

# Schattengutachten

mit Schattenausbreitungskarte  
zur Ermittlung des Schattenwurfes von 6 neuen  
Windenergieanlagen an einem Standort bei  
Südergellersen (Niedersachsen)

Landwind Planung GmbH & Co. KG



Juli 2025

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## ANHANG

### ERGEBNISSE DER WINDPRO BERECHNUNG SHADOW:

#### Berechnung: Gesamtbelastung 6x N175 +23 Bestand

Hauptergebnis	4 Seiten
Kalender	102 Seiten
Grafischer Kalender	12 Seiten
Karte	1 Seite

#### Berechnung: Zusatzbelastung 6x N175

Hauptergebnis	4 Seiten
Grafischer Kalender	12 Seiten
Karte	1 Seite

#### Berechnung: Vorbelastung 23 Bestand

Hauptergebnis	4 Seiten
Grafischer Kalender	12 Seiten
Karte	1 Seite

## **1                      Einleitung**

Die Landwind Planung GmbH & Co. KG plant südöstlich der Ortschaft Südergellersen (Landkreis Lüneburg, (Niedersachsen) den Neubau eines Windparks, bestehend aus 6 Anlagen mit 179 m Nabenhöhe. Zwei Anlagen (A4, A5) werden bis zur Inbetriebnahme der geplanten Anlagen zurückgebaut.

Für dieses Vorhaben wird in dem vorliegenden Gutachten eine Prognose über den zu erwartenden Schattenwurf in der Umgebung erstellt. Dazu werden an den vom Auftraggeber vorgesehenen Standorten 6 neue Windenergieanlagen neben 23 weiteren zu berücksichtigenden Anlagen angesetzt.

Es wird die aus dem Betrieb aller 29 Windenergieanlagen resultierende Beschattung im Umfeld der Anlagen, insbesondere an ausgewählten Gebäuden mit Wohnnutzung in den umliegenden Ortschaften, ermittelt.

## **2 Der Standort**

Eine Standortbesichtigung des Anlagenstandortes und der Immissionsorte fand am 27.06.2025 durch den Mitarbeiter Herrn Helms statt. Eine Fotodokumentation wurde dabei erstellt.

Die geplanten Anlagen liegen ca. 8,5 km südwestlich von der Kreisstadt Lüneburg. Im Westen (ca. 3 km) liegt Oerzen und im Norden (ca. 1,5 km) liegt Südergellersen. Die nähere Standortumgebung ist gekennzeichnet durch großflächige, landwirtschaftliche Nutzflächen, sowie kleinere Waldflächen innerhalb des Windparks sowie größere Waldgebiete im Süden und im Norden.

Das Gelände ist im nahen Umfeld eben mit Höhen zwischen 45 m und 80 m ü. NHN. Zu den Waldstücken steigt die Höhe an. Im nördlichen Waldgebiet werden Höhen über 80 m ü. NHN erreicht. Die geplanten Windanlagen stehen auf Höhen zwischen 53 und 75 m ü. NHN.

Im vorliegenden Gutachten werden als Schatten-Verursacher die 6 geplanten Anlagen - NORDEX N175/6.X-6.800, mit 179 m Nabenhöhe, neben 23 bestehenden Anlagen, an den vom Auftraggeber vorgegebenen Positionen angesetzt. Überlagerungen durch den gleichzeitigen Betrieb aller 29 Anlagen werden bei der Berechnung berücksichtigt.

Die Lage der Immissionsorte wird auf der Kartengrundlage gewählt und ist den Karten im Anhang zu entnehmen.



### **3 Allgemeines zum Schattenwurf**

Bei der Ermittlung des Standortes von geplanten Windenergieanlagen sind viele Faktoren zu beachten. Neben den positiven Aspekten gehören dazu auch negative Einflüsse der Anlagen auf ihre nähere Umgebung. Einen dieser Einflüsse stellt der Schattenwurf der Anlage dar. Zum einen werfen Turm und Maschinenhaus einen ruhenden Schatten, dieser wird in der Regel jedoch nicht als störend empfunden. Zum anderen verursacht der Rotor durch seine Bewegung einen häufigen Helligkeitswechsel im Beschattungsbereich. Dieser dynamische Schatten wird schnell als unangenehm empfunden und kann bei längerer Dauer stark belastend sein. Aus diesem Grund wird der Schattenwurf einer Windenergieanlage als erhebliche Belästigung im Sinne des Bundes-Immissionsschutzgesetz (BImSchG) angesehen [1].

Um eine unzumutbare Beeinträchtigung der Bewohner in der Nähe einer geplanten Windenergieanlage zu vermeiden, ist daher vor dem Bau der Anlage eine Genehmigung nach Bundes-Immissionsschutzgesetz nötig. Dafür wird im Rahmen eines Schattengutachtens der zu erwartende Schattenwurf der Anlage simuliert und auf seine Auswirkungen auf die Anwohner untersucht. Für die Bewertung dieser Auswirkungen gibt es keine rechtsverbindlichen Vorschriften, stattdessen wird hierbei auf die Schattenwurfhinweise der Bund/Länder-Arbeitsgemeinschaft Immissionsschutz (LAI) zurückgegriffen. Dort werden allgemein anerkannte Richtwerte zur maximalen Dauer der Schatteneinwirkung gegeben. [2].

Für die Simulation des Schattenwurfs sind zunächst die genauen Standorte der Anlagen erforderlich. Hierbei sind neben den geplanten Anlagen auch bereits bestehenden Anlagen in der Umgebung zu berücksichtigen, da diese ebenfalls das betrachtete Gebiet beschatten können. Für jede der betrachteten Anlagen wird anschließend der Schattenwurf simuliert. Hierbei müssen auch die Eigenschaften des Geländes wie etwa Höhenunterschiede berücksichtigt werden. Das zu betrachtende Gebiet richtet sich hierbei nach der Entfernung zu den Windenergieanlagen: Alle Orte, an denen die Sonnenfläche zu mindestens 20 % durch einen Rotorflügel verdeckt werden kann, müssen berücksichtigt werden. Zur Vereinfachung wird dabei von einem rechteckigen Rotorflügel mit mittlerer Blatattiefe ausgegangen.

Einen großen Einfluss auf den Schatten hat die Bewölkung. Durch sie kann zu jeder Tageszeit ein Schattenwurf verhindert werden. Den größten Einfluss hat jedoch die Position der Sonne. Zum einen bestimmt sie durch ihre Himmelsrichtung die Richtung in die der Schatten fällt. Zum anderen beeinflusst sie durch ihre Höhe über dem Horizont die Länge des Schattens. Da sich die Himmelsrichtung der Sonne im Verlauf des Tages und die Höhe der Sonne über dem Horizont sowohl im Tages- als auch im Jahresverlauf ändern, entsteht hierbei ein wandernder Schatten. Dabei ist der Schatten morgens und abends länger als am Mittag, und im Winter länger als im Sommer. Der längste Schattenwurf ist hierbei kurz nach Sonnenaufgang und kurz vor Sonnenuntergang zu erwarten. Da sich die Höhe der Sonne über dem Horizont zu diesen Zeiten aber besonders schnell ändert, ändert sich auch die Länge des Schattens entsprechend schnell. Für die Berechnung werden nur Zeiten betrachtet, bei denen die Sonne mindestens 3 Grad über dem Horizont steht. Für einen niedrigeren Sonnenstand ist aufgrund von Bebauung, Bewuchs und der zu durchdringenden Atmosphärenschicht nicht mit Schattenwurf zu rechnen.

Zur Bewertung des Schattenwurfs ist die Ermittlung der Standorte der maßgeblichen Immissionsorte erforderlich. Hierbei handelt es sich um Räume in Gebäuden, bei denen aufgrund ihrer Nutzung die potenzielle Beeinträchtigung durch Schatten besonders groß



sind. Diese Räume sind vor allem in Wohngebäuden zu finden (z.B. Wohn- und Schlaf-räume), aber auch Unterrichts-, Praxis-, Büro- und Arbeitsräume zählen dazu. Um den Berechnungsaufwand zu begrenzen, werden lediglich die Immissionsorte betrachtet, bei denen aufgrund ihrer Position eine besonders starke Beeinflussung durch Schattenwurf zu erwarten ist.

Um eine übermäßige Belastung der Anwohner möglichst sicher ausschließen zu können, wird bei der Berechnung der „Worst Case“ angewendet. Es wird davon ausgegangen, dass die Sonne nie durch Bewölkung verdeckt wird, sowie dass die Anlagen immer in Betrieb sind. Es gibt also keinen Stillstand aufgrund von Windmangel, Defekten oder Wartungsarbeiten. Des Weiteren wird davon ausgegangen, dass der Wind immer aus der gleichen Richtung weht, wie die Sonne scheint. Auch wird eine Verdeckung der Immissionsorte durch Bewuchs oder Bebauung ausgeschlossen. Durch diese Annahmen wird sichergestellt, dass für die Immissionsorte die astronomisch maximal mögliche Beschattungsdauer errechnet wird. Die Berechnung soll für einen punktförmigen Rezeptor in 2 m Höhe erfolgen. Für die hier vorliegende Betrachtung wird von den oben genannten Bedingungen ausgegangen. Der Rezeptor wird aus programmtechnischen Gründen jedoch nicht punktförmig, sondern mit einer Fläche von 10 cm x 10 cm angenommen. Dadurch liegen die berechneten Schattenwurfdauern leicht über den Ergebnissen für punktförmige Rezeptoren. Die Rezeptoren sind wegen der großen Anzahl von Windenergieanlagen auf den Gewächshausmodus eingestellt. Hier wird der Schatten im Gegensatz zum Fenstermodus aus allen Richtungen empfangen.

Die Ergebnisse der Berechnungen werden anschließend für jeden Immissionsort mit den Vorgaben des LAI abgeglichen: Um eine unzumutbare Beeinträchtigung zu verhindern, darf die maximale tägliche Verschattungsdauer 30 Minuten und die maximale jährliche Verschattungsdauer 30 Stunden nicht überschreiten. Sollte an einem Immissionsort durch den Bau einer neuen Anlage eine Überschreitung der Grenzwerte zu erwarten sein, so sind Maßnahmen zur Einhaltung des Grenzwertes zu ergreifen: Dazu kann eine Abschalteinrichtung in der Anlage installiert werden. Diese schaltet die Anlage ab, wenn sie den betroffenen Immissionsort verschatten würde.



## 4 Berechnung des Schattenwurfs

In Berechnungen von Schattenwurf-Weiten und Zeiten werden alle Randbedingungen, die vorstehend geschildert wurden, mit ihren ungünstigsten Ausprägungen angesetzt. D.h. es wird davon ausgegangen, dass es nie Wolken gibt, keine Flaute herrscht und somit die Windenergieanlagen sich immer drehen und der Wind immer aus der gleichen Richtung wie die Sonne kommt und damit die größte mögliche Fläche von Schatten betroffen ist.

Die Berechnung des Schattenwurfes wird mit dem Programm WindPRO von EMD International A/S (Aalborg-Dänemark) in der aktuellen Version 4.1.287 vom Juni 2025 mit dem Programmteil *Shadow* vorgenommen.

Als Schattenverursacher werden 29 Windenergieanlagen an den vom Auftraggeber vorgegebenen Positionen angenommen. Diese sind die 6 vom Auftraggeber beantragten Standort und 23 einer bereits genehmigten bestehende bzw. geplanten Windenergieanlagen. Die angesetzten Koordinaten sind dem Anhang (Shadow-Hauptergebnis) zu entnehmen. Dabei werden die folgenden technischen Daten der Windenergieanlagen zugrunde gelegt. Die Nummerierung der Anlagen bezieht sich auf die im Berechnungsausdruck SHADOW (siehe Anhang) angegebene Liste:

- o **Gesamtbelastung:**  
alle 29 WEA im Windpark Süderheide
- o **Zusatzbelastung:**  
  
**6 x Nordex N175 6.X-6.800**  
6.800 kW Nennleistung  
175 m Rotordurchmesser  
179 m Nabenhöhe
- o **Vorbelastung:**  
23 weiter bestehende WEA

**Tabelle 1:** Die Windenergieanlagen der Vorbelastung

WEA	Hersteller	Typ, Generator	Leistung [kW]	Rotor [m]	Nabe [m]
B 01	NORDEX	N149/4.0-4.5-4.500	4.500	149,0	125,0
B 02	NORDEX	N131/3300-3.300	3.300	131,0	134,0
B 03	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0
B 04	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0
B 05	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0
B 06	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0
B 07	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0
B 08	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0
B 09	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0
B 10	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0
B 11	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0
B 12	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0
B 13	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0
Oerzen 1	NORDEX	N175/6.X-6.800	6.800	175,0	179,0
Oerzen 2	NORDEX	N175/6.X-6.800	6.800	175,0	179,0
Oerzen 3	NORDEX	N175/6.X-6.800	6.800	175,0	179,0
Oerzen 4	NORDEX	N175/6.X-6.800	6.800	175,0	179,0
Oerzen 5	NORDEX	N175/6.X-6.800	6.800	175,0	179,0

Rep 10	NORDEX	N175/6.X-6.800	6,800	175,0	179,0
Rep 11	NORDEX	N175/6.X-6.800	6,800	175,0	179,0
Rep 5	NORDEX	N175/6.X-6.800	6,800	175,0	179,0
Rep 8	NORDEX	N175/6.X-6.800	6,800	175,0	179,0
Rep 9	NORDEX	N175/6.X-6.800	6,800	175,0	179,0

In einem ersten Schritt werden die Schattenwurfzeiten an ausgewählten, auf der Karten-grundlage erkennbaren Gebäuden, im Umfeld der Windenergieanlagen mit vermuteter Wohnnutzung ermittelt, die den neu zu errichtenden Windenergieanlagen am nächsten liegen.

Die dadurch entstehenden Untersuchungspunkte werden im Vokabular der verwendeten Software als „Schattenrezeptoren“ bezeichnet. Hier im Text werden sie auch Immissionsorte (IO) genannt. Die Schattenrezeptoren werden entsprechend der Vorgabe des „Arbeitskreises Schattenwurf von Windenergieanlagen“ angesetzt. Konkret sind jeweils über den entsprechenden Hauswänden in einer Höhe von 2 m ebene Rezeptoren (Neigung des Fensters gleich 0°) mit einer Größe von 0,1 m x 0,1 m angenommen (annähernd punktförmig). Als Ausrichtungsmodus wird der Gewächshausmodus gewählt, da dieser Schatteneinfall aus allen Richtungen berücksichtigt. Für real in den Gebäuden vorhandene Fenster können sich andere Beschattungsdauern, als hier rechnerisch ermittelt, ergeben, da die Positionen und Größen von den hier getroffenen Annahmen abweichen werden. Allerdings bleibt auch ggf. vorhandener schattenverdeckender Bewuchs vor den Fenstern hier unbeachtet.

In einem *zweiten Schritt* werden Schattendauerlinien für die Umgebung des Windparks berechnet. Hier wird für jeden Punkt auf einem Raster von 20 \* 20 Metern die im Jahresverlauf auftretende Beschattung ermittelt und Punkte gleicher Beschattungsdauer werden durch Linien verbunden. Im Anhang befinden sich die Ausdrucke der Berechnungen.

Die folgende Tabelle gibt eine Übersicht über die Lage der Immissionsorte.

**Tabelle 2:** Koordinaten der Immissionsorte, Alle Koordinatenangaben in: UTM (north)- ETRS89 Zone: 32

IO-Nr.	Name	Ost	Nord	Z
				[m]
s01	Neu Oerzen, Soltau Straße 1	588.101,7	5.893.084,2	46,4
s02	Oerzen, Am Ohfeld 1	588.404,8	5.894.762,2	45,3
s03	Oerzen, Am Ohfeld 4	588.478,4	5.894.877,5	40,0
s04	Oerzen, Am Ohfeld 9	588.431,5	5.894.865,5	40,0
s05	Oerzen, Am Ohfeld 15	588.429,4	5.894.972,8	43,6
s06	Oerzen, Im Dorfe 14	588.496,1	5.894.607,3	48,1
s07	Oerzen, Im Dorfe 16	588.303,1	5.894.557,6	47,8
s08	Oerzen, Im Dorfe 19	588.526,8	5.894.534,4	50,0
s09	Oerzen, Im Dorfe 25	588.443,9	5.894.543,8	50,0
s10	Oerzen, Westerheide 1	588.389,1	5.894.636,1	49,6
s11	Oerzen, Westerheide 3	588.370,1	5.894.675,9	47,7
s12	Oerzen, Westerheide 4	588.427,4	5.894.685,8	48,0
s13	Oerzen, Westerheide 5	588.381,0	5.894.813,7	42,6
s14	Oerzen, Westerheide 12A	588.325,0	5.894.865,9	42,6
s15	Oerzen, Westerheide 12C	588.306,5	5.894.823,7	44,5
s16	Oerzen, Westerheide 18	588.256,0	5.894.856,0	45,0
s17	Oerzen, Westerheide 19	588.291,4	5.894.974,5	48,1
s18	Oerzen, Westerheide 20	588.229,9	5.894.881,8	47,7
s19	Oerzen, Westerheide 22	588.185,2	5.894.847,2	46,0
s20	Oerzen, Westerheide 28	588.102,7	5.894.825,3	47,2
s21	Oerzen, Zum Hasel 5	587.786,3	5.893.215,0	57,9
s22	Oerzen, Zum Hasel 10	588.158,0	5.893.781,7	45,8
s23	Oerzen, Mühlenweg 10	588.545,4	5.894.776,2	44,6
s24	Oerzen, Mühlenweg 18	588.468,7	5.894.823,3	42,4
s25	Südergellersen, Auf dem Brink 6	586.477,5	5.896.246,7	67,4
s26	Südergellersen, Auf dem Brink 7	586.498,2	5.896.189,4	65,8



s27	Südergellersen, Birkenweg 7	586.547,8	5.896.410,5	65,2
s28	Südergellersen, Forstweg 4	586.302,3	5.896.127,2	65,0
s29	Südergellersen, Forstweg 8	586.230,1	5.896.140,7	65,0
s30	Südergellersen, Forstweg 11	586.166,4	5.896.101,6	63,6
s31	Südergellersen, Forstweg 16	586.112,1	5.896.167,0	64,0
s32	Südergellersen, Forstweg 17	586.094,1	5.896.128,7	62,5
s33	Südergellersen, Gewerbegebiet 587	587.007,3	5.895.062,8	43,3
s34	Südergellersen, Heidberg 2	586.177,4	5.896.183,9	66,8
s35	Südergellersen, Heidberg 3	586.154,2	5.896.223,0	66,9
s36	Südergellersen, Heiligenthaler Weg 2	586.863,9	5.896.155,5	55,9
s37	Südergellersen, Heiligenthaler Weg 3	586.792,8	5.896.190,0	58,8
s38	Südergellersen, Heiligenthaler Weg 3c	586.833,1	5.896.217,7	58,1
s39	Südergellersen, Heiligenthaler Weg 11	586.911,1	5.896.239,1	52,2
s40	Südergellersen, Im Alten Dorfe 2	586.402,6	5.896.082,0	64,0
s41	Südergellersen, Im Alten Dorfe 3	586.453,7	5.896.115,5	65,2
s42	Südergellersen, Im Alten Dorfe 4	586.480,0	5.896.021,4	61,1
s43	Südergellersen, Im Alten Dorfe 5	586.561,2	5.896.156,3	63,0
s44	Südergellersen, Im Alten Dorfe 7	586.616,6	5.896.197,1	62,0
s45	Südergellersen, Im Alten Dorfe 8	586.561,9	5.896.067,6	60,9
s46	Südergellersen, Im Alten Dorfe 10A	586.625,5	5.896.101,5	60,2
s47	Südergellersen, Kirchgellerser Straße 2	586.638,0	5.896.277,9	62,7
s48	Südergellersen, Kirchgellerser Straße 3	586.594,8	5.896.327,3	63,8
s49	Südergellersen, Kirchgellerser Straße 6	586.637,2	5.896.375,2	63,6
s50	Südergellersen, Kirchgellerser Straße 9	586.617,5	5.896.432,1	64,5
s51	Südergellersen, Kirchgellerser Straße 10	586.660,0	5.896.465,5	63,2
s52	Südergellersen, Kirchgellerser Straße 13	586.632,2	5.896.499,1	64,0
s53	Südergellersen, Kirchgellerser Straße 15	586.747,3	5.896.191,6	60,0
s54	Südergellersen, Kirchgellerser Straße 16	586.731,0	5.896.121,0	59,3
s55	Südergellersen, Oerzer Str. 13A	586.909,5	5.895.981,7	53,8
s56	Südergellersen, Oerzer Str. 15	587.010,6	5.895.899,8	50,0
s57	Südergellersen, Oerzer Str. 18	586.781,3	5.896.062,2	56,4
s58	Südergellersen, Oerzer Str. 19	586.879,7	5.895.864,2	49,3
s59	Südergellersen, Poggenpohl 7	586.751,1	5.895.922,0	55,9
s60	Südergellersen, Poggenpohl 8	586.640,6	5.895.995,8	58,5
s61	Südergellersen, Schwarzer Weg 2	586.403,0	5.896.246,5	71,4
s62	Südergellersen, Schwarzer Weg 9	586.404,8	5.896.338,8	69,4
s63	Südergellersen, Westergellerser Weg 1	586.545,3	5.896.256,4	63,9
s64	Südergellersen, Westergellerser Weg 4	586.498,9	5.896.338,8	65,0
s65	Südergellersen, Wetzter Weg 3	586.268,4	5.896.052,0	63,3
s66	Südergellersen, Wetzter Weg 6	586.172,4	5.895.854,5	57,8
s67	Südergellersen, In de Masch 8	586.717,4	5.896.250,8	61,1
s68	Wetzen, Zum Lerchenberg 5	583.085,3	5.892.839,1	65,0
s69	Wetzen, Zum Lerchenberg 10	583.242,4	5.892.711,0	60,0
s70	Wetzen, Zum Lerchenberg 37	582.866,7	5.892.994,9	69,4

## **5 Erläuterung zu den Resultatausdrucken**

Die Berechnungsergebnisse des Programmes WindPRO, Programmteil Shadow zum Berechnen des Schattenwurfes im Rahmen dieses Gutachtens befinden sich im Anhang, nachfolgend einige ergänzende Erläuterungen zu den einzelnen Berechnungsergebnissen.

### **SHADOW – Hauptergebnis**

Auf dieser Ausgabeseite werden die Berechnungsgrundlagen und eine Kurzfassung der Berechnungsergebnisse aufgeführt. Das Berechnungsverfahren ist kurz textlich erläutert und die berücksichtigten Anlagenstandorte und Schattenrezeptoren sind tabellarisch angegeben.

Für die Windenergieanlagen sind neben den genauen Standorten und den entscheidenden technischen Daten Nabenhöhe und Rotordurchmesser auch weitere Angaben enthalten, wie z.B. den Beschattungsbereich (s Kapitel 3) und wenn vorhanden die Rotordrehzahl.

Die Schattenrezeptoren (Immissionsorte) sind in einer gesonderten Tabelle mit allen relevanten Daten abgedruckt. Im Ausrichtungsmodus „Gewächshaus-Modus“ wird Schatten aus allen Himmelsrichtungen empfangen. Die „Neigung des Fensters“ bezieht sich auf die Neigung gegenüber dem Boden. Fenster in den Außenwänden haben einen Winkel von 90 Grad, gegebenenfalls vorhandene Dachfenster haben entsprechend abweichende Ausrichtungen. Ebene Rezeptoren (Flachdach, Terrasse) haben eine Neigung von 0°.

Unter „Berechnungsergebnisse“ werden die unter „Worst Case“-Annahmen, (d. h. die astronomische, maximale Beschattungsdauer) berechneten Ergebnisse kurz zusammengefasst. Diese sind neben der Anzahl der Tage im Jahr an denen Schattenwurf am Immissionsort auftritt, die Gesamtdauer in Stunden und Minuten pro Jahr sowie die maximalen täglichen Schattendauern in Stunden und Minuten pro Tag.

### **SHADOW – Kalender**

Der Ausdruck Kalender (nur ausgedruckt für die Rezeptoren an denen Schatten auftritt) zeigt für jeden Schattenrezeptor separat, an welchen Tagen im Jahr und über welche Dauer am einzelnen Tag mit Schatten zu rechnen ist.

In einer Tabelle sind spaltenweise die Monate und zeilenweise die Tage (zwei Zeilen pro Tag) angegeben. Für jeden Tag sind die Sonnenaufgangs- und die Sonnenuntergangszeit ausgedruckt. Fällt an dem entsprechenden Tag ein Schatten einer Windenergieanlage auf das Fenster wird die Schattendauer, die Anfangs- und Endzeit des Schattens sowie die Bezeichnung der verursachenden Windenergieanlage aufgeführt.

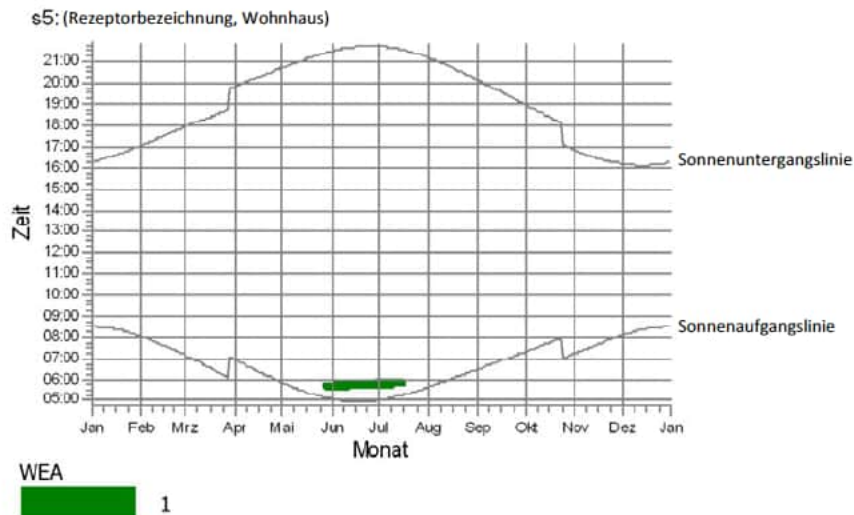
Eine Erläuterung der einzelnen Werte befindet sich unterhalb der Tabelle. Als letzte Zeile der Tabelle sind die Schattendauern in Minuten pro Monat aufaddiert. Im Shadow Kalender sind nur die Schatten verursachenden Windenergieanlagen aufgeführt.

Anhand der Angaben kann ermittelt werden, welchen Beitrag zur Gesamtbeschattung die einzelnen Anlagen liefern.



## SHADOW – Kalender, grafisch

Die grafische Kalenderdarstellung ist eine übersichtliche Aufbereitung und Ergänzung zu den tabellarischen Kalendern. Die Darstellung ist für alle Schattenrezeptoren, die vom Schattenwurf der Windenergieanlagen betroffen sind, ausgeführt. In den Grafiken ist für die einzelnen Rezeptoren schnell erkennbar, wie sich die Beschattungszeiten über das Jahr und die einzelnen Tage verteilen. Als Anhaltspunkte sind jeweils die Zeiten des Sonnenauf- und -untergangs, für die Sommermonate unter Berücksichtigung der Sommerzeit, als Begrenzungslinien eingetragen. Die Schattenanteile der verschiedenen Anlagenstandorte sind durch die Farbgebung identifizierbar.

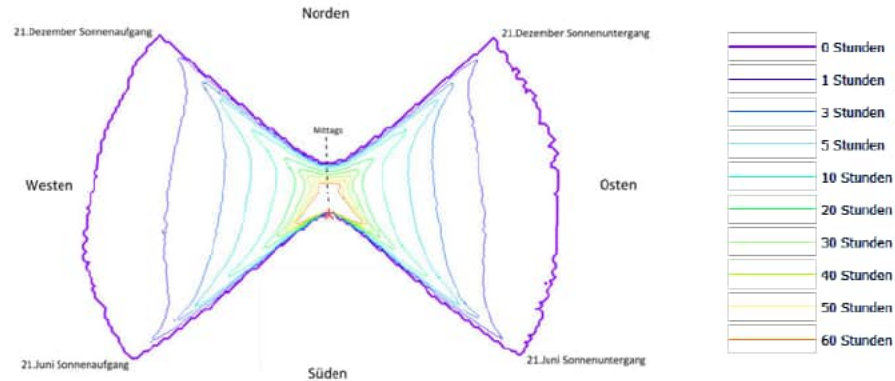


**Abbildung 1:** grafische Kalenderdarstellung



## SHADOW – Karte der Schattendauerlinien

Als letzter Ausdruck findet sich eine Karte mit eingetragenen Linien gleicher Schattendauer pro Jahr. Aus dieser Karte ist leicht ablesbar, welche Bereiche am stärksten vom Schattenwurf betroffen sind. Die Karte zeigt deutlich, dass die Schattenwirkung weit nach Osten und Westen reicht und in direkter Nord- bzw. Süd-Richtung unproblematischer ist.



**Abbildung 2:** Schattenwurfdiagramm für eine Windanlage für ein ganzes Jahr

Das Diagramm zeigt die komplette Fläche, auf der eine Windanlage im Laufe eines Jahres Schatten werfen kann.

Die Windanlage ist der rote Stern in der Mitte. Dort und in deren näherer Umgebung ist der meiste Schatten möglich, da dort die Sonne oben am Himmel steht (die rote bis zu den grünen Linien). Diese hohen Sonnenwinkel, in deren Folge der Schattenwurf auf einer Fläche weniger wird, sind häufiger als die sehr niedrigen zur Dämmerung, wenn auch weiter entfernte Gebiete erreicht werden (die blauen Linien).

Die violette Linie ist die Grenze, ab der kein Schatten mehr vorkommt.

Die Farben der Linien in der Karte im Anhang können von den hier beschriebenen abweichen.

## 6 Ergebnis der Schattenwurfberechnung

An dieser Stelle werden kurz die Endergebnisse der im Anhang befindlichen Ausdrucke zusammengefasst. Die Berechnungen wurden für die 6 geplanten Windenergieanlagen (**Zusatzbelastung**), die 23 bestehenden (**Vorbelastung**) und für alle 29 Windenergieanlagen (**Gesamtbelastung**) durchgeführt.

Der real entstehende Anteil der Beschattung wird langfristig gesehen bei nur ca. 25% dieser berechneten Werte liegen. Hinzu kommt, dass bei diesen Werten eine Abschirmung der Fenster durch Hindernisse und auch Bäume nicht berücksichtigt wird, und so die Schattenwirkung besonders von Frühjahr bis Herbst weiter gemindert wird.

Auf dem Kalender und den grafischen Kalenderausdrucken ist der Schattenwurfanteil der vom Auftraggeber beantragten Windenergieanlagen gut zu erkennen. Der Kalender und der grafische Kalender, für die vom Schattenwurf betroffenen Rezeptoren, befinden sich im Anhang. An den im Einzelnen betrachteten Schattenrezeptoren ergibt sich folgende Situation der astronomisch maximal möglichen Beschattungsdauer:

**Tabelle 3:** Die **jährlichen** Schattenzeiten an den Rezeptoren für die Gesamtbelastung, sowie Vor- und Zusatz-Belastung. Überschreitungen sind fett gedruckt und grau hinterlegt.

		Gesamt- belastung	Zusatz- belastung	Vorbelastung
IO Nr.	Name	Stunden / Jahr	Stunden / Jahr	Stunden / Jahr
		[Std:Min]	[Std:Min]	[Std:Min]
s01	Neu Oerzen, Soltau Straße 1	0:00	0:00	0:00
s02	Oerzen, Am Ohfeld 1	<b>54:40</b>	0:00	<b>54:40</b>
s03	Oerzen, Am Ohfeld 4	<b>47:02</b>	0:00	<b>47:02</b>
s04	Oerzen, Am Ohfeld 9	<b>50:47</b>	0:00	<b>50:47</b>
s05	Oerzen, Am Ohfeld 15	<b>49:31</b>	0:00	<b>49:31</b>
s06	Oerzen, Im Dorfe 14	<b>51:18</b>	0:00	<b>51:18</b>
s07	Oerzen, Im Dorfe 16	<b>71:46</b>	0:00	<b>71:46</b>
s08	Oerzen, Im Dorfe 19	<b>35:44</b>	0:00	<b>35:44</b>
s09	Oerzen, Im Dorfe 25	<b>57:14</b>	0:00	<b>57:14</b>
s10	Oerzen, Westerheide 1	<b>59:19</b>	0:00	<b>59:19</b>
s11	Oerzen, Westerheide 3	<b>59:58</b>	0:00	<b>59:58</b>
s12	Oerzen, Westerheide 4	<b>54:14</b>	0:00	<b>54:14</b>
s13	Oerzen, Westerheide 5	<b>55:53</b>	0:00	<b>55:53</b>
s14	Oerzen, Westerheide 12A	<b>60:09</b>	0:00	<b>60:09</b>
s15	Oerzen, Westerheide 12C	<b>62:51</b>	0:00	<b>62:51</b>
s16	Oerzen, Westerheide 18	<b>67:54</b>	0:00	<b>67:54</b>
s17	Oerzen, Westerheide 19	<b>61:44</b>	0:00	<b>61:44</b>
s18	Oerzen, Westerheide 20	<b>70:26</b>	0:00	<b>70:26</b>
s19	Oerzen, Westerheide 22	<b>77:16</b>	0:00	<b>77:16</b>
s20	Oerzen, Westerheide 28	<b>98:48</b>	0:00	<b>98:48</b>
s21	Oerzen, Zum Hasel 5	16:16	0:00	16:16
s22	Oerzen, Zum Hasel 10	<b>47:29</b>	0:00	<b>47:29</b>
s23	Oerzen, Mühlenweg 10	<b>30:40</b>	0:00	<b>30:40</b>
s24	Oerzen, Mühlenweg 18	<b>48:19</b>	0:00	<b>48:19</b>
s25	Südergellersen, Auf dem Brink 6	14:25	14:25	0:00

s26	Südergellersen, Auf dem Brink 7	20:07	20:07	0:00
s27	Südergellersen, Birkenweg 7	5:54	5:54	0:00
s28	Südergellersen, Forstweg 4	21:47	15:57	5:50
s29	Südergellersen, Forstweg 8	21:16	10:06	11:10
s30	Südergellersen, Forstweg 11	<b>38:43</b>	10:38	28:05
s31	Südergellersen, Forstweg 16	20:52	0:00	20:52
s32	Südergellersen, Forstweg 17	<b>34:19</b>	3:16	<b>31:03</b>
s33	Südergellersen, Gewerbegebiet 747	<b>747:08</b>	23:09	<b>729:45</b>
s34	Südergellersen, Heidberg 2	9:25	1:40	7:45
s35	Südergellersen, Heidberg 3	5:56	0:00	5:56
s36	Südergellersen, Heilighenthaler Weg 2	<b>43:41</b>	16:50	<b>31:23</b>
s37	Südergellersen, Heilighenthaler Weg 3	<b>39:14</b>	23:25	19:41
s38	Südergellersen, Heilighenthaler Weg 3c	<b>37:12</b>	21:54	19:25
s39	Südergellersen, Heilighenthaler Weg 11	<b>34:29</b>	16:36	21:43
s40	Südergellersen, Im Alten Dorfe 2	28:58	25:15	3:43
s41	Südergellersen, Im Alten Dorfe 3	24:17	24:17	0:00
s42	Südergellersen, Im Alten Dorfe 4	<b>61:21</b>	<b>33:19</b>	28:18
s43	Südergellersen, Im Alten Dorfe 5	29:48	25:08	4:40
s44	Südergellersen, Im Alten Dorfe 7	29:15	24:00	5:15
s45	Südergellersen, Im Alten Dorfe 8	<b>46:41</b>	29:51	17:07
s46	Südergellersen, Im Alten Dorfe 10A	<b>45:12</b>	28:29	18:07
s47	Südergellersen, Kirchgellerser Straße 2	19:43	19:43	0:00
s48	Südergellersen, Kirchgellerser Straße 3	14:35	14:35	0:00
s49	Südergellersen, Kirchgellerser Straße 6	13:11	13:11	0:00
s50	Südergellersen, Kirchgellerser Straße 9	8:16	8:16	0:00
s51	Südergellersen, Kirchgellerser Straße 10	0:00	0:00	0:00
s52	Südergellersen, Kirchgellerser Straße 13	0:00	0:00	0:00
s53	Südergellersen, Kirchgellerser Straße 15	<b>38:54</b>	24:52	16:39
s54	Südergellersen, Kirchgellerser Straße 16	<b>44:12</b>	25:09	22:55
s55	Südergellersen, Oerzer Str. 13A	<b>90:19</b>	13:33	<b>84:16</b>
s56	Südergellersen, Oerzer Str. 15	<b>119:02</b>	11:35	<b>116:41</b>



s57	Südergellersen, Oerzer Str. 18	<b>58:28</b>	18:15	<b>45:20</b>
s58	Südergellersen, Oerzer Str. 19	<b>134:01</b>	13:44	<b>130:08</b>
s59	Südergellersen, Poggenpohl 7	<b>104:02</b>	17:27	<b>94:05</b>
s60	Südergellersen, Poggenpohl 8	<b>67:23</b>	24:42	<b>46:42</b>
s61	Südergellersen, Schwarzer Weg 2	9:11	9:11	0:00
s62	Südergellersen, Schwarzer Weg 9	1:57	1:57	0:00
s63	Südergellersen, Westergellersen Weg 1	17:34	17:34	0:00
s64	Südergellersen, Westergellersen Weg 4	8:43	8:43	0:00
s65	Südergellersen, Wetzter Weg 3	<b>49:14</b>	22:07	27:07
s66	Südergellersen, Wetzter Weg 6	<b>155:31</b>	<b>40:57</b>	<b>114:34</b>
s67	Südergellersen, In de Masch 8	<b>31:00</b>	23:04	8:07
s68	Wetzen, Zum Lerchenberg 5	20:25	0:00	20:25
s69	Wetzen, Zum Lerchenberg 10	13:47	0:00	13:47
s70	Wetzen, Zum Lerchenberg 37	<b>35:54</b>	0:00	<b>35:54</b>

**Tabelle 4:** Die **täglichen** Schattenzeiten an den Rezeptoren für die Gesamtbelastung, sowie Vor- und Zusatzbelastung. Überschreitungen sind fett gedruckt und grau hinterlegt.

IO Nr.	Name	Gesamtbelastung	Zusatzbelastung	Vorbelastung
		Stunden / Jahr	Stunden / Jahr	Stunden / Jahr
		[Std:Min]	[Std:Min]	[Std:Min]
s01	Neu Oerzen, Soltau Straße 1	0:00	0:00	0:00
s02	Oerzen, Am Ohfeld 1	<b>0:48</b>	0:00	<b>0:48</b>
s03	Oerzen, Am Ohfeld 4	<b>0:41</b>	0:00	<b>0:41</b>
s04	Oerzen, Am Ohfeld 9	<b>0:43</b>	0:00	<b>0:43</b>
s05	Oerzen, Am Ohfeld 15	<b>0:44</b>	0:00	<b>0:44</b>
s06	Oerzen, Im Dorfe 14	<b>0:48</b>	0:00	<b>0:48</b>
s07	Oerzen, Im Dorfe 16	<b>0:55</b>	0:00	<b>0:55</b>
s08	Oerzen, Im Dorfe 19	<b>0:32</b>	0:00	<b>0:32</b>
s09	Oerzen, Im Dorfe 25	<b>0:49</b>	0:00	<b>0:49</b>
s10	Oerzen, Westerheide 1	<b>0:53</b>	0:00	<b>0:53</b>
s11	Oerzen, Westerheide 3	<b>0:53</b>	0:00	<b>0:53</b>
s12	Oerzen, Westerheide 4	<b>0:50</b>	0:00	<b>0:50</b>
s13	Oerzen, Westerheide 5	<b>0:48</b>	0:00	<b>0:48</b>
s14	Oerzen, Westerheide 12A	<b>0:47</b>	0:00	<b>0:47</b>
s15	Oerzen, Westerheide 12C	<b>0:49</b>	0:00	<b>0:49</b>
s16	Oerzen, Westerheide 18	<b>0:50</b>	0:00	<b>0:50</b>
s17	Oerzen, Westerheide 19	<b>0:51</b>	0:00	<b>0:51</b>
s18	Oerzen, Westerheide 20	<b>0:52</b>	0:00	<b>0:52</b>
s19	Oerzen, Westerheide 22	<b>0:55</b>	0:00	<b>0:55</b>
s20	Oerzen, Westerheide 28	<b>1:08</b>	0:00	<b>1:08</b>
s21	Oerzen, Zum Hasel 5	0:24	0:00	0:24

s22	Oerzen, Zum Hasel 10	0:30	0:00	0:30
s23	Oerzen, Mühlenweg 10	<b>0:32</b>	0:00	<b>0:32</b>
s24	Oerzen, Mühlenweg 18	<b>0:43</b>	0:00	<b>0:43</b>
s25	Südergellersen, Auf dem Brink 6	0:25	0:25	0:00
s26	Südergellersen, Auf dem Brink 7	0:27	0:27	0:00
s27	Südergellersen, Birkenweg 7	0:16	0:16	0:00
s28	Südergellersen, Forstweg 4	<b>0:44</b>	0:27	0:17
s29	Südergellersen, Forstweg 8	<b>0:54</b>	0:23	<b>0:32</b>
s30	Südergellersen, Forstweg 11	<b>1:14</b>	0:24	<b>0:51</b>
s31	Südergellersen, Forstweg 16	<b>0:43</b>	0:00	<b>0:43</b>
s32	Südergellersen, Forstweg 17	<b>1:06</b>	0:14	<b>0:52</b>
s33	Südergellersen, Gewerbegebiet 747	<b>3:15</b>	0:29	<b>3:06</b>
s34	Südergellersen, Heidberg 2	0:29	0:10	0:19
s35	Südergellersen, Heidberg 3	0:17	0:00	0:17
s36	Südergellersen, Heilighenthaler Weg 2	<b>0:46</b>	0:24	<b>0:46</b>
s37	Südergellersen, Heilighenthaler Weg 3	<b>0:39</b>	0:24	0:27
s38	Südergellersen, Heilighenthaler Weg 3c	<b>0:38</b>	0:24	0:26
s39	Südergellersen, Heilighenthaler Weg 11	<b>0:35</b>	0:23	0:25
s40	Südergellersen, Im Alten Dorfe 2	<b>0:44</b>	0:30	0:14
s41	Südergellersen, Im Alten Dorfe 3	0:29	0:29	0:00
s42	Südergellersen, Im Alten Dorfe 4	<b>1:36</b>	<b>0:31</b>	<b>1:06</b>
s43	Südergellersen, Im Alten Dorfe 5	<b>0:43</b>	0:28	0:16
s44	Südergellersen, Im Alten Dorfe 7	<b>0:42</b>	0:26	0:16
s45	Südergellersen, Im Alten Dorfe 8	<b>0:53</b>	0:29	0:29
s46	Südergellersen, Im Alten Dorfe 10A	<b>0:48</b>	0:27	0:29
s47	Südergellersen, Kirchgellerser Straße 2	0:26	0:26	0:00
s48	Südergellersen, Kirchgellerser Straße 3	0:24	0:24	0:00
s49	Südergellersen, Kirchgellerser Straße 6	0:23	0:23	0:00
s50	Südergellersen, Kirchgellerser Straße 9	0:19	0:19	0:00
s51	Südergellersen, Kirchgellerser Straße 10	0:00	0:00	0:00
s52	Südergellersen, Kirchgellerser Straße 13	0:00	0:00	0:00
s53	Südergellersen, Kirchgellerser Straße 15	<b>0:41</b>	0:25	0:26



s54	Südergellersen, Kirchgel- lerer Straße 16	<b>0:42</b>	0:26	0:29
s55	Südergellersen, Oerzer Str. 13A	<b>1:34</b>	0:24	<b>1:34</b>
s56	Südergellersen, Oerzer Str. 15	<b>1:38</b>	0:24	<b>1:38</b>
s57	Südergellersen, Oerzer Str. 18	<b>1:15</b>	0:26	<b>1:15</b>
s58	Südergellersen, Oerzer Str. 19	<b>2:06</b>	0:26	<b>2:06</b>
s59	Südergellersen, Poggenpohl 7	<b>1:51</b>	0:28	<b>1:51</b>
s60	Südergellersen, Poggenpohl 8	<b>1:21</b>	0:28	<b>1:21</b>
s61	Südergellersen, Schwarzer Weg 2	0:21	0:21	0:00
s62	Südergellersen, Schwarzer Weg 9	0:10	0:10	0:00
s63	Südergellersen, Westergel- lenser Weg 1	0:26	0:26	0:00
s64	Südergellersen, Westergel- lenser Weg 4	0:20	0:20	0:00
s65	Südergellersen, Wetzer Weg 3	<b>1:23</b>	<b>0:31</b>	<b>0:52</b>
s66	Südergellersen, Wetzer Weg 6	<b>2:55</b>	<b>0:38</b>	<b>2:17</b>
s67	Südergellersen, In de Masch 8	<b>0:42</b>	0:25	0:20
s68	Wetzen, Zum Lerchenberg 5	0:19	0:00	0:19
s69	Wetzen, Zum Lerchenberg 10	0:18	0:00	0:18
s70	Wetzen, Zum Lerchenberg 37	<b>0:40</b>	0:00	<b>0:40</b>

Die Verteilung der Schattenwurfdauer auf der gesamten betrachteten Fläche kann der Karte im Anhang anhand der Iso-Schattenlinien für den jährlichen Schattenwurf entnommen werden.

Die geplanten Anlagen verursachen in Oerzen und Neu Oerzen keinen Schattenwurf.

An den umliegenden Dörfern und Häusern kommt es durch die geplanten Anlagen zum Teil zu großen Überschreitungen der Grenzwerte (max. 30 Stunden im Jahr und max. 30 Minuten täglich). Durch den großen Rotordurchmesser ist der Beschattungsbereich mit 1893 m sehr weit. Die Anlagen haben dagegen teilweise nur ca. 1100 m Abstand zu den Immissionsorten.

Benachbarte Häuser können ähnliche Beschattungswerte haben, wie die hier beispielhaft untersuchten Immissionsorte.

Für die Einhaltung der Grenzwerte muss eine spezielle Steuerung die Schattenwurf verursachenden Windenergieanlagen abschalten. Das Abschaltmodul besteht aus einem Sonnenscheindetektor und einer Steuereinheit, die bei einem möglichen Schattenwurf (in Abhängigkeit des Azimutwinkels der Windanlage und des Sonnenstands) die entsprechenden Windkraftanlagen abschaltet. Durch dieses Modul wird sichergestellt, dass die Windenergieanlagen, in dem kritischen Zeitraum mit Schattenwurf auf die betroffenen Immissionsorte, abgeschaltet werden und so die Richtwerte nicht überschritten werden.

## **7 Zusammenfassung**

Durch Errichtung und Betrieb der beantragten neuen Windenergieanlagen ist Schattenwurf an einigen der umliegenden Häuser zu erwarten.

Dabei kommt es zu Schattenwurf, der über den Grenzwerten (max. 30 Stunden im Jahr und max. 30 Minuten täglich) liegt.

Um die Überschreitungen zu verhindern und für die Einhaltung der Grenzwerte müssen die geplanten Anlagen mit einem Schattenabschaltmodul ausgestattet werden.

Bei der Bewertung der berechneten Zahlen ist zu berücksichtigen, dass sie jeweils unter „Worst Case“-Annahmen zustande gekommen sind und in der Realität wesentlich geringere Schattendauern festzustellen sein werden. Insbesondere ist zu bemerken, dass bereits vorhandene lichtundurchlässige Hindernisse vor den betrachteten Objekten nicht berücksichtigt wurden.

Für die Untersuchung wurden die durch den Auftraggeber dieses Gutachtens beantragten 6 Windenergieanlagen des Typs NORDEX N175/6.X-6.800 mit einer Nabenhöhe von 179 m und einem Rotordurchmesser von 175 m neben 23 bestehenden, genehmigten Windenergieanlagen an den vom Auftraggeber vorgegebenen Positionen angesetzt.

## **8** **Literaturverzeichnis**

- [1] J. Pohl, F. Faul und R. Mausfeld, *Belästigung durch periodischen Schattenwurf von Windenergieanlagen*, Institut für Psychologie der Christian-Albrechts-Universität zu Kiel, 1999.
- [2] Bund/Länder-Arbeitsgemeinschaft für Immissionsschutz (LAI), *Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windkraftanlagen Aktualisierung 2019 (WKA-Schattenwurfhinweise)*.

Karte Titel: Map data: © OpenStreetMap contributors, SRTM | map graphic: © OpenTopoMap (CC-BY-SA)  
WEA Titel, Nordex N175/6X, © Nordex Energy SE & Co. KG

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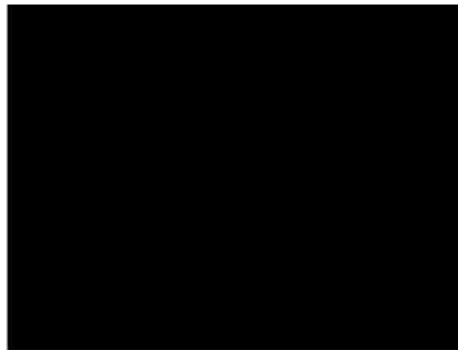
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Gevensleben, den 22. Juli 2025



## Anhang

### Ergebnisse der WindPRO Berechnung Shadow:

#### Berechnung: Gesamtbelastung 6x N175 +23 Bestand

Hauptergebnis	4 Seiten
Kalender	102 Seiten
Grafischer Kalender	12 Seiten
Karte	1 Seite

#### Berechnung: Zusatzbelastung 6x N175

Hauptergebnis	4 Seiten
Grafischer Kalender	12 Seiten
Karte	1 Seite

#### Berechnung: Vorbelastung 23 Bestand

Hauptergebnis	4 Seiten
Grafischer Kalender	12 Seiten
Karte	1 Seite



## SHADOW - Hauptergebnis

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand

### Annahmen für Schattenwurfberechnung

Beschattungsbereich der WEA  
Schatten nur relevant, wo Rotorblatt mind. 20% der Sonne verdeckt  
Siehe WEA-Tabelle

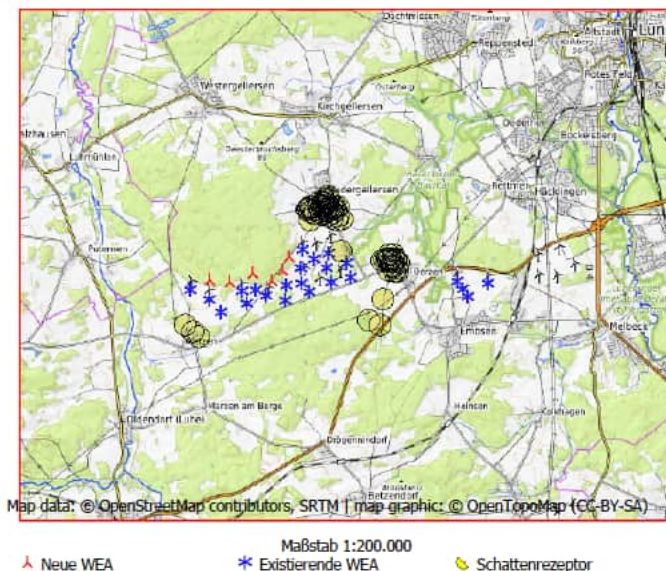
Minimale relevante Sonnenhöhe über Horizont 3 °  
Tage zwischen Berechnungen 1 Tag(e)  
Berechnungszeitsprung 1 Minuten

Die dargestellten Zeiten sind die astronomisch maximal mögliche  
Beschattungsdauer, berechnet unter folgenden Annahmen:  
Die Sonne scheint täglich von Sonnenauf- bis -untergang  
Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung  
Die Windenergieanlage/n ist/sind immer in Betrieb

Eine WEA wird nicht berücksichtigt, wenn sie von keinem Teil der  
Rezeptorfläche aus sichtbar ist. Die Sichtbarkeitsberechnung basiert auf  
den folgenden Annahmen:

DHM: Höhenlinien: CONTOURLINE\_ONLINEDATA\_0.wpo (1)  
Rasterauflösung: 1,0 m

Alle Koordinatenangaben in:  
UTM (north)-ETRS89 Zone: 32



### WEA

	Ost	Nord	Z	Beschreibung	WEA-Typ	Hersteller	Typ	Nennleistung	Rotor-durchmesser	NH	Schattendaten	
											Beschatt.-Bereich	U/min
			[m]		Aktuell			[kW]	[m]	[m]	[m]	[U/min]
B 01	585.971,6	5.895.090,6	50,0	NORDEX N1...	Ja	NORDEX	N149/4.0-4.5-4.500	4.500	149,0	125,0	1.822	10,7
B 02	585.959,5	5.894.188,5	45,0	NORDEX N1...	Ja	NORDEX	N131/3300 DE-3.300	3.300	131,0	134,0	1.722	10,9
B 03	585.020,8	5.893.835,6	50,0	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 04	584.733,6	5.893.984,8	50,0	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 05	584.375,7	5.893.950,2	55,0	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 06	584.497,2	5.893.629,8	56,7	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 07	583.821,9	5.893.385,7	64,4	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 08	583.491,9	5.893.713,6	60,0	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 09	582.991,2	5.893.966,5	55,0	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 10	590.139,5	5.894.321,8	37,1	ENERCON E...	Nein	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0	1.487	22,0
B 11	590.290,9	5.894.120,4	40,0	ENERCON E...	Nein	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0	1.487	22,0
B 12	590.431,2	5.893.915,7	42,1	ENERCON E...	Nein	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0	1.487	22,0
B 13	590.960,7	5.894.291,0	45,6	ENERCON E...	Nein	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0	1.487	22,0
Oerzen 1	587.151,9	5.894.746,2	45,6	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Oerzen 2	587.284,9	5.894.361,9	40,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Oerzen 3	586.751,2	5.894.214,7	49,2	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Oerzen 4	586.171,4	5.893.951,1	50,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Oerzen 5	585.523,5	5.893.709,1	56,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Rep 10	586.619,0	5.894.596,4	42,4	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Rep 11	586.661,3	5.895.000,3	44,3	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Rep 5	585.563,4	5.894.124,0	45,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Rep 8	585.927,2	5.894.596,0	48,8	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Rep 9	586.287,4	5.894.833,5	45,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
WEA 1	583.483,3	5.894.212,8	63,6	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
WEA 2	584.033,5	5.894.180,5	60,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
WEA 3	584.658,9	5.894.431,7	75,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
WEA 4	585.154,3	5.894.214,4	53,9	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
WEA 6	585.438,2	5.894.508,1	65,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
WEA 7	585.624,4	5.894.865,7	60,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8



**SHADOW - Hauptergebnis****Berechnung:** Gesamtbelastung 6x N175 +23 Bestand**Schattenrezeptor-Eingabe**

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
				[m]	[m]	[m]	[m]	[°]		[m]
s01	Neu Oerzen, Soltauer Straße 1	588.101,7	5.893.084,2	46,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s02	Oerzen, Am Ohfeld 1	588.404,8	5.894.762,2	45,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s03	Oerzen, Am Ohfeld 4	588.478,4	5.894.877,5	40,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s04	Oerzen, Am Ohfeld 9	588.431,5	5.894.865,5	40,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s05	Oerzen, Am Ohfeld 15	588.429,4	5.894.972,8	43,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s06	Oerzen, Im Dorfe 14	588.496,1	5.894.607,3	48,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s07	Oerzen, Im Dorfe 16	588.303,1	5.894.557,6	47,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s08	Oerzen, Im Dorfe 19	588.526,8	5.894.534,4	50,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s09	Oerzen, Im Dorfe 25	588.443,9	5.894.543,8	50,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s10	Oerzen, Westerheide 1	588.389,1	5.894.636,1	49,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s11	Oerzen, Westerheide 3	588.370,1	5.894.675,9	47,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s12	Oerzen, Westerheide 4	588.427,4	5.894.685,8	48,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s13	Oerzen, Westerheide 5	588.381,0	5.894.813,7	42,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s14	Oerzen, Westerheide 12A	588.325,0	5.894.865,9	42,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s15	Oerzen, Westerheide 12C	588.306,5	5.894.823,7	44,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s16	Oerzen, Westerheide 18	588.256,0	5.894.856,0	45,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s17	Oerzen, Westerheide 19	588.291,4	5.894.974,5	48,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s18	Oerzen, Westerheide 20	588.229,9	5.894.881,8	47,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s19	Oerzen, Westerheide 22	588.185,2	5.894.847,2	46,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s20	Oerzen, Westerheide 28	588.102,7	5.894.825,3	47,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s21	Oerzen, Zum Hasel 5	587.786,3	5.893.215,0	57,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s22	Oerzen, Zum Hasel 10	588.158,0	5.893.781,7	45,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s23	Oerzen, Mühlenweg 10	588.545,4	5.894.776,2	44,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s24	Oerzen, Mühlenweg 18	588.468,7	5.894.823,3	42,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s25	Südergellersen, Auf dem Brink 6	586.477,5	5.896.246,7	67,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s26	Südergellersen, Auf dem Brink 7	586.498,2	5.896.189,4	65,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s27	Südergellersen, Birkenweg 7	586.547,8	5.896.410,5	65,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s28	Südergellersen, Forstweg 4	586.302,3	5.896.127,2	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s29	Südergellersen, Forstweg 8	586.230,1	5.896.140,7	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s30	Südergellersen, Forstweg 11	586.166,4	5.896.101,6	63,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s31	Südergellersen, Forstweg 16	586.112,1	5.896.167,0	64,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s32	Südergellersen, Forstweg 17	586.094,1	5.896.128,7	62,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s33	Südergellersen, Gewerbegebiet	587.007,3	5.895.062,8	43,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s34	Südergellersen, Heidberg 2	586.177,4	5.896.183,9	66,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s35	Südergellersen, Heidberg 3	586.154,2	5.896.223,0	66,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s36	Südergellersen, Heilighenthaler Weg 2	586.863,9	5.896.155,5	55,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s37	Südergellersen, Heilighenthaler Weg 3	586.792,8	5.896.190,0	58,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s38	Südergellersen, Heilighenthaler Weg 3c	586.833,1	5.896.217,7	58,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s39	Südergellersen, Heilighenthaler Weg 11	586.911,1	5.896.239,1	52,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s40	Südergellersen, Im Alten Dorfe 2	586.402,6	5.896.082,0	64,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s41	Südergellersen, Im Alten Dorfe 3	586.453,7	5.896.115,5	65,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s42	Südergellersen, Im Alten Dorfe 4	586.480,0	5.896.021,4	61,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s43	Südergellersen, Im Alten Dorfe 5	586.561,2	5.896.156,3	63,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s44	Südergellersen, Im Alten Dorfe 7	586.616,6	5.896.197,1	62,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s45	Südergellersen, Im Alten Dorfe 8	586.561,9	5.896.067,6	60,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s46	Südergellersen, Im Alten Dorfe 10A	586.625,5	5.896.101,5	60,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s47	Südergellersen, Kirchgellerser Straße 2	586.638,0	5.896.277,9	62,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s48	Südergellersen, Kirchgellerser Straße 3	586.594,8	5.896.327,3	63,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s49	Südergellersen, Kirchgellerser Straße 6	586.637,2	5.896.375,2	63,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s50	Südergellersen, Kirchgellerser Straße 9	586.617,5	5.896.432,1	64,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s51	Südergellersen, Kirchgellerser Straße 10	586.660,0	5.896.465,5	63,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s52	Südergellersen, Kirchgellerser Straße 13	586.632,2	5.896.499,1	64,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s53	Südergellersen, Kirchgellerser Straße 15	586.747,3	5.896.191,6	60,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s54	Südergellersen, Kirchgellerser Straße 16	586.731,0	5.896.121,0	59,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s55	Südergellersen, Oerzer Str. 13A	586.909,5	5.895.981,7	53,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s56	Südergellersen, Oerzer Str. 15	587.010,6	5.895.899,8	50,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s57	Südergellersen, Oerzer Str. 18	586.781,3	5.896.062,2	56,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s58	Südergellersen, Oerzer Str. 19	586.879,7	5.895.864,2	49,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s59	Südergellersen, Poggenpohl 7	586.751,1	5.895.922,0	55,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s60	Südergellersen, Poggenpohl 8	586.640,6	5.895.995,8	58,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s61	Südergellersen, Schwarzer Weg 2	586.403,0	5.896.246,5	71,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s62	Südergellersen, Schwarzer Weg 9	586.404,8	5.896.338,8	69,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0

(Fortsetzung nächste Seite)...



**SHADOW - Hauptergebnis****Berechnung:** Gesamtbelastung 6x N175 +23 Bestand

...(Fortsetzung von vorheriger Seite)

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
				[m]	[m]	[m]	[m]	[°]		[m]
s63	Südergellersen, Westergellenser Weg 1	586.545,3	5.896.256,4	63,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s64	Südergellersen, Westergellenser Weg 4	586.498,9	5.896.338,8	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s65	Südergellersen, Wetzter Weg 3	586.268,4	5.896.052,0	63,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s66	Südergellersen, Wetzter Weg 6	586.172,4	5.895.854,5	57,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s67	Südergellersen, In de Masch 8	586.717,4	5.896.250,8	61,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s68	Wetzen, Zum Lerchenberg 5	583.085,3	5.892.839,1	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s69	Wetzen, Zum Lerchenberg 10	583.242,4	5.892.711,0	60,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s70	Wetzen, Zum Lerchenberg 37	582.866,7	5.892.994,9	69,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0

**Berechnungsergebnisse**

Schattenrezeptor

**astron. max. mögl. Beschattungsdauer**

Nr.	Name	Stunden/Jahr [h/a]	Schattentage/Jahr [d/a]	Max.Schattendauer/Tag [h/d]
s01	Neu Oerzen, Soltauer Straße 1	0:00	0	0:00
s02	Oerzen, Am Ohfeld 1	54:40	112	0:48
s03	Oerzen, Am Ohfeld 4	47:02	107	0:41
s04	Oerzen, Am Ohfeld 9	50:47	112	0:43
s05	Oerzen, Am Ohfeld 15	49:31	110	0:44
s06	Oerzen, Im Dorfe 14	51:18	108	0:48
s07	Oerzen, Im Dorfe 16	71:46	123	0:55
s08	Oerzen, Im Dorfe 19	35:44	92	0:32
s09	Oerzen, Im Dorfe 25	57:14	113	0:49
s10	Oerzen, Westerheide 1	59:19	115	0:53
s11	Oerzen, Westerheide 3	59:58	116	0:53
s12	Oerzen, Westerheide 4	54:14	111	0:50
s13	Oerzen, Westerheide 5	55:53	116	0:48
s14	Oerzen, Westerheide 12A	60:09	120	0:47
s15	Oerzen, Westerheide 12C	62:51	122	0:49
s16	Oerzen, Westerheide 18	67:54	126	0:50
s17	Oerzen, Westerheide 19	61:44	122	0:51
s18	Oerzen, Westerheide 20	70:26	128	0:52
s19	Oerzen, Westerheide 22	77:16	134	0:55
s20	Oerzen, Westerheide 28	98:48	144	1:08
s21	Oerzen, Zum Hasel 5	16:16	55	0:24
s22	Oerzen, Zum Hasel 10	47:29	116	0:30
s23	Oerzen, Mühlenweg 10	30:40	77	0:32
s24	Oerzen, Mühlenweg 18	48:19	109	0:43
s25	Südergellersen, Auf dem Brink 6	14:25	42	0:25
s26	Südergellersen, Auf dem Brink 7	20:07	52	0:27
s27	Südergellersen, Birkenweg 7	5:54	27	0:16
s28	Südergellersen, Forstweg 4	21:47	44	0:44
s29	Südergellersen, Forstweg 8	21:16	34	0:54
s30	Südergellersen, Forstweg 11	38:43	46	1:14
s31	Südergellersen, Forstweg 16	20:52	42	0:43
s32	Südergellersen, Forstweg 17	34:19	48	1:06
s33	Südergellersen, Gewerbegebiet	747:08	365	3:15
s34	Südergellersen, Heidberg 2	9:25	31	0:29
s35	Südergellersen, Heidberg 3	5:56	27	0:17
s36	Südergellersen, Heiligenthaler Weg 2	43:41	82	0:46
s37	Südergellersen, Heiligenthaler Weg 3	39:14	74	0:39
s38	Südergellersen, Heiligenthaler Weg 3c	37:12	74	0:38
s39	Südergellersen, Heiligenthaler Weg 11	34:29	78	0:35
s40	Südergellersen, Im Alten Dorfe 2	28:58	58	0:44
s41	Südergellersen, Im Alten Dorfe 3	24:17	58	0:29
s42	Südergellersen, Im Alten Dorfe 4	61:21	72	1:36
s43	Südergellersen, Im Alten Dorfe 5	29:48	62	0:43
s44	Südergellersen, Im Alten Dorfe 7	29:15	62	0:42
s45	Südergellersen, Im Alten Dorfe 8	46:41	72	0:53
s46	Südergellersen, Im Alten Dorfe 10A	45:12	74	0:48
s47	Südergellersen, Kirchgellerser Straße 2	19:43	54	0:26

(Fortsetzung nächste Seite)...



**SHADOW - Hauptergebnis****Berechnung:** Gesamtbelastung 6x N175 +23 Bestand

...(Fortsetzung von vorheriger Seite)

Nr.	Name	astron. max. mögl. Beschattungsdauer		
		Stunden/Jahr [h/a]	Schattentage/Jahr [d/a]	Max.Schattendauer/Tag [h/d]
s48	Südergellersen, Kirchgellerser Straße 3	14:35	44	0:24
s49	Südergellersen, Kirchgellerser Straße 6	13:11	42	0:23
s50	Südergellersen, Kirchgellerser Straße 9	8:16	32	0:19
s51	Südergellersen, Kirchgellerser Straße 10	0:00	0	0:00
s52	Südergellersen, Kirchgellerser Straße 13	0:00	0	0:00
s53	Südergellersen, Kirchgellerser Straße 15	38:54	72	0:41
s54	Südergellersen, Kirchgellerser Straße 16	44:12	78	0:42
s55	Südergellersen, Oerzer Str. 13A	90:19	102	1:34
s56	Südergellersen, Oerzer Str. 15	119:02	114	1:38
s57	Südergellersen, Oerzer Str. 18	58:28	87	1:15
s58	Südergellersen, Oerzer Str. 19	134:01	112	2:06
s59	Südergellersen, Poggenpohl 7	104:02	100	1:51
s60	Südergellersen, Poggenpohl 8	67:23	86	1:21
s61	Südergellersen, Schwarzer Weg 2	9:11	33	0:21
s62	Südergellersen, Schwarzer Weg 9	1:57	15	0:10
s63	Südergellersen, Westergellerser Weg 1	17:34	50	0:26
s64	Südergellersen, Westergellerser Weg 4	8:43	32	0:20
s65	Südergellersen, Wetzer Weg 3	49:14	52	1:23
s66	Südergellersen, Wetzer Weg 6	155:31	78	2:55
s67	Südergellersen, In de Masch 8	31:00	64	0:42
s68	Wetzen, Zum Lerchenberg 5	20:25	89	0:19
s69	Wetzen, Zum Lerchenberg 10	13:47	66	0:18
s70	Wetzen, Zum Lerchenberg 37	35:54	103	0:40

Gesamtdauer Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [h/a]
B 01	NORDEX N149/4.0-4.5 4500 149.0 !-! NH: 125,0 m (Ges:199,5 m) (101)	142:41
B 02	NORDEX N131/3300 DE 3300 131.0 !-! NH: 134,0 m (Ges:199,5 m) (120)	11:43
B 03	GE WIND ENERGY GE 2.75-120 2750 120.0 !-! NH: 139,0 m (Ges:199,0 m) (94)	11:18
B 04	GE WIND ENERGY GE 2.75-120 2750 120.0 !-! NH: 139,0 m (Ges:199,0 m) (95)	12:12
B 05	GE WIND ENERGY GE 2.75-120 2750 120.0 !-! NH: 139,0 m (Ges:199,0 m) (96)	10:15
B 06	GE WIND ENERGY GE 2.75-120 2750 120.0 !-! NH: 139,0 m (Ges:199,0 m) (97)	23:02
B 07	GE WIND ENERGY GE 2.75-120 2750 120.0 !-! NH: 139,0 m (Ges:199,0 m) (98)	20:35
B 08	GE WIND ENERGY GE 2.75-120 2750 120.0 !-! NH: 139,0 m (Ges:199,0 m) (99)	0:00
B 09	GE WIND ENERGY GE 2.75-120 2750 120.0 !-! NH: 139,0 m (Ges:199,0 m) (100)	0:00
B 10	ENERCON E-66/18.70 1800 70.0 !-! NH: 65,0 m (Ges:100,0 m) (103)	0:00
B 11	ENERCON E-66/18.70 1800 70.0 !-! NH: 65,0 m (Ges:100,0 m) (104)	0:00
B 12	ENERCON E-66/18.70 1800 70.0 !-! NH: 65,0 m (Ges:100,0 m) (105)	0:00
B 13	ENERCON E-66/18.70 1800 70.0 !-! NH: 65,0 m (Ges:100,0 m) (106)	0:00
Oerzen 1	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (79)	331:00
Oerzen 2	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (80)	194:07
Oerzen 3	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (81)	115:16
Oerzen 4	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (82)	50:45
Oerzen 5	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (83)	0:00
Rep 10	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (110)	142:32
Rep 11	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (111)	462:12
Rep 5	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (107)	10:50
Rep 8	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (108)	76:51
Rep 9	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (109)	134:59
WEA 1	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (339)	0:00
WEA 2	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (340)	0:00
WEA 3	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (341)	0:00
WEA 4	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (342)	0:00
WEA 6	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (343)	41:08
WEA 7	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (344)	154:37

Summen in Rezeptortabelle und WEA-Tabelle können sich unterscheiden, da eine WEA gleichzeitig an zwei oder mehr Rezeptoren Beschattung verursachen kann und/oder ein Rezeptor gleichzeitig von zwei oder mehr WEA beschattet werden kann.

## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s01 - Neu Oerzen, Soltauer Straße 1

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34 16:11	08:05 17:01	07:09 17:56	06:55 19:53	05:48 20:47	05:00 21:35	04:56 21:50	05:35 21:16	06:27 20:11	07:19 18:58	07:16 16:49	08:09 16:06
2	08:34 16:13	08:03 17:03	07:06 17:58	06:53 19:54	05:46 20:48	04:59 21:36	04:57 21:49	05:36 21:14	06:29 20:08	07:21 18:56	07:18 16:47	08:11 16:06
3	08:34 16:14	08:01 17:05	07:04 18:00	06:50 19:56	05:44 20:50	04:58 21:37	04:57 21:49	05:38 21:12	06:31 20:06	07:23 18:54	07:20 16:45	08:12 16:05
4	08:33 16:15	08:00 17:07	07:02 18:01	06:48 19:58	05:42 20:52	04:57 21:38	04:58 21:48	05:39 21:10	06:32 20:04	07:24 18:51	07:21 16:44	08:14 16:04
5	08:33 16:16	07:58 17:09	07:00 18:03	06:46 20:00	05:40 20:54	04:56 21:39	04:59 21:48	05:41 21:08	06:34 20:01	07:26 18:49	07:23 16:42	08:15 16:04
6	08:33 16:17	07:56 17:11	06:57 18:05	06:43 20:02	05:38 20:55	04:56 21:41	05:00 21:47	05:43 21:06	06:36 19:59	07:28 18:46	07:25 16:40	08:16 16:03
7	08:32 16:19	07:54 17:13	06:55 18:07	06:41 20:04	05:36 20:57	04:55 21:41	05:01 21:47	05:44 21:05	06:38 19:56	07:30 18:44	07:27 16:38	08:18 16:03
8	08:32 16:20	07:53 17:15	06:53 18:09	06:39 20:05	05:34 20:59	04:54 21:42	05:02 21:46	05:46 21:03	06:39 19:54	07:31 18:42	07:29 16:36	08:19 16:02
9	08:31 16:22	07:51 17:17	06:50 18:11	06:36 20:07	05:32 21:00	04:54 21:43	05:03 21:45	05:48 21:01	06:41 19:52	07:33 18:39	07:31 16:35	08:20 16:02
10	08:31 16:23	07:49 17:19	06:48 18:13	06:34 20:09	05:30 21:02	04:53 21:44	05:04 21:44	05:50 20:59	06:43 19:49	07:35 18:37	07:33 16:33	08:21 16:02
11	08:30 16:24	07:47 17:21	06:46 18:15	06:32 20:11	05:29 21:04	04:53 21:45	05:05 21:44	05:51 20:57	06:44 19:47	07:37 18:35	07:35 16:31	08:23 16:02
12	08:29 16:26	07:45 17:23	06:43 18:16	06:29 20:12	05:27 21:06	04:53 21:46	05:06 21:43	05:53 20:55	06:46 19:44	07:39 18:32	07:36 16:30	08:24 16:01
13	08:28 16:28	07:43 17:25	06:41 18:18	06:27 20:14	05:25 21:07	04:52 21:46	05:07 21:42	05:55 20:53	06:48 19:42	07:40 18:30	07:38 16:28	08:25 16:01
14	08:28 16:29	07:41 17:27	06:38 18:20	06:25 20:16	05:23 21:09	04:52 21:47	05:09 21:41	05:56 20:51	06:50 19:40	07:42 18:28	07:40 16:26	08:26 16:01
15	08:27 16:31	07:39 17:29	06:36 18:22	06:22 20:18	05:22 21:11	04:52 21:48	05:10 21:40	05:58 20:49	06:51 19:37	07:44 18:25	07:42 16:25	08:27 16:01
16	08:26 16:32	07:37 17:31	06:34 18:24	06:20 20:20	05:20 21:12	04:52 21:48	05:11 21:39	06:00 20:46	06:53 19:35	07:46 18:23	07:44 16:23	08:27 16:01
17	08:25 16:34	07:35 17:33	06:31 18:26	06:18 20:21	05:19 21:14	04:51 21:49	05:12 21:37	06:01 20:44	06:55 19:32	07:48 18:21	07:46 16:22	08:28 16:02
18	08:24 16:36	07:33 17:35	06:29 18:27	06:16 20:23	05:17 21:15	04:51 21:49	05:14 21:36	06:03 20:42	06:56 19:30	07:50 18:19	07:47 16:21	08:29 16:02
19	08:23 16:37	07:31 17:37	06:26 18:29	06:13 20:25	05:15 21:17	04:51 21:49	05:15 21:35	06:05 20:40	06:58 19:27	07:51 18:17	07:49 16:19	08:30 16:02
20	08:22 16:39	07:29 17:39	06:24 18:31	06:11 20:27	05:14 21:18	04:52 21:50	05:16 21:34	06:07 20:38	07:00 19:25	07:53 18:14	07:51 16:18	08:30 16:02
21	08:20 16:41	07:26 17:40	06:22 18:33	06:09 20:29	05:13 21:20	04:52 21:50	05:18 21:32	06:08 20:36	07:02 19:23	07:55 18:12	07:53 16:17	08:31 16:03
22	08:19 16:43	07:24 17:42	06:19 18:35	06:07 20:30	05:11 21:21	04:52 21:50	05:19 21:31	06:10 20:33	07:03 19:20	07:57 18:10	07:55 16:15	08:32 16:03
23	08:18 16:45	07:22 17:44	06:17 18:36	06:04 20:32	05:10 21:23	04:52 21:50	05:21 21:30	06:12 20:31	07:05 19:18	07:59 18:08	07:56 16:14	08:32 16:04
24	08:17 16:46	07:20 17:46	06:14 18:38	06:02 20:34	05:08 21:24	04:52 21:50	05:22 21:28	06:13 20:29	07:07 19:15	08:01 18:06	07:58 16:13	08:33 16:04
25	08:15 16:48	07:18 17:48	06:12 18:40	06:00 20:36	05:07 21:26	04:53 21:50	05:24 21:27	06:15 20:27	07:09 19:13	07:03 17:04	08:00 16:12	08:33 16:05
26	08:14 16:50	07:15 17:50	06:10 18:42	05:58 20:38	05:06 21:27	04:53 21:50	05:25 21:25	06:17 20:24	07:10 19:10	07:04 17:01	08:01 16:11	08:33 16:06
27	08:13 16:52	07:13 17:52	06:07 18:44	05:56 20:39	05:05 21:29	04:54 21:50	05:27 21:24	06:19 20:22	07:12 19:08	07:06 16:59	08:03 16:10	08:33 16:07
28	08:11 16:54	07:11 17:54	06:05 18:45	05:54 20:41	05:04 21:30	04:54 21:50	05:28 21:22	06:20 20:20	07:14 19:06	07:08 16:57	08:05 16:09	08:34 16:07
29	08:10 16:56		07:02 19:47	05:52 20:43	05:03 21:31	04:55 21:50	05:30 21:21	06:22 20:18	07:16 19:03	07:10 16:55	08:06 16:08	08:34 16:08
30	08:08 16:58		07:00 19:49	05:50 20:45	05:02 21:33	04:55 21:50	05:31 21:19	06:24 20:15	07:17 19:01	07:12 16:53	08:08 16:07	08:34 16:09
31	08:06 17:00		06:58 19:51		05:01 21:34		05:33 21:17	06:26 20:13		07:14 16:51		08:34 16:10
Sonnenscheinstunden	253	275	367	419	491	506	509	458	382	329	262	237
astr.max.mögl.Beschattung												

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s02 - Oerzen, Am Ohfeld 1

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März		April		Mai		Juni	
1	08:34	08:05		07:09	17:02 (Oerzen 2)	06:55	18:50 (Oerzen 1)	05:48	04:59		
	16:11	17:01		17:56	27 17:29 (Oerzen 3)	19:53	27 19:17 (Oerzen 1)	20:47	21:35		
2	08:34	08:03		07:06	17:00 (Oerzen 2)	06:53	18:50 (Oerzen 1)	05:45	04:59		
	16:12	17:03		17:58	31 17:31 (Oerzen 3)	19:54	28 19:18 (Oerzen 1)	20:48	21:36		
3	08:34	08:01		07:04	16:58 (Oerzen 2)	06:50	18:49 (Oerzen 1)	05:44	04:58		
	16:14	17:05		18:00	33 17:31 (Oerzen 3)	19:56	30 19:19 (Oerzen 1)	20:50	21:37		
4	08:33	08:00		07:02	16:57 (Oerzen 2)	06:48	18:48 (Oerzen 1)	05:42	04:57		
	16:15	17:07		18:01	35 17:32 (Oerzen 3)	19:58	30 19:18 (Oerzen 1)	20:52	21:39		
5	08:33	07:58		07:00	16:56 (Oerzen 2)	06:46	18:47 (Oerzen 1)	05:40	04:56		
	16:16	17:09		18:03	36 17:32 (Oerzen 3)	20:00	32 19:19 (Oerzen 1)	20:54	21:40		
6	08:33	07:56		06:57	16:55 (Oerzen 2)	06:43	18:47 (Oerzen 1)	05:38	04:55		
	16:17	17:11		18:05	37 17:32 (Oerzen 3)	20:02	32 19:19 (Oerzen 1)	20:55	21:41		
7	08:32	07:54		06:55	16:55 (Oerzen 2)	06:41	18:46 (Oerzen 1)	05:36	04:55		
	16:19	17:13		18:07	37 17:32 (Oerzen 3)	20:04	32 19:18 (Oerzen 1)	20:57	21:42		
8	08:32	07:53		06:53	16:53 (Oerzen 2)	06:39	18:46 (Oerzen 1)	05:34	04:54		
	16:20	17:15		18:09	38 17:31 (Oerzen 3)	20:05	39 19:38 (Rep 11)	20:59	21:42		
9	08:31	07:51		06:50	16:53 (Oerzen 2)	06:36	18:47 (Oerzen 1)	05:32	04:54		
	16:21	17:17		18:11	38 17:31 (Oerzen 3)	20:07	44 19:41 (Rep 11)	21:01	21:43		
10	08:31	07:49		06:48	16:54 (Oerzen 2)	06:34	18:46 (Oerzen 1)	05:30	04:53		
	16:23	17:19		18:13	36 17:30 (Oerzen 3)	20:09	46 19:42 (Rep 11)	21:02	21:44		
11	08:30	07:47		06:46	16:53 (Oerzen 2)	06:32	18:47 (Oerzen 1)	05:28	04:53		
	16:24	17:21		18:14	35 17:28 (Oerzen 3)	20:11	48 19:44 (Rep 11)	21:04	21:45		
12	08:29	07:45		06:43	16:53 (Oerzen 2)	06:29	18:48 (Oerzen 1)	05:27	04:52		
	16:26	17:23		18:16	34 17:27 (Oerzen 3)	20:13	48 19:45 (Rep 11)	21:06	21:46		
13	08:28	07:43		06:41	16:53 (Oerzen 2)	06:27	18:48 (Oerzen 1)	05:25	04:52		
	16:27	17:25		18:18	32 17:25 (Oerzen 2)	20:14	47 19:44 (Rep 11)	21:07	21:46		
14	08:28	07:41		06:38	16:54 (Oerzen 2)	06:25	18:49 (Oerzen 1)	05:23	04:52		
	16:29	17:27		18:20	30 17:24 (Oerzen 2)	20:16	45 19:44 (Rep 11)	21:09	21:47		
15	08:27	07:39		06:36	16:54 (Oerzen 2)	06:22	18:51 (Oerzen 1)	05:22	04:52		
	16:31	17:29		18:22	28 17:22 (Oerzen 2)	20:18	42 19:45 (Rep 11)	21:11	21:48		
16	08:26	07:37		06:34	16:55 (Oerzen 2)	06:20	18:53 (Oerzen 1)	05:20	04:51		
	16:32	17:31		18:24	26 17:21 (Oerzen 2)	20:20	37 19:44 (Rep 11)	21:12	21:48		
17	08:25	07:35		06:31	16:57 (Oerzen 2)	06:18	18:57 (Oerzen 1)	05:18	04:51		
	16:34	17:33		18:26	23 17:20 (Oerzen 2)	20:21	29 19:44 (Rep 11)	21:14	21:49		
18	08:24	07:33		06:29	16:58 (Oerzen 2)	06:15	19:21 (Rep 11)	05:17	04:51		
	16:36	17:35		18:27	19 17:17 (Oerzen 2)	20:23	22 19:43 (Rep 11)	21:15	21:49		
19	08:23	07:31		06:26	17:01 (Oerzen 2)	06:13	19:22 (Rep 11)	05:15	04:51		
	16:37	17:37		18:29	22 18:03 (Rep 10)	20:25	20 19:42 (Rep 11)	21:17	21:49		
20	08:22	07:29		06:24	17:06 (Oerzen 2)	06:11	19:23 (Rep 11)	05:14	04:51		
	16:39	17:38		18:31	15 18:05 (Rep 10)	20:27	18 19:41 (Rep 11)	21:18	21:50		
21	08:20	07:26		06:22	17:50 (Rep 10)	06:09	19:24 (Rep 11)	05:12	04:52		
	16:41	17:40		18:33	17 18:07 (Rep 10)	20:29	16 19:40 (Rep 11)	21:20	21:50		
22	08:19	07:24		06:19	17:50 (Rep 10)	06:07	19:25 (Rep 11)	05:11	04:52		
	16:43	17:42		18:35	19 18:09 (Rep 10)	20:30	13 19:38 (Rep 11)	21:22	21:50		
23	08:18	07:22		06:17	17:48 (Rep 10)	06:04	19:28 (Rep 11)	05:10	04:52		
	16:44	17:44		18:36	21 18:09 (Rep 10)	20:32	7 19:35 (Rep 11)	21:23	21:50		
24	08:17	07:20		06:14	17:48 (Rep 10)	06:02		05:08	04:52		
	16:46	17:46		18:38	22 18:10 (Rep 10)	20:34		21:24	21:51		
25	08:15	07:18		06:12	17:47 (Rep 10)	06:00		05:07	04:53		
	16:48	17:48		18:40	22 18:09 (Rep 10)	20:36		21:26	21:51		
26	08:14	07:16		06:10	17:47 (Rep 10)	05:58		05:06	04:53		
	16:50	17:50		18:42	22 18:09 (Rep 10)	20:38		21:27	21:51		
27	08:13	07:13	17:09 (Oerzen 2)	06:07	17:46 (Rep 10)	05:56		05:05	04:53		
	16:52	17:52	7 17:16 (Oerzen 2)	18:44	22 18:08 (Rep 10)	20:39		21:29	21:50		
28	08:11	07:11	17:04 (Oerzen 2)	06:05	17:47 (Rep 10)	05:54		05:04	04:54		
	16:54	17:54	22 17:26 (Oerzen 3)	18:45	25 18:12 (Oerzen 1)	20:41		21:30	21:50		
29	08:10			07:02	18:48 (Rep 10)	05:52		05:02	04:55		
	16:56			19:47	27 19:15 (Oerzen 1)	20:43		21:31	21:50		
30	08:08			07:00	18:48 (Rep 10)	05:50		05:01	04:55		
	16:58			19:49	28 19:16 (Oerzen 1)	20:45		21:33	21:50		
31	08:06			06:58	18:50 (Rep 10)			05:00			
	16:59			19:51	27 19:17 (Oerzen 1)			21:34			
Sonnenscheinstunden		253		367		419		491	506		
astr.max.mögl.Beschattung			29		864		732				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s02 - Oerzen, Am Ohfeld 1

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56 21:50	05:34 21:16		06:27 20:11	48	18:46 (Oerzen 1) 19:42 (Rep 11)	07:19 18:58	32	17:33 (Oerzen 2) 18:05 (Oerzen 3)	07:16 16:49	08:09 16:06
2	04:57 21:49	05:36 21:14		06:29 20:08	46	18:45 (Oerzen 1) 19:41 (Rep 11)	07:21 18:56	35	17:32 (Oerzen 2) 18:07 (Oerzen 3)	07:18 16:47	08:11 16:06
3	04:57 21:49	05:38 21:12		06:31 20:06	44	18:44 (Oerzen 1) 19:38 (Rep 11)	07:23 18:54	36	17:32 (Oerzen 2) 18:08 (Oerzen 3)	07:20 16:45	08:12 16:05
4	04:58 21:48	05:39 21:10		06:32 20:04	40	18:43 (Oerzen 1) 19:36 (Rep 11)	07:24 18:51	37	17:30 (Oerzen 2) 18:07 (Oerzen 3)	07:21 16:43	08:14 16:04
5	04:59 21:48	05:41 21:08		06:34 20:01	32	18:43 (Oerzen 1) 19:15 (Oerzen 1)	07:26 18:49	38	17:30 (Oerzen 2) 18:08 (Oerzen 3)	07:23 16:42	08:15 16:04
6	05:00 21:47	05:43 21:07		06:36 19:59	32	18:42 (Oerzen 1) 19:14 (Oerzen 1)	07:28 18:46	38	17:30 (Oerzen 2) 18:08 (Oerzen 3)	07:25 16:40	08:16 16:03
7	05:01 21:47	05:44 21:05		06:38 19:56	32	18:42 (Oerzen 1) 19:14 (Oerzen 1)	07:30 18:44	37	17:31 (Oerzen 2) 18:08 (Oerzen 3)	07:27 16:38	08:18 16:03
8	05:02 21:46	05:46 21:03		06:39 19:54	31	18:43 (Oerzen 1) 19:14 (Oerzen 1)	07:31 18:42	37	17:31 (Oerzen 2) 18:08 (Oerzen 3)	07:29 16:36	08:19 16:02
9	05:03 21:45	05:48 21:01		06:41 19:52	30	18:42 (Oerzen 1) 19:12 (Oerzen 1)	07:33 18:39	35	17:32 (Oerzen 2) 18:07 (Oerzen 3)	07:31 16:34	08:20 16:02
10	05:04 21:44	05:49 20:59		06:43 19:49	28	18:43 (Oerzen 1) 19:11 (Oerzen 1)	07:35 18:37	34	17:31 (Oerzen 2) 18:05 (Oerzen 3)	07:33 16:33	08:21 16:02
11	05:05 21:44	05:51 20:57		06:44 19:47	28	18:43 (Oerzen 1) 19:11 (Oerzen 1)	07:37 18:35	32	17:32 (Oerzen 2) 18:04 (Oerzen 3)	07:35 16:31	08:23 16:01
12	05:06 21:43	05:53 20:55		06:46 19:44	28	18:41 (Rep 10) 19:09 (Oerzen 1)	07:39 18:32	29	17:34 (Oerzen 2) 18:03 (Oerzen 3)	07:36 16:29	08:24 16:01
13	05:07 21:42	05:55 20:53		06:48 19:42	27	18:40 (Rep 10) 19:07 (Oerzen 1)	07:40 18:30	25	17:36 (Oerzen 2) 18:01 (Oerzen 3)	07:38 16:28	08:25 16:01
14	05:08 21:41	05:56 20:51		06:50 19:39	27	18:38 (Rep 10) 19:05 (Oerzen 1)	07:42 18:28	20	17:38 (Oerzen 2) 17:58 (Oerzen 3)	07:40 16:26	08:26 16:01
15	05:10 21:40	05:58 20:49		06:51 19:37	26	18:36 (Rep 10) 19:02 (Oerzen 1)	07:44 18:25		07:42 16:25	08:27 16:01	
16	05:11 21:39	06:00 20:46		06:53 19:35	21	18:36 (Rep 10) 18:57 (Rep 10)	07:46 18:23		07:44 16:23	08:28 16:01	
17	05:12 21:38	06:01 20:44		06:55 19:32	22	18:35 (Rep 10) 18:57 (Rep 10)	07:48 18:21		07:46 16:22	08:28 16:02	
18	05:14 21:36	06:03 20:42		06:56 19:30	22	18:34 (Rep 10) 18:56 (Rep 10)	07:50 18:19		07:48 16:20	08:29 16:02	
19	05:15 21:35	06:05 20:40		06:58 19:27	22	18:34 (Rep 10) 18:56 (Rep 10)	07:51 18:16		07:49 16:19	08:30 16:02	
20	05:16 21:34	06:07 20:38	9	19:33 (Rep 11) 19:42 (Rep 11)	07:00 19:25	18:34 (Rep 10) 18:56 (Rep 10)	07:53 18:14		07:51 16:18	08:30 16:02	
21	05:18 21:33	06:08 20:36	13	19:30 (Rep 11) 19:43 (Rep 11)	07:02 19:22	18:35 (Rep 10) 18:55 (Rep 10)	07:55 18:12		07:53 16:16	08:31 16:03	
22	05:19 21:31	06:10 20:33	17	19:28 (Rep 11) 19:45 (Rep 11)	07:03 19:20	18:35 (Rep 10) 18:52 (Rep 10)	07:57 18:10		07:55 16:15	08:32 16:03	
23	05:21 21:30	06:12 20:31	19	19:26 (Rep 11) 19:45 (Rep 11)	07:05 19:18	18:36 (Rep 10) 18:50 (Rep 10)	07:59 18:08		07:56 16:14	08:32 16:04	
24	05:22 21:28	06:13 20:29	21	19:25 (Rep 11) 19:46 (Rep 11)	07:07 19:15	17:46 (Oerzen 2) 18:48 (Rep 10)	08:01 18:06		07:58 16:13	08:33 16:04	
25	05:24 21:27	06:15 20:27	22	19:25 (Rep 11) 19:47 (Rep 11)	07:09 19:13	17:41 (Oerzen 2) 18:44 (Rep 10)	07:03 17:03		08:00 16:12	08:33 16:05	
26	05:25 21:25	06:17 20:24	30	18:58 (Oerzen 1) 19:46 (Rep 11)	07:10 19:10	17:39 (Oerzen 2) 18:01 (Oerzen 2)	07:04 17:01		08:01 16:11	08:33 16:06	
27	05:27 21:24	06:19 20:22	38	18:55 (Oerzen 1) 19:46 (Rep 11)	07:12 19:08	17:37 (Oerzen 2) 18:03 (Oerzen 2)	07:06 16:59		08:03 16:10	08:34 16:06	
28	05:28 21:22	06:20 20:20	43	18:52 (Oerzen 1) 19:46 (Rep 11)	07:14 19:06	17:36 (Oerzen 2) 18:04 (Oerzen 2)	07:08 16:57		08:05 16:09	08:34 16:07	
29	05:30 21:21	06:22 20:18	45	18:50 (Oerzen 1) 19:45 (Rep 11)	07:16 19:03	17:34 (Oerzen 2) 18:04 (Oerzen 2)	07:10 16:55		08:06 16:08	08:34 16:08	
30	05:31 21:19	06:24 20:15	47	18:49 (Oerzen 1) 19:45 (Rep 11)	07:17 19:01	17:33 (Oerzen 2) 18:04 (Oerzen 2)	07:12 16:53		08:08 16:07	08:34 16:09	
31	05:33 21:17	06:25 20:13	47	18:48 (Oerzen 1) 19:44 (Rep 11)			07:14 16:51			08:34 16:10	
Sonnenscheinstunden		509	458		382		329		261	237	
astr.max.mögl.Beschattung			351		839		465				

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s03 - Oerzen, Am Ohfeld 4

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:34 16:11	08:05 17:01	07:09 17:56	16:46 (Oerzen 2)   06:55 17:24 (Oerzen 3)   19:53	18:35 (Oerzen 1)   05:48 19:03 (Oerzen 1)   20:47	04:59 21:35
2	08:34 16:12	08:03 17:03	07:06 17:58	16:46 (Oerzen 2)   06:53 17:24 (Oerzen 3)   19:54	18:35 (Oerzen 1)   05:45 19:28 (Rep 11)   20:48	04:59 21:36
3	08:34 16:14	08:01 17:05	07:04 18:00	16:45 (Oerzen 2)   06:50 17:23 (Oerzen 3)   19:56	18:36 (Oerzen 1)   05:43 19:30 (Rep 11)   20:50	04:58 21:37
4	08:33 16:15	08:00 17:07	07:02 18:01	16:45 (Oerzen 2)   06:48 17:23 (Oerzen 3)   19:58	18:36 (Oerzen 1)   05:42 19:31 (Rep 11)   20:52	04:57 21:39
5	08:33 16:16	07:58 17:09	07:00 18:03	16:45 (Oerzen 2)   06:46 17:23 (Oerzen 3)   20:00	18:38 (Oerzen 1)   05:40 19:33 (Rep 11)   20:54	04:56 21:40
6	08:33 16:17	07:56 17:11	06:57 18:05	16:45 (Oerzen 2)   06:43 17:21 (Oerzen 3)   20:02	18:39 (Oerzen 1)   05:38 19:34 (Rep 11)   20:55	04:55 21:41
7	08:32 16:19	07:54 17:13	06:55 18:07	16:46 (Oerzen 2)   06:41 17:20 (Oerzen 3)   20:03	18:41 (Oerzen 1)   05:36 19:33 (Rep 11)   20:57	04:55 21:42
8	08:32 16:20	07:53 17:15	06:53 18:09	16:46 (Oerzen 2)   06:39 17:18 (Oerzen 3)   20:05	18:47 (Oerzen 1)   05:34 19:34 (Rep 11)   20:59	04:54 21:42
9	08:31 16:21	07:51 17:17	06:50 18:11	16:47 (Oerzen 2)   06:36 17:15 (Oerzen 3)   20:07	19:12 (Rep 11)   05:32 19:34 (Rep 11)   21:01	04:54 21:43
10	08:31 16:23	07:49 17:19	06:48 18:13	16:48 (Oerzen 2)   06:34 17:10 (Oerzen 2)   20:09	19:11 (Rep 11)   05:30 19:33 (Rep 11)   21:02	04:53 21:44
11	08:30 16:24	07:47 17:21	06:46 18:14	16:49 (Oerzen 2)   06:32 17:08 (Oerzen 2)   20:11	19:11 (Rep 11)   05:28 19:32 (Rep 11)   21:04	04:53 21:45
12	08:29 16:26	07:45 17:23	06:43 18:16	16:52 (Oerzen 2)   06:29 17:05 (Oerzen 2)   20:13	19:12 (Rep 11)   05:27 19:32 (Rep 11)   21:06	04:52 21:46
13	08:28 16:27	07:43 17:25	06:41 18:18	06:27 20:14	19:12 (Rep 11)   05:25 19:30 (Rep 11)   21:07	04:52 21:46
14	08:28 16:29	07:41 17:27	06:38 18:20	17:47 (Rep 10)   06:25 17:54 (Rep 10)   20:16	19:13 (Rep 11)   05:23 19:29 (Rep 11)   21:09	04:52 21:47
15	08:27 16:31	07:39 17:29	06:36 18:22	17:43 (Rep 10)   06:22 17:55 (Rep 10)   20:18	19:14 (Rep 11)   05:22 19:27 (Rep 11)   21:11	04:52 21:48
16	08:26 16:32	07:37 17:31	06:34 18:24	17:42 (Rep 10)   06:20 17:58 (Rep 10)   20:20	19:18 (Rep 11)   05:20 19:24 (Rep 11)   21:12	04:51 21:48
17	08:25 16:34	07:35 17:33	06:31 18:26	17:41 (Rep 10)   06:18 18:00 (Rep 10)   20:21	05:18 21:14	04:51 21:49
18	08:24 16:36	07:33 17:35	06:29 18:27	17:40 (Rep 10)   06:15 18:00 (Rep 10)   20:23	05:17 21:15	04:51 21:49
19	08:23 16:37	07:31 17:37	06:26 18:29	17:39 (Rep 10)   06:13 18:00 (Rep 10)   20:25	05:15 21:17	04:51 21:49
20	08:22 16:39	07:29 17:38	06:24 18:31	17:38 (Rep 10)   06:11 17:59 (Rep 10)   20:27	05:14 21:18	04:51 21:50
21	08:20 16:41	07:26 17:40	06:22 18:33	17:38 (Rep 10)   06:09 18:00 (Oerzen 1)   20:29	05:12 21:20	04:52 21:50
22	08:19 16:43	07:24 17:42	06:19 17:08 (Oerzen 2)   18:35	17:39 (Rep 10)   06:07 18:02 (Oerzen 1)   20:30	05:11 21:22	04:52 21:50
23	08:18 16:44	07:22 17:44	06:17 16:53 (Oerzen 2)   18:36	17:39 (Rep 10)   06:04 18:03 (Oerzen 1)   20:32	05:10 21:23	04:52 21:50
24	08:17 16:46	07:20 17:46	06:14 16:50 (Oerzen 2)   18:38	17:40 (Oerzen 1)   06:02 18:04 (Oerzen 1)   20:34	05:08 21:24	04:52 21:51
25	08:15 16:48	07:18 17:48	06:12 16:49 (Oerzen 2)   18:40	17:38 (Oerzen 1)   06:00 18:04 (Oerzen 1)   20:36	05:07 21:26	04:53 21:51
26	08:14 16:50	07:16 17:50	06:10 16:48 (Oerzen 2)   18:42	17:37 (Oerzen 1)   05:58 18:05 (Oerzen 1)   20:38	05:06 21:27	04:53 21:51
27	08:13 16:52	07:13 17:52	06:07 16:47 (Oerzen 2)   18:44	17:36 (Oerzen 1)   05:56 18:05 (Oerzen 1)   20:39	05:05 21:29	04:53 21:50
28	08:11 16:54	07:11 17:54	06:05 16:46 (Oerzen 2)   18:45	17:36 (Oerzen 1)   05:54 18:05 (Oerzen 1)   20:41	05:04 21:30	04:54 21:50
29	08:10 16:56		07:02 19:47	18:36 (Oerzen 1)   05:52 19:05 (Oerzen 1)   20:43	05:02 21:31	04:55 21:50
30	08:08 16:58		07:00 19:49	18:35 (Oerzen 1)   05:50 19:05 (Oerzen 1)   20:45	05:01 21:33	04:55 21:50
31	08:06 16:59		06:58 19:51	18:35 (Oerzen 1)   19:04 (Oerzen 1)	05:00 21:34	
Sonnenscheinstunden	253	275	367	419	491	506
astr.max.mögl.Beschattung		198	783	415		

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s03 - Oerzen, Am Ohfeld 4

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56 21:50	05:34 21:16		06:27 20:11	21	19:10 (Rep 11) 19:31 (Rep 11)	07:19 18:58	10	17:33 (Oerzen 2) 17:43 (Oerzen 2)	07:16 16:49	08:09 16:06
2	04:57 21:49	05:36 21:14		06:29 20:08	22	19:10 (Rep 11) 19:32 (Rep 11)	07:21 18:56	17	17:29 (Oerzen 2) 17:46 (Oerzen 2)	07:18 16:47	08:11 16:06
3	04:57 21:49	05:38 21:12		06:31 20:06	22	19:09 (Rep 11) 19:31 (Rep 11)	07:23 18:54	21	17:27 (Oerzen 2) 17:48 (Oerzen 2)	07:20 16:45	08:12 16:05
4	04:58 21:48	05:39 21:10		06:32 20:04	22	19:09 (Rep 11) 19:31 (Rep 11)	07:24 18:51	24	17:24 (Oerzen 2) 17:48 (Oerzen 2)	07:21 16:43	08:14 16:04
5	04:59 21:48	05:41 21:08		06:34 20:01	34	18:38 (Oerzen 1) 19:30 (Rep 11)	07:26 18:49	31	17:23 (Oerzen 2) 17:54 (Oerzen 3)	07:23 16:42	08:15 16:04
6	05:00 21:47	05:43 21:07		06:36 19:59	39	18:34 (Oerzen 1) 19:29 (Rep 11)	07:28 18:46	34	17:22 (Oerzen 2) 17:56 (Oerzen 3)	07:25 16:40	08:16 16:03
7	05:01 21:47	05:44 21:05		06:38 19:56	40	18:33 (Oerzen 1) 19:28 (Rep 11)	07:30 18:44	36	17:21 (Oerzen 2) 17:57 (Oerzen 3)	07:27 16:38	08:18 16:03
8	05:02 21:46	05:46 21:03		06:39 19:54	41	18:31 (Oerzen 1) 19:27 (Rep 11)	07:31 18:42	37	17:21 (Oerzen 2) 17:58 (Oerzen 3)	07:29 16:36	08:19 16:02
9	05:03 21:45	05:48 21:01		06:41 19:52	38	18:29 (Oerzen 1) 19:23 (Rep 11)	07:33 18:39	38	17:20 (Oerzen 2) 17:58 (Oerzen 3)	07:31 16:34	08:20 16:02
10	05:04 21:44	05:49 20:59		06:43 19:49	35	18:29 (Oerzen 1) 19:21 (Rep 11)	07:35 18:37	38	17:19 (Oerzen 2) 17:57 (Oerzen 3)	07:33 16:33	08:21 16:02
11	05:05 21:44	05:51 20:57		06:44 19:47	28	18:28 (Oerzen 1) 18:56 (Oerzen 1)	07:37 18:35	38	17:19 (Oerzen 2) 17:57 (Oerzen 3)	07:35 16:31	08:23 16:01
12	05:06 21:43	05:53 20:55		06:46 19:44	30	18:26 (Oerzen 1) 18:56 (Oerzen 1)	07:39 18:32	38	17:19 (Oerzen 2) 17:57 (Oerzen 3)	07:36 16:29	08:24 16:01
13	05:07 21:42	05:55 20:53		06:48 19:42	30	18:26 (Oerzen 1) 18:56 (Oerzen 1)	07:40 18:30	38	17:19 (Oerzen 2) 17:57 (Oerzen 3)	07:38 16:28	08:25 16:01
14	05:08 21:41	05:56 20:51		06:50 19:39	30	18:26 (Oerzen 1) 18:56 (Oerzen 1)	07:42 18:28	37	17:19 (Oerzen 2) 17:56 (Oerzen 3)	07:40 16:26	08:26 16:01
15	05:10 21:40	05:58 20:49		06:51 19:37	30	18:25 (Oerzen 1) 18:55 (Oerzen 1)	07:44 18:25	35	17:20 (Oerzen 2) 17:55 (Oerzen 3)	07:42 16:25	08:27 16:01
16	05:11 21:39	06:00 20:46		06:53 19:35	29	18:25 (Oerzen 1) 18:54 (Oerzen 1)	07:46 18:23	33	17:21 (Oerzen 2) 17:54 (Oerzen 3)	07:44 16:23	08:28 16:01
17	05:12 21:38	06:01 20:44		06:55 19:32	28	18:26 (Oerzen 1) 18:54 (Oerzen 1)	07:48 18:21	30	17:22 (Oerzen 2) 17:52 (Oerzen 3)	07:46 16:22	08:28 16:01
18	05:14 21:36	06:03 20:42		06:56 19:30	27	18:25 (Oerzen 1) 18:52 (Oerzen 1)	07:50 18:19	26	17:23 (Oerzen 2) 17:49 (Oerzen 3)	07:48 16:20	08:29 16:02
19	05:15 21:35	06:05 20:40		06:58 19:27	25	18:26 (Oerzen 1) 18:51 (Oerzen 1)	07:51 18:16	16	17:25 (Oerzen 2) 17:41 (Oerzen 2)	07:49 16:19	08:30 16:02
20	05:16 21:34	06:07 20:38		07:00 19:25	25	18:25 (Rep 10) 18:50 (Oerzen 1)	07:53 18:14	10	17:27 (Oerzen 2) 17:37 (Oerzen 2)	07:51 16:18	08:30 16:02
21	05:18 21:33	06:08 20:36		07:02 19:22	23	18:25 (Rep 10) 18:48 (Oerzen 1)	07:55 18:12			07:53 16:16	08:31 16:03
22	05:19 21:31	06:10 20:33		07:03 19:20	22	18:23 (Rep 10) 18:45 (Oerzen 1)	07:57 18:10			07:55 16:15	08:32 16:03
23	05:21 21:30	06:12 20:31		07:05 19:18	21	18:23 (Rep 10) 18:44 (Rep 10)	07:59 18:08			07:56 16:14	08:32 16:04
24	05:22 21:28	06:13 20:29		07:07 19:15	21	18:23 (Rep 10) 18:44 (Rep 10)	08:01 18:06			07:58 16:13	08:33 16:04
25	05:24 21:27	06:15 20:27		07:09 19:13	21	18:22 (Rep 10) 18:43 (Rep 10)	07:03 17:03			08:00 16:12	08:33 16:05
26	05:25 21:25	06:17 20:24		07:10 19:10	19	18:23 (Rep 10) 18:42 (Rep 10)	07:04 17:01			08:01 16:11	08:33 16:06
27	05:27 21:24	06:19 20:22	7	07:12 19:08	17	18:23 (Rep 10) 18:40 (Rep 10)	07:06 16:59			08:03 16:10	08:34 16:06
28	05:28 21:22	06:20 20:20	13	07:14 19:06	14	18:24 (Rep 10) 18:38 (Rep 10)	07:08 16:57			08:05 16:09	08:34 16:07
29	05:30 21:21	06:22 20:18	16	07:16 19:03	10	18:25 (Rep 10) 18:35 (Rep 10)	07:10 16:55			08:06 16:08	08:34 16:08
30	05:31 21:19	06:24 20:15	19	07:17 19:01			07:12 16:53			08:08 16:07	08:34 16:09
31	05:33 21:17	06:25 20:13	20	07:18 19:00			07:14 16:51			08:09 16:10	08:34 16:10
Sonnenscheinstunden		509	458	382	764	329	587	261	237		
astr.max.mögl.Beschattung			75								

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s04 - Oerzen, Am Ohfeld 9

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März		April		Mai		Juni	
1	08:34 16:11	08:05 17:01			07:09 17:56	16:43 (Oerzen 2) 17:23 (Oerzen 3)	06:55 19:53	18:34 (Oerzen 1) 19:04 (Oerzen 1)	05:48 20:47	04:59 21:35	
2	08:34 16:12	08:03 17:03			07:06 17:58	16:43 (Oerzen 2) 17:23 (Oerzen 3)	06:53 19:54	18:34 (Oerzen 1) 19:04 (Oerzen 1)	05:45 20:48	04:59 21:36	
3	08:34 16:14	08:01 17:05			07:04 18:00	16:42 (Oerzen 2) 17:23 (Oerzen 3)	06:50 19:56	18:35 (Oerzen 1) 19:30 (Rep 11)	05:43 20:50	04:58 21:37	
4	08:33 16:15	08:00 17:07			07:02 18:01	16:43 (Oerzen 2) 17:23 (Oerzen 3)	06:48 19:58	18:35 (Oerzen 1) 19:31 (Rep 11)	05:42 20:52	04:57 21:39	
5	08:33 16:16	07:58 17:09			07:00 18:03	16:43 (Oerzen 2) 17:22 (Oerzen 3)	06:46 20:00	18:36 (Oerzen 1) 19:33 (Rep 11)	05:40 20:54	04:56 21:40	
6	08:33 16:17	07:56 17:11			06:57 18:05	16:42 (Oerzen 2) 17:21 (Oerzen 3)	06:43 20:02	18:37 (Oerzen 1) 19:34 (Rep 11)	05:38 20:55	04:55 21:41	
7	08:32 16:19	07:54 17:13			06:55 18:07	16:43 (Oerzen 2) 17:20 (Oerzen 3)	06:41 20:04	18:38 (Oerzen 1) 19:34 (Rep 11)	05:36 20:57	04:55 21:42	
8	08:32 16:20	07:53 17:15			06:53 18:09	16:43 (Oerzen 2) 17:17 (Oerzen 3)	06:39 20:05	18:40 (Oerzen 1) 19:35 (Rep 11)	05:34 20:59	04:54 21:42	
9	08:31 16:21	07:51 17:17			06:50 18:11	16:44 (Oerzen 2) 17:15 (Oerzen 3)	06:36 20:07	18:43 (Oerzen 1) 19:35 (Rep 11)	05:32 21:01	04:54 21:43	
10	08:31 16:23	07:49 17:19			06:48 18:13	16:46 (Oerzen 2) 17:10 (Oerzen 2)	06:34 20:09	19:12 (Rep 11) 19:34 (Rep 11)	05:30 21:02	04:53 21:44	
11	08:30 16:24	07:47 17:21			06:46 18:14	16:46 (Oerzen 2) 17:07 (Oerzen 2)	06:32 20:11	19:12 (Rep 11) 19:34 (Rep 11)	05:28 21:04	04:53 21:45	
12	08:29 16:26	07:45 17:23			06:43 18:16	16:49 (Oerzen 2) 17:05 (Oerzen 2)	06:29 20:13	19:12 (Rep 11) 19:34 (Rep 11)	05:27 21:06	04:52 21:46	
13	08:28 16:27	07:43 17:25			06:41 18:18	16:52 (Oerzen 2) 17:01 (Oerzen 2)	06:27 20:14	19:12 (Rep 11) 19:32 (Rep 11)	05:25 21:07	04:52 21:46	
14	08:28 16:29	07:41 17:27			06:38 18:20	17:48 (Rep 10) 17:54 (Rep 10)	06:25 20:16	19:12 (Rep 11) 19:31 (Rep 11)	05:23 21:09	04:52 21:47	
15	08:27 16:31	07:39 17:29			06:36 18:22	17:44 (Rep 10) 17:55 (Rep 10)	06:22 20:18	19:13 (Rep 11) 19:30 (Rep 11)	05:22 21:11	04:52 21:48	
16	08:26 16:32	07:37 17:31			06:34 18:24	17:42 (Rep 10) 17:58 (Rep 10)	06:20 20:20	19:15 (Rep 11) 19:29 (Rep 11)	05:20 21:12	04:51 21:48	
17	08:25 16:34	07:35 17:33			06:31 18:26	17:41 (Rep 10) 18:00 (Rep 10)	06:18 20:21	19:17 (Rep 11) 19:26 (Rep 11)	05:18 21:14	04:51 21:49	
18	08:24 16:36	07:33 17:35			06:29 18:27	17:40 (Rep 10) 18:00 (Rep 10)	06:15 20:23		05:17 21:15	04:51 21:49	
19	08:23 16:37	07:31 17:37			06:26 18:29	17:39 (Rep 10) 18:00 (Rep 10)	06:13 20:25		05:15 21:17	04:51 21:49	
20	08:22 16:39	07:29 17:38			06:24 18:31	17:38 (Rep 10) 18:00 (Rep 10)	06:11 20:27		05:14 21:18	04:51 21:50	
21	08:20 16:41	07:26 17:40	16:56 (Oerzen 2)		06:22 18:33	17:38 (Rep 10) 18:00 (Rep 10)	06:09 20:29		05:12 21:20	04:52 21:50	
22	08:19 16:43	07:24 17:42	16:52 (Oerzen 2)		06:19 18:35	17:39 (Rep 10) 18:01 (Oerzen 1)	06:07 20:30		05:11 21:22	04:52 21:50	
23	08:18 16:44	07:22 17:44	16:50 (Oerzen 2)		06:17 18:36	17:38 (Rep 10) 18:02 (Oerzen 1)	06:04 20:32		05:10 21:23	04:52 21:50	
24	08:17 16:46	07:20 17:46	16:48 (Oerzen 2)		06:14 18:38	17:39 (Rep 10) 18:04 (Oerzen 1)	06:02 20:34		05:08 21:24	04:52 21:51	
25	08:15 16:48	07:18 17:48	16:47 (Oerzen 2)		06:12 18:40	17:39 (Oerzen 1) 18:04 (Oerzen 1)	06:00 20:36		05:07 21:26	04:53 21:51	
26	08:14 16:50	07:16 17:50	16:46 (Oerzen 2)		06:10 18:42	17:38 (Oerzen 1) 18:05 (Oerzen 1)	05:58 20:38		05:06 21:27	04:53 21:51	
27	08:13 16:52	07:13 17:52	16:45 (Oerzen 2)		06:07 18:44	17:36 (Oerzen 1) 18:05 (Oerzen 1)	05:56 20:39		05:05 21:29	04:53 21:50	
28	08:11 16:54	07:11 17:54	16:44 (Oerzen 2)		06:05 18:45	17:36 (Oerzen 1) 18:06 (Oerzen 1)	05:54 20:41		05:04 21:30	04:54 21:50	
29	08:10 16:56		17:23 (Oerzen 3)		07:02 19:47	18:36 (Oerzen 1) 19:06 (Oerzen 1)	05:52 20:43		05:02 21:31	04:55 21:50	
30	08:08 16:58				07:00 19:49	18:35 (Oerzen 1) 19:05 (Oerzen 1)	05:50 20:45		05:01 21:33	04:55 21:50	
31	08:06 16:59				06:58 19:51	18:35 (Oerzen 1) 19:06 (Oerzen 1)			05:00 21:34		
Sonnenscheinstunden		253	275		367		419		491	506	
astr.max.mögl.Beschattung			218		821		478				

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s04 - Oerzen, Am Ohfeld 9

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56	05:34		06:27		19:11 (Rep 11)	07:19	17:29 (Oerzen 2)	07:16	08:09	
	21:50	21:16		20:11	22	19:33 (Rep 11)	18:58	14	17:43 (Oerzen 2)	16:49	16:06
2	04:57	05:36		06:29		19:10 (Rep 11)	07:21		17:26 (Oerzen 2)	07:18	08:11
	21:49	21:14		20:08	23	19:33 (Rep 11)	18:56	19	17:45 (Oerzen 2)	16:47	16:06
3	04:57	05:38		06:31		18:40 (Oerzen 1)	07:23		17:24 (Oerzen 2)	07:20	08:12
	21:49	21:12		20:06	31	19:32 (Rep 11)	18:54	23	17:47 (Oerzen 2)	16:45	16:05
4	04:58	05:39		06:32		18:37 (Oerzen 1)	07:24		17:22 (Oerzen 2)	07:21	08:14
	21:48	21:10		20:04	38	19:32 (Rep 11)	18:51	27	17:49 (Oerzen 3)	16:43	16:04
5	04:59	05:41		06:34		18:35 (Oerzen 1)	07:26		17:21 (Oerzen 2)	07:23	08:15
	21:48	21:08		20:01	41	19:31 (Rep 11)	18:49	32	17:53 (Oerzen 3)	16:42	16:04
6	05:00	05:43		06:36		18:32 (Oerzen 1)	07:28		17:20 (Oerzen 2)	07:25	08:16
	21:47	21:07		19:59	43	19:30 (Rep 11)	18:46	35	17:55 (Oerzen 3)	16:40	16:03
7	05:01	05:44		06:38		18:31 (Oerzen 1)	07:30		17:19 (Oerzen 2)	07:27	08:18
	21:47	21:05		19:56	42	19:28 (Rep 11)	18:44	37	17:56 (Oerzen 3)	16:38	16:03
8	05:02	05:46		06:39		18:30 (Oerzen 1)	07:31		17:18 (Oerzen 2)	07:29	08:19
	21:46	21:03		19:54	41	19:27 (Rep 11)	18:42	39	17:57 (Oerzen 3)	16:36	16:02
9	05:03	05:48		06:41		18:28 (Oerzen 1)	07:33		17:18 (Oerzen 2)	07:31	08:20
	21:45	21:01		19:52	38	19:23 (Rep 11)	18:39	39	17:57 (Oerzen 3)	16:34	16:02
10	05:04	05:49		06:43		18:28 (Oerzen 1)	07:35		17:17 (Oerzen 2)	07:33	08:21
	21:44	20:59		19:49	29	18:57 (Oerzen 1)	18:37	40	17:57 (Oerzen 3)	16:33	16:02
11	05:05	05:51		06:44		18:27 (Oerzen 1)	07:37		17:16 (Oerzen 2)	07:35	08:23
	21:44	20:57		19:47	31	18:58 (Oerzen 1)	18:35	41	17:57 (Oerzen 3)	16:31	16:01
12	05:06	05:53		06:46		18:26 (Oerzen 1)	07:39		17:16 (Oerzen 2)	07:36	08:24
	21:43	20:55		19:44	31	18:57 (Oerzen 1)	18:32	40	17:56 (Oerzen 3)	16:29	16:01
13	05:07	05:55		06:48		18:26 (Oerzen 1)	07:40		17:17 (Oerzen 2)	07:38	08:25
	21:42	20:53		19:42	31	18:57 (Oerzen 1)	18:30	39	17:56 (Oerzen 3)	16:28	16:01
14	05:08	05:56		06:50		18:26 (Oerzen 1)	07:42		17:17 (Oerzen 2)	07:40	08:26
	21:41	20:51		19:39	31	18:57 (Oerzen 1)	18:28	38	17:55 (Oerzen 3)	16:26	16:01
15	05:10	05:58		06:51		18:25 (Oerzen 1)	07:44		17:18 (Oerzen 2)	07:42	08:27
	21:40	20:49		19:37	30	18:55 (Oerzen 1)	18:25	36	17:54 (Oerzen 3)	16:25	16:01
16	05:11	06:00		06:53		18:26 (Oerzen 1)	07:46		17:18 (Oerzen 2)	07:44	08:28
	21:39	20:46		19:35	29	18:55 (Oerzen 1)	18:23	35	17:53 (Oerzen 3)	16:23	16:01
17	05:12	06:01		06:55		18:26 (Oerzen 1)	07:48		17:19 (Oerzen 2)	07:46	08:28
	21:38	20:44		19:32	28	18:54 (Oerzen 1)	18:21	33	17:52 (Oerzen 3)	16:22	16:01
18	05:14	06:03		06:56		18:26 (Oerzen 1)	07:50		17:20 (Oerzen 2)	07:48	08:29
	21:36	20:42		19:30	26	18:52 (Oerzen 1)	18:19	29	17:49 (Oerzen 3)	16:20	16:02
19	05:15	06:05		06:58		18:26 (Rep 10)	07:51		17:22 (Oerzen 2)	07:49	08:30
	21:35	20:40		19:27	25	18:51 (Oerzen 1)	18:16	18	17:40 (Oerzen 2)	16:19	16:02
20	05:16	06:07		07:00		18:25 (Rep 10)	07:53		17:24 (Oerzen 2)	07:51	08:31
	21:34	20:38		19:25	24	18:49 (Oerzen 1)	18:14	12	17:36 (Oerzen 2)	16:18	16:02
21	05:18	06:08		07:02		18:24 (Rep 10)	07:55			07:53	08:31
	21:33	20:36		19:22	23	18:47 (Oerzen 1)	18:12			16:16	16:03
22	05:19	06:10		07:03		18:23 (Rep 10)	07:57			07:55	08:32
	21:31	20:33		19:20	22	18:45 (Rep 10)	18:10			16:15	16:03
23	05:21	06:12		07:05		18:23 (Rep 10)	07:59			07:56	08:32
	21:30	20:31		19:18	22	18:45 (Rep 10)	18:08			16:14	16:04
24	05:22	06:13		07:07		18:23 (Rep 10)	08:01			07:58	08:33
	21:28	20:29		19:15	21	18:44 (Rep 10)	18:06			16:13	16:04
25	05:24	06:15		07:09		18:22 (Rep 10)	07:03			08:00	08:33
	21:27	20:27		19:13	21	18:43 (Rep 10)	17:03			16:12	16:05
26	05:25	06:17	19:19 (Rep 11)	07:10		18:23 (Rep 10)	07:04			08:01	08:33
	21:25	20:24	9	19:28 (Rep 11)	19:10	18:42 (Rep 10)	17:01			16:11	16:06
27	05:27	06:19	19:17 (Rep 11)	07:12		18:24 (Rep 10)	07:06			08:03	08:34
	21:24	20:22	14	19:31 (Rep 11)	19:08	18:40 (Rep 10)	16:59			16:10	16:06
28	05:28	06:20	19:15 (Rep 11)	07:14		18:25 (Rep 10)	07:08			08:05	08:34
	21:22	20:20	17	19:32 (Rep 11)	19:06	18:38 (Rep 10)	16:57			16:09	16:07
29	05:30	06:22	19:13 (Rep 11)	07:16		18:26 (Rep 10)	07:10			08:06	08:34
	21:21	20:18	19	19:32 (Rep 11)	19:03	9	18:35 (Rep 10)	16:55		16:08	16:08
30	05:31	06:24	19:12 (Rep 11)	07:17		17:35 (Oerzen 2)	07:12			08:08	08:34
	21:19	20:15	21	19:33 (Rep 11)	19:01	2	17:37 (Oerzen 2)	16:53		16:07	16:09
31	05:33	06:25	19:12 (Rep 11)				07:14				08:34
	21:17	20:13	22	19:34 (Rep 11)			16:51				16:10
Sonnenscheinstunden		509		382			329			261	237
astr.max.mögl.Beschattung			102		802		626				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s05 - Oerzen, Am Ohfeld 15

