (3)	20:37	94	10:51 (3)
23	07:19	09:28 (3)	06:44	08:59 (3)	05:59	08:45 (3)	06:08	09:43 (3)	05:33	09:49 (3)	05:24	05:57 (2)						
	17:02	122	11:30 (3)	17:41	188	12:07 (3)	18:13	210	12:15 (3)	19:47	134	11:57 (3)	20:18	110	11:00 (3)	20:37	94	10:51 (3)
24	07:19	09:25 (3)	06:43	09:00 (3)	05:57	08:43 (3)	06:06	09:43 (3)	05:32	09:49 (3)	05:25	05:57 (2)						
	17:03	126	11:31 (3)	17:42	188	12:08 (3)	18:14	212	12:15 (3)	19:48	130	11:53 (3)	20:19	108	10:59 (3)	20:37	96	10:51 (3)
25	07:18	09:25 (3)	06:41	08:58 (3)	05:55	08:44 (3)	06:05	09:44 (3)	05:31	09:49 (3)	05:25	05:58 (2)						
	17:04	128	11:33 (3)	17:43	190	12:08 (3)	18:15	212	12:16 (3)	19:49	126	11:50 (3)	20:20	110	10:58 (3)	20:37	96	10:52 (3)
26	07:17	09:24 (3)	06:40	08:59 (3)	05:53	08:44 (3)	06:03	09:43 (3)	05:30	09:49 (3)	05:25	05:58 (2)						
	17:05	132	11:36 (3)	17:44	190	12:09 (3)	18:16	212	12:16 (3)	19:50	124	11:47 (3)	20:21	110	10:58 (3)	20:37	96	10:52 (3)
27	07:16	09:23 (3)	06:38	08:57 (3)	05:52	08:44 (3)	06:02	09:43 (3)	05:30	09:49 (3)	05:26	05:58 (2)						
	17:07	134	11:37 (3)	17:45	192	12:09 (3)	18:17	210	12:14 (3)	19:51	120	11:43 (3)	20:22	108	10:57 (3)	20:37	96	10:52 (3)
28	07:15	09:22 (3)	06:36	08:58 (3)	05:50	08:43 (3)	06:01	09:44 (3)	05:29	09:49 (3)	05:26	05:59 (2)						
	17:08	136	11:38 (3)	17:47	194	12:12 (3)	18:18	212	12:15 (3)	19:52	118	11:42 (3)	20:23	110	10:57 (3)	20:37	96	10:53 (3)
29	07:14	09:21 (3)	06:35	08:59 (3)	05:48	08:43 (3)	06:00	09:45 (3)	05:29	09:49 (3)	05:26	05:57 (2)						
	17:09	138	11:39 (3)	17:48	196	12:13 (3)	18:19	212	12:15 (3)	19:53	114	11:39 (3)	20:23	108	10:56 (3)	20:37	98	10:53 (3)
30	07:14	09:20 (3)	06:34	08:59 (3)	05:47	08:43 (3)	06:00	09:45 (3)	05:28	09:49 (3)	05:27	05:58 (2)						
	17:10	140	11:40 (3)	17:49	198	12:14 (3)	18:20	210	12:14 (3)	19:55	110	11:35 (3)	20:24	108	10:56 (3)	20:37	100	10:54 (3)
31	07:13	09:19 (3)	06:33	08:59 (3)	05:45	08:43 (3)	06:00	09:45 (3)	05:27	09:49 (3)	05:27	05:55 (2)						
	17:12	144	11:43 (3)	17:50	200	12:15 (3)	18:22	212	12:14 (3)	19:56	106	11:35 (3)	20:25	106	10:55 (3)	20:37	100	10:54 (3)
Potential sun hours	296		296		369		399		450		454							
Total, worst case	3266		4810		6414		5076		3218		2942							

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

Project:  
OMBRA

Printed/Page  
24/04/2020 08:06 / 19

Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: L - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December
1	05:27 20:37	05:58 (2) 20:17	05:52 20:17	06:24 (2) 19:33	06:23 19:33	09:40 (3) 18:42
2	05:28 20:37	05:59 (2) 20:16	05:53 20:16	06:24 19:32	06:24 19:32	09:39 (3) 18:40
3	05:28 20:37	05:59 (2) 20:15	05:54 20:15	06:25 19:30	06:25 19:30	09:38 (3) 18:39
4	05:29 20:36	06:00 (2) 20:14	05:55 20:14	06:26 19:28	06:26 19:28	09:39 (3) 18:37
5	05:29 20:36	06:00 (2) 20:13	05:56 20:13	06:27 19:27	06:27 19:27	09:38 (3) 18:35
6	05:30 20:36	06:01 (2) 20:12	05:57 20:12	06:28 19:25	06:28 19:25	09:37 (3) 18:33
7	05:31 20:36	06:02 (2) 20:10	05:58 20:10	06:29 19:23	06:29 19:23	09:36 (3) 18:32
8	05:31 20:35	06:02 (2) 20:09	05:59 20:09	06:30 19:22	06:30 19:22	09:35 (3) 18:30
9	05:32 20:35	06:01 (2) 20:08	06:00 20:08	06:31 19:20	06:31 19:20	09:34 (3) 18:29
10	05:33 20:35	06:02 (2) 20:07	06:01 20:07	06:32 19:18	06:32 19:18	09:33 (3) 18:27
11	05:33 20:34	06:02 (2) 20:05	06:02 20:05	06:33 19:17	06:33 19:17	09:32 (3) 18:25
12	05:34 20:34	06:03 (2) 20:04	06:03 20:04	06:34 19:15	06:34 19:15	09:31 (3) 18:24
13	05:35 20:33	06:04 (2) 20:02	06:04 20:02	06:35 19:13	06:35 19:13	09:30 (3) 18:22
14	05:36 20:33	06:02 (2) 20:01	06:05 20:01	06:36 19:11	06:36 19:11	09:29 (3) 18:20
15	05:36 20:32	06:03 (2) 20:00	06:06 20:00	06:37 19:10	06:37 19:10	09:28 (3) 18:19
16	05:37 20:31	06:04 (2) 19:58	06:07 19:58	06:38 19:08	06:38 19:08	09:27 (3) 18:17
17	05:38 20:31	06:05 (2) 19:57	06:08 19:57	06:40 19:06	06:40 19:06	09:26 (3) 18:16
18	05:39 20:30	06:06 (2) 19:55	06:09 19:55	06:41 19:04	06:41 19:04	09:25 (3) 18:14
19	05:40 20:29	06:06 (2) 19:54	06:10 19:54	06:42 19:03	06:42 19:03	09:24 (3) 18:13
20	05:40 20:29	06:07 (2) 19:52	06:11 19:52	06:43 19:01	06:43 19:01	09:23 (3) 18:11
21	05:41 20:28	06:08 (2) 19:51	06:12 19:51	06:44 18:59	06:44 18:59	09:22 (3) 18:10
22	05:42 20:27	06:09 (2) 19:49	06:13 19:49	06:45 18:57	06:45 18:57	09:21 (3) 18:08
23	05:43 20:26	06:10 (2) 19:48	06:14 19:48	06:46 18:56	06:46 18:56	09:20 (3) 18:07
24	05:44 20:25	06:11 (2) 19:46	06:15 19:46	06:47 18:54	06:47 18:54	09:19 (3) 18:05
25	05:45 20:24	06:12 (2) 19:45	06:16 19:45	06:48 18:52	06:48 18:52	09:18 (3) 18:04
26	05:46 20:24	06:12 (2) 19:43	06:17 19:43	06:49 18:51	06:49 18:51	09:17 (3) 18:02
27	05:47 20:23	06:13 (2) 19:42	06:18 19:42	06:50 18:49	06:50 18:49	09:16 (3) 18:01
28	05:48 20:22	06:14 (2) 19:40	06:19 19:40	06:51 18:47	06:51 18:47	09:15 (3) 17:59
29	05:49 20:21	06:15 (2) 19:38	06:20 19:38	06:52 18:45	06:52 18:45	09:14 (3) 17:58
30	05:50 20:20	06:16 (2) 19:37	06:21 19:37	06:53 18:44	06:53 18:44	09:13 (3) 17:57
31	05:51 20:19	06:21 (2) 19:35	06:22 19:35	06:54 18:42	06:54 18:42	09:12 (3) 17:56
Potential sun hours	461	429	375	345	296	286
Total, worst case	3280	3980	6264	5860	3928	2104

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:  
OMBRA

Printed/Page  
24/04/2020 08:06 / 20

Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: M - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 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	05:26 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	06:26 19:28	06:57 18:37	06:33 16:51	07:08 16:28
5	07:26 16:42	07:08 17:18	06:29 17:53	06:36 19:27	05:51 20:00	05:25 20:29	05:29 20:36	05:56 20:13	06:27 19:27	06:59 18:35	06:34 16:49	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	06:28 19:25	07:00 18:34	06:36 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	05:46 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 17:24	06:20 17:58	06:28 19:33	05:45 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	05:44 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	05:23 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	05:23 20:34	05:36 20:33	06:05 20:01	06:37 19:11	07:08 18:20	06:45 16:40	07:17 16:28
15	07:24 16:52	06:55 17:31	06:12 18:04	06:20 19:38	05:40 20:10	05:23 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	05:23 20:35	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	06:48 16:38	07:19 16:29
17	07:23 16:54	06:53 17:33	06:09 18:06	06:17 19:40	05:38 20:12	05:23 20:35	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	06:49 16:37	07:19 16:29
18	07:22 16:56	06:51 17:35	06:07 18:07	06:15 19:41	05:37 20:13	05:23 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	07:21 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	05:40 20:29	06:11 19:52	06:43 19:01	07:15 18:11	06:53 16:35	07:21 16:30
21	07:21 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:34 20:16	05:24 20:36	05:41 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 17:00	06:46 17:39	06:00 18:12	06:09 19:46	05:34 20:17	05:24 20:37	05:42 20:27	06:13 19:49	06:45 18:57	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	07:19 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 16:32	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	07:21 17:04	06:58 16:32	07:24 16:33
26	07:17 17:05	06:40 17:44	05:53 18:16	06:03 19:50	05:30 20:21	05:25 20:37	05:46 20:24	06:17 19:43	06:49 18:51	07:22 17:02	07:00 16:31	07:24 16:33
27	07:16 17:07	06:38 17:45	05:52 18:17	06:02 19:51	05:30 20:22	05:26 20:37	05:47 20:23	06:18 19:42	06:50 18:49	07:23 17:01	07:01 16:31	07:24 16:34
28	07:15 17:08	06:37 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	07:24 17:00	07:02 16:30	07:25 16:35
29	07:14 17:09		06:48 19:20	05:59 19:53	05:29 20:23	05:26 20:37	05:49 20:21	06:20 19:38	06:52 18:45	07:25 16:58	07:03 16:30	07:25 16:36
30	07:14 17:10		06:47 19:21	05:58 19:55	05:28 20:24	05:27 20:37	05:50 20:20	06:21 19:37	06:53 18:44	07:26 16:57	07:04 16:30	07:25 16:36
31	07:13 17:12		06:45 19:22		05:27 20:25		05:51 20:19	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	296	286
Total, worst case												

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: N - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26 16:38	07:12 17:13	15:58 (5) 16:46 (5)	06:35 17:48	16:12 (5) 19:23	05:57 19:56
2	07:26 16:39	07:11 17:14	15:59 (5) 16:47 (5)	06:33 17:49	16:16 (5) 16:30 (5)	05:55 19:57
3	07:26 16:40	07:10 17:16	15:58 (5) 16:48 (5)	06:32 17:50	06:40 19:25	05:54 19:58
4	07:26 16:41	07:09 17:17	15:57 (5) 16:49 (5)	06:30 17:51	06:38 19:26	05:53 19:59
5	07:26 16:42	07:08 17:18	15:58 (5) 16:48 (5)	06:29 17:53	06:36 19:27	05:51 20:00
6	07:26 16:43	07:06 17:19	15:56 (5) 16:48 (5)	06:27 17:54	06:35 19:28	05:50 20:01
7	07:26 16:44	07:05 17:21	15:57 (5) 16:49 (5)	06:25 17:55	06:33 19:29	05:49 20:02
8	07:26 16:45	07:04 17:22	15:56 (5) 16:50 (5)	06:24 17:56	06:31 19:31	05:48 20:03
9	07:25 16:46	07:03 17:23	15:57 (5) 16:51 (5)	06:22 17:57	06:30 19:32	05:46 20:04
10	07:25 16:47	07:02 17:24	15:56 (5) 16:50 (5)	06:20 17:58	06:28 19:33	05:45 20:05
11	07:25 16:48	07:00 17:26	15:56 (5) 16:50 (5)	06:19 18:00	06:27 19:34	05:44 20:06
12	07:25 16:49	06:59 17:27	15:57 (5) 16:51 (5)	06:17 18:01	06:25 19:35	05:43 20:07
13	07:24 16:50	06:58 17:28	15:56 (5) 16:52 (5)	06:15 18:02	06:23 19:36	05:42 20:08
14	07:24 16:51	06:57 17:30	15:56 (5) 16:50 (5)	06:14 18:03	06:22 19:37	05:41 20:09
15	07:24 16:52	06:55 17:31	15:57 (5) 16:51 (5)	06:12 18:04	06:20 19:38	05:40 20:10
16	07:23 16:53	06:54 17:32	15:58 (5) 16:50 (5)	06:10 18:05	06:19 19:39	05:39 20:11
17	07:23 16:54	06:53 17:33	15:58 (5) 16:50 (5)	06:09 18:06	06:17 19:40	05:38 20:12
18	07:22 16:56	06:51 17:35	15:59 (5) 16:49 (5)	06:07 18:07	06:15 19:41	05:37 20:13
19	07:22 16:57	06:50 17:36	15:59 (5) 16:49 (5)	06:05 18:09	06:14 19:43	05:36 20:14
20	07:21 16:58	06:48 17:37	16:00 (5) 16:48 (5)	06:04 18:10	06:12 19:44	05:35 20:15
21	07:21 16:59	06:47 17:38	16:00 (5) 16:48 (5)	06:02 18:11	06:11 19:45	05:34 20:16
22	07:20 17:00	06:46 17:39	16:01 (5) 16:47 (5)	06:00 18:12	06:09 19:46	05:33 20:17
23	07:19 17:02	06:44 17:41	16:01 (5) 16:45 (5)	05:59 18:13	06:08 19:47	05:33 20:18
24	07:19 17:03	06:43 17:42	16:02 (5) 16:44 (5)	05:57 18:14	06:06 19:48	05:32 20:19
25	07:18 17:04	06:41 17:43	16:04 (5) 16:42 (5)	05:55 18:15	06:05 19:49	05:31 20:20
26	07:17 17:05	06:40 17:44	16:05 (5) 16:41 (5)	05:53 18:16	06:03 19:50	05:30 20:21
27	07:16 17:07	06:38 17:45	16:07 (5) 16:39 (5)	05:52 18:17	06:02 19:51	05:30 20:22
28	07:15 17:08	06:36 17:47	16:10 (5) 16:38 (5)	05:50 18:18	06:01 19:52	05:29 20:23
29	07:14 17:09	06:35 17:48	16:11 (5) 16:43 (5)	05:48 18:19	05:59 19:53	05:29 20:24
30	07:14 17:10	06:34 17:49	16:12 (5) 16:44 (5)	05:47 18:20	05:58 19:54	05:28 20:25
31	07:13 17:12	06:33 17:50	16:13 (5) 16:45 (5)	05:45 18:21	05:57 19:55	05:27 20:26
Potential sun hours	296	296	369	399	450	454
Total, worst case	562	1352	36			

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

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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Project:  
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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: N - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December		
1	05:27 20:37	05:52 20:17	06:23 19:33	06:54 18:42	06:29 16:54	15:25 (5) 16:19 (5)	07:05 16:29	15:55 (6) 16:03 (6)
2	05:28 20:37	05:53 20:16	06:24 19:32	06:55 18:40	06:31 16:53	15:27 (5) 16:21 (5)	07:06 16:29	15:56 (6) 16:04 (6)
3	05:28 20:37	05:54 20:15	06:25 19:30	06:56 18:39	06:32 16:52	15:26 (5) 16:20 (5)	07:07 16:29	15:57 (6) 16:03 (6)
4	05:29 20:36	05:55 20:14	06:26 19:28	06:57 18:37	06:33 16:51	15:27 (5) 16:19 (5)	07:08 16:28	15:58 (6) 16:02 (6)
5	05:29 20:36	05:56 20:13	06:27 19:27	06:59 18:35	06:34 16:49	15:26 (5) 16:18 (5)	07:09 16:28	16:01 (6) 16:05 (6)
6	05:30 20:36	05:57 20:12	06:28 19:25	07:00 18:34	06:35 16:48	15:28 (5) 16:18 (5)	07:10 16:28	
7	05:31 20:36	05:58 20:10	06:30 19:23	07:01 18:32	06:37 16:47	15:27 (5) 16:17 (5)	07:11 16:28	
8	05:31 20:35	05:59 20:09	06:31 19:22	07:02 18:30	06:38 16:46	15:28 (5) 16:18 (5)	07:12 16:28	
9	05:32 20:35	06:00 20:08	06:32 19:20	07:03 18:29	06:39 16:45	15:30 (5) 16:18 (5)	07:13 16:28	
10	05:33 20:35	06:01 20:07	06:33 19:18	07:04 18:27	06:40 16:44	15:29 (5) 16:17 (5)	07:14 16:28	
11	05:33 20:34	06:02 20:05	06:34 19:17	07:05 18:25	16:54 (5) 17:00 (5)	06:42 16:43	15:30 (5) 16:28	07:15 16:28
12	05:34 20:34	06:03 20:04	06:35 19:15	07:06 18:24	16:47 (5) 17:07 (5)	06:43 16:42	15:32 (5) 16:28	07:15 16:28
13	05:35 20:33	06:04 20:02	06:36 19:13	07:07 18:22	16:44 (5) 17:10 (5)	06:44 16:41	15:33 (5) 16:15 (5)	07:16 16:28
14	05:36 20:33	06:05 20:01	06:37 19:11	07:08 18:20	16:41 (5) 17:11 (5)	06:45 16:40	15:34 (5) 16:14 (5)	07:17 16:28
15	05:36 20:32	06:06 20:00	06:38 19:10	07:10 18:19	16:38 (5) 17:12 (5)	06:46 16:39	15:36 (5) 16:14 (6)	07:18 16:29
16	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	16:37 (5) 17:13 (5)	06:48 16:38	15:37 (5) 16:13 (6)	07:19 16:29
17	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	16:35 (5) 17:15 (5)	06:49 16:37	15:38 (5) 16:12 (6)	07:19 16:29
18	05:39 20:30	06:09 19:55	06:41 19:04	07:13 18:14	16:34 (5) 17:16 (5)	06:50 16:37	15:39 (5) 16:11 (6)	07:20 16:30
19	05:40 20:29	06:10 19:54	06:42 19:03	07:14 18:13	16:33 (5) 17:17 (5)	06:51 16:36	15:43 (5) 16:11 (6)	07:21 16:30
20	05:40 20:29	06:11 19:52	06:43 19:01	07:15 18:11	16:30 (5) 17:18 (5)	06:53 16:35	15:44 (6) 16:10 (6)	07:21 16:30
21	05:41 20:28	06:12 19:51	06:44 18:59	07:16 18:10	16:29 (5) 17:17 (5)	06:54 16:34	15:45 (6) 16:09 (6)	07:22 16:31
22	05:42 20:27	06:13 19:49	06:45 18:57	07:18 18:08	16:29 (5) 17:19 (5)	06:55 16:34	15:46 (6) 16:08 (6)	07:22 16:31
23	05:43 20:26	06:14 19:48	06:46 18:56	07:19 18:07	16:28 (5) 17:20 (5)	06:56 16:33	15:46 (6) 16:08 (6)	07:23 16:32
24	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:05	16:27 (5) 17:19 (5)	06:57 16:32	15:47 (6) 16:07 (6)	07:23 16:32
25	05:45 20:24	06:16 19:45	06:48 18:52	06:21 17:04	15:26 (5) 16:20 (5)	06:58 16:32	15:48 (6) 16:06 (6)	07:24 16:33
26	05:46 20:24	06:17 19:43	06:49 18:51	06:22 17:02	15:26 (5) 16:20 (5)	07:00 16:31	15:49 (6) 16:05 (6)	07:24 16:33
27	05:47 20:23	06:18 19:42	06:50 18:49	06:23 17:01	15:27 (5) 16:21 (5)	07:01 16:31	15:51 (6) 16:05 (6)	07:24 16:34
28	05:48 20:22	06:19 19:40	06:51 18:47	06:25 17:00	15:26 (5) 16:20 (5)	07:02 16:30	15:52 (6) 16:06 (6)	07:25 16:35
29	05:49 20:21	06:20 19:38	06:52 18:45	06:26 16:58	15:25 (5) 16:19 (5)	07:03 16:30	15:53 (6) 16:05 (6)	07:25 16:36
30	05:50 20:20	06:21 19:37	06:53 18:44	06:27 16:57	15:25 (5) 16:21 (5)	07:04 16:30	15:54 (6) 16:04 (6)	07:25 16:36
31	05:51 20:19	06:22 19:35		06:28 16:56	15:26 (5) 16:20 (5)			07:25 16:37
Potential sun hours	461	429	375	345	296	286		
Total, worst case				908	1050	30		

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:  
**OMBRA**

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Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** O - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

**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

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

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

	January	February	March	April	May	June
1	07:26 16:38 60	15:06 (5) 16:06 (6) 07:12 17:13 116	13:22 (4) 15:18 (4) 17:48 13:21 (4) 06:33 182	12:46 (4) 15:48 (4) 19:23 12:45 (4) 06:42 202	13:28 (4) 16:50 (4) 19:56 13:28 (4) 05:55 124	14:30 (4) 16:34 (4) 20:26 14:31 (4) 05:26 72
2	07:26 16:39 60	15:06 (5) 16:06 (6) 07:10 17:14 120	13:20 (4) 15:21 (4) 17:49 13:20 (4) 06:32 184	12:45 (4) 15:49 (4) 19:24 12:45 (4) 06:40 200	13:28 (4) 16:48 (4) 19:57 13:28 (4) 05:54 122	14:33 (4) 16:33 (4) 20:27 14:33 (4) 05:26 70
3	07:26 16:40 60	15:06 (5) 16:06 (6) 07:10 17:16 122	13:20 (4) 15:22 (4) 17:50 13:19 (4) 06:30 184	12:43 (4) 15:49 (4) 19:25 12:43 (4) 06:38 200	13:29 (4) 16:48 (4) 19:58 13:29 (4) 05:53 118	14:34 (4) 16:31 (4) 20:27 14:34 (4) 05:26 70
4	07:26 16:41 58	15:08 (5) 16:06 (6) 07:09 17:17 124	13:19 (4) 15:23 (4) 17:51 13:18 (4) 06:29 186	12:43 (4) 15:49 (4) 19:26 12:42 (4) 06:36 200	13:29 (4) 16:49 (4) 19:59 13:29 (4) 05:51 118	14:37 (4) 16:32 (4) 20:28 14:37 (4) 05:25 68
5	07:26 16:42 58	15:08 (5) 16:06 (6) 07:08 17:18 128	13:18 (4) 15:26 (4) 17:53 13:14 (4) 06:27 188	12:42 (4) 15:50 (4) 19:27 12:40 (4) 06:35 198	13:29 (4) 16:47 (4) 20:00 13:31 (4) 05:50 114	14:37 (4) 16:31 (4) 20:29 14:38 (4) 05:25 66
6	07:26 16:43 58	15:08 (5) 16:06 (6) 07:06 17:19 132	13:14 (4) 15:26 (4) 17:54 13:13 (4) 06:25 190	12:40 (4) 15:50 (4) 19:28 12:40 (4) 06:33 196	13:31 (4) 16:47 (4) 20:01 13:32 (4) 05:49 112	14:38 (4) 16:30 (4) 20:29 14:41 (4) 05:25 66
7	07:26 16:44 58	15:10 (5) 16:08 (6) 07:05 17:21 134	13:13 (4) 15:27 (4) 17:55 13:12 (4) 06:24 190	12:40 (4) 15:50 (4) 19:29 12:39 (4) 06:31 196	13:32 (4) 16:48 (4) 20:02 13:34 (4) 05:48 110	14:41 (4) 16:31 (4) 20:30 14:42 (4) 05:24 66
8	07:26 16:44 58	15:10 (5) 16:08 (6) 07:04 17:22 138	13:12 (4) 15:30 (4) 17:56 13:11 (4) 06:22 192	12:39 (4) 15:51 (4) 19:31 12:39 (4) 06:30 192	13:34 (4) 16:46 (4) 20:03 13:37 (4) 05:46 108	14:42 (4) 16:30 (4) 20:31 14:42 (4) 05:24 64
9	07:25 16:44 56	15:12 (5) 16:08 (6) 07:03 17:23 140	13:11 (4) 15:31 (4) 17:57 13:10 (4) 06:20 192	12:39 (4) 15:51 (4) 19:32 12:37 (4) 06:28 190	13:37 (4) 16:47 (4) 20:04 13:39 (4) 05:45 106	14:42 (4) 16:28 (4) 20:31 14:43 (4) 05:24 64
10	07:25 16:47 56	15:11 (5) 16:07 (6) 07:02 17:24 142	13:10 (4) 15:32 (4) 17:58 13:08 (4) 06:19 194	12:37 (4) 15:51 (4) 19:33 12:36 (4) 06:27 186	13:39 (4) 16:45 (4) 20:05 13:41 (4) 05:44 104	14:43 (4) 16:27 (4) 20:32 14:46 (4) 05:24 62
11	07:25 16:48 56	15:11 (5) 16:07 (6) 07:01 17:26 146	13:08 (4) 15:34 (4) 18:00 13:07 (4) 06:17 196	12:36 (4) 15:52 (4) 19:34 12:36 (4) 06:25 184	13:41 (4) 16:45 (4) 20:06 13:44 (4) 05:43 102	14:46 (4) 16:28 (4) 20:32 14:47 (4) 05:24 62
12	07:25 16:49 54	15:13 (5) 16:07 (6) 07:00 17:27 148	13:07 (4) 15:35 (4) 18:01 13:06 (4) 06:15 196	12:36 (4) 15:52 (4) 19:35 12:34 (4) 06:23 180	13:44 (4) 16:44 (4) 20:07 13:46 (4) 05:42 100	14:47 (4) 16:27 (4) 20:33 14:48 (4) 05:23 62
13	07:24 16:50 72	14:06 (4) 16:06 (6) 07:00 17:28 150	13:06 (4) 15:36 (4) 18:02 13:04 (4) 06:14 198	12:34 (4) 15:52 (4) 19:36 12:35 (4) 06:22 178	13:46 (4) 16:44 (4) 20:08 13:48 (4) 05:41 98	14:48 (4) 16:26 (4) 20:33 14:49 (4) 05:23 60
14	07:24 16:51 80	14:02 (4) 16:04 (6) 07:00 17:30 152	13:04 (4) 15:36 (4) 18:03 13:03 (4) 06:12 198	12:35 (4) 15:53 (4) 19:37 12:33 (4) 06:20 174	13:48 (4) 16:42 (4) 20:09 13:51 (4) 05:40 96	14:49 (4) 16:25 (4) 20:34 14:50 (4) 05:23 60
15	07:24 16:52 88	13:57 (4) 16:03 (6) 07:00 17:31 156	13:03 (4) 15:39 (4) 18:04 13:02 (4) 06:10 200	12:33 (4) 15:53 (4) 19:38 12:32 (4) 06:19 172	13:51 (4) 16:43 (4) 20:10 13:55 (4) 05:39 94	14:50 (4) 16:24 (4) 20:34 14:51 (4) 05:23 60
16	07:23 16:53 92	13:55 (4) 16:01 (6) 07:00 17:32 158	13:02 (4) 15:40 (4) 18:05 13:00 (4) 06:09 200	12:33 (4) 15:53 (4) 19:39 12:31 (4) 06:17 166	13:55 (4) 16:41 (4) 20:11 13:58 (4) 05:38 92	14:51 (4) 16:25 (4) 20:35 14:53 (4) 05:23 60
17	07:23 16:54 94	13:52 (4) 15:58 (5) 07:00 17:33 160	13:00 (4) 15:40 (4) 18:06 12:59 (4) 06:07 200	12:31 (4) 15:51 (4) 19:40 12:32 (4) 06:15 164	13:58 (4) 16:42 (4) 20:12 14:00 (4) 05:37 90	14:53 (4) 16:25 (4) 20:35 14:54 (4) 05:23 60
18	07:22 16:56 100	13:50 (4) 16:00 (5) 07:00 17:35 162	12:59 (4) 15:41 (4) 18:07 12:57 (4) 06:05 200	12:32 (4) 15:52 (4) 19:41 12:30 (4) 06:14 160	14:00 (4) 16:40 (4) 20:13 14:03 (4) 05:36 90	14:54 (4) 16:24 (4) 20:35 14:55 (4) 05:24 60
19	07:22 16:57 104	13:47 (4) 15:59 (5) 07:00 17:36 164	12:57 (4) 15:41 (4) 18:09 12:56 (4) 06:04 202	12:30 (4) 15:52 (4) 19:43 12:30 (4) 06:12 158	14:03 (4) 16:41 (4) 20:14 14:05 (4) 05:35 88	14:55 (4) 16:23 (4) 20:36 14:56 (4) 05:24 58
20	07:21 16:58 108	13:44 (4) 15:58 (5) 07:00 17:37 166	12:56 (4) 15:42 (4) 18:10 12:54 (4) 06:02 202	12:30 (4) 15:52 (4) 19:44 12:29 (4) 06:11 154	14:05 (4) 16:39 (4) 20:15 14:08 (4) 05:34 86	14:56 (4) 16:22 (4) 20:36 14:57 (4) 05:24 58
21	07:21 16:59 112	13:42 (4) 15:58 (5) 07:00 17:38 170	12:54 (4) 15:44 (4) 18:11 12:55 (4) 06:00 204	12:29 (4) 15:53 (4) 19:45 12:29 (4) 06:09 152	14:08 (4) 16:40 (4) 20:16 14:10 (4) 05:33 84	14:57 (4) 16:21 (4) 20:36 14:58 (4) 05:24 58
22	07:20 17:00 114	13:41 (4) 15:57 (5) 07:00 17:39 170	12:55 (4) 15:45 (4) 18:12 12:53 (4) 05:59 204	12:29 (4) 15:53 (4) 19:46 12:29 (4) 06:08 148	14:10 (4) 16:38 (4) 20:17 14:13 (4) 05:33 82	14:58 (4) 16:22 (4) 20:37 15:00 (4) 05:24 58
23	07:19 17:02 116	13:38 (4) 15:56 (5) 07:00 17:41 172	12:53 (4) 15:45 (4) 18:13 12:52 (4) 05:57 202	12:29 (4) 15:51 (4) 19:47 12:27 (4) 06:06 146	14:13 (4) 16:39 (4) 20:18 14:15 (4) 05:32 80	15:00 (4) 16:22 (4) 20:37 15:01 (4) 05:25 58
24	07:19 17:03 120	13:35 (4) 15:55 (5) 07:00 17:42 174	12:52 (4) 15:46 (4) 18:14 12:50 (4) 05:55 204	12:27 (4) 15:51 (4) 19:48 12:28 (4) 06:05 142	14:15 (4) 16:37 (4) 20:19 14:18 (4) 05:31 80	15:01 (4) 16:21 (4) 20:37 15:02 (4) 05:25 60
25	07:18 17:04 118	13:35 (4) 15:55 (5) 07:00 17:43 176	12:50 (4) 15:46 (4) 18:15 12:49 (4) 05:53 204	12:28 (4) 15:52 (4) 19:49 12:28 (4) 06:03 140	14:18 (4) 16:38 (4) 20:20 14:21 (4) 05:30 78	15:02 (4) 16:20 (4) 20:37 15:03 (4) 05:26 60
26	07:17 17:05 122	13:32 (4) 15:54 (5) 07:00 17:44 178	12:49 (4) 15:47 (4) 18:16 12:49 (4) 05:52 204	12:28 (4) 15:52 (4) 19:50 12:26 (4) 06:02 136	14:21 (4) 16:37 (4) 20:21 14:23 (4) 05:30 76	15:02 (4) 16:20 (4) 20:37 15:03 (4) 05:26 60
27	07:16 17:07 126	13:31 (4) 15:53 (5) 07:00 17:45 180	12:49 (4) 15:47 (4) 18:17 12:48 (4) 05:50 204	12:26 (4) 15:50 (4) 19:51 12:27 (4) 06:01 132	14:23 (4) 16:35 (4) 20:22 14:24 (4) 05:29 74	15:03 (4) 16:19 (4) 20:37 15:05 (4) 05:26 60
28	07:15 17:08 120	13:30 (4) 15:50 (5) 07:00 17:47 180	12:48 (4) 15:48 (4) 18:18 12:48 (4) 05:50 204	12:27 (4) 15:51 (4) 19:52 12:27 (4) 06:01 132	14:24 (4) 16:36 (4) 20:23 14:27 (4) 05:29 74	15:04 (4) 16:19 (4) 20:37 15:05 (4) 05:26 60
29	07:14 17:09 116	13:27 (4) 15:47 (5) 07:00 17:48 180	12:47 (4) 15:47 (4) 18:19 12:47 (4) 05:50 204	12:26 (4) 15:51 (4) 19:53 12:27 (4) 06:01 128	14:27 (4) 16:35 (4) 20:24 14:27 (4) 05:28 74	15:04 (4) 16:18 (4) 20:37 15:06 (4) 05:27 60
30	07:14 17:10 110	13:26 (4) 15:46 (4) 07:00 17:49 180	12:46 (4) 15:46 (4) 18:20 12:46 (4) 05:50 202	12:26 (4) 15:51 (4) 19:54 12:26 (4) 06:01 126	14:28 (4) 16:34 (4) 20:25 14:30 (4) 05:28 72	15:05 (4) 16:18 (4) 20:37 15:07 (4) 05:27 62
31	07:13 17:11 112	13:25 (4) 15:45 (4) 07:00 17:50 180	12:45 (4) 15:45 (4) 18:21 12:45 (4) 05:50 202	12:25 (4) 15:51 (4) 19:55 12:25 (4) 06:01 126	14:30 (4) 16:33 (4) 20:26 14:32 (4) 05:28 70	15:06 (4) 16:17 (4) 20:38 15:08 (4) 05:27 62
Potential sun hours	296	296	369	399	450	454
Total, worst case	2712	4256	6112	5032	2930	1862

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: O - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December
1	05:27 20:37	15:18 (4) 05:52	14:56 (4) 06:23	13:40 (4) 06:54	13:14 (4) 06:29	12:39 (4) 07:05
2	05:28 20:37	15:19 (4) 05:53	14:55 (4) 06:24	13:37 (4) 06:55	13:14 (4) 06:31	12:41 (4) 07:06
3	05:28 20:37	15:17 (4) 05:54	14:54 (4) 06:25	13:34 (4) 06:56	13:15 (4) 06:32	12:42 (4) 07:07
4	05:29 20:36	15:18 (4) 05:55	14:53 (4) 06:26	13:31 (4) 06:57	13:16 (4) 06:33	12:43 (4) 07:08
5	05:29 20:36	15:18 (4) 05:56	14:50 (4) 06:27	13:28 (4) 06:59	13:15 (4) 06:34	12:44 (4) 07:09
6	05:30 20:36	15:17 (4) 05:57	14:49 (4) 06:28	13:27 (4) 07:00	13:16 (4) 06:36	12:48 (4) 07:10
7	05:31 20:36	15:18 (4) 05:58	14:48 (4) 06:30	13:26 (4) 07:01	13:17 (4) 06:37	12:49 (4) 07:11
8	05:31 20:35	15:16 (4) 05:59	14:45 (4) 06:31	13:23 (4) 07:02	13:16 (4) 06:38	12:50 (4) 07:12
9	05:32 20:35	15:17 (4) 06:00	14:44 (4) 06:32	13:22 (4) 07:03	13:17 (4) 06:39	12:52 (4) 07:13
10	05:33 20:35	15:16 (4) 06:01	14:43 (4) 06:33	13:21 (4) 07:04	13:18 (4) 06:40	12:53 (4) 07:14
11	05:33 20:34	15:16 (4) 06:02	14:40 (4) 06:34	13:20 (4) 07:05	13:18 (4) 06:42	12:56 (4) 07:15
12	05:34 20:34	15:15 (4) 06:03	14:39 (4) 06:35	13:19 (4) 07:06	13:19 (4) 06:43	12:58 (4) 07:15
13	05:35 20:33	15:14 (4) 06:04	14:36 (4) 06:36	13:18 (4) 07:07	13:20 (4) 06:44	12:59 (4) 07:16
14	05:36 20:33	15:14 (4) 06:05	14:33 (4) 06:37	13:17 (4) 07:08	13:21 (4) 06:45	13:02 (4) 07:17
15	05:36 20:32	15:13 (4) 06:06	14:32 (4) 06:38	13:16 (4) 07:10	13:20 (4) 06:46	13:04 (4) 07:18
16	05:37 20:31	15:12 (4) 06:07	14:29 (4) 06:39	13:17 (4) 07:11	13:21 (4) 06:48	13:05 (4) 07:19
17	05:38 20:31	15:13 (4) 06:08	14:26 (4) 06:40	13:16 (4) 07:12	13:23 (4) 06:49	13:08 (4) 07:19
18	05:39 20:30	15:12 (4) 06:09	14:25 (4) 06:41	13:15 (4) 07:13	13:24 (4) 06:50	13:09 (4) 07:20
19	05:40 20:29	15:10 (4) 06:10	14:22 (4) 06:42	13:14 (4) 07:14	13:25 (4) 06:51	13:13 (4) 07:21
20	05:40 20:29	15:09 (4) 06:11	14:19 (4) 06:43	13:15 (4) 07:15	13:26 (4) 06:53	13:16 (4) 07:21
21	05:41 20:28	15:08 (4) 06:12	14:16 (4) 06:44	13:14 (4) 07:16	13:25 (4) 06:54	13:17 (4) 07:22
22	05:42 20:27	15:07 (4) 06:13	14:13 (4) 06:45	13:13 (4) 07:18	13:27 (4) 06:55	13:20 (4) 07:22
23	05:43 20:26	15:08 (4) 06:14	14:10 (4) 06:46	13:14 (4) 07:19	13:28 (4) 06:56	13:24 (4) 07:23
24	05:44 20:25	15:07 (4) 06:15	14:07 (4) 06:47	13:13 (4) 07:20	13:29 (4) 06:57	13:27 (4) 07:23
25	05:45 20:24	15:06 (4) 06:16	14:03 (4) 06:48	13:14 (4) 06:21	12:30 (4) 06:58	13:30 (4) 07:24
26	05:46 20:24	15:05 (4) 06:17	14:00 (4) 06:49	13:13 (4) 06:22	12:32 (4) 07:00	13:33 (4) 07:24
27	05:47 20:23	15:03 (4) 06:18	13:55 (4) 06:50	13:14 (4) 06:23	12:33 (4) 07:01	13:37 (4) 07:24
28	05:48 20:22	15:02 (4) 06:19	13:52 (4) 06:51	13:13 (4) 06:25	12:34 (4) 07:02	13:42 (4) 07:25
29	05:49 20:21	15:01 (4) 06:20	13:49 (4) 06:52	13:14 (4) 06:26	12:35 (4) 07:03	13:47 (4) 07:25
30	05:50 20:20	15:00 (4) 06:21	13:46 (4) 06:53	13:13 (4) 06:27	12:37 (4) 07:04	14:54 (5) 07:25
31	05:51 20:19	14:57 (4) 06:22	13:43 (4) 06:54	13:11 (4) 06:28	12:38 (4) 07:05	15:48 (6) 07:25
Potential sun hours	461	429	375	345	296	286
Total, worst case	2400	4240	5984	5426	3368	1836

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: P - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26 16:38	14:30 (5) 15:16 (5)	07:12 17:13	09:26 (4) 10:58 (4)	06:35 17:48	08:44 (4) 19:23
2	07:26 16:39	14:33 (5) 15:17 (5)	07:11 17:14	09:25 (4) 11:01 (4)	06:33 17:49	08:45 (4) 19:24
3	07:26 16:40	14:32 (5) 15:16 (5)	07:10 17:16	09:22 (4) 11:04 (4)	06:32 17:50	08:43 (4) 19:25
4	07:26 16:41	14:34 (5) 15:16 (5)	07:09 17:17	09:21 (4) 11:05 (4)	06:30 17:51	08:41 (4) 19:26
5	07:26 16:42	14:34 (5) 15:16 (5)	07:08 17:18	09:20 (4) 11:08 (4)	06:29 17:53	08:40 (4) 19:27
6	07:26 16:43	14:36 (5) 15:16 (5)	07:06 17:19	09:16 (4) 11:10 (4)	06:27 17:54	08:40 (4) 19:28
7	07:26 16:44	14:36 (5) 15:16 (5)	07:05 17:21	09:15 (4) 11:11 (4)	06:25 17:55	08:38 (4) 19:29
8	07:26 16:45	14:38 (5) 15:16 (5)	07:04 17:22	09:14 (4) 11:14 (4)	06:24 17:56	08:37 (4) 19:31
9	07:25 16:46	14:40 (5) 15:16 (5)	07:03 17:23	09:11 (4) 11:17 (4)	06:22 17:57	08:37 (4) 19:32
10	07:25 16:47	14:39 (5) 15:15 (5)	07:02 17:24	09:10 (4) 11:18 (4)	06:20 17:58	08:35 (4) 19:33
11	07:25 16:48	14:41 (5) 15:15 (5)	07:01 17:26	09:08 (4) 11:20 (4)	06:19 18:00	08:36 (4) 19:34
12	07:25 16:49	14:43 (5) 15:15 (5)	06:59 17:27	09:07 (4) 11:21 (4)	06:17 18:01	08:34 (4) 19:35
13	07:24 16:50	14:44 (5) 15:14 (5)	06:58 17:28	09:06 (4) 11:24 (4)	06:15 18:02	08:32 (4) 19:36
14	07:24 16:51	14:48 (5) 15:14 (5)	06:57 17:30	09:04 (4) 11:24 (4)	06:14 18:03	08:33 (4) 19:37
15	07:24 16:52	14:49 (5) 15:11 (5)	06:55 17:31	09:03 (4) 11:27 (4)	06:12 18:04	08:31 (4) 19:38
16	07:23 16:53	14:51 (5) 15:09 (5)	06:54 17:32	09:02 (4) 11:28 (4)	06:10 18:05	08:31 (4) 19:39
17	07:23 16:54	14:56 (5) 15:06 (5)	06:53 17:33	09:00 (4) 11:30 (4)	06:09 18:06	08:30 (4) 19:40
18	07:22 16:56	15:06 (5) 17:35	06:51 17:35	08:59 (4) 11:31 (4)	06:07 18:07	08:30 (4) 19:41
19	07:22 16:57	17:35 17:36	06:50 17:36	08:57 (4) 11:33 (4)	06:05 18:09	08:28 (4) 19:43
20	07:21 16:58	17:36 17:37	06:48 17:37	08:56 (4) 11:34 (4)	06:04 18:10	08:28 (4) 19:44
21	07:21 16:59	17:37 17:38	06:47 17:38	08:54 (4) 11:36 (4)	06:02 18:11	08:27 (4) 19:45
22	07:20 17:00	17:38 17:39	06:46 17:39	08:53 (4) 11:37 (4)	06:00 18:12	08:27 (4) 19:46
23	07:19 17:02	17:39 17:40	06:45 17:41	08:51 (4) 11:37 (4)	05:59 18:13	08:25 (4) 19:47
24	07:19 17:03	17:40 17:41	06:44 17:42	08:50 (4) 11:40 (4)	05:57 18:14	08:25 (4) 19:48
25	07:18 17:04	17:41 17:42	06:43 17:43	08:48 (4) 11:40 (4)	05:55 18:15	08:24 (4) 19:49
26	07:17 17:05	17:42 17:43	06:42 17:44	08:47 (4) 11:43 (4)	05:53 18:16	08:24 (4) 19:50
27	07:16 17:06	17:43 17:44	06:41 17:45	08:46 (4) 11:43 (4)	05:52 18:17	08:22 (4) 19:51
28	07:15 17:07	17:44 17:45	06:40 17:46	08:45 (4) 11:44 (4)	05:50 18:18	08:23 (4) 19:52
29	07:14 17:08	17:45 17:46	06:39 17:47	08:44 (4) 11:44 (4)	05:49 18:19	08:23 (4) 19:53
30	07:14 17:09	17:46 17:47	06:38 17:48	08:43 (4) 11:45 (4)	05:48 18:20	08:23 (4) 19:54
31	07:13 17:10	17:47 17:48	06:37 17:49	08:42 (4) 11:45 (4)	05:47 18:21	08:23 (4) 19:55
Potential sun hours	296	296	369	399	450	454
Total, worst case	1120	3918	6322	6466	4074	3028

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:  
**OMBRA**

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Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** P - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

**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

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

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

	July	August	September	October	November	December						
1	05:27 20:37	09:34 (4) 20:17	05:52 136	09:28 (4) 19:33	06:23 224	09:16 (4) 13:00 (4)	06:54 18:42	09:12 (4) 202	06:29 16:54	08:39 (4) 128	07:05 16:29	14:23 (5) 34
2	05:28 20:37	09:33 (4) 20:16	05:53 140	09:27 (4) 19:32	06:24 224	09:15 (4) 12:59 (4)	06:55 18:40	09:14 (4) 198	06:31 16:53	08:41 (4) 124	07:06 16:29	14:24 (5) 34
3	05:28 20:37	09:33 (4) 20:15	05:54 140	09:28 (4) 19:30	06:25 224	09:14 (4) 12:58 (4)	06:56 18:39	09:13 (4) 198	06:32 16:52	08:44 (4) 120	07:07 16:29	14:23 (5) 36
4	05:29 20:36	09:34 (4) 20:14	05:55 144	09:27 (4) 19:28	06:26 224	09:15 (4) 12:59 (4)	06:57 18:37	09:14 (4) 196	06:33 16:51	08:45 (4) 116	07:08 16:28	14:22 (5) 38
5	05:29 20:36	09:34 (4) 20:13	05:56 146	09:26 (4) 19:27	06:27 224	09:14 (4) 12:58 (4)	06:59 18:35	09:15 (4) 194	06:34 16:49	08:46 (4) 114	07:09 16:28	14:21 (5) 40
6	05:30 20:36	09:33 (4) 20:12	05:57 148	09:27 (4) 19:25	06:28 224	09:13 (4) 12:57 (4)	07:00 18:34	09:14 (4) 194	06:36 16:48	08:50 (4) 108	07:10 16:28	14:22 (5) 40
7	05:31 20:36	09:34 (4) 20:10	05:58 152	09:26 (4) 19:23	06:30 222	09:14 (4) 12:56 (4)	07:01 18:32	09:15 (4) 192	06:37 16:47	08:51 (4) 104	07:11 16:28	14:21 (5) 42
8	05:31 20:35	09:34 (4) 20:09	05:59 154	09:25 (4) 19:22	06:31 224	09:13 (4) 12:57 (4)	07:02 18:30	09:16 (4) 188	06:38 16:46	08:52 (4) 100	07:12 16:28	14:22 (5) 42
9	05:32 20:35	09:33 (4) 20:08	06:00 156	09:26 (4) 19:20	06:32 222	09:14 (4) 12:56 (4)	07:03 18:29	09:15 (4) 188	06:39 16:45	08:56 (4) 96	07:13 16:28	14:21 (5) 44
10	05:33 20:35	09:34 (4) 20:07	06:01 160	09:25 (4) 19:18	06:33 222	09:13 (4) 12:55 (4)	07:04 18:27	09:16 (4) 186	06:40 16:44	08:57 (4) 92	07:14 16:28	14:22 (5) 44
11	05:33 20:34	09:34 (4) 20:05	06:02 166	09:24 (4) 19:17	06:34 222	09:12 (4) 12:54 (4)	07:05 18:25	09:18 (4) 184	06:42 16:43	09:00 (4) 86	07:15 16:28	14:21 (5) 46
12	05:34 20:34	09:33 (4) 20:04	06:03 168	09:25 (4) 19:15	06:35 220	09:13 (4) 12:53 (4)	07:06 18:24	09:17 (4) 182	06:43 16:42	09:04 (4) 80	07:16 16:28	14:22 (5) 46
13	05:35 20:33	09:34 (4) 20:02	06:04 174	09:24 (4) 19:13	06:36 220	09:12 (4) 12:52 (4)	07:07 18:22	09:18 (4) 180	06:44 16:41	09:07 (4) 74	07:16 16:28	14:22 (5) 46
14	05:36 20:33	09:32 (4) 20:01	06:05 180	09:23 (4) 19:11	06:37 218	09:13 (4) 12:51 (4)	07:08 18:20	09:19 (4) 178	06:45 16:40	09:08 (4) 70	07:17 16:28	14:21 (5) 48
15	05:36 20:32	09:33 (4) 20:00	06:06 186	09:22 (4) 19:10	06:38 218	09:12 (4) 12:50 (4)	07:10 18:19	09:20 (4) 174	06:46 16:39	09:12 (4) 64	07:18 16:29	14:22 (5) 48
16	05:37 20:31	09:32 (4) 19:58	06:07 194	09:23 (4) 19:08	06:39 218	09:11 (4) 12:49 (4)	07:11 18:17	09:21 (4) 172	06:48 16:38	09:17 (4) 54	07:19 16:29	14:23 (5) 48
17	05:38 20:31	09:33 (4) 19:57	06:08 204	09:22 (4) 19:06	06:40 216	09:12 (4) 12:48 (4)	07:12 18:16	09:21 (4) 172	06:49 16:37	09:20 (4) 48	07:19 16:29	14:23 (5) 48
18	05:39 20:30	09:32 (4) 19:55	06:09 210	09:21 (4) 19:04	06:41 216	09:11 (4) 12:47 (4)	07:13 18:14	09:22 (4) 168	06:50 16:37	09:25 (4) 38	07:20 16:30	14:24 (5) 48
19	05:40 20:29	09:32 (4) 19:54	06:10 214	09:22 (4) 19:03	06:42 214	09:12 (4) 12:46 (4)	07:14 18:13	09:23 (4) 166	06:51 16:36	09:33 (4) 24	07:21 16:30	14:22 (5) 50
20	05:40 20:29	09:31 (4) 19:52	06:11 216	09:21 (4) 19:01	06:43 214	09:11 (4) 12:45 (4)	07:15 18:11	09:24 (4) 164	06:53 16:35	09:34 (4) 24	07:22 16:30	14:23 (5) 50
21	05:41 20:28	09:32 (4) 19:51	06:12 218	09:20 (4) 18:59	06:44 212	09:12 (4) 12:44 (4)	07:16 18:10	09:25 (4) 160	06:54 16:34	09:35 (4) 24	07:23 16:31	14:24 (5) 50
22	05:42 20:27	09:31 (4) 19:49	06:13 218	09:21 (4) 18:57	06:45 212	09:11 (4) 12:43 (4)	07:18 18:08	09:27 (4) 158	06:55 16:34	09:36 (4) 24	07:24 16:31	14:24 (5) 50
23	05:43 20:26	09:32 (4) 19:48	06:14 220	09:20 (4) 18:56	06:46 210	09:12 (4) 12:42 (4)	07:19 18:07	09:28 (4) 154	06:56 16:33	09:37 (4) 24	07:25 16:32	14:25 (5) 50
24	05:44 20:25	09:31 (4) 19:46	06:15 222	09:19 (4) 18:54	06:47 210	09:11 (4) 12:41 (4)	07:20 18:05	09:29 (4) 152	06:57 16:32	09:38 (4) 24	07:26 16:32	14:25 (5) 50
25	05:45 20:24	09:30 (4) 19:45	06:16 224	09:17 (4) 18:52	06:48 208	09:12 (4) 12:40 (4)	07:21 17:04	09:30 (4) 150	06:58 16:32	09:39 (4) 10	07:27 16:33	14:26 (5) 48
26	05:46 20:24	09:31 (4) 19:43	06:17 222	09:18 (4) 18:51	06:49 208	09:13 (4) 12:39 (4)	07:22 17:02	09:31 (4) 146	06:59 16:31	09:40 (4) 16	07:28 16:33	14:27 (5) 48
27	05:47 20:23	09:32 (4) 19:42	06:18 224	09:19 (4) 18:49	06:50 206	09:14 (4) 12:38 (4)	07:23 17:01	09:32 (4) 144	07:01 16:31	09:41 (4) 22	07:29 16:34	14:28 (5) 48
28	05:48 20:22	09:30 (4) 19:40	06:19 224	09:16 (4) 18:47	06:51 206	09:11 (4) 12:36 (4)	07:24 17:00	09:33 (4) 140	07:02 16:30	09:42 (4) 24	07:30 16:35	14:28 (5) 48
29	05:49 20:21	09:31 (4) 19:38	06:20 224	09:17 (4) 18:45	06:52 204	09:12 (4) 12:35 (4)	07:25 16:58	09:34 (4) 138	07:03 16:30	09:43 (4) 30	07:31 16:36	14:29 (5) 48
30	05:50 20:20	09:32 (4) 19:37	06:21 224	09:18 (4) 18:44	06:53 202	09:13 (4) 12:34 (4)	07:26 16:57	09:35 (4) 134	07:04 16:30	09:44 (4) 32	07:32 16:36	14:28 (5) 48
31	05:51 20:19	09:29 (4) 19:35	06:22 226	09:15 (4) 18:01 (4)	06:54 202	09:14 (4) 12:33 (4)	07:27 16:56	09:36 (4) 132	07:05 16:30	09:45 (4) 32	07:33 16:37	14:29 (5) 46
Potential sun hours	461	429	375	345	296	286	286	286	286	286	286	286
Total, worst case	3532	5834	6488	5284	1774	1406						

