

BERICHT ZUR SCHATTENWURF-UNTERSUCHUNG NR. LQ13955.2/01

zum Genehmigungsverfahren für die Errichtung von 4 Windenergieanlagen
im Vorrangstandort für Windenergiegewinnung "südlich Hörsten"
südöstlich von Fürstenau-Hollenstede

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Zusammenfassung

Die Windenergie Hollenstede 18 Planungsgesellschaft mbH plant im Bereich des Vorrangstandortes für Windenergiegewinnung "südlich Hörsten" (18-2013) südöstlich von Fürstenau-Hollenstede die Errichtung von vier Windenergieanlagen vom Typ Enercon E-138 EP3 E2 mit Trailing Edge Serrations (Hinterkanten-Verzahnungen) mit einer Nennleistung von jeweils 4.200 kW.

Im Rahmen des hierfür erforderlichen Genehmigungsverfahrens war zu prüfen und bewerten, welche Auswirkungen die geplanten Windenergieanlagen hinsichtlich der zu erwartenden Beschattungsdauer in der Nachbarschaft haben. Hierzu wurde die im vorliegenden Bericht dokumentierte schattenwurftechnische Untersuchung durchgeführt. Grundlage hierfür sind die "Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (WEA-Schattenwurf-Hinweise)" des Länderausschusses für Immissionsschutz (LAI) sowie des Windenergieerlasses des Landes Niedersachsen.

Bei den Prognoseberechnungen wurde in Abstimmung mit dem Landkreis Osnabrück die Beschattungsgesamtbelastung durch alle insgesamt sieben von der Windenergie Hollenstede 17 Planungsgesellschaft mbH sowie der Windenergie Hollenstede 18 Planungsgesellschaft mbH geplanten Windenergieanlagen auf den Vorrangflächen 17 und 18 der Samtgemeinde Fürstenau in einer gemeinsamen Berechnung ermittelt.

Die vorliegende Untersuchung hat ergeben, dass durch den Betrieb der sieben geplanten Windenergieanlagen an den betrachteten Immissionspunkten südlich von Hollenstede Beeinträchtigungen durch periodischen Schattenwurf zu erwarten sind. Diese Bewertung beruht auf Berechnungen der astronomisch maximal möglichen Beschattungsdauer für die Gesamtbelastung.

Zur Einhaltung der Immissionsrichtwerte gemäß der WEA-Schattenwurf-Hinweise des Länderausschusses für Immissionsschutz (LAI) sowie des Windenergieerlasses des Landes Niedersachsen ist eine Minderung durch die gezielte Anlagenabschaltung für Zeiten real auftretenden oder astronomisch möglichen Schattenwurfs an den betreffenden Immissionsorten vorzunehmen. Die erforderlichen Einschränkungen der Nutzungszeit für die geplanten Windenergieanlagen wurden im Rahmen der gegenständlichen Untersuchungen rechnerisch ermittelt. Die entsprechenden Zeitparameter sind detailliert den Anlagen zu entnehmen.

Bei den ermittelten Beschattungszeiten handelt es sich um die astronomisch maximal möglichen Zeiten mit Beschattung. Durch Einsatz einer elektronischen Steuerung können die Einsatzzeiten der geplanten Windenergieanlagen ggf. verlängert werden, indem die Windenergieanlage durch die Steuerung nur dann außer Betrieb genommen wird, wenn zum einen eine unzulässige Beschattung eines Immissionspunktes zu erwarten ist und zum anderen auch tatsächlich eine bestimmte Lichtintensität - gemäß dem Länderausschuss für Immissionsschutz bei Sonneneinstrahlung auf der zur Einfallrichtung normalen Ebene von mehr als 120 W/m^2 - erreicht bzw. überschritten wird sowie die gemäß der WEA-Schattenwurf-Hinweise des Länderausschusses für Immissionsschutz (LAI) sowie des Windenergieerlasses des Landes Niedersachsen maximal zulässige Beschattungsdauer für den jeweils betroffenen Immissionspunkt in dem dann aktuellen Kalenderjahr bereits ausgeschöpft wurde.

Die ermittelte Beschattungsdauer an den betrachteten Immissionspunkten ist nur in der in dieser Untersuchung zu Grunde gelegten Konfiguration der geplanten Windenergieanlagen gültig. Eine Änderung der geografischen Daten, der Nabenhöhe und/oder des Anlagentyps erfordert eine Neuberechnung der Beschattungssituation.

Der nachfolgende Bericht wurde nach bestem Wissen und Gewissen mit größter Sorgfalt erstellt. Dieser Bericht besteht aus 24 Seiten und 10 Anlagen.

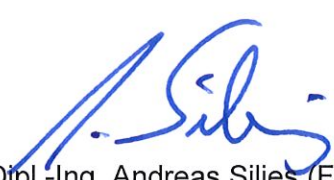
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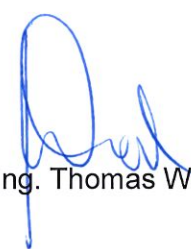
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Messstelle nach § 29b BImSchG für
Geräusche, Erschütterungen
und Luftinhaltsstoffe
(Gruppen I (G, P) IV (P), V und VI)

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1 Situation und Aufgabenstellung

Die Windenergie Hollenstede 18 Planungsgesellschaft mbH plant im Bereich des Vorrangstandortes für Windenergiegewinnung "südlich Hörsten" (18-2013) südöstlich von Fürstenau-Hollenstede die Errichtung von vier Windenergieanlagen vom Typ Enercon E-138 EP3 E2 mit Trailing Edge Serrations (Hinterkanten-Verzahnungen) mit einer Nennleistung von jeweils 4.200 kW.

Im Rahmen des hierfür erforderlichen Genehmigungsverfahrens ist zu prüfen und bewerten, welche Auswirkungen die geplanten Windenergieanlagen hinsichtlich der zu erwartenden Beschattungsdauer in der Nachbarschaft haben. Grundlage hierfür sind die "Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (WEA-Schattenwurf-Hinweise)" [2] des Länderausschusses für Immissionsschutz (LAI) sowie des Windenergieerlasses des Landes Niedersachsen [3].

Bei den Prognoseberechnungen wird in Abstimmung mit dem Landkreis Osnabrück [7] sowie dem projektbegleitenden Ingenieurbüro [6] die Beschattungsgesamtbelastung durch 3 von der Windenergie Hollenstede 17 Planungsgesellschaft mbH sowie durch 4 von der Windenergie Hollenstede 18 Planungsgesellschaft mbH geplanten Windenergieanlagen auf den Vorrangflächen 17 und 18 der Samtgemeinde Fürstenau in einer gemeinsamen Berechnung ermittelt.

Für den Fall, dass die schattenwurftechnischen Anforderungen des LAI [2] bzw. des Landes Niedersachsen [3] bei Betrieb der Windenergieanlagen nicht erfüllt werden, sind Angaben erforderlich, an welchen Tagen und zu welchen Uhrzeiten die geplanten Windenergieanlagen außer Betrieb genommen werden müssen, um diese Anforderungen einhalten zu können.

Der vorliegende gutachtliche Bericht dokumentiert die durchgeführten Untersuchungen sowie deren Ergebnisse und Beurteilungen.

2 Beurteilungsgrundlagen

Die Grundlage zur Ermittlung und zur Beurteilung des Schattenwurfes von Windenergieanlagen bildet im vorliegenden Fall der Windenergieerlass des niedersächsischen Ministeriums für Umwelt, Energie und Umweltschutz [3] in Verbindung mit den "Hinweisen zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (WEA-Schattenwurf-Hinweise)" des Länderausschusses für Immissionsschutz (LAI) [2]. Neben dem Verfahren zur Ermittlung der Beschattungsdauer nennen die "WEA-Schattenwurf-Hinweise" [2] Immissionsrichtwerte, bei deren Einhaltung erhebliche Belästigungen durch periodischen Schattenwurf nicht vorliegen. Die Immissionsrichtwerte sind dabei unabhängig von der Gebietsnutzung und sind durch die Summe der Beschattungszeiten aller relevant einwirkenden Windenergieanlagen einzuhalten.

2.1 Allgemeine Hinweise

Durch die Bewegung des Rotorblattes wird bei Windenergieanlagen ein periodischer Wechsel von Licht und Schatten bewirkt. Dieser stellt eine qualitative Veränderung der natürlichen Lichtverhältnisse dar. Das Ausmaß dieser qualitativen Veränderung für die betroffene Nachbarschaft ist im Sinne des BImSchG [1] hinsichtlich schädlicher Umwelteinwirkungen zu prüfen.

Schattenwurf von geringer Dauer ist hinzunehmen bzw. kann vernachlässigt werden. Es muss jedoch sichergestellt sein, dass die im Kapitel 2.3 genannten Immissionsrichtwerte für die astronomisch maximal mögliche Beschattungsdauer nicht überschritten werden.

Die Einhaltung der Immissionsschutzanforderungen ist durch geeignete Maßnahmen zu gewährleisten, z. B. durch eine Abschaltautomatik, welche meteorologische Parameter (z. B. Intensität des Sonnenlichtes) berücksichtigt.

In den Anlagen sowie dem schriftlichen Teil dieser Untersuchung werden u. a. die folgenden Begriffe benutzt:

- Schattenrezeptor: Die verwendete Software zur Berechnung der Beschattungsdauer "WindPRO 3.0.654" [4] bezeichnet die Immissionspunkte nach [2] als Schattenrezeptoren.

- mittlere Blatttiefe: $Br_{\text{mittel}} = (0,5 \cdot (\text{maximale Blatttiefe})) + (0,5 \cdot (\text{Blatttiefe bei } 90 \% \text{ Rotorlänge}))$ in m
- Beschattungsbereich: Der Bereich, in dem durch einen Windenergieanlagentyp unter Berücksichtigung der mittleren Blatttiefe der Rotorblätter ein Schattenwurf zu erwarten ist.

$$Dist_{\text{max}} = (5 \cdot Br_{\text{mittel}} \cdot D) / K \quad \text{in m}$$

mit

 - mittlerer Abstand zur Sonne: $D = 150.000.000 \text{ km}$
 - Konstante: $K = 1.097.780 \text{ km}$
- astronomisch maximal mögliche Beschattungsdauer (worst case): Die Zeit, in der die Sonne theoretisch während der gesamten Zeit zwischen Sonnenauf- und Sonnenuntergang durchgehend bei wolkenlosem Himmel scheint, die Rotorfläche senkrecht zur Sonneneinstrahlung steht und die Windenergieanlage in Betrieb ist [2].
- tatsächliche Beschattungsdauer: Die vor Ort real ermittelte und aufsummierte Einwirkzeit an periodischem Schattenwurf. Beträgt die Bestrahlungsstärke der direkten Sonneneinstrahlung auf der zur Einfallrichtung normalen Ebene mehr als 120 W/m^2 , so ist Sonnenschein mit Schattenwurf anzunehmen [2].
- meteorologisch wahrscheinliche Beschattungsdauer: Die Zeit, für die der Schattenwurf unter Berücksichtigung der üblichen Witterungsbedingungen berechnet wird. Als Grundlage dienen die langfristigen Messreihen des Deutschen Wetterdienstes (DWD) [2].
- Gültigkeit über mehrere Kalenderjahre: Da die Ergebnisse nicht nur für ein Jahr gültig sein sollen, wird in den Berechnungen die Tagesanzahl im Jahr auf 365,25 Tage gemittelt. Dadurch können sich die Ergebnisse innerhalb eines Zeitraums von vier Jahren um bis zu einem Tag verschieben. In der vorliegenden Untersuchung zum Schattenwurf wird das Jahr 2018 als Basisjahr berücksichtigt.

2.2 Immissionspunkte

Im Umfeld der geplanten Windenergieanlagen der Windenergie Hollenstede 17 Planungsgesellschaft mbH auf der Vorrangfläche 17 sowie der Windenergie Hollenstede 18 Planungsgesellschaft mbH auf der Vorrangfläche 18 befinden sich Räume, die gemäß den WEA-Schattenwurf-Hinweisen des Länderausschusses für Immissionsschutz [2] als schutzbedürftig gegenüber dem periodischen Schattenwurf durch Windenergieanlagen zu betrachten sind. In der Tabelle 1 sind die in der vorliegenden Untersuchung betrachteten Immissionspunkte zusammengefasst. Die Lage dieser Immissionspunkte kann der Anlage 2 entnommen werden.

Tabelle 1 Immissionsorte und deren geografischen Lagekoordinaten (Angaben in m)

Immissionspunkt	UTM-Koordinaten (ETRS89)	
	Rechtswert	Hochwert
IP 01 - Welperort 1	32.408.023	5.815.895
IP 02 - Welperort 4	32.408.004	5.815.689
IP 03 - Welperort 7	32.408.037	5.815.694
IP 04 - Welperort 7	32.408.176	5.815.560
IP 05 - Welperort 10	32.408.127	5.815.415
IP 06 - Welperort 14	32.408.060	5.815.099
IP 07 - Welperort 16	32.407.956	5.815.007
IP 08 - Welperort 24	32.407.901	5.814.722
IP 09 - Welperort 20	32.408.073	5.814.655
IP 10 - Welperort 19	32.408.243	5.814.763
IP 11a - Große Haar 2/Ost	32.409.747	5.814.699
IP 11b - Große Haar 2/West	32.409.739	5.814.703
IP 12a - Holle 10/Ost	32.409.875	5.814.923
IP 12b - Holle 10/West	32.409.862	5.814.922

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Tabelle 1 Immissionsorte und deren geografischen Lagekoordinaten (Angaben in m)
<Fortsetzung>

Immissionspunkt	UTM-Koordinaten (ETRS89)	
	Rechtswert	Hochwert
IP 13a - Holle 9/Ost	32.409.951	5.815.066
IP 13b - Holle 9/West	32.409.935	5.815.068
IP 14a - Holle 7/Ost	32.409.993	5.815.141
IP 14b - Holle 7/West	32.409.973	5.815.144
IP 15a - Holle 5/Süd	32.409.998	5.815.387
IP 15b - Holle 5/West	32.409.993	5.815.391
IP 16 - Holle 2	32.409.628	5.815.875
IP 17a - Neuenstadt 25/Südost	32.408.902	5.815.894
IP 17b - Neuenstadt 25/Südwest	32.408.895	5.815.892
IP 18a - Neuenstadt 25A/Südost	32.408.874	5.815.875
IP 18b - Neuenstadt 25/Südwest	32.408.865	5.815.873
IP 19 - Holle 2/Südost	32.410.021	5.815.749
IP 20a - Zur Dasslage 1/Südost	32.410.263	5.815.503
IP 20b - Zur Dasslage 1/Südwest	32.410.252	5.815.511
IP 21a - Zur Dasslage 3/Südost	32.410.314	5.815.361
IP 21b - Zur Dasslage 3/Südwest	32.410.306	5.815.360
IP 22a - Zur Dasslage 4/Südost	32.410.459	5.814.851
IP 22b - Zur Dasslage 4/Nordwest	32.410.443	5.814.879
IP 23a - Große Haar 9/Nordwest	32.410.422	5.814.524
IP 23b - Große Haar 9/Südost	32.410.440	5.814.523
IP 24a - Große Haar 7/Nordwest	32.410.087	5.814.270
IP 24b - Große Haar 7/Südost	32.410.104	5.814.259

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Tabelle 1 Immissionsorte und deren geografischen Lagekoordinaten (Angaben in m)
<Fortsetzung>

Immissionspunkt	UTM-Koordinaten (ETRS89)	
	Rechtswert	Hochwert
IP 25a - Zur Dasslage 7A/Nordwest	32.410.775	5.814.440
IP 25b - Zur Dasslage 7A/Südost	32.410.781	5.814.432
IP 26a - Zur Dasslage 7/Nordwest	32.410.761	5.814.431
IP 26b - Zur Dasslage 7/Südost	32.410.771	5.814.414
IP 27a - Zur Dasslage 7/Nordwest	32.410.754	5.814.366
IP 27b - Zur Dasslage 8/Südost	32.410.766	5.814.351
IP 28a - Hörsten 6/Südost	32.411.258	5.814.900
IP 28b - Hörsten 6/West	32.411.246	5.814.895
IP 29a - Zur Dasslage 6/Nordost	32.411.061	5.814.321
IP 29b - Zur Dasslage 6/Südwest	32.411.075	5.814.304
IP 30a - Zur Dasslage 11/Südost	32.410.863	5.814.106
IP 30b - Zur Dasslage 11/Südwest	32.410.838	5.814.116
IP 31a - Zur Dasslage 13/Nordwest	32.410.760	5.813.946
IP 31b - Zur Dasslage 13/Südost	32.410.768	5.813.939
IP 32 - Große Harr 13	32.410.467	5.813.511
IP 33a - Große Haar 15/Nordost	32.410.668	5.813.352
IP 33b - Große Haar 15A/Südost	32.410.668	5.813.348
IP 34a - Große Haar 15/Nordost	32.410.670	5.813.317
IP 34b - Große Haar 15/Südost	32.410.672	5.813.315
IP 35 - Pius 24	32.410.703	5.812.756
IP 36 - Bruchstraße 6	32.412.091	5.813.109

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Tabelle 1 Immissionsorte und deren geografischen Lagekoordinaten (Angaben in m)
<Fortsetzung>

Immissionspunkt	UTM-Koordinaten (ETRS89)	
	Rechtswert	Hochwert
IP 37a - Bruchstraße 4/Nordwest	32.412.568	5.813.471
IP 37b - Bruchstraße 4/Südwest	32.412.566	5.813.464
IP 38 - Wielage 5	32.412.556	5.814.279
IP 39 - Wielage 4	32.412.724	5.814.455

In der vorliegenden Untersuchung zum Schattenwurf der geplanten Windenergieanlage werden nur relevante Immissionspunkte betrachtet, die sich innerhalb bzw. am Rand des Beschattungsbereichs mit zu erwartenden Überschreitungen der Immissionsrichtwerte gemäß [2; 3] durch den Betrieb der geplanten Windenergieanlagen (Anlagen 4.2 und 4.2) befinden.

"WEA-Schattenwurf-Hinweise " [2] gelten die folgenden Räume als schutzwürdig und damit als maßgebliche Immissionsorte:

- Wohnräume, einschließlich Wohndielen
- Schlafräume, einschließlich Übernachtungsräume in Beherbergungsstätten und Bettenräume in Krankenhäusern und Sanatorien
- Unterrichtsräume in Schulen, Hochschulen und ähnlichen Einrichtungen
- Büroräume, Praxisräume, Arbeitsräume, Schulungsräume und ähnliche Arbeitsräume

Küchenräume werden in [2] nicht explizit aufgeführt, sollten aber zumindest dann als schützenswert angesehen werden, wenn diese - z. B. Wohnküchen - als Wohnräume anzusehen sind.

Schützenswert sind auch direkt an Gebäude angrenzende Außenflächen wie Terrassen und Balkone, die in der Zeit von 06:00 Uhr bis 22:00 Uhr den o. g. Räumen gleichgestellt sind [2].

Unbebaute Flächen sind in einer Bezugshöhe von 2,0 m über Grund dann schützenswert, wenn auf ihnen nach Bau- oder Planungsrecht Gebäude mit schutzwürdigen Räumen zulässig sind [2].

2.3 Immissionsrichtwerte

Gemäß der WEA-Schattenwurf-Hinweise des Länderausschusses für Immissionsschutz [2] gelten für die in Kapitel 2.1 definierten schützenswerten Räume die folgenden Immissionsrichtwerte:

- Die astronomisch maximal mögliche Beschattungsdauer darf durch die Gesamtbelastung den Immissionsrichtwert von 30 Minuten pro Tag nicht überschreiten.
- Die astronomisch maximal mögliche Beschattungsdauer darf durch die Gesamtbelastung den Immissionsrichtwert von 30 Stunden pro Kalenderjahr nicht überschreiten.

Die genannten Immissionsrichtwerte gelten für alle schützenswerten Räume unabhängig von der Gebietsnutzung und davon, ob die Gebäude in beplanten oder unbeplanten Bereichen liegen. Eine Sonderfallbetrachtung - von z. B. Gemengelagen - ist gemäß [2] nicht vorgesehen.

Die Gesamtbelastung darf die angegebenen Immissionsrichtwerte nicht überschreiten. Überschreitet eine WEA die zulässigen Immissionsrichtwerte, so ist eine Immissionsminderung durchzuführen, die die überprüfbare Einhaltung der Immissionsrichtwerte zum Ziel hat. Diese Minderung erfolgt durch die gezielte Anlagenabschaltung für Zeiten real auftretenden oder astronomisch möglichen Schattenwurfs an den betreffenden Immissionsorten. Bei der Festlegung der genauen Abschaltzeiten ist die räumliche Ausdehnung am Immissionsort (z. B. Fenster- oder Balkonfläche) zu berücksichtigen.

Eine Vorbelastung durch weitere Windenergieanlagen - außer den hier in den Windvorrangszonen 17 und 18 betrachteten Anlagen - liegt nach Feststellung im Zuge eines Ortstermins [5] nicht vor.

3 Berechnungsgrundlagen

Bei der Berechnung der Beschattungsdauer an den einzelnen Immissionspunkten werden - als konservativster Ansatz im Sinne eines Schutzes der schutzwürdigen Räume - in allen Belangen Maximalbetrachtungen vorgenommen. Hierzu zählen:

- An jedem Tag im Kalenderjahr scheint zwischen Sonnenauf- bis Sonnenuntergang die Sonne ununterbrochen von wolkenlosem Himmel.
- Es wird keine meteorologische Korrektur in Form von meteorologisch wahrscheinlichen Beschattungen auf Basis von Statistiken oder Zeitreihen vorgenommen.
- Die Windrichtung zeigt exakt vom Immissionspunkt zur jeweiligen Windenergieanlage oder um 180° umgekehrt, sodass die Rotorfläche eine maximale Beschattungsfläche zu jedem Immissionspunkt ergibt.
- Die betrachtete Windenergieanlage ist dauerhaft in Betrieb.

Weiterhin werden bei den Berechnungen gemäß [2] die folgenden Randbedingungen berücksichtigt:

- Es werden keine Hindernisse wie z. B. Gebäude, Bewuchs etc. berücksichtigt.
- Die Berechnungen schließen einen Schattenwurf aus, wenn die Sonne weniger als 3° über dem Horizont steht, da die Sonneneinstrahlung dann auf Grund der atmosphärischen Diffusion nicht mehr relevant ist.
- Die Beschattung ist nur relevant, wenn die Sonne durch ein Rotorblatt um mehr als 20 % verdeckt wird.
- Die Sonne wird als punktförmige Quelle angenähert; d. h., dass keine Unterscheidung in Kern- und Halbschatten getroffen wird.
- Es wird die astronomisch maximal mögliche Beschattungsdauer ermittelt.

Für die grafische Darstellung der Beschattungsdauer wird ein Punktraster von 5 m x 5 m gewählt. Die Rasterberechnung erfolgt bei einer Schrittweite von 1 Tag in 1-Minuten-Zeitsprüngen.

4 Planungsdaten für die Windenergieanlagen

Die Windenergie Hollenstede 18 Planungsgesellschaft mbH plant im Bereich des Vorrangstandortes für Windenergiegewinnung "südlich Hörsten" (18-2013) südöstlich von Fürstenau-Hollenstede die Errichtung von vier Windenergieanlagen vom Typ Enercon E-138 EP3 E2 mit Trailing Edge Serrations (Hinterkanten-Verzahnungen) mit einer Nennleistung von jeweils 4.200 kW.

Bei den Prognoseberechnungen wird in Abstimmung mit dem Landkreis Osnabrück [7] sowie dem projektbegleitenden Ingenieurbüro [6] die Beschattungsgesamtbelastung durch 4 von der Windenergie Hollenstede 18 Planungsgesellschaft mbH sowie durch 3 von der Windenergie Hollenstede 17 Planungsgesellschaft mbH geplanten Windenergieanlagen auf den Vorrangflächen 17 und 18 der Samtgemeinde Fürstenau in einer gemeinsamen Berechnung ermittelt. Die Windenergie Hollenstede 17 Planungsgesellschaft mbH plant ebenfalls Windenergieanlagen vom Typ Enercon E-138 EP3 E2 mit Trailing Edge Serrations.

In den folgenden Tabellen 2 und 3 sind die geografischen Daten der geplanten Windenergieanlagen [10] sowie die Rotorblattdaten angegeben [9].

Tabelle 2 geografische Daten der geplanten Windenergieanlagen

Bezeichnung	Typ	UTM-Koordinaten in m		
		Rechtswert	Hochwert	Nabenhöhe
WEA 17-1	E-138 EP3 E2	32.409.261	5.815.378	160,0
WEA 17-2	E-138 EP3 E2	32.408.752	5.815.215	160,0
WEA 17-3	E-138 EP3 E2	32.409.155	5.814.940	160,0
WEA 18-1	E-138 EP3 E2	32.411.682	5.814.008	160,0
WEA 18-2	E-138 EP3 E2	32.411.992	5.813.886	160,0
WEA 18-3	E-138 EP3 E2	32.411.288	5.813.534	160,0
WEA 18-4	E-138 EP3 E2	32.411.624	5.813.436	160,0

Tabelle 3 Rotorblattdaten der geplanten Windenergieanlagen

Typ	Blattlänge in mm	Blatttiefe in mm		Beschattungsbereich in m
		maximal	bei 90%	
E-138 EP3-RB-01	66.885	3.956	1.024	1.689

5 Berechnungsergebnisse

Unter Berücksichtigung der in Kapitel 3 genannten Berechnungsgrundlagen sowie der in Kapitel 4 angegebenen Planungsdaten für die geplanten Windenergieanlagen ergeben sich die in der Tabelle 4 zusammengefassten Beschattungsdauern an den betrachtete Immissionspunkte als Gesamtbelastung durch alle insgesamt sieben auf den Vorrangflächen 17 und 18 der Samtgemeinde Fürstenau geplanten Windenergieanlagen. Die in Tabelle 4 aufgeführten Berechnungsergebnisse sind auch der Anlagen 3 zu entnehmen.

Die in der Tabelle 4 hellgrau unterlegten Zellen weisen auf eine Überschreitung eines der beiden Immissionsrichtwerte nach [2; 3] hin (vgl. Kapitel 2.3).

Im Anhang des vorliegenden Berichtes werden die Ergebnisse der Schattenwurfberechnungen in Tabellenform als Ausdruck des Berechnungsprogramms [4] sowie in Form von Isolinien und Rasterflächen dargestellt. Die Linien und Flächen sind im Anhang als farbige Iso-Schattenlinienkarte dargestellt.

Tabelle 4 Immissionspunkte und ermittelte Beschattungsdauer

Immissionspunkt	Stunden pro Jahr in Std./Jahr	Minuten pro Tag in Std./Tag
IP 01 - Welperort 1	40:01	00:44
IP 02 - Welperort 4	37:20	00:36
IP 03 - Welperort 7	39:40	00:38
IP 04 - Welperort 7	58:30	00:47
IP 05 - Welperort 10	63:44	01:03
IP 06 - Welperort 14	73:52	01:01
IP 07 - Welperort 16	60:57	00:45
IP 08 - Welperort 24	42:47	00:28
IP 09 - Welperort 20	34:16	00:30
IP 10 - Welperort 19	40:20	00:35

<wird fortgesetzt>

Tabelle 4 Immissionspunkte und ermittelte Beschattungsdauer <Fortsetzung>

Immissionspunkt	Stunden pro Jahr in Std./Jahr	Minuten pro Tag in Std./Tag
IP 11a - Große Haar 2/Ost	00:00	00:00
IP 11b - Große Haar 2/West	92:02	01:16
IP 12a - Holle 10/Ost	00:00	00:00
IP 12b - Holle 10/West	53:39	01:04
IP 13a - Holle 9/Ost	00:00	00:00
IP 13b - Holle 9/West	89:36	00:46
IP 14a - Holle 7/Ost	00:00	00:00
IP 14b - Holle 7/West	99:47	00:44
IP 15a - Holle 5/Süd	62:38	00:43
IP 15b - Holle 5/West	63:31	00:43
IP 16 - Holle 2	100:51	01:21
IP 17a - Neuenstadt 25/Südost	115:11	01:16
IP 17b - Neuenstadt 25/Südwest	114:30	01:15
IP 18a - Neuenstadt 25A/Südost	119:00	01:14
IP 18b - Neuenstadt 25/Südwest	118:40	01:16
IP 19 - Holle 2/Südost	50:12	00:50
IP 20a - Zur Dasslage 1/Südost	12:02	00:26
IP 20b - Zur Dasslage 1/Südwest	34:27	00:32
IP 21a - Zur Dasslage 3/Südost	00:00	00:00
IP 21b - Zur Dasslage 3/Südwest	34:33	00:31
IP 22a - Zur Dasslage 4/Südost	15:26	00:23
IP 22b - Zur Dasslage 4/Nordwest	29:22	00:27

<wird fortgesetzt>

Tabelle 4 Immissionspunkte und ermittelte Beschattungsdauer <Fortsetzung>

Immissionspunkt	Stunden pro Jahr in Std./Jahr	Minuten pro Tag in Std./Tag
IP 23a - Große Haar 9/Nordwest	16:17	00:25
IP 23b - Große Haar 9/Südost	48:42	00:44
IP 24a - Große Haar 7/Nordwest	09:38	00:19
IP 24b - Große Haar 7/Südost	16:52	00:24
IP 25a - Zur Dasslage 7A/Nordwest	00:00	00:00
IP 25b - Zur Dasslage 7A/Südost	76:59	00:57
IP 26a - Zur Dasslage 7/Nordwest	07:48	00:20
IP 26b - Zur Dasslage 7/Südost	78:27	00:56
IP 27a - Zur Dasslage 7/Nordwest	00:00	00:00
IP 27b - Zur Dasslage 8/Südost	80:41	00:59
IP 28a - Hörsten 6/Südost	53:01	01:01
IP 28b - Hörsten 6/West	00:00	00:00
IP 29a - Zur Dasslage 6/Nordost	00:00	00:00
IP 29b - Zur Dasslage 6/Südwest	111:26	01:15
IP 30a - Zur Dasslage 11/Südost	106:46	01:18
IP 30b - Zur Dasslage 11/Südwest	00:00	00:00
IP 31a - Zur Dasslage 13/Nordwest	00:00	00:00
IP 31b - Zur Dasslage 13/Südost	91:06	01:15
IP 32 - Große Harr 13	65:29	00:53
IP 33a - Große Haar 15/Nordost	117:54	01:12
IP 33b - Große Haar 15A/Südost	116:12	01:12
IP 34a - Große Haar 15/Nordost	102:52	01:07

<wird fortgesetzt>

Tabelle 4 Immissionspunkte und ermittelte Beschattungsdauer <Fortsetzung>

Immissionspunkt	Stunden pro Jahr in Std./Jahr	Minuten pro Tag in Std./Tag
IP 34b - Große Haar 15/Südost	102:39	01:07
IP 35 - Pius 24	00:00	00:00
IP 36 - Bruchstraße 6	36:15	00:38
IP 37a - Bruchstraße 4/Nordwest	51:04	00:50
IP 37b - Bruchstraße 4/Südwest	49:24	00:50
IP 38 - Wielage 5	84:35	01:01
IP 39 - Wielage 4	51:40	00:38

Wie die Tabelle 4 zeigt, wird an mehreren - für die Ermittlung der Beschattungsdauer relevanten - Immissionspunkten der Immissionsrichtwert gemäß [2; 3] überschritten. Die Anlage 5 zeigt in einer grafischen Darstellung die Zeiten, in denen durch die geplanten Windenergieanlagen an den mit unterschiedlichen Farben gekennzeichneten Immissionspunkten an den vorhandenen Gebäuden - unter den in Kapitel 5 dargestellten Maximalbetrachtungen - eine Beschattung zu erwarten ist.

Aufgrund der festgestellten Überschreitungen der Immissionsrichtwerte ist eine Immissionsminderung durchzuführen. Zur Einhaltung der Immissionsrichtwerte ist die erforderliche Minderung durch die gezielte Anlagenabschaltung für Zeiten real auftretenden oder astronomisch möglichen Schattenwurfs an den betreffenden Immissionsorten vorzunehmen.

Wie in Kapitel 3 beschrieben, wurden die Berechnungen der zu erwartenden - astronomisch maximal möglichen - Beschattungsdauer unter den Maximalbetrachtungen durchgeführt. Um eine Abschaltung der geplanten Windenergieanlagen zu jedem theoretisch möglichen Beschattungszeitraum zu vermeiden, ist der Einsatz einer Abschalteinrichtung mit Erfassung der tatsächlich lokal vorliegenden Meteorologiedaten möglich. Mit Hilfe einer derartigen Steuerung kann in den Zeiträumen, in denen eine Beschattung eines Immissionspunktes zu erwarten ist - unter Berücksichtigung der aktuellen lokalen Wetterlage und bei Unterschreitung der Sonneneinstrahlung auf der zur Einfallrichtung normalen Ebene von 120 W/m^2 -, die Außerbetriebnahme der jeweiligen Windenergieanlage verhindert werden. Gemäß [2] ist erst ab diesem Wert mit Sonnenschein und daher mit Schattenwurf zu rechnen.

6 Berechnungs- und Beurteilungsgrundlagen, Literatur

Für die Ermittlung und Beurteilung der Geräuschsituation werden folgende Normen, Richtlinien, Verordnungen und Unterlagen herangezogen:

	Literatur	Beschreibung	Datum
[1]	Bundes-Immissionsschutzgesetz in der Fassung der Bekanntmachung vom 17. Mai 2013 (BGBl. I S. 1274)	Gesetz zum Schutz vor schädlichen Umwelteinwirkungen durch Luftverunreinigungen, Geräusche, Erschütterungen und ähnliche Vorgänge	17. Mai 2013
[2]	Länderausschuss für Immissionsschutz (LAI)	Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (WEA-Schattenwurf-Hinweise)	13.03.2002
[3]	Niedersächsisches Ministerium für Umwelt, Energie und Umweltschutz	Planung und Genehmigung von Windenergieanlagen an Land (Windenergieerlass), veröffentlicht im Niedersächsischen Ministerialblatt Nummer 7	24.02.2016
[4]	EMD International A/S	Software zur Ermittlung von Schattenwurf durch Windenergieanlagen WindPRO	Version 3.0.654

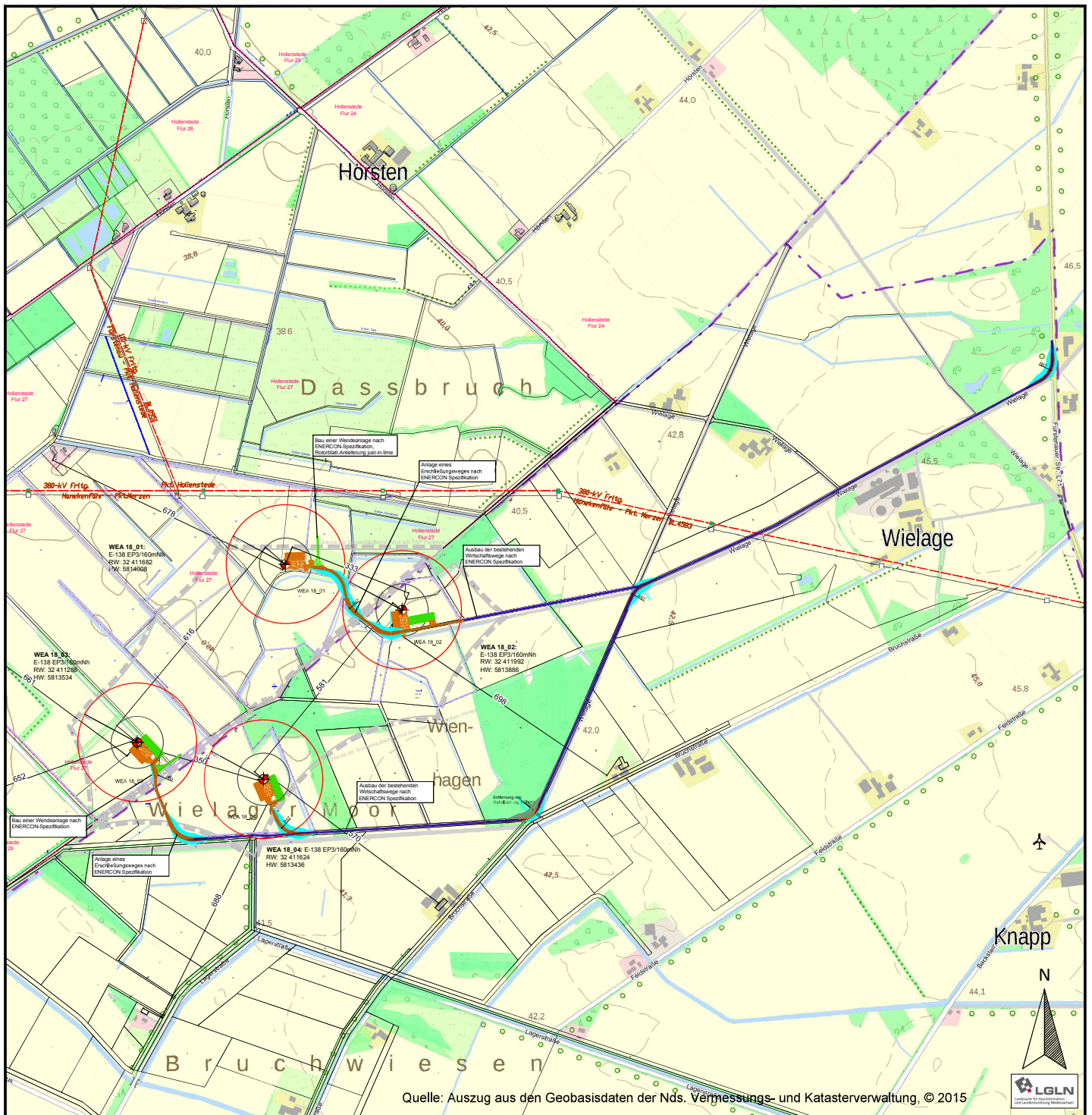
	Zusätzliche Beurteilungs- grundlagen	Beschreibung	Datum
[5]	Ortstermin	Zur Ermittlung der Bebauung so- wie der topografischen Gegeben- heiten im Bereich der geplanten 7 Windenergieanlagen	19.05.2015
[6]	Agrowea GmbH & Co. KG	Telefonat mit Herrn Tannen be- züglich der gemeinsamen Be- trachtung der auf den Vorrangflä- chen 17 und 18 geplanten sieben Windenergieanlagen	28.05.2015
[7]	Landkreis Osnabrück	E-Mail von Frau Beimesche be- züglich der gemeinsamen Be- trachtung der auf den Vorrangflä- chen 17 und 18 geplanten sieben Windenergieanlagen	29.05.2015
[8]	Samtgemeinde Fürstenau	Bebauungsplan Nr. 50 "Wohn- baufläche östlich der Dorfstrasse K 114" der Stadt Fürstenau per E-Mail	26.01.2017
		Flächennutzungsplan der Samt- gemeinde Fürstenau, 45. Ände- rung (Entwurf)	Stand 2018-11

- | | | | |
|------|-----------------------|--|--------------|
| [9] | ENERCON GmbH | Datenblatt zum Rotorblatt E-138
EP3-RB-01 mit Hinterkanten-
kamm (TES) | 03.11.2017 |
| [10] | Agrowea GmbH & Co. KG | Lageplan zum Windpark Hol-
lenstede "Welperort" und "südlich
Hörsten", Standortkoordinaten für
drei bzw. 4 geplante Windener-
gieanlagen vom Typ Enercon E-
138 EP3 E2 mit einer Nabenhöhe
von 160 m | Oktober 2018 |

7 Anlagen

- Anlage 1: Lageplan mit Darstellung der geplanten Windenergieanlagen
- Anlage 2: digitales Rechenmodell
- Anlage 3: Berechnungsdatenblätter
- Anlage 4: Lagepläne mit Darstellung des Schattenwurfes 4.1 astronomisch maximal mögliche Stunden pro Jahr 4.2 astronomisch maximal mögliche Minuten pro Tag
- Anlage 5: Grafische Darstellung der Beschattungszeiten an der Immissionspunkten für die jeweilige Windenergieanlage
- Anlage 6: Grafische Darstellung der Beschattungszeiten durch die Windenergieanlagen an den einzelnen Immissionspunkten
- Anlage 7: Tabellarische Darstellung der Beschattungszeiten an der Immissionspunkten für die jeweilige Windenergieanlage
- Anlage 8: Tabellarische Darstellung der Beschattungszeiten durch die Windenergieanlagen an den einzelnen Immissionspunkten (Auszug)
- Anlage 9: Rotordatenblätter ENERCON E-138 EP3-RB-01
- Anlage 10: Standortkoordinaten der geplanten Windenergieanlagen

Anlage 1: Lageplan mit Darstellung der geplanten Windenergieanlagen

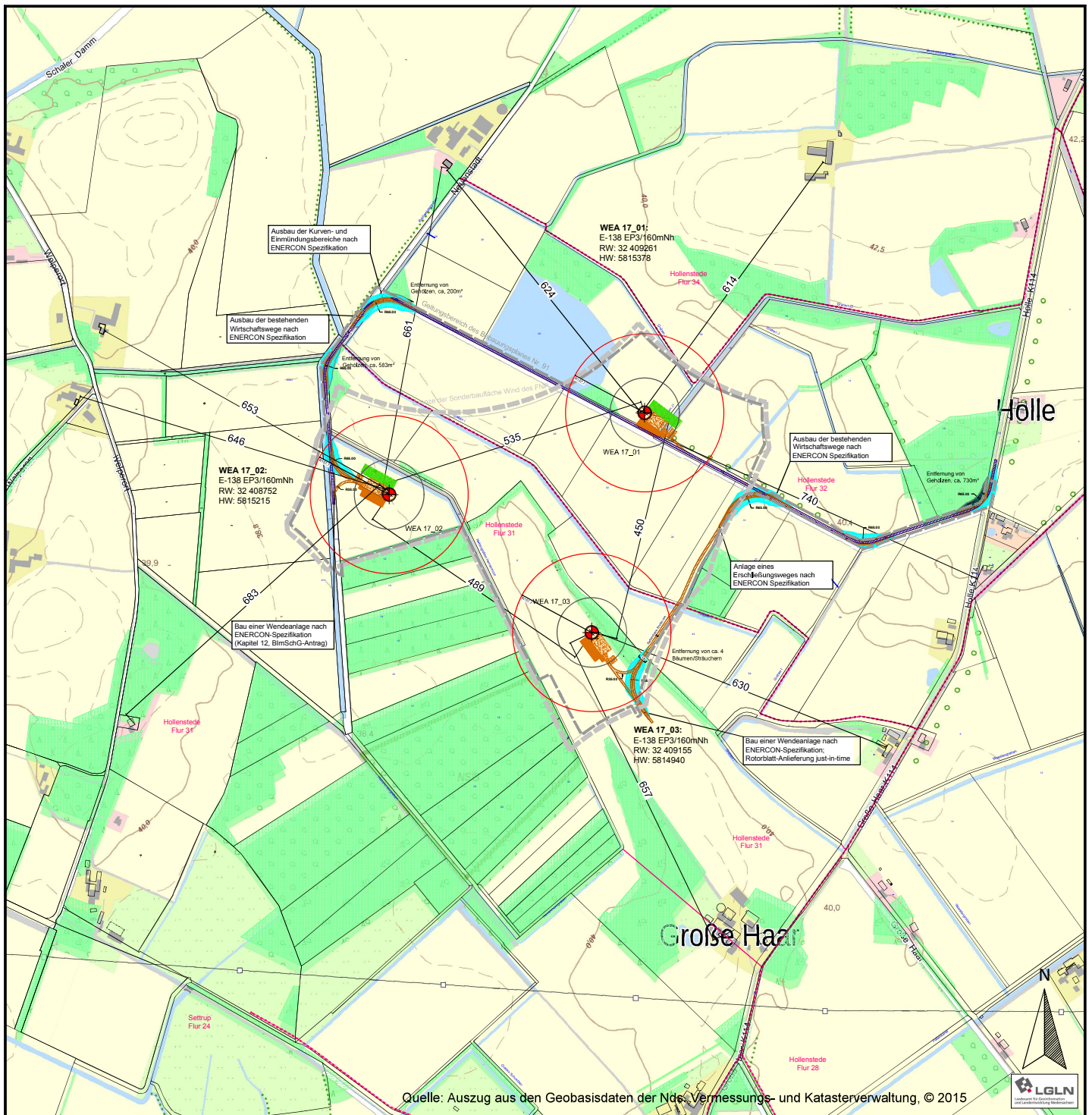


Legende					
	Zuwegung Neubau		Kranstellfläche		Zuwegung Temporär
	Zuwegung Bestand		Montagefläche		Überschwenkbereich
			Lagerfläche		Containerfläche
			Potenzialfläche		Fläche RROP- Gebiet
			Freileitung		Windenergieanlage Rotor/ Grenzabstand
					Bestand



ENERCON GmbH
Dreckamp 5, 26605 Aurich
Tel.: 0 49 41 / 927-0, Fax: 0 49 41 / 927-109

Bauherr: Windenergie Hollenstede 18 PlanungsGmbH Zur Dasslage 11 49584 Fürstenau OT Hollenstede		Standort: Windpark Hollenstede Teilfläche 18 des RROP Osnabrück		Entwurfsverfasser:	
Bauvorhaben: 4x ENERCON E-138 EP3 mit 160mN		Zeichnung: Lageplan		Vorabzug	
Gez: JBERLIN	Datum: 16.05.2017	geändert: JBERLIN	Datum: 12.10.2018	O-Nummer: 4905	W-Nummer: XXXXX
				Blatt: A3	Rev.: 1-8



Legende

Zuwegung Neubau	Kranstellfläche	Zuwegung Temporär	Lagerfläche	Potenzialfläche	Windenergieanlage Rotor/ Grenzabstand
Zuwegung Bestand	Montagefläche	Überschwenkbereich	Containerfläche	Fläche RROP- Gebiet	Bestand
				Freileitung	



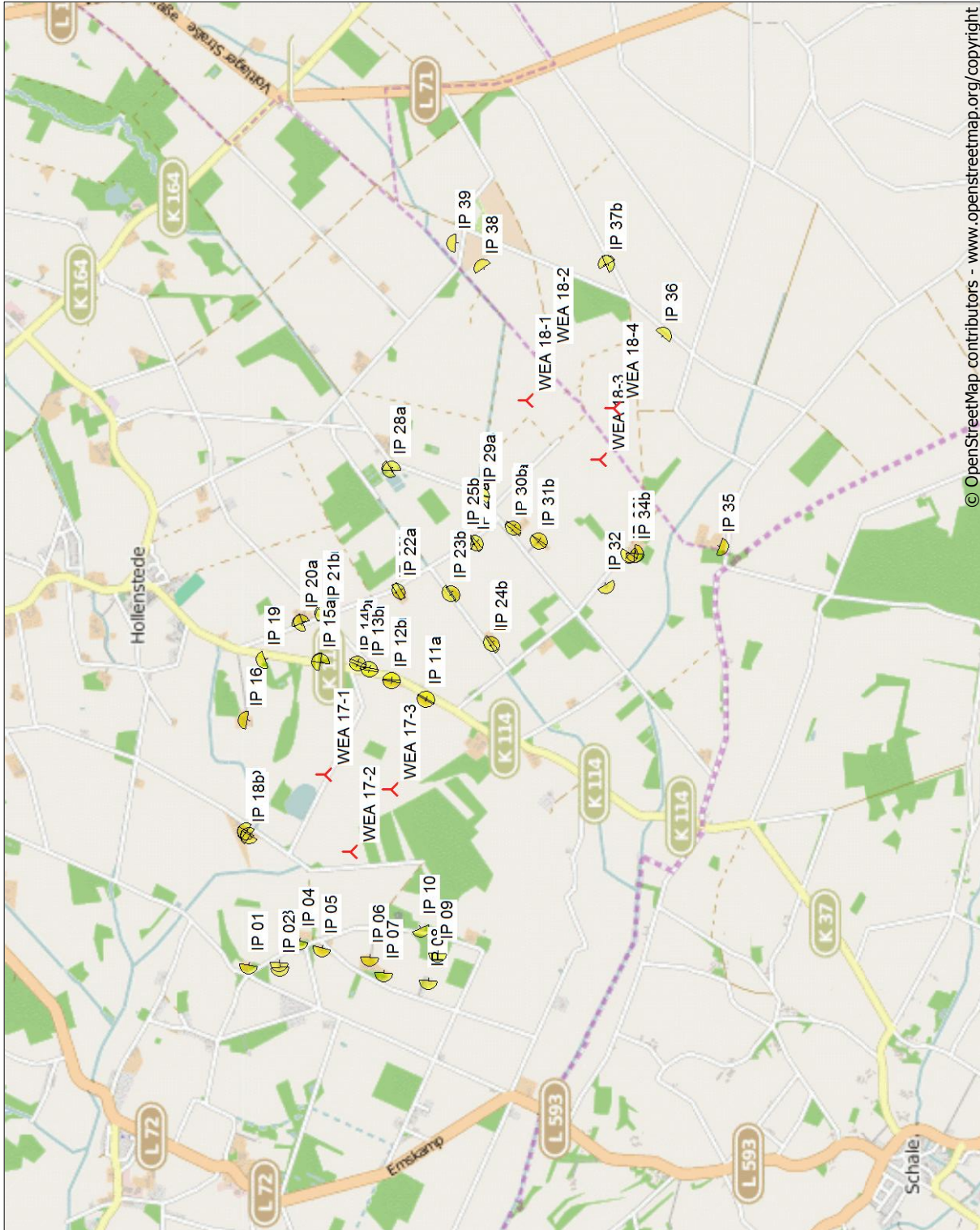
ENERCON GmbH

Dreerkamp 5, 26605 Aurich

Tel.: 0 49 41 / 927-0, Fax: 0 49 41 / 927-109

Bauherr: Windenergie Hollenstede 18 PlanungsGmbH Zur Dasslage 11 49584 Fürstenau OT Hollenstede				Standort: Windpark Hollenstede Welperort Teilfläche 17 des RROP Osnabrück		Entwurfsverfasser:	
Bauvorhaben: 3x ENERCON E-138 EP3 mit 160mNh				Zeichnung: Lageplan Zuwegung mit Überschwenkbereichen		Vorabzug	
Gez: JBERLIN		Datum: 16.05.2017		geändert: JBERLIN		Datum: 12.10.2018	
Maßstab: 1:7500		Blatt: A3		O-Nummer: 4084		W-Nummer: XXXXX	
				Rev.: 1-8			

Anlage 2: digitales Rechenmodell



Anlage 3: Berechnungsdatenblätter

SHADOW - Hauptergebnis

Berechnung: Windenergie Hollenstede 2018-12

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: Höhenlinien: Höhendaten 2017-01.wpo (16)

Hindernisse in Berechnung verwendet

Augenhöhe: 1,5 m

Rasterauflösung: 10,0 m

Alle Koordinatenangaben in

UTM (north)-WGS84 Zone: 32

WEA

	Ost	Nord	Z	Beschreibung	WEA-Typ			Nennleistung	Rotor-durchmesser	Nabenhöhe	Schattendaten	
					Aktuell	Hersteller	Typ				Beschatt.-Bereich	U/min
			[m]					[kW]	[m]	[m]	[m]	[U/min]
WEA 17-1	409.261	5.815.378	40,0	E-138 EP3 E...	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,6	160,0	1.689	11,1
WEA 17-2	408.752	5.815.215	38,4	E-138 EP3 E...	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,6	160,0	1.689	11,1
WEA 17-3	409.155	5.814.940	40,0	E-138 EP3 E...	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,6	160,0	1.689	11,1
WEA 18-1	411.682	5.814.008	38,3	E-138 EP3 E...	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,6	160,0	1.689	11,1
WEA 18-2	411.992	5.813.886	39,7	E-138 EP3 E...	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,6	160,0	1.689	11,1
WEA 18-3	411.288	5.813.534	39,9	E-138 EP3 E...	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,6	160,0	1.689	11,1
WEA 18-4	411.624	5.813.436	39,6	E-138 EP3 E...	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,6	160,0	1.689	11,1

Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe über Grund	Azimutwinkel (von Süd)	Neigung des Fensters	Ausrichtungsmodus
				[m]	[m]	[m]	[m]	[°]	[°]	
IP 01	Welperort 1	408.023	5.815.895	40,0	1,0	1,0	1,5	-80,6	90,0	Feste Richtung
IP 02	Welperort 4	408.004	5.815.689	39,0	1,0	1,0	1,5	-95,6	90,0	Feste Richtung
IP 03	Welperort 7	408.037	5.815.694	39,3	1,0	1,0	1,5	-86,2	90,0	Feste Richtung
IP 04	Welperort 7	408.176	5.815.560	40,0	1,0	1,0	1,5	-74,6	90,0	Feste Richtung
IP 05	Welperort 10	408.127	5.815.415	40,0	1,0	1,0	1,5	-76,3	90,0	Feste Richtung
IP 06	Welperort 14	408.060	5.815.099	40,0	1,0	1,0	1,5	-86,2	90,0	Feste Richtung
IP 07	Welperort 16	407.956	5.815.007	39,7	1,0	1,0	1,5	-86,2	90,0	Feste Richtung
IP 08	Welperort 24	407.901	5.814.722	38,6	1,0	1,0	1,5	-86,2	90,0	Feste Richtung
IP 09	Welperort 20	408.073	5.814.655	40,0	1,0	1,0	1,5	-86,2	90,0	Feste Richtung
IP 10	Welperort 19	408.243	5.814.763	40,0	1,0	1,0	1,5	-117,0	90,0	Feste Richtung
IP 11a	Große Haar 2/Ost	409.747	5.814.699	40,0	1,0	1,0	1,5	-57,3	90,0	Feste Richtung
IP 11b	Große Haar 2/West	409.739	5.814.703	40,0	1,0	1,0	1,5	-240,2	90,0	Feste Richtung
IP 12a	Holle 10/Ost	409.875	5.814.923	40,0	1,0	1,0	1,5	-84,9	90,0	Feste Richtung
IP 12b	Holle 10/West	409.862	5.814.922	40,0	1,0	1,0	1,5	-260,1	90,0	Feste Richtung
IP 13a	Holle 9/Ost	409.951	5.815.066	40,0	1,0	1,0	1,5	-82,0	90,0	Feste Richtung
IP 13b	Holle 9/West	409.935	5.815.068	40,0	1,0	1,0	1,5	-259,6	90,0	Feste Richtung
IP 14a	Holle 7/Ost	409.993	5.815.141	40,0	1,0	1,0	1,5	-70,1	90,0	Feste Richtung
IP 14b	Holle 7/West	409.973	5.815.144	40,0	1,0	1,0	1,5	-245,9	90,0	Feste Richtung
IP 15a	Holle 5/Süd	409.998	5.815.387	40,3	1,0	1,0	1,5	10,0	90,0	Feste Richtung
IP 15b	Holle 5/West	409.993	5.815.391	40,3	1,0	1,0	1,5	-261,9	90,0	Feste Richtung
IP 16	Holle 2	409.628	5.815.875	40,5	1,0	1,0	1,5	7,5	90,0	Feste Richtung
IP 17a	Neuenstadt 25/Südost	408.902	5.815.894	38,9	1,0	1,0	1,5	-59,6	90,0	Feste Richtung
IP 17b	Neuenstadt 25/Südwest	408.895	5.815.892	38,9	1,0	1,0	1,5	34,6	90,0	Feste Richtung
IP 18a	Neuenstadt 25A/Südost	408.874	5.815.875	38,8	1,0	1,0	1,5	-59,6	90,0	Feste Richtung
IP 18b	Neuenstadt 25/Südwest	408.865	5.815.873	38,8	1,0	1,0	1,5	34,6	90,0	Feste Richtung

(Fortsetzung nächste Seite)...

SHADOW - Hauptergebnis

Berechnung: Windenergie Hollenstede 2018-12

...(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]	[°]	[°]	
IP 19	Holle 2/Südost	410.021	5.815.749	41,2	1,0	1,0	1,5	-20,0	90,0	Feste Richtung
IP 20a	Zur Dasslage 1/Südost	410.263	5.815.503	41,1	1,0	1,0	1,5	-20,0	90,0	Feste Richtung
IP 20b	Zur Dasslage 1/Südwest	410.252	5.815.511	41,1	1,0	1,0	1,5	70,0	90,0	Feste Richtung
IP 21a	Zur Dasslage 3/Südost	410.314	5.815.361	40,6	1,0	1,0	1,5	-45,0	90,0	Feste Richtung
IP 21b	Zur Dasslage 3/Südwest	410.306	5.815.360	40,6	1,0	1,0	1,5	45,0	90,0	Feste Richtung
IP 22a	Zur Dasslage 4/Südost	410.459	5.814.851	39,5	1,0	1,0	1,5	-30,0	90,0	Feste Richtung
IP 22b	Zur Dasslage 4/Nordwest	410.443	5.814.879	39,5	1,0	1,0	1,5	150,0	90,0	Feste Richtung
IP 23a	Große Haar 9/Nordwest	410.422	5.814.524	40,0	1,0	1,0	1,5	-215,9	90,0	Feste Richtung
IP 23b	Große Haar 9/Südost	410.440	5.814.523	40,0	1,0	1,0	1,5	-37,4	90,0	Feste Richtung
IP 24a	Große Haar 7/Nordwest	410.087	5.814.270	40,0	1,0	1,0	1,5	-212,4	90,0	Feste Richtung
IP 24b	Große Haar 7/Südost	410.104	5.814.259	40,0	1,0	1,0	1,5	-37,8	90,0	Feste Richtung
IP 25a	Zur Dasslage 7A/Nordwest	410.775	5.814.440	40,0	1,0	1,0	1,5	-210,9	90,0	Feste Richtung
IP 25b	Zur Dasslage 7A/Südost	410.781	5.814.432	40,0	1,0	1,0	1,5	-30,5	90,0	Feste Richtung
IP 26a	Zur Dasslage 7/Nordwest	410.761	5.814.431	40,0	1,0	1,0	1,5	-210,9	90,0	Feste Richtung
IP 26b	Zur Dasslage 7/Südost	410.771	5.814.414	40,0	1,0	1,0	1,5	-30,5	90,0	Feste Richtung
IP 27a	Zur Dasslage 7/Nordwest	410.754	5.814.366	40,0	1,0	1,0	1,5	-210,9	90,0	Feste Richtung
IP 27b	Zur Dasslage 8/Südost	410.766	5.814.351	40,0	1,0	1,0	1,5	-39,9	90,0	Feste Richtung
IP 28a	Hörsten 6/Südost	411.258	5.814.900	39,0	1,0	1,0	1,5	-30,0	90,0	Feste Richtung
IP 28b	Hörsten 6/West	411.246	5.814.895	39,0	1,0	1,0	1,5	90,0	90,0	Feste Richtung
IP 29a	Zur Dasslage 6/Nordost	411.061	5.814.321	39,6	1,0	1,0	1,5	-219,9	90,0	Feste Richtung
IP 29b	Zur Dasslage 6/Südwest	411.075	5.814.304	39,7	1,0	1,0	1,5	-39,4	90,0	Feste Richtung
IP 30a	Zur Dasslage 11/Südost	410.863	5.814.106	40,0	1,0	1,0	1,5	-56,1	90,0	Feste Richtung
IP 30b	Zur Dasslage 11/Südwest	410.838	5.814.116	40,0	1,0	1,0	1,5	-229,1	90,0	Feste Richtung
IP 31a	Zur Dasslage 13/Nordwest	410.760	5.813.946	40,0	1,0	1,0	1,5	-225,0	90,0	Feste Richtung
IP 31b	Zur Dasslage 13/Südost	410.768	5.813.939	40,0	1,0	1,0	1,5	-54,5	90,0	Feste Richtung
IP 32	Große Harr 13	410.467	5.813.511	40,0	1,0	1,0	1,5	-120,0	90,0	Feste Richtung
IP 33a	Große Haar 15/Nordost	410.668	5.813.352	40,0	1,0	1,0	1,5	-140,0	0,0	Feste Richtung
IP 33b	Große Haar 15A/Südost	410.668	5.813.348	40,0	1,0	1,0	1,5	-55,0	0,0	Feste Richtung
IP 34a	Große Haar 15/Nordost	410.670	5.813.317	40,0	1,0	1,0	1,5	-176,2	90,0	Feste Richtung
IP 34b	Große Haar 15/Südost	410.672	5.813.315	40,0	1,0	1,0	1,5	-86,5	90,0	Feste Richtung
IP 35	Pius 24	410.703	5.812.756	40,2	1,0	1,0	1,5	-162,4	90,0	Feste Richtung
IP 36	Bruchstraße 6	412.091	5.813.109	41,9	1,0	1,0	1,5	-228,7	90,0	Feste Richtung
IP 37a	Bruchstraße 4/Nordwest	412.568	5.813.471	42,7	1,0	1,0	1,5	-204,5	90,0	Feste Richtung
IP 37b	Bruchstraße 4/Südwest	412.566	5.813.464	42,7	1,0	1,0	1,5	60,4	90,0	Feste Richtung
IP 38	Wielage 5	412.556	5.814.279	42,5	1,0	1,0	1,5	55,9	90,0	Feste Richtung
IP 39	Wielage 4	412.724	5.814.455	42,6	1,0	1,0	1,5	3,0	90,0	Feste Richtung

Berechnungsergebnisse

Schattenrezeptor

astron. max. mögl. Beschattungsdauer

Nr.	Name	Stunden/Jahr	Schattentage/a	Max.Schatten Stunden/Tag
		[Std/Jahr]	[Tage/Jahr]	[Std/Tag]
IP 01	Welperort 1	40:01	86	0:44
IP 02	Welperort 4	37:20	92	0:36
IP 03	Welperort 7	39:40	93	0:38
IP 04	Welperort 7	58:30	109	0:47
IP 05	Welperort 10	63:44	108	1:03
IP 06	Welperort 14	73:52	122	1:01
IP 07	Welperort 16	60:57	124	0:45
IP 08	Welperort 24	42:47	116	0:28
IP 09	Welperort 20	34:16	97	0:30
IP 10	Welperort 19	40:20	100	0:35
IP 11a	Große Haar 2/Ost	0:00	0	0:00
IP 11b	Große Haar 2/West	92:02	83	1:16
IP 12a	Holle 10/Ost	0:00	0	0:00
IP 12b	Holle 10/West	53:39	81	1:04
IP 13a	Holle 9/Ost	0:00	0	0:00
IP 13b	Holle 9/West	89:36	157	0:46
IP 14a	Holle 7/Ost	0:00	0	0:00
IP 14b	Holle 7/West	99:47	188	0:44
IP 15a	Holle 5/Süd	62:38	135	0:43
IP 15b	Holle 5/West	63:31	136	0:43

(Fortsetzung nächste Seite)...

SHADOW - Hauptergebnis**Berechnung: Windenergie Hollenstede 2018-12**

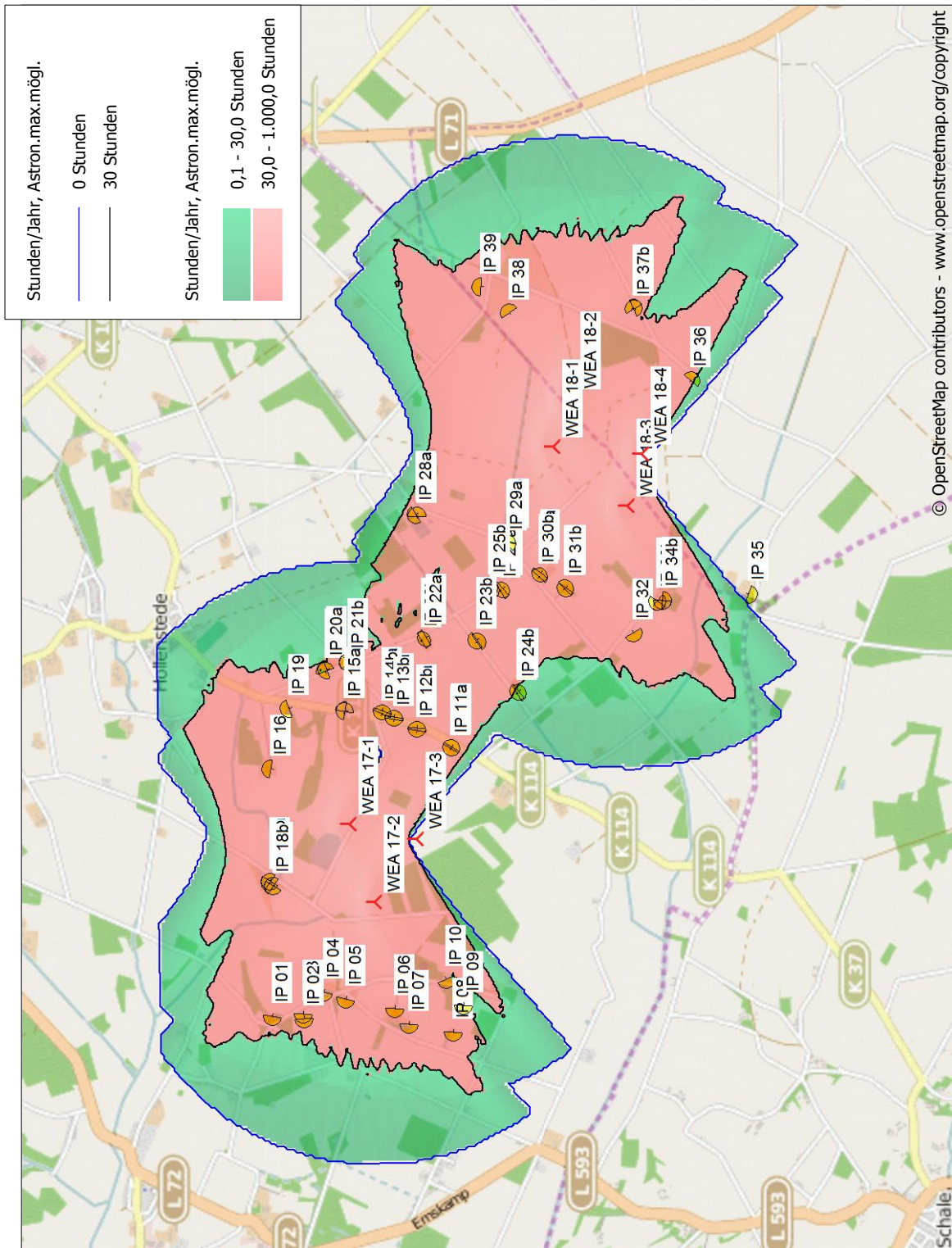
...(Fortsetzung von letzter Seite)

Nr.	Name	astron. max. mögl. Beschattungsdauer		
		Stunden/Jahr	Schattentage/a	Max.Schatten Stunden/Tag
		[Std/Jahr]	[Tage/Jahr]	[Std/Tag]
IP 16	Holle 2	100:51	123	1:21
IP 17a	Neuenstadt 25/Südost	115:11	123	1:16
IP 17b	Neuenstadt 25/Südwest	114:30	124	1:15
IP 18a	Neuenstadt 25A/Südost	119:00	129	1:14
IP 18b	Neuenstadt 25/Südwest	118:40	130	1:16
IP 19	Holle 2/Südost	50:12	105	0:50
IP 20a	Zur Dasslage 1/Südost	12:02	35	0:26
IP 20b	Zur Dasslage 1/Südwest	34:27	93	0:32
IP 21a	Zur Dasslage 3/Südost	0:00	0	0:00
IP 21b	Zur Dasslage 3/Südwest	34:33	99	0:31
IP 22a	Zur Dasslage 4/Südost	15:26	60	0:23
IP 22b	Zur Dasslage 4/Nordwest	29:22	90	0:27
IP 23a	Große Haar 9/Nordwest	16:17	61	0:25
IP 23b	Große Haar 9/Südost	48:42	120	0:44
IP 24a	Große Haar 7/Nordwest	9:38	38	0:19
IP 24b	Große Haar 7/Südost	16:52	58	0:24
IP 25a	Zur Dasslage 7A/Nordwest	0:00	0	0:00
IP 25b	Zur Dasslage 7A/Südost	76:59	120	0:57
IP 26a	Zur Dasslage 7/Nordwest	7:48	31	0:20
IP 26b	Zur Dasslage 7/Südost	78:27	123	0:56
IP 27a	Zur Dasslage 7/Nordwest	0:00	0	0:00
IP 27b	Zur Dasslage 8/Südost	80:41	135	0:59
IP 28a	Hörsten 6/Südost	53:01	65	1:01
IP 28b	Hörsten 6/West	0:00	0	0:00
IP 29a	Zur Dasslage 6/Nordost	0:00	0	0:00
IP 29b	Zur Dasslage 6/Südwest	111:26	134	1:15
IP 30a	Zur Dasslage 11/Südost	106:46	162	1:18
IP 30b	Zur Dasslage 11/Südwest	0:00	0	0:00
IP 31a	Zur Dasslage 13/Nordwest	0:00	0	0:00
IP 31b	Zur Dasslage 13/Südost	91:06	140	1:15
IP 32	Große Harr 13	65:29	144	0:53
IP 33a	Große Haar 15/Nordost	117:54	149	1:12
IP 33b	Große Haar 15A/Südost	116:12	147	1:12
IP 34a	Große Haar 15/Nordost	102:52	140	1:07
IP 34b	Große Haar 15/Südost	102:39	140	1:07
IP 35	Pius 24	0:00	0	0:00
IP 36	Bruchstraße 6	36:15	68	0:38
IP 37a	Bruchstraße 4/Nordwest	51:04	99	0:50
IP 37b	Bruchstraße 4/Südwest	49:24	96	0:50
IP 38	Wielage 5	84:35	141	1:01
IP 39	Wielage 4	51:40	122	0:38

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal	Erwartet
		[Std/Jahr]	[Std/Jahr]
WEA 17-1	E-138 EP3 E2 TES	429:49	
WEA 17-2	E-138 EP3 E2 TES	395:29	
WEA 17-3	E-138 EP3 E2 TES	354:12	
WEA 18-1	E-138 EP3 E2 TES	223:28	
WEA 18-2	E-138 EP3 E2 TES	155:05	
WEA 18-3	E-138 EP3 E2 TES	366:05	
WEA 18-4	E-138 EP3 E2 TES	199:55	

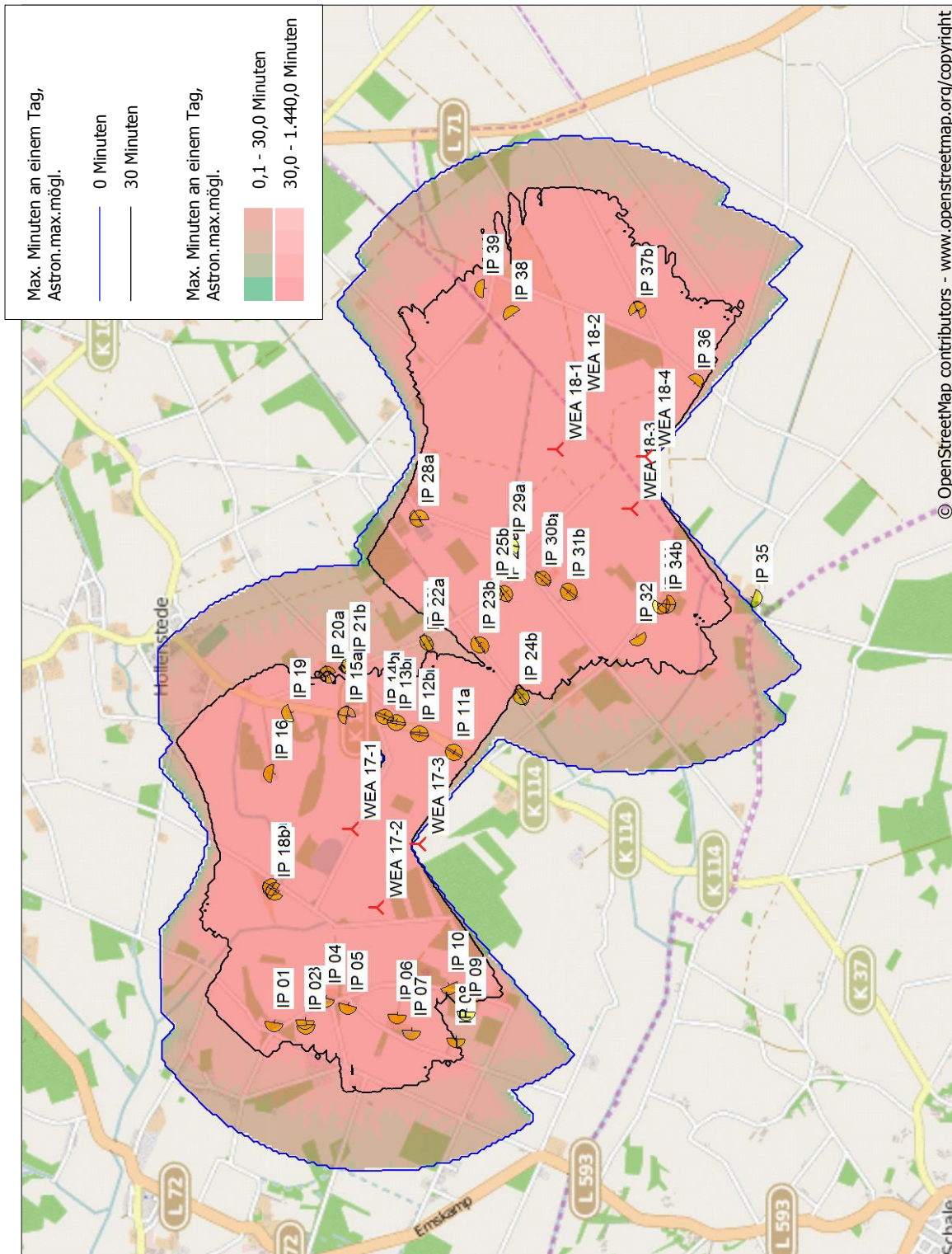
Anlage 4: Lagepläne mit Darstellung des Schattenwurfes 4.1 astronomisch maximal mögliche Stunden pro Jahr 4.2 astronomisch maximal mögliche Minuten pro Tag



SHADOW - Karte

Berechnung:
Windenergie Hollenstede 2018-12

Lizenzierter Anwender:
ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654



Anlage 5: Grafische Darstellung der Beschattungszeiten an der Immissionspunkten für die jeweilige Windenergieanlage

