

Schattenwurfanalyse

zum

Bebauungsplan „Windeignungsgebiet Bandelow-Lübbenow, Teil 1: Bandelow“

Gemeinde Uckerland

Landkreis Uckermark

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Literatur:

- Leitlinie des Ministeriums für Landwirtschaft, Umweltschutz und Raumordnung des Landes Brandenburg zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (WEA-Schattenwurf-Leitlinie) vom 24. März 2003 geändert durch den Erlass vom 28. Februar 2015

1 Einleitung /Aufgabenstellung

Windkraftanlagen (WKA) werfen bei Sonnenschein aufgrund der baulichen Abmessungen einen Schatten. Je nach Standort der WKA kann vom Schattenwurf des sich drehenden Rotors eine unerwünschte Beeinträchtigung für Menschen ausgehen. Aus der Rotordrehzahl und der Anzahl der Rotorblätter einer WKA ergibt sich die jeweilige Frequenz, mit der stark wechselnde Lichtverhältnisse im Schattenbereich der Rotorkreisfläche auftreten können. Es handelt sich in der Regel um niedrige Frequenzen im Bereich von 0,5 bis 3 Hz, mit der für den Betrachter die Lichtverhältnisse (hell/dunkel) wechseln; je nach Intensität, Frequenz und Häufigkeit der wechselnden Lichtverhältnisse können für Personen, die sich längere Zeit im Schattenbereich des Rotors aufhalten, Beeinträchtigungen entstehen.

Im Hoheitsgebiet der Gemeinde Uckerland im Landkreis Uckermark sind Flächen als Windeignungsgebiete ausgewiesen. Für eine geordnete städtebauliche Entwicklung für die Errichtung von Windkraftanlagen stellt die Gemeinde Uckerland den Bebauungsplan **„Windeignungsgebiet Bandelow-Lübbenow, Teil 1: Bandelow“** auf.

Für einen Teil des rechtskräftigen Eignungsgebietes für Windenergienutzung Nr. 01 **„Bandelow“** des Regionalplanes Uckermark-Barnim werden die bauplanungsrechtlichen Voraussetzungen für die Errichtung und den Betrieb von bis zu 19 Windkraftanlagen (WKA) geschaffen.

Gegenstand dieser Schallimmissionsprognose ist die Ermittlung der möglichen Schattenwurfzeiten von insgesamt 23 bestehenden bzw. beantragten WKA aus dem Windeignungsgebiet (WEG) Nr. 01 **„Bandelow“** und Nr. 15 **„Lübbenow“** (14 WKA Bestand und 9 WKA im Genehmigungsverfahren) sowie den 19 hier möglichen Standorten aus dem Bebauungsplan **„WEG Bandelow-Lübbenow, Teil 1: Bandelow“**.

Die hier vorliegende Betrachtung prognostiziert die maximal mögliche Schattenwurfdauer an den einzelnen relevanten Immissionsorten im Einwirkungsbereich rund um die geplanten Baugrenzen für Windkraftanlagen.

Die Berechnung der theoretisch maximalen Schattenwurfdauer für insgesamt 42 WKA erfolgt als Linien gleicher Schattenwurfdauer und für die einzelnen Immissionsorte (Schattenrezeptoren).

Grundlage und Voraussetzungen der Berechnung sind:

- Entwurf mit festgesetzten Baugrenzen (BG) für Standorte
- Topographische Karte mit Lage der Immissionspunkte
- Die Sonne scheint den ganzen Tag, an allen Tagen im Jahr (wolkenloser Himmel)
- Windrichtung entspricht dem Azimutwinkel der Sonne (max. Schatten)
- Windkraftanlagen sind an allen Tagen im Jahr in Betrieb und drehen sich

2 Schattenwurf von Windkraftanlagen

Die Weltorganisation für Meteorologie (WMO) hat festgelegt, dass man von Sonnenschein spricht, wenn die Bestrahlungsstärke der direkten Sonnenstrahlung mindestens 120 W/m² beträgt.

Bei Sonnenschein beeinflussen die folgenden drei meteorologischen Effekte die Größe des Schattenwurfes und die Dauer der Beschattung (reale Beschattung):

- Sonnenstand
- Bewölkung / Wetterlage
- Windrichtung

Aufgrund der o.g. Effekte reduziert sich die reale Beschattungsdauer um ca. 70%

gegenüber der theoretisch maximalen Beschattungsdauer.

2.1 Einfluss des Sonnenstandes

Befinden sich im Strahlengang undurchsichtige oder nicht völlig durchsichtige Körper (Hindernisse), so entsteht infolge Ablendung des Lichtes (oder allgemein der Strahlung) eine nicht oder weniger belichtete (bestrahlte) Fläche, die als Schatten bezeichnet wird. Derartige Hindernisse können sich am Himmel befinden, wie z.B. Wolken oder Flugzeuge, oder an der Erdoberfläche, wie Bewuchs (Bäume, Hecken), Hügel oder Bauten. Durch diese Zusammenstellung soll veranschaulicht werden, dass Beschattung durch WKA nur einer der vielen Lichteffekte ist, die uns im täglichen Leben begegnen.

Es wird auch der Begriff „Schlagschatten“ verwendet, um anzudeuten, dass die Umrisse des Hindernisses sich am Schattenrand scharf abzeichnen. Der Begriff „Halbschatten“ bedeutet, dass andere Lichtquellen hinter ein Hindernis leuchten und den Schatten aufhellen. Die direkte Sonnenstrahlung wird auch durch Streuung und Absorption in der Atmosphäre geschwächt. Der Linke-Trübungsfaktor T_L ist ein Maß für die optische Dicke der getrübbten und feuchten Atmosphäre. Für den Linke-Trübungsfaktor T_L gelten folgende Richtwerte.

Tab. 1: Typische Werte für T_L in Deutschland

Luftmasse	T_L
sehr reine frische Luft	2
reine Warmluft	3
gealterte oder feuchtwarme Luft	4-6
verunreinigte Luft	>6

Je flacher die Sonne über dem Horizont steht, desto dicker ist die durchstrahlte Atmosphäre. Beim Passieren der Atmosphäre kann die direkte Sonnenstrahlung derart geschwächt werden, dass weniger als 120 W/m^2 den Erdboden erreichen. Das ist z.B. bei einem Sonnenhöhenwinkel von $7,5^\circ$ der Fall, wenn eine gealterte oder feuchtwarme Luft mit einem Trübungsfaktor $T_L=5$ vorliegt.

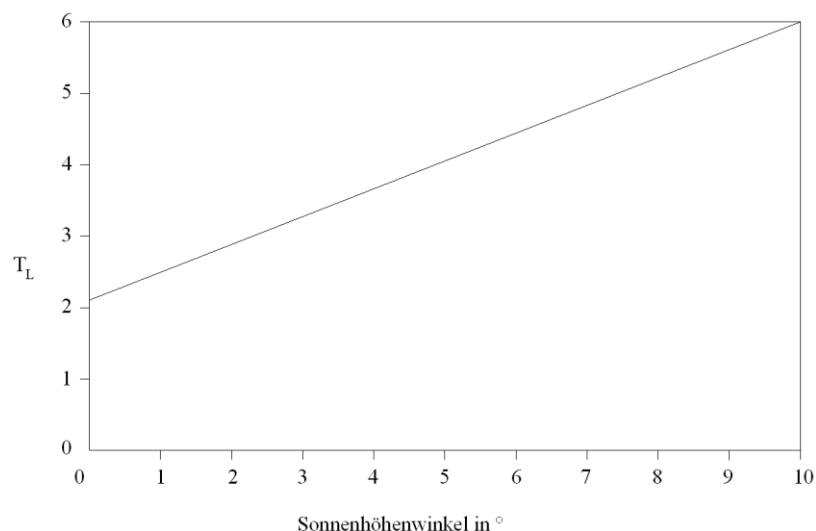


Abb. 1: Reduktion der direkten Sonneneinstrahlung auf 120 W/m^2 in Abhängigkeit vom Sonnenhöhenwinkel und Linke-Trübungsfaktor

Aufgrund des langen Weges der Sonnenstrahlen in den frühen Morgen- und den späten Abendstunden (zusätzlich gealterte Luft) durch die Atmosphäre, kann generell davon ausgegangen werden, dass unterhalb eines Kappungswinkels von 3° die Sonneneinstrahlung weniger als 120 W/m^2 beträgt.

2.2 Einfluss der Bewölkung

Wenn die Sonne von Wolken verdeckt wird, kann durch die Windkraftanlage kein Schatten entstehen. Mit Hilfe der Messdaten zur Sonnenscheindauer an Klimastationen des Deutschen Wetterdienstes DWD lässt sich feststellen, wie lange im Mittel direkte, schattenwerfende Sonnenstrahlung auftritt.

Tabelle 2 gibt für jeden Monat die Sonnenscheindauer in Minuten pro Tagesstunde an, z.B. scheint im Monat Mai die Sonne zwischen 10 Uhr und 11 Uhr im Mittel 32 Minuten lang.

Nur während dieser 32 Minuten kann Schattenwurf auftreten.

Tab. 2: Durchschnittliche Sonnenscheindauer pro Tagesstunde

Monat WOZ	Jan.	Febr.	März	April	Mai	Juni	Juli	August	Sept.	Okt.	Nov.	Dez.
03-04												
04-05					4	7	5	1				
05-06				4	17	19	17	8				
06-07			1	13	24	23	24	21	6			
07-08		2	7	23	29	23	26	28	17	4	1	
08-09	2	10	16	26	29	25	26	29	23	14	5	1
09-10	8	14	19	28	31	26	29	34	26	20	13	6
10-11	13	19	20	35	32	27	30	34	27	22	16	10
11-12	14	21	21	31	33	29	32	34	26	24	17	12
12-13	13	22	20	31	34	29	32	35	26	22	18	13
13-14	11	21	20	30	34	29	32	34	25	20	16	11
14-15	7	18	19	28	34	29	30	33	22	20	14	5
15-16	1	11	16	26	34	28	31	32	20	24	5	
16-17		2	10	23	32	27	29	29	16	4		
17-18			2	17	29	26	25	22	4			
18-19				3	20	22	19	8				
19-20					4	8	4					
20-21												

2.3 Einfluss der Windrichtung

Die Rotationsscheibe ruft auf der Erdoberfläche einen elliptischen Schatten hervor. Dieser hat seine größte Breite, wenn die Scheibe senkrecht zur Sonnenrichtung steht, d.h. wenn der Wind aus der Richtung oder in die Richtung zur Sonne weht. Dreht der Wind aus dieser Richtung heraus, so wird der elliptische Schatten zunehmend schmaler. Für den Fall, dass Windrichtung und Sonneneinstrahlung senkrecht aufeinander stehen, hat der Schatten die Form eines Striches, kann also unberücksichtigt bleiben.

3 Berechnung der Schattenwurfdauer

3.1 Richtlinien

Das Ministerium für Umwelt, Gesundheit und Verbraucherschutz des Landes Brandenburg hat am 24. März 2003, geändert durch den Erlass vom 28. Februar 2015, eine Leitlinie zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (WEA-Schattenwurf-Leitlinie) herausgegeben.

Die Richtwerte für die Schattenwurfzeiten an einem Immissionspunkt (Rezeptor) bei permanentem Sonnenschein liegen bei maximal 30 Stunden im Jahr und 30 Minuten am Tag. Bei Überschreitung des Tag-Richtwertes an mindestens **drei** Tagen im Jahr ist durch geeignete Maßnahmen die Begrenzung der täglichen Beschattungsdauer auf 30 Minuten zu gewährleisten.

Die realen Schattenwurfzeiten sollen maximal 8 Stunden im Jahr nicht überschreiten.

Ein Expertengremium, das sich mit der Schattenwurfproblematik beschäftigt, hat festgestellt, dass der Einwirkungsbereich der Beeinträchtigungen durch den Schattenwurf bei ca. 20% Verdeckungsgrad (= Schattenintensität) der Sonne endet, da ab dieser Schattenintensität die Helligkeitsschwankungen durch den Schattenwurf kaum mehr wahrgenommen werden. Der Wert für den Verdeckungsgrad bzw. die Schattenintensität bestimmt sich über die Blattbreite (mittlere Blattiefe), den Sonnendurchmesser, die Entfernung zur Sonne und den Abstand zwischen WKA und Immissionspunkt (Rezeptor).

3.2 Kernschatten / Halbschatten

Zu unterscheiden sind im Wesentlichen der Kern- und der Halbschatten. Als Kernschatten bezeichnet man den Bereich des Schattens, der dadurch entsteht, dass keine direkte (Sonnen-) Strahlung diesen Bereich erreicht. Der Halbschatten ist durch teilweise Strahlungseinwirkung erhellt. Bei WKA ist der Kernschatten der Bereich, aus dem man die Sonne nicht sehen kann -sie also insgesamt durch das Rotorblatt verdeckt wird. Der Kernschatten sorgt für den Schlagschatten mit stark abgegrenzten Konturen. Der Abstand, ab dem nur noch ein Halbschatten vorhanden ist, lässt sich wie folgt berechnen:

Die Bedingung für Halbschatten lautet:

$$\alpha_{RB} < \alpha_S$$

Mit α_{RB} = vom Rotorblatt eingenommener Winkel
 α_S = von der Sonne eingenommener Winkel

Für die Winkel gilt:

$$\alpha_{RB} = \arctan(d/f)$$
$$\alpha_S = \arctan(D_s/A_{SE}) = 0,53^\circ$$

mit:

- der Abstand des Rotorblattes zum Betrachter wird mit f dargestellt
- das Maß des Rotorblattes an der breitesten Stelle – d
- A_{SE} bezeichnet den Abstand zwischen Sonne und Erde ($1,5 \times 10^8$ km) und
- D_s den Durchmesser der Sonne.

Es ergibt sich die Bedingung:

$$\alpha_{RB} < 0,53$$

Berechnet man das Verhältnis der durchschnittlichen Rotorblatttiefe im Verhältnis zum von der Sonne eingenommenen Winkel, so erhält man ein Verdeckungsverhältnis zwischen Sonne und Blattiefe. Dies wird als Schattenintensität bezeichnet. Man unterscheidet in Kernschattengrenze und Grenze der Schattenintensität von 20%.

3.3 Abschätzung der Schattendauer an den Immissionspunkten

3.3.1 Beschreibung der Immissionsorte und der Windkraftanlagenparameter

Es sollen insgesamt 42 WKA (23 WKA als Vorbelastung, 19 WKA mögliche Zusatzbelastung) betrachtet werden. In der Berechnung werden die umliegenden Wohnbebauungen im Einwirkungsbereich rund um die geplanten Standorte betrachtet.

Im Planverfahren werden keine Anlagentypen festgelegt. Die hier gewählten bzw. angewandten Parameter dienen zum Nachweis der Umsetzbarkeit des Bebauungsplanes und entsprechen den derzeit gängigen Größen von Windkraftanlagen. Der genaue Anlagentyp wird erst im immissionsschutzrechtlichen Genehmigungsverfahren (nach BImSchG) bestimmt.

Hersteller und Typ der WKA: n.n.
 Nennleistung: 5.300 kW
 Nabenhöhe: 151 m
 Rotordurchmesser: 158 m
 Beschattungsbereich: 1.799 m

Innerhalb der festgesetzten Baugrenze (BG) dürfen Windkraftanlagen errichtet werden und so können zu den hier angenommenen Standorten, im geometrischen Schwerpunkt der Baugrenze, leichte Standortverschiebungen innerhalb der Baugrenze möglich sein.

Tab. 3: Standorte der geplanten WKA innerhalb der festgesetzten Baugrenzen

Anlage Bez.	Typ	UTM Koordinaten WGS 84 Zone 33N		Geographische Koordinaten WGS 84	
		Rechts	Hoch	Länge	Breite
BG01	n.n.	421.351	5.919.209	13,8166333	53,4160724
BG02	n.n.	422.018	5.919.204	13,8266681	53,4161265
BG03	n.n.	421.683	5.918.983	13,8216837	53,4140908
BG04	n.n.	421.347	5.918.726	13,8166937	53,4117312
BG05	n.n.	422.082	5.918.834	13,8277222	53,4128108
BG06	n.n.	421.691	5.918.493	13,8219257	53,4096884
BG07	n.n.	421.110	5.918.336	13,8132265	53,4081909
BG08	n.n.	422.132	5.918.381	13,8285862	53,4087471
BG09	n.n.	421.856	5.918.108	13,8245028	53,4062529
BG10	n.n.	421.042	5.917.963	13,8122972	53,4048286
BG11	n.n.	421.445	5.918.013	13,8183453	53,4053381
BG12	n.n.	422.188	5.917.978	13,8295279	53,4051336
BG13	n.n.	422.518	5.917.857	13,8345204	53,4040947
BG14	n.n.	421.764	5.917.651	13,8232325	53,4021322
BG15	n.n.	422.193	5.917.621	13,8296911	53,4019260
BG16	n.n.	422.902	5.917.681	13,8403382	53,4025693
BG17	n.n.	423.415	5.917.504	13,8480957	53,4010532
BG18	n.n.	423.888	5.917.598	13,8551858	53,4019664
BG19	n.n.	423.753	5.917.189	13,8532545	53,3982712

Vorbelastung:

Als zu berücksichtigende bzw. zu prüfende Vorbelastung wurde durch das Referat T22 des Landesamtes für Umwelt die WEG „Bandelow“, „Hetzdorf“ und „Lübbenow“ am 04.05.2018 und 12.06.2018 mitgeteilt.

Als Vorbelastung einzustellen sind 23 beantragte und in Betrieb befindliche WKA in dem WEG „Bandelow“ und „Lübbenow“ (14 WKA Bestand, und 9 WKA im Genehmigungsverfahren).

Für die Vorbelastung aus dem WEG „Hetzdorf“ zeigen die Berechnungen (siehe Anhang), dass keiner der zu berücksichtigenden IO innerhalb des Einwirkungsbereiches der WKA liegen. Daher sind diese WKA für die vorliegende Schattenwurfanalyse irrelevant und nicht zu berücksichtigen.

Die technischen Daten und die Standorte der geplanten, beantragten, und errichteten WKA können dem Emissionsquellenplan in der Anlage A1 entnommen werden.

Immissionsorte:

In der Berechnung werden die umliegenden Wohnbebauungen betrachtet. Die Rezeptoren sind nach den örtlichen Gegebenheiten im Einwirkungsbereich der WKA oder an den Ortsrändern mit der höchsten Nähe zum Plangebiet ausgewählt. Um alle Neigungen bzw.

möglichen Winkel vorhandener Fenster abzudecken, wurde der Gewächshausmodus eingestellt.

Tab. 4: Adressen und Koordinaten der Immissionsorte (IO)

Bez. IO		Lagebeschreibung / Adresse	UTM Koordinaten WGS 84 Zone 33N	
			Rechts	Hoch
A	KS	Karlstein 1, Uckerland-Karlstein	421.108	5.920.274
B		Karlstein 2, Uckerland-Karlstein	421.241	5.920.310
C		Karlstein 16, Uckerland-Karlstein	421.450	5.920.286
D		Karlstein 15, Uckerland-Karlstein	421.594	5.920.188
E		Karlstein 13, Uckerland-Karlstein	421.770	5.920.170
F	BL	Bandelow 17E, Uckerland-Bandelow	423.119	5.918.783
G		Bandelow 16A, Uckerland-Bandelow	423.172	5.918.746
H		Bandelow 15, Uckerland-Bandelow	423.279	5.918.684
I		Bandelow 11, Uckerland-Bandelow	423.368	5.918.692
J		Bandelow 1, Uckerland-Bandelow	423.453	5.918.520
K	LI	Dorfstr. 82, Prenzlau (Lindenhof)	421.577	5.916.052
L	LH	Lauenhof 1, Uckerland	421.009	5.916.958
M	JW	Jagow 74c, Uckerland-Jagow	419.960	5.919.386
N		Jagow 77, Uckerland-Jagow	420.093	5.919.358
O		Jagow 1, Uckerland-Jagow	420.322	5.919.532

3.3.2 Berechnung und Bewertung der Schattenwurfdauer

Die Berechnung der Schattenwurfzeiten wird mit der Software WindPRO SHADOW der Firma EMD durchgeführt. Dieses Programm berücksichtigt die bisherigen Erkenntnisse aus der Expertenrunde des staatlichen Umweltamtes Schleswig. Eine Kappung wird unterhalb des Sonnenstandes von 3° durchgeführt.

Das Berechnungsmodell geht von einer sogenannten "worst case" Situation aus. Das bedeutet, dass angenommen wird, dass die Sonne an 365 Tagen im Jahr scheint, dass die Windkraftanlagen das ganze Jahr über permanent drehen und dass die Anlagen in einem 90° Winkel zu den einzelnen Rezeptoren stehen. Zudem sind alle Rezeptoren so zu den Emissionsquellen (Windkraftanlagen) ausgerichtet, dass das schützenswerte Objekt zu 100% von dem Schattenwurf betroffen ist.

Die Ergebnisse des Prognoseverfahrens zur Ermittlung der theoretischen Beschattung weisen i.d.R. erheblich höhere Beschattungszeiten auf, als effektiv vorliegen werden. Das Verfahren geht von dem worst case Fall aus. In der Realität ist von erheblich geringeren Beschattungszeiten an den relevanten Immissionspunkten auszugehen.

Die Abweichungen beruhen auf folgende Annahmen:

1. an 365 Tagen liegen Witterungs- und Betriebsbedingungen vor, die den Schattenwurf maximieren
 - 365 Tage Windgeschwindigkeiten über 3 m/s bis unter 25 m/s
 - Azimutwinkel der Gondel steht im 90° Winkel zum relevanten Immissionspunkt
 - 365 Tage Sonnenschein
2. das Modell beruht auf einem geometrischen Rechenmodell
 - unendliche Ausdehnung der Sonnenstrahlung
 - die Rotorblätter werden als schattenwerfende strukturlose Kreisscheibe angenommen / Einfluss der Flügelform wird vernachlässigt
 - der Einfluss der Atmosphäre wird vernachlässigt

Daher ist von einer realen Beschattungsdauer auszugehen, die um 70% niedriger ausfällt als die theoretisch ermittelte Dauer. Dies ergibt sich aus den folgenden Umständen:

- a) Die Windverhältnisse liegen insgesamt nur an 75% der Jahresstunden im Betriebsbereich.
- b) Aufgrund der ermittelten Windverteilung ergibt sich bereits, dass in maximal 30 bis 40% der Zeit der Azimutwinkel der Gondel die Einwirkung auf den jeweilig relevanten Immissionspunkt zulässt.
- c) Für Deutschland wurde ermittelt, dass maximal an 1.900 Std. die Sonne scheint.
- d) Es wird deutlich, dass die Annahme, dass es in nur 30% der Fälle überhaupt zu einer realen Beschattung der Immissionspunkte kommen kann, ein realistischer Wert ist.

4 Ergebnisse

4.1 Durch die mögliche Planung verursachte Schattenwurfimmissionen

Um alle Neigungen bzw. möglichen Winkel vorhandener Fenster abzudecken, wurde der Gewächshausmodus eingestellt.

Vorbelastung

Die Vorbelastungs-WKA werden ohne Abschaltzeiten für Schattenwurf eingestellt, da nicht für alle WKA bekannt ist, ob sie mit einer Abschaltautomatik betrieben werden.

Durch die beantragten und errichteten insgesamt 23 WKA ergeben sich folgende maximale Schattenwurfzeiten für die Vorbelastung:

Tab. 5: Ergebnisse der Schattenwurfberechnung – Vorbelastung (23 WKA)

Bez. IO		Schattenwurf Gesamtdauer pro Jahr	Mittlere Schattendauer Maximum pro Tag
		[Std/Jahr]	[Std/Tag]
A	KS	0:00	0:00
B		1:34	0:08
C		18:36	0:27
D		15:21	0:23
E		21:18	0:22
F	BL	0:00	0:00
G		0:00	0:00
H		0:00	0:00
I		4:30	0:14
J		18:06	0:21
K	LI	67:34	0:27
L	LH	47:35	0:39
M	JW	0:00	0:00
N		0:00	0:00
O		0:00	0:00

Im Ergebnis der Schattenwurfberechnung zeigt sich, dass es durch die eingestellten WKA der Vorbelastung am Lauenhof und Lindehof zu einer Überschreitung der Richtwerte für den Schattenwurf kommt.

Ein Teil der vorhandenen Anlagen ist möglicherweise mit Abschaltautomatiken ausgestattet. Es kann davon ausgegangen werden, dass die Richtwerte so eingehalten werden.

Im Ergebnis der worst-case Simulation tritt die maximale Belastung mit theoretischen 67:34 Std:Min Gesamtschattendauer pro Jahr am Lindenhof und mit 00:39 Std:Min mittlere maximale Schattendauer pro Tag am Lauenhof auf.

Zusatzbelastung

Durch bis zu 19 zusätzliche WKA in den Gemarkungen Jagow und Bandelow kann es zu folgenden theoretisch maximal möglichen Schattenwurf dauern an den einzelnen Immissionspunkten kommen:

Tab. 6: Ergebnisse der Schattenwurfberechnung – Zusatzbelastung (19 WKA mögliche Planung);

Bez. IO		Schattenwurf Gesamtdauer pro Jahr	Mittlere Schattendauer Maximum pro Tag
		[Std/Jahr]	[Std/Tag]
A	KS	43:49	0:49
B		31:13	0:39
C		22:34	0:31
D		38:36	1:02
E		43:07	1:07
F	BL	200:29	1:23
G		188:53	1:18
H		168:22	1:11
I		142:10	0:58
J		166:21	1:15
K	LI	0:00	0:00
L	LH	34:10	0:35
M	JW	56:07	0:27
N		62:41	0:30
O		67:59	0:53

Durch die Zusatzbelastung von bis zu 19 WKA wird an den Immissionsorten in den Ortschaften Karlstein, Bandelow und Jagow sowie am Lauenhof Schattenwurf hervorgerufen. Es kommt zu Überschreitung der Richtwerte an allen Immissionsorten mit Ausnahme des Immissionsorts C in Karlstein. Der Immissionsort K wird nicht von der möglichen Zusatzbelastung beschattet.

Aufgrund der Überschreitung der Immissionsrichtwerte, ist es sehr wahrscheinlich, dass ein Teil oder alle der bis zu 19 WKA der Zusatzbelastung mit einer Abschaltautomatik ausgestattet bzw. durch eine solche gesteuert werden müssen. Durch die Steuerung ist sichergestellt, dass es zu keiner Richtwertüberschreitung durch die mögliche Planung kommt.

Gesamtbelastung

Durch die bis zu 19 zusätzlichen WKA Standorte und die insgesamt 23 beantragten und errichteten WKA ergeben sich folgende maximale Schattenwurfzeiten für die Gesamtbelastung.

Tab. 7: Ergebnisse der Schattenwurfberechnung – Gesamtbelastung (23 WKA VB, 19 WKA mögliche Planung); IO die durch die mögliche Planung nicht betroffen sind, sind in grau dargestellt

Bez. IO		Schattenwurf Gesamtdauer pro Jahr	Mittlere Schattendauer Maximum pro Tag
		[Std/Jahr]	[Std/Tag]
A	KS	43:49	0:49
B		32:47	0:39
C		41:10	0:31
D		53:57	1:02
E		64:25	1:07

Bez. IO		Schattenwurf Gesamtdauer pro Jahr	Mittlere Schattendauer Maximum pro Tag
		[Std/Jahr]	[Std/Tag]
F	BL	200:29	1:23
G		188:53	1:18
H		168:22	1:11
I		146:40	1:11
J		184:27	1:35
K	LI	67:34	0:27
L	LH	81:45	0:39
M	JW	56:07	0:27
N		62:41	0:30
O		67:59	0:53

An den Immissionsorten B bis E, I und J in den Ortschaften Karlstein und Bandelow sowie am Lauenhof kommt es zu einer Erhöhung der Schattenwurfzeiten durch die Zusatzbelastung von bis zu 19 WKA.

An den Immissionsorten A, F bis H und L bis O werden die Richtwerte durch die mögliche Zusatzbelastung überschritten.

Die maximale Belastung tritt mit theoretischen 200:29 Std:Min Gesamtschattendauer pro Jahr am IO F und mit 1:35 Std:Min mittlere maximale Schattendauer pro Tag am IO J in der Ortschaft Bandelow auf.

Um die Einhaltung Richtwerte sicherzustellen, ist die im vorherigen Abschnitt „Zusatzbelastung“ beschriebene Maßnahme sehr wahrscheinlich umzusetzen.

4.2 Gesamtbeurteilung

Durch die zusätzlichen 19 möglichen WKA wird in den Ortschaften Karlstein, Bandelow und Jagow sowie am Lauenhof Schattenwurf verursacht. Zum größten Teil kommt es durch die Schattenwurfbelastung der zusätzlichen möglichen WKA zu unzulässigen Überschreitungen der zulässigen Schattenwurfdauern in den vorgenannten Ortschaften.

Durch den Einsatz einer geeigneten Abschaltautomatik bzw. durch den Anschluss an eine vernetzte Steuerung, kann für die bis zu 19 möglichen WKA die Einhaltung der Richtwerte für die Schattenwurfbelastung gewährleistet werden. Aus Sicht der zu erwartenden Schattenwurfbelastung, besteht daher gegen den Bebauungsplan **„Windeignungsgebiet Bandelow-Lübbenow, Teil 1: Bandelow“ der Gemeinde Uckerland** keine Bedenken.

5 Gewähr

Diese Prognose stellt die voraussichtlichen Schattenwurfzeiten für 19 mögliche WKA-Standorte in einem Teil des rechtskräftigen Eignungsgebietes für Windenergienutzung Nr. 01 „Bandelow“ und insgesamt 23 weitere beantragte und in Betrieb befindliche WKA in den WEG Nr 01 „Bandelow“ und Nr. 15 „Lübbenow“ für die umliegenden Wohnbebauungen dar.

Es wird versichert, dass die vorliegenden Ermittlungen unparteiisch, gemäß dem Stand von Wissenschaft und Technik und nach bestem Wissen und Gewissen durchgeführt wurden.

Dauerthal, den 14.06.2018



M.Sc. Jonas Armbröster

ANLAGEN

A1 Emissionsquellenplan (Stand 04.05.2018 und 12.06.2018)

Tab.1A: Emissionsquellenplan Zusatzbelastung – mögliche geplante WKA Standorte im WEG „Bandelow“
(Bebauungsplan „Windeignungsgebiet Bandelow-Lübbenow, Teil 1: Bandelow“)

Lfd. Nr.	Bezeichnung	AZ	Rechtswert [m]	Hochwert [m]	Anlagentyp	NH [m]	RD [m]	Bemerkungen
1	BG01		421.351	5.919.209	n.n.	151,0	158,0	
2	BG02		422.018	5.919.204	n.n.	151,0	158,0	
3	BG03		421.683	5.918.983	n.n.	151,0	158,0	
4	BG04		421.347	5.918.726	n.n.	151,0	158,0	
5	BG05		422.082	5.918.834	n.n.	151,0	158,0	
6	BG06		421.691	5.918.493	n.n.	151,0	158,0	
7	BG07		421.110	5.918.336	n.n.	151,0	158,0	
8	BG08		422.132	5.918.381	n.n.	151,0	158,0	
9	BG09		421.856	5.918.108	n.n.	151,0	158,0	
10	BG10		421.042	5.917.963	n.n.	151,0	158,0	
11	BG11		421.445	5.918.013	n.n.	151,0	158,0	
12	BG12		422.188	5.917.978	n.n.	151,0	158,0	
13	BG13		422.518	5.917.857	n.n.	151,0	158,0	
14	BG14		421.764	5.917.651	n.n.	151,0	158,0	
15	BG15		422.193	5.917.621	n.n.	151,0	158,0	
16	BG16		422.902	5.917.681	n.n.	151,0	158,0	
17	BG17		423.415	5.917.504	n.n.	151,0	158,0	
18	BG18		423.888	5.917.598	n.n.	151,0	158,0	
19	BG19		423.753	5.917.189	n.n.	151,0	158,0	

Tab.2A: Emissionsquellenplan Vorbelastung im WEG „Bandelow“

Lfd. Nr.	Bezeichnung	AZ	Rechtswert [m]	Hochwert [m]	Anlagentyp	NH [m]	RD [m]	Bemerkungen
20	NO02	G007/16	422.489	5.917.354	V126-3.45	149,0	126,0	
21	NO03	G007/16	422.629	5.917.012	V126-3.45	149,0	126,0	
22	NO05	G007/16	423.357	5.916.994	V126-3.45	149,0	126,0	
23	NO06	G007/16	423.686	5.916.712	V126-3.45	149,0	126,0	
24	NO08	G007/16	422.265	5.916.870	V126-3.45	149,0	126,0	
25	NO09	G007/16	422.950	5.916.769	V126-3.45	149,0	126,0	
26	NO10	G007/16	423.303	5.916.642	V126-3.45	149,0	126,0	
27	NO11	G007/16	422.554	5.916.667	V126-3.45	149,0	126,0	
28	NO12	G007/16	422.647	5.916.329	V126-3.45	149,0	126,0	
29	NO13	G007/16	423.144	5.916.319	V126-3.45	149,0	126,0	
30	NO14	G007/16	422.889	5.916.075	V126-3.45	149,0	126,0	

Lfd. Nr.	Bezeichnung	AZ	Rechtswert [m]	Hochwert [m]	Anlagentyp	NH [m]	RD [m]	Bemerkungen
31	NO15	G007/16	422.642	5.915.825	V126-3.45	149,0	126,0	

Tab.3A: Emissionsquellenplan Vorbelastung WEG „Bandelow“ – WKA im Genehmigungsverfahren

Lfd. Nr.	Bezeichnung	AZ	Rechtswert [m]	Hochwert [m]	Anlagentyp	NH [m]	RD [m]	Bemerkungen
32	B01	G073/17	422.054	5.917.206	V150-4.2	169,0	150,0	
33	B04	G073/17	422.984	5.917.128	V150-4.2	169,0	150,0	

Tab.4A: Emissionsquellenplan Vorbelastung WEG „Lübbenow“

Lfd. Nr.	Bezeichnung	AZ	Rechtswert [m]	Hochwert [m]	Anlagentyp	NH [m]	RD [m]	Bemerkungen
34	WEA 1 (G080/16)	G080/16	419.800	5.921.570	V136-3.6	133,5	136,0	
35	WEA 2 (G080/16)	G080/16	421.734	5.921.631	V126-3.45	138,5	126,0	

Tab.5A: Emissionsquellenplan Vorbelastung WEG „Lübbenow“ – WKA im Genehmigungsverfahren

Lfd. Nr.	Bezeichnung	AZ	Rechtswert [m]	Hochwert [m]	Anlagentyp	NH [m]	RD [m]	Bemerkungen
36	WEA 4 (G057/17)	G057/17	420.122	5.921.597	V136-3.6	135,0	136,0	
37	WEA 3 (G063/17)	G063/17	421.958	5.922.120	V150-4.2	126,0	150,0	
38	WEA 6 (G063/17)	G063/17	421.269	5.921.557	V150-4.2	126,0	150,0	
39	L-01	G04018	419.950	5.921.290	V150-4.2	169,0	150,0	
40	L-02	G04018	420.309	5.921.049	V150-4.2	169,0	150,0	
41	L-03	G04018	420.478	5.921.429	V150-4.2	169,0	150,0	
42	L-04	G04018	420.840	5.921.368	V150-4.2	169,0	150,0	

A2 Berechnungsergebnisse WindPRO

SHADOW - Hauptergebnis

Berechnung: Vorbelastung

Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinstrahlung
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:

Verwendete Höhenlinien: Höhenraster-Objekt: KL BT 34 AEP-Progn Rev02_EN

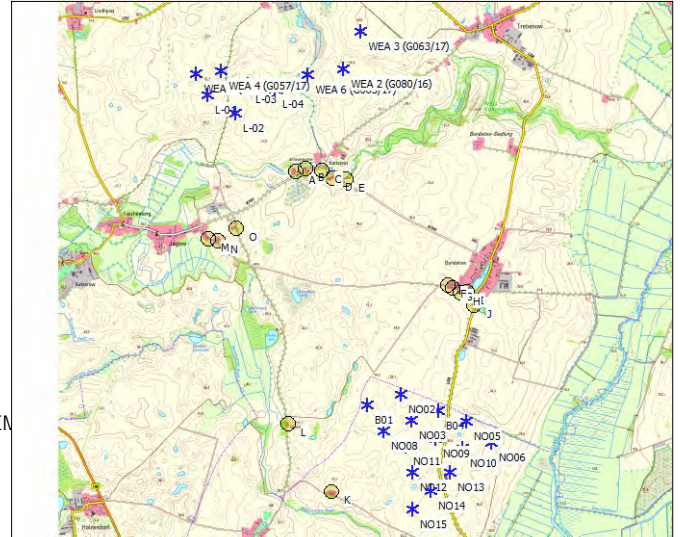
Hindernisse in Berechnung verwendet

Augenhöhe: 1,5 m

Rasterauflösung: 10,0 m

Alle Koordinatenangaben in:
UTM (north)-WGS84 Zone: 33

WEA



Maßstab 1:100.000
* Existierende WEA ● Schattenrezeptor

	Ost	Nord	Z	Beschreibung	WEA-Typ		Typ	Nennleistung [kW]	Rotor-durchmesser [m]	Nabenhöhe [m]	Schattendaten	
					Aktuell	Hersteller					Beschatt.-Bereich [m]	U/min
			[m]									
B01	422.054	5.917.206	52,5	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
B04	422.984	5.917.128	45,5	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
L-01	419.950	5.921.290	48,4	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
L-02	420.309	5.921.049	46,1	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
L-03	420.478	5.921.429	50,0	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
L-04	420.840	5.921.368	49,5	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
NO02	422.489	5.917.354	51,6	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO03	422.629	5.917.012	49,8	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO05	423.357	5.916.994	41,8	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO06	423.686	5.916.712	38,4	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO08	422.265	5.916.870	52,4	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO09	422.950	5.916.769	45,3	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO10	423.303	5.916.642	42,5	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO11	422.554	5.916.667	48,1	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO12	422.647	5.916.329	46,7	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO13	423.144	5.916.319	43,7	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO14	422.889	5.916.075	45,0	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO15	422.642	5.915.825	45,0	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
WEA 1 (G080/16)	419.800	5.921.570	50,0	VESTAS V136...Ja	VESTAS	V136-3.450	3.450	136,0	133,5	1.814	12,8	
WEA 2 (G080/16)	421.734	5.921.631	50,0	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	138,5	1.715	12,8	
WEA 3 (G063/17)	421.958	5.922.120	50,0	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	126,0	1.904	0,0	
WEA 4 (G057/17)	420.122	5.921.597	50,0	VESTAS V136...Ja	VESTAS	V136-3.600	3.600	136,0	135,0	1.814	12,8	
WEA 6 (G063/17)	421.269	5.921.557	50,0	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	126,0	1.904	0,0	

Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe über Grund	Azimutwinkel (von Süd)	Neigung des Fensters	Ausrichtungsmodus
A	Karlstein 1, Uckerland	421.108	5.920.274	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
B	Karlstein 2, Uckerland	421.241	5.920.310	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
C	Karlstein 16, Uckerland	421.450	5.920.286	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
D	Karlstein 15, Uckerland	421.594	5.920.188	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
E	Karlstein 13, Uckerland	421.770	5.920.170	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
F	Bandelow 17E, Uckerland	423.119	5.918.783	47,8	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
G	Bandelow 16A, Uckerland	423.172	5.918.746	47,5	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
H	Bandelow 15, Uckerland	423.279	5.918.684	45,2	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
I	Bandelow 11, Uckerland	423.368	5.918.692	43,4	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
J	Bandelow 1, Uckerland	423.453	5.918.520	44,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"

(Fortsetzung nächste Seite)...

SHADOW - Hauptergebnis

Berechnung: Vorbelastung

...(Fortsetzung von letzter Seite)

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe über Grund	Azimutwinkel (von Süd)	Neigung des Fensters	Ausrichtungsmodus
				[m]	[m]	[m]	[m]	[°]	[°]	
K	Dorfstr. 82, Prenzlau	421.577	5.916.052	43,1	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
L	Lauenhof 1, Uckerland	421.009	5.916.958	41,6	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
M	Jagow 74c, Uckerland	419.960	5.919.386	45,2	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
N	Jagow 77, Uckerland	420.093	5.919.358	48,4	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
O	Jagow 1, Uckerland	420.322	5.919.532	50,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"

Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer		
		Stunden/Jahr	Schattentage/a	Max.Schatten Stunden/Tag
		[Std/Jahr]	[Tage/Jahr]	[Std/Tag]
A	Karlstein 1, Uckerland	0:00	0	0:00
B	Karlstein 2, Uckerland	1:34	15	0:08
C	Karlstein 16, Uckerland	18:36	52	0:27
D	Karlstein 15, Uckerland	15:21	48	0:23
E	Karlstein 13, Uckerland	21:18	67	0:22
F	Bandelow 17E, Uckerland	0:00	0	0:00
G	Bandelow 16A, Uckerland	0:00	0	0:00
H	Bandelow 15, Uckerland	0:00	0	0:00
I	Bandelow 11, Uckerland	4:30	24	0:14
J	Bandelow 1, Uckerland	18:06	60	0:21
K	Dorfstr. 82, Prenzlau	67:34	200	0:27
L	Lauenhof 1, Uckerland	47:35	118	0:39
M	Jagow 74c, Uckerland	0:00	0	0:00
N	Jagow 77, Uckerland	0:00	0	0:00
O	Jagow 1, Uckerland	0:00	0	0:00

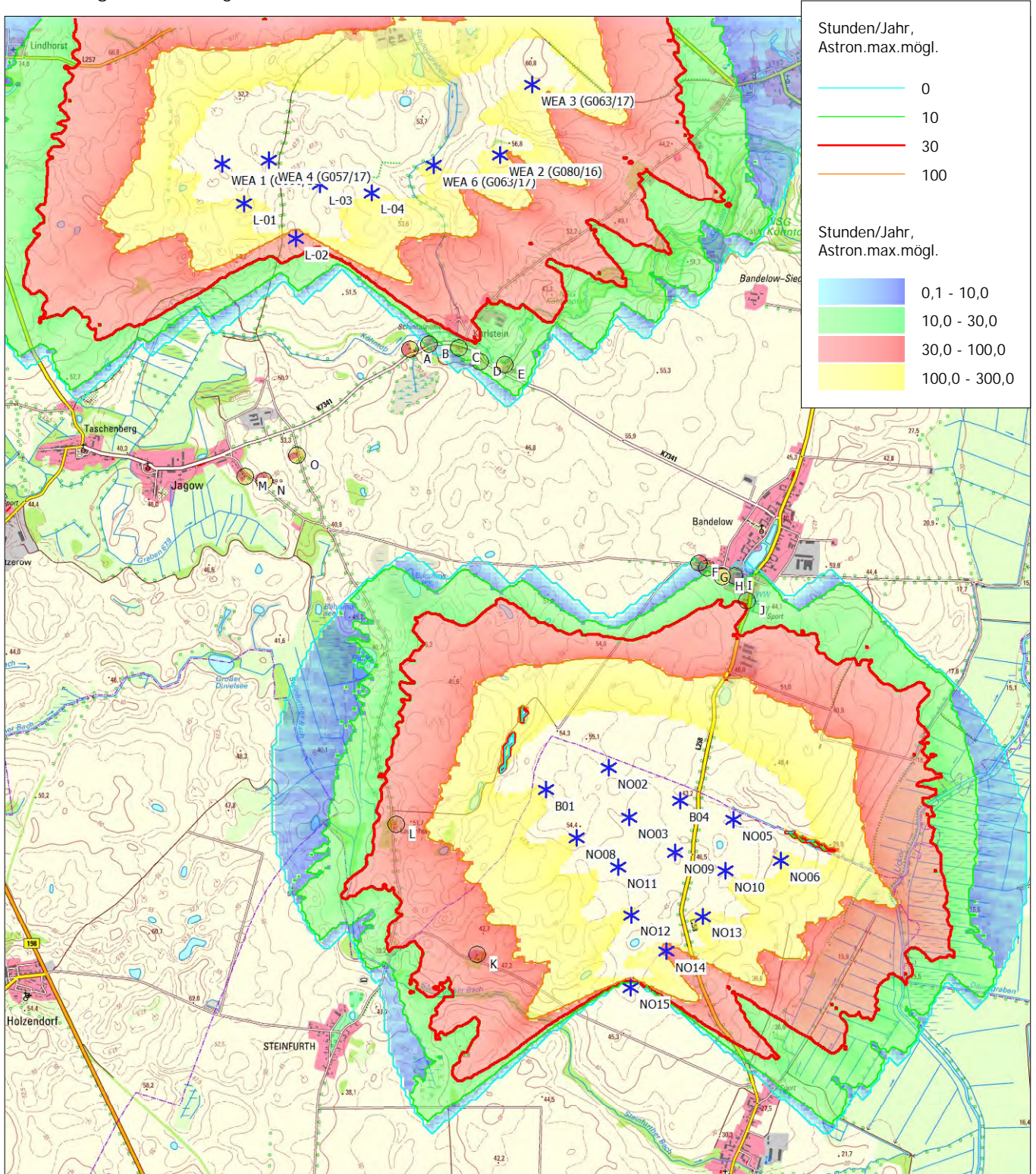
Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [Std/Jahr]
B01	VESTAS V150 4200 150.0 !O! NH: 169,0 m (Ges:244,0 m) (160)	23:58
B04	VESTAS V150 4200 150.0 !O! NH: 169,0 m (Ges:244,0 m) (161)	0:00
L-01	VESTAS V150 4200 150.0 !O! NH: 169,0 m (Ges:244,0 m) (204)	16:27
L-02	VESTAS V150 4200 150.0 !O! NH: 169,0 m (Ges:244,0 m) (205)	27:37
L-03	VESTAS V150 4200 150.0 !O! NH: 169,0 m (Ges:244,0 m) (206)	0:00
L-04	VESTAS V150 4200 150.0 !O! NH: 169,0 m (Ges:244,0 m) (207)	0:00
NO02	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (103)	30:12
NO03	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (104)	5:17
NO05	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (105)	0:00
NO06	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (106)	0:00
NO08	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (107)	8:43
NO09	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (108)	16:30
NO10	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (109)	0:00
NO11	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (110)	16:19
NO12	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (111)	15:21
NO13	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (112)	6:08
NO14	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (113)	8:30
NO15	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (114)	11:26
WEA 1 (G080/16)	VESTAS V136 3450 136.0 !O! NH: 133,5 m (Ges:201,5 m) (171)	0:00
WEA 2 (G080/16)	VESTAS V126-3.45 3450 126.0 !O! NH: 138,5 m (Ges:201,5 m) (172)	0:00
WEA 3 (G063/17)	VESTAS V150 4200 150.0 !O! NH: 126,0 m (Ges:201,0 m) (184)	0:00
WEA 4 (G057/17)	VESTAS V136 3600 136.0 !O! NH: 135,0 m (Ges:203,0 m) (183)	0:00
WEA 6 (G063/17)	VESTAS V150 4200 150.0 !O! NH: 126,0 m (Ges:201,0 m) (185)	0:00

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 - Karte

Berechnung: Vorbelastung



0 500 1000 1500 2000 m

Karte: TK 25, Maßstab 1:40.000, Mitte: UTM (north)-WGS84 Zone: 33 Ost: 421.860 Nord: 5.918.550

* Existierende WEA ● Schattenrezeptor

Höhe der Schattenkarte: Höhenraster-Objekt: KL BT 34 AEP-Progn Rev02_EMDGrid_0.wpg (5)

SHADOW - Hauptergebnis

Berechnung: Zusatzbelastung
Voraussetzungen für Berechnung des Schattenwurfs

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

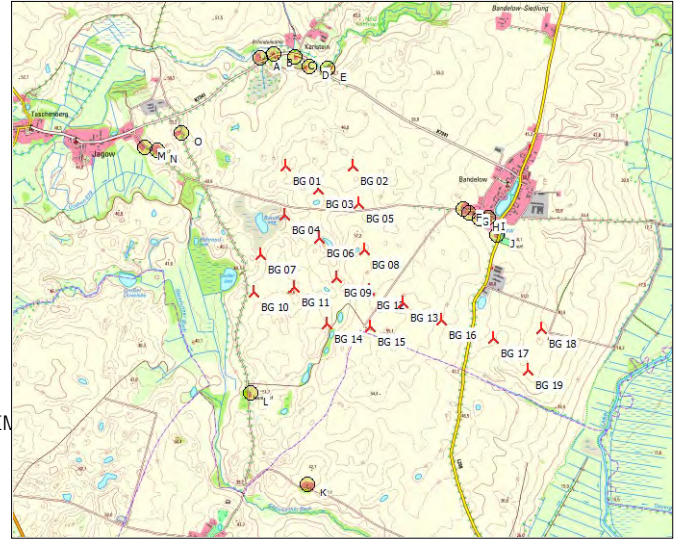
Minimale relevante Sonnenhöhe über Horizont 3 °
Tage zwischen Berechnungen 1 Tag(e)
Berechnungszeitsprung 1 Minuten
Die dargestellten Zeiten sind die astronomisch maximal mögliche
Beschattungsdauer, berechnet unter folgenden Annahmen:
Die Sonne scheint täglich von Sonnenauf- bis -untergang
Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlrichtung
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:
Verwendete Höhenlinien: Höhenraster-Objekt: KL BT 34 AEP-Progn Rev02_EM
Hindernisse in Berechnung verwendet
Augenhöhe: 1,5 m
Rasterauflösung: 10,0 m

Alle Koordinatenangaben in:
UTM (north)-WGS84 Zone: 33

WEA

	Ost	Nord	Z	Beschreibung	WEA-Typ			Nennleistung	Rotor-durchmesser	Nabenhöhe	Schattendaten	
					Aktuell	Hersteller	Typ				Beschatt.-Bereich	U/min
			[m]								[m]	[U/min]
BG 01	421.351	5.919.209	50,7	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 02	422.018	5.919.204	52,5	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 03	421.683	5.918.983	48,7	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 04	421.347	5.918.726	40,0	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 05	422.082	5.918.834	52,5	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 06	421.691	5.918.493	45,1	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 07	421.110	5.918.336	40,0	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 08	422.132	5.918.381	55,0	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 09	421.856	5.918.108	51,4	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 10	421.042	5.917.963	43,9	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 11	421.445	5.918.621	47,5	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 12	422.188	5.917.978	53,5	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 13	422.518	5.917.857	50,0	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 14	421.764	5.917.651	52,4	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 15	422.193	5.917.621	52,5	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 16	422.902	5.917.681	49,6	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 17	423.415	5.917.504	45,0	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 18	423.888	5.917.598	46,0	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0
BG 19	423.753	5.917.189	46,6	ABC A158-5300 53...	Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0



Maßstab 1:75.000
▲ Neue WEA ● Schattenrezeptor

Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe über Grund	Azimutwinkel (von Süd)	Neigung des Fensters	Ausrichtungsmodus
A	Karlstein 1, Uckerland	421.108	5.920.274	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
B	Karlstein 2, Uckerland	421.241	5.920.310	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
C	Karlstein 16, Uckerland	421.450	5.920.286	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
D	Karlstein 15, Uckerland	421.594	5.920.188	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
E	Karlstein 13, Uckerland	421.770	5.920.170	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
F	Bandelow 17E, Uckerland	423.119	5.918.783	47,8	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
G	Bandelow 16A, Uckerland	423.172	5.918.746	47,5	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
H	Bandelow 15, Uckerland	423.279	5.918.684	45,2	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
I	Bandelow 11, Uckerland	423.368	5.918.692	43,4	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
J	Bandelow 1, Uckerland	423.453	5.918.520	44,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
K	Dorfstr. 82, Prenzlau	421.577	5.916.052	43,1	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
L	Lauenhof 1, Uckerland	421.009	5.916.958	41,6	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
M	Jagow 74c, Uckerland	419.960	5.919.386	45,2	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
N	Jagow 77, Uckerland	420.093	5.919.358	48,4	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
O	Jagow 1, Uckerland	420.322	5.919.532	50,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"

SHADOW - Hauptergebnis

Berechnung: Zusatzbelastung

Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer		
		Stunden/Jahr [Std/Jahr]	Schattentage/a [Tage/Jahr]	Max.Schatten Stunden/Tag [Std/Tag]
A	Karlstein 1, Uckerland	43:49	80	0:49
B	Karlstein 2, Uckerland	31:13	66	0:39
C	Karlstein 16, Uckerland	22:34	52	0:31
D	Karlstein 15, Uckerland	38:36	54	1:02
E	Karlstein 13, Uckerland	43:07	52	1:07
F	Bandelow 17E, Uckerland	200:29	307	1:23
G	Bandelow 16A, Uckerland	188:53	290	1:18
H	Bandelow 15, Uckerland	168:22	288	1:11
I	Bandelow 11, Uckerland	142:10	275	0:58
J	Bandelow 1, Uckerland	166:21	296	1:15
K	Dorfstr. 82, Prenzlau	0:00	0	0:00
L	Lauenhof 1, Uckerland	34:10	67	0:35
M	Jagow 74c, Uckerland	56:07	177	0:27
N	Jagow 77, Uckerland	62:41	182	0:30
O	Jagow 1, Uckerland	67:59	154	0:53

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [Std/Jahr]
BG 01	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (52)	72:54
BG 02	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (55)	159:33
BG 03	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (53)	33:45
BG 04	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (51)	36:08
BG 05	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (59)	59:24
BG 06	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (60)	32:59
BG 07	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (62)	43:00
BG 08	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (61)	50:07
BG 09	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (56)	32:52
BG 10	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (63)	22:09
BG 11	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (64)	0:00
BG 12	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (48)	58:27
BG 13	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (49)	135:48
BG 14	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (65)	14:41
BG 15	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (69)	98:06
BG 16	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (50)	72:46
BG 17	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (66)	0:00
BG 18	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (54)	56:04
BG 19	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (67)	0:00

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: Zusatzbelastung Schattenrezeptor: A - Karlstein 1, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 15:56 39	09:00 (BG 02) 16:47	06:55 17:41	06:41 19:39	05:33 20:33	04:44 21:22	04:40 21:37	05:20 21:03	06:13 19:57	07:05 18:44	07:02 16:35	07:57 15:51	08:43 (BG 02) 31
2	08:21 15:57 39	09:42 (BG 05) 16:49	06:53 17:43	06:39 19:41	05:31 20:35	04:43 21:24	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	07:04 16:33	07:58 15:50	08:43 (BG 02) 34
3	08:21 15:58 39	09:00 (BG 02) 16:51	07:48 17:45	06:51 19:43	06:36 20:37	05:29 21:25	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 16:31	07:50 15:50	08:44 (BG 02) 36
4	08:21 16:00 38	09:00 (BG 02) 16:52	07:47 17:47	06:48 19:44	06:34 20:39	05:27 21:26	04:42 21:36	05:24 20:57	06:18 19:50	07:10 18:37	07:08 16:29	07:51 15:49	08:44 (BG 02) 37
5	08:20 16:01 39	09:00 (BG 02) 16:54	07:45 17:49	06:46 19:46	06:31 20:40	05:25 21:27	04:41 21:35	05:26 20:55	06:20 19:48	07:12 18:35	07:10 16:27	07:48 15:48	08:45 (BG 02) 39
6	08:20 16:02 39	09:01 (BG 02) 16:56	07:43 17:51	06:44 19:48	06:29 20:42	05:23 21:28	04:40 21:35	05:28 20:53	06:21 19:45	07:14 18:32	07:12 16:25	07:49 15:48	08:46 (BG 02) 38
7	08:19 16:03 38	09:00 (BG 02) 16:58	07:41 17:53	06:41 19:50	06:27 20:44	05:21 21:29	04:40 21:34	05:30 20:52	06:23 19:43	07:16 18:30	07:14 16:23	07:50 15:48	08:47 (BG 02) 39
8	08:19 16:05 37	09:00 (BG 02) 17:00	07:39 17:55	06:39 19:52	06:24 20:46	05:19 21:30	04:39 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:16 16:22	07:51 15:47	08:47 (BG 02) 39
9	08:18 16:06 36	09:00 (BG 02) 17:02	07:37 17:57	06:37 19:54	06:22 20:47	05:17 21:31	04:38 21:33	05:33 20:48	06:27 19:38	07:19 18:25	07:18 16:20	07:52 15:47	08:48 (BG 02) 38
10	08:18 16:08 35	09:01 (BG 02) 17:04	07:36 17:59	06:34 19:55	06:20 20:49	05:15 21:32	04:38 21:32	05:35 20:46	06:28 19:35	07:21 18:23	07:20 16:18	07:53 15:46	08:49 (BG 02) 39
11	08:17 16:09 31	09:01 (BG 02) 17:06	07:34 18:00	06:32 19:57	06:17 20:51	05:14 21:32	04:37 21:31	05:36 20:44	06:30 19:33	07:23 18:20	07:21 16:16	07:54 15:46	08:50 (BG 02) 39
12	08:16 16:11 26	09:01 (BG 02) 17:08	07:32 18:02	06:29 19:59	06:15 20:53	05:12 21:33	04:37 21:30	05:38 20:42	06:32 19:31	07:25 18:18	07:23 16:15	07:55 15:46	08:51 (BG 02) 37
13	08:16 16:12 27	09:01 (BG 02) 17:10	07:30 18:04	06:27 19:54	06:13 20:54	05:10 21:34	04:37 21:29	05:40 20:40	06:34 19:28	07:27 18:16	07:25 16:13	07:56 15:46	08:51 (BG 02) 40
14	08:15 16:14 27	09:01 (BG 02) 17:12	07:28 18:06	06:25 20:03	06:10 20:56	05:08 21:35	04:36 21:28	05:42 20:37	06:35 19:26	07:29 18:13	07:27 16:11	07:57 15:46	08:52 (BG 02) 44
15	08:14 16:16 27	09:02 (BG 02) 17:14	07:26 18:08	06:22 20:04	06:08 20:58	05:07 21:35	04:36 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	07:58 15:46	08:53 (BG 02) 46
16	08:13 16:17 27	09:02 (BG 02) 17:16	07:24 18:10	06:20 20:06	06:06 20:59	05:05 21:36	04:36 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	07:59 15:46	08:54 (BG 02) 46
17	08:12 16:19 28	09:01 (BG 02) 17:18	07:22 18:12	06:17 20:08	06:03 21:01	05:03 21:36	04:36 21:25	05:47 20:31	06:41 19:18	07:34 18:07	07:33 16:07	08:00 15:46	08:55 (BG 02) 49
18	08:11 16:21 27	09:02 (BG 02) 17:20	07:19 18:13	06:15 20:10	06:01 21:02	05:02 21:37	04:36 21:24	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:06	08:01 15:46	08:56 (BG 02) 48
19	08:10 16:22 27	09:03 (BG 02) 17:22	07:17 18:15	06:13 20:12	05:59 21:04	05:00 21:37	04:36 21:22	05:50 20:27	06:44 19:14	07:38 18:02	07:36 16:04	08:02 15:47	08:56 (BG 02) 49
20	08:09 16:24 26	09:03 (BG 02) 17:25	07:15 18:17	06:10 20:13	05:56 21:06	05:01 21:37	04:36 21:21	05:52 20:25	06:46 19:11	07:40 18:00	07:38 16:03	08:03 15:47	08:57 (BG 02) 49
21	08:08 16:26 27	09:03 (BG 02) 17:26	07:13 18:19	06:08 20:15	05:54 21:07	05:03 21:38	04:36 21:20	05:54 20:22	06:48 19:09	07:42 17:58	07:40 16:01	08:04 15:47	08:58 (BG 02) 48
22	08:06 16:28 26	09:04 (BG 02) 17:28	07:11 18:21	06:05 20:17	05:52 21:09	05:04 21:38	04:36 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:42 16:00	08:05 15:48	08:58 (BG 02) 48
23	08:05 16:30 25	09:05 (BG 02) 17:30	07:09 18:23	06:03 20:19	05:50 21:10	05:05 21:38	04:36 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	08:06 15:48	08:59 (BG 02) 48
24	08:04 16:31 24	09:06 (BG 02) 17:32	07:06 18:24	06:00 20:21	05:48 21:12	05:07 21:38	04:37 21:16	05:59 20:16	06:53 19:01	07:47 17:51	07:45 15:58	08:07 15:49	08:59 (BG 02) 49
25	08:02 16:33 23	09:06 (BG 02) 17:34	07:04 18:26	05:58 20:23	05:45 21:13	05:08 21:38	04:37 21:14	06:01 20:13	06:55 18:59	07:47 16:49	07:47 15:57	08:08 15:50	08:59 (BG 02) 48
26	08:01 16:35 21	09:08 (BG 02) 17:36	07:02 18:28	05:56 20:24	05:43 21:15	05:10 21:38	04:38 21:13	06:02 20:11	06:56 18:56	07:49 16:47	07:49 15:56	08:09 15:50	08:59 (BG 02) 48
27	08:00 16:37 19	09:09 (BG 02) 17:38	07:00 18:30	05:53 20:26	05:41 21:16	05:12 21:38	04:38 21:11	06:04 20:09	06:58 18:54	07:50 16:45	07:50 15:55	08:10 15:51	08:59 (BG 02) 47
28	07:58 16:39 17	09:10 (BG 02) 17:40	06:57 18:32	05:51 20:28	05:39 21:17	05:13 21:38	04:39 21:09	06:06 20:06	07:00 18:52	07:52 16:43	07:52 15:54	08:11 15:52	08:59 (BG 02) 47
29	07:57 16:41 14	09:12 (BG 02) 17:42	06:48 18:33	05:49 20:30	05:37 21:19	05:15 21:38	04:39 21:08	06:08 20:04	07:02 18:49	07:53 16:41	07:53 15:53	08:12 15:53	08:59 (BG 02) 45
30	07:55 16:43 8	09:15 (BG 02) 17:44	06:46 18:35	05:35 20:32	05:35 21:20	05:16 21:37	04:40 21:06	06:09 20:02	07:03 18:47	07:55 16:39	07:55 15:52	08:13 15:54	08:59 (BG 02) 43
31	07:53 16:45	09:23 (BG 02) 17:45	06:43 19:37	05:32 21:21	05:17 21:21	05:18 21:04	06:11 21:04	06:11 19:59	07:01 16:37	07:01 15:52	07:01 15:51	08:14 15:51	09:00 (BG 02) 37
	Sonnenscheinstunden astr.max.mögl.Beschattung	252 856	274 367	419 367	492 367	508 367	510 367	458 367	382 329	329 261	261 448	236 1325	

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: B - Karlstein 2, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 15:56	09:16 (BG 02) 16:47	07:52 17:41	06:55 19:39	06:41 20:33	04:44 21:22	04:40 21:37	05:20 21:03	06:13 19:57	07:05 18:44	07:02 16:35	07:57 15:51
2	08:21 15:57	09:45 (BG 02) 16:49	07:50 17:43	06:53 19:41	06:39 20:35	04:43 21:24	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	07:04 16:33	07:58 15:50
3	08:21 15:58	09:17 (BG 02) 16:51	07:48 17:45	06:51 19:43	06:36 20:37	04:42 21:25	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 16:31	08:00 15:50
4	08:21 16:00	09:18 (BG 02) 16:52	07:47 17:47	06:48 19:44	06:34 20:39	04:42 21:26	04:43 21:36	05:24 20:57	06:18 19:50	07:10 18:37	07:08 16:29	08:01 15:49
5	08:20 16:01	09:18 (BG 02) 16:54	07:45 17:49	06:46 19:46	06:31 20:40	04:41 21:27	04:44 21:35	05:26 20:55	06:20 19:48	07:12 18:35	07:10 16:27	08:02 15:48
6	08:20 16:02	09:19 (BG 02) 16:56	07:43 17:51	06:44 19:48	06:29 20:42	04:40 21:28	04:44 21:35	05:28 20:53	06:21 19:45	07:14 18:32	07:12 16:25	08:04 15:48
7	08:19 16:03	09:19 (BG 02) 16:58	07:41 17:53	06:41 19:50	06:27 20:44	04:39 21:29	04:45 21:34	05:30 20:52	06:23 19:43	07:16 18:30	07:14 16:23	08:05 15:48
8	08:19 16:05	09:19 (BG 02) 17:00	07:39 17:55	06:39 19:52	06:24 20:46	04:39 21:30	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:16 16:21	08:06 15:47
9	08:18 16:06	09:19 (BG 02) 17:02	07:37 17:57	06:37 19:53	06:22 20:47	04:38 21:31	04:47 21:33	05:33 20:48	06:27 19:38	07:19 18:25	07:18 16:20	08:08 15:47
10	08:18 16:08	09:20 (BG 02) 17:04	07:36 17:58	06:34 19:55	06:20 20:49	04:38 21:32	04:48 21:32	05:35 20:46	06:28 19:35	07:21 18:23	07:20 16:18	08:09 15:46
11	08:17 16:09	09:21 (BG 02) 17:06	07:34 18:00	06:32 19:57	06:17 20:51	04:37 21:32	04:50 21:31	05:36 20:44	06:30 19:33	07:23 18:20	07:21 16:16	08:10 15:46
12	08:16 16:11	09:21 (BG 02) 17:08	07:32 18:02	06:29 19:59	06:15 20:53	04:37 21:33	04:51 21:30	05:38 20:42	06:32 19:31	07:25 18:18	07:23 16:15	08:11 15:46
13	08:16 16:12	09:22 (BG 02) 17:10	07:30 18:04	06:27 20:01	06:13 20:54	04:37 21:34	04:52 21:29	05:40 20:40	06:34 19:28	07:27 18:16	07:25 16:13	08:12 15:46
14	08:15 16:14	09:22 (BG 02) 17:12	07:28 18:06	06:25 20:03	06:10 20:56	04:36 21:35	04:53 21:28	05:41 20:37	06:35 19:26	07:29 18:13	07:27 16:11	08:13 15:46
15	08:14 16:16	09:23 (BG 02) 17:14	07:26 18:08	06:22 20:04	06:08 20:58	04:36 21:35	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 15:46
16	08:13 16:17	09:24 (BG 02) 17:16	07:24 18:10	06:20 20:06	06:06 20:59	04:36 21:36	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 15:46
17	08:12 16:19	09:24 (BG 02) 17:18	07:22 18:12	06:17 20:08	06:03 21:01	04:36 21:36	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	07:33 16:07	08:16 15:46
18	08:11 16:21	09:25 (BG 02) 17:20	07:19 18:13	06:15 20:10	06:01 21:02	04:36 21:37	04:58 21:24	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:06	08:16 15:46
19	08:10 16:22	09:27 (BG 02) 17:22	07:17 18:15	06:13 20:12	05:59 21:04	04:36 21:37	05:00 21:22	05:50 20:27	06:44 19:14	07:38 18:02	07:36 16:04	08:17 15:47
20	08:09 16:24	09:27 (BG 02) 17:24	07:15 18:17	06:10 20:13	05:56 21:06	04:36 21:37	05:01 21:21	05:52 20:25	06:46 19:11	07:40 18:00	07:38 16:03	08:18 15:47
21	08:08 16:26	09:29 (BG 02) 17:26	07:13 18:19	06:08 20:15	05:54 21:07	04:36 21:38	05:02 21:20	05:54 20:22	06:48 19:09	07:42 17:58	07:40 16:01	08:18 15:47
22	08:06 16:28	09:31 (BG 02) 17:28	07:11 18:21	06:05 20:17	05:52 21:09	04:36 21:38	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:42 16:00	08:19 15:48
23	08:05 16:29	09:33 (BG 02) 17:30	07:09 18:23	06:03 20:19	05:50 21:10	04:37 21:38	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	08:19 15:48
24	08:04 16:31	09:34 (BG 02) 17:32	07:07 18:24	06:00 20:21	05:48 21:12	04:37 21:38	05:07 21:16	05:59 20:16	06:53 19:01	07:47 17:51	07:45 15:58	08:20 15:49
25	08:02 16:33	09:34 (BG 02) 17:34	07:04 18:26	05:58 20:23	05:45 21:13	04:37 21:38	05:08 21:14	06:01 20:13	06:55 18:59	07:47 16:49	07:47 15:57	08:20 15:50
26	08:01 16:35	09:34 (BG 02) 17:36	07:02 18:28	05:56 20:24	05:43 21:15	04:38 21:38	05:10 21:13	06:02 20:11	06:56 18:56	07:49 17:56	07:49 15:56	08:21 15:50
27	08:00 16:37	09:34 (BG 02) 17:38	07:00 18:30	05:53 20:26	05:41 21:16	04:38 21:38	05:12 21:11	06:04 20:09	06:58 18:54	07:50 17:55	07:50 15:55	08:21 15:51
28	07:58 16:39	09:34 (BG 02) 17:40	06:57 18:32	05:51 20:28	05:39 21:17	04:39 21:38	05:13 21:09	06:06 20:06	07:00 18:52	07:52 17:54	07:52 15:54	08:21 15:52
29	07:57 16:41	09:34 (BG 02) 17:42	06:48 18:34	05:49 20:30	05:37 21:19	04:40 21:39	05:15 21:08	06:08 20:04	07:02 18:49	07:53 17:41	07:53 15:53	08:21 15:53
30	07:55 16:43	09:34 (BG 02) 17:44	06:46 18:36	05:46 20:32	05:35 21:20	04:40 21:37	05:16 21:06	06:09 20:02	07:03 18:47	07:55 17:39	07:55 15:52	08:21 15:54
31	07:53 16:45	09:34 (BG 02) 17:46	06:43 18:38	05:43 20:34	05:32 21:21	04:40 21:38	05:18 21:04	06:11 20:04	07:01 16:37	07:56 17:31	07:56 15:51	08:21 15:51
Sonnenscheinstunden	252	274	367	419	492	508	510	458	382	329	261	236
astr.max.mögl.Beschattung	574										262	1037

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: Zusatzbelastung Schattenrezeptor: C - Karlstein 16, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 15:56	09:47 (BG 02) 10:16 (BG 02)	07:52 16:47	06:55 17:41	06:41 19:39	05:33 20:33	04:44 21:22	04:40 21:37	05:19 21:03	06:13 19:57	07:05 18:44	07:02 16:35	07:57 15:51
2	08:21 15:57	09:47 (BG 02) 10:16 (BG 02)	07:50 16:49	06:53 17:43	06:39 19:41	05:31 20:35	04:43 21:24	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	07:04 16:33	07:58 15:50
3	08:21 15:58	09:48 (BG 02) 10:17 (BG 02)	07:48 16:50	06:51 17:45	06:36 19:43	05:29 20:37	04:42 21:25	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 16:31	07:59 15:50
4	08:21 16:00	09:49 (BG 02) 10:17 (BG 02)	07:47 16:52	06:48 17:47	06:34 19:44	05:27 20:39	04:42 21:26	04:43 21:36	05:24 20:57	06:18 19:50	07:10 18:37	07:08 16:29	08:01 15:49
5	08:20 16:01	09:49 (BG 02) 10:17 (BG 02)	07:45 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 21:27	04:44 21:35	05:26 20:55	06:20 19:48	07:12 18:35	07:10 16:27	08:02 15:48
6	08:20 16:02	09:49 (BG 02) 10:17 (BG 02)	07:43 16:56	06:44 17:51	06:29 19:48	05:23 20:42	04:40 21:28	04:44 21:35	05:28 20:53	06:21 19:45	07:14 18:32	07:12 16:25	08:04 15:48
7	08:19 16:03	09:51 (BG 02) 10:17 (BG 02)	07:41 16:58	06:41 17:53	06:27 19:50	05:21 20:44	04:39 21:29	04:45 21:34	05:29 20:52	06:23 19:43	07:16 18:30	07:14 16:23	08:05 15:47
8	08:19 16:05	09:51 (BG 02) 10:17 (BG 02)	07:39 17:00	06:39 17:55	06:24 19:52	05:19 20:46	04:39 21:30	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:16 16:21	08:06 15:47
9	08:18 16:06	09:52 (BG 02) 10:17 (BG 02)	07:37 17:02	06:37 17:57	06:22 19:53	05:17 20:47	04:38 21:31	04:47 21:33	05:33 20:48	06:27 19:38	07:19 18:25	07:18 16:20	08:08 15:47
10	08:18 16:08	09:54 (BG 02) 10:17 (BG 02)	07:36 17:04	06:34 17:58	06:20 19:55	05:15 20:49	04:38 21:32	04:48 21:32	05:35 20:46	06:28 19:35	07:21 18:23	07:20 16:18	08:09 15:46
11	08:17 16:09	09:55 (BG 02) 10:17 (BG 02)	07:34 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:37 21:32	04:50 21:31	05:36 20:44	06:30 19:33	07:23 18:20	07:21 16:16	08:10 15:46
12	08:16 16:11	09:56 (BG 02) 10:16 (BG 02)	07:32 17:08	06:29 18:02	06:15 19:59	05:12 20:53	04:37 21:33	04:51 21:30	05:38 20:42	06:32 19:31	07:25 18:18	07:23 16:15	08:11 15:46
13	08:16 16:12	09:57 (BG 02) 10:16 (BG 02)	07:30 17:10	06:27 18:04	06:12 20:01	05:10 20:54	04:37 21:34	04:52 21:29	05:40 20:40	06:34 19:28	07:27 18:16	07:25 16:13	08:12 15:46
14	08:15 16:14	09:58 (BG 02) 10:15 (BG 02)	07:28 17:12	06:25 18:06	06:10 20:03	05:08 20:56	04:36 21:35	04:53 21:28	05:41 20:37	06:35 19:26	07:29 18:13	07:27 16:11	08:13 15:46
15	08:14 16:16	10:00 (BG 02) 10:14 (BG 02)	07:26 17:14	06:22 18:08	06:08 20:04	05:07 20:58	04:36 21:35	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 15:46
16	08:13 16:17	10:03 (BG 02) 10:12 (BG 02)	07:24 17:16	06:20 18:10	06:06 20:06	05:05 20:59	04:36 21:36	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 15:46
17	08:12 16:19	07:21 17:18	06:17 18:12	06:03 20:08	05:03 21:01	04:36 21:36	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	07:33 16:07	07:33 16:07	08:16 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 21:37	04:58 21:24	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:05	07:34 16:05	08:16 15:46
19	08:10 16:22	07:17 17:22	06:13 18:15	05:59 20:12	05:00 21:04	04:36 21:37	05:00 21:22	05:50 20:27	06:44 19:14	07:38 18:02	07:36 16:04	07:36 16:04	08:17 15:47
20	08:09 16:24	07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:06	04:36 21:37	05:01 21:21	05:52 20:25	06:46 19:11	07:40 18:00	07:38 16:03	07:38 16:03	08:18 15:47
21	08:08 16:26	07:13 17:26	06:08 18:19	05:54 20:15	04:57 21:07	04:36 21:38	05:02 21:20	05:54 20:22	06:48 19:09	07:42 17:58	07:40 16:01	07:40 16:01	08:18 15:47
22	08:06 16:28	07:11 17:28	06:05 18:21	05:52 20:17	04:56 21:09	04:36 21:38	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:42 16:00	07:42 16:00	08:19 15:48
23	08:05 16:29	07:09 17:30	06:03 18:23	05:50 20:19	04:55 21:10	04:37 21:38	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	07:43 15:59	08:19 15:48
24	08:04 16:31	07:06 17:32	06:00 18:24	05:48 20:21	04:53 21:12	04:37 21:38	05:07 21:16	05:59 20:16	06:53 19:01	07:47 17:51	07:45 15:58	07:45 15:58	08:20 15:49
25	08:02 16:33	07:04 17:34	05:58 18:26	05:45 20:23	04:52 21:13	04:37 21:38	05:08 21:14	06:01 20:13	06:55 18:59	07:49 16:49	07:47 15:57	07:47 15:57	08:20 15:50
26	08:01 16:35	07:02 17:36	05:56 18:28	05:43 20:24	04:51 21:15	04:38 21:38	05:10 21:13	06:02 20:11	06:56 18:56	07:49 16:47	07:49 15:56	07:49 15:56	08:21 15:50
27	08:00 16:37	07:00 17:38	05:53 18:30	05:41 20:26	04:50 21:16	04:38 21:38	05:11 21:11	06:04 20:09	06:58 18:54	07:50 16:45	07:50 15:55	07:50 15:55	08:21 15:51
28	07:58 16:39	06:57 17:40	05:51 18:32	05:39 20:28	04:48 21:17	04:39 21:38	05:13 21:09	06:06 20:06	07:00 18:52	07:52 16:43	07:52 15:54	07:52 15:54	08:21 15:52
29	07:57 16:41	06:48 19:33	05:37 18:30	05:25 20:30	04:47 21:19	04:39 21:38	05:15 21:08	06:08 20:04	07:02 18:49	07:53 16:41	07:53 15:53	07:53 15:53	08:21 15:53
30	07:55 16:43	06:46 19:35	05:35 20:32	05:23 21:20	04:46 21:27	04:40 21:37	05:16 21:06	06:09 20:02	07:03 18:47	07:55 16:39	07:55 15:52	07:55 15:52	08:21 15:54
31	07:53 16:45	06:43 19:37	05:33 20:32	05:21 21:21	04:45 21:21	04:38 21:04	05:18 21:04	06:11 19:59	07:00 16:37	07:50 16:37	07:50 16:37	07:50 16:37	08:21 15:55
Sonnenscheinstunden	252	274	367	419	492	508	510	458	382	329	261	236	905
astr.max.mögl.Beschattung	372										77		