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: Q - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 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	06:26 19:28	06:57 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	05:51 20:00	05:25 20:29	05:29 20:36	05:56 20:13	06:27 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	06:36 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 17:24	06:20 17:58	06:28 19:33	05:45 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	05:44 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	07:16 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 20:03	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	05:23 20:34	05:36 20:33	06:05 20:01	06:37 19:11	07:08 18:20	06:45 16:40	07:17 16:28
15	07:24 16:52	06:55 17:31	06:12 18:04	06:20 19:38	05:40 20:10	05:23 20:34	05:36 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 16:53	06:54 17:32	06:10 18:05	06:19 19:39	05:39 20:11	05:23 20:35	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	06:48 16:38	07:19 16:29
17	07:23 16:54	06:53 17:33	06:09 18:06	06:17 19:40	05:38 20:12	05:23 20:35	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	06:49 16:37	07:19 16:29
18	07:22 16:56	06:51 17:35	06:07 18:07	06:15 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	07:21 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	06:53 16:35	07:21 16:30
21	07:21 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:34 20:16	05:24 20:36	05:41 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 17:00	06:46 17:39	06:00 18:12	06:09 19:46	05:34 20:17	05:24 20:37	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	07:19 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 16:32	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	07:21 17:04	06:58 16:32	07:24 16:33
26	07:17 17:05	06:40 17:44	05:53 18:16	06:03 19:50	05:31 20:21	05:25 20:37	05:46 20:24	06:17 19:43	06:49 18:51	07:22 17:02	07:00 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 20:23	06:18 19:42	06:50 18:49	07:23 17:01	07:01 16:31	07:24 16:34
28	07:15 17:08	06:37 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	07:24 17:00	07:02 16:30	07:25 16:35
29	07:15 17:09		06:48 19:20	05:59 19:53	05:29 20:23	05:26 20:37	05:49 20:21	06:20 19:38	06:52 18:45	07:25 16:58	07:03 16:30	07:25 16:36
30	07:14 17:10		06:47 19:21	05:58 19:55	05:28 20:24	05:27 20:37	05:50 20:20	06:21 19:37	06:53 18:44	07:26 16:57	07:04 16:30	07:25 16:36
31	07:13 17:12		06:45 19:22		05:27 20:25		05:51 20:19	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	296	286
Total, worst case												

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

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

Project:  
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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: R - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26 16:38	07:12 17:13	16:44 (7) 17:48	06:35 17:48	16:20 (6) 19:23	05:57 19:56
2	07:26 16:39	07:11 17:14	16:43 (7) 17:49	06:33 17:49	16:19 (6) 19:24	05:55 19:57
3	07:26 16:40	07:10 17:16	16:42 (7) 17:50	06:32 17:50	16:19 (6) 19:25	05:54 19:58
4	07:26 16:41	07:09 17:17	16:43 (7) 17:51	06:30 17:51	16:19 (6) 19:26	05:53 19:59
5	07:26 16:42	07:08 17:18	16:42 (7) 17:53	06:29 17:53	16:18 (6) 19:27	05:51 20:00
6	07:26 16:43	07:06 17:19	16:40 (7) 17:54	06:27 17:54	16:18 (6) 19:28	05:50 20:01
7	07:26 16:44	07:05 17:21	16:41 (7) 17:55	06:25 17:55	16:18 (6) 19:29	05:49 20:02
8	07:26 16:45	07:04 17:22	16:42 (7) 17:56	06:24 17:56	16:19 (6) 19:31	05:48 20:03
9	07:25 16:46	07:03 17:23	16:41 (7) 17:57	06:22 17:57	16:19 (6) 19:32	05:46 20:04
10	07:25 16:47	07:02 17:24	16:42 (7) 17:58	06:20 17:58	16:19 (6) 19:33	05:45 20:05
11	07:25 16:48	07:01 17:26	16:42 (7) 18:00	06:19 18:00	16:20 (6) 19:34	05:44 20:06
12	07:25 16:49	06:59 17:27	16:43 (7) 18:01	06:17 18:01	16:20 (6) 19:35	05:43 20:07
13	07:24 16:50	06:58 17:28	16:44 (7) 18:02	06:15 18:02	16:20 (6) 19:36	05:42 20:08
14	07:24 16:51	06:57 17:30	16:38 (6) 18:03	06:14 18:03	16:21 (6) 19:37	05:41 20:09
15	07:24 16:52	06:55 17:31	16:35 (6) 18:04	06:12 18:04	16:23 (6) 19:38	05:40 20:10
16	07:23 16:53	06:54 17:32	16:34 (6) 18:05	06:10 18:05	16:23 (6) 19:39	05:39 20:11
17	07:23 16:54	06:53 17:33	16:30 (6) 18:06	06:09 18:06	16:26 (6) 19:40	05:38 20:12
18	07:22 16:56	06:51 17:35	16:29 (6) 18:07	06:07 18:07	16:26 (6) 19:41	05:37 20:13
19	07:22 16:57	06:50 17:36	16:27 (6) 18:09	06:05 18:09	16:28 (6) 19:43	05:36 20:14
20	07:21 16:58	06:48 17:37	16:26 (6) 18:10	06:04 18:10	16:30 (6) 19:44	05:35 20:15
21	07:21 16:59	06:47 17:38	16:24 (6) 18:11	06:02 18:11	16:33 (6) 19:45	05:34 20:16
22	07:20 17:00	06:46 17:39	16:25 (6) 18:12	06:00 18:12	16:37 (6) 19:46	05:34 20:17
23	07:19 17:02	06:44 17:41	16:23 (6) 18:13	05:59 18:13	16:51 (6) 19:47	05:33 20:18
24	07:19 17:03	06:43 17:42	16:22 (6) 18:14	05:57 18:14	16:51 (6) 19:48	05:32 20:19
25	07:18 17:04	06:41 17:43	16:22 (6) 18:15	05:55 18:15	16:51 (6) 19:49	05:31 20:20
26	07:17 17:05	06:40 17:44	16:21 (6) 18:16	05:53 18:16	16:51 (6) 19:50	05:31 20:21
27	07:16 17:07	06:38 17:46	16:21 (6) 18:17	05:52 18:17	16:51 (6) 19:51	05:30 20:22
28	07:15 17:08	06:37 17:47	16:20 (6) 18:19	05:50 18:19	16:51 (6) 19:52	05:29 20:23
29	07:14 17:09		06:48 19:20	05:59 19:20	19:53	05:29 20:23
30	07:14 17:10		06:47 19:21	05:58 19:21	19:55	05:28 20:24
31	07:13 17:12	16:45 (7) 16:49 (7)	06:45 19:22	05:57 19:22	19:55	05:27 20:25
Potential sun hours	296	296	369	399	450	454
Total, worst case	4	848	1044			

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: R - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December		
1	05:27 20:37	05:52 20:17	06:23 19:33	06:54 18:42	17:01 (6) 17:51 (6)	06:29 16:54	16:11 (7) 16:29 (7)	07:05 16:29
2	05:28 20:37	05:53 20:16	06:24 19:32	06:55 18:40	16:58 (6) 17:52 (6)	06:31 16:53	16:11 (7) 16:29 (7)	07:06 16:29
3	05:28 20:37	05:54 20:15	06:25 19:30	06:56 18:39	16:57 (6) 17:51 (6)	06:32 16:52	16:10 (7) 16:28 (7)	07:07 16:29
4	05:29 20:36	05:55 20:14	06:26 19:28	06:57 18:37	16:56 (6) 17:52 (6)	06:33 16:51	16:11 (7) 16:27 (7)	07:08 16:29
5	05:29 20:36	05:56 20:13	06:27 19:27	06:59 18:35	16:55 (6) 17:51 (6)	06:34 16:49	16:10 (7) 16:24 (7)	07:09 16:28
6	05:30 20:36	05:57 20:12	06:29 19:25	07:00 18:34	16:56 (6) 17:52 (6)	06:36 16:48	16:12 (7) 16:24 (7)	07:10 16:28
7	05:31 20:36	05:58 20:10	06:30 19:23	07:01 18:32	16:55 (6) 17:51 (6)	06:37 16:47	16:11 (7) 16:23 (7)	07:11 16:28
8	05:31 20:35	05:59 20:09	06:31 19:22	07:02 18:30	16:54 (6) 17:52 (6)	06:38 16:46	16:12 (7) 16:22 (7)	07:12 16:28
9	05:32 20:35	06:00 20:08	06:32 19:20	07:03 18:29	16:53 (6) 17:51 (6)	06:39 16:45	16:14 (7) 16:20 (7)	07:13 16:28
10	05:33 20:35	06:01 20:07	06:33 19:18	07:04 18:27	16:52 (6) 17:50 (6)	06:40 16:44	16:15 (7) 16:19 (7)	07:14 16:28
11	05:33 20:34	06:02 20:05	06:34 19:17	07:05 18:25	16:54 (6) 17:52 (6)	06:42 16:43	16:16 (7) 16:20 (7)	07:15 16:28
12	05:34 20:34	06:03 20:04	06:35 19:15	07:06 18:24	16:53 (6) 17:51 (6)	06:43 16:42	07:15 16:28	07:15 16:28
13	05:35 20:33	06:04 20:02	06:36 19:13	07:07 18:22	16:52 (6) 17:50 (6)	06:44 16:41	07:16 16:28	07:16 16:28
14	05:36 20:33	06:05 20:01	06:37 19:11	07:08 18:20	16:53 (6) 17:49 (6)	06:45 16:40	07:17 16:28	07:17 16:28
15	05:36 20:32	06:06 20:00	06:38 19:10	07:10 18:19	16:52 (6) 17:48 (6)	06:46 16:39	07:18 16:29	07:18 16:29
16	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	16:53 (6) 17:47 (6)	06:48 16:38	07:19 16:29	07:19 16:29
17	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	16:53 (6) 17:47 (6)	06:49 16:37	07:19 16:29	07:19 16:29
18	05:39 20:30	06:09 19:55	06:41 19:04	07:13 18:14	16:54 (6) 17:46 (6)	06:50 16:37	07:20 16:30	07:20 16:30
19	05:40 20:29	06:10 19:54	06:42 19:03	07:14 18:13	16:55 (6) 17:45 (6)	06:51 16:36	07:21 16:30	07:21 16:30
20	05:41 20:29	06:11 19:52	06:43 19:01	07:15 18:11	16:56 (6) 17:44 (6)	06:53 16:35	07:21 16:30	07:21 16:30
21	05:41 20:28	06:12 19:51	06:44 18:59	07:16 18:10	16:55 (6) 17:43 (6)	06:54 16:34	07:22 16:31	07:22 16:31
22	05:42 20:27	06:13 19:49	06:45 18:58	07:18 18:08	16:57 (6) 17:41 (6)	06:55 16:34	07:22 16:31	07:22 16:31
23	05:43 20:26	06:14 19:48	06:46 18:56	07:19 18:07	16:58 (6) 17:40 (6)	06:56 16:33	07:23 16:32	07:23 16:32
24	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:05	16:59 (6) 17:39 (6)	06:57 16:32	07:23 16:32	07:23 16:32
25	05:45 20:24	06:16 19:45	06:48 18:52	07:21 18:04	16:59 (6) 17:38 (6)	06:58 16:32	07:24 16:33	07:24 16:33
26	05:46 20:24	06:17 19:43	06:49 18:51	07:22 18:03	16:59 (6) 17:37 (6)	06:59 16:31	07:24 16:34	07:24 16:34
27	05:47 20:23	06:18 19:42	06:50 18:49	07:23 18:02	16:59 (6) 17:36 (6)	07:00 16:30	07:24 16:34	07:24 16:34
28	05:48 20:22	06:19 19:40	06:51 18:47	07:24 18:01	16:59 (6) 17:35 (6)	07:01 16:29	07:24 16:34	07:24 16:34
29	05:49 20:21	06:20 19:38	06:52 18:45	07:25 18:00	16:59 (6) 17:34 (6)	07:02 16:28	07:25 16:34	07:25 16:34
30	05:50 20:20	06:21 19:37	06:53 18:44	07:26 17:59	16:59 (6) 17:33 (6)	07:03 16:27	07:25 16:34	07:25 16:34
31	05:51 20:19	06:22 19:35	06:54 18:43	07:27 17:58	16:59 (6) 17:32 (6)	07:04 16:26	07:25 16:34	07:25 16:34
Potential sun hours	461	429	375	345	296	132	286	
Total, worst case			356	1446				

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:  
**OMBRA**

Printed/Page  
24/04/2020 08:06 / 30

Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** S - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

**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

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

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

	January	February	March	April	May	June
1	07:26 16:38 154	12:56 (5) 07:12 16:06 (6) 17:13 198	12:40 (5) 06:35 16:14 (6) 17:48 188	12:22 (5) 06:43 15:30 (5) 19:23 162	13:38 (5) 05:57 16:20 (5) 19:56 50	14:58 (5) 05:27 15:48 (5) 20:26 15:01 (5) 05:26
2	07:26 16:39 154	12:57 (5) 07:11 16:07 (6) 17:14 200	12:40 (5) 06:32 16:15 (6) 17:49 190	12:21 (5) 06:40 15:31 (5) 19:24 158	13:42 (5) 05:54 16:18 (5) 19:57 46	15:03 (5) 05:26 15:47 (5) 20:27 15:03 (5) 05:26
3	07:26 16:40 158	12:56 (5) 07:10 16:08 (6) 17:16 198	12:40 (5) 06:32 16:14 (6) 17:50 190	12:21 (5) 06:38 15:31 (5) 19:25 156	13:42 (5) 05:54 16:18 (5) 19:58 40	15:03 (5) 05:26 15:43 (5) 20:27 15:04 (5) 05:26
4	07:26 16:41 158	12:56 (5) 07:09 16:08 (6) 17:17 198	12:39 (5) 06:30 16:13 (6) 17:51 190	12:21 (5) 06:38 15:31 (5) 19:26 150	13:47 (5) 05:53 16:17 (5) 19:59 38	15:04 (5) 05:26 15:42 (5) 20:28 15:07 (5) 05:25
5	07:26 16:42 160	12:56 (5) 07:08 16:08 (6) 17:18 196	12:38 (5) 06:29 16:12 (6) 17:53 190	12:20 (5) 06:37 15:30 (5) 19:27 146	13:49 (5) 05:51 16:15 (5) 20:00 34	15:07 (5) 05:25 15:10 (5) 05:25 15:10 (5) 05:25
6	07:26 16:43 166	12:56 (5) 07:06 16:18 (7) 17:19 196	12:36 (5) 06:27 16:10 (6) 17:54 190	12:20 (5) 06:35 15:30 (5) 19:28 142	13:53 (5) 05:50 16:15 (5) 20:01 28	15:10 (5) 05:25 15:38 (5) 20:29 15:15 (5) 05:25
7	07:26 16:44 166	12:56 (5) 07:05 16:18 (7) 17:21 192	12:35 (5) 06:25 16:07 (6) 17:55 192	12:18 (5) 06:33 15:30 (5) 19:29 136	13:58 (5) 05:49 16:14 (5) 20:02 20	15:15 (5) 05:25 15:35 (5) 20:30 15:20 (5) 05:24
8	07:26 16:45 170	12:56 (5) 07:04 16:18 (7) 17:22 188	12:36 (5) 06:24 16:06 (6) 17:56 192	12:19 (5) 06:32 15:31 (5) 19:31 134	14:00 (5) 05:48 16:14 (5) 20:03 10	15:20 (5) 05:24 15:30 (5) 20:31 15:30 (5) 20:31
9	07:25 16:46 174	12:56 (5) 07:03 16:20 (7) 17:23 184	12:35 (5) 06:22 16:03 (6) 17:57 190	12:19 (5) 06:30 15:29 (5) 19:32 130	14:03 (5) 05:46 16:13 (5) 20:04 10	15:30 (5) 20:31 15:41 (5) 20:31 15:41 (5) 20:31
10	07:25 16:47 172	12:55 (5) 07:02 16:19 (7) 17:24 170	12:34 (5) 06:20 15:24 (5) 17:58 192	12:17 (5) 06:28 15:29 (5) 19:33 124	14:07 (5) 05:45 16:11 (5) 20:05 10	15:45 (5) 20:32 15:45 (5) 20:32 15:45 (5) 20:32
11	07:25 16:48 178	12:55 (5) 07:01 16:21 (7) 17:26 170	12:34 (5) 06:19 15:24 (5) 18:00 192	12:18 (5) 06:27 15:30 (5) 19:34 122	14:09 (5) 05:44 16:11 (5) 20:06 10	15:44 (5) 20:32 15:44 (5) 20:32 15:44 (5) 20:32
12	07:25 16:49 184	12:53 (5) 06:59 16:23 (7) 17:27 172	12:33 (5) 06:17 15:25 (5) 18:01 192	12:18 (5) 06:25 15:30 (5) 19:35 116	14:14 (5) 05:43 16:10 (5) 20:07 10	15:43 (5) 20:32 15:43 (5) 20:33 15:43 (5) 20:33
13	07:24 16:50 186	12:52 (5) 06:58 16:24 (7) 17:28 174	12:32 (5) 06:15 15:26 (5) 18:02 190	12:18 (5) 06:23 15:28 (5) 19:36 112	14:16 (5) 05:42 16:08 (5) 20:08 10	15:42 (5) 20:33 15:42 (5) 20:33 15:42 (5) 20:33
14	07:24 16:51 188	12:52 (5) 06:57 16:26 (7) 17:30 176	12:30 (5) 06:14 15:26 (5) 18:03 192	12:17 (5) 06:22 15:29 (5) 19:37 110	14:19 (5) 05:41 16:09 (5) 20:09 10	15:41 (5) 20:34 15:41 (5) 20:34 15:41 (5) 20:34
15	07:24 16:52 190	12:51 (5) 06:55 16:25 (7) 17:31 176	12:31 (5) 06:12 15:27 (5) 18:04 192	12:17 (5) 06:20 15:29 (5) 19:38 106	14:21 (5) 05:40 16:07 (5) 20:10 10	15:40 (5) 20:34 15:40 (5) 20:34 15:40 (5) 20:34
16	07:23 16:53 192	12:51 (5) 06:54 16:27 (7) 17:32 178	12:30 (5) 06:10 15:28 (5) 18:05 190	12:17 (5) 06:19 15:27 (5) 19:39 102	14:23 (5) 05:39 16:05 (5) 20:11 10	15:39 (5) 20:35 15:39 (5) 20:35 15:39 (5) 20:35
17	07:23 16:54 196	12:50 (5) 06:53 16:28 (7) 17:33 180	12:28 (5) 06:09 15:28 (5) 18:06 190	12:18 (5) 06:17 15:28 (5) 19:40 100	14:26 (5) 05:38 16:06 (5) 20:12 10	15:38 (5) 20:35 15:38 (5) 20:35 15:38 (5) 20:35
18	07:22 16:56 198	12:50 (5) 06:51 16:30 (7) 17:35 178	12:29 (5) 06:07 15:27 (5) 18:07 190	12:18 (5) 06:15 15:28 (5) 19:41 96	14:28 (5) 05:37 16:04 (5) 20:13 10	15:37 (5) 20:35 15:37 (5) 20:35 15:37 (5) 20:35
19	07:22 16:57 202	12:49 (5) 06:50 16:31 (7) 17:36 180	12:27 (5) 06:05 15:27 (5) 18:09 188	12:18 (5) 06:14 15:26 (5) 19:43 92	14:31 (5) 05:36 16:03 (5) 20:14 10	15:36 (5) 20:35 15:36 (5) 20:36 15:36 (5) 20:36
20	07:21 16:58 204	12:48 (5) 06:48 16:32 (7) 17:37 180	12:28 (5) 06:04 15:28 (5) 18:10 188	12:18 (5) 06:12 15:26 (5) 19:44 88	14:33 (5) 05:35 16:01 (5) 20:15 10	15:35 (5) 20:36 15:35 (5) 20:36 15:35 (5) 20:36
21	07:21 16:59 206	12:48 (5) 06:47 16:34 (7) 17:38 182	12:26 (5) 06:02 15:28 (5) 18:11 188	12:19 (5) 06:11 15:27 (5) 19:45 84	14:36 (5) 05:34 16:00 (5) 20:16 10	15:34 (5) 20:36 15:34 (5) 20:36 15:34 (5) 20:36
22	07:20 17:00 208	12:47 (5) 06:46 16:35 (7) 17:39 184	12:25 (5) 06:00 15:29 (5) 18:12 186	12:19 (5) 06:09 15:25 (5) 19:46 82	14:38 (5) 05:34 16:00 (5) 20:17 10	15:33 (5) 20:37 15:33 (5) 20:37 15:33 (5) 20:37
23	07:19 17:02 212	12:46 (5) 06:44 16:36 (7) 17:41 184	12:25 (5) 05:59 15:29 (5) 18:13 184	12:21 (5) 06:08 15:25 (5) 19:47 78	14:41 (5) 05:33 15:59 (5) 20:18 10	15:32 (5) 20:37 15:32 (5) 20:37 15:32 (5) 20:37
24	07:19 17:03 212	12:45 (5) 06:43 16:35 (7) 17:42 186	12:24 (5) 05:57 15:30 (5) 18:14 182	12:22 (5) 06:06 15:24 (5) 19:48 74	14:43 (5) 05:32 15:57 (5) 20:19 10	15:31 (5) 20:37 15:31 (5) 20:37 15:31 (5) 20:37
25	07:18 17:04 210	12:47 (5) 06:41 16:37 (7) 17:43 186	12:24 (5) 05:55 15:30 (5) 18:15 182	12:22 (5) 06:05 15:24 (5) 19:49 72	14:44 (5) 05:31 15:56 (5) 20:20 10	15:30 (5) 20:37 15:30 (5) 20:37 15:30 (5) 20:37
26	07:17 17:05 210	12:46 (5) 06:40 16:36 (7) 17:44 188	12:23 (5) 05:53 15:31 (5) 18:16 180	12:24 (5) 06:03 15:24 (5) 19:50 68	14:47 (5) 05:31 15:55 (5) 20:21 10	15:29 (5) 20:37 15:29 (5) 20:37 15:29 (5) 20:37
27	07:16 17:07 210	12:45 (5) 06:38 16:35 (7) 17:46 186	12:23 (5) 05:52 15:29 (5) 18:17 176	12:26 (5) 06:02 15:22 (5) 19:51 64	14:49 (5) 05:30 15:53 (5) 20:22 10	15:28 (5) 20:37 15:28 (5) 20:37 15:28 (5) 20:37
28	07:15 17:08 204	12:44 (5) 06:37 16:32 (7) 17:47 188	12:22 (5) 05:50 15:30 (5) 18:19 176	12:27 (5) 06:01 15:23 (5) 19:52 60	14:52 (5) 05:29 15:52 (5) 20:23 10	15:27 (5) 20:37 15:27 (5) 20:37 15:27 (5) 20:37
29	07:15 17:09 198	12:43 (5) 06:36 16:17 (6) 17:48 192	12:21 (5) 05:48 15:30 (5) 18:20 172	13:29 (5) 05:59 16:21 (5) 19:53 56	14:55 (5) 05:29 15:51 (5) 20:23 10	15:26 (5) 20:37 15:26 (5) 20:37 15:26 (5) 20:37
30	07:14 17:10 198	12:42 (5) 06:35 16:16 (6) 17:49 192	12:20 (5) 05:47 15:31 (5) 18:21 170	13:31 (5) 05:58 16:21 (5) 19:55 54	14:55 (5) 05:28 15:49 (5) 20:24 10	15:25 (5) 20:37 15:25 (5) 20:37 15:25 (5) 20:37
31	07:13 17:12 198	12:41 (5) 06:34 16:15 (6) 17:50 192	12:19 (5) 05:46 15:32 (5) 18:22 166	13:34 (5) 05:59 16:20 (5) 19:56 50	14:57 (5) 05:27 15:48 (5) 20:25 10	15:24 (5) 20:37 15:24 (5) 20:37 15:24 (5) 20:37
Potential sun hours	296	296	369	399	450	454
Total, worst case	5816	5168	5770	3174	266	

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:  
OMBRA

Printed/Page  
24/04/2020 08:06 / 31

Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: S - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December						
1	05:27 20:37	05:52 20:17	06:23 19:33	14:08 (5) 16:10 (5)	06:54 18:42	12:57 (5) 16:09 (5)	06:29 16:54	12:03 (5) 15:27 (6)	07:05 16:29	12:37 (5) 16:03 (7)		
2	05:28 20:37	05:53 20:16	06:24 19:32	14:05 (5) 16:09 (5)	06:55 18:40	12:56 (5) 16:08 (5)	06:31 16:53	12:05 (5) 15:33 (6)	07:06 16:29	12:38 (5) 16:04 (7)		
3	05:28 20:37	05:54 20:15	06:25 19:30	14:02 (5) 16:10 (5)	06:56 18:39	12:57 (5) 16:09 (5)	06:32 16:52	12:06 (5) 15:36 (6)	07:07 16:29	12:39 (5) 16:03 (7)		
4	05:29 20:36	05:55 20:14	06:26 19:28	13:57 (5) 16:11 (5)	06:57 18:37	12:56 (5) 16:08 (5)	06:33 16:51	12:05 (5) 15:37 (6)	07:08 16:29	12:40 (5) 16:02 (7)		
5	05:29 20:36	05:56 20:13	06:27 19:27	15:28 (5) 15:42 (5)	06:27 19:27	13:54 (5) 16:10 (5)	06:59 18:35	12:55 (5) 16:07 (5)	06:34 16:49	12:06 (5) 15:40 (6)	07:09 16:28	12:41 (5) 16:03 (7)
6	05:30 20:36	05:57 20:12	06:29 19:25	15:23 (5) 15:45 (5)	06:29 19:25	13:49 (5) 16:11 (5)	07:00 18:34	12:56 (5) 16:06 (5)	06:36 16:48	12:08 (5) 15:42 (6)	07:10 16:28	12:42 (5) 16:04 (7)
7	05:31 20:36	05:58 20:10	06:30 19:23	15:20 (5) 15:48 (5)	06:30 19:23	13:46 (5) 16:10 (5)	07:01 18:32	12:55 (5) 16:07 (5)	06:37 16:47	12:09 (5) 15:43 (6)	07:11 16:28	12:43 (5) 15:55 (6)
8	05:31 20:35	05:59 20:09	06:31 19:22	15:17 (5) 15:51 (5)	06:31 19:22	13:41 (5) 16:11 (5)	07:02 18:30	12:54 (5) 16:06 (5)	06:38 16:46	12:10 (5) 15:44 (6)	07:12 16:28	12:44 (5) 15:56 (6)
9	05:32 20:35	06:00 20:08	06:32 19:20	15:14 (5) 15:52 (5)	06:32 19:20	13:38 (5) 16:12 (5)	07:03 18:29	12:55 (5) 16:05 (5)	06:39 16:45	12:10 (5) 15:46 (6)	07:13 16:28	12:45 (5) 15:57 (6)
10	05:33 20:35	06:01 20:07	06:33 19:18	15:11 (5) 15:53 (5)	06:33 19:18	13:33 (5) 16:11 (5)	07:04 18:27	12:54 (5) 16:04 (5)	06:40 16:44	12:11 (5) 15:45 (6)	07:14 16:28	12:46 (5) 15:56 (6)
11	05:33 20:34	06:02 20:05	06:34 19:17	15:08 (5) 15:56 (5)	06:34 19:17	13:30 (5) 16:12 (5)	07:05 18:25	12:56 (5) 16:04 (5)	06:42 16:43	12:12 (5) 15:46 (6)	07:15 16:28	12:47 (5) 15:57 (6)
12	05:34 20:34	06:03 20:04	06:35 19:15	15:07 (5) 15:57 (5)	06:35 19:15	13:27 (5) 16:11 (5)	07:06 18:24	12:55 (5) 16:05 (5)	06:43 16:42	12:14 (5) 15:48 (6)	07:16 16:28	12:48 (5) 15:58 (6)
13	05:35 20:33	06:04 20:02	06:36 19:13	15:04 (5) 15:58 (5)	06:36 19:13	13:24 (5) 16:12 (5)	07:07 18:22	12:56 (5) 16:04 (5)	06:44 16:41	12:15 (5) 15:49 (6)	07:16 16:28	12:48 (5) 15:58 (6)
14	05:36 20:33	06:05 20:01	06:37 19:11	15:01 (5) 15:59 (5)	06:37 19:11	13:21 (5) 16:11 (5)	07:08 18:20	12:55 (5) 16:03 (5)	06:45 16:40	12:16 (5) 15:46 (6)	07:17 16:28	12:49 (5) 15:57 (6)
15	05:36 20:32	06:06 20:00	06:38 19:10	14:58 (5) 16:00 (5)	06:38 19:10	13:18 (5) 16:12 (5)	07:10 18:19	12:56 (5) 16:02 (5)	06:47 16:39	12:18 (5) 15:48 (6)	07:18 16:29	12:50 (5) 15:58 (6)
16	05:37 20:31	06:07 19:58	06:39 19:08	14:57 (5) 16:01 (5)	06:39 19:08	13:15 (5) 16:11 (5)	07:11 18:17	12:55 (5) 16:01 (5)	06:48 16:38	12:19 (5) 15:49 (6)	07:19 16:29	12:51 (5) 15:59 (6)
17	05:38 20:31	06:08 19:57	06:40 19:06	14:54 (5) 16:02 (5)	06:40 19:06	13:12 (5) 16:12 (5)	07:12 18:16	12:57 (5) 16:01 (5)	06:49 16:37	12:20 (5) 15:46 (6)	07:19 16:29	12:51 (5) 15:59 (6)
18	05:39 20:30	06:09 19:55	06:41 19:04	14:51 (5) 16:03 (5)	06:41 19:04	13:11 (5) 16:11 (5)	07:13 18:14	12:56 (5) 16:02 (5)	06:50 16:37	12:19 (5) 15:47 (6)	07:20 16:30	12:54 (5) 16:00 (6)
19	05:40 20:29	06:10 19:54	06:42 19:03	14:48 (5) 16:04 (5)	06:42 19:03	13:08 (5) 16:12 (5)	07:14 18:13	12:57 (5) 16:01 (5)	06:51 16:36	12:21 (5) 15:48 (6)	07:21 16:30	12:54 (5) 16:00 (6)
20	05:41 20:29	06:11 19:52	06:43 19:01	14:47 (5) 16:05 (5)	06:43 19:01	13:07 (5) 16:11 (5)	07:15 18:11	12:56 (5) 16:00 (5)	06:53 16:35	12:22 (5) 15:49 (6)	07:21 16:30	12:55 (5) 16:01 (6)
21	05:41 20:28	06:12 19:51	06:44 18:59	14:44 (5) 16:04 (5)	06:44 18:59	13:06 (5) 16:10 (5)	07:16 18:10	12:57 (5) 15:59 (5)	06:54 16:34	12:23 (5) 15:46 (6)	07:22 16:30	12:56 (5) 16:02 (6)
22	05:42 20:27	06:13 19:49	06:45 18:58	14:41 (5) 16:05 (5)	06:45 18:58	13:05 (5) 16:11 (5)	07:18 18:08	12:57 (5) 15:59 (5)	06:55 16:34	12:24 (5) 15:47 (6)	07:22 16:31	12:56 (5) 16:02 (6)
23	05:43 20:26	06:14 19:48	06:46 18:56	14:38 (5) 16:06 (5)	06:46 18:56	13:02 (5) 16:10 (5)	07:19 18:07	12:58 (5) 15:58 (5)	06:56 16:33	12:26 (5) 15:48 (6)	07:23 16:32	12:56 (5) 16:02 (6)
24	05:44 20:25	06:15 19:46	06:47 18:54	14:35 (5) 16:07 (5)	06:47 18:54	13:01 (5) 16:11 (5)	07:20 18:05	12:59 (5) 15:57 (5)	06:57 16:32	12:27 (5) 15:49 (6)	07:23 16:32	12:57 (5) 16:03 (6)
25	05:45 20:24	06:16 19:45	06:48 18:52	14:32 (5) 16:08 (5)	06:48 18:52	13:00 (5) 16:10 (5)	06:21 17:04	11:58 (5) 14:56 (5)	06:58 16:32	12:28 (5) 15:46 (6)	07:24 16:33	12:57 (5) 16:03 (6)
26	05:46 20:24	06:17 19:43	06:49 18:51	14:28 (5) 16:08 (5)	06:49 18:51	12:59 (5) 16:09 (5)	06:22 17:02	12:00 (5) 14:56 (5)	07:00 16:31	12:29 (5) 15:47 (6)	07:24 16:34	12:58 (5) 16:04 (6)
27	05:47 20:23	06:18 19:42	06:50 18:49	14:25 (5) 16:07 (5)	06:50 18:49	13:00 (5) 16:10 (5)	06:23 17:01	12:01 (5) 14:55 (5)	07:01 16:31	12:31 (5) 15:48 (6)	07:24 16:34	12:56 (5) 16:04 (6)
28	05:48 20:22	06:19 19:40	06:51 18:47	14:22 (5) 16:08 (5)	06:51 18:47	12:59 (5) 16:09 (5)	06:25 17:00	12:00 (5) 14:56 (5)	07:02 16:30	12:32 (5) 15:49 (6)	07:25 16:35	12:56 (5) 16:04 (6)
29	05:49 20:21	06:20 19:38	06:52 18:45	14:19 (5) 16:09 (5)	06:52 18:45	12:58 (5) 16:08 (5)	06:26 16:58	12:01 (5) 14:55 (5)	07:03 16:30	12:33 (5) 15:46 (6)	07:25 16:36	12:56 (5) 16:04 (6)
30	05:50 20:20	06:21 19:37	06:53 18:44	14:16 (5) 16:08 (5)	06:53 18:44	12:57 (5) 16:09 (5)	06:27 16:57	12:03 (5) 14:55 (5)	07:04 16:30	12:34 (5) 15:47 (6)	07:25 16:36	12:56 (5) 16:05 (6)
31	05:51 20:19	06:22 19:35	06:54 18:43	14:11 (5) 16:09 (5)	06:54 18:43	12:56 (5) 16:08 (5)	06:28 16:56	12:02 (5) 14:54 (5)	07:05 16:31	12:35 (5) 15:48 (6)	07:26 16:37	12:56 (5) 16:06 (6)
Potential sun hours	461	429	375	345	296	286						
Total, worst case		1896	5024	5722	5940	4800						

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: T - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26	14:36 (6) 07:12	09:14 (5) 06:35	08:46 (5) 06:43	09:30 (5) 05:57	09:30 (5) 05:27
	16:38	42 15:18 (6) 17:13	136 15:10 (6) 17:48	190 11:56 (5) 19:23	212 13:02 (5) 19:56	126 11:36 (5) 20:26
2	07:26	14:37 (6) 07:11	09:13 (5) 06:33	08:47 (5) 06:42	09:30 (5) 05:55	09:31 (5) 05:27
	16:39	42 15:19 (6) 17:14	136 15:11 (6) 17:49	190 11:57 (5) 19:24	212 13:02 (5) 19:57	122 11:33 (5) 20:27
3	07:26	14:36 (6) 07:10	09:12 (5) 06:32	08:45 (5) 06:40	09:28 (5) 05:54	09:32 (5) 05:26
	16:40	42 15:18 (6) 17:16	136 11:28 (5) 17:50	194 11:59 (5) 19:25	212 13:00 (5) 19:58	120 11:32 (5) 20:27
4	07:26	14:36 (6) 07:09	09:11 (5) 06:30	08:43 (5) 06:38	09:29 (5) 05:53	09:30 (5) 05:26
	16:41	42 15:18 (6) 17:17	138 11:29 (5) 17:51	196 11:59 (5) 19:26	212 13:01 (5) 19:59	118 11:28 (5) 20:28
5	07:26	10:02 (5) 07:08	09:10 (5) 06:29	08:44 (5) 06:37	09:29 (5) 05:51	09:31 (5) 05:25
	16:42	54 15:18 (6) 17:18	140 11:30 (5) 17:53	196 12:00 (5) 19:27	210 12:59 (5) 20:00	116 11:27 (5) 20:29
6	07:26	09:56 (5) 07:06	09:08 (5) 06:27	08:42 (5) 06:35	09:27 (5) 05:50	09:32 (5) 05:25
	16:43	66 15:18 (6) 17:19	144 11:32 (5) 17:54	198 12:00 (5) 19:28	212 12:59 (5) 20:01	114 11:26 (5) 20:29
7	07:26	09:54 (5) 07:05	09:07 (5) 06:25	08:42 (5) 06:33	09:28 (5) 05:49	09:33 (5) 05:25
	16:44	72 15:18 (6) 17:21	146 11:33 (5) 17:55	198 12:00 (5) 19:29	210 12:58 (5) 20:02	110 11:23 (5) 20:30
8	07:26	09:52 (5) 07:04	09:06 (5) 06:24	08:41 (5) 06:32	09:28 (5) 05:48	09:34 (5) 05:24
	16:45	76 15:18 (6) 17:22	148 11:34 (5) 17:56	200 12:01 (5) 19:31	208 12:56 (5) 20:03	108 11:22 (5) 20:31
9	07:25	09:50 (5) 07:03	09:05 (5) 06:22	08:41 (5) 06:30	09:29 (5) 05:46	09:32 (5) 05:24
	16:46	82 15:18 (6) 17:23	152 11:37 (5) 17:57	200 12:01 (5) 19:32	208 12:57 (5) 20:04	108 11:20 (5) 20:31
10	07:25	09:47 (5) 07:02	09:04 (5) 06:20	08:39 (5) 06:28	09:27 (5) 05:45	09:33 (5) 05:24
	16:47	86 15:19 (6) 17:24	154 11:38 (5) 17:58	202 12:01 (5) 19:33	208 12:55 (5) 20:05	104 11:17 (5) 20:32
11	07:25	09:45 (5) 07:01	09:02 (5) 06:19	08:40 (5) 06:27	09:27 (5) 05:44	09:34 (5) 05:24
	16:48	92 15:19 (6) 17:26	156 11:38 (5) 18:00	202 12:02 (5) 19:34	206 12:53 (5) 20:06	102 11:16 (5) 20:32
12	07:25	09:43 (5) 06:59	09:03 (5) 06:17	08:38 (5) 06:25	09:28 (5) 05:43	09:35 (5) 05:24
	16:49	94 15:19 (6) 17:27	158 11:41 (5) 18:01	204 12:02 (5) 19:35	202 12:50 (5) 20:07	100 11:15 (5) 20:33
13	07:24	09:40 (5) 06:58	09:02 (5) 06:15	08:38 (5) 06:23	09:28 (5) 05:42	09:34 (5) 05:24
	16:50	100 15:18 (6) 17:28	160 11:42 (5) 18:02	204 12:02 (5) 19:36	200 12:48 (5) 20:08	100 11:14 (5) 20:33
14	07:24	09:40 (5) 06:57	09:00 (5) 06:14	08:37 (5) 06:22	09:29 (5) 05:41	09:35 (5) 05:23
	16:51	100 15:18 (6) 17:30	162 11:42 (5) 18:03	206 12:03 (5) 19:37	196 12:45 (5) 20:09	96 11:11 (5) 20:34
15	07:24	09:37 (5) 06:55	08:59 (5) 06:12	08:37 (5) 06:20	09:27 (5) 05:40	09:36 (5) 05:23
	16:52	106 15:17 (6) 17:31	164 11:43 (5) 18:04	206 12:03 (5) 19:38	194 12:41 (5) 20:10	94 11:10 (5) 20:34
16	07:23	09:37 (5) 06:54	08:58 (5) 06:10	08:37 (5) 06:19	09:27 (5) 05:39	09:35 (5) 05:23
	16:53	106 15:17 (6) 17:32	168 11:46 (5) 18:05	206 12:03 (5) 19:39	188 12:35 (5) 20:11	94 11:09 (5) 20:35
17	07:23	09:34 (5) 06:53	08:56 (5) 06:09	08:36 (5) 06:17	09:28 (5) 05:38	09:37 (5) 05:23
	16:54	112 15:18 (6) 17:33	170 11:46 (5) 18:06	208 12:04 (5) 19:40	182 12:30 (5) 20:12	92 11:09 (5) 20:35
18	07:22	09:34 (5) 06:51	08:57 (5) 06:07	08:36 (5) 06:15	09:28 (5) 05:37	09:38 (5) 05:24
	16:56	114 15:18 (6) 17:35	170 11:47 (5) 18:07	208 12:04 (5) 19:41	176 12:24 (5) 20:13	90 11:08 (5) 20:35
19	07:22	09:31 (5) 06:50	08:55 (5) 06:05	08:34 (5) 06:14	09:27 (5) 05:36	09:39 (5) 05:24
	16:57	118 15:17 (6) 17:36	172 11:47 (5) 18:09	210 12:04 (5) 19:43	172 12:19 (5) 20:14	88 11:07 (5) 20:36
20	07:21	09:30 (5) 06:48	08:54 (5) 06:04	08:34 (5) 06:12	09:27 (5) 05:35	09:38 (5) 05:24
	16:58	118 15:16 (6) 17:37	176 11:50 (5) 18:10	210 12:04 (5) 19:44	166 12:13 (5) 20:15	88 11:06 (5) 20:36
21	07:21	09:30 (5) 06:47	08:52 (5) 06:02	08:33 (5) 06:11	09:28 (5) 05:34	09:39 (5) 05:24
	16:59	122 15:16 (6) 17:38	178 11:50 (5) 18:11	212 12:05 (5) 19:45	162 12:10 (5) 20:16	86 11:05 (5) 20:36
22	07:20	09:27 (5) 06:46	08:53 (5) 06:00	08:33 (5) 06:09	09:28 (5) 05:34	09:41 (5) 05:24
	17:00	124 15:15 (6) 17:39	178 11:51 (5) 18:12	212 12:05 (5) 19:46	156 12:04 (5) 20:17	82 11:03 (5) 20:37
23	07:19	09:26 (5) 06:44	08:51 (5) 05:59	08:33 (5) 06:08	09:29 (5) 05:33	09:40 (5) 05:24
	17:02	126 15:16 (6) 17:41	180 11:51 (5) 18:13	212 12:05 (5) 19:47	152 12:01 (5) 20:18	82 11:02 (5) 20:37
24	07:19	09:25 (5) 06:43	08:50 (5) 05:57	08:32 (5) 06:06	09:28 (5) 05:32	09:41 (5) 05:25
	17:03	128 15:15 (6) 17:42	182 11:52 (5) 18:14	212 12:04 (5) 19:48	150 11:58 (5) 20:19	80 11:01 (5) 20:37
25	07:18	09:23 (5) 06:41	08:50 (5) 05:55	08:32 (5) 06:05	09:28 (5) 05:31	09:40 (5) 05:25
	17:04	130 15:15 (6) 17:43	184 11:54 (5) 18:15	212 12:04 (5) 19:49	144 11:52 (5) 20:20	80 11:00 (5) 20:37
26	07:17	09:22 (5) 06:40	08:49 (5) 05:53	08:32 (5) 06:03	09:29 (5) 05:31	09:42 (5) 05:25
	17:05	132 15:14 (6) 17:44	186 11:55 (5) 18:16	212 12:04 (5) 19:50	140 11:49 (5) 20:21	78 11:00 (5) 20:37
27	07:16	09:21 (5) 06:38	08:47 (5) 05:52	08:30 (5) 06:02	09:29 (5) 05:30	09:43 (5) 05:26
	17:07	132 15:13 (6) 17:46	188 11:55 (5) 18:17	214 12:04 (5) 19:51	138 11:47 (5) 20:22	76 10:59 (5) 20:37
28	07:15	09:20 (5) 06:37	08:48 (5) 05:50	08:31 (5) 06:01	09:30 (5) 05:29	09:43 (5) 05:26
	17:08	134 15:14 (6) 17:47	188 11:56 (5) 18:19	212 12:03 (5) 19:52	134 11:44 (5) 20:23	76 10:59 (5) 20:37
29	07:15	09:19 (5) 06:36	08:48 (5) 05:49	08:31 (5) 06:00	09:29 (5) 05:29	09:44 (5) 05:26
	17:09	134 15:13 (6) 17:48	190 11:57 (5) 18:20	212 12:03 (5) 19:53	132 11:41 (5) 20:23	74 10:58 (5) 20:37
30	07:14	09:18 (5) 06:35	08:47 (5) 05:48	08:30 (5) 06:00	09:29 (5) 05:28	09:44 (5) 05:27
	17:10	136 15:12 (6) 17:49	192 11:58 (5) 18:21	214 12:03 (5) 19:54	128 11:37 (5) 20:24	74 10:58 (5) 20:37
31	07:13	09:17 (5) 06:34	08:46 (5) 05:47	08:29 (5) 06:00	09:28 (5) 05:27	09:45 (5) 05:27
	17:12	136 15:11 (6) 17:50	194 11:59 (5) 18:22	214 12:03 (5) 19:55	126 11:36 (5) 20:25	72 10:57 (5) 20:38
Potential sun hours	296	296	369	399	450	454
Total, worst case	3098	4550	6366	5422	2950	2062

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: T - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December
1	05:27 20:37	09:54 (5) 05:52	09:44 (5) 06:23	09:26 (5) 06:54	09:19 (5) 06:29	08:33 (5) 07:05
2	05:28 20:37	09:55 (5) 05:53	09:45 (5) 06:24	09:25 (5) 06:55	09:18 (5) 06:31	08:35 (5) 07:06
3	05:28 20:37	09:55 (5) 05:54	09:44 (5) 06:25	09:26 (5) 06:56	09:19 (5) 06:32	08:36 (5) 07:07
4	05:29 20:36	09:54 (5) 05:55	09:43 (5) 06:26	09:25 (5) 06:57	09:18 (5) 06:33	08:37 (5) 07:08
5	05:29 20:36	09:54 (5) 05:56	09:42 (5) 06:27	09:24 (5) 06:59	09:19 (5) 06:34	08:38 (5) 07:09
6	05:30 20:36	09:55 (5) 05:57	09:41 (5) 06:29	09:23 (5) 07:00	09:18 (5) 06:36	08:40 (5) 07:10
7	05:31 20:36	11:01 (5) 20:12	11:33 (5) 19:25	12:55 (5) 18:34	12:38 (5) 16:48	14:00 (5) 16:28
8	05:31 20:35	09:54 (5) 05:59	09:42 (5) 06:30	09:24 (5) 07:01	09:19 (5) 06:37	08:41 (5) 07:11
9	05:32 20:35	11:02 (5) 20:10	11:36 (5) 19:23	12:54 (5) 18:32	12:35 (5) 16:47	14:00 (5) 16:28
10	05:33 20:35	09:53 (5) 06:00	09:40 (5) 06:32	09:22 (5) 07:03	09:19 (5) 06:39	08:44 (5) 07:13
11	05:33 20:34	11:03 (5) 20:08	11:38 (5) 19:20	12:54 (5) 18:29	12:33 (5) 16:45	14:02 (5) 16:28
12	05:34 20:34	09:54 (5) 06:01	09:39 (5) 06:33	09:23 (5) 07:04	09:18 (5) 06:40	08:45 (5) 07:14
13	05:35 20:33	11:04 (5) 20:07	11:41 (5) 19:18	12:55 (5) 18:27	12:32 (5) 16:44	14:01 (5) 16:28
14	05:36 20:33	09:54 (5) 06:02	09:40 (5) 06:34	09:22 (5) 07:05	09:20 (5) 06:42	08:46 (5) 07:15
15	05:36 20:32	11:05 (5) 20:05	11:42 (5) 19:17	12:54 (5) 18:25	12:32 (5) 16:43	14:02 (5) 16:28
16	05:37 20:31	09:53 (5) 06:03	09:39 (5) 06:35	09:21 (5) 07:06	09:19 (5) 06:43	08:48 (5) 07:16
17	05:38 20:31	11:05 (5) 20:04	11:45 (5) 19:15	12:55 (5) 18:24	12:31 (5) 16:42	14:01 (5) 16:28
18	05:39 20:30	09:54 (5) 06:04	09:38 (5) 06:36	09:22 (5) 07:07	09:20 (5) 06:44	08:51 (5) 07:16
19	05:40 20:29	11:06 (5) 20:03	11:48 (5) 19:13	12:54 (5) 18:22	12:30 (5) 16:41	14:01 (5) 16:28
20	05:41 20:29	09:52 (5) 06:05	09:37 (5) 06:37	09:21 (5) 07:08	09:21 (5) 06:45	08:52 (5) 07:17
21	05:41 20:28	11:06 (5) 20:01	11:49 (5) 19:11	12:53 (5) 18:20	12:29 (5) 16:40	14:01 (5) 16:28
22	05:42 20:27	09:51 (5) 06:06	09:36 (5) 06:38	09:20 (5) 07:10	09:20 (5) 06:47	08:54 (5) 07:18
23	05:43 20:26	11:07 (5) 20:00	11:52 (5) 19:10	12:54 (5) 18:19	12:28 (5) 16:39	14:02 (5) 16:29
24	05:44 20:25	09:52 (5) 06:07	09:37 (5) 06:39	09:21 (5) 07:11	09:21 (5) 06:48	08:55 (5) 07:19
25	05:45 20:24	11:08 (5) 19:58	11:55 (5) 19:08	12:53 (5) 18:17	12:25 (5) 16:38	14:01 (5) 16:29
26	05:46 20:24	09:51 (5) 06:08	09:36 (5) 06:40	09:20 (5) 07:12	09:23 (5) 06:49	08:56 (5) 07:19
27	05:47 20:23	11:09 (5) 19:57	11:58 (5) 19:06	12:52 (5) 18:16	12:25 (5) 16:37	14:01 (5) 16:29
28	05:48 20:22	09:52 (5) 06:09	09:35 (5) 06:41	09:19 (5) 07:13	09:22 (5) 06:50	08:59 (5) 07:20
29	05:49 20:21	11:10 (5) 19:55	12:01 (5) 19:04	12:51 (5) 18:14	12:24 (5) 16:37	14:01 (5) 16:30
30	05:50 20:20	09:50 (5) 06:10	09:34 (5) 06:42	09:20 (5) 07:14	09:23 (5) 06:51	09:01 (5) 07:21
31	05:51 20:19	11:11 (5) 19:52	12:04 (5) 19:03	12:52 (5) 18:13	12:23 (5) 16:36	14:01 (5) 16:30
Potential sun hours	461	429	375	345	296	286
Total, worst case	2424	4480	6310	5674	3834	1544