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbH

Schattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

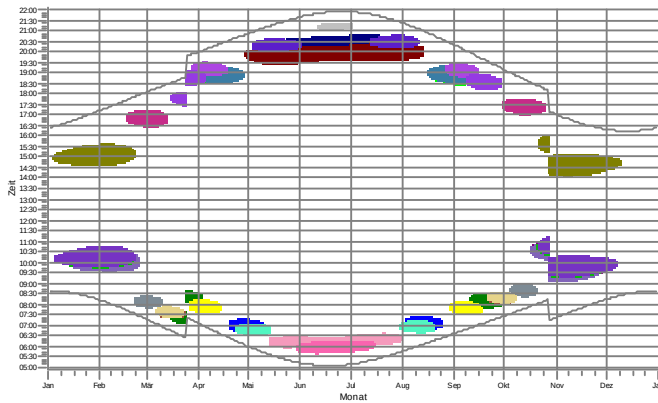
Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654

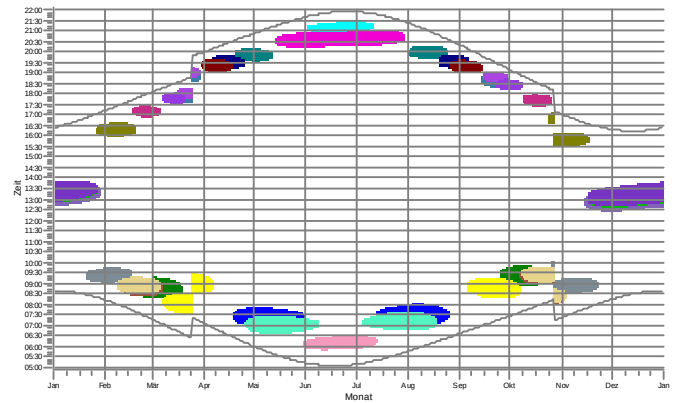
SHADOW - Grafischer Kalender pro WEA

Berechnung: Windenergie Hollenstede 2018-12

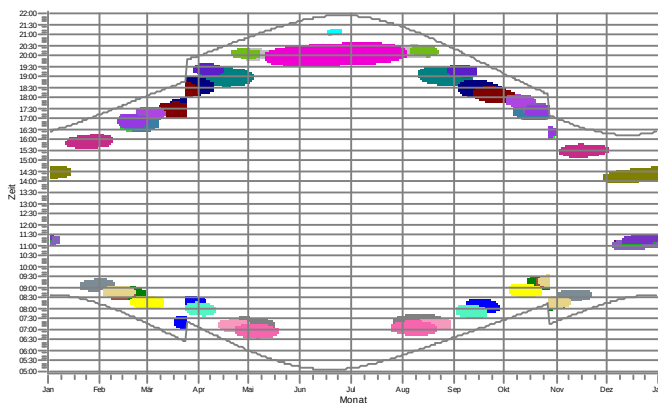
WEA 17-1: E-138 EP3 E2 TES



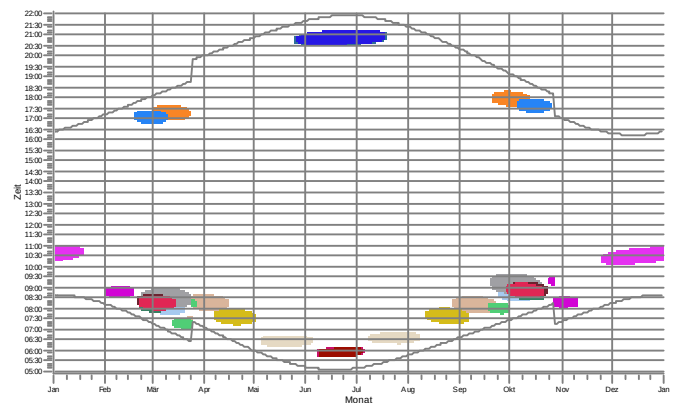
WEA 17-2: E-138 EP3 E2 TES



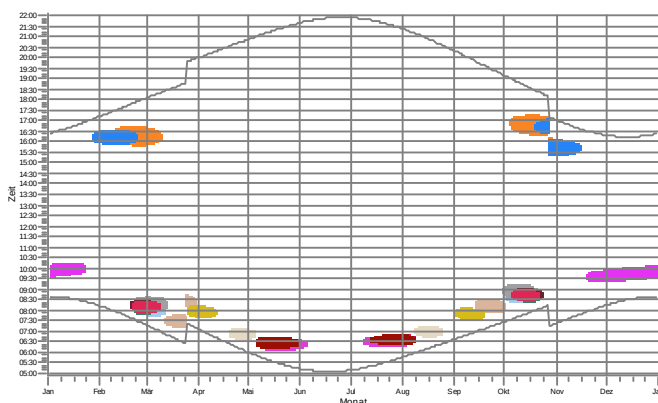
WEA 17-3: E-138 EP3 E2 TES



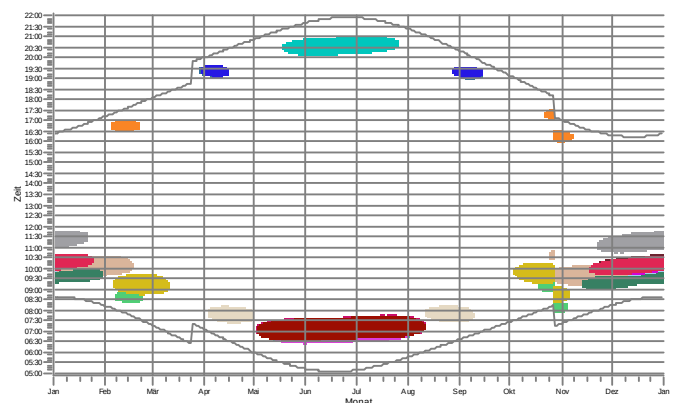
WEA 18-1: E-138 EP3 E2 TES



WEA 18-2: E-138 EP3 E2 TES



WEA 18-3: E-138 EP3 E2 TES



Schattenrezeptoren

IP 04: Welperort 7
IP 05: Welperort 10
IP 06: Welperort 14
IP 10: Welperort 19
IP 12b: Holle 10/West
IP 13b: Holle 9/West
IP 14b: Holle 7/West
IP 15b: Holle 5/West
IP 16: Holle 2
IP 18a: Neuenstadt 25A/Südost

IP 23a: Große Haar 9/Nordwest
IP 24a: Große Haar 7/Nordwest
IP 27b: Zur Dasslage 8/Südost
IP 29b: Zur Dasslage 6/Südwest
IP 30a: Zur Dasslage 11/Südost
IP 34a: Große Haar 15/Nordost
IP 36: Bruchstraße 6
IP 37a: Bruchstraße 4/Nordwest
IP 38: Wielage 5
IP 11b: Große Haar 2/West

IP 24b: Große Haar 7/Südost
IP 23b: Große Haar 9/Südost
IP 31b: Zur Dasslage 13/Südost
IP 25b: Zur Dasslage 7A/Südost
IP 18b: Neuenstadt 25/Südwest
IP 34b: Große Haar 15/Südost
IP 37b: Bruchstraße 4/Südwest
IP 15a: Holle 5/Süd
IP 01: Welperort 1
IP 39: Wielage 4

IP 02: Welperort 4
IP 22a: Zur Dasslage 4/Südost
IP 22b: Zur Dasslage 4/Nordwest
IP 21b: Zur Dasslage 3/Südwest
IP 20a: Zur Dasslage 1/Südost
IP 20b: Zur Dasslage 1/Südwest
IP 28a: Hörsten 6/Südost
IP 32: Große Haar 13
IP 33a: Große Haar 15/Nordost
IP 33b: Große Haar 15A/Südost

IP 26a: Zur Dasslage 7/Nordwest
IP 26b: Zur Dasslage 7/Südost
IP 17b: Neuenstadt 25/Südwest
IP 17a: Neuenstadt 25/Südost
IP 07: Welperort 16
IP 19: Holle 2/Südost
IP 03: Welperort 7
IP 08: Welperort 24
IP 09: Welperort 20

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbH

Schattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH

Hessenweg 38

DE-49809 Lingen (Ems)

0049 591 800 1634

Thomas Wihard / wihard@zechgmbh.de

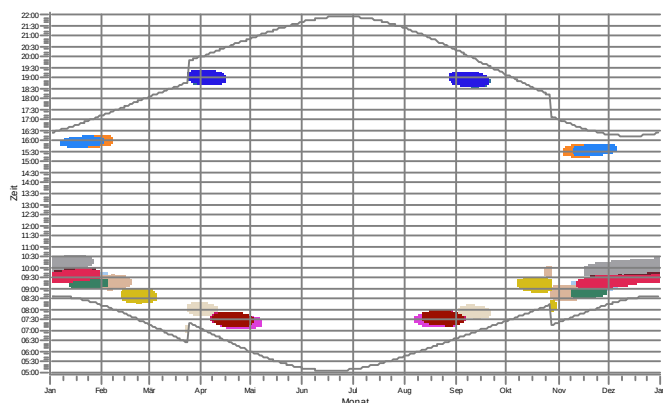
Berechnet:

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SHADOW - Grafischer Kalender pro WEA

Berechnung: Windenergie Hollenstede 2018-12

WEA 18-4: E-138 EP3 E2 TES



Schattenrezeptoren

IP 27b: Zur Dasslage 8/Südost
IP 29b: Zur Dasslage 6/Südwest
IP 30a: Zur Dasslage 11/Südost
IP 34a: Große Haar 15/Nordost

IP 37a: Bruchstraße 4/Nordwest
IP 38: Wielage 5
IP 23b: Große Haar 9/Südost
IP 31b: Zur Dasslage 13/Südost

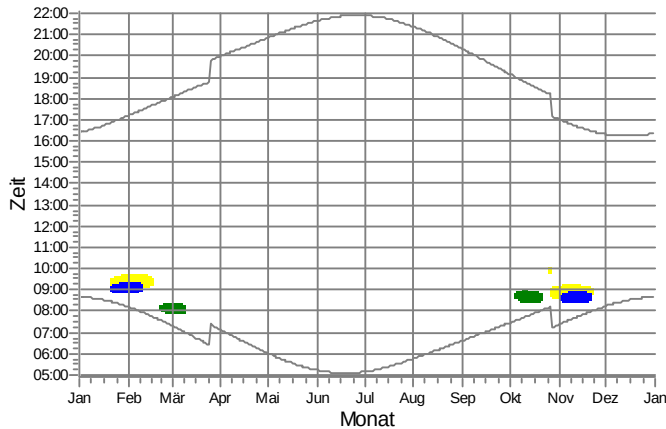
IP 25b: Zur Dasslage 7A/Südost
IP 34b: Große Haar 15/Südost
IP 37b: Bruchstraße 4/Südwest
IP 39: Wielage 4

IP 32: Große Harr 13
IP 33a: Große Haar 15/Nordost
IP 33b: Große Haar 15A/Südost
IP 26b: Zur Dasslage 7/Südost

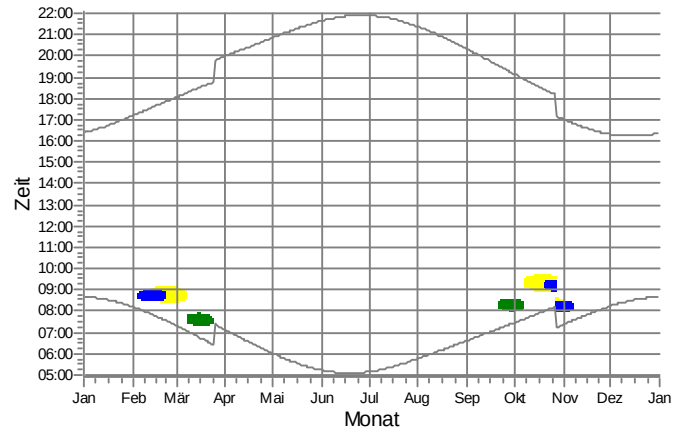
Anlage 6: Grafische Darstellung der Beschattungszeiten durch die Windenergieanlagen an den einzelnen Immissionspunkten

SHADOW - Grafischer Kalender**Berechnung:** Windenergie Hollenstede 2018-12

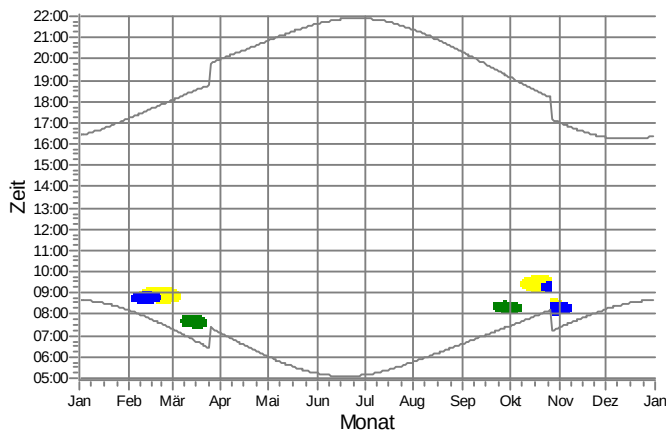
IP 01: Welperort 1



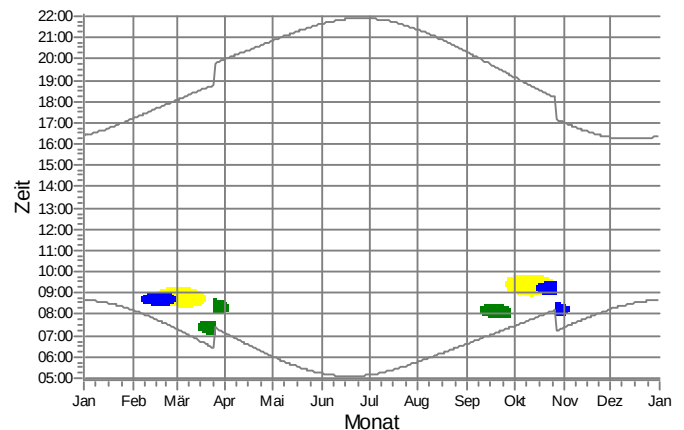
IP 02: Welperort 4



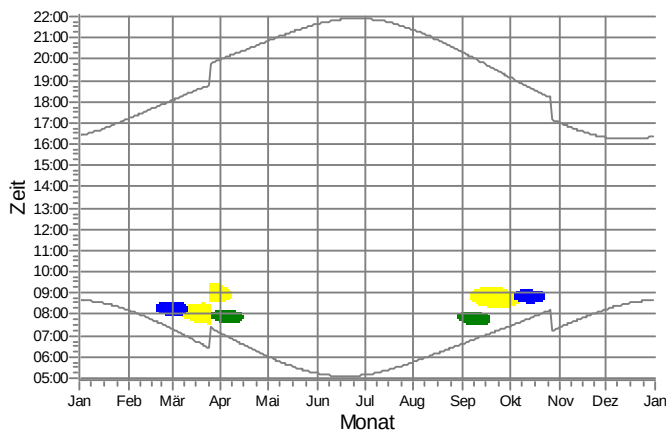
IP 03: Welperort 7



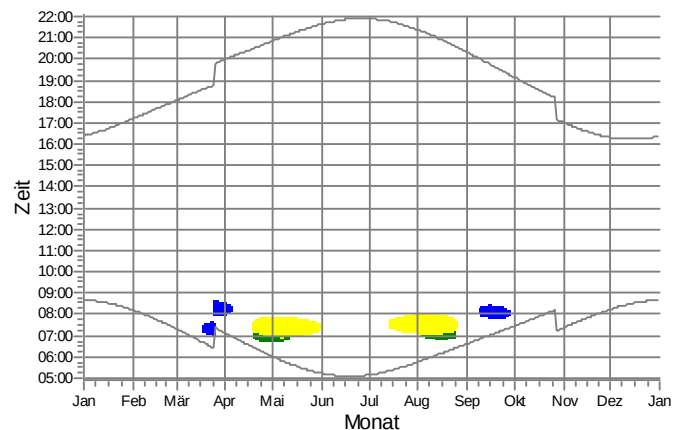
IP 04: Welperort 7



IP 05: Welperort 10



IP 06: Welperort 14



WEA



WEA 17-1: E-138 EP3 E2 TES



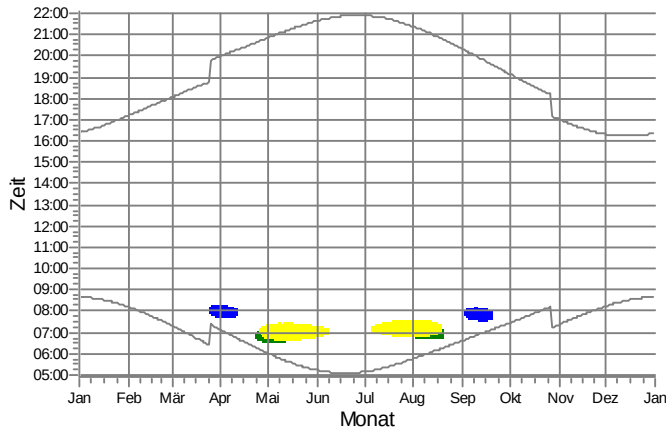
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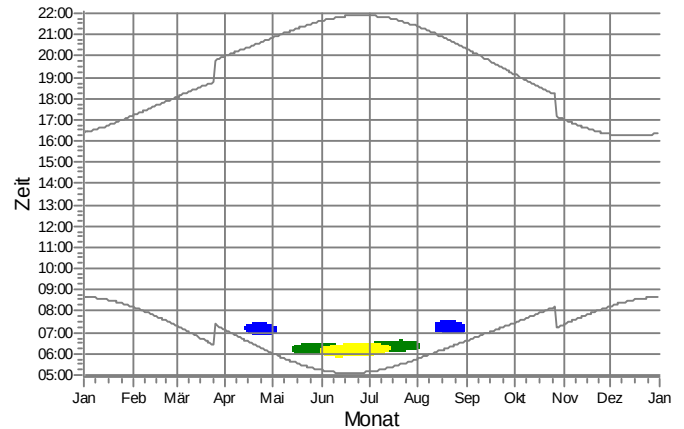
WEA 17-3: E-138 EP3 E2 TES

SHADOW - Grafischer Kalender**Berechnung:** Windenergie Hollenstede 2018-12

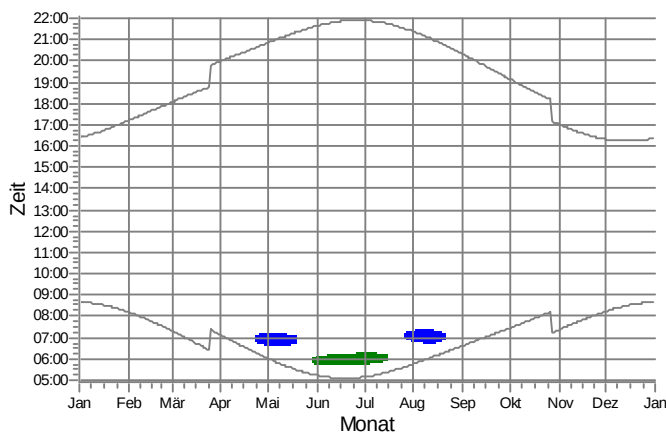
IP 07: Welperort 16



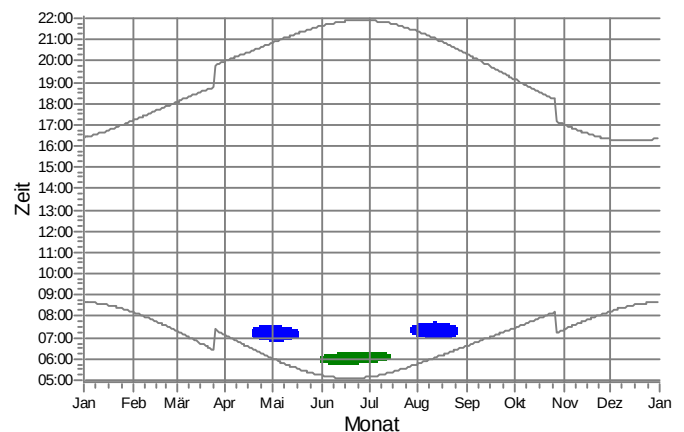
IP 08: Welperort 24



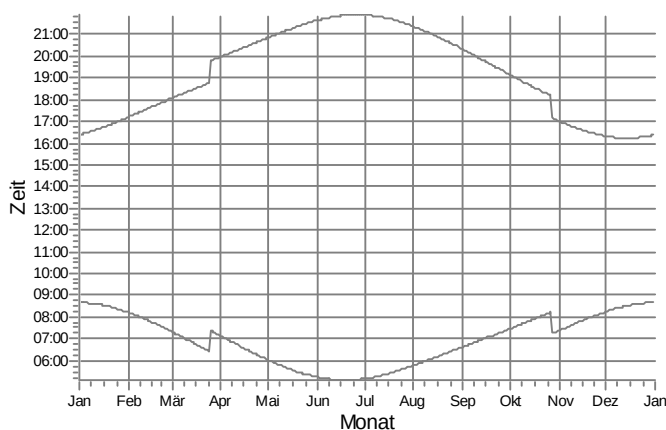
IP 09: Welperort 20



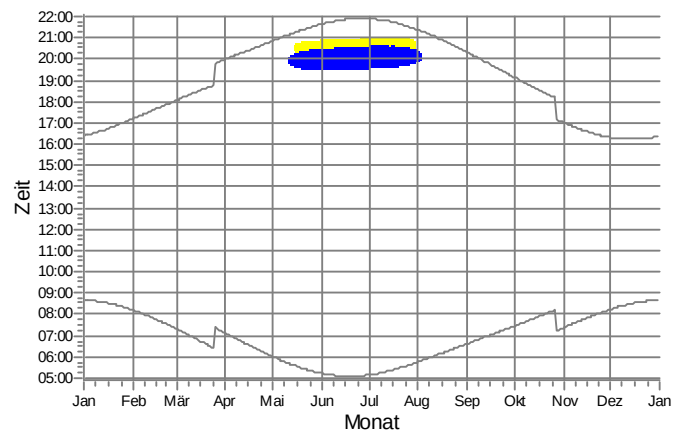
IP 10: Welperort 19



IP 11a: Große Haar 2/Ost



IP 11b: Große Haar 2/West



WEA



WEA 17-1: E-138 EP3 E2 TES



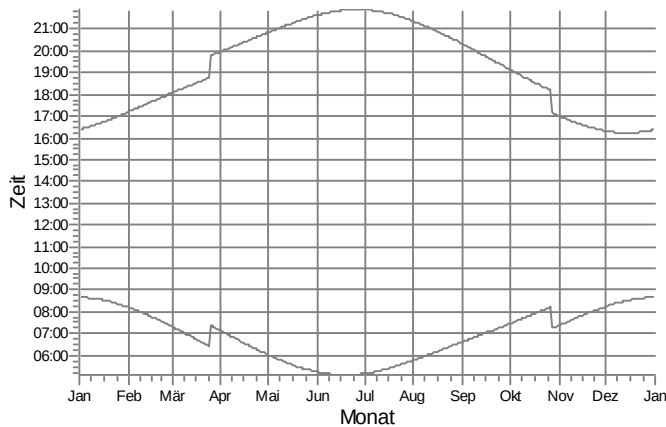
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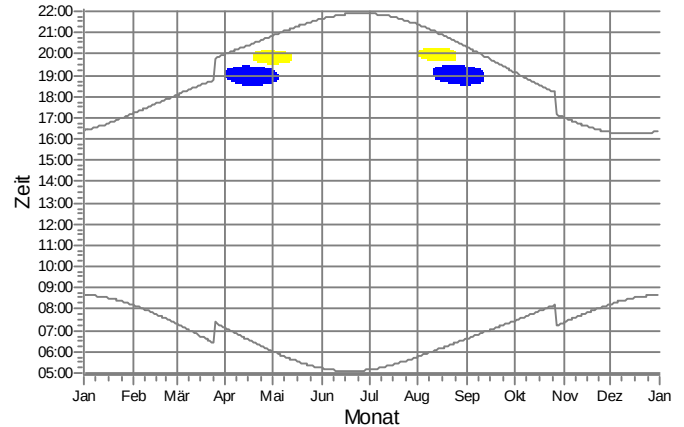
WEA 17-3: E-138 EP3 E2 TES

SHADOW - Grafischer Kalender**Berechnung:** Windenergie Hollenstede 2018-12

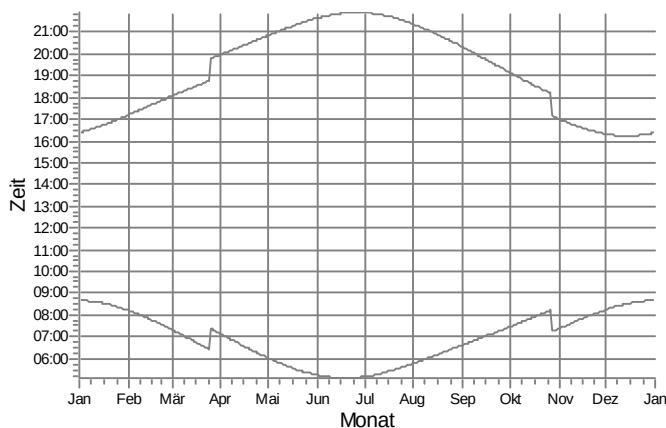
IP 12a: Holle 10/Ost



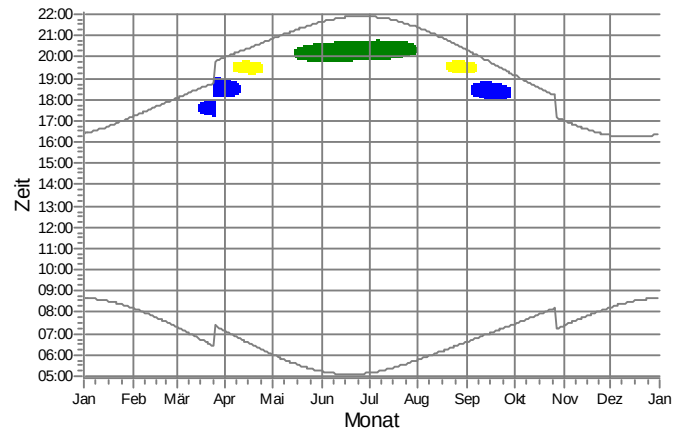
IP 12b: Holle 10/West



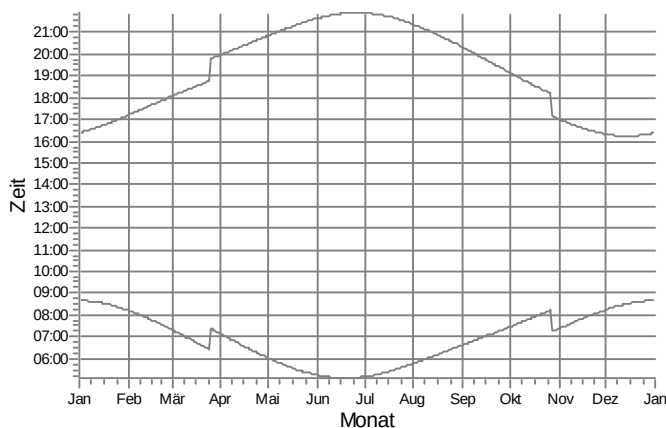
IP 13a: Holle 9/Ost



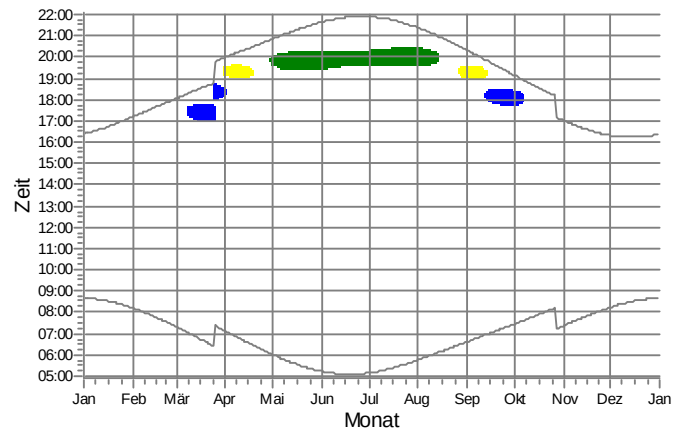
IP 13b: Holle 9/West



IP 14a: Holle 7/Ost



IP 14b: Holle 7/West



WEA



WEA 17-1: E-138 EP3 E2 TES



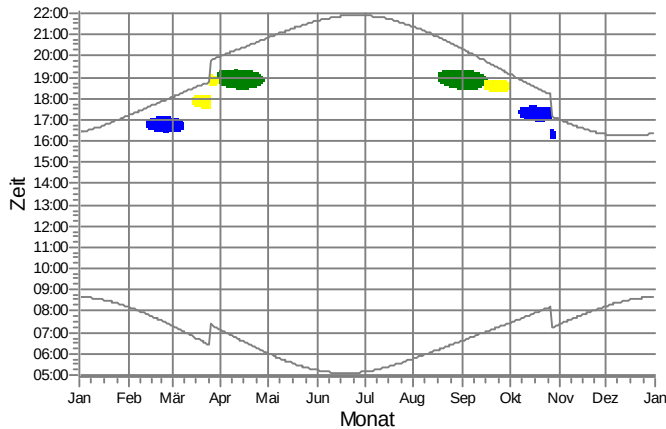
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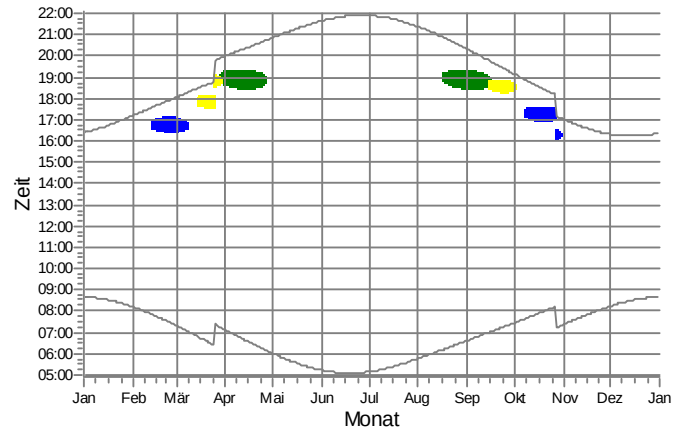
WEA 17-3: E-138 EP3 E2 TES

SHADOW - Grafischer Kalender**Berechnung:** Windenergie Hollenstede 2018-12

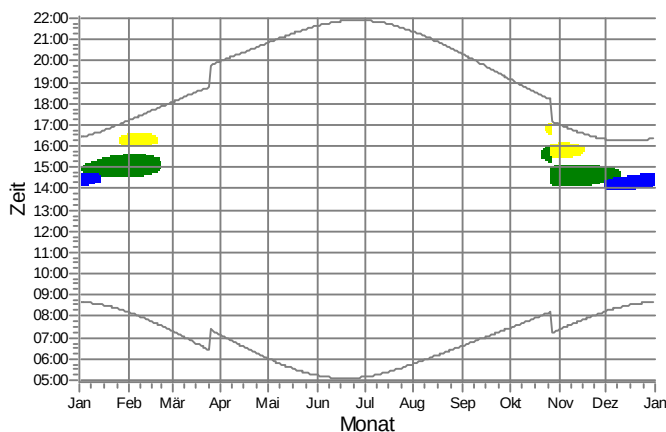
IP 15a: Holle 5/Süd



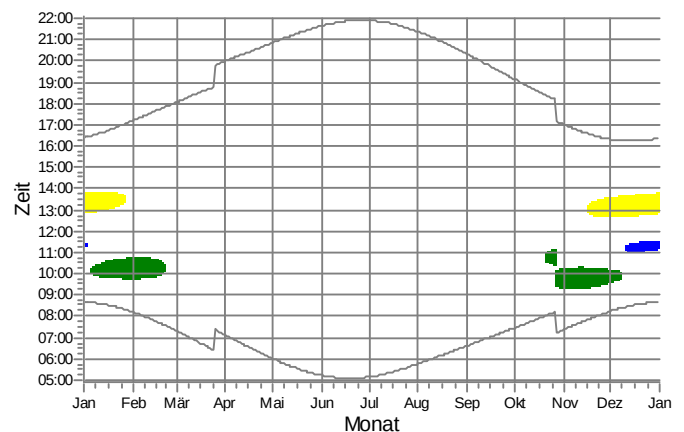
IP 15b: Holle 5/West



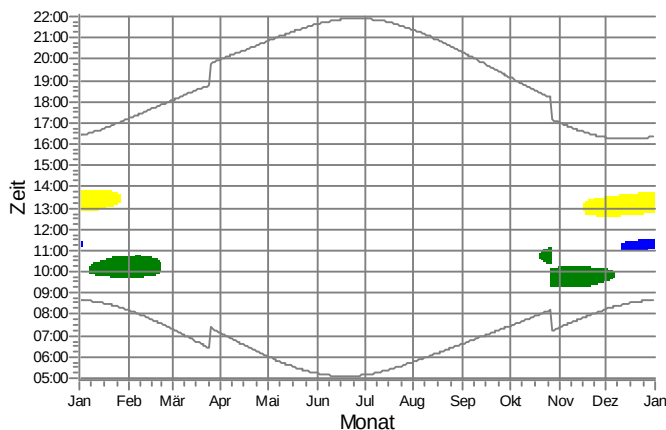
IP 16: Holle 2



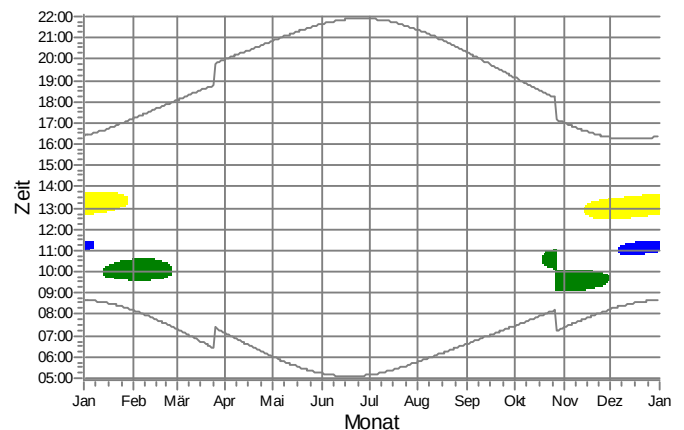
IP 17a: Neuenstadt 25/Südost



IP 17b: Neuenstadt 25/Südwest



IP 18a: Neuenstadt 25A/Südost



WEA



WEA 17-1: E-138 EP3 E2 TES



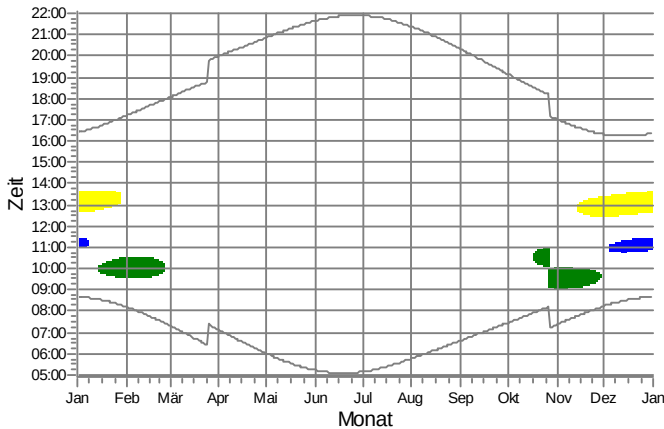
WEA 17-2: E-138 EP3 E2 TES



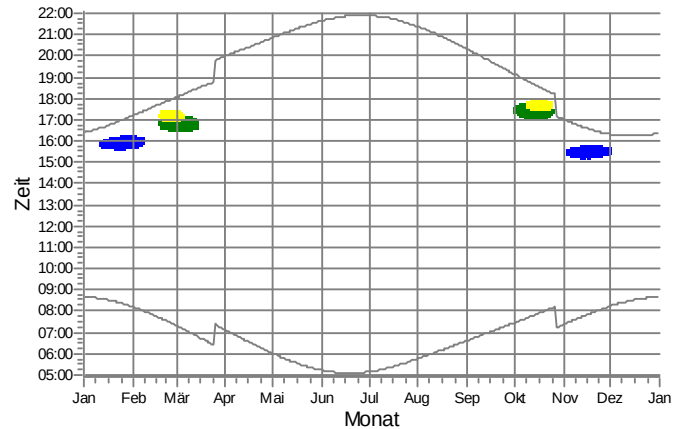
WEA 17-3: E-138 EP3 E2 TES

SHADOW - Grafischer Kalender**Berechnung:** Windenergie Hollenstede 2018-12

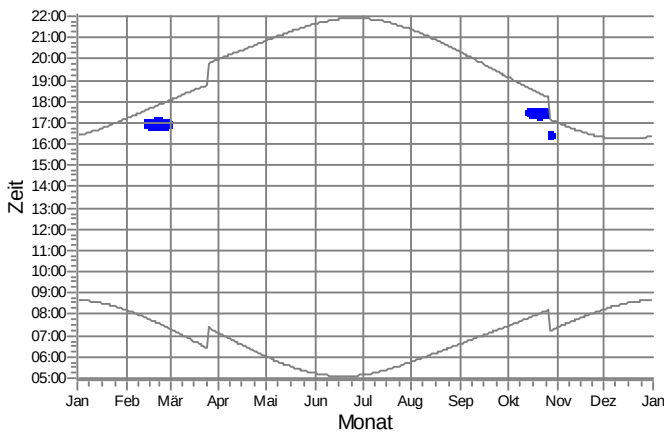
IP 18b: Neuenstadt 25/Südwest



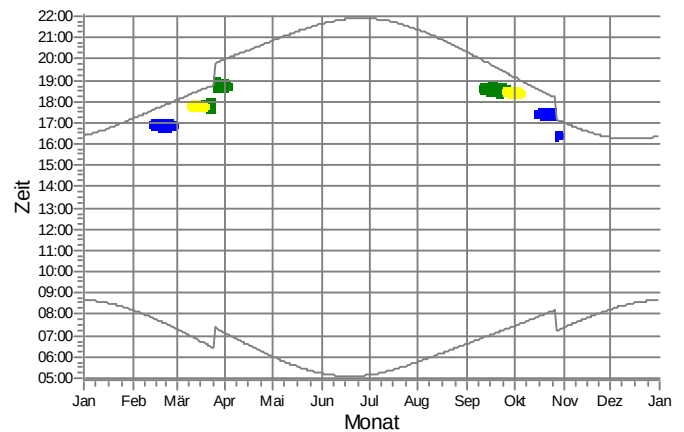
IP 19: Holle 2/Südost



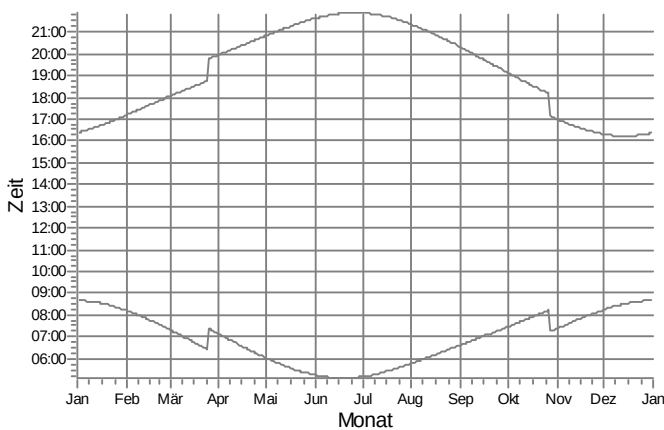
IP 20a: Zur Dasslage 1/Südost



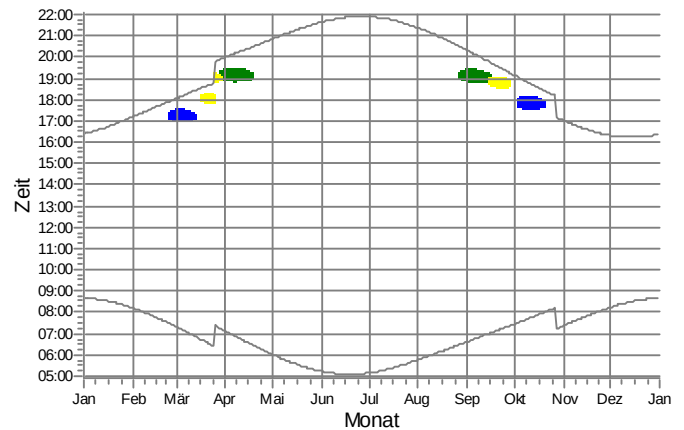
IP 20b: Zur Dasslage 1/Südwest



IP 21a: Zur Dasslage 3/Südost



IP 21b: Zur Dasslage 3/Südwest



WEA



WEA 17-1: E-138 EP3 E2 TES



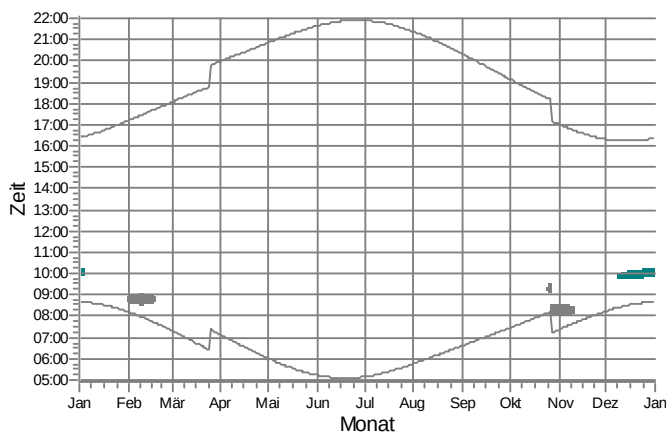
WEA 17-2: E-138 EP3 E2 TES



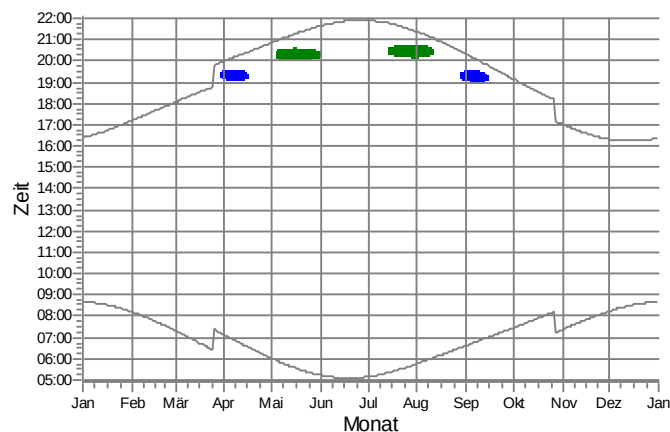
WEA 17-3: E-138 EP3 E2 TES

SHADOW - Grafischer Kalender**Berechnung:** Windenergie Hollenstede 2018-12

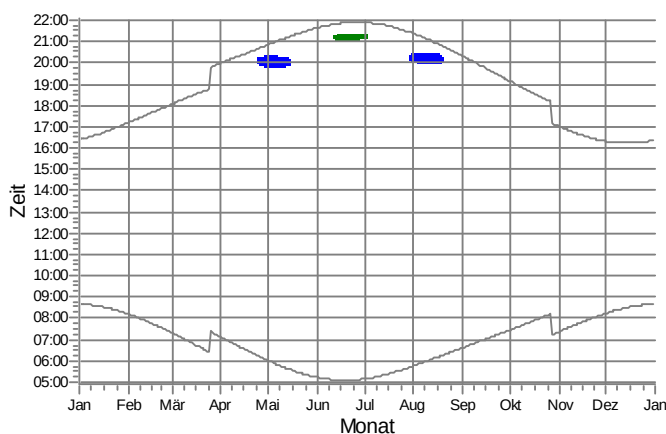
IP 22a: Zur Dasslage 4/Südost



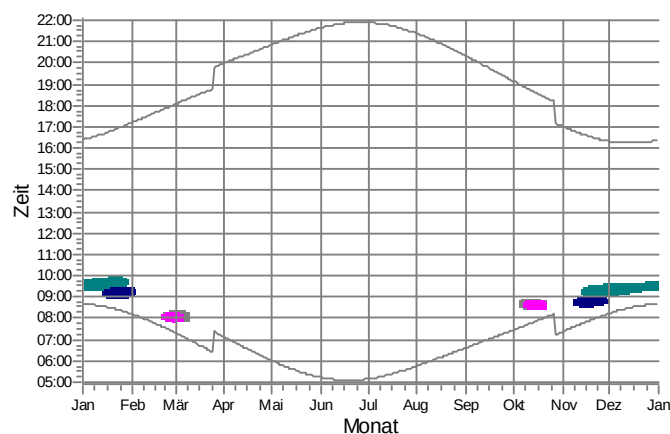
IP 22b: Zur Dasslage 4/Nordwest



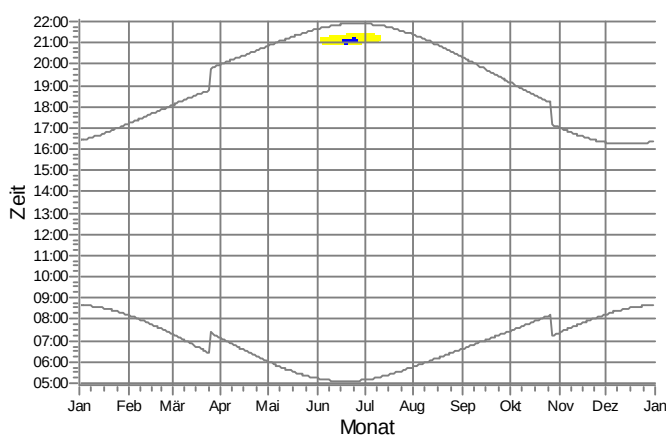
IP 23a: Große Haar 9/Nordwest



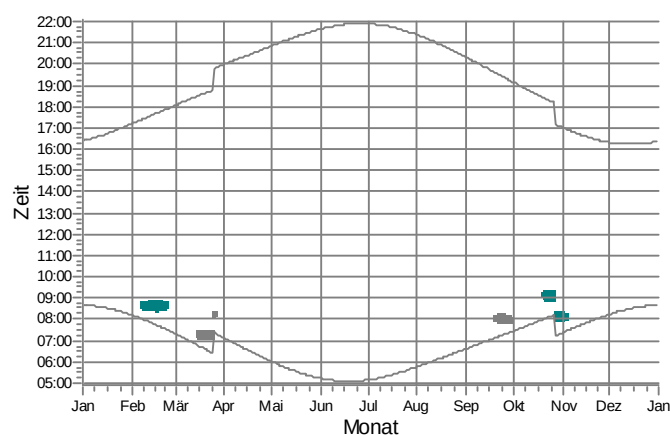
IP 23b: Große Haar 9/Südost



IP 24a: Große Haar 7/Nordwest



IP 24b: Große Haar 7/Südost



WEA



WEA 17-1: E-138 EP3 E2 TES

WEA 17-2: E-138 EP3 E2 TES

WEA 17-3: E-138 EP3 E2 TES



WEA 18-1: E-138 EP3 E2 TES

WEA 18-2: E-138 EP3 E2 TES

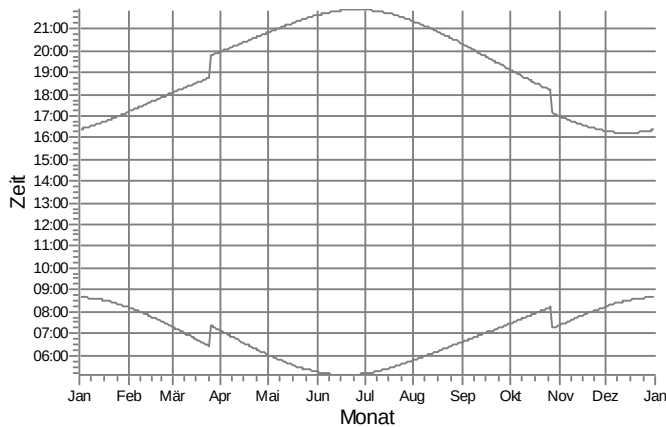
WEA 18-3: E-138 EP3 E2 TES



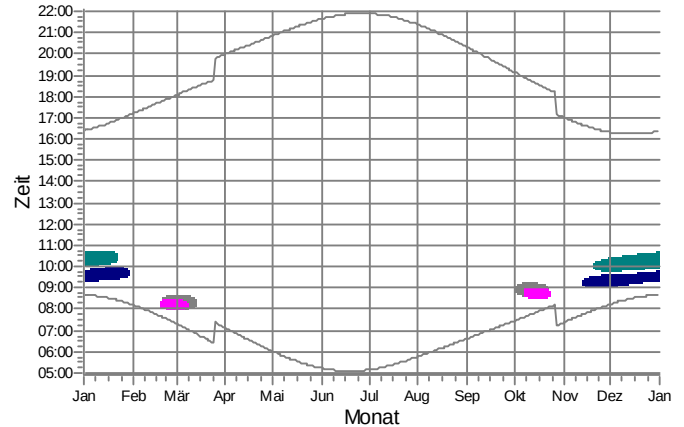
WEA 18-4: E-138 EP3 E2 TES

SHADOW - Grafischer Kalender**Berechnung:** Windenergie Hollenstede 2018-12

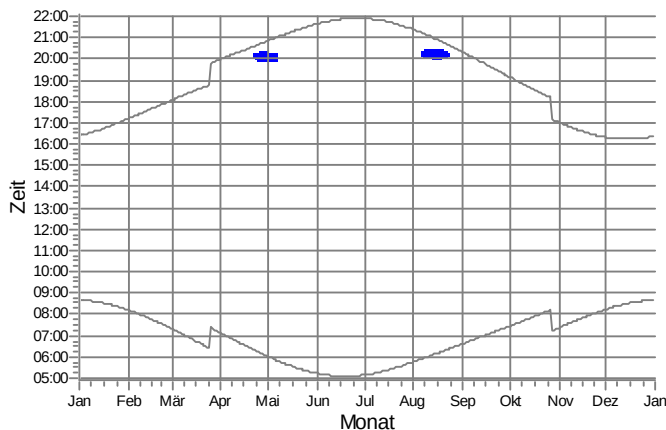
IP 25a: Zur Dasslage 7A/Nordwest



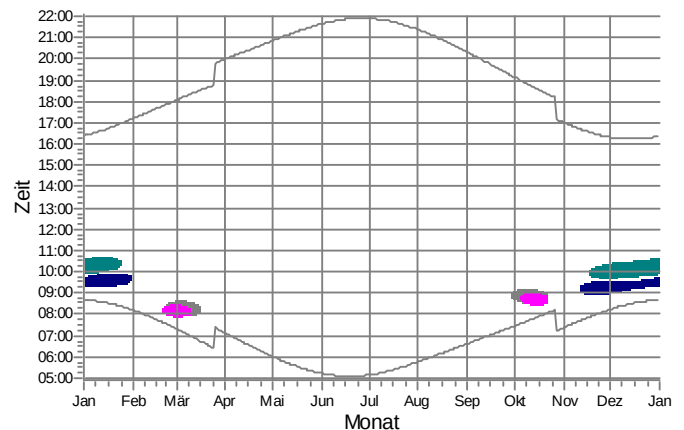
IP 25b: Zur Dasslage 7A/Südost



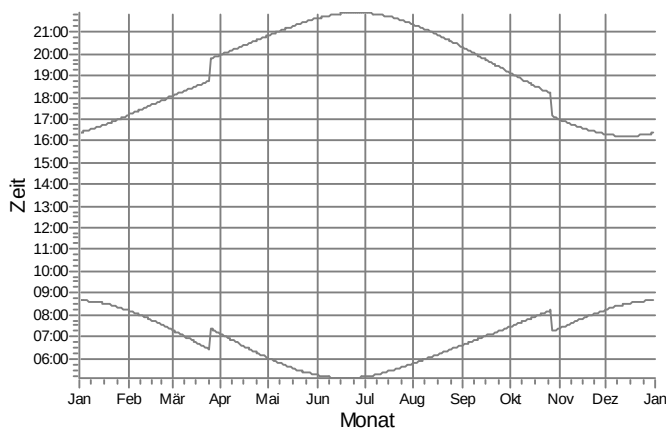
IP 26a: Zur Dasslage 7/Nordwest



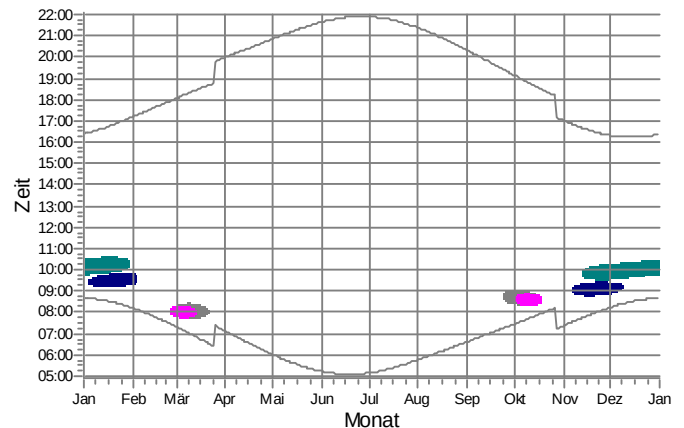
IP 26b: Zur Dasslage 7/Südost



IP 27a: Zur Dasslage 7/Nordwest



IP 27b: Zur Dasslage 8/Südost



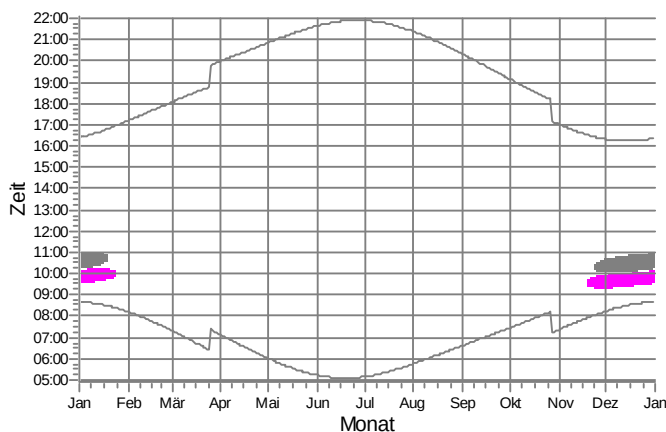
WEA

WEA 17-3: E-138 EP3 E2 TES
WEA 18-1: E-138 EP3 E2 TESWEA 18-2: E-138 EP3 E2 TES
WEA 18-3: E-138 EP3 E2 TES

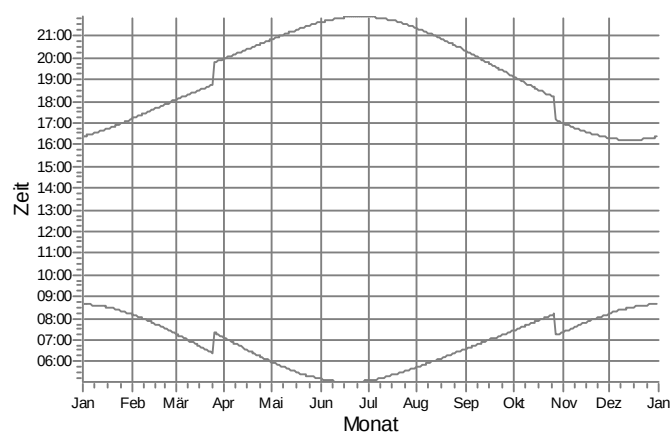
WEA 18-4: E-138 EP3 E2 TES

SHADOW - Grafischer Kalender**Berechnung:** Windenergie Hollenstede 2018-12

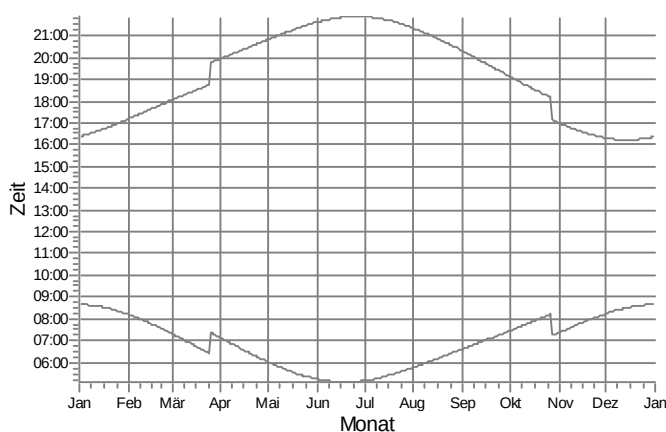
IP 28a: Hörsten 6/Südst



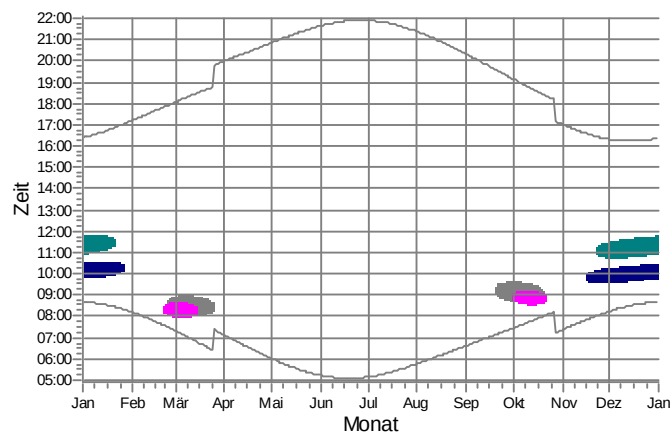
IP 28b: Hörsten 6/West



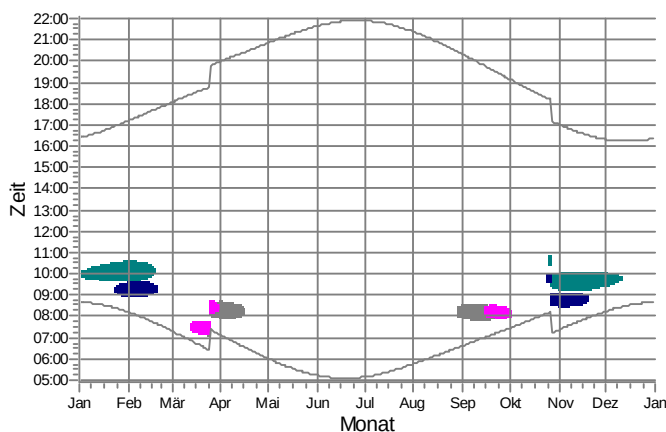
IP 29a: Zur Dasslage 6/Nordost



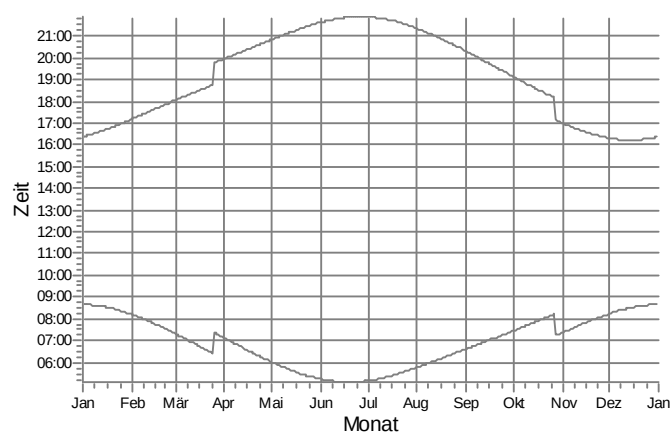
IP 29b: Zur Dasslage 6/Südwest



IP 30a: Zur Dasslage 11/Südst



IP 30b: Zur Dasslage 11/Süd west



WEA



WEA 18-1: E-138 EP3 E2 TES

WEA 18-2: E-138 EP3 E2 TES

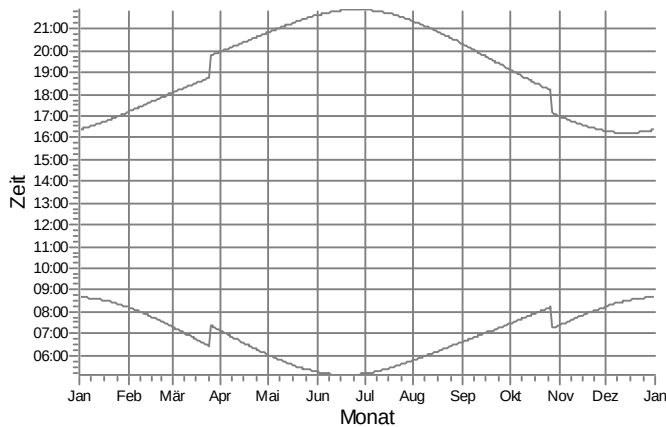


WEA 18-3: E-138 EP3 E2 TES

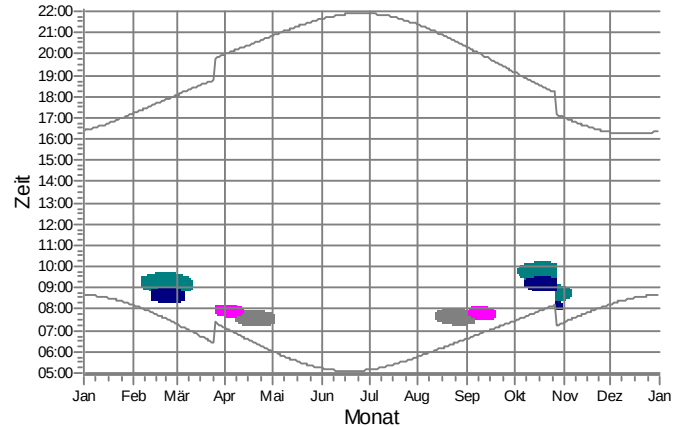
WEA 18-4: E-138 EP3 E2 TES

SHADOW - Grafischer Kalender**Berechnung:** Windenergie Hollenstede 2018-12

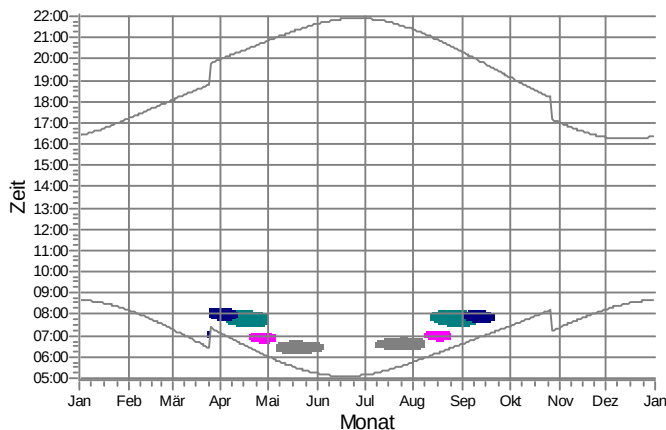
IP 31a: Zur Dasslage 13/Nordwest



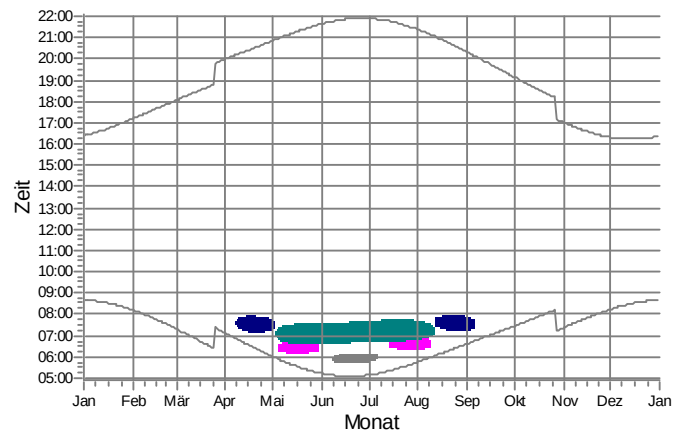
IP 31b: Zur Dasslage 13/Südost



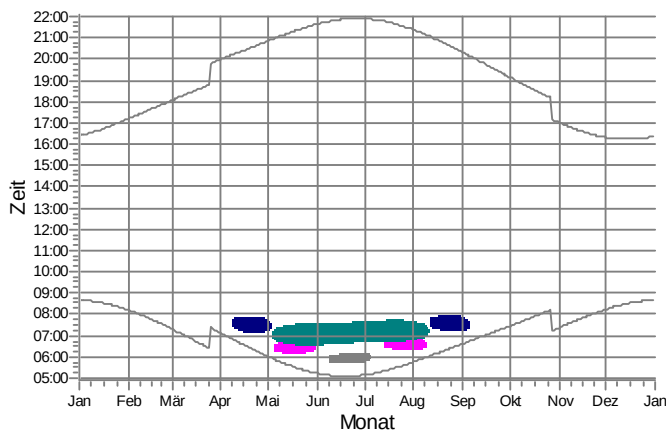
IP 32: Große Harr 13



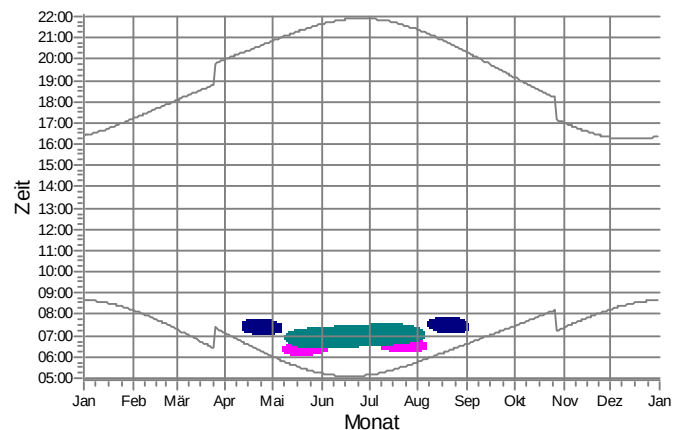
IP 33a: Große Haar 15/Nordost



IP 33b: Große Haar 15A/Südost



IP 34a: Große Haar 15/Nordost



WEA



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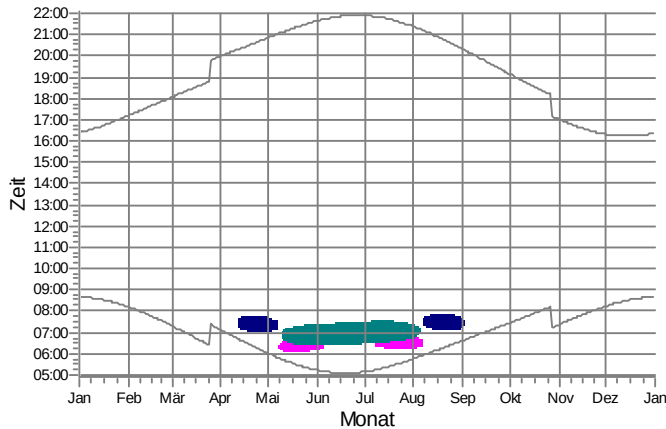
WEA 18-2: E-138 EP3 E2 TES

WEA 18-3: E-138 EP3 E2 TES

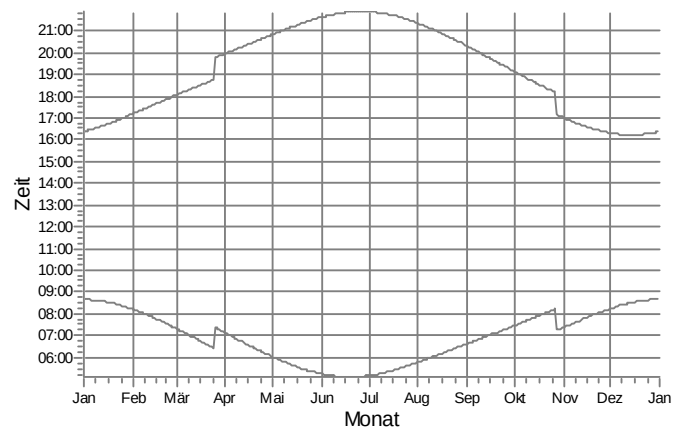
WEA 18-4: E-138 EP3 E2 TES

SHADOW - Grafischer Kalender**Berechnung:** Windenergie Hollenstede 2018-12

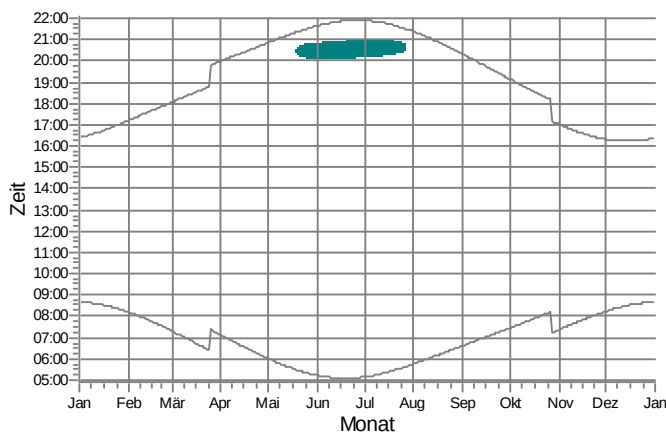
IP 34b: Große Haar 15/Südost



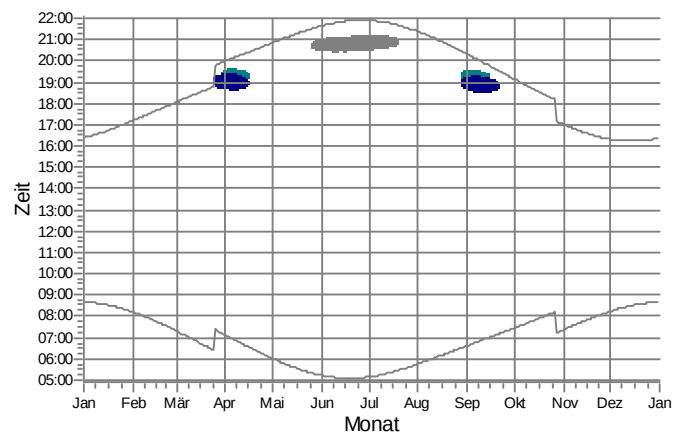
IP 35: Pius 24



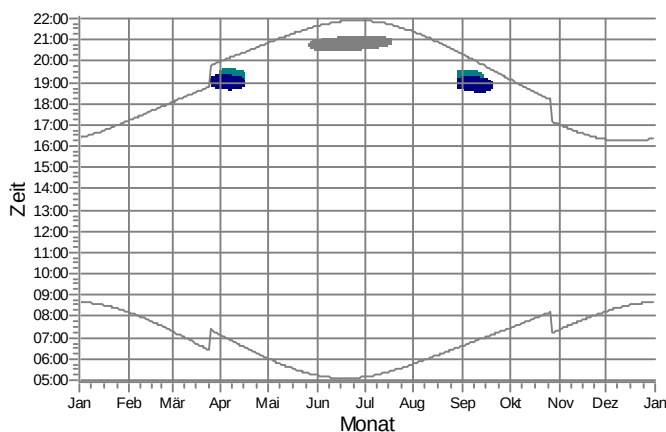
IP 36: Bruchstraße 6



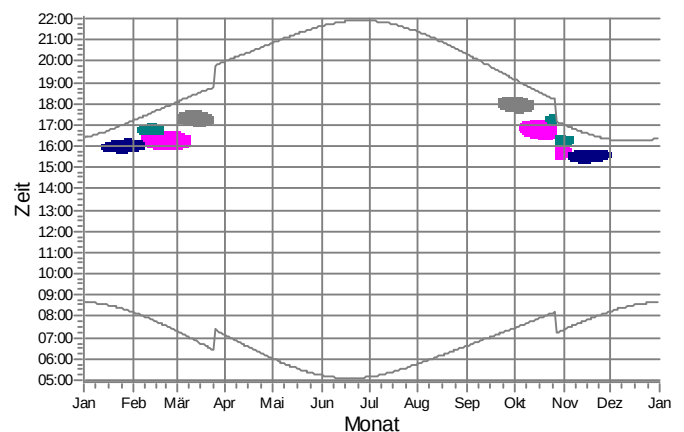
IP 37a: Bruchstraße 4/Nordwest



IP 37b: Bruchstraße 4/Südwest



IP 38: Wielage 5



WEA

WEA 18-1: E-138 EP3 E2 TES
WEA 18-2: E-138 EP3 E2 TES

WEA 18-3: E-138 EP3 E2 TES
WEA 18-4: E-138 EP3 E2 TES

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbH

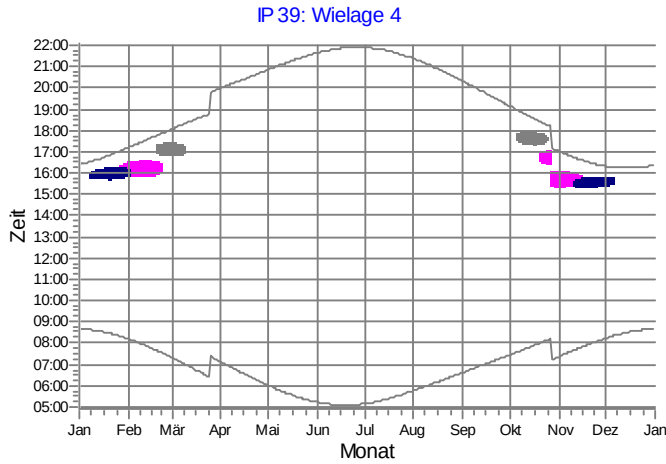
Schattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654

SHADOW - Grafischer Kalender

Berechnung: Windenergie Hollenstede 2018-12



WEA



WEA 18-1: E-138 EP3 E2 TES



WEA 18-2: E-138 EP3 E2 TES



WEA 18-4: E-138 EP3 E2 TES

Anlage 7: Tabellarische Darstellung der Beschattungszeiten an der Immissionspunkten für
die jeweilige Windenergieanlage