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)	Schattenende (WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: D - Karlstein 15, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:
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- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:21 15:56 56	10:04 (BG 02) 13:16 (BG 01) 16:47	07:52 16:41 17:41	06:55 19:39 20:33	06:41 19:39 20:33	05:33 20:33 21:22	04:44 21:37 21:22	04:40 21:03 21:03	05:19 19:57 18:44	06:13 18:44 16:35	07:05 16:35 16:35	07:02 15:51 26	09:54 (BG 02) 10:20 (BG 02)	
2	08:21 15:57 53	10:04 (BG 02) 13:15 (BG 01) 16:49	07:50 16:49 17:43	06:53 19:41 20:35	06:39 19:41 20:35	05:31 20:35 21:24	04:43 21:37 21:01	04:41 21:01 19:55	05:21 19:55 18:42	06:15 18:42 16:33	07:04 16:33 15:50	07:58 15:50 27	10:21 (BG 02) 09:54 (BG 02)	
3	08:21 15:58 52	10:05 (BG 02) 13:15 (BG 01) 16:50	07:48 16:50 17:45	06:51 19:43 20:37	06:36 19:43 20:37	05:29 20:37 21:25	04:42 21:36 21:25	04:42 20:59 19:52	05:23 19:52 18:39	06:16 18:39 16:31	07:09 16:31 16:31	07:06 15:50 28	10:22 (BG 02) 09:54 (BG 02)	
4	08:21 16:00 49	10:07 (BG 02) 13:15 (BG 01) 16:52	07:47 16:52 17:47	06:48 16:52 17:47	06:34 19:44 20:39	05:27 20:39 21:26	04:42 21:36 21:26	04:43 20:57 19:50	05:24 19:50 18:37	06:18 18:37 16:29	07:10 16:29 16:29	07:08 15:49 29	10:22 (BG 02) 09:53 (BG 02)	
5	08:20 16:01 46	10:07 (BG 02) 13:14 (BG 01) 16:54	07:45 16:54 17:49	06:46 16:54 17:49	06:31 19:46 20:40	05:25 20:40 21:27	04:41 21:27 21:35	04:44 20:55 19:48	05:26 19:48 18:35	06:20 18:35 16:27	07:12 16:27 16:27	07:10 15:48 37	10:22 (BG 02) 09:54 (BG 02)	
6	08:20 16:02 44	10:07 (BG 02) 13:13 (BG 01) 16:56	07:43 16:56 17:51	06:44 16:56 17:51	06:29 19:48 20:42	05:23 20:42 21:28	04:40 21:28 21:35	04:44 20:53 19:45	05:28 19:45 18:32	06:21 18:32 16:25	07:14 16:25 16:25	07:12 15:48 43	10:22 (BG 02) 09:53 (BG 02)	
7	08:19 16:03 39	10:08 (BG 02) 13:12 (BG 01) 16:58	07:41 16:58 17:53	06:41 16:58 17:53	06:27 19:50 20:44	05:21 20:44 21:29	04:39 21:29 21:34	04:45 20:52 19:43	05:29 19:43 18:30	06:23 18:30 16:23	07:16 16:23 16:23	07:14 15:47 46	10:22 (BG 02) 09:54 (BG 02)	
8	08:19 16:05 29	10:09 (BG 02) 10:38 (BG 02) 17:00	07:39 17:00 17:55	06:39 17:00 17:55	06:24 19:52 20:46	05:19 20:46 21:30	04:39 21:30 21:33	04:46 20:50 19:40	05:31 19:40 18:27	06:25 18:27 16:21	07:18 16:21 16:21	07:16 15:47 49	10:22 (BG 02) 09:54 (BG 02)	
9	08:18 16:06 28	10:10 (BG 02) 10:38 (BG 02) 17:02	07:37 17:02 17:57	06:36 17:02 17:57	06:22 19:53 20:47	05:17 20:47 21:31	04:38 21:31 21:33	04:47 20:48 19:38	05:33 19:38 18:25	06:27 18:25 16:20	07:19 16:20 16:20	07:18 15:47 51	10:22 (BG 02) 09:54 (BG 02)	
10	08:18 16:08 28	10:11 (BG 02) 10:39 (BG 02) 17:04	07:36 17:04 17:58	06:34 17:04 17:58	06:20 19:55 20:49	05:15 20:49 21:32	04:38 21:32 21:32	04:48 20:46 19:35	05:35 19:35 18:23	06:28 18:23 16:18	07:21 16:18 16:18	07:20 15:46 52	10:22 (BG 02) 09:55 (BG 02)	
11	08:17 16:09 26	10:12 (BG 02) 10:38 (BG 02) 17:06	07:34 17:06 18:00	06:32 17:06 18:00	06:17 19:57 20:51	05:14 20:51 21:32	04:37 21:32 21:31	04:50 20:44 19:33	05:36 19:33 18:20	06:30 18:20 16:16	07:23 16:16 16:16	07:21 15:46 55	10:22 (BG 02) 09:55 (BG 02)	
12	08:16 16:11 25	10:13 (BG 02) 10:38 (BG 02) 17:08	07:32 17:08 18:02	06:29 17:08 18:02	06:15 19:59 20:53	05:12 20:53 21:33	04:37 21:33 21:30	04:51 20:42 19:31	05:38 19:31 18:18	06:32 18:18 16:15	07:25 16:15 16:15	07:23 15:46 56	10:22 (BG 02) 09:55 (BG 02)	
13	08:16 16:12 22	10:15 (BG 02) 10:37 (BG 02) 17:10	07:30 17:10 18:04	06:27 17:10 18:04	06:12 20:01 20:54	05:10 20:54 21:34	04:37 21:34 21:29	04:52 20:40 19:28	05:40 19:28 18:16	06:34 18:16 16:13	07:27 16:13 16:13	07:25 15:46 58	10:22 (BG 02) 09:55 (BG 02)	
14	08:15 16:14 21	10:16 (BG 02) 10:37 (BG 02) 17:12	07:28 17:12 18:06	06:25 17:12 18:06	06:10 20:03 20:56	05:08 20:56 21:35	04:36 21:35 21:28	04:53 20:37 19:26	05:41 19:26 18:13	06:35 18:13 16:11	07:29 16:11 16:11	07:27 15:46 59	10:22 (BG 02) 09:55 (BG 02)	
15	08:14 16:15 18	10:18 (BG 02) 10:36 (BG 02) 17:14	07:26 17:14 18:08	06:22 17:14 18:08	06:08 20:04 20:58	05:07 20:58 21:35	04:36 21:35 21:27	04:54 20:35 19:23	05:43 19:23 18:11	06:37 18:11 16:10	07:30 16:10 16:10	07:29 15:46 59	10:22 (BG 02) 09:56 (BG 02)	
16	08:13 16:17 15	10:19 (BG 02) 10:34 (BG 02) 17:16	07:24 17:16 18:10	06:20 17:16 18:10	06:06 20:06 20:59	05:05 20:59 21:36	04:36 21:36 21:26	04:56 20:33 19:21	05:45 19:21 18:09	06:39 18:09 16:08	07:32 16:08 16:08	07:31 15:46 60	10:22 (BG 02) 09:56 (BG 02)	
17	08:12 16:19 10	10:22 (BG 02) 10:32 (BG 02) 17:18	07:21 17:18 18:11	06:17 17:18 18:11	06:03 20:08 21:01	05:03 21:01 21:36	04:36 21:36 21:25	04:57 20:31 19:18	05:47 19:18 18:07	06:41 18:07 16:07	07:34 16:07 16:07	07:33 15:46 60	10:22 (BG 02) 09:56 (BG 02)	
18	08:11 16:21 9	10:23 (BG 02) 10:33 (BG 02) 17:19	07:20 17:19 18:13	06:16 17:19 18:13	06:01 20:10 21:02	05:02 21:02 21:37	04:36 21:37 21:24	04:58 20:29 19:16	05:48 19:16 18:04	06:42 18:04 16:05	07:34 16:05 16:05	07:34 15:46 61	10:22 (BG 02) 09:56 (BG 02)	
19	08:10 16:22 8	10:24 (BG 02) 10:34 (BG 02) 17:20	07:19 17:20 18:13	06:15 17:20 18:13	06:01 20:12 21:04	05:00 21:04 21:37	04:36 21:37 21:22	05:00 20:27 19:13	06:44 19:13 18:02	06:44 18:02 16:04	07:36 16:04 16:04	07:36 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
20	08:09 16:24 7	10:25 (BG 02) 10:35 (BG 02) 17:21	07:18 17:21 18:14	06:14 17:21 18:14	05:56 20:13 21:05	05:00 21:05 21:37	04:36 21:37 21:22	05:01 20:25 19:11	06:46 19:11 18:00	06:46 18:00 16:03	07:38 16:03 16:03	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
21	08:08 16:26 6	10:26 (BG 02) 10:36 (BG 02) 17:22	07:17 17:22 18:15	06:13 17:22 18:15	05:59 20:12 21:04	05:00 21:04 21:37	04:36 21:37 21:22	05:00 20:27 19:13	06:44 19:13 18:02	06:44 18:02 16:04	07:38 16:04 16:04	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
22	08:06 16:28 5	10:27 (BG 02) 10:37 (BG 02) 17:23	07:16 17:23 18:16	06:12 17:23 18:16	05:56 20:11 21:03	05:00 21:03 21:37	04:36 21:37 21:22	05:00 20:25 19:11	06:44 19:11 18:00	06:44 18:00 16:03	07:38 16:03 16:03	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
23	08:05 16:29 4	10:28 (BG 02) 10:38 (BG 02) 17:24	07:15 17:24 18:17	06:11 17:24 18:17	05:52 20:10 21:02	05:00 21:02 21:37	04:36 21:37 21:22	05:00 20:25 19:11	06:44 19:11 18:00	06:44 18:00 16:03	07:38 16:03 16:03	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
24	08:04 16:31 3	10:29 (BG 02) 10:39 (BG 02) 17:25	07:14 17:25 18:18	06:10 17:25 18:18	05:48 20:09 21:01	05:00 21:01 21:37	04:36 21:37 21:22	05:00 20:25 19:11	06:44 19:11 18:00	06:44 18:00 16:03	07:38 16:03 16:03	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
25	08:02 16:33 2	10:30 (BG 02) 10:40 (BG 02) 17:26	07:13 17:26 18:19	06:09 17:26 18:19	05:45 20:08 21:00	05:00 21:00 21:37	04:36 21:37 21:22	05:00 20:25 19:11	06:44 19:11 18:00	06:44 18:00 16:03	07:38 16:03 16:03	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
26	08:01 16:35 1	10:31 (BG 02) 10:41 (BG 02) 17:27	07:12 17:27 18:20	06:08 17:27 18:20	05:42 20:07 21:00	05:00 21:00 21:37	04:36 21:37 21:22	05:00 20:25 19:11	06:44 19:11 18:00	06:44 18:00 16:03	07:38 16:03 16:03	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
27	07:59 16:37 0	10:32 (BG 02) 10:42 (BG 02) 17:28	07:11 17:28 18:21	06:07 17:28 18:21	05:40 20:06 21:00	05:00 21:00 21:37	04:36 21:37 21:22	05:00 20:25 19:11	06:44 19:11 18:00	06:44 18:00 16:03	07:38 16:03 16:03	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
28	07:58 16:39 0	10:33 (BG 02) 10:43 (BG 02) 17:29	07:10 17:29 18:22	06:06 17:29 18:22	05:38 20:05 21:00	05:00 21:00 21:37	04:36 21:37 21:22	05:00 20:25 19:11	06:44 19:11 18:00	06:44 18:00 16:03	07:38 16:03 16:03	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
29	07:56 16:41 0	10:34 (BG 02) 10:44 (BG 02) 17:30	07:09 17:30 18:23	06:05 17:30 18:23	05:36 20:04 21:00	05:00 21:00 21:37	04:36 21:37 21:22	05:00 20:25 19:11	06:44 19:11 18:00	06:44 18:00 16:03	07:38 16:03 16:03	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
30	07:55 16:43 0	10:35 (BG 02) 10:45 (BG 02) 17:31	07:08 17:31 18:24	06:04 17:31 18:24	05:34 20:03 21:00	05:00 21:00 21:37	04:36 21:37 21:22	05:00 20:25 19:11	06:44 19:11 18:00	06:44 18:00 16:03	07:38 16:03 16:03	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
31	07:53 16:45 0	10:36 (BG 02) 10:46 (BG 02) 17:32	07:07 17:32 18:25	06:03 17:32 18:25	05:32 20:02 21:00	05:00 21:00 21:37	04:36 21:37 21:22	05:00 20:25 19:11	06:44 19:11 18:00	06:44 18:00 16:03	07:38 16:03 16:03	07:38 15:47 62	10:22 (BG 02) 09:56 (BG 02)	
	Sonnenscheinstunden astr.max.mögl.Beschattung	252 561	274 674	367 941	419 1046	492 1249	508 1276	510 1284	458 1146	382 954	329 821	261 651	111 276	1644 4110

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)	Schattenende (WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: E - Karlstein 13, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 15:56	10:45 (BG 02) 14:03 (BG 01)	07:52 16:47	06:55 17:41	06:41 19:39	05:33 20:33	04:44 21:22	04:40 21:37	05:19 21:03	06:13 19:57	07:05 18:44	07:02 16:35	10:41 (BG 02) 15:51
2	08:21 15:57	62 10:46 (BG 02) 14:03 (BG 01)	07:50 16:49	06:53 17:43	06:39 19:41	05:31 20:35	04:43 21:24	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	07:04 16:33	34 13:45 (BG 01) 15:50
3	08:21 15:58	60 10:47 (BG 02) 14:03 (BG 01)	07:48 16:50	06:51 17:45	06:36 19:43	05:29 20:37	04:42 21:25	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 16:31	40 13:46 (BG 01) 15:50
4	08:21 16:00	59 10:48 (BG 02) 14:04 (BG 01)	07:47 16:52	06:48 17:47	06:34 19:44	05:27 20:39	04:42 21:26	04:43 21:36	05:24 20:57	06:18 19:50	07:10 18:37	07:08 16:29	46 13:47 (BG 01) 15:49
5	08:20 16:01	57 10:49 (BG 02) 14:03 (BG 01)	07:45 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 21:27	04:44 21:35	05:26 20:55	06:20 19:48	07:12 18:35	07:10 16:27	46 13:47 (BG 01) 15:48
6	08:20 16:02	54 10:49 (BG 02) 14:03 (BG 01)	07:43 16:56	06:44 17:51	06:29 19:48	05:23 20:42	04:40 21:28	04:44 21:35	05:28 20:53	06:21 19:45	07:14 18:32	07:12 16:25	51 13:49 (BG 01) 15:48
7	08:19 16:03	54 10:51 (BG 02) 14:04 (BG 01)	07:41 16:58	06:41 17:53	06:27 19:50	05:21 20:44	04:39 21:29	04:45 21:34	05:29 20:52	06:23 19:43	07:16 18:30	07:14 16:23	53 13:51 (BG 01) 15:05
8	08:19 16:05	51 10:52 (BG 02) 14:03 (BG 01)	07:39 17:00	06:39 17:55	06:24 19:52	05:19 20:46	04:39 21:30	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:16 16:21	55 13:51 (BG 01) 15:06
9	08:18 16:06	48 10:54 (BG 02) 14:03 (BG 01)	07:37 17:02	06:36 17:57	06:22 19:53	05:17 20:47	04:38 21:31	04:47 21:33	05:33 20:48	06:27 19:38	07:19 18:25	07:18 16:20	57 13:51 (BG 01) 15:08
10	08:18 16:08	44 10:56 (BG 02) 14:04 (BG 01)	07:36 17:04	06:34 17:58	06:20 19:55	05:15 20:49	04:38 21:32	04:48 21:32	05:35 20:46	06:28 19:35	07:21 18:23	07:20 16:18	58 13:51 (BG 01) 15:09
11	08:17 16:09	41 10:59 (BG 02) 14:03 (BG 01)	07:34 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:37 21:32	04:50 21:31	05:36 20:44	06:30 19:33	07:23 18:20	07:21 16:16	60 13:53 (BG 01) 15:08
12	08:16 16:11	34 13:40 (BG 01) 14:02 (BG 01)	07:32 17:08	06:29 18:02	06:15 19:59	05:12 20:53	04:37 21:33	04:51 21:30	05:38 20:42	06:32 19:31	07:25 18:18	07:23 16:15	61 13:53 (BG 01) 15:08
13	08:16 16:12	22 13:42 (BG 01) 14:02 (BG 01)	07:30 17:10	06:27 18:04	06:12 20:01	05:10 20:54	04:37 21:34	04:52 21:29	05:40 20:40	06:34 19:28	07:27 18:16	07:25 16:13	62 13:54 (BG 01) 15:08
14	08:15 16:14	20 13:44 (BG 01) 14:01 (BG 01)	07:28 17:12	06:25 18:06	06:10 20:03	05:08 20:56	04:36 21:34	04:53 21:28	05:41 20:37	06:35 19:26	07:29 18:13	07:27 16:11	62 13:54 (BG 01) 15:08
15	08:14 16:15	17 13:46 (BG 01) 14:00 (BG 01)	07:26 17:14	06:22 18:08	06:08 20:04	05:07 20:58	04:36 21:35	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	64 13:55 (BG 01) 15:08
16	08:13 16:17	14 13:48 (BG 01) 13:56 (BG 01)	07:24 17:16	06:20 18:10	06:06 20:06	05:05 20:59	04:36 21:36	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	65 13:55 (BG 01) 15:08
17	08:12 16:19	8 13:56 (BG 01)	07:21 17:18	06:17 18:11	06:03 20:08	05:03 21:01	04:36 21:36	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	07:33 16:07	65 13:56 (BG 01) 15:08
18	08:11 16:21	16:19	07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 21:37	04:58 21:24	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:05	66 13:57 (BG 01) 15:08
19	08:10 16:22	16:21	07:17 17:22	06:13 18:15	05:59 20:12	05:00 21:04	04:36 21:37	05:00 21:22	05:50 20:27	06:44 19:13	07:38 18:02	07:36 16:04	66 13:57 (BG 01) 15:08
20	08:09 16:24	16:22	07:15 17:24	06:10 18:17	05:56 20:13	05:01 21:06	04:36 21:37	05:01 21:21	05:52 20:25	06:46 19:11	07:40 18:00	07:38 16:03	66 13:57 (BG 01) 15:08
21	08:08 16:26	16:24	07:13 17:26	06:08 18:19	05:54 20:15	05:02 21:07	04:36 21:38	05:02 21:20	05:54 20:22	06:48 19:09	07:42 17:58	07:40 16:01	66 13:58 (BG 01) 15:08
22	08:06 16:28	16:26	07:11 17:28	06:05 18:21	05:52 20:17	05:04 21:09	04:36 21:38	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:42 16:00	66 13:58 (BG 01) 15:08
23	08:05 16:29	16:28	07:09 17:30	06:03 18:22	05:50 20:19	05:05 21:10	04:37 21:38	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	67 13:59 (BG 01) 15:08
24	08:04 16:31	16:29	07:06 17:32	06:00 18:24	05:48 20:21	05:04 21:12	04:37 21:38	05:07 21:16	05:59 20:16	06:53 19:01	07:47 17:51	07:45 15:58	66 14:00 (BG 01) 15:08
25	08:02 16:33	16:31	07:04 17:34	05:58 18:26	05:45 20:23	05:02 21:13	04:37 21:38	05:08 21:14	06:01 20:13	06:55 18:59	07:49 16:49	07:47 15:57	67 14:01 (BG 01) 15:08
26	08:01 16:35	16:33	07:02 17:36	05:56 18:28	05:43 20:24	05:01 21:15	04:38 21:38	05:10 21:12	06:02 20:11	06:56 18:56	07:48 16:47	07:48 15:56	66 14:01 (BG 01) 15:08
27	07:59 16:37	16:41	07:00 17:38	05:53 18:30	05:41 20:26	05:01 21:16	04:38 21:38	05:11 21:11	06:04 20:09	06:58 18:54	07:50 16:45	07:50 15:55	66 14:01 (BG 01) 15:08
28	07:58 16:39	16:41	06:57 17:39	05:51 18:32	05:39 20:28	05:01 21:17	04:39 21:38	05:13 21:09	06:06 20:06	07:00 18:51	07:52 16:43	07:52 15:54	65 14:01 (BG 01) 15:08
29	07:56 16:41	16:41	06:56 17:39	05:50 18:33	05:38 20:29	05:00 21:18	04:39 21:38	05:15 21:08	06:08 20:04	07:02 18:49	07:53 16:41	07:53 15:53	64 14:02 (BG 01) 15:08
30	07:55 16:43	16:43	06:55 17:39	05:49 18:34	05:37 20:30	05:01 21:19	04:40 21:38	05:16 21:06	06:09 20:02	07:03 18:47	07:55 16:39	07:55 15:52	64 14:02 (BG 01) 15:08
31	07:53 16:45	16:45	06:53 17:37	05:47 18:35	05:35 20:32	05:02 21:20	04:41 21:37	05:18 21:06	06:11 20:02	07:00 18:47	07:56 16:37	07:56 15:52	64 14:03 (BG 01) 15:08
	Sonnenscheinstunden astr.max.mögl.Beschattung	252 645	274	367	419	492	508	510	458	382	329	261	81 1861

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: F - Bandelow 17E, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 15:56	09:24 (BG 18) 07:52 15:04 (BG 15) 16:47	15:25 (BG 12) 06:55 15:57 (BG 14) 17:41	16:26 (BG 08) 06:41 16:59 (BG 08) 19:39	18:43 (BG 05) 05:33 18:42 (BG 05) 05:31	19:37 (BG 02) 04:44 19:59 (BG 02) 21:22	
2	08:21 15:57	09:25 (BG 18) 07:50 15:05 (BG 15) 16:48	15:25 (BG 12) 06:53 15:56 (BG 14) 17:43	16:26 (BG 08) 06:39 16:59 (BG 08) 19:41	18:42 (BG 05) 05:31 19:07 (BG 05) 20:35	19:36 (BG 02) 04:43 20:00 (BG 02) 21:23	
3	08:21 15:58	09:26 (BG 18) 07:48 15:06 (BG 15) 16:50	15:25 (BG 12) 06:50 15:55 (BG 12) 17:47	16:26 (BG 08) 06:36 17:00 (BG 08) 19:42	18:39 (BG 05) 05:29 19:07 (BG 05) 20:37	19:35 (BG 02) 04:42 20:01 (BG 02) 21:25	
4	08:20 16:00	09:26 (BG 18) 07:46 15:06 (BG 15) 16:52	15:25 (BG 12) 06:48 15:55 (BG 12) 17:47	16:25 (BG 08) 06:34 16:59 (BG 08) 19:44	18:38 (BG 05) 05:27 19:08 (BG 05) 20:39	19:34 (BG 02) 04:41 20:02 (BG 02) 21:26	
5	08:20 16:01	09:27 (BG 18) 07:45 15:07 (BG 15) 16:54	15:27 (BG 12) 06:46 15:56 (BG 12) 17:49	16:25 (BG 08) 06:31 16:59 (BG 08) 19:46	18:38 (BG 05) 05:25 19:20 (BG 03) 20:40	19:34 (BG 02) 04:41 20:03 (BG 02) 21:27	
6	08:20 16:02	09:27 (BG 18) 07:43 15:07 (BG 15) 16:56	15:28 (BG 12) 06:43 15:55 (BG 12) 17:51	16:25 (BG 08) 06:29 17:24 (BG 06) 19:48	18:36 (BG 05) 05:23 19:21 (BG 03) 20:42	19:33 (BG 02) 04:40 20:03 (BG 02) 21:28	
7	08:19 16:03	09:29 (BG 18) 07:41 15:08 (BG 15) 16:58	15:28 (BG 12) 06:41 15:55 (BG 12) 17:53	16:26 (BG 08) 06:27 17:26 (BG 06) 19:50	18:36 (BG 05) 05:21 19:23 (BG 03) 20:44	19:32 (BG 02) 04:39 20:03 (BG 02) 21:29	
8	08:19 16:05	09:29 (BG 18) 07:39 15:08 (BG 15) 17:00	15:29 (BG 12) 06:39 15:54 (BG 12) 17:55	16:26 (BG 08) 06:24 17:29 (BG 06) 19:52	18:35 (BG 05) 05:19 19:25 (BG 03) 20:46	19:32 (BG 02) 04:39 20:03 (BG 02) 21:30	
9	08:18 16:06	09:30 (BG 18) 07:37 15:08 (BG 15) 17:02	15:30 (BG 12) 06:36 16:33 (BG 09) 17:57	16:26 (BG 08) 06:22 17:30 (BG 06) 19:53	18:34 (BG 05) 05:17 19:25 (BG 03) 20:47	19:32 (BG 02) 04:38 20:04 (BG 02) 21:31	
10	08:18 16:08	09:31 (BG 18) 07:35 15:08 (BG 15) 17:04	15:32 (BG 12) 06:34 16:35 (BG 09) 17:58	16:28 (BG 08) 06:19 17:32 (BG 06) 19:55	18:34 (BG 05) 05:15 19:26 (BG 03) 20:49	19:32 (BG 02) 04:38 20:04 (BG 02) 21:31	
11	08:17 16:09	09:32 (BG 18) 07:33 15:09 (BG 15) 17:06	15:33 (BG 12) 06:32 16:36 (BG 09) 18:00	16:28 (BG 08) 06:17 17:33 (BG 06) 19:57	18:34 (BG 05) 05:14 19:26 (BG 03) 20:51	19:31 (BG 02) 04:37 20:03 (BG 02) 21:32	
12	08:16 16:11	09:34 (BG 18) 07:32 15:09 (BG 15) 17:08	15:36 (BG 12) 06:29 16:38 (BG 09) 18:02	16:30 (BG 08) 06:15 17:33 (BG 06) 19:59	18:34 (BG 05) 05:12 19:26 (BG 03) 20:52	19:32 (BG 02) 04:37 20:04 (BG 02) 21:33	
13	08:15 16:12	09:35 (BG 18) 07:30 15:09 (BG 15) 17:10	16:18 (BG 09) 06:27 16:39 (BG 09) 18:04	16:32 (BG 08) 06:12 17:33 (BG 06) 20:01	18:34 (BG 05) 05:10 19:26 (BG 03) 20:54	19:32 (BG 02) 04:37 20:03 (BG 02) 21:34	
14	08:15 16:14	09:37 (BG 18) 07:28 15:09 (BG 15) 17:12	16:17 (BG 09) 06:24 16:40 (BG 09) 18:06	16:36 (BG 08) 06:10 17:33 (BG 06) 20:02	18:35 (BG 05) 05:08 19:26 (BG 03) 20:56	19:31 (BG 02) 04:36 20:03 (BG 02) 21:34	
15	08:14 16:15	09:38 (BG 18) 07:25 15:08 (BG 15) 17:14	16:17 (BG 09) 06:22 16:41 (BG 09) 18:08	17:09 (BG 06) 06:08 17:33 (BG 06) 20:04	18:35 (BG 05) 05:07 19:25 (BG 03) 20:57	19:32 (BG 02) 04:36 20:03 (BG 02) 21:35	
16	08:13 16:17	14:17 (BG 13) 07:23 15:42 (BG 14) 17:16	16:16 (BG 09) 06:20 16:41 (BG 09) 18:10	17:08 (BG 06) 06:05 17:32 (BG 06) 20:06	18:35 (BG 05) 05:05 19:24 (BG 03) 20:59	19:32 (BG 02) 04:36 20:02 (BG 02) 21:35	
17	08:12 16:19	14:19 (BG 13) 07:21 15:44 (BG 14) 17:18	16:16 (BG 09) 06:17 16:42 (BG 09) 18:11	17:09 (BG 06) 06:03 17:31 (BG 06) 20:08	18:36 (BG 05) 05:03 19:23 (BG 03) 21:01	19:33 (BG 02) 04:36 20:02 (BG 02) 21:36	
18	08:11 16:21	14:20 (BG 13) 07:19 15:46 (BG 14) 17:20	16:15 (BG 09) 06:15 16:41 (BG 09) 18:13	17:09 (BG 06) 06:01 17:29 (BG 06) 20:10	18:37 (BG 05) 05:02 19:22 (BG 03) 21:02	19:34 (BG 02) 04:36 20:02 (BG 02) 21:36	
19	08:10 16:22	14:21 (BG 13) 07:17 15:49 (BG 14) 17:22	16:16 (BG 09) 06:12 16:41 (BG 09) 18:15	17:10 (BG 06) 05:59 17:28 (BG 06) 20:12	18:39 (BG 05) 05:00 19:21 (BG 03) 21:04	19:34 (BG 02) 04:36 20:01 (BG 02) 21:37	
20	08:09 16:24	14:22 (BG 13) 07:15 15:50 (BG 14) 17:24	16:16 (BG 09) 06:10 16:41 (BG 09) 18:17	17:12 (BG 06) 05:56 17:50 (BG 04) 20:13	18:41 (BG 05) 04:59 19:19 (BG 03) 21:05	19:35 (BG 02) 04:36 20:01 (BG 02) 21:37	
21	08:07 16:26	14:24 (BG 13) 07:13 15:52 (BG 14) 17:26	16:17 (BG 09) 06:08 16:49 (BG 08) 18:19	17:15 (BG 06) 05:54 17:53 (BG 04) 20:15	18:43 (BG 05) 04:57 19:15 (BG 03) 21:07	19:36 (BG 02) 04:36 20:01 (BG 02) 21:37	
22	08:06 16:28	14:25 (BG 13) 07:11 15:54 (BG 14) 17:28	16:17 (BG 09) 06:05 16:52 (BG 08) 18:21	17:44 (BG 04) 05:52 17:55 (BG 04) 20:17	19:15 (BG 03) 21:07 19:15 (BG 03) 21:07	19:36 (BG 02) 04:36 19:59 (BG 02) 21:38	
23	08:05 16:29	14:27 (BG 13) 07:08 15:56 (BG 14) 17:30	16:18 (BG 09) 06:03 16:54 (BG 08) 18:22	17:42 (BG 04) 05:50 17:56 (BG 04) 20:19	19:15 (BG 03) 21:07 19:15 (BG 03) 21:07	19:37 (BG 02) 04:37 19:59 (BG 02) 21:38	
24	08:04 16:31	14:30 (BG 13) 07:06 15:56 (BG 14) 17:32	16:19 (BG 09) 06:00 16:56 (BG 08) 18:24	17:42 (BG 04) 05:48 17:58 (BG 04) 20:21	19:15 (BG 03) 21:07 19:15 (BG 03) 21:07	19:38 (BG 02) 04:37 19:58 (BG 02) 21:38	
25	08:02 16:33	15:26 (BG 12) 07:04 15:57 (BG 14) 17:34	16:21 (BG 09) 05:58 16:57 (BG 08) 18:26	17:41 (BG 04) 05:45 18:00 (BG 04) 20:22	19:15 (BG 03) 21:07 19:15 (BG 03) 21:07	19:39 (BG 02) 04:37 19:57 (BG 02) 21:38	
26	08:01 16:35	15:25 (BG 12) 07:02 15:57 (BG 14) 17:36	16:24 (BG 09) 05:55 16:57 (BG 08) 18:28	17:41 (BG 04) 05:43 18:01 (BG 04) 20:24	19:15 (BG 03) 21:07 19:15 (BG 03) 21:07	19:41 (BG 02) 04:38 19:56 (BG 02) 21:38	
27	07:59 16:37	15:25 (BG 12) 07:00 15:58 (BG 14) 17:38	16:28 (BG 08) 05:53 16:58 (BG 08) 18:30	17:40 (BG 04) 05:41 18:00 (BG 04) 20:26	19:15 (BG 03) 21:07 19:15 (BG 03) 21:07	19:42 (BG 02) 04:38 19:55 (BG 02) 21:38	
28	07:58 16:39	15:25 (BG 12) 06:57 15:58 (BG 14) 17:39	16:27 (BG 08) 05:51 16:59 (BG 08) 18:32	17:41 (BG 04) 05:39 18:00 (BG 04) 20:28	19:45 (BG 02) 04:48 19:53 (BG 02) 21:17	19:45 (BG 02) 04:39 19:53 (BG 02) 21:38	
29	07:56 16:41	15:24 (BG 12) 06:55 15:58 (BG 14) 17:40	16:28 (BG 08) 05:50 16:59 (BG 08) 18:33	18:41 (BG 04) 05:37 18:58 (BG 04) 20:30	19:41 (BG 02) 04:47 19:56 (BG 02) 21:18	04:39 21:37	
30	07:55 16:43	15:25 (BG 12) 06:54 15:58 (BG 14) 17:41	16:29 (BG 08) 05:49 16:59 (BG 08) 18:34	18:42 (BG 04) 05:35 19:00 (BG 05) 20:31	19:39 (BG 02) 04:46 19:58 (BG 02) 21:20	04:40 21:37	
31	07:53 16:45	15:25 (BG 12) 06:53 15:58 (BG 14) 17:42	16:29 (BG 08) 05:48 16:59 (BG 08) 18:35	18:44 (BG 04) 05:34 19:04 (BG 05) 20:32	19:58 (BG 02) 21:21 19:58 (BG 02) 21:21	04:45 21:38	
	Sonnenscheinstunden astr.max.mögl.Beschattung	252 1829	274 823	367 869	419 921	492 727	508

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: F - Bandelow 17E, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	04:40	05:19	19:42 (BG 02)	06:13	18:33 (BG 05)	07:05	17:10 (BG 08)	07:02	15:00 (BG 12)	07:56	09:15 (BG 18)	
	21:37	21:02	32 20:14 (BG 02)	19:57	52 19:25 (BG 03)	18:44	43 18:12 (BG 06)	16:35	33 16:03 (BG 09)	15:51	72 14:51 (BG 15)	
2	04:41	05:21	19:42 (BG 02)	06:14	18:32 (BG 05)	07:07	17:08 (BG 08)	07:04	14:59 (BG 12)	07:58	09:14 (BG 18)	
	21:37	21:01	32 20:14 (BG 02)	19:55	52 19:24 (BG 03)	18:42	47 18:12 (BG 06)	16:33	30 16:01 (BG 09)	15:50	75 14:51 (BG 15)	
3	04:42	05:23	19:42 (BG 02)	06:16	18:32 (BG 05)	07:09	17:06 (BG 08)	07:06	14:59 (BG 12)	07:59	09:14 (BG 18)	
	21:36	20:59	32 20:14 (BG 02)	19:52	51 19:23 (BG 03)	18:39	49 18:11 (BG 06)	16:31	25 15:24 (BG 12)	15:50	76 14:52 (BG 15)	
4	04:43	05:24	19:42 (BG 02)	06:18	18:32 (BG 05)	07:10	17:05 (BG 08)	07:08	14:58 (BG 12)	08:01	09:13 (BG 18)	
	21:36	20:57	31 20:13 (BG 02)	19:50	50 19:22 (BG 03)	18:37	48 18:09 (BG 06)	16:29	26 15:24 (BG 12)	15:49	78 14:52 (BG 15)	
5	04:44	05:26	19:42 (BG 02)	06:20	18:32 (BG 05)	07:12	17:03 (BG 08)	07:10	14:57 (BG 12)	08:02	09:14 (BG 18)	
	21:35	20:55	31 20:13 (BG 02)	19:47	47 19:19 (BG 03)	18:35	47 18:06 (BG 06)	16:27	28 15:25 (BG 12)	15:48	79 14:53 (BG 15)	
6	04:44	05:28	19:42 (BG 02)	06:21	18:32 (BG 05)	07:14	17:02 (BG 08)	07:12	14:57 (BG 12)	08:04	09:13 (BG 18)	
	21:35	20:53	30 20:12 (BG 02)	19:45	45 19:17 (BG 03)	18:32	43 18:03 (BG 06)	16:25	29 15:26 (BG 12)	15:48	80 14:53 (BG 15)	
7	04:45	05:29	19:43 (BG 02)	06:23	18:33 (BG 05)	07:16	17:01 (BG 08)	07:14	14:56 (BG 12)	08:05	09:14 (BG 18)	
	21:34	20:51	29 20:12 (BG 02)	19:43	40 19:15 (BG 03)	18:30	41 18:01 (BG 06)	16:23	30 15:26 (BG 12)	15:47	80 14:54 (BG 15)	
8	04:46	05:31	19:44 (BG 02)	06:25	18:32 (BG 05)	07:18	17:01 (BG 08)	07:16	14:56 (BG 12)	08:06	09:14 (BG 18)	
	21:33	20:49	28 20:12 (BG 02)	19:40	30 19:02 (BG 05)	18:27	33 17:34 (BG 08)	16:21	30 15:26 (BG 12)	15:47	81 14:54 (BG 15)	
9	04:47	05:33	19:43 (BG 02)	06:27	18:33 (BG 05)	07:19	17:00 (BG 08)	07:18	14:56 (BG 12)	08:07	09:14 (BG 18)	
	21:32	20:47	28 20:11 (BG 02)	19:38	28 19:01 (BG 05)	18:25	34 17:34 (BG 08)	16:20	31 15:27 (BG 12)	15:47	81 14:54 (BG 15)	
10	04:48	05:35	19:45 (BG 02)	06:28	18:35 (BG 05)	07:21	17:00 (BG 08)	07:19	14:56 (BG 12)	08:09	09:15 (BG 18)	
	21:32	20:46	25 20:10 (BG 02)	19:35	25 19:00 (BG 05)	18:23	34 17:34 (BG 08)	16:18	32 15:28 (BG 12)	15:46	81 14:55 (BG 15)	
11	04:50	05:36	19:45 (BG 02)	06:30	18:36 (BG 05)	07:23	17:00 (BG 08)	07:21	14:56 (BG 12)	08:10	09:15 (BG 18)	
	21:31	20:43	24 20:09 (BG 02)	19:33	22 18:58 (BG 05)	18:20	34 17:34 (BG 08)	16:16	33 15:29 (BG 12)	15:46	83 14:56 (BG 15)	
12	04:51	05:38	19:46 (BG 02)	06:32	18:36 (BG 05)	07:25	16:59 (BG 08)	07:23	14:56 (BG 12)	08:11	09:15 (BG 18)	
	21:30	20:41	22 20:08 (BG 02)	19:30	19 18:55 (BG 05)	18:18	33 17:32 (BG 08)	16:15	33 15:29 (BG 12)	15:46	82 14:56 (BG 15)	
13	04:52	05:40	19:48 (BG 02)	06:34	18:34 (BG 04)	07:27	16:59 (BG 08)	07:25	14:56 (BG 12)	08:12	09:15 (BG 18)	
	21:29	20:39	18 20:06 (BG 02)	19:28	18 18:52 (BG 05)	18:16	33 17:32 (BG 08)	16:13	34 15:30 (BG 12)	15:46	83 14:56 (BG 15)	
14	04:53	05:41	19:50 (BG 02)	06:35	18:32 (BG 04)	07:28	16:59 (BG 08)	07:27	14:57 (BG 12)	08:13	09:16 (BG 18)	
	21:28	20:37	13 20:03 (BG 02)	19:26	17 18:49 (BG 04)	18:13	32 17:31 (BG 08)	16:11	33 15:30 (BG 12)	15:46	83 14:57 (BG 15)	
15	04:54	19:55 (BG 02)	05:43	06:37	18:30 (BG 04)	07:30	17:00 (BG 08)	07:29	14:57 (BG 12)	08:14	09:16 (BG 18)	
	21:27	5 20:00 (BG 02)	20:35	5 19:59 (BG 02)	19:23	19 18:49 (BG 04)	18:11	30 17:30 (BG 08)	16:10	33 15:30 (BG 12)	15:46	83 14:57 (BG 15)
16	04:56	19:52 (BG 02)	05:45	06:39	18:30 (BG 04)	07:32	16:55 (BG 09)	07:31	14:58 (BG 12)	08:15	09:17 (BG 18)	
	21:26	11 20:03 (BG 02)	20:33	19:21	19 18:49 (BG 04)	18:09	34 17:29 (BG 08)	16:08	32 15:30 (BG 12)	15:46	82 14:58 (BG 15)	
17	04:57	19:51 (BG 02)	05:47	06:40	18:29 (BG 04)	07:34	16:52 (BG 09)	07:32	14:59 (BG 12)	08:15	09:17 (BG 18)	
	21:25	14 20:05 (BG 02)	20:31	19:18	21 18:50 (BG 04)	18:06	36 17:28 (BG 08)	16:07	31 15:30 (BG 12)	15:46	83 14:58 (BG 15)	
18	04:58	19:50 (BG 02)	05:48	06:42	18:28 (BG 04)	07:36	16:50 (BG 09)	07:34	14:04 (BG 13)	08:16	09:17 (BG 18)	
	21:23	16 20:06 (BG 02)	20:29	19:16	20 18:48 (BG 04)	18:04	36 17:26 (BG 08)	16:05	41 15:30 (BG 12)	15:46	83 14:58 (BG 15)	
19	05:00	19:48 (BG 02)	05:50	06:44	18:28 (BG 04)	07:38	16:49 (BG 09)	07:36	14:01 (BG 13)	08:17	09:18 (BG 18)	
	21:22	19 20:07 (BG 02)	20:27	19:13	17 18:45 (BG 04)	18:02	36 17:25 (BG 08)	16:04	46 15:30 (BG 12)	15:47	83 14:59 (BG 15)	
20	05:01	19:47 (BG 02)	05:52	06:46	18:29 (BG 04)	07:40	16:48 (BG 09)	07:38	14:00 (BG 13)	08:18	09:18 (BG 18)	
	21:21	21 20:08 (BG 02)	20:24	19:11	14 18:43 (BG 04)	18:00	34 17:22 (BG 08)	16:03	46 15:29 (BG 12)	15:47	83 14:59 (BG 15)	
21	05:02	19:47 (BG 02)	05:54	18:53 (BG 05)	06:47	18:29 (BG 04)	07:41	16:47 (BG 09)	07:40	13:59 (BG 13)	08:18	09:18 (BG 18)
	21:20	23 20:10 (BG 02)	20:22	2 18:55 (BG 05)	19:09	12 18:41 (BG 04)	17:58	31 17:18 (BG 08)	16:01	53 15:27 (BG 12)	15:47	83 14:59 (BG 15)
22	05:04	19:46 (BG 02)	05:55	18:47 (BG 05)	06:49	18:01 (BG 06)	07:43	16:46 (BG 09)	07:41	13:58 (BG 13)	08:19	09:19 (BG 18)
	21:18	24 20:10 (BG 02)	20:20	22 19:20 (BG 03)	19:06	13 18:38 (BG 04)	17:55	25 17:11 (BG 09)	16:00	57 15:26 (BG 12)	15:48	83 15:00 (BG 15)
23	05:05	19:46 (BG 02)	05:57	18:44 (BG 05)	06:51	17:57 (BG 06)	07:45	16:46 (BG 09)	07:43	13:57 (BG 13)	08:19	09:19 (BG 18)
	21:17	25 20:11 (BG 02)	20:18	33 19:23 (BG 03)	19:04	17 18:36 (BG 04)	17:53	26 17:12 (BG 09)	15:59	60 15:25 (BG 12)	15:48	83 15:00 (BG 15)
24	05:07	19:45 (BG 02)	05:59	18:42 (BG 05)	06:53	17:55 (BG 06)	07:47	16:46 (BG 09)	07:45	13:57 (BG 13)	08:20	09:20 (BG 18)
	21:15	27 20:12 (BG 02)	20:15	41 19:25 (BG 03)	19:01	16 18:11 (BG 06)	17:51	25 17:11 (BG 09)	15:58	59 15:23 (BG 12)	15:49	82 15:00 (BG 15)
25	05:08	19:44 (BG 02)	06:01	18:40 (BG 05)	06:54	17:52 (BG 06)	06:49	15:46 (BG 09)	07:47	13:57 (BG 13)	08:20	09:21 (BG 18)
	21:14	28 20:12 (BG 02)	20:13	45 19:25 (BG 03)	18:59	20 18:12 (BG 06)	16:49	25 16:11 (BG 09)	15:57	53 15:22 (BG 12)	15:50	83 15:02 (BG 15)
26	05:10	19:44 (BG 02)	06:02	18:39 (BG 05)	06:56	17:51 (BG 06)	06:51	15:46 (BG 09)	07:48	13:57 (BG 13)	08:20	09:21 (BG 18)
	21:12	29 20:13 (BG 02)	20:11	47 19:26 (BG 03)	18:56	22 18:13 (BG 06)	16:47	25 16:11 (BG 09)	15:56	52 15:21 (BG 12)	15:50	83 15:02 (BG 15)
27	05:11	19:43 (BG 02)	06:04	18:38 (BG 05)	06:58	17:50 (BG 06)	06:53	15:46 (BG 09)	07:50	09:18 (BG 18)	08:21	09:21 (BG 18)
	21:11	30 20:13 (BG 02)	20:09	49 19:27 (BG 03)	18:54	23 18:13 (BG 06)	16:45	24 16:10 (BG 09)	15:55	60 14:48 (BG 15)	15:51	83 15:02 (BG 15)
28	05:13	19:43 (BG 02)	06:06	18:36 (BG 05)	07:00	17:49 (BG 06)	06:55	15:47 (BG 09)	07:52	09:16 (BG 18)	08:21	09:22 (BG 18)
	21:09	31 20:14 (BG 02)	20:06	50 19:26 (BG 03)	18:51	24 18:13 (BG 06)	16:43	23 16:10 (BG 09)	15:54	64 14:48 (BG 15)	15:52	83 15:03 (BG 15)
29	05:15	19:43 (BG 02)	06:07	18:35 (BG 05)	07:01	17:49 (BG 06)	06:57	15:47 (BG 09)	07:53	09:15 (BG 18)	08:21	09:22 (BG 18)
	21:08	30 20:13 (BG 02)	20:04	51 19:26 (BG 03)	18:49	25 18:14 (BG 06)	16:41	22 16:09 (BG 09)	15:53	68 14:49 (BG 15)	15:53	83 15:03 (BG 15)
30	05:16	19:43 (BG 02)	06:09	18:35 (BG 05)	07:03	17:13 (BG 08)	06:58	15:05 (BG 12)	07:55	09:15 (BG 18)	08:21	09:23 (BG 18)
	21:06	31 20:14 (BG 02)	20:02	52 19:27 (BG 03)	18:47	38 18:13 (BG 06)	16:39	32 16:08 (BG 09)	15:52	71 14:50 (BG 15)	15:54	83 15:04 (BG 15)
31	05:18	19:42 (BG 02)	06:11	18:34 (BG 05)	07:00	07:00	16:37	33 16:05 (BG 09)	15:52	71 14:50 (BG 15)	15:54	83 15:04 (BG 15)
	21:04	32 20:14 (BG 02)	19:59	52 19:26 (BG 03)	18:47	38 18:13 (BG 06)	16:39	32 16:08 (BG 09)	15:52	71 14:50 (BG 15)	15:54	83 15:04 (BG 15)
	Sonnenscheinstunden	510	458	382	816	329	1048	261	1253	2523		
	astr.max.mögl.Beschattung	396	824	816	1048	1253						

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: G - Bandelow 16A, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	09:28 (BG 18) 07:52	15:37 (BG 12) 06:55	16:33 (BG 09) 06:41	05:33	19:43 (BG 02) 04:44	
2	08:21 15:57	09:29 (BG 18) 07:50	15:36 (BG 12) 06:53	16:38 (BG 08) 06:39	18:54 (BG 05) 05:31	20:01 (BG 02) 21:22	
3	08:21 15:58	09:30 (BG 18) 07:48	15:36 (BG 12) 06:50	16:37 (BG 08) 06:36	19:08 (BG 05) 05:29	21:02 (BG 02) 21:23	
4	08:20 16:00	09:31 (BG 18) 07:46	15:36 (BG 12) 06:48	16:36 (BG 08) 06:34	18:50 (BG 05) 05:27	21:04 (BG 02) 21:26	
5	08:20 16:01	09:31 (BG 18) 07:45	15:37 (BG 12) 06:46	16:36 (BG 08) 06:31	18:47 (BG 05) 05:25	21:06 (BG 02) 21:27	
6	08:20 16:02	09:31 (BG 18) 07:43	15:37 (BG 12) 06:43	16:35 (BG 08) 06:29	18:45 (BG 05) 05:23	21:07 (BG 02) 21:28	
7	08:19 16:03	09:33 (BG 18) 07:41	15:37 (BG 12) 06:41	16:35 (BG 08) 06:27	18:44 (BG 05) 05:21	21:08 (BG 02) 21:29	
8	08:19 16:05	09:33 (BG 18) 07:39	15:38 (BG 12) 06:39	16:35 (BG 08) 06:24	18:44 (BG 05) 05:19	21:09 (BG 02) 21:30	
9	08:18 16:06	09:34 (BG 18) 07:37	15:38 (BG 12) 06:36	16:35 (BG 08) 06:22	18:42 (BG 05) 05:17	21:10 (BG 02) 21:31	
10	08:18 16:08	09:35 (BG 18) 07:35	15:39 (BG 12) 06:34	16:35 (BG 08) 06:19	18:42 (BG 05) 05:15	21:11 (BG 02) 21:32	
11	08:17 16:09	09:37 (BG 18) 07:33	15:39 (BG 12) 06:32	16:35 (BG 08) 06:17	18:42 (BG 05) 05:14	21:12 (BG 02) 21:33	
12	08:16 16:11	09:38 (BG 18) 07:32	15:40 (BG 12) 06:29	16:36 (BG 08) 06:15	18:41 (BG 05) 05:12	21:13 (BG 02) 21:34	
13	08:15 16:12	09:39 (BG 18) 07:30	15:41 (BG 12) 06:27	16:36 (BG 08) 06:12	18:41 (BG 05) 05:10	21:14 (BG 02) 21:35	
14	08:15 16:14	09:41 (BG 18) 07:28	15:43 (BG 12) 06:24	16:38 (BG 08) 06:10	18:41 (BG 05) 05:08	21:15 (BG 02) 21:36	
15	08:14 16:15	09:42 (BG 18) 07:25	15:45 (BG 12) 06:22	16:40 (BG 08) 06:08	18:42 (BG 05) 05:07	21:16 (BG 02) 21:37	
16	08:13 16:17	09:43 (BG 18) 07:23	15:49 (BG 12) 06:20	16:41 (BG 08) 06:05	18:41 (BG 05) 05:05	21:17 (BG 02) 21:38	
17	08:12 16:19	09:44 (BG 18) 07:21	15:50 (BG 12) 06:18	16:42 (BG 08) 06:03	18:42 (BG 05) 05:03	21:18 (BG 02) 21:39	
18	08:11 16:21	09:45 (BG 18) 07:19	15:52 (BG 12) 06:16	16:43 (BG 08) 06:01	18:43 (BG 05) 05:02	21:19 (BG 02) 21:40	
19	08:10 16:22	09:46 (BG 18) 07:17	15:54 (BG 12) 06:14	16:44 (BG 08) 05:59	18:44 (BG 05) 05:00	21:20 (BG 02) 21:41	
20	08:09 16:24	09:47 (BG 18) 07:15	15:56 (BG 12) 06:12	16:45 (BG 08) 05:56	18:45 (BG 05) 04:59	21:21 (BG 02) 21:42	
21	08:07 16:26	09:48 (BG 18) 07:13	15:58 (BG 12) 06:10	16:46 (BG 08) 05:54	18:46 (BG 05) 04:57	21:22 (BG 02) 21:43	
22	08:06 16:28	09:49 (BG 18) 07:11	16:00 (BG 12) 06:08	16:47 (BG 08) 05:52	18:47 (BG 05) 04:55	21:23 (BG 02) 21:44	
23	08:05 16:29	09:50 (BG 18) 07:08	16:02 (BG 12) 06:06	16:48 (BG 08) 05:50	18:48 (BG 05) 04:53	21:24 (BG 02) 21:45	
24	08:04 16:31	09:51 (BG 18) 07:06	16:04 (BG 12) 06:04	16:49 (BG 08) 05:48	18:49 (BG 05) 04:51	21:25 (BG 02) 21:46	
25	08:02 16:33	09:52 (BG 18) 07:04	16:06 (BG 12) 06:02	16:50 (BG 08) 05:46	18:50 (BG 05) 04:49	21:26 (BG 02) 21:47	
26	08:01 16:35	09:53 (BG 18) 07:02	16:08 (BG 12) 06:00	16:51 (BG 08) 05:44	18:51 (BG 05) 04:47	21:27 (BG 02) 21:48	
27	07:59 16:37	09:54 (BG 18) 07:00	16:10 (BG 12) 05:58	16:52 (BG 08) 05:42	18:52 (BG 05) 04:45	21:28 (BG 02) 21:49	
28	07:58 16:39	09:55 (BG 18) 06:58	16:12 (BG 12) 05:56	16:53 (BG 08) 05:40	18:53 (BG 05) 04:43	21:29 (BG 02) 21:50	
29	07:56 16:41	09:56 (BG 18) 06:56	16:14 (BG 12) 05:54	16:54 (BG 08) 05:38	18:54 (BG 05) 04:41	21:30 (BG 02) 21:51	
30	07:55 16:43	09:57 (BG 18) 06:54	16:16 (BG 12) 05:52	16:55 (BG 08) 05:36	18:55 (BG 05) 04:39	21:31 (BG 02) 21:52	
31	07:53 16:45	09:58 (BG 18) 06:52	16:18 (BG 12) 05:50	16:56 (BG 08) 05:34	18:56 (BG 05) 04:37	21:32 (BG 02) 21:53	
	Sonnenscheinstunden astr.max.mögl.Beschattung	252 1826	274 796	367 745	419 832	492 680	508

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: G - Bandelow 16A, Uckerland

Voraussetzungen für Berechnung des Schattenwurfs

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

	Jul	August	September	Oktober	November	Dezember
1	04:40	05:19	19:47 (BG 02) 06:13	18:41 (BG 05) 07:05	17:15 (BG 08) 07:02	15:07 (BG 12) 07:56
	21:37	21:02	20:17 (BG 02) 19:57	19:28 (BG 03) 18:44	18:16 (BG 06) 16:35	15:35 (BG 12) 15:51
2	04:41	05:21	19:46 (BG 02) 06:14	18:40 (BG 05) 07:07	17:14 (BG 08) 07:04	15:07 (BG 12) 07:58
	21:37	21:01	20:16 (BG 02) 19:55	19:26 (BG 03) 18:42	18:13 (BG 06) 16:33	15:35 (BG 12) 15:50
3	04:42	05:23	19:46 (BG 02) 06:16	18:40 (BG 05) 07:09	17:13 (BG 08) 07:06	15:07 (BG 12) 07:59
	21:36	20:59	20:17 (BG 02) 19:52	19:24 (BG 03) 18:39	18:11 (BG 06) 16:31	15:36 (BG 12) 15:50
4	04:43	05:24	19:46 (BG 02) 06:18	18:41 (BG 05) 07:10	17:13 (BG 08) 07:08	15:07 (BG 12) 08:01
	21:36	20:57	20:16 (BG 02) 19:50	19:22 (BG 03) 18:37	18:09 (BG 06) 16:29	15:37 (BG 12) 15:49
5	04:44	05:26	19:47 (BG 02) 06:20	18:40 (BG 05) 07:12	17:11 (BG 08) 07:10	15:07 (BG 12) 08:02
	21:35	20:55	20:16 (BG 02) 19:47	19:19 (BG 03) 18:35	18:06 (BG 06) 16:27	15:37 (BG 12) 15:48
6	04:44	05:28	19:46 (BG 02) 06:21	18:41 (BG 05) 07:14	17:11 (BG 08) 07:12	15:07 (BG 12) 08:04
	21:35	20:53	20:15 (BG 02) 19:45	19:17 (BG 03) 18:32	17:44 (BG 08) 16:25	15:37 (BG 12) 15:48
7	04:45	05:29	19:47 (BG 02) 06:23	18:42 (BG 05) 07:16	17:11 (BG 08) 07:14	15:07 (BG 12) 08:05
	21:34	20:51	20:15 (BG 02) 19:43	19:08 (BG 05) 18:30	17:43 (BG 08) 16:23	15:37 (BG 12) 15:47
8	04:46	05:31	19:48 (BG 02) 06:25	18:43 (BG 05) 07:18	17:11 (BG 08) 07:16	15:07 (BG 12) 08:06
	21:33	20:49	20:14 (BG 02) 19:40	19:06 (BG 05) 18:27	17:43 (BG 08) 16:21	15:36 (BG 12) 15:47
9	04:47	05:33	19:48 (BG 02) 06:27	18:44 (BG 05) 07:19	17:11 (BG 08) 07:18	15:07 (BG 12) 08:07
	21:32	20:47	20:13 (BG 02) 19:38	19:04 (BG 05) 18:25	17:43 (BG 08) 16:20	15:36 (BG 12) 15:47
10	04:48	05:35	19:49 (BG 02) 06:28	18:47 (BG 05) 07:21	17:11 (BG 08) 07:19	15:08 (BG 12) 08:09
	21:32	20:45	20:12 (BG 02) 19:35	19:01 (BG 05) 18:23	17:42 (BG 08) 16:18	15:37 (BG 12) 15:46
11	04:50	05:36	19:50 (BG 02) 06:30	18:52 (BG 05) 07:23	17:12 (BG 08) 07:21	15:08 (BG 12) 08:10
	21:31	20:43	20:10 (BG 02) 19:33	18:57 (BG 05) 18:20	17:41 (BG 08) 16:16	15:37 (BG 12) 15:46
12	04:51	05:38	19:52 (BG 02) 06:32	19:01 (BG 05) 18:25	17:11 (BG 08) 07:23	15:09 (BG 12) 08:11
	21:30	20:41	20:09 (BG 02) 19:30	18:58 (BG 05) 18:18	17:39 (BG 08) 16:15	15:37 (BG 12) 15:46
13	04:52	05:40	19:54 (BG 02) 06:34	19:04 (BG 05) 18:25	17:04 (BG 09) 07:25	14:18 (BG 13) 08:12
	21:29	20:39	20:07 (BG 02) 19:28	18:16 (BG 05) 17:38	17:38 (BG 08) 16:13	15:37 (BG 12) 15:46
14	04:53	05:41	19:57 (BG 02) 06:35	19:01 (BG 05) 18:23	17:01 (BG 09) 07:27	14:14 (BG 13) 08:13
	21:28	20:37	20:02 (BG 02) 19:26	18:13 (BG 05) 17:37	17:37 (BG 08) 16:11	15:37 (BG 12) 15:46
15	04:54	05:43	19:58 (BG 02) 06:37	19:04 (BG 05) 18:25	16:59 (BG 09) 07:29	14:12 (BG 13) 08:14
	21:27	20:35	19:23 (BG 02) 19:23	18:11 (BG 05) 17:35	17:35 (BG 08) 16:10	15:37 (BG 12) 15:46
16	04:56	19:56 (BG 02) 05:45	19:23 (BG 02) 19:23	18:11 (BG 05) 17:35	16:57 (BG 09) 07:31	14:11 (BG 13) 08:15
	21:26	20:05 (BG 02) 05:33	19:21 (BG 02) 19:21	18:09 (BG 05) 17:32	17:32 (BG 08) 16:08	15:36 (BG 12) 15:46
17	04:57	19:55 (BG 02) 05:47	19:21 (BG 02) 19:21	18:09 (BG 05) 17:32	16:56 (BG 09) 07:32	14:10 (BG 13) 08:15
	21:25	20:08 (BG 02) 05:41	19:18 (BG 02) 19:18	18:06 (BG 05) 17:28	17:28 (BG 08) 16:07	15:33 (BG 12) 15:46
18	04:58	19:53 (BG 02) 05:48	19:18 (BG 02) 19:18	18:06 (BG 05) 17:28	16:56 (BG 09) 07:34	14:09 (BG 13) 08:16
	21:23	20:09 (BG 02) 05:48	19:16 (BG 02) 19:16	18:04 (BG 05) 17:19	17:19 (BG 09) 16:05	15:32 (BG 12) 15:46
19	05:00	19:52 (BG 02) 05:50	19:16 (BG 02) 19:16	18:04 (BG 05) 17:19	16:55 (BG 09) 07:36	14:08 (BG 13) 08:17
	21:22	20:10 (BG 02) 05:52	19:13 (BG 02) 19:13	18:02 (BG 05) 17:20	17:20 (BG 09) 16:04	15:30 (BG 12) 15:47
20	05:01	19:51 (BG 02) 05:52	18:56 (BG 05) 06:46	18:08 (BG 06) 07:40	16:55 (BG 09) 07:38	14:08 (BG 13) 08:18
	21:21	20:11 (BG 02) 05:54	19:11 (BG 05) 19:11	18:13 (BG 06) 18:00	17:20 (BG 09) 16:03	15:29 (BG 12) 15:47
21	05:02	19:51 (BG 02) 05:54	18:53 (BG 05) 06:47	18:04 (BG 06) 07:41	16:54 (BG 09) 07:40	14:08 (BG 13) 08:18
	21:20	20:12 (BG 02) 05:55	19:08 (BG 03) 19:08	18:17 (BG 06) 17:58	17:20 (BG 09) 16:01	15:27 (BG 12) 15:47
22	05:04	19:50 (BG 02) 05:55	18:50 (BG 05) 06:49	18:01 (BG 06) 07:43	16:54 (BG 09) 07:41	14:07 (BG 13) 08:19
	21:18	20:13 (BG 02) 05:57	19:06 (BG 03) 19:06	18:18 (BG 06) 17:55	17:19 (BG 09) 16:00	14:56 (BG 15) 15:48
23	05:05	19:50 (BG 02) 05:57	18:48 (BG 05) 06:51	18:00 (BG 06) 07:45	16:55 (BG 09) 07:43	14:07 (BG 13) 08:19
	21:17	20:14 (BG 02) 05:59	19:04 (BG 03) 19:04	18:19 (BG 06) 17:53	17:19 (BG 09) 15:59	14:56 (BG 15) 15:48
24	05:07	19:49 (BG 02) 05:59	18:47 (BG 05) 06:53	17:58 (BG 06) 07:47	16:55 (BG 09) 07:45	14:07 (BG 13) 08:20
	21:15	20:14 (BG 02) 06:01	19:01 (BG 03) 19:01	18:20 (BG 06) 17:51	17:18 (BG 09) 15:58	14:57 (BG 15) 15:49
25	05:08	19:48 (BG 02) 06:01	18:45 (BG 05) 06:54	17:57 (BG 06) 06:49	16:55 (BG 09) 07:47	14:08 (BG 13) 08:20
	21:14	20:14 (BG 02) 06:02	18:59 (BG 03) 18:59	18:19 (BG 06) 16:49	16:17 (BG 09) 15:57	14:58 (BG 15) 15:50
26	05:10	19:48 (BG 02) 06:02	18:44 (BG 05) 06:56	17:56 (BG 06) 06:51	16:17 (BG 09) 15:57	14:08 (BG 13) 08:20
	21:12	20:16 (BG 02) 06:04	18:56 (BG 03) 18:56	18:20 (BG 06) 16:47	16:16 (BG 09) 15:56	14:59 (BG 15) 15:50
27	05:11	19:47 (BG 02) 06:04	18:44 (BG 05) 06:58	17:24 (BG 08) 06:53	15:14 (BG 12) 07:50	14:59 (BG 15) 15:50
	21:11	20:15 (BG 02) 06:06	18:54 (BG 03) 18:54	18:20 (BG 06) 16:45	16:14 (BG 09) 15:55	15:00 (BG 15) 15:51
28	05:13	19:47 (BG 02) 06:06	18:42 (BG 05) 07:00	17:21 (BG 08) 06:55	15:12 (BG 12) 07:52	14:59 (BG 15) 15:52
	21:09	20:16 (BG 02) 06:06	18:51 (BG 03) 18:51	18:20 (BG 06) 16:43	16:12 (BG 09) 15:54	15:00 (BG 15) 15:52
29	05:15	19:47 (BG 02) 06:07	18:42 (BG 05) 07:01	17:19 (BG 08) 06:57	15:10 (BG 12) 07:53	14:59 (BG 15) 15:52
	21:08	20:16 (BG 02) 06:09	18:49 (BG 03) 18:49	18:19 (BG 06) 16:41	16:10 (BG 09) 15:53	15:00 (BG 15) 15:53
30	05:16	19:47 (BG 02) 06:09	18:42 (BG 05) 07:03	17:17 (BG 08) 06:58	15:09 (BG 12) 07:55	14:59 (BG 15) 15:53
	21:06	20:17 (BG 02) 06:11	18:41 (BG 05) 18:41	18:18 (BG 06) 16:39	15:33 (BG 12) 15:52	15:01 (BG 15) 15:54
31	05:18	19:46 (BG 02) 06:11	18:41 (BG 05) 18:41	18:18 (BG 06) 16:39	15:33 (BG 12) 15:52	15:01 (BG 15) 15:54
	21:04	20:16 (BG 02) 19:59	19:29 (BG 03) 19:29	18:18 (BG 06) 16:39	15:33 (BG 12) 15:52	15:01 (BG 15) 15:54
Sonnenscheinstunden	510	458	382	329	261	236
astr.max.mögl.Beschattung	369	819	634	973	1286	2373

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) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: H - Bandelow 15, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

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	08:21	09:39 (BG 18)	07:52	15:01 (BG 13)	06:55	16:37 (BG 09)	06:41	05:33	19:49 (BG 02)	04:44		
	15:56	65 15:11 (BG 13)	16:47	33 15:34 (BG 15)	17:41	22 16:59 (BG 09)	19:39	20:33	13 20:02 (BG 02)	21:22		
2	08:21	09:40 (BG 18)	07:50	15:02 (BG 13)	06:53	16:38 (BG 09)	06:39	05:31	19:47 (BG 02)	04:43		
	15:57	66 15:13 (BG 13)	16:48	32 16:13 (BG 12)	17:43	21 16:59 (BG 09)	19:41	20:35	17 20:04 (BG 02)	21:23		
3	08:21	09:41 (BG 18)	07:48	15:03 (BG 13)	06:50	16:40 (BG 09)	06:36	05:29	19:45 (BG 02)	04:42		
	15:58	66 15:14 (BG 13)	16:50	36 16:16 (BG 12)	17:45	21 17:10 (BG 08)	19:42	20:37	20 20:05 (BG 02)	21:25		
4	08:20	09:41 (BG 18)	07:46	15:05 (BG 13)	06:48	16:40 (BG 09)	06:34	05:27	19:44 (BG 02)	04:42		
	16:00	70 15:22 (BG 15)	16:52	37 16:18 (BG 12)	17:47	29 17:14 (BG 08)	19:44	20:39	22 20:06 (BG 02)	21:26		
5	08:20	09:42 (BG 18)	07:45	15:08 (BG 13)	06:46	16:43 (BG 09)	06:31	05:25	19:44 (BG 02)	04:41		
	16:01	71 15:24 (BG 15)	16:54	36 16:20 (BG 12)	17:49	29 17:17 (BG 08)	19:46	8 19:14 (BG 05)	05:25	23 20:07 (BG 02)	21:27	
6	08:20	09:43 (BG 18)	07:43	15:11 (BG 13)	06:43	16:56 (BG 08)	06:29	05:23	19:01 (BG 05)	05:23	19:43 (BG 02)	04:40
	16:02	70 15:25 (BG 15)	16:56	33 16:22 (BG 12)	17:51	22 17:18 (BG 08)	19:48	16 19:17 (BG 05)	05:23	25 20:08 (BG 02)	21:28	
7	08:19	09:44 (BG 18)	07:41	15:58 (BG 12)	06:41	16:55 (BG 08)	06:27	05:21	18:59 (BG 05)	05:21	19:42 (BG 02)	04:39
	16:03	69 15:27 (BG 15)	16:58	25 16:23 (BG 12)	17:53	24 17:19 (BG 08)	19:50	20 19:19 (BG 05)	05:21	26 20:08 (BG 02)	21:29	
8	08:19	09:45 (BG 18)	07:39	15:58 (BG 12)	06:39	16:54 (BG 08)	06:24	05:19	18:58 (BG 05)	05:19	19:41 (BG 02)	04:39
	16:05	67 15:29 (BG 15)	17:00	25 16:23 (BG 12)	17:55	27 17:21 (BG 08)	19:52	22 19:20 (BG 05)	05:19	27 20:08 (BG 02)	21:30	
9	08:18	09:45 (BG 18)	07:37	15:57 (BG 12)	06:36	16:52 (BG 08)	06:22	05:17	18:55 (BG 05)	05:17	19:42 (BG 02)	04:38
	16:06	58 15:30 (BG 15)	17:02	27 16:24 (BG 12)	17:57	29 17:21 (BG 08)	19:53	31 19:26 (BG 03)	05:17	27 20:09 (BG 02)	21:31	
10	08:18	09:46 (BG 18)	07:35	15:57 (BG 12)	06:34	16:52 (BG 08)	06:19	05:15	18:55 (BG 05)	05:15	19:41 (BG 02)	04:38
	16:08	58 15:31 (BG 15)	17:04	27 16:24 (BG 12)	17:58	29 17:21 (BG 08)	19:55	33 19:28 (BG 03)	05:15	28 20:09 (BG 02)	21:31	
11	08:17	09:48 (BG 18)	07:33	15:56 (BG 12)	06:32	16:51 (BG 08)	06:17	05:14	18:54 (BG 05)	05:14	19:41 (BG 02)	04:37
	16:09	58 15:33 (BG 15)	17:06	28 16:24 (BG 12)	18:00	30 17:21 (BG 08)	19:57	36 19:30 (BG 03)	05:14	27 20:08 (BG 02)	21:32	
12	08:16	09:50 (BG 18)	07:32	15:56 (BG 12)	06:29	16:51 (BG 08)	06:15	05:12	18:52 (BG 05)	05:12	19:41 (BG 02)	04:37
	16:11	57 15:34 (BG 15)	17:08	28 16:24 (BG 12)	18:02	30 17:21 (BG 08)	19:59	39 19:31 (BG 03)	05:12	28 20:09 (BG 02)	21:33	
13	08:15	09:51 (BG 18)	07:30	15:56 (BG 12)	06:27	16:50 (BG 08)	06:12	05:10	18:52 (BG 05)	05:10	19:41 (BG 02)	04:37
	16:12	56 15:35 (BG 15)	17:10	28 16:24 (BG 12)	18:04	35 17:37 (BG 06)	20:01	41 19:33 (BG 03)	05:10	27 20:08 (BG 02)	21:34	
14	08:15	09:53 (BG 18)	07:28	15:56 (BG 12)	06:24	16:50 (BG 08)	06:10	05:08	18:52 (BG 05)	05:08	19:41 (BG 02)	04:36
	16:14	54 15:36 (BG 15)	17:12	28 16:24 (BG 12)	18:06	41 17:40 (BG 06)	20:02	42 19:34 (BG 03)	05:08	27 20:08 (BG 02)	21:34	
15	08:14	09:55 (BG 18)	07:25	15:57 (BG 12)	06:22	16:51 (BG 08)	06:08	05:07	18:52 (BG 05)	05:07	19:41 (BG 02)	04:36
	16:15	50 15:36 (BG 15)	17:14	27 16:24 (BG 12)	18:08	43 17:42 (BG 06)	20:04	42 19:34 (BG 03)	05:07	27 20:08 (BG 02)	21:35	
16	08:13	14:54 (BG 13)	07:23	15:57 (BG 12)	06:20	16:51 (BG 08)	06:05	05:05	18:51 (BG 05)	05:05	19:41 (BG 02)	04:36
	16:17	43 15:37 (BG 15)	17:16	27 16:24 (BG 12)	18:10	45 17:43 (BG 06)	20:06	42 19:33 (BG 03)	05:05	26 20:07 (BG 02)	21:35	
17	08:12	14:55 (BG 13)	07:21	15:58 (BG 12)	06:17	16:52 (BG 08)	06:03	05:03	18:51 (BG 05)	05:03	19:42 (BG 02)	04:36
	16:19	43 15:38 (BG 15)	17:18	25 16:23 (BG 12)	18:11	46 17:45 (BG 06)	20:08	42 19:33 (BG 03)	05:03	25 20:07 (BG 02)	21:36	
18	08:11	14:55 (BG 13)	07:19	15:58 (BG 12)	06:15	16:52 (BG 08)	06:01	05:02	18:52 (BG 05)	05:02	19:43 (BG 02)	04:36
	16:21	43 15:38 (BG 15)	17:20	24 16:22 (BG 12)	18:13	47 17:46 (BG 06)	20:10	41 19:33 (BG 03)	05:02	24 20:07 (BG 02)	21:36	
19	08:10	14:55 (BG 13)	07:17	15:59 (BG 12)	06:12	16:53 (BG 08)	05:59	05:00	18:52 (BG 05)	05:00	19:43 (BG 02)	04:36
	16:22	44 15:39 (BG 15)	17:22	31 16:53 (BG 09)	18:15	44 17:46 (BG 06)	20:12	40 19:32 (BG 03)	05:00	23 20:06 (BG 02)	21:37	
20	08:09	14:55 (BG 13)	07:15	16:01 (BG 12)	06:10	16:54 (BG 08)	05:56	04:59	18:53 (BG 05)	04:59	19:44 (BG 02)	04:36
	16:24	44 15:39 (BG 15)	17:24	33 16:56 (BG 09)	18:17	42 17:46 (BG 06)	20:13	39 19:32 (BG 03)	04:59	22 20:06 (BG 02)	21:37	
21	08:07	14:55 (BG 13)	07:13	16:03 (BG 12)	06:08	16:57 (BG 08)	05:54	04:57	18:53 (BG 05)	04:57	19:45 (BG 02)	04:36
	16:26	45 15:40 (BG 15)	17:26	32 16:58 (BG 09)	18:19	36 17:45 (BG 06)	20:15	37 19:30 (BG 03)	04:57	21 20:06 (BG 02)	21:37	
22	08:06	14:55 (BG 13)	07:11	16:06 (BG 12)	06:05	17:00 (BG 08)	05:52	04:56	18:54 (BG 05)	04:56	19:45 (BG 02)	04:36
	16:28	44 15:39 (BG 15)	17:28	28 16:59 (BG 09)	18:21	26 17:44 (BG 06)	20:17	34 19:28 (BG 03)	04:56	19 20:04 (BG 02)	21:38	
23	08:05	14:56 (BG 13)	07:08	16:38 (BG 09)	06:03	17:24 (BG 06)	05:50	04:55	18:55 (BG 05)	04:55	19:47 (BG 02)	04:37
	16:29	44 15:40 (BG 15)	17:30	22 17:00 (BG 09)	18:22	20 17:44 (BG 06)	20:19	29 19:26 (BG 03)	04:55	16 20:03 (BG 02)	21:38	
24	08:04	14:56 (BG 13)	07:06	16:38 (BG 09)	06:00	17:25 (BG 06)	05:48	04:53	18:57 (BG 05)	04:53	19:48 (BG 02)	04:37
	16:31	44 15:40 (BG 15)	17:32	23 17:01 (BG 09)	18:24	18 17:43 (BG 06)	20:21	15 19:12 (BG 05)	04:53	14 20:02 (BG 02)	21:38	
25	08:02	14:56 (BG 13)	07:04	16:38 (BG 09)	05:58	17:26 (BG 06)	05:45	04:52	19:01 (BG 05)	04:52	19:50 (BG 02)	04:37
	16:33	44 15:40 (BG 15)	17:34	23 17:01 (BG 09)	18:26	14 17:40 (BG 06)	20:22	8 19:09 (BG 05)	04:52	11 20:01 (BG 02)	21:38	
26	08:01	14:56 (BG 13)	07:02	16:37 (BG 09)	05:55	17:28 (BG 06)	05:43	04:51	18:59 (BG 05)	04:51	19:52 (BG 02)	04:38
	16:35	44 15:40 (BG 15)	17:36	24 17:01 (BG 09)	18:28	10 17:38 (BG 06)	20:24	21:14	7 19:59 (BG 02)	21:38		
27	07:59	14:58 (BG 13)	07:00	16:37 (BG 09)	05:53		05:41	04:49			04:38	
	16:37	42 15:40 (BG 15)	17:37	24 17:01 (BG 09)	18:30		20:26	21:16			21:38	
28	07:58	14:58 (BG 13)	06:57	16:38 (BG 09)	05:51		05:39	04:48			04:39	
	16:39	41 15:39 (BG 15)	17:39	23 17:01 (BG 09)	18:32		20:28	21:17			21:38	
29	07:56	14:58 (BG 13)			06:48		05:37	04:47			04:39	
	16:41	40 15:38 (BG 15)			19:33		20:30	21:18			21:37	
30	07:55	15:00 (BG 13)			06:46		05:35	04:46	19:52 (BG 02)		04:40	
	16:43	38 15:38 (BG 15)			19:35		20:31	21:20	7 19:59 (BG 02)		21:37	
31	07:53	15:00 (BG 13)			06:43			04:45				
	16:45	37 15:37 (BG 15)			19:37			21:21				
Sonnenscheinstunden	252		274		367		419	492		572		508
astr.max.mögl.Beschattung	1615		789		780		664					

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: I - Bandelow 11, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

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	08:21	09:58 (BG 18)	07:52	15:12 (BG 13)	06:55	16:41 (BG 09)	06:41	05:33	19:40 (BG 02)	04:44		
	15:56	52 14:06 (BG 16)	16:47	34 15:46 (BG 15)	17:41	22 17:03 (BG 09)	19:39	22 20:33	22 20:02 (BG 02)	21:22		
2	08:21	09:59 (BG 18)	07:50	15:12 (BG 13)	06:53	16:42 (BG 09)	06:39	05:31	19:39 (BG 02)	04:43		
	15:57	50 14:06 (BG 16)	16:48	33 15:45 (BG 15)	17:43	20 17:02 (BG 09)	19:41	23 20:35	23 20:02 (BG 02)	21:23		
3	08:21	10:00 (BG 18)	07:48	15:13 (BG 13)	06:50	16:43 (BG 09)	06:36	05:29	19:38 (BG 02)	04:42		
	15:58	49 14:07 (BG 16)	16:50	30 15:43 (BG 15)	17:45	19 17:02 (BG 09)	19:42	24 20:37	24 20:02 (BG 02)	21:25		
4	08:20	10:00 (BG 18)	07:46	15:14 (BG 13)	06:48	16:44 (BG 09)	06:34	19:02 (BG 05)	05:27	19:38 (BG 02)	04:42	
	16:00	48 14:06 (BG 16)	16:52	25 15:39 (BG 13)	17:47	23 17:14 (BG 08)	19:44	12 19:14 (BG 05)	20:39	25 20:03 (BG 02)	21:26	
5	08:20	10:02 (BG 18)	07:45	15:16 (BG 13)	06:46	16:46 (BG 09)	06:31	18:59 (BG 05)	05:25	19:38 (BG 02)	04:41	
	16:01	45 14:07 (BG 16)	16:54	33 16:22 (BG 12)	17:49	26 17:18 (BG 08)	19:46	18 19:17 (BG 05)	20:40	26 20:04 (BG 02)	21:27	
6	08:20	10:03 (BG 18)	07:43	15:17 (BG 13)	06:43	16:48 (BG 09)	06:29	18:57 (BG 05)	05:23	19:38 (BG 02)	04:40	
	16:02	42 14:06 (BG 16)	16:56	35 16:24 (BG 12)	17:51	25 17:20 (BG 08)	19:48	20 19:17 (BG 05)	20:42	25 20:03 (BG 02)	21:28	
7	08:19	10:05 (BG 18)	07:41	15:19 (BG 13)	06:41	16:59 (BG 08)	06:27	18:56 (BG 05)	05:21	19:37 (BG 02)	04:39	
	16:03	40 14:07 (BG 16)	16:58	35 16:26 (BG 12)	17:53	22 17:21 (BG 08)	19:50	25 19:23 (BG 03)	20:44	26 20:03 (BG 02)	21:29	
8	08:19	10:06 (BG 18)	07:39	15:22 (BG 13)	06:39	16:59 (BG 08)	06:24	18:55 (BG 05)	05:19	19:37 (BG 02)	04:39	
	16:05	36 14:06 (BG 16)	17:00	31 16:27 (BG 12)	17:55	24 17:23 (BG 08)	19:52	30 19:25 (BG 03)	20:46	26 20:03 (BG 02)	21:30	
9	08:18	10:07 (BG 18)	07:37	16:06 (BG 12)	06:36	16:57 (BG 08)	06:22	18:53 (BG 05)	05:17	19:38 (BG 02)	04:38	
	16:06	39 15:23 (BG 13)	17:02	23 16:29 (BG 12)	17:57	26 17:23 (BG 08)	19:53	33 19:26 (BG 03)	20:47	25 20:03 (BG 02)	21:31	
10	08:18	10:09 (BG 18)	07:35	16:06 (BG 12)	06:34	16:56 (BG 08)	06:19	18:53 (BG 05)	05:15	19:38 (BG 02)	04:38	
	16:08	38 15:25 (BG 13)	17:04	23 16:29 (BG 12)	17:58	27 17:23 (BG 08)	19:55	35 19:28 (BG 03)	20:49	25 20:03 (BG 02)	21:31	
11	08:17	13:50 (BG 16)	07:33	16:04 (BG 12)	06:32	16:55 (BG 08)	06:17	18:52 (BG 05)	05:13	19:38 (BG 02)	04:37	
	16:09	34 15:34 (BG 15)	17:06	25 16:29 (BG 12)	18:00	28 17:23 (BG 08)	19:57	38 19:30 (BG 03)	20:51	24 20:02 (BG 02)	21:32	
12	08:16	13:52 (BG 16)	07:32	16:04 (BG 12)	06:29	16:55 (BG 08)	06:15	18:51 (BG 05)	05:12	19:39 (BG 02)	04:37	
	16:11	35 15:36 (BG 15)	17:08	26 16:30 (BG 12)	18:02	28 17:23 (BG 08)	19:59	40 19:31 (BG 03)	20:52	23 20:02 (BG 02)	21:33	
13	08:15	13:56 (BG 16)	07:30	16:04 (BG 12)	06:27	16:54 (BG 08)	06:12	18:51 (BG 05)	05:10	19:39 (BG 02)	04:37	
	16:12	29 15:37 (BG 15)	17:10	26 16:30 (BG 12)	18:04	33 17:37 (BG 06)	20:01	41 19:32 (BG 03)	20:54	22 20:01 (BG 02)	21:34	
14	08:15	15:11 (BG 13)	07:28	16:04 (BG 12)	06:24	16:55 (BG 08)	06:10	18:52 (BG 05)	05:08	19:39 (BG 02)	04:36	
	16:14	28 15:39 (BG 15)	17:12	26 16:30 (BG 12)	18:06	38 17:40 (BG 06)	20:02	40 19:32 (BG 03)	20:56	21 20:00 (BG 02)	21:34	
15	08:14	15:10 (BG 13)	07:25	16:04 (BG 12)	06:22	16:55 (BG 08)	06:08	18:52 (BG 05)	05:07	19:40 (BG 02)	04:36	
	16:15	30 15:40 (BG 15)	17:14	26 16:30 (BG 12)	18:08	40 17:42 (BG 06)	20:04	40 19:32 (BG 03)	20:57	20 20:00 (BG 02)	21:35	
16	08:13	15:10 (BG 13)	07:23	16:04 (BG 12)	06:20	16:55 (BG 08)	06:05	18:51 (BG 05)	05:05	19:41 (BG 02)	04:36	
	16:17	32 15:42 (BG 15)	17:16	26 16:30 (BG 12)	18:10	42 17:43 (BG 06)	20:06	39 19:30 (BG 03)	20:59	17 19:58 (BG 02)	21:35	
17	08:12	15:09 (BG 13)	07:21	16:05 (BG 12)	06:17	16:56 (BG 08)	06:03	18:52 (BG 05)	05:03	19:43 (BG 02)	04:36	
	16:19	34 15:43 (BG 15)	17:18	25 16:30 (BG 12)	18:11	42 17:45 (BG 06)	20:08	38 19:30 (BG 03)	21:01	14 19:57 (BG 02)	21:36	
18	08:11	15:09 (BG 13)	07:19	16:04 (BG 12)	06:15	16:56 (BG 08)	06:01	18:53 (BG 05)	05:02	19:45 (BG 02)	04:36	
	16:21	35 15:44 (BG 15)	17:20	25 16:29 (BG 12)	18:13	44 17:46 (BG 06)	20:10	36 19:29 (BG 03)	21:02	11 19:56 (BG 02)	21:36	
19	08:10	15:09 (BG 13)	07:17	16:05 (BG 12)	06:12	16:58 (BG 08)	05:59	18:54 (BG 05)	05:00	19:47 (BG 02)	04:36	
	16:22	37 15:46 (BG 15)	17:22	23 16:28 (BG 12)	18:15	41 17:47 (BG 06)	20:12	34 19:28 (BG 03)	21:04	6 19:53 (BG 02)	21:37	
20	08:09	15:09 (BG 13)	07:15	16:06 (BG 12)	06:10	16:59 (BG 08)	05:56	18:56 (BG 05)	04:59		04:36	
	16:24	37 15:46 (BG 15)	17:24	29 16:56 (BG 09)	18:17	38 17:46 (BG 06)	20:13	30 19:26 (BG 03)	21:05		21:37	
21	08:07	15:09 (BG 13)	07:13	16:08 (BG 12)	06:08	17:02 (BG 08)	05:54	18:57 (BG 05)	04:57		04:36	
	16:26	38 15:47 (BG 15)	17:26	30 16:58 (BG 09)	18:19	31 17:46 (BG 06)	20:15	21 19:23 (BG 03)	21:07		21:37	
22	08:06	15:08 (BG 13)	07:11	16:09 (BG 12)	06:05	17:25 (BG 06)	05:52	19:01 (BG 05)	04:56		04:36	
	16:28	39 15:47 (BG 15)	17:28	31 17:00 (BG 09)	18:21	19 17:44 (BG 06)	20:17	5 19:06 (BG 05)	21:09		21:38	
23	08:05	15:09 (BG 13)	07:08	16:12 (BG 12)	06:03	17:26 (BG 06)	05:50		04:55		04:37	
	16:29	38 15:47 (BG 15)	17:30	28 17:02 (BG 09)	18:22	17 17:43 (BG 06)	20:19		21:10		21:38	
24	08:04	15:08 (BG 13)	07:06	16:43 (BG 09)	06:00	17:27 (BG 06)	05:48		04:53		04:37	
	16:31	39 15:47 (BG 15)	17:32	20 17:03 (BG 09)	18:24	15 17:42 (BG 06)	20:21		21:11		21:38	
25	08:02	15:09 (BG 13)	07:04	16:42 (BG 09)	05:58	17:28 (BG 06)	05:45		04:52		04:37	
	16:33	39 15:48 (BG 15)	17:34	22 17:04 (BG 09)	18:26	11 17:39 (BG 06)	20:22		21:13		21:38	
26	08:01	15:09 (BG 13)	07:02	16:41 (BG 09)	05:55	17:33 (BG 06)	05:43		04:51		04:38	
	16:35	39 15:48 (BG 15)	17:36	23 17:04 (BG 09)	18:28	2 17:35 (BG 06)	20:24		21:14		21:38	
27	07:59	15:10 (BG 13)	07:00	16:41 (BG 09)	05:53		05:41		19:47 (BG 02)	04:49	04:38	
	16:37	39 15:49 (BG 15)	17:37	23 17:04 (BG 09)	18:30		20:26	9 19:56 (BG 02)	21:16		21:38	
28	07:58	15:10 (BG 13)	06:57	16:42 (BG 09)	05:51		05:39		19:44 (BG 02)	04:48	04:39	
	16:39	38 15:48 (BG 15)	17:39	22 17:04 (BG 09)	18:32		20:28	14 19:58 (BG 02)	21:17		21:38	
29	07:56	15:10 (BG 13)			06:48		05:37		19:43 (BG 02)	04:47	04:39	
	16:41	38 15:48 (BG 15)			19:33		20:30	17 20:00 (BG 02)	21:18		21:37	
30	07:55	15:11 (BG 13)			06:46		05:35		19:41 (BG 02)	04:46	04:40	
	16:43	37 15:48 (BG 15)			19:35		20:31	20 20:01 (BG 02)	21:20		21:37	
31	07:53	15:11 (BG 13)			06:43				04:45			
	16:45	36 15:47 (BG 15)			19:37				21:21			
Sonnenscheinstunden	252		274		367		419		492		508	
astr.max.mögl.Beschattung	1190		758		703		635		405			