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: U - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

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

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

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:  
OMBRA

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24/04/2020 08:06 / 35

Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: V - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:38	07:12 17:13	06:35 17:48 (7)	16:48 (7) 19:23	06:43 19:56	05:57 20:26	05:27 20:37	05:27 20:17	05:52 19:33	06:23 18:42	06:54 18:29	06:29 16:54
2	07:26 16:39	07:11 17:14	06:33 17:49	16:49 (7) 17:13 (7)	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
3	07:26 16:40	07:10 17:16	06:32 17:50	16:51 (7) 17:11 (7)	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
4	07:26 16:41	07:09 17:17	06:30 17:51	16:53 (7) 17:09 (7)	06:38 19:26	05:53 19:59	05:26 20:28	05:29 20:36	05:55 20:14	06:26 19:28	06:58 18:37	06:33 16:51
5	07:26 16:42	07:08 17:18	06:29 17:53	16:56 (7) 17:06 (7)	06:37 19:27	05:51 20:00	05:25 20:29	05:29 20:36	05:56 20:13	06:28 19:27	06:59 18:35	06:34 16:50
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	06:36 16:48
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
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
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
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 20:35	06:01 20:07	06:33 19:18	07:04 18:27	06:40 16:44
11	07:25 16:48	07:01 17:26	06:19 17:00 (7)	18:00 17:04 (7)	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
12	07:25 16:49	06:59 17:27	16:55 (7) 17:03 (7)	18:01 18:01	06:17 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
13	07:24 16:50	06:58 17:28	16:54 (7) 17:06 (7)	18:02 18:02	06:15 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
14	07:24 16:51	06:57 17:30	16:52 (7) 17:06 (7)	18:03 18:03	06:14 19:37	05:41 20:09	05:23 20:34	05:36 20:33	06:05 20:01	06:37 19:11	07:08 18:20	06:45 16:40
15	07:24 16:52	06:55 17:31	16:51 (7) 17:07 (7)	18:02 18:04	06:12 19:38	05:40 20:10	05:23 20:34	05:36 20:32	06:06 20:00	06:38 19:10	07:10 18:19	06:47 16:39
16	07:23 16:53	06:54 17:32	16:50 (7) 17:10 (7)	18:01 18:05	06:10 19:39	05:39 20:11	05:23 20:35	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	06:48 16:38
17	07:23 16:55	06:53 17:33	16:48 (7) 17:10 (7)	18:09 18:06	06:09 19:40	05:38 20:12	05:23 20:35	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	06:49 16:37
18	07:22 16:56	06:51 17:35	16:47 (7) 17:11 (7)	18:07 18:07	06:15 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
19	07:22 16:57	06:50 17:36	16:47 (7) 17:13 (7)	18:05 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
20	07:21 16:58	06:48 17:37	16:46 (7) 17:14 (7)	18:04 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	06:53 16:35
21	07:21 16:59	06:47 17:38	16:46 (7) 17:16 (7)	18:02 18:11	06:11 19:45	05:34 20:16	05:24 20:36	05:41 20:28	06:12 19:51	06:44 18:59	07:16 18:10	06:54 16:34
22	07:20 17:00	06:46 17:39	16:45 (7) 17:17 (7)	18:00 18:12	06:09 19:46	05:34 20:17	05:24 20:37	05:42 20:27	06:13 19:49	06:45 18:58	07:18 18:08	06:55 16:34
23	07:19 17:02	06:44 17:41	16:45 (7) 17:17 (7)	18:05 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
24	07:19 17:03	06:43 17:42	16:46 (7) 17:18 (7)	18:04 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 16:32
25	07:18 17:04	06:41 17:43	16:46 (7) 17:18 (7)	18:05 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
26	07:17 17:05	06:40 17:44	16:47 (7) 17:17 (7)	18:06 18:16	06:04 19:50	05:31 20:21	05:25 20:37	05:46 20:24	06:17 19:43	06:49 18:51	06:22 17:02	07:00 16:31
27	07:16 17:07	06:38 17:46	16:47 (7) 17:17 (7)	18:07 18:17	06:02 19:51	05:30 20:22	05:26 20:37	05:47 20:23	06:18 19:42	06:50 18:49	06:23 17:01	07:01 16:31
28	07:15 17:08	06:37 17:47	16:48 (7) 17:16 (7)	18:08 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 16:30
29	07:15 17:09		06:48 19:20		05:59 19:53	05:29 20:23	05:26 20:37	05:49 20:21	06:20 19:38	06:52 18:45	06:26 16:58	07:03 16:30
30	07:14 17:10		06:47 19:21		05:58 19:55	05:28 20:24	05:27 20:37	05:50 20:20	06:21 19:37	06:53 18:44	06:27 16:57	07:04 16:30
31	07:13 17:12		06:45 19:22			05:28 20:25		05:51 20:19	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	520	296
Total, worst case		420	96									286

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:  
**OMBRA**

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24/04/2020 08:06 / 36

Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** W - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

**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

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

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

	January	February	March	April	May	June
1	07:26 16:38 136	12:30 (6) 07:12 17:13 200	12:22 (6) 06:35 17:48 188	12:12 (6) 06:43 15:20 (6) 19:23	13:56 (6) 05:57 16:02 (6) 19:56	05:27 20:26 05:27
2	07:26 16:39 138	12:31 (6) 07:11 17:14 198	12:21 (6) 06:33 17:49 190	12:11 (6) 06:42 15:21 (6) 19:24	13:58 (6) 05:55 16:00 (6) 19:57	05:27 20:27 05:26
3	07:26 16:40 138	12:31 (6) 07:10 17:16 196	12:22 (6) 06:32 17:50 190	12:11 (6) 06:40 15:21 (6) 19:25	14:02 (6) 05:54 16:00 (6) 19:58	05:26 20:27 05:26
4	07:26 16:41 144	12:30 (6) 07:09 17:17 196	12:21 (6) 06:30 17:51 188	12:11 (6) 06:38 15:19 (6) 19:26	14:07 (6) 05:53 15:59 (6) 19:59	05:26 20:28 05:25
5	07:26 16:42 144	12:30 (6) 07:08 17:18 196	12:20 (6) 06:29 17:53 188	12:12 (6) 06:37 15:20 (6) 19:27	14:09 (6) 05:51 15:57 (6) 20:00	05:25 20:29 05:25
6	07:26 16:43 148	12:30 (6) 07:06 17:19 190	12:20 (6) 06:27 17:54 188	12:12 (6) 06:35 15:20 (6) 19:28	14:13 (6) 05:50 15:57 (6) 20:01	05:25 20:29 05:25
7	07:26 16:44 148	12:30 (6) 07:05 17:21 188	12:19 (6) 06:25 17:55 188	12:10 (6) 06:33 15:18 (6) 19:29	14:16 (6) 05:49 15:56 (6) 20:02	05:25 20:30 05:24
8	07:26 16:45 152	12:30 (6) 07:04 17:22 176	12:20 (6) 06:24 17:56 188	12:11 (6) 06:32 15:19 (6) 19:31	14:20 (6) 05:48 15:54 (6) 20:03	05:24 20:31 05:24
9	07:25 16:46 154	12:30 (6) 07:03 17:23 178	12:19 (6) 06:22 17:57 188	12:11 (6) 06:30 15:19 (6) 19:32	14:23 (6) 05:47 15:53 (6) 20:04	05:24 20:31 05:24
10	07:25 16:47 158	12:29 (6) 07:02 17:25 180	12:18 (6) 06:20 17:58 186	12:11 (6) 06:28 15:17 (6) 19:33	14:27 (6) 05:45 15:51 (6) 20:05	05:24 20:32 05:24
11	07:25 16:48 160	12:29 (6) 07:01 17:26 180	12:18 (6) 06:19 18:00 186	12:12 (6) 06:27 15:18 (6) 19:34	14:29 (6) 05:44 15:49 (6) 20:06	05:24 20:32 05:24
12	07:25 16:49 164	12:29 (6) 06:59 17:27 182	12:17 (6) 06:17 18:01 186	12:12 (6) 06:25 15:18 (6) 19:35	14:32 (6) 05:43 15:48 (6) 20:07	05:24 20:33 05:24
13	07:24 16:50 166	12:28 (6) 06:58 17:28 182	12:18 (6) 06:15 18:02 184	12:12 (6) 06:23 15:16 (6) 19:36	14:36 (6) 05:42 15:46 (6) 20:08	05:24 20:33 05:23
14	07:24 16:51 168	12:28 (6) 06:57 17:30 184	12:16 (6) 06:14 18:03 184	12:13 (6) 06:22 15:17 (6) 19:37	14:39 (6) 05:41 15:45 (6) 20:09	05:23 20:34 05:23
15	07:24 16:52 168	12:29 (6) 06:55 17:31 182	12:17 (6) 06:12 18:04 180	12:15 (6) 06:20 15:15 (6) 19:38	14:41 (6) 05:40 15:43 (6) 20:10	05:23 20:34 05:23
16	07:23 16:53 172	12:29 (6) 06:54 17:32 184	12:16 (6) 06:10 18:05 180	12:15 (6) 06:19 15:15 (6) 19:39	14:43 (6) 05:39 15:41 (6) 20:11	05:23 20:35 05:23
17	07:23 16:55 174	12:28 (6) 06:53 17:33 184	12:16 (6) 06:09 18:06 180	12:16 (6) 06:17 15:16 (6) 19:40	14:48 (6) 05:38 15:40 (6) 20:12	05:23 20:35 05:24
18	07:22 16:56 178	12:28 (6) 06:51 17:35 186	12:15 (6) 06:07 18:07 176	12:18 (6) 06:15 15:14 (6) 19:42	14:50 (6) 05:37 15:38 (6) 20:13	05:24 20:35 05:24
19	07:22 16:57 180	12:27 (6) 06:50 17:36 186	12:15 (6) 06:05 18:09 176	12:18 (6) 06:14 15:14 (6) 19:43	14:55 (6) 05:36 15:35 (6) 20:14	05:24 20:36 05:24
20	07:21 16:58 184	12:26 (6) 06:48 17:37 186	12:14 (6) 06:04 18:10 172	12:20 (6) 06:12 15:12 (6) 19:44	14:57 (6) 05:35 15:33 (6) 20:15	05:24 20:36 05:24
21	07:21 16:59 184	12:28 (6) 06:47 17:38 186	12:14 (6) 06:02 18:11 172	12:21 (6) 06:11 15:13 (6) 19:45	15:02 (6) 05:34 15:30 (6) 20:16	05:24 20:36 05:24
22	07:20 17:00 186	12:27 (6) 06:46 17:39 188	12:13 (6) 06:00 18:12 168	12:23 (6) 06:09 15:11 (6) 19:46	15:06 (6) 05:34 15:26 (6) 20:17	05:24 20:37 05:24
23	07:19 17:02 190	12:26 (6) 06:44 17:41 188	12:13 (6) 05:59 18:13 166	12:25 (6) 06:08 15:11 (6) 19:47	05:33 20:18 15:08 (6) 20:19	05:24 20:37 05:25
24	07:19 17:03 192	12:25 (6) 06:43 17:42 190	12:12 (6) 05:57 18:14 162	12:28 (6) 06:06 15:10 (6) 19:48	05:32 20:19 15:06 (6) 20:20	05:25 20:37 05:25
25	07:18 17:04 196	12:25 (6) 06:41 17:43 188	12:12 (6) 05:55 18:15 158	12:30 (6) 06:05 15:08 (6) 19:49	05:31 20:20 15:06 (6) 20:21	05:25 20:37 05:25
26	07:17 17:05 194	12:26 (6) 06:40 17:44 188	12:13 (6) 05:53 18:16 154	12:34 (6) 06:04 15:08 (6) 19:50	05:31 20:21 15:06 (6) 20:22	05:25 20:37 05:26
27	07:16 17:07 196	12:25 (6) 06:38 17:46 190	12:11 (6) 05:52 18:17 150	12:36 (6) 06:02 15:06 (6) 19:51	05:30 20:22 15:06 (6) 20:23	05:26 20:37 05:26
28	07:15 17:08 198	12:24 (6) 06:37 17:47 190	12:12 (6) 05:50 18:19 146	12:41 (6) 06:01 15:07 (6) 19:52	05:29 20:23 15:07 (6) 20:24	05:26 20:37 05:26
29	07:15 17:09 198	12:23 (6) 06:36 17:48 192	12:13 (6) 05:49 18:20 142	13:43 (6) 05:59 16:05 (6) 19:53	05:29 20:23 15:08 (6) 20:25	05:26 20:37 05:27
30	07:14 17:10 198	12:24 (6) 06:35 17:49 192	12:14 (6) 05:48 18:21 136	13:47 (6) 05:58 16:03 (6) 19:55	05:28 20:24 15:09 (6) 20:26	05:27 20:37 05:27
31	07:13 17:12 198	12:23 (6) 06:34 17:50 192	12:15 (6) 05:47 18:22 132	13:52 (6) 05:57 16:04 (6) 19:56	05:28 20:25 15:10 (6) 20:27	05:27 20:37 05:27
Potential sun hours	296	296	369	399	450	454
Total, worst case	5304	5242	5372	5694		

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: W - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December				
1	05:27 20:37	05:52 20:17	06:23 19:33	14:28 (6) 15:48 (6)	06:54 18:42	12:53 (6) 16:54	06:29 180	11:47 (6) 14:47 (6)	07:05 16:29	12:11 (6) 16:03 (7)
2	05:28 20:37	05:53 20:16	06:24 19:32	14:25 (6) 15:49 (6)	06:55 18:40	12:52 (6) 15:56 (6)	06:31 178	11:49 (6) 14:47 (6)	07:06 16:29	12:12 (6) 16:04 (7)
3	05:28 20:37	05:54 20:15	06:25 19:30	14:20 (6) 15:50 (6)	06:56 18:39	12:51 (6) 15:57 (6)	06:32 178	11:48 (6) 14:46 (6)	07:07 16:29	12:13 (6) 16:03 (7)
4	05:29 20:36	05:55 20:14	06:26 19:28	14:17 (6) 15:51 (6)	06:58 18:37	12:50 (6) 15:56 (6)	06:33 188	11:49 (6) 16:01 (7)	07:08 16:29	12:14 (6) 16:02 (7)
5	05:29 20:36	05:56 20:13	06:28 19:27	14:12 (6) 15:52 (6)	06:59 18:35	12:49 (6) 15:55 (6)	06:34 192	11:50 (6) 16:04 (7)	07:09 16:28	12:15 (6) 16:03 (7)
6	05:30 20:36	05:57 20:12	06:29 19:25	14:09 (6) 15:53 (6)	07:00 18:34	12:48 (6) 15:56 (6)	06:36 196	11:50 (6) 16:06 (7)	07:10 16:28	12:16 (6) 16:02 (7)
7	05:31 20:36	05:58 20:10	06:30 19:23	14:04 (6) 15:52 (6)	07:01 18:32	12:47 (6) 15:55 (6)	06:37 196	11:51 (6) 16:07 (7)	07:11 16:28	12:17 (6) 16:01 (7)
8	05:31 20:35	05:59 20:09	06:31 19:22	14:01 (6) 15:53 (6)	07:02 18:30	12:46 (6) 15:54 (6)	06:38 196	11:52 (6) 16:08 (7)	07:12 16:28	12:18 (6) 16:04 (7)
9	05:32 20:35	06:00 20:08	06:32 19:20	13:56 (6) 15:54 (6)	07:03 18:29	12:45 (6) 15:55 (6)	06:39 200	11:52 (6) 16:10 (7)	07:13 16:28	12:19 (6) 14:37 (6)
10	05:33 20:35	06:01 20:07	06:33 19:18	13:53 (6) 15:55 (6)	07:04 18:27	12:46 (6) 15:54 (6)	06:40 198	11:53 (6) 16:09 (7)	07:14 16:28	12:20 (6) 14:38 (6)
11	05:33 20:34	06:02 20:05	06:34 19:17	13:48 (6) 15:54 (6)	07:05 18:25	12:46 (6) 15:54 (6)	06:42 198	11:54 (6) 16:10 (7)	07:15 16:28	12:21 (6) 14:39 (6)
12	05:34 20:34	06:03 20:04	06:35 19:15	13:43 (6) 15:55 (6)	07:06 18:24	12:45 (6) 15:55 (6)	06:43 198	11:56 (6) 16:12 (7)	07:16 16:28	12:22 (6) 14:38 (6)
13	05:35 20:33	06:04 20:03	06:36 19:13	13:40 (6) 15:56 (6)	07:07 18:22	12:44 (6) 15:54 (6)	06:44 198	11:55 (6) 16:11 (7)	07:16 16:28	12:22 (6) 14:38 (6)
14	05:36 20:33	06:05 20:01	06:37 19:11	13:35 (6) 15:55 (6)	07:08 18:20	12:45 (6) 15:53 (6)	06:45 198	11:56 (6) 16:12 (7)	07:17 16:28	12:21 (6) 14:39 (6)
15	05:36 20:32	06:06 20:00	06:38 19:10	13:30 (6) 15:56 (6)	07:10 18:19	12:44 (6) 15:54 (6)	06:47 196	11:58 (6) 16:14 (7)	07:18 16:29	12:22 (6) 14:38 (6)
16	05:37 20:31	06:07 19:58	06:39 19:08	13:27 (6) 15:55 (6)	07:11 18:17	12:43 (6) 15:53 (6)	06:48 194	11:59 (6) 16:13 (7)	07:19 16:29	12:23 (6) 14:39 (6)
17	05:38 20:31	06:08 19:57	06:40 19:06	13:22 (6) 15:56 (6)	07:12 18:16	12:45 (6) 15:53 (6)	06:49 196	11:58 (6) 16:12 (7)	07:19 16:29	12:23 (6) 14:39 (6)
18	05:39 20:30	06:09 19:55	06:41 19:04	13:19 (6) 15:57 (6)	07:13 18:14	12:44 (6) 15:52 (6)	06:50 192	11:59 (6) 16:11 (7)	07:20 16:30	12:24 (6) 14:40 (6)
19	05:40 20:29	06:10 19:54	06:42 19:03	13:16 (6) 15:56 (6)	07:14 18:13	12:45 (6) 15:53 (6)	06:51 190	12:01 (6) 16:11 (7)	07:21 16:30	12:24 (6) 14:40 (6)
20	05:41 20:29	06:11 19:52	06:43 19:01	13:13 (6) 15:52 (6)	07:15 18:11	12:44 (6) 15:52 (6)	06:53 186	12:02 (6) 16:10 (7)	07:21 16:30	12:25 (6) 14:41 (6)
21	05:41 20:28	06:12 19:51	06:44 18:59	13:10 (6) 15:52 (6)	07:16 18:10	12:45 (6) 15:51 (6)	06:54 184	12:03 (6) 16:09 (7)	07:22 16:31	12:26 (6) 14:42 (6)
22	05:42 20:27	06:13 19:49	06:45 18:58	13:07 (6) 15:35 (6)	07:18 18:08	12:45 (6) 15:51 (6)	06:55 184	12:02 (6) 16:08 (7)	07:22 16:31	12:26 (6) 14:42 (6)
23	05:43 20:26	06:14 19:48	06:46 18:56	13:04 (6) 15:38 (6)	07:19 18:07	12:44 (6) 15:50 (6)	06:56 180	12:04 (6) 16:08 (7)	07:23 16:32	12:26 (6) 14:42 (6)
24	05:44 20:25	06:15 19:46	06:47 18:54	13:01 (6) 15:39 (6)	07:20 18:05	12:45 (6) 15:51 (6)	06:57 178	12:05 (6) 16:07 (7)	07:23 16:32	12:27 (6) 14:43 (6)
25	05:45 20:24	06:16 19:45	06:48 18:52	13:00 (6) 15:42 (6)	06:21 17:04	11:44 (6) 14:50 (6)	06:58 174	12:06 (6) 16:06 (7)	07:24 16:33	12:27 (6) 14:43 (6)
26	05:46 20:24	06:17 19:43	06:49 18:51	14:51 (6) 15:43 (6)	06:49 17:02	11:46 (6) 14:50 (6)	07:00 172	12:07 (6) 16:05 (7)	07:24 16:34	12:28 (6) 14:44 (6)
27	05:47 20:23	06:18 19:42	06:50 18:49	14:46 (6) 15:44 (6)	06:50 17:01	11:45 (6) 14:49 (6)	07:01 168	12:09 (6) 16:05 (7)	07:24 16:34	12:28 (6) 14:44 (6)
28	05:48 20:22	06:19 19:40	06:51 18:47	14:42 (6) 15:42 (6)	06:51 17:00	11:46 (6) 14:48 (6)	07:02 168	12:08 (6) 16:06 (7)	07:25 16:35	12:28 (6) 14:44 (6)
29	05:49 20:21	06:20 19:38	06:52 18:45	14:39 (6) 15:45 (6)	06:52 16:58	11:47 (6) 14:49 (6)	07:03 166	12:09 (6) 16:05 (7)	07:25 16:36	12:28 (6) 14:46 (6)
30	05:50 20:20	06:21 19:37	06:53 18:44	14:34 (6) 15:46 (6)	06:53 16:57	11:47 (6) 14:49 (6)	07:04 164	12:10 (6) 16:04 (7)	07:25 16:36	12:30 (6) 14:46 (6)
31	05:51 20:19	06:22 19:35	06:54 18:43	14:31 (6) 15:47 (6)	06:54 16:56	11:48 (6) 14:48 (6)	07:04 180	12:10 (6) 16:04 (7)	07:25 16:37	12:31 (6) 14:47 (6)
Potential sun hours	461	429	375	345	296	286				
Total, worst case		570	4240	5780	5586	4350				

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: X - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26 16:38	08:42 (6) 09:50 (6)	07:12 17:13	08:24 (6) 10:32 (6)	06:35 17:48	08:08 (6) 10:46 (6)
2	07:26 16:39	08:43 (6) 09:51 (6)	07:11 17:14	08:23 (6) 10:33 (6)	06:33 17:49	08:09 (6) 10:47 (6)
3	07:26 16:40	08:43 (6) 09:53 (6)	07:10 17:16	08:22 (6) 10:34 (6)	06:32 17:50	08:07 (6) 10:45 (6)
4	07:26 16:41	08:42 (6) 09:54 (6)	07:09 17:17	08:21 (6) 10:35 (6)	06:30 17:51	08:07 (6) 10:45 (6)
5	07:26 16:42	08:40 (6) 09:54 (6)	07:08 17:18	08:22 (6) 10:36 (6)	06:29 17:53	08:08 (6) 10:44 (6)
6	07:26 16:43	08:40 (6) 09:56 (6)	07:06 17:19	08:20 (6) 10:36 (6)	06:27 17:54	08:08 (6) 10:44 (6)
7	07:26 16:44	08:40 (6) 09:58 (6)	07:05 17:21	08:19 (6) 10:37 (6)	06:25 17:55	08:06 (6) 10:44 (6)
8	07:26 16:45	08:40 (6) 10:00 (6)	07:04 17:22	08:18 (6) 10:38 (6)	06:24 17:56	08:07 (6) 10:43 (6)
9	07:26 16:46	08:40 (6) 10:02 (6)	07:03 17:23	08:19 (6) 10:39 (6)	06:22 17:57	08:07 (6) 10:41 (6)
10	07:25 16:47	08:37 (6) 10:01 (6)	07:02 17:25	08:18 (6) 10:40 (6)	06:20 17:58	08:05 (6) 10:41 (6)
11	07:25 16:48	08:37 (6) 10:03 (6)	07:01 17:26	08:16 (6) 10:40 (6)	06:19 18:00	08:06 (6) 10:40 (6)
12	07:25 16:49	08:37 (6) 10:05 (6)	06:59 17:27	08:17 (6) 10:41 (6)	06:17 18:01	08:06 (6) 10:40 (6)
13	07:24 16:50	08:36 (6) 10:06 (6)	06:58 17:28	08:16 (6) 10:42 (6)	06:16 18:02	08:06 (6) 10:38 (6)
14	07:24 16:51	08:36 (6) 10:08 (6)	06:57 17:30	08:14 (6) 10:42 (6)	06:14 18:03	08:07 (6) 10:37 (6)
15	07:24 16:52	08:35 (6) 10:09 (6)	06:55 17:31	08:15 (6) 10:43 (6)	06:12 18:04	08:05 (6) 10:35 (6)
16	07:23 16:53	08:35 (6) 10:11 (6)	06:54 17:32	08:14 (6) 10:44 (6)	06:10 18:05	08:06 (6) 10:33 (6)
17	07:23 16:55	08:34 (6) 10:12 (6)	06:53 17:33	08:14 (6) 10:44 (6)	06:09 18:06	08:06 (6) 10:34 (6)
18	07:22 16:56	08:34 (6) 10:14 (6)	06:51 17:35	08:13 (6) 10:45 (6)	06:07 18:07	08:06 (6) 10:32 (6)
19	07:22 16:57	08:33 (6) 10:15 (6)	06:50 17:36	08:13 (6) 10:45 (6)	06:05 18:09	08:06 (6) 10:30 (6)
20	07:21 16:58	08:32 (6) 10:16 (6)	06:48 17:37	08:12 (6) 10:46 (6)	06:04 18:10	08:06 (6) 10:28 (6)
21	07:21 16:59	08:32 (6) 10:18 (6)	06:47 17:38	08:12 (6) 10:46 (6)	06:02 18:11	08:05 (6) 10:27 (6)
22	07:20 17:00	08:31 (6) 10:19 (6)	06:46 17:39	08:11 (6) 10:47 (6)	06:00 18:12	08:05 (6) 10:25 (6)
23	07:19 17:02	08:30 (6) 10:20 (6)	06:44 17:41	08:11 (6) 10:47 (6)	06:00 18:13	08:05 (6) 10:23 (6)
24	07:19 17:03	08:29 (6) 10:21 (6)	06:43 17:42	08:10 (6) 10:46 (6)	06:00 18:14	08:06 (6) 10:20 (6)
25	07:18 17:04	08:29 (6) 10:22 (6)	06:41 17:43	08:10 (6) 10:46 (6)	06:00 18:15	08:06 (6) 10:18 (6)
26	07:17 17:05	08:28 (6) 10:23 (6)	06:40 17:44	08:09 (6) 10:47 (6)	06:00 18:16	08:06 (6) 10:16 (6)
27	07:16 17:06	08:27 (6) 10:24 (6)	06:38 17:45	08:09 (6) 10:47 (6)	06:00 18:17	08:06 (6) 10:14 (6)
28	07:15 17:07	08:26 (6) 10:25 (6)	06:37 17:46	08:08 (6) 10:48 (6)	06:00 18:18	08:07 (6) 10:12 (6)
29	07:15 17:08	08:25 (6) 10:26 (6)	06:37 17:47	08:10 (6) 10:48 (6)	06:00 18:19	08:07 (6) 10:13 (6)
30	07:14 17:09	08:24 (6) 10:27 (6)	06:37 17:48	08:10 (6) 10:48 (6)	06:00 18:20	09:07 (6) 10:11 (6)
31	07:13 17:10	08:23 (6) 10:28 (6)	06:37 17:49	08:10 (6) 10:48 (6)	06:00 18:21	09:07 (6) 10:11 (6)
Potential sun hours	296	296	296	399	450	454
Total, worst case	2992	4092	4486	1952	1682	1908

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:  
**OMBRA**

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Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** X - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

**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

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

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

	July	August	September	October	November	December
1	05:27 20:37	05:50 (4) 07:08 (5)	05:52 06:20 (5)	06:23 07:16 (5)	09:14 (6) 10:36 (6)	06:54 08:45 (6)
2	05:28 20:37	05:51 (4) 07:09 (5)	05:53 06:20 (5)	06:24 07:15 (5)	09:13 (6) 10:39 (6)	06:55 08:45 (6)
3	05:28 20:37	05:51 (4) 07:09 (5)	05:54 06:20 (5)	06:25 07:14 (5)	09:10 (6) 10:40 (6)	06:56 08:39 (6)
4	05:29 20:36	05:52 (4) 07:10 (5)	05:55 06:21 (5)	06:26 07:15 (5)	09:09 (6) 10:43 (6)	06:58 08:37 (6)
5	05:29 20:36	05:52 (4) 07:10 (5)	05:56 06:22 (5)	06:28 07:14 (5)	09:08 (6) 10:44 (6)	06:59 08:35 (6)
6	05:30 20:36	05:53 (4) 07:11 (5)	05:57 06:21 (5)	06:29 07:13 (5)	09:07 (6) 10:47 (6)	07:00 08:34 (6)
7	05:31 20:36	05:54 (4) 07:12 (5)	05:58 06:22 (5)	06:30 07:12 (5)	09:06 (6) 10:48 (6)	07:01 08:32 (6)
8	05:31 20:35	05:54 (4) 07:12 (5)	05:59 06:23 (5)	06:31 07:13 (5)	09:05 (6) 10:49 (6)	07:02 08:30 (6)
9	05:32 20:35	05:55 (4) 07:11 (5)	06:00 06:24 (5)	06:32 07:12 (5)	09:04 (6) 10:52 (6)	07:03 08:29 (6)
10	05:33 20:35	05:56 (4) 07:12 (5)	06:01 06:25 (5)	06:33 07:11 (5)	09:01 (6) 10:53 (6)	07:04 08:27 (6)
11	05:33 20:34	05:56 (4) 07:12 (5)	06:02 06:26 (5)	06:34 07:10 (5)	09:00 (6) 10:54 (6)	07:05 08:25 (6)
12	05:34 20:34	05:57 (4) 07:13 (5)	06:03 06:27 (5)	06:35 07:07 (5)	08:59 (6) 10:57 (6)	07:06 08:24 (6)
13	05:35 20:33	06:20 (5) 07:14 (5)	06:04 07:14 (5)	06:36 07:06 (5)	07:07 08:58 (6)	07:07 08:42 (6)
14	05:36 20:33	06:18 (5) 07:14 (5)	06:05 07:05 (5)	06:37 07:05 (5)	07:08 08:59 (6)	07:08 08:41 (6)
15	05:36 20:32	06:19 (5) 07:13 (5)	06:06 07:13 (5)	06:38 07:04 (5)	07:10 08:56 (6)	07:10 08:42 (6)
16	05:37 20:31	06:20 (5) 07:14 (5)	06:07 07:01 (5)	06:39 07:01 (5)	07:11 08:55 (6)	07:11 08:41 (6)
17	05:38 20:31	06:19 (5) 07:15 (5)	06:08 07:15 (5)	06:40 06:58 (5)	07:12 08:54 (6)	07:12 08:43 (6)
18	05:39 20:30	06:20 (5) 07:16 (5)	06:09 06:55 (5)	06:41 07:04 (5)	07:13 08:53 (6)	07:13 08:42 (6)
19	05:40 20:29	06:18 (5) 07:14 (5)	06:10 06:54 (5)	06:42 07:00 (6)	07:14 08:52 (6)	07:14 08:43 (6)
20	05:41 20:29	06:19 (5) 07:15 (5)	06:11 06:55 (5)	06:43 07:01 (6)	07:15 08:53 (6)	07:15 08:42 (6)
21	05:41 20:28	06:18 (5) 07:16 (5)	06:12 06:56 (5)	06:44 07:02 (6)	07:16 08:52 (6)	07:16 08:41 (6)
22	05:42 20:27	06:19 (5) 07:15 (5)	06:13 06:57 (5)	06:45 07:03 (6)	07:18 08:51 (6)	07:18 08:43 (6)
23	05:43 20:26	06:18 (5) 07:16 (5)	06:14 06:58 (5)	06:46 07:04 (6)	07:19 08:50 (6)	07:19 08:44 (6)
24	05:44 20:25	06:19 (5) 07:17 (5)	06:15 06:59 (5)	06:47 07:05 (6)	07:20 08:49 (6)	07:20 08:43 (6)
25	05:45 20:24	06:20 (5) 07:16 (5)	06:16 07:00 (6)	06:48 07:06 (6)	06:21 07:14 (6)	06:21 07:44 (6)
26	05:46 20:24	06:19 (5) 07:17 (5)	06:17 06:59 (5)	06:49 07:07 (6)	06:22 07:15 (6)	06:22 07:44 (6)
27	05:47 20:23	06:19 (5) 07:15 (5)	06:18 06:59 (5)	06:50 07:08 (6)	06:23 07:16 (6)	06:23 07:45 (6)
28	05:48 20:22	06:18 (5) 07:16 (5)	06:19 07:00 (6)	06:51 07:09 (6)	06:25 07:17 (6)	06:25 07:44 (6)
29	05:49 20:21	06:19 (5) 07:15 (5)	06:20 07:01 (6)	06:52 07:10 (6)	06:26 07:18 (6)	06:26 07:45 (6)
30	05:50 20:20	06:20 (5) 07:16 (5)	06:21 06:59 (5)	06:53 07:11 (6)	06:27 07:19 (6)	06:27 07:46 (6)
31	05:51 20:19	06:19 (5) 07:15 (5)	06:22 06:59 (5)	06:54 07:12 (6)	06:28 07:20 (6)	06:28 07:46 (6)
Potential sun hours	461	429	375	345	296	286
Total, worst case	1814	1464	3692	4766	3510	2072

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: Y - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:26 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	05:50 (6) 05:54 (6)	05:52 20:17	06:23 19:34	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	06:26 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 17:52	06:38 19:26	05:53 19:59	05:26 20:28	05:29 20:37		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	05:51 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 20:30	05:30 20:36		05:57 20:12	06:29 19:25	07:00 18:34	06:36 16:48	07:10 16:28
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	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	07:26 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 17:58	06:28 19:33	05:45 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	05:44 20:06	05:24 20:33	05:33 20:34	05:46 (6)	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	05:46 (6)	06:03 20:04	06:35 19:15	07:06 18:24	06:43 16:42	07:16 16:28
13	07:25 16:50	06:58 17:28	06:16 18:02	06:23 19:36	05:42 20:08	05:24 20:34	05:35 20:33	05:46 (6)	06:04 20:03	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 20:33	05:46 (6)	06:05 20:01	06:37 19:11	07:08 18:21	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	05:46 (6)	06:06 20:00	06:38 19:10	07:10 18:19	06:47 16:39	07:18 16:29
16	07:23 16:53	06:54 17:32	06:11 18:05	06:19 19:39	05:39 20:11	05:24 20:35	05:37 20:31	05:46 (6)	06:07 19:58	06:39 19:08	07:11 18:17	06:48 16:38	07:19 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	05:46 (6)	06:08 19:57	06:40 19:06	07:12 18:16	06:49 16:37	07:19 16:29
18	07:22 16:56	06:51 17:35	06:07 18:08	06:16 19:42	05:37 20:13	05:24 20:36	05:39 20:30	05:46 (6)	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	06:05 18:09	06:14 19:43	05:36 20:14	05:24 20:36	05:40 20:29	05:46 (6)	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	06:12 19:44	05:35 20:15	05:24 20:36	05:41 20:29	05:46 (6)	06:11 19:52	06:43 19:01	07:15 18:11	06:53 16:35	07:21 16:30
21	07:21 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:34 20:16	05:24 20:36	05:41 20:28	05:46 (6)	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 20:37	05:42 20:27	05:46 (6)	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	05:46 (6)	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	06:06 19:48	05:32 20:19	05:25 20:37	05:44 20:25	05:46 (6)	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 20:25	05:46 (6)	06:16 19:45	06:48 18:52	07:21 17:04	06:58 16:32	07:24 16:33
26	07:17 17:05	06:40 17:44	05:54 18:16	06:04 19:50	05:31 20:21	05:25 20:37	05:46 20:24	05:46 (6)	06:17 19:43	06:49 18:51	07:22 17:03	07:00 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 20:23	05:46 (6)	06:18 19:42	06:50 18:49	07:23 17:01	07:03 16:31	07:24 16:34
28	07:15 17:08	06:37 17:47	05:50 18:19	06:01 19:52	05:29 20:23	05:26 20:37	05:48 20:22	05:46 (6)	06:19 19:40	06:51 18:47	06:25 17:00	07:02 16:31	07:25 16:35
29	07:15 17:09		06:48 19:20	05:59 19:54	05:29 20:24	05:26 20:37	05:49 20:21	05:46 (6)	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 19:55	05:28 20:24	05:27 20:37	05:50 20:20	05:50 (6)	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 20:19		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	296	286
Total, worst case						112		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:  
**OMBRA**

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Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** Z - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

**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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 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 19:34	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	06:26 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 17:52	06:38 19:26	05:53 19:59	05:26 20:28	05:29 20:37	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	05:51 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 20:30	05:30 20:36	05:57 20:12	06:29 19:25	07:00 18:34	06:36 16:48	07:10 16:28
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	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	07:26 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 17:58	06:28 19:33	05:45 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	05:44 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	07:16 16:28
13	07:24 16:50	06:58 17:28	06:16 18:02	06:23 19:36	05:42 20:08	05:24 20:34	05:35 20:33	06:04 20:03	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 20:33	06:05 20:01	06:37 19:11	07:08 18:21	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	06:47 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	07:19 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 16:37	07:19 16:29
18	07:22 16:56	06:51 17:35	06:07 18:08	06:16 19:42	05:37 20:13	05:24 20:36	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	06:05 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	07:21 16:30
20	07:21 16:58	06:49 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	06:53 16:35	07:21 16:30
21	07:21 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:34 20:16	05:24 20:36	05:41 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 20:37	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	07:19 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 20:25	06:16 19:45	06:48 18:52	06:21 17:04	06:58 16:32	07:24 16:33
26	07:17 17:05	06:40 17:44	05:53 18:16	06:04 19:50	05:31 20:21	05:25 20:37	05:46 20:24	06:17 19:43	06:49 18:51	06:22 17:02	07:00 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 20:23	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	06:37 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	07:15 17:09		06:48 19:20	05:59 19:54	05:29 20:24	05:26 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 19:55	05:28 20:24	05:27 20:37	05:50 20:20	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 20:19	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	296	286
Total, worst case												

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

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

Project:  
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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AA - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June			
1	07:26 16:38	13:11 (7) 17:13	07:12 16:2	13:00 (7) 17:48	06:35 18:2	12:48 (7) 19:23	06:43 12:8	14:26 (7) 19:56	05:57 20:26
2	07:26 16:39	13:11 (7) 17:14	07:11 16:4	12:59 (7) 17:49	06:33 18:2	12:49 (7) 19:24	06:42 12:4	14:28 (7) 19:57	05:27 20:27
3	07:26 16:40	13:11 (7) 17:15	07:10 16:6	13:00 (7) 17:50	06:32 18:2	12:49 (7) 19:25	06:40 12:0	14:31 (7) 19:58	05:26 20:27
4	07:26 16:41	13:10 (7) 17:16	07:09 16:8	12:59 (7) 17:51	06:30 18:0	12:49 (7) 19:26	06:38 11:8	14:33 (7) 19:59	05:26 20:28
5	07:26 16:42	13:10 (7) 17:17	07:08 16:10	12:58 (7) 17:52	06:29 18:0	12:50 (7) 19:27	06:37 11:4	14:35 (7) 20:00	05:25 20:29
6	07:26 16:43	13:10 (7) 17:18	07:07 16:12	12:57 (7) 17:53	06:27 18:0	12:50 (7) 19:28	06:35 11:0	14:38 (7) 20:01	05:25 20:30
7	07:26 16:44	13:10 (7) 17:19	07:05 16:14	12:57 (7) 17:54	06:25 18:0	12:50 (7) 19:29	06:33 10:6	14:40 (7) 20:02	05:25 20:30
8	07:26 16:45	13:10 (7) 17:20	07:04 16:16	12:56 (7) 17:55	06:24 18:0	12:49 (7) 19:30	06:32 10:2	14:42 (7) 20:03	05:24 20:31
9	07:26 16:46	13:10 (7) 17:21	07:03 16:18	12:57 (7) 17:56	06:22 18:0	12:49 (7) 19:31	06:30 10:0	14:45 (7) 20:04	05:24 20:31
10	07:25 16:47	13:09 (7) 17:22	07:02 16:20	12:56 (7) 17:57	06:21 18:0	12:51 (7) 19:32	06:28 9:6	14:47 (7) 20:05	05:24 20:32
11	07:25 16:48	13:09 (7) 17:23	07:01 16:22	12:54 (7) 17:58	06:19 17:8	12:52 (7) 19:33	06:27 9:2	14:49 (7) 20:06	05:24 20:33
12	07:25 16:49	13:09 (7) 17:24	06:59 16:24	12:54 (7) 18:00	06:17 17:6	12:52 (7) 19:34	06:25 8:8	14:52 (7) 20:07	05:24 20:33
13	07:25 16:50	13:08 (7) 17:25	06:58 16:26	12:54 (7) 18:01	06:16 17:6	12:52 (7) 19:35	06:23 8:4	14:54 (7) 20:08	05:24 20:34
14	07:24 16:51	13:08 (7) 17:26	06:57 16:28	12:54 (7) 18:02	06:14 17:4	12:53 (7) 19:36	06:22 8:0	14:57 (7) 20:09	05:24 20:34
15	07:24 16:52	13:07 (7) 17:27	06:55 16:30	12:53 (7) 18:03	06:12 17:4	12:53 (7) 19:37	06:20 7:6	14:59 (7) 20:10	05:23 20:34
16	07:23 16:53	13:07 (7) 17:28	06:54 16:32	12:54 (7) 18:04	06:10 17:4	12:55 (7) 19:38	06:19 7:2	15:01 (7) 20:11	05:23 20:35
17	07:23 16:54	13:07 (7) 17:29	06:53 16:34	12:54 (7) 18:05	06:09 17:2	12:56 (7) 19:39	06:17 6:8	15:04 (7) 20:12	05:24 20:35
18	07:22 16:55	13:08 (7) 17:30	06:51 16:36	12:53 (7) 18:06	06:07 17:0	12:58 (7) 19:40	06:16 6:4	15:06 (7) 20:13	05:24 20:36
19	07:22 16:56	13:07 (7) 17:31	06:50 16:38	12:51 (7) 18:07	06:05 16:6	12:58 (7) 19:41	06:14 6:0	15:09 (7) 20:14	05:24 20:36
20	07:21 16:57	13:07 (7) 17:32	06:49 16:40	12:51 (7) 18:08	06:04 16:4	12:58 (7) 19:42	06:12 5:6	15:11 (7) 20:15	05:24 20:36
21	07:21 16:58	13:06 (7) 17:33	06:47 16:42	12:50 (7) 18:09	06:02 16:2	13:00 (7) 19:43	06:11 5:2	15:14 (7) 20:16	05:24 20:36
22	07:20 16:59	13:06 (7) 17:34	06:46 16:44	12:50 (7) 18:10	06:01 16:0	13:01 (7) 19:44	06:09 4:8	15:17 (7) 20:17	05:24 20:37
23	07:19 17:00	13:05 (7) 17:35	06:44 16:46	12:51 (7) 18:11	06:00 15:8	13:02 (7) 19:45	06:08 4:4	15:20 (7) 20:18	05:24 20:37
24	07:19 17:01	13:05 (7) 17:36	06:43 16:48	12:51 (7) 18:12	05:59 15:6	13:03 (7) 19:46	06:06 4:0	15:23 (7) 20:19	05:25 20:37
25	07:18 17:02	13:05 (7) 17:37	06:41 16:50	12:50 (7) 18:13	05:57 15:4	13:04 (7) 19:47	06:05 3:6	15:26 (7) 20:20	05:25 20:37
26	07:17 17:03	13:04 (7) 17:38	06:40 16:52	12:50 (7) 18:14	05:55 15:2	13:05 (7) 19:48	06:04 3:2	15:29 (7) 20:21	05:25 20:37
27	07:16 17:04	13:04 (7) 17:39	06:38 16:54	12:49 (7) 18:15	05:53 15:0	13:06 (7) 19:49	06:02 2:8	15:32 (7) 20:22	05:26 20:37
28	07:15 17:05	13:03 (7) 17:40	06:37 16:56	12:49 (7) 18:16	05:52 14:8	13:07 (7) 19:50	06:01 2:4	15:35 (7) 20:23	05:26 20:37
29	07:15 17:06	13:03 (7) 17:41	06:36 16:58	12:48 (7) 18:17	05:50 14:6	13:08 (7) 19:51	06:00 2:0	15:38 (7) 20:24	05:26 20:37
30	07:14 17:07	13:02 (7) 17:42	06:34 16:59	12:48 (7) 18:18	05:49 14:4	13:09 (7) 19:52	06:00 1:6	15:41 (7) 20:25	05:26 20:37
31	07:13 17:08	13:01 (7) 17:43	06:33 17:00	12:47 (7) 18:19	05:48 14:2	13:10 (7) 19:53	06:00 1:2	15:44 (7) 20:26	05:26 20:37
Potential sun hours	296	296	369	399	450	454			
Total, worst case	4330	4870	5128	2070					

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AA - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December		
1	05:27 20:37	05:52 20:17	06:23 19:34	14:48 (7) 16:20 (7)	06:54 18:42	13:31 (7) 16:29	12:25 (7) 16:29	12:51 (7) 15:05 (7)
2	05:28 20:37	05:53 20:16	06:24 19:32	14:45 (7) 16:21 (7)	06:55 18:40	13:30 (7) 16:26 (7)	12:27 (7) 16:29	12:52 (7) 15:04 (7)
3	05:28 20:37	05:54 20:15	06:26 19:30	14:42 (7) 16:22 (7)	06:56 18:39	13:29 (7) 16:27 (7)	12:26 (7) 16:29	12:53 (7) 15:03 (7)
4	05:29 20:37	05:55 20:14	06:27 19:29	14:39 (7) 16:23 (7)	06:58 18:37	13:28 (7) 16:26 (7)	12:27 (7) 16:29	12:54 (7) 15:04 (7)
5	05:30 20:36	05:56 20:13	06:28 19:27	14:36 (7) 16:22 (7)	06:59 18:35	13:27 (7) 16:27 (7)	12:29 (7) 16:28	12:55 (7) 15:03 (7)
6	05:30 20:36	05:57 20:12	06:29 19:25	14:33 (7) 16:23 (7)	07:00 18:34	13:26 (7) 16:26 (7)	12:28 (7) 16:28	12:56 (7) 15:04 (7)
7	05:31 20:36	05:58 20:10	06:30 19:23	14:30 (7) 16:24 (7)	07:01 18:32	13:25 (7) 16:25 (7)	12:29 (7) 16:28	12:57 (7) 15:03 (7)
8	05:31 20:35	05:59 20:09	06:31 19:22	14:27 (7) 16:25 (7)	07:02 18:30	13:24 (7) 16:26 (7)	12:30 (7) 16:28	12:58 (7) 15:02 (7)
9	05:32 20:35	06:00 20:08	06:32 19:20	14:24 (7) 16:24 (7)	07:03 18:29	13:23 (7) 16:25 (7)	12:30 (7) 16:28	12:59 (7) 15:03 (7)
10	05:33 20:35	06:01 20:07	06:33 19:18	14:21 (7) 16:25 (7)	07:04 18:27	13:22 (7) 16:24 (7)	12:31 (7) 16:28	13:00 (7) 15:04 (7)
11	05:33 20:34	06:02 20:05	06:34 19:17	14:18 (7) 16:26 (7)	07:05 18:25	13:24 (7) 16:24 (7)	12:32 (7) 16:28	13:01 (7) 15:03 (7)
12	05:34 20:34	06:03 20:04	06:35 19:15	14:15 (7) 16:25 (7)	07:06 18:24	13:23 (7) 16:25 (7)	12:34 (7) 16:28	13:02 (7) 15:04 (7)
13	05:35 20:33	06:04 20:03	06:36 19:13	14:12 (7) 16:26 (7)	07:07 18:22	13:22 (7) 16:24 (7)	12:33 (7) 16:28	13:02 (7) 15:02 (7)
14	05:36 20:33	06:05 20:01	06:37 19:11	14:09 (7) 16:27 (7)	07:08 18:21	13:21 (7) 16:23 (7)	12:34 (7) 16:29	13:03 (7) 15:03 (7)
15	05:36 20:32	06:06 20:00	06:38 19:10	14:06 (7) 16:26 (7)	07:10 18:19	13:22 (7) 16:24 (7)	12:36 (7) 16:29	13:04 (7) 15:04 (7)
16	05:37 20:31	06:07 19:58	06:39 19:08	14:03 (7) 16:27 (7)	07:11 18:17	13:21 (7) 16:23 (7)	12:37 (7) 16:29	13:05 (7) 15:05 (7)
17	05:38 20:31	06:08 19:57	06:40 19:06	14:00 (7) 16:26 (7)	07:12 18:16	13:21 (7) 16:23 (7)	12:38 (7) 16:29	13:05 (7) 15:03 (7)
18	05:39 20:30	06:09 19:55	06:41 19:05	13:57 (7) 16:27 (7)	07:13 18:14	13:22 (7) 16:22 (7)	12:39 (7) 16:30	13:06 (7) 15:04 (7)
19	05:40 20:29	06:10 19:54	06:42 19:03	13:54 (7) 16:26 (7)	07:14 18:13	13:21 (7) 16:21 (7)	12:39 (7) 16:30	13:06 (7) 15:04 (7)
20	05:41 20:29	06:11 19:52	06:43 19:01	13:51 (7) 16:27 (7)	07:15 18:11	13:22 (7) 16:22 (7)	12:40 (7) 16:30	13:07 (7) 15:05 (7)
21	05:41 20:28	06:12 19:51	06:44 18:59	13:50 (7) 16:28 (7)	07:16 18:10	13:21 (7) 16:21 (7)	12:41 (7) 16:31	13:08 (7) 15:06 (7)
22	05:42 20:27	06:13 19:49	06:45 18:58	13:47 (7) 16:29 (7)	07:18 18:08	13:23 (7) 16:21 (7)	12:43 (7) 16:31	13:08 (7) 15:06 (7)
23	05:43 20:26	06:14 19:48	06:46 18:56	13:44 (7) 16:28 (7)	07:19 18:07	13:22 (7) 16:20 (7)	12:44 (7) 16:32	13:08 (7) 15:06 (7)
24	05:44 20:25	06:15 19:46	06:47 18:54	13:43 (7) 16:27 (7)	07:20 18:05	13:23 (7) 16:19 (7)	12:45 (7) 16:33	13:09 (7) 15:07 (7)
25	05:45 20:25	06:16 19:45	06:48 18:52	13:40 (7) 16:26 (7)	07:21 17:04	13:22 (7) 16:20 (7)	12:46 (7) 16:33	13:09 (7) 15:07 (7)
26	05:46 20:24	06:17 19:43	06:49 18:51	13:39 (7) 16:27 (7)	07:22 17:02	13:24 (7) 16:21 (7)	12:47 (7) 16:34	13:10 (7) 15:08 (7)
27	05:47 20:23	06:18 19:42	06:50 18:49	13:36 (7) 16:26 (7)	07:23 17:01	13:23 (7) 16:21 (7)	12:49 (7) 16:34	13:10 (7) 15:10 (7)
28	05:48 20:22	06:19 19:40	06:51 18:47	13:35 (7) 16:27 (7)	07:25 17:00	13:24 (7) 16:22 (7)	12:48 (7) 16:35	13:10 (7) 15:10 (7)
29	05:49 20:21	06:20 19:38	06:52 18:45	13:34 (7) 16:28 (7)	07:26 16:58	13:23 (7) 16:23 (7)	12:49 (7) 16:36	13:10 (7) 15:10 (7)
30	05:50 20:20	06:21 19:37	06:53 18:44	13:31 (7) 16:27 (7)	07:27 16:57	13:25 (7) 16:24 (7)	12:50 (7) 16:36	13:10 (7) 15:10 (7)
31	05:51 20:19	06:22 19:35	06:54 18:41	13:30 (7) 16:28 (7)	07:28 16:56	13:26 (7) 16:25 (7)	12:51 (7) 16:37	13:11 (7) 15:13 (7)
Potential sun hours	461	429	375	345	296	286		
Total, worst case		866	4172	5540	4594	3786		