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654**SHADOW - Kalender pro WEA****Berechnung: Windenergie Hollenstede 2018-12WEA: WEA 17-1 - E-138 EP3 E2 TES**
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 09:39-10:43/64 17:12 14:39-15:12/52	07:17 07:55-08:19/24 18:04 16:31-17:08/37	07:06 07:42-08:08/26 18:32-18:58/26 20:00 08:11-08:27/16 18:57-19:23/26	05:59 06:36-07:01/25 19:43-19:58/15 20:52 07:01-07:12/11	05:12 05:49-06:02/13 19:32-20:35/63 21:39 06:03-06:24/21
2	08:39 16:24	08:10 09:39-10:43/64 17:13 14:40-15:32/52	07:15 07:55-08:19/24 18:06 16:31-17:08/37	07:03 07:42-08:08/26 18:33-18:57/24 20:01 08:14-08:24/10 18:56-19:25/29	05:57 06:35-07:01/26 19:40-20:01/21 20:54 07:01-07:11/10	05:12 05:48-06:03/15 19:32-20:35/63 21:40 06:03-06:24/21
3	08:38 16:25	08:08 09:38-10:43/65 17:15 14:39-15:32/53	07:13 07:55-08:19/24 18:08 16:31-17:08/38	07:01 07:41-08:09/28 18:54-19:25/31 20:03 18:36-18:55/19	05:55 06:35-07:00/25 19:38-20:03/25 20:55 07:00-07:10/10	05:11 05:47-06:04/17 19:32-20:35/63 21:41 06:04-06:23/19
4	08:38 14:54-14:58/4 16:27	08:07 09:38-10:43/65 17:17 14:39-15:32/53	07:11 07:55-08:18/23 18:10 16:31-17:07/36	06:59 07:40-08:08/28 18:50-19:25/35 20:05 18:37-18:51/14	05:54 06:36-07:01/25 19:37-20:05/28 20:57 07:01-07:11/10 20:14-20:22/8	05:10 05:47-06:03/18 19:34-20:36/62 21:43 06:05-06:24/19
5	08:38 14:52-15:02/10 16:28	08:05 09:38-10:42/64 17:19 14:40-15:32/52	07:08 07:56-08:17/21 18:12 16:31-17:07/36	06:56 07:40-08:08/28 20:07 18:37-19:26/49	05:52 06:36-07:01/25 19:35-20:06/31 20:59 07:01-07:09/8 20:12-20:25/13	05:09 05:46-06:05/19 19:34-20:36/62 21:44 06:05-06:23/18
6	08:38 10:05-10:12/7 16:29	08:03 09:38-10:43/65 17:25 14:41-15:32/51	07:06 07:57-08:16/18 18:14 16:32-17:07/35	06:54 07:40-08:08/28 20:08 18:36-19:26/50	05:50 06:36-07:00/24 19:34-20:07/33 21:00 07:00-07:08/8 20:10-20:27/17	05:08 05:46-06:07/21 19:34-20:35/61 21:45 06:06-06:22/16
7	08:37 10:03-10:16/13 16:30	08:02 09:38-10:43/65 17:23 14:41-15:32/51	07:04 07:38-07:42/4 16:31-17:05/34 18:15 16:32-17:07/35	06:52 07:40-08:07/27 20:10 18:34-19:25/51	05:48 06:36-06:59/23 19:32-20:07/35 21:02 06:59-07:07/8 20:09-20:28/19	05:08 05:46-06:08/22 19:35-20:36/61 21:46 06:07-06:23/16
8	08:37 10:01-10:18/17 16:32	08:00 09:38-10:42/64 17:29 14:42-15:31/49	07:02 07:34-07:47/13 16:32-17:05/33 18:17 16:34-17:02/28	06:49 07:40-08:06/26 20:12 18:34-19:25/51	05:46 06:37-06:59/22 19:32-20:29/57 21:04 06:59-07:06/7	05:07 05:46-06:09/23 19:35-20:36/61 21:46 06:08-06:23/15
9	08:36 10:01-10:20/19 16:33	07:58 09:38-10:42/64 17:27 14:42-15:32/50	06:59 07:31-07:49/18 16:34-17:04/30 18:19 16:34-17:02/28	06:47 07:40-08:05/25 20:14 18:33-19:25/52	05:44 06:37-06:58/21 19:31-20:30/59 21:05 06:58-07:04/6	05:07 05:46-06:09/23 19:36-20:37/61 21:47 06:08-06:22/14
10	08:36 09:59-10:22/23 16:34	07:56 09:38-10:42/64 17:29 14:42-15:31/49	06:57 07:29-07:49/20 18:21 16:34-17:02/28	06:45 07:41-08:04/23 20:15 18:33-19:24/51	05:43 06:37-06:57/20 19:30-20:30/60 21:07 06:57-07:00/3	05:06 05:46-06:08/22 19:37-20:37/60 21:48 06:08-06:22/14
11	08:35 09:58-10:23/25 16:36	07:54 09:39-10:41/62 17:31 14:43-15:31/48	06:55 07:27-07:50/23 18:23 16:36-17:00/24	06:42 07:42-08:03/21 20:17 18:32-19:23/51	05:41 06:39-06:55/16 21:09 19:30-20:31/61	05:06 05:45-06:08/23 19:36-20:37/61 21:49 06:08-06:21/13
12	08:35 09:57-10:24/27 16:37	07:52 09:39-10:40/61 17:32 14:44-15:30/46	06:52 07:26-07:51/25 18:24 16:38-16:58/20	06:40 07:43-08:00/17 20:19 18:32-19:22/50	05:39 06:40-06:53/13 21:10 19:29-20:31/62	05:05 05:46-06:09/23 19:37-20:37/60 21:50 06:09-06:21/12 21:10-21:11/1
13	08:34 09:56-10:26/30 16:39	07:51 09:39-10:39/60 17:34 14:45-15:29/44	06:50 07:25-07:51/26 18:26 16:40-16:54/14	06:38 07:45-07:58/13 20:21 18:32-19:21/49	05:37 06:42-06:52/10 21:12 19:29-20:31/62	05:05 05:46-06:09/23 19:38-20:38/60 21:50 06:09-06:21/12 21:08-21:14/6
14	08:33 09:55-10:27/32 16:40	07:49 09:40-10:38/58 17:36 14:46-15:29/43	06:48 07:25-07:51/26 18:28	06:36 07:49-07:53/4 20:22 18:32-19:20/48	05:36 06:07-06:17/10 21:14 19:28-20:31/63	05:05 05:46-06:10/24 19:38-20:38/60 21:51 06:10-06:21/11 21:08-21:15/7
15	08:32 09:53-10:28/35 16:42	07:47 09:40-10:37/57 17:38 14:47-15:28/41	06:45 07:24-07:51/27 18:30	06:33 18:33-19:18/45 20:24	05:34 06:06-06:19/13 21:15 19:29-20:32/63	05:05 05:46-06:10/24 19:38-20:38/60 21:52 06:10-06:21/11 21:07-21:15/8
16	08:31 09:51-10:30/39 16:43	07:45 09:41-10:36/55 17:40 14:48-15:27/39	06:43 07:19-07:50/31 18:32 17:44-17:53/9	06:31 18:32-19:15/43 20:26	05:33 06:04-06:19/15 21:17 19:28-20:31/63	05:04 05:47-06:11/24 19:39-20:39/60 21:52 06:11-06:21/10 21:06-21:16/10
17	08:31 09:49-10:31/42 16:45	07:43 09:42-10:34/52 17:42 14:50-15:25/35	06:41 07:17-07:50/33 18:33 17:41-17:57/16	06:29 18:32-19:13/41 20:28	05:31 06:04-06:21/17 21:18 19:28-20:31/63	05:04 05:47-06:11/24 19:39-20:39/60 21:53 06:11-06:21/10 21:06-21:16/10
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	Sonnenscheinstunden Anzahl Minuten mit Schatten	256 2096	275 2625	366 1797	416 1737	487 2456

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

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654**SHADOW - Kalender pro WEA****Berechnung: Windenergie Hollenstede 2018-12 WEA: WEA 17-2 - E-138 EP3 E2 TES**
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 12:43-13:44/61 16:23	08:12 09:07-09:39/32 17:12 16:05-16:29/24	07:17 08:26-09:08/42 16:59-17:20/21 18:04 09:08-09:11/3	07:06 08:39-09:16/37 20:00 19:16-19:29/13	05:59 06:48-07:18/30 19:36-20:05/29 20:52 07:18-07:46/28	05:12 06:03-06:10/7 20:18-20:48/30 21:39 06:51-07:14/23
2	08:39 12:44-13:45/61 16:24	08:10 09:06-09:39/33 17:14 16:05-16:31/26	07:15 08:25-09:07/42 17:00-17:19/19 18:06 09:07-09:12/5	07:03 08:40-09:14/34 20:01 19:14-19:31/17	05:57 06:46-07:19/33 19:36-20:04/28 20:54 07:19-07:46/27	05:12 06:01-06:12/11 20:17-20:48/31 21:40 06:52-07:13/21
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28	08:18 09:07-09:35/28 16:10-16:23/13 17:04 13:15-13:26/11	07:20 08:26-09:10/44 16:58-17:20/22 18:03 09:10-09:11/1	07:15 08:38-09:22/44 19:53 18:42-19:06/24	06:05 06:53-07:14/21 19:37-20:05/28 20:47 07:14-07:45/31	05:16 06:47-07:17/30 20:17-20:47/30 21:34 07:17-07:31/14	05:07 05:58-06:25/27 21:03-21:21/18 21:55 20:23-20:52/29
29	08:16 09:08-09:37/29 17:06 16:08-16:25/17		07:13 08:37-09:20/43 18:59-19:01/2 19:54 18:44-18:53/9	06:03 06:51-07:16/25 19:37-20:05/28 20:49 07:16-07:46/30	05:15 06:48-07:16/28 20:17-20:47/30 21:36 07:16-07:29/13	05:07 05:59-06:25/26 21:04-21:21/17 21:55 20:24-20:53/29
30	08:15 09:07-09:37/30 17:08 16:07-16:27/20		07:10 08:38-09:19/41 19:56	06:01 06:49-07:17/28 19:37-20:05/28 20:50 07:17-07:46/29	05:14 06:49-07:15/26 20:17-20:47/30 21:37 07:18-07:27/9	05:08 05:58-06:24/26 21:04-21:21/17 21:54 20:23-20:53/30
31	08:13 09:06-09:38/32 17:10 16:06-16:28/22		07:08 08:39-09:18/39 19:58 19:21-19:25/4		05:13 06:51-07:15/24 21:38 20:17-20:47/30	
Sonnenscheinstunden	256		366		487	
Anzahl Minuten mit Schatten	1738	1832	2277	1493	2381	2167

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

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654**SHADOW - Kalender pro WEA****Berechnung:** Windenergie Hollenstede 2018-12**WEA:** WEA 17-2 - E-138 EP3 E2 TES**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	05:08 05:59-06:25/26 21:04-21:21/17 21:54 20:24-20:54/30	05:45 06:52-07:33/41 05:47 06:52-07:33/41 19:58-20:02/4	06:36 19:07-19:32/25 21:22 07:33-07:55/22	07:26 08:26-09:02/36 18:15-18:36/21 19:08 09:07-09:42/35	07:21 08:13-08:34/21 15:34-16:03/29 17:01 08:39-09:07/28	08:14 12:32-13:29/57 16:19
2	05:09 06:00-06:25/25 21:05-21:22/17 21:54 20:24-20:54/30	05:47 06:52-07:33/41 19:58-20:02/4 21:20 07:33-07:55/22	06:38 19:06-19:32/26 20:17 19:32-19:42/10	07:28 08:27-09:01/34 18:15-18:36/21 19:06 09:06-09:44/38	07:23 08:16-08:32/16 15:33-16:03/30 16:59 08:38-09:08/30	08:15 12:31-13:29/58 16:18
3	05:10 06:00-06:24/24 21:06-21:21/16 21:53 20:24-20:54/30	05:49 06:52-07:33/41 19:55-20:06/11 21:19 07:33-07:55/22	06:40 19:05-19:32/27 20:14 19:32-19:41/9	07:30 08:28-08:58/30 18:15-18:34/19 19:04 09:04-09:44/40	07:25 08:19-08:28/9 15:33-16:03/30 16:57 08:38-09:08/30	08:16 12:32-13:30/58 16:17
4	05:11 06:01-06:24/23 21:06-21:21/15 21:53 20:24-20:54/30	05:50 06:52-07:32/40 19:52-20:08/16 21:17 07:32-07:55/23	06:41 19:04-19:31/27 20:12 19:31-19:39/8	07:32 08:30-08:56/26 18:16-18:33/17 19:01 09:03-09:45/42	07:27 08:37-09:09/32 16:55 15:33-16:03/30	08:18 12:32-13:30/58 16:17
5	05:11 06:02-06:24/22 21:07-21:21/14 21:53 20:24-20:55/31	05:52 06:52-07:33/41 19:51-20:10/19 21:15 07:33-07:56/23	06:43 19:04-19:31/27 20:10 19:31-19:37/6	07:33 08:32-08:53/21 18:17-18:32/15 18:59 09:02-09:45/43	07:29 08:37-09:09/32 16:53 15:33-16:03/30	08:19 12:32-13:32/60 16:16
6	05:13 06:03-06:24/24 20:25-20:55/30 21:06 07:17-17:26 21:07-21:11/8	05:53 06:52-07:33/40 19:49-20:10/21 21:13 07:32-07:55/23	06:45 19:04-19:32/27 20:07 19:31-19:35/4	07:35 08:36-08:49/13 18:19-18:30/11 18:57 09:02-09:46/44	07:31 08:37-09:10/33 16:52 15:34-16:03/29	08:22 12:32-13:32/60 16:16
7	05:13 06:04-06:24/20 20:24-20:55/31 21:51 05:07-07:15/10 21:07-21:11/2	05:55 06:53-07:32/39 19:49-20:11/22 21:11 07:32-07:56/24	06:46 08:44-08:58/14 20:05 19:04-19:29/25	07:37 09:00-09:45/45 18:54 18:21-18:26/5	07:32 08:37-09:10/33 16:50 15:34-16:03/29	08:22 12:33-13:33/60 16:15
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10	05:16 06:06-06:22/15 20:25-20:55/30 21:49 07:01-07:18/17 21:11-21:17/6	06:00 06:54-07:29/35 19:46-20:12/26 21:06 07:29-07:55/26	06:51 08:35-09-05/26 19:58 19:05-19-26/21	07:42 08:59-09:35/36 17:38-17:49/11 18:47 09:35-09:46/11	07:38 08:37-09:10/33 16:45 15:36-16:01/25	08:26 12:34-13:35/61 16:14
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19	05:27 06:55-07:28/33 20:27-20:55/28 21:41 07:28-07:44/16	06:15 07:12-07:49/37 20:48 19:45-20:10/25	07:06 08:25-09-12/46 19:37 18:26-18:58/32	07:58 09:01-09-42/41 18:27 17:30-17:52/22	07:54 08:44-09-05/21 16:31 12:36-13:15/39	08:34 12:37-13:39/62 16:14
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Sonnensteinstunden Anzahl Minuten mit Schatten		456	382	1878	2084	1875

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
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0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654**SHADOW - Kalender pro WEA****Berechnung:** Windenergie Hollenstede 2018-12**WEA:** WEA 17-3 - E-138 EP3 E2 TES**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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	08:39 11:00-11:24/24 16:23 14:11-14:39/28	08:12 08:56-09:18/22 17:12 15:43-16:09/26	07:17 08:03-08:31/28 18:04 16:29-16:58/29	07:06 07:45-08:12/27 18:14 18:52-18:58/30	05:59 06:41-07:11/30 18:46 19:08-19:08/22	05:12 19:33-20:24/51 21:39
2	08:39 11:02-11:23/21 16:24 14:12-14:39/27	08:10 08:56-09:18/22 17:13 15:44-16:10/26	07:15 08:03-08:31/28 18:06 16:30-17:00/30	07:03 07:45-08:12/27 18:15 18:51-18:51/36	05:57 06:40-07:11/31 18:49 19:05/16	05:12 19:33-20:24/51 21:40
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Sonnensteinschneider Anzahl Minuten mit Schatten		1275	1684	1997	2395	1789
		1020	1684	1997	2395	1619

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654**SHADOW - Kalender pro WEA****Berechnung:** Windenergie Hollenstede 2018-12**WEA:** WEA 17-3 - E-138 EP3 E2 TES
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	05:08 19:38-20:31/53 21:54	05:45 06:53-07:17/24 19:58-20:22/24 21:22 07:17-07:32/15	06:36 18:39-19:27/48 20:19	07:26 17:49-18:21/32 19:08	07:21 08:02-08:28/26 17:01	08:14 14:05-14:19/14 16:19
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31	05:44 06:53-07:16/23 19:55-20:19/24 21:24	06:35 18:38-19:26/48 20:21	07:24 17:48-18:23/35 19:11	08:16 08:01-08:29/28 17:05 16:14-16:30/16	08:16 15:27-15:37/10 16:19	08:47 10:59-11:26/21 16:20
Sonnensendstunden Anzahl Minuten mit Schatten	1505	1539	1505	1539	1505	1539
	2313	2313	2382	2283	2603	2502

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbH

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654Schattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

SHADOW - Kalender pro WEA

Berechnung: Windenergie Hollenstede 2018-12**WEA:** WEA 18-1 - E-138 EP3 E2 TES

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38 10:20-10:52/32 16:23	08:11 17:11	07:17 07:55-08:34/39 16:51-17:19/28 18:04 08:33-08:50/17	07:05 07:58-08:36/38 20:00	05:59 07:26-07:38/12 20:52	05:12 06:21-06:35/14 21:39 20:34-20:57/23
2	08:38 10:20-10:53/33 16:24	08:10 08:42-08:52/10 17:13	07:15 07:55-08:34/39 16:52-17:25/33 18:06 08:33-08:52/19	07:03 07:58-08:36/38 20:01	05:57 20:53	05:11 06:22-06:33/11 21:40 20:33-20:57/24
3	08:38 10:20-10:52/32 16:25	08:08 08:40-08:54/14 17:15	07:13 07:53-08:34/41 16:51-17:28/37 18:08 08:33-08:52/19	07:01 07:58-08:36/38 20:03	05:55 20:55	05:11 06:23-06:32/9 21:41 20:32-20:58/26
4	08:38 10:21-10:53/32 16:26	08:07 08:38-08:55/17 17:17	07:11 07:52-08:34/42 16:52-17:30/38 18:10 08:33-08:53/20	06:58 07:57-08:35/38 20:05	05:53 20:57	05:10 06:25-06:31/6 21:42 20:32-20:58/26
5	08:38 10:22-10:54/32 16:28	08:05 08:37-08:56/19 17:19	07:08 07:51-08:34/43 16:53-17:32/39 18:12 08:33-08:53/20	06:56 07:57-08:35/38 20:07	05:52 20:59	05:09 20:32-20:59/27 21:43
6	08:37 10:23-10:53/30 16:29	08:03 08:37-08:56/19 17:21	07:06 07:50-08:34/44 16:53-17:33/40 18:13 08:33-08:54/21	06:54 07:58-08:34/36 20:08	05:50 21:00	05:08 20:32-20:59/27 21:44
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25	08:21 16:59	07:26 07:58-08:30/32 16:53-17:19/26 17:57 08:29-08:43/14	07:22 08:07-08:21/14 19:47 08:21-08:33/12	06:12 07:19-07:49/30 20:41	05:20 06:15-06:38/23 21:30	05:05 05:48-06:04/16 20:34-21:06/32 21:55 06:04-06:05/1
26	08:20 17:00	07:24 07:57-08:32/35 16:52-17:20/28 17:59 08:31-08:46/15	07:20 08:04-08:17/13 19:49 08:17-08:34/17	06:09 07:19-07:48/29 20:43	05:19 06:16-06:37/21 21:31	05:06 05:48-06:04/16 20:34-21:06/32 21:55 06:04-06:05/1
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31	08:13 17:10		07:08 08:00-08:37/37 19:58		05:13 06:19-06:34/15 21:38	
Sonnenscheinstunden	256	275	366	416	487	502
Anzahl Minuten mit Schatten	464	816	2456	1123	636	1274

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:** Windenergie Hollenstede 2018-12**WEA:** WEA 18-1 - E-138 EP3 E2 TES**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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

	Jul	August	September	Oktober	November	Dezember	
1	05:08 05:51-06:03/12 20:36-21:07/31 21:54 06:03-06:04/1	05:45 06:25-06:48/23 21:22	06:36 07:22-07:51/29 20:19 08:01-08:26/25	07:26 08:27-09:02/35 17:40-18:15/35 19:08 09:02-09:32/30	07:21 08:06-08:28/22 17:01	08:13 10:10-10:35/25 16:19	
2	05:09 05:52-06:03/11 20:35-21:06/31 21:54 06:03-06:04/1	05:47 06:25-06:47/22 21:20	06:38 07:22-07:49/27 20:17 07:58-08:27/29	07:28 08:26-09:03/37 17:39-18:14/35 19:06 09:03-09:31/28	07:23 08:06-08:28/22 16:59	08:15 10:09-10:36/27 16:18	
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4	05:10 05:54-06:00/6 20:37-21:07/30 21:53 06:00-06:02/2	05:50 06:27-06:46/19 21:17	06:41 07:25-07:44/19 20:12 07:55-08:28/33	07:31 08:25-09:07/42 17:39-18:13/34 19:01 09:07-09:31/24	07:27 08:06-08:28/22 16:55	08:18 10:09-10:37/28 16:17	
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25	05:35 06:24-06:49/25 21:33	06:25 07:21-07:56/35 20:35	07:16 07:50-08:10/20 08:53-09:29/36 19:22 08:38-08:51/13 17:46-18:13/27	08:08 09:16-09:18/2 18:15	08:04 10:15-10:24/9 16:24	08:37 10:16-10:50/34 16:17	
26	05:36 06:23-06:49/26 21:31	06:26 07:20-07:55/35 20:32	07:18 07:49-08:08/19 17:44-18:14/30 19:20 08:34-09:29/55	08:10 09:12-09:23/11 18:12	08:06 10:13-10:27/14 16:23	08:38 10:16-10:50/34 16:18	
27	05:38 06:24-06:50/26 21:30	06:28 07:21-07:55/34 20:30	07:20 07:50-08:08/18 17:43-18:14/31 19:18 08:33-09:30/57	08:12 09:10-09:25/15 18:10	08:07 10:12-10:29/17 16:22	08:38 10:17-10:50/33 16:18	
28	05:39 06:24-06:49/25 21:28	06:30 07:20-07:54/34 20:28	07:21 07:50-08:07/17 17:43-18:15/32 19:15 08:31-09:31/60	07:14 08:08-08:26/18 17:08	08:09 10:12-10:31/19 16:21	08:38 10:17-10:51/34 16:19	
29	05:41 06:24-06:49/25 21:27	06:31 07:21-07:54/33 20:26 08:09-08:19/10	07:23 07:51-08:05/14 17:41-18:14/33 19:13 08:29-09:31/62	07:16 08:07-08:27/20 17:06	08:10 10:10-10:32/22 16:20	08:38 10:18-10:51/33 16:20	
30	05:42 06:24-06:49/25 21:25	06:33 07:20-07:52/32 20:23 08:04-08:22/18	07:25 07:53-08:02/9 08:57-09:31/34 19:11 08:28-08:57/29 17:41-18:15/34	07:18 08:07-08:27/20 17:04	08:12 10:10-10:34/24 16:19	08:38 10:18-10:51/33 16:21	
31	05:44 06:24-06:48/24 21:23	06:35 07:21-07:52/31 20:21 08:02-08:24/22		07:19 08:06-08:28/22 17:03		08:38 10:19-10:52/33 16:22	
	Sonnenscheinstunden Anzahl Minuten mit Schatten	505 950	456 742	382 1685	332 1977	265 290	241 996

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: Windenergie Hollenstede 2018-12 WEA: WEA 18-2 - E-138 EP3 E2 TES

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38 09:37-10:04/27	08:11 15:59-16:24/25		07:17 07:51-08:24/33	15:54-16:36/42	07:05 07:43-08:08/25	05:59 06:43-07:01/18	05:12 06:16-06:29/13			
	16:23	17:11		18:04 08:23-08:34/11		20:00	20:52	21:39			
2	08:38 09:38-10:05/27	08:10 15:59-16:26/27		07:15 07:50-08:24/34	15:55-16:36/41	07:03 07:42-08:08/26	05:57 06:44-07:00/16	05:11 06:17-06:28/11			
	16:24	17:13		18:06 08:23-08:34/11		20:01	20:53	21:40			
3	08:38 09:38-10:05/27	08:08 15:58-16:27/29		07:13 07:49-08:22/33	15:56-16:34/38	07:01 07:42-08:08/26	05:55 06:45-06:58/13	05:11 06:18-06:27/9			
	16:25	17:15		18:08 08:21-08:33/12		20:03	20:55	21:41			
4	08:38 09:38-10:06/28	08:07 15:57-16:27/30		07:11 07:48-08:22/34	15:57-16:33/36	06:58 07:41-08:07/26	05:53 06:48-06:57/9	05:10 06:20-06:26/6			
	16:26	17:17		18:10 08:21-08:33/12		20:05	20:57	21:42			
5	08:38 09:39-10:07/28	08:05 15:56-16:28/32		07:08 07:48-08:21/33	15:58-16:32/34	06:56 07:42-08:07/25	05:52	05:09			
	16:28	17:19		18:12 08:21-08:33/12		20:07	20:59	21:43			
6	08:37 09:39-10:07/28	08:03 15:55-16:28/33		07:06 07:49-08:20/31	15:59-16:29/30	06:54 07:42-08:06/24	05:50 06:21-06:31/10	05:08			
	16:29	17:21		18:13 08:20-08:33/13		20:08	21:00	21:44			
7	08:37 09:40-10:08/28	08:01 15:55-16:29/34		07:04 07:48-08:16/28	16:02-16:28/26	06:51 07:42-08:04/22	05:48 06:19-06:33/14	05:08			
	16:30	17:23		18:15 08:16-08:32/16		20:10	21:02	21:45			
8	08:37 09:40-10:08/28	08:00 15:55-16:29/34		07:01 07:49-08:14/25	16:05-16:25/20	06:49 07:43-08:03/20	05:46 06:18-06:35/17	05:07			
	16:31	17:25		18:17 08:14-08:31/17		20:12	21:04	21:46			
9	08:36 09:40-10:08/28	07:58 15:55-16:30/35		06:59 07:50-08:30/40		06:47 07:45-08:02/17	05:44 06:16-06:35/19	05:07			
	16:33	17:27		18:19 16:08-16:20/12		20:13	21:05	21:47			
10	08:36 09:42-10:09/27	07:56 15:55-16:30/35		06:57 07:50-08:28/38		06:45 07:47-07:59/12	05:42 06:14-06:36/22	05:06			
	16:34	17:29		18:21		20:15	21:07	21:48			
11	08:35 09:42-10:09/27	07:54 15:55-16:31/36		06:55 07:52-08:27/35		06:42 07:50-07:54/4	05:41 06:13-06:37/24	05:06			
	16:36	17:30 16:31-16:32/1		18:22		20:17	21:09	21:49			
12	08:34 09:42-10:09/27	07:52 15:56-16:31/35		06:52 07:54-08:04/10		06:40	05:39 06:11-06:37/26	05:05			
	16:37	17:32 16:31-16:34/3		18:24 08:06-08:24/18		20:19	21:10	21:49			
13	08:34 09:43-10:09/26	07:50 15:56-16:31/35		06:50 07:26-07:33/7		06:38	05:37 06:11-06:38/27	05:05			
	16:39	17:34 16:31-16:35/4		18:26 08:09-08:21/12		20:20	21:12	21:50			
14	08:33 09:43-10:09/26	07:48 15:56-16:31/35		06:48 07:22-07:37/15		06:35	05:36 06:10-06:37/27	05:05			
	16:40	17:36 16:31-16:36/5		18:28		20:22	21:13	21:51			
15	08:32 09:44-10:09/25	07:47 15:57-16:31/34		06:45 07:19-07:38/19		06:33	05:34 06:10-06:38/28	05:05			
	16:42	17:38 16:31-16:37/6		18:30		20:24	21:15	21:51			
16	08:31 09:45-10:09/24	07:45 15:55-16:29/34		06:43 07:18-07:39/21		06:31	05:32 06:09-06:37/28	05:04			
	16:43	17:40 16:29-16:37/8		18:31		20:26	21:17	21:52			
17	08:30 09:46-10:09/23	07:43 15:55-16:28/33		06:41 07:17-07:41/24		06:29	05:31 06:09-06:38/29	05:04			
	16:45	17:42 16:28-16:37/9		18:33		20:27	21:18	21:52			
18	08:29 09:47-10:09/22	07:41 15:54-16:28/34		06:38 07:15-07:40/25		06:27	05:29 06:09-06:37/28	05:04			
	16:47	17:44 16:28-16:38/10		18:35		20:29	21:20	21:53			
19	08:28 09:48-10:08/20	07:39 15:54-16:26/32		06:36 07:15-07:41/26		06:24	05:28 06:09-06:37/28	05:04			
	16:48	17:46 16:26-16:38/12		18:37		20:31	21:21	21:53			
20	08:27 09:48-10:07/19	07:36 08:09-08:18/9	16:25-16:39/14	06:34 07:14-07:42/28		06:22 06:50-06:59/9	05:26 06:09-06:37/28	05:04			
	16:50	17:47 15:54-16:25/31		18:38		20:33	21:23	21:54			
21	08:26 09:50-10:06/16	07:34 08:03-08:05/2	08:15-08:21/6	06:31 07:13-07:41/28		06:20 06:47-07:01/14	05:25 06:10-06:37/27	05:04			
	16:52	17:49 08:07-08:15/8	15:53-16:39/46	18:40		20:34	21:24	21:54			
22	08:25 09:52-10:05/13	07:32 07:59-08:19/20	15:53-16:39/46	06:29 07:13-07:41/28		06:18 06:46-07:02/16	05:24 06:09-06:36/27	05:05			
	16:53	17:51 08:18-08:25/7		18:42		20:36	21:26	21:54			
23	08:24 09:54-10:03/9	07:30 07:57-08:21/24	15:52-16:39/47	06:27 07:13-07:40/27		06:16 06:45-07:03/18	05:22 06:10-06:35/25	05:05			
	16:55	17:53 08:20-08:27/7		18:44		20:38	21:27	21:54			
24	08:23	07:28 07:55-08:22/27	15:53-16:39/46	06:24 07:13-07:39/26		06:14 06:44-07:04/20	05:21 06:10-06:35/25	05:05			
	16:57	17:55 08:21-08:29/8		18:46		20:40	21:29	21:54			
25	08:21	07:26 07:55-08:23/28	15:53-16:39/46	07:22 08:14-08:39/25		06:12 06:44-07:04/20	05:20 06:10-06:34/24	05:05			
	16:59	17:57 08:22-08:31/9		19:47		20:41	21:30	21:55			
26	08:20	07:24 07:54-08:24/30	15:53-16:38/45	07:20 07:52-08:03/11		06:09 06:43-07:04/21	05:19 06:11-06:34/23	05:06			
	17:00	17:59 08:23-08:32/9		19:49 08:14-08:37/23		20:43	21:31	21:55			
27	08:19	07:22 07:54-08:24/30	15:53-16:37/44	07:17 07:49-08:05/16		06:07 06:43-07:04/21	05:17 06:12-06:33/21	05:06			
	17:02	18:01 08:23-08:33/10		19:51 08:15-08:36/21		20:45	21:33	21:55			
28	08:17 16:06-16:16/10	07:19 07:52-08:23/31	15:54-16:37/43	07:15 07:48-08:07/19		06:05 06:43-07:03/20	05:16 06:12-06:32/20	05:07			
	17:04	18:02 08:22-08:33/11		19:53 08:16-08:34/18		20:47	21:34	21:54			
29	08:16 16:03-16:18/15			07:12 07:45-08:07/22		06:03 06:43-07:03/20	05:15 06:13-06:30/17	05:07			
	17:06			19:54 08:17-08:31/14		20:48	21:35	21:54			
30	08:14 16:02-16:21/19			07:10 07:45-08:08/23		06:01 06:43-07:02/19	05:14 06:13-06:30/17	05:08			
	17:08			19:56 08:22-08:26/4		20:50	21:37 06:29-06:30/1	21:54			
31	08:13 16:00-16:23/23			07:08 07:44-08:09/25			05:13 06:14-06:29/15				
	17:10			19:58			21:38				
Sonnenscheinstunden		256		366		416	487	502			
Anzahl Minuten mit Schatten		620	1358	1278		425	653	39			

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: Windenergie Hollenstede 2018-12 WEA: WEA 18-2 - E-138 EP3 E2 TES

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

	Jul	August	September	Oktober	November	Dezember
1	05:08 21:54	05:45 06:22-06:48/26 21:22	06:36 20:19	07:26 08:04-08:15/11 19:08 08:51-08:59/8	07:21 15:24-16:00/36 17:01	08:13 09:24-09:51/27 16:19
2	05:09 21:54	05:47 06:22-06:47/25 21:20	06:38 07:48-07:53/5 20:16	07:28 08:34-08:40/6 19:06 08:46-09:02/16	07:23 15:24-15:59/35 16:59	08:15 09:24-09:51/27 16:18
3	05:10 21:53	05:48 06:24-06:47/23 21:18	06:40 07:45-07:57/12 20:14	07:30 08:30-09:04/34 19:03	07:25 15:24-15:59/35 16:57	08:16 09:25-09:52/27 16:17
4	05:10 21:53	05:50 06:25-06:46/21 21:17	06:41 07:42-07:59/17 20:12	07:31 08:28-09:06/38 19:01	07:27 15:24-15:59/35 16:55	08:18 09:24-09:52/28 16:17
5	05:11 21:52	05:52 06:27-06:45/18 21:15	06:43 07:40-08:00/20 20:10	07:33 08:27-09:07/40 18:59 16:49-16:55/6	07:29 15:25-15:58/33 16:53	08:19 09:25-09:53/28 16:16
6	05:12 21:52	05:53 06:28-06:44/16 21:13	06:44 07:39-08:01/22 20:07	07:35 08:25-08:47/22 16:42-17:00/18 18:56 08:47-09:07/20	07:30 15:25-15:58/33 16:51	08:20 09:25-09:53/28 16:16
7	05:13 21:51	05:55 06:30-06:42/12 21:11	06:46 07:37-08:01/24 20:05	07:37 08:24-08:51/27 16:39-17:02/23 18:54 08:51-09:07/16	07:32 15:26-15:57/31 16:50	08:22 09:25-09:53/28 16:15
8	05:14 21:51	05:56 06:32-06:38/6 21:09	06:48 07:37-08:02/25 20:03	07:38 08:24-08:53/29 16:36-17:05/29 18:52 08:53-09:08/15	07:34 15:27-15:57/30 16:48	08:23 09:26-09:54/28 16:15
9	05:15 06:27-06:31/4 21:50	05:58 06:59-07:04/5 21:07	06:49 07:36-08:01/25 20:00	07:40 08:24-08:56/32 16:34-17:06/32 18:50 08:56-09:08/12	07:36 15:27-15:56/29 16:46	08:24 09:26-09:54/28 16:14
10	05:16 06:26-06:33/7 21:49	06:00 06:55-07:06/11 21:06	06:51 07:35-08:01/26 19:58	07:42 08:23-08:57/34 16:33-17:07/34 18:47 08:57-09:08/11	07:38 15:28-15:55/27 16:45	08:25 09:27-09:54/27 16:14
11	05:17 06:24-06:35/11 21:48	06:01 06:54-07:08/14 21:04	06:53 07:36-08:01/25 19:56	07:44 08:23-08:56/33 16:30-17:07/37 18:45 08:55-09:07/12	07:40 15:30-15:54/24 16:43	08:27 09:27-09:54/27 16:14
12	05:18 06:24-06:36/12 21:48	06:03 06:52-07:09/17 21:02	06:54 07:35-08:00/25 19:53	07:45 08:23-08:57/34 16:29-17:08/39 18:43 08:56-09:07/11	07:41 15:31-15:53/22 16:41	08:28 09:28-09:56/28 16:14
13	05:19 06:23-06:37/14 21:47	06:05 06:52-07:10/18 21:00	06:56 07:35-08:00/25 19:51	07:47 08:24-08:57/34 16:28-17:09/41 18:41 08:56-09:07/11	07:43 15:33-15:52/19 16:40	08:29 09:29-09:56/27 16:14
14	05:20 06:22-06:37/15 21:46	06:06 06:50-07:10/20 20:58	06:58 07:35-07:58/23 19:48	07:49 08:24-08:57/33 16:27-17:10/43 18:38 08:56-09:06/10	07:45 15:35-15:50/15 16:38	08:30 09:29-09:56/27 16:14
15	05:21 06:21-06:38/17 21:45	06:08 06:50-07:10/20 20:56	06:59 07:36-07:58/22 19:46	07:51 08:25-08:57/32 16:27-17:10/43 18:36 08:56-09:06/10	07:47 15:38-15:47/9 16:37	08:31 09:30-09:57/27 16:14
16	05:23 06:22-06:41/19 21:44	06:10 06:49-07:10/21 20:54	07:01 07:37-07:56/19 19:44	07:52 08:26-08:56/30 16:26-17:10/44 18:34 08:55-09:05/10	07:49 15:39-15:48/9 16:35	08:32 09:30-09:57/27 16:14
17	05:24 06:21-06:42/21 21:43	06:11 06:49-07:10/21 20:52	07:03 07:37-07:54/17 19:41	07:54 08:27-08:55/28 16:24-17:10/46 18:32 08:54-09:03/9	07:50 15:40-15:49/9 16:34	08:32 09:30-09:57/27 16:14
18	05:25 06:21-06:43/22 21:42	06:13 06:50-07:10/20 20:50	07:04 07:40-07:51/11 19:39	07:56 08:26-08:54/28 16:24-17:10/46 18:29 08:53-09:02/9	07:52 15:41-15:50/9 16:32	08:33 09:31-09:57/26 16:14
19	05:26 06:20-06:44/24 21:40	06:15 06:49-07:09/20 20:47	07:06 08:01-08:26/25 19:37	07:58 08:27-08:53/26 16:24-17:10/46 18:27 08:52-09:00/8	07:54 15:42-15:51/9 16:31	08:34 09:32-09:58/26 16:14
20	05:28 06:20-06:44/24 21:39	06:16 06:50-07:09/19 20:45	07:08 08:00-08:26/26 19:34	07:59 08:28-08:51/23 16:24-17:10/46 18:25 08:50-08:58/8	07:56 09:29-09:38/9 16:30	08:35 09:31-09:58/27 16:15
21	05:29 06:20-06:46/26 21:38	06:18 06:50-07:08/18 20:43	07:09 07:59-08:26/27 19:32	08:01 08:30-08:49/19 16:24-17:10/46 18:23 08:48-08:54/6	07:57 09:27-09:40/13 16:29	08:35 09:32-09:59/27 16:15
22	05:31 06:20-06:46/26 21:37	06:20 06:51-07:07/16 20:41	07:11 07:59-08:26/27 19:29	08:03 08:38-08:50/12 16:54-17:09/15 18:21 16:24-16:54/30	07:59 09:26-09:42/16 16:27	08:36 09:33-10:00/27 16:15
23	05:32 06:19-06:46/27 21:35	06:21 06:51-07:05/14 20:39	07:13 07:58-08:25/27 19:27	08:05 08:41-08:47/6 16:56-17:09/13 18:19 16:24-16:56/32	08:01 09:25-09:44/19 16:26	08:36 09:33-10:00/27 16:16
24	05:33 06:20-06:48/28 21:34	06:23 06:54-07:03/9 20:37	07:14 07:58-08:25/27 19:25	08:07 16:24-16:57/33 18:17 16:57-17:09/12	08:02 09:25-09:45/20 16:25	08:37 09:33-10:00/27 16:16
25	05:35 06:20-06:48/28 21:33	06:25 06:54-07:03/9 20:34	07:16 07:58-08:25/27 19:22	08:08 16:25-16:58/33 18:15 16:58-17:08/10	08:04 09:24-09:46/22 16:24	08:37 09:35-10:01/26 16:17
26	05:36 06:19-06:48/29 21:31	06:26 06:54-07:03/9 20:32	07:18 07:58-08:23/25 19:20	08:10 16:25-16:59/34 18:12 16:59-17:08/9	08:06 09:24-09:47/23 16:23	08:37 09:35-10:01/26 16:18
27	05:38 06:20-06:48/28 21:30	06:28 06:54-07:03/9 20:30	07:20 07:58-08:23/25 19:18	08:12 16:26-17:00/34 18:10 17:00-17:07/7	08:07 09:24-09:48/24 16:22	08:38 09:35-10:02/27 16:18
28	05:39 06:20-06:48/28 21:28	06:30 06:54-07:03/9 20:28	07:21 07:59-08:22/23 19:15	07:14 15:26-16:00/34 17:08 16:00-16:06/6	08:09 09:24-09:49/25 16:21	08:38 09:35-10:02/27 16:19
29	05:41 06:20-06:48/28 21:27	06:31 06:54-07:03/9 20:26	07:23 07:59-08:19/20 19:13	07:16 15:26-16:01/35 17:06 16:01-16:05/4	08:10 09:23-09:49/26 16:20	08:38 09:36-10:03/27 16:20
30	05:42 06:21-06:48/27 21:25	06:33 06:54-07:03/9 20:23	07:25 08:01-08:17/16 19:11	07:18 15:24-16:00/36 17:04 16:00-16:03/3	08:12 09:24-09:50/26 16:19	08:38 09:36-10:03/27 16:21
31	05:44 06:21-06:48/27 21:23	06:35 06:54-07:03/9 20:21	07:26 08:01-08:17/16 19:11	07:19 15:24-16:00/36 17:03 16:00-16:02/2	08:13 09:24-09:51/27 16:18	08:38 09:37-10:04/27 16:22
Sonnenscheinstunden	505	456	382	332	265	241
Anzahl Minuten mit Schatten	493	413	712	1840	636	840

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

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbH

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654Schattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

SHADOW - Kalender pro WEA

Berechnung: Windenergie Hollenstede 2018-12 WEA: WEA 18-3 - E-138 EP3 E2 TES

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38 09:23-09:41/18 10:33-10:36/3 16:23 09:50-10:33/43 11:00-11:40/40	08:11 09:44-10:30/46 17:12	07:17 08:50-09:35/45 18:04	07:05 19:13-19:30/17 20:00	05:59 20:52	05:12 06:29-07:31/62 21:39 20:13-20:47/34
2	08:38 09:23-09:42/19 10:34-10:36/2 16:24 09:51-10:34/43 11:01-11:41/40	08:10 09:45-10:31/46 17:13	07:15 08:51-09:34/43 18:06	07:03 19:12-19:32/20 20:01	05:57 20:53	05:12 06:29-07:30/61 20:13-20:47/34 21:40
3	08:38 09:22-09:42/20 10:33-10:36/3 16:25 09:51-10:33/42 11:01-11:40/39	08:08 09:45-10:30/45 17:15	07:13 08:51-09:32/41 18:08	07:01 19:11-19:33/22 20:03	05:55 07:01-07:08/7 20:55	05:11 06:29-07:30/61 21:41 20:13-20:47/34
4	08:38 09:23-09:44/21 10:34-10:37/3 16:27 09:51-10:34/43 11:02-11:41/39	08:07 09:45-10:30/45 17:17	07:11 08:52-09:31/39 18:10	06:58 07:47-07:54/7 20:05 19:09-19:33/24	05:53 06:57-07:10/13 20:57 07:10-07:14/4	05:10 06:29-07:31/62 21:42 20:12-20:47/35
5	08:38 09:23-09:45/22 10:35-10:37/2 16:28 09:52-10:35/43 11:03-11:42/39	08:05 09:45-10:30/45 17:19 16:42-16:48/6	07:08 08:53-09:30/37 18:12	06:56 07:42-07:59/17 20:07 19:09-19:34/25	05:52 06:54-07:14/20 20:59 07:14-07:16/2	05:09 06:29-07:31/62 21:43 20:13-20:48/35
6	08:37 09:23-09:45/22 10:35-10:37/2 16:29 09:51-10:35/44 11:03-11:41/38	08:03 09:46-10:29/43 17:21 16:39-16:51/12	07:06 08:55-09:29/34 18:13	06:54 07:40-08:01/21 20:08 19:08-19:34/26	05:50 06:51-07:16/25 21:00 07:16-07:18/2	05:08 06:29-07:30/61 21:44 20:12-20:48/36
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11	08:35 09:24-09:49/25 10:36-10:38/2 16:36 09:48-10:36/48 11:07-11:42/35	07:54 08:28-08:47/19 09:50-10:26/36 17:30 08:59-09:31/32 16:35-16:57/22	06:55 18:22	06:42 07:31-08:06/35 20:17 19:08-19:31/23	05:41 06:43-07:23/40 21:09 07:23-07:25/2	05:06 06:30-07:31/61 21:49 20:13-20:50/37
12	08:34 09:24-09:49/25 10:36-10:38/2 16:37 09:47-10:36/49 11:08-11:41/33	07:52 08:27-08:48/21 09:51-10:25/34 17:32 08:57-09:32/35 16:35-16:57/22	06:52 18:24	06:40 07:30-08:06/36 20:19 19:09-19:30/21	05:39 06:41-07:24/43 21:10 07:24-07:25/1	05:05 06:30-07:31/61 21:49 20:13-20:50/37
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21	08:26 09:27-09:52/25 16:52 09:44-10:32/48	07:34 08:28-08:46/18 17:49 08:50-09:38/48	06:31 18:40	06:20 07:28-08:04/36 20:34	05:25 06:32-07:29/57 21:24 20:20-20:37/17	05:04 06:32-07:33/61 21:54 20:15-20:53/38
22	08:25 09:28-09:52/24 16:53 09:44-10:31/47	07:32 08:30-08:45/15 17:51 08:50-09:38/48	06:29 18:42	06:18 07:28-08:04/36 20:36	05:24 06:30-07:28/58 20:18-20:38/20 21:26 07:28-07:29/1	05:05 06:32-07:33/61 21:54 20:15-20:53/38
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24	08:23 09:29-09:52/23 10:28-10:29/1 16:57 09:44-10:28/44	07:28 08:49-09:37/48 17:55	06:24 18:46	06:14 07:29-08:02/33 20:40	05:21 06:30-07:29/59 20:16-20:41/25 21:29 07:29-07:30/1	05:05 06:33-07:34/61 21:54 20:15-20:53/38
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26	08:20 09:31-09:51/20 17:00 09:51-10:28/37	07:24 08:50-09:37/47 17:59	07:20 19:49	06:09 07:31-07:59/28 20:43	05:19 06:29-07:30/61 21:31 20:15-20:43/28	05:06 06:33-07:33/60 21:55 20:16-20:53/37
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29	08:16 09:36-09:47/11 17:06 09:47-10:29/42	 17:08	07:13 19:54	06:03 07:35-07:54/19 20:48	05:15 06:29-07:30/61 21:35 20:14-20:45/31	05:07 06:34-07:35/61 21:54 20:17-20:54/37
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31	08:13 09:44-10:30/46 17:10	 17:10	07:08 19:15-19:28/13 19:58	 20:50	05:13 06:28-07:30/62 21:38 20:13-20:46/33	 502
Sonnenscheinstunden	256		366	416	487	
Anzahl Minuten mit Schatten	2671	2069	351	1143	1692	2936

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

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654**SHADOW - Kalender pro WEA****Berechnung:** Windenergie Hollenstede 2018-12**WEA:** WEA 18-3 - E-138 EP3 E2 TES**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	05:08 06:34-07:35/61 21:54 20:17-20:54/37	05:45 06:50-07:35/45 21:22 07:35-07:36/1	06:36 07:30-08:06/36 20:19 19:09-19:30/21	07:26 19:08	07:21 07:58-08:17/19 17:01 08:28-09:00/32	08:13 09:06-09:31/25 16:19 09:29-10:18/49
2	05:09 06:35-07:36/61 21:54 20:18-20:55/37	05:47 06:52-07:34/42 21:20 07:34-07:35/1	06:38 07:30-08:05/35 20:17 19:07-19:30/23	07:28 19:04	07:23 07:59-08:16/17 16:59 08:30-08:58/28	08:15 09:06-09:31/25 16:18 09:30-10:18/48
3	05:10 06:34-07:35/61 21:53 07:35-07:36/1	05:48 06:54-07:33/39 21:18 07:33-07:35/2	06:40 07:31-08:04/33 20:14 19:06-19:30/24	07:30 19:04	07:25 08:01-08:14/13 16:57 08:32-08:56/24	08:16 09:07-09:31/24 16:17 09:32-10:20/48
4	05:11 06:35-07:36/61 21:53 20:18-20:55/37	05:50 06:55-07:32/37 21:17 07:32-07:33/1	06:41 07:31-08:02/31 20:12 19:05-19:30/25	07:31 19:01	07:27 08:03-08:12/9 16:55 08:35-08:54/19	08:18 09:07-09:31/24 16:17 09:33-10:20/47
5	05:11 06:35-07:36/61 21:52 20:19-20:55/36	05:52 06:57-07:31/34 21:15 07:31-07:32/1	06:43 07:32-08:01/29 20:10 19:04-19:30/26	07:33 18:59	07:29 08:38-08:50/12 16:53 09:17-09:59/42	08:19 09:08-09:32/24 16:16 09:35-10:21/46
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11	05:17 06:36-07:38/62 21:48 20:20-20:55/35	06:01 21:04	06:53 19:04-19:24/20 19:56	07:44 18:45	07:40 09:16-10:02/46 16:43	08:27 09:13-09:32/19 16:14 09:40-10:23/43
12	05:18 06:37-07:38/61 21:48 20:21-20:54/33	06:03 21:02	06:55 19:05-19:23/18 19:53	07:45 18:43	07:41 09:16-10:02/46 16:41	08:28 09:14-09:32/18 16:14 09:41-10:24/43
13	05:19 06:37-07:38/61 21:47 20:21-20:54/33	06:05 07:48-07:56/8 21:00	06:56 19:07-19:21/14 19:51	07:47 18:41	07:43 09:16-10:02/46 16:40	08:29 09:14-09:32/18 16:14 09:42-10:25/43
14	05:20 06:37-07:38/61 21:46 20:21-20:54/33	06:06 07:44-07:59/15 20:58	06:58 19:09-19:17/8 19:49	07:49 18:38	07:45 09:09-09:20/11 16:38 09:20-10:01/41	08:30 09:15-09:33/18 16:14 09:42-10:25/43
15	05:22 06:37-07:38/61 21:45 07:38-07:39/1	06:08 07:42-08:02/20 20:56	07:00 19:46	07:51 18:36	07:47 09:07-09:22/15 16:37 09:22-10:01/39	08:31 09:16-09:33/17 16:14 09:43-10:25/42
16	05:23 06:38-07:39/61 21:44 07:39-07:40/1	06:10 07:39-08:03/24 20:54	07:01 19:44	07:52 18:34	07:49 09:05-09:23/18 16:35 09:23-10:01/38	08:32 09:17-09:33/16 16:14 09:44-10:26/42
17	05:24 06:39-07:39/60 21:43 07:39-07:40/1	06:11 07:38-08:05/27 20:52	07:03 19:41	07:54 18:32	07:50 09:04-09:24/20 16:34 09:24-10:01/37	08:34 09:19-09:34/15 16:14 09:43-10:26/43
18	05:25 06:39-07:39/60 21:42 20:24-20:53/29	06:13 07:37-08:06/29 20:50	07:05 19:39	07:56 18:29	07:52 09:04-09:26/22 16:33 09:26-10:02/36	08:33 09:18-09:33/15 16:14 09:44-10:26/42
19	05:27 06:39-07:39/60 21:40 20:25-20:52/27	06:15 07:35-08:06/31 20:47	07:06 19:37	07:58 18:27	07:54 09:03-09:26/23 16:31 09:18-10:02/44	08:34 09:19-09:34/15 16:14 09:45-10:27/42
20	05:28 06:39-07:39/60 21:39 20:25-20:51/26	06:16 07:35-08:08/33 20:45	07:08 19:34	07:59 18:25	07:56 09:03-09:26/23 16:30 09:19-10:04/45	08:35 09:19-09:33/14 16:15 09:45-10:27/42
21	05:29 06:41-07:39/58 21:38 07:39-07:40/1	06:18 07:33-08:08/35 20:43	07:10 19:32	08:01 18:23	07:57 09:03-09:27/24 16:29 09:19-10:06/47	08:35 09:20-09:34/14 16:15 09:46-10:28/42
22	05:31 06:41-07:39/58 21:37 07:39-07:40/1	06:20 07:33-08:08/35 20:41	07:11 19:30	08:03 18:21	07:59 09:03-09:28/25 16:27 09:20-10:08/48	08:36 09:21-09:35/14 16:15 09:47-10:29/42
23	05:32 06:41-07:39/58 21:35 20:29-20:48/19	06:21 07:31-08:08/37 20:39	07:13 19:27	08:05 18:19	08:01 09:03-09:29/26 16:26 09:21-10:11/50	08:36 09:21-09:35/14 16:16 09:47-10:29/42
24	05:33 06:42-07:39/57 21:34 07:39-07:40/1	06:23 07:31-08:09/38 20:37	07:15 19:25	08:07 18:17	08:02 09:03-09:29/26 16:25 09:22-10:12/50	08:37 09:21-09:35/14 16:17 09:47-10:29/42
25	05:35 06:43-07:38/55 21:33 07:38-07:39/1	06:25 07:31-08:09/38 20:35	07:16 19:22	08:08 18:15	08:04 09:03-09:29/26 16:24 09:22-10:13/51	08:37 09:22-09:36/14 16:17 09:48-10:30/42
26	05:36 06:43-07:38/55 21:31 07:38-07:39/1	06:26 07:30-08:09/39 20:32	07:18 19:20	08:10 18:13	08:06 09:03-09:29/26 16:23 09:23-10:14/51	08:38 09:22-09:37/15 16:18 09:48-10:30/42
27	05:38 06:45-07:38/53 21:30 07:38-07:39/1	06:28 07:30-08:09/39 20:30	07:20 19:18	08:12 18:10	08:07 09:04-09:30/26 16:22 09:25-10:15/50	08:38 09:22-09:37/15 16:19 09:48-10:31/43
28	05:39 06:45-07:37/52 21:28 07:37-07:38/1	06:30 07:29-08:08/39 20:28	07:21 19:15	08:14 18:08	08:09 09:05-09:31/26 16:21 09:26-10:16/50	08:38 09:22-09:38/16 16:19 09:49-10:31/42
29	05:41 06:46-07:36/50 21:27 07:36-07:37/1	06:31 07:30-08:08/38 20:26	07:23 19:13	08:16 18:06	08:10 09:04-09:30/26 16:20 09:26-10:16/50	08:38 09:22-09:39/17 16:20 09:49-10:31/42
30	05:42 06:46-07:36/48 21:25 07:36-07:37/1	06:33 07:29-08:07/38 20:23	07:25 19:11	08:18 18:06	08:12 09:05-09:31/26 16:19 09:28-10:17/49	08:38 09:22-09:39/17 16:21 09:49-10:32/43
31	05:44 06:48-07:35/47 21:23 07:35-07:36/1	06:35 07:29-08:06/37 20:21	07:26 19:10	08:19 18:03	08:13 09:05-09:31/26 16:18 09:28-10:17/49	08:38 09:22-09:40/18 16:22 09:50-10:32/42
Sonnenscheinstunden	505	456	382	332	265	241
Anzahl Minuten mit Schatten	2585	968	536	1685	2133	3207

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

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654**SHADOW - Kalender pro WEA****Berechnung:** Windenergie Hollenstede 2018-12**WEA:** WEA 18-4 - E-138 EP3 E2 TES**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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	08:38 09:22-09:39/17 09:51-10:24/33 16:23 09:39-09:43/4	08:11 09:01-09:42/41 16:05-16:13/8 17:12 15:48-16:05/17	07:17 08:24-08:52/28 18:04	07:05 07:47-08:14/27 20:00 18:44-19:17/33	05:59 07:09-07:35/26 20:52	05:12 21:39	
2	08:38 09:22-09:41/19 09:52-10:25/33 16:24 09:41-09:44/3	08:10 09:02-09:22/20 15:50-16:13/23 17:13 09:22-09:41/19	07:15 08:25-08:51/26 18:06	07:03 07:47-08:14/27 20:01 18:44-19:18/34	05:57 07:10-07:33/23 20:53 07:32-07:34/2	05:12 21:40	
3	08:38 09:21-09:41/20 09:52-10:25/33 16:25 09:41-09:44/3	08:08 09:01-09:19/18 15:51-16:12/21 17:15 09:19-09:39/20	07:13 08:26-08:48/22 18:08	07:01 07:47-08:14/27 20:03 18:44-19:18/34	05:55 07:11-07:32/21 20:55	05:11 21:41	
4	08:38 09:22-09:42/20 09:52-10:26/34 16:26 09:42-09:45/3	08:07 09:01-09:32/31 17:17 15:51-16:11/20	07:11 08:28-08:46/18 18:10	06:58 07:46-08:12/26 20:05 18:43-19:17/34	05:53 07:13-07:31/18 20:57	05:10 21:42	
5	08:38 09:22-09:43/21 09:53-10:27/34 16:28 09:43-09:46/3	08:05 09:00-09:33/33 17:19 15:53-16:10/17	07:08 08:31-08:44/13 18:12	06:56 07:47-08:12/25 20:07 18:43-19:17/34	05:52 07:14-07:29/15 20:59	05:09 21:43	
6	08:37 09:21-09:44/23 09:53-10:26/33 16:29 09:44-09:47/3	08:03 09:00-09:33/33 17:21 15:55-16:08/13	07:06 18:13	06:54 07:47-08:11/24 20:08 18:43-19:17/34	05:50 07:17-07:25/8 21:00	05:08 21:44	
7	08:37 09:20-09:45/25 09:54-10:27/33 16:30 09:45-09:48/3	08:01 09:00-09:33/33 17:23 15:57-16:06/9	07:04 18:15	06:51 07:47-08:09/22 20:10 18:42-19:16/34	05:48 21:02	05:08 21:45	
8	08:37 09:19-09:45/26 09:54-10:27/33 16:31 09:45-09:48/3 15:50-15:57/7	08:00 09:01-09:34/33 17:25	07:01 18:17	06:49 07:33-07:37/4 18:43-19:15/32 20:12 07:49-08:07/18	05:46 21:04	05:07 21:46	
9	08:36 09:18-09:46/28 09:54-10:27/33 16:33 09:46-09:49/3 15:49-15:58/9	07:58 09:01-09:33/32 17:27	06:59 18:19	06:47 07:28-07:40/12 07:51-08:05/14 20:13 07:40-07:42/2 18:44-19:15/31	05:44 21:05	05:07 21:47	
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12	08:34 09:18-09:48/30 09:56-10:29/33 16:37 09:48-09:51/3 15:47-16:03/16	07:52 09:03-09:32/29 17:32	06:52 18:24	06:40 07:21-07:46/25 18:46-19:11/25 20:19 07:46-07:47/1	05:39 21:10	05:05 21:49	
13	08:34 09:17-09:49/32 09:56-10:29/33 16:39 09:49-09:51/2 15:47-16:04/17	07:50 08:34-08:46/12 17:34 09:04-09:31/27	06:50 18:26	06:38 07:18-07:47/29 18:48-19:09/21 20:20 07:47-07:48/1	05:37 21:12	05:05 21:50	
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15	08:32 09:05-09:13/8 09:50-09:52/2 15:47-16:05/18 16:42 09:17-09:50/33 09:58-10:29/31	07:47 08:29-08:51/22 17:38 09:06-09:29/23	06:45 18:30	06:33 07:14-07:49/35 20:24 18:51-19:03/12	05:34 21:15	05:05 21:51	
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17	08:30 09:03-09:17/14 09:51-09:53/2 15:47-16:07/20 16:45 09:17-09:51/34 09:59-10:29/30	07:43 08:26-08:52/26 17:42 09:09-09:24/15	06:41 18:33	06:29 07:11-07:49/38 20:27	05:31 21:18	05:04 21:52	
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31	08:13 09:02-09:43/41 16:08-16:13/5 17:10 15:48-16:08/20		07:08 07:48-08:15/27 19:58 18:45-19:17/32		05:13 21:38		
	Sonnenscheinstunden Anzahl Minuten mit Schatten	256 2456	275 1092	366 441	416 1394	487 113	502 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

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH

Hessenweg 38

DE-49809 Lingen (Ems)

0049 591 800 1634

Thomas Wihard / wihard@zechgmbh.de

Berechnet:

18.12.2018 11:19/3.0.654

SHADOW - Kalender pro WEA**Berechnung:** Windenergie Hollenstede 2018-12**WEA:** WEA 18-4 - E-138 EP3 E2 TES**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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

	Jul	August	September	Oktober	November	Dezember
1	05:08 21:54	05:45 21:22	06:36 07:20-07:46/26 20:19 18:46-19:11/25	07:26 19:08	07:21 08:32-09:02/30 17:01	08:13 09:00-09:30/30 09:38-10:11/33 16:19 09:30-09:33/3 15:29-15:44/15
2	05:09 21:54	05:47 21:20	06:38 07:21-07:43/22 18:43-19:11/28 20:17 07:43-07:44/1	07:28 19:06	07:23 08:31-09:03/32 16:59	08:15 09:00-09:30/30 09:38-10:11/33 16:18 09:30-09:32/2 15:30-15:44/14
3	05:10 21:53	05:48 21:18	06:40 07:23-07:41/18 07:52-08:00/8 20:14 07:41-07:42/1 18:42-19:12/30	07:30 19:04	07:25 08:31-09:03/32 16:57	08:16 09:02-09:30/28 09:38-10:12/34 16:17 09:30-09:33/3 15:32-15:44/12
4	05:11 21:53	05:50 21:17	06:41 07:25-07:37/12 07:48-08:02/14 20:12 07:37-07:39/2 18:40-19:12/32	07:31 19:01	07:27 08:31-09:03/32 16:55	08:18 09:02-09:30/28 09:38-10:11/33 16:17 09:30-09:33/3 15:33-15:42/9
5	05:11 21:52	05:52 21:15	06:43 07:30-07:34/4 18:40-19:12/32 20:10 07:46-08:04/18	07:33 18:59	07:29 08:31-09:03/32 16:53	08:19 09:04-09:30/26 09:39-10:12/33 16:16 09:30-09:33/3 15:35-15:42/7
6	05:12 21:52	05:53 21:13	06:45 07:45-08:06/21 20:07 18:38-19:12/34	07:35 18:57	07:30 08:31-09:03/32 16:51	08:20 09:05-09:30/25 09:39-10:12/33 16:16 09:30-09:33/3
7	05:13 21:51	05:55 21:11	06:46 07:43-08:06/23 20:05 18:38-19:12/34	07:37 18:54	07:32 08:31-09:03/32 16:50	08:22 09:07-09:30/23 09:39-10:13/34 16:15 09:30-09:33/3
8	05:14 21:51	05:56 07:25-07:36/11 21:09	06:48 07:42-08:07/25 20:03 18:38-19:12/34	07:38 18:52	07:34 08:32-09:05/33 16:48	08:23 09:09-09:30/21 09:40-10:14/34 16:15 09:30-09:34/4
9	05:15 21:50	05:58 07:23-07:39/16 21:07	06:50 07:40-08:06/26 20:00 18:37-19:11/34	07:40 09:08-09:17/9 18:50	07:36 08:32-08:51/19 15:20-15:42/22 16:46	08:24 09:10-09:30/20 09:40-10:14/34 16:14 09:30-09:33/3
10	05:16 21:49	06:00 07:21-07:40/19 21:06	06:51 07:40-08:07/27 19:58 18:37-19:11/34	07:42 09:04-09:20/16 18:47	07:38 08:32-08:53/21 15:20-15:43/23 16:45	08:25 09:11-09:30/19 09:41-10:14/33 16:14 09:30-09:33/3
11	05:17 21:48	06:01 07:20-07:42/22 21:04	06:53 07:40-08:07/27 19:56 18:36-19:10/34	07:44 09:01-09:21/20 18:45	07:40 08:33-09:14/41 15:36-15:44/8 16:43	08:27 09:11-09:30/19 09:41-10:14/33 16:14 09:30-09:33/3
12	05:18 21:48	06:03 07:18-07:43/25 21:02 07:42-07:43/1	06:55 07:39-08:06/27 19:53 18:36-19:10/34	07:45 08:59-09:23/24 18:43	07:41 08:34-09:15/41 15:39-15:44/5 16:41	08:28 09:13-09:31/18 09:42-10:15/33 16:14 09:31-09:34/3
13	05:19 21:47	06:05 07:17-07:45/28 21:00	06:56 07:39-08:06/27 19:51 18:37-19:09/32	07:47 08:58-09:24/26 18:41	07:43 08:35-09:01/26 15:19-15:45/26 16:40	08:29 09:14-09:31/17 09:43-10:16/33 16:14 09:31-09:34/3
14	05:20 21:46	06:06 07:16-07:46/30 20:58	06:58 07:38-08:05/27 19:48 18:36-19:07/31	07:49 08:57-09:25/28 18:38	07:45 08:35-08:59/24 15:19-15:45/26 16:38	08:30 09:15-09:31/16 09:43-10:16/33 16:14 09:31-09:35/4
15	05:22 21:45	06:08 07:15-07:48/33 20:56	06:59 07:39-08:04/25 19:46 18:37-19:06/29	07:51 08:56-09:26/30 18:36	07:47 08:36-08:59/23 15:19-15:45/26 16:37	08:31 09:15-09:31/16 09:44-10:17/33 16:14 09:31-09:35/4
16	05:23 21:44	06:10 07:14-07:48/34 20:54	07:01 07:40-08:03/23 19:44 18:38-19:05/27	07:52 08:56-09:26/30 18:34	07:49 08:35-08:58/23 15:19-15:46/27 16:35	08:32 09:16-09:31/15 09:43-10:16/33 16:14 09:31-09:35/4
17	05:24 21:43	06:11 07:14-07:50/36 20:52	07:03 07:40-08:01/21 19:41 18:39-19:02/23	07:54 08:54-09:26/32 18:32	07:50 08:35-08:56/21 09:23-09:24/1 15:19-15:46/27 16:34	08:32 09:16-09:30/14 09:44-10:17/33 16:14 09:30-09:35/5
18	05:25 21:42	06:13 07:14-07:51/37 20:50	07:04 07:41-08:00/19 19:39 18:41-19:00/19	07:56 08:54-09:26/32 18:29	07:52 08:35-08:56/21 09:24-09:25/1 15:20-15:46/26 16:32	08:33 09:17-09:31/14 09:45-10:17/32 16:14 09:31-09:35/4
19	05:27 21:40	06:15 07:13-07:51/38 20:47	07:06 07:43-07:58/15 19:37 18:42-18:56/14	07:58 08:54-09:26/32 18:27	07:54 08:36-08:57/21 09:25-09:26/1 15:20-15:46/26 16:31	08:34 09:18-09:31/13 09:46-10:18/32 16:14 09:31-09:36/5
20	05:28 21:39	06:16 07:13-07:52/39 20:45	07:08 07:45-07:54/9 19:34 18:48-18:50/2	07:59 08:54-09:26/32 18:25	07:56 08:36-08:57/21 09:26-09:27/1 15:21-15:46/25 16:30	08:35 09:18-09:31/13 09:45-10:18/33 16:15 09:31-09:35/4
21	05:29 21:38	06:18 07:12-07:52/40 20:43	07:10 19:32	08:01 08:54-09:26/32 18:23	07:57 08:37-08:57/20 09:27-09:28/1 15:22-15:46/24 16:29	08:35 09:19-09:32/13 09:46-10:19/33 16:15 09:32-09:36/4
22	05:31 21:37	06:20 07:12-07:52/40 20:41	07:11 19:29	08:03 08:54-09:25/31 18:21	07:59 08:38-08:57/19 09:27-09:29/2 15:23-15:46/23 16:27	08:36 09:20-09:32/12 09:47-10:20/33 16:15 09:32-09:37/5
23	05:32 21:35	06:21 07:12-07:52/40 20:39	07:13 19:27	08:05 08:54-09:25/31 18:19	08:01 08:39-08:57/18 09:28-09:30/2 15:23-15:46/23 16:26	08:36 09:20-09:32/12 09:47-10:20/33 16:16 09:32-09:37/5
24	05:33 21:34	06:23 07:12-07:52/40 20:37	07:15 19:25	08:07 08:55-09:24/29 18:17	08:02 08:40-08:57/17 09:29-09:30/1 15:23-15:45/22 16:25	08:37 09:20-09:33/13 09:47-10:20/33 16:17 09:33-09:37/4
25	05:35 21:33	06:25 07:13-07:52/39 20:35	07:16 19:22	08:08 08:56-09:23/27 18:15	08:04 08:40-08:55/15 09:28-09:30/2 15:24-15:45/21 16:24	08:37 09:21-09:34/13 09:48-10:21/33 16:17 09:34-09:39/5
26	05:36 21:31	06:26 07:13-07:51/38 20:32	07:18 19:20	08:10 08:57-09:22/25 18:13	08:06 08:41-08:55/14 09:29-09:31/2 15:25-15:45/20 16:23	08:37 09:21-09:34/13 09:49-10:21/32 16:18 09:34-09:39/5
27	05:38 21:30	06:28 07:13-07:51/38 20:30	07:20 19:18	08:12 08:58-09:21/23 18:10	08:07 08:43-08:54/11 09:29-09:31/2 15:26-15:45/19 16:22	08:38 09:21-09:35/14 09:49-10:22/33 16:18 09:35-09:39/4
28	05:39 21:28	06:30 07:14-07:50/36 20:28	07:21 19:15	07:14 07:59-08:20/21 17:08	08:09 08:45-08:54/9 09:30-09:32/2 15:27-15:46/19 16:21	08:38 09:21-09:36/15 09:49-10:22/33 16:19 09:36-09:40/4
29	05:41 21:27	06:31 07:15-07:50/35 20:26	07:23 19:13	07:16 08:01-08:18/17 17:06	08:10 08:47-08:51/4 09:29-09:32/3 15:27-15:45/18 16:20	08:38 09:21-09:36/15 09:50-10:22/32 16:20 09:36-09:41/5
30	05:42 21:25	06:33 07:16-07:48/32 20:23	07:25 19:11	07:18 08:04-08:15/11 17:04	08:12 08:58-09:30/32 09:38-10:10/32 16:19	08:38 09:22-09:37/15 09:50-10:23/33 16:21 09:37-09:41/4
31	05:44 21:23	06:35 07:18-07:47/29 20:21	07:26 18:47-19:09/22	07:19 08:32-09:02/30 17:03	09:30-09:32/2 15:28-15:45/17 16:22	08:38 09:22-09:38/16 09:50-10:23/33 16:22 09:38-09:42/4
Sonnenscheinstunden		505	456	382	332	265
Anzahl Minuten mit Schatten		0	828	1030	715	2180
						1754

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

Anlage 8: Tabellarische Darstellung der Beschattungszeiten durch die Windenergieanlagen
an den einzelnen Immissionspunkten (Auszug)

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 01 - Welperort 1

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	08:56 (WEA 17-3) 07:17 18:04	07:55 (WEA 17-1) 07:06 20:00	05:59 20:52	05:12 21:39
2	08:39 16:24	08:10 17:14	08:56 (WEA 17-3) 07:15 18:06	07:55 (WEA 17-1) 07:03 20:02	05:57 20:54	05:12 21:40
3	08:38 16:25	08:08 17:15	08:56 (WEA 17-3) 07:13 18:08	07:55 (WEA 17-1) 07:01 20:03	05:56 20:55	05:11 21:42
4	08:38 16:27	08:07 17:17	08:56 (WEA 17-3) 07:11 18:10	07:55 (WEA 17-1) 06:59 20:05	05:54 20:57	05:10 21:43
5	08:38 16:28	08:05 17:19	08:57 (WEA 17-3) 07:09 18:12	07:56 (WEA 17-1) 06:56 20:07	05:52 20:59	05:09 21:44
6	08:38 16:29	08:03 17:21	08:58 (WEA 17-3) 07:06 18:14	07:57 (WEA 17-1) 06:54 20:09	05:50 21:01	05:09 21:45
7	08:37 16:30	08:02 17:23	08:59 (WEA 17-3) 07:04 18:15	07:57 (WEA 17-1) 06:52 20:10	05:48 21:02	05:08 21:46
8	08:37 16:32	08:00 17:25	09:01 (WEA 17-3) 07:02 18:17	07:59 (WEA 17-1) 06:49 20:12	05:46 21:04	05:07 21:47
9	08:36 16:33	07:58 17:27	09:03 (WEA 17-3) 06:59 18:19	08:02 (WEA 17-1) 06:47 20:14	05:44 21:06	05:07 21:47
10	08:36 16:34	07:56 17:29	09:09 (WEA 17-2) 06:57 18:21	08:10 (WEA 17-1) 06:45 20:15	05:43 21:07	05:06 21:48
11	08:35 16:36	07:54 17:31	09:09 (WEA 17-2) 06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49
12	08:35 16:37	07:53 17:33	09:10 (WEA 17-2) 06:53 18:24	06:40 20:19	05:39 21:10	05:06 21:50
13	08:34 16:39	07:51 17:34	09:11 (WEA 17-2) 06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50
14	08:33 16:40	07:49 17:36	09:13 (WEA 17-2) 06:48 18:28	06:36 20:22	05:36 21:14	05:05 21:51
15	08:32 16:42	07:47 17:38	09:15 (WEA 17-2) 06:46 18:30	06:33 20:24	05:34 21:15	05:05 21:52
16	08:32 16:43	07:45 17:40	09:18 (WEA 17-2) 06:43 18:32	06:31 20:26	05:33 21:17	05:05 21:52
17	08:31 16:45	07:43 17:42	09:28 (WEA 17-2) 06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53
18	08:30 16:47	07:41 17:44	06:39 18:35	06:27 20:29	05:30 21:20	05:04 21:53
19	08:29 16:48	07:39 17:46	06:36 18:37	06:25 20:31	05:28 21:22	05:04 21:54
20	08:28 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54
21	08:27 16:52	07:35 17:50	06:32 18:40	06:20 20:35	05:25 21:25	05:05 21:54
22	08:25 16:53	09:00 (WEA 17-3) 07:33 17:51	08:06 (WEA 17-1) 06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54
23	08:24 16:55	09:27 (WEA 17-2) 07:30 17:53	08:11 (WEA 17-1) 06:27 18:44	06:16 20:38	05:23 21:27	05:05 21:55
24	08:23 16:57	09:30 (WEA 17-2) 07:28 17:55	08:15 (WEA 17-1) 06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55
25	08:22 16:59	08:57 (WEA 17-3) 07:26 17:57	08:00 (WEA 17-1) 07:22 19:48	06:12 20:42	05:20 21:30	05:06 21:55
26	08:20 17:01	09:33 (WEA 17-2) 07:24 17:59	08:16 (WEA 17-1) 07:20 19:49	06:10 20:43	05:19 21:32	05:06 21:55
27	08:19 17:02	08:56 (WEA 17-3) 07:22 18:01	07:57 (WEA 17-1) 07:17 19:51	06:08 20:45	05:18 21:33	05:06 21:55
28	08:18 17:04	09:35 (WEA 17-2) 07:20 18:03	08:19 (WEA 17-1) 07:15 19:53	06:05 20:47	05:17 21:34	05:07 21:55
29	08:16 17:06	09:35 (WEA 17-2) 07:13 19:55	08:20 (WEA 17-1) 07:10 19:56	06:03 20:49	05:15 21:36	05:07 21:55
30	08:15 17:08	09:37 (WEA 17-2) 07:10 19:56	06:01 20:50	06:01 21:37	05:14 21:54	05:08 21:54
31	08:13 17:10	08:55 (WEA 17-3) 07:08 19:58	07:08 19:58	05:13 21:38	05:13 21:38	05:08 21:54
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung	376	646	174			