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:34 16:11	08:05 17:01	07:09 17:56	16:32 (Oerzen 2) 17:12 (Oerzen 3)	06:55 19:25 (Rep 11)	18:30 (Oerzen 1) 20:47 21:35
2	08:34 16:12	08:03 17:03	07:06 17:58	16:33 (Oerzen 2) 17:11 (Oerzen 3)	06:53 19:25 (Rep 11)	19:04 (Rep 11) 20:48 21:36
3	08:34 16:14	08:02 17:05	07:04 18:00	16:34 (Oerzen 2) 17:08 (Oerzen 3)	06:50 19:26 (Rep 11)	19:04 (Rep 11) 20:50 21:37
4	08:33 16:15	08:00 17:07	07:02 18:01	16:35 (Oerzen 2) 17:05 (Oerzen 3)	06:48 19:25 (Rep 11)	19:02 (Rep 11) 20:52 21:39
5	08:33 16:16	07:58 17:09	07:00 18:03	16:38 (Oerzen 2) 16:52 (Oerzen 2)	06:46 20:00	19:03 (Rep 11) 20:54 21:40
6	08:33 16:17	07:56 17:11	06:57 18:05	16:42 (Oerzen 2) 16:46 (Oerzen 2)	06:43 20:02	19:03 (Rep 11) 20:55 21:41
7	08:32 16:19	07:54 17:13	06:55 18:07	16:41 17:44 (Rep 10)	06:41 20:05	19:02 (Rep 11) 20:57 21:42
8	08:32 16:20	07:53 17:15	06:53 18:09	16:39 17:38 (Rep 10)	06:39 20:07	19:03 (Rep 11) 20:59 21:44
9	08:31 16:21	07:51 17:17	06:50 18:11	16:36 17:47 (Rep 10)	06:36 20:09	19:04 (Rep 11) 21:01 21:43
10	08:31 16:23	07:49 17:19	06:48 18:13	16:34 17:48 (Rep 10)	06:34 20:11	19:05 (Rep 11) 21:02 21:44
11	08:30 16:24	07:47 17:21	06:46 18:14	16:32 17:50 (Rep 10)	06:32 20:13	19:07 (Rep 11) 21:04 21:45
12	08:29 16:26	07:45 17:23	06:43 18:16	16:29 17:51 (Rep 10)	06:29 20:14	19:17 (Rep 11) 21:06 21:46
13	08:28 16:27	07:43 17:25	06:41 18:18	16:27 17:52 (Rep 10)	06:27 20:16	19:17 (Rep 11) 21:07 21:47
14	08:28 16:29	07:41 17:27	16:42 (Oerzen 2) 16:52 (Oerzen 2)	16:38 17:52 (Rep 10)	06:25 20:16	19:17 (Rep 11) 21:09 21:48
15	08:27 16:31	07:39 17:29	16:38 (Oerzen 2) 16:54 (Oerzen 2)	16:36 17:51 (Rep 10)	06:22 20:18	19:17 (Rep 11) 21:11 21:49
16	08:26 16:32	07:37 17:31	16:36 (Oerzen 2) 16:56 (Oerzen 2)	16:34 17:51 (Rep 10)	06:20 20:20	19:17 (Rep 11) 21:12 21:50
17	08:25 16:34	07:35 17:33	16:35 (Oerzen 2) 16:58 (Oerzen 2)	16:31 17:52 (Rep 10)	06:18 20:21	19:17 (Rep 11) 21:14 21:51
18	08:24 16:36	07:33 17:35	16:34 (Oerzen 2) 17:06 (Oerzen 3)	16:29 17:52 (Rep 10)	06:15 20:23	19:17 (Rep 11) 21:15 21:52
19	08:23 16:37	07:31 17:37	16:33 (Oerzen 2) 17:09 (Oerzen 3)	16:26 17:53 (Rep 10)	06:13 20:25	19:17 (Rep 11) 21:17 21:53
20	08:22 16:39	07:29 17:38	16:31 (Oerzen 2) 17:10 (Oerzen 3)	16:24 17:53 (Rep 10)	06:11 20:27	19:17 (Rep 11) 21:19 21:54
21	08:20 16:41	07:26 17:40	16:31 (Oerzen 2) 17:12 (Oerzen 3)	16:22 17:54 (Rep 10)	06:09 20:29	19:17 (Rep 11) 21:20 21:55
22	08:19 16:43	07:24 17:42	16:31 (Oerzen 2) 17:13 (Oerzen 3)	16:19 17:54 (Rep 10)	06:07 20:30	19:17 (Rep 11) 21:22 21:56
23	08:18 16:44	07:22 17:44	16:31 (Oerzen 2) 17:14 (Oerzen 3)	16:17 17:53 (Rep 10)	06:04 20:32	19:17 (Rep 11) 21:23 21:57
24	08:17 16:46	07:20 17:46	16:30 (Oerzen 2) 17:13 (Oerzen 3)	16:14 17:53 (Rep 10)	06:02 20:34	19:17 (Rep 11) 21:24 21:58
25	08:15 16:48	07:18 17:48	16:30 (Oerzen 2) 17:14 (Oerzen 3)	16:12 17:52 (Rep 10)	06:00 20:36	19:17 (Rep 11) 21:26 21:59
26	08:14 16:50	07:16 17:50	16:31 (Oerzen 2) 17:14 (Oerzen 3)	16:10 17:52 (Rep 10)	05:58 20:38	19:17 (Rep 11) 21:27 21:51
27	08:13 16:52	07:13 17:52	16:31 (Oerzen 2) 17:14 (Oerzen 3)	16:07 17:50 (Rep 10)	05:56 20:39	19:17 (Rep 11) 21:29 21:52
28	08:11 16:54	07:11 17:54	16:31 (Oerzen 2) 17:12 (Oerzen 3)	16:05 18:45	05:54 20:41	19:17 (Rep 11) 21:30 21:53
29	08:10 16:56		07:02 19:47	18:25 (Oerzen 1) 19:21 (Rep 11)	05:52 20:43	19:17 (Rep 11) 21:31 21:54
30	08:08 16:58		07:00 19:49	18:25 (Rep 11) 19:23 (Rep 11)	05:50 20:45	19:17 (Rep 11) 21:33 21:55
31	08:06 16:59		06:58 19:51	18:28 (Oerzen 1) 19:25 (Rep 11)		19:17 (Rep 11) 21:34 21:56
Sonnenscheinstunden	253	275	367	419	491	506
astr.max.mögl.Beschattung		514	741	224		

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s05 - Oerzen, Am Ohfeld 15

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	[Juli	[August	[September		[Oktober		[November	[Dezember	
1	04:56 21:50	05:34 21:16	06:27 20:11	10	19:06 (Rep 11) 19:16 (Rep 11)	07:19 18:58	18:11 (Rep 10) 18:30 (Rep 10)	07:16 16:49	08:09 16:06
2	04:57 21:49	05:36 21:14	06:29 20:08	14	19:04 (Rep 11) 19:18 (Rep 11)	07:21 18:56	18:12 (Rep 10) 18:28 (Rep 10)	07:18 16:47	08:11 16:06
3	04:57 21:49	05:38 21:12	06:31 20:06	18	19:01 (Rep 11) 19:19 (Rep 11)	07:23 18:54	18:13 (Rep 10) 18:26 (Rep 10)	07:20 16:45	08:12 16:05
4	04:58 21:48	05:39 21:10	06:32 20:04	20	19:00 (Rep 11) 19:20 (Rep 11)	07:24 18:51	18:14 (Rep 10) 18:22 (Rep 10)	07:21 16:43	08:14 16:04
5	04:59 21:48	05:41 21:08	06:34 20:01	20	19:00 (Rep 11) 19:20 (Rep 11)	07:26 18:49		07:23 16:42	08:15 16:04
6	05:00 21:47	05:43 21:07	06:36 19:59	22	18:58 (Rep 11) 19:20 (Rep 11)	07:28 18:46		07:25 16:40	08:16 16:03
7	05:01 21:47	05:44 21:05	06:38 19:56	22	18:58 (Rep 11) 19:20 (Rep 11)	07:30 18:44		07:27 16:38	08:18 16:03
8	05:02 21:46	05:46 21:03	06:39 19:54	22	18:58 (Rep 11) 19:20 (Rep 11)	07:31 18:42	17:15 (Oerzen 2) 17:25 (Oerzen 2)	07:29 16:36	08:19 16:02
9	05:03 21:45	05:48 21:01	06:41 19:52	22	18:57 (Rep 11) 19:19 (Rep 11)	07:33 18:39	17:12 (Oerzen 2) 17:28 (Oerzen 2)	07:31 16:34	08:20 16:02
10	05:04 21:44	05:49 20:59	06:43 19:49	22	18:57 (Rep 11) 19:19 (Rep 11)	07:35 18:37	17:09 (Oerzen 2) 17:41 (Oerzen 3)	07:33 16:33	08:21 16:02
11	05:05 21:44	05:51 20:57	06:44 19:47	29	18:24 (Oerzen 1) 19:18 (Rep 11)	07:37 18:35	17:07 (Oerzen 2) 17:43 (Oerzen 3)	07:35 16:31	08:23 16:01
12	05:06 21:43	05:53 20:55	06:46 19:44	35	18:19 (Oerzen 1) 19:16 (Rep 11)	07:39 18:32	17:06 (Oerzen 2) 17:44 (Oerzen 3)	07:36 16:29	08:24 16:01
13	05:07 21:42	05:55 20:53	06:48 19:42	35	18:17 (Oerzen 1) 19:14 (Rep 11)	07:40 18:30	17:05 (Oerzen 2) 17:45 (Oerzen 3)	07:38 16:28	08:25 16:01
14	05:08 21:41	05:56 20:51	06:50 19:39	35	18:15 (Oerzen 1) 19:12 (Rep 11)	07:42 18:28	17:04 (Oerzen 2) 17:46 (Oerzen 3)	07:40 16:26	08:26 16:01
15	05:10 21:40	05:58 20:49	06:51 19:37	32	18:13 (Oerzen 1) 19:09 (Rep 11)	07:44 18:25	17:03 (Oerzen 2) 17:46 (Oerzen 3)	07:42 16:25	08:27 16:01
16	05:11 21:39	06:00 20:46	06:53 19:35	27	18:12 (Oerzen 1) 18:39 (Oerzen 1)	07:46 18:23	17:03 (Oerzen 2) 17:46 (Oerzen 3)	07:44 16:23	08:28 16:01
17	05:12 21:38	06:01 20:44	06:55 19:32	29	18:11 (Oerzen 1) 18:40 (Oerzen 1)	07:48 18:21	17:02 (Oerzen 2) 17:46 (Oerzen 3)	07:46 16:22	08:28 16:01
18	05:14 21:36	06:03 20:42	06:56 19:30	29	18:10 (Oerzen 1) 18:39 (Oerzen 1)	07:50 18:19	17:02 (Oerzen 2) 17:45 (Oerzen 3)	07:48 16:20	08:29 16:02
19	05:15 21:35	06:05 20:40	06:58 19:27	31	18:09 (Oerzen 1) 18:40 (Oerzen 1)	07:51 18:16	17:02 (Oerzen 2) 17:45 (Oerzen 3)	07:49 16:19	08:30 16:02
20	05:16 21:34	06:07 20:38	07:00 19:25	31	18:09 (Oerzen 1) 18:40 (Oerzen 1)	07:53 18:14	17:02 (Oerzen 2) 17:44 (Oerzen 3)	07:51 16:18	08:31 16:02
21	05:18 21:33	06:08 20:36	07:02 19:22	31	18:09 (Oerzen 1) 18:40 (Oerzen 1)	07:55 18:12	17:02 (Oerzen 2) 17:42 (Oerzen 3)	07:53 16:16	08:31 16:03
22	05:19 21:31	06:10 20:33	07:03 19:20	30	18:08 (Oerzen 1) 18:38 (Oerzen 1)	07:57 18:10	17:02 (Oerzen 2) 17:40 (Oerzen 3)	07:55 16:15	08:32 16:03
23	05:21 21:30	06:12 20:31	07:05 19:18	30	18:08 (Oerzen 1) 18:38 (Oerzen 1)	07:59 18:08	17:03 (Oerzen 2) 17:38 (Oerzen 3)	07:56 16:14	08:32 16:04
24	05:22 21:28	06:13 20:29	07:07 19:15	28	18:09 (Oerzen 1) 18:37 (Oerzen 1)	08:01 18:06	17:03 (Oerzen 2) 17:28 (Oerzen 2)	07:58 16:13	08:33 16:04
25	05:24 21:27	06:15 20:27	07:09 19:13	27	18:08 (Oerzen 1) 18:35 (Oerzen 1)	07:03 17:03	16:05 (Oerzen 2) 16:27 (Oerzen 2)	08:00 16:12	08:33 16:05
26	05:25 21:25	06:17 20:24	07:10 19:10	25	18:09 (Oerzen 1) 18:34 (Oerzen 1)	07:04 17:01	16:06 (Oerzen 2) 16:25 (Oerzen 2)	08:01 16:11	08:33 16:06
27	05:27 21:24	06:19 20:22	07:12 19:08	23	18:10 (Oerzen 1) 18:33 (Oerzen 1)	07:06 16:59	16:08 (Oerzen 2) 16:23 (Oerzen 2)	08:03 16:10	08:34 16:06
28	05:28 21:22	06:20 20:20	07:14 19:06	22	18:11 (Rep 10) 18:33 (Rep 10)	07:08 16:57	16:11 (Oerzen 2) 16:20 (Oerzen 2)	08:05 16:09	08:34 16:07
29	05:30 21:21	06:22 20:18	07:16 19:03	21	18:10 (Rep 10) 18:31 (Rep 10)	07:10 16:55		08:06 16:08	08:34 16:08
30	05:31 21:19	06:24 20:15	07:17 19:01	21	18:10 (Rep 10) 18:31 (Rep 10)	07:12 16:53		08:08 16:07	08:34 16:09
31	05:33 21:17	06:25 20:13				07:14 16:51			08:34 16:10
Sonnenscheinstunden	509	458	382			329		261	237
astr.max.mögl.Beschattung			763			729			

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s06 - Oerzen, Im Dorfe 14

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

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Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai	Juni
1	08:34 16:11	08:05 17:01	07:09 17:56		06:55 19:53	22	19:01 (Rep 10) 19:23 (Rep 10)	04:58 20:47
2	08:34 16:12	08:03 17:03	07:06 17:58		06:53 19:54	22	19:01 (Rep 10) 19:23 (Rep 10)	04:59 20:48
3	08:34 16:14	08:01 17:05	07:04 18:00		06:50 19:56	20	19:02 (Rep 10) 19:22 (Rep 10)	04:58 20:50
4	08:33 16:15	08:00 17:07	07:02 18:01		06:48 19:58	20	19:01 (Rep 10) 19:21 (Rep 10)	04:57 20:52
5	08:33 16:16	07:58 17:09	07:00 18:03		06:46 20:00	18	19:02 (Rep 10) 19:20 (Rep 10)	04:56 20:54
6	08:33 16:17	07:56 17:11	06:57 18:05		06:43 20:02	21	19:04 (Rep 10) 19:29 (Oerzen 1)	04:55 20:55
7	08:32 16:19	07:54 17:13	06:55 18:07		06:41 20:03	26	19:04 (Rep 10) 19:32 (Oerzen 1)	04:55 20:57
8	08:32 16:20	07:53 17:15	06:53 18:09	8	17:34 (Oerzen 3) 17:42 (Oerzen 3)	23	19:08 (Rep 10) 19:34 (Oerzen 1)	04:54 20:59
9	08:31 16:21	07:51 17:17	06:50 18:11	12	17:32 (Oerzen 3) 17:44 (Oerzen 3)	22	19:14 (Oerzen 1) 19:36 (Oerzen 1)	04:54 21:00
10	08:31 16:23	07:49 17:19	06:48 18:13	17	17:30 (Oerzen 3) 17:47 (Oerzen 3)	24	19:12 (Oerzen 1) 19:36 (Oerzen 1)	04:53 21:02
11	08:30 16:24	07:47 17:21	06:46 18:14	20	17:28 (Oerzen 3) 17:48 (Oerzen 3)	26	19:11 (Oerzen 1) 19:37 (Oerzen 1)	04:53 21:04
12	08:29 16:26	07:45 17:23	06:43 18:16	21	17:28 (Oerzen 3) 17:49 (Oerzen 3)	28	19:10 (Oerzen 1) 19:38 (Oerzen 1)	04:52 21:06
13	08:28 16:27	07:43 17:25	06:41 18:18	22	17:26 (Oerzen 3) 17:48 (Oerzen 3)	28	19:09 (Oerzen 1) 19:37 (Oerzen 1)	04:52 21:07
14	08:28 16:29	07:41 17:27	06:38 18:20	25	17:24 (Oerzen 2) 17:49 (Oerzen 3)	30	19:08 (Oerzen 1) 19:38 (Oerzen 1)	04:52 21:09
15	08:27 16:31	07:39 17:29	06:36 18:22	27	17:22 (Oerzen 2) 17:49 (Oerzen 2)	37	19:08 (Oerzen 1) 19:50 (Rep 11)	04:52 21:11
16	08:26 16:32	07:37 17:31	06:34 18:24	29	17:21 (Oerzen 2) 17:50 (Oerzen 2)	41	19:08 (Oerzen 1) 19:52 (Rep 11)	04:51 21:12
17	08:25 16:34	07:35 17:33	06:31 18:26	30	17:21 (Oerzen 2) 17:51 (Oerzen 2)	45	19:08 (Oerzen 1) 19:54 (Rep 11)	04:51 21:14
18	08:24 16:36	07:33 17:35	06:29 18:27	31	17:19 (Oerzen 2) 17:50 (Oerzen 2)	47	19:07 (Oerzen 1) 19:55 (Rep 11)	04:51 21:15
19	08:23 16:37	07:31 17:37	06:26 18:29	32	17:19 (Oerzen 2) 17:51 (Oerzen 2)	48	19:08 (Oerzen 1) 19:57 (Rep 11)	04:51 21:17
20	08:22 16:39	07:29 17:38	06:24 18:31	32	17:18 (Oerzen 2) 17:50 (Oerzen 2)	48	19:08 (Oerzen 1) 19:57 (Rep 11)	04:51 21:18
21	08:20 16:41	07:26 17:40	06:22 18:33	32	17:18 (Oerzen 2) 17:50 (Oerzen 2)	48	19:09 (Oerzen 1) 19:58 (Rep 11)	04:52 21:20
22	08:19 16:43	07:24 17:42	06:19 18:35	31	17:19 (Oerzen 2) 17:50 (Oerzen 2)	46	19:10 (Oerzen 1) 19:58 (Rep 11)	04:52 21:22
23	08:18 16:44	07:22 17:44	06:17 18:36	31	17:18 (Oerzen 2) 17:49 (Oerzen 2)	43	19:11 (Oerzen 1) 19:57 (Rep 11)	04:52 21:23
24	08:17 16:46	07:20 17:46	06:14 18:38	30	17:19 (Oerzen 2) 17:49 (Oerzen 2)	40	19:12 (Oerzen 1) 19:57 (Rep 11)	04:52 21:24
25	08:15 16:48	07:18 17:48	06:12 18:40	29	17:18 (Oerzen 2) 17:47 (Oerzen 2)	35	19:14 (Oerzen 1) 19:56 (Rep 11)	04:53 21:26
26	08:14 16:50	07:15 17:50	06:10 18:42	34	17:19 (Oerzen 2) 18:16 (Rep 10)	28	19:16 (Oerzen 1) 19:55 (Rep 11)	04:53 21:27
27	08:13 16:52	07:13 17:52	06:07 18:44	35	17:20 (Oerzen 2) 18:17 (Rep 10)	16	19:38 (Rep 11) 19:54 (Rep 11)	04:53 21:29
28	08:11 16:54	07:11 17:54	06:05 18:45	36	17:21 (Oerzen 2) 18:19 (Rep 10)	14	19:39 (Rep 11) 19:53 (Rep 11)	04:54 21:30
29	08:10 16:56		07:02 19:47	35	18:23 (Oerzen 2) 19:21 (Rep 10)	10	19:41 (Rep 11) 19:51 (Rep 11)	04:55 21:31
30	08:08 16:58		07:00 19:49	33	18:25 (Oerzen 2) 19:23 (Rep 10)			04:55 21:33
31	08:06 16:59		06:58 19:51	21	19:02 (Rep 10) 19:23 (Rep 10)			04:55 21:34
Sonnenscheinstunden	253	275	367		419		491	506
astr.max.mögl.Beschattung			653		876			

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s06 - Oerzen, Im Dorfe 14

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August		September		Oktober		November	Dezember
1	04:56	05:34		06:27	19:10 (Oerzen 1)	07:19	18:06 (Oerzen 3)	07:16	08:09
	21:50	21:16		20:11	26 19:36 (Oerzen 1)	18:58	22 18:28 (Oerzen 3)	16:49	16:06
2	04:57	05:36		06:29	19:11 (Oerzen 1)	07:21	18:07 (Oerzen 3)	07:18	08:11
	21:49	21:14		20:08	24 19:35 (Oerzen 1)	18:56	20 18:27 (Oerzen 3)	16:47	16:06
3	04:57	05:38		06:31	19:11 (Oerzen 1)	07:23	18:08 (Oerzen 3)	07:20	08:12
	21:49	21:12		20:06	22 19:33 (Oerzen 1)	18:54	18 18:26 (Oerzen 3)	16:45	16:05
4	04:58	05:39		06:32	19:05 (Rep 10)	07:24	18:08 (Oerzen 3)	07:21	08:14
	21:48	21:10		20:03	23 19:31 (Oerzen 1)	18:51	14 18:22 (Oerzen 3)	16:43	16:04
5	04:59	05:41		06:34	19:02 (Rep 10)	07:26	18:10 (Oerzen 3)	07:23	08:15
	21:48	21:08		20:01	25 19:29 (Oerzen 1)	18:49	10 18:20 (Oerzen 3)	16:42	16:04
6	05:00	05:43		06:36	18:59 (Rep 10)	07:28	18:14 (Oerzen 3)	07:25	08:16
	21:47	21:07		19:59	21 19:24 (Oerzen 1)	18:46	3 18:17 (Oerzen 3)	16:40	16:03
7	05:01	05:44		06:38	18:58 (Rep 10)	07:30		07:27	08:18
	21:47	21:05		19:56	17 19:15 (Rep 10)	18:44		16:38	16:03
8	05:02	05:46		06:39	18:57 (Rep 10)	07:31		07:29	08:19
	21:46	21:03		19:54	19 19:16 (Rep 10)	18:42		16:36	16:02
9	05:03	05:48		06:41	18:55 (Rep 10)	07:33		07:31	08:20
	21:45	21:01		19:52	21 19:16 (Rep 10)	18:39		16:34	16:02
10	05:04	05:49		06:43	18:55 (Rep 10)	07:35		07:33	08:21
	21:44	20:59		19:49	21 19:16 (Rep 10)	18:37		16:33	16:02
11	05:05	05:51		06:44	18:55 (Rep 10)	07:37		07:35	08:23
	21:44	20:57		19:47	21 19:16 (Rep 10)	18:35		16:31	16:01
12	05:06	05:53		06:46	18:54 (Rep 10)	07:39		07:36	08:24
	21:43	20:55		19:44	21 19:15 (Rep 10)	18:32		16:29	16:01
13	05:07	05:55		19:51 (Rep 11)	06:48	18:17 (Oerzen 2)	07:40	07:38	08:25
	21:42	20:53	4	19:55 (Rep 11)	19:42	31 19:14 (Rep 10)	18:30	16:28	16:01
14	05:08	05:56		19:48 (Rep 11)	06:50	18:14 (Oerzen 2)	07:42	07:40	08:26
	21:41	20:51	11	19:59 (Rep 11)	19:39	34 19:12 (Rep 10)	18:28	16:26	16:01
15	05:10	05:58		19:45 (Rep 11)	06:51	18:11 (Oerzen 2)	07:44	07:42	08:27
	21:40	20:49	15	20:00 (Rep 11)	19:37	36 19:09 (Rep 10)	18:25	16:25	16:01
16	05:11	06:00		19:44 (Rep 11)	06:53	18:09 (Oerzen 2)	07:46	07:44	08:27
	21:39	20:46	17	20:01 (Rep 11)	19:35	36 19:07 (Rep 10)	18:23	16:23	16:01
17	05:12	06:01		19:22 (Oerzen 1)	06:55	18:08 (Oerzen 2)	07:48	07:46	08:28
	21:38	20:44	30	20:02 (Rep 11)	19:32	34 19:05 (Rep 10)	18:21	16:22	16:02
18	05:14	06:03		19:19 (Oerzen 1)	06:56	18:06 (Oerzen 2)	07:50	07:47	08:29
	21:36	20:42	36	20:02 (Rep 11)	19:30	29 18:35 (Oerzen 2)	18:19	16:20	16:02
19	05:15	06:05		19:17 (Oerzen 1)	06:58	18:05 (Oerzen 2)	07:51	07:49	08:30
	21:35	20:40	41	20:03 (Rep 11)	19:27	30 18:35 (Oerzen 2)	18:16	16:19	16:02
20	05:16	06:07		19:16 (Oerzen 1)	07:00	18:05 (Oerzen 2)	07:53	07:51	08:30
	21:34	20:38	44	20:03 (Rep 11)	19:25	31 18:36 (Oerzen 2)	18:14	16:18	16:02
21	05:18	06:08		19:14 (Oerzen 1)	07:02	18:04 (Oerzen 2)	07:55	07:53	08:31
	21:33	20:36	47	20:02 (Rep 11)	19:22	32 18:36 (Oerzen 2)	18:12	16:16	16:03
22	05:19	06:10		19:13 (Oerzen 1)	07:03	18:03 (Oerzen 2)	07:57	07:55	08:32
	21:31	20:33	48	20:02 (Rep 11)	19:20	32 18:35 (Oerzen 2)	18:10	16:15	16:03
23	05:21	06:12		19:12 (Oerzen 1)	07:05	18:03 (Oerzen 2)	07:59	07:56	08:32
	21:30	20:31	48	20:01 (Rep 11)	19:18	32 18:35 (Oerzen 2)	18:08	16:14	16:04
24	05:22	06:13		19:11 (Oerzen 1)	07:07	18:03 (Oerzen 2)	08:01	07:58	08:33
	21:28	20:29	48	20:00 (Rep 11)	19:15	32 18:35 (Oerzen 2)	18:06	16:13	16:04
25	05:24	06:15		19:11 (Oerzen 1)	07:09	18:02 (Oerzen 2)	07:03	08:00	08:33
	21:27	20:27	47	19:59 (Rep 11)	19:13	31 18:33 (Oerzen 2)	17:03	16:12	16:05
26	05:25	06:17		19:10 (Oerzen 1)	07:10	18:02 (Oerzen 2)	07:04	08:01	08:33
	21:25	20:24	45	19:56 (Rep 11)	19:10	31 18:33 (Oerzen 2)	17:01	16:11	16:06
27	05:27	06:19		19:10 (Oerzen 1)	07:12	18:03 (Oerzen 2)	07:06	08:03	08:34
	21:24	20:22	41	19:54 (Rep 11)	19:08	29 18:32 (Oerzen 2)	16:59	16:10	16:06
28	05:28	06:20		19:10 (Oerzen 1)	07:14	18:04 (Oerzen 2)	07:08	08:05	08:34
	21:22	20:20	37	19:52 (Rep 11)	19:06	27 18:31 (Oerzen 2)	16:57	16:09	16:07
29	05:30	06:22		19:09 (Oerzen 1)	07:16	18:03 (Oerzen 2)	07:10	08:06	08:34
	21:21	20:18	30	19:39 (Oerzen 1)	19:03	26 18:29 (Oerzen 2)	16:55	16:08	16:08
30	05:31	06:24		19:10 (Oerzen 1)	07:17	18:05 (Oerzen 2)	07:12	08:08	08:34
	21:19	20:15	28	19:38 (Oerzen 1)	19:01	23 18:28 (Oerzen 3)	16:53	16:07	16:09
31	05:33	06:25		19:10 (Oerzen 1)			07:14		08:34
	21:17	20:13	28	19:38 (Oerzen 1)			16:51		16:10
Sonnenscheinstunden	509	458		382		329		261	237
astr.max.mögl.Beschattung		645		817		87			

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s07 - Oerzen, Im Dorfe 16

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar			Februar			März			April			Mai			Juni		
1	08:34	08:05	07:09						06:55	18:14 (Oerzen 2)	05:48		19:13 (Oerzen 1)	04:59				
	16:11	17:01	17:56						19:53	50	19:26 (Rep 10)	20:47	52	20:05 (Rep 11)	21:35			
2	08:34	08:03	07:06						06:53		18:16 (Oerzen 2)	05:46		19:14 (Oerzen 1)	04:59			
	16:12	17:03	17:58						19:54	49	19:27 (Rep 10)	20:48	51	20:05 (Rep 11)	21:36			
3	08:34	08:01	07:04						06:50		18:18 (Oerzen 2)	05:44		19:14 (Oerzen 1)	04:58			
	16:14	17:05	18:00						19:56	46	19:27 (Rep 10)	20:50	48	20:04 (Rep 11)	21:37			
4	08:33	08:00	07:02						06:48		18:19 (Oerzen 2)	05:42		19:15 (Oerzen 1)	04:57			
	16:15	17:07	18:01						19:58	43	19:27 (Rep 10)	20:52	45	20:03 (Rep 11)	21:38			
5	08:33	07:58	07:00						06:46		18:22 (Oerzen 2)	05:40		19:16 (Oerzen 1)	04:56			
	16:16	17:09	18:03						20:00	37	19:27 (Rep 10)	20:54	40	20:02 (Rep 11)	21:40			
6	08:33	07:56	06:57						06:43		19:03 (Rep 10)	05:38		19:19 (Oerzen 1)	04:55			
	16:17	17:11	18:05						20:02	24	19:27 (Rep 10)	20:55	34	20:01 (Rep 11)	21:41			
7	08:32	07:54	06:55						06:41		19:03 (Rep 10)	05:36		19:20 (Oerzen 1)	04:55			
	16:19	17:13	18:07						20:04	23	19:26 (Rep 10)	20:57	27	19:59 (Rep 11)	21:42			
8	08:32	07:53	06:53						06:39		19:03 (Rep 10)	05:34		19:23 (Oerzen 1)	04:54			
	16:20	17:15	18:09						20:05	22	19:25 (Rep 10)	20:59	16	19:56 (Rep 11)	21:42			
9	08:31	07:51	06:50		17:33 (Oerzen 3)				06:36		19:04 (Rep 10)	05:32			04:54			
	16:21	17:17	18:11	10	17:43 (Oerzen 3)				20:07	20	19:24 (Rep 10)	21:01			21:43			
10	08:31	07:49	06:48		17:30 (Oerzen 3)				06:34		19:04 (Rep 10)	05:30			04:53			
	16:23	17:19	18:13	15	17:45 (Oerzen 3)				20:09	18	19:22 (Rep 10)	21:02			21:44			
11	08:30	07:47	06:46		17:28 (Oerzen 3)				06:32		19:05 (Rep 10)	05:28			04:53			
	16:24	17:21	18:15	18	17:46 (Oerzen 3)				20:11	16	19:21 (Rep 10)	21:04			21:45			
12	08:29	07:45	06:43		17:27 (Oerzen 3)				06:29		19:08 (Rep 10)	05:27			04:52			
	16:26	17:23	18:16	21	17:48 (Oerzen 3)				20:13	11	19:19 (Rep 10)	21:06			21:46			
13	08:28	07:43	06:41		17:25 (Oerzen 3)				06:27		19:26 (Oerzen 1)	05:25			04:52			
	16:27	17:25	18:18	23	17:48 (Oerzen 3)				20:14	12	19:38 (Oerzen 1)	21:07			21:46			
14	08:28	07:41	06:38		17:24 (Oerzen 3)				06:25		19:22 (Oerzen 1)	05:23			04:52			
	16:29	17:27	18:20	24	17:48 (Oerzen 3)				20:16	18	19:40 (Oerzen 1)	21:09			21:47			
15	08:27	07:39	06:36		17:22 (Oerzen 2)				06:22		19:20 (Oerzen 1)	05:22			04:52			
	16:31	17:29	18:22	26	17:48 (Oerzen 3)				20:18	22	19:42 (Oerzen 1)	21:11			21:48			
16	08:26	07:37	06:34		17:20 (Oerzen 2)				06:20		19:18 (Oerzen 1)	05:20			04:51			
	16:32	17:31	18:24	28	17:48 (Oerzen 3)				20:20	26	19:44 (Oerzen 1)	21:12			21:48			
17	08:25	07:35	06:31		17:19 (Oerzen 2)				06:18		19:17 (Oerzen 1)	05:18			04:51			
	16:34	17:33	18:26	30	17:49 (Oerzen 2)				20:21	28	19:45 (Oerzen 1)	21:14			21:49			
18	08:24	07:33	06:29		17:17 (Oerzen 2)				06:15		19:15 (Oerzen 1)	05:17			04:51			
	16:36	17:35	18:27	32	17:49 (Oerzen 2)				20:23	30	19:45 (Oerzen 1)	21:15			21:49			
19	08:23	07:31	06:26		17:16 (Oerzen 2)				06:13		19:14 (Oerzen 1)	05:15			04:51			
	16:37	17:37	18:29	34	17:50 (Oerzen 2)				20:25	31	19:45 (Oerzen 1)	21:17			21:49			
20	08:22	07:29	06:24		17:15 (Oerzen 2)				06:11		19:13 (Oerzen 1)	05:14			04:51			
	16:39	17:39	18:31	35	17:50 (Oerzen 2)				20:27	40	19:59 (Rep 11)	21:18			21:50			
21	08:20	07:26	06:22		17:14 (Oerzen 2)				06:09		19:13 (Oerzen 1)	05:12			04:52			
	16:41	17:40	18:33	37	17:51 (Oerzen 2)				20:29	45	20:01 (Rep 11)	21:20			21:50			
22	08:19	07:24	06:19		17:14 (Oerzen 2)				06:07		19:13 (Oerzen 1)	05:11			04:52			
	16:43	17:42	18:35	37	17:51 (Oerzen 2)				20:30	49	20:02 (Rep 11)	21:22			21:50			
23	08:18	07:22	06:17		17:13 (Oerzen 2)				06:04		19:12 (Oerzen 1)	05:10			04:52			
	16:44	17:44	18:36	38	17:51 (Oerzen 2)				20:32	52	20:04 (Rep 11)	21:23			21:50			
24	08:17	07:20	06:14		17:13 (Oerzen 2)				06:02		19:12 (Oerzen 1)	05:08			04:52			
	16:46	17:46	18:38	38	17:51 (Oerzen 2)				20:34	53	20:05 (Rep 11)	21:24			21:51			
25	08:15	07:18	06:12		17:12 (Oerzen 2)				06:00		19:12 (Oerzen 1)	05:07			04:53			
	16:48	17:48	18:40	38	17:50 (Oerzen 2)				20:36	54	20:06 (Rep 11)	21:26			21:51			
26	08:14	07:16	06:10		17:12 (Oerzen 2)				05:58		19:12 (Oerzen 1)	05:06			04:53			
	16:50	17:50	18:42	38	17:50 (Oerzen 2)				20:38	54	20:06 (Rep 11)	21:27			21:51			
27	08:13	07:13	06:07		17:12 (Oerzen 2)				05:56		19:12 (Oerzen 1)	05:05			04:54			
	16:52	17:52	18:44	37	17:49 (Oerzen 2)				20:39	54	20:06 (Rep 11)	21:29			21:50			
28	08:11	07:11	06:05		17:12 (Oerzen 2)				05:54		19:12 (Oerzen 1)	05:04			04:54			
	16:54	17:54	18:45	37	17:49 (Oerzen 2)				20:41	54	20:06 (Rep 11)	21:30			21:50			
29	08:10		07:02		18:13 (Oerzen 2)				05:52		19:12 (Oerzen 1)	05:02			04:55			
	16:56		19:47	43	19:21 (Rep 10)				20:43	54	20:06 (Rep 11)	21:31			21:50			
30	08:08		07:00		18:13 (Oerzen 2)				05:50		19:13 (Oerzen 1)	05:01			04:55			
	16:58		19:49	48	19:23 (Rep 10)				20:45	53	20:06 (Rep 11)	21:33			21:50			
31	08:06		06:58		18:14 (Oerzen 2)													
	17:00		19:51	49	19:25 (Rep 10)							21:34						
Sonnenscheinstunden	253	275	367						419			491					506	
astr.max.mögl.Beschattung				736						1088			313					

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



**SHADOW - Kalender****Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s07 - Oerzen, Im Dorfe 16**Annahmen für Schattenwurfberechnung**

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56   21:50	05:35   21:16		06:27   20:11	16	19:04 (Rep 10)   19:20 (Rep 10)	07:19   18:58	22	18:05 (Oerzen 3)   18:27 (Oerzen 3)	07:16   16:49	08:09   16:06
2	04:57   21:49	05:36   21:14		06:29   20:08	18	19:03 (Rep 10)   19:21 (Rep 10)	07:21   18:56	20	18:06 (Oerzen 3)   18:26 (Oerzen 3)	07:18   16:47	08:11   16:06
3	04:57   21:49	05:38   21:12		06:31   20:06	20	19:01 (Rep 10)   19:21 (Rep 10)	07:23   18:54	17	18:07 (Oerzen 3)   18:24 (Oerzen 3)	07:20   16:45	08:12   16:05
4	04:58   21:48	05:39   21:10		06:32   20:04	22	19:00 (Rep 10)   19:22 (Rep 10)	07:24   18:51	13	18:08 (Oerzen 3)   18:21 (Oerzen 3)	07:21   16:44	08:14   16:04
5	04:59   21:48	05:41   21:08	22	19:32 (Oerzen 1)   20:08 (Rep 11)	23	19:00 (Rep 10)   19:23 (Rep 10)	07:26   18:49	5	18:12 (Oerzen 3)   18:17 (Oerzen 3)	07:23   16:42	08:15   16:04
6	05:00   21:47	05:43   21:07	29	19:29 (Oerzen 1)   20:09 (Rep 11)	24	18:58 (Rep 10)   19:22 (Rep 10)	07:28   18:46			07:25   16:40	08:16   16:03
7	05:01   21:47	05:44   21:05	37	19:27 (Oerzen 1)   20:11 (Rep 11)	35	18:18 (Oerzen 2)   19:22 (Rep 10)	07:30   18:44			07:27   16:38	08:18   16:03
8	05:02   21:46	05:46   21:03	42	19:25 (Oerzen 1)   20:12 (Rep 11)	43	18:14 (Oerzen 2)   19:22 (Rep 10)	07:31   18:42			07:29   16:36	08:19   16:02
9	05:03   21:45	05:48   21:01	47	19:24 (Oerzen 1)   20:13 (Rep 11)	46	18:11 (Oerzen 2)   19:21 (Rep 10)	07:33   18:39			07:31   16:35	08:20   16:02
10	05:04   21:44	05:49   21:00	49	19:23 (Oerzen 1)   20:13 (Rep 11)	49	18:09 (Oerzen 2)   19:20 (Rep 10)	07:35   18:37			07:33   16:33	08:21   16:02
11	05:05   21:44	05:51   21:00	51	19:22 (Oerzen 1)   20:13 (Rep 11)	49	18:08 (Oerzen 2)   19:19 (Rep 10)	07:37   18:35			07:35   16:33	08:23   16:02
12	05:06   21:43	05:53   21:00	53	19:21 (Oerzen 1)   20:14 (Rep 11)	49	18:05 (Oerzen 2)   19:16 (Rep 10)	07:39   18:32			07:36   16:31	08:24   16:01
13	05:07   21:42	05:55   21:00	53	19:20 (Oerzen 1)   20:13 (Rep 11)	48	18:04 (Oerzen 2)   19:14 (Rep 10)	07:40   18:30			07:38   16:29	08:25   16:01
14	05:08   21:41	05:56   21:01	54	19:20 (Oerzen 1)   20:14 (Rep 11)	44	18:03 (Oerzen 2)   19:12 (Rep 10)	07:42   18:28			07:40   16:28	08:26   16:01
15	05:10   21:40	05:58   21:01	54	19:19 (Oerzen 1)   20:13 (Rep 11)	36	18:02 (Oerzen 2)   19:13 (Rep 10)	07:44   18:25			07:42   16:26	08:27   16:01
16	05:11   21:39	06:00   21:02	55	19:18 (Oerzen 1)   20:13 (Rep 11)	37	18:01 (Oerzen 2)   19:13 (Rep 10)	07:46   18:23			07:44   16:25	08:28   16:01
17	05:12   21:38	06:01   21:03	55	19:18 (Oerzen 1)   20:13 (Rep 11)	38	18:01 (Oerzen 2)   19:13 (Rep 10)	07:48   18:21			07:46   16:24	08:28   16:02
18	05:14   21:36	06:03   21:04	54	19:17 (Oerzen 1)   20:11 (Rep 11)	38	18:00 (Oerzen 2)   19:11 (Rep 10)	07:50   18:19			07:48   16:22	08:29   16:02
19	05:15   21:35	06:05   21:04	53	19:18 (Oerzen 1)   20:11 (Rep 11)	39	18:38 (Oerzen 2)   19:11 (Rep 10)	07:51   18:16			07:49   16:20	08:30   16:02
20	05:16   21:34	06:07   21:05	52	19:18 (Oerzen 1)   20:10 (Rep 11)	38	17:59 (Oerzen 2)   19:11 (Rep 10)	07:53   18:14			07:51   16:19	08:30   16:02
21	05:18   21:33	06:08   21:06	49	19:17 (Oerzen 1)   20:10 (Rep 11)	37	18:37 (Oerzen 2)   19:11 (Rep 10)	07:55   18:12			07:53   16:18	08:31   16:02
22	05:19   21:31	06:10   21:07	44	19:18 (Oerzen 1)   20:05 (Rep 11)	37	18:37 (Oerzen 2)   19:11 (Rep 10)	07:57   18:10			07:55   16:16	08:32   16:03
23	05:21   21:30	06:12   21:08	39	19:17 (Oerzen 1)   20:02 (Rep 11)	36	18:36 (Oerzen 2)   19:11 (Rep 10)	07:59   18:08			07:56   16:15	08:32   16:03
24	05:22   21:28	06:13   21:09	31	19:18 (Oerzen 1)   19:49 (Oerzen 1)	34	18:35 (Oerzen 2)   19:11 (Rep 10)	08:01   18:06			07:58   16:14	08:33   16:04
25	05:24   21:27	06:15   21:10	29	19:19 (Oerzen 1)   19:48 (Oerzen 1)	32	18:34 (Oerzen 2)   19:11 (Rep 10)	08:03   18:03			08:00   16:13	08:33   16:04
26	05:25   21:25	06:17   21:11	28	19:19 (Oerzen 1)   19:47 (Oerzen 1)	31	18:00 (Oerzen 2)   19:11 (Rep 10)	07:04   17:01			08:01   16:12	08:33   16:05
27	05:27   21:24	06:19   21:12	25	19:20 (Oerzen 1)   19:45 (Oerzen 1)	28	18:31 (Oerzen 2)   19:11 (Rep 10)	07:06   16:59			08:03   16:11	08:34   16:06
28	05:28   21:22	06:20   21:13	22	19:22 (Oerzen 1)   19:44 (Oerzen 1)	27	18:30 (Oerzen 2)   19:11 (Rep 10)	07:08   16:57			08:05   16:10	08:34   16:07
29	05:30   21:21	06:22   21:14	18	19:23 (Oerzen 1)   19:41 (Oerzen 1)	24	18:04 (Oerzen 2)   19:11 (Rep 10)	07:10   16:55			08:06   16:09	08:34   16:08
30	05:31   21:19	06:24   21:15	13	19:41 (Oerzen 1)   19:13 (Rep 10)	24	18:28 (Oerzen 3)   19:11 (Rep 10)	16:55   16:53			16:08   16:07	16:08   16:09
31	05:33   21:17	06:25   21:13	12	19:07 (Rep 10)   19:19 (Rep 10)			07:14   16:51				08:34   16:10
Sonnenscheinstunden		509	458	382	1022	329	77	261	237		
astr.max.mögl.Beschattung			1070								

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s08 - Oerzen, Im Dorfe 19

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	[Januar	[Februar	[März		[April		[Mai		[Juni	
1	08:34	08:05	07:09		06:55		18:30 (Oerzen 2)	05:48	19:29 (Oerzen 1)	04:59
	16:11	17:01	17:56		19:53	24	18:54 (Oerzen 2)	20:47	2 19:31 (Oerzen 1)	21:35
2	08:34	08:03	07:06		06:53		18:32 (Oerzen 2)	05:45		04:59
	16:12	17:03	17:58		19:54	21	18:53 (Oerzen 2)	20:48		21:36
3	08:34	08:01	07:04		06:50		18:34 (Oerzen 2)	05:44		04:58
	16:14	17:05	18:00		19:56	17	18:51 (Oerzen 2)	20:50		21:37
4	08:33	08:00	07:02		06:48		18:36 (Oerzen 2)	05:42		04:57
	16:15	17:07	18:01		19:58	11	18:47 (Oerzen 2)	20:52		21:38
5	08:33	07:58	07:00		06:46			05:40		04:56
	16:16	17:09	18:03		20:00			20:54		21:40
6	08:33	07:56	06:57		06:43			05:38		04:55
	16:17	17:11	18:05		20:02			20:55		21:41
7	08:32	07:54	06:55		06:41			05:36		04:55
	16:19	17:13	18:07		20:03			20:57		21:42
8	08:32	07:53	06:53		06:39			05:34		04:54
	16:20	17:15	18:09		20:05			20:59		21:42
9	08:31	07:51	06:50		06:36			05:32		04:54
	16:21	17:17	18:11		20:07			21:00		21:43
10	08:31	07:49	06:48		06:34			05:30		04:53
	16:23	17:19	18:13		20:09			21:02		21:44
11	08:30	07:47	06:46		17:45 (Oerzen 3)		19:28 (Oerzen 1)	05:28		04:53
	16:24	17:21	18:14	2	17:47 (Oerzen 3)	12	19:40 (Oerzen 1)	21:04		21:45
12	08:29	07:45	06:43		17:41 (Oerzen 3)		19:25 (Oerzen 1)	05:27		04:52
	16:26	17:23	18:16	9	17:50 (Oerzen 3)	18	19:43 (Oerzen 1)	21:06		21:46
13	08:28	07:43	06:41		17:38 (Oerzen 3)		19:23 (Oerzen 1)	05:25		04:52
	16:27	17:25	18:18	14	17:52 (Oerzen 3)	20	19:43 (Oerzen 1)	21:07		21:46
14	08:28	07:41	06:38		17:36 (Oerzen 3)		19:21 (Oerzen 1)	05:23		04:52
	16:29	17:27	18:20	18	17:54 (Oerzen 3)	24	19:45 (Oerzen 1)	21:09		21:47
15	08:27	07:39	06:36		17:35 (Oerzen 3)		19:20 (Oerzen 1)	05:22		04:52
	16:31	17:29	18:22	20	17:55 (Oerzen 3)	26	19:46 (Oerzen 1)	21:11		21:48
16	08:26	07:37	06:34		17:34 (Oerzen 3)		19:19 (Oerzen 1)	05:20		04:51
	16:32	17:31	18:24	21	17:55 (Oerzen 3)	27	19:46 (Oerzen 1)	21:12		21:48
17	08:25	07:35	06:31		17:34 (Oerzen 3)		19:19 (Oerzen 1)	05:18		04:51
	16:34	17:33	18:26	22	17:56 (Oerzen 3)	28	19:47 (Oerzen 1)	21:14		21:49
18	08:24	07:33	06:29		17:33 (Oerzen 3)		19:17 (Oerzen 1)	05:17		04:51
	16:36	17:35	18:27	24	17:57 (Oerzen 2)	29	19:46 (Oerzen 1)	21:15		21:49
19	08:23	07:31	06:26		17:33 (Oerzen 3)		19:17 (Oerzen 1)	05:15		04:51
	16:37	17:37	18:29	26	17:59 (Oerzen 2)	29	19:46 (Oerzen 1)	21:17		21:49
20	08:22	07:29	06:24		17:33 (Oerzen 3)		19:17 (Oerzen 1)	05:14		04:51
	16:39	17:38	18:31	26	17:59 (Oerzen 2)	29	19:46 (Oerzen 1)	21:18		21:50
21	08:20	07:26	06:22		17:32 (Oerzen 2)		19:17 (Oerzen 1)	05:12		04:52
	16:41	17:40	18:33	28	18:00 (Oerzen 2)	29	19:46 (Oerzen 1)	21:20		21:50
22	08:19	07:24	06:19		17:31 (Oerzen 2)		19:17 (Oerzen 1)	05:11		04:52
	16:43	17:42	18:35	30	18:01 (Oerzen 2)	29	19:46 (Oerzen 1)	21:22		21:50
23	08:18	07:22	06:17		17:30 (Oerzen 2)		19:17 (Oerzen 1)	05:10		04:52
	16:44	17:44	18:36	31	18:01 (Oerzen 2)	28	19:45 (Oerzen 1)	21:23		21:50
24	08:17	07:20	06:14		17:30 (Oerzen 2)		19:18 (Oerzen 1)	05:08		04:52
	16:46	17:46	18:38	31	18:01 (Oerzen 2)	27	19:45 (Oerzen 1)	21:24		21:51
25	08:15	07:18	06:12		17:29 (Oerzen 2)		19:18 (Oerzen 1)	05:07		04:53
	16:48	17:48	18:40	31	18:00 (Oerzen 2)	26	19:44 (Oerzen 1)	21:26		21:51
26	08:14	07:15	06:10		17:29 (Oerzen 2)		19:19 (Oerzen 1)	05:06		04:53
	16:50	17:50	18:42	31	18:00 (Oerzen 2)	24	19:43 (Oerzen 1)	21:27		21:51
27	08:13	07:13	06:07		17:28 (Oerzen 2)		19:20 (Oerzen 1)	05:05		04:53
	16:52	17:52	18:44	31	17:59 (Oerzen 2)	22	19:42 (Oerzen 1)	21:29		21:50
28	08:11	07:11	06:05		17:29 (Oerzen 2)		19:21 (Oerzen 1)	05:04		04:54
	16:54	17:54	18:45	30	17:59 (Oerzen 2)	20	19:41 (Oerzen 1)	21:30		21:50
29	08:10		07:02		18:29 (Oerzen 2)		19:22 (Oerzen 1)	05:02		04:55
	16:56		19:47	30	18:59 (Oerzen 2)	17	19:39 (Oerzen 1)	21:31		21:50
30	08:08		07:00		18:29 (Oerzen 2)		19:24 (Oerzen 1)	05:01		04:55
	16:58		19:49	28	18:57 (Oerzen 2)	12	19:36 (Oerzen 1)	21:33		21:50
31	08:06		06:58		18:30 (Oerzen 2)			05:00		
	16:59		19:51	26	18:56 (Oerzen 2)			21:34		
Sonnenscheinstunden	253	275	367		419		491			506
astr.max.mögl.Beschattung			509		549			2		

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s08 - Oerzen, Im Dorfe 19

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember
1	04:56 21:50	05:34 21:16		06:27 20:11	12	19:27 (Oerzen 1) 19:39 (Oerzen 1)	07:19 18:58	18:18 (Oerzen 3) 18:30 (Oerzen 3)	07:16 16:49	08:09 16:06
2	04:57 21:49	05:36 21:14		06:29 20:08			07:21 18:56	18:21 (Oerzen 3) 18:28 (Oerzen 3)	07:18 16:47	08:11 16:06
3	04:57 21:49	05:38 21:12		06:31 20:06			07:23 18:53		07:20 16:45	08:12 16:05
4	04:58 21:48	05:39 21:10		06:32 20:03			07:24 18:51		07:21 16:43	08:14 16:04
5	04:59 21:48	05:41 21:08		06:34 20:01			07:26 18:49		07:23 16:42	08:15 16:04
6	05:00 21:47	05:43 21:07		06:36 19:59			07:28 18:46		07:25 16:40	08:16 16:03
7	05:01 21:47	05:44 21:05		06:38 19:56			07:30 18:44		07:27 16:38	08:18 16:03
8	05:02 21:46	05:46 21:03		06:39 19:54	10	18:32 (Oerzen 2) 18:42 (Oerzen 2)	07:31 18:42		07:29 16:36	08:19 16:02
9	05:03 21:45	05:48 21:01		06:41 19:52	17	18:27 (Oerzen 2) 18:44 (Oerzen 2)	07:33 18:39		07:31 16:34	08:20 16:02
10	05:04 21:44	05:49 20:59		06:43 19:49	21	18:25 (Oerzen 2) 18:46 (Oerzen 2)	07:35 18:37		07:33 16:33	08:21 16:02
11	05:05 21:44	05:51 20:57		06:44 19:47	23	18:24 (Oerzen 2) 18:47 (Oerzen 2)	07:37 18:35		07:35 16:31	08:23 16:01
12	05:06 21:43	05:53 20:55	7	19:35 (Oerzen 1) 19:42 (Oerzen 1)	06:46 19:44	18:21 (Oerzen 2) 18:48 (Oerzen 2)	07:39 18:32		07:36 16:29	08:24 16:01
13	05:07 21:42	05:55 20:53	14	19:31 (Oerzen 1) 19:45 (Oerzen 1)	06:48 19:42	18:20 (Oerzen 2) 18:48 (Oerzen 2)	07:40 18:30		07:38 16:28	08:25 16:01
14	05:08 21:41	05:56 20:51	18	19:29 (Oerzen 1) 19:47 (Oerzen 1)	06:50 19:39	18:20 (Oerzen 2) 18:49 (Oerzen 2)	07:42 18:28		07:40 16:26	08:26 16:01
15	05:10 21:40	05:58 20:49	20	19:27 (Oerzen 1) 19:47 (Oerzen 1)	06:51 19:37	18:18 (Oerzen 2) 18:49 (Oerzen 2)	07:44 18:25		07:42 16:25	08:27 16:01
16	05:11 21:39	06:00 20:46	23	19:26 (Oerzen 1) 19:49 (Oerzen 1)	06:53 19:35	18:18 (Oerzen 2) 18:49 (Oerzen 2)	07:46 18:23		07:44 16:23	08:27 16:01
17	05:12 21:38	06:01 20:44	25	19:25 (Oerzen 1) 19:50 (Oerzen 1)	06:55 19:32	18:17 (Oerzen 2) 18:49 (Oerzen 2)	07:48 18:21		07:46 16:22	08:28 16:02
18	05:14 21:36	06:03 20:42	26	19:24 (Oerzen 1) 19:50 (Oerzen 1)	06:56 19:30	18:16 (Oerzen 2) 18:48 (Oerzen 2)	07:50 18:19		07:47 16:20	08:29 16:02
19	05:15 21:35	06:05 20:40	28	19:23 (Oerzen 1) 19:51 (Oerzen 1)	06:58 19:27	18:16 (Oerzen 2) 18:48 (Oerzen 2)	07:51 18:16		07:49 16:19	08:30 16:02
20	05:16 21:34	06:07 20:38	28	19:23 (Oerzen 1) 19:51 (Oerzen 1)	07:00 19:25	18:16 (Oerzen 2) 18:47 (Oerzen 2)	07:53 18:14		07:51 16:18	08:30 16:02
21	05:18 21:33	06:08 20:36	29	19:22 (Oerzen 1) 19:51 (Oerzen 1)	07:02 19:22	18:17 (Oerzen 2) 18:47 (Oerzen 2)	07:55 18:12		07:53 16:16	08:31 16:03
22	05:19 21:31	06:10 20:33	29	19:22 (Oerzen 1) 19:51 (Oerzen 1)	07:03 19:20	18:16 (Oerzen 2) 18:45 (Oerzen 2)	07:57 18:10		07:55 16:15	08:32 16:03
23	05:21 21:30	06:12 20:31	29	19:21 (Oerzen 1) 19:50 (Oerzen 1)	07:05 19:18	18:17 (Oerzen 2) 18:44 (Oerzen 2)	07:59 18:08		07:56 16:14	08:32 16:04
24	05:22 21:28	06:13 20:29	29	19:21 (Oerzen 1) 19:50 (Oerzen 1)	07:07 19:15	18:17 (Oerzen 3) 18:43 (Oerzen 2)	08:01 18:06		07:58 16:13	08:33 16:04
25	05:24 21:27	06:15 20:27	29	19:21 (Oerzen 1) 19:50 (Oerzen 1)	07:09 19:13	18:16 (Oerzen 3) 18:40 (Oerzen 2)	07:03 17:03		08:00 16:12	08:33 16:05
26	05:25 21:25	06:17 20:24	27	19:21 (Oerzen 1) 19:48 (Oerzen 1)	07:10 19:10	18:16 (Oerzen 3) 18:39 (Oerzen 2)	07:04 17:01		08:01 16:11	08:33 16:06
27	05:27 21:24	06:19 20:22	27	19:21 (Oerzen 1) 19:48 (Oerzen 1)	07:12 19:08	18:16 (Oerzen 3) 18:37 (Oerzen 3)	07:06 16:59		08:03 16:10	08:33 16:06
28	05:28 21:22	06:20 20:20	25	19:22 (Oerzen 1) 19:47 (Oerzen 1)	07:14 19:06	18:16 (Oerzen 3) 18:37 (Oerzen 3)	07:08 16:57		08:05 16:09	08:34 16:07
29	05:30 21:21	06:22 20:18	23	19:22 (Oerzen 1) 19:45 (Oerzen 1)	07:15 19:03	18:16 (Oerzen 3) 18:35 (Oerzen 3)	07:10 16:55		08:06 16:08	08:34 16:08
30	05:31 21:19	06:24 20:15	21	19:23 (Oerzen 1) 19:44 (Oerzen 1)	07:17 19:01	18:17 (Oerzen 3) 18:32 (Oerzen 3)	07:12 16:53		08:08 16:07	08:34 16:09
31	05:33 21:17	06:25 20:13	17	19:25 (Oerzen 1) 19:42 (Oerzen 1)			07:14 16:51			08:34 16:10
Sonnenscheinstunden		509	458	382	591	329	19	261	237	
astr.max.mögl.Beschattung			474							

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s09 - Oerzen, Im Dorfe 25

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar   Februar   März			April			Mai			Juni		
1	08:34	08:05	07:09	06:55	18:25 (Oerzen 2)	05:48	19:21 (Oerzen 1)	04:59			
	16:11	17:01	17:56	19:53	43	19:26 (Rep 10)	20:47	35	20:02 (Rep 11)	21:35	
2	08:34	08:03	07:06	06:53	18:27 (Oerzen 2)	05:45	19:23 (Oerzen 1)	04:59			
	16:12	17:03	17:58	19:54	42	19:28 (Rep 10)	20:48	29	20:00 (Rep 11)	21:36	
3	08:34	08:01	07:04	06:50	18:29 (Oerzen 2)	05:44	19:26 (Oerzen 1)	04:58			
	16:14	17:05	18:00	19:56	40	19:29 (Rep 10)	20:50	19	19:59 (Rep 11)	21:37	
4	08:33	08:00	07:02	06:48	18:31 (Oerzen 2)	05:42	19:48 (Rep 11)	04:57			
	16:15	17:07	18:01	19:58	35	19:28 (Rep 10)	20:52	8	19:56 (Rep 11)	21:38	
5	08:33	07:58	07:00	06:46	19:06 (Rep 10)	05:40					
	16:16	17:09	18:03	20:00	22	19:28 (Rep 10)	20:54				
6	08:33	07:56	06:57	06:43	19:07 (Rep 10)	05:38					
	16:17	17:11	18:05	20:02	21	19:28 (Rep 10)	20:55				
7	08:32	07:54	06:55	06:41	19:06 (Rep 10)	05:36					
	16:19	17:13	18:07	20:03	21	19:27 (Rep 10)	20:57				
8	08:32	07:53	06:53	06:39	19:07 (Rep 10)	05:34					
	16:20	17:15	18:09	20:05	19	19:26 (Rep 10)	20:59				
9	08:31	07:51	06:50	06:36	19:08 (Rep 10)	05:32					
	16:21	17:17	18:11	20:07	17	19:25 (Rep 10)	21:00				
10	08:31	07:49	06:48	17:43 (Oerzen 3)	06:34	19:08 (Rep 10)	05:30				
	16:23	17:19	18:13	2	17:45 (Oerzen 3)	20:09	19:23 (Rep 10)	21:02			
11	08:30	07:47	06:46	17:37 (Oerzen 3)	06:32	19:11 (Rep 10)	05:28				
	16:24	17:21	18:14	11	17:48 (Oerzen 3)	20:11	19:37 (Oerzen 1)	21:04			
12	08:29	07:45	06:43	17:35 (Oerzen 3)	06:29	19:26 (Oerzen 1)	05:27				
	16:26	17:23	18:16	15	17:50 (Oerzen 3)	20:12	19:41 (Oerzen 1)	21:06			
13	08:28	07:43	06:41	17:33 (Oerzen 3)	06:27	19:22 (Oerzen 1)	05:25				
	16:27	17:25	18:18	19	17:52 (Oerzen 3)	20:14	19:42 (Oerzen 1)	21:07			
14	08:28	07:41	06:38	17:32 (Oerzen 3)	06:25	19:21 (Oerzen 1)	05:23				
	16:29	17:27	18:20	21	17:53 (Oerzen 3)	20:16	19:44 (Oerzen 1)	21:09			
15	08:27	07:39	06:36	17:31 (Oerzen 3)	06:22	19:20 (Oerzen 1)	05:22				
	16:31	17:29	18:22	22	17:53 (Oerzen 3)	20:18	19:45 (Oerzen 1)	21:11			
16	08:26	07:37	06:34	17:30 (Oerzen 3)	06:20	19:19 (Oerzen 1)	05:20				
	16:32	17:31	18:24	23	17:53 (Oerzen 3)	20:20	19:46 (Oerzen 1)	21:12			
17	08:25	07:35	06:31	17:30 (Oerzen 3)	06:18	19:18 (Oerzen 1)	05:18				
	16:34	17:33	18:26	24	17:54 (Oerzen 2)	20:21	19:46 (Oerzen 1)	21:14			
18	08:24	07:33	06:29	17:29 (Oerzen 3)	06:15	19:16 (Oerzen 1)	05:17				
	16:36	17:35	18:27	26	17:55 (Oerzen 2)	20:23	19:55 (Rep 11)	21:15			
19	08:23	07:31	06:26	17:28 (Oerzen 2)	06:13	19:16 (Oerzen 1)	05:15				
	16:37	17:37	18:29	28	17:56 (Oerzen 2)	20:25	19:57 (Rep 11)	21:17			
20	08:22	07:29	06:24	17:27 (Oerzen 2)	06:11	19:16 (Oerzen 1)	05:14				
	16:39	17:38	18:31	29	17:56 (Oerzen 2)	20:27	19:59 (Rep 11)	21:18			
21	08:20	07:26	06:22	17:26 (Oerzen 2)	06:09	19:15 (Oerzen 1)	05:12				
	16:41	17:40	18:33	31	17:57 (Oerzen 2)	20:29	20:01 (Rep 11)	21:20			
22	08:19	07:24	06:19	17:26 (Oerzen 2)	06:07	19:15 (Oerzen 1)	05:11				
	16:43	17:42	18:35	32	17:58 (Oerzen 2)	20:30	20:02 (Rep 11)	21:22			
23	08:18	07:22	06:17	17:24 (Oerzen 2)	06:04	19:15 (Oerzen 1)	05:10				
	16:44	17:44	18:36	33	17:57 (Oerzen 2)	20:32	20:04 (Rep 11)	21:23			
24	08:17	07:20	06:14	17:24 (Oerzen 2)	06:02	19:16 (Oerzen 1)	05:08				
	16:46	17:46	18:38	34	17:58 (Oerzen 2)	20:34	20:05 (Rep 11)	21:24			
25	08:15	07:18	06:12	17:23 (Oerzen 2)	06:00	19:16 (Oerzen 1)	05:07				
	16:48	17:48	18:40	34	17:57 (Oerzen 2)	20:36	20:05 (Rep 11)	21:26			
26	08:14	07:15	06:10	17:23 (Oerzen 2)	05:58	19:16 (Oerzen 1)	05:06				
	16:50	17:50	18:42	34	17:57 (Oerzen 2)	20:38	20:05 (Rep 11)	21:27			
27	08:13	07:13	06:07	17:23 (Oerzen 2)	05:56	19:17 (Oerzen 1)	05:05				
	16:52	17:52	18:44	33	17:56 (Oerzen 2)	20:39	20:04 (Rep 11)	21:29			
28	08:11	07:11	06:05	17:23 (Oerzen 2)	05:54	19:17 (Oerzen 1)	05:04				
	16:54	17:54	18:45	33	17:56 (Oerzen 2)	20:41	20:04 (Rep 11)	21:30			
29	08:10		07:02	18:24 (Oerzen 2)	05:52	19:18 (Oerzen 1)	05:02				
	16:56		19:47	37	19:21 (Rep 10)	20:43	20:03 (Rep 11)	21:31			
30	08:08		07:00	18:24 (Oerzen 2)	05:50	19:19 (Oerzen 1)	05:01				
	16:58		19:49	41	19:23 (Rep 10)	20:45	20:03 (Rep 11)	21:33			
31	08:06		06:58	18:25 (Oerzen 2)			05:00				
	16:59		19:51	43	19:25 (Rep 10)		21:34				
Sonnenscheinstunden	253	275	367		419		491			506	
astr.max.mögl.Beschattung			605		1013		91				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s09 - Oerzen, Im Dorfe 25

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung
- Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember
1	04:56 21:50	05:34 21:16		06:27 20:11	17	19:10 (Rep 10) 19:36 (Oerzen 1)	07:19 18:58	18:13 (Oerzen 3) 18:30 (Oerzen 3)	07:16 16:49	08:09 16:06
2	04:57 21:49	05:36 21:14		06:29 20:08	15	19:07 (Rep 10) 19:22 (Rep 10)	07:21 18:56	18:15 (Oerzen 3) 18:28 (Oerzen 3)	07:18 16:47	08:11 16:06
3	04:57 21:49	05:38 21:12		06:31 20:06	17	19:05 (Rep 10) 19:22 (Rep 10)	07:23 18:54	18:18 (Oerzen 3) 18:26 (Oerzen 3)	07:20 16:45	08:12 16:05
4	04:58 21:48	05:39 21:10		06:32 20:04	19	19:04 (Rep 10) 19:23 (Rep 10)	07:24 18:51		07:21 16:43	08:14 16:04
5	04:59 21:48	05:41 21:08		06:34 20:01	21	19:03 (Rep 10) 19:24 (Rep 10)	07:26 18:49		07:23 16:42	08:15 16:04
6	05:00 21:47	05:43 21:07		06:36 19:59	21	19:02 (Rep 10) 19:23 (Rep 10)	07:28 18:46		07:25 16:40	08:16 16:03
7	05:01 21:47	05:44 21:05		06:38 19:56	21	19:02 (Rep 10) 19:23 (Rep 10)	07:30 18:44		07:27 16:38	08:18 16:03
8	05:02 21:46	05:46 21:03	2	20:00 (Rep 11) 20:02 (Rep 11)	35	06:39 19:23 (Rep 10)	07:31 18:42		07:29 16:36	08:19 16:02
9	05:03 21:45	05:48 21:01	10	19:56 (Rep 11) 20:06 (Rep 11)	39	06:41 19:22 (Rep 10)	07:33 18:39		07:31 16:34	08:20 16:02
10	05:04 21:44	05:49 20:59	23	19:33 (Oerzen 1) 20:08 (Rep 11)	42	06:43 19:21 (Rep 10)	07:35 18:37		07:33 16:33	08:21 16:02
11	05:05 21:44	05:51 20:57	31	19:30 (Oerzen 1) 20:09 (Rep 11)	42	06:44 19:19 (Rep 10)	07:37 18:35		07:35 16:31	08:23 16:01
12	05:06 21:43	05:53 20:55	36	19:29 (Oerzen 1) 20:10 (Rep 11)	42	06:46 19:16 (Rep 10)	07:39 18:32		07:36 16:29	08:24 16:01
13	05:07 21:42	05:55 20:53	42	19:26 (Oerzen 1) 20:10 (Rep 11)	41	06:48 19:14 (Rep 10)	07:40 18:30		07:38 16:28	08:25 16:01
14	05:08 21:41	05:56 20:51	44	19:26 (Oerzen 1) 20:11 (Rep 11)	38	06:50 19:12 (Rep 10)	07:42 18:28		07:40 16:26	08:26 16:01
15	05:10 21:40	05:58 20:49	47	19:24 (Oerzen 1) 20:11 (Rep 11)	32	06:51 19:11 (Rep 10)	07:44 18:25		07:42 16:25	08:27 16:01
16	05:11 21:39	06:00 20:46	48	19:23 (Oerzen 1) 20:11 (Rep 11)	33	06:53 18:45 (Oerzen 2)	07:46 18:23		07:44 16:23	08:27 16:01
17	05:12 21:38	06:01 20:44	48	19:23 (Oerzen 1) 20:11 (Rep 11)	33	06:55 18:45 (Oerzen 2)	07:48 18:21		07:46 16:22	08:28 16:02
18	05:14 21:36	06:03 20:42	49	19:21 (Oerzen 1) 20:10 (Rep 11)	33	06:56 18:44 (Oerzen 2)	07:50 18:19		07:47 16:20	08:29 16:02
19	05:15 21:35	06:05 20:40	49	19:21 (Oerzen 1) 20:10 (Rep 11)	33	06:58 18:44 (Oerzen 2)	07:51 18:16		07:49 16:19	08:30 16:02
20	05:16 21:34	06:07 20:38	49	19:21 (Oerzen 1) 20:10 (Rep 11)	33	07:00 18:44 (Oerzen 2)	07:53 18:14		07:51 16:18	08:30 16:02
21	05:18 21:33	06:08 20:36	47	19:20 (Oerzen 1) 20:07 (Rep 11)	33	07:02 18:44 (Oerzen 2)	07:55 18:12		07:53 16:16	08:31 16:03
22	05:19 21:31	06:10 20:33	45	19:20 (Oerzen 1) 20:05 (Rep 11)	32	07:03 18:42 (Oerzen 2)	07:57 18:10		07:55 16:15	08:32 16:03
23	05:21 21:30	06:12 20:31	43	19:19 (Oerzen 1) 20:02 (Rep 11)	30	07:05 18:41 (Oerzen 2)	07:59 18:08		07:56 16:14	08:32 16:04
24	05:22 21:28	06:13 20:29	38	19:20 (Oerzen 1) 20:00 (Rep 11)	28	07:07 18:40 (Oerzen 2)	08:01 18:06		07:58 16:13	08:33 16:04
25	05:24 21:27	06:15 20:27	32	19:20 (Oerzen 1) 19:59 (Rep 11)	26	07:09 18:38 (Oerzen 2)	08:03 17:03		08:00 16:12	08:33 16:05
26	05:25 21:25	06:17 20:24	28	19:20 (Oerzen 1) 19:48 (Oerzen 1)	25	07:10 18:37 (Oerzen 2)	08:04 17:01		08:01 16:11	08:33 16:06
27	05:27 21:24	06:19 20:22	26	19:21 (Oerzen 1) 19:47 (Oerzen 1)	23	07:12 18:35 (Oerzen 3)	08:06 16:59		08:03 16:10	08:34 16:06
28	05:28 21:22	06:20 20:20	25	19:22 (Oerzen 1) 19:47 (Oerzen 1)	23	07:14 18:35 (Oerzen 3)	08:08 16:57		08:05 16:09	08:34 16:07
29	05:30 21:21	06:22 20:18	22	19:22 (Oerzen 1) 19:44 (Oerzen 1)	21	07:16 18:33 (Oerzen 3)	08:10 16:55		08:06 16:08	08:34 16:08
30	05:31 21:19	06:24 20:15	20	19:23 (Oerzen 1) 19:43 (Oerzen 1)	20	07:17 18:32 (Oerzen 3)	08:12 16:53		08:08 16:07	08:34 16:09
31	05:33 21:17	06:25 20:13	15	19:26 (Oerzen 1) 19:41 (Oerzen 1)		07:14 16:51				08:34 16:10
Sonnenscheinstunden		509	458	382	868	329	38	261	237	
astr.max.mögl.Beschattung			819							

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s10 - Oerzen, Westerheide 1

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

		Januar	Februar	März			April			Mai	Juni
	1	08:34	08:05	07:09			06:55		18:57 (Rep 10)	05:48	04:59
		16:11	17:01	17:56			19:53	23	19:20 (Rep 10)	20:47	21:35
	2	08:34	08:03	07:06			06:53		18:57 (Rep 10)	05:45	04:59
		16:12	17:03	17:58			19:54	22	19:19 (Rep 10)	20:48	21:36
	3	08:34	08:01	07:04			06:50		18:58 (Rep 10)	05:44	04:58
		16:14	17:05	18:00			19:56	21	19:19 (Rep 10)	20:50	21:37
	4	08:33	08:00	07:02			06:48		18:58 (Rep 10)	05:42	04:57
		16:15	17:07	18:01			19:58	19	19:17 (Rep 10)	20:52	21:38
	5	08:33	07:58	07:00		17:33 (Oerzen 3)	06:46		18:59 (Rep 10)	05:40	04:56
		16:16	17:09	18:03	2	17:35 (Oerzen 3)	20:00	21	19:24 (Oerzen 1)	20:54	21:40
	6	08:33	07:56	06:57		17:27 (Oerzen 3)	06:43		19:01 (Rep 10)	05:38	04:55
		16:17	17:11	18:05	12	17:39 (Oerzen 3)	20:02	28	19:29 (Oerzen 1)	20:55	21:41
	7	08:32	07:54	06:55		17:25 (Oerzen 3)	06:41		19:02 (Rep 10)	05:36	04:55
		16:19	17:13	18:07	16	17:41 (Oerzen 3)	20:04	29	19:31 (Oerzen 1)	20:57	21:42
	8	08:32	07:53	06:53		17:21 (Oerzen 2)	06:39		19:10 (Oerzen 1)	05:34	04:54
		16:20	17:15	18:09	21	17:42 (Oerzen 3)	20:05	22	19:32 (Oerzen 1)	20:59	21:42
	9	08:31	07:51	06:50		17:18 (Oerzen 2)	06:36		19:08 (Oerzen 1)	05:32	04:54
		16:21	17:17	18:11	25	17:43 (Oerzen 3)	20:07	26	19:34 (Oerzen 1)	21:01	21:43
	10	08:31	07:49	06:48		17:17 (Oerzen 2)	06:34		19:06 (Oerzen 1)	05:30	04:53
		16:23	17:19	18:13	27	17:44 (Oerzen 3)	20:09	28	19:34 (Oerzen 1)	21:02	21:44
	11	08:30	07:47	06:46		17:14 (Oerzen 2)	06:32		19:05 (Oerzen 1)	05:28	04:53
		16:24	17:21	18:15	29	17:43 (Oerzen 3)	20:11	30	19:35 (Oerzen 1)	21:04	21:45
	12	08:29	07:45	06:43		17:13 (Oerzen 2)	06:29		19:05 (Oerzen 1)	05:27	04:52
		16:26	17:23	18:16	31	17:44 (Oerzen 3)	20:13	30	19:35 (Oerzen 1)	21:06	21:46
	13	08:28	07:43	06:41		17:11 (Oerzen 2)	06:27		19:03 (Oerzen 1)	05:25	04:52
		16:27	17:25	18:18	32	17:43 (Oerzen 3)	20:14	32	19:35 (Oerzen 1)	21:07	21:46
	14	08:28	07:41	06:38		17:11 (Oerzen 2)	06:25		19:03 (Oerzen 1)	05:23	04:52
		16:29	17:27	18:20	32	17:43 (Oerzen 3)	20:16	35	19:48 (Rep 11)	21:09	21:47
	15	08:27	07:39	06:36		17:09 (Oerzen 2)	06:22		19:03 (Oerzen 1)	05:22	04:52
		16:31	17:29	18:22	34	17:43 (Oerzen 2)	20:18	41	19:50 (Rep 11)	21:11	21:48
	16	08:26	07:37	06:34		17:09 (Oerzen 2)	06:20		19:03 (Oerzen 1)	05:20	04:51
		16:32	17:31	18:24	34	17:43 (Oerzen 2)	20:20	45	19:52 (Rep 11)	21:12	21:48
	17	08:25	07:35	06:31		17:09 (Oerzen 2)	06:18		19:03 (Oerzen 1)	05:18	04:51
		16:34	17:33	18:26	35	17:44 (Oerzen 2)	20:21	48	19:54 (Rep 11)	21:14	21:49
	18	08:24	07:33	06:29		17:08 (Oerzen 2)	06:15		19:02 (Oerzen 1)	05:17	04:51
		16:36	17:35	18:27	35	17:43 (Oerzen 2)	20:23	51	19:55 (Rep 11)	21:15	21:49
	19	08:23	07:31	06:26		17:08 (Oerzen 2)	06:13		19:02 (Oerzen 1)	05:15	04:51
		16:37	17:37	18:29	35	17:43 (Oerzen 2)	20:25	52	19:56 (Rep 11)	21:17	21:49
	20	08:22	07:29	06:24		17:08 (Oerzen 2)	06:11		19:03 (Oerzen 1)	05:14	04:51
		16:39	17:38	18:31	34	17:42 (Oerzen 2)	20:27	53	19:57 (Rep 11)	21:18	21:50
	21	08:20	07:26	06:22		17:08 (Oerzen 2)	06:09		19:03 (Oerzen 1)	05:12	04:52
		16:41	17:40	18:33	34	17:42 (Oerzen 2)	20:29	52	19:57 (Rep 11)	21:20	21:50
	22	08:19	07:24	06:19		17:09 (Oerzen 2)	06:07		19:04 (Oerzen 1)	05:11	04:52
		16:43	17:42	18:35	32	17:41 (Oerzen 2)	20:30	50	19:57 (Rep 11)	21:22	21:50
	23	08:18	07:22	06:17		17:09 (Oerzen 2)	06:04		19:05 (Oerzen 1)	05:10	04:52
		16:44	17:44	18:36	31	17:40 (Oerzen 2)	20:32	48	19:57 (Rep 11)	21:23	21:50
	24	08:17	07:20	06:14		17:10 (Oerzen 2)	06:02		19:06 (Oerzen 1)	05:08	04:52
		16:46	17:46	18:38	29	17:39 (Oerzen 2)	20:34	45	19:56 (Rep 11)	21:24	21:51
	25	08:15	07:18	06:12		17:10 (Oerzen 2)	06:00		19:08 (Oerzen 1)	05:07	04:53
		16:48	17:48	18:40	36	18:14 (Rep 10)	20:36	41	19:56 (Rep 11)	21:26	21:51
	26	08:14	07:16	06:10		17:12 (Oerzen 2)	05:58		19:10 (Oerzen 1)	05:06	04:53
		16:50	17:50	18:42	37	18:16 (Rep 10)	20:38	35	19:55 (Rep 11)	21:27	21:51
	27	08:13	07:13	06:07		17:13 (Oerzen 2)	05:56		19:13 (Oerzen 1)	05:05	04:53
		16:52	17:52	18:44	36	18:17 (Rep 10)	20:39	28	19:54 (Rep 11)	21:29	21:50
	28	08:11	07:11	06:05		17:16 (Oerzen 2)	05:54		19:36 (Rep 11)	05:04	04:54
		16:54	17:54	18:45	34	18:19 (Rep 10)	20:41	17	19:53 (Rep 11)	21:30	21:50
	29	08:10		07:02		18:21 (Oerzen 2)	05:52		19:38 (Rep 11)	05:02	04:55
		16:56		19:47	27	19:21 (Rep 10)	20:43	13	19:51 (Rep 11)	21:31	21:50
	30	08:08		07:00		18:58 (Rep 10)	05:50		19:40 (Rep 11)	05:01	04:55
		16:58		19:49	22	19:20 (Rep 10)	20:45	9	19:49 (Rep 11)	21:33	21:50
	31	08:06		06:58		18:58 (Rep 10)				05:00	
		16:59		19:51	23	19:21 (Rep 10)				21:34	
Sonnenscheinstunden		253	275	367			419			491	506
astr.max.mögl.Beschattung				775			994				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s10 - Oerzen, Westerheide 1

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56 21:50	05:34 21:16		06:27 20:11	19:04 (Oerzen 1) 19:34 (Oerzen 1)	07:19 18:58	17:52 (Oerzen 2) 18:22 (Oerzen 3)	07:16 16:49	08:09 16:06		
2	04:57 21:49	05:36 21:14		06:29 20:08	19:05 (Oerzen 1) 19:33 (Oerzen 1)	07:21 18:56	17:53 (Oerzen 2) 18:22 (Oerzen 3)	07:18 16:47	08:11 16:06		
3	04:57 21:49	05:38 21:12		06:31 20:06	19:05 (Oerzen 1) 19:31 (Oerzen 1)	07:23 18:54	17:54 (Oerzen 2) 18:22 (Oerzen 3)	07:20 16:45	08:12 16:05		
4	04:58 21:48	05:39 21:10		06:32 20:04	19:07 (Oerzen 1) 19:29 (Oerzen 1)	07:24 18:51	17:54 (Oerzen 2) 18:20 (Oerzen 3)	07:21 16:43	08:14 16:04		
5	04:59 21:48	05:41 21:08		06:34 20:01	18:59 (Rep 10) 19:28 (Oerzen 1)	07:26 18:49	17:57 (Oerzen 2) 18:19 (Oerzen 3)	07:23 16:42	08:15 16:04		
6	05:00 21:47	05:43 21:07		06:36 19:59	18:56 (Rep 10) 19:24 (Oerzen 1)	07:28 18:46	18:00 (Oerzen 3) 18:18 (Oerzen 3)	07:25 16:40	08:16 16:03		
7	05:01 21:47	05:44 21:05		06:38 19:56	18:54 (Rep 10) 19:20 (Oerzen 1)	07:30 18:44	18:02 (Oerzen 3) 18:16 (Oerzen 3)	07:27 16:38	08:18 16:03		
8	05:02 21:46	05:46 21:03		06:39 19:54	18:53 (Rep 10) 19:12 (Rep 10)	07:31 18:42	18:04 (Oerzen 3) 18:13 (Oerzen 3)	07:29 16:36	08:19 16:02		
9	05:03 21:45	05:48 21:01		06:41 19:52	18:51 (Rep 10) 19:12 (Rep 10)	07:33 18:39		07:31 16:34	08:20 16:02		
10	05:04 21:44	05:49 20:59		06:43 19:49	18:51 (Rep 10) 19:13 (Rep 10)	07:35 18:37		07:33 16:33	08:21 16:02		
11	05:05 21:44	05:51 20:57		06:44 19:47	18:50 (Rep 10) 19:13 (Rep 10)	07:37 18:35		07:35 16:31	08:23 16:01		
12	05:06 21:43	05:53 20:55		19:51 (Rep 11) 19:54 (Rep 11)	06:46 19:44	07:39 18:32		07:36 16:29	08:24 16:01		
13	05:07 21:42	05:55 20:53	3	19:46 (Rep 11) 19:57 (Rep 11)	06:48 19:42	07:40 18:30		07:38 16:28	08:25 16:01		
14	05:08 21:41	05:56 20:51	11	19:45 (Rep 11) 19:59 (Rep 11)	06:50 19:39	07:42 18:28		07:40 16:26	08:26 16:01		
15	05:10 21:40	05:58 20:49	14	19:43 (Rep 11) 20:00 (Rep 11)	06:51 19:37	07:44 18:25		07:42 16:25	08:27 16:01		
16	05:11 21:39	06:00 20:46	17	19:18 (Oerzen 1) 20:01 (Rep 11)	06:53 19:35	07:46 18:23		07:44 16:23	08:28 16:01		
17	05:12 21:38	06:01 20:44	30	19:16 (Oerzen 1) 20:02 (Rep 11)	06:55 19:32	07:48 18:21		07:46 16:22	08:28 16:02		
18	05:14 21:36	06:03 20:42	37	19:13 (Oerzen 1) 20:02 (Rep 11)	06:56 19:30	07:50 18:19		07:48 16:20	08:29 16:02		
19	05:15 21:35	06:05 20:40	42	19:12 (Oerzen 1) 20:02 (Rep 11)	06:58 19:27	07:51 18:16		07:49 16:19	08:30 16:02		
20	05:16 21:34	06:07 20:38	45	19:11 (Oerzen 1) 20:02 (Rep 11)	07:00 19:25	07:53 18:14		07:51 16:18	08:30 16:02		
21	05:18 21:33	06:08 20:36	48	19:09 (Oerzen 1) 20:02 (Rep 11)	07:02 19:22	07:55 18:12		07:53 16:16	08:31 16:03		
22	05:19 21:31	06:10 20:33	50	19:08 (Oerzen 1) 20:02 (Rep 11)	07:03 19:20	07:57 18:10		07:55 16:15	08:32 16:03		
23	05:21 21:30	06:12 20:31	52	19:06 (Oerzen 1) 20:00 (Rep 11)	07:05 19:18	07:59 18:08		07:56 16:14	08:32 16:04		
24	05:22 21:28	06:13 20:29	53	19:06 (Oerzen 1) 20:00 (Rep 11)	07:07 19:15	08:01 18:06		07:58 16:13	08:33 16:04		
25	05:24 21:27	06:15 20:27	52	19:06 (Oerzen 1) 19:59 (Rep 11)	07:09 19:13	07:03 17:03		08:00 16:12	08:33 16:05		
26	05:25 21:25	06:17 20:24	48	19:05 (Oerzen 1) 19:56 (Rep 11)	07:10 19:10	07:04 17:01		08:01 16:11	08:33 16:06		
27	05:27 21:24	06:19 20:22	45	19:05 (Oerzen 1) 19:54 (Rep 11)	07:12 19:08	07:06 16:59		08:03 16:10	08:34 16:06		
28	05:28 21:22	06:20 20:20	41	19:05 (Oerzen 1) 19:52 (Rep 11)	07:14 19:06	07:08 16:57		08:05 16:09	08:34 16:07		
29	05:30 21:21	06:22 20:18	33	19:04 (Oerzen 1) 19:48 (Rep 11)	07:16 19:03	07:10 16:55		08:06 16:08	08:34 16:08		
30	05:31 21:19	06:24 20:15	32	19:04 (Oerzen 1) 19:36 (Oerzen 1)	07:17 19:01	07:12 16:53		08:08 16:07	08:34 16:09		
31	05:33 21:17	06:25 20:13	30	19:05 (Oerzen 1) 19:35 (Oerzen 1)		07:14 16:51			08:34 16:10		
Sonnenscheinstunden		509	458		382	329		261	237		
astr.max.mögl.Beschattung			735		879	176					

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s11 - Oerzen, Westerheide 3

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

		Januar	Februar	März			April			Mai	Juni
	1	08:34	08:05	07:09			06:55		18:53 (Rep 10)	05:48	04:59
		16:11	17:01	17:56			19:53	22	19:15 (Rep 10)	20:47	21:35
	2	08:34	08:03	07:06			06:53		18:54 (Rep 10)	05:45	04:59
		16:12	17:03	17:58			19:54	20	19:14 (Rep 10)	20:48	21:36
	3	08:34	08:01	07:04		17:27 (Oerzen 3)	06:50		18:55 (Rep 10)	05:44	04:58
		16:14	17:05	18:00	3	17:30 (Oerzen 3)	19:56	27	19:22 (Oerzen 1)	20:50	21:37
	4	08:33	08:00	07:02		17:22 (Oerzen 3)	06:48		18:56 (Rep 10)	05:42	04:57
		16:15	17:07	18:01	13	17:35 (Oerzen 3)	19:58	28	19:24 (Oerzen 1)	20:52	21:39
	5	08:33	07:58	07:00		17:15 (Oerzen 2)	06:46		18:58 (Rep 10)	05:40	04:56
		16:16	17:09	18:03	22	17:37 (Oerzen 3)	20:00	28	19:26 (Oerzen 1)	20:54	21:40
	6	08:33	07:56	06:57		17:12 (Oerzen 2)	06:43		19:03 (Oerzen 1)	05:38	04:55
		16:17	17:11	18:05	25	17:37 (Oerzen 3)	20:02	25	19:28 (Oerzen 1)	20:55	21:41
	7	08:32	07:54	06:55		17:10 (Oerzen 2)	06:41		19:01 (Oerzen 1)	05:36	04:55
		16:19	17:13	18:07	29	17:39 (Oerzen 3)	20:04	27	19:28 (Oerzen 1)	20:57	21:42
	8	08:32	07:53	06:53		17:07 (Oerzen 2)	06:39		19:00 (Oerzen 1)	05:34	04:54
		16:20	17:15	18:09	31	17:38 (Oerzen 3)	20:05	29	19:29 (Oerzen 1)	20:59	21:42
	9	08:31	07:51	06:50		17:06 (Oerzen 2)	06:36		19:00 (Oerzen 1)	05:32	04:54
		16:21	17:17	18:11	33	17:39 (Oerzen 3)	20:07	30	19:30 (Oerzen 1)	21:01	21:43
	10	08:31	07:49	06:48		17:06 (Oerzen 2)	06:34		18:58 (Oerzen 1)	05:30	04:53
		16:23	17:19	18:13	33	17:39 (Oerzen 3)	20:09	31	19:29 (Oerzen 1)	21:02	21:44
	11	08:30	07:47	06:46		17:04 (Oerzen 2)	06:32		18:58 (Oerzen 1)	05:28	04:53
		16:24	17:21	18:15	35	17:39 (Oerzen 3)	20:11	32	19:30 (Oerzen 1)	21:04	21:45
	12	08:29	07:45	06:43		17:04 (Oerzen 2)	06:29		18:57 (Oerzen 1)	05:27	04:52
		16:26	17:23	18:16	34	17:38 (Oerzen 3)	20:13	33	19:30 (Oerzen 1)	21:06	21:46
	13	08:28	07:43	06:41		17:02 (Oerzen 2)	06:27		18:56 (Oerzen 1)	05:25	04:52
		16:27	17:25	18:18	35	17:37 (Oerzen 3)	20:14	42	19:47 (Rep 11)	21:07	21:46
	14	08:28	07:41	06:38		17:02 (Oerzen 2)	06:25		18:56 (Oerzen 1)	05:23	04:52
		16:29	17:27	18:20	35	17:37 (Oerzen 3)	20:16	46	19:48 (Rep 11)	21:09	21:47
	15	08:27	07:39	06:36		17:01 (Oerzen 2)	06:22		18:57 (Oerzen 1)	05:22	04:52
		16:31	17:29	18:22	35	17:36 (Oerzen 2)	20:18	48	19:50 (Rep 11)	21:11	21:48
	16	08:26	07:37	06:34		17:01 (Oerzen 2)	06:20		18:57 (Oerzen 1)	05:20	04:51
		16:32	17:31	18:24	35	17:36 (Oerzen 2)	20:20	51	19:52 (Rep 11)	21:12	21:48
	17	08:25	07:35	06:31		17:02 (Oerzen 2)	06:18		18:57 (Oerzen 1)	05:18	04:51
		16:34	17:33	18:26	34	17:36 (Oerzen 2)	20:21	52	19:53 (Rep 11)	21:14	21:49
	18	08:24	07:33	06:29		17:01 (Oerzen 2)	06:15		18:57 (Oerzen 1)	05:17	04:51
		16:36	17:35	18:27	34	17:35 (Oerzen 2)	20:23	53	19:53 (Rep 11)	21:15	21:49
	19	08:23	07:31	06:26		17:02 (Oerzen 2)	06:13		18:58 (Oerzen 1)	05:15	04:51
		16:37	17:37	18:29	33	17:35 (Oerzen 2)	20:25	51	19:53 (Rep 11)	21:17	21:49
	20	08:22	07:29	06:24		17:02 (Oerzen 2)	06:11		18:58 (Oerzen 1)	05:14	04:51
		16:39	17:38	18:31	31	17:33 (Oerzen 2)	20:27	50	19:53 (Rep 11)	21:18	21:50
	21	08:20	07:26	06:22		17:03 (Oerzen 2)	06:09		18:59 (Oerzen 1)	05:12	04:52
		16:41	17:40	18:33	30	17:33 (Oerzen 2)	20:29	48	19:53 (Rep 11)	21:20	21:50
	22	08:19	07:24	06:19		17:04 (Oerzen 2)	06:07		19:01 (Oerzen 1)	05:11	04:52
		16:43	17:42	18:35	28	17:32 (Oerzen 2)	20:30	44	19:53 (Rep 11)	21:22	21:50
	23	08:18	07:22	06:17		17:05 (Oerzen 2)	06:04		19:03 (Oerzen 1)	05:10	04:52
		16:44	17:44	18:36	32	18:10 (Rep 10)	20:32	39	19:52 (Rep 11)	21:23	21:50
	24	08:17	07:20	06:14		17:07 (Oerzen 2)	06:02		19:05 (Oerzen 1)	05:08	04:52
		16:46	17:46	18:38	33	18:12 (Rep 10)	20:34	35	19:52 (Rep 11)	21:24	21:51
	25	08:15	07:18	06:12		17:08 (Oerzen 2)	06:00		19:31 (Rep 11)	05:07	04:53
		16:48	17:48	18:40	33	18:14 (Rep 10)	20:36	20	19:51 (Rep 11)	21:26	21:51
	26	08:14	07:16	06:10		17:13 (Oerzen 2)	05:58		19:32 (Rep 11)	05:06	04:53
		16:50	17:50	18:42	27	18:16 (Rep 10)	20:38	18	19:50 (Rep 11)	21:27	21:51
	27	08:13	07:13	06:07		17:55 (Rep 10)	05:56		19:33 (Rep 11)	05:05	04:53
		16:52	17:52	18:44	21	18:16 (Rep 10)	20:39	15	19:48 (Rep 11)	21:29	21:50
	28	08:11	07:11	06:05		17:54 (Rep 10)	05:54		19:35 (Rep 11)	05:04	04:54
		16:54	17:54	18:45	23	18:17 (Rep 10)	20:41	11	19:46 (Rep 11)	21:30	21:50
	29	08:10		07:02		18:54 (Rep 10)	05:52		19:39 (Rep 11)	05:02	04:55
		16:56		19:47	23	19:17 (Rep 10)	20:43	3	19:42 (Rep 11)	21:31	21:50
	30	08:08		07:00		18:53 (Rep 10)	05:50			05:01	04:55
		16:58		19:49	23	19:16 (Rep 10)	20:45			21:33	21:50
	31	08:06		06:58		18:54 (Rep 10)				05:00	
		16:59		19:51	22	19:16 (Rep 10)				21:34	
Sonnenscheinstunden		253	275	367			419			491	506
astr.max.mögl.Beschattung				825			958				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s11 - Oerzen, Westerheide 3

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56 21:50	05:34 21:16		06:27 20:11	18:57 (Oerzen 1) 19:29 (Oerzen 1)	07:19 18:58	35	17:42 (Oerzen 2) 18:17 (Oerzen 3)	07:16 16:49	08:09 16:06	
2	04:57 21:49	05:36 21:14		06:29 20:08	18:57 (Oerzen 1) 19:28 (Oerzen 1)	07:21 18:56	34	17:43 (Oerzen 2) 18:17 (Oerzen 3)	07:18 16:47	08:11 16:06	
3	04:57 21:49	05:38 21:12		06:31 20:06	18:57 (Oerzen 1) 19:27 (Oerzen 1)	07:23 18:54	34	17:43 (Oerzen 2) 18:17 (Oerzen 3)	07:20 16:45	08:12 16:05	
4	04:58 21:48	05:39 21:10		06:32 20:04	18:57 (Oerzen 1) 19:26 (Oerzen 1)	07:24 18:51	33	17:43 (Oerzen 2) 18:16 (Oerzen 3)	07:21 16:43	08:14 16:04	
5	04:59 21:48	05:41 21:08		06:34 20:01	18:58 (Oerzen 1) 19:25 (Oerzen 1)	07:26 18:49	32	17:44 (Oerzen 2) 18:16 (Oerzen 3)	07:23 16:42	08:15 16:04	
6	05:00 21:47	05:43 21:07		06:36 19:59	18:58 (Oerzen 1) 19:23 (Oerzen 1)	07:28 18:46	30	17:45 (Oerzen 2) 18:15 (Oerzen 3)	07:25 16:40	08:16 16:03	
7	05:01 21:47	05:44 21:05		06:38 19:56	18:53 (Rep 10) 19:22 (Oerzen 1)	07:30 18:44	27	17:47 (Oerzen 2) 18:14 (Oerzen 3)	07:27 16:38	08:18 16:03	
8	05:02 21:46	05:46 21:03		06:39 19:54	18:51 (Rep 10) 19:20 (Oerzen 1)	07:31 18:42	24	17:49 (Oerzen 2) 18:13 (Oerzen 3)	07:29 16:36	08:19 16:02	
9	05:03 21:45	05:48 21:01		06:41 19:52	18:48 (Rep 10) 19:16 (Oerzen 1)	07:33 18:39	19	17:52 (Oerzen 2) 18:11 (Oerzen 3)	07:31 16:34	08:20 16:02	
10	05:04 21:44	05:49 20:59		06:43 19:49	18:47 (Rep 10) 19:07 (Rep 10)	07:35 18:37	9	17:58 (Oerzen 3) 18:07 (Oerzen 3)	07:33 16:33	08:21 16:02	
11	05:05 21:44	05:51 20:57		06:44 19:47	18:46 (Rep 10) 19:08 (Rep 10)	07:37 18:35			07:35 16:31	08:23 16:01	
12	05:06 21:43	05:53 20:55		06:46 19:44	18:45 (Rep 10) 19:07 (Rep 10)	07:39 18:32			07:36 16:29	08:24 16:01	
13	05:07 21:42	05:55 20:53		06:48 19:42	18:45 (Rep 10) 19:07 (Rep 10)	07:40 18:30			07:38 16:28	08:25 16:01	
14	05:08 21:41	05:56 20:51		06:50 19:41	18:45 (Rep 10) 19:07 (Rep 10)	07:42 18:28			07:40 16:26	08:26 16:01	
15	05:10 21:40	05:58 20:49	6	19:45 (Rep 11) 19:51 (Rep 11)	18:44 (Rep 10) 19:06 (Rep 10)	07:44 18:25			07:42 16:25	08:27 16:01	
16	05:11 21:39	06:00 20:46	12	19:53 (Rep 11) 19:39 (Rep 11)	18:44 (Rep 10) 19:06 (Rep 10)	07:46 18:23			07:44 16:23	08:28 16:01	
17	05:12 21:38	06:01 20:44	16	19:55 (Rep 11) 19:38 (Rep 11)	18:44 (Rep 10) 19:05 (Rep 10)	07:48 18:21			07:46 16:22	08:28 16:02	
18	05:14 21:36	06:03 20:42	18	19:56 (Rep 11) 19:15 (Oerzen 1)	18:46 (Rep 10) 17:56 (Oerzen 2)	07:50 18:19			07:48 16:20	08:29 16:02	
19	05:15 21:35	06:05 20:40	24	19:57 (Rep 11) 19:10 (Oerzen 1)	19:02 (Rep 10) 17:54 (Oerzen 2)	07:51 18:16			07:49 16:19	08:30 16:02	
20	05:16 21:34	06:07 20:38	35	19:57 (Rep 11) 19:08 (Oerzen 1)	18:59 (Rep 10) 17:52 (Oerzen 2)	07:53 18:14			07:51 16:18	08:30 16:02	
21	05:18 21:33	06:08 20:36	40	19:58 (Rep 11) 19:05 (Oerzen 1)	18:57 (Rep 10) 17:50 (Oerzen 2)	07:55 18:12			07:53 16:16	08:31 16:03	
22	05:19 21:31	06:10 20:33	45	19:57 (Rep 11) 19:04 (Oerzen 1)	18:55 (Rep 10) 17:48 (Oerzen 2)	07:57 18:10			07:55 16:15	08:32 16:03	
23	05:21 21:30	06:12 20:31	49	19:58 (Rep 11) 19:02 (Oerzen 1)	18:17 (Oerzen 2) 17:47 (Oerzen 2)	07:59 18:08			07:56 16:14	08:32 16:04	
24	05:22 21:28	06:13 20:29	51	19:57 (Rep 11) 19:01 (Oerzen 1)	18:18 (Oerzen 2) 17:46 (Oerzen 2)	08:01 18:06			07:58 16:13	08:33 16:04	
25	05:24 21:27	06:15 20:27	52	19:57 (Rep 11) 19:00 (Oerzen 1)	18:18 (Oerzen 2) 17:44 (Oerzen 2)	08:06 07:03			16:13 08:00	16:04 08:33	
26	05:25 21:25	06:17 20:24	53	19:57 (Rep 11) 18:59 (Oerzen 1)	18:18 (Oerzen 2) 17:44 (Oerzen 2)	17:03 07:04			16:12 08:01	16:05 08:33	
27	05:27 21:24	06:19 20:22	52	19:55 (Rep 11) 18:59 (Oerzen 1)	18:18 (Oerzen 2) 17:43 (Oerzen 2)	17:01 07:06			16:11 08:03	16:06 08:34	
28	05:28 21:22	06:20 20:20	51	19:54 (Rep 11) 18:58 (Oerzen 1)	18:18 (Oerzen 2) 17:43 (Oerzen 2)	16:59 07:08			16:10 08:05	16:06 08:34	
29	05:30 21:21	06:22 20:18	49	19:52 (Rep 11) 18:57 (Oerzen 1)	18:18 (Oerzen 2) 17:42 (Oerzen 2)	16:57 07:10			16:09 08:06	16:07 08:34	
30	05:31 21:19	06:24 20:15	46	19:49 (Rep 11) 18:57 (Oerzen 1)	18:17 (Oerzen 2) 17:42 (Oerzen 2)	16:55 07:12			16:08 08:08	16:08 08:34	
31	05:33 21:17	06:25 20:13	41	19:47 (Rep 11) 18:57 (Oerzen 1)	18:17 (Oerzen 3) 17:42 (Oerzen 3)	16:53 07:14			16:07 08:07	16:09 08:34	
Sonnenscheinstunden		509		382		329			261	237	
astr.max.mögl.Beschattung			673		865		277				

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s12 - Oerzen, Westerheide 4

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

		Januar	Februar	März			April			Mai	Juni
	1	08:34	08:05	07:09			06:55		18:54 (Rep 10)	05:48	04:59
		16:11	17:01	17:56			19:53	19	19:13 (Rep 10)	20:47	21:35
	2	08:34	08:03	07:06			06:53		18:55 (Rep 10)	05:45	04:59
		16:12	17:03	17:58			19:54	27	19:22 (Oerzen 1)	20:48	21:36
	3	08:34	08:01	07:04			06:50		18:56 (Rep 10)	05:44	04:58
		16:14	17:05	18:00			19:56	29	19:25 (Oerzen 1)	20:50	21:37
	4	08:33	08:00	07:02		17:24 (Oerzen 3)	06:48		18:58 (Rep 10)	05:42	04:57
		16:15	17:07	18:01	11	17:35 (Oerzen 3)	19:58	27	19:25 (Oerzen 1)	20:52	21:38
	5	08:33	07:58	07:00		17:18 (Oerzen 2)	06:46		19:02 (Oerzen 1)	05:40	04:56
		16:16	17:09	18:03	19	17:37 (Oerzen 3)	20:00	25	19:27 (Oerzen 1)	20:54	21:40
	6	08:33	07:56	06:57		17:14 (Oerzen 2)	06:43		19:01 (Oerzen 1)	05:38	04:55
		16:17	17:11	18:05	24	17:38 (Oerzen 3)	20:02	27	19:28 (Oerzen 1)	20:55	21:41
	7	08:32	07:54	06:55		17:12 (Oerzen 2)	06:41		19:00 (Oerzen 1)	05:36	04:55
		16:19	17:13	18:07	27	17:39 (Oerzen 3)	20:03	28	19:28 (Oerzen 1)	20:57	21:42
	8	08:32	07:53	06:53		17:10 (Oerzen 2)	06:39		18:59 (Oerzen 1)	05:34	04:54
		16:20	17:15	18:09	29	17:39 (Oerzen 3)	20:05	30	19:29 (Oerzen 1)	20:59	21:42
	9	08:31	07:51	06:50		17:09 (Oerzen 2)	06:36		18:59 (Oerzen 1)	05:32	04:54
		16:21	17:17	18:11	31	17:40 (Oerzen 3)	20:07	30	19:29 (Oerzen 1)	21:01	21:43
	10	08:31	07:49	06:48		17:08 (Oerzen 2)	06:34		18:57 (Oerzen 1)	05:30	04:53
		16:23	17:19	18:13	32	17:40 (Oerzen 3)	20:09	31	19:28 (Oerzen 1)	21:02	21:44
	11	08:30	07:47	06:46		17:07 (Oerzen 2)	06:32		18:57 (Oerzen 1)	05:28	04:53
		16:24	17:21	18:14	32	17:39 (Oerzen 3)	20:11	31	19:28 (Oerzen 1)	21:04	21:45
	12	08:29	07:45	06:43		17:06 (Oerzen 2)	06:29		18:57 (Oerzen 1)	05:27	04:52
		16:26	17:23	18:16	33	17:39 (Oerzen 3)	20:13	40	19:46 (Rep 11)	21:06	21:46
	13	08:28	07:43	06:41		17:05 (Oerzen 2)	06:27		18:56 (Oerzen 1)	05:25	04:52
		16:27	17:25	18:18	33	17:38 (Oerzen 3)	20:14	45	19:47 (Rep 11)	21:07	21:46
	14	08:28	07:41	06:38		17:05 (Oerzen 2)	06:25		18:57 (Oerzen 1)	05:23	04:52
		16:29	17:27	18:20	33	17:38 (Oerzen 2)	20:16	46	19:48 (Rep 11)	21:09	21:47
	15	08:27	07:39	06:36		17:04 (Oerzen 2)	06:22		18:57 (Oerzen 1)	05:22	04:52
		16:31	17:29	18:22	33	17:37 (Oerzen 2)	20:18	49	19:50 (Rep 11)	21:11	21:48
	16	08:26	07:37	06:34		17:04 (Oerzen 2)	06:20		18:58 (Oerzen 1)	05:20	04:51
		16:32	17:31	18:24	33	17:37 (Oerzen 2)	20:20	50	19:52 (Rep 11)	21:12	21:48
	17	08:25	07:35	06:31		17:05 (Oerzen 2)	06:18		18:58 (Oerzen 1)	05:18	04:51
		16:34	17:33	18:26	32	17:37 (Oerzen 2)	20:21	49	19:52 (Rep 11)	21:14	21:49
	18	08:24	07:33	06:29		17:04 (Oerzen 2)	06:15		18:58 (Oerzen 1)	05:17	04:51
		16:36	17:35	18:27	32	17:36 (Oerzen 2)	20:23	47	19:51 (Rep 11)	21:15	21:49
	19	08:23	07:31	06:26		17:05 (Oerzen 2)	06:13		18:59 (Oerzen 1)	05:15	04:51
		16:37	17:37	18:29	31	17:36 (Oerzen 2)	20:25	45	19:51 (Rep 11)	21:17	21:49
	20	08:22	07:29	06:24		17:05 (Oerzen 2)	06:11		19:01 (Oerzen 1)	05:14	04:51
		16:39	17:38	18:31	29	17:34 (Oerzen 2)	20:27	41	19:51 (Rep 11)	21:18	21:50
	21	08:20	07:26	06:22		17:06 (Oerzen 2)	06:09		19:03 (Oerzen 1)	05:12	04:52
		16:41	17:40	18:33	27	17:33 (Oerzen 2)	20:29	37	19:51 (Rep 11)	21:20	21:50
	22	08:19	07:24	06:19		17:08 (Oerzen 2)	06:07		19:06 (Oerzen 1)	05:11	04:52
		16:43	17:42	18:35	28	18:09 (Rep 10)	20:30	30	19:50 (Rep 11)	21:22	21:50
	23	08:18	07:22	06:17		17:09 (Oerzen 2)	06:04		19:30 (Rep 11)	05:10	04:52
		16:44	17:44	18:36	30	18:10 (Rep 10)	20:32	19	19:49 (Rep 11)	21:23	21:50
	24	08:17	07:20	06:14		17:11 (Oerzen 2)	06:02		19:31 (Rep 11)	05:08	04:52
		16:46	17:46	18:38	29	18:12 (Rep 10)	20:34	17	19:48 (Rep 11)	21:24	21:51
	25	08:15	07:18	06:12		17:14 (Oerzen 2)	06:00		19:32 (Rep 11)	05:07	04:53
		16:48	17:48	18:40	25	18:14 (Rep 10)	20:36	15	19:47 (Rep 11)	21:26	21:51
	26	08:14	07:16	06:10		17:56 (Rep 10)	05:58		19:34 (Rep 11)	05:06	04:53
		16:50	17:50	18:42	20	18:16 (Rep 10)	20:38	11	19:45 (Rep 11)	21:27	21:51
	27	08:13	07:13	06:07		17:54 (Rep 10)	05:56		19:37 (Rep 11)	05:05	04:53
		16:52	17:52	18:44	22	18:16 (Rep 10)	20:39	4	19:41 (Rep 11)	21:29	21:50
	28	08:11	07:11	06:05		17:54 (Rep 10)	05:54			05:04	04:54
		16:54	17:54	18:45	22	18:16 (Rep 10)	20:41			21:30	21:50
	29	08:10		07:02		18:54 (Rep 10)	05:52			05:02	04:55
		16:56		19:47	22	19:16 (Rep 10)	20:43			21:31	21:50
	30	08:08		07:00		18:54 (Rep 10)	05:50			05:01	04:55
		16:58		19:49	21	19:15 (Rep 10)	20:45			21:33	21:50
	31	08:06		06:58		18:54 (Rep 10)				05:00	
		16:59		19:51	21	19:15 (Rep 10)				21:34	
Sonnenscheinstunden		253	275	367			419			491	506
astr.max.mögl.Beschattung				761			849				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s12 - Oerzen, Westerheide 4

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August		September		Oktober		November	Dezember
1	04:56	05:34		06:27	18:56 (Oerzen 1)	07:19	17:45 (Oerzen 2)	07:16	08:09
	21:50	21:16		20:11	31 19:27 (Oerzen 1)	18:58	33 18:18 (Oerzen 3)	16:49	16:06
2	04:57	05:36		06:29	18:56 (Oerzen 1)	07:21	17:45 (Oerzen 2)	07:18	08:11
	21:49	21:14		20:08	31 19:27 (Oerzen 1)	18:56	33 18:18 (Oerzen 3)	16:47	16:06
3	04:57	05:38		06:31	18:56 (Oerzen 1)	07:23	17:46 (Oerzen 2)	07:20	08:12
	21:49	21:12		20:06	30 19:26 (Oerzen 1)	18:54	32 18:18 (Oerzen 3)	16:45	16:05
4	04:58	05:39		06:32	18:56 (Oerzen 1)	07:24	17:45 (Oerzen 2)	07:21	08:14
	21:48	21:10		20:04	30 19:26 (Oerzen 1)	18:51	32 18:17 (Oerzen 3)	16:43	16:04
5	04:59	05:41		06:34	18:57 (Oerzen 1)	07:26	17:46 (Oerzen 2)	07:23	08:15
	21:48	21:08		20:01	28 19:25 (Oerzen 1)	18:49	30 18:16 (Oerzen 3)	16:42	16:04
6	05:00	05:43		06:36	18:56 (Oerzen 1)	07:28	17:47 (Oerzen 2)	07:25	08:16
	21:47	21:07		19:59	27 19:23 (Oerzen 1)	18:46	29 18:16 (Oerzen 3)	16:40	16:03
7	05:01	05:44		06:38	18:57 (Oerzen 1)	07:30	17:49 (Oerzen 2)	07:27	08:18
	21:47	21:05		19:56	25 19:22 (Oerzen 1)	18:44	26 18:15 (Oerzen 3)	16:38	16:03
8	05:02	05:46		06:39	18:53 (Rep 10)	07:31	17:51 (Oerzen 2)	07:29	08:19
	21:46	21:03		19:54	28 19:21 (Oerzen 1)	18:42	22 18:13 (Oerzen 3)	16:36	16:02
9	05:03	05:48		06:41	18:50 (Rep 10)	07:33	17:55 (Oerzen 2)	07:31	08:20
	21:45	21:01		19:52	28 19:18 (Oerzen 1)	18:39	16 18:11 (Oerzen 3)	16:34	16:02
10	05:04	05:49		06:43	18:48 (Rep 10)	07:35	17:59 (Oerzen 3)	07:33	08:21
	21:44	20:59		19:49	27 19:15 (Oerzen 1)	18:37	9 18:08 (Oerzen 3)	16:33	16:02
11	05:05	05:51		06:44	18:47 (Rep 10)	07:37		07:35	08:23
	21:44	20:57		19:47	20 19:07 (Rep 10)	18:35		16:31	16:01
12	05:06	05:53		06:46	18:45 (Rep 10)	07:39		07:36	08:24
	21:43	20:55		19:44	21 19:06 (Rep 10)	18:32		16:29	16:01
13	05:07	05:55		06:48	18:45 (Rep 10)	07:40		07:38	08:25
	21:42	20:53		19:42	22 19:07 (Rep 10)	18:30		16:28	16:01
14	05:08	05:56		06:50	18:45 (Rep 10)	07:42		07:40	08:26
	21:41	20:51		19:39	22 19:07 (Rep 10)	18:28		16:26	16:01
15	05:10	05:58		06:51	18:44 (Rep 10)	07:44		07:42	08:27
	21:40	20:49		19:37	22 19:06 (Rep 10)	18:25		16:25	16:01
16	05:11	06:00	19:42 (Rep 11)	06:53	18:44 (Rep 10)	07:46		07:44	08:28
	21:39	20:46	7 19:49 (Rep 11)	19:35	21 19:05 (Rep 10)	18:23		16:23	16:01
17	05:12	06:01	19:40 (Rep 11)	06:55	18:44 (Rep 10)	07:48		07:46	08:28
	21:38	20:44	12 19:52 (Rep 11)	19:32	21 19:05 (Rep 10)	18:21		16:22	16:02
18	05:14	06:03	19:37 (Rep 11)	06:56	18:03 (Oerzen 2)	07:50		07:48	08:29
	21:36	20:42	16 19:53 (Rep 11)	19:30	23 19:02 (Rep 10)	18:19		16:20	16:02
19	05:15	06:05	19:36 (Rep 11)	06:58	17:58 (Oerzen 2)	07:51		07:49	08:30
	21:35	20:40	18 19:54 (Rep 11)	19:27	29 18:59 (Rep 10)	18:16		16:19	16:02
20	05:16	06:07	19:35 (Rep 11)	07:00	17:56 (Oerzen 2)	07:53		07:51	08:30
	21:34	20:38	20 19:55 (Rep 11)	19:25	30 18:57 (Rep 10)	18:14		16:18	16:02
21	05:18	06:08	19:10 (Oerzen 1)	07:02	17:54 (Oerzen 2)	07:55		07:53	08:31
	21:33	20:36	31 19:55 (Rep 11)	19:22	29 18:55 (Rep 10)	18:12		16:16	16:03
22	05:19	06:10	19:07 (Oerzen 1)	07:03	17:51 (Oerzen 2)	07:57		07:55	08:32
	21:31	20:33	38 19:55 (Rep 11)	19:20	26 18:17 (Oerzen 2)	18:10		16:15	16:03
23	05:21	06:12	19:04 (Oerzen 1)	07:05	17:50 (Oerzen 2)	07:59		07:56	08:32
	21:30	20:31	43 19:55 (Rep 11)	19:18	28 18:18 (Oerzen 2)	18:08		16:14	16:04
24	05:22	06:13	19:03 (Oerzen 1)	07:07	17:49 (Oerzen 2)	08:01		07:58	08:33
	21:28	20:29	46 19:55 (Rep 11)	19:15	30 18:19 (Oerzen 2)	18:06		16:13	16:04
25	05:24	06:15	19:02 (Oerzen 1)	07:09	17:47 (Oerzen 2)	07:03		08:00	08:33
	21:27	20:27	48 19:55 (Rep 11)	19:13	32 18:19 (Oerzen 2)	17:03		16:12	16:05
26	05:25	06:17	19:00 (Oerzen 1)	07:10	17:47 (Oerzen 2)	07:04		08:01	08:33
	21:25	20:24	49 19:54 (Rep 11)	19:10	32 18:19 (Oerzen 2)	17:01		16:11	16:06
27	05:27	06:19	18:59 (Oerzen 1)	07:12	17:46 (Oerzen 2)	07:06		08:03	08:34
	21:24	20:22	50 19:53 (Rep 11)	19:08	33 18:19 (Oerzen 2)	16:59		16:10	16:06
28	05:28	06:20	18:59 (Oerzen 1)	07:14	17:46 (Oerzen 2)	07:08		08:05	08:34
	21:22	20:20	49 19:52 (Rep 11)	19:06	33 18:19 (Oerzen 2)	16:57		16:09	16:07
29	05:30	06:22	18:57 (Oerzen 1)	07:16	17:45 (Oerzen 2)	07:10		08:06	08:34
	21:21	20:18	47 19:49 (Rep 11)	19:03	33 18:18 (Oerzen 2)	16:55		16:08	16:08
30	05:31	06:24	18:57 (Oerzen 1)	07:17	17:45 (Oerzen 2)	07:12		08:08	08:34
	21:19	20:15	44 19:47 (Rep 11)	19:01	33 18:18 (Oerzen 2)	16:53		16:07	16:09
31	05:33	06:25	18:57 (Oerzen 1)			07:14			08:34
	21:17	20:13	39 19:45 (Rep 11)			16:51			16:10
Sonnenscheinstunden	509	458		382		329		261	237
astr.max.mögl.Beschattung			557		825		262		

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s13 - Oerzen, Westerheide 5

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März		April		Mai		Juni	
1	08:34	08:05			07:09	16:47 (Oerzen 2)	06:55		18:40 (Oerzen 1)	05:48		04:59
	16:11	17:01			17:56	39 17:26 (Oerzen 3)	19:53	31	19:11 (Oerzen 1)	20:47		21:35
2	08:34	08:03			07:06	16:47 (Oerzen 2)	06:53		18:40 (Oerzen 1)	05:45		04:59
	16:12	17:03			17:58	39 17:26 (Oerzen 3)	19:54	32	19:12 (Oerzen 1)	20:48		21:36
3	08:34	08:01			07:04	16:46 (Oerzen 2)	06:50		18:40 (Oerzen 1)	05:44		04:58
	16:14	17:05			18:00	40 17:26 (Oerzen 3)	19:56	32	19:12 (Oerzen 1)	20:50		21:37
4	08:33	08:00			07:02	16:45 (Oerzen 2)	06:48		18:39 (Oerzen 1)	05:42		04:57
	16:15	17:07			18:01	41 17:26 (Oerzen 3)	19:58	32	19:11 (Oerzen 1)	20:52		21:39
5	08:33	07:58			07:00	16:45 (Oerzen 2)	06:46		18:39 (Oerzen 1)	05:40		04:56
	16:16	17:09			18:03	41 17:26 (Oerzen 3)	20:00	32	19:11 (Oerzen 1)	20:54		21:40
6	08:33	07:56			06:57	16:45 (Oerzen 2)	06:43		18:39 (Oerzen 1)	05:38		04:55
	16:17	17:11			18:05	40 17:25 (Oerzen 3)	20:02	40	19:35 (Rep 11)	20:55		21:41
7	08:32	07:54			06:55	16:45 (Oerzen 2)	06:41		18:39 (Oerzen 1)	05:36		04:55
	16:19	17:13			18:07	40 17:25 (Oerzen 3)	20:04	44	19:36 (Rep 11)	20:57		21:42
8	08:32	07:53			06:53	16:44 (Oerzen 2)	06:39		18:40 (Oerzen 1)	05:34		04:54
	16:20	17:15			18:09	39 17:23 (Oerzen 3)	20:05	45	19:38 (Rep 11)	20:59		21:42
9	08:31	07:51			06:50	16:45 (Oerzen 2)	06:36		18:40 (Oerzen 1)	05:32		04:54
	16:21	17:17			18:11	37 17:22 (Oerzen 3)	20:07	48	19:40 (Rep 11)	21:01		21:43
10	08:31	07:49			06:48	16:46 (Oerzen 2)	06:34		18:41 (Oerzen 1)	05:30		04:53
	16:23	17:19			18:13	35 17:21 (Oerzen 3)	20:09	46	19:39 (Rep 11)	21:02		21:44
11	08:30	07:47			06:46	16:46 (Oerzen 2)	06:32		18:42 (Oerzen 1)	05:28		04:53
	16:24	17:21			18:14	31 17:17 (Oerzen 3)	20:11	45	19:40 (Rep 11)	21:04		21:45
12	08:29	07:45			06:43	16:47 (Oerzen 2)	06:29		18:44 (Oerzen 1)	05:27		04:52
	16:26	17:23			18:16	27 17:14 (Oerzen 2)	20:13	41	19:40 (Rep 11)	21:06		21:46
13	08:28	07:43			06:41	16:47 (Oerzen 2)	06:27		18:46 (Oerzen 1)	05:25		04:52
	16:27	17:25			18:18	25 17:12 (Oerzen 2)	20:14	36	19:39 (Rep 11)	21:07		21:46
14	08:28	07:41			06:38	16:49 (Oerzen 2)	06:25		19:16 (Rep 11)	05:23		04:52
	16:29	17:27			18:20	22 17:11 (Oerzen 2)	20:16	23	19:39 (Rep 11)	21:09		21:47
15	08:27	07:39			06:36	16:51 (Oerzen 2)	06:22		19:16 (Rep 11)	05:22		04:52
	16:31	17:29			18:22	17 17:08 (Oerzen 2)	20:18	23	19:39 (Rep 11)	21:11		21:48
16	08:26	07:37			06:34	16:54 (Oerzen 2)	06:20		19:17 (Rep 11)	05:20		04:51
	16:32	17:31			18:24	15 17:57 (Rep 10)	20:20	21	19:38 (Rep 11)	21:12		21:48
17	08:25	07:35			06:31	17:49 (Rep 10)	06:18		19:17 (Rep 11)	05:18		04:51
	16:34	17:33			18:26	11 18:00 (Rep 10)	20:21	21	19:38 (Rep 11)	21:14		21:49
18	08:24	07:33			06:29	17:46 (Rep 10)	06:15		19:17 (Rep 11)	05:17		04:51
	16:36	17:35			18:27	15 18:01 (Rep 10)	20:23	19	19:36 (Rep 11)	21:15		21:49
19	08:23	07:31			06:26	17:45 (Rep 10)	06:13		19:18 (Rep 11)	05:15		04:51
	16:37	17:37			18:29	18 18:03 (Rep 10)	20:25	16	19:34 (Rep 11)	21:17		21:49
20	08:22	07:29			06:24	17:43 (Rep 10)	06:11		19:20 (Rep 11)	05:14		04:51
	16:39	17:38			18:31	21 18:04 (Rep 10)	20:27	12	19:32 (Rep 11)	21:18		21:50
21	08:20	07:26			06:22	17:43 (Rep 10)	06:09		19:24 (Rep 11)	05:12		04:52
	16:41	17:40			18:33	21 18:04 (Rep 10)	20:29	5	19:29 (Rep 11)	21:20		21:50
22	08:19	07:24			06:19	17:42 (Rep 10)	06:07			05:11		04:52
	16:43	17:42			18:35	23 18:05 (Rep 10)	20:30			21:22		21:50
23	08:18	07:22		17:01 (Oerzen 2)	06:17	17:41 (Rep 10)	06:04			05:10		04:52
	16:44	17:44	5	17:06 (Oerzen 2)	18:36	23 18:04 (Rep 10)	20:32			21:23		21:50
24	08:17	07:20		16:55 (Oerzen 2)	06:14	17:42 (Rep 10)	06:02			05:08		04:52
	16:46	17:46	15	17:10 (Oerzen 2)	18:38	22 18:04 (Rep 10)	20:34			21:24		21:51
25	08:15	07:18		16:53 (Oerzen 2)	06:12	17:41 (Rep 10)	06:00			05:07		04:53
	16:48	17:48	26	17:19 (Oerzen 3)	18:40	24 18:05 (Oerzen 1)	20:36			21:26		21:51
26	08:14	07:16		16:51 (Oerzen 2)	06:10	17:42 (Rep 10)	05:58			05:06		04:53
	16:50	17:50	31	17:22 (Oerzen 3)	18:42	26 18:08 (Oerzen 1)	20:38			21:27		21:51
27	08:13	07:13		16:50 (Oerzen 2)	06:07	17:42 (Rep 10)	05:56			05:05		04:53
	16:52	17:52	34	17:24 (Oerzen 3)	18:44	27 18:09 (Oerzen 1)	20:39			21:29		21:50
28	08:11	07:11		16:48 (Oerzen 2)	06:05	17:43 (Rep 10)	05:54			05:04		04:54
	16:54	17:54	37	17:25 (Oerzen 3)	18:45	27 18:10 (Oerzen 1)	20:41			21:30		21:50
29	08:10				07:02	18:43 (Oerzen 1)	05:52			05:02		04:55
	16:56				19:47	28 19:11 (Oerzen 1)	20:43			21:31		21:50
30	08:08				07:00	18:42 (Oerzen 1)	05:50			05:01		04:55
	16:58				19:49	29 19:11 (Oerzen 1)	20:45			21:33		21:50
31	08:06				06:58	18:41 (Oerzen 1)				05:00		
	16:59				19:51	31 19:12 (Oerzen 1)				21:34		
Sonnenscheinstunden	253	275			367		419			491		506
astr.max.mögl.Beschattung			148		874		644					