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

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

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Calculated:  
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### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AB - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

	January		February		March		April		May		June							
1	07:26	08:43 (7)	07:12	08:38 (7)	06:35	08:30 (7)	06:43	09:36 (7)	05:57	06:16 (6)	05:27	05:51 (5)						
	16:38	130	10:53 (7)	17:13	162	11:20 (7)	17:48	176	11:26 (7)	19:23	108	11:24 (7)	19:56	20	06:36 (6)	20:26	18	06:09 (5)
2	07:26	08:43 (7)	07:11	08:37 (7)	06:33	08:31 (7)	06:42	09:36 (7)	05:55	06:15 (6)	05:27	05:52 (5)						
	16:39	130	10:53 (7)	17:14	164	11:21 (7)	17:49	174	11:25 (7)	19:24	106	11:22 (7)	19:57	22	06:37 (6)	20:27	18	06:10 (5)
3	07:26	08:43 (7)	07:10	08:38 (7)	06:32	08:31 (7)	06:40	09:37 (7)	05:54	06:14 (6)	05:26	05:52 (5)						
	16:40	130	10:53 (7)	17:16	164	11:22 (7)	17:50	174	11:25 (7)	19:25	102	11:19 (7)	19:58	24	06:38 (6)	20:27	18	06:10 (5)
4	07:26	08:42 (7)	07:09	08:37 (7)	06:30	08:29 (7)	06:38	09:37 (7)	05:53	06:12 (6)	05:26	05:54 (5)						
	16:41	132	10:54 (7)	17:17	164	11:21 (7)	17:52	174	11:23 (7)	19:26	98	11:15 (7)	19:59	26	06:38 (6)	20:28	16	06:10 (5)
5	07:26	08:42 (7)	07:08	08:36 (7)	06:29	08:30 (7)	06:37	09:37 (7)	05:51	06:11 (6)	05:25	05:53 (5)						
	16:42	132	10:54 (7)	17:18	166	11:22 (7)	17:53	174	11:24 (7)	19:27	96	11:13 (7)	20:00	26	06:37 (6)	20:29	14	06:07 (5)
6	07:26	08:42 (7)	07:06	08:37 (7)	06:27	08:30 (7)	06:35	09:40 (7)	05:50	06:10 (6)	05:25	05:55 (5)						
	16:43	134	10:56 (7)	17:19	166	11:23 (7)	17:54	172	11:22 (7)	19:28	90	11:10 (7)	20:01	28	06:38 (6)	20:30	12	06:07 (5)
7	07:26	08:44 (7)	07:05	08:35 (7)	06:25	08:30 (7)	06:33	09:40 (7)	05:49	06:09 (6)	05:25	05:57 (5)						
	16:44	132	10:56 (7)	17:21	168	11:23 (7)	17:55	172	11:22 (7)	19:30	86	11:06 (7)	20:02	30	06:39 (6)	20:30	10	06:07 (5)
8	07:26	08:44 (7)	07:04	08:36 (7)	06:24	08:29 (7)	06:32	09:40 (7)	05:48	06:08 (6)	05:24	05:57 (5)						
	16:45	134	10:58 (7)	17:22	168	11:24 (7)	17:56	172	11:21 (7)	19:31	82	11:02 (7)	20:03	30	06:38 (6)	20:31	10	06:07 (5)
9	07:26	08:44 (7)	07:03	08:35 (7)	06:22	08:29 (7)	06:30	09:43 (7)	05:47	06:07 (6)	05:24	05:58 (5)						
	16:46	136	11:00 (7)	17:23	170	11:25 (7)	17:57	170	11:19 (7)	19:32	78	11:01 (7)	20:04	32	06:39 (6)	20:31	8	06:06 (5)
10	07:25	08:43 (7)	07:02	08:36 (7)	06:21	08:29 (7)	06:28	09:43 (7)	05:45	06:05 (6)	05:24	05:58 (5)						
	16:47	136	10:59 (7)	17:25	170	11:26 (7)	17:58	168	11:17 (7)	19:33	74	10:57 (7)	20:05	32	06:37 (6)	20:32	6	06:04 (5)
11	07:25	08:43 (7)	07:01	08:34 (7)	06:19	08:30 (7)	06:27	09:43 (7)	05:44	06:04 (6)	05:24	06:00 (5)						
	16:48	138	11:01 (7)	17:26	172	11:26 (7)	18:00	166	11:16 (7)	19:34	70	10:53 (7)	20:06	34	06:38 (6)	20:33	4	06:04 (5)
12	07:25	08:43 (7)	06:59	08:35 (7)	06:17	08:30 (7)	06:25	09:46 (7)	05:43	06:03 (6)	05:24	06:00 (5)						
	16:49	138	11:01 (7)	17:27	170	11:25 (7)	18:01	166	11:16 (7)	19:35	64	10:50 (7)	20:07	34	06:37 (6)	20:33		
13	07:25	08:42 (7)	06:58	08:34 (7)	06:16	08:30 (7)	06:23	09:46 (7)	05:42	06:02 (5)	05:24	06:00 (5)						
	16:50	140	11:02 (7)	17:28	172	11:26 (7)	18:02	164	11:14 (7)	19:36	60	10:46 (7)	20:08	36	06:38 (6)	20:34		
14	07:24	08:42 (7)	06:57	08:34 (7)	06:14	08:31 (7)	06:22	09:49 (7)	05:41	06:01 (5)	05:24	06:00 (5)						
	16:51	142	11:04 (7)	17:30	172	11:26 (7)	18:03	162	11:13 (7)	19:37	54	10:43 (7)	20:09	36	06:37 (6)	20:34		
15	07:24	08:41 (7)	06:55	08:33 (7)	06:12	08:29 (7)	06:20	09:51 (7)	05:40	06:00 (5)	05:24	06:00 (5)						
	16:52	144	11:05 (7)	17:31	174	11:27 (7)	18:04	162	11:11 (7)	19:38	48	10:39 (7)	20:10	38	06:38 (6)	20:34		
16	07:23	08:43 (7)	06:54	08:34 (7)	06:11	08:29 (7)	06:19	09:53 (7)	05:39	06:00 (5)	05:24	06:00 (5)						
	16:53	142	11:05 (7)	17:32	174	11:28 (7)	18:05	158	11:07 (7)	19:39	42	10:35 (7)	20:11	38	06:38 (6)	20:35		
17	07:23	08:42 (7)	06:53	08:32 (7)	06:09	08:30 (7)	06:17	09:56 (7)	05:38	05:59 (5)	05:24	06:00 (5)						
	16:55	144	11:06 (7)	17:33	176	11:28 (7)	18:06	156	11:06 (7)	19:40	36	10:32 (7)	20:12	38	06:37 (6)	20:35		
18	07:22	08:42 (7)	06:51	08:33 (7)	06:07	08:30 (7)	06:16	09:58 (7)	05:37	05:58 (5)	05:24	06:00 (5)						
	16:56	146	11:08 (7)	17:35	174	11:27 (7)	18:08	154	11:04 (7)	19:42	28	10:26 (7)	20:13	38	06:36 (6)	20:36		
19	07:22	08:41 (7)	06:50	08:31 (7)	06:05	08:30 (7)	06:14	10:03 (7)	05:36	05:57 (5)	05:24	06:00 (5)						
	16:57	148	11:09 (7)	17:36	176	11:27 (7)	18:09	152	11:02 (7)	19:43	18	10:21 (7)	20:14	40	06:37 (6)	20:36		
20	07:21	08:40 (7)	06:49	08:32 (7)	06:04	08:30 (7)	06:12	10:03 (7)	05:35	05:56 (5)	05:24	06:00 (5)						
	16:58	148	11:08 (7)	17:37	176	11:28 (7)	18:10	148	10:58 (7)	19:44		20:15	40	06:36 (6)	20:36			
21	07:21	08:42 (7)	06:47	08:32 (7)	06:02	08:31 (7)	06:11	10:03 (7)	05:34	05:55 (5)	05:24	06:00 (5)						
	16:59	148	11:10 (7)	17:38	176	11:28 (7)	18:11	146	10:57 (7)	19:45		20:16	40	06:35 (6)	20:36			
22	07:20	08:41 (7)	06:46	08:31 (7)	06:00	08:31 (7)	06:09	10:03 (7)	05:34	05:55 (5)	05:24	06:00 (5)						
	17:01	150	11:11 (7)	17:40	176	11:27 (7)	18:12	144	10:55 (7)	19:46		20:17	40	06:35 (6)	20:37			
23	07:19	08:40 (7)	06:44	08:31 (7)	05:59	08:31 (7)	06:08	10:03 (7)	05:33	05:54 (5)	05:24	06:00 (5)						
	17:02	152	11:12 (7)	17:41	176	11:27 (7)	18:13	140	10:51 (7)	19:47		20:18	40	06:34 (6)	20:37			
24	07:19	08:39 (7)	06:43	08:32 (7)	05:57	08:32 (7)	06:06	10:03 (7)	05:32	05:53 (5)	05:25	06:00 (5)						
	17:03	154	11:13 (7)	17:42	176	11:28 (7)	18:14	138	10:50 (7)	19:48		20:19	40	06:33 (6)	20:37			
25	07:18	08:41 (7)	06:41	08:30 (7)	05:55	08:32 (7)	06:05	10:03 (7)	05:31	05:53 (5)	05:25	06:00 (5)						
	17:04	154	11:15 (7)	17:43	176	11:26 (7)	18:15	134	10:46 (7)	19:49		20:20	40	06:33 (6)	20:37			
26	07:17	08:40 (7)	06:40	08:31 (7)	05:54	08:32 (7)	06:04	10:03 (7)	05:31	05:52 (5)	05:25	06:00 (5)						
	17:05	154	11:14 (7)	17:44	176	11:27 (7)	18:16	130	10:42 (7)	19:50		20:21	40	06:32 (6)	20:37			
27	07:16	08:39 (7)	06:38	08:31 (7)	05:52	08:32 (7)	06:02	10:03 (7)	05:30	05:51 (5)	05:26	06:00 (5)						
	17:07	156	11:15 (7)	17:46	176	11:27 (7)	18:17	128	10:40 (7)	19:51	8	06:29 (6)	20:22	36	06:29 (6)	20:37		
28	07:15	08:38 (7)	06:37	08:30 (7)	05:50	08:33 (7)	06:01	10:03 (7)	05:29	05:51 (5)	05:26	06:00 (5)						
	17:08	158	11:16 (7)	17:47	176	11:26 (7)	18:19	124	10:37 (7)	19:52	12	06:32 (6)	20:23	34	06:29 (6)	20:37		
29	07:15	08:39 (7)		06:48	09:33 (7)	05:59	06:19 (6)	05:29	05:50 (5)	05:26	06:00 (5)							
	17:09	158	11:17 (7)	19:20	120	11:33 (7)	19:54	14	06:33 (6)	20:24	30	06:26 (6)	20:37					
30	07:14	08:38 (7)		06:47	09:33 (7)	05:58	06:17 (6)	05:28	05:50 (5)	05:27	06:00 (5)							
	17:11	160	11:18 (7)	19:21	118	11:31 (7)	19:55	18	06:35 (6)	20:24	24	06:24 (6)	20:37					
31	07:13	08:37 (7)		06:45	09:36 (7)		06:17 (6)	05:28	05:51 (5)		06:00 (5)							
	17:12	162	11:19 (7)	19:22	112	11:28 (7)		20:25	18	06:09 (5)								
Potential sun hours	296		296	369	478	399	1392	450	1024	454	134							
Total, worst case	4462		4806	4748	1392	1024	134											

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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Calculated:  
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### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AB - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December
1	05:27 20:37	05:52 20:17	06:14 (6) 19:34	06:23 18:42	09:09 (7) 16:54	08:03 (7) 16:29
2	05:28 20:37	06:05 (5) 20:16	06:15 (6) 19:32	06:24 18:40	09:08 (7) 16:53	08:05 (7) 16:29
3	05:28 20:37	06:03 (5) 20:15	06:16 (6) 19:30	06:26 18:39	09:07 (7) 16:52	08:06 (7) 16:29
4	05:29 20:37	06:02 (5) 20:14	06:17 (6) 19:29	06:27 18:37	09:08 (7) 16:51	08:05 (7) 16:29
5	05:30 20:36	06:02 (5) 20:13	06:18 (6) 19:27	06:28 18:35	09:07 (7) 16:50	08:07 (7) 16:28
6	05:30 20:36	06:01 (5) 20:12	06:19 (6) 19:25	06:29 18:34	09:06 (7) 16:48	08:06 (7) 16:28
7	05:31 20:36	06:02 (5) 20:10	06:20 (6) 19:23	06:30 18:32	09:05 (7) 16:47	08:07 (7) 16:28
8	05:31 20:35	06:00 (5) 20:09	06:21 (6) 19:22	06:31 18:30	09:04 (7) 16:46	08:06 (7) 16:28
9	05:32 20:35	06:01 (5) 20:08	06:22 (6) 19:20	06:32 18:29	09:05 (7) 16:45	08:08 (7) 16:28
10	05:33 20:35	06:00 (5) 20:07	06:23 (6) 19:18	06:33 18:27	09:04 (7) 16:44	08:09 (7) 16:28
11	05:33 20:34	06:18 (5) 20:05	06:45 (6) 19:17	06:34 18:25	09:04 (7) 16:43	08:08 (7) 16:28
12	05:34 20:34	06:00 (5) 20:04	06:24 (6) 19:15	06:34 18:24	09:04 (7) 16:42	08:08 (7) 16:28
13	05:35 20:33	06:00 (5) 20:03	06:25 (6) 19:13	06:35 18:22	09:03 (7) 16:41	08:10 (7) 16:28
14	05:36 20:33	06:00 (5) 20:01	06:26 (6) 19:11	06:36 18:21	09:03 (7) 16:40	08:11 (7) 16:29
15	05:36 20:32	05:59 (5) 20:00	06:27 (6) 19:10	06:37 18:19	09:02 (7) 16:39	08:12 (7) 16:29
16	05:37 20:31	06:00 (5) 19:58	06:28 (6) 19:08	06:38 18:17	09:02 (7) 16:38	08:13 (7) 16:29
17	05:38 20:31	06:01 (5) 19:57	06:29 (6) 19:06	06:39 18:16	09:03 (7) 16:37	08:14 (7) 16:29
18	05:39 20:30	06:02 (5) 19:55	06:30 (6) 19:05	06:40 18:15	09:02 (7) 16:36	08:15 (7) 16:30
19	05:40 20:29	06:03 (5) 19:54	06:31 (6) 19:04	06:41 18:14	09:03 (7) 16:35	08:16 (7) 16:30
20	05:41 20:29	06:03 (5) 19:52	06:32 (6) 19:03	06:42 18:13	09:02 (7) 16:34	08:17 (7) 16:31
21	05:41 20:28	06:04 (5) 19:51	06:33 (6) 18:59	06:43 18:12	09:02 (7) 16:33	08:18 (7) 16:31
22	05:42 20:27	06:05 (5) 19:49	06:34 (6) 18:58	06:44 18:11	09:03 (7) 16:32	08:19 (7) 16:32
23	05:43 20:26	06:06 (5) 19:48	06:35 (6) 18:56	06:45 18:10	09:02 (7) 16:31	08:20 (7) 16:32
24	05:44 20:25	06:07 (5) 19:46	06:36 (6) 18:54	06:46 18:09	09:03 (7) 16:30	08:21 (7) 16:33
25	05:45 20:25	06:08 (5) 19:45	06:37 (6) 18:52	06:47 18:08	09:02 (7) 16:29	08:22 (7) 16:33
26	05:46 20:24	06:09 (5) 19:43	06:38 (6) 18:51	06:48 18:07	09:03 (7) 16:28	08:23 (7) 16:34
27	05:47 20:23	06:10 (5) 19:42	06:39 (6) 18:50	06:49 18:06	09:04 (7) 16:27	08:24 (7) 16:34
28	05:48 20:22	06:11 (5) 19:40	06:40 (6) 18:49	06:50 18:05	09:05 (7) 16:26	08:25 (7) 16:35
29	05:49 20:21	06:12 (5) 19:38	06:41 (6) 18:48	06:51 18:04	09:06 (7) 16:25	08:26 (7) 16:35
30	05:50 20:20	06:13 (5) 19:37	06:42 (6) 18:47	06:52 18:03	09:07 (7) 16:24	08:27 (7) 16:36
31	05:51 20:19	06:14 (5) 19:35	06:43 (6) 18:46	06:53 18:02	09:08 (7) 16:23	08:28 (7) 16:36
Potential sun hours	461	429	375	345	296	286
Total, worst case	830	732	3666	5380	4662	3996

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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Calculated:  
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### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AC - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 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	06:26 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 17:52	06:38 19:26	05:53 19:59	05:26 20:28	05:29 20:36	05:55 20:14	06:27 19:28	06:58 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	05:51 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	05:25 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	05:34 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 16:28
13	07:24 16:50	06:58 17:28	06:16 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 20:33	06:05 20:01	06:37 19:11	07:08 18:21	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	05:37 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 18:08	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	07:21 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 16:35	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	05:25 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	07:19 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	07:21 17:04	06:58 16:32	07:24 16:33
26	07:17 17:06	06:40 17:44	05:53 18:16	06:04 19:50	05:31 20:21	05:25 20:37	05:46 20:23	06:17 19:43	06:49 18:51	07:22 17:03	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 20:22	05:26 20:37	05:47 20:23	06:18 19:42	06:50 18:49	07:23 17:01	07:01 16:31	07:24 16:34
28	07:15 17:08	06:37 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	07:24 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	07:25 16:58	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	06:21 19:37	06:53 18:44	07:26 16:57	07:04 16:30	07:25 16:36
31	07:13 17:12		06:45 19:22	05:58 20:25	05:28 20:25	05:28 20:25	05:51 20:18	06:22 19:35	06:54 18:56	07:27 16:56	07:05 16:30	07:25 16:37
Potential sun hours	296	296	369	399	450	454	461	429	375	345	297	286
Total, worst case												

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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Calculated:  
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### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AD - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 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	06:26 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	06:58 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	05:25 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 20:33	06:05 20:01	06:37 19:11	07:08 18:21	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	05:37 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	07:21 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	05:25 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	07:24 16:33
26	07:17 17:06	06:40 17:44	05:53 18:16	06:04 19:50	05:31 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 20:22	05:26 20:37	05:47 20:23	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	06:37 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 19:55	05:28 20:24	05:27 20:37	05:50 20:20	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	05:58 20:25	05:28 20:25	05:28 20:25	05:51 20:18	06:22 19:35	06:54 18:56	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												

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AE - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26 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 17:51	06:38 19:26	05:53 19:59	05:26 20:28
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
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
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
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	06:20 17:58	06:28 19:33	05:45 20:05	05:24 20:32
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
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
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
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
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 19:43	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	07:21 16:59	06:47 17:38	06:02 18:11	06:11 19:45	05:34 20:16	05:24 20:36
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
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
24	07:19 17:03	06:43 17:42	05:57 18:14	06:06 19:48	05:32 20:19	05:25 20:37
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
26	07:17 17:06	06:40 17:44	05:53 18:16	06:04 19:50	05:31 20:21	05:25 20:37
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
28	07:15 17:08	06:37 17:47	05:50 18:19	06:01 19:52	05:29 20:23	05:26 20:37
29	07:14 17:09	06:36 17:48	05:48 18:20	05:59 19:53	05:29 20:23	05:27 20:37
30	07:14 17:11	06:35 17:49	05:47 18:21	05:58 19:55	05:28 20:24	05:27 20:37
31	07:13 17:12	06:34 17:50	05:45 18:22	05:57 19:56	05:28 20:25	05:27 20:37
Potential sun hours	296	296	369	399	450	454
Total, worst case	3840	4244	3906	578		

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AE - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December
1	05:27 20:37	05:52 20:17	06:23 19:33	15:46 (8) 16:00 (8)	06:54 18:42	14:15 (8) 16:54
2	05:28 20:37	05:53 20:16	06:24 19:32	15:39 (8) 16:05 (8)	06:55 18:40	14:14 (8) 16:53
3	05:28 20:37	05:54 20:15	06:26 19:30	15:34 (8) 16:10 (8)	06:56 18:39	14:11 (8) 16:52
4	05:29 20:36	05:55 20:14	06:27 19:28	15:29 (8) 16:13 (8)	06:58 18:37	14:10 (8) 16:51
5	05:30 20:36	05:56 20:13	06:28 19:27	15:24 (8) 16:14 (8)	06:59 18:35	14:09 (8) 16:50
6	05:30 20:36	05:57 20:12	06:29 19:25	15:21 (8) 16:17 (8)	07:00 18:34	14:06 (8) 16:48
7	05:31 20:36	05:58 20:10	06:30 19:23	15:18 (8) 16:18 (8)	07:01 18:32	14:05 (8) 16:47
8	05:31 20:35	05:59 20:09	06:31 19:22	15:13 (8) 16:19 (8)	07:02 18:30	14:04 (8) 16:46
9	05:32 20:35	06:00 20:08	06:32 19:20	15:10 (8) 16:20 (8)	07:03 18:29	14:03 (8) 16:45
10	05:33 20:34	06:01 20:06	06:33 19:18	15:07 (8) 16:21 (8)	07:04 18:27	14:02 (8) 16:44
11	05:33 20:34	06:02 20:05	06:34 19:17	15:04 (8) 16:24 (8)	07:05 18:25	14:02 (8) 16:43
12	05:34 20:34	06:03 20:04	06:35 19:15	15:01 (8) 16:25 (8)	07:06 18:24	14:01 (8) 16:42
13	05:35 20:33	06:04 20:02	06:36 19:13	14:58 (8) 16:26 (8)	07:07 18:22	14:00 (8) 16:41
14	05:36 20:33	06:05 20:01	06:37 19:11	14:55 (8) 16:25 (8)	07:08 18:21	13:59 (8) 16:40
15	05:37 20:32	06:06 20:00	06:38 19:10	14:52 (8) 16:26 (8)	07:10 18:19	13:58 (8) 16:39
16	05:37 20:31	06:07 19:58	06:39 19:08	14:49 (8) 16:27 (8)	07:11 18:17	13:57 (8) 16:38
17	05:38 20:31	06:08 19:57	06:40 19:06	14:46 (8) 16:28 (8)	07:12 18:16	13:57 (8) 16:38
18	05:39 20:30	06:09 19:55	06:41 19:04	14:45 (8) 16:29 (8)	07:13 18:14	13:56 (8) 16:37
19	05:40 20:29	06:10 19:54	06:42 19:03	14:42 (8) 16:30 (8)	07:14 18:13	13:57 (8) 16:36
20	05:41 20:29	06:11 19:52	06:43 19:01	14:39 (8) 16:29 (8)	07:15 18:11	13:56 (8) 16:35
21	05:42 20:28	06:12 19:51	06:44 18:59	14:36 (8) 16:30 (8)	07:16 18:10	13:55 (8) 16:34
22	05:42 20:27	06:13 19:49	06:45 18:58	14:33 (8) 16:31 (8)	07:18 18:08	13:55 (8) 16:34
23	05:43 20:26	06:14 19:48	06:46 18:56	14:32 (8) 16:30 (8)	07:19 18:07	13:56 (8) 16:33
24	05:44 20:25	06:15 19:46	06:47 18:54	14:29 (8) 16:31 (8)	07:20 18:05	13:55 (8) 16:33
25	05:45 20:24	06:16 19:45	06:48 18:52	14:26 (8) 16:32 (8)	06:21 17:04	12:56 (8) 16:32
26	05:46 20:23	06:17 19:43	06:49 18:51	14:25 (8) 16:31 (8)	06:22 17:02	12:56 (8) 16:31
27	05:47 20:23	06:18 19:42	06:50 18:49	14:22 (8) 16:32 (8)	06:23 17:01	12:55 (8) 16:31
28	05:48 20:22	06:19 19:40	06:51 18:47	14:21 (8) 16:31 (8)	06:25 17:00	12:56 (8) 16:31
29	05:49 20:21	06:20 19:38	06:52 18:45	14:18 (8) 16:32 (8)	06:26 16:58	12:55 (8) 16:30
30	05:50 20:20	06:21 19:37	06:53 18:44	14:17 (8) 16:33 (8)	06:27 16:57	12:57 (8) 16:30
31	05:51 20:18	06:22 19:35		06:28 16:56	12:56 (8) 15:28 (8)	
Potential sun hours	461	429	375	345	297	286
Total, worst case			2708	4678	4076	3328

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AF - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June				
1	07:26 16:38	08:52 (8) 10:56 (8)	07:12 17:13	08:46 (8) 11:26 (8)	06:35 17:48	08:38 (8) 11:34 (8)	06:43 19:23	09:40 (8) 11:34 (8)	05:57 19:56	05:27 20:26
2	07:26 16:39	08:52 (8) 10:58 (8)	07:11 17:14	08:45 (8) 11:27 (8)	06:33 17:49	08:37 (8) 11:35 (8)	06:42 19:24	09:40 (8) 11:32 (8)	05:55 19:57	05:27 20:27
3	07:26 16:40	08:52 (8) 10:58 (8)	07:10 17:16	08:46 (8) 11:28 (8)	06:32 17:50	08:37 (8) 11:33 (8)	06:40 19:25	09:43 (8) 11:29 (8)	05:54 19:58	05:26 20:27
4	07:26 16:41	08:52 (8) 11:00 (8)	07:09 17:17	08:45 (8) 11:29 (8)	06:30 17:52	08:37 (8) 11:33 (8)	06:38 19:26	09:43 (8) 11:25 (8)	05:53 19:59	05:26 20:28
5	07:26 16:42	08:52 (8) 11:00 (8)	07:08 17:18	08:44 (8) 11:30 (8)	06:29 17:53	08:38 (8) 11:32 (8)	06:37 19:27	09:43 (8) 11:21 (8)	05:51 20:00	05:25 20:29
6	07:26 16:43	08:52 (8) 11:02 (8)	07:06 17:19	08:44 (8) 11:30 (8)	06:27 17:54	08:36 (8) 11:32 (8)	06:35 19:28	09:44 (8) 11:18 (8)	05:50 20:01	05:25 20:29
7	07:26 16:44	08:52 (8) 11:02 (8)	07:05 17:21	08:43 (8) 11:31 (8)	06:25 17:55	08:36 (8) 11:30 (8)	06:33 19:29	09:44 (8) 11:16 (8)	05:49 20:02	05:25 20:30
8	07:26 16:45	08:52 (8) 11:04 (8)	07:04 17:22	08:44 (8) 11:32 (8)	06:24 17:56	08:37 (8) 11:31 (8)	06:32 19:31	09:46 (8) 11:12 (8)	05:48 20:03	05:25 20:31
9	07:25 16:46	08:52 (8) 11:04 (8)	07:03 17:23	08:43 (8) 11:31 (8)	06:22 17:57	08:37 (8) 11:29 (8)	06:30 19:32	09:47 (8) 11:09 (8)	05:47 20:04	05:24 20:31
10	07:25 16:47	08:51 (8) 11:05 (8)	07:02 17:25	08:42 (8) 11:32 (8)	06:20 17:58	08:35 (8) 11:27 (8)	06:28 19:33	09:47 (8) 11:05 (8)	05:45 20:05	05:24 20:32
11	07:25 16:48	08:51 (8) 11:07 (8)	07:00 17:26	08:42 (8) 11:32 (8)	06:19 18:00	08:36 (8) 11:28 (8)	06:27 19:34	09:47 (8) 11:03 (8)	05:44 20:06	05:24 20:32
12	07:25 16:49	08:51 (8) 11:07 (8)	06:59 17:27	08:41 (8) 11:33 (8)	06:17 18:01	08:36 (8) 11:26 (8)	06:25 19:35	09:50 (8) 11:00 (8)	05:43 20:07	05:24 20:33
13	07:24 16:50	08:52 (8) 11:08 (8)	06:58 17:28	08:42 (8) 11:34 (8)	06:16 18:02	08:36 (8) 11:24 (8)	06:23 19:36	09:50 (8) 10:56 (8)	05:42 20:08	05:24 20:33
14	07:24 16:51	08:52 (8) 11:10 (8)	06:57 17:30	08:40 (8) 11:34 (8)	06:14 18:03	08:37 (8) 11:23 (8)	06:22 19:37	09:53 (8) 10:53 (8)	05:41 20:09	05:24 20:34
15	07:24 16:52	08:51 (8) 11:11 (8)	06:55 17:31	08:41 (8) 11:35 (8)	06:12 18:04	08:37 (8) 11:21 (8)	06:20 19:38	09:53 (8) 10:49 (8)	05:40 20:10	05:24 20:34
16	07:23 16:53	08:51 (8) 11:11 (8)	06:54 17:32	08:40 (8) 11:36 (8)	06:10 18:05	08:37 (8) 11:19 (8)	06:19 19:39	09:55 (8) 10:45 (8)	05:39 20:11	05:24 20:35
17	07:23 16:55	08:50 (8) 11:12 (8)	06:53 17:33	08:40 (8) 11:34 (8)	06:09 18:06	08:36 (8) 11:18 (8)	06:17 19:40	09:58 (8) 10:42 (8)	05:38 20:12	05:24 20:35
18	07:22 16:56	08:50 (8) 11:14 (8)	06:51 17:35	08:41 (8) 11:35 (8)	06:07 18:08	08:36 (8) 11:16 (8)	06:16 19:41	10:00 (8) 10:38 (8)	05:37 20:13	05:24 20:35
19	07:22 16:57	08:49 (8) 11:15 (8)	06:50 17:36	08:39 (8) 11:35 (8)	06:05 18:09	08:36 (8) 11:12 (8)	06:14 19:43	10:03 (8) 10:33 (8)	05:36 20:14	05:24 20:36
20	07:21 16:58	08:50 (8) 11:16 (8)	06:48 17:37	08:40 (8) 11:36 (8)	06:04 18:10	08:36 (8) 11:10 (8)	06:12 19:44	10:05 (8) 10:27 (8)	05:35 20:15	05:24 20:36
21	07:21 16:59	08:50 (8) 11:16 (8)	06:47 17:38	08:38 (8) 11:36 (8)	06:02 18:11	08:37 (8) 11:09 (8)	06:11 19:45	10:14 (8) 10:20 (8)	05:34 20:16	05:24 20:36
22	07:20 17:01	08:49 (8) 11:17 (8)	06:46 17:40	08:39 (8) 11:35 (8)	06:00 18:12	08:37 (8) 11:05 (8)	06:09 19:46	05:34 20:17	05:24 20:36	05:24 20:36
23	07:19 17:02	08:48 (8) 11:18 (8)	06:44 17:41	08:39 (8) 11:35 (8)	05:59 18:13	08:37 (8) 11:03 (8)	06:08 19:47	05:33 20:18	05:25 20:37	05:25 20:37
24	07:19 17:03	08:49 (8) 11:19 (8)	06:43 17:42	08:38 (8) 11:36 (8)	05:57 18:14	08:38 (8) 11:00 (8)	06:06 19:48	05:32 20:19	05:25 20:37	05:25 20:37
25	07:18 17:04	08:49 (8) 11:21 (8)	06:41 17:43	08:38 (8) 11:36 (8)	05:55 18:15	08:38 (8) 10:56 (8)	06:05 19:49	05:31 20:20	05:25 20:37	05:25 20:37
26	07:17 17:05	08:48 (8) 11:22 (8)	06:40 17:44	08:39 (8) 11:35 (8)	05:53 18:16	08:38 (8) 10:54 (8)	06:04 19:50	05:31 20:21	05:25 20:37	05:25 20:37
27	07:16 17:07	08:47 (8) 11:23 (8)	06:38 17:46	08:37 (8) 11:35 (8)	05:52 18:17	08:38 (8) 10:50 (8)	06:02 19:51	05:30 20:22	05:26 20:37	05:26 20:37
28	07:15 17:08	08:48 (8) 11:24 (8)	06:37 17:47	08:38 (8) 11:36 (8)	05:50 18:19	08:39 (8) 10:47 (8)	06:01 19:52	05:29 20:23	05:26 20:37	05:26 20:37
29	07:14 17:09	08:47 (8) 11:23 (8)	06:47 17:48	06:48 19:20	05:49 18:20	09:39 (8) 11:45 (8)	05:59 19:53	05:29 20:23	05:27 20:37	05:27 20:37
30	07:14 17:11	08:46 (8) 11:24 (8)	06:48 17:49	06:47 19:21	05:48 18:21	09:39 (8) 11:41 (8)	05:58 19:55	05:28 20:24	05:27 20:37	05:27 20:37
31	07:13 17:12	08:47 (8) 11:25 (8)	06:49 17:50	06:45 19:22	05:47 18:22	09:40 (8) 11:38 (8)	05:57 19:56	05:28 20:25	05:27 20:37	05:27 20:37
Potential sun hours	296	296	369	399	450	454				
Total, worst case	4378	4810	4870	1482						

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AF - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December				
1	05:27 20:37	05:52 20:17	06:23 19:33	09:46 (8) 11:02 (8)	06:54 18:42	09:15 (8) 12:05 (8)	06:29 16:54	08:11 (8) 11:01 (8)	07:05 16:29	08:33 (8) 10:49 (8)
2	05:28 20:37	05:53 20:16	06:24 19:32	09:45 (8) 11:03 (8)	06:55 18:40	09:16 (8) 12:06 (8)	06:31 16:53	08:13 (8) 11:01 (8)	07:06 16:29	08:34 (8) 10:48 (8)
3	05:28 20:37	05:54 20:15	06:26 19:30	09:44 (8) 11:06 (8)	06:56 18:39	09:15 (8) 12:05 (8)	06:32 16:52	08:14 (8) 11:00 (8)	07:07 16:29	08:35 (8) 10:49 (8)
4	05:29 20:36	05:55 20:14	06:27 19:28	09:43 (8) 11:09 (8)	06:58 18:37	09:14 (8) 12:06 (8)	06:33 16:51	08:13 (8) 11:01 (8)	07:08 16:29	08:36 (8) 10:48 (8)
5	05:30 20:36	05:56 20:13	06:28 19:27	09:40 (8) 11:12 (8)	06:59 18:35	09:13 (8) 12:07 (8)	06:34 16:50	08:14 (8) 11:00 (8)	07:09 16:28	08:37 (8) 10:47 (8)
6	05:30 20:36	05:57 20:12	06:29 19:25	09:39 (8) 11:13 (8)	07:00 18:34	09:12 (8) 12:06 (8)	06:35 16:48	08:14 (8) 11:00 (8)	07:10 16:28	08:38 (8) 10:48 (8)
7	05:31 20:36	05:58 20:10	06:30 19:23	09:38 (8) 11:16 (8)	07:01 18:32	09:13 (8) 12:07 (8)	06:37 16:47	08:15 (8) 10:59 (8)	07:11 16:28	08:39 (8) 10:47 (8)
8	05:31 20:35	05:59 20:09	06:31 19:22	09:37 (8) 11:19 (8)	07:02 18:30	09:12 (8) 12:08 (8)	06:38 16:46	08:16 (8) 10:58 (8)	07:12 16:28	08:40 (8) 10:48 (8)
9	05:32 20:35	06:00 20:08	06:32 19:20	09:36 (8) 11:22 (8)	07:03 18:29	09:11 (8) 12:07 (8)	06:39 16:45	08:16 (8) 10:58 (8)	07:13 16:28	08:41 (8) 10:47 (8)
10	05:33 20:34	06:01 20:06	06:33 19:18	09:35 (8) 11:23 (8)	07:04 18:27	09:10 (8) 12:08 (8)	06:40 16:44	08:17 (8) 10:57 (8)	07:14 16:28	08:42 (8) 10:48 (8)
11	05:33 20:34	06:02 20:05	06:34 19:17	09:34 (8) 11:26 (8)	07:05 18:25	09:12 (8) 12:08 (8)	06:42 16:43	08:16 (8) 10:56 (8)	07:15 16:28	08:43 (8) 10:47 (8)
12	05:34 20:34	06:03 20:04	06:35 19:15	09:31 (8) 11:29 (8)	07:06 18:24	09:11 (8) 12:09 (8)	06:43 16:42	08:18 (8) 10:56 (8)	07:15 16:28	08:44 (8) 10:48 (8)
13	05:35 20:33	06:04 20:02	06:36 19:13	09:30 (8) 11:32 (8)	07:07 18:22	09:10 (8) 12:08 (8)	06:44 16:41	08:19 (8) 10:55 (8)	07:16 16:28	08:44 (8) 10:48 (8)
14	05:36 20:33	06:05 20:01	06:37 19:11	09:29 (8) 11:35 (8)	07:08 18:21	09:11 (8) 12:07 (8)	06:45 16:40	08:20 (8) 10:56 (8)	07:17 16:29	08:45 (8) 10:47 (8)
15	05:37 20:32	06:06 20:00	06:38 19:10	09:28 (8) 11:36 (8)	07:10 18:19	09:10 (8) 12:08 (8)	06:46 16:39	08:20 (8) 10:56 (8)	07:18 16:29	08:46 (8) 10:48 (8)
16	05:37 20:31	06:07 19:58	06:39 19:08	09:27 (8) 11:39 (8)	07:11 18:17	09:09 (8) 12:07 (8)	06:48 16:38	08:21 (8) 10:55 (8)	07:18 16:29	08:47 (8) 10:49 (8)
17	05:38 20:31	06:08 19:57	06:40 19:06	09:26 (8) 11:42 (8)	07:12 18:16	09:11 (8) 12:07 (8)	06:49 16:38	08:22 (8) 10:54 (8)	07:19 16:29	08:47 (8) 10:49 (8)
18	05:39 20:30	06:09 19:55	06:41 19:04	09:25 (8) 11:43 (8)	07:13 18:14	09:10 (8) 12:08 (8)	06:50 16:37	08:23 (8) 10:53 (8)	07:20 16:30	08:48 (8) 10:50 (8)
19	05:40 20:29	06:10 19:54	06:42 19:03	09:24 (8) 11:46 (8)	07:14 18:13	09:09 (8) 12:07 (8)	06:51 16:36	08:23 (8) 10:53 (8)	07:20 16:30	08:48 (8) 10:48 (8)
20	05:41 20:29	06:11 19:52	06:43 19:01	09:23 (8) 11:47 (8)	07:15 18:11	09:10 (8) 12:06 (8)	06:52 16:35	08:24 (8) 10:52 (8)	07:21 16:30	08:49 (8) 10:49 (8)
21	05:42 20:28	06:12 19:51	06:44 18:59	09:22 (8) 11:50 (8)	07:16 18:10	09:09 (8) 12:05 (8)	06:54 16:34	08:25 (8) 10:51 (8)	07:22 16:31	08:49 (8) 10:49 (8)
22	05:42 20:27	06:13 19:49	06:45 18:58	09:21 (8) 11:51 (8)	07:18 18:08	09:11 (8) 12:07 (8)	06:55 16:34	08:26 (8) 10:52 (8)	07:22 16:31	08:50 (8) 10:50 (8)
23	05:43 20:26	06:14 19:48	06:46 18:56	09:20 (8) 11:54 (8)	07:19 18:07	09:10 (8) 12:06 (8)	06:56 16:33	08:26 (8) 10:52 (8)	07:23 16:32	08:50 (8) 10:50 (8)
24	05:44 20:25	06:15 19:46	06:47 18:54	09:21 (8) 11:55 (8)	07:20 18:05	09:09 (8) 12:05 (8)	06:57 16:33	08:27 (8) 10:51 (8)	07:23 16:32	08:51 (8) 10:51 (8)
25	05:45 20:24	06:16 19:45	06:48 18:52	09:20 (8) 11:56 (8)	07:21 17:04	08:10 (8) 11:04 (8)	06:58 16:32	08:28 (8) 10:50 (8)	07:24 16:33	08:51 (8) 10:53 (8)
26	05:46 20:23	06:17 19:43	06:49 18:51	09:19 (8) 11:59 (8)	07:22 17:03	08:10 (8) 11:04 (8)	06:59 16:32	08:29 (8) 10:49 (8)	07:24 16:34	08:51 (8) 10:53 (8)
27	05:47 20:23	06:18 19:42	06:50 18:49	09:18 (8) 12:00 (8)	07:23 17:01	08:11 (8) 11:05 (8)	07:01 16:31	08:30 (8) 10:50 (8)	07:24 16:34	08:52 (8) 10:54 (8)
28	05:48 20:22	06:19 19:40	06:51 18:47	09:17 (8) 12:01 (8)	07:25 17:00	08:10 (8) 11:04 (8)	07:02 16:31	08:32 (8) 10:50 (8)	07:25 16:35	08:52 (8) 10:54 (8)
29	05:49 20:21	06:20 19:38	06:52 18:45	09:16 (8) 12:02 (8)	07:26 16:58	08:11 (8) 11:03 (8)	07:03 16:30	08:33 (8) 10:49 (8)	07:25 16:36	08:52 (8) 10:54 (8)
30	05:50 20:20	06:21 19:37	06:53 18:44	09:15 (8) 12:03 (8)	07:27 16:57	08:11 (8) 11:03 (8)	07:04 16:30	08:32 (8) 10:48 (8)	07:25 16:36	08:52 (8) 10:56 (8)
31	05:51 20:18	06:22 19:35	06:54 18:42	09:14 (8) 12:04 (8)	07:28 16:56	08:12 (8) 11:02 (8)	07:04 16:30	08:32 (8) 10:48 (8)	07:25 16:37	08:52 (8) 10:56 (8)
Potential sun hours	461	429	375	345	297	286	286	286	286	286
Total, worst case		456	3802	5420	4606	3864				

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AG - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 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 16:55	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	06:25 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	06:26 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 17:52	06:38 19:26	05:53 19:59	05:26 20:28	05:29 20:36	05:55 20:14	06:27 19:28	06:58 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 16:29
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	06:35 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	05:25 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	05:34 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 16:28
13	07:24 16:50	06:58 17:28	06:16 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 20:33	06:05 20:01	06:37 19:11	07:08 18:21	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	05:37 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 18:08	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 16:31
21	07:21 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	06:54 16:35	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	05:25 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	07:19 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 18:05	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	07:21 17:04	06:58 16:32	07:24 16:33
26	07:17 17:06	06:40 17:44	05:53 18:16	06:04 19:50	05:31 20:21	05:25 20:37	05:46 20:23	06:17 19:43	06:49 18:51	07:22 17:03	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 20:22	05:26 20:37	05:47 20:23	06:18 19:42	06:50 18:49	07:23 17:01	07:01 16:31	07:24 16:34
28	07:15 17:08	06:37 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	07:24 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	07:25 16:58	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	06:21 19:37	06:53 18:44	07:26 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 20:18	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												