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 01 - Welperort 1**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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	05:08 21:54	05:45 21:22	06:36 20:19	07:27 19:08		07:21 17:01	08:14 16:19
2	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06		07:23 16:59	08:15 16:18
3	05:10 21:53	05:49 21:19	06:40 20:14	07:30 19:04		07:25 16:57	08:17 16:17
4	05:11 21:53	05:50 21:17	06:41 20:12	07:32 19:01		07:27 16:55	08:18 16:17
5	05:11 21:53	05:52 21:15	06:43 20:10	07:33 18:59	08:42 (WEA 17-1)	07:29 16:53	08:19 16:16
6	05:12 21:52	05:53 21:13	06:45 20:08	07:35 18:57	08:43 (WEA 17-1) 08:37 (WEA 17-1)	07:31 16:52	08:21 16:16
7	05:13 21:52	05:55 21:12	06:46 20:05	07:37 18:54	11 08:48 (WEA 17-1) 08:34 (WEA 17-1)	07:33 16:50	08:22 16:15
8	05:14 21:51	05:57 21:10	06:48 20:03	07:39 18:52	16 08:50 (WEA 17-1) 08:32 (WEA 17-1)	07:34 16:48	08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:01	07:40 18:50	19 08:51 (WEA 17-1) 08:31 (WEA 17-1)	07:36 16:46	08:25 16:15
10	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:48	21 08:52 (WEA 17-1) 08:30 (WEA 17-1)	07:38 16:45	08:26 16:14
11	05:17 21:49	06:01 21:04	06:53 19:56	07:44 18:45	23 08:53 (WEA 17-1) 08:30 (WEA 17-1)	07:40 16:43	08:27 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53	07:46 18:43	23 08:53 (WEA 17-1) 08:28 (WEA 17-1)	07:42 16:41	08:28 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	24 08:52 (WEA 17-1) 08:28 (WEA 17-1)	07:43 16:40	08:29 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	24 08:52 (WEA 17-1) 08:29 (WEA 17-1)	07:45 16:38	08:30 16:14
15	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36	23 08:29 (WEA 17-1) 08:52 (WEA 17-1)	07:47 16:37	08:31 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44	07:53 18:34	22 08:29 (WEA 17-1) 08:51 (WEA 17-1)	07:49 16:35	08:32 16:14
17	05:24 21:43	06:11 20:52	07:03 19:42	07:54 18:32	20 08:30 (WEA 17-1) 08:50 (WEA 17-1)	07:51 16:34	08:33 16:14
18	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:30	18 08:31 (WEA 17-1) 08:49 (WEA 17-1)	07:52 16:33	08:33 16:14
19	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27	15 08:31 (WEA 17-1) 08:46 (WEA 17-1)	07:54 16:31	08:34 16:14
20	05:28 21:40	06:16 20:46	07:08 19:34	08:00 18:25	10 08:34 (WEA 17-1) 08:44 (WEA 17-1)	07:56 16:30	08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:32	08:02 18:23		07:58 16:29	08:36 16:15
22	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21		07:59 16:28	08:36 16:16
23	05:32 21:36	06:21 20:39	07:13 19:27	08:05 18:19		08:01 16:26	08:37 16:16
24	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17		08:03 16:25	08:37 16:17
25	05:35 21:33	06:25 20:35	07:16 19:23	08:09 18:15		08:04 16:24	08:37 16:17
26	05:36 21:31	06:26 20:33	07:18 19:20	08:11 18:13		08:06 16:23	08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	09:47 (WEA 17-2) 09:59 (WEA 17-2)	08:08 16:22	08:38 16:19
28	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:09	12 08:44 (WEA 17-2) 09:02 (WEA 17-2)	08:09 16:21	08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07	18 08:42 (WEA 17-2) 09:04 (WEA 17-2)	08:11 16:20	08:38 16:20
30	05:42 21:25	06:33 20:24	07:25 19:11	07:18 17:05	22 08:41 (WEA 17-2) 09:05 (WEA 17-2)	08:12 16:20	08:39 16:21
31	05:44 21:24	06:35 20:21		07:20 17:03	24 08:40 (WEA 17-2) 09:06 (WEA 17-2)		08:39 16:22
Sonnenscheinstunden	505	456	382	332		265	241
astr.max.mögl.Beschattung				396		809	

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 02 - Welperort 4

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39	08:12	07:17	08:31 (WEA 17-2)	07:06	05:59
	16:23	17:12	18:04	09:02 (WEA 17-2)	20:00	20:52
2	08:39	08:10	07:15	08:32 (WEA 17-2)	07:03	05:57
	16:24	17:14	18:06	09:01 (WEA 17-2)	20:02	20:54
3	08:38	08:08	07:13	08:34 (WEA 17-2)	07:01	05:56
	16:25	17:15	18:08	09:00 (WEA 17-2)	20:03	20:55
4	08:38	08:07	07:11	08:34 (WEA 17-2)	06:59	05:54
	16:27	17:17	18:10	08:57 (WEA 17-2)	20:05	20:57
5	08:38	08:05	08:40 (WEA 17-3)	07:09	08:36 (WEA 17-2)	06:56
	16:28	17:19	08:45 (WEA 17-3)	18:12	08:55 (WEA 17-2)	20:07
6	08:38	08:03	08:38 (WEA 17-3)	07:06	08:40 (WEA 17-2)	06:54
	16:29	17:21	08:49 (WEA 17-3)	18:14	08:52 (WEA 17-2)	20:09
7	08:37	08:02	08:36 (WEA 17-3)	07:04		06:52
	16:30	17:23	08:51 (WEA 17-3)	18:15		20:10
8	08:37	08:00	08:34 (WEA 17-3)	07:02	07:34 (WEA 17-1)	06:49
	16:32	17:25	08:52 (WEA 17-3)	18:17	07:42 (WEA 17-1)	20:12
9	08:36	07:58	08:33 (WEA 17-3)	06:59	07:31 (WEA 17-1)	06:47
	16:33	17:27	08:53 (WEA 17-3)	18:19	07:45 (WEA 17-1)	20:14
10	08:36	07:56	08:33 (WEA 17-3)	06:57	07:29 (WEA 17-1)	06:45
	16:34	17:29	08:54 (WEA 17-3)	18:21	07:46 (WEA 17-1)	20:15
11	08:35	07:54	08:32 (WEA 17-3)	06:55	07:27 (WEA 17-1)	06:42
	16:36	17:31	08:55 (WEA 17-3)	18:23	07:47 (WEA 17-1)	20:17
12	08:35	07:53	08:32 (WEA 17-3)	06:53	07:26 (WEA 17-1)	06:40
	16:37	17:33	08:57 (WEA 17-2)	18:24	07:48 (WEA 17-1)	20:19
13	08:34	07:51	08:32 (WEA 17-3)	06:50	07:25 (WEA 17-1)	06:38
	16:39	17:34	08:59 (WEA 17-2)	18:26	07:48 (WEA 17-1)	20:21
14	08:33	07:49	08:32 (WEA 17-3)	06:48	07:25 (WEA 17-1)	06:36
	16:40	17:36	09:01 (WEA 17-2)	18:28	07:49 (WEA 17-1)	20:22
15	08:32	07:47	08:32 (WEA 17-3)	06:46	07:24 (WEA 17-1)	06:33
	16:42	17:38	09:02 (WEA 17-2)	18:30	07:49 (WEA 17-1)	20:24
16	08:32	07:45	08:32 (WEA 17-3)	06:43	07:24 (WEA 17-1)	06:31
	16:43	17:40	09:04 (WEA 17-2)	18:32	07:48 (WEA 17-1)	20:26
17	08:31	07:43	08:33 (WEA 17-2)	06:41	07:24 (WEA 17-1)	06:29
	16:45	17:42	09:05 (WEA 17-2)	18:33	07:48 (WEA 17-1)	20:28
18	08:30	07:41	08:33 (WEA 17-2)	06:39	07:23 (WEA 17-1)	06:27
	16:47	17:44	09:05 (WEA 17-2)	18:35	07:46 (WEA 17-1)	20:29
19	08:29	07:39	08:31 (WEA 17-2)	06:36	07:24 (WEA 17-1)	06:25
	16:48	17:46	09:05 (WEA 17-2)	18:37	07:46 (WEA 17-1)	20:31
20	08:28	07:37	08:31 (WEA 17-2)	06:34	07:25 (WEA 17-1)	06:22
	16:50	17:48	09:06 (WEA 17-2)	18:39	07:45 (WEA 17-1)	20:33
21	08:27	07:35	08:30 (WEA 17-2)	06:32	07:26 (WEA 17-1)	06:20
	16:52	17:50	09:06 (WEA 17-2)	18:40	07:43 (WEA 17-1)	20:35
22	08:25	07:33	08:30 (WEA 17-2)	06:29	07:28 (WEA 17-1)	06:18
	16:54	17:51	09:06 (WEA 17-2)	18:42	07:41 (WEA 17-1)	20:36
23	08:24	07:30	08:30 (WEA 17-2)	06:27	07:32 (WEA 17-1)	06:16
	16:55	17:53	09:06 (WEA 17-2)	18:44	5 07:37 (WEA 17-1)	20:38
24	08:23	07:28	08:29 (WEA 17-2)	06:24		06:14
	16:57	17:55	09:05 (WEA 17-2)	18:46		20:40
25	08:22	07:26	08:30 (WEA 17-2)	07:22		06:12
	16:59	17:57	09:05 (WEA 17-2)	19:48		20:42
26	08:20	07:24	08:30 (WEA 17-2)	07:20		06:10
	17:01	17:59	09:05 (WEA 17-2)	19:49		20:43
27	08:19	07:22	08:31 (WEA 17-2)	07:17		06:08
	17:02	18:01	09:05 (WEA 17-2)	19:51		20:45
28	08:18	07:20	08:31 (WEA 17-2)	07:15		06:05
	17:04	18:03	09:04 (WEA 17-2)	19:53		20:47
29	08:16			07:13		06:03
	17:06			19:55		20:49
30	08:15			07:10		06:01
	17:08			19:56		20:50
31	08:13			07:08		05:13
	17:10			19:58		21:38
Sonnenscheinstunden	256	275	366		416	487
astr.max.mögl.Beschattung		670	441			502

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: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 02 - Welperort 4

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

	July	August	September		Oktober		November		Dezember
1	05:08 21:54	05:45 21:22	06:36 20:19		07:27 19:08	08:05 (WEA 17-1) 23 08:28 (WEA 17-1)	07:21 17:01	08:02 (WEA 17-3) 22 08:24 (WEA 17-3)	08:14 16:19
2	05:09 21:54	05:47 21:20	06:38 20:17		07:28 19:06	08:05 (WEA 17-1) 23 08:28 (WEA 17-1)	07:23 16:59	08:02 (WEA 17-3) 22 08:24 (WEA 17-3)	08:15 16:18
3	05:10 21:53	05:49 21:19	06:40 20:14		07:30 19:04	08:05 (WEA 17-1) 21 08:26 (WEA 17-1)	07:25 16:57	08:03 (WEA 17-3) 20 08:23 (WEA 17-3)	08:17 16:17
4	05:11 21:53	05:50 21:17	06:41 20:12		07:32 19:01	08:06 (WEA 17-1) 19 08:25 (WEA 17-1)	07:27 16:55	08:04 (WEA 17-3) 18 08:22 (WEA 17-3)	08:18 16:17
5	05:11 21:53	05:52 21:15	06:43 20:10		07:33 18:59	08:07 (WEA 17-1) 16 08:23 (WEA 17-1)	07:29 16:53	08:06 (WEA 17-3) 15 08:21 (WEA 17-3)	08:19 16:16
6	05:12 21:52	05:53 21:13	06:45 20:08		07:35 18:57	08:10 (WEA 17-1) 11 08:21 (WEA 17-1)	07:31 16:52	08:08 (WEA 17-3) 11 08:19 (WEA 17-3)	08:21 16:16
7	05:13 21:51	05:55 21:12	06:46 20:05		07:37 18:54	07:33 16:50	07:33 16:50	08:11 (WEA 17-3) 4 08:15 (WEA 17-3)	08:22 16:15
8	05:14 21:51	05:57 21:10	06:48 20:03		07:39 18:52	09:17 (WEA 17-2) 8 09:25 (WEA 17-2)	07:34 16:48		08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:01		07:40 18:50	09:13 (WEA 17-2) 16 09:29 (WEA 17-2)	07:36 16:46		08:25 16:15
10	05:16 21:49	06:00 21:06	06:51 19:58		07:42 18:48	09:10 (WEA 17-2) 21 09:31 (WEA 17-2)	07:38 16:45		08:26 16:14
11	05:17 21:49	06:01 21:04	06:53 19:56		07:44 18:45	09:09 (WEA 17-2) 24 09:33 (WEA 17-2)	07:40 16:43		08:27 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53		07:46 18:43	09:06 (WEA 17-2) 28 09:34 (WEA 17-2)	07:42 16:41		08:28 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51		07:47 18:41	09:05 (WEA 17-2) 30 09:35 (WEA 17-2)	07:43 16:40		08:29 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49		07:49 18:38	09:04 (WEA 17-2) 32 09:36 (WEA 17-2)	07:45 16:38		08:30 16:14
15	05:22 21:45	06:08 20:56	07:00 19:46		07:51 18:36	09:03 (WEA 17-2) 33 09:36 (WEA 17-2)	07:47 16:37		08:31 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44		07:53 18:34	09:03 (WEA 17-2) 34 09:37 (WEA 17-2)	07:49 16:35		08:32 16:14
17	05:24 21:43	06:11 20:52	07:03 19:42		07:54 18:32	09:02 (WEA 17-2) 35 09:37 (WEA 17-2)	07:51 16:34		08:33 16:14
18	05:25 21:42	06:13 20:50	07:05 19:39		07:56 18:30	09:02 (WEA 17-2) 36 09:38 (WEA 17-2)	07:52 16:33		08:33 16:14
19	05:27 21:41	06:15 20:48	07:06 19:37		07:58 18:27	09:01 (WEA 17-2) 36 09:37 (WEA 17-2)	07:54 16:31		08:34 16:14
20	05:28 21:40	06:16 20:46	07:08 19:34		08:00 18:25	09:01 (WEA 17-2) 36 09:37 (WEA 17-2)	07:56 16:30		08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:32		08:01 18:23	09:01 (WEA 17-2) 35 09:36 (WEA 17-2)	07:58 16:29		08:36 16:15
22	05:31 21:37	06:20 20:41	07:11 19:30	11 08:14 (WEA 17-1)	08:03 18:21	09:01 (WEA 17-2) 35 09:36 (WEA 17-2)	07:59 16:28		08:36 16:16
23	05:32 21:36	06:21 20:39	07:13 19:27	11 08:25 (WEA 17-1)	08:05 18:19	09:01 (WEA 17-2) 35 09:36 (WEA 17-2)	08:01 16:26		08:37 16:16
24	05:33 21:34	06:23 20:37	07:15 19:25	16 08:27 (WEA 17-1)	08:07 18:17	09:02 (WEA 17-2) 33 09:35 (WEA 17-2)	08:03 16:25		08:37 16:17
25	05:35 21:33	06:25 20:35	07:16 19:23	19 08:28 (WEA 17-1)	08:09 18:15	09:02 (WEA 17-2) 33 09:35 (WEA 17-2)	08:04 16:24		08:37 16:17
26	05:36 21:31	06:26 20:33	07:18 19:20	21 08:29 (WEA 17-1)	08:11 18:13	09:02 (WEA 17-3) 32 09:34 (WEA 17-2)	08:06 16:23		08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:18	23 08:29 (WEA 17-1)	08:12 18:11	09:02 (WEA 17-3) 31 09:33 (WEA 17-2)	08:08 16:22		08:38 16:19
28	05:39 21:28	06:30 20:28	07:21 19:15	23 08:29 (WEA 17-1)	07:14 17:09	08:01 (WEA 17-3) 31 08:32 (WEA 17-2)	08:09 16:21		08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:13	25 08:30 (WEA 17-1)	07:16 17:07	08:01 (WEA 17-3) 29 08:30 (WEA 17-2)	08:11 16:20		08:38 16:20
30	05:42 21:25	06:33 20:24	07:25 19:11	25 08:29 (WEA 17-1)	07:18 17:05	08:01 (WEA 17-3) 28 08:29 (WEA 17-2)	08:12 16:20		08:39 16:21
31	05:44 21:24	06:35 20:21			07:20 17:03	08:01 (WEA 17-3) 25 08:26 (WEA 17-2)			08:39 16:22
Sonnenscheinstunden	505	456	382		332		265		241
astr.max.mögl.Beschattung			188		829		112		

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 03 - Welperort 7

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39	08:12	07:17	08:37 (WEA 17-2)	07:06	05:59
	16:23	17:12	18:04	09:07 (WEA 17-2)	20:00	20:52
2	08:39	08:10	07:15	08:39 (WEA 17-2)	07:03	05:57
	16:24	17:14	18:06	09:06 (WEA 17-2)	20:02	20:54
3	08:38	08:08	07:13	08:40 (WEA 17-2)	07:01	05:56
	16:25	17:15	18:08	09:04 (WEA 17-2)	20:03	20:55
4	08:38	08:07	07:11	08:42 (WEA 17-2)	06:59	05:54
	16:27	17:17	18:10	09:01 (WEA 17-2)	20:05	20:57
5	08:38	08:05	07:09	08:45 (WEA 17-2)	06:56	05:52
	16:28	17:19	18:12	08:58 (WEA 17-2)	20:07	20:59
6	08:38	08:03	07:06		06:54	05:50
	16:29	17:21	18:14		20:09	21:01
7	08:37	08:02	07:04	07:38 (WEA 17-1)	06:52	05:48
	16:30	17:23	18:15	07:42 (WEA 17-1)	20:10	21:02
8	08:37	08:00	07:02	07:34 (WEA 17-1)	06:49	05:46
	16:32	17:25	18:17	07:47 (WEA 17-1)	20:12	21:04
9	08:36	07:58	06:59	07:32 (WEA 17-1)	06:47	05:44
	16:33	17:27	18:19	07:49 (WEA 17-1)	20:14	21:06
10	08:36	07:56	06:57	07:30 (WEA 17-1)	06:45	05:43
	16:34	17:29	18:21	07:49 (WEA 17-1)	20:15	21:07
11	08:35	07:54	06:55	07:29 (WEA 17-1)	06:42	05:41
	16:36	17:31	18:23	07:50 (WEA 17-1)	20:17	21:09
12	08:35	07:53	06:53	07:28 (WEA 17-1)	06:40	05:39
	16:37	17:33	18:24	07:51 (WEA 17-1)	20:19	21:10
13	08:34	07:51	06:50	07:27 (WEA 17-1)	06:38	05:37
	16:39	17:34	18:26	07:51 (WEA 17-1)	20:21	21:12
14	08:33	07:49	06:48	07:26 (WEA 17-1)	06:36	05:36
	16:40	17:36	18:28	07:51 (WEA 17-1)	20:22	21:14
15	08:32	07:47	06:46	07:26 (WEA 17-1)	06:33	05:34
	16:42	17:38	18:30	07:51 (WEA 17-1)	20:24	21:15
16	08:32	07:45	06:43	07:26 (WEA 17-1)	06:31	05:33
	16:43	17:40	18:32	07:50 (WEA 17-1)	20:26	21:17
17	08:31	07:43	06:41	07:26 (WEA 17-1)	06:29	05:31
	16:45	17:42	18:33	07:50 (WEA 17-1)	20:28	21:18
18	08:30	07:41	06:39	07:26 (WEA 17-1)	06:27	05:30
	16:47	17:44	18:35	07:49 (WEA 17-1)	20:29	21:20
19	08:29	07:39	06:36	07:26 (WEA 17-1)	06:25	05:28
	16:48	17:46	18:37	07:48 (WEA 17-1)	20:31	21:22
20	08:28	07:37	06:34	07:28 (WEA 17-1)	06:22	05:27
	16:50	17:48	18:39	07:47 (WEA 17-1)	20:33	21:23
21	08:27	07:35	06:32	07:28 (WEA 17-1)	06:20	05:25
	16:52	17:50	18:40	07:44 (WEA 17-1)	20:35	21:25
22	08:25	07:33	06:29	07:31 (WEA 17-1)	06:18	05:24
	16:54	17:51	18:42	07:42 (WEA 17-1)	20:36	21:26
23	08:24	07:30	06:27		06:16	05:23
	16:55	17:53	18:44		20:38	21:27
24	08:23	07:28	06:24		06:14	05:21
	16:57	17:55	18:46		20:40	21:29
25	08:22	07:26	07:22		06:12	05:20
	16:59	17:57	19:48		20:42	21:30
26	08:20	07:24	07:20		06:10	05:19
	17:01	17:59	19:49		20:43	21:32
27	08:19	07:22	07:17		06:08	05:18
	17:02	18:01	19:51		20:45	21:33
28	08:18	07:20	07:15		06:05	05:17
	17:04	18:03	19:53		20:47	21:34
29	08:16		07:13		06:03	05:15
	17:06		19:55		20:49	21:36
30	08:15		07:10		06:01	05:14
	17:08		19:56		20:50	21:37
31	08:13		07:08			05:13
	17:10		19:58			21:38
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung		758	423			

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 03 - Welperort 7

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

	July	August	September		Oktober		November		Dezember
1	05:08 21:54	05:45 21:22	06:36 20:19		07:27 19:08	08:06 (WEA 17-1) 25 08:31 (WEA 17-1)	07:21 17:01	08:05 (WEA 17-3) 29 08:34 (WEA 17-2)	08:14 16:19
2	05:09 21:54	05:47 21:20	06:38 20:17		07:28 19:06	08:07 (WEA 17-1) 23 08:30 (WEA 17-1)	07:23 16:59	08:05 (WEA 17-3) 27 08:32 (WEA 17-2)	08:15 16:18
3	05:10 21:53	05:49 21:19	06:40 20:14		07:30 19:04	08:06 (WEA 17-1) 23 08:29 (WEA 17-1)	07:25 16:57	08:05 (WEA 17-3) 23 08:28 (WEA 17-2)	08:17 16:17
4	05:11 21:53	05:50 21:17	06:41 20:12		07:32 19:01	08:07 (WEA 17-1) 21 08:28 (WEA 17-1)	07:27 16:55	08:06 (WEA 17-3) 21 08:27 (WEA 17-3)	08:18 16:17
5	05:11 21:53	05:52 21:15	06:43 20:10		07:33 18:59	08:08 (WEA 17-1) 18 08:26 (WEA 17-1)	07:29 16:53	08:07 (WEA 17-3) 19 08:26 (WEA 17-3)	08:19 16:16
6	05:12 21:52	05:53 21:13	06:45 20:08		07:35 18:57	08:10 (WEA 17-1) 15 08:25 (WEA 17-1)	07:31 16:52	08:08 (WEA 17-3) 17 08:25 (WEA 17-3)	08:21 16:16
7	05:13 21:51	05:55 21:12	06:46 20:05		07:37 18:54	08:12 (WEA 17-1) 9 08:21 (WEA 17-1)	07:33 16:50	08:10 (WEA 17-3) 13 08:23 (WEA 17-3)	08:22 16:15
8	05:14 21:51	05:57 21:10	06:48 20:03		07:39 18:52		07:34 16:48	08:12 (WEA 17-3) 9 08:21 (WEA 17-3)	08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:00		07:40 18:50	09:23 (WEA 17-2) 7 09:30 (WEA 17-2)	07:36 16:46		08:25 16:15
10	05:16 21:49	06:00 21:06	06:51 19:58		07:42 18:48	09:18 (WEA 17-2) 16 09:34 (WEA 17-2)	07:38 16:45		08:26 16:14
11	05:17 21:49	06:01 21:04	06:53 19:56		07:44 18:45	09:16 (WEA 17-2) 21 09:37 (WEA 17-2)	07:40 16:43		08:27 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53		07:46 18:43	09:13 (WEA 17-2) 25 09:38 (WEA 17-2)	07:42 16:41		08:28 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51		07:47 18:41	09:11 (WEA 17-2) 28 09:39 (WEA 17-2)	07:43 16:40		08:29 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49		07:49 18:38	09:10 (WEA 17-2) 30 09:40 (WEA 17-2)	07:45 16:38		08:30 16:14
15	05:22 21:45	06:08 20:56	07:00 19:46		07:51 18:36	09:09 (WEA 17-2) 32 09:41 (WEA 17-2)	07:47 16:37		08:31 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44		07:53 18:34	09:08 (WEA 17-2) 34 09:42 (WEA 17-2)	07:49 16:35		08:32 16:14
17	05:24 21:43	06:11 20:52	07:03 19:42		07:54 18:32	09:08 (WEA 17-2) 35 09:43 (WEA 17-2)	07:51 16:34		08:33 16:14
18	05:25 21:42	06:13 20:50	07:05 19:39		07:56 18:30	09:07 (WEA 17-2) 36 09:43 (WEA 17-2)	07:52 16:33		08:33 16:14
19	05:27 21:41	06:15 20:48	07:06 19:37		07:58 18:27	09:06 (WEA 17-2) 36 09:42 (WEA 17-2)	07:54 16:31		08:34 16:14
20	05:28 21:40	06:16 20:46	07:08 19:34		08:00 18:25	09:06 (WEA 17-2) 37 09:43 (WEA 17-2)	07:56 16:30		08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:32		08:01 18:23	09:05 (WEA 17-2) 38 09:43 (WEA 17-2)	07:58 16:29		08:36 16:15
22	05:31 21:37	06:20 20:41	07:11 19:30	9 08:17 (WEA 17-1)	08:03 18:21	09:05 (WEA 17-2) 37 09:42 (WEA 17-2)	07:59 16:28		08:36 16:16
23	05:32 21:36	06:21 20:39	07:13 19:27	9 08:26 (WEA 17-1)	08:05 18:19	09:06 (WEA 17-2) 36 09:42 (WEA 17-2)	08:01 16:26		08:37 16:16
24	05:33 21:34	06:23 20:37	07:15 19:25	15 08:28 (WEA 17-1)	08:07 18:17	09:06 (WEA 17-2) 36 09:42 (WEA 17-2)	08:03 16:25		08:37 16:17
25	05:35 21:33	06:25 20:35	07:16 19:23	18 08:30 (WEA 17-1)	08:09 18:15	09:06 (WEA 17-2) 35 09:41 (WEA 17-2)	08:04 16:24		08:37 16:17
26	05:36 21:31	06:26 20:33	07:18 19:20	21 08:31 (WEA 17-1)	08:11 18:13	09:06 (WEA 17-3) 35 09:41 (WEA 17-2)	08:06 16:23		08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:18	23 08:31 (WEA 17-1)	08:12 18:11	09:05 (WEA 17-3) 35 09:40 (WEA 17-2)	08:08 16:22		08:38 16:19
28	05:39 21:28	06:30 20:28	07:21 19:15	24 08:32 (WEA 17-1)	07:14 17:09	08:05 (WEA 17-3) 34 08:39 (WEA 17-2)	08:09 16:21		08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:13	25 08:32 (WEA 17-1)	07:16 17:07	08:04 (WEA 17-3) 34 08:38 (WEA 17-2)	08:11 16:20		08:38 16:20
30	05:42 21:25	06:33 20:24	07:25 19:11	25 08:31 (WEA 17-1)	07:18 17:05	08:04 (WEA 17-3) 33 08:37 (WEA 17-2)	08:12 16:20		08:39 16:21
31	05:44 21:24	06:35 20:21			07:20 17:03	08:04 (WEA 17-3) 32 08:36 (WEA 17-2)			08:39 16:22
Sonnenscheinstunden	505	456	382		332		265		241
astr.max.mögl.Beschattung			185		856		158		

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 04 - Welperort 7

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04	08:26 (WEA 17-2) 07:06 09:11 (WEA 17-2) 20:00	08:11 (WEA 17-1) 05:59 08:27 (WEA 17-1) 20:52	05:12 21:39
2	08:39 16:24	08:10 17:14	07:15 18:06	08:25 (WEA 17-2) 07:03 09:12 (WEA 17-2) 20:02	08:14 (WEA 17-1) 05:57 08:24 (WEA 17-1) 20:54	05:12 21:40
3	08:38 16:25	08:08 17:15	07:13 18:08	08:25 (WEA 17-2) 07:01 09:12 (WEA 17-2) 20:03	05:56 20:55	05:11 21:41
4	08:38 16:27	08:07 17:17	07:11 18:10	08:24 (WEA 17-2) 06:59 09:11 (WEA 17-2) 20:05	05:54 20:57	05:10 21:43
5	08:38 16:28	08:05 17:19	07:09 18:12	08:25 (WEA 17-2) 06:56 09:11 (WEA 17-2) 20:07	05:52 20:59	05:09 21:44
6	08:38 16:29	08:03 17:21	07:06 18:14	08:25 (WEA 17-2) 06:54 09:11 (WEA 17-2) 20:08	05:50 21:00	05:09 21:45
7	08:37 16:30	08:02 17:23	07:04 18:15	08:24 (WEA 17-2) 06:52 09:10 (WEA 17-2) 20:10	05:48 21:02	05:08 21:46
8	08:37 16:32	08:00 17:25	07:02 18:17	08:25 (WEA 17-2) 06:49 09:09 (WEA 17-2) 20:12	05:46 21:04	05:07 21:47
9	08:36 16:33	07:58 17:27	06:59 18:19	08:25 (WEA 17-2) 06:47 09:09 (WEA 17-2) 20:14	05:44 21:06	05:07 21:47
10	08:36 16:34	07:56 17:29	06:57 18:21	08:25 (WEA 17-2) 06:45 09:07 (WEA 17-2) 20:15	05:43 21:07	05:06 21:48
11	08:35 16:36	07:54 17:31	06:55 18:23	08:26 (WEA 17-2) 06:42 09:06 (WEA 17-2) 20:17	05:41 21:09	05:06 21:49
12	08:35 16:37	07:53 17:33	06:53 18:24	08:27 (WEA 17-2) 06:40 09:05 (WEA 17-2) 20:19	05:39 21:10	05:06 21:50
13	08:34 16:39	07:51 17:34	06:50 18:26	08:27 (WEA 17-2) 06:38 09:03 (WEA 17-2) 20:21	05:37 21:12	05:05 21:50
14	08:33 16:40	07:49 17:36	06:48 18:28	08:28 (WEA 17-2) 06:36 09:02 (WEA 17-2) 20:22	05:36 21:14	05:05 21:51
15	08:32 16:42	07:47 17:38	06:46 18:30	08:30 (WEA 17-2) 06:33 09:00 (WEA 17-2) 20:24	05:34 21:15	05:05 21:52
16	08:32 16:43	07:45 17:40	06:43 18:32	07:19 (WEA 17-1) 06:31 08:57 (WEA 17-2) 20:26	05:33 21:17	05:05 21:52
17	08:31 16:45	07:43 17:42	06:41 18:33	07:17 (WEA 17-1) 06:29 08:54 (WEA 17-2) 20:28	05:31 21:18	05:04 21:53
18	08:30 16:47	07:41 17:44	06:39 18:35	07:14 (WEA 17-1) 06:27 08:49 (WEA 17-2) 20:29	05:30 21:20	05:04 21:53
19	08:29 16:48	07:39 17:46	06:36 18:37	07:12 (WEA 17-1) 06:25 07:35 (WEA 17-1) 20:31	05:28 21:22	05:04 21:54
20	08:28 16:50	07:37 17:48	06:34 18:39	07:11 (WEA 17-1) 06:22 07:36 (WEA 17-1) 20:33	05:27 21:23	05:04 21:54
21	08:27 16:52	07:35 17:50	06:32 18:40	07:10 (WEA 17-1) 06:20 07:36 (WEA 17-1) 20:35	05:25 21:25	05:05 21:54
22	08:25 16:53	07:33 17:51	06:29 18:42	07:09 (WEA 17-1) 06:18 07:37 (WEA 17-1) 20:36	05:24 21:26	05:05 21:54
23	08:24 16:55	07:30 17:53	06:27 18:44	07:09 (WEA 17-1) 06:16 07:37 (WEA 17-1) 20:38	05:23 21:27	05:05 21:55
24	08:23 16:57	07:28 17:55	06:24 18:46	07:08 (WEA 17-1) 06:14 07:36 (WEA 17-1) 20:40	05:21 21:29	05:05 21:55
25	08:22 16:59	07:26 17:57	06:22 19:48	08:08 (WEA 17-1) 06:12 08:37 (WEA 17-1) 20:42	05:20 21:30	05:06 21:55
26	08:20 17:01	07:24 17:59	06:20 19:49	08:08 (WEA 17-1) 06:10 08:36 (WEA 17-1) 20:43	05:19 21:32	05:06 21:55
27	08:19 17:02	07:22 18:01	06:17 19:51	08:07 (WEA 17-1) 06:08 08:35 (WEA 17-1) 20:45	05:18 21:33	05:06 21:55
28	08:18 17:04	07:20 18:03	06:15 19:53	08:08 (WEA 17-1) 06:05 08:34 (WEA 17-1) 20:47	05:17 21:34	05:07 21:55
29	08:16 17:06		07:13 19:55	08:08 (WEA 17-1) 06:03 08:33 (WEA 17-1) 20:49	05:15 21:36	05:07 21:55
30	08:15 17:08		07:10 19:56	08:09 (WEA 17-1) 06:01 08:32 (WEA 17-1) 20:50	05:14 21:37	05:08 21:54
31	08:13 17:10		07:08 19:58	08:10 (WEA 17-1) 06:00 08:30 (WEA 17-1) 20:50	05:13 21:38	
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung		640	1074	26		

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
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SHADOW - Kalender**Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 04 - Welperort 7**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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

	Jul	August	September		Oktober		November		Dezember
1	05:08	05:45	06:36		07:27	09:07 (WEA 17-2)	07:21	08:03 (WEA 17-3)	08:14
	21:54	21:22	20:19		19:08	35 09:42 (WEA 17-2)	17:01	20 08:23 (WEA 17-3)	16:19
2	05:09	05:47	06:38		07:28	09:06 (WEA 17-2)	07:23	08:04 (WEA 17-3)	08:15
	21:54	21:20	20:17		19:06	38 09:44 (WEA 17-2)	16:59	18 08:22 (WEA 17-3)	16:18
3	05:10	05:49	06:40		07:30	09:04 (WEA 17-2)	07:25	08:06 (WEA 17-3)	08:17
	21:53	21:19	20:14		19:04	40 09:44 (WEA 17-2)	16:57	14 08:20 (WEA 17-3)	16:17
4	05:11	05:50	06:41		07:32	09:03 (WEA 17-2)	07:27	08:10 (WEA 17-3)	08:18
	21:53	21:17	20:12		19:01	42 09:45 (WEA 17-2)	16:55	6 08:16 (WEA 17-3)	16:17
5	05:11	05:52	06:43		07:33	09:02 (WEA 17-2)	07:29		08:19
	21:53	21:15	20:10		18:59	43 09:45 (WEA 17-2)	16:53		16:16
6	05:12	05:53	06:45		07:35	09:02 (WEA 17-2)	07:31		08:21
	21:52	21:13	20:07		18:57	44 09:46 (WEA 17-2)	16:52		16:16
7	05:13	05:55	06:46		07:37	09:00 (WEA 17-2)	07:33		08:22
	21:51	21:11	20:05		18:54	45 09:45 (WEA 17-2)	16:50		16:15
8	05:14	05:57	06:48		07:39	09:00 (WEA 17-2)	07:34		08:23
	21:51	21:10	20:03		18:52	46 09:46 (WEA 17-2)	16:48		16:15
9	05:15	05:58	06:50		07:40	09:00 (WEA 17-2)	07:36		08:25
	21:50	21:08	20:00		18:50	46 09:46 (WEA 17-2)	16:46		16:15
10	05:16	06:00	06:51		07:42	08:59 (WEA 17-2)	07:38		08:26
	21:49	21:06	19:58		18:48	47 09:46 (WEA 17-2)	16:45		16:14
11	05:17	06:01	06:53	08:07 (WEA 17-1)	07:44	08:59 (WEA 17-2)	07:40		08:27
	21:49	21:04	19:56	10 08:17 (WEA 17-1)	18:45	47 09:46 (WEA 17-2)	16:43		16:14
12	05:18	06:03	06:55	08:04 (WEA 17-1)	07:46	08:58 (WEA 17-2)	07:42		08:28
	21:48	21:02	19:53	15 08:19 (WEA 17-1)	18:43	47 09:45 (WEA 17-2)	16:41		16:14
13	05:19	06:05	06:56	08:02 (WEA 17-1)	07:47	08:59 (WEA 17-2)	07:43		08:29
	21:47	21:00	19:51	19 08:21 (WEA 17-1)	18:41	46 09:45 (WEA 17-2)	16:40		16:14
14	05:20	06:06	06:58	08:00 (WEA 17-1)	07:49	08:59 (WEA 17-2)	07:45		08:30
	21:46	20:58	19:49	23 08:23 (WEA 17-1)	18:38	45 09:44 (WEA 17-2)	16:38		16:14
15	05:22	06:08	07:00	07:58 (WEA 17-1)	07:51	08:59 (WEA 17-2)	07:47		08:31
	21:45	20:56	19:46	25 08:23 (WEA 17-1)	18:36	45 09:44 (WEA 17-2)	16:37		16:14
16	05:23	06:10	07:01	07:57 (WEA 17-1)	07:53	09:00 (WEA 17-2)	07:49		08:32
	21:44	20:54	19:44	27 08:24 (WEA 17-1)	18:34	43 09:43 (WEA 17-2)	16:35		16:14
17	05:24	06:11	07:03	07:56 (WEA 17-1)	07:54	09:00 (WEA 17-2)	07:51		08:33
	21:43	20:52	19:42	27 08:23 (WEA 17-1)	18:32	43 09:43 (WEA 17-2)	16:34		16:14
18	05:25	06:13	07:05	07:55 (WEA 17-1)	07:56	09:01 (WEA 17-2)	07:52		08:33
	21:42	20:50	19:39	29 08:24 (WEA 17-1)	18:30	41 09:42 (WEA 17-2)	16:33		16:14
19	05:27	06:15	07:06	07:55 (WEA 17-1)	07:58	09:01 (WEA 17-2)	07:54		08:34
	21:41	20:48	19:37	29 08:24 (WEA 17-1)	18:27	39 09:40 (WEA 17-2)	16:31		16:14
20	05:28	06:16	07:08	07:54 (WEA 17-1)	08:00	09:01 (WEA 17-3)	07:56		08:35
	21:40	20:46	19:34	29 08:23 (WEA 17-1)	18:25	38 09:39 (WEA 17-2)	16:30		16:15
21	05:29	06:18	07:10	07:54 (WEA 17-1)	08:01	09:01 (WEA 17-3)	07:58		08:35
	21:38	20:43	19:32	29 08:23 (WEA 17-1)	18:23	36 09:37 (WEA 17-2)	16:29		16:15
22	05:31	06:20	07:11	07:55 (WEA 17-1)	08:03	09:00 (WEA 17-3)	07:59		08:36
	21:37	20:41	19:30	27 08:22 (WEA 17-1)	18:21	36 09:36 (WEA 17-2)	16:28		16:16
23	05:32	06:21	07:13	07:54 (WEA 17-1)	08:05	09:00 (WEA 17-3)	08:01		08:37
	21:36	20:39	19:27	27 08:21 (WEA 17-1)	18:19	34 09:34 (WEA 17-2)	16:26		16:16
24	05:33	06:23	07:15	07:55 (WEA 17-1)	08:07	08:59 (WEA 17-3)	08:03		08:37
	21:34	20:37	19:25	25 08:20 (WEA 17-1)	18:17	33 09:32 (WEA 17-2)	16:25		16:17
25	05:35	06:25	07:16	07:56 (WEA 17-1)	08:09	08:59 (WEA 17-3)	08:04		08:37
	21:33	20:35	19:23	23 08:19 (WEA 17-1)	18:15	30 09:29 (WEA 17-2)	16:24		16:17
26	05:36	06:26	07:18	07:56 (WEA 17-1)	08:11	08:59 (WEA 17-3)	08:06		08:38
	21:31	20:33	19:20	29 09:29 (WEA 17-2)	18:13	28 09:27 (WEA 17-3)	16:23		16:18
27	05:38	06:28	07:20	07:57 (WEA 17-1)	08:12	08:59 (WEA 17-3)	08:08		08:38
	21:30	20:30	19:18	37 09:35 (WEA 17-2)	18:11	28 09:27 (WEA 17-3)	16:22		16:19
28	05:39	06:30	07:21	08:00 (WEA 17-1)	07:14	08:00 (WEA 17-3)	08:09		08:38
	21:28	20:28	19:15	38 09:38 (WEA 17-2)	17:09	26 08:26 (WEA 17-3)	16:21		16:19
29	05:41	06:31	07:23	09:10 (WEA 17-2)	07:16	08:00 (WEA 17-3)	08:11		08:38
	21:27	20:26	19:13	29 09:39 (WEA 17-2)	17:07	26 08:26 (WEA 17-3)	16:20		16:20
30	05:42	06:33	07:25	09:09 (WEA 17-2)	07:18	08:01 (WEA 17-3)	08:12		08:39
	21:25	20:24	19:11	32 09:41 (WEA 17-2)	17:05	24 08:25 (WEA 17-3)	16:20		16:21
31	05:44	06:35			07:20	08:02 (WEA 17-3)			08:39
	21:24	20:21			17:03	22 08:24 (WEA 17-3)			16:22
Sonnenscheinstunden	505	456	382		332		265		241
astr.max.mögl.Beschattung			529		1183		58		

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:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 05 - Welperort 10**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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	08:39	08:12	07:17	08:03 (WEA 17-3)	07:06	07:42 (WEA 17-1)
	16:23	17:12	18:04	28 08:31 (WEA 17-3)	20:00	63 09:16 (WEA 17-2)
2	08:39	08:10	07:15	08:03 (WEA 17-3)	07:03	63 07:42 (WEA 17-1)
	16:24	17:14	18:06	28 08:31 (WEA 17-3)	20:02	60 09:14 (WEA 17-2)
3	08:38	08:08	07:13	08:03 (WEA 17-3)	07:01	60 07:41 (WEA 17-1)
	16:25	17:15	18:08	28 08:31 (WEA 17-3)	20:03	58 09:12 (WEA 17-2)
4	08:38	08:07	07:11	08:03 (WEA 17-3)	06:59	58 07:40 (WEA 17-1)
	16:27	17:17	18:10	27 08:30 (WEA 17-3)	20:05	54 09:09 (WEA 17-2)
5	08:38	08:05	07:09	08:03 (WEA 17-3)	06:56	54 07:40 (WEA 17-1)
	16:28	17:19	18:12	26 08:29 (WEA 17-3)	20:07	50 09:07 (WEA 17-2)
6	08:38	08:03	07:06	08:04 (WEA 17-3)	06:54	50 07:40 (WEA 17-1)
	16:29	17:21	18:14	24 08:28 (WEA 17-3)	20:08	42 09:03 (WEA 17-2)
7	08:37	08:02	07:04	08:05 (WEA 17-3)	06:52	42 07:40 (WEA 17-1)
	16:30	17:23	18:15	21 08:26 (WEA 17-3)	20:10	27 08:07 (WEA 17-1)
8	08:37	08:00	07:02	08:03 (WEA 17-2)	06:49	27 07:40 (WEA 17-1)
	16:32	17:25	18:17	22 08:25 (WEA 17-3)	20:12	26 08:06 (WEA 17-1)
9	08:36	07:58	06:59	07:57 (WEA 17-2)	06:47	26 07:40 (WEA 17-1)
	16:33	17:27	18:19	26 08:23 (WEA 17-3)	20:14	25 08:05 (WEA 17-1)
10	08:36	07:56	06:57	07:53 (WEA 17-2)	06:45	25 07:41 (WEA 17-1)
	16:34	17:29	18:21	25 08:18 (WEA 17-3)	20:15	23 08:04 (WEA 17-1)
11	08:35	07:54	06:55	07:51 (WEA 17-2)	06:42	23 07:42 (WEA 17-1)
	16:36	17:31	18:23	28 08:19 (WEA 17-2)	20:17	21 08:03 (WEA 17-1)
12	08:35	07:53	06:53	07:49 (WEA 17-2)	06:40	21 07:43 (WEA 17-1)
	16:37	17:33	18:24	32 08:21 (WEA 17-2)	20:19	17 08:00 (WEA 17-1)
13	08:34	07:51	06:50	07:46 (WEA 17-2)	06:38	17 07:45 (WEA 17-1)
	16:39	17:34	18:26	36 08:22 (WEA 17-2)	20:21	13 07:58 (WEA 17-1)
14	08:33	07:49	06:48	07:45 (WEA 17-2)	06:36	4 07:49 (WEA 17-1)
	16:40	17:36	18:28	38 08:23 (WEA 17-2)	20:22	4 07:53 (WEA 17-1)
15	08:32	07:47	06:46	07:44 (WEA 17-2)	06:33	05:34
	16:42	17:38	18:30	40 08:24 (WEA 17-2)	20:24	21:15
16	08:32	07:45	06:43	07:42 (WEA 17-2)	06:31	05:33
	16:43	17:40	18:32	42 08:24 (WEA 17-2)	20:26	21:17
17	08:31	07:43	06:41	07:42 (WEA 17-2)	06:29	05:31
	16:45	17:42	18:33	43 08:25 (WEA 17-2)	20:28	21:18
18	08:30	07:41	06:39	07:40 (WEA 17-2)	06:27	05:30
	16:47	17:44	18:35	45 08:25 (WEA 17-2)	20:29	21:20
19	08:29	07:39	06:36	07:40 (WEA 17-2)	06:25	05:28
	16:48	17:46	18:37	45 08:25 (WEA 17-2)	20:31	21:22
20	08:28	07:37	06:34	07:39 (WEA 17-2)	06:22	05:27
	16:50	17:48	18:39	47 08:26 (WEA 17-2)	20:33	21:23
21	08:27	07:35	06:32	07:38 (WEA 17-2)	06:20	05:25
	16:52	17:50	18:40	47 08:25 (WEA 17-2)	20:35	21:25
22	08:25	07:33	06:29	07:38 (WEA 17-2)	06:18	05:24
	16:54	17:51	18:42	47 08:25 (WEA 17-2)	20:36	21:26
23	08:24	07:30	06:27	07:38 (WEA 17-2)	06:16	05:23
	16:55	17:53	18:44	47 08:25 (WEA 17-2)	20:38	21:27
24	08:23	07:28	06:24	07:37 (WEA 17-2)	06:14	05:21
	16:57	17:55	18:46	47 08:24 (WEA 17-2)	20:40	21:29
25	08:22	07:26	07:22	08:37 (WEA 17-2)	06:12	05:20
	16:59	17:57	19:48	47 09:24 (WEA 17-2)	20:42	21:30
26	08:20	07:24	07:20	08:38 (WEA 17-2)	06:10	05:19
	17:01	17:59	19:49	46 09:24 (WEA 17-2)	20:43	21:32
27	08:19	07:22	07:17	07:53 (WEA 17-1)	06:08	05:18
	17:02	18:01	19:51	52 09:22 (WEA 17-2)	20:45	21:33
28	08:18	07:20	07:15	07:50 (WEA 17-1)	06:05	05:17
	17:04	18:03	19:53	58 09:22 (WEA 17-2)	20:47	21:34
29	08:16		07:13	07:47 (WEA 17-1)	06:03	05:15
	17:06		19:55	61 09:20 (WEA 17-2)	20:49	21:36
30	08:15		07:10	07:45 (WEA 17-1)	06:01	05:14
	17:08		19:56	63 09:19 (WEA 17-2)	20:50	21:37
31	08:13		07:08	07:44 (WEA 17-1)		05:13
	17:10		19:58	63 09:18 (WEA 17-2)		21:38
Sonnenscheinstunden	256	275	366	416	483	502
astr.max.mögl.Beschattung		188	1229			

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	Schattenende (WEA mit letztem Schatten)

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 05 - Welperort 10

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	05:08 21:54	05:45 21:22	06:36 20:19	07:43 (WEA 17-1) 19:08	08:26 (WEA 17-2) 17:01	08:14 16:19
2	05:09 21:54	05:47 21:20	06:38 20:17	07:40 (WEA 17-1) 19:06	08:27 (WEA 17-2) 16:59	08:15 16:18
3	05:10 21:53	05:49 21:19	06:40 20:14	07:39 (WEA 17-1) 19:04	08:28 (WEA 17-2) 16:57	08:17 16:17
4	05:11 21:53	05:50 21:17	06:41 20:12	07:38 (WEA 17-1) 19:01	08:30 (WEA 17-2) 16:55	08:18 16:17
5	05:11 21:53	05:52 21:15	06:43 20:10	07:37 (WEA 17-1) 18:59	08:32 (WEA 17-2) 16:53	08:19 16:16
6	05:12 21:52	05:53 21:13	06:45 20:07	07:36 (WEA 17-1) 18:57	08:36 (WEA 17-2) 16:52	08:21 16:16
7	05:13 21:51	05:55 21:11	06:46 20:05	07:35 (WEA 17-1) 18:54	08:41 (WEA 17-3) 16:50	08:22 16:15
8	05:14 21:51	05:57 21:10	06:48 20:03	07:35 (WEA 17-1) 18:52	08:40 (WEA 17-3) 16:48	08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:00	07:35 (WEA 17-1) 18:50	08:39 (WEA 17-3) 16:46	08:25 16:15
10	05:16 21:49	06:00 21:06	06:51 19:58	07:34 (WEA 17-1) 18:48	08:38 (WEA 17-3) 16:45	08:26 16:14
11	05:17 21:49	06:01 21:04	06:53 19:56	07:35 (WEA 17-1) 18:45	08:38 (WEA 17-3) 16:43	08:27 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53	07:34 (WEA 17-1) 18:43	08:36 (WEA 17-3) 16:41	08:28 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51	07:35 (WEA 17-1) 18:41	08:36 (WEA 17-3) 16:40	08:29 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49	07:36 (WEA 17-1) 18:38	08:36 (WEA 17-3) 16:38	08:30 16:14
15	05:22 21:45	06:08 20:56	07:00 19:46	07:37 (WEA 17-1) 18:36	08:36 (WEA 17-3) 16:37	08:31 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44	07:39 (WEA 17-1) 18:34	08:36 (WEA 17-3) 16:35	08:32 16:14
17	05:24 21:43	06:11 20:52	07:03 19:42	07:41 (WEA 17-1) 18:32	08:37 (WEA 17-3) 16:34	08:33 16:14
18	05:25 21:42	06:13 20:50	07:05 19:39	08:25 (WEA 17-2) 18:30	08:38 (WEA 17-3) 16:33	08:33 16:14
19	05:27 21:41	06:15 20:48	07:06 19:37	08:25 (WEA 17-2) 18:27	08:37 (WEA 17-3) 16:31	08:34 16:14
20	05:28 21:40	06:16 20:46	07:08 19:34	08:24 (WEA 17-2) 18:25	08:39 (WEA 17-3) 16:30	08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:32	08:24 (WEA 17-2) 18:23	08:40 (WEA 17-3) 16:29	08:35 16:15
22	05:31 21:37	06:20 20:41	07:11 19:30	08:24 (WEA 17-2) 18:21	08:43 (WEA 17-3) 16:28	08:36 16:16
23	05:32 21:36	06:21 20:39	07:13 19:27	08:23 (WEA 17-2) 18:19	08:44 (WEA 17-3) 16:26	08:37 16:16
24	05:33 21:34	06:23 20:37	07:15 19:25	08:23 (WEA 17-2) 18:17	08:45 (WEA 17-3) 16:25	08:37 16:17
25	05:35 21:33	06:25 20:35	07:16 19:23	08:23 (WEA 17-2) 18:15	08:46 (WEA 17-3) 16:24	08:37 16:17
26	05:36 21:31	06:26 20:33	07:18 19:20	08:23 (WEA 17-2) 18:13	08:47 (WEA 17-3) 16:23	08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:18	08:23 (WEA 17-2) 18:11	08:48 (WEA 17-3) 16:22	08:38 16:19
28	05:39 21:28	06:30 20:28	07:21 19:15	08:24 (WEA 17-2) 17:09	08:49 (WEA 17-3) 16:21	08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:13	08:24 (WEA 17-2) 17:07	08:50 (WEA 17-3) 16:20	08:38 16:20
30	05:42 21:25	06:33 20:24	07:25 19:11	08:24 (WEA 17-2) 17:05	08:51 (WEA 17-3) 16:20	08:39 16:21
31	05:44 21:24	06:35 20:21	07:25 19:11	08:24 (WEA 17-2) 17:03	08:52 (WEA 17-3) 16:20	08:39 16:22
Sonnenscheinstunden	505	456	382	332	265	241
astr.max.mögl.Beschattung		19	1346	559		

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	Schattenende (WEA mit letztem Schatten)

SHADOW - Kalender**Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 06 - Welperort 14**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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	08:39	08:12	07:17		07:06	08:04 (WEA 17-3)	05:59	06:45 (WEA 17-1)	05:13
	16:23	17:12	18:04		20:00	22 08:26 (WEA 17-3)	20:52	61 07:46 (WEA 17-2)	21:39
2	08:39	08:10	07:15		07:03	08:06 (WEA 17-3)	05:57	06:45 (WEA 17-1)	05:12
	16:24	17:14	18:06		20:02	19 08:25 (WEA 17-3)	20:54	61 07:46 (WEA 17-2)	21:40
3	08:38	08:08	07:13		07:01	08:08 (WEA 17-3)	05:56	06:46 (WEA 17-1)	05:11
	16:25	17:15	18:08		20:03	15 08:23 (WEA 17-3)	20:55	60 07:46 (WEA 17-2)	21:41
4	08:38	08:07	07:11		06:59	08:10 (WEA 17-3)	05:54	06:47 (WEA 17-1)	05:10
	16:27	17:17	18:10		20:05	8 08:18 (WEA 17-3)	20:57	60 07:47 (WEA 17-2)	21:43
5	08:38	08:05	07:09		06:56		05:52	06:47 (WEA 17-1)	05:09
	16:28	17:19	18:12		20:07		20:59	59 07:46 (WEA 17-2)	21:44
6	08:38	08:03	07:06		06:54		05:50	06:48 (WEA 17-1)	05:09
	16:29	17:21	18:14		20:08		21:00	58 07:46 (WEA 17-2)	21:45
7	08:37	08:02	07:04		06:52		05:48	06:48 (WEA 17-1)	05:08
	16:30	17:23	18:15		20:10		21:02	58 07:46 (WEA 17-2)	21:46
8	08:37	08:00	07:02		06:49		05:46	06:50 (WEA 17-1)	05:07
	16:32	17:25	18:17		20:12		21:04	56 07:46 (WEA 17-2)	21:46
9	08:36	07:58	06:59		06:47		05:44	06:52 (WEA 17-1)	05:07
	16:33	17:27	18:19		20:14		21:05	53 07:45 (WEA 17-2)	21:47
10	08:36	07:56	06:57		06:45		05:43	06:54 (WEA 17-1)	05:06
	16:34	17:29	18:21		20:15		21:07	51 07:45 (WEA 17-2)	21:48
11	08:35	07:54	06:55		06:42		05:41	07:00 (WEA 17-2)	05:06
	16:36	17:31	18:23		20:17		21:09	45 07:45 (WEA 17-2)	21:49
12	08:35	07:53	06:53		06:40		05:39	07:00 (WEA 17-2)	05:06
	16:37	17:33	18:24		20:19		21:10	44 07:44 (WEA 17-2)	21:50
13	08:34	07:51	06:50		06:38		05:37	07:01 (WEA 17-2)	05:05
	16:39	17:34	18:26		20:21		21:12	43 07:44 (WEA 17-2)	21:50
14	08:33	07:49	06:48		06:36		05:36	07:01 (WEA 17-2)	05:05
	16:40	17:36	18:28		20:22		21:14	42 07:43 (WEA 17-2)	21:51
15	08:32	07:47	06:46		06:33		05:34	07:02 (WEA 17-2)	05:05
	16:42	17:38	18:30		20:24		21:15	41 07:43 (WEA 17-2)	21:52
16	08:32	07:45	06:43		06:31		05:33	07:02 (WEA 17-2)	05:05
	16:43	17:40	18:32		20:26		21:17	40 07:42 (WEA 17-2)	21:52
17	08:31	07:43	06:41		06:29		05:31	07:03 (WEA 17-2)	05:04
	16:45	17:42	18:33		20:28		21:18	39 07:42 (WEA 17-2)	21:53
18	08:30	07:41	06:39	12 07:14 (WEA 17-3)	06:27		05:30	07:04 (WEA 17-2)	05:04
	16:47	17:44	18:35	07:26 (WEA 17-3)	20:29		21:20	38 07:42 (WEA 17-2)	21:53
19	08:29	07:39	06:36	18 07:11 (WEA 17-3)	06:25	12 07:20 (WEA 17-2)	05:28	07:04 (WEA 17-2)	05:04
	16:48	17:46	18:37	07:29 (WEA 17-3)	20:31	07:32 (WEA 17-2)	21:21	36 07:40 (WEA 17-2)	21:54
20	08:28	07:37	06:34	20 07:10 (WEA 17-3)	06:22	06:56 (WEA 17-1)	05:27	07:05 (WEA 17-2)	05:04
	16:50	17:48	18:39	07:30 (WEA 17-3)	20:33	29 07:36 (WEA 17-2)	21:23	35 07:40 (WEA 17-2)	21:54
21	08:27	07:35	06:32	20 07:07 (WEA 17-3)	06:20	06:53 (WEA 17-1)	05:25	07:06 (WEA 17-2)	05:05
	16:52	17:50	18:40	24 07:31 (WEA 17-3)	20:35	40 07:38 (WEA 17-2)	21:25	33 07:39 (WEA 17-2)	21:54
22	08:25	07:33	06:29	26 07:06 (WEA 17-3)	06:18	06:52 (WEA 17-1)	05:24	07:07 (WEA 17-2)	05:05
	16:54	17:51	18:42	26 07:32 (WEA 17-3)	20:36	47 07:40 (WEA 17-2)	21:26	32 07:39 (WEA 17-2)	21:54
23	08:24	07:30	06:27	27 07:06 (WEA 17-3)	06:16	06:50 (WEA 17-1)	05:23	07:07 (WEA 17-2)	05:05
	16:55	17:53	18:44	27 07:33 (WEA 17-3)	20:38	51 07:41 (WEA 17-2)	21:27	30 07:37 (WEA 17-2)	21:55
24	08:23	07:28	06:24	28 07:04 (WEA 17-3)	06:14	06:49 (WEA 17-1)	05:21	07:08 (WEA 17-2)	05:05
	16:57	17:55	18:46	28 07:32 (WEA 17-3)	20:40	54 07:43 (WEA 17-2)	21:29	28 07:36 (WEA 17-2)	21:55
25	08:22	07:26	07:22	28 08:04 (WEA 17-3)	06:12	06:48 (WEA 17-1)	05:20	07:09 (WEA 17-2)	05:06
	16:59	17:57	19:48	28 08:32 (WEA 17-3)	20:42	55 07:43 (WEA 17-2)	21:30	26 07:35 (WEA 17-2)	21:55
26	08:20	07:24	07:20	29 08:04 (WEA 17-3)	06:10	06:47 (WEA 17-1)	05:19	07:11 (WEA 17-2)	05:06
	17:01	17:59	19:49	29 08:33 (WEA 17-3)	20:43	57 07:44 (WEA 17-2)	21:32	23 07:34 (WEA 17-2)	21:55
27	08:19	07:22	07:17	29 08:03 (WEA 17-3)	06:08	06:47 (WEA 17-1)	05:18	07:12 (WEA 17-2)	05:06
	17:02	18:01	19:51	29 08:32 (WEA 17-3)	20:45	58 07:45 (WEA 17-2)	21:33	21 07:33 (WEA 17-2)	21:55
28	08:18	07:20	07:15	28 08:03 (WEA 17-3)	06:06	06:46 (WEA 17-1)	05:17	07:14 (WEA 17-2)	05:07
	17:04	18:03	19:53	28 08:31 (WEA 17-3)	20:47	59 07:45 (WEA 17-2)	21:34	17 07:31 (WEA 17-2)	21:55
29	08:16		07:13	28 08:03 (WEA 17-3)	06:03	06:46 (WEA 17-1)	05:15	07:15 (WEA 17-2)	05:07
	17:06		19:55	27 08:30 (WEA 17-3)	20:49	60 07:46 (WEA 17-2)	21:36	14 07:29 (WEA 17-2)	21:55
30	08:15		07:10	26 08:03 (WEA 17-3)	06:01	06:46 (WEA 17-1)	05:14	07:18 (WEA 17-2)	05:08
	17:08		19:56	26 08:29 (WEA 17-3)	20:50	60 07:46 (WEA 17-2)	21:37	9 07:27 (WEA 17-2)	21:54
31	08:13		07:08	24 08:04 (WEA 17-3)			05:13		
	17:10		19:58	24 08:28 (WEA 17-3)			21:38		
Sonnenscheinstunden	256	275	366		416		487		502
astr.max.mögl.Beschattung				346	646		1213		

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 06 - Welperort 14

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	05:09	05:45	07:11 (WEA 17-2)	06:36		07:27	07:21	08:14			
	21:54	21:22	44 07:55 (WEA 17-2)	20:19		19:08	17:01	16:19			
2	05:09	05:47	07:10 (WEA 17-2)	06:38		07:28	07:23	08:15			
	21:54	21:20	45 07:55 (WEA 17-2)	20:17		19:06	16:59	16:18			
3	05:10	05:49	07:11 (WEA 17-2)	06:40		07:30	07:25	08:17			
	21:53	21:19	44 07:55 (WEA 17-2)	20:14		19:04	16:57	16:17			
4	05:11	05:50	07:03 (WEA 17-1)	06:41		07:32	07:27	08:18			
	21:53	21:17	52 07:55 (WEA 17-2)	20:12		19:01	16:55	16:17			
5	05:11	05:52	07:01 (WEA 17-1)	06:43		07:33	07:29	08:19			
	21:53	21:15	55 07:56 (WEA 17-2)	20:10		18:59	16:53	16:16			
6	05:12	05:53	06:59 (WEA 17-1)	06:45		07:35	07:31	08:21			
	21:52	21:13	56 07:55 (WEA 17-2)	20:07		18:57	16:52	16:16			
7	05:13	05:55	06:58 (WEA 17-1)	06:46		07:37	07:32	08:22			
	21:51	21:11	58 07:56 (WEA 17-2)	20:05		18:54	16:50	16:15			
8	05:14	05:57	06:57 (WEA 17-1)	06:48		07:39	07:34	08:23			
	21:51	21:10	58 07:55 (WEA 17-2)	20:03		18:52	16:48	16:15			
9	05:15	05:58	06:56 (WEA 17-1)	06:50		08:06 (WEA 17-3)	07:40	08:25			
	21:50	21:08	60 07:56 (WEA 17-2)	20:00	7	08:13 (WEA 17-3)	18:50	16:46	16:15		
10	05:16	06:00	06:55 (WEA 17-1)	06:51		08:01 (WEA 17-3)	07:42	08:26			
	21:49	21:06	60 07:55 (WEA 17-2)	19:58	15	08:16 (WEA 17-3)	18:48	16:45	16:14		
11	05:17	06:02	06:55 (WEA 17-1)	06:53		07:59 (WEA 17-3)	07:44	08:27			
	21:49	21:04	60 07:55 (WEA 17-2)	19:56	19	08:18 (WEA 17-3)	18:45	16:43	16:14		
12	05:18	06:03	06:54 (WEA 17-1)	06:55		07:57 (WEA 17-3)	07:46	08:28			
	21:48	21:02	60 07:54 (WEA 17-2)	19:53	21	08:18 (WEA 17-3)	18:43	16:41	16:14		
13	05:19	06:05	06:54 (WEA 17-1)	06:56		07:56 (WEA 17-3)	07:47	08:29			
	21:47	21:00	60 07:54 (WEA 17-2)	19:51	24	08:20 (WEA 17-3)	18:41	16:40	16:14		
14	05:20	07:28 (WEA 17-2)	06:06	06:53 (WEA 17-1)	06:58	07:55 (WEA 17-3)	07:49	08:30			
	21:46	6 07:34 (WEA 17-2)	20:58	60 07:53 (WEA 17-2)	19:49	25	08:20 (WEA 17-3)	18:38	16:38	16:14	
15	05:22	07:26 (WEA 17-2)	06:08	06:53 (WEA 17-1)	07:00	07:53 (WEA 17-3)	07:51	08:31			
	21:45	12 07:38 (WEA 17-2)	20:56	60 07:53 (WEA 17-2)	19:46	27	08:20 (WEA 17-3)	18:36	16:37	16:14	
16	05:23	07:24 (WEA 17-2)	06:10	06:54 (WEA 17-1)	07:01	07:53 (WEA 17-3)	07:53	08:32			
	21:44	16 07:40 (WEA 17-2)	20:54	59 07:53 (WEA 17-2)	19:44	28	08:21 (WEA 17-3)	18:34	16:35	16:14	
17	05:24	07:22 (WEA 17-2)	06:11	06:53 (WEA 17-1)	07:03	07:51 (WEA 17-3)	07:54	08:33			
	21:43	19 07:41 (WEA 17-2)	20:52	58 07:51 (WEA 17-2)	19:42	29	08:20 (WEA 17-3)	18:32	16:34	16:14	
18	05:25	07:21 (WEA 17-2)	06:13	06:54 (WEA 17-1)	07:05	07:51 (WEA 17-3)	07:56	08:33			
	21:42	22 07:43 (WEA 17-2)	20:50	57 07:51 (WEA 17-2)	19:39	29	08:20 (WEA 17-3)	18:30	16:33	16:14	
19	05:27	07:19 (WEA 17-2)	06:15	06:54 (WEA 17-1)	07:06	07:51 (WEA 17-3)	07:58	08:34			
	21:41	25 07:44 (WEA 17-2)	20:48	55 07:49 (WEA 17-2)	19:37	29	08:20 (WEA 17-3)	18:27	16:31	16:14	
20	05:28	07:18 (WEA 17-2)	06:16	06:55 (WEA 17-1)	07:08	07:51 (WEA 17-3)	08:00	08:35			
	21:39	27 07:45 (WEA 17-2)	20:46	53 07:48 (WEA 17-2)	19:34	28	08:19 (WEA 17-3)	18:25	16:30	16:15	
21	05:29	07:18 (WEA 17-2)	06:18	06:55 (WEA 17-1)	07:10	07:51 (WEA 17-3)	08:01	08:35			
	21:38	29 07:47 (WEA 17-2)	20:43	51 07:46 (WEA 17-2)	19:32	27	08:18 (WEA 17-3)	18:23	16:29	16:15	
22	05:31	07:17 (WEA 17-2)	06:20	06:56 (WEA 17-1)	07:11	07:52 (WEA 17-3)	08:03	08:36			
	21:37	31 07:48 (WEA 17-2)	20:41	46 07:44 (WEA 17-2)	19:30	25	08:17 (WEA 17-3)	18:21	16:28	16:16	
23	05:32	07:16 (WEA 17-2)	06:21	06:59 (WEA 17-1)	07:13	07:52 (WEA 17-3)	08:05	08:37			
	21:36	32 07:48 (WEA 17-2)	20:39	37 07:42 (WEA 17-2)	19:27	24	08:16 (WEA 17-3)	18:19	16:26	16:16	
24	05:34	07:16 (WEA 17-2)	06:23	07:01 (WEA 17-1)	07:15	07:53 (WEA 17-3)	08:07	08:37			
	21:34	34 07:50 (WEA 17-2)	20:37	26 07:39 (WEA 17-2)	19:25	21	08:14 (WEA 17-3)	18:17	16:25	16:17	
25	05:35	07:15 (WEA 17-2)	06:25	07:25 (WEA 17-2)	07:16	07:54 (WEA 17-3)	08:09	08:37			
	21:33	35 07:50 (WEA 17-2)	20:35	10 07:35 (WEA 17-2)	19:23	19	08:13 (WEA 17-3)	18:15	16:24	16:17	
26	05:36	07:14 (WEA 17-2)	06:26		07:18	07:56 (WEA 17-3)	08:11	08:38			
	21:31	37 07:51 (WEA 17-2)	20:33		19:20	13 08:09 (WEA 17-3)	18:13	16:23	16:18		
27	05:38	07:14 (WEA 17-2)	06:28		07:20	08:00 (WEA 17-3)	08:12	08:38			
	21:30	38 07:52 (WEA 17-2)	20:30		19:18	5 08:05 (WEA 17-3)	18:11	16:22	16:19		
28	05:39	07:13 (WEA 17-2)	06:30		07:21		07:14	08:09	08:38		
	21:28	39 07:52 (WEA 17-2)	20:28		19:15		17:09	16:21	16:19		
29	05:41	07:13 (WEA 17-2)	06:31		07:23		07:16	08:11	08:38		
	21:27	41 07:54 (WEA 17-2)	20:26		19:13		17:07	16:20	16:20		
30	05:42	07:12 (WEA 17-2)	06:33		07:25		07:18	08:12	08:39		
	21:25	42 07:54 (WEA 17-2)	20:24		19:11		17:05	16:20	16:21		
31	05:44	07:11 (WEA 17-2)	06:35				07:20		08:39		
	21:24	43 07:54 (WEA 17-2)	20:21				17:03		16:22		
Sonnenscheinstunden		505			382	415					
astr.max.mögl.Beschattung		528	1284				332	265	241		

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

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

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 07 - Welperort 16**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04	07:06 20:00	07:45 (WEA 17-3) 20:52	06:36 (WEA 17-1) 20:52
2	08:39 16:24	08:10 17:14	07:15 18:06	07:03 20:02	07:45 (WEA 17-3) 20:54	06:35 (WEA 17-1) 20:54
3	08:38 16:26	08:08 17:15	07:13 18:08	07:01 20:03	07:45 (WEA 17-3) 20:55	06:35 (WEA 17-1) 20:54
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05	07:44 (WEA 17-3) 20:57	06:36 (WEA 17-1) 20:57
5	08:38 16:28	08:05 17:19	07:09 18:12	06:56 20:07	07:45 (WEA 17-3) 20:59	06:36 (WEA 17-1) 20:59
6	08:38 16:29	08:03 17:21	07:06 18:14	06:54 20:09	07:45 (WEA 17-3) 21:00	06:36 (WEA 17-1) 21:00
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10	07:46 (WEA 17-3) 21:02	06:36 (WEA 17-1) 21:02
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	07:47 (WEA 17-3) 21:04	06:37 (WEA 17-1) 21:04
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	07:48 (WEA 17-3) 21:06	06:37 (WEA 17-1) 21:06
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	07:51 (WEA 17-3) 21:07	06:37 (WEA 17-1) 21:07
11	08:35 16:36	07:54 17:31	06:55 18:23	06:43 20:17	08:00 (WEA 17-3) 21:09	06:39 (WEA 17-1) 21:09
12	08:35 16:37	07:53 17:33	06:53 18:24	06:40 20:19	08:05 (WEA 17-3) 21:10	06:39 (WEA 17-1) 21:10
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21	08:08 (WEA 17-3) 21:12	06:40 (WEA 17-1) 21:12
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	08:07 (WEA 17-3) 21:14	06:41 (WEA 17-1) 21:14
15	08:32 16:42	07:47 17:38	06:46 18:30	06:33 20:24	08:06 (WEA 17-3) 21:15	06:42 (WEA 17-1) 21:15
16	08:32 16:43	07:45 17:40	06:43 18:32	06:31 20:26	08:04 (WEA 17-3) 21:17	06:42 (WEA 17-1) 21:17
17	08:31 16:45	07:43 17:42	06:41 18:33	06:29 20:28	08:03 (WEA 17-3) 21:18	06:42 (WEA 17-1) 21:18
18	08:30 16:47	07:41 17:44	06:39 18:35	06:27 20:29	08:02 (WEA 17-3) 21:20	06:43 (WEA 17-1) 21:20
19	08:29 16:48	07:39 17:46	06:36 18:37	06:25 20:31	08:01 (WEA 17-3) 21:22	06:43 (WEA 17-1) 21:22
20	08:28 16:50	07:37 17:48	06:34 18:39	06:22 20:33	08:00 (WEA 17-3) 21:23	06:43 (WEA 17-1) 21:23
21	08:27 16:52	07:35 17:50	06:32 18:40	06:20 20:35	07:59 (WEA 17-3) 21:25	06:44 (WEA 17-1) 21:25
22	08:25 16:54	07:33 17:51	06:29 18:42	06:18 20:36	07:58 (WEA 17-3) 21:26	06:44 (WEA 17-1) 21:26
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	07:57 (WEA 17-3) 21:27	06:44 (WEA 17-1) 21:27
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	07:56 (WEA 17-3) 21:29	06:45 (WEA 17-1) 21:29
25	08:22 16:59	07:26 17:57	07:22 19:48	06:12 20:42	07:55 (WEA 17-3) 21:30	06:45 (WEA 17-1) 21:30
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	07:54 (WEA 17-3) 21:32	06:46 (WEA 17-1) 21:32
27	08:19 17:02	07:22 18:01	07:17 19:51	06:08 20:45	07:53 (WEA 17-3) 21:33	06:46 (WEA 17-1) 21:33
28	08:18 17:04	07:20 18:03	07:15 19:53	06:06 20:47	07:52 (WEA 17-3) 21:34	06:47 (WEA 17-1) 21:34
29	08:16 17:06		07:13 19:55	06:03 20:49	07:51 (WEA 17-3) 21:36	06:47 (WEA 17-1) 21:36
30	08:15 17:08		07:10 19:56	06:01 20:50	07:50 (WEA 17-3) 21:37	06:48 (WEA 17-1) 21:37
31	08:13 17:10		07:08 19:58	06:00 20:52	07:49 (WEA 17-3) 21:38	06:49 (WEA 17-1) 21:38
	Sonnenscheinstunden astr. max. mögl. Beschattung	256 275	366 366	416 416	487 487	502 502