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s13 - Oerzen, Westerheide 5

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56	05:34		06:27	18:41 (Oerzen 1)	07:19	17:26 (Oerzen 2)	07:16	08:09		
	21:50	21:16		20:11	45 19:39 (Rep 11)	18:58	27 17:53 (Oerzen 2)	16:49	16:06		
2	04:57	05:36		06:29	18:40 (Oerzen 1)	07:21	17:25 (Oerzen 2)	07:18	08:11		
	21:49	21:14		20:08	46 19:38 (Rep 11)	18:56	29 17:54 (Oerzen 3)	16:47	16:06		
3	04:57	05:38		06:31	18:38 (Oerzen 1)	07:23	17:24 (Oerzen 2)	07:20	08:12		
	21:49	21:12		20:06	47 19:37 (Rep 11)	18:54	34 17:58 (Oerzen 3)	16:45	16:05		
4	04:58	05:39		06:32	18:37 (Oerzen 1)	07:24	17:22 (Oerzen 2)	07:21	08:14		
	21:48	21:10		20:04	45 19:35 (Rep 11)	18:51	37 17:59 (Oerzen 3)	16:43	16:04		
5	04:59	05:41		06:34	18:36 (Oerzen 1)	07:26	17:21 (Oerzen 2)	07:23	08:15		
	21:48	21:08		20:01	45 19:34 (Rep 11)	18:49	39 18:00 (Oerzen 3)	16:42	16:04		
6	05:00	05:43		06:36	18:34 (Oerzen 1)	07:28	17:21 (Oerzen 2)	07:25	08:16		
	21:47	21:07		19:59	42 19:31 (Rep 11)	18:46	40 18:01 (Oerzen 3)	16:40	16:03		
7	05:01	05:44		06:38	18:34 (Oerzen 1)	07:30	17:21 (Oerzen 2)	07:27	08:18		
	21:47	21:05		19:56	32 19:06 (Oerzen 1)	18:44	40 18:01 (Oerzen 3)	16:38	16:03		
8	05:02	05:46		06:39	18:34 (Oerzen 1)	07:31	17:21 (Oerzen 2)	07:29	08:19		
	21:46	21:03		19:54	32 19:06 (Oerzen 1)	18:42	40 18:01 (Oerzen 3)	16:36	16:02		
9	05:03	05:48		06:41	18:33 (Oerzen 1)	07:33	17:20 (Oerzen 2)	07:31	08:20		
	21:45	21:01		19:52	32 19:05 (Oerzen 1)	18:39	41 18:01 (Oerzen 3)	16:34	16:02		
10	05:04	05:49		06:43	18:33 (Oerzen 1)	07:35	17:20 (Oerzen 2)	07:33	08:21		
	21:44	20:59		19:49	32 19:05 (Oerzen 1)	18:37	40 18:00 (Oerzen 3)	16:33	16:02		
11	05:05	05:51		06:44	18:33 (Oerzen 1)	07:37	17:20 (Oerzen 2)	07:35	08:23		
	21:44	20:57		19:47	32 19:05 (Oerzen 1)	18:35	40 18:00 (Oerzen 3)	16:31	16:01		
12	05:06	05:53		06:46	18:32 (Oerzen 1)	07:39	17:20 (Oerzen 2)	07:36	08:24		
	21:43	20:55		19:44	31 19:03 (Oerzen 1)	18:32	39 17:59 (Oerzen 3)	16:29	16:01		
13	05:07	05:55		06:48	18:33 (Oerzen 1)	07:40	17:21 (Oerzen 2)	07:38	08:25		
	21:42	20:53		19:42	29 19:02 (Oerzen 1)	18:30	37 17:58 (Oerzen 3)	16:28	16:01		
14	05:08	05:56		06:50	18:34 (Oerzen 1)	07:42	17:22 (Oerzen 2)	07:40	08:26		
	21:41	20:51		19:39	28 19:02 (Oerzen 1)	18:28	35 17:57 (Oerzen 3)	16:26	16:01		
15	05:10	05:58		06:51	18:33 (Oerzen 1)	07:44	17:23 (Oerzen 2)	07:42	08:27		
	21:40	20:49		19:37	27 19:00 (Oerzen 1)	18:25	33 17:56 (Oerzen 3)	16:25	16:01		
16	05:11	06:00		06:53	18:32 (Rep 10)	07:46	17:24 (Oerzen 2)	07:44	08:28		
	21:39	20:46		19:35	26 18:58 (Oerzen 1)	18:23	30 17:54 (Oerzen 3)	16:23	16:01		
17	05:12	06:01		06:55	18:30 (Rep 10)	07:48	17:26 (Oerzen 2)	07:46	08:28		
	21:38	20:44		19:32	27 18:57 (Oerzen 1)	18:21	19 17:48 (Oerzen 3)	16:22	16:01		
18	05:14	06:03		06:56	18:29 (Rep 10)	07:50	17:29 (Oerzen 2)	07:48	08:29		
	21:36	20:42		19:30	24 18:53 (Oerzen 1)	18:19	12 17:41 (Oerzen 2)	16:20	16:02		
19	05:15	06:05		06:58	18:28 (Rep 10)	07:51		07:49	08:30		
	21:35	20:40		19:27	22 18:50 (Rep 10)	18:16		16:19	16:02		
20	05:16	06:07		07:00	18:28 (Rep 10)	07:53		07:51	08:31		
	21:34	20:38		19:25	22 18:50 (Rep 10)	18:14		16:18	16:02		
21	05:18	06:08		07:02	18:28 (Rep 10)	07:55		07:53	08:31		
	21:33	20:36		19:22	22 18:50 (Rep 10)	18:12		16:16	16:03		
22	05:19	06:10		07:03	18:27 (Rep 10)	07:57		07:55	08:32		
	21:31	20:33	7	19:34 (Rep 11)	19:20	22 18:49 (Rep 10)		16:15	16:03		
23	05:21	06:12		19:24 (Rep 11)	07:05	18:27 (Rep 10)		07:56	08:32		
	21:30	20:31	12	19:36 (Rep 11)	19:18	21 18:48 (Rep 10)		16:14	16:04		
24	05:22	06:13		19:22 (Rep 11)	07:07	18:28 (Rep 10)		07:58	08:33		
	21:28	20:29	16	19:38 (Rep 11)	19:15	19 18:47 (Rep 10)		16:13	16:04		
25	05:24	06:15		19:21 (Rep 11)	07:09	18:28 (Rep 10)		08:00	08:33		
	21:27	20:27	19	19:40 (Rep 11)	19:13	16 18:44 (Rep 10)		16:12	16:05		
26	05:25	06:17		19:19 (Rep 11)	07:10	18:30 (Rep 10)		08:01	08:33		
	21:25	20:24	21	19:40 (Rep 11)	19:10	12 18:42 (Rep 10)		16:11	16:06		
27	05:27	06:19		19:18 (Rep 11)	07:12	17:38 (Oerzen 2)		08:03	08:34		
	21:24	20:22	22	19:40 (Rep 11)	19:08	14 18:40 (Rep 10)		16:10	16:06		
28	05:28	06:20		19:18 (Rep 11)	07:14	17:33 (Oerzen 2)		08:05	08:34		
	21:22	20:20	23	19:41 (Rep 11)	19:06	15 17:48 (Oerzen 2)		16:09	16:07		
29	05:30	06:22		18:51 (Oerzen 1)	07:16	17:30 (Oerzen 2)		08:06	08:34		
	21:21	20:18	27	19:40 (Rep 11)	19:03	20 17:50 (Oerzen 2)		16:08	16:08		
30	05:31	06:24		18:46 (Oerzen 1)	07:17	17:28 (Oerzen 2)		08:08	08:34		
	21:19	20:15	37	19:40 (Rep 11)	19:01	23 17:51 (Oerzen 2)		16:07	16:09		
31	05:33	06:25		18:44 (Oerzen 1)		07:14			08:34		
	21:17	20:13	41	19:40 (Rep 11)		16:51			16:10		
Sonnenscheinstunden		509		458		382		329		261	237
astr.max.mögl.Beschattung			225		850		612				

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten
		Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s14 - Oerzen, Westerheide 12A

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März		April		Mai		Juni	
1	08:34	08:05			07:09	16:33 (Oerzen 2)	06:55	18:29 (Oerzen 1)	05:48		04:59	
	16:11	17:01			17:56	46	17:19 (Oerzen 3)	19:53	34	19:03 (Oerzen 1)	20:47	21:35
2	08:34	08:03			07:06	16:34 (Oerzen 2)	06:53	18:30 (Oerzen 1)	05:45		04:59	
	16:12	17:03			17:58	45	17:19 (Oerzen 3)	19:54	33	19:03 (Oerzen 1)	20:48	21:36
3	08:34	08:02			07:04	16:33 (Oerzen 2)	06:50	18:30 (Oerzen 1)	05:44		04:58	
	16:14	17:05			18:00	45	17:18 (Oerzen 3)	19:56	32	19:02 (Oerzen 1)	20:50	21:37
4	08:33	08:00			07:02	16:33 (Oerzen 2)	06:48	18:30 (Oerzen 1)	05:42		04:57	
	16:15	17:07			18:01	45	17:18 (Oerzen 3)	19:58	43	19:31 (Rep 11)	20:52	21:39
5	08:33	07:58			07:00	16:34 (Oerzen 2)	06:46	18:31 (Oerzen 1)	05:40		04:56	
	16:16	17:09			18:03	43	17:17 (Oerzen 3)	20:00	45	19:33 (Rep 11)	20:54	21:40
6	08:33	07:56			06:57	16:34 (Oerzen 2)	06:43	18:32 (Oerzen 1)	05:38		04:55	
	16:17	17:11			18:05	41	17:15 (Oerzen 3)	20:02	46	19:34 (Rep 11)	20:55	21:41
7	08:32	07:54			06:55	16:35 (Oerzen 2)	06:41	18:32 (Oerzen 1)	05:36		04:55	
	16:19	17:13			18:07	39	17:14 (Oerzen 3)	20:04	46	19:34 (Rep 11)	20:57	21:42
8	08:32	07:53			06:53	16:35 (Oerzen 2)	06:39	18:34 (Oerzen 1)	05:34		04:54	
	16:20	17:15			18:09	35	17:10 (Oerzen 3)	20:05	44	19:35 (Rep 11)	20:59	21:42
9	08:31	07:51			06:50	16:37 (Oerzen 2)	06:36	18:36 (Oerzen 1)	05:32		04:54	
	16:21	17:17			18:11	25	17:02 (Oerzen 2)	20:07	42	19:36 (Rep 11)	21:01	21:43
10	08:31	07:49			06:48	16:39 (Oerzen 2)	06:34	18:37 (Oerzen 1)	05:30		04:53	
	16:23	17:19			18:13	21	17:00 (Oerzen 2)	20:09	37	19:35 (Rep 11)	21:02	21:44
11	08:30	07:47			06:46	16:40 (Oerzen 2)	06:32	19:11 (Rep 11)	05:28		04:53	
	16:24	17:21			18:15	17	16:57 (Oerzen 2)	20:11	24	19:35 (Rep 11)	21:04	21:45
12	08:29	07:45			06:43	16:44 (Oerzen 2)	06:29	19:11 (Rep 11)	05:27		04:52	
	16:26	17:23			18:16	9	16:53 (Oerzen 2)	20:13	24	19:35 (Rep 11)	21:06	21:46
13	08:28	07:43			06:41		06:27	19:10 (Rep 11)	05:25		04:52	
	16:27	17:25			18:18		20:14	24	19:34 (Rep 11)	21:07	21:46	
14	08:28	07:41			06:38	17:43 (Rep 10)	06:25	19:11 (Rep 11)	05:23		04:52	
	16:29	17:27			18:20	11	17:54 (Rep 10)	20:16	22	19:33 (Rep 11)	21:09	21:47
15	08:27	07:39			06:36	17:40 (Rep 10)	06:22	19:12 (Rep 11)	05:22		04:52	
	16:31	17:29			18:22	15	17:55 (Rep 10)	20:18	20	19:32 (Rep 11)	21:11	21:48
16	08:26	07:37			06:34	17:39 (Rep 10)	06:20	19:12 (Rep 11)	05:20		04:51	
	16:32	17:31			18:24	18	17:57 (Rep 10)	20:20	19	19:31 (Rep 11)	21:12	21:48
17	08:25	07:35			06:31	17:38 (Rep 10)	06:18	19:14 (Rep 11)	05:18		04:51	
	16:34	17:33			18:26	21	17:59 (Rep 10)	20:22	16	19:30 (Rep 11)	21:14	21:49
18	08:24	07:33		16:49 (Oerzen 2)	06:29	17:37 (Rep 10)	06:15	19:15 (Rep 11)	05:17		04:51	
	16:36	17:35	6	16:55 (Oerzen 2)	18:27	21	17:58 (Rep 10)	20:23	12	19:27 (Rep 11)	21:15	21:49
19	08:23	07:31		16:45 (Oerzen 2)	06:26	17:36 (Rep 10)	06:13	19:18 (Rep 11)	05:15		04:51	
	16:37	17:37	14	16:59 (Oerzen 2)	18:29	23	17:59 (Rep 10)	20:25	6	19:24 (Rep 11)	21:17	21:49
20	08:22	07:29		16:41 (Oerzen 2)	06:24	17:35 (Rep 10)	06:11		05:14		04:51	
	16:39	17:38	20	17:01 (Oerzen 2)	18:31	23	17:58 (Rep 10)	20:27		21:19	21:50	
21	08:20	07:26		16:40 (Oerzen 2)	06:22	17:35 (Rep 10)	06:09		05:12		04:52	
	16:41	17:40	23	17:03 (Oerzen 2)	18:33	23	17:58 (Rep 10)	20:29		21:20	21:50	
22	08:19	07:24		16:38 (Oerzen 2)	06:19	17:36 (Rep 10)	06:07		05:11		04:52	
	16:43	17:42	35	17:13 (Oerzen 3)	18:35	24	18:00 (Oerzen 1)	20:30		21:22	21:50	
23	08:18	07:22		16:37 (Oerzen 2)	06:17	17:35 (Rep 10)	06:04		05:10		04:52	
	16:44	17:44	39	17:16 (Oerzen 3)	18:36	26	18:01 (Oerzen 1)	20:32		21:23	21:50	
24	08:17	07:20		16:36 (Oerzen 2)	06:14	17:36 (Oerzen 1)	06:02		05:08		04:52	
	16:46	17:46	40	17:16 (Oerzen 3)	18:38	26	18:02 (Oerzen 1)	20:34		21:24	21:51	
25	08:15	07:18		16:35 (Oerzen 2)	06:12	17:34 (Oerzen 1)	06:00		05:07		04:53	
	16:48	17:48	43	17:18 (Oerzen 3)	18:40	29	18:03 (Oerzen 1)	20:36		21:26	21:51	
26	08:14	07:16		16:35 (Oerzen 2)	06:10	17:34 (Oerzen 1)	05:58		05:06		04:53	
	16:50	17:50	44	17:19 (Oerzen 3)	18:42	30	18:04 (Oerzen 1)	20:38		21:27	21:51	
27	08:13	07:13		16:34 (Oerzen 2)	06:07	17:32 (Oerzen 1)	05:56		05:05		04:53	
	16:52	17:52	45	17:19 (Oerzen 3)	18:44	31	18:03 (Oerzen 1)	20:39		21:29	21:50	
28	08:11	07:11		16:33 (Oerzen 2)	06:05	17:32 (Oerzen 1)	05:54		05:04		04:54	
	16:54	17:54	46	17:19 (Oerzen 3)	18:45	32	18:04 (Oerzen 1)	20:41		21:30	21:50	
29	08:10				07:02	18:31 (Oerzen 1)	05:52		05:02		04:55	
	16:56				19:47	33	19:04 (Oerzen 1)	20:43		21:31	21:50	
30	08:08				07:00	18:30 (Oerzen 1)	05:50		05:01		04:55	
	16:58				19:49	34	19:04 (Oerzen 1)	20:45		21:33	21:50	
31	08:06				06:58	18:30 (Oerzen 1)			05:00			
	16:59				19:51	34	19:04 (Oerzen 1)		21:34			
Sonnenscheinstunden	253	275			367		419		491		506	
astr.max.mögl.Beschattung			355		865		569					

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s14 - Oerzen, Westerheide 12A

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56	05:34		06:27		19:10 (Rep 11)	07:19		07:16	08:09	
	21:50	21:16		20:11	24	19:34 (Rep 11)	18:58		16:49	16:06	
2	04:57	05:36		06:29		18:36 (Oerzen 1)	07:21	17:20 (Oerzen 2)	07:18	08:11	
	21:49	21:14		20:08	37	19:34 (Rep 11)	18:56	15	17:35 (Oerzen 2)	16:47	16:06
3	04:57	05:38		06:31		18:33 (Oerzen 1)	07:23		17:18 (Oerzen 2)	07:20	08:12
	21:49	21:12		20:06	42	19:33 (Rep 11)	18:54	19	17:37 (Oerzen 2)	16:45	16:05
4	04:58	05:39		06:32		18:31 (Oerzen 1)	07:24		17:14 (Oerzen 2)	07:21	08:14
	21:48	21:10		20:04	44	19:32 (Rep 11)	18:51	24	17:38 (Oerzen 2)	16:43	16:04
5	04:59	05:41		06:34		18:29 (Oerzen 1)	07:26		17:13 (Oerzen 2)	07:23	08:15
	21:48	21:08		20:01	47	19:32 (Rep 11)	18:49	31	17:45 (Oerzen 3)	16:42	16:04
6	05:00	05:43		06:36		18:27 (Oerzen 1)	07:28		17:11 (Oerzen 2)	07:25	08:16
	21:47	21:07		19:59	47	19:30 (Rep 11)	18:46	38	17:49 (Oerzen 3)	16:40	16:03
7	05:01	05:44		06:38		18:26 (Oerzen 1)	07:30		17:10 (Oerzen 2)	07:27	08:18
	21:47	21:05		19:56	45	19:28 (Rep 11)	18:44	40	17:50 (Oerzen 3)	16:38	16:03
8	05:02	05:46		06:39		18:25 (Oerzen 1)	07:31		17:09 (Oerzen 2)	07:29	08:19
	21:46	21:03		19:54	43	19:26 (Rep 11)	18:42	43	17:52 (Oerzen 3)	16:36	16:02
9	05:03	05:48		06:41		18:24 (Oerzen 1)	07:33		17:09 (Oerzen 2)	07:31	08:20
	21:45	21:01		19:52	36	19:21 (Rep 11)	18:39	43	17:52 (Oerzen 3)	16:34	16:02
10	05:04	05:49		06:43		18:23 (Oerzen 1)	07:35		17:07 (Oerzen 2)	07:33	08:21
	21:44	20:59		19:49	33	18:56 (Oerzen 1)	18:37	45	17:52 (Oerzen 3)	16:33	16:02
11	05:05	05:51		06:44		18:23 (Oerzen 1)	07:37		17:07 (Oerzen 2)	07:35	08:23
	21:44	20:57		19:47	33	18:56 (Oerzen 1)	18:35	45	17:52 (Oerzen 3)	16:31	16:01
12	05:06	05:53		06:46		18:22 (Oerzen 1)	07:39		17:07 (Oerzen 2)	07:36	08:24
	21:43	20:55		19:44	33	18:55 (Oerzen 1)	18:32	45	17:52 (Oerzen 3)	16:29	16:01
13	05:07	05:55		06:48		18:22 (Oerzen 1)	07:40		17:06 (Oerzen 2)	07:38	08:25
	21:42	20:53		19:42	33	18:55 (Oerzen 1)	18:30	46	17:52 (Oerzen 3)	16:28	16:01
14	05:08	05:56		06:50		18:22 (Oerzen 1)	07:42		17:07 (Oerzen 2)	07:40	08:26
	21:41	20:51		19:40	33	18:55 (Oerzen 1)	18:28	45	17:52 (Oerzen 3)	16:26	16:01
15	05:10	05:58		06:51		18:21 (Oerzen 1)	07:44		17:07 (Oerzen 2)	07:42	08:27
	21:40	20:49		19:37	32	18:53 (Oerzen 1)	18:25	44	17:51 (Oerzen 3)	16:25	16:01
16	05:11	06:00		06:53		18:21 (Oerzen 1)	07:46		17:07 (Oerzen 2)	07:44	08:28
	21:39	20:46		19:35	32	18:53 (Oerzen 1)	18:23	44	17:51 (Oerzen 3)	16:23	16:01
17	05:12	06:01		06:55		18:22 (Oerzen 1)	07:48		17:07 (Oerzen 2)	07:46	08:28
	21:38	20:44		19:32	30	18:52 (Oerzen 1)	18:21	43	17:50 (Oerzen 3)	16:22	16:02
18	05:14	06:03		06:56		18:22 (Oerzen 1)	07:50		17:08 (Oerzen 2)	07:48	08:29
	21:36	20:42		19:30	28	18:50 (Oerzen 1)	18:19	40	17:48 (Oerzen 3)	16:20	16:02
19	05:15	06:05		06:58		18:23 (Oerzen 1)	07:51		17:09 (Oerzen 2)	07:49	08:30
	21:35	20:40		19:27	26	18:49 (Oerzen 1)	18:16	37	17:46 (Oerzen 3)	16:19	16:02
20	05:16	06:07		07:00		18:22 (Rep 10)	07:53		17:10 (Oerzen 2)	07:51	08:31
	21:34	20:38		19:25	26	18:48 (Oerzen 1)	18:14	33	17:43 (Oerzen 3)	16:18	16:02
21	05:18	06:08		07:02		18:21 (Rep 10)	07:55		17:10 (Oerzen 2)	07:53	08:31
	21:33	20:36		19:22	25	18:46 (Oerzen 1)	18:12	23	17:33 (Oerzen 2)	16:16	16:03
22	05:19	06:10		07:03		18:20 (Rep 10)	07:57		17:12 (Oerzen 2)	07:55	08:32
	21:31	20:33		19:20	23	18:43 (Rep 10)	18:10	19	17:31 (Oerzen 2)	16:15	16:03
23	05:21	06:12		07:05		18:20 (Rep 10)	07:59		17:15 (Oerzen 2)	07:56	08:32
	21:30	20:31		19:18	23	18:43 (Rep 10)	18:08	13	17:28 (Oerzen 2)	16:14	16:04
24	05:22	06:13	19:21 (Rep 11)	07:07		18:20 (Rep 10)	08:01		17:58 (Oerzen 2)	07:58	08:33
	21:28	20:29	7	19:28 (Rep 11)	19:15	18:43 (Rep 10)	18:06		16:13	16:04	
25	05:24	06:15	19:18 (Rep 11)	07:09		18:19 (Rep 10)	07:03		08:00	08:33	
	21:27	20:27	13	19:31 (Rep 11)	19:13	18:41 (Rep 10)	17:03		16:12	16:05	
26	05:25	06:17	19:15 (Rep 11)	07:10		18:20 (Rep 10)	07:04		08:01	08:33	
	21:25	20:24	17	19:32 (Rep 11)	19:10	18:41 (Rep 10)	17:01		16:11	16:06	
27	05:27	06:19	19:14 (Rep 11)	07:12		18:20 (Rep 10)	07:06		08:03	08:34	
	21:24	20:22	19	19:33 (Rep 11)	19:08	18:40 (Rep 10)	16:59		16:10	16:06	
28	05:28	06:20	19:13 (Rep 11)	07:14		18:21 (Rep 10)	07:08		08:05	08:34	
	21:22	20:20	21	19:34 (Rep 11)	19:06	18:38 (Rep 10)	16:57		16:09	16:07	
29	05:30	06:22	19:12 (Rep 11)	07:16		18:22 (Rep 10)	07:10		08:06	08:34	
	21:21	20:18	22	19:34 (Rep 11)	19:03	18:35 (Rep 10)	16:55		16:08	16:08	
30	05:31	06:24	19:11 (Rep 11)	07:17		18:25 (Rep 10)	07:12		08:08	08:34	
	21:19	20:15	24	19:35 (Rep 11)	19:01	18:32 (Rep 10)	16:53		16:07	16:09	
31	05:33	06:25	19:11 (Rep 11)				07:14			08:34	
	21:17	20:13	24	19:35 (Rep 11)			16:51			16:10	
Sonnenscheinstunden	509	458		382			329		261	237	
astr.max.mögl.Beschattung			147		898		775				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s15 - Oerzen, Westerheide 12C

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März		April		Mai		Juni	
1	08:34 16:11	08:05 17:01			07:09 17:56	16:38 (Oerzen 2) 17:22 (Oerzen 3)	06:55 19:53	18:35 (Oerzen 1) 19:09 (Oerzen 1)	05:48 20:47	04:59 21:35	
2	08:34 16:12	08:03 17:03			07:06 17:58	16:38 (Oerzen 2) 17:23 (Oerzen 3)	06:53 19:55	18:35 (Oerzen 1) 19:09 (Oerzen 1)	05:45 20:48	04:59 21:36	
3	08:34 16:14	08:02 17:05			07:04 18:00	16:37 (Oerzen 2) 17:22 (Oerzen 3)	06:50 19:56	18:35 (Oerzen 1) 19:10 (Oerzen 1)	05:44 20:50	04:58 21:37	
4	08:33 16:15	08:00 17:07			07:02 18:01	16:37 (Oerzen 2) 17:22 (Oerzen 3)	06:48 19:58	18:34 (Oerzen 1) 19:09 (Oerzen 1)	05:42 20:52	04:57 21:39	
5	08:33 16:16	07:58 17:09			07:00 18:03	16:37 (Oerzen 2) 17:22 (Oerzen 3)	06:46 20:00	18:35 (Oerzen 1) 19:08 (Oerzen 1)	05:40 20:54	04:56 21:40	
6	08:33 16:17	07:56 17:11			06:57 18:05	16:37 (Oerzen 2) 17:21 (Oerzen 3)	06:43 20:02	18:35 (Oerzen 1) 19:35 (Rep 11)	05:38 20:55	04:55 21:41	
7	08:32 16:19	07:54 17:13			06:55 18:07	16:37 (Oerzen 2) 17:20 (Oerzen 3)	06:41 20:04	18:35 (Oerzen 1) 19:36 (Rep 11)	05:36 20:57	04:55 21:42	
8	08:32 16:20	07:53 17:15			06:53 18:09	16:37 (Oerzen 2) 17:18 (Oerzen 3)	06:39 20:05	18:35 (Oerzen 1) 19:38 (Rep 11)	05:34 20:59	04:54 21:42	
9	08:31 16:21	07:51 17:17			06:50 18:11	16:38 (Oerzen 2) 17:16 (Oerzen 3)	06:36 20:07	18:36 (Oerzen 1) 19:39 (Rep 11)	05:32 21:01	04:54 21:43	
10	08:31 16:23	07:49 17:19			06:48 18:13	16:39 (Oerzen 2) 17:13 (Oerzen 3)	06:34 20:09	18:36 (Oerzen 1) 19:39 (Rep 11)	05:30 21:02	04:53 21:44	
11	08:30 16:24	07:47 17:21			06:46 18:15	16:39 (Oerzen 2) 17:07 (Oerzen 2)	06:32 20:11	18:38 (Oerzen 1) 19:40 (Rep 11)	05:28 21:04	04:53 21:45	
12	08:29 16:26	07:45 17:23			06:43 18:16	16:41 (Oerzen 2) 17:06 (Oerzen 2)	06:29 20:13	18:39 (Oerzen 1) 19:40 (Rep 11)	05:27 21:06	04:52 21:46	
13	08:28 16:27	07:43 17:25			06:41 18:18	16:42 (Oerzen 2) 17:03 (Oerzen 2)	06:27 20:14	18:41 (Oerzen 1) 19:39 (Rep 11)	05:25 21:07	04:52 21:46	
14	08:28 16:29	07:41 17:27			06:38 18:20	16:45 (Oerzen 2) 17:01 (Oerzen 2)	06:25 20:16	18:44 (Oerzen 1) 19:39 (Rep 11)	05:23 21:09	04:52 21:47	
15	08:27 16:31	07:39 17:29			06:36 18:22	16:49 (Oerzen 2) 17:54 (Rep 10)	06:22 20:18	19:15 (Rep 11) 19:39 (Rep 11)	05:22 21:11	04:52 21:48	
16	08:26 16:32	07:37 17:31			06:34 18:24	17:46 (Rep 10) 17:58 (Rep 10)	06:20 20:20	19:15 (Rep 11) 19:38 (Rep 11)	05:20 21:12	04:51 21:48	
17	08:25 16:34	07:35 17:33			06:31 18:26	17:44 (Rep 10) 18:00 (Rep 10)	06:18 20:22	19:16 (Rep 11) 19:38 (Rep 11)	05:18 21:14	04:51 21:49	
18	08:24 16:36	07:33 17:35			06:29 18:27	17:42 (Rep 10) 18:01 (Rep 10)	06:15 20:23	19:16 (Rep 11) 19:36 (Rep 11)	05:17 21:15	04:51 21:49	
19	08:23 16:37	07:31 17:37			06:26 18:29	17:41 (Rep 10) 18:02 (Rep 10)	06:13 20:25	19:17 (Rep 11) 19:35 (Rep 11)	05:15 21:17	04:51 21:49	
20	08:22 16:39	07:29 17:38			06:24 18:31	17:40 (Rep 10) 18:02 (Rep 10)	06:11 20:27	19:18 (Rep 11) 19:33 (Rep 11)	05:14 21:19	04:51 21:50	
21	08:20 16:41	07:26 17:40	12	16:50 (Oerzen 2) 17:02 (Oerzen 2)	06:22 18:33	17:39 (Rep 10) 18:02 (Rep 10)	06:09 20:29	19:20 (Rep 11) 19:31 (Rep 11)	05:12 21:20	04:52 21:50	
22	08:19 16:43	07:24 17:42	18	16:47 (Oerzen 2) 17:05 (Oerzen 2)	06:19 18:35	17:39 (Rep 10) 18:03 (Rep 10)	06:07 20:30		05:11 21:22	04:52 21:50	
23	08:18 16:44	07:22 17:44	27	16:45 (Oerzen 2) 17:14 (Oerzen 3)	06:17 18:36	17:39 (Rep 10) 18:02 (Rep 10)	06:04 20:32		05:10 21:23	04:52 21:50	
24	08:17 16:46	07:20 17:46	35	16:42 (Oerzen 2) 17:17 (Oerzen 3)	06:14 18:38	17:39 (Rep 10) 18:02 (Oerzen 1)	06:02 20:34		05:08 21:24	04:52 21:51	
25	08:15 16:48	07:18 17:48	38	16:41 (Oerzen 2) 17:19 (Oerzen 3)	06:12 18:40	17:39 (Rep 10) 18:04 (Oerzen 1)	06:00 20:36		05:07 21:26	04:53 21:51	
26	08:14 16:50	07:16 17:50	40	16:41 (Oerzen 2) 17:21 (Oerzen 3)	06:10 18:42	17:39 (Rep 10) 18:06 (Oerzen 1)	05:58 20:38		05:06 21:27	04:53 21:51	
27	08:13 16:52	07:13 17:52	42	16:40 (Oerzen 2) 17:22 (Oerzen 3)	06:07 18:44	17:40 (Rep 10) 18:07 (Oerzen 1)	05:56 20:39		05:05 21:29	04:53 21:50	
28	08:11 16:54	07:11 17:54	44	16:38 (Oerzen 2) 17:22 (Oerzen 3)	06:05 18:45	17:40 (Oerzen 1) 18:08 (Oerzen 1)	05:54 20:41		05:04 21:30	04:54 21:50	
29	08:10 16:56				07:02 19:47	18:39 (Oerzen 1) 19:09 (Oerzen 1)	05:52 20:43		05:02 21:31	04:55 21:50	
30	08:08 16:58				07:00 19:49	18:37 (Oerzen 1) 19:09 (Oerzen 1)	05:50 20:45		05:01 21:33	04:55 21:50	
31	08:06 16:59				06:58 19:51	18:37 (Oerzen 1) 19:10 (Oerzen 1)			05:00 21:34		
Sonnenscheinstunden		253	275		367		419		491	506	
astr.max.mögl.Beschattung			256		908		708				

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s15 - Oerzen, Westerheide 12C

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56	05:34		06:27	18:37 (Oerzen 1)	07:19	17:21 (Oerzen 2)	07:16	08:09		
	21:50	21:16		20:11	47 19:38 (Rep 11)	18:58	23 17:44 (Oerzen 2)	16:49	16:06		
2	04:57	05:36		06:29	18:35 (Oerzen 1)	07:21	17:19 (Oerzen 2)	07:18	08:11		
	21:49	21:14		20:08	49 19:38 (Rep 11)	18:56	26 17:45 (Oerzen 2)	16:47	16:06		
3	04:57	05:38		06:31	18:33 (Oerzen 1)	07:23	17:17 (Oerzen 2)	07:20	08:12		
	21:49	21:12		20:06	49 19:36 (Rep 11)	18:54	29 17:46 (Oerzen 2)	16:45	16:05		
4	04:58	05:39		06:32	18:32 (Oerzen 1)	07:24	17:15 (Oerzen 2)	07:21	08:14		
	21:48	21:10		20:04	49 19:35 (Rep 11)	18:51	37 17:52 (Oerzen 3)	16:43	16:04		
5	04:59	05:41		06:34	18:32 (Oerzen 1)	07:26	17:14 (Oerzen 2)	07:23	08:15		
	21:48	21:08		20:01	47 19:33 (Rep 11)	18:49	40 17:54 (Oerzen 3)	16:42	16:04		
6	05:00	05:43		06:36	18:30 (Oerzen 1)	07:28	17:14 (Oerzen 2)	07:25	08:16		
	21:47	21:07		19:59	43 19:30 (Rep 11)	18:46	41 17:55 (Oerzen 3)	16:40	16:03		
7	05:01	05:44		06:38	18:30 (Oerzen 1)	07:30	17:13 (Oerzen 2)	07:27	08:18		
	21:47	21:05		19:56	34 19:04 (Oerzen 1)	18:44	43 17:56 (Oerzen 3)	16:38	16:03		
8	05:02	05:46		06:39	18:30 (Oerzen 1)	07:31	17:13 (Oerzen 2)	07:29	08:19		
	21:46	21:03		19:54	34 19:04 (Oerzen 1)	18:42	44 17:57 (Oerzen 3)	16:36	16:02		
9	05:03	05:48		06:41	18:28 (Oerzen 1)	07:33	17:12 (Oerzen 2)	07:31	08:20		
	21:45	21:01		19:52	35 19:03 (Oerzen 1)	18:39	45 17:57 (Oerzen 3)	16:34	16:02		
10	05:04	05:49		06:43	18:28 (Oerzen 1)	07:35	17:11 (Oerzen 2)	07:33	08:21		
	21:44	20:59		19:49	35 19:03 (Oerzen 1)	18:37	45 17:56 (Oerzen 3)	16:33	16:02		
11	05:05	05:51		06:44	18:29 (Oerzen 1)	07:37	17:11 (Oerzen 2)	07:35	08:23		
	21:44	20:57		19:47	33 19:02 (Oerzen 1)	18:35	45 17:56 (Oerzen 3)	16:31	16:01		
12	05:06	05:53		06:46	18:28 (Oerzen 1)	07:39	17:11 (Oerzen 2)	07:36	08:24		
	21:43	20:55		19:44	33 19:01 (Oerzen 1)	18:32	45 17:56 (Oerzen 3)	16:29	16:01		
13	05:07	05:55		06:48	18:28 (Oerzen 1)	07:40	17:11 (Oerzen 2)	07:38	08:25		
	21:42	20:53		19:42	32 19:00 (Oerzen 1)	18:30	44 17:55 (Oerzen 3)	16:28	16:01		
14	05:08	05:56		06:50	18:29 (Oerzen 1)	07:42	17:12 (Oerzen 2)	07:40	08:26		
	21:41	20:51		19:40	31 19:00 (Oerzen 1)	18:28	43 17:55 (Oerzen 3)	16:26	16:01		
15	05:10	05:58		06:51	18:29 (Oerzen 1)	07:44	17:12 (Oerzen 2)	07:42	08:27		
	21:40	20:49		19:37	29 18:58 (Oerzen 1)	18:25	42 17:54 (Oerzen 3)	16:25	16:01		
16	05:11	06:00		06:53	18:29 (Rep 10)	07:46	17:13 (Oerzen 2)	07:44	08:28		
	21:39	20:46		19:35	28 18:57 (Oerzen 1)	18:23	40 17:53 (Oerzen 3)	16:23	16:01		
17	05:12	06:01		06:55	18:28 (Rep 10)	07:48	17:14 (Oerzen 2)	07:46	08:28		
	21:38	20:44		19:32	27 18:55 (Oerzen 1)	18:21	37 17:51 (Oerzen 3)	16:22	16:02		
18	05:14	06:03		06:56	18:26 (Rep 10)	07:50	17:15 (Oerzen 2)	07:48	08:29		
	21:36	20:42		19:30	26 18:52 (Oerzen 1)	18:19	33 17:48 (Oerzen 3)	16:20	16:02		
19	05:15	06:05		06:58	18:26 (Rep 10)	07:51	17:17 (Oerzen 2)	07:49	08:30		
	21:35	20:40		19:27	24 18:50 (Oerzen 1)	18:16	21 17:38 (Oerzen 2)	16:19	16:02		
20	05:16	06:07		07:00	18:25 (Rep 10)	07:53	17:19 (Oerzen 2)	07:51	08:31		
	21:34	20:38		19:25	23 18:48 (Rep 10)	18:14	17 17:36 (Oerzen 2)	16:18	16:02		
21	05:18	06:08	19:28 (Rep 11)	07:02	18:25 (Rep 10)	07:55	17:21 (Oerzen 2)	07:53	08:31		
	21:33	20:36	4 19:32 (Rep 11)	19:22	18:48 (Rep 10)	18:12	10 17:31 (Oerzen 2)	16:16	16:03		
22	05:19	06:10	19:24 (Rep 11)	07:03	18:24 (Rep 10)	07:57		07:55	08:32		
	21:31	20:33	12 19:36 (Rep 11)	19:20	18:47 (Rep 10)	18:10		16:15	16:03		
23	05:21	06:12	19:21 (Rep 11)	07:05	18:24 (Rep 10)	07:59		07:56	08:32		
	21:30	20:31	16 19:37 (Rep 11)	19:18	18:47 (Rep 10)	18:08		16:14	16:04		
24	05:22	06:13	19:20 (Rep 11)	07:07	18:25 (Rep 10)	08:01		07:58	08:33		
	21:28	20:29	19 19:39 (Rep 11)	19:15	18:46 (Rep 10)	18:06		16:13	16:04		
25	05:24	06:15	19:19 (Rep 11)	07:09	18:24 (Rep 10)	07:03		08:00	08:33		
	21:27	20:27	21 19:40 (Rep 11)	19:13	18:44 (Rep 10)	17:03		16:12	16:05		
26	05:25	06:17	19:17 (Rep 11)	07:10	18:26 (Rep 10)	07:04		08:01	08:33		
	21:25	20:24	23 19:40 (Rep 11)	19:10	18:42 (Rep 10)	17:01		16:11	16:06		
27	05:27	06:19	19:17 (Rep 11)	07:12	18:27 (Rep 10)	07:06		08:03	08:34		
	21:24	20:22	23 19:40 (Rep 11)	19:08	18:40 (Rep 10)	16:59		16:10	16:06		
28	05:28	06:20	19:17 (Rep 11)	07:14	18:30 (Rep 10)	07:08		08:05	08:34		
	21:22	20:20	24 19:41 (Rep 11)	19:06	8 18:38 (Rep 10)	16:57		16:09	16:07		
29	05:30	06:22	18:45 (Oerzen 1)	07:16	17:26 (Oerzen 2)	07:10		08:06	08:34		
	21:21	20:18	34 19:40 (Rep 11)	19:03	13 17:39 (Oerzen 2)	16:55		16:08	16:08		
30	05:31	06:24	18:41 (Oerzen 1)	07:17	17:23 (Oerzen 2)	07:12		08:08	08:34		
	21:19	20:15	41 19:40 (Rep 11)	19:01	19 17:42 (Oerzen 2)	16:53		16:07	16:09		
31	05:33	06:25	18:39 (Oerzen 1)			07:14			08:34		
	21:17	20:13	45 19:40 (Rep 11)			16:51			16:10		
Sonnenscheinstunden		509	458	382		329		261	237		
astr.max.mögl.Beschattung			262		887		750				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s16 - Oerzen, Westerheide 18

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März		April		Mai		Juni	
1	08:34	08:05		07:09		16:28 (Oerzen 2)	06:55		18:28 (Oerzen 1)	05:48		04:59
	16:11	17:01		17:56	49	17:17 (Oerzen 3)	19:53	35	19:03 (Oerzen 1)	20:47		21:35
2	08:34	08:03		07:06		16:28 (Oerzen 2)	06:53		18:28 (Oerzen 1)	05:45		04:59
	16:12	17:03		17:58	49	17:17 (Oerzen 3)	19:55	35	19:03 (Oerzen 1)	20:48		21:36
3	08:34	08:02		07:04		16:28 (Oerzen 2)	06:50		18:28 (Oerzen 1)	05:44		04:58
	16:14	17:05		18:00	48	17:16 (Oerzen 3)	19:56	35	19:03 (Oerzen 1)	20:50		21:37
4	08:33	08:00		07:02		16:28 (Oerzen 2)	06:48		18:28 (Oerzen 1)	05:42		04:57
	16:15	17:07		18:01	47	17:15 (Oerzen 3)	19:58	38	19:28 (Rep 11)	20:52		21:39
5	08:33	07:58		07:00		16:29 (Oerzen 2)	06:46		18:28 (Oerzen 1)	05:40		04:56
	16:16	17:09		18:03	46	17:15 (Oerzen 3)	20:00	46	19:32 (Rep 11)	20:54		21:40
6	08:33	07:56		06:57		16:29 (Oerzen 2)	06:43		18:29 (Oerzen 1)	05:38		04:55
	16:17	17:11		18:05	44	17:13 (Oerzen 3)	20:02	49	19:35 (Rep 11)	20:55		21:41
7	08:32	07:54		06:55		16:30 (Oerzen 2)	06:41		18:29 (Oerzen 1)	05:36		04:55
	16:19	17:13		18:07	41	17:11 (Oerzen 3)	20:04	50	19:35 (Rep 11)	20:57		21:42
8	08:32	07:53		06:53		16:30 (Oerzen 2)	06:39		18:30 (Oerzen 1)	05:34		04:54
	16:20	17:15		18:09	37	17:07 (Oerzen 3)	20:05	50	19:36 (Rep 11)	20:59		21:43
9	08:31	07:51		06:50		16:32 (Oerzen 2)	06:36		18:31 (Oerzen 1)	05:32		04:54
	16:21	17:17		18:11	25	16:57 (Oerzen 2)	20:07	49	19:37 (Rep 11)	21:01		21:43
10	08:31	07:49		06:48		16:34 (Oerzen 2)	06:34		18:32 (Oerzen 1)	05:30		04:53
	16:23	17:19		18:13	22	16:56 (Oerzen 2)	20:09	47	19:36 (Rep 11)	21:02		21:44
11	08:30	07:47		06:46		16:36 (Oerzen 2)	06:32		18:34 (Oerzen 1)	05:28		04:53
	16:24	17:21		18:15	16	16:52 (Oerzen 2)	20:11	43	19:37 (Rep 11)	21:04		21:45
12	08:29	07:45		06:43		16:40 (Oerzen 2)	06:29		18:38 (Oerzen 1)	05:27		04:52
	16:26	17:23		18:16	8	16:48 (Oerzen 2)	20:13	36	19:37 (Rep 11)	21:06		21:46
13	08:28	07:43		06:41			06:27		19:12 (Rep 11)	05:25		04:52
	16:27	17:25		18:18			20:14	25	19:37 (Rep 11)	21:07		21:46
14	08:28	07:41		06:38		17:42 (Rep 10)	06:25		19:11 (Rep 11)	05:23		04:52
	16:29	17:27		18:20	12	17:54 (Rep 10)	20:16	25	19:36 (Rep 11)	21:09		21:47
15	08:27	07:39		06:36		17:39 (Rep 10)	06:22		19:11 (Rep 11)	05:22		04:52
	16:31	17:29		18:22	16	17:55 (Rep 10)	20:18	24	19:35 (Rep 11)	21:11		21:48
16	08:26	07:37		06:34		17:38 (Rep 10)	06:20		19:12 (Rep 11)	05:20		04:51
	16:32	17:31		18:24	19	17:57 (Rep 10)	20:20	23	19:35 (Rep 11)	21:12		21:48
17	08:25	07:35		16:41 (Oerzen 2)	06:31	17:37 (Rep 10)	06:18		19:13 (Rep 11)	05:18		04:51
	16:34	17:33	12	16:53 (Oerzen 2)	18:26	17:58 (Rep 10)	20:22	21	19:34 (Rep 11)	21:14		21:49
18	08:24	07:33		16:38 (Oerzen 2)	06:29	17:36 (Rep 10)	06:15		19:13 (Rep 11)	05:17		04:51
	16:36	17:35	18	16:56 (Oerzen 2)	18:27	17:58 (Rep 10)	20:23	19	19:32 (Rep 11)	21:15		21:49
19	08:23	07:31		16:36 (Oerzen 2)	06:26	17:35 (Rep 10)	06:13		19:14 (Rep 11)	05:15		04:51
	16:37	17:37	23	16:59 (Oerzen 2)	18:29	17:59 (Rep 10)	20:25	16	19:30 (Rep 11)	21:17		21:49
20	08:22	07:29		16:34 (Oerzen 2)	06:24	17:34 (Rep 10)	06:11		19:16 (Rep 11)	05:14		04:51
	16:39	17:38	25	16:59 (Oerzen 2)	18:31	17:58 (Rep 10)	20:27	12	19:28 (Rep 11)	21:19		21:50
21	08:20	07:26		16:32 (Oerzen 2)	06:22	17:34 (Rep 10)	06:09			05:12		04:52
	16:41	17:40	38	17:10 (Oerzen 3)	18:33	17:58 (Rep 10)	20:29			21:20		21:50
22	08:19	07:24		16:32 (Oerzen 2)	06:19	17:35 (Rep 10)	06:07			05:11		04:52
	16:43	17:42	41	17:13 (Oerzen 3)	18:35	17:58 (Oerzen 1)	20:30			21:22		21:50
23	08:18	07:22		16:31 (Oerzen 2)	06:17	17:34 (Rep 10)	06:04			05:10		04:52
	16:44	17:44	44	17:15 (Oerzen 3)	18:36	18:00 (Oerzen 1)	20:32			21:23		21:50
24	08:17	07:20		16:29 (Oerzen 2)	06:14	17:35 (Rep 10)	06:02			05:08		04:52
	16:46	17:46	46	17:15 (Oerzen 3)	18:38	18:02 (Oerzen 1)	20:34			21:24		21:51
25	08:15	07:18		16:29 (Oerzen 2)	06:12	17:34 (Oerzen 1)	06:00			05:07		04:53
	16:48	17:48	47	17:16 (Oerzen 3)	18:40	18:02 (Oerzen 1)	20:36			21:26		21:51
26	08:14	07:16		16:29 (Oerzen 2)	06:10	17:33 (Oerzen 1)	05:58			05:06		04:53
	16:50	17:50	48	17:17 (Oerzen 3)	18:42	18:03 (Oerzen 1)	20:38			21:27		21:51
27	08:13	07:13		16:29 (Oerzen 2)	06:07	17:31 (Oerzen 1)	05:56			05:05		04:53
	16:52	17:52	49	17:18 (Oerzen 3)	18:44	18:03 (Oerzen 1)	20:39			21:29		21:50
28	08:11	07:11		16:28 (Oerzen 2)	06:05	17:30 (Oerzen 1)	05:54			05:04		04:54
	16:54	17:54	49	17:17 (Oerzen 3)	18:45	18:04 (Oerzen 1)	20:41			21:30		21:50
29	08:10			07:02		18:30 (Oerzen 1)	05:52			05:02		04:55
	16:56			19:47	35	19:05 (Oerzen 1)	20:43			21:31		21:50
30	08:08			07:00		18:29 (Oerzen 1)	05:50			05:01		04:55
	16:58			19:49	35	19:04 (Oerzen 1)	20:45			21:33		21:50
31	08:06			06:58		18:29 (Oerzen 1)				05:00		
	16:59			19:51	35	19:04 (Oerzen 1)				21:34		
Sonnenscheinstunden	253	275		367			419		491			506
astr.max.mögl.Beschattung		440		899			678					

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s16 - Oerzen, Westerheide 18

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56	05:34		06:27	18:33 (Oerzen 1)	07:19		07:16	08:09		
	21:50	21:16		20:11	43 19:36 (Rep 11)	18:58		16:49	16:06		
2	04:57	05:36		06:29	18:31 (Oerzen 1)	07:21		17:16 (Oerzen 2)	07:18	08:11	
	21:49	21:14		20:08	47 19:35 (Rep 11)	18:56	14	17:30 (Oerzen 2)	16:47	16:06	
3	04:57	05:38		06:31	18:28 (Oerzen 1)	07:23		17:13 (Oerzen 2)	07:20	08:12	
	21:49	21:12		20:06	49 19:34 (Rep 11)	18:54	20	17:33 (Oerzen 2)	16:45	16:05	
4	04:58	05:39		06:32	18:27 (Oerzen 1)	07:24		17:10 (Oerzen 2)	07:21	08:14	
	21:48	21:10		20:04	50 19:33 (Rep 11)	18:51	24	17:34 (Oerzen 2)	16:43	16:04	
5	04:59	05:41		06:34	18:26 (Oerzen 1)	07:26		17:08 (Oerzen 2)	07:23	08:15	
	21:48	21:08		20:01	50 19:32 (Rep 11)	18:49	27	17:35 (Oerzen 2)	16:42	16:04	
6	05:00	05:43		06:36	18:24 (Oerzen 1)	07:28		17:06 (Oerzen 2)	07:25	08:16	
	21:47	21:07		19:59	49 19:30 (Rep 11)	18:46	40	17:46 (Oerzen 3)	16:40	16:03	
7	05:01	05:44		06:38	18:23 (Oerzen 1)	07:30		17:05 (Oerzen 2)	07:27	08:18	
	21:47	21:05		19:56	47 19:28 (Rep 11)	18:44	43	17:48 (Oerzen 3)	16:38	16:03	
8	05:02	05:46		06:39	18:23 (Oerzen 1)	07:31		17:04 (Oerzen 2)	07:29	08:19	
	21:46	21:03		19:54	39 19:24 (Rep 11)	18:42	45	17:49 (Oerzen 3)	16:36	16:02	
9	05:03	05:48		06:41	18:21 (Oerzen 1)	07:33		17:04 (Oerzen 2)	07:31	08:20	
	21:45	21:01		19:52	36 18:57 (Oerzen 1)	18:39	46	17:50 (Oerzen 3)	16:34	16:02	
10	05:04	05:49		06:43	18:21 (Oerzen 1)	07:35		17:02 (Oerzen 2)	07:33	08:21	
	21:44	20:59		19:49	36 18:57 (Oerzen 1)	18:37	48	17:50 (Oerzen 3)	16:33	16:02	
11	05:05	05:51		06:44	18:21 (Oerzen 1)	07:37		17:01 (Oerzen 2)	07:35	08:23	
	21:44	20:57		19:47	36 18:57 (Oerzen 1)	18:35	49	17:50 (Oerzen 3)	16:31	16:01	
12	05:06	05:53		06:46	18:20 (Oerzen 1)	07:39		17:01 (Oerzen 2)	07:37	08:24	
	21:43	20:55		19:44	36 18:56 (Oerzen 1)	18:32	49	17:50 (Oerzen 3)	16:29	16:01	
13	05:07	05:55		06:48	18:20 (Oerzen 1)	07:40		17:01 (Oerzen 2)	07:38	08:25	
	21:42	20:53		19:42	35 18:55 (Oerzen 1)	18:30	49	17:50 (Oerzen 3)	16:28	16:01	
14	05:08	05:56		06:50	18:20 (Oerzen 1)	07:42		17:01 (Oerzen 2)	07:40	08:26	
	21:41	20:51		19:40	35 18:55 (Oerzen 1)	18:28	49	17:50 (Oerzen 3)	16:26	16:01	
15	05:10	05:58		06:51	18:20 (Oerzen 1)	07:44		17:01 (Oerzen 2)	07:42	08:27	
	21:40	20:49		19:37	34 18:54 (Oerzen 1)	18:25	49	17:50 (Oerzen 3)	16:25	16:01	
16	05:11	06:00		06:53	18:20 (Oerzen 1)	07:46		17:01 (Oerzen 2)	07:44	08:28	
	21:39	20:46		19:35	33 18:53 (Oerzen 1)	18:23	48	17:49 (Oerzen 3)	16:23	16:01	
17	05:12	06:01		06:55	18:21 (Oerzen 1)	07:48		17:01 (Oerzen 2)	07:46	08:28	
	21:38	20:44		19:32	31 18:52 (Oerzen 1)	18:21	47	17:48 (Oerzen 3)	16:22	16:02	
18	05:14	06:03		06:56	18:21 (Oerzen 1)	07:50		17:02 (Oerzen 2)	07:48	08:29	
	21:36	20:42		19:30	29 18:50 (Oerzen 1)	18:19	45	17:47 (Oerzen 3)	16:20	16:02	
19	05:15	06:05		06:58	18:22 (Oerzen 1)	07:51		17:02 (Oerzen 2)	07:49	08:30	
	21:35	20:40		19:27	26 18:48 (Oerzen 1)	18:16	44	17:46 (Oerzen 3)	16:19	16:02	
20	05:16	06:07		07:00	18:21 (Rep 10)	07:53		17:03 (Oerzen 2)	07:51	08:31	
	21:34	20:38		19:25	26 18:47 (Oerzen 1)	18:14	41	17:44 (Oerzen 3)	16:18	16:02	
21	05:18	06:08		07:02	18:20 (Rep 10)	07:55		17:03 (Oerzen 2)	07:53	08:31	
	21:33	20:36		19:23	25 18:45 (Oerzen 1)	18:12	35	17:39 (Oerzen 3)	16:16	16:03	
22	05:19	06:10		07:03	18:19 (Rep 10)	07:57		17:04 (Oerzen 2)	07:55	08:32	
	21:31	20:33	4	19:29 (Rep 11)	19:20	24	25	17:29 (Oerzen 2)	16:15	16:03	
23	05:21	06:12		19:20 (Rep 11)	07:05	18:19 (Rep 10)	07:59	17:06 (Oerzen 2)	07:56	08:32	
	21:30	20:31	12	19:32 (Rep 11)	19:18	24	21	17:27 (Oerzen 2)	16:14	16:04	
24	05:22	06:13		19:18 (Rep 11)	07:07	18:43 (Rep 10)	08:01	17:08 (Oerzen 2)	07:58	08:33	
	21:28	20:29	16	19:34 (Rep 11)	19:15	24	17	17:25 (Oerzen 2)	16:13	16:04	
25	05:24	06:15		19:16 (Rep 11)	07:09	18:18 (Rep 10)	07:03	16:12 (Oerzen 2)	08:00	08:33	
	21:27	20:27	20	19:36 (Rep 11)	19:13	23	9	16:21 (Oerzen 2)	16:12	16:05	
26	05:25	06:17		19:15 (Rep 11)	07:10	18:19 (Rep 10)	07:04		08:01	08:33	
	21:25	20:24	21	19:36 (Rep 11)	19:10	21			16:11	16:06	
27	05:27	06:19		19:14 (Rep 11)	07:12	18:19 (Rep 10)	07:06		08:03	08:34	
	21:24	20:22	22	19:36 (Rep 11)	19:08	20			16:10	16:06	
28	05:28	06:20		19:13 (Rep 11)	07:14	18:21 (Rep 10)	07:08		08:05	08:34	
	21:22	20:20	24	19:37 (Rep 11)	19:06	17			16:09	16:07	
29	05:30	06:22		19:12 (Rep 11)	07:16	18:21 (Rep 10)	07:10		08:06	08:34	
	21:21	20:18	25	19:37 (Rep 11)	19:03	14			16:08	16:08	
30	05:31	06:24		19:12 (Rep 11)	07:17	18:24 (Rep 10)	07:12		08:08	08:34	
	21:19	20:15	25	19:37 (Rep 11)	19:01	8			16:07	16:09	
31	05:33	06:25		18:37 (Oerzen 1)						08:34	
	21:17	20:13	37	19:37 (Rep 11)						16:10	
Sonnenscheinstunden		509		458		382		329		261	237
astr.max.mögl.Beschattung			206		967		884				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten
		Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s17 - Oerzen, Westerheide 19

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:34 16:11	08:05 17:01	07:09 17:56	16:22 (Oerzen 2) 17:03 (Oerzen 3)	06:55 19:25 (Rep 11)	18:22 (Oerzen 1) 20:47 21:35
2	08:34 16:12	08:03 17:03	07:06 17:58	16:24 (Oerzen 2) 17:00 (Oerzen 3)	06:53 19:25 (Rep 11)	18:27 (Oerzen 1) 20:48 21:36
3	08:34 16:14	08:02 17:05	07:04 18:00	16:26 (Oerzen 2) 16:39 (Oerzen 2)	06:50 19:26 (Rep 11)	19:02 (Rep 11) 20:50 21:37
4	08:33 16:15	08:00 17:07	07:02 18:01	16:48 19:58	19:01 (Rep 11) 20:52	05:42 21:39
5	08:33 16:16	07:58 17:09	07:00 18:03	06:46 20:00	19:01 (Rep 11) 20:54	05:40 21:40
6	08:33 16:17	07:56 17:11	06:57 18:05	06:43 20:02	19:01 (Rep 11) 20:55	05:38 21:41
7	08:32 16:19	07:54 17:13	06:55 18:07	06:41 20:04	19:00 (Rep 11) 20:57	05:36 21:42
8	08:32 16:20	07:53 17:15	06:53 18:09	17:33 (Rep 10) 17:42 (Rep 10)	06:39 20:05	19:01 (Rep 11) 20:59
9	08:31 16:21	07:51 17:17	06:50 18:11	17:31 (Rep 10) 17:44 (Rep 10)	06:36 20:07	19:02 (Rep 11) 21:01
10	08:31 16:23	07:49 17:19	06:48 18:13	17:29 (Rep 10) 17:47 (Rep 10)	06:34 20:09	19:02 (Rep 11) 21:02
11	08:30 16:24	07:47 17:21	06:46 18:15	17:27 (Rep 10) 17:48 (Rep 10)	06:32 20:11	19:03 (Rep 11) 21:04
12	08:29 16:26	07:45 17:23	06:43 18:16	17:27 (Rep 10) 17:49 (Rep 10)	06:29 20:13	19:05 (Rep 11) 21:06
13	08:28 16:27	07:43 17:25	06:41 18:18	17:26 (Oerzen 1) 17:48 (Rep 10)	06:27 20:14	19:09 (Rep 11) 21:07
14	08:28 16:29	07:41 17:27	06:38 18:20	17:24 (Oerzen 1) 17:49 (Rep 10)	06:25 20:16	05:23 21:09
15	08:27 16:31	07:39 17:29	06:36 18:22	17:22 (Oerzen 1) 17:48 (Rep 10)	06:22 20:18	05:22 21:11
16	08:26 16:32	07:37 17:31	06:34 18:24	17:20 (Oerzen 1) 17:48 (Oerzen 1)	06:20 20:20	05:20 21:12
17	08:25 16:34	07:35 17:33	06:31 18:26	17:20 (Oerzen 1) 17:49 (Oerzen 1)	06:18 20:22	05:18 21:14
18	08:24 16:36	07:33 17:35	06:29 18:27	17:18 (Oerzen 1) 17:49 (Oerzen 1)	06:15 20:23	05:17 21:15
19	08:23 16:37	07:31 17:37	06:26 18:29	17:17 (Oerzen 1) 17:50 (Oerzen 1)	06:13 20:25	05:15 21:17
20	08:22 16:39	07:29 17:38	06:24 18:31	17:16 (Oerzen 1) 17:49 (Oerzen 1)	06:11 20:27	05:14 21:19
21	08:21 16:41	07:26 17:40	06:22 18:33	17:16 (Oerzen 1) 17:50 (Oerzen 1)	06:09 20:29	05:12 21:20
22	08:19 16:43	07:24 17:42	06:19 18:35	17:16 (Oerzen 1) 17:50 (Oerzen 1)	06:07 20:30	05:11 21:22
23	08:18 16:44	07:22 17:44	06:17 18:36	17:15 (Oerzen 1) 17:49 (Oerzen 1)	06:04 20:32	05:10 21:23
24	08:17 16:46	07:20 17:46	06:14 18:38	17:16 (Oerzen 1) 17:49 (Oerzen 1)	06:02 20:34	05:08 21:24
25	08:15 16:48	07:18 17:48	06:12 18:40	17:15 (Oerzen 1) 17:48 (Oerzen 1)	06:00 20:36	05:07 21:26
26	08:14 16:50	07:16 17:50	06:10 18:42	17:16 (Oerzen 1) 17:48 (Oerzen 1)	05:58 20:38	05:06 21:27
27	08:13 16:52	07:13 17:52	06:07 18:44	17:15 (Oerzen 1) 17:46 (Oerzen 1)	05:56 20:39	05:05 21:29
28	08:11 16:54	07:11 17:54	06:05 18:45	17:16 (Oerzen 1) 18:16 (Rep 11)	05:54 20:41	05:04 21:30
29	08:10 16:56		07:02 19:47	18:18 (Oerzen 1) 19:21 (Rep 11)	05:52 20:43	05:02 21:31
30	08:08 16:58		07:00 19:49	18:18 (Oerzen 1) 19:23 (Rep 11)	05:50 20:45	05:01 21:33
31	08:06 16:59		06:58 19:51	18:20 (Oerzen 1) 19:24 (Rep 11)		05:00 21:34
Sonnenscheinstunden	253	275	367	419	491	506
astr.max.mögl.Beschattung		792	766	279		

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s17 - Oerzen, Westerheide 19

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrichtungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	04:56 21:50	05:34 21:16	06:27 20:11	19:02 (Rep 11) 18:58	18:06 (Rep 10) 16:49	15:56 (Oerzen 2) 16:06
2	04:57 21:49	05:36 21:14	06:29 20:08	19:01 (Rep 11) 18:56	18:06 (Rep 10) 16:47	15:59 (Oerzen 2) 16:06
3	04:57 21:49	05:38 21:12	06:31 20:06	19:20 (Rep 11) 18:54	18:07 (Rep 10) 16:45	16:09 (Oerzen 2) 16:06
4	04:58 21:48	05:39 21:10	06:32 20:04	18:58 (Rep 11) 18:51	18:07 (Rep 10) 16:43	16:05 16:04
5	04:59 21:48	05:41 21:08	06:34 20:01	18:57 (Rep 11) 18:49	18:08 (Rep 10) 16:42	16:05 16:04
6	05:00 21:47	05:43 21:07	06:36 19:59	18:56 (Rep 11) 18:46	18:11 (Rep 10) 16:40	16:04 16:03
7	05:01 21:47	05:44 21:05	06:38 19:56	18:56 (Rep 11) 18:44	18:18 (Rep 10) 16:38	16:03 16:03
8	05:02 21:46	05:46 21:03	06:39 19:54	18:56 (Rep 11) 18:42	16:38 16:36	16:03 16:02
9	05:03 21:45	05:48 21:01	06:41 19:52	18:55 (Rep 11) 18:39	16:36 16:34	16:02 16:02
10	05:04 21:44	05:49 20:59	06:43 19:49	18:21 (Oerzen 1) 18:37	17:03 (Oerzen 2) 16:33	16:02 16:02
11	05:05 21:44	05:51 20:57	06:44 19:47	18:15 (Oerzen 1) 18:35	16:59 (Oerzen 2) 16:31	16:02 16:01
12	05:06 21:43	05:53 20:55	06:46 19:44	18:12 (Oerzen 1) 18:32	16:56 (Oerzen 2) 16:29	16:01 16:01
13	05:07 21:42	05:55 20:53	06:48 19:42	18:10 (Oerzen 1) 18:30	16:54 (Oerzen 2) 16:28	16:01 16:01
14	05:08 21:41	05:56 20:51	06:50 19:40	18:08 (Oerzen 1) 18:28	16:53 (Oerzen 2) 16:26	16:01 16:01
15	05:10 21:40	05:58 20:49	06:51 19:37	18:06 (Oerzen 1) 18:25	16:52 (Oerzen 2) 16:25	16:01 16:01
16	05:11 21:39	06:00 20:46	06:53 19:35	18:05 (Oerzen 1) 18:23	16:51 (Oerzen 2) 16:23	16:01 16:01
17	05:12 21:38	06:01 20:44	06:55 19:32	18:04 (Oerzen 1) 18:21	16:50 (Oerzen 2) 16:22	16:01 16:01
18	05:14 21:36	06:03 20:42	06:56 19:30	18:03 (Oerzen 1) 18:19	16:49 (Oerzen 2) 16:20	16:01 16:02
19	05:15 21:35	06:05 20:40	06:58 19:27	18:02 (Oerzen 1) 18:16	16:49 (Oerzen 2) 16:19	16:02 16:02
20	05:16 21:34	06:07 20:38	07:00 19:25	18:02 (Oerzen 1) 18:14	16:48 (Oerzen 2) 16:18	16:02 16:02
21	05:18 21:33	06:08 20:36	07:02 19:22	18:02 (Oerzen 1) 18:12	16:47 (Oerzen 2) 16:16	16:02 16:03
22	05:19 21:31	06:10 20:33	07:03 19:20	18:01 (Oerzen 1) 18:10	16:47 (Oerzen 2) 16:15	16:03 16:03
23	05:21 21:30	06:12 20:31	07:05 19:18	18:01 (Oerzen 1) 18:08	16:47 (Oerzen 2) 16:14	16:03 16:04
24	05:22 21:28	06:13 20:29	07:07 19:15	18:01 (Oerzen 1) 18:06	16:47 (Oerzen 2) 16:13	16:04 16:04
25	05:24 21:27	06:15 20:27	07:09 19:13	18:00 (Oerzen 1) 17:03	15:47 (Oerzen 2) 16:12	16:04 16:05
26	05:25 21:25	06:17 20:24	07:10 19:10	18:01 (Oerzen 1) 17:04	15:48 (Oerzen 2) 16:11	16:05 16:06
27	05:27 21:24	06:19 20:22	07:12 19:08	18:02 (Oerzen 1) 16:59	15:48 (Oerzen 2) 16:10	16:06 16:06
28	05:28 21:22	06:20 20:20	07:14 19:06	18:03 (Oerzen 1) 16:57	15:49 (Oerzen 2) 16:09	16:07 16:07
29	05:30 21:21	06:22 20:18	07:16 19:03	18:03 (Oerzen 1) 16:55	15:51 (Oerzen 2) 16:08	16:08 16:08
30	05:31 21:19	06:24 20:15	07:17 19:01	18:05 (Oerzen 1) 16:53	15:52 (Oerzen 2) 16:07	16:09 16:09
31	05:33 21:17	06:25 20:13	07:19 19:05	18:28 (Rep 10) 16:51	15:54 (Oerzen 2) 16:14	16:10 16:10
Sonnenscheinstunden	509	458	382	329	261	237
astr.max.mögl.Beschattung		16	874	951	26	

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s18 - Oerzen, Westerheide 20

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März		April		Mai		Juni	
1	08:34 16:11	08:05 17:01		07:09 17:56	51	16:22 (Oerzen 2) 17:13 (Oerzen 3)	06:55 19:53	18:23 (Oerzen 1) 18:59 (Oerzen 1)	05:48 20:47	04:59 21:35	
2	08:34 16:12	08:03 17:03		07:06 17:58	49	16:23 (Oerzen 2) 17:12 (Oerzen 3)	06:53 19:55	18:23 (Oerzen 1) 18:58 (Oerzen 1)	05:46 20:48	04:59 21:36	
3	08:34 16:14	08:02 17:05		07:04 18:00	48	16:23 (Oerzen 2) 17:11 (Oerzen 3)	06:50 19:56	18:24 (Oerzen 1) 19:29 (Rep 11)	05:44 20:50	04:58 21:37	
4	08:33 16:15	08:00 17:07		07:02 18:01	46	16:24 (Oerzen 2) 17:10 (Oerzen 3)	06:48 19:58	18:24 (Oerzen 1) 19:31 (Rep 11)	05:42 20:52	04:57 21:39	
5	08:33 16:16	07:58 17:09		07:00 18:03	43	16:25 (Oerzen 2) 17:08 (Oerzen 3)	06:46 20:00	18:25 (Oerzen 1) 19:33 (Rep 11)	05:40 20:54	04:56 21:40	
6	08:33 16:17	07:56 17:11		06:57 18:05	38	16:25 (Oerzen 2) 17:05 (Oerzen 3)	06:43 20:02	18:26 (Oerzen 1) 19:34 (Rep 11)	05:38 20:55	04:55 21:41	
7	08:32 16:19	07:54 17:13		06:55 18:07	24	16:27 (Oerzen 2) 16:51 (Oerzen 2)	06:41 20:04	18:26 (Oerzen 1) 19:34 (Rep 11)	05:36 20:57	04:55 21:42	
8	08:32 16:20	07:53 17:15		06:53 18:09	19	16:29 (Oerzen 2) 16:48 (Oerzen 2)	06:39 20:05	18:28 (Oerzen 1) 19:35 (Rep 11)	05:34 20:59	04:54 21:43	
9	08:31 16:21	07:51 17:17		06:50 18:11	13	16:32 (Oerzen 2) 16:45 (Oerzen 2)	06:36 20:07	18:30 (Oerzen 1) 19:35 (Rep 11)	05:32 21:01	04:54 21:43	
10	08:31 16:23	07:49 17:19		06:48 18:13			06:34 20:09	18:33 (Oerzen 1) 19:34 (Rep 11)	05:30 21:02	04:53 21:44	
11	08:30 16:24	07:47 17:21		06:46 18:15			06:32 20:11	19:09 (Rep 11) 19:34 (Rep 11)	05:28 21:04	04:53 21:45	
12	08:29 16:26	07:45 17:23		06:43 18:16	9	17:41 (Rep 10) 17:50 (Rep 10)	06:29 20:13	19:09 (Rep 11) 19:34 (Rep 11)	05:27 21:06	04:52 21:46	
13	08:28 16:27	07:43 17:25		06:41 18:18	15	17:37 (Rep 10) 17:52 (Rep 10)	06:27 20:14	19:09 (Rep 11) 19:34 (Rep 11)	05:25 21:07	04:52 21:46	
14	08:28 16:29	07:41 17:27	13	16:35 (Oerzen 2) 16:48 (Oerzen 2)	18	17:36 (Rep 10) 17:54 (Rep 10)	06:25 20:16	19:09 (Rep 11) 19:33 (Rep 11)	05:23 21:09	04:52 21:47	
15	08:27 16:31	07:39 17:29	19	16:31 (Oerzen 2) 16:50 (Oerzen 2)	21	17:34 (Rep 10) 17:55 (Rep 10)	06:22 20:18	19:09 (Rep 11) 19:32 (Rep 11)	05:22 21:11	04:52 21:48	
16	08:26 16:32	07:37 17:31	23	16:29 (Oerzen 2) 16:52 (Oerzen 2)	23	17:33 (Rep 10) 17:56 (Rep 10)	06:20 20:20	19:10 (Rep 11) 19:31 (Rep 11)	05:20 21:12	04:51 21:48	
17	08:25 16:34	07:35 17:33	26	16:28 (Oerzen 2) 16:54 (Oerzen 2)	23	17:33 (Rep 10) 17:56 (Rep 10)	06:18 20:22	19:11 (Rep 11) 19:30 (Rep 11)	05:18 21:14	04:51 21:49	
18	08:24 16:36	07:33 17:35	29	16:27 (Oerzen 2) 16:56 (Oerzen 2)	24	17:32 (Rep 10) 17:56 (Rep 10)	06:15 20:23	19:12 (Rep 11) 19:27 (Rep 11)	05:17 21:15	04:51 21:49	
19	08:23 16:37	07:31 17:37	41	16:26 (Oerzen 2) 17:07 (Oerzen 3)	24	17:32 (Rep 10) 17:56 (Rep 10)	06:13 20:25	19:15 (Rep 11) 19:24 (Rep 11)	05:15 21:17	04:51 21:49	
20	08:22 16:39	07:29 17:38	45	16:24 (Oerzen 2) 17:09 (Oerzen 3)	24	17:31 (Rep 10) 17:55 (Rep 10)	06:11 20:27		05:14 21:19	04:51 21:50	
21	08:21 16:41	07:26 17:40	47	16:24 (Oerzen 2) 17:11 (Oerzen 3)	26	17:31 (Rep 10) 17:57 (Oerzen 1)	06:09 20:29		05:12 21:20	04:52 21:50	
22	08:19 16:43	07:24 17:42	49	16:23 (Oerzen 2) 17:12 (Oerzen 3)	27	17:31 (Oerzen 1) 17:58 (Oerzen 1)	06:07 20:30		05:11 21:22	04:52 21:50	
23	08:18 16:44	07:22 17:44	50	16:23 (Oerzen 2) 17:13 (Oerzen 3)	30	17:29 (Oerzen 1) 17:59 (Oerzen 1)	06:04 20:32		05:10 21:23	04:52 21:50	
24	08:17 16:46	07:20 17:46	51	16:22 (Oerzen 2) 17:13 (Oerzen 3)	32	17:28 (Oerzen 1) 18:00 (Oerzen 1)	06:02 20:34		05:08 21:24	04:52 21:51	
25	08:15 16:48	07:18 17:48	51	16:22 (Oerzen 2) 17:13 (Oerzen 3)	33	17:27 (Oerzen 1) 18:00 (Oerzen 1)	06:00 20:36		05:07 21:26	04:53 21:51	
26	08:14 16:50	07:16 17:50	52	16:22 (Oerzen 2) 17:14 (Oerzen 3)	34	17:26 (Oerzen 1) 18:00 (Oerzen 1)	05:58 20:38		05:06 21:27	04:53 21:51	
27	08:13 16:52	07:13 17:52	52	16:22 (Oerzen 2) 17:14 (Oerzen 3)	35	17:25 (Oerzen 1) 18:00 (Oerzen 1)	05:56 20:39		05:05 21:29	04:53 21:50	
28	08:11 16:54	07:11 17:54	51	16:22 (Oerzen 2) 17:13 (Oerzen 3)	36	17:24 (Oerzen 1) 18:00 (Oerzen 1)	05:54 20:41		05:04 21:30	04:54 21:50	
29	08:10 16:56			07:02 19:47	37	18:24 (Oerzen 1) 19:01 (Oerzen 1)	05:52 20:43		05:02 21:31	04:55 21:50	
30	08:08 16:58			07:00 19:49	37	18:23 (Oerzen 1) 19:00 (Oerzen 1)	05:50 20:45		05:01 21:33	04:55 21:50	
31	08:06 16:59			06:58 19:51	36	18:24 (Oerzen 1) 19:00 (Oerzen 1)			05:00 21:34		
Sonnenscheinstunden		253	275	367	875	419	623	491	506		
astr.max.mögl.Beschattung			599								

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s18 - Oerzen, Westerheide 20

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56	05:34		06:27		19:08 (Rep 11)	07:19		18:19 (Rep 10)	07:16	08:09
	21:50	21:16		20:11	25	19:33 (Rep 11)	18:58	11	18:30 (Rep 10)	16:49	16:06
2	04:57	05:36		06:29		18:32 (Oerzen 1)	07:21		18:23 (Rep 10)	07:18	08:11
	21:49	21:14		20:08	36	19:33 (Rep 11)	18:56	3	18:26 (Rep 10)	16:47	16:06
3	04:57	05:38		06:31		18:27 (Oerzen 1)	07:23			07:20	08:12
	21:49	21:12		20:06	44	19:32 (Rep 11)	18:54			16:45	16:05
4	04:58	05:39		06:32		18:25 (Oerzen 1)	07:24		17:11 (Oerzen 2)	07:21	08:14
	21:48	21:10		20:04	47	19:32 (Rep 11)	18:51	9	17:20 (Oerzen 2)	16:43	16:04
5	04:59	05:41		06:34		18:24 (Oerzen 1)	07:26		17:07 (Oerzen 2)	07:23	08:15
	21:48	21:08		20:01	48	19:31 (Rep 11)	18:49	17	17:24 (Oerzen 2)	16:42	16:04
6	05:00	05:43		06:36		18:21 (Oerzen 1)	07:28		17:04 (Oerzen 2)	07:25	08:16
	21:47	21:07		19:59	50	19:29 (Rep 11)	18:46	22	17:26 (Oerzen 2)	16:40	16:03
7	05:01	05:44		06:38		18:20 (Oerzen 1)	07:30		17:02 (Oerzen 2)	07:27	08:18
	21:47	21:05		19:56	50	19:28 (Rep 11)	18:44	32	17:39 (Oerzen 3)	16:38	16:03
8	05:02	05:46		06:39		18:19 (Oerzen 1)	07:31		17:01 (Oerzen 2)	07:29	08:19
	21:46	21:03		19:54	47	19:26 (Rep 11)	18:42	41	17:42 (Oerzen 3)	16:36	16:02
9	05:03	05:48		06:41		18:17 (Oerzen 1)	07:33		16:59 (Oerzen 2)	07:31	08:20
	21:45	21:01		19:52	43	19:22 (Rep 11)	18:39	45	17:44 (Oerzen 3)	16:34	16:02
10	05:04	05:49		06:43		18:17 (Oerzen 1)	07:35		16:57 (Oerzen 2)	07:33	08:21
	21:44	20:59		19:49	35	18:52 (Oerzen 1)	18:37	47	17:44 (Oerzen 3)	16:33	16:02
11	05:05	05:51		06:44		18:16 (Oerzen 1)	07:37		16:56 (Oerzen 2)	07:35	08:23
	21:44	20:57		19:47	36	18:52 (Oerzen 1)	18:35	49	17:45 (Oerzen 3)	16:31	16:01
12	05:06	05:53		06:46		18:15 (Oerzen 1)	07:39		16:56 (Oerzen 2)	07:37	08:24
	21:43	20:55		19:44	36	18:51 (Oerzen 1)	18:32	50	17:46 (Oerzen 3)	16:29	16:01
13	05:07	05:55		06:48		18:15 (Oerzen 1)	07:40		16:55 (Oerzen 2)	07:38	08:25
	21:42	20:53		19:42	36	18:51 (Oerzen 1)	18:30	51	17:46 (Oerzen 3)	16:28	16:01
14	05:08	05:56		06:50		18:15 (Oerzen 1)	07:42		16:55 (Oerzen 2)	07:40	08:26
	21:41	20:51		19:40	36	18:51 (Oerzen 1)	18:28	51	17:46 (Oerzen 3)	16:26	16:01
15	05:10	05:58		06:51		18:14 (Oerzen 1)	07:44		16:54 (Oerzen 2)	07:42	08:27
	21:40	20:49		19:37	36	18:50 (Oerzen 1)	18:25	52	17:46 (Oerzen 3)	16:25	16:01
16	05:11	06:00		06:53		18:14 (Oerzen 1)	07:46		16:54 (Oerzen 2)	07:44	08:28
	21:39	20:46		19:35	36	18:50 (Oerzen 1)	18:23	52	17:46 (Oerzen 3)	16:23	16:01
17	05:12	06:01		06:55		18:14 (Oerzen 1)	07:48		16:54 (Oerzen 2)	07:46	08:28
	21:38	20:44		19:32	35	18:49 (Oerzen 1)	18:21	52	17:46 (Oerzen 3)	16:22	16:02
18	05:14	06:03		06:56		18:14 (Oerzen 1)	07:50		16:54 (Oerzen 2)	07:48	08:29
	21:36	20:42		19:30	33	18:47 (Oerzen 1)	18:19	51	17:45 (Oerzen 3)	16:20	16:02
19	05:15	06:05		06:58		18:15 (Oerzen 1)	07:51		16:54 (Oerzen 2)	07:49	08:30
	21:35	20:40		19:27	32	18:47 (Oerzen 1)	18:16	50	17:44 (Oerzen 3)	16:19	16:02
20	05:16	06:07		07:00		18:15 (Oerzen 1)	07:53		16:55 (Oerzen 2)	07:51	08:31
	21:34	20:38		19:25	30	18:45 (Oerzen 1)	18:14	48	17:43 (Oerzen 3)	16:18	16:02
21	05:18	06:08		07:02		18:16 (Oerzen 1)	07:55		16:54 (Oerzen 2)	07:53	08:31
	21:33	20:36		19:23	28	18:44 (Oerzen 1)	18:12	47	17:41 (Oerzen 3)	16:16	16:03
22	05:19	06:10		07:03		18:16 (Rep 10)	07:57		16:55 (Oerzen 2)	07:55	08:32
	21:31	20:33		19:20	26	18:42 (Oerzen 1)	18:10	44	17:39 (Oerzen 3)	16:15	16:03
23	05:21	06:12		07:05		18:16 (Rep 10)	07:59		16:56 (Oerzen 2)	07:56	08:32
	21:30	20:31		19:18	24	18:40 (Oerzen 1)	18:08	38	17:36 (Oerzen 3)	16:14	16:04
24	05:22	06:13		19:18 (Rep 11)	07:07	18:15 (Rep 10)	08:01		16:57 (Oerzen 2)	07:58	08:33
	21:28	20:29	11	19:29 (Rep 11)	19:15	18:40 (Rep 10)	18:06	28	17:25 (Oerzen 2)	16:13	16:04
25	05:24	06:15		19:16 (Rep 11)	07:09	18:14 (Rep 10)	07:03		15:58 (Oerzen 2)	08:00	08:33
	21:27	20:27	15	19:31 (Rep 11)	19:13	18:38 (Rep 10)	17:03	25	16:23 (Oerzen 2)	16:12	16:05
26	05:25	06:17		19:13 (Rep 11)	07:10	18:14 (Rep 10)	07:04		15:59 (Oerzen 2)	08:01	08:33
	21:25	20:24	19	19:32 (Rep 11)	19:10	18:38 (Rep 10)	17:01	22	16:21 (Oerzen 2)	16:11	16:06
27	05:27	06:19		19:12 (Rep 11)	07:12	18:15 (Rep 10)	07:06		16:02 (Oerzen 2)	08:03	08:34
	21:24	20:22	21	19:33 (Rep 11)	19:08	18:38 (Rep 10)	16:59	17	16:19 (Oerzen 2)	16:10	16:06
28	05:28	06:20		19:11 (Rep 11)	07:14	18:15 (Rep 10)	07:08		16:05 (Oerzen 2)	08:05	08:34
	21:22	20:20	23	19:34 (Rep 11)	19:06	18:37 (Rep 10)	16:57	11	16:16 (Oerzen 2)	16:09	16:07
29	05:30	06:22		19:10 (Rep 11)	07:16	18:15 (Rep 10)	07:10			08:06	08:34
	21:21	20:18	23	19:33 (Rep 11)	19:03	18:35 (Rep 10)	16:55			16:08	16:08
30	05:31	06:24		19:09 (Rep 11)	07:17	18:17 (Rep 10)	07:12			08:08	08:34
	21:19	20:15	25	19:34 (Rep 11)	19:01	18:32 (Rep 10)	16:53			16:07	16:09
31	05:33	06:25		19:09 (Rep 11)			07:14				08:34
	21:17	20:13	25	19:34 (Rep 11)			16:51				16:10
Sonnenscheinstunden		509		458		382		329		261	237
astr.max.mögl.Beschattung			162		1002		965				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s19 - Oerzen, Westerheide 22

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:34 16:11	08:05 17:01	07:09 17:56	16:21 (Oerzen 2)   06:55 17:15 (Oerzen 3)   19:53	18:26 (Oerzen 1)   05:48 19:04 (Oerzen 1)   20:47	04:59 21:35
2	08:34 16:12	08:03 17:03	07:07 17:58	16:21 (Oerzen 2)   06:53 17:15 (Oerzen 3)   19:55	18:26 (Oerzen 1)   05:46 19:04 (Oerzen 1)   20:48	04:59 21:36
3	08:34 16:14	08:02 17:05	07:04 18:00	16:21 (Oerzen 2)   06:50 17:13 (Oerzen 3)   19:56	18:26 (Oerzen 1)   05:44 19:04 (Oerzen 1)   20:50	04:58 21:37
4	08:33 16:15	08:00 17:07	07:02 18:01	16:22 (Oerzen 2)   06:48 17:13 (Oerzen 3)   19:58	18:25 (Oerzen 1)   05:42 19:03 (Oerzen 1)   20:52	04:57 21:39
5	08:33 16:16	07:58 17:09	07:00 18:03	16:22 (Oerzen 2)   06:46 17:12 (Oerzen 3)   20:00	18:25 (Oerzen 1)   05:40 19:29 (Rep 11)   20:54	04:56 21:40
6	08:33 16:17	07:56 17:11	06:57 18:05	16:22 (Oerzen 2)   06:43 17:10 (Oerzen 3)   20:02	18:26 (Oerzen 1)   05:38 19:34 (Rep 11)   20:55	04:55 21:41
7	08:32 16:19	07:54 17:13	06:55 18:07	16:24 (Oerzen 2)   06:41 17:08 (Oerzen 3)   20:04	18:26 (Oerzen 1)   05:36 19:35 (Rep 11)   20:57	04:55 21:42
8	08:32 16:20	07:53 17:15	06:53 18:09	16:24 (Oerzen 2)   06:39 17:03 (Oerzen 3)   20:05	18:26 (Oerzen 1)   05:34 19:37 (Rep 11)   20:59	04:54 21:43
9	08:31 16:21	07:51 17:17	06:50 18:11	16:26 (Oerzen 2)   06:36 16:52 (Oerzen 2)   20:07	18:27 (Oerzen 1)   05:32 19:38 (Rep 11)   21:01	04:54 21:43
10	08:31 16:23	07:49 17:19	06:48 18:13	16:28 (Oerzen 2)   06:34 16:50 (Oerzen 2)   20:09	18:27 (Oerzen 1)   05:30 19:38 (Rep 11)   21:02	04:53 21:44
11	08:30 16:24	07:47 17:21	06:46 18:15	16:30 (Oerzen 2)   06:32 16:47 (Oerzen 2)   20:11	18:29 (Oerzen 1)   05:28 19:38 (Rep 11)   21:04	04:53 21:45
12	08:29 16:26	07:45 17:23	06:43 18:16	16:35 (Oerzen 2)   06:29 16:43 (Oerzen 2)   20:13	18:30 (Oerzen 1)   05:27 19:38 (Rep 11)   21:06	04:52 21:46
13	08:28 16:27	07:43 17:25	06:41 18:18	06:27 20:14	18:33 (Oerzen 1)   05:25 19:39 (Rep 11)   21:07	04:52 21:46
14	08:28 16:29	07:41 17:27	06:38 18:20	17:42 (Rep 10)   06:25 17:54 (Rep 10)   20:16	18:35 (Oerzen 1)   05:23 19:38 (Rep 11)   21:09	04:52 21:47
15	08:27 16:31	07:39 17:29	16:37 (Oerzen 2)   06:36 16:45 (Oerzen 2)   18:22	17:39 (Rep 10)   06:22 17:56 (Rep 10)   20:18	19:12 (Rep 11)   05:22 19:38 (Rep 11)   21:11	04:52 21:48
16	08:26 16:32	07:37 17:31	16:33 (Oerzen 2)   06:34 16:50 (Oerzen 2)   18:24	17:37 (Rep 10)   06:20 17:57 (Rep 10)   20:20	19:12 (Rep 11)   05:20 19:37 (Rep 11)   21:12	04:51 21:48
17	08:25 16:34	07:35 17:33	16:31 (Oerzen 2)   06:31 16:52 (Oerzen 2)   18:26	17:36 (Rep 10)   06:18 17:58 (Rep 10)   20:22	19:12 (Rep 11)   05:18 19:37 (Rep 11)   21:14	04:51 21:49
18	08:24 16:36	07:33 17:35	16:29 (Oerzen 2)   06:29 16:54 (Oerzen 2)   18:27	17:34 (Rep 10)   06:15 17:58 (Rep 10)   20:23	19:12 (Rep 11)   05:17 19:35 (Rep 11)   21:15	04:51 21:49
19	08:23 16:37	07:31 17:37	16:27 (Oerzen 2)   06:26 16:56 (Oerzen 2)   18:29	17:34 (Rep 10)   06:13 17:58 (Rep 10)   20:25	19:13 (Rep 11)   05:15 19:34 (Rep 11)   21:17	04:51 21:49
20	08:22 16:39	07:29 17:39	16:25 (Oerzen 2)   06:24 17:07 (Oerzen 3)   18:31	17:33 (Rep 10)   06:11 17:58 (Rep 10)   20:27	19:14 (Rep 11)   05:14 19:33 (Rep 11)   21:19	04:51 21:50
21	08:21 16:41	07:26 17:40	16:24 (Oerzen 2)   06:22 17:10 (Oerzen 3)   18:33	17:33 (Rep 10)   06:09 17:58 (Rep 10)   20:29	19:15 (Rep 11)   05:12 19:31 (Rep 11)   21:20	04:52 21:50
22	08:19 16:43	07:24 17:42	16:24 (Oerzen 2)   06:19 17:12 (Oerzen 3)   18:35	17:33 (Rep 10)   06:07 17:58 (Rep 10)   20:30	19:17 (Rep 11)   05:11 19:29 (Rep 11)   21:22	04:52 21:50
23	08:18 16:44	07:22 17:44	16:23 (Oerzen 2)   06:17 17:13 (Oerzen 3)   18:36	17:33 (Rep 10)   06:04 17:58 (Oerzen 1)   20:32	05:10 21:23	04:52 21:50
24	08:17 16:46	07:20 17:46	16:22 (Oerzen 2)   06:14 17:13 (Oerzen 3)   18:38	17:58 (Rep 10)   06:02 18:00 (Oerzen 1)   20:34	05:08 21:24	04:52 21:51
25	08:15 16:48	07:18 17:48	16:22 (Oerzen 2)   06:12 17:14 (Oerzen 3)   18:40	17:33 (Oerzen 1)   06:00 18:01 (Oerzen 1)   20:36	05:07 21:26	04:53 21:51
26	08:14 16:50	07:16 17:50	16:22 (Oerzen 2)   06:10 17:15 (Oerzen 3)   18:42	17:32 (Oerzen 1)   05:58 18:02 (Oerzen 1)   20:38	05:06 21:27	04:53 21:51
27	08:13 16:52	07:13 17:52	16:22 (Oerzen 2)   06:07 17:15 (Oerzen 3)   18:44	17:30 (Oerzen 1)   05:56 18:02 (Oerzen 1)   20:39	05:05 21:29	04:53 21:50
28	08:11 16:54	07:11 17:54	16:21 (Oerzen 2)   06:05 17:15 (Oerzen 3)   18:45	17:29 (Oerzen 1)   05:54 18:03 (Oerzen 1)   20:41	05:04 21:30	04:54 21:50
29	08:10 16:56		07:02 19:47	18:28 (Oerzen 1)   05:52 19:04 (Oerzen 1)   20:43	05:02 21:31	04:55 21:50
30	08:08 16:58		07:00 19:49	18:27 (Oerzen 1)   05:50 19:04 (Oerzen 1)   20:45	05:01 21:33	04:55 21:50
31	08:06 16:59		06:58 19:51	18:27 (Oerzen 1)   19:04 (Oerzen 1)	05:00 21:34	
Sonnenscheinstunden	253	275	367	419	491	506
astr.max.mögl.Beschattung		547	942	811		

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s19 - Oerzen, Westerheide 22

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56 21:50	05:34 21:16		06:27 20:11	52	18:28 (Oerzen 1) 19:37 (Rep 11)	07:19 18:58		07:16 16:49	08:09 16:06	
2	04:57 21:49	05:36 21:14		06:29 20:08	53	18:26 (Oerzen 1) 19:36 (Rep 11)	07:21 18:56	17:10 (Oerzen 2)	07:18 16:47	08:11 16:06	
3	04:57 21:49	05:38 21:12		06:31 20:06	55	18:24 (Oerzen 1) 19:35 (Rep 11)	07:23 18:54	20	17:07 (Oerzen 2) 17:27 (Oerzen 2)	08:12 16:05	
4	04:58 21:48	05:39 21:10		06:32 20:04	55	18:23 (Oerzen 1) 19:34 (Rep 11)	07:24 18:51	24	17:04 (Oerzen 2) 17:28 (Oerzen 2)	08:14 16:04	
5	04:59 21:48	05:41 21:08		06:34 20:01	52	18:23 (Oerzen 1) 19:32 (Rep 11)	07:26 18:49	28	17:02 (Oerzen 2) 17:30 (Oerzen 2)	08:15 16:04	
6	05:00 21:47	05:43 21:07		06:36 19:59	49	18:21 (Oerzen 1) 19:29 (Rep 11)	07:28 18:46	41	17:00 (Oerzen 2) 17:42 (Oerzen 2)	08:16 16:03	
7	05:01 21:47	05:44 21:05		06:38 19:56	42	18:21 (Oerzen 1) 19:25 (Rep 11)	07:30 18:44	46	16:59 (Oerzen 2) 17:45 (Oerzen 3)	08:18 16:03	
8	05:02 21:46	05:46 21:03		06:39 19:54	38	18:20 (Oerzen 1) 18:58 (Oerzen 1)	07:31 18:42	48	16:58 (Oerzen 2) 17:46 (Oerzen 3)	08:19 16:02	
9	05:03 21:45	05:48 21:01		06:41 19:52	38	18:19 (Oerzen 1) 18:57 (Oerzen 1)	07:33 18:39	50	16:57 (Oerzen 2) 17:47 (Oerzen 2)	08:20 16:02	
10	05:04 21:44	05:49 20:59		06:43 19:49	38	18:19 (Oerzen 1) 18:57 (Oerzen 1)	07:35 18:37	52	16:55 (Oerzen 2) 17:47 (Oerzen 3)	08:21 16:02	
11	05:05 21:44	05:51 20:57		06:44 19:47	38	18:19 (Oerzen 1) 18:57 (Oerzen 1)	07:37 18:35	53	16:55 (Oerzen 2) 17:48 (Oerzen 3)	08:23 16:01	
12	05:06 21:43	05:53 20:55		06:46 19:44	38	18:18 (Oerzen 1) 18:56 (Oerzen 1)	07:39 18:32	54	16:54 (Oerzen 2) 17:48 (Oerzen 3)	08:24 16:01	
13	05:07 21:42	05:55 20:53		06:48 19:42	37	18:18 (Oerzen 1) 18:55 (Oerzen 1)	07:40 18:30	54	16:54 (Oerzen 2) 17:48 (Oerzen 3)	08:25 16:01	
14	05:08 21:41	05:56 20:51		06:50 19:40	36	18:19 (Oerzen 1) 18:55 (Oerzen 1)	07:42 18:28	54	16:54 (Oerzen 2) 17:48 (Oerzen 3)	08:26 16:01	
15	05:10 21:40	05:58 20:49		06:51 19:37	35	18:18 (Oerzen 1) 18:53 (Oerzen 1)	07:44 18:25	53	16:54 (Oerzen 2) 17:47 (Oerzen 3)	08:27 16:01	
16	05:11 21:39	06:00 20:46		06:53 19:35	33	18:19 (Oerzen 1) 18:52 (Oerzen 1)	07:46 18:23	53	16:54 (Oerzen 2) 17:47 (Oerzen 3)	08:28 16:01	
17	05:12 21:38	06:01 20:44		06:55 19:32	31	18:20 (Oerzen 1) 18:51 (Oerzen 1)	07:48 18:21	52	16:54 (Oerzen 2) 17:46 (Oerzen 3)	08:28 16:02	
18	05:14 21:36	06:03 20:42		06:56 19:30	29	18:20 (Oerzen 1) 18:49 (Oerzen 1)	07:50 18:19	51	16:54 (Oerzen 2) 17:45 (Oerzen 3)	08:29 16:02	
19	05:15 21:35	06:05 20:40		06:58 19:27	27	18:20 (Rep 10) 18:47 (Oerzen 1)	07:51 18:16	49	16:55 (Oerzen 2) 17:44 (Oerzen 3)	08:30 16:02	
20	05:16 21:34	06:07 20:38	5	07:00 19:25	26	18:19 (Rep 10) 18:45 (Oerzen 1)	07:53 18:14	48	16:55 (Oerzen 2) 17:43 (Oerzen 3)	08:31 16:02	
21	05:18 21:33	06:08 20:36	12	07:02 19:23	25	18:19 (Rep 10) 18:44 (Rep 10)	07:55 18:12	45	16:55 (Oerzen 2) 17:40 (Oerzen 3)	08:31 16:03	
22	05:19 21:31	06:10 20:33	16	07:03 19:20	25	18:18 (Rep 10) 18:43 (Rep 10)	07:57 18:10	36	16:56 (Oerzen 2) 17:36 (Oerzen 3)	08:32 16:03	
23	05:21 21:30	06:12 20:31	20	07:05 19:18	26	18:17 (Rep 10) 18:43 (Rep 10)	07:59 18:08	28	16:57 (Oerzen 2) 17:25 (Oerzen 2)	08:32 16:04	
24	05:22 21:28	06:13 20:29	22	07:07 19:15	24	18:18 (Rep 10) 18:42 (Rep 10)	08:01 18:06	24	16:59 (Oerzen 2) 17:23 (Oerzen 2)	08:33 16:04	
25	05:24 21:27	06:15 20:27	23	07:09 19:13	24	18:17 (Rep 10) 18:41 (Rep 10)	07:03 17:03	20	16:01 (Oerzen 2) 16:21 (Oerzen 2)	08:33 16:05	
26	05:25 21:25	06:17 20:24	25	07:10 19:10	22	18:18 (Rep 10) 18:40 (Rep 10)	07:04 17:01	15	16:03 (Oerzen 2) 16:18 (Oerzen 2)	08:33 16:06	
27	05:27 21:24	06:19 20:22	25	07:12 19:08	21	18:18 (Rep 10) 18:39 (Rep 10)	07:06 16:59	5	16:08 (Oerzen 2) 16:13 (Oerzen 2)	08:34 16:06	
28	05:28 21:22	06:20 20:20	26	07:14 19:06	17	18:20 (Rep 10) 18:37 (Rep 10)	07:08 16:57		08:05 16:09	08:34 16:07	
29	05:30 21:21	06:22 20:18	41	07:16 19:03	14	18:20 (Rep 10) 18:34 (Rep 10)	07:10 16:55		08:06 16:08	08:34 16:08	
30	05:31 21:19	06:24 20:15	47	07:17 19:01	8	18:32 (Oerzen 1) 18:31 (Rep 10)	07:12 16:53		08:08 16:07	08:34 16:09	
31	05:33 21:17	06:25 20:13	49	07:14 19:38 (Rep 11)			07:14 16:51			08:34 16:10	
Sonnenscheinstunden		509		382			329		261	237	
astr.max.mögl.Beschattung			311		1008		1017				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s20 - Oerzen, Westerheide 28

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März		April		Mai		Juni	
1	08:34	08:05		07:09	16:14 (Oerzen 2)	06:55	18:26 (Oerzen 1)	05:48		04:59	
	16:11	17:01		17:56	59	17:13 (Oerzen 3)	19:53	58	19:24 (Rep 9)	20:47	21:35
2	08:34	08:03		07:07	16:14 (Oerzen 2)	06:53	18:25 (Oerzen 1)	05:46		04:59	
	16:12	17:03		17:58	59	17:13 (Oerzen 3)	19:55	59	19:24 (Rep 9)	20:48	21:36
3	08:34	08:02		07:04	16:14 (Oerzen 2)	06:50	18:25 (Oerzen 1)	05:44		04:58	
	16:14	17:05		18:00	58	17:12 (Oerzen 3)	19:56	59	19:24 (Rep 9)	20:50	21:37
4	08:33	08:00		07:02	16:14 (Oerzen 2)	06:48	18:24 (Oerzen 1)	05:42		04:57	
	16:15	17:07		18:01	57	17:11 (Oerzen 3)	19:58	59	19:23 (Rep 9)	20:52	21:39
5	08:33	07:58		07:00	16:15 (Oerzen 2)	06:46	18:24 (Oerzen 1)	05:40		04:56	
	16:16	17:09		18:03	55	17:10 (Oerzen 3)	20:00	59	19:23 (Rep 9)	20:54	21:40
6	08:33	07:56		06:57	16:15 (Oerzen 2)	06:43	18:24 (Oerzen 1)	05:38		04:55	
	16:17	17:11		18:05	53	17:08 (Oerzen 3)	20:02	58	19:22 (Rep 9)	20:55	21:41
7	08:32	07:54		06:55	16:16 (Oerzen 2)	06:41	18:23 (Oerzen 1)	05:36		04:55	
	16:19	17:13		18:07	51	17:07 (Oerzen 3)	20:04	57	19:20 (Rep 9)	20:57	21:42
8	08:32	07:53		06:53	16:16 (Oerzen 2)	06:39	18:24 (Oerzen 1)	05:34		04:54	
	16:20	17:15		18:09	44	17:03 (Oerzen 3)	20:05	68	19:36 (Rep 11)	20:59	21:43
9	08:31	07:51		06:50	16:18 (Oerzen 2)	06:36	18:24 (Oerzen 1)	05:32		04:54	
	16:21	17:17		18:11	31	16:49 (Oerzen 2)	20:07	68	19:38 (Rep 11)	21:01	21:43
10	08:31	07:49		06:48	16:20 (Oerzen 2)	06:34	18:24 (Oerzen 1)	05:30		04:53	
	16:23	17:19		18:13	27	16:47 (Oerzen 2)	20:09	59	19:39 (Rep 11)	21:02	21:44
11	08:30	07:47		06:46	16:21 (Oerzen 2)	06:32	18:24 (Oerzen 1)	05:28		04:53	
	16:24	17:21		18:15	24	16:45 (Oerzen 2)	20:11	61	19:40 (Rep 11)	21:04	21:45
12	08:29	07:45		06:43	16:24 (Oerzen 2)	06:29	18:25 (Oerzen 1)	05:27		04:52	
	16:26	17:23		18:16	18	16:42 (Oerzen 2)	20:13	61	19:41 (Rep 11)	21:06	21:46
13	08:28	07:43		06:41	16:28 (Oerzen 2)	06:27	18:26 (Oerzen 1)	05:25		04:52	
	16:27	17:25		18:18	8	16:36 (Oerzen 2)	20:14	60	19:42 (Rep 11)	21:07	21:46
14	08:28	07:41	16:31 (Oerzen 2)	06:38	17:44 (Rep 10)	06:25	18:26 (Oerzen 1)	05:23		04:52	
	16:29	17:27	11	16:42 (Oerzen 2)	18:20	7	17:51 (Rep 10)	20:16	59	19:41 (Rep 11)	21:09
15	08:27	07:39	16:26 (Oerzen 2)	06:36	17:41 (Rep 10)	06:22	18:28 (Oerzen 1)	05:22		04:52	
	16:31	17:29	19	16:45 (Oerzen 2)	18:22	14	17:55 (Rep 10)	20:18	56	19:41 (Rep 11)	21:11
16	08:26	07:37	16:24 (Oerzen 2)	06:34	17:38 (Rep 10)	06:20	18:29 (Oerzen 1)	05:20		04:51	
	16:32	17:31	23	16:47 (Oerzen 2)	18:24	18	17:56 (Rep 10)	20:20	53	19:41 (Rep 11)	21:12
17	08:25	07:35	16:22 (Oerzen 2)	06:31	17:37 (Rep 10)	06:18	18:31 (Oerzen 1)	05:18		04:51	
	16:34	17:33	27	16:49 (Oerzen 2)	18:26	21	17:58 (Rep 10)	20:22	49	19:41 (Rep 11)	21:14
18	08:24	07:33	16:21 (Oerzen 2)	06:29	17:35 (Rep 10)	06:15	18:33 (Oerzen 1)	05:17		04:51	
	16:36	17:35	30	16:51 (Oerzen 2)	18:27	23	17:58 (Rep 10)	20:23	43	19:40 (Rep 11)	21:15
19	08:23	07:31	16:19 (Oerzen 2)	06:26	17:34 (Rep 10)	06:13	18:39 (Oerzen 1)	05:15		04:51	
	16:37	17:37	38	17:03 (Oerzen 3)	18:29	25	17:59 (Rep 10)	20:25	32	19:40 (Rep 11)	21:17
20	08:22	07:29	16:18 (Oerzen 2)	06:24	17:33 (Rep 10)	06:11	19:13 (Rep 11)	05:14		04:51	
	16:39	17:39	48	17:07 (Oerzen 3)	18:31	26	17:59 (Rep 10)	20:27	26	19:39 (Rep 11)	21:19
21	08:21	07:26	16:17 (Oerzen 2)	06:22	17:33 (Rep 10)	06:09	19:14 (Rep 11)	05:12		04:52	
	16:41	17:40	52	17:09 (Oerzen 3)	18:33	26	17:59 (Rep 10)	20:29	25	19:39 (Rep 11)	21:20
22	08:19	07:24	16:16 (Oerzen 2)	06:19	17:33 (Rep 10)	06:07	19:15 (Rep 11)	05:11		04:52	
	16:43	17:42	55	17:11 (Oerzen 3)	18:35	26	17:59 (Rep 10)	20:30	23	19:38 (Rep 11)	21:22
23	08:18	07:22	16:16 (Oerzen 2)	06:17	17:32 (Rep 10)	06:04	19:16 (Rep 11)	05:10		04:52	
	16:44	17:44	56	17:12 (Oerzen 3)	18:36	26	17:58 (Rep 10)	20:32	20	19:36 (Rep 11)	21:23
24	08:17	07:20	16:14 (Oerzen 2)	06:14	17:32 (Rep 10)	06:02	19:17 (Rep 11)	05:08		04:52	
	16:46	17:46	58	17:12 (Oerzen 3)	18:38	26	17:58 (Rep 10)	20:34	18	19:35 (Rep 11)	21:24
25	08:15	07:18	16:14 (Oerzen 2)	06:12	17:32 (Rep 10)	06:00	19:19 (Rep 11)	05:07		04:53	
	16:48	17:48	59	17:13 (Oerzen 3)	18:40	27	17:59 (Oerzen 1)	20:36	14	19:33 (Rep 11)	21:26
26	08:14	07:16	16:14 (Oerzen 2)	06:10	17:33 (Rep 10)	05:58	19:22 (Rep 11)	05:06		04:53	
	16:50	17:50	59	17:13 (Oerzen 3)	18:42	28	18:01 (Oerzen 1)	20:38	8	19:30 (Rep 11)	21:27
27	08:13	07:13	16:14 (Oerzen 2)	06:07	17:32 (Oerzen 1)	05:56		05:05		04:53	
	16:52	17:52	60	17:14 (Oerzen 3)	18:44	36	18:17 (Rep 9)	20:39		21:29	21:50
28	08:11	07:11	16:13 (Oerzen 2)	06:05	17:31 (Oerzen 1)	05:54		05:04		04:54	
	16:54	17:54	60	17:13 (Oerzen 3)	18:45	43	18:19 (Rep 9)	20:41		21:30	21:50
29	08:10			07:02	18:30 (Oerzen 1)	05:52		05:02		04:55	
	16:56			19:47	49	19:21 (Rep 9)	20:43		21:31	21:50	
30	08:08			07:00	18:28 (Oerzen 1)	05:50		05:01		04:55	
	16:58			19:49	55	19:23 (Rep 9)	20:45		21:33	21:50	
31	08:06			06:58	18:27 (Oerzen 1)			05:00			
	17:00			19:51	57	19:24 (Rep 9)		21:34			
Sonnenscheinstunden		253	275	367	419	491	506				
astr.max.mögl.Beschattung			655	1077	1212						

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s20 - Oerzen, Westerheide 28

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrichtungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August		September		Oktober		November	Dezember
1	04:56	05:35		06:27	18:23 (Oerzen 1)	07:19	17:05 (Oerzen 2)	07:16	08:09
	21:50	21:16		20:11	61 19:39 (Rep 11)	18:58	14 17:19 (Oerzen 2)	16:49	16:06
2	04:57	05:36		06:29	18:23 (Oerzen 1)	07:21	17:01 (Oerzen 2)	07:18	08:11
	21:49	21:14		20:08	59 19:38 (Rep 11)	18:56	21 17:22 (Oerzen 2)	16:47	16:06
3	04:57	05:38		06:31	18:21 (Oerzen 1)	07:23	16:59 (Oerzen 2)	07:20	08:12
	21:49	21:12		20:06	68 19:35 (Rep 11)	18:54	26 17:25 (Oerzen 2)	16:45	16:05
4	04:58	05:39		06:32	18:21 (Oerzen 1)	07:24	16:56 (Oerzen 2)	07:21	08:14
	21:48	21:10		20:04	68 19:33 (Rep 11)	18:51	29 17:25 (Oerzen 2)	16:44	16:04
5	04:59	05:41		06:34	18:20 (Oerzen 1)	07:26	16:54 (Oerzen 2)	07:23	08:15
	21:48	21:08		20:01	59 19:28 (Rep 11)	18:49	37 17:37 (Oerzen 3)	16:42	16:04
6	05:00	05:43		06:36	18:19 (Oerzen 1)	07:28	16:53 (Oerzen 2)	07:25	08:16
	21:47	21:07		19:59	58 19:17 (Rep 9)	18:46	47 17:41 (Oerzen 3)	16:40	16:03
7	05:01	05:44		06:38	18:19 (Oerzen 1)	07:30	16:51 (Oerzen 2)	07:27	08:18
	21:47	21:05		19:56	59 19:18 (Rep 9)	18:44	52 17:43 (Oerzen 3)	16:38	16:03
8	05:02	05:46		06:39	18:19 (Oerzen 1)	07:31	16:50 (Oerzen 2)	07:29	08:19
	21:46	21:03		19:54	59 19:18 (Rep 9)	18:42	55 17:45 (Oerzen 3)	16:36	16:02
9	05:03	05:48		06:41	18:18 (Oerzen 1)	07:33	16:50 (Oerzen 2)	07:31	08:20
	21:45	21:01		19:52	59 19:17 (Rep 9)	18:39	56 17:46 (Oerzen 3)	16:35	16:02
10	05:04	05:49		06:43	18:18 (Oerzen 1)	07:35	16:48 (Oerzen 2)	07:33	08:21
	21:44	20:59		19:49	59 19:17 (Rep 9)	18:37	57 17:45 (Oerzen 3)	16:33	16:02
11	05:05	05:51		06:44	18:19 (Oerzen 1)	07:37	16:47 (Oerzen 2)	07:35	08:23
	21:44	20:57		19:47	58 19:17 (Rep 9)	18:35	59 17:46 (Oerzen 3)	16:31	16:02
12	05:06	05:53		06:46	18:18 (Oerzen 1)	07:39	16:47 (Oerzen 2)	07:37	08:24
	21:43	20:55		19:44	58 19:16 (Rep 9)	18:32	59 17:46 (Oerzen 3)	16:29	16:01
13	05:07	05:55		06:48	18:19 (Oerzen 1)	07:40	16:47 (Oerzen 2)	07:38	08:25
	21:42	20:53		19:42	55 19:14 (Rep 9)	18:30	59 17:46 (Oerzen 3)	16:28	16:01
14	05:08	05:56		06:50	18:20 (Oerzen 1)	07:42	16:46 (Oerzen 2)	07:40	08:26
	21:41	20:51		19:40	50 19:12 (Rep 9)	18:28	60 17:46 (Oerzen 3)	16:26	16:01
15	05:10	05:58		06:51	18:20 (Oerzen 1)	07:44	16:46 (Oerzen 2)	07:42	08:27
	21:40	20:49		19:37	45 19:09 (Rep 9)	18:25	60 17:46 (Oerzen 3)	16:25	16:01
16	05:11	06:00		06:53	18:21 (Oerzen 1)	07:46	16:46 (Oerzen 2)	07:44	08:28
	21:39	20:46		19:35	38 19:07 (Rep 9)	18:23	59 17:45 (Oerzen 3)	16:23	16:01
17	05:12	06:01	19:28 (Rep 11)	06:55	18:21 (Rep 10)	07:48	16:47 (Oerzen 2)	07:46	08:28
	21:38	20:44	9 19:37 (Rep 11)	19:32	29 18:50 (Oerzen 1)	18:21	58 17:45 (Oerzen 3)	16:22	16:02
18	05:14	06:03	19:24 (Rep 11)	06:56	18:20 (Rep 10)	07:50	16:47 (Oerzen 2)	07:48	08:29
	21:36	20:42	15 19:39 (Rep 11)	19:30	27 18:47 (Oerzen 1)	18:19	57 17:44 (Oerzen 3)	16:20	16:02
19	05:15	06:05	19:22 (Rep 11)	06:58	18:19 (Rep 10)	07:51	16:47 (Oerzen 2)	07:49	08:30
	21:35	20:40	19 19:41 (Rep 11)	19:27	25 18:44 (Oerzen 1)	18:16	56 17:43 (Oerzen 3)	16:19	16:02
20	05:16	06:07	19:21 (Rep 11)	07:00	18:18 (Rep 10)	07:53	16:48 (Oerzen 2)	07:51	08:31
	21:34	20:38	21 19:42 (Rep 11)	19:25	27 18:45 (Rep 10)	18:14	53 17:41 (Oerzen 3)	16:18	16:02
21	05:18	06:08	19:19 (Rep 11)	07:02	18:18 (Rep 10)	07:55	16:47 (Oerzen 2)	07:53	08:31
	21:33	20:36	23 19:42 (Rep 11)	19:23	27 18:45 (Rep 10)	18:12	52 17:39 (Oerzen 3)	16:16	16:03
22	05:19	06:10	19:19 (Rep 11)	07:03	18:17 (Rep 10)	07:57	16:48 (Oerzen 2)	07:55	08:32
	21:31	20:33	24 19:43 (Rep 11)	19:20	27 18:44 (Rep 10)	18:10	46 17:36 (Oerzen 3)	16:15	16:03
23	05:21	06:12	19:17 (Rep 11)	07:05	18:17 (Rep 10)	07:59	16:49 (Oerzen 2)	07:56	08:32
	21:30	20:31	26 19:43 (Rep 11)	19:18	26 18:43 (Rep 10)	18:08	33 17:22 (Oerzen 2)	16:14	16:04
24	05:22	06:13	18:41 (Oerzen 1)	07:07	18:18 (Rep 10)	08:01	16:50 (Oerzen 2)	07:58	08:33
	21:28	20:29	35 19:44 (Rep 11)	19:15	25 18:43 (Rep 10)	18:06	30 17:20 (Oerzen 2)	16:13	16:04
25	05:24	06:15	18:37 (Oerzen 1)	07:09	18:17 (Rep 10)	07:03	15:52 (Oerzen 2)	08:00	08:33
	21:27	20:27	44 19:44 (Rep 11)	19:13	24 18:41 (Rep 10)	17:03	26 16:18 (Oerzen 2)	16:12	16:05
26	05:25	06:17	18:33 (Oerzen 1)	07:10	18:18 (Rep 10)	07:04	15:54 (Oerzen 2)	08:01	08:33
	21:25	20:24	50 19:43 (Rep 11)	19:10	22 18:40 (Rep 10)	17:01	22 16:16 (Oerzen 2)	16:11	16:06
27	05:27	06:19	18:31 (Oerzen 1)	07:12	18:19 (Rep 10)	07:06	15:56 (Oerzen 2)	08:03	08:34
	21:24	20:22	54 19:43 (Rep 11)	19:08	20 18:39 (Rep 10)	16:59	18 16:14 (Oerzen 2)	16:10	16:06
28	05:28	06:20	18:29 (Oerzen 1)	07:14	18:21 (Rep 10)	07:08	16:01 (Oerzen 2)	08:05	08:34
	21:22	20:20	56 19:43 (Rep 11)	19:06	16 18:37 (Rep 10)	16:57	9 16:10 (Oerzen 2)	16:09	16:07
29	05:30	06:22	18:27 (Oerzen 1)	07:16	18:22 (Rep 10)	07:10		08:06	08:34
	21:21	20:18	59 19:42 (Rep 11)	19:03	11 18:33 (Rep 10)	16:55		16:08	16:08
30	05:31	06:24	18:26 (Oerzen 1)	07:17		07:12		08:08	08:34
	21:19	20:15	59 19:41 (Rep 11)	19:01		16:53		16:07	16:09
31	05:33	06:26	18:25 (Oerzen 1)			07:14			08:34
	21:17	20:13	61 19:41 (Rep 11)			16:51			16:10
Sonnenscheinstunden	509	458		382		329		261	237
astr.max.mögl.Beschattung			555		1219		1210		

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s21 - Oerzen, Zum Hasel 5

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai		Juni
1	08:34	08:05	07:09	06:55	05:48		05:00
	16:11	17:02	17:56	19:53	20:47		21:35
2	08:34	08:03	07:07	06:53	05:46		20:59
	16:13	17:03	17:58	19:55	20:48		21:36
3	08:34	08:01	07:04	06:50	05:44		04:58
	16:14	17:05	18:00	19:56	20:50		21:37
4	08:33	08:00	07:02	06:48	05:42		04:57
	16:15	17:07	18:01	19:58	20:52		21:38
5	08:33	07:58	07:00	06:46	05:40		04:56
	16:16	17:09	18:03	20:00	20:54		21:40
6	08:33	07:56	06:57	06:43	05:38		04:56
	16:17	17:11	18:05	20:02	20:55		21:41
7	08:32	07:54	06:55	06:41	05:36	20:22 (Oerzen 4)	04:55
	16:19	17:13	18:07	20:04	20:57	5 20:27 (Oerzen 4)	21:42
8	08:32	07:53	06:53	06:39	05:34		20:19 (Oerzen 4)
	16:20	17:15	18:09	20:05	20:59	9 20:28 (Oerzen 4)	21:42
9	08:31	07:51	06:50	06:36	05:32		20:17 (Oerzen 4)
	16:22	17:17	18:11	20:07	21:00	13 20:30 (Oerzen 4)	21:43
10	08:31	07:49	06:48	06:34	05:30		20:17 (Oerzen 4)
	16:23	17:19	18:13	20:09	21:02	15 20:32 (Oerzen 4)	21:44
11	08:30	07:47	06:46	06:32	05:29		20:15 (Oerzen 4)
	16:24	17:21	18:15	20:11	21:04	18 20:33 (Oerzen 4)	21:45
12	08:29	07:45	06:43	06:29	05:27		20:15 (Oerzen 4)
	16:26	17:23	18:16	20:13	21:06	20 20:35 (Oerzen 4)	21:46
13	08:28	07:43	06:41	06:27	05:25		20:14 (Oerzen 4)
	16:28	17:25	18:18	20:14	21:07	22 20:36 (Oerzen 4)	21:46
14	08:28	07:41	06:38	06:25	05:23		20:13 (Oerzen 4)
	16:29	17:27	18:20	20:16	21:09	23 20:36 (Oerzen 4)	21:47
15	08:27	07:39	06:36	06:22	05:22		20:14 (Oerzen 4)
	16:31	17:29	18:22	20:18	21:11	23 20:37 (Oerzen 4)	21:48
16	08:26	07:37	06:34	06:20	05:20		20:13 (Oerzen 4)
	16:32	17:31	18:24	20:20	21:12	24 20:37 (Oerzen 4)	21:48
17	08:25	07:35	06:31	06:18	05:19		20:13 (Oerzen 4)
	16:34	17:33	18:26	20:22	21:14	24 20:37 (Oerzen 4)	21:49
18	08:24	07:33	06:29	06:16	05:17		20:14 (Oerzen 4)
	16:36	17:35	18:27	20:23	21:15	24 20:38 (Oerzen 4)	21:49
19	08:23	07:31	06:27	06:13	05:15		20:13 (Oerzen 4)
	16:37	17:37	18:29	20:25	21:17	24 20:37 (Oerzen 4)	21:49
20	08:22	07:29	06:24	06:11	05:14		20:14 (Oerzen 4)
	16:39	17:39	18:31	20:27	21:18	23 20:37 (Oerzen 4)	21:50
21	08:20	07:26	06:22	06:09	05:13		20:14 (Oerzen 4)
	16:41	17:40	18:33	20:29	21:20	23 20:37 (Oerzen 4)	21:50
22	08:19	07:24	06:19	06:07	05:11		20:14 (Oerzen 4)
	16:43	17:42	18:35	20:30	21:21	22 20:36 (Oerzen 4)	21:50
23	08:18	07:22	06:17	06:04	05:10		20:14 (Oerzen 4)
	16:45	17:44	18:36	20:32	21:23	22 20:36 (Oerzen 4)	21:50
24	08:17	07:20	06:14	06:02	05:09		20:15 (Oerzen 4)
	16:46	17:46	18:38	20:34	21:24	21 20:36 (Oerzen 4)	21:50
25	08:15	07:18	06:12	06:00	05:07		20:16 (Oerzen 4)
	16:48	17:48	18:40	20:36	21:26	20 20:36 (Oerzen 4)	21:51
26	08:14	07:16	06:10	05:58	05:06		20:16 (Oerzen 4)
	16:50	17:50	18:42	20:38	21:27	20 20:36 (Oerzen 4)	21:51
27	08:13	07:13	06:07	05:56	05:05		20:17 (Oerzen 4)
	16:52	17:52	18:44	20:39	21:29	18 20:35 (Oerzen 4)	21:50
28	08:11	07:11	06:05	05:54	05:04		20:18 (Oerzen 4)
	16:54	17:54	18:46	20:41	21:30	17 20:35 (Oerzen 4)	21:50
29	08:10		07:02	05:52	05:03		20:19 (Oerzen 4)
	16:56		19:47	20:43	21:31	15 20:34 (Oerzen 4)	21:50
30	08:08		07:00	05:50	05:02		20:19 (Oerzen 4)
	16:58		19:49	20:45	21:33	14 20:33 (Oerzen 4)	21:50
31	08:06		06:58		05:01		20:20 (Oerzen 4)
	17:00		19:51		21:34	12 20:32 (Oerzen 4)	
Sonnenscheinstunden	253	275	367	419	491		506
astr.max.mögl.Beschattung					471		15

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)	Zeitpunkt (SS:MM) Schattenende	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s21 - Oerzen, Zum Hasel 5