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AH - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December			
1	07:26 16:38	15:44 (11) 16:08 (10)	07:12 17:13	15:36 (10) 16:18 (10)	06:35 17:48	06:43 19:23	05:57 19:56	05:27 20:26	05:52 20:37	06:23 19:33	06:54 18:42	06:29 16:55	15:05 (10) 15:39 (10)	07:05 16:29	15:27 (10) 15:57 (10)
2	07:26 16:39	15:44 (11) 16:08 (10)	07:11 17:14	15:35 (10) 16:17 (10)	06:33 17:49	06:42 19:24	05:55 19:57	05:27 20:27	05:53 20:37	06:24 19:32	06:55 18:39	06:31 16:53	15:02 (10) 15:40 (10)	07:06 17:06	15:28 (10) 15:56 (10)
3	07:26 16:40	15:44 (11) 16:08 (10)	07:10 17:16	15:34 (10) 16:16 (10)	06:32 17:50	06:40 19:25	05:54 19:58	05:26 20:27	05:54 20:37	06:26 19:30	06:56 18:39	06:32 16:52	15:02 (10) 15:42 (10)	07:07 16:29	15:29 (10) 15:57 (10)
4	07:26 16:41	15:44 (11) 16:08 (10)	07:09 17:17	15:33 (10) 16:17 (10)	06:30 17:52	06:38 19:26	05:53 19:59	05:26 20:28	05:55 20:36	06:27 19:28	06:58 18:37	06:33 16:51	15:01 (10) 15:43 (10)	07:08 16:29	15:30 (10) 15:56 (10)
5	07:26 16:42	15:44 (10) 16:10 (10)	07:07 17:18	15:32 (10) 16:16 (10)	06:29 17:53	06:37 19:27	05:51 20:00	05:25 20:29	05:30 20:36	06:28 19:27	06:59 18:35	06:34 16:50	15:02 (10) 15:44 (10)	07:09 16:29	15:31 (10) 15:57 (10)
6	07:26 16:43	15:46 (10) 16:10 (10)	07:06 17:19	15:32 (10) 16:14 (10)	06:27 17:54	06:35 19:28	05:50 20:01	05:25 20:29	05:30 20:36	06:29 19:25	07:00 18:34	06:35 16:48	15:02 (10) 15:46 (10)	07:10 16:28	15:32 (10) 15:56 (10)
7	07:26 16:44	15:46 (10) 16:12 (10)	07:05 17:21	15:31 (10) 16:13 (10)	06:25 17:55	06:33 19:29	05:49 20:02	05:25 20:30	05:31 20:36	06:30 19:23	07:01 18:32	06:37 16:47	15:03 (10) 15:47 (10)	07:11 16:28	15:31 (10) 15:57 (10)
8	07:26 16:45	15:46 (10) 16:12 (10)	07:04 17:22	15:32 (10) 16:12 (10)	06:24 17:56	06:32 19:31	05:48 20:03	05:25 20:31	05:31 20:35	06:31 19:22	07:02 18:30	06:38 16:46	15:04 (10) 15:46 (10)	07:12 16:28	15:32 (11) 15:58 (10)
9	07:25 16:46	15:45 (10) 16:13 (10)	07:03 17:23	15:35 (10) 16:11 (10)	06:22 17:57	06:30 19:32	05:47 20:04	05:24 20:31	05:32 20:35	06:00 19:20	07:03 18:29	06:39 16:45	15:06 (10) 15:48 (10)	07:13 16:28	15:33 (11) 15:57 (10)
10	07:25 16:47	15:45 (10) 16:13 (10)	07:02 17:25	15:36 (10) 16:10 (10)	07:02 17:58	06:28 19:33	05:45 20:05	05:24 20:32	05:33 20:34	06:01 19:20	07:04 18:29	06:40 16:44	15:07 (10) 15:49 (10)	07:14 16:28	15:34 (11) 15:58 (10)
11	07:25 16:48	15:45 (10) 16:13 (10)	07:00 17:26	15:38 (10) 16:06 (10)	07:00 18:00	06:27 19:34	05:44 20:06	05:24 20:32	05:34 20:34	06:02 19:17	07:05 18:25	06:42 16:43	15:08 (10) 15:50 (10)	07:15 16:28	15:35 (11) 15:59 (10)
12	07:25 16:49	15:44 (10) 16:14 (10)	06:59 17:27	15:41 (10) 16:05 (10)	06:17 18:01	06:25 19:35	05:43 20:07	05:24 20:33	05:34 20:34	06:03 19:15	07:06 18:24	06:43 16:42	15:08 (10) 15:50 (10)	07:15 16:28	15:36 (11) 16:00 (10)
13	07:24 16:50	15:44 (10) 16:14 (10)	06:58 17:28	15:46 (10) 16:02 (10)	06:15 18:02	06:23 19:36	05:42 20:08	05:24 20:33	05:35 20:33	06:04 19:13	07:07 18:22	06:44 16:41	15:09 (10) 15:51 (10)	07:16 16:28	15:36 (11) 15:58 (10)
14	07:24 16:51	15:44 (10) 16:16 (10)	06:57 17:30	16:04 18:03	06:22 19:37	06:24 20:09	05:41 20:34	05:24 20:32	05:36 20:32	06:05 19:11	07:08 18:21	06:45 16:40	15:10 (10) 15:50 (10)	07:17 16:29	15:37 (11) 15:59 (10)
15	07:24 16:52	15:43 (10) 16:15 (10)	06:55 17:31	06:12 18:04	06:20 19:38	06:24 20:10	05:40 20:34	05:24 20:32	05:37 20:30	06:06 19:10	07:10 18:19	06:46 16:39	15:11 (10) 15:51 (10)	07:18 16:29	15:38 (11) 16:00 (10)
16	07:23 16:53	15:45 (10) 16:17 (10)	06:54 17:32	06:10 18:05	06:19 19:39	06:24 20:11	05:39 20:35	05:24 20:31	05:37 20:31	06:07 19:58	07:11 18:08	06:48 16:38	15:13 (10) 15:53 (10)	07:18 16:29	15:38 (11) 16:00 (10)
17	07:23 16:55	15:44 (10) 16:16 (10)	06:53 17:33	06:09 18:06	06:17 19:40	06:23 20:12	05:38 20:35	05:24 20:31	05:38 20:31	06:08 19:57	07:12 18:16	06:49 16:38	15:14 (10) 15:52 (10)	07:19 16:29	15:39 (11) 16:01 (10)
18	07:22 16:56	15:44 (10) 16:18 (10)	06:51 17:35	06:07 18:08	06:16 19:41	06:23 20:13	05:37 20:35	05:24 20:30	05:39 20:30	06:09 19:55	07:13 18:14	06:50 16:37	15:15 (10) 15:53 (10)	07:20 16:30	15:40 (11) 16:00 (10)
19	07:22 16:57	15:43 (10) 16:17 (10)	06:50 17:36	06:05 18:09	06:14 19:43	06:23 20:14	05:36 20:36	05:24 20:29	05:40 20:34	06:10 19:54	07:14 18:13	06:51 16:36	15:15 (10) 15:53 (10)	07:20 16:30	15:41 (11) 16:00 (10)
20	07:21 16:58	15:42 (10) 16:18 (10)	06:48 17:37	06:04 18:10	06:12 19:44	06:22 20:15	05:35 20:36	05:24 20:29	05:41 20:32	06:11 19:52	07:15 18:11	06:52 16:35	15:16 (10) 15:54 (10)	07:21 16:30	15:41 (11) 16:01 (10)
21	07:21 16:59	15:42 (10) 16:18 (10)	06:47 17:38	06:02 18:11	06:11 19:45	06:21 20:16	05:35 20:36	05:24 20:28	05:42 20:31	06:12 19:51	07:16 18:10	06:54 16:35	15:17 (10) 15:53 (10)	07:22 16:31	15:41 (11) 16:01 (10)
22	07:20 17:01	15:41 (10) 16:19 (10)	06:46 17:40	06:00 18:12	06:09 19:46	06:20 20:17	05:34 20:36	05:24 20:27	05:42 20:31	06:13 19:49	07:17 18:08	06:55 16:34	15:18 (10) 15:54 (10)	07:22 16:31	15:42 (11) 16:02 (10)
23	07:19 17:02	15:40 (10) 16:18 (10)	06:44 17:41	05:59 18:13	06:08 19:47	06:21 20:18	05:33 20:37	05:25 20:26	05:43 19:48	06:14 18:56	07:19 18:07	06:56 16:33	15:20 (10) 15:54 (10)	07:23 16:32	15:42 (11) 16:02 (10)
24	07:18 17:03	15:41 (10) 16:19 (10)	06:43 17:42	05:57 18:14	06:06 19:48	06:22 20:19	05:32 20:37	05:25 20:25	05:44 20:31	06:15 19:46	07:20 18:05	06:57 16:33	15:21 (10) 15:55 (10)	07:23 16:32	15:43 (11) 16:03 (10)
25	07:18 17:04	15:41 (10) 16:19 (10)	06:41 17:43	05:55 18:15	06:05 19:49	06:21 20:20	05:25 20:37	05:45 20:24	05:45 20:24	06:16 19:45	07:21 18:04	06:58 16:32	15:22 (10) 15:54 (10)	07:24 16:33	15:43 (11) 16:03 (10)
26	07:17 17:06	15:40 (10) 16:20 (10)	06:40 17:44	05:53 18:16	06:04 19:50	06:20 20:21	05:25 20:37	05:46 20:23	05:46 20:23	06:17 19:43	07:22 18:03	06:59 16:32	15:23 (10) 15:55 (10)	07:24 16:34	15:43 (11) 16:05 (10)
27	07:16 17:07	15:39 (10) 16:19 (10)	06:38 17:46	05:52 18:17	06:02 19:51	06:20 20:22	05:26 20:37	05:47 20:23	05:47 20:23	06:18 19:42	07:23 18:01	07:01 16:31	15:22 (10) 15:54 (10)	07:24 16:34	15:44 (11) 16:06 (10)
28	07:15 17:08	15:38 (10) 16:18 (10)	06:37 17:47	05:50 18:19	06:01 19:52	06:20 20:23	05:26 20:37	05:48 20:22	05:48 20:22	06:19 19:40	07:24 18:00	07:02 16:31	15:24 (10) 15:56 (10)	07:25 16:35	15:44 (11) 16:06 (10)
29	07:14 17:09	15:37 (10) 16:19 (10)		06:48 19:20	06:09 19:53	06:21 20:23	05:27 20:37	05:49 20:21	06:20 19:38	06:52 18:45	07:25 18:18	07:03 16:30	15:25 (10) 15:55 (10)	07:25 16:36	15:44 (11) 16:06 (10)
30	07:14 17:11	15:36 (10) 16:18 (10)		06:47 19:21	06:08 19:55	06:22 20:24	05:27 20:37	05:49 20:20	06:21 19:37	06:53 18:44	07:26 18:14	07:04 16:30	15:26 (10) 15:56 (10)	07:25 16:36	15:44 (11) 16:06 (10)
31	07:13 17:12	15:37 (10) 16:19 (10)		06:45 19:22	06:08 20:25	06:23 20:25	05:28 20:18	05:51 20:18	06:22 19:35	06:28 19:35	07:27 18:14	07:05 16:56	15:08 (10) 15:38 (10)	07:25 16:37	15:44 (11) 16:06 (10)
Potential sun hours	296	296	396	399	450	454	461	429	375	345	297	286			
Total, worst case	1010	476	369	399	450	454	461	429	375	345	297	286			

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

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

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AI - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26 16:38 146	07:12 15:06 (9) 17:13	06:35 15:26 (9) 17:48	06:43 12:42 (9) 19:23	05:57 14:54 (9) 19:56	05:27 19:56 20:26
2	07:26 16:39 146	07:11 15:06 (9) 17:14	06:33 15:27 (9) 17:49	06:42 12:43 (9) 19:24	05:55 14:58 (9) 19:57	05:27 19:57 20:27
3	07:26 16:40 144	07:10 15:06 (9) 17:16	06:32 15:28 (9) 17:50	06:40 12:43 (9) 19:25	05:54 15:03 (9) 19:58	05:26 19:58 20:27
4	07:26 16:41 146	07:09 15:06 (9) 17:17	06:30 15:29 (9) 17:51	06:38 12:44 (9) 19:26	05:53 15:04 (9) 19:59	05:26 19:59 20:28
5	07:26 16:42 146	07:07 15:08 (9) 17:18	06:29 15:28 (9) 17:53	06:37 12:46 (9) 19:27	05:51 15:13 (9) 19:59	05:25 20:00 20:29
6	07:26 16:43 148	07:06 15:10 (9) 17:19	06:27 15:28 (9) 17:54	06:35 12:46 (9) 19:28	05:50 15:14 (9) 19:59	05:25 20:01 20:29
7	07:26 16:44 148	07:05 15:10 (9) 17:21	06:25 15:27 (9) 17:55	06:33 12:48 (9) 19:29	05:49 15:15 (9) 19:59	05:25 20:02 20:30
8	07:26 16:45 148	07:04 15:10 (9) 17:22	06:24 15:28 (9) 17:56	06:32 12:49 (9) 19:31	05:48 15:16 (9) 19:59	05:25 20:03 20:31
9	07:25 16:46 150	07:03 15:11 (9) 17:23	06:22 15:29 (9) 17:57	06:30 12:51 (9) 19:32	05:47 15:17 (9) 19:59	05:24 20:04 20:31
10	07:25 16:47 150	07:02 15:11 (9) 17:25	06:20 15:30 (9) 17:58	06:28 12:51 (9) 19:33	05:45 15:18 (9) 19:59	05:24 20:05 20:32
11	07:25 16:48 150	07:00 15:13 (9) 17:26	06:19 15:28 (9) 18:00	06:27 12:54 (9) 19:34	05:44 15:19 (9) 19:59	05:24 20:06 20:32
12	07:25 16:49 150	06:59 15:13 (9) 17:27	06:17 15:29 (9) 18:01	06:25 12:56 (9) 19:35	05:43 15:20 (9) 19:59	05:24 20:07 20:33
13	07:24 16:50 152	06:58 15:14 (9) 17:28	06:16 15:30 (9) 18:02	06:23 12:58 (9) 19:36	05:42 15:21 (9) 19:59	05:24 20:08 20:33
14	07:24 16:51 154	06:57 15:16 (9) 17:30	06:14 15:30 (9) 18:03	06:22 12:59 (9) 19:37	05:41 15:22 (9) 19:59	05:24 20:09 20:34
15	07:24 16:52 154	06:55 15:15 (9) 17:31	06:12 15:29 (9) 18:04	06:20 13:01 (9) 19:38	05:40 15:23 (9) 19:59	05:24 20:10 20:34
16	07:23 16:53 154	06:54 15:17 (9) 17:32	06:10 15:30 (9) 18:05	06:19 13:03 (9) 19:39	05:39 15:24 (9) 19:59	05:24 20:11 20:35
17	07:23 16:55 154	06:53 15:16 (9) 17:33	06:09 15:30 (9) 18:06	06:17 13:08 (9) 19:40	05:38 15:25 (9) 19:59	05:24 20:12 20:35
18	07:22 16:56 156	06:51 15:18 (9) 17:35	06:07 15:29 (9) 18:08	06:16 13:10 (9) 19:41	05:37 15:26 (9) 19:59	05:24 20:13 20:35
19	07:22 16:57 158	06:50 15:19 (9) 17:36	06:05 15:29 (9) 18:09	06:14 13:12 (9) 19:43	05:36 15:27 (9) 19:59	05:24 20:14 20:36
20	07:21 16:58 156	06:48 15:18 (9) 17:37	06:04 15:30 (9) 18:10	06:12 13:14 (9) 19:44	05:35 15:28 (9) 19:59	05:24 20:15 20:36
21	07:21 16:59 158	06:47 15:20 (9) 17:38	06:02 15:28 (9) 18:11	06:11 13:19 (9) 19:45	05:35 15:29 (9) 19:59	05:24 20:16 20:36
22	07:20 17:01 160	06:46 15:21 (9) 17:40	06:00 15:29 (9) 18:12	06:09 13:21 (9) 19:46	05:34 15:30 (9) 19:59	05:24 20:17 20:36
23	07:19 17:02 160	06:44 15:20 (9) 17:41	05:59 15:29 (9) 18:13	06:08 13:23 (9) 19:47	05:33 15:31 (9) 19:59	05:25 20:18 20:37
24	07:18 17:03 160	06:43 15:21 (9) 17:42	05:57 15:28 (9) 18:14	06:06 13:28 (9) 19:48	05:32 15:32 (9) 19:59	05:25 20:19 20:37
25	07:18 17:04 162	06:41 15:23 (9) 17:43	05:55 15:28 (9) 18:15	06:05 13:30 (9) 19:49	05:31 15:33 (9) 19:59	05:25 20:20 20:37
26	07:17 17:06 164	06:40 15:24 (9) 17:44	05:53 15:29 (9) 18:16	06:04 13:34 (9) 19:50	05:31 15:34 (9) 19:59	05:25 20:21 20:37
27	07:16 17:07 162	06:38 15:23 (9) 17:46	05:52 15:27 (9) 18:17	06:02 13:36 (9) 19:51	05:30 15:35 (9) 19:59	05:26 20:22 20:37
28	07:15 17:08 164	06:37 15:24 (9) 17:47	05:50 15:28 (9) 18:19	06:01 13:41 (9) 19:52	05:29 15:36 (9) 19:59	05:26 20:23 20:37
29	07:14 17:09 164	06:36 15:25 (9) 17:48	05:48 15:29 (9) 18:20	05:59 13:43 (9) 19:53	05:29 15:37 (9) 19:59	05:27 20:24 20:37
30	07:14 17:11 166	06:35 15:26 (9) 17:49	05:47 15:30 (9) 18:21	05:58 13:47 (9) 19:54	05:28 15:38 (9) 19:59	05:27 20:25 20:37
31	07:13 17:12 166	06:34 15:25 (9) 17:50	05:45 15:31 (9) 18:22	05:57 13:50 (9) 19:55	05:28 15:39 (9) 19:59	05:27 20:26 20:37
Potential sun hours	296	296	369	399	450	454
Total, worst case	4796	4744	3872	208		

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)	Last time (hh:mm) with flicker (WTG causing flicker last time)
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Project:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AI - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December			
1	05:27 20:37	05:52 20:17	06:23 19:33	06:54 18:42	13:35 (9) 15:59 (9)	06:29 16:54	12:07 (9) 14:59 (9)	07:05 16:29	12:25 (9) 14:55 (9)
2	05:28 20:37	05:53 20:16	06:24 19:32	06:55 18:40	13:34 (9) 16:00 (9)	06:31 16:53	12:09 (9) 14:59 (9)	07:06 16:29	12:24 (9) 14:54 (9)
3	05:28 20:37	05:54 20:15	06:26 19:30	06:56 18:39	13:31 (9) 15:59 (9)	06:32 16:52	12:08 (9) 14:58 (9)	07:07 16:29	12:25 (9) 14:55 (9)
4	05:29 20:36	05:55 20:14	06:27 19:28	06:58 18:37	13:28 (9) 16:00 (9)	06:33 16:51	12:09 (9) 14:57 (9)	07:08 16:29	12:26 (9) 14:54 (9)
5	05:30 20:36	05:56 20:13	06:28 19:27	06:59 18:35	13:27 (9) 15:59 (9)	06:34 16:50	12:08 (9) 14:58 (9)	07:09 16:28	12:27 (9) 14:55 (9)
6	05:30 20:36	05:57 20:12	06:29 19:25	07:00 18:34	13:24 (9) 16:00 (9)	06:35 16:48	12:10 (9) 14:58 (9)	07:10 16:28	12:28 (9) 14:56 (9)
7	05:31 20:36	05:58 20:10	06:30 19:23	07:01 18:32	13:23 (9) 15:59 (9)	06:37 16:47	12:09 (9) 14:57 (9)	07:11 16:28	12:29 (9) 14:55 (9)
8	05:31 20:35	05:59 20:09	06:31 19:22	07:02 18:30	13:22 (9) 16:00 (9)	06:38 16:46	12:10 (9) 14:56 (9)	07:12 16:28	12:30 (9) 14:56 (9)
9	05:32 20:35	06:00 20:08	06:32 19:20	07:03 18:29	13:19 (9) 15:59 (9)	06:39 16:45	12:10 (9) 14:58 (9)	07:13 16:28	12:31 (9) 14:55 (9)
10	05:33 20:34	06:01 20:06	06:33 19:18	07:04 18:27	13:18 (9) 16:00 (9)	06:40 16:44	12:11 (9) 14:57 (9)	07:14 16:28	12:30 (9) 14:56 (9)
11	05:34 20:34	06:02 20:05	06:34 19:17	07:05 18:25	13:18 (9) 16:00 (9)	06:42 16:43	12:10 (9) 14:56 (9)	07:15 16:28	12:31 (9) 14:57 (9)
12	05:34 20:34	06:03 20:04	06:35 19:15	07:06 18:24	13:17 (9) 16:01 (9)	06:43 16:42	12:12 (9) 14:58 (9)	07:15 16:28	12:32 (9) 14:56 (9)
13	05:35 20:33	06:04 20:02	06:36 19:13	07:07 18:22	13:16 (9) 16:00 (9)	06:44 16:41	12:13 (9) 14:57 (9)	07:16 16:28	12:32 (9) 14:56 (9)
14	05:36 20:33	06:05 20:01	06:37 19:11	07:08 18:21	13:13 (9) 15:59 (9)	06:45 16:40	12:12 (9) 14:56 (9)	07:17 16:29	12:33 (9) 14:57 (9)
15	05:37 20:32	06:06 20:00	06:38 19:10	07:10 18:19	13:12 (9) 16:00 (9)	06:46 16:39	12:13 (9) 14:55 (9)	07:18 16:29	12:34 (9) 14:58 (9)
16	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	13:11 (9) 15:59 (9)	06:48 16:38	12:13 (9) 14:57 (9)	07:18 16:29	12:34 (9) 14:58 (9)
17	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	13:11 (9) 16:01 (9)	06:49 16:38	12:14 (9) 14:56 (9)	07:19 16:29	12:35 (9) 14:57 (9)
18	05:39 20:30	06:09 19:55	06:41 19:04	07:13 18:14	13:12 (9) 16:00 (9)	06:50 16:37	12:15 (9) 14:55 (9)	07:20 16:30	12:36 (9) 14:58 (9)
19	05:40 20:29	06:10 19:54	06:42 19:03	07:14 18:13	13:11 (9) 15:59 (9)	06:51 16:36	12:15 (9) 14:55 (9)	07:20 16:30	12:36 (9) 14:58 (9)
20	05:41 20:29	06:11 19:52	06:43 19:01	07:15 18:11	13:10 (9) 16:00 (9)	06:52 16:35	12:16 (9) 14:56 (9)	07:21 16:30	12:37 (9) 14:59 (9)
21	05:42 20:28	06:12 19:51	06:44 18:59	07:16 18:10	13:09 (9) 15:59 (9)	06:54 16:35	12:17 (9) 14:55 (9)	07:22 16:31	12:37 (9) 14:59 (9)
22	05:42 20:27	06:13 19:49	06:45 18:58	07:18 18:08	13:09 (9) 16:01 (9)	06:55 16:34	12:18 (9) 14:54 (9)	07:22 16:31	12:38 (9) 15:00 (9)
23	05:43 20:26	06:14 19:48	06:46 18:56	07:19 18:07	13:08 (9) 16:00 (9)	06:56 16:33	12:18 (9) 14:56 (9)	07:23 16:32	12:38 (9) 15:00 (9)
24	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:05	13:09 (9) 15:59 (9)	06:57 16:33	12:19 (9) 14:55 (9)	07:23 16:32	12:39 (9) 15:01 (9)
25	05:45 20:24	06:16 19:45	06:48 18:52	07:21 17:04	12:08 (9) 14:58 (9)	06:58 16:32	12:20 (9) 14:56 (9)	07:24 16:33	12:39 (9) 15:01 (9)
26	05:46 20:23	06:17 19:43	06:49 18:51	07:22 17:03	12:08 (9) 15:00 (9)	06:59 16:32	12:21 (9) 14:55 (9)	07:24 16:34	12:39 (9) 15:01 (9)
27	05:47 20:23	06:18 19:42	06:50 18:49	07:23 17:01	12:09 (9) 14:59 (9)	07:01 16:31	12:20 (9) 14:54 (9)	07:24 16:34	12:40 (9) 15:02 (9)
28	05:48 20:22	06:19 19:40	06:51 18:47	07:25 17:00	12:08 (9) 14:58 (9)	07:02 16:31	12:22 (9) 14:56 (9)	07:25 16:35	12:40 (9) 15:04 (9)
29	05:49 20:21	06:20 19:38	06:52 18:45	07:26 16:58	12:07 (9) 14:59 (9)	07:03 16:30	12:23 (9) 14:55 (9)	07:25 16:36	12:40 (9) 15:04 (9)
30	05:50 20:20	06:21 19:37	06:53 18:44	07:27 16:57	12:09 (9) 14:59 (9)	07:04 16:30	12:24 (9) 14:56 (9)	07:25 16:36	12:40 (9) 15:04 (9)
31	05:51 20:18	06:22 19:35		06:28 16:56	12:08 (9) 14:58 (9)		07:25 16:37		12:40 (9) 15:04 (9)
Potential sun hours	461	429	375	345	297	286			
Total, worst case			2192	5080	4864	4480			

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

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker (WTG causing flicker first time)	Last time (hh:mm) with flicker (WTG causing flicker last time)
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Project:  
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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AJ - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26	08:16 (9) 07:12	08:12 (9) 06:35	08:10 (9) 06:43	05:57	05:27
	16:38	94 09:50 (9) 17:13	124 10:16 (9) 17:48	122 10:12 (9) 19:23	19:56	20:26
2	07:26	08:16 (9) 07:11	08:11 (9) 06:33	08:11 (9) 06:42	05:55	05:27
	16:39	96 09:52 (9) 17:14	126 10:17 (9) 17:49	120 10:11 (9) 19:24	19:57	20:27
3	07:26	08:16 (9) 07:10	08:12 (9) 06:32	08:11 (9) 06:40	05:54	05:26
	16:40	96 09:52 (9) 17:16	126 10:18 (9) 17:50	118 10:09 (9) 19:25	19:58	20:27
4	07:26	08:16 (9) 07:09	08:11 (9) 06:30	08:11 (9) 06:38	05:53	05:26
	16:41	98 09:54 (9) 17:17	128 10:19 (9) 17:52	116 10:07 (9) 19:26	19:59	20:28
5	07:26	08:16 (9) 07:08	08:12 (9) 06:29	08:12 (9) 06:37	05:51	05:25
	16:42	98 09:54 (9) 17:18	128 10:20 (9) 17:53	114 10:06 (9) 19:27	20:00	20:29
6	07:26	08:16 (9) 07:06	08:10 (9) 06:27	08:12 (9) 06:35	05:50	05:25
	16:43	100 09:56 (9) 17:20	128 10:18 (9) 17:54	114 10:06 (9) 19:28	20:01	20:29
7	07:26	08:16 (9) 07:05	08:11 (9) 06:25	08:12 (9) 06:33	05:49	05:25
	16:44	100 09:56 (9) 17:21	128 10:19 (9) 17:55	112 10:04 (9) 19:29	20:02	20:30
8	07:26	08:16 (9) 07:04	08:10 (9) 06:24	08:13 (9) 06:32	05:48	05:25
	16:45	102 09:58 (9) 17:22	130 10:20 (9) 17:56	110 10:03 (9) 19:31	20:03	20:31
9	07:25	08:15 (9) 07:03	08:11 (9) 06:22	08:13 (9) 06:30	05:47	05:24
	16:46	102 09:57 (9) 17:23	130 10:21 (9) 17:57	108 10:01 (9) 19:32	20:04	20:31
10	07:25	08:15 (9) 07:02	08:10 (9) 06:20	08:13 (9) 06:28	05:45	05:24
	16:47	104 09:59 (9) 17:25	130 10:20 (9) 17:58	106 09:59 (9) 19:33	20:05	20:32
11	07:25	08:17 (9) 07:00	08:10 (9) 06:19	08:14 (9) 06:27	05:44	05:24
	16:48	104 10:01 (9) 17:26	130 10:20 (9) 18:00	102 09:56 (9) 19:34	20:06	20:32
12	07:25	08:17 (9) 06:59	08:09 (9) 06:17	08:14 (9) 06:25	05:43	05:24
	16:49	104 10:01 (9) 17:27	132 10:21 (9) 18:01	100 09:54 (9) 19:35	20:07	20:33
13	07:24	08:16 (9) 06:58	08:10 (9) 06:16	08:14 (9) 06:23	05:42	05:24
	16:50	106 10:02 (9) 17:28	130 10:20 (9) 18:02	98 09:52 (9) 19:36	20:08	20:33
14	07:24	08:16 (9) 06:57	08:10 (9) 06:14	08:17 (9) 06:22	05:41	05:24
	16:51	108 10:04 (9) 17:30	130 10:20 (9) 18:03	94 09:51 (9) 19:37	20:09	20:34
15	07:24	08:15 (9) 06:55	08:09 (9) 06:12	08:17 (9) 06:20	05:40	05:24
	16:52	108 10:03 (9) 17:31	132 10:21 (9) 18:04	92 09:49 (9) 19:38	20:10	20:34
16	07:23	08:15 (9) 06:54	08:10 (9) 06:10	08:17 (9) 06:19	05:39	05:24
	16:53	110 10:05 (9) 17:32	130 10:20 (9) 18:05	88 09:45 (9) 19:39	20:11	20:35
17	07:23	08:14 (9) 06:53	08:10 (9) 06:09	08:18 (9) 06:17	05:38	05:24
	16:55	112 10:06 (9) 17:33	130 10:20 (9) 18:06	86 09:44 (9) 19:40	20:12	20:35
18	07:22	08:16 (9) 06:51	08:09 (9) 06:07	08:20 (9) 06:16	05:37	05:24
	16:56	110 10:06 (9) 17:35	130 10:19 (9) 18:08	82 09:42 (9) 19:41	20:13	20:35
19	07:22	08:15 (9) 06:50	08:09 (9) 06:05	08:20 (9) 06:14	05:36	05:24
	16:57	112 10:07 (9) 17:36	130 10:19 (9) 18:09	78 09:38 (9) 19:43	20:14	20:36
20	07:21	08:14 (9) 06:48	08:10 (9) 06:04	08:22 (9) 06:12	05:35	05:24
	16:58	114 10:08 (9) 17:37	128 10:18 (9) 18:10	74 09:36 (9) 19:44	20:15	20:36
21	07:21	08:14 (9) 06:47	08:08 (9) 06:02	08:23 (9) 06:11	05:35	05:24
	16:59	116 10:10 (9) 17:38	130 10:18 (9) 18:11	70 09:33 (9) 19:45	20:16	20:36
22	07:20	08:15 (9) 06:46	08:09 (9) 06:00	08:25 (9) 06:09	05:34	05:24
	17:01	116 10:11 (9) 17:40	128 10:17 (9) 18:12	64 09:29 (9) 19:46	20:17	20:36
23	07:19	08:14 (9) 06:44	08:09 (9) 05:59	08:25 (9) 06:08	05:33	05:25
	17:02	116 10:10 (9) 17:41	128 10:17 (9) 18:13	62 09:27 (9) 19:47	20:18	20:37
24	07:19	08:13 (9) 06:43	08:10 (9) 05:57	08:28 (9) 06:07	05:32	05:25
	17:03	118 10:11 (9) 17:42	126 10:16 (9) 18:14	56 09:24 (9) 19:48	20:19	20:37
25	07:18	08:13 (9) 06:41	08:10 (9) 05:55	08:30 (9) 06:05	05:31	05:25
	17:04	120 10:13 (9) 17:43	126 10:16 (9) 18:15	50 09:20 (9) 19:49	20:20	20:37
26	07:17	08:14 (9) 06:40	08:09 (9) 05:53	08:32 (9) 06:04	05:31	05:25
	17:06	120 10:14 (9) 17:44	126 10:15 (9) 18:16	44 09:16 (9) 19:50	20:21	20:37
27	07:16	08:13 (9) 06:38	08:09 (9) 05:52	08:36 (9) 06:02	05:30	05:26
	17:07	120 10:13 (9) 17:46	124 10:13 (9) 18:17	34 09:10 (9) 19:51	20:22	20:37
28	07:15	08:12 (9) 06:37	08:10 (9) 05:50	08:41 (9) 06:01	05:29	05:26
	17:08	122 10:14 (9) 17:47	122 10:12 (9) 18:19	24 09:05 (9) 19:52	20:23	20:37
29	07:14	08:13 (9) 06:36	08:11 (9) 05:49	08:44 (9) 06:00	05:29	05:27
	17:09	122 10:15 (9) 17:48	122 10:13 (9) 18:20	22 09:00 (9) 19:53	20:24	20:37
30	07:14	08:12 (9) 06:35	08:12 (9) 05:48	08:47 (9) 06:00	05:28	05:27
	17:11	124 10:16 (9) 17:49	124 10:14 (9) 18:21	20 08:55 (9) 19:54	20:25	20:37
31	07:13	08:11 (9) 06:34	08:13 (9) 05:47	08:50 (9) 06:00	05:28	05:27
	17:12	126 10:17 (9) 17:50	126 10:15 (9) 18:22	18 08:48 (9) 19:55	20:26	20:37
Potential sun hours	296	296	369	399	450	454
Total, worst case	3398	3590	2438			

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AJ - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December			
1	05:27 20:37	05:52 20:17	06:23 19:33	06:54 18:42	08:55 (9) 10:33 (9)	06:29 16:55	07:39 (9) 130 09:49 (9)	07:05 16:29	07:59 (9) 104 09:43 (9)
2	05:28 20:37	05:53 20:16	06:25 19:32	06:55 18:40	08:54 (9) 10:34 (9)	06:31 16:53	07:41 (9) 128 09:49 (9)	07:06 16:29	07:58 (9) 104 09:42 (9)
3	05:28 20:37	05:54 20:15	06:26 19:30	06:56 18:39	08:53 (9) 10:35 (9)	06:32 16:52	07:40 (9) 130 09:50 (9)	07:07 16:29	07:59 (9) 102 09:41 (9)
4	05:29 20:36	05:55 20:14	06:27 19:28	06:58 18:37	08:50 (9) 10:38 (9)	06:33 16:51	07:41 (9) 128 09:49 (9)	07:08 16:29	08:00 (9) 102 09:42 (9)
5	05:30 20:36	05:56 20:13	06:28 19:27	06:59 18:35	08:49 (9) 10:39 (9)	06:34 16:50	07:40 (9) 128 09:48 (9)	07:09 16:29	08:01 (9) 100 09:41 (9)
6	05:30 20:36	05:57 20:12	06:29 19:25	07:00 18:34	08:48 (9) 10:40 (9)	06:35 16:48	07:42 (9) 126 09:48 (9)	07:10 16:28	08:02 (9) 100 09:42 (9)
7	05:31 20:36	05:58 20:10	06:30 19:23	07:01 18:32	08:47 (9) 10:41 (9)	06:37 16:47	07:41 (9) 128 09:49 (9)	07:11 16:28	08:03 (9) 98 09:41 (9)
8	05:31 20:35	05:59 20:09	06:31 19:22	07:02 18:30	08:46 (9) 10:40 (9)	06:38 16:46	07:42 (9) 126 09:48 (9)	07:12 16:28	08:04 (9) 98 09:42 (9)
9	05:32 20:35	06:00 20:08	06:32 19:20	07:03 18:29	08:45 (9) 10:41 (9)	06:39 16:45	07:42 (9) 126 09:48 (9)	07:13 16:28	08:05 (9) 96 09:41 (9)
10	05:33 20:34	06:01 20:06	06:33 19:18	07:04 18:27	08:44 (9) 10:42 (9)	06:40 16:44	07:43 (9) 124 09:47 (9)	07:14 16:28	08:06 (9) 96 09:42 (9)
11	05:34 20:34	06:02 20:05	06:34 19:17	07:05 18:25	08:44 (9) 10:44 (9)	06:42 16:43	07:42 (9) 126 09:48 (9)	07:15 16:28	08:07 (9) 94 09:41 (9)
12	05:34 20:34	06:03 20:04	06:35 19:15	07:06 18:24	08:45 (9) 10:45 (9)	06:43 16:42	07:44 (9) 124 09:48 (9)	07:15 16:28	08:08 (9) 94 09:42 (9)
13	05:35 20:33	06:04 20:02	06:36 19:13	07:07 18:22	08:44 (9) 10:46 (9)	06:44 16:41	07:45 (9) 122 09:47 (9)	07:16 16:28	08:09 (9) 94 09:42 (9)
14	05:36 20:33	06:05 20:01	06:37 19:11	07:08 18:21	08:43 (9) 10:45 (9)	06:45 16:40	07:44 (9) 122 09:46 (9)	07:17 16:29	08:09 (9) 92 09:41 (9)
15	05:37 20:32	06:06 20:00	06:38 19:10	07:10 18:19	08:42 (9) 10:46 (9)	06:46 16:39	07:45 (9) 120 09:45 (9)	07:18 16:29	08:10 (9) 92 09:42 (9)
16	05:37 20:31	06:07 19:58	06:39 19:09	07:11 18:17	08:41 (9) 10:47 (9)	06:48 16:38	07:47 (9) 120 09:47 (9)	07:18 16:29	08:10 (9) 92 09:42 (9)
17	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	08:41 (9) 10:47 (9)	06:49 16:38	07:46 (9) 120 09:46 (9)	07:19 16:29	08:11 (9) 92 09:43 (9)
18	05:39 20:30	06:09 19:55	06:41 19:05	07:13 18:14	08:42 (9) 10:48 (9)	06:50 16:37	07:47 (9) 118 09:45 (9)	07:20 16:30	08:12 (9) 92 09:44 (9)
19	05:40 20:29	06:10 19:54	06:42 19:03	07:14 18:13	08:41 (9) 10:49 (9)	06:51 16:36	07:49 (9) 116 09:45 (9)	07:20 16:30	08:12 (9) 90 09:42 (9)
20	05:41 20:29	06:11 19:52	06:43 19:01	07:15 18:11	08:40 (9) 10:48 (9)	06:52 16:35	07:50 (9) 116 09:46 (9)	07:21 16:31	08:13 (9) 90 09:43 (9)
21	05:42 20:28	06:12 19:51	06:44 18:59	07:16 18:10	08:39 (9) 10:49 (9)	06:54 16:35	07:49 (9) 116 09:45 (9)	07:22 16:31	08:13 (9) 90 09:43 (9)
22	05:42 20:27	06:13 19:49	06:45 18:58	07:18 18:08	08:39 (9) 10:49 (9)	06:55 16:34	07:50 (9) 114 09:44 (9)	07:22 16:31	08:14 (9) 90 09:44 (9)
23	05:43 20:26	06:14 19:48	06:46 18:56	07:19 18:07	08:40 (9) 10:50 (9)	06:56 16:33	07:52 (9) 112 09:44 (9)	07:23 16:32	08:14 (9) 90 09:44 (9)
24	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:05	08:39 (9) 10:49 (9)	06:57 16:33	07:53 (9) 112 09:45 (9)	07:23 16:32	08:15 (9) 90 09:45 (9)
25	05:45 20:24	06:16 19:45	06:48 18:52	07:21 17:04	08:38 (9) 09:50 (9)	06:58 16:32	07:52 (9) 112 09:44 (9)	07:24 16:33	08:15 (9) 92 09:47 (9)
26	05:46 20:23	06:17 19:43	06:49 18:51	07:22 17:03	08:37 (9) 09:50 (9)	06:59 16:32	07:53 (9) 110 09:43 (9)	07:24 16:34	08:15 (9) 92 09:47 (9)
27	05:47 20:23	06:18 19:42	06:50 18:49	07:23 17:01	08:36 (9) 09:49 (9)	07:01 16:31	07:54 (9) 108 09:42 (9)	07:24 16:34	08:16 (9) 92 09:48 (9)
28	05:48 20:22	06:19 19:40	06:51 18:47	07:24 17:00	08:35 (9) 09:50 (9)	07:02 16:31	07:56 (9) 108 09:44 (9)	07:25 16:35	08:16 (9) 92 09:48 (9)
29	05:49 20:21	06:20 19:38	06:52 18:45	07:25 16:58	08:34 (9) 10:30 (9)	07:03 16:30	07:57 (9) 106 09:43 (9)	07:25 16:36	08:16 (9) 92 09:48 (9)
30	05:50 20:20	06:21 19:37	06:53 18:44	07:26 16:57	08:33 (9) 10:31 (9)	07:04 16:30	07:58 (9) 104 09:42 (9)	07:25 16:36	08:16 (9) 94 09:50 (9)
31	05:51 20:18	06:22 19:35		07:27 16:56	08:32 (9) 10:30 (9)	07:05 16:30	07:59 (9) 16:37	07:26 16:37	08:16 (9) 94 09:50 (9)
Potential sun hours	461	429	375	345	297	286			
Total, worst case			1064	3768	3580	2930			

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AK - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:38	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 19:33	06:54 18:42	06:29 16:55	07:05 16:30
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	06:25 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	05:29 20:37	05:54 20:15	06:26 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 17:52	06:38 19:26	05:53 19:59	05:26 20:28	05:29 20:36	05:55 20:14	06:27 19:28	06:58 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	05:25 20:29	05:30 20:36	05:56 20:13	06:28 19:27	06:59 18:35	06:34 16:50	07:09 16:29
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	06:35 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	05:25 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 17:58	06:28 19:33	05:46 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	05:34 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 16:28
13	07:24 16:50	06:58 17:28	06:16 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 16:29
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 19:11	07:08 18:21	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	05:37 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 16:54	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 18:08	06:16 19:41	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	06:05 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	06:13 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 16:31
21	07:21 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	06:54 16:35	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	05:25 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	07:19 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 18:05	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	07:24 16:33
26	07:17 17:06	06:40 17:44	05:54 18:16	06:04 19:50	05:31 20:21	05:25 20:37	05:46 20:23	06:17 19:43	06:49 18:51	06:22 17:03	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 20:22	05:26 20:37	05:47 20:23	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	06:37 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 19:55	05:28 20:24	05:27 20:37	05:50 20:20	06:21 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 20:18	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												

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AL - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26 16:38	07:12 17:13	16:02 (11) 16:48 (11)	06:35 17:48	16:12 (11) 19:23	05:57 19:56
2	07:26 16:39	07:11 17:14	16:01 (11) 16:51 (11)	06:33 17:49	16:15 (11) 19:24	05:55 19:57
3	07:26 16:40	07:10 17:16	16:00 (11) 16:52 (11)	06:32 17:50	16:19 (11) 19:25	05:54 19:58
4	07:26 16:41	07:09 17:17	16:01 (11) 16:53 (11)	06:30 17:52	06:38 19:26	05:53 19:59
5	07:26 16:42	07:07 17:18	16:00 (11) 16:54 (11)	06:29 17:53	06:37 19:27	05:52 20:00
6	07:26 16:43	07:06 17:20	15:58 (11) 16:54 (11)	06:27 17:54	06:35 19:28	05:50 20:01
7	07:26 16:44	07:05 17:21	15:59 (11) 16:55 (11)	06:25 17:55	06:33 19:29	05:49 20:02
8	07:26 16:45	07:04 17:22	15:58 (11) 16:54 (11)	06:24 17:56	06:32 19:31	05:48 20:03
9	07:25 16:46	16:17 (12) 07:03 17:23	15:59 (11) 16:55 (11)	06:22 17:57	06:30 19:32	05:47 20:04
10	07:25 16:47	4 16:21 (12) 07:02 17:25	16:00 (11) 16:56 (11)	06:20 17:58	06:28 19:33	05:46 20:05
11	07:25 16:48	4 16:21 (12) 07:00 17:26	15:58 (11) 16:56 (11)	06:19 18:00	06:27 19:34	05:44 20:06
12	07:25 16:49	4 16:21 (12) 06:59 17:27	15:59 (11) 16:55 (11)	06:17 18:01	06:25 19:35	05:43 20:07
13	07:24 16:50	6 16:22 (12) 06:58 17:28	16:00 (11) 16:56 (11)	06:16 18:02	06:23 19:36	05:42 20:08
14	07:24 16:51	8 16:24 (12) 06:57 17:30	15:58 (11) 16:56 (11)	06:14 18:03	06:22 19:37	05:41 20:09
15	07:24 16:52	10 16:26 (12) 06:55 17:31	15:59 (11) 16:55 (11)	06:12 18:04	06:20 19:38	05:40 20:10
16	07:23 16:54	12 16:27 (12) 06:54 17:32	16:00 (11) 16:56 (11)	06:10 18:05	06:19 19:39	05:39 20:11
17	07:23 16:55	12 16:27 (12) 06:53 17:33	16:00 (11) 16:54 (11)	06:09 18:06	06:17 19:40	05:38 20:12
18	07:22 16:56	14 16:28 (12) 06:51 17:35	16:01 (11) 16:55 (11)	06:07 18:08	06:16 19:41	05:37 20:13
19	07:22 16:57	16 16:30 (12) 06:50 17:36	16:01 (11) 16:53 (11)	06:05 18:09	06:14 19:43	05:36 20:14
20	07:21 16:58	18 16:31 (12) 06:48 17:37	16:02 (11) 16:54 (11)	06:04 18:10	06:13 19:44	05:35 20:15
21	07:21 16:59	18 16:32 (12) 06:47 17:38	16:02 (11) 16:52 (11)	06:02 18:11	06:11 19:45	05:35 20:16
22	07:20 17:01	20 16:34 (12) 06:46 17:40	16:03 (11) 16:53 (11)	06:00 18:12	06:09 19:46	05:34 20:17
23	07:19 17:02	24 16:35 (11) 06:44 17:41	16:03 (11) 16:51 (11)	05:59 18:13	06:08 19:47	05:33 20:18
24	07:18 17:03	26 16:36 (11) 06:43 17:42	16:04 (11) 16:50 (11)	05:57 18:14	06:07 19:48	05:32 20:19
25	07:18 17:04	30 16:37 (11) 06:41 17:43	16:04 (11) 16:48 (11)	05:55 18:15	06:05 19:49	05:31 20:20
26	07:17 17:06	32 16:39 (11) 06:40 17:44	16:07 (11) 16:47 (11)	05:53 18:16	06:04 19:50	05:31 20:21
27	07:16 17:07	34 16:40 (11) 06:38 17:46	16:07 (11) 16:45 (11)	05:52 18:17	06:02 19:51	05:30 20:22
28	07:15 17:08	36 16:41 (11) 06:37 17:47	16:10 (11) 16:44 (11)	05:50 18:19	06:01 19:52	05:29 20:23
29	07:14 17:09	40 16:44 (11) 06:35 17:48	16:11 (11) 16:43 (11)	05:48 18:20	05:59 19:53	05:29 20:24
30	07:14 17:11	42 16:45 (11) 06:34 17:49	16:12 (11) 16:42 (11)	05:47 18:21	05:58 19:54	05:28 20:25
31	07:13 17:12	44 16:46 (11) 06:33 17:50	16:13 (11) 16:41 (11)	05:46 18:22	05:57 19:55	05:28 20:26
Potential sun hours	296	296	369	399	450	454
Total, worst case	500	1436	70			

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AL - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December		
1	05:27 20:37	05:52 20:17	06:23 19:33	06:54 18:42	06:29 16:55	15:27 (11) 16:25 (11)	07:05 16:29	15:59 (12) 16:03 (12)
2	05:28 20:37	05:53 20:16	06:25 19:32	06:55 18:40	06:31 16:53	15:29 (11) 16:25 (11)	07:06 16:29	16:00 (12) 16:04 (12)
3	05:29 20:37	05:54 20:15	06:26 19:30	06:56 18:39	06:32 16:52	15:28 (11) 16:24 (11)	07:07 16:29	16:01 (12) 16:05 (12)
4	05:29 20:36	05:55 20:14	06:27 19:28	06:58 18:37	06:33 16:51	15:29 (11) 16:23 (11)	07:08 16:29	
5	05:30 20:36	05:56 20:13	06:28 19:27	06:59 18:35	06:34 16:50	15:28 (11) 16:24 (11)	07:09 16:29	
6	05:30 20:36	05:57 20:12	06:29 19:25	07:00 18:34	06:35 16:48	15:30 (11) 16:24 (11)	07:10 16:28	
7	05:31 20:36	05:58 20:10	06:30 19:23	07:01 18:32	06:37 16:47	15:31 (11) 16:23 (11)	07:11 16:28	
8	05:31 20:35	05:59 20:09	06:31 19:22	07:02 18:30	06:38 16:46	15:30 (11) 16:22 (11)	07:12 16:28	
9	05:32 20:35	06:00 20:08	06:32 19:20	07:03 18:29	06:39 16:45	15:32 (11) 16:20 (11)	07:13 16:28	
10	05:33 20:34	06:01 20:06	06:33 19:18	07:04 18:27	06:40 17:04 (11)	15:33 (11) 16:44	07:14 16:28	
11	05:34 20:34	06:02 20:05	06:34 19:17	07:05 18:25	06:42 17:10 (11)	15:32 (11) 16:43	07:15 16:28	
12	05:34 20:34	06:03 20:04	06:35 19:15	07:06 18:24	06:43 17:13 (11)	15:34 (11) 16:42	07:15 16:28	
13	05:35 20:33	06:04 20:02	06:36 19:13	07:07 18:22	06:44 17:16 (11)	15:35 (11) 16:41	07:16 16:28	
14	05:36 20:32	06:05 20:01	06:37 19:11	07:08 18:21	06:45 17:17 (11)	15:36 (11) 16:40	07:17 16:29	
15	05:37 20:32	06:06 20:00	06:38 19:10	07:10 18:19	06:46 17:18 (11)	15:37 (11) 16:39	07:18 16:29	
16	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	06:48 17:19 (11)	15:39 (11) 16:38	07:18 16:29	
17	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	06:49 17:21 (11)	15:40 (11) 16:38	07:19 16:29	
18	05:39 20:30	06:09 19:55	06:41 19:05	07:13 18:14	06:50 17:22 (11)	15:41 (11) 16:37	07:20 16:30	
19	05:40 20:29	06:10 19:54	06:42 19:03	07:14 18:13	06:51 17:23 (11)	15:45 (11) 16:36	07:20 16:30	
20	05:41 20:29	06:11 19:52	06:43 19:01	07:15 18:11	06:52 17:22 (11)	15:46 (11) 16:35	07:21 16:31	
21	05:42 20:28	06:12 19:51	06:44 18:59	07:16 18:10	06:54 17:23 (11)	15:49 (12) 16:35	07:22 16:31	
22	05:42 20:27	06:13 19:49	06:45 18:58	07:18 18:08	06:55 17:25 (11)	15:50 (12) 16:34	07:22 16:31	
23	05:43 20:26	06:14 19:48	06:46 18:56	07:19 18:07	06:56 17:24 (11)	15:50 (12) 16:33	07:23 16:32	
24	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:05	06:57 17:25 (11)	15:51 (12) 16:33	07:23 16:33	
25	05:45 20:24	06:16 19:45	06:48 18:52	06:21 17:04	06:58 16:24 (11)	15:52 (12) 16:32	07:24 16:33	
26	05:46 20:23	06:17 19:43	06:49 18:51	06:22 17:03	06:59 16:26 (11)	15:53 (12) 16:32	07:24 16:34	
27	05:47 20:23	06:18 19:42	06:50 18:49	06:23 17:01	07:01 16:25 (11)	15:54 (12) 16:31	07:24 16:34	
28	05:48 20:22	06:19 19:40	06:51 18:47	06:25 17:00	07:02 16:26 (11)	15:56 (12) 16:31	07:25 16:35	
29	05:49 20:21	06:20 19:38	06:52 18:45	06:26 16:58	07:03 16:25 (11)	15:57 (12) 16:30	07:25 16:36	
30	05:50 20:20	06:21 19:37	06:53 18:44	06:27 16:57	07:04 16:25 (11)	15:58 (12) 16:30	07:25 16:37	
31	05:51 20:18	06:22 19:35		06:28 16:56	07:05 16:26 (11)		07:25 16:37	
Potential sun hours	461	429	375	345	297	286		
Total, worst case				1002	1020	12		