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) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: I - Bandelow 11, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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

	Jul	August	September	Oktober	November	Dezember				
1	04:40	05:19	19:49 (BG 02) 06:13	18:51 (BG 05) 07:05	17:34 (BG 08) 07:02	15:34 (BG 12) 07:56				
	21:37	21:02	20:13 (BG 02) 19:57	19:29 (BG 03) 18:44	18:02 (BG 08) 16:35	15:58 (BG 12) 15:51				
2	04:41	05:21	19:48 (BG 02) 06:14	18:51 (BG 05) 07:07	17:34 (BG 08) 07:04	15:35 (BG 12) 07:58				
	21:37	21:01	20:13 (BG 02) 19:55	19:26 (BG 03) 18:42	18:02 (BG 08) 16:33	15:57 (BG 12) 15:50				
3	04:42	05:23	19:48 (BG 02) 06:16	18:51 (BG 05) 07:09	17:34 (BG 08) 07:06	14:51 (BG 13) 07:59				
	21:36	20:59	20:13 (BG 02) 19:52	19:24 (BG 03) 18:39	18:02 (BG 08) 16:31	15:57 (BG 12) 15:50				
4	04:43	05:24	19:47 (BG 02) 06:18	18:52 (BG 05) 07:10	17:35 (BG 08) 07:08	14:49 (BG 13) 08:01				
	21:36	20:57	20:13 (BG 02) 19:50	19:22 (BG 03) 18:37	18:01 (BG 08) 16:29	15:56 (BG 12) 15:49				
5	04:44	05:26	19:47 (BG 02) 06:20	18:52 (BG 05) 07:12	17:34 (BG 08) 07:10	14:47 (BG 13) 08:02				
	21:35	20:55	20:13 (BG 02) 19:47	19:19 (BG 03) 18:35	17:59 (BG 08) 16:27	15:54 (BG 12) 15:48				
6	04:44	05:28	19:47 (BG 02) 06:21	18:53 (BG 05) 07:14	17:35 (BG 08) 07:12	14:46 (BG 13) 08:04				
	21:35	20:53	20:13 (BG 02) 19:45	19:14 (BG 05) 18:32	17:58 (BG 08) 16:25	15:51 (BG 12) 15:48				
7	04:45	05:29	19:47 (BG 02) 06:23	18:54 (BG 05) 07:16	17:36 (BG 08) 07:14	14:44 (BG 13) 08:05				
	21:34	20:51	20:13 (BG 02) 19:43	19:12 (BG 05) 18:30	17:56 (BG 08) 16:23	15:10 (BG 13) 15:47				
8	04:46	05:31	19:48 (BG 02) 06:25	18:56 (BG 05) 07:18	17:22 (BG 09) 07:16	14:44 (BG 13) 08:06				
	21:33	20:49	20:13 (BG 02) 19:40	19:09 (BG 05) 18:27	17:55 (BG 08) 16:21	15:14 (BG 15) 15:47				
9	04:47	05:33	19:47 (BG 02) 06:27	19:01 (BG 05) 07:19	17:20 (BG 09) 07:18	14:43 (BG 13) 08:07				
	21:32	20:47	20:12 (BG 02) 19:38	19:03 (BG 05) 18:25	17:52 (BG 08) 16:20	15:16 (BG 15) 15:47				
10	04:48	05:35	19:48 (BG 02) 06:28	19:03 (BG 05) 07:21	17:18 (BG 09) 07:19	14:42 (BG 13) 08:09				
	21:32	20:45	20:12 (BG 02) 19:35	18:23	17:35 (BG 09) 16:18	15:17 (BG 15) 15:46				
11	04:50	05:36	19:48 (BG 02) 06:30	19:03 (BG 05) 07:23	17:17 (BG 09) 07:21	14:42 (BG 13) 08:10				
	21:31	20:43	20:10 (BG 02) 19:33	18:20	17:36 (BG 09) 16:16	15:18 (BG 15) 15:46				
12	04:51	05:38	19:49 (BG 02) 06:32	19:03 (BG 05) 07:25	17:15 (BG 09) 07:23	14:42 (BG 13) 08:11				
	21:30	20:41	20:10 (BG 02) 19:30	18:18	17:36 (BG 09) 16:15	15:19 (BG 15) 15:46				
13	04:52	05:40	19:50 (BG 02) 06:34	19:03 (BG 05) 07:27	17:14 (BG 09) 07:25	14:42 (BG 13) 08:12				
	21:29	20:39	20:09 (BG 02) 19:28	18:16	17:36 (BG 09) 16:13	15:20 (BG 15) 15:46				
14	04:53	05:41	19:50 (BG 02) 06:35	19:03 (BG 05) 07:28	17:14 (BG 09) 07:27	14:41 (BG 13) 08:13				
	21:28	20:37	20:07 (BG 02) 19:26	18:13	17:36 (BG 09) 16:11	15:20 (BG 15) 15:46				
15	04:54	05:43	19:52 (BG 02) 06:37	19:03 (BG 05) 07:30	17:14 (BG 09) 07:29	14:42 (BG 13) 08:14				
	21:27	20:35	20:05 (BG 02) 19:23	18:11	17:36 (BG 09) 16:10	15:20 (BG 15) 15:46				
16	04:56	05:45	19:55 (BG 02) 06:39	19:03 (BG 05) 07:32	17:14 (BG 09) 07:31	14:42 (BG 13) 08:15				
	21:26	20:33	20:01 (BG 02) 19:21	18:09	17:36 (BG 09) 16:08	15:21 (BG 15) 15:46				
17	04:57	05:47	06:40	19:03 (BG 05) 07:34	17:14 (BG 09) 07:32	14:42 (BG 13) 08:15				
	21:25	20:31	19:18	18:06	17:35 (BG 09) 16:07	15:21 (BG 15) 15:46				
18	04:58	05:48	06:42	18:16 (BG 06) 07:36	17:14 (BG 09) 07:34	14:42 (BG 13) 08:16				
	21:23	20:29	19:16	18:04	17:34 (BG 09) 16:05	15:21 (BG 15) 15:46				
19	05:00	05:50	06:44	18:14 (BG 06) 07:38	16:42 (BG 12) 07:36	14:43 (BG 13) 08:17				
	21:22	20:27	19:13	18:02	17:32 (BG 09) 16:04	15:21 (BG 15) 15:47				
20	05:01	05:52	06:46	18:12 (BG 06) 07:40	16:39 (BG 12) 07:38	14:43 (BG 13) 08:18				
	21:21	20:24	19:11	18:00	17:30 (BG 09) 16:03	15:22 (BG 15) 15:47				
21	05:02	05:54	19:05 (BG 05) 06:47	18:11 (BG 06) 07:41	16:38 (BG 12) 07:40	14:44 (BG 13) 08:18				
	21:20	20:22	19:12 (BG 05) 19:08	18:31 (BG 06) 17:58	17:28 (BG 09) 16:01	15:22 (BG 15) 15:47				
22	05:04	05:55	19:01 (BG 05) 06:49	17:48 (BG 08) 07:43	16:36 (BG 12) 07:41	14:45 (BG 13) 08:19				
	21:18	20:20	19:28 (BG 03) 19:06	18:30 (BG 06) 17:55	17:26 (BG 09) 16:00	15:22 (BG 15) 15:48				
23	05:05	05:57	18:59 (BG 05) 06:51	17:44 (BG 08) 07:45	16:35 (BG 12) 07:43	14:45 (BG 13) 08:19				
	21:17	20:18	19:30 (BG 03) 19:04	18:30 (BG 06) 17:53	16:59 (BG 12) 15:59	15:22 (BG 15) 15:48				
24	05:07	05:59	18:58 (BG 05) 06:53	17:42 (BG 08) 07:47	16:35 (BG 12) 07:45	14:46 (BG 13) 08:20				
	21:15	20:15	19:32 (BG 03) 19:01	18:30 (BG 06) 17:51	16:59 (BG 12) 15:58	15:22 (BG 15) 15:49				
25	05:08	19:56 (BG 02) 06:01	18:56 (BG 05) 06:54	17:39 (BG 08) 06:49	15:34 (BG 12) 07:47	14:47 (BG 13) 08:20				
	21:14	20:05 (BG 02) 06:02	19:32 (BG 03) 18:59	18:29 (BG 06) 16:49	16:00 (BG 12) 15:57	15:21 (BG 15) 15:50				
26	05:10	19:54 (BG 02) 06:02	18:55 (BG 05) 06:56	17:38 (BG 08) 06:51	15:34 (BG 12) 07:48	14:49 (BG 13) 08:20				
	21:12	20:07 (BG 02) 06:04	19:33 (BG 03) 18:56	18:28 (BG 06) 16:47	16:00 (BG 12) 15:56	15:21 (BG 15) 15:50				
27	05:11	19:52 (BG 02) 06:04	18:54 (BG 05) 06:58	17:37 (BG 08) 06:53	15:33 (BG 12) 07:50	14:50 (BG 13) 08:21				
	21:11	20:08 (BG 02) 06:06	19:33 (BG 03) 18:54	18:26 (BG 06) 16:45	16:00 (BG 12) 15:55	15:20 (BG 15) 15:51				
28	05:13	19:52 (BG 02) 06:06	18:53 (BG 05) 07:00	17:36 (BG 08) 06:55	15:33 (BG 12) 07:52	14:50 (BG 13) 08:21				
	21:09	20:10 (BG 02) 06:06	19:32 (BG 03) 18:51	18:23 (BG 06) 16:43	16:00 (BG 12) 15:54	15:18 (BG 15) 15:52				
29	05:15	19:50 (BG 02) 06:07	18:52 (BG 05) 07:01	17:36 (BG 08) 06:57	15:33 (BG 12) 07:53	13:37 (BG 16) 08:21				
	21:08	20:10 (BG 02) 06:04	19:33 (BG 03) 18:49	18:21 (BG 06) 16:41	16:00 (BG 12) 15:53	15:18 (BG 15) 15:53				
30	05:16	19:50 (BG 02) 06:09	18:51 (BG 05) 07:03	17:34 (BG 08) 06:58	15:33 (BG 12) 07:55	13:33 (BG 16) 08:21				
	21:06	20:12 (BG 02) 06:02	19:31 (BG 03) 18:47	18:18 (BG 06) 16:39	16:59 (BG 12) 15:52	15:17 (BG 15) 15:54				
31	05:18	19:49 (BG 02) 06:11	18:51 (BG 05) 07:03	17:34 (BG 08) 06:58	15:34 (BG 12) 07:55	13:33 (BG 16) 08:21				
	21:04	20:12 (BG 02) 19:59	19:31 (BG 03) 18:47	18:18 (BG 06) 16:39	16:59 (BG 12) 15:52	15:17 (BG 15) 15:54				
	Sonnenscheinstunden	510		382		261		1555	53	14:06 (BG 16)
	astr.max.mögl.Beschattung	121	458	718	622	329	765	1019	236	1594

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: J - Bandelow 1, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
 Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:21 15:56	09:54 (BG 18) 07:52	15:49 (BG 13) 06:55	16:30 (BG 12) 06:41	18:25 (BG 08) 05:33	19:18 (BG 05) 04:44
2	08:21 15:57	09:55 (BG 18) 07:50	15:48 (BG 13) 06:53	16:31 (BG 12) 06:39	18:45 (BG 06) 05:31	19:22 (BG 05) 04:43
3	08:21 15:58	09:56 (BG 18) 07:48	15:47 (BG 13) 06:50	16:32 (BG 12) 06:36	18:47 (BG 06) 05:29	19:27 (BG 05) 04:42
4	08:20 16:00	09:56 (BG 18) 07:46	15:46 (BG 13) 06:48	16:33 (BG 12) 06:34	18:53 (BG 06) 05:27	19:31 (BG 05) 04:42
5	08:20 16:01	09:57 (BG 18) 07:45	15:45 (BG 13) 06:46	16:34 (BG 12) 06:31	19:00 (BG 06) 05:25	20:06 (BG 02) 04:41
6	08:20 16:02	09:57 (BG 18) 07:43	15:45 (BG 13) 06:43	16:37 (BG 12) 06:29	19:09 (BG 06) 05:23	20:12 (BG 02) 04:40
7	08:19 16:03	09:58 (BG 18) 07:41	15:45 (BG 13) 06:41	17:03 (BG 09) 06:27	19:18 (BG 06) 05:21	20:18 (BG 02) 04:39
8	08:19 16:05	09:59 (BG 18) 07:39	15:45 (BG 13) 06:39	17:03 (BG 09) 06:24	19:27 (BG 06) 05:19	20:24 (BG 02) 04:39
9	08:18 16:06	09:59 (BG 18) 07:37	15:44 (BG 13) 06:36	17:02 (BG 09) 06:22	19:36 (BG 06) 05:17	20:30 (BG 02) 04:38
10	08:18 16:08	10:00 (BG 18) 07:35	15:44 (BG 13) 06:34	17:02 (BG 09) 06:19	19:45 (BG 06) 05:15	20:36 (BG 02) 04:38
11	08:17 16:09	10:01 (BG 18) 07:33	15:43 (BG 13) 06:32	17:02 (BG 09) 06:17	19:54 (BG 06) 05:13	20:42 (BG 02) 04:37
12	08:16 16:11	10:02 (BG 18) 07:31	15:44 (BG 13) 06:29	17:03 (BG 09) 06:15	20:03 (BG 06) 05:12	20:48 (BG 02) 04:37
13	08:15 16:12	10:03 (BG 18) 07:30	15:44 (BG 13) 06:27	17:03 (BG 09) 06:12	20:12 (BG 06) 05:10	20:54 (BG 02) 04:37
14	08:15 16:14	10:04 (BG 18) 07:28	15:44 (BG 13) 06:24	17:05 (BG 09) 06:10	20:21 (BG 06) 05:08	21:00 (BG 02) 04:36
15	08:14 16:15	10:05 (BG 18) 07:25	15:45 (BG 13) 06:22	17:08 (BG 09) 06:08	20:30 (BG 06) 05:07	21:06 (BG 02) 04:36
16	08:13 16:17	10:06 (BG 18) 07:23	15:46 (BG 13) 06:20	17:10 (BG 09) 06:05	20:39 (BG 06) 05:05	21:12 (BG 02) 04:36
17	08:12 16:19	10:08 (BG 18) 07:21	15:47 (BG 13) 06:17	17:13 (BG 09) 06:03	20:48 (BG 06) 05:03	21:18 (BG 02) 04:36
18	08:11 16:21	10:10 (BG 18) 07:19	15:47 (BG 13) 06:15	17:16 (BG 09) 06:01	20:57 (BG 06) 05:02	21:24 (BG 02) 04:36
19	08:10 16:22	10:12 (BG 18) 07:17	15:49 (BG 13) 06:12	17:23 (BG 09) 05:59	21:06 (BG 06) 05:00	21:30 (BG 02) 04:36
20	08:09 16:24	10:15 (BG 18) 07:15	15:50 (BG 13) 06:10	17:21 (BG 09) 05:56	21:15 (BG 06) 04:59	21:36 (BG 02) 04:36
21	08:07 16:26	10:18 (BG 18) 07:13	15:53 (BG 13) 06:08	17:21 (BG 09) 05:54	21:24 (BG 06) 04:57	21:42 (BG 02) 04:36
22	08:06 16:28	10:20 (BG 18) 07:11	15:56 (BG 13) 06:05	17:19 (BG 09) 05:52	21:33 (BG 06) 04:56	21:48 (BG 02) 04:36
23	08:05 16:29	10:23 (BG 18) 07:08	15:59 (BG 13) 06:03	17:19 (BG 09) 05:50	21:42 (BG 06) 04:55	21:54 (BG 02) 04:37
24	08:04 16:31	10:26 (BG 18) 07:06	16:02 (BG 13) 06:00	17:19 (BG 09) 05:48	21:51 (BG 06) 04:53	22:00 (BG 02) 04:37
25	08:02 16:33	10:29 (BG 18) 07:04	16:05 (BG 13) 05:58	17:19 (BG 09) 05:45	22:00 (BG 06) 04:52	22:06 (BG 02) 04:37
26	08:01 16:35	10:32 (BG 18) 07:02	16:08 (BG 13) 05:55	17:19 (BG 09) 05:43	22:09 (BG 06) 04:51	22:12 (BG 02) 04:38
27	07:59 16:37	10:35 (BG 18) 07:00	16:11 (BG 13) 05:53	17:19 (BG 09) 05:41	22:18 (BG 06) 04:49	22:18 (BG 02) 04:38
28	07:58 16:39	10:38 (BG 18) 06:58	16:14 (BG 13) 05:51	18:03 (BG 06) 05:39	22:27 (BG 06) 04:48	22:24 (BG 02) 04:39
29	07:56 16:41	10:41 (BG 18) 06:56	16:17 (BG 13) 05:49	18:03 (BG 06) 05:37	22:36 (BG 06) 04:47	22:30 (BG 02) 04:39
30	07:55 16:43	10:44 (BG 18) 06:54	16:20 (BG 13) 05:46	19:02 (BG 06) 05:35	22:45 (BG 06) 04:46	22:36 (BG 02) 04:37
31	07:53 16:45	10:47 (BG 18) 06:52	16:23 (BG 13) 05:44	19:01 (BG 06) 05:33	22:54 (BG 06) 04:45	22:42 (BG 02) 04:37
Sonnenscheinstunden		252	274	367	419	492
astr.max.mögl.Beschattung		1629	840	858	419	491

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) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Zusatzbelastung Schattenrezeptor: J - Bandelow 1, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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

	Jul	August	September	Oktober	November	Dezember
1	04:40	05:19	20:07 (BG 02) 06:13	07:05	17:42 (BG 09) 07:02	15:13 (BG 13) 07:56
	21:37	21:02	20:29 (BG 02) 19:57	18:44	18:00 (BG 09) 16:35	15:45 (BG 13) 15:51
2	04:41	05:21	20:07 (BG 02) 06:14	07:07	17:41 (BG 09) 07:04	15:13 (BG 13) 07:58
	21:36	21:01	20:28 (BG 02) 19:55	18:42	18:01 (BG 09) 16:33	15:45 (BG 13) 15:50
3	04:42	05:23	20:08 (BG 02) 06:16	07:09	17:40 (BG 09) 07:06	15:13 (BG 13) 07:59
	21:36	20:59	20:28 (BG 02) 19:52	18:39	18:01 (BG 09) 16:31	15:45 (BG 13) 15:50
4	04:43	05:24	20:08 (BG 02) 06:18	07:10	17:40 (BG 09) 07:08	15:15 (BG 13) 08:01
	21:36	20:57	20:26 (BG 02) 19:50	18:37	18:02 (BG 09) 16:29	15:45 (BG 15) 15:49
5	04:44	05:26	20:09 (BG 02) 06:20	07:12	17:39 (BG 09) 07:10	15:15 (BG 13) 08:02
	21:35	20:55	20:25 (BG 02) 19:47	18:34	18:01 (BG 09) 16:27	15:45 (BG 15) 15:48
6	04:44	05:28	20:10 (BG 02) 06:21	07:14	17:39 (BG 09) 07:12	15:16 (BG 13) 08:03
	21:34	20:53	20:22 (BG 02) 19:45	18:32	18:00 (BG 09) 16:25	15:45 (BG 15) 15:48
7	04:45	05:29	20:12 (BG 02) 06:23	07:16	17:15 (BG 12) 07:14	15:17 (BG 13) 08:05
	21:34	20:51	20:21 (BG 02) 19:43	18:30	18:00 (BG 09) 16:23	15:45 (BG 15) 15:47
8	04:46	05:31	06:25	07:18	17:11 (BG 12) 07:16	15:18 (BG 13) 08:06
	21:33	20:49	19:40	18:27	17:59 (BG 09) 16:21	15:45 (BG 15) 15:47
9	04:47	05:33	06:27	07:19	17:09 (BG 12) 07:17	15:19 (BG 13) 08:07
	21:32	20:47	19:38	4 18:46 (BG 06) 18:25	17:56 (BG 09) 16:20	15:44 (BG 15) 15:47
10	04:48	05:35	06:28	07:21	17:07 (BG 12) 07:19	15:20 (BG 13) 08:09
	21:32	20:45	19:35	11 18:50 (BG 06) 18:23	17:54 (BG 09) 16:18	15:44 (BG 15) 15:46
11	04:50	05:36	19:29 (BG 05) 06:30	07:23	17:06 (BG 12) 07:21	15:22 (BG 13) 08:10
	21:31	20:43	19:37 (BG 05) 19:33	24 18:52 (BG 06) 18:20	17:52 (BG 09) 16:16	15:43 (BG 15) 15:46
12	04:51	05:38	19:26 (BG 05) 06:32	07:25	17:04 (BG 12) 07:23	15:24 (BG 13) 08:11
	21:30	20:41	19:40 (BG 05) 19:30	33 18:52 (BG 06) 18:18	17:48 (BG 09) 16:15	15:42 (BG 15) 15:46
13	04:52	05:40	19:25 (BG 05) 06:34	07:27	17:03 (BG 12) 07:25	14:01 (BG 16) 08:12
	21:29	20:39	19:42 (BG 05) 19:28	36 18:52 (BG 06) 18:16	17:29 (BG 12) 16:13	15:40 (BG 15) 15:46
14	04:53	20:13 (BG 02) 05:41	19:23 (BG 05) 06:35	07:28	17:03 (BG 12) 07:27	13:59 (BG 16) 08:13
	21:28	8 20:21 (BG 02) 20:37	19:42 (BG 05) 19:26	42 18:53 (BG 06) 18:13	17:29 (BG 12) 16:11	15:38 (BG 15) 15:46
15	04:54	20:12 (BG 02) 05:43	19:22 (BG 05) 06:37	07:30	17:02 (BG 12) 07:29	13:57 (BG 16) 08:14
	21:27	10 20:22 (BG 02) 20:35	19:43 (BG 05) 19:23	43 18:52 (BG 06) 18:11	17:29 (BG 12) 16:10	15:37 (BG 15) 15:46
16	04:56	20:10 (BG 02) 05:45	19:20 (BG 05) 06:39	07:32	17:02 (BG 12) 07:31	13:56 (BG 16) 08:15
	21:26	13 20:23 (BG 02) 20:33	19:43 (BG 05) 19:21	44 18:52 (BG 06) 18:09	17:29 (BG 12) 16:08	15:42 (BG 16) 15:46
17	04:57	20:12 (BG 02) 05:47	19:20 (BG 05) 06:40	07:34	17:02 (BG 12) 07:32	13:55 (BG 16) 08:15
	21:25	15 20:25 (BG 02) 20:31	19:44 (BG 05) 19:18	43 18:51 (BG 06) 18:06	17:28 (BG 12) 16:07	15:42 (BG 16) 15:46
18	04:58	20:09 (BG 02) 05:48	19:19 (BG 05) 06:42	07:36	17:02 (BG 12) 07:34	13:54 (BG 16) 08:16
	21:23	17 20:26 (BG 02) 20:29	19:45 (BG 05) 19:16	42 18:48 (BG 06) 18:04	17:28 (BG 12) 16:05	15:42 (BG 16) 15:46
19	05:00	20:08 (BG 02) 05:50	19:18 (BG 05) 06:44	07:38	17:03 (BG 12) 07:36	13:53 (BG 16) 08:17
	21:22	19 20:27 (BG 02) 20:27	19:44 (BG 05) 19:13	39 18:45 (BG 06) 18:02	17:27 (BG 12) 16:04	15:42 (BG 16) 15:47
20	05:01	20:08 (BG 02) 05:52	19:18 (BG 05) 06:46	07:40	16:26 (BG 13) 07:38	13:53 (BG 16) 08:18
	21:21	19 20:27 (BG 02) 20:24	19:44 (BG 05) 19:11	37 18:43 (BG 06) 18:00	17:26 (BG 12) 16:03	15:42 (BG 16) 15:47
21	05:02	20:08 (BG 02) 05:54	19:18 (BG 05) 06:47	07:41	16:22 (BG 13) 07:40	13:53 (BG 16) 08:18
	21:20	20 20:28 (BG 02) 20:22	19:44 (BG 05) 19:08	32 18:41 (BG 06) 17:58	17:25 (BG 12) 16:01	15:42 (BG 16) 15:47
22	05:04	20:07 (BG 02) 05:55	19:18 (BG 05) 06:49	07:43	16:20 (BG 13) 07:41	13:52 (BG 16) 08:19
	21:18	21 20:28 (BG 02) 20:20	19:43 (BG 05) 19:06	27 18:38 (BG 06) 17:55	17:24 (BG 12) 16:00	15:42 (BG 16) 15:48
23	05:05	20:07 (BG 02) 05:57	19:18 (BG 05) 06:51	07:45	16:19 (BG 13) 07:43	13:51 (BG 16) 08:19
	21:17	22 20:29 (BG 02) 20:18	19:43 (BG 05) 19:04	24 18:30 (BG 06) 17:53	17:22 (BG 12) 15:59	15:42 (BG 16) 15:48
24	05:07	20:07 (BG 02) 05:59	19:18 (BG 05) 06:53	07:47	16:17 (BG 13) 07:45	13:50 (BG 16) 08:20
	21:15	22 20:29 (BG 02) 20:15	19:43 (BG 05) 19:01	22 18:29 (BG 06) 17:51	17:18 (BG 12) 15:58	15:42 (BG 16) 15:49
25	05:08	20:06 (BG 02) 06:01	19:18 (BG 05) 06:54	07:49	15:16 (BG 13) 07:47	13:49 (BG 16) 08:20
	21:14	23 20:29 (BG 02) 20:13	19:41 (BG 05) 18:59	20 18:27 (BG 06) 16:49	17:16 (BG 12) 15:57	15:42 (BG 16) 15:50
26	05:10	20:06 (BG 02) 06:02	19:19 (BG 05) 06:56	07:51	15:15 (BG 13) 07:48	13:48 (BG 16) 08:20
	21:12	24 20:30 (BG 02) 20:11	19:41 (BG 05) 18:56	17 18:25 (BG 06) 16:47	17:15 (BG 12) 15:56	15:42 (BG 16) 15:50
27	05:11	20:06 (BG 02) 06:04	19:20 (BG 05) 06:58	07:53	15:14 (BG 13) 07:50	13:47 (BG 16) 08:21
	21:11	24 20:30 (BG 02) 20:09	19:39 (BG 05) 18:54	13 18:23 (BG 06) 16:45	17:14 (BG 12) 15:55	15:42 (BG 16) 15:51
28	05:13	20:06 (BG 02) 06:06	19:21 (BG 05) 07:00	07:55	15:14 (BG 13) 07:52	13:46 (BG 16) 08:21
	21:09	24 20:30 (BG 02) 20:06	19:37 (BG 05) 18:51	3 17:54 (BG 09) 16:43	17:13 (BG 12) 15:54	15:42 (BG 16) 15:52
29	05:15	20:06 (BG 02) 06:07	19:23 (BG 05) 07:01	07:57	15:14 (BG 13) 07:53	13:45 (BG 16) 08:21
	21:08	24 20:30 (BG 02) 20:04	19:35 (BG 05) 18:49	11 17:58 (BG 09) 16:41	17:12 (BG 12) 15:53	15:42 (BG 16) 15:53
30	05:16	20:07 (BG 02) 06:09	19:24 (BG 05) 07:03	07:58	15:13 (BG 13) 07:55	13:44 (BG 16) 08:21
	21:06	23 20:30 (BG 02) 20:02	18:47	15 17:59 (BG 09) 16:39	17:11 (BG 12) 15:52	15:42 (BG 16) 15:54
31	05:18	20:06 (BG 02) 06:11		07:00	15:13 (BG 13) 07:56	13:43 (BG 16) 08:21
	21:04	23 20:29 (BG 02) 19:59		16:37	15:45 (BG 13) 07:57	15:55
Sonnenscheinstunden	510	458	382	329	261	236
astr.max.mögl.Beschattung	351	515	582	889	1122	2285

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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schatteneende (WEA mit letztem Schatten)
	Sonnenuntergang (SS:MM)			

SHADOW - Kalender pro WEA

Berechnung: ZusatzbelastungWEA: BG 01 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (52)
Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 13:30-14:03/33 15:56 12:54-13:16/22	07:52 16:47	06:55 17:41		06:41 07:33-07:53/20 19:39	05:33 20:33	04:44 21:22
2	08:21 13:30-14:03/33 15:57 12:55-13:15/20	07:50 16:49	06:53 17:43	07:24-07:34/10	06:39 07:35-07:51/16 19:41	05:31 20:35	04:43 21:24
3	08:21 13:31-14:03/32 15:58 12:56-13:15/19	07:48 16:51	06:51 17:45	07:20-07:37/17	06:36 07:38-07:48/10 19:43	05:29 20:37	04:42 21:25
4	08:21 13:33-14:04/31 16:00 12:58-13:15/17	07:47 16:52	06:48 17:47	07:17-07:39/22	06:34 19:44	05:27 20:39	04:42 21:26
5	08:20 13:33-14:03/30 16:01 12:59-13:14/15	07:45 16:54	06:46 17:49	07:16-07:41/25	06:31 19:46	05:25 20:40	04:41 21:27
6	08:20 13:33-14:03/30 16:02 13:00-13:13/13	07:43 16:56	06:44 17:51	07:15-07:42/27	06:29 19:48	05:23 20:42	04:40 21:28
7	08:19 13:35-14:04/29 16:03 13:04-13:12/8	07:41 16:58	06:41 17:53	07:13-07:42/29	06:27 19:50	05:21 20:44	04:40 21:29
8	08:19 13:35-14:03/28 16:05	07:39 17:00	06:39 17:55	07:12-07:43/31	06:24 19:52	05:19 20:46	04:39 21:30
9	08:18 13:36-14:03/27 16:06	07:37 17:02	06:37 17:57	07:11-07:43/32	06:22 19:53	05:17 20:47	04:38 21:31
10	08:18 13:38-14:04/26 16:08	07:36 17:04	06:34 17:58	07:11-07:43/32	06:20 19:55	05:15 20:49	04:38 21:32
11	08:17 13:39-14:03/24 16:09	07:34 17:06	06:32 18:00	07:11-07:44/33	06:17 19:57	05:14 20:51	04:37 21:32
12	08:16 13:40-14:02/22 16:11	07:32 17:08	06:29 18:02	07:10-07:43/33	06:15 19:59	05:12 20:53	04:37 21:33
13	08:16 13:42-14:02/20 16:12	07:30 17:10	06:27 18:04	07:10-07:43/33	06:13 20:01	05:10 20:54	04:37 21:34
14	08:15 13:44-14:01/17 16:14	07:28 17:12	06:25 18:06	07:09-07:42/33	06:10 20:03	05:08 20:56	04:36 21:34
15	08:14 13:46-14:00/14 16:16	07:26 17:14	06:22 18:08	07:10-07:42/32	06:08 20:04	05:07 20:58	04:36 21:35
16	08:13 13:48-13:56/8 16:17	07:24 17:16	06:20 18:10	07:10-07:40/30 06:45-06:52/7	06:06 20:06	05:05 20:59	04:36 21:36
17	08:12 16:19	07:21 17:18	06:17 18:12	07:10-07:40/30 06:42-06:56/14	06:03 20:08	05:03 21:01	04:36 21:36
18	08:11 16:21	07:19 17:20	06:15 18:13	07:10-07:38/28 06:39-06:57/18	06:01 20:10	05:02 21:02	04:36 21:37
19	08:10 16:22	07:17 17:22	06:13 18:15	07:12-07:37/25 06:38-06:58/20	05:59 20:12	05:00 21:04	04:36 21:37
20	08:09 16:24	07:15 17:24	06:10 18:17	07:13-07:35/22 06:37-06:59/22	05:56 20:13	04:59 21:06	04:36 21:37
21	08:08 16:26	07:13 17:26	06:08 18:19	07:15-07:32/17 06:35-06:59/24	05:54 20:15	04:57 21:07	04:36 21:37
22	08:06 16:28	07:11 17:28	06:05 18:21	07:18-07:29/11 06:34-07:00/26	05:52 20:17	04:56 21:09	04:36 21:38
23	08:05 16:30	07:09 17:30	06:03 18:23	06:33-07:00/27	05:50 20:19	04:55 21:10	04:37 21:38
24	08:04 16:31	07:06 17:32	06:00 18:24	06:32-07:00/28	05:48 20:21	04:53 21:12	04:37 21:38
25	08:02 16:33	07:04 17:34	05:58 18:26	06:31-06:59/28	05:45 20:23	04:52 21:13	04:37 21:38
26	08:01 16:35	07:02 17:36	05:56 18:28	06:31-07:00/29	05:43 20:24	04:51 21:14	04:38 21:38
27	07:59 16:37	07:00 17:38	05:53 18:30	06:32-07:00/28	05:41 20:26	04:50 21:16	04:38 21:38
28	07:58 16:39	06:57 17:40	05:51 18:32	06:31-06:58/27	05:39 20:28	04:48 21:17	04:39 21:38
29	07:56 16:41		06:48 19:33	07:32-07:58/26	05:37 20:30	04:47 21:19	04:39 21:38
30	07:55 16:43		06:46 19:35	07:31-07:56/25	05:35 20:32	04:46 21:20	04:40 21:37
31	07:53 16:45		06:43 19:37	07:33-07:55/22		04:45 21:21	
Sonnenscheinstunden	252	274	367	419	492	508	0
Anzahl Minuten mit Schatten	518	0	923	46	0	0	0

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

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

Berechnung: ZusatzbelastungWEA: BG 01 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (52)
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember
1	04:40 21:37	05:20 21:03	06:13 19:57	07:05 18:44	07:49-08:22/33 16:35	07:56 15:51
2	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	07:49-08:22/33 16:33	07:58 15:50
3	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:49-08:21/32 16:31	07:59 15:50
4	04:43 21:36	05:24 20:57	06:18 19:50	07:10 18:37	07:49-08:21/32 16:29	08:01 15:49
5	04:44 21:35	05:26 20:55	06:20 19:48	07:12 18:35	07:49-08:20/31 16:27	08:02 15:49
6	04:45 21:35	05:28 20:53	06:21 19:45	07:14 18:32	07:49-08:19/30 16:25	08:04 15:48
7	04:45 21:34	05:30 20:52	06:23 19:43	07:16 18:30	07:49-08:18/29 16:23	08:05 15:48
8	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:50-08:16/26 16:22	08:06 15:47
9	04:47 21:33	05:33 20:48	06:27 19:38	07:19 18:25	07:52-08:15/23 16:20	08:07 15:47
10	04:49 21:32	05:35 20:46	06:28 19:35	07:21 18:23	07:53-08:13/20 16:18	08:09 15:47
11	04:50 21:31	05:36 20:44	06:30 19:33	07:23 18:20	07:56-08:10/14 16:16	08:10 15:46
12	04:51 21:30	05:38 20:42	06:32 19:31	07:25 18:18	08:01-08:05/4 16:15	08:11 15:46
13	04:52 21:29	05:40 20:40	06:34 19:28	07:27 18:16	07:23 16:13	08:12 15:46
14	04:53 21:28	05:42 20:37	06:35 19:26	07:29 18:13	07:29 16:11	08:13 15:46
15	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 15:46
16	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 15:46
17	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	07:33 16:07	08:16 15:46
18	04:58 21:24	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:06	08:16 15:46
19	05:00 21:22	05:50 20:27	06:44 19:14	07:38 18:02	07:38 16:04	08:17 15:47
20	05:01 21:21	05:52 20:25	06:46 19:11	07:40 18:00	07:38 16:03	08:18 15:47
21	05:03 21:20	05:54 20:22	06:48 19:09	07:42 17:58	07:40 16:02	08:18 15:48
22	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:42 16:00	08:19 15:48
23	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	08:19 15:49
24	05:07 21:15	05:59 20:16	06:53 19:01	07:47 17:51	07:45 15:58	08:20 15:49
25	05:08 21:14	06:01 20:13	06:55 18:59	07:49 17:49	07:47 15:57	08:20 15:50
26	05:10 21:12	06:02 20:11	06:56 18:56	07:51 17:47	07:48 15:56	08:21 15:50
27	05:12 21:11	06:04 20:09	06:58 18:54	07:53 17:45	07:50 15:55	08:21 15:51
28	05:13 21:09	06:06 20:06	07:00 18:52	07:55 17:43	07:52 15:54	08:21 15:52
29	05:15 21:08	06:08 20:04	07:02 18:49	07:57 17:41	07:53 15:53	08:21 15:53
30	05:16 21:06	06:09 20:02	07:03 18:47	07:59 17:39	07:55 15:52	08:21 15:54
31	05:18 21:04	06:11 19:59		07:00 16:37		08:21 15:55
Sonnenscheinstunden	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	675	307	81	1824

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

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

Berechnung: ZusatzbelastungWEA: BG 02 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (55)
 Voraussetzungen für Berechnung des Schattenwurfs

- 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 Sonneneinfallrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:21 10:45-11:14/29 09:00-09:45/45 15:56 09:47-10:38/51	07:52 06:55 16:47 17:41		06:41 06:39 19:39	05:33 19:37-20:02/25 20:33	04:44 21:22
2	08:21 10:46-11:13/27 08:59-09:45/46 15:57 09:47-10:37/50	07:50 06:53 16:49 17:43		06:39 06:31 19:41	05:31 19:36-20:04/28 20:35	04:43 21:24
3	08:21 10:47-11:14/27 09:00-09:45/45 15:58 09:48-10:38/50	07:48 06:50 16:50 17:45		06:36 06:34 19:43	05:29 19:35-20:05/30 20:37	04:42 21:25
4	08:21 10:48-11:14/26 09:00-09:46/46 16:00 09:49-10:39/50	07:47 06:48 16:52 17:47		06:34 06:31 19:44	05:27 19:34-20:06/32 20:39	04:42 21:26
5	08:20 10:49-11:13/24 09:00-09:46/46 16:01 09:49-10:38/49	07:45 06:46 16:54 17:49		06:31 06:29 19:46	05:25 19:34-20:11/37 20:40	04:41 21:27
6	08:20 10:49-11:13/24 09:01-09:47/46 16:02 09:49-10:38/49	07:43 06:44 16:56 17:51		06:29 06:27 19:48	05:23 19:33-20:12/39 20:42	04:40 21:28
7	08:19 10:51-11:13/22 09:00-09:47/47 16:03 09:51-10:39/48	07:41 06:41 16:58 17:53		06:27 06:24 19:50	05:21 19:32-20:13/41 20:44	04:40 21:29
8	08:19 10:52-11:12/20 09:00-09:47/47 16:05 09:51-10:38/47	07:39 06:39 17:00 17:55		06:24 06:22 19:52	05:19 19:32-20:15/43 20:46	04:39 21:30
9	08:18 10:54-11:11/17 09:00-09:47/47 16:06 09:52-10:38/46	07:37 06:36 17:02 17:57		06:22 06:20 19:53	05:17 19:32-20:17/45 20:47	04:38 21:31
10	08:18 10:56-11:11/15 09:01-09:49/48 16:08 09:54-10:39/45	07:36 06:34 17:04 17:58	06:58-07:05/7	06:20 06:17 19:55	05:15 19:32-20:18/46 20:49	04:38 21:32
11	08:17 10:59-11:09/10 09:01-09:49/48 16:09 09:55-10:38/43	07:34 06:32 17:06 18:00	06:56-07:07/11	06:17 06:15 19:57	05:14 19:31-20:18/47 20:51	04:37 21:32
12	08:16 09:56-10:38/42 16:11 09:01-09:49/48	07:32 06:29 17:08 18:02	06:53-07:07/14	06:15 06:12 19:59	05:12 19:32-20:19/47 20:53	04:37 21:33
13	08:16 09:57-10:37/40 16:12 09:01-09:49/48	07:30 06:27 17:10 18:04	06:51-07:08/17	06:12 06:10 20:01	05:10 19:32-20:19/47 20:54	04:37 21:34
14	08:15 10:16-10:37/21 09:01-09:49/48 16:14 09:58-10:35/17	07:28 06:25 17:12 18:06	06:48-07:08/20	06:10 06:08 20:03	05:08 19:31-20:19/48 20:56	04:36 21:34
15	08:14 10:18-10:36/18 09:02-09:49/47 16:16 10:00-10:14/14	07:26 06:22 17:14 18:08	06:48-07:09/21	06:08 06:06 20:04	05:07 19:32-20:19/47 20:58	04:36 21:35
16	08:13 10:19-10:34/15 09:02-09:49/47 16:17 10:03-10:12/9	07:24 06:20 17:16 18:10	06:47-07:08/21	06:06 06:03 20:06	05:05 19:32-20:19/47 20:59	04:36 21:36
17	08:12 10:22-10:32/10 16:19 09:01-09:48/47	07:21 06:17 17:18 18:11	06:47-07:08/21	06:03 06:01 20:08	05:03 19:33-20:19/46 21:01	04:36 21:36
18	08:11 09:02-09:48/46 16:21	07:19 06:15 17:20 18:13	06:47-07:06/19	06:01 05:59 20:10	05:02 19:34-20:20/46 21:02	04:36 21:36
19	08:10 09:03-09:48/45 16:22	07:17 06:12 17:22 18:15	06:48-07:06/18	05:59 05:57 20:12	05:00 19:34-20:19/45 21:04	04:36 21:37
20	08:09 09:03-09:47/44 16:24	07:15 06:10 17:24 18:17	06:49-07:05/16	05:56 05:54 20:13	04:59 19:35-20:19/44 21:06	04:36 21:37
21	08:07 09:03-09:46/43 16:26	07:13 06:08 17:26 18:19	06:50-07:02/12	05:54 05:52 20:15	04:57 19:36-20:19/43 21:07	04:36 21:37
22	08:06 09:31-09:46/15 16:28 09:04-09:30/26	07:11 06:05 17:28 18:21	06:53-06:59/6	05:52 05:50 20:17	04:56 19:36-20:18/42 21:09	04:36 21:38
23	08:05 09:33-09:43/10 16:29 09:05-09:30/25	07:09 06:03 17:30 18:22		05:50 05:48 20:19	04:55 19:37-20:18/41 21:10	04:37 21:38
24	08:04 09:06-09:30/24 16:31	07:06 06:00 17:32 18:24		05:48 05:46 20:21	04:53 19:38-20:17/39 21:12	04:37 21:38
25	08:02 09:06-09:29/23 16:33	07:04 05:58 17:34 18:26		05:45 05:43 20:22	04:52 19:39-20:17/38 21:13	04:37 21:38
26	08:01 09:08-09:29/21 16:35	07:02 05:56 17:36 18:28		05:43 05:41 20:24	04:51 20:00-20:16/16 21:14	04:38 21:38
27	07:59 09:09-09:28/19 16:37	07:00 05:53 17:38 18:30		05:41 05:39 20:26	04:50 20:01-20:15/14 21:16	04:38 21:38
28	07:58 09:10-09:27/17 16:39	06:57 05:51 17:39 18:32		05:39 05:37 20:28	04:48 20:03-20:14/11 21:17	04:39 21:38
29	07:56 09:12-09:26/14 16:41	06:48 05:48 19:33		05:37 05:35 20:30	04:47 20:04-20:13/9 21:19	04:39 21:38
30	07:55 09:15-09:23/8 16:43	06:46 05:46 19:35		05:35 05:33 20:31	04:46 20:06-20:11/5 21:20	04:40 21:37
31	07:53 16:45	06:43 05:43 19:37			04:45 21:21	
Sonnenscheinstunden	252	274	367	419	492	508
Anzahl Minuten mit Schatten	2131	0	203	64	1131	0

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-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten

SHADOW - Kalender pro WEA

Berechnung: ZusatzbelastungWEA: BG 02 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (55)
 Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
 Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember	
1	04:40 21:37	05:20 19:42-20:29/47 21:03	06:13 19:57	07:05 07:31-07:47/16 18:44	07:02 16:35	07:56 10:41-10:51/10 08:43-09:31/48 15:51 09:37-10:20/43	
2	04:41 21:37	05:21 19:42-20:28/46 21:01	06:15 19:55	07:07 07:33-07:45/12 18:42	07:04 16:33	07:58 10:39-10:53/14 08:43-09:31/48 15:50 09:36-10:21/45	
3	04:42 21:36	05:23 19:42-20:28/46 20:59	06:16 19:52	07:09 07:35-07:44/9 18:39	07:06 16:31	07:59 10:38-10:55/17 08:44-09:32/48 15:50 09:36-10:22/46	
4	04:43 21:36	05:24 19:42-20:26/44 20:57	06:18 19:50	07:10 07:37-07:41/4 18:37	07:08 16:29	08:01 10:37-10:56/19 08:44-09:31/47 15:49 09:35-10:22/47	
5	04:44 21:35	05:26 19:42-20:25/43 20:55	06:20 19:47	07:12 18:35	07:10 16:27	08:02 10:36-10:58/22 08:45-09:32/47 15:48 09:36-10:24/48	
6	04:44 21:35	05:28 19:42-20:22/40 20:53	06:21 19:45	07:14 18:32	07:12 16:25	08:04 10:36-10:59/23 08:46-09:32/46 15:48 09:35-10:24/49	
7	04:45 21:34	05:29 19:43-20:21/38 20:51	06:23 19:43	07:16 18:30	07:14 16:23	08:05 10:36-11:03/27 08:47-09:33/46 15:48 09:36-10:25/49	
8	04:46 21:33	05:31 19:44-20:17/33 20:50	06:25 19:40	07:18 18:27	07:16 16:21	08:06 10:35-11:01/26 08:47-09:33/46 15:47 09:36-10:26/50	
9	04:47 21:33	05:33 19:43-20:15/32 20:48	06:27 19:38	07:19 18:25	07:18 16:20	08:07 10:35-11:02/27 08:48-09:34/46 15:47 09:36-10:26/50	
10	04:49 21:32	05:35 19:45-20:14/29 20:46	06:28 19:35	07:21 18:23	07:20 16:18	08:09 10:36-11:03/27 08:49-09:35/46 15:46 09:37-10:27/50	
11	04:50 21:31	05:36 19:45-20:12/27 20:44	06:30 19:33	07:23 18:20	07:21 16:16	08:10 10:36-11:04/28 08:50-09:35/45 15:46 09:37-10:28/51	
12	04:51 21:30	05:38 19:46-20:10/24 20:42	06:32 19:31	07:25 18:18	07:23 08:45-08:55/10 16:15	08:11 10:36-11:05/29 08:51-09:35/44 15:46 09:37-10:28/51	
13	04:52 21:29	05:40 19:48-20:09/21 20:39	06:34 19:28	07:27 18:16	07:25 08:43-08:57/14 16:13	08:12 10:36-11:05/29 08:51-09:35/44 15:46 09:37-10:29/52	
14	04:53 20:13-20:21/8 21:28	05:41 19:50-20:07/17 20:37	06:35 19:26	07:29 18:13	07:27 08:43-09:00/17 16:11	08:13 10:36-11:06/30 08:52-09:36/44 15:46 09:38-10:29/51	
15	04:54 20:12-20:22/10 21:27	05:43 19:52-20:05/13 20:35	06:37 19:23	07:30 18:11	07:29 08:41-09:01/20 16:10	08:14 10:36-11:07/31 08:53-09:36/43 15:46 09:38-10:30/52	
16	04:56 20:10-20:23/13 21:26	05:45 19:55-20:01/6 20:33	06:39 19:21	07:32 18:09	07:31 08:41-09:02/21 16:08	08:15 10:37-11:08/31 08:54-09:37/43 15:46 09:39-10:31/52	
17	04:57 20:10-20:25/15 21:25	05:47 19:51-20:08/17 20:31	06:41 19:18	07:34 18:07	07:33 08:40-09:03/23 16:07	08:16 10:37-11:08/31 08:55-09:37/42 15:46 09:39-10:31/52	
18	04:58 19:50-20:26/36 21:24	05:48 20:29 20:29	06:42 19:16	07:36 18:04	07:34 08:40-09:04/24 16:06	08:16 10:37-11:08/31 08:56-09:38/42 15:46 09:39-10:31/52	
19	05:00 19:48-20:27/39 21:22	05:50 20:27 20:27	06:44 19:13	07:38 18:02	07:36 09:08-09:18/10 16:04 08:40-09:05/25	08:17 10:37-11:09/32 08:56-09:38/42 15:47 09:40-10:32/52	
20	05:01 19:47-20:27/40 21:21	05:52 20:24 20:24	06:46 19:11	07:40 18:00	07:38 09:06-09:21/15 16:03 08:39-09:05/26	08:18 10:38-11:10/32 08:57-09:39/42 15:47 09:40-10:33/53	
21	05:02 19:47-20:28/41 21:20	05:54 20:22 20:22	06:47 19:09	07:41 17:58	07:40 08:39-09:22/43 16:01	08:18 10:38-11:10/32 09:11-09:39/28 15:47 09:40-10:33/53 08:57-09:10/13	
22	05:04 19:46-20:28/42 21:18	05:55 20:20 20:20	06:49 07:35-07:46/11 19:06	07:43 17:55	07:42 08:39-09:23/44 16:00	08:19 10:39-11:11/32 09:12-09:40/28 15:48 09:41-10:34/53 08:58-09:11/13	
23	05:05 19:46-20:29/43 21:17	05:57 20:18 20:18	06:51 07:33-07:48/15 19:04	07:45 17:53	07:43 08:39-09:24/45 15:59	08:19 10:39-11:11/32 09:12-09:40/28 15:48 09:41-10:34/53 08:58-09:11/13	
24	05:07 19:45-20:29/44 21:15	05:59 20:16 20:16	06:53 07:32-07:49/17 19:01	07:47 17:51	07:45 08:39-09:25/46 15:58	08:20 10:40-11:12/32 08:59-09:41/42 15:49 09:42-10:35/53	
25	05:08 19:44-20:29/45 21:14	06:01 20:13 20:13	06:54 07:31-07:50/19 18:59	06:49 16:49	07:47 10:00-10:10/10 15:57 08:40-09:26/46	08:20 10:40-11:12/32 08:59-09:41/42 15:50 09:43-10:35/52	
26	05:10 19:44-20:30/46 21:12	06:02 20:11 20:11	06:56 07:29-07:49/20 18:56	06:51 16:47	07:48 09:58-10:13/15 08:40-09:27/47 15:56 09:41-09:50/9	08:20 10:41-11:12/31 08:59-09:41/42 15:50 09:43-10:35/52	
27	05:12 19:43-20:30/47 21:11	06:04 20:09 20:09	06:58 07:29-07:49/20 18:54	06:53 16:45	07:50 09:57-10:15/18 08:41-09:28/47 15:55 09:40-09:53/13	08:21 10:41-11:12/31 08:59-09:42/43 15:51 09:43-10:36/53	
28	05:13 19:43-20:30/47 21:09	06:06 20:06 20:06	07:00 07:29-07:49/20 18:51	06:55 16:43	07:52 09:56-10:17/21 08:41-09:29/48 15:54 09:39-09:55/16	08:21 10:42-11:13/31 08:59-09:42/43 15:52 09:44-10:36/52	
29	05:15 19:43-20:30/47 21:08	06:08 20:04 20:04	07:02 07:29-07:49/20 18:49	06:57 16:41	07:53 09:37-10:17/40 15:53 08:41-09:29/48	08:21 10:43-11:13/30 08:59-09:43/44 15:53 09:44-10:36/52	
30	05:16 19:43-20:30/47 21:06	06:09 20:02 20:02	07:03 07:30-07:49/19 18:47	06:59 16:39	07:55 09:37-10:19/42 15:52 08:42-09:30/48	08:21 10:43-11:13/30 08:59-09:43/44 15:54 09:45-10:37/52	
31	05:18 19:42-20:29/47 21:04	06:11 19:59 19:59		07:00 16:37		08:21 10:44-11:14/30 09:00-09:44/44 15:55 09:46-10:37/51	
	Sonnenscheinstunden Anzahl Minuten mit Schatten	510 692	458 506	382 161	329 41	261 851	236 3793

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

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

Berechnung: ZusatzbelastungWEA: BG 03 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (53)
Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	07:52 16:47	06:55 07:26-07:51/25 17:41	06:41 19:39	05:33 20:33	04:44 21:22
2	08:21 15:57	07:50 16:49	06:53 07:26-07:51/25 17:43	06:39 19:41	05:31 20:35	04:43 21:24
3	08:21 15:58	07:48 16:51	06:51 07:27-07:51/24 17:45	06:36 19:43	05:29 20:37	04:42 21:25
4	08:21 16:00	07:47 16:52	06:48 07:27-07:49/22 17:47	06:34 19:44	05:27 20:39	04:42 21:26
5	08:20 16:01	07:45 16:54	06:46 07:27-07:49/22 17:49	06:31 19:11-19:20/9 19:46	05:25 20:40	04:41 21:27
6	08:20 16:02	07:43 16:56	06:44 07:29-07:48/19 17:51	06:29 19:07-19:21/14 19:48	05:23 20:42	04:40 21:28
7	08:19 16:03	07:41 16:58	06:41 07:29-07:46/17 17:53	06:27 19:06-19:23/17 19:50	05:21 20:44	04:40 21:29
8	08:19 16:05	07:39 17:00	06:39 07:32-07:43/11 17:55	06:24 19:05-19:25/20 19:52	05:19 20:46	04:39 21:30
9	08:18 16:06	07:37 17:02	06:36 07:00-07:17/17 17:57	06:22 19:03-19:26/23 19:53	05:17 20:47	04:38 21:31
10	08:18 16:08	07:36 17:04	06:34 06:58-07:18/20 17:58	06:20 19:02-19:28/26 19:55	05:15 20:49	04:38 21:32
11	08:17 16:09	07:34 17:06	06:32 06:56-07:18/22 18:00	06:17 19:02-19:30/28 19:57	05:14 20:51	04:37 21:32
12	08:16 16:11	07:32 17:08	06:29 06:55-07:18/23 18:02	06:15 19:01-19:31/30 19:59	05:12 20:53	04:37 21:33
13	08:16 16:12	07:30 17:10	06:27 06:56-07:18/22 18:04	06:13 19:01-19:33/32 20:01	05:10 20:54	04:37 21:34
14	08:15 16:14	07:28 17:12	06:25 06:55-07:17/22 18:06	06:10 19:01-19:34/33 20:03	05:08 20:56	04:36 21:34
15	08:14 16:16	07:26 17:14	06:22 06:56-07:17/21 18:08	06:08 19:01-19:34/33 20:04	05:07 20:58	04:36 21:35
16	08:13 16:17	07:24 17:16	06:20 06:56-07:15/19 18:10	06:06 19:01-19:33/32 20:06	05:05 20:59	04:36 21:36
17	08:12 16:19	07:21 17:18	06:17 06:57-07:14/17 18:11	06:03 19:01-19:33/32 20:08	05:03 21:01	04:36 21:36
18	08:11 16:21	07:19 17:20	06:15 06:57-07:12/15 18:13	06:01 19:02-19:33/31 20:10	05:02 21:02	04:36 21:36
19	08:10 16:22	07:17 17:22	06:13 07:00-07:09/9 18:15	05:59 19:04-19:32/28 20:12	05:00 21:04	04:36 21:37
20	08:09 16:24	07:15 17:24	06:10 18:17	05:56 19:05-19:32/27 20:13	04:59 21:06	04:36 21:37
21	08:07 16:26	07:13 07:38-07:43/5 17:26	06:08 18:19	05:54 19:07-19:30/23 20:15	04:57 21:07	04:36 21:37
22	08:06 16:28	07:11 07:36-07:47/11 17:28	06:05 18:21	05:52 19:11-19:28/17 20:17	04:56 21:09	04:36 21:38
23	08:05 16:30	07:09 07:33-07:48/15 17:30	06:03 18:23	05:50 19:16-19:26/10 20:19	04:55 21:10	04:37 21:38
24	08:04 16:31	07:06 07:31-07:49/18 17:32	06:00 18:24	05:48 20:21	04:53 21:12	04:37 21:38
25	08:02 16:33	07:04 07:29-07:51/22 17:34	05:58 18:26	05:45 20:22	04:52 21:13	04:37 21:38
26	08:01 16:35	07:02 07:27-07:50/23 17:36	05:56 18:28	05:43 20:24	04:51 21:14	04:38 21:38
27	07:59 16:37	07:00 07:27-07:51/24 17:38	05:53 18:30	05:41 20:26	04:50 21:16	04:38 21:38
28	07:58 16:39	06:57 07:27-07:52/25 17:40	05:51 18:32	05:39 20:28	04:48 21:17	04:39 21:38
29	07:56 16:41		06:48 19:33	05:37 20:30	04:47 21:19	04:39 21:38
30	07:55 16:43		06:46 19:35	05:35 20:31	04:46 21:20	04:40 21:37
31	07:53 16:45		06:43 19:37		04:45 21:21	
Sonnenscheinstunden	252	274	367	419	492	508
Anzahl Minuten mit Schatten	0	143	398	465	0	0

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

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

Berechnung: ZusatzbelastungWEA: BG 03 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (53)
Voraussetzungen für Berechnung des Schattenwurfs

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	04:40	05:20	06:13	19:01-19:29/28	07:05	07:34-07:57/23	07:02	07:56		
	21:37	21:03	19:57		18:44		16:35	15:51		
2	04:41	05:21	06:15	19:00-19:26/26	07:07	07:34-07:56/22	07:04	07:58		
	21:37	21:01	19:55		18:42		16:33	15:50		
3	04:42	05:23	06:16	19:01-19:24/23	07:09	07:35-07:56/21	07:06	07:59		
	21:36	20:59	19:52		18:39		16:31	15:50		
4	04:43	05:24	06:18	19:02-19:22/20	07:10	07:37-07:55/18	07:08	08:01		
	21:36	20:57	19:50		18:37		16:29	15:49		
5	04:44	05:26	06:20	19:02-19:19/17	07:12	08:11-08:19/8	07:10	08:02		
	21:35	20:55	19:47		18:35	07:39-07:54/15	16:27	15:49		
6	04:45	05:28	06:21	19:03-19:17/14	07:14	08:06-08:21/15	07:12	08:04		
	21:35	20:53	19:45		18:32	07:40-07:51/11	16:25	15:48		
7	04:45	05:30	06:23	19:06-19:15/9	07:16	08:04-08:22/18	07:14	08:05		
	21:34	20:51	19:43		18:30	07:42-07:49/7	16:23	15:48		
8	04:46	05:31	06:25		07:18	08:03-08:23/20	07:16	08:06		
	21:33	20:50	19:40		18:27		16:22	15:47		
9	04:47	05:33	06:27		07:19	08:02-08:24/22	07:18	08:07		
	21:33	20:48	19:38		18:25		16:20	15:47		
10	04:49	05:35	06:28		07:21	08:01-08:25/24	07:20	08:09		
	21:32	20:46	19:35		18:23		16:18	15:47		
11	04:50	05:36	06:30		07:23	08:01-08:25/24	07:21	08:10		
	21:31	20:44	19:33		18:20		16:16	15:46		
12	04:51	05:38	06:32		07:25	08:00-08:25/25	07:23	08:11		
	21:30	20:42	19:31		18:18		16:15	15:46		
13	04:52	05:40	06:34		07:27	08:00-08:25/25	07:25	08:12		
	21:29	20:39	19:28		18:16		16:13	15:46		
14	04:53	05:42	06:35		07:29	07:59-08:24/25	07:27	08:13		
	21:28	20:37	19:26		18:13		16:11	15:46		
15	04:54	05:43	06:37		07:30	07:59-08:23/24	07:29	08:14		
	21:27	20:35	19:23		18:11		16:10	15:46		
16	04:56	05:45	06:39		07:32	08:00-08:22/22	07:31	08:15		
	21:26	20:33	19:21		18:09		16:08	15:46		
17	04:57	05:47	06:41		07:34	08:01-08:21/20	07:33	08:16		
	21:25	20:31	19:18		18:07		16:07	15:46		
18	04:58	05:48	06:42		07:36	08:03-08:20/17	07:34	08:16		
	21:24	20:29	19:16		18:04		16:06	15:46		
19	05:00	05:50	06:44	19:24-19:28/4	07:38	08:05-08:19/14	07:36	08:17		
	21:22	20:27	19:13		18:02		16:04	15:47		
20	05:01	05:52	06:46	19:21-19:32/11	07:40	08:07-08:16/9	07:38	08:18		
	21:21	20:24	19:11		18:00		16:03	15:47		
21	05:03	05:54	06:48	19:16-19:34/18	07:42		07:40	08:18		
	21:20	20:22	19:09		17:58		16:02	15:48		
22	05:04	05:55	06:49	19:11-19:34/23	07:43		07:42	08:19		
	21:18	20:20	19:06		17:55		16:00	15:48		
23	05:05	05:57	06:51	19:09-19:35/26	07:45		07:43	08:19		
	21:17	20:18	19:04		17:53		15:59	15:48		
24	05:07	05:59	06:53	07:45-07:52/7	07:47		07:45	08:20		
	21:15	20:16	19:01		17:51		15:58	15:49		
25	05:08	06:01	06:55	07:42-07:55/13	06:49		07:47	08:20		
	21:14	20:13	18:59		16:49		15:57	15:50		
26	05:10	06:02	06:56	07:39-07:55/16	06:51		07:48	08:21		
	21:12	20:11	18:56		16:47		15:56	15:50		
27	05:12	06:04	06:58	07:38-07:56/18	06:53		07:50	08:21		
	21:11	20:09	18:54		16:45		15:55	15:51		
28	05:13	06:06	07:00	07:37-07:57/20	06:55		07:52	08:21		
	21:09	20:06	18:51		16:43		15:54	15:52		
29	05:15	06:08	07:02	07:36-07:58/22	06:57		07:53	08:21		
	21:08	20:04	18:49		16:41		15:53	15:53		
30	05:16	06:09	07:03	07:36-07:58/22	06:59		07:55	08:21		
	21:06	20:02	18:47		16:39		15:52	15:54		
31	05:18	06:11		19:01-19:31/30	07:00			08:21		
	21:04	19:59			16:37			15:55		
Sonnenscheinstunden	510	458	382		329		261	236		
Anzahl Minuten mit Schatten	0	335	255		429		0	0		

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

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

Berechnung: ZusatzbelastungWEA: BG 04 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (51)
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- Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:21 15:56	07:52 08:22-08:49/27 16:47	06:55 07:42-08:01/19 17:41	06:41 18:47-18:50/3 19:39	05:33 20:33	04:44 21:22
2	08:21 15:57	07:50 08:22-08:49/27 16:49	06:53 07:44-07:58/14 17:43	06:39 19:41	05:31 20:35	04:43 21:24
3	08:21 15:58	07:48 08:23-08:51/28 16:51	06:51 17:45	06:36 19:43	05:29 20:37	04:43 21:25
4	08:21 16:00	07:47 08:22-08:51/29 16:53	06:48 17:47	06:34 19:44	05:27 20:39	04:42 21:26
5	08:20 16:01	07:45 08:22-08:51/29 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 21:27
6	08:20 16:02	07:43 08:22-08:51/29 16:56	06:44 17:51	06:29 19:48	05:23 20:42	04:40 21:28
7	08:19 16:04	07:41 08:23-08:51/28 16:58	06:41 17:53	06:27 19:50	05:21 20:44	04:40 21:29
8	08:19 16:05	07:39 08:23-08:51/28 17:00	06:39 17:55	06:24 19:52	05:19 20:46	04:39 21:30
9	08:18 16:06	07:37 08:24-08:50/26 17:02	06:36 17:57	06:22 19:53	05:17 20:47	04:38 21:31
10	08:18 16:08	07:36 08:24-08:50/26 17:04	06:34 17:59	06:20 19:55	05:15 20:49	04:38 21:32
11	08:17 16:09	07:34 08:25-08:49/24 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:37 21:32
12	08:16 16:11	07:32 08:26-08:48/22 17:08	06:29 18:02	06:15 19:59	05:12 20:53	04:37 21:33
13	08:16 16:12	07:30 08:27-08:46/19 17:10	06:27 18:04	06:13 20:01	05:10 20:54	04:37 21:34
14	08:15 16:14	07:28 08:28-08:44/16 17:12	06:25 18:06	06:10 20:03	05:08 20:56	04:37 21:34
15	08:14 16:16	07:26 08:31-08:42/11 17:14	06:22 18:08	06:08 20:04	05:07 20:58	04:36 21:35
16	08:13 16:17	07:24 07:49-08:06/17 17:16	06:20 18:10	06:06 20:06	05:05 20:59	04:36 21:36
17	08:12 16:19	07:21 07:47-08:07/20 17:18	06:17 18:12	06:03 20:08	05:03 21:01	04:36 21:36
18	08:11 16:21	07:19 07:45-08:08/23 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 21:36
19	08:10 16:22	07:17 07:42-08:08/26 17:22	06:13 18:15	05:59 20:12	05:00 21:04	04:36 21:37
20	08:09 16:24	07:15 07:40-08:09/29 17:24	06:10 17:47-17:50/3 18:17	05:57 20:13	04:59 21:06	04:36 21:37
21	08:07 16:26	07:13 07:39-08:09/30 17:26	06:08 17:45-17:53/8 18:19	05:54 20:15	04:57 21:07	04:36 21:37
22	08:06 16:28	07:11 07:39-08:09/30 17:28	06:05 17:44-17:55/11 18:21	05:52 20:17	04:56 21:09	04:36 21:38
23	08:05 16:30	07:09 07:38-08:08/30 17:30	06:03 17:42-17:56/14 18:23	05:50 20:19	04:55 21:10	04:37 21:38
24	08:04 08:33-08:38/5 16:31	07:06 07:39-08:08/29 17:32	06:00 17:42-17:58/16 18:24	05:48 20:21	04:53 21:12	04:37 21:38
25	08:02 08:31-08:41/10 16:33	07:04 07:39-08:08/29 17:34	05:58 17:41-18:00/19 18:26	05:45 20:22	04:52 21:13	04:37 21:38
26	08:01 08:30-08:43/13 16:35	07:02 07:40-08:06/26 17:36	05:56 17:41-18:01/20 18:28	05:43 20:24	04:51 21:14	04:38 21:38
27	07:59 08:28-08:44/16 16:37	07:00 07:40-08:05/25 17:38	05:53 17:40-18:00/20 18:30	05:41 20:26	04:50 21:16	04:38 21:38
28	07:58 08:26-08:45/19 16:39	06:57 07:41-08:04/23 17:40	05:51 17:41-18:00/19 18:32	05:39 20:28	04:48 21:17	04:39 21:38
29	07:56 08:25-08:47/22 16:41		06:48 18:41-18:58/17 19:33	05:37 20:30	04:47 21:19	04:39 21:38
30	07:55 08:23-08:48/25 16:43		06:46 18:42-18:57/15 19:35	05:35 20:31	04:46 21:20	04:40 21:37
31	07:53 08:23-08:49/26 16:45		06:43 18:44-18:55/11 19:37		04:45 21:21	
Sonnenscheinstunden	252	274	367	419	492	508
Anzahl Minuten mit Schatten	136	734	206	3	0	0

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-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten

SHADOW - Kalender pro WEA

Berechnung: ZusatzbelastungWEA: BG 04 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (51)
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	04:40 21:37	05:20 21:03	06:13 19:57	07:05 18:44	07:02 07:54-08:20/26 16:35	07:56 15:51
2	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	07:04 07:53-08:20/27 16:33	07:58 15:50
3	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 07:53-08:20/27 16:31	07:59 15:50
4	04:43 21:36	05:25 20:57	06:18 19:50	07:10 18:37	07:08 07:52-08:21/29 16:29	08:01 15:49
5	04:44 21:35	05:26 20:55	06:20 19:48	07:12 18:35	07:10 07:52-08:21/29 16:27	08:02 15:49
6	04:45 21:35	05:28 20:53	06:22 19:45	07:14 18:32	07:12 07:52-08:21/29 16:25	08:04 15:48
7	04:45 21:34	05:30 20:52	06:23 19:43	07:16 18:30	07:14 07:52-08:21/29 16:23	08:05 15:48
8	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:16 07:52-08:21/29 16:22	08:06 15:47
9	04:47 21:33	05:33 20:48	06:27 19:38	07:19 18:25	07:18 07:53-08:20/27 16:20	08:07 15:47
10	04:49 21:32	05:35 20:46	06:28 19:35	07:21 18:23	07:20 07:53-08:20/27 16:18	08:09 15:47
11	04:50 21:31	05:36 20:44	06:30 19:33	07:23 18:20	08:21-08:26/5 16:16	08:10 15:46
12	04:51 21:30	05:38 20:42	06:32 19:31	07:25 18:18	08:17-08:34/17 16:15	08:11 15:46
13	04:52 21:29	05:40 20:39	06:34 19:28	07:27 18:16	08:15-08:36/21 16:13	08:12 15:46
14	04:53 21:28	05:42 20:37	06:35 19:26	07:29 18:13	08:13-08:37/24 16:12	08:13 15:46
15	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	08:11-08:38/27 16:10	08:14 15:46
16	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	08:11-08:39/28 16:08	08:15 15:46
17	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	08:10-08:39/29 16:07	08:16 15:46
18	04:58 21:24	05:48 20:29	06:42 19:16	07:36 18:04	08:10-08:39/29 16:06	08:16 15:47
19	05:00 21:22	05:50 20:27	06:44 19:14	07:38 18:02	08:10-08:40/30 16:04	08:17 15:47
20	05:01 21:21	05:52 20:24	06:46 19:11	07:40 18:00	08:10-08:40/30 16:03	08:18 15:47
21	05:03 21:20	05:54 20:22	06:48 19:09	07:42 17:58	08:10-08:39/29 16:02	08:18 15:48
22	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	08:11-08:39/28 16:00	08:19 15:48
23	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	08:13-08:38/25 15:59	08:19 15:49
24	05:07 21:15	05:59 20:16	06:53 19:01	07:47 17:51	08:15-08:38/23 15:58	08:20 15:49
25	05:08 21:14	06:01 20:13	06:55 18:59	06:49 16:49	07:17-07:37/20 15:57	08:20 15:50
26	05:10 21:12	06:02 20:11	06:56 18:56	06:51 16:47	07:19-07:35/16 15:56	08:21 15:50
27	05:12 21:11	06:04 20:09	06:58 18:54	06:53 16:45	08:00-08:12/12 07:21-07:34/13 15:55	08:21 15:51
28	05:13 21:09	06:06 20:06	07:00 18:52	06:55 16:43	07:58-08:14/16 07:23-07:31/8 15:54	08:21 15:52
29	05:15 21:08	06:08 20:04	07:02 18:49	06:57 16:41	07:56-08:16/20 07:25-07:27/2 15:53	08:21 15:53
30	05:16 21:06	06:09 20:02	07:03 18:47	06:59 16:39	07:55-08:17/22 15:52	08:21 15:54
31	05:18 21:04	06:11 19:59		07:00 16:37	07:55-08:19/24 15:51	08:21 15:55
Sonnenscheinstunden	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	177	498	414	0

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

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

Berechnung: ZusatzbelastungWEA: BG 05 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (59)
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 09:22-09:42/20 15:56	07:52 06:55 16:47 17:41		06:41 18:43-19:05/22 19:39	05:33 19:18-19:31/13 20:33	04:44 21:22
2	08:21 09:22-09:41/19 15:57	07:50 06:53 16:49 17:43		06:39 18:42-19:08/26 19:41	05:31 19:22-19:27/5 20:35	04:43 21:23
3	08:21 09:23-09:42/19 15:58	07:48 06:50 16:50 17:45		06:36 18:39-19:10/31 19:43	05:29 20:37	04:42 21:25
4	08:20 09:25-09:42/17 16:00	07:47 06:48 16:52 17:47		06:34 18:38-19:14/36 19:44	05:27 20:39	04:42 21:26
5	08:20 09:25-09:42/17 16:01	07:45 06:46 16:54 17:49		06:31 18:38-19:17/39 19:46	05:25 20:40	04:41 21:27
6	08:20 09:26-09:43/17 16:02	07:43 06:44 16:56 17:51		06:29 18:36-19:17/41 19:48	05:23 20:42	04:40 21:28
7	08:19 09:27-09:42/15 16:03	07:41 06:41 16:58 17:53		06:27 18:36-19:19/43 19:50	05:21 20:44	04:40 21:29
8	08:19 09:28-09:41/13 16:05	07:39 06:39 17:00 17:55		06:24 18:35-19:20/45 19:52	05:19 20:46	04:39 21:30
9	08:18 09:29-09:41/12 16:06	07:37 06:36 17:02 17:57		06:22 18:34-19:20/46 19:53	05:17 20:47	04:38 21:31
10	08:18 09:31-09:41/10 16:08	07:35 06:34 17:04 17:58		06:20 18:34-19:21/47 19:55	05:15 20:49	04:38 21:32
11	08:17 09:33-09:39/6 16:09	07:34 06:32 17:06 18:00		06:17 18:34-19:22/48 19:57	05:14 20:51	04:37 21:32
12	08:16 16:11	07:32 06:29 17:08 18:02		06:15 18:34-19:22/48 19:59	05:12 20:52	04:37 21:33
13	08:16 16:12	07:30 06:27 17:10 18:04		06:12 18:34-19:22/48 20:01	05:10 20:54	04:37 21:34
14	08:15 16:14	07:28 06:25 17:12 18:06		06:10 18:35-19:34/59 20:03	05:08 20:56	04:36 21:34
15	08:14 16:16	07:26 06:22 17:14 18:08		06:08 18:35-19:36/61 20:04	05:07 20:58	04:36 21:35
16	08:13 16:17	07:23 06:20 17:16 18:10		06:06 18:35-19:37/62 20:06	05:05 20:59	04:36 21:36
17	08:12 16:19	07:21 06:17 17:18 18:11		06:03 18:36-19:38/62 20:08	05:03 21:01	04:36 21:36
18	08:11 16:21	07:19 06:15 17:20 18:13		06:01 18:37-19:39/62 20:10	05:02 21:02	04:36 21:36
19	08:10 16:22	07:17 06:12 17:22 18:15		05:59 18:39-19:39/60 20:12	05:00 21:04	04:36 21:37
20	08:09 16:24	07:15 06:10 17:24 18:17		05:56 18:41-19:40/59 20:13	04:59 21:06	04:36 21:37
21	08:07 16:26	07:13 06:08 17:26 18:19		05:54 18:43-19:39/56 20:15	04:57 21:07	04:36 21:37
22	08:06 16:28	07:11 06:05 17:28 18:21		05:52 18:47-19:39/52 20:17	04:56 21:09	04:36 21:38
23	08:05 16:30	07:09 06:03 17:30 18:22		05:50 18:51-19:39/48 20:19	04:55 21:10	04:37 21:38
24	08:04 16:31	07:06 06:00 17:32 18:24		05:48 19:13-19:38/25 20:21	04:53 21:12	04:37 21:38
25	08:02 16:33	07:04 05:58 17:34 18:26		05:45 19:13-19:38/25 20:22	04:52 21:13	04:37 21:38
26	08:01 16:35	07:02 05:56 17:36 18:28		05:43 19:13-19:37/24 20:24	04:51 21:14	04:38 21:38
27	07:59 16:37	07:00 05:53 17:38 18:30		05:41 19:14-19:37/23 20:26	04:50 21:16	04:38 21:38
28	07:58 16:39	06:57 05:51 17:39 18:32		05:39 19:15-19:36/21 20:28	04:48 21:17	04:39 21:38
29	07:56 16:41	06:48 19:33		05:37 19:15-19:34/19 20:30	04:47 21:19	04:39 21:38
30	07:55 16:43	06:46 19:35	18:50-19:00/10	05:35 19:17-19:33/16 20:31	04:46 21:20	04:40 21:37
31	07:53 16:45	06:43 19:37	18:46-19:04/18		04:45 21:21	
Sonnenscheinstunden	252	274	367	419	492	508
Anzahl Minuten mit Schatten	165	0	28	1277	18	0