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September	Oktober	November	Dezember
1	04:56	05:35	20:26 (Oerzen 4)	06:27	07:19	07:16	08:09
	21:50	21:16	19 20:45 (Oerzen 4)	20:11	18:58	16:49	16:06
2	04:57	05:36	20:26 (Oerzen 4)	06:29	07:21	07:18	08:11
	21:49	21:14	17 20:43 (Oerzen 4)	20:08	18:56	16:47	16:06
3	04:57	05:38	20:27 (Oerzen 4)	06:31	07:23	07:20	08:12
	21:49	21:12	15 20:42 (Oerzen 4)	20:06	18:54	16:45	16:05
4	04:58	05:39	20:28 (Oerzen 4)	06:32	07:24	07:21	08:14
	21:48	21:10	11 20:39 (Oerzen 4)	20:04	18:51	16:44	16:04
5	04:59	05:41	20:30 (Oerzen 4)	06:34	07:26	07:23	08:15
	21:48	21:08	8 20:38 (Oerzen 4)	20:01	18:49	16:42	16:04
6	05:00	05:43	20:33 (Oerzen 4)	06:36	07:28	07:25	08:16
	21:47	21:07	3 20:36 (Oerzen 4)	19:59	18:46	16:40	16:03
7	05:01	05:44		06:38	07:30	07:27	08:18
	21:47	21:05		19:56	18:44	16:38	16:03
8	05:02	05:46		06:39	07:31	07:29	08:19
	21:46	21:03		19:54	18:42	16:36	16:02
9	05:03	05:48		06:41	07:33	07:31	08:20
	21:45	21:01		19:52	18:39	16:35	16:02
10	05:04	05:50		06:43	07:35	07:33	08:21
	21:44	20:33 (Oerzen 4)	05:50				
	21:44	3 20:36 (Oerzen 4)	20:59	19:49	18:37	16:33	16:02
11	05:05	20:31 (Oerzen 4)	05:51	06:44	07:37	07:35	08:23
	21:44	7 20:38 (Oerzen 4)	20:57	19:47	18:35	16:31	16:02
12	05:06	20:29 (Oerzen 4)	05:53	06:46	07:39	07:36	08:24
	21:43	11 20:40 (Oerzen 4)	20:55	19:44	18:32	16:30	16:01
13	05:07	20:28 (Oerzen 4)	05:55	06:48	07:40	07:38	08:25
	21:42	13 20:41 (Oerzen 4)	20:53	19:42	18:30	16:28	16:01
14	05:09	20:27 (Oerzen 4)	05:56	06:50	07:42	07:40	08:26
	21:41	15 20:42 (Oerzen 4)	20:51	19:40	18:28	16:26	16:01
15	05:10	20:27 (Oerzen 4)	05:58	06:51	07:44	07:42	08:27
	21:40	16 20:43 (Oerzen 4)	20:49	19:37	18:26	16:25	16:01
16	05:11	20:27 (Oerzen 4)	06:00	06:53	07:46	07:44	08:27
	21:39	17 20:44 (Oerzen 4)	20:46	19:35	18:23	16:23	16:01
17	05:12	20:26 (Oerzen 4)	06:01	06:55	07:48	07:46	08:28
	21:37	19 20:45 (Oerzen 4)	20:44	19:32	18:21	16:22	16:02
18	05:14	20:25 (Oerzen 4)	06:03	06:56	07:50	07:47	08:29
	21:36	20 20:45 (Oerzen 4)	20:42	19:30	18:19	16:21	16:02
19	05:15	20:25 (Oerzen 4)	06:05	06:58	07:51	07:49	08:30
	21:35	20 20:45 (Oerzen 4)	20:40	19:27	18:17	16:19	16:02
20	05:16	20:25 (Oerzen 4)	06:07	07:00	07:53	07:51	08:30
	21:34	22 20:47 (Oerzen 4)	20:38	19:25	18:14	16:18	16:02
21	05:18	20:25 (Oerzen 4)	06:08	07:02	07:55	07:53	08:31
	21:33	22 20:47 (Oerzen 4)	20:36	19:23	18:12	16:17	16:03
22	05:19	20:24 (Oerzen 4)	06:10	07:03	07:57	07:55	08:32
	21:31	23 20:47 (Oerzen 4)	20:33	19:20	18:10	16:15	16:03
23	05:21	20:24 (Oerzen 4)	06:12	07:05	07:59	07:56	08:32
	21:30	24 20:48 (Oerzen 4)	20:31	19:18	18:08	16:14	16:04
24	05:22	20:24 (Oerzen 4)	06:13	07:07	08:01	07:58	08:33
	21:28	24 20:48 (Oerzen 4)	20:29	19:15	18:06	16:13	16:04
25	05:24	20:23 (Oerzen 4)	06:15	07:09	07:03	08:00	08:33
	21:27	24 20:47 (Oerzen 4)	20:27	19:13	17:04	16:12	16:05
26	05:25	20:24 (Oerzen 4)	06:17	07:10	07:04	08:01	08:33
	21:25	24 20:48 (Oerzen 4)	20:24	19:10	17:01	16:11	16:06
27	05:27	20:24 (Oerzen 4)	06:19	07:12	07:06	08:03	08:33
	21:24	23 20:47 (Oerzen 4)	20:22	19:08	16:59	16:10	16:07
28	05:28	20:24 (Oerzen 4)	06:20	07:14	07:08	08:05	08:34
	21:22	24 20:48 (Oerzen 4)	20:20	19:06	16:57	16:09	16:07
29	05:30	20:24 (Oerzen 4)	06:22	07:16	07:10	08:06	08:34
	21:21	23 20:47 (Oerzen 4)	20:18	19:03	16:55	16:08	16:08
30	05:31	20:25 (Oerzen 4)	06:24	07:17	07:12	08:08	08:34
	21:19	22 20:47 (Oerzen 4)	20:15	19:01	16:53	16:07	16:09
31	05:33	20:25 (Oerzen 4)	06:26		07:14		08:34
	21:17	21 20:46 (Oerzen 4)	20:13		16:51		16:10
Sonnenscheinstunden		509	458	382	329	262	237
astr.max.mögl.Beschattung		417	73				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s22 - Oerzen, Zum Hasel 10

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April		Mai		Juni	
1	08:34	08:05	07:09	06:55		05:48	19:45 (Oerzen 3)	05:00	20:25 (Rep 10)
	16:11	17:01	17:56	19:53		20:47	20:10 (Oerzen 3)	21:35	20:50 (Rep 10)
2	08:34	08:03	07:06	06:53		05:46	19:44 (Oerzen 3)	04:59	20:26 (Rep 10)
	16:13	17:03	17:58	19:55		20:48	20:11 (Oerzen 3)	21:36	20:50 (Rep 10)
3	08:34	08:01	07:04	06:50		05:44	19:43 (Oerzen 3)	04:58	20:26 (Rep 10)
	16:14	17:05	18:00	19:56		20:50	20:11 (Oerzen 3)	21:37	20:50 (Rep 10)
4	08:33	08:00	07:02	06:48		05:42	19:43 (Oerzen 3)	04:57	20:26 (Rep 10)
	16:15	17:07	18:01	19:58		20:52	20:11 (Oerzen 3)	21:38	20:50 (Rep 10)
5	08:33	07:58	07:00	06:46		05:40	19:42 (Oerzen 3)	04:56	20:27 (Rep 10)
	16:16	17:09	18:03	20:00		20:54	20:10 (Oerzen 3)	21:40	20:50 (Rep 10)
6	08:33	07:56	06:57	06:43		05:38	19:43 (Oerzen 3)	04:56	20:27 (Rep 10)
	16:17	17:11	18:05	20:02		20:55	20:11 (Oerzen 3)	21:41	20:50 (Rep 10)
7	08:32	07:54	06:55	06:41		05:36	19:43 (Oerzen 3)	04:55	20:28 (Rep 10)
	16:19	17:13	18:07	20:04		20:57	20:11 (Oerzen 3)	21:42	20:50 (Rep 10)
8	08:32	07:53	06:53	06:39		05:34	19:43 (Oerzen 3)	04:54	20:28 (Rep 10)
	16:20	17:15	18:09	20:05		20:59	20:10 (Oerzen 3)	21:42	20:50 (Rep 10)
9	08:31	07:51	06:50	06:36		05:32	19:43 (Oerzen 3)	04:54	20:29 (Rep 10)
	16:21	17:17	18:11	20:07		21:00	20:10 (Oerzen 3)	21:43	20:50 (Rep 10)
10	08:31	07:49	06:48	06:34		05:30	19:44 (Oerzen 3)	04:53	20:28 (Rep 10)
	16:23	17:19	18:13	20:09		21:02	20:10 (Oerzen 3)	21:44	20:50 (Rep 10)
11	08:30	07:47	06:46	06:32		05:29	19:44 (Oerzen 3)	04:53	20:29 (Rep 10)
	16:24	17:21	18:15	20:11		21:04	20:09 (Oerzen 3)	21:45	20:55 (Oerzen 2)
12	08:29	07:45	06:43	06:29		05:27	19:44 (Oerzen 3)	04:52	20:30 (Rep 10)
	16:26	17:23	18:16	20:13		21:06	20:08 (Oerzen 3)	21:46	20:57 (Oerzen 2)
13	08:28	07:43	06:41	06:27		05:25	19:45 (Oerzen 3)	04:52	20:30 (Rep 10)
	16:27	17:25	18:18	20:14		21:07	20:08 (Oerzen 3)	21:46	20:58 (Oerzen 2)
14	08:28	07:41	06:38	06:25		05:23	19:45 (Oerzen 3)	04:52	20:30 (Rep 10)
	16:29	17:27	18:20	20:16		21:09	20:07 (Oerzen 3)	21:47	20:58 (Oerzen 2)
15	08:27	07:39	06:36	06:22		05:22	19:47 (Oerzen 3)	04:52	20:30 (Rep 10)
	16:31	17:29	18:22	20:18		21:11	20:39 (Rep 10)	21:48	20:59 (Oerzen 2)
16	08:26	07:37	06:34	06:20		05:20	19:47 (Oerzen 3)	04:52	20:31 (Rep 10)
	16:32	17:31	18:24	20:20		21:12	20:40 (Rep 10)	21:48	20:59 (Oerzen 2)
17	08:25	07:35	06:31	06:18		05:19	19:49 (Oerzen 3)	04:51	20:31 (Rep 10)
	16:34	17:33	18:26	20:21		21:14	20:42 (Rep 10)	21:49	20:59 (Oerzen 2)
18	08:24	07:33	06:29	06:16		05:17	19:52 (Oerzen 3)	04:51	20:31 (Rep 10)
	16:36	17:35	18:27	20:23		21:15	20:44 (Rep 10)	21:49	20:59 (Oerzen 2)
19	08:23	07:31	06:26	06:13		05:15	19:55 (Oerzen 3)	04:51	20:31 (Rep 10)
	16:37	17:37	18:29	20:25		21:17	20:45 (Rep 10)	21:49	20:59 (Oerzen 2)
20	08:22	07:29	06:24	06:11		05:14	20:26 (Rep 10)	04:52	20:33 (Rep 10)
	16:39	17:39	18:31	20:27		21:18	20:46 (Rep 10)	21:50	20:59 (Oerzen 2)
21	08:20	07:26	06:22	06:09		05:13	20:26 (Rep 10)	04:52	20:33 (Rep 10)
	16:41	17:40	18:33	20:29		21:20	20:48 (Rep 10)	21:50	20:59 (Oerzen 2)
22	08:19	07:24	06:19	06:07		05:11	20:25 (Rep 10)	04:52	20:33 (Rep 10)
	16:43	17:42	18:35	20:30		21:22	20:47 (Rep 10)	21:50	20:59 (Oerzen 2)
23	08:18	07:22	06:17	06:04		05:10	20:25 (Rep 10)	04:52	20:33 (Rep 10)
	16:45	17:44	18:36	20:32		21:23	20:48 (Rep 10)	21:50	20:59 (Oerzen 2)
24	08:17	07:20	06:14	06:02		05:08	20:25 (Rep 10)	04:52	20:33 (Rep 10)
	16:46	17:46	18:38	20:34		21:24	20:48 (Rep 10)	21:50	20:59 (Oerzen 2)
25	08:15	07:18	06:12	06:00		05:07	20:25 (Rep 10)	04:53	20:33 (Rep 10)
	16:48	17:48	18:40	20:36	7	20:02 (Oerzen 3)	20:49 (Rep 10)	21:51	20:59 (Oerzen 2)
26	08:14	07:16	06:10	05:58		05:06	20:25 (Rep 10)	04:53	20:33 (Rep 10)
	16:50	17:50	18:42	20:38	14	20:05 (Oerzen 3)	20:49 (Rep 10)	21:51	20:59 (Oerzen 2)
27	08:13	07:13	06:07	05:56		05:05	20:25 (Rep 10)	04:54	20:33 (Rep 10)
	16:52	17:52	18:44	20:39	18	20:07 (Oerzen 3)	20:49 (Rep 10)	21:50	20:59 (Oerzen 2)
28	08:11	07:11	06:05	05:54		05:04	20:25 (Rep 10)	04:54	20:33 (Rep 10)
	16:54	17:54	18:45	20:41	20	20:08 (Oerzen 3)	20:50 (Rep 10)	21:50	20:59 (Oerzen 2)
29	08:10		07:02	05:52		05:03	20:25 (Rep 10)	04:55	20:33 (Rep 10)
	16:56		19:47	20:43	23	20:09 (Oerzen 3)	20:50 (Rep 10)	21:50	20:59 (Oerzen 2)
30	08:08		07:00	05:50		05:01	20:25 (Rep 10)	04:55	20:34 (Rep 10)
	16:58		19:49	20:45	25	20:10 (Oerzen 3)	20:50 (Rep 10)	21:50	20:59 (Oerzen 2)
31	08:06		06:58			05:00	20:25 (Rep 10)		
	17:00		19:51			21:34	20:50 (Rep 10)		
Sonnenscheinstunden	253	275	367	419		491		506	
astr.max.mögl.Beschattung				107		776		803	

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s22 - Oerzen, Zum Hasel 10

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober	November	Dezember
1	04:56	20:33 (Rep 10)	05:35	19:55 (Oerzen 3)	06:27	07:19	07:16	08:09
	21:50	27	21:00 (Oerzen 2)	21:16	25	20:20 (Oerzen 3)	20:11	18:58
2	04:57	20:34 (Rep 10)	05:36	19:54 (Oerzen 3)	06:29	07:21	07:18	08:11
	21:49	24	20:58 (Oerzen 2)	21:14	26	20:20 (Oerzen 3)	20:08	18:56
3	04:57	20:34 (Rep 10)	05:38	19:54 (Oerzen 3)	06:31	07:23	07:20	08:12
	21:49	21	20:55 (Rep 10)	21:12	26	20:20 (Oerzen 3)	20:06	18:54
4	04:58	20:33 (Rep 10)	05:39	19:53 (Oerzen 3)	06:32	07:24	07:21	08:14
	21:48	22	20:55 (Rep 10)	21:10	27	20:20 (Oerzen 3)	20:04	18:51
5	04:59	20:33 (Rep 10)	05:41	19:53 (Oerzen 3)	06:34	07:26	07:23	08:15
	21:48	23	20:56 (Rep 10)	21:08	28	20:21 (Oerzen 3)	20:01	18:49
6	05:00	20:33 (Rep 10)	05:43	19:52 (Oerzen 3)	06:36	07:28	07:25	08:16
	21:47	23	20:56 (Rep 10)	21:07	28	20:20 (Oerzen 3)	19:59	18:46
7	05:01	20:33 (Rep 10)	05:44	19:53 (Oerzen 3)	06:38	07:30	07:27	08:18
	21:47	24	20:57 (Rep 10)	21:05	28	20:21 (Oerzen 3)	19:56	18:44
8	05:02	20:34 (Rep 10)	05:46	19:52 (Oerzen 3)	06:39	07:31	07:29	08:19
	21:46	23	20:57 (Rep 10)	21:03	28	20:20 (Oerzen 3)	19:54	18:42
9	05:03	20:34 (Rep 10)	05:48	19:52 (Oerzen 3)	06:41	07:33	07:31	08:20
	21:45	23	20:57 (Rep 10)	21:01	28	20:20 (Oerzen 3)	19:52	18:39
10	05:04	20:34 (Rep 10)	05:49	19:52 (Oerzen 3)	06:43	07:35	07:33	08:21
	21:44	24	20:58 (Rep 10)	20:59	27	20:19 (Oerzen 3)	19:49	18:37
11	05:05	20:34 (Rep 10)	05:51	19:52 (Oerzen 3)	06:44	07:37	07:35	08:23
	21:44	24	20:58 (Rep 10)	20:57	27	20:19 (Oerzen 3)	19:47	18:35
12	05:06	20:34 (Rep 10)	05:53	19:53 (Oerzen 3)	06:46	07:39	07:36	08:24
	21:43	24	20:58 (Rep 10)	20:55	26	20:19 (Oerzen 3)	19:44	18:32
13	05:07	20:34 (Rep 10)	05:55	19:53 (Oerzen 3)	06:48	07:40	07:38	08:25
	21:42	24	20:58 (Rep 10)	20:53	24	20:17 (Oerzen 3)	19:42	18:30
14	05:08	20:34 (Rep 10)	05:56	19:54 (Oerzen 3)	06:50	07:42	07:40	08:26
	21:41	24	20:58 (Rep 10)	20:51	23	20:17 (Oerzen 3)	19:40	18:28
15	05:10	20:34 (Rep 10)	05:58	19:55 (Oerzen 3)	06:51	07:44	07:42	08:27
	21:40	24	20:58 (Rep 10)	20:49	20	20:15 (Oerzen 3)	19:37	18:25
16	05:11	20:33 (Rep 10)	06:00	19:56 (Oerzen 3)	06:53	07:46	07:44	08:27
	21:39	25	20:58 (Rep 10)	20:46	17	20:13 (Oerzen 3)	19:35	18:23
17	05:12	20:34 (Rep 10)	06:01	19:59 (Oerzen 3)	06:55	07:48	07:46	08:28
	21:37	25	20:59 (Rep 10)	20:44	12	20:11 (Oerzen 3)	19:32	18:21
18	05:14	20:34 (Rep 10)	06:03	20:01 (Oerzen 3)	06:56	07:50	07:47	08:29
	21:36	25	20:59 (Rep 10)	20:42	6	20:07 (Oerzen 3)	19:30	18:19
19	05:15	20:34 (Rep 10)	06:05		06:58	07:51	07:49	08:30
	21:35	24	20:58 (Rep 10)	20:40		19:27	18:16	16:19
20	05:16	20:34 (Rep 10)	06:07		07:00	07:53	07:51	08:30
	21:34	24	20:58 (Rep 10)	20:38		19:25	18:14	16:18
21	05:18	20:36 (Rep 10)	06:08		07:02	07:55	07:53	08:31
	21:33	22	20:58 (Rep 10)	20:36		19:23	18:12	16:17
22	05:19	20:36 (Rep 10)	06:10		07:03	07:57	07:55	08:32
	21:31	22	20:58 (Rep 10)	20:33		19:20	18:10	16:15
23	05:21	20:36 (Rep 10)	06:12		07:05	07:59	07:56	08:32
	21:30	21	20:57 (Rep 10)	20:31		19:18	18:08	16:14
24	05:22	20:37 (Rep 10)	06:13		07:07	08:01	07:58	08:33
	21:28	19	20:56 (Rep 10)	20:29		19:15	18:06	16:13
25	05:24	20:03 (Oerzen 3)	06:15		07:09	07:03	08:00	08:33
	21:27	23	20:54 (Rep 10)	20:27		19:13	17:04	16:12
26	05:25	20:01 (Oerzen 3)	06:17		07:10	07:04	08:01	08:33
	21:25	27	20:54 (Rep 10)	20:24		19:10	17:01	16:11
27	05:27	19:59 (Oerzen 3)	06:19		07:12	07:06	08:03	08:33
	21:24	28	20:52 (Rep 10)	20:22		19:08	16:59	16:10
28	05:28	19:58 (Oerzen 3)	06:20		07:14	07:08	08:05	08:34
	21:22	28	20:51 (Rep 10)	20:20		19:06	16:57	16:09
29	05:30	19:57 (Oerzen 3)	06:22		07:16	07:10	08:06	08:34
	21:21	24	20:49 (Rep 10)	20:18		19:03	16:55	16:08
30	05:31	19:56 (Oerzen 3)	06:24		07:17	07:12	08:08	08:34
	21:19	22	20:18 (Oerzen 3)	20:15		19:01	16:53	16:07
31	05:33	19:55 (Oerzen 3)	06:26			07:14		08:34
	21:17	24	20:19 (Oerzen 3)	20:13			16:51	16:10
Sonnenscheinstunden		509	458		382	329	262	237
astr.max.mögl.Beschattung		737	426					

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s23 - Oerzen, Mühlenweg 10

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai	Juni
1	08:34	08:05	07:09		17:13 (Oerzen 2)	06:55	18:51 (Oerzen 1)	05:48
	16:11	17:01	17:56	16	17:29 (Oerzen 3)	19:53	19:18 (Oerzen 1)	20:47
2	08:34	08:03	07:06		17:10 (Oerzen 2)	06:53	18:50 (Oerzen 1)	05:45
	16:12	17:03	17:58	21	17:31 (Oerzen 3)	19:54	19:18 (Oerzen 1)	20:48
3	08:34	08:01	07:04		17:07 (Oerzen 2)	06:50	18:50 (Oerzen 1)	05:43
	16:14	17:05	18:00	26	17:33 (Oerzen 3)	19:56	19:18 (Oerzen 1)	20:50
4	08:33	08:00	07:02		17:06 (Oerzen 2)	06:48	18:49 (Oerzen 1)	05:42
	16:15	17:07	18:01	28	17:34 (Oerzen 3)	19:58	19:18 (Oerzen 1)	20:52
5	08:33	07:58	07:00		17:04 (Oerzen 2)	06:46	18:49 (Oerzen 1)	05:40
	16:16	17:09	18:03	30	17:34 (Oerzen 3)	20:00	19:18 (Oerzen 1)	20:54
6	08:33	07:56	06:57		17:04 (Oerzen 2)	06:43	18:49 (Oerzen 1)	05:38
	16:17	17:11	18:05	31	17:35 (Oerzen 3)	20:02	19:17 (Oerzen 1)	20:55
7	08:32	07:54	06:55		17:03 (Oerzen 2)	06:41	18:49 (Oerzen 1)	05:36
	16:19	17:13	18:07	32	17:35 (Oerzen 3)	20:03	19:16 (Oerzen 1)	20:57
8	08:32	07:53	06:53		17:02 (Oerzen 2)	06:39	18:50 (Oerzen 1)	05:34
	16:20	17:15	18:09	32	17:34 (Oerzen 3)	20:05	19:16 (Oerzen 1)	20:59
9	08:31	07:51	06:50		17:02 (Oerzen 2)	06:36	18:50 (Oerzen 1)	05:32
	16:21	17:17	18:11	32	17:34 (Oerzen 3)	20:07	19:15 (Oerzen 1)	21:00
10	08:31	07:49	06:48		17:02 (Oerzen 2)	06:34	18:50 (Oerzen 1)	05:30
	16:23	17:19	18:13	32	17:34 (Oerzen 3)	20:09	19:13 (Oerzen 1)	21:02
11	08:30	07:47	06:46		17:01 (Oerzen 2)	06:32	18:52 (Oerzen 1)	05:28
	16:24	17:21	18:14	31	17:32 (Oerzen 3)	20:11	19:11 (Oerzen 1)	21:04
12	08:29	07:45	06:43		17:02 (Oerzen 2)	06:29	18:54 (Oerzen 1)	05:27
	16:26	17:23	18:16	29	17:31 (Oerzen 3)	20:12	19:10 (Oerzen 1)	21:06
13	08:28	07:43	06:41		17:01 (Oerzen 2)	06:27	18:56 (Oerzen 1)	05:25
	16:27	17:25	18:18	29	17:30 (Oerzen 3)	20:14	19:06 (Oerzen 1)	21:07
14	08:28	07:41	06:38		17:02 (Oerzen 2)	06:25	05:23	04:52
	16:29	17:27	18:20	27	17:29 (Oerzen 3)	20:16	21:09	21:47
15	08:27	07:39	06:36		17:02 (Oerzen 2)	06:22	05:22	04:52
	16:31	17:29	18:22	25	17:27 (Oerzen 3)	20:18	21:11	21:48
16	08:26	07:37	06:34		17:03 (Oerzen 2)	06:20	05:20	04:51
	16:32	17:31	18:24	23	17:26 (Oerzen 3)	20:20	21:12	21:48
17	08:25	07:35	06:31		17:05 (Oerzen 2)	06:18	05:18	04:51
	16:34	17:33	18:26	20	17:25 (Oerzen 3)	20:21	21:14	21:49
18	08:24	07:33	06:29		17:07 (Oerzen 2)	06:15	05:17	04:51
	16:36	17:35	18:27	15	17:22 (Oerzen 3)	20:23	21:15	21:49
19	08:23	07:31	06:26		17:10 (Oerzen 2)	06:13	05:15	04:51
	16:37	17:37	18:29	9	17:19 (Oerzen 3)	20:25	21:17	21:49
20	08:22	07:29	06:24		06:11		05:14	04:51
	16:39	17:38	18:31		20:27		21:18	21:50
21	08:20	07:26	06:22		06:09		05:12	04:52
	16:41	17:40	18:33		20:29		21:20	21:50
22	08:19	07:24	06:19		06:07		05:11	04:52
	16:43	17:42	18:35		20:30		21:22	21:50
23	08:18	07:22	06:17		06:04		05:10	04:52
	16:44	17:44	18:36		20:32		21:23	21:50
24	08:17	07:20	06:14		06:02		05:08	04:52
	16:46	17:46	18:38		20:34		21:24	21:51
25	08:15	07:18	06:12		06:00		05:07	04:53
	16:48	17:48	18:40		20:36		21:26	21:51
26	08:14	07:15	06:10		18:04 (Oerzen 1)	05:58	05:06	04:53
	16:50	17:50	18:42	5	18:09 (Oerzen 1)	20:38	21:27	21:51
27	08:13	07:13	06:07		17:59 (Oerzen 1)	05:56	05:05	04:53
	16:52	17:52	18:44	14	18:13 (Oerzen 1)	20:39	21:29	21:50
28	08:11	07:11	06:05		17:57 (Oerzen 1)	05:54	05:04	04:54
	16:54	17:54	18:45	18	18:15 (Oerzen 1)	20:41	21:30	21:50
29	08:10		07:02		18:55 (Oerzen 1)	05:52	05:02	04:55
	16:56		19:47	22	19:17 (Oerzen 1)	20:43	21:31	21:50
30	08:08		07:00		18:53 (Oerzen 1)	05:50	05:01	04:55
	16:58		19:49	24	19:17 (Oerzen 1)	20:45	21:33	21:50
31	08:06		06:58		18:52 (Oerzen 1)		05:00	
	16:59		19:51	26	19:18 (Oerzen 1)		21:34	
Sonnenscheinstunden	253	275	367		419		491	506
astr.max.mögl.Beschattung			597		315			

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s23 - Oerzen, Mühlenweg 10

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember
1	04:56 21:50	05:34 21:16		06:27 20:11	18:51 (Oerzen 1) 19:10 (Oerzen 1)	07:19 18:58	29	17:41 (Oerzen 2) 18:10 (Oerzen 2)	07:16 16:49	08:09 16:06
2	04:57 21:49	05:36 21:14		06:29 20:08	18:49 (Oerzen 1) 19:12 (Oerzen 1)	07:21 18:56	30	17:40 (Oerzen 2) 18:10 (Oerzen 3)	07:18 16:47	08:11 16:06
3	04:57 21:49	05:38 21:12		06:31 20:06	18:47 (Oerzen 1) 19:12 (Oerzen 1)	07:23 18:53	31	17:40 (Oerzen 2) 18:11 (Oerzen 3)	07:20 16:45	08:12 16:05
4	04:58 21:48	05:39 21:10		06:32 20:03	18:47 (Oerzen 1) 19:13 (Oerzen 1)	07:24 18:51	32	17:39 (Oerzen 2) 18:11 (Oerzen 3)	07:21 16:43	08:14 16:04
5	04:59 21:48	05:41 21:08		06:34 20:01	18:46 (Oerzen 1) 19:13 (Oerzen 1)	07:26 18:49	32	17:39 (Oerzen 2) 18:11 (Oerzen 3)	07:23 16:42	08:15 16:04
6	05:00 21:47	05:43 21:07		06:36 19:59	18:45 (Oerzen 1) 19:13 (Oerzen 1)	07:28 18:46	32	17:39 (Oerzen 2) 18:11 (Oerzen 3)	07:25 16:40	08:16 16:03
7	05:01 21:47	05:44 21:05		06:38 19:56	18:44 (Oerzen 1) 19:13 (Oerzen 1)	07:30 18:44	32	17:39 (Oerzen 2) 18:11 (Oerzen 3)	07:27 16:38	08:18 16:03
8	05:02 21:46	05:46 21:03		06:39 19:54	18:44 (Oerzen 1) 19:13 (Oerzen 1)	07:31 18:42	31	17:40 (Oerzen 2) 18:11 (Oerzen 3)	07:29 16:36	08:19 16:02
9	05:03 21:45	05:48 21:01		06:41 19:52	18:43 (Oerzen 1) 19:12 (Oerzen 1)	07:33 18:39	29	17:41 (Oerzen 2) 18:10 (Oerzen 3)	07:31 16:34	08:20 16:02
10	05:04 21:44	05:49 20:59		06:43 19:49	18:43 (Oerzen 1) 19:11 (Oerzen 1)	07:35 18:37	27	17:41 (Oerzen 2) 18:08 (Oerzen 3)	07:33 16:33	08:21 16:02
11	05:05 21:44	05:51 20:57		06:44 19:47	18:44 (Oerzen 1) 19:11 (Oerzen 1)	07:37 18:35	24	17:42 (Oerzen 2) 18:06 (Oerzen 3)	07:35 16:31	08:23 16:01
12	05:06 21:43	05:53 20:55		06:46 19:44	18:43 (Oerzen 1) 19:09 (Oerzen 1)	07:39 18:32	19	17:44 (Oerzen 2) 18:03 (Oerzen 3)	07:36 16:29	08:24 16:01
13	05:07 21:42	05:55 20:53		06:48 19:42	18:44 (Oerzen 1) 19:08 (Oerzen 1)	07:40 18:30	12	17:48 (Oerzen 2) 18:01 (Oerzen 3)	07:38 16:28	08:25 16:01
14	05:08 21:41	05:56 20:51		06:50 19:39	18:45 (Oerzen 1) 19:07 (Oerzen 1)	07:42 18:28		07:40 16:26	08:26 16:01	
15	05:10 21:40	05:58 20:49		06:51 19:37	18:46 (Oerzen 1) 19:05 (Oerzen 1)	07:44 18:25		07:42 16:25	08:27 16:01	
16	05:11 21:39	06:00 20:46		06:53 19:35	18:48 (Oerzen 1) 19:02 (Oerzen 1)	07:46 18:23		07:44 16:23	08:27 16:01	
17	05:12 21:38	06:01 20:44		06:55 19:32	18:51 (Oerzen 1) 18:59 (Oerzen 1)	07:48 18:21		07:46 16:22	08:28 16:01	
18	05:14 21:36	06:03 20:42		06:56 19:30		07:50 18:19		07:48 16:20	08:29 16:02	
19	05:15 21:35	06:05 20:40		06:58 19:27		07:51 18:16		07:49 16:19	08:30 16:02	
20	05:16 21:34	06:07 20:38		07:00 19:25		07:53 18:14		07:51 16:18	08:30 16:02	
21	05:18 21:33	06:08 20:36		07:02 19:22		07:55 18:12		07:53 16:16	08:31 16:03	
22	05:19 21:31	06:10 20:33		07:03 19:20		07:57 18:10		07:55 16:15	08:32 16:03	
23	05:21 21:30	06:12 20:31		07:05 19:18		07:59 18:08		07:56 16:14	08:32 16:04	
24	05:22 21:28	06:13 20:29		07:07 19:15	17:56 (Oerzen 2) 18:00 (Oerzen 2)	08:01 18:06		07:58 16:13	08:33 16:04	
25	05:24 21:27	06:15 20:27		07:09 19:13	17:50 (Oerzen 2) 18:04 (Oerzen 2)	07:03 17:03	14	08:00 16:12	08:33 16:05	
26	05:25 21:25	06:17 20:24		07:10 19:10	17:48 (Oerzen 2) 18:06 (Oerzen 2)	07:04 17:01	18	08:01 16:11	08:33 16:06	
27	05:27 21:24	06:19 20:22		07:12 19:08	17:46 (Oerzen 2) 18:08 (Oerzen 2)	07:06 16:59	22	08:03 16:10	08:34 16:06	
28	05:28 21:22	06:20 20:20		07:14 19:06	17:44 (Oerzen 2) 18:09 (Oerzen 2)	07:08 16:57	25	08:05 16:09	08:34 16:07	
29	05:30 21:21	06:22 20:18		07:15 19:03	17:42 (Oerzen 2) 18:09 (Oerzen 2)	07:10 16:55	27	08:06 16:08	08:34 16:08	
30	05:31 21:19	06:24 20:15	11	07:17 19:07 (Oerzen 1)	17:41 (Oerzen 2) 18:09 (Oerzen 2)	07:12 16:53	28	08:08 16:07	08:34 16:09	
31	05:33 21:17	06:25 20:13	16	07:18 19:10 (Oerzen 1)		07:14 16:51			08:34 16:10	
Sonnenscheinstunden		509	458	382	541	329	360	261	237	
astr.max.mögl.Beschattung			27							

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s24 - Oerzen, Mühlenweg 18

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März		April		Mai		Juni	
1	08:34	08:05		07:09	16:54 (Oerzen 2)	06:55	18:41 (Oerzen 1)	05:48	04:59		
	16:11	17:01		17:56	33 17:27 (Oerzen 3)	19:53	30 19:11 (Oerzen 1)	20:47	21:35		
2	08:34	08:03		07:06	16:53 (Oerzen 2)	06:53	18:41 (Oerzen 1)	05:45	04:59		
	16:12	17:03		17:58	35 17:28 (Oerzen 3)	19:54	30 19:11 (Oerzen 1)	20:48	21:36		
3	08:34	08:01		07:04	16:52 (Oerzen 2)	06:50	18:41 (Oerzen 1)	05:43	04:58		
	16:14	17:05		18:00	36 17:28 (Oerzen 3)	19:56	30 19:11 (Oerzen 1)	20:50	21:37		
4	08:33	08:00		07:02	16:52 (Oerzen 2)	06:48	18:41 (Oerzen 1)	05:42	04:57		
	16:15	17:07		18:01	36 17:28 (Oerzen 3)	19:58	29 19:10 (Oerzen 1)	20:52	21:39		
5	08:33	07:58		07:00	16:51 (Oerzen 2)	06:46	18:41 (Oerzen 1)	05:40	04:56		
	16:16	17:09		18:03	38 17:29 (Oerzen 3)	20:00	38 19:33 (Rep 11)	20:54	21:40		
6	08:33	07:56		06:57	16:51 (Oerzen 2)	06:43	18:42 (Oerzen 1)	05:38	04:55		
	16:17	17:11		18:05	37 17:28 (Oerzen 3)	20:02	40 19:35 (Rep 11)	20:55	21:41		
7	08:32	07:54		06:55	16:51 (Oerzen 2)	06:41	18:42 (Oerzen 1)	05:36	04:55		
	16:19	17:13		18:07	36 17:27 (Oerzen 3)	20:03	42 19:36 (Rep 11)	20:57	21:42		
8	08:32	07:53		06:53	16:50 (Oerzen 2)	06:39	18:43 (Oerzen 1)	05:34	04:54		
	16:20	17:15		18:09	36 17:26 (Oerzen 3)	20:05	43 19:38 (Rep 11)	20:59	21:42		
9	08:31	07:51		06:50	16:51 (Oerzen 2)	06:36	18:44 (Oerzen 1)	05:32	04:54		
	16:21	17:17		18:11	34 17:25 (Oerzen 3)	20:07	42 19:39 (Rep 11)	21:01	21:43		
10	08:31	07:49		06:48	16:51 (Oerzen 2)	06:34	18:45 (Oerzen 1)	05:30	04:53		
	16:23	17:19		18:13	32 17:23 (Oerzen 3)	20:09	39 19:38 (Rep 11)	21:02	21:44		
11	08:30	07:47		06:46	16:51 (Oerzen 2)	06:32	18:48 (Oerzen 1)	05:28	04:53		
	16:24	17:21		18:14	29 17:20 (Oerzen 3)	20:11	33 19:38 (Rep 11)	21:04	21:45		
12	08:29	07:45		06:43	16:52 (Oerzen 2)	06:29	19:16 (Rep 11)	05:27	04:52		
	16:26	17:23		18:16	26 17:18 (Oerzen 2)	20:13	22 19:38 (Rep 11)	21:06	21:46		
13	08:28	07:43		06:41	16:53 (Oerzen 2)	06:27	19:15 (Rep 11)	05:25	04:52		
	16:27	17:25		18:18	23 17:16 (Oerzen 2)	20:14	22 19:37 (Rep 11)	21:07	21:46		
14	08:28	07:41		06:38	16:55 (Oerzen 2)	06:25	19:16 (Rep 11)	05:23	04:52		
	16:29	17:27		18:20	20 17:15 (Oerzen 2)	20:16	21 19:37 (Rep 11)	21:09	21:47		
15	08:27	07:39		06:36	16:56 (Oerzen 2)	06:22	19:16 (Rep 11)	05:22	04:52		
	16:31	17:29		18:22	15 17:11 (Oerzen 2)	20:18	20 19:36 (Rep 11)	21:11	21:48		
16	08:26	07:37		06:34	17:01 (Oerzen 2)	06:20	19:17 (Rep 11)	05:20	04:51		
	16:32	17:31		18:24	12 17:58 (Rep 10)	20:20	18 19:35 (Rep 11)	21:12	21:48		
17	08:25	07:35		06:31	17:49 (Rep 10)	06:18	19:19 (Rep 11)	05:18	04:51		
	16:34	17:33		18:26	11 18:00 (Rep 10)	20:21	15 19:34 (Rep 11)	21:14	21:49		
18	08:24	07:33		06:29	17:47 (Rep 10)	06:15	19:19 (Rep 11)	05:17	04:51		
	16:36	17:35		18:27	14 18:01 (Rep 10)	20:23	12 19:31 (Rep 11)	21:15	21:49		
19	08:23	07:31		06:26	17:46 (Rep 10)	06:13	19:23 (Rep 11)	05:15	04:51		
	16:37	17:37		18:29	17 18:03 (Rep 10)	20:25	4 19:27 (Rep 11)	21:17	21:49		
20	08:22	07:29		06:24	17:44 (Rep 10)	06:11		05:14	04:51		
	16:39	17:38		18:31	20 18:04 (Rep 10)	20:27		21:18	21:50		
21	08:20	07:26		06:22	17:44 (Rep 10)	06:09		05:12	04:52		
	16:41	17:40		18:33	21 18:05 (Rep 10)	20:29		21:20	21:50		
22	08:19	07:24		06:19	17:44 (Rep 10)	06:07		05:11	04:52		
	16:43	17:42		18:35	21 18:05 (Rep 10)	20:30		21:22	21:50		
23	08:18	07:22		06:17	17:43 (Rep 10)	06:04		05:10	04:52		
	16:44	17:44		18:36	21 18:04 (Rep 10)	20:32		21:23	21:50		
24	08:17	07:20		06:14	17:43 (Rep 10)	06:02		05:08	04:52		
	16:46	17:46		18:38	22 18:05 (Oerzen 1)	20:34		21:24	21:51		
25	08:15	07:18	17:01 (Oerzen 2)	06:12	17:43 (Rep 10)	06:00		05:07	04:53		
	16:48	17:48	13 17:14 (Oerzen 2)	18:40	24 18:07 (Oerzen 1)	20:36		21:26	21:51		
26	08:14	07:16	16:59 (Oerzen 2)	06:10	17:44 (Rep 10)	05:58		05:06	04:53		
	16:50	17:50	24 17:23 (Oerzen 3)	18:42	25 18:09 (Oerzen 1)	20:38		21:27	21:51		
27	08:13	07:13	16:57 (Oerzen 2)	06:07	17:44 (Rep 10)	05:56		05:05	04:53		
	16:52	17:52	28 17:25 (Oerzen 3)	18:44	26 18:10 (Oerzen 1)	20:39		21:29	21:50		
28	08:11	07:11	16:55 (Oerzen 2)	06:05	17:45 (Oerzen 1)	05:54		05:04	04:54		
	16:54	17:54	31 17:26 (Oerzen 3)	18:45	26 18:11 (Oerzen 1)	20:41		21:30	21:50		
29	08:10			07:02	18:44 (Oerzen 1)	05:52		05:02	04:55		
	16:56			19:47	28 19:12 (Oerzen 1)	20:43		21:31	21:50		
30	08:08			07:00	18:43 (Oerzen 1)	05:50		05:01	04:55		
	16:58			19:49	28 19:11 (Oerzen 1)	20:45		21:33	21:50		
31	08:06			06:58	18:42 (Oerzen 1)			05:00			
	16:59			19:51	30 19:12 (Oerzen 1)			21:34			
Sonnenscheinstunden		253		367		419		491		506	
astr.max.mögl.Beschattung			96		812		530				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s24 - Oerzen, Mühlenweg 18

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56 21:50	05:34 21:16		06:27 20:11	34	18:47 (Oerzen 1) 19:37 (Rep 11)	07:19 18:58	25	17:32 (Oerzen 2) 17:57 (Oerzen 2)	07:16 16:49	08:09 16:06
2	04:57 21:49	05:36 21:14		06:29 20:08	39	18:44 (Oerzen 1) 19:37 (Rep 11)	07:21 18:56	26	17:31 (Oerzen 2) 17:57 (Oerzen 3)	07:18 16:47	08:11 16:06
3	04:57 21:49	05:38 21:12		06:31 20:06	42	18:41 (Oerzen 1) 19:36 (Rep 11)	07:23 18:54	30	17:30 (Oerzen 2) 18:00 (Oerzen 3)	07:20 16:45	08:12 16:05
4	04:58 21:48	05:39 21:10		06:32 20:04	43	18:40 (Oerzen 1) 19:35 (Rep 11)	07:24 18:51	33	17:28 (Oerzen 2) 18:01 (Oerzen 3)	07:21 16:43	08:14 16:04
5	04:59 21:48	05:41 21:08		06:34 20:01	43	18:39 (Oerzen 1) 19:34 (Rep 11)	07:26 18:49	35	17:27 (Oerzen 2) 18:02 (Oerzen 3)	07:23 16:42	08:15 16:04
6	05:00 21:47	05:43 21:07		06:36 19:59	41	18:37 (Oerzen 1) 19:31 (Rep 11)	07:28 18:46	36	17:27 (Oerzen 2) 18:03 (Oerzen 3)	07:25 16:40	08:16 16:03
7	05:01 21:47	05:44 21:05		06:38 19:56	39	18:36 (Oerzen 1) 19:29 (Rep 11)	07:30 18:44	36	17:27 (Oerzen 2) 18:03 (Oerzen 3)	07:27 16:38	08:18 16:03
8	05:02 21:46	05:46 21:03		06:39 19:54	29	18:36 (Oerzen 1) 19:05 (Oerzen 1)	07:31 18:42	37	17:27 (Oerzen 2) 18:04 (Oerzen 3)	07:29 16:36	08:19 16:02
9	05:03 21:45	05:48 21:01		06:41 19:52	29	18:35 (Oerzen 1) 19:04 (Oerzen 1)	07:33 18:39	37	17:27 (Oerzen 2) 18:04 (Oerzen 3)	07:31 16:34	08:20 16:02
10	05:04 21:44	05:49 20:59		06:43 19:49	31	18:34 (Oerzen 1) 19:05 (Oerzen 1)	07:35 18:37	36	17:26 (Oerzen 2) 18:02 (Oerzen 3)	07:33 16:33	08:21 16:02
11	05:05 21:44	05:51 20:57		06:44 19:47	30	18:34 (Oerzen 1) 19:04 (Oerzen 1)	07:37 18:35	36	17:26 (Oerzen 2) 18:02 (Oerzen 3)	07:35 16:31	08:23 16:01
12	05:06 21:43	05:53 20:55		06:46 19:44	29	18:34 (Oerzen 1) 19:03 (Oerzen 1)	07:39 18:32	34	17:27 (Oerzen 2) 18:01 (Oerzen 3)	07:36 16:29	08:24 16:01
13	05:07 21:42	05:55 20:53		06:48 19:42	29	18:34 (Oerzen 1) 19:03 (Oerzen 1)	07:40 18:30	32	17:28 (Oerzen 2) 18:00 (Oerzen 3)	07:38 16:28	08:25 16:01
14	05:08 21:41	05:56 20:51		06:50 19:39	28	18:34 (Oerzen 1) 19:02 (Oerzen 1)	07:42 18:28	30	17:29 (Oerzen 2) 17:59 (Oerzen 3)	07:40 16:26	08:26 16:01
15	05:10 21:40	05:58 20:49		06:51 19:37	26	18:34 (Oerzen 1) 19:00 (Oerzen 1)	07:44 18:25	27	17:30 (Oerzen 2) 17:57 (Oerzen 3)	07:42 16:25	08:27 16:01
16	05:11 21:39	06:00 20:46		06:53 19:35	25	18:34 (Rep 10) 18:59 (Oerzen 1)	07:46 18:23	21	17:32 (Oerzen 2) 17:53 (Oerzen 3)	07:44 16:23	08:28 16:01
17	05:12 21:38	06:01 20:44		06:55 19:32	26	18:32 (Rep 10) 18:58 (Oerzen 1)	07:48 18:21	10	17:35 (Oerzen 2) 17:45 (Oerzen 2)	07:46 16:22	08:28 16:01
18	05:14 21:36	06:03 20:42		06:56 19:30	25	18:30 (Rep 10) 18:55 (Oerzen 1)	07:50 18:19			07:48 16:20	08:29 16:02
19	05:15 21:35	06:05 20:40		06:58 19:27	23	18:30 (Rep 10) 18:53 (Oerzen 1)	07:51 18:16			07:49 16:19	08:30 16:02
20	05:16 21:34	06:07 20:38		07:00 19:25	22	18:29 (Rep 10) 18:51 (Rep 10)	07:53 18:14			07:51 16:18	08:30 16:02
21	05:18 21:33	06:08 20:36		07:02 19:22	22	18:29 (Rep 10) 18:51 (Rep 10)	07:55 18:12			07:53 16:16	08:31 16:03
22	05:19 21:31	06:10 20:33		07:03 19:20	21	18:28 (Rep 10) 18:49 (Rep 10)	07:57 18:10			07:55 16:15	08:32 16:03
23	05:21 21:30	06:12 20:31		07:05 19:18	20	18:29 (Rep 10) 18:49 (Rep 10)	07:59 18:08			07:56 16:14	08:32 16:04
24	05:22 21:28	06:13 20:29	6	07:07 19:15	19	18:29 (Rep 10) 18:48 (Rep 10)	08:01 18:06			07:58 16:13	08:33 16:04
25	05:24 21:27	06:15 20:27	12	07:09 19:13	15	18:29 (Rep 10) 18:44 (Rep 10)	07:03 17:03			08:00 16:12	08:33 16:05
26	05:25 21:25	06:17 20:24	16	07:10 19:10	12	18:30 (Rep 10) 18:42 (Rep 10)	07:04 17:01			08:01 16:11	08:33 16:06
27	05:27 21:24	06:19 20:22	18	07:12 19:08	7	18:33 (Rep 10) 18:40 (Rep 10)	07:06 16:59			08:03 16:10	08:34 16:06
28	05:28 21:22	06:20 20:20	20	07:14 19:06	13	17:39 (Oerzen 2) 17:52 (Oerzen 2)	07:08 16:57			08:05 16:09	08:34 16:07
29	05:30 21:21	06:22 20:18	21	07:16 19:03	19	17:35 (Oerzen 2) 17:54 (Oerzen 2)	07:10 16:55			08:06 16:08	08:34 16:08
30	05:31 21:19	06:24 20:15	22	07:17 19:01	22	17:33 (Oerzen 2) 17:55 (Oerzen 2)	07:12 16:53			08:08 16:07	08:34 16:09
31	05:33 21:17	06:25 20:13	22	07:14 19:38 (Rep 11)			07:14 16:51				08:34 16:10
Sonnenscheinstunden		509		382			329			261	237
astr.max.mögl.Beschattung			137		803		521				

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	

## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s25 - Südergellersen, Auf dem Brink 6

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrichtungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März		April		Mai		Juni		Juli		August		September		Oktober		November		Dezember	
1	08:34	14:35 (WEA 7)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16	08:10	14:28 (WEA 7)										
	16:11	22	14:57 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:06	9	14:37 (WEA 7)								
2	08:34	14:36 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11	14:27 (WEA 7)										
	16:12	22	14:58 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06	12	14:39 (WEA 7)								
3	08:34	14:37 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:12	14:27 (WEA 7)										
	16:14	21	14:58 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05	14	14:41 (WEA 7)								
4	08:34	14:37 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14	14:26 (WEA 7)										
	16:15	21	14:58 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04	16	14:42 (WEA 7)								
5	08:33	14:39 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	14:26 (WEA 7)										
	16:16	19	14:58 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04	17	14:43 (WEA 7)								
6	08:33	14:39 (WEA 7)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25	08:17	14:25 (WEA 7)										
	16:17	19	14:58 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40	16:03	19	14:44 (WEA 7)								
7	08:32	14:40 (WEA 7)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	14:25 (WEA 7)										
	16:19	17	14:57 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38	16:03	19	14:44 (WEA 7)								
8	08:32	14:42 (WEA 7)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	14:26 (WEA 7)										
	16:20	16	14:58 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02	20	14:46 (WEA 7)								
9	08:31	14:43 (WEA 7)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	14:25 (WEA 7)										
	16:21	14	14:57 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02	21	14:46 (WEA 7)								
10	08:31	14:44 (WEA 7)	07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	07:33	08:22	14:25 (WEA 7)										
	16:23	12	14:56 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02	22	14:47 (WEA 7)								
11	08:30	14:46 (WEA 7)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35	08:23	14:25 (WEA 7)										
	16:24	9	14:55 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02	22	14:47 (WEA 7)								
12	08:29		07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	14:26 (WEA 7)										
	16:26		17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01	23	14:49 (WEA 7)									
13	08:29		07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25	14:26 (WEA 7)										
	16:27		17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01	24	14:50 (WEA 7)									
14	08:28		07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	14:27 (WEA 7)										
	16:29		17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01	23	14:50 (WEA 7)									
15	08:27		07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	14:27 (WEA 7)										
	16:31		17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01	24	14:51 (WEA 7)									
16	08:26		07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44	08:28	14:27 (WEA 7)										
	16:32		17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01	24	14:51 (WEA 7)									
17	08:25		07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46	08:29	14:27 (WEA 7)										
	16:34		17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	16:02	24	14:51 (WEA 7)									
18	08:24		07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29	14:28 (WEA 7)										
	16:36		17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	16:02	24	14:52 (WEA 7)									
19	08:23		07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30	14:28 (WEA 7)										
	16:37		17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02	25	14:53 (WEA 7)									
20	08:22		07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31	14:28 (WEA 7)										
	16:39		17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02	25	14:53 (WEA 7)									
21	08:21		07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31	14:29 (WEA 7)										
	16:41		17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17	16:03	25	14:54 (WEA 7)									
22	08:19		07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32	14:29 (WEA 7)										
	16:43		17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03	25	14:54 (WEA 7)									
23	08:18		07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32	14:30 (WEA 7)										
	16:45		17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04	25	14:55 (WEA 7)									
24	08:17		07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58	08:33	14:30 (WEA 7)										
	16:46		17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04	25	14:55 (WEA 7)									
25	08:16		07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00	08:33	14:31 (WEA 7)										
	16:48		17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	16:05	24	14:55 (WEA 7)									
26	08:14		07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02	08:33	14:32 (WEA 7)										
	16:50		17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	16:06	24	14:56 (WEA 7)									
27	08:13		07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:03	08:34	14:32 (WEA 7)										
	16:52		17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	16:59	16:10	16:06	24	14:56 (WEA 7)									
28	08:11		07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05	08:34	14:33 (WEA 7)										
	16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	16:57	16:09	16:07	24	14:57 (WEA 7)									
29	08:10		07:03	05:52	05:03	04:55	05:30	06:22	07:16	08:10	09:06	09:03	08:34	14:33 (WEA 7)										
	16:56		19:47	20:43	21:32	21:50	21:21	20:18	19:03	16:55	16:08	16:08	16:08	24	14:57 (WEA 7)									
30	08:08		07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	09:08	09:05	08:34	14:34 (WEA 7)										
	16:58		19:49	20:45	21:33	21:50	21:19	20:15	19:01	16:53	16:07	16:07	16:09	23	14:57 (WEA 7)									
31	08:07		06:58		05:00		05:33	06:26		07:14			08:34	14:35 (WEA 7)										
	17:00		19:51		21:34		21:17	20:13		16:51			16:10	23	14:58 (WEA 7)									
Sonnenscheinstunden	253		275	367	419	491	506	509	458	382	329	261	237											
astr.max.mögl.Beschattung		192																						67

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



Projekt:

Süderheide

Lizenzierter Anwender:

SOWIWAS - Energie GmbH

Watenstedter Straße 11

DE-38384 Gevensleben

+49 0 53 54 / 99 06 - 235

/ gutachten@sowiwas.de

Berechnet:

21.07.2025 16:43/4.1.287

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s26 - Südergellersen, Auf dem Brink 7

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrichtungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:34	14:40 (WEA 7)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16	08:10	14:29 (WEA 7)
2	16:11	26 15:06 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:06	20 14:49 (WEA 7)
3	08:34	14:41 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11	14:29 (WEA 7)
4	16:12	26 15:07 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06	22 14:51 (WEA 7)
5	08:34	14:42 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:12	14:30 (WEA 7)
6	16:14	25 15:07 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05	22 14:52 (WEA 7)
7	08:34	14:42 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14	14:29 (WEA 7)
8	16:15	25 15:07 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04	23 14:52 (WEA 7)
9	08:33	14:43 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	14:30 (WEA 7)
10	16:16	25 15:08 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04	23 14:53 (WEA 7)
11	08:33	14:43 (WEA 7)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25	08:17	14:29 (WEA 7)
12	16:17	25 15:08 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40	16:03	25 14:54 (WEA 7)
13	08:32	14:43 (WEA 7)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	14:29 (WEA 7)
14	16:19	24 15:07 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38	16:03	25 14:54 (WEA 7)
15	08:32	14:45 (WEA 7)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	14:30 (WEA 7)
16	16:20	23 15:08 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02	25 14:55 (WEA 7)
17	08:31	14:45 (WEA 7)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	14:30 (WEA 7)
18	16:21	23 15:08 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02	25 14:55 (WEA 7)
19	08:31	14:46 (WEA 7)	07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	07:33	08:22	14:30 (WEA 7)
20	16:23	21 15:07 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02	26 14:56 (WEA 7)
21	08:30	14:47 (WEA 7)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35	08:23	14:30 (WEA 7)
22	16:24	20 15:07 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02	26 14:56 (WEA 7)
23	08:29	14:48 (WEA 7)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	14:31 (WEA 7)
24	16:26	19 15:07 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01	27 14:58 (WEA 7)
25	08:29	14:50 (WEA 7)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25	14:31 (WEA 7)
26	16:27	17 15:07 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01	27 14:58 (WEA 7)
27	08:28	14:51 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	14:32 (WEA 7)
28	16:29	15 15:06 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01	27 14:59 (WEA 7)
29	08:27	14:52 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	14:32 (WEA 7)
30	16:31	13 15:05 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01	27 14:59 (WEA 7)
31	08:26	14:55 (WEA 7)	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44	08:28	14:32 (WEA 7)
1	16:32	8 15:03 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01	27 14:59 (WEA 7)
2	08:25		07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	07:46	08:29	14:32 (WEA 7)
3	16:34		17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	16:02	27 14:59 (WEA 7)
4	08:24		07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29	14:33 (WEA 7)
5	16:36		17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	16:02	27 15:00 (WEA 7)
6	08:23		07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30	14:34 (WEA 7)
7	16:37		17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02	27 15:01 (WEA 7)
8	08:22		07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31	14:34 (WEA 7)
9	16:39		17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02	27 15:01 (WEA 7)
10	08:21		07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31	14:35 (WEA 7)
11	16:41		17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17	16:03	27 15:02 (WEA 7)
12	08:19		07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32	14:35 (WEA 7)
13	16:43		17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03	27 15:02 (WEA 7)
14	08:18		07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32	14:36 (WEA 7)
15	16:45		17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04	27 15:03 (WEA 7)
16	08:17		07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58	08:33	14:36 (WEA 7)
17	16:46		17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04	27 15:03 (WEA 7)
18	08:16		07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	07:03	08:00	08:33	14:36 (WEA 7)
19	16:48		17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	17:04	16:12	16:05	27 15:03 (WEA 7)
20	08:14		07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	07:05	08:02	08:33	14:37 (WEA 7)
21	16:50		17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	17:01	16:11	8 14:42 (WEA 7)	16:06 27 15:04 (WEA 7)
22	08:13		07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	07:06	08:03	08:34	14:38 (WEA 7)
23	16:52		17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	16:59	16:10	13 14:45 (WEA 7)	16:06 27 15:05 (WEA 7)
24	08:11		07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	07:08	08:05	08:34	14:38 (WEA 7)
25	16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	16:57	16:09	15 14:46 (WEA 7)	16:07 27 15:05 (WEA 7)
26	08:10			07:03	05:52	05:03	04:55	05:30	06:22	07:16	07:10	08:06	08:34	14:39 (WEA 7)
27	16:56			19:47	20:43	21:32	21:50	21:21	20:18	19:03	16:55	16:08	17 14:47 (WEA 7)	16:08 26 15:05 (WEA 7)
28	08:08			07:00	05:50	05:01	04:55	05:31	06:24	07:17	07:12	08:08	08:34	14:39 (WEA 7)
29	16:58			19:49	20:45	21:33	21:50	21:19	20:15	19:01	16:53	16:07	19 14:49 (WEA 7)	27 15:06 (WEA 7)
30	08:07			06:58		05:00		05:33	06:26		07:14		08:34	14:40 (WEA 7)
31	17:00			19:51		21:34		21:17	20:13		16:51		16:10	26 15:06 (WEA 7)
Sonnenscheinstunden		253												
astr.max.mögl.Beschattung		335	275	367	419	491	506	509	458	382	329	261	237	800

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s27 - Südergellersen, Birkenweg 7

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	14:38 (WEA 7)	08:05	07:09	06:55	05:48	04:59	04:56	05:35	06:27	07:19	08:10
16:11	11	14:49 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49
2	08:34	14:40 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	08:11
16:12	9	14:49 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47
3	08:34	14:42 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	08:12
16:14	7	14:49 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45
4	08:34	14:44 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	08:14
16:15	2	14:46 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44
5	08:33		07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	08:15
16:16			17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42
6	08:33		07:56	06:57	06:43	05:38	04:55	05:00	05:43	06:36	07:28	08:17
16:17			17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40
7	08:32		07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	08:18
16:19			17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38
8	08:32		07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	08:19
16:20			17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36
9	08:31		07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	08:20
16:21			17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35
10	08:31		07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	08:22
16:23			17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33
11	08:30		07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	08:23
16:24			17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31
12	08:29		07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	08:24
16:26			17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30
13	08:29		07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	08:25
16:27			17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28
14	08:28		07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	08:26
16:29			17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26
15	08:27		07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	08:27
16:31			17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25
16	08:26		07:37	06:34	06:20	05:20	04:51	05:11	06:00	06:53	07:46	08:28
16:32			17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23
17	08:25		07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	08:29
16:34			17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22
18	08:24		07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	08:29
16:36			17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20
19	08:23		07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	08:30
16:37			17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19
20	08:22		07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	08:31
16:39			17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18
21	08:21		07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	08:31
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16:43			17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15
23	08:18		07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	08:32
16:45			17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14
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16:46			17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13
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16:48			17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12
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16:52			17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10
28	08:11		07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:34
16:54			17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09
29	08:10			07:03	05:52	05:02	04:55	05:30	06:22	07:16	08:10	08:34
16:56				19:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08
30	08:08			07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	08:34
16:58				19:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07
31	08:07			06:58		05:00		05:33	06:26		07:14	08:34
17:00				19:51		21:34		21:17	20:13		16:51	16:10
Sonnenscheinstunden	253											
astr.max.mögl.Beschattung	29	275	367	419	491	506	509	458	382	329	261	237

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s28 - Südergellersen, Forstweg 4

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34 16:11 35 16:13 32 16:14 28 16:15 22 16:16 22 16:17 20 16:18 19 16:19 18 16:20 18 16:21 16 16:22 13 16:23 13 16:24 10 16:25 5 16:26 5 16:27 14 16:28 14 16:29 15 16:30 16 16:31 16 16:32 17 16:33 18 16:34 18 16:35 19 16:36 20 16:37 21 16:38 21 16:39 22 16:40 23 16:41 24 16:42 25 16:43 26 16:44 27 16:45 28 16:46 29 16:47 30 16:48 31 16:49 17:00	08:05 17:01 08:03 17:03 08:02 17:05 08:00 17:07 08:00 17:09 08:00 17:11 08:00 17:13 08:00 17:15 08:00 17:17 08:00 17:19 08:00 17:21 08:00 17:23 08:00 17:25 08:00 17:27 08:00 17:29 08:00 17:31 08:00 17:33 08:00 17:35 08:00 17:37 08:00 17:39 08:00 17:41 08:00 17:43 08:00 17:45 08:00 17:47 08:00 17:49 08:00 17:51 08:00 17:53 08:00 17:55 08:00 17:57 08:00 17:59 08:00 18:01 08:00 18:03 08:00 18:05 08:00 18:07 08:00 18:09 08:00 18:11 08:00 18:13 08:00 18:15 08:00 18:17 08:00 18:19 08:00 18:21 08:00 18:23 08:00 18:25 08:00 18:27 08:00 18:29 08:00 18:31 08:00 18:33 08:00 18:35 08:00 18:37 08:00 18:39 08:00 18:41 08:00 18:43 08:00 18:45 08:00 18:47 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08:42 16:07 08:43 16:07 08:44 16:07 08:45 16:07 08:46 16:07 08:47 16:07 08:48 16:07 08:49 16:07 08:50 16:07 08:51 16:07 08:52 16:07 08:53 16:07 08:54 16:07 08:55 16:07 08:56 16:07 08:57 16:07 08:58 16:07 08:59 16:07 09:00 16:07 09:01 16:07 09:02 16:07 09:03 16:07 09:04 16:07 09:05 16:07 09:06 16:07 09:07 16:07 09:08 16:07 09:09 16:07 09:10 16:07 09:11 16:07 09:12 16:07 09:13 16:07 09:14 16:07 09:15 16:07 09:16 16:07 09:17 16:07 09:18 16:07 09:19 16:07 09:20 16:07 09:21 16:07 09:22 16:07 09:23 16:07 09:24 16:07 09:25 16:07 09:26 16:07 09:27 16:07 09:28 16:07 09:29 16:07 09:30 16:07 09:31 16:07 09:32 16:07 09:33 16:07 09:34 16:07 09:35 16:07 09:36 16:07 09:37 16:07 09:38 16:07 09:39 16:07 09:40 16:07 09:41 16:07 09:42 16:07 09:43 16:07 09:44 16:07 09:45 16:07 09:46 16:07 09:47 16:07 09:48 16:07 09:49 16:07 09:50 16:07 09:51 16:07 09:52 16:07 09:53 16:07 09:54 16:07 09:55 16:07 09:56 16:07 09:57 16:07 09:58 16:07 09:59 16:07 10:00 16:07	08:10 16:06 08:11 16:06 08:12 16:05 08:14 16:05 08:15 16:04 08:17 16:03 08:18 16:03 08:19 16:02 08:20 16:02 08:21 16:02 08:22 16:02 08:23 16:02 08:24 16:02 08:25 16:02 08:26 16:02 08:27 16:02 08:28 16:02 08:29 16:02 08:30 16:02 08:31 16:02 08:32 16:02 08:33 16:02 08:34 16:02 08:35 16:02 08:36 16:02 08:37 16:02 08:38 16:02 08:39 16:02 08:40 16:02 08:41 16:02 08:42 16:02 08:43 16:02 08:44 16:02 08:45 16:02 08:46 16:02 08:47 16:02 08:48 16:02 08:49 16:02 08:50 16:02 08:51 16:02 08:52 16:02 08:53 16:02 08:54 16:02 08:55 16:02 08:56 16:02 08:57 16:02 08:58 16:02 08:59 16:02 09:00 16:02 09:01 16:02 09:02 16:02 09:03 16:02 09:04 16:02 09:05 16:02 09:06 16:02 09:09				

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s29 - Südergellersen, Forstweg 8

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34 16:11	09:48 (Oerzen 1) 14:28 (WEA 7)	08:05 17:01	07:09 17:56	06:55 19:53	05:48 20:47	05:00 21:35	04:56 21:50	05:35 21:16	06:27 20:11	07:19 18:58	08:10 16:06
2	08:34 16:13	09:49 (Oerzen 1) 14:28 (WEA 7)	08:03 17:03	07:07 17:58	06:53 19:55	05:46 20:48	04:59 21:36	04:57 21:49	05:36 21:14	06:29 20:08	07:21 18:56	08:11 16:06
3	08:34 16:14	09:51 (Oerzen 1) 14:28 (WEA 7)	08:02 17:05	07:04 18:00	06:51 19:56	05:44 20:50	04:58 21:38	04:57 21:49	05:38 21:12	06:31 20:06	07:23 18:54	08:13 16:05
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7	08:32 16:19	14:19 (WEA 7) 14:23 (WEA 7)	07:55 17:13	06:55 18:07	06:41 20:04	05:36 20:57	04:55 21:42	05:01 21:47	05:44 21:05	06:38 19:57	07:30 18:44	08:18 16:02
8	08:32 16:20	07:53 17:15	06:53 18:09	06:39 20:05	05:34 20:59	04:54 21:43	05:02 21:46	05:06 21:43	05:46 21:03	06:39 19:54	07:32 18:42	08:19 16:02
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18	08:24 16:36	07:33 17:35	06:29 18:27	06:16 20:23	05:17 21:16	04:51 21:49	05:14 21:37	05:18 20:42	06:03 21:09	06:57 19:30	07:50 18:19	08:29 16:02
19	08:23 16:37	07:31 17:37	06:27 18:29	06:13 20:25	05:15 21:17	04:51 21:50	05:15 21:35	05:19 20:40	06:05 21:07	06:58 19:27	07:52 18:17	08:30 16:02
20	08:22 16:39	07:29 17:39	06:24 18:31	06:11 20:27	05:14 21:19	04:51 21:50	05:16 21:34	05:20 20:38	06:07 21:05	07:00 19:25	07:53 18:14	08:31 16:02
21	08:21 16:41	07:27 17:41	06:22 18:33	06:09 20:29	05:13 21:20	04:52 21:50	05:18 21:33	05:22 20:36	06:08 21:03	07:02 19:23	07:55 18:12	08:31 16:03
22	08:19 16:43	07:24 17:42	06:19 18:35	06:07 20:31	05:11 21:22	04:52 21:50	05:19 21:31	05:23 20:34	06:10 21:09	07:03 19:20	07:57 18:10	08:32 16:03
23	08:18 16:45	07:22 17:44	06:17 18:37	06:04 20:32	05:10 21:23	04:52 21:51	05:21 21:30	05:25 20:31	06:12 21:07	07:05 19:18	07:59 18:08	08:32 16:04
24	08:17 16:46	07:20 17:46	06:15 18:38	06:02 20:34	05:08 21:25	04:52 21:51	05:22 21:29	05:26 20:29	06:14 21:15	07:07 19:15	07:58 18:06	08:33 16:04
25	08:16 16:48	07:18 17:48	06:12 18:40	06:00 20:36	05:07 21:26	04:53 21:51	05:24 21:27	05:28 20:27	06:15 21:13	07:09 19:13	07:03 17:04	08:00 16:12
26	08:14 16:50	07:16 17:50	06:10 18:42	05:58 20:38	05:06 21:27	04:53 21:51	05:25 21:26	05:29 20:25	06:17 21:10	07:10 19:10	07:05 17:01	08:02 16:11
27	08:13 16:52	07:13 17:52	06:07 18:44	05:56 20:40	05:05 21:29	04:54 21:51	05:27 21:24	05:31 20:22	06:19 21:08	07:12 19:08	07:06 16:59	08:03 16:10
28	08:11 16:54	07:11 17:54	06:05 18:46	05:54 20:41	05:04 21:30	04:54 21:51	05:28 21:22	05:32 20:20	06:20 21:06	07:14 19:06	07:08 16:57	08:05 16:09
29	08:10 16:56		07:03 19:47	05:52 20:43	05:03 21:32	04:55 21:50	05:30 21:21	05:34 20:18	06:22 21:07	07:16 19:03	07:10 16:55	08:06 16:08
30	08:08 16:58		07:00 19:49	05:50 20:45	05:01 21:33	04:55 21:50	05:31 21:19	05:35 20:15	06:24 21:05	07:17 19:01	07:12 16:53	08:08 16:07
31	08:07 17:00		06:58 19:51		05:00 21:34		05:33 21:17	06:26 20:13		07:14 16:51		08:34 16:10
Sonnenscheinstunden	253											
astr.max.mögl.Beschattung	165	275	367	419	491	506	509	458	382	329	261	237
												1111

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s30 - Südergellersen, Forstweg 11

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	09:34 (Oerzen 1)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	08:10
16:11	64	14:20 (WEA 7)	17:02	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49
2	08:34	09:35 (Oerzen 1)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	08:11
16:13	62	14:21 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47
3	08:34	09:36 (Oerzen 1)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	08:13
16:14	58	14:21 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45
4	08:34	09:36 (Oerzen 1)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	08:14
16:15	55	14:20 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44
5	08:33	09:38 (Oerzen 1)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	08:15
16:16	49	14:20 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42
6	08:33	09:38 (Oerzen 1)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	08:17
16:17	44	14:18 (WEA 7)	17:11	18:05	20:02	20:56	21:41	21:48	21:07	19:59	18:46	16:40
7	08:32	09:39 (Oerzen 1)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	08:18
16:19	34	14:16 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:57	18:44	16:38
8	08:32	09:40 (Oerzen 1)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	08:19
16:20	24	10:44 (Rep 11)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36
9	08:31	09:41 (Oerzen 1)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	08:20
16:21	17	09:58 (Oerzen 1)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35
10	08:31	09:42 (Oerzen 1)	07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	08:22
16:23	15	09:57 (Oerzen 1)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33
11	08:30	09:43 (Oerzen 1)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:45	07:37	08:23
16:24	13	09:56 (Oerzen 1)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31
12	08:29	09:46 (Oerzen 1)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	08:24
16:26	10	09:56 (Oerzen 1)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30
13	08:29	09:49 (Oerzen 1)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	08:25
16:27	5	09:54 (Oerzen 1)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28
14	08:28		07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	08:26
16:29			17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26
15	08:27		07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	08:27
16:31			17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25
16	08:26		07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	08:28
16:32			17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23
17	08:25		07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	08:29
16:34			17:33	18:26	20:22	21:14	21:49	21:38	20:45	19:32	18:21	16:22
18	08:24		07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	08:29
16:36			17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:21
19	08:23		07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	08:30
16:37			17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19
20	08:22		07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	08:31
16:39			17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18
21	08:21		07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	08:31
16:41			17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17
22	08:19		07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	08:32
16:43			17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15
23	08:18		07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	08:32
16:45			17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14
24	08:17		07:20	06:15	06:02	05:08	04:52	05:22	06:14	07:07	08:01	08:33
16:46			17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13
25	08:16		07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:33
16:48			17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12
26	08:14		07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:33
16:50			17:50	18:42	20:38	21:28	21:51	21:26	20:25	19:10	18:01	16:11
27	08:13		07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:33
16:52			17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10
28	08:11		07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:34
16:54			17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09
29	08:10			07:03	05:52	05:03	04:55	05:30	06:22	07:16	08:10	08:34
16:56				19:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08
30	08:08			07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	08:34
16:58				19:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07
31	08:07			06:58		05:00		05:33	06:26		07:14	
17:00				19:51		21:34		21:17	20:13		16:51	
Sonnenscheinstunden	253											
astr.max.mögl.Beschattung	450	275	367	419	491	506	509	458	382	329	261	15
												1858

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s31 - Südergellersen, Forstweg 16

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:34	09:34 (Oerzen 1)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16	08:10	09:28 (Oerzen 1)		
	16:11	35	10:40 (Rep 11)	17:02	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:06	5	09:33 (Oerzen 1)
2	08:34	09:35 (Oerzen 1)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11	09:27 (Oerzen 1)		
	16:13	33	10:40 (Rep 11)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06	9	09:36 (Oerzen 1)
3	08:34	09:36 (Oerzen 1)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:13	09:26 (Oerzen 1)		
	16:14	30	10:39 (Rep 11)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05	12	09:38 (Oerzen 1)
4	08:34	09:37 (Oerzen 1)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14	09:25 (Oerzen 1)		
	16:15	25	10:38 (Rep 11)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04	14	09:39 (Oerzen 1)
5	08:33	09:38 (Oerzen 1)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	09:25 (Oerzen 1)		
	16:16	18	09:56 (Oerzen 1)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04	16	09:41 (Oerzen 1)
6	08:33	09:38 (Oerzen 1)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25	08:17	09:25 (Oerzen 1)		
	16:17	17	09:55 (Oerzen 1)	17:11	18:05	20:02	20:56	21:41	21:48	21:07	19:59	18:46	16:40	16:03	16	09:41 (Oerzen 1)
7	08:32	09:40 (Oerzen 1)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	09:24 (Oerzen 1)		
	16:19	16	09:56 (Oerzen 1)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:57	18:44	16:38	16:03	18	09:42 (Oerzen 1)
8	08:32	09:41 (Oerzen 1)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	09:25 (Oerzen 1)		
	16:20	14	09:55 (Oerzen 1)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02	24	10:25 (Rep 11)
9	08:31	09:42 (Oerzen 1)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	09:24 (Oerzen 1)		
	16:21	12	09:54 (Oerzen 1)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02	30	10:27 (Rep 11)
10	08:31	09:44 (Oerzen 1)	07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	07:33	08:22	09:24 (Oerzen 1)		
	16:23	9	09:53 (Oerzen 1)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02	33	10:29 (Rep 11)
11	08:30	09:46 (Oerzen 1)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:45	07:37	07:35	08:23	09:24 (Oerzen 1)		
	16:24	5	09:51 (Oerzen 1)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02	35	10:30 (Rep 11)
12	08:29		07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	09:25 (Oerzen 1)		
	16:26		17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01	37	10:32 (Rep 11)	
13	08:29		07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25	09:26 (Oerzen 1)		
	16:27		17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01	38	10:33 (Rep 11)	
14	08:28		07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	09:26 (Oerzen 1)		
	16:29		17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01	40	10:34 (Rep 11)	
15	08:27		07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	09:26 (Oerzen 1)		
	16:31		17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01	41	10:35 (Rep 11)	
16	08:26		07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44	08:28	09:26 (Oerzen 1)		
	16:32		17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01	42	10:35 (Rep 11)	
17	08:25		07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	07:46	08:29	09:26 (Oerzen 1)		
	16:34		17:33	18:26	20:22	21:14	21:49	21:38	20:45	19:32	18:21	16:22	16:02	43	10:36 (Rep 11)	
18	08:24		07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29	09:27 (Oerzen 1)		
	16:36		17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:21	16:02	43	10:37 (Rep 11)	
19	08:23		07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30	09:28 (Oerzen 1)		
	16:37		17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02	43	10:38 (Rep 11)	
20	08:22		07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31	09:27 (Oerzen 1)		
	16:39		17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02	43	10:37 (Rep 11)	
21	08:21		07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31	09:28 (Oerzen 1)		
	16:41		17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17	16:03	43	10:38 (Rep 11)	
22	08:19		07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32	09:28 (Oerzen 1)		
	16:43		17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03	43	10:38 (Rep 11)	
23	08:18		07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32	09:29 (Oerzen 1)		
	16:45		17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04	43	10:39 (Rep 11)	
24	08:17		07:20	06:15	06:02	05:08	04:52	05:22	06:14	07:07	08:01	07:58	08:33	09:30 (Oerzen 1)		
	16:46		17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04	43	10:40 (Rep 11)	
25	08:16		07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	07:03	08:00	08:33	09:30 (Oerzen 1)		
	16:48		17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	16:05	43	10:40 (Rep 11)	
26	08:14		07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	07:05	08:02	08:33	09:31 (Oerzen 1)		
	16:50		17:50	18:42	20:38	21:28	21:51	21:26	20:25	19:10	18:01	16:11	16:06	43	10:41 (Rep 11)	
27	08:13		07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	07:06	08:03	08:34	09:32 (Oerzen 1)		
	16:52		17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	16:06	42	10:41 (Rep 11)	
28	08:11		07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	07:08	08:05	08:34	09:32 (Oerzen 1)		
	16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:10	16:07	41	10:41 (Rep 11)	
29	08:10			07:03	05:52	05:03	04:55	05:30	06:22	07:16	07:10	08:06	08:34	09:33 (Oerzen 1)		
	16:56			19:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:10	16:08	39	10:41 (Rep 11)	
30	08:08			07:00	05:50	05:01	04:55	05:31	06:24	07:17	07:12	08:08	08:34	09:33 (Oerzen 1)		
	16:58			19:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:10	16:07	39	10:41 (Rep 11)	
31	08:07			06:58		05:00		05:33	06:26		07:14		08:34	09:34 (Oerzen 1)		
	17:00			19:51		21:34		21:17	20:13		16:51		16:10	37	10:41 (Rep 11)	
Sonnenscheinstunden	253															
astr.max.mögl.Beschattung	214	275	367	419	491	506	509	458	382	329	261	237	1038			

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s32 - Südergellersen, Forstweg 17

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März		April		Mai		Juni		Juli		August		September		Oktober		November		Dezember	
1	08:34	09:28 (Oerzen 1)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16	08:10	09:18 (Oerzen 1)										
2	16:11	48 10:39 (Rep 11)	17:02	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:06	16 09:34 (Oerzen 1)										
3	08:34	09:29 (Oerzen 1)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11	09:18 (Oerzen 1)										
4	16:13	46 10:39 (Rep 11)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06	17 09:35 (Oerzen 1)										
5	08:34	09:30 (Oerzen 1)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:13	09:18 (Oerzen 1)										
6	16:14	45 10:39 (Rep 11)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05	28 10:19 (Rep 11)										
7	08:34	09:30 (Oerzen 1)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14	09:18 (Oerzen 1)										
8	16:15	43 10:39 (Rep 11)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04	32 10:21 (Rep 11)										
9	08:33	09:31 (Oerzen 1)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	09:18 (Oerzen 1)										
10	16:16	42 10:39 (Rep 11)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04	36 10:23 (Rep 11)										
11	08:33	09:31 (Oerzen 1)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25	08:17	09:18 (Oerzen 1)										
12	16:17	40 10:38 (Rep 11)	17:11	18:05	20:02	20:56	21:41	21:48	21:07	19:59	18:46	16:40	16:03	39 10:24 (Rep 11)										
13	08:32	09:33 (Oerzen 1)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	09:17 (Oerzen 1)										
14	16:19	36 10:38 (Rep 11)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:57	18:44	16:38	16:03	41 10:25 (Rep 11)										
15	08:32	09:33 (Oerzen 1)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	09:18 (Oerzen 1)										
16	16:20	33 10:37 (Rep 11)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02	43 10:27 (Rep 11)										
17	08:31	09:34 (Oerzen 1)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	09:18 (Oerzen 1)										
18	16:21	28 10:35 (Rep 11)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02	44 10:27 (Rep 11)										
19	08:31	09:35 (Oerzen 1)	07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	07:33	08:22	09:18 (Oerzen 1)										
20	16:23	18 10:31 (Rep 11)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02	46 10:28 (Rep 11)										
21	08:30	09:36 (Oerzen 1)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:45	07:37	07:35	08:23	09:18 (Oerzen 1)										
22	16:24	16 09:52 (Oerzen 1)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02	48 10:29 (Rep 11)										
23	08:29	09:38 (Oerzen 1)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	09:19 (Oerzen 1)										
24	16:26	14 09:52 (Oerzen 1)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01	48 10:30 (Rep 11)										
25	08:29	09:40 (Oerzen 1)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25	09:20 (Oerzen 1)										
26	16:27	11 09:51 (Oerzen 1)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01	53 13:51 (WEA 7)										
27	08:28	09:42 (Oerzen 1)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	09:20 (Oerzen 1)										
28	16:29	8 09:50 (Oerzen 1)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01	58 13:53 (WEA 7)										
29	08:27	09:43 (Oerzen 1)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	09:20 (Oerzen 1)										
30	16:31	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01	60 13:54 (WEA 7)											
31	08:26	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44	08:28	09:20 (Oerzen 1)											
32	16:32	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01	61 13:55 (WEA 7)											
33	08:25	07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	07:46	08:29	09:21 (Oerzen 1)											
34	16:34	17:33	18:26	20:22	21:14	21:49	21:38	20:45	19:32	18:21	16:22	16:02	63 13:56 (WEA 7)											
35	08:24	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29	09:21 (Oerzen 1)											
36	16:36	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:21	16:02	65 13:57 (WEA 7)											
37	08:23	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30	09:22 (Oerzen 1)											
38	16:37	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02	65 13:58 (WEA 7)											
39	08:22	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31	09:22 (Oerzen 1)											
40	16:39	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02	64 13:58 (WEA 7)											
41	08:21	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31	09:23 (Oerzen 1)											
42	16:41	17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17	16:03	66 13:59 (WEA 7)											
43	08:19	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32	09:23 (Oerzen 1)											
44	16:43	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03	66 13:59 (WEA 7)											
45	08:18	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32	09:24 (Oerzen 1)											
46	16:45	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04	66 14:00 (WEA 7)											
47	08:17	07:20	06:15	06:02	05:08	04:52	05:22	06:14	07:07	08:01	07:58	08:33	09:24 (Oerzen 1)											
48	16:46	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04	64 14:00 (WEA 7)											
49	08:16	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00	08:33	09:24 (Oerzen 1)											
50	16:48	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	16:05	65 14:00 (WEA 7)											
51	08:14	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02	08:33	09:25 (Oerzen 1)											
52	16:50	17:50	18:42	20:38	21:28	21:51	21:26	20:25	19:10	18:01	16:11	16:06	64 14:01 (WEA 7)											
53	08:13	07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:03	08:34	09:26 (Oerzen 1)											
54	16:52	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	16:06	61 14:01 (WEA 7)											
55	08:11	06:49	05:58	05:44	05:04	04:54	05:28	06:20	07:14	08:08	08:05	08:34	09:26 (Oerzen 1)											
56	16:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	16:57	16:00	8 09:21 (Oerzen 1)	16:07	59 14:00 (WEA 7)											
57	08:10	07:03	05:52	05:43	04:55	05:30	06:22	07:16	08:10	09:04	09:20 (Oerzen 1)	16:08	58 14:00 (WEA 7)											
58	16:56	19:47	20:43	21:32	21:50	21:21	20:18	19:03	16:55	16:08	11 09:31 (Oerzen 1)	16:08	58 14:00 (WEA 7)											
59	08:08	07:00	05:50	05:41	04:55	05:31	06:24	07:17	08:11	09:05	09:19 (Oerzen 1)	16:08	58 14:00 (WEA 7)											
60	16:58	19:49	20:45	21:33	21:50	21:19	20:15	19:01	16:53	16:07	14 09:33 (Oerzen 1)	16:09	54 13:59 (WEA 7)											
61	08:07	06:58	05:48	05:40	05:00	05:33	06:26	07:19	08:13	09:07	09:14	08:34	09:28 (Oerzen 1)											
62	17:00	19:51	20:45	21:34	21:51	21:17	20:13	19:00	16:51	16:05	14 09:33 (Oerzen 1)	16:10	48 10:39 (Rep 11)											
Sonnenscheinstunden		253	275	367	419	491	506	509	458	382	329	261	33	1598										
astr.max.mögl.Beschattung		428																						

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende	(WEA mit letztem Schatten)
	Minuten mit Schatten		



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s33 - Südergellersen, Gewerbegebiet

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März		April		Mai		Juni	
1	08:34	10:27 (Oerzen 2)	08:05	10:38 (Oerzen 1)	07:09	10:16 (Oerzen 1)	06:55	17:28 (Rep 11)	05:48	16:51 (Rep 11)	05:00
2	16:11	130 15:18 (Oerzen 4)	17:01	135 16:20 (B 02)	17:56	194 17:24 (WEA 6)	19:53	97 19:27 (B 01)	20:47	102 18:33 (Rep 11)	21:35
3	08:34	10:28 (Oerzen 2)	08:03	10:36 (Oerzen 1)	07:07	10:16 (Oerzen 1)	06:53	17:24 (Rep 11)	05:46	16:50 (Rep 11)	04:59
4	16:13	130 15:19 (Oerzen 4)	17:03	141 16:20 (B 02)	17:58	194 17:25 (WEA 6)	19:55	99 19:27 (B 01)	20:48	103 18:33 (Rep 11)	21:36
5	08:34	10:28 (Oerzen 2)	08:02	10:35 (Oerzen 1)	07:04	10:15 (Oerzen 1)	06:51	17:21 (Rep 11)	05:44	16:50 (Rep 11)	04:58
6	16:14	131 15:19 (Oerzen 4)	17:05	144 16:20 (B 02)	18:00	192 17:25 (WEA 6)	19:56	97 19:28 (B 01)	20:50	103 18:33 (Rep 11)	21:38
7	08:33	10:29 (Oerzen 2)	08:00	10:34 (Oerzen 1)	07:02	10:15 (Oerzen 1)	06:48	17:17 (Rep 11)	05:42	16:50 (Rep 11)	04:57
8	16:15	131 15:20 (Oerzen 4)	17:07	155 16:37 (Rep 5)	18:02	189 17:26 (WEA 6)	19:58	89 19:28 (B 01)	20:52	102 18:32 (Rep 11)	21:39
9	08:33	10:29 (Oerzen 2)	07:58	10:33 (Oerzen 1)	07:00	10:16 (Oerzen 1)	06:46	17:15 (Rep 11)	05:40	16:50 (Rep 11)	04:56
10	16:16	132 15:21 (Oerzen 4)	17:09	163 16:39 (Rep 5)	18:03	184 17:27 (WEA 6)	20:00	93 19:28 (B 01)	20:54	102 18:32 (Rep 11)	21:40
11	08:33	10:29 (Oerzen 2)	07:56	10:32 (Oerzen 1)	06:57	10:15 (Oerzen 1)	06:43	17:13 (Rep 11)	05:38	16:51 (Rep 11)	04:56
12	16:17	134 15:22 (Oerzen 4)	17:11	169 16:41 (Rep 5)	18:05	179 17:26 (WEA 6)	20:02	99 19:29 (B 01)	20:55	102 18:33 (Rep 11)	21:41
13	08:32	10:29 (Oerzen 2)	07:55	10:31 (Oerzen 1)	06:55	10:15 (Oerzen 1)	06:41	17:10 (Rep 11)	05:36	16:51 (Rep 11)	04:55
14	16:19	133 15:22 (Oerzen 4)	17:13	172 16:43 (B 03)	18:07	171 17:27 (WEA 6)	20:04	103 19:28 (B 01)	20:57	102 18:33 (Rep 11)	21:42
15	08:32	10:30 (Oerzen 2)	07:53	10:29 (Oerzen 1)	06:53	10:15 (Oerzen 1)	06:39	17:08 (Rep 11)	05:34	16:51 (Rep 11)	04:54
16	16:20	133 15:23 (Oerzen 4)	17:15	176 16:45 (B 03)	18:09	157 17:26 (WEA 6)	20:05	107 19:28 (B 01)	20:59	101 18:32 (Rep 11)	21:43
17	08:31	10:30 (Oerzen 2)	07:51	10:28 (Oerzen 1)	06:50	10:15 (Oerzen 1)	06:36	17:07 (Rep 11)	05:32	16:51 (Rep 11)	04:54
18	16:21	132 15:23 (Oerzen 4)	17:17	178 16:47 (B 03)	18:11	145 17:25 (WEA 6)	20:07	109 19:28 (B 01)	21:01	101 18:32 (Rep 11)	21:43
19	08:31	10:31 (Oerzen 2)	07:49	10:28 (Oerzen 1)	06:48	10:15 (Oerzen 1)	06:34	17:04 (Rep 11)	05:30	16:52 (Rep 11)	04:53
20	16:23	132 15:24 (Oerzen 4)	17:19	173 16:49 (B 03)	18:13	143 17:25 (WEA 6)	20:09	113 19:27 (B 01)	21:02	100 18:32 (Rep 11)	21:44
21	08:30	10:31 (Oerzen 2)	07:47	10:27 (Oerzen 1)	06:46	10:15 (Oerzen 1)	06:32	17:03 (Rep 11)	05:29	16:52 (Rep 11)	04:53
22	16:24	133 15:24 (Oerzen 4)	17:21	174 16:48 (B 03)	18:15	140 17:23 (WEA 6)	20:11	114 19:27 (B 01)	21:04	100 18:32 (Rep 11)	21:45
23	08:29	10:31 (Oerzen 2)	07:45	10:26 (Oerzen 1)	06:43	10:15 (Oerzen 1)	06:29	17:02 (Rep 11)	05:27	16:53 (Rep 11)	04:52
24	16:26	132 15:24 (Oerzen 4)	17:23	176 16:47 (B 03)	18:16	138 17:23 (Rep 9)	20:13	115 19:26 (B 01)	21:06	99 18:32 (Rep 11)	21:46
25	08:29	10:32 (Oerzen 2)	07:43	10:25 (Oerzen 1)	06:41	10:15 (Oerzen 1)	06:27	17:01 (Rep 11)	05:25	16:54 (Rep 11)	04:52
26	16:27	131 15:25 (Oerzen 4)	17:25	177 16:45 (Rep 5)	18:18	137 17:24 (Rep 9)	20:14	115 19:25 (B 01)	21:07	98 18:32 (Rep 11)	21:47
27	08:28	10:32 (Oerzen 2)	07:41	10:25 (Oerzen 1)	06:39	10:16 (Oerzen 1)	06:25	16:59 (Rep 11)	05:23	16:54 (Rep 11)	04:52
28	16:28	132 15:25 (Oerzen 4)	17:27	178 16:45 (Rep 5)	18:20	138 17:25 (Rep 9)	20:16	116 19:24 (B 01)	21:09	97 18:31 (Rep 11)	21:47
29	08:27	10:32 (Oerzen 2)	07:39	10:23 (Oerzen 1)	06:36	10:17 (Oerzen 1)	06:22	16:58 (Rep 11)	05:22	16:55 (Rep 11)	04:52
30	16:31	131 15:26 (Oerzen 4)	17:29	179 16:44 (Rep 5)	18:22	138 17:26 (Rep 9)	20:18	116 19:23 (B 01)	21:11	97 18:32 (Rep 11)	21:48
31	08:26	10:33 (Oerzen 2)	07:37	10:22 (Oerzen 1)	06:34	10:16 (Oerzen 1)	06:20	16:57 (Rep 11)	05:20	16:55 (Rep 11)	04:52
32	16:32	129 15:26 (Oerzen 4)	17:31	181 16:44 (Rep 5)	18:24	138 17:26 (Rep 9)	20:20	115 19:21 (B 01)	21:12	96 18:31 (Rep 11)	21:48
33	08:25	10:34 (Oerzen 2)	07:35	10:22 (Oerzen 1)	06:31	10:17 (Oerzen 1)	06:18	16:57 (Rep 11)	05:19	16:56 (Rep 11)	04:51
34	16:34	127 15:26 (Oerzen 4)	17:33	179 16:43 (Rep 5)	18:26	143 17:49 (WEA 7)	20:22	113 19:20 (B 01)	21:14	95 18:31 (Rep 11)	21:49
35	08:24	10:34 (Oerzen 2)	07:33	10:21 (Oerzen 1)	06:29	10:17 (Oerzen 1)	06:16	16:55 (Rep 11)	05:17	16:56 (Rep 11)	04:51
36	16:36	126 15:27 (Oerzen 4)	17:35	179 16:42 (Rep 5)	18:27	150 17:52 (WEA 7)	20:23	109 19:16 (B 01)	21:15	95 18:31 (Rep 11)	21:49
37	08:23	10:35 (Oerzen 2)	07:31	10:21 (Oerzen 1)	06:27	10:18 (Oerzen 1)	06:13	16:54 (Rep 11)	05:15	16:56 (Rep 11)	04:51
38	16:37	124 15:27 (Oerzen 4)	17:37	176 16:41 (Rep 5)	18:29	153 17:55 (WEA 7)	20:25	105 19:13 (B 01)	21:17	95 18:31 (Rep 11)	21:50
39	08:22	10:35 (Oerzen 2)	07:29	10:21 (Oerzen 1)	06:24	10:19 (Oerzen 1)	06:11	16:54 (Rep 11)	05:14	16:57 (Rep 11)	04:52
40	16:39	120 15:26 (Oerzen 4)	17:39	173 16:39 (Rep 5)	18:31	152 17:55 (WEA 7)	20:27	97 18:31 (Rep 11)	21:19	94 18:31 (Rep 11)	21:50
41	08:21	10:36 (Oerzen 2)	07:27	10:19 (Oerzen 1)	06:22	10:20 (Oerzen 1)	06:09	16:53 (Rep 11)	05:13	16:58 (Rep 11)	04:52
42	16:41	121 16:08 (B 02)	17:41	162 15:44 (Rep 10)	18:33	152 17:57 (WEA 7)	20:29	98 18:31 (Rep 11)	21:20	93 18:31 (Rep 11)	21:50
43	08:19	10:36 (Oerzen 2)	07:24	10:19 (Oerzen 1)	06:19	10:22 (Oerzen 1)	06:07	16:53 (Rep 11)	05:11	16:58 (Rep 11)	04:52
44	16:43	124 16:09 (B 02)	17:42	162 15:43 (Rep 10)	18:35	150 17:58 (WEA 7)	20:31	98 18:31 (Rep 11)	21:22	92 18:30 (Rep 11)	21:50
45	08:18	10:37 (Oerzen 2)	07:22	10:19 (Oerzen 1)	06:17	10:22 (Oerzen 1)	06:04	16:52 (Rep 11)	05:10	16:59 (Rep 11)	04:52
46	16:45	125 16:11 (B 02)	17:44	172 17:05 (Rep 8)	18:37	148 17:57 (WEA 7)	20:32	100 18:32 (Rep 11)	21:23	91 18:30 (Rep 11)	21:51
47	08:17	10:37 (Oerzen 2)	07:20	10:18 (Oerzen 1)	06:15	10:24 (Oerzen 1)	06:02	16:52 (Rep 11)	05:08	17:00 (Rep 11)	04:52
48	16:46	126 16:13 (B 02)	17:46	179 17:08 (Rep 8)	18:38	145 17:58 (WEA 7)	20:34	100 18:32 (Rep 11)	21:25	90 18:30 (Rep 11)	21:51
49	08:15	10:38 (Oerzen 2)	07:18	10:17 (Oerzen 1)	06:12	10:25 (Oerzen 1)	06:00	16:52 (Rep 11)	05:07	17:01 (Rep 11)	04:53
50	16:48	130 16:16 (B 02)	17:48	181 17:09 (Rep 8)	18:40	138 17:57 (WEA 7)	20:36	100 18:32 (Rep 11)	21:26	89 18:30 (Rep 11)	21:51
51	08:14	10:39 (Oerzen 2)	07:16	10:17 (Oerzen 1)	06:10	10:28 (Oerzen 1)	05:58	16:51 (Rep 11)	05:06	17:01 (Rep 11)	04:53
52	16:50	129 16:17 (B 02)	17:50	185 17:11 (Rep 8)	18:42	130 17:57 (WEA 7)	20:38	102 18:33 (Rep 11)	21:27	89 18:30 (Rep 11)	21:51
53	08:13	10:40 (Oerzen 2)	07:13	10:17 (Oerzen 1)	06:07	10:31 (Oerzen 1)	05:56	16:51 (Rep 11)	05:05	17:02 (Rep 11)	04:54
54	16:52	128 16:18 (B 02)	17:52	186 17:13 (Rep 8)	18:44	122 17:57 (WEA 7)	20:40	102 18:33 (Rep 11)	21:29	88 18:30 (Rep 11)	21:51
55	08:11	10:41 (Oerzen 2)	07:11	10:16 (Oerzen 1)	06:05	10:34 (Oerzen 1)	05:54	16:51 (Rep 11)	05:04	17:03 (Rep 11)	04:54
56	16:54	124 16:18 (B 02)	17:54	193 17:21 (WEA 6)	18:46	111 17:56 (WEA 7)	20:41	102 18:33 (Rep 11)	21:30	87 18:30 (Rep 11)	21:50
57	08:10	10:41 (Oerzen 2)			07:02	11:41 (Oerzen 1)	05:52	16:51 (Rep 11)	05:03	17:03 (Rep 11)	04:55
58	16:56	119 16:19 (B 02)			19:47	104 19:20 (B 01)	20:43	102 18:33 (Rep 11)	21:31	86 18:29 (Rep 11)	21:50
59	08:08	10:41 (Oerzen 1)			07:00	106 17:36 (Rep 9)	05:50	16:51 (Rep 11)	05:01	17:04 (Rep 11)	04:55
60	16:58	125 16:20 (B 02)			19:49	88 19:23 (B 01)	20:45	102 18:33 (Rep 11)	21:33	85 18:29 (Rep 11)	21:50
61	08:07	10:39 (Oerzen 1)			06:50	106 17:33 (Rep 11)	05:51		05:00	17:04 (Rep 11)	
62	17:00	130 16:20 (B 02)			19:51	93 19:25 (B 01)			21:34	85 18:29 (Rep 11)	
Sonnenscheinstunden		253					419		491		506
astr.max.mögl.Beschattung		3984		4798		4556	3127		2959		2312

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s33 - Südergellersen, Gewerbegebiet

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56	17:16 (Rep 11)	05:35	17:04 (Rep 11)	06:27	17:02 (Rep 11)	07:19	10:55 (Oerzen 1)	07:16	09:57 (Oerzen 1)	08:09
2	21:50	17:16 (Rep 11)	21:16	18:43 (Rep 11)	20:11	19:26 (B 01)	18:58	18:03 (Rep 9)	16:49	16:19 (B 03)	16:06
3	04:57	17:16 (Rep 11)	05:36	17:03 (Rep 11)	06:29	17:03 (Rep 11)	07:21	10:54 (Oerzen 1)	07:18	09:58 (Oerzen 1)	08:11
4	21:49	17:16 (Rep 11)	21:14	18:42 (Rep 11)	20:08	19:26 (B 01)	18:56	18:02 (WEA 6)	16:47	16:17 (B 03)	16:06
5	04:57	17:16 (Rep 11)	05:38	17:03 (Rep 11)	06:31	17:05 (Rep 11)	07:23	10:53 (Oerzen 1)	07:20	09:59 (Oerzen 1)	08:12
6	21:49	17:16 (Rep 11)	21:12	18:43 (Rep 11)	20:06	19:26 (B 01)	18:54	18:03 (WEA 6)	16:45	16:15 (B 03)	16:05
7	04:58	17:15 (Rep 11)	05:39	17:02 (Rep 11)	06:32	17:05 (Rep 11)	07:24	10:52 (Oerzen 1)	07:22	10:00 (Oerzen 1)	08:14
8	21:48	17:15 (Rep 11)	21:10	18:42 (Rep 11)	20:04	19:25 (B 01)	18:51	18:02 (WEA 6)	16:44	16:13 (B 03)	16:04
9	04:59	17:15 (Rep 11)	05:41	17:02 (Rep 11)	06:34	17:07 (Rep 11)	07:26	10:52 (Oerzen 1)	07:23	10:02 (Oerzen 1)	08:15
10	21:48	17:15 (Rep 11)	21:08	18:43 (Rep 11)	20:01	19:25 (B 01)	18:49	18:03 (WEA 6)	16:42	16:11 (B 03)	16:04
11	05:00	18:35 (Rep 11)	05:43	17:01 (Rep 11)	06:36	17:08 (Rep 11)	07:28	10:51 (Oerzen 1)	07:25	10:03 (Oerzen 1)	08:17
12	21:47	18:35 (Rep 11)	21:07	18:42 (Rep 11)	19:59	19:24 (B 01)	18:46	18:03 (WEA 6)	16:40	16:08 (Rep 5)	16:03
13	05:01	17:15 (Rep 11)	05:44	17:01 (Rep 11)	06:38	17:10 (Rep 11)	07:30	10:51 (Oerzen 1)	07:27	10:04 (Oerzen 1)	08:18
14	21:47	18:35 (Rep 11)	21:05	18:42 (Rep 11)	19:56	19:23 (B 01)	18:44	18:03 (WEA 6)	16:38	16:06 (Rep 5)	16:03
15	05:02	17:15 (Rep 11)	05:46	17:00 (Rep 11)	06:39	17:12 (Rep 11)	07:32	10:51 (Oerzen 1)	07:29	10:05 (Oerzen 1)	08:19
16	21:46	18:36 (Rep 11)	21:03	18:42 (Rep 11)	19:54	19:23 (B 01)	18:42	18:02 (WEA 6)	16:36	15:50 (B 02)	16:02
17	05:03	17:14 (Rep 11)	05:48	17:00 (Rep 11)	06:41	17:14 (Rep 11)	07:33	10:51 (Oerzen 1)	07:31	10:07 (Oerzen 1)	08:20
18	21:45	18:36 (Rep 11)	21:01	18:42 (Rep 11)	19:52	19:21 (B 01)	18:39	18:02 (WEA 6)	16:35	15:51 (B 02)	16:02
19	05:04	17:14 (Rep 11)	05:50	17:00 (Rep 11)	06:43	17:16 (Rep 11)	07:35	10:49 (Oerzen 1)	07:33	10:08 (Oerzen 1)	08:22
20	21:45	18:36 (Rep 11)	20:59	18:42 (Rep 11)	19:49	19:20 (B 01)	18:37	18:00 (WEA 6)	16:33	15:51 (B 02)	16:02
21	05:05	17:14 (Rep 11)	05:51	16:59 (Rep 11)	06:44	17:20 (Rep 11)	07:37	10:49 (Oerzen 1)	07:35	10:10 (Oerzen 1)	08:23
22	21:44	18:37 (Rep 11)	20:57	18:41 (Rep 11)	19:47	19:19 (B 01)	18:35	17:59 (WEA 6)	16:31	15:51 (B 02)	16:02
23	05:06	17:13 (Rep 11)	05:53	16:59 (Rep 11)	06:46	17:23 (Rep 11)	07:39	10:49 (Oerzen 1)	07:37	10:12 (Oerzen 1)	08:24
24	21:43	18:37 (Rep 11)	20:55	18:41 (Rep 11)	19:44	19:16 (B 01)	18:32	17:58 (WEA 6)	16:30	15:51 (B 02)	16:01
25	05:07	17:13 (Rep 11)	05:55	16:58 (Rep 11)	06:48	17:28 (Rep 9)	07:41	10:49 (Oerzen 1)	07:38	10:13 (Oerzen 1)	08:25
26	21:42	18:37 (Rep 11)	20:53	18:40 (Rep 11)	19:42	19:14 (B 01)	18:30	17:56 (WEA 6)	16:28	15:50 (B 02)	16:01
27	05:08	17:12 (Rep 11)	05:56	16:58 (Rep 11)	06:50	11:33 (Oerzen 1)	07:42	10:49 (Oerzen 1)	07:40	10:12 (Oerzen 1)	08:26
28	21:41	18:38 (Rep 11)	20:51	18:40 (Rep 11)	19:40	19:11 (B 01)	18:28	17:53 (WEA 6)	16:26	15:50 (B 02)	16:01
29	05:10	17:12 (Rep 11)	05:58	16:59 (Rep 11)	06:51	11:24 (Oerzen 1)	07:44	10:49 (Oerzen 1)	07:42	10:12 (Oerzen 1)	08:27
30	21:40	18:38 (Rep 11)	20:49	18:40 (Rep 11)	19:37	18:46 (WEA 7)	18:26	17:44 (Rep 8)	16:25	15:50 (B 02)	16:01
31	05:11	17:11 (Rep 11)	06:00	16:58 (Rep 11)	06:53	11:20 (Oerzen 1)	07:46	10:49 (Oerzen 1)	07:44	10:11 (Oerzen 1)	08:28
1	21:39	18:37 (Rep 11)	20:47	18:39 (Rep 11)	19:35	18:46 (WEA 7)	18:23	17:43 (Rep 8)	16:23	15:49 (B 02)	16:01
2	05:12	17:11 (Rep 11)	06:01	16:58 (Rep 11)	06:55	11:17 (Oerzen 1)	07:48	10:50 (Oerzen 1)	07:46	10:11 (Oerzen 1)	08:28
3	21:38	18:39 (Rep 11)	20:44	18:39 (Rep 11)	19:32	18:46 (WEA 7)	18:21	17:41 (Rep 8)	16:22	15:49 (B 02)	16:02
4	05:14	17:10 (Rep 11)	06:03	16:57 (Rep 11)	06:57	11:14 (Oerzen 1)	07:50	10:50 (Oerzen 1)	07:48	10:11 (Oerzen 1)	08:29
5	21:36	18:39 (Rep 11)	20:42	18:38 (Rep 11)	19:30	18:46 (WEA 7)	18:19	17:38 (Rep 8)	16:20	15:47 (B 02)	16:02
6	05:15	17:10 (Rep 11)	06:05	16:58 (Rep 11)	06:58	11:11 (Oerzen 1)	07:51	10:50 (Oerzen 1)	07:49	10:11 (Oerzen 1)	08:30
7	21:35	18:39 (Rep 11)	20:40	18:38 (Rep 11)	19:27	18:44 (WEA 7)	18:17	17:34 (Rep 8)	16:19	15:45 (B 02)	16:02
8	05:16	17:10 (Rep 11)	06:07	16:58 (Rep 11)	07:00	11:09 (Oerzen 1)	07:53	10:50 (Oerzen 1)	07:51	10:11 (Oerzen 1)	08:31
9	21:34	18:41 (Rep 11)	20:38	18:37 (Rep 11)	19:25	18:44 (WEA 7)	18:14	16:15 (Rep 10)	16:18	15:44 (B 02)	16:02
10	05:18	17:09 (Rep 11)	06:08	16:58 (Rep 11)	07:02	11:07 (Oerzen 1)	07:55	10:51 (Oerzen 1)	07:53	10:11 (Oerzen 1)	08:31
11	21:33	18:41 (Rep 11)	20:36	18:36 (Rep 11)	19:23	18:43 (WEA 7)	18:12	17:07 (Rep 5)	16:17	15:43 (B 02)	16:03
12	05:19	17:08 (Rep 11)	06:10	16:58 (Rep 11)	07:03	11:05 (Oerzen 1)	07:57	10:51 (Oerzen 1)	07:55	10:11 (Oerzen 1)	08:32
13	21:31	18:40 (Rep 11)	20:34	18:36 (Rep 11)	19:20	18:42 (WEA 7)	18:10	17:10 (Rep 5)	16:15	15:02 (Oerzen 1)	16:03
14	05:21	17:08 (Rep 11)	06:12	16:58 (Rep 11)	07:05	11:04 (Oerzen 1)	07:59	10:51 (Oerzen 1)	07:56	10:11 (Oerzen 1)	08:32
15	21:30	18:41 (Rep 11)	20:31	18:34 (Rep 11)	19:18	18:40 (WEA 7)	18:08	17:12 (Rep 5)	16:14	15:03 (Oerzen 1)	16:04
16	05:22	17:08 (Rep 11)	06:13	16:58 (Rep 11)	07:07	11:02 (Oerzen 1)	08:01	10:52 (Oerzen 1)	07:58	10:11 (Oerzen 1)	08:33
17	21:28	18:41 (Rep 11)	20:29	19:17 (B 01)	19:15	18:39 (WEA 7)	18:06	17:13 (Rep 5)	16:13	15:04 (Oerzen 1)	16:04
18	05:24	17:07 (Rep 11)	06:15	16:59 (Rep 11)	07:09	11:01 (Oerzen 1)	07:03	09:52 (Oerzen 1)	08:00	10:12 (Oerzen 1)	08:33
19	21:27	18:41 (Rep 11)	20:27	19:21 (B 01)	19:13	18:37 (WEA 7)	17:04	16:14 (Rep 5)	16:12	15:04 (Oerzen 1)	16:05
20	05:25	17:07 (Rep 11)	06:17	16:58 (Rep 11)	07:10	10:59 (Oerzen 1)	07:05	09:53 (Oerzen 1)	08:02	10:12 (Oerzen 1)	08:33
21	21:25	18:42 (Rep 11)	20:25	19:22 (B 01)	19:10	18:33 (WEA 7)	17:01	16:14 (Rep 5)	16:11	15:05 (Oerzen 1)	16:06
22	05:27	17:06 (Rep 11)	06:19	16:59 (Rep 11)	07:12	10:58 (Oerzen 1)	07:06	09:54 (Oerzen 1)	08:03	10:11 (Oerzen 1)	08:34
23	21:24	18:42 (Rep 11)	20:22	19:23 (B 01)	19:08	18:08 (Rep 9)	16:59	16:15 (Rep 5)	16:10	15:05 (Oerzen 1)	16:06
24	05:28	17:06 (Rep 11)	06:20	17:00 (Rep 11)	07:14	10:58 (Oerzen 1)	07:08	09:54 (Oerzen 1)	08:05	10:12 (Oerzen 1)	08:34
25	21:22	18:42 (Rep 11)	20:20	19:25 (B 01)	19:06	18:07 (Rep 9)	16:57	16:15 (Rep 5)	16:09	15:05 (Oerzen 1)	16:07
26	05:30	17:05 (Rep 11)	06:22	17:00 (Rep 11)	07:16	10:57 (Oerzen 1)	07:10	09:55 (Oerzen 1)	08:06	10:13 (Oerzen 1)	08:34
27	21:21	18:42 (Rep 11)	20:18	19:25 (B 01)	19:03	18:06 (Rep 9)	16:55	16:15 (Rep 5)	16:08	15:06 (Oerzen 1)	16:08
28	05:31	17:05 (Rep 11)	06:24	17:01 (Rep 11)	07:17	10:55 (Oerzen 1)	07:12	09:56 (Oerzen 1)	08:08	10:13 (Oerzen 1)	08:34
29	21:19	18:43 (Rep 11)	20:15	19:25 (B 01)	19:01	18:04 (Rep 9)	16:53	16:17 (B 03)	16:07	15:06 (Oerzen 1)	16:09
30	05:33	17:04 (Rep 11)	06:26	17:02 (Rep 11)		17:14		09:56 (Oerzen 1)		16:10 (B 03)	
31	21:17	18:42 (Rep 11)	20:13	19:26 (B 01)		16:51		16:18 (B 03)			
Sonnenscheinstunden		509				329			261		237
astr.max.mögl.Beschattung		2705	458	3217	3638	5390	4132			4010	

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	

## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s34 - Südergellersen, Heidberg 2

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	09:46 (Oerzen 1)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16	08:10	
	16:11	14	10:00 (Oerzen 1)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:06
2	08:34	09:47 (Oerzen 1)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11	
	16:13	13	10:00 (Oerzen 1)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06
3	08:34	09:49 (Oerzen 1)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:13	
	16:14	11	10:00 (Oerzen 1)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05
4	08:34	09:49 (Oerzen 1)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14	
	16:15	10	09:59 (Oerzen 1)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04
5	08:33	09:52 (Oerzen 1)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	
	16:16	7	09:59 (Oerzen 1)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04
6	08:33	09:55 (Oerzen 1)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25	08:17	
	16:17	1	09:56 (Oerzen 1)	17:11	18:05	20:02	20:56	21:41	21:48	21:07	19:59	18:46	16:40	16:03
7	08:32		07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	09:38 (Oerzen 1)
	16:19		17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:57	18:44	16:38	16:03	7 09:45 (Oerzen 1)
8	08:32		07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	09:38 (Oerzen 1)
	16:20		17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02	9 09:47 (Oerzen 1)
9	08:31		07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	09:37 (Oerzen 1)
	16:21		17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02	11 09:48 (Oerzen 1)
10	08:31		07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	07:33	08:22	09:36 (Oerzen 1)
	16:23		17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02	13 09:49 (Oerzen 1)
11	08:30		07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:45	07:37	07:35	08:23	09:36 (Oerzen 1)
	16:24		17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02	14 09:50 (Oerzen 1)
12	08:29		07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	09:37 (Oerzen 1)
	16:26		17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01	15 09:52 (Oerzen 1)
13	08:29		07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25	09:37 (Oerzen 1)
	16:27		17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01	16 09:53 (Oerzen 1)
14	08:28		07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	09:37 (Oerzen 1)
	16:29		17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01	16 09:53 (Oerzen 1)
15	08:27		07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	09:37 (Oerzen 1)
	16:31		17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01	17 09:54 (Oerzen 1)
16	08:26		07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44	08:28	09:36 (Oerzen 1)
	16:32		17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01	22 14:02 (WEA 7)
17	08:25		07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	07:46	08:29	09:37 (Oerzen 1)
	16:34		17:33	18:26	20:22	21:14	21:49	21:38	20:45	19:32	18:21	16:22	16:02	25 14:04 (WEA 7)
18	08:24		07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29	09:37 (Oerzen 1)
	16:36		17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:21	16:02	27 14:05 (WEA 7)
19	08:23		07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30	09:38 (Oerzen 1)
	16:37		17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02	27 14:06 (WEA 7)
20	08:22		07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31	09:38 (Oerzen 1)
	16:39		17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02	29 14:07 (WEA 7)
21	08:21		07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31	09:39 (Oerzen 1)
	16:41		17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17	16:03	29 14:08 (WEA 7)
22	08:19		07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32	09:39 (Oerzen 1)
	16:43		17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03	29 14:08 (WEA 7)
23	08:18		07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32	09:40 (Oerzen 1)
	16:45		17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04	29 14:09 (WEA 7)
24	08:17		07:20	06:15	06:02	05:08	04:52	05:22	06:14	07:07	08:01	07:58	08:33	09:40 (Oerzen 1)
	16:46		17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04	28 14:09 (WEA 7)
25	08:16		07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	07:03	08:00	08:33	09:40 (Oerzen 1)
	16:48		17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	17:04	16:12	16:05	27 14:08 (WEA 7)
26	08:14		07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	07:05	08:02	08:33	09:42 (Oerzen 1)
	16:50		17:50	18:42	20:38	21:28	21:51	21:26	20:25	19:10	17:01	16:11	16:06	25 14:09 (WEA 7)
27	08:13		07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	07:06	08:03	08:34	09:42 (Oerzen 1)
	16:52		17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	16:59	16:10	16:06	24 14:09 (WEA 7)
28	08:11		07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	07:08	08:05	08:34	09:43 (Oerzen 1)
	16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	16:57	16:09	16:07	20 14:08 (WEA 7)
29	08:10			07:03	05:52	05:03	04:55	05:30	06:22	07:16	07:10	08:06	08:34	09:43 (Oerzen 1)
	16:56			19:47	20:43	21:32	21:50	21:21	20:18	19:03	16:55	16:08	16:08	17 10:00 (Oerzen 1)
30	08:08			07:00	05:50	05:01	04:55	05:31	06:24	07:17	07:12	08:08	08:34	09:44 (Oerzen 1)
	16:58			19:49	20:45	21:33	21:50	21:19	20:15	19:01	16:53	16:07	16:09	17 10:01 (Oerzen 1)
31	08:07				06:58		05:00		05:33	06:26		07:14		08:34
	17:00				19:51		21:34		21:17	20:13		16:51		16:10
Sonnenscheinstunden	253		275	367	419	491	506	509	458	382	329	261	237	
astr.max.mögl.Beschattung	56													509

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s35 - Südergellersen, Heidberg 3

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:34	09:48 (Oerzen 1)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16	08:10
16:11	10	09:58 (Oerzen 1)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:06
2	08:34	09:49 (Oerzen 1)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11
16:13	9	09:58 (Oerzen 1)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06
3	08:34	09:51 (Oerzen 1)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:13
16:14	7	09:58 (Oerzen 1)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05
4	08:34	09:54 (Oerzen 1)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14
16:15	1	09:55 (Oerzen 1)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04
5	08:33	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	
16:16		17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04	
6	08:33	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25	08:17	
16:17		17:11	18:05	20:02	20:56	21:41	21:48	21:07	19:59	18:46	16:40	16:03	
7	08:32	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	
16:19		17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:57	18:44	16:38	16:03	
8	08:32	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	
16:20		17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02	
9	08:31	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	09:40 (Oerzen 1)
16:21		17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02	6 09:46 (Oerzen 1)
10	08:31	07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	07:33	08:22	09:38 (Oerzen 1)
16:23		17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02	9 09:47 (Oerzen 1)
11	08:30	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:45	07:37	07:35	08:23	09:38 (Oerzen 1)
16:24		17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02	10 09:48 (Oerzen 1)
12	08:29	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	09:38 (Oerzen 1)
16:26		17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01	12 09:50 (Oerzen 1)
13	08:29	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25	09:38 (Oerzen 1)
16:27		17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01	13 09:51 (Oerzen 1)
14	08:28	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	09:38 (Oerzen 1)
16:29		17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01	14 09:52 (Oerzen 1)
15	08:27	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	09:38 (Oerzen 1)
16:31		17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01	15 09:53 (Oerzen 1)
16	08:26	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44	08:28	09:38 (Oerzen 1)
16:32		17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01	15 09:53 (Oerzen 1)
17	08:25	07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	07:46	08:29	09:39 (Oerzen 1)
16:34		17:33	18:26	20:22	21:14	21:49	21:38	20:45	19:32	18:21	16:22	16:02	16 09:54 (Oerzen 1)
18	08:24	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29	09:39 (Oerzen 1)
16:36		17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:21	16:02	16 09:55 (Oerzen 1)
19	08:23	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30	09:39 (Oerzen 1)
16:37		17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02	17 09:56 (Oerzen 1)
20	08:22	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31	09:39 (Oerzen 1)
16:39		17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02	17 09:56 (Oerzen 1)
21	08:21	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31	09:40 (Oerzen 1)
16:41		17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17	16:03	17 09:57 (Oerzen 1)
22	08:19	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32	09:40 (Oerzen 1)
16:43		17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03	17 09:57 (Oerzen 1)
23	08:18	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32	09:41 (Oerzen 1)
16:45		17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04	17 09:58 (Oerzen 1)
24	08:17	07:20	06:15	06:02	05:08	04:52	05:22	06:14	07:07	08:01	07:58	08:33	09:41 (Oerzen 1)
16:46		17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04	17 09:58 (Oerzen 1)
25	08:16	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	07:03	08:00	08:33	09:42 (Oerzen 1)
16:48		17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	17:04	16:12	16:05	16 09:58 (Oerzen 1)
26	08:14	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	07:05	08:02	08:33	09:43 (Oerzen 1)
16:50		17:50	18:42	20:38	21:28	21:51	21:26	20:25	19:10	17:01	16:11	16:06	16 09:59 (Oerzen 1)
27	08:13	07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	07:06	08:03	08:34	09:44 (Oerzen 1)
16:52		17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	16:59	16:10	16:06	15 09:59 (Oerzen 1)
28	08:11	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	07:08	08:05	08:34	09:44 (Oerzen 1)
16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	16:57	16:09	16:07	15 09:59 (Oerzen 1)
29	08:10		07:03	05:52	05:03	04:55	05:30	06:22	07:16	07:10	08:06	08:34	09:45 (Oerzen 1)
16:56			19:47	20:43	21:32	21:50	21:21	20:18	19:03	16:55	16:08	16:08	14 09:59 (Oerzen 1)
30	08:08		07:00	05:50	05:01	04:55	05:31	06:24	07:17	07:12	08:08	08:34	09:46 (Oerzen 1)
16:58			19:49	20:45	21:33	21:50	21:19	20:15	19:01	16:53	16:07	16:09	13 09:59 (Oerzen 1)
31	08:07		06:58		05:00		05:33	06:26		07:14		08:34	09:47 (Oerzen 1)
17:00			19:51		21:34		21:17	20:13		16:51		16:10	12 09:59 (Oerzen 1)
Sonnenscheinstunden	253												
astr.max.mögl.Beschattung	27	275	367	419	491	506	509	458	382	329	261	237	329

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	

## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s36 - Südergellersen, Heiligenthaler Weg 2

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34 16:11 35	14:40 (Rep 8) 15:34 (B 01) 17:01	08:05 17:56	06:55 19:53	05:48 20:47	04:59 21:35	04:56 21:50	05:35 21:16	06:27 20:11	07:19 18:58	07:16 16:49	08:10 16:06
2	08:34 16:12 32	14:42 (Rep 8) 15:35 (B 01) 17:03	08:03 17:58	06:53 19:55	05:46 20:48	04:59 21:36	04:57 21:49	05:36 21:14	06:29 20:08	07:21 18:56	07:18 16:47	08:11 16:06
3	08:34 16:14 28	14:45 (Rep 8) 15:36 (B 01) 17:05	08:02 18:00	06:51 19:56	05:44 20:50	04:58 21:38	04:57 21:49	05:38 21:12	06:31 20:06	07:23 18:54	07:20 16:45	08:12 16:05
4	08:33 16:14 30	15:09 (B 01) 15:37 (WEA 7) 17:07	08:00 18:01	06:48 19:58	05:42 20:52	04:57 21:39	04:58 21:49	05:39 21:10	06:32 20:04	07:24 18:51	07:22 16:44	08:14 16:04
5	08:33 16:16 30	15:10 (B 01) 15:40 (WEA 7) 17:09	07:58 18:03	06:46 20:00	05:40 20:54	04:56 21:40	04:59 21:48	05:41 21:09	06:34 20:01	07:26 18:49	07:23 16:42	08:15 16:04
6	08:33 16:17 31	15:10 (B 01) 15:41 (WEA 7) 17:11	07:56 18:05	06:43 20:02	05:38 20:55	04:55 21:41	05:00 21:47	05:43 21:07	06:36 19:59	07:28 18:46	07:25 16:40	08:17 16:03
7	08:32 16:19 32	15:11 (B 01) 15:42 (WEA 7) 17:13	07:55 18:07	06:41 20:04	05:36 20:57	04:55 21:42	05:01 21:47	05:44 21:05	06:38 19:56	07:30 18:44	07:27 16:38	08:18 16:03
8	08:32 16:20 33	15:11 (B 01) 15:44 (WEA 7) 17:15	07:53 18:09	06:39 20:05	05:34 20:59	04:54 21:43	05:02 21:46	05:46 21:03	06:39 19:54	07:32 18:42	07:29 16:36	08:19 16:02
9	08:31 16:21 34	15:12 (B 01) 15:46 (WEA 7) 17:17	07:51 18:11	06:50 20:07	05:32 21:01	04:54 21:44	05:03 21:45	05:48 21:01	06:41 19:52	07:33 18:39	07:31 16:35	08:20 16:02
10	08:31 16:23 34	15:12 (B 01) 15:47 (WEA 7) 17:19	07:49 18:13	06:48 20:09	05:30 21:02	04:53 21:44	05:04 21:45	05:49 20:59	06:43 19:49	07:35 18:37	07:33 16:33	08:22 16:02
11	08:30 16:24 35	15:12 (B 01) 15:47 (WEA 7) 17:21	07:47 18:15	06:46 20:11	05:29 21:04	04:53 21:45	05:05 21:46	05:51 20:57	06:44 19:47	07:37 18:35	07:35 16:31	08:23 16:02
12	08:29 16:26 35	15:13 (B 01) 15:48 (WEA 7) 17:23	07:45 18:16	06:43 20:13	05:27 21:06	04:52 21:46	05:06 21:43	05:53 20:55	06:46 19:44	07:39 18:32	07:37 16:30	08:24 16:01
13	08:29 16:27 35	15:14 (B 01) 15:49 (WEA 7) 17:25	07:43 18:18	06:41 20:14	05:25 21:07	04:52 21:47	05:07 21:42	05:55 20:53	06:48 19:42	07:41 18:30	07:38 16:28	08:25 16:01
14	08:28 16:29 36	15:14 (B 01) 15:50 (WEA 7) 17:27	07:41 18:20	06:39 20:16	05:23 21:09	04:52 21:47	05:08 21:41	05:56 20:51	06:50 19:40	07:42 18:28	07:40 16:26	08:26 16:01
15	08:27 16:31 36	15:15 (B 01) 15:51 (WEA 7) 17:29	07:39 18:22	06:36 20:18	05:22 21:11	04:52 21:48	05:10 21:40	05:58 20:49	06:51 19:37	07:44 18:26	07:42 16:25	08:27 16:01
16	08:26 16:32 36	15:16 (B 01) 15:52 (WEA 7) 17:31	07:37 18:24	06:34 20:20	05:20 21:12	04:51 21:48	05:11 21:39	06:00 20:47	06:53 19:35	07:46 18:23	07:44 16:23	08:28 16:01
17	08:25 16:34 35	15:17 (B 01) 15:52 (WEA 7) 17:33	07:35 18:26	06:31 20:22	05:18 21:14	04:51 21:49	05:12 21:38	06:01 20:44	06:55 19:32	07:48 18:21	07:46 16:22	08:28 16:02
18	08:24 16:36 35	15:18 (B 01) 15:53 (WEA 7) 17:35	07:33 18:27	06:16 20:23	05:17 21:16	04:51 21:49	05:14 21:37	06:03 20:42	06:57 19:30	07:50 18:19	07:48 16:20	08:29 16:02
19	08:23 16:37 34	15:20 (B 01) 15:54 (WEA 7) 17:37	07:31 18:29	06:13 20:25	05:15 21:17	04:51 21:50	05:15 21:35	06:05 20:40	06:58 19:27	07:52 18:17	07:49 16:19	08:30 16:02
20	08:22 16:39 33	15:21 (B 01) 15:54 (WEA 7) 17:39	07:29 18:31	06:11 20:27	05:14 21:19	04:51 21:50	05:16 21:34	06:07 20:38	07:00 19:25	07:53 18:14	07:51 16:18	08:31 16:02
21	08:21 16:41 31	15:22 (B 01) 15:54 (WEA 7) 17:40	07:27 18:33	06:09 20:29	05:12 21:20	04:52 21:50	05:18 21:33	06:08 20:36	07:02 19:23	07:55 18:12	07:53 16:16	08:31 16:03
22	08:19 16:43 30	15:24 (B 01) 15:54 (WEA 7) 17:42	07:24 18:35	06:07 20:31	05:11 21:22	04:52 21:50	05:19 21:31	06:10 20:34	07:03 19:20	07:57 18:10	07:55 16:15	08:32 16:03
23	08:18 16:45 29	15:24 (B 01) 15:54 (WEA 7) 17:44	07:22 18:37	06:04 20:32	05:10 21:23	04:52 21:51	05:21 21:30	06:12 20:31	07:05 19:18	07:59 18:08	07:56 16:14	08:33 16:04
24	08:17 16:46 23	15:25 (B 01) 15:55 (WEA 7) 17:46	07:20 18:38	06:05 20:34	05:08 21:25	04:52 21:51	05:22 21:29	06:13 20:29	07:07 19:15	08:01 18:06	07:58 16:13	08:33 16:04
25	08:16 16:48 22	15:26 (B 01) 15:56 (WEA 7) 17:48	07:18 18:40	06:00 20:36	05:07 21:26	04:53 21:51	05:24 21:27	06:15 20:27	07:09 19:13	08:04 18:04	08:00 16:12	08:34 16:05
26	08:14 16:50 21	15:27 (B 01) 15:57 (WEA 7) 17:50	07:16 18:42	06:00 20:38	05:06 21:27	04:53 21:51	05:25 21:26	06:17 20:25	07:10 19:10	08:05 18:03	08:02 16:11	08:35 16:06
27	08:13 16:52 20	15:28 (B 01) 15:58 (WEA 7) 17:52	07:13 18:44	06:00 20:40	05:05 21:29	04:53 21:51	05:27 21:24	06:19 20:22	07:12 19:08	08:06 18:05	08:03 16:10	08:36 16:07
28	08:11 16:54 18	15:29 (B 01) 15:59 (WEA 7) 17:54	07:11 18:46	06:00 20:41	05:04 21:30	04:54 21:51	05:28 21:22	06:20 20:20	07:14 19:06	08:08 18:06	08:05 16:09	08:37 16:07
29	08:10 16:56 16	15:30 (B 01) 16:00 (WEA 7) 17:56	07:09 18:47	06:00 20:43	05:04 21:32	04:55 21:50	05:30 21:21	06:22 20:18	07:16 19:03	08:09 18:05	08:06 16:08	08:38 16:08
30	08:08 16:58 13	15:31 (B 01) 16:01 (WEA 7) 17:57	07:07 18:49	06:00 20:45	05:04 21:33	04:55 21:50	05:31 21:19	06:24 20:15	07:17 19:01	08:10 18:07	08:07 16:07	08:39 16:09
31	08:07 17:00 9	15:32 (B 01) 16:02 (WEA 7) 17:58	07:06 18:51	06:00 20:46	05:04 21:34	04:56 21:51	05:32 21:17	06:26 20:13	07:18 19:02	08:11 18:08	08:08 16:06	08:40 16:10
Sonnenscheinstunden	253	275	367	419	491	506	509	458	329	261	541	1187
astr.max.mögl.Beschattung	893											