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AM - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	
1	07:26 16:38 174	12:58 (10) 15:56 (12) 17:13	07:12 17:13 172	12:48 (10) 15:40 (10) 17:48	06:35 15:52 (10) 19:23	12:32 (10) 16:38 (10) 19:56	06:43 13:54 (10) 05:57 15:06 (10) 05:27
2	07:26 16:39 172	12:58 (10) 15:54 (12) 17:14	07:10 17:14 174	12:46 (10) 15:41 (10) 17:49	06:32 15:53 (10) 19:24	12:31 (10) 16:38 (10) 19:57	06:40 14:01 (10) 05:54 15:10 (10) 05:26
3	07:26 16:40 170	12:58 (10) 15:54 (12) 17:16	07:09 17:16 176	12:47 (10) 15:42 (10) 17:50	06:30 15:51 (10) 19:25	12:31 (10) 16:37 (10) 19:58	06:38 14:03 (10) 05:53 15:12 (10) 05:26
4	07:26 16:41 168	12:58 (10) 15:54 (12) 17:17	07:07 17:17 176	12:46 (10) 15:43 (10) 17:52	06:29 15:51 (10) 19:26	12:32 (10) 16:37 (10) 19:59	06:37 14:05 (10) 05:51 15:13 (10) 05:25
5	07:26 16:42 160	12:58 (10) 15:53 (11) 17:18	07:06 17:18 178	12:44 (10) 15:44 (10) 17:53	06:27 15:52 (10) 19:27	12:30 (10) 16:35 (10) 19:27	06:35 14:10 (10) 05:50 15:16 (10) 05:25
6	07:26 16:43 160	12:58 (10) 15:53 (11) 17:20	07:05 17:20 180	12:43 (10) 15:44 (10) 17:54	06:25 15:52 (10) 19:28	12:30 (10) 16:36 (10) 20:01	06:33 14:12 (10) 05:49 15:19 (10) 05:25
7	07:26 16:44 160	12:58 (10) 15:53 (11) 17:21	07:04 17:21 182	12:43 (10) 15:45 (10) 17:55	06:24 15:52 (10) 19:29	12:30 (10) 16:34 (10) 20:02	06:32 14:14 (10) 05:48 15:22 (10) 05:25
8	07:26 16:45 160	12:58 (10) 15:53 (11) 17:22	07:04 17:22 182	12:44 (10) 15:46 (10) 17:56	06:24 15:51 (10) 19:31	12:31 (10) 16:32 (10) 20:03	06:32 14:14 (10) 05:48 15:22 (10) 05:25
9	07:25 16:46 160	12:57 (10) 15:53 (11) 17:23	07:03 17:23 184	12:43 (10) 15:47 (10) 17:57	06:22 15:51 (10) 19:32	12:29 (10) 16:33 (10) 20:04	06:30 14:17 (10) 05:47 15:25 (10) 05:24
10	07:25 16:47 160	12:57 (10) 15:53 (11) 17:25	07:02 17:25 186	12:42 (10) 15:48 (10) 17:58	06:20 15:51 (10) 19:33	12:29 (10) 16:31 (10) 20:05	06:28 14:19 (10) 05:46 15:28 (10) 05:24
11	07:25 16:48 160	12:57 (10) 15:53 (11) 17:26	07:00 17:26 184	12:42 (10) 15:46 (10) 18:00	06:19 15:50 (10) 19:34	12:30 (10) 16:29 (10) 20:06	06:27 14:23 (10) 05:44 15:30 (10) 05:24
12	07:25 16:49 160	12:57 (10) 15:53 (11) 17:27	06:59 17:27 186	12:41 (10) 15:47 (10) 18:01	06:17 15:50 (10) 19:35	12:30 (10) 16:30 (10) 20:07	06:25 14:26 (10) 05:43 15:46 (10) 05:24
13	07:24 16:50 160	12:56 (10) 15:56 (11) 17:28	06:58 17:28 188	12:40 (10) 15:48 (10) 18:02	06:16 15:50 (10) 19:36	12:30 (10) 16:28 (10) 20:08	06:23 14:28 (10) 05:42 15:53 (10) 05:24
14	07:24 16:51 156	12:56 (10) 15:54 (11) 17:30	06:57 17:30 188	12:40 (10) 15:48 (10) 18:03	06:14 15:49 (10) 19:37	12:31 (10) 16:27 (10) 20:09	06:22 14:31 (10) 05:41 15:57 (10) 05:24
15	07:24 16:52 156	12:57 (10) 15:53 (11) 17:31	06:55 17:31 190	12:39 (10) 15:49 (10) 18:04	06:12 15:49 (10) 19:38	12:31 (10) 16:25 (10) 20:10	06:20 14:33 (10) 05:40 15:57 (10) 05:24
16	07:23 16:53 152	12:57 (10) 15:52 (11) 17:32	06:54 17:32 192	12:38 (10) 15:50 (10) 18:05	06:10 15:49 (10) 19:39	12:31 (10) 16:25 (10) 20:11	06:19 14:35 (10) 05:39 15:57 (10) 05:24
17	07:23 16:55 150	12:56 (10) 15:52 (10) 17:33	06:53 17:33 192	12:38 (10) 15:50 (10) 18:06	06:09 15:48 (10) 19:40	12:32 (10) 16:24 (10) 20:12	06:17 14:38 (10) 05:38 15:57 (10) 05:24
18	07:22 16:56 152	12:56 (10) 15:52 (10) 17:35	06:51 17:35 194	12:37 (10) 15:51 (10) 18:08	06:07 15:48 (10) 19:41	12:32 (10) 16:22 (10) 20:13	06:16 14:38 (10) 05:37 15:57 (10) 05:24
19	07:22 16:57 154	12:55 (10) 15:52 (10) 17:36	06:50 17:36 194	12:37 (10) 15:51 (10) 18:09	06:05 15:48 (10) 19:43	12:32 (10) 16:21 (10) 20:14	06:14 14:41 (10) 05:36 15:57 (10) 05:24
20	07:21 16:58 156	12:54 (10) 15:50 (10) 17:37	06:49 17:37 194	12:36 (10) 15:50 (10) 18:10	06:04 15:48 (10) 19:44	12:32 (10) 16:21 (10) 20:15	06:13 14:43 (10) 05:35 15:57 (10) 05:24
21	07:21 16:59 156	12:54 (10) 15:50 (10) 17:38	06:47 17:38 194	12:36 (10) 15:50 (10) 18:11	06:02 15:47 (10) 19:45	12:35 (10) 16:20 (10) 20:16	06:11 14:46 (10) 05:35 15:57 (10) 05:24
22	07:20 17:01 158	12:53 (10) 15:51 (10) 17:40	06:46 17:40 196	12:35 (10) 15:51 (10) 18:12	06:00 15:45 (10) 19:46	12:35 (10) 16:18 (10) 20:17	06:09 14:48 (10) 05:34 15:57 (10) 05:24
23	07:19 17:02 160	12:52 (10) 15:52 (10) 17:41	06:44 17:41 196	12:35 (10) 15:51 (10) 18:13	06:08 15:45 (10) 19:47	12:35 (10) 16:17 (10) 20:18	06:08 14:49 (10) 05:33 15:57 (10) 05:25
24	07:19 17:03 162	12:51 (10) 15:53 (10) 17:42	06:43 17:42 198	12:34 (10) 15:52 (10) 18:14	06:07 15:44 (10) 19:48	12:38 (10) 16:16 (10) 20:19	06:07 14:52 (10) 05:32 15:57 (10) 05:25
25	07:18 17:04 162	12:53 (10) 15:55 (10) 17:43	06:41 17:43 198	12:34 (10) 15:52 (10) 18:15	06:05 15:44 (10) 19:49	12:40 (10) 16:14 (10) 20:20	06:05 14:54 (10) 05:31 15:57 (10) 05:25
26	07:17 17:05 164	12:52 (10) 15:56 (10) 17:44	06:40 17:44 200	12:33 (10) 15:53 (10) 18:16	06:04 15:42 (10) 19:50	12:40 (10) 16:13 (10) 20:21	06:04 14:57 (10) 05:31 15:57 (10) 05:25
27	07:16 17:06 166	12:51 (10) 15:57 (10) 17:45	06:38 17:45 198	12:33 (10) 15:53 (10) 18:17	06:02 15:42 (10) 19:51	12:42 (10) 16:11 (10) 20:22	06:02 14:57 (10) 05:30 15:57 (10) 05:26
28	07:15 17:07 168	12:50 (10) 15:58 (10) 17:46	06:37 17:46 200	12:32 (10) 15:52 (10) 18:19	06:01 15:43 (10) 19:52	12:43 (10) 16:10 (10) 20:23	06:01 15:00 (10) 05:29 15:57 (10) 05:26
29	07:14 17:08 168	12:49 (10) 15:57 (10) 17:47	06:36 17:47 200	12:32 (10) 15:52 (10) 18:20	06:00 15:43 (10) 19:53	12:44 (10) 16:09 (10) 20:24	06:00 15:03 (10) 05:28 15:57 (10) 05:27
30	07:14 17:09 170	12:48 (10) 15:58 (10) 17:48	06:35 17:48 200	12:31 (10) 15:53 (10) 18:21	06:00 15:44 (10) 19:54	12:45 (10) 16:08 (10) 20:25	06:00 15:03 (10) 05:28 15:57 (10) 05:27
31	07:13 17:10 170	12:49 (10) 15:59 (10) 17:49	06:34 17:49 200	12:31 (10) 15:53 (10) 18:22	06:00 15:44 (10) 19:55	12:46 (10) 16:07 (10) 20:26	06:00 15:03 (10) 05:28 15:57 (10) 05:27
Potential sun hours	296	296	369	399	450	454	
Total, worst case	5004	5272	5978	3380	450		

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)

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Calculated:  
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### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AM - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December
1	05:27 20:37	05:52 20:17	15:46 (10) 15:52 (10)	06:23 19:33	14:22 (10) 16:28 (10)	06:54 18:42
2	05:28 20:37	05:53 20:16	15:39 (10) 15:57 (10)	06:25 19:32	14:17 (10) 16:29 (10)	06:55 18:40
3	05:29 20:37	05:54 20:15	15:36 (10) 16:00 (10)	06:26 19:30	14:14 (10) 16:30 (10)	06:56 18:39
4	05:29 20:36	05:55 20:14	15:33 (10) 16:03 (10)	06:27 19:28	14:11 (10) 16:29 (10)	06:58 18:37
5	05:30 20:36	05:56 20:13	15:30 (10) 16:06 (10)	06:28 19:27	14:08 (10) 16:30 (10)	06:59 18:35
6	05:30 20:36	05:57 20:12	15:27 (10) 16:07 (10)	06:29 19:25	14:05 (10) 16:31 (10)	07:00 18:34
7	05:31 20:36	05:58 20:10	15:26 (10) 16:08 (10)	06:30 19:23	14:02 (10) 16:30 (10)	07:01 18:32
8	05:31 20:35	05:59 20:09	15:23 (10) 16:11 (10)	06:31 19:22	13:57 (10) 16:31 (10)	07:02 18:30
9	05:32 20:35	06:00 20:08	15:20 (10) 16:12 (10)	06:32 19:20	13:54 (10) 16:30 (10)	07:03 18:29
10	05:33 20:34	06:01 20:06	15:19 (10) 16:13 (10)	06:33 19:18	13:51 (10) 16:31 (10)	07:04 18:27
11	05:34 20:34	06:02 20:05	15:16 (10) 16:14 (10)	06:34 19:17	13:48 (10) 16:30 (10)	07:05 18:25
12	05:34 20:34	06:03 20:04	15:13 (10) 16:15 (10)	06:35 19:15	13:43 (10) 16:31 (10)	07:06 18:24
13	05:35 20:33	06:04 20:02	15:12 (10) 16:16 (10)	06:36 19:13	13:40 (10) 16:32 (10)	07:07 18:22
14	05:36 20:33	06:05 20:01	15:09 (10) 16:17 (10)	06:37 19:11	13:37 (10) 16:31 (10)	07:08 18:21
15	05:37 20:32	06:06 20:00	15:06 (10) 16:18 (10)	06:38 19:10	13:34 (10) 16:32 (10)	07:10 18:19
16	05:37 20:31	06:07 19:58	15:05 (10) 16:19 (10)	06:39 19:08	13:31 (10) 16:31 (10)	07:11 18:17
17	05:38 20:31	06:08 19:57	15:02 (10) 16:20 (10)	06:40 19:06	13:30 (10) 16:32 (10)	07:12 18:16
18	05:39 20:30	06:09 19:55	15:01 (10) 16:21 (10)	06:41 19:05	13:27 (10) 16:31 (10)	07:13 18:14
19	05:40 20:29	06:10 19:54	14:58 (10) 16:22 (10)	06:42 19:03	13:24 (10) 16:32 (10)	07:14 18:13
20	05:41 20:29	06:11 19:52	14:55 (10) 16:23 (10)	06:43 19:01	13:23 (10) 16:31 (10)	07:15 18:11
21	05:42 20:28	06:12 19:51	14:52 (10) 16:24 (10)	06:44 18:59	13:20 (10) 16:30 (10)	07:16 18:10
22	05:42 20:27	06:13 19:49	14:51 (10) 16:25 (10)	06:45 18:58	13:19 (10) 16:31 (10)	07:18 18:08
23	05:43 20:26	06:14 19:48	14:48 (10) 16:26 (10)	06:46 18:56	13:18 (10) 16:30 (10)	07:19 18:07
24	05:44 20:25	06:15 19:46	14:45 (10) 16:25 (10)	06:47 18:54	13:15 (10) 16:31 (10)	07:20 18:05
25	05:45 20:24	06:16 19:45	14:42 (10) 16:26 (10)	06:48 18:52	13:14 (10) 16:30 (10)	06:21 17:04
26	05:46 20:23	06:17 19:43	14:39 (10) 16:27 (10)	06:49 18:51	13:13 (10) 16:31 (10)	06:22 17:03
27	05:47 20:23	06:18 19:42	14:36 (10) 16:28 (10)	06:50 18:49	13:12 (10) 16:30 (10)	06:23 17:01
28	05:48 20:22	06:19 19:40	14:35 (10) 16:27 (10)	06:51 18:47	13:11 (10) 16:29 (10)	06:25 17:00
29	05:49 20:21	06:20 19:38	14:32 (10) 16:28 (10)	06:52 18:45	13:10 (10) 16:30 (10)	06:26 16:58
30	05:50 20:20	06:21 19:37	14:29 (10) 16:29 (10)	06:53 18:44	13:09 (10) 16:29 (10)	06:27 16:57
31	05:51 20:18	06:22 19:35	14:25 (10) 16:29 (10)		06:28 16:56	12:12 (10) 15:16 (10)
Potential sun hours	461	429	375	345	297	286
Total, worst case		2258	5174	6084	4986	5354

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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Calculated:  
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### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AN - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26 16:38 118	08:46 (10) 17:13 118	09:14 (10) 17:48 96	06:35 11:14 (10) 17:48 96	09:38 (10) 11:14 (10) 19:23 12	06:43 11:12 (10) 19:56 12
2	07:26 16:39 118	08:48 (10) 17:14 116	09:15 (10) 17:49 96	06:33 11:15 (10) 19:24 10	09:39 (10) 11:15 (10) 19:57 10	06:42 11:10 (10) 19:57 10
3	07:26 16:40 118	08:48 (10) 17:16 116	09:16 (10) 17:50 94	06:32 11:16 (10) 19:25 6	09:39 (10) 11:16 (10) 19:58 6	06:40 11:01 (10) 19:58 6
4	07:26 16:41 118	08:48 (10) 17:17 116	09:17 (10) 17:52 92	06:30 11:17 (10) 19:26 4	09:41 (10) 11:17 (10) 19:59 4	06:38 11:01 (10) 19:59 4
5	07:26 16:42 116	08:50 (10) 17:18 116	09:18 (10) 17:53 90	06:29 11:18 (10) 19:27 90	09:42 (10) 11:18 (10) 19:27 90	06:37 11:12 (10) 19:27 90
6	07:26 16:43 118	08:50 (10) 17:20 116	09:18 (10) 17:54 88	06:27 11:19 (10) 19:28 88	09:42 (10) 11:19 (10) 19:28 88	06:35 11:10 (10) 19:28 88
7	07:26 16:44 118	08:50 (10) 17:21 116	09:19 (10) 17:55 88	06:25 11:20 (10) 19:29 88	09:42 (10) 11:20 (10) 19:29 88	06:33 11:10 (10) 19:29 88
8	07:26 16:45 118	08:52 (10) 17:22 116	09:20 (10) 17:56 86	06:24 11:21 (10) 19:31 86	09:43 (10) 11:21 (10) 19:31 86	06:32 11:09 (10) 19:31 86
9	07:25 16:46 118	08:53 (10) 17:23 114	09:21 (10) 17:57 82	06:22 11:22 (10) 19:32 82	09:45 (10) 11:22 (10) 19:32 82	06:30 11:07 (10) 19:32 82
10	07:25 16:47 118	08:53 (10) 17:25 114	09:22 (10) 17:58 80	06:21 11:23 (10) 19:33 80	09:45 (10) 11:23 (10) 19:33 80	06:28 11:05 (10) 19:33 80
11	07:25 16:48 118	08:55 (10) 17:26 114	09:22 (10) 18:00 78	06:19 11:24 (10) 19:34 78	09:46 (10) 11:24 (10) 19:34 78	06:27 11:04 (10) 19:34 78
12	07:25 16:49 120	08:55 (10) 17:27 114	09:23 (10) 18:01 76	06:17 11:25 (10) 19:35 76	09:46 (10) 11:25 (10) 19:35 76	06:25 11:02 (10) 19:35 76
13	07:24 16:50 118	08:56 (10) 17:28 112	09:26 (10) 18:02 74	06:16 11:26 (10) 19:36 74	09:46 (10) 11:26 (10) 19:36 74	06:23 11:00 (10) 19:36 74
14	07:24 16:51 118	08:58 (10) 17:30 110	09:26 (10) 18:03 70	06:14 11:27 (10) 19:37 70	09:49 (10) 11:27 (10) 19:37 70	06:22 10:59 (10) 19:37 70
15	07:24 16:52 120	08:57 (10) 17:31 110	09:27 (10) 18:04 68	06:12 11:28 (10) 19:38 68	09:49 (10) 11:28 (10) 19:38 68	06:20 10:57 (10) 19:38 68
16	07:23 16:54 118	08:59 (10) 17:32 110	09:28 (10) 18:05 66	06:10 11:29 (10) 19:39 66	09:49 (10) 11:29 (10) 19:39 66	06:19 10:55 (10) 19:39 66
17	07:23 16:55 118	09:00 (10) 17:33 110	09:28 (10) 18:06 64	06:09 11:30 (10) 19:40 64	09:50 (10) 11:30 (10) 19:40 64	06:17 10:54 (10) 19:40 64
18	07:22 16:56 120	09:00 (10) 17:35 110	09:29 (10) 18:08 62	06:07 11:31 (10) 19:41 62	09:50 (10) 11:31 (10) 19:41 62	06:16 10:52 (10) 19:41 62
19	07:22 16:57 120	09:01 (10) 17:36 108	09:29 (10) 18:09 56	06:05 11:32 (10) 19:43 56	09:52 (10) 11:32 (10) 19:43 56	06:14 10:48 (10) 19:43 56
20	07:21 16:58 118	09:02 (10) 17:37 106	09:32 (10) 18:10 54	06:04 11:33 (10) 19:44 54	09:52 (10) 11:33 (10) 19:44 54	06:13 10:46 (10) 19:44 54
21	07:21 16:59 118	09:04 (10) 17:38 106	09:32 (10) 18:11 52	06:02 11:34 (10) 19:45 52	09:53 (10) 11:34 (10) 19:45 52	06:11 10:45 (10) 19:45 52
22	07:20 17:01 118	09:05 (10) 17:40 104	09:33 (10) 18:12 48	06:00 11:35 (10) 19:46 48	09:53 (10) 11:35 (10) 19:46 48	06:09 10:41 (10) 19:46 48
23	07:19 17:02 120	09:04 (10) 17:41 104	09:33 (10) 18:13 46	05:59 11:36 (10) 19:47 46	09:53 (10) 11:36 (10) 19:47 46	06:08 10:39 (10) 19:47 46
24	07:19 17:03 120	09:05 (10) 17:42 104	09:34 (10) 18:14 40	05:57 11:37 (10) 19:48 40	09:56 (10) 11:37 (10) 19:48 40	06:07 10:36 (10) 19:48 40
25	07:18 17:04 118	09:07 (10) 17:43 102	09:34 (10) 18:15 38	05:55 11:38 (10) 19:49 38	09:56 (10) 11:38 (10) 19:49 38	06:05 10:34 (10) 19:49 38
26	07:17 17:06 118	09:08 (10) 17:44 100	09:37 (10) 18:16 34	05:54 11:39 (10) 19:50 34	09:56 (10) 11:39 (10) 19:50 34	06:04 10:30 (10) 19:50 34
27	07:16 17:07 118	09:09 (10) 17:46 98	09:37 (10) 18:17 32	05:52 11:40 (10) 19:51 32	09:56 (10) 11:40 (10) 19:51 32	06:02 10:28 (10) 19:51 32
28	07:15 17:08 118	09:10 (10) 17:47 98	09:38 (10) 18:19 28	05:50 11:41 (10) 19:52 28	09:57 (10) 11:41 (10) 19:52 28	06:01 10:25 (10) 19:52 28
29	07:14 17:09 118	09:11 (10) 17:49 98	09:38 (10) 18:20 24	05:48 11:42 (10) 19:53 24	09:57 (10) 11:42 (10) 19:53 24	05:59 10:57 (10) 19:53 24
30	07:14 17:11 118	09:12 (10) 17:50 98	09:39 (10) 18:21 20	05:47 11:43 (10) 19:54 20	09:58 (10) 11:43 (10) 19:54 20	05:58 10:59 (10) 19:54 20
31	07:13 17:12 118	09:13 (10) 17:51 98	09:39 (10) 18:22 16	05:45 11:44 (10) 19:55 16	09:58 (10) 11:44 (10) 19:55 16	05:57 11:00 (10) 19:55 16
Potential sun hours	296	296	369	399	450	454
Total, worst case	3668	3078	1938	32		

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

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker (WTG causing flicker first time)	Last time (hh:mm) with flicker (WTG causing flicker last time)
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Project:  
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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AN - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December
1	05:27 20:37	05:52 20:17	06:24 19:33	06:54 18:42	10:27 (10) 16:55	08:51 (10) 16:29
2	05:28 20:37	05:53 20:16	06:25 19:32	06:55 18:40	74 11:41 (10) 16:53	114 10:45 (10) 16:29
3	05:29 20:37	05:54 20:15	06:26 19:30	06:56 18:39	80 11:43 (10) 16:52	114 10:44 (10) 16:29
4	05:29 20:36	05:55 20:14	06:27 19:28	06:58 18:37	82 11:44 (10) 16:51	116 10:45 (10) 16:29
5	05:30 20:36	05:56 20:13	06:28 19:27	06:59 18:35	84 11:45 (10) 16:50	116 10:44 (10) 16:29
6	05:30 20:36	05:57 20:12	06:29 19:25	07:00 18:34	86 11:46 (10) 16:48	116 10:44 (10) 16:28
7	05:31 20:36	05:58 20:10	06:30 19:23	07:01 18:32	88 11:47 (10) 16:47	116 10:43 (10) 16:28
8	05:31 20:35	05:59 20:09	06:31 19:22	07:02 18:30	90 11:46 (10) 16:46	116 10:42 (10) 16:28
9	05:32 20:35	06:00 20:08	06:32 19:20	10:54 (10) 18:29	92 11:47 (10) 16:45	116 10:42 (10) 16:28
10	05:33 20:34	06:01 20:06	06:33 19:18	10:53 (10) 18:27	94 11:48 (10) 16:44	116 10:41 (10) 16:28
11	05:34 20:34	06:02 20:05	06:34 19:17	10:52 (10) 18:25	94 11:48 (10) 16:43	118 10:42 (10) 16:28
12	05:34 20:34	06:03 20:04	06:35 19:15	10:51 (10) 18:24	96 11:49 (10) 16:42	118 10:42 (10) 16:28
13	05:35 20:33	06:04 20:02	06:36 19:13	10:50 (10) 18:22	96 11:48 (10) 16:41	118 10:41 (10) 16:29
14	05:36 20:33	06:05 20:01	06:37 19:11	10:49 (10) 18:21	100 11:49 (10) 16:40	118 10:40 (10) 16:29
15	05:37 20:32	06:06 20:00	06:38 19:10	10:48 (10) 18:19	100 11:48 (10) 16:39	118 10:39 (10) 16:29
16	05:37 20:31	06:07 19:58	06:39 19:09	10:45 (10) 18:17	102 11:49 (10) 16:38	118 10:39 (10) 16:29
17	05:38 20:31	06:08 19:57	06:40 19:06	10:44 (10) 18:16	102 11:49 (10) 16:38	118 10:38 (10) 16:29
18	05:39 20:30	06:09 19:55	06:41 19:05	10:43 (10) 18:14	102 11:48 (10) 16:37	120 10:39 (10) 16:30
19	05:40 20:29	06:10 19:54	06:42 19:03	10:42 (10) 18:13	104 11:49 (10) 16:36	120 10:39 (10) 16:30
20	05:41 20:29	06:11 19:52	06:43 19:01	10:41 (10) 18:11	104 11:48 (10) 16:35	118 10:38 (10) 16:31
21	05:42 20:28	06:12 19:51	06:44 18:59	10:40 (10) 18:10	106 11:47 (10) 16:35	118 10:37 (10) 16:31
22	05:42 20:27	06:13 19:49	06:45 18:58	10:37 (10) 18:08	108 11:49 (10) 16:34	118 10:36 (10) 16:31
23	05:43 20:26	06:14 19:48	06:46 18:56	10:36 (10) 18:07	108 11:48 (10) 16:33	120 10:38 (10) 16:32
24	05:44 20:25	06:15 19:46	06:47 18:54	10:35 (10) 18:05	108 11:47 (10) 16:33	120 10:37 (10) 16:33
25	05:45 20:24	06:16 19:45	06:48 18:52	10:34 (10) 17:04	110 10:48 (10) 16:32	118 10:36 (10) 16:33
26	05:46 20:23	06:17 19:43	06:49 18:51	10:33 (10) 17:03	110 10:48 (10) 16:32	118 10:35 (10) 16:34
27	05:47 20:23	06:18 19:42	06:50 18:49	10:30 (10) 17:01	110 10:47 (10) 16:31	120 10:36 (10) 16:34
28	05:48 20:22	06:19 19:40	06:51 18:47	10:29 (10) 17:00	112 10:46 (10) 16:31	118 10:36 (10) 16:35
29	05:49 20:21	06:20 19:38	06:52 18:45	10:28 (10) 16:58	114 10:47 (10) 16:30	118 10:35 (10) 16:36
30	05:50 20:20	06:21 19:37	06:53 18:44	10:27 (10) 16:57	114 10:47 (10) 16:30	120 10:36 (10) 16:37
31	05:51 20:18	06:22 19:35		06:28 16:56	114 10:46 (10)	07:25 16:37
Potential sun hours	461	429	375	345	297	286
Total, worst case			900	3060	3526	3642

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AO - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:38	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 19:33	06:54 18:42	06:29 16:55	07:05 16:30
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	06:25 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	05:29 20:37	05:54 20:15	06:26 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 17:52	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	06:35 16:49	07:10 16:28
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	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	05:25 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 20:34	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	05:44 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 16:28
13	07:24 16:50	06:58 17:28	06:16 18:02	06:24 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 16:29
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 19:11	07:08 18:21	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	05:37 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 16:54	06:54 17:32	06:11 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 18:08	06:16 19:41	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	06:05 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	06:13 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 16:31
21	07:21 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	06:54 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 20:36	05:43 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	05:25 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	07:19 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 18:05	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	07:21 17:04	06:58 16:32	07:24 16:33
26	07:17 17:06	06:40 17:44	05:54 18:16	06:04 19:50	05:31 20:21	05:25 20:37	05:46 20:23	06:17 19:43	06:49 18:51	07:04 17:03	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 20:22	05:26 20:37	05:47 20:23	06:18 19:42	06:50 18:49	07:03 17:01	07:01 16:31	07:24 16:34
28	07:15 17:08	06:37 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	07:02 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 18:46	07:03 16:58	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	06:21 19:37	06:53 18:44	07:04 16:57	07:04 16:30	07:25 16:37
31	07:13 17:12		06:45 19:22	05:58 20:25	05:28 20:25	05:28 20:25	05:51 20:18	06:23 19:35	06:54 18:56	07:05 16:56	07:05 16:30	07:25 16:37
Potential sun hours	296	296	369	399	450	454	461	429	375	345	297	286
Total, worst case												

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:  
**OMBRA**

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Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** AP - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

**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

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

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:26 16:38	07:12 17:13	06:35 17:48	06:43 17:24 (12)	05:57 19:23	05:27 20:26	05:28 20:37	05:52 20:17	06:24 19:33	06:54 18:42	17:15 (12) 16:59 (12)	06:29 16:55	07:05 16:30
2	07:26 16:39	07:11 17:14	06:33 17:49	06:42 17:25 (12)	05:55 19:24	05:27 20:27	05:28 20:37	05:53 20:16	06:25 19:32	06:55 18:40	17:14 (12) 16:52 (12)	06:31 16:29	07:06 16:29
3	07:26 16:40	07:10 17:16	06:32 17:50	06:40 17:25 (12)	05:54 19:25	05:26 20:27	05:29 20:37	05:54 20:15	06:26 19:30	06:56 18:39	17:13 (12) 16:51 (12)	06:32 16:29	07:07 16:29
4	07:26 16:41	07:09 17:17	06:30 17:52	06:38 17:25 (12)	05:53 19:26	05:26 20:28	05:29 20:36	05:55 20:14	06:27 19:28	06:58 18:37	17:10 (12) 16:51 (12)	06:33 16:29	07:08 16:29
5	07:26 16:42	07:08 17:18	06:29 17:53	06:37 17:26 (12)	05:52 20:00	05:26 20:29	05:30 20:36	05:56 20:13	06:28 19:27	06:59 18:35	17:11 (12) 16:50 (12)	06:34 16:29	07:09 16:29
6	07:26 16:43	07:06 17:20	06:27 17:54	06:35 17:24 (12)	05:50 20:01	05:25 20:29	05:30 20:36	05:57 20:12	06:29 19:25	07:00 18:34	17:10 (12) 16:49 (12)	06:35 16:28	07:10 16:28
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8	07:26 16:45	07:04 17:22	06:24 17:56	06:32 17:23 (12)	05:48 20:03	05:25 20:31	05:32 20:35	05:59 20:09	06:31 19:22	07:02 18:30	17:08 (12) 16:46 (12)	06:38 16:28	07:12 16:28
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10	07:25 16:47	07:02 17:25	06:21 17:59	06:28 17:21 (12)	05:46 20:05	05:24 20:32	05:33 20:34	06:01 20:06	06:33 19:18	07:04 18:27	17:06 (12) 16:44 (12)	06:40 16:28	07:14 16:28
11	07:25 16:48	07:00 17:26	06:19 18:00	06:27 17:22 (12)	05:44 20:06	05:24 20:32	05:34 20:34	06:02 20:05	06:34 19:17	07:05 18:25	17:05 (12) 16:43 (12)	06:41 16:28	07:15 16:28
12	07:25 16:49	06:59 17:27	06:17 18:01	06:25 17:20 (12)	05:43 20:07	05:24 20:33	05:34 20:34	06:03 20:04	06:35 19:15	07:06 18:24	17:04 (12) 16:42 (12)	06:42 16:28	07:15 16:28
13	07:24 16:50	06:58 17:28	06:16 18:02	06:23 17:18 (12)	05:42 20:08	05:24 20:33	05:35 20:33	06:04 20:02	06:36 19:13	07:07 18:22	17:03 (12) 16:41 (12)	06:43 16:29	07:16 16:29
14	07:24 16:51	06:57 17:30	06:14 18:03	06:22 17:19 (12)	05:41 20:09	05:24 20:34	05:36 20:33	06:05 20:01	06:37 19:11	07:08 18:21	17:02 (12) 16:40 (12)	06:44 16:29	07:17 16:29
15	07:24 16:52	06:55 17:31	06:12 18:04	06:20 17:17 (12)	05:40 20:10	05:24 20:34	05:37 20:32	06:06 20:00	06:38 19:10	07:10 18:19	17:01 (12) 16:39 (12)	06:45 16:29	07:18 16:29
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19	07:22 16:57	06:50 17:36	06:05 18:09	06:05 17:13 (12)	05:36 20:14	05:24 20:36	05:40 20:29	06:10 19:54	06:42 19:03	07:14 18:13	17:00 (12) 16:36 (12)	06:49 16:30	07:22 16:30
20	07:21 16:58	06:48 17:37	06:04 18:10	06:04 17:14 (12)	05:35 20:15	05:24 20:36	05:41 20:29	06:11 19:52	06:43 19:01	07:15 18:11	17:00 (12) 16:35 (12)	06:50 16:31	07:23 16:31
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27	07:16 17:07	06:38 17:46	05:52 18:17	05:52 17:23 (12)	05:30 20:22	05:26 20:37	05:47 20:23	06:18 19:42	06:50 18:49	07:22 18:01	17:00 (12) 16:31 (12)	06:57 16:34	07:30 16:34
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31	07:13 17:12	06:34 17:50	05:46 18:22	05:46 17:27 (12)	05:28 20:26	05:28 20:37	05:51 20:18	06:22 19:35	06:54 18:45	07:26 18:00	17:00 (12) 16:27 (12)	07:01 16:30	07:34 16:34
Potential sun hours	296	296	369	399	450	454	461	429	375	254	345	1114	297
Total, worst case		482		870									286

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AQ - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	
1	07:26 16:38 154	13:34 (11) 16:12 (12) 17:13	07:12 17:13 178	13:26 (11) 16:24 (12) 17:48	06:35 17:48 172	13:16 (11) 16:08 (11) 19:23	116 14:52 (11) 05:57 20:26
2	07:26 16:39 156	13:34 (11) 16:12 (12) 17:14	07:10 17:14 180	13:24 (11) 16:25 (12) 17:49	06:32 17:49 172	13:17 (11) 16:09 (11) 19:24	114 14:55 (11) 05:54 20:27
3	07:26 16:40 158	13:34 (11) 16:14 (12) 17:16	07:09 17:16 180	13:23 (11) 16:24 (12) 17:50	06:30 17:50 172	13:17 (11) 16:09 (11) 19:25	112 14:57 (11) 05:53 20:27
4	07:26 16:41 158	13:34 (11) 16:14 (12) 17:17	07:09 17:17 180	13:23 (11) 16:23 (12) 17:52	06:30 17:52 170	13:17 (11) 16:07 (11) 19:26	108 14:55 (11) 05:59 20:28
5	07:26 16:42 160	13:34 (11) 16:16 (12) 17:18	07:08 17:18 176	13:24 (11) 16:20 (12) 17:53	06:29 17:53 170	13:18 (11) 16:08 (11) 19:27	104 14:59 (11) 05:52 20:29
6	07:26 16:43 162	13:34 (11) 16:16 (12) 17:20	07:06 17:20 176	13:22 (11) 16:18 (12) 17:54	06:27 17:54 170	13:18 (11) 16:08 (11) 19:28	102 15:02 (11) 05:50 20:29
7	07:26 16:44 164	13:34 (11) 16:18 (12) 17:21	07:05 17:21 174	13:21 (11) 16:15 (12) 17:55	06:25 17:55 168	13:18 (11) 16:06 (11) 19:29	98 15:04 (11) 05:49 20:30
8	07:26 16:45 164	13:34 (11) 16:18 (12) 17:22	07:04 17:22 170	13:22 (11) 16:12 (12) 17:56	06:24 17:56 168	13:19 (11) 16:07 (11) 19:31	94 15:06 (11) 05:48 20:31
9	07:25 16:46 164	13:35 (11) 16:19 (12) 17:23	07:03 17:23 164	13:21 (11) 16:05 (11) 17:57	06:22 17:57 168	13:19 (11) 16:07 (11) 19:32	90 15:09 (11) 05:47 20:31
10	07:25 16:47 166	13:35 (11) 16:21 (12) 17:25	07:02 17:25 164	13:22 (11) 16:06 (11) 17:59	06:21 17:59 166	13:19 (11) 16:05 (11) 19:33	86 15:11 (11) 05:46 20:32
11	07:25 16:48 166	13:35 (11) 16:21 (12) 17:26	07:01 17:26 166	13:20 (11) 16:06 (11) 18:00	06:19 18:00 166	13:20 (11) 16:06 (11) 19:34	82 15:13 (11) 05:44 20:32
12	07:25 16:49 168	13:35 (11) 16:23 (12) 17:27	06:59 17:27 168	13:19 (11) 16:07 (11) 18:01	06:17 18:01 166	13:20 (11) 16:06 (11) 19:35	80 15:14 (11) 05:43 20:32
13	07:24 16:50 170	13:34 (11) 16:24 (12) 17:28	06:58 17:28 168	13:20 (11) 16:08 (11) 18:02	06:16 18:02 162	13:22 (11) 16:04 (11) 19:36	76 15:16 (11) 05:42 20:33
14	07:24 16:51 170	13:34 (11) 16:24 (12) 17:30	06:57 17:30 168	13:18 (11) 16:06 (11) 18:03	06:14 18:03 162	13:23 (11) 16:05 (11) 19:37	72 15:19 (11) 05:41 20:34
15	07:24 16:52 172	13:33 (11) 16:25 (12) 17:31	06:55 17:31 168	13:19 (11) 16:07 (11) 18:04	06:12 18:04 160	13:23 (11) 16:03 (11) 19:38	68 15:21 (11) 05:40 20:34
16	07:23 16:54 172	13:33 (11) 16:25 (12) 17:32	06:54 17:32 170	13:18 (11) 16:08 (11) 18:05	06:11 18:05 158	13:25 (11) 16:03 (11) 19:39	64 15:24 (11) 05:39 20:35
17	07:23 16:55 174	13:32 (11) 16:26 (12) 17:33	06:53 17:33 170	13:18 (11) 16:08 (11) 18:06	06:09 18:06 156	13:26 (11) 16:02 (11) 19:40	60 15:26 (11) 05:38 20:35
18	07:22 16:56 174	13:32 (11) 16:26 (12) 17:35	06:51 17:35 172	13:17 (11) 16:09 (11) 18:08	06:07 18:08 154	13:28 (11) 16:02 (11) 19:41	58 15:30 (11) 05:37 20:35
19	07:22 16:57 176	13:31 (11) 16:27 (12) 17:36	06:50 17:36 172	13:17 (11) 16:09 (11) 18:09	06:05 18:09 152	13:28 (11) 16:00 (11) 19:43	54 15:33 (11) 05:36 20:36
20	07:21 16:58 176	13:30 (11) 16:28 (12) 17:37	06:48 17:37 170	13:18 (11) 16:08 (11) 18:10	06:04 18:10 150	13:30 (11) 16:00 (11) 19:44	50 15:35 (11) 05:35 20:36
21	07:21 16:59 178	13:30 (11) 16:28 (12) 17:38	06:47 17:38 172	13:16 (11) 16:08 (11) 18:11	06:02 18:11 148	13:31 (11) 15:59 (11) 19:45	48 15:40 (11) 05:35 20:36
22	07:20 17:01 178	13:29 (11) 16:27 (12) 17:40	06:46 17:40 172	13:17 (11) 16:09 (11) 18:12	06:00 18:12 146	13:33 (11) 15:59 (11) 19:46	46 15:43 (11) 05:34 20:36
23	07:19 17:02 176	13:30 (11) 16:26 (12) 17:41	06:44 17:41 172	13:17 (11) 16:09 (11) 18:13	05:59 18:13 142	13:35 (11) 15:57 (11) 19:47	44 15:49 (11) 05:33 20:37
24	07:19 17:03 178	13:29 (11) 16:27 (12) 17:42	06:43 17:42 174	13:16 (11) 16:10 (11) 18:14	05:57 18:14 142	13:36 (11) 15:58 (11) 19:48	42 16:05 (11) 05:32 20:37
25	07:18 17:04 178	13:29 (11) 16:27 (12) 17:43	06:41 17:43 172	13:16 (11) 16:08 (11) 18:15	05:55 18:15 138	13:38 (11) 15:56 (11) 19:49	40 16:07 (11) 05:31 20:37
26	07:17 17:05 180	13:28 (11) 16:28 (12) 17:44	06:40 17:44 172	13:17 (11) 16:09 (11) 18:16	05:54 18:16 134	13:40 (11) 15:54 (11) 19:50	38 16:09 (11) 05:30 20:37
27	07:16 17:07 180	13:27 (11) 16:27 (12) 17:46	06:38 17:46 174	13:15 (11) 16:09 (11) 18:17	05:52 18:17 132	13:42 (11) 15:54 (11) 19:51	36 16:11 (11) 05:29 20:37
28	07:15 17:08 178	13:28 (11) 16:26 (12) 17:47	06:37 17:47 174	13:16 (11) 16:10 (11) 18:19	05:50 18:19 130	13:43 (11) 15:53 (11) 19:52	34 16:13 (11) 05:28 20:37
29	07:14 17:09 180	13:27 (11) 16:27 (12) 17:48	06:36 17:48 172	13:16 (11) 16:08 (11) 18:20	05:48 18:20 128	14:45 (11) 16:53 (11) 19:53	32 16:15 (11) 05:27 20:37
30	07:14 17:11 180	13:26 (11) 16:26 (12) 17:49	06:35 17:49 172	13:17 (11) 16:09 (11) 18:21	05:47 18:21 124	14:47 (11) 16:51 (11) 19:55	30 16:17 (11) 05:26 20:37
31	07:13 17:12 180	13:25 (11) 16:25 (12) 17:50	06:34 17:50 172	13:18 (11) 16:10 (11) 18:22	05:46 18:22 120	14:50 (11) 16:50 (11) 19:56	28 16:19 (11) 05:25 20:37
Potential sun hours	296	296	369	399	450	454	
Total, worst case	5290	4816	4766	1742			

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:  
**OMBRA**

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AQ - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

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

	July	August	September	October	November	December				
1	05:28 20:37	05:52 20:17	06:24 19:33	15:10 (11) 16:34 (11)	06:54 18:42	14:01 (11) 16:45 (11)	06:29 16:55	12:49 (11) 15:35 (11)	07:05 16:30	13:17 (11) 16:03 (12)
2	05:28 20:37	05:53 20:16	06:25 19:32	15:09 (11) 16:35 (11)	06:55 18:40	14:00 (11) 16:44 (11)	06:31 16:53	12:51 (11) 15:35 (11)	07:06 16:29	13:18 (11) 16:04 (12)
3	05:29 20:37	05:54 20:15	06:26 19:30	15:06 (11) 16:36 (11)	06:56 18:39	13:57 (11) 16:45 (11)	06:32 16:52	12:52 (11) 15:42 (12)	07:07 16:29	13:19 (11) 16:03 (12)
4	05:29 20:36	05:55 20:14	06:27 19:28	15:03 (11) 16:37 (11)	06:58 18:37	13:56 (11) 16:44 (11)	06:33 16:51	12:51 (11) 15:45 (12)	07:08 16:29	13:18 (11) 16:02 (12)
5	05:30 20:36	05:56 20:13	06:28 19:27	15:00 (11) 16:38 (11)	06:59 18:35	13:55 (11) 16:43 (11)	06:34 16:50	12:52 (11) 15:48 (12)	07:09 16:29	13:19 (11) 16:03 (12)
6	05:30 20:36	05:57 20:12	06:29 19:25	14:57 (11) 16:39 (11)	07:00 18:34	13:54 (11) 16:44 (11)	06:35 16:49	12:54 (11) 15:50 (12)	07:10 16:28	13:20 (11) 16:02 (12)
7	05:31 20:36	05:58 20:10	06:30 19:23	14:54 (11) 16:38 (11)	07:01 18:32	13:53 (11) 16:43 (11)	06:37 16:47	12:53 (11) 15:53 (12)	07:11 16:28	13:21 (11) 16:03 (12)
8	05:32 20:35	05:59 20:09	06:31 19:22	14:51 (11) 16:39 (11)	07:02 18:30	13:52 (11) 16:42 (11)	06:38 16:46	12:54 (11) 15:54 (12)	07:12 16:28	13:22 (11) 16:02 (12)
9	05:32 20:35	06:00 20:08	06:32 19:20	14:50 (11) 16:40 (11)	07:03 18:29	13:51 (11) 16:43 (11)	06:39 16:45	12:56 (11) 15:56 (12)	07:13 16:28	13:23 (11) 16:03 (12)
10	05:33 20:34	06:01 20:06	06:33 19:18	14:47 (11) 16:41 (11)	07:04 18:27	13:50 (11) 16:42 (11)	06:40 16:44	12:55 (11) 15:55 (12)	07:14 16:28	13:24 (11) 16:02 (12)
11	05:34 20:34	06:02 20:05	06:34 19:17	14:44 (11) 16:40 (11)	07:05 18:25	13:50 (11) 16:42 (11)	06:42 16:43	12:56 (11) 15:56 (12)	07:15 16:28	13:25 (11) 16:03 (12)
12	05:34 20:34	06:03 20:04	06:35 19:15	14:41 (11) 16:41 (11)	07:06 18:24	13:51 (11) 16:43 (11)	06:43 16:42	12:58 (11) 15:58 (12)	07:15 16:28	13:26 (11) 16:02 (12)
13	05:35 20:33	06:04 20:02	06:36 19:13	14:38 (11) 16:42 (11)	07:07 18:22	13:50 (11) 16:42 (11)	06:44 16:41	12:59 (11) 15:59 (12)	07:16 16:29	13:26 (11) 16:02 (12)
14	05:36 20:33	06:05 20:01	06:37 19:11	14:35 (11) 16:43 (11)	07:08 18:21	13:49 (11) 16:41 (11)	06:45 16:40	13:00 (11) 15:58 (12)	07:17 16:29	13:27 (11) 16:03 (12)
15	05:37 20:32	06:06 20:00	06:38 19:10	14:34 (11) 16:42 (11)	07:10 18:19	13:48 (11) 16:42 (11)	06:46 16:39	12:59 (11) 15:59 (12)	07:18 16:29	13:30 (11) 16:02 (12)
16	05:37 20:31	06:07 19:58	06:39 19:08	14:31 (11) 16:43 (11)	07:11 18:17	13:47 (11) 16:41 (11)	06:48 16:38	13:01 (11) 16:01 (12)	07:18 16:29	13:30 (11) 16:02 (12)
17	05:38 20:31	06:08 19:57	06:40 19:06	14:28 (11) 16:44 (11)	07:12 18:16	13:49 (11) 16:41 (11)	06:49 16:38	13:02 (11) 16:00 (12)	07:19 16:29	13:31 (11) 16:03 (12)
18	05:39 20:30	06:09 19:55	06:41 19:05	14:25 (11) 16:43 (11)	07:13 18:14	13:48 (11) 16:40 (11)	06:50 16:37	13:03 (11) 16:01 (12)	07:20 16:30	13:32 (11) 16:04 (12)
19	05:40 20:29	06:10 19:54	06:42 19:03	14:24 (11) 16:44 (11)	07:14 18:13	13:47 (11) 16:41 (11)	06:51 16:36	13:05 (11) 16:01 (12)	07:20 16:30	13:32 (11) 16:04 (12)
20	05:41 20:29	06:11 19:52	06:43 18:53 (11)	14:21 (11) 16:43 (11)	07:15 18:11	13:48 (11) 16:40 (11)	06:52 16:35	13:04 (11) 16:02 (12)	07:21 16:31	13:33 (11) 16:05 (12)
21	05:42 20:28	06:12 19:51	06:44 18:54 (11)	14:18 (11) 16:46 (11)	07:16 18:10	13:47 (11) 16:39 (11)	06:54 16:35	13:05 (11) 16:03 (12)	07:22 16:31	13:33 (11) 16:05 (12)
22	05:42 20:27	06:13 19:49	06:45 18:58 (11)	14:17 (11) 16:43 (11)	07:18 18:08	13:47 (11) 16:39 (11)	06:55 16:34	13:06 (11) 16:02 (12)	07:22 16:31	13:34 (11) 16:06 (12)
23	05:43 20:26	06:14 19:48	06:46 18:56 (11)	14:14 (11) 16:44 (11)	07:19 18:07	13:48 (11) 16:38 (11)	06:56 16:33	13:08 (11) 16:04 (12)	07:23 16:32	13:34 (11) 16:06 (12)
24	05:44 20:25	06:15 19:46	06:47 18:54 (11)	14:13 (11) 16:45 (11)	07:20 18:05	13:47 (11) 16:39 (11)	06:57 16:33	13:09 (11) 16:03 (12)	07:23 16:33	13:35 (11) 16:07 (12)
25	05:45 20:24	06:16 19:45	06:48 18:52 (11)	14:10 (11) 16:44 (11)	07:21 17:04	12:48 (11) 15:38 (11)	06:58 16:32	13:10 (11) 16:04 (12)	07:24 16:33	13:35 (11) 16:07 (12)
26	05:46 20:23	06:17 19:43	06:49 18:51 (11)	14:09 (11) 16:45 (11)	07:22 17:03	12:48 (11) 15:38 (11)	06:59 16:32	13:11 (11) 16:03 (12)	07:24 16:34	13:35 (11) 16:07 (12)
27	05:47 20:23	06:18 19:42	06:50 18:49 (11)	14:06 (11) 16:44 (11)	07:23 17:01	12:49 (11) 15:37 (11)	07:01 16:31	13:12 (11) 16:04 (12)	07:24 16:34	13:36 (11) 16:08 (12)
28	05:48 20:22	06:19 19:40	06:51 18:47 (11)	14:05 (11) 16:43 (11)	07:25 17:00	12:48 (11) 15:36 (11)	07:02 16:31	13:14 (11) 16:04 (12)	07:25 16:35	13:36 (11) 16:08 (12)
29	05:49 20:21	06:20 19:38	06:52 18:45 (11)	14:02 (11) 16:44 (11)	07:26 16:58	12:49 (11) 15:35 (11)	07:03 16:30	13:15 (11) 16:05 (12)	07:25 16:36	13:36 (11) 16:10 (12)
30	05:50 20:20	06:21 19:37	06:53 18:44 (11)	14:01 (11) 16:43 (11)	07:27 16:57	12:49 (11) 15:37 (11)	07:04 16:30	13:16 (11) 16:04 (12)	07:25 16:37	13:34 (11) 16:10 (12)
31	05:51 20:18	06:22 19:35	06:54 18:44 (11)	14:00 (11) 16:44 (11)	07:28 16:56	12:50 (11) 15:36 (11)	07:05 16:30	13:17 (11) 16:05 (12)	07:25 16:37	13:34 (11) 16:10 (12)
Potential sun hours	461	429	375	345	297	286				
Total, worst case		644	3838	5274	5264	4706				