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

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

Berechnung: ZusatzbelastungWEA: BG 05 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (59)
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember
1	04:40 21:37	05:20 21:03	06:13 18:33-19:21/48 19:57	07:05 18:44	07:02 16:35	07:56 09:16-09:21/5 15:51
2	04:41 21:37	05:21 21:01	06:15 18:32-19:19/47 19:55	07:07 18:42	07:04 16:33	07:58 09:14-09:23/9 15:50
3	04:42 21:36	05:23 20:59	06:16 18:32-19:19/47 19:52	07:09 18:39	07:06 16:31	07:59 09:13-09:25/12 15:50
4	04:43 21:36	05:24 20:57	06:18 18:32-19:17/45 19:50	07:10 18:37	07:08 16:29	08:01 09:12-09:25/13 15:49
5	04:44 21:35	05:26 20:55	06:20 18:32-19:15/43 19:47	07:12 18:35	07:10 16:27	08:02 09:12-09:27/15 15:49
6	04:44 21:35	05:28 20:53	06:21 18:32-19:14/42 19:45	07:14 18:32	07:12 16:25	08:04 09:12-09:28/16 15:48
7	04:45 21:34	05:30 20:51	06:23 18:33-19:12/39 19:43	07:16 18:30	07:14 16:23	08:05 09:12-09:29/17 15:48
8	04:46 21:33	05:31 20:50	06:25 18:32-19:09/37 19:40	07:18 18:27	07:16 16:21	08:06 09:12-09:30/18 15:47
9	04:47 21:33	05:33 20:48	06:27 18:33-19:04/31 19:38	07:19 18:25	07:18 16:20	08:07 09:12-09:30/18 15:47
10	04:49 21:32	05:35 20:46	06:28 18:35-19:01/26 19:35	07:21 18:23	07:19 16:18	08:09 09:12-09:31/19 15:46
11	04:50 21:31	05:36 19:29-19:37/8 20:44	06:30 18:36-18:58/22 19:33	07:23 18:20	07:21 16:16	08:10 09:12-09:32/20 15:46
12	04:51 21:30	05:38 19:26-19:40/14 20:42	06:32 18:37-18:55/18 19:31	07:25 18:18	07:23 16:15	08:11 09:13-09:32/19 15:46
13	04:52 21:29	05:40 19:25-19:42/17 20:39	06:34 18:40-18:52/12 19:28	07:27 18:16	07:25 16:13	08:12 09:39-09:43/4 15:46 09:13-09:33/20
14	04:53 21:28	05:41 19:23-19:42/19 20:37	06:35 19:26	07:29 18:13	07:27 16:11	08:13 09:38-09:45/7 15:46 09:13-09:34/21
15	04:54 21:27	05:43 19:22-19:43/21 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 09:38-09:46/8 15:46 09:13-09:34/21
16	04:56 21:26	05:45 19:20-19:43/23 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 09:38-09:47/9 15:46 09:14-09:35/21
17	04:57 21:25	05:47 19:20-19:44/24 20:31	06:41 19:18	07:34 18:07	07:33 16:07	08:16 09:38-09:48/10 15:46 09:14-09:36/22
18	04:58 21:23	05:48 19:19-19:45/26 20:29 19:06-19:16/10	06:42 19:16	07:36 18:04	07:34 16:06	08:16 09:39-09:49/10 15:46 09:15-09:36/21
19	05:00 21:22	05:50 19:03-19:44/41 20:27	06:44 19:13	07:38 18:02	07:36 16:04	08:17 09:38-09:49/11 15:47 09:15-09:36/21
20	05:01 21:21	05:52 18:56-19:44/48 20:24	06:46 19:11	07:40 18:00	07:38 16:03	08:18 09:39-09:50/11 15:47 09:16-09:37/21
21	05:03 21:20	05:54 18:53-19:44/51 20:22	06:47 19:09	07:41 17:58	07:40 16:01	08:18 09:39-09:50/11 15:47 09:16-09:37/21
22	05:04 21:18	05:55 18:47-19:43/56 20:20	06:49 19:06	07:43 17:55	07:42 16:00	08:19 09:40-09:51/11 15:48 09:17-09:38/21
23	05:05 21:17	05:57 18:44-19:43/59 20:18	06:51 19:04	07:45 17:53	07:43 15:59	08:19 09:40-09:51/11 15:48 09:17-09:38/21
24	05:07 21:15	05:59 18:42-19:43/61 20:16	06:53 19:01	07:47 17:51	07:45 15:58	08:20 09:41-09:52/11 15:49 09:18-09:39/21
25	05:08 21:14	06:01 18:40-19:41/61 20:13	06:54 18:59	06:49 16:49	07:47 15:57	08:20 09:42-09:52/10 15:50 09:18-09:39/21
26	05:10 21:12	06:02 18:39-19:41/62 20:11	06:56 18:56	06:51 16:47	07:48 15:56	08:20 09:42-09:52/10 15:50 09:18-09:39/21
27	05:12 21:11	06:04 18:38-19:39/61 20:09	06:58 18:54	06:53 16:45	07:50 15:55	08:21 09:43-09:52/9 15:51 09:19-09:40/21
28	05:13 21:09	06:06 18:36-19:37/61 20:06	07:00 18:51	06:55 16:43	07:52 15:54	08:21 09:44-09:52/8 15:52 09:19-09:40/21
29	05:15 21:08	06:08 18:35-19:35/60 20:04	07:02 18:49	06:57 16:41	07:53 15:53	08:21 09:45-09:52/7 15:53 09:20-09:40/20
30	05:16 21:06	06:09 18:35-19:23/48 20:02	07:03 18:47	06:59 16:39	07:55 15:52	08:21 09:47-09:51/4 15:54 09:20-09:41/21
31	05:18 21:04	06:11 18:34-19:22/48 19:59		07:00 16:37		08:21 09:21-09:41/20 15:55
Sonnenscheinstunden	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	879	457	0	0	740

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

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

Berechnung: ZusatzbelastungWEA: BG 06 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (60)
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	
1	08:21 15:56	07:52 08:19-08:40/21 16:47	06:55 17:41	06:41 19:39	18:43-18:59/16 20:33	04:44 21:22	
2	08:21 15:57	07:50 08:19-08:40/21 16:49	06:53 17:43	06:39 19:41	18:45-18:57/12 20:35	04:43 21:23	
3	08:21 15:58	07:48 08:19-08:41/22 16:51	06:51 17:45	06:36 19:43	18:47-18:53/6 20:37	04:42 21:25	
4	08:20 16:00	07:47 08:20-08:41/21 16:52	06:48 17:47	06:34 19:44	05:27 20:39	04:42 21:26	
5	08:20 16:01	07:45 08:20-08:41/21 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 21:27	
6	08:20 16:02	07:43 08:20-08:41/21 16:56	06:44 17:51	17:19-17:24/5 19:48	06:29 19:48	05:23 20:42	04:40 21:28
7	08:19 16:03	07:41 08:21-08:40/19 16:58	06:41 17:53	17:15-17:26/11 19:50	06:27 19:50	05:21 20:44	04:40 21:29
8	08:19 16:05	07:39 08:22-08:40/18 17:00	06:39 17:55	17:14-17:29/15 19:52	06:24 19:52	05:19 20:46	04:39 21:30
9	08:18 16:06	07:37 08:23-08:39/16 17:02	06:36 17:57	17:12-17:30/18 19:53	06:22 19:53	05:17 20:47	04:38 21:31
10	08:18 16:08	07:36 08:25-08:37/12 17:04	06:34 17:58	17:11-17:32/21 19:55	06:20 19:55	05:15 20:49	04:38 21:32
11	08:17 16:09	07:34 08:27-08:34/7 17:06	06:32 18:00	17:09-17:34/25 19:57	06:17 19:57	05:14 20:51	04:37 21:32
12	08:16 16:11	07:32 17:08	06:29 18:02	17:09-17:36/27 19:59	06:15 19:59	05:12 20:53	04:37 21:33
13	08:16 16:12	07:30 17:10	06:27 18:04	17:08-17:37/29 20:01	06:13 20:01	05:10 20:54	04:37 21:34
14	08:15 16:14	07:28 17:12	06:25 18:06	17:08-17:40/32 20:03	06:10 20:03	05:08 20:56	04:37 21:34
15	08:14 16:16	07:26 17:14	06:22 18:08	17:09-17:42/33 20:04	06:08 20:04	05:07 20:58	04:36 21:35
16	08:13 16:17	07:24 17:16	06:20 18:10	17:08-17:43/35 20:06	06:06 20:06	05:05 20:59	04:36 21:36
17	08:12 16:19	07:21 17:18	06:17 18:11	17:09-17:45/36 20:08	06:03 20:08	05:03 21:01	04:36 21:36
18	08:11 16:21	07:19 17:20	06:15 18:13	17:09-17:46/37 20:10	06:01 20:10	05:02 21:02	04:36 21:36
19	08:10 16:22	07:17 17:22	06:13 18:15	17:10-17:47/37 20:12	05:59 20:12	05:00 21:04	04:36 21:37
20	08:09 16:24	07:15 17:24	06:10 18:17	17:12-17:46/34 20:13	05:56 20:13	04:59 21:06	04:36 21:37
21	08:07 16:26	07:13 17:26	06:08 18:19	17:15-17:46/31 20:15	05:54 20:15	04:57 21:07	04:36 21:37
22	08:06 16:28	07:11 17:28	06:05 18:21	17:49-17:54/5 20:17	05:52 20:17	04:56 21:09	04:36 21:38
23	08:05 16:30	07:09 17:30	06:03 18:22	17:47-17:56/9 20:19	05:50 20:19	04:55 21:10	04:37 21:38
24	08:04 16:31	07:06 17:32	06:00 18:24	17:46-17:58/12 20:21	05:48 20:21	04:53 21:12	04:37 21:38
25	08:02 16:33	08:31-08:32/1 07:04	05:58 18:26	17:44-18:00/16 20:22	05:45 20:22	04:52 21:13	04:37 21:38
26	08:01 16:35	08:30-08:35/5 07:02	05:56 18:28	17:43-18:02/19 20:24	05:43 20:24	04:51 21:14	04:38 21:38
27	07:59 16:37	08:28-08:36/8 07:00	05:53 18:30	17:42-18:03/21 20:26	05:41 20:26	04:50 21:16	04:38 21:38
28	07:58 16:39	08:26-08:37/11 06:57	05:51 18:32	17:42-18:03/21 20:28	05:39 20:28	04:48 21:17	04:39 21:38
29	07:56 16:41	08:25-08:39/14 07:00	06:48 19:33	18:42-19:02/20 20:30	05:37 20:30	04:47 21:19	04:39 21:38
30	07:55 16:43	08:23-08:39/16 07:00	06:46 19:35	18:42-19:01/19 20:31	05:35 20:31	04:46 21:20	04:40 21:37
31	07:53 16:45	08:21-08:40/19 07:00	06:43 19:37	18:43-19:01/18 20:31	05:35 20:31	04:45 21:21	04:40 21:37
Sonnenscheinstunden	252	274	367	419	492	507	0
Anzahl Minuten mit Schatten	74	199	678	34	0	0	0

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

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

Berechnung: ZusatzbelastungWEA: BG 06 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (60)
 Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
 Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	October	November	Dezember
1	04:40 21:37	05:20 21:03	06:13 19:57	07:05 17:48-18:16/28 18:44	07:02 07:54-08:07/13 16:35	07:56 15:51
2	04:41 21:37	05:21 21:01	06:15 19:55	07:07 17:48-18:13/25 18:42	07:04 07:52-08:08/16 16:33	07:58 15:50
3	04:42 21:36	05:23 20:59	06:16 19:52	07:09 17:48-18:11/23 18:39	07:06 07:51-08:09/18 16:31	07:59 15:50
4	04:43 21:36	05:25 20:57	06:18 19:50	07:10 17:49-18:09/20 18:37	07:08 07:50-08:10/20 16:29	08:01 15:49
5	04:44 21:35	05:26 20:55	06:20 19:47	07:12 17:49-18:06/17 18:35	07:10 07:50-08:11/21 16:27	08:02 15:49
6	04:45 21:35	05:28 20:53	06:21 19:45	07:14 17:51-18:03/12 18:32	07:12 07:50-08:11/21 16:25	08:04 15:48
7	04:45 21:34	05:30 20:51	06:23 19:43	07:16 17:53-18:01/8 18:30	07:14 07:49-08:11/22 16:23	08:05 15:48
8	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:16 07:49-08:11/22 16:22	08:06 15:47
9	04:47 21:33	05:33 20:48	06:27 19:38	18:42-18:46/4 07:19 18:25	07:18 07:49-08:11/22 16:20	08:07 15:47
10	04:49 21:32	05:35 20:46	06:28 19:35	18:39-18:50/11 07:21 18:23	07:19 07:50-08:11/21 16:18	08:09 15:47
11	04:50 21:31	05:36 20:44	06:30 19:33	18:37-18:52/15 07:23 18:20	07:21 07:52-08:11/19 16:16	08:10 15:46
12	04:51 21:30	05:38 20:42	06:32 19:31	18:34-18:52/18 07:25 18:18	07:23 07:54-08:10/16 16:15	08:11 15:46
13	04:52 21:29	05:40 20:39	06:34 19:28	18:34-18:52/18 07:27 18:16	07:25 07:56-08:10/14 16:13	08:12 15:46
14	04:53 21:28	05:42 20:37	06:35 19:26	18:33-18:53/20 07:29 18:13	07:27 07:59-08:10/11 16:11	08:13 15:46
15	04:54 21:27	05:43 20:35	06:37 19:23	18:32-18:52/20 07:30 18:11	07:29 08:01-08:09/8 16:10	08:14 15:46
16	04:56 21:26	05:45 20:33	06:39 19:21	18:32-18:52/20 07:32 18:09	07:31 08:03-08:08/5 16:08	08:15 15:46
17	04:57 21:25	05:47 20:31	06:41 19:18	18:32-18:51/19 07:34 18:07	07:33 08:05-08:06/1 16:07	08:16 15:46
18	04:58 21:24	05:48 20:29	06:42 19:16	18:31-18:48/17 07:36 18:04	07:34 16:06	08:16 15:47
19	05:00 21:22	05:50 20:27	06:44 19:13	18:32-18:45/13 07:38 18:02	07:36 16:04	08:17 15:47
20	05:01 21:21	05:52 20:24	06:46 19:11	18:33-18:43/10 07:40 18:00	07:38 16:03	08:18 15:47
21	05:03 21:20	05:54 20:22	06:48 19:09	18:35-18:41/6 07:41 17:58	07:40 16:02	08:18 15:48
22	05:04 21:18	05:55 20:20	06:49 19:06	18:37-18:38/1 07:43 17:55	07:42 16:00	08:19 15:48
23	05:05 21:17	05:57 20:18	06:51 19:04	17:57-18:30/33 07:45 17:53	07:43 15:59	08:19 15:49
24	05:07 21:15	05:59 20:16	06:53 19:01	17:55-18:30/35 07:47 17:51	07:45 15:58	08:20 15:49
25	05:08 21:14	06:01 20:13	06:55 18:59	17:52-18:29/37 06:49 16:49	07:47 15:57	08:20 15:50
26	05:10 21:12	06:02 20:11	06:56 18:56	17:51-18:28/37 06:51 16:47	07:48 15:56	08:20 15:50
27	05:12 21:11	06:04 20:09	06:58 18:54	17:50-18:26/36 06:53 16:45	07:50 15:55	08:21 15:51
28	05:13 21:09	06:06 20:06	07:00 18:51	17:49-18:23/34 06:55 16:43	07:52 15:54	08:21 15:52
29	05:15 21:08	06:08 20:04	07:02 18:49	17:49-18:21/32 06:57 16:41	07:53 15:53	08:21 15:53
30	05:16 21:06	06:09 20:02	07:03 18:47	17:48-18:18/30 06:59 16:39	07:55 15:52	08:21 15:54
31	05:18 21:04	06:11 19:59		07:00 07:56-08:05/9 16:37		08:21 15:55
Sonnenscheinstunden	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	582	142	270	0

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

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

Berechnung: ZusatzbelastungWEA: BG 07 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (62)
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 09:23-09:48/25 15:56	07:52 08:39-09:08/29 16:47	06:55 06:41 17:41 19:39	05:33 04:44 20:33 21:22	04:41 04:41 21:22 21:37	05:20 06:13 21:03 19:57	07:05 07:02 18:44 16:35	07:02 07:02 16:35 15:51	07:02 07:02 16:35 15:51	07:02 07:02 16:35 15:51	07:02 07:02 16:35 15:51	07:02 07:02 16:35 15:51
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	329	261	820
Anzahl Minuten mit Schatten	930	99	0	0	0	0	0	0	0	0	731	820

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-Zeitpunkt (SS:MM) Schattenende/Minuten mit Schatten
 Sonnenuntergang (SS:MM) Zeitpunkt (SS:MM) Schattenanfang-Zeitpunkt (SS:MM) Schattenende/Minuten mit Schatten

SHADOW - Kalender pro WEA

Berechnung: ZusatzbelastungWEA: BG 08 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (61)
 Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	07:52 16:47	06:55 17:41	16:26-17:06/40 17:41	06:41 18:25-18:35/10 19:39	05:33 20:33	04:44 21:22	04:40 21:37	05:20 21:02	06:13 19:57	07:05 18:44	17:10-18:02/52 16:35	07:02 15:51
2	08:21 15:57	07:50 16:49	06:53 17:43	16:26-17:07/41 19:41	06:39 19:41	05:31 20:35	04:43 21:23	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	17:08-18:02/54 16:33	07:04 15:50
3	08:21 15:58	07:48 16:51	06:50 17:45	16:26-17:10/44 19:43	06:36 19:43	05:29 20:37	04:42 21:25	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	17:06-18:02/56 16:31	07:06 15:50
4	08:20 16:00	07:47 16:52	06:48 17:47	16:25-17:14/49 19:44	06:34 19:44	05:27 20:39	04:42 21:26	04:43 21:36	05:24 20:57	06:18 19:50	07:10 18:37	17:05-18:01/56 16:29	07:08 15:49
5	08:20 16:01	07:45 16:54	06:46 17:49	16:25-17:18/53 19:46	06:31 19:46	05:25 20:40	04:41 21:27	04:44 21:35	05:26 20:55	06:20 19:47	07:12 18:35	17:03-17:59/56 16:27	07:10 15:49
6	08:20 16:02	07:43 16:56	06:44 17:51	16:25-17:20/55 19:48	06:29 19:48	05:23 20:42	04:40 21:28	04:45 21:35	05:28 20:53	06:21 19:45	07:14 18:32	17:02-17:58/56 16:25	07:12 15:48
7	08:19 16:03	07:41 16:58	06:41 17:53	16:26-17:21/55 19:50	06:27 19:50	05:21 20:44	04:40 21:29	04:45 21:34	05:30 20:51	06:23 19:43	07:16 18:30	17:01-17:56/55 16:23	07:14 15:48
8	08:19 16:05	07:39 17:00	06:39 17:55	16:26-17:23/57 19:52	06:24 19:52	05:19 20:46	04:39 21:30	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	17:01-17:55/54 16:21	07:16 15:47
9	08:18 16:06	07:37 17:02	06:36 17:57	16:26-17:23/57 19:53	06:22 19:53	05:17 20:47	04:38 21:31	04:47 21:32	05:33 20:48	06:27 19:38	07:19 18:25	17:00-17:52/52 16:20	07:18 15:47
10	08:18 16:08	07:35 17:04	06:34 17:58	16:28-17:23/55 19:55	06:20 19:55	05:15 20:49	04:38 21:31	04:49 21:32	05:35 20:46	06:28 19:35	07:21 18:23	17:00-17:48/48 16:18	07:19 15:47
11	08:17 16:09	07:34 17:06	06:32 18:00	16:28-17:23/55 19:57	06:17 19:57	05:14 20:51	04:37 21:32	04:50 21:31	05:36 20:44	06:30 19:33	07:23 18:20	18:19-18:28/9 16:16	07:21 15:46
12	08:16 16:11	07:32 17:08	06:29 18:02	16:30-17:23/53 19:59	06:15 19:59	05:12 20:52	04:37 21:33	04:51 21:30	05:38 20:41	06:32 19:31	07:25 18:18	18:15-18:30/15 16:15	06:59-17:39/40 15:46
13	08:16 16:12	07:30 17:10	06:27 18:04	16:32-17:23/51 20:01	06:12 20:01	05:10 20:54	04:37 21:34	04:52 21:29	05:40 20:39	06:34 19:28	07:27 18:16	18:13-18:31/18 16:13	06:59-17:38/39 15:46
14	08:15 16:14	07:28 17:12	06:25 18:06	16:36-17:23/47 20:02	06:10 20:02	05:08 20:56	04:36 21:34	04:53 21:28	05:41 20:37	06:35 19:26	07:29 18:13	18:11-18:33/22 16:11	06:59-17:37/38 15:46
15	08:14 16:16	07:26 17:14	06:22 18:08	16:40-17:22/42 20:04	06:08 20:04	05:07 20:57	04:36 21:35	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	18:09-18:33/24 16:10	07:29 15:46
16	08:13 16:17	07:23 17:16	06:20 18:10	17:30-17:40/10 20:06	06:06 20:06	05:05 20:59	04:36 21:36	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	18:08-18:33/25 16:08	07:31 15:46
17	08:12 16:19	07:21 17:18	06:17 18:11	17:27-17:43/16 20:08	06:03 20:08	05:03 21:01	04:36 21:36	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	18:08-18:34/26 16:07	07:33 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	17:24-17:44/20 20:10	06:01 20:10	05:02 21:02	04:36 21:36	04:58 21:23	05:48 20:29	06:42 19:16	07:36 18:04	18:06-18:33/27 16:06	07:34 15:46
19	08:10 16:22	07:17 17:22	06:12 18:15	17:23-17:45/22 20:12	05:59 20:12	05:00 21:04	04:36 21:37	05:00 21:22	05:50 20:27	06:44 19:13	07:38 18:02	18:06-18:33/27 16:04	07:36 15:47
20	08:09 16:24	07:15 17:24	06:10 18:17	17:21-17:45/24 20:13	05:56 20:13	04:59 21:06	04:36 21:37	05:01 21:21	05:52 20:24	06:46 19:11	07:40 18:00	18:06-18:33/27 16:03	07:38 15:47
21	08:07 16:26	07:13 17:26	16:38-16:49/11 06:08	17:21-17:46/25 20:15	05:54 20:15	04:57 21:07	04:36 21:37	05:03 21:20	05:54 20:22	06:47 19:09	07:41 17:58	18:06-18:32/26 16:02	07:40 15:48
22	08:06 16:28	07:11 17:28	16:34-16:52/18 06:05	17:19-17:46/27 20:17	05:52 20:17	04:56 21:09	04:36 21:38	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	18:05-18:31/26 16:00	07:42 15:48
23	08:05 16:30	07:09 17:30	16:32-16:54/22 06:03	17:19-17:46/27 20:19	05:50 20:19	04:55 21:10	04:37 21:38	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	18:06-18:30/24 15:59	07:43 15:48
24	08:04 16:31	07:06 17:32	16:31-16:56/25 06:00	17:19-17:46/27 20:21	05:48 20:21	04:53 21:12	04:37 21:38	05:07 21:15	05:59 20:15	06:53 19:01	07:47 17:51	18:07-18:29/22 15:58	07:45 15:49
25	08:02 16:33	07:04 17:34	16:30-16:59/29 05:58	17:19-17:45/26 20:22	05:45 20:22	04:52 21:13	04:37 21:38	05:08 21:14	06:01 20:13	06:54 18:59	07:49 17:49	18:07-18:27/20 16:49	07:47 15:50
26	08:01 16:35	07:02 17:36	16:28-17:01/33 05:56	17:19-17:45/26 20:24	05:43 20:24	04:51 21:14	04:38 21:38	05:10 21:12	06:02 20:11	06:56 18:56	07:51 16:47	18:08-18:25/17 16:49	07:48 15:50
27	07:59 16:37	07:00 17:38	16:28-17:03/35 05:53	17:19-17:44/25 20:26	05:41 20:26	04:50 21:16	04:38 21:38	05:12 21:11	06:04 20:09	06:58 18:54	07:50 16:45	18:10-18:23/13 16:45	07:50 15:51
28	07:58 16:45	06:57 17:39	16:27-17:05/38 05:51	17:19-17:43/24 20:28	05:39 20:28	04:48 21:17	04:39 21:38	05:13 21:09	06:06 20:06	07:00 18:51	07:52 16:43	17:21-18:03/42 16:43	07:52 15:52
29	07:56 16:41	07:56 17:39	06:48 18:32	18:20-18:42/22 20:28	05:37 20:28	04:47 21:17	04:39 21:38	05:15 21:09	06:08 20:06	07:02 18:51	07:53 16:43	17:19-18:03/44 16:41	07:53 15:53
30	07:55 16:43	07:55 17:38	06:46 19:35	18:21-18:40/19 20:31	05:35 20:31	04:46 21:20	04:40 21:37	05:16 21:06	06:09 20:02	07:03 18:47	07:54 16:39	17:13-18:02/49 16:39	07:55 15:54
31	07:53 16:45	07:53 17:45	06:43 19:37	18:23-18:39/16 20:31	05:31 20:31	04:45 21:21	05:18 21:04	06:11 19:59	06:11 21:04	07:00 16:37	07:54 16:37	07:00 16:37	08:21 15:55
Sonnenscheinstunden		252	274	367	419	492	507	510	458	382	653	329	261
Anzahl Minuten mit Schatten		0	211	1277	10	0	0	0	0	653	856	0	0

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

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

Berechnung: ZusatzbelastungWEA: BG 09 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (56)
 Voraussetzungen für Berechnung des Schattenwurfs

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

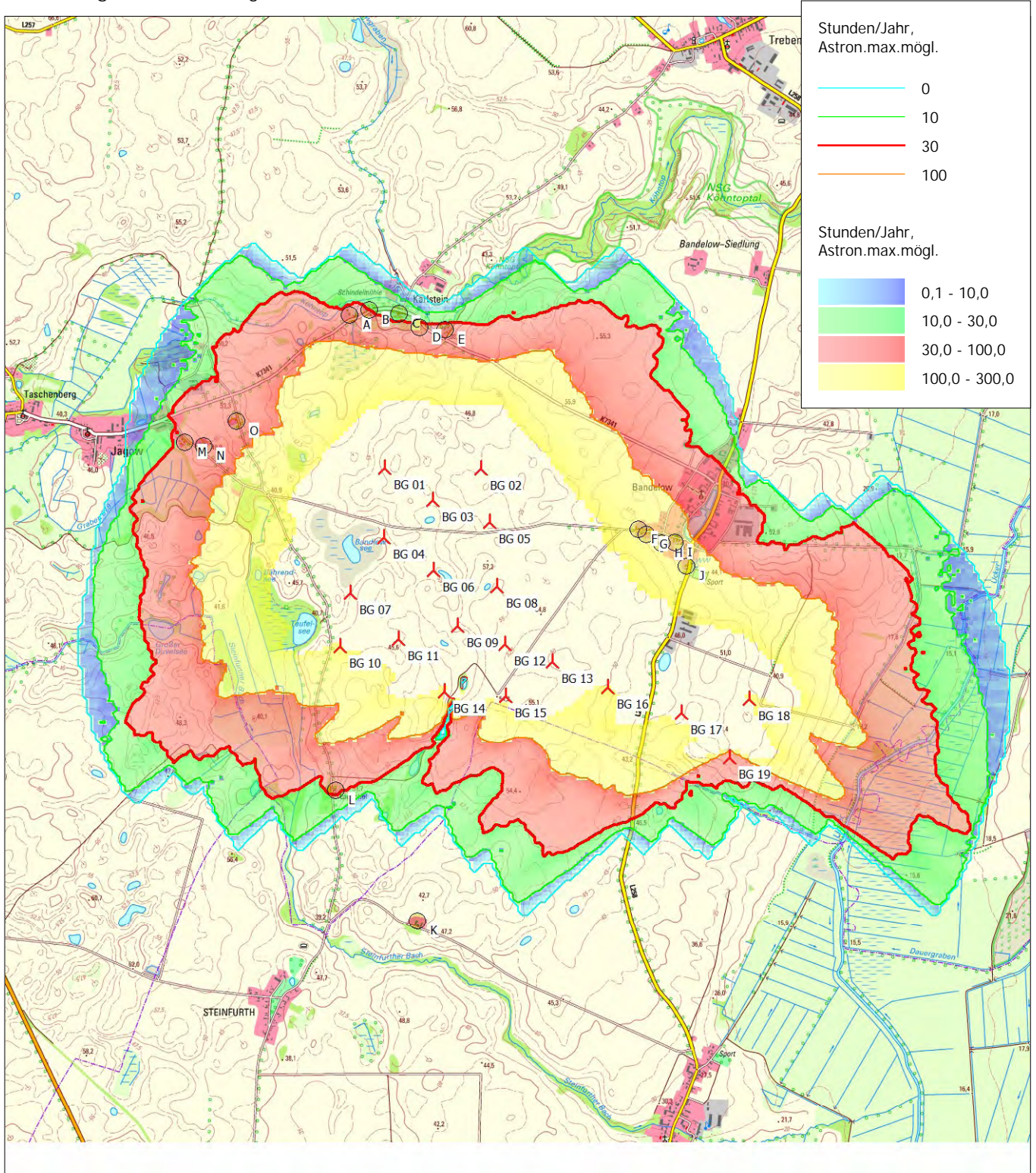
	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:21 15:56	07:52 16:47	06:55 17:41	16:33-17:03/30 06:41	05:33 19:39	04:44 20:33	04:41 21:22	05:20 21:37	06:13 21:02	07:05 19:57	17:42-18:00/18 16:35	07:02 15:51	15:16:03/12 15:51
2	08:21 15:57	07:50 16:49	06:53 17:43	17:10-17:16/6 06:39	05:31 19:41	04:43 20:35	04:41 21:23	05:21 21:01	06:15 19:55	07:07 18:42	17:41-18:01/20 16:33	07:04 15:54-16:01/7	07:58 15:50
3	08:21 15:58	07:48 16:51	06:50 17:45	17:08-17:19/11 06:36	05:29 19:43	04:43 20:37	04:42 21:25	05:23 20:59	06:16 19:52	07:09 18:39	17:40-18:01/21 16:31	07:06 15:50	07:59 15:50
4	08:20 16:00	07:47 16:52	06:48 17:47	17:05-17:20/15 06:34	05:27 19:44	04:42 20:39	04:43 21:26	05:25 20:57	06:18 19:50	07:10 18:37	17:40-18:02/22 16:29	07:08 15:49	08:01 15:49
5	08:20 16:01	07:45 16:54	06:46 17:49	17:05-17:22/17 06:31	05:25 19:46	04:41 20:40	04:44 21:27	05:26 20:55	06:20 19:47	07:12 18:35	17:39-18:01/22 16:27	07:10 15:49	08:02 15:49
6	08:20 16:02	07:43 16:56	06:44 17:51	17:03-17:23/20 06:29	05:23 19:48	04:40 20:42	04:45 21:28	05:28 20:53	06:21 19:45	07:14 18:32	17:39-18:00/21 16:25	07:12 15:48	08:04 15:48
7	08:19 16:03	07:41 16:58	06:41 17:53	17:03-17:24/21 06:27	05:21 19:50	04:40 20:44	04:45 21:29	05:30 20:51	06:23 19:43	07:16 18:30	17:39-18:00/21 16:23	07:14 15:48	08:05 15:48
8	08:19 16:05	07:39 17:00	06:39 17:55	17:03-17:24/21 06:24	05:19 19:52	04:39 20:46	04:46 21:30	05:31 20:50	06:25 19:40	07:18 18:27	17:39-17:59/20 16:22	07:16 15:47	08:06 15:47
9	08:18 16:06	07:37 17:02	06:36 17:57	17:02-17:24/22 06:22	05:17 19:53	04:38 20:47	04:48 21:31	05:33 20:48	06:27 19:38	07:19 18:25	17:40-17:56/16 16:20	07:18 15:47	08:07 15:47
10	08:18 16:08	07:35 17:04	06:34 17:58	17:02-17:24/22 06:20	05:15 19:55	04:38 20:49	04:49 21:31	05:35 20:46	06:28 19:35	07:21 18:23	17:41-17:54/13 16:18	07:19 15:47	08:09 15:47
11	08:17 16:09	07:34 17:06	06:32 18:00	17:02-17:22/20 06:17	05:14 19:57	04:38 20:51	04:50 21:32	05:36 20:44	06:30 19:33	07:23 18:20	17:43-17:52/9 16:16	07:21 15:46	08:10 15:46
12	08:16 16:11	07:32 17:08	06:29 18:02	17:03-17:22/19 06:15	05:12 19:59	04:37 20:52	04:51 21:30	05:38 20:42	06:32 19:31	07:25 18:18	17:46-17:48/2 16:15	07:23 15:46	08:11 15:46
13	08:16 16:12	07:30 17:10	06:27 18:04	17:03-17:20/17 06:13	05:10 20:01	04:37 20:54	04:52 21:34	05:40 20:39	06:34 19:28	07:27 18:16	17:04-17:36/32 16:13	07:25 15:46	08:12 15:46
14	08:15 16:14	07:28 17:12	06:25 18:06	17:05-17:18/13 06:10	05:08 20:03	04:37 20:56	04:53 21:34	05:42 20:37	06:35 19:26	07:29 18:13	17:01-17:36/35 16:11	07:27 15:46	08:13 15:46
15	08:14 16:16	07:26 17:14	06:22 18:08	17:08-17:16/8 06:08	05:07 20:04	04:36 20:57	04:54 21:35	05:43 20:35	06:37 19:23	07:30 18:11	16:59-17:36/37 16:10	07:29 15:46	08:14 15:46
16	08:13 16:17	07:23 17:16	06:20 18:10	16:16-16:47/31 06:06	05:05 20:06	04:36 20:59	04:56 21:36	05:45 20:33	06:39 19:21	07:32 18:09	16:55-17:36/41 16:08	07:31 15:46	08:15 15:46
17	08:12 16:19	07:21 17:18	06:17 18:11	16:16-16:48/32 06:03	05:03 20:08	04:36 21:01	04:57 21:36	05:47 20:31	06:41 19:18	07:34 18:07	16:52-17:35/43 16:07	07:33 15:46	08:16 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	16:15-16:48/33 06:01	05:02 20:10	04:36 21:02	04:58 21:36	05:48 20:29	06:42 19:16	07:36 18:04	16:50-17:34/44 16:06	07:34 15:47	08:16 15:47
19	08:10 16:22	07:17 17:22	06:13 18:15	16:16-16:53/37 06:03	05:00 20:12	04:36 21:04	05:00 21:37	06:44 20:27	06:44 19:13	07:38 18:02	16:49-17:32/43 16:04	07:36 15:47	08:17 15:47
20	08:09 16:24	07:15 17:24	06:10 18:17	16:16-16:56/40 06:00	05:06 20:13	04:36 21:06	05:01 21:21	06:46 20:24	06:46 19:11	07:40 18:00	16:48-17:30/42 16:03	07:38 15:47	08:18 15:47
21	08:07 16:26	07:13 17:26	06:08 18:19	16:17-16:58/41 06:08	05:04 20:15	04:36 21:07	05:03 21:37	06:48 20:22	06:48 19:09	07:41 17:58	16:47-17:28/41 16:02	07:40 15:48	08:18 15:48
22	08:06 16:28	07:11 17:28	06:05 18:21	16:17-17:00/43 06:05	05:02 20:17	04:36 21:09	05:04 21:38	06:49 20:20	06:49 19:06	07:43 17:55	16:46-17:26/40 16:00	07:42 15:48	08:19 15:48
23	08:05 16:30	07:09 17:30	06:03 18:22	16:18-17:02/44 06:03	05:00 20:19	04:37 21:10	05:05 21:38	06:51 20:18	06:51 19:04	07:45 17:53	16:46-17:23/37 15:59	07:43 15:49	08:19 15:49
24	08:04 16:31	07:06 17:32	06:00 18:24	16:19-17:03/44 06:00	05:04 20:21	04:37 21:12	05:07 21:38	06:53 20:16	06:53 19:01	07:47 17:51	16:46-17:18/32 15:58	07:45 15:49	08:20 15:49
25	08:02 16:33	07:04 17:34	05:58 18:26	16:21-17:04/43 05:58	05:45 20:22	04:37 21:13	05:08 21:38	06:01 20:13	06:54 18:59	07:49 16:49	15:46-16:17/31 15:57	07:47 15:50	08:20 15:50
26	08:01 16:35	07:02 17:36	05:56 18:28	16:24-17:04/40 05:56	05:43 20:24	04:38 21:14	05:10 21:38	06:02 20:11	06:56 18:56	07:51 16:47	15:46-16:16/30 15:56	07:48 15:50	08:20 15:50
27	07:59 16:37	07:00 17:38	05:53 18:30	16:27-17:04/37 05:53	05:41 20:26	04:38 21:16	05:12 21:38	06:04 20:09	06:58 18:54	07:53 16:45	15:46-16:14/28 15:55	07:50 15:51	08:21 15:51
28	07:58 16:39	06:57 17:40	05:51 18:32	16:30-17:04/34 05:51	05:39 20:28	04:48 21:17	05:13 21:38	06:06 20:06	06:54 18:51	07:54 16:43	15:47-16:12/25 15:54	07:52 15:52	08:21 15:52
29	07:56 16:41		06:48 19:33		05:37 20:30	04:47 21:18	05:15 21:37	06:08 20:04	06:49 18:49	07:57 16:41	17:47-17:58/11 15:48-16:08/20	07:53 15:53	08:21 15:53
30	07:55 16:43		06:46 19:35		05:35 20:31	04:46 21:20	05:16 21:37	06:09 20:02	06:54 18:47	07:59 16:39	17:44-17:59/15 15:48-16:08/20	07:55 15:52	08:21 15:54
31	07:53 16:45		06:43 19:37		06:43 21:21	04:45 21:21	05:18 21:04	06:11 19:59		07:00 16:37	15:49-16:05/16 15:55	08:21 15:55	08:21 15:55
	Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	29	329	236
	Anzahl Minuten mit Schatten	0	633	349	0	0	0	0	0	0	942	19	0

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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SHADOW - Karte

Berechnung: Zusatzbelastung



0 500 1000 1500 2000 m

Karte: TK 25, Maßstab 1:40.000, Mitte: UTM (north)-WGS84 Zone: 33 Ost: 422.280 Nord: 5.918.310

Neue WEA

Schattenrezeptor

Höhe der Schattenkarte: Höhenraster-Objekt: KL BT 34 AEP-Progn Rev02_EMDGrid_0.wpg (5)

SHADOW - Hauptergebnis

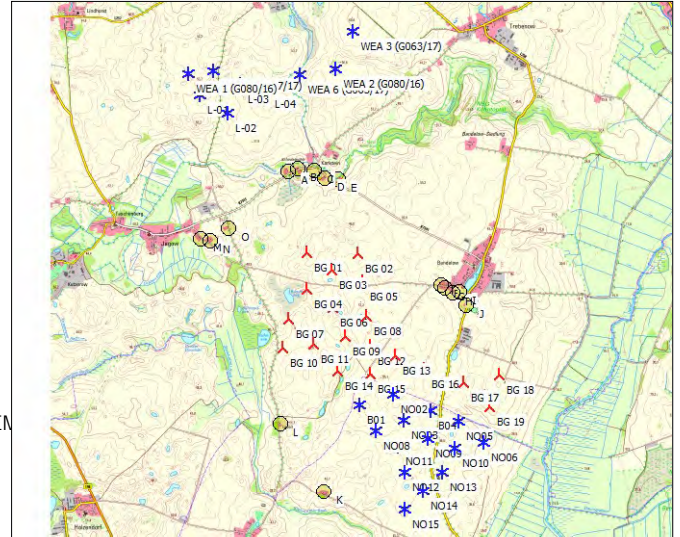
Berechnung: Gesamtbelastung
Voraussetzungen für Berechnung des Schattenwurfs

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:
Verwendete Höhenlinien: Höhenraster-Objekt: KL BT 34 AEP-Progn Rev02_EN
Hindernisse in Berechnung verwendet
Augenhöhe: 1,5 m
Rasterauflösung: 10,0 m

Alle Koordinatenangaben in:
UTM (north)-WGS84 Zone: 33



Maßstab 1:100.000
▲ Neue WEA ✱ Existierende WEA ● Schattenrezeptor

WEA

	Ost	Nord	Z	Beschreibung	WEA-Typ			Nennleistung [kW]	Rotor-durchmesser [m]	Nabenhöhe [m]	Schattendaten	
					Aktuell	Hersteller	Typ				Beschatt.-Bereich [m]	U/min [U/min]
B01	422.054	5.917.206	52,5	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
B04	422.984	5.917.128	45,5	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
BG 01	421.351	5.919.209	50,7	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 02	422.018	5.919.204	52,5	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 03	421.683	5.918.983	48,7	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 04	421.347	5.918.726	40,0	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 05	422.082	5.918.834	52,5	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 06	421.691	5.918.493	45,1	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 07	421.110	5.918.336	40,0	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 08	422.132	5.918.381	55,0	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 09	421.856	5.918.108	51,4	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 10	421.042	5.917.963	43,9	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 11	421.445	5.918.013	47,5	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 12	422.188	5.917.978	53,5	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 13	422.518	5.917.857	50,0	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 14	421.764	5.917.651	52,4	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 15	422.193	5.917.621	52,5	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 16	422.902	5.917.681	49,6	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 17	423.415	5.917.504	45,0	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 18	423.888	5.917.598	46,0	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
BG 19	423.753	5.917.189	46,6	ABC A158-53... Ja	ABC	A158-5300-5.300	5.300	158,0	151,0	1.799	0,0	
L-01	419.950	5.921.290	48,4	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
L-02	420.309	5.921.049	46,1	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
L-03	420.478	5.921.429	50,0	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
L-04	420.840	5.921.368	49,5	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	169,0	1.900	0,0	
NO02	422.489	5.917.354	51,6	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO03	422.629	5.917.012	49,8	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO05	423.357	5.916.994	41,8	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO06	423.686	5.916.712	38,4	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO08	422.265	5.916.870	52,4	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO09	422.950	5.916.769	45,3	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO10	423.303	5.916.642	42,5	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO11	422.554	5.916.667	48,1	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO12	422.647	5.916.329	46,7	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO13	423.144	5.916.319	43,7	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO14	422.889	5.916.075	45,0	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
NO15	422.642	5.915.825	45,0	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	149,0	1.714	12,8	
WEA 1 (G080/16)	419.800	5.921.570	50,0	VESTAS V136...Ja	VESTAS	V136-3.450	3.450	136,0	133,5	1.814	12,8	
WEA 2 (G080/16)	421.734	5.921.631	50,0	VESTAS V126...Ja	VESTAS	V126-3.45-3.450	3.450	126,0	138,5	1.715	12,8	

(Fortsetzung nächste Seite)...

SHADOW - Hauptergebnis

Berechnung: Gesamtbelastung

...(Fortsetzung von letzter Seite)

	Ost	Nord	Z	Beschreibung	WEA-Typ			Nennleistung [kW]	Rotor- durchmesser [m]	Nabenhöhe [m]	Schattendaten	
					Aktuell	Hersteller	Typ				Beschatt.- Bereich [m]	U/min [U/min]
			[m]									
WEA 3 (G063/17)	421.958	5.922.120	50,0	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	126,0	1.904	0,0	
WEA 4 (G057/17)	420.122	5.921.597	50,0	VESTAS V136...Ja	VESTAS	V136-3.600	3.600	136,0	135,0	1.814	12,8	
WEA 6 (G063/17)	421.269	5.921.557	50,0	VESTAS V150...Ja	VESTAS	V150-4.200	4.200	150,0	126,0	1.904	0,0	

Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe über Grund	Azimutwinkel (von Süd)	Neigung des Fensters	Ausrichtungsmodus
A	Karlstein 1, Uckerland	421.108	5.920.274	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
B	Karlstein 2, Uckerland	421.241	5.920.310	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
C	Karlstein 16, Uckerland	421.450	5.920.286	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
D	Karlstein 15, Uckerland	421.594	5.920.188	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
E	Karlstein 13, Uckerland	421.770	5.920.170	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
F	Bandelow 17E, Uckerland	423.119	5.918.783	47,8	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
G	Bandelow 16A, Uckerland	423.172	5.918.746	47,5	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
H	Bandelow 15, Uckerland	423.279	5.918.684	45,2	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
I	Bandelow 11, Uckerland	423.368	5.918.692	43,4	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
J	Bandelow 1, Uckerland	423.453	5.918.520	44,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
K	Dorfstr. 82, Prenzlau	421.577	5.916.052	43,1	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
L	Lauenhof 1, Uckerland	421.009	5.916.958	41,6	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
M	Jagow 74c, Uckerland	419.960	5.919.386	45,2	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
N	Jagow 77, Uckerland	420.093	5.919.358	48,4	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
O	Jagow 1, Uckerland	420.322	5.919.532	50,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"

Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer		
		Stunden/Jahr	Schattentage/a	Max.Schatten Stunden/Tag
		[Std/Jahr]	[Tage/Jahr]	[Std/Tag]
A	Karlstein 1, Uckerland	43:49	80	0:49
B	Karlstein 2, Uckerland	32:47	81	0:39
C	Karlstein 16, Uckerland	41:10	104	0:31
D	Karlstein 15, Uckerland	53:57	102	1:02
E	Karlstein 13, Uckerland	64:25	119	1:07
F	Bandelow 17E, Uckerland	200:29	307	1:23
G	Bandelow 16A, Uckerland	188:53	290	1:18
H	Bandelow 15, Uckerland	168:22	288	1:11
I	Bandelow 11, Uckerland	146:40	275	1:11
J	Bandelow 1, Uckerland	184:27	296	1:35
K	Dorfstr. 82, Prenzlau	67:34	200	0:27
L	Lauenhof 1, Uckerland	81:45	183	0:39
M	Jagow 74c, Uckerland	56:07	177	0:27
N	Jagow 77, Uckerland	62:41	182	0:30
O	Jagow 1, Uckerland	67:59	154	0:53

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [Std/Jahr]
B01	VESTAS V150 4200 150.0 IO! NH: 169,0 m (Ges:244,0 m) (160)	23:58
B04	VESTAS V150 4200 150.0 IO! NH: 169,0 m (Ges:244,0 m) (161)	0:00
BG 01	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (52)	72:54
BG 02	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (55)	159:33
BG 03	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (53)	33:45
BG 04	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (51)	36:08
BG 05	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (59)	59:24
BG 06	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (60)	32:59
BG 07	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (62)	43:00
BG 08	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (61)	50:07
BG 09	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (56)	32:52

(Fortsetzung nächste Seite)...

SHADOW - Hauptergebnis

Berechnung: Gesamtbelastung

...(Fortsetzung von letzter Seite)

Nr.	Name	Maximal [Std/Jahr]
BG 10	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (63)	22:09
BG 11	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (64)	0:00
BG 12	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (48)	58:27
BG 13	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (49)	135:48
BG 14	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (65)	14:41
BG 15	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (69)	98:06
BG 16	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (50)	72:46
BG 17	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (66)	0:00
BG 18	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (54)	56:04
BG 19	ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (67)	0:00
L-01	VESTAS V150 4200 150.0 !O! NH: 169,0 m (Ges:244,0 m) (204)	16:27
L-02	VESTAS V150 4200 150.0 !O! NH: 169,0 m (Ges:244,0 m) (205)	27:37
L-03	VESTAS V150 4200 150.0 !O! NH: 169,0 m (Ges:244,0 m) (206)	0:00
L-04	VESTAS V150 4200 150.0 !O! NH: 169,0 m (Ges:244,0 m) (207)	0:00
NO02	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (103)	30:12
NO03	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (104)	5:17
NO05	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (105)	0:00
NO06	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (106)	0:00
NO08	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (107)	8:43
NO09	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (108)	16:30
NO10	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (109)	0:00
NO11	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (110)	16:19
NO12	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (111)	15:21
NO13	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (112)	6:08
NO14	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (113)	8:30
NO15	VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (114)	11:26
WEA 1 (G080/16)	VESTAS V136 3450 136.0 !O! NH: 133,5 m (Ges:201,5 m) (171)	0:00
WEA 2 (G080/16)	VESTAS V126-3.45 3450 126.0 !O! NH: 138,5 m (Ges:201,5 m) (172)	0:00
WEA 3 (G063/17)	VESTAS V150 4200 150.0 !O! NH: 126,0 m (Ges:201,0 m) (184)	0:00
WEA 4 (G057/17)	VESTAS V136 3600 136.0 !O! NH: 135,0 m (Ges:203,0 m) (183)	0:00
WEA 6 (G063/17)	VESTAS V150 4200 150.0 !O! NH: 126,0 m (Ges:201,0 m) (185)	0:00

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 Schattenrezeptor: A - Karlstein 1, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 15:56 39	09:00 (BG 02) 16:47	06:55 17:41	06:41 19:39	05:33 20:33	04:44 21:22	04:40 21:37	05:20 21:03	06:13 19:57	07:05 18:44	07:02 16:35	07:57 15:51	08:43 (BG 02) 31
2	08:21 15:57 39	09:42 (BG 05) 16:49	06:53 17:43	06:39 19:41	05:31 20:35	04:43 21:24	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	07:04 16:33	07:58 15:50	08:43 (BG 02) 34
3	08:21 15:58 39	09:00 (BG 02) 16:51	07:48 17:45	06:51 19:43	06:36 20:37	05:29 21:25	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 16:31	08:00 15:50	08:44 (BG 02) 37
4	08:21 16:00 38	09:00 (BG 02) 16:52	07:47 17:47	06:48 19:44	06:34 20:39	05:27 21:26	04:42 21:36	05:24 20:57	06:18 19:50	07:10 18:37	07:08 16:29	08:01 15:49	08:44 (BG 02) 36
5	08:20 16:01 39	09:00 (BG 02) 16:54	07:45 17:49	06:46 19:46	06:31 20:40	05:25 21:27	04:41 21:35	05:26 20:55	06:20 19:48	07:12 18:35	07:10 16:27	08:02 15:48	08:45 (BG 02) 39
6	08:20 16:02 39	09:01 (BG 02) 16:56	07:43 17:51	06:44 19:48	06:29 20:42	05:23 21:28	04:40 21:35	05:28 20:53	06:21 19:45	07:14 18:32	07:12 16:25	08:04 15:48	08:46 (BG 02) 38
7	08:19 16:03 38	09:00 (BG 02) 16:58	07:41 17:53	06:41 19:50	06:27 20:44	05:21 21:29	04:40 21:34	05:30 20:52	06:23 19:43	07:16 18:30	07:14 16:23	08:05 15:48	08:47 (BG 02) 39
8	08:19 16:05 37	09:00 (BG 02) 17:00	07:39 17:55	06:39 19:52	06:24 20:46	05:19 21:30	04:39 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:16 16:22	08:06 15:47	08:47 (BG 02) 39
9	08:18 16:06 36	09:00 (BG 02) 17:02	07:37 17:57	06:37 19:54	06:22 20:47	05:17 21:31	04:38 21:33	05:33 20:48	06:27 19:38	07:19 18:25	07:18 16:20	08:08 15:47	08:48 (BG 02) 38
10	08:18 16:08 35	09:01 (BG 02) 17:04	07:36 17:59	06:34 19:55	06:20 20:49	05:15 21:32	04:38 21:32	05:35 20:46	06:28 19:35	07:21 18:23	07:20 16:18	08:09 15:46	08:49 (BG 02) 39
11	08:17 16:09 31	09:01 (BG 02) 17:06	07:34 18:00	06:32 19:57	06:17 20:51	05:14 21:32	04:37 21:31	05:50 20:44	06:30 19:33	07:23 18:20	07:21 16:16	08:10 15:46	08:50 (BG 02) 39
12	08:16 16:11 26	09:01 (BG 02) 17:08	07:32 18:02	06:29 19:59	06:15 20:53	05:12 21:33	04:37 21:30	05:58 20:42	06:32 19:31	07:25 18:18	07:23 16:15	08:11 15:46	08:51 (BG 02) 37
13	08:16 16:12 27	09:01 (BG 02) 17:10	07:30 18:04	06:27 19:54	06:13 20:54	05:10 21:34	04:37 21:29	06:02 20:40	06:34 19:28	07:27 18:16	07:25 16:13	08:12 15:46	08:51 (BG 02) 40
14	08:15 16:14 27	09:01 (BG 02) 17:12	07:28 18:06	06:25 20:03	06:10 20:56	05:08 21:35	04:36 21:28	05:42 20:37	06:35 19:26	07:29 18:13	07:27 16:11	08:13 15:46	08:52 (BG 02) 44
15	08:14 16:16 27	09:02 (BG 02) 17:14	07:26 18:08	06:22 20:04	06:08 20:58	05:07 21:35	04:36 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 15:46	08:53 (BG 02) 46
16	08:13 16:17 27	09:02 (BG 02) 17:16	07:24 18:10	06:20 20:06	06:06 20:59	05:05 21:36	04:36 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 15:46	08:54 (BG 02) 46
17	08:12 16:19 28	09:01 (BG 02) 17:18	07:22 18:12	06:17 20:08	06:03 21:01	05:03 21:36	04:36 21:25	05:47 20:31	06:41 19:18	07:34 18:07	07:33 16:07	08:16 15:46	08:55 (BG 02) 49
18	08:11 16:21 27	09:02 (BG 02) 17:20	07:19 18:13	06:15 20:10	06:01 21:02	05:02 21:37	04:36 21:24	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:06	08:16 15:46	08:56 (BG 02) 48
19	08:10 16:22 27	09:03 (BG 02) 17:22	07:17 18:15	06:13 20:12	05:59 21:04	05:00 21:37	04:36 21:22	05:50 20:27	06:44 19:14	07:38 18:02	07:36 16:04	08:17 15:47	08:56 (BG 02) 49
20	08:09 16:24 26	09:03 (BG 02) 17:25	07:15 18:17	06:10 20:13	05:56 21:06	05:01 21:37	04:36 21:21	05:52 20:25	06:46 19:11	07:40 18:00	07:38 16:03	08:18 15:47	08:57 (BG 02) 49
21	08:08 16:26 27	09:03 (BG 02) 17:26	07:13 18:19	06:08 20:15	05:54 21:07	05:03 21:38	04:36 21:20	05:54 20:22	06:48 19:09	07:42 17:58	07:40 16:01	08:18 15:47	08:58 (BG 02) 48
22	08:06 16:28 26	09:04 (BG 02) 17:28	07:11 18:21	06:05 20:17	05:52 21:09	05:04 21:38	04:36 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:42 16:00	08:19 15:48	08:58 (BG 02) 48
23	08:05 16:30 25	09:05 (BG 02) 17:30	07:09 18:23	06:03 20:19	05:50 21:10	05:05 21:38	04:36 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	08:19 15:48	08:58 (BG 02) 48
24	08:04 16:31 24	09:06 (BG 02) 17:32	07:06 18:24	06:00 20:21	05:48 21:12	05:07 21:38	04:37 21:16	05:59 20:16	06:53 19:01	07:47 17:51	07:45 15:58	08:20 15:49	08:59 (BG 02) 49
25	08:02 16:33 23	09:06 (BG 02) 17:34	07:04 18:26	05:58 20:23	05:45 21:13	05:08 21:38	04:37 21:14	06:01 20:13	06:55 18:59	07:47 16:49	07:47 15:57	08:20 15:50	08:59 (BG 02) 48
26	08:01 16:35 21	09:08 (BG 02) 17:36	07:02 18:28	05:56 20:24	05:43 21:15	05:10 21:38	04:38 21:13	06:02 20:11	06:56 18:56	07:49 17:56	07:49 15:56	08:21 15:50	08:59 (BG 02) 48
27	08:00 16:37 19	09:09 (BG 02) 17:38	07:00 18:30	05:53 20:26	05:41 21:16	05:12 21:38	04:38 21:11	06:04 20:09	06:58 18:54	07:50 17:55	07:50 15:55	08:21 15:51	08:59 (BG 02) 47
28	07:58 16:39 17	09:10 (BG 02) 17:40	06:57 18:32	05:51 20:28	05:39 21:17	05:13 21:38	04:39 21:09	06:06 20:06	07:00 18:52	07:52 17:52	07:52 15:54	08:21 15:52	08:59 (BG 02) 47
29	07:57 16:41 14	09:12 (BG 02) 17:42	06:48 18:33	05:49 20:30	05:37 21:19	05:15 21:38	04:40 21:08	06:08 20:04	07:02 18:49	07:53 17:53	07:53 16:41	08:21 15:53	08:59 (BG 02) 45
30	07:55 16:43 8	09:15 (BG 02) 17:44	06:46 18:35	05:46 20:32	05:35 21:20	05:16 21:37	04:40 21:06	06:09 20:02	07:03 18:47	07:55 17:52	07:55 15:52	08:21 15:54	08:59 (BG 02) 43
31	07:53 16:45	09:23 (BG 02)	06:43 19:37	05:44 21:21	05:34 21:21	05:18 21:04	04:41 21:04	06:11 19:59	07:01 16:37	07:56 15:52	07:56 15:52	08:21 15:55	09:00 (BG 02) 37
	Sonnenscheinstunden astr.max.mögl.Beschattung	252 856	274 367	419 367	492 367	508 367	510 367	458 367	382 329	329 261	261 448	236 1325	

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: B - Karlstein 2, Uckerland
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	
1	08:21	09:16 (BG 02)	07:52	06:55	06:41	05:33	04:44
	15:56	29 09:45 (BG 02)	16:47	17:41	19:39	20:33	21:22
2	08:21	09:16 (BG 02)	07:50	06:53	06:39	05:31	04:43
	15:57	29 09:45 (BG 02)	16:49	17:43	19:41	20:35	21:24
3	08:21	09:17 (BG 02)	07:48	06:51	06:36	05:29	04:42
	15:58	28 09:45 (BG 02)	16:51	17:45	19:43	20:37	21:25
4	08:21	09:18 (BG 02)	07:47	06:48	06:34	05:27	04:42
	16:00	28 09:46 (BG 02)	16:52	17:47	19:44	20:39	21:26
5	08:20	09:18 (BG 02)	07:45	06:46	06:31	05:25	04:41
	16:01	28 09:46 (BG 02)	16:54	17:49	19:46	20:40	21:27
6	08:20	09:19 (BG 02)	07:43	06:44	06:29	05:23	04:40
	16:02	28 09:47 (BG 02)	16:56	17:51	19:48	20:42	21:28
7	08:19	09:19 (BG 02)	07:41	06:41	06:27	05:21	04:39
	16:03	28 09:47 (BG 02)	16:58	17:53	19:50	20:44	21:29
8	08:19	09:19 (BG 02)	07:39	06:39	06:24	05:19	04:39
	16:05	28 09:47 (BG 02)	17:00	17:55	19:52	20:46	21:30
9	08:18	09:19 (BG 02)	07:37	06:37	06:22	05:17	04:38
	16:06	28 09:47 (BG 02)	17:02	17:57	19:53	20:47	21:31
10	08:18	09:20 (BG 02)	07:36	06:34	06:20	05:15	04:38
	16:08	29 09:49 (BG 02)	17:04	17:58	19:55	20:49	21:32
11	08:17	09:21 (BG 02)	07:34	06:32	06:17	05:14	04:37
	16:09	28 09:49 (BG 02)	17:06	18:00	19:57	20:51	21:32
12	08:16	09:21 (BG 02)	07:32	06:29	06:15	05:12	04:37
	16:11	28 09:49 (BG 02)	17:08	18:02	19:59	20:53	21:33
13	08:16	09:22 (BG 02)	07:30	06:27	06:13	05:10	04:37
	16:12	27 09:49 (BG 02)	17:10	18:04	20:01	20:54	21:34
14	08:15	09:22 (BG 02)	07:28	06:25	06:10	05:08	04:36
	16:14	27 09:49 (BG 02)	17:12	18:06	20:03	20:56	21:35
15	08:14	09:23 (BG 02)	07:26	06:22	06:08	05:07	04:36
	16:16	26 09:49 (BG 02)	17:14	18:08	20:04	20:58	21:35
16	08:13	09:24 (BG 02)	07:24	06:20	06:06	05:05	04:36
	16:17	25 09:49 (BG 02)	17:16	18:10	20:06	20:59	21:36
17	08:12	09:24 (BG 02)	07:22	06:17	06:03	05:03	04:36
	16:19	24 09:48 (BG 02)	17:18	18:12	20:08	21:01	21:36
18	08:11	09:25 (BG 02)	07:19	06:15	06:01	05:02	04:36
	16:21	23 09:48 (BG 02)	17:20	18:13	20:10	21:02	21:37
19	08:10	09:27 (BG 02)	07:17	06:13	05:59	05:00	04:36
	16:22	21 09:48 (BG 02)	17:22	18:15	20:12	21:04	21:37
20	08:09	09:27 (BG 02)	07:15	06:10	05:56	04:59	04:36
	16:24	20 09:47 (BG 02)	17:24	18:17	20:13	21:06	21:37
21	08:08	09:29 (BG 02)	07:13	06:08	05:54	04:57	04:36
	16:26	17 09:46 (BG 02)	17:26	18:19	20:15	21:07	21:38
22	08:06	09:31 (BG 02)	07:11	06:05	05:52	04:56	04:36
	16:28	15 09:46 (BG 02)	17:28	18:21	20:17	21:09	21:38
23	08:05	09:33 (BG 02)	07:09	06:03	05:50	04:55	04:37
	16:29	10 09:43 (BG 02)	17:30	18:23	20:19	21:10	21:38
24	08:04		07:06	06:00	05:48	04:53	04:37
	16:31		17:32	18:24	20:21	21:12	21:38
25	08:02		07:04	05:58	05:45	04:52	04:37
	16:33		17:34	18:26	20:23	21:13	21:38
26	08:01		07:02	05:56	05:43	04:51	04:38
	16:35		17:36	18:28	20:24	21:15	21:38
27	08:00		07:00	05:53	05:41	04:50	04:38
	16:37		17:38	18:30	20:26	21:16	21:38
28	07:58		06:57	05:51	05:39	04:48	04:39
	16:39		17:40	18:32	20:28	21:17	21:38
29	07:57			06:48	05:37	04:47	04:39
	16:41			19:33	20:30	21:19	21:38
30	07:55			06:46	05:35	04:46	04:40
	16:43			19:35	20:32	21:20	21:37
31	07:53			06:43		04:45	
	16:45			19:37		21:21	
Sonnenscheinstunden	252					508	
astr.max.mögl.Beschattung	574	274	367	419	492	508	94

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)	Schattenende (WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: B - Karlstein 2, Uckerland
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember
1	04:40 21:37	05:20 21:03	06:13 19:57	07:05 18:44	07:02 16:35	07:57 15:51 28 09:03 (BG 02)
2	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	07:04 16:33	07:58 15:50 29 09:02 (BG 02)
3	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 16:31	08:00 15:50 29 09:03 (BG 02)
4	04:43 21:36	05:24 20:57	06:18 19:50	07:10 18:37	07:08 16:29	08:01 15:49 28 09:03 (BG 02)
5	04:44 21:35	05:26 20:55	06:20 19:48	07:12 18:35	07:10 16:27	08:02 15:48 28 09:04 (BG 02)
6	04:44 21:35	05:28 20:53	06:21 19:45	07:14 18:32	07:12 16:25	08:04 15:48 28 09:04 (BG 02)
7	04:45 21:34	05:30 20:52	06:23 19:43	07:16 18:30	07:14 16:23	08:05 15:48 28 09:05 (BG 02)
8	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:16 16:21	08:06 15:47 28 09:05 (BG 02)
9	04:47 21:33	05:33 20:48	06:27 19:38	07:19 18:25	07:18 16:20	08:08 15:47 29 09:05 (BG 02)
10	04:48 21:32	05:35 20:46	06:28 19:35	07:21 18:23	07:20 16:18	08:09 15:46 29 09:06 (BG 02)
11	04:50 21:31	05:36 20:44	06:30 19:33	07:23 18:20	07:21 16:16	08:10 15:46 29 09:06 (BG 02)
12	04:51 21:30	05:38 20:42	06:32 19:31	07:25 18:18	07:23 16:15	08:11 15:46 28 09:07 (BG 02)
13	04:52 21:29	05:40 20:40	06:34 19:28	07:27 18:16	07:25 16:13	08:12 15:46 32 09:07 (BG 02)
14	04:53 21:28	05:41 20:37	06:35 19:26	07:29 18:13	07:27 16:11	08:13 15:46 35 09:08 (BG 02)
15	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 15:46 36 09:08 (BG 02)
16	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 15:46 37 09:09 (BG 02)
17	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	07:33 16:07	08:16 15:46 38 09:09 (BG 02)
18	04:58 21:24	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:06	08:16 15:46 38 09:10 (BG 02)
19	05:00 21:22	05:50 20:27	06:44 19:14	07:38 18:02	07:36 16:04	09:08 (BG 02) 08:17 39 09:10 (BG 02)
20	05:01 21:21	05:52 20:25	06:46 19:11	07:40 18:00	07:38 16:03	09:06 (BG 02) 08:18 39 09:11 (BG 02)
21	05:02 21:20	05:54 20:22	06:48 19:09	07:42 17:58	07:40 16:01	09:05 (BG 02) 08:18 39 09:11 (BG 02)
22	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:42 16:00	09:03 (BG 02) 08:19 39 09:12 (BG 02)
23	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	09:03 (BG 02) 08:19 39 09:12 (BG 02)
24	05:07 21:16	05:59 20:16	06:53 19:01	07:47 17:51	07:45 15:58	09:02 (BG 02) 08:20 39 09:13 (BG 02)
25	05:08 21:14	06:01 20:13	06:55 18:59	07:49 17:49	07:47 15:57	09:02 (BG 02) 08:20 38 09:13 (BG 02)
26	05:10 21:13	06:02 20:11	06:56 18:56	07:51 17:47	07:49 15:56	09:02 (BG 02) 08:21 38 09:13 (BG 02)
27	05:12 21:11	06:04 20:09	06:58 18:54	07:53 17:45	07:50 15:55	09:02 (BG 02) 08:21 37 09:14 (BG 02)
28	05:13 21:09	06:06 20:06	07:00 18:52	07:55 17:43	07:52 15:54	09:03 (BG 02) 08:21 36 09:14 (BG 02)
29	05:15 21:08	06:08 20:04	07:02 18:49	07:57 17:41	07:53 15:53	09:02 (BG 02) 08:21 36 09:14 (BG 02)
30	05:16 21:06	06:09 20:02	07:03 18:47	07:59 17:39	07:55 15:52	09:02 (BG 02) 08:21 32 09:15 (BG 02)
31	05:18 21:04	06:11 19:59		07:01 17:37		08:21 15:55 29 09:15 (BG 02)
Sonnenscheinstunden	510	458	382	329	261	236
astr.max.mögl. Beschattung					262	1037

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) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: GesamtbelastungSchattenrezeptor: C - Karlstein 16, Uckerland

Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:21 15:56 29	09:47 (BG 02) 10:16 (BG 02)	07:52 16:47	06:55 17:41	06:41 19:39	05:33 20:33
2	08:21 15:57 29	09:47 (BG 02) 10:16 (BG 02)	07:50 16:49	06:53 17:43	06:39 19:41	05:31 20:35
3	08:21 15:58 29	09:48 (BG 02) 10:17 (BG 02)	07:48 16:50	06:51 17:45	06:36 19:43	05:29 20:37
4	08:21 16:00 28	09:49 (BG 02) 10:17 (BG 02)	07:47 16:52	06:48 17:47	06:34 19:44	05:27 20:39
5	08:20 16:01 28	09:49 (BG 02) 10:17 (BG 02)	07:45 16:54	06:46 17:49	06:31 19:46	05:25 20:40
6	08:20 16:02 28	09:49 (BG 02) 10:17 (BG 02)	07:43 16:56	06:44 17:51	06:29 19:48	05:23 20:42
7	08:19 16:03 26	09:51 (BG 02) 10:17 (BG 02)	07:41 16:58	06:41 17:53	06:27 19:50	05:21 20:44
8	08:19 16:05 26	09:51 (BG 02) 10:17 (BG 02)	07:39 17:00	06:39 17:55	06:24 19:52	05:19 20:46
9	08:18 16:06 25	09:52 (BG 02) 10:17 (BG 02)	07:37 17:02	06:37 17:57	06:22 19:53	05:17 20:47
10	08:18 16:08 23	09:54 (BG 02) 10:17 (BG 02)	07:36 17:04	06:34 17:58	06:20 19:55	05:15 20:49
11	08:17 16:09 22	09:55 (BG 02) 10:17 (BG 02)	07:34 17:06	06:32 18:00	06:17 19:57	05:14 20:51
12	08:16 16:11 20	09:56 (BG 02) 10:16 (BG 02)	07:32 17:08	06:29 18:02	06:15 19:59	05:12 20:53
13	08:16 16:12 19	09:57 (BG 02) 10:16 (BG 02)	07:30 17:10	06:27 18:04	06:12 20:01	05:10 20:54
14	08:15 16:14 17	09:58 (BG 02) 10:15 (BG 02)	07:28 17:12	06:25 18:06	06:10 20:03	05:08 20:56
15	08:14 16:16 14	10:00 (BG 02) 10:14 (BG 02)	07:26 17:14	06:22 18:08	06:08 20:04	05:07 20:58
16	08:13 16:17 9	10:03 (BG 02) 10:12 (BG 02)	07:24 17:16	06:20 18:10	06:06 20:06	05:05 20:59
17	08:12 16:19		07:21 17:18	06:17 18:12	06:03 20:08	05:03 21:01
18	08:11 16:21		07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02
19	08:10 16:22		07:17 17:22	06:13 18:15	05:59 20:12	05:00 21:04
20	08:09 16:24		07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:06
21	08:08 16:26		07:13 17:26	06:08 18:19	05:54 20:15	04:57 21:07
22	08:06 16:28		07:11 17:28	06:05 18:21	05:52 20:17	04:56 21:09
23	08:05 16:29		07:09 17:30	06:03 18:23	05:50 20:19	04:55 21:10
24	08:04 16:31		07:06 17:32	06:00 18:24	05:48 20:21	04:53 21:12
25	08:02 16:33		07:04 17:34	05:58 18:26	05:45 20:23	04:52 21:13
26	08:01 16:35		07:02 17:36	05:56 18:28	05:43 20:24	04:51 21:15
27	08:00 16:37		07:00 17:38	05:53 18:30	05:41 20:26	04:50 21:16
28	07:58 16:39		06:57 17:40	05:51 18:32	05:39 20:28	04:48 21:17
29	07:57 16:41			06:48 19:33	05:37 20:30	04:47 21:19
30	07:55 16:43			06:46 19:35	05:35 20:32	04:46 21:20
31	07:53 16:45			06:43 19:37		04:45 21:21
	Sonnenscheinstunden 252		274	367	419	492
	astr.max.mögl.Beschattung 372				58	740

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)	Schattenende (WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: C - Karlstein 16, Uckerland
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli		August		September		Oktober		November		Dezember	
1	04:40		20:29 (L-02)	05:19	06:13	07:05	07:02				07:57	09:37 (BG 02)
	21:37	26	20:55 (L-01)	21:03	19:57	18:44	16:35				15:51	22 09:59 (BG 02)
2	04:41		20:30 (L-02)	05:21	06:15	07:07	07:04				07:58	09:36 (BG 02)
	21:37	25	20:55 (L-01)	21:01	19:55	18:42	16:33				15:50	23 09:59 (BG 02)
3	04:42		20:30 (L-02)	05:23	06:16	07:09	07:06				07:59	09:36 (BG 02)
	21:36	24	20:54 (L-01)	20:59	19:52	18:39	16:31				15:50	25 10:01 (BG 02)
4	04:43		20:30 (L-02)	05:24	06:18	07:10	07:08				08:01	09:35 (BG 02)
	21:36	25	20:55 (L-01)	20:57	19:50	18:37	16:29				15:49	26 10:01 (BG 02)
5	04:44		20:31 (L-02)	05:26	06:20	07:12	07:10				08:02	09:36 (BG 02)
	21:35	24	20:55 (L-01)	20:55	19:48	18:35	16:27				15:48	26 10:02 (BG 02)
6	04:44		20:32 (L-02)	05:28	06:21	07:14	07:12				08:04	09:35 (BG 02)
	21:35	23	20:55 (L-01)	20:53	19:45	18:32	16:25				15:48	28 10:03 (BG 02)
7	04:45		20:33 (L-02)	05:29	06:23	07:16	07:14				08:05	09:36 (BG 02)
	21:34	22	20:55 (L-01)	20:52	19:43	18:30	16:23				15:47	28 10:04 (BG 02)
8	04:46		20:33 (L-02)	05:31	06:25	07:18	07:16				08:06	09:36 (BG 02)
	21:33	22	20:55 (L-01)	20:50	19:40	18:27	16:21				15:47	28 10:04 (BG 02)
9	04:47		20:34 (L-02)	05:33	06:27	07:19	07:18				08:08	09:36 (BG 02)
	21:33	21	20:55 (L-01)	20:48	19:38	18:25	16:20				15:47	29 10:05 (BG 02)
10	04:48		20:35 (L-02)	05:35	06:28	07:21	07:20				08:09	09:37 (BG 02)
	21:32	20	20:55 (L-01)	20:46	19:35	18:23	16:18				15:46	29 10:06 (BG 02)
11	04:50		20:36 (L-02)	05:36	06:30	07:23	07:21				08:10	09:37 (BG 02)
	21:31	19	20:55 (L-01)	20:44	19:33	18:20	16:16				15:46	29 10:06 (BG 02)
12	04:51		20:38 (L-02)	05:38	06:32	07:25	07:23				08:11	09:37 (BG 02)
	21:30	16	20:54 (L-01)	20:42	19:31	18:18	16:15				15:46	30 10:07 (BG 02)
13	04:52		20:39 (L-01)	05:40	06:34	07:27	07:25				08:12	09:37 (BG 02)
	21:29	15	20:54 (L-01)	20:40	19:28	18:16	16:13				15:46	30 10:07 (BG 02)
14	04:53		20:40 (L-01)	05:41	06:35	07:29	07:27				08:13	09:38 (BG 02)
	21:28	13	20:53 (L-01)	20:37	19:26	18:13	16:11				15:46	30 10:08 (BG 02)
15	04:54		20:41 (L-01)	05:43	06:37	07:30	07:29				08:14	09:38 (BG 02)
	21:27	11	20:52 (L-01)	20:35	19:23	18:11	16:10				15:46	31 10:09 (BG 02)
16	04:56		20:42 (L-01)	05:45	06:39	07:32	07:31				08:15	09:39 (BG 02)
	21:26	9	20:51 (L-01)	20:33	19:21	18:09	16:08				15:46	30 10:09 (BG 02)
17	04:57		20:46 (L-01)	05:47	06:41	07:34	07:33				08:16	09:39 (BG 02)
	21:25	3	20:49 (L-01)	20:31	19:18	18:07	16:07				15:46	31 10:10 (BG 02)
18	04:58			05:48	06:42	07:36	07:34				08:16	09:39 (BG 02)
	21:24			20:29	19:16	18:04	16:05				15:46	31 10:10 (BG 02)
19	05:00			05:50	06:44	07:38	07:36				08:17	09:40 (BG 02)
	21:22			20:27	19:14	18:02	16:04				15:47	30 10:10 (BG 02)
20	05:01			05:52	06:46	07:40	07:38				08:18	09:40 (BG 02)
	21:21			20:25	19:11	18:00	16:03				15:47	31 10:11 (BG 02)
21	05:02			05:54	06:48	07:42	07:40				08:18	09:40 (BG 02)
	21:20			20:22	19:09	17:58	16:01				15:47	31 10:11 (BG 02)
22	05:04			05:55	06:49	07:43	07:42				08:19	09:41 (BG 02)
	21:18			20:20	19:06	17:55	16:00				15:48	31 10:12 (BG 02)
23	05:05			05:57	06:51	07:45	07:43				08:19	09:41 (BG 02)
	21:17			20:18	19:04	17:53	15:59				15:48	31 10:12 (BG 02)
24	05:07			05:59	06:53	07:47	07:45				08:20	09:42 (BG 02)
	21:16			20:16	19:01	17:51	15:58				15:49	31 10:13 (BG 02)
25	05:08			06:01	06:55	06:49	07:47				08:20	09:43 (BG 02)
	21:14			20:13	18:59	16:49	15:57				15:50	31 10:14 (BG 02)
26	05:10			06:02	06:56	06:51	07:49	09:41 (BG 02)			08:21	09:43 (BG 02)
	21:13			20:11	18:56	16:47	15:56	9 09:50 (BG 02)			15:50	31 10:14 (BG 02)
27	05:11			06:04	06:58	06:53	07:50	09:40 (BG 02)			08:21	09:43 (BG 02)
	21:11			20:09	18:54	16:45	15:55	13 09:53 (BG 02)			15:51	31 10:14 (BG 02)
28	05:13			06:06	07:00	06:55	07:52	09:39 (BG 02)			08:21	09:44 (BG 02)
	21:09			20:06	18:52	16:43	15:54	16 09:55 (BG 02)			15:52	30 10:14 (BG 02)
29	05:15			06:08	07:02	06:57	07:53	09:37 (BG 02)			08:21	09:44 (BG 02)
	21:08			20:04	18:49	16:41	15:53	19 09:56 (BG 02)			15:53	31 10:15 (BG 02)
30	05:16			06:09	07:03	06:59	07:55	09:37 (BG 02)			08:21	09:45 (BG 02)
	21:06			20:02	18:47	16:39	15:52	20 09:57 (BG 02)			15:54	30 10:15 (BG 02)
31	05:18			06:11		07:00					08:21	09:46 (BG 02)
	21:04			19:59		16:37					15:55	30 10:16 (BG 02)
Sonnenscheinstunden	510			458	382	329	261	77			236	905
astr.max.mögl.Beschattung		318										