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 07 - Welperort 16

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	05:09 21:54	05:45 21:22	06:52 (WEA 17-1) 06:36 07:32 (WEA 17-2) 20:19	07:27 19:08	07:21 17:01	08:14 16:19
2	05:09 21:54	05:47 21:20	06:50 (WEA 17-1) 06:38 07:32 (WEA 17-2) 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	05:10 21:53	05:49 21:19	06:49 (WEA 17-1) 06:40 07:32 (WEA 17-2) 20:14	07:30 19:04	07:25 16:57	08:17 16:17
4	05:11 21:53	05:50 21:17	06:47 (WEA 17-1) 06:41 07:31 (WEA 17-2) 20:12	07:32 19:01	07:27 16:55	08:18 16:17
5	05:11 21:53	05:52 21:15	06:47 (WEA 17-1) 06:43 07:32 (WEA 17-2) 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	05:12 21:52	05:53 21:13	06:46 (WEA 17-1) 06:45 07:31 (WEA 17-2) 20:08	07:35 18:57	07:31 16:52	08:21 16:16
7	05:13 21:51	05:55 21:11	06:46 (WEA 17-1) 06:46 07:31 (WEA 17-2) 20:05	07:37 18:54	07:33 16:50	08:22 16:15
8	05:14 21:51	05:57 21:10	06:45 (WEA 17-1) 06:48 07:30 (WEA 17-2) 20:03	07:39 18:52	07:34 16:48	08:23 16:15
9	05:15 21:50	05:58 21:08	06:45 (WEA 17-1) 06:50 07:30 (WEA 17-2) 20:00	07:40 18:50	07:36 16:46	08:25 16:15
10	05:16 21:49	06:00 21:06	06:44 (WEA 17-1) 06:51 07:28 (WEA 17-2) 19:58	07:42 18:48	07:38 16:45	08:26 16:14
11	05:17 21:49	06:02 21:04	06:45 (WEA 17-1) 06:53 07:28 (WEA 17-2) 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	05:18 21:48	06:03 21:02	06:44 (WEA 17-1) 06:55 07:26 (WEA 17-2) 19:53	07:46 18:43	07:42 16:42	08:28 16:14
13	05:19 21:47	06:05 21:00	06:45 (WEA 17-1) 06:56 07:25 (WEA 17-2) 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	05:20 21:46	06:06 20:58	06:44 (WEA 17-1) 06:58 07:23 (WEA 17-2) 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	05:22 21:45	06:08 20:56	06:45 (WEA 17-1) 07:00 07:22 (WEA 17-2) 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	05:23 21:44	06:10 20:54	06:46 (WEA 17-1) 07:01 07:20 (WEA 17-2) 19:44	07:53 18:34	07:49 16:35	08:32 16:14
17	05:24 21:43	06:11 20:52	06:46 (WEA 17-1) 07:03 07:17 (WEA 17-2) 19:42	07:54 18:32	07:51 16:34	08:33 16:14
18	05:25 21:42	06:13 20:50	06:48 (WEA 17-1) 07:05 07:03 (WEA 17-1) 19:39	07:56 18:30	07:52 16:33	08:33 16:14
19	05:27 21:41	06:15 20:48	06:49 (WEA 17-1) 07:06 07:00 (WEA 17-1) 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	05:28 21:39	06:16 20:46	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:58 16:29	08:35 16:15
22	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:28	08:36 16:16
23	05:32 21:36	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:37 16:16
24	05:34 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:03 16:25	08:37 16:17
25	05:35 21:33	06:25 20:35	07:16 19:23	08:09 18:15	08:04 16:24	08:37 16:17
26	05:36 21:31	06:26 20:33	07:18 19:20	08:11 18:13	08:06 16:23	08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:08 16:22	08:38 16:19
28	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:09	08:09 16:21	08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07	08:11 16:20	08:38 16:20
30	05:42 21:25	06:33 20:24	07:25 19:11	07:18 17:05	08:12 16:20	08:39 16:21
31	05:44 21:24	06:35 20:21		07:20 17:03		08:39 16:22
Sonnenscheinstunden	505	456	382	332	265	241
astr.max.mögl.Beschattung	745	730	359			

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 08 - Welperort 24

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04	07:06 20:00		05:59 20:52		05:13 21:39	06:03 (WEA 17-1) 06:24 (WEA 17-1)
2	08:39 16:24	08:10 17:14	07:15 18:06	07:03 20:02		05:58 20:54	14 8	05:12 21:40	06:01 (WEA 17-2) 06:24 (WEA 17-1)
3	08:38 16:26	08:08 17:15	07:13 18:08	07:01 20:03		05:56 20:55		05:11 21:41	05:59 (WEA 17-2) 06:23 (WEA 17-1)
4	08:38 16:27	08:07 17:19	07:11 18:10	06:59 20:05		05:54 20:57		05:10 21:43	05:59 (WEA 17-2) 06:24 (WEA 17-1)
5	08:38 16:28	08:05 17:19	07:09 18:12	06:56 20:07		05:52 20:59		05:09 21:44	05:58 (WEA 17-2) 06:23 (WEA 17-1)
6	08:38 16:29	08:03 17:21	07:06 18:14	06:54 20:09		05:50 21:00		05:09 21:45	05:57 (WEA 17-2) 06:22 (WEA 17-1)
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10		05:48 21:02		05:08 21:46	05:57 (WEA 17-2) 06:23 (WEA 17-1)
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12		05:46 21:04		05:07 21:46	05:57 (WEA 17-2) 06:23 (WEA 17-1)
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14		05:44 21:05		05:07 21:47	05:56 (WEA 17-2) 06:22 (WEA 17-1)
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15		05:43 21:07		05:06 21:48	05:56 (WEA 17-2) 06:22 (WEA 17-1)
11	08:35 16:36	07:54 17:31	06:55 18:23	06:43 20:17		05:41 21:09		05:06 21:49	05:55 (WEA 17-2) 06:21 (WEA 17-1)
12	08:35 16:37	07:53 17:33	06:53 18:24	06:40 20:19		05:39 21:10		05:06 21:50	05:55 (WEA 17-2) 06:21 (WEA 17-1)
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21		05:37 21:12		05:05 21:50	05:55 (WEA 17-2) 06:21 (WEA 17-1)
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	07:11 (WEA 17-3) 07:14 (WEA 17-3)	05:36 21:14	06:07 (WEA 17-1) 06:17 (WEA 17-1)	05:05 21:51	05:56 (WEA 17-2) 06:22 (WEA 17-2)
15	08:32 16:42	07:47 17:38	06:46 18:30	06:33 20:24	07:06 (WEA 17-3) 07:18 (WEA 17-3)	05:34 21:15	06:06 (WEA 17-1) 06:19 (WEA 17-1)	05:05 21:52	05:56 (WEA 17-2) 06:22 (WEA 17-2)
16	08:32 16:43	07:45 17:40	06:43 18:32	06:31 20:26	07:04 (WEA 17-3) 07:20 (WEA 17-3)	05:33 21:17	06:04 (WEA 17-1) 06:19 (WEA 17-1)	05:05 21:52	05:56 (WEA 17-2) 06:23 (WEA 17-2)
17	08:31 16:45	07:43 17:42	06:41 18:33	06:29 20:28	07:01 (WEA 17-3) 07:21 (WEA 17-3)	05:31 21:18	06:04 (WEA 17-1) 06:21 (WEA 17-1)	05:05 21:53	05:56 (WEA 17-2) 06:23 (WEA 17-2)
18	08:30 16:47	07:41 17:44	06:39 18:35	06:27 20:29	07:00 (WEA 17-3) 07:22 (WEA 17-3)	05:30 21:20	06:03 (WEA 17-1) 06:22 (WEA 17-1)	05:04 21:53	05:56 (WEA 17-2) 06:24 (WEA 17-2)
19	08:29 16:48	07:39 17:46	06:36 18:37	06:25 20:31	06:59 (WEA 17-3) 07:22 (WEA 17-3)	05:28 21:21	06:02 (WEA 17-1) 06:22 (WEA 17-1)	05:04 21:54	05:56 (WEA 17-2) 06:24 (WEA 17-2)
20	08:28 16:50	07:37 17:48	06:34 18:39	06:22 20:33	06:59 (WEA 17-3) 07:23 (WEA 17-3)	05:27 21:23	06:02 (WEA 17-1) 06:23 (WEA 17-1)	05:05 21:54	05:56 (WEA 17-2) 06:24 (WEA 17-2)
21	08:27 16:52	07:35 17:50	06:32 18:40	06:20 20:35	06:58 (WEA 17-3) 07:23 (WEA 17-3)	05:25 21:24	06:02 (WEA 17-1) 06:23 (WEA 17-1)	05:05 21:54	05:56 (WEA 17-2) 06:24 (WEA 17-2)
22	08:25 16:54	07:33 17:51	06:29 18:42	06:18 20:36	06:58 (WEA 17-3) 07:23 (WEA 17-3)	05:24 21:26	06:02 (WEA 17-1) 06:24 (WEA 17-1)	05:05 21:54	05:56 (WEA 17-2) 06:24 (WEA 17-2)
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	06:57 (WEA 17-3) 07:23 (WEA 17-3)	05:23 21:27	06:01 (WEA 17-1) 06:23 (WEA 17-1)	05:05 21:55	05:56 (WEA 17-2) 06:24 (WEA 17-2)
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	06:57 (WEA 17-3) 07:23 (WEA 17-3)	05:21 21:29	06:01 (WEA 17-1) 06:24 (WEA 17-1)	05:05 21:55	05:57 (WEA 17-2) 06:25 (WEA 17-2)
25	08:22 16:59	07:26 17:57	07:22 19:48	06:12 20:42	06:57 (WEA 17-3) 07:22 (WEA 17-3)	05:20 21:30	06:01 (WEA 17-1) 06:24 (WEA 17-1)	05:06 21:55	05:57 (WEA 17-2) 06:25 (WEA 17-2)
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	06:58 (WEA 17-3) 07:22 (WEA 17-3)	05:19 21:32	06:01 (WEA 17-1) 06:24 (WEA 17-1)	05:06 21:55	05:57 (WEA 17-2) 06:24 (WEA 17-2)
27	08:19 17:02	07:22 18:01	07:17 19:51	06:08 20:45	06:58 (WEA 17-3) 07:21 (WEA 17-3)	05:18 21:33	06:02 (WEA 17-1) 06:24 (WEA 17-1)	05:06 21:55	05:58 (WEA 17-2) 06:25 (WEA 17-2)
28	08:18 17:04	07:20 18:03	07:15 19:53	06:06 20:47	06:58 (WEA 17-3) 07:20 (WEA 17-3)	05:17 21:34	06:02 (WEA 17-1) 06:24 (WEA 17-1)	05:07 21:55	05:58 (WEA 17-2) 06:25 (WEA 17-2)
29	08:16 17:06		07:13 19:55	06:03 20:49	06:59 (WEA 17-3) 07:19 (WEA 17-3)	05:15 21:36	06:02 (WEA 17-1) 06:24 (WEA 17-1)	05:07 21:55	05:59 (WEA 17-2) 06:25 (WEA 17-2)
30	08:15 17:08		07:10 19:56	06:01 20:50	07:00 (WEA 17-3) 07:17 (WEA 17-3)	05:14 21:37	06:02 (WEA 17-1) 06:24 (WEA 17-1)	05:08 21:54	05:58 (WEA 17-2) 06:24 (WEA 17-1)
31	08:13 17:10		07:08 19:58			05:13 21:38	06:03 (WEA 17-1) 06:24 (WEA 17-1)		
Sonnenscheinstunden	256	275	366	416		487		502	
astr.max.mögl.Beschattung				353		380		788	

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	Schattenende (WEA mit letztem Schatten)

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 08 - Welperort 24

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli		August		September		Oktober	November	Dezember
1	05:09		05:59 (WEA 17-2)	05:45		06:36	07:27	07:21	08:14
	21:54	26	06:25 (WEA 17-1)	21:22		20:19	19:08	17:01	16:19
2	05:09		06:00 (WEA 17-2)	05:47		06:38	07:28	07:23	08:15
	21:54	26	06:26 (WEA 17-1)	21:20		20:17	19:06	16:59	16:18
3	05:10		06:00 (WEA 17-2)	05:49		06:40	07:30	07:25	08:17
	21:53	26	06:26 (WEA 17-1)	21:19		20:14	19:04	16:57	16:17
4	05:11		06:01 (WEA 17-2)	05:50		06:41	07:32	07:27	08:18
	21:53	26	06:27 (WEA 17-1)	21:17		20:12	19:01	16:55	16:17
5	05:11		06:02 (WEA 17-2)	05:52		06:43	07:33	07:29	08:19
	21:53	26	06:28 (WEA 17-1)	21:15		20:10	18:59	16:53	16:16
6	05:12		06:03 (WEA 17-2)	05:53		06:45	07:35	07:31	08:21
	21:52	26	06:29 (WEA 17-1)	21:13		20:08	18:57	16:52	16:16
7	05:13		06:04 (WEA 17-2)	05:55		06:46	07:37	07:32	08:22
	21:51	25	06:29 (WEA 17-1)	21:11		20:05	18:54	16:50	16:15
8	05:14		06:04 (WEA 17-2)	05:57		06:48	07:39	07:34	08:23
	21:51	25	06:29 (WEA 17-1)	21:10		20:03	18:52	16:48	16:15
9	05:15		06:05 (WEA 17-2)	05:58		06:50	07:40	07:36	08:25
	21:50	25	06:30 (WEA 17-1)	21:08		20:00	18:50	16:46	16:15
10	05:16		06:06 (WEA 17-2)	06:00		06:51	07:42	07:38	08:26
	21:49	24	06:30 (WEA 17-1)	21:06		19:58	18:48	16:45	16:14
11	05:17		06:07 (WEA 17-2)	06:02		06:53	07:44	07:40	08:27
	21:49	24	06:31 (WEA 17-1)	21:04		19:56	18:45	16:43	16:14
12	05:18		06:09 (WEA 17-2)	06:03	11 07:11 (WEA 17-3)	06:55	07:46	07:42	08:28
	21:48	22	06:31 (WEA 17-1)	21:02	11 07:22 (WEA 17-3)	19:53	18:43	16:42	16:14
13	05:19		06:11 (WEA 17-1)	06:05	13 07:09 (WEA 17-3)	06:56	07:47	07:43	08:29
	21:47	21	06:32 (WEA 17-1)	21:00	15 07:24 (WEA 17-3)	19:51	18:41	16:40	16:14
14	05:20		06:11 (WEA 17-1)	06:06	14 07:07 (WEA 17-3)	06:58	07:49	07:45	08:30
	21:46	21	06:32 (WEA 17-1)	20:58	18 07:25 (WEA 17-3)	19:49	18:38	16:38	16:14
15	05:22		06:11 (WEA 17-1)	06:08	15 07:06 (WEA 17-3)	07:00	07:51	07:47	08:31
	21:45	22	06:33 (WEA 17-1)	20:56	20 07:26 (WEA 17-3)	19:46	18:36	16:37	16:14
16	05:23		06:11 (WEA 17-1)	06:10	16 07:06 (WEA 17-3)	07:01	07:53	07:49	08:32
	21:44	22	06:33 (WEA 17-1)	20:54	22 07:28 (WEA 17-3)	19:44	18:34	16:35	16:14
17	05:24		06:11 (WEA 17-1)	06:11	17 07:04 (WEA 17-3)	07:03	07:54	07:51	08:33
	21:43	22	06:33 (WEA 17-1)	20:52	24 07:28 (WEA 17-3)	19:42	18:32	16:34	16:14
18	05:25		06:11 (WEA 17-1)	06:13	18 07:04 (WEA 17-3)	07:05	07:56	07:52	08:33
	21:42	22	06:33 (WEA 17-1)	20:50	24 07:28 (WEA 17-3)	19:39	18:30	16:33	16:14
19	05:27		06:11 (WEA 17-1)	06:15	19 07:03 (WEA 17-3)	07:06	07:58	07:54	08:34
	21:41	22	06:33 (WEA 17-1)	20:48	25 07:28 (WEA 17-3)	19:37	18:27	16:31	16:14
20	05:28		06:11 (WEA 17-1)	06:16	20 07:03 (WEA 17-3)	07:08	08:00	07:56	08:35
	21:39	22	06:33 (WEA 17-1)	20:46	25 07:28 (WEA 17-3)	19:34	18:25	16:30	16:15
21	05:29		06:11 (WEA 17-1)	06:18	21 07:02 (WEA 17-3)	07:10	08:01	07:58	08:35
	21:38	23	06:34 (WEA 17-1)	20:43	26 07:28 (WEA 17-3)	19:32	18:23	16:29	16:15
22	05:31		06:11 (WEA 17-1)	06:20	22 07:02 (WEA 17-3)	07:11	08:03	07:59	08:36
	21:37	22	06:33 (WEA 17-1)	20:41	26 07:28 (WEA 17-3)	19:30	18:21	16:28	16:16
23	05:32		06:11 (WEA 17-1)	06:21	23 07:03 (WEA 17-3)	07:13	08:05	08:01	08:37
	21:36	22	06:33 (WEA 17-1)	20:39	25 07:28 (WEA 17-3)	19:27	18:19	16:26	16:16
24	05:34		06:12 (WEA 17-1)	06:23	24 07:02 (WEA 17-3)	07:15	08:07	08:03	08:37
	21:34	21	06:33 (WEA 17-1)	20:37	24 07:26 (WEA 17-3)	19:25	18:17	16:25	16:17
25	05:35		06:12 (WEA 17-1)	06:25	25 07:03 (WEA 17-3)	07:16	08:09	08:04	08:37
	21:33	21	06:33 (WEA 17-1)	20:35	23 07:26 (WEA 17-3)	19:23	18:15	16:24	16:17
26	05:36		06:13 (WEA 17-1)	06:26	26 07:03 (WEA 17-3)	07:18	08:11	08:06	08:38
	21:31	19	06:32 (WEA 17-1)	20:33	21 07:24 (WEA 17-3)	19:20	18:13	16:23	16:18
27	05:38		06:14 (WEA 17-1)	06:28	27 07:04 (WEA 17-3)	07:20	08:12	08:08	08:38
	21:30	18	06:32 (WEA 17-1)	20:30	19 07:23 (WEA 17-3)	19:18	18:11	16:22	16:19
28	05:39		06:14 (WEA 17-1)	06:30	28 07:05 (WEA 17-3)	07:21	07:14	08:09	08:38
	21:28	17	06:31 (WEA 17-1)	20:28	16 07:21 (WEA 17-3)	19:15	17:09	16:21	16:19
29	05:41		06:16 (WEA 17-1)	06:31	29 07:07 (WEA 17-3)	07:23	07:16	08:11	08:38
	21:27	14	06:30 (WEA 17-1)	20:26	12 07:19 (WEA 17-3)	19:13	17:07	16:20	16:20
30	05:42		06:17 (WEA 17-1)	06:33		07:25	07:18	08:12	08:39
	21:25	11	06:28 (WEA 17-1)	20:24		19:11	17:05	16:20	16:21
31	05:44		06:19 (WEA 17-1)	06:35			07:20		08:39
	21:24	7	06:26 (WEA 17-1)	20:21			17:03		16:22
Sonnenscheinstunden		505		456		382	332	265	241
astr.max.mögl.Beschattung		670		376					

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 09 - Welperort 20

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04	07:06 20:00		05:59 20:52		05:13 21:39	05:49 (WEA 17-1) 06:01 (WEA 17-1)
2	08:39 16:24	08:10 17:14	07:15 18:06	07:03 20:02		05:58 20:54	28	05:12 21:40	05:48 (WEA 17-1) 06:02 (WEA 17-1)
3	08:38 16:26	08:08 17:15	07:13 18:08	07:01 20:03		05:56 20:55	29	05:11 21:41	05:47 (WEA 17-1) 06:03 (WEA 17-1)
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05		05:54 20:57	30	05:10 21:43	05:47 (WEA 17-1) 06:04 (WEA 17-1)
5	08:38 16:28	08:05 17:19	07:09 18:12	06:56 20:07		05:52 20:59	29	05:09 21:44	05:46 (WEA 17-1) 06:04 (WEA 17-1)
6	08:38 16:29	08:03 17:21	07:06 18:14	06:54 20:08		05:50 21:00	29	05:09 21:45	05:46 (WEA 17-1) 06:05 (WEA 17-1)
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10		05:48 21:02	29	05:08 21:46	05:46 (WEA 17-1) 06:06 (WEA 17-1)
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12		05:46 21:04	29	05:07 21:46	05:46 (WEA 17-1) 06:07 (WEA 17-1)
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14		05:44 21:05	28	05:07 21:47	05:46 (WEA 17-1) 06:07 (WEA 17-1)
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15		05:43 21:07	27	05:06 21:48	05:46 (WEA 17-1) 06:07 (WEA 17-1)
11	08:35 16:36	07:54 17:31	06:55 18:23	06:43 20:17		05:41 21:09	26	05:06 21:49	05:45 (WEA 17-1) 06:07 (WEA 17-1)
12	08:35 16:37	07:53 17:33	06:53 18:24	06:40 20:19		05:39 21:10	24	05:06 21:50	05:46 (WEA 17-1) 06:08 (WEA 17-1)
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21		05:37 21:12	22	05:05 21:50	05:46 (WEA 17-1) 06:08 (WEA 17-1)
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22		05:36 21:14	21	05:05 21:51	05:46 (WEA 17-1) 06:09 (WEA 17-1)
15	08:32 16:42	07:47 17:38	06:46 18:30	06:33 20:24		05:34 21:15	18	05:05 21:52	05:46 (WEA 17-1) 06:09 (WEA 17-1)
16	08:32 16:43	07:45 17:40	06:43 18:32	06:31 20:26		05:33 21:17	15	05:05 21:52	05:47 (WEA 17-1) 06:10 (WEA 17-1)
17	08:31 16:45	07:43 17:42	06:41 18:33	06:29 20:28		05:31 21:18	12	05:04 21:53	05:47 (WEA 17-1) 06:10 (WEA 17-1)
18	08:30 16:47	07:41 17:44	06:39 18:35	06:27 20:29		05:30 21:20	6	05:04 21:53	05:47 (WEA 17-1) 06:10 (WEA 17-1)
19	08:29 16:48	07:39 17:46	06:36 18:37	06:25 20:31		05:28 21:21		05:04 21:54	05:47 (WEA 17-1) 06:10 (WEA 17-1)
20	08:28 16:50	07:37 17:48	06:34 18:39	06:22 20:33		05:27 21:23		05:05 21:54	05:47 (WEA 17-1) 06:10 (WEA 17-1)
21	08:26 16:52	07:35 17:50	06:32 18:40	06:20 20:35		05:25 21:24		05:05 21:54	05:47 (WEA 17-1) 06:11 (WEA 17-1)
22	08:25 16:54	07:33 17:51	06:29 18:42	06:18 20:36		05:24 21:26		05:05 21:54	05:47 (WEA 17-1) 06:11 (WEA 17-1)
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38		05:23 21:27		05:05 21:55	05:47 (WEA 17-1) 06:11 (WEA 17-1)
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	11	05:21 21:29		05:05 21:55	05:48 (WEA 17-1) 06:11 (WEA 17-1)
25	08:22 16:59	07:26 17:57	07:22 19:48	06:12 20:42	16	05:20 21:30		05:06 21:55	05:48 (WEA 17-1) 06:11 (WEA 17-1)
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	20	05:19 21:32		05:06 21:55	05:48 (WEA 17-1) 06:11 (WEA 17-1)
27	08:19 17:02	07:22 18:01	07:17 19:51	06:08 20:45	22	05:18 21:33		05:06 21:55	05:49 (WEA 17-1) 06:12 (WEA 17-1)
28	08:18 17:04	07:20 18:03	07:15 19:53	06:06 20:47	24	05:17 21:34		05:07 21:55	05:48 (WEA 17-1) 06:11 (WEA 17-1)
29	08:16 17:06		07:13 19:55	06:03 20:49	25	05:15 21:36		05:07 21:55	05:49 (WEA 17-1) 06:12 (WEA 17-1)
30	08:15 17:08		07:10 19:56	06:01 20:50	27	05:14 21:37	6	05:08 21:54	05:49 (WEA 17-1) 06:11 (WEA 17-1)
31	08:13 17:10		07:08 19:58			05:13 21:38	10	05:50 (WEA 17-1) 06:00 (WEA 17-1)	
Sonnenscheinstunden	256	275	366	416		487		502	
astr.max.mögl.Beschattung				145		447		638	

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

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

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 09 - Welperort 20

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober	November	Dezember
1	05:09	05:50 (WEA 17-1)	05:45	06:53 (WEA 17-3)	06:36	07:27	07:21	08:14
	21:54	22 06:12 (WEA 17-1)	21:22	23 07:16 (WEA 17-3)	20:19	19:08	17:01	16:19
2	05:09	05:50 (WEA 17-1)	05:47	06:52 (WEA 17-3)	06:38	07:28	07:23	08:15
	21:54	22 06:12 (WEA 17-1)	21:20	24 07:16 (WEA 17-3)	20:17	19:06	16:59	16:18
3	05:10	05:50 (WEA 17-1)	05:49	06:51 (WEA 17-3)	06:40	07:30	07:25	08:17
	21:53	22 06:12 (WEA 17-1)	21:19	27 07:18 (WEA 17-3)	20:14	19:04	16:57	16:17
4	05:11	05:51 (WEA 17-1)	05:50	06:50 (WEA 17-3)	06:41	07:32	07:27	08:18
	21:53	21 06:12 (WEA 17-1)	21:17	28 07:18 (WEA 17-3)	20:12	19:01	16:55	16:17
5	05:11	05:52 (WEA 17-1)	05:52	06:50 (WEA 17-3)	06:43	07:33	07:29	08:19
	21:53	20 06:12 (WEA 17-1)	21:15	28 07:18 (WEA 17-3)	20:10	18:59	16:53	16:16
6	05:12	05:52 (WEA 17-1)	05:53	06:50 (WEA 17-3)	06:45	07:35	07:31	08:21
	21:52	20 06:12 (WEA 17-1)	21:13	28 07:18 (WEA 17-3)	20:07	18:57	16:52	16:16
7	05:13	05:53 (WEA 17-1)	05:55	06:50 (WEA 17-3)	06:46	07:37	07:32	08:22
	21:51	19 06:12 (WEA 17-1)	21:11	29 07:19 (WEA 17-3)	20:05	18:54	16:50	16:15
8	05:14	05:53 (WEA 17-1)	05:57	06:49 (WEA 17-3)	06:48	07:39	07:34	08:23
	21:51	18 06:11 (WEA 17-1)	21:10	29 07:18 (WEA 17-3)	20:03	18:52	16:48	16:15
9	05:15	05:53 (WEA 17-1)	05:58	06:49 (WEA 17-3)	06:50	07:40	07:36	08:24
	21:50	18 06:11 (WEA 17-1)	21:08	30 07:19 (WEA 17-3)	20:00	18:50	16:46	16:15
10	05:16	05:54 (WEA 17-1)	06:00	06:49 (WEA 17-3)	06:51	07:42	07:38	08:26
	21:49	16 06:10 (WEA 17-1)	21:06	29 07:18 (WEA 17-3)	19:58	18:48	16:45	16:14
11	05:17	05:55 (WEA 17-1)	06:02	06:49 (WEA 17-3)	06:53	07:44	07:40	08:27
	21:49	15 06:10 (WEA 17-1)	21:04	29 07:18 (WEA 17-3)	19:56	18:45	16:43	16:14
12	05:18	05:56 (WEA 17-1)	06:03	06:49 (WEA 17-3)	06:55	07:46	07:42	08:28
	21:48	13 06:09 (WEA 17-1)	21:02	28 07:17 (WEA 17-3)	19:53	18:43	16:42	16:14
13	05:19	05:57 (WEA 17-1)	06:05	06:49 (WEA 17-3)	06:56	07:47	07:43	08:29
	21:47	11 06:08 (WEA 17-1)	21:00	28 07:17 (WEA 17-3)	19:51	18:41	16:40	16:14
14	05:20	05:59 (WEA 17-1)	06:06	06:49 (WEA 17-3)	06:58	07:49	07:45	08:30
	21:46	8 06:07 (WEA 17-1)	20:58	27 07:16 (WEA 17-3)	19:49	18:38	16:38	16:14
15	05:22	06:03 (WEA 17-1)	06:08	06:50 (WEA 17-3)	07:00	07:51	07:47	08:31
	21:45	1 06:04 (WEA 17-1)	20:56	26 07:16 (WEA 17-3)	19:46	18:36	16:37	16:14
16	05:23		06:10	06:51 (WEA 17-3)	07:01	07:53	07:49	08:32
	21:44		20:54	24 07:15 (WEA 17-3)	19:44	18:34	16:35	16:14
17	05:24		06:11	06:52 (WEA 17-3)	07:03	07:54	07:51	08:33
	21:43		20:52	21 07:13 (WEA 17-3)	19:42	18:32	16:34	16:14
18	05:25		06:13	06:53 (WEA 17-3)	07:05	07:56	07:52	08:33
	21:42		20:50	19 07:12 (WEA 17-3)	19:39	18:30	16:33	16:14
19	05:27		06:15	06:55 (WEA 17-3)	07:06	07:58	07:54	08:34
	21:41		20:48	14 07:09 (WEA 17-3)	19:37	18:27	16:31	16:14
20	05:28		06:16	06:58 (WEA 17-3)	07:08	08:00	07:56	08:35
	21:39		20:46	8 07:06 (WEA 17-3)	19:34	18:25	16:30	16:15
21	05:29		06:18		07:10	08:01	07:58	08:35
	21:38		20:43		19:32	18:23	16:29	16:15
22	05:31		06:20		07:11	08:03	07:59	08:36
	21:37		20:41		19:30	18:21	16:28	16:16
23	05:32		06:21		07:13	08:05	08:01	08:37
	21:36		20:39		19:27	18:19	16:26	16:16
24	05:34		06:23		07:15	08:07	08:03	08:37
	21:34		20:37		19:25	18:17	16:25	16:17
25	05:35		06:25		07:16	08:09	08:04	08:37
	21:33		20:35		19:23	18:15	16:24	16:17
26	05:36		06:26		07:18	08:11	08:06	08:38
	21:31		20:33		19:20	18:13	16:23	16:18
27	05:38	07:00 (WEA 17-3)	06:28		07:20	08:12	08:08	08:38
	21:30	9 07:09 (WEA 17-3)	20:30		19:18	18:11	16:22	16:19
28	05:39	06:57 (WEA 17-3)	06:30		07:21	07:14	08:09	08:38
	21:28	14 07:11 (WEA 17-3)	20:28		19:15	17:09	16:21	16:19
29	05:41	06:56 (WEA 17-3)	06:31		07:23	07:16	08:11	08:38
	21:27	17 07:13 (WEA 17-3)	20:26		19:13	17:07	16:20	16:20
30	05:42	06:55 (WEA 17-3)	06:33		07:25	07:18	08:12	08:39
	21:25	19 07:14 (WEA 17-3)	20:24		19:11	17:05	16:20	16:21
31	05:44	06:53 (WEA 17-3)	06:35			07:20		08:39
	21:24	22 07:15 (WEA 17-3)	20:21			17:03		16:22
Sonnenscheinstunden	505		456		382	332	265	241
astr.max.mögl.Beschattung	327		499					

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 10 - Welperort 19

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04	07:06 20:00		05:59 20:52		05:13 21:39	
2	08:39 16:24	08:10 17:14	07:15 18:06	07:03 20:02		05:57 20:54	35	05:12 21:40	7
3	08:38 16:26	08:08 17:15	07:13 18:08	07:01 20:03		05:56 20:55	35	05:11 21:41	11
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05		05:54 20:57	34	05:10 21:43	13
5	08:38 16:28	08:05 17:19	07:09 18:12	06:56 20:07		05:52 20:59	34	05:09 21:44	15
6	08:38 16:29	08:03 17:21	07:06 18:14	06:54 20:08		05:50 21:00	33	05:09 21:45	16
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10		05:48 21:02	32	05:08 21:46	18
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12		05:46 21:04	31	05:07 21:46	19
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14		05:44 21:05	29	05:07 21:47	20
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15		05:43 21:07	28	05:06 21:48	21
11	08:35 16:36	07:54 17:31	06:55 18:23	06:42 20:17		05:41 21:09	26	05:06 21:49	22
12	08:35 16:37	07:53 17:33	06:53 18:24	06:40 20:19		05:39 21:10	24	05:06 21:50	22
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21		05:37 21:12	21	05:05 21:50	23
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22		05:36 21:14	19	05:05 21:51	23
15	08:32 16:42	07:47 17:38	06:46 18:30	06:33 20:24		05:34 21:15	15	05:05 21:52	24
16	08:31 16:43	07:45 17:40	06:43 18:32	06:31 20:26		05:33 21:17	10	05:05 21:52	24
17	08:31 16:45	07:43 17:42	06:41 18:33	06:29 20:28		05:31 21:18		05:04 21:53	24
18	08:30 16:47	07:41 17:44	06:39 18:35	06:27 20:29		05:30 21:20		05:04 21:53	24
19	08:29 16:48	07:39 17:46	06:36 18:37	06:25 20:31	07:08 (WEA 17-3)	05:28 21:21		05:04 21:54	24
20	08:28 16:50	07:37 17:48	06:34 18:39	06:22 20:33	07:20 (WEA 17-3)	05:27 21:23		05:04 21:54	25
21	08:26 16:52	07:35 17:50	06:32 18:40	06:20 20:35	07:05 (WEA 17-3)	05:25 21:24		05:05 21:54	25
22	08:25 16:54	07:33 17:51	06:29 18:42	06:18 20:36	07:23 (WEA 17-3)	05:24 21:26		05:05 21:54	25
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	07:02 (WEA 17-3)	05:23 21:27		05:05 21:55	25
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	07:01 (WEA 17-3)	05:22 21:29		05:05 21:55	25
25	08:22 16:59	07:26 17:57	06:22 19:48	06:12 20:42	06:58 (WEA 17-3)	05:20 21:30		05:06 21:55	24
26	08:20 17:01	07:24 17:59	06:20 19:49	06:10 20:43	06:56 (WEA 17-3)	05:19 21:32		05:06 21:55	24
27	08:19 17:02	07:22 18:01	06:17 19:51	06:08 20:45	07:29 (WEA 17-3)	05:18 21:33		05:06 21:55	24
28	08:18 17:04	07:20 18:03	06:15 19:53	06:06 20:47	06:55 (WEA 17-3)	05:17 21:34		05:07 21:55	23
29	08:16 17:06		06:13 19:55	06:03 20:49	07:29 (WEA 17-3)	05:15 21:36		05:07 21:55	24
30	08:15 17:08		06:10 19:56	06:01 20:50	06:54 (WEA 17-3)	05:14 21:37		05:08 21:54	23
31	08:13 17:10		07:08 19:58		07:29 (WEA 17-3)	05:13 21:38			
Sonnenscheinstunden	256	275	366	416		487		502	
astr.max.mögl.Beschattung				335		441		642	

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

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

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 10 - Welperort 19

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober	November	Dezember
1	05:09	05:53 (WEA 17-1)	05:45	07:09 (WEA 17-3)	06:36	07:27	07:21	08:14
	21:54	23 06:16 (WEA 17-1)	21:22	23 07:32 (WEA 17-3)	20:19	19:08	17:01	16:19
2	05:09	05:54 (WEA 17-1)	05:47	07:08 (WEA 17-3)	06:38	07:28	07:23	08:15
	21:54	22 06:16 (WEA 17-1)	21:20	25 07:33 (WEA 17-3)	20:17	19:06	16:59	16:18
3	05:10	05:54 (WEA 17-1)	05:49	07:07 (WEA 17-3)	06:40	07:30	07:25	08:17
	21:53	21 06:15 (WEA 17-1)	21:19	27 07:34 (WEA 17-3)	20:14	19:04	16:57	16:17
4	05:11	05:54 (WEA 17-1)	05:50	07:06 (WEA 17-3)	06:41	07:32	07:27	08:18
	21:53	21 06:15 (WEA 17-1)	21:17	29 07:35 (WEA 17-3)	20:12	19:01	16:55	16:17
5	05:11	05:55 (WEA 17-1)	05:52	07:06 (WEA 17-3)	06:43	07:33	07:29	08:19
	21:53	21 06:16 (WEA 17-1)	21:15	30 07:36 (WEA 17-3)	20:10	18:59	16:53	16:16
6	05:12	05:56 (WEA 17-1)	05:53	07:05 (WEA 17-3)	06:45	07:35	07:31	08:21
	21:52	19 06:15 (WEA 17-1)	21:13	31 07:36 (WEA 17-3)	20:07	18:57	16:52	16:16
7	05:13	05:57 (WEA 17-1)	05:55	07:04 (WEA 17-3)	06:46	07:37	07:32	08:22
	21:51	18 06:15 (WEA 17-1)	21:11	33 07:37 (WEA 17-3)	20:05	18:54	16:50	16:15
8	05:14	05:57 (WEA 17-1)	05:57	07:03 (WEA 17-3)	06:48	07:39	07:34	08:23
	21:51	17 06:14 (WEA 17-1)	21:10	34 07:37 (WEA 17-3)	20:03	18:52	16:48	16:15
9	05:15	05:58 (WEA 17-1)	05:58	07:03 (WEA 17-3)	06:50	07:40	07:36	08:24
	21:50	15 06:13 (WEA 17-1)	21:08	34 07:37 (WEA 17-3)	20:00	18:50	16:46	16:15
10	05:16	05:59 (WEA 17-1)	06:00	07:03 (WEA 17-3)	06:51	07:42	07:38	08:26
	21:49	14 06:13 (WEA 17-1)	21:06	34 07:37 (WEA 17-3)	19:58	18:48	16:45	16:14
11	05:17	06:00 (WEA 17-1)	06:02	07:03 (WEA 17-3)	06:53	07:44	07:40	08:27
	21:49	12 06:12 (WEA 17-1)	21:04	35 07:38 (WEA 17-3)	19:56	18:45	16:43	16:14
12	05:18	06:02 (WEA 17-1)	06:03	07:02 (WEA 17-3)	06:55	07:46	07:42	08:28
	21:48	8 06:10 (WEA 17-1)	21:02	35 07:37 (WEA 17-3)	19:53	18:43	16:41	16:14
13	05:19	06:05 (WEA 17-1)	06:05	07:02 (WEA 17-3)	06:56	07:47	07:43	08:29
	21:47	3 06:08 (WEA 17-1)	21:00	35 07:37 (WEA 17-3)	19:51	18:41	16:40	16:14
14	05:20		06:06	07:02 (WEA 17-3)	06:58	07:49	07:45	08:30
	21:46		20:58	34 07:36 (WEA 17-3)	19:49	18:38	16:38	16:14
15	05:22		06:08	07:02 (WEA 17-3)	07:00	07:51	07:47	08:31
	21:45		20:56	35 07:37 (WEA 17-3)	19:46	18:36	16:37	16:14
16	05:23		06:10	07:03 (WEA 17-3)	07:01	07:53	07:49	08:32
	21:44		20:54	34 07:37 (WEA 17-3)	19:44	18:34	16:35	16:14
17	05:24		06:11	07:02 (WEA 17-3)	07:03	07:54	07:51	08:33
	21:43		20:52	33 07:35 (WEA 17-3)	19:42	18:32	16:34	16:14
18	05:25		06:13	07:03 (WEA 17-3)	07:05	07:56	07:52	08:33
	21:42		20:50	32 07:35 (WEA 17-3)	19:39	18:30	16:33	16:14
19	05:27		06:15	07:03 (WEA 17-3)	07:06	07:58	07:54	08:34
	21:41		20:48	31 07:34 (WEA 17-3)	19:37	18:27	16:31	16:14
20	05:28		06:16	07:04 (WEA 17-3)	07:08	08:00	07:56	08:35
	21:39		20:46	29 07:33 (WEA 17-3)	19:34	18:25	16:30	16:15
21	05:29		06:18	07:04 (WEA 17-3)	07:10	08:01	07:58	08:35
	21:38		20:43	27 07:31 (WEA 17-3)	19:32	18:23	16:29	16:15
22	05:31		06:20	07:06 (WEA 17-3)	07:11	08:03	07:59	08:36
	21:37		20:41	24 07:30 (WEA 17-3)	19:30	18:21	16:28	16:16
23	05:32		06:21	07:07 (WEA 17-3)	07:13	08:05	08:01	08:37
	21:36		20:39	22 07:29 (WEA 17-3)	19:27	18:19	16:26	16:16
24	05:34		06:23	07:09 (WEA 17-3)	07:15	08:07	08:03	08:37
	21:34		20:37	17 07:26 (WEA 17-3)	19:25	18:17	16:25	16:17
25	05:35		06:25	07:12 (WEA 17-3)	07:16	08:09	08:04	08:37
	21:33		20:35	11 07:23 (WEA 17-3)	19:23	18:15	16:24	16:17
26	05:36		06:26		07:18	08:10	08:06	08:38
	21:31		20:33		19:20	18:13	16:23	16:18
27	05:38		06:28		07:20	08:12	08:08	08:38
	21:30		20:30		19:18	18:11	16:22	16:19
28	05:39	07:18 (WEA 17-3)	06:30		07:21	07:14	08:09	08:38
	21:28	5 07:23 (WEA 17-3)	20:28		19:15	17:09	16:21	16:19
29	05:41	07:15 (WEA 17-3)	06:31		07:23	07:16	08:11	08:38
	21:27	12 07:27 (WEA 17-3)	20:26		19:13	17:07	16:20	16:20
30	05:42	07:12 (WEA 17-3)	06:33		07:25	07:18	08:12	08:39
	21:25	17 07:29 (WEA 17-3)	20:24		19:11	17:05	16:20	16:21
31	05:44	07:10 (WEA 17-3)	06:35			07:20		08:39
	21:24	20 07:30 (WEA 17-3)	20:21			17:03		16:22
Sonnenscheinstunden	505		456		382	332	265	241
astr.max.mögl.Beschattung	268		734					

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 11a - Große Haar 2/Ost

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:39 16:23	08:12 17:12	07:17 18:04	07:06 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:54	05:12 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:49 21:19	06:40 20:14	07:30 19:04	07:25 16:57	08:17 16:17
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05	05:54 20:57	05:10 21:42	05:11 21:53	05:50 21:17	06:41 20:12	07:32 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:38 16:29	08:03 17:21	07:06 18:14	06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:31 16:51	08:21 16:16
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:57 21:10	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:43 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:26 16:14
11	08:35 16:36	07:54 17:31	06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:49	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:35 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:42 16:41	08:28 16:14
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:14	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:52	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:32	06:31 20:26	05:33 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:31 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:51 16:34	08:33 16:14
18	08:30 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:30	07:52 16:33	08:33 16:14
19	08:29 16:48	07:39 17:46	06:36 18:37	06:25 20:31	05:28 21:21	05:04 21:53	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:35 17:49	06:31 18:40	06:20 20:35	05:25 21:24	05:05 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:16
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:55	05:32 21:36	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:03 16:25	08:37 16:17
25	08:22 16:59	07:26 17:57	07:22 19:47	06:12 20:42	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:07 16:22	08:38 16:19
28	08:17 17:04	07:20 18:03	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:09	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07	08:11 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:24	06:35 20:21		07:20 17:03		08:39 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

SHADOW - Kalender**Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 11b - Große Haar 2/West**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04	07:06 20:00	05:59 20:52		05:12 21:39 75
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:54		19:33 (WEA 17-3) 20:48 (WEA 17-2) 19:33 (WEA 17-3) 21:40 75
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55		19:33 (WEA 17-3) 21:41 75
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05	05:54 20:57		19:33 (WEA 17-3) 21:42 76
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59		19:33 (WEA 17-3) 21:43 76
6	08:38 16:29	08:03 17:21	07:06 18:14	06:54 20:08	05:50 21:00		19:33 (WEA 17-3) 21:44 75
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10	05:48 21:02		19:33 (WEA 17-3) 21:45 76
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04		19:33 (WEA 17-3) 21:46 76
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05		19:33 (WEA 17-3) 21:47 76
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:43 21:07		19:34 (WEA 17-3) 21:48 76
11	08:35 16:36	07:54 17:31	06:55 18:23	06:42 20:17	05:41 21:09		19:33 (WEA 17-3) 21:49 76
12	08:35 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	15	19:49 (WEA 17-3) 20:04 (WEA 17-3) 19:47 (WEA 17-3) 21:50 75
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21	05:37 21:12	21	19:47 (WEA 17-3) 20:08 (WEA 17-3) 19:44 (WEA 17-3) 21:50 76
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:14	25	20:09 (WEA 17-3) 19:43 (WEA 17-3) 20:34 (WEA 17-2) 21:51 75
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	35	20:09 (WEA 17-3) 19:43 (WEA 17-3) 20:34 (WEA 17-2) 21:52 75
16	08:31 16:43	07:45 17:40	06:43 18:32	06:31 20:26	05:33 21:17	43	19:41 (WEA 17-3) 20:37 (WEA 17-2) 19:40 (WEA 17-3) 21:53 76
17	08:31 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	50	20:39 (WEA 17-2) 19:38 (WEA 17-3) 20:40 (WEA 17-2) 21:53 75
18	08:30 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	56	19:38 (WEA 17-3) 20:40 (WEA 17-2) 19:38 (WEA 17-3) 21:53 75
19	08:29 16:48	07:39 17:46	06:36 18:37	06:25 20:31	05:28 21:21	60	19:36 (WEA 17-3) 20:42 (WEA 17-2) 19:37 (WEA 17-3) 21:53 75
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	63	19:36 (WEA 17-3) 20:43 (WEA 17-2) 19:37 (WEA 17-3) 21:54 75
21	08:26 16:52	07:35 17:49	06:31 18:40	06:20 20:35	05:25 21:24	66	19:36 (WEA 17-3) 20:44 (WEA 17-2) 19:35 (WEA 17-3) 21:54 75
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	69	19:36 (WEA 17-3) 20:44 (WEA 17-2) 19:35 (WEA 17-3) 21:54 75
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	69	19:36 (WEA 17-3) 20:44 (WEA 17-2) 19:35 (WEA 17-3) 21:55 75
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	70	19:37 (WEA 17-3) 20:45 (WEA 17-2) 19:34 (WEA 17-3) 21:55 75
25	08:22 16:59	07:26 17:57	07:22 19:47	06:12 20:42	05:20 21:30	72	19:37 (WEA 17-3) 20:46 (WEA 17-2) 19:34 (WEA 17-3) 21:55 75
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	05:19 21:31	72	19:37 (WEA 17-3) 20:46 (WEA 17-2) 19:34 (WEA 17-3) 21:55 75
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	73	19:37 (WEA 17-3) 20:47 (WEA 17-2) 19:33 (WEA 17-3) 21:55 76
28	08:17 17:04	07:20 18:03	07:15 19:53	06:05 20:47	05:16 21:34	74	19:37 (WEA 17-3) 20:47 (WEA 17-2) 19:33 (WEA 17-3) 21:55 75
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	74	19:38 (WEA 17-3) 20:47 (WEA 17-2) 19:33 (WEA 17-3) 21:54 75
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	74	19:37 (WEA 17-3) 20:47 (WEA 17-2) 19:33 (WEA 17-3) 21:54 76
31	08:13 17:10		07:08 19:58		05:13 21:38	74	19:37 (WEA 17-3) 20:47 (WEA 17-2) 19:33 (WEA 17-3) 21:54 76
Sonnenscheinstunden	256	275	366	416	487		502
astr.max.mögl.Beschattung					1155		2262

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 11b - Große Haar 2/West

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	05:08 21:54	19:38 (WEA 17-3) 20:54 (WEA 17-2)	05:45 21:22	19:58 (WEA 17-3) 20:19	07:26 19:08	07:21 17:01
2	05:09 21:54	19:39 (WEA 17-3) 20:54 (WEA 17-2)	05:47 21:20	20:01 (WEA 17-3) 20:17	07:28 19:06	07:23 16:59
3	05:10 21:53	19:38 (WEA 17-3) 20:54 (WEA 17-2)	05:49 21:19	20:13 (WEA 17-3) 20:17	07:30 19:04	07:25 16:57
4	05:11 21:53	19:39 (WEA 17-3) 20:54 (WEA 17-2)	05:50 21:17	20:14 20:12	19:04 19:01	16:57 16:55
5	05:11 21:52	19:39 (WEA 17-3) 20:55 (WEA 17-2)	05:52 21:15	20:14 20:10	19:04 18:59	16:57 16:53
6	05:12 21:52	19:40 (WEA 17-3) 20:55 (WEA 17-2)	05:53 21:13	20:10 20:07	18:59 18:57	16:53 16:51
7	05:13 21:51	19:39 (WEA 17-3) 20:55 (WEA 17-2)	05:55 21:11	20:07 20:05	18:57 18:54	16:51 16:50
8	05:14 21:51	19:39 (WEA 17-3) 20:55 (WEA 17-2)	05:57 21:10	20:05 20:03	18:54 18:52	16:50 16:48
9	05:15 21:50	19:40 (WEA 17-3) 20:55 (WEA 17-2)	05:58 21:08	20:03 20:00	18:52 18:50	16:48 16:46
10	05:16 21:49	19:40 (WEA 17-3) 20:55 (WEA 17-2)	06:00 21:06	20:00 19:58	18:50 18:47	16:46 16:45
11	05:17 21:49	19:40 (WEA 17-3) 20:56 (WEA 17-2)	06:01 21:04	19:58 19:56	18:47 18:45	16:45 16:43
12	05:18 21:48	19:41 (WEA 17-3) 20:56 (WEA 17-2)	06:03 21:02	19:56 19:53	18:45 18:43	16:43 16:41
13	05:19 21:47	19:41 (WEA 17-3) 20:56 (WEA 17-2)	06:05 21:00	19:53 19:51	18:43 18:41	16:41 16:40
14	05:20 21:46	19:41 (WEA 17-3) 20:56 (WEA 17-2)	06:06 20:58	19:51 19:49	18:41 18:38	16:40 16:38
15	05:22 21:45	19:41 (WEA 17-3) 20:56 (WEA 17-2)	06:08 20:56	19:49 19:46	18:38 18:36	16:38 16:37
16	05:23 21:44	19:43 (WEA 17-3) 20:56 (WEA 17-2)	06:10 20:54	19:46 19:44	18:36 18:34	16:37 16:35
17	05:24 21:43	19:43 (WEA 17-3) 20:56 (WEA 17-2)	06:11 20:52	19:44 19:41	18:34 18:32	16:35 16:34
18	05:25 21:42	19:43 (WEA 17-3) 20:56 (WEA 17-2)	06:13 20:50	19:44 19:39	18:34 18:30	16:35 16:33
19	05:27 21:41	19:44 (WEA 17-3) 20:55 (WEA 17-2)	06:15 20:48	19:39 19:37	18:30 18:27	16:33 16:31
20	05:28 21:39	19:44 (WEA 17-3) 20:55 (WEA 17-2)	06:16 20:45	19:37 19:34	18:27 18:25	16:31 16:30
21	05:29 21:38	19:45 (WEA 17-3) 20:55 (WEA 17-2)	06:18 20:43	19:37 19:32	18:27 18:23	16:31 16:29
22	05:31 21:37	19:46 (WEA 17-3) 20:55 (WEA 17-2)	06:20 20:41	19:32 19:30	18:23 18:21	16:29 16:27
23	05:32 21:36	19:46 (WEA 17-3) 20:54 (WEA 17-2)	06:21 20:39	19:30 19:27	18:21 18:19	16:27 16:26
24	05:33 21:34	19:47 (WEA 17-3) 20:54 (WEA 17-2)	06:23 20:37	19:27 19:25	18:19 18:17	16:26 16:25
25	05:35 21:33	19:48 (WEA 17-3) 20:53 (WEA 17-2)	06:25 20:35	19:25 19:22	18:17 18:15	16:25 16:24
26	05:36 21:31	19:48 (WEA 17-3) 20:51 (WEA 17-2)	06:26 20:32	19:22 19:20	18:15 18:13	16:24 16:23
27	05:38 21:30	19:50 (WEA 17-3) 20:51 (WEA 17-2)	06:28 20:30	19:18 19:18	18:12 18:11	16:23 16:22
28	05:39 21:28	19:51 (WEA 17-3) 20:49 (WEA 17-2)	06:30 20:28	19:21 19:15	18:13 17:09	16:24 16:21
29	05:41 21:27	19:52 (WEA 17-3) 20:46 (WEA 17-2)	06:31 20:26	19:23 19:13	17:09 17:07	16:21 16:20
30	05:42 21:25	19:54 (WEA 17-3) 20:21 (WEA 17-3)	06:33 20:23	19:25 19:11	17:08 17:05	16:22 16:19
31	05:44 21:24	19:55 (WEA 17-3) 20:19 (WEA 17-3)	06:35 20:21	19:11 19:00	17:05 17:03	16:21 16:22
Sonnenscheinstunden	505	456	382	332	265	241
astr.max.mögl.Beschattung	2074	31				

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 12a - Holle 10/Ost

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:39 16:23	08:12 17:12	07:17 18:04	07:06 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:54	05:12 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:49 21:19	06:40 20:14	07:30 19:04	07:25 16:57	08:17 16:17
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05	05:54 20:57	05:10 21:42	05:11 21:53	05:50 21:17	06:41 20:12	07:32 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:38 16:29	08:03 17:21	07:06 18:14	06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:31 16:51	08:21 16:16
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:57 21:10	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:42 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:26 16:14
11	08:35 16:36	07:54 17:31	06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:49	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:35 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:42 16:41	08:28 16:14
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:14	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:52	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:32	06:31 20:26	05:33 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:31 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:51 16:34	08:33 16:14
18	08:30 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:30	07:52 16:33	08:33 16:14
19	08:29 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:35 17:49	06:31 18:40	06:20 20:35	05:25 21:24	05:04 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:15
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:55	05:32 21:36	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:03 16:25	08:37 16:17
25	08:22 16:59	07:26 17:57	07:22 19:47	06:12 20:42	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:07 16:22	08:38 16:19
28	08:17 17:04	07:20 18:03	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:09	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07	08:11 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:24	06:35 20:21		07:20 17:03		08:39 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 12b - Holle 10/West

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04	07:06 20:00		05:59 20:52	51	18:46 (WEA 17-3) 05:12 20:05 (WEA 17-2) 21:39
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	6	19:00 (WEA 17-3) 05:57 19:06 (WEA 17-3) 20:54	44	18:49 (WEA 17-3) 05:12 20:04 (WEA 17-2) 21:40
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	18	18:54 (WEA 17-3) 05:55 19:12 (WEA 17-3) 20:55	35	18:53 (WEA 17-3) 05:11 20:04 (WEA 17-2) 21:41
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05	24	18:50 (WEA 17-3) 05:54 19:14 (WEA 17-3) 20:57	26	19:38 (WEA 17-2) 05:10 20:04 (WEA 17-2) 21:42
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	28	18:48 (WEA 17-3) 05:52 19:16 (WEA 17-3) 20:59	25	19:38 (WEA 17-2) 05:09 20:03 (WEA 17-2) 21:43
6	08:38 16:29	08:03 17:21	07:06 18:14	06:54 20:08	32	18:46 (WEA 17-3) 05:50 19:18 (WEA 17-3) 21:00	24	19:38 (WEA 17-2) 05:08 20:02 (WEA 17-2) 21:44
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10	34	18:44 (WEA 17-3) 05:48 19:18 (WEA 17-3) 21:02	22	19:39 (WEA 17-2) 05:08 20:01 (WEA 17-2) 21:45
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	36	18:43 (WEA 17-3) 05:46 19:19 (WEA 17-3) 21:04	20	19:40 (WEA 17-2) 05:07 20:00 (WEA 17-2) 21:46
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	38	18:42 (WEA 17-3) 05:44 19:20 (WEA 17-3) 21:05	18	19:41 (WEA 17-2) 05:07 19:59 (WEA 17-2) 21:47
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	40	18:41 (WEA 17-3) 05:42 19:21 (WEA 17-3) 21:07	14	19:43 (WEA 17-2) 05:06 19:57 (WEA 17-2) 21:48
11	08:35 16:36	07:54 17:31	06:55 18:23	06:42 20:17	42	18:39 (WEA 17-3) 05:41 19:21 (WEA 17-3) 21:09	9	19:46 (WEA 17-2) 05:06 19:55 (WEA 17-2) 21:49
12	08:35 16:37	07:52 17:32	06:52 18:24	06:40 20:19	42	18:39 (WEA 17-3) 05:39 19:21 (WEA 17-3) 21:10		05:05 21:50
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21	44	18:38 (WEA 17-3) 05:37 19:22 (WEA 17-3) 21:12		05:05 21:50
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	44	18:38 (WEA 17-3) 05:36 19:22 (WEA 17-3) 21:14		05:05 21:51
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	44	18:38 (WEA 17-3) 05:34 19:22 (WEA 17-3) 21:15		05:05 21:52
16	08:31 16:43	07:45 17:40	06:43 18:32	06:31 20:26	45	18:36 (WEA 17-3) 05:33 19:21 (WEA 17-3) 21:17		05:04 21:52
17	08:31 16:45	07:43 17:42	06:41 18:33	06:29 20:28	45	18:36 (WEA 17-3) 05:31 19:21 (WEA 17-3) 21:18		05:04 21:53
18	08:30 16:47	07:41 17:44	06:38 18:35	06:27 20:29	45	18:36 (WEA 17-3) 05:29 19:21 (WEA 17-3) 21:20		05:04 21:53
19	08:29 16:48	07:39 17:46	06:36 18:37	06:24 20:31	45	18:36 (WEA 17-3) 05:28 19:21 (WEA 17-3) 21:21		05:04 21:53
20	08:28 16:50	07:37 17:48	06:34 18:39	06:22 20:33	54	18:37 (WEA 17-3) 05:27 19:58 (WEA 17-2) 21:23		05:04 21:54
21	08:26 16:52	07:35 17:49	06:31 18:40	06:20 20:35	60	18:37 (WEA 17-3) 05:25 20:01 (WEA 17-2) 21:24		05:04 21:54
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	62	18:37 (WEA 17-3) 05:24 20:02 (WEA 17-2) 21:26		05:05 21:54
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	62	18:38 (WEA 17-3) 05:22 20:03 (WEA 17-2) 21:27		05:05 21:55
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	64	18:38 (WEA 17-3) 05:21 20:04 (WEA 17-2) 21:29		05:05 21:55
25	08:22 16:59	07:26 17:57	07:22 19:47	06:12 20:42	64	18:39 (WEA 17-3) 05:20 20:05 (WEA 17-2) 21:30		05:05 21:55
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	63	18:40 (WEA 17-3) 05:19 20:05 (WEA 17-2) 21:31		05:06 21:55
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	61	18:41 (WEA 17-3) 05:18 20:05 (WEA 17-2) 21:33		05:06 21:55
28	08:18 17:04	07:20 18:03	07:15 19:53	06:05 20:47	59	18:42 (WEA 17-3) 05:16 20:05 (WEA 17-2) 21:34		05:07 21:55
29	08:16 17:06		07:13 19:54	06:03 20:48	57	18:43 (WEA 17-3) 05:15 20:05 (WEA 17-2) 21:35		05:07 21:54
30	08:15 17:08		07:10 19:56	06:01 20:50	53	18:45 (WEA 17-3) 05:14 20:05 (WEA 17-2) 21:37		05:08 21:54
31	08:13 17:10		07:08 19:58			05:13 21:38		
Sonnenscheinstunden	256	275	366	416		487		502
astr.max.mögl.Beschattung				1311		288		

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 12b - Holle 10/West

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	05:08 21:54	05:45 21:22	06:36 20:19	18:39 (WEA 17-3) 19:08	07:21 17:01	08:14 16:19
2	05:09 21:54	05:47 21:20	19:58 (WEA 17-2) 20:02 (WEA 17-2)	18:38 (WEA 17-3) 19:19 (WEA 17-3)	07:28 19:06	08:15 16:18
3	05:10 21:53	05:49 21:19	19:55 (WEA 17-2) 20:06 (WEA 17-2)	18:39 (WEA 17-3) 19:19 (WEA 17-3)	07:30 19:04	08:17 16:17
4	05:11 21:53	05:50 21:17	19:52 (WEA 17-2) 20:08 (WEA 17-2)	18:39 (WEA 17-3) 19:17 (WEA 17-3)	07:32 19:01	08:18 16:17
5	05:11 21:52	05:52 21:15	19:51 (WEA 17-2) 20:10 (WEA 17-2)	18:40 (WEA 17-3) 19:16 (WEA 17-3)	07:33 18:59	08:19 16:16
6	05:12 21:52	05:53 21:13	19:49 (WEA 17-2) 20:10 (WEA 17-2)	18:41 (WEA 17-3) 19:15 (WEA 17-3)	07:35 18:57	08:21 16:16
7	05:13 21:51	05:55 21:11	19:49 (WEA 17-2) 20:11 (WEA 17-2)	18:41 (WEA 17-3) 19:13 (WEA 17-3)	07:37 18:54	08:22 16:15
8	05:14 21:51	05:57 21:10	19:47 (WEA 17-2) 20:12 (WEA 17-2)	18:43 (WEA 17-3) 19:11 (WEA 17-3)	07:38 18:52	08:23 16:15
9	05:15 21:50	05:58 21:08	19:47 (WEA 17-2) 20:13 (WEA 17-2)	18:44 (WEA 17-3) 19:08 (WEA 17-3)	07:40 18:50	08:24 16:14
10	05:16 21:49	06:00 21:06	19:46 (WEA 17-2) 20:12 (WEA 17-2)	18:47 (WEA 17-3) 19:05 (WEA 17-3)	07:42 18:47	08:26 16:14
11	05:17 21:49	06:01 21:04	19:01 (WEA 17-3) 20:13 (WEA 17-2)	18:53 (WEA 17-3) 19:00 (WEA 17-3)	07:44 18:45	08:27 16:14
12	05:18 21:48	06:03 21:02	18:56 (WEA 17-3) 20:13 (WEA 17-2)	06:55 19:53	07:45 18:43	08:28 16:14
13	05:19 21:47	06:05 21:00	18:54 (WEA 17-3) 20:13 (WEA 17-2)	06:56 19:51	07:47 18:41	08:29 16:14
14	05:20 21:46	06:06 20:58	18:52 (WEA 17-3) 20:13 (WEA 17-2)	06:58 19:49	07:49 18:38	08:30 16:14
15	05:22 21:45	06:08 20:56	18:50 (WEA 17-3) 20:13 (WEA 17-2)	07:00 19:46	07:51 18:36	08:31 16:14
16	05:23 21:44	06:10 20:54	18:48 (WEA 17-3) 20:12 (WEA 17-2)	07:01 19:44	07:52 18:34	08:32 16:14
17	05:24 21:43	06:11 20:52	18:47 (WEA 17-3) 20:12 (WEA 17-2)	07:03 19:41	07:54 18:32	08:33 16:14
18	05:25 21:42	06:13 20:50	18:46 (WEA 17-3) 20:12 (WEA 17-2)	07:05 19:39	07:56 18:30	08:33 16:14
19	05:27 21:41	06:15 20:48	18:44 (WEA 17-3) 20:10 (WEA 17-2)	07:06 19:37	07:58 18:27	08:34 16:14
20	05:28 21:39	06:16 20:45	18:44 (WEA 17-3) 20:10 (WEA 17-2)	07:08 19:34	08:00 18:25	08:35 16:15
21	05:29 21:38	06:18 20:43	18:42 (WEA 17-3) 20:08 (WEA 17-2)	07:10 19:32	08:01 18:23	08:35 16:15
22	05:31 21:37	06:20 20:41	18:42 (WEA 17-3) 20:07 (WEA 17-2)	07:11 19:30	08:03 18:21	08:36 16:15
23	05:32 21:36	06:21 20:39	18:41 (WEA 17-3) 20:04 (WEA 17-2)	07:13 19:27	08:05 18:19	08:36 16:16
24	05:33 21:34	06:23 20:37	18:40 (WEA 17-3) 20:01 (WEA 17-2)	07:15 19:25	08:07 18:17	08:37 16:17
25	05:35 21:33	06:25 20:35	18:40 (WEA 17-3) 19:24 (WEA 17-3)	07:16 19:22	08:09 18:15	08:37 16:17
26	05:36 21:31	06:26 20:32	18:39 (WEA 17-3) 19:24 (WEA 17-3)	07:18 19:20	08:10 18:13	08:38 16:18
27	05:38 21:30	06:28 20:30	18:39 (WEA 17-3) 19:24 (WEA 17-3)	07:20 19:18	08:12 18:11	08:38 16:19
28	05:39 21:28	06:30 20:28	18:38 (WEA 17-3) 19:23 (WEA 17-3)	07:21 19:15	07:14 17:09	08:38 16:19
29	05:41 21:27	06:31 20:26	18:38 (WEA 17-3) 19:23 (WEA 17-3)	07:23 19:13	07:16 17:07	08:38 16:20
30	05:42 21:25	06:33 20:23	18:38 (WEA 17-3) 19:22 (WEA 17-3)	07:25 19:11	07:18 17:05	08:38 16:21
31	05:44 21:24	06:35 20:21	18:38 (WEA 17-3) 19:21 (WEA 17-3)	07:20 17:03	07:20 17:03	08:39 16:22
Sonnenscheinstunden	505	456	382	332	265	241
astr.max.mögl.Beschattung		1280	340			

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 13a - Holle 9/Ost

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:39 16:23	08:12 17:12	07:17 18:04	07:06 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:54	05:12 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:48 21:19	06:40 20:14	07:30 19:04	07:25 16:57	08:17 16:17
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05	05:54 20:57	05:10 21:42	05:11 21:53	05:50 21:17	06:41 20:12	07:32 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:38 16:29	08:03 17:21	07:06 18:14	06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:31 16:51	08:21 16:16
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:57 21:10	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:42 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:26 16:14
11	08:35 16:36	07:54 17:31	06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:49	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:35 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:42 16:41	08:28 16:14
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:14	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:52	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:32	06:31 20:26	05:33 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:31 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:51 16:34	08:33 16:14
18	08:30 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:30	07:52 16:33	08:33 16:14
19	08:29 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:28 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:35 17:49	06:31 18:40	06:20 20:35	05:25 21:24	05:04 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:15
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:55	05:32 21:36	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:03 16:25	08:37 16:17
25	08:22 16:59	07:26 17:57	07:22 19:47	06:12 20:42	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:07 16:22	08:38 16:19
28	08:17 17:04	07:20 18:03	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:09	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07	08:11 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:24	06:35 20:21		07:20 17:03		08:39 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 13b - Holle 9/West

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04		07:06 20:00	38	18:14 (WEA 17-3) 18:52 (WEA 17-3)	05:59 20:52	05:12 21:39	19:52 (WEA 17-1) 20:35 (WEA 17-1)
2	08:38 16:24	08:10 17:13	07:15 18:06		07:03 20:01	36	18:15 (WEA 17-3) 18:51 (WEA 17-3)	05:57 20:54	05:12 21:40	19:51 (WEA 17-1) 20:35 (WEA 17-1)
3	08:38 16:25	08:08 17:15	07:13 18:08		07:01 20:03	34	18:16 (WEA 17-3) 18:50 (WEA 17-3)	05:55 20:55	05:11 21:41	19:51 (WEA 17-1) 20:35 (WEA 17-1)
4	08:38 16:27	08:07 17:17	07:11 18:10		06:59 20:05	32	18:16 (WEA 17-3) 18:48 (WEA 17-3)	05:54 20:57	05:10 21:42	19:52 (WEA 17-1) 20:36 (WEA 17-1)
5	08:38 16:28	08:05 17:19	07:08 18:12		06:56 20:07	30	18:17 (WEA 17-3) 18:47 (WEA 17-3)	05:52 20:59	05:09 21:43	19:51 (WEA 17-1) 20:36 (WEA 17-1)
6	08:38 16:29	08:03 17:21	07:06 18:14		06:54 20:08	27	18:19 (WEA 17-3) 18:46 (WEA 17-3)	05:50 21:00	05:08 21:44	19:51 (WEA 17-1) 20:35 (WEA 17-1)
7	08:37 16:30	08:02 17:23	07:04 18:15		06:52 20:10	35	18:20 (WEA 17-3) 19:38 (WEA 17-2)	05:48 21:02	05:08 21:45	19:52 (WEA 17-1) 20:36 (WEA 17-1)
8	08:37 16:32	08:00 17:25	07:02 18:17		06:49 20:12	36	18:22 (WEA 17-3) 19:40 (WEA 17-2)	05:46 21:04	05:07 21:46	19:51 (WEA 17-1) 20:36 (WEA 17-1)
9	08:36 16:33	07:58 17:27	06:59 18:19		06:47 20:14	33	18:25 (WEA 17-3) 19:42 (WEA 17-2)	05:44 21:05	05:07 21:47	19:52 (WEA 17-1) 20:37 (WEA 17-1)
10	08:36 16:34	07:56 17:29	06:57 18:21		06:45 20:15	23	19:20 (WEA 17-2) 19:43 (WEA 17-2)	05:42 21:07	05:06 21:48	19:52 (WEA 17-1) 20:37 (WEA 17-1)
11	08:35 16:36	07:54 17:31	06:55 18:23		06:42 20:17	25	19:18 (WEA 17-2) 19:43 (WEA 17-2)	05:41 21:09	05:06 21:49	19:52 (WEA 17-1) 20:37 (WEA 17-1)
12	08:35 16:37	07:52 17:32	06:52 18:24		06:40 20:19	25	19:18 (WEA 17-2) 19:43 (WEA 17-2)	05:39 21:10	05:05 21:50	19:52 (WEA 17-1) 20:37 (WEA 17-1)
13	08:34 16:39	07:51 17:34	06:50 18:26		06:38 20:21	27	19:17 (WEA 17-2) 19:44 (WEA 17-2)	05:37 21:12	05:05 21:50	19:52 (WEA 17-1) 20:38 (WEA 17-1)
14	08:33 16:40	07:49 17:36	06:48 18:28		06:36 20:22	27	19:17 (WEA 17-2) 19:44 (WEA 17-2)	05:36 21:14	05:05 21:51	19:53 (WEA 17-1) 20:38 (WEA 17-1)
15	08:32 16:42	07:47 17:38	06:45 18:30		06:33 20:24	27	19:17 (WEA 17-2) 19:44 (WEA 17-2)	05:34 21:15	05:05 21:52	19:52 (WEA 17-1) 20:38 (WEA 17-1)
16	08:31 16:43	07:45 17:40	06:43 18:32	12	06:31 20:26	27	19:16 (WEA 17-2) 19:43 (WEA 17-2)	05:33 21:17	05:04 21:52	19:52 (WEA 17-1) 20:38 (WEA 17-1)
17	08:31 16:45	07:43 17:42	06:41 18:33	20	06:29 20:28	26	19:16 (WEA 17-2) 19:42 (WEA 17-2)	05:31 21:18	05:04 21:53	19:53 (WEA 17-1) 20:38 (WEA 17-1)
18	08:30 16:47	07:41 17:44	06:38 18:35	24	06:27 20:29	26	19:16 (WEA 17-2) 19:42 (WEA 17-2)	05:29 21:20	05:04 21:53	19:53 (WEA 17-1) 20:39 (WEA 17-1)
19	08:29 16:48	07:39 17:46	06:36 18:37	28	06:24 20:31	24	19:17 (WEA 17-2) 19:41 (WEA 17-2)	05:28 21:21	05:04 21:53	19:53 (WEA 17-1) 20:39 (WEA 17-1)
20	08:28 16:50	07:37 17:48	06:34 18:39	31	06:22 20:33	23	19:17 (WEA 17-2) 19:40 (WEA 17-2)	05:27 21:23	05:04 21:54	19:54 (WEA 17-1) 20:40 (WEA 17-1)
21	08:26 16:52	07:35 17:49	06:31 18:40	33	06:20 20:35	21	19:18 (WEA 17-2) 19:39 (WEA 17-2)	05:25 21:24	05:04 21:54	19:54 (WEA 17-1) 20:40 (WEA 17-1)
22	08:25 16:53	07:32 17:51	06:29 18:42	35	06:18 20:36	18	19:20 (WEA 17-2) 19:38 (WEA 17-2)	05:24 21:26	05:05 21:54	19:54 (WEA 17-1) 20:40 (WEA 17-1)
23	08:24 16:55	07:30 17:53	06:27 18:44	37	06:16 20:38	15	19:21 (WEA 17-2) 19:36 (WEA 17-2)	05:22 21:27	05:05 21:55	19:54 (WEA 17-1) 20:40 (WEA 17-1)
24	08:23 16:57	07:28 17:55	06:24 18:46	37	06:14 20:40	9	19:24 (WEA 17-2) 19:33 (WEA 17-2)	05:21 21:29	05:05 21:55	19:55 (WEA 17-1) 20:41 (WEA 17-1)
25	08:22 16:59	07:26 17:57	06:22 18:47	39	06:12 20:42		18:16 (WEA 17-3) 18:55 (WEA 17-3)	05:20 21:30	05:05 21:55	19:55 (WEA 17-1) 20:41 (WEA 17-1)
26	08:20 17:01	07:24 17:59	06:20 18:49	39	06:10 20:43		18:15 (WEA 17-3) 18:54 (WEA 17-3)	05:19 21:31	05:06 21:55	19:55 (WEA 17-1) 20:40 (WEA 17-1)
27	08:19 17:02	07:22 18:01	06:17 19:51	39	06:07 20:45		18:15 (WEA 17-3) 18:54 (WEA 17-3)	05:18 21:33	05:06 21:55	19:55 (WEA 17-1) 20:41 (WEA 17-1)
28	08:18 17:04	07:20 18:03	06:15 19:53	40	06:05 20:47		18:15 (WEA 17-3) 18:55 (WEA 17-3)	05:16 21:34	05:07 21:55	19:55 (WEA 17-1) 20:41 (WEA 17-1)
29	08:16 17:06		07:13 19:54	40	06:03 20:48		18:14 (WEA 17-3) 18:54 (WEA 17-3)	05:15 21:35	05:07 21:54	19:56 (WEA 17-1) 20:41 (WEA 17-1)
30	08:15 17:08		07:10 19:56	40	06:01 20:50		18:14 (WEA 17-3) 18:53 (WEA 17-3)	05:14 21:37	05:08 21:54	19:56 (WEA 17-1) 20:41 (WEA 17-1)
31	08:13 17:10		07:08 19:58	38			18:15 (WEA 17-3) 18:53 (WEA 17-3)	05:13 21:38		
Sonneneinstrahlung										
astr. max. mögl. Beschattung										
	256	275	366	531	644		549		502	1356