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:  
OMBRA

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24/04/2020 08:06 / 69

Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AR - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	
1	07:26 08:18 (11)	07:12 08:18 (11)	06:35 08:18 (11)	06:43 08:18 (11)	05:57 08:18 (11)	05:27 08:18 (11)	05:49 (10)
	16:38 142	14:56 (12) 17:13 140	10:38 (11) 17:48 132	10:30 (11) 19:23 132	19:56 19:56	20:26 20:26	50 06:39 (10)
2	07:26 08:18 (11)	07:11 08:17 (11)	06:33 08:19 (11)	06:42 08:19 (11)	05:55 08:19 (11)	05:27 08:19 (11)	05:49 (10)
	16:39 140	14:56 (12) 17:14 142	10:39 (11) 17:49 132	10:31 (11) 19:24 132	19:57 19:57	20:27 20:27	52 06:41 (10)
3	07:26 08:20 (11)	07:10 08:18 (11)	06:32 08:19 (11)	06:40 08:19 (11)	05:54 08:19 (11)	05:26 08:19 (11)	05:48 (10)
	16:40 134	14:54 (12) 17:16 142	10:40 (11) 17:50 130	10:29 (11) 19:25 130	19:58 19:58	20:27 20:27	52 06:40 (10)
4	07:26 08:20 (11)	07:09 08:17 (11)	06:30 08:17 (11)	06:38 08:19 (11)	05:53 08:19 (11)	05:26 08:19 (11)	05:48 (10)
	16:41 134	14:54 (12) 17:17 142	10:39 (11) 17:52 128	10:27 (11) 19:26 128	19:59 19:59	20:28 20:28	52 06:40 (10)
5	07:26 08:20 (11)	07:08 08:18 (11)	06:29 08:18 (11)	06:37 08:18 (11)	05:52 08:18 (11)	05:26 08:18 (11)	05:47 (10)
	16:42 130	14:52 (12) 17:18 142	10:40 (11) 17:53 128	10:26 (11) 19:27 128	20:00 20:00	20:29 20:29	54 06:41 (10)
6	07:26 08:20 (11)	07:06 08:16 (11)	06:27 08:18 (11)	06:35 08:18 (11)	05:50 08:18 (11)	05:25 08:18 (11)	05:47 (10)
	16:43 124	14:50 (12) 17:20 144	10:40 (11) 17:54 126	10:24 (11) 19:28 126	20:01 20:01	20:29 20:29	54 06:41 (10)
7	07:26 08:20 (11)	07:05 08:17 (11)	06:25 08:17 (11)	06:33 08:18 (11)	05:49 08:18 (11)	05:25 08:18 (11)	05:47 (10)
	16:44 120	10:20 (11) 17:21 144	10:41 (11) 17:55 124	10:22 (11) 19:30 124	20:02 20:02	20:30 20:30	54 06:41 (10)
8	07:26 08:20 (11)	07:04 08:16 (11)	06:24 08:16 (11)	06:32 08:19 (11)	05:48 08:19 (11)	05:25 08:19 (11)	05:47 (10)
	16:45 122	10:22 (11) 17:22 144	10:40 (11) 17:56 122	10:21 (11) 19:31 122	20:03 20:03	20:31 20:31	54 06:41 (10)
9	07:25 08:20 (11)	07:03 08:17 (11)	06:22 08:17 (11)	06:30 08:21 (11)	05:47 08:21 (11)	05:24 08:21 (11)	05:47 (10)
	16:46 122	10:22 (11) 17:23 144	10:41 (11) 17:57 118	10:19 (11) 19:32 118	20:04 20:04	20:31 20:31	56 06:43 (10)
10	07:25 08:19 (11)	07:02 08:18 (11)	06:21 08:18 (11)	06:28 08:21 (11)	05:46 08:21 (11)	05:24 08:21 (11)	05:46 (10)
	16:47 124	10:23 (11) 17:25 144	10:42 (11) 17:59 116	10:17 (11) 19:33 116	20:05 20:05	20:32 20:32	56 06:42 (10)
11	07:25 08:21 (11)	07:01 08:16 (11)	06:19 08:16 (11)	06:27 08:22 (11)	05:44 08:22 (11)	05:24 08:22 (11)	05:46 (10)
	16:48 122	10:23 (11) 17:26 144	10:40 (11) 18:00 114	10:16 (11) 19:34 114	20:06 20:06	20:32 20:32	56 06:42 (10)
12	07:25 08:21 (11)	06:59 08:17 (11)	06:17 08:17 (11)	06:25 08:22 (11)	05:43 08:22 (11)	05:24 08:22 (11)	05:46 (10)
	16:49 124	10:25 (11) 17:27 144	10:41 (11) 18:01 110	10:12 (11) 19:35 110	20:07 20:07	20:33 20:33	56 06:42 (10)
13	07:24 08:20 (11)	06:58 08:16 (11)	06:16 08:16 (11)	06:24 08:22 (11)	05:42 08:22 (11)	05:24 08:22 (11)	05:46 (10)
	16:50 126	10:26 (11) 17:28 146	10:42 (11) 18:02 108	10:10 (11) 19:36 108	20:08 20:08	10 06:16 (10) 20:33	56 06:42 (10)
14	07:24 08:20 (11)	06:57 08:16 (11)	06:14 08:16 (11)	06:22 08:23 (11)	05:41 08:23 (11)	05:24 08:23 (11)	05:48 (10)
	16:51 126	10:26 (11) 17:30 144	10:40 (11) 18:03 106	10:09 (11) 19:37 106	20:09 20:09	18 06:22 (10) 20:34	56 06:44 (10)
15	07:24 08:19 (11)	06:55 08:17 (11)	06:12 08:17 (11)	06:20 08:23 (11)	05:40 08:23 (11)	05:24 08:23 (11)	05:48 (10)
	16:52 128	10:27 (11) 17:31 144	10:41 (11) 18:04 104	10:07 (11) 19:38 104	20:10 20:10	24 06:25 (10) 20:34	56 06:44 (10)
16	07:23 08:21 (11)	06:54 08:16 (11)	06:11 08:16 (11)	06:19 08:25 (11)	05:39 08:25 (11)	05:24 08:25 (11)	05:48 (10)
	16:54 128	10:29 (11) 17:32 144	10:40 (11) 18:05 98	10:03 (11) 19:39 98	20:11 20:11	26 06:26 (10) 20:35	56 06:44 (10)
17	07:23 08:20 (11)	06:53 08:16 (11)	06:09 08:16 (11)	06:17 08:26 (11)	05:38 08:26 (11)	05:24 08:26 (11)	05:48 (10)
	16:55 128	10:28 (11) 17:33 144	10:40 (11) 18:06 96	10:02 (11) 19:40 96	20:12 20:12	28 06:27 (10) 20:35	56 06:44 (10)
18	07:22 08:20 (11)	06:51 08:17 (11)	06:07 08:17 (11)	06:16 08:26 (11)	05:37 08:26 (11)	05:24 08:26 (11)	05:48 (10)
	16:56 130	10:30 (11) 17:35 142	10:39 (11) 18:08 92	09:58 (11) 19:41 92	20:13 20:13	30 06:28 (10) 20:35	56 06:44 (10)
19	07:22 08:19 (11)	06:50 08:17 (11)	06:05 08:17 (11)	06:14 08:26 (11)	05:36 08:26 (11)	05:24 08:26 (11)	05:49 (10)
	16:57 132	10:31 (11) 17:36 142	10:39 (11) 18:09 90	09:56 (11) 19:43 90	20:14 20:14	32 06:29 (10) 20:36	56 06:45 (10)
20	07:21 08:20 (11)	06:48 08:16 (11)	06:04 08:16 (11)	06:13 08:28 (11)	05:35 08:28 (11)	05:24 08:28 (11)	05:49 (10)
	16:58 130	10:30 (11) 17:37 142	10:38 (11) 18:10 84	09:52 (11) 19:44 84	20:15 20:15	34 06:30 (10) 20:36	56 06:45 (10)
21	07:21 08:20 (11)	06:47 08:16 (11)	06:02 08:16 (11)	06:11 08:29 (11)	05:35 08:29 (11)	05:24 08:29 (11)	05:49 (10)
	16:59 132	10:32 (11) 17:38 142	10:38 (11) 18:11 82	09:51 (11) 19:45 82	20:16 20:16	36 06:31 (10) 20:36	56 06:45 (10)
22	07:20 08:19 (11)	06:46 08:17 (11)	06:00 08:17 (11)	06:10 08:31 (11)	05:34 08:31 (11)	05:24 08:31 (11)	05:49 (10)
	17:01 134	10:33 (11) 17:40 140	10:37 (11) 18:12 76	09:47 (11) 19:46 76	20:17 20:17	38 06:33 (10) 20:36	56 06:45 (10)
23	07:19 08:18 (11)	06:44 08:17 (11)	05:59 08:17 (11)	06:08 08:31 (11)	05:33 08:31 (11)	05:25 08:31 (11)	05:49 (10)
	17:02 136	10:34 (11) 17:41 140	10:37 (11) 18:13 72	09:43 (11) 19:47 72	20:18 20:18	40 06:34 (10) 20:37	56 06:45 (10)
24	07:19 08:19 (11)	06:43 08:16 (11)	05:57 08:16 (11)	06:07 08:34 (11)	05:32 08:34 (11)	05:25 08:34 (11)	05:50 (10)
	17:03 134	10:33 (11) 17:42 140	10:36 (11) 18:14 68	09:42 (11) 19:48 68	20:19 20:19	42 06:35 (10) 20:37	56 06:46 (10)
25	07:18 08:19 (11)	06:41 08:16 (11)	05:55 08:16 (11)	06:05 08:34 (11)	05:31 08:34 (11)	05:25 08:34 (11)	05:50 (10)
	17:04 136	10:35 (11) 17:43 138	10:34 (11) 18:15 64	09:38 (11) 19:49 64	20:20 20:20	42 06:35 (10) 20:37	56 06:46 (10)
26	07:17 08:18 (11)	06:40 08:17 (11)	05:54 08:17 (11)	06:04 08:36 (11)	05:31 08:36 (11)	05:25 08:36 (11)	05:50 (10)
	17:06 138	10:36 (11) 17:44 138	10:35 (11) 18:16 58	09:34 (11) 19:50 58	20:21 20:21	44 06:36 (10) 20:37	56 06:46 (10)
27	07:16 08:19 (11)	06:38 08:17 (11)	05:52 08:17 (11)	06:02 08:38 (11)	05:30 08:38 (11)	05:26 08:38 (11)	05:51 (10)
	17:07 136	10:35 (11) 17:46 136	10:33 (11) 18:17 52	09:30 (11) 19:51 52	20:22 20:22	46 06:37 (10) 20:37	56 06:47 (10)
28	07:15 08:18 (11)	06:37 08:18 (11)	05:50 08:18 (11)	06:01 08:41 (11)	05:29 08:41 (11)	05:26 08:41 (11)	05:51 (10)
	17:08 138	10:36 (11) 17:47 134	10:32 (11) 18:19 44	09:25 (11) 19:52 44	20:23 20:23	46 06:37 (10) 20:37	56 06:47 (10)
29	07:14 08:19 (11)	06:36 08:19 (11)	05:48 08:19 (11)	05:59 09:45 (11)	05:29 09:45 (11)	05:27 09:45 (11)	05:52 (10)
	17:09 138	10:37 (11) 17:48 138	10:31 (11) 18:20 36	09:21 (11) 19:53 36	20:24 20:24	48 06:38 (10) 20:37	56 06:48 (10)
30	07:14 08:18 (11)	06:35 08:18 (11)	05:47 08:18 (11)	05:58 09:49 (11)	05:28 09:49 (11)	05:27 09:49 (11)	05:50 (10)
	17:11 140	10:38 (11) 17:49 140	10:30 (11) 18:21 26	09:15 (11) 19:55 26	20:25 20:25	48 06:38 (10) 20:37	56 06:46 (10)
31	07:13 08:17 (11)	06:34 08:17 (11)	05:46 08:17 (11)	05:57 09:58 (11)	05:28 09:58 (11)	05:27 09:58 (11)	05:50 (10)
	17:12 140	10:37 (11) 17:50 140	10:29 (11) 18:22 6	09:04 (11) 19:56 6	20:26 20:26	50 06:39 (10) 20:37	56 06:46 (10)
Potential sun hours	296	296	369	399	450	454	
Total, worst case	4068	3972	2842	399	450	682	1654

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:  
**OMBRA**

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24/04/2020 08:06 / 70

Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** AR - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

**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

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

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

	July	August	September	October	November	December					
1	05:28 20:37	05:50 (10) 06:46 (10)	05:52 20:17	06:24 19:33	06:54 18:42	09:01 (11) 10:51 (11)	06:29 16:55	07:45 (11) 10:11 (11)	07:05 16:30	08:03 (11) 122	10:05 (11)
2	05:28 20:37	05:51 (10) 06:47 (10)	05:53 20:16	06:25 19:32	06:55 18:40	09:00 (11) 10:54 (11)	06:31 16:53	07:47 (11) 10:11 (11)	07:06 16:29	08:02 (11) 124	10:06 (11)
3	05:29 20:37	05:51 (10) 06:47 (10)	05:54 20:15	06:26 19:30	06:56 18:39	08:59 (11) 10:55 (11)	06:32 16:52	07:46 (11) 10:10 (11)	07:07 16:29	08:03 (11) 122	10:05 (11)
4	05:29 20:36	05:52 (10) 06:48 (10)	05:55 20:14	06:27 19:29	06:58 18:37	08:58 (11) 10:56 (11)	06:33 16:51	07:47 (11) 10:11 (11)	07:08 16:29	08:04 (11) 122	10:06 (11)
5	05:30 20:36	05:53 (10) 06:47 (10)	05:56 20:13	06:28 19:27	06:59 18:35	08:57 (11) 10:57 (11)	06:34 16:50	07:46 (11) 10:10 (11)	07:09 16:29	08:05 (11) 120	10:05 (11)
6	05:30 20:36	05:53 (10) 06:47 (10)	05:57 20:12	06:29 19:25	07:00 18:34	08:56 (11) 10:58 (11)	06:36 16:49	07:48 (11) 10:10 (11)	07:10 16:28	08:06 (11) 120	10:06 (11)
7	05:31 20:36	05:54 (10) 06:48 (10)	05:58 20:10	06:30 19:23	07:01 18:32	08:55 (11) 10:59 (11)	06:37 16:47	07:47 (11) 10:09 (11)	07:11 16:28	08:07 (11) 130	10:07 (11)
8	05:32 20:35	05:54 (10) 06:46 (10)	05:59 20:09	06:31 19:22	07:02 18:30	08:54 (11) 11:00 (11)	06:38 16:46	07:48 (11) 10:10 (11)	07:12 16:28	08:08 (11) 134	10:08 (11)
9	05:32 20:35	05:55 (10) 06:47 (10)	06:00 20:08	06:32 19:20	07:03 18:29	08:53 (11) 11:01 (11)	06:39 16:45	07:48 (11) 10:10 (11)	07:13 16:28	08:09 (11) 136	10:09 (11)
10	05:33 20:34	05:56 (10) 06:48 (10)	06:01 20:07	06:33 19:18	07:04 18:27	08:52 (11) 11:02 (11)	06:40 16:44	07:49 (11) 10:09 (11)	07:14 16:28	08:08 (11) 140	10:10 (11)
11	05:34 20:34	05:56 (10) 06:46 (10)	06:02 20:05	06:34 19:17	07:05 18:25	08:52 (11) 11:04 (11)	06:42 16:43	07:48 (11) 10:08 (11)	07:15 16:28	08:09 (11) 142	10:11 (11)
12	05:34 20:34	05:57 (10) 06:47 (10)	06:03 20:04	06:35 19:15	07:06 18:24	08:51 (11) 11:05 (11)	06:43 16:42	07:50 (11) 10:10 (11)	07:15 16:28	08:10 (11) 140	10:11 (11)
13	05:35 20:33	05:58 (10) 06:46 (10)	06:04 20:02	06:36 19:13	07:07 18:22	08:50 (11) 11:04 (11)	06:44 16:41	07:51 (11) 10:09 (11)	07:16 16:29	08:10 (11) 142	10:11 (11)
14	05:36 20:33	05:59 (10) 06:47 (10)	06:05 20:01	06:37 19:11	07:08 18:21	08:49 (11) 11:05 (11)	06:45 16:40	07:50 (11) 10:08 (11)	07:17 16:29	08:11 (11) 142	10:11 (11)
15	05:37 20:32	05:59 (10) 06:45 (10)	06:06 20:00	06:38 19:10	07:10 18:19	08:50 (11) 11:06 (11)	06:46 16:39	07:52 (11) 10:08 (11)	07:18 16:29	08:12 (11) 146	10:12 (11)
16	05:37 20:31	06:00 (10) 06:46 (10)	06:07 19:58	06:39 19:08	07:11 18:17	08:49 (11) 11:07 (11)	06:48 16:38	07:51 (11) 10:09 (11)	07:18 16:29	08:13 (11) 144	10:13 (11)
17	05:38 20:31	06:01 (10) 06:45 (10)	06:08 19:57	06:40 19:06	07:12 18:16	08:49 (11) 11:07 (11)	06:49 16:38	07:52 (11) 10:08 (11)	07:19 16:29	08:13 (11) 144	10:13 (11)
18	05:39 20:30	06:02 (10) 06:46 (10)	06:09 19:55	06:41 19:05	07:13 18:14	08:48 (11) 11:08 (11)	06:50 16:37	07:53 (11) 10:07 (11)	07:20 16:30	08:14 (11) 146	10:14 (11)
19	05:40 20:29	06:03 (10) 06:45 (10)	06:10 19:54	06:42 19:03	07:14 18:13	08:47 (11) 11:09 (11)	06:51 16:36	07:53 (11) 10:09 (11)	07:20 16:30	08:14 (11) 146	10:14 (11)
20	05:41 20:29	06:03 (10) 06:43 (10)	06:11 19:52	06:43 19:01	07:15 18:11	08:48 (11) 11:08 (11)	06:52 16:35	07:54 (11) 10:08 (11)	07:21 16:31	08:15 (11) 146	10:15 (11)
21	05:42 20:28	06:04 (10) 06:44 (10)	06:12 19:51	06:44 18:59	07:16 18:10	08:47 (11) 11:09 (11)	06:54 16:35	07:55 (11) 10:07 (11)	07:22 16:31	08:15 (11) 146	10:15 (11)
22	05:43 20:27	06:05 (10) 06:43 (10)	06:13 19:49	06:45 18:58	07:18 18:08	08:47 (11) 11:09 (11)	06:55 16:34	07:56 (11) 10:06 (11)	07:22 16:31	08:16 (11) 146	10:16 (11)
23	05:43 20:26	06:06 (10) 06:42 (10)	06:14 19:48	06:46 18:56	07:19 18:07	08:46 (11) 11:10 (11)	06:56 16:33	07:56 (11) 10:05 (11)	07:23 16:32	08:16 (11) 146	10:16 (11)
24	05:44 20:25	06:07 (10) 06:41 (10)	06:15 19:46	06:47 18:54	07:20 18:05	08:47 (11) 11:09 (11)	06:57 16:33	07:57 (11) 10:07 (11)	07:23 16:33	08:17 (11) 146	10:17 (11)
25	05:45 20:24	06:08 (10) 06:40 (10)	06:16 19:45	06:48 18:52	07:21 17:04	08:46 (11) 10:10 (11)	06:58 16:32	07:58 (11) 10:06 (11)	07:24 16:33	08:17 (11) 146	10:17 (11)
26	05:46 20:24	06:09 (10) 06:39 (10)	06:17 19:43	06:49 18:51	07:22 17:03	08:45 (11) 10:10 (11)	06:59 16:32	07:59 (11) 10:07 (11)	07:24 16:34	08:17 (11) 146	10:17 (11)
27	05:47 20:23	06:10 (10) 06:38 (10)	06:18 19:42	06:50 18:49	07:23 17:01	08:44 (11) 10:11 (11)	07:01 16:31	07:58 (11) 10:06 (11)	07:24 16:34	08:18 (11) 144	10:18 (11)
28	05:48 20:22	06:11 (10) 06:35 (10)	06:19 19:40	06:51 18:47	07:25 17:00	08:43 (11) 10:10 (11)	07:02 16:31	08:00 (11) 10:06 (11)	07:25 16:35	08:18 (11) 146	10:18 (11)
29	05:49 20:21	06:11 (10) 06:33 (10)	06:20 19:38	06:52 18:46	07:26 16:58	08:42 (11) 10:09 (11)	07:03 16:30	08:01 (11) 10:05 (11)	07:25 16:36	08:18 (11) 144	10:18 (11)
30	05:50 20:20	06:14 (10) 06:30 (10)	06:21 19:37	06:53 18:44	07:27 16:57	08:41 (11) 10:11 (11)	07:04 16:30	08:02 (11) 10:06 (11)	07:25 16:37	08:18 (11) 142	10:19 (11)
31	05:51 20:18	06:21 (10) 06:25 (10)	06:23 19:35		06:54 16:56	08:40 (11) 10:10 (11)	07:05 16:30		07:25 16:37	08:18 (11) 142	10:19 (11)
Potential sun hours	461	429	375	345	297	286					
Total, worst case	1304		1328	4156	4084	4302					

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:  
OMBRA

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24/04/2020 08:06 / 71

Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AS - Shadow Receptor: 1.0 x 1.0 Azimuth: 200.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:38	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	06:29 16:55	07:05 16:30
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	06:25 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	05:29 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 16:28
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	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	05:25 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 20:34	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	05:44 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 16:28
13	07:24 16:50	06:58 17:28	06:16 18:02	06:24 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 16:29
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 19:11	07:08 18:21	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	05:37 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 16:54	06:54 17:32	06:11 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 16:30
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	06:05 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	06:13 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 16:31
21	07:21 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	06:54 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 20:36	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	05:43 20:26	06:14 19:48	06:46 18:56	07:19 18:07	06:56 16:33	07:23 16:32
24	07:19 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 18:05	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	07:24 16:33
26	07:17 17:06	06:40 17:44	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	06:59 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	06:18 19:42	06:50 18:49	06:23 17:01	07:01 16:31	07:24 16:34
28	07:15 17:08	06:37 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 18:46	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 20:18	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												

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AT - Shadow Receptor: 1.0 x 1.0 Azimuth: 140.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:26 16:38	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 19:33	06:54 18:42	06:29 16:55	07:05 16:30
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	06:25 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	05:29 20:37	05:54 20:15	06:26 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 17:52	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 16:28
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	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	05:25 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 20:34	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	05:44 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 16:28
13	07:24 16:50	06:58 17:28	06:16 18:02	06:24 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 16:29
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 19:11	07:08 18:21	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	05:37 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 16:54	06:54 17:32	06:11 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 18:08	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	06:05 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	06:13 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 16:31
21	07:21 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	06:54 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 20:36	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	05:43 20:26	06:14 19:48	06:46 18:56	07:19 18:07	06:56 16:33	07:23 16:32
24	07:19 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 18:05	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	07:24 16:33
26	07:17 17:06	06:40 17:44	05:54 18:16	06:04 19:50	05:31 20:21	05:26 20:37	05:46 20:23	06:17 19:43	06:49 18:51	06:22 17:03	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 20:22	05:26 20:37	05:47 20:23	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	06:37 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 18:46	06:26 16:58	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	05:58 20:25	05:28 20:25	05:28 20:25	05:51 20:18	06:23 19:35	06:28 18:56	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												

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:  
OMBRA

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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AU - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	January	February	March	April	May	June
1	07:26 12:38 (12)	07:12 12:38 (12)	06:35 12:46 (12)	06:43 12:46 (12)	05:57 15:06 (12)	05:27 19:57
	16:38 156	15:14 (12) 17:13 174	15:32 (12) 17:48 164	15:30 (12) 19:23 40	15:46 (12) 19:56	20:26
2	07:26 12:38 (12)	07:11 12:39 (12)	06:33 12:47 (12)	06:42 12:47 (12)	05:55 15:12 (12)	05:27 19:57
	16:39 156	15:14 (12) 17:14 174	15:33 (12) 17:49 162	15:29 (12) 19:24 30	15:42 (12) 19:57	20:27
3	07:26 12:38 (12)	07:10 12:40 (12)	06:32 12:47 (12)	06:40 12:47 (12)	05:54 15:21 (12)	05:26 19:58
	16:40 156	15:14 (12) 17:16 172	15:32 (12) 17:50 162	15:29 (12) 19:25 16	15:37 (12) 19:58	20:27
4	07:26 12:38 (12)	07:09 12:39 (12)	06:30 12:49 (12)	06:38 12:49 (12)	05:53 15:27 (12)	05:26 19:59
	16:41 158	15:16 (12) 17:17 174	15:33 (12) 17:52 158	15:27 (12) 19:26	19:59	20:28
5	07:26 12:38 (12)	07:08 12:40 (12)	06:29 12:50 (12)	06:37 12:50 (12)	05:52 15:28 (12)	05:26 19:59
	16:42 158	15:16 (12) 17:18 174	15:34 (12) 17:53 158	15:28 (12) 19:27	20:00	20:29
6	07:26 12:38 (12)	07:06 12:38 (12)	06:27 12:52 (12)	06:35 12:52 (12)	05:50 15:26 (12)	05:25 19:58
	16:43 160	15:18 (12) 17:20 174	15:32 (12) 17:54 154	15:26 (12) 19:28	20:01	20:29
7	07:26 12:38 (12)	07:05 12:39 (12)	06:25 12:52 (12)	06:33 12:52 (12)	05:49 15:26 (12)	05:25 19:59
	16:44 160	15:18 (12) 17:21 174	15:33 (12) 17:55 154	15:26 (12) 19:30	20:02	20:30
8	07:26 12:40 (12)	07:04 12:38 (12)	06:24 12:55 (12)	06:32 12:55 (12)	05:48 15:25 (12)	05:25 19:58
	16:45 158	15:18 (12) 17:22 176	15:34 (12) 17:56 150	15:25 (12) 19:31	20:03	20:31
9	07:25 12:40 (12)	07:03 12:39 (12)	06:22 12:57 (12)	06:30 12:57 (12)	05:47 15:25 (12)	05:24 19:57
	16:46 160	15:20 (12) 17:23 176	15:35 (12) 17:57 148	15:25 (12) 19:32	20:04	20:31
10	07:25 12:39 (12)	07:02 12:40 (12)	06:21 12:59 (12)	06:28 12:59 (12)	05:46 15:23 (12)	05:24 19:56
	16:47 160	15:19 (12) 17:25 174	15:34 (12) 17:59 144	15:23 (12) 19:33	20:05	20:32
11	07:25 12:39 (12)	07:01 12:38 (12)	06:19 13:00 (12)	06:27 13:00 (12)	05:44 15:22 (12)	05:24 19:55
	16:48 162	15:21 (12) 17:26 176	15:34 (12) 18:00 142	15:22 (12) 19:34	20:06	20:32
12	07:25 12:39 (12)	06:59 12:39 (12)	06:17 13:02 (12)	06:25 13:02 (12)	05:43 15:21 (12)	05:24 19:54
	16:49 162	15:21 (12) 17:27 176	15:35 (12) 18:01 140	15:22 (12) 19:35	20:07	20:33
13	07:24 12:40 (12)	06:58 12:40 (12)	06:16 13:04 (12)	06:24 13:04 (12)	05:42 15:20 (12)	05:24 19:53
	16:50 162	15:22 (12) 17:28 174	15:34 (12) 18:02 136	15:20 (12) 19:36	20:08	20:33
14	07:24 12:40 (12)	06:57 12:38 (12)	06:14 13:07 (12)	06:22 13:07 (12)	05:41 15:19 (12)	05:24 19:52
	16:51 162	15:22 (12) 17:30 176	15:34 (12) 18:03 132	15:19 (12) 19:37	20:09	20:34
15	07:24 12:39 (12)	06:55 12:39 (12)	06:12 13:09 (12)	06:20 13:09 (12)	05:40 15:19 (12)	05:24 19:51
	16:52 164	15:23 (12) 17:31 176	15:35 (12) 18:04 130	15:19 (12) 19:38	20:10	20:34
16	07:23 12:39 (12)	06:54 12:40 (12)	06:11 13:13 (12)	06:19 13:13 (12)	05:39 15:17 (12)	05:24 19:50
	16:54 164	15:23 (12) 17:32 174	15:34 (12) 18:05 124	15:17 (12) 19:39	20:11	20:35
17	07:23 12:40 (12)	06:53 12:40 (12)	06:09 13:16 (12)	06:17 13:16 (12)	05:38 15:16 (12)	05:24 19:49
	16:55 164	15:24 (12) 17:33 174	15:34 (12) 18:06 120	15:16 (12) 19:40	20:12	20:35
18	07:22 12:40 (12)	06:51 12:41 (12)	06:07 13:18 (12)	06:16 13:18 (12)	05:37 15:15 (12)	05:24 19:48
	16:56 166	15:26 (12) 17:35 174	15:35 (12) 18:08 118	15:16 (12) 19:42	20:13	20:35
19	07:22 12:39 (12)	06:50 12:39 (12)	06:05 13:20 (12)	06:14 13:20 (12)	05:36 15:14 (12)	05:24 19:47
	16:57 166	15:25 (12) 17:36 174	15:33 (12) 18:09 114	15:14 (12) 19:43	20:14	20:36
20	07:21 12:40 (12)	06:48 12:40 (12)	06:04 13:24 (12)	06:13 13:24 (12)	05:35 15:13 (12)	05:24 19:46
	16:58 166	15:26 (12) 17:37 174	15:34 (12) 18:10 108	15:12 (12) 19:44	20:15	20:36
21	07:21 12:40 (12)	06:47 12:40 (12)	06:02 13:27 (12)	06:11 13:27 (12)	05:35 15:11 (12)	05:24 19:45
	16:59 168	15:28 (12) 17:38 172	15:32 (12) 18:11 104	15:11 (12) 19:45	20:16	20:36
22	07:20 12:39 (12)	06:46 12:41 (12)	06:00 13:31 (12)	06:10 13:31 (12)	05:34 15:10 (12)	05:24 19:44
	17:01 168	15:27 (12) 17:40 172	15:33 (12) 18:12 98	15:09 (12) 19:46	20:17	20:36
23	07:19 12:40 (12)	06:44 12:41 (12)	05:59 13:33 (12)	06:08 13:33 (12)	05:33 15:09 (12)	05:25 19:43
	17:02 168	15:28 (12) 17:41 172	15:33 (12) 18:13 94	15:07 (12) 19:47	20:18	20:37
24	07:19 12:39 (12)	06:43 12:42 (12)	05:57 13:38 (12)	06:07 13:38 (12)	05:32 15:08 (12)	05:25 19:42
	17:03 170	15:29 (12) 17:42 170	15:32 (12) 18:14 88	15:06 (12) 19:48	20:19	20:37
25	07:18 12:39 (12)	06:41 12:42 (12)	05:55 13:40 (12)	06:05 13:40 (12)	05:31 15:07 (12)	05:25 19:41
	17:04 170	15:29 (12) 17:43 170	15:32 (12) 18:15 84	15:04 (12) 19:49	20:20	20:37
26	07:17 12:40 (12)	06:40 12:43 (12)	05:54 13:44 (12)	06:04 13:44 (12)	05:31 15:06 (12)	05:25 19:40
	17:06 170	15:30 (12) 17:44 168	15:31 (12) 18:16 78	15:02 (12) 19:50	20:21	20:37
27	07:16 12:39 (12)	06:38 12:43 (12)	05:52 13:46 (12)	06:02 13:46 (12)	05:30 15:05 (12)	05:26 19:39
	17:07 172	15:31 (12) 17:46 168	15:31 (12) 18:17 74	15:00 (12) 19:51	20:22	20:37
28	07:15 12:40 (12)	06:37 12:46 (12)	05:50 13:51 (12)	06:01 13:51 (12)	05:29 15:04 (12)	05:26 19:38
	17:08 170	15:30 (12) 17:47 164	15:30 (12) 18:19 68	14:59 (12) 19:52	20:23	20:37
29	07:14 12:39 (12)	06:36 12:46 (12)	05:49 14:53 (12)	05:59 14:53 (12)	05:29 15:03 (12)	05:27 19:37
	17:09 172	15:31 (12) 17:48 162	15:30 (12) 18:20 62	15:55 (12) 19:53	20:24	20:37
30	07:14 12:40 (12)	06:35 12:47 (12)	05:48 14:57 (12)	05:58 14:57 (12)	05:28 15:02 (12)	05:27 19:36
	17:11 172	15:32 (12) 17:49 160	15:30 (12) 18:21 56	15:53 (12) 19:55	20:25	20:37
31	07:13 12:39 (12)	06:34 12:48 (12)	05:47 15:02 (12)	05:57 15:02 (12)	05:28 15:01 (12)	05:27 19:35
	17:12 172	15:31 (12) 17:50 158	15:29 (12) 18:22 50	15:50 (12) 19:56	20:26	20:37
Potential sun hours	296	296	369	399	450	454
Total, worst case	5092	4846	3672	86		

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)	Last time (hh:mm) with flicker (WTG causing flicker last time)
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Project:  
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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AU - Shadow Receptor: 1.0 x 1.0 Azimuth: 45.0° Slope: 90.0°

#### 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

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

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

	July	August	September	October	November	December
1	05:28 20:37	05:52 20:17	06:24 19:33	06:54 18:42	13:43 (12) 16:01 (12)	06:29 15:03 (12)
2	05:28 20:37	05:53 20:16	06:25 19:32	06:55 18:40	138 162	16:01 (12) 16:53 (12)
3	05:29 20:37	05:54 20:15	06:26 19:30	06:56 18:39	142 144	16:02 (12) 16:52 (12)
4	05:29 20:36	05:55 20:14	06:27 19:29	06:58 18:37	144 146	16:01 (12) 16:51 (12)
5	05:30 20:36	05:56 20:13	06:28 19:27	06:59 18:35	144 148	16:02 (12) 16:50 (12)
6	05:30 20:36	05:57 20:12	06:29 19:25	07:00 18:34	148 152	16:03 (12) 16:49 (12)
7	05:31 20:36	05:58 20:10	06:30 19:23	07:01 18:32	152 154	16:04 (12) 16:47 (12)
8	05:32 20:35	05:59 20:09	06:31 19:22	07:02 18:30	154 156	16:05 (12) 16:46 (12)
9	05:32 20:35	06:00 20:08	06:32 19:20	07:03 18:29	156 158	16:06 (12) 16:45 (12)
10	05:33 20:34	06:01 20:07	06:33 19:18	07:04 18:27	158 160	16:07 (12) 16:44 (12)
11	05:34 20:34	06:02 20:05	06:34 19:17	07:05 18:25	160 162	16:08 (12) 16:43 (12)
12	05:34 20:34	06:03 20:04	06:35 19:15	07:06 18:24	162 162	16:09 (12) 16:42 (12)
13	05:35 20:33	06:04 20:02	06:36 19:13	07:07 18:22	162 166	16:10 (12) 16:41 (12)
14	05:36 20:33	06:05 20:01	06:37 19:11	07:08 18:21	166 166	16:11 (12) 16:40 (12)
15	05:37 20:32	06:06 20:00	06:38 19:10	07:10 18:19	166 168	16:12 (12) 16:39 (12)
16	05:37 20:31	06:07 19:58	06:39 19:08	07:11 18:17	168 168	16:13 (12) 16:38 (12)
17	05:38 20:31	06:08 19:57	06:40 19:06	07:12 18:16	168 170	16:14 (12) 16:38 (12)
18	05:39 20:30	06:09 19:55	06:41 19:05	07:13 18:14	170 170	16:15 (12) 16:37 (12)
19	05:40 20:29	06:10 19:54	06:42 19:03	07:14 18:13	170 170	16:16 (12) 16:36 (12)
20	05:41 20:29	06:11 19:52	06:43 19:01	07:15 18:11	170 172	16:17 (12) 16:35 (12)
21	05:42 20:28	06:12 19:51	06:44 18:59	07:16 18:10	172 172	16:18 (12) 16:34 (12)
22	05:43 20:27	06:13 19:49	06:45 18:58	07:18 18:08	172 174	16:19 (12) 16:33 (12)
23	05:43 20:26	06:14 19:48	06:46 18:56	07:19 18:07	174 174	16:34 (12) 16:33 (12)
24	05:44 20:25	06:15 19:46	06:47 18:54	07:20 18:05	174 174	16:34 (12) 16:33 (12)
25	05:45 20:24	06:16 19:45	06:48 18:52	07:21 18:04	174 174	16:34 (12) 16:32 (12)
26	05:46 20:24	06:17 19:43	06:49 18:51	07:22 18:03	174 174	16:33 (12) 16:32 (12)
27	05:47 20:23	06:18 19:42	06:50 18:49	07:23 18:02	174 174	16:33 (12) 16:31 (12)
28	05:48 20:22	06:19 19:40	06:51 18:47	07:24 18:01	174 176	16:32 (12) 16:31 (12)
29	05:49 20:21	06:20 19:38	06:52 18:46	07:25 18:00	176 174	16:31 (12) 16:30 (12)
30	05:50 20:20	06:22 19:37	06:53 18:44	07:26 18:00	176 174	16:31 (12) 16:30 (12)
31	05:51 20:18	06:23 19:35		07:27 18:00	176 176	16:31 (12) 16:30 (12)
Potential sun hours	461	429	375	345	297	286
Total, worst case			1894	5088	5090	4848

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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Calculated:  
24/04/2020 07:51/2.4.0.62

### SHADOW - Calendar

Calculation: SHADOW\_NORDEX Shadow receptor: AV - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

#### 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

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

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

	January		February		March		April		May		June							
1	07:26	08:20 (12)	07:12	08:14 (12)	06:35	08:10 (12)	06:43	09:24 (12)	05:57	06:16 (11)	05:27	06:15 (11)						
	16:38	116	10:16 (12)	17:13	150	10:44 (12)	17:48	154	10:44 (12)	19:23	78	10:42 (12)	19:56	42	06:58 (11)	20:26	42	06:57 (11)
2	07:26	08:20 (12)	07:11	08:15 (12)	06:33	08:11 (12)	06:42	09:24 (12)	05:55	06:15 (11)	05:27	06:15 (11)						
	16:39	118	10:18 (12)	17:14	150	10:45 (12)	17:49	152	10:43 (12)	19:24	74	10:38 (12)	19:57	44	06:59 (11)	20:27	42	06:57 (11)
3	07:26	08:20 (12)	07:10	08:14 (12)	06:32	08:11 (12)	06:40	09:27 (12)	05:54	06:14 (11)	05:26	05:48 (10)						
	16:40	118	10:18 (12)	17:16	152	10:46 (12)	17:50	152	10:43 (12)	19:25	68	10:35 (12)	19:58	46	07:00 (11)	20:27	44	06:56 (11)
4	07:26	08:20 (12)	07:09	08:15 (12)	06:30	08:09 (12)	06:38	09:27 (12)	05:53	06:12 (11)	05:26	05:48 (10)						
	16:41	120	10:20 (12)	17:17	150	10:45 (12)	17:52	152	10:41 (12)	19:26	66	10:33 (12)	19:59	48	07:00 (11)	20:28	44	06:56 (11)
5	07:26	08:20 (12)	07:08	08:14 (12)	06:29	08:10 (12)	06:37	09:29 (12)	05:52	06:11 (11)	05:26	05:48 (10)						
	16:42	120	10:20 (12)	17:18	152	10:46 (12)	17:53	150	10:40 (12)	19:27	60	10:29 (12)	20:00	50	07:01 (11)	20:29	42	06:56 (11)
6	07:26	08:20 (12)	07:06	08:14 (12)	06:27	08:10 (12)	06:35	09:32 (12)	05:50	06:10 (11)	05:25	05:47 (10)						
	16:43	122	10:22 (12)	17:20	152	10:46 (12)	17:54	148	10:38 (12)	19:28	54	10:26 (12)	20:01	50	07:00 (11)	20:29	44	06:55 (11)
7	07:26	08:20 (12)	07:05	08:13 (12)	06:25	08:10 (12)	06:33	09:34 (12)	05:49	06:09 (11)	05:25	05:47 (10)						
	16:44	122	10:22 (12)	17:21	154	10:47 (12)	17:55	148	10:38 (12)	19:30	48	10:22 (12)	20:02	52	07:01 (11)	20:30	44	06:55 (11)
8	07:26	08:20 (12)	07:04	08:14 (12)	06:24	08:11 (12)	06:32	09:36 (12)	05:48	06:08 (11)	05:25	05:47 (10)						
	16:45	124	10:24 (12)	17:22	154	10:48 (12)	17:56	146	10:37 (12)	19:31	40	10:16 (12)	20:03	54	07:02 (11)	20:31	44	06:55 (11)
9	07:25	08:20 (12)	07:03	08:13 (12)	06:22	08:11 (12)	06:30	09:39 (12)	05:47	06:09 (11)	05:24	05:47 (10)						
	16:46	124	10:24 (12)	17:23	154	10:47 (12)	17:57	144	10:35 (12)	19:32	34	10:13 (12)	20:04	52	07:01 (11)	20:31	44	06:55 (11)
10	07:25	08:19 (12)	07:02	08:14 (12)	06:21	08:11 (12)	06:28	09:45 (12)	05:46	06:08 (11)	05:24	05:46 (10)						
	16:47	126	10:25 (12)	17:25	154	10:48 (12)	17:59	142	10:33 (12)	19:33	20	10:05 (12)	20:05	54	07:02 (11)	20:32	44	06:54 (11)
11	07:25	08:19 (12)	07:01	08:12 (12)	06:19	08:12 (12)	06:27	09:45 (12)	05:44	06:09 (11)	05:24	05:46 (10)						
	16:48	128	10:27 (12)	17:26	156	10:48 (12)	18:00	140	10:32 (12)	19:34	20:06	52	07:01 (11)	20:32	44	06:54 (11)		
12	07:25	08:19 (12)	06:59	08:13 (12)	06:17	08:12 (12)	06:25	09:45 (12)	05:43	06:08 (11)	05:24	05:46 (10)						
	16:49	128	10:27 (12)	17:27	156	10:49 (12)	18:01	138	10:30 (12)	19:35	20:07	54	07:02 (11)	20:33	44	06:54 (11)		
13	07:24	08:20 (12)	06:58	08:12 (12)	06:16	08:12 (12)	06:24	09:45 (12)	05:42	06:09 (11)	05:24	05:46 (10)						
	16:50	128	10:28 (12)	17:28	158	10:50 (12)	18:02	136	10:28 (12)	19:36	20:08	52	07:01 (11)	20:33	44	06:54 (11)		
14	07:24	08:20 (12)	06:57	08:12 (12)	06:14	08:11 (12)	06:22	09:45 (12)	05:41	06:08 (11)	05:24	05:46 (10)						
	16:51	130	10:30 (12)	17:30	156	10:48 (12)	18:03	136	10:27 (12)	19:37	20:09	54	07:02 (11)	20:34	42	06:52 (11)		
15	07:24	08:19 (12)	06:55	08:11 (12)	06:12	08:11 (12)	06:20	09:45 (12)	05:40	06:09 (11)	05:24	05:46 (10)						
	16:52	130	10:29 (12)	17:31	158	10:49 (12)	18:04	134	10:25 (12)	19:38	20:10	52	07:01 (11)	20:34	42	06:52 (11)		
16	07:23	08:19 (12)	06:54	08:12 (12)	06:11	08:13 (12)	06:19	09:45 (12)	05:39	06:08 (11)	05:24	05:46 (10)						
	16:54	132	10:31 (12)	17:32	158	10:50 (12)	18:05	128	10:21 (12)	19:39	20:11	52	07:00 (11)	20:35	42	06:52 (11)		
17	07:23	08:18 (12)	06:53	08:10 (12)	06:09	08:14 (12)	06:17	09:45 (12)	05:38	06:09 (11)	05:24	05:46 (10)						
	16:55	134	10:32 (12)	17:33	158	10:48 (12)	18:06	126	10:20 (12)	19:40	20:12	52	07:01 (11)	20:35	42	06:52 (11)		
18	07:22	08:18 (12)	06:51	08:11 (12)	06:07	08:14 (12)	06:16	09:45 (12)	05:37	06:08 (11)	05:24	05:46 (10)						
	16:56	136	10:34 (12)	17:35	158	10:49 (12)	18:08	124	10:18 (12)	19:42	20:13	52	07:00 (11)	20:35	40	06:52 (11)		
19	07:22	08:19 (12)	06:50	08:11 (12)	06:05	08:14 (12)	06:14	09:45 (12)	05:36	06:09 (11)	05:24	05:47 (10)						
	16:57	134	10:33 (12)	17:36	158	10:49 (12)	18:09	122	10:16 (12)	19:43	20:14	50	06:59 (11)	20:36	40	06:53 (11)		
20	07:21	08:18 (12)	06:48	08:10 (12)	06:04	08:14 (12)	06:13	09:45 (12)	05:35	06:08 (11)	05:24	05:47 (10)						
	16:58	136	10:34 (12)	17:37	158	10:48 (12)	18:10	120	10:14 (12)	19:44	20:15	52	07:00 (11)	20:36	40	06:53 (11)		
21	07:21	08:18 (12)	06:47	08:10 (12)	06:02	08:15 (12)	06:11	09:45 (12)	05:35	06:09 (11)	05:24	05:47 (10)						
	16:59	138	10:36 (12)	17:38	158	10:48 (12)	18:11	116	10:11 (12)	19:45	6	06:40 (11)	20:16	50	06:59 (11)	20:36	40	06:53 (11)
22	07:20	08:17 (12)	06:46	08:11 (12)	06:00	08:15 (12)	06:10	09:45 (12)	05:34	06:09 (11)	05:24	05:47 (10)						
	17:01	140	10:37 (12)	17:40	158	10:49 (12)	18:12	114	10:09 (12)	19:46	18	06:47 (11)	20:17	50	06:59 (11)	20:36	40	06:53 (11)
23	07:19	08:18 (12)	06:44	08:09 (12)	05:59	08:15 (12)	06:08	09:45 (12)	05:33	06:10 (11)	05:25	05:47 (10)						
	17:02	138	10:36 (12)	17:41	158	10:47 (12)	18:13	112	10:07 (12)	19:47	22	06:49 (11)	20:18	48	06:58 (11)	20:37	40	06:53 (11)
24	07:19	08:17 (12)	06:43	08:10 (12)	05:57	08:16 (12)	06:07	09:45 (12)	05:32	06:09 (11)	05:25	05:48 (10)						
	17:03	140	10:37 (12)	17:42	158	10:48 (12)	18:14	108	10:04 (12)	19:48	26	06:52 (11)	20:19	50	06:59 (11)	20:37	40	06:54 (11)
25	07:18	08:17 (12)	06:41	08:10 (12)	05:55	08:18 (12)	06:05	09:45 (12)	05:31	06:11 (11)	05:25	05:48 (10)						
	17:04	142	10:39 (12)	17:43	156	10:46 (12)	18:15	104	10:02 (12)	19:49	28	06:52 (11)	20:20	48	06:59 (11)	20:37	42	06:54 (11)
26	07:17	08:16 (12)	06:40	08:11 (12)	05:54	08:18 (12)	06:04	09:45 (12)	05:30	06:12 (11)	05:26	05:48 (10)						
	17:06	144	10:40 (12)	17:44	156	10:47 (12)	18:16	100	09:58 (12)	19:50	32	06:55 (11)	20:21	46	06:58 (11)	20:37	42	06:54 (11)
27	07:16	08:17 (12)	06:38	08:09 (12)	05:52	08:18 (12)	06:02	09:45 (12)	05:29	06:11 (11)	05:26	05:49 (10)						
	17:07	144	10:41 (12)	17:46	156	10:45 (12)	18:18	98	09:56 (12)	19:51	34	06:56 (11)	20:22	46	06:57 (11)	20:37	42	06:55 (11)
28	07:15	08:16 (12)	06:37	08:10 (12)	05:50	08:19 (12)	06:01	09:45 (12)	05:28	06:13 (11)	05:26	05:49 (10)						
	17:08	146	10:42 (12)	17:47	154	10:44 (12)	18:19	94	09:53 (12)	19:52	36	06:56 (11)	20:23	44	06:57 (11)	20:37	42	06:55 (11)
29	07:14	08:15 (12)	06:36	08:11 (12)	05:49	09:21 (12)	05:59	09:45 (12)	05:27	06:12 (11)	05:27	05:50 (10)						
	17:09	146	10:41 (12)	17:46	154	10:43 (12)	18:19	90	10:51 (12)	19:53	38	06:57 (11)	20:23	44	06:56 (11)	20:37	44	06:58 (11)
30	07:14	08:16 (12)	06:35	08:12 (12)	05:48	09:21 (12)	05:58	09:45 (12)	05:26	06:14 (11)	05:27	05:50 (10)						
	17:11	146	10:42 (12)	17:47	154	10:44 (12)	18:20	86	10:47 (12)	19:55	40	06:58 (11)	20:24	42	06:56 (11)	20:37	44	06:58 (11)
31	07:13	08:15 (12)	06:34	08:13 (12)	05:47	09:22 (12)	05:59	09:45 (12)	05:25	06:13 (11)	05:27	05:50 (10)						
	17:12	148	10:43 (12)	17:48	156	10:45 (12)	18:21	82	10:44 (12)	19:56	42	06:57 (11)	20:25	44	06:57 (11)	20:37	44	06:58 (11)
Potential sun hours	296		296		369		399		450		454							
Total, worst case	4098		4350		3896		822		1526		1270							

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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Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - Calendar**

**Calculation:** SHADOW\_NORDEX **Shadow receptor:** AV - Shadow Receptor: 1.0 x 1.0 Azimuth: 315.0° Slope: 90.0°

**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

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

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

	July	August	September	October	November	December				
1	05:28 20:37	05:50 (10) 05:52 (11)	05:52 06:18 (11)	06:24 07:12 (11)	06:54 18:42	08:51 (12) 16:55	07:41 (12) 16:30	07:05 16:30	08:01 (12) 10:09 (12)	
2	05:28 20:37	05:51 (10) 05:53 (11)	05:53 06:17 (11)	06:25 06:17 (11)	09:41 (12) 18:40	06:55 11:09 (12)	08:50 (12) 16:55	06:31 156	07:43 (12) 16:29	07:06 128
3	05:29 20:37	05:52 (10) 05:54 (11)	05:54 06:18 (11)	06:26 06:18 (11)	09:36 (12) 18:40	06:57 11:10 (12)	08:49 (12) 16:53	06:32 154	07:42 (12) 16:29	07:07 126
4	05:29 20:36	05:52 (10) 05:55 (11)	05:55 06:19 (11)	06:27 06:19 (11)	09:33 (12) 18:39	06:58 11:11 (12)	08:48 (12) 16:52	06:33 156	07:43 (12) 16:29	07:08 124
5	05:30 20:36	05:53 (10) 05:56 (11)	05:56 06:18 (11)	06:28 06:18 (11)	09:30 (12) 18:35	06:59 11:13 (12)	08:47 (12) 16:50	06:34 152	07:44 (12) 16:29	07:09 122
6	05:30 20:36	05:53 (10) 05:57 (11)	05:57 06:19 (11)	06:29 06:19 (11)	09:27 (12) 18:34	07:00 11:14 (12)	08:46 (12) 16:49	06:36 152	07:44 (12) 16:28	07:10 122
7	05:31 20:36	05:54 (10) 05:58 (11)	05:58 06:20 (11)	06:30 06:20 (11)	09:24 (12) 18:32	07:01 11:13 (12)	08:47 (12) 16:47	06:37 150	07:45 (12) 16:28	07:11 120
8	05:32 20:35	05:54 (10) 05:59 (11)	05:59 06:21 (11)	06:31 06:21 (11)	09:21 (12) 18:30	07:02 11:14 (12)	08:46 (12) 16:46	06:38 150	07:44 (12) 16:28	07:12 120
9	05:32 20:35	05:55 (10) 06:00 (11)	06:00 06:22 (11)	06:32 06:22 (11)	09:20 (12) 18:29	07:03 11:15 (12)	08:45 (12) 16:45	06:39 150	07:46 (12) 16:28	07:13 118
10	05:33 20:35	06:22 (11) 06:01 (11)	06:01 06:23 (11)	06:33 06:23 (11)	09:17 (12) 18:27	07:04 11:16 (12)	08:44 (12) 16:44	06:40 150	07:45 (12) 16:28	07:14 118
11	05:34 20:34	06:24 (11) 06:02 (11)	06:02 06:24 (11)	06:34 06:24 (11)	09:16 (12) 18:25	07:05 11:16 (12)	08:44 (12) 16:43	06:42 148	07:46 (12) 16:28	07:15 118
12	05:34 20:34	06:21 (11) 06:03 (11)	06:03 06:25 (11)	06:35 06:25 (11)	09:15 (12) 18:24	07:06 11:17 (12)	08:43 (12) 16:42	06:43 146	07:48 (12) 16:28	07:15 118
13	05:35 20:33	06:22 (11) 06:04 (11)	06:04 06:26 (11)	06:36 06:26 (11)	09:12 (12) 18:22	07:07 11:18 (12)	08:44 (12) 16:41	06:44 146	07:47 (12) 16:29	07:16 118
14	05:36 20:33	06:21 (11) 06:05 (11)	06:05 06:27 (11)	06:37 06:27 (11)	09:11 (12) 18:21	07:08 11:17 (12)	08:43 (12) 16:40	06:45 146	07:48 (12) 16:29	07:17 118
15	05:37 20:32	06:21 (11) 06:06 (11)	06:06 06:28 (11)	06:38 06:28 (11)	09:10 (12) 18:19	07:10 11:18 (12)	08:42 (12) 16:39	06:46 144	07:50 (12) 16:29	07:18 116
16	05:37 20:31	06:20 (11) 06:07 (11)	06:07 06:29 (11)	06:39 06:29 (11)	09:07 (12) 18:17	07:11 11:17 (12)	08:41 (12) 16:38	06:48 144	07:49 (12) 16:29	07:19 116
17	05:38 20:31	06:21 (11) 06:08 (11)	06:08 06:30 (11)	06:40 06:30 (11)	09:06 (12) 18:16	07:12 11:19 (12)	08:43 (12) 16:38	06:49 142	07:50 (12) 16:29	07:19 116
18	05:39 20:30	06:20 (11) 06:09 (11)	06:09 06:31 (11)	06:41 06:31 (11)	09:05 (12) 18:15	07:13 11:18 (12)	08:42 (12) 16:37	06:50 140	07:51 (12) 16:30	07:20 116
19	05:40 20:29	06:21 (11) 06:10 (11)	06:10 06:32 (11)	06:42 06:32 (11)	09:04 (12) 18:14	07:14 11:18 (12)	08:41 (12) 16:36	06:51 138	07:53 (12) 16:30	07:20 116
20	05:41 20:29	06:20 (11) 06:11 (11)	06:11 06:33 (11)	06:43 06:33 (11)	09:01 (12) 18:13	07:15 11:19 (12)	08:42 (12) 16:35	06:52 138	07:52 (12) 16:30	07:21 116
21	05:42 20:28	06:20 (11) 06:12 (11)	06:12 06:34 (11)	06:44 06:34 (11)	09:00 (12) 18:12	07:16 11:18 (12)	08:41 (12) 16:35	06:54 140	07:53 (12) 16:31	07:22 116
22	05:43 20:27	06:19 (11) 06:13 (11)	06:13 06:35 (11)	06:45 06:35 (11)	08:59 (12) 18:10	07:18 11:19 (12)	08:41 (12) 16:34	06:55 136	07:54 (12) 16:32	07:22 116
23	05:43 20:26	06:19 (11) 06:14 (11)	06:14 06:36 (11)	06:46 06:36 (11)	08:58 (12) 18:07	07:19 11:20 (12)	08:42 (12) 16:33	06:56 134	07:56 (12) 16:32	07:23 116
24	05:44 20:25	06:19 (11) 06:15 (11)	06:15 06:37 (11)	06:47 06:37 (11)	08:57 (12) 18:05	07:20 11:19 (12)	08:41 (12) 16:33	06:57 136	07:55 (12) 16:33	07:23 116
25	05:45 20:24	06:18 (11) 06:16 (11)	06:16 06:38 (11)	06:48 06:38 (11)	08:56 (12) 18:04	07:21 11:19 (12)	08:40 (12) 16:32	06:58 134	07:56 (12) 16:33	07:24 116
26	05:46 20:24	06:19 (11) 06:17 (11)	06:17 06:39 (11)	06:49 06:39 (11)	08:55 (12) 17:04	07:22 11:20 (12)	08:40 (12) 16:31	06:59 132	07:57 (12) 16:33	07:24 116
27	05:47 20:23	06:18 (11) 06:18 (11)	06:18 06:40 (11)	06:50 06:40 (11)	08:54 (12) 17:03	07:23 11:20 (12)	08:40 (12) 16:30	07:01 130	07:58 (12) 16:34	07:24 116
28	05:48 20:22	06:19 (11) 06:19 (11)	06:19 06:41 (11)	06:51 06:41 (11)	08:53 (12) 17:02	07:24 11:21 (12)	08:40 (12) 16:29	07:02 130	07:59 (12) 16:34	07:25 116
29	05:49 20:21	06:19 (11) 06:20 (11)	06:20 06:42 (11)	06:52 06:42 (11)	08:52 (12) 17:01	07:25 11:21 (12)	08:40 (12) 16:28	07:03 128	08:00 (12) 16:34	07:25 116
30	05:50 20:20	06:18 (11) 06:22 (11)	06:22 06:43 (11)	06:53 06:43 (11)	08:51 (12) 16:59	07:26 11:22 (12)	08:40 (12) 16:27	07:04 128	08:01 (12) 16:34	07:25 116
31	05:51 20:18	06:17 (11) 06:23 (11)	06:23 06:44 (11)	06:54 06:44 (11)	08:50 (12) 16:57	07:27 11:22 (12)	08:40 (12) 16:26	07:05 128	08:02 (12) 16:34	07:25 116
Potential sun hours	461	429	375	345	297	286				
Total, worst case	1464	862	2660	4738	4284	3670				