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: D - Karlstein 15, Uckerland
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März		April		Mai		Juni	
1	08:21	10:04 (BG 02)	07:52	06:55	06:41	05:33	04:44					20:29 (L-02)
	15:56	56	13:16 (BG 01)	16:47	17:41	19:39	20:33	21:22	14			20:43 (L-02)
2	08:21	10:04 (BG 02)	07:50	06:53	06:39	05:31	04:43					20:29 (L-02)
	15:57	53	13:15 (BG 01)	16:49	17:43	19:41	20:35	21:24	16			20:45 (L-02)
3	08:21	10:05 (BG 02)	07:48	06:51	06:36	05:29	04:42					20:28 (L-02)
	15:58	52	13:15 (BG 01)	16:50	17:45	19:43	20:37	21:25	18			20:46 (L-02)
4	08:21	10:07 (BG 02)	07:47	06:48	06:34	05:27	04:42					20:28 (L-02)
	16:00	49	13:15 (BG 01)	16:52	17:47	19:44	20:39	21:26	18			20:46 (L-02)
5	08:20	10:07 (BG 02)	07:45	06:46	06:31	05:25	04:41					20:28 (L-02)
	16:01	46	13:14 (BG 01)	16:54	17:49	19:46	20:40	21:27	19			20:47 (L-02)
6	08:20	10:07 (BG 02)	07:43	06:44	06:29	05:23	04:40					20:28 (L-02)
	16:02	44	13:13 (BG 01)	16:56	17:51	19:48	20:42	21:28	19			20:47 (L-02)
7	08:19	10:08 (BG 02)	07:41	06:41	06:27	05:21	04:39					20:28 (L-02)
	16:03	39	13:12 (BG 01)	16:58	17:53	19:50	20:44	21:29	20			20:48 (L-02)
8	08:19	10:09 (BG 02)	07:39	06:39	06:24	05:19	04:39					20:27 (L-02)
	16:05	29	10:38 (BG 02)	17:00	17:55	19:52	20:46	21:30	21			20:48 (L-02)
9	08:18	10:10 (BG 02)	07:37	06:36	06:22	05:17	04:38					20:28 (L-02)
	16:06	28	10:38 (BG 02)	17:02	17:57	19:53	20:47	21:31	21			20:49 (L-02)
10	08:18	10:11 (BG 02)	07:36	06:34	06:20	05:15	04:38					20:27 (L-02)
	16:08	28	10:39 (BG 02)	17:04	17:58	19:55	20:49	21:32	22			20:49 (L-02)
11	08:17	10:12 (BG 02)	07:34	06:32	06:17	05:14	04:37					20:27 (L-02)
	16:09	26	10:38 (BG 02)	17:06	18:00	19:57	20:51	21:32	22			20:49 (L-02)
12	08:16	10:13 (BG 02)	07:32	06:29	06:15	05:12	04:37					20:28 (L-02)
	16:11	25	10:38 (BG 02)	17:08	18:02	19:59	20:53	21:33	22			20:50 (L-02)
13	08:16	10:15 (BG 02)	07:30	06:27	06:12	05:10	04:37					20:27 (L-02)
	16:12	22	10:37 (BG 02)	17:10	18:04	20:01	20:54	21:34	22			20:49 (L-02)
14	08:15	10:16 (BG 02)	07:28	06:25	06:10	05:08	04:36					20:27 (L-02)
	16:14	21	10:37 (BG 02)	17:12	18:06	20:03	20:56	21:35	23			20:50 (L-02)
15	08:14	10:18 (BG 02)	07:26	06:22	06:08	05:07	04:36					20:28 (L-02)
	16:15	18	10:36 (BG 02)	17:14	18:08	20:04	20:58	21:35	22			20:50 (L-02)
16	08:13	10:19 (BG 02)	07:24	06:20	06:06	05:05	04:36					20:28 (L-02)
	16:17	15	10:34 (BG 02)	17:16	18:10	20:06	20:59	21:36	23			20:51 (L-02)
17	08:12	10:22 (BG 02)	07:21	06:17	06:03	05:03	04:36					20:28 (L-02)
	16:19	10	10:32 (BG 02)	17:18	18:11	20:08	21:01	21:36	23			20:51 (L-02)
18	08:11		07:19	06:15	06:01	05:02	04:36					20:28 (L-02)
	16:21		17:20	18:13	20:10	21:02	21:37	23				20:51 (L-02)
19	08:10		07:17	06:13	05:59	05:00	04:36					20:28 (L-02)
	16:22		17:22	18:15	20:12	21:04	21:37	23				20:51 (L-02)
20	08:09		07:15	06:10	05:56	04:59	04:36					20:28 (L-02)
	16:24		17:24	18:17	20:13	21:06	21:37	23				20:51 (L-02)
21	08:08		07:13	06:08	05:54	04:57	04:36					20:29 (L-02)
	16:26		17:26	18:19	20:15	21:07	21:38	23				20:52 (L-02)
22	08:06		07:11	06:05	05:52	04:56	04:36					20:29 (L-02)
	16:28		17:28	18:21	20:17	21:09	21:38	23				20:52 (L-02)
23	08:05		07:09	06:03	05:50	04:55	04:37					20:29 (L-02)
	16:29		17:30	18:23	20:19	21:10	21:38	23				20:52 (L-02)
24	08:04		07:06	06:00	05:48	04:53	04:37					20:29 (L-02)
	16:31		17:32	18:24	20:21	21:12	21:38	23				20:52 (L-02)
25	08:02		07:04	05:58	05:45	04:52	04:37					20:30 (L-02)
	16:33		17:34	18:26	20:23	21:13	21:38	23				20:53 (L-02)
26	08:01		07:02	05:56	05:43	04:51	04:38					20:30 (L-02)
	16:35		17:36	18:28	20:24	21:15	21:38	23				20:53 (L-02)
27	07:59		07:00	05:53	05:41	04:50	04:38					20:31 (L-02)
	16:37		17:38	18:30	20:26	21:16	21:38	22				20:53 (L-02)
28	07:58		06:57	05:51	05:39	04:48	04:39					20:31 (L-02)
	16:39		17:40	18:32	20:28	21:17	21:38	22				20:53 (L-02)
29	07:56			06:48	05:37	04:47						20:31 (L-02)
	16:41			19:33	20:30	21:19	7	20:33 (L-02)				20:40 (L-02)
30	07:55			06:46	05:35	04:46						20:31 (L-02)
	16:43			19:35	20:32	21:20	10	20:41 (L-02)				20:31 (L-02)
31	07:53			06:43		04:45						20:30 (L-02)
	16:45			19:37		21:21	13	20:43 (L-02)				
Sonnenscheinstunden	252		274	367	419	492		508				
astr.max.mögl.Beschattung	561					30						641

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)	Schattenende (WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: D - Karlstein 15, Uckerland
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli		August		September		Oktober		November		Dezember	
1	04:40		20:32 (L-02)	05:19	06:13	07:05	07:02				07:57	09:54 (BG 02)
	21:37	22	20:54 (L-02)	21:03	19:57	18:44	16:35				15:51	10:20 (BG 02)
2	04:41		20:32 (L-02)	05:21	06:15	07:07	07:04				07:58	09:54 (BG 02)
	21:37	22	20:54 (L-02)	21:01	19:55	18:42	16:33				15:50	10:21 (BG 02)
3	04:42		20:32 (L-02)	05:23	06:16	07:09	07:06				07:59	09:54 (BG 02)
	21:36	21	20:53 (L-02)	20:59	19:52	18:39	16:31				15:50	10:22 (BG 02)
4	04:43		20:33 (L-02)	05:24	06:18	07:10	07:08				08:01	09:53 (BG 02)
	21:36	20	20:53 (L-02)	20:57	19:50	18:37	16:29				15:49	10:22 (BG 02)
5	04:44		20:33 (L-02)	05:26	06:20	07:12	07:10				08:02	09:54 (BG 02)
	21:35	21	20:54 (L-02)	20:55	19:48	18:35	16:27				15:48	12:56 (BG 01)
6	04:44		20:34 (L-02)	05:28	06:21	07:14	07:12				08:04	09:53 (BG 02)
	21:35	20	20:54 (L-02)	20:53	19:45	18:32	16:25				15:48	12:59 (BG 01)
7	04:45		20:34 (L-02)	05:29	06:23	07:16	07:14				08:05	09:54 (BG 02)
	21:34	20	20:54 (L-02)	20:52	19:43	18:30	16:23				15:47	13:01 (BG 01)
8	04:46		20:35 (L-02)	05:31	06:25	07:18	07:16				08:06	09:54 (BG 02)
	21:33	18	20:53 (L-02)	20:50	19:40	18:27	16:21				15:47	13:02 (BG 01)
9	04:47		20:36 (L-02)	05:33	06:27	07:19	07:18				08:08	09:54 (BG 02)
	21:33	17	20:53 (L-02)	20:48	19:38	18:25	16:20				15:47	13:03 (BG 01)
10	04:48		20:36 (L-02)	05:35	06:28	07:21	07:20				08:09	09:55 (BG 02)
	21:32	17	20:53 (L-02)	20:46	19:35	18:23	16:18				15:46	13:05 (BG 01)
11	04:50		20:37 (L-02)	05:36	06:30	07:23	07:21				08:10	09:55 (BG 02)
	21:31	15	20:52 (L-02)	20:44	19:33	18:20	16:16				15:46	13:06 (BG 01)
12	04:51		20:38 (L-02)	05:38	06:32	07:25	07:23				08:11	09:55 (BG 02)
	21:30	13	20:51 (L-02)	20:42	19:31	18:18	16:15				15:46	13:07 (BG 01)
13	04:52		20:39 (L-02)	05:40	06:34	07:27	07:25				08:12	09:55 (BG 02)
	21:29	11	20:50 (L-02)	20:40	19:28	18:16	16:13				15:46	13:08 (BG 01)
14	04:53		20:40 (L-02)	05:41	06:35	07:29	07:27				08:13	09:55 (BG 02)
	21:28	9	20:49 (L-02)	20:37	19:26	18:13	16:11				15:46	13:09 (BG 01)
15	04:54		20:43 (L-02)	05:43	06:37	07:30	07:29				08:14	09:56 (BG 02)
	21:27	4	20:47 (L-02)	20:35	19:23	18:11	16:10				15:46	13:09 (BG 01)
16	04:56			05:45	06:39	07:32	07:31				08:15	09:56 (BG 02)
	21:26			20:33	19:21	18:09	16:08				15:46	13:10 (BG 01)
17	04:57			05:47	06:41	07:34	07:33				08:16	09:57 (BG 02)
	21:25			20:31	19:18	18:07	16:07				15:46	13:11 (BG 01)
18	04:58			05:48	06:42	07:36	07:34				08:16	09:56 (BG 02)
	21:24			20:29	19:16	18:04	16:05				15:46	13:11 (BG 01)
19	05:00			05:50	06:44	07:38	07:36				08:17	09:57 (BG 02)
	21:22			20:27	19:13	18:02	16:04				15:47	13:12 (BG 01)
20	05:01			05:52	06:46	07:40	07:38				08:18	09:58 (BG 02)
	21:21			20:25	19:11	18:00	16:03				15:47	13:13 (BG 01)
21	05:02			05:54	06:48	07:42	07:40				08:18	09:58 (BG 02)
	21:20			20:22	19:09	17:58	16:01				15:47	13:13 (BG 01)
22	05:04			05:55	06:49	07:43	07:42				08:19	09:59 (BG 02)
	21:18			20:20	19:06	17:55	16:00				15:48	13:14 (BG 01)
23	05:05			05:57	06:51	07:45	07:43				08:19	09:59 (BG 02)
	21:17			20:18	19:04	17:53	15:59				15:48	13:14 (BG 01)
24	05:07			05:59	06:53	07:47	07:45				08:20	10:00 (BG 02)
	21:16			20:16	19:01	17:51	15:58				15:49	13:15 (BG 01)
25	05:08			06:01	06:55	06:49	07:47			10:00 (BG 02)	08:20	10:00 (BG 02)
	21:14			20:13	18:59	16:49	15:57	10	10:10 (BG 02)	15:50	62	13:15 (BG 01)
26	05:10			06:02	06:56	06:51	07:48		09:58 (BG 02)	08:21		10:01 (BG 02)
	21:13			20:11	18:56	16:47	15:56	15	10:13 (BG 02)	15:50	60	13:15 (BG 01)
27	05:11			06:04	06:58	06:53	07:50		09:57 (BG 02)	08:21		10:01 (BG 02)
	21:11			20:09	18:54	16:45	15:55	18	10:15 (BG 02)	15:51	61	13:15 (BG 01)
28	05:13			06:06	07:00	06:55	07:52		09:56 (BG 02)	08:21		10:01 (BG 02)
	21:09			20:06	18:52	16:43	15:54	21	10:17 (BG 02)	15:52	60	13:15 (BG 01)
29	05:15			06:08	07:02	06:57	07:53		09:55 (BG 02)	08:21		10:02 (BG 02)
	21:08			20:04	18:49	16:41	15:53	22	10:17 (BG 02)	15:53	58	13:15 (BG 01)
30	05:16			06:09	07:03	06:59	07:55		09:54 (BG 02)	08:21		10:03 (BG 02)
	21:06			20:02	18:47	16:39	15:52	25	10:19 (BG 02)	15:54	58	13:16 (BG 01)
31	05:18			06:11		07:00				08:21		10:03 (BG 02)
	21:04			19:59		16:37				15:55	57	13:16 (BG 01)
Sonnenscheinstunden	510			458	382	329	261	111		236		1644
astr.max.mögl.Beschattung		250										

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) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: E - Karlstein 13, Uckerland

Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni		
1	08:21 15:56 62	10:45 (BG 02) 14:03 (BG 01)	07:52 16:47	06:55 17:41	06:41 19:39	05:33 20:33	04:44 21:22 21	20:17 (L-02) 20:38 (L-02)
2	08:21 15:57 60	10:46 (BG 02) 14:03 (BG 01)	07:50 16:49	06:53 17:43	06:39 19:41	05:31 20:35	04:43 21:24 21	20:18 (L-02) 20:39 (L-02)
3	08:21 15:58 59	10:47 (BG 02) 14:03 (BG 01)	07:48 16:50	06:51 17:45	06:36 19:43	05:29 20:37	04:42 21:25 21	20:18 (L-02) 20:39 (L-02)
4	08:21 16:00 57	10:48 (BG 02) 14:04 (BG 01)	07:47 16:52	06:48 17:47	06:34 19:44	05:27 20:39	04:42 21:26 22	20:17 (L-02) 20:39 (L-02)
5	08:20 16:01 54	10:49 (BG 02) 14:03 (BG 01)	07:45 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 21:27 22	20:18 (L-02) 20:40 (L-02)
6	08:20 16:02 54	10:49 (BG 02) 14:03 (BG 01)	07:43 16:56	06:44 17:51	06:29 19:48	05:23 20:42	04:40 21:28 21	20:18 (L-02) 20:39 (L-02)
7	08:19 16:03 51	10:51 (BG 02) 14:04 (BG 01)	07:41 16:58	06:41 17:53	06:27 19:50	05:21 20:44	04:39 21:29 21	20:19 (L-02) 20:40 (L-02)
8	08:19 16:05 48	10:52 (BG 02) 14:03 (BG 01)	07:39 17:00	06:39 17:55	06:24 19:52	05:19 20:46	04:39 21:30 21	20:19 (L-02) 20:40 (L-02)
9	08:18 16:06 44	10:54 (BG 02) 14:03 (BG 01)	07:37 17:02	06:36 17:57	06:22 19:53	05:17 20:47	04:38 21:31 21	20:19 (L-02) 20:40 (L-02)
10	08:18 16:08 41	10:56 (BG 02) 14:04 (BG 01)	07:36 17:04	06:34 17:58	06:20 19:55	05:15 20:49	04:38 21:32 21	20:19 (L-02) 20:40 (L-02)
11	08:17 16:09 34	10:59 (BG 02) 14:03 (BG 01)	07:34 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:37 21:32 20	20:20 (L-02) 20:40 (L-02)
12	08:16 16:11 22	13:40 (BG 01) 14:02 (BG 01)	07:32 17:08	06:29 18:02	06:15 19:59	05:12 20:53	04:37 21:33 20	20:20 (L-02) 20:40 (L-02)
13	08:16 16:12 20	13:42 (BG 01) 14:02 (BG 01)	07:30 17:10	06:27 18:04	06:12 20:01	05:10 20:54	04:37 21:34 20	20:20 (L-02) 20:40 (L-02)
14	08:15 16:14 17	13:44 (BG 01) 14:01 (BG 01)	07:28 17:12	06:25 18:06	06:10 20:03	05:08 20:56	04:36 21:34 20	20:20 (L-02) 20:40 (L-02)
15	08:14 16:15 14	13:46 (BG 01) 14:00 (BG 01)	07:26 17:14	06:22 18:08	06:08 20:04	05:07 20:58	04:36 21:35 19	20:21 (L-02) 20:40 (L-02)
16	08:13 16:17 8	13:48 (BG 01) 13:56 (BG 01)	07:24 17:16	06:20 18:10	06:06 20:06	05:05 20:59	04:36 21:36 19	20:21 (L-02) 20:40 (L-02)
17	08:12 16:19		07:21 17:18	06:17 18:11	06:03 20:08	05:03 21:01	04:36 21:36 20	20:21 (L-02) 20:41 (L-02)
18	08:11 16:21		07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 21:37 19	20:22 (L-02) 20:41 (L-02)
19	08:10 16:22		07:17 17:22	06:13 18:15	05:59 20:12	05:00 21:04	04:36 20:24 (L-02) 21:37 19	20:22 (L-02) 20:41 (L-02)
20	08:09 16:24		07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:06	4 20:22 (L-02) 04:36 19	20:22 (L-02) 20:41 (L-02)
21	08:08 16:26		07:13 17:26	06:08 18:19	05:54 20:15	04:57 21:07	9 20:31 (L-02) 04:36 19	20:21 (L-02) 20:42 (L-02)
22	08:06 16:28		07:11 17:28	06:05 18:21	05:52 20:17	04:56 21:09	12 20:33 (L-02) 21:38 19	20:23 (L-02) 20:42 (L-02)
23	08:05 16:29		07:09 17:30	06:03 18:22	05:50 20:19	04:55 21:10	15 20:34 (L-02) 21:38 19	20:23 (L-02) 20:42 (L-02)
24	08:04 16:31		07:06 17:32	06:00 18:24	05:48 20:21	04:53 21:12	16 20:35 (L-02) 21:38 19	20:23 (L-02) 20:42 (L-02)
25	08:02 16:33		07:04 17:34	05:58 18:26	05:45 20:23	04:52 21:13	18 20:36 (L-02) 21:38 20	20:23 (L-02) 20:43 (L-02)
26	08:01 16:35		07:02 17:36	05:56 18:28	05:43 20:24	04:51 21:15	18 20:36 (L-02) 21:38 19	20:23 (L-02) 20:42 (L-02)
27	07:59 16:37		07:00 17:38	05:53 18:30	05:41 20:26	04:49 21:16	19 20:37 (L-02) 21:38 19	20:24 (L-02) 20:43 (L-02)
28	07:58 16:39		06:57 17:39	05:51 18:32	05:39 20:28	04:48 21:17	20 20:37 (L-02) 21:38 20	20:23 (L-02) 20:43 (L-02)
29	07:56 16:41			06:48 19:33	05:37 20:30	04:47 21:19	21 20:38 (L-02) 21:38 20	20:24 (L-02) 20:44 (L-02)
30	07:55 16:43			06:46 19:35	05:35 20:32	04:46 21:20	21 20:38 (L-02) 21:37 20	20:23 (L-02) 20:43 (L-02)
31	07:53 16:45			06:43 19:37		04:45 21:21	21 20:38 (L-02) 21:37 20	
Sonnenscheinstunden	252		274	367	419	492	508	
astr.max.mögl.Beschattung	645					215	601	

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) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: E - Karlstein 13, Uckerland
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli		August		September		Oktober		November		Dezember	
1	04:40		20:24 (L-02)	05:19	06:13	07:05	07:02				07:56	10:41 (BG 02)
	21:37	20	20:44 (L-02)	21:03	19:57	18:44	16:35				15:51	34 13:45 (BG 01)
2	04:41		20:24 (L-02)	05:21	06:15	07:07	07:04				07:58	10:39 (BG 02)
	21:37	21	20:45 (L-02)	21:01	19:55	18:42	16:33				15:50	40 13:46 (BG 01)
3	04:42		20:24 (L-02)	05:23	06:16	07:09	07:06				07:59	10:38 (BG 02)
	21:36	20	20:44 (L-02)	20:59	19:52	18:39	16:31				15:50	44 13:47 (BG 01)
4	04:43		20:24 (L-02)	05:24	06:18	07:10	07:08				08:01	10:37 (BG 02)
	21:36	21	20:45 (L-02)	20:57	19:50	18:37	16:29				15:49	46 13:47 (BG 01)
5	04:44		20:24 (L-02)	05:26	06:20	07:12	07:10				08:02	10:36 (BG 02)
	21:35	21	20:45 (L-02)	20:55	19:48	18:35	16:27				15:48	51 13:49 (BG 01)
6	04:44		20:24 (L-02)	05:28	06:21	07:14	07:12				08:04	10:36 (BG 02)
	21:35	22	20:46 (L-02)	20:53	19:45	18:32	16:25				15:48	53 13:49 (BG 01)
7	04:45		20:25 (L-02)	05:29	06:23	07:16	07:14				08:05	10:36 (BG 02)
	21:34	21	20:46 (L-02)	20:52	19:43	18:30	16:23				15:47	55 13:51 (BG 01)
8	04:46		20:25 (L-02)	05:31	06:25	07:18	07:16				08:06	10:35 (BG 02)
	21:33	21	20:46 (L-02)	20:50	19:40	18:27	16:21				15:47	57 13:51 (BG 01)
9	04:47		20:25 (L-02)	05:33	06:27	07:19	07:18				08:08	10:35 (BG 02)
	21:33	22	20:47 (L-02)	20:48	19:38	18:25	16:20				15:47	58 13:51 (BG 01)
10	04:48		20:25 (L-02)	05:35	06:28	07:21	07:20				08:09	10:36 (BG 02)
	21:32	22	20:47 (L-02)	20:46	19:35	18:23	16:18				15:46	60 13:53 (BG 01)
11	04:50		20:25 (L-02)	05:36	06:30	07:23	07:21				08:10	10:36 (BG 02)
	21:31	22	20:47 (L-02)	20:44	19:33	18:20	16:16				15:46	61 13:53 (BG 01)
12	04:51		20:25 (L-02)	05:38	06:32	07:25	07:23				08:11	10:36 (BG 02)
	21:30	22	20:47 (L-02)	20:42	19:31	18:18	16:15				15:46	62 13:54 (BG 01)
13	04:52		20:25 (L-02)	05:40	06:34	07:27	07:25				08:12	10:36 (BG 02)
	21:29	22	20:47 (L-02)	20:40	19:28	18:16	16:13				15:46	62 13:54 (BG 01)
14	04:53		20:26 (L-02)	05:41	06:35	07:29	07:27				08:13	10:36 (BG 02)
	21:28	21	20:47 (L-02)	20:37	19:26	18:13	16:11				15:46	64 13:55 (BG 01)
15	04:54		20:26 (L-02)	05:43	06:37	07:30	07:29				08:14	10:36 (BG 02)
	21:27	20	20:46 (L-02)	20:35	19:23	18:11	16:10				15:46	65 13:55 (BG 01)
16	04:56		20:26 (L-02)	05:45	06:39	07:32	07:31				08:15	10:37 (BG 02)
	21:26	20	20:46 (L-02)	20:33	19:21	18:09	16:08				15:46	65 13:56 (BG 01)
17	04:57		20:27 (L-02)	05:47	06:41	07:34	07:33				08:16	10:37 (BG 02)
	21:25	20	20:47 (L-02)	20:31	19:18	18:07	16:07				15:46	66 13:57 (BG 01)
18	04:58		20:27 (L-02)	05:48	06:42	07:36	07:34				08:16	10:37 (BG 02)
	21:24	19	20:46 (L-02)	20:29	19:16	18:04	16:05				15:46	66 13:57 (BG 01)
19	05:00		20:27 (L-02)	05:50	06:44	07:38	07:36				08:17	10:37 (BG 02)
	21:22	19	20:46 (L-02)	20:27	19:13	18:02	16:04				15:47	66 13:57 (BG 01)
20	05:01		20:29 (L-02)	05:52	06:46	07:40	07:38				08:18	10:38 (BG 02)
	21:21	17	20:46 (L-02)	20:25	19:11	18:00	16:03				15:47	66 13:58 (BG 01)
21	05:02		20:29 (L-02)	05:54	06:48	07:42	07:40				08:18	10:38 (BG 02)
	21:20	16	20:45 (L-02)	20:22	19:09	17:58	16:01				15:47	66 13:58 (BG 01)
22	05:04		20:30 (L-02)	05:55	06:49	07:43	07:42				08:19	10:39 (BG 02)
	21:18	14	20:44 (L-02)	20:20	19:06	17:55	16:00				15:48	67 13:59 (BG 01)
23	05:05		20:32 (L-02)	05:57	06:51	07:45	07:43				08:19	10:39 (BG 02)
	21:17	11	20:43 (L-02)	20:18	19:04	17:53	15:59				15:48	66 13:59 (BG 01)
24	05:07		20:33 (L-02)	05:59	06:53	07:47	07:45				08:20	10:40 (BG 02)
	21:16	8	20:41 (L-02)	20:16	19:01	17:51	15:58				15:49	66 14:00 (BG 01)
25	05:08			06:01	06:55	06:49	07:47				08:20	10:40 (BG 02)
	21:14			20:13	18:59	16:49	15:57				15:50	67 14:01 (BG 01)
26	05:10			06:02	06:56	06:51	07:48			13:27 (BG 01)	08:21	10:41 (BG 02)
	21:12			20:11	18:56	16:47	15:56		8	13:35 (BG 01)	15:50	66 14:01 (BG 01)
27	05:11			06:04	06:58	06:53	07:50			13:25 (BG 01)	08:21	10:41 (BG 02)
	21:11			20:09	18:54	16:45	15:55		14	13:39 (BG 01)	15:51	65 14:01 (BG 01)
28	05:13			06:06	07:00	06:55	07:52			13:24 (BG 01)	08:21	10:42 (BG 02)
	21:09			20:06	18:51	16:43	15:54		17	13:41 (BG 01)	15:52	65 14:01 (BG 01)
29	05:15			06:08	07:02	06:57	07:53			13:22 (BG 01)	08:21	10:43 (BG 02)
	21:08			20:04	18:49	16:41	15:53		20	13:42 (BG 01)	15:53	64 14:02 (BG 01)
30	05:16			06:09	07:03	06:59	07:55			13:21 (BG 01)	08:21	10:43 (BG 02)
	21:06			20:02	18:47	16:39	15:52		22	13:43 (BG 01)	15:54	64 14:02 (BG 01)
31	05:18			06:11		07:00					08:21	10:44 (BG 02)
	21:04			19:59		16:37					15:55	64 14:03 (BG 01)
Sonnenscheinstunden	510			458	382	329	261				236	
astr.max.mögl.Beschattung		462					81				1861	

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: F - Bandelow 17E, Uckerland

Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	09:24 (BG 18) 07:52 15:04 (BG 15) 16:47	15:25 (BG 12) 06:55 15:57 (BG 14) 17:41	16:26 (BG 08) 06:41 16:59 (BG 08) 19:39	18:43 (BG 05) 05:33 19:05 (BG 05) 20:33	19:37 (BG 02) 04:44 19:59 (BG 02) 21:22
2	08:21 15:57	09:25 (BG 18) 07:50 15:05 (BG 15) 16:48	15:25 (BG 12) 06:53 15:56 (BG 14) 17:43	16:26 (BG 08) 06:39 16:59 (BG 08) 19:41	18:42 (BG 05) 05:31 19:07 (BG 05) 20:35	19:36 (BG 02) 04:43 20:00 (BG 02) 21:23
3	08:21 15:58	09:26 (BG 18) 07:48 15:06 (BG 15) 16:50	15:25 (BG 12) 06:50 15:55 (BG 12) 17:45	16:26 (BG 08) 06:36 17:00 (BG 08) 19:42	18:39 (BG 05) 05:29 19:07 (BG 05) 20:37	19:35 (BG 02) 04:42 20:01 (BG 02) 21:25
4	08:20 16:00	09:26 (BG 18) 07:46 15:06 (BG 15) 16:52	15:25 (BG 12) 06:48 15:55 (BG 12) 17:47	16:25 (BG 08) 06:34 16:59 (BG 08) 19:44	18:38 (BG 05) 05:27 19:08 (BG 05) 20:39	19:34 (BG 02) 04:42 20:02 (BG 02) 21:26
5	08:20 16:01	09:27 (BG 18) 07:45 15:07 (BG 15) 16:54	15:27 (BG 12) 06:46 15:56 (BG 12) 17:49	16:25 (BG 08) 06:31 16:59 (BG 08) 19:46	18:38 (BG 05) 05:25 19:20 (BG 03) 20:40	19:34 (BG 02) 04:41 20:03 (BG 02) 21:27
6	08:20 16:02	09:27 (BG 18) 07:43 15:07 (BG 15) 16:56	15:28 (BG 12) 06:43 15:55 (BG 12) 17:51	16:25 (BG 08) 06:29 17:24 (BG 06) 19:48	18:36 (BG 05) 05:23 19:21 (BG 03) 20:42	19:33 (BG 02) 04:40 20:03 (BG 02) 21:28
7	08:19 16:03	09:29 (BG 18) 07:41 15:08 (BG 15) 16:58	15:28 (BG 12) 06:41 15:55 (BG 12) 17:53	16:26 (BG 08) 06:27 17:24 (BG 06) 19:50	18:36 (BG 05) 05:21 19:23 (BG 03) 20:44	19:32 (BG 02) 04:39 20:03 (BG 02) 21:29
8	08:19 16:05	09:29 (BG 18) 07:39 15:08 (BG 15) 17:00	15:29 (BG 12) 06:39 15:54 (BG 12) 17:55	16:26 (BG 08) 06:24 17:29 (BG 06) 19:52	18:35 (BG 05) 05:19 19:25 (BG 03) 20:46	19:32 (BG 02) 04:39 20:03 (BG 02) 21:30
9	08:18 16:06	09:30 (BG 18) 07:37 15:08 (BG 15) 17:02	15:30 (BG 12) 06:36 16:33 (BG 09) 17:57	16:26 (BG 08) 06:22 17:30 (BG 06) 19:53	18:34 (BG 05) 05:17 19:25 (BG 03) 20:47	19:32 (BG 02) 04:38 20:04 (BG 02) 21:31
10	08:18 16:08	09:31 (BG 18) 07:35 15:08 (BG 15) 17:04	15:32 (BG 12) 06:34 16:35 (BG 09) 17:58	16:28 (BG 08) 06:19 17:32 (BG 06) 19:55	18:34 (BG 05) 05:15 19:26 (BG 03) 20:49	19:32 (BG 02) 04:38 20:04 (BG 02) 21:31
11	08:17 16:09	09:32 (BG 18) 07:33 15:09 (BG 15) 17:06	15:33 (BG 12) 06:32 16:36 (BG 09) 18:00	16:28 (BG 08) 06:17 17:33 (BG 06) 19:57	18:34 (BG 05) 05:14 19:26 (BG 03) 20:51	19:31 (BG 02) 04:37 20:03 (BG 02) 21:32
12	08:16 16:11	09:34 (BG 18) 07:32 15:09 (BG 15) 17:08	15:36 (BG 12) 06:29 16:38 (BG 09) 18:02	16:30 (BG 08) 06:15 17:33 (BG 06) 19:59	18:34 (BG 05) 05:12 19:26 (BG 03) 20:52	19:32 (BG 02) 04:37 20:04 (BG 02) 21:33
13	08:15 16:12	09:35 (BG 18) 07:30 15:09 (BG 15) 17:10	16:18 (BG 09) 06:27 16:39 (BG 09) 18:04	16:32 (BG 08) 06:12 17:33 (BG 06) 20:01	18:34 (BG 05) 05:10 19:26 (BG 03) 20:54	19:32 (BG 02) 04:37 20:03 (BG 02) 21:34
14	08:15 16:14	09:37 (BG 18) 07:28 15:09 (BG 15) 17:12	16:17 (BG 09) 06:24 16:40 (BG 09) 18:06	16:36 (BG 08) 06:10 17:33 (BG 06) 20:02	18:35 (BG 05) 05:08 19:26 (BG 03) 20:56	19:31 (BG 02) 04:36 20:03 (BG 02) 21:34
15	08:14 16:15	09:38 (BG 18) 07:25 15:08 (BG 15) 17:14	16:17 (BG 09) 06:22 16:41 (BG 09) 18:08	17:09 (BG 06) 06:08 17:33 (BG 06) 20:04	18:35 (BG 05) 05:07 19:25 (BG 03) 20:57	19:32 (BG 02) 04:36 20:03 (BG 02) 21:35
16	08:13 16:17	14:17 (BG 13) 07:23 15:42 (BG 14) 17:16	16:16 (BG 09) 06:20 16:41 (BG 09) 18:10	17:08 (BG 06) 06:05 17:32 (BG 06) 20:06	18:35 (BG 05) 05:05 19:24 (BG 03) 20:59	19:32 (BG 02) 04:36 20:02 (BG 02) 21:35
17	08:12 16:19	14:19 (BG 13) 07:21 15:44 (BG 14) 17:18	16:16 (BG 09) 06:17 16:42 (BG 09) 18:11	17:09 (BG 06) 06:03 17:31 (BG 06) 20:08	18:36 (BG 05) 05:03 19:23 (BG 03) 21:01	19:33 (BG 02) 04:36 20:02 (BG 02) 21:36
18	08:11 16:21	14:20 (BG 13) 07:19 15:46 (BG 14) 17:20	16:15 (BG 09) 06:15 16:41 (BG 09) 18:13	17:09 (BG 06) 06:01 17:29 (BG 06) 20:10	18:37 (BG 05) 05:02 19:22 (BG 03) 21:02	19:34 (BG 02) 04:36 20:02 (BG 02) 21:36
19	08:10 16:22	14:21 (BG 13) 07:17 15:49 (BG 14) 17:22	16:16 (BG 09) 06:12 16:41 (BG 09) 18:15	17:10 (BG 06) 05:59 17:28 (BG 06) 20:12	18:39 (BG 05) 05:00 19:21 (BG 03) 21:04	19:34 (BG 02) 04:36 20:01 (BG 02) 21:37
20	08:09 16:24	14:22 (BG 13) 07:15 15:50 (BG 14) 17:24	16:16 (BG 09) 06:10 16:41 (BG 09) 18:17	17:12 (BG 06) 05:56 17:50 (BG 04) 20:13	18:41 (BG 05) 04:59 19:19 (BG 03) 21:05	19:35 (BG 02) 04:36 20:01 (BG 02) 21:37
21	08:07 16:26	14:24 (BG 13) 07:13 15:52 (BG 14) 17:26	16:17 (BG 09) 06:08 16:49 (BG 08) 18:19	17:15 (BG 06) 05:54 17:53 (BG 04) 20:15	18:43 (BG 05) 04:57 19:15 (BG 03) 21:07	19:36 (BG 02) 04:36 20:01 (BG 02) 21:37
22	08:06 16:28	14:25 (BG 13) 07:11 15:54 (BG 14) 17:28	16:17 (BG 09) 06:05 16:52 (BG 08) 18:21	17:44 (BG 04) 05:52 17:55 (BG 04) 20:17	19:15 (BG 03) 21:07 19:23 (BG 03) 21:09	19:36 (BG 02) 04:36 19:59 (BG 02) 21:38
23	08:05 16:29	14:27 (BG 13) 07:08 15:56 (BG 14) 17:30	16:18 (BG 09) 06:03 16:54 (BG 08) 18:22	17:42 (BG 04) 05:50 17:56 (BG 04) 20:19	19:23 (BG 03) 21:09 19:30 (BG 03) 21:10	19:37 (BG 02) 04:37 19:59 (BG 02) 21:38
24	08:04 16:31	14:30 (BG 13) 07:06 15:56 (BG 14) 17:32	16:19 (BG 09) 06:00 16:56 (BG 08) 18:24	17:42 (BG 04) 05:48 17:58 (BG 04) 20:21	19:30 (BG 03) 21:09 19:41 (BG 02) 21:12	19:38 (BG 02) 04:37 19:58 (BG 02) 21:38
25	08:02 16:33	15:26 (BG 12) 07:04 15:57 (BG 14) 17:34	16:21 (BG 09) 05:58 16:57 (BG 08) 18:26	17:41 (BG 04) 05:45 18:00 (BG 04) 20:22	19:30 (BG 03) 21:09 19:41 (BG 02) 21:13	19:39 (BG 02) 04:37 19:57 (BG 02) 21:38
26	08:01 16:35	15:25 (BG 12) 07:02 15:57 (BG 14) 17:36	16:24 (BG 09) 05:55 16:57 (BG 08) 18:28	17:41 (BG 04) 05:43 18:01 (BG 04) 20:24	19:30 (BG 03) 21:09 19:41 (BG 02) 21:14	19:41 (BG 02) 04:38 19:56 (BG 02) 21:38
27	07:59 16:37	15:25 (BG 12) 07:00 15:58 (BG 14) 17:38	16:28 (BG 08) 05:53 16:58 (BG 08) 18:30	17:40 (BG 04) 05:41 18:00 (BG 04) 20:26	19:30 (BG 03) 21:09 19:41 (BG 02) 21:16	19:42 (BG 02) 04:38 19:55 (BG 02) 21:38
28	07:58 16:39	15:25 (BG 12) 06:57 15:58 (BG 14) 17:39	16:27 (BG 08) 05:51 16:59 (BG 08) 18:32	17:41 (BG 04) 05:39 18:00 (BG 04) 20:28	19:45 (BG 02) 04:48 19:53 (BG 02) 21:17	19:45 (BG 02) 04:39 19:53 (BG 02) 21:38
29	07:56 16:41	15:24 (BG 12) 06:55 15:58 (BG 14) 17:40	16:28 (BG 08) 05:49 16:59 (BG 08) 18:34	18:41 (BG 04) 05:37 18:58 (BG 04) 20:30	19:41 (BG 02) 04:47 19:56 (BG 02) 21:18	04:39 21:37
30	07:55 16:43	15:25 (BG 12) 06:53 15:58 (BG 14) 17:41	16:29 (BG 08) 05:47 16:59 (BG 08) 18:36	18:42 (BG 04) 05:35 19:00 (BG 05) 20:31	19:39 (BG 02) 04:46 19:58 (BG 02) 21:20	04:40 21:37
31	07:53 16:45	15:25 (BG 12) 06:51 15:58 (BG 14) 17:42	16:30 (BG 08) 05:45 16:59 (BG 08) 18:38	18:44 (BG 04) 05:33 19:04 (BG 05) 20:33	19:40 (BG 02) 04:45 19:58 (BG 02) 21:21	04:45 21:38
Sonnenscheinstunden		252	274	367	419	492
astr.max.mögl.Beschattung		1829	823	869	921	727

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: F - Bandelow 17E, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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

	Jul	August	September	Oktober	November	Dezember	
1	04:40	05:19	19:42 (BG 02) 06:13	18:33 (BG 05) 07:05	17:10 (BG 08) 07:02	15:00 (BG 12) 07:56	
2	21:37	21:02	20:14 (BG 02) 19:57	19:25 (BG 03) 18:44	18:12 (BG 06) 16:35	16:03 (BG 09) 15:51	
3	04:41	05:21	19:42 (BG 02) 06:14	18:32 (BG 05) 07:07	17:08 (BG 08) 07:04	14:59 (BG 12) 07:58	
4	21:37	21:01	20:14 (BG 02) 19:55	19:24 (BG 03) 18:42	18:12 (BG 06) 16:33	16:01 (BG 09) 15:50	
5	04:42	05:23	19:42 (BG 02) 06:16	18:32 (BG 05) 07:09	17:06 (BG 08) 07:06	14:59 (BG 12) 07:59	
6	21:36	20:59	20:14 (BG 02) 19:52	19:23 (BG 03) 18:39	18:11 (BG 06) 16:31	15:24 (BG 12) 15:50	
7	04:43	05:24	19:42 (BG 02) 06:18	18:32 (BG 05) 07:10	17:05 (BG 08) 07:08	14:58 (BG 12) 08:01	
8	21:36	20:57	20:13 (BG 02) 19:50	19:22 (BG 03) 18:37	18:09 (BG 06) 16:29	15:24 (BG 12) 15:49	
9	04:44	05:26	19:42 (BG 02) 06:20	18:32 (BG 05) 07:12	17:03 (BG 08) 07:10	14:57 (BG 12) 08:02	
10	21:35	20:55	20:13 (BG 02) 19:47	19:19 (BG 03) 18:35	18:06 (BG 06) 16:27	15:25 (BG 12) 15:48	
11	04:44	05:28	19:42 (BG 02) 06:21	18:32 (BG 05) 07:14	17:02 (BG 08) 07:12	14:57 (BG 12) 08:04	
12	21:35	20:53	20:12 (BG 02) 19:45	19:17 (BG 03) 18:32	18:03 (BG 06) 16:25	15:26 (BG 12) 15:48	
13	04:45	05:29	19:43 (BG 02) 06:23	18:33 (BG 05) 07:16	17:01 (BG 08) 07:14	14:56 (BG 12) 08:05	
14	21:34	20:51	20:12 (BG 02) 19:43	19:15 (BG 03) 18:30	18:01 (BG 06) 16:23	15:26 (BG 12) 15:47	
15	04:46	05:31	19:44 (BG 02) 06:25	18:32 (BG 05) 07:18	17:01 (BG 08) 07:16	14:56 (BG 12) 08:06	
16	21:33	20:49	20:12 (BG 02) 19:40	19:02 (BG 05) 18:27	17:34 (BG 08) 16:21	15:26 (BG 12) 15:47	
17	04:47	05:33	19:43 (BG 02) 06:27	18:33 (BG 05) 07:19	17:00 (BG 08) 07:18	14:56 (BG 12) 08:07	
18	21:32	20:47	20:11 (BG 02) 19:38	19:01 (BG 05) 18:25	17:34 (BG 08) 16:20	15:27 (BG 14) 15:47	
19	04:48	05:35	19:45 (BG 02) 06:28	18:35 (BG 05) 07:21	17:00 (BG 08) 07:19	14:56 (BG 12) 08:09	
20	21:32	20:46	20:10 (BG 02) 19:35	19:00 (BG 05) 18:23	17:34 (BG 08) 16:18	15:28 (BG 14) 15:46	
21	04:50	05:36	19:45 (BG 02) 06:30	18:36 (BG 05) 07:23	17:00 (BG 08) 07:21	14:56 (BG 12) 08:10	
22	21:31	20:43	20:09 (BG 02) 19:33	18:58 (BG 05) 18:20	17:34 (BG 08) 16:16	15:29 (BG 14) 15:46	
23	04:51	05:38	19:46 (BG 02) 06:32	18:36 (BG 05) 07:25	16:59 (BG 08) 07:23	14:56 (BG 12) 08:11	
24	21:30	20:41	20:08 (BG 02) 19:30	18:55 (BG 05) 18:18	17:32 (BG 08) 16:15	15:29 (BG 14) 15:46	
25	04:52	05:40	19:48 (BG 02) 06:34	18:34 (BG 04) 07:27	16:59 (BG 08) 07:25	14:56 (BG 12) 08:12	
26	21:29	20:39	20:06 (BG 02) 19:28	18:52 (BG 05) 18:16	17:32 (BG 08) 16:13	15:30 (BG 14) 15:46	
27	04:53	05:41	19:50 (BG 02) 06:35	18:32 (BG 04) 07:28	16:59 (BG 08) 07:27	14:57 (BG 12) 08:13	
28	21:28	20:37	20:03 (BG 02) 19:26	18:49 (BG 04) 18:13	17:31 (BG 08) 16:11	15:30 (BG 14) 15:46	
29	04:54	19:55 (BG 02) 05:43	19:54 (BG 02) 06:37	18:30 (BG 04) 07:30	17:00 (BG 08) 07:29	14:57 (BG 12) 08:14	
30	21:27	20:35	19:59 (BG 02) 19:23	18:49 (BG 04) 18:11	17:30 (BG 08) 16:10	15:30 (BG 14) 15:46	
31	04:56	19:52 (BG 02) 05:45	06:39	18:30 (BG 04) 07:32	16:55 (BG 09) 07:31	14:58 (BG 12) 08:15	
32	21:26	20:33	19:21	18:49 (BG 04) 18:09	17:29 (BG 08) 16:08	15:30 (BG 14) 15:46	
33	04:57	19:51 (BG 02) 05:47	06:40	18:29 (BG 04) 07:34	16:52 (BG 09) 07:32	14:59 (BG 12) 08:15	
34	21:25	20:05 (BG 02) 05:48	19:18	18:50 (BG 04) 18:06	17:28 (BG 08) 16:07	15:30 (BG 14) 15:46	
35	04:58	19:50 (BG 02) 05:48	06:42	18:28 (BG 04) 07:36	16:50 (BG 09) 07:34	14:04 (BG 13) 08:16	
36	21:23	20:06 (BG 02) 05:50	19:16	18:48 (BG 04) 18:04	17:26 (BG 08) 16:05	15:30 (BG 14) 15:46	
37	05:00	19:48 (BG 02) 05:50	06:44	18:28 (BG 04) 07:38	16:49 (BG 09) 07:36	14:01 (BG 13) 08:17	
38	21:22	19:47 (BG 02) 05:52	19:13	18:45 (BG 04) 18:02	17:25 (BG 08) 16:04	15:30 (BG 14) 15:47	
39	05:01	19:47 (BG 02) 05:52	06:46	18:29 (BG 04) 07:40	16:48 (BG 09) 07:38	14:00 (BG 13) 08:18	
40	21:21	20:08 (BG 02) 05:54	19:11	18:43 (BG 04) 18:00	17:22 (BG 08) 16:03	15:29 (BG 14) 15:47	
41	05:02	19:47 (BG 02) 05:54	18:53 (BG 05) 06:47	18:29 (BG 04) 07:41	16:47 (BG 09) 07:40	13:59 (BG 13) 08:18	
42	21:20	20:10 (BG 02) 05:55	19:09	18:41 (BG 04) 17:58	17:18 (BG 08) 16:01	15:27 (BG 14) 15:47	
43	05:04	19:46 (BG 02) 05:55	06:49	18:01 (BG 06) 07:43	16:46 (BG 09) 07:41	13:58 (BG 13) 08:19	
44	21:18	20:10 (BG 02) 05:57	19:06	18:38 (BG 04) 17:55	17:11 (BG 09) 16:00	15:26 (BG 14) 15:48	
45	05:05	19:46 (BG 02) 05:57	06:51	17:57 (BG 06) 07:45	16:46 (BG 09) 07:43	13:57 (BG 13) 08:19	
46	21:17	20:11 (BG 02) 05:59	19:04	18:36 (BG 04) 17:53	17:12 (BG 09) 15:59	15:25 (BG 14) 15:48	
47	05:07	19:45 (BG 02) 05:59	06:53	17:55 (BG 06) 07:47	16:46 (BG 09) 07:45	13:57 (BG 13) 08:20	
48	21:15	20:12 (BG 02) 06:01	19:01	18:11 (BG 06) 17:51	17:11 (BG 09) 15:58	15:23 (BG 14) 15:49	
49	05:08	19:44 (BG 02) 06:01	06:54	17:52 (BG 06) 06:49	15:46 (BG 09) 07:47	13:57 (BG 13) 08:20	
50	21:14	20:12 (BG 02) 06:02	18:59	18:12 (BG 06) 16:49	16:11 (BG 09) 15:57	15:22 (BG 14) 15:50	
51	05:10	19:44 (BG 02) 06:02	06:56	17:51 (BG 06) 06:51	15:46 (BG 09) 07:48	13:57 (BG 13) 08:20	
52	21:12	20:13 (BG 02) 06:04	18:56	18:13 (BG 06) 16:47	16:11 (BG 09) 15:56	15:21 (BG 14) 15:50	
53	05:11	19:43 (BG 02) 06:04	06:58	17:50 (BG 06) 06:53	15:46 (BG 09) 07:50	09:18 (BG 18) 08:21	
54	21:11	20:13 (BG 02) 06:06	18:54	18:13 (BG 06) 16:45	16:10 (BG 09) 15:55	14:48 (BG 15) 15:51	
55	05:13	19:43 (BG 02) 06:06	07:00	17:49 (BG 06) 06:55	15:47 (BG 09) 07:52	09:16 (BG 18) 08:21	
56	21:09	20:14 (BG 02) 06:07	18:51	18:13 (BG 06) 16:43	16:10 (BG 09) 15:54	14:48 (BG 15) 15:52	
57	05:15	19:43 (BG 02) 06:07	07:01	17:49 (BG 06) 06:57	15:47 (BG 09) 07:53	09:15 (BG 18) 08:21	
58	21:08	20:13 (BG 02) 06:09	18:49	18:14 (BG 06) 16:41	16:09 (BG 09) 15:53	14:49 (BG 15) 15:53	
59	05:16	19:43 (BG 02) 06:09	07:03	17:13 (BG 08) 06:58	15:05 (BG 12) 07:55	09:15 (BG 18) 08:21	
60	21:06	20:14 (BG 02) 06:11	18:47	18:13 (BG 06) 16:39	16:08 (BG 09) 15:52	14:50 (BG 15) 15:54	
61	05:18	19:42 (BG 02) 06:11	07:03	17:00	15:02 (BG 12)	08:21	
62	21:04	20:14 (BG 02) 19:59	18:47	16:37	16:05 (BG 09)	15:55	
63	Sonnenscheinstunden	510	458	382	329	261	236
64	astr.max.mögl.Beschattung	396	824	816	1048	1253	2523

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 Schattenrezeptor: G - Bandelow 16A, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 15:56	09:28 (BG 18) 07:52	15:37 (BG 12) 06:55	16:33 (BG 09) 06:41	05:33	19:43 (BG 02) 04:44	
2	08:21 15:57	09:29 (BG 18) 07:50	15:36 (BG 12) 06:53	16:38 (BG 08) 06:39	18:54 (BG 05) 05:31	20:01 (BG 02) 21:22	
3	08:21 15:58	09:30 (BG 18) 07:48	15:36 (BG 12) 06:50	16:37 (BG 08) 06:36	19:08 (BG 05) 05:29	21:02 (BG 02) 21:23	
4	08:20 16:00	09:31 (BG 18) 07:45	15:37 (BG 12) 06:46	16:36 (BG 08) 06:34	19:10 (BG 05) 05:27	21:03 (BG 02) 21:25	
5	08:20 16:01	09:31 (BG 18) 07:43	15:37 (BG 12) 06:43	16:36 (BG 08) 06:31	19:12 (BG 05) 05:25	21:04 (BG 02) 21:26	
6	08:20 16:02	09:31 (BG 18) 07:41	15:37 (BG 12) 06:41	16:36 (BG 08) 06:29	19:13 (BG 05) 05:23	21:05 (BG 02) 21:27	
7	08:19 16:03	09:32 (BG 18) 07:39	15:37 (BG 12) 06:39	16:35 (BG 08) 06:27	19:14 (BG 05) 05:21	21:06 (BG 02) 21:28	
8	08:19 16:05	09:33 (BG 18) 07:37	15:38 (BG 12) 06:37	16:35 (BG 08) 06:24	19:15 (BG 05) 05:19	21:07 (BG 02) 21:29	
9	08:18 16:06	09:34 (BG 18) 07:35	15:38 (BG 12) 06:35	16:35 (BG 08) 06:22	19:16 (BG 05) 05:17	21:08 (BG 02) 21:30	
10	08:18 16:08	09:35 (BG 18) 07:33	15:39 (BG 12) 06:34	16:35 (BG 08) 06:19	19:17 (BG 05) 05:15	21:09 (BG 02) 21:31	
11	08:17 16:09	09:36 (BG 18) 07:31	15:39 (BG 12) 06:32	16:35 (BG 08) 06:17	19:18 (BG 05) 05:14	21:10 (BG 02) 21:32	
12	08:16 16:11	09:37 (BG 18) 07:29	15:40 (BG 12) 06:30	16:34 (BG 08) 06:15	19:19 (BG 05) 05:12	21:11 (BG 02) 21:33	
13	08:15 16:12	09:38 (BG 18) 07:27	15:41 (BG 12) 06:28	16:34 (BG 08) 06:13	19:20 (BG 05) 05:10	21:12 (BG 02) 21:34	
14	08:15 16:14	09:39 (BG 18) 07:25	15:42 (BG 12) 06:26	16:33 (BG 08) 06:11	19:21 (BG 05) 05:08	21:13 (BG 02) 21:35	
15	08:14 16:15	09:40 (BG 18) 07:23	15:43 (BG 12) 06:24	16:33 (BG 08) 06:09	19:22 (BG 05) 05:06	21:14 (BG 02) 21:36	
16	08:13 16:17	09:41 (BG 18) 07:21	15:44 (BG 12) 06:22	16:32 (BG 08) 06:07	19:23 (BG 05) 05:04	21:15 (BG 02) 21:37	
17	08:12 16:19	09:42 (BG 18) 07:19	15:45 (BG 12) 06:20	16:32 (BG 08) 06:05	19:24 (BG 05) 05:02	21:16 (BG 02) 21:38	
18	08:11 16:21	09:43 (BG 18) 07:17	15:46 (BG 12) 06:18	16:31 (BG 08) 06:03	19:25 (BG 05) 05:00	21:17 (BG 02) 21:39	
19	08:10 16:22	09:44 (BG 18) 07:15	15:47 (BG 12) 06:16	16:31 (BG 08) 06:01	19:26 (BG 05) 04:58	21:18 (BG 02) 21:40	
20	08:09 16:24	09:45 (BG 18) 07:13	15:48 (BG 12) 06:14	16:30 (BG 08) 05:59	19:27 (BG 05) 04:56	21:19 (BG 02) 21:41	
21	08:07 16:26	09:46 (BG 18) 07:11	15:49 (BG 12) 06:12	16:30 (BG 08) 05:57	19:28 (BG 05) 04:54	21:20 (BG 02) 21:42	
22	08:06 16:28	09:47 (BG 18) 07:09	15:50 (BG 12) 06:10	16:29 (BG 08) 05:55	19:29 (BG 05) 04:52	21:21 (BG 02) 21:43	
23	08:05 16:29	09:48 (BG 18) 07:07	15:51 (BG 12) 06:08	16:29 (BG 08) 05:53	19:30 (BG 05) 04:50	21:22 (BG 02) 21:44	
24	08:04 16:31	09:49 (BG 18) 07:05	15:52 (BG 12) 06:06	16:28 (BG 08) 05:51	19:31 (BG 05) 04:48	21:23 (BG 02) 21:45	
25	08:02 16:33	09:50 (BG 18) 07:03	15:53 (BG 12) 06:04	16:28 (BG 08) 05:49	19:32 (BG 05) 04:46	21:24 (BG 02) 21:46	
26	08:01 16:35	09:51 (BG 18) 07:01	15:54 (BG 12) 06:02	16:27 (BG 08) 05:47	19:33 (BG 05) 04:44	21:25 (BG 02) 21:47	
27	07:59 16:37	09:52 (BG 18) 06:59	15:55 (BG 12) 06:00	16:27 (BG 08) 05:45	19:34 (BG 05) 04:42	21:26 (BG 02) 21:48	
28	07:58 16:39	09:53 (BG 18) 06:57	15:56 (BG 12) 05:58	16:26 (BG 08) 05:43	19:35 (BG 05) 04:40	21:27 (BG 02) 21:49	
29	07:56 16:41	09:54 (BG 18) 06:55	15:57 (BG 12) 05:56	16:26 (BG 08) 05:41	19:36 (BG 05) 04:38	21:28 (BG 02) 21:50	
30	07:55 16:43	09:55 (BG 18) 06:53	15:58 (BG 12) 05:54	16:25 (BG 08) 05:39	19:37 (BG 05) 04:36	21:29 (BG 02) 21:51	
31	07:53 16:45	09:56 (BG 18) 06:51	15:59 (BG 12) 05:52	16:25 (BG 08) 05:37	19:38 (BG 05) 04:34	21:30 (BG 02) 21:52	
	Sonnenscheinstunden astr.max.mögl.Beschattung	252 1826	274 796	367 745	419 832	492 680	508

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: G - Bandelow 16A, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

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

	Jul	August	September	Oktober	November	Dezember
1	04:40	05:19	19:47 (BG 02) 06:13	18:41 (BG 05) 07:05	17:15 (BG 08) 07:02	15:07 (BG 12) 07:56
	21:37	21:02	20:17 (BG 02) 19:57	19:28 (BG 03) 18:44	18:16 (BG 06) 16:35	15:35 (BG 12) 15:51
2	04:41	05:21	19:46 (BG 02) 06:14	18:40 (BG 05) 07:07	17:14 (BG 08) 07:04	15:07 (BG 12) 07:58
	21:37	21:01	20:16 (BG 02) 19:55	19:26 (BG 03) 18:42	18:13 (BG 06) 16:33	15:35 (BG 12) 15:50
3	04:42	05:23	19:46 (BG 02) 06:16	18:40 (BG 05) 07:09	17:13 (BG 08) 07:06	15:07 (BG 12) 07:59
	21:36	20:59	20:17 (BG 02) 19:52	19:24 (BG 03) 18:39	18:11 (BG 06) 16:31	15:36 (BG 12) 15:50
4	04:43	05:24	19:46 (BG 02) 06:18	18:41 (BG 05) 07:10	17:13 (BG 08) 07:08	15:07 (BG 12) 08:01
	21:36	20:57	20:16 (BG 02) 19:50	19:22 (BG 03) 18:37	18:09 (BG 06) 16:29	15:37 (BG 12) 15:49
5	04:44	05:26	19:47 (BG 02) 06:20	18:40 (BG 05) 07:12	17:11 (BG 08) 07:10	15:07 (BG 12) 08:02
	21:35	20:55	20:16 (BG 02) 19:47	19:19 (BG 03) 18:35	18:06 (BG 06) 16:27	15:37 (BG 12) 15:48
6	04:44	05:28	19:46 (BG 02) 06:21	18:41 (BG 05) 07:14	17:11 (BG 08) 07:12	15:07 (BG 12) 08:04
	21:35	20:53	20:15 (BG 02) 19:45	19:17 (BG 03) 18:32	17:44 (BG 08) 16:25	15:37 (BG 12) 15:48
7	04:45	05:29	19:47 (BG 02) 06:23	18:42 (BG 05) 07:16	17:11 (BG 08) 07:14	15:07 (BG 12) 08:05
	21:34	20:51	20:15 (BG 02) 19:43	19:08 (BG 05) 18:30	17:43 (BG 08) 16:23	15:37 (BG 12) 15:47
8	04:46	05:31	19:48 (BG 02) 06:25	18:43 (BG 05) 07:18	17:11 (BG 08) 07:16	15:07 (BG 12) 08:06
	21:33	20:49	20:14 (BG 02) 19:40	19:06 (BG 05) 18:27	17:43 (BG 08) 16:21	15:36 (BG 12) 15:47
9	04:47	05:33	19:48 (BG 02) 06:27	18:44 (BG 05) 07:19	17:11 (BG 08) 07:18	15:07 (BG 12) 08:07
	21:32	20:47	20:13 (BG 02) 19:38	19:04 (BG 05) 18:25	17:43 (BG 08) 16:20	15:36 (BG 12) 15:47
10	04:48	05:35	19:49 (BG 02) 06:28	18:47 (BG 05) 07:21	17:11 (BG 08) 07:19	15:08 (BG 12) 08:09
	21:32	20:45	20:12 (BG 02) 19:35	19:01 (BG 05) 18:23	17:42 (BG 08) 16:18	15:37 (BG 12) 15:46
11	04:50	05:36	19:50 (BG 02) 06:30	18:52 (BG 05) 07:23	17:12 (BG 08) 07:21	15:08 (BG 12) 08:10
	21:31	20:43	20:10 (BG 02) 19:33	18:57 (BG 05) 18:20	17:41 (BG 08) 16:16	15:37 (BG 12) 15:46
12	04:51	05:38	19:52 (BG 02) 06:32	19:01 (BG 05) 18:20	17:11 (BG 08) 07:23	15:09 (BG 12) 08:11
	21:30	20:41	20:09 (BG 02) 19:30	18:18	17:39 (BG 08) 16:15	15:37 (BG 12) 15:46
13	04:52	05:40	19:54 (BG 02) 06:34	19:04 (BG 05) 18:25	17:04 (BG 09) 07:25	14:18 (BG 13) 08:12
	21:29	20:39	20:07 (BG 02) 19:28	18:16	17:38 (BG 08) 16:13	15:37 (BG 12) 15:46
14	04:53	05:41	19:57 (BG 02) 06:35	19:01 (BG 05) 18:23	17:01 (BG 09) 07:27	14:14 (BG 13) 08:13
	21:28	20:37	20:02 (BG 02) 19:26	18:13	17:37 (BG 08) 16:11	15:37 (BG 12) 15:46
15	04:54	05:43	19:58 (BG 02) 06:37	19:04 (BG 05) 18:24	16:59 (BG 09) 07:29	14:12 (BG 13) 08:14
	21:27	20:35	19:23	18:11	17:35 (BG 08) 16:10	15:37 (BG 12) 15:46
16	04:56	19:56 (BG 02) 05:45	19:23	18:11	16:57 (BG 09) 07:31	14:11 (BG 13) 08:15
	21:26	20:05 (BG 02) 20:33	19:21	18:09	17:32 (BG 08) 16:08	15:35 (BG 12) 15:46
17	04:57	19:55 (BG 02) 05:47	19:21	18:09	16:56 (BG 09) 07:32	14:10 (BG 13) 08:15
	21:25	20:08 (BG 02) 20:31	19:18	18:06	17:28 (BG 08) 16:07	15:33 (BG 12) 15:46
18	04:58	19:53 (BG 02) 05:48	19:18	18:06	16:56 (BG 09) 07:34	14:09 (BG 13) 08:16
	21:23	20:09 (BG 02) 20:29	19:16	18:04	17:19 (BG 09) 16:05	15:32 (BG 12) 15:46
19	05:00	19:52 (BG 02) 05:50	19:16	18:04	16:55 (BG 09) 07:36	14:08 (BG 13) 08:17
	21:22	20:10 (BG 02) 20:27	19:13	18:02	17:20 (BG 09) 16:04	15:30 (BG 12) 15:47
20	05:01	19:51 (BG 02) 05:52	18:56 (BG 05) 06:46	18:08 (BG 06) 07:40	16:55 (BG 09) 07:38	14:08 (BG 13) 08:18
	21:21	20:11 (BG 02) 20:24	19:11	18:13 (BG 06) 18:00	17:20 (BG 09) 16:03	15:29 (BG 12) 15:47
21	05:02	19:51 (BG 02) 05:54	18:53 (BG 05) 06:47	18:04 (BG 06) 07:41	16:54 (BG 09) 07:40	14:08 (BG 13) 08:18
	21:20	20:12 (BG 02) 20:22	19:08	18:17 (BG 06) 17:58	17:20 (BG 09) 16:01	15:27 (BG 12) 15:47
22	05:04	19:50 (BG 02) 05:55	18:50 (BG 05) 06:49	18:01 (BG 06) 07:43	16:54 (BG 09) 07:41	14:07 (BG 13) 08:19
	21:18	20:13 (BG 02) 20:20	19:06	18:18 (BG 06) 17:55	17:19 (BG 09) 16:00	14:56 (BG 15) 15:48
23	05:05	19:50 (BG 02) 05:57	18:48 (BG 05) 06:51	18:00 (BG 06) 07:45	16:55 (BG 09) 07:43	14:07 (BG 13) 08:19
	21:17	20:14 (BG 02) 20:18	19:04	18:19 (BG 06) 17:53	17:19 (BG 09) 15:59	14:56 (BG 15) 15:48
24	05:07	19:49 (BG 02) 05:59	18:47 (BG 05) 06:53	17:58 (BG 06) 07:47	16:55 (BG 09) 07:45	14:07 (BG 13) 08:20
	21:15	20:14 (BG 02) 20:15	19:01	18:20 (BG 06) 17:51	17:18 (BG 09) 15:58	14:57 (BG 15) 15:49
25	05:08	19:48 (BG 02) 06:01	18:45 (BG 05) 06:54	17:57 (BG 06) 06:49	16:55 (BG 09) 07:47	14:08 (BG 13) 08:20
	21:14	20:14 (BG 02) 20:13	18:59	18:19 (BG 06) 16:49	16:17 (BG 09) 15:57	14:58 (BG 15) 15:50
26	05:10	19:48 (BG 02) 06:02	18:44 (BG 05) 06:56	17:56 (BG 06) 06:51	16:17 (BG 09) 15:57	14:08 (BG 13) 08:20
	21:12	20:16 (BG 02) 20:11	18:56	18:20 (BG 06) 16:47	16:16 (BG 09) 15:56	14:59 (BG 15) 15:50
27	05:11	19:47 (BG 02) 06:04	18:44 (BG 05) 06:58	17:24 (BG 08) 06:53	15:14 (BG 12) 07:50	14:59 (BG 15) 15:50
	21:11	20:15 (BG 02) 20:09	18:54	18:20 (BG 06) 16:45	16:14 (BG 09) 15:55	15:00 (BG 15) 15:51
28	05:13	19:47 (BG 02) 06:06	18:42 (BG 05) 07:00	17:21 (BG 08) 06:55	15:12 (BG 12) 07:52	14:59 (BG 15) 15:52
	21:09	20:16 (BG 02) 20:06	18:51	18:20 (BG 06) 16:43	16:12 (BG 09) 15:54	15:00 (BG 15) 15:52
29	05:15	19:47 (BG 02) 06:07	18:42 (BG 05) 07:01	17:19 (BG 08) 06:57	15:10 (BG 12) 07:53	14:59 (BG 15) 15:52
	21:08	20:16 (BG 02) 20:04	18:49	18:19 (BG 06) 16:41	16:10 (BG 09) 15:53	15:00 (BG 15) 15:53
30	05:16	19:47 (BG 02) 06:09	18:42 (BG 05) 07:03	17:17 (BG 08) 06:58	15:09 (BG 12) 07:55	14:59 (BG 15) 15:53
	21:06	20:17 (BG 02) 20:02	18:47	18:18 (BG 06) 16:39	15:33 (BG 12) 15:52	15:01 (BG 15) 15:54
31	05:18	19:46 (BG 02) 06:11	18:41 (BG 05) 07:03	17:16 (BG 08) 06:57	15:08 (BG 12) 07:54	14:58 (BG 15) 15:53
	21:04	20:16 (BG 02) 19:59	18:49	18:19 (BG 06) 16:41	16:37	15:34 (BG 12) 15:52
Sonnenscheinstunden	510	458	382	329	261	236
astr.max.mögl.Beschattung	369	819	634	973	1286	2373

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: GesamtbelastungSchattenrezeptor: H - Bandelow 15, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

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	08:21	09:39 (BG 18)	07:52	15:01 (BG 13)	06:55	16:37 (BG 09)	06:41	05:33	19:49 (BG 02)	04:44		
	15:56	65 15:11 (BG 13)	16:47	33 15:34 (BG 15)	17:41	22 16:59 (BG 09)	19:39	20:33	13 20:02 (BG 02)	21:22		
2	08:21	09:40 (BG 18)	07:50	15:02 (BG 13)	06:53	16:38 (BG 09)	06:39	05:31	19:47 (BG 02)	04:43		
	15:57	66 15:13 (BG 13)	16:48	32 16:13 (BG 12)	17:43	21 16:59 (BG 09)	19:41	20:35	17 20:04 (BG 02)	21:23		
3	08:21	09:41 (BG 18)	07:48	15:03 (BG 13)	06:50	16:40 (BG 09)	06:36	05:29	19:45 (BG 02)	04:42		
	15:58	66 15:14 (BG 13)	16:50	36 16:16 (BG 12)	17:45	21 17:10 (BG 08)	19:42	20:37	20 20:05 (BG 02)	21:25		
4	08:20	09:41 (BG 18)	07:46	15:05 (BG 13)	06:48	16:40 (BG 09)	06:34	05:27	19:44 (BG 02)	04:42		
	16:00	70 15:22 (BG 15)	16:52	37 16:18 (BG 12)	17:47	29 17:14 (BG 08)	19:44	20:39	22 20:06 (BG 02)	21:26		
5	08:20	09:42 (BG 18)	07:45	15:08 (BG 13)	06:46	16:43 (BG 09)	06:31	05:25	19:44 (BG 02)	04:41		
	16:01	71 15:24 (BG 15)	16:54	36 16:20 (BG 12)	17:49	29 17:17 (BG 08)	19:46	8 19:14 (BG 05)	05:25	23 20:07 (BG 02)	21:27	
6	08:20	09:43 (BG 18)	07:43	15:11 (BG 13)	06:43	16:56 (BG 08)	06:29	05:23	19:43 (BG 02)	04:40		
	16:02	70 15:25 (BG 15)	16:56	33 16:22 (BG 12)	17:51	22 17:18 (BG 08)	19:48	16 19:17 (BG 05)	05:23	25 20:08 (BG 02)	21:28	
7	08:19	09:44 (BG 18)	07:41	15:58 (BG 12)	06:41	16:55 (BG 08)	06:27	05:21	19:42 (BG 02)	04:39		
	16:03	69 15:27 (BG 15)	16:58	25 16:23 (BG 12)	17:53	24 17:19 (BG 08)	19:50	20 19:19 (BG 05)	05:21	26 20:08 (BG 02)	21:29	
8	08:19	09:45 (BG 18)	07:39	15:58 (BG 12)	06:39	16:54 (BG 08)	06:24	05:19	19:41 (BG 02)	04:39		
	16:05	67 15:29 (BG 15)	17:00	25 16:23 (BG 12)	17:55	27 17:21 (BG 08)	19:52	22 19:20 (BG 05)	05:19	27 20:08 (BG 02)	21:30	
9	08:18	09:45 (BG 18)	07:37	15:57 (BG 12)	06:36	16:52 (BG 08)	06:22	05:17	19:42 (BG 02)	04:38		
	16:06	58 15:30 (BG 15)	17:02	27 16:24 (BG 12)	17:57	29 17:21 (BG 08)	19:53	31 19:26 (BG 05)	05:17	27 20:09 (BG 02)	21:31	
10	08:18	09:46 (BG 18)	07:35	15:57 (BG 12)	06:34	16:52 (BG 08)	06:19	05:15	19:41 (BG 02)	04:38		
	16:08	58 15:31 (BG 15)	17:04	27 16:24 (BG 12)	17:58	29 17:21 (BG 08)	19:55	33 19:28 (BG 05)	05:15	28 20:09 (BG 02)	21:31	
11	08:17	09:48 (BG 18)	07:33	15:56 (BG 12)	06:32	16:51 (BG 08)	06:17	05:14	19:41 (BG 02)	04:37		
	16:09	58 15:33 (BG 15)	17:06	28 16:24 (BG 12)	18:00	30 17:21 (BG 08)	19:57	36 19:30 (BG 05)	05:14	27 20:08 (BG 02)	21:32	
12	08:16	09:50 (BG 18)	07:32	15:56 (BG 12)	06:29	16:51 (BG 08)	06:15	05:12	19:41 (BG 02)	04:37		
	16:11	57 15:34 (BG 15)	17:08	28 16:24 (BG 12)	18:02	30 17:21 (BG 08)	19:59	39 19:31 (BG 05)	05:12	28 20:09 (BG 02)	21:33	
13	08:15	09:51 (BG 18)	07:30	15:56 (BG 12)	06:27	16:50 (BG 08)	06:12	05:10	19:41 (BG 02)	04:37		
	16:12	56 15:35 (BG 15)	17:10	28 16:24 (BG 12)	18:04	35 17:37 (BG 06)	20:01	41 19:33 (BG 03)	05:10	27 20:08 (BG 02)	21:34	
14	08:15	09:53 (BG 18)	07:28	15:56 (BG 12)	06:24	16:50 (BG 08)	06:10	05:08	19:41 (BG 02)	04:36		
	16:14	54 15:36 (BG 15)	17:12	28 16:24 (BG 12)	18:06	41 17:40 (BG 06)	20:02	42 19:34 (BG 03)	05:08	27 20:08 (BG 02)	21:34	
15	08:14	09:55 (BG 18)	07:25	15:57 (BG 12)	06:22	16:51 (BG 08)	06:08	05:07	19:41 (BG 02)	04:36		
	16:15	50 15:36 (BG 15)	17:14	27 16:24 (BG 12)	18:08	43 17:42 (BG 06)	20:04	42 19:34 (BG 03)	05:07	27 20:08 (BG 02)	21:35	
16	08:13	14:54 (BG 13)	07:23	15:57 (BG 12)	06:20	16:51 (BG 08)	06:05	05:05	19:41 (BG 02)	04:36		
	16:17	43 15:37 (BG 15)	17:16	27 16:24 (BG 12)	18:10	45 17:43 (BG 06)	20:06	42 19:33 (BG 03)	05:05	26 20:07 (BG 02)	21:35	
17	08:12	14:55 (BG 13)	07:21	15:58 (BG 12)	06:17	16:52 (BG 08)	06:03	05:03	19:42 (BG 02)	04:36		
	16:19	43 15:38 (BG 15)	17:18	25 16:23 (BG 12)	18:11	46 17:45 (BG 06)	20:08	42 19:33 (BG 03)	05:03	25 20:07 (BG 02)	21:36	
18	08:11	14:55 (BG 13)	07:19	15:58 (BG 12)	06:15	16:52 (BG 08)	06:01	05:02	19:43 (BG 02)	04:36		
	16:21	43 15:38 (BG 15)	17:20	24 16:22 (BG 12)	18:13	47 17:46 (BG 06)	20:10	41 19:33 (BG 03)	05:02	24 20:07 (BG 02)	21:36	
19	08:10	14:55 (BG 13)	07:17	15:59 (BG 12)	06:12	16:53 (BG 08)	05:59	05:00	19:43 (BG 02)	04:36		
	16:22	44 15:39 (BG 15)	17:22	31 16:53 (BG 09)	18:15	44 17:46 (BG 06)	20:12	40 19:32 (BG 03)	05:00	23 20:06 (BG 02)	21:37	
20	08:09	14:55 (BG 13)	07:15	16:01 (BG 12)	06:10	16:54 (BG 08)	05:56	04:59	19:44 (BG 02)	04:36		
	16:24	44 15:39 (BG 15)	17:24	33 16:56 (BG 09)	18:17	42 17:46 (BG 06)	20:13	39 19:32 (BG 03)	04:59	22 20:06 (BG 02)	21:37	
21	08:07	14:55 (BG 13)	07:13	16:03 (BG 12)	06:08	16:57 (BG 08)	05:54	04:57	19:45 (BG 02)	04:36		
	16:26	45 15:40 (BG 15)	17:26	32 16:58 (BG 09)	18:19	36 17:45 (BG 06)	20:15	37 19:30 (BG 03)	04:57	21 20:06 (BG 02)	21:37	
22	08:06	14:55 (BG 13)	07:11	16:06 (BG 12)	06:05	17:00 (BG 08)	05:52	04:56	19:45 (BG 02)	04:36		
	16:28	44 15:39 (BG 15)	17:28	28 16:59 (BG 09)	18:21	26 17:44 (BG 06)	20:17	34 19:28 (BG 03)	04:56	19 20:04 (BG 02)	21:38	
23	08:05	14:56 (BG 13)	07:08	16:38 (BG 09)	06:03	17:24 (BG 06)	05:50	04:55	19:47 (BG 02)	04:37		
	16:29	44 15:40 (BG 15)	17:30	22 17:00 (BG 09)	18:22	20 17:44 (BG 06)	20:19	29 19:26 (BG 03)	04:55	16 20:03 (BG 02)	21:38	
24	08:04	14:56 (BG 13)	07:06	16:38 (BG 09)	06:00	17:25 (BG 06)	05:48	04:53	19:48 (BG 02)	04:37		
	16:31	44 15:40 (BG 15)	17:32	23 17:01 (BG 09)	18:24	18 17:43 (BG 06)	20:21	15 19:12 (BG 05)	04:53	14 20:02 (BG 02)	21:38	
25	08:02	14:56 (BG 13)	07:04	16:38 (BG 09)	05:58	17:26 (BG 06)	05:45	04:52	19:50 (BG 02)	04:37		
	16:33	44 15:40 (BG 15)	17:34	23 17:01 (BG 09)	18:26	14 17:40 (BG 06)	20:22	8 19:09 (BG 05)	04:52	11 20:01 (BG 02)	21:38	
26	08:01	14:56 (BG 13)	07:02	16:37 (BG 09)	05:55	17:28 (BG 06)	05:43	04:51	19:52 (BG 02)	04:38		
	16:35	44 15:40 (BG 15)	17:36	24 17:01 (BG 09)	18:28	10 17:38 (BG 06)	20:24	21:14	7 19:59 (BG 02)	21:38		
27	07:59	14:58 (BG 13)	07:00	16:37 (BG 09)	05:53		05:41	04:49		04:38		
	16:37	42 15:40 (BG 15)	17:37	24 17:01 (BG 09)	18:30		20:26	21:16		21:38		
28	07:58	14:58 (BG 13)	06:57	16:38 (BG 09)	05:51		05:39	04:48		04:39		
	16:39	41 15:39 (BG 15)	17:39	23 17:01 (BG 09)	18:32		20:28	21:17		21:38		
29	07:56	14:58 (BG 13)			06:48		05:37	04:47		04:39		
	16:41	40 15:38 (BG 15)			19:33		20:30	21:18		21:37		
30	07:55	15:00 (BG 13)			06:46		05:35	04:46		04:40		
	16:43	38 15:38 (BG 15)			19:35		20:31	21:20		21:37		
31	07:53	15:00 (BG 13)			06:43			04:45				
	16:45	37 15:37 (BG 15)			19:37			21:21				
Sonnenscheinstunden	252		274		367		419	492		508		
astr.max.mögl.Beschattung	1615		789		780		664	572				

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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: H - Bandelow 15, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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