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 13b - Holle 9/West

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	05:08	19:56 (WEA 17-1)	05:45	06:36	19:18 (WEA 17-2)	07:26	07:21	08:14			
	21:54	46 20:42 (WEA 17-1)	21:22	20:19	25 19:43 (WEA 17-2)	19:08	17:01	16:19			
2	05:09	19:57 (WEA 17-1)	05:47	06:38	19:17 (WEA 17-2)	07:28	07:23	08:15			
	21:54	45 20:42 (WEA 17-1)	21:20	20:17	25 19:42 (WEA 17-2)	19:06	16:59	16:18			
3	05:10	19:56 (WEA 17-1)	05:48	06:40	19:18 (WEA 17-2)	07:30	07:25	08:17			
	21:53	46 20:42 (WEA 17-1)	21:19	20:14	23 19:41 (WEA 17-2)	19:04	16:57	16:17			
4	05:11	19:57 (WEA 17-1)	05:50	06:41	18:22 (WEA 17-3)	07:32	07:27	08:18			
	21:53	45 20:42 (WEA 17-1)	21:17	20:12	33 19:39 (WEA 17-2)	19:01	16:55	16:17			
5	05:11	19:57 (WEA 17-1)	05:52	06:43	18:19 (WEA 17-3)	07:33	07:29	08:19			
	21:52	45 20:42 (WEA 17-1)	21:15	20:10	36 19:37 (WEA 17-2)	18:59	16:53	16:16			
6	05:12	19:58 (WEA 17-1)	05:53	06:45	18:17 (WEA 17-3)	07:35	07:31	08:21			
	21:52	45 20:43 (WEA 17-1)	21:13	20:07	35 19:35 (WEA 17-2)	18:57	16:51	16:16			
7	05:13	19:57 (WEA 17-1)	05:55	06:46	18:14 (WEA 17-3)	07:37	07:32	08:22			
	21:51	45 20:42 (WEA 17-1)	21:11	20:05	27 18:41 (WEA 17-3)	18:54	16:50	16:15			
8	05:14	19:58 (WEA 17-1)	05:57	06:48	18:12 (WEA 17-3)	07:38	07:34	08:23			
	21:51	44 20:42 (WEA 17-1)	21:10	20:03	30 18:42 (WEA 17-3)	18:52	16:48	16:15			
9	05:15	19:58 (WEA 17-1)	05:58	06:50	18:10 (WEA 17-3)	07:40	07:36	08:24			
	21:50	44 20:42 (WEA 17-1)	21:08	20:00	32 18:42 (WEA 17-3)	18:50	16:46	16:14			
10	05:16	19:58 (WEA 17-1)	06:00	06:51	18:09 (WEA 17-3)	07:42	07:38	08:26			
	21:49	44 20:42 (WEA 17-1)	21:06	19:58	34 18:43 (WEA 17-3)	18:47	16:45	16:14			
11	05:17	19:59 (WEA 17-1)	06:01	06:53	18:08 (WEA 17-3)	07:44	07:40	08:27			
	21:49	43 20:42 (WEA 17-1)	21:04	19:56	36 18:44 (WEA 17-3)	18:45	16:43	16:14			
12	05:18	19:59 (WEA 17-1)	06:03	06:55	18:07 (WEA 17-3)	07:45	07:42	08:28			
	21:48	43 20:42 (WEA 17-1)	21:02	19:53	37 18:44 (WEA 17-3)	18:43	16:41	16:14			
13	05:19	19:59 (WEA 17-1)	06:05	06:56	18:06 (WEA 17-3)	07:47	07:43	08:29			
	21:47	43 20:42 (WEA 17-1)	21:00	19:51	38 18:44 (WEA 17-3)	18:41	16:40	16:14			
14	05:20	20:00 (WEA 17-1)	06:06	06:58	18:05 (WEA 17-3)	07:49	07:45	08:30			
	21:46	42 20:42 (WEA 17-1)	20:58	19:49	39 18:44 (WEA 17-3)	18:38	16:38	16:14			
15	05:22	20:00 (WEA 17-1)	06:08	07:00	18:04 (WEA 17-3)	07:51	07:47	08:31			
	21:45	41 20:41 (WEA 17-1)	20:56	19:46	40 18:44 (WEA 17-3)	18:36	16:37	16:14			
16	05:23	20:01 (WEA 17-1)	06:10	07:01	18:04 (WEA 17-3)	07:52	07:49	08:32			
	21:44	41 20:42 (WEA 17-1)	20:54	19:44	40 18:44 (WEA 17-3)	18:34	16:35	16:14			
17	05:24	20:02 (WEA 17-1)	06:11	07:03	18:03 (WEA 17-3)	07:54	07:51	08:33			
	21:43	40 20:42 (WEA 17-1)	20:52	19:41	40 18:43 (WEA 17-3)	18:32	16:34	16:14			
18	05:25	20:02 (WEA 17-1)	06:13	07:05	18:03 (WEA 17-3)	07:56	07:52	08:33			
	21:42	39 20:41 (WEA 17-1)	20:50	19:39	40 18:43 (WEA 17-3)	18:30	16:33	16:14			
19	05:27	20:02 (WEA 17-1)	06:15	07:06	18:04 (WEA 17-3)	07:58	07:54	08:34			
	21:41	38 20:40 (WEA 17-1)	20:48	19:37	38 18:42 (WEA 17-3)	18:27	16:31	16:14			
20	05:28	20:03 (WEA 17-1)	06:16	07:08	18:03 (WEA 17-3)	08:00	07:56	08:35			
	21:39	37 20:40 (WEA 17-1)	20:45	11 19:29 (WEA 17-2)	19:34	38 18:41 (WEA 17-3)	18:25	16:30	16:15		
21	05:29	20:04 (WEA 17-1)	06:18	19:25 (WEA 17-2)	07:10	18:03 (WEA 17-3)	08:01	07:57	08:35		
	21:38	36 20:40 (WEA 17-1)	20:43	16 19:41 (WEA 17-2)	19:32	37 18:40 (WEA 17-3)	18:23	16:29	16:15		
22	05:31	20:05 (WEA 17-1)	06:20	19:24 (WEA 17-2)	07:11	18:04 (WEA 17-3)	08:03	07:59	08:36		
	21:37	34 20:39 (WEA 17-1)	20:41	19 19:43 (WEA 17-2)	19:30	36 18:40 (WEA 17-3)	18:21	16:27	16:15		
23	05:32	20:05 (WEA 17-1)	06:21	07:13	19:22 (WEA 17-2)	07:13	18:04 (WEA 17-3)	08:05	08:01	08:36	
	21:36	33 20:38 (WEA 17-1)	20:39	21 19:43 (WEA 17-2)	19:27	34 18:38 (WEA 17-3)	18:19	16:26	16:16		
24	05:33	20:07 (WEA 17-1)	06:23	07:15	19:21 (WEA 17-2)	07:15	18:05 (WEA 17-3)	08:07	08:03	08:37	
	21:34	31 20:38 (WEA 17-1)	20:37	23 19:44 (WEA 17-2)	19:25	31 18:36 (WEA 17-3)	18:17	16:25	16:17		
25	05:35	20:08 (WEA 17-1)	06:25	07:16	19:20 (WEA 17-2)	07:16	18:06 (WEA 17-3)	08:09	08:04	08:37	
	21:33	28 20:36 (WEA 17-1)	20:35	25 19:45 (WEA 17-2)	19:22	29 18:35 (WEA 17-3)	18:15	16:24	16:17		
26	05:36	20:08 (WEA 17-1)	06:26	07:18	19:19 (WEA 17-2)	07:18	18:07 (WEA 17-3)	08:10	08:06	08:38	
	21:31	27 20:35 (WEA 17-1)	20:32	26 19:45 (WEA 17-2)	19:20	25 18:32 (WEA 17-3)	18:13	16:23	16:18		
27	05:38	20:11 (WEA 17-1)	06:28	07:20	19:19 (WEA 17-2)	07:20	18:09 (WEA 17-3)	08:12	08:07	08:38	
	21:30	23 20:34 (WEA 17-1)	20:30	26 19:45 (WEA 17-2)	19:18	21 18:30 (WEA 17-3)	18:11	16:22	16:19		
28	05:39	20:12 (WEA 17-1)	06:30	07:21	19:18 (WEA 17-2)	07:21	18:12 (WEA 17-3)	07:14	08:09	08:38	
	21:28	20 20:32 (WEA 17-1)	20:28	26 19:44 (WEA 17-2)	19:15	15 18:27 (WEA 17-3)	17:09	16:21	16:19		
29	05:41	20:14 (WEA 17-1)	06:31	07:23	19:18 (WEA 17-2)	07:23	17:16	08:11	08:38		
	21:27	15 20:29 (WEA 17-1)	20:26	27 19:45 (WEA 17-2)	19:13		17:07	16:20	16:20		
30	05:42	20:19 (WEA 17-1)	06:33	07:25	19:17 (WEA 17-2)	07:25	17:18	08:12	08:38		
	21:25	6 20:25 (WEA 17-1)	20:23	27 19:44 (WEA 17-2)	19:11		17:05	16:19	16:21		
31	05:44		06:35	19:17 (WEA 17-2)			07:20		08:39		
	21:24		20:21	26 19:43 (WEA 17-2)			17:03		16:22		
Sonnenscheinstunden		505			382						
astr.max.mögl.Beschattung		1109	456	273	914	332	265	241			

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)
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SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 14a - Holle 7/Ost

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:39 16:23	08:12 17:12	07:17 18:04	07:06 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:54	05:12 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:48 21:19	06:40 20:14	07:30 19:04	07:25 16:57	08:17 16:17
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05	05:54 20:57	05:10 21:42	05:11 21:53	05:50 21:17	06:41 20:12	07:32 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:38 16:29	08:03 17:21	07:06 18:14	06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:31 16:51	08:21 16:16
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:56 21:10	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:42 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:26 16:14
11	08:35 16:36	07:54 17:30	06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:49	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:35 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:42 16:41	08:28 16:14
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:14	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:52	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:32	06:31 20:26	05:33 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:31 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:51 16:34	08:33 16:14
18	08:30 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:30	07:52 16:33	08:33 16:14
19	08:29 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:28 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:35 17:49	06:31 18:40	06:20 20:35	05:25 21:24	05:04 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:15
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:55	05:32 21:36	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:03 16:25	08:37 16:17
25	08:22 16:59	07:26 17:57	07:22 19:47	06:12 20:42	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:07 16:22	08:38 16:19
28	08:18 17:04	07:20 18:03	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	08:14 17:09	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07	08:11 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:24	06:35 20:21		07:20 17:03		08:39 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

Schattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 14b - Holle 7/West

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04		07:06 20:00	13	19:16 (WEA 17-2) 19:29 (WEA 17-2)	05:59 20:52	15	19:43 (WEA 17-1) 19:58 (WEA 17-1)	05:12 21:39	40	19:32 (WEA 17-1) 20:12 (WEA 17-1)
2	08:38 16:24	08:10 17:13	07:15 18:06		07:03 20:01	17	19:14 (WEA 17-2) 19:31 (WEA 17-2)	05:57 20:54	21	19:40 (WEA 17-1) 20:01 (WEA 17-1)	05:12 21:40	40	19:32 (WEA 17-1) 20:12 (WEA 17-1)
3	08:38 16:25	08:08 17:15	07:13 18:08		07:01 20:03	20	19:12 (WEA 17-2) 19:32 (WEA 17-2)	05:55 20:55	25	19:38 (WEA 17-1) 20:03 (WEA 17-1)	05:11 21:41	39	19:32 (WEA 17-1) 20:11 (WEA 17-1)
4	08:38 16:27	08:07 17:17	07:11 18:10		06:59 20:05	22	19:10 (WEA 17-2) 19:32 (WEA 17-2)	05:54 20:57	28	19:37 (WEA 17-1) 20:05 (WEA 17-1)	05:10 21:42	38	19:34 (WEA 17-1) 20:12 (WEA 17-1)
5	08:38 16:28	08:05 17:19	07:08 18:12		06:56 20:07	24	19:09 (WEA 17-2) 19:33 (WEA 17-2)	05:52 20:59	31	19:35 (WEA 17-1) 20:06 (WEA 17-1)	05:09 21:43	37	19:34 (WEA 17-1) 20:11 (WEA 17-1)
6	08:38 16:29	08:03 17:21	07:06 18:14		06:54 20:08	25	19:09 (WEA 17-2) 19:34 (WEA 17-2)	05:50 21:00	33	19:34 (WEA 17-1) 20:07 (WEA 17-1)	05:08 21:44	37	19:34 (WEA 17-1) 20:11 (WEA 17-1)
7	08:37 16:30	08:02 17:23	07:04 18:15		06:52 20:10	26	19:07 (WEA 17-2) 19:33 (WEA 17-2)	05:48 21:02	35	19:32 (WEA 17-1) 20:07 (WEA 17-1)	05:08 21:45	36	19:35 (WEA 17-1) 20:11 (WEA 17-1)
8	08:37 16:32	08:00 17:25	07:02 18:17		06:49 20:12	26	19:07 (WEA 17-2) 19:33 (WEA 17-2)	05:46 21:04	37	19:32 (WEA 17-1) 20:09 (WEA 17-1)	05:07 21:46	36	19:35 (WEA 17-1) 20:11 (WEA 17-1)
9	08:36 16:33	07:58 17:27	06:59 18:19	8	17:23 (WEA 17-3) 17:31 (WEA 17-3)	26	17:19 (WEA 17-3) 17:35 (WEA 17-3)	06:47 20:14	38	19:31 (WEA 17-1) 20:09 (WEA 17-1)	05:07 21:47	35	19:36 (WEA 17-1) 20:11 (WEA 17-1)
10	08:36 16:34	07:56 17:29	06:57 18:21	16	17:15 (WEA 17-3) 17:37 (WEA 17-3)	26	17:15 (WEA 17-3) 17:37 (WEA 17-3)	06:45 20:15	39	19:30 (WEA 17-1) 20:09 (WEA 17-1)	05:06 21:48	34	19:37 (WEA 17-1) 20:11 (WEA 17-1)
11	08:35 16:36	07:54 17:30	06:55 18:23	22	17:13 (WEA 17-3) 17:39 (WEA 17-3)	26	17:13 (WEA 17-3) 17:39 (WEA 17-3)	06:42 20:17	40	19:30 (WEA 17-1) 20:10 (WEA 17-1)	05:06 21:49	34	19:36 (WEA 17-1) 20:10 (WEA 17-1)
12	08:35 16:37	07:52 17:32	06:52 18:24	26	17:12 (WEA 17-3) 17:41 (WEA 17-3)	25	17:12 (WEA 17-3) 17:41 (WEA 17-3)	06:40 20:19	41	19:29 (WEA 17-1) 20:10 (WEA 17-1)	05:05 21:50	34	19:37 (WEA 17-1) 20:11 (WEA 17-1)
13	08:34 16:39	07:51 17:34	06:50 18:26	29	17:10 (WEA 17-3) 17:41 (WEA 17-3)	24	17:10 (WEA 17-3) 17:41 (WEA 17-3)	06:38 20:21	42	19:28 (WEA 17-1) 20:11 (WEA 17-1)	05:05 21:50	33	19:38 (WEA 17-1) 20:11 (WEA 17-1)
14	08:33 16:40	07:49 17:36	06:48 18:28	31	17:09 (WEA 17-3) 17:42 (WEA 17-3)	22	17:09 (WEA 17-3) 17:42 (WEA 17-3)	06:36 20:22	43	19:28 (WEA 17-1) 20:11 (WEA 17-1)	05:05 21:51	33	19:38 (WEA 17-1) 20:11 (WEA 17-1)
15	08:32 16:42	07:47 17:38	06:45 18:30	33	17:07 (WEA 17-3) 17:42 (WEA 17-3)	20	17:07 (WEA 17-3) 17:42 (WEA 17-3)	06:33 20:24	44	19:29 (WEA 17-1) 20:12 (WEA 17-1)	05:05 21:52	32	19:39 (WEA 17-1) 20:10 (WEA 17-1)
16	08:31 16:43	07:45 17:40	06:43 18:32	35	17:07 (WEA 17-3) 17:42 (WEA 17-3)	18	17:07 (WEA 17-3) 17:42 (WEA 17-3)	06:31 20:26	43	19:28 (WEA 17-1) 20:12 (WEA 17-1)	05:04 21:52	32	19:38 (WEA 17-1) 20:10 (WEA 17-1)
17	08:31 16:45	07:43 17:42	06:41 18:33	36	17:07 (WEA 17-3) 17:43 (WEA 17-3)	13	17:07 (WEA 17-3) 17:43 (WEA 17-3)	06:29 20:28	44	19:28 (WEA 17-1) 20:12 (WEA 17-1)	05:04 21:53	31	19:39 (WEA 17-1) 20:10 (WEA 17-1)
18	08:30 16:47	07:41 17:44	06:38 18:35	37	17:05 (WEA 17-3) 17:42 (WEA 17-3)	6	17:05 (WEA 17-3) 17:42 (WEA 17-3)	06:27 20:29	44	19:28 (WEA 17-1) 20:12 (WEA 17-1)	05:04 21:53	31	19:39 (WEA 17-1) 20:11 (WEA 17-1)
19	08:29 16:48	07:39 17:46	06:36 18:37	38	17:05 (WEA 17-3) 17:43 (WEA 17-3)	20	17:05 (WEA 17-3) 17:43 (WEA 17-3)	06:24 20:31	44	19:28 (WEA 17-1) 20:12 (WEA 17-1)	05:04 21:53	32	19:39 (WEA 17-1) 20:11 (WEA 17-1)
20	08:28 16:50	07:37 17:48	06:34 18:39	38	17:06 (WEA 17-3) 17:43 (WEA 17-3)	20	17:06 (WEA 17-3) 17:43 (WEA 17-3)	06:22 20:33	44	19:28 (WEA 17-1) 20:12 (WEA 17-1)	05:04 21:54	32	19:40 (WEA 17-1) 20:12 (WEA 17-1)
21	08:26 16:52	07:35 17:49	06:31 18:40	37	17:05 (WEA 17-3) 17:42 (WEA 17-3)	20	17:05 (WEA 17-3) 17:42 (WEA 17-3)	06:20 20:35	44	19:29 (WEA 17-1) 20:13 (WEA 17-1)	05:04 21:54	31	19:41 (WEA 17-1) 20:12 (WEA 17-1)
22	08:25 16:53	07:32 17:51	06:29 18:42	37	17:05 (WEA 17-3) 17:41 (WEA 17-3)	20	17:05 (WEA 17-3) 17:41 (WEA 17-3)	06:18 20:36	44	19:28 (WEA 17-1) 20:12 (WEA 17-1)	05:05 21:54	31	19:41 (WEA 17-1) 20:12 (WEA 17-1)
23	08:24 16:55	07:30 17:53	06:27 18:44	36	17:06 (WEA 17-3) 17:41 (WEA 17-3)	20	17:06 (WEA 17-3) 17:41 (WEA 17-3)	06:16 20:38	44	19:28 (WEA 17-1) 20:12 (WEA 17-1)	05:05 21:55	31	19:41 (WEA 17-1) 20:12 (WEA 17-1)
24	08:23 16:57	07:28 17:55	06:24 18:46	35	17:05 (WEA 17-3) 17:39 (WEA 17-3)	20	17:05 (WEA 17-3) 17:39 (WEA 17-3)	06:14 20:40	43	19:29 (WEA 17-1) 20:12 (WEA 17-1)	05:05 21:55	32	19:41 (WEA 17-1) 20:13 (WEA 17-1)
25	08:22 16:59	07:26 17:57	06:22 18:47	34	18:06 (WEA 17-3) 18:39 (WEA 17-3)	20	18:06 (WEA 17-3) 18:39 (WEA 17-3)	06:12 20:42	43	19:29 (WEA 17-1) 20:12 (WEA 17-1)	05:05 21:55	32	19:41 (WEA 17-1) 20:13 (WEA 17-1)
26	08:20 17:01	07:24 17:59	06:20 18:49	33	18:06 (WEA 17-3) 18:37 (WEA 17-3)	20	18:06 (WEA 17-3) 18:37 (WEA 17-3)	06:10 20:43	43	19:29 (WEA 17-1) 20:12 (WEA 17-1)	05:06 21:55	31	19:41 (WEA 17-1) 20:12 (WEA 17-1)
27	08:19 17:02	07:22 18:01	06:17 19:51	31	18:08 (WEA 17-3) 18:36 (WEA 17-3)	20	18:08 (WEA 17-3) 18:36 (WEA 17-3)	06:07 20:45	42	19:30 (WEA 17-1) 20:12 (WEA 17-1)	05:06 21:55	31	19:42 (WEA 17-1) 20:13 (WEA 17-1)
28	08:18 17:04	07:20 18:03	06:15 19:53	28	18:09 (WEA 17-3) 18:34 (WEA 17-3)	20	18:09 (WEA 17-3) 18:34 (WEA 17-3)	06:05 20:47	42	19:30 (WEA 17-1) 20:12 (WEA 17-1)	05:07 21:55	32	19:41 (WEA 17-1) 20:13 (WEA 17-1)
29	08:16 17:06		07:13 19:54	25	18:10 (WEA 17-3) 18:32 (WEA 17-3)	20	18:10 (WEA 17-3) 18:32 (WEA 17-3)	06:03 20:48	42	19:30 (WEA 17-1) 20:12 (WEA 17-1)	05:07 21:54	32	19:42 (WEA 17-1) 20:14 (WEA 17-1)
30	08:15 17:08		07:10 19:56	22	18:13 (WEA 17-3) 18:29 (WEA 17-3)	20	18:13 (WEA 17-3) 18:29 (WEA 17-3)	06:01 20:50	42	19:31 (WEA 17-1) 20:12 (WEA 17-1)	05:08 21:54	32	19:41 (WEA 17-1) 20:14 (WEA 17-1)
31	08:13 17:10		07:08 19:58	16	18:18 (WEA 17-3) 19:25 (WEA 17-2)	3	19:50 (WEA 17-1) 19:53 (WEA 17-1)	05:13 21:37	41	19:31 (WEA 17-1) 20:11 (WEA 17-1)		33	20:14 (WEA 17-1)
	Sonnenscheinstunden	256	275	366	416			487			502		
	astr.max.mögl.Beschattung			691	356			1199			1013		

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:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 14b - Holle 7/West**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli		August		September		Oktober		November		Dezember	
1	05:08	19:41 (WEA 17-1)	05:45	19:40 (WEA 17-1)	06:36	19:07 (WEA 17-2)	07:26	17:49 (WEA 17-3)	07:21	08:14		
	21:54	20:15 (WEA 17-1)	21:22	20:22 (WEA 17-1)	20:19	19:31 (WEA 17-2)	19:08	18:21 (WEA 17-3)	17:01	16:19		
2	05:09	19:42 (WEA 17-1)	05:47	19:40 (WEA 17-1)	06:38	19:06 (WEA 17-2)	07:28	17:50 (WEA 17-3)	07:23	08:15		
	21:54	20:16 (WEA 17-1)	21:20	20:21 (WEA 17-1)	20:17	19:31 (WEA 17-2)	19:06	18:20 (WEA 17-3)	16:59	16:18		
3	05:10	19:41 (WEA 17-1)	05:48	19:41 (WEA 17-1)	06:40	19:05 (WEA 17-2)	07:30	17:51 (WEA 17-3)	07:25	08:17		
	21:53	20:15 (WEA 17-1)	21:19	20:21 (WEA 17-1)	20:14	19:31 (WEA 17-2)	19:04	18:18 (WEA 17-3)	16:57	16:17		
4	05:11	19:41 (WEA 17-1)	05:50	19:41 (WEA 17-1)	06:41	19:04 (WEA 17-2)	07:32	17:52 (WEA 17-3)	07:27	08:18		
	21:53	20:16 (WEA 17-1)	21:17	20:20 (WEA 17-1)	20:12	19:30 (WEA 17-2)	19:01	18:16 (WEA 17-3)	16:55	16:17		
5	05:11	19:41 (WEA 17-1)	05:52	19:42 (WEA 17-1)	06:43	19:04 (WEA 17-2)	07:33	17:54 (WEA 17-3)	07:29	08:19		
	21:52	20:17 (WEA 17-1)	21:15	20:19 (WEA 17-1)	20:10	19:30 (WEA 17-2)	18:59	18:14 (WEA 17-3)	16:53	16:16		
6	05:12	19:41 (WEA 17-1)	05:53	19:42 (WEA 17-1)	06:45	19:04 (WEA 17-2)	07:35	17:57 (WEA 17-3)	07:31	08:21		
	21:52	20:17 (WEA 17-1)	21:13	20:18 (WEA 17-1)	20:07	19:30 (WEA 17-2)	18:57	18:10 (WEA 17-3)	16:51	16:16		
7	05:13	19:40 (WEA 17-1)	05:55	19:43 (WEA 17-1)	06:46	19:04 (WEA 17-2)	07:37		07:32	08:22		
	21:51	20:17 (WEA 17-1)	21:11	20:17 (WEA 17-1)	20:05	19:29 (WEA 17-2)	18:54		16:50	16:15		
8	05:14	19:40 (WEA 17-1)	05:57	19:43 (WEA 17-1)	06:48	19:04 (WEA 17-2)	07:38		07:34	08:23		
	21:51	20:17 (WEA 17-1)	21:10	20:16 (WEA 17-1)	20:03	19:28 (WEA 17-2)	18:52		16:48	16:15		
9	05:15	19:40 (WEA 17-1)	05:58	19:45 (WEA 17-1)	06:50	19:04 (WEA 17-2)	07:40		07:36	08:24		
	21:50	20:18 (WEA 17-1)	21:08	20:15 (WEA 17-1)	20:00	19:27 (WEA 17-2)	18:50		16:46	16:14		
10	05:16	19:40 (WEA 17-1)	06:00	19:46 (WEA 17-1)	06:51	19:05 (WEA 17-2)	07:42		07:38	08:26		
	21:49	20:19 (WEA 17-1)	21:06	20:13 (WEA 17-1)	19:58	19:26 (WEA 17-2)	18:47		16:45	16:14		
11	05:17	19:40 (WEA 17-1)	06:01	19:48 (WEA 17-1)	06:53	19:07 (WEA 17-2)	07:44		07:40	08:27		
	21:49	20:19 (WEA 17-1)	21:04	20:11 (WEA 17-1)	19:56	19:24 (WEA 17-2)	18:45		16:43	16:14		
12	05:18	19:40 (WEA 17-1)	06:03	19:49 (WEA 17-1)	06:55	19:08 (WEA 17-2)	07:45		07:42	08:28		
	21:48	20:19 (WEA 17-1)	21:02	20:09 (WEA 17-1)	19:53	19:21 (WEA 17-2)	18:43		16:41	16:14		
13	05:19	19:39 (WEA 17-1)	06:05	19:53 (WEA 17-1)	06:56	18:10 (WEA 17-3)	07:47		07:43	08:29		
	21:47	20:20 (WEA 17-1)	21:00	20:06 (WEA 17-1)	19:51	19:17 (WEA 17-2)	18:41		16:40	16:14		
14	05:20	19:39 (WEA 17-1)	06:06		06:58	18:04 (WEA 17-3)	07:49		07:45	08:30		
	21:46	20:20 (WEA 17-1)	20:58		19:49	18:19 (WEA 17-3)	18:38		16:38	16:14		
15	05:22	19:39 (WEA 17-1)	06:08		07:00	18:01 (WEA 17-3)	07:51		07:47	08:31		
	21:45	20:20 (WEA 17-1)	20:56		19:46	18:22 (WEA 17-3)	18:36		16:37	16:14		
16	05:23	19:40 (WEA 17-1)	06:10		07:01	17:59 (WEA 17-3)	07:52		07:49	08:32		
	21:44	20:21 (WEA 17-1)	20:54		19:44	18:24 (WEA 17-3)	18:34		16:35	16:14		
17	05:24	19:39 (WEA 17-1)	06:11		07:03	17:56 (WEA 17-3)	07:54		07:51	08:33		
	21:43	20:22 (WEA 17-1)	20:52		19:41	18:24 (WEA 17-3)	18:32		16:34	16:14		
18	05:25	19:39 (WEA 17-1)	06:13		07:05	17:55 (WEA 17-3)	07:56		07:52	08:33		
	21:42	20:22 (WEA 17-1)	20:50		19:39	18:25 (WEA 17-3)	18:30		16:33	16:14		
19	05:27	19:39 (WEA 17-1)	06:15		07:06	17:54 (WEA 17-3)	07:58		07:54	08:34		
	21:41	20:22 (WEA 17-1)	20:48		19:37	18:26 (WEA 17-3)	18:27		16:31	16:14		
20	05:28	19:38 (WEA 17-1)	06:16		07:08	17:52 (WEA 17-3)	08:00		07:56	08:35		
	21:39	20:22 (WEA 17-1)	20:45		19:34	18:26 (WEA 17-3)	18:25		16:30	16:15		
21	05:29	19:39 (WEA 17-1)	06:18		07:10	17:51 (WEA 17-3)	08:01		07:57	08:35		
	21:38	20:23 (WEA 17-1)	20:43		19:32	18:26 (WEA 17-3)	18:23		16:29	16:15		
22	05:31	19:39 (WEA 17-1)	06:20		07:11	17:51 (WEA 17-3)	08:03		07:59	08:36		
	21:37	20:23 (WEA 17-1)	20:41		19:30	18:27 (WEA 17-3)	18:21		16:27	16:15		
23	05:32	19:38 (WEA 17-1)	06:21		07:13	17:49 (WEA 17-3)	08:05		08:01	08:36		
	21:36	20:22 (WEA 17-1)	20:39		19:27	18:26 (WEA 17-3)	18:19		16:26	16:16		
24	05:33	19:39 (WEA 17-1)	06:23		07:15	17:49 (WEA 17-3)	08:07		08:03	08:37		
	21:34	20:23 (WEA 17-1)	20:37		19:25	18:26 (WEA 17-3)	18:17		16:25	16:17		
25	05:35	19:39 (WEA 17-1)	06:25		07:16	17:49 (WEA 17-3)	08:09		08:04	08:37		
	21:33	20:23 (WEA 17-1)	20:35		19:22	18:26 (WEA 17-3)	18:15		16:24	16:17		
26	05:36	19:38 (WEA 17-1)	06:26		07:18	17:48 (WEA 17-3)	08:10		08:06	08:38		
	21:31	20:22 (WEA 17-1)	20:32		19:20	18:25 (WEA 17-3)	18:13		16:23	16:18		
27	05:38	19:39 (WEA 17-1)	06:28	19:17 (WEA 17-2)	07:20	17:48 (WEA 17-3)	08:12		08:07	08:38		
	21:30	20:23 (WEA 17-1)	20:30	19:24 (WEA 17-2)	19:18	18:25 (WEA 17-3)	18:11		16:22	16:19		
28	05:39	19:39 (WEA 17-1)	06:30	19:13 (WEA 17-2)	07:21	17:48 (WEA 17-3)	07:14		08:09	08:38		
	21:28	20:22 (WEA 17-1)	20:28	19:27 (WEA 17-2)	19:15	18:24 (WEA 17-3)	17:09		16:21	16:19		
29	05:41	19:38 (WEA 17-1)	06:31	19:11 (WEA 17-2)	07:23	17:48 (WEA 17-3)	07:16		08:11	08:38		
	21:27	20:22 (WEA 17-1)	20:26	19:28 (WEA 17-2)	19:13	18:23 (WEA 17-3)	17:07		16:20	16:20		
30	05:42	19:39 (WEA 17-1)	06:33	19:09 (WEA 17-2)	07:25	17:49 (WEA 17-3)	07:18		08:12	08:38		
	21:25	20:22 (WEA 17-1)	20:23	19:29 (WEA 17-2)	19:11	18:22 (WEA 17-3)	17:05		16:19	16:21		
31	05:44	19:39 (WEA 17-1)	06:35	19:08 (WEA 17-2)			07:20			08:39		
	21:24	20:21 (WEA 17-1)	20:21	19:30 (WEA 17-2)			17:03			16:22		
Sonnenscheinstunden	505		456		382		332		265	241		
astr. max. mögl. Beschattung	1255		495		832		146					

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 15a - Holle 5/Süd

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04	16:30 (WEA 17-3) 17:01 (WEA 17-3)	07:06 20:00	18:45 (WEA 17-1) 19:11 (WEA 17-1)
2	08:38 16:24	08:10 17:13	07:15 18:06	16:31 (WEA 17-3) 17:00 (WEA 17-3)	07:03 20:01	18:43 (WEA 17-1) 19:13 (WEA 17-1)
3	08:38 16:25	08:08 17:15	07:13 18:08	16:32 (WEA 17-3) 17:00 (WEA 17-3)	07:01 20:03	18:41 (WEA 17-1) 19:14 (WEA 17-1)
4	08:38 16:27	08:07 17:17	07:11 18:10	16:33 (WEA 17-3) 16:58 (WEA 17-3)	06:59 20:05	18:39 (WEA 17-1) 19:14 (WEA 17-1)
5	08:38 16:28	08:05 17:19	07:08 18:12	16:34 (WEA 17-3) 16:56 (WEA 17-3)	06:56 20:07	18:38 (WEA 17-1) 19:15 (WEA 17-1)
6	08:38 16:29	08:03 17:21	07:06 18:14	16:37 (WEA 17-3) 16:54 (WEA 17-3)	06:54 20:08	18:37 (WEA 17-1) 19:16 (WEA 17-1)
7	08:37 16:30	08:02 17:23	07:04 18:15	16:39 (WEA 17-3) 16:50 (WEA 17-3)	06:52 20:10	18:36 (WEA 17-1) 19:16 (WEA 17-1)
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	18:35 (WEA 17-1) 19:16 (WEA 17-1)
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	18:35 (WEA 17-1) 19:16 (WEA 17-1)
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:42 21:07	18:35 (WEA 17-1) 19:17 (WEA 17-1)
11	08:35 16:36	07:54 17:30	06:55 18:23	06:42 20:17	05:41 21:09	18:33 (WEA 17-1) 19:16 (WEA 17-1)
12	08:35 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	18:33 (WEA 17-1) 19:16 (WEA 17-1)
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21	05:37 21:12	18:33 (WEA 17-1) 19:16 (WEA 17-1)
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:14	18:33 (WEA 17-1) 19:16 (WEA 17-1)
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	18:34 (WEA 17-1) 19:15 (WEA 17-1)
16	08:31 16:43	07:45 17:40	06:43 18:32	06:31 20:26	05:33 21:17	18:33 (WEA 17-1) 19:14 (WEA 17-1)
17	08:31 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	18:33 (WEA 17-1) 19:13 (WEA 17-1)
18	08:30 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	18:34 (WEA 17-1) 19:13 (WEA 17-1)
19	08:29 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	18:35 (WEA 17-1) 19:12 (WEA 17-1)
20	08:28 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	18:36 (WEA 17-1) 19:11 (WEA 17-1)
21	08:26 16:52	07:35 17:49	06:31 18:40	06:20 20:35	05:25 21:24	18:36 (WEA 17-1) 19:10 (WEA 17-1)
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	18:38 (WEA 17-1) 19:08 (WEA 17-1)
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	18:39 (WEA 17-1) 19:07 (WEA 17-1)
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	18:40 (WEA 17-1) 19:05 (WEA 17-1)
25	08:22 16:59	07:26 17:57	06:22 19:47	06:12 20:42	05:20 21:30	18:42 (WEA 17-1) 19:03 (WEA 17-1)
26	08:20 17:01	07:24 17:59	06:20 19:49	06:10 20:43	05:19 21:32	18:45 (WEA 17-1) 19:00 (WEA 17-1)
27	08:19 17:02	07:22 18:01	06:17 19:51	06:07 20:45	05:18 21:33	18:51 (WEA 17-1) 18:54 (WEA 17-1)
28	08:18 17:04	07:20 18:03	06:15 19:53	06:05 20:47	05:16 21:34	18:42 (WEA 17-2) 18:57 (WEA 17-2)
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	18:44 (WEA 17-2) 18:53 (WEA 17-2)
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	18:51 (WEA 17-1) 19:06 (WEA 17-1)
31	08:13 17:10		07:08 19:58		05:13 21:38	18:48 (WEA 17-1) 19:10 (WEA 17-1)
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung		423	519	925		

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 15a - Holle 5/Süd

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	05:08 21:54	05:45 21:22	06:36 20:19	18:33 (WEA 17-1) 19:16 (WEA 17-1)	07:26 17:01	08:14 16:19
2	05:09 21:54	05:47 21:20	06:38 20:17	18:32 (WEA 17-1) 19:15 (WEA 17-1)	07:28 19:06	08:15 16:18
3	05:10 21:53	05:48 21:19	06:40 20:14	18:32 (WEA 17-1) 19:15 (WEA 17-1)	07:30 19:04	08:17 16:17
4	05:11 21:53	05:50 21:17	06:41 20:12	18:32 (WEA 17-1) 19:13 (WEA 17-1)	07:32 19:01	08:18 16:17
5	05:11 21:52	05:52 21:15	06:43 20:10	18:32 (WEA 17-1) 19:13 (WEA 17-1)	07:33 18:59	08:19 16:16
6	05:12 21:52	05:53 21:13	06:45 20:07	18:33 (WEA 17-1) 19:13 (WEA 17-1)	07:35 18:57	08:21 16:16
7	05:13 21:51	05:55 21:11	06:46 20:05	18:32 (WEA 17-1) 19:11 (WEA 17-1)	07:37 18:54	08:22 16:15
8	05:14 21:51	05:56 21:10	06:48 20:03	18:33 (WEA 17-1) 19:10 (WEA 17-1)	07:38 18:52	08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:00	18:33 (WEA 17-1) 19:08 (WEA 17-1)	07:40 18:50	08:24 16:14
10	05:16 21:49	06:00 21:06	06:51 19:58	18:34 (WEA 17-1) 19:07 (WEA 17-1)	07:42 18:47	08:26 16:14
11	05:17 21:49	06:01 21:04	06:53 19:56	18:36 (WEA 17-1) 19:06 (WEA 17-1)	07:44 18:45	08:27 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53	18:37 (WEA 17-1) 19:03 (WEA 17-1)	07:45 18:43	08:28 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51	18:39 (WEA 17-1) 19:01 (WEA 17-1)	07:47 18:41	08:29 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49	18:41 (WEA 17-1) 18:57 (WEA 17-1)	07:49 18:38	08:30 16:14
15	05:22 21:45	06:08 20:56	07:00 19:46	18:35 (WEA 17-2) 18:50 (WEA 17-1)	07:51 18:36	08:31 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44	18:32 (WEA 17-2) 18:46 (WEA 17-2)	07:52 18:34	08:32 16:14
17	05:24 21:43	06:11 20:52	07:03 19:03 (WEA 17-1)	18:29 (WEA 17-2) 18:47 (WEA 17-2)	07:54 18:32	08:33 16:14
18	05:25 21:42	06:13 20:50	07:05 19:07 (WEA 17-1)	18:28 (WEA 17-2) 18:48 (WEA 17-2)	07:56 18:30	08:33 16:14
19	05:27 21:41	06:15 20:48	07:06 19:09 (WEA 17-1)	18:27 (WEA 17-2) 18:49 (WEA 17-2)	07:58 18:27	08:34 16:14
20	05:28 21:39	06:16 20:45	07:08 19:11 (WEA 17-1)	18:25 (WEA 17-2) 18:48 (WEA 17-2)	08:00 18:25	08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:12 (WEA 17-1)	18:24 (WEA 17-2) 18:49 (WEA 17-2)	08:01 18:23	08:35 16:15
22	05:31 21:37	06:20 20:41	07:11 19:13 (WEA 17-1)	18:24 (WEA 17-2) 18:49 (WEA 17-2)	08:03 18:21	08:36 16:15
23	05:32 21:36	06:21 20:39	07:13 19:14 (WEA 17-1)	18:23 (WEA 17-2) 18:48 (WEA 17-2)	08:05 18:19	08:36 16:16
24	05:33 21:34	06:23 20:37	07:15 19:15 (WEA 17-1)	18:23 (WEA 17-2) 18:48 (WEA 17-2)	08:07 18:17	08:37 16:17
25	05:35 21:33	06:25 20:35	07:16 19:16 (WEA 17-1)	18:23 (WEA 17-2) 18:48 (WEA 17-2)	08:09 18:15	08:37 16:17
26	05:36 21:31	06:26 20:32	07:18 19:15 (WEA 17-1)	18:23 (WEA 17-2) 18:46 (WEA 17-2)	08:10 18:13	08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:16 (WEA 17-1)	18:24 (WEA 17-2) 18:45 (WEA 17-2)	08:12 18:11	08:38 16:18
28	05:39 21:28	06:30 20:28	07:21 19:16 (WEA 17-1)	18:25 (WEA 17-2) 18:44 (WEA 17-2)	07:14 17:09	08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:16 (WEA 17-1)	18:25 (WEA 17-2) 18:41 (WEA 17-2)	07:16 17:07	08:38 16:20
30	05:42 21:25	06:33 20:23	07:25 19:15 (WEA 17-1)	18:28 (WEA 17-2) 18:39 (WEA 17-2)	07:18 17:05	08:38 16:21
31	05:44 21:24	06:35 20:21	07:26 19:16 (WEA 17-1)	18:33 (WEA 17-1)	07:20 17:03	08:39 16:22
Sonnenscheinstunden	505	456	382	332	265	241
astr.max.mögl.Beschattung		485	811	595		

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 15b - Holle 5/West

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04	16:29 (WEA 17-3) 17:00 (WEA 17-3)	18:42 (WEA 17-1) 19:11 (WEA 17-1)	05:59 20:52
2	08:38 16:24	08:10 17:13	07:15 18:06	16:30 (WEA 17-3) 16:59 (WEA 17-3)	18:41 (WEA 17-1) 19:12 (WEA 17-1)	05:57 20:54
3	08:38 16:25	08:08 17:15	07:13 18:08	16:32 (WEA 17-3) 16:58 (WEA 17-3)	18:40 (WEA 17-1) 19:14 (WEA 17-1)	05:55 20:55
4	08:38 16:27	08:07 17:17	07:11 18:10	16:32 (WEA 17-3) 16:56 (WEA 17-3)	18:37 (WEA 17-1) 19:14 (WEA 17-1)	05:53 20:57
5	08:38 16:28	08:05 17:19	07:08 18:12	16:34 (WEA 17-3) 16:54 (WEA 17-3)	18:37 (WEA 17-1) 19:15 (WEA 17-1)	05:52 20:59
6	08:38 16:29	08:03 17:21	07:06 18:14	16:37 (WEA 17-3) 16:52 (WEA 17-3)	18:36 (WEA 17-1) 19:15 (WEA 17-1)	05:50 21:00
7	08:37 16:30	08:02 17:23	07:04 18:15	16:40 (WEA 17-3) 16:47 (WEA 17-3)	18:34 (WEA 17-1) 19:15 (WEA 17-1)	05:48 21:02
8	08:37 16:32	08:00 17:25	07:02 18:17	16:49 20:12	18:34 (WEA 17-1) 19:15 (WEA 17-1)	05:46 21:04
9	08:36 16:33	07:58 17:27	06:59 18:19	16:47 20:14	18:33 (WEA 17-1) 19:16 (WEA 17-1)	05:44 21:05
10	08:36 16:34	07:56 17:29	06:57 18:21	16:45 20:15	18:33 (WEA 17-1) 19:16 (WEA 17-1)	05:42 21:07
11	08:35 16:36	07:54 17:30	06:55 18:23	16:42 20:17	18:32 (WEA 17-1) 19:15 (WEA 17-1)	05:41 21:09
12	08:35 16:37	07:52 17:32	06:52 18:24	16:40 20:19	18:32 (WEA 17-1) 19:15 (WEA 17-1)	05:39 21:10
13	08:34 16:39	07:51 17:34	16:43 (WEA 17-3) 18:26	16:38 20:21	18:32 (WEA 17-1) 19:15 (WEA 17-1)	05:37 21:12
14	08:33 16:40	07:49 17:36	16:39 (WEA 17-3) 18:28	16:36 20:22	18:32 (WEA 17-1) 19:15 (WEA 17-1)	05:36 21:14
15	08:32 16:42	07:47 17:38	16:36 (WEA 17-3) 18:30	16:33 20:24	18:33 (WEA 17-1) 19:14 (WEA 17-1)	05:34 21:15
16	08:31 16:43	07:45 17:40	16:35 (WEA 17-3) 18:32	16:31 20:26	18:32 (WEA 17-1) 19:13 (WEA 17-1)	05:33 21:17
17	08:31 16:45	07:43 17:42	16:33 (WEA 17-3) 18:33	16:29 20:28	18:32 (WEA 17-1) 19:12 (WEA 17-1)	05:31 21:18
18	08:30 16:47	07:41 17:44	16:31 (WEA 17-3) 18:35	16:27 20:29	18:33 (WEA 17-1) 19:12 (WEA 17-1)	05:29 21:20
19	08:29 16:48	07:39 17:46	16:31 (WEA 17-3) 18:37	16:24 20:31	18:34 (WEA 17-1) 19:11 (WEA 17-1)	05:28 21:21
20	08:28 16:50	07:37 17:48	16:30 (WEA 17-3) 18:39	16:22 20:33	18:35 (WEA 17-1) 19:10 (WEA 17-1)	05:27 21:23
21	08:26 16:52	07:35 17:49	16:30 (WEA 17-3) 18:40	16:20 20:35	18:36 (WEA 17-1) 19:09 (WEA 17-1)	05:25 21:24
22	08:25 16:53	07:32 17:51	16:29 (WEA 17-3) 18:42	16:18 20:36	18:37 (WEA 17-1) 19:07 (WEA 17-1)	05:24 21:26
23	08:24 16:55	07:30 17:53	16:29 (WEA 17-3) 18:44	16:16 20:38	18:38 (WEA 17-1) 19:06 (WEA 17-1)	05:22 21:27
24	08:23 16:57	07:28 17:55	16:28 (WEA 17-3) 18:46	16:14 20:40	18:40 (WEA 17-1) 19:04 (WEA 17-1)	05:21 21:29
25	08:22 16:59	07:26 17:57	16:28 (WEA 17-3) 19:47	16:12 20:42	18:42 (WEA 17-1) 19:02 (WEA 17-1)	05:20 21:30
26	08:20 17:01	07:24 17:59	16:29 (WEA 17-3) 19:49	16:10 20:43	18:45 (WEA 17-1) 18:58 (WEA 17-1)	05:19 21:32
27	08:19 17:02	07:22 18:01	16:29 (WEA 17-3) 19:51	16:07 20:45	18:58 (WEA 17-2) 18:42 (WEA 17-2)	05:18 21:33
28	08:18 17:04	07:20 18:03	16:29 (WEA 17-3) 19:53	16:05 20:47	18:42 (WEA 17-2) 18:56 (WEA 17-2)	05:16 21:34
29	08:16 17:06		07:13 19:54	16:03 20:48	18:45 (WEA 17-2) 19:02 (WEA 17-1)	05:15 21:35
30	08:15 17:08		07:10 19:56	16:01 20:50	18:48 (WEA 17-1) 19:07 (WEA 17-1)	05:14 21:37
31	08:13 17:10		07:08 19:58	16:00 20:51	18:45 (WEA 17-1) 19:09 (WEA 17-1)	05:13 21:38
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung		440	523	929		

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 15b - Holle 5/West

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	05:08 21:54	05:45 21:22	06:36 20:19	18:32 (WEA 17-1) 19:15 (WEA 17-1)	07:26 18:30 (WEA 17-2)	08:14 16:19
2	05:09 21:54	05:47 21:20	06:38 20:17	18:31 (WEA 17-1) 19:14 (WEA 17-1)	07:28 19:06	08:15 16:18
3	05:10 21:53	05:48 21:19	06:40 20:14	18:31 (WEA 17-1) 19:14 (WEA 17-1)	07:30 19:04	08:17 16:17
4	05:11 21:53	05:50 21:17	06:41 20:12	18:30 (WEA 17-1) 19:13 (WEA 17-1)	07:32 19:01	08:18 16:17
5	05:11 21:52	05:52 21:15	06:43 20:10	18:31 (WEA 17-1) 19:12 (WEA 17-1)	07:33 18:59	08:19 16:16
6	05:12 21:52	05:53 21:13	06:45 20:07	18:31 (WEA 17-1) 19:12 (WEA 17-1)	07:35 18:57	08:21 16:16
7	05:13 21:51	05:55 21:11	06:46 20:05	18:31 (WEA 17-1) 19:10 (WEA 17-1)	07:37 18:54	08:22 16:15
8	05:14 21:51	05:56 21:10	06:48 20:03	18:32 (WEA 17-1) 19:10 (WEA 17-1)	07:38 18:52	08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:00	18:32 (WEA 17-1) 19:08 (WEA 17-1)	07:40 18:50	08:24 16:14
10	05:16 21:49	06:00 21:06	06:51 19:58	18:33 (WEA 17-1) 19:07 (WEA 17-1)	07:42 18:47	08:26 16:14
11	05:17 21:49	06:01 21:04	06:53 19:56	18:34 (WEA 17-1) 19:05 (WEA 17-1)	07:44 18:45	08:27 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53	18:34 (WEA 17-1) 19:03 (WEA 17-1)	07:45 18:43	08:28 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51	18:36 (WEA 17-1) 19:01 (WEA 17-1)	07:47 18:41	08:29 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49	18:38 (WEA 17-1) 18:57 (WEA 17-1)	07:49 18:38	08:30 16:14
15	05:22 21:45	06:08 20:56	07:00 19:46	18:36 (WEA 17-2) 18:53 (WEA 17-1)	07:51 18:36	08:31 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44	18:32 (WEA 17-2) 18:45 (WEA 17-2)	07:52 18:34	08:32 16:14
17	05:24 21:43	06:11 20:52	07:03 19:00 (WEA 17-1)	18:29 (WEA 17-2) 18:46 (WEA 17-2)	07:54 18:32	08:33 16:14
18	05:25 21:42	06:13 20:50	07:05 19:06 (WEA 17-1)	18:27 (WEA 17-2) 18:47 (WEA 17-2)	07:56 18:30	08:33 16:14
19	05:27 21:41	06:15 20:48	07:06 19:08 (WEA 17-1)	18:26 (WEA 17-2) 18:48 (WEA 17-2)	07:58 18:27	08:34 16:14
20	05:28 21:39	06:16 20:45	07:08 19:10 (WEA 17-1)	18:24 (WEA 17-2) 18:48 (WEA 17-2)	08:00 18:25	08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:11 (WEA 17-1)	18:24 (WEA 17-2) 18:48 (WEA 17-2)	08:01 18:23	08:35 16:15
22	05:31 21:37	06:20 20:41	07:11 19:12 (WEA 17-1)	18:23 (WEA 17-2) 18:48 (WEA 17-2)	08:03 18:21	08:36 16:15
23	05:32 21:36	06:21 20:39	07:13 19:12 (WEA 17-1)	18:22 (WEA 17-2) 18:48 (WEA 17-2)	08:05 18:19	08:36 16:16
24	05:33 21:34	06:23 20:37	07:15 19:14 (WEA 17-1)	18:22 (WEA 17-2) 18:47 (WEA 17-2)	08:07 18:17	08:37 16:17
25	05:35 21:33	06:25 20:35	07:16 19:15 (WEA 17-1)	18:22 (WEA 17-2) 18:47 (WEA 17-2)	08:09 18:15	08:37 16:17
26	05:36 21:31	06:26 20:32	07:18 19:14 (WEA 17-1)	18:22 (WEA 17-2) 18:46 (WEA 17-2)	08:10 18:13	08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:15 (WEA 17-1)	18:23 (WEA 17-2) 18:45 (WEA 17-2)	08:12 18:11	08:38 16:18
28	05:39 21:28	06:30 20:28	07:21 19:15 (WEA 17-1)	18:24 (WEA 17-2) 18:44 (WEA 17-2)	07:14 17:09	08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:15 (WEA 17-1)	18:24 (WEA 17-2) 18:41 (WEA 17-2)	07:16 17:07	08:38 16:20
30	05:42 21:25	06:33 20:23	07:25 19:14 (WEA 17-1)	18:26 (WEA 17-2) 18:39 (WEA 17-2)	07:18 17:05	08:38 16:21
31	05:44 21:24	06:35 20:21	07:26 19:15 (WEA 17-1)	18:24 (WEA 17-2) 17:03	07:14 17:03	08:39 16:22
Sonnenscheinstunden	505	456	382	332	605	241
astr.max.mögl.Beschattung		477	837			

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	Schattenende (WEA mit letztem Schatten)

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 16 - Holle 2

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39	14:11 (WEA 17-3) 08:12	14:39 (WEA 17-1) 07:17	07:06	05:59	05:12
	16:23	28 14:39 (WEA 17-3) 17:12	76 16:29 (WEA 17-2) 18:04	20:00	20:52	21:39
2	08:39	14:12 (WEA 17-3) 08:10	14:40 (WEA 17-1) 07:15	07:03	05:57	05:12
	16:24	27 14:39 (WEA 17-3) 17:13	78 16:31 (WEA 17-2) 18:06	20:01	20:54	21:40
3	08:38	14:13 (WEA 17-3) 08:08	14:39 (WEA 17-1) 07:13	07:01	05:55	05:11
	16:25	27 14:40 (WEA 17-3) 17:15	80 16:31 (WEA 17-2) 18:08	20:03	20:55	21:41
4	08:38	14:14 (WEA 17-3) 08:07	14:39 (WEA 17-1) 07:11	06:59	05:54	05:10
	16:27	29 14:58 (WEA 17-1) 17:17	81 16:32 (WEA 17-2) 18:10	20:05	20:57	21:43
5	08:38	14:15 (WEA 17-3) 08:05	14:40 (WEA 17-1) 07:08	06:56	05:52	05:09
	16:28	35 15:02 (WEA 17-1) 17:19	81 16:32 (WEA 17-2) 18:12	20:07	20:59	21:44
6	08:38	14:15 (WEA 17-3) 08:03	14:41 (WEA 17-1) 07:06	06:54	05:50	05:08
	16:29	39 15:04 (WEA 17-1) 17:21	80 16:33 (WEA 17-2) 18:14	20:08	21:00	21:45
7	08:37	14:17 (WEA 17-3) 08:02	14:41 (WEA 17-1) 07:04	06:52	05:48	05:08
	16:30	41 15:07 (WEA 17-1) 17:23	80 16:33 (WEA 17-2) 18:15	20:10	21:02	21:46
8	08:37	14:17 (WEA 17-3) 08:00	14:41 (WEA 17-1) 07:02	06:49	05:46	05:07
	16:32	42 15:08 (WEA 17-1) 17:25	80 16:33 (WEA 17-2) 18:17	20:12	21:04	21:46
9	08:36	14:18 (WEA 17-3) 07:58	14:42 (WEA 17-1) 06:59	06:47	05:44	05:07
	16:33	44 15:10 (WEA 17-1) 17:27	79 16:33 (WEA 17-2) 18:19	20:14	21:05	21:47
10	08:36	14:20 (WEA 17-3) 07:56	14:42 (WEA 17-1) 06:57	06:45	05:42	05:06
	16:34	45 15:12 (WEA 17-1) 17:29	78 16:33 (WEA 17-2) 18:21	20:15	21:07	21:48
11	08:35	14:21 (WEA 17-3) 07:54	14:43 (WEA 17-1) 06:55	06:42	05:41	05:06
	16:36	45 15:13 (WEA 17-1) 17:31	77 16:33 (WEA 17-2) 18:23	20:17	21:09	21:49
12	08:35	14:23 (WEA 17-3) 07:52	14:44 (WEA 17-1) 06:52	06:40	05:39	05:05
	16:37	43 15:14 (WEA 17-1) 17:32	74 16:33 (WEA 17-2) 18:24	20:19	21:10	21:50
13	08:34	14:25 (WEA 17-3) 07:51	14:45 (WEA 17-1) 06:50	06:38	05:37	05:05
	16:39	42 15:16 (WEA 17-1) 17:34	71 16:32 (WEA 17-2) 18:26	20:21	21:12	21:50
14	08:33	14:43 (WEA 17-1) 07:49	14:46 (WEA 17-1) 06:48	06:36	05:36	05:05
	16:40	34 15:17 (WEA 17-1) 17:36	68 16:31 (WEA 17-2) 18:28	20:22	21:14	21:51
15	08:32	14:43 (WEA 17-1) 07:47	14:47 (WEA 17-1) 06:45	06:33	05:34	05:05
	16:42	35 15:18 (WEA 17-1) 17:38	65 16:31 (WEA 17-2) 18:30	20:24	21:15	21:52
16	08:31	14:42 (WEA 17-1) 07:45	14:48 (WEA 17-1) 06:43	06:31	05:33	05:04
	16:43	37 15:19 (WEA 17-1) 17:40	59 16:29 (WEA 17-2) 18:32	20:26	21:17	21:52
17	08:31	14:42 (WEA 17-1) 07:43	14:50 (WEA 17-1) 06:41	06:29	05:31	05:04
	16:45	39 15:21 (WEA 17-1) 17:42	53 16:28 (WEA 17-2) 18:33	20:28	21:18	21:53
18	08:30	14:42 (WEA 17-1) 07:41	14:51 (WEA 17-1) 06:38	06:27	05:29	05:04
	16:47	40 15:22 (WEA 17-1) 17:44	44 16:24 (WEA 17-2) 18:35	20:29	21:20	21:53
19	08:29	14:42 (WEA 17-1) 07:39	14:54 (WEA 17-1) 06:36	06:24	05:28	05:04
	16:48	41 15:23 (WEA 17-1) 17:46	27 15:21 (WEA 17-1) 18:37	20:31	21:21	21:54
20	08:28	14:41 (WEA 17-1) 07:37	14:57 (WEA 17-1) 06:34	06:22	05:27	05:04
	16:50	43 15:24 (WEA 17-1) 17:48	21 15:18 (WEA 17-1) 18:39	20:33	21:23	21:54
21	08:26	14:40 (WEA 17-1) 07:35	15:02 (WEA 17-1) 06:31	06:20	05:25	05:04
	16:52	44 15:24 (WEA 17-1) 17:49	12 15:14 (WEA 17-1) 18:40	20:35	21:24	21:54
22	08:25	14:40 (WEA 17-1) 07:32		06:29	06:18	05:05
	16:53	46 15:26 (WEA 17-1) 17:51		18:42	20:36	21:26
23	08:24	14:41 (WEA 17-1) 07:30		06:27	06:16	05:05
	16:55	46 15:27 (WEA 17-1) 17:53		18:44	20:38	21:27
24	08:23	14:40 (WEA 17-1) 07:28		06:24	06:14	05:05
	16:57	47 15:27 (WEA 17-1) 17:55		18:46	20:40	21:29
25	08:22	14:40 (WEA 17-1) 07:26		07:22	06:12	05:05
	16:59	48 15:28 (WEA 17-1) 17:57		19:47	20:42	21:30
26	08:20	14:39 (WEA 17-1) 07:24		07:20	06:10	05:06
	17:01	49 15:28 (WEA 17-1) 17:59		19:49	20:43	21:32
27	08:19	14:40 (WEA 17-1) 07:22		07:17	06:07	05:06
	17:02	56 16:20 (WEA 17-2) 18:01		19:51	20:45	21:33
28	08:18	14:39 (WEA 17-1) 07:20		07:15	06:05	05:07
	17:04	64 16:23 (WEA 17-2) 18:03		19:53	20:47	21:34
29	08:16	14:39 (WEA 17-1)		07:13	06:03	05:07
	17:06	68 16:25 (WEA 17-2)		19:54	20:48	21:35
30	08:15	14:39 (WEA 17-1)		07:10	06:01	05:14
	17:08	72 16:27 (WEA 17-2)		19:56	20:50	21:37
31	08:13	14:39 (WEA 17-1)		07:08		05:13
	17:10	74 16:28 (WEA 17-2)		19:58		21:38
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung	1370	1364				

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 16 - Holle 2

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

	July	August	September	Oktober		November		Dezember	
1	05:08	05:45	06:36	07:26		07:21	14:12 (WEA 17-1)	08:14	14:05 (WEA 17-3)
	21:54	21:22	20:19	19:08		17:01	16:03 (WEA 17-2)	16:19	14:57 (WEA 17-1)
2	05:09	05:47	06:38	07:28		07:23	14:12 (WEA 17-1)	08:15	14:04 (WEA 17-3)
	21:54	21:20	20:17	19:06		16:59	16:03 (WEA 17-2)	16:18	14:55 (WEA 17-1)
3	05:10	05:48	06:40	07:30		07:25	14:11 (WEA 17-1)	08:17	14:03 (WEA 17-3)
	21:53	21:19	20:14	19:04		16:57	16:03 (WEA 17-2)	16:17	14:55 (WEA 17-1)
4	05:11	05:50	06:41	07:32		07:27	14:11 (WEA 17-1)	08:18	14:02 (WEA 17-3)
	21:53	21:17	20:12	19:01		16:55	16:03 (WEA 17-2)	16:17	14:54 (WEA 17-1)
5	05:11	05:52	06:43	07:33		07:29	14:11 (WEA 17-1)	08:19	14:02 (WEA 17-3)
	21:53	21:15	20:10	18:59		16:53	16:03 (WEA 17-2)	16:16	14:53 (WEA 17-1)
6	05:12	05:53	06:45	07:35		07:31	14:10 (WEA 17-1)	08:21	14:02 (WEA 17-3)
	21:52	21:13	20:07	18:57		16:51	16:03 (WEA 17-2)	16:16	14:52 (WEA 17-1)
7	05:13	05:55	06:46	07:37		07:32	14:10 (WEA 17-1)	08:22	14:02 (WEA 17-3)
	21:51	21:11	20:05	18:54		16:50	16:03 (WEA 17-2)	16:15	14:51 (WEA 17-1)
8	05:14	05:56	06:48	07:38		07:34	14:10 (WEA 17-1)	08:23	14:02 (WEA 17-3)
	21:51	21:10	20:03	18:52		16:48	16:02 (WEA 17-2)	16:15	14:50 (WEA 17-1)
9	05:15	05:58	06:50	07:40		07:36	14:10 (WEA 17-1)	08:24	14:02 (WEA 17-3)
	21:50	21:08	20:00	18:50		16:46	16:02 (WEA 17-2)	16:14	14:47 (WEA 17-1)
10	05:16	06:00	06:51	07:42		07:38	14:10 (WEA 17-1)	08:26	14:01 (WEA 17-3)
	21:49	21:06	19:58	18:47		16:45	16:01 (WEA 17-2)	16:14	14:28 (WEA 17-3)
11	05:17	06:01	06:53	07:44		07:40	14:11 (WEA 17-1)	08:27	14:02 (WEA 17-3)
	21:49	21:04	19:56	18:45		16:43	16:01 (WEA 17-2)	16:14	14:29 (WEA 17-3)
12	05:18	06:03	06:55	07:45		07:42	14:11 (WEA 17-1)	08:28	14:02 (WEA 17-3)
	21:48	21:02	19:53	18:43		16:41	16:00 (WEA 17-2)	16:14	14:30 (WEA 17-3)
13	05:19	06:05	06:56	07:47		07:43	14:11 (WEA 17-1)	08:29	14:03 (WEA 17-3)
	21:47	21:00	19:51	18:41		16:40	15:59 (WEA 17-2)	16:14	14:31 (WEA 17-3)
14	05:20	06:06	06:58	07:49		07:45	14:12 (WEA 17-1)	08:30	14:03 (WEA 17-3)
	21:46	20:58	19:49	18:38		16:38	15:57 (WEA 17-2)	16:14	14:31 (WEA 17-3)
15	05:22	06:08	07:00	07:51		07:47	14:12 (WEA 17-1)	08:31	14:03 (WEA 17-3)
	21:45	20:56	19:46	18:36		16:37	15:56 (WEA 17-2)	16:14	14:32 (WEA 17-3)
16	05:23	06:10	07:01	07:52		07:49	14:13 (WEA 17-1)	08:32	14:04 (WEA 17-3)
	21:44	20:54	19:44	18:34		16:35	15:53 (WEA 17-2)	16:14	14:33 (WEA 17-3)
17	05:24	06:11	07:03	07:54		07:51	14:13 (WEA 17-1)	08:33	14:03 (WEA 17-3)
	21:43	20:52	19:42	18:32		16:34	15:02 (WEA 17-1)	16:14	14:32 (WEA 17-3)
18	05:25	06:13	07:05	07:56		07:52	14:13 (WEA 17-1)	08:33	14:04 (WEA 17-3)
	21:42	20:50	19:39	18:30		16:33	15:01 (WEA 17-1)	16:14	14:33 (WEA 17-3)
19	05:27	06:15	07:06	07:58		07:54	14:14 (WEA 17-1)	08:34	14:04 (WEA 17-3)
	21:41	20:48	19:37	18:27		16:31	15:01 (WEA 17-1)	16:14	14:34 (WEA 17-3)
20	05:28	06:16	07:08	08:00		07:56	14:15 (WEA 17-1)	08:35	14:05 (WEA 17-3)
	21:39	20:46	19:34	18:25		16:30	15:01 (WEA 17-1)	16:15	14:35 (WEA 17-3)
21	05:29	06:18	07:10	08:01		07:58	14:15 (WEA 17-1)	08:35	14:05 (WEA 17-3)
	21:38	20:43	19:32	18:23		16:29	15:01 (WEA 17-1)	16:15	14:35 (WEA 17-3)
22	05:31	06:20	07:11	08:03	16	07:59	14:16 (WEA 17-1)	08:36	14:06 (WEA 17-3)
	21:37	20:41	19:30	18:21	15:30 (WEA 17-1)	16:27	15:00 (WEA 17-1)	16:15	14:36 (WEA 17-3)
23	05:32	06:21	07:13	08:05	15:26 (WEA 17-1)	08:01	14:17 (WEA 17-1)	08:37	14:06 (WEA 17-3)
	21:36	20:39	19:27	18:19	15:49 (WEA 17-1)	16:26	15:00 (WEA 17-1)	16:16	14:36 (WEA 17-3)
24	05:33	06:23	07:15	08:07	15:23 (WEA 17-1)	08:03	14:19 (WEA 17-1)	08:37	14:07 (WEA 17-3)
	21:34	20:37	19:25	18:17	16:52 (WEA 17-2)	16:25	15:00 (WEA 17-1)	16:17	14:37 (WEA 17-3)
25	05:35	06:25	07:16	08:09	15:21 (WEA 17-1)	08:04	14:20 (WEA 17-1)	08:37	14:07 (WEA 17-3)
	21:33	20:35	19:22	18:15	16:56 (WEA 17-2)	16:24	15:00 (WEA 17-1)	16:17	14:37 (WEA 17-3)
26	05:36	06:26	07:18	08:10	15:19 (WEA 17-1)	08:06	14:20 (WEA 17-1)	08:38	14:08 (WEA 17-3)
	21:31	20:32	19:20	18:13	16:58 (WEA 17-2)	16:23	14:59 (WEA 17-1)	16:18	14:37 (WEA 17-3)
27	05:38	06:28	07:20	08:12	15:17 (WEA 17-1)	08:07	14:21 (WEA 17-1)	08:38	14:08 (WEA 17-3)
	21:30	20:30	19:18	18:11	16:59 (WEA 17-2)	16:22	14:58 (WEA 17-1)	16:18	14:37 (WEA 17-3)
28	05:39	06:30	07:21	07:14	14:16 (WEA 17-1)	08:09	14:23 (WEA 17-1)	08:38	14:08 (WEA 17-3)
	21:28	20:28	19:15	17:09	16:00 (WEA 17-2)	16:21	14:58 (WEA 17-1)	16:19	14:37 (WEA 17-3)
29	05:41	06:31	07:23	07:16	14:15 (WEA 17-1)	08:11	14:23 (WEA 17-1)	08:38	14:09 (WEA 17-3)
	21:27	20:26	19:13	17:07	16:01 (WEA 17-2)	16:20	14:57 (WEA 17-1)	16:20	14:38 (WEA 17-3)
30	05:42	06:33	07:25	07:18	14:14 (WEA 17-1)	08:12	14:07 (WEA 17-3)	08:39	14:10 (WEA 17-3)
	21:25	20:24	19:11	17:05	16:02 (WEA 17-2)	16:19	14:57 (WEA 17-1)	16:21	14:38 (WEA 17-3)
31	05:44	06:35		07:20	14:13 (WEA 17-1)			08:39	14:10 (WEA 17-3)
	21:24	20:21		17:03	16:02 (WEA 17-2)			16:22	14:38 (WEA 17-3)
Sonnenscheinstunden	505	456	382	332		265		241	
astr.max.mögl.Beschattung					517	1796		1004	

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

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

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 17a - Neuenstadt 25/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	11:17 (WEA 17-3) 13:44 (WEA 17-2)	08:12 17:12	09:52 (WEA 17-1) 18:04	07:06 20:02	05:59 21:39
2	08:39 16:24	11:21 (WEA 17-3) 13:45 (WEA 17-2)	08:10 17:13	09:51 (WEA 17-1) 18:06	07:03 20:01	05:57 21:40
3	08:38 16:25	12:58 (WEA 17-2) 13:46 (WEA 17-2)	08:08 17:15	09:51 (WEA 17-1) 18:08	07:01 20:03	05:55 21:41
4	08:38 16:27	12:58 (WEA 17-2) 13:45 (WEA 17-2)	08:07 17:17	09:51 (WEA 17-1) 18:10	06:59 20:05	05:54 21:43
5	08:38 16:28	12:59 (WEA 17-2) 13:46 (WEA 17-2)	08:05 17:19	09:51 (WEA 17-1) 18:12	06:56 20:07	05:52 21:44
6	08:38 16:29	10:05 (WEA 17-1) 13:46 (WEA 17-2)	08:03 17:21	09:52 (WEA 17-1) 18:14	06:54 20:08	05:50 21:45
7	08:37 16:30	10:03 (WEA 17-1) 13:47 (WEA 17-2)	08:02 17:23	09:52 (WEA 17-1) 18:15	06:52 20:10	05:48 21:46
8	08:37 16:32	10:01 (WEA 17-1) 13:46 (WEA 17-2)	08:00 17:25	09:53 (WEA 17-1) 18:17	06:49 20:12	05:46 21:46
9	08:36 16:33	10:01 (WEA 17-1) 13:47 (WEA 17-2)	07:58 17:27	09:53 (WEA 17-1) 18:19	06:47 20:14	05:44 21:47
10	08:36 16:34	09:59 (WEA 17-1) 13:47 (WEA 17-2)	07:56 17:29	09:53 (WEA 17-1) 18:21	06:45 20:15	05:43 21:48
11	08:35 16:36	09:58 (WEA 17-1) 13:47 (WEA 17-2)	07:54 17:31	09:54 (WEA 17-1) 18:23	06:42 20:17	05:41 21:49
12	08:35 16:37	09:57 (WEA 17-1) 13:47 (WEA 17-2)	07:53 17:32	09:55 (WEA 17-1) 18:24	06:40 20:19	05:39 21:50
13	08:34 16:39	09:57 (WEA 17-1) 13:47 (WEA 17-2)	07:51 17:34	09:55 (WEA 17-1) 18:26	06:38 20:21	05:37 21:50
14	08:33 16:40	09:56 (WEA 17-1) 13:47 (WEA 17-2)	07:49 17:36	09:56 (WEA 17-1) 18:28	06:36 20:22	05:36 21:51
15	08:32 16:42	09:55 (WEA 17-1) 13:47 (WEA 17-2)	07:47 17:38	09:57 (WEA 17-1) 18:30	06:33 20:24	05:34 21:52
16	08:32 16:43	09:55 (WEA 17-1) 13:47 (WEA 17-2)	07:45 17:40	09:58 (WEA 17-1) 18:32	06:31 20:26	05:33 21:52
17	08:31 16:45	09:54 (WEA 17-1) 13:46 (WEA 17-2)	07:43 17:42	10:00 (WEA 17-1) 18:33	06:29 20:28	05:31 21:53
18	08:30 16:47	09:54 (WEA 17-1) 13:46 (WEA 17-2)	07:41 17:44	10:01 (WEA 17-1) 18:35	06:27 20:29	05:29 21:53
19	08:29 16:48	09:54 (WEA 17-1) 13:46 (WEA 17-2)	07:39 17:46	10:03 (WEA 17-1) 18:37	06:25 20:31	05:28 21:54
20	08:28 16:50	09:54 (WEA 17-1) 13:46 (WEA 17-2)	07:37 17:48	10:06 (WEA 17-1) 18:39	06:22 20:33	05:27 21:54
21	08:26 16:52	09:53 (WEA 17-1) 13:44 (WEA 17-2)	07:35 17:50	10:10 (WEA 17-1) 18:40	06:20 20:35	05:25 21:54
22	08:25 16:53	09:53 (WEA 17-1) 13:44 (WEA 17-2)	07:33 17:51	10:22 (WEA 17-1) 18:42	06:18 20:36	05:24 21:54
23	08:24 16:55	09:53 (WEA 17-1) 13:43 (WEA 17-2)	07:30 17:53	18:44	06:16 20:38	05:22 21:55
24	08:23 16:57	09:52 (WEA 17-1) 13:41 (WEA 17-2)	07:28 17:55	18:46	06:14 20:40	05:21 21:55
25	08:22 16:59	09:52 (WEA 17-1) 13:39 (WEA 17-2)	07:26 17:57	18:47	06:12 20:42	05:20 21:55
26	08:20 17:01	09:51 (WEA 17-1) 13:36 (WEA 17-2)	07:24 17:59	19:47 19:49	06:10 20:43	05:19 21:55
27	08:19 17:02	09:52 (WEA 17-1) 10:40 (WEA 17-1)	07:22 18:01	19:51	06:07 20:45	05:18 21:55
28	08:18 17:04	09:51 (WEA 17-1) 10:40 (WEA 17-1)	07:20 18:03	19:15	06:05 20:47	05:16 21:55
29	08:16 17:06	09:52 (WEA 17-1) 10:42 (WEA 17-1)		19:53 19:54	06:03 20:49	05:15 21:55
30	08:15 17:08	09:51 (WEA 17-1) 10:42 (WEA 17-1)		19:56	06:01 20:50	05:14 21:54
31	08:13 17:10	09:51 (WEA 17-1) 10:42 (WEA 17-1)		19:58	05:13	
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung	1963	886				