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s37 - Südergellersen, Heiligenthaler Weg 3

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

			Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November		Dezember
1	08:34		14:56 (B 01)	08:05	07:09	06:55	05:48	04:59	04:56	05:35	06:27	07:19	07:16	08:10	14:45 (B 01)
	16:11	38	15:34 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	38	15:23 (WEA 7)
2	08:34		14:57 (B 01)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11	14:45 (B 01)
	16:12	38	15:35 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	38	15:24 (WEA 7)
3	08:34		14:58 (B 01)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:12	14:46 (B 01)
	16:14	38	15:36 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	38	15:24 (WEA 7)
4	08:33		14:58 (B 01)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14	14:45 (B 01)
	16:15	38	15:36 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	39	15:24 (WEA 7)
5	08:33		14:59 (B 01)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	14:45 (B 01)
	16:16	39	15:38 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	39	15:24 (WEA 7)
6	08:33		14:59 (B 01)	07:56	06:57	06:43	05:38	04:55	05:00	05:43	06:36	07:28	07:25	08:17	14:45 (B 01)
	16:17	39	15:38 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40	39	15:24 (WEA 7)
7	08:32		14:59 (B 01)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	14:45 (B 01)
	16:19	39	15:38 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38	39	15:24 (WEA 7)
8	08:32		15:01 (B 01)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	14:46 (B 01)
	16:20	39	15:40 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	38	15:24 (WEA 7)
9	08:31		15:01 (B 01)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	14:46 (B 01)
	16:21	39	15:40 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	38	15:24 (WEA 7)
10	08:31		15:02 (B 01)	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	07:33	08:22	14:46 (B 01)
	16:23	38	15:40 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	38	15:24 (WEA 7)
11	08:30		15:03 (B 01)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35	08:23	14:46 (B 01)
	16:24	38	15:41 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	38	15:24 (WEA 7)
12	08:29		15:04 (B 01)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	14:47 (B 01)
	16:26	37	15:41 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	38	15:25 (WEA 7)
13	08:29		15:06 (B 01)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:38	08:25	14:47 (B 01)
	16:27	37	15:43 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	38	15:25 (WEA 7)
14	08:28		15:07 (B 01)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	14:48 (B 01)
	16:29	35	15:42 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	37	15:25 (WEA 7)
15	08:27		15:08 (B 01)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	14:48 (B 01)
	16:31	35	15:43 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	10	15:13 (WEA 7)
16	08:26		15:11 (B 01)	07:37	06:34	06:20	05:20	04:51	05:11	06:00	06:53	07:46	07:44	10	15:01 (WEA 7)
	16:32	31	15:43 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	14	15:15 (WEA 7)
17	08:25		15:20 (WEA 7)	07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46	08:29	14:48 (B 01)
	16:34	24	15:44 (WEA 7)	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	16	15:16 (WEA 7)
18	08:24		15:20 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	16	14:59 (WEA 7)
	16:36	24	15:44 (WEA 7)	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	18	15:17 (WEA 7)
19	08:23		15:21 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	18	14:59 (WEA 7)
	16:37	24	15:45 (WEA 7)	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	19	15:18 (WEA 7)
20	08:22		15:21 (WEA 7)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	19	14:57 (WEA 7)
	16:39	23	15:44 (WEA 7)	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	21	15:18 (WEA 7)
21	08:21		15:22 (WEA 7)	07:27	06:22	06:09	05:12	04:52	05:18	06:08	07:02	07:55	07:53	21	14:57 (WEA 7)
	16:41	22	15:44 (WEA 7)	17:40	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16	22	15:19 (WEA 7)
22	08:19		15:22 (WEA 7)	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	22	14:57 (WEA 7)
	16:43	21	15:43 (WEA 7)	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	23	15:20 (WEA 7)
23	08:18		15:24 (WEA 7)	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:56	23	14:57 (WEA 7)
	16:45	19	15:43 (WEA 7)	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	24	15:21 (WEA 7)
24	08:17		15:25 (WEA 7)	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58	24	14:57 (WEA 7)
	16:46	18	15:43 (WEA 7)	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	24	15:21 (WEA 7)
25	08:16		15:26 (WEA 7)	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	07:03	08:00	25	14:58 (WEA 7)
	16:48	16	15:42 (WEA 7)	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	24	15:22 (WEA 7)
26	08:14		15:27 (WEA 7)	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	07:05	08:02	25	14:50 (B 01)
	16:50	14	15:41 (WEA 7)	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	31	15:22 (WEA 7)
27	08:13		15:30 (WEA 7)	07:13	06:07	05:56	05:05	04:53	05:27	06:19	07:12	07:06	08:03	31	14:49 (B 01)
	16:52	10	15:40 (WEA 7)	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	34	15:23 (WEA 7)
28	08:11			07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:06	34	14:47 (B 01)
	16:54			17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09	35	15:22 (WEA 7)
29	08:10				07:02	05:52	05:02	04:55	05:30	06:22	07:16	07:10	08:06	35	14:46 (B 01)
	16:56				19:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08	37	15:23 (WEA 7)
30	08:08				07:00	05:50	05:01	04:55	05:31	06:24	07:17	07:12	08:08	37	14:46 (B 01)
	16:58				19:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07	37	15:23 (WEA 7)
31	08:07				06:58		05:00		05:33	06:26		07:14			
	17:00				19:51		21:34		21:17	20:13		16:51			
Sonnenscheinstunden	253			275	367	419	491	506	509	458	382	329	261		237
astr.max.mögl.Beschattung	813											389			1152

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s38 - Südergellersen, Heiligenthaler Weg 3c

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

		Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	14:59 (B 01)	08:05	07:09	06:55	05:48	04:59	04:56	05:35	06:27	07:19	07:16	08:10
	16:11	35 15:34 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	36 15:24 (WEA 7)
2	08:34	15:00 (B 01)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11
	16:12	36 15:36 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	37 15:25 (WEA 7)
3	08:34	15:01 (B 01)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:12
	16:14	36 15:37 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	37 15:25 (WEA 7)
4	08:33	15:01 (B 01)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14
	16:15	36 15:37 (WEA 7)	17:07	18:01	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	37 15:25 (WEA 7)
5	08:33	15:02 (B 01)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15
	16:16	37 15:39 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	38 15:26 (WEA 7)
6	08:33	15:02 (B 01)	07:56	06:57	06:43	05:38	04:55	05:00	05:43	06:36	07:28	07:25	08:17
	16:17	37 15:39 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40	37 15:25 (WEA 7)
7	08:32	15:02 (B 01)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18
	16:19	37 15:39 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38	37 15:25 (WEA 7)
8	08:32	15:04 (B 01)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19
	16:20	37 15:41 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	37 15:26 (WEA 7)
9	08:31	15:04 (B 01)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20
	16:21	37 15:41 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	36 15:25 (WEA 7)
10	08:31	15:05 (B 01)	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	07:33	08:22
	16:23	37 15:42 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	36 15:25 (WEA 7)
11	08:30	15:06 (B 01)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35	08:23
	16:24	36 15:42 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	36 15:25 (WEA 7)
12	08:29	15:07 (B 01)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24
	16:26	36 15:43 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	36 15:25 (WEA 7)
13	08:29	15:09 (B 01)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:38	08:25
	16:27	35 15:44 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	35 15:25 (WEA 7)
14	08:28	15:09 (B 01)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26
	16:29	35 15:44 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	34 15:24 (WEA 7)
15	08:27	15:11 (B 01)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27
	16:31	33 15:44 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	9 15:14 (WEA 7)
16	08:26	15:13 (B 01)	07:37	06:34	06:20	05:20	04:51	05:11	06:00	06:53	07:46	07:44	15:05 (WEA 7)
	16:32	32 15:45 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	15:03 (WEA 7)
17	08:25	15:22 (WEA 7)	07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46	15:16 (WEA 7)
	16:34	23 15:45 (WEA 7)	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	15:02 (WEA 7)
18	08:24	15:22 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	15:18 (WEA 7)
	16:36	24 15:46 (WEA 7)	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	15:01 (WEA 7)
19	08:23	15:23 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	15:19 (WEA 7)
	16:37	23 15:46 (WEA 7)	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	15:00 (WEA 7)
20	08:22	15:23 (WEA 7)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	15:19 (WEA 7)
	16:39	22 15:45 (WEA 7)	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	14:59 (B 01)
21	08:21	15:24 (WEA 7)	07:27	06:22	06:09	05:12	04:52	05:18	06:08	07:02	07:55	07:53	14:59 (B 01)
	16:41	22 15:46 (WEA 7)	17:40	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16	14:54 (B 01)
22	08:19	15:24 (WEA 7)	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	15:21 (WEA 7)
	16:43	21 15:45 (WEA 7)	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	15:21 (WEA 7)
23	08:18	15:26 (WEA 7)	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:56	15:22 (WEA 7)
	16:45	19 15:45 (WEA 7)	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	15:22 (WEA 7)
24	08:17	15:27 (WEA 7)	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58	15:23 (WEA 7)
	16:46	18 15:45 (WEA 7)	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	15:22 (WEA 7)
25	08:16	15:28 (WEA 7)	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00	15:23 (WEA 7)
	16:48	16 15:44 (WEA 7)	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	15:24 (WEA 7)
26	08:14	15:29 (WEA 7)	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02	15:25 (WEA 7)
	16:50	13 15:42 (WEA 7)	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	14:53 (B 01)
27	08:13	15:32 (WEA 7)	07:13	06:07	05:56	05:05	04:53	05:27	06:19	07:12	08:06	08:03	15:24 (WEA 7)
	16:52	9 15:41 (WEA 7)	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	14:51 (B 01)
28	08:11	15:33 (WEA 7)	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05	15:24 (WEA 7)
	16:54	17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:18	18:04	16:57	16:09	14:49 (B 01)
29	08:10	15:34 (WEA 7)	07:10	06:04	05:52	05:02	04:55	05:30	06:22	07:16	08:10	08:06	15:24 (WEA 7)
	16:56	19:47	20:43	21:32	21:50	21:21	20:18	19:03	16:55	16:08	15:00	14:49 (B 01)	14:49 (B 01)
30	08:08	15:35 (WEA 7)	07:09	06:03	05:50	05:01	04:55	05:31	06:24	07:17	08:11	08:08	15:25 (WEA 7)
	16:58	19:49	20:45	21:33	21:50	21:19	20:15	19:01	16:53	16:07	15:00	14:49 (B 01)	14:49 (B 01)
31	08:07	15:36 (WEA 7)	07:08	06:02	05:50	05:00	04:55	05:32	06:26	07:19	08:12	08:09	15:26 (WEA 7)
	17:00	253	275	367	419	491	506	509	458	382	329	261	237
Sonnenscheinstunden													
astr. max. mögl. Beschuttung													
		782									380		1070



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s39 - Südergellersen, Heilighenthaler Weg 11

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung
- Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:34	15:06 (B 01)	08:05	07:09	06:55	05:48	04:59	04:56	05:35	06:27	07:19	07:16	08:10	14:54 (B 01)
2	16:11	28 15:34 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:06	34 15:28 (WEA 7)
3	08:34	15:07 (B 01)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11	14:54 (B 01)
4	16:12	29 15:36 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06	34 15:28 (WEA 7)
5	08:34	15:08 (B 01)	08:02	07:04	06:50	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:12	14:55 (B 01)
6	16:14	30 15:38 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05	34 15:29 (WEA 7)
7	08:33	15:08 (B 01)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14	14:54 (B 01)
8	16:15	30 15:38 (WEA 7)	17:07	18:01	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04	34 15:28 (WEA 7)
9	08:33	15:09 (B 01)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	14:55 (B 01)
10	16:16	31 15:40 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04	33 15:28 (WEA 7)
11	08:33	15:09 (B 01)	07:56	06:57	06:43	05:38	04:55	05:00	05:43	06:36	07:28	07:25	08:17	14:55 (B 01)
12	16:17	32 15:41 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40	16:03	32 15:27 (WEA 7)
13	08:32	15:09 (B 01)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	14:55 (B 01)
14	16:19	33 15:42 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38	16:03	31 15:26 (WEA 7)
15	08:32	15:10 (B 01)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	14:56 (B 01)
16	16:20	34 15:44 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02	30 15:26 (WEA 7)
17	08:31	15:11 (B 01)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	14:56 (B 01)
18	16:21	33 15:44 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02	30 15:26 (WEA 7)
19	08:31	15:11 (B 01)	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	07:33	08:22	14:56 (B 01)
20	16:23	34 15:45 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02	29 15:25 (WEA 7)
21	08:30	15:12 (B 01)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35	08:23	14:56 (B 01)
22	16:24	34 15:46 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:46	20:57	19:47	18:35	16:31	16:02	29 15:25 (WEA 7)
23	08:29	15:12 (B 01)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	14:58 (B 01)
24	16:26	34 15:46 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01	27 15:25 (WEA 7)
25	08:29	15:13 (B 01)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:38	08:25	14:58 (B 01)
26	16:27	34 15:47 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01	25 15:23 (WEA 7)
27	08:28	15:14 (B 01)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	14:59 (B 01)
28	16:29	34 15:48 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01	25 15:24 (WEA 7)
29	08:27	15:15 (B 01)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	14:59 (B 01)
30	16:31	33 15:49 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01	25 15:24 (B 01)
31	08:26	15:16 (B 01)	07:37	06:34	06:20	05:20	04:51	05:11	06:00	06:53	07:46	07:44	08:28	14:59 (B 01)
1	16:32	33 15:49 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01	25 15:24 (B 01)
2	08:25	15:18 (B 01)	07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46	08:28	14:59 (B 01)
3	16:34	32 15:50 (WEA 7)	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	16:02	25 15:24 (B 01)
4	08:24	15:19 (B 01)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29	15:00 (B 01)
5	16:36	31 15:50 (WEA 7)	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	16:02	25 15:25 (B 01)
6	08:23	15:22 (B 01)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:51	07:49	08:30	15:01 (B 01)
7	16:37	29 15:51 (WEA 7)	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02	24 15:25 (B 01)
8	08:22	15:25 (B 01)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31	15:01 (B 01)
9	16:39	26 15:51 (WEA 7)	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02	24 15:25 (B 01)
10	08:21	15:29 (WEA 7)	07:27	06:22	06:09	05:12	04:52	05:18	06:08	07:02	07:55	07:53	08:31	15:02 (B 01)
11	16:41	22 15:51 (WEA 7)	17:40	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16	16:03	24 15:26 (B 01)
12	08:19	15:29 (WEA 7)	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32	15:02 (B 01)
13	16:43	21 15:50 (WEA 7)	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03	24 15:26 (B 01)
14	08:18	15:30 (WEA 7)	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:56	08:32	15:03 (B 01)
15	16:45	21 15:51 (WEA 7)	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04	24 15:27 (B 01)
16	08:17	15:31 (WEA 7)	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58	08:33	15:03 (B 01)
17	16:46	20 15:51 (WEA 7)	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04	24 15:27 (B 01)
18	08:16	15:32 (WEA 7)	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00	08:33	15:03 (B 01)
19	16:48	18 15:50 (WEA 7)	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	16:05	25 15:28 (B 01)
20	08:14	15:32 (WEA 7)	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02	08:33	15:04 (B 01)
21	16:50	17 15:49 (WEA 7)	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	16:06	25 15:29 (B 01)
22	08:13	15:34 (WEA 7)	07:13	06:07	05:56	05:05	04:53	05:27	06:19	07:12	08:06	08:03	08:34	15:05 (B 01)
23	16:52	15 15:49 (WEA 7)	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	16:06	24 15:29 (B 01)
24	08:11	15:36 (WEA 7)	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05	08:34	15:05 (B 01)
25	16:54	11 15:47 (WEA 7)	17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09	16:07	25 15:30 (B 01)
26	08:10	15:39 (WEA 7)		07:02	05:52	05:02	04:55	05:30	06:22	07:16	08:10	08:06	08:34	15:05 (B 01)
27	16:56	7 15:46 (WEA 7)		19:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:55	16:08	25 15:30 (B 01)
28	08:08			07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	08:08	08:34	15:06 (B 01)
29	16:58			19:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:57	16:09	25 15:31 (B 01)
30	08:07			06:58		05:00		05:33	06:26			07:14	08:34	15:06 (B 01)
31	17:00			19:51		21:34		21:17	20:13			16:51	16:10	24 15:30 (B 01)
Sonnenscheinstunden		253		275		419		506		458		329		439
astr.max.mögl.Beschattung		786												844

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s40 - Südergellersen, Im Alten Dorfe 2

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	14:34 (WEA 7)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	08:10
16:11	29	15:03 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49
2	08:34	14:35 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	08:11
16:13	29	15:04 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47
3	08:34	14:35 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	08:12
16:14	30	15:05 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45
4	08:34	14:35 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	08:14
16:15	30	15:05 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44
5	08:33	14:37 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	08:15
16:16	28	15:05 (WEA 7)	17:09	18:03	19:59	20:54	21:40	21:48	21:09	20:01	18:49	16:42
6	08:33	14:37 (WEA 7)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	08:17
16:17	28	15:05 (WEA 7)	17:11	18:05	19:58	20:55	21:41	21:47	21:07	19:59	18:46	16:40
7	08:32	14:37 (WEA 7)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	08:18
16:19	28	15:05 (WEA 7)	17:13	18:07	19:59	20:57	21:42	21:47	21:05	19:56	18:44	16:38
8	08:32	14:38 (WEA 7)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	08:19
16:20	28	15:06 (WEA 7)	17:15	18:09	19:59	20:55	21:43	21:46	21:03	19:54	18:42	16:36
9	08:31	14:39 (WEA 7)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	08:20
16:21	27	15:06 (WEA 7)	17:17	18:11	19:57	20:51	21:44	21:45	21:01	19:52	18:39	16:35
10	08:31	14:39 (WEA 7)	07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	08:22
16:23	27	15:06 (WEA 7)	17:19	18:13	19:59	20:52	21:44	21:45	20:59	19:49	18:37	16:33
11	08:30	14:40 (WEA 7)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:45	07:37	08:23
16:24	25	15:05 (WEA 7)	17:21	18:15	19:59	20:51	21:44	21:45	20:57	19:47	18:35	16:31
12	08:29	14:41 (WEA 7)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	08:24
16:26	24	15:05 (WEA 7)	17:23	18:16	19:59	20:51	21:46	21:43	20:55	19:44	18:32	16:30
13	08:29	14:43 (WEA 7)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	08:25
16:27	23	15:06 (WEA 7)	17:25	18:18	19:59	20:51	21:47	21:42	20:53	19:42	18:30	16:28
14	08:28	14:43 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	08:26
16:29	22	15:05 (WEA 7)	17:27	18:20	19:59	20:51	21:47	21:41	20:51	19:40	18:28	16:26
15	08:27	14:44 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	08:27
16:31	21	15:05 (WEA 7)	17:29	18:22	19:59	20:51	21:48	21:40	20:49	19:37	18:26	16:25
16	08:26	14:45 (WEA 7)	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	08:28
16:32	19	15:04 (WEA 7)	17:31	18:24	19:59	20:51	21:48	21:39	20:47	19:35	18:23	16:23
17	08:25	14:47 (WEA 7)	07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	08:29
16:34	17	15:04 (WEA 7)	17:33	18:26	19:59	20:51	21:49	21:38	20:44	19:32	18:21	16:22
18	08:24	14:49 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	08:30
16:36	14	15:03 (WEA 7)	17:35	18:27	19:59	20:51	21:49	21:37	20:42	19:30	18:19	16:20
19	08:23	14:52 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	08:31
16:37	9	15:01 (WEA 7)	17:37	18:29	19:59	20:51	21:50	21:35	20:40	19:27	18:17	16:19
20	08:22		07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	08:31
16:39			17:39	18:31	19:59	20:51	21:50	21:34	20:38	19:25	18:14	16:18
21	08:21		07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	08:31
16:41			17:41	18:33	19:59	20:51	21:50	21:33	20:36	19:23	18:12	16:17
22	08:19		07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	08:32
16:43			17:42	18:35	19:59	20:51	21:50	21:31	20:34	19:20	18:10	16:15
23	08:18		07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	08:32
16:45			17:44	18:37	19:59	20:51	21:50	21:30	20:31	19:18	18:08	16:14
24	08:17		07:20	06:15	06:02	05:08	04:52	05:22	06:14	07:07	08:01	08:33
16:46			17:46	18:38	19:59	20:51	21:51	21:29	20:29	19:15	18:06	16:13
25	08:16		07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:33
16:48			17:48	18:40	19:59	20:51	21:51	21:27	20:27	19:13	18:04	16:12
26	08:14		07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:33
16:50			17:50	18:42	19:59	20:51	21:51	21:26	20:25	19:10	18:01	16:11
27	08:13		07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:33
16:52			17:52	18:44	19:59	20:51	21:51	21:24	20:22	19:08	18:00	16:10
28	08:11		07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:34
16:54			17:54	18:46	19:59	20:51	21:51	21:22	20:20	19:06	18:00	16:09
29	08:10			07:03	05:52	05:03	04:55	05:30	06:22	07:16	08:10	08:34
16:56				19:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08
30	08:08			07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	08:34
16:58				19:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:09
31	08:07			06:58		05:00		05:23	06:26			08:34
17:00				19:51		21:34		21:17	20:13			16:10
Sonnenscheinstunden	253		275	419	491	506	509	458	382	329	261	237
astr.max.mögl.Beschattung	458									149		1131

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende	(WEA mit letztem Schatten)
	Minuten mit Schatten		



Projekt:

Süderheide

Lizenzierter Anwender:

SOWIWAS - Energie GmbH

Watenstedter Straße 11

DE-38384 Gevensleben

+49 0 53 54 / 99 06 - 235

/ gutachten@sowiwas.de

Berechnet:

21.07.2025 16:43/4.1.287

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s41 - Südergellersen, Im Alten Dorfe 3

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:34	14:39 (WEA 7)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16	08:10	14:27 (WEA 7)
2	16:11	15:07 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:06	24 14:51 (WEA 7)
3	08:34	14:39 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11	14:27 (WEA 7)
4	16:13	15:08 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06	26 14:53 (WEA 7)
5	08:34	14:40 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:12	14:28 (WEA 7)
6	16:14	15:09 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05	26 14:54 (WEA 7)
7	08:34	14:40 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14	14:27 (WEA 7)
8	16:15	15:08 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04	27 14:54 (WEA 7)
9	08:33	14:41 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	14:28 (WEA 7)
10	16:16	15:09 (WEA 7)	17:09	18:03	19:59	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04	27 14:55 (WEA 7)
11	08:33	14:41 (WEA 7)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25	08:17	14:28 (WEA 7)
12	16:17	15:09 (WEA 7)	17:11	18:05	19:58	20:53	21:41	21:47	21:07	19:59	18:46	16:40	16:03	27 14:55 (WEA 7)
13	08:32	14:42 (WEA 7)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	14:27 (WEA 7)
14	16:19	15:09 (WEA 7)	17:13	18:07	19:59	20:54	21:42	21:47	21:05	19:56	18:44	16:38	16:03	28 14:55 (WEA 7)
15	08:32	14:43 (WEA 7)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	14:28 (WEA 7)
16	16:20	15:10 (WEA 7)	17:15	18:09	19:59	20:55	21:43	21:46	21:03	19:54	18:42	16:36	16:02	28 14:56 (WEA 7)
17	08:31	14:43 (WEA 7)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	14:28 (WEA 7)
18	16:21	15:10 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02	29 14:57 (WEA 7)
19	08:31	14:44 (WEA 7)	07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	07:33	08:22	14:28 (WEA 7)
20	16:23	15:09 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02	29 14:57 (WEA 7)
21	08:30	14:45 (WEA 7)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:45	07:37	07:35	08:23	14:29 (WEA 7)
22	16:24	15:09 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02	28 14:57 (WEA 7)
23	08:29	14:45 (WEA 7)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	14:30 (WEA 7)
24	16:26	15:09 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01	29 14:59 (WEA 7)
25	08:29	14:47 (WEA 7)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25	14:30 (WEA 7)
26	16:27	15:10 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01	29 14:59 (WEA 7)
27	08:28	14:47 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	14:31 (WEA 7)
28	16:29	15:09 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01	28 14:59 (WEA 7)
29	08:27	14:49 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	14:31 (WEA 7)
30	16:31	15:08 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01	29 15:00 (WEA 7)
31	08:26	14:50 (WEA 7)	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44	08:28	14:31 (WEA 7)
1	16:32	15:08 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01	29 15:00 (WEA 7)
2	08:25	14:52 (WEA 7)	07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	07:46	08:29	14:31 (WEA 7)
3	16:34	15:07 (WEA 7)	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	16:02	29 15:00 (WEA 7)
4	08:24	14:54 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29	14:32 (WEA 7)
5	16:36	15:06 (WEA 7)	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	16:02	29 15:01 (WEA 7)
6	08:23	14:57 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30	14:33 (WEA 7)
7	16:37	15:05 (WEA 7)	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02	29 15:02 (WEA 7)
8	08:22	14:59 (WEA 7)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31	14:33 (WEA 7)
9	16:39	15:07 (WEA 7)	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02	29 15:02 (WEA 7)
10	08:21	14:59 (WEA 7)	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31	14:34 (WEA 7)
11	16:41	15:04 (WEA 7)	17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17	16:03	29 15:03 (WEA 7)
12	08:19	14:59 (WEA 7)	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32	14:34 (WEA 7)
13	16:43	15:06 (WEA 7)	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03	29 15:03 (WEA 7)
14	08:18	14:59 (WEA 7)	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32	14:35 (WEA 7)
15	16:45	15:04 (WEA 7)	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04	29 15:04 (WEA 7)
16	08:17	14:59 (WEA 7)	07:20	06:15	06:02	05:08	04:52	05:22	06:14	07:07	08:01	07:58	08:33	14:35 (WEA 7)
17	16:46	15:06 (WEA 7)	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04	29 15:04 (WEA 7)
18	08:16	14:58 (WEA 7)	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00	08:33	14:35 (WEA 7)
19	16:48	15:04 (WEA 7)	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	16:05	29 15:04 (WEA 7)
20	08:14	14:59 (WEA 7)	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02	08:33	14:36 (WEA 7)
21	16:50	15:02 (WEA 7)	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	16:06	29 15:05 (WEA 7)
22	08:13	14:59 (WEA 7)	07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:03	08:34	14:37 (WEA 7)
23	16:52	15:01 (WEA 7)	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	16:06	28 15:05 (WEA 7)
24	08:11	14:59 (WEA 7)	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05	08:34	14:37 (WEA 7)
25	16:54	15:03 (WEA 7)	17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09	16:07	29 15:06 (WEA 7)
26	08:10	14:59 (WEA 7)	07:03	05:52	05:03	04:55	05:30	06:22	07:16	08:10	09:06	09:03	08:34	14:37 (WEA 7)
27	16:56	15:04 (WEA 7)	17:56	18:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:10	16:08	29 15:06 (WEA 7)
28	08:08	14:59 (WEA 7)	07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	09:08	09:05	08:34	14:38 (WEA 7)
29	16:58	15:05 (WEA 7)	17:59	18:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07	16:09	29 15:07 (WEA 7)
30	08:07	14:59 (WEA 7)	06:58	05:48	05:00	04:54	05:30	06:26	07:14	08:10	09:06	09:03	08:34	14:39 (WEA 7)
31	17:00	15:06 (WEA 7)	17:51	18:41	20:37	21:24	21:47	21:17	20:13	19:00	18:00	16:07	16:10	28 15:07 (WEA 7)
Sonnenscheinstunden		253	441	275	367	419	491	506	509	458	382	329	261	140
astr.max.mögl.Beschattung													237	876

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s42 - Südergellersen, Im Alten Dorfe 4

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrichtungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34 16:11 76 16:13 67 08:34 16:14 55 08:33 16:15 55 08:33 16:16 53 08:33 16:17 50 08:32 16:19 50 08:32 16:20 48 08:31 16:21 44 08:31 16:23 41 08:30 16:24 37 08:29 16:26 30 08:29 16:27 29 08:28 16:29 30 08:27 16:31 29 08:26 16:32 28 08:25 16:34 27 08:24 16:36 27 08:23 16:37 26 08:22 16:39 25 08:21 16:41 24 08:19 16:43 22 08:18 16:45 20 08:17 16:46 18 08:16 16:48 14 08:14 16:50 9 08:13 16:52 08:11 16:54 08:10 16:56 08:08 16:58 08:07 17:00	10:16 (Oerzen 1) 15:18 (WEA 7) 10:19 (Oerzen 1) 15:19 (WEA 7) 14:23 (B 01) 15:20 (WEA 7) 14:23 (B 01) 15:20 (WEA 7) 14:25 (B 01) 15:21 (WEA 7) 14:26 (B 01) 15:21 (WEA 7) 14:26 (B 01) 15:21 (WEA 7) 14:28 (B 01) 15:22 (WEA 7) 14:30 (B 01) 15:22 (WEA 7) 14:32 (B 01) 15:23 (WEA 7) 14:34 (B 01) 15:23 (WEA 7) 14:53 (WEA 7) 15:23 (WEA 7) 14:55 (WEA 7) 15:24 (WEA 7) 14:54 (WEA 7) 15:24 (WEA 7) 14:55 (WEA 7) 15:24 (WEA 7) 14:56 (WEA 7) 15:24 (WEA 7) 14:57 (WEA 7) 15:24 (WEA 7) 14:58 (WEA 7) 15:25 (WEA 7) 14:59 (WEA 7) 15:24 (WEA 7) 15:00 (WEA 7) 15:24 (WEA 7) 15:02 (WEA 7) 15:24 (WEA 7) 15:04 (WEA 7) 15:22 (WEA 7) 15:04 (WEA 7) 15:22 (WEA 7) 15:04 (WEA 7) 15:20 (WEA 7) 15:06 (WEA 7) 15:20 (WEA 7) 15:08 (WEA 7) 15:17 (WEA 7)	08:05 17:01 08:03 17:03 08:02 17:05 08:00 17:02 08:00 17:07 08:02 17:08 08:00 17:11 08:00 17:13 08:00 17:15 08:00 17:17 08:00 17:19 08:00 17:21 08:00 17:23 08:00 17:25 08:00 17:27 08:00 17:29 08:00 17:31 08:00 17:33 08:00 17:35 08:00 17:37 08:00 17:39 08:00 17:41 08:00 17:43 08:00 17:45 08:00 17:47 08:00 17:49 08:00 17:51 08:00 17:53 08:00 17:55 08:00 17:57 08:00 17:59 08:00 18:01 08:00 18:03 08:00 18:05 08:00 18:07 08:00 18:09 08:00 18:11 08:00 18:13 08:00 18:15 08:00 18:17 08:00 18:19 08:00 18:21 08:00 18:23 08:00 18:25 08:00 18:27 08:00 18:29 08:00 18:31 08:00 18:33 08:00 18:35 08:00 18:37 08:00 18:39 08:00 18:41 08:00 18:43 08:00 18:45 08:00 18:47 08:00 18:49 08:00 18:51 08:00 18:53 08:00 18:55 08:00 18:57 08:00 18:59 08:00 19:01 08:00 19:03 08:00 19:05 08:00 19:07 08:00 19:09 08:00 19:11 08:00 19:13 08:00 19:15 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## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s44 - Südergellersen, Im Alten Dorfe 7

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	14:38 (B 01)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16
2	16:11	34 15:19 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49
3	08:34	14:40 (B 01)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18
4	16:12	31 15:20 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47
5	08:34	14:55 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20
6	16:14	26 15:21 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45
7	08:33	14:55 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22
8	16:15	26 15:21 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44
9	08:33	14:56 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23
10	16:16	26 15:22 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42
11	08:33	14:56 (WEA 7)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25
12	16:17	25 15:21 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40
13	08:32	14:56 (WEA 7)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27
14	16:19	25 15:21 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38
15	08:32	14:57 (WEA 7)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29
16	16:20	25 15:22 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36
17	08:31	14:57 (WEA 7)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31
18	16:21	25 15:22 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35
19	08:31	14:58 (WEA 7)	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	07:33
20	16:23	25 15:23 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33
21	08:30	14:58 (WEA 7)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35
22	16:24	25 15:23 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:46	20:57	19:47	18:35	16:31
23	08:29	14:59 (WEA 7)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37
24	16:26	24 15:23 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30
25	08:29	15:00 (WEA 7)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39
26	16:27	24 15:24 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28
27	08:28	15:00 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40
28	16:29	23 15:23 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26
29	08:27	15:01 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42
30	16:31	22 15:23 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25
31	08:26	15:02 (WEA 7)	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44
32	16:32	20 15:22 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23
33	08:25	15:03 (WEA 7)	07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46
34	16:34	19 15:22 (WEA 7)	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22
35	08:24	15:05 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48
36	16:36	17 15:22 (WEA 7)	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20
37	08:23	15:07 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49
38	16:37	14 15:21 (WEA 7)	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19
39	08:22	15:08 (WEA 7)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51
40	16:39	12 15:20 (WEA 7)	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18
41	08:21	15:11 (WEA 7)	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53
42	16:41	7 15:18 (WEA 7)	17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16
43	08:19	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	7 14:46 (WEA 7)
44	16:43	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	12 14:53 (WEA 7)
45	08:18	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	12 14:56 (WEA 7)
46	16:45	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	14 14:57 (WEA 7)
47	08:17	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58	14 14:52 (WEA 7)
48	16:46	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	17 14:59 (WEA 7)
49	08:16	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00	14:41 (WEA 7)
50	16:48	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	19 15:00 (WEA 7)
51	08:14	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02	14:41 (WEA 7)
52	16:50	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	21 15:02 (WEA 7)
53	08:13	07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:03	14:41 (WEA 7)
54	16:52	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	22 15:03 (WEA 7)
55	08:11	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05	14:40 (WEA 7)
56	16:54	17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09	23 15:03 (WEA 7)
57	08:10	07:02	05:52	05:03	04:55	05:30	06:22	07:16	08:10	09:04	09:01	14:40 (WEA 7)
58	16:56	17:56	18:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08	24 15:04 (WEA 7)
59	08:08	07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:11	09:05	09:02	14:41 (WEA 7)
60	16:58	17:59	18:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07	24 15:05 (WEA 7)
61	08:07	06:58	05:50	05:00	04:54	05:33	06:26	07:14	08:08	09:02	09:00	14:41 (WEA 7)
62	17:00	19:51	18:41	20:34	21:24	21:41	21:17	20:13	19:00	18:00	16:51	16:10
63	Sonnenscheinstunden	253										
64	astr.max.mögl.Beschattung	475	275	367	419	491	506	509	458	382	329	261
65											183	1097

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



Projekt:

Süderheide

Lizenzierter Anwender:

SOWIWS - Energie GmbH

Watenstedter Straße 11

DE-38384 Gevensleben

+49 0 53 54 / 99 06 - 235

/ gutachten@sowiwas.de

Berechnet:

21.07.2025 16:43/4.1.287

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s45 - Südergellersen, Im Alten Dorfe 8

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

			Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November		Dezember	
1	08:34		14:32 (B 01)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16	08:10	14:25 (B 01)	
	16:11	51	15:23 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:06	40	15:10 (WEA 7)
2	08:34		14:33 (B 01)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11	14:24 (B 01)	
	16:12	51	15:24 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06	43	15:11 (WEA 7)
3	08:34		14:34 (B 01)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:12	14:24 (B 01)	
	16:14	51	15:25 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05	45	15:12 (WEA 7)
4	08:33		14:34 (B 01)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14	14:23 (B 01)	
	16:15	51	15:25 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04	47	15:12 (WEA 7)
5	08:33		14:35 (B 01)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	14:23 (B 01)	
	16:16	50	15:26 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04	47	15:12 (WEA 7)
6	08:33		14:36 (B 01)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25	08:17	14:22 (B 01)	
	16:17	49	15:26 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40	16:03	49	15:12 (WEA 7)
7	08:32		14:37 (B 01)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	14:22 (B 01)	
	16:19	47	15:26 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38	16:03	49	15:12 (WEA 7)
8	08:32		14:39 (B 01)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	14:22 (B 01)	
	16:20	47	15:28 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02	51	15:13 (WEA 7)
9	08:31		14:40 (B 01)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	14:22 (B 01)	
	16:21	45	15:28 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02	51	15:13 (WEA 7)
10	08:31		14:41 (B 01)	07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	07:33	08:22	14:22 (B 01)	
	16:23	43	15:28 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02	51	15:13 (WEA 7)
11	08:30		14:43 (B 01)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35	08:23	14:22 (B 01)	
	16:24	40	15:28 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02	51	15:13 (WEA 7)
12	08:29		14:45 (B 01)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	14:23 (B 01)	
	16:26	37	15:29 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01	51	15:14 (WEA 7)
13	08:29		15:02 (WEA 7)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25	14:23 (B 01)	
	16:27	28	15:30 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01	52	15:15 (WEA 7)
14	08:28		15:01 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	14:23 (B 01)	
	16:29	28	15:29 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01	52	15:15 (WEA 7)
15	08:27		15:02 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	14:23 (B 01)	
	16:31	28	15:30 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01	52	15:15 (WEA 7)
16	08:26		15:03 (WEA 7)	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44	08:28	14:23 (B 01)	
	16:32	27	15:30 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01	52	15:15 (WEA 7)
17	08:25		15:03 (WEA 7)	07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	07:46	08:29	14:23 (B 01)	
	16:34	27	15:30 (WEA 7)	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	16:02	52	15:15 (WEA 7)
18	08:24		15:04 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29	14:24 (B 01)	
	16:36	26	15:30 (WEA 7)	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	16:02	52	15:16 (WEA 7)
19	08:23		15:05 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30	14:25 (B 01)	
	16:37	26	15:31 (WEA 7)	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02	52	15:17 (WEA 7)
20	08:22		15:05 (WEA 7)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31	14:25 (B 01)	
	16:39	25	15:30 (WEA 7)	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02	52	15:17 (WEA 7)
21	08:21		15:07 (WEA 7)	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31	14:25 (B 01)	
	16:41	23	15:30 (WEA 7)	17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17	16:03	52	15:17 (WEA 7)
22	08:19		15:08 (WEA 7)	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32	14:25 (B 01)	
	16:43	22	15:30 (WEA 7)	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03	52	15:17 (WEA 7)
23	08:18		15:09 (WEA 7)	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32	14:26 (B 01)	
	16:45	20	15:29 (WEA 7)	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04	53	15:19 (WEA 7)
24	08:17		15:11 (WEA 7)	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58	08:33	14:27 (B 01)	
	16:46	17	15:28 (WEA 7)	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04	52	15:19 (WEA 7)
25	08:16		15:12 (WEA 7)	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	07:03	08:00	08:33	14:27 (B 01)	
	16:48	14	15:26 (WEA 7)	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	17:04	16:12	16:05	52	15:19 (WEA 7)
26	08:14		15:14 (WEA 7)	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	07:05	08:02	08:33	14:28 (B 01)	
	16:50	10	15:24 (WEA 7)	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	17:01	16:11	16:06	52	15:20 (WEA 7)
27	08:13			07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	07:06	08:03	08:34	14:29 (B 01)	
	16:52			17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	16:59	16:10	16:06	52	15:21 (WEA 7)
28	08:11			07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	07:08	08:05	08:34	14:29 (B 01)	
	16:54			17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	16:57	16:09	16:07	52	15:21 (WEA 7)
29	08:10				07:03	05:52	05:03	04:55	05:30	06:22	07:16	07:10	08:06	08:34	14:30 (B 01)	
	16:56				19:47	20:43	21:32	21:50	21:21	20:18	19:03	16:55	16:08	16:08	52	15:22 (WEA 7)
30	08:08				07:00	05:50	05:01	04:55	05:31	06:24	07:17	07:12	08:08	08:34	14:31 (B 01)	
	16:58				19:49	20:45	21:33	21:50	21:19	20:15	19:01	16:53	16:07	16:09	51	15:22 (WEA 7)
31	08:07				06:58		05:00		05:33	06:26		07:14		08:34	14:31 (B 01)	
	17:00				19:51		21:34		21:17	20:13		16:51		16:10	52	15:23 (WEA 7)
Sonnenscheinstunden		253		275		367		419		491		509		458		382
astr.max.mögl.Beschattung		883														355
																1563

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s46 - Südergellersen, Im Alten Dorfe 10A

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

			Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November		Dezember
1	08:34		14:39 (B 01)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16		08:10
	16:11	48	15:27 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	42	14:31 (B 01)
2	08:34		14:40 (B 01)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18		08:11
	16:12	48	15:28 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	45	15:15 (WEA 7)
3	08:34		14:41 (B 01)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20		08:12
	16:14	48	15:29 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	46	15:16 (WEA 7)
4	08:33		14:41 (B 01)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22		08:14
	16:15	48	15:29 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	46	15:15 (WEA 7)
5	08:33		14:43 (B 01)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23		08:15
	16:16	47	15:30 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	46	15:16 (WEA 7)
6	08:33		14:43 (B 01)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25		08:17
	16:17	47	15:30 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40	47	15:16 (WEA 7)
7	08:32		14:44 (B 01)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27		08:18
	16:19	46	15:30 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38	47	15:16 (WEA 7)
8	08:32		14:45 (B 01)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29		08:19
	16:20	46	15:31 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	48	15:17 (WEA 7)
9	08:31		14:46 (B 01)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31		08:20
	16:21	46	15:32 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	48	15:17 (WEA 7)
10	08:31		14:47 (B 01)	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	07:33		08:22
	16:23	45	15:32 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	48	15:17 (WEA 7)
11	08:30		14:49 (B 01)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35		08:23
	16:24	42	15:32 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	48	15:17 (WEA 7)
12	08:29		14:50 (B 01)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37		08:24
	16:26	40	15:33 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	48	15:18 (WEA 7)
13	08:29		14:54 (B 01)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:38		08:25
	16:27	35	15:34 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	48	15:18 (WEA 7)
14	08:28		15:06 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40		08:26
	16:29	27	15:33 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	47	15:19 (WEA 7)
15	08:27		15:07 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42		08:27
	16:31	27	15:34 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	3	14:56 (WEA 7)
16	08:26		15:08 (WEA 7)	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44		14:59 (WEA 7)
	16:32	26	15:34 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	11	14:52 (WEA 7)
17	08:25		15:08 (WEA 7)	07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46		15:03 (WEA 7)
	16:34	26	15:34 (WEA 7)	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	15	14:50 (WEA 7)
18	08:24		15:09 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48		15:05 (WEA 7)
	16:36	26	15:35 (WEA 7)	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	18	14:49 (WEA 7)
19	08:23		15:10 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49		15:07 (WEA 7)
	16:37	25	15:35 (WEA 7)	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	20	14:48 (WEA 7)
20	08:22		15:10 (WEA 7)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51		15:08 (WEA 7)
	16:39	24	15:34 (WEA 7)	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	21	14:47 (WEA 7)
21	08:21		15:11 (WEA 7)	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53		15:09 (WEA 7)
	16:41	23	15:34 (WEA 7)	17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16	23	14:46 (WEA 7)
22	08:19		15:13 (WEA 7)	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55		15:10 (WEA 7)
	16:43	21	15:34 (WEA 7)	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	24	14:45 (WEA 7)
23	08:18		15:13 (WEA 7)	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57		15:11 (WEA 7)
	16:45	20	15:33 (WEA 7)	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	25	14:44 (WEA 7)
24	08:17		15:15 (WEA 7)	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58		15:12 (WEA 7)
	16:46	18	15:33 (WEA 7)	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	26	14:43 (WEA 7)
25	08:16		15:16 (WEA 7)	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00		15:13 (WEA 7)
	16:48	15	15:31 (WEA 7)	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	26	14:42 (WEA 7)
26	08:14		15:18 (WEA 7)	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02		15:14 (WEA 7)
	16:50	11	15:29 (WEA 7)	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	26	14:41 (WEA 7)
27	08:13		15:23 (WEA 7)	07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:03		15:15 (WEA 7)
	16:52	3	15:26 (WEA 7)	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	27	14:40 (WEA 7)
28	08:11		15:26 (WEA 7)	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05		15:16 (WEA 7)
	16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:57	16:09		15:17 (WEA 7)
29	08:10			07:02	05:52	05:03	04:55	05:30	06:22	07:16	08:10	09:06		26	15:13 (WEA 7)
	16:56			19:47	20:43	21:32	21:50	21:21	20:18	19:03	16:55	16:08	35	14:34 (B 01)	08:34
30	08:08			07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	09:08		30	15:14 (WEA 7)
	16:58			19:49	20:45	21:33	21:50	21:19	20:15	19:01	16:53	16:07	40	14:32 (B 01)	08:34
31	08:07			06:58	05:00			05:33	06:26		07:14				08:34
	17:00			19:51	21:34			21:17	20:13		16:51				16:10
Sonnenscheinstunden	253			275	367	419	491	506	509	458	382	329	261		237
astr.max.mögl.Beschuttung	878											366			1468



Projekt:

Süderheide

Lizenzierter Anwender:

SOWIWAS - Energie GmbH

Watenstedter Straße 11

DE-38384 Gevensleben

+49 0 53 54 / 99 06 - 235

/ gutachten@sowiwas.de

Berechnet:

21.07.2025 16:43/4.1.287

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s47 - Südergellersen, Kirchgellerser Straße 2

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	14:50 (WEA 7)	08:05	07:09	06:55	05:48	04:59	04:56	05:35	06:27	07:19	08:10
2	16:11	15:15 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49
3	08:34	14:51 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	08:11
4	16:12	15:16 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47
5	08:34	14:52 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	08:12
6	16:14	15:16 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45
7	08:34	14:52 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	08:14
8	16:15	15:16 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44
9	08:33	14:53 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	08:15
10	16:16	15:17 (WEA 7)	17:09	18:03	19:59	20:54	21:40	21:48	21:09	20:01	18:49	16:42
11	08:33	14:53 (WEA 7)	07:56	06:57	06:43	05:38	04:55	05:00	05:43	06:36	07:28	08:17
12	16:17	15:17 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40
13	08:32	14:53 (WEA 7)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	08:18
14	16:19	15:17 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38
15	08:32	14:55 (WEA 7)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	08:19
16	16:20	15:17 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36
17	08:31	14:55 (WEA 7)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	08:20
18	16:21	15:17 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35
19	08:31	14:56 (WEA 7)	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	08:22
20	16:23	15:17 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33
21	08:31	14:57 (WEA 7)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	08:23
22	16:24	15:17 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31
23	08:29	14:57 (WEA 7)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	08:24
24	16:26	15:17 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30
25	08:29	14:59 (WEA 7)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	08:25
26	16:27	15:17 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28
27	08:28	15:00 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	08:26
28	16:29	15:16 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26
29	08:27	15:01 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	08:27
30	16:31	15:15 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25
31	08:26	15:03 (WEA 7)	07:37	06:34	06:20	05:20	04:51	05:11	06:00	06:53	07:46	08:28
1	16:32	15:15 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23
2	08:25	15:05 (WEA 7)	07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	08:29
3	16:34	15:13 (WEA 7)	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22
4	08:24	15:06 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	08:29
5	16:36	15:13 (WEA 7)	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20
6	08:23	15:07 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	08:30
7	16:37	15:13 (WEA 7)	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19
8	08:22	15:09 (WEA 7)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	08:31
9	16:39	15:13 (WEA 7)	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18
10	08:21	15:11 (WEA 7)	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	08:31
11	16:41	15:11 (WEA 7)	17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16
12	08:19	15:12 (WEA 7)	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	08:32
13	16:43	15:12 (WEA 7)	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15
14	08:18	15:14 (WEA 7)	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	08:32
15	16:45	15:14 (WEA 7)	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14
16	08:17	15:15 (WEA 7)	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	08:33
17	16:46	15:14 (WEA 7)	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13
18	08:16	15:16 (WEA 7)	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:00	08:33
19	16:48	15:14 (WEA 7)	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12
20	08:14	15:17 (WEA 7)	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:02	08:33
21	16:50	15:15 (WEA 7)	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11
22	08:13	15:19 (WEA 7)	07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:34
23	16:52	15:15 (WEA 7)	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10
24	08:11	15:20 (WEA 7)	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:34
25	16:54	15:14 (WEA 7)	17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09
26	08:10	15:21 (WEA 7)	07:10	06:04	05:53	05:03	04:55	05:30	06:22	07:16	08:10	08:34
27	16:56	15:13 (WEA 7)	17:56	18:48	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08
28	08:08	15:22 (WEA 7)	07:09	06:03	05:52	05:02	04:55	05:31	06:24	07:17	08:12	08:34
29	16:58	15:12 (WEA 7)	17:58	18:50	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07
30	08:07	15:23 (WEA 7)	07:08	06:02	05:51	05:01	04:55	05:32	06:26	07:14	08:14	08:34
31	17:00	15:24 (WEA 7)	07:09	06:03	05:52	05:02	04:55	05:33	06:27	07:14	08:14	08:34
Sonnenscheinstunden	253	343	275	367	419	491	506	509	458	382	329	261
astr.max.mögl.Beschattung											86	754

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s48 - Südergellersen, Kirchgellerser Straße 3

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	14:43 (WEA 7)	08:05	07:09	06:55	05:48	04:59	04:56	05:35	06:27	07:19	07:16
2	16:11	15:05 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49
3	08:34	14:44 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18
4	16:12	15:06 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47
5	08:34	14:45 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20
6	16:14	15:06 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45
7	08:34	14:46 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22
8	16:15	15:06 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44
9	08:33	14:47 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23
10	16:16	15:07 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42
11	08:33	14:47 (WEA 7)	07:56	06:57	06:43	05:38	04:55	05:00	05:43	06:36	07:28	07:25
12	16:17	15:06 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40
13	08:32	14:48 (WEA 7)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27
14	16:19	15:06 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38
15	08:32	14:51 (WEA 7)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29
16	16:20	15:06 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36
17	08:31	14:50 (WEA 7)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31
18	16:21	15:06 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35
19	08:31	14:51 (WEA 7)	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	07:33
20	16:23	15:05 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33
21	08:30	14:53 (WEA 7)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35
22	16:24	15:04 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31
23	08:29	14:53 (WEA 7)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37
24	16:26	15:03 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30
25	08:29	14:53 (WEA 7)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39
26	16:27	15:03 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28
27	08:28	14:54 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40
28	16:29	15:03 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26
29	08:27	14:55 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42
30	16:31	15:03 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25
31	08:26	14:56 (WEA 7)	07:37	06:34	06:20	05:20	04:51	05:11	06:00	06:53	07:46	07:44
32	16:32	15:03 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23
33	08:25	14:57 (WEA 7)	07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46
34	16:34	15:03 (WEA 7)	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22
35	08:24	14:58 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48
36	16:36	15:03 (WEA 7)	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20
37	08:23	14:59 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49
38	16:37	15:03 (WEA 7)	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19
39	08:22	15:00 (WEA 7)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51
40	16:39	15:03 (WEA 7)	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18
41	08:21	15:01 (WEA 7)	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53
42	16:41	15:03 (WEA 7)	17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16
43	08:19	15:02 (WEA 7)	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55
44	16:43	15:03 (WEA 7)	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15
45	08:18	15:03 (WEA 7)	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57
46	16:45	15:03 (WEA 7)	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14
47	08:17	15:04 (WEA 7)	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58
48	16:46	15:04 (WEA 7)	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13
49	08:16	15:04 (WEA 7)	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00
50	16:48	15:04 (WEA 7)	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12
51	08:14	15:05 (WEA 7)	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02
52	16:50	15:05 (WEA 7)	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11
53	08:13	15:06 (WEA 7)	07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:03
54	16:52	15:06 (WEA 7)	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10
55	08:11	15:07 (WEA 7)	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05
56	16:54	15:07 (WEA 7)	17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09
57	08:10	15:08 (WEA 7)	07:02	06:52	05:02	05:02	04:55	05:30	06:22	07:16	08:10	08:06
58	16:56	15:08 (WEA 7)	17:56	18:48	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08
59	08:08	15:09 (WEA 7)	07:00	06:50	05:01	05:01	04:55	05:31	06:24	07:17	08:12	08:08
60	16:58	15:09 (WEA 7)	17:58	18:50	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07
61	08:07	15:10 (WEA 7)	06:58	06:48	05:00	05:00	05:33	06:26	07:14	08:08	09:02	08:58
62	17:00	15:10 (WEA 7)	17:51	18:43	20:34	21:24	21:17	20:13	09:02	08:58	09:52	08:58
Sonnenscheinstunden	253											
astr. max. mögl. Beschattung	208											
		275	367	419	491	506	509	458	382	329	261	8
												659

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s49 - Südergellersen, Kirchgellerser Straße 6**Annahmen für Schattenwurfberechnung**

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März		April		Mai		Juni		Juli		August		September		Oktober		November		Dezember	
1	08:34	14:46 (WEA 7)	08:05	07:09	06:55	05:48	04:59	04:56	05:35	06:27	07:19	07:16	08:10	14:38 (WEA 7)										
	16:11	20	15:06 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:06	8	14:46 (WEA 7)								
2	08:34	14:46 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11	14:37 (WEA 7)										
	16:12	21	15:07 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06	11	14:48 (WEA 7)								
3	08:34	14:48 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:12	14:37 (WEA 7)										
	16:14	19	15:07 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05	13	14:50 (WEA 7)								
4	08:34	14:48 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14	14:36 (WEA 7)										
	16:15	19	15:07 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04	15	14:51 (WEA 7)								
5	08:33	14:49 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	14:36 (WEA 7)										
	16:16	18	15:07 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04	16	14:52 (WEA 7)								
6	08:33	14:50 (WEA 7)	07:56	06:57	06:43	05:38	04:55	05:00	05:43	06:36	07:28	07:25	08:17	14:36 (WEA 7)										
	16:17	17	15:07 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40	16:03	17	14:53 (WEA 7)								
7	08:32	14:50 (WEA 7)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	14:35 (WEA 7)										
	16:19	16	15:06 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38	16:03	18	14:53 (WEA 7)								
8	08:32	14:52 (WEA 7)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	14:36 (WEA 7)										
	16:20	15	15:07 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02	19	14:55 (WEA 7)								
9	08:31	14:53 (WEA 7)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	14:36 (WEA 7)										
	16:21	13	15:06 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02	19	14:55 (WEA 7)								
10	08:31	14:54 (WEA 7)	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	07:33	08:22	14:36 (WEA 7)										
	16:23	11	15:05 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02	20	14:56 (WEA 7)								
11	08:30	14:56 (WEA 7)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35	08:23	14:36 (WEA 7)										
	16:24	8	15:04 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02	20	14:56 (WEA 7)								
12	08:29		07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	14:37 (WEA 7)										
	16:26		17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01	21	14:58 (WEA 7)									
13	08:29		07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25	14:37 (WEA 7)										
	16:27		17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01	21	14:58 (WEA 7)									
14	08:28		07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	14:37 (WEA 7)										
	16:29		17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01	22	14:59 (WEA 7)									
15	08:27		07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	14:38 (WEA 7)										
	16:31		17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01	21	14:59 (WEA 7)									
16	08:26		07:37	06:34	06:20	05:20	04:51	05:11	06:00	06:53	07:46	07:44	08:28	14:37 (WEA 7)										
	16:32		17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01	22	14:59 (WEA 7)									
17	08:25		07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46	08:29	14:38 (WEA 7)										
	16:34		17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	16:02	22	15:00 (WEA 7)									
18	08:24		07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29	14:38 (WEA 7)										
	16:36		17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	16:02	23	15:01 (WEA 7)									
19	08:23		07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30	14:39 (WEA 7)										
	16:37		17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02	22	15:01 (WEA 7)									
20	08:22		07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31	14:39 (WEA 7)										
	16:39		17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02	22	15:01 (WEA 7)									
21	08:21		07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31	14:40 (WEA 7)										
	16:41		17:40	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16	16:03	22	15:02 (WEA 7)									
22	08:19		07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32	14:40 (WEA 7)										
	16:43		17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03	22	15:02 (WEA 7)									
23	08:18		07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32	14:41 (WEA 7)										
	16:45		17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04	22	15:03 (WEA 7)									
24	08:17		07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58	08:33	14:41 (WEA 7)										
	16:46		17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04	22	15:03 (WEA 7)									
25	08:16		07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00	08:33	14:41 (WEA 7)										
	16:48		17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	16:05	23	15:04 (WEA 7)									
26	08:14		07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02	08:33	14:43 (WEA 7)										
	16:50		17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	16:06	22	15:05 (WEA 7)									
27	08:13		07:13	06:07	05:56	05:05	04:53	05:27	06:19	07:12	08:06	08:03	08:34	14:43 (WEA 7)										
	16:52		17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	16:06	22	15:05 (WEA 7)									
28	08:11		07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05	08:34	14:43 (WEA 7)										
	16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:10	16:07	22	15:05 (WEA 7)									
29	08:10			07:02	05:52	05:02	04:55	05:30	06:22	07:16	08:10	08:06	08:34	14:44 (WEA 7)										
	16:56			19:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:10	16:08	22	15:06 (WEA 7)									
30	08:08			07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	08:08	08:34	14:45 (WEA 7)										
	16:58			19:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:10	16:09	21	15:06 (WEA 7)									
31	08:07			06:58		05:00		05:33	06:26		07:14		08:34											
	17:00			19:51		21:34		21:17	20:13		16:51		16:10	22	15:07 (WEA 7)									
Sonnenscheinstunden	253																							
astr.max.mögl.Beschattung	177	275	367	419	491	506	509	458	382	329	261	237	614											

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	

## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s50 - Südergellersen, Kirchgellerser Straße 9

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	14:42 (WEA 7)	08:05	07:09	06:55	05:48	04:59	04:56	05:35	06:27	07:19	08:10
16:11	16	14:58 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49
2	08:34	14:44 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	08:11
16:12	14	14:58 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47
3	08:34	14:45 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	08:12
16:14	13	14:58 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45
4	08:34	14:46 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	08:14
16:15	11	14:57 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44
5	08:33	14:48 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	08:15
16:16	9	14:57 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42
6	08:33	14:49 (WEA 7)	07:56	06:57	06:43	05:38	04:55	05:00	05:43	06:36	07:28	08:17
16:17	7	14:56 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40
7	08:32		07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	08:18
16:19		17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38	16:03
8	08:32		07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	08:19
16:20		17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02
9	08:31		07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	08:20
16:21		17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02
10	08:31		07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	08:22
16:23		17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02
11	08:30		07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	08:23
16:24		17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02
12	08:29		07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	08:24
16:26		17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01
13	08:29		07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	08:25
16:27		17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01
14	08:28		07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	08:26
16:29		17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01
15	08:27		07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	08:27
16:31		17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01
16	08:26		07:37	06:34	06:20	05:20	04:51	05:11	06:00	06:53	07:46	08:28
16:32		17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01
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16:34		17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	16:02
18	08:24		07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	08:29
16:36		17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	16:02
19	08:23		07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	08:30
16:37		17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02
20	08:22		07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	08:31
16:39		17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02
21	08:21		07:27	06:22	06:09	05:12	04:52	05:18	06:08	07:02	07:55	08:31
16:41		17:40	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16	16:03
22	08:19		07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	08:32
16:43		17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03
23	08:18		07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	08:32
16:45		17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04
24	08:17		07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	08:33
16:46		17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04
25	08:16		07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:33
16:48		17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	16:05
26	08:14		07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:33
16:50		17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	16:06
27	08:13		07:13	06:07	05:56	05:05	04:53	05:27	06:19	07:12	08:06	08:34
16:52		17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	16:06
28	08:11		07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:34
16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09	16:07
29	08:10		07:02	05:52	05:02	04:55	05:30	06:22	07:16	08:10	09:06	08:34
16:56		19:47	20:43	21:32	21:32	21:50	21:21	20:18	19:03	18:00	16:08	16:08
30	08:08		07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	09:08	08:34
16:58		19:49	20:45	21:33	21:33	21:50	21:19	20:15	19:01	18:03	16:07	16:09
31	08:07		06:58		05:00		05:33	06:26		07:14		08:34
17:00		19:51		21:34			21:17	20:13		16:51		16:10
Sonnenscheinstunden	253											
astr.max.mögl.Beschattung	70	275	367	419	491	506	509	458	382	329	261	237
												426

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s51 - Südergellersen, Kirchgellerser Straße 10

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34 16:11	08:05 17:01	07:09 17:56	06:55 19:53	05:48 20:47	04:59 21:35	04:56 21:50	05:35 21:16	06:27 20:11	07:19 18:58	07:16 16:49	08:10 16:06
2	08:34 16:12	08:03 17:03	07:07 17:58	06:53 19:55	05:46 20:48	04:59 21:36	04:57 21:49	05:36 21:14	06:29 20:08	07:21 18:56	07:18 16:47	08:11 16:06
3	08:34 16:14	08:02 17:05	07:04 18:00	06:51 19:56	05:44 20:50	04:58 21:38	04:57 21:49	05:38 21:12	06:31 20:06	07:23 18:54	07:20 16:45	08:12 16:05
4	08:34 16:15	08:00 17:07	07:02 18:02	06:48 19:58	05:42 20:52	04:57 21:39	04:58 21:49	05:39 21:10	06:32 20:04	07:24 18:51	07:22 16:44	08:14 16:04
5	08:33 16:16	07:58 17:09	07:00 18:03	06:46 20:00	05:40 20:54	04:56 21:40	04:59 21:48	05:41 21:09	06:34 20:01	07:26 18:49	07:23 16:42	08:15 16:04
6	08:33 16:17	07:56 17:11	06:57 18:05	06:43 20:02	05:38 20:55	04:55 21:41	05:00 21:47	05:43 21:07	06:36 19:59	07:28 18:46	07:25 16:40	08:17 16:03
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8	08:32 16:20	07:53 17:15	06:53 18:09	06:39 20:05	05:34 20:59	04:54 21:43	05:02 21:46	05:46 21:03	06:39 19:54	07:32 18:42	07:29 16:36	08:19 16:02
9	08:31 16:21	07:51 17:17	06:50 18:11	06:36 20:07	05:32 21:01	04:54 21:44	05:03 21:45	05:48 21:01	06:41 19:52	07:33 18:39	07:31 16:35	08:20 16:02
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18	08:24 16:36	07:33 17:35	06:29 18:27	06:16 20:23	05:17 21:16	04:51 21:49	05:14 21:37	06:03 20:42	06:57 19:30	07:50 18:19	07:48 16:20	08:29 16:02
19	08:23 16:37	07:31 17:37	06:27 18:29	06:13 20:25	05:15 21:17	04:51 21:50	05:15 21:35	06:05 20:40	06:58 19:27	07:52 18:17	07:49 16:19	08:30 16:02
20	08:22 16:39	07:29 17:39	06:24 18:31	06:11 20:27	05:14 21:19	04:51 21:50	05:16 21:34	06:07 20:38	07:00 19:25	07:53 18:14	07:51 16:18	08:31 16:02
21	08:21 16:41	07:27 17:40	06:22 18:33	06:09 20:29	05:12 21:20	04:52 21:50	05:18 21:33	06:08 20:36	07:02 19:23	07:55 18:12	07:53 16:16	08:31 16:03
22	08:19 16:43	07:24 17:42	06:19 18:35	06:07 20:31	05:11 21:22	04:52 21:50	05:19 21:31	06:10 20:34	07:03 19:20	07:57 18:10	07:55 16:15	08:32 16:03
23	08:18 16:45	07:22 17:44	06:17 18:37	06:04 20:32	05:10 21:23	04:52 21:51	05:21 21:30	06:12 20:31	07:05 19:18	07:59 18:08	07:57 16:14	08:32 16:04
24	08:17 16:46	07:20 17:46	06:15 18:38	06:02 20:34	05:08 21:25	04:52 21:51	05:22 21:29	06:13 20:29	07:07 19:15	08:01 18:06	07:58 16:13	08:33 16:04
25	08:16 16:48	07:18 17:48	06:12 18:40	06:00 20:36	05:07 21:26	04:53 21:51	05:24 21:27	06:15 20:27	07:09 19:13	07:03 17:04	08:00 16:12	08:33 16:05
26	08:14 16:50	07:16 17:50	06:10 18:42	05:58 20:38	05:06 21:27	04:53 21:51	05:25 21:26	06:17 20:25	07:10 19:10	07:05 17:01	08:02 16:11	08:33 16:06
27	08:13 16:52	07:13 17:52	06:07 18:44	05:56 20:40	05:05 21:29	04:53 21:51	05:27 21:24	06:19 20:22	07:12 19:08	07:06 16:59	08:03 16:10	08:34 16:06
28	08:11 16:54	07:11 17:54	06:05 18:46	05:54 20:41	05:04 21:30	04:54 21:51	05:28 21:22	06:20 20:20	07:14 19:06	07:08 16:57	08:05 16:09	08:34 16:07
29	08:10 16:56		07:02 19:47	05:52 20:43	05:02 21:32	04:55 21:50	05:30 21:21	06:22 20:18	07:16 19:03	07:10 16:55	08:06 16:08	08:34 16:08
30	08:08 16:58		07:00 19:49	05:50 20:45	05:01 21:33	04:55 21:50	05:31 21:19	06:24 20:15	07:17 19:01	07:12 16:53	08:08 16:07	08:34 16:09
31	08:07 17:00		06:58 19:51		05:00 21:34		05:33 21:17	06:26 20:13		07:14 16:51		08:34 16:10
Sonnenscheinstunden	253	275	367	419	491	506	509	458	382	329	261	237
astr.max.mögl.Beschattung												

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	

## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s52 - Südergellersen, Kirchgellerser Straße 13

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34 16:11	08:05 17:01	07:09 17:56	06:55 19:53	05:48 20:47	04:59 21:35	04:56 21:50	05:35 21:16	06:27 20:11	07:19 18:58	07:16 16:49	08:10 16:06
2	08:34 16:12	08:03 17:03	07:07 17:58	06:53 19:55	05:46 20:48	04:59 21:36	04:57 21:49	05:36 21:14	06:29 20:08	07:21 18:56	07:18 16:47	08:11 16:06
3	08:34 16:14	08:02 17:05	07:04 18:00	06:51 19:56	05:44 20:50	04:58 21:38	04:57 21:49	05:38 21:12	06:31 20:06	07:23 18:54	07:20 16:45	08:12 16:05
4	08:34 16:15	08:00 17:07	07:02 18:02	06:48 19:58	05:42 20:52	04:57 21:39	04:58 21:49	05:39 21:10	06:32 20:04	07:24 18:51	07:22 16:44	08:14 16:04
5	08:33 16:16	07:58 17:09	07:00 18:03	06:46 20:00	05:40 20:54	04:56 21:40	04:59 21:48	05:41 21:09	06:34 20:01	07:26 18:49	07:23 16:42	08:15 16:04
6	08:33 16:17	07:56 17:11	06:57 18:05	06:43 20:02	05:38 20:55	04:55 21:41	05:00 21:47	05:43 21:07	06:36 19:59	07:28 18:46	07:25 16:40	08:17 16:03
7	08:32 16:19	07:55 17:13	06:55 18:07	06:41 20:04	05:36 20:57	04:55 21:42	05:01 21:47	05:44 21:05	06:38 19:56	07:30 18:44	07:27 16:38	08:18 16:03
8	08:32 16:20	07:53 17:15	06:53 18:09	06:39 20:05	05:34 20:59	04:54 21:43	05:02 21:46	05:46 21:03	06:39 19:54	07:32 18:42	07:29 16:36	08:19 16:02
9	08:31 16:21	07:51 17:17	06:50 18:11	06:36 20:07	05:32 21:01	04:54 21:44	05:03 21:45	05:48 21:01	06:41 19:52	07:33 18:39	07:31 16:35	08:20 16:02
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12	08:29 16:26	07:45 17:23	06:43 18:16	06:29 20:13	05:27 21:06	04:52 21:46	05:06 21:43	05:53 20:55	06:46 19:44	07:39 18:32	07:37 16:30	08:24 16:01
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22	08:19 16:43	07:24 17:42	06:19 18:35	06:07 20:31	05:11 21:22	04:52 21:50	05:19 21:31	06:10 20:34	07:03 19:20	07:57 18:10	07:55 16:15	08:32 16:03
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31	08:07 17:00		06:58 19:51		05:00 21:34		05:33 21:17	06:26 20:13		07:14 16:51		08:34 16:10
Sonnenscheinstunden	253	275	367	419	491	506	509	458	382	329	261	237
astr.max.mögl.Beschattung												

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



Projekt:

Süderheide

Lizenzierter Anwender:

SOWIWAS - Energie GmbH

Watenstedter Straße 11

DE-38384 Gevensleben

+49 0 53 54 / 99 06 - 235

/ gutachten@sowiwas.de

Berechnet:

21.07.2025 16:43/4.1.287

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s53 - Südergellersen, Kirchgellerser Straße 15

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrichtungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	14:50 (B 01)	08:05	07:09	06:55	05:48	04:59	04:56	05:35	06:27	07:19	07:16
2	16:11	15:31 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49
3	08:34	14:51 (B 01)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18
4	16:12	15:32 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47
5	08:34	14:52 (B 01)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20
6	16:14	15:33 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45
7	08:33	14:52 (B 01)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22
8	16:15	15:33 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44
9	08:33	14:54 (B 01)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23
10	16:16	15:34 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42
11	08:33	14:54 (B 01)	07:56	06:57	06:43	05:38	04:55	05:00	05:43	06:36	07:28	07:25
12	16:17	15:34 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40
13	08:32	14:54 (B 01)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27
14	16:19	15:35 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38
15	08:32	14:56 (B 01)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29
16	16:20	15:36 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36
17	08:31	14:57 (B 01)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31
18	16:21	15:36 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35
19	08:31	14:58 (B 01)	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	07:33
20	16:23	15:37 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33
21	08:30	14:59 (B 01)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35
22	16:24	15:37 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31
23	08:29	15:01 (B 01)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37
24	16:26	15:37 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30
25	08:29	15:04 (B 01)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:38
26	16:27	15:39 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28
27	08:28	15:13 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40
28	16:29	15:38 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26
29	08:27	15:14 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42
30	16:31	15:38 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25
31	08:26	15:14 (WEA 7)	07:37	06:34	06:20	05:20	04:51	05:11	06:00	06:53	07:46	07:44
32	16:32	15:39 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23
33	08:25	15:15 (WEA 7)	07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46
34	16:34	15:39 (WEA 7)	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22
35	08:24	15:16 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48
36	16:36	15:39 (WEA 7)	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20
37	08:23	15:17 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49
38	16:37	15:39 (WEA 7)	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19
39	08:22	15:17 (WEA 7)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51
40	16:39	15:39 (WEA 7)	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18
41	08:21	15:18 (WEA 7)	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53
42	16:41	15:39 (WEA 7)	17:40	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16
43	08:19	15:19 (WEA 7)	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55
44	16:43	15:38 (WEA 7)	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15
45	08:18	15:21 (WEA 7)	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:56
46	16:45	15:38 (WEA 7)	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14
47	08:17	15:23 (WEA 7)	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58
48	16:46	15:37 (WEA 7)	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13
49	08:16	15:24 (WEA 7)	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00
50	16:48	15:36 (WEA 7)	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12
51	08:14	15:27 (WEA 7)	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02
52	16:50	15:32 (WEA 7)	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11
53	08:13	15:28 (WEA 7)	07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:03
54	16:52	15:32 (WEA 7)	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10
55	08:11	15:29 (WEA 7)	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05
56	16:54	15:34 (WEA 7)	17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09
57	08:10	15:30 (WEA 7)	07:09	06:03	05:52	05:02	04:55	05:30	06:22	07:16	08:10	08:06
58	16:56	15:36 (WEA 7)	17:56	18:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08
59	08:08	15:32 (WEA 7)	07:07	06:01	05:50	05:01	04:55	05:31	06:24	07:17	08:12	08:08
60	16:58	15:38 (WEA 7)	17:58	18:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07
61	08:07	15:34 (WEA 7)	07:06	06:00	05:50	05:00	04:55	05:33	06:26	07:14	08:14	08:10
62	17:00	15:35 (WEA 7)	17:59	18:51	20:46	21:34	21:51	21:17	20:13	19:00	18:00	16:51
63	Sonnenscheinstunden	253	275	367	419	491	506	509	458	382	329	261
64	astr.max.mögl.Beschattung	761									320	237
65												1253

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende
			(WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s54 - Südergellersen, Kirchgellerser Straße 16

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34 16:11 40	14:53 (B 01) 15:33 (WEA 7) 17:01	08:05 17:56	06:55 19:53	05:48 20:47	05:00 21:35	04:56 21:50	05:35 21:16	06:27 20:11	07:19 18:58	07:16 16:49	08:10 16:06
2	08:34 16:12 41	14:53 (B 01) 15:34 (WEA 7) 17:03	08:03 17:58	06:53 19:55	05:46 20:48	04:59 21:36	04:57 21:49	05:36 21:14	06:29 20:08	07:21 18:56	07:18 16:47	08:11 16:06
3	08:34 16:14 42	14:54 (B 01) 15:35 (WEA 7) 17:05	08:02 18:00	06:51 19:56	05:44 20:50	04:58 21:38	04:57 21:49	05:38 21:12	06:31 20:06	07:23 18:54	07:20 16:45	08:12 16:05
4	08:33 16:15 42	14:54 (B 01) 15:36 (WEA 7) 17:07	08:00 18:02	06:48 19:58	05:42 20:52	04:57 21:39	04:58 21:49	05:39 21:10	06:32 20:04	07:24 18:51	07:22 16:44	08:14 16:04
5	08:33 16:16 42	14:55 (B 01) 15:37 (WEA 7) 17:09	07:58 18:03	06:46 20:00	05:40 20:54	04:56 21:40	04:59 21:48	05:41 21:09	06:34 20:01	07:26 18:49	07:23 16:42	08:15 16:04
6	08:33 16:17 41	14:56 (B 01) 15:37 (WEA 7) 17:11	07:56 18:05	06:43 20:02	05:38 20:55	04:56 21:41	05:00 21:47	05:43 21:07	06:36 19:59	07:28 18:46	07:25 16:40	08:17 16:03
7	08:32 16:19 42	14:56 (B 01) 15:38 (WEA 7) 17:13	07:55 18:07	06:41 20:04	05:36 20:57	04:55 21:42	05:01 21:47	05:44 21:05	06:38 19:56	07:30 18:44	07:27 16:38	08:18 16:03
8	08:32 16:20 42	14:57 (B 01) 15:39 (WEA 7) 17:15	07:53 18:09	06:39 20:05	05:34 20:59	04:54 21:43	05:02 21:46	05:46 21:03	06:39 19:54	07:32 18:42	07:29 16:36	08:19 16:02
9	08:31 16:21 42	14:58 (B 01) 15:40 (WEA 7) 17:17	07:51 18:11	06:50 20:07	05:32 21:01	04:54 21:44	05:03 21:45	05:48 21:01	06:41 19:52	07:33 18:39	07:31 16:35	08:20 16:02
10	08:31 16:23 42	14:58 (B 01) 15:40 (WEA 7) 17:19	07:49 18:13	06:48 20:09	05:30 21:02	04:53 21:44	05:04 21:45	05:49 20:59	06:43 19:49	07:35 18:37	07:33 16:33	08:22 16:02
11	08:30 16:24 42	14:59 (B 01) 15:41 (WEA 7) 17:21	07:47 18:15	06:46 20:11	05:29 21:04	04:53 21:45	05:05 21:46	05:51 20:57	06:44 19:47	07:37 18:35	07:35 16:31	08:23 16:02
12	08:29 16:26 41	15:00 (B 01) 15:41 (WEA 7) 17:23	07:45 18:16	06:43 20:13	05:27 21:06	04:52 21:46	05:06 21:43	05:53 20:55	06:46 19:44	07:39 18:32	07:37 16:30	08:24 16:01
13	08:29 16:27 41	15:02 (B 01) 15:43 (WEA 7) 17:25	07:43 18:18	06:41 20:14	05:25 21:07	04:52 21:47	05:07 21:42	05:55 20:53	06:48 19:42	07:41 18:30	07:38 16:28	08:25 16:01
14	08:28 16:29 40	15:02 (B 01) 15:42 (WEA 7) 17:27	07:41 18:20	06:39 20:16	05:23 21:09	04:52 21:47	05:08 21:41	05:56 20:51	06:50 19:40	07:42 18:26	07:40 16:26	08:26 16:01
15	08:27 16:31 39	15:04 (B 01) 15:43 (WEA 7) 17:29	07:39 18:22	06:36 20:18	05:22 21:11	04:52 21:48	05:10 21:40	05:58 20:49	06:51 19:37	07:44 18:26	07:42 16:25	08:27 16:01
16	08:26 16:32 38	15:05 (B 01) 15:43 (WEA 7) 17:31	07:37 18:24	06:34 20:20	05:20 21:12	04:52 21:48	05:11 21:39	06:00 20:47	06:53 19:35	07:46 18:23	07:44 16:23	08:28 16:01
17	08:25 16:34 37	15:07 (B 01) 15:44 (WEA 7) 17:33	07:35 18:26	06:31 20:22	05:18 21:14	04:51 21:49	05:12 21:38	06:01 20:44	06:55 19:32	07:48 18:21	07:46 16:22	08:29 16:02
18	08:24 16:36 31	15:11 (B 01) 15:44 (WEA 7) 17:35	07:33 18:27	06:29 20:23	05:17 21:16	04:51 21:49	05:14 21:37	06:03 20:42	06:57 19:30	07:50 18:19	07:48 16:20	08:29 16:02
19	08:23 16:37 25	15:20 (WEA 7) 15:45 (WEA 7) 17:37	07:31 18:29	06:27 20:25	05:15 21:17	04:51 21:50	05:15 21:35	06:05 20:40	06:58 19:27	07:52 18:17	07:49 16:19	08:30 16:02
20	08:22 16:39 25	15:19 (WEA 7) 15:44 (WEA 7) 17:39	07:29 18:31	06:24 20:27	05:14 21:19	04:51 21:50	05:16 21:34	06:07 20:38	07:00 19:25	07:53 18:14	07:51 16:18	08:31 16:02
21	08:21 16:41 25	15:20 (WEA 7) 15:45 (WEA 7) 17:40	07:27 18:33	06:22 20:29	05:13 21:20	04:52 21:50	05:18 21:33	06:08 20:36	07:02 19:23	07:55 18:12	07:53 16:16	08:31 16:03
22	08:19 16:43 24	15:20 (WEA 7) 15:44 (WEA 7) 17:42	07:24 18:35	06:19 20:31	05:11 21:22	04:52 21:50	05:19 21:31	06:10 20:34	07:03 19:20	07:57 18:10	07:55 16:15	08:32 16:03
23	08:18 16:45 22	15:22 (WEA 7) 15:44 (WEA 7) 17:44	07:22 18:37	06:17 20:32	05:10 21:23	04:52 21:51	05:21 21:30	06:12 20:31	07:05 19:18	07:59 18:08	07:56 16:14	08:32 16:04
24	08:17 16:46 21	15:23 (WEA 7) 15:44 (WEA 7) 17:46	07:20 18:38	06:15 20:34	05:08 21:25	04:52 21:51	05:22 21:29	06:13 20:19	07:07 19:15	07:58 18:06	07:58 16:13	08:33 16:04
25	08:16 16:48 19	15:24 (WEA 7) 15:43 (WEA 7) 17:48	07:18 18:40	06:12 20:36	05:07 21:26	04:53 21:51	05:24 21:27	06:15 20:27	07:09 19:13	07:03 18:04	07:03 16:12	08:34 16:05
26	08:14 16:50 18	15:24 (WEA 7) 15:42 (WEA 7) 17:50	07:16 18:42	06:10 20:38	05:06 21:27	04:53 21:51	05:25 21:26	06:17 20:25	07:10 19:10	07:05 18:03	07:05 16:11	08:33 16:06
27	08:13 16:52 16	15:26 (WEA 7) 15:42 (WEA 7) 17:52	07:13 18:44	06:07 20:40	05:05 21:29	04:54 21:51	05:27 21:24	06:19 20:22	07:12 19:08	07:06 18:05	07:06 16:10	08:34 16:06
28	08:11 16:54 12	15:28 (WEA 7) 15:40 (WEA 7) 17:54	07:11 18:46	06:05 20:41	05:04 21:30	04:54 21:51	05:28 21:22	06:20 20:20	07:14 19:06	07:08 18:05	07:08 16:09	08:34 16:07
29	08:10 16:56 6	15:32 (WEA 7) 15:38 (WEA 7)	07:02 19:47	05:52 20:43	05:03 21:32	04:55 21:50	05:30 21:21	06:22 20:18	07:16 19:03	07:10 18:05	07:10 16:08	08:34 16:08
30	08:08 16:58		07:00 19:49	05:50 20:45	05:01 21:33	04:55 21:50	05:31 21:19	06:24 20:15	07:17 19:01	07:12 18:05	07:12 16:07	08:34 16:09
31	08:07 17:00		06:58 19:51	05:00 21:34	05:00 21:34	05:33 21:17	05:26 20:13	06:26 20:13	07:14 19:01	07:14 18:05	07:14 16:07	08:34 16:10
Sonnenscheinstunden	253		275	419	491	506	509	458	382	329	261	237
astr.max.mögl.Beschattung	937									480		1235

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s55 - Südergellersen, Oerzer Str. 13A

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:34	13:12 (Rep 11)   08:05	15:45 (B 01)   07:09	06:55	05:48	04:59
	16:11	15:14 (Rep 8)   17:01	16:15 (WEA 7)   17:56	19:53	20:47	21:35
2	08:34	13:13 (Rep 11)   08:03	15:46 (B 01)   07:07	06:53	05:46	04:59
	16:12	15:14 (Rep 8)   17:03	16:15 (WEA 7)   17:58	19:55	20:48	21:36
3	08:34	13:14 (Rep 11)   08:02	15:49 (B 01)   07:04	06:51	05:44	04:58
	16:14	15:15 (Rep 8)   17:05	16:16 (WEA 7)   18:00	19:56	20:50	21:38
4	08:33	13:14 (Rep 11)   08:00	15:51 (B 01)   07:02	06:48	05:42	04:57
	16:15	15:15 (Rep 8)   17:07	16:16 (WEA 7)   18:01	19:58	20:52	21:39
5	08:33	13:16 (Rep 11)   07:58	15:53 (WEA 7)   07:00	06:46	05:40	04:56
	16:16	15:16 (Rep 8)   17:09	16:15 (WEA 7)   18:03	20:00	20:54	21:40
6	08:33	13:16 (Rep 11)   07:56	15:54 (WEA 7)   06:57	06:43	05:38	04:55
	16:17	15:16 (Rep 8)   17:11	16:14 (WEA 7)   18:05	20:02	20:55	21:41
7	08:32	13:17 (Rep 11)   07:55	15:55 (WEA 7)   06:55	06:41	05:36	04:55
	16:19	15:15 (Rep 8)   17:13	16:13 (WEA 7)   18:07	20:04	20:57	21:42
8	08:32	13:19 (Rep 11)   07:53	15:57 (WEA 7)   06:53	06:39	05:34	04:54
	16:20	15:44 (B 01)   17:15	16:12 (WEA 7)   18:09	20:05	20:59	21:43
9	08:31	13:20 (Rep 11)   07:51	15:59 (WEA 7)   06:50	06:36	05:32	04:54
	16:21	15:46 (B 01)   17:17	16:10 (WEA 7)   18:11	20:07	21:01	21:44
10	08:31	13:21 (Rep 11)   07:49	16:03 (WEA 7)   06:48	06:34	05:30	04:53
	16:23	15:47 (B 01)   17:19	16:06 (WEA 7)   18:13	20:09	21:02	21:44
11	08:30	13:23 (Rep 11)   07:47	06:46	06:32	05:29	04:53
	16:24	15:49 (B 01)   17:21	18:15	20:11	21:04	21:45
12	08:29	13:25 (Rep 11)   07:45	06:43	06:29	05:27	04:52
	16:26	15:50 (B 01)   17:23	18:16	20:13	21:06	21:46
13	08:29	13:28 (Rep 11)   07:43	06:41	06:27	05:25	04:52
	16:27	15:52 (B 01)   17:25	18:18	20:14	21:07	21:47
14	08:28	14:27 (Rep 9)   07:41	06:39	06:25	05:23	04:52
	16:29	15:54 (B 01)   17:27	18:20	20:16	21:09	21:47
15	08:27	14:29 (Rep 9)   07:39	06:36	06:22	05:22	04:52
	16:31	15:56 (B 01)   17:29	18:22	20:18	21:11	21:48
16	08:26	14:32 (Rep 9)   07:37	06:34	06:20	05:20	04:51
	16:32	15:58 (B 01)   17:31	18:24	20:20	21:12	21:48
17	08:25	15:04 (Rep 8)   07:35	06:31	06:18	05:18	04:51
	16:34	16:00 (B 01)   17:33	18:26	20:22	21:14	21:49
18	08:24	15:39 (B 01)   07:33	06:29	06:16	05:17	04:51
	16:36	16:02 (B 01)   17:35	18:27	20:23	21:16	21:49
19	08:23	15:40 (B 01)   07:31	06:27	06:13	05:15	04:51
	16:37	16:04 (B 01)   17:37	18:29	20:25	21:17	21:50
20	08:22	15:39 (B 01)   07:29	06:24	06:11	05:14	04:51
	16:39	16:05 (B 01)   17:39	18:31	20:27	21:19	21:50
21	08:21	15:40 (B 01)   07:27	06:22	06:09	05:13	04:52
	16:41	16:07 (B 01)   17:40	18:33	20:29	21:20	21:50
22	08:19	15:39 (B 01)   07:24	06:19	06:07	05:11	04:52
	16:43	16:07 (WEA 7)   17:42	18:35	20:31	21:22	21:50
23	08:18	15:40 (B 01)   07:22	06:17	06:04	05:10	04:52
	16:45	16:09 (WEA 7)   17:44	18:37	20:32	21:23	21:51
24	08:17	15:40 (B 01)   07:20	06:15	06:02	05:08	04:52
	16:46	16:11 (WEA 7)   17:46	18:38	20:34	21:25	21:51
25	08:15	15:40 (B 01)   07:18	06:12	06:00	05:07	04:53
	16:48	16:12 (WEA 7)   17:48	18:40	20:36	21:26	21:51
26	08:14	15:40 (B 01)   07:16	06:10	05:58	05:06	04:53
	16:50	16:12 (WEA 7)   17:50	18:42	20:38	21:27	21:51
27	08:13	15:41 (B 01)   07:13	06:07	05:56	05:05	04:54
	16:52	16:14 (WEA 7)   17:52	18:44	20:40	21:29	21:51
28	08:11	15:42 (B 01)   07:11	06:05	05:54	05:04	04:54
	16:54	16:14 (WEA 7)   17:54	18:46	20:41	21:30	21:51
29	08:10	15:42 (B 01)	07:02	05:52	05:02	04:55
	16:56	16:14 (WEA 7)	19:47	20:43	21:31	21:50
30	08:08	15:43 (B 01)	07:00	05:50	05:01	04:55
	16:58	16:15 (WEA 7)	19:49	20:45	21:33	21:50
31	08:07	15:44 (B 01)	06:58		05:00	
	17:00	16:15 (WEA 7)	19:51		21:34	
Sonnenscheinstunden	253	275	367	419	491	506
astr.max.mögl.Beschattung	1588	200				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende	(WEA mit letztem Schatten)
	Minuten mit Schatten		

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s55 - Südergellersen, Oerzer Str. 13A

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November		Dezember
1	04:56	05:35	06:27	07:19	07:16	15:32 (WEA 7)	08:09
	21:50	21:16	20:11	18:58	16:49	5	15:37 (WEA 7)
2	04:57	05:36	06:29	07:21	07:18	15:28 (WEA 7)	08:11
	21:49	21:14	20:08	18:56	16:47	12	15:40 (WEA 7)
3	04:57	05:38	06:31	07:23	07:20	15:26 (WEA 7)	08:12
	21:49	21:12	20:06	18:54	16:45	16	15:42 (WEA 7)
4	04:58	05:39	06:32	07:24	07:22	15:25 (WEA 7)	08:14
	21:49	21:10	20:04	18:51	16:44	18	15:43 (WEA 7)
5	04:59	05:41	06:34	07:26	07:23	15:24 (WEA 7)	08:15
	21:48	21:09	20:01	18:49	16:42	20	15:44 (WEA 7)
6	05:00	05:43	06:36	07:28	07:25	15:23 (WEA 7)	08:17
	21:47	21:07	19:59	18:46	16:40	22	15:45 (WEA 7)
7	05:01	05:44	06:38	07:30	07:27	15:21 (B 01)	08:18
	21:47	21:05	19:56	18:44	16:38	24	15:45 (WEA 7)
8	05:02	05:46	06:39	07:32	07:29	15:18 (B 01)	08:19
	21:46	21:03	19:54	18:42	16:36	28	15:46 (WEA 7)
9	05:03	05:48	06:41	07:33	07:31	15:17 (B 01)	08:20
	21:45	21:01	19:52	18:39	16:35	29	15:46 (WEA 7)
10	05:04	05:49	06:43	07:35	07:33	15:16 (B 01)	08:22
	21:45	20:59	19:49	18:37	16:33	30	15:46 (WEA 7)
11	05:05	05:51	06:44	07:37	07:35	15:15 (B 01)	08:23
	21:44	20:57	19:47	18:35	16:31	31	15:46 (WEA 7)
12	05:06	05:53	06:46	07:39	07:37	15:14 (B 01)	08:24
	21:43	20:55	19:44	18:32	16:30	32	15:46 (WEA 7)
13	05:07	05:55	06:48	07:41	07:38	15:14 (B 01)	08:25
	21:42	20:53	19:42	18:30	16:28	32	15:46 (WEA 7)
14	05:08	05:56	06:50	07:42	07:40	15:13 (B 01)	08:26
	21:41	20:51	19:40	18:28	16:26	33	15:46 (WEA 7)
15	05:10	05:58	06:51	07:44	07:42	15:14 (B 01)	08:27
	21:40	20:49	19:37	18:26	16:25	33	15:47 (WEA 7)
16	05:11	06:00	06:53	07:46	07:44	15:14 (B 01)	08:28
	21:39	20:47	19:35	18:23	16:23	32	15:46 (WEA 7)
17	05:12	06:01	06:55	07:48	07:46	15:14 (B 01)	08:28
	21:38	20:44	19:32	18:21	16:22	32	15:46 (WEA 7)
18	05:14	06:03	06:57	07:50	07:48	15:14 (B 01)	08:29
	21:36	20:42	19:30	18:19	16:20	31	15:45 (WEA 7)
19	05:15	06:05	06:58	07:51	07:49	15:14 (B 01)	08:30
	21:35	20:40	19:27	18:17	16:19	29	15:43 (WEA 7)
20	05:16	06:07	07:00	07:53	07:51	15:14 (B 01)	08:31
	21:34	20:38	19:25	18:14	16:18	28	15:42 (WEA 7)
21	05:18	06:08	07:02	07:55	07:53	15:15 (B 01)	08:31
	21:33	20:36	19:23	18:12	16:16	27	15:42 (B 01)
22	05:19	06:10	07:03	07:57	07:55	15:15 (B 01)	08:32
	21:31	20:34	19:20	18:10	16:15	26	15:41 (B 01)
23	05:21	06:12	07:05	07:59	07:56	15:16 (B 01)	08:32
	21:30	20:31	19:18	18:08	16:14	24	15:40 (B 01)
24	05:22	06:13	07:07	08:01	07:58	15:17 (B 01)	08:33
	21:29	20:29	19:15	18:06	16:13	22	15:39 (B 01)
25	05:24	06:15	07:09	07:03	08:00	14:42 (Rep 8)	08:33
	21:27	20:27	19:13	17:04	16:12	29	15:38 (B 01)
26	05:25	06:17	07:10	07:05	08:02	14:11 (Rep 9)	08:33
	21:26	20:25	19:10	17:01	16:11	40	15:37 (B 01)
27	05:27	06:19	07:12	07:06	08:03	14:10 (Rep 9)	08:34
	21:24	20:22	19:08	16:59	16:10	45	15:36 (B 01)
28	05:28	06:20	07:14	07:08	08:05	14:08 (Rep 9)	08:34
	21:22	20:20	19:06	16:57	16:09	49	15:34 (B 01)
29	05:30	06:22	07:16	07:10	08:06	13:09 (Rep 11)	08:34
	21:21	20:18	19:03	16:55	16:08	61	15:33 (B 01)
30	05:31	06:24	07:17	07:12	08:08	13:07 (Rep 11)	08:34
	21:19	20:15	19:01	16:53	16:07	66	15:32 (B 01)
31	05:33	06:26		07:14			08:34
	21:17	20:13		16:51			16:10
Sonnenscheinstunden	509	458	382	329	261		237
astr.max.mögl.Beschattung					906		2725

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende
			(WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s56 - Südergellersen, Oerzer Str. 15

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:34	13:35 (Rep 11)   08:05	16:03 (B 01)   07:09	06:55	05:48	04:59
	16:11	97 15:30 (Rep 8)   17:01	26 16:29 (B 01)   17:56	19:53	20:47	21:35
2	08:34	13:36 (Rep 11)   08:03	16:02 (B 01)   07:07	06:53	05:46	04:59
	16:12	96 15:30 (Rep 8)   17:03	27 16:29 (B 01)   17:58	19:55	20:48	21:36
3	08:34	13:37 (Rep 11)   08:02	16:03 (B 01)   07:04	06:50	05:44	04:58
	16:14	97 15:31 (Rep 8)   17:05	27 16:30 (WEA 7)   18:00	19:56	20:50	21:38
4	08:33	13:37 (Rep 11)   08:00	16:03 (B 01)   07:02	06:48	05:42	04:57
	16:15	96 15:31 (Rep 8)   17:07	27 16:30 (WEA 7)   18:01	19:58	20:52	21:39
5	08:33	13:38 (Rep 11)   07:58	16:04 (B 01)   07:00	06:46	05:40	04:56
	16:16	97 15:33 (Rep 8)   17:09	27 16:31 (WEA 7)   18:03	20:00	20:54	21:40
6	08:33	13:38 (Rep 11)   07:56	16:04 (B 01)   06:57	06:43	05:38	04:55
	16:17	97 15:33 (Rep 8)   17:11	27 16:31 (WEA 7)   18:05	20:02	20:55	21:41
7	08:32	13:39 (Rep 11)   07:55	16:04 (B 01)   06:55	06:41	05:36	04:55
	16:19	96 15:33 (Rep 8)   17:13	27 16:31 (WEA 7)   18:07	20:04	20:57	21:42
8	08:32	13:40 (Rep 11)   07:53	16:05 (B 01)   06:53	06:39	05:34	04:54
	16:20	96 15:34 (Rep 8)   17:15	26 16:31 (WEA 7)   18:09	20:05	20:59	21:43
9	08:31	13:40 (Rep 11)   07:51	16:06 (B 01)   06:50	06:36	05:32	04:54
	16:21	96 15:34 (Rep 8)   17:17	25 16:31 (WEA 7)   18:11	20:07	21:01	21:44
10	08:31	13:41 (Rep 11)   07:49	16:07 (B 01)   06:48	06:34	05:30	04:53
	16:23	95 15:35 (Rep 8)   17:19	24 16:31 (WEA 7)   18:13	20:09	21:02	21:44
11	08:30	13:41 (Rep 11)   07:47	16:09 (WEA 7)   06:46	06:32	05:29	04:53
	16:24	95 15:35 (Rep 8)   17:21	22 16:31 (WEA 7)   18:15	20:11	21:04	21:45
12	08:29	13:42 (Rep 11)   07:45	16:10 (WEA 7)   06:43	06:29	05:27	04:52
	16:26	94 15:35 (Rep 8)   17:23	20 16:30 (WEA 7)   18:16	20:13	21:06	21:46
13	08:29	13:43 (Rep 11)   07:43	16:11 (WEA 7)   06:41	06:27	05:25	04:52
	16:27	93 15:36 (Rep 8)   17:25	18 16:29 (WEA 7)   18:18	20:14	21:07	21:47
14	08:28	13:44 (Rep 11)   07:41	16:12 (WEA 7)   06:39	06:25	05:23	04:52
	16:29	90 15:36 (Rep 8)   17:27	16 16:28 (WEA 7)   18:20	20:16	21:09	21:47
15	08:27	13:45 (Rep 11)   07:39	16:13 (WEA 7)   06:36	06:22	05:22	04:52
	16:31	89 15:36 (Rep 8)   17:29	12 16:25 (WEA 7)   18:22	20:18	21:11	21:48
16	08:26	13:46 (Rep 11)   07:37	16:17 (WEA 7)   06:34	06:20	05:20	04:51
	16:32	88 15:37 (Rep 8)   17:31	5 16:22 (WEA 7)   18:24	20:20	21:12	21:48
17	08:25	13:47 (Rep 11)   07:35		06:31	06:18	05:18
	16:34	86 15:37 (Rep 8)   17:33		18:26	20:22	21:14
18	08:24	13:49 (Rep 11)   07:33		06:29	06:16	05:17
	16:36	83 15:37 (Rep 8)   17:35		18:27	20:23	21:16
19	08:23	13:50 (Rep 11)   07:31		06:27	06:13	05:15
	16:37	81 15:37 (Rep 8)   17:37		18:29	20:25	21:17
20	08:22	13:51 (Rep 11)   07:29		06:24	06:11	05:14
	16:39	77 15:36 (Rep 8)   17:39		18:31	20:27	21:19
21	08:21	13:53 (Rep 11)   07:27		06:22	06:09	05:12
	16:41	73 15:37 (Rep 8)   17:40		18:33	20:29	21:20
22	08:19	13:54 (Rep 11)   07:24		06:19	06:07	05:11
	16:43	65 15:35 (Rep 8)   17:42		18:35	20:31	21:22
23	08:18	13:57 (Rep 11)   07:22		06:17	06:04	05:10
	16:45	60 16:11 (B 01)   17:44		18:37	20:32	21:23
24	08:17	14:00 (Rep 11)   07:20		06:15	06:02	05:08
	16:46	54 16:14 (B 01)   17:46		18:38	20:34	21:25
25	08:15	14:55 (Rep 9)   07:18		06:12	06:00	05:07
	16:48	36 16:15 (B 01)   17:48		18:40	20:36	21:26
26	08:14	14:57 (Rep 9)   07:16		06:10	05:58	05:06
	16:50	24 16:17 (B 01)   17:50		18:42	20:38	21:27
27	08:13	16:05 (B 01)   07:13		06:07	05:56	05:05
	16:52	15 16:20 (B 01)   17:52		18:44	20:40	21:29
28	08:11	16:04 (B 01)   07:11		06:05	05:54	05:04
	16:54	18 16:22 (B 01)   17:54		18:46	20:41	21:30
29	08:10	16:03 (B 01)		07:02	05:52	05:02
	16:56	20 16:23 (B 01)		19:47	20:43	21:31
30	08:08	16:03 (B 01)		07:00	05:50	05:01
	16:58	23 16:26 (B 01)		19:49	20:45	21:33
31	08:07	16:03 (B 01)		06:58		05:00
	17:00	25 16:28 (B 01)		19:51		21:34
Sonnenscheinstunden	253	275	367	419	491	506
astr.max.mögl.Beschattung	2252	356				

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende
			(WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s56 - Südergellersen, Oerzer Str. 15

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56	05:35	06:27	07:19				07:16	15:37 (B 01)	08:09	13:24 (Rep 11)
	21:50	21:16	20:11	18:58				16:49	24 16:01 (WEA 7)	16:06	94 15:17 (Rep 8)
2	04:57	05:36	06:29	07:21				07:18	15:35 (B 01)	08:11	13:24 (Rep 11)
	21:49	21:14	20:08	18:56				16:47	26 16:01 (WEA 7)	16:06	95 15:18 (Rep 8)
3	04:57	05:38	06:31	07:23				07:20	15:35 (B 01)	08:12	13:24 (Rep 11)
	21:49	21:12	20:06	18:54				16:45	26 16:01 (WEA 7)	16:05	96 15:19 (Rep 8)
4	04:58	05:39	06:32	07:24				07:22	15:34 (B 01)	08:14	13:24 (Rep 11)
	21:49	21:10	20:04	18:51				16:44	27 16:01 (WEA 7)	16:04	96 15:18 (Rep 8)
5	04:59	05:41	06:34	07:26				07:23	15:34 (B 01)	08:15	13:25 (Rep 11)
	21:48	21:09	20:01	18:49				16:42	27 16:01 (WEA 7)	16:04	96 15:19 (Rep 8)
6	05:00	05:43	06:36	07:28				07:25	15:33 (B 01)	08:17	13:25 (Rep 11)
	21:47	21:07	19:59	18:46				16:40	28 16:01 (WEA 7)	16:03	96 15:19 (Rep 8)
7	05:01	05:44	06:38	07:30				07:27	15:33 (B 01)	08:18	13:24 (Rep 11)
	21:47	21:05	19:56	18:44				16:38	27 16:00 (WEA 7)	16:03	97 15:19 (Rep 8)
8	05:02	05:46	06:39	07:32				07:29	15:33 (B 01)	08:19	13:25 (Rep 11)
	21:46	21:03	19:54	18:42				16:36	27 16:00 (WEA 7)	16:02	98 15:20 (Rep 8)
9	05:03	05:48	06:41	07:33				07:31	15:33 (B 01)	08:20	13:25 (Rep 11)
	21:45	21:01	19:52	18:39				16:35	27 16:00 (B 01)	16:02	97 15:20 (Rep 8)
10	05:04	05:49	06:43	07:35				07:33	15:33 (B 01)	08:22	13:25 (Rep 11)
	21:45	20:59	19:49	18:37				16:33	27 16:00 (B 01)	16:02	97 15:20 (Rep 8)
11	05:05	05:51	06:44	07:37				07:35	15:34 (B 01)	08:23	13:26 (Rep 11)
	21:44	20:57	19:47	18:35				16:31	25 15:59 (B 01)	16:02	96 15:20 (Rep 8)
12	05:06	05:53	06:46	07:39				07:37	15:34 (B 01)	08:24	13:27 (Rep 11)
	21:43	20:55	19:44	18:32				16:30	23 15:57 (B 01)	16:01	97 15:21 (Rep 8)
13	05:07	05:55	06:48	07:41				07:38	15:35 (B 01)	08:25	13:27 (Rep 11)
	21:42	20:53	19:42	18:30				16:28	20 15:55 (B 01)	16:01	96 15:21 (Rep 8)
14	05:08	05:56	06:50	07:42				07:40	15:36 (B 01)	08:26	13:28 (Rep 11)
	21:41	20:51	19:40	18:28				16:26	17 15:53 (B 01)	16:01	96 15:21 (Rep 8)
15	05:10	05:58	06:51	07:44				07:42	15:38 (B 01)	08:27	13:28 (Rep 11)
	21:40	20:49	19:37	18:26				16:25	15 15:53 (B 01)	16:01	96 15:22 (Rep 8)
16	05:11	06:00	06:53	07:46				07:44	14:31 (Rep 9)	08:28	13:28 (Rep 11)
	21:39	20:47	19:35	18:23				16:23	25 15:51 (B 01)	16:01	95 15:21 (Rep 8)
17	05:12	06:01	06:55	07:48				07:46	14:29 (Rep 9)	08:28	13:28 (Rep 11)
	21:38	20:44	19:32	18:21				16:22	36 15:49 (B 01)	16:02	97 15:22 (Rep 8)
18	05:14	06:03	06:57	07:50				07:48	13:34 (Rep 11)	08:29	13:29 (Rep 11)
	21:36	20:42	19:30	18:19				16:20	54 15:48 (B 01)	16:02	95 15:22 (Rep 8)
19	05:15	06:05	06:58	07:51				07:49	13:31 (Rep 11)	08:30	13:30 (Rep 11)
	21:35	20:40	19:27	18:17				16:19	60 15:45 (B 01)	16:02	95 15:23 (Rep 8)
20	05:16	06:07	07:00	07:53				07:51	13:29 (Rep 11)	08:31	13:29 (Rep 11)
	21:34	20:38	19:25	18:14				16:18	65 15:10 (Rep 8)	16:02	96 15:23 (Rep 8)
21	05:18	06:08	07:02	07:55				07:53	13:28 (Rep 11)	08:31	13:30 (Rep 11)
	21:33	20:36	19:23	18:12				16:16	73 15:12 (Rep 8)	16:03	96 15:24 (Rep 8)
22	05:19	06:10	07:03	07:57				07:55	13:27 (Rep 11)	08:32	13:30 (Rep 11)
	21:31	20:34	19:20	18:10				16:15	77 15:12 (Rep 8)	16:03	96 15:24 (Rep 8)
23	05:21	06:12	07:05	07:59				07:56	13:26 (Rep 11)	08:32	13:31 (Rep 11)
	21:30	20:31	19:18	18:08				16:14	81 15:13 (Rep 8)	16:04	96 15:25 (Rep 8)
24	05:22	06:13	07:07	08:01				07:58	13:26 (Rep 11)	08:33	13:32 (Rep 11)
	21:28	20:29	19:15	18:06				16:13	83 15:14 (Rep 8)	16:04	95 15:25 (Rep 8)
25	05:24	06:15	07:09	07:03				08:00	13:25 (Rep 11)	08:33	13:32 (Rep 11)
	21:27	20:27	19:13	17:04				16:12	86 15:15 (Rep 8)	16:05	95 15:25 (Rep 8)
26	05:25	06:17	07:10	07:05	15:46 (WEA 7)	08:02		13:25 (Rep 11)	08:33	13:32 (Rep 11)	
	21:26	20:25	19:10	17:01	8 15:54 (WEA 7)	16:11		15:16 (Rep 8)	16:06	95 15:25 (Rep 8)	
27	05:27	06:19	07:12	07:06	15:43 (WEA 7)	08:03		13:25 (Rep 11)	08:34	13:33 (Rep 11)	
	21:24	20:22	19:08	16:59	13 15:56 (WEA 7)	16:10		15:16 (Rep 8)	16:06	96 15:27 (Rep 8)	
28	05:28	06:20	07:14	07:08	15:41 (WEA 7)	08:05		13:24 (Rep 11)	08:34	13:34 (Rep 11)	
	21:22	20:20	19:06	16:57	17 15:58 (WEA 7)	16:09		15:16 (Rep 8)	16:07	95 15:27 (Rep 8)	
29	05:30	06:22	07:16	07:10	15:40 (WEA 7)	08:06		13:24 (Rep 11)	08:34	13:34 (Rep 11)	
	21:21	20:18	19:03	16:55	19 15:59 (WEA 7)	16:08		15:17 (Rep 8)	16:08	97 15:28 (Rep 8)	
30	05:31	06:24	07:17	07:12	15:39 (WEA 7)	08:08		13:24 (Rep 11)	08:34	13:35 (Rep 11)	
	21:19	20:15	19:01	16:53	21 16:00 (WEA 7)	16:07		15:17 (Rep 8)	16:09	96 15:29 (Rep 8)	
31	05:33	06:26		07:14	15:38 (WEA 7)				08:34	13:35 (Rep 11)	
	21:17	20:13		16:51	22 16:00 (WEA 7)				16:10	96 15:28 (Rep 8)	
Sonnenscheinstunden		509	458	382	329			261		237	
astr.max.mögl.Beschattung					100			1460		2974	

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s57 - Südergellersen, Oerzer Str. 18

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:34	14:00 (Rep 9)   08:05	15:37 (WEA 7)   07:09	06:55	05:48	05:00
	16:11	49 15:34 (B 01)   17:01	15 15:52 (WEA 7)   17:56	19:53	20:47	21:35
2	08:34	14:04 (Rep 9)   08:03	15:39 (WEA 7)   07:07	06:53	05:46	04:59
	16:12	43 15:35 (B 01)   17:03	11 15:50 (WEA 7)   17:58	19:55	20:48	21:36
3	08:34	14:37 (Rep 8)   08:02	07:04	06:51	05:44	04:58
	16:14	40 15:36 (B 01)   17:05	18:00	19:56	20:50	21:38
4	08:33	14:38 (Rep 8)   08:00	07:02	06:48	05:42	04:57
	16:15	37 15:36 (B 01)   17:07	18:02	19:58	20:52	21:39
5	08:33	14:40 (Rep 8)   07:58	07:00	06:46	05:40	04:56
	16:16	35 15:37 (B 01)   17:09	18:03	20:00	20:54	21:40
6	08:33	15:08 (B 01)   07:56	06:57	06:43	05:38	04:56
	16:17	30 15:38 (WEA 7)   17:11	18:05	20:02	20:55	21:41
7	08:32	15:08 (B 01)   07:55	06:55	06:41	05:36	04:55
	16:19	32 15:40 (WEA 7)   17:13	18:07	20:04	20:57	21:42
8	08:32	15:09 (B 01)   07:53	06:53	06:39	05:34	04:54
	16:20	34 15:43 (WEA 7)   17:15	18:09	20:05	20:59	21:43
9	08:31	15:09 (B 01)   07:51	06:50	06:36	05:32	04:54
	16:21	35 15:44 (WEA 7)   17:17	18:11	20:07	21:01	21:44
10	08:31	15:09 (B 01)   07:49	06:48	06:34	05:30	04:53
	16:23	36 15:45 (WEA 7)   17:19	18:13	20:09	21:02	21:44
11	08:30	15:09 (B 01)   07:47	06:46	06:32	05:29	04:53
	16:24	38 15:47 (WEA 7)   17:21	18:15	20:11	21:04	21:45
12	08:29	15:10 (B 01)   07:45	06:43	06:29	05:27	04:52
	16:26	38 15:48 (WEA 7)   17:23	18:16	20:13	21:06	21:46
13	08:29	15:10 (B 01)   07:43	06:41	06:27	05:25	04:52
	16:27	39 15:49 (WEA 7)   17:25	18:18	20:14	21:07	21:47
14	08:28	15:11 (B 01)   07:41	06:39	06:25	05:23	04:52
	16:29	39 15:50 (WEA 7)   17:27	18:20	20:16	21:09	21:47
15	08:27	15:12 (B 01)   07:39	06:36	06:22	05:22	04:52
	16:31	39 15:51 (WEA 7)   17:29	18:22	20:18	21:11	21:48
16	08:26	15:12 (B 01)   07:37	06:34	06:20	05:20	04:52
	16:32	40 15:52 (WEA 7)   17:31	18:24	20:20	21:12	21:48
17	08:25	15:13 (B 01)   07:35	06:31	06:18	05:18	04:51
	16:34	39 15:52 (WEA 7)   17:33	18:26	20:22	21:14	21:49
18	08:24	15:14 (B 01)   07:33	06:29	06:16	05:17	04:51
	16:36	39 15:53 (WEA 7)   17:35	18:27	20:23	21:16	21:49
19	08:23	15:16 (B 01)   07:31	06:27	06:13	05:15	04:51
	16:37	38 15:54 (WEA 7)   17:37	18:29	20:25	21:17	21:50
20	08:22	15:16 (B 01)   07:29	06:24	06:11	05:14	04:51
	16:39	38 15:54 (WEA 7)   17:39	18:31	20:27	21:19	21:50
21	08:21	15:17 (B 01)   07:27	06:22	06:09	05:13	04:52
	16:41	38 15:55 (WEA 7)   17:40	18:33	20:29	21:20	21:50
22	08:19	15:18 (B 01)   07:24	06:19	06:07	05:11	04:52
	16:43	37 15:55 (WEA 7)   17:42	18:35	20:31	21:22	21:50
23	08:18	15:20 (B 01)   07:22	06:17	06:04	05:10	04:52
	16:45	35 15:55 (WEA 7)   17:44	18:37	20:32	21:23	21:51
24	08:17	15:23 (B 01)   07:20	06:15	06:02	05:08	04:52
	16:46	33 15:56 (WEA 7)   17:46	18:38	20:34	21:25	21:51
25	08:16	15:25 (B 01)   07:18	06:12	06:00	05:07	04:53
	16:48	31 15:56 (WEA 7)   17:48	18:40	20:36	21:26	21:51
26	08:14	15:31 (WEA 7)   07:16	06:10	05:58	05:06	04:53
	16:50	24 15:55 (WEA 7)   17:50	18:42	20:38	21:27	21:51
27	08:13	15:32 (WEA 7)   07:13	06:07	05:56	05:05	04:54
	16:52	24 15:56 (WEA 7)   17:52	18:44	20:40	21:29	21:51
28	08:11	15:33 (WEA 7)   07:11	06:05	05:54	05:04	04:54
	16:54	22 15:55 (WEA 7)   17:54	18:46	20:41	21:30	21:51
29	08:10	15:34 (WEA 7)	07:02	05:52	05:03	04:55
	16:56	21 15:55 (WEA 7)	19:47	20:43	21:32	21:50
30	08:08	15:35 (WEA 7)	07:00	05:50	05:01	04:55
	16:58	20 15:55 (WEA 7)	19:49	20:45	21:33	21:50
31	08:07	15:36 (WEA 7)	06:58		05:00	
	17:00	17 15:53 (WEA 7)	19:51		21:34	
Sonnenscheinstunden	253	275	367	419	491	506
astr.max.mögl.Beschattung	1060	26				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende
			(WEA mit letztem Schatten)

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s57 - Südergellersen, Oerzer Str. 18

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	04:56 21:50	05:35 21:16	06:27 20:11	07:19 18:58	07:16 16:49	08:10 16:06
2	04:57 21:49	05:36 21:14	06:29 20:08	07:21 18:56	07:18 16:47	08:11 16:06
3	04:57 21:49	05:38 21:12	06:31 20:06	07:23 18:54	07:20 16:45	08:12 16:05
4	04:58 21:49	05:39 21:10	06:32 20:04	07:24 18:51	07:22 16:44	08:14 16:04
5	04:59 21:48	05:41 21:09	06:34 20:01	07:26 18:49	07:23 16:42	08:15 16:04
6	05:00 21:47	05:43 21:07	06:36 19:59	07:28 18:46	07:25 16:40	08:17 16:03
7	05:01 21:47	05:44 21:05	06:38 19:56	07:30 18:44	07:27 16:38	08:18 16:03
8	05:02 21:46	05:46 21:03	06:39 19:54	07:32 18:42	07:29 16:36	15:14 (WEA 7) 16:02
9	05:03 21:45	05:48 21:01	06:41 19:52	07:33 18:39	07:31 16:35	15:10 (WEA 7) 16:02
10	05:04 21:45	05:49 20:59	06:43 19:49	07:35 18:37	07:33 16:33	15:08 (WEA 7) 16:02
11	05:05 21:44	05:51 20:57	06:44 19:47	07:37 18:35	07:35 16:31	15:07 (WEA 7) 16:02
12	05:06 21:43	05:53 20:55	06:46 19:44	07:39 18:32	07:37 16:30	15:06 (WEA 7) 16:01
13	05:07 21:42	05:55 20:53	06:48 19:42	07:41 18:30	07:38 16:28	15:05 (WEA 7) 16:01
14	05:08 21:41	05:56 20:51	06:50 19:40	07:42 18:28	07:40 16:26	15:04 (WEA 7) 16:01
15	05:10 21:40	05:58 20:49	06:51 19:37	07:44 18:26	07:42 16:25	15:05 (WEA 7) 16:01
16	05:11 21:39	06:00 20:47	06:53 19:35	07:46 18:23	07:44 16:23	15:05 (WEA 7) 16:01
17	05:12 21:38	06:01 20:44	06:55 19:32	07:48 18:21	07:46 16:22	14:59 (B 01) 16:02
18	05:14 21:37	06:03 20:42	06:57 19:30	07:50 18:19	07:48 16:20	14:57 (B 01) 16:02
19	05:15 21:35	06:05 20:40	06:58 19:27	07:52 18:17	07:49 16:19	14:54 (B 01) 16:02
20	05:16 21:34	06:07 20:38	07:00 19:25	07:53 18:14	07:51 16:18	14:53 (B 01) 16:02
21	05:18 21:33	06:08 20:36	07:02 19:23	07:55 18:12	07:53 16:16	14:52 (B 01) 16:03
22	05:19 21:31	06:10 20:34	07:03 19:20	07:57 18:10	07:55 16:15	14:52 (B 01) 16:03
23	05:21 21:30	06:12 20:31	07:05 19:18	07:59 18:08	07:56 16:14	14:52 (B 01) 16:04
24	05:22 21:29	06:13 20:29	07:07 19:15	08:01 18:06	07:58 16:13	14:51 (B 01) 16:04
25	05:24 21:27	06:15 20:27	07:09 19:13	08:03 18:04	08:00 16:12	14:51 (B 01) 16:05
26	05:25 21:26	06:17 20:25	07:10 19:10	08:05 18:01	08:02 16:11	14:52 (B 01) 16:06
27	05:27 21:24	06:19 20:22	07:12 19:08	08:07 17:59	08:03 16:10	14:52 (B 01) 16:06
28	05:28 21:22	06:20 20:20	07:14 19:06	08:09 17:57	08:05 16:09	14:51 (B 01) 16:07
29	05:30 21:21	06:22 20:18	07:16 19:03	08:11 17:55	08:06 16:08	14:51 (B 01) 16:08
30	05:31 21:19	06:24 20:15	07:17 19:01	08:12 17:53	08:08 16:07	14:52 (B 01) 16:09
31	05:33 21:17	06:26 20:13		07:14 17:51		08:34 16:10
Sonnenscheinstunden	509	458	382	329	261	237
astr.max.mögl.Beschattung					679	1743

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s58 - Südergellersen, Oerzer Str. 19

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar			Februar			März			April			Mai			Juni		
1	08:34		13:04 (Rep 11)	08:05		15:51 (B 01)	07:09		06:55		05:48		05:00					
	16:11	109	15:20 (Rep 8)	17:01	31	16:22 (WEA 7)	17:56		19:53		20:47		21:35					
2	08:34		13:05 (Rep 11)	08:03		15:51 (B 01)	07:07		06:53		05:46		04:59					
	16:12	109	15:21 (Rep 8)	17:03	32	16:23 (WEA 7)	17:58		19:55		20:48		21:36					
3	08:34		13:06 (Rep 11)	08:02		15:52 (B 01)	07:04		06:51		05:44		04:58					
	16:14	108	15:22 (Rep 8)	17:05	32	16:24 (WEA 7)	18:00		19:56		20:50		21:38					
4	08:33		13:06 (Rep 11)	08:00		15:52 (B 01)	07:02		06:48		05:42		04:57					
	16:15	107	15:21 (Rep 8)	17:07	33	16:25 (WEA 7)	18:01		19:58		20:52		21:39					
5	08:33		13:07 (Rep 11)	07:58		15:53 (B 01)	07:00		06:46		05:40		04:56					
	16:16	107	15:22 (Rep 8)	17:09	32	16:25 (WEA 7)	18:03		20:00		20:54		21:40					
6	08:33		13:07 (Rep 11)	07:56		15:53 (B 01)	06:57		06:43		05:38		04:56					
	16:17	107	15:22 (Rep 8)	17:11	32	16:25 (WEA 7)	18:05		20:02		20:55		21:41					
7	08:32		13:07 (Rep 11)	07:55		15:54 (B 01)	06:55		06:41		05:36		04:55					
	16:19	106	15:22 (Rep 8)	17:13	31	16:25 (WEA 7)	18:07		20:04		20:57		21:42					
8	08:32		13:09 (Rep 11)	07:53		15:55 (B 01)	06:53		06:39		05:34		04:54					
	16:20	106	15:24 (Rep 8)	17:15	30	16:25 (WEA 7)	18:09		20:05		20:59		21:43					
9	08:31		13:09 (Rep 11)	07:51		15:56 (B 01)	06:50		06:36		05:32		04:54					
	16:21	104	15:24 (Rep 8)	17:17	28	16:24 (WEA 7)	18:11		20:07		21:01		21:44					
10	08:31		13:10 (Rep 11)	07:49		15:58 (B 01)	06:48		06:34		05:30		04:53					
	16:23	103	15:24 (Rep 8)	17:19	26	16:24 (WEA 7)	18:13		20:09		21:02		21:44					
11	08:30		13:10 (Rep 11)	07:47		16:00 (B 01)	06:46		06:32		05:29		04:53					
	16:24	104	15:24 (Rep 8)	17:21	23	16:23 (WEA 7)	18:15		20:11		21:04		21:45					
12	08:29		13:11 (Rep 11)	07:45		16:02 (WEA 7)	06:43		06:29		05:27		04:52					
	16:26	101	15:24 (Rep 8)	17:23	21	16:23 (WEA 7)	18:16		20:13		21:06		21:46					
13	08:29		13:12 (Rep 11)	07:43		16:04 (WEA 7)	06:41		06:27		05:25		04:52					
	16:27	99	15:24 (Rep 8)	17:25	18	16:22 (WEA 7)	18:18		20:14		21:07		21:47					
14	08:28		13:13 (Rep 11)	07:41		16:06 (WEA 7)	06:39		06:25		05:23		04:52					
	16:29	96	15:24 (Rep 8)	17:27	14	16:20 (WEA 7)	18:20		20:16		21:09		21:47					
15	08:27		13:14 (Rep 11)	07:39		16:09 (WEA 7)	06:36		06:22		05:22		04:52					
	16:31	93	15:24 (Rep 8)	17:29	8	16:17 (WEA 7)	18:22		20:18		21:11		21:48					
16	08:26		13:15 (Rep 11)	07:37			06:34		06:20		05:20		04:52					
	16:32	91	15:25 (Rep 8)	17:31			18:24		20:20		21:12		21:48					
17	08:25		13:17 (Rep 11)	07:35			06:31		06:18		05:18		04:51					
	16:34	87	15:25 (Rep 8)	17:33			18:26		20:22		21:14		21:49					
18	08:24		13:18 (Rep 11)	07:33			06:29		06:16		05:17		04:51					
	16:36	85	16:02 (B 01)	17:35			18:27		20:23		21:16		21:49					
19	08:23		13:20 (Rep 11)	07:31			06:27		06:13		05:15		04:51					
	16:37	84	16:04 (B 01)	17:37			18:29		20:25		21:17		21:50					
20	08:22		13:21 (Rep 11)	07:29			06:24		06:11		05:14		04:51					
	16:39	80	16:05 (B 01)	17:39			18:31		20:27		21:19		21:50					
21	08:21		13:24 (Rep 11)	07:27			06:22		06:09		05:13		04:52					
	16:41	74	16:08 (B 01)	17:40			18:33		20:29		21:20		21:50					
22	08:19		13:25 (Rep 11)	07:24			06:19		06:07		05:11		04:52					
	16:43	69	16:09 (B 01)	17:42			18:35		20:31		21:22		21:50					
23	08:18		13:29 (Rep 11)	07:22			06:17		06:04		05:10		04:52					
	16:45	58	16:11 (B 01)	17:44			18:37		20:32		21:23		21:51					
24	08:17		14:40 (Rep 9)	07:20			06:15		06:02		05:08		04:52					
	16:46	32	16:14 (B 01)	17:46			18:38		20:34		21:25		21:51					
25	08:15		15:51 (B 01)	07:18			06:12		06:00		05:07		04:53					
	16:48	25	16:16 (B 01)	17:48			18:40		20:36		21:26		21:51					
26	08:14		15:51 (B 01)	07:16			06:10		05:58		05:06		04:53					
	16:50	26	16:17 (B 01)	17:50			18:42		20:38		21:27		21:51					
27	08:13		15:51 (B 01)	07:13			06:07		05:56		05:05		04:54					
	16:52	28	16:19 (B 01)	17:52			18:44		20:40		21:29		21:51					
28	08:11		15:51 (B 01)	07:11			06:05		05:54		05:04		04:54					
	16:54	28	16:19 (B 01)	17:54			18:46		20:41		21:30		21:51					
29	08:10		15:50 (B 01)	07:09			07:02		05:52		05:03		04:55					
	16:56	29	16:19 (WEA 7)	17:54			19:47		20:43		21:31		21:50					
30	08:08		15:51 (B 01)	07:07			07:00		05:50		05:01		04:55					
	16:58	30	16:21 (WEA 7)	17:54			19:49		20:45		21:33		21:50					
31	08:07		15:51 (B 01)	07:05			06:58				05:00							
	17:00	31	16:22 (WEA 7)	17:54			19:51				21:34							
Sonnenscheinstunden	253			275			367		419		491		506					
astr.max.mögl.Beschattung		2416			391													