	Jul	August	September	Oktober	November	Dezember
1	04:40	05:19	19:52 (BG 02) 06:13	18:53 (BG 05) 07:05	17:30 (BG 08) 07:02	15:26 (BG 12) 07:56
	21:37	21:02	20:19 (BG 02) 19:57	18:29 (BG 03) 18:44	18:00 (BG 08) 16:35	15:53 (BG 12) 15:51
2	04:41	05:21	19:51 (BG 02) 06:14	18:53 (BG 05) 07:07	17:30 (BG 08) 07:04	15:26 (BG 12) 07:58
	21:37	21:01	20:19 (BG 02) 19:55	18:26 (BG 03) 18:42	18:00 (BG 08) 16:33	15:53 (BG 12) 15:50
3	04:42	05:23	19:52 (BG 02) 06:16	18:53 (BG 05) 07:09	17:30 (BG 08) 07:06	15:27 (BG 12) 07:59
	21:36	20:59	20:19 (BG 02) 19:52	18:24 (BG 03) 18:39	17:59 (BG 08) 16:31	15:53 (BG 12) 15:50
4	04:43	05:24	19:51 (BG 02) 06:18	18:55 (BG 05) 07:10	17:30 (BG 08) 07:08	15:28 (BG 12) 08:01
	21:36	20:57	20:18 (BG 02) 19:50	18:17 (BG 05) 18:37	17:59 (BG 08) 16:29	15:52 (BG 12) 15:49
5	04:44	05:26	19:52 (BG 02) 06:20	18:55 (BG 05) 07:12	17:30 (BG 08) 07:10	14:40 (BG 13) 08:02
	21:35	20:55	20:18 (BG 02) 19:47	18:15 (BG 05) 18:35	17:57 (BG 08) 16:27	15:51 (BG 12) 15:48
6	04:44	05:28	19:52 (BG 02) 06:21	18:57 (BG 05) 07:14	17:30 (BG 08) 07:12	14:37 (BG 13) 08:04
	21:35	20:53	20:17 (BG 02) 19:45	18:16 (BG 05) 18:32	17:56 (BG 08) 16:25	15:50 (BG 12) 15:48
7	04:45	05:29	19:53 (BG 02) 06:23	19:00 (BG 05) 07:16	17:31 (BG 08) 07:14	14:35 (BG 13) 08:05
	21:34	20:51	20:17 (BG 02) 19:43	18:30 (BG 05) 18:30	17:55 (BG 08) 16:23	15:48 (BG 12) 15:47
8	04:46	05:31	19:54 (BG 02) 06:25	19:09 (BG 05) 07:18	17:20 (BG 09) 07:16	14:34 (BG 13) 08:06
	21:33	20:49	20:17 (BG 02) 19:40	18:27 (BG 05) 18:27	17:53 (BG 08) 16:21	15:46 (BG 12) 15:47
9	04:47	05:33	19:54 (BG 02) 06:27	19:19 (BG 05) 07:19	17:17 (BG 09) 07:18	14:33 (BG 13) 08:07
	21:32	20:47	20:15 (BG 02) 19:38	18:25 (BG 05) 18:25	17:51 (BG 08) 16:20	15:43 (BG 12) 15:47
10	04:48	05:35	19:55 (BG 02) 06:28	19:21 (BG 05) 07:21	17:15 (BG 09) 07:19	14:32 (BG 13) 08:09
	21:32	20:45	20:14 (BG 02) 19:35	18:23 (BG 05) 18:23	17:48 (BG 08) 16:18	15:05 (BG 15) 15:46
11	04:50	05:36	19:56 (BG 02) 06:30	19:23 (BG 05) 07:23	17:13 (BG 09) 07:21	14:31 (BG 13) 08:10
	21:31	20:43	20:12 (BG 02) 19:33	18:20 (BG 05) 18:20	17:33 (BG 09) 16:16	15:08 (BG 15) 15:46
12	04:51	05:38	19:58 (BG 02) 06:32	19:25 (BG 05) 07:25	17:11 (BG 09) 07:23	14:30 (BG 13) 08:11
	21:30	20:41	20:10 (BG 02) 19:30	18:18 (BG 05) 18:18	17:32 (BG 09) 16:15	15:09 (BG 15) 15:46
13	04:52	05:40	20:03 (BG 02) 06:34	19:27 (BG 05) 07:27	17:10 (BG 09) 07:25	14:30 (BG 13) 08:12
	21:29	20:39	20:06 (BG 02) 19:28	18:16 (BG 05) 18:16	17:33 (BG 09) 16:13	15:10 (BG 15) 15:46
14	04:53	05:41	19:59 (BG 02) 06:35	19:28 (BG 05) 07:28	17:09 (BG 09) 07:27	14:30 (BG 13) 08:13
	21:28	20:37	19:58 (BG 02) 19:26	18:13 (BG 05) 18:13	17:33 (BG 09) 16:11	15:11 (BG 15) 15:46
15	04:54	05:43	19:59 (BG 02) 06:37	19:30 (BG 05) 07:30	17:09 (BG 09) 07:29	14:29 (BG 13) 08:14
	21:27	20:35	19:58 (BG 02) 19:23	18:11 (BG 05) 18:11	17:33 (BG 09) 16:10	15:12 (BG 15) 15:46
16	04:56	05:45	19:59 (BG 02) 06:39	19:32 (BG 05) 07:32	17:09 (BG 09) 07:31	14:29 (BG 13) 08:15
	21:26	20:33	19:58 (BG 02) 19:21	18:09 (BG 05) 18:09	17:33 (BG 09) 16:08	15:13 (BG 15) 15:46
17	04:57	20:04 (BG 02) 05:47	19:59 (BG 02) 06:40	18:18 (BG 06) 07:34	17:09 (BG 09) 07:32	14:29 (BG 13) 08:15
	21:25	20:07 (BG 02) 05:48	19:58 (BG 02) 19:18	18:06 (BG 06) 18:06	17:33 (BG 09) 16:07	15:13 (BG 15) 15:46
18	04:58	20:00 (BG 02) 05:48	19:06 (BG 05) 06:42	18:14 (BG 06) 07:36	17:10 (BG 09) 07:34	14:30 (BG 13) 08:16
	21:23	20:10 (BG 02) 05:50	19:16 (BG 05) 19:16	18:04 (BG 06) 18:04	17:32 (BG 09) 16:05	15:14 (BG 15) 15:46
19	05:00	19:58 (BG 02) 05:50	19:03 (BG 05) 06:44	18:12 (BG 06) 07:38	17:10 (BG 09) 07:36	14:30 (BG 13) 08:17
	21:22	20:11 (BG 02) 05:52	19:08 (BG 05) 19:13	18:02 (BG 06) 18:02	17:31 (BG 09) 16:04	15:14 (BG 15) 15:47
20	05:01	19:57 (BG 02) 05:52	19:01 (BG 05) 06:46	18:11 (BG 06) 07:40	16:35 (BG 12) 07:38	14:30 (BG 13) 08:18
	21:21	20:12 (BG 02) 05:54	19:04 (BG 05) 19:11	18:00 (BG 06) 18:00	17:30 (BG 09) 16:03	15:14 (BG 15) 15:47
21	05:02	19:57 (BG 02) 05:54	18:59 (BG 05) 06:47	18:10 (BG 06) 07:41	16:33 (BG 12) 07:40	14:30 (BG 13) 08:18
	21:20	20:14 (BG 02) 05:55	19:06 (BG 05) 19:08	18:01 (BG 06) 18:01	17:28 (BG 09) 16:01	15:15 (BG 15) 15:47
22	05:04	19:55 (BG 02) 05:55	18:57 (BG 05) 06:49	17:42 (BG 08) 07:43	16:31 (BG 12) 07:41	14:31 (BG 13) 08:19
	21:18	20:15 (BG 02) 05:57	19:03 (BG 05) 19:06	18:00 (BG 06) 18:00	17:26 (BG 09) 16:00	15:15 (BG 15) 15:48
23	05:05	19:55 (BG 02) 05:57	18:57 (BG 05) 06:51	17:39 (BG 08) 07:45	16:29 (BG 12) 07:43	14:31 (BG 13) 08:19
	21:17	20:16 (BG 02) 05:59	19:04 (BG 05) 19:04	18:00 (BG 06) 18:00	17:23 (BG 09) 16:00	15:15 (BG 15) 15:48
24	05:07	19:54 (BG 02) 05:59	18:56 (BG 05) 06:53	17:37 (BG 08) 07:47	16:28 (BG 12) 07:45	14:32 (BG 13) 08:20
	21:15	20:17 (BG 02) 06:01	19:06 (BG 05) 19:06	18:00 (BG 06) 18:00	17:23 (BG 09) 16:00	15:15 (BG 15) 15:49
25	05:08	19:53 (BG 02) 06:01	18:54 (BG 05) 06:54	17:35 (BG 08) 07:49	16:26 (BG 12) 07:47	14:33 (BG 13) 08:20
	21:14	20:17 (BG 02) 06:02	19:06 (BG 05) 19:06	18:00 (BG 06) 18:00	17:23 (BG 09) 16:00	15:15 (BG 15) 15:50
26	05:10	19:53 (BG 02) 06:02	18:54 (BG 05) 06:56	17:34 (BG 08) 07:51	16:25 (BG 12) 07:48	14:33 (BG 13) 08:20
	21:12	20:18 (BG 02) 06:04	19:08 (BG 05) 19:08	18:00 (BG 06) 18:00	17:23 (BG 09) 16:00	15:15 (BG 15) 15:50
27	05:11	19:52 (BG 02) 06:04	18:54 (BG 05) 06:58	17:33 (BG 08) 07:53	16:24 (BG 12) 07:50	14:33 (BG 13) 08:21
	21:11	20:18 (BG 02) 06:06	19:10 (BG 05) 19:10	18:00 (BG 06) 18:00	17:23 (BG 09) 16:00	15:15 (BG 15) 15:51
28	05:13	19:53 (BG 02) 06:06	18:53 (BG 05) 07:00	17:32 (BG 08) 07:55	16:23 (BG 12) 07:52	14:33 (BG 13) 08:21
	21:09	20:19 (BG 02) 06:08	19:16 (BG 05) 19:16	18:00 (BG 06) 18:00	17:23 (BG 09) 16:00	15:15 (BG 15) 15:52
29	05:15	19:52 (BG 02) 06:07	18:53 (BG 05) 07:01	17:31 (BG 08) 07:57	16:22 (BG 12) 07:53	14:33 (BG 13) 08:21
	21:08	20:19 (BG 02) 06:09	19:18 (BG 05) 19:18	18:00 (BG 06) 18:00	17:23 (BG 09) 16:00	15:15 (BG 15) 15:53
30	05:16	19:52 (BG 02) 06:09	18:53 (BG 05) 07:03	17:30 (BG 08) 07:58	16:21 (BG 12) 07:55	14:33 (BG 13) 08:21
	21:06	20:19 (BG 02) 06:11	19:24 (BG 05) 19:24	18:00 (BG 06) 18:00	17:23 (BG 09) 16:00	15:15 (BG 15) 15:54
31	05:18	19:51 (BG 02) 06:11	18:52 (BG 05) 07:05	17:29 (BG 08) 07:59	16:20 (BG 12) 07:56	14:33 (BG 13) 08:21
	21:04	20:19 (BG 02) 19:59	19:31 (BG 03) 19:31	18:00 (BG 06) 18:00	17:23 (BG 09) 16:00	15:15 (BG 15) 15:55
Sonnenscheinstunden	510	458	382	329	261	236
astr.max.mögl.Beschattung	305	777	627	827	1209	1937

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) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: GesamtbelastungSchattenrezeptor: I - Bandelow 11, Uckerland
Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	09:58 (BG 18) 07:52	15:12 (BG 13) 06:55	16:41 (BG 09) 06:41	05:33	19:40 (BG 02) 04:44
2	08:21 15:57	09:59 (BG 18) 07:50	15:12 (BG 13) 06:53	16:42 (BG 09) 06:39	05:31	19:39 (BG 02) 04:43
3	08:21 15:58	10:00 (BG 18) 07:48	15:13 (BG 13) 06:50	16:43 (BG 09) 06:36	05:29	19:38 (BG 02) 04:42
4	08:20 16:00	14:07 (BG 16) 16:50	15:14 (BG 13) 06:48	16:44 (BG 09) 06:34	19:02 (BG 05) 05:27	19:38 (BG 02) 04:42
5	08:20 16:01	14:06 (BG 16) 16:52	15:14 (BG 13) 06:48	16:44 (BG 09) 06:34	19:14 (BG 05) 05:29	20:03 (BG 02) 21:26
6	08:20 16:02	10:02 (BG 18) 07:45	15:16 (BG 13) 06:46	16:46 (BG 09) 06:31	18:59 (BG 05) 05:25	19:38 (BG 02) 04:41
7	08:19 16:03	14:07 (BG 16) 16:54	15:17 (BG 13) 06:43	16:48 (BG 09) 06:29	19:17 (BG 05) 05:23	20:04 (BG 02) 21:27
8	08:19 16:05	14:06 (BG 16) 16:56	15:17 (BG 13) 06:43	16:48 (BG 09) 06:29	18:57 (BG 05) 05:23	19:38 (BG 02) 04:40
9	08:18 16:06	10:05 (BG 18) 07:41	15:19 (BG 13) 06:41	16:59 (BG 08) 06:27	19:17 (BG 05) 05:21	20:03 (BG 02) 21:28
10	08:18 16:08	14:07 (BG 16) 16:58	15:22 (BG 13) 06:39	17:21 (BG 08) 19:50	19:23 (BG 03) 20:44	20:03 (BG 02) 21:29
11	08:17 16:09	10:06 (BG 18) 07:39	15:22 (BG 13) 06:39	16:59 (BG 08) 06:24	18:55 (BG 05) 05:19	19:37 (BG 02) 04:39
12	08:16 16:11	14:06 (BG 16) 17:00	16:27 (BG 12) 17:55	17:23 (BG 08) 19:52	19:25 (BG 03) 20:46	20:03 (BG 02) 21:30
13	08:15 16:12	10:07 (BG 18) 07:37	16:06 (BG 12) 06:36	16:57 (BG 08) 06:22	18:53 (BG 05) 05:17	19:38 (BG 02) 04:38
14	08:15 16:14	15:23 (BG 13) 17:02	16:29 (BG 12) 17:57	17:23 (BG 08) 19:53	19:26 (BG 03) 20:47	20:03 (BG 02) 21:31
15	08:14 16:15	10:09 (BG 18) 07:35	16:06 (BG 12) 06:34	16:56 (BG 08) 06:19	18:53 (BG 05) 05:15	19:38 (BG 02) 04:38
16	08:13 16:17	15:25 (BG 13) 17:04	16:29 (BG 12) 17:58	17:23 (BG 08) 19:55	19:28 (BG 03) 20:49	20:03 (BG 02) 21:31
17	08:12 16:19	13:50 (BG 16) 07:33	16:04 (BG 12) 06:32	16:55 (BG 08) 06:17	18:52 (BG 05) 05:13	19:38 (BG 02) 04:37
18	08:11 16:21	15:34 (BG 15) 17:06	16:29 (BG 12) 18:00	17:23 (BG 08) 19:57	19:30 (BG 03) 20:51	20:02 (BG 02) 21:32
19	08:10 16:22	13:52 (BG 16) 07:32	16:04 (BG 12) 06:29	16:55 (BG 08) 06:15	18:51 (BG 05) 05:12	19:39 (BG 02) 04:37
20	08:09 16:24	15:36 (BG 15) 17:08	16:30 (BG 12) 18:02	17:23 (BG 08) 19:59	19:31 (BG 03) 20:52	20:02 (BG 02) 21:33
21	08:07 16:26	13:56 (BG 16) 07:30	16:04 (BG 12) 06:27	16:54 (BG 08) 06:12	18:51 (BG 05) 05:10	19:39 (BG 02) 04:37
22	08:06 16:28	15:37 (BG 15) 17:10	16:30 (BG 12) 18:04	17:37 (BG 06) 20:01	19:32 (BG 03) 20:54	20:01 (BG 02) 21:34
23	08:05 16:29	15:11 (BG 13) 07:28	16:04 (BG 12) 06:24	16:55 (BG 08) 06:10	18:52 (BG 05) 05:08	19:39 (BG 02) 04:36
24	08:04 16:31	15:39 (BG 15) 17:12	16:30 (BG 12) 18:06	17:40 (BG 06) 20:02	19:32 (BG 03) 20:56	20:00 (BG 02) 21:34
25	08:02 16:33	15:10 (BG 13) 07:25	16:04 (BG 12) 06:22	16:55 (BG 08) 06:08	18:52 (BG 05) 05:07	19:40 (BG 02) 04:36
26	08:01 16:35	15:40 (BG 15) 17:14	16:30 (BG 12) 18:08	17:42 (BG 06) 20:04	19:32 (BG 03) 20:57	20:00 (BG 02) 21:35
27	07:59 16:37	15:10 (BG 13) 07:23	16:04 (BG 12) 06:20	16:55 (BG 08) 06:05	18:51 (BG 05) 05:05	19:41 (BG 02) 04:36
28	07:58 16:39	15:42 (BG 15) 17:16	16:30 (BG 12) 18:10	17:43 (BG 06) 20:06	19:30 (BG 03) 20:59	19:58 (BG 02) 21:35
29	07:56 16:41	15:09 (BG 13) 07:21	16:05 (BG 12) 06:17	16:56 (BG 08) 06:03	18:52 (BG 05) 05:03	19:43 (BG 02) 04:36
30	07:55 16:43	15:43 (BG 15) 17:18	16:30 (BG 12) 18:11	17:45 (BG 06) 20:08	19:30 (BG 03) 21:01	19:57 (BG 02) 21:36
31	07:53 16:45	15:09 (BG 13) 07:19	16:04 (BG 12) 06:15	16:56 (BG 08) 06:01	18:53 (BG 05) 05:02	19:45 (BG 02) 04:36
	252	17:20	18:13	19:10	20:10	21:36
		16:05 (BG 12) 07:17	16:05 (BG 12) 06:12	16:58 (BG 08) 05:59	18:54 (BG 05) 05:00	19:47 (BG 02) 04:36
		16:22 (BG 12) 18:15	16:28 (BG 12) 18:15	17:47 (BG 06) 20:12	19:28 (BG 03) 21:04	19:53 (BG 02) 21:37
		16:06 (BG 12) 07:15	16:06 (BG 12) 06:10	16:59 (BG 08) 05:56	18:56 (BG 05) 04:59	04:36
		16:24 (BG 15) 17:24	16:56 (BG 09) 18:17	17:46 (BG 06) 20:13	19:26 (BG 03) 21:05	21:37
		15:09 (BG 13) 07:13	16:08 (BG 12) 06:08	17:02 (BG 08) 05:54	18:57 (BG 05) 04:57	04:36
		15:47 (BG 15) 17:26	16:58 (BG 09) 18:19	17:46 (BG 06) 20:15	19:23 (BG 03) 21:07	21:37
		15:08 (BG 13) 07:11	16:09 (BG 12) 06:05	17:25 (BG 06) 05:52	19:01 (BG 05) 04:56	04:36
		15:47 (BG 15) 17:28	17:00 (BG 09) 18:21	17:44 (BG 06) 20:17	19:06 (BG 05) 21:09	21:38
		15:09 (BG 13) 07:08	16:12 (BG 12) 06:03	17:26 (BG 06) 05:50	18:55 (BG 05) 04:55	04:37
		15:47 (BG 15) 17:30	17:02 (BG 09) 18:22	17:43 (BG 06) 20:19	19:06 (BG 05) 21:10	21:38
		15:08 (BG 13) 07:06	16:43 (BG 09) 06:00	17:27 (BG 06) 05:48	18:54 (BG 05) 04:53	04:37
		15:47 (BG 15) 17:32	17:03 (BG 09) 18:24	17:42 (BG 06) 20:21	19:01 (BG 05) 21:11	21:38
		15:09 (BG 13) 07:04	16:42 (BG 09) 05:58	17:28 (BG 06) 05:45	18:52 (BG 05) 04:52	04:37
		15:48 (BG 15) 17:34	17:04 (BG 09) 18:26	17:39 (BG 06) 20:22	19:01 (BG 05) 21:13	21:38
		15:09 (BG 13) 07:02	16:41 (BG 09) 05:55	17:33 (BG 06) 05:43	18:51 (BG 05) 04:51	04:38
		15:48 (BG 15) 17:36	17:04 (BG 09) 18:28	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:10 (BG 13) 07:00	16:41 (BG 09) 05:53	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:49 (BG 15) 17:37	17:04 (BG 09) 18:30	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:10 (BG 13) 06:57	16:42 (BG 09) 05:51	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:48 (BG 15) 17:39	17:04 (BG 09) 18:32	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:10 (BG 13) 06:48	16:12 (BG 12) 06:03	17:26 (BG 06) 05:50	18:55 (BG 05) 04:55	04:37
		15:48 (BG 15) 17:30	17:02 (BG 09) 18:22	17:43 (BG 06) 20:19	19:06 (BG 05) 21:10	21:38
		15:11 (BG 13) 06:46	16:43 (BG 09) 06:00	17:27 (BG 06) 05:48	18:54 (BG 05) 04:53	04:37
		15:48 (BG 15) 17:32	17:03 (BG 09) 18:24	17:42 (BG 06) 20:21	19:01 (BG 05) 21:11	21:38
		15:10 (BG 13) 06:46	16:42 (BG 09) 05:58	17:28 (BG 06) 05:45	18:52 (BG 05) 04:52	04:37
		15:11 (BG 13) 06:46	17:04 (BG 09) 18:26	17:39 (BG 06) 20:22	19:01 (BG 05) 21:13	21:38
		15:48 (BG 15) 17:36	17:04 (BG 09) 18:28	17:33 (BG 06) 05:43	18:51 (BG 05) 04:51	04:38
		15:11 (BG 13) 06:43	16:41 (BG 09) 05:53	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:47 (BG 15) 17:37	17:04 (BG 09) 18:30	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:10 (BG 13) 06:57	16:42 (BG 09) 05:51	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:48 (BG 15) 17:39	17:04 (BG 09) 18:32	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:10 (BG 13) 06:48	16:12 (BG 12) 06:03	17:26 (BG 06) 05:50	18:55 (BG 05) 04:55	04:37
		15:48 (BG 15) 17:30	17:02 (BG 09) 18:22	17:43 (BG 06) 20:19	19:06 (BG 05) 21:10	21:38
		15:11 (BG 13) 06:46	16:43 (BG 09) 06:00	17:27 (BG 06) 05:48	18:54 (BG 05) 04:53	04:37
		15:48 (BG 15) 17:32	17:03 (BG 09) 18:24	17:42 (BG 06) 20:21	19:01 (BG 05) 21:11	21:38
		15:10 (BG 13) 06:46	16:42 (BG 09) 05:58	17:28 (BG 06) 05:45	18:52 (BG 05) 04:52	04:37
		15:11 (BG 13) 06:46	17:04 (BG 09) 18:26	17:39 (BG 06) 20:22	19:01 (BG 05) 21:13	21:38
		15:48 (BG 15) 17:36	17:04 (BG 09) 18:28	17:33 (BG 06) 05:43	18:51 (BG 05) 04:51	04:38
		15:11 (BG 13) 06:43	16:41 (BG 09) 05:53	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:47 (BG 15) 17:37	17:04 (BG 09) 18:30	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:10 (BG 13) 06:57	16:42 (BG 09) 05:51	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:48 (BG 15) 17:39	17:04 (BG 09) 18:32	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:10 (BG 13) 06:48	16:12 (BG 12) 06:03	17:26 (BG 06) 05:50	18:55 (BG 05) 04:55	04:37
		15:48 (BG 15) 17:30	17:02 (BG 09) 18:22	17:43 (BG 06) 20:19	19:06 (BG 05) 21:10	21:38
		15:11 (BG 13) 06:46	16:43 (BG 09) 06:00	17:27 (BG 06) 05:48	18:54 (BG 05) 04:53	04:37
		15:48 (BG 15) 17:32	17:03 (BG 09) 18:24	17:42 (BG 06) 20:21	19:01 (BG 05) 21:11	21:38
		15:10 (BG 13) 06:46	16:42 (BG 09) 05:58	17:28 (BG 06) 05:45	18:52 (BG 05) 04:52	04:37
		15:11 (BG 13) 06:46	17:04 (BG 09) 18:26	17:39 (BG 06) 20:22	19:01 (BG 05) 21:13	21:38
		15:48 (BG 15) 17:36	17:04 (BG 09) 18:28	17:33 (BG 06) 05:43	18:51 (BG 05) 04:51	04:38
		15:11 (BG 13) 06:43	16:41 (BG 09) 05:53	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:47 (BG 15) 17:37	17:04 (BG 09) 18:30	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:10 (BG 13) 06:57	16:42 (BG 09) 05:51	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:48 (BG 15) 17:39	17:04 (BG 09) 18:32	17:35 (BG 06) 20:24	19:01 (BG 05) 21:14	21:38
		15:10 (BG 13) 06:48	16:12 (BG 12) 06:03	17:26 (BG 06) 05:50	18:55 (BG 05) 04:55	04:37
		15:48 (BG 15) 17:30	17:02 (BG 09) 18:22	17:43 (BG 06) 20:19	19:06 (BG 05) 21:10	21:38
		15:11 (BG 13) 06:46	16:43 (BG 09) 06:00	17:27 (BG 06) 05:48	18:54 (BG 05) 04:53	04:37
		15:48 (BG 15) 17:32	17:03 (BG 09) 18:24	17:42 (BG 06) 20:21	19:01 (BG 05) 21:11	21:38

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: I - Bandelow 11, Uckerland

Voraussetzungen für Berechnung des Schattenwurfs

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

	Jul	August	September	Oktober	November	Dezember
1	04:40	05:19	19:49 (BG 02) 06:13	18:51 (BG 05) 07:05	17:34 (BG 08) 07:02	15:34 (BG 12) 07:56
	21:37	21:02	20:13 (BG 02) 19:57	19:29 (BG 03) 18:44	18:02 (BG 08) 16:35	15:58 (BG 12) 15:51
2	04:41	05:21	19:48 (BG 02) 06:14	18:51 (BG 05) 07:07	17:34 (BG 08) 07:04	15:35 (BG 12) 07:58
	21:37	21:01	20:13 (BG 02) 19:55	19:26 (BG 03) 18:42	18:02 (BG 08) 16:33	15:57 (BG 12) 15:50
3	04:42	05:23	19:48 (BG 02) 06:16	18:51 (BG 05) 07:09	17:34 (BG 08) 07:06	14:51 (BG 13) 07:59
	21:36	20:59	20:13 (BG 02) 19:52	19:24 (BG 03) 18:39	18:02 (BG 08) 16:31	15:57 (BG 12) 15:50
4	04:43	05:24	19:47 (BG 02) 06:18	18:52 (BG 05) 07:10	17:35 (BG 08) 07:08	14:49 (BG 13) 08:01
	21:36	20:57	20:13 (BG 02) 19:50	19:22 (BG 03) 18:37	18:01 (BG 08) 16:29	15:56 (BG 12) 15:49
5	04:44	05:26	19:47 (BG 02) 06:20	18:52 (BG 05) 07:12	17:34 (BG 08) 07:10	14:47 (BG 13) 08:02
	21:35	20:55	20:13 (BG 02) 19:47	19:19 (BG 03) 18:35	17:59 (BG 08) 16:27	15:54 (BG 12) 15:48
6	04:44	05:28	19:47 (BG 02) 06:21	18:53 (BG 05) 07:14	17:35 (BG 08) 07:12	14:46 (BG 13) 08:04
	21:35	20:53	20:13 (BG 02) 19:45	19:14 (BG 05) 18:32	17:58 (BG 08) 16:25	15:51 (BG 12) 15:48
7	04:45	05:29	19:47 (BG 02) 06:23	18:54 (BG 05) 07:16	17:36 (BG 08) 07:14	14:44 (BG 13) 08:05
	21:34	20:51	20:13 (BG 02) 19:43	19:12 (BG 05) 18:30	17:56 (BG 08) 16:23	15:10 (BG 13) 15:47
8	04:46	05:31	19:48 (BG 02) 06:25	18:56 (BG 05) 07:18	17:22 (BG 09) 07:16	14:44 (BG 13) 08:06
	21:33	20:49	20:13 (BG 02) 19:40	19:09 (BG 05) 18:27	17:55 (BG 08) 16:21	15:14 (BG 15) 15:47
9	04:47	05:33	19:47 (BG 02) 06:27	19:01 (BG 05) 07:19	17:20 (BG 09) 07:18	15:14 (BG 13) 08:07
	21:32	20:47	20:12 (BG 02) 19:38	19:03 (BG 05) 18:25	17:52 (BG 08) 16:20	15:16 (BG 15) 15:47
10	04:48	05:35	19:48 (BG 02) 06:28	19:01 (BG 05) 07:21	17:18 (BG 09) 07:19	15:16 (BG 15) 15:47
	21:32	20:45	20:12 (BG 02) 19:35	18:23	17:35 (BG 09) 16:18	15:17 (BG 15) 15:46
11	04:50	05:36	19:48 (BG 02) 06:30	18:23	17:17 (BG 09) 07:21	14:42 (BG 13) 08:10
	21:31	20:43	20:10 (BG 02) 19:33	18:20	17:36 (BG 09) 16:16	15:18 (BG 15) 15:46
12	04:51	05:38	19:49 (BG 02) 06:32	18:20	17:15 (BG 09) 07:23	14:42 (BG 13) 08:11
	21:30	20:41	20:10 (BG 02) 19:30	18:18	17:36 (BG 09) 16:15	15:19 (BG 15) 15:46
13	04:52	05:40	19:50 (BG 02) 06:34	18:18	17:14 (BG 09) 07:25	14:42 (BG 13) 08:12
	21:29	20:39	20:09 (BG 02) 19:28	18:16	17:36 (BG 09) 16:13	15:20 (BG 15) 15:46
14	04:53	05:41	19:50 (BG 02) 06:35	18:16	17:14 (BG 09) 07:27	14:41 (BG 13) 08:13
	21:28	20:37	20:07 (BG 02) 19:26	18:13	17:36 (BG 09) 16:11	15:20 (BG 15) 15:46
15	04:54	05:43	19:52 (BG 02) 06:37	18:13	17:14 (BG 09) 07:29	14:42 (BG 13) 08:14
	21:27	20:35	20:05 (BG 02) 19:23	18:11	17:36 (BG 09) 16:10	15:20 (BG 15) 15:46
16	04:56	05:45	19:55 (BG 02) 06:39	18:11	17:14 (BG 09) 07:31	14:42 (BG 13) 08:15
	21:26	20:33	20:01 (BG 02) 19:21	18:09	17:36 (BG 09) 16:08	15:21 (BG 15) 15:46
17	04:57	05:47	06:40	18:09	17:14 (BG 09) 07:32	14:42 (BG 13) 08:15
	21:25	20:31	19:18	18:06	17:35 (BG 09) 16:07	15:21 (BG 15) 15:46
18	04:58	05:48	06:42	18:06	17:14 (BG 09) 07:34	14:42 (BG 13) 08:16
	21:23	20:29	19:16	18:04	17:34 (BG 09) 16:05	15:21 (BG 15) 15:46
19	05:00	05:50	06:44	18:04	16:42 (BG 12) 07:36	14:43 (BG 13) 08:17
	21:22	20:27	19:13	18:02	17:32 (BG 09) 16:04	15:21 (BG 15) 15:47
20	05:01	05:52	06:46	18:02	16:39 (BG 12) 07:38	14:43 (BG 13) 08:18
	21:21	20:24	19:11	18:00	17:30 (BG 09) 16:03	15:22 (BG 15) 15:47
21	05:02	05:54	19:05 (BG 05) 06:47	18:00	16:38 (BG 12) 07:40	14:44 (BG 13) 08:18
	21:20	20:22	19:12 (BG 05) 19:08	18:00	17:28 (BG 09) 16:01	15:22 (BG 15) 15:47
22	05:04	05:55	19:01 (BG 05) 06:49	18:00	16:36 (BG 12) 07:41	14:45 (BG 13) 08:19
	21:18	20:20	19:28 (BG 03) 19:06	18:00	17:26 (BG 09) 16:00	15:22 (BG 15) 15:48
23	05:05	05:57	18:59 (BG 05) 06:51	18:00	16:35 (BG 12) 07:43	14:45 (BG 13) 08:19
	21:17	20:18	19:30 (BG 03) 19:04	18:00	16:59 (BG 12) 15:59	15:22 (BG 15) 15:48
24	05:07	05:59	18:58 (BG 05) 06:53	18:00	16:35 (BG 12) 07:45	14:46 (BG 13) 08:20
	21:15	20:15	19:32 (BG 03) 19:01	18:00	16:59 (BG 12) 15:58	15:22 (BG 15) 15:49
25	05:08	19:56 (BG 02) 06:01	18:56 (BG 05) 06:54	18:00	15:34 (BG 12) 07:47	14:47 (BG 13) 08:20
	21:14	20:05 (BG 02) 20:13	19:32 (BG 03) 18:59	18:00	16:00 (BG 12) 15:57	15:21 (BG 15) 15:50
26	05:10	19:54 (BG 02) 06:02	18:55 (BG 05) 06:56	18:00	15:34 (BG 12) 07:48	14:49 (BG 13) 08:20
	21:12	20:07 (BG 02) 20:11	19:33 (BG 03) 18:56	18:00	16:00 (BG 12) 15:56	15:21 (BG 15) 15:50
27	05:11	19:52 (BG 02) 06:04	18:54 (BG 05) 06:58	18:00	15:33 (BG 12) 07:50	14:50 (BG 13) 08:21
	21:11	20:08 (BG 02) 20:09	19:33 (BG 03) 18:54	18:00	16:00 (BG 12) 15:55	15:20 (BG 15) 15:51
28	05:13	19:52 (BG 02) 06:06	18:53 (BG 05) 07:00	18:00	15:33 (BG 12) 07:52	14:50 (BG 13) 08:21
	21:09	20:10 (BG 02) 20:06	19:32 (BG 03) 18:51	18:00	16:00 (BG 12) 15:54	15:18 (BG 15) 15:52
29	05:15	19:50 (BG 02) 06:07	18:52 (BG 05) 07:01	18:00	15:33 (BG 12) 07:53	13:37 (BG 16) 08:21
	21:08	20:10 (BG 02) 20:04	19:33 (BG 03) 18:49	18:00	16:00 (BG 12) 15:53	15:18 (BG 15) 15:53
30	05:16	19:50 (BG 02) 06:09	18:51 (BG 05) 07:03	18:00	15:33 (BG 12) 07:55	13:33 (BG 16) 08:21
	21:06	20:12 (BG 02) 20:02	19:31 (BG 03) 18:47	18:00	16:59 (BG 12) 15:52	15:17 (BG 15) 15:54
31	05:18	19:49 (BG 02) 06:11	18:51 (BG 05) 07:03	18:00	15:34 (BG 12) 07:56	14:48 (BG 13) 08:21
	21:04	20:12 (BG 02) 19:59	19:31 (BG 03) 18:47	18:00	16:37	15:55
Sonnenscheinstunden	510	458	382	329	261	236
astr.max.mögl.Beschattung	121	718	622	765	1019	1851

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) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: J - Bandelow 1, Uckerland
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März		April		Mai		Juni	
1	08:21	09:54 (BG 18)	07:52	15:49 (BG 13)	06:55	16:30 (BG 12)	06:41	18:25 (BG 08)	05:33	19:18 (BG 05)	04:44	
	15:56	94 15:06 (NO02)	16:47	24 16:13 (BG 15)	17:41	25 16:55 (BG 12)	19:39	26 18:59 (BG 06)	20:33	13 19:31 (BG 05)	21:22	
2	08:21	09:55 (BG 18)	07:50	15:48 (BG 13)	06:53	16:31 (BG 12)	06:39	18:45 (BG 06)	05:31	19:22 (BG 05)	04:43	
	15:57	93 15:06 (NO02)	16:48	26 16:14 (BG 15)	17:43	30 17:16 (BG 09)	19:41	12 18:57 (BG 06)	20:35	5 19:27 (BG 05)	21:23	
3	08:21	09:56 (BG 18)	07:48	15:47 (BG 13)	06:50	16:32 (BG 12)	06:36	18:47 (BG 06)	05:29		04:42	
	15:58	94 15:07 (NO02)	16:50	27 16:14 (BG 15)	17:45	33 17:19 (BG 09)	19:42	6 18:53 (BG 06)	20:37		21:25	
4	08:20	09:56 (BG 18)	07:46	15:46 (BG 13)	06:48	16:33 (BG 12)	06:34		05:27		04:42	
	16:00	93 15:07 (NO02)	16:52	28 16:14 (BG 15)	17:47	34 17:20 (BG 09)	19:44		20:38		21:26	
5	08:20	09:57 (BG 18)	07:45	15:45 (BG 13)	06:46	16:35 (BG 12)	06:31		05:25	20:06 (BG 02)	04:41	
	16:01	93 15:08 (NO02)	16:54	29 16:14 (BG 15)	17:49	33 17:22 (BG 09)	19:46		20:40	5 20:11 (BG 02)	21:27	
6	08:20	09:57 (BG 18)	07:43	15:45 (BG 13)	06:43	16:37 (BG 12)	06:29		05:23	20:02 (BG 02)	04:40	
	16:02	93 15:08 (NO02)	16:56	31 16:16 (BG 15)	17:51	30 17:23 (BG 09)	19:48		20:42	10 20:12 (BG 02)	21:28	
7	08:19	09:58 (BG 18)	07:41	15:45 (BG 13)	06:41	17:03 (BG 09)	06:27		05:21	20:00 (BG 02)	04:39	
	16:03	93 15:09 (NO02)	16:58	30 16:15 (BG 15)	17:53	21 17:24 (BG 09)	19:50		20:44	13 20:13 (BG 02)	21:29	
8	08:19	09:59 (BG 18)	07:39	15:45 (BG 13)	06:39	17:03 (BG 09)	06:24		05:19	19:59 (BG 02)	04:39	
	16:05	92 15:09 (NO02)	17:00	31 16:16 (BG 13)	17:55	21 17:24 (BG 09)	19:52		20:46	16 20:15 (BG 02)	21:30	
9	08:18	09:59 (BG 18)	07:37	15:44 (BG 13)	06:36	17:02 (BG 09)	06:22		05:17	19:58 (BG 02)	04:38	
	16:06	92 15:09 (NO02)	17:02	32 16:16 (BG 13)	17:56	22 17:24 (BG 09)	19:53		20:47	19 20:17 (BG 02)	21:31	
10	08:18	10:00 (BG 18)	07:35	15:44 (BG 13)	06:34	17:02 (BG 09)	06:19		05:15	19:57 (BG 02)	04:38	
	16:08	91 15:10 (NO02)	17:04	33 16:17 (BG 13)	17:58	22 17:24 (BG 09)	19:55		20:49	21 20:18 (BG 02)	21:31	
11	08:17	10:01 (BG 18)	07:33	15:43 (BG 13)	06:32	17:02 (BG 09)	06:17		05:13	19:56 (BG 02)	04:37	
	16:09	89 15:10 (NO02)	17:06	33 16:16 (BG 13)	18:00	20 17:22 (BG 09)	19:57		20:51	22 20:18 (BG 02)	21:32	
12	08:16	10:02 (BG 18)	07:31	15:44 (BG 13)	06:29	17:03 (BG 09)	06:15		05:12	19:56 (BG 02)	04:37	
	16:11	89 15:11 (NO02)	17:08	32 16:16 (BG 13)	18:02	19 17:22 (BG 09)	19:59		20:52	23 20:19 (BG 02)	21:33	
13	08:15	10:03 (BG 18)	07:30	15:44 (BG 13)	06:27	17:03 (BG 09)	06:12		05:10	19:56 (BG 02)	04:37	
	16:12	86 15:11 (NO02)	17:10	32 16:16 (BG 13)	18:04	17 17:20 (BG 09)	20:01		20:54	23 20:19 (BG 02)	21:34	
14	08:15	10:04 (BG 18)	07:28	15:44 (BG 13)	06:24	17:05 (BG 09)	06:10		05:08	19:55 (BG 02)	04:36	
	16:14	84 15:10 (NO02)	17:12	32 16:16 (BG 13)	18:06	13 17:18 (BG 09)	20:02	12 19:34 (BG 05)	20:56	24 20:19 (BG 02)	21:34	
15	08:14	10:05 (BG 18)	07:25	15:45 (BG 13)	06:22	17:08 (BG 09)	06:08		05:07	19:55 (BG 02)	04:36	
	16:15	80 15:10 (NO02)	17:14	30 16:15 (BG 13)	18:08	8 17:16 (BG 09)	20:04	16 19:36 (BG 05)	20:57	24 20:19 (BG 02)	21:35	
16	08:13	10:06 (BG 18)	07:23	15:46 (BG 13)	06:20	17:30 (BG 08)	06:05		05:05	19:55 (BG 02)	04:36	
	16:17	77 15:10 (NO02)	17:16	29 16:15 (BG 13)	18:10	10 17:40 (BG 08)	20:06	20 19:37 (BG 05)	20:59	24 20:19 (BG 02)	21:35	
17	08:12	10:08 (BG 18)	07:21	15:47 (BG 13)	06:17	17:27 (BG 08)	06:03		05:03	19:55 (BG 02)	04:36	
	16:19	73 15:10 (NO02)	17:18	27 16:14 (BG 13)	18:11	16 17:43 (BG 08)	20:08	22 19:38 (BG 05)	21:01	24 20:19 (BG 02)	21:36	
18	08:11	10:10 (BG 18)	07:19	15:47 (BG 13)	06:15	17:24 (BG 08)	06:01		05:02	19:56 (BG 02)	04:36	
	16:21	66 15:09 (NO02)	17:20	35 16:49 (BG 12)	18:13	20 17:44 (BG 08)	20:10	24 19:39 (BG 05)	21:02	24 20:20 (BG 02)	21:36	
19	08:10	10:12 (BG 18)	07:17	15:49 (BG 13)	06:12	17:23 (BG 08)	05:59		05:00	19:56 (BG 02)	04:36	
	16:22	59 15:08 (NO02)	17:22	38 16:52 (BG 12)	18:15	22 17:45 (BG 08)	20:11	24 19:39 (BG 05)	21:04	23 20:19 (BG 02)	21:37	
20	08:09	10:15 (BG 18)	07:15	15:50 (BG 13)	06:10	17:21 (BG 08)	05:56		04:59	19:56 (BG 02)	04:36	
	16:24	49 15:06 (NO02)	17:24	39 16:54 (BG 12)	18:17	24 17:45 (BG 08)	20:13	26 19:40 (BG 05)	21:05	23 20:19 (BG 02)	21:37	
21	08:07	14:18 (BG 16)	07:13	15:53 (BG 13)	06:08	17:21 (BG 08)	05:54		04:57	19:57 (BG 02)	04:36	
	16:26	33 14:51 (BG 16)	17:26	36 16:55 (BG 12)	18:19	25 17:46 (BG 08)	20:15	26 19:39 (BG 05)	21:07	22 20:19 (BG 02)	21:37	
22	08:06	14:18 (BG 16)	07:11	15:56 (BG 13)	06:05	17:19 (BG 08)	05:52		04:56	19:57 (BG 02)	04:36	
	16:28	32 14:50 (BG 16)	17:28	30 16:55 (BG 12)	18:21	32 17:54 (BG 06)	20:17	26 19:39 (BG 05)	21:08	21 20:18 (BG 02)	21:38	
23	08:05	14:19 (BG 16)	07:08	16:31 (BG 12)	06:03	17:19 (BG 08)	05:50		04:55	19:58 (BG 02)	04:37	
	16:29	31 14:50 (BG 16)	17:30	25 16:56 (BG 12)	18:22	36 17:56 (BG 06)	20:19	26 19:39 (BG 05)	21:10	20 20:18 (BG 02)	21:38	
24	08:04	14:20 (BG 16)	07:06	16:31 (BG 12)	06:00	17:19 (BG 08)	05:48		04:53	19:58 (BG 02)	04:37	
	16:31	29 14:49 (BG 16)	17:32	26 16:57 (BG 12)	18:24	39 17:58 (BG 06)	20:21	25 19:38 (BG 05)	21:11	19 20:17 (BG 02)	21:38	
25	08:02	14:22 (BG 16)	07:04	16:31 (BG 12)	05:58	17:19 (BG 08)	05:45		04:52	19:59 (BG 02)	04:37	
	16:33	27 14:49 (BG 16)	17:34	26 16:57 (BG 12)	18:26	41 18:00 (BG 06)	20:22	25 19:38 (BG 05)	21:13	18 20:17 (BG 02)	21:38	
26	08:01	14:23 (BG 16)	07:02	16:30 (BG 12)	05:55	17:19 (BG 08)	05:43		04:51	20:00 (BG 02)	04:38	
	16:35	25 14:48 (BG 16)	17:36	26 16:56 (BG 12)	18:28	43 18:02 (BG 06)	20:24	24 19:37 (BG 05)	21:14	16 20:16 (BG 02)	21:38	
27	07:59	14:25 (BG 16)	07:00	16:30 (BG 12)	05:53	17:19 (BG 08)	05:41		04:49	20:01 (BG 02)	04:38	
	16:37	29 16:05 (BG 15)	17:37	27 16:57 (BG 12)	18:30	44 18:03 (BG 06)	20:26	23 19:37 (BG 05)	21:16	14 20:15 (BG 02)	21:38	
28	07:58	14:27 (BG 16)	06:57	16:31 (BG 12)	05:51	17:19 (BG 08)	05:39		04:48	20:03 (BG 02)	04:39	
	16:39	30 16:07 (BG 15)	17:39	26 16:57 (BG 12)	18:32	44 18:03 (BG 06)	20:28	21 19:36 (BG 05)	21:17	11 20:14 (BG 02)	21:38	
29	07:56	14:30 (BG 16)			06:48	18:20 (BG 08)	05:37		04:47	20:04 (BG 02)	04:39	
	16:41	26 16:08 (BG 15)			19:33	42 19:02 (BG 06)	20:30	19 19:34 (BG 05)	21:18	9 20:13 (BG 02)	21:37	
30	07:55	15:53 (BG 15)			06:46	18:21 (BG 08)	05:35		04:46	20:06 (BG 02)	04:40	
	16:43	18 16:11 (BG 15)			19:35	38 19:01 (BG 06)	20:31	16 19:33 (BG 05)	21:20	5 20:11 (BG 02)	21:37	
31	07:53	15:51 (BG 13)			06:43	18:23 (BG 08)			04:45			
	16:45	21 16:12 (BG 15)			19:37	34 19:01 (BG 06)			21:21			
Sonnenscheinstunden	252		274		367		419		492		507	
astr.max.mögl.Beschattung	1981		840		858		419		491		507	

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	Schattendecke (WEA mit letztem Schatten)

SHADOW - Kalender

Berechnung: GesamtbelastungSchattenrezeptor: J - Bandelow 1, Uckerland
 Voraussetzungen für Berechnung des Schattenwurfs

- 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

	July	August	September	Oktober	November	Dezember			
1	04:40 21:37	05:19 21:02	20:07 (BG 02) 19:57	06:13	07:05 18:44	17:42 (BG 09) 16:35	07:02 15:13 (BG 13)	07:56 15:51	09:43 (BG 18)
2	04:41 21:36	05:21 21:01	20:07 (BG 02) 19:55	06:14	07:07 18:42	18:00 (BG 09) 16:33	07:04 15:13 (BG 13)	07:58 15:50	09:43 (BG 18)
3	04:42 21:36	05:23 20:59	20:08 (BG 02) 19:52	06:16	07:09 18:39	17:40 (BG 09) 16:31	07:06 15:15 (BG 13)	07:59 15:50	09:43 (BG 18)
4	04:43 21:36	05:24 20:57	20:08 (BG 02) 19:50	06:18	07:10 18:37	18:01 (BG 09) 16:29	07:08 15:15 (BG 13)	08:01 15:49	09:44 (BG 18)
5	04:44 21:35	05:26 20:55	20:09 (BG 02) 19:47	06:20	07:12 18:34	17:39 (BG 09) 16:27	07:10 15:16 (BG 13)	08:02 15:48	09:43 (BG 18)
6	04:44 21:34	05:28 20:53	20:10 (BG 02) 19:45	06:21	07:14 18:32	18:01 (BG 09) 16:25	07:12 15:17 (BG 13)	08:03 15:48	09:43 (BG 18)
7	04:45 21:34	05:29 20:51	20:12 (BG 02) 19:43	06:23	07:16 18:30	18:00 (BG 09) 16:23	07:14 15:18 (BG 13)	08:05 15:47	09:44 (BG 18)
8	04:46 21:33	05:31 20:49	20:21 (BG 02) 19:40	06:25	07:18 18:27	17:11 (BG 12) 16:21	07:16 15:19 (BG 13)	08:06 15:47	09:44 (BG 18)
9	04:47 21:32	05:33 20:47	06:27 19:38	06:30	07:19 18:25	17:09 (BG 12) 16:20	07:17 15:20 (BG 13)	08:07 15:47	09:44 (BG 18)
10	04:48 21:32	05:35 20:45	06:28 19:35	06:30	07:21 18:23	18:39 (BG 06) 17:07 (BG 12)	07:19 15:20 (BG 13)	08:09 15:46	09:44 (BG 18)
11	04:50 21:31	05:36 20:43	19:29 (BG 05) 19:33	06:30	07:23 18:21	18:19 (BG 08) 17:06 (BG 12)	07:21 15:22 (BG 13)	08:10 15:46	09:45 (BG 18)
12	04:51 21:30	05:38 20:41	19:37 (BG 05) 19:30	06:30	07:25 18:18	18:52 (BG 06) 17:04 (BG 12)	07:23 15:24 (BG 13)	08:11 15:46	09:45 (BG 18)
13	04:52 21:29	05:40 20:39	19:40 (BG 05) 19:28	06:33	07:27 18:16	18:13 (BG 08) 17:03 (BG 12)	07:25 15:25 (BG 13)	08:12 15:46	09:45 (BG 18)
14	04:53 21:28	20:13 (BG 02) 20:37	19:42 (BG 05) 19:26	06:35	07:28 18:14	18:11 (BG 08) 17:02 (BG 12)	07:27 15:26 (BG 13)	08:13 15:46	09:46 (BG 18)
15	04:54 21:27	8 20:21 (BG 02) 20:35	19:42 (BG 05) 19:23	06:37	07:30 18:11	18:09 (BG 08) 17:02 (BG 12)	07:29 15:27 (BG 13)	08:14 15:46	09:46 (BG 18)
16	04:56 21:26	10 20:20 (BG 02) 20:33	19:43 (BG 05) 19:23	06:39	07:32 18:08	18:08 (BG 08) 17:02 (BG 12)	07:31 15:28 (BG 13)	08:15 15:46	09:47 (BG 18)
17	04:57 21:25	13 20:19 (BG 02) 20:31	19:43 (BG 05) 19:21	06:40	07:34 18:05	18:08 (BG 08) 17:02 (BG 12)	07:32 15:29 (BG 13)	08:15 15:46	09:47 (BG 18)
18	04:58 21:23	15 20:25 (BG 02) 20:31	19:44 (BG 05) 19:18	06:42	07:36 18:04	18:06 (BG 08) 17:02 (BG 12)	07:34 15:30 (BG 13)	08:16 15:46	09:47 (BG 18)
19	05:00 21:22	17 20:26 (BG 02) 20:29	19:45 (BG 05) 19:16	06:44	07:38 18:03	18:06 (BG 08) 17:03 (BG 12)	07:36 15:31 (BG 13)	08:17 15:47	09:48 (BG 18)
20	05:01 21:21	19 20:27 (BG 02) 20:24	19:44 (BG 05) 19:13	06:46	07:40 18:02	18:06 (BG 08) 17:02 (BG 12)	07:38 15:32 (BG 13)	08:18 15:47	09:48 (BG 18)
21	05:02 21:20	20 20:28 (BG 02) 20:22	19:44 (BG 05) 19:08	06:47	07:41 18:01	18:06 (BG 08) 17:02 (BG 12)	07:40 15:33 (BG 13)	08:18 15:47	09:48 (BG 18)
22	05:04 21:18	20 20:27 (BG 02) 20:20	19:44 (BG 05) 19:06	06:49	07:43 18:00	18:05 (BG 08) 17:02 (BG 12)	07:41 15:34 (BG 13)	08:19 15:48	09:49 (BG 18)
23	05:05 21:17	21 20:28 (BG 02) 20:18	19:43 (BG 05) 19:04	06:51	07:45 18:00	18:06 (BG 08) 17:03 (BG 12)	07:43 15:35 (BG 13)	08:19 15:48	09:49 (BG 18)
24	05:07 21:15	22 20:29 (BG 02) 20:15	19:43 (BG 05) 19:01	06:53	07:47 18:00	18:07 (BG 08) 17:04 (BG 12)	07:45 15:36 (BG 13)	08:20 15:49	09:50 (BG 18)
25	05:08 21:14	22 20:29 (BG 02) 20:13	19:43 (BG 05) 18:59	06:54	07:49 18:00	18:07 (BG 08) 17:05 (BG 12)	07:47 15:37 (BG 13)	08:20 15:50	09:51 (BG 18)
26	05:10 21:12	23 20:29 (BG 02) 20:11	19:41 (BG 05) 18:56	06:56	07:51 18:00	18:27 (BG 08) 17:06 (BG 12)	07:49 15:38 (BG 13)	08:20 15:50	09:51 (BG 18)
27	05:11 21:11	24 20:30 (BG 02) 20:09	19:41 (BG 05) 18:54	06:58	07:53 18:00	18:28 (BG 08) 17:07 (BG 12)	07:51 15:39 (BG 13)	08:21 15:51	09:51 (BG 18)
28	05:13 21:09	24 20:30 (BG 02) 20:06	19:21 (BG 05) 18:51	07:00	07:55 17:54	17:51 (BG 09) 16:43	07:52 15:40 (BG 13)	08:21 15:52	09:52 (BG 18)
29	05:15 21:08	24 20:30 (BG 02) 20:04	19:23 (BG 05) 18:49	07:01	07:57 17:54	17:47 (BG 09) 16:41	07:53 15:41 (BG 13)	08:21 15:53	09:52 (BG 18)
30	05:16 21:06	23 20:30 (BG 02) 20:02	19:35 (BG 05) 18:47	07:03	07:59 17:54	17:44 (BG 09) 16:39	07:55 15:42 (BG 13)	08:21 15:54	09:53 (BG 18)
31	05:18 21:04	23 20:30 (BG 02) 19:59		07:03	08:00 16:37	17:59 (BG 09) 16:37	07:55 15:43 (BG 13)	08:21 15:55	09:54 (BG 18)
	Sonnenscheinstunden astr.max.mögl.Beschattung	510 351	458 515	382 582	329 889	261 1252	236 2889		

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) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: BG 01 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (52)
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 13:30-14:03/33 15:56 12:54-13:16/22	07:52 06:55 16:47 17:41		06:41 07:33-07:53/20 19:39	05:33 04:44 20:33 21:22	
2	08:21 13:30-14:03/33 15:57 12:55-13:15/20	07:50 06:53 16:49 17:43	07:24-07:34/10	06:39 07:35-07:51/16 19:41	05:31 04:43 20:35 21:24	
3	08:21 13:31-14:03/32 15:58 12:56-13:15/19	07:48 06:51 16:51 17:45	07:20-07:37/17	06:36 07:38-07:48/10 19:43	05:29 04:42 20:37 21:25	
4	08:21 13:33-14:04/31 16:00 12:58-13:15/17	07:47 06:48 16:52 17:47	07:17-07:39/22	06:34 19:44	05:27 04:42 20:39 21:26	
5	08:20 13:33-14:03/30 16:01 12:59-13:14/15	07:45 06:46 16:54 17:49	07:16-07:41/25	06:31 19:46	05:25 04:41 20:40 21:27	
6	08:20 13:33-14:03/30 16:02 13:00-13:13/13	07:43 06:44 16:56 17:51	07:15-07:42/27	06:29 19:48	05:23 04:40 20:42 21:28	
7	08:19 13:35-14:04/29 16:03 13:04-13:12/8	07:41 06:41 16:58 17:53	07:13-07:42/29	06:27 19:50	05:21 04:40 20:44 21:29	
8	08:19 13:35-14:03/28 16:05	07:39 06:39 17:00 17:55	07:12-07:43/31	06:24 19:52	05:19 04:39 20:46 21:30	
9	08:18 13:36-14:03/27 16:06	07:37 06:37 17:02 17:57	07:11-07:43/32	06:22 19:53	05:17 04:38 20:47 21:31	
10	08:18 13:38-14:04/26 16:08	07:36 06:34 17:04 17:58	07:11-07:43/32	06:20 19:55	05:15 04:38 20:49 21:32	
11	08:17 13:39-14:03/24 16:09	07:34 06:32 17:06 18:00	07:11-07:44/33	06:17 19:57	05:14 04:37 20:51 21:32	
12	08:16 13:40-14:02/22 16:11	07:32 06:29 17:08 18:02	07:10-07:43/33	06:15 19:59	05:12 04:37 20:53 21:33	
13	08:16 13:42-14:02/20 16:12	07:30 06:27 17:10 18:04	07:10-07:43/33	06:13 20:01	05:10 04:37 20:54 21:34	
14	08:15 13:44-14:01/17 16:14	07:28 06:25 17:12 18:06	07:09-07:42/33	06:10 20:03	05:08 04:36 20:56 21:34	
15	08:14 13:46-14:00/14 16:16	07:26 06:22 17:14 18:08	07:10-07:42/32	06:08 20:04	05:07 04:36 20:58 21:35	
16	08:13 13:48-13:56/8 16:17	07:24 06:20 17:16 18:10	07:10-07:40/30 06:45-06:52/7	06:06 20:06	05:05 04:36 20:59 21:36	
17	08:12 16:19	07:21 06:17 17:18 18:12	07:10-07:40/30 06:42-06:56/14	06:03 20:08	05:03 04:36 21:01 21:36	
18	08:11 16:21	07:19 06:15 17:20 18:13	07:10-07:38/28 06:39-06:57/18	06:01 20:10	05:02 04:36 21:02 21:37	
19	08:10 16:22	07:17 06:13 17:22 18:15	07:12-07:37/25 06:38-06:58/20	05:59 20:12	05:00 04:36 21:04 21:37	
20	08:09 16:24	07:15 06:10 17:24 18:17	07:13-07:35/22 06:37-06:59/22	05:56 20:13	04:59 04:36 21:06 21:37	
21	08:08 16:26	07:13 06:08 17:26 18:19	07:15-07:32/17 06:35-06:59/24	05:54 20:15	04:57 04:36 21:07 21:37	
22	08:06 16:28	07:11 06:05 17:28 18:21	07:18-07:29/11 06:34-07:00/26	05:52 20:17	04:56 04:36 21:09 21:38	
23	08:05 16:30	07:09 06:03 17:30 18:23	06:33-07:00/27	05:50 20:19	04:55 04:37 21:10 21:38	
24	08:04 16:31	07:06 06:00 17:32 18:24	06:32-07:00/28	05:48 20:21	04:53 04:37 21:12 21:38	
25	08:02 16:33	07:04 05:58 17:34 18:26	06:31-06:59/28	05:45 20:23	04:52 04:37 21:13 21:38	
26	08:01 16:35	07:02 05:56 17:36 18:28	06:31-07:00/29	05:43 20:24	04:51 04:38 21:14 21:38	
27	07:59 16:37	07:00 05:53 17:38 18:30	06:32-07:00/28	05:41 20:26	04:50 04:38 21:16 21:38	
28	07:58 16:39	06:57 05:51 17:40 18:32	06:31-06:58/27	05:39 20:28	04:48 04:39 21:17 21:38	
29	07:56 16:41	06:48 19:33	07:32-07:58/26	05:37 20:30	04:47 04:39 21:19 21:38	
30	07:55 16:43	06:46 19:35	07:31-07:56/25	05:35 20:32	04:46 04:40 21:20 21:37	
31	07:53 16:45	06:43 19:37	07:33-07:55/22		04:45 21:21	
Sonnenscheinstunden	252	274	367	419	492	508
Anzahl Minuten mit Schatten	518	0	923	46	0	0

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

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

Berechnung: GesamtbelastungWEA: BG 01 - ABC A158-5300 5300 158.0 l-! NH: 151,0 m (Ges:230,0 m) (52)
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember
1	04:40 21:37	05:20 21:03	06:13 19:57	07:05 18:44	07:49-08:22/33 16:35	07:56 15:51
2	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	07:49-08:22/33 16:33	07:58 15:50
3	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:49-08:21/32 16:31	07:59 15:50
4	04:43 21:36	05:24 20:57	06:18 19:50	07:10 18:37	07:49-08:21/32 16:29	08:01 15:49
5	04:44 21:35	05:26 20:55	06:20 19:48	07:12 18:35	07:49-08:20/31 16:27	08:02 15:49
6	04:45 21:35	05:28 20:53	06:21 19:45	07:14 18:32	07:49-08:19/30 16:25	08:04 15:48
7	04:45 21:34	05:30 20:52	06:23 19:43	07:16 18:30	07:49-08:18/29 16:23	08:05 15:48
8	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:50-08:16/26 16:22	08:06 15:47
9	04:47 21:33	05:33 20:48	06:27 19:38	07:19 18:25	07:52-08:15/23 16:20	08:07 15:47
10	04:49 21:32	05:35 20:46	06:28 19:35	07:21 18:23	07:53-08:13/20 16:18	08:09 15:47
11	04:50 21:31	05:36 20:44	06:30 19:33	07:23 18:20	07:56-08:10/14 16:16	08:10 15:46
12	04:51 21:30	05:38 20:42	06:32 19:31	07:25 18:18	08:01-08:05/4 16:15	08:11 15:46
13	04:52 21:29	05:40 20:40	06:34 19:28	07:27 18:16	07:27 16:13	08:12 15:46
14	04:53 21:28	05:42 20:37	06:35 19:26	07:29 18:13	07:29 16:11	08:13 15:46
15	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 15:46
16	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 15:46
17	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	07:33 16:07	08:16 15:46
18	04:58 21:24	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:06	08:16 15:46
19	05:00 21:22	05:50 20:27	06:44 19:14	07:38 18:02	07:36 16:04	08:17 15:47
20	05:01 21:21	05:52 20:25	06:46 19:11	07:40 18:00	07:38 16:03	08:18 15:47
21	05:03 21:20	05:54 20:22	06:48 19:09	07:42 17:58	07:40 16:02	08:18 15:48
22	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:42 16:00	08:19 15:48
23	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	08:19 15:49
24	05:07 21:15	05:59 20:16	06:53 19:01	07:47 17:51	07:45 15:58	08:20 15:49
25	05:08 21:14	06:01 20:13	06:55 18:59	07:49 17:49	07:47 15:57	08:20 15:50
26	05:10 21:12	06:02 20:11	06:56 18:56	07:52-08:21/29 16:47	07:48 15:56	08:21 15:50
27	05:12 21:11	06:04 20:09	06:58 18:54	07:52-08:22/30 16:45	07:50 15:55	08:21 15:51
28	05:13 21:09	06:06 20:06	07:00 18:52	07:51-08:22/31 16:43	07:52 15:54	08:21 15:52
29	05:15 21:08	06:08 20:04	07:02 18:49	07:50-08:23/33 16:41	07:53 15:53	08:21 15:53
30	05:16 21:06	06:09 20:02	07:03 18:47	07:50-08:23/33 16:39	07:55 15:52	08:21 15:54
31	05:18 21:04	06:11 19:59		07:00 16:37		08:21 15:55
Sonnenscheinstunden	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	675	307	81	1824

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

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

Berechnung: GesamtbelastungWEA: BG 02 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (55)
Voraussetzungen für Berechnung des Schattenwurfs

- 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 Sonneneinfallrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:21 10:45-11:14/29 09:00-09:45/45 15:56 09:47-10:38/51	07:52 06:55 16:47 17:41		06:41 19:39 17:41 19:39	05:33 19:37-20:02/25 20:33	04:44 21:22
2	08:21 10:46-11:13/27 08:59-09:45/46 15:57 09:47-10:37/50	07:50 06:53 16:49 17:43		06:39 19:41 19:41 19:41	05:31 19:36-20:04/28 20:35	04:43 21:24
3	08:21 10:47-11:14/27 09:00-09:45/45 15:58 09:48-10:38/50	07:48 06:50 16:50 17:45		06:36 19:43 19:43 19:43	05:29 19:35-20:05/30 20:37	04:42 21:25
4	08:21 10:48-11:14/26 09:00-09:46/46 16:00 09:49-10:39/50	07:47 06:48 16:52 17:47		06:34 19:44 19:44 19:44	05:27 19:34-20:06/32 20:39	04:42 21:26
5	08:20 10:49-11:13/24 09:00-09:46/46 16:01 09:49-10:38/49	07:45 06:46 16:54 17:49		06:31 19:46 19:46 19:46	05:25 19:34-20:11/37 20:40	04:41 21:27
6	08:20 10:49-11:13/24 09:01-09:47/46 16:02 09:49-10:38/49	07:43 06:44 16:56 17:51		06:29 19:48 19:48 19:48	05:23 19:33-20:12/39 20:42	04:40 21:28
7	08:19 10:51-11:13/22 09:00-09:47/47 16:03 09:51-10:39/48	07:41 06:41 16:58 17:53		06:27 19:50 19:50 19:50	05:21 19:32-20:13/41 20:44	04:40 21:29
8	08:19 10:52-11:12/20 09:00-09:47/47 16:05 09:51-10:38/47	07:39 06:39 17:00 17:55		06:24 19:52 19:52 19:52	05:19 19:32-20:15/43 20:46	04:39 21:30
9	08:18 10:54-11:11/17 09:00-09:47/47 16:06 09:52-10:38/46	07:37 06:36 17:02 17:57		06:22 19:53 19:53 19:53	05:17 19:32-20:17/45 20:47	04:38 21:31
10	08:18 10:56-11:11/15 09:01-09:49/48 16:08 09:54-10:39/45	07:36 06:34 17:04 17:58	06:58-07:05/7	06:20 19:55 19:55 19:55	05:15 19:32-20:18/46 20:49	04:38 21:32
11	08:17 10:59-11:09/10 09:01-09:49/48 16:09 09:55-10:38/43	07:34 06:32 17:06 18:00	06:56-07:07/11	06:17 19:57 19:57 19:57	05:14 19:31-20:18/47 20:51	04:37 21:32
12	08:16 09:56-10:38/42 16:11 09:01-09:49/48	07:32 06:29 17:08 18:02	06:53-07:07/14	06:15 19:59 19:59 19:59	05:12 19:32-20:19/47 20:53	04:37 21:33
13	08:16 09:57-10:37/40 16:12 09:01-09:49/48	07:30 06:27 17:10 18:04	06:51-07:08/17	06:12 20:01 20:01 20:01	05:10 19:32-20:19/47 20:54	04:37 21:34
14	08:15 10:16-10:37/21 09:01-09:49/48 16:14 09:58-10:35/17	07:28 06:25 17:12 18:06	06:48-07:08/20	06:10 20:03 20:03 20:03	05:08 19:31-20:19/48 20:56	04:36 21:34
15	08:14 10:18-10:36/18 09:02-09:49/47 16:16 10:00-10:14/14	07:26 06:22 17:14 18:08	06:48-07:09/21	06:08 20:04 20:04 20:04	05:07 19:32-20:19/47 20:58	04:36 21:35
16	08:13 10:19-10:34/15 09:02-09:49/47 16:17 10:03-10:12/9	07:24 06:20 17:16 18:10	06:47-07:08/21	06:06 20:06 20:06 20:06	05:05 19:32-20:19/47 20:59	04:36 21:36
17	08:12 10:22-10:32/10 16:19 09:01-09:48/47	07:21 06:17 17:18 18:11	06:47-07:08/21	06:03 20:08 20:08 20:08	05:03 19:33-20:19/46 21:01	04:36 21:36
18	08:11 09:02-09:48/46 16:21	07:19 06:15 17:20 18:13	06:47-07:06/19	06:01 20:10 20:10 20:10	05:02 19:34-20:20/46 21:02	04:36 21:36
19	08:10 09:03-09:48/45 16:22	07:17 06:12 17:22 18:15	06:48-07:06/18	05:59 20:12 20:12 20:12	05:00 19:34-20:19/45 21:04	04:36 21:37
20	08:09 09:03-09:47/44 16:24	07:15 06:10 17:24 18:17	06:49-07:05/16	05:56 20:13 20:13 20:13	04:59 19:35-20:19/44 21:06	04:36 21:37
21	08:07 09:03-09:46/43 16:26	07:13 06:08 17:26 18:19	06:50-07:02/12	05:54 20:15 20:15 20:15	04:57 19:36-20:19/43 21:07	04:36 21:37
22	08:06 09:31-09:46/15 16:28 09:04-09:30/26	07:11 06:05 17:28 18:21	06:53-06:59/6	05:52 20:17 20:17 20:17	04:56 19:36-20:18/42 21:09	04:36 21:38
23	08:05 09:33-09:43/10 16:29 09:05-09:30/25	07:09 06:03 17:30 18:22		05:50 20:19 20:19 20:19	04:55 19:37-20:18/41 21:10	04:37 21:38
24	08:04 09:06-09:30/24 16:31	07:06 06:00 17:32 18:24		05:48 20:21 20:21 20:21	04:53 19:38-20:17/39 21:12	04:37 21:38
25	08:02 09:06-09:29/23 16:33	07:04 05:58 17:34 18:26		05:45 20:22 20:22 20:22	04:52 19:39-20:17/38 21:13	04:37 21:38
26	08:01 09:08-09:29/21 16:35	07:02 05:56 17:36 18:28		05:43 20:24 20:24 20:24	04:51 20:00-20:16/16 21:14	04:38 21:38
27	07:59 09:09-09:28/19 16:37	07:00 05:53 17:38 18:30		05:41 19:47-19:56/9 20:26	04:50 20:01-20:15/14 21:16	04:38 21:38
28	07:58 09:10-09:27/17 16:39	06:57 05:51 17:39 18:32		05:39 19:44-19:58/14 20:28	04:48 20:03-20:14/11 21:17	04:39 21:38
29	07:56 09:12-09:26/14 16:41	06:48 05:48 19:33		05:37 19:41-20:00/19 20:30	04:47 20:04-20:13/9 21:19	04:39 21:38
30	07:55 09:15-09:23/8 16:43	06:46 05:46 19:35		05:35 19:39-20:01/22 20:31	04:46 20:06-20:11/5 21:20	04:40 21:37
31	07:53 16:45	06:43 05:43 19:37			04:45 21:21	
Sonnenscheinstunden	252	274	367	419	492	508
Anzahl Minuten mit Schatten	2131	0	203	64	1131	0

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-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: BG 02 - ABC A158-5300 5300 158.0 l-! NH: 151,0 m (Ges:230,0 m) (55)
 Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
 Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	04:40 21:37	05:20 19:42-20:29/47 21:03	06:13 19:57	07:05 07:31-07:47/16 18:44	07:02 16:35	07:56 10:41-10:51/10 08:43-09:31/48 15:51 09:37-10:20/43	
2	04:41 21:37	05:21 19:42-20:28/46 21:01	06:15 19:55	07:07 07:33-07:45/12 18:42	07:04 16:33	07:58 10:39-10:53/14 08:43-09:31/48 15:50 09:36-10:21/45	
3	04:42 21:36	05:23 19:42-20:28/46 20:59	06:16 19:52	07:09 07:35-07:44/9 18:39	07:06 16:31	07:59 10:38-10:55/17 08:44-09:32/48 15:50 09:36-10:22/46	
4	04:43 21:36	05:24 19:42-20:26/44 20:57	06:18 19:50	07:10 07:37-07:41/4 18:37	07:08 16:29	08:01 10:37-10:56/19 08:44-09:31/47 15:49 09:35-10:22/47	
5	04:44 21:35	05:26 19:42-20:25/43 20:55	06:20 19:47	07:12 18:35	07:10 16:27	08:02 10:36-10:58/22 08:45-09:32/47 15:48 09:36-10:24/48	
6	04:44 21:35	05:28 19:42-20:22/40 20:53	06:21 19:45	07:14 18:32	07:12 16:25	08:04 10:36-10:59/23 08:46-09:32/46 15:48 09:35-10:24/49	
7	04:45 21:34	05:29 19:43-20:21/38 20:51	06:23 19:43	07:16 18:30	07:14 16:23	08:05 10:36-11:03/27 08:47-09:33/46 15:48 09:36-10:25/49	
8	04:46 21:33	05:31 19:44-20:17/33 20:50	06:25 19:40	07:18 18:27	07:16 16:21	08:06 10:35-11:01/26 08:47-09:33/46 15:47 09:36-10:26/50	
9	04:47 21:33	05:33 19:43-20:15/32 20:48	06:27 19:38	07:19 18:25	07:18 16:20	08:07 10:35-11:02/27 08:48-09:34/46 15:47 09:36-10:26/50	
10	04:49 21:32	05:35 19:45-20:14/29 20:46	06:28 19:35	07:21 18:23	07:20 16:18	08:09 10:36-11:03/27 08:49-09:35/46 15:46 09:37-10:27/50	
11	04:50 21:31	05:36 19:45-20:12/27 20:44	06:30 19:33	07:23 18:20	07:21 16:16	08:10 10:36-11:04/28 08:50-09:35/45 15:46 09:37-10:28/51	
12	04:51 21:30	05:38 19:46-20:10/24 20:42	06:32 19:31	07:25 18:18	07:23 08:45-08:55/10 16:15	08:11 10:36-11:05/29 08:51-09:35/44 15:46 09:37-10:28/51	
13	04:52 21:29	05:40 19:48-20:09/21 20:39	06:34 19:28	07:27 18:16	07:25 08:43-08:57/14 16:13	08:12 10:36-11:05/29 08:51-09:35/44 15:46 09:37-10:29/52	
14	04:53 20:13-20:21/8 21:28	05:41 19:50-20:07/17 20:37	06:35 19:26	07:29 18:13	07:27 08:43-09:00/17 16:11	08:13 10:36-11:06/30 08:52-09:36/44 15:46 09:38-10:29/51	
15	04:54 20:12-20:22/10 21:27	05:43 19:52-20:05/13 20:35	06:37 19:23	07:30 18:11	07:29 08:41-09:01/20 16:10	08:14 10:36-11:07/31 08:53-09:36/43 15:46 09:38-10:30/52	
16	04:56 20:10-20:23/13 21:26	05:45 19:55-20:01/6 20:33	06:39 19:21	07:32 18:09	07:31 08:41-09:02/21 16:08	08:15 10:37-11:08/31 08:54-09:37/43 15:46 09:39-10:31/52	
17	04:57 20:10-20:25/15 21:25	05:47 19:51-20:08/17 20:31	06:41 19:18	07:34 18:07	07:33 08:40-09:03/23 16:07	08:16 10:37-11:08/31 08:55-09:37/42 15:46 09:39-10:31/52	
18	04:58 19:50-20:26/36 21:24	05:48 20:29 20:29	06:42 19:16	07:36 18:04	07:34 08:40-09:04/24 16:06	08:16 10:37-11:08/31 08:56-09:38/42 15:46 09:39-10:31/52	
19	05:00 19:48-20:27/39 21:22	05:50 20:27 20:27	06:44 19:13	07:38 18:02	07:36 09:08-09:18/10 16:04 08:40-09:05/25	08:17 10:37-11:09/32 08:56-09:38/42 15:47 09:40-10:32/52	
20	05:01 19:47-20:27/40 21:21	05:52 20:24 20:24	06:46 19:11	07:40 18:00	07:38 09:06-09:21/15 16:03 08:39-09:05/26	08:18 10:38-11:10/32 08:57-09:39/42 15:47 09:40-10:33/53	
21	05:02 19:47-20:28/41 21:20	05:54 20:22 20:22	06:47 19:09	07:41 17:58	07:40 08:39-09:22/43 16:01	08:18 10:38-11:10/32 09:11-09:39/28 15:47 09:40-10:33/53 08:57-09:10/13	
22	05:04 19:46-20:28/42 21:18	05:55 20:20 20:20	06:49 07:35-07:46/11 19:06	07:43 17:55	07:42 08:39-09:23/44 16:00	08:19 10:39-11:11/32 09:12-09:40/28 15:48 09:41-10:34/53 08:58-09:11/13	
23	05:05 19:46-20:29/43 21:17	05:57 20:18 20:18	06:51 07:33-07:48/15 19:04	07:45 17:53	07:43 08:39-09:24/45 15:59	08:19 10:39-11:11/32 09:12-09:40/28 15:48 09:41-10:34/53 08:58-09:11/13	
24	05:07 19:45-20:29/44 21:15	05:59 20:16 20:16	06:53 07:32-07:49/17 19:01	07:47 17:51	07:45 08:39-09:25/46 15:58	08:20 10:40-11:12/32 08:59-09:41/42 15:49 09:42-10:35/53	
25	05:08 19:44-20:29/45 21:14	06:01 20:13 20:13	06:54 07:31-07:50/19 18:59	06:49 16:49	07:47 10:00-10:10/10 15:57 08:40-09:26/46	08:20 10:40-11:12/32 08:59-09:41/42 15:50 09:43-10:35/52	
26	05:10 19:44-20:30/46 21:12	06:02 20:11 20:11	06:56 07:29-07:49/20 18:56	06:51 16:47	07:48 09:58-10:13/15 08:40-09:27/47 15:56 09:41-09:50/9	08:20 10:41-11:12/31 08:59-09:41/42 15:50 09:43-10:35/52	
27	05:12 19:43-20:30/47 21:11	06:04 20:09 20:09	06:58 07:29-07:49/20 18:54	06:53 16:45	07:50 09:57-10:15/18 08:41-09:28/47 15:55 09:40-09:53/13	08:21 10:41-11:12/31 08:59-09:42/43 15:51 09:43-10:36/53	
28	05:13 19:43-20:30/47 21:09	06:06 20:06 20:06	07:00 07:29-07:49/20 18:51	06:55 16:43	07:52 09:56-10:17/21 08:41-09:29/48 15:54 09:39-09:55/16	08:21 10:42-11:13/31 08:59-09:42/43 15:52 09:44-10:36/52	
29	05:15 19:43-20:30/47 21:08	06:08 20:04 20:04	07:02 07:29-07:49/20 18:49	06:57 16:41	07:53 09:37-10:17/40 15:53 08:41-09:29/48	08:21 10:43-11:13/30 08:59-09:43/44 15:53 09:44-10:36/52	
30	05:16 19:43-20:30/47 21:06	06:09 20:02 20:02	07:03 07:30-07:49/19 18:47	06:59 16:39	07:55 09:37-10:19/42 15:52 08:42-09:30/48	08:21 10:43-11:13/30 08:59-09:43/44 15:54 09:45-10:37/52	
31	05:18 19:42-20:29/47 21:04	06:11 19:59 19:59		07:00 16:37		08:21 10:44-11:14/30 09:00-09:44/44 15:55 09:46-10:37/51	
	Sonnenscheinstunden Anzahl Minuten mit Schatten	510 692	458 506	382 161	329 41	261 851	236 3793

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

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

Berechnung: GesamtbelastungWEA: BG 03 - ABC A158-5300 5300 158.0 !- NH: 151,0 m (Ges:230,0 m) (53)
Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	07:52 16:47	06:55 07:26-07:51/25 17:41	06:41 19:39	05:33 20:33	04:44 21:22
2	08:21 15:57	07:50 16:49	06:53 07:26-07:51/25 17:43	06:39 19:41	05:31 20:35	04:43 21:24
3	08:21 15:58	07:48 16:51	06:51 07:27-07:51/24 17:45	06:36 19:43	05:29 20:37	04:42 21:25
4	08:21 16:00	07:47 16:52	06:48 07:27-07:49/22 17:47	06:34 19:44	05:27 20:39	04:42 21:26
5	08:20 16:01	07:45 16:54	06:46 07:27-07:49/22 17:49	06:31 19:11-19:20/9 19:46	05:25 20:40	04:41 21:27
6	08:20 16:02	07:43 16:56	06:44 07:29-07:48/19 17:51	06:29 19:07-19:21/14 19:48	05:23 20:42	04:40 21:28
7	08:19 16:03	07:41 16:58	06:41 07:29-07:46/17 17:53	06:27 19:06-19:23/17 19:50	05:21 20:44	04:40 21:29
8	08:19 16:05	07:39 17:00	06:39 07:32-07:43/11 17:55	06:24 19:05-19:25/20 19:52	05:19 20:46	04:39 21:30
9	08:18 16:06	07:37 17:02	06:36 07:00-07:17/17 17:57	06:22 19:03-19:26/23 19:53	05:17 20:47	04:38 21:31
10	08:18 16:08	07:36 17:04	06:34 06:58-07:18/20 17:58	06:20 19:02-19:28/26 19:55	05:15 20:49	04:38 21:32
11	08:17 16:09	07:34 17:06	06:32 06:56-07:18/22 18:00	06:17 19:02-19:30/28 19:57	05:14 20:51	04:37 21:32
12	08:16 16:11	07:32 17:08	06:29 06:55-07:18/23 18:02	06:15 19:01-19:31/30 19:59	05:12 20:53	04:37 21:33
13	08:16 16:12	07:30 17:10	06:27 06:56-07:18/22 18:04	06:13 19:01-19:33/32 20:01	05:10 20:54	04:37 21:34
14	08:15 16:14	07:28 17:12	06:25 06:55-07:17/22 18:06	06:10 19:01-19:34/33 20:03	05:08 20:56	04:36 21:34
15	08:14 16:16	07:26 17:14	06:22 06:56-07:17/21 18:08	06:08 19:01-19:34/33 20:04	05:07 20:58	04:36 21:35
16	08:13 16:17	07:24 17:16	06:20 06:56-07:15/19 18:10	06:06 19:01-19:33/32 20:06	05:05 20:59	04:36 21:36
17	08:12 16:19	07:21 17:18	06:17 06:57-07:14/17 18:11	06:03 19:01-19:33/32 20:08	05:03 21:01	04:36 21:36
18	08:11 16:21	07:19 17:20	06:15 06:57-07:12/15 18:13	06:01 19:02-19:33/31 20:10	05:02 21:02	04:36 21:36
19	08:10 16:22	07:17 17:22	06:13 07:00-07:09/9 18:15	05:59 19:04-19:32/28 20:12	05:00 21:04	04:36 21:37
20	08:09 16:24	07:15 17:24	06:10 18:17	05:56 19:05-19:32/27 20:13	04:59 21:06	04:36 21:37
21	08:07 16:26	07:13 07:38-07:43/5 17:26	06:08 18:19	05:54 19:07-19:30/23 20:15	04:57 21:07	04:36 21:37
22	08:06 16:28	07:11 07:36-07:47/11 17:28	06:05 18:21	05:52 19:11-19:28/17 20:17	04:56 21:09	04:36 21:38
23	08:05 16:30	07:09 07:33-07:48/15 17:30	06:03 18:23	05:50 19:16-19:26/10 20:19	04:55 21:10	04:37 21:38
24	08:04 16:31	07:06 07:31-07:49/18 17:32	06:00 18:24	05:48 20:21	04:53 21:12	04:37 21:38
25	08:02 16:33	07:04 07:29-07:51/22 17:34	05:58 18:26	05:45 20:22	04:52 21:13	04:37 21:38
26	08:01 16:35	07:02 07:27-07:50/23 17:36	05:56 18:28	05:43 20:24	04:51 21:14	04:38 21:38
27	07:59 16:37	07:00 07:27-07:51/24 17:38	05:53 18:30	05:41 20:26	04:50 21:16	04:38 21:38
28	07:58 16:39	06:57 07:27-07:52/25 17:40	05:51 18:32	05:39 20:28	04:48 21:17	04:39 21:38
29	07:56 16:41		06:48 19:33	05:37 20:30	04:47 21:19	04:39 21:38
30	07:55 16:43		06:46 19:35	05:35 20:31	04:46 21:20	04:40 21:37
31	07:53 16:45		06:43 19:37		04:45 21:21	
Sonnenscheinstunden	252	274	367	419	492	508
Anzahl Minuten mit Schatten	0	143	398	465	0	0