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

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

SHADOW - Kalender**Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 17a - Neuenstadt 25/Südost**
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

	Jul	August	September	Oktober		November		Dezember	
1	05:08	05:45	06:36	07:26		07:21	09:23 (WEA 17-1)	08:14	09:39 (WEA 17-1)
	21:54	21:22	20:19	19:08		17:01	10:11 (WEA 17-1)	16:19	13:29 (WEA 17-2)
2	05:09	05:47	06:38	07:28		07:23	09:23 (WEA 17-1)	08:15	09:40 (WEA 17-1)
	21:54	21:20	20:17	19:06		16:59	10:11 (WEA 17-1)	16:18	13:29 (WEA 17-2)
3	05:10	05:49	06:40	07:30		07:25	09:23 (WEA 17-1)	08:17	09:42 (WEA 17-1)
	21:53	21:19	20:14	19:04		16:57	10:12 (WEA 17-1)	16:17	13:30 (WEA 17-2)
4	05:11	05:50	06:41	07:32		07:27	09:22 (WEA 17-1)	08:18	09:44 (WEA 17-1)
	21:53	21:17	20:12	19:01		16:55	10:12 (WEA 17-1)	16:17	13:30 (WEA 17-2)
5	05:11	05:52	06:43	07:33		07:29	09:22 (WEA 17-1)	08:19	09:46 (WEA 17-1)
	21:53	21:15	20:10	18:59		16:53	10:13 (WEA 17-1)	16:16	13:32 (WEA 17-2)
6	05:12	05:53	06:45	07:35		07:31	09:22 (WEA 17-1)	08:21	09:48 (WEA 17-1)
	21:52	21:13	20:07	18:57		16:52	10:13 (WEA 17-1)	16:16	13:32 (WEA 17-2)
7	05:13	05:55	06:46	07:37		07:32	09:22 (WEA 17-1)	08:22	09:51 (WEA 17-1)
	21:51	21:11	20:05	18:54		16:50	10:13 (WEA 17-1)	16:15	13:33 (WEA 17-2)
8	05:14	05:57	06:48	07:39		07:34	09:22 (WEA 17-1)	08:23	12:46 (WEA 17-2)
	21:51	21:10	20:03	18:52		16:48	10:13 (WEA 17-1)	16:15	13:33 (WEA 17-2)
9	05:15	05:58	06:50	07:40		07:36	09:22 (WEA 17-1)	08:25	12:46 (WEA 17-2)
	21:50	21:08	20:00	18:50		16:46	10:13 (WEA 17-1)	16:14	13:33 (WEA 17-2)
10	05:16	06:00	06:51	07:42		07:38	09:22 (WEA 17-1)	08:26	12:47 (WEA 17-2)
	21:49	21:06	19:58	18:47		16:45	10:13 (WEA 17-1)	16:14	13:35 (WEA 17-2)
11	05:17	06:01	06:53	07:44		07:40	09:22 (WEA 17-1)	08:27	12:47 (WEA 17-2)
	21:49	21:04	19:56	18:45		16:43	10:14 (WEA 17-1)	16:14	13:35 (WEA 17-2)
12	05:18	06:03	06:55	07:45		07:42	09:23 (WEA 17-1)	08:28	11:08 (WEA 17-3)
	21:48	21:02	19:53	18:43		16:41	10:14 (WEA 17-1)	16:14	13:35 (WEA 17-2)
13	05:19	06:05	06:56	07:47		07:43	09:23 (WEA 17-1)	08:29	11:07 (WEA 17-3)
	21:47	21:00	19:51	18:41		16:40	10:13 (WEA 17-1)	16:14	13:36 (WEA 17-2)
14	05:20	06:06	06:58	07:49		07:45	09:24 (WEA 17-1)	08:30	11:07 (WEA 17-3)
	21:46	20:58	19:49	18:38		16:38	10:13 (WEA 17-1)	16:14	13:36 (WEA 17-2)
15	05:22	06:08	07:00	07:51		07:47	09:24 (WEA 17-1)	08:31	11:06 (WEA 17-3)
	21:45	20:56	19:46	18:36		16:37	10:13 (WEA 17-1)	16:14	13:37 (WEA 17-2)
16	05:23	06:10	07:01	07:53		07:49	09:25 (WEA 17-1)	08:32	11:06 (WEA 17-3)
	21:44	20:54	19:44	18:34		16:35	10:13 (WEA 17-1)	16:14	13:37 (WEA 17-2)
17	05:24	06:11	07:03	07:54		07:51	09:25 (WEA 17-1)	08:33	11:07 (WEA 17-3)
	21:43	20:52	19:42	18:32		16:34	13:10 (WEA 17-2)	16:14	13:38 (WEA 17-2)
18	05:25	06:13	07:05	07:56		07:52	09:26 (WEA 17-1)	08:33	11:06 (WEA 17-3)
	21:42	20:50	19:39	18:30		16:33	13:13 (WEA 17-2)	16:14	13:38 (WEA 17-2)
19	05:27	06:15	07:06	07:58		07:54	09:26 (WEA 17-1)	08:34	11:07 (WEA 17-3)
	21:41	20:48	19:37	18:27		16:31	13:15 (WEA 17-2)	16:14	13:39 (WEA 17-2)
20	05:28	06:16	07:08	08:00		07:56	09:27 (WEA 17-1)	08:35	11:07 (WEA 17-3)
	21:39	20:46	19:34	18:25		16:30	13:17 (WEA 17-2)	16:15	13:39 (WEA 17-2)
21	05:29	06:18	07:10	08:01		07:58	09:28 (WEA 17-1)	08:35	11:07 (WEA 17-3)
	21:38	20:43	19:32	18:23		16:29	13:19 (WEA 17-2)	16:15	13:39 (WEA 17-2)
22	05:31	06:20	07:11	08:03		07:59	09:29 (WEA 17-1)	08:36	11:08 (WEA 17-3)
	21:37	20:41	19:30	18:21	15	10:39 (WEA 17-1)	13:20 (WEA 17-2)	16:16	13:40 (WEA 17-2)
23	05:32	06:21	07:13	08:05		10:35 (WEA 17-1)	09:30 (WEA 17-1)	08:37	11:08 (WEA 17-3)
	21:36	20:39	19:27	18:19	23	10:58 (WEA 17-1)	13:22 (WEA 17-2)	16:16	13:40 (WEA 17-2)
24	05:33	06:23	07:15	08:07		10:33 (WEA 17-1)	09:31 (WEA 17-1)	08:37	11:09 (WEA 17-3)
	21:34	20:37	19:25	18:17	27	11:00 (WEA 17-1)	13:23 (WEA 17-2)	16:17	13:41 (WEA 17-2)
25	05:35	06:25	07:16	08:09		10:31 (WEA 17-1)	09:32 (WEA 17-1)	08:37	11:09 (WEA 17-3)
	21:33	20:35	19:23	18:15	32	11:03 (WEA 17-1)	13:24 (WEA 17-2)	16:17	13:42 (WEA 17-2)
26	05:36	06:26	07:18	08:10		10:29 (WEA 17-1)	09:32 (WEA 17-1)	08:38	11:10 (WEA 17-3)
	21:31	20:33	19:20	18:13	35	11:04 (WEA 17-1)	13:24 (WEA 17-2)	16:18	13:42 (WEA 17-2)
27	05:38	06:28	07:20	08:12		10:28 (WEA 17-1)	09:34 (WEA 17-1)	08:38	11:10 (WEA 17-3)
	21:30	20:30	19:18	18:11	38	11:06 (WEA 17-1)	13:26 (WEA 17-2)	16:19	13:42 (WEA 17-2)
28	05:39	06:30	07:21	07:14		09:26 (WEA 17-1)	09:35 (WEA 17-1)	08:38	11:11 (WEA 17-3)
	21:28	20:28	19:15	17:09	41	10:07 (WEA 17-1)	13:27 (WEA 17-2)	16:19	13:42 (WEA 17-2)
29	05:41	06:31	07:23	07:16		09:26 (WEA 17-1)	09:37 (WEA 17-1)	08:38	11:12 (WEA 17-3)
	21:27	20:26	19:13	17:07	42	10:08 (WEA 17-1)	13:28 (WEA 17-2)	16:20	13:43 (WEA 17-2)
30	05:42	06:33	07:25	07:18		09:25 (WEA 17-1)	09:38 (WEA 17-1)	08:39	11:13 (WEA 17-3)
	21:25	20:24	19:11	17:05	44	10:09 (WEA 17-1)	13:28 (WEA 17-2)	16:21	13:43 (WEA 17-2)
31	05:44	06:35		07:20		09:24 (WEA 17-1)		08:39	11:15 (WEA 17-3)
	21:24	20:21		17:03	46	10:10 (WEA 17-1)		16:22	13:44 (WEA 17-2)
Sonnenscheinstunden	505	456	382	332		265		241	59
astr.max.mögl.Beschattung				343		1818			1901

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: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 17b - Neuenstadt 25/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	11:14 (WEA 17-3) 13:42 (WEA 17-2)	08:12 17:12	09:50 (WEA 17-1) 18:04	07:06 20:02	05:59 21:39
2	08:39 16:24	11:16 (WEA 17-3) 13:43 (WEA 17-2)	08:10 17:13	09:49 (WEA 17-1) 18:06	07:03 20:01	05:57 21:40
3	08:38 16:25	12:55 (WEA 17-2) 13:44 (WEA 17-2)	08:08 17:15	09:49 (WEA 17-1) 18:08	07:01 20:03	05:55 21:41
4	08:38 16:27	12:55 (WEA 17-2) 13:43 (WEA 17-2)	08:07 17:17	09:49 (WEA 17-1) 18:10	06:59 20:05	05:54 21:43
5	08:38 16:28	12:56 (WEA 17-2) 13:44 (WEA 17-2)	08:05 17:19	09:49 (WEA 17-1) 18:12	06:56 20:07	05:52 21:44
6	08:38 16:29	12:56 (WEA 17-2) 13:44 (WEA 17-2)	08:03 17:21	09:50 (WEA 17-1) 18:14	06:54 20:08	05:50 21:45
7	08:37 16:30	12:58 (WEA 17-2) 13:45 (WEA 17-2)	08:02 17:23	09:50 (WEA 17-1) 18:15	06:52 20:10	05:48 21:46
8	08:37 16:32	10:02 (WEA 17-1) 13:44 (WEA 17-2)	08:00 17:25	09:50 (WEA 17-1) 18:17	06:49 20:12	05:46 21:46
9	08:36 16:33	10:01 (WEA 17-1) 13:45 (WEA 17-2)	07:58 17:27	09:51 (WEA 17-1) 18:19	06:47 20:14	05:44 21:47
10	08:36 16:34	09:59 (WEA 17-1) 13:45 (WEA 17-2)	07:56 17:29	09:51 (WEA 17-1) 18:21	06:45 20:15	05:43 21:48
11	08:35 16:36	09:58 (WEA 17-1) 13:45 (WEA 17-2)	07:54 17:31	09:52 (WEA 17-1) 18:23	06:42 20:17	05:41 21:49
12	08:35 16:37	09:57 (WEA 17-1) 13:45 (WEA 17-2)	07:53 17:32	09:52 (WEA 17-1) 18:24	06:40 20:19	05:39 21:50
13	08:34 16:39	09:56 (WEA 17-1) 13:45 (WEA 17-2)	07:51 17:34	09:53 (WEA 17-1) 18:26	06:38 20:21	05:37 21:50
14	08:33 16:40	09:55 (WEA 17-1) 13:45 (WEA 17-2)	07:49 17:36	09:54 (WEA 17-1) 18:28	06:36 20:22	05:36 21:51
15	08:32 16:42	09:54 (WEA 17-1) 13:45 (WEA 17-2)	07:47 17:38	09:55 (WEA 17-1) 18:30	06:33 20:24	05:34 21:52
16	08:32 16:43	09:53 (WEA 17-1) 13:45 (WEA 17-2)	07:45 17:40	09:56 (WEA 17-1) 18:32	06:31 20:26	05:33 21:52
17	08:31 16:45	09:53 (WEA 17-1) 13:44 (WEA 17-2)	07:43 17:42	09:57 (WEA 17-1) 18:33	06:29 20:28	05:31 21:53
18	08:30 16:47	09:53 (WEA 17-1) 13:44 (WEA 17-2)	07:41 17:44	09:58 (WEA 17-1) 18:35	06:27 20:29	05:29 21:53
19	08:29 16:48	09:52 (WEA 17-1) 13:44 (WEA 17-2)	07:39 17:46	10:00 (WEA 17-1) 18:37	06:25 20:31	05:28 21:54
20	08:28 16:50	09:52 (WEA 17-1) 13:44 (WEA 17-2)	07:37 17:48	10:02 (WEA 17-1) 18:39	06:22 20:33	05:27 21:54
21	08:26 16:52	09:51 (WEA 17-1) 13:42 (WEA 17-2)	07:35 17:50	10:06 (WEA 17-1) 18:40	06:20 20:35	05:25 21:54
22	08:25 16:53	09:51 (WEA 17-1) 13:42 (WEA 17-2)	07:33 17:51	10:22 (WEA 17-1) 18:42	06:18 20:36	05:24 21:54
23	08:24 16:55	09:51 (WEA 17-1) 13:41 (WEA 17-2)	07:30 17:53	18:44	06:16 20:38	05:22 21:55
24	08:23 16:57	09:50 (WEA 17-1) 13:39 (WEA 17-2)	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:55
25	08:22 16:59	09:50 (WEA 17-1) 13:37 (WEA 17-2)	07:26 17:57	07:22 19:47	06:12 20:42	05:20 21:55
26	08:20 17:01	09:50 (WEA 17-1) 13:34 (WEA 17-2)	07:24 17:59	07:20 19:49	06:10 20:43	05:19 21:55
27	08:19 17:02	09:50 (WEA 17-1) 10:37 (WEA 17-1)	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:55
28	08:18 17:04	09:49 (WEA 17-1) 10:38 (WEA 17-1)	07:20 18:03	07:15 19:53	06:05 20:47	05:16 21:55
29	08:16 17:06	09:50 (WEA 17-1) 10:39 (WEA 17-1)	18:03	19:53 19:54	20:47 20:49	21:54 21:55
30	08:15 17:08	09:49 (WEA 17-1) 10:39 (WEA 17-1)		07:10 19:56	06:01 20:50	05:14 21:57
31	08:13 17:10	09:49 (WEA 17-1) 10:39 (WEA 17-1)		07:08 19:58	05:13 21:38	
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung	1910	898				

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

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

SHADOW - Kalender**Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 17b - Neuenstadt 25/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober		November		Dezember	
1	05:08	05:45	06:36	07:26		07:21	09:21 (WEA 17-1)	08:14	09:39 (WEA 17-1)
	21:54	21:22	20:19	19:08		17:01	48 10:09 (WEA 17-1)	16:19	68 13:27 (WEA 17-2)
2	05:09	05:47	06:38	07:28		07:23	09:21 (WEA 17-1)	08:15	09:40 (WEA 17-1)
	21:54	21:20	20:17	19:06		16:59	48 10:09 (WEA 17-1)	16:18	66 13:27 (WEA 17-2)
3	05:10	05:49	06:40	07:30		07:25	09:20 (WEA 17-1)	08:17	09:42 (WEA 17-1)
	21:53	21:19	20:14	19:04		16:57	50 10:10 (WEA 17-1)	16:17	63 13:28 (WEA 17-2)
4	05:11	05:50	06:41	07:32		07:27	09:20 (WEA 17-1)	08:18	09:44 (WEA 17-1)
	21:53	21:17	20:12	19:01		16:55	50 10:10 (WEA 17-1)	16:17	60 13:28 (WEA 17-2)
5	05:11	05:52	06:43	07:33		07:29	09:20 (WEA 17-1)	08:19	09:47 (WEA 17-1)
	21:53	21:15	20:10	18:59		16:53	50 10:10 (WEA 17-1)	16:16	56 13:29 (WEA 17-2)
6	05:12	05:53	06:45	07:35		07:31	09:20 (WEA 17-1)	08:21	12:43 (WEA 17-2)
	21:52	21:13	20:07	18:57		16:52	50 10:10 (WEA 17-1)	16:16	47 13:30 (WEA 17-2)
7	05:13	05:55	06:46	07:37		07:32	09:20 (WEA 17-1)	08:22	12:43 (WEA 17-2)
	21:51	21:11	20:05	18:54		16:50	51 10:11 (WEA 17-1)	16:15	48 13:31 (WEA 17-2)
8	05:14	05:57	06:48	07:39		07:34	09:20 (WEA 17-1)	08:23	12:43 (WEA 17-2)
	21:51	21:10	20:03	18:52		16:48	51 10:11 (WEA 17-1)	16:15	48 13:31 (WEA 17-2)
9	05:15	05:58	06:50	07:40		07:36	09:20 (WEA 17-1)	08:25	12:43 (WEA 17-2)
	21:50	21:08	20:00	18:50		16:46	51 10:11 (WEA 17-1)	16:14	48 13:31 (WEA 17-2)
10	05:16	06:00	06:51	07:42		07:38	09:20 (WEA 17-1)	08:26	12:45 (WEA 17-2)
	21:49	21:06	19:58	18:47		16:45	51 10:11 (WEA 17-1)	16:14	48 13:33 (WEA 17-2)
11	05:17	06:01	06:53	07:44		07:40	09:20 (WEA 17-1)	08:27	11:07 (WEA 17-3)
	21:49	21:04	19:56	18:45		16:43	51 10:11 (WEA 17-1)	16:14	54 13:33 (WEA 17-2)
12	05:18	06:03	06:55	07:45		07:42	09:21 (WEA 17-1)	08:28	11:05 (WEA 17-3)
	21:48	21:02	19:53	18:43		16:41	50 10:11 (WEA 17-1)	16:14	58 13:33 (WEA 17-2)
13	05:19	06:05	06:56	07:47		07:43	09:21 (WEA 17-1)	08:29	11:04 (WEA 17-3)
	21:47	21:00	19:51	18:41		16:40	50 10:11 (WEA 17-1)	16:14	61 13:34 (WEA 17-2)
14	05:20	06:06	06:58	07:49		07:45	09:22 (WEA 17-1)	08:30	11:04 (WEA 17-3)
	21:46	20:58	19:49	18:38		16:38	49 10:11 (WEA 17-1)	16:14	62 13:34 (WEA 17-2)
15	05:22	06:08	07:00	07:51		07:47	09:22 (WEA 17-1)	08:31	11:04 (WEA 17-3)
	21:45	20:56	19:46	18:36		16:37	49 10:11 (WEA 17-1)	16:14	64 13:35 (WEA 17-2)
16	05:23	06:10	07:01	07:53		07:49	09:23 (WEA 17-1)	08:32	11:04 (WEA 17-3)
	21:44	20:54	19:44	18:34		16:35	47 10:10 (WEA 17-1)	16:14	64 13:35 (WEA 17-2)
17	05:24	06:11	07:03	07:54		07:51	09:23 (WEA 17-1)	08:33	11:04 (WEA 17-3)
	21:43	20:52	19:42	18:32		16:34	60 13:08 (WEA 17-2)	16:14	66 13:36 (WEA 17-2)
18	05:25	06:13	07:05	07:56		07:52	09:24 (WEA 17-1)	08:33	11:04 (WEA 17-3)
	21:42	20:50	19:39	18:30		16:33	65 13:11 (WEA 17-2)	16:14	66 13:36 (WEA 17-2)
19	05:27	06:15	07:06	07:58		07:54	09:24 (WEA 17-1)	08:34	11:04 (WEA 17-3)
	21:41	20:48	19:37	18:27		16:31	69 13:13 (WEA 17-2)	16:14	67 13:37 (WEA 17-2)
20	05:28	06:16	07:08	08:00		07:56	09:25 (WEA 17-1)	08:35	11:05 (WEA 17-3)
	21:39	20:46	19:34	18:25		16:30	72 13:15 (WEA 17-2)	16:15	67 13:37 (WEA 17-2)
21	05:29	06:18	07:10	08:01	10:41 (WEA 17-1)	07:58	09:26 (WEA 17-1)	08:35	11:05 (WEA 17-3)
	21:38	20:43	19:32	18:23	7 10:48 (WEA 17-1)	16:29	13:17 (WEA 17-2)	16:15	67 13:37 (WEA 17-2)
22	05:31	06:20	07:11	08:03	10:35 (WEA 17-1)	07:59	09:27 (WEA 17-1)	08:36	11:06 (WEA 17-3)
	21:37	20:41	19:30	18:21	19 10:54 (WEA 17-1)	16:27	13:18 (WEA 17-2)	16:16	67 13:38 (WEA 17-2)
23	05:32	06:21	07:13	08:05	10:32 (WEA 17-1)	08:01	09:28 (WEA 17-1)	08:37	11:06 (WEA 17-3)
	21:36	20:39	19:27	18:19	25 10:57 (WEA 17-1)	16:26	13:20 (WEA 17-2)	16:16	67 13:38 (WEA 17-2)
24	05:33	06:23	07:15	08:07	10:30 (WEA 17-1)	08:03	09:29 (WEA 17-1)	08:37	11:07 (WEA 17-3)
	21:34	20:37	19:25	18:17	29 10:59 (WEA 17-1)	16:25	13:21 (WEA 17-2)	16:17	67 13:39 (WEA 17-2)
25	05:35	06:25	07:16	08:09	10:28 (WEA 17-1)	08:04	09:31 (WEA 17-1)	08:37	11:07 (WEA 17-3)
	21:33	20:35	19:23	18:15	33 11:01 (WEA 17-1)	16:24	13:22 (WEA 17-2)	16:17	67 13:40 (WEA 17-2)
26	05:36	06:26	07:18	08:10	10:26 (WEA 17-1)	08:06	09:31 (WEA 17-1)	08:38	11:07 (WEA 17-3)
	21:31	20:33	19:20	18:13	37 11:03 (WEA 17-1)	16:23	13:22 (WEA 17-2)	16:18	67 13:40 (WEA 17-2)
27	05:38	06:28	07:20	08:12	10:25 (WEA 17-1)	08:08	09:32 (WEA 17-1)	08:38	11:08 (WEA 17-3)
	21:30	20:30	19:18	18:11	39 11:04 (WEA 17-1)	16:22	13:24 (WEA 17-2)	16:19	66 13:40 (WEA 17-2)
28	05:39	06:30	07:21	07:14	09:24 (WEA 17-1)	08:09	09:34 (WEA 17-1)	08:38	11:09 (WEA 17-3)
	21:28	20:28	19:15	17:09	41 10:05 (WEA 17-1)	16:21	13:25 (WEA 17-2)	16:19	65 13:40 (WEA 17-2)
29	05:41	06:31	07:23	07:16	09:23 (WEA 17-1)	08:11	09:36 (WEA 17-1)	08:38	11:10 (WEA 17-3)
	21:27	20:26	19:13	17:07	43 10:06 (WEA 17-1)	16:20	13:26 (WEA 17-2)	16:20	64 13:41 (WEA 17-2)
30	05:42	06:33	07:25	07:18	09:22 (WEA 17-1)	08:12	09:37 (WEA 17-1)	08:39	11:11 (WEA 17-3)
	21:25	20:24	19:11	17:05	45 10:07 (WEA 17-1)	16:19	13:26 (WEA 17-2)	16:21	63 13:41 (WEA 17-2)
31	05:44	06:35		07:20	09:22 (WEA 17-1)			08:39	11:12 (WEA 17-3)
	21:24	20:21		17:03	46 10:08 (WEA 17-1)			16:22	61 13:42 (WEA 17-2)
Sonnenscheinstunden	505	456	382	332		265		241	
astr.max.mögl.Beschattung				364		1796		1902	

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: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 18a - Neuenstadt 25A/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	11:03 (WEA 17-3) 13:37 (WEA 17-2)	08:12 17:12	07:17 18:04	05:59 20:52	05:12 21:39
2	08:39 16:24	11:05 (WEA 17-3) 13:38 (WEA 17-2)	08:10 17:13	07:15 18:06	05:57 20:54	05:12 21:40
3	08:38 16:25	11:06 (WEA 17-3) 13:38 (WEA 17-2)	08:08 17:15	07:13 18:08	05:55 20:55	05:11 21:41
4	08:38 16:27	11:07 (WEA 17-3) 13:38 (WEA 17-2)	08:07 17:17	07:11 18:10	05:54 20:57	05:10 21:43
5	08:38 16:28	11:09 (WEA 17-3) 13:39 (WEA 17-2)	08:05 17:19	07:08 18:12	05:52 20:59	05:09 21:44
6	08:38 16:29	11:11 (WEA 17-3) 13:38 (WEA 17-2)	08:03 17:21	07:06 18:14	05:50 21:00	05:08 21:45
7	08:37 16:30	12:50 (WEA 17-2) 13:39 (WEA 17-2)	08:02 17:23	07:04 18:15	05:48 21:02	05:08 21:46
8	08:37 16:32	12:51 (WEA 17-2) 13:39 (WEA 17-2)	08:00 17:25	07:02 18:17	05:46 21:04	05:07 21:46
9	08:36 16:33	12:52 (WEA 17-2) 13:40 (WEA 17-2)	07:58 17:27	06:59 18:19	05:44 21:05	05:07 21:47
10	08:36 16:34	12:52 (WEA 17-2) 13:40 (WEA 17-2)	07:56 17:29	06:57 18:21	05:43 21:07	05:06 21:48
11	08:35 16:36	12:53 (WEA 17-2) 13:40 (WEA 17-2)	07:54 17:31	06:55 18:23	05:41 21:09	05:06 21:49
12	08:35 16:37	12:53 (WEA 17-2) 13:40 (WEA 17-2)	07:53 17:32	06:52 18:24	05:39 21:10	05:05 21:50
13	08:34 16:39	12:54 (WEA 17-2) 13:40 (WEA 17-2)	07:51 17:34	06:50 18:26	05:37 21:12	05:05 21:50
14	08:33 16:40	09:56 (WEA 17-1) 13:40 (WEA 17-2)	07:49 17:36	06:48 18:28	05:36 21:14	05:05 21:51
15	08:32 16:42	09:53 (WEA 17-1) 13:40 (WEA 17-2)	07:47 17:38	06:46 18:30	05:34 21:15	05:05 21:52
16	08:32 16:43	09:51 (WEA 17-1) 13:40 (WEA 17-2)	07:45 17:40	06:43 18:32	05:33 21:17	05:04 21:52
17	08:31 16:45	09:50 (WEA 17-1) 13:40 (WEA 17-2)	07:43 17:42	06:41 18:33	05:31 21:18	05:04 21:53
18	08:30 16:47	09:49 (WEA 17-1) 13:40 (WEA 17-2)	07:41 17:44	06:39 18:35	05:29 21:20	05:04 21:53
19	08:29 16:48	09:48 (WEA 17-1) 13:39 (WEA 17-2)	07:39 17:46	06:36 18:37	05:28 21:21	05:04 21:54
20	08:28 16:50	09:47 (WEA 17-1) 13:39 (WEA 17-2)	07:37 17:48	06:34 18:39	05:27 21:23	05:04 21:54
21	08:26 16:52	09:46 (WEA 17-1) 13:38 (WEA 17-2)	07:35 17:50	06:31 18:40	05:25 21:24	05:04 21:54
22	08:25 16:53	09:45 (WEA 17-1) 13:38 (WEA 17-2)	07:33 17:51	06:29 18:42	05:24 21:26	05:05 21:54
23	08:24 16:55	09:45 (WEA 17-1) 13:37 (WEA 17-2)	07:30 17:53	06:27 18:44	05:22 21:27	05:05 21:55
24	08:23 16:57	09:44 (WEA 17-1) 13:35 (WEA 17-2)	07:28 17:55	06:24 18:46	05:21 21:29	05:05 21:55
25	08:22 16:59	09:44 (WEA 17-1) 13:35 (WEA 17-2)	07:26 17:57	06:22 19:47	05:20 21:30	05:05 21:55
26	08:20 17:01	09:43 (WEA 17-1) 13:32 (WEA 17-2)	07:24 17:59	06:20 19:49	05:19 21:32	05:06 21:55
27	08:19 17:02	09:43 (WEA 17-1) 13:30 (WEA 17-2)	07:22 18:01	06:17 19:51	05:18 21:33	05:06 21:55
28	08:18 17:04	09:42 (WEA 17-1) 13:26 (WEA 17-2)	07:20 18:03	06:15 19:53	05:16 21:34	05:07 21:55
29	08:16 17:06	09:42 (WEA 17-1) 10:28 (WEA 17-1)		06:13 19:54	05:15 21:36	05:07 21:55
30	08:15 17:08	09:41 (WEA 17-1) 10:29 (WEA 17-1)		06:10 19:56	05:14 21:37	05:08 21:54
31	08:13 17:10	09:41 (WEA 17-1) 10:29 (WEA 17-1)		06:08 19:58	05:13 21:38	
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung	1832	1038				

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 18a - Neuenstadt 25A/Südost Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober		November		Dezember	
1	05:08	05:45	06:36	07:26		07:21	09:11 (WEA 17-1)	08:14	12:35 (WEA 17-2)
	21:54	21:22	20:19	19:08		17:01	10:01 (WEA 17-1)	16:19	47 13:22 (WEA 17-2)
2	05:09	05:47	06:38	07:28		07:23	09:11 (WEA 17-1)	08:15	12:35 (WEA 17-2)
	21:54	21:20	20:17	19:06		16:59	10:01 (WEA 17-1)	16:18	47 13:22 (WEA 17-2)
3	05:10	05:49	06:40	07:30		07:25	09:10 (WEA 17-1)	08:17	12:35 (WEA 17-2)
	21:53	21:19	20:14	19:04		16:57	10:01 (WEA 17-1)	16:17	48 13:23 (WEA 17-2)
4	05:11	05:50	06:41	07:32		07:27	09:10 (WEA 17-1)	08:18	12:35 (WEA 17-2)
	21:53	21:17	20:12	19:01		16:55	10:01 (WEA 17-1)	16:17	48 13:23 (WEA 17-2)
5	05:11	05:52	06:43	07:33		07:29	09:10 (WEA 17-1)	08:19	12:36 (WEA 17-2)
	21:53	21:15	20:10	18:59		16:53	10:02 (WEA 17-1)	16:16	48 13:24 (WEA 17-2)
6	05:12	05:53	06:45	07:35		07:31	09:11 (WEA 17-1)	08:21	12:35 (WEA 17-2)
	21:52	21:13	20:07	18:57		16:52	10:02 (WEA 17-1)	16:16	49 13:24 (WEA 17-2)
7	05:13	05:55	06:46	07:37		07:32	09:11 (WEA 17-1)	08:22	10:58 (WEA 17-3)
	21:51	21:11	20:05	18:54		16:50	10:02 (WEA 17-1)	16:15	58 13:26 (WEA 17-2)
8	05:14	05:57	06:48	07:39		07:34	09:11 (WEA 17-1)	08:23	10:56 (WEA 17-3)
	21:51	21:10	20:03	18:52		16:48	10:01 (WEA 17-1)	16:15	62 13:26 (WEA 17-2)
9	05:15	05:58	06:50	07:40		07:36	09:11 (WEA 17-1)	08:25	10:55 (WEA 17-3)
	21:50	21:08	20:00	18:50		16:46	10:01 (WEA 17-1)	16:14	64 13:26 (WEA 17-2)
10	05:16	06:00	06:51	07:42		07:38	09:12 (WEA 17-1)	08:26	10:55 (WEA 17-3)
	21:49	21:06	19:58	18:47		16:45	10:01 (WEA 17-1)	16:14	66 13:27 (WEA 17-2)
11	05:17	06:01	06:53	07:44		07:40	09:12 (WEA 17-1)	08:27	10:55 (WEA 17-3)
	21:49	21:04	19:56	18:45		16:43	10:01 (WEA 17-1)	16:14	67 13:28 (WEA 17-2)
12	05:18	06:03	06:55	07:45		07:42	09:13 (WEA 17-1)	08:28	10:54 (WEA 17-3)
	21:48	21:02	19:53	18:43		16:41	10:01 (WEA 17-1)	16:14	69 13:28 (WEA 17-2)
13	05:19	06:05	06:56	07:47		07:43	09:13 (WEA 17-1)	08:29	10:54 (WEA 17-3)
	21:47	21:00	19:51	18:41		16:40	10:00 (WEA 17-1)	16:14	70 13:28 (WEA 17-2)
14	05:20	06:06	06:58	07:49		07:45	09:14 (WEA 17-1)	08:30	10:54 (WEA 17-3)
	21:46	20:58	19:49	18:38		16:38	10:00 (WEA 17-1)	16:14	71 13:29 (WEA 17-2)
15	05:22	06:08	07:00	07:51		07:47	09:15 (WEA 17-1)	08:31	10:54 (WEA 17-3)
	21:45	20:56	19:46	18:36		16:37	12:59 (WEA 17-2)	16:14	72 13:29 (WEA 17-2)
16	05:23	06:10	07:01	07:53		07:49	09:16 (WEA 17-1)	08:32	10:55 (WEA 17-3)
	21:44	20:54	19:44	18:34		16:35	13:04 (WEA 17-2)	16:14	72 13:30 (WEA 17-2)
17	05:24	06:11	07:03	07:54		07:51	09:17 (WEA 17-1)	08:33	10:55 (WEA 17-3)
	21:43	20:52	19:42	18:32		16:34	13:06 (WEA 17-2)	16:14	74 13:31 (WEA 17-2)
18	05:25	06:13	07:05	07:56		07:52	09:18 (WEA 17-1)	08:33	10:55 (WEA 17-3)
	21:42	20:50	19:39	18:30		16:33	13:09 (WEA 17-2)	16:14	73 13:30 (WEA 17-2)
19	05:27	06:15	07:06	07:58		07:54	09:18 (WEA 17-1)	08:34	10:55 (WEA 17-3)
	21:41	20:48	19:37	18:27	17	10:44 (WEA 17-1)	13:09 (WEA 17-2)	16:14	74 13:31 (WEA 17-2)
20	05:28	06:16	07:08	08:00		07:56	09:19 (WEA 17-1)	08:35	10:56 (WEA 17-3)
	21:39	20:46	19:34	18:25	24	10:47 (WEA 17-1)	13:11 (WEA 17-2)	16:15	73 13:32 (WEA 17-2)
21	05:29	06:18	07:10	08:01		07:58	09:20 (WEA 17-1)	08:35	10:56 (WEA 17-3)
	21:38	20:43	19:32	18:23	29	10:50 (WEA 17-1)	13:13 (WEA 17-2)	16:15	74 13:32 (WEA 17-2)
22	05:31	06:20	07:11	08:03		07:59	09:22 (WEA 17-1)	08:36	10:57 (WEA 17-3)
	21:37	20:41	19:30	18:21	33	10:52 (WEA 17-1)	13:14 (WEA 17-2)	16:16	74 13:33 (WEA 17-2)
23	05:32	06:21	07:13	08:05		08:01	09:23 (WEA 17-1)	08:37	10:57 (WEA 17-3)
	21:36	20:39	19:27	18:19	36	10:53 (WEA 17-1)	13:15 (WEA 17-2)	16:16	74 13:33 (WEA 17-2)
24	05:33	06:23	07:15	08:07		08:03	09:25 (WEA 17-1)	08:37	10:58 (WEA 17-3)
	21:34	20:37	19:25	18:17	39	10:55 (WEA 17-1)	13:16 (WEA 17-2)	16:17	74 13:34 (WEA 17-2)
25	05:35	06:25	07:16	08:09		08:04	09:27 (WEA 17-1)	08:37	10:58 (WEA 17-3)
	21:33	20:35	19:23	18:15	41	10:56 (WEA 17-1)	13:18 (WEA 17-2)	16:17	74 13:34 (WEA 17-2)
26	05:36	06:26	07:18	08:10		08:06	09:28 (WEA 17-1)	08:38	10:58 (WEA 17-3)
	21:31	20:33	19:20	18:13	43	10:57 (WEA 17-1)	13:18 (WEA 17-2)	16:18	74 13:34 (WEA 17-2)
27	05:38	06:28	07:20	08:12		08:08	09:30 (WEA 17-1)	08:38	10:59 (WEA 17-3)
	21:30	20:30	19:18	18:11	45	10:58 (WEA 17-1)	13:19 (WEA 17-2)	16:19	74 13:35 (WEA 17-2)
28	05:39	06:30	07:21	07:14		08:09	09:33 (WEA 17-1)	08:38	10:59 (WEA 17-3)
	21:28	20:28	19:15	17:09	46	09:59 (WEA 17-1)	13:20 (WEA 17-2)	16:19	73 13:35 (WEA 17-2)
29	05:41	06:31	07:23	07:16		08:11	09:37 (WEA 17-1)	08:38	11:00 (WEA 17-3)
	21:27	20:26	19:13	17:07	47	09:59 (WEA 17-1)	13:21 (WEA 17-2)	16:20	72 13:35 (WEA 17-2)
30	05:42	06:33	07:25	07:18		08:12	12:35 (WEA 17-2)	08:39	11:01 (WEA 17-3)
	21:25	20:24	19:11	17:05	49	10:00 (WEA 17-1)	13:21 (WEA 17-2)	16:21	72 13:36 (WEA 17-2)
31	05:44	06:35		07:20		09:11 (WEA 17-1)		08:39	11:02 (WEA 17-3)
	21:24	20:21		17:03	49	10:00 (WEA 17-1)		16:22	70 13:36 (WEA 17-2)
Sonnenscheinstunden	505	456	382	332		265		241	
astr.max.mögl.Beschattung				498		1715		2057	

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: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 18b - Neuenstadt 25/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	11:00 (WEA 17-3) 13:34 (WEA 17-2)	08:12 17:12	07:17 18:04	05:59 20:52	05:12 21:39
2	08:39 16:24	11:02 (WEA 17-3) 13:35 (WEA 17-2)	08:10 17:13	07:15 18:06	05:57 20:54	05:12 21:40
3	08:38 16:25	11:03 (WEA 17-3) 13:35 (WEA 17-2)	08:08 17:15	07:13 18:08	05:55 20:55	05:11 21:41
4	08:38 16:27	11:04 (WEA 17-3) 13:35 (WEA 17-2)	08:07 17:17	07:11 18:10	05:54 20:57	05:10 21:43
5	08:38 16:28	11:06 (WEA 17-3) 13:36 (WEA 17-2)	08:05 17:19	07:08 18:12	05:52 20:59	05:09 21:44
6	08:38 16:29	11:07 (WEA 17-3) 13:35 (WEA 17-2)	08:03 17:21	07:06 18:14	05:50 21:00	05:08 21:45
7	08:37 16:30	11:10 (WEA 17-3) 13:36 (WEA 17-2)	08:02 17:23	07:04 18:15	05:48 21:02	05:08 21:46
8	08:37 16:32	12:47 (WEA 17-2) 13:36 (WEA 17-2)	08:00 17:25	07:02 18:17	05:46 21:04	05:07 21:46
9	08:36 16:33	12:48 (WEA 17-2) 13:37 (WEA 17-2)	07:58 17:27	06:59 18:19	05:44 21:05	05:07 21:47
10	08:36 16:34	12:49 (WEA 17-2) 13:37 (WEA 17-2)	07:56 17:29	06:57 18:21	05:43 21:07	05:06 21:48
11	08:35 16:36	12:49 (WEA 17-2) 13:37 (WEA 17-2)	07:54 17:31	06:55 18:23	05:41 21:09	05:06 21:49
12	08:35 16:37	12:50 (WEA 17-2) 13:37 (WEA 17-2)	07:53 17:32	06:52 18:24	05:39 21:10	05:05 21:50
13	08:34 16:39	12:50 (WEA 17-2) 13:37 (WEA 17-2)	07:51 17:34	06:50 18:26	05:37 21:12	05:05 21:50
14	08:33 16:40	12:51 (WEA 17-2) 13:37 (WEA 17-2)	07:49 17:36	06:48 18:28	05:36 21:14	05:05 21:51
15	08:32 16:42	12:52 (WEA 17-2) 13:37 (WEA 17-2)	07:47 17:38	06:46 18:30	05:34 21:15	05:05 21:52
16	08:32 16:43	09:52 (WEA 17-1) 13:37 (WEA 17-2)	07:45 17:40	06:43 18:32	05:33 21:17	05:04 21:52
17	08:31 16:45	09:49 (WEA 17-1) 13:37 (WEA 17-2)	07:43 17:42	06:41 18:33	05:31 21:18	05:04 21:53
18	08:30 16:47	09:48 (WEA 17-1) 13:37 (WEA 17-2)	07:41 17:44	06:39 18:35	05:29 21:20	05:04 21:53
19	08:29 16:48	09:47 (WEA 17-1) 13:36 (WEA 17-2)	07:39 17:46	06:36 18:37	05:28 21:21	05:04 21:54
20	08:28 16:50	09:46 (WEA 17-1) 13:36 (WEA 17-2)	07:37 17:48	06:34 18:39	05:27 21:23	05:04 21:54
21	08:26 16:52	09:44 (WEA 17-1) 13:35 (WEA 17-2)	07:35 17:50	06:31 18:40	05:25 21:24	05:04 21:54
22	08:25 16:53	09:44 (WEA 17-1) 13:35 (WEA 17-2)	07:33 17:51	06:29 18:42	05:24 21:26	05:05 21:54
23	08:24 16:55	09:43 (WEA 17-1) 13:34 (WEA 17-2)	07:30 17:53	06:27 18:44	05:22 21:27	05:05 21:55
24	08:23 16:57	09:42 (WEA 17-1) 13:33 (WEA 17-2)	07:28 17:55	06:24 18:46	05:21 21:29	05:05 21:55
25	08:22 16:59	09:42 (WEA 17-1) 13:32 (WEA 17-2)	07:26 17:57	06:22 19:47	05:20 21:30	05:05 21:55
26	08:20 17:01	09:41 (WEA 17-1) 13:29 (WEA 17-2)	07:24 17:59	06:20 19:49	05:19 21:32	05:06 21:55
27	08:19 17:02	09:41 (WEA 17-1) 13:27 (WEA 17-2)	07:22 18:01	06:17 19:51	05:18 21:33	05:06 21:55
28	08:18 17:04	09:40 (WEA 17-1) 13:23 (WEA 17-2)	07:20 18:03	06:15 19:53	05:16 21:34	05:07 21:55
29	08:16 17:06	09:40 (WEA 17-1) 10:25 (WEA 17-1)		06:13 19:54	05:15 21:36	05:07 21:55
30	08:15 17:08	09:39 (WEA 17-1) 10:25 (WEA 17-1)		06:10 19:56	05:14 21:37	05:08 21:54
31	08:13 17:10	09:39 (WEA 17-1) 10:25 (WEA 17-1)		06:08 19:58	05:13 21:38	
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung	1796	1045				

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 18b - Neuenstadt 25/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober		November		Dezember	
1	05:08	05:45	06:36	07:26		07:21	09:08 (WEA 17-1)	08:14	12:32 (WEA 17-2)
	21:54	21:22	20:19	19:08		17:01	50 09:58 (WEA 17-1)	16:19	47 13:19 (WEA 17-2)
2	05:09	05:47	06:38	07:28		07:23	09:08 (WEA 17-1)	08:15	12:31 (WEA 17-2)
	21:54	21:20	20:17	19:06		16:59	50 09:58 (WEA 17-1)	16:18	48 13:19 (WEA 17-2)
3	05:10	05:49	06:40	07:30		07:25	09:08 (WEA 17-1)	08:17	12:32 (WEA 17-2)
	21:53	21:19	20:14	19:04		16:57	50 09:58 (WEA 17-1)	16:17	48 13:20 (WEA 17-2)
4	05:11	05:50	06:41	07:32		07:27	09:08 (WEA 17-1)	08:18	12:32 (WEA 17-2)
	21:53	21:17	20:12	19:01		16:55	50 09:58 (WEA 17-1)	16:17	48 13:20 (WEA 17-2)
5	05:11	05:52	06:43	07:33		07:29	09:08 (WEA 17-1)	08:19	12:32 (WEA 17-2)
	21:53	21:15	20:10	18:59		16:53	50 09:58 (WEA 17-1)	16:16	49 13:21 (WEA 17-2)
6	05:12	05:53	06:45	07:35		07:31	09:08 (WEA 17-1)	08:21	10:55 (WEA 17-3)
	21:52	21:13	20:07	18:57		16:52	50 09:58 (WEA 17-1)	16:16	56 13:21 (WEA 17-2)
7	05:13	05:55	06:46	07:37		07:32	09:08 (WEA 17-1)	08:22	10:54 (WEA 17-3)
	21:51	21:11	20:05	18:54		16:50	50 09:58 (WEA 17-1)	16:15	61 13:23 (WEA 17-2)
8	05:14	05:57	06:48	07:39		07:34	09:09 (WEA 17-1)	08:23	10:53 (WEA 17-3)
	21:51	21:10	20:03	18:52		16:48	49 09:58 (WEA 17-1)	16:15	64 13:23 (WEA 17-2)
9	05:15	05:58	06:50	07:40		07:36	09:09 (WEA 17-1)	08:25	10:52 (WEA 17-3)
	21:50	21:08	20:00	18:50		16:46	49 09:58 (WEA 17-1)	16:14	66 13:23 (WEA 17-2)
10	05:16	06:00	06:51	07:42		07:38	09:09 (WEA 17-1)	08:26	10:52 (WEA 17-3)
	21:49	21:06	19:58	18:47		16:45	49 09:58 (WEA 17-1)	16:14	68 13:24 (WEA 17-2)
11	05:17	06:01	06:53	07:44		07:40	09:10 (WEA 17-1)	08:27	10:52 (WEA 17-3)
	21:49	21:04	19:56	18:45		16:43	47 09:57 (WEA 17-1)	16:14	70 13:25 (WEA 17-2)
12	05:18	06:03	06:55	07:45		07:42	09:10 (WEA 17-1)	08:28	10:52 (WEA 17-3)
	21:48	21:02	19:53	18:43		16:41	47 09:57 (WEA 17-1)	16:14	70 13:25 (WEA 17-2)
13	05:19	06:05	06:56	07:47		07:43	09:11 (WEA 17-1)	08:29	10:51 (WEA 17-3)
	21:47	21:00	19:51	18:41		16:40	46 09:57 (WEA 17-1)	16:14	72 13:25 (WEA 17-2)
14	05:20	06:06	06:58	07:49		07:45	09:12 (WEA 17-1)	08:30	10:51 (WEA 17-3)
	21:46	20:58	19:49	18:38		16:38	44 09:56 (WEA 17-1)	16:14	73 13:26 (WEA 17-2)
15	05:22	06:08	07:00	07:51		07:47	09:13 (WEA 17-1)	08:31	10:52 (WEA 17-3)
	21:45	20:56	19:46	18:36		16:37	52 12:56 (WEA 17-2)	16:14	72 13:26 (WEA 17-2)
16	05:23	06:10	07:01	07:53		07:49	09:14 (WEA 17-1)	08:32	10:52 (WEA 17-3)
	21:44	20:54	19:44	18:34		16:35	60 13:01 (WEA 17-2)	16:14	74 13:27 (WEA 17-2)
17	05:24	06:11	07:03	07:54		07:51	09:15 (WEA 17-1)	08:33	10:52 (WEA 17-3)
	21:43	20:52	19:42	18:32		16:34	63 13:03 (WEA 17-2)	16:14	75 13:28 (WEA 17-2)
18	05:25	06:13	07:05	07:56	10:28 (WEA 17-1)	07:52	09:16 (WEA 17-1)	08:33	10:52 (WEA 17-3)
	21:42	20:50	19:39	18:30	11 10:39 (WEA 17-1)	16:33	13:06 (WEA 17-2)	16:14	74 13:27 (WEA 17-2)
19	05:27	06:15	07:06	07:58	10:23 (WEA 17-1)	07:54	09:16 (WEA 17-1)	08:34	10:52 (WEA 17-3)
	21:41	20:48	19:37	18:27	20 10:43 (WEA 17-1)	16:31	13:07 (WEA 17-2)	16:14	76 13:28 (WEA 17-2)
20	05:28	06:16	07:08	08:00	10:20 (WEA 17-1)	07:56	09:17 (WEA 17-1)	08:35	10:53 (WEA 17-3)
	21:39	20:46	19:34	18:25	26 10:46 (WEA 17-1)	16:30	13:08 (WEA 17-2)	16:15	76 13:29 (WEA 17-2)
21	05:29	06:18	07:10	08:01	10:17 (WEA 17-1)	07:58	09:19 (WEA 17-1)	08:35	10:53 (WEA 17-3)
	21:38	20:43	19:32	18:23	31 10:48 (WEA 17-1)	16:29	13:10 (WEA 17-2)	16:15	76 13:29 (WEA 17-2)
22	05:31	06:20	07:11	08:03	10:16 (WEA 17-1)	07:59	09:20 (WEA 17-1)	08:36	10:54 (WEA 17-3)
	21:37	20:41	19:30	18:21	34 10:50 (WEA 17-1)	16:27	13:11 (WEA 17-2)	16:16	76 13:30 (WEA 17-2)
23	05:32	06:21	07:13	08:05	10:14 (WEA 17-1)	08:01	09:22 (WEA 17-1)	08:37	10:54 (WEA 17-3)
	21:36	20:39	19:27	18:19	37 10:51 (WEA 17-1)	16:26	13:12 (WEA 17-2)	16:16	76 13:30 (WEA 17-2)
24	05:33	06:23	07:15	08:07	10:13 (WEA 17-1)	08:03	09:24 (WEA 17-1)	08:37	10:55 (WEA 17-3)
	21:34	20:37	19:25	18:17	40 10:53 (WEA 17-1)	16:25	13:13 (WEA 17-2)	16:17	76 13:31 (WEA 17-2)
25	05:35	06:25	07:16	08:09	10:12 (WEA 17-1)	08:04	09:26 (WEA 17-1)	08:37	10:55 (WEA 17-3)
	21:33	20:35	19:23	18:15	42 10:54 (WEA 17-1)	16:24	13:15 (WEA 17-2)	16:17	76 13:31 (WEA 17-2)
26	05:36	06:26	07:18	08:10	10:11 (WEA 17-1)	08:06	09:27 (WEA 17-1)	08:38	10:56 (WEA 17-3)
	21:31	20:33	19:20	18:13	44 10:55 (WEA 17-1)	16:23	13:15 (WEA 17-2)	16:18	75 13:31 (WEA 17-2)
27	05:38	06:28	07:20	08:12	10:10 (WEA 17-1)	08:08	09:31 (WEA 17-1)	08:38	10:56 (WEA 17-3)
	21:30	20:30	19:18	18:11	45 10:55 (WEA 17-1)	16:22	13:16 (WEA 17-2)	16:19	75 13:32 (WEA 17-2)
28	05:39	06:30	07:21	07:14	09:10 (WEA 17-1)	08:09	09:36 (WEA 17-1)	08:38	10:57 (WEA 17-3)
	21:28	20:28	19:15	17:09	46 09:56 (WEA 17-1)	16:21	13:17 (WEA 17-2)	16:19	74 13:32 (WEA 17-2)
29	05:41	06:31	07:23	07:16	09:09 (WEA 17-1)	08:11	12:32 (WEA 17-2)	08:38	10:57 (WEA 17-3)
	21:27	20:26	19:13	17:07	48 09:57 (WEA 17-1)	16:20	13:18 (WEA 17-2)	16:20	73 13:32 (WEA 17-2)
30	05:42	06:33	07:25	07:18	09:09 (WEA 17-1)	08:12	12:31 (WEA 17-2)	08:39	10:58 (WEA 17-3)
	21:25	20:24	19:11	17:05	48 09:57 (WEA 17-1)	16:19	13:18 (WEA 17-2)	16:21	73 13:33 (WEA 17-2)
31	05:44	06:35		07:20	09:08 (WEA 17-1)			08:39	10:59 (WEA 17-3)
	21:24	20:21		17:03	50 09:58 (WEA 17-1)			16:22	71 13:33 (WEA 17-2)
Sonnenscheinstunden	505	456	382	332		265		241	
astr.max.mögl.Beschattung				522		1649		2108	

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 19 - Holle 2/Südost

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	15:43 (WEA 17-3) 18:04	16:31 (WEA 17-1) 17:20 (WEA 17-2)	07:06 20:00	05:59 21:39
2	08:39 16:24	08:10 17:13	15:44 (WEA 17-3) 18:06	16:31 (WEA 17-1) 17:19 (WEA 17-2)	07:03 20:01	05:57 21:40
3	08:38 16:25	08:08 17:15	15:45 (WEA 17-3) 18:08	16:31 (WEA 17-1) 17:18 (WEA 17-2)	07:01 20:03	05:55 21:41
4	08:38 16:26	08:07 17:17	15:46 (WEA 17-3) 18:10	16:31 (WEA 17-1) 17:15 (WEA 17-2)	06:59 20:05	05:53 21:42
5	08:38 16:28	08:05 17:19	15:47 (WEA 17-3) 18:12	16:31 (WEA 17-1) 17:12 (WEA 17-2)	06:56 20:07	05:52 21:44
6	08:38 16:29	08:03 17:21	15:49 (WEA 17-3) 18:14	16:32 (WEA 17-1) 17:07 (WEA 17-1)	06:54 20:08	05:50 21:45
7	08:37 16:30	08:02 17:23	15:52 (WEA 17-3) 18:15	16:31 (WEA 17-1) 17:05 (WEA 17-1)	06:52 20:10	05:48 21:45
8	08:37 16:31	08:00 17:25	15:56 (WEA 17-3) 18:17	16:32 (WEA 17-1) 17:05 (WEA 17-1)	06:49 20:12	05:46 21:46
9	08:36 16:33	07:58 17:27	16:00 (WEA 17-3) 18:19	17:04 (WEA 17-1) 16:34 (WEA 17-1)	06:47 20:14	05:44 21:47
10	08:36 16:34	07:56 17:29	16:05 (WEA 17-3) 18:21	17:04 (WEA 17-1) 17:02 (WEA 17-1)	06:45 20:15	05:42 21:48
11	08:35 16:36	07:54 17:30	16:05 (WEA 17-3) 18:23	16:36 (WEA 17-1) 17:00 (WEA 17-1)	06:42 20:17	05:41 21:49
12	08:35 16:37	15:49 (WEA 17-3) 17:32	07:52 18:24	16:38 (WEA 17-1) 16:58 (WEA 17-1)	06:40 20:19	05:39 21:50
13	08:34 16:39	15:53 (WEA 17-3) 17:34	07:51 18:26	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:38 20:21	05:37 21:50
14	08:33 16:40	15:56 (WEA 17-3) 17:36	07:51 18:28	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:38 20:22	05:37 21:51
15	08:32 16:42	15:58 (WEA 17-3) 17:38	07:49 18:30	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:36 20:24	05:36 21:52
16	08:31 16:43	15:44 (WEA 17-3) 17:40	07:47 18:32	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:33 20:26	05:34 21:52
17	08:31 16:45	16:00 (WEA 17-3) 17:42	07:38 18:33	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:31 20:28	05:32 21:53
18	08:30 16:47	15:43 (WEA 17-3) 17:41	07:43 18:35	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:29 20:29	05:31 21:53
19	08:29 16:48	16:02 (WEA 17-3) 17:42	07:42 18:36	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:28 20:31	05:30 21:54
20	08:28 16:50	15:42 (WEA 17-3) 17:44	07:39 18:37	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:27 20:33	05:29 21:54
21	08:26 16:52	15:42 (WEA 17-3) 17:46	07:37 18:39	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:26 20:35	05:28 21:54
22	08:25 16:53	16:06 (WEA 17-3) 17:48	07:35 18:40	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:25 20:37	05:27 21:55
23	08:24 16:55	15:41 (WEA 17-3) 17:51	07:32 18:42	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:24 20:39	05:26 21:55
24	08:23 16:57	15:42 (WEA 17-3) 17:53	07:30 18:44	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:23 20:41	05:25 21:55
25	08:22 16:59	16:08 (WEA 17-3) 17:55	07:28 18:46	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:22 20:43	05:24 21:55
26	08:20 17:00	15:42 (WEA 17-3) 17:57	07:26 18:48	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:21 20:45	05:23 21:55
27	08:19 17:02	16:09 (WEA 17-3) 17:59	07:24 18:50	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:20 20:47	05:22 21:55
28	08:18 17:04	15:42 (WEA 17-3) 18:01	07:22 18:52	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:19 20:49	05:21 21:55
29	08:16 17:06	15:42 (WEA 17-3) 18:03	07:20 18:54	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:18 20:51	05:20 21:55
30	08:15 17:08	16:06 (WEA 17-3) 18:05	07:18 18:56	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:17 20:53	05:19 21:55
31	08:13 17:10	15:43 (WEA 17-3) 18:07	07:16 18:58	16:40 (WEA 17-1) 16:54 (WEA 17-1)	06:16 20:55	05:18 21:55
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung	445	604	447			

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 19 - Holle 2/Südost

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

	July	August	September	Oktober		November		Dezember	
1	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	10	17:22 (WEA 17-1) 17:32 (WEA 17-1)	07:21 17:01	08:14 16:19	15:30 (WEA 17-3) 15:35 (WEA 17-3)
2	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	18	17:18 (WEA 17-1) 17:36 (WEA 17-1)	07:23 16:59	08:15 16:18	
3	05:10 21:53	05:48 21:19	06:40 20:14	07:30 19:04	23	17:14 (WEA 17-1) 17:37 (WEA 17-1)	07:25 16:57	08:17 16:17	
4	05:10 21:53	05:50 21:17	06:41 20:12	07:32 19:01	26	17:13 (WEA 17-1) 17:39 (WEA 17-1)	07:27 16:55	15:24 (WEA 17-3) 15:31 (WEA 17-3)	08:18 16:17
5	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	29	17:11 (WEA 17-1) 17:40 (WEA 17-1)	07:29 16:53	15:21 (WEA 17-3) 15:34 (WEA 17-3)	08:19 16:16
6	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	31	17:10 (WEA 17-1) 17:41 (WEA 17-1)	07:31 16:51	15:19 (WEA 17-3) 15:36 (WEA 17-3)	08:21 16:16
7	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	33	17:08 (WEA 17-1) 17:41 (WEA 17-1)	07:32 16:50	15:18 (WEA 17-3) 15:38 (WEA 17-3)	08:22 16:15
8	05:14 21:51	05:56 21:10	06:48 20:03	07:38 18:52	35	17:07 (WEA 17-1) 17:42 (WEA 17-1)	07:34 16:48	15:17 (WEA 17-3) 15:39 (WEA 17-3)	08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	36	17:06 (WEA 17-1) 17:42 (WEA 17-1)	07:36 16:46	15:16 (WEA 17-3) 15:40 (WEA 17-3)	08:24 16:14
10	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	43	17:06 (WEA 17-1) 17:49 (WEA 17-2)	07:38 16:45	15:15 (WEA 17-3) 15:40 (WEA 17-3)	08:26 16:14
11	05:17 21:49	06:01 21:04	06:53 19:56	07:44 18:45	46	17:04 (WEA 17-1) 17:50 (WEA 17-2)	07:40 16:43	15:15 (WEA 17-3) 15:41 (WEA 17-3)	08:27 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	47	17:04 (WEA 17-1) 17:51 (WEA 17-2)	07:42 16:41	15:15 (WEA 17-3) 15:42 (WEA 17-3)	08:28 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	48	17:04 (WEA 17-1) 17:52 (WEA 17-2)	07:43 16:40	15:14 (WEA 17-3) 15:42 (WEA 17-3)	08:29 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	49	17:04 (WEA 17-1) 17:53 (WEA 17-2)	07:45 16:38	15:14 (WEA 17-3) 15:42 (WEA 17-3)	08:30 16:14
15	05:21 21:45	06:08 20:56	07:00 19:46	07:51 18:36	50	17:04 (WEA 17-1) 17:54 (WEA 17-2)	07:47 16:37	15:15 (WEA 17-3) 15:43 (WEA 17-3)	08:31 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	49	17:05 (WEA 17-1) 17:54 (WEA 17-2)	07:49 16:35	15:15 (WEA 17-3) 15:43 (WEA 17-3)	08:32 16:14
17	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	49	17:05 (WEA 17-1) 17:54 (WEA 17-2)	07:51 16:34	15:14 (WEA 17-3) 15:42 (WEA 17-3)	08:33 16:14
18	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:30	48	17:05 (WEA 17-1) 17:53 (WEA 17-2)	07:52 16:33	15:15 (WEA 17-3) 15:42 (WEA 17-3)	08:33 16:14
19	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27	47	17:05 (WEA 17-1) 17:52 (WEA 17-2)	07:54 16:31	15:15 (WEA 17-3) 15:42 (WEA 17-3)	08:34 16:14
20	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	46	17:06 (WEA 17-1) 17:52 (WEA 17-2)	07:56 16:30	15:16 (WEA 17-3) 15:42 (WEA 17-3)	08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	44	17:07 (WEA 17-1) 17:51 (WEA 17-2)	07:58 16:29	15:16 (WEA 17-3) 15:42 (WEA 17-3)	08:35 16:15
22	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	41	17:09 (WEA 17-1) 17:50 (WEA 17-2)	07:59 16:27	15:17 (WEA 17-3) 15:42 (WEA 17-3)	08:36 16:15
23	05:32 21:36	06:21 20:39	07:13 19:27	08:05 18:19	34	17:11 (WEA 17-1) 17:48 (WEA 17-2)	08:01 16:26	15:18 (WEA 17-3) 15:42 (WEA 17-3)	08:36 16:16
24	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	26	17:13 (WEA 17-1) 17:46 (WEA 17-2)	08:03 16:25	15:19 (WEA 17-3) 15:42 (WEA 17-3)	08:37 16:16
25	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	6	17:18 (WEA 17-1) 17:24 (WEA 17-1)	08:04 16:24	15:19 (WEA 17-3) 15:41 (WEA 17-3)	08:37 16:17
26	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13			08:06 16:23	15:21 (WEA 17-3) 15:40 (WEA 17-3)	08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11			08:07 16:22	15:22 (WEA 17-3) 15:40 (WEA 17-3)	08:38 16:18
28	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:09			08:09 16:21	15:24 (WEA 17-3) 15:40 (WEA 17-3)	08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07			08:11 16:20	15:25 (WEA 17-3) 15:38 (WEA 17-3)	08:38 16:20
30	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05			08:12 16:19	15:27 (WEA 17-3) 15:37 (WEA 17-3)	08:38 16:21
31	05:44 21:24	06:35 20:21		07:20 17:03					08:39 16:22
Sonnenscheinstunden	505	456	382	332		265		241	
astr.max.mögl.Beschattung				914		597		5	

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:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 20a - Zur Dasslage 1/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:39 16:23	08:12 17:12	07:17 18:04	16:48 (WEA 17-3) 17:00 (WEA 17-3)	07:06 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19	
2	08:38 16:24	08:10 17:13	07:15 18:06		07:03 20:01	05:57 20:54	05:11 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18	
3	08:38 16:25	08:08 17:15	07:13 18:08		07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:48 21:19	06:40 20:14	07:30 19:04	07:25 16:57	08:17 16:17	
4	08:38 16:26	08:07 17:17	07:11 18:10		06:59 20:05	05:53 20:57	05:10 21:42	05:10 21:53	05:50 21:17	06:41 20:12	07:32 19:01	07:27 16:55	08:18 16:17	
5	08:38 16:28	08:05 17:19	07:08 18:12		06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16	
6	08:38 16:29	08:03 17:21	07:06 18:13		06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:31 16:51	08:21 16:16	
7	08:37 16:30	08:02 17:23	07:04 18:15		06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:23 16:15	
8	08:37 16:31	08:00 17:25	07:02 18:17		06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:56 21:10	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15	
9	08:36 16:33	07:58 17:27	06:59 18:19		06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14	
10	08:36 16:34	07:56 17:29	06:57 18:21		06:45 20:15	05:42 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:26 16:14	
11	08:35 16:36	07:54 17:30	06:55 18:23		06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:49	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14	
12	08:35 16:37	07:52 17:32	06:52 18:24		06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:42 16:41	08:28 16:14	
13	08:34 16:39	07:51 17:34	16:50 (WEA 17-3) 17:01 (WEA 17-3)	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	17:24 (WEA 17-3) 17:31 (WEA 17-3)	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	16:48 (WEA 17-3) 17:03 (WEA 17-3)	06:48 18:28	06:36 20:22	05:36 21:14	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	17:20 (WEA 17-3) 17:34 (WEA 17-3)	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	16:46 (WEA 17-3) 17:05 (WEA 17-3)	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:52	05:21 21:45	06:08 20:56	07:00 19:46	07:51 18:36	17:18 (WEA 17-3) 17:36 (WEA 17-3)	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	16:45 (WEA 17-3) 17:06 (WEA 17-3)	06:43 18:31	06:31 20:26	05:32 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	17:17 (WEA 17-3) 17:37 (WEA 17-3)	07:49 16:35	08:32 16:14
17	08:31 16:45	07:43 17:42	16:44 (WEA 17-3) 17:07 (WEA 17-3)	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	17:15 (WEA 17-3) 17:38 (WEA 17-3)	07:51 16:34	08:33 16:14
18	08:30 16:47	07:41 17:44	16:43 (WEA 17-3) 17:07 (WEA 17-3)	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:29	17:14 (WEA 17-3) 17:13 (WEA 17-3)	07:52 16:33	08:33 16:14
19	08:29 16:48	07:39 17:46	16:42 (WEA 17-3) 17:07 (WEA 17-3)	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27	17:13 (WEA 17-3) 17:38 (WEA 17-3)	07:54 16:31	08:34 16:14
20	08:28 16:50	07:37 17:48	16:42 (WEA 17-3) 17:08 (WEA 17-3)	06:34 18:39	06:22 20:33	05:26 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	17:13 (WEA 17-3) 17:38 (WEA 17-3)	07:56 16:30	08:35 16:15
21	08:26 16:52	07:35 17:49	16:42 (WEA 17-3) 17:08 (WEA 17-3)	06:31 18:40	06:20 20:35	05:25 21:24	05:04 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	17:12 (WEA 17-3) 17:38 (WEA 17-3)	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	16:42 (WEA 17-3) 17:08 (WEA 17-3)	06:29 18:42	06:18 20:36	05:23 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	17:12 (WEA 17-3) 17:38 (WEA 17-3)	07:59 16:27	08:36 16:15
23	08:24 16:55	07:30 17:53	16:42 (WEA 17-3) 17:08 (WEA 17-3)	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:55	05:32 21:36	06:21 20:39	07:13 19:27	08:05 18:19	17:13 (WEA 17-3) 17:38 (WEA 17-3)	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	16:42 (WEA 17-3) 17:07 (WEA 17-3)	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	17:13 (WEA 17-3) 17:38 (WEA 17-3)	08:03 16:25	08:37 16:16
25	08:22 16:59	07:26 17:57	16:43 (WEA 17-3) 17:06 (WEA 17-3)	07:22 19:47	06:12 20:42	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	17:13 (WEA 17-3) 17:37 (WEA 17-3)	08:04 16:24	08:37 16:17
26	08:20 17:00	07:24 17:59	16:44 (WEA 17-3) 17:05 (WEA 17-3)	07:20 19:49	06:09 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	17:14 (WEA 17-3) 17:36 (WEA 17-3)	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	16:45 (WEA 17-3) 17:04 (WEA 17-3)	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	17:15 (WEA 17-3) 17:35 (WEA 17-3)	08:07 16:22	08:38 16:18
28	08:17 17:04	07:20 18:02	16:46 (WEA 17-3) 17:02 (WEA 17-3)	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	08:14 18:08	16:16 (WEA 17-3) 16:34 (WEA 17-3)	08:09 16:21	08:38 16:19
29	08:16 17:06			07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:54	07:23 19:13	07:16 18:07	16:18 (WEA 17-3) 16:32 (WEA 17-3)	08:11 16:21	08:38 16:20
30	08:15 17:08			07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 18:05	16:21 (WEA 17-3) 16:29 (WEA 17-3)	08:12 16:19	08:38 16:21
31	08:13 17:10			07:08 19:58		05:13		05:44	06:35		07:20			08:39 16:22
Sonnenscheinstunden	256	275	366		416	487	502	505	456	382	332	364	265	241
astr.max.mögl.Beschattung			346	12										

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: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 20b - Zur Dasslage 1/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04	16:49 (WEA 17-3) 16:55 (WEA 17-3)	18:32 (WEA 17-1) 18:56 (WEA 17-1)	05:59 20:52
2	08:38 16:24	08:10 17:13	07:15 18:06	20:00 07:03	20:54 05:57	21:39 05:11
3	08:38 16:25	08:08 17:15	07:13 18:08	20:01 20:03	20:54 20:55	21:40 21:41
4	08:38 16:26	08:07 17:17	07:11 18:10	20:01 20:05	20:54 20:57	21:40 21:42
5	08:38 16:28	08:05 17:19	07:08 18:12	20:05 20:07	20:57 20:59	21:42 21:43
6	08:38 16:29	08:03 17:21	07:06 18:13	20:07 20:08	20:59 21:00	21:43 21:45
7	08:37 16:30	08:02 17:23	07:04 18:15	20:08 20:10	21:00 21:02	21:45 21:45
8	08:37 16:31	08:00 17:25	07:02 18:17	20:10 20:12	21:02 21:04	21:45 21:46
9	08:36 16:33	07:58 17:27	06:59 18:19	20:12 20:14	21:04 21:05	21:46 21:47
10	08:36 16:34	07:56 17:29	06:57 18:21	20:14 20:15	21:05 21:07	21:47 21:48
11	08:35 16:36	07:54 17:30	06:55 18:23	20:15 20:17	21:07 21:09	21:48 21:49
12	08:35 16:37	07:52 17:32	06:52 18:24	20:17 20:19	21:09 21:10	21:49 21:50
13	08:34 16:39	07:51 17:34	06:50 18:26	20:19 20:21	21:10 21:12	21:50 21:50
14	08:33 16:40	07:49 17:36	06:48 18:28	20:21 20:22	21:12 21:14	21:50 21:51
15	08:32 16:42	07:47 17:38	06:45 18:30	20:22 20:24	21:14 21:15	21:51 21:52
16	08:31 16:43	07:45 17:40	06:43 18:31	20:24 20:26	21:15 21:17	21:52 21:53
17	08:31 16:45	07:43 17:42	06:41 18:33	20:26 20:28	21:17 21:18	21:53 21:54
18	08:30 16:47	07:41 17:44	06:38 18:35	20:29 20:29	21:19 21:20	21:54 21:55
19	08:29 16:48	07:39 17:46	06:36 18:37	20:31 20:31	21:20 21:21	21:55 21:56
20	08:28 16:50	07:37 17:48	06:34 18:39	20:33 20:33	21:22 21:23	21:56 21:57
21	08:26 16:52	07:35 17:49	06:31 18:40	20:35 20:35	21:24 21:24	21:58 21:59
22	08:25 16:53	07:32 17:51	06:29 18:42	20:37 20:36	21:26 21:26	22:00 22:00
23	08:24 16:55	07:30 17:53	06:27 18:44	20:39 20:38	21:28 21:27	22:02 22:03
24	08:23 16:57	07:28 17:55	06:24 18:46	20:41 20:40	21:29 21:29	22:04 22:05
25	08:22 16:59	07:26 17:57	06:22 18:47	20:43 20:42	21:30 21:30	22:06 22:07
26	08:20 17:00	07:24 17:59	06:20 18:49	20:45 20:43	21:32 21:31	22:08 22:09
27	08:19 17:02	07:22 18:01	06:17 18:51	20:47 20:45	21:34 21:33	22:10 22:11
28	08:17 17:04	07:20 18:02	06:15 18:53	20:49 20:47	21:36 21:34	22:12 22:13
29	08:16 17:06		06:13 18:55	20:51 20:49	21:38 21:36	22:14 22:15
30	08:15 17:08		06:10 18:57	20:53 20:51	21:40 21:38	22:16 22:17
31	08:13 17:10		06:08 18:59	20:55 20:53	21:42 21:40	22:18 22:19
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung		365	585	74		