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s58 - Südergellersen, Oerzer Str. 19

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober		November		Dezember	
1	04:56	05:35	06:27	07:19		07:16	15:27 (B 01)	08:09	12:53 (Rep 11)
	21:50	21:16	20:11	18:58		16:49	27 15:54 (WEA 7)	16:06	102 15:06 (Rep 8)
2	04:57	05:36	06:29	07:21		07:18	15:26 (B 01)	08:11	12:53 (Rep 11)
	21:49	21:14	20:08	18:56		16:47	28 15:54 (WEA 7)	16:06	104 15:07 (Rep 8)
3	04:57	05:38	06:31	07:23		07:20	15:25 (B 01)	08:12	12:53 (Rep 11)
	21:49	21:12	20:06	18:54		16:45	29 15:54 (WEA 7)	16:05	105 15:08 (Rep 8)
4	04:58	05:39	06:32	07:24		07:22	15:24 (B 01)	08:14	12:53 (Rep 11)
	21:49	21:10	20:04	18:51		16:44	31 15:55 (WEA 7)	16:04	106 15:08 (Rep 8)
5	04:59	05:41	06:34	07:26		07:23	15:23 (B 01)	08:15	12:53 (Rep 11)
	21:48	21:09	20:01	18:49		16:42	32 15:55 (WEA 7)	16:04	107 15:09 (Rep 8)
6	05:00	05:43	06:36	07:28		07:25	15:22 (B 01)	08:17	12:53 (Rep 11)
	21:47	21:07	19:59	18:46		16:40	33 15:55 (WEA 7)	16:03	108 15:09 (Rep 8)
7	05:01	05:44	06:38	07:30		07:27	15:22 (B 01)	08:18	12:53 (Rep 11)
	21:47	21:05	19:56	18:44		16:38	32 15:54 (WEA 7)	16:03	108 15:09 (Rep 8)
8	05:02	05:46	06:39	07:32		07:29	15:22 (B 01)	08:19	12:54 (Rep 11)
	21:46	21:03	19:54	18:42		16:36	32 15:54 (WEA 7)	16:02	108 15:10 (Rep 8)
9	05:03	05:48	06:41	07:33		07:31	15:22 (B 01)	08:20	12:54 (Rep 11)
	21:45	21:01	19:52	18:39		16:35	32 15:54 (WEA 7)	16:02	108 15:10 (Rep 8)
10	05:04	05:49	06:43	07:35		07:33	15:21 (B 01)	08:22	12:54 (Rep 11)
	21:45	20:59	19:49	18:37		16:33	32 15:53 (WEA 7)	16:02	109 15:10 (Rep 8)
11	05:05	05:51	06:44	07:37		07:35	15:22 (B 01)	08:23	12:54 (Rep 11)
	21:44	20:57	19:47	18:35		16:31	30 15:52 (WEA 7)	16:02	109 15:10 (Rep 8)
12	05:06	05:53	06:46	07:39		07:37	15:22 (B 01)	08:24	12:55 (Rep 11)
	21:43	20:55	19:44	18:32		16:30	30 15:52 (WEA 7)	16:01	109 15:11 (Rep 8)
13	05:07	05:55	06:48	07:41		07:38	15:22 (B 01)	08:25	11:13 (Oerzen 1)
	21:42	20:53	19:42	18:30		16:28	29 15:51 (B 01)	16:01	116 15:12 (Rep 8)
14	05:08	05:56	06:50	07:42		07:40	15:22 (B 01)	08:26	11:12 (Oerzen 1)
	21:41	20:51	19:40	18:28		16:26	29 15:51 (B 01)	16:01	119 15:12 (Rep 8)
15	05:10	05:58	06:51	07:44		07:42	15:24 (B 01)	08:27	11:12 (Oerzen 1)
	21:40	20:49	19:37	18:26		16:25	28 15:52 (B 01)	16:01	120 15:12 (Rep 8)
16	05:11	06:00	06:53	07:46		07:44	15:25 (B 01)	08:28	11:11 (Oerzen 1)
	21:39	20:47	19:35	18:23		16:23	26 15:51 (B 01)	16:01	122 15:12 (Rep 8)
17	05:12	06:01	06:55	07:48		07:46	15:25 (B 01)	08:28	11:11 (Oerzen 1)
	21:38	20:44	19:32	18:21		16:22	24 15:49 (B 01)	16:02	123 15:12 (Rep 8)
18	05:14	06:03	06:57	07:50		07:48	14:14 (Rep 9)	08:29	11:11 (Oerzen 1)
	21:36	20:42	19:30	18:19		16:20	32 15:48 (B 01)	16:02	123 15:13 (Rep 8)
19	05:15	06:05	06:58	07:51		07:49	13:03 (Rep 11)	08:30	11:11 (Oerzen 1)
	21:35	20:40	19:27	18:17		16:19	58 15:45 (B 01)	16:02	124 15:14 (Rep 8)
20	05:16	06:07	07:00	07:53		07:51	13:00 (Rep 11)	08:31	11:11 (Oerzen 1)
	21:34	20:38	19:25	18:14		16:18	69 15:44 (B 01)	16:02	125 15:14 (Rep 8)
21	05:18	06:08	07:02	07:55		07:53	12:59 (Rep 11)	08:31	11:12 (Oerzen 1)
	21:33	20:36	19:23	18:12		16:16	74 15:43 (B 01)	16:03	126 15:15 (Rep 8)
22	05:19	06:10	07:03	07:57		07:55	12:57 (Rep 11)	08:32	11:12 (Oerzen 1)
	21:31	20:34	19:20	18:10		16:15	80 15:41 (B 01)	16:03	126 15:15 (Rep 8)
23	05:21	06:12	07:05	07:59		07:56	12:56 (Rep 11)	08:32	11:13 (Oerzen 1)
	21:30	20:31	19:18	18:08		16:14	84 15:40 (B 01)	16:04	126 15:16 (Rep 8)
24	05:22	06:13	07:07	08:01		07:58	12:55 (Rep 11)	08:33	11:13 (Oerzen 1)
	21:29	20:29	19:15	18:06		16:13	86 15:39 (B 01)	16:04	124 15:16 (Rep 8)
25	05:24	06:15	07:09	07:03		08:00	12:55 (Rep 11)	08:33	11:14 (Oerzen 1)
	21:27	20:27	19:13	17:04		16:12	86 15:03 (Rep 8)	16:05	123 15:16 (Rep 8)
26	05:25	06:17	07:10	07:05		08:02	12:55 (Rep 11)	08:33	11:14 (Oerzen 1)
	21:26	20:25	19:10	17:01		16:11	90 15:04 (Rep 8)	16:06	123 15:16 (Rep 8)
27	05:27	06:19	07:12	07:06	15:37 (WEA 7)	08:03	12:54 (Rep 11)	08:34	11:16 (Oerzen 1)
	21:24	20:22	19:08	16:59	11 15:48 (WEA 7)	16:10	94 15:05 (Rep 8)	16:06	123 15:18 (Rep 8)
28	05:28	06:20	07:14	07:08	15:35 (WEA 7)	08:05	12:53 (Rep 11)	08:34	11:17 (Oerzen 1)
	21:22	20:20	19:06	16:57	15 15:50 (WEA 7)	16:09	95 15:04 (Rep 8)	16:07	121 15:18 (Rep 8)
29	05:30	06:22	07:16	07:10	15:33 (WEA 7)	08:06	12:53 (Rep 11)	08:34	11:18 (Oerzen 1)
	21:21	20:18	19:03	16:55	18 15:51 (WEA 7)	16:08	99 15:05 (Rep 8)	16:08	119 15:19 (Rep 8)
30	05:31	06:24	07:17	07:12	15:32 (WEA 7)	08:08	12:53 (Rep 11)	08:34	11:20 (Oerzen 1)
	21:19	20:15	19:01	16:53	20 15:52 (WEA 7)	16:07	101 15:06 (Rep 8)	16:09	117 15:19 (Rep 8)
31	05:33	06:26		07:14	15:30 (B 01)			08:34	11:22 (Oerzen 1)
	21:17	20:13		16:51	23 15:53 (WEA 7)			16:10	112 15:19 (Rep 8)
Sonnenscheinstunden	509	458	382	329		261		237	
astr.max.mögl.Beschattung				87		1552		3595	

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s59 - Südergellersen, Poggenpohl 7

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:34	12:32 (Rep 11)   08:05	15:33 (B 01)   07:09	06:55	05:48	05:00
	16:11	15:35 (B 01)   17:01	16:07 (WEA 7)   17:56	19:53	20:47	21:35
2	08:34	12:34 (Rep 11)   08:03	15:36 (B 01)   07:07	06:53	05:46	04:59
	16:12	15:36 (B 01)   17:03	16:07 (WEA 7)   17:58	19:55	20:48	21:36
3	08:34	12:35 (Rep 11)   08:02	15:41 (B 01)   07:04	06:51	05:44	04:58
	16:14	15:38 (B 01)   17:05	16:07 (WEA 7)   18:00	19:56	20:50	21:38
4	08:33	12:35 (Rep 11)   08:00	15:43 (WEA 7)   07:02	06:48	05:42	04:57
	16:15	15:38 (B 01)   17:07	16:07 (WEA 7)   18:02	19:58	20:52	21:39
5	08:33	12:37 (Rep 11)   07:58	15:44 (WEA 7)   07:00	06:46	05:40	04:56
	16:16	15:40 (B 01)   17:09	16:06 (WEA 7)   18:03	20:00	20:54	21:40
6	08:33	12:37 (Rep 11)   07:56	15:45 (WEA 7)   06:57	06:43	05:38	04:56
	16:17	15:41 (B 01)   17:11	16:05 (WEA 7)   18:05	20:02	20:55	21:41
7	08:32	12:38 (Rep 11)   07:55	15:47 (WEA 7)   06:55	06:41	05:36	04:55
	16:19	15:42 (B 01)   17:13	16:04 (WEA 7)   18:07	20:04	20:57	21:42
8	08:32	12:40 (Rep 11)   07:53	15:49 (WEA 7)   06:53	06:39	05:34	04:54
	16:20	15:44 (B 01)   17:15	16:02 (WEA 7)   18:09	20:05	20:59	21:43
9	08:31	12:41 (Rep 11)   07:51	15:53 (WEA 7)   06:50	06:36	05:32	04:54
	16:21	15:46 (B 01)   17:17	15:58 (WEA 7)   18:11	20:07	21:01	21:44
10	08:31	12:42 (Rep 11)   07:49		06:48	06:34	05:30
	16:23	15:47 (B 01)   17:19		18:13	20:09	21:02
11	08:30	12:44 (Rep 11)   07:47		06:46	06:32	05:29
	16:24	15:49 (B 01)   17:21		18:15	20:11	21:04
12	08:29	12:46 (Rep 11)   07:45		06:43	06:29	05:27
	16:26	15:50 (B 01)   17:23		18:16	20:13	21:06
13	08:29	12:48 (Rep 11)   07:43		06:41	06:27	05:25
	16:27	15:51 (B 01)   17:25		18:18	20:14	21:07
14	08:28	12:52 (Rep 11)   07:41		06:39	06:25	05:23
	16:29	15:52 (B 01)   17:27		18:20	20:16	21:09
15	08:27	15:22 (B 01)   07:39		06:36	06:22	05:22
	16:31	15:53 (B 01)   17:29		18:22	20:18	21:11
16	08:26	15:22 (B 01)   07:37		06:34	06:20	05:20
	16:32	15:53 (WEA 7)   17:31		18:24	20:20	21:12
17	08:25	15:22 (B 01)   07:35		06:31	06:18	05:18
	16:34	15:56 (WEA 7)   17:33		18:26	20:22	21:14
18	08:24	15:23 (B 01)   07:33		06:29	06:16	05:17
	16:36	15:58 (WEA 7)   17:35		18:27	20:23	21:16
19	08:23	15:23 (B 01)   07:31		06:27	06:13	05:15
	16:37	16:00 (WEA 7)   17:37		18:29	20:25	21:17
20	08:22	15:23 (B 01)   07:29		06:24	06:11	05:14
	16:39	16:01 (WEA 7)   17:39		18:31	20:27	21:19
21	08:21	15:24 (B 01)   07:27		06:22	06:09	05:13
	16:41	16:02 (WEA 7)   17:41		18:33	20:29	21:20
22	08:19	15:24 (B 01)   07:24		06:19	06:07	05:11
	16:43	16:03 (WEA 7)   17:42		18:35	20:31	21:22
23	08:18	15:25 (B 01)   07:22		06:17	06:04	05:10
	16:45	16:04 (WEA 7)   17:44		18:37	20:32	21:23
24	08:17	15:26 (B 01)   07:20		06:15	06:02	05:08
	16:46	16:05 (WEA 7)   17:46		18:38	20:34	21:25
25	08:16	15:26 (B 01)   07:18		06:12	06:00	05:07
	16:48	16:05 (WEA 7)   17:48		18:40	20:36	21:26
26	08:14	15:26 (B 01)   07:16		06:10	05:58	05:06
	16:50	16:06 (WEA 7)   17:50		18:42	20:38	21:27
27	08:13	15:27 (B 01)   07:13		06:07	05:56	05:05
	16:52	16:07 (WEA 7)   17:52		18:44	20:40	21:29
28	08:11	15:28 (B 01)   07:11		06:05	05:54	05:04
	16:54	16:07 (WEA 7)   17:54		18:46	20:41	21:30
29	08:10	15:29 (B 01)		07:02	05:52	05:03
	16:56	16:07 (WEA 7)		19:47	20:43	21:31
30	08:08	15:31 (B 01)		07:00	05:50	05:01
	16:58	16:08 (WEA 7)		19:49	20:45	21:33
31	08:07	15:32 (B 01)		06:58		05:00
	17:00	16:07 (WEA 7)		19:51		21:34
Sonnenscheinstunden	253	275	367	419	491	506
astr.max.mögl.Beschattung	1864	192				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende	(WEA mit letztem Schatten)

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s59 - Südergellersen, Poggenpohl 7

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	04:56 21:50	05:35 21:16	06:27 20:11	07:19 18:58	07:16 16:49	08:10 16:06
2	04:57 21:49	05:36 21:14	06:29 20:08	07:21 18:56	07:18 16:47	15:21 (WEA 7) 16:06
3	04:57 21:49	05:38 21:12	06:31 20:06	07:23 18:54	07:20 16:45	15:18 (WEA 7) 16:05
4	04:58 21:49	05:39 21:10	06:32 20:04	07:24 18:51	07:22 16:44	15:16 (WEA 7) 16:04
5	04:59 21:48	05:41 21:09	06:34 20:01	07:26 18:49	07:23 16:42	15:15 (WEA 7) 16:04
6	05:00 21:47	05:43 21:07	06:36 19:59	07:28 18:46	07:25 16:40	15:14 (WEA 7) 16:03
7	05:01 21:47	05:44 21:05	06:38 19:56	07:30 18:44	07:27 16:38	15:13 (WEA 7) 16:03
8	05:02 21:46	05:46 21:03	06:39 19:54	07:32 18:42	07:29 16:36	15:10 (B 01) 16:02
9	05:03 21:45	05:48 21:01	06:41 19:52	07:33 18:39	07:31 16:35	15:06 (B 01) 16:02
10	05:04 21:45	05:49 20:59	06:43 19:49	07:35 18:37	07:33 16:33	15:04 (B 01) 16:02
11	05:05 21:44	05:51 20:57	06:44 19:47	07:37 18:35	07:35 16:31	15:03 (B 01) 16:02
12	05:06 21:43	05:53 20:55	06:46 19:44	07:39 18:32	07:37 16:30	15:01 (B 01) 16:01
13	05:07 21:42	05:55 20:53	06:48 19:42	07:41 18:30	07:38 16:28	15:00 (B 01) 16:01
14	05:08 21:41	05:56 20:51	06:50 19:40	07:42 18:28	07:40 16:26	15:00 (B 01) 16:01
15	05:10 21:40	05:58 20:49	06:51 19:37	07:44 18:26	07:42 16:25	15:00 (B 01) 16:01
16	05:11 21:39	06:00 20:47	06:53 19:35	07:46 18:23	07:44 16:23	15:00 (B 01) 16:01
17	05:12 21:38	06:01 20:44	06:55 19:32	07:48 18:21	07:46 16:22	15:00 (B 01) 16:02
18	05:14 21:37	06:03 20:42	06:57 19:30	07:50 18:19	07:48 16:20	15:00 (B 01) 16:02
19	05:15 21:35	06:05 20:40	06:58 19:27	07:52 18:17	07:49 16:19	14:59 (B 01) 16:02
20	05:16 21:34	06:07 20:38	07:00 19:25	07:53 18:14	07:51 16:18	14:59 (B 01) 16:02
21	05:18 21:33	06:08 20:36	07:02 19:23	07:55 18:12	07:53 16:16	14:59 (B 01) 16:03
22	05:19 21:31	06:10 20:34	07:03 19:20	07:57 18:10	07:55 16:15	14:59 (B 01) 16:03
23	05:21 21:30	06:12 20:31	07:05 19:18	07:59 18:08	07:56 16:14	14:59 (B 01) 16:04
24	05:22 21:29	06:13 20:29	07:07 19:15	08:01 18:06	07:58 16:13	15:00 (B 01) 16:04
25	05:24 21:27	06:15 20:27	07:09 19:13	08:00 17:04	08:00 16:12	15:00 (B 01) 16:05
26	05:25 21:26	06:17 20:25	07:10 19:10	08:02 17:01	08:02 16:11	15:01 (B 01) 16:06
27	05:27 21:24	06:19 20:22	07:12 19:08	08:03 16:59	08:03 16:10	15:02 (B 01) 16:06
28	05:28 21:22	06:20 20:20	07:14 19:06	08:05 16:57	08:05 16:09	15:33 (B 01) 16:07
29	05:30 21:21	06:22 20:18	07:16 19:03	08:06 16:55	08:06 16:08	12:29 (Rep 11) 15:32 (B 01)
30	05:31 21:19	06:24 20:16	07:17 19:01	08:08 16:53	08:08 16:07	12:28 (Rep 11) 15:32 (B 01)
31	05:33 21:17	06:26 20:13		07:14 16:51		08:34 16:10
Sonnenscheinstunden	509	458	382	329	261	237
astr.max.mögl.Beschattung					1006	3180

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s60 - Südergellersen, Poggenpohl 8

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:34	12:12 (Rep 11)   08:05	15:29 (WEA 7)   07:09	06:55	05:48	05:00
	16:11	58 15:31 (WEA 7)   17:01	13 15:42 (WEA 7)   17:56	19:53	20:47	21:35
2	08:34	12:14 (Rep 11)   08:03	15:33 (WEA 7)   07:07	06:53	05:46	04:59
	16:12	56 15:32 (WEA 7)   17:03	6 15:39 (WEA 7)   17:58	19:55	20:48	21:36
3	08:34	12:16 (Rep 11)   08:02	07:04	06:51	05:44	04:58
	16:14	54 15:34 (WEA 7)   17:05	18:00	19:56	20:50	21:38
4	08:33	12:19 (Rep 11)   08:00	07:02	06:48	05:42	04:57
	16:15	49 15:34 (WEA 7)   17:07	18:02	19:58	20:52	21:39
5	08:33	14:52 (B 01)   07:58	07:00	06:46	05:40	04:56
	16:16	44 15:36 (WEA 7)   17:09	18:03	20:00	20:54	21:40
6	08:33	14:52 (B 01)   07:56	06:57	06:43	05:38	04:56
	16:17	45 15:37 (WEA 7)   17:11	18:05	20:02	20:55	21:41
7	08:32	14:52 (B 01)   07:55	06:55	06:41	05:36	04:55
	16:19	45 15:37 (WEA 7)   17:13	18:07	20:04	20:57	21:42
8	08:32	14:53 (B 01)   07:53	06:53	06:39	05:34	04:54
	16:20	46 15:39 (WEA 7)   17:15	18:09	20:05	20:59	21:43
9	08:31	14:54 (B 01)   07:51	06:50	06:36	05:32	04:54
	16:21	46 15:40 (WEA 7)   17:17	18:11	20:07	21:01	21:44
10	08:31	14:54 (B 01)   07:49	06:48	06:34	05:30	04:53
	16:23	46 15:40 (WEA 7)   17:19	18:13	20:09	21:02	21:44
11	08:30	14:54 (B 01)   07:47	06:46	06:32	05:29	04:53
	16:24	47 15:41 (WEA 7)   17:21	18:15	20:11	21:04	21:45
12	08:29	14:55 (B 01)   07:45	06:43	06:29	05:27	04:52
	16:26	47 15:42 (WEA 7)   17:23	18:16	20:13	21:06	21:46
13	08:29	14:57 (B 01)   07:43	06:41	06:27	05:25	04:52
	16:27	47 15:44 (WEA 7)   17:25	18:18	20:14	21:07	21:47
14	08:28	14:56 (B 01)   07:41	06:39	06:25	05:23	04:52
	16:29	47 15:43 (WEA 7)   17:27	18:20	20:16	21:09	21:47
15	08:27	14:57 (B 01)   07:39	06:36	06:22	05:22	04:52
	16:31	47 15:44 (WEA 7)   17:29	18:22	20:18	21:11	21:48
16	08:26	14:58 (B 01)   07:37	06:34	06:20	05:20	04:52
	16:32	47 15:45 (WEA 7)   17:31	18:24	20:20	21:12	21:48
17	08:25	15:00 (B 01)   07:35	06:31	06:18	05:19	04:51
	16:34	46 15:46 (WEA 7)   17:33	18:26	20:22	21:14	21:49
18	08:24	15:01 (B 01)   07:33	06:29	06:16	05:17	04:51
	16:36	45 15:46 (WEA 7)   17:35	18:27	20:23	21:16	21:49
19	08:23	15:02 (B 01)   07:31	06:27	06:13	05:15	04:51
	16:37	45 15:47 (WEA 7)   17:37	18:29	20:25	21:17	21:50
20	08:22	15:03 (B 01)   07:29	06:24	06:11	05:14	04:51
	16:39	44 15:47 (WEA 7)   17:39	18:31	20:27	21:19	21:50
21	08:21	15:05 (B 01)   07:27	06:22	06:09	05:13	04:52
	16:41	42 15:47 (WEA 7)   17:41	18:33	20:29	21:20	21:50
22	08:19	15:07 (B 01)   07:24	06:19	06:07	05:11	04:52
	16:43	40 15:47 (WEA 7)   17:42	18:35	20:31	21:22	21:50
23	08:18	15:10 (B 01)   07:22	06:17	06:04	05:10	04:52
	16:45	37 15:48 (WEA 7)   17:44	18:37	20:32	21:23	21:51
24	08:17	15:21 (WEA 7)   07:20	06:15	06:02	05:08	04:52
	16:46	27 15:48 (WEA 7)   17:46	18:38	20:34	21:25	21:51
25	08:16	15:21 (WEA 7)   07:18	06:12	06:00	05:07	04:53
	16:48	27 15:48 (WEA 7)   17:48	18:40	20:36	21:26	21:51
26	08:14	15:22 (WEA 7)   07:16	06:10	05:58	05:06	04:53
	16:50	25 15:47 (WEA 7)   17:50	18:42	20:38	21:27	21:51
27	08:13	15:23 (WEA 7)   07:13	06:07	05:56	05:05	04:54
	16:52	24 15:47 (WEA 7)   17:52	18:44	20:40	21:29	21:51
28	08:11	15:23 (WEA 7)   07:11	06:05	05:54	05:04	04:54
	16:54	24 15:47 (WEA 7)   17:54	18:46	20:41	21:30	21:51
29	08:10	15:25 (WEA 7)	07:02	05:52	05:03	04:55
	16:56	22 15:47 (WEA 7)	19:47	20:43	21:32	21:50
30	08:08	15:26 (WEA 7)	07:00	05:50	05:01	04:55
	16:58	20 15:46 (WEA 7)	19:49	20:45	21:33	21:50
31	08:07	15:28 (WEA 7)	06:58		05:00	
	17:00	16 15:44 (WEA 7)	19:51		21:34	
Sonnenscheinstunden	253	275	367	419	491	506
astr.max.mögl.Beschattung	1255	19				

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende
			(WEA mit letztem Schatten)

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s60 - Südergellersen, Poggenpohl 8

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	04:56 21:50	05:35 21:16	06:27 20:11	07:19 18:58	07:16 16:49	08:10 16:06
2	04:57 21:49	05:36 21:14	06:29 20:08	07:21 18:56	07:18 16:47	46 15:23 (WEA 7) 08:11 14:37 (B 01)
3	04:57 21:49	05:38 21:12	06:31 20:06	07:23 18:54	07:20 16:45	47 15:24 (WEA 7) 08:12 14:38 (B 01)
4	04:58 21:49	05:39 21:10	06:32 20:04	07:24 18:51	07:22 16:44	46 15:24 (WEA 7) 08:14 14:37 (B 01)
5	04:59 21:48	05:41 21:09	06:34 20:01	07:26 18:49	07:23 16:42	46 15:23 (WEA 7) 08:15 14:38 (B 01)
6	05:00 21:47	05:43 21:07	06:36 19:59	07:28 18:46	07:25 16:40	46 15:24 (WEA 7) 08:17 14:38 (B 01)
7	05:01 21:47	05:44 21:05	06:38 19:56	07:30 18:44	07:27 16:38	45 15:23 (WEA 7) 08:18 14:38 (B 01)
8	05:02 21:46	05:46 21:03	06:39 19:54	07:32 18:42	07:29 16:36	44 15:22 (WEA 7) 08:19 12:07 (Rep 11)
9	05:03 21:45	05:48 21:01	06:41 19:52	07:33 18:39	07:31 16:35	49 15:23 (WEA 7) 08:20 12:05 (Rep 11)
10	05:04 21:45	05:49 20:59	06:43 19:49	07:35 18:37	07:33 16:33	53 15:22 (WEA 7) 08:22 12:03 (Rep 11)
11	05:05 21:44	05:51 20:57	06:44 19:47	07:37 18:35	07:35 16:31	57 15:22 (WEA 7) 08:23 12:02 (Rep 11)
12	05:06 21:43	05:53 20:55	06:46 19:44	07:39 18:32	07:37 16:30	58 15:21 (WEA 7) 08:24 12:03 (Rep 11)
13	05:07 21:42	05:55 20:53	06:48 19:42	07:41 18:30	07:38 16:28	64 15:21 (WEA 7) 08:25 12:03 (Rep 11)
14	05:08 21:41	05:56 20:51	06:50 19:40	07:42 18:28	07:40 16:26	66 15:21 (WEA 7) 08:26 12:02 (Rep 11)
15	05:10 21:40	05:58 20:49	06:51 19:37	07:44 18:26	07:42 16:25	69 15:20 (WEA 7) 08:27 12:02 (Rep 11)
16	05:11 21:39	06:00 20:47	06:53 19:35	07:46 18:23	07:44 16:23	70 15:15 (B 01) 08:28 12:02 (Rep 11)
17	05:12 21:38	06:01 20:44	06:55 19:32	07:48 18:21	07:46 16:22	73 15:14 (B 01) 08:29 12:02 (Rep 11)
18	05:14 21:37	06:03 20:42	06:57 19:30	07:50 18:19	07:48 16:20	78 15:15 (B 01) 08:29 12:02 (Rep 11)
19	05:15 21:35	06:05 20:40	06:58 19:27	07:52 18:17	07:49 16:19	80 15:16 (B 01) 08:30 12:03 (Rep 11)
20	05:16 21:34	06:07 20:38	07:00 19:25	07:53 18:14	07:51 16:18	81 15:16 (B 01) 08:31 12:04 (Rep 11)
21	05:18 21:33	06:08 20:36	07:02 19:23	07:55 18:12	07:53 16:17	81 15:17 (B 01) 08:32 12:04 (Rep 11)
22	05:19 21:31	06:10 20:34	07:03 19:20	07:57 18:10	07:55 16:15	81 15:17 (B 01) 08:33 12:05 (Rep 11)
23	05:21 21:30	06:12 20:31	07:05 19:18	07:59 18:08	07:56 16:14	81 15:18 (B 01) 08:34 12:05 (Rep 11)
24	05:22 21:29	06:13 20:29	07:07 19:15	08:01 18:06	07:58 16:13	81 15:18 (B 01) 08:35 12:05 (Rep 11)
25	05:24 21:27	06:15 20:27	07:09 19:13	08:03 17:04	08:00 16:12	80 15:19 (B 01) 08:36 12:07 (Rep 11)
26	05:25 21:26	06:17 20:25	07:10 19:10	08:05 17:01	08:02 16:11	78 15:20 (B 01) 08:37 12:07 (Rep 11)
27	05:27 21:24	06:19 20:22	07:12 19:08	08:07 16:59	08:03 16:10	76 15:20 (B 01) 08:38 12:08 (Rep 11)
28	05:28 21:22	06:20 20:20	07:14 19:06	08:09 16:57	08:05 16:09	72 15:21 (B 01) 08:39 12:09 (Rep 11)
29	05:30 21:21	06:22 20:18	07:16 19:03	08:11 16:55	08:06 16:08	67 15:26 (WEA 7) 08:40 12:10 (Rep 11)
30	05:31 21:19	06:24 20:15	07:17 19:01	08:12 16:53	08:08 16:07	68 15:28 (WEA 7) 08:41 12:10 (Rep 11)
31	05:33 21:17	06:26 20:13		07:14 16:51		66 15:29 (WEA 7) 08:42 12:10 (Rep 11)
Sonnenscheinstunden	509	458	382	329	261	237
astr.max.mögl.Beschattung					740	2029

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s61 - Südergellersen, Schwarzer Weg 2

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	14:29 (WEA 7)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	08:10
16	16:11	14:45 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49
2	08:34	14:30 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	08:11
15	16:12	14:45 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47
3	08:34	14:31 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	08:12
15	16:14	14:46 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45
4	08:34	14:32 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	08:14
13	16:15	14:45 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44
5	08:33	14:34 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	08:15
11	16:16	14:45 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42
6	08:33	14:35 (WEA 7)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	08:17
8	16:17	14:43 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40
7	08:32	14:38 (WEA 7)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	08:18
2	16:19	14:40 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:57	18:44	16:38
8	08:32		07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	08:19
16	16:20		17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36
9	08:31		07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	08:20
16	16:21		17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35
10	08:31		07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	08:22
16	16:23		17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33
11	08:30		07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:45	07:37	08:23
16	16:24		17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31
12	08:29		07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	08:24
16	16:26		17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30
13	08:29		07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	08:25
16	16:27		17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28
14	08:28		07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	08:26
16	16:29		17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26
15	08:27		07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	08:27
16	16:31		17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25
16	08:26		07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	08:28
16	16:32		17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23
17	08:25		07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	08:29
16	16:34		17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22
18	08:24		07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	08:29
16	16:36		17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20
19	08:23		07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	08:30
16	16:37		17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19
20	08:22		07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	08:31
16	16:39		17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18
21	08:21		07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	08:31
16	16:41		17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17
22	08:19		07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	08:32
16	16:43		17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15
23	08:18		07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	08:32
16	16:45		17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14
24	08:17		07:20	06:15	06:02	05:08	04:52	05:22	06:14	07:07	08:01	08:33
16	16:46		17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13
25	08:16		07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:33
16	16:48		17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12
26	08:14		07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:33
16	16:50		17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11
27	08:13		07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:34
16	16:52		17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10
28	08:11		07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:34
16	16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09
29	08:10			07:03	05:52	05:03	04:55	05:30	06:22	07:16	08:10	08:34
16	16:56			19:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08
30	08:08			07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	08:34
16	16:58			19:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07
31	08:07			06:58		05:00		05:33	06:26		07:14	08:34
17	08:07			19:51		21:34		21:17	20:13		16:51	16:10
Sonnenscheinstunden	253											
astr.max.mögl.Beschattung	80	275	367	419	491	506	509	458	382	329	261	237
												471

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)

## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s62 - Südergellersen, Schwarzer Weg 9**Annahmen für Schattenwurfberechnung**

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:34	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16	08:10	
	16:11	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:06	
2	08:34	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11	
	16:12	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06	
3	08:34	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:12	
	16:14	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05	
4	08:34	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14	
	16:15	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04	
5	08:33	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15	
	16:16	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04	
6	08:33	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25	08:17	
	16:17	17:11	18:05	20:02	20:55	21:41	21:48	21:07	19:59	18:46	16:40	16:03	
7	08:32	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18	
	16:19	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:57	18:44	16:38	16:03	
8	08:32	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19	
	16:20	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02	
9	08:31	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20	
	16:21	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02	
10	08:31	07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	07:33	08:22	
	16:23	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02	
11	08:30	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:45	07:37	07:35	08:23	
	16:24	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02	
12	08:29	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24	
	16:26	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01	
13	08:29	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25	
	16:27	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01	
14	08:28	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26	
	16:29	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01	
15	08:27	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27	14:21 (WEA 7)
	16:31	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01	5 14:26 (WEA 7)
16	08:26	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44	08:28	14:20 (WEA 7)
	16:32	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01	6 14:26 (WEA 7)
17	08:25	07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	07:46	08:29	14:20 (WEA 7)
	16:34	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	16:02	8 14:28 (WEA 7)
18	08:24	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29	14:20 (WEA 7)
	16:36	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	16:02	9 14:29 (WEA 7)
19	08:23	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30	14:21 (WEA 7)
	16:37	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02	9 14:30 (WEA 7)
20	08:22	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31	14:20 (WEA 7)
	16:39	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02	10 14:30 (WEA 7)
21	08:21	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31	14:21 (WEA 7)
	16:41	17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17	16:03	10 14:31 (WEA 7)
22	08:19	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32	14:21 (WEA 7)
	16:43	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03	10 14:31 (WEA 7)
23	08:18	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32	14:22 (WEA 7)
	16:45	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04	10 14:32 (WEA 7)
24	08:17	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58	08:33	14:23 (WEA 7)
	16:46	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04	9 14:32 (WEA 7)
25	08:16	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00	08:33	14:23 (WEA 7)
	16:48	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	16:05	9 14:32 (WEA 7)
26	08:14	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02	08:33	14:25 (WEA 7)
	16:50	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	16:06	8 14:33 (WEA 7)
27	08:13	07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:03	08:34	14:26 (WEA 7)
	16:52	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	16:06	7 14:33 (WEA 7)
28	08:11	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05	08:34	14:27 (WEA 7)
	16:54	17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09	16:07	5 14:32 (WEA 7)
29	08:10		07:03	05:52	05:03	04:55	05:30	06:22	07:16	08:10	08:06	08:34	14:29 (WEA 7)
	16:56		19:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08	16:08	2 14:31 (WEA 7)
30	08:08		07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	08:08	08:34	
	16:58		19:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07	16:09	
31	08:07		06:58		05:00		05:33	06:26		07:14		08:34	
	17:00		19:51		21:34		21:17	20:13		18:00		16:10	
Sonnenscheinstunden	253	275	367	419	491	506	509	458	382	329	261	237	117
astr.max.mögl.Beschattung													

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s63 - Südergellersen, Westergellersen Weg 1

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März	April		Mai	Juni	Juli	August	September	Oktober	November		Dezember							
1	08:34	14:41 (WEA 7)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16				08:10	14:32 (WEA 7)						
	16:11	25	15:06 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49			16:06	16	14:48 (WEA 7)					
2	08:34	14:42 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18				08:11	14:32 (WEA 7)						
	16:12	24	15:06 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47			16:06	18	14:50 (WEA 7)					
3	08:34	14:43 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20				08:12	14:32 (WEA 7)						
	16:14	24	15:07 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45			16:05	19	14:51 (WEA 7)					
4	08:34	14:43 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22				08:14	14:31 (WEA 7)						
	16:15	24	15:07 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44			16:04	20	14:51 (WEA 7)					
5	08:33	14:45 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23				08:15	14:32 (WEA 7)						
	16:16	22	15:07 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42			16:04	21	14:53 (WEA 7)					
6	08:33	14:45 (WEA 7)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25				08:17	14:31 (WEA 7)						
	16:17	22	15:07 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40			16:03	22	14:53 (WEA 7)					
7	08:32	14:45 (WEA 7)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27				08:18	14:31 (WEA 7)						
	16:19	22	15:07 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38			16:03	22	14:53 (WEA 7)					
8	08:32	14:47 (WEA 7)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29				08:19	14:32 (WEA 7)						
	16:20	20	15:07 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36			16:02	23	14:55 (WEA 7)					
9	08:31	14:48 (WEA 7)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31				08:20	14:32 (WEA 7)						
	16:21	19	15:07 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35			16:02	23	14:55 (WEA 7)					
10	08:31	14:48 (WEA 7)	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	07:33				08:22	14:31 (WEA 7)						
	16:23	19	15:07 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33			16:02	24	14:55 (WEA 7)					
11	08:30	14:49 (WEA 7)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35				08:23	14:32 (WEA 7)						
	16:24	17	15:06 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31			16:02	24	14:56 (WEA 7)					
12	08:29	14:51 (WEA 7)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37				08:24	14:33 (WEA 7)						
	16:26	15	15:06 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30			16:01	24	14:57 (WEA 7)					
13	08:29	14:53 (WEA 7)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39				08:25	14:33 (WEA 7)						
	16:27	13	15:06 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28			16:01	25	14:58 (WEA 7)					
14	08:28	14:54 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40				08:26	14:33 (WEA 7)						
	16:29	9	15:03 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26			16:01	25	14:58 (WEA 7)					
15	08:27	14:58 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42				08:27	14:34 (WEA 7)						
	16:31	2	15:00 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25			16:01	25	14:59 (WEA 7)					
16	08:26	14:59 (WEA 7)	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44				08:28	14:33 (WEA 7)						
	16:32		17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23				16:01	26	14:59 (WEA 7)					
17	08:25	14:59 (WEA 7)	07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46				08:29	14:34 (WEA 7)						
	16:34		17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22				16:02	25	14:59 (WEA 7)					
18	08:24	14:59 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48				08:29	14:35 (WEA 7)						
	16:36		17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20				16:02	25	15:00 (WEA 7)					
19	08:23	14:59 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49				08:30	14:35 (WEA 7)						
	16:37		17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19				16:02	26	15:01 (WEA 7)					
20	08:22	14:59 (WEA 7)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51				08:31	14:35 (WEA 7)						
	16:39		17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18				16:02	26	15:01 (WEA 7)					
21	08:21	14:59 (WEA 7)	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53				08:31	14:36 (WEA 7)						
	16:41		17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16				16:03	26	15:02 (WEA 7)					
22	08:19	14:59 (WEA 7)	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55				08:32	14:36 (WEA 7)						
	16:43		17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15				16:03	26	15:02 (WEA 7)					
23	08:18	14:59 (WEA 7)	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57				08:32	14:37 (WEA 7)						
	16:45		17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14				16:04	26	15:03 (WEA 7)					
24	08:17	14:59 (WEA 7)	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58				08:33	14:37 (WEA 7)						
	16:46		17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13				16:04	26	15:03 (WEA 7)					
25	08:16	14:59 (WEA 7)	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00				08:33	14:37 (WEA 7)						
	16:48		17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12				16:05	26	15:03 (WEA 7)					
26	08:14	14:59 (WEA 7)	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02				08:33	14:39 (WEA 7)						
	16:50		17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11				16:06	25	15:04 (WEA 7)					
27	08:13	14:59 (WEA 7)	07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:03			14:39 (WEA 7)	08:34	14:39 (WEA 7)						
	16:52		17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:59			14:40 (WEA 7)	16:06	25	15:04 (WEA 7)					
28	08:11	14:59 (WEA 7)	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05			14:34 (WEA 7)	08:34	14:40 (WEA 7)						
	16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:57			14:43 (WEA 7)	16:07	25	15:05 (WEA 7)					
29	08:10	14:59 (WEA 7)	07:03	05:52	05:03	04:55	05:30	06:22	07:16	08:10	09:04	09:01			14:33 (WEA 7)	08:34	14:40 (WEA 7)						
	16:56		17:56	18:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:55			14:46 (WEA 7)	16:08	25	15:05 (WEA 7)					
30	08:08	14:59 (WEA 7)	07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	09:06	09:03			14:33 (WEA 7)	08:34	14:41 (WEA 7)						
	16:58		17:58	18:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:53			14:48 (WEA 7)	16:09	25	15:06 (WEA 7)					
31	08:07	14:59 (WEA 7)	06:58	05:48	05:00	04:54	05:33	06:26	07:14	08:10	09:04	09:01				08:34	14:41 (WEA 7)						
	17:00		17:51	18:41	20:34	21:24	21:47	21:17	20:13	19:00	18:00	16:51				16:10	25	15:06 (WEA 7)					
Sonnenscheinstunden	253		275		367		419		491		509		458		382		329		261		38		739
astr.max.mögl.Beschattung	277																						

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s64 - Südergellersen, Westergellersen Weg 4

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	14:35 (WEA 7)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	08:10
16:11	15	14:50 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49
2	08:34	14:36 (WEA 7)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	08:11
16:12	15	14:51 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47
3	08:34	14:37 (WEA 7)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	08:12
16:14	14	14:51 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45
4	08:34	14:38 (WEA 7)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	08:14
16:15	12	14:50 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44
5	08:33	14:40 (WEA 7)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	08:15
16:16	10	14:50 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42
6	08:33	14:41 (WEA 7)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	08:17
16:17	7	14:48 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40
7	08:32		07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	08:18
16:19		17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38	16:03
8	08:32	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19
16:20		17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02
9	08:31	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20
16:21		17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02
10	08:31	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	07:33	08:22
16:23		17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02
11	08:30	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35	08:23
16:24		17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02
12	08:29	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24
16:26		17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01
13	08:29	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25
16:27		17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01
14	08:28	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26
16:29		17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26	16:01
15	08:27	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27
16:31		17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01
16	08:26	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44	08:28
16:32		17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01
17	08:25	07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46	08:29
16:34		17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	16:02
18	08:24	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29
16:36		17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20	16:02
19	08:23	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30
16:37		17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02
20	08:22	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31
16:39		17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02
21	08:21	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31
16:41		17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16	16:03
22	08:19	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32
16:43		17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03
23	08:18	07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32
16:45		17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04
24	08:17	07:20	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58	08:33
16:46		17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04
25	08:16	07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:03	08:00	08:33
16:48		17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	16:05
26	08:14	07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:05	08:02	08:33
16:50		17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	16:06
27	08:13	07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	08:06	08:03	08:34
16:52		17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	16:06
28	08:11	07:11	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:08	08:05	08:34
16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09	16:07
29	08:10		07:03	05:52	05:03	04:55	05:30	06:22	07:16	08:10	08:06	08:34
16:56			19:47	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08	16:08
30	08:08		07:00	05:50	05:01	04:55	05:31	06:24	07:17	08:12	08:08	08:34
16:58			19:49	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07	16:09
31	08:07		06:58		05:00		05:33	06:26		07:14		08:34
17:00			19:51		21:34		21:17	20:13		16:51		16:10
Sonnenscheinstunden	253											
astr.max.mögl.Beschattung	73	275	367	419	491	506	509	458	382	329	261	237
												450

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende
			(WEA mit letztem Schatten)



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand    **Schattenrezeptor:** s65 - Südergellersen, Wetzter Weg 3

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

		Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	09:43 (Oerzen 1)	08:05	07:09	06:55	05:48	05:00	04:56	05:35	06:27	07:19	07:16	08:10
	16:11	75 14:46 (WEA 7)	17:01	17:56	19:57	20:47	21:35	21:50	21:16	20:11	18:58	16:49	16:09
2	08:34	09:44 (Oerzen 1)	08:03	07:07	06:53	05:46	04:59	04:57	05:36	06:29	07:21	07:18	08:11
	16:13	71 14:46 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47	16:06
3	08:34	09:45 (Oerzen 1)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20	08:12
	16:14	70 14:47 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45	16:05
4	08:34	09:45 (Oerzen 1)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22	08:14
	16:15	66 14:46 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44	16:04
5	08:33	09:46 (Oerzen 1)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23	08:15
	16:16	63 14:47 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42	16:04
6	08:33	09:47 (Oerzen 1)	07:56	06:57	06:43	05:38	04:56	05:00	05:43	06:36	07:28	07:25	08:17
	16:17	59 14:47 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40	16:03
7	08:32	09:48 (Oerzen 1)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27	08:18
	16:19	52 14:46 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:57	18:44	16:38	16:03
8	08:32	09:49 (Oerzen 1)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29	08:19
	16:20	42 14:47 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36	16:02
9	08:31	09:50 (Oerzen 1)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31	08:20
	16:21	39 14:47 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35	16:02
10	08:31	09:52 (Oerzen 1)	07:49	06:48	06:34	05:30	04:53	05:04	05:50	06:43	07:35	07:33	08:22
	16:23	35 14:46 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33	16:02
11	08:30	09:54 (Oerzen 1)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:45	07:37	07:35	08:23
	16:24	31 14:46 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31	16:02
12	08:29	09:57 (Oerzen 1)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37	08:24
	16:26	22 14:45 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30	16:01
13	08:29	14:28 (WEA 7)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:39	08:25
	16:27	18 14:46 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28	16:01
14	08:28	14:30 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40	08:26
	16:29	15 14:45 (WEA 7)	17:27	18:16	20:16	21:09	21:47	21:42	20:51	19:40	18:28	16:26	16:02
15	08:27	14:31 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42	08:27
	16:31	12 14:43 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25	16:01
16	08:26	14:34 (WEA 7)	07:37	06:34	06:20	05:20	04:52	05:11	06:00	06:53	07:46	07:44	08:28
	16:32	6 14:40 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23	16:01
17	08:25		07:35	06:31	06:18	05:19	04:51	05:12	06:01	06:55	07:48	07:46	08:29
	16:34		17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22	16:02
18	08:24		07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48	08:29
	16:36		17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:21	16:02
19	08:23		07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49	08:30
	16:37		17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19	16:02
20	08:22		07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51	08:31
	16:39		17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18	16:02
21	08:21		07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53	08:31
	16:41		17:41	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:17	16:03
22	08:19		07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55	08:32
	16:43		17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15	16:03
23	08:18		07:22	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57	08:32
	16:45		17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:04
24	08:17		07:20	06:15	06:02	05:08	04:52	05:22	06:14	07:07	08:01	07:58	08:33
	16:46		17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:04
25	08:16		07:18	06:12	06:00	05:07	04:53	05:24	06:15	07:09	07:03	08:00	08:33
	16:48		17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	17:04	16:12	16:05
26	08:14		07:16	06:10	05:58	05:06	04:53	05:25	06:17	07:10	07:05	08:02	08:33
	16:50		17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	17:01	16:11	16:06
27	08:13		07:13	06:07	05:56	05:05	04:54	05:27	06:19	07:12	07:06	08:00	08:34
	16:52		17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	16:59	16:10	16:06
28	08:11		06:05	05:54	05:04	04:54	04:54	05:28	06:20	07:14	07:08	08:01	08:34
	16:54		17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	16:57	16:09	16:07
29	08:10			07:03	05:52	05:03	04:55	05:30	06:22	07:16	07:10	08:06	08:34
	16:56			19:47	20:43	21:32	21:50	21:21	20:18	19:03	16:55	16:08	16:08
30	08:08			07:00	05:50	05:01	04:55	05:31	06:24	07:17	07:12	08:08	08:34
	16:58			19:49	20:45	21:33	21:50	21:19	20:15	19:01	16:53	16:07	16:09
31	08:07			06:58		05:00		05:33	06:26		07:14		08:34
	17:00			19:51		21:34		21:17	20:13		16:51		16:10
Sonnenscheinstunden	253		275	367	419	491	506	509	458	382	329	261	237
ustr.max.mögl.Beschuttung	676										71		2207

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)	Zeitpunkt (SS:MM) Schattenende	(WEA mit letztem Schatten)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
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21							
22							
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25							
26							
27							
28							
29							
30							
31							



## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s66 - Südergellersen, Wetzter Weg 6

### Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34 16:11 160	09:13 (Oerzen 1) 14:50 (WEA 7) 17:02	08:05 17:56	07:09 19:53	06:55 20:47	05:48 21:35	05:00 21:50	04:56 21:16	05:35 20:11	06:27 18:58	07:19 16:49	08:10 16:06
2	08:34 16:13	09:14 (Oerzen 1) 14:50 (WEA 7) 17:03	08:03 17:58	07:07 19:55	06:53 20:48	05:46 21:36	04:59 21:49	04:57 21:14	05:36 20:08	06:29 18:56	07:21 16:47	08:11 16:06
3	08:34 16:14	09:14 (Oerzen 1) 14:51 (WEA 7) 17:05	08:02 18:00	07:04 19:56	06:51 20:50	05:44 21:38	04:58 21:49	04:57 21:12	05:38 20:06	06:31 18:54	07:23 16:45	08:12 16:05
4	08:34 16:15	09:14 (Oerzen 1) 14:51 (WEA 7) 17:07	08:00 18:02	07:02 19:58	06:48 20:52	05:42 21:39	04:57 21:49	04:58 21:10	05:39 20:04	06:32 18:51	07:24 16:44	08:14 16:04
5	08:33 16:16	09:15 (Oerzen 1) 14:52 (WEA 7) 17:09	07:58 18:03	07:00 19:58	06:46 20:54	05:40 21:40	04:56 21:48	04:59 21:09	05:41 20:01	06:34 18:49	07:26 16:42	08:15 16:04
6	08:33 16:17	09:14 (Oerzen 1) 14:52 (WEA 7) 17:11	07:56 18:05	06:57 20:02	06:43 20:55	05:38 21:41	04:56 21:47	05:00 21:07	05:43 19:59	06:36 18:46	07:28 16:40	08:17 16:03
7	08:32 16:19	09:14 (Oerzen 1) 14:52 (WEA 7) 17:13	07:55 18:07	06:55 20:04	06:41 20:57	05:36 21:42	04:55 21:47	05:01 21:05	05:44 19:57	06:38 18:44	07:30 16:38	08:18 16:03
8	08:32 16:20	09:15 (Oerzen 1) 14:53 (WEA 7) 17:15	07:53 18:09	06:53 20:05	06:39 20:59	05:34 21:43	04:54 21:46	05:02 21:03	05:46 19:54	06:39 18:42	07:32 16:36	08:19 16:02
9	08:31 16:21	09:15 (Oerzen 1) 14:53 (WEA 7) 17:17	07:51 18:11	06:50 20:07	06:36 21:01	05:32 21:44	04:54 21:45	05:03 21:01	05:48 19:52	06:41 18:39	07:33 16:35	08:20 16:02
10	08:31 16:23	09:15 (Oerzen 1) 14:53 (WEA 7) 17:19	07:49 18:13	06:48 20:09	06:34 21:02	05:30 21:44	04:53 21:45	05:04 20:59	05:50 19:49	06:43 18:37	07:35 16:33	08:22 16:02
11	08:30 16:24	09:15 (Oerzen 1) 14:53 (WEA 7) 17:21	07:47 18:15	06:46 20:11	06:32 21:04	05:29 21:45	04:53 21:44	05:05 20:57	05:51 19:47	06:45 18:35	07:37 16:31	08:23 16:02
12	08:29 16:26	09:16 (Oerzen 1) 14:53 (WEA 7) 17:23	07:45 18:16	06:43 20:13	06:29 21:06	05:27 21:46	04:52 21:43	05:06 20:55	05:53 19:44	06:46 18:32	07:39 16:30	08:24 16:01
13	08:29 16:27	09:17 (Oerzen 1) 14:54 (WEA 7) 17:25	07:43 18:18	06:41 20:14	06:27 21:07	05:25 21:47	04:52 21:42	05:07 20:53	05:55 19:42	06:48 18:30	07:41 16:28	08:25 16:01
14	08:28 16:29	09:16 (Oerzen 1) 14:54 (WEA 7) 17:27	07:41 18:20	06:39 20:16	06:25 21:09	05:23 21:47	04:52 21:41	05:08 20:51	05:56 19:40	06:50 18:28	07:42 16:26	08:26 16:01
15	08:27 16:31	09:17 (Oerzen 1) 14:54 (WEA 7) 17:29	07:39 18:22	06:36 20:18	06:22 21:11	05:22 21:48	04:52 21:40	05:10 20:49	05:58 19:37	06:51 18:26	07:44 16:25	08:27 16:01
16	08:26 16:32	09:17 (Oerzen 1) 14:54 (WEA 7) 17:31	07:37 18:24	06:34 20:20	06:20 21:12	05:20 21:48	04:52 21:39	05:11 20:47	06:00 19:35	06:53 18:23	07:46 16:23	08:28 16:01
17	08:25 16:34	09:18 (Oerzen 1) 14:54 (WEA 7) 17:33	07:35 18:26	06:31 20:22	06:18 21:14	05:19 21:49	04:51 21:38	05:12 20:44	06:01 19:32	06:55 18:21	07:48 16:22	08:29 16:02
18	08:24 16:36	09:19 (Oerzen 1) 14:54 (WEA 7) 17:35	07:33 18:27	06:29 20:23	06:16 21:16	05:17 21:49	04:51 21:37	05:14 20:42	06:03 19:30	06:57 18:19	07:50 16:21	08:30 16:02
19	08:23 16:37	09:20 (Oerzen 1) 14:54 (WEA 7) 17:37	07:31 18:29	06:27 20:25	06:13 21:17	05:15 21:50	04:51 21:35	05:15 20:40	06:05 19:27	06:58 18:17	07:52 16:19	08:31 16:02
20	08:22 16:39	09:20 (Oerzen 1) 14:55 (WEA 7) 17:39	07:29 18:31	06:24 20:27	06:11 21:19	05:14 21:50	04:52 21:34	05:16 20:38	06:07 19:25	06:59 18:14	07:53 16:18	08:32 16:02
21	08:21 16:41	09:21 (Oerzen 1) 14:55 (WEA 7) 17:41	07:27 18:33	06:22 20:29	06:09 21:20	05:13 21:50	04:52 21:33	05:18 20:36	06:08 19:23	06:56 18:12	07:55 16:17	08:33 16:03
22	08:19 16:43	09:22 (Oerzen 1) 14:55 (WEA 7) 17:42	07:24 18:35	06:19 20:31	06:07 21:22	05:11 21:50	04:52 21:31	05:19 20:34	06:10 19:20	06:57 18:10	07:57 16:15	08:34 16:03
23	08:18 16:45	09:22 (Oerzen 1) 14:55 (WEA 7) 17:44	07:22 18:37	06:17 20:32	06:04 21:23	05:10 21:51	04:52 21:30	05:21 20:31	06:12 19:18	06:59 18:08	07:57 16:14	08:35 16:04
24	08:17 16:46	09:24 (Oerzen 1) 14:55 (WEA 7) 17:46	07:20 18:38	06:15 20:34	06:02 21:25	05:08 21:51	04:52 21:29	05:22 20:29	06:14 19:15	06:58 18:06	07:58 16:13	08:36 16:04
25	08:16 16:48	09:25 (Oerzen 1) 14:56 (WEA 7) 17:48	07:18 18:40	06:12 20:36	06:00 21:26	05:07 21:51	04:53 21:27	05:24 20:27	06:15 19:13	06:59 18:04	07:59 16:12	08:37 16:05
26	08:14 16:50	09:26 (Oerzen 1) 14:56 (WEA 7) 17:50	07:16 18:42	06:10 20:38	05:58 21:27	05:06 21:51	04:53 21:26	05:25 20:25	06:17 19:10	06:57 18:03	07:59 16:11	08:38 16:06
27	08:13 16:52	09:28 (Oerzen 1) 14:57 (WEA 7) 17:52	07:13 18:44	06:07 20:40	05:56 21:29	05:05 21:51	04:54 21:24	05:27 20:22	06:19 19:08	06:56 18:05	07:59 16:10	08:39 16:06
28	08:11 16:54	09:31 (Oerzen 1) 14:58 (WEA 7) 17:54	07:11 18:46	06:05 20:41	05:54 21:30	05:04 21:51	04:54 21:22	05:28 20:20	06:20 19:06	06:57 18:06	07:59 16:09	08:40 16:07
29	08:10 16:56	09:32 (Oerzen 1) 14:58 (WEA 7) 17:56	07:09 18:47	06:03 20:43	05:52 21:32	05:03 21:50	04:53 21:21	05:30 20:18	06:22 19:03	06:58 18:05	07:59 16:08	08:41 16:08
30	08:08 16:58	09:33 (Oerzen 1) 14:59 (WEA 7) 17:58	07:07 18:49	06:01 20:45	05:50 21:33	05:02 21:50	04:55 21:19	05:31 20:15	06:24 19:01	06:59 18:04	07:59 16:07	08:42 16:09
31	08:07 17:00	09:34 (Oerzen 1) 14:59 (WEA 7) 18:00	07:05 18:51	06:00 20:46	05:49 21:34	05:01 21:51	04:56 21:17	05:32 20:13	06:25 19:00	07:00 18:03	07:59 16:06	08:43 16:10
	Sonnenscheinstunden astr.max.mögl.Beschattung	253 2957	275 367	419	491	506	509	458	382	329	261 1435	237 4939

**Tabellen-Layout:** Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s67 - Südergellersen, In de Masch 8

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:34	14:45 (B 01)	08:05	07:09	06:55	05:48	04:59	04:56	05:35	06:27	07:19	07:16
2	16:11	39 15:25 (WEA 7)	17:01	17:56	19:53	20:47	21:35	21:50	21:16	20:11	18:58	16:49
3	08:34	14:46 (B 01)	08:02	07:04	06:51	05:44	04:58	04:57	05:36	06:29	07:21	07:18
4	16:12	37 15:26 (WEA 7)	17:03	17:58	19:55	20:48	21:36	21:49	21:14	20:08	18:56	16:47
5	08:34	14:46 (B 01)	08:02	07:04	06:51	05:44	04:58	04:57	05:38	06:31	07:23	07:20
6	16:14	37 15:27 (WEA 7)	17:05	18:00	19:56	20:50	21:38	21:49	21:12	20:06	18:54	16:45
7	08:33	14:49 (B 01)	08:00	07:02	06:48	05:42	04:57	04:58	05:39	06:32	07:24	07:22
8	16:15	35 15:27 (WEA 7)	17:07	18:02	19:58	20:52	21:39	21:49	21:10	20:04	18:51	16:44
9	08:33	14:51 (B 01)	07:58	07:00	06:46	05:40	04:56	04:59	05:41	06:34	07:26	07:23
10	16:16	33 15:28 (WEA 7)	17:09	18:03	20:00	20:54	21:40	21:48	21:09	20:01	18:49	16:42
11	08:33	14:54 (B 01)	07:56	06:57	06:43	05:38	04:55	05:00	05:43	06:36	07:28	07:25
12	16:17	27 15:28 (WEA 7)	17:11	18:05	20:02	20:55	21:41	21:47	21:07	19:59	18:46	16:40
13	08:32	15:03 (WEA 7)	07:55	06:55	06:41	05:36	04:55	05:01	05:44	06:38	07:30	07:27
14	16:19	25 15:28 (WEA 7)	17:13	18:07	20:04	20:57	21:42	21:47	21:05	19:56	18:44	16:38
15	08:32	15:04 (WEA 7)	07:53	06:53	06:39	05:34	04:54	05:02	05:46	06:39	07:32	07:29
16	16:20	25 15:29 (WEA 7)	17:15	18:09	20:05	20:59	21:43	21:46	21:03	19:54	18:42	16:36
17	08:31	15:04 (WEA 7)	07:51	06:50	06:36	05:32	04:54	05:03	05:48	06:41	07:33	07:31
18	16:21	25 15:29 (WEA 7)	17:17	18:11	20:07	21:01	21:44	21:45	21:01	19:52	18:39	16:35
19	08:31	15:05 (WEA 7)	07:49	06:48	06:34	05:30	04:53	05:04	05:49	06:43	07:35	07:33
20	16:23	24 15:29 (WEA 7)	17:19	18:13	20:09	21:02	21:44	21:45	20:59	19:49	18:37	16:33
21	08:30	15:05 (WEA 7)	07:47	06:46	06:32	05:29	04:53	05:05	05:51	06:44	07:37	07:35
22	16:24	24 15:29 (WEA 7)	17:21	18:15	20:11	21:04	21:45	21:44	20:57	19:47	18:35	16:31
23	08:29	15:06 (WEA 7)	07:45	06:43	06:29	05:27	04:52	05:06	05:53	06:46	07:39	07:37
24	16:26	23 15:29 (WEA 7)	17:23	18:16	20:13	21:06	21:46	21:43	20:55	19:44	18:32	16:30
25	08:29	15:07 (WEA 7)	07:43	06:41	06:27	05:25	04:52	05:07	05:55	06:48	07:41	07:38
26	16:27	23 15:30 (WEA 7)	17:25	18:18	20:14	21:07	21:47	21:42	20:53	19:42	18:30	16:28
27	08:28	15:07 (WEA 7)	07:41	06:39	06:25	05:23	04:52	05:08	05:56	06:50	07:42	07:40
28	16:29	22 15:29 (WEA 7)	17:27	18:20	20:16	21:09	21:47	21:41	20:51	19:40	18:28	16:26
29	08:27	15:08 (WEA 7)	07:39	06:36	06:22	05:22	04:52	05:10	05:58	06:51	07:44	07:42
30	16:31	21 15:29 (WEA 7)	17:29	18:22	20:18	21:11	21:48	21:40	20:49	19:37	18:26	16:25
31	08:26	15:09 (WEA 7)	07:37	06:34	06:20	05:20	04:51	05:11	06:00	06:53	07:46	07:44
32	16:32	20 15:29 (WEA 7)	17:31	18:24	20:20	21:12	21:48	21:39	20:47	19:35	18:23	16:23
33	08:25	15:10 (WEA 7)	07:35	06:31	06:18	05:18	04:51	05:12	06:01	06:55	07:48	07:46
34	16:34	19 15:29 (WEA 7)	17:33	18:26	20:22	21:14	21:49	21:38	20:44	19:32	18:21	16:22
35	08:24	15:11 (WEA 7)	07:33	06:29	06:16	05:17	04:51	05:14	06:03	06:57	07:50	07:48
36	16:36	18 15:29 (WEA 7)	17:35	18:27	20:23	21:16	21:49	21:37	20:42	19:30	18:19	16:20
37	08:23	15:13 (WEA 7)	07:31	06:27	06:13	05:15	04:51	05:15	06:05	06:58	07:52	07:49
38	16:37	16 15:29 (WEA 7)	17:37	18:29	20:25	21:17	21:50	21:35	20:40	19:27	18:17	16:19
39	08:22	15:14 (WEA 7)	07:29	06:24	06:11	05:14	04:51	05:16	06:07	07:00	07:53	07:51
40	16:39	13 15:27 (WEA 7)	17:39	18:31	20:27	21:19	21:50	21:34	20:38	19:25	18:14	16:18
41	08:21	15:16 (WEA 7)	07:27	06:22	06:09	05:13	04:52	05:18	06:08	07:02	07:55	07:53
42	16:41	10 15:26 (WEA 7)	17:40	18:33	20:29	21:20	21:50	21:33	20:36	19:23	18:12	16:16
43	08:19	15:20 (WEA 7)	07:24	06:19	06:07	05:11	04:52	05:19	06:10	07:03	07:57	07:55
44	16:43	4 15:24 (WEA 7)	17:42	18:35	20:31	21:22	21:50	21:31	20:34	19:20	18:10	16:15
45	08:18	07:22	17:44	06:17	06:04	05:10	04:52	05:21	06:12	07:05	07:59	07:57
46	16:45	17:44	18:37	20:32	21:23	21:51	21:30	20:31	19:18	18:08	16:14	16:14
47	08:17	07:20	17:46	06:15	06:02	05:08	04:52	05:22	06:13	07:07	08:01	07:58
48	16:46	17:46	18:38	20:34	21:25	21:51	21:29	20:29	19:15	18:06	16:13	16:13
49	08:16	07:18	17:48	06:12	06:00	05:07	04:53	05:24	06:15	07:09	08:00	08:00
50	16:48	17:48	18:40	20:36	21:26	21:51	21:27	20:27	19:13	18:04	16:12	16:12
51	08:14	07:16	17:50	06:10	05:58	05:06	04:53	05:25	06:17	07:10	08:02	08:02
52	16:50	17:50	18:42	20:38	21:27	21:51	21:26	20:25	19:10	18:01	16:11	16:11
53	08:13	07:13	17:52	06:07	05:56	05:05	04:53	05:27	06:19	07:12	08:03	08:03
54	16:52	17:52	18:44	20:40	21:29	21:51	21:24	20:22	19:08	18:00	16:10	16:10
55	08:11	07:11	17:54	06:05	05:54	05:04	04:54	05:28	06:20	07:14	08:05	08:05
56	16:54	17:54	18:46	20:41	21:30	21:51	21:22	20:20	19:06	18:00	16:09	16:09
57	08:10	07:10	17:56	06:02	05:52	05:02	04:55	05:30	06:22	07:16	08:06	08:06
58	16:56	17:56	18:48	20:43	21:32	21:50	21:21	20:18	19:03	18:00	16:08	16:08
59	08:08	07:00	17:58	06:00	05:50	05:01	04:55	05:31	06:24	07:17	08:08	08:08
60	16:58	17:58	18:50	20:45	21:33	21:50	21:19	20:15	19:01	18:00	16:07	16:07
61	08:07	06:58	17:59	05:58	05:00	05:00	05:33	06:26	07:14	08:00	16:07	16:07
62	17:00	19:51	19:51	19:51	21:34	21:34	21:17	20:13	19:00	18:00	16:51	16:51
Sonnenscheinstunden	253		275		419		506		509	458	329	261
astr.max.mögl.Beschattung	520										189	1151

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende
			(WEA mit letztem Schatten)

## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s68 - Wetzen, Zum Lerchenberg 5

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai		Juni
1	08:34	08:05	07:09	06:56	05:48		05:00
	16:12	17:02	17:56	19:53	20:47		18 05:58 (B 04)
2	08:34	08:03	07:07	06:53	05:46		04:59
	16:13	17:04	17:58	19:55	20:49		17 05:57 (B 06)
3	08:34	08:02	07:04	06:51	05:44		04:58
	16:14	17:06	18:00	19:57	20:50		15 05:56 (B 06)
4	08:34	08:00	07:02	06:48	05:42		04:57
	16:15	17:08	18:02	19:58	20:52		11 05:39 (B 04)
5	08:33	07:58	07:00	06:46	05:40		04:57
	16:16	17:10	18:04	20:00	20:54		12 05:39 (B 04)
6	08:33	07:57	06:58	06:44	05:38		04:56
	16:18	17:12	18:06	20:02	20:56		13 05:39 (B 04)
7	08:32	07:55	06:55	06:41	05:36		04:55
	16:19	17:13	18:07	20:04	20:57		13 05:39 (B 04)
8	08:32	07:53	06:53	06:39	05:34	06:00 (B 03)	04:55
	16:20	17:15	18:09	20:06	20:59	1 06:01 (B 03)	14 05:40 (B 04)
9	08:31	07:51	06:51	06:37	05:32	05:59 (B 03)	04:54
	16:22	17:17	18:11	20:07	21:01	3 06:02 (B 03)	14 05:39 (B 04)
10	08:31	07:49	06:48	06:34	05:31	05:57 (B 03)	04:54
	16:23	17:19	18:13	20:09	21:02	5 06:02 (B 03)	14 05:40 (B 04)
11	08:30	07:47	06:46	06:32	05:29	05:55 (B 03)	04:53
	16:25	17:21	18:15	20:11	21:04	7 06:02 (B 03)	13 05:39 (B 04)
12	08:29	07:45	06:44	06:30	05:27	05:54 (B 03)	04:53
	16:26	17:23	18:17	20:13	21:06	9 06:03 (B 03)	14 05:40 (B 04)
13	08:29	07:43	06:41	06:27	05:25	05:52 (B 06)	04:53
	16:28	17:25	18:19	20:15	21:08	10 06:02 (B 03)	13 05:40 (B 04)
14	08:28	07:41	06:39	06:25	05:24	05:51 (B 06)	04:52
	16:29	17:27	18:20	20:16	21:09	11 06:02 (B 03)	13 05:40 (B 04)
15	08:27	07:39	06:36	06:23	05:22	05:49 (B 06)	04:52
	16:31	17:29	18:22	20:18	21:11	12 06:01 (B 03)	12 05:40 (B 04)
16	08:26	07:37	06:34	06:20	05:20	05:48 (B 06)	04:52
	16:33	17:31	18:24	20:20	21:12	13 06:01 (B 03)	13 05:41 (B 04)
17	08:25	07:35	06:32	06:18	05:19	05:46 (B 06)	04:52
	16:34	17:33	18:26	20:22	21:14	14 06:00 (B 06)	13 05:41 (B 04)
18	08:24	07:33	06:29	06:16	05:17	05:45 (B 06)	04:52
	16:36	17:35	18:28	20:24	21:16	16 06:01 (B 06)	12 05:41 (B 04)
19	08:23	07:31	06:27	06:14	05:16	05:44 (B 06)	04:52
	16:38	17:37	18:30	20:25	21:17	17 06:01 (B 06)	12 05:41 (B 04)
20	08:22	07:29	06:24	06:11	05:14	05:43 (B 06)	04:52
	16:40	17:39	18:31	20:27	21:19	18 06:01 (B 06)	12 05:41 (B 04)
21	08:21	07:27	06:22	06:09	05:13	05:43 (B 06)	04:52
	16:41	17:41	18:33	20:29	21:20	18 06:01 (B 06)	12 05:41 (B 04)
22	08:20	07:25	06:20	06:07	05:11	05:44 (B 06)	04:52
	16:43	17:43	18:35	20:31	21:22	18 06:02 (B 06)	12 05:41 (B 04)
23	08:18	07:22	06:17	06:05	05:10	05:44 (B 06)	04:52
	16:45	17:45	18:37	20:33	21:23	18 06:02 (B 06)	12 05:42 (B 04)
24	08:17	07:20	06:15	06:03	05:09	05:43 (B 06)	04:53
	16:47	17:47	18:39	20:34	21:25	18 06:01 (B 06)	12 05:42 (B 04)
25	08:16	07:18	06:12	06:00	05:08	05:44 (B 06)	04:53
	16:49	17:48	18:40	20:36	21:26	17 06:01 (B 06)	13 05:42 (B 04)
26	08:14	07:16	06:10	05:58	05:06	05:44 (B 06)	04:53
	16:50	17:50	18:42	20:38	21:28	17 06:01 (B 06)	13 05:43 (B 04)
27	08:13	07:14	06:08	05:56	05:05	05:34 (B 04)	04:54
	16:52	17:52	18:44	20:40	21:29	17 06:00 (B 06)	12 05:42 (B 04)
28	08:11	07:11	06:05	05:54	05:04	05:33 (B 04)	04:54
	16:54	17:54	18:46	20:41	21:30	18 06:00 (B 06)	13 05:43 (B 04)
29	08:10		07:03	05:52	05:03	05:32 (B 04)	04:55
	16:56		19:48	20:43	21:32	19 06:00 (B 06)	13 05:43 (B 04)
30	08:08		07:00	05:50	05:02	05:31 (B 04)	04:56
	16:58		19:49	20:45	21:33	19 05:59 (B 06)	14 05:44 (B 04)
31	08:07		06:58		05:01	05:31 (B 04)	
	17:00		19:51		21:34	18 05:59 (B 06)	
Sonnenscheinstunden	253	275	367	419	491		506
astr.max.mögl.Beschattung					333		394

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s68 - Wetzten, Zum Lerchenberg 5

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober	November	Dezember
1	04:56	05:30 (B 04)	05:35	06:05 (B 03)	06:28	07:19	07:16	08:10
	21:50	13 05:43 (B 04)	21:16	8 06:13 (B 03)	20:11	18:59	16:50	16:07
2	04:57	05:30 (B 04)	05:37	06:06 (B 03)	06:29	07:21	07:18	08:11
	21:49	14 05:44 (B 04)	21:14	7 06:13 (B 03)	20:09	18:56	16:48	16:06
3	04:58	05:31 (B 04)	05:38	06:08 (B 03)	06:31	07:23	07:20	08:13
	21:49	14 05:45 (B 04)	21:12	5 06:13 (B 03)	20:06	18:54	16:46	16:05
4	04:59	05:31 (B 04)	05:40	06:09 (B 03)	06:33	07:25	07:22	08:14
	21:49	14 05:45 (B 04)	21:10	3 06:12 (B 03)	20:04	18:51	16:44	16:05
5	04:59	05:32 (B 04)	05:41		06:34	07:26	07:24	08:15
	21:48	14 05:46 (B 04)	21:09		20:01	18:49	16:42	16:04
6	05:00	05:32 (B 04)	05:43		06:36	07:28	07:25	08:17
	21:48	13 05:45 (B 04)	21:07		19:59	18:47	16:40	16:04
7	05:01	05:33 (B 04)	05:45		06:38	07:30	07:27	08:18
	21:47	12 05:45 (B 04)	21:05		19:57	18:44	16:38	16:03
8	05:02	05:34 (B 04)	05:46		06:40	07:32	07:29	08:19
	21:46	12 05:46 (B 04)	21:03		19:54	18:42	16:37	16:03
9	05:03	05:35 (B 04)	05:48		06:41	07:34	07:31	08:21
	21:45	13 06:02 (B 06)	21:01		19:52	18:40	16:35	16:02
10	05:04	05:36 (B 04)	05:50		06:43	07:35	07:33	08:22
	21:45	16 06:04 (B 06)	20:59		19:49	18:37	16:33	16:02
11	05:05	05:37 (B 04)	05:52		06:45	07:37	07:35	08:23
	21:44	17 06:05 (B 06)	20:57		19:47	18:35	16:31	16:02
12	05:06	05:38 (B 04)	05:53		06:46	07:39	07:37	08:24
	21:43	18 06:06 (B 06)	20:55		19:45	18:33	16:30	16:02
13	05:08	05:39 (B 04)	05:55		06:48	07:41	07:39	08:25
	21:42	19 06:07 (B 06)	20:53		19:42	18:30	16:28	16:02
14	05:09	05:40 (B 04)	05:57		06:50	07:43	07:40	08:26
	21:41	19 06:08 (B 06)	20:51		19:40	18:28	16:27	16:02
15	05:10	05:42 (B 04)	05:58		06:52	07:44	07:42	08:27
	21:40	18 06:09 (B 06)	20:49		19:37	18:26	16:25	16:02
16	05:11	05:43 (B 04)	06:00		06:53	07:46	07:44	08:28
	21:39	19 06:10 (B 06)	20:47		19:35	18:24	16:24	16:02
17	05:13	05:44 (B 04)	06:02		06:55	07:48	07:46	08:29
	21:38	17 06:10 (B 06)	20:45		19:33	18:21	16:22	16:02
18	05:14	05:53 (B 06)	06:03		06:57	07:50	07:48	08:29
	21:37	17 06:10 (B 06)	20:42		19:30	18:19	16:21	16:02
19	05:15	05:54 (B 06)	06:05		06:58	07:52	07:50	08:30
	21:35	17 06:11 (B 06)	20:40		19:28	18:17	16:19	16:02
20	05:17	05:54 (B 06)	06:07		07:00	07:54	07:51	08:31
	21:34	17 06:11 (B 06)	20:38		19:25	18:15	16:18	16:03
21	05:18	05:53 (B 06)	06:09		07:02	07:55	07:53	08:31
	21:33	18 06:11 (B 06)	20:36		19:23	18:12	16:17	16:03
22	05:20	05:53 (B 06)	06:10		07:04	07:57	07:55	08:32
	21:31	18 06:11 (B 06)	20:34		19:20	18:10	16:16	16:04
23	05:21	05:54 (B 06)	06:12		07:05	07:59	07:57	08:32
	21:30	18 06:12 (B 06)	20:31		19:18	18:08	16:14	16:04
24	05:22	05:54 (B 06)	06:14		07:07	08:01	07:58	08:33
	21:29	17 06:11 (B 06)	20:29		19:16	18:06	16:13	16:05
25	05:24	05:55 (B 06)	06:16		07:09	07:03	08:00	08:33
	21:27	17 06:12 (B 06)	20:27		19:13	17:04	16:12	16:05
26	05:25	05:56 (B 06)	06:17		07:11	07:05	08:02	08:33
	21:26	15 06:11 (B 06)	20:25		19:11	17:02	16:11	16:06
27	05:27	05:57 (B 06)	06:19		07:12	07:07	08:03	08:34
	21:24	13 06:10 (B 06)	20:22		19:08	17:00	16:10	16:07
28	05:29	05:59 (B 06)	06:21		07:14	07:08	08:05	08:34
	21:22	13 06:12 (B 03)	20:20		19:06	16:58	16:09	16:08
29	05:30	06:00 (B 06)	06:22		07:16	07:10	08:07	08:34
	21:21	12 06:12 (B 03)	20:18		19:03	16:56	16:08	16:09
30	05:32	06:02 (B 06)	06:24		07:18	07:12	08:08	08:34
	21:19	11 06:13 (B 03)	20:16		19:01	16:54	16:07	16:09
31	05:33	06:03 (B 06)	06:26			07:14		08:34
	21:18	10 06:13 (B 03)	20:13			16:52		16:10
Sonnenscheinstunden		509	458		382	329	262	237
astr.max.mögl.Beschattung		475	23					

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	

## SHADOW - Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand **Schattenrezeptor:** s69 - Wetzten, Zum Lerchenberg 10**Annahmen für Schattenwurfberechnung**

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai		Juni		Juli		August	September	Oktober	November	Dezember	
1	08:34	08:05	07:09	06:56	05:48		05:00		05:35 (B 03)	04:56	05:28 (B 06)	05:35	06:28	07:19	07:16	08:10
	16:12	17:02	17:56	19:53	20:47		21:35	11	05:46 (B 03)	21:50	05:43 (B 06)	21:16	20:11	18:59	16:50	16:07
2	08:34	08:03	07:07	06:53	05:46		04:59		05:35 (B 03)	04:57	05:29 (B 06)	05:37	06:29	07:21	07:18	08:11
	16:13	17:04	17:58	19:55	20:49		21:36	10	05:45 (B 03)	21:49	05:43 (B 06)	21:14	20:09	18:56	16:48	16:06
3	08:34	08:02	07:04	06:51	05:44		04:58		05:28 (B 06)	04:58	05:30 (B 06)	05:38	06:31	07:23	07:20	08:13
	16:14	17:06	18:00	19:57	20:50		21:38	12	05:44 (B 03)	21:49	05:43 (B 06)	21:12	20:06	18:54	16:46	16:05
4	08:34	08:00	07:02	06:48	05:42		04:57		05:28 (B 06)	04:59	05:31 (B 06)	05:40	06:33	07:25	07:22	08:14
	16:15	17:08	18:02	19:58	20:52		21:39	14	05:45 (B 03)	21:49	05:43 (B 06)	21:10	20:04	18:51	16:44	16:05
5	08:33	07:58	07:00	06:46	05:40		04:57		05:27 (B 06)	04:59	05:32 (B 06)	05:41	06:34	07:26	07:24	08:15
	16:16	17:10	18:04	20:00	20:54		21:40	13	05:43 (B 03)	21:48	05:43 (B 06)	21:09	20:01	18:49	16:42	16:04
6	08:33	07:57	06:58	06:44	05:38		04:56		05:26 (B 06)	05:00	05:32 (B 06)	05:43	06:36	07:28	07:25	08:17
	16:18	17:12	18:06	20:02	20:56		21:41	13	05:42 (B 03)	21:48	05:42 (B 06)	21:07	19:59	18:47	16:40	16:04
7	08:32	07:55	06:55	06:41	05:36		04:55		05:26 (B 06)	05:01	05:33 (B 06)	05:45	06:38	07:30	07:27	08:18
	16:19	17:13	18:07	20:04	20:57		21:42	11	05:37 (B 06)	21:47	05:49 (B 03)	21:05	19:57	18:44	16:38	16:03
8	08:32	07:53	06:53	06:39	05:34		04:55		05:26 (B 06)	05:02	05:34 (B 06)	05:46	06:40	07:32	07:29	08:19
	16:20	17:15	18:09	20:06	20:59		21:43	12	05:38 (B 06)	21:46	05:51 (B 03)	21:03	19:54	18:42	16:37	16:03
9	08:31	07:51	06:51	06:37	05:32		04:54		05:25 (B 06)	05:03	05:35 (B 06)	05:48	06:41	07:34	07:31	08:20
	16:22	17:17	18:11	20:07	21:01		21:44	13	05:38 (B 06)	21:45	05:52 (B 03)	21:01	19:52	18:40	16:35	16:02
10	08:31	07:49	06:48	06:34	05:31		04:54		05:25 (B 06)	05:04	05:36 (B 06)	05:50	06:43	07:35	07:33	08:22
	16:23	17:19	18:13	20:09	21:02		21:44	14	05:39 (B 06)	21:45	05:52 (B 03)	20:59	19:49	18:37	16:33	16:02
11	08:30	07:47	06:46	06:32	05:29		04:53		05:24 (B 06)	05:05	05:42 (B 03)	05:52	06:45	07:37	07:35	08:23
	16:25	17:21	18:15	20:11	21:04		21:45	14	05:38 (B 06)	21:44	05:53 (B 03)	20:57	19:47	18:35	16:31	16:02
12	08:29	07:45	06:43	06:30	05:27		04:53		05:24 (B 06)	05:06	05:42 (B 03)	05:53	06:46	07:39	07:37	08:24
	16:26	17:23	18:17	20:13	21:06		21:46	15	05:39 (B 06)	21:43	05:54 (B 03)	20:55	19:45	18:33	16:30	16:02
13	08:29	07:43	06:41	06:27	05:25		04:53		05:24 (B 06)	05:08	05:42 (B 03)	05:55	06:48	07:41	07:39	08:25
	16:28	17:25	18:19	20:15	21:07		21:47	16	05:40 (B 06)	21:42	05:54 (B 03)	20:53	19:42	18:30	16:28	16:02
14	08:28	07:41	06:39	06:25	05:24		04:52		05:24 (B 06)	05:09	05:41 (B 03)	05:57	06:50	07:43	07:40	08:26
	16:29	17:27	18:20	20:16	21:09		21:47	16	05:40 (B 06)	21:41	05:54 (B 03)	20:51	19:40	18:28	16:27	16:02
15	08:27	07:39	06:36	06:23	05:22		04:52		05:24 (B 06)	05:10	05:42 (B 03)	05:58	06:52	07:44	07:42	08:27
	16:31	17:29	18:22	20:18	21:11		21:48	17	05:41 (B 06)	21:40	05:55 (B 03)	20:49	19:37	18:26	16:25	16:02
16	08:26	07:37	06:34	06:20	05:20		04:52		05:24 (B 06)	05:11	05:43 (B 03)	06:00	06:53	07:46	07:44	08:28
	16:33	17:31	18:24	20:20	21:12		21:48	17	05:41 (B 06)	21:39	05:56 (B 03)	20:47	19:35	18:24	16:24	16:02
17	08:25	07:35	06:32	06:18	05:19		04:52		05:24 (B 06)	05:13	05:44 (B 03)	06:02	06:55	07:48	07:46	08:29
	16:34	17:33	18:26	20:22	21:14		21:49	17	05:41 (B 06)	21:38	05:56 (B 03)	20:45	19:33	18:21	16:22	16:02
18	08:24	07:33	06:29	06:16	05:17		04:52		05:24 (B 06)	05:14	05:45 (B 03)	06:03	06:57	07:50	07:48	08:29
	16:36	17:35	18:28	20:24	21:16		21:49	18	05:42 (B 06)	21:37	05:55 (B 03)	20:42	19:30	18:19	16:21	16:02
19	08:23	07:31	06:27	06:14	05:16		04:52		05:24 (B 06)	05:15	05:47 (B 03)	06:05	06:58	07:52	07:50	08:30
	16:38	17:37	18:29	20:25	21:17		21:50	18	05:42 (B 06)	21:35	05:56 (B 03)	20:40	19:28	18:17	16:19	16:02
20	08:22	07:29	06:24	06:11	05:14	05:42 (B 03)	04:52		05:24 (B 06)	05:17	05:48 (B 03)	06:07	07:00	07:54	07:51	08:31
	16:39	17:39	18:31	20:27	21:19	05:44 (B 03)	21:50	18	05:42 (B 06)	21:34	05:56 (B 03)	20:38	19:25	18:15	16:18	16:03
21	08:21	07:27	06:22	06:09	05:13	05:41 (B 03)	04:52		05:24 (B 06)	05:18	05:49 (B 03)	06:09	07:02	07:55	07:53	08:31
	16:41	17:41	18:33	20:29	21:20	05:45 (B 03)	21:50	18	05:42 (B 06)	21:33	05:55 (B 03)	20:36	19:23	18:12	16:17	16:03
22	08:20	07:25	06:20	06:07	05:11	05:40 (B 03)	04:52		05:24 (B 06)	05:19	05:50 (B 03)	06:10	07:04	07:57	07:55	08:32
	16:43	17:43	18:35	20:31	21:22	05:46 (B 03)	21:50	18	05:42 (B 06)	21:31	05:55 (B 03)	20:34	19:20	18:10	16:16	16:04
23	08:18	07:22	06:17	06:05	05:10	05:39 (B 03)	04:52		05:25 (B 06)	05:21	05:52 (B 03)	06:12	07:05	07:59	07:57	08:32
	16:45	17:45	18:37	20:33	21:23	05:46 (B 03)	21:51	18	05:43 (B 06)	21:30	05:55 (B 03)	20:31	19:18	18:08	16:14	16:04
24	08:17	07:20	06:15	06:03	05:09	05:37 (B 03)	04:53		05:25 (B 06)	05:22	05:53 (B 03)	06:14	07:07	08:01	07:58	08:33
	16:47	17:47	18:39	20:34	21:25	05:46 (B 03)	21:51	18	05:43 (B 06)	21:29	05:54 (B 03)	20:29	19:16	18:06	16:13	16:05
25	08:16	07:18	06:12	06:00	05:08	05:36 (B 03)	04:53		05:25 (B 06)	05:24	05:53 (B 03)	06:15	07:09	07:53	08:00	08:33
	16:49	17:48	18:40	20:36	21:26	05:46 (B 03)	21:51	17	05:42 (B 06)	21:27	05:54 (B 03)	20:27	19:13	17:54	16:12	16:05
26	08:14	07:16	06:10	05:58	05:06	05:35 (B 03)	04:53		05:26 (B 06)	05:25	05:53 (B 03)	06:17	07:11	07:05	08:02	08:33
	16:50	17:50	18:42	20:38	21:28	05:46 (B 03)	21:51	17	05:43 (B 06)	21:26	05:54 (B 03)	20:25	19:11	17:52	16:11	16:06
27	08:13	07:14	06:08	05:56	05:05	05:34 (B 03)	04:54		05:26 (B 06)	05:27	05:53 (B 03)	06:19	07:12	07:07	08:03	08:34
	16:52	17:52	18:44	20:40	21:29	05:46 (B 03)	21:51	17	05:43 (B 06)	21:24	05:54 (B 03)	20:22	19:08	17:50	16:10	16:07
28	08:11	07:11	06:05	05:54	05:04	05:33 (B 03)	04:54		05:27 (B 06)	05:29	05:52 (B 03)	06:21	07:14	07:08	08:05	08:34
	16:54	17:54	18:46	20:41	21:30	05:46 (B 03)	21:51	16	05:43 (B 06)	21:22	05:54 (B 03)	20:20	19:06	17:58	16:09	16:08
29	08:10		07:03	05:52	05:03	05:33 (B 03)	04:55		05:27 (B 06)	05:30	05:52 (B 03)	06:22	07:16	07:10	08:06	08:34
	16:56		19:48	20:43	21:32	05:46 (B 03)	21:50	16	05:43 (B 06)	21:18	05:54 (B 03)	20:18	19:03	17:56	16:09	16:09
30	08:08		07:00	05:50	05:02	05:33 (B 03)	04:56		05:28 (B 06)	05:32	05:52 (B 03)	06:24	07:18	07:12	08:08	08:34
	16:58		19:49	20:45	21:33	05:46 (B 03)	21:50	15	05:43 (B 06)	21:19	05:54 (B 03)	20:16	19:01	17:54	16:07	16:09
31	08:07		06:58		05:01	05:34 (B 03)			05:33		05:53 (B 03)	06:26		07:14		08:34
	17:00		19:51		21:34	12	05:46 (B 03)		21:18		20:13	16:52		17:14		16:10
Sonnenscheinstunden	253	275	367	419	491		506		509		458		382	329	262	237
astr.max.mögl.Beschattung					112		459		256							

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
	Minuten mit Schatten	



## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s70 - Wetzen, Zum Lerchenberg 37

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April		Mai		Juni	
1	08:34	08:05	07:09	06:56		05:48		06:13 (B 06)	05:00
	16:12	17:02	17:56	19:53		20:47	14	06:27 (B 06)	21:35
2	08:34	08:03	07:07	06:53		05:46		06:11 (B 06)	04:59
	16:13	17:04	17:58	19:55		20:49	17	06:28 (B 07)	21:37
3	08:34	08:02	07:05	06:51		05:44		06:11 (B 06)	04:58
	16:14	17:06	18:00	19:57		20:50	20	06:31 (B 07)	21:38
4	08:34	08:00	07:02	06:48		05:42		06:11 (B 06)	04:57
	16:15	17:08	18:02	19:58		20:52	21	06:32 (B 07)	21:39
5	08:33	07:58	07:00	06:46		05:40		06:12 (B 06)	04:57
	16:16	17:10	18:04	20:00		20:54	22	06:34 (B 07)	21:40
6	08:33	07:57	06:58	06:44		05:38		06:12 (B 07)	04:56
	16:18	17:12	18:06	20:02		20:56	23	06:35 (B 07)	21:41
7	08:32	07:55	06:55	06:41		05:36		06:11 (B 07)	04:55
	16:19	17:13	18:07	20:04		20:57	24	06:35 (B 07)	21:42
8	08:32	07:53	06:53	06:39		05:34		06:10 (B 07)	04:55
	16:20	17:15	18:09	20:06		20:59	25	06:35 (B 07)	21:43
9	08:31	07:51	06:51	06:37		05:32		06:10 (B 07)	04:54
	16:22	17:17	18:11	20:07		21:01	26	06:36 (B 07)	21:44
10	08:31	07:49	06:48	06:34		05:31		05:57 (B 04)	04:54
	16:23	17:19	18:13	20:09		21:02	29	06:36 (B 07)	21:44
11	08:30	07:47	06:46	06:32		05:29		05:55 (B 04)	04:53
	16:25	17:21	18:15	20:11		21:04	32	06:36 (B 07)	21:45
12	08:29	07:45	06:44	06:30		05:27		05:54 (B 04)	04:53
	16:26	17:23	18:17	20:13		21:06	34	06:37 (B 07)	21:46
13	08:29	07:43	06:41	06:27		05:25		05:52 (B 04)	04:53
	16:28	17:25	18:19	20:15		21:08	36	06:37 (B 07)	21:47
14	08:28	07:41	06:39	06:25		05:24		05:51 (B 04)	04:52
	16:29	17:27	18:20	20:16		21:09	38	06:37 (B 07)	21:47
15	08:27	07:39	06:36	06:23		05:22		05:49 (B 04)	04:52
	16:31	17:29	18:22	20:18		21:11	39	06:37 (B 07)	21:48
16	08:26	07:37	06:34	06:20		05:20		05:48 (B 04)	04:52
	16:33	17:31	18:24	20:20		21:12	40	06:37 (B 07)	21:48
17	08:25	07:35	06:32	06:18		05:19		05:48 (B 04)	04:52
	16:34	17:33	18:26	20:22		21:14	38	06:36 (B 07)	21:49
18	08:24	07:33	06:29	06:16		05:17		05:49 (B 04)	04:52
	16:36	17:35	18:28	20:24		21:16	35	06:36 (B 07)	21:49
19	08:23	07:31	06:27	06:14		05:16		05:50 (B 04)	04:52
	16:38	17:37	18:30	20:25		21:17	33	06:36 (B 07)	21:50
20	08:22	07:29	06:24	06:11		05:14		05:42 (B 05)	04:52
	16:40	17:39	18:31	20:27		21:19	31	06:35 (B 07)	21:50
21	08:21	07:27	06:22	06:09		05:13		05:41 (B 05)	04:52
	16:41	17:41	18:33	20:29		21:20	29	06:35 (B 07)	21:50
22	08:20	07:25	06:20	06:07		05:11		05:40 (B 05)	04:52
	16:43	17:43	18:35	20:31		21:22	30	06:35 (B 07)	21:51
23	08:18	07:22	06:17	06:05		05:10		05:39 (B 05)	04:52
	16:45	17:45	18:37	20:33		21:23	30	06:34 (B 07)	21:51
24	08:17	07:20	06:15	06:03		05:09		05:37 (B 05)	04:53
	16:47	17:47	18:39	20:34		21:25	30	06:33 (B 07)	21:51
25	08:16	07:18	06:12	06:00		05:08		05:36 (B 05)	04:53
	16:49	17:48	18:40	20:36		21:26	30	06:32 (B 07)	21:51
26	08:14	07:16	06:10	05:58		05:06		05:35 (B 05)	04:53
	16:50	17:50	18:42	20:38		21:28	29	06:31 (B 07)	21:51
27	08:13	07:14	06:08	05:56		05:05		05:34 (B 05)	04:54
	16:52	17:52	18:44	20:40	4	06:25 (B 06)	28	06:30 (B 07)	21:51
28	08:11	07:11	06:05	05:54		05:04		05:33 (B 05)	04:54
	16:54	17:54	18:46	20:41	7	06:26 (B 06)	28	06:29 (B 07)	21:51
29	08:10		07:03	05:52		05:03		05:32 (B 05)	04:55
	16:56		19:48	20:43	10	06:27 (B 06)	25	06:27 (B 07)	21:50
30	08:08		07:00	05:50		05:02		05:32 (B 05)	04:56
	16:58		19:49	20:45	12	06:27 (B 06)	16	05:48 (B 05)	21:50
31	08:07		06:58			05:01		05:33 (B 05)	
	17:00		19:51			21:34	16	05:49 (B 05)	
Sonnenscheinstunden	253	275	367	419		491		506	
astr.max.mögl.Beschattung				33		868		191	

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Kalender

Berechnung: Gesamtbelastung 6x N175 +23 Bestand Schattenrezeptor: s70 - Wetzten, Zum Lerchenberg 37

## Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	04:56	05:43 (B 05)	05:35	06:05 (B 04)	06:28	07:19	07:16	08:10			
	21:50	9 05:52 (B 05)	21:16	33 06:47 (B 07)	20:11	18:59	16:50	16:07			
2	04:57	05:42 (B 05)	05:37	06:06 (B 04)	06:29	07:21	07:18	08:11			
	21:50	10 05:52 (B 05)	21:14	32 06:47 (B 07)	20:09	18:56	16:48	16:06			
3	04:58	05:42 (B 05)	05:38	06:08 (B 04)	06:31	07:23	07:20	08:13			
	21:49	11 05:53 (B 05)	21:12	29 06:47 (B 07)	20:06	18:54	16:46	16:05			
4	04:59	05:42 (B 05)	05:40	06:20 (B 07)	06:33	07:25	07:22	08:14			
	21:49	11 05:53 (B 05)	21:11	26 06:46 (B 07)	20:04	18:51	16:44	16:05			
5	04:59	05:42 (B 05)	05:41	06:21 (B 07)	06:34	07:26	07:24	08:15			
	21:48	12 05:54 (B 05)	21:09	25 06:46 (B 07)	20:01	18:49	16:42	16:04			
6	05:00	05:41 (B 05)	05:43	06:22 (B 07)	06:36	07:28	07:25	08:17			
	21:48	13 05:54 (B 05)	21:07	23 06:45 (B 07)	19:59	18:47	16:40	16:04			
7	05:01	05:41 (B 05)	05:45	06:22 (B 07)	06:38	07:30	07:27	08:18			
	21:47	14 05:55 (B 05)	21:05	22 06:44 (B 07)	19:57	18:44	16:38	16:03			
8	05:02	05:41 (B 05)	05:46	06:21 (B 06)	06:40	07:32	07:29	08:19			
	21:46	14 05:55 (B 05)	21:03	22 06:43 (B 07)	19:54	18:42	16:37	16:03			
9	05:03	05:41 (B 05)	05:48	06:20 (B 06)	06:41	07:34	07:31	08:21			
	21:45	15 05:56 (B 05)	21:01	21 06:41 (B 07)	19:52	18:40	16:35	16:02			
10	05:04	05:41 (B 05)	05:50	06:20 (B 06)	06:43	07:35	07:33	08:22			
	21:45	15 05:56 (B 05)	20:59	19 06:39 (B 07)	19:49	18:37	16:33	16:02			
11	05:05	05:41 (B 05)	05:52	06:20 (B 06)	06:45	07:37	07:35	08:23			
	21:44	15 05:56 (B 05)	20:57	16 06:36 (B 06)	19:47	18:35	16:31	16:02			
12	05:06	05:41 (B 05)	05:53	06:22 (B 06)	06:46	07:39	07:37	08:24			
	21:43	16 05:57 (B 05)	20:55	14 06:36 (B 06)	19:45	18:33	16:30	16:02			
13	05:08	05:41 (B 05)	05:55	06:24 (B 06)	06:48	07:41	07:39	08:25			
	21:42	16 05:57 (B 05)	20:53	12 06:36 (B 06)	19:42	18:30	16:28	16:02			
14	05:09	05:41 (B 05)	05:57	06:25 (B 06)	06:50	07:43	07:40	08:26			
	21:41	22 06:35 (B 07)	20:51	9 06:34 (B 06)	19:40	18:28	16:27	16:02			
15	05:10	05:42 (B 05)	05:58	06:27 (B 06)	06:52	07:44	07:42	08:27			
	21:40	26 06:38 (B 07)	20:49	7 06:34 (B 06)	19:37	18:26	16:25	16:02			
16	05:11	05:43 (B 05)	06:00	06:28 (B 06)	06:53	07:46	07:44	08:28			
	21:39	28 06:39 (B 07)	20:47	4 06:32 (B 06)	19:35	18:24	16:24	16:02			
17	05:13	05:44 (B 05)	06:02		06:55	07:48	07:46	08:29			
	21:38	29 06:40 (B 07)	20:45		19:33	18:21	16:22	16:02			
18	05:14	05:45 (B 05)	06:03		06:57	07:50	07:48	08:29			
	21:37	30 06:41 (B 07)	20:42		19:30	18:19	16:21	16:02			
19	05:15	05:47 (B 05)	06:05		06:58	07:52	07:50	08:30			
	21:35	30 06:43 (B 07)	20:40		19:28	18:17	16:19	16:02			
20	05:17	05:48 (B 05)	06:07		07:00	07:54	07:51	08:31			
	21:34	31 06:44 (B 07)	20:38		19:25	18:15	16:18	16:03			
21	05:18	05:49 (B 05)	06:09		07:02	07:55	07:53	08:31			
	21:33	30 06:44 (B 07)	20:36		19:23	18:12	16:17	16:03			
22	05:20	05:50 (B 05)	06:10		07:04	07:57	07:55	08:32			
	21:31	29 06:44 (B 07)	20:34		19:20	18:10	16:16	16:04			
23	05:21	05:52 (B 05)	06:12		07:05	07:59	07:57	08:32			
	21:30	29 06:46 (B 07)	20:32		19:18	18:08	16:14	16:04			
24	05:22	05:53 (B 05)	06:14		07:07	08:01	07:58	08:33			
	21:29	34 06:46 (B 07)	20:29		19:16	18:06	16:13	16:05			
25	05:24	06:00 (B 04)	06:16		07:09	07:03	08:00	08:33			
	21:27	35 06:47 (B 07)	20:27		19:13	17:04	16:12	16:05			
26	05:25	05:59 (B 04)	06:17		07:11	07:05	08:02	08:34			
	21:26	37 06:47 (B 07)	20:25		19:11	17:02	16:11	16:06			
27	05:27	05:58 (B 04)	06:19		07:12	07:07	08:03	08:34			
	21:24	39 06:47 (B 07)	20:22		19:08	17:00	16:10	16:07			
28	05:29	05:59 (B 04)	06:21		07:14	07:08	08:05	08:34			
	21:23	38 06:47 (B 07)	20:20		19:06	16:58	16:09	16:08			
29	05:30	06:00 (B 04)	06:22		07:16	07:10	08:07	08:34			
	21:21	38 06:47 (B 07)	20:18		19:03	16:56	16:08	16:09			
30	05:32	06:02 (B 04)	06:24		07:18	07:12	08:08	08:34			
	21:19	37 06:48 (B 07)	20:16		19:01	16:54	16:07	16:09			
31	05:33	06:03 (B 04)	06:26			07:14		08:34			
	21:18	35 06:47 (B 07)	20:13			16:52		16:10			
Sonnenscheinstunden	509		458		382	329	262	237			
astr.max.mögl.Beschattung	748		314								

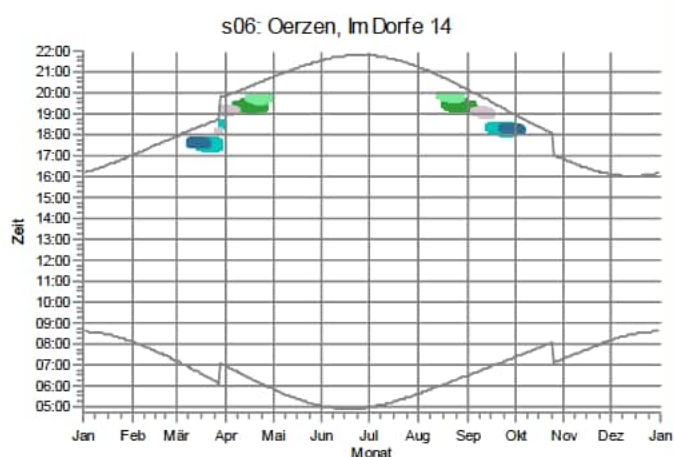
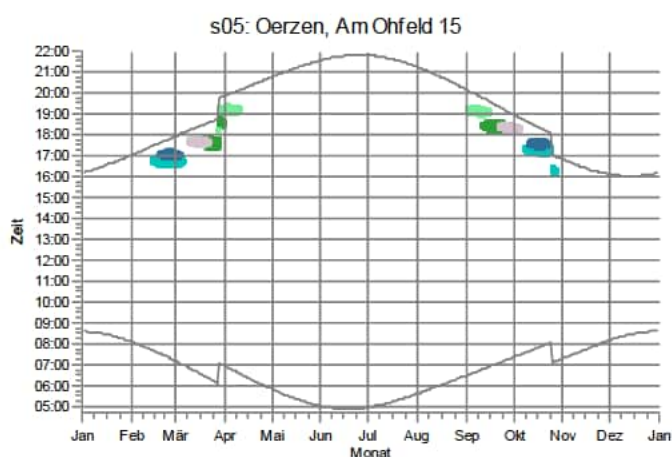
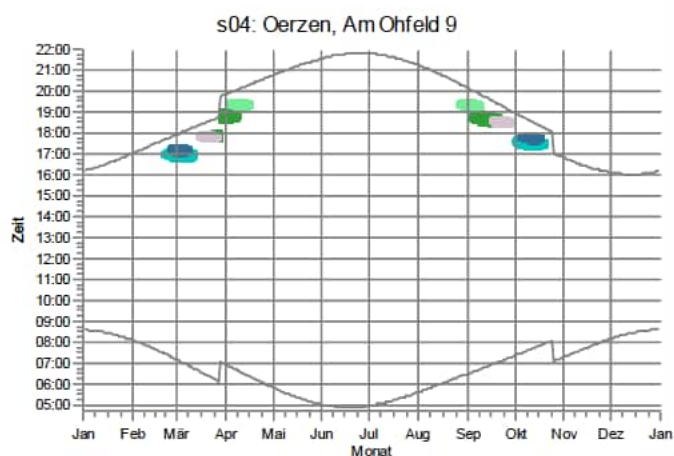
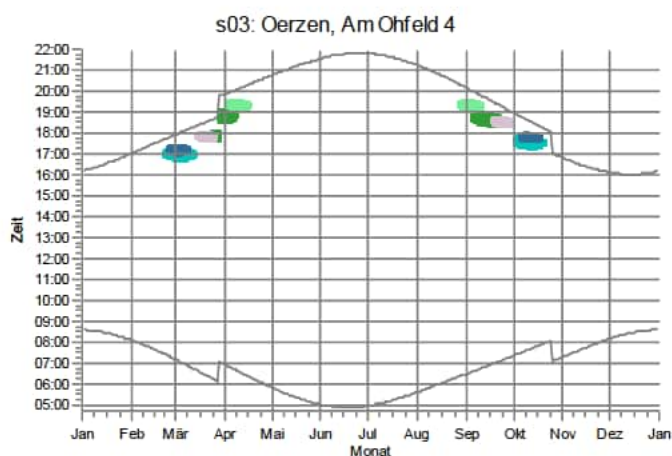
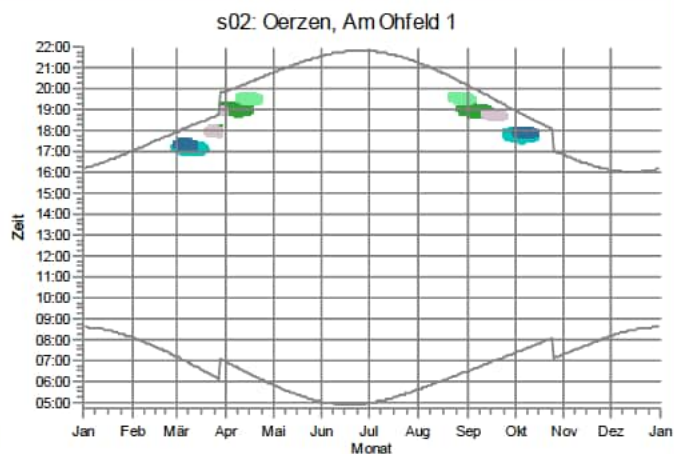
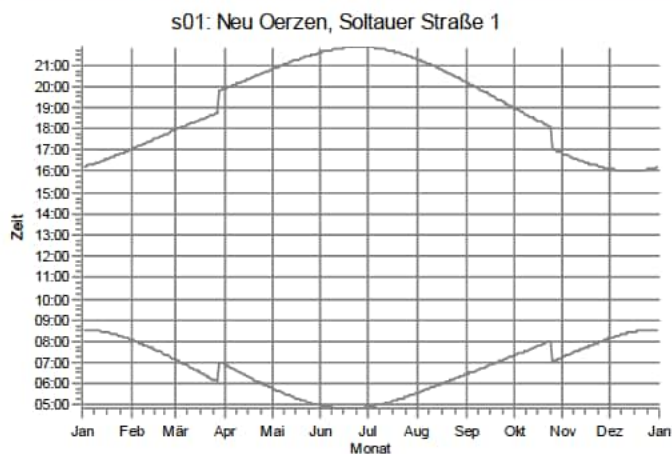
Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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## SHADOW - Grafischer Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



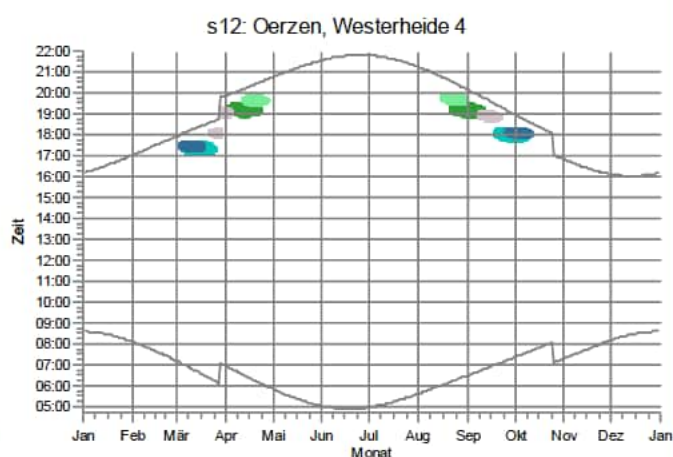
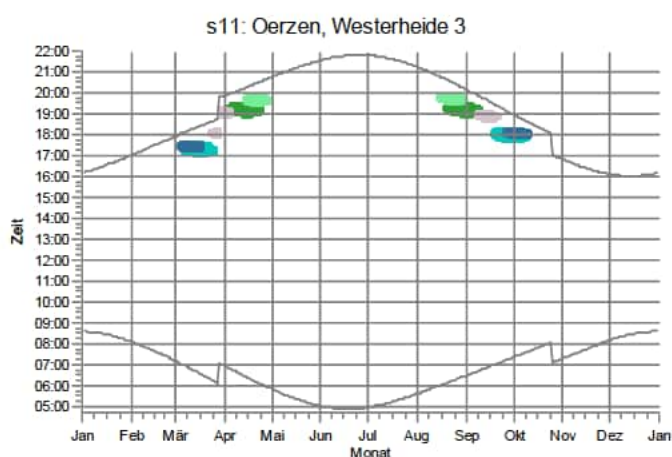
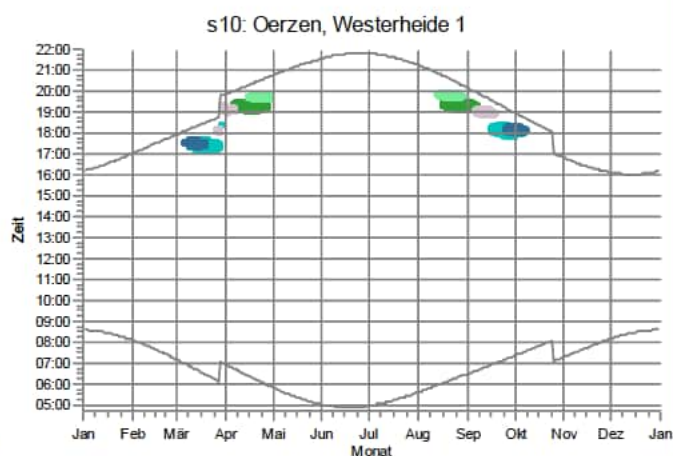
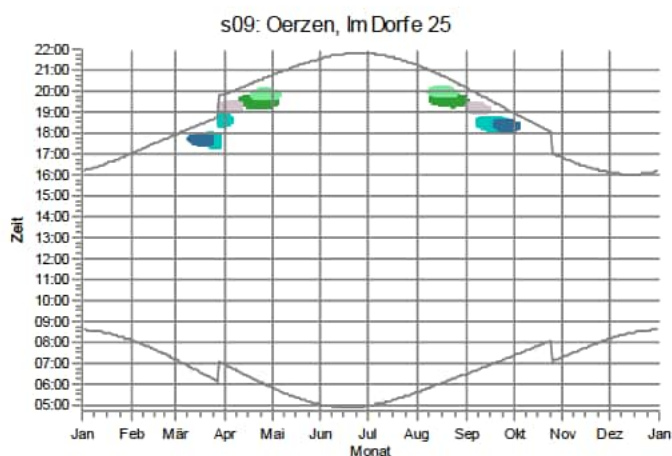
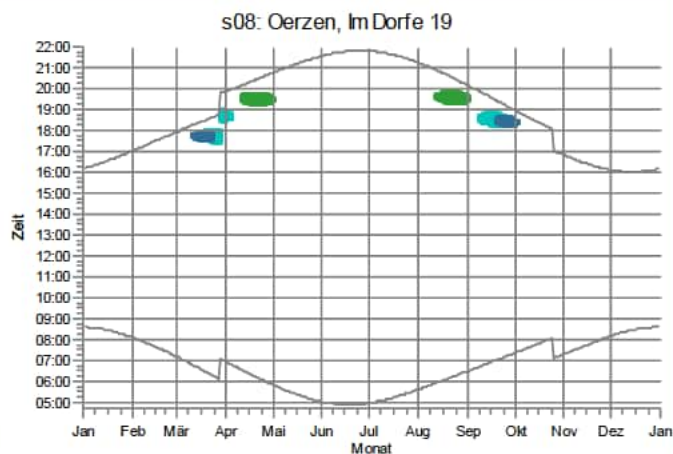
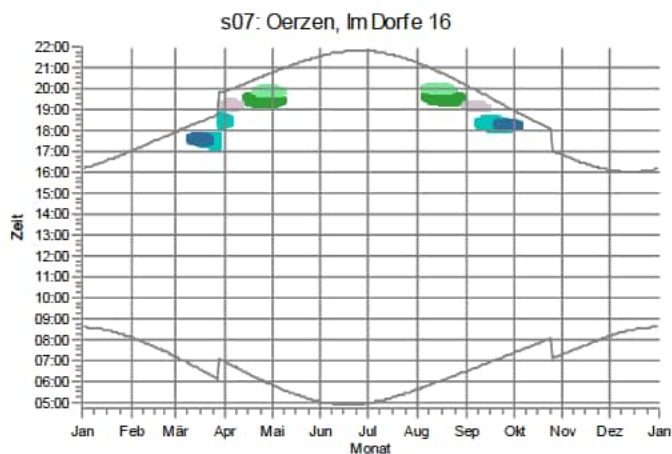
WEA

Oerzen 1: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (79)  
Oerzen 2: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (80)  
Oerzen 3: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (81)

Rep 10: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (110)  
Rep 11: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (111)

## SHADOW - Grafischer Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



WEA

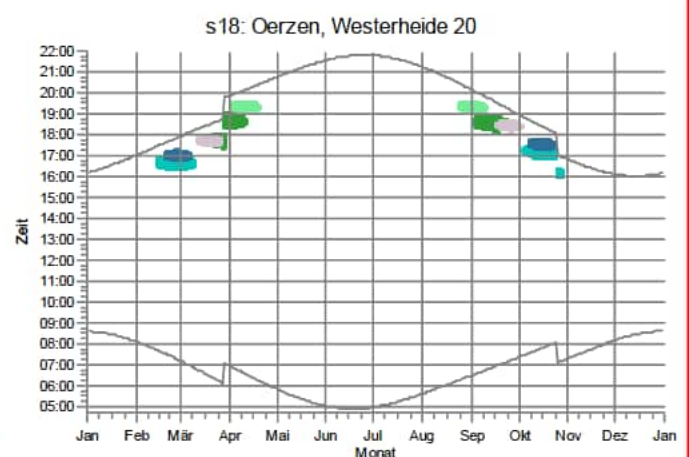
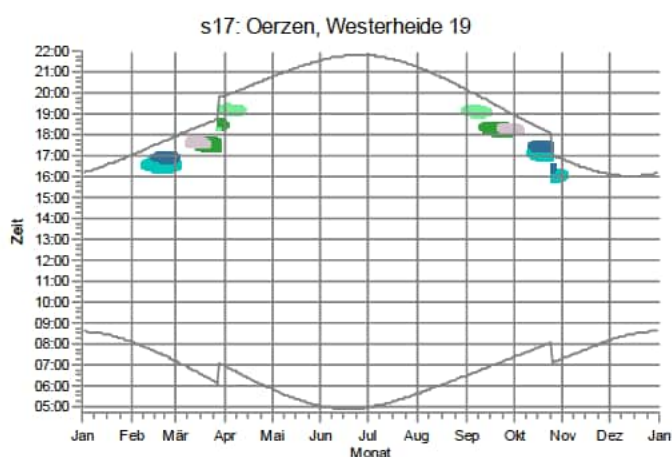
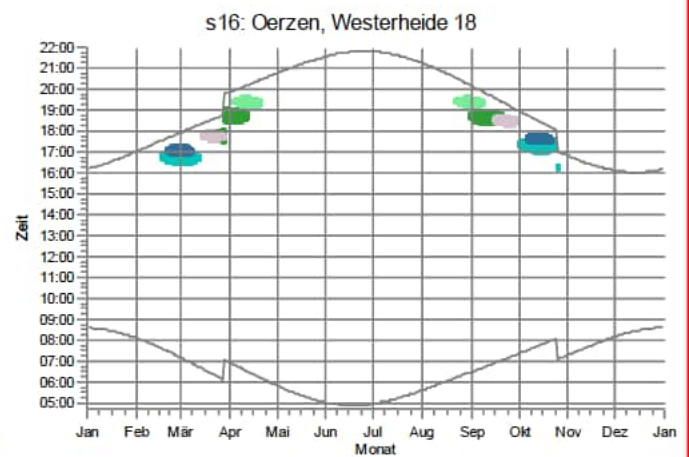
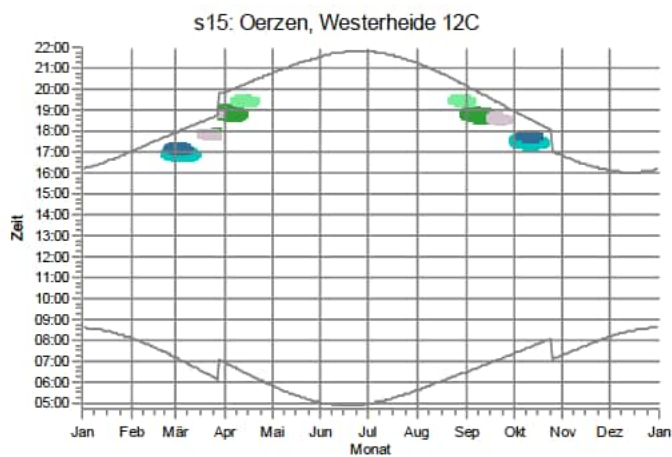
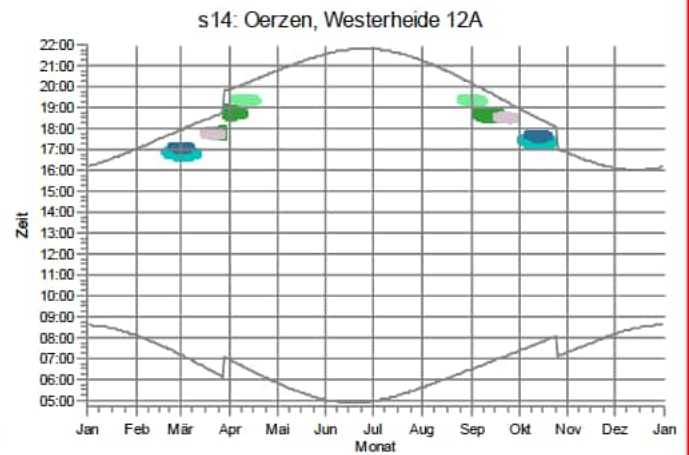
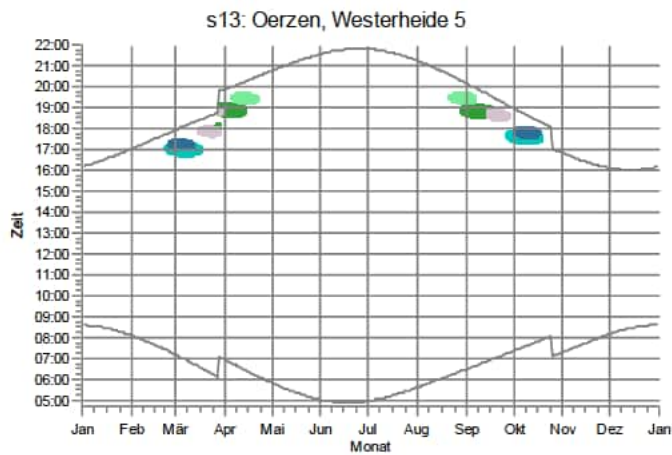
Oerzen 1: NORDEX N175/6.X 6800 175,0 t-H NH: 179,0 m (Ges:266,5 m) (79)  
Oerzen 2: NORDEX N175/6.X 6800 175,0 t-H NH: 179,0 m (Ges:266,5 m) (80)  
Oerzen 3: NORDEX N175/6.X 6800 175,0 t-H NH: 179,0 m (Ges:266,5 m) (81)

Rep 10: NORDEX N175/6.X 6800 175,0 t-H NH: 179,0 m (Ges:266,5 m) (110)  
Rep 11: NORDEX N175/6.X 6800 175,0 t-H NH: 179,0 m (Ges:266,5 m) (111)



## SHADOW - Grafischer Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



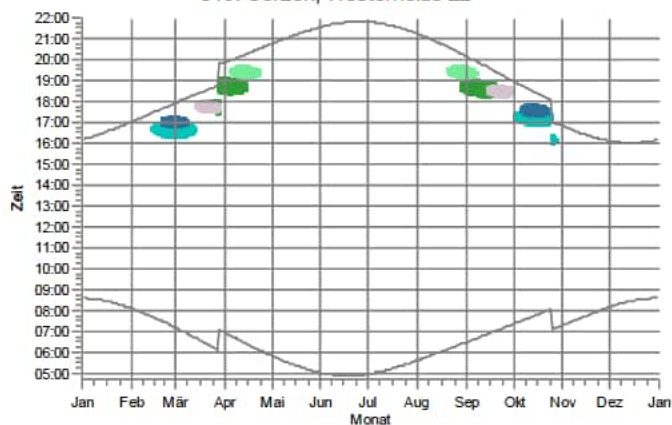
WEA

Oerzen 1: NORDEX N175/6.X 6800 175,0 t-H NH: 179,0 m (Ges:266,5 m) (79)  
Oerzen 2: NORDEX N175/6.X 6800 175,0 t-H NH: 179,0 m (Ges:266,5 m) (80)  
Oerzen 3: NORDEX N175/6.X 6800 175,0 t-H NH: 179,0 m (Ges:266,5 m) (81)

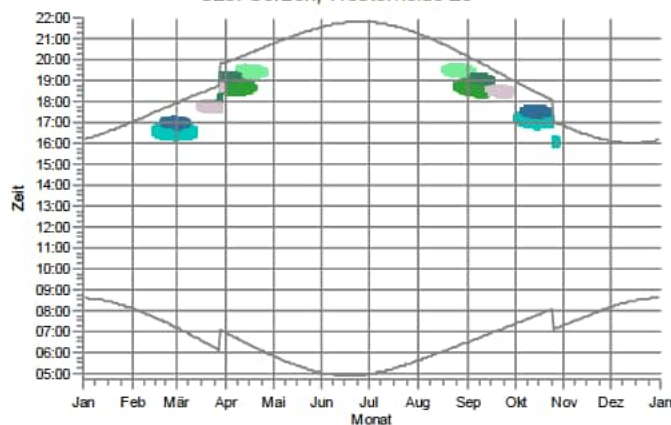
Rep 10: NORDEX N175/6.X 6800 175,0 t-H NH: 179,0 m (Ges:266,5 m) (110)  
Rep 11: NORDEX N175/6.X 6800 175,0 t-H NH: 179,0 m (Ges:266,5 m) (111)