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

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

Berechnung: GesamtbelastungWEA: BG 03 - ABC A158-5300 5300 158.0 l-! NH: 151,0 m (Ges:230,0 m) (53)
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	04:40	21:37	05:20	21:03	06:13	19:01-19:29/28	07:05	07:34-07:57/23	07:02	16:35	07:56	15:51
2	04:41	21:37	05:21	21:01	06:15	19:00-19:26/26	07:07	07:34-07:56/22	07:04	16:33	07:58	15:50
3	04:42	21:36	05:23	20:59	06:16	19:01-19:24/23	07:09	07:35-07:56/21	07:06	16:31	07:59	15:50
4	04:43	21:36	05:24	20:57	06:18	19:02-19:22/20	07:10	07:37-07:55/18	07:08	16:29	08:01	15:49
5	04:44	21:35	05:26	20:55	06:20	19:02-19:19/17	07:12	08:11-08:19/8	07:10	16:27	08:02	15:49
6	04:45	21:35	05:28	20:53	06:21	19:03-19:17/14	07:14	08:06-08:21/15	07:12	16:23	08:04	15:48
7	04:45	21:34	05:30	20:51	06:23	19:06-19:15/9	07:16	08:04-08:22/18	07:14	16:23	08:05	15:48
8	04:46	21:33	05:31	20:50	06:25		07:18	08:03-08:23/20	07:16	16:22	08:06	15:47
9	04:47	21:33	05:33	20:48	06:27		07:19	08:02-08:24/22	07:18	16:20	08:07	15:47
10	04:49	21:32	05:35	20:46	06:28		07:21	08:01-08:25/24	07:20	16:18	08:09	15:47
11	04:50	21:31	05:36	20:44	06:30		07:23	08:01-08:25/24	07:21	16:16	08:10	15:46
12	04:51	21:30	05:38	20:42	06:32		07:25	08:00-08:25/25	07:23	16:15	08:11	15:46
13	04:52	21:29	05:40	20:39	06:34		07:27	08:00-08:25/25	07:25	16:13	08:12	15:46
14	04:53	21:28	05:42	20:37	06:35		07:29	07:59-08:24/25	07:27	16:11	08:13	15:46
15	04:54	21:27	05:43	20:35	06:37		07:30	07:59-08:23/24	07:29	16:10	08:14	15:46
16	04:56	21:26	05:45	20:33	06:39		07:32	08:00-08:22/22	07:31	16:08	08:15	15:46
17	04:57	21:25	05:47	20:31	06:41		07:34	08:01-08:21/20	07:33	16:07	08:16	15:46
18	04:58	21:24	05:48	20:29	06:42		07:36	08:03-08:20/17	07:34	16:06	08:16	15:46
19	05:00	21:22	05:50	19:24-19:28/4	06:44		07:38	08:05-08:19/14	07:36	16:04	08:17	15:47
20	05:01	21:21	05:52	19:21-19:32/11	06:46		07:40	08:07-08:16/9	07:38	16:03	08:18	15:47
21	05:03	21:20	05:54	19:16-19:34/18	06:48		07:42		07:40	16:02	08:18	15:48
22	05:04	21:18	05:55	19:11-19:34/23	06:49		07:43		07:42	16:00	08:19	15:48
23	05:05	21:17	05:57	19:09-19:35/26	06:51		07:45		07:43	16:00	08:19	15:48
24	05:07	21:15	05:59	19:07-19:36/29	06:53	07:45-07:52/7	07:47		07:45	15:59	08:20	15:48
25	05:08	21:14	06:01	19:05-19:36/31	06:55	07:42-07:55/13	06:49		07:47	15:58	08:21	15:49
26	05:10	21:12	06:02	19:04-19:36/32	06:56	07:39-07:55/16	06:51		07:48	15:57	08:21	15:50
27	05:12	21:11	06:04	19:03-19:36/33	06:58	07:38-07:56/18	06:53		07:50	15:56	08:21	15:50
28	05:13	21:09	06:06	19:02-19:35/33	07:00	07:37-07:57/20	06:55		07:52	15:55	08:21	15:51
29	05:15	21:08	06:08	19:02-19:35/33	07:02	07:36-07:58/22	06:57		07:53	15:54	08:21	15:52
30	05:16	21:06	06:09	19:02-19:34/32	07:03	07:36-07:58/22	06:59		07:55	15:53	08:21	15:53
31	05:18	21:04	06:11	19:01-19:31/30	07:05		07:00		07:55	15:53	08:21	15:53
							16:37			15:52	08:21	15:54
											08:21	15:55
Sonnenscheinstunden	510	458			382		329		261		236	
Anzahl Minuten mit Schatten	0	335			255		429		0		0	

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

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

Berechnung: GesamtbelastungWEA: BG 04 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (51)
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:21 15:56	07:52 08:22-08:49/27 16:47	06:55 07:42-08:01/19 17:41	06:41 18:47-18:50/3 19:39	05:33 20:33	04:44 21:22
2	08:21 15:57	07:50 08:22-08:49/27 16:49	06:53 07:44-07:58/14 17:43	06:39 19:41	05:31 20:35	04:43 21:24
3	08:21 15:58	07:48 08:23-08:51/28 16:51	06:51 17:45	06:36 19:43	05:29 20:37	04:43 21:25
4	08:21 16:00	07:47 08:22-08:51/29 16:53	06:48 17:47	06:34 19:44	05:27 20:39	04:42 21:26
5	08:20 16:01	07:45 08:22-08:51/29 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 21:27
6	08:20 16:02	07:43 08:22-08:51/29 16:56	06:44 17:51	06:29 19:48	05:23 20:42	04:40 21:28
7	08:19 16:04	07:41 08:23-08:51/28 16:58	06:41 17:53	06:27 19:50	05:21 20:44	04:40 21:29
8	08:19 16:05	07:39 08:23-08:51/28 17:00	06:39 17:55	06:24 19:52	05:19 20:46	04:39 21:30
9	08:18 16:06	07:37 08:24-08:50/26 17:02	06:36 17:57	06:22 19:53	05:17 20:47	04:38 21:31
10	08:18 16:08	07:36 08:24-08:50/26 17:04	06:34 17:59	06:20 19:55	05:15 20:49	04:38 21:32
11	08:17 16:09	07:34 08:25-08:49/24 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:37 21:32
12	08:16 16:11	07:32 08:26-08:48/22 17:08	06:29 18:02	06:15 19:59	05:12 20:53	04:37 21:33
13	08:16 16:12	07:30 08:27-08:46/19 17:10	06:27 18:04	06:13 20:01	05:10 20:54	04:37 21:34
14	08:15 16:14	07:28 08:28-08:44/16 17:12	06:25 18:06	06:10 20:03	05:08 20:56	04:37 21:34
15	08:14 16:16	07:26 08:31-08:42/11 17:14	06:22 18:08	06:08 20:04	05:07 20:58	04:36 21:35
16	08:13 16:17	07:24 07:49-08:06/17 17:16	06:20 18:10	06:06 20:06	05:05 20:59	04:36 21:36
17	08:12 16:19	07:21 07:47-08:07/20 17:18	06:17 18:12	06:03 20:08	05:03 21:01	04:36 21:36
18	08:11 16:21	07:19 07:45-08:08/23 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 21:36
19	08:10 16:22	07:17 07:42-08:08/26 17:22	06:13 18:15	05:59 20:12	05:00 21:04	04:36 21:37
20	08:09 16:24	07:15 07:40-08:09/29 17:24	06:10 18:17	05:57 20:13	04:59 21:06	04:36 21:37
21	08:07 16:26	07:13 07:39-08:09/30 17:26	06:08 18:19	05:54 20:15	04:57 21:07	04:36 21:37
22	08:06 16:28	07:11 07:39-08:09/30 17:28	06:05 18:21	05:52 20:17	04:56 21:09	04:36 21:38
23	08:05 16:30	07:09 07:38-08:08/30 17:30	06:03 18:23	05:50 20:19	04:55 21:10	04:37 21:38
24	08:04 08:33-08:38/5 16:31	07:06 07:39-08:08/29 17:32	06:00 18:24	05:48 20:21	04:53 21:12	04:37 21:38
25	08:02 08:31-08:41/10 16:33	07:04 07:39-08:08/29 17:34	05:58 18:26	05:45 20:22	04:52 21:13	04:37 21:38
26	08:01 08:30-08:43/13 16:35	07:02 07:40-08:06/26 17:36	05:56 18:28	05:43 20:24	04:51 21:14	04:38 21:38
27	07:59 08:28-08:44/16 16:37	07:00 07:40-08:05/25 17:38	05:53 18:30	05:41 20:26	04:50 21:16	04:38 21:38
28	07:58 08:26-08:45/19 16:39	06:57 07:41-08:04/23 17:40	05:51 18:32	05:39 20:28	04:48 21:17	04:39 21:38
29	07:56 08:25-08:47/22 16:41		06:48 19:33	05:37 20:30	04:47 21:19	04:39 21:38
30	07:55 08:23-08:48/25 16:43		06:46 19:35	05:35 20:31	04:46 21:20	04:40 21:37
31	07:53 08:23-08:49/26 16:45		06:43 19:37		04:45 21:21	
Sonnenscheinstunden	252	274	367	419	492	508
Anzahl Minuten mit Schatten	136	734	206	3	0	0

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-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: BG 04 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (51)
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	October	November	Dezember
1	04:40 21:37	05:20 21:03	06:13 19:57	07:05 18:44	07:02 07:54-08:20/26 16:35	07:56 15:51
2	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	07:04 07:53-08:20/27 16:33	07:58 15:50
3	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 07:53-08:20/27 16:31	07:59 15:50
4	04:43 21:36	05:25 20:57	06:18 19:50	07:10 18:37	07:08 07:52-08:21/29 16:29	08:01 15:49
5	04:44 21:35	05:26 20:55	06:20 19:48	07:12 18:35	07:10 07:52-08:21/29 16:27	08:02 15:49
6	04:45 21:35	05:28 20:53	06:22 19:45	07:14 18:32	07:12 07:52-08:21/29 16:25	08:04 15:48
7	04:45 21:34	05:30 20:52	06:23 19:43	07:16 18:30	07:14 07:52-08:21/29 16:23	08:05 15:48
8	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:16 07:52-08:21/29 16:22	08:06 15:47
9	04:47 21:33	05:33 20:48	06:27 19:38	07:19 18:25	07:18 07:53-08:20/27 16:20	08:07 15:47
10	04:49 21:32	05:35 20:46	06:28 19:35	07:21 18:23	07:20 07:53-08:20/27 16:18	08:09 15:47
11	04:50 21:31	05:36 20:44	06:30 19:33	07:23 18:20	08:21-08:26/5 16:16	08:10 15:46
12	04:51 21:30	05:38 20:42	06:32 19:31	07:25 18:18	08:17-08:34/17 16:15	08:11 15:46
13	04:52 21:29	05:40 20:39	06:34 19:28	07:27 18:16	08:15-08:36/21 16:13	08:12 15:46
14	04:53 21:28	05:42 20:37	06:35 19:26	07:29 18:13	08:13-08:37/24 16:12	08:13 15:46
15	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	08:11-08:38/27 16:10	08:14 15:46
16	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	08:11-08:39/28 16:08	08:15 15:46
17	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	08:10-08:39/29 16:07	08:16 15:46
18	04:58 21:24	05:48 20:29	06:42 19:16	07:36 18:04	08:10-08:39/29 16:06	08:16 15:47
19	05:00 21:22	05:50 20:27	06:44 19:14	07:38 18:02	08:10-08:40/30 16:04	08:17 15:47
20	05:01 21:21	05:52 20:24	06:46 19:11	07:40 18:00	08:10-08:40/30 16:03	08:18 15:47
21	05:03 21:20	05:54 20:22	06:48 19:09	07:42 17:58	08:10-08:39/29 16:02	08:18 15:48
22	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	08:11-08:39/28 16:00	08:19 15:48
23	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	08:13-08:38/25 15:59	08:19 15:49
24	05:07 21:15	05:59 20:16	06:53 19:01	07:47 17:51	08:15-08:38/23 15:58	08:20 15:49
25	05:08 21:14	06:01 20:13	06:55 18:59	06:49 16:49	07:17-07:37/20 15:57	08:20 15:50
26	05:10 21:12	06:02 20:11	06:56 18:56	06:51 16:47	07:19-07:35/16 15:56	08:21 15:50
27	05:12 21:11	06:04 20:09	06:58 18:54	06:53 16:45	08:00-08:12/12 07:21-07:34/13 15:55	08:21 15:51
28	05:13 21:09	06:06 20:06	07:00 18:52	06:55 16:43	07:58-08:14/16 07:23-07:31/8 15:54	08:21 15:52
29	05:15 21:08	06:08 20:04	07:02 18:49	06:57 16:41	07:56-08:16/20 07:25-07:27/2 15:53	08:21 15:53
30	05:16 21:06	06:09 20:02	07:03 18:47	06:59 16:39	07:55-08:17/22 15:52	08:21 15:54
31	05:18 21:04	06:11 19:59		07:00 16:37	07:55-08:19/24 15:51	08:21 15:55
Sonnenscheinstunden	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	177	498	414	0

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

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

Berechnung: GesamtbelastungWEA: BG 05 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (59)
Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 09:22-09:42/20 15:56	07:52 06:55 16:47 17:41		06:41 18:43-19:05/22 19:39	05:33 19:18-19:31/13 20:33	04:44 21:22
2	08:21 09:22-09:41/19 15:57	07:50 06:53 16:49 17:43		06:39 18:42-19:08/26 19:41	05:31 19:22-19:27/5 20:35	04:43 21:23
3	08:21 09:23-09:42/19 15:58	07:48 06:50 16:50 17:45		06:36 18:39-19:10/31 19:43	05:29 20:37	04:42 21:25
4	08:20 09:25-09:42/17 16:00	07:47 06:48 16:52 17:47		06:34 18:38-19:14/36 19:44	05:27 20:39	04:42 21:26
5	08:20 09:25-09:42/17 16:01	07:45 06:46 16:54 17:49		06:31 18:38-19:17/39 19:46	05:25 20:40	04:41 21:27
6	08:20 09:26-09:43/17 16:02	07:43 06:44 16:56 17:51		06:29 18:36-19:17/41 19:48	05:23 20:42	04:40 21:28
7	08:19 09:27-09:42/15 16:03	07:41 06:41 16:58 17:53		06:27 18:36-19:19/43 19:50	05:21 20:44	04:40 21:29
8	08:19 09:28-09:41/13 16:05	07:39 06:39 17:00 17:55		06:24 18:35-19:20/45 19:52	05:19 20:46	04:39 21:30
9	08:18 09:29-09:41/12 16:06	07:37 06:36 17:02 17:57		06:22 18:34-19:20/46 19:53	05:17 20:47	04:38 21:31
10	08:18 09:31-09:41/10 16:08	07:35 06:34 17:04 17:58		06:20 18:34-19:21/47 19:55	05:15 20:49	04:38 21:32
11	08:17 09:33-09:39/6 16:09	07:34 06:32 17:06 18:00		06:17 18:34-19:22/48 19:57	05:14 20:51	04:37 21:32
12	08:16 16:11	07:32 06:29 17:08 18:02		06:15 18:34-19:22/48 19:59	05:12 20:52	04:37 21:33
13	08:16 16:12	07:30 06:27 17:10 18:04		06:12 18:34-19:22/48 20:01	05:10 20:54	04:37 21:34
14	08:15 16:14	07:28 06:25 17:12 18:06		06:10 18:35-19:34/59 20:03	05:08 20:56	04:36 21:34
15	08:14 16:16	07:26 06:22 17:14 18:08		06:08 18:35-19:36/61 20:04	05:07 20:58	04:36 21:35
16	08:13 16:17	07:23 06:20 17:16 18:10		06:06 18:35-19:37/62 20:06	05:05 20:59	04:36 21:36
17	08:12 16:19	07:21 06:17 17:18 18:11		06:03 18:36-19:38/62 20:08	05:03 21:01	04:36 21:36
18	08:11 16:21	07:19 06:15 17:20 18:13		06:01 18:37-19:39/62 20:10	05:02 21:02	04:36 21:36
19	08:10 16:22	07:17 06:12 17:22 18:15		05:59 18:39-19:39/60 20:12	05:00 21:04	04:36 21:37
20	08:09 16:24	07:15 06:10 17:24 18:17		05:56 18:41-19:40/59 20:13	04:59 21:06	04:36 21:37
21	08:07 16:26	07:13 06:08 17:26 18:19		05:54 18:43-19:39/56 20:15	04:57 21:07	04:36 21:37
22	08:06 16:28	07:11 06:05 17:28 18:21		05:52 18:47-19:39/52 20:17	04:56 21:09	04:36 21:38
23	08:05 16:30	07:09 06:03 17:30 18:22		05:50 18:51-19:39/48 20:19	04:55 21:10	04:37 21:38
24	08:04 16:31	07:06 06:00 17:32 18:24		05:48 19:13-19:38/25 20:21	04:53 21:12	04:37 21:38
25	08:02 16:33	07:04 05:58 17:34 18:26		05:45 19:13-19:38/25 20:22	04:52 21:13	04:37 21:38
26	08:01 16:35	07:02 05:56 17:36 18:28		05:43 19:13-19:37/24 20:24	04:51 21:14	04:38 21:38
27	07:59 16:37	07:00 05:53 17:38 18:30		05:41 19:14-19:37/23 20:26	04:50 21:16	04:38 21:38
28	07:58 16:39	06:57 05:51 17:39 18:32		05:39 19:15-19:36/21 20:28	04:48 21:17	04:39 21:38
29	07:56 16:41	06:48 19:33		05:37 19:15-19:34/19 20:30	04:47 21:19	04:39 21:38
30	07:55 16:43	06:46 19:35	18:50-19:00/10	05:35 19:17-19:33/16 20:31	04:46 21:20	04:40 21:37
31	07:53 16:45	06:43 19:37	18:46-19:04/18		04:45 21:21	
Sonnenscheinstunden	252	274	367	419	492	508
Anzahl Minuten mit Schatten	165	0	28	1277	18	0

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

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

Berechnung: GesamtbelastungWEA: BG 05 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (59)
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember
1	04:40 21:37	05:20 21:03	06:13 18:33-19:21/48 19:57	07:05 18:44	07:02 16:35	07:56 09:16-09:21/5 15:51
2	04:41 21:37	05:21 21:01	06:15 18:32-19:19/47 19:55	07:07 18:42	07:04 16:33	07:58 09:14-09:23/9 15:50
3	04:42 21:36	05:23 20:59	06:16 18:32-19:19/47 19:52	07:09 18:39	07:06 16:31	07:59 09:13-09:25/12 15:50
4	04:43 21:36	05:24 20:57	06:18 18:32-19:17/45 19:50	07:10 18:37	07:08 16:29	08:01 09:12-09:25/13 15:49
5	04:44 21:35	05:26 20:55	06:20 18:32-19:15/43 19:47	07:12 18:35	07:10 16:27	08:02 09:12-09:27/15 15:49
6	04:44 21:35	05:28 20:53	06:21 18:32-19:14/42 19:45	07:14 18:32	07:12 16:25	08:04 09:12-09:28/16 15:48
7	04:45 21:34	05:30 20:51	06:23 18:33-19:12/39 19:43	07:16 18:30	07:14 16:23	08:05 09:12-09:29/17 15:48
8	04:46 21:33	05:31 20:50	06:25 18:32-19:09/37 19:40	07:18 18:27	07:16 16:21	08:06 09:12-09:30/18 15:47
9	04:47 21:33	05:33 20:48	06:27 18:33-19:04/31 19:38	07:19 18:25	07:18 16:20	08:07 09:12-09:30/18 15:47
10	04:49 21:32	05:35 20:46	06:28 18:35-19:01/26 19:35	07:21 18:23	07:19 16:18	08:09 09:12-09:31/19 15:46
11	04:50 21:31	05:36 19:29-19:37/8 20:44	06:30 18:36-18:58/22 19:33	07:23 18:20	07:21 16:16	08:10 09:12-09:32/20 15:46
12	04:51 21:30	05:38 19:26-19:40/14 20:42	06:32 18:37-18:55/18 19:31	07:25 18:18	07:23 16:15	08:11 09:13-09:32/19 15:46
13	04:52 21:29	05:40 19:25-19:42/17 20:39	06:34 18:40-18:52/12 19:28	07:27 18:16	07:25 16:13	08:12 09:39-09:43/4 15:46 09:13-09:33/20
14	04:53 21:28	05:41 19:23-19:42/19 20:37	06:35 19:26	07:29 18:13	07:27 16:11	08:13 09:38-09:45/7 15:46 09:13-09:34/21
15	04:54 21:27	05:43 19:22-19:43/21 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 09:38-09:46/8 15:46 09:13-09:34/21
16	04:56 21:26	05:45 19:20-19:43/23 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 09:38-09:47/9 15:46 09:14-09:35/21
17	04:57 21:25	05:47 19:20-19:44/24 20:31	06:41 19:18	07:34 18:07	07:33 16:07	08:16 09:38-09:48/10 15:46 09:14-09:36/22
18	04:58 21:23	05:48 19:19-19:45/26 20:29 19:06-19:16/10	06:42 19:16	07:36 18:04	07:34 16:06	08:16 09:39-09:49/10 15:46 09:15-09:36/21
19	05:00 21:22	05:50 19:03-19:44/41 20:27	06:44 19:13	07:38 18:02	07:36 16:04	08:17 09:38-09:49/11 15:47 09:15-09:36/21
20	05:01 21:21	05:52 18:56-19:44/48 20:24	06:46 19:11	07:40 18:00	07:38 16:03	08:18 09:39-09:50/11 15:47 09:16-09:37/21
21	05:03 21:20	05:54 18:53-19:44/51 20:22	06:47 19:09	07:41 17:58	07:40 16:01	08:18 09:39-09:50/11 15:47 09:16-09:37/21
22	05:04 21:18	05:55 18:47-19:43/56 20:20	06:49 19:06	07:43 17:55	07:42 16:00	08:19 09:40-09:51/11 15:48 09:17-09:38/21
23	05:05 21:17	05:57 18:44-19:43/59 20:18	06:51 19:04	07:45 17:53	07:43 15:59	08:19 09:40-09:51/11 15:48 09:17-09:38/21
24	05:07 21:15	05:59 18:42-19:43/61 20:16	06:53 19:01	07:47 17:51	07:45 15:58	08:20 09:41-09:52/11 15:49 09:18-09:39/21
25	05:08 21:14	06:01 18:40-19:41/61 20:13	06:54 18:59	06:49 16:49	07:47 15:57	08:20 09:42-09:52/10 15:50 09:18-09:39/21
26	05:10 21:12	06:02 18:39-19:41/62 20:11	06:56 18:56	06:51 16:47	07:48 15:56	08:20 09:42-09:52/10 15:50 09:18-09:39/21
27	05:12 21:11	06:04 18:38-19:39/61 20:09	06:58 18:54	06:53 16:45	07:50 15:55	08:21 09:43-09:52/9 15:51 09:19-09:40/21
28	05:13 21:09	06:06 18:36-19:37/61 20:06	07:00 18:51	06:55 16:43	07:52 15:54	08:21 09:44-09:52/8 15:52 09:19-09:40/21
29	05:15 21:08	06:08 18:35-19:35/60 20:04	07:02 18:49	06:57 16:41	07:53 15:53	08:21 09:45-09:52/7 15:53 09:20-09:40/20
30	05:16 21:06	06:09 18:35-19:23/48 20:02	07:03 18:47	06:59 16:39	07:55 15:52	08:21 09:47-09:51/4 15:54 09:20-09:41/21
31	05:18 21:04	06:11 18:34-19:22/48 19:59		07:00 16:37		08:21 09:21-09:41/20 15:55
Sonnenscheinstunden	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	879	457	0	0	740

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

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

Berechnung: GesamtbelastungWEA: BG 06 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (60)
 Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
 Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	
1	08:21 15:56	07:52 08:19-08:40/21 16:47	06:55 17:41	06:41 19:39	18:43-18:59/16 20:33	04:44 21:22	
2	08:21 15:57	07:50 08:19-08:40/21 16:49	06:53 17:43	06:39 19:41	18:45-18:57/12 20:35	04:43 21:23	
3	08:21 15:58	07:48 08:19-08:41/22 16:51	06:51 17:45	06:36 19:43	18:47-18:53/6 20:29	04:42 21:25	
4	08:20 16:00	07:47 08:20-08:41/21 16:52	06:48 17:47	06:34 19:44	05:27 20:39	04:42 21:26	
5	08:20 16:01	07:45 08:20-08:41/21 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 21:27	
6	08:20 16:02	07:43 08:20-08:41/21 16:56	06:44 17:51	17:19-17:24/5 19:48	06:29 19:48	05:23 20:42	04:40 21:28
7	08:19 16:03	07:41 08:21-08:40/19 16:58	06:41 17:53	17:15-17:26/11 19:50	06:27 19:50	05:21 20:44	04:40 21:29
8	08:19 16:05	07:39 08:22-08:40/18 17:00	06:39 17:55	17:14-17:29/15 19:52	06:24 19:52	05:19 20:46	04:39 21:30
9	08:18 16:06	07:37 08:23-08:39/16 17:02	06:36 17:57	17:12-17:30/18 19:53	06:22 19:53	05:17 20:47	04:38 21:31
10	08:18 16:08	07:36 08:25-08:37/12 17:04	06:34 17:58	17:11-17:32/21 19:55	06:20 19:55	05:15 20:49	04:38 21:32
11	08:17 16:09	07:34 08:27-08:34/7 17:06	06:32 18:00	17:09-17:34/25 19:57	06:17 19:57	05:14 20:51	04:37 21:32
12	08:16 16:11	07:32 17:08	06:29 18:02	17:09-17:36/27 19:59	06:15 19:59	05:12 20:53	04:37 21:33
13	08:16 16:12	07:30 17:10	06:27 18:04	17:08-17:37/29 20:01	06:13 20:01	05:10 20:54	04:37 21:34
14	08:15 16:14	07:28 17:12	06:25 18:06	17:08-17:40/32 20:03	06:10 20:03	05:08 20:56	04:37 21:34
15	08:14 16:16	07:26 17:14	06:22 18:08	17:09-17:42/33 20:04	06:08 20:04	05:07 20:58	04:36 21:35
16	08:13 16:17	07:24 17:16	06:20 18:10	17:08-17:43/35 20:06	06:06 20:06	05:05 20:59	04:36 21:36
17	08:12 16:19	07:21 17:18	06:17 18:11	17:09-17:45/36 20:08	06:03 20:08	05:03 21:01	04:36 21:36
18	08:11 16:21	07:19 17:20	06:15 18:13	17:09-17:46/37 20:10	06:01 20:10	05:02 21:02	04:36 21:36
19	08:10 16:22	07:17 17:22	06:13 18:15	17:10-17:47/37 20:12	05:59 20:12	05:00 21:04	04:36 21:37
20	08:09 16:24	07:15 17:24	06:10 18:17	17:12-17:46/34 20:13	05:56 20:13	04:59 21:06	04:36 21:37
21	08:07 16:26	07:13 17:26	06:08 18:19	17:15-17:46/31 20:15	05:54 20:15	04:57 21:07	04:36 21:37
22	08:06 16:28	07:11 17:28	06:05 18:21	17:49-17:54/5 20:17	05:52 20:17	04:56 21:09	04:36 21:38
23	08:05 16:30	07:09 17:30	06:03 18:22	17:47-17:56/9 20:19	05:50 20:19	04:55 21:10	04:37 21:38
24	08:04 16:31	07:06 17:32	06:00 18:24	17:46-17:58/12 20:21	05:48 20:21	04:53 21:12	04:37 21:38
25	08:02 16:33	08:31-08:32/1 07:04	05:58 18:26	17:44-18:00/16 20:22	05:45 20:22	04:52 21:13	04:37 21:38
26	08:01 16:35	08:30-08:35/5 07:02	05:56 18:28	17:43-18:02/19 20:24	05:43 20:24	04:51 21:14	04:38 21:38
27	07:59 16:37	08:28-08:36/8 07:00	05:53 18:30	17:42-18:03/21 20:26	05:41 20:26	04:50 21:16	04:38 21:38
28	07:58 16:39	08:26-08:37/11 06:57	05:51 18:32	17:42-18:03/21 20:28	05:39 20:28	04:48 21:17	04:39 21:38
29	07:56 16:41	08:25-08:39/14 07:00	06:48 19:33	18:42-19:02/20 20:30	05:37 20:30	04:47 21:19	04:39 21:38
30	07:55 16:43	08:23-08:39/16 07:00	06:46 19:35	18:42-19:01/19 20:31	05:35 20:31	04:46 21:20	04:40 21:37
31	07:53 16:45	08:21-08:40/19 07:00	06:43 19:37	18:43-19:01/18 20:31	05:35 20:31	04:45 21:21	04:40 21:37
Sonnenscheinstunden	252	274	367	419	492	507	0
Anzahl Minuten mit Schatten	74	199	678	34	0	0	0

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

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

Berechnung: GesamtbelastungWEA: BG 06 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (60)
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember
1	04:40 21:37	05:20 21:03	06:13 19:57	07:05 17:48-18:16/28 18:44	07:02 07:54-08:07/13 16:35	07:56 15:51
2	04:41 21:37	05:21 21:01	06:15 19:55	07:07 17:48-18:13/25 18:42	07:04 07:52-08:08/16 16:33	07:58 15:50
3	04:42 21:36	05:23 20:59	06:16 19:52	07:09 17:48-18:11/23 18:39	07:06 07:51-08:09/18 16:31	07:59 15:50
4	04:43 21:36	05:25 20:57	06:18 19:50	07:10 17:49-18:09/20 18:37	07:08 07:50-08:10/20 16:29	08:01 15:49
5	04:44 21:35	05:26 20:55	06:20 19:47	07:12 17:49-18:06/17 18:35	07:10 07:50-08:11/21 16:27	08:02 15:49
6	04:45 21:35	05:28 20:53	06:21 19:45	07:14 17:51-18:03/12 18:32	07:12 07:50-08:11/21 16:25	08:04 15:48
7	04:45 21:34	05:30 20:51	06:23 19:43	07:16 17:53-18:01/8 18:30	07:14 07:49-08:11/22 16:23	08:05 15:48
8	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	07:16 07:49-08:11/22 16:22	08:06 15:47
9	04:47 21:33	05:33 20:48	06:27 19:38	18:42-18:46/4 07:19 18:25	07:18 07:49-08:11/22 16:20	08:07 15:47
10	04:49 21:32	05:35 20:46	06:28 19:35	18:39-18:50/11 07:21 18:23	07:19 07:50-08:11/21 16:18	08:09 15:47
11	04:50 21:31	05:36 20:44	06:30 19:33	18:37-18:52/15 07:23 18:20	07:21 07:52-08:11/19 16:16	08:10 15:46
12	04:51 21:30	05:38 20:42	06:32 19:31	18:34-18:52/18 07:25 18:18	07:23 07:54-08:10/16 16:15	08:11 15:46
13	04:52 21:29	05:40 20:39	06:34 19:28	18:34-18:52/18 07:27 18:16	07:25 07:56-08:10/14 16:13	08:12 15:46
14	04:53 21:28	05:42 20:37	06:35 19:26	18:33-18:53/20 07:29 18:13	07:27 07:59-08:10/11 16:11	08:13 15:46
15	04:54 21:27	05:43 20:35	06:37 19:23	18:32-18:52/20 07:30 18:11	07:29 08:01-08:09/8 16:10	08:14 15:46
16	04:56 21:26	05:45 20:33	06:39 19:21	18:32-18:52/20 07:32 18:09	07:31 08:03-08:08/5 16:08	08:15 15:46
17	04:57 21:25	05:47 20:31	06:41 19:18	18:32-18:51/19 07:34 18:07	07:33 08:05-08:06/1 16:07	08:16 15:46
18	04:58 21:24	05:48 20:29	06:42 19:16	18:31-18:48/17 07:36 18:04	07:34 16:06	08:16 15:47
19	05:00 21:22	05:50 20:27	06:44 19:13	18:32-18:45/13 07:38 18:02	07:36 16:04	08:17 15:47
20	05:01 21:21	05:52 20:24	06:46 19:11	18:33-18:43/10 07:40 18:00	07:38 16:03	08:18 15:47
21	05:03 21:20	05:54 20:22	06:48 19:09	18:35-18:41/6 07:41 17:58	07:40 16:02	08:18 15:48
22	05:04 21:18	05:55 20:20	06:49 19:06	18:37-18:38/1 07:43 17:55	07:42 16:00	08:19 15:48
23	05:05 21:17	05:57 20:18	06:51 19:04	17:57-18:30/33 07:45 17:53	07:43 15:59	08:19 15:49
24	05:07 21:15	05:59 20:16	06:53 19:01	17:55-18:30/35 07:47 17:51	07:45 15:58	08:20 15:49
25	05:08 21:14	06:01 20:13	06:55 18:59	17:52-18:29/37 06:49 16:49	07:47 15:57	08:20 15:50
26	05:10 21:12	06:02 20:11	06:56 18:56	17:51-18:28/37 06:51 16:47	07:48 15:56	08:20 15:50
27	05:12 21:11	06:04 20:09	06:58 18:54	17:50-18:26/36 06:53 16:45	07:50 15:55	08:21 15:51
28	05:13 21:09	06:06 20:06	07:00 18:51	17:49-18:23/34 06:55 16:43	07:52 15:54	08:21 15:52
29	05:15 21:08	06:08 20:04	07:02 18:49	17:49-18:21/32 06:57 16:41	07:53 15:53	08:21 15:53
30	05:16 21:06	06:09 20:02	07:03 18:47	17:48-18:18/30 06:59 16:39	07:55 15:52	08:21 15:54
31	05:18 21:04	06:11 19:59		07:00 07:56-08:05/9 16:37		08:21 15:55
Sonnenscheinstunden	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	582	142	270	0

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

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

Berechnung: GesamtbelastungWEA: BG 07 - ABC A158-5300 5300 158.0 l-! NH: 151,0 m (Ges:230,0 m) (62)
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 09:23-09:48/25 15:56	07:52 08:39-09:08/29 16:47	06:55 06:41 17:41 19:39	05:33 04:44 20:33 21:22	04:41 04:41 21:22 21:37	05:20 06:13 21:03 19:57	07:05 07:02 18:44 16:35	07:02 07:02 16:35 15:51	07:02 07:02 16:35 15:51	07:02 07:02 16:35 15:51	07:02 07:02 16:35 15:51	07:02 07:02 16:35 15:51	
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	329	261	731	820
Anzahl Minuten mit Schatten	930	99	0	0	0	0	0	0	0	0	0	731	820

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-Zeitpunkt (SS:MM) Schattenende/Minuten mit Schatten
 Sonnenuntergang (SS:MM) Zeitpunkt (SS:MM) Schattenanfang-Zeitpunkt (SS:MM) Schattenende/Minuten mit Schatten

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: BG 08 - ABC A158-5300 5300 158.0 l-! NH: 151,0 m (Ges:230,0 m) (61)
 Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	07:52 16:47	06:55 17:41	16:26-17:06/40 17:41	06:41 18:25-18:35/10 19:39	05:33 20:33	04:44 21:22	04:40 21:37	05:20 21:02	06:13 19:57	07:05 18:44	17:10-18:02/52 16:35	07:02 15:51
2	08:21 15:57	07:50 16:49	06:53 17:43	16:26-17:07/41 19:41	06:39 19:41	05:31 20:35	04:43 21:23	04:41 21:37	05:21 21:01	06:15 19:55	07:07 18:42	17:08-18:02/54 16:33	07:04 15:50
3	08:21 15:58	07:48 16:51	06:50 17:45	16:26-17:10/44 19:43	06:36 19:43	05:29 20:37	04:42 21:25	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	17:06-18:02/56 16:31	07:06 15:50
4	08:20 16:00	07:47 16:52	06:48 17:47	16:25-17:14/49 19:44	06:34 19:44	05:27 20:39	04:42 21:26	04:43 21:36	05:24 20:57	06:18 19:50	07:10 18:37	17:05-18:01/56 16:29	07:08 15:49
5	08:20 16:01	07:45 16:54	06:46 17:49	16:25-17:18/53 19:46	06:31 19:46	05:25 20:40	04:41 21:27	04:44 21:35	05:26 20:55	06:20 19:47	07:12 18:35	17:03-17:59/56 16:27	07:10 15:49
6	08:20 16:02	07:43 16:56	06:44 17:51	16:25-17:20/55 19:48	06:29 19:48	05:23 20:42	04:40 21:28	04:45 21:35	05:28 20:53	06:21 19:45	07:14 18:32	17:02-17:58/56 16:25	07:12 15:48
7	08:19 16:03	07:41 16:58	06:41 17:53	16:26-17:21/55 19:50	06:27 19:50	05:21 20:44	04:40 21:29	04:45 21:34	05:30 20:51	06:23 19:43	07:16 18:30	17:01-17:56/55 16:23	07:14 15:48
8	08:19 16:05	07:39 17:00	06:39 17:55	16:26-17:23/57 19:52	06:24 19:52	05:19 20:46	04:39 21:30	04:46 21:33	05:31 20:50	06:25 19:40	07:18 18:27	17:01-17:55/54 16:21	07:16 15:47
9	08:18 16:06	07:37 17:02	06:36 17:57	16:26-17:23/57 19:53	06:22 19:53	05:17 20:47	04:38 21:31	04:47 21:32	05:33 20:48	06:27 19:58	07:19 18:25	17:00-17:52/52 16:20	07:18 15:47
10	08:18 16:08	07:35 17:04	06:34 17:58	16:28-17:23/55 19:55	06:20 19:55	05:15 20:49	04:38 21:31	04:49 21:32	05:35 20:46	06:28 19:35	07:21 18:23	17:00-17:48/48 16:18	07:19 15:47
11	08:17 16:09	07:34 17:06	06:32 18:00	16:28-17:23/55 19:57	06:17 19:57	05:14 20:51	04:37 21:32	04:50 21:31	05:36 20:44	06:30 19:33	18:19-18:28/9 18:20	17:00-17:41/41 16:16	07:21 15:46
12	08:16 16:11	07:32 17:08	06:29 18:02	16:30-17:23/53 19:59	06:15 19:59	05:12 20:52	04:37 21:33	04:51 21:30	05:38 20:41	06:32 19:31	18:15-18:30/15 18:18	16:59-17:39/40 16:15	07:23 15:46
13	08:16 16:12	07:30 17:10	06:27 18:04	16:32-17:23/51 20:01	06:12 20:01	05:10 20:54	04:37 21:34	04:52 21:29	05:40 20:39	06:34 19:28	18:13-18:31/18 18:16	16:59-17:38/39 16:13	07:25 15:46
14	08:15 16:14	07:28 17:12	06:25 18:06	16:36-17:23/47 20:02	06:10 20:02	05:08 20:56	04:36 21:34	04:53 21:28	05:41 20:37	06:35 19:26	18:11-18:33/22 18:13	16:59-17:37/38 16:11	07:27 15:46
15	08:14 16:16	07:26 17:14	06:22 18:08	16:40-17:22/42 20:04	06:08 20:04	05:07 20:57	04:36 21:35	04:54 21:27	05:43 20:35	06:37 19:23	18:09-18:33/24 18:11	17:00-17:35/35 16:10	07:29 15:46
16	08:13 16:17	07:23 17:16	06:20 18:10	17:30-17:40/10 20:06	06:06 20:06	05:05 20:59	04:36 21:36	04:56 21:26	05:45 20:33	06:39 19:21	18:08-18:33/25 18:09	17:01-17:32/31 16:08	07:31 15:46
17	08:12 16:19	07:21 17:18	06:17 18:11	17:27-17:43/16 20:08	06:03 20:08	05:03 21:01	04:36 21:36	04:57 21:25	05:47 20:31	06:41 19:18	18:08-18:34/26 18:07	17:02-17:28/26 16:07	07:33 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	17:24-17:44/20 20:10	06:01 20:10	05:02 21:02	04:36 21:36	04:58 21:23	05:48 20:29	06:42 19:16	18:06-18:33/27 18:04	17:03-17:26/23 16:06	07:34 15:46
19	08:10 16:22	07:17 17:22	06:12 18:15	17:23-17:45/22 20:12	05:59 20:12	05:00 21:04	04:36 21:37	05:00 21:22	05:50 20:27	06:44 19:13	18:06-18:33/27 18:02	17:04-17:25/21 16:06	07:36 15:47
20	08:09 16:24	07:15 17:24	06:10 18:17	17:21-17:45/24 20:13	05:56 20:13	04:59 21:06	04:36 21:37	05:01 21:21	05:52 20:24	06:46 19:11	18:06-18:33/27 18:00	17:07-17:22/15 16:03	07:38 15:47
21	08:07 16:26	07:13 17:26	16:38-16:49/11 06:08	17:21-17:46/25 20:15	05:54 20:15	04:57 21:07	04:36 21:37	05:03 21:20	05:54 20:22	06:47 19:09	18:06-18:32/26 17:58	17:10-17:18/8 16:02	07:40 15:48
22	08:06 16:28	07:11 17:28	16:34-16:52/18 06:05	17:19-17:46/27 20:17	05:52 20:17	04:56 21:09	04:36 21:38	05:04 21:18	05:55 20:20	06:49 19:06	18:05-18:31/26 17:55	17:00-17:05/5 16:00	07:42 15:48
23	08:05 16:30	07:09 17:30	16:32-16:54/22 06:03	17:19-17:46/27 20:19	05:50 20:19	04:55 21:10	04:37 21:38	05:05 21:17	05:57 20:18	06:51 19:04	18:06-18:30/24 17:53	17:00-17:05/5 15:59	07:43 15:48
24	08:04 16:31	07:06 17:32	16:31-16:56/25 06:00	17:19-17:46/27 20:21	05:48 20:21	04:53 21:12	04:37 21:38	05:07 21:15	05:59 20:15	06:53 19:01	18:07-18:29/22 17:51	17:00-17:05/5 15:58	07:47 15:49
25	08:02 16:33	07:04 17:34	16:30-16:59/29 05:58	17:19-17:45/26 20:22	05:45 20:22	04:52 21:13	04:37 21:38	05:08 21:14	06:01 20:13	06:54 18:59	18:07-18:27/20 16:49	17:00-17:05/5 15:57	07:47 15:50
26	08:01 16:35	07:02 17:36	16:28-17:01/33 05:56	17:19-17:45/26 20:24	05:43 20:24	04:51 21:14	04:38 21:38	05:10 21:12	06:02 20:11	06:56 18:56	18:08-18:25/17 16:49	17:00-17:05/5 15:56	07:48 15:50
27	07:59 16:37	07:00 17:38	16:28-17:03/35 05:53	17:19-17:44/25 20:26	05:41 20:26	04:50 21:16	04:38 21:38	05:12 21:11	06:04 20:09	06:58 18:54	18:10-18:23/13 16:45	17:00-17:05/5 15:55	07:50 15:51
28	07:58 16:39	06:57 17:39	16:27-17:05/38 05:51	17:19-17:43/24 20:28	05:39 20:28	04:48 21:17	04:39 21:38	05:13 21:09	06:06 20:06	07:00 18:51	17:21-18:03/42 16:43	17:00-17:05/5 15:54	07:52 15:52
29	07:56 16:41	07:56 17:41	06:48 18:20	18:42-18:42/22 20:30	05:37 20:30	04:47 21:18	04:39 21:37	05:15 21:08	06:08 20:04	07:02 18:49	17:19-18:03/44 16:41	17:00-17:05/5 15:53	07:53 15:53
30	07:55 16:43	07:55 17:40	06:46 18:21	18:40-18:40/19 20:31	05:35 20:31	04:46 21:20	04:40 21:37	05:16 21:06	06:09 20:02	07:03 18:47	17:13-18:02/49 16:39	17:00-17:05/5 15:52	07:55 15:54
31	07:53 16:45	07:53 17:41	06:43 18:23	18:39-18:39/16 19:37	05:33 19:37	04:45 21:21	05:18 21:04	06:11 19:59	06:11 19:59	07:00 16:37	17:00-17:05/5 16:37	17:00-17:05/5 15:55	07:56 15:55
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	653	329	261	236
Anzahl Minuten mit Schatten	0	211	1277	10	0	0	0	0	653	856	0	0	0

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-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: BG 09 - ABC A158-5300 5300 158.0 !-! NH: 151,0 m (Ges:230,0 m) (56)
 Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	07:52 16:47	06:55 17:41	16:33-17:03/30 06:41	05:33 19:39	04:44 20:33	04:41 21:22	05:20 21:37	06:13 19:57	07:05 18:44	17:42-18:00/18 16:35	07:02 15:51	15:16:03/12 15:51
2	08:21 15:57	07:50 16:49	06:53 17:43	17:10-17:16/6 06:39	05:31 19:41	04:43 20:35	04:41 21:23	05:21 21:01	06:15 19:55	07:07 18:42	17:41-18:01/20 16:33	07:04 15:54-16:01/7	07:58 15:50
3	08:21 15:58	07:48 16:51	06:50 17:45	17:08-17:19/11 06:36	05:29 19:43	04:43 20:37	04:42 21:25	05:23 20:59	06:16 19:52	07:09 18:39	17:40-18:01/21 16:31	07:06 15:49	07:59 15:50
4	08:20 16:00	07:47 16:52	06:48 17:47	17:05-17:20/15 06:34	05:27 19:44	04:42 20:39	04:43 21:26	05:25 20:57	06:18 19:50	07:10 18:37	17:40-18:02/22 16:29	07:08 15:49	08:01 15:49
5	08:20 16:01	07:45 16:54	06:46 17:49	17:05-17:22/17 06:31	05:25 19:46	04:41 20:40	04:44 21:27	05:26 20:55	06:20 19:45	07:12 18:35	17:39-18:01/22 16:27	07:10 15:49	08:02 15:49
6	08:20 16:02	07:43 16:56	06:44 17:51	17:03-17:23/20 06:29	05:23 19:48	04:40 20:42	04:45 21:28	05:28 20:53	06:21 19:45	07:14 18:32	17:39-18:00/21 16:25	07:12 15:48	08:04 15:48
7	08:19 16:03	07:41 16:58	06:41 17:53	17:03-17:24/21 06:27	05:21 19:50	04:40 20:44	04:45 21:29	05:30 20:51	06:23 19:43	07:16 18:30	17:39-18:00/21 16:23	07:14 15:48	08:05 15:48
8	08:19 16:05	07:39 17:00	06:39 17:55	17:03-17:24/21 06:24	05:19 19:52	04:39 20:46	04:46 21:30	05:31 20:50	06:25 19:40	07:18 18:27	17:39-17:59/20 16:22	07:16 15:47	08:06 15:47
9	08:18 16:06	07:37 17:02	06:36 17:57	17:02-17:24/22 06:22	05:17 19:53	04:38 20:47	04:48 21:31	05:33 20:48	06:27 19:38	07:19 18:25	17:40-17:56/16 16:20	07:18 15:47	08:07 15:47
10	08:18 16:08	07:35 17:04	06:34 17:58	17:02-17:24/22 06:20	05:15 19:55	04:38 20:49	04:49 21:31	05:35 20:46	06:28 19:35	07:21 18:23	17:41-17:54/13 16:18	07:19 15:47	08:09 15:47
11	08:17 16:09	07:34 17:06	06:32 18:00	17:02-17:22/20 06:17	05:14 19:57	04:38 20:51	04:50 21:31	05:36 20:44	06:30 19:33	07:23 18:20	17:43-17:52/9 16:16	07:21 15:46	08:10 15:46
12	08:16 16:11	07:32 17:08	06:29 18:02	17:03-17:22/19 06:15	05:12 19:59	04:37 20:52	04:51 21:30	05:38 20:42	06:32 19:31	07:25 18:18	17:46-17:48/2 16:15	07:23 15:46	08:11 15:46
13	08:16 16:12	07:30 17:10	06:27 18:04	17:03-17:20/17 06:13	05:10 20:01	04:37 20:54	04:52 21:29	05:40 20:39	06:34 19:28	07:27 18:16	17:04-17:36/32 16:13	07:25 15:46	08:12 15:46
14	08:15 16:14	07:28 17:12	06:25 18:06	17:05-17:18/13 06:10	05:08 20:03	04:37 20:56	04:53 21:28	05:42 20:37	06:35 19:26	07:29 18:13	17:01-17:36/35 16:11	07:27 15:46	08:13 15:46
15	08:14 16:16	07:26 17:14	06:22 18:08	17:08-17:16/8 06:08	05:07 20:04	04:36 20:57	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	16:59-17:36/37 16:10	07:29 15:46	08:14 15:46
16	08:13 16:17	07:23 17:16	06:20 18:10	16:16-16:47/31 06:20	05:05 20:06	04:36 20:59	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	16:55-17:36/41 16:08	07:31 15:46	08:15 15:46
17	08:12 16:19	07:21 17:18	06:17 18:11	16:16-16:48/32 06:17	05:03 20:08	04:36 21:01	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	16:52-17:35/43 16:07	07:33 15:46	08:16 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	16:15-16:48/33 06:15	05:02 20:10	04:36 21:02	04:58 21:23	05:48 20:29	06:42 19:16	07:36 18:04	16:50-17:34/44 16:06	07:34 15:47	08:16 15:47
19	08:10 16:22	07:17 17:22	06:13 18:15	16:16-16:53/37 06:13	05:00 20:12	04:36 21:04	05:00 21:22	05:50 20:27	06:44 19:13	07:38 18:02	16:49-17:32/43 16:04	07:36 15:47	08:17 15:47
20	08:09 16:24	07:15 17:24	06:10 18:17	16:16-16:56/40 06:10	05:56 20:13	04:36 21:06	05:01 21:21	05:52 20:24	06:46 19:11	07:40 18:00	16:48-17:30/42 16:03	07:38 15:47	08:18 15:47
21	08:07 16:26	07:13 17:26	06:08 18:19	16:17-16:58/41 06:08	05:54 20:15	04:36 21:07	05:03 21:20	05:54 20:22	06:48 19:09	07:41 17:58	16:47-17:28/41 16:02	07:40 15:48	08:18 15:48
22	08:06 16:28	07:11 17:28	06:05 18:21	16:17-17:00/43 06:05	05:52 20:17	04:36 21:09	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	16:46-17:26/40 16:00	07:42 15:48	08:19 15:48
23	08:05 16:30	07:09 17:30	06:03 18:22	16:18-17:02/44 06:03	05:50 20:19	04:37 21:10	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	16:46-17:23/37 15:59	07:43 15:49	08:19 15:49
24	08:04 16:31	07:06 17:32	06:00 18:24	16:19-17:03/44 06:00	05:48 20:21	04:37 21:12	05:07 21:15	05:59 20:16	06:53 19:01	07:47 17:51	16:46-17:18/32 15:58	07:45 15:49	08:20 15:49
25	08:02 16:33	07:04 17:34	05:58 18:26	16:21-17:04/43 05:58	05:45 20:22	04:37 21:13	05:08 21:14	06:01 20:13	06:54 18:59	07:49 16:49	15:46-16:17/31 15:57	07:47 15:50	08:20 15:50
26	08:01 16:35	07:02 17:36	05:56 18:28	16:24-17:04/40 05:56	05:43 20:24	04:38 21:14	05:10 21:12	06:02 20:11	06:56 18:56	07:51 16:47	15:46-16:16/30 15:56	07:48 15:50	08:20 15:50
27	07:59 16:37	07:00 17:38	05:53 18:30	16:27-17:04/37 05:53	05:41 20:26	04:38 21:16	05:12 21:11	06:04 20:09	06:58 18:54	07:53 16:45	15:46-16:14/28 15:55	07:50 15:51	08:21 15:51
28	07:58 16:39	06:57 17:40	05:51 18:32	16:30-17:04/34 05:51	05:39 20:28	04:48 21:17	05:13 21:09	06:06 20:06	06:59 18:51	07:54 16:43	17:51-17:54/3 15:47-16:12/25	07:52 15:54	08:21 15:52
29	07:56 16:41		06:48 19:33		05:37 20:30	04:47 21:18	05:15 21:08	06:08 20:04	06:58 18:49	07:57 16:41	17:47-17:58/11 15:48-16:08/20	07:53 15:53	08:21 15:53
30	07:55 16:43		06:46 19:35		05:35 20:31	04:46 21:20	05:16 21:37	06:09 21:06	06:59 18:47	07:03 16:39	17:44-17:59/15 15:48-16:08/20	07:55 15:52	08:21 15:54
31	07:53 16:45		06:43 19:37		06:45 21:21		05:18 21:04	06:11 19:59		07:00 16:37	15:49-16:05/16 15:55	08:21 15:55	08:21 15:55
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	29	329	261	236
Anzahl Minuten mit Schatten	0	633	349	0	0	0	0	0	0	29	942	19	0

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

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

Berechnung: GesamtbelastungWEA: B01 - VESTAS V150 4200 150.0 IO! NH: 169,0 m (Ges:244,0 m) (160)
 Voraussetzungen für Berechnung des Schattenwurfs

- 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 Sonneneinfallrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:21 15:56	07:52 16:47	06:55 17:41	06:41 19:39	05:33 20:33	06:22-06:53/31 21:22	04:44 21:37	04:41 21:02	05:20 19:57	06:33-07:01/28 18:44	06:13 16:35	07:05 15:51	07:02 15:51
2	08:21 15:57	07:50 16:49	06:53 17:43	06:39 19:41	05:31 20:35	06:21-06:53/32 21:23	04:43 21:37	04:41 21:01	05:21 19:55	06:32-07:01/29 18:42	06:15 16:33	07:04 15:50	07:04 15:50
3	08:21 15:58	07:48 16:51	06:50 17:45	06:36 19:42	05:29 20:37	06:21-06:53/32 21:25	04:43 21:36	04:42 20:59	05:23 19:52	06:32-07:02/30 18:39	06:16 16:31	07:09 15:50	07:06 15:50
4	08:20 16:00	07:46 16:53	06:48 17:47	06:34 19:44	05:27 20:39	06:21-06:54/33 21:26	04:42 21:36	04:43 20:57	05:25 19:50	06:31-07:02/31 18:37	06:18 16:29	07:10 15:49	07:08 15:49
5	08:20 16:01	07:45 16:54	06:46 17:49	06:31 19:46	05:25 20:40	06:21-06:54/33 21:27	04:41 21:35	04:44 20:55	05:26 19:47	06:31-07:03/32 18:35	06:20 16:27	07:12 15:49	07:10 15:49
6	08:20 16:02	07:43 16:56	06:43 17:51	06:29 19:48	05:23 20:42	06:21-06:53/32 21:28	04:40 21:35	04:45 20:53	05:28 19:45	06:31-07:03/32 18:32	06:23 16:25	07:14 15:48	07:12 15:48
7	08:19 16:04	07:41 16:58	06:41 17:53	06:27 19:50	05:21 20:44	06:21-06:53/32 21:29	04:40 21:34	04:46 20:51	05:30 19:43	06:30-07:03/33 18:30	06:23 16:23	07:14 15:48	07:14 15:48
8	08:19 16:05	07:39 17:00	06:39 17:55	06:24 19:52	05:19 20:46	06:21-06:52/31 21:30	04:39 21:33	04:47 20:49	05:31 19:40	06:31-07:03/32 18:27	06:25 16:22	07:18 15:47	07:16 15:47
9	08:18 16:06	07:37 17:02	06:36 17:57	06:22 19:53	05:17 20:47	06:22-06:53/31 21:31	04:38 21:32	04:48 20:48	05:33 19:38	06:30-07:03/33 18:25	06:27 16:20	07:19 15:47	07:18 15:47
10	08:18 16:08	07:35 17:04	06:34 17:58	06:20 19:55	05:15 20:49	06:22-06:52/30 21:31	04:38 21:32	04:49 20:46	05:35 19:35	06:30-07:03/33 18:23	06:28 16:18	07:21 15:47	07:19 15:47
11	08:17 16:09	07:34 17:06	06:32 18:00	06:17 19:57	05:14 20:51	06:22-06:51/29 21:32	04:38 21:31	04:50 20:43	05:36 19:33	06:31-07:03/32 18:20	06:30 16:16	07:23 15:46	07:21 15:46
12	08:16 16:11	07:32 17:08	06:29 18:02	06:15 19:59	05:12 20:52	06:23-06:51/28 21:33	04:37 21:30	04:51 20:41	05:38 19:31	06:30-07:02/32 18:18	06:32 16:15	07:25 15:46	07:23 15:46
13	08:15 16:12	07:30 17:10	06:27 18:04	06:13 20:01	05:10 20:54	06:23-06:50/27 21:34	04:37 21:29	04:52 20:39	05:40 19:28	06:31-07:02/31 18:16	06:34 16:13	07:27 15:46	07:25 15:46
14	08:15 16:14	07:28 17:12	06:25 18:06	06:10 20:02	05:08 20:56	06:25-06:49/24 21:34	04:37 21:28	04:53 20:37	05:42 19:26	06:31-07:00/29 18:13	06:35 16:12	07:28 15:46	07:27 15:46
15	08:14 16:16	07:26 17:14	06:22 18:08	06:08 20:04	05:07 20:57	06:25-06:48/23 21:35	04:36 21:27	04:54 20:35	05:43 19:23	06:32-07:00/28 18:11	06:37 16:10	07:30 15:46	07:29 15:46
16	08:13 16:17	07:23 17:16	06:20 18:10	06:06 20:06	05:05 20:59	06:27-06:47/20 21:35	04:36 21:26	04:56 20:33	05:45 19:21	06:33-06:59/26 18:09	06:39 16:08	07:32 15:46	07:31 15:46
17	08:12 16:19	07:21 17:18	06:17 18:11	06:03 20:08	05:04 21:01	06:27-06:45/18 21:36	04:36 21:25	04:57 20:31	05:47 19:18	06:33-06:57/24 18:07	06:41 16:07	07:34 15:46	07:32 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	06:29-06:44/15 21:36	04:36 21:23	04:58 20:29	05:48 19:16	06:34-06:56/22 18:04	06:42 16:06	07:36 15:47	07:34 15:47
19	08:10 16:22	07:17 17:22	06:12 18:15	05:59 20:12	05:00 21:04	06:31-06:41/10 21:37	04:36 21:22	05:00 20:27	05:50 19:13	06:36-06:55/19 18:02	06:44 16:04	07:38 15:47	07:36 15:47
20	08:09 16:24	07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:05	06:31-06:41/10 21:37	04:36 21:21	05:01 20:24	05:52 19:11	06:38-06:51/13 18:00	06:46 16:03	07:38 15:47	07:38 15:47
21	08:07 16:26	07:13 17:26	06:08 18:19	05:54 20:15	04:57 21:07	06:31-06:41/10 21:37	04:36 21:20	05:03 20:22	05:54 19:09	06:43-06:46/3 17:58	06:47 16:02	07:41 15:48	07:40 15:48
22	08:06 16:28	07:11 17:28	06:05 18:21	05:52 20:17	04:56 21:09	06:36-06:42/6 21:38	04:36 21:18	05:04 20:20	05:55 19:06	06:49 17:55	06:49 16:00	07:43 15:48	07:41 15:48
23	08:05 16:30	07:09 17:30	06:03 18:22	05:50 20:19	04:55 21:10	06:32-06:46/14 21:38	04:37 21:17	05:05 20:18	05:57 19:04	06:45 17:53	06:51 16:00	07:43 15:49	07:43 15:49
24	08:04 16:31	07:06 17:32	06:00 18:24	05:48 20:21	04:53 21:11	06:29-06:48/19 21:38	04:37 21:15	05:07 20:15	05:59 19:01	06:44-06:50/6 17:51	06:53 16:00	07:47 15:49	07:45 15:49
25	08:02 16:33	07:04 17:34	05:58 18:26	05:45 20:22	04:52 21:13	06:27-06:50/23 21:38	04:37 21:14	05:09 20:13	06:01 18:59	06:41-06:54/13 17:49	06:54 16:00	07:47 15:50	07:47 15:50
26	08:01 16:35	07:02 17:36	05:56 18:28	05:43 20:24	04:51 21:14	06:26-06:51/25 21:38	04:38 21:12	05:10 20:11	06:02 18:56	06:39-06:55/16 17:47	06:56 16:00	07:48 15:50	07:48 15:50
27	07:59 16:37	07:00 17:38	05:53 18:30	05:41 20:26	04:50 21:16	06:25-06:52/27 21:38	04:38 21:11	05:12 20:09	06:04 18:54	06:37-06:56/19 17:45	06:58 16:00	07:50 15:51	07:50 15:51
28	07:58 16:39	06:57 17:40	05:51 18:32	05:39 20:28	04:48 21:17	06:24-06:52/28 21:38	04:39 21:09	05:13 20:06	06:06 18:51	06:36-06:58/22 17:43	07:00 16:00	07:52 15:52	07:52 15:52
29	07:56 16:41	06:56 17:41	05:48 18:33	05:37 20:30	04:47 21:18	06:23-06:53/30 21:38	04:39 21:08	05:15 20:04	06:08 18:49	06:35-06:59/24 17:41	07:02 16:00	07:53 15:53	07:53 15:53
30	07:55 16:43	06:55 17:39	05:46 18:35	05:35 20:31	04:46 21:20	06:22-06:53/31 21:37	04:40 21:06	05:16 20:02	06:09 18:47	06:35-07:00/25 17:39	07:03 16:00	07:55 15:54	07:55 15:54
31	07:53 16:45	06:53 17:37	05:43 18:37	05:31 20:33	04:45 21:21	06:22-06:53/31 21:37	04:40 21:06	05:16 20:02	06:09 18:47	06:35-07:00/25 17:39	07:03 16:00	07:55 15:54	07:55 15:54
	Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	329	261	236
	Anzahl Minuten mit Schatten	0	0	0	203	511	0	152	572	0	0	0	0

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

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

Berechnung: GesamtbelastungWEA: B04 - VESTAS V150 4200 150.0 IO! NH: 169,0 m (Ges:244,0 m) (161)
Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	07:52 16:47	06:55 17:41	06:41 19:39	05:33 20:33	04:44 21:22	04:40 21:37	05:20 21:02	06:13 19:57	07:05 18:44	07:02 16:35	07:56 15:51
2	08:21 15:57	07:50 16:49	06:53 17:43	06:39 19:41	05:31 20:35	04:43 21:23	04:41 21:36	05:21 21:01	06:14 19:55	07:07 18:42	07:04 16:33	07:58 15:50
3	08:21 15:58	07:48 16:50	06:50 17:45	06:36 19:42	05:29 20:37	04:42 21:24	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 16:31	07:59 15:50
4	08:20 16:00	07:46 16:52	06:48 17:47	06:34 19:44	05:27 20:38	04:42 21:26	04:43 21:36	05:24 20:57	06:18 19:50	07:10 18:37	07:08 16:29	08:01 15:49
5	08:20 16:01	07:45 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 21:27	04:44 21:35	05:26 20:55	06:20 19:47	07:12 18:35	07:10 16:27	08:02 15:49
6	08:20 16:02	07:43 16:56	06:43 17:51	06:29 19:48	05:23 20:42	04:40 21:28	04:45 21:34	05:28 20:53	06:21 19:45	07:14 18:32	07:12 16:25	08:03 15:48
7	08:19 16:03	07:41 16:58	06:41 17:53	06:27 19:50	05:21 20:44	04:40 21:29	04:45 21:34	05:30 20:51	06:23 19:43	07:16 18:30	07:14 16:23	08:05 15:48
8	08:19 16:05	07:39 17:00	06:39 17:55	06:24 19:52	05:19 20:46	04:39 21:30	04:46 21:33	05:31 20:49	06:25 19:40	07:18 18:27	07:16 16:21	08:06 15:47
9	08:18 16:06	07:37 17:02	06:36 17:57	06:22 19:53	05:17 20:47	04:38 21:31	04:47 21:32	05:33 20:47	06:27 19:38	07:19 18:25	07:17 16:20	08:07 15:47
10	08:18 16:08	07:35 17:04	06:34 17:58	06:19 19:55	05:15 20:49	04:38 21:31	04:49 21:32	05:35 20:45	06:28 19:35	07:21 18:23	07:19 16:18	08:08 15:47
11	08:17 16:09	07:33 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:37 21:32	04:50 21:31	05:36 20:43	06:30 19:33	07:23 18:20	07:21 16:16	08:10 15:46
12	08:16 16:11	07:31 17:08	06:29 18:02	06:15 19:59	05:12 20:52	04:37 21:33	04:51 21:30	05:38 20:41	06:32 19:30	07:25 18:18	07:23 16:15	08:11 15:46
13	08:15 16:12	07:30 17:10	06:27 18:04	06:12 20:01	05:10 20:54	04:37 21:34	04:52 21:29	05:40 20:39	06:34 19:28	07:27 18:16	07:25 16:13	08:12 15:46
14	08:15 16:14	07:27 17:12	06:24 18:06	06:10 20:02	05:08 20:56	04:37 21:34	04:53 21:28	05:41 20:37	06:35 19:26	07:28 18:13	07:27 16:11	08:13 15:46
15	08:14 16:16	07:25 17:14	06:22 18:08	06:08 20:04	05:07 20:57	04:36 21:35	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 15:46
16	08:13 16:17	07:23 17:16	06:20 18:10	06:06 20:06	05:05 20:59	04:36 21:35	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 15:46
17	08:12 16:19	07:21 17:18	06:17 18:11	06:03 20:08	05:03 21:01	04:36 21:36	04:57 21:25	05:47 20:31	06:40 19:18	07:34 18:07	07:32 16:07	08:15 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 21:36	05:48 21:23	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:06	08:16 15:47
19	08:10 16:22	07:17 17:22	06:12 18:15	05:59 20:11	05:00 21:04	04:36 21:37	05:00 21:22	05:50 20:27	06:44 19:13	07:38 18:02	07:36 16:04	08:17 15:47
20	08:09 16:24	07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:05	04:36 21:37	05:01 21:21	05:52 20:24	06:46 19:11	07:40 18:00	07:38 16:03	08:18 15:47
21	08:07 16:26	07:13 17:26	06:08 18:19	05:54 20:15	04:57 21:07	04:36 21:37	05:03 21:20	05:54 20:22	06:47 19:09	07:41 17:58	07:40 16:01	08:18 15:48
22	08:06 16:28	07:11 17:28	06:05 18:21	05:52 20:17	04:56 21:08	04:36 21:37	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:41 16:00	08:19 15:48
23	08:05 16:30	07:08 17:30	06:03 18:22	05:50 20:19	04:55 21:10	04:37 21:38	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	08:19 15:49
24	08:04 16:31	07:06 17:32	06:00 18:24	05:48 20:21	04:53 21:11	04:37 21:38	05:07 21:15	05:59 20:15	06:53 19:01	07:47 17:51	07:45 15:58	08:20 15:49
25	08:02 16:33	07:04 17:34	05:58 18:26	05:45 20:22	04:52 21:13	04:37 21:38	05:08 21:14	06:01 20:13	06:54 18:59	06:49 17:49	07:47 15:57	08:20 15:50
26	08:01 16:35	07:02 17:36	05:55 18:28	05:43 20:24	04:51 21:14	04:38 21:38	05:10 21:12	06:02 20:11	06:56 18:56	06:51 16:47	07:48 15:56	08:20 15:50
27	07:59 16:37	07:00 17:38	05:53 18:30	05:41 20:26	04:50 21:16	04:38 21:38	05:12 21:11	06:04 20:09	06:58 18:54	06:53 16:45	07:50 15:55	08:21 15:51
28	07:58 16:39	06:57 17:39	05:51 18:32	05:39 20:28	04:48 21:17	04:39 21:38	05:13 21:09	06:06 20:06	07:00 18:51	06:55 16:43	07:52 15:54	08:21 15:52
29	07:56 16:41		06:48 19:33	05:37 20:30	04:47 21:18	04:39 21:37	05:15 21:07	06:08 20:04	07:01 18:49	06:57 16:41	07:53 15:53	08:21 15:53
30	07:55 16:43		06:46 19:35	05:35 20:31	04:46 21:20	04:40 21:37	05:16 21:06	06:09 20:02	07:03 18:47	06:58 16:39	07:55 15:52	08:21 15:54
31	07:53 16:45		06:43 19:37		04:45 21:21		05:18 21:04	06:11 19:59		07:00 16:37		08:21 15:55
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Berechnung: GesamtbelastungWEA: NO02 - VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (103)
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:21 14:46-15:06/20 15:56 14:27-14:35/8	07:52 16:47	06:55 17:41	06:41 19:39	05:33 06:14-06:32/18 20:33	04:44 21:22
2	08:21 14:46-15:06/20 15:57 14:29-14:34/5	07:50 16:49	06:53 17:43	06:39 19:41	05:31 06:15-06:31/16 20:35	04:43 21:23
3	08:21 14:47-15:07/20 15:58	07:48 16:51	06:50 17:45	06:36 19:42	05:29 06:15-06:30/15 20:37	04:43 21:25
4	08:20 14:47-15:07/20 16:00	07:46 16:52	06:48 17:47	06:34 19:44	05:27 06:17-06:30/13 20:39	04:42 21:26
5	08:20 14:48-15:08/20 16:01	07:45 16:54	06:46 17:49	06:31 19:46	05:25 06:19-06:28/9 20:40	04:41 21:27
6	08:20 14:48-15:08/20 16:02	07:43 16:56	06:43 17:51	06:29 19:48	05:23 20:42	04:40 21:28
7	08:19 14:49-15:09/20 16:03	07:41 16:58	06:41 17:53	06:27 19:50	05:21 20:44	04:40 21:29
8	08:19 14:49-15:09/20 16:05	07:39 17:00	06:39 17:55	06:24 19:52	05:19 20:46	04:39 21:30
9	08:18 14:49-15:09/20 16:06	07:37 17:02	06:36 17:57	06:22 19:53	05:17 20:47	04:38 21:31
10	08:18 14:49-15:10/21 16:08	07:35 17:04	06:34 17:58	06:20 19:55	05:15 20:49	04:38 21:31
11	08:17 14:50-15:10/20 16:09	07:33 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:38 21:32
12	08:16 14:51-15:11/20 16:11	07:32 17:08	06:29 18:02	06:15 19:59	05:12 20:52	04:37 21:33
13	08:15 14:52-15:11/19 16:12	07:30 17:10	06:27 18:04	06:12 20:01	05:10 20:54	04:37 21:34
14	08:15 14:53-15:11/18 16:14	07:28 17:12	06:25 18:06	06:10 20:02	05:08 20:56	04:37 21:34
15	08:14 14:53-15:10/17 16:16	07:25 17:14	06:22 18:08	06:08 20:04	05:07 20:57	04:36 21:35
16	08:13 14:54-15:10/16 16:17	07:23 17:16	06:20 18:10	06:06 20:06	05:05 20:59	04:36 21:35
17	08:12 14:55-15:10/15 16:19	07:21 17:18	06:17 18:11	06:03 20:08	05:03 21:01	04:36 21:36
18	08:11 14:57-15:09/12 16:21	07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 21:36
19	08:10 14:59-15:08/9 16:22	07:17 17:22	06:12 18:15	05:59 20:12	05:00 21:04	04:36 21:37
20	08:09 15:01-15:06/5 16:24	07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:05	04:36 21:37
21	08:07 16:26	07:13 17:26	06:08 18:19	05:54 06:24-06:27/3 20:15	04:57 21:07	04:36 21:37
22	08:06 16:28	07:11 17:28	06:05 18:21	05:52 06:20-06:30/10 20:17	04:56 21:09	04:36 21:38
23	08:05 16:30	07:08 17:30	06:03 18:22	05:50 06:18-06:32/14 20:19	04:55 21:10	04:37 21:38
24	08:04 16:31	07:06 17:32	06:00 18:24	05:48 06:17-06:33/16 20:21	04:53 21:11	04:37 21:38
25	08:02 16:33	07:04 17:34	05:58 18:26	05:45 06:16-06:33/17 20:22	04:52 21:13	04:37 21:38
26	08:01 16:35	07:02 17:36	05:56 18:28	05:43 06:15-06:34/19 20:24	04:51 21:14	04:38 21:38
27	07:59 16:37	07:00 17:38	05:53 18:30	05:41 06:15-06:34/19 20:26	04:50 21:16	04:38 21:38
28	07:58 16:39	06:57 17:39	05:51 18:32	05:39 06:14-06:34/20 20:28	04:48 21:17	04:39 21:38
29	07:56 16:41	07:02 17:36	06:48 19:33	05:37 06:14-06:33/19 20:30	04:47 21:18	04:39 21:37
30	07:55 16:43	07:00 17:34	06:46 19:35	05:35 06:14-06:33/19 20:31	04:46 21:20	04:40 21:37
31	07:53 16:45	07:00 17:34	06:43 19:37	05:34 20:31	04:45 21:21	04:40 21:37
Sonnenscheinstunden	252	274	367	419	492	507
Anzahl Minuten mit Schatten	365	0	0	156	71	0

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-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: NO02 - VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (103)
Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli		August		September		Oktober		November		Dezember	
1	04:41	05:20			06:13	07:05	07:02				07:56	14:32-14:52/20
	21:37	21:02			19:57	18:44	16:35				15:51	
2	04:41	05:21			06:15	07:07	07:04				07:58	14:33-14:53/20
	21:36	21:01			19:55	18:42	16:33				15:50	
3	04:42	05:23			06:16	07:09	07:06				07:59	14:33-14:54/21
	21:36	20:59			19:52	18:39	16:31				15:50	
4	04:43	05:24			06:18	07:10	07:08				08:01	14:33-14:53/20
	21:36	20:57			19:50	18:37	16:29				15:49	
5	04:44	05:26			06:20	07:12	07:10				08:02	14:34-14:54/20
	21:35	20:55			19:47	18:35	16:27				15:49	
6	04:45	05:28			06:21	07:14	07:12				08:03	14:34-14:54/20
	21:34	20:53			19:45	18:32	16:25				15:48	
7	04:45	05:30	06:30-06:35/5		06:23	07:16	07:14				08:05	14:35-14:55/20
	21:34	20:51			19:43	18:30	16:23				15:48	
8	04:46	05:31	06:28-06:38/10		06:25	07:18	07:16				08:06	14:35-14:55/20
	21:33	20:49			19:40	18:27	16:22				15:47	
9	04:48	05:33	06:25-06:39/14		06:27	07:19	07:18				08:07	14:35-14:55/20
	21:32	20:47			19:38	18:25	16:20				15:47	
10	04:49	05:35	06:25-06:40/15		06:28	07:21	07:19				08:09	14:35-14:55/20
	21:32	20:45			19:35	18:23	16:18				15:47	14:18-14:23/5
11	04:50	05:36	06:24-06:41/17		06:30	07:23	07:21				08:10	14:37-14:57/20
	21:31	20:43			19:33	18:20	16:16				15:46	14:18-14:26/8
12	04:51	05:38	06:23-06:41/18		06:32	07:25	07:23				08:11	14:37-14:57/20
	21:30	20:41			19:31	18:18	16:15				15:46	14:18-14:27/9
13	04:52	05:40	06:23-06:42/19		06:34	07:27	07:25				08:12	14:37-14:57/20
	21:29	20:39			19:28	18:16	16:13				15:46	14:18-14:28/10
14	04:53	05:42	06:22-06:41/19		06:35	07:28	07:27				08:13	14:38-14:57/19
	21:28	20:37			19:26	18:13	16:11				15:46	14:17-14:28/11
15	04:54	05:43	06:22-06:41/19		06:37	07:30	07:29				08:14	14:39-14:58/19
	21:27	20:35			19:23	18:11	16:10				15:46	14:18-14:29/11
16	04:56	05:45	06:22-06:41/19		06:39	07:32	07:31				08:15	14:39-14:58/19
	21:26	20:33			19:21	18:09	16:08				15:46	14:18-14:30/12
17	04:57	05:47	06:22-06:40/18		06:41	07:34	07:32				08:15	14:40-14:59/19
	21:25	20:31			19:18	18:07	16:07				15:46	14:18-14:31/13
18	04:58	05:48	06:22-06:40/18		06:42	07:36	07:34				08:16	14:40-14:59/19
	21:23	20:29			19:16	18:04	16:06				15:47	14:18-14:31/13
19	05:00	05:50	06:23-06:39/16		06:44	07:38	07:36				08:17	14:41-14:59/18
	21:22	20:27			19:13	18:02	16:04				15:47	14:19-14:32/13
20	05:01	05:52	06:24-06:37/13		06:46	07:40	07:38				08:18	14:41-15:00/19
	21:21	20:24			19:11	18:00	16:03				15:47	14:19-14:33/14
21	05:03	05:54	06:26-06:35/9		06:47	07:41	07:40				08:18	14:41-15:00/19
	21:20	20:22			19:09	17:58	16:02				15:48	14:19-14:33/14
22	05:04	05:55			06:49	07:43	07:41	14:37-14:41/4			08:19	14:42-15:01/19
	21:18	20:20			19:06	17:55	16:00				15:48	14:20-14:34/14
23	05:05	05:57			06:51	07:45	07:43	14:35-14:44/9			08:19	14:42-15:01/19
	21:17	20:18			19:04	17:53	15:59				15:49	14:20-14:34/14
24	05:07	05:59			06:53	07:47	07:45	14:34-14:46/12			08:20	14:42-15:01/19
	21:15	20:15			19:01	17:51	15:58				15:49	14:20-14:34/14
25	05:08	06:01			06:54	06:49	07:47	14:33-14:48/15			08:20	14:44-15:02/18
	21:14	20:13			18:59	16:49	15:57				15:50	14:22-14:35/13
26	05:10	06:02			06:56	06:51	07:48	14:33-14:49/16			08:20	14:44-15:03/19
	21:12	20:11			18:56	16:47	15:56				15:50	14:22-14:35/13
27	05:12	06:04			06:58	06:53	07:50	14:33-14:50/17			08:21	14:44-15:03/19
	21:11	20:09			18:54	16:45	15:55				15:51	14:23-14:35/12
28	05:13	06:06			07:00	06:55	07:52	14:32-14:50/18			08:21	14:44-15:04/20
	21:09	20:06			18:51	16:43	15:54				15:52	14:23-14:35/12
29	05:15	06:08			07:02	06:57	07:53	14:32-14:51/19			08:21	14:45-15:04/19
	21:08	20:04			18:49	16:41	15:53				15:53	14:24-14:35/11
30	05:16	06:09			07:03	06:58	07:55	14:32-14:52/20			08:21	14:45-15:05/20
	21:06	20:02			18:47	16:39	15:52				15:54	14:25-14:36/11
31	05:18	06:11				07:00					08:21	14:46-15:06/20
	21:04	19:59				16:37					15:55	14:26-14:36/10
Sonnenscheinstunden	510	458			382	329	261	130			236	
Anzahl Minuten mit Schatten	0	229			0	0	130				861	