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 20b - Zur Dasslage 1/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September		Oktober		November	Dezember
1	05:08 21:54	05:45 21:22	06:36 20:19		07:26 19:08	18:15 (WEA 17-2)	07:21 17:01	08:14 16:19
2	05:09 21:54	05:47 21:20	06:38 20:17		07:28 19:06	18:15 (WEA 17-2)	07:23 16:59	08:15 16:18
3	05:10 21:53	05:48 21:19	06:40 20:14		07:30 19:04	18:15 (WEA 17-2)	07:25 16:57	08:17 16:17
4	05:10 21:53	05:50 21:17	06:41 20:12		07:32 19:01	18:16 (WEA 17-2)	07:27 16:55	08:18 16:17
5	05:11 21:52	05:52 21:15	06:43 20:10		07:33 18:59	18:17 (WEA 17-2)	07:29 16:53	08:19 16:16
6	05:12 21:52	05:53 21:13	06:45 20:07		07:35 18:57	18:19 (WEA 17-2)	07:31 16:51	08:21 16:16
7	05:13 21:51	05:55 21:11	06:46 20:05		07:37 18:54	18:21 (WEA 17-2)	07:32 16:50	08:22 16:15
8	05:14 21:51	05:56 21:10	06:48 20:03		07:38 18:52	18:26 (WEA 17-2)	07:34 16:48	08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:00	18:32 (WEA 17-1)	07:40 18:50		07:36 16:46	08:24 16:14
10	05:16 21:49	06:00 21:06	06:51 19:58	18:29 (WEA 17-1)	07:42 18:47		07:38 16:45	08:26 16:14
11	05:17 21:49	06:01 21:04	06:53 19:56	18:27 (WEA 17-1)	07:44 18:45		07:40 16:43	08:27 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53	18:24 (WEA 17-1)	07:45 18:43		07:42 16:41	08:28 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51	18:23 (WEA 17-1)	07:47 18:41		07:43 16:40	08:29 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49	18:21 (WEA 17-1)	07:49 18:38	17:20 (WEA 17-3)	07:45 16:38	08:30 16:14
15	05:21 21:45	06:08 20:56	07:00 19:46	18:20 (WEA 17-1)	07:51 18:36	17:30 (WEA 17-3)	07:47 16:37	08:31 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44	18:20 (WEA 17-1)	07:52 18:34	17:17 (WEA 17-3)	07:49 16:35	08:32 16:14
17	05:24 21:43	06:11 20:52	07:03 19:41	18:50 (WEA 17-1)	07:54 18:32	17:33 (WEA 17-3)	07:51 16:34	08:33 16:14
18	05:25 21:42	06:13 20:50	07:05 19:39	18:18 (WEA 17-1)	07:56 18:29	17:34 (WEA 17-3)	07:52 16:33	08:33 16:14
19	05:27 21:41	06:15 20:48	07:06 19:37	18:50 (WEA 17-1)	07:58 18:27	17:14 (WEA 17-3)	07:54 16:31	08:34 16:14
20	05:28 21:39	06:16 20:45	07:08 19:34	18:17 (WEA 17-1)	08:00 18:25	17:35 (WEA 17-3)	07:56 16:30	08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:32	18:49 (WEA 17-1)	08:01 18:23	17:36 (WEA 17-3)	07:57 16:29	08:35 16:15
22	05:31 21:37	06:20 20:41	07:11 19:30	18:18 (WEA 17-1)	08:03 18:21	17:10 (WEA 17-3)	07:59 16:27	08:36 16:15
23	05:32 21:36	06:21 20:39	07:13 19:27	18:48 (WEA 17-1)	08:05 18:19	17:36 (WEA 17-3)	08:01 16:26	08:36 16:16
24	05:33 21:34	06:23 20:37	07:15 19:25	18:46 (WEA 17-1)	08:07 18:17	17:36 (WEA 17-3)	08:03 16:25	08:37 16:16
25	05:35 21:33	06:25 20:35	07:16 19:22	18:18 (WEA 17-1)	08:09 18:15	17:10 (WEA 17-3)	08:04 16:24	08:37 16:17
26	05:36 21:31	06:26 20:32	07:18 19:20	18:44 (WEA 17-1)	08:10 18:13	17:36 (WEA 17-3)	08:06 16:23	08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:18	18:19 (WEA 17-2)	08:12 18:11	17:35 (WEA 17-3)	08:07 16:22	08:38 16:18
28	05:39 21:28	06:30 20:28	07:21 19:15	18:18 (WEA 17-2)	07:14 17:08	17:12 (WEA 17-3)	08:09 16:21	08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:13	18:37 (WEA 17-1)	07:16 17:07	16:33 (WEA 17-3)	08:11 16:20	08:38 16:20
30	05:42 21:25	06:33 20:23	07:25 19:11	18:16 (WEA 17-2)	07:18 17:05	16:32 (WEA 17-3)	08:12 16:19	08:38 16:21
31	05:44 21:24	06:35 20:21		18:15 (WEA 17-2)	07:20 17:03	16:16 (WEA 17-3)		08:39 16:22
Sonnenscheinstunden	505	456	382		332	16:27 (WEA 17-3)	265	241
astr.max.mögl.Beschattung			560		483			

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: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 21a - Zur Dasslage 3/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:39 16:23	08:12 17:12	07:17 18:04	07:06 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:54	05:11 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:48 21:19	06:40 20:14	07:30 19:04	07:25 16:57	08:17 16:17
4	08:38 16:26	08:07 17:17	07:11 18:10	06:59 20:05	05:53 20:57	05:10 21:42	05:10 21:53	05:50 21:17	06:41 20:12	07:32 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:38 16:29	08:03 17:21	07:06 18:13	06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:31 16:51	08:21 16:16
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:31	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:56 21:10	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:42 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:26 16:14
11	08:35 16:36	07:54 17:30	06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:49	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:35 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:42 16:41	08:28 16:14
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:14	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:52	05:21 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:31	06:31 20:26	05:32 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:50 16:34	08:33 16:14
18	08:30 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:29	07:52 16:33	08:33 16:14
19	08:29 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:35 17:49	06:31 18:40	06:20 20:35	05:25 21:24	05:04 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:15
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:55	05:32 21:36	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:03 16:25	08:37 16:16
25	08:22 16:59	07:26 17:57	07:22 19:47	06:12 20:41	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	08:20 17:00	07:24 17:59	07:20 19:49	06:09 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:07 16:22	08:38 16:18
28	08:17 17:04	07:20 18:02	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:08	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07	08:11 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:24	06:35 20:21		07:20 17:03		08:39 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

SHADOW - Kalender**Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 21b - Zur Dasslage 3/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:12 17:12	07:17 18:04	17:04 (WEA 17-3) 17:29 (WEA 17-3)	19:00 (WEA 17-1) 19:23 (WEA 17-1)	05:59 20:52
2	08:38 16:24	08:10 17:13	07:15 18:06	17:04 (WEA 17-3) 17:29 (WEA 17-3)	18:59 (WEA 17-1) 19:25 (WEA 17-1)	05:11 20:54
3	08:38 16:25	08:08 17:15	07:13 18:08	17:04 (WEA 17-3) 17:30 (WEA 17-3)	18:58 (WEA 17-1) 19:25 (WEA 17-1)	05:55 20:55
4	08:38 16:26	08:07 17:17	07:11 18:10	17:03 (WEA 17-3) 17:29 (WEA 17-3)	18:56 (WEA 17-1) 19:25 (WEA 17-1)	05:53 20:57
5	08:38 16:28	08:05 17:19	07:08 18:12	17:03 (WEA 17-3) 17:29 (WEA 17-3)	18:56 (WEA 17-1) 19:26 (WEA 17-1)	05:52 20:59
6	08:38 16:29	08:03 17:21	07:06 18:13	17:03 (WEA 17-3) 17:28 (WEA 17-3)	18:56 (WEA 17-1) 19:26 (WEA 17-1)	05:50 21:00
7	08:37 16:30	08:02 17:23	07:04 18:15	17:03 (WEA 17-3) 17:27 (WEA 17-3)	18:54 (WEA 17-1) 19:25 (WEA 17-1)	05:48 21:02
8	08:37 16:31	08:00 17:25	07:02 18:17	17:04 (WEA 17-3) 17:26 (WEA 17-3)	18:55 (WEA 17-1) 19:25 (WEA 17-1)	05:46 21:04
9	08:36 16:33	07:58 17:27	06:59 18:19	17:05 (WEA 17-3) 17:25 (WEA 17-3)	18:55 (WEA 17-1) 19:25 (WEA 17-1)	05:44 21:05
10	08:36 16:34	07:56 17:29	06:57 18:21	17:06 (WEA 17-3) 17:23 (WEA 17-3)	18:55 (WEA 17-1) 19:24 (WEA 17-1)	05:42 21:07
11	08:35 16:36	07:54 17:30	06:55 18:23	17:08 (WEA 17-3) 17:21 (WEA 17-3)	18:55 (WEA 17-1) 19:23 (WEA 17-1)	05:41 21:09
12	08:35 16:37	07:52 17:32	06:52 18:24	17:12 (WEA 17-3) 17:17 (WEA 17-3)	18:55 (WEA 17-1) 19:22 (WEA 17-1)	05:39 21:10
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21	18:56 (WEA 17-1) 19:21 (WEA 17-1)	05:37 21:12
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	18:57 (WEA 17-1) 19:20 (WEA 17-1)	05:36 21:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	18:59 (WEA 17-1) 19:18 (WEA 17-1)	05:34 21:15
16	08:31 16:43	07:45 17:40	06:43 18:31	06:31 20:26	19:00 (WEA 17-1) 19:15 (WEA 17-1)	05:32 21:17
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 17:59 (WEA 17-2)	19:03 (WEA 17-1) 19:12 (WEA 17-1)	05:31 21:18
18	08:30 16:47	07:41 17:44	06:38 18:35	10 17:56 (WEA 17-2)	05:29 21:20	21:53
19	08:29 16:48	07:39 17:46	06:36 18:37	14 18:10 (WEA 17-2)	05:28 21:21	21:53
20	08:27 16:50	07:37 17:48	06:34 18:39	17 18:12 (WEA 17-2)	05:27 21:22	21:54
21	08:26 16:52	07:35 17:49	06:31 18:40	19 17:52 (WEA 17-2)	05:25 21:24	21:54
22	08:25 16:53	07:32 17:51	06:29 18:42	20 18:12 (WEA 17-2)	05:24 21:26	21:54
23	08:24 16:55	07:30 17:53	06:27 18:44	21 18:13 (WEA 17-2)	05:22 21:27	21:55
24	08:23 16:57	07:28 17:55	06:24 17:22 (WEA 17-3)	19 17:52 (WEA 17-2)	05:21 21:29	21:55
25	08:22 16:59	07:26 17:57	07:22 17:09 (WEA 17-3)	19 18:52 (WEA 17-2)	05:20 21:30	21:55
26	08:20 17:00	07:24 17:59	07:20 17:08 (WEA 17-3)	17 18:52 (WEA 17-2)	05:19 21:31	21:55
27	08:19 17:02	07:22 18:01	07:17 17:06 (WEA 17-3)	15 18:53 (WEA 17-2)	05:18 21:33	21:55
28	08:17 17:04	07:20 18:02	07:15 17:05 (WEA 17-3)	11 19:06 (WEA 17-2)	05:16 21:34	21:55
29	08:16 17:06		07:13 19:54	12 18:59 (WEA 17-2)	05:15 21:35	21:55
30	08:15 17:08		07:10 19:56	17 19:04 (WEA 17-1)	05:14 21:37	21:54
31	08:13 17:10		07:08 19:58	21 19:02 (WEA 17-1)	05:13 21:38	21:54
Sonnenscheinstunden	256	275	366	416	431	502
astr.max.mögl.Beschattung		90	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	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 21b - Zur Dasslage 3/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

	July	August	September	Oktober	November	Dezember
1	05:08 21:54	05:45 21:22	06:36 20:19	18:55 (WEA 17-1) 19:22 (WEA 17-1)	07:26 19:08	07:21 17:01
2	05:09 21:54	05:47 21:20	06:38 20:17	18:53 (WEA 17-1) 19:22 (WEA 17-1)	07:28 19:06	07:23 16:59
3	05:10 21:53	05:48 21:19	06:40 20:14	18:53 (WEA 17-1) 19:22 (WEA 17-1)	07:30 19:04	17:47 (WEA 17-3) 17:58 (WEA 17-3)
4	05:10 21:53	05:50 21:17	06:41 20:12	18:52 (WEA 17-1) 19:22 (WEA 17-1)	07:32 19:01	17:44 (WEA 17-3) 18:00 (WEA 17-3)
5	05:11 21:52	05:52 21:15	06:43 20:10	18:52 (WEA 17-1) 19:22 (WEA 17-1)	07:33 18:59	17:43 (WEA 17-3) 18:02 (WEA 17-3)
6	05:12 21:52	05:53 21:13	06:45 20:07	18:52 (WEA 17-1) 19:22 (WEA 17-1)	07:35 18:57	17:41 (WEA 17-3) 18:03 (WEA 17-3)
7	05:13 21:51	05:55 21:11	06:46 20:05	18:51 (WEA 17-1) 19:21 (WEA 17-1)	07:37 18:54	17:39 (WEA 17-3) 18:03 (WEA 17-3)
8	05:14 21:51	05:56 21:10	06:48 20:03	18:51 (WEA 17-1) 19:21 (WEA 17-1)	07:38 18:52	17:39 (WEA 17-3) 18:03 (WEA 17-3)
9	05:15 21:50	05:58 21:08	06:50 20:00	18:50 (WEA 17-1) 19:19 (WEA 17-1)	07:40 18:50	17:38 (WEA 17-3) 18:04 (WEA 17-3)
10	05:16 21:49	06:00 21:06	06:51 19:58	18:51 (WEA 17-1) 19:19 (WEA 17-1)	07:42 18:47	17:38 (WEA 17-3) 18:04 (WEA 17-3)
11	05:17 21:49	06:01 21:04	06:53 19:56	18:52 (WEA 17-1) 19:18 (WEA 17-1)	07:44 18:45	17:37 (WEA 17-3) 18:03 (WEA 17-3)
12	05:18 21:48	06:03 21:02	06:55 19:53	18:52 (WEA 17-1) 19:16 (WEA 17-1)	07:45 18:43	17:37 (WEA 17-3) 18:02 (WEA 17-3)
13	05:19 21:47	06:05 21:00	06:56 19:51	18:53 (WEA 17-1) 19:14 (WEA 17-1)	07:47 18:41	17:37 (WEA 17-3) 18:02 (WEA 17-3)
14	05:20 21:46	06:06 20:58	06:58 19:49	18:54 (WEA 17-1) 19:11 (WEA 17-1)	07:49 18:38	17:37 (WEA 17-3) 18:01 (WEA 17-3)
15	05:21 21:45	06:08 20:56	07:00 19:46	18:57 (WEA 17-1) 19:08 (WEA 17-1)	07:51 18:36	17:38 (WEA 17-3) 18:01 (WEA 17-3)
16	05:23 21:44	06:10 20:54	07:01 19:44	18:45 (WEA 17-2) 18:55 (WEA 17-2)	07:52 18:34	17:39 (WEA 17-3) 18:00 (WEA 17-3)
17	05:24 21:43	06:11 20:52	07:03 19:41	18:42 (WEA 17-2) 18:56 (WEA 17-2)	07:54 18:32	17:40 (WEA 17-3) 17:58 (WEA 17-3)
18	05:25 21:42	06:13 20:50	07:05 19:39	18:41 (WEA 17-2) 18:57 (WEA 17-2)	07:56 18:29	17:41 (WEA 17-3) 17:55 (WEA 17-3)
19	05:27 21:41	06:15 20:48	07:06 19:37	18:40 (WEA 17-2) 18:58 (WEA 17-2)	07:58 18:27	17:44 (WEA 17-3) 17:52 (WEA 17-3)
20	05:28 21:39	06:16 20:45	07:08 19:34	18:38 (WEA 17-2) 18:58 (WEA 17-2)	08:00 18:25	16:31 16:30
21	05:29 21:38	06:18 20:43	07:10 19:32	18:38 (WEA 17-2) 18:58 (WEA 17-2)	08:01 18:23	07:57 16:29
22	05:31 21:37	06:20 20:41	07:11 19:30	18:38 (WEA 17-2) 18:58 (WEA 17-2)	08:03 18:21	07:59 16:27
23	05:32 21:36	06:21 20:39	07:13 19:27	18:37 (WEA 17-2) 18:57 (WEA 17-2)	08:05 18:19	08:01 16:26
24	05:33 21:34	06:23 20:37	07:15 19:25	18:37 (WEA 17-2) 18:56 (WEA 17-2)	08:07 18:17	08:03 16:25
25	05:35 21:33	06:25 20:35	07:16 19:22	18:38 (WEA 17-2) 18:56 (WEA 17-2)	08:09 18:15	08:04 16:24
26	05:36 21:31	06:26 20:32	07:18 19:20	18:38 (WEA 17-2) 18:53 (WEA 17-2)	08:10 18:13	08:06 16:23
27	05:38 21:30	06:28 20:30	19:05 (WEA 17-1) 19:16 (WEA 17-1)	07:20 19:18	08:12 18:11	08:07 16:22
28	05:39 21:28	06:30 20:28	19:01 (WEA 17-1) 19:17 (WEA 17-1)	07:21 19:15	07:14 17:08	08:09 16:21
29	05:41 21:27	06:31 20:26	18:59 (WEA 17-1) 19:19 (WEA 17-1)	07:23 19:13	07:16 17:07	08:11 16:20
30	05:42 21:25	06:33 20:23	18:57 (WEA 17-1) 19:20 (WEA 17-1)	07:25 19:11	07:18 17:05	08:12 16:19
31	05:44 21:24	06:35 20:21	18:56 (WEA 17-1) 19:21 (WEA 17-1)	07:20 17:03	07:20 17:03	08:39 16:22
Sonnenscheinstunden	505	456	382	332	352	241
astr.max.mögl.Beschattung		95	598			

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: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 22a - Zur Dasslage 4/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	09:58 (WEA 18-3) 10:09 (WEA 18-3)	08:11 17:12	07:17 18:04	05:59 20:00	05:12 21:39
2	08:38 16:24	09:59 (WEA 18-3) 10:09 (WEA 18-3)	08:10 17:13	07:15 18:06	05:57 20:01	05:12 21:40
3	08:38 16:25	10:00 (WEA 18-3) 10:08 (WEA 18-3)	08:08 17:15	07:13 18:08	05:55 20:03	05:11 21:41
4	08:38 16:27	10:02 (WEA 18-3) 10:07 (WEA 18-3)	08:07 17:17	07:11 18:10	05:53 20:05	05:10 21:42
5	08:38 16:28	08:05 17:19	08:05 18:12	06:56 20:07	05:52 20:59	05:09 21:43
6	08:38 16:29	08:03 17:21	08:37 (WEA 18-1) 18:13	07:06 20:08	06:54 21:00	05:08 21:44
7	08:37 16:30	08:02 17:23	08:37 (WEA 18-1) 18:15	07:04 20:10	05:48 21:02	05:08 21:45
8	08:37 16:32	08:00 17:25	08:37 (WEA 18-1) 18:17	07:02 20:12	05:46 21:04	05:07 21:46
9	08:36 16:33	07:58 17:27	08:36 (WEA 18-1) 18:19	06:59 20:14	05:44 21:05	05:07 21:47
10	08:36 16:34	07:56 17:29	08:36 (WEA 18-1) 18:21	06:57 20:15	05:42 21:07	05:06 21:48
11	08:35 16:36	07:54 17:30	08:37 (WEA 18-1) 18:23	06:55 20:17	05:41 21:09	05:06 21:49
12	08:34 16:37	07:52 17:32	08:37 (WEA 18-1) 18:24	06:52 20:19	05:39 21:10	05:05 21:50
13	08:34 16:39	07:51 17:34	08:37 (WEA 18-1) 18:26	06:50 20:21	05:37 21:12	05:05 21:50
14	08:33 16:40	07:49 17:36	08:38 (WEA 18-1) 18:28	06:48 20:22	05:36 21:14	05:05 21:51
15	08:32 16:42	07:47 17:38	08:39 (WEA 18-1) 18:30	06:45 20:24	05:34 21:15	05:05 21:52
16	08:31 16:43	07:45 17:40	08:41 (WEA 18-1) 18:31	06:43 20:26	05:32 21:17	05:04 21:52
17	08:30 16:45	07:43 17:42	08:42 (WEA 18-1) 18:33	06:41 20:28	05:31 21:18	05:04 21:53
18	08:30 16:47	07:41 17:44	08:51 (WEA 18-1) 18:35	06:38 20:29	05:29 21:20	05:04 21:53
19	08:29 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54
21	08:26 16:52	07:34 17:49	06:31 18:40	06:20 20:35	05:25 21:24	05:04 21:54
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:54
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55
25	08:22 16:59	07:26 17:57	07:22 19:47	06:12 20:41	05:20 21:30	05:05 21:55
26	08:20 17:00	07:24 17:59	07:20 19:49	06:09 20:43	05:19 21:31	05:06 21:55
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55
28	08:17 17:04	07:19 18:02	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54
31	08:13 17:10		07:08 19:58		05:13 21:38	
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung	34	289				

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: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 22a - Zur Dasslage 4/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober		November		Dezember
1	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08		07:21 17:01	08:06 (WEA 18-1) 22 08:28 (WEA 18-1)	08:14 16:19
2	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06		07:23 16:59	08:06 (WEA 18-1) 22 08:28 (WEA 18-1)	08:15 16:18
3	05:10 21:53	05:48 21:18	06:40 20:14	07:30 19:04		07:25 16:57	08:06 (WEA 18-1) 22 08:28 (WEA 18-1)	08:16 16:17
4	05:11 21:53	05:50 21:17	06:41 20:12	07:32 19:01		07:27 16:55	08:06 (WEA 18-1) 22 08:28 (WEA 18-1)	08:18 16:17
5	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59		07:29 16:53	08:07 (WEA 18-1) 21 08:28 (WEA 18-1)	08:19 16:16
6	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57		07:31 16:51	08:07 (WEA 18-1) 20 08:27 (WEA 18-1)	08:21 16:16
7	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54		07:32 16:50	08:08 (WEA 18-1) 18 08:26 (WEA 18-1)	08:22 16:15
8	05:14 21:51	05:56 21:09	06:48 20:03	07:38 18:52		07:34 16:48	08:09 (WEA 18-1) 16 08:25 (WEA 18-1)	08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50		07:36 16:46	08:11 (WEA 18-1) 13 08:24 (WEA 18-1)	08:24 16:14
10	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47		07:38 16:45	08:13 (WEA 18-1) 9 08:22 (WEA 18-1)	5 09:55 (WEA 18-3) 08:26 8 09:57 (WEA 18-3)
11	05:17 21:48	06:01 21:04	06:53 19:56	07:44 18:45		07:40 16:43	08:27 16:14	10 09:59 (WEA 18-3)
12	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43		07:41 16:41	08:28 16:14	11 10:00 (WEA 18-3)
13	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41		07:43 16:40	08:29 16:14	12 10:01 (WEA 18-3)
14	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38		07:45 16:38	08:30 16:14	13 10:02 (WEA 18-3)
15	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36		07:47 16:37	08:31 16:14	14 10:03 (WEA 18-3)
16	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34		07:49 16:35	08:32 16:14	14 10:03 (WEA 18-3)
17	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32		07:50 16:34	08:32 16:14	14 10:03 (WEA 18-3)
18	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:29		07:52 16:33	08:33 16:14	15 10:04 (WEA 18-3)
19	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27		07:54 16:31	08:34 16:14	15 10:05 (WEA 18-3)
20	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25		07:56 16:30	08:35 16:15	16 10:05 (WEA 18-3)
21	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23		07:57 16:29	08:35 16:15	16 10:06 (WEA 18-3)
22	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21		07:59 16:27	08:36 16:15	16 10:07 (WEA 18-3)
23	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19		08:01 16:26	08:36 16:16	16 10:07 (WEA 18-3)
24	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17		08:03 16:25	08:37 16:17	16 10:07 (WEA 18-3)
25	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	2 09:16 (WEA 18-1)	08:04 16:24	08:37 16:17	15 10:08 (WEA 18-3)
26	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	11 09:18 (WEA 18-1)	08:06 16:23	08:38 16:18	15 10:08 (WEA 18-3)
27	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	15 09:23 (WEA 18-1)	08:07 16:22	08:38 16:18	15 10:08 (WEA 18-3)
28	05:39 21:28	06:30 20:28	07:21 19:15	08:14 17:08	18 09:25 (WEA 18-1)	08:09 16:21	08:38 16:19	14 10:08 (WEA 18-3)
29	05:41 21:27	06:31 20:26	07:23 19:13	08:16 17:07	18 08:26 (WEA 18-1)	08:11 16:20	08:38 16:20	13 10:08 (WEA 18-3)
30	05:42 21:25	06:33 20:23	07:25 19:11	08:18 17:05	20 08:07 (WEA 18-1)	08:12 16:19	08:38 16:21	14 10:09 (WEA 18-3)
31	05:44 21:24	06:35 20:21		07:19 17:03	20 08:27 (WEA 18-1)		08:38 16:22	13 10:09 (WEA 18-3)
Sonnenscheinstunden	505	456	382	332		265		241
astr.max.mögl.Beschattung				108		185		310

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 22b - Zur Dasslage 4/Nordwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:11 17:12	07:17 18:04		07:06 20:00	18	19:12 (WEA 17-3) 19:30 (WEA 17-3)	05:59 20:52	05:12 21:39
2	08:38 16:24	08:10 17:13	07:15 18:06		07:03 20:01	20	19:11 (WEA 17-3) 19:31 (WEA 17-3)	05:57 20:54	05:12 21:40
3	08:38 16:25	08:08 17:15	07:13 18:08		07:01 20:03	22	19:10 (WEA 17-3) 19:32 (WEA 17-3)	05:55 20:55	05:11 21:41
4	08:38 16:27	08:07 17:17	07:11 18:10		06:59 20:05	24	19:08 (WEA 17-3) 19:32 (WEA 17-3)	05:53 20:57	20:14 (WEA 17-1) 21:42
5	08:38 16:28	08:05 17:19	07:08 18:12		06:56 20:07	24	19:08 (WEA 17-3) 19:32 (WEA 17-3)	05:52 20:59	20:12 (WEA 17-1) 21:43
6	08:38 16:29	08:03 17:21	07:06 18:13		06:54 20:08	24	19:08 (WEA 17-3) 19:32 (WEA 17-3)	05:50 21:00	20:10 (WEA 17-1) 21:44
7	08:37 16:30	08:02 17:23	07:04 18:15		06:52 20:10	24	19:07 (WEA 17-3) 19:31 (WEA 17-3)	05:48 21:02	20:09 (WEA 17-1) 21:45
8	08:37 16:32	08:00 17:25	07:02 18:17		06:49 20:12	24	19:07 (WEA 17-3) 19:31 (WEA 17-3)	05:46 21:04	20:08 (WEA 17-1) 21:46
9	08:36 16:33	07:58 17:27	06:59 18:19		06:47 20:14	24	19:07 (WEA 17-3) 19:31 (WEA 17-3)	05:44 21:05	20:07 (WEA 17-1) 21:47
10	08:36 16:34	07:56 17:29	06:57 18:21		06:45 20:15	22	19:08 (WEA 17-3) 19:30 (WEA 17-3)	05:42 21:07	20:06 (WEA 17-1) 21:48
11	08:35 16:36	07:54 17:30	06:55 18:23		06:42 20:17	21	19:07 (WEA 17-3) 19:28 (WEA 17-3)	05:41 21:09	20:06 (WEA 17-1) 21:49
12	08:34 16:37	07:52 17:32	06:52 18:24		06:40 20:19	19	19:08 (WEA 17-3) 19:27 (WEA 17-3)	05:39 21:10	20:05 (WEA 17-1) 21:50
13	08:34 16:39	07:51 17:34	06:50 18:26		06:38 20:21	16	19:10 (WEA 17-3) 19:26 (WEA 17-3)	05:37 21:12	20:06 (WEA 17-1) 21:50
14	08:33 16:40	07:49 17:36	06:48 18:28		06:36 20:22	12	19:12 (WEA 17-3) 19:24 (WEA 17-3)	05:36 21:14	20:05 (WEA 17-1) 21:51
15	08:32 16:42	07:47 17:38	06:45 18:30		06:33 20:24	4	19:16 (WEA 17-3) 19:20 (WEA 17-3)	05:34 21:15	20:05 (WEA 17-1) 21:52
16	08:31 16:43	07:45 17:40	06:43 18:31		06:31 20:26		05:32 21:17	20:05 (WEA 17-1) 21:52	05:04 21:52
17	08:30 16:45	07:43 17:42	06:41 18:33		06:29 20:28		05:31 21:18	20:05 (WEA 17-1) 21:53	05:04 21:53
18	08:30 16:47	07:41 17:44	06:38 18:35		06:27 20:29		05:29 21:20	20:05 (WEA 17-1) 21:53	05:04 21:53
19	08:29 16:48	07:39 17:46	06:36 18:37		06:24 20:31		05:28 21:21	20:06 (WEA 17-1) 21:53	05:04 21:53
20	08:27 16:50	07:37 17:48	06:34 18:39		06:22 20:33		05:27 21:23	20:06 (WEA 17-1) 21:54	05:04 21:54
21	08:26 16:52	07:34 17:49	06:31 18:40		06:20 20:35		05:25 21:24	20:07 (WEA 17-1) 21:54	05:04 21:54
22	08:25 16:53	07:32 17:51	06:29 18:42		06:18 20:36		05:24 21:26	20:07 (WEA 17-1) 21:54	05:05 21:54
23	08:24 16:55	07:30 17:53	06:27 18:44		06:16 20:38		05:22 21:27	20:07 (WEA 17-1) 21:54	05:05 21:54
24	08:23 16:57	07:28 17:55	06:24 18:46		06:14 20:40		05:21 21:29	20:08 (WEA 17-1) 21:55	05:05 21:55
25	08:22 16:59	07:26 17:57	06:22 19:47		06:12 20:41		05:20 21:30	20:09 (WEA 17-1) 21:55	05:05 21:55
26	08:20 17:00	07:24 17:59	06:20 19:49		06:09 20:43		05:19 21:31	20:10 (WEA 17-1) 21:55	05:06 21:55
27	08:19 17:02	07:22 18:01	06:17 19:51		06:07 20:45		05:18 21:33	20:11 (WEA 17-1) 21:55	05:06 21:55
28	08:17 17:04	07:19 18:02	06:15 19:53		06:05 20:47		05:16 21:34	20:12 (WEA 17-1) 21:55	05:07 21:55
29	08:16 17:06		07:13 19:54		06:03 20:48		05:15 21:35	20:13 (WEA 17-1) 21:54	05:07 21:54
30	08:15 17:08		07:10 19:56	19:19 (WEA 17-3) 6 19:25 (WEA 17-3)	06:01 20:50		05:14 21:37	20:15 (WEA 17-1) 21:54	05:08 21:54
31	08:13 17:10		07:08 19:58	19:15 (WEA 17-3) 14 19:29 (WEA 17-3)			05:13 21:38	20:18 (WEA 17-1) 21:54	
Sonnenscheinstunden	256	275	366		416		487		502
astr.max.mögl.Beschattung			20		298		560		

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: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 22b - Zur Dasslage 4/Nordwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	05:08 21:54	05:45 21:22	20:16 (WEA 17-1) 20:42 (WEA 17-1)	06:36 20:19	19:08 (WEA 17-3) 19:27 (WEA 17-3)	07:26 17:01
2	05:09 21:54	05:47 21:20	20:16 (WEA 17-1) 20:41 (WEA 17-1)	06:38 20:17	19:06 (WEA 17-3) 19:27 (WEA 17-3)	07:28 16:59
3	05:10 21:53	05:48 21:18	20:17 (WEA 17-1) 20:41 (WEA 17-1)	06:40 20:14	19:06 (WEA 17-3) 19:28 (WEA 17-3)	07:30 16:57
4	05:11 21:53	05:50 21:17	20:17 (WEA 17-1) 20:40 (WEA 17-1)	06:41 20:12	19:04 (WEA 17-3) 19:28 (WEA 17-3)	07:32 16:55
5	05:11 21:52	05:52 21:15	20:18 (WEA 17-1) 20:40 (WEA 17-1)	06:43 20:10	19:04 (WEA 17-3) 19:28 (WEA 17-3)	07:33 16:53
6	05:12 21:52	05:53 21:13	20:18 (WEA 17-1) 20:38 (WEA 17-1)	06:45 20:07	19:04 (WEA 17-3) 19:28 (WEA 17-3)	07:35 16:51
7	05:13 21:51	05:55 21:11	20:19 (WEA 17-1) 20:38 (WEA 17-1)	06:46 20:05	19:03 (WEA 17-3) 19:27 (WEA 17-3)	07:37 16:50
8	05:14 21:51	05:56 21:09	20:20 (WEA 17-1) 20:36 (WEA 17-1)	06:48 20:03	19:03 (WEA 17-3) 19:27 (WEA 17-3)	07:38 16:48
9	05:15 21:50	05:58 21:08	20:23 (WEA 17-1) 20:34 (WEA 17-1)	06:50 20:00	19:02 (WEA 17-3) 19:26 (WEA 17-3)	07:40 16:46
10	05:16 21:49	06:00 21:06	20:26 (WEA 17-1) 20:29 (WEA 17-1)	06:51 19:58	19:03 (WEA 17-3) 19:25 (WEA 17-3)	07:42 16:45
11	05:17 21:49	06:01 21:04		06:53 19:56	19:04 (WEA 17-3) 19:24 (WEA 17-3)	07:44 16:43
12	05:18 21:48	06:03 21:02		06:55 19:53	19:04 (WEA 17-3) 19:22 (WEA 17-3)	07:45 16:41
13	05:19 21:47	06:05 21:00		06:56 19:51	19:06 (WEA 17-3) 19:20 (WEA 17-3)	07:47 16:40
14	05:20 21:46	20:24 (WEA 17-1) 20:31 (WEA 17-1)	06:06 20:58	06:58 19:49	19:09 (WEA 17-3) 19:16 (WEA 17-3)	07:49 16:38
15	05:22 21:45	20:22 (WEA 17-1) 20:33 (WEA 17-1)	06:08 20:56	07:00 19:46	18:51 18:36	07:47 16:37
16	05:23 21:44	20:22 (WEA 17-1) 20:35 (WEA 17-1)	06:10 20:54	07:01 19:44	18:52 18:34	07:49 16:35
17	05:24 21:43	20:21 (WEA 17-1) 20:36 (WEA 17-1)	06:11 20:52	07:03 19:41	18:54 18:32	07:50 16:34
18	05:25 21:42	20:20 (WEA 17-1) 20:37 (WEA 17-1)	06:13 20:50	07:05 19:39	18:56 18:29	07:52 16:33
19	05:27 21:41	20:19 (WEA 17-1) 20:38 (WEA 17-1)	06:15 20:48	07:06 19:37	18:58 18:27	07:54 16:31
20	05:28 21:39	20:18 (WEA 17-1) 20:38 (WEA 17-1)	06:16 20:45	07:08 19:34	18:00 18:25	07:56 16:30
21	05:29 21:38	20:18 (WEA 17-1) 20:39 (WEA 17-1)	06:18 20:43	07:10 19:32	18:01 18:23	07:57 16:29
22	05:31 21:37	20:17 (WEA 17-1) 20:40 (WEA 17-1)	06:20 20:41	07:11 19:30	18:03 18:21	07:59 16:27
23	05:32 21:35	20:17 (WEA 17-1) 20:40 (WEA 17-1)	06:21 20:39	07:13 19:27	18:05 18:19	08:01 16:26
24	05:33 21:34	20:17 (WEA 17-1) 20:41 (WEA 17-1)	06:23 20:37	07:15 19:25	18:07 18:17	08:03 16:25
25	05:35 21:33	20:16 (WEA 17-1) 20:41 (WEA 17-1)	06:25 20:35	07:16 19:22	18:09 18:15	08:04 16:24
26	05:36 21:31	20:16 (WEA 17-1) 20:41 (WEA 17-1)	06:26 20:32	07:18 19:20	18:10 18:13	08:06 16:23
27	05:38 21:30	20:16 (WEA 17-1) 20:42 (WEA 17-1)	06:28 20:30	07:20 19:18	18:12 18:11	08:07 16:22
28	05:39 21:28	20:16 (WEA 17-1) 20:42 (WEA 17-1)	06:30 20:28	07:21 19:15	18:14 17:08	08:09 16:21
29	05:41 21:27	20:15 (WEA 17-1) 20:41 (WEA 17-1)	06:31 20:26	07:23 19:13	17:16 17:07	08:11 16:20
30	05:42 21:25	20:16 (WEA 17-1) 20:42 (WEA 17-1)	06:33 20:23	07:25 19:11	17:18 17:05	08:12 16:19
31	05:44 21:24	20:15 (WEA 17-1) 20:41 (WEA 17-1)	06:35 20:21	19:09 (WEA 17-3) 19:26 (WEA 17-3)	17:19 17:03	08:38 16:22
Sonnenscheinstunden	505	456	382	332	265	241
astr.max.mögl.Beschattung	373	224	287			

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 23a - Große Haar 9/Nordwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39 16:23	08:11 17:12	07:17 18:04	07:06 20:00		05:59 20:52		19:52 (WEA 17-3) 20:16 (WEA 17-3)	05:12 21:39
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01		05:57 20:54	24	19:52 (WEA 17-3) 20:16 (WEA 17-3)	05:12 21:40
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03		05:55 20:55		19:51 (WEA 17-3) 20:16 (WEA 17-3)	05:11 21:41
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05		05:53 20:57	25	19:52 (WEA 17-3) 20:17 (WEA 17-3)	05:10 21:42
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07		05:52 20:59		19:52 (WEA 17-3) 20:16 (WEA 17-3)	05:09 21:43
6	08:38 16:29	08:03 17:21	07:06 18:13	06:54 20:08		05:50 21:00	24	19:52 (WEA 17-3) 20:16 (WEA 17-3)	05:08 21:44
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10		05:48 21:02		19:52 (WEA 17-3) 20:15 (WEA 17-3)	05:08 21:45
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12		05:46 21:04	23	19:53 (WEA 17-3) 20:15 (WEA 17-3)	05:07 21:46
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14		05:44 21:05		19:53 (WEA 17-3) 20:14 (WEA 17-3)	05:07 21:47
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15		05:42 21:07	21	19:53 (WEA 17-3) 20:13 (WEA 17-3)	05:06 21:48
11	08:35 16:36	07:54 17:30	06:55 18:23	06:42 20:17		05:41 21:09	20	19:55 (WEA 17-3) 20:13 (WEA 17-3)	05:06 21:49
12	08:34 16:37	07:52 17:32	06:52 18:24	06:40 20:19		05:39 21:10	18	19:55 (WEA 17-3) 20:11 (WEA 17-3)	05:05 21:50
13	08:34 16:39	07:50 17:34	06:50 18:26	06:38 20:21		05:37 21:12	16	19:57 (WEA 17-3) 20:11 (WEA 17-3)	05:05 21:50
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22		05:36 21:14	14	19:59 (WEA 17-3) 20:08 (WEA 17-3)	05:05 21:51
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24		05:34 21:15	9		05:05 21:52
16	08:31 16:43	07:45 17:40	06:43 18:31	06:31 20:26		05:33 21:17			05:04 21:52
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 20:28		05:31 21:18	10		05:04 21:53
18	08:30 16:47	07:41 17:44	06:38 18:35	06:27 20:29		05:29 21:20	10		05:04 21:53
19	08:29 16:48	07:39 17:46	06:36 18:37	06:24 20:31		05:28 21:21	11		05:04 21:53
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33		05:27 21:23	11		05:04 21:54
21	08:26 16:52	07:34 17:49	06:31 18:40	06:20 20:35		05:25 21:24	11		05:04 21:54
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36		05:24 21:26	12		05:05 21:54
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38		05:22 21:27	12		05:05 21:54
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40		05:21 21:29	11		05:05 21:55
25	08:22 16:59	07:26 17:57	07:22 19:47	06:12 20:41	20:01 (WEA 17-3)	05:20 21:30	11		05:05 21:55
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	9 20:10 (WEA 17-3)	05:19 21:31	11		05:06 21:55
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	15 20:13 (WEA 17-3)	05:18 21:33	11		05:06 21:55
28	08:17 17:04	07:19 18:03	07:15 19:53	06:05 20:47	18 20:14 (WEA 17-3)	05:16 21:34	10		05:07 21:55
29	08:16 17:06		07:13 19:54	06:03 20:48	20 20:15 (WEA 17-3)	05:15 21:35	8		05:07 21:55
30	08:15 17:08		07:10 19:56	06:01 20:50	21 20:15 (WEA 17-3)	05:14 21:37	7		05:08 21:54
31	08:13 17:10		07:08 19:58		23 20:16 (WEA 17-3)	05:13 21:38	6		05:08 21:54
Sonnenscheinstunden	256	275	366	416		487		502	
astr.max.mögl.Beschattung				106		289		174	

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

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

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 23a - Große Haar 9/Nordwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli		August		September		Oktober		November		Dezember	
1	05:08	21:13 (WEA 17-1)	05:45	20:07 (WEA 17-3)	06:36	07:26	07:21	08:14			
	21:54	4 21:17 (WEA 17-1)	21:22	15 20:22 (WEA 17-3)	20:19	19:08	17:01	16:19			
2	05:09		05:47	20:05 (WEA 17-3)	06:38	07:28	07:23	08:15			
	21:54		21:20	17 20:22 (WEA 17-3)	20:17	19:06	16:59	16:18			
3	05:10		05:48	20:05 (WEA 17-3)	06:40	07:30	07:25	08:16			
	21:53		21:18	19 20:24 (WEA 17-3)	20:14	19:04	16:57	16:17			
4	05:11		05:50	20:03 (WEA 17-3)	06:41	07:32	07:27	08:18			
	21:53		21:17	21 20:24 (WEA 17-3)	20:12	19:01	16:55	16:17			
5	05:11		05:52	20:03 (WEA 17-3)	06:43	07:33	07:29	08:19			
	21:52		21:15	22 20:25 (WEA 17-3)	20:10	18:59	16:53	16:16			
6	05:12		05:53	20:02 (WEA 17-3)	06:45	07:35	07:31	08:21			
	21:52		21:13	23 20:25 (WEA 17-3)	20:07	18:57	16:51	16:16			
7	05:13		05:55	20:02 (WEA 17-3)	06:46	07:37	07:32	08:22			
	21:51		21:11	24 20:26 (WEA 17-3)	20:05	18:54	16:50	16:15			
8	05:14		05:56	20:01 (WEA 17-3)	06:48	07:38	07:34	08:23			
	21:51		21:09	24 20:25 (WEA 17-3)	20:03	18:52	16:48	16:15			
9	05:15		05:58	20:01 (WEA 17-3)	06:50	07:40	07:36	08:24			
	21:50		21:08	25 20:26 (WEA 17-3)	20:00	18:50	16:46	16:14			
10	05:16		06:00	20:00 (WEA 17-3)	06:51	07:42	07:38	08:26			
	21:49		21:06	25 20:25 (WEA 17-3)	19:58	18:47	16:45	16:14			
11	05:17		06:01	20:01 (WEA 17-3)	06:53	07:44	07:40	08:27			
	21:48		21:04	24 20:25 (WEA 17-3)	19:56	18:45	16:43	16:14			
12	05:18		06:03	20:00 (WEA 17-3)	06:55	07:45	07:41	08:28			
	21:48		21:02	24 20:24 (WEA 17-3)	19:53	18:43	16:41	16:14			
13	05:19		06:05	20:01 (WEA 17-3)	06:56	07:47	07:43	08:29			
	21:47		21:00	23 20:24 (WEA 17-3)	19:51	18:41	16:40	16:14			
14	05:20		06:06	20:01 (WEA 17-3)	06:58	07:49	07:45	08:30			
	21:46		20:58	22 20:23 (WEA 17-3)	19:49	18:38	16:38	16:14			
15	05:22		06:08	20:02 (WEA 17-3)	07:00	07:51	07:47	08:31			
	21:45		20:56	21 20:23 (WEA 17-3)	19:46	18:36	16:37	16:14			
16	05:23		06:10	20:02 (WEA 17-3)	07:01	07:52	07:49	08:32			
	21:44		20:54	19 20:21 (WEA 17-3)	19:44	18:34	16:35	16:14			
17	05:24		06:11	20:03 (WEA 17-3)	07:03	07:54	07:50	08:32			
	21:43		20:52	17 20:20 (WEA 17-3)	19:41	18:32	16:34	16:14			
18	05:25		06:13	20:05 (WEA 17-3)	07:05	07:56	07:52	08:33			
	21:42		20:50	14 20:19 (WEA 17-3)	19:39	18:30	16:33	16:14			
19	05:27		06:15	20:07 (WEA 17-3)	07:06	07:58	07:54	08:34			
	21:41		20:48	8 20:15 (WEA 17-3)	19:37	18:27	16:31	16:14			
20	05:28		06:16		07:08	08:00	07:56	08:35			
	21:39		20:45		19:34	18:25	16:30	16:15			
21	05:29		06:18		07:10	08:01	07:57	08:35			
	21:38		20:43		19:32	18:23	16:29	16:15			
22	05:31		06:20		07:11	08:03	07:59	08:36			
	21:37		20:41		19:30	18:21	16:27	16:15			
23	05:32		06:21		07:13	08:05	08:01	08:36			
	21:35		20:39		19:27	18:19	16:26	16:16			
24	05:33		06:23		07:15	08:07	08:03	08:37			
	21:34		20:37		19:25	18:17	16:25	16:17			
25	05:35		06:25		07:16	08:09	08:04	08:37			
	21:33		20:35		19:22	18:15	16:24	16:17			
26	05:36		06:26		07:18	08:10	08:06	08:38			
	21:31		20:32		19:20	18:13	16:23	16:18			
27	05:38		06:28		07:20	08:12	08:07	08:38			
	21:30		20:30		19:18	18:11	16:22	16:19			
28	05:39		06:30		07:21	07:14	08:09	08:38			
	21:28		20:28		19:15	17:09	16:21	16:19			
29	05:41		06:31		07:23	07:16	08:11	08:38			
	21:27		20:26		19:13	17:07	16:20	16:20			
30	05:42	20:11 (WEA 17-3)	06:33		07:25	07:18	08:12	08:38			
	21:25	6 20:17 (WEA 17-3)	20:23		19:11	17:05	16:19	16:21			
31	05:44	20:08 (WEA 17-3)	06:35			07:19		08:38			
	21:24	11 20:19 (WEA 17-3)	20:21			17:03		16:22			
Sonnenscheinstunden	505		456		382	332	265	241			
astr.max.mögl.Beschattung	21		387								

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 23b - Große Haar 9/Südost**
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39		09:23 (WEA 18-3)	08:11		09:06 (WEA 18-4)	07:17		07:54 (WEA 18-2)	07:06		05:59			05:12		
	16:23	18	09:41 (WEA 18-3)	17:12	15	09:21 (WEA 18-4)	18:04	24	08:18 (WEA 18-1)	20:00		20:52			21:39		
2	08:38		09:23 (WEA 18-3)	08:10		09:08 (WEA 18-4)	07:15		07:54 (WEA 18-2)	07:03		05:57			05:12		
	16:24	19	09:42 (WEA 18-3)	17:13	13	09:21 (WEA 18-4)	18:06	25	08:19 (WEA 18-1)	20:01		20:54			21:40		
3	08:38		09:22 (WEA 18-3)	08:08		09:10 (WEA 18-4)	07:13		07:55 (WEA 18-1)	07:01		05:55			05:11		
	16:25	20	09:42 (WEA 18-3)	17:15	8	09:18 (WEA 18-4)	18:08	23	08:18 (WEA 18-1)	20:03		20:55			21:41		
4	08:38		09:23 (WEA 18-3)	08:07			07:11		07:54 (WEA 18-1)	06:59		05:53			05:10		
	16:27	21	09:44 (WEA 18-3)	17:17			18:10	23	08:17 (WEA 18-1)	20:05		20:57			21:42		
5	08:38		09:23 (WEA 18-3)	08:05			07:08		07:55 (WEA 18-1)	06:56		05:52			05:09		
	16:28	22	09:45 (WEA 18-3)	17:19			18:12	22	08:17 (WEA 18-1)	20:07		20:59			21:43		
6	08:38		09:23 (WEA 18-3)	08:03			07:06		07:56 (WEA 18-1)	06:54		05:50			05:08		
	16:29	22	09:45 (WEA 18-3)	17:21			18:13	20	08:16 (WEA 18-1)	20:08		21:00			21:44		
7	08:37		09:24 (WEA 18-3)	08:02			07:04		07:56 (WEA 18-1)	06:52		05:48			05:08		
	16:30	22	09:46 (WEA 18-3)	17:23			18:15	18	08:14 (WEA 18-1)	20:10		21:02			21:45		
8	08:37		09:23 (WEA 18-3)	08:00			07:02		07:58 (WEA 18-1)	06:49		05:46			05:07		
	16:32	24	09:47 (WEA 18-3)	17:25			18:17	14	08:12 (WEA 18-1)	20:12		21:04			21:46		
9	08:36		09:23 (WEA 18-3)	07:58			06:59		08:01 (WEA 18-1)	06:47		05:44			05:07		
	16:33	24	09:47 (WEA 18-3)	17:27			18:19	8	08:09 (WEA 18-1)	20:14		21:05			21:47		
10	08:36		09:24 (WEA 18-3)	07:56			06:57			06:45		05:42			05:06		
	16:34	24	09:48 (WEA 18-3)	17:29			18:21			20:15		21:07			21:48		
11	08:35		09:24 (WEA 18-3)	07:54			06:55			06:42		05:41			05:06		
	16:36	25	09:49 (WEA 18-3)	17:30			18:23			20:17		21:09			21:49		
12	08:34		09:24 (WEA 18-3)	07:52			06:52			06:40		05:39			05:05		
	16:37	25	09:49 (WEA 18-3)	17:32			18:24			20:19		21:10			21:50		
13	08:34		09:24 (WEA 18-3)	07:50			06:50			06:38		05:37			05:05		
	16:39	26	09:50 (WEA 18-3)	17:34			18:26			20:21		21:12			21:50		
14	08:33		09:08 (WEA 18-4)	07:49			06:48			06:36		05:36			05:05		
	16:40	28	09:50 (WEA 18-3)	17:36			18:28			20:22		21:14			21:51		
15	08:32		09:05 (WEA 18-4)	07:47			06:45			06:33		05:34			05:05		
	16:42	34	09:51 (WEA 18-3)	17:38			18:30			20:24		21:15			21:52		
16	08:31		09:04 (WEA 18-4)	07:45			06:43			06:31		05:33			05:04		
	16:43	37	09:51 (WEA 18-3)	17:40			18:31			20:26		21:17			21:52		
17	08:30		09:03 (WEA 18-4)	07:43			06:41			06:29		05:31			05:04		
	16:45	40	09:51 (WEA 18-3)	17:42			18:33			20:28		21:18			21:53		
18	08:30		09:03 (WEA 18-4)	07:41			06:38			06:27		05:29			05:04		
	16:47	41	09:52 (WEA 18-3)	17:44			18:35			20:29		21:20			21:53		
19	08:29		09:03 (WEA 18-4)	07:39			06:36			06:24		05:28			05:04		
	16:48	43	09:52 (WEA 18-3)	17:46			18:37			20:31		21:21			21:53		
20	08:27		09:02 (WEA 18-4)	07:37			06:34			06:22		05:27			05:04		
	16:50	44	09:52 (WEA 18-3)	17:48			18:39			20:33		21:23			21:54		
21	08:26		09:02 (WEA 18-4)	07:34		08:03 (WEA 18-2)	06:31			06:20		05:25			05:04		
	16:52	44	09:52 (WEA 18-3)	17:49	2	08:05 (WEA 18-2)	18:40			20:35		21:24			21:54		
22	08:25		09:02 (WEA 18-4)	07:32		07:59 (WEA 18-2)	06:29			06:18		05:24			05:05		
	16:53	44	09:52 (WEA 18-3)	17:51	11	08:10 (WEA 18-1)	18:42			20:36		21:26			21:54		
23	08:24		09:01 (WEA 18-4)	07:30		07:57 (WEA 18-2)	06:27			06:16		05:22			05:05		
	16:55	44	09:51 (WEA 18-3)	17:53	17	08:14 (WEA 18-1)	18:44			20:38		21:27			21:54		
24	08:23		09:02 (WEA 18-4)	07:28		07:55 (WEA 18-2)	06:24			06:14		05:21			05:05		
	16:57	44	09:52 (WEA 18-3)	17:55	20	08:15 (WEA 18-1)	18:46			20:40		21:29			21:55		
25	08:22		09:02 (WEA 18-4)	07:26		07:55 (WEA 18-2)	07:22			06:12		05:20			05:05		
	16:59	42	09:52 (WEA 18-3)	17:57	22	08:17 (WEA 18-1)	19:47			20:41		21:30			21:55		
26	08:20		09:02 (WEA 18-4)	07:24		07:54 (WEA 18-2)	07:20			06:10		05:19			05:06		
	17:01	40	09:50 (WEA 18-3)	17:59	24	08:18 (WEA 18-1)	19:49			20:43		21:31			21:55		
27	08:19		09:03 (WEA 18-4)	07:22		07:54 (WEA 18-2)	07:17			06:07		05:18			05:06		
	17:02	38	09:50 (WEA 18-3)	18:01	24	08:18 (WEA 18-1)	19:51			20:45		21:33			21:55		
28	08:17		09:03 (WEA 18-4)	07:19		07:53 (WEA 18-2)	07:15			06:05		05:16			05:07		
	17:04	34	09:48 (WEA 18-3)	18:02	25	08:18 (WEA 18-1)	19:53			20:47		21:34			21:55		
29	08:16		09:03 (WEA 18-4)				07:13			06:03		05:15			05:07		
	17:06	30	09:46 (WEA 18-3)				19:54			20:48		21:35			21:54		
30	08:15		09:05 (WEA 18-4)				07:10			06:01		05:14			05:08		
	17:08	18	09:23 (WEA 18-4)				19:56			20:50		21:37			21:54		
31	08:13		09:05 (WEA 18-4)				07:08					05:13					
	17:10	17	09:22 (WEA 18-4)				19:58					21:38					
Sonnenscheinstunden			256		275		366			416		487			502		
astr.max.mögl.Beschattung			954		181		177										

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 23b - Große Haar 9/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08		07:21 17:01		08:14 16:19 25
2	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06		07:23 16:59		09:06 (WEA 18-3) 09:31 (WEA 18-3)
3	05:10 21:53	05:48 21:18	06:40 20:14	07:30 19:04		07:25 16:57		09:07 (WEA 18-3) 09:31 (WEA 18-3)
4	05:11 21:53	05:50 21:17	06:41 20:12	07:32 19:01		07:27 16:55		09:07 (WEA 18-3) 09:31 (WEA 18-3)
5	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59		07:29 16:53		09:08 (WEA 18-3) 09:32 (WEA 18-3)
6	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	12	08:35 (WEA 18-1) 08:47 (WEA 18-1)		09:09 (WEA 18-3) 09:31 (WEA 18-3)
7	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	16	08:33 (WEA 18-1) 08:49 (WEA 18-1)		09:10 (WEA 18-3) 09:32 (WEA 18-3)
8	05:14 21:51	05:56 21:09	06:48 20:03	07:38 18:52	18	08:32 (WEA 18-1) 08:50 (WEA 18-1)		09:10 (WEA 18-3) 09:32 (WEA 18-3)
9	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	20	08:31 (WEA 18-1) 08:51 (WEA 18-1)	9	08:41 (WEA 18-4) 08:50 (WEA 18-4)
10	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	22	08:30 (WEA 18-1) 08:52 (WEA 18-1)	13	08:39 (WEA 18-4) 08:52 (WEA 18-4)
11	05:17 21:48	06:01 21:04	06:53 19:56	07:44 18:45	23	08:28 (WEA 18-1) 08:51 (WEA 18-1)	15	08:38 (WEA 18-4) 08:53 (WEA 18-4)
12	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	24	08:28 (WEA 18-1) 08:52 (WEA 18-1)	17	08:37 (WEA 18-4) 08:54 (WEA 18-4)
13	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	25	08:27 (WEA 18-2) 08:52 (WEA 18-1)	19	08:36 (WEA 18-4) 08:55 (WEA 18-4)
14	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	24	08:27 (WEA 18-2) 08:51 (WEA 18-1)	30	08:36 (WEA 18-4) 09:19 (WEA 18-3)
15	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36	25	08:26 (WEA 18-2) 08:51 (WEA 18-1)	34	08:31 (WEA 18-4) 09:21 (WEA 18-3)
16	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	24	08:26 (WEA 18-2) 08:50 (WEA 18-1)	38	08:32 (WEA 18-4) 09:22 (WEA 18-3)
17	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	22	08:27 (WEA 18-2) 08:49 (WEA 18-1)	40	08:32 (WEA 18-4) 09:23 (WEA 18-3)
18	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:29	21	08:26 (WEA 18-2) 08:47 (WEA 18-1)	42	08:33 (WEA 18-4) 09:25 (WEA 18-3)
19	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27	19	08:27 (WEA 18-2) 08:46 (WEA 18-1)	44	08:34 (WEA 18-4) 09:26 (WEA 18-3)
20	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	15	08:28 (WEA 18-2) 08:43 (WEA 18-1)	44	08:35 (WEA 18-4) 09:26 (WEA 18-3)
21	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	9	08:30 (WEA 18-2) 08:39 (WEA 18-2)	44	08:35 (WEA 18-4) 09:27 (WEA 18-3)
22	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21		07:59 16:27		08:36 (WEA 18-4) 09:28 (WEA 18-3)
23	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19		08:01 16:26	44	08:36 (WEA 18-4) 09:29 (WEA 18-3)
24	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17		08:03 16:25	43	08:37 (WEA 18-4) 09:29 (WEA 18-3)
25	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15		08:04 16:24	41	08:37 (WEA 18-4) 09:29 (WEA 18-3)
26	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13		08:06 16:23	40	08:38 (WEA 18-4) 09:29 (WEA 18-3)
27	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11		08:07 16:22	37	08:38 (WEA 18-4) 09:30 (WEA 18-3)
28	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:09		08:09 16:21	35	08:38 (WEA 18-4) 09:31 (WEA 18-3)
29	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07		08:11 16:20	30	08:38 (WEA 18-4) 09:30 (WEA 18-3)
30	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05		08:12 16:19	26	08:38 (WEA 18-4) 09:05 (WEA 18-3)
31	05:44 21:24	06:35 20:21		07:19 17:03				08:38 (WEA 18-4) 16:22
Sonnenscheinstunden	505	456	382	332		265		241
astr.max.mögl.Beschattung				319		729		562

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: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 24a - Große Haar 7/Nordwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:39 16:23	08:11 17:12	07:17 18:04	07:06 20:00	05:59 20:52	05:12 21:39	05:08 21:54	21:04 (WEA 17-2) 21:22 (WEA 17-2)	05:45 20:19	06:36 19:08	07:26 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:54	05:12 21:40	05:09 21:54	21:05 (WEA 17-2) 21:22 (WEA 17-2)	05:47 20:17	06:38 19:06	07:28 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	21:05 (WEA 17-2) 21:09 (WEA 17-2)	21:05 (WEA 17-2) 21:21 (WEA 17-2)	05:49 20:14	06:40 19:04	07:30 16:57	08:16 16:17
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05	05:54 20:57	05:10 21:42	21:04 (WEA 17-2) 21:12 (WEA 17-2)	21:06 (WEA 17-2) 21:21 (WEA 17-2)	05:50 20:12	06:41 19:01	07:32 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	21:02 (WEA 17-2) 21:12 (WEA 17-2)	21:07 (WEA 17-2) 21:21 (WEA 17-2)	05:52 20:10	06:43 18:59	07:33 16:53	08:19 16:16
6	08:38 16:29	08:03 17:21	07:06 18:14	06:54 20:08	05:50 21:00	05:09 21:44	21:01 (WEA 17-2) 21:13 (WEA 17-2)	21:07 (WEA 17-2) 21:21 (WEA 17-2)	05:53 20:07	06:45 18:57	07:35 16:51	08:21 16:16
7	08:37 16:30	08:02 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	21:01 (WEA 17-2) 21:14 (WEA 17-2)	21:07 (WEA 17-2) 21:19 (WEA 17-2)	05:55 20:05	06:46 18:54	07:37 16:50	08:22 16:15
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	21:01 (WEA 17-2) 21:14 (WEA 17-2)	21:08 (WEA 17-2) 21:19 (WEA 17-2)	05:57 20:03	06:48 18:52	07:38 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	21:01 (WEA 17-2) 21:16 (WEA 17-2)	21:10 (WEA 17-2) 21:18 (WEA 17-2)	05:58 20:00	06:50 18:50	07:40 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:43 21:07	05:06 21:48	21:01 (WEA 17-2) 21:17 (WEA 17-2)	21:11 (WEA 17-2) 21:17 (WEA 17-2)	06:00 19:58	06:51 18:47	07:42 16:45	08:26 16:14
11	08:35 16:36	07:54 17:31	06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49	21:00 (WEA 17-2) 21:16 (WEA 17-2)	21:06 (WEA 17-2) 21:16 (WEA 17-2)	06:01 19:56	06:53 18:45	07:44 16:43	08:27 16:14
12	08:34 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	21:00 (WEA 17-2) 21:17 (WEA 17-2)	21:05 (WEA 17-2) 21:17 (WEA 17-2)	06:03 19:53	06:55 18:43	07:45 16:41	08:28 16:14
13	08:34 16:39	07:51 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	21:01 (WEA 17-2) 21:18 (WEA 17-2)	21:05 (WEA 17-2) 21:18 (WEA 17-2)	06:05 19:51	06:56 18:41	07:47 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:14	05:05 21:51	21:01 (WEA 17-2) 21:18 (WEA 17-2)	21:05 (WEA 17-2) 21:18 (WEA 17-2)	06:06 19:49	06:58 18:38	07:49 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:52	21:01 (WEA 17-2) 21:19 (WEA 17-2)	21:05 (WEA 17-2) 21:19 (WEA 17-2)	06:08 19:46	07:00 18:36	07:51 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:32	06:31 20:26	05:33 21:17	05:05 21:52	21:00 (WEA 17-2) 21:18 (WEA 17-2)	21:05 (WEA 17-2) 21:18 (WEA 17-2)	06:10 19:44	07:01 18:34	07:52 16:35	08:32 16:14
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	21:00 (WEA 17-2) 21:19 (WEA 17-2)	21:05 (WEA 17-2) 21:19 (WEA 17-2)	06:11 19:41	07:03 18:32	07:54 16:34	08:33 16:14
18	08:30 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	21:00 (WEA 17-2) 21:01 (WEA 17-2)	21:05 (WEA 17-2) 21:19 (WEA 17-2)	06:13 19:39	07:05 18:30	07:56 16:33	08:33 16:14
19	08:29 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	21:01 (WEA 17-2) 21:19 (WEA 17-2)	21:05 (WEA 17-2) 21:19 (WEA 17-2)	06:15 19:37	07:06 18:27	07:58 16:31	08:34 16:14
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54	21:02 (WEA 17-2) 21:20 (WEA 17-2)	21:05 (WEA 17-2) 21:20 (WEA 17-2)	06:16 19:34	07:08 18:25	08:00 16:30	08:35 16:15
21	08:26 16:52	07:34 17:49	06:31 18:40	06:20 20:35	05:25 21:24	05:05 21:54	21:02 (WEA 17-2) 21:20 (WEA 17-2)	21:05 (WEA 17-2) 21:20 (WEA 17-2)	06:18 19:32	07:10 18:23	08:01 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	21:02 (WEA 17-2) 21:20 (WEA 17-2)	21:05 (WEA 17-2) 21:20 (WEA 17-2)	06:20 19:30	07:11 18:21	08:03 16:27	08:36 16:16
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:54	21:02 (WEA 17-2) 21:20 (WEA 17-2)	21:05 (WEA 17-2) 21:20 (WEA 17-2)	06:21 19:27	07:13 18:19	08:05 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	21:03 (WEA 17-2) 21:21 (WEA 17-2)	21:05 (WEA 17-2) 21:21 (WEA 17-2)	06:23 19:25	07:15 18:17	08:07 16:25	08:37 16:17
25	08:22 16:59	07:26 17:57	06:22 19:47	06:12 20:41	05:20 21:30	05:05 21:55	21:02 (WEA 17-2) 21:21 (WEA 17-2)	21:05 (WEA 17-2) 21:21 (WEA 17-2)	06:25 19:22	07:16 18:15	08:09 16:24	08:37 16:17
26	08:20 17:01	07:24 17:59	06:20 19:49	06:10 20:43	05:19 21:31	05:06 21:55	21:02 (WEA 17-2) 21:21 (WEA 17-2)	21:05 (WEA 17-2) 21:21 (WEA 17-2)	06:26 19:20	07:18 18:13	08:10 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	06:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	21:03 (WEA 17-2) 21:21 (WEA 17-2)	21:05 (WEA 17-2) 21:21 (WEA 17-2)	06:28 19:18	07:20 18:11	08:12 16:22	08:38 16:19
28	08:17 17:04	07:20 18:03	06:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	21:03 (WEA 17-2) 21:21 (WEA 17-2)	21:05 (WEA 17-2) 21:21 (WEA 17-2)	06:30 19:15	07:21 17:09	08:14 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	21:04 (WEA 17-2) 21:21 (WEA 17-2)	21:05 (WEA 17-2) 21:21 (WEA 17-2)	06:31 19:13	07:23 17:07	08:16 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	21:04 (WEA 17-2) 21:21 (WEA 17-2)	21:05 (WEA 17-2) 21:21 (WEA 17-2)	06:33 19:11	07:25 17:05	08:18 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38				06:35 20:21	07:19 17:03		08:38 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung						448	130					

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 24b - Große Haar 7/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:39	08:11	07:17	07:06	05:59	05:12
	16:23	17:12	18:04	20:00	20:52	21:39
2	08:38	08:10	07:15	07:03	05:57	05:12
	16:24	17:13	18:06	20:01	20:54	21:40
3	08:38	08:08	07:13	07:01	05:55	05:11
	16:25	17:15	18:08	20:03	20:55	21:41
4	08:38	08:07	07:11	06:59	05:54	05:10
	16:27	17:17	18:10	20:05	20:57	21:42
5	08:38	08:05	07:08	06:56	05:52	05:09
	16:28	17:19	18:12	20:07	20:59	21:43
6	08:38	08:03	07:06	06:54	05:50	05:08
	16:29	17:21	18:14	20:08	21:00	21:44
7	08:37	08:02	07:04	06:52	05:48	05:08
	16:30	17:23	18:15	20:10	21:02	21:45
8	08:37	08:00	07:02	06:49	05:46	05:07
	16:32	17:25	18:17	20:12	21:04	21:46
9	08:36	07:58	06:59	06:47	05:44	05:07
	16:33	17:27	18:19	20:14	21:05	21:47
10	08:36	07:56	06:57	06:45	05:43	05:06
	16:34	17:29	18:21	20:15	21:07	21:48
11	08:35	07:54	06:55	06:42	05:41	05:06
	16:36	17:31	18:23	20:17	21:09	21:49
12	08:34	07:52	06:52	06:40	05:39	05:05
	16:37	17:32	18:24	20:19	21:10	21:50
13	08:34	07:51	06:50	06:38	05:37	05:05
	16:39	17:34	18:26	20:21	21:12	21:50
14	08:33	07:49	06:48	06:36	05:36	05:05
	16:40	17:36	18:28	20:22	21:14	21:51
15	08:32	07:47	06:45	06:33	05:34	05:05
	16:42	17:38	18:30	20:24	21:15	21:52
16	08:31	07:45	06:43	06:31	05:33	05:05
	16:43	17:40	18:32	20:26	21:17	21:52
17	08:30	07:43	06:41	06:29	05:31	05:04
	16:45	17:42	18:33	20:28	21:18	21:53
18	08:30	07:41	06:38	06:27	05:29	05:04
	16:47	17:44	18:35	20:29	21:20	21:53
19	08:29	07:39	06:36	06:24	05:28	05:04
	16:48	17:46	18:37	20:31	21:21	21:53
20	08:27	07:37	06:34	06:22	05:27	05:04
	16:50	17:48	18:39	20:33	21:23	21:54
21	08:26	07:34	06:31	06:20	05:25	05:05
	16:52	17:49	18:40	20:35	21:24	21:54
22	08:25	07:32	06:29	06:18	05:24	05:05
	16:53	17:51	18:42	20:36	21:26	21:54
23	08:24	07:30	06:27	06:16	05:22	05:05
	16:55	17:53	18:44	20:38	21:27	21:54
24	08:23	07:28	06:24	06:14	05:21	05:05
	16:57	17:55	18:46	20:40	21:29	21:55
25	08:22	07:26	06:22	06:12	05:20	05:05
	16:59	17:57	19:47	20:41	21:30	21:55
26	08:20	07:24	06:20	06:10	05:19	05:06
	17:01	17:59	19:49	20:43	21:31	21:55
27	08:19	07:22	06:17	06:07	05:18	05:06
	17:02	18:01	19:51	20:45	21:33	21:55
28	08:17	07:20	06:15	06:05	05:16	05:07
	17:04	18:03	19:53	20:47	21:34	21:55
29	08:16		06:13	06:03	05:15	05:07
	17:06		19:54	20:48	21:35	21:54
30	08:15		06:10	06:01	05:14	05:08
	17:08		19:56	20:50	21:37	21:54
31	08:13		06:08		05:13	
	17:10		19:58		21:38	
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung		306	198			

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 24b - Große Haar 7/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September		Oktober		November		Dezember
1	05:08 21:54	05:45 21:22	06:36 20:19		07:26 19:08		07:21 17:01	19	07:58 (WEA 18-3) 08:14 08:17 (WEA 18-3) 16:19
2	05:09 21:54	05:47 21:20	06:38 20:17		07:28 19:06		07:23 16:59	17	07:59 (WEA 18-3) 08:15 08:16 (WEA 18-3) 16:18
3	05:10 21:53	05:49 21:18	06:40 20:14		07:30 19:04		07:25 16:57	13	08:01 (WEA 18-3) 08:16 08:14 (WEA 18-3) 16:17
4	05:11 21:53	05:50 21:17	06:41 20:12		07:32 19:01		07:27 16:55	9	08:03 (WEA 18-3) 08:18 08:12 (WEA 18-3) 16:17
5	05:11 21:52	05:52 21:15	06:43 20:10		07:33 18:59		07:29 16:53		08:19 16:16
6	05:12 21:52	05:53 21:13	06:45 20:07		07:35 18:57		07:31 16:51		08:21 16:16
7	05:13 21:51	05:55 21:11	06:46 20:05		07:37 18:54		07:32 16:50		08:22 16:15
8	05:14 21:51	05:57 21:09	06:48 20:03		07:38 18:52		07:34 16:48		08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:00		07:40 18:50		07:36 16:46		08:24 16:14
10	05:16 21:49	06:00 21:06	06:51 19:58		07:42 18:47		07:38 16:45		08:26 16:14
11	05:17 21:48	06:01 21:04	06:53 19:56		07:44 18:45		07:40 16:43		08:27 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53		07:45 18:43		07:41 16:41		08:28 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51		07:47 18:41		07:43 16:40		08:29 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49		07:49 18:38		07:45 16:38		08:30 16:14
15	05:22 21:45	06:08 20:56	07:00 19:46		07:51 18:36		07:47 16:37		08:31 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44		07:52 18:34		07:49 16:35		08:32 16:14
17	05:24 21:43	06:11 20:52	07:03 19:41		07:54 18:32		07:50 16:34		08:32 16:14
18	05:25 21:42	06:13 20:50	07:05 19:39		07:56 18:30		07:52 16:33		08:33 16:14
19	05:27 21:41	06:15 20:48	07:06 19:37	10	07:57 (WEA 18-1) 07:58 08:07 (WEA 18-1) 18:27	6	09:05 (WEA 18-3) 07:54 09:11 (WEA 18-3) 16:31		08:34 16:14
20	05:28 21:39	06:16 20:45	07:08 19:34	14	07:54 (WEA 18-1) 08:00 08:08 (WEA 18-1) 18:25	13	09:01 (WEA 18-3) 07:56 09:14 (WEA 18-3) 16:30		08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:32	16	07:53 (WEA 18-1) 08:01 08:09 (WEA 18-1) 18:23	16	09:00 (WEA 18-3) 07:57 09:16 (WEA 18-3) 16:29		08:35 16:15
22	05:31 21:37	06:20 20:41	07:11 19:30	18	07:52 (WEA 18-1) 08:03 08:10 (WEA 18-1) 18:21	19	08:58 (WEA 18-3) 07:59 09:17 (WEA 18-3) 16:27		08:36 16:16
23	05:32 21:35	06:21 20:39	07:13 19:27	20	07:50 (WEA 18-1) 08:05 08:10 (WEA 18-1) 18:19	21	08:57 (WEA 18-3) 08:01 09:18 (WEA 18-3) 16:26		08:36 16:16
24	05:33 21:34	06:23 20:37	07:15 19:25	20	07:50 (WEA 18-1) 08:07 08:10 (WEA 18-1) 18:17	22	08:57 (WEA 18-3) 08:03 09:19 (WEA 18-3) 16:25		08:37 16:17
25	05:35 21:33	06:25 20:35	07:16 19:22	20	07:50 (WEA 18-1) 08:09 08:10 (WEA 18-1) 18:15	23	08:56 (WEA 18-3) 08:04 09:19 (WEA 18-3) 16:24		08:37 16:17
26	05:36 21:31	06:26 20:32	07:18 19:20	19	07:49 (WEA 18-1) 08:10 08:08 (WEA 18-1) 18:13	23	08:56 (WEA 18-3) 08:06 09:19 (WEA 18-3) 16:23		08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:18	18	07:50 (WEA 18-1) 08:12 08:08 (WEA 18-1) 18:11	23	08:56 (WEA 18-3) 08:07 09:19 (WEA 18-3) 16:22		08:38 16:19
28	05:39 21:28	06:30 20:28	07:21 19:15	17	07:50 (WEA 18-1) 07:14 08:07 (WEA 18-1) 17:09	23	07:56 (WEA 18-3) 08:09 08:19 (WEA 18-3) 16:21		08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:13	14	07:51 (WEA 18-1) 07:16 08:05 (WEA 18-1) 17:07	23	07:56 (WEA 18-3) 08:11 08:19 (WEA 18-3) 16:20		08:38 16:20
30	05:42 21:25	06:33 20:23	07:25 19:11	9	07:53 (WEA 18-1) 07:18 08:02 (WEA 18-1) 17:05	22	07:56 (WEA 18-3) 08:12 08:18 (WEA 18-3) 16:19		08:38 16:21
31	05:44 21:24	06:35 20:21			07:19 17:03	21	07:57 (WEA 18-3) 08:18 (WEA 18-3)		08:38 16:22
Sonnenscheinstunden	505	456	382		332		265		241
astr.max.mögl.Beschattung			195		255		58		

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

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

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 25a - Zur Dasslage 7A/Nordwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:38 16:23	08:11 17:12	07:17 18:04	07:05 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:54	05:12 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:48 21:18	06:40 20:14	07:30 19:04	07:25 16:57	08:16 16:17
4	08:38 16:27	08:07 17:17	07:11 18:10	06:58 20:05	05:53 