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:  
OMBRA

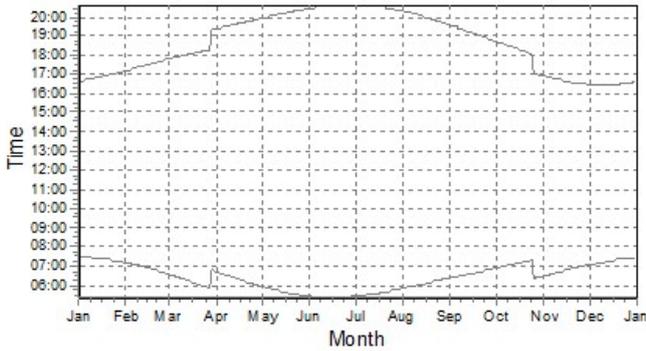
Printed/Page  
24/04/2020 08:55 / 1

Calculated:  
24/04/2020 07:51/2.4.0.62

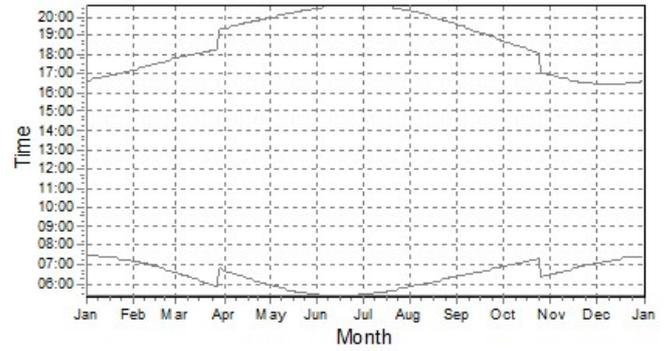
### SHADOW - Calendar, graphical

Calculation: SHADOW\_NORDEX

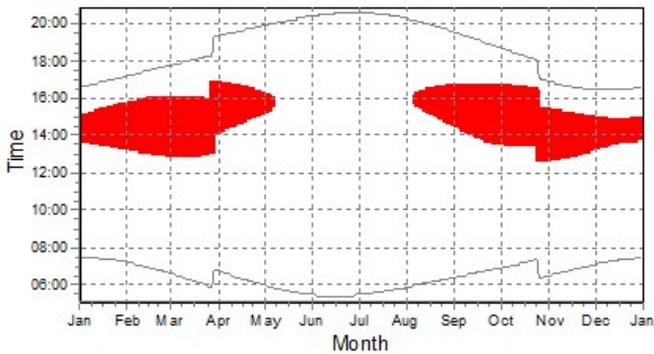
A: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



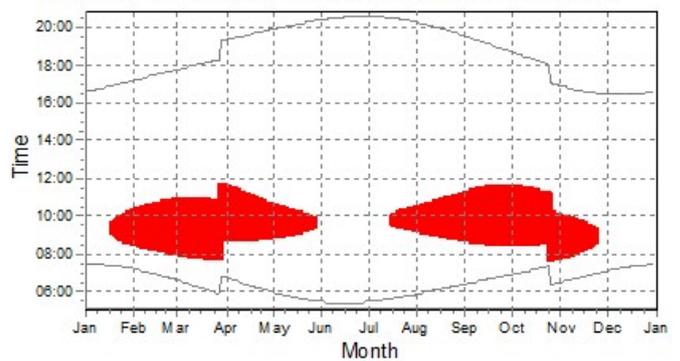
B: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



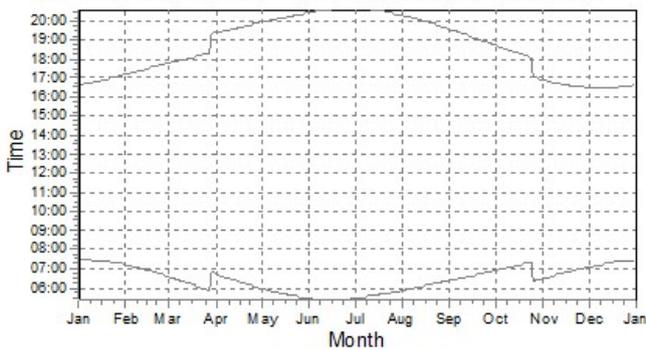
C: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



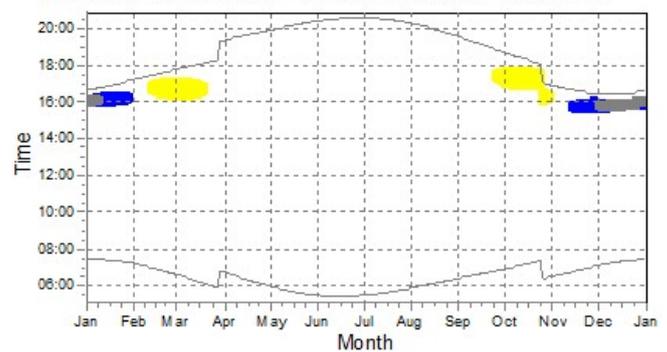
D: Shadow Receptor: 1.0 × 1.0 Azimuth: 315.0° Slope: 90.0°



E: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



F: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



#### WTGs

1: NORDEX N149 45000 149.0 !-! hub: 145.0 m  
 3: NORDEX N149 45000 149.0 !-! hub: 145.0 m

4: NORDEX N149 45000 149.0 !-! hub: 145.0 m  
 5: NORDEX N149 45000 149.0 !-! hub: 145.0 m

Project:  
OMBRA

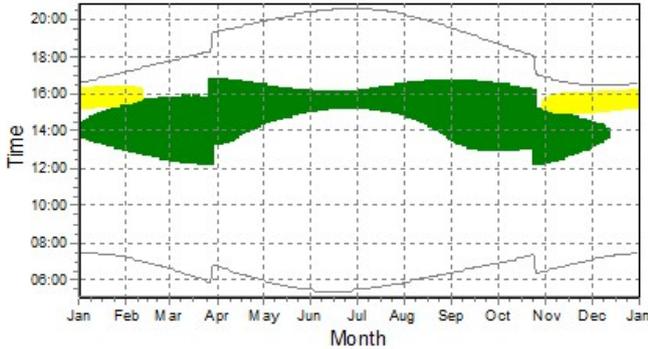
Printed/Page  
24/04/2020 08:55 / 2

Calculated:  
24/04/2020 07:51/2.4.0.62

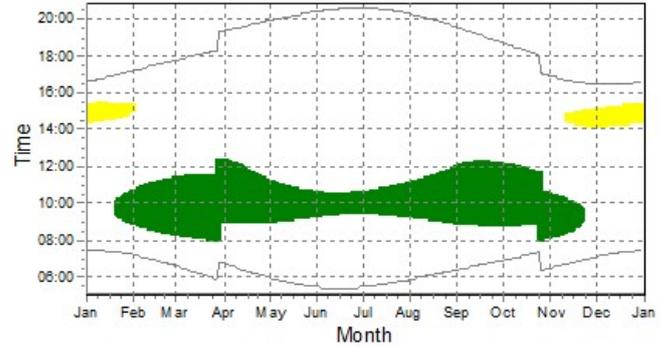
**SHADOW - Calendar, graphical**

Calculation: SHADOW\_NORDEX

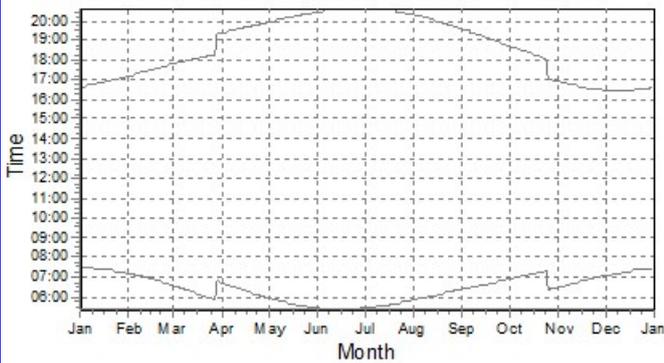
G: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



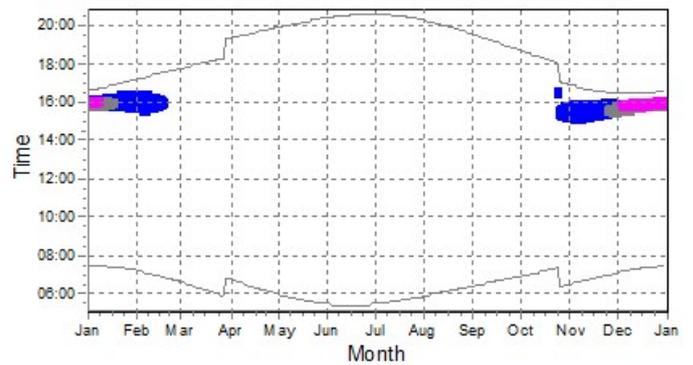
H: Shadow Receptor: 1.0 × 1.0 Azimuth: 315.0° Slope: 90.0°



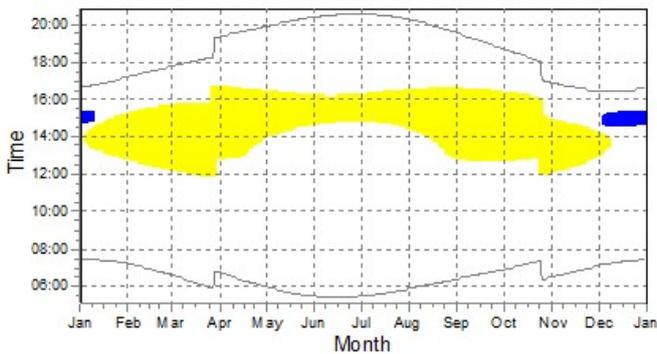
I: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



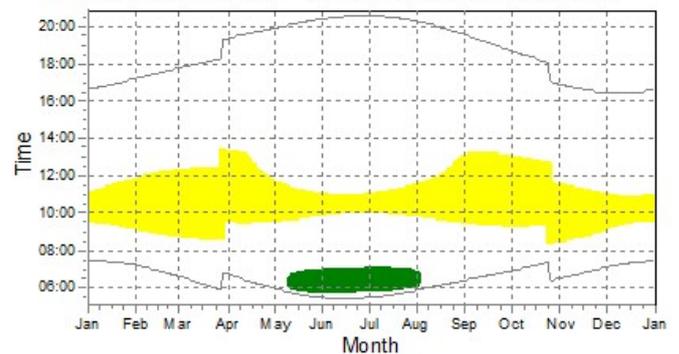
J: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



K: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



L: Shadow Receptor: 1.0 × 1.0 Azimuth: 315.0° Slope: 90.0°



WTGs

- 2: NORDEX N149 45000 149.0 !-! hub: 145.0 m
- 3: NORDEX N149 45000 149.0 !-! hub: 145.0 m
- 4: NORDEX N149 45000 149.0 !-! hub: 145.0 m

- 5: NORDEX N149 45000 149.0 !-! hub: 145.0 m
- 6: NORDEX N149 45000 149.0 !-! hub: 145.0 m

Project:  
OMBRA

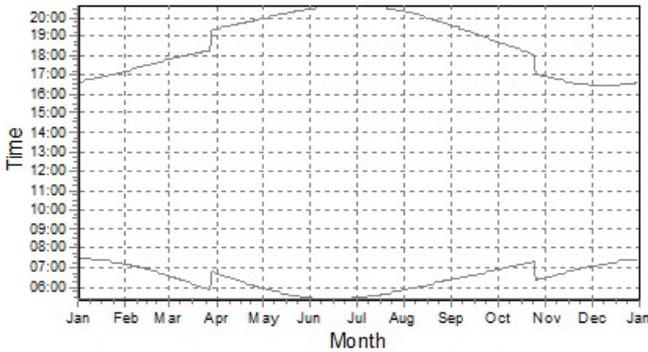
Printed/Page  
24/04/2020 08:55 / 3

Calculated:  
24/04/2020 07:51/2.4.0.62

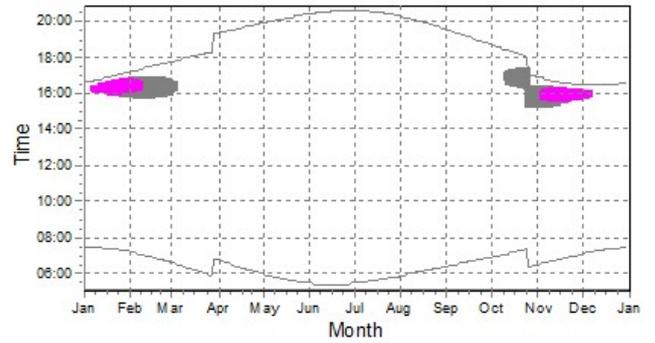
**SHADOW - Calendar, graphical**

Calculation: SHADOW\_NORDEX

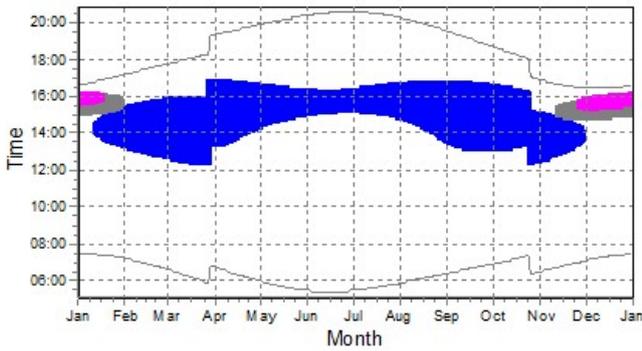
M: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



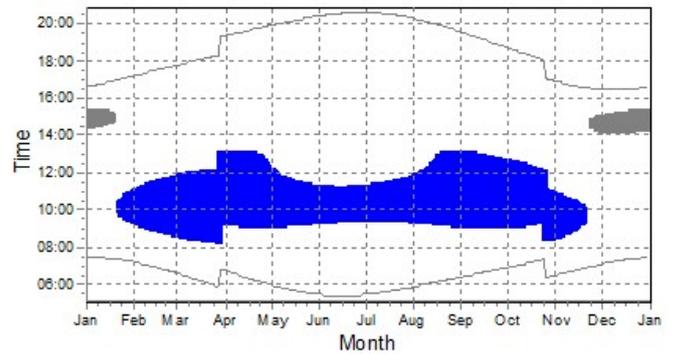
N: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



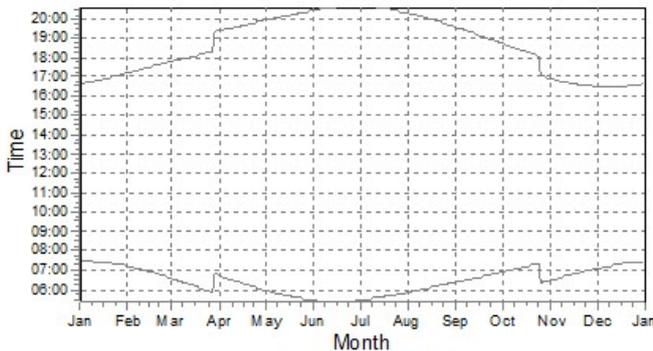
O: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



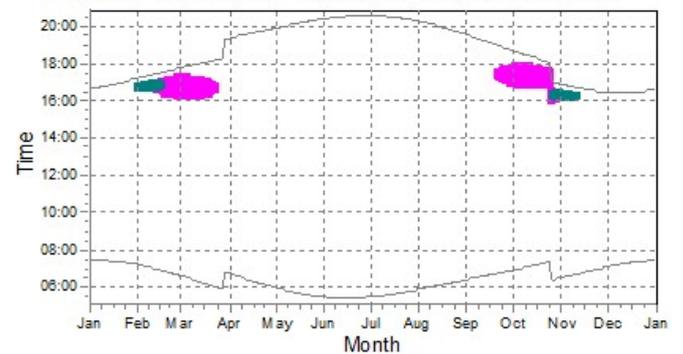
P: Shadow Receptor: 1.0 × 1.0 Azimuth: 315.0° Slope: 90.0°



Q: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



R: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



WTGs

4: NORDEX N149 45000 149.0 !-! hub: 145.0 m  
 5: NORDEX N149 45000 149.0 !-! hub: 145.0 m

6: NORDEX N149 45000 149.0 !-! hub: 145.0 m  
 7: NORDEX N149 45000 149.0 !-! hub: 145.0 m

Project:  
OMBRA

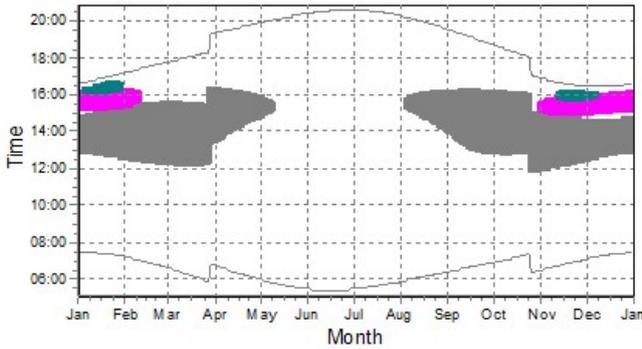
Printed/Page  
24/04/2020 08:55 / 4

Calculated:  
24/04/2020 07:51/2.4.0.62

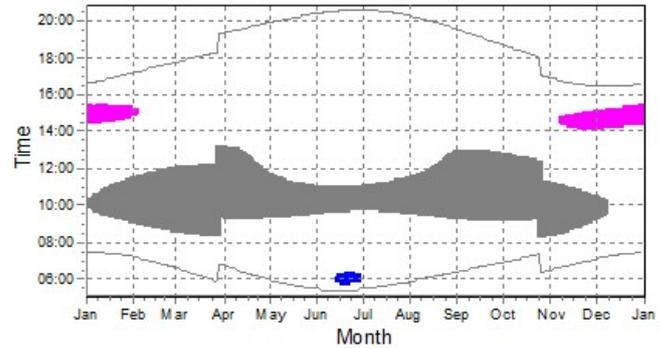
**SHADOW - Calendar, graphical**

Calculation: SHADOW\_NORDEX

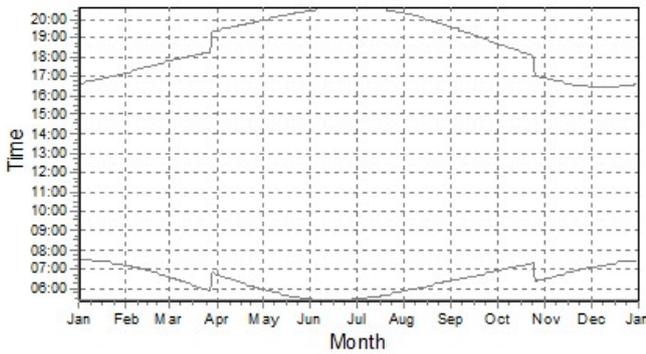
S: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



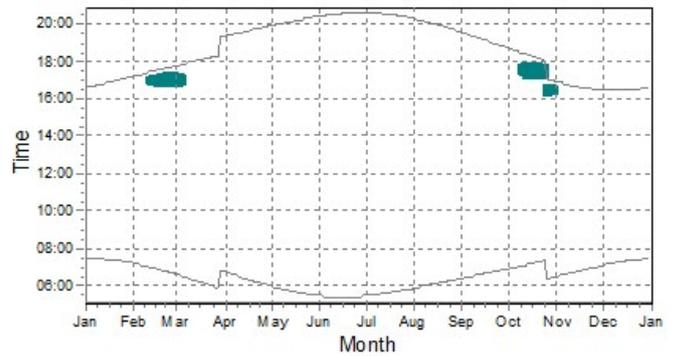
T: Shadow Receptor: 1.0 × 1.0 Azimuth: 315.0° Slope: 90.0°



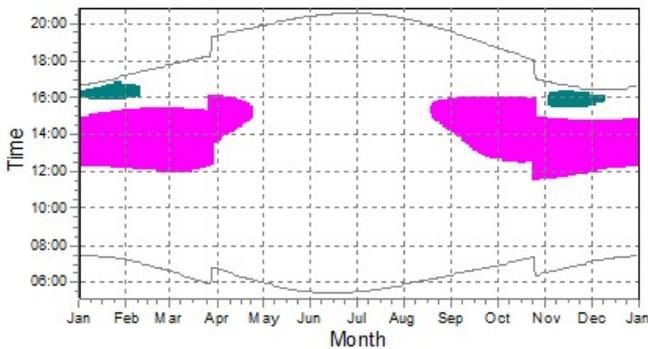
U: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



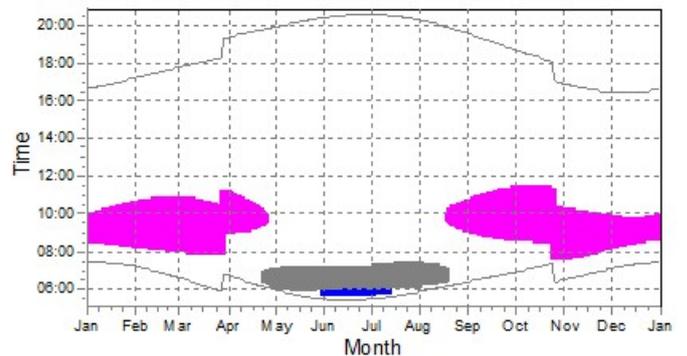
V: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



W: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



X: Shadow Receptor: 1.0 × 1.0 Azimuth: 315.0° Slope: 90.0°



WTGs

4: NORDEX N149 45000 149.0 !-! hub: 145.0 m  
5: NORDEX N149 45000 149.0 !-! hub: 145.0 m

6: NORDEX N149 45000 149.0 !-! hub: 145.0 m  
7: NORDEX N149 45000 149.0 !-! hub: 145.0 m

Project:  
OMBRA

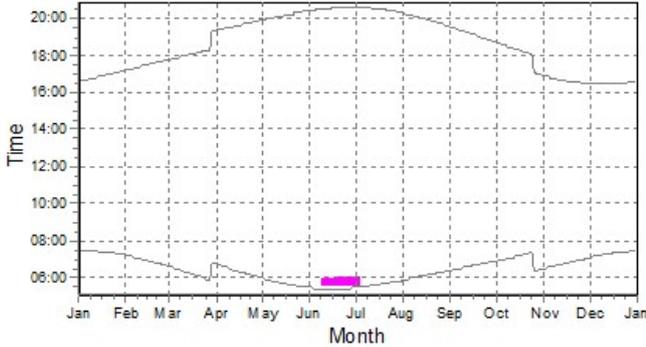
Printed/Page  
24/04/2020 08:55 / 5

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24/04/2020 07:51/2.4.0.62

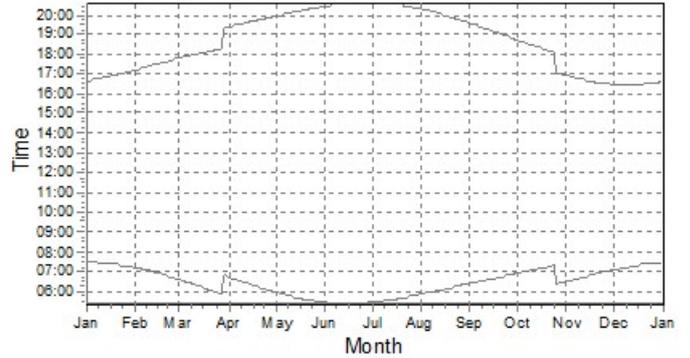
**SHADOW - Calendar, graphical**

Calculation: SHADOW\_NORDEX

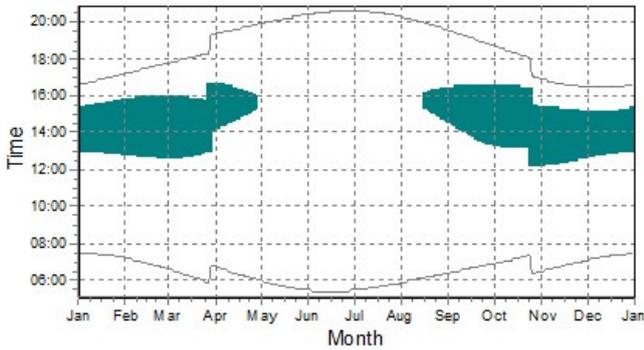
Y: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



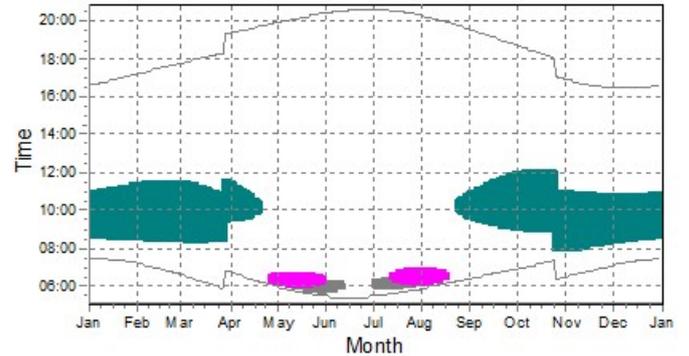
Z: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



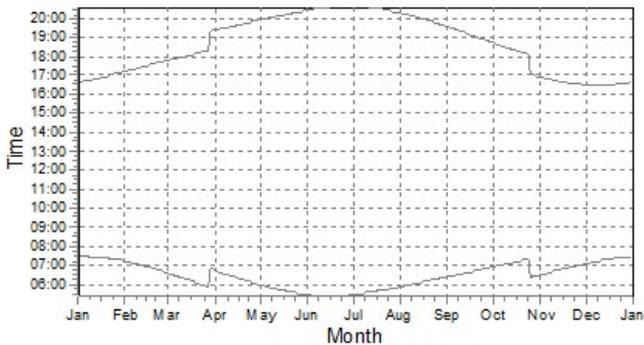
AA: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



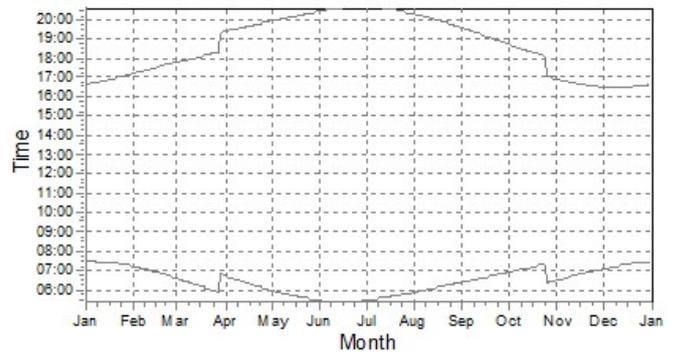
AB: Shadow Receptor: 1.0 × 1.0 Azimuth: 315.0° Slope: 90.0°



AC: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



AD: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



WTGs

- 5: NORDEX N149 45000 149.0 !-! hub: 145.0 m
- 6: NORDEX N149 45000 149.0 !-! hub: 145.0 m

- 7: NORDEX N149 45000 149.0 !-! hub: 145.0 m

Project:  
OMBRA

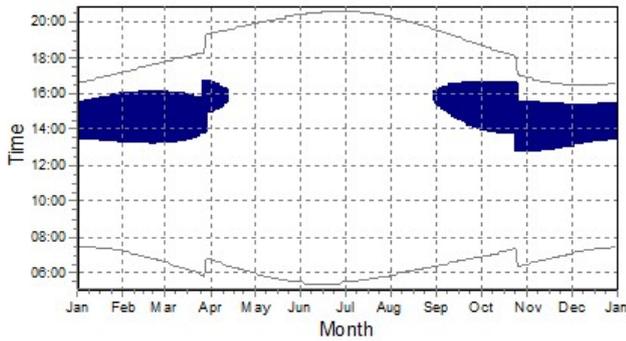
Printed/Page  
24/04/2020 08:55 / 6

Calculated:  
24/04/2020 07:51/2.4.0.62

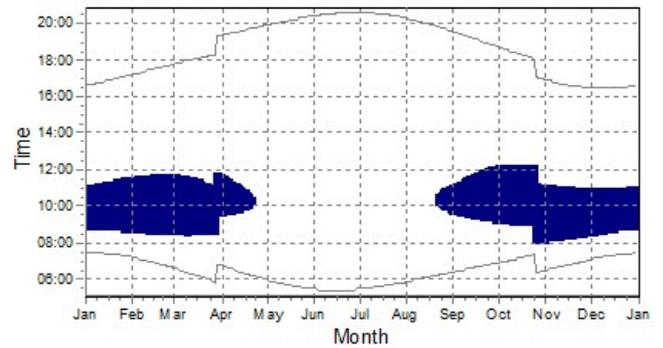
### SHADOW - Calendar, graphical

Calculation: SHADOW\_NORDEX

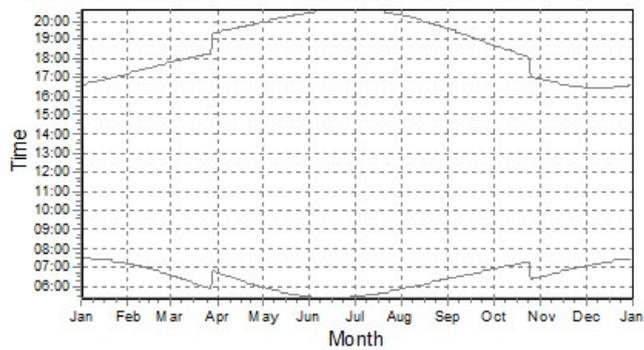
AE: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



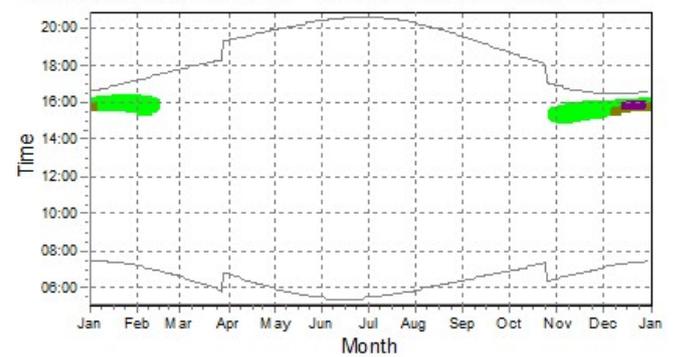
AF: Shadow Receptor: 1.0 × 1.0 Azimuth: 315.0° Slope: 90.0°



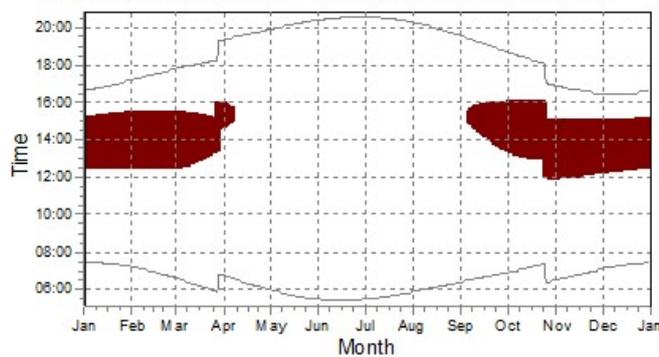
AG: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



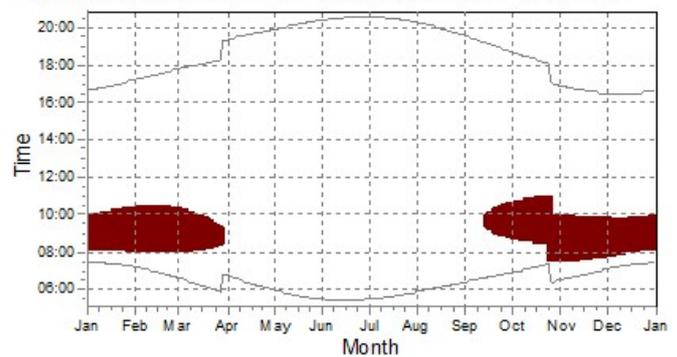
AH: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



AI: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



AJ: Shadow Receptor: 1.0 × 1.0 Azimuth: 315.0° Slope: 90.0°



WTGs

- 8: NORDEX N149 45000 149.0 !-! hub: 145.0 m
- 9: NORDEX N149 45000 149.0 !-! hub: 145.0 m
- 10: NORDEX N149 45000 149.0 !-! hub: 145.0 m

- 11: NORDEX N149 45000 149.0 !-! hub: 145.0 m
- 12: NORDEX N149 45000 149.0 !-! hub: 145.0 m

Project:  
OMBRA

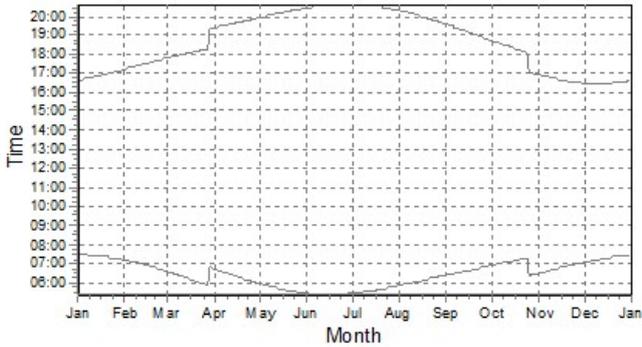
Printed/Page  
24/04/2020 08:55 / 7

Calculated:  
24/04/2020 07:51/2.4.0.62

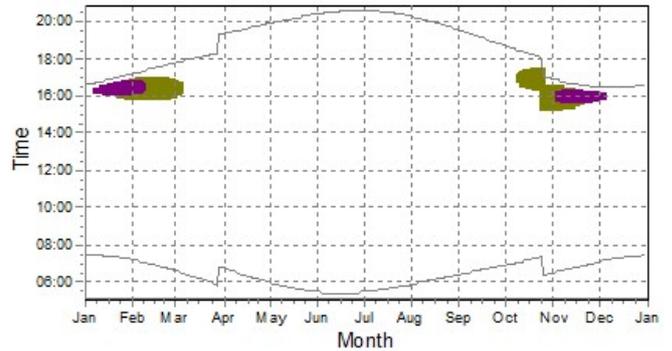
**SHADOW - Calendar, graphical**

Calculation: SHADOW\_NORDEX

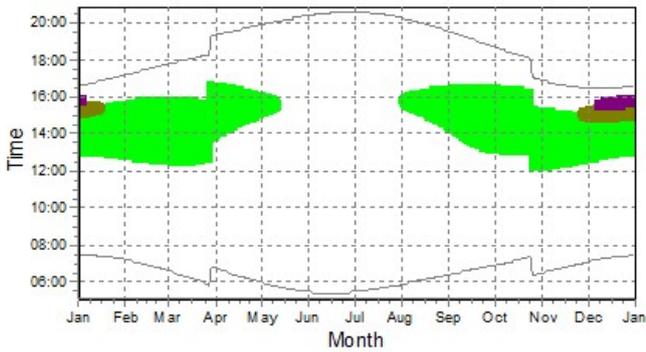
AK: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



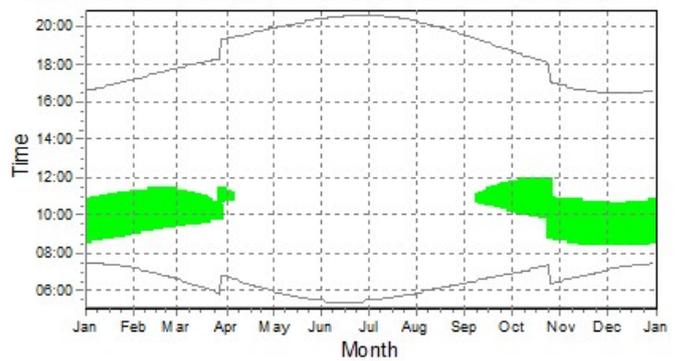
AL: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



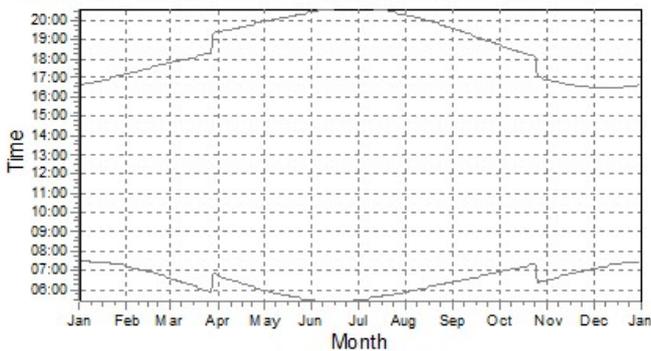
AM: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



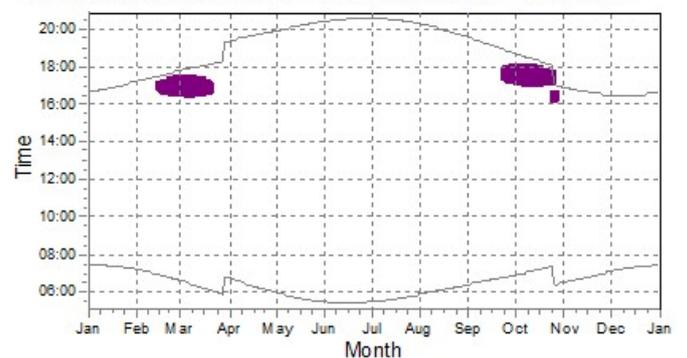
AN: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



AO: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



AP: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



WTGs

10: NORDEX N149 45000 149.0 !-! hub: 145.0 m  
 11: NORDEX N149 45000 149.0 !-! hub: 145.0 m

12: NORDEX N149 45000 149.0 !-! hub: 145.0 m

Project:  
OMBRA

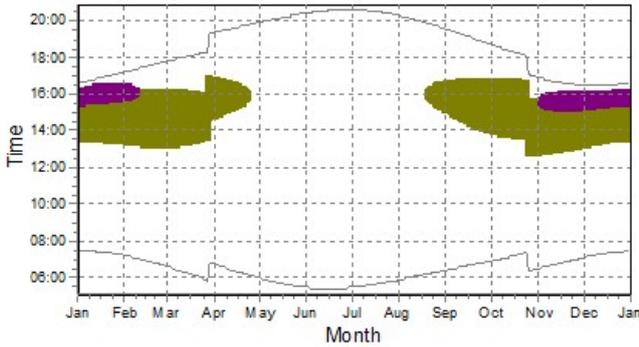
Printed/Page  
24/04/2020 08:55 / 8

Calculated:  
24/04/2020 07:51/2.4.0.62

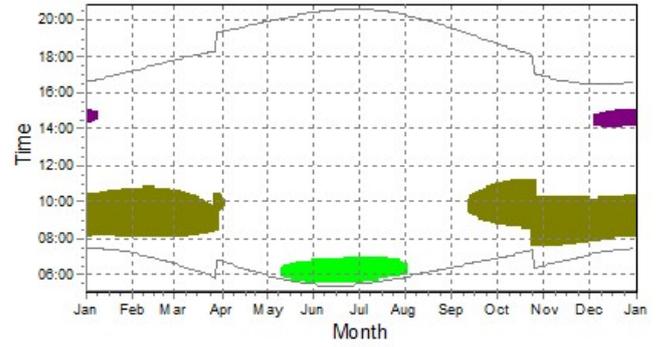
**SHADOW - Calendar, graphical**

Calculation: SHADOW\_NORDEX

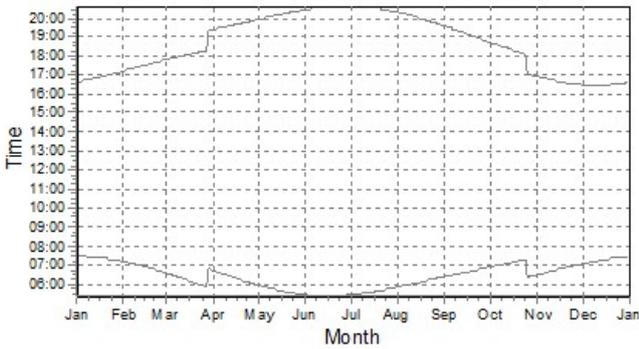
AQ: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



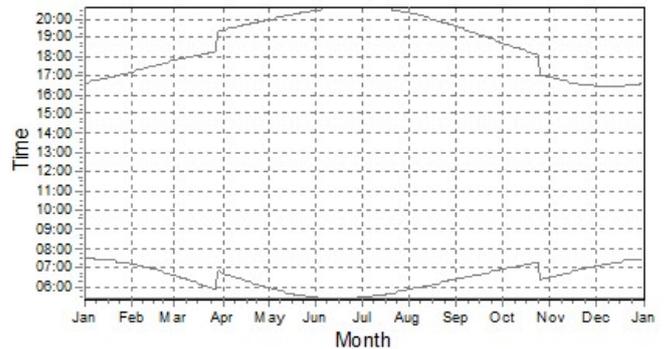
AR: Shadow Receptor: 1.0 × 1.0 Azimuth: 315.0° Slope: 90.0°



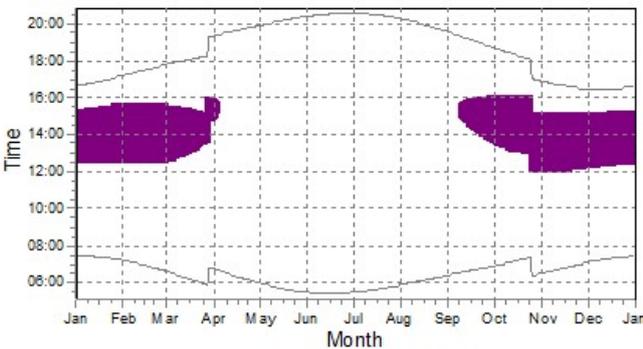
AS: Shadow Receptor: 1.0 × 1.0 Azimuth: 200.0° Slope: 90.0°



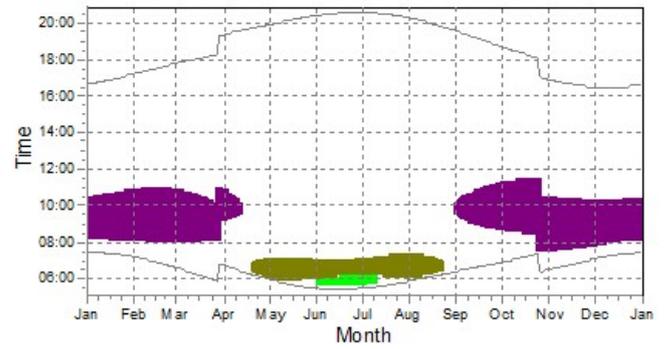
AT: Shadow Receptor: 1.0 × 1.0 Azimuth: 140.0° Slope: 90.0°



AU: Shadow Receptor: 1.0 × 1.0 Azimuth: 45.0° Slope: 90.0°



AV: Shadow Receptor: 1.0 × 1.0 Azimuth: 315.0° Slope: 90.0°



WTGs

10: NORDEX N149 45000 149.0 !-! hub: 145.0 m  
 11: NORDEX N149 45000 149.0 !-! hub: 145.0 m

12: NORDEX N149 45000 149.0 !-! hub: 145.0 m

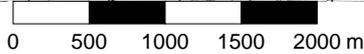
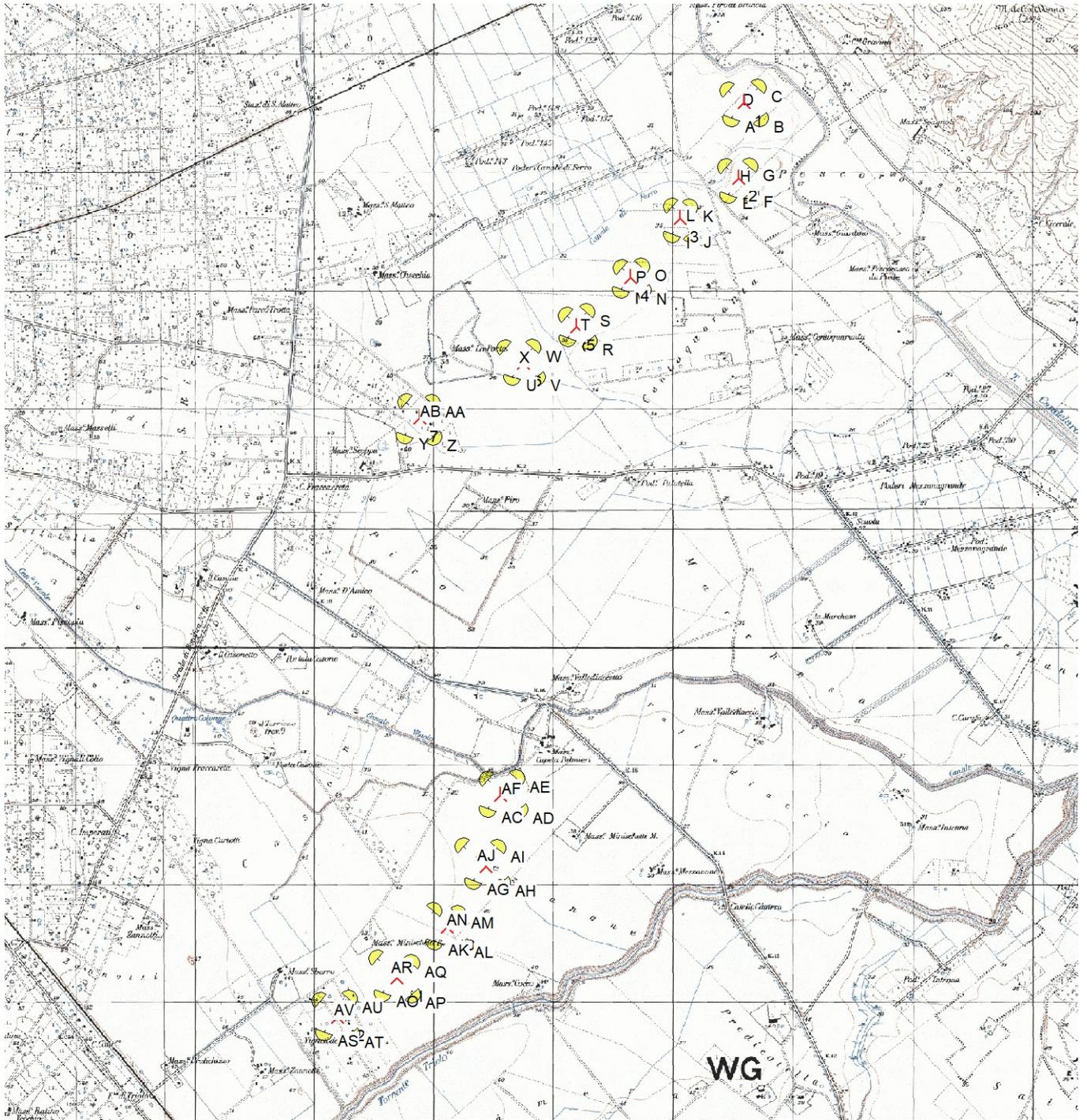
Project:  
**OMBRA**

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24/04/2020 09:04 / 1

Calculated:  
24/04/2020 07:51/2.4.0.62

**SHADOW - IGM**

Calculation: SHADOW\_NORDEX File: IGM.jpg



Map: , Print scale 1:50,000, Map center UTM WGS84 Zone: 33 East: 540,814 North: 4,612,526

New WTG

Shadow receptor

Isolines showing shadow in Shadow hours/per year. Worst case calculation.