**SHADOW - Grafischer Kalender****Berechnung:** Gesamtbelastung 6x N175 +23 Bestand

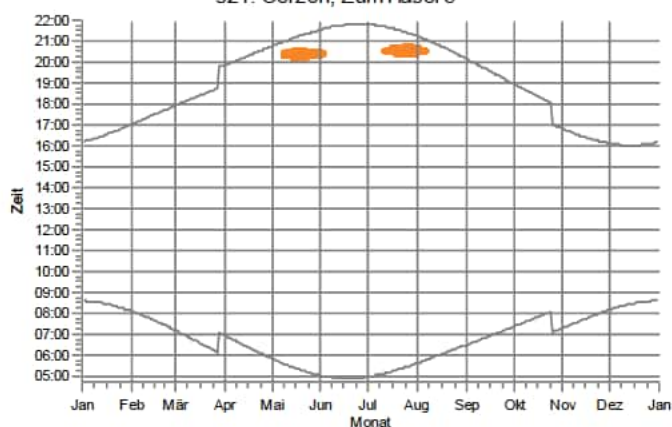
s19: Oerzen, Westerheide 22



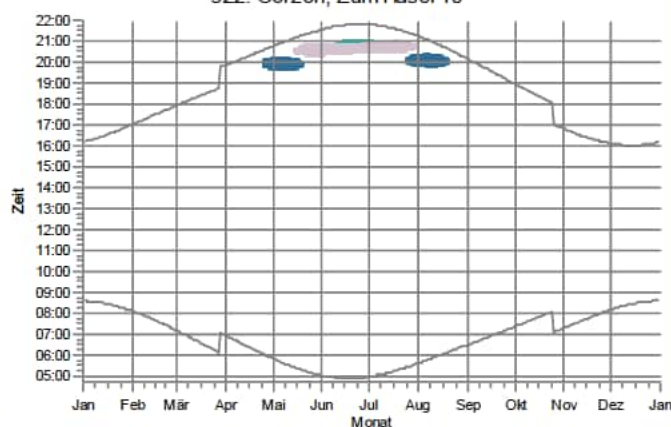
s20: Oerzen, Westerheide 28



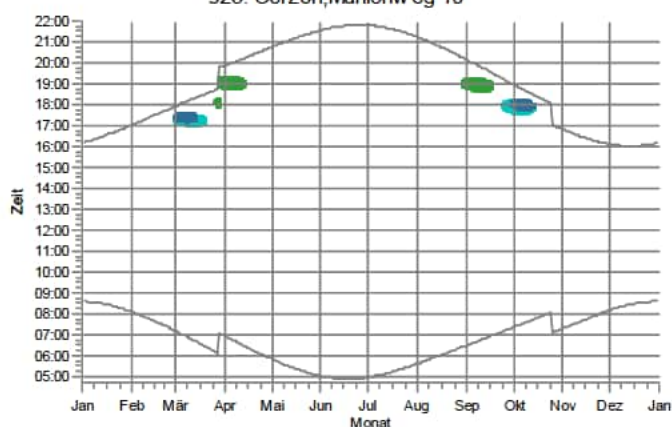
s21: Oerzen, Zum Hasel 5



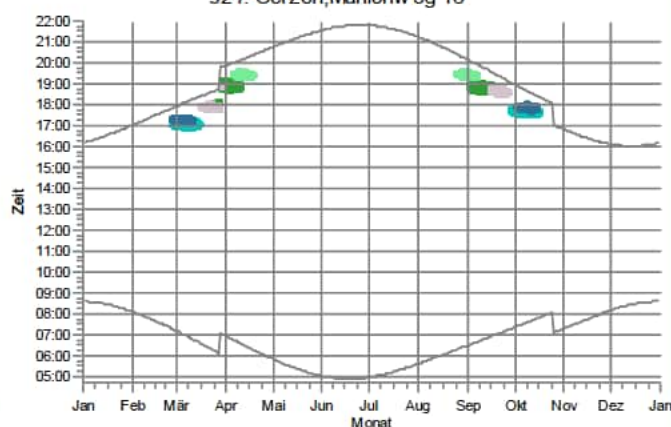
s22: Oerzen, Zum Hasel 10



s23: Oerzen, Mühlenweg 10



s24: Oerzen, Mühlenweg 18



WEA

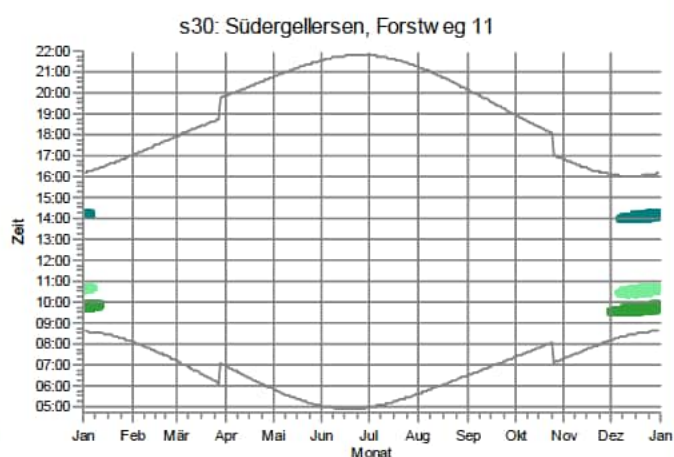
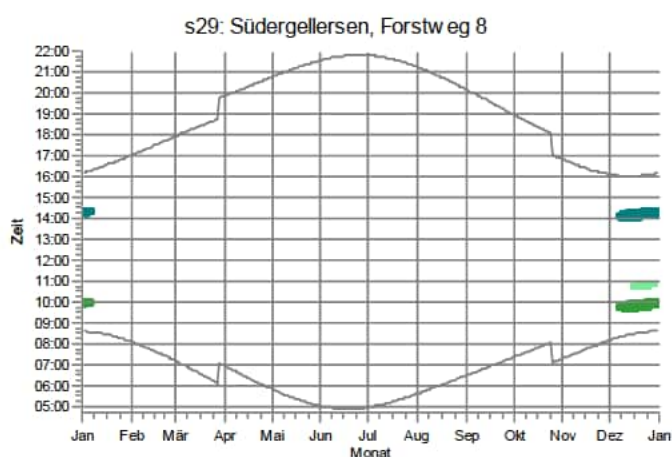
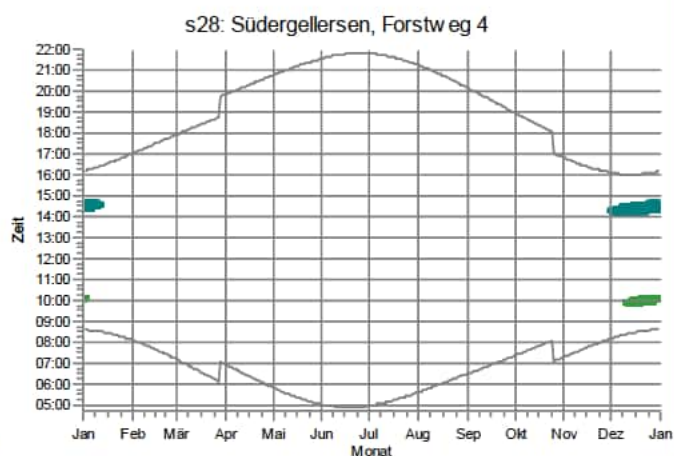
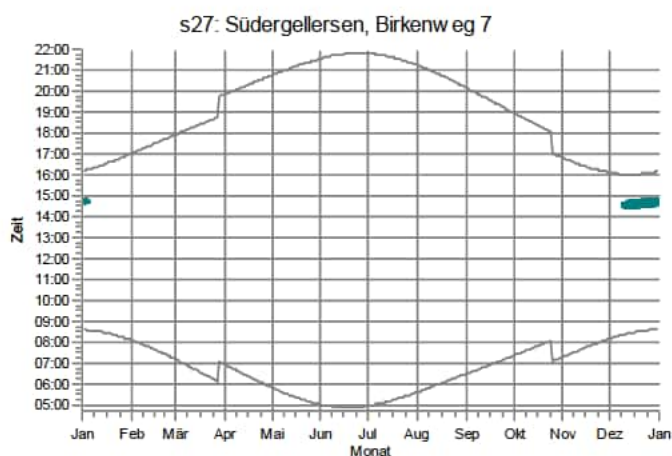
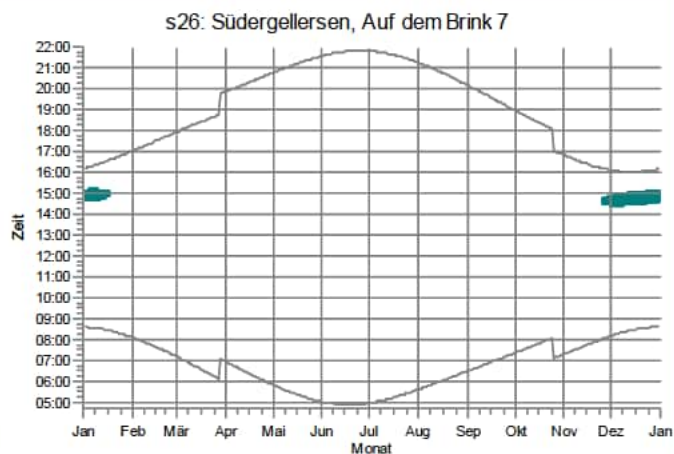
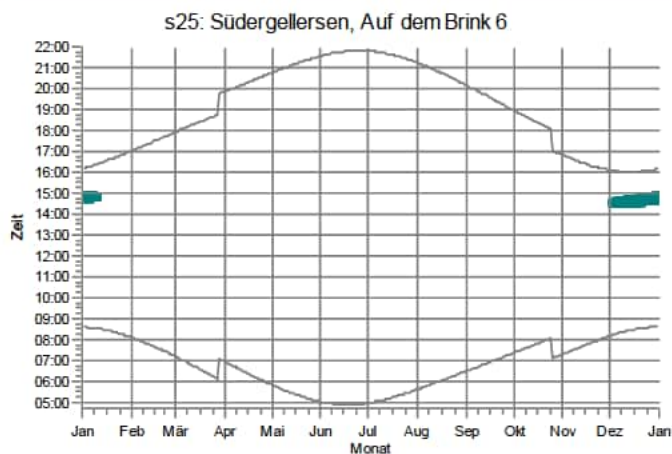
Oerzen 1: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (79)  
 Oerzen 2: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (80)  
 Oerzen 3: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (81)  
 Oerzen 4: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (82)

Rep 10: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (110)  
 Rep 11: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (111)  
 Rep 9: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (109)



## SHADOW - Grafischer Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



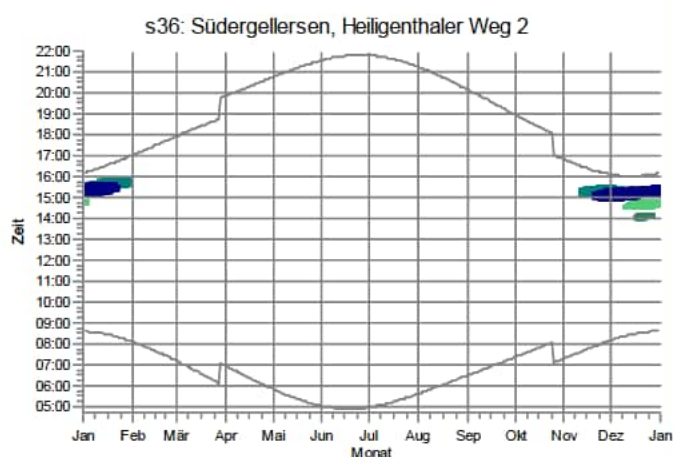
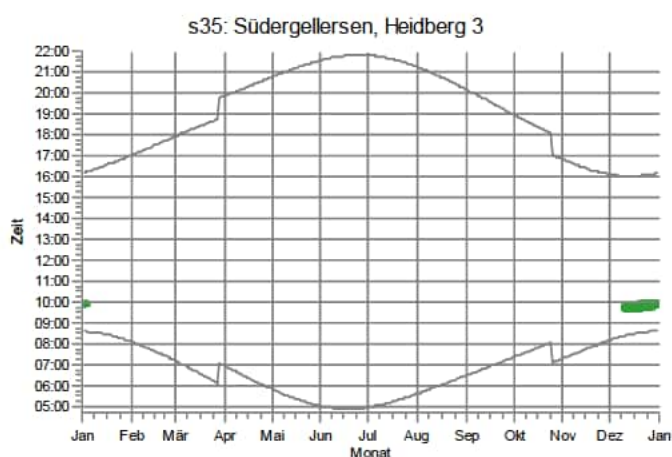
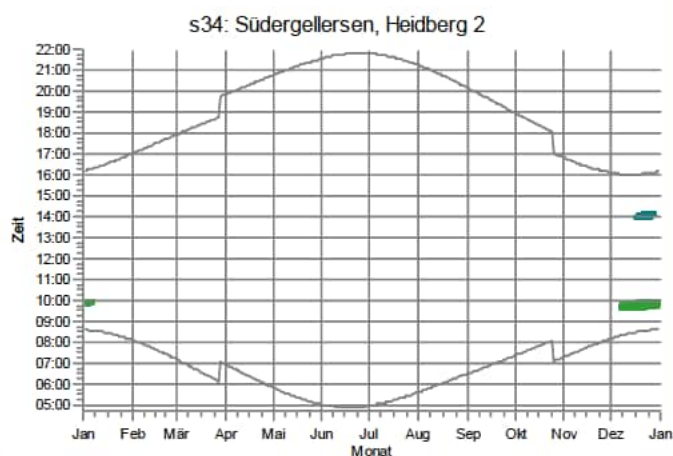
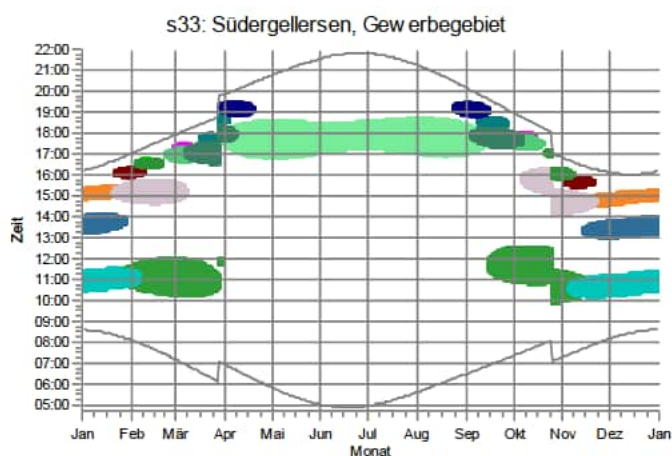
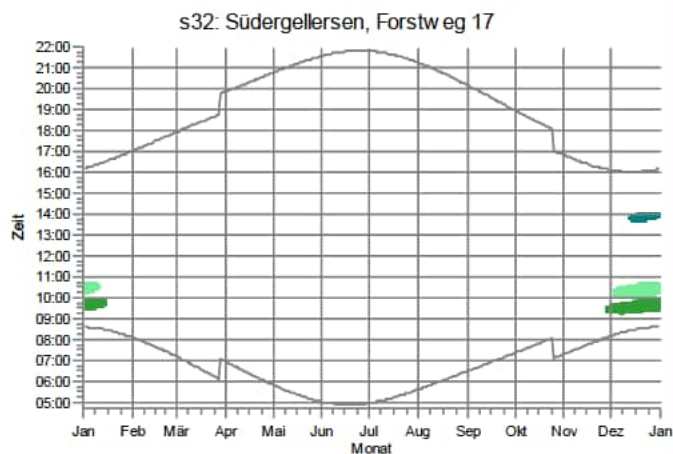
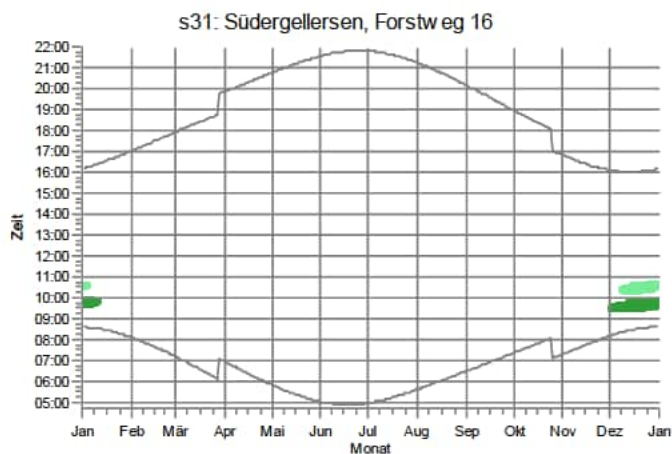
WEA

WEA 7: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (344)  
Oerem 1: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (79)

Rep 11: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (111)

## SHADOW - Grafischer Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



WEA

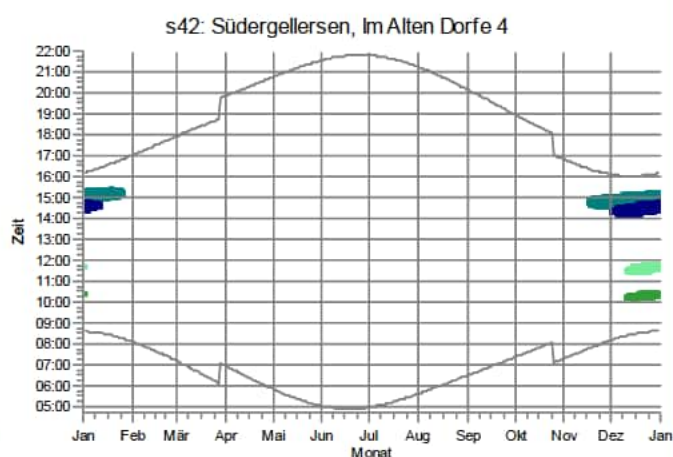
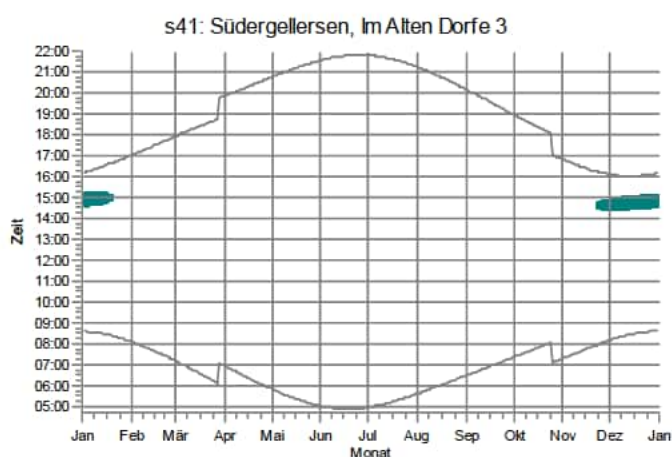
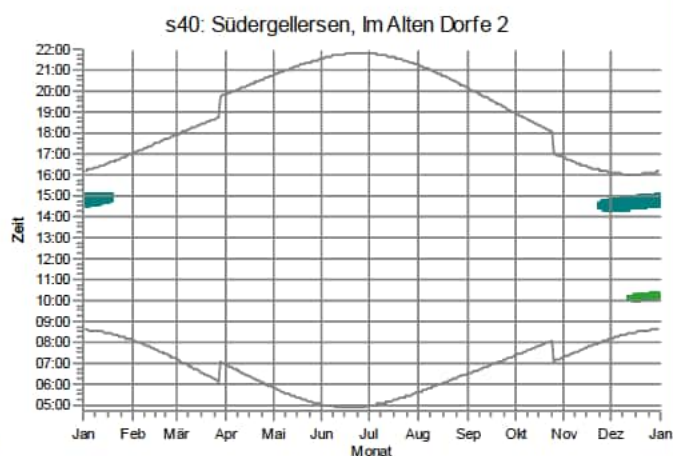
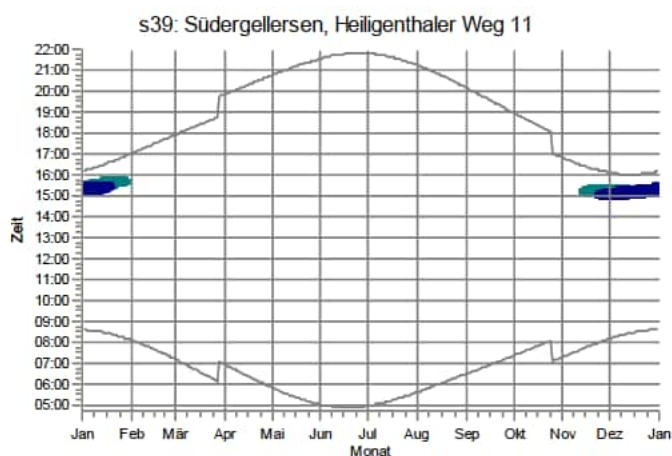
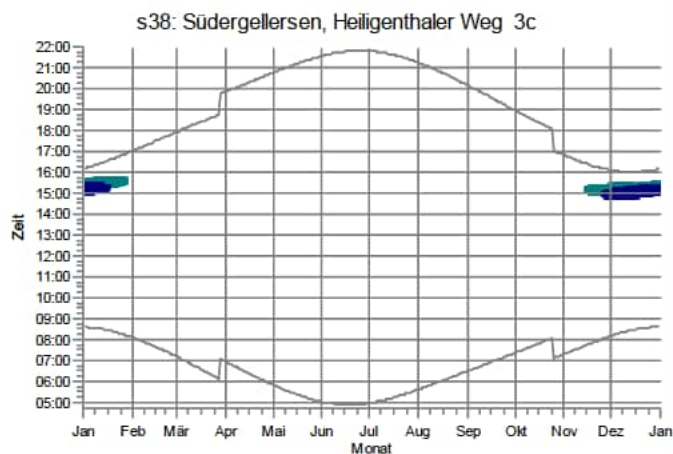
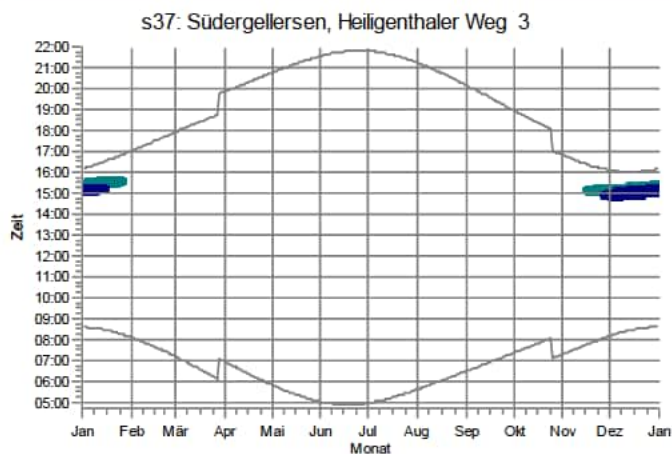
WEA 6: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (343)  
WEA 7: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (344)  
B 01: NORDEX N149/4.0-4.5 4500 149.0 ICH NH: 125.0 m (Ges:199,5 m) (101)  
B 02: NORDEX N131/3300 DE 3300 131.0 I-H NH: 134.0 m (Ges:199,5 m) (120)  
B 03: GE WIND ENERGY GE 275-120 2750 120.0 ICH NH: 139.0 m (Ges:199,0 m) (94)  
Oerzen 1: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (79)  
Oerzen 2: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (80)

Oerzen 3: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (81)  
Oerzen 4: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (82)  
Rep 10: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (110)  
Rep 11: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (111)  
Rep 5: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (107)  
Rep 8: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (108)  
Rep 9: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (109)



## SHADOW - Grafischer Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



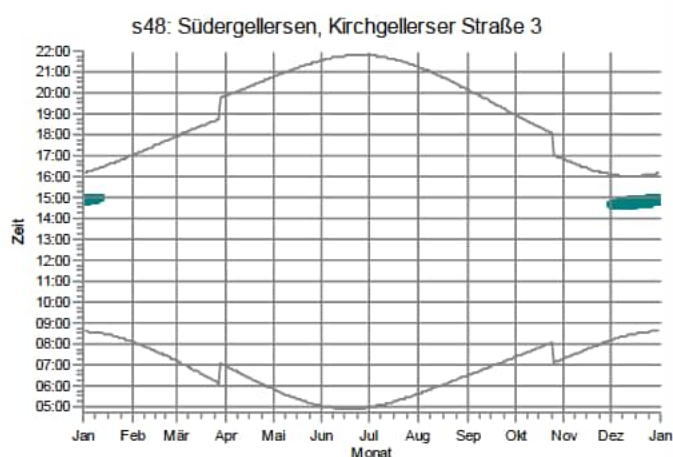
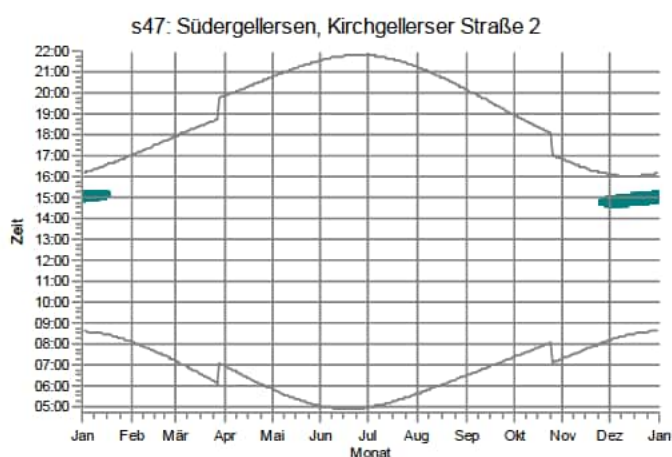
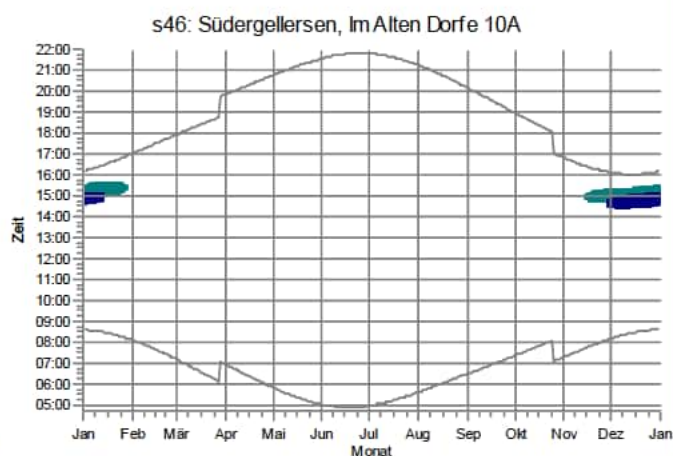
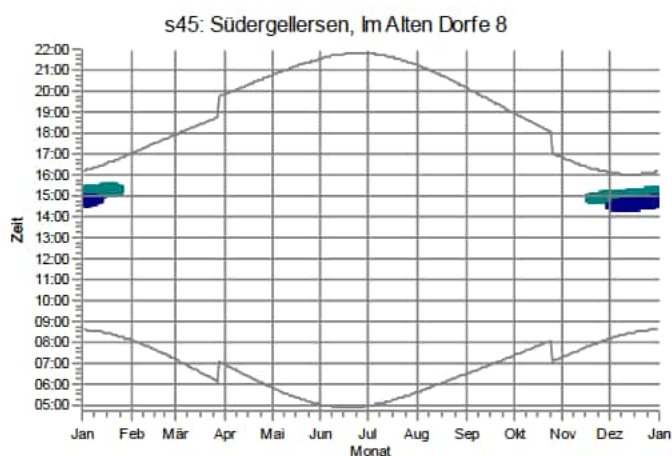
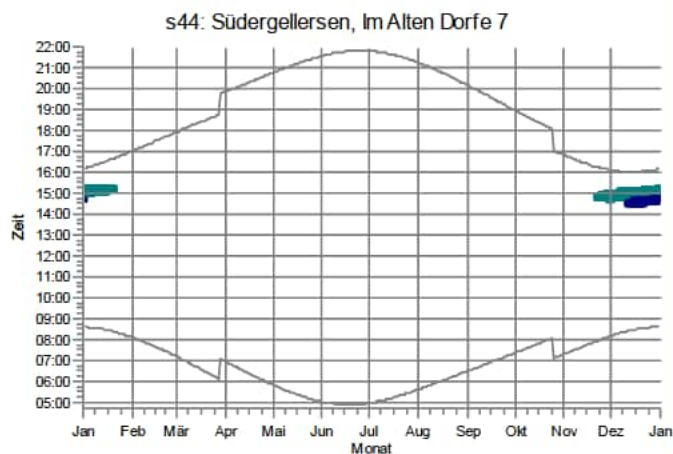
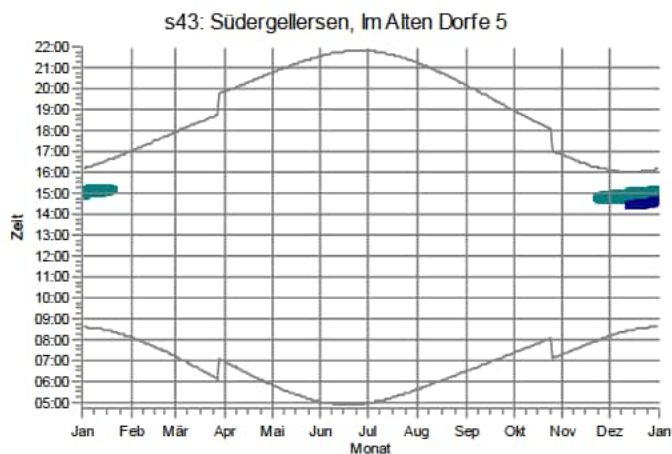
WEA

WEA 6: NORDEX N175/6.X 6800 175,0 I-I NH: 179,0 m (Ges:266,5 m) (343)  
WEA 7: NORDEX N175/6.X 6800 175,0 I-I NH: 179,0 m (Ges:266,5 m) (344)  
B 01: NORDEX N149/4,0-4,5 4500 149,0 ICH NH: 125,0 m (Ges:199,5 m) (101)

Oerzem 1: NORDEX N175/6.X 6800 175,0 I-I NH: 179,0 m (Ges:266,5 m) (79)  
Rep 11: NORDEX N175/6.X 6800 175,0 I-I NH: 179,0 m (Ges:266,5 m) (111)

## SHADOW - Grafischer Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



WEA

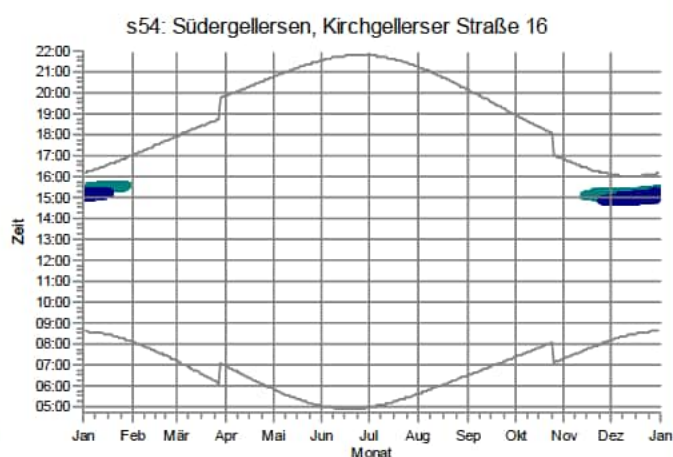
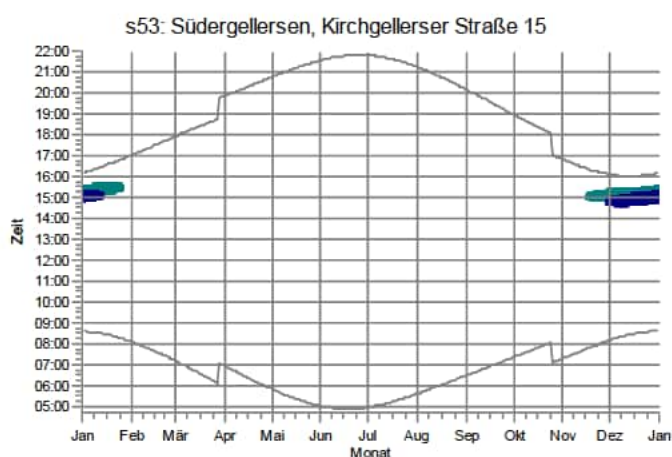
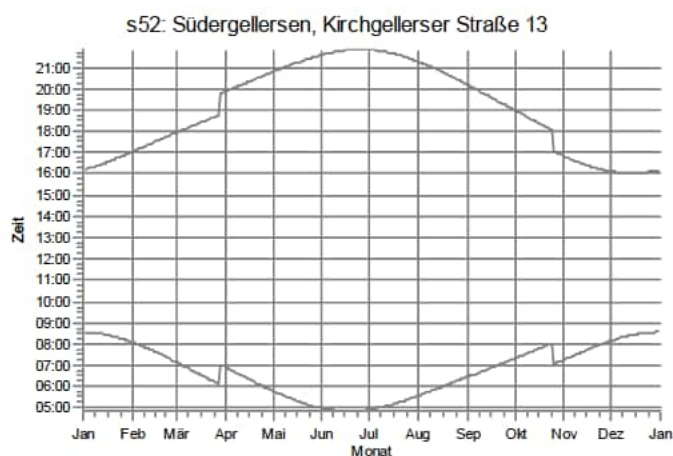
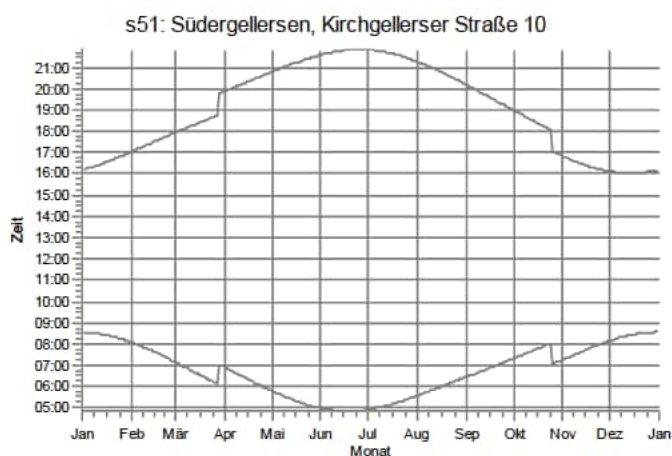
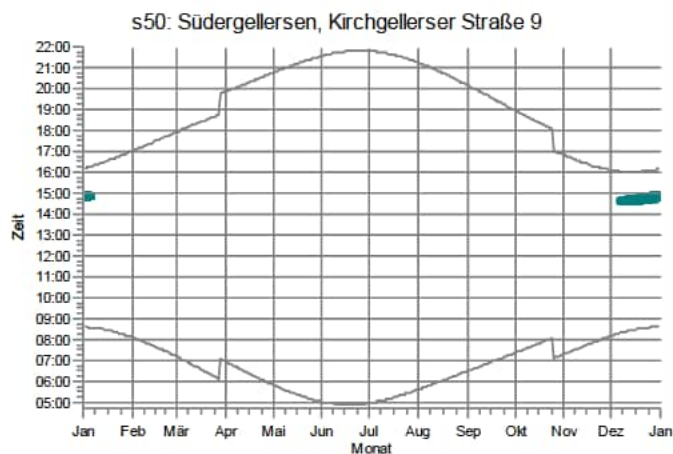
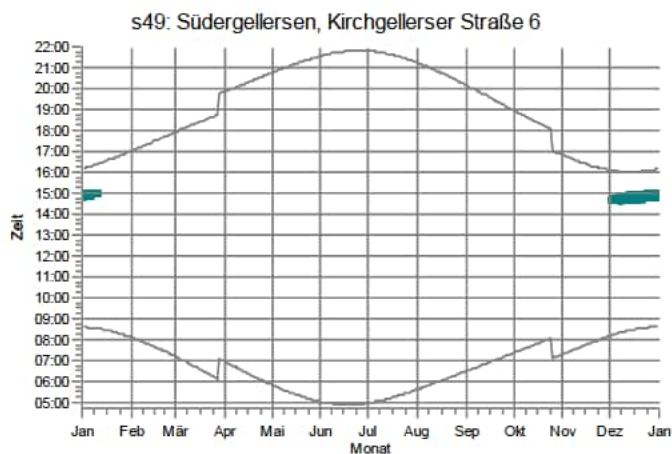
WEA 7: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (344)

B 01: NORDEX N145/4.0-4.5 4500 149.0 ICI NH: 125.0 m (Ges:199,5 m) (101)



## SHADOW - Grafischer Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



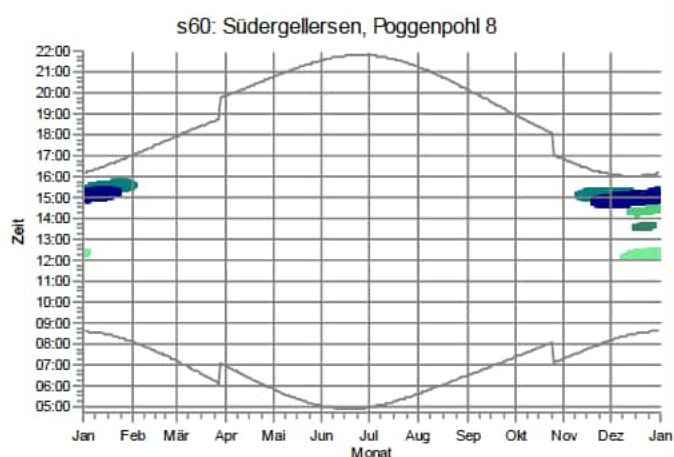
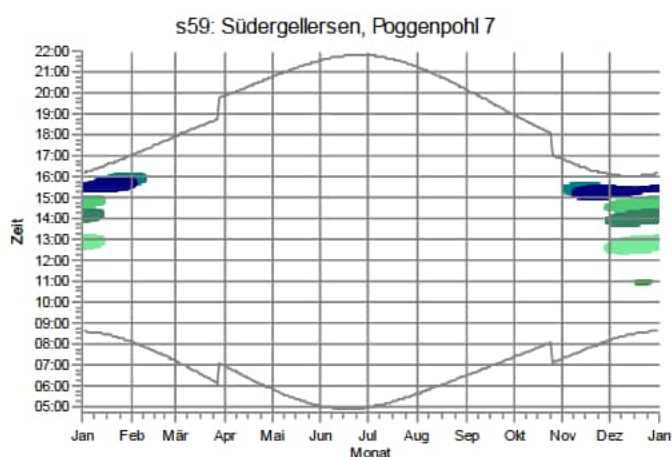
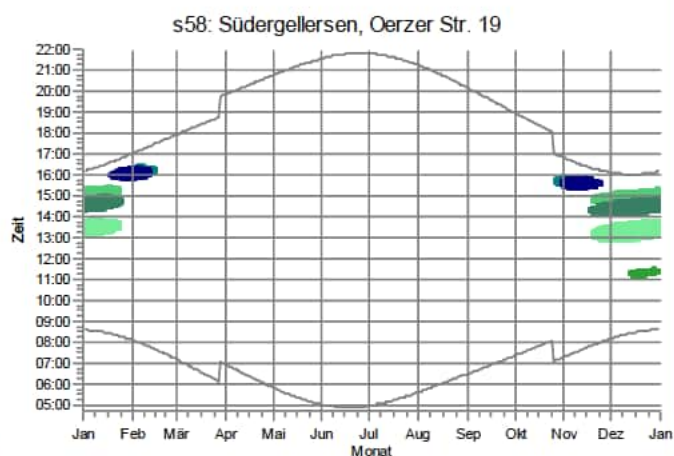
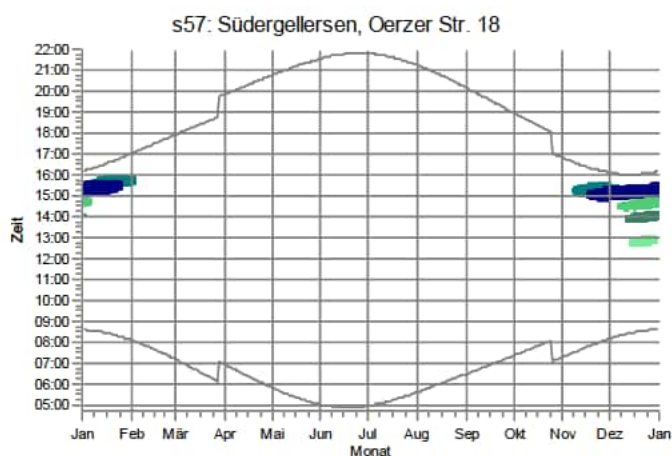
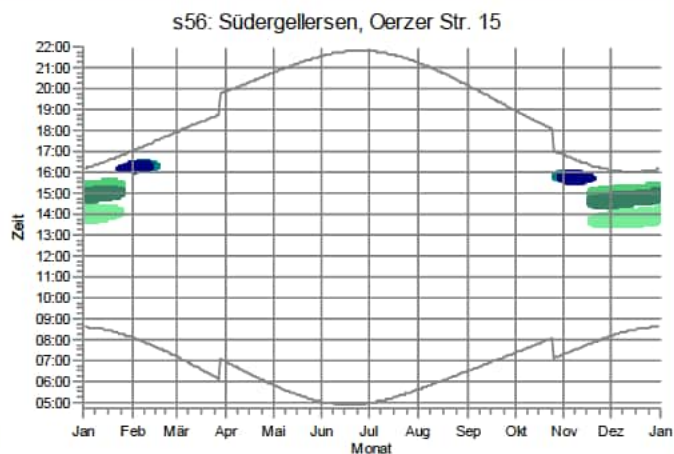
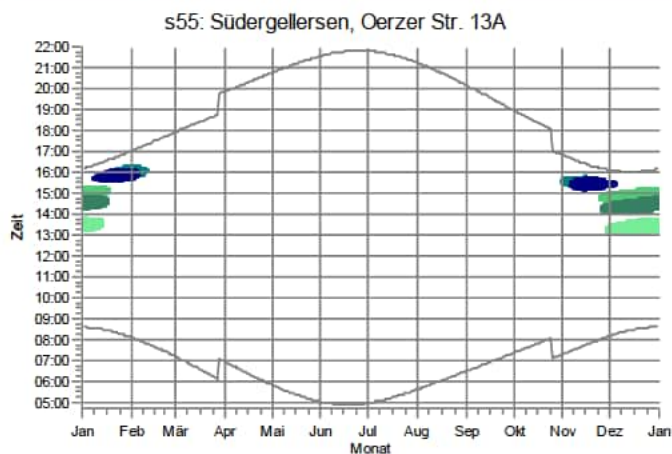
WEA

WEA 7: NORDEX N175/6.X 6800 175.0 t NH: 179.0 m (Ges:266,5 m) (344)

B 01: NORDEX N145/4.0-4.5 4500 149.0 t NH: 125.0 m (Ges:199,5 m) (101)

## SHADOW - Grafischer Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



WEA

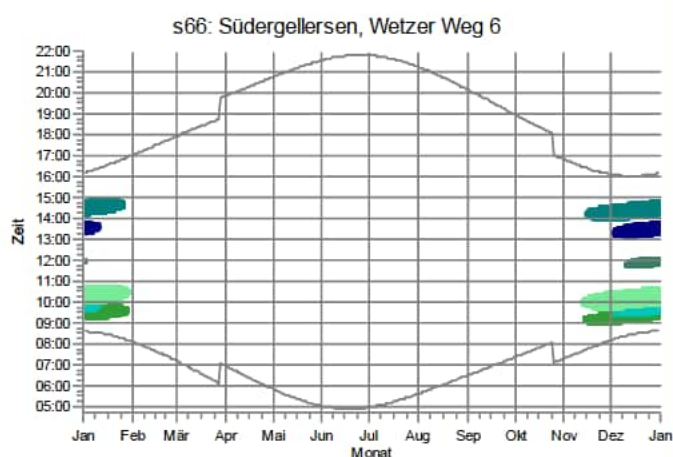
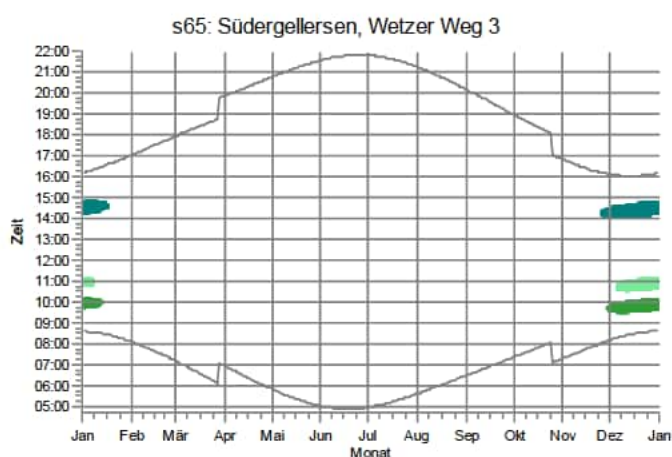
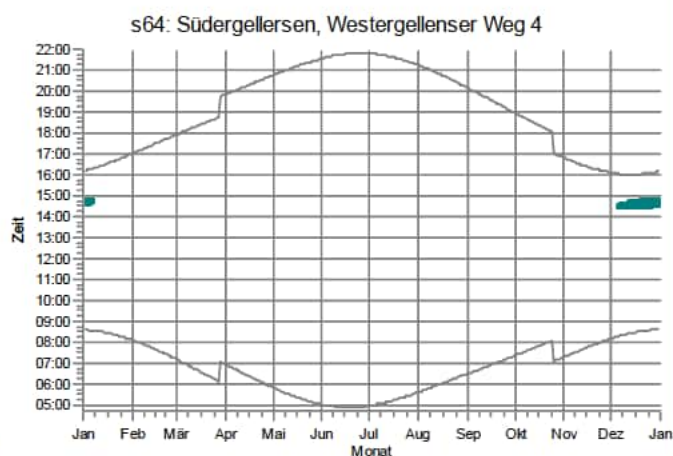
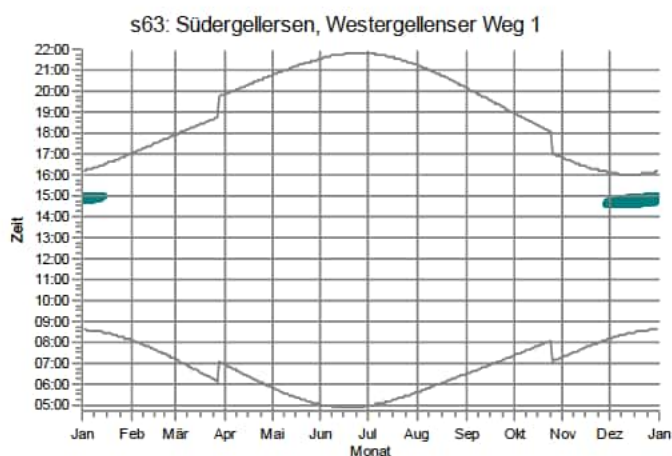
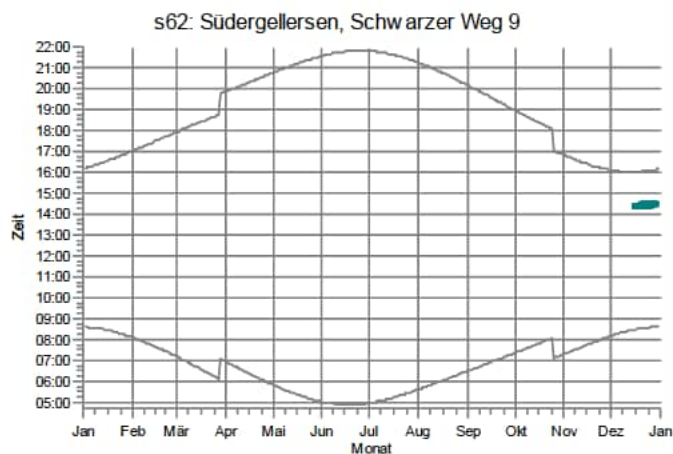
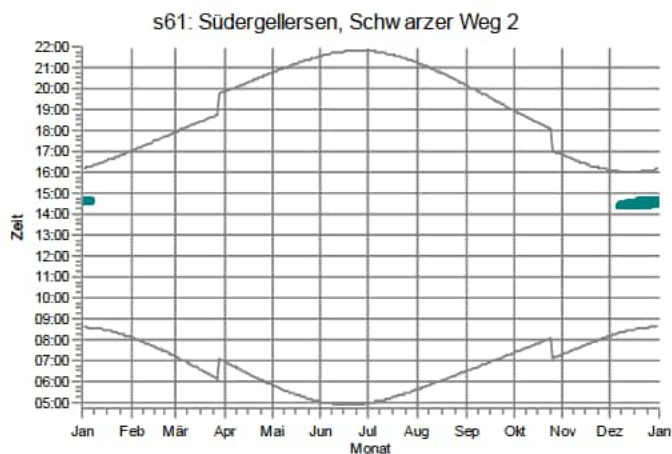
WEA 7: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (344)  
B 01: NORDEX N149/4.0-4.5 4500 149.0 I-H NH: 125.0 m (Ges:199,5 m) (101)  
Oerzen 1: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (79)

Rep 11: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (111)  
Rep 8: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (108)  
Rep 9: NORDEX N175/6.X 6800 175.0 I-H NH: 179.0 m (Ges:266,5 m) (109)



## SHADOW - Grafischer Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



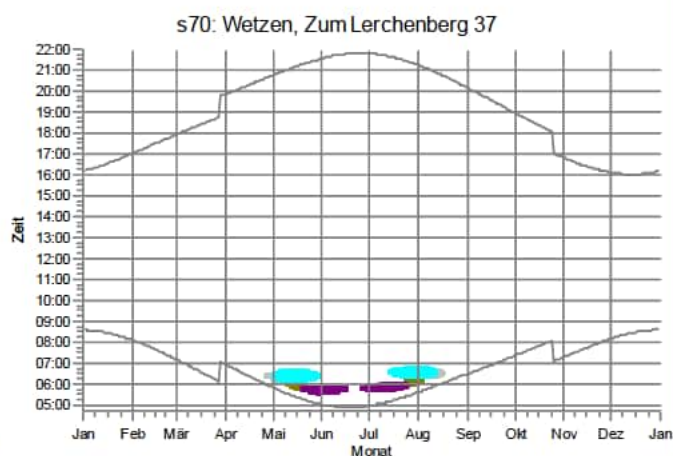
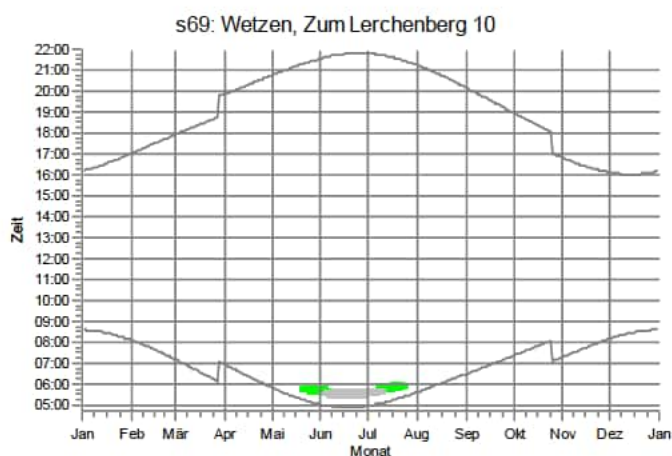
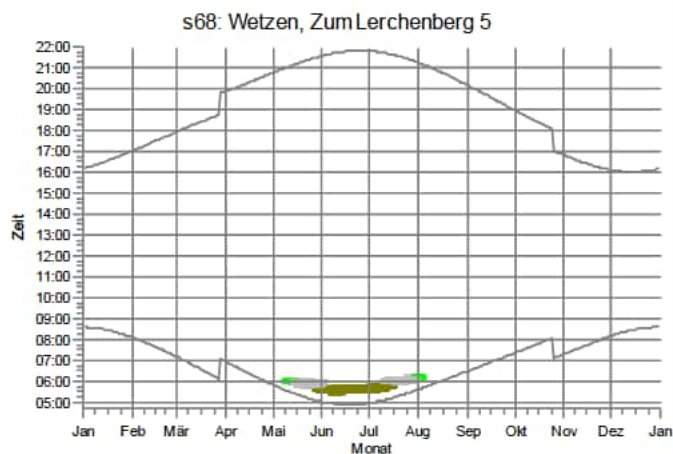
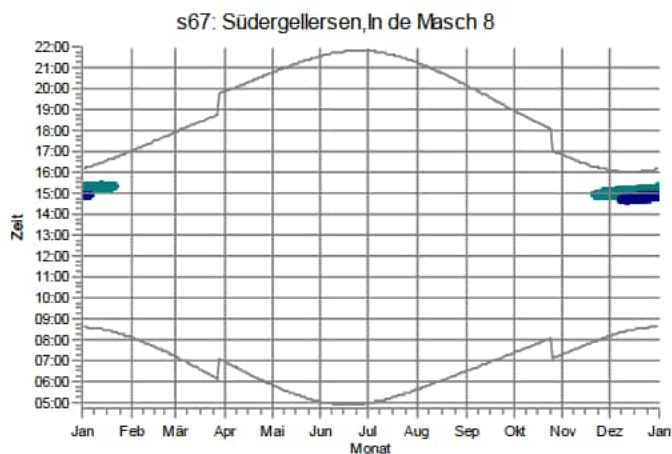
WEA

WEA 6: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (343)  
WEA 7: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (344)  
B 01: NORDEX N149/4.0-4.5 4500 149.0 I-H NH: 125,0 m (Ges:199,5 m) (101)  
Oerzen 1: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (79)

Oerzen 2: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (80)  
Rep 11: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (111)  
Rep 9: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (109)

## SHADOW - Grafischer Kalender

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



WEA

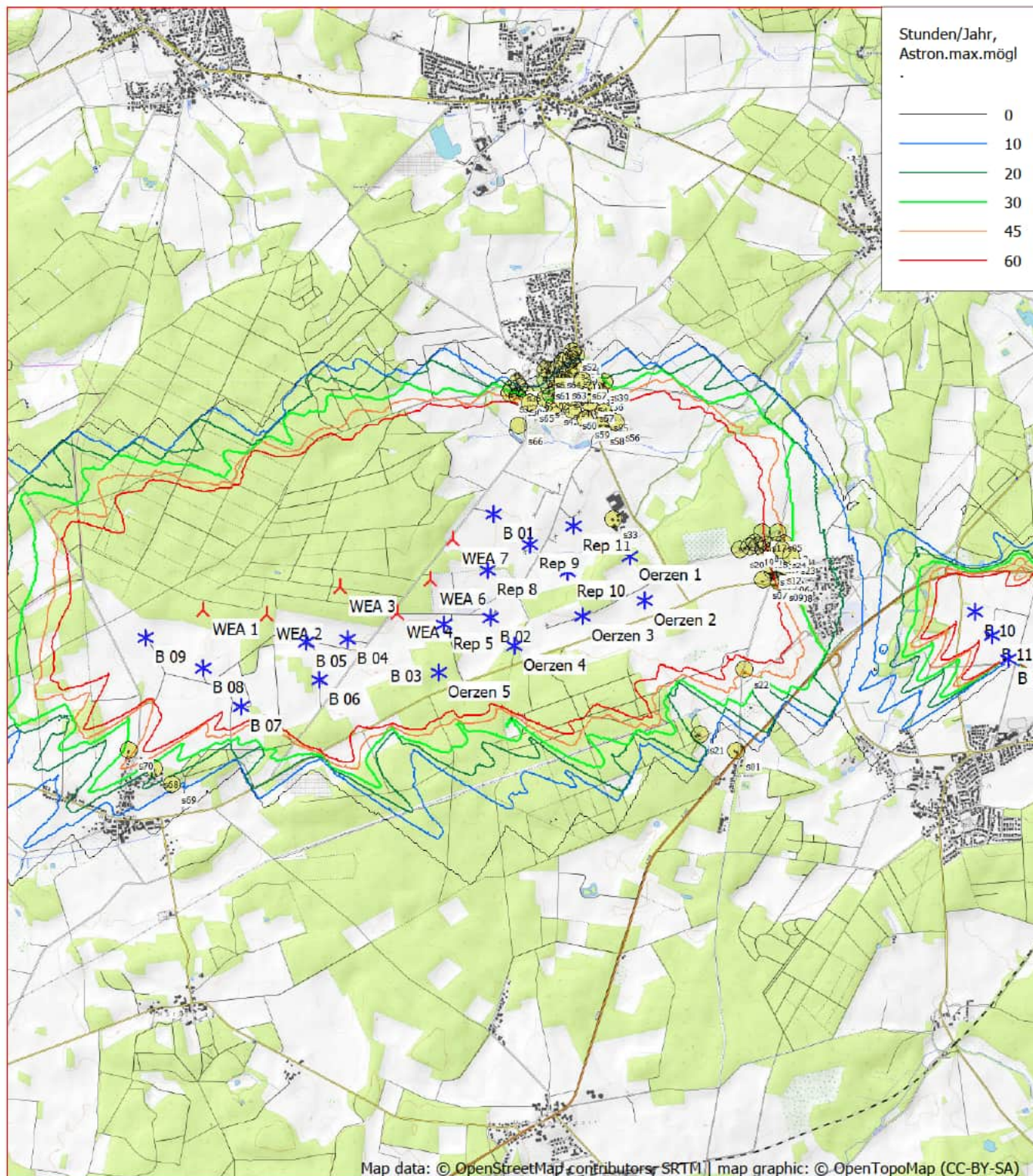
WEA 7: NORDEX N175/6.0X 6800 175.0 I+I NH: 179,0 m (Ges:266,5 m) (344)  
B 01: NORDEX N149/4.0-4.5 4500 149.0 I+I NH: 125,0 m (Ges:199,5 m) (101)  
B 03: GE WIND ENERGY GE 2.75-120 2750 120.0 I+I NH: 139,0 m (Ges:199,0 m) (94)  
B 04: GE WIND ENERGY GE 2.75-120 2750 120.0 I+I NH: 139,0 m (Ges:199,0 m) (95)

B 05: GE WIND ENERGY GE 2.75-120 2750 120.0 I+I NH: 139,0 m (Ges:199,0 m) (96)  
B 06: GE WIND ENERGY GE 2.75-120 2750 120.0 I+I NH: 139,0 m (Ges:199,0 m) (97)  
B 07: GE WIND ENERGY GE 2.75-120 2750 120.0 I+I NH: 139,0 m (Ges:199,0 m) (98)



## SHADOW - Karte

**Berechnung:** Gesamtbelastung 6x N175 +23 Bestand



0 500 1000 1500 2000 m

Karte: OpenTopoMap.org, Maßstab 1:50.000, Mitte: UTM (north)-ETRS89 Zone: 32 Ost: 586.120,0 Nord: 5.894.340,0  
 ⚡ Neue WEA    ⚙ Existierende WEA    📡 Schattenrezeptor  
 Höhe der Schattenkarte: Höhenlinien: CONTOURLINE\_ONLINEDATA\_0.wpo (1)  
 Zeitschritt: 2 Minuten, Schrittweite: 2 Tag(e), Kartenaufösung: 20 m, Sichtbarkeit Auflösung: 5 m, Augenhöhe: 1,5 m

## **Berechnung: Zusatzbelastung 6x N175**

Hauptergebnis	4 Seiten
Grafischer Kalender	12 Seiten
Karte	1 Seite



## SHADOW - Hauptergebnis

**Berechnung:** Zusatzbelastung 6x N175

### Annahmen für Schattenwurfberechnung

Beschattungsbereich der WEA  
Schatten nur relevant, wo Rotorblatt mind. 20% der Sonne verdeckt  
Siehe WEA-Tabelle

Minimale relevante Sonnenhöhe über Horizont 3 °  
Tage zwischen Berechnungen 1 Tag(e)  
Berechnungszeitsprung 1 Minuten

Die dargestellten Zeiten sind die astronomisch maximal mögliche  
Beschattungsdauer, berechnet unter folgenden Annahmen:  
Die Sonne scheint täglich von Sonnenauf- bis -untergang  
Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung  
Die Windenergieanlage/n ist/sind immer in Betrieb

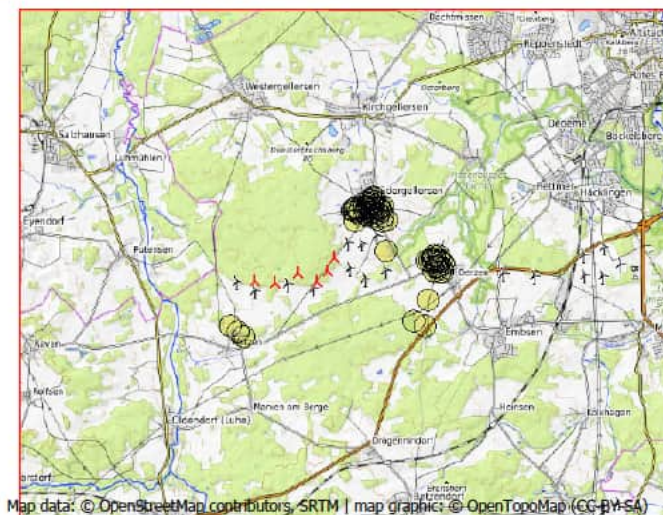
Eine WEA wird nicht berücksichtigt, wenn sie von keinem Teil der  
Rezeptorfläche aus sichtbar ist. Die Sichtbarkeitsberechnung basiert auf  
den folgenden Annahmen:

DHM: Höhenlinien: CONTOURLINE\_ONLINEDATA\_0.wpo (1)  
Rasterauflösung: 1,0 m

Alle Koordinatenangaben in:  
UTM (north)-ETRS89 Zone: 32

### WEA

	Ost	Nord	Z	Beschreibung	WEA-Typ		Nenn- leistung	Rotor- durch- messer	NH	Schattendaten	
					Aktu- ell	Hersteller Typ				Beschatt.- Bereich	U/min
			[m]				[kW]	[m]	[m]	[m]	[U/min]
WEA 1	583.483,3	5.894.212,8	63,6	NORDEX N175/6.X 6800 1...	Ja	NORDEX N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
WEA 2	584.033,5	5.894.180,5	60,0	NORDEX N175/6.X 6800 1...	Ja	NORDEX N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
WEA 3	584.658,9	5.894.431,7	75,0	NORDEX N175/6.X 6800 1...	Ja	NORDEX N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
WEA 4	585.154,3	5.894.214,4	53,9	NORDEX N175/6.X 6800 1...	Ja	NORDEX N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
WEA 6	585.438,2	5.894.508,1	65,0	NORDEX N175/6.X 6800 1...	Ja	NORDEX N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
WEA 7	585.624,4	5.894.865,7	60,0	NORDEX N175/6.X 6800 1...	Ja	NORDEX N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8



Maßstab 1:200.000  
▲ Neue WEA  
● Schattenrezeptor

### Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
				[m]	[m]	[m]	[m]	[°]		[m]
s01	Neu Oerzen, Soltauer Straße 1	588.101,7	5.893.084,2	46,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s02	Oerzen, Am Ohfeld 1	588.404,8	5.894.762,2	45,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s03	Oerzen, Am Ohfeld 4	588.478,4	5.894.877,5	40,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s04	Oerzen, Am Ohfeld 9	588.431,5	5.894.865,5	40,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s05	Oerzen, Am Ohfeld 15	588.429,4	5.894.972,8	43,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s06	Oerzen, Im Dorfe 14	588.496,1	5.894.607,3	48,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s07	Oerzen, Im Dorfe 16	588.303,1	5.894.557,6	47,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s08	Oerzen, Im Dorfe 19	588.526,8	5.894.534,4	50,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s09	Oerzen, Im Dorfe 25	588.443,9	5.894.543,8	50,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s10	Oerzen, Westerheide 1	588.389,1	5.894.636,1	49,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s11	Oerzen, Westerheide 3	588.370,1	5.894.675,9	47,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s12	Oerzen, Westerheide 4	588.427,4	5.894.685,8	48,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s13	Oerzen, Westerheide 5	588.381,0	5.894.813,7	42,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s14	Oerzen, Westerheide 12A	588.325,0	5.894.865,9	42,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s15	Oerzen, Westerheide 12C	588.306,5	5.894.823,7	44,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s16	Oerzen, Westerheide 18	588.256,0	5.894.856,0	45,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s17	Oerzen, Westerheide 19	588.291,4	5.894.974,5	48,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s18	Oerzen, Westerheide 20	588.229,9	5.894.881,8	47,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s19	Oerzen, Westerheide 22	588.185,2	5.894.847,2	46,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s20	Oerzen, Westerheide 28	588.102,7	5.894.825,3	47,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s21	Oerzen, Zum Hasel 5	587.786,3	5.893.215,0	57,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s22	Oerzen, Zum Hasel 10	588.158,0	5.893.781,7	45,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s23	Oerzen, Mühlenweg 10	588.545,4	5.894.776,2	44,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s24	Oerzen, Mühlenweg 18	588.468,7	5.894.823,3	42,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0

(Fortsetzung nächste Seite)...



**SHADOW - Hauptergebnis****Berechnung: Zusatzbelastung 6x N175**

...(Fortsetzung von vorheriger Seite)

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
				[m]	[m]	[m]	[m]	[°]		[m]
s25	Südergellersen, Auf dem Brink 6	586.477,5	5.896.246,7	67,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s26	Südergellersen, Auf dem Brink 7	586.498,2	5.896.189,4	65,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s27	Südergellersen, Birkenweg 7	586.547,8	5.896.410,5	65,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s28	Südergellersen, Forstweg 4	586.302,3	5.896.127,2	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s29	Südergellersen, Forstweg 8	586.230,1	5.896.140,7	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s30	Südergellersen, Forstweg 11	586.166,4	5.896.101,6	63,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s31	Südergellersen, Forstweg 16	586.112,1	5.896.167,0	64,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s32	Südergellersen, Forstweg 17	586.094,1	5.896.128,7	62,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s33	Südergellersen, Gewerbegebiet	587.007,3	5.895.062,8	43,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s34	Südergellersen, Heidberg 2	586.177,4	5.896.183,9	66,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s35	Südergellersen, Heidberg 3	586.154,2	5.896.223,0	66,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s36	Südergellersen, Heilighenthaler Weg 2	586.863,9	5.896.155,5	55,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s37	Südergellersen, Heilighenthaler Weg 3	586.792,8	5.896.190,0	58,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s38	Südergellersen, Heilighenthaler Weg 3c	586.833,1	5.896.217,7	58,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s39	Südergellersen, Heilighenthaler Weg 11	586.911,1	5.896.239,1	52,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s40	Südergellersen, Im Alten Dorfe 2	586.402,6	5.896.082,0	64,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s41	Südergellersen, Im Alten Dorfe 3	586.453,7	5.896.115,5	65,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s42	Südergellersen, Im Alten Dorfe 4	586.480,0	5.896.021,4	61,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s43	Südergellersen, Im Alten Dorfe 5	586.561,2	5.896.156,3	63,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s44	Südergellersen, Im Alten Dorfe 7	586.616,6	5.896.197,1	62,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s45	Südergellersen, Im Alten Dorfe 8	586.561,9	5.896.067,6	60,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s46	Südergellersen, Im Alten Dorfe 10A	586.625,5	5.896.101,5	60,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s47	Südergellersen, Kirchgellerser Straße 2	586.638,0	5.896.277,9	62,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s48	Südergellersen, Kirchgellerser Straße 3	586.594,8	5.896.327,3	63,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s49	Südergellersen, Kirchgellerser Straße 6	586.637,2	5.896.375,2	63,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s50	Südergellersen, Kirchgellerser Straße 9	586.617,5	5.896.432,1	64,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s51	Südergellersen, Kirchgellerser Straße 10	586.660,0	5.896.465,5	63,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s52	Südergellersen, Kirchgellerser Straße 13	586.632,2	5.896.499,1	64,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s53	Südergellersen, Kirchgellerser Straße 15	586.747,3	5.896.191,6	60,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s54	Südergellersen, Kirchgellerser Straße 16	586.731,0	5.896.121,0	59,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s55	Südergellersen, Oerzer Str. 13A	586.909,5	5.895.981,7	53,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s56	Südergellersen, Oerzer Str. 15	587.010,6	5.895.899,8	50,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s57	Südergellersen, Oerzer Str. 18	586.781,3	5.896.062,2	56,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s58	Südergellersen, Oerzer Str. 19	586.879,7	5.895.864,2	49,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s59	Südergellersen, Poggenpohl 7	586.751,1	5.895.922,0	55,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s60	Südergellersen, Poggenpohl 8	586.640,6	5.895.995,8	58,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s61	Südergellersen, Schwarzer Weg 2	586.403,0	5.896.246,5	71,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s62	Südergellersen, Schwarzer Weg 9	586.404,8	5.896.338,8	69,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s63	Südergellersen, Westergellerser Weg 1	586.545,3	5.896.256,4	63,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s64	Südergellersen, Westergellerser Weg 4	586.498,9	5.896.338,8	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s65	Südergellersen, Wetzter Weg 3	586.268,4	5.896.052,0	63,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s66	Südergellersen, Wetzter Weg 6	586.172,4	5.895.854,5	57,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s67	Südergellersen, In den Masch 8	586.717,4	5.896.250,8	61,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s68	Wetzen, Zum Lerchenberg 5	583.085,3	5.892.839,1	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s69	Wetzen, Zum Lerchenberg 10	583.242,4	5.892.711,0	60,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s70	Wetzen, Zum Lerchenberg 37	582.866,7	5.892.994,9	69,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0

**Berechnungsergebnisse**

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer		
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag
		[h/a]	[d/a]	[h/d]
s01	Neu Oerzen, Soltauer Straße 1	0:00	0	0:00
s02	Oerzen, Am Ohfeld 1	0:00	0	0:00
s03	Oerzen, Am Ohfeld 4	0:00	0	0:00
s04	Oerzen, Am Ohfeld 9	0:00	0	0:00
s05	Oerzen, Am Ohfeld 15	0:00	0	0:00
s06	Oerzen, Im Dorfe 14	0:00	0	0:00
s07	Oerzen, Im Dorfe 16	0:00	0	0:00
s08	Oerzen, Im Dorfe 19	0:00	0	0:00
s09	Oerzen, Im Dorfe 25	0:00	0	0:00

(Fortsetzung nächste Seite)...



**SHADOW - Hauptergebnis****Berechnung: Zusatzbelastung 6x N175**

...(Fortsetzung von vorheriger Seite)

Nr.	Name	astron. max. mögl. Beschattungsdauer		
		Stunden/Jahr [h/a]	Schattentage/Jahr [d/a]	Max.Schattendauer/Tag [h/d]
s10	Oerzen, Westerheide 1	0:00	0	0:00
s11	Oerzen, Westerheide 3	0:00	0	0:00
s12	Oerzen, Westerheide 4	0:00	0	0:00
s13	Oerzen, Westerheide 5	0:00	0	0:00
s14	Oerzen, Westerheide 12A	0:00	0	0:00
s15	Oerzen, Westerheide 12C	0:00	0	0:00
s16	Oerzen, Westerheide 18	0:00	0	0:00
s17	Oerzen, Westerheide 19	0:00	0	0:00
s18	Oerzen, Westerheide 20	0:00	0	0:00
s19	Oerzen, Westerheide 22	0:00	0	0:00
s20	Oerzen, Westerheide 28	0:00	0	0:00
s21	Oerzen, Zum Hasel 5	0:00	0	0:00
s22	Oerzen, Zum Hasel 10	0:00	0	0:00
s23	Oerzen, Mühlenweg 10	0:00	0	0:00
s24	Oerzen, Mühlenweg 18	0:00	0	0:00
s25	Südergellersen, Auf dem Brink 6	14:25	42	0:25
s26	Südergellersen, Auf dem Brink 7	20:07	52	0:27
s27	Südergellersen, Birkenweg 7	5:54	27	0:16
s28	Südergellersen, Forstweg 4	15:57	44	0:27
s29	Südergellersen, Forstweg 8	10:06	34	0:23
s30	Südergellersen, Forstweg 11	10:38	34	0:24
s31	Südergellersen, Forstweg 16	0:00	0	0:00
s32	Südergellersen, Forstweg 17	3:16	18	0:14
s33	Südergellersen, Gewerbegebiet	23:09	67	0:29
s34	Südergellersen, Heidberg 2	1:40	13	0:10
s35	Südergellersen, Heidberg 3	0:00	0	0:00
s36	Südergellersen, Heilighaler Weg 2	16:50	56	0:24
s37	Südergellersen, Heilighaler Weg 3	23:25	74	0:24
s38	Südergellersen, Heilighaler Weg 3c	21:54	74	0:24
s39	Südergellersen, Heilighaler Weg 11	16:36	59	0:23
s40	Südergellersen, Im Alten Dorfe 2	25:15	58	0:30
s41	Südergellersen, Im Alten Dorfe 3	24:17	58	0:29
s42	Südergellersen, Im Alten Dorfe 4	33:19	72	0:31
s43	Südergellersen, Im Alten Dorfe 5	25:08	62	0:28
s44	Südergellersen, Im Alten Dorfe 7	24:00	62	0:26
s45	Südergellersen, Im Alten Dorfe 8	29:51	72	0:29
s46	Südergellersen, Im Alten Dorfe 10A	28:29	74	0:27
s47	Südergellersen, Kirchgellerser Straße 2	19:43	54	0:26
s48	Südergellersen, Kirchgellerser Straße 3	14:35	44	0:24
s49	Südergellersen, Kirchgellerser Straße 6	13:11	42	0:23
s50	Südergellersen, Kirchgellerser Straße 9	8:16	32	0:19
s51	Südergellersen, Kirchgellerser Straße 10	0:00	0	0:00
s52	Südergellersen, Kirchgellerser Straße 13	0:00	0	0:00
s53	Südergellersen, Kirchgellerser Straße 15	24:52	72	0:25
s54	Südergellersen, Kirchgellerser Straße 16	25:09	78	0:26
s55	Südergellersen, Oerzer Str. 13A	13:33	44	0:24
s56	Südergellersen, Oerzer Str. 15	11:35	38	0:24
s57	Südergellersen, Oerzer Str. 18	18:15	57	0:26
s58	Südergellersen, Oerzer Str. 19	13:44	40	0:26
s59	Südergellersen, Poggenpohl 7	17:27	50	0:28
s60	Südergellersen, Poggenpohl 8	24:42	72	0:28
s61	Südergellersen, Schwarzer Weg 2	9:11	33	0:21
s62	Südergellersen, Schwarzer Weg 9	1:57	15	0:10
s63	Südergellersen, Westergellerser Weg 1	17:34	50	0:26
s64	Südergellersen, Westergellerser Weg 4	8:43	32	0:20
s65	Südergellersen, Wetzter Weg 3	22:07	52	0:31
s66	Südergellersen, Wetzter Weg 6	40:57	73	0:38
s67	Südergellersen, In de Masch 8	23:04	64	0:25
s68	Wetzen, Zum Lerchenberg 5	0:00	0	0:00
s69	Wetzen, Zum Lerchenberg 10	0:00	0	0:00
s70	Wetzen, Zum Lerchenberg 37	0:00	0	0:00

**SHADOW - Hauptergebnis****Berechnung: Zusatzbelastung 6x N175**

Gesamtdauer Beschattung an Rezeptoren pro WEA

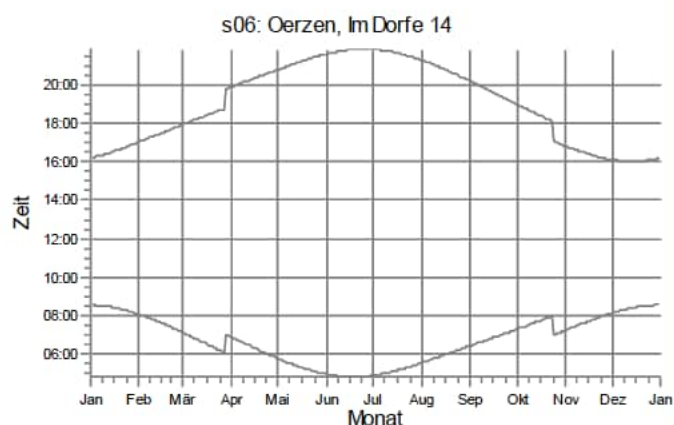
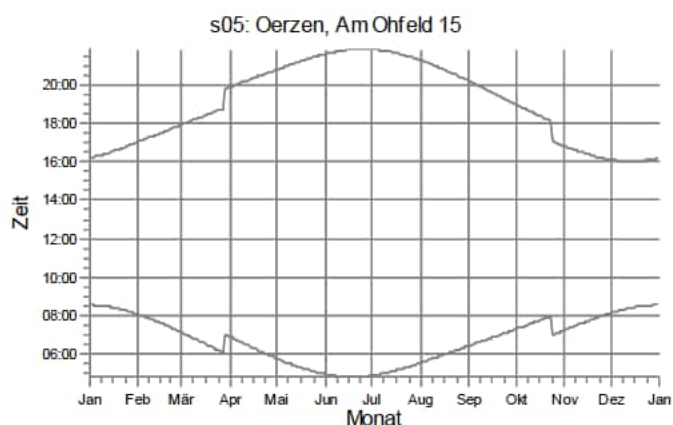
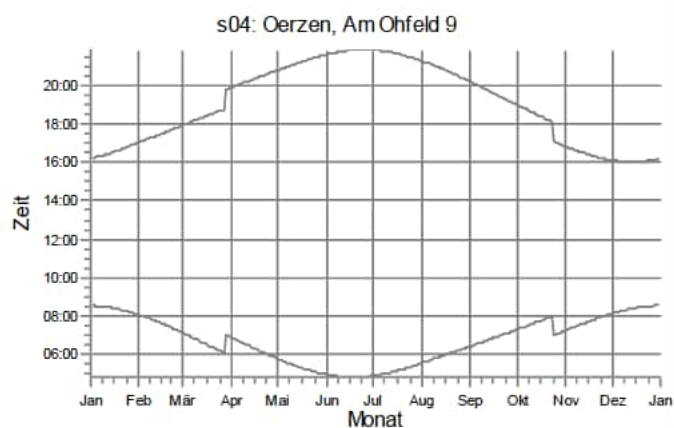
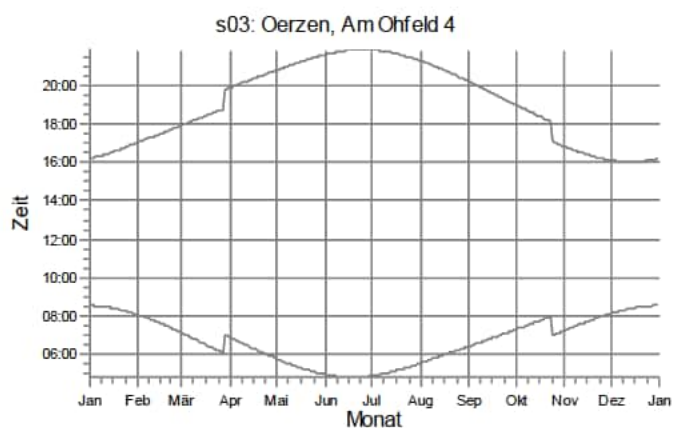
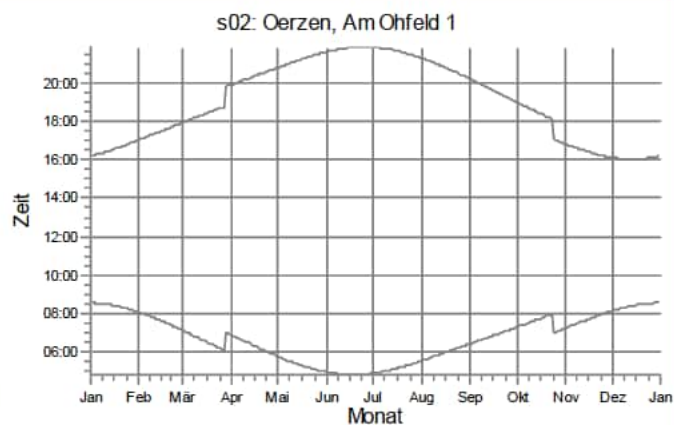
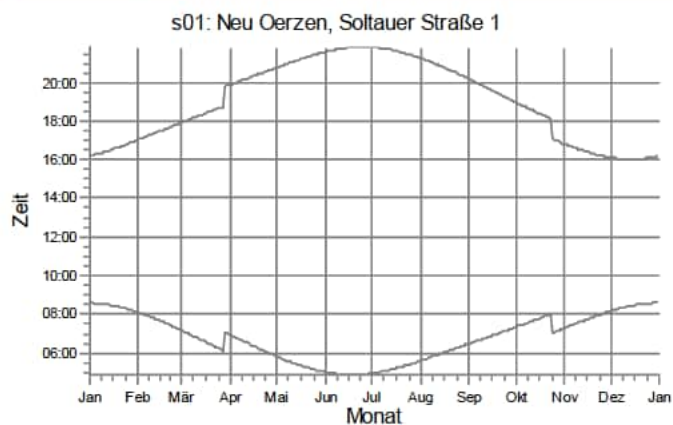
Nr.	Name	Maximal [h/a]
WEA 1	NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (339)	0:00
WEA 2	NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (340)	0:00
WEA 3	NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (341)	0:00
WEA 4	NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (342)	0:00
WEA 6	NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (343)	41:08
WEA 7	NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (344)	154:37

Summen in Rezeptortabelle und WEA-Tabelle können sich unterscheiden, da eine WEA gleichzeitig an zwei oder mehr Rezeptoren Beschattung verursachen kann und/oder ein Rezeptor gleichzeitig von zwei oder mehr WEA beschattet werden kann.



## SHADOW - Grafischer Kalender

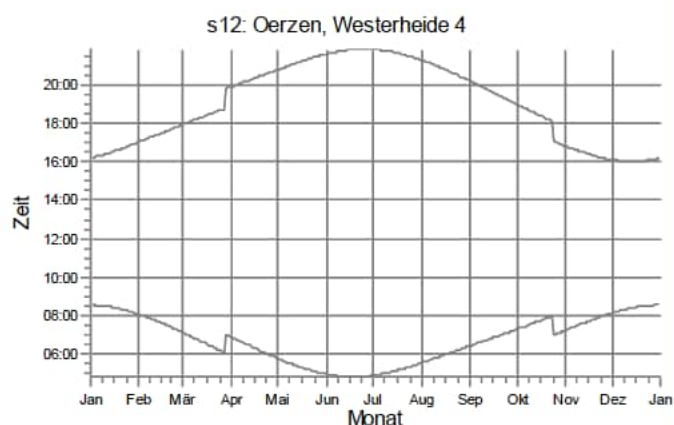
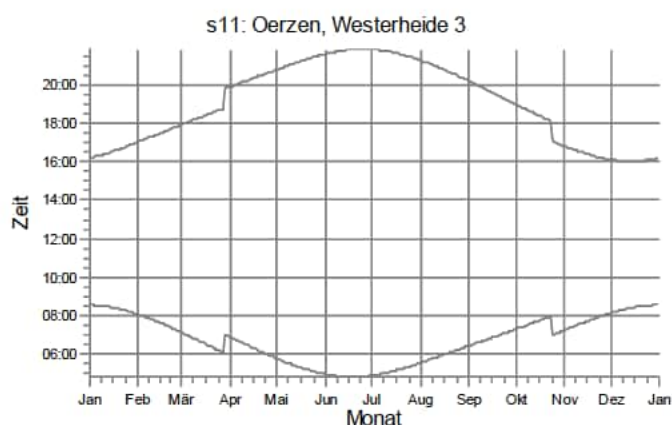
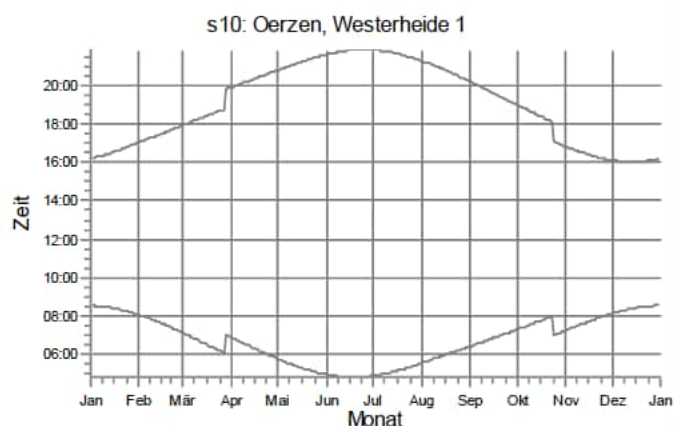
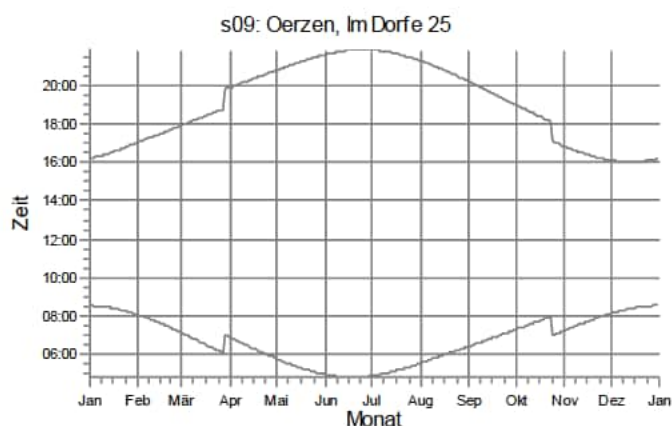
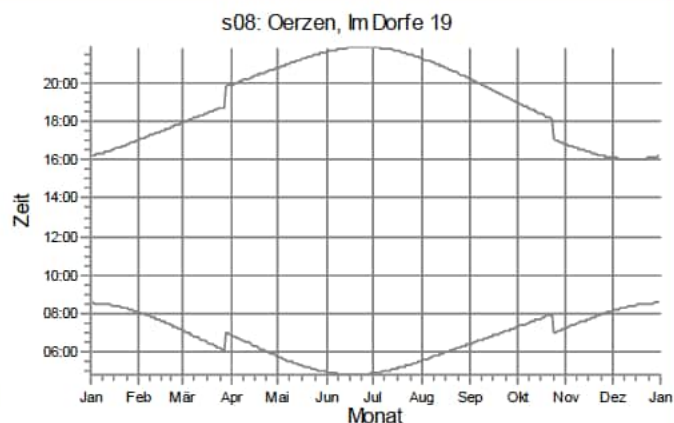
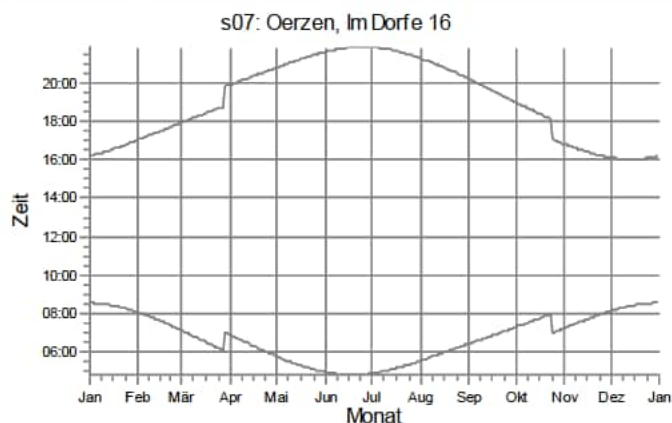
**Berechnung:** Zusatzbelastung 6x N175



WEA

## SHADOW - Grafischer Kalender

Berechnung: Zusatzbelastung 6x N175



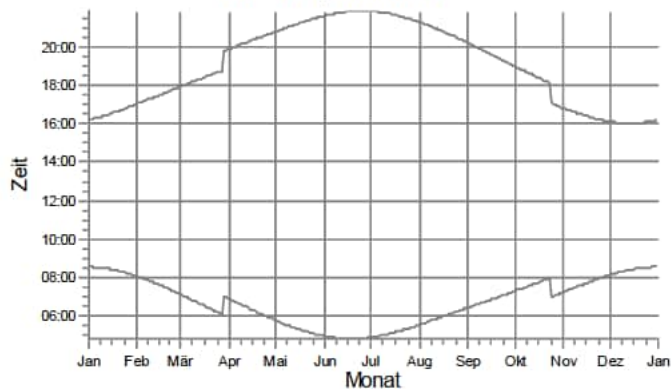
WEA



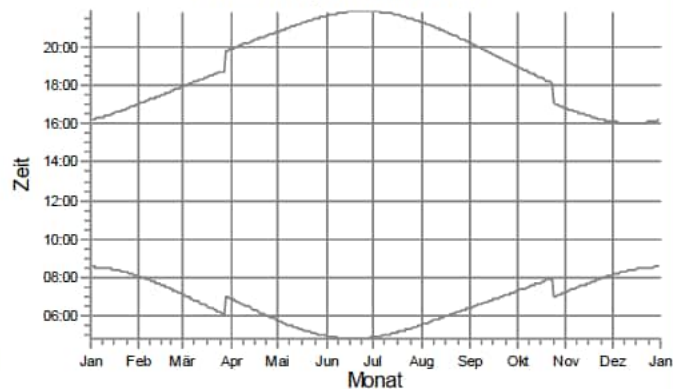
## SHADOW - Grafischer Kalender

Berechnung: Zusatzbelastung 6x N175

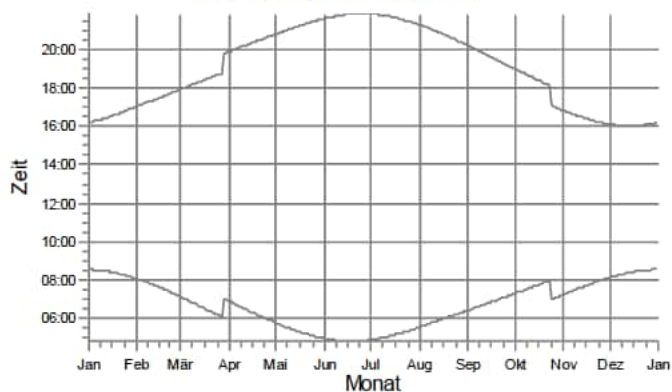
s13: Oerzen, Westerheide 5



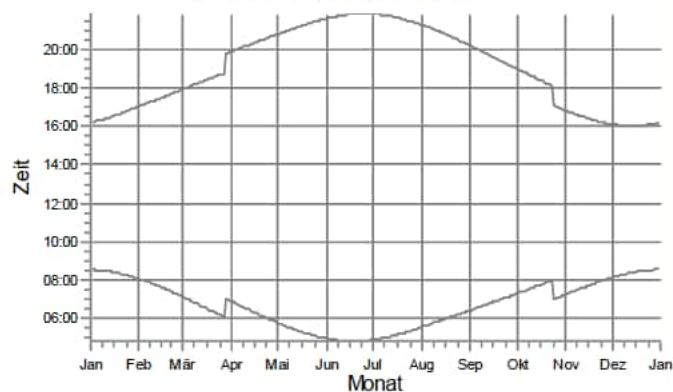
s14: Oerzen, Westerheide 12A



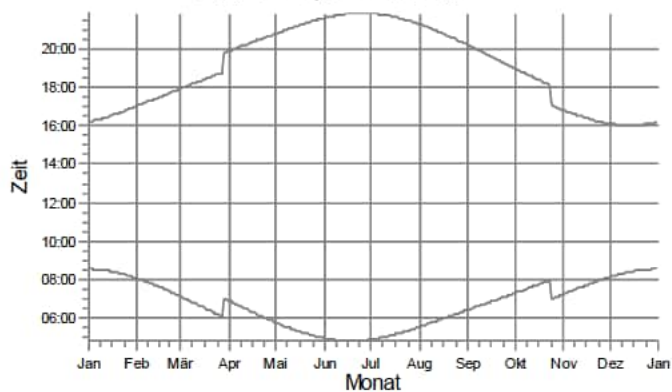
s15: Oerzen, Westerheide 12C



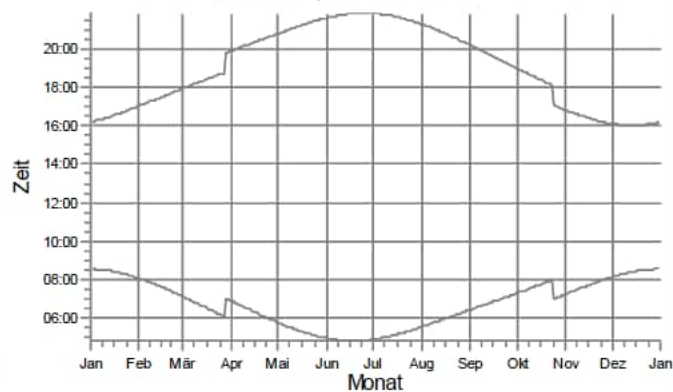
s16: Oerzen, Westerheide 18



s17: Oerzen, Westerheide 19



s18: Oerzen, Westerheide 20

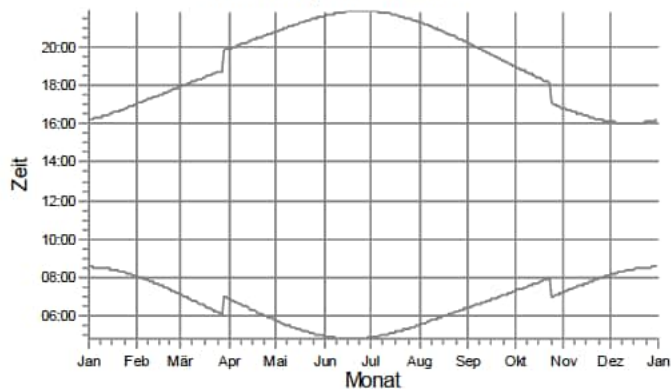


WEA

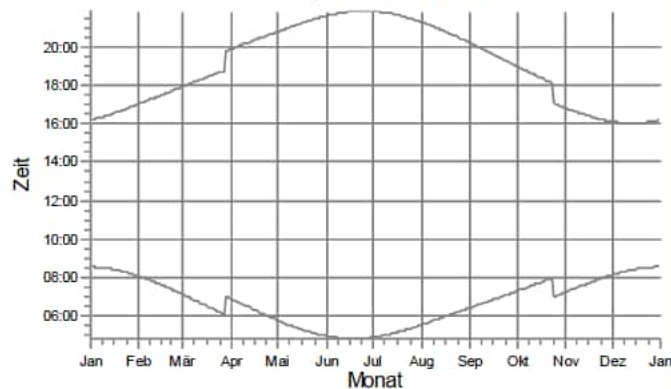
## SHADOW - Grafischer Kalender

Berechnung: Zusatzbelastung 6x N175

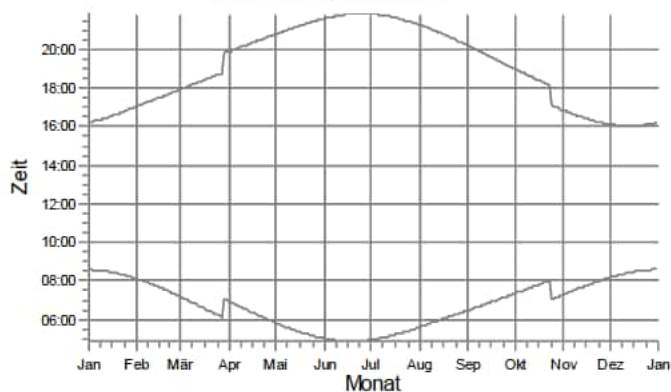
s19: Oerzen, Westerheide 22



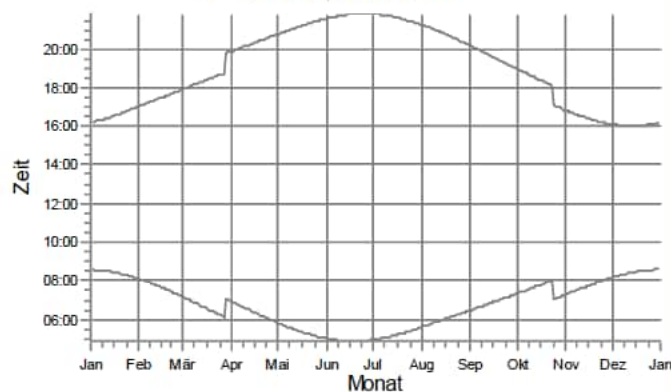
s20: Oerzen, Westerheide 28



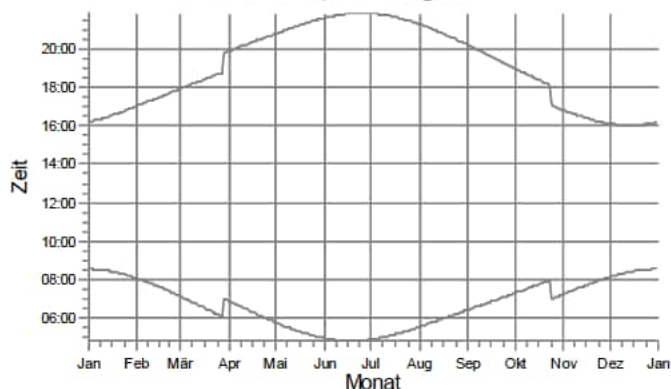
s21: Oerzen, Zum Hasel 5



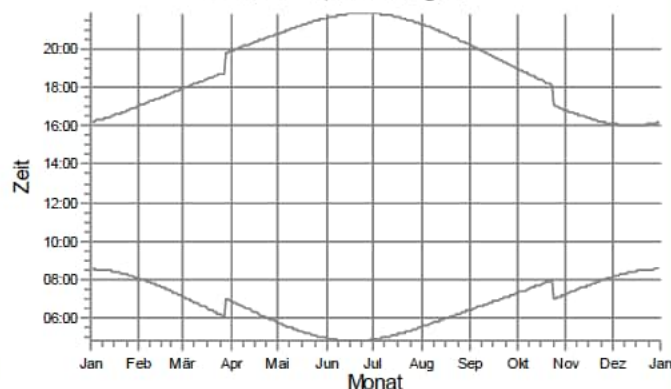
s22: Oerzen, Zum Hasel 10



s23: Oerzen, Mühlenweg 10



s24: Oerzen, Mühlenweg 18

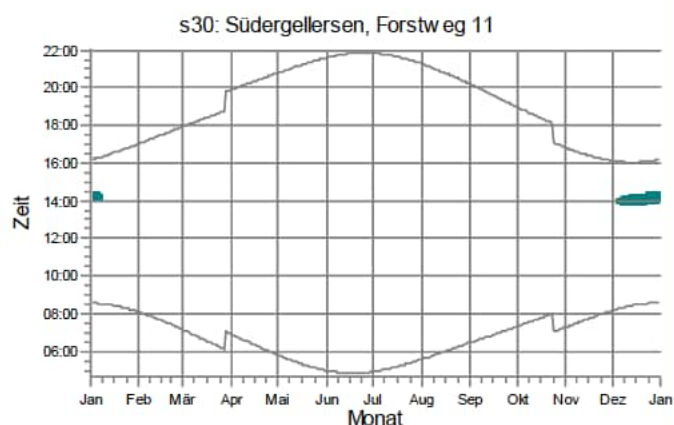
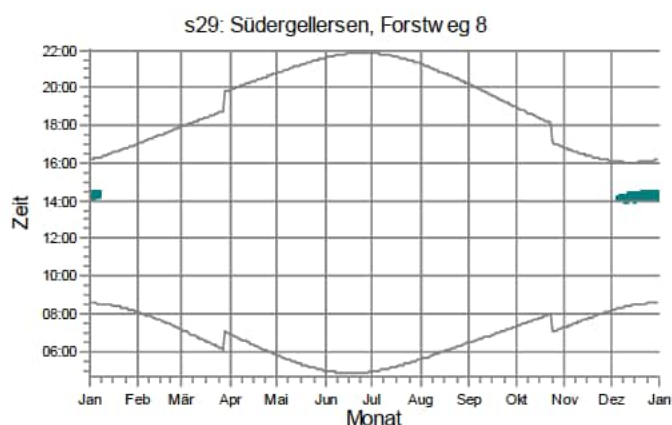
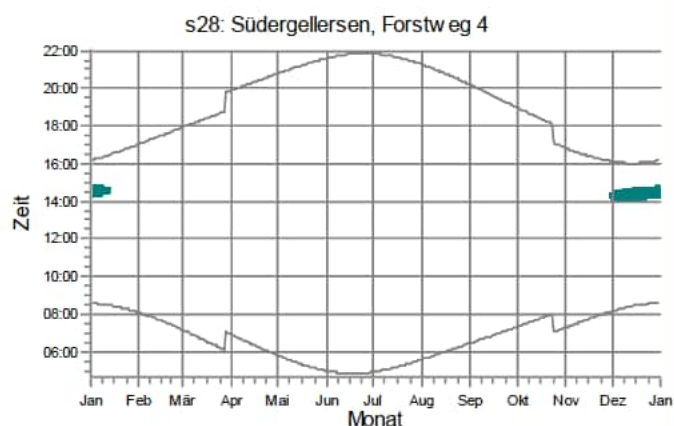
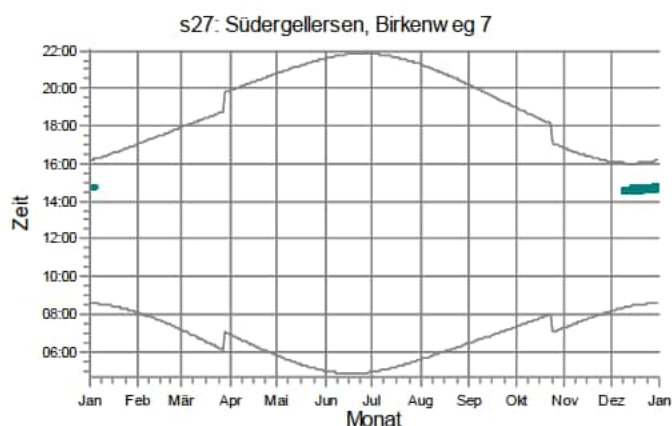
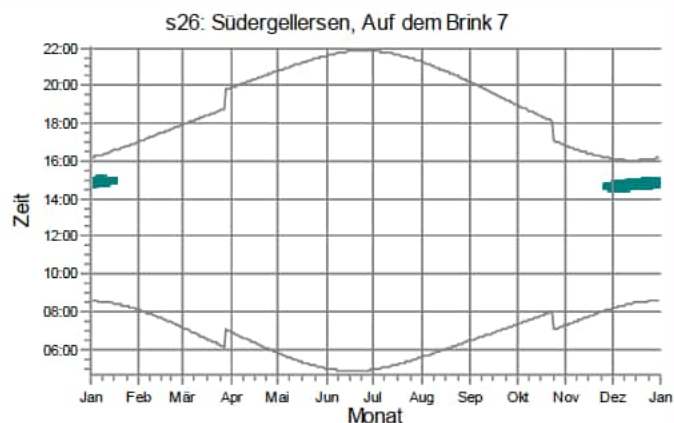
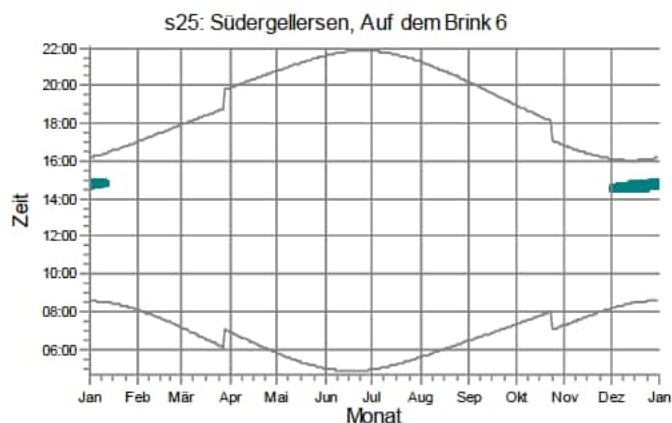


WEA



## SHADOW - Grafischer Kalender

**Berechnung:** Zusatzbelastung 6x N175

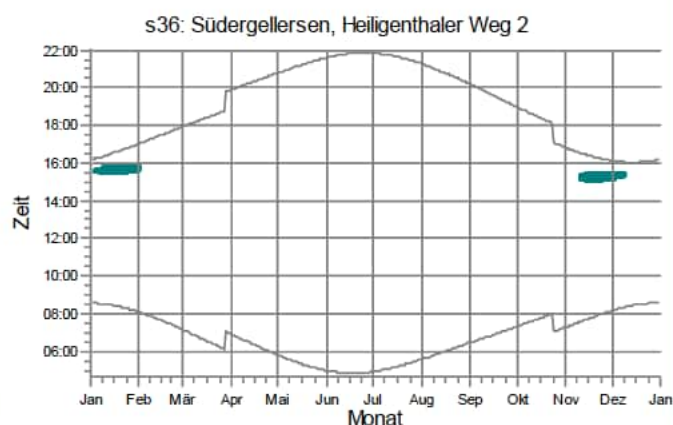
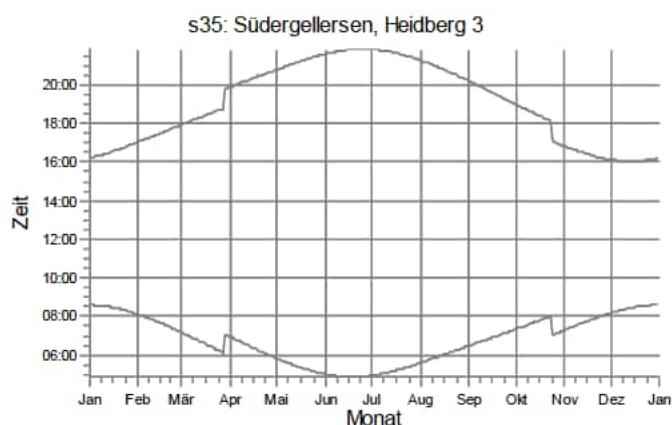
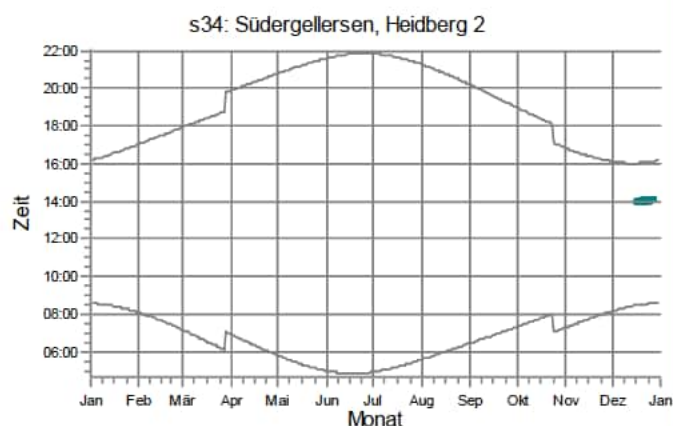
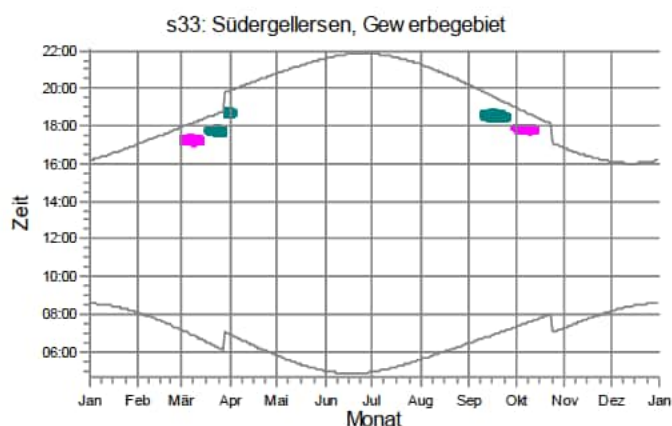
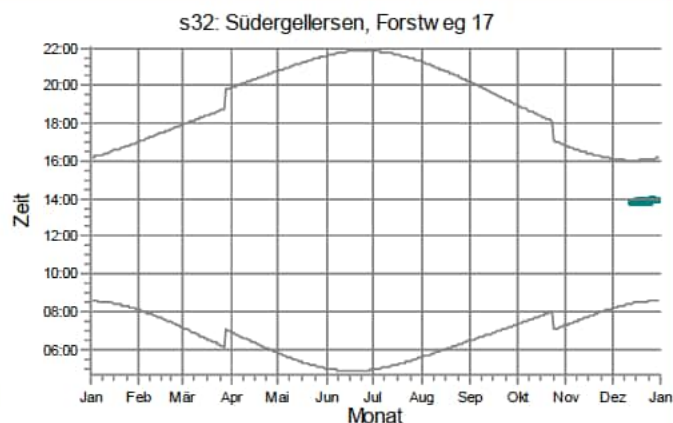
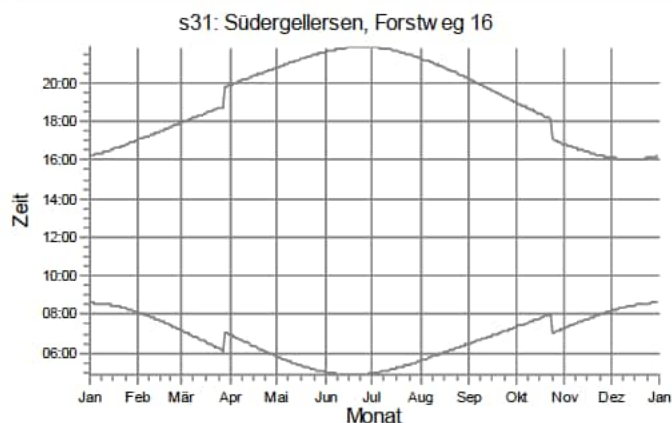


WEA

WEA 7: NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (344)

## SHADOW - Grafischer Kalender

Berechnung: Zusatzbelastung 6x N175



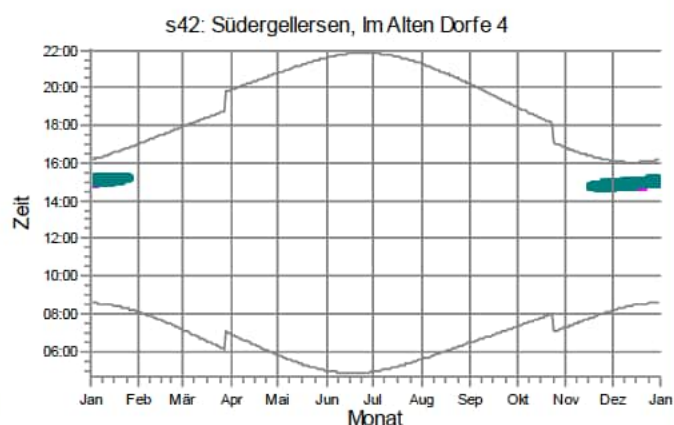
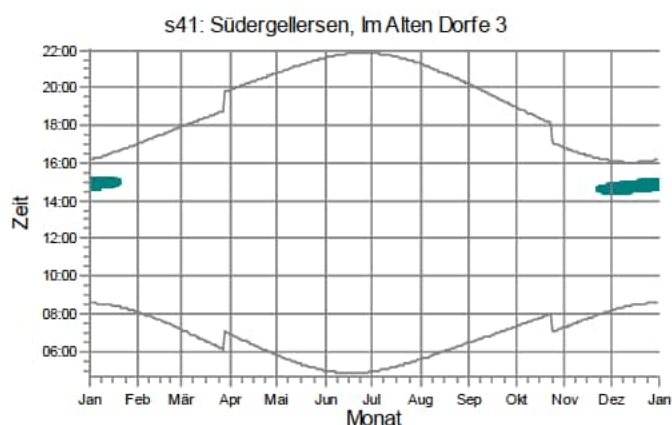
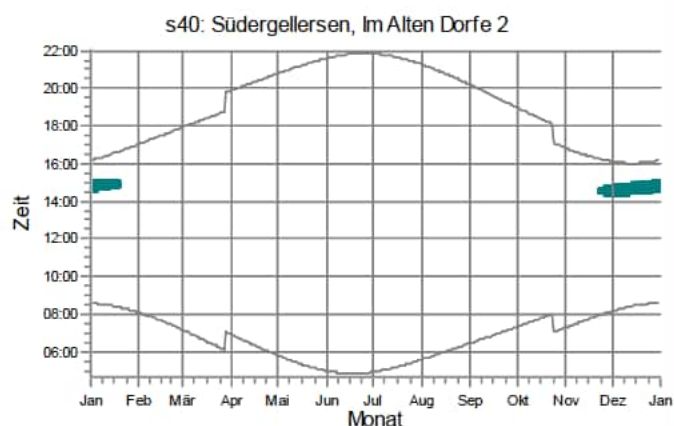
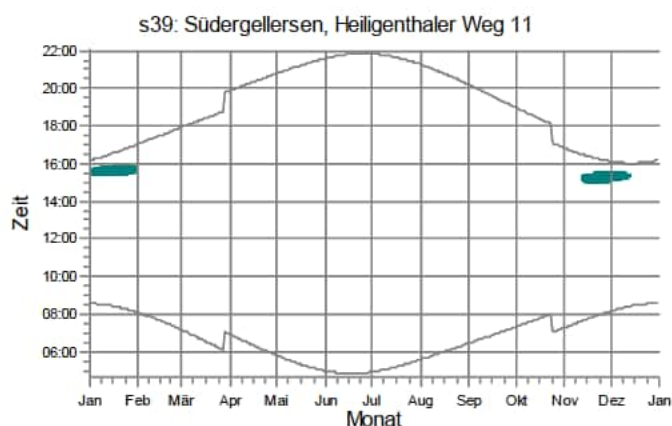
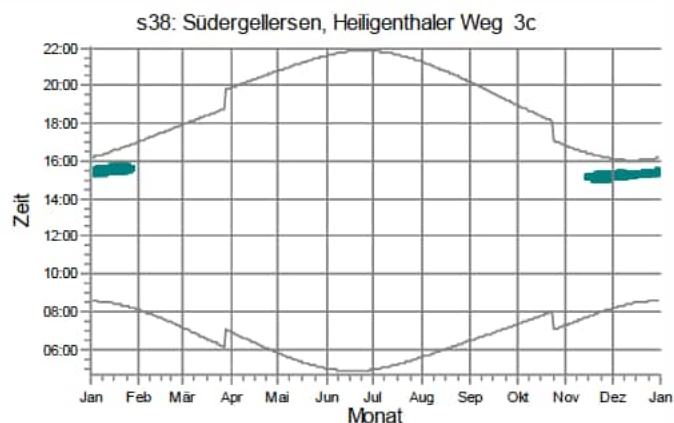
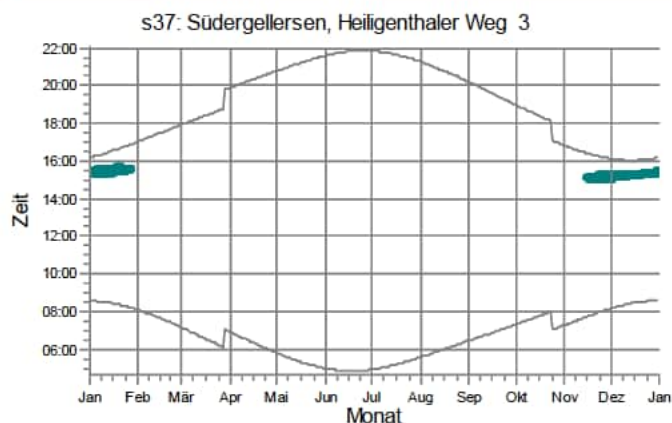
WEA

- WEA 6: NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (343)
- WEA 7: NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (344)



## SHADOW - Grafischer Kalender

**Berechnung:** Zusatzbelastung 6x N175



WEA

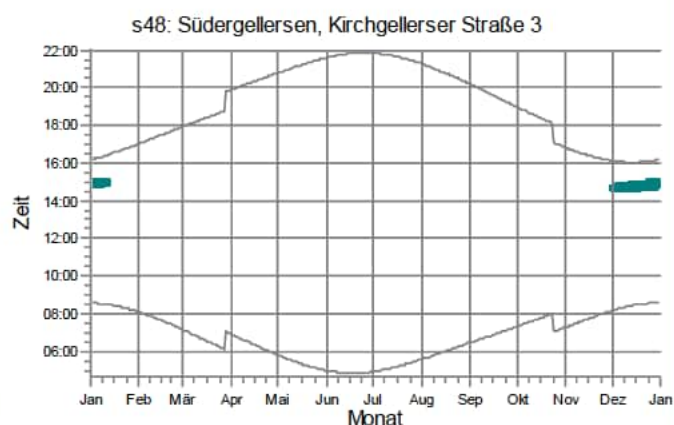
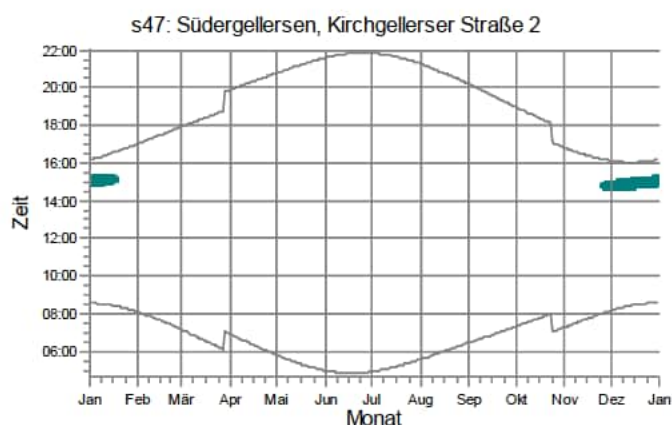
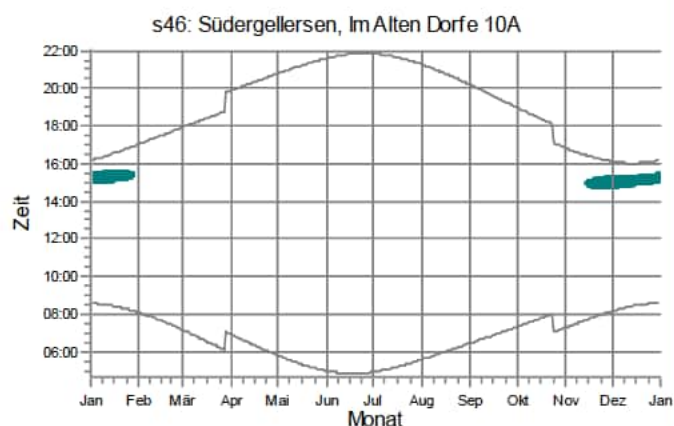
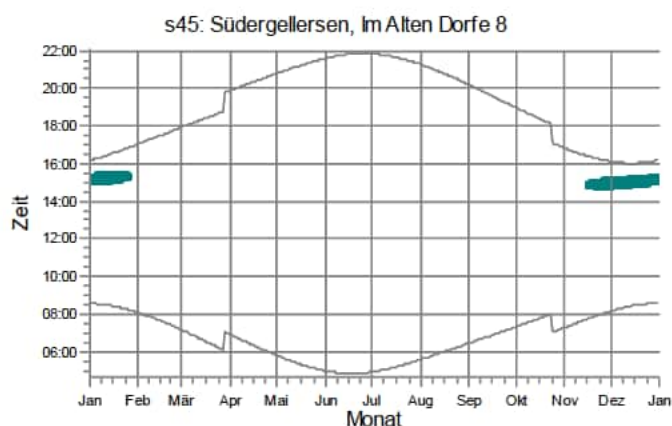
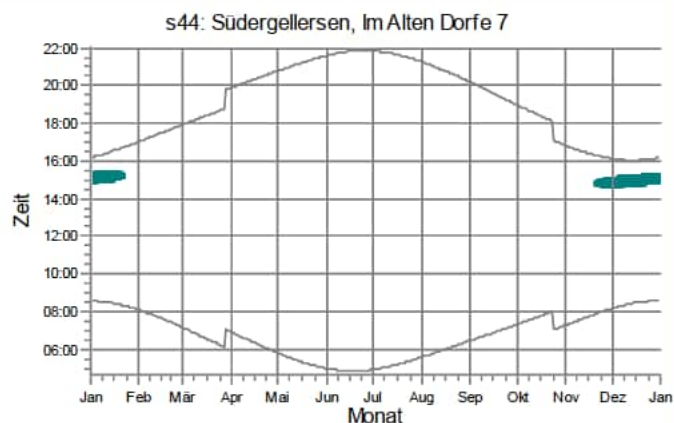
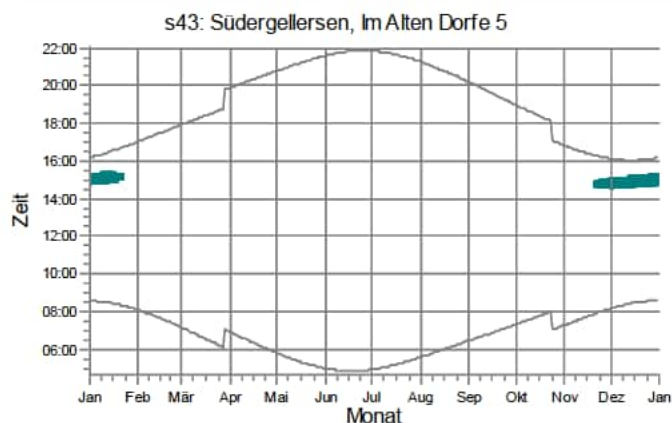


WEA 6: NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (343)

WEA 7: NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (344)