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

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

Berechnung: GesamtbelastungWEA: NO03 - VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (104)
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21 15:56	07:52 16:47	06:55 17:41	06:41 19:39	07:06-07:18/12 20:33	05:33 21:22	04:44 21:37	04:41 21:02	05:20 19:57	06:13 18:44	07:08-07:09/1 16:35	07:05 15:51	07:02 15:51	
2	08:21 15:57	07:50 16:49	06:53 17:43	06:39 19:41	07:05-07:20/15 20:35	05:31 21:23	04:43 21:36	04:41 21:01	05:21 19:55	06:15 18:42	07:04-07:13/9 16:33	07:07 15:50	07:04 15:50	
3	08:21 15:58	07:48 16:51	06:50 17:45	06:36 19:42	07:04-07:21/17 20:37	05:29 21:25	04:43 21:36	04:42 20:59	05:23 19:52	06:16 18:39	07:01-07:14/13 16:31	07:09 15:50	07:06 15:50	
4	08:20 16:00	07:46 16:52	06:48 17:47	06:34 19:44	07:03-07:20/17 20:38	05:27 21:26	04:42 21:36	04:43 20:57	05:24 19:50	06:18 18:37	07:00-07:15/15 16:29	07:10 15:49	07:08 15:49	
5	08:20 16:01	07:45 16:54	06:46 17:49	06:31 19:46	07:03-07:20/17 20:40	05:25 21:27	04:41 21:35	04:44 20:55	05:26 19:47	06:20 18:35	06:59-07:16/17 16:27	07:12 15:49	07:10 15:49	
6	08:20 16:02	07:43 16:56	06:43 17:51	06:29 19:48	07:02-07:19/17 20:42	05:23 21:28	04:40 21:34	04:45 20:53	05:28 19:45	06:21 18:32	06:58-07:15/17 16:25	07:14 15:48	07:12 15:48	
7	08:19 16:04	07:41 16:58	06:41 17:53	06:27 19:50	07:02-07:19/17 20:44	05:21 21:29	04:40 21:34	04:45 20:51	05:30 19:43	06:23 18:30	06:58-07:15/17 16:23	07:16 15:48	07:14 15:48	
8	08:19 16:05	07:39 17:00	06:39 17:55	06:24 19:52	07:03-07:18/15 20:46	05:19 21:30	04:39 21:33	04:46 20:49	05:31 19:40	06:25 18:27	06:58-07:15/17 16:22	07:18 15:47	07:16 15:47	
9	08:18 16:06	07:37 17:02	06:36 17:57	06:22 19:53	07:03-07:16/13 20:47	05:17 21:31	04:38 21:32	04:48 20:47	05:33 19:38	06:27 18:25	06:57-07:14/17 16:20	07:19 15:47	07:17 15:47	
10	08:18 16:08	07:35 17:04	06:34 17:58	06:20 19:55	07:05-07:14/9 20:49	05:15 21:31	04:38 21:32	04:49 20:45	05:35 19:35	06:28 18:23	06:58-07:13/15 16:18	07:21 15:47	07:19 15:47	
11	08:17 16:09	07:33 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:38 21:32	04:50 21:31	05:36 20:43	06:30 19:33	06:59-07:12/13 18:20	07:23 16:16	07:21 15:46	08:10 15:46	
12	08:16 16:11	07:32 17:08	06:29 18:02	06:15 19:59	05:12 20:52	04:37 21:33	04:51 21:30	05:38 20:41	06:32 19:31	07:00-07:09/9 18:18	07:25 16:15	07:23 15:46	08:11 15:46	
13	08:15 16:12	07:30 17:10	06:27 18:04	06:12 20:01	05:10 20:54	04:37 21:34	04:52 21:29	05:40 20:39	06:34 19:28	07:27 18:16	07:25 16:13	08:12 15:46	08:12 15:46	
14	08:15 16:14	07:28 17:12	06:24 18:06	06:10 20:02	05:08 20:56	04:37 21:34	04:53 21:28	05:42 20:37	06:35 19:26	07:28 18:13	08:13 16:11	08:13 15:46	08:13 15:46	
15	08:14 16:16	07:25 17:14	06:22 18:08	06:08 20:04	05:07 20:57	04:36 21:35	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	08:14 16:10	08:14 15:46	08:14 15:46	
16	08:13 16:17	07:23 17:16	06:20 18:10	06:06 20:06	05:05 20:59	04:36 21:35	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	08:15 16:08	08:15 15:46	08:15 15:46	
17	08:12 16:19	07:21 17:18	06:17 18:11	06:03 20:08	05:03 21:01	04:36 21:36	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	08:16 16:07	08:16 15:46	08:16 15:46	
18	08:11 16:21	07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 21:36	04:58 21:23	05:48 20:29	06:42 19:16	07:36 18:04	08:16 16:06	08:16 15:47	08:16 15:47	
19	08:10 16:22	07:17 17:22	06:12 18:15	05:59 20:12	05:00 21:04	04:36 21:37	05:00 21:22	05:50 20:27	06:44 19:13	07:38 18:02	08:17 16:04	08:17 15:47	08:17 15:47	
20	08:09 16:24	07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:05	04:36 21:37	05:01 21:21	05:52 20:24	06:46 19:11	07:40 18:00	08:18 16:03	08:18 15:47	08:18 15:47	
21	08:07 16:26	07:13 17:26	06:08 18:19	05:54 20:15	04:57 21:07	04:36 21:37	05:03 21:20	05:54 20:22	06:47 19:09	07:41 17:58	08:18 16:02	08:18 15:48	08:18 15:48	
22	08:06 16:28	07:11 17:28	06:05 18:21	05:52 20:17	04:56 21:08	04:36 21:37	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	08:19 16:00	08:19 15:48	08:19 15:48	
23	08:05 16:30	07:08 17:30	06:03 18:22	05:50 20:19	04:55 21:10	04:37 21:38	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	08:19 15:59	08:19 15:49	08:19 15:49	
24	08:04 16:31	07:06 17:32	06:00 18:24	05:48 20:21	04:53 21:11	04:37 21:38	05:07 21:15	05:59 20:15	06:53 19:01	07:47 17:51	08:20 15:58	08:20 15:49	08:20 15:49	
25	08:02 16:33	07:04 17:34	05:58 18:26	05:45 20:22	04:52 21:13	04:37 21:38	05:08 21:14	06:01 20:13	06:54 18:59	07:49 17:51	08:20 15:57	08:20 15:50	08:20 15:50	
26	08:01 16:35	07:02 17:36	05:55 18:28	05:43 20:24	04:51 21:14	04:38 21:38	05:10 21:12	06:02 20:11	06:56 18:56	07:50 17:51	08:20 15:56	08:20 15:50	08:20 15:50	
27	07:59 16:37	07:00 17:38	05:53 18:30	05:41 20:26	04:50 21:16	04:38 21:38	05:12 21:11	06:04 20:09	06:58 18:54	07:51 17:51	08:21 15:55	08:21 15:51	08:21 15:51	
28	07:58 16:39	06:57 17:39	05:51 18:32	05:39 20:28	04:48 21:17	04:39 21:38	05:13 21:09	06:06 20:06	07:00 18:51	07:52 17:51	08:21 15:54	08:21 15:52	08:21 15:52	
29	07:56 16:41	06:48 19:33	06:48 19:33	05:37 20:30	04:47 21:18	04:39 21:37	05:15 21:08	06:08 20:04	07:01 18:49	07:53 17:51	08:21 15:53	08:21 15:53	08:21 15:53	
30	07:55 16:43	06:46 19:35	06:46 19:35	05:35 20:31	04:46 21:20	04:40 21:37	05:16 21:06	06:09 20:02	07:03 18:47	07:55 17:51	08:21 15:52	08:21 15:54	08:21 15:54	
31	07:53 16:45	06:43 19:37	06:43 19:37	07:09-07:17/8 19:37	04:45 21:21	04:40 21:37	05:18 21:04	06:11 19:59	07:00 18:47	07:56 17:51	08:21 15:55	08:21 15:55	08:21 15:55	
	Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	160	329	261	236
	Anzahl Minuten mit Schatten	0	0	8	149	0	0	0	0	0	160	0	0	0

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

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

Berechnung: GesamtbelastungWEA: NO05 - VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (105)
Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	07:51 16:47	06:55 17:41	06:41 19:39	05:33 20:33	04:44 21:22	04:40 21:37	05:20 21:02	06:13 19:57	07:05 18:44	07:02 16:35	07:56 15:51
2	08:21 15:57	07:50 16:49	06:53 17:43	06:39 19:41	05:31 20:35	04:43 21:23	04:41 21:36	05:21 21:01	06:14 19:55	07:07 18:42	07:04 16:33	07:58 15:50
3	08:21 15:58	07:48 16:50	06:50 17:45	06:36 19:42	05:29 20:37	04:42 21:24	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 16:31	07:59 15:50
4	08:20 16:00	07:46 16:52	06:48 17:47	06:34 19:44	05:27 20:38	04:42 21:26	04:43 21:36	05:24 20:57	06:18 19:50	07:10 18:37	07:08 16:29	08:01 15:49
5	08:20 16:01	07:45 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 21:27	04:44 21:35	05:26 20:55	06:20 19:47	07:12 18:35	07:10 16:27	08:02 15:49
6	08:20 16:02	07:43 16:56	06:43 17:51	06:29 19:48	05:23 20:42	04:40 21:28	04:45 21:34	05:28 20:53	06:21 19:45	07:14 18:32	07:12 16:25	08:03 15:48
7	08:19 16:03	07:41 16:58	06:41 17:53	06:27 19:50	05:21 20:44	04:40 21:29	04:45 21:34	05:29 20:51	06:23 19:43	07:16 18:30	07:14 16:23	08:05 15:48
8	08:19 16:05	07:39 17:00	06:39 17:55	06:24 19:52	05:19 20:45	04:39 21:30	04:46 21:33	05:31 20:49	06:25 19:40	07:18 18:27	07:16 16:21	08:06 15:47
9	08:18 16:06	07:37 17:02	06:36 17:57	06:22 19:53	05:17 20:47	04:38 21:30	04:47 21:32	05:33 20:47	06:27 19:38	07:19 18:25	07:17 16:20	08:07 15:47
10	08:18 16:08	07:35 17:04	06:34 17:58	06:19 19:55	05:15 20:49	04:38 21:31	04:49 21:32	05:35 20:45	06:28 19:35	07:21 18:23	07:19 16:18	08:08 15:47
11	08:17 16:09	07:33 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:37 21:32	04:50 21:31	05:36 20:43	06:30 19:33	07:23 18:20	07:21 16:16	08:10 15:46
12	08:16 16:11	07:31 17:08	06:29 18:02	06:15 19:59	05:12 20:52	04:37 21:33	04:51 21:30	05:38 20:41	06:32 19:30	07:25 18:18	07:23 16:15	08:11 15:46
13	08:15 16:12	07:29 17:10	06:27 18:04	06:12 20:01	05:10 20:54	04:37 21:34	04:52 21:29	05:40 20:39	06:34 19:28	07:27 18:16	07:25 16:13	08:12 15:46
14	08:15 16:14	07:27 17:12	06:24 18:06	06:10 20:02	05:08 20:56	04:36 21:34	04:53 21:28	05:41 20:37	06:35 19:26	07:28 18:13	07:27 16:11	08:13 15:46
15	08:14 16:16	07:25 17:14	06:22 18:08	06:08 20:04	05:07 20:57	04:36 21:35	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 15:46
16	08:13 16:17	07:23 17:16	06:20 18:10	06:05 20:06	05:05 20:59	04:36 21:35	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 15:46
17	08:12 16:19	07:21 17:18	06:17 18:11	06:03 20:08	05:03 21:01	04:36 21:36	04:57 21:25	05:47 20:31	06:40 19:18	07:34 18:07	07:32 16:07	08:15 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 21:36	04:58 21:23	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:06	08:16 15:46
19	08:10 16:22	07:17 17:22	06:12 18:15	05:59 20:11	05:00 21:04	04:36 21:37	05:00 21:22	05:50 20:27	06:44 19:13	07:38 18:02	07:36 16:04	08:17 15:47
20	08:08 16:24	07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:05	04:36 21:37	05:01 21:21	05:52 20:24	06:46 19:11	07:40 18:00	07:38 16:03	08:18 15:47
21	08:07 16:26	07:13 17:26	06:08 18:19	05:54 20:15	04:57 21:07	04:36 21:37	05:03 21:19	05:54 20:22	06:47 19:08	07:41 17:58	07:40 16:01	08:18 15:48
22	08:06 16:28	07:11 17:28	06:05 18:21	05:52 20:17	04:56 21:08	04:36 21:37	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:41 16:00	08:19 15:48
23	08:05 16:29	07:08 17:30	06:03 18:22	05:50 20:19	04:55 21:10	04:37 21:38	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	08:19 15:48
24	08:03 16:31	07:06 17:32	06:00 18:24	05:48 20:21	04:53 21:11	04:37 21:38	05:07 21:15	05:59 20:15	06:53 19:01	07:47 17:51	07:45 15:58	08:20 15:49
25	08:02 16:33	07:04 17:34	05:58 18:26	05:45 20:22	04:52 21:13	04:37 21:38	05:08 21:14	06:01 20:13	06:54 18:59	06:49 17:49	07:47 15:57	08:20 15:50
26	08:01 16:35	07:02 17:36	05:55 18:28	05:43 20:24	04:51 21:14	04:38 21:38	05:10 21:12	06:02 20:11	06:56 18:56	06:51 16:47	07:48 15:56	08:20 15:50
27	07:59 16:37	07:00 17:38	05:53 18:30	05:41 20:26	04:50 21:16	04:38 21:38	05:12 21:11	06:04 20:09	06:58 18:54	06:53 16:45	07:50 15:55	08:21 15:51
28	07:58 16:39	06:57 17:39	05:51 18:32	05:39 20:28	04:48 21:17	04:39 21:38	05:13 21:09	06:06 20:06	07:00 18:51	06:55 16:43	07:52 15:54	08:21 15:52
29	07:56 16:41		06:48 19:33	05:37 20:30	04:47 21:18	04:39 21:37	05:15 21:07	06:08 20:04	07:01 18:49	06:56 16:41	07:53 15:53	08:21 15:53
30	07:55 16:43		06:46 19:35	05:35 20:31	04:46 21:20	04:40 21:37	05:16 21:06	06:09 20:02	07:03 18:47	06:58 16:39	07:55 15:52	08:21 15:54
31	07:53 16:45		06:43 19:37		04:45 21:21		05:18 21:04	06:11 19:59		07:00 16:37		08:21 15:55
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Berechnung: GesamtbelastungWEA: NO06 - VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (106)
Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	07:51 16:47	06:55 17:41	06:41 19:39	05:33 20:33	04:44 21:22	04:40 21:37	05:19 21:02	06:13 19:57	07:05 18:44	07:02 16:35	07:56 15:51
2	08:21 15:57	07:50 16:49	06:53 17:43	06:39 19:41	05:31 20:35	04:43 21:23	04:41 21:36	05:21 21:01	06:14 19:54	07:07 18:42	07:04 16:33	07:58 15:50
3	08:21 15:58	07:48 16:50	06:50 17:45	06:36 19:42	05:29 20:37	04:42 21:24	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 16:31	07:59 15:50
4	08:20 16:00	07:46 16:52	06:48 17:47	06:34 19:44	05:27 20:38	04:42 21:26	04:43 21:35	05:24 20:57	06:18 19:50	07:10 18:37	07:08 16:29	08:01 15:49
5	08:20 16:01	07:45 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 21:27	04:44 21:35	05:26 20:55	06:20 19:47	07:12 18:34	07:10 16:27	08:02 15:49
6	08:20 16:02	07:43 16:56	06:43 17:51	06:29 19:48	05:23 20:42	04:40 21:28	04:45 21:34	05:28 20:53	06:21 19:45	07:14 18:32	07:12 16:25	08:03 15:48
7	08:19 16:03	07:41 16:58	06:41 17:53	06:27 19:50	05:21 20:44	04:40 21:29	04:45 21:34	05:29 20:51	06:23 19:43	07:16 18:30	07:14 16:23	08:05 15:48
8	08:19 16:05	07:39 17:00	06:39 17:55	06:24 19:51	05:19 20:45	04:39 21:30	04:46 21:33	05:31 20:49	06:25 19:40	07:17 18:27	07:16 16:21	08:06 15:47
9	08:18 16:06	07:37 17:02	06:36 17:56	06:22 19:53	05:17 20:47	04:38 21:30	04:47 21:32	05:33 20:47	06:27 19:38	07:19 18:25	07:17 16:20	08:07 15:47
10	08:18 16:08	07:35 17:04	06:34 17:58	06:19 19:55	05:15 20:49	04:38 21:31	04:49 21:31	05:35 20:45	06:28 19:35	07:21 18:23	07:19 16:18	08:08 15:47
11	08:17 16:09	07:33 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:37 21:32	04:50 21:31	05:36 20:43	06:30 19:33	07:23 18:20	07:21 16:16	08:10 15:46
12	08:16 16:11	07:31 17:08	06:29 18:02	06:15 19:59	05:12 20:52	04:37 21:33	04:51 21:30	05:38 20:41	06:32 19:30	07:25 18:18	07:23 16:15	08:11 15:46
13	08:15 16:12	07:29 17:10	06:27 18:04	06:12 20:01	05:10 20:54	04:37 21:34	04:52 21:29	05:40 20:39	06:34 19:28	07:27 18:16	07:25 16:13	08:12 15:46
14	08:15 16:14	07:27 17:12	06:24 18:06	06:10 20:02	05:08 20:56	04:36 21:34	04:53 21:28	05:41 20:37	06:35 19:26	07:28 18:13	07:27 16:11	08:13 15:46
15	08:14 16:16	07:25 17:14	06:22 18:08	06:08 20:04	05:07 20:57	04:36 21:35	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 15:46
16	08:13 16:17	07:23 17:16	06:20 18:10	06:05 20:06	05:05 20:59	04:36 21:35	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:14 15:46
17	08:12 16:19	07:21 17:18	06:17 18:11	06:03 20:08	05:03 21:01	04:36 21:36	04:57 21:24	05:47 20:31	06:40 19:18	07:34 18:06	07:32 16:07	08:15 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 21:36	04:58 21:23	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:05	08:16 15:46
19	08:10 16:22	07:17 17:22	06:12 18:15	05:59 20:11	05:00 21:04	04:36 21:37	05:00 21:22	05:50 20:27	06:44 19:13	07:38 18:02	07:36 16:04	08:17 15:47
20	08:08 16:24	07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:05	04:36 21:37	05:01 21:21	05:52 20:24	06:46 19:11	07:39 18:00	07:38 16:03	08:18 15:47
21	08:07 16:26	07:13 17:26	06:08 18:19	05:54 20:15	04:57 21:07	04:36 21:37	05:03 21:19	05:54 20:22	06:47 19:08	07:41 17:58	07:40 16:01	08:18 15:47
22	08:06 16:28	07:11 17:28	06:05 18:21	05:52 20:17	04:56 21:08	04:36 21:37	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:41 16:00	08:19 15:48
23	08:05 16:29	07:08 17:30	06:03 18:22	05:50 20:19	04:55 21:10	04:37 21:38	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	08:19 15:48
24	08:03 16:31	07:06 17:32	06:00 18:24	05:48 20:20	04:53 21:11	04:37 21:38	05:07 21:15	05:59 20:15	06:53 19:01	07:47 17:51	07:45 15:58	08:20 15:49
25	08:02 16:33	07:04 17:34	05:58 18:26	05:45 20:22	04:52 21:13	04:37 21:38	05:08 21:14	06:01 20:13	06:54 18:59	06:49 16:49	07:47 15:57	08:20 15:50
26	08:01 16:35	07:02 17:36	05:55 18:28	05:43 20:24	04:51 21:14	04:38 21:38	05:10 21:12	06:02 20:11	06:56 18:56	06:51 16:47	07:48 15:56	08:20 15:50
27	07:59 16:37	06:59 17:37	05:53 18:30	05:41 20:26	04:50 21:16	04:38 21:38	05:12 21:11	06:04 20:09	06:58 18:54	06:53 16:45	07:50 15:55	08:21 15:51
28	07:58 16:39	06:57 17:39	05:51 18:31	05:39 20:28	04:48 21:17	04:39 21:37	05:13 21:09	06:06 20:06	07:00 18:51	06:55 16:43	07:52 15:54	08:21 15:52
29	07:56 16:41		06:48 19:33	05:37 20:29	04:47 21:18	04:39 21:37	05:15 21:07	06:07 20:04	07:01 18:49	06:56 16:41	07:53 15:53	08:21 15:53
30	07:55 16:43		06:46 19:35	05:35 20:31	04:46 21:20	04:40 21:37	05:16 21:06	06:09 20:02	07:03 18:47	06:58 16:39	07:55 15:52	08:21 15:54
31	07:53 16:45		06:43 19:37		04:45 21:21		05:18 21:04	06:11 19:59		07:00 16:37		08:21 15:55
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Berechnung: GesamtbelastungWEA: NO08 - VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (107)
 Voraussetzungen für Berechnung des Schattenwurfs

- 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	08:21	07:52	06:55	06:41	07:24-07:46/22	05:33	04:44	04:41	05:20	06:13	07:05	07:02	07:56	
	15:56	16:47	17:41	19:39		20:33	21:22	21:37	21:02	19:57	18:44	16:35	15:51	
2	08:21	07:50	06:53	06:39	07:24-07:46/22	05:31	04:43	04:41	05:21	06:15	07:07	07:04	07:58	
	15:57	16:49	17:43	19:41		20:35	21:23	21:36	21:01	19:55	18:42	16:33	15:50	
3	08:21	07:48	06:50	06:36	07:25-07:45/20	05:29	04:43	04:42	05:23	06:16	07:09	07:06	07:59	
	15:58	16:51	17:45	19:42		20:37	21:25	21:36	20:59	19:52	18:39	16:31	15:50	
4	08:20	07:46	06:48	06:34	07:25-07:43/18	05:27	04:42	04:43	05:25	06:18	07:10	07:08	08:01	
	16:00	16:53	17:47	19:44		20:39	21:26	21:36	20:57	19:50	18:37	16:29	15:49	
5	08:20	07:45	06:46	06:31	07:27-07:42/15	05:25	04:41	04:44	05:26	06:20	07:12	07:10	08:02	
	16:01	16:54	17:49	19:46		20:40	21:27	21:35	20:55	19:47	18:35	16:27	15:49	
6	08:20	07:43	06:43	06:29	07:28-07:38/10	05:23	04:40	04:45	05:28	06:21	07:24-07:34/10	07:14	07:12	08:03
	16:02	16:56	17:51	19:48		20:42	21:28	21:34	20:53	19:45	18:32	16:25	15:48	
7	08:19	07:41	06:41	06:27		05:21	04:40	04:46	05:30	06:23	07:22-07:37/15	07:16	07:14	08:05
	16:04	16:58	17:53	19:50		20:44	21:29	21:34	20:51	19:43	18:30	16:23	15:48	
8	08:19	07:39	06:39	06:24		05:19	04:39	04:47	05:31	06:25	07:21-07:38/17	07:18	07:16	08:06
	16:05	17:00	17:55	19:52		20:46	21:30	21:33	20:49	19:40	18:27	16:22	15:47	
9	08:18	07:37	06:36	06:22		05:17	04:38	04:48	05:33	06:27	07:19-07:38/19	07:19	07:18	08:07
	16:06	17:02	17:57	19:53		20:47	21:31	21:32	20:47	19:38	18:25	16:20	15:47	
10	08:18	07:35	06:34	06:20		05:15	04:38	04:49	05:35	06:28	07:18-07:39/21	07:21	07:19	08:08
	16:08	17:04	17:58	19:55		20:49	21:31	21:32	20:45	19:35	18:23	16:18	15:47	
11	08:17	07:33	06:32	06:17		05:14	04:38	04:50	05:36	06:30	07:17-07:39/22	07:23	07:21	08:10
	16:09	17:06	18:00	19:57		20:51	21:32	21:31	20:43	19:33	18:20	16:16	15:46	
12	08:16	07:32	06:29	06:15		05:12	04:37	04:51	05:38	06:32	07:16-07:39/23	07:25	07:23	08:11
	16:11	17:08	18:02	19:59		20:52	21:33	21:30	20:41	19:31	18:18	16:15	15:46	
13	08:15	07:30	06:27	06:13		05:10	04:37	04:52	05:40	06:34	07:16-07:39/23	07:27	07:25	08:12
	16:12	17:10	18:04	20:01		20:54	21:34	21:29	20:39	19:28	18:16	16:13	15:46	
14	08:15	07:28	06:25	06:10		05:08	04:37	04:53	05:42	06:35	07:16-07:38/22	07:28	07:27	08:13
	16:14	17:12	18:06	20:02		20:56	21:34	21:28	20:37	19:26	18:13	16:12	15:46	
15	08:14	07:25	06:22	06:08		05:07	04:36	04:54	05:43	06:37	07:15-07:37/22	07:30	07:29	08:14
	16:16	17:14	18:08	20:04		20:57	21:35	21:27	20:35	19:23	18:11	16:10	15:46	
16	08:13	07:23	06:20	06:06		05:05	04:36	04:56	05:45	06:39	07:16-07:36/20	07:32	07:31	08:15
	16:17	17:16	18:10	20:06		20:59	21:35	21:26	20:33	19:21	18:09	16:08	15:46	
17	08:12	07:21	06:17	06:03		05:04	04:36	04:57	05:47	06:41	07:17-07:35/18	07:34	07:32	08:15
	16:19	17:18	18:11	20:08		21:01	21:36	21:25	20:31	19:18	18:07	16:07	15:46	
18	08:11	07:19	06:15	06:01		05:02	04:36	04:58	05:48	06:42	07:18-07:34/16	07:36	07:34	08:16
	16:21	17:20	18:13	20:10		21:02	21:36	21:23	20:29	19:16	18:04	16:06	15:47	
19	08:10	07:17	06:12	05:59		05:00	04:36	05:00	05:50	06:44	07:19-07:31/12	07:38	07:36	08:17
	16:22	17:22	18:15	20:12		21:04	21:37	21:22	20:27	19:13	18:02	16:04	15:47	
20	08:09	07:15	06:10	05:56		04:59	04:36	05:01	05:52	06:46	07:23-07:27/4	07:40	07:38	08:18
	16:24	17:24	18:17	20:13		21:05	21:37	21:21	20:24	19:11	18:00	16:03	15:47	
21	08:07	07:13	06:08	05:54		04:57	04:36	05:03	05:54	06:47	07:41	07:40	08:18	
	16:26	17:26	18:19	20:15		21:07	21:37	21:20	20:22	19:09	17:58	16:02	15:48	
22	08:06	07:11	06:05	05:52		04:56	04:36	05:04	05:55	06:49	07:43	07:41	08:19	
	16:28	17:28	18:21	20:17		21:08	21:38	21:18	20:20	19:06	17:55	16:00	15:48	
23	08:05	07:08	06:03	05:50		04:55	04:37	05:06	05:57	06:51	07:45	07:43	08:19	
	16:30	17:30	18:22	20:19		21:10	21:38	21:17	20:18	19:04	17:53	15:59	15:49	
24	08:04	07:06	06:00	06:33-06:44/11	05:48	04:53	04:37	05:07	05:59	06:53	07:47	07:45	08:20	
	16:31	17:32	18:24	20:21		21:11	21:38	21:15	20:15	19:01	17:51	15:58	15:49	
25	08:02	07:04	05:58	06:30-06:45/15	05:45	04:52	04:37	05:09	06:01	06:54	06:49	07:47	08:20	
	16:33	17:34	18:26	20:22		21:13	21:38	21:14	20:13	18:59	16:49	15:57	15:50	
26	08:01	07:02	05:56	06:29-06:47/18	05:43	04:51	04:38	05:10	06:02	06:56	06:51	07:48	08:20	
	16:35	17:36	18:28	20:24		21:14	21:38	21:12	20:11	18:56	16:47	15:56	15:50	
27	07:59	07:00	05:53	06:27-06:47/20	05:41	04:50	04:38	05:12	06:04	06:58	06:53	07:50	08:21	
	16:37	17:38	18:30	20:26		21:16	21:38	21:11	20:09	18:54	16:45	15:55	15:51	
28	07:58	06:57	05:51	06:26-06:48/22	05:39	04:48	04:39	05:13	06:06	07:00	06:55	07:52	08:21	
	16:39	17:40	18:32	20:28		21:17	21:38	21:09	20:06	18:51	16:43	15:54	15:52	
29	07:56		06:48	07:26-07:48/22	05:37	04:47	04:39	05:15	06:08	07:02	06:57	07:53	08:21	
	16:41		19:33	20:30		21:18	21:37	21:08	20:04	18:49	16:41	15:53	15:53	
30	07:55		06:46	07:25-07:47/22	05:35	04:46	04:40	05:16	06:09	07:03	06:58	07:55	08:21	
	16:43		19:35	20:31		21:20	21:37	21:06	20:02	18:47	16:39	15:52	15:54	
31	07:53		06:43	07:25-07:47/22	05:33	04:45		05:18	06:11		07:00		08:21	
	16:45		19:37	20:31		21:21		21:04	19:59		16:37		15:55	
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	264	329	261	236	
Anzahl Minuten mit Schatten	0	0	152	107	0	0	0	0	264	0	0	0	0	

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

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

Berechnung: GesamtbelastungWEA: NO09 - VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (108)
 Voraussetzungen für Berechnung des Schattenwurfs

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	Jun	Jul	August	September	Oktober	November	Dezember
1	08:21	07:52	06:55	06:41	05:33	04:44 05:32-05:50/18	04:41 05:41-05:51/10	05:20	06:13	07:05	07:02	07:56
	15:56	16:47	17:41	19:39	20:33	21:22	21:37	21:02	19:57	18:44	16:35	15:51
2	08:21	07:50	06:53	06:39	05:31	04:43 05:32-05:49/17	04:41 05:41-05:52/11	05:21	06:14	07:07	07:04	07:58
	15:57	16:49	17:43	19:41	20:35	21:23	21:36	21:01	19:55	18:42	16:33	15:50
3	08:21	07:48	06:50	06:36	05:29	04:43 05:32-05:49/17	04:42 05:41-05:53/12	05:23	06:16	07:09	07:06	07:59
	15:58	16:51	17:45	19:42	20:37	21:24	21:36	20:59	19:52	18:39	16:31	15:50
4	08:20	07:46	06:48	06:34	05:27	04:42 05:32-05:49/17	04:43 05:40-05:53/13	05:24	06:18	07:10	07:08	08:01
	16:00	16:52	17:47	19:44	20:38	21:26	21:36	20:57	19:50	18:37	16:29	15:49
5	08:20	07:45	06:46	06:31	05:25	04:41 05:33-05:49/16	04:44 05:40-05:54/14	05:26	06:20	07:12	07:10	08:02
	16:01	16:54	17:49	19:46	20:40	21:27	21:35	20:55	19:47	18:35	16:27	15:49
6	08:20	07:43	06:43	06:29	05:23	04:40 05:33-05:48/15	04:45 05:40-05:54/14	05:28	06:21	07:14	07:12	08:03
	16:02	16:56	17:51	19:48	20:42	21:28	21:34	20:53	19:45	18:32	16:25	15:48
7	08:19	07:41	06:41	06:27	05:21	04:40 05:34-05:49/15	04:45 05:40-05:55/15	05:30	06:23	07:16	07:14	08:05
	16:03	16:58	17:53	19:50	20:44	21:29	21:34	20:51	19:43	18:30	16:23	15:48
8	08:19	07:39	06:39	06:24	05:19	04:39 05:34-05:48/14	04:46 05:40-05:56/16	05:31	06:25	07:18	07:16	08:06
	16:05	17:00	17:55	19:52	20:45	21:30	21:33	20:49	19:40	18:27	16:21	15:47
9	08:18	07:37	06:36	06:22	05:17	04:38 05:36-05:48/12	04:48 05:39-05:56/17	05:33	06:27	07:19	07:17	08:07
	16:06	17:02	17:57	19:53	20:47	21:30	21:32	20:47	19:38	18:25	16:20	15:47
10	08:18	07:35	06:34	06:19	05:15	04:38 05:36-05:47/11	04:49 05:39-05:57/18	05:35	06:28	07:21	07:19	08:08
	16:08	17:04	17:58	19:55	20:49	21:31	21:32	20:45	19:35	18:23	16:18	15:47
11	08:17	07:33	06:32	06:17	05:14	04:38 05:37-05:47/10	04:50 05:39-05:57/18	05:36	06:30	07:23	07:21	08:10
	16:09	17:06	18:00	19:57	20:51	21:32	21:31	20:43	19:33	18:20	16:16	15:46
12	08:16	07:31	06:29	06:15	05:12	04:37 05:38-05:47/9	04:51 05:39-05:57/18	05:38	06:32	07:25	07:23	08:11
	16:11	17:08	18:02	19:59	20:52	21:33	21:30	20:41	19:30	18:18	16:15	15:46
13	08:15	07:29	06:27	06:12	05:10	04:37 05:38-05:47/9	04:52 05:39-05:58/19	05:40	06:34	07:27	07:25	08:12
	16:12	17:10	18:04	20:01	20:54	21:34	21:29	20:39	19:28	18:16	16:13	15:46
14	08:15	07:27	06:24	06:10	05:08	04:37 05:38-05:46/8	04:53 05:39-05:58/19	05:41	06:35	07:28	07:27	08:13
	16:14	17:12	18:06	20:02	20:56	21:34	21:28	20:37	19:26	18:13	16:11	15:46
15	08:14	07:25	06:22	06:08	05:07 05:37-05:41/4	04:36 05:39-05:46/7	04:54 05:38-05:58/20	05:43	06:37	07:30	07:29	08:14
	16:16	17:14	18:08	20:04	20:57	21:35	21:27	20:35	19:23	18:10	16:10	15:46
16	08:13	07:23	06:20	06:06	05:05 05:34-05:44/10	04:36 05:40-05:45/5	04:56 05:39-05:59/20	05:45	06:39	07:32	07:31	08:15
	16:17	17:16	18:10	20:06	20:59	21:35	21:26	20:33	19:21	18:09	16:08	15:46
17	08:12	07:21	06:17	06:03	05:03 05:32-05:45/13	04:36 05:41-05:45/4	04:57 05:39-05:59/20	05:47	06:40	07:34	07:32	08:15
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18	08:11	07:19	06:15	06:01	05:02 05:32-05:46/14	04:36 05:42-05:45/3	04:58 05:39-05:59/20	05:48	06:42	07:36	07:34	08:16
	16:21	17:20	18:13	20:10	21:02	21:36	21:23	20:29	19:16	18:04	16:06	15:47
19	08:10	07:17	06:12	05:59	05:00 05:31-05:47/16	04:36 05:42-05:44/2	05:00 05:39-05:59/20	05:50	06:44	07:38	07:36	08:17
	16:22	17:22	18:15	20:11	21:04	21:37	21:22	20:27	19:13	18:02	16:04	15:47
20	08:08	07:15	06:10	05:56	04:59 05:30-05:47/17	04:36	05:01 05:40-05:59/19	05:52	06:46	07:40	07:38	08:18
	16:24	17:24	18:17	20:13	21:05	21:37	21:21	20:24	19:11	18:00	16:03	15:47
21	08:07	07:13	06:08	05:54	04:57 05:30-05:48/18	04:36	05:03 05:40-05:59/19	05:54	06:47	07:41	07:40	08:18
	16:26	17:26	18:19	20:15	21:07	21:37	21:20	20:22	19:09	17:58	16:02	15:48
22	08:06	07:11	06:05	05:52	04:56 05:30-05:49/19	04:36	05:04 05:40-05:58/18	05:55	06:49	07:43	07:41	08:19
	16:28	17:28	18:21	20:17	21:08	21:37	21:18	20:20	19:06	17:55	16:00	15:48
23	08:05	07:08	06:03	05:50	04:55 05:29-05:48/19	04:37 05:44-05:45/1	05:05 05:41-05:58/17	05:57	06:51	07:45	07:43	08:19
	16:30	17:30	18:22	20:19	21:10	21:38	21:17	20:18	19:04	17:53	15:59	15:49
24	08:03	07:06	06:00	05:48	04:53 05:29-05:49/20	04:37 05:44-05:46/2	05:07 05:41-05:58/17	05:59	06:53	07:47	07:45	08:20
	16:31	17:32	18:24	20:21	21:11	21:38	21:15	20:15	19:01	17:51	15:58	15:49
25	08:02	07:04	05:58	05:45	04:52 05:29-05:49/20	04:37 05:43-05:47/4	05:08 05:41-05:57/16	06:01	06:54	07:49	07:47	08:20
	16:33	17:34	18:26	20:22	21:13	21:38	21:14	20:13	18:59	16:49	15:57	15:50
26	08:01	07:02	05:55	05:43	04:51 05:29-05:49/20	04:38 05:42-05:47/5	05:10 05:43-05:56/13	06:02	06:56	06:51	07:48	08:20
	16:35	17:36	18:28	20:24	21:14	21:38	21:12	20:11	18:56	16:47	15:56	15:50
27	07:59	07:00	05:53	05:41	04:50 05:30-05:49/19	04:38 05:43-05:49/6	05:12 05:43-05:55/12	06:04	06:58	06:53	07:50	08:21
	16:37	17:38	18:30	20:26	21:16	21:38	21:11	20:09	18:54	16:45	15:55	15:51
28	07:58	06:57	05:51	05:39	04:48 05:30-05:50/20	04:39 05:42-05:49/7	05:13 05:46-05:54/8	06:06	07:00	06:55	07:52	08:21
	16:39	17:39	18:32	20:28	21:17	21:38	21:09	20:06	18:51	16:43	15:54	15:52
29	07:56		06:48	05:37	04:47 05:30-05:49/19	04:39 05:42-05:50/8	05:15	06:08	07:01	06:56	07:53	08:21
	16:41		19:33	20:30	21:18	21:37	21:07	20:04	18:49	16:41	15:53	15:53
30	07:55		06:46	05:35	04:46 05:30-05:49/19	04:40 05:42-05:51/9	05:16	06:09	07:03	06:58	07:55	08:21
	16:43		19:35	20:31	21:20	21:37	21:06	20:02	18:47	16:39	15:52	15:54
31	07:53		06:43		04:45 05:30-05:49/19		05:18	06:11		07:00		08:21
	16:45		19:37		21:21		21:04	19:59		16:37		15:55
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	0	0	286	251	453	0	0	0	0	0

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

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

Berechnung: GesamtbelastungWEA: NO10 - VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (109)

Voraussetzungen für Berechnung des Schattenwurfs

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	08:21 15:56	07:51 16:47	06:55 17:41	06:41 19:39	05:33 20:33	04:44 21:22	04:40 21:37	05:20 21:02	06:13 19:57	07:05 18:44	07:02 16:35	07:56 15:51
2	08:21 15:57	07:50 16:49	06:53 17:43	06:39 19:41	05:31 20:35	04:43 21:23	04:41 21:36	05:21 21:01	06:14 19:55	07:07 18:42	07:04 16:33	07:58 15:50
3	08:21 15:58	07:48 16:50	06:50 17:45	06:36 19:42	05:29 20:37	04:42 21:24	04:42 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 16:31	07:59 15:50
4	08:20 16:00	07:46 16:52	06:48 17:47	06:34 19:44	05:27 20:38	04:42 21:26	04:43 21:36	05:24 20:57	06:18 19:50	07:10 18:37	07:08 16:29	08:01 15:49
5	08:20 16:01	07:45 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 21:27	04:44 21:35	05:26 20:55	06:20 19:47	07:12 18:35	07:10 16:27	08:02 15:49
6	08:20 16:02	07:43 16:56	06:43 17:51	06:29 19:48	05:23 20:42	04:40 21:28	04:45 21:34	05:28 20:53	06:21 19:45	07:14 18:32	07:12 16:25	08:03 15:48
7	08:19 16:03	07:41 16:58	06:41 17:53	06:27 19:50	05:21 20:44	04:40 21:29	04:45 21:34	05:30 20:51	06:23 19:43	07:16 18:30	07:14 16:23	08:05 15:48
8	08:19 16:05	07:39 17:00	06:39 17:55	06:24 19:52	05:19 20:45	04:39 21:30	04:46 21:33	05:31 20:49	06:25 19:40	07:18 18:27	07:16 16:21	08:06 15:47
9	08:18 16:06	07:37 17:02	06:36 17:57	06:22 19:53	05:17 20:47	04:38 21:30	04:47 21:32	05:33 20:47	06:27 19:38	07:19 18:25	07:17 16:20	08:07 15:47
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11	08:17 16:09	07:33 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:37 21:32	04:50 21:31	05:36 20:43	06:30 19:33	07:23 18:20	07:21 16:16	08:10 15:46
12	08:16 16:11	07:31 17:08	06:29 18:02	06:15 19:59	05:12 20:52	04:37 21:33	04:51 21:30	05:38 20:41	06:32 19:30	07:25 18:18	07:23 16:15	08:11 15:46
13	08:15 16:12	07:29 17:10	06:27 18:04	06:12 20:01	05:10 20:54	04:37 21:34	04:52 21:29	05:40 20:39	06:34 19:28	07:27 18:16	07:25 16:13	08:12 15:46
14	08:15 16:14	07:27 17:12	06:24 18:06	06:10 20:02	05:08 20:56	04:37 21:34	04:53 21:28	05:41 20:37	06:35 19:26	07:28 18:13	07:27 16:11	08:13 15:46
15	08:14 16:16	07:25 17:14	06:22 18:08	06:08 20:04	05:07 20:57	04:36 21:35	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 15:46
16	08:13 16:17	07:23 17:16	06:20 18:10	06:06 20:06	05:05 20:59	04:36 21:35	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 15:46
17	08:12 16:19	07:21 17:18	06:17 18:11	06:03 20:08	05:03 21:01	04:36 21:36	04:57 21:25	05:47 20:31	06:40 19:18	07:34 18:07	07:32 16:07	08:15 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 21:36	04:58 21:23	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:06	08:16 15:47
19	08:10 16:22	07:17 17:22	06:12 18:15	05:59 20:11	05:00 21:04	04:36 21:37	05:00 21:22	05:50 20:27	06:44 19:13	07:38 18:02	07:36 16:04	08:17 15:47
20	08:08 16:24	07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:05	04:36 21:37	05:01 21:21	05:52 20:24	06:46 19:11	07:39 18:00	07:38 16:03	08:18 15:47
21	08:07 16:26	07:13 17:26	06:08 18:19	05:54 20:15	04:57 21:07	04:36 21:37	05:03 21:19	05:54 20:22	06:47 19:08	07:41 17:58	07:40 16:01	08:18 15:48
22	08:06 16:28	07:11 17:28	06:05 18:21	05:52 20:17	04:56 21:08	04:36 21:37	05:04 21:18	05:55 20:20	06:49 19:06	07:43 17:55	07:41 16:00	08:19 15:48
23	08:05 16:30	07:08 17:30	06:03 18:22	05:50 20:19	04:55 21:10	04:37 21:38	05:05 21:17	05:57 20:18	06:51 19:04	07:45 17:53	07:43 15:59	08:19 15:49
24	08:03 16:31	07:06 17:32	06:00 18:24	05:48 20:21	04:53 21:11	04:37 21:38	05:07 21:15	05:59 20:15	06:53 19:01	07:47 17:51	07:45 15:58	08:20 15:49
25	08:02 16:33	07:04 17:34	05:58 18:26	05:45 20:22	04:52 21:13	04:37 21:38	05:08 21:14	06:01 20:13	06:54 18:59	06:49 17:49	07:47 15:57	08:20 15:50
26	08:01 16:35	07:02 17:36	05:55 18:28	05:43 20:24	04:51 21:14	04:38 21:38	05:10 21:12	06:02 20:11	06:56 18:56	06:51 16:47	07:48 15:56	08:20 15:50
27	07:59 16:37	07:00 17:38	05:53 18:30	05:41 20:26	04:50 21:16	04:38 21:38	05:12 21:11	06:04 20:09	06:58 18:54	06:53 16:45	07:50 15:55	08:21 15:51
28	07:58 16:39	06:57 17:39	05:51 18:32	05:39 20:28	04:48 21:17	04:39 21:37	05:13 21:09	06:06 20:06	07:00 18:51	06:55 16:43	07:52 15:54	08:21 15:52
29	07:56 16:41		06:48 19:33	05:37 20:30	04:47 21:18	04:39 21:37	05:15 21:07	06:08 20:04	07:01 18:49	06:56 16:41	07:53 15:53	08:21 15:53
30	07:55 16:43		06:46 19:35	05:35 20:31	04:46 21:20	04:40 21:37	05:16 21:06	06:09 20:02	07:03 18:47	06:58 16:39	07:55 15:52	08:21 15:54
31	07:53 16:45		06:43 19:37		04:45 21:21		05:18 21:04	06:11 19:59		07:00 16:37		08:21 15:55
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Berechnung: GesamtbelastungWEA: NO11 - VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (110)
 Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinfallrichtung
 Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:21 15:56	07:52 16:47	06:55 17:41	06:41 19:39	05:33 20:33	04:44 21:22	04:41 05:25-05:44/19 21:37	05:20 21:02	06:13 19:57	07:05 18:44	07:33-07:43/10 16:35	07:02 15:51
2	08:21 15:57	07:50 16:49	06:53 17:43	06:39 19:41	05:31 20:35	04:43 21:23	04:41 05:26-05:44/18 21:36	05:21 21:01	06:15 19:55	07:07 18:42	07:04 16:33	07:58 15:50
3	08:21 15:58	07:48 16:51	06:50 17:45	06:36 19:42	05:29 20:37	04:43 05:26-05:32/6 21:24	04:42 05:27-05:44/17 21:36	05:23 20:59	06:16 19:52	07:09 18:39	07:06 16:31	07:59 15:50
4	08:20 16:00	07:46 16:52	06:48 17:47	06:34 19:44	05:27 20:38	04:42 05:24-05:33/9 21:26	04:43 05:27-05:43/16 21:36	05:25 20:57	06:18 19:50	07:10 18:37	07:08 16:29	08:01 15:49
5	08:20 16:01	07:45 16:54	06:46 17:49	06:31 19:46	05:25 20:40	04:41 05:24-05:35/11 21:27	04:44 05:27-05:43/16 21:35	05:26 20:55	06:20 19:47	07:12 18:35	07:10 16:27	08:02 15:49
6	08:20 16:02	07:43 16:56	06:43 17:51	06:29 19:48	05:23 20:42	04:40 05:22-05:36/14 21:28	04:45 05:28-05:43/15 21:34	05:28 20:53	06:21 19:45	07:14 18:32	07:12 16:25	08:03 15:48
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9	08:18 16:06	07:37 17:02	06:36 17:57	06:22 19:53	05:17 20:47	04:38 05:22-05:39/17 21:31	04:48 05:32-05:40/8 21:32	05:33 20:47	06:27 19:38	07:19 18:25	07:17 16:20	08:07 15:47
10	08:18 16:08	07:35 17:04	06:34 17:58	06:20 19:55	05:15 20:49	04:38 05:21-05:39/18 21:31	04:49 21:32	05:35 20:45	06:28 19:35	07:21 18:23	07:19 16:18	08:08 15:47
11	08:17 16:09	07:33 17:06	06:32 18:00	06:17 19:57	05:14 20:51	04:38 05:21-05:40/19 21:32	04:50 21:31	05:36 20:43	06:30 19:33	07:23 18:20	07:21 16:16	08:10 15:46
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13	08:15 16:12	07:30 17:10	06:27 18:04	06:12 20:01	05:10 20:54	04:37 05:21-05:41/20 21:34	04:52 21:29	05:40 20:39	06:34 19:28	07:27 18:16	07:25 16:13	08:12 15:46
14	08:15 16:14	07:28 17:12	06:25 18:06	06:10 20:02	05:08 20:56	04:37 05:20-05:41/21 21:34	04:53 21:28	05:42 20:37	06:35 19:26	07:28 18:13	07:27 16:12	08:13 15:46
15	08:14 16:16	07:25 17:14	06:22 18:08	06:08 20:04	05:07 20:57	04:36 05:21-05:41/20 21:35	04:54 21:27	05:43 20:35	06:37 19:23	07:30 18:11	07:29 16:10	08:14 15:46
16	08:13 16:17	07:23 17:16	06:20 18:10	06:06 20:06	05:05 20:59	04:36 05:21-05:42/21 21:35	04:56 21:26	05:45 20:33	06:39 19:21	07:32 18:09	07:31 16:08	08:15 15:46
17	08:12 16:19	07:21 17:18	06:17 18:11	06:03 20:08	05:04 21:01	04:36 05:21-05:42/21 21:36	04:57 21:25	05:47 20:31	06:41 19:18	07:34 18:07	07:32 16:07	08:15 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	04:36 05:21-05:42/21 21:36	04:58 21:23	05:48 20:29	06:42 19:16	07:36 18:04	07:34 16:06	08:16 15:47
19	08:10 16:22	07:17 17:22	06:12 18:15	05:59 20:12	05:00 21:04	04:36 05:21-05:42/21 21:37	05:00 21:22	05:50 20:27	06:44 19:13	07:38 18:02	07:36 16:04	08:17 15:47
20	08:09 16:24	07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:05	04:36 05:22-05:43/21 21:37	05:01 21:21	05:52 20:24	06:46 19:11	07:40 18:00	07:38 16:03	08:18 15:47
21	08:07 16:26	07:13 17:26	06:08 18:19	05:54 20:15	04:57 21:07	04:36 05:22-05:44/22 21:37	05:03 21:20	05:54 20:22	06:47 07:38-07:47/9 19:09	07:41 17:58	07:40 16:02	08:18 15:48
22	08:06 16:28	07:11 17:28	06:05 18:21	05:52 20:17	04:56 21:08	04:36 05:22-05:43/21 21:37	05:04 21:18	05:55 20:20	06:49 07:35-07:48/13 19:06	07:43 17:55	07:41 16:00	08:19 15:48
23	08:05 16:30	07:08 17:30	06:03 18:22	05:50 20:19	04:55 21:10	04:37 05:22-05:43/21 21:38	05:05 21:17	05:57 20:18	06:51 07:33-07:49/16 19:04	07:45 17:53	07:43 16:00	08:19 15:49
24	08:04 16:31	07:06 17:32	06:00 18:24	05:48 20:21	04:53 21:11	04:37 05:23-05:44/21 21:38	05:07 21:15	05:59 20:15	06:53 07:32-07:49/17 19:01	07:47 17:51	07:45 16:00	08:20 15:49
25	08:02 16:33	07:04 17:34	05:58 18:26	05:45 20:22	04:52 21:13	04:37 05:23-05:44/21 21:38	05:08 21:14	06:01 20:13	06:54 07:32-07:50/18 18:59	07:49 17:49	07:47 16:00	08:20 15:50
26	08:01 16:35	07:02 17:36	05:55 18:28	05:43 20:24	04:51 21:14	04:38 05:23-05:44/21 21:38	05:10 21:12	06:02 20:11	06:56 07:31-07:49/18 18:56	07:51 17:47	07:48 16:00	08:20 15:50
27	07:59 16:37	07:00 17:38	05:53 18:30	05:41 20:26	04:50 21:16	04:38 05:24-05:44/20 21:38	05:12 21:11	06:04 20:09	06:58 07:31-07:49/18 18:54	07:53 17:45	07:50 16:00	08:21 15:51
28	07:58 16:39	06:57 17:39	05:51 18:32	05:39 20:28	04:48 21:17	04:39 05:23-05:44/21 21:38	05:13 21:09	06:06 20:06	07:00 07:31-07:48/17 18:51	07:55 17:43	07:52 16:00	08:21 15:52
29	07:56 16:41	06:56 17:33	05:48 18:33	05:37 20:30	04:47 21:18	04:39 05:24-05:44/20 21:37	05:15 21:07	06:08 20:04	07:01 07:31-07:47/16 18:49	07:57 17:41	07:53 16:00	08:21 15:53
30	07:55 16:43	06:55 17:35	05:46 18:35	05:35 20:31	04:46 21:20	04:40 05:25-05:45/20 21:37	05:16 21:06	06:09 20:02	07:03 07:31-07:45/14 18:47	07:58 17:39	07:55 16:00	08:21 15:54
31	07:53 16:45	06:53 17:37	05:43 18:37	05:33 20:31	04:45 21:21	05:18 21:04	05:18 21:04	06:11 19:59	07:00 18:47	07:00 17:37	07:00 16:00	08:21 15:55
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	329	261	236
Anzahl Minuten mit Schatten	0	0	164	0	0	518	131	0	156	10	0	0

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

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

Berechnung: GesamtbelastungWEA: NO12 - VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (111)
 Voraussetzungen für Berechnung des Schattenwurfs

- 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 Sonneneinfallrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:21 15:56	07:52 16:47	06:55 17:41	06:41 19:39	05:33 20:33	06:16-06:43/27 21:22	04:44 21:37	04:41 21:02	05:20 19:57	06:32-06:47/15 18:44	06:13 18:44	07:05 16:35	07:02 15:51
2	08:21 15:57	07:50 16:49	06:53 17:43	06:39 19:41	05:31 20:35	06:16-06:43/27 21:23	04:43 21:36	04:41 21:01	05:21 19:55	06:30-06:48/18 18:42	06:15 18:42	07:04 16:33	07:04 15:50
3	08:21 15:58	07:48 16:51	06:50 17:45	06:36 19:42	05:29 20:37	06:16-06:43/27 21:24	04:42 21:36	04:43 20:59	05:23 19:52	06:29-06:49/20 18:39	06:16 18:39	07:09 16:31	07:06 15:50
4	08:20 16:00	07:46 16:53	06:48 17:47	06:34 19:44	05:27 20:38	06:17-06:43/26 21:26	04:42 21:36	04:43 20:57	05:25 19:50	06:28-06:50/22 18:37	06:18 18:37	07:10 16:29	07:08 15:49
5	08:20 16:01	07:45 16:54	06:46 17:49	06:31 19:46	05:25 20:40	06:17-06:43/26 21:27	04:41 21:35	04:44 20:55	05:26 19:47	06:27-06:51/24 18:35	06:20 18:35	07:12 16:27	07:10 15:49
6	08:20 16:02	07:43 16:56	06:43 17:51	06:29 19:48	05:23 20:42	06:17-06:42/25 21:28	04:40 21:34	04:45 20:53	05:28 19:45	06:27-06:52/25 18:32	06:21 18:32	07:14 16:25	07:12 15:48
7	08:19 16:04	07:41 16:58	06:41 17:53	06:27 19:50	05:21 20:44	06:17-06:41/24 21:29	04:40 21:34	04:46 20:51	05:30 19:43	06:26-06:51/25 18:30	06:23 18:30	07:16 16:23	07:14 15:48
8	08:19 16:05	07:39 17:00	06:39 17:55	06:24 19:52	05:19 20:45	06:17-06:40/23 21:30	04:39 21:33	04:47 21:30	05:31 19:40	06:26-06:52/26 18:27	06:25 18:27	07:18 16:22	07:16 15:47
9	08:18 16:06	07:37 17:02	06:36 17:57	06:22 19:53	05:17 20:47	06:19-06:40/21 21:30	04:38 21:32	04:48 21:32	05:33 19:38	06:25-06:52/27 18:25	06:27 18:25	07:19 16:20	07:17 15:47
10	08:18 16:08	07:35 17:04	06:34 17:58	06:20 19:55	05:15 20:49	06:19-06:39/20 21:31	04:38 21:32	04:49 21:32	05:35 19:35	06:25-06:52/27 18:23	06:28 18:23	07:21 16:18	07:19 15:47
11	08:17 16:09	07:33 17:06	06:32 18:00	06:17 19:57	05:14 20:51	06:20-06:37/17 21:32	04:38 21:31	04:50 21:31	05:36 19:33	06:26-06:52/26 18:20	06:30 18:20	07:23 16:16	07:21 15:46
12	08:16 16:11	07:31 17:08	06:29 18:02	06:15 19:59	05:12 20:52	06:22-06:36/14 21:33	04:37 21:30	04:51 21:30	05:38 19:30	06:25-06:51/26 18:18	06:32 18:18	07:25 16:15	07:23 15:46
13	08:15 16:12	07:30 17:10	06:27 18:04	06:12 20:01	05:10 20:54	06:23-06:34/11 21:34	04:37 21:29	04:52 21:29	05:40 19:28	06:25-06:51/26 18:16	06:34 18:16	07:27 16:13	07:25 15:46
14	08:15 16:14	07:27 17:12	06:24 18:06	06:10 20:02	05:08 20:56	06:28-06:30/2 21:34	04:37 21:28	04:53 21:28	05:42 19:26	06:25-06:50/25 18:13	06:35 18:13	07:28 16:12	07:27 15:46
15	08:14 16:16	07:25 17:14	06:22 18:08	06:08 20:04	05:07 20:57	06:28-06:30/2 21:35	04:36 21:27	04:54 21:27	05:43 19:23	06:26-06:50/24 18:11	06:37 18:11	07:30 16:10	07:29 15:46
16	08:13 16:17	07:23 17:16	06:20 18:10	06:06 20:06	05:05 20:59	06:28-06:30/2 21:36	04:36 21:26	04:56 21:26	05:45 19:21	06:27-06:49/22 18:09	06:39 18:09	07:32 16:08	07:31 15:46
17	08:12 16:19	07:21 17:18	06:17 18:11	06:03 20:08	05:04 21:01	06:28-06:30/2 21:37	04:36 21:25	04:57 21:25	05:47 19:18	06:27-06:48/21 18:07	06:41 18:07	07:34 16:07	07:32 15:46
18	08:11 16:21	07:19 17:20	06:15 18:13	06:01 20:10	05:02 21:02	06:28-06:30/2 21:38	04:36 21:23	04:58 21:23	05:48 19:16	06:28-06:47/19 18:04	06:42 18:04	07:36 16:06	07:34 15:47
19	08:10 16:22	07:17 17:22	06:12 18:15	05:59 20:11	05:00 21:04	06:28-06:30/2 21:39	04:36 21:22	05:00 21:22	05:50 19:13	06:30-06:45/15 18:02	06:44 18:02	07:38 16:04	07:36 15:47
20	08:08 16:24	07:15 17:24	06:10 18:17	05:56 20:13	04:59 21:05	06:28-06:30/2 21:40	04:36 21:21	05:01 21:21	05:52 19:11	06:31-06:42/11 18:00	06:46 18:00	07:40 16:03	07:38 15:47
21	08:07 16:26	07:13 17:26	06:08 18:19	05:54 20:15	04:57 21:07	06:28-06:30/2 21:41	04:36 21:20	05:03 21:20	05:54 19:09	06:47 17:58	06:47 17:58	07:41 16:02	07:40 15:48
22	08:06 16:28	07:11 17:28	06:05 18:21	05:52 20:17	04:56 21:08	06:28-06:30/2 21:42	04:36 21:18	05:04 21:18	05:55 19:06	06:49 17:55	06:49 17:55	07:43 16:00	07:41 15:48
23	08:05 16:30	07:08 17:30	06:03 18:22	05:50 20:19	04:55 21:10	06:25-06:37/12 21:43	04:37 21:17	05:06 21:17	05:57 19:04	06:51 17:53	06:51 17:53	07:45 15:59	07:43 15:49
24	08:03 16:31	07:06 17:32	06:00 18:24	05:48 20:21	04:53 21:11	06:23-06:39/16 21:44	04:37 21:15	05:07 21:15	05:59 19:01	06:53 17:51	06:53 17:51	07:47 15:58	07:45 15:49
25	08:02 16:33	07:04 17:34	05:58 18:26	05:45 20:22	04:52 21:13	06:21-06:40/19 21:45	04:37 21:14	05:09 21:14	06:01 18:59	06:54 17:49	06:54 17:49	07:47 15:57	07:47 15:50
26	08:01 16:35	07:02 17:36	05:55 18:28	05:43 20:24	04:51 21:14	06:20-06:41/21 21:46	04:38 21:12	05:10 21:12	06:02 18:56	06:56 17:47	06:56 17:47	07:48 15:56	07:48 15:50
27	07:59 16:37	07:00 17:38	05:53 18:30	05:41 20:26	04:50 21:16	06:19-06:42/23 21:47	04:38 21:11	05:12 21:11	06:04 18:54	06:58 17:45	06:58 17:45	07:50 15:55	07:50 15:51
28	07:58 16:39	06:57 17:39	05:51 18:32	05:39 20:28	04:48 21:17	06:18-06:43/25 21:48	04:39 21:09	05:13 21:09	06:06 18:51	07:00 17:43	07:00 17:43	07:52 15:54	07:52 15:52
29	07:56 16:41	06:56 17:40	05:48 18:33	05:37 20:30	04:47 21:18	06:17-06:43/26 21:49	04:39 21:07	05:15 21:07	06:08 18:49	07:01 17:41	07:01 17:41	07:53 15:53	07:53 15:53
30	07:55 16:43	06:56 17:42	05:46 18:35	05:35 20:31	04:46 21:20	06:17-06:43/26 21:50	04:40 21:06	05:16 21:06	06:09 18:47	07:03 17:39	07:03 17:39	07:55 15:52	07:55 15:54
31	07:53 16:45	06:53 17:43	05:43 18:37	05:31 20:33	04:45 21:21	06:17-06:43/26 21:51	04:45 21:04	05:18 21:04	06:11 19:59	07:00 17:37	07:00 17:37	07:55 15:55	07:55 15:55
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	329	261	236	0
Anzahl Minuten mit Schatten	0	0	0	168	290	0	19	444	0	0	0	0	0

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

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

Berechnung: GesamtbelastungWEA: NO13 - VESTAS V126-3.45 3450 126.0 !O! NH: 149,0 m (Ges:212,0 m) (112)
 Voraussetzungen für Berechnung des Schattenwurfs

- 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 Sonneneinfallrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

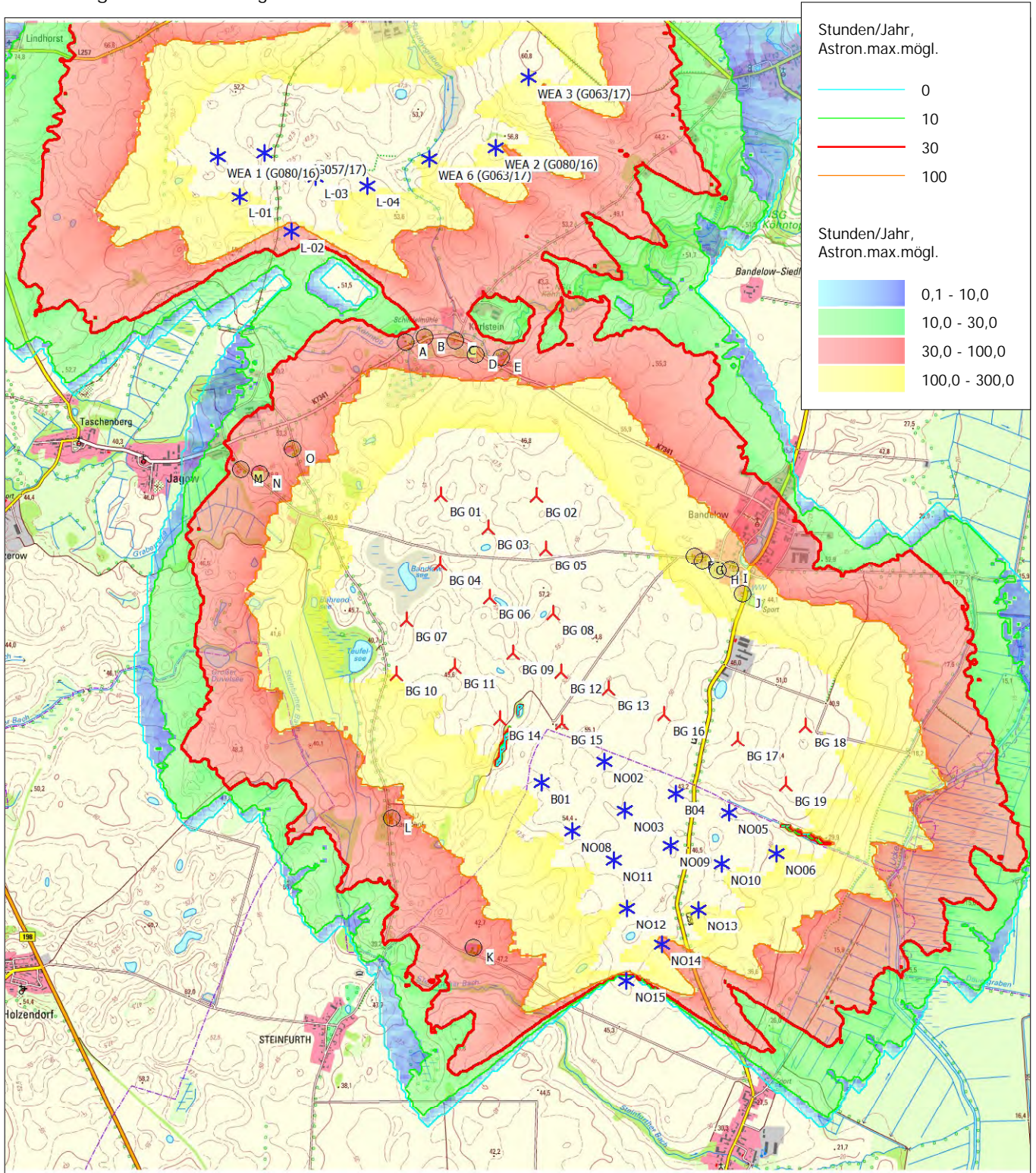
	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:21	07:51	06:55	06:41	05:33	04:44	04:41	05:20	06:13	07:05	07:02	07:56	
	15:56	16:47	17:41	19:39	20:33	21:22	21:37	21:02	19:57	18:44	16:35	15:51	
2	08:21	07:50	06:53	06:39	05:31	04:43	04:41	05:21	06:14	07:07	07:04	07:58	
	15:57	16:49	17:43	19:41	20:35	21:23	21:36	21:01	19:55	18:42	16:33	15:50	
3	08:21	07:48	06:50	06:36	05:29	04:43	04:42	05:23	06:16	07:09	07:06	07:59	
	15:58	16:51	17:45	19:42	20:37	21:24	21:36	20:59	19:52	18:39	16:31	15:50	
4	08:20	07:46	06:48	06:34	05:27	04:42	04:43	05:24	06:18	07:10	07:08	08:01	
	16:00	16:52	17:47	19:44	20:38	21:26	21:35	20:57	19:50	18:37	16:29	15:49	
5	08:20	07:45	06:46	06:31	05:25	04:41	04:44	05:26	06:20	07:12	07:10	08:02	
	16:01	16:54	17:49	19:46	20:40	21:27	21:35	20:55	19:47	18:35	16:27	15:49	
6	08:20	07:43	06:43	06:29	05:23	04:40	04:45	05:28	06:21	07:14	07:12	08:03	
	16:02	16:56	17:51	19:48	20:42	21:28	21:34	20:53	19:45	18:32	16:25	15:48	
7	08:19	07:41	06:41	06:27	05:21	04:40	04:46	05:30	06:23	07:16	07:14	08:05	
	16:04	16:58	17:53	19:50	20:44	21:29	21:34	20:51	19:43	18:30	16:23	15:48	
8	08:19	07:39	06:39	06:24	05:19	04:39	04:46	05:31	06:25	07:18	07:16	08:06	
	16:05	17:00	17:55	19:52	20:45	21:30	21:33	20:49	19:40	18:27	16:21	15:47	
9	08:18	07:37	06:36	06:22	05:17	04:38	04:48	05:33	06:27	07:19	07:17	08:07	
	16:06	17:02	17:57	19:53	20:47	21:30	21:32	20:47	19:38	18:25	16:20	15:47	
10	08:18	07:35	06:34	06:19	05:15	04:38	04:49	05:35	06:28	07:21	07:19	08:08	
	16:08	17:04	17:58	19:55	20:49	21:31	21:32	20:45	19:35	18:23	16:18	15:47	
11	08:17	07:33	06:32	06:17	05:14	04:38	04:50	05:36	06:30	07:23	07:21	08:10	
	16:09	17:06	18:00	19:57	20:51	21:32	21:31	20:43	19:33	18:20	16:16	15:46	
12	08:16	07:31	06:29	06:15	05:12	04:37	04:51	05:38	06:32	07:25	07:23	08:11	
	16:11	17:08	18:02	19:59	20:52	21:33	21:30	20:41	19:30	18:18	16:15	15:46	
13	08:15	07:29	06:27	06:12	05:10	04:37	04:52	05:40	06:34	07:27	07:25	08:12	
	16:12	17:10	18:04	20:01	20:54	21:34	21:29	20:39	19:28	18:16	16:13	15:46	
14	08:15	07:27	06:24	06:10	05:08	04:37	04:53	05:41	06:35	07:28	07:27	08:13	
	16:14	17:12	18:06	20:02	20:56	21:34	21:28	20:37	19:26	18:13	16:11	15:46	
15	08:14	07:25	06:22	06:08	05:07	04:36	04:54	05:43	06:37	07:30	07:29	08:14	
	16:16	17:14	18:08	20:04	20:57	21:35	21:27	20:35	19:23	18:11	16:10	15:46	
16	08:13	07:23	06:20	06:06	05:05	04:36	04:56	05:45	06:39	07:32	07:31	08:15	
	16:17	17:16	18:10	20:06	20:59	21:35	21:26	20:33	19:21	18:09	16:08	15:46	
17	08:12	07:21	06:17	06:03	05:03	04:36	04:57	05:47	06:40	07:34	07:32	08:15	
	16:19	17:18	18:11	20:08	21:01	21:36	21:25	20:31	19:18	18:07	16:07	15:46	
18	08:11	07:19	06:15	06:01	05:02	04:36	04:58	05:48	06:42	07:36	07:34	08:16	
	16:21	17:20	18:13	20:10	21:02	21:36	21:23	20:29	19:16	18:04	16:06	15:47	
19	08:10	07:17	06:12	05:59	05:00	04:36	05:00	05:50	06:45-06:49/4	06:44	07:38	07:36	08:17
	16:22	17:22	18:15	20:11	21:04	21:37	21:22	20:27	19:13	18:02	16:04	15:47	
20	08:08	07:15	06:10	05:56	05:00	04:36	05:01	05:52	06:41-06:51/10	06:46	07:40	07:38	08:18
	16:24	17:24	18:17	20:13	21:05	21:37	21:21	20:24	19:11	18:00	16:03	15:47	
21	08:07	07:13	06:08	05:54	05:00	04:36	05:03	05:54	06:40-06:53/13	06:47	07:41	07:40	08:18
	16:26	17:26	18:19	20:15	21:07	21:37	21:19	20:22	19:08	17:58	16:02	15:48	
22	08:06	07:11	06:05	05:52	05:00	04:36	05:04	05:55	06:38-06:53/15	06:49	07:43	07:41	08:19
	16:28	17:28	18:21	20:17	21:08	21:37	21:18	20:20	19:06	17:55	16:00	15:48	
23	08:05	07:08	06:03	05:50	05:00	04:37	05:05	05:57	06:37-06:54/17	06:51	07:45	07:43	08:19
	16:30	17:30	18:22	20:19	21:10	21:38	21:17	20:18	19:04	17:53	15:59	15:49	
24	08:03	07:06	06:00	05:48	04:53	04:37	05:07	05:59	06:37-06:55/18	06:53	07:47	07:45	08:20
	16:31	17:32	18:24	20:21	21:11	21:38	21:15	20:15	19:01	17:51	15:58	15:49	
25	08:02	07:04	05:58	05:45	04:52	04:37	05:08	06:01	06:36-06:54/18	06:54	06:49	07:47	08:20
	16:33	17:34	18:26	20:22	21:13	21:38	21:14	20:13	18:59	16:49	15:57	15:50	
26	08:01	07:02	05:55	05:43	04:51	04:38	05:10	06:02	06:36-06:54/18	06:56	06:51	07:48	08:20
	16:35	17:36	18:28	20:24	21:14	21:38	21:12	20:11	18:56	16:47	15:56	15:50	
27	07:59	07:00	05:53	05:41	04:50	04:38	05:12	06:04	06:36-06:54/18	06:58	06:53	07:50	08:21
	16:37	17:38	18:30	20:26	21:16	21:38	21:11	20:09	18:54	16:45	15:55	15:51	
28	07:58	06:57	05:51	05:39	04:48	04:39	05:13	06:06	06:36-06:53/17	07:00	06:55	07:52	08:21
	16:39	17:39	18:32	20:28	21:17	21:37	21:09	20:06	18:51	16:43	15:54	15:52	
29	07:56		06:48	05:37	04:47	04:39	05:15	06:08	06:36-06:52/16	07:01	06:56	07:53	08:21
	16:41		19:33	20:30	21:18	21:37	21:07	20:04	18:49	16:41	15:53	15:53	
30	07:55		06:46	05:35	04:46	04:40	05:16	06:09	06:38-06:51/13	07:03	06:58	07:55	08:21
	16:43		19:35	20:31	21:20	21:37	21:06	20:02	18:47	16:39	15:52	15:54	
31	07:53		06:43		04:45		05:18	06:11	06:38-06:48/10		07:00		08:21
	16:45		19:37		21:21		21:04	19:59			16:37		15:55
Sonnenscheinstunden	252	274	367	419	492	507	510	458	382	329	261	236	
Anzahl Minuten mit Schatten	0	0	0	181	0	0	0	187	0	0	0	0	

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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SHADOW - Karte

Berechnung: Gesamtbelastung



0 500 1000 1500 2000 m

Karte: TK 25, Maßstab 1:40.000, Mitte: UTM (north)-WGS84 Zone: 33 Ost: 421.890 Nord: 5.918.490

Neue WEA

Existierende WEA

Schattenrezeptor

Höhe der Schattenkarte: Höhenraster-Objekt: KL BT 34 AEP-Progn Rev02_EMDGrid_0.wpg (5)

SHADOW - Hauptergebnis

Berechnung: Vorbelastung Hetzdorf

Voraussetzungen für Berechnung des Schattenwurfs

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 Sonneneinstrahlung

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:

Verwendete Höhenlinien: Höhenraster-Objekt: KL BT 34 AEP-Progn Rev02_EMDGrid_0.wpg (5)

Hindernisse in Berechnung verwendet

Augenhöhe: 1,5 m

Rasterauflösung: 10,0 m

Alle Koordinatenangaben in:
UTM (north)-WGS84 Zone: 33

WEA

	Ost	Nord	Z	Beschreibung	WEA-Typ		Typ	Nenn- leistung [kW]	Rotor- durchmesser [m]	Nabenhöhe [m]	Schattendaten	
					Aktuell	Hersteller					Beschatt.- Bereich [m]	U/min [U/min]
H1	416.663	5.921.648	70,0	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.3-2.300	2.300	94,0	100,0	2.500	14,9	
H2	416.864	5.921.089	70,0	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.3-2.300	2.300	94,0	100,0	2.500	14,9	
H3	417.124	5.921.796	70,0	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.3-2.300	2.300	94,0	100,0	2.500	14,9	
H4	417.027	5.921.437	70,0	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.3-2.300	2.300	94,0	100,0	2.500	14,9	
L1	416.474	5.922.917	80,0	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.3-2.300	2.300	94,0	100,0	2.500	14,9	
L2	416.669	5.922.630	78,1	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.3-2.300	2.300	94,0	100,0	2.500	14,9	
L3	416.768	5.922.103	70,5	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.3-2.300	2.300	94,0	100,0	2.500	14,9	
U1	417.412	5.920.779	70,0	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.5xl-2.500	2.500	100,0	100,0	1.574	14,0	
U2	417.039	5.920.750	70,0	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.5xl-2.500	2.500	100,0	100,0	1.574	14,0	
U3	416.679	5.920.500	70,0	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.5xl-2.500	2.500	100,0	100,0	1.574	14,0	
U4	416.568	5.920.197	70,0	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.5xl-2.500	2.500	100,0	100,0	1.574	14,0	
W1	416.381	5.922.150	70,0	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.5xl-2.500	2.500	100,0	100,0	1.574	14,0	
W2	416.060	5.921.875	72,3	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.5xl-2.500	2.500	100,0	100,0	1.574	14,0	
W3	416.920	5.922.377	76,5	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.5xl-2.500	2.500	100,0	100,0	1.574	14,0	
W4	416.390	5.921.782	70,0	GE WIND ENER...Nein	GE WIND ENERGY	GE 2.5xl-2.500	2.500	100,0	100,0	1.574	14,0	

Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe über Grund	Azimutwinkel (von Süd)	Neigung des Fensters	Ausrichtungsmodus
A	Karlstein 1, Uckerland	421.108	5.920.274	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
B	Karlstein 2, Uckerland	421.241	5.920.310	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
C	Karlstein 16, Uckerland	421.450	5.920.286	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
D	Karlstein 15, Uckerland	421.594	5.920.188	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
E	Karlstein 13, Uckerland	421.770	5.920.170	40,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
F	Bandelow 17E, Uckerland	423.119	5.918.783	47,8	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
G	Bandelow 16A, Uckerland	423.172	5.918.746	47,5	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
H	Bandelow 15, Uckerland	423.279	5.918.684	45,2	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
I	Bandelow 11, Uckerland	423.368	5.918.692	43,4	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
J	Bandelow 1, Uckerland	423.453	5.918.520	44,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
K	Dorfstr. 82, Prenzlau	421.577	5.916.052	43,1	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
L	Lauenhof 1, Uckerland	421.009	5.916.958	41,6	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
M	Jagow 74c, Uckerland	419.960	5.919.386	45,2	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
N	Jagow 77, Uckerland	420.093	5.919.358	48,4	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"
O	Jagow 1, Uckerland	420.322	5.919.532	50,0	0,1	0,1	2,0	0,0	0,0	"Gewächshaus-Modus"

SHADOW - Hauptergebnis

Berechnung: Vorbelastung Hetzdorf

Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer		
		Stunden/Jahr [Std/Jahr]	Schattentage/a [Tage/Jahr]	Max.Schatten Stunden/Tag [Std/Tag]
A	Karlstein 1, Uckerland	0:00	0	0:00
B	Karlstein 2, Uckerland	0:00	0	0:00
C	Karlstein 16, Uckerland	0:00	0	0:00
D	Karlstein 15, Uckerland	0:00	0	0:00
E	Karlstein 13, Uckerland	0:00	0	0:00
F	Bandelow 17E, Uckerland	0:00	0	0:00
G	Bandelow 16A, Uckerland	0:00	0	0:00
H	Bandelow 15, Uckerland	0:00	0	0:00
I	Bandelow 11, Uckerland	0:00	0	0:00
J	Bandelow 1, Uckerland	0:00	0	0:00
K	Dorfstr. 82, Prenzlau	0:00	0	0:00
L	Lauenhof 1, Uckerland	0:00	0	0:00
M	Jagow 74c, Uckerland	0:00	0	0:00
N	Jagow 77, Uckerland	0:00	0	0:00
O	Jagow 1, Uckerland	0:00	0	0:00

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [Std/Jahr]
H1	GE WIND ENERGY GE 2.3 2300 94.0 !O! NH: 100,0 m (Ges:147,0 m) (76)	0:00
H2	GE WIND ENERGY GE 2.3 2300 94.0 !O! NH: 100,0 m (Ges:147,0 m) (77)	0:00
H3	GE WIND ENERGY GE 2.3 2300 94.0 !O! NH: 100,0 m (Ges:147,0 m) (78)	0:00
H4	GE WIND ENERGY GE 2.3 2300 94.0 !O! NH: 100,0 m (Ges:147,0 m) (79)	0:00
L1	GE WIND ENERGY GE 2.3 2300 94.0 !O! NH: 100,0 m (Ges:147,0 m) (80)	0:00
L2	GE WIND ENERGY GE 2.3 2300 94.0 !O! NH: 100,0 m (Ges:147,0 m) (81)	0:00
L3	GE WIND ENERGY GE 2.3 2300 94.0 !O! NH: 100,0 m (Ges:147,0 m) (82)	0:00
U1	GE WIND ENERGY GE 2.5xl 2500 100.0 !O! NH: 100,0 m (Ges:150,0 m) (83)	0:00
U2	GE WIND ENERGY GE 2.5xl 2500 100.0 !O! NH: 100,0 m (Ges:150,0 m) (84)	0:00
U3	GE WIND ENERGY GE 2.5xl 2500 100.0 !O! NH: 100,0 m (Ges:150,0 m) (85)	0:00
U4	GE WIND ENERGY GE 2.5xl 2500 100.0 !O! NH: 100,0 m (Ges:150,0 m) (86)	0:00
W1	GE WIND ENERGY GE 2.5xl 2500 100.0 !O! NH: 100,0 m (Ges:150,0 m) (87)	0:00
W2	GE WIND ENERGY GE 2.5xl 2500 100.0 !O! NH: 100,0 m (Ges:150,0 m) (88)	0:00
W3	GE WIND ENERGY GE 2.5xl 2500 100.0 !O! NH: 100,0 m (Ges:150,0 m) (89)	0:00
W4	GE WIND ENERGY GE 2.5xl 2500 100.0 !O! NH: 100,0 m (Ges:150,0 m) (90)	0:00

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.