## SHADOW - Grafischer Kalender

**Berechnung:** Zusatzbelastung 6x N175



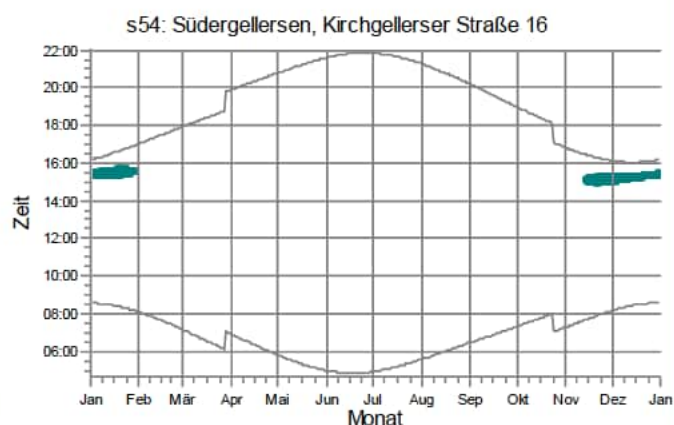
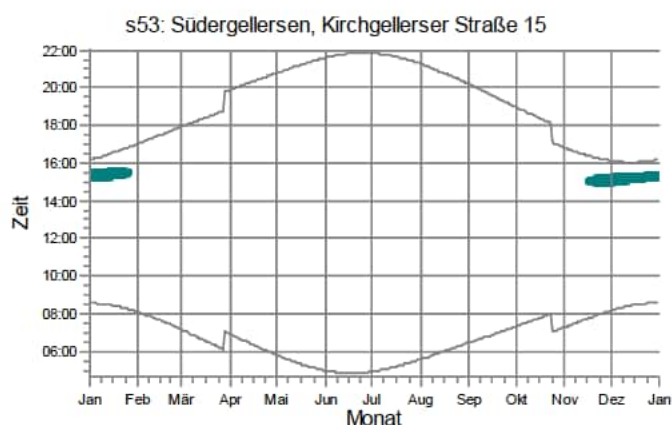
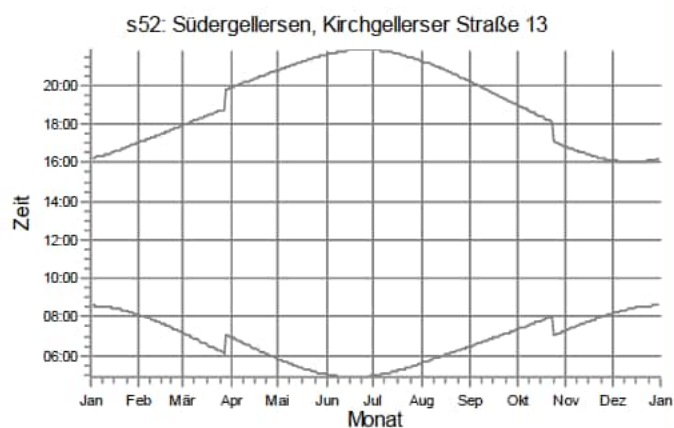
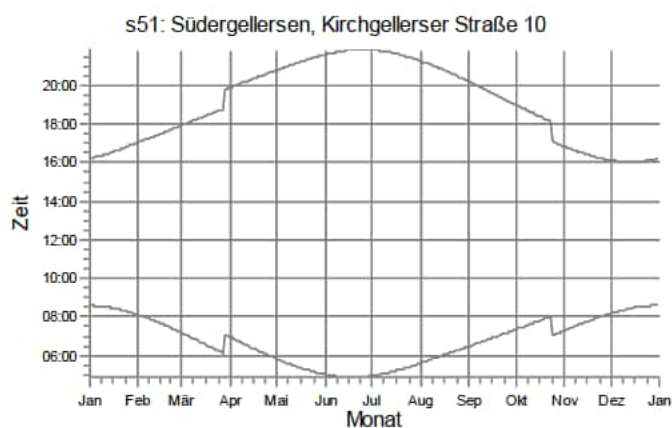
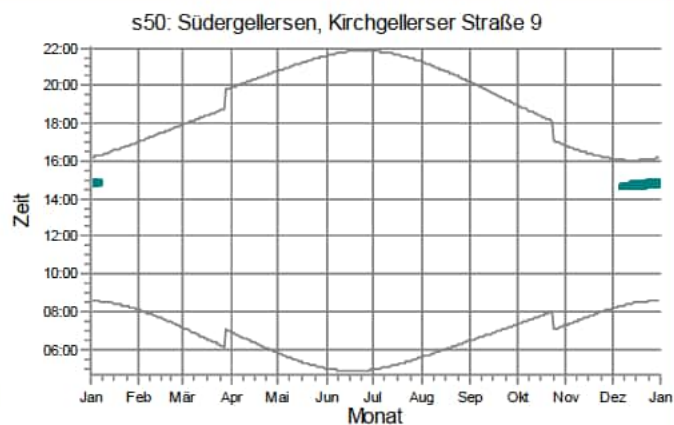
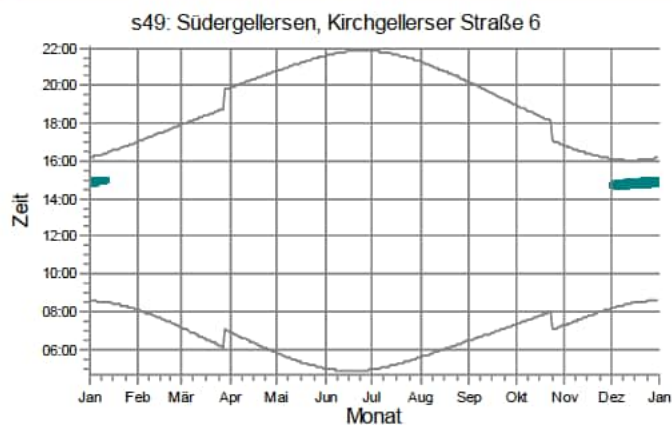
WEA

WEA 7: NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (344)



## SHADOW - Grafischer Kalender

**Berechnung:** Zusatzbelastung 6x N175

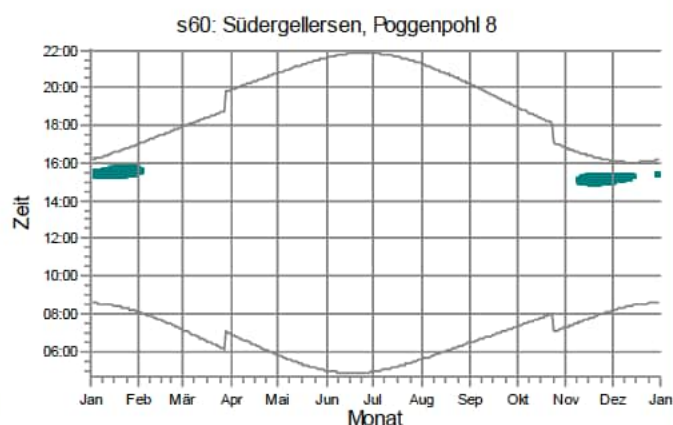
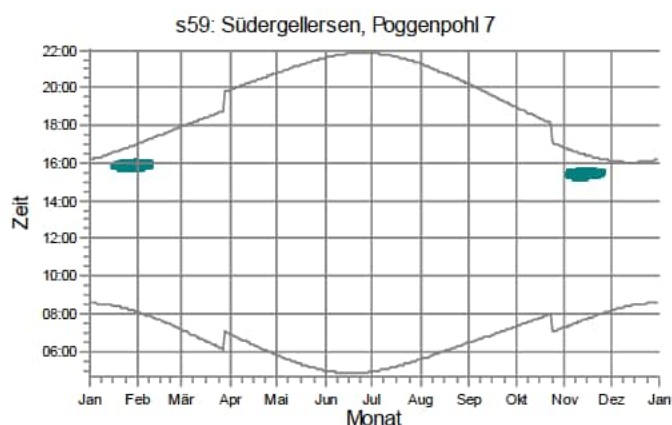
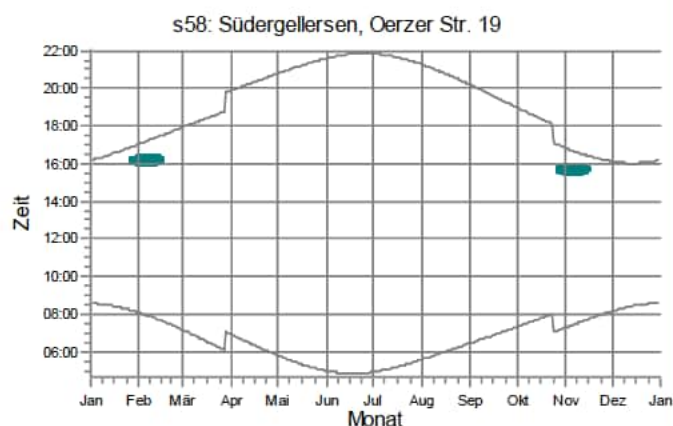
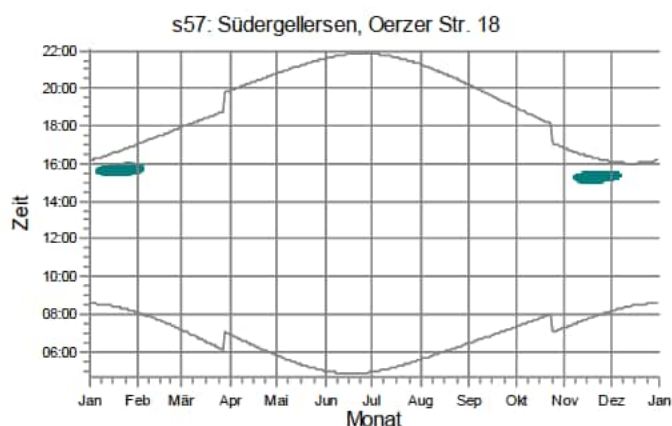
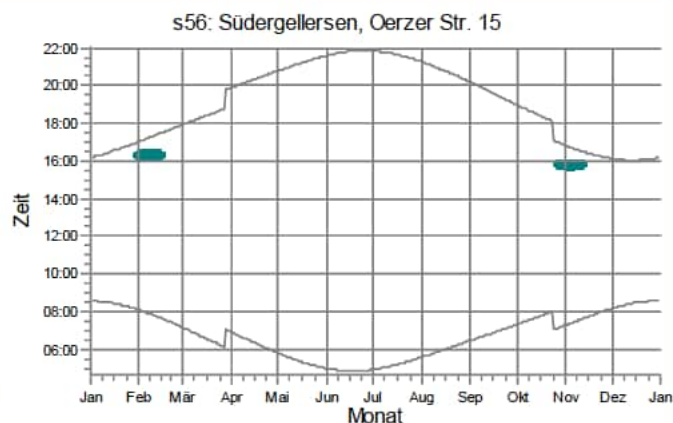
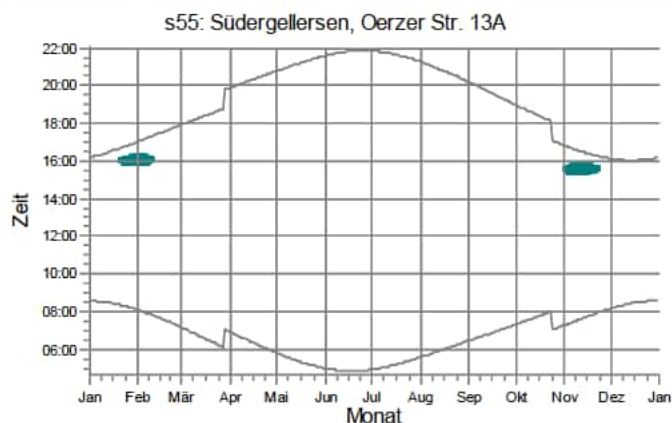


WEA

WEA 7: NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (344)

## SHADOW - Grafischer Kalender

**Berechnung:** Zusatzbelastung 6x N175



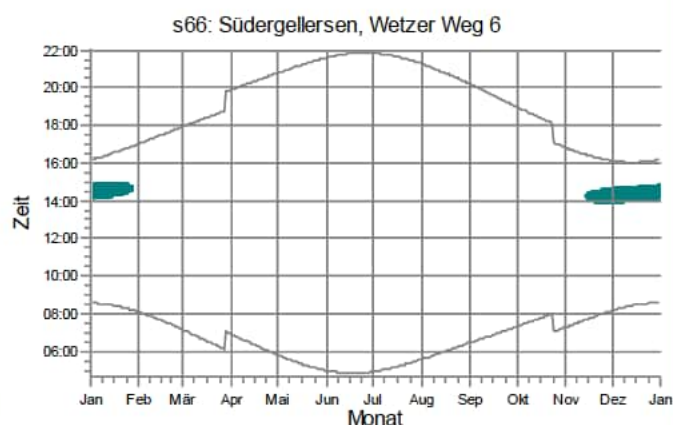
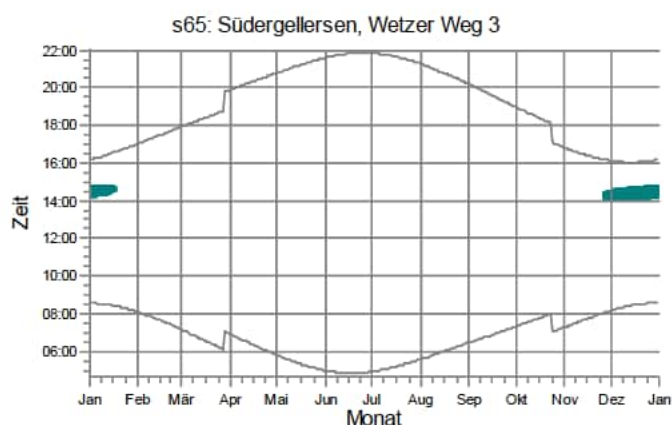
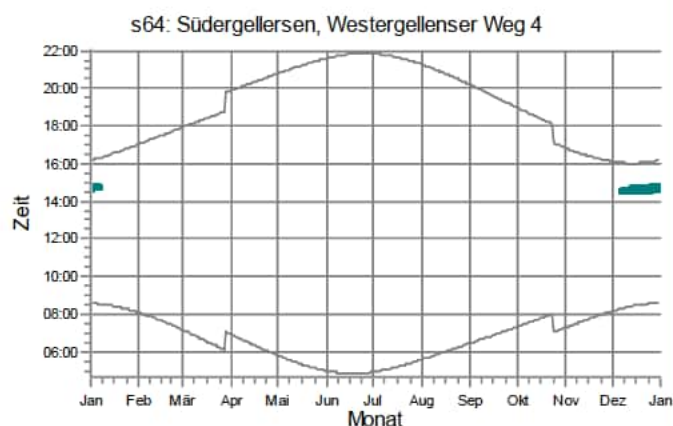
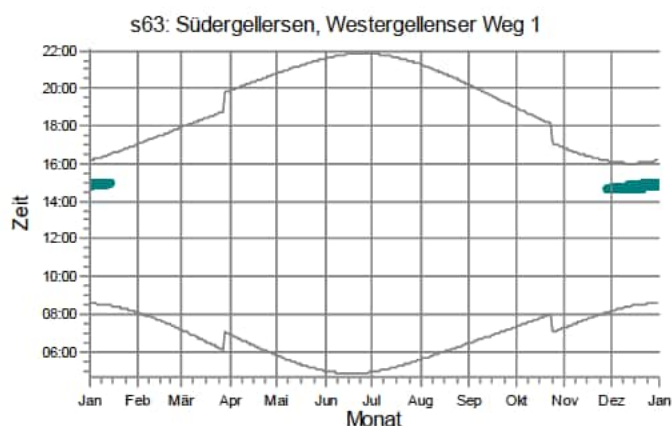
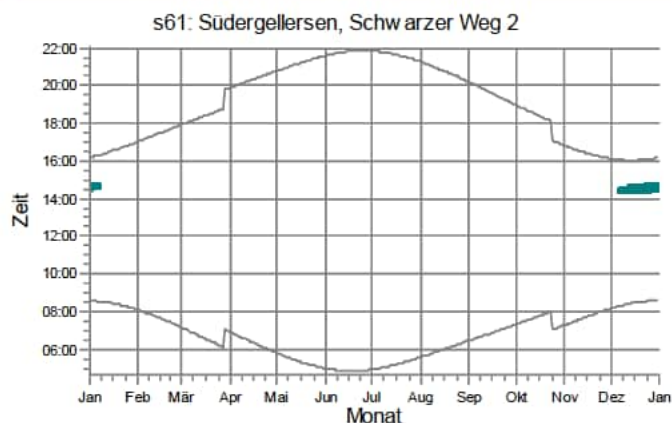
WEA

WEA 7: NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (344)



## SHADOW - Grafischer Kalender

**Berechnung:** Zusatzbelastung 6x N175



WEA

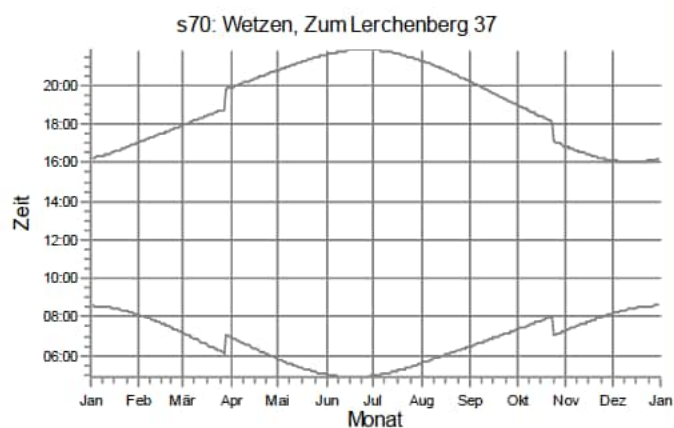
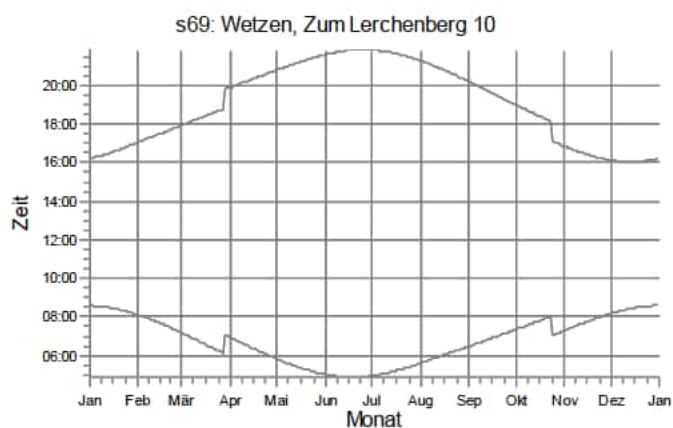
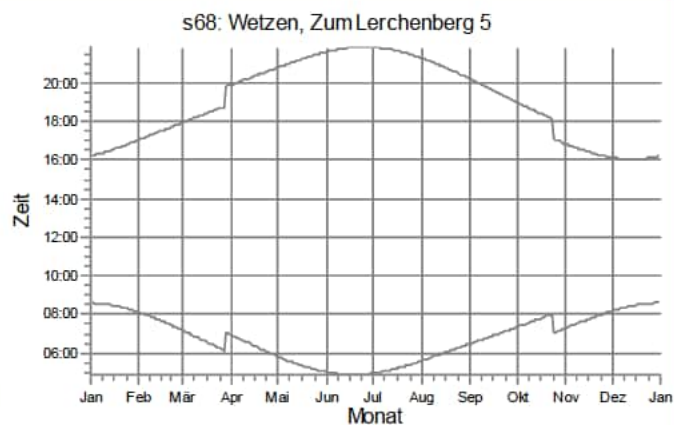
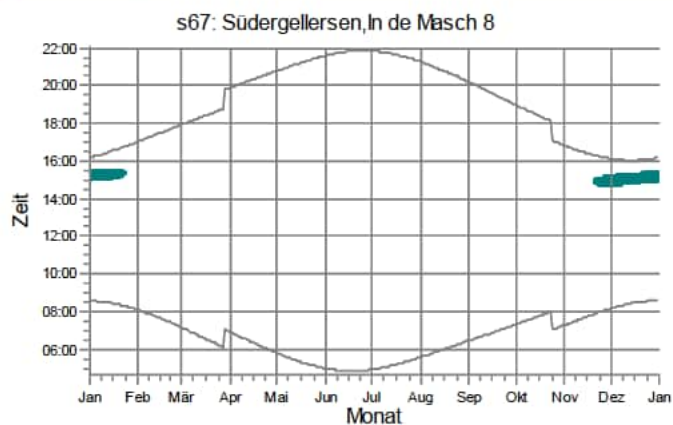


WEA 6: NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (343)

WEA 7: NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (344)

## SHADOW - Grafischer Kalender

**Berechnung:** Zusatzbelastung 6x N175



WEA

WEA 7: NORDEX N175/6.X 6800 175.0 !- NH: 179,0 m (Ges:266,5 m) (344)

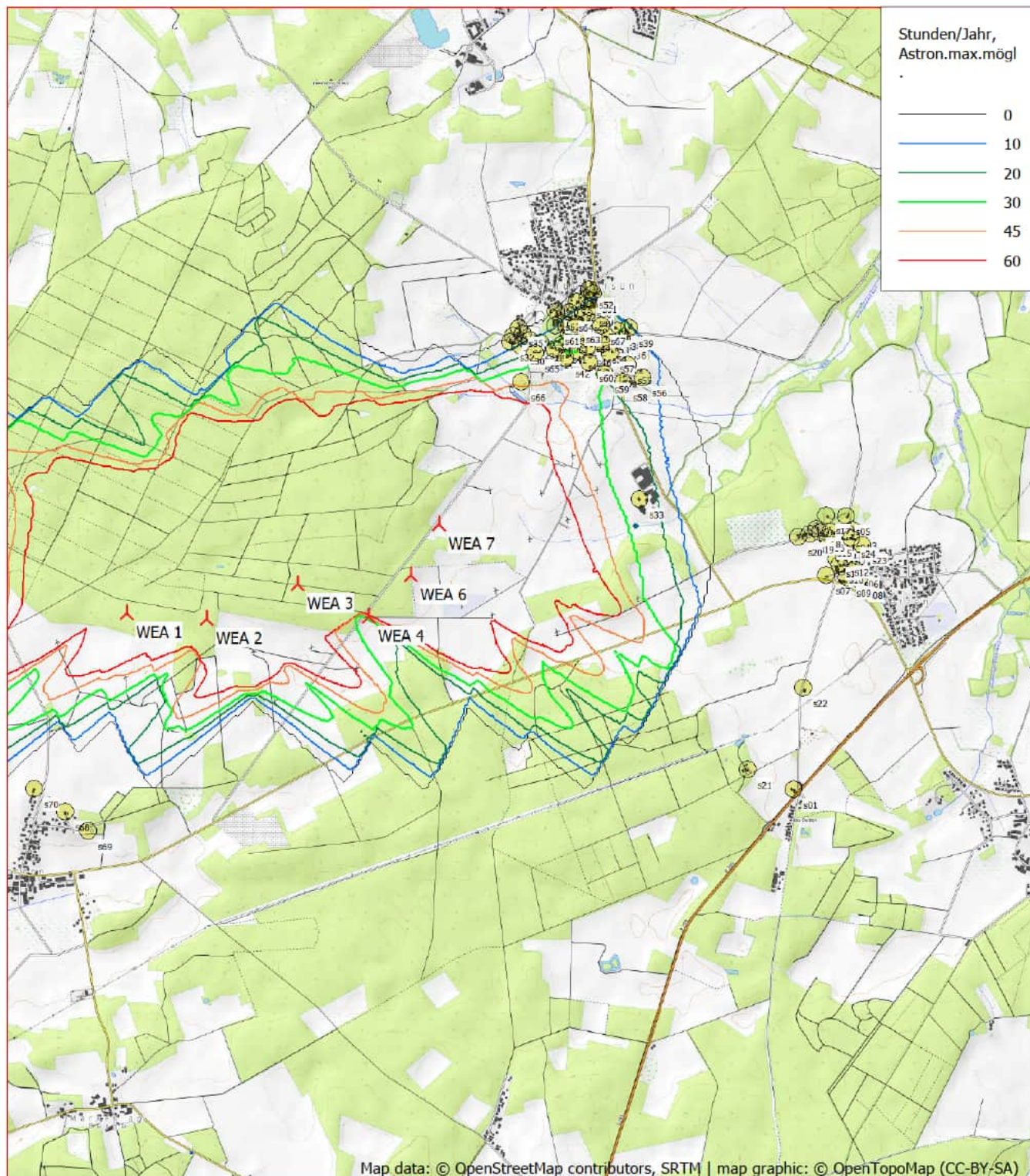


Projekt:  
**Süderheide**

Lizenzierter Anwender:  
**SOWIWAS - Energie GmbH**  
Watenstedter Straße 11  
DE-38384 Gevensleben  
+49 0 53 54 / 99 06 - 235  
/ gutachten@sowiwas.de  
Berechnet:  
22.07.2025 09:16/4.1.287

## SHADOW - Karte

**Berechnung:** Zusatzbelastung 6x N175



0 500 1000 1500 2000 m

Karte: OpenTopoMap.org , Maßstab 1:40.000, Mitte: UTM (north)-ETRS89 Zone: 32 Ost: 586.120,0 Nord: 5.894.340,0

⚡ Neue WEA      📍 Schattenrezeptor

Höhe der Schattenkarte: Höhenlinien: CONTOURLINE\_ONLINEDATA\_0.wpo (1)

Zeitschritt: 2 Minuten, Schrittweite: 2 Tag(e), Kartenaufösung: 20 m, Sichtbarkeit Auflösung: 5 m, Augenhöhe: 1,5 m

## **Berechnung: Vorbelastung 23 Bestand**

Hauptergebnis	4 Seiten
Grafischer Kalender	12 Seiten
Karte	1 Seite



## SHADOW - Hauptergebnis

**Berechnung:** Vorbelastung 23 Bestand

### Annahmen für Schattenwurfberechnung

Beschattungsbereich der WEA  
Schatten nur relevant, wo Rotorblatt mind. 20% der Sonne verdeckt  
Siehe WEA-Tabelle

Minimale relevante Sonnenhöhe über Horizont 3 °  
Tage zwischen Berechnungen 1 Tag(e)  
Berechnungszeitsprung 1 Minuten

Die dargestellten Zeiten sind die astronomisch maximal mögliche  
Beschattungsdauer, berechnet unter folgenden Annahmen:  
Die Sonne scheint täglich von Sonnenauf- bis -untergang  
Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung  
Die Windenergieanlage/n ist/sind immer in Betrieb

Eine WEA wird nicht berücksichtigt, wenn sie von keinem Teil der  
Rezeptorfläche aus sichtbar ist. Die Sichtbarkeitsberechnung basiert auf  
den folgenden Annahmen:

DHM: Höhenlinien: CONTOURLINE\_ONLINEDATA\_0.wpo (1)  
Rasterauflösung: 1,0 m

Alle Koordinatenangaben in:  
UTM (north)-ETRS89 Zone: 32

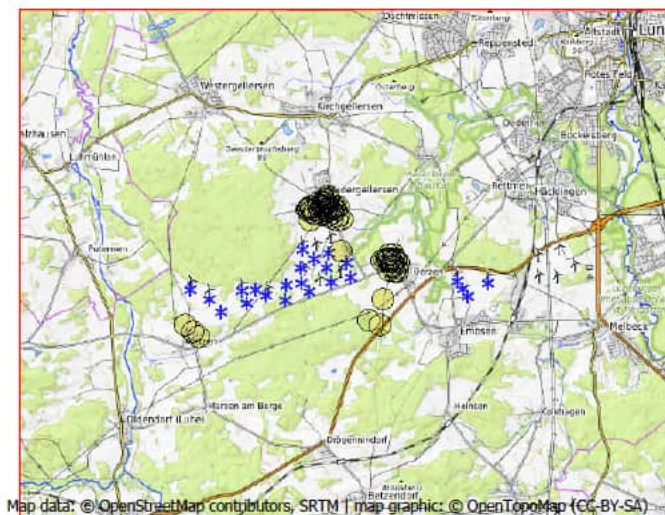
### WEA

	Ost	Nord	Z	Beschreibung	Aktuell	Hersteller	Typ	Nennleistung	Rotor-durchmesser	NH	Schattendaten	
											Beschatt.-Bereich	U/min
			[m]					[kW]	[m]	[m]	[m]	[U/min]
B 01	585.971,6	5.895.090,6	50,0	NORDEX N1...	Ja	NORDEX	N149/4.0-4.5-4.500	4.500	149,0	125,0	1.822	10,7
B 02	585.959,5	5.894.188,5	45,0	NORDEX N1...	Ja	NORDEX	N131/3300 DE-3.300	3.300	131,0	134,0	1.722	10,9
B 03	585.020,8	5.893.835,6	50,0	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 04	584.733,6	5.893.984,8	50,0	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 05	584.375,7	5.893.950,2	55,0	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 06	584.497,2	5.893.629,8	56,7	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 07	583.821,9	5.893.385,7	64,4	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 08	583.491,9	5.893.713,6	60,0	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 09	582.991,2	5.893.966,5	55,0	GE WIND EN...	Nein	GE WIND ENERGY	GE 2.75-120-2.750	2.750	120,0	139,0	2.500	-
B 10	590.139,5	5.894.321,8	37,1	ENERCON E...	Nein	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0	1.487	22,0
B 11	590.290,9	5.894.120,4	40,0	ENERCON E...	Nein	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0	1.487	22,0
B 12	590.431,2	5.893.915,7	42,1	ENERCON E...	Nein	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0	1.487	22,0
B 13	590.960,7	5.894.291,0	45,6	ENERCON E...	Nein	ENERCON	E-66/18.70-1.800	1.800	70,0	65,0	1.487	22,0
Oerzen 1	587.151,9	5.894.746,2	45,6	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Oerzen 2	587.284,9	5.894.361,9	40,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Oerzen 3	586.751,2	5.894.214,7	49,2	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Oerzen 4	586.171,4	5.893.951,1	50,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Oerzen 5	585.523,5	5.893.709,1	56,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Rep 10	586.619,0	5.894.596,4	42,4	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Rep 11	586.661,3	5.895.000,3	44,3	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Rep 5	585.563,4	5.894.124,0	45,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Rep 8	585.927,2	5.894.596,0	48,8	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8
Rep 9	586.287,4	5.894.833,5	45,0	NORDEX N1...	Ja	NORDEX	N175/6.X-6.800	6.800	175,0	179,0	1.893	10,8

### Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
				[m]	[m]	[m]	[m]	[°]		[m]
s01	Neu Oerzen, Soltauer Straße 1	588.101,7	5.893.084,2	46,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s02	Oerzen, Am Ohfeld 1	588.404,8	5.894.762,2	45,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s03	Oerzen, Am Ohfeld 4	588.478,4	5.894.877,5	40,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s04	Oerzen, Am Ohfeld 9	588.431,5	5.894.865,5	40,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s05	Oerzen, Am Ohfeld 15	588.429,4	5.894.972,8	43,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s06	Oerzen, Im Dorfe 14	588.496,1	5.894.607,3	48,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s07	Oerzen, Im Dorfe 16	588.303,1	5.894.557,6	47,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s08	Oerzen, Im Dorfe 19	588.526,8	5.894.534,4	50,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0

(Fortsetzung nächste Seite)...



Maßstab 1:200.000  
\* Existierende WEA  
● Schattenrezeptor



**SHADOW - Hauptergebnis****Berechnung: Vorbelastung 23 Bestand**

...(Fortsetzung von vorheriger Seite)

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
				[m]	[m]	[m]	[m]	[°]		[m]
s09	Oerzen, Im Dorfe 25	588.443,9	5.894.543,8	50,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s10	Oerzen, Westerheide 1	588.389,1	5.894.636,1	49,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s11	Oerzen, Westerheide 3	588.370,1	5.894.675,9	47,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s12	Oerzen, Westerheide 4	588.427,4	5.894.685,8	48,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s13	Oerzen, Westerheide 5	588.381,0	5.894.813,7	42,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s14	Oerzen, Westerheide 12A	588.325,0	5.894.865,9	42,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s15	Oerzen, Westerheide 12C	588.306,5	5.894.823,7	44,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s16	Oerzen, Westerheide 18	588.256,0	5.894.856,0	45,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s17	Oerzen, Westerheide 19	588.291,4	5.894.974,5	48,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s18	Oerzen, Westerheide 20	588.229,9	5.894.881,8	47,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s19	Oerzen, Westerheide 22	588.185,2	5.894.847,2	46,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s20	Oerzen, Westerheide 28	588.102,7	5.894.825,3	47,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s21	Oerzen, Zum Hasel 5	587.786,3	5.893.215,0	57,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s22	Oerzen, Zum Hasel 10	588.158,0	5.893.781,7	45,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s23	Oerzen, Mühlenweg 10	588.545,4	5.894.776,2	44,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s24	Oerzen, Mühlenweg 18	588.468,7	5.894.823,3	42,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s25	Südergellersen, Auf dem Brink 6	586.477,5	5.896.246,7	67,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s26	Südergellersen, Auf dem Brink 7	586.498,2	5.896.189,4	65,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s27	Südergellersen, Birkenweg 7	586.547,8	5.896.410,5	65,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s28	Südergellersen, Forstweg 4	586.302,3	5.896.127,2	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s29	Südergellersen, Forstweg 8	586.230,1	5.896.140,7	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s30	Südergellersen, Forstweg 11	586.166,4	5.896.101,6	63,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s31	Südergellersen, Forstweg 16	586.112,1	5.896.167,0	64,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s32	Südergellersen, Forstweg 17	586.094,1	5.896.128,7	62,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s33	Südergellersen, Gewerbegebiet	587.007,3	5.895.062,8	43,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s34	Südergellersen, Heidberg 2	586.177,4	5.896.183,9	66,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s35	Südergellersen, Heidberg 3	586.154,2	5.896.223,0	66,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s36	Südergellersen, Heiligenthaler Weg 2	586.863,9	5.896.155,5	55,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s37	Südergellersen, Heiligenthaler Weg 3	586.792,8	5.896.190,0	58,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s38	Südergellersen, Heiligenthaler Weg 3c	586.833,1	5.896.217,7	58,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s39	Südergellersen, Heiligenthaler Weg 11	586.911,1	5.896.239,1	52,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s40	Südergellersen, Im Alten Dorfe 2	586.402,6	5.896.082,0	64,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s41	Südergellersen, Im Alten Dorfe 3	586.453,7	5.896.115,5	65,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s42	Südergellersen, Im Alten Dorfe 4	586.480,0	5.896.021,4	61,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s43	Südergellersen, Im Alten Dorfe 5	586.561,2	5.896.156,3	63,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s44	Südergellersen, Im Alten Dorfe 7	586.616,6	5.896.197,1	62,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s45	Südergellersen, Im Alten Dorfe 8	586.561,9	5.896.067,6	60,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s46	Südergellersen, Im Alten Dorfe 10A	586.625,5	5.896.101,5	60,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s47	Südergellersen, Kirchgellerser Straße 2	586.638,0	5.896.277,9	62,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s48	Südergellersen, Kirchgellerser Straße 3	586.594,8	5.896.327,3	63,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s49	Südergellersen, Kirchgellerser Straße 6	586.637,2	5.896.375,2	63,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s50	Südergellersen, Kirchgellerser Straße 9	586.617,5	5.896.432,1	64,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s51	Südergellersen, Kirchgellerser Straße 10	586.660,0	5.896.465,5	63,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s52	Südergellersen, Kirchgellerser Straße 13	586.632,2	5.896.499,1	64,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s53	Südergellersen, Kirchgellerser Straße 15	586.747,3	5.896.191,6	60,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s54	Südergellersen, Kirchgellerser Straße 16	586.731,0	5.896.121,0	59,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s55	Südergellersen, Oerzer Str. 13A	586.909,5	5.895.981,7	53,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s56	Südergellersen, Oerzer Str. 15	587.010,6	5.895.899,8	50,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s57	Südergellersen, Oerzer Str. 18	586.781,3	5.896.062,2	56,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s58	Südergellersen, Oerzer Str. 19	586.879,7	5.895.864,2	49,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s59	Südergellersen, Poggenpohl 7	586.751,1	5.895.922,0	55,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s60	Südergellersen, Poggenpohl 8	586.640,6	5.895.995,8	58,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s61	Südergellersen, Schwarzer Weg 2	586.403,0	5.896.246,5	71,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s62	Südergellersen, Schwarzer Weg 9	586.404,8	5.896.338,8	69,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s63	Südergellersen, Westergellerser Weg 1	586.545,3	5.896.256,4	63,9	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s64	Südergellersen, Westergellerser Weg 4	586.498,9	5.896.338,8	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s65	Südergellersen, Wetzter Weg 3	586.268,4	5.896.052,0	63,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s66	Südergellersen, Wetzter Weg 6	586.172,4	5.895.854,5	57,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s67	Südergellersen, In de Masch 8	586.717,4	5.896.250,8	61,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s68	Wetzen, Zum Lerchenberg 5	583.085,3	5.892.839,1	65,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s69	Wetzen, Zum Lerchenberg 10	583.242,4	5.892.711,0	60,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
s70	Wetzen, Zum Lerchenberg 37	582.866,7	5.892.994,9	69,4	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0



**SHADOW - Hauptergebnis****Berechnung:** Vorbelastung 23 Bestand**Berechnungsergebnisse**

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer		
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag
		[h/a]	[d/a]	[h/d]
s01	Neu Oerzen, Soltau Straße 1	0:00	0	0:00
s02	Oerzen, Am Ohfeld 1	54:40	112	0:48
s03	Oerzen, Am Ohfeld 4	47:02	107	0:41
s04	Oerzen, Am Ohfeld 9	50:47	112	0:43
s05	Oerzen, Am Ohfeld 15	49:31	110	0:44
s06	Oerzen, Im Dorfe 14	51:18	108	0:48
s07	Oerzen, Im Dorfe 16	71:46	123	0:55
s08	Oerzen, Im Dorfe 19	35:44	92	0:32
s09	Oerzen, Im Dorfe 25	57:14	113	0:49
s10	Oerzen, Westerheide 1	59:19	115	0:53
s11	Oerzen, Westerheide 3	59:58	116	0:53
s12	Oerzen, Westerheide 4	54:14	111	0:50
s13	Oerzen, Westerheide 5	55:53	116	0:48
s14	Oerzen, Westerheide 12A	60:09	120	0:47
s15	Oerzen, Westerheide 12C	62:51	122	0:49
s16	Oerzen, Westerheide 18	67:54	126	0:50
s17	Oerzen, Westerheide 19	61:44	122	0:51
s18	Oerzen, Westerheide 20	70:26	128	0:52
s19	Oerzen, Westerheide 22	77:16	134	0:55
s20	Oerzen, Westerheide 28	98:48	144	1:08
s21	Oerzen, Zum Hasel 5	16:16	55	0:24
s22	Oerzen, Zum Hasel 10	47:29	116	0:30
s23	Oerzen, Mühlenweg 10	30:40	77	0:32
s24	Oerzen, Mühlenweg 18	48:19	109	0:43
s25	Südergellersen, Auf dem Brink 6	0:00	0	0:00
s26	Südergellersen, Auf dem Brink 7	0:00	0	0:00
s27	Südergellersen, Birkenweg 7	0:00	0	0:00
s28	Südergellersen, Forstweg 4	5:50	26	0:17
s29	Südergellersen, Forstweg 8	11:10	32	0:32
s30	Südergellersen, Forstweg 11	28:05	46	0:51
s31	Südergellersen, Forstweg 16	20:52	42	0:43
s32	Südergellersen, Forstweg 17	31:03	48	0:52
s33	Südergellersen, Gewerbegebiet	729:45	365	3:06
s34	Südergellersen, Heidberg 2	7:45	31	0:19
s35	Südergellersen, Heidberg 3	5:56	27	0:17
s36	Südergellersen, Heiligenthaler Weg 2	31:23	64	0:46
s37	Südergellersen, Heiligenthaler Weg 3	19:41	52	0:27
s38	Südergellersen, Heiligenthaler Weg 3c	19:25	52	0:26
s39	Südergellersen, Heiligenthaler Weg 11	21:43	60	0:25
s40	Südergellersen, Im Alten Dorfe 2	3:43	20	0:14
s41	Südergellersen, Im Alten Dorfe 3	0:00	0	0:00
s42	Südergellersen, Im Alten Dorfe 4	28:18	42	1:06
s43	Südergellersen, Im Alten Dorfe 5	4:40	22	0:16
s44	Südergellersen, Im Alten Dorfe 7	5:15	24	0:16
s45	Südergellersen, Im Alten Dorfe 8	17:07	44	0:29
s46	Südergellersen, Im Alten Dorfe 10A	18:07	46	0:29
s47	Südergellersen, Kirchgellerser Straße 2	0:00	0	0:00
s48	Südergellersen, Kirchgellerser Straße 3	0:00	0	0:00
s49	Südergellersen, Kirchgellerser Straße 6	0:00	0	0:00
s50	Südergellersen, Kirchgellerser Straße 9	0:00	0	0:00
s51	Südergellersen, Kirchgellerser Straße 10	0:00	0	0:00
s52	Südergellersen, Kirchgellerser Straße 13	0:00	0	0:00
s53	Südergellersen, Kirchgellerser Straße 15	16:39	46	0:26
s54	Südergellersen, Kirchgellerser Straße 16	22:55	56	0:29
s55	Südergellersen, Oerzer Str. 13A	84:16	90	1:34
s56	Südergellersen, Oerzer Str. 15	116:41	108	1:38
s57	Südergellersen, Oerzer Str. 18	45:20	70	1:15
s58	Südergellersen, Oerzer Str. 19	130:08	106	2:06
s59	Südergellersen, Poggenpohl 7	94:05	88	1:51
s60	Südergellersen, Poggenpohl 8	46:42	66	1:21
s61	Südergellersen, Schwarzer Weg 2	0:00	0	0:00
s62	Südergellersen, Schwarzer Weg 9	0:00	0	0:00

(Fortsetzung nächste Seite)...

**SHADOW - Hauptergebnis****Berechnung:** Vorbelastung 23 Bestand

...(Fortsetzung von vorheriger Seite)

Nr.	Name	astron. max. mögl. Beschattungsdauer		
		Stunden/Jahr [h/a]	Schattentage/Jahr [d/a]	Max.Schattendauer/Tag [h/d]
s63	Südergellersen, Westergellenser Weg 1	0:00	0	0:00
s64	Südergellersen, Westergellenser Weg 4	0:00	0	0:00
s65	Südergellersen, Wetzer Weg 3	27:07	44	0:52
s66	Südergellersen, Wetzer Weg 6	114:34	78	2:17
s67	Südergellersen, In de Masch 8	8:07	31	0:20
s68	Wetzen, Zum Lerchenberg 5	20:25	89	0:19
s69	Wetzen, Zum Lerchenberg 10	13:47	66	0:18
s70	Wetzen, Zum Lerchenberg 37	35:54	103	0:40

## Gesamtdauer Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [h/a]
B 01	NORDEX N149/4.0-4.5 4500 149.0 !O! NH: 125,0 m (Ges:199,5 m) (101)	142:41
B 02	NORDEX N131/3300 DE 3300 131.0 !-! NH: 134,0 m (Ges:199,5 m) (120)	11:43
B 03	GE WIND ENERGY GE 2.75-120 2750 120.0 !O! NH: 139,0 m (Ges:199,0 m) (94)	11:18
B 04	GE WIND ENERGY GE 2.75-120 2750 120.0 !O! NH: 139,0 m (Ges:199,0 m) (95)	12:12
B 05	GE WIND ENERGY GE 2.75-120 2750 120.0 !O! NH: 139,0 m (Ges:199,0 m) (96)	10:15
B 06	GE WIND ENERGY GE 2.75-120 2750 120.0 !O! NH: 139,0 m (Ges:199,0 m) (97)	23:02
B 07	GE WIND ENERGY GE 2.75-120 2750 120.0 !O! NH: 139,0 m (Ges:199,0 m) (98)	20:35
B 08	GE WIND ENERGY GE 2.75-120 2750 120.0 !O! NH: 139,0 m (Ges:199,0 m) (99)	0:00
B 09	GE WIND ENERGY GE 2.75-120 2750 120.0 !O! NH: 139,0 m (Ges:199,0 m) (100)	0:00
B 10	ENERCON E-66/18.70 1800 70.0 !O! NH: 65,0 m (Ges:100,0 m) (103)	0:00
B 11	ENERCON E-66/18.70 1800 70.0 !O! NH: 65,0 m (Ges:100,0 m) (104)	0:00
B 12	ENERCON E-66/18.70 1800 70.0 !O! NH: 65,0 m (Ges:100,0 m) (105)	0:00
B 13	ENERCON E-66/18.70 1800 70.0 !O! NH: 65,0 m (Ges:100,0 m) (106)	0:00
Oerzen 1	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (79)	331:00
Oerzen 2	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (80)	194:07
Oerzen 3	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (81)	115:16
Oerzen 4	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (82)	50:45
Oerzen 5	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (83)	0:00
Rep 10	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (110)	142:32
Rep 11	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (111)	462:12
Rep 5	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (107)	10:50
Rep 8	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (108)	76:51
Rep 9	NORDEX N175/6.X 6800 175.0 !-! NH: 179,0 m (Ges:266,5 m) (109)	134:59

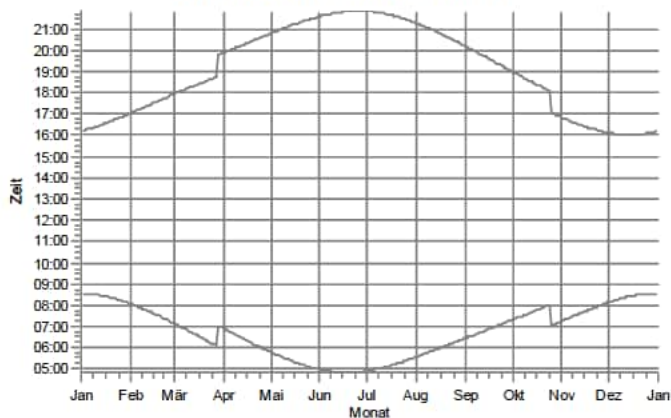
Summen in Rezeptortabelle und WEA-Tabelle können sich unterscheiden, da eine WEA gleichzeitig an zwei oder mehr Rezeptoren Beschattung verursachen kann und/oder ein Rezeptor gleichzeitig von zwei oder mehr WEA beschattet werden kann.



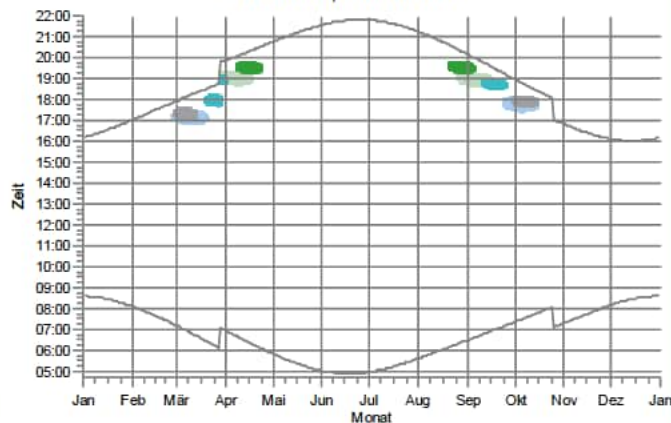
## SHADOW - Grafischer Kalender

**Berechnung:** Vorbelastung 23 Bestand

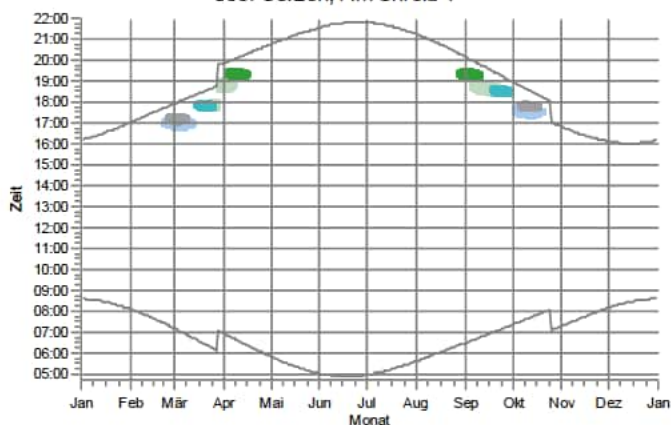
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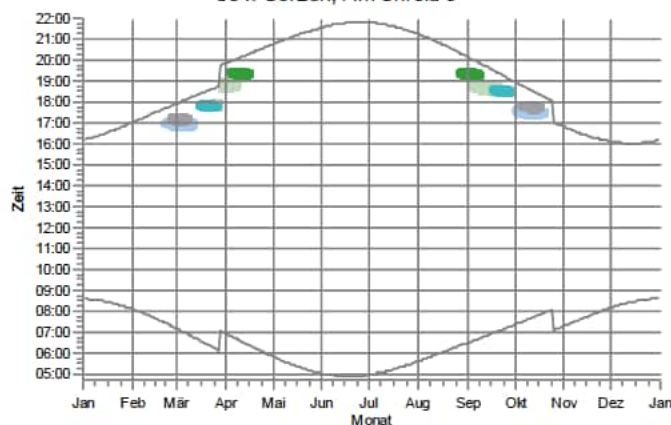
s02: Oerzen, Am Ohfeld 1



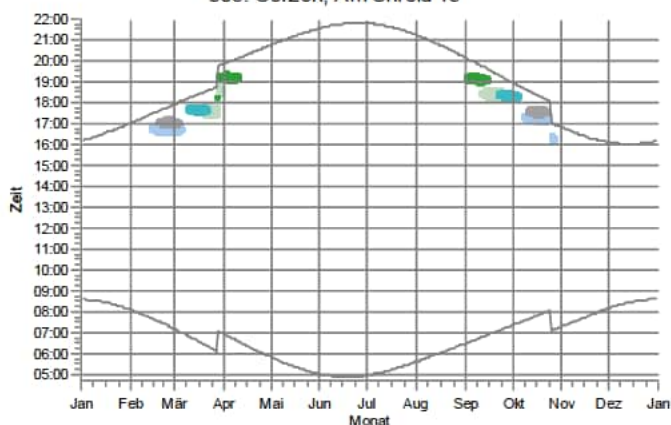
s03: Oerzen, Am Ohfeld 4



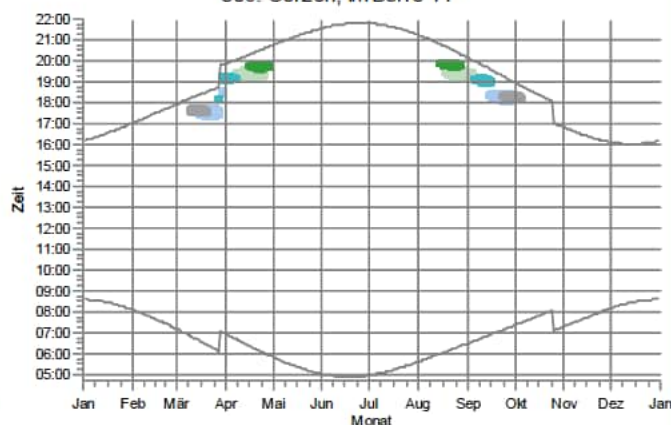
s04: Oerzen, Am Ohfeld 9



s05: Oerzen, Am Ohfeld 15



s06: Oerzen, Im Dorfe 14



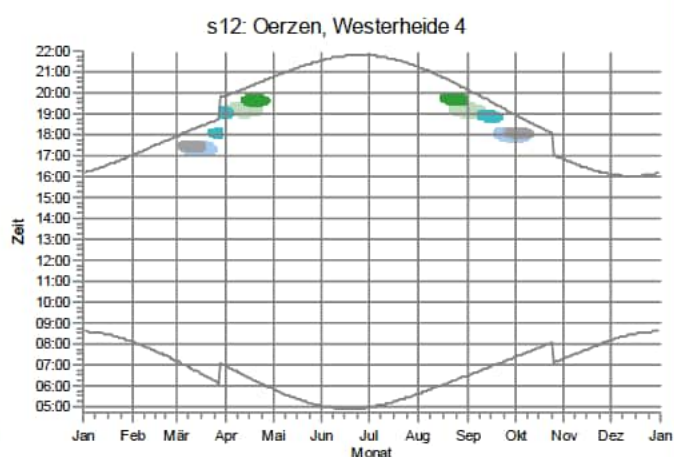
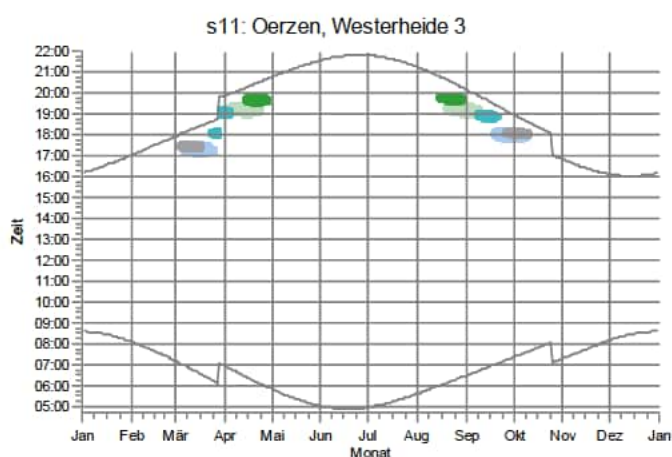
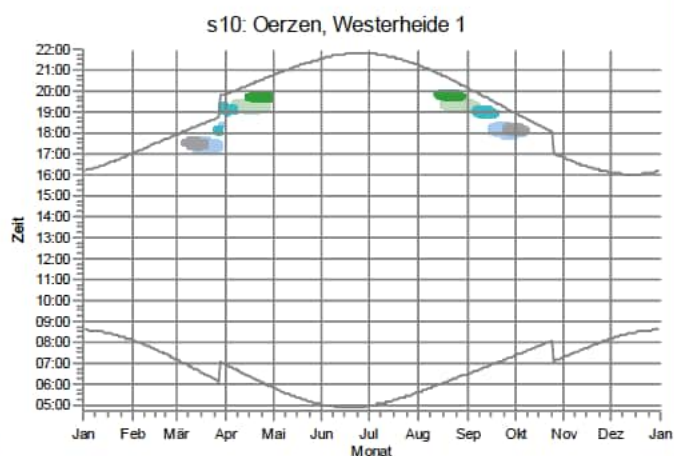
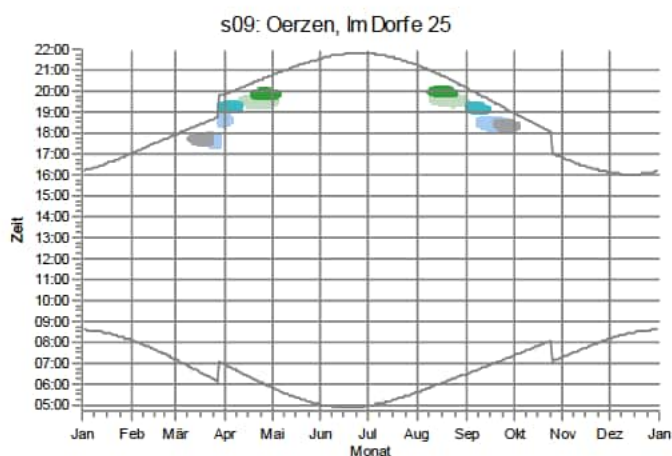
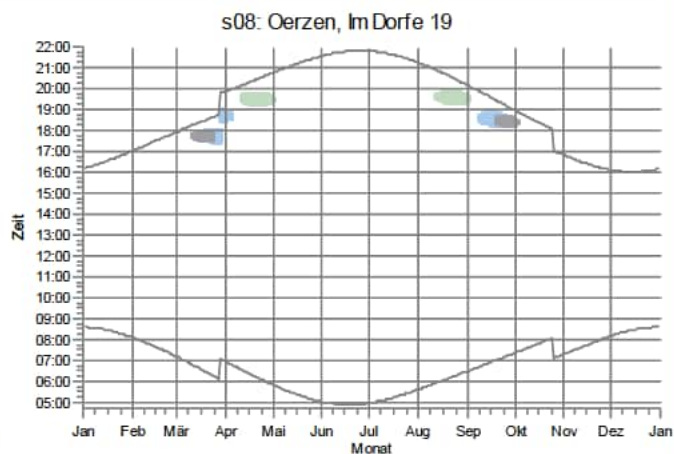
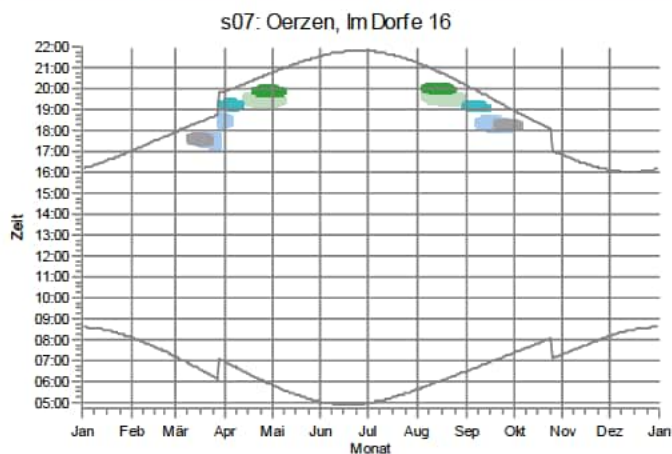
WEA

Oerzen 1: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (79)  
Oerzen 2: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (80)  
Oerzen 3: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (81)

Rep 10: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (110)  
Rep 11: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (111)

## SHADOW - Grafischer Kalender

**Berechnung:** Vorbelastung 23 Bestand



WEA

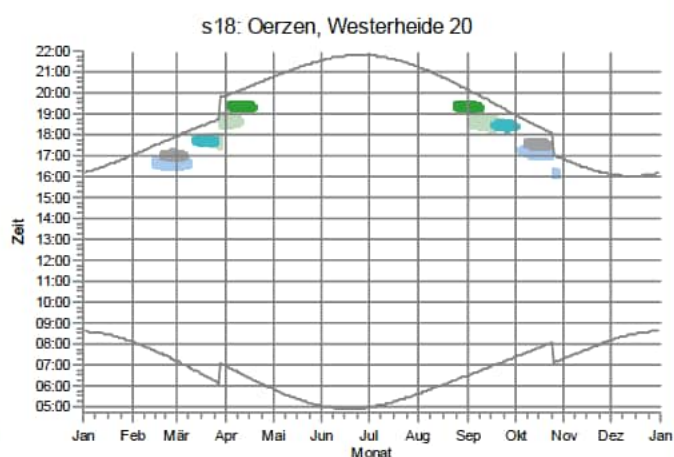
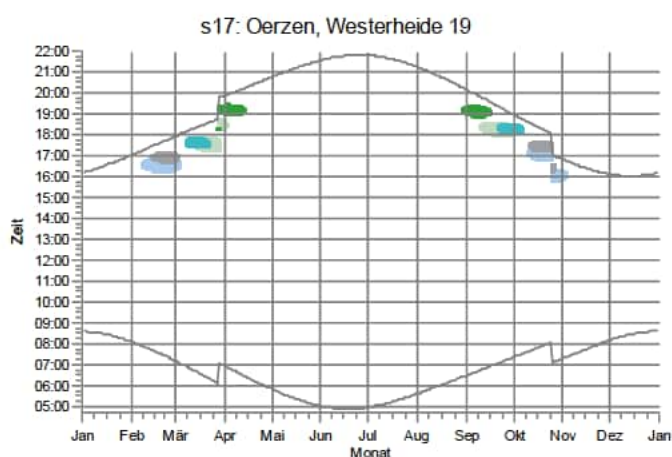
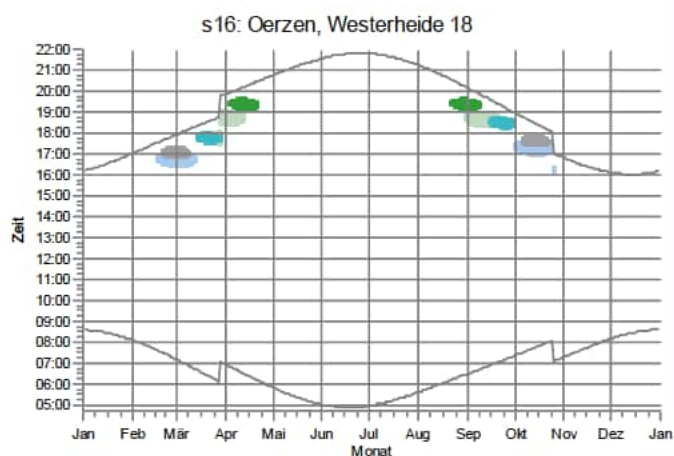
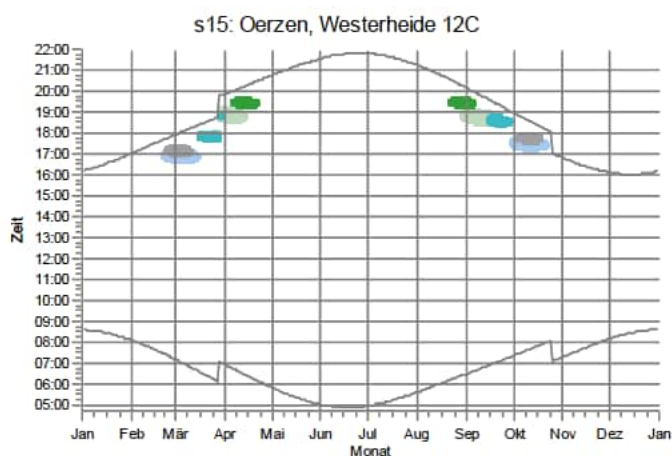
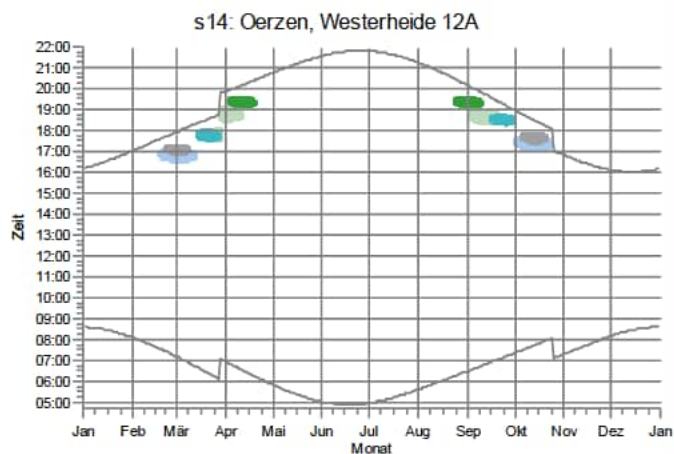
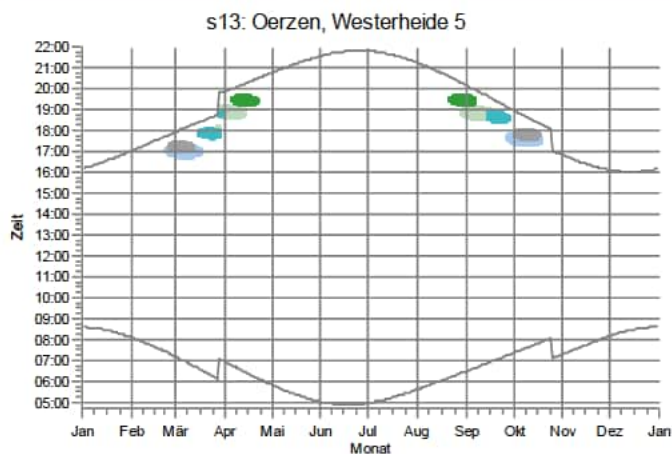
Oerzen 1: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (79)  
Oerzen 2: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (80)  
Oerzen 3: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (81)

Rep 10: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (110)  
Rep 11: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (111)



## SHADOW - Grafischer Kalender

Berechnung: Vorbelastung 23 Bestand



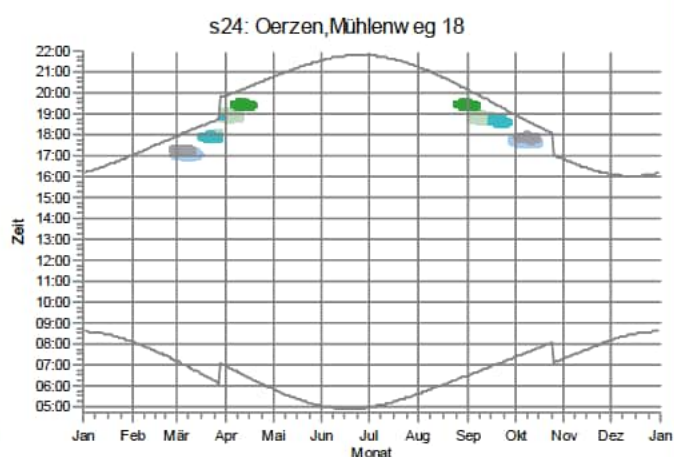
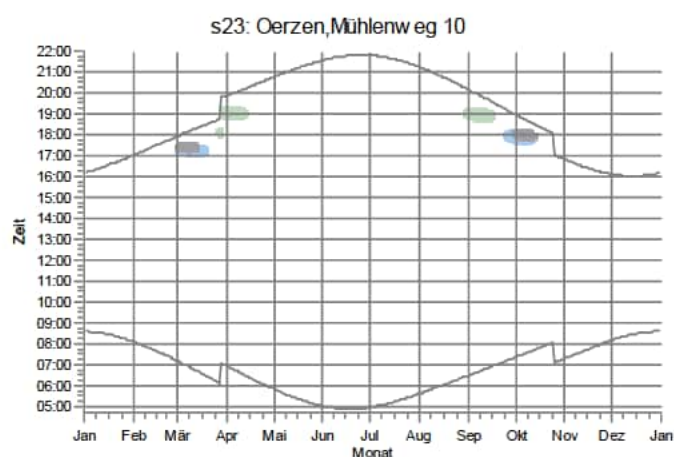
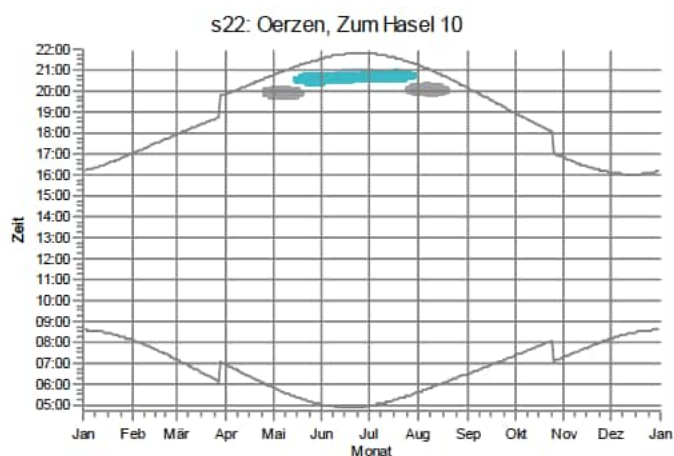
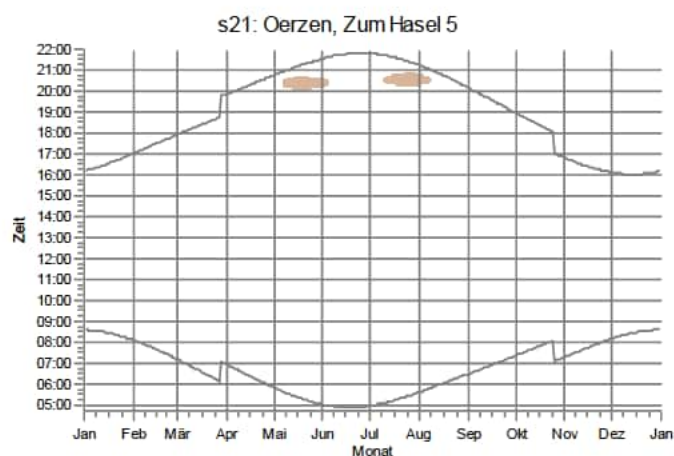
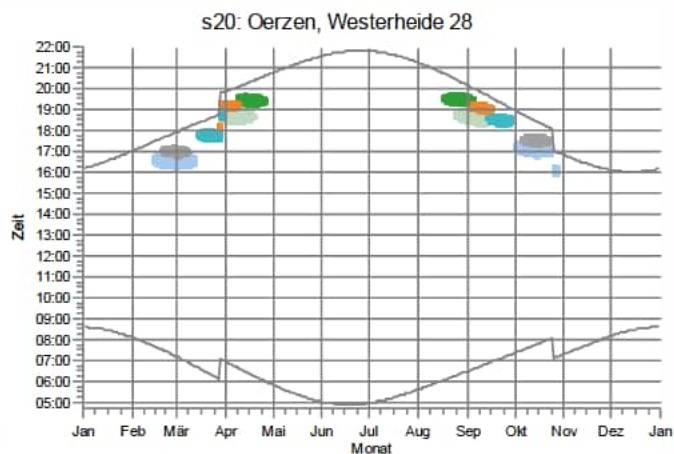
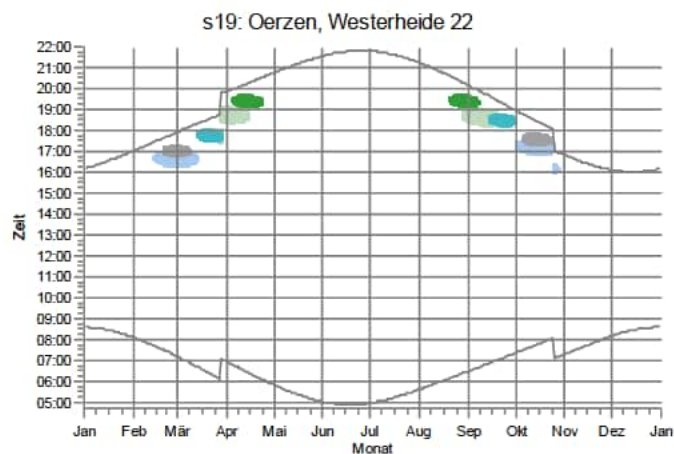
WEA

Oerzen 1: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (79)  
Oerzen 2: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (80)  
Oerzen 3: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (81)

Rep 10: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (110)  
Rep 11: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (111)

## SHADOW - Grafischer Kalender

**Berechnung:** Vorbelastung 23 Bestand



WEA

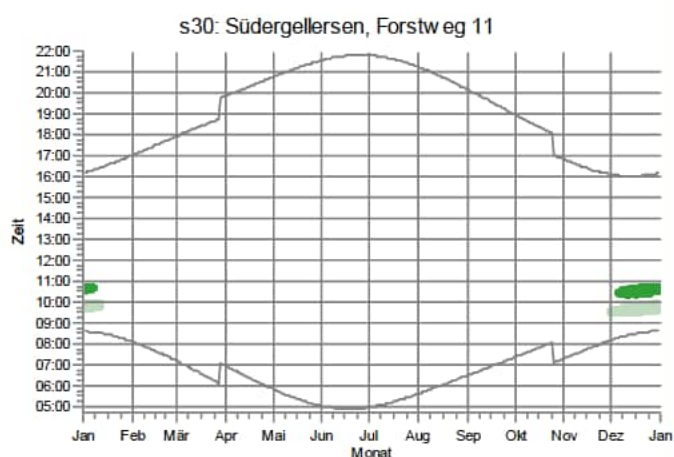
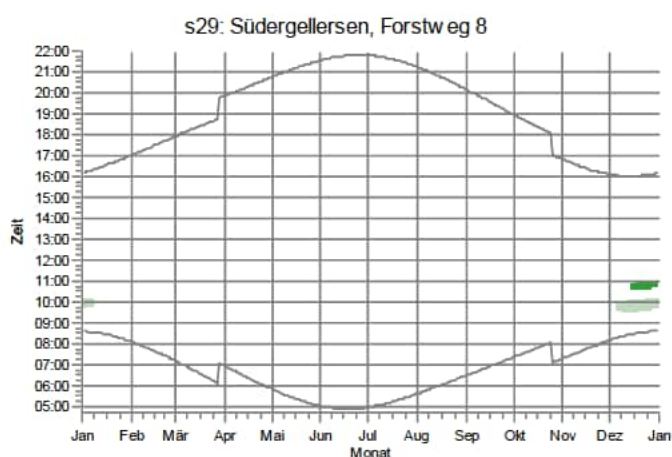
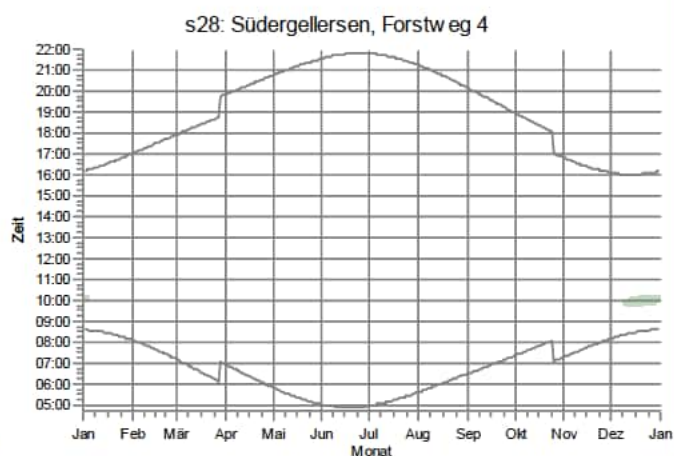
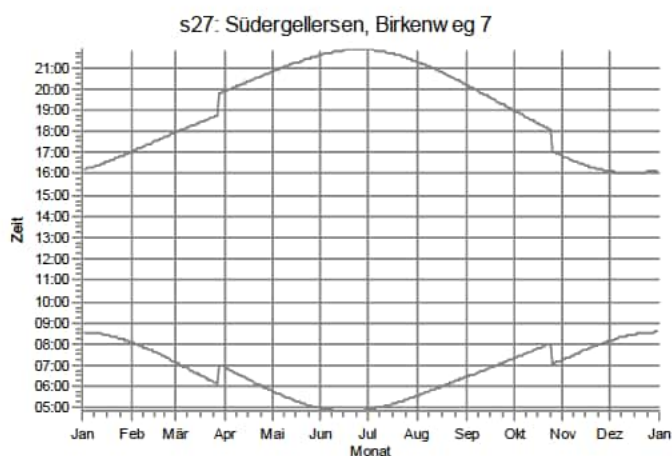
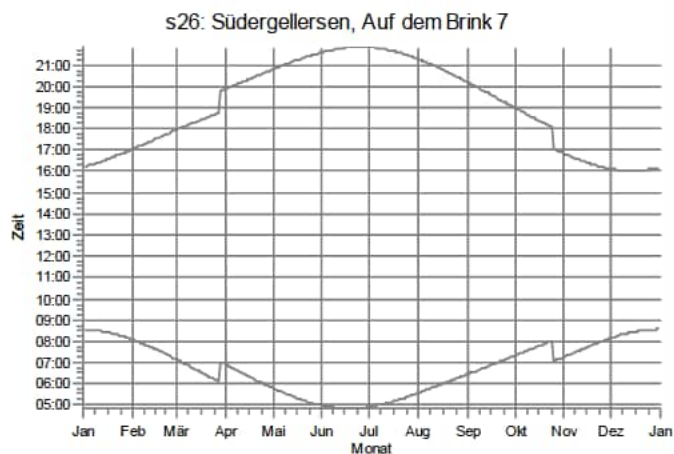
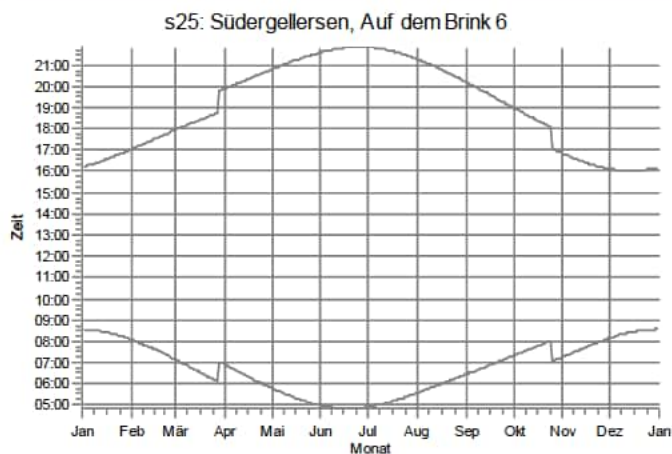
Oerzen 1: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (79)  
Oerzen 2: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (80)  
Oerzen 3: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (81)  
Oerzen 4: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (82)

Rep 10: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (110)  
Rep 11: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (111)  
Rep 9: NORDEX N175/6.X 6800 175.0 I-I NH: 179,0 m (Ges:266,5 m) (109)



## SHADOW - Grafischer Kalender

**Berechnung:** Vorbelastung 23 Bestand



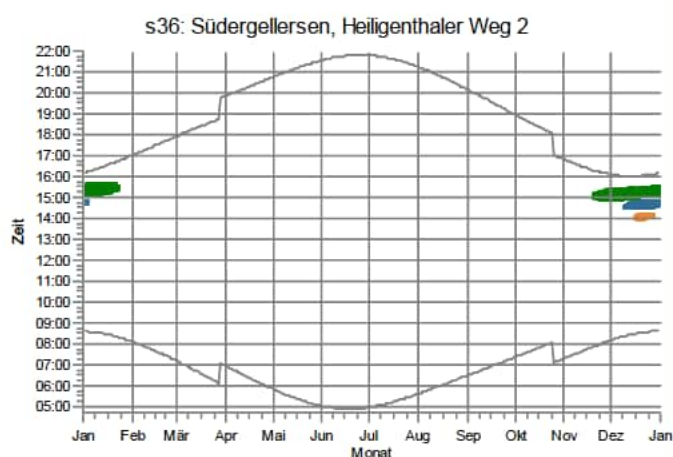
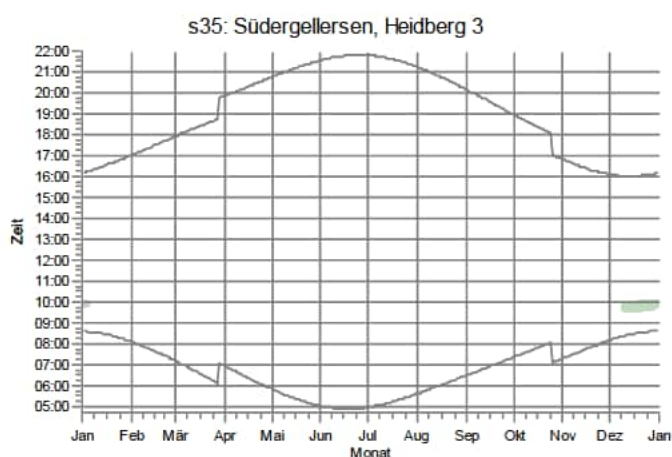
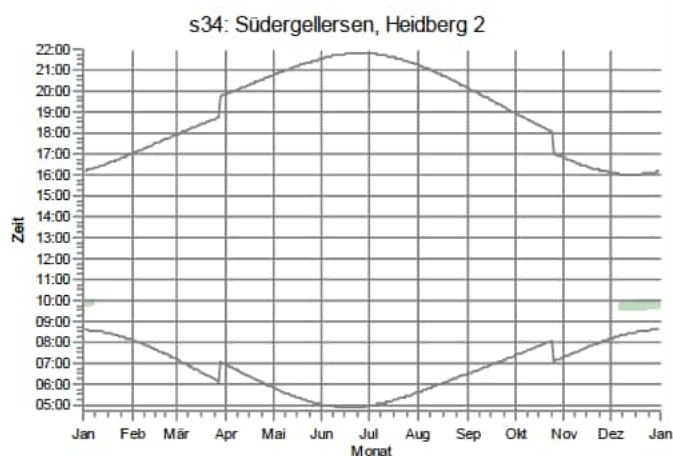
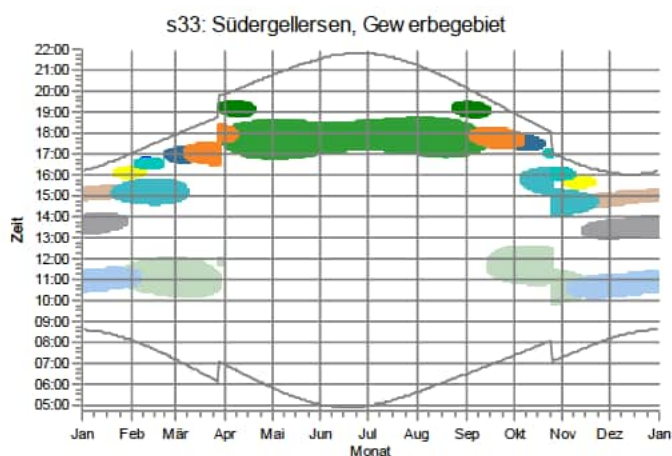
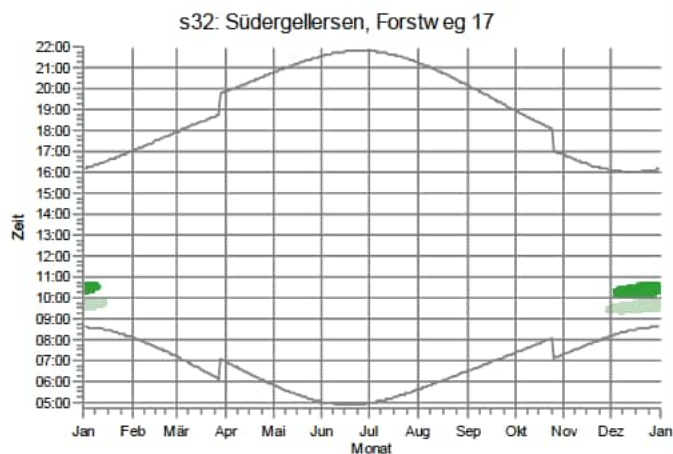
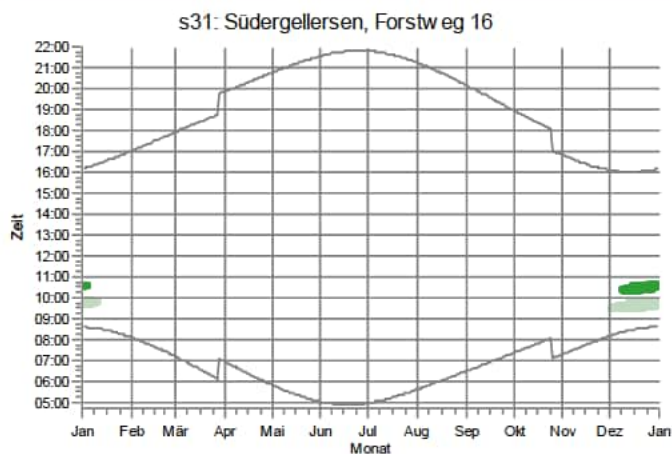
WEA

Oerzen 1: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (79)

Rep 11: NORDEX N175/6.X 6800 175.0 I-H NH: 179,0 m (Ges:266,5 m) (111)

## SHADOW - Grafischer Kalender

Berechnung: Vorbelastung 23 Bestand



WEA

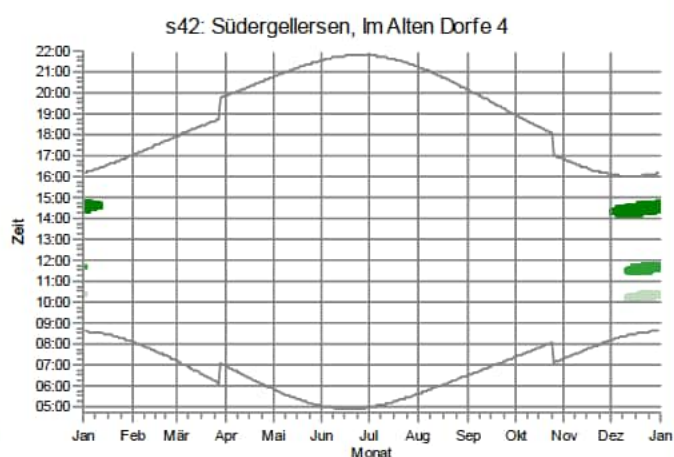
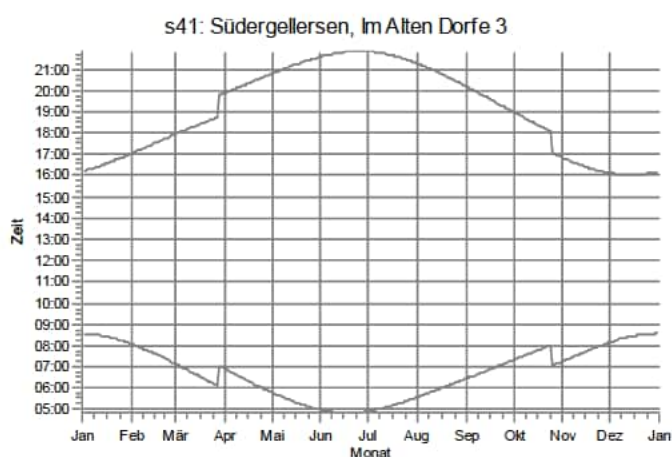
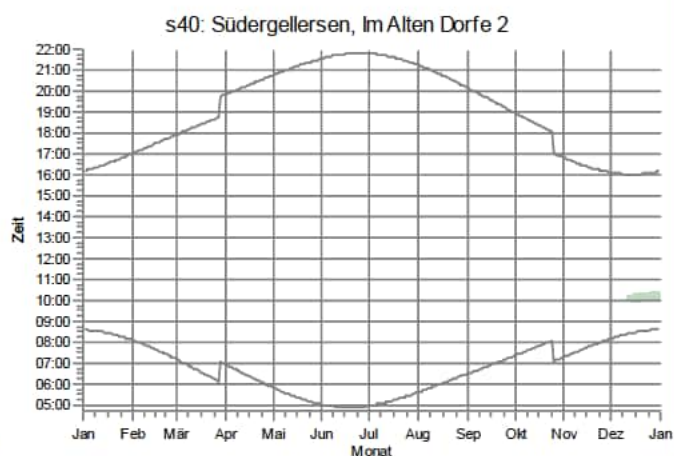
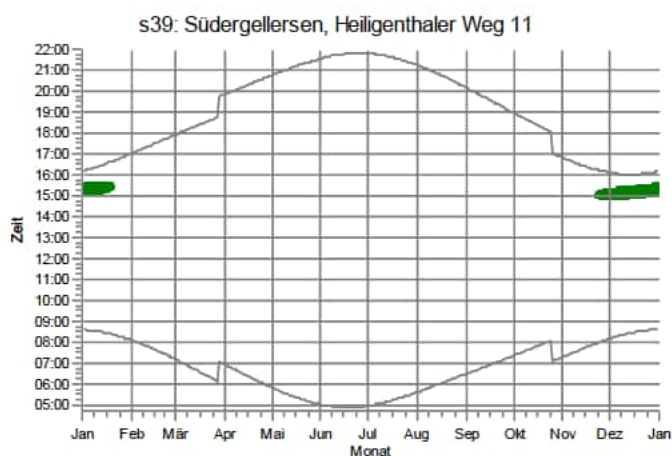
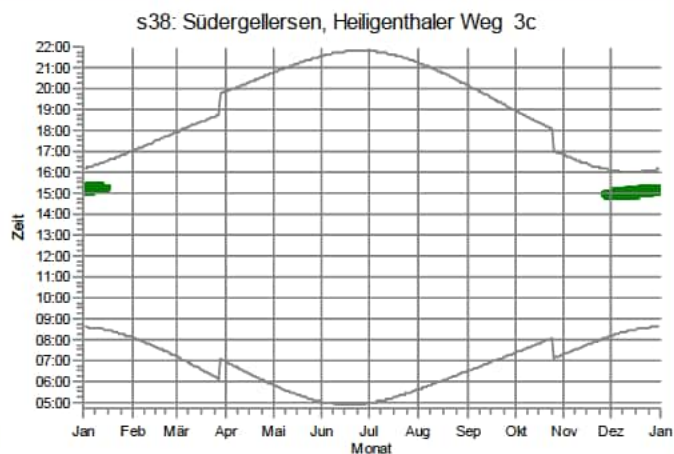
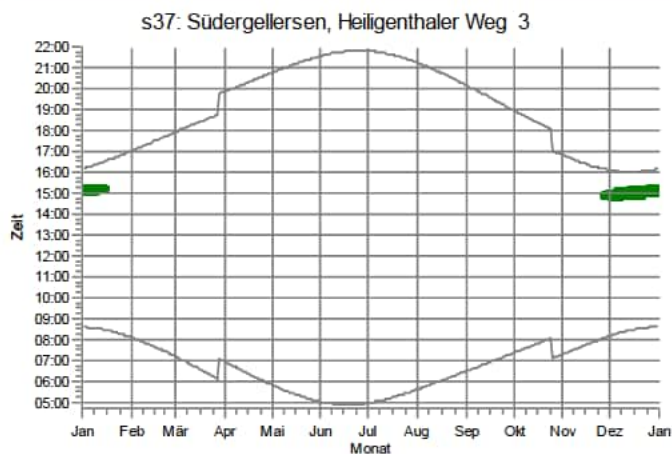
B 01: NORDEX N149/4.0-4.5 4500 149.0 101 NH: 125,0 m (Ges:199,5 m) (101)  
B 02: NORDEX N131/3300 DE 3300 131.0 11 NH: 134,0 m (Ges:199,5 m) (120)  
B 03: GE WIND ENERGY GE 2.75-120 2750 120.0 101 NH: 139,0 m (Ges:199,0 m) (94)  
Oerzen 1: NORDEX N175/6.X 6800 175.0 11 NH: 179,0 m (Ges:266,5 m) (79)  
Oerzen 2: NORDEX N175/6.X 6800 175.0 11 NH: 179,0 m (Ges:266,5 m) (80)  
Oerzen 3: NORDEX N175/6.X 6800 175.0 11 NH: 179,0 m (Ges:266,5 m) (81)

Oerzen 4: NORDEX N175/6.X 6800 175.0 11 NH: 179,0 m (Ges:266,5 m) (82)  
Rep 10: NORDEX N175/6.X 6800 175.0 11 NH: 179,0 m (Ges:266,5 m) (110)  
Rep 11: NORDEX N175/6.X 6800 175.0 11 NH: 179,0 m (Ges:266,5 m) (111)  
Rep 5: NORDEX N175/6.X 6800 175.0 11 NH: 179,0 m (Ges:266,5 m) (107)  
Rep 8: NORDEX N175/6.X 6800 175.0 11 NH: 179,0 m (Ges:266,5 m) (108)  
Rep 9: NORDEX N175/6.X 6800 175.0 11 NH: 179,0 m (Ges:266,5 m) (109)



## SHADOW - Grafischer Kalender

**Berechnung:** Vorbelastung 23 Bestand



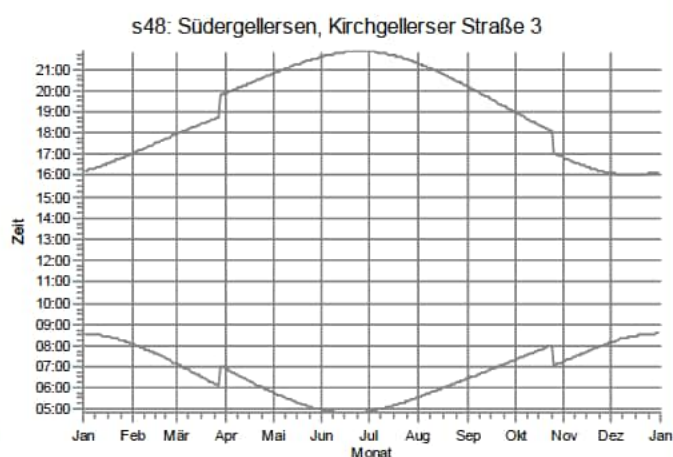
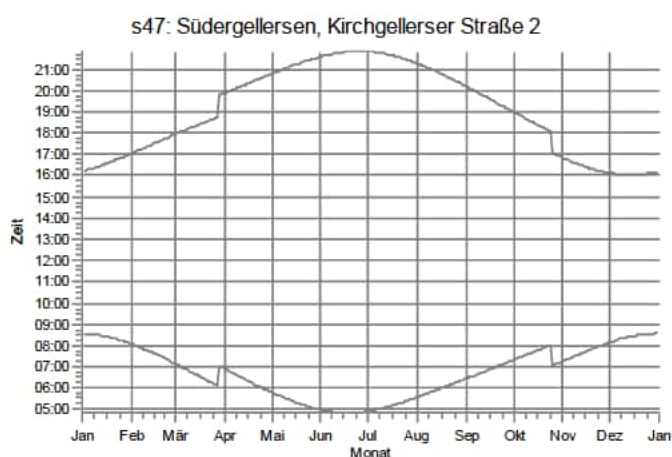
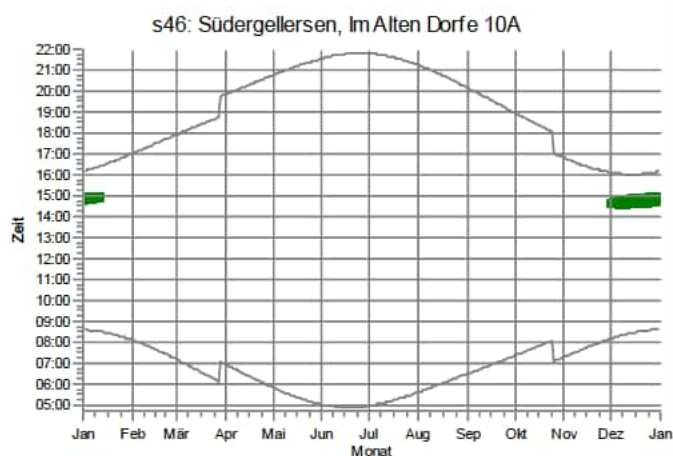
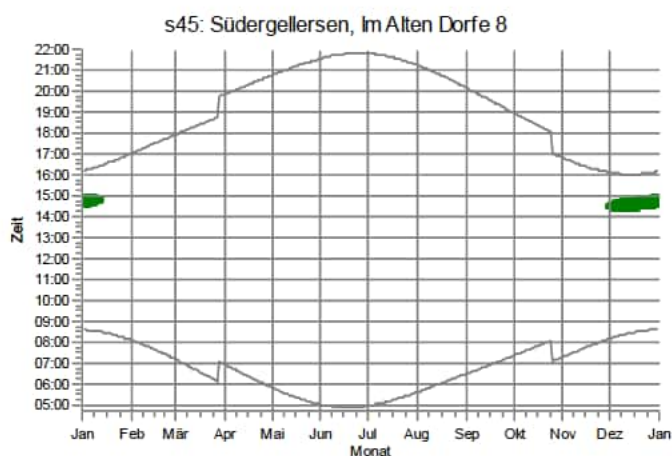
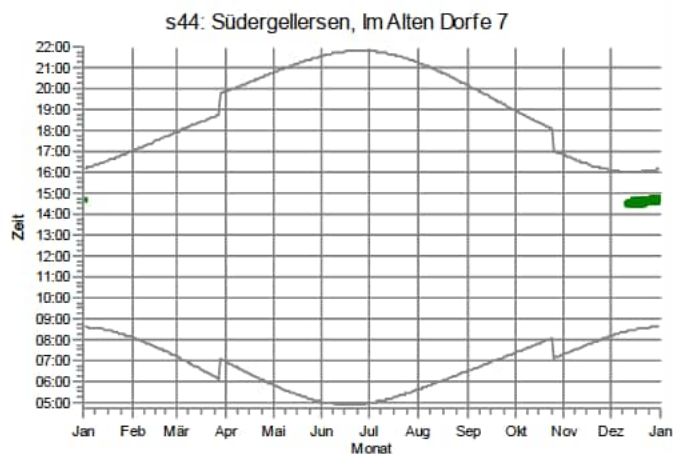
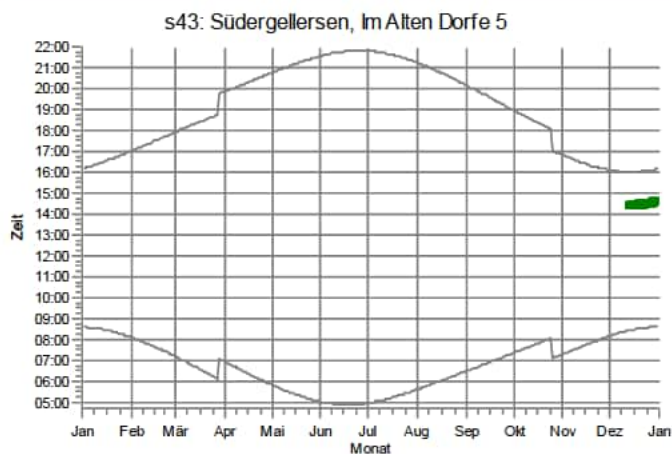
WEA

B 01: NORDEX N149/4.0-4.5 4500 149.0 I-1 NH: 125,0 m (Ges:199,5 m) (101)  
Oerzen 1: NORDEX N175/6.X 6800 175.0 I-1 NH: 179,0 m (Ges:266,5 m) (79)

Rep 11: NORDEX N175/6.X 6800 175.0 I-1 NH: 179,0 m (Ges:266,5 m) (111)

## SHADOW - Grafischer Kalender

**Berechnung:** Vorbelastung 23 Bestand



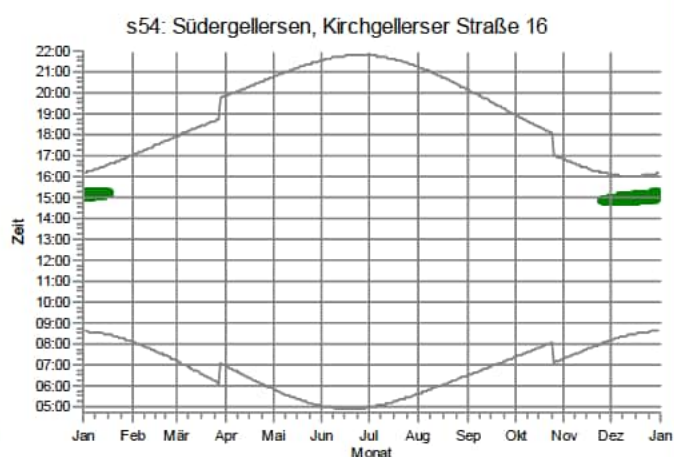
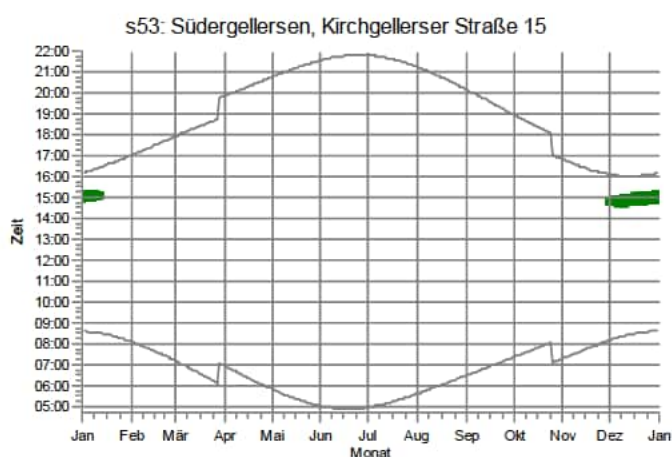
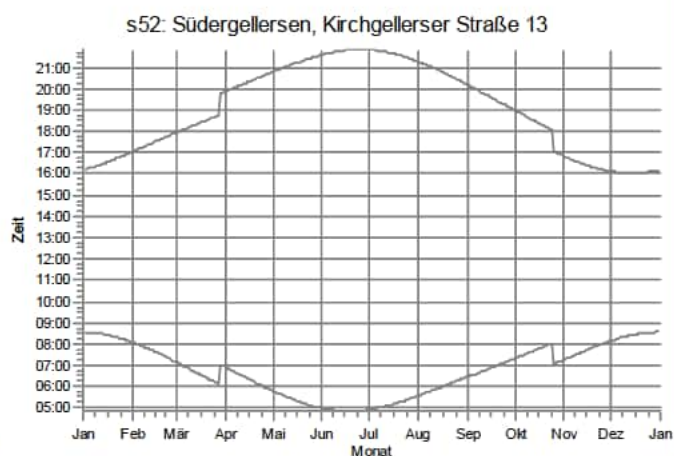
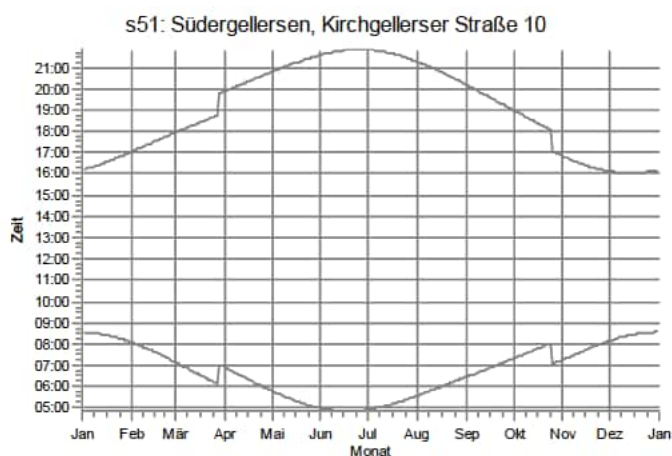
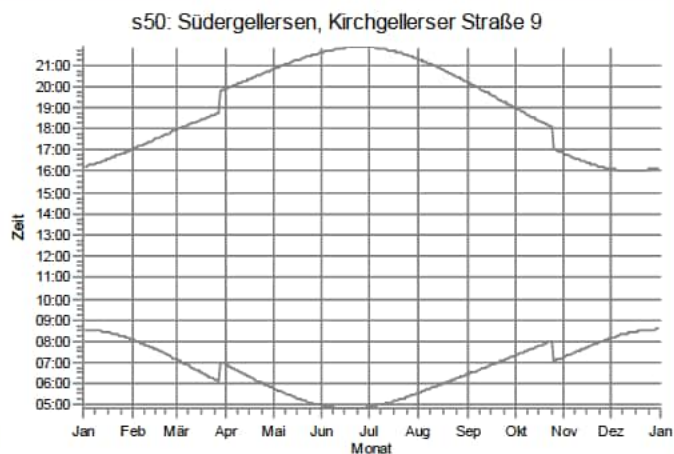
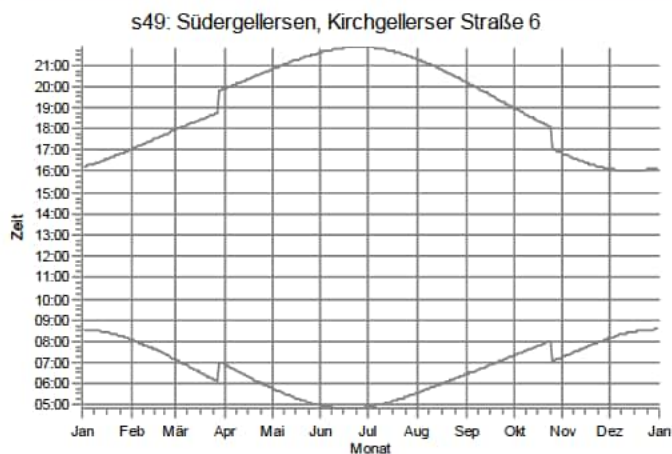
WEA

B 01: NORDEX N149/4.0-4.5 4500 149.0 10! NH: 125,0 m (Ges:199,5 m) (101)



## SHADOW - Grafischer Kalender

Berechnung: Vorbelastung 23 Bestand

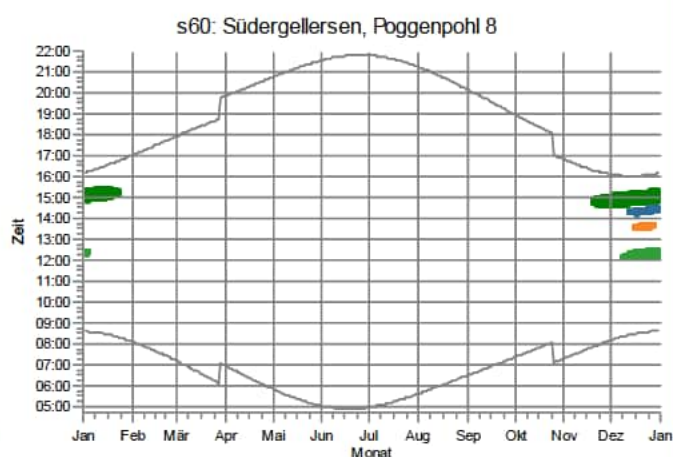
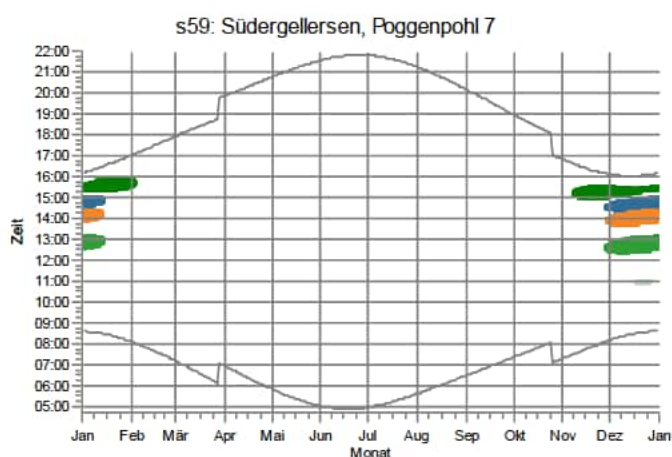
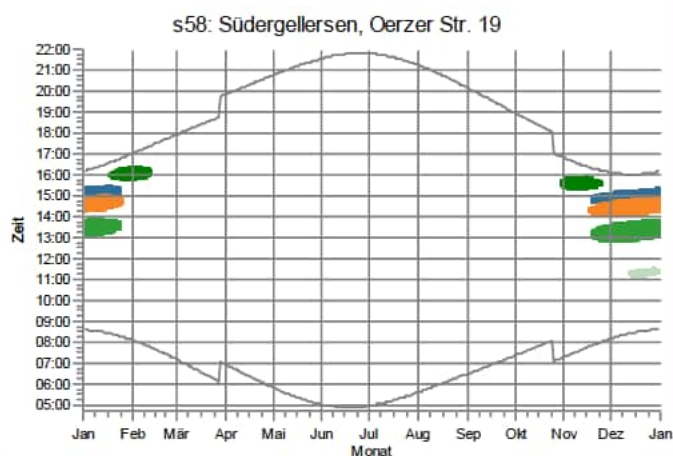
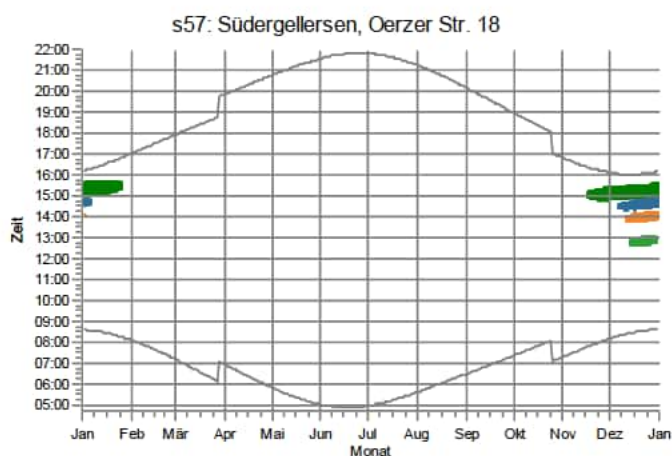
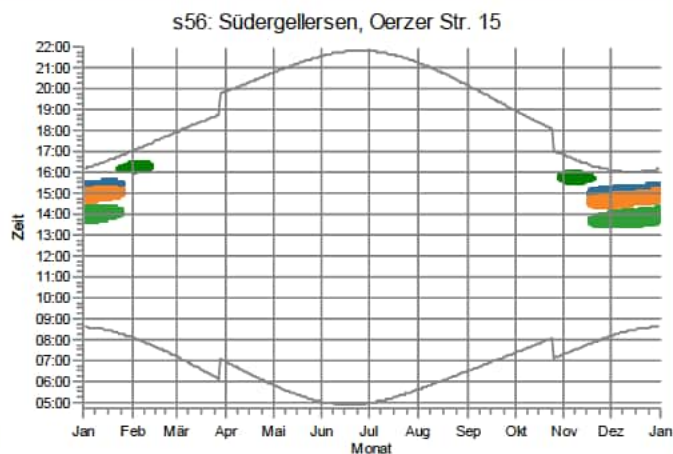
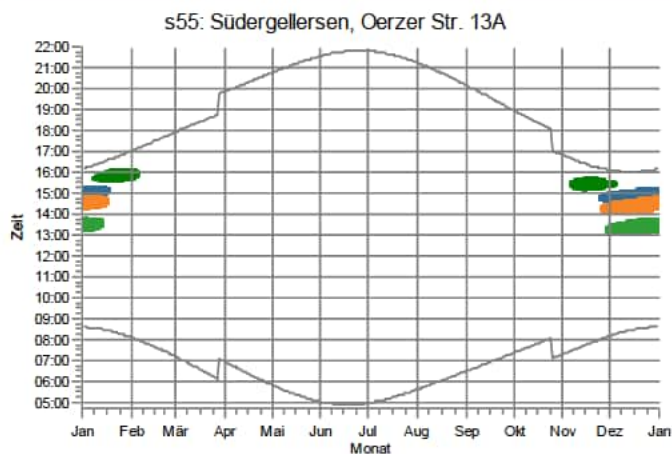


WEA

B 01: NORDEX N149/4.0-4.5 4500 149.0 101 NH: 125,0 m (Ges:199,5 m) (101)

## SHADOW - Grafischer Kalender

**Berechnung:** Vorbelastung 23 Bestand



WEA

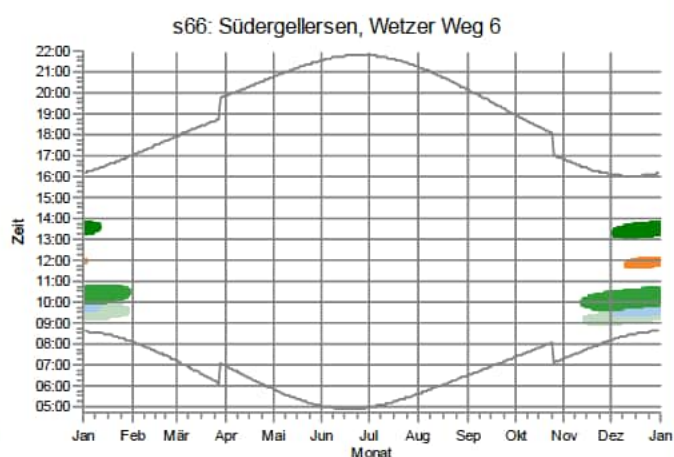
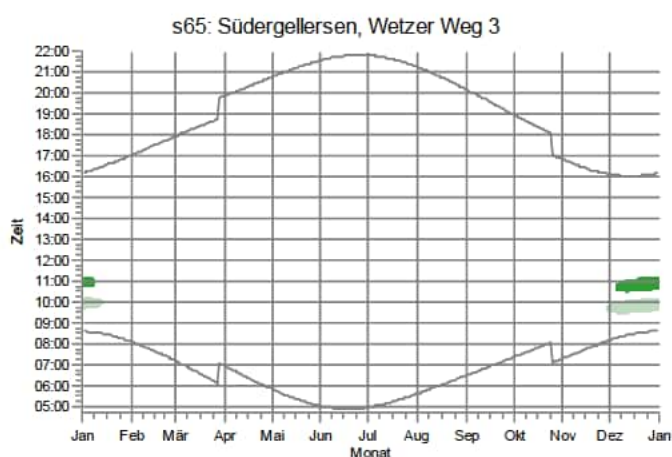
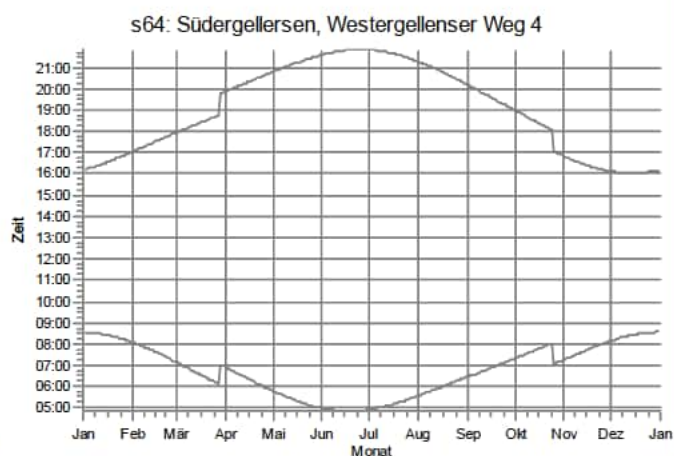
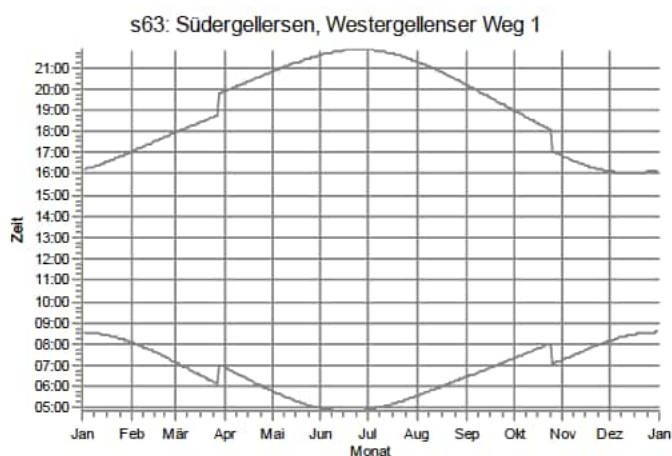
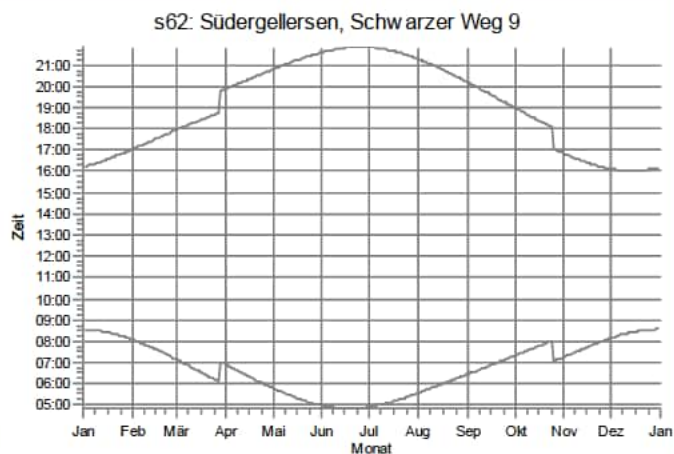
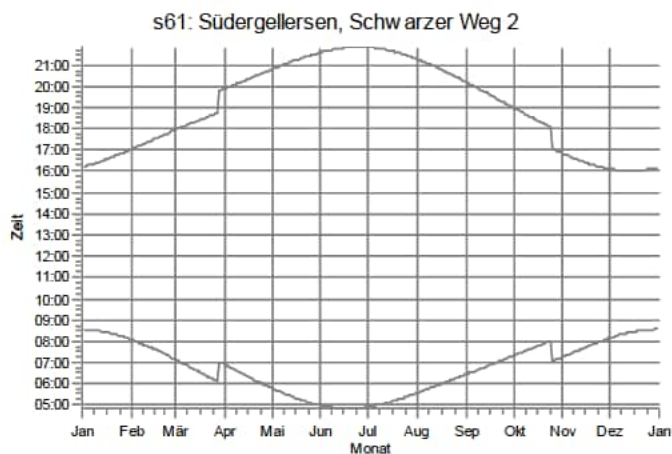
B 01: NORDEX N149/4.0-4.5 4500 149.0 I-1 NH: 125,0 m (Ges:199,5 m) (101)  
Oerzen 1: NORDEX N175/6.X 6800 175.0 I-1 NH: 179,0 m (Ges:266,5 m) (79)  
Rep 11: NORDEX N175/6.X 6800 175.0 I-1 NH: 179,0 m (Ges:266,5 m) (111)

Rep 8: NORDEX N175/6.X 6800 175.0 I-1 NH: 179,0 m (Ges:266,5 m) (108)  
Rep 9: NORDEX N175/6.X 6800 175.0 I-1 NH: 179,0 m (Ges:266,5 m) (109)



## SHADOW - Grafischer Kalender

Berechnung: Vorbelastung 23 Bestand



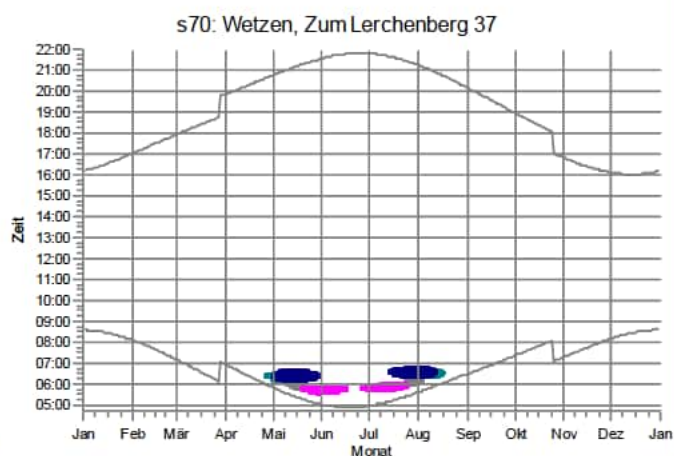
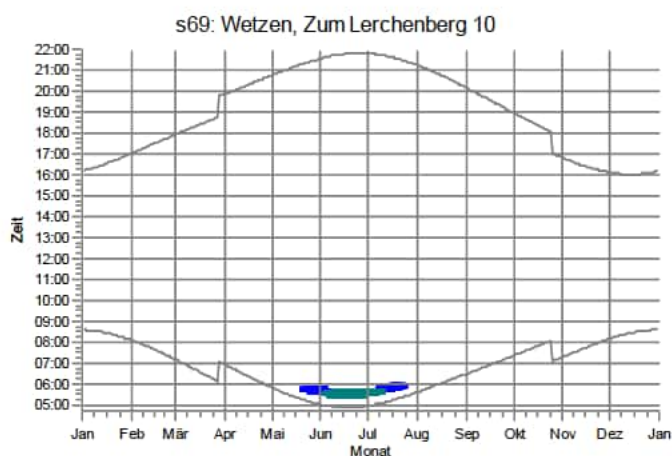
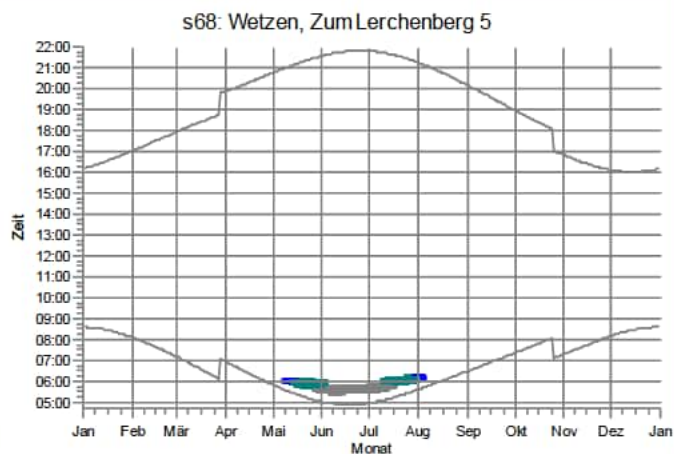
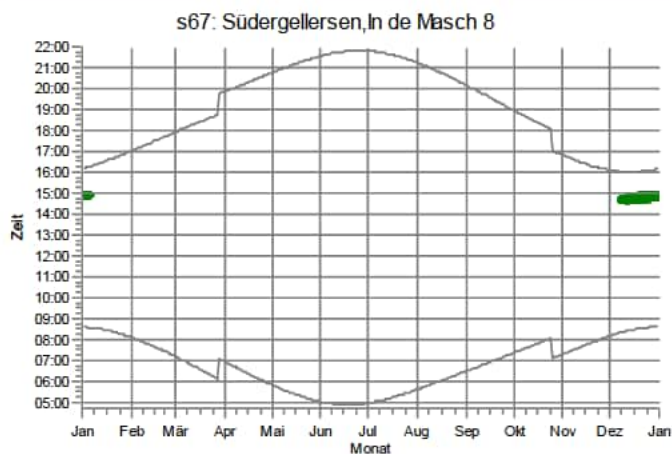
WEA

B 01: NORDEX N149/4.0-4.5 4500 149.0 I-1 NH: 125,0 m (Ges:199,5 m) (101)  
Oerzen 1: NORDEX N175/6.X 6800 175.0 I-1 NH: 179,0 m (Ges:266,5 m) (79)  
Oerzen 2: NORDEX N175/6.X 6800 175.0 I-1 NH: 179,0 m (Ges:266,5 m) (80)

Rep 11: NORDEX N175/6.X 6800 175.0 I-1 NH: 179,0 m (Ges:266,5 m) (111)  
Rep 9: NORDEX N175/6.X 6800 175.0 I-1 NH: 179,0 m (Ges:266,5 m) (109)

## SHADOW - Grafischer Kalender

**Berechnung:** Vorbelastung 23 Bestand



### WEA

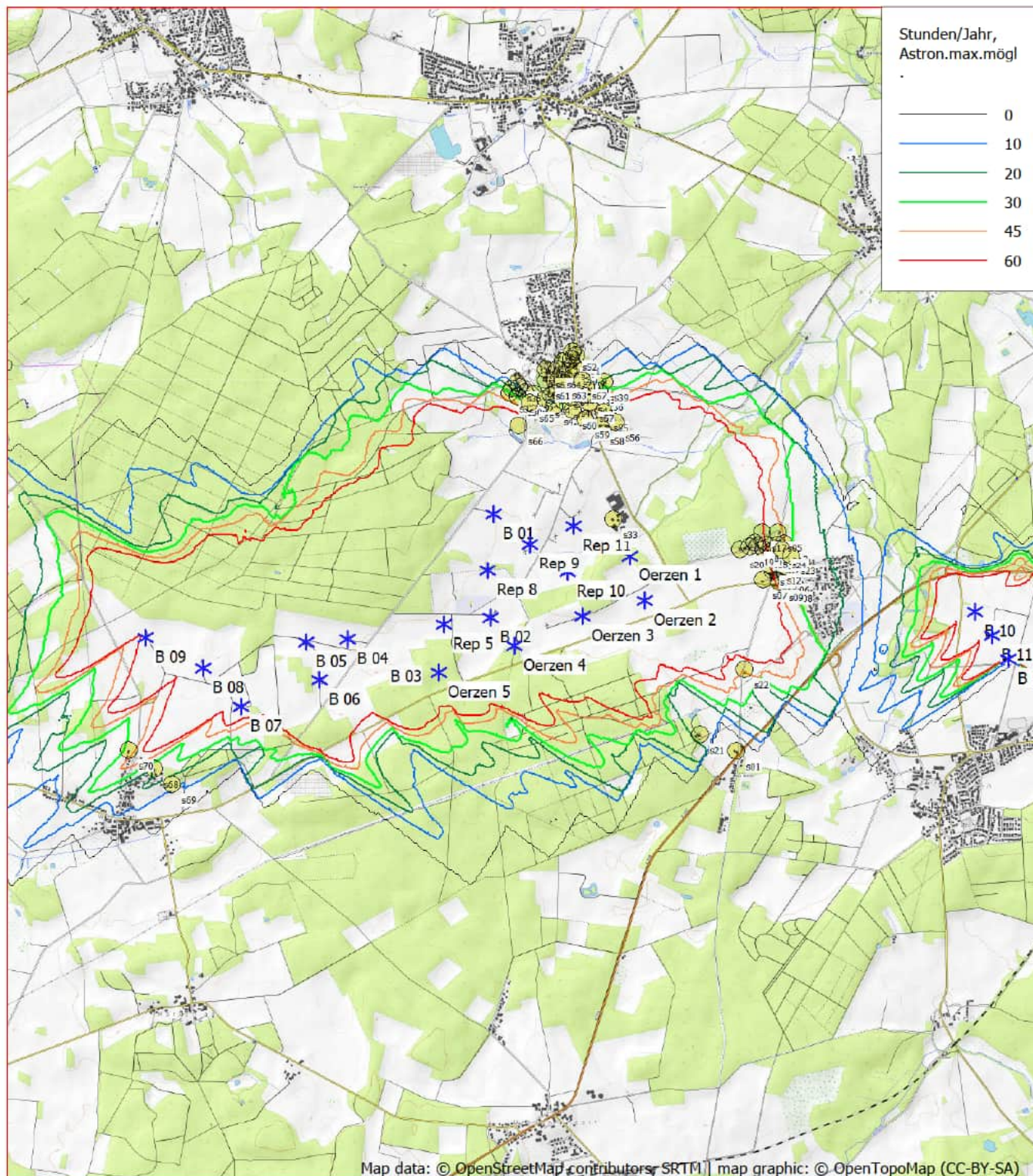
B 01: NORDEX N149/4.0-4.5 4500 149.0 IOI NH: 125,0 m (Ges:199,5 m) (101)  
B 03: GE WIND ENERGY GE 2.75-120 2750 120.0 IOI NH: 139,0 m (Ges:199,0 m) (94)  
B 04: GE WIND ENERGY GE 2.75-120 2750 120.0 IOI NH: 139,0 m (Ges:199,0 m) (95)

B 05: GE WIND ENERGY GE 2.75-120 2750 120.0 IOI NH: 139,0 m (Ges:199,0 m) (96)  
B 06: GE WIND ENERGY GE 2.75-120 2750 120.0 IOI NH: 139,0 m (Ges:199,0 m) (97)  
B 07: GE WIND ENERGY GE 2.75-120 2750 120.0 IOI NH: 139,0 m (Ges:199,0 m) (98)



## SHADOW - Karte

**Berechnung:** Vorbelastung 23 Bestand



0 500 1000 1500 2000 m

Karte: OpenTopoMap.org, Maßstab 1:50.000, Mitte: UTM (north)-ETRS89 Zone: 32 Ost: 586.120,0 Nord: 5.894.340,0

\* Existierende WEA ☼ Schattenrezeptor

Höhe der Schattenkarte: Höhenlinien: CONTOURLINE\_ONLINEDATA\_0.wpo (1)

Zeitschritt: 2 Minuten, Schrittweite: 2 Tag(e), Kartenaufösung: 20 m, Sichtbarkeit Auflösung: 5 m, Augenhöhe: 1,5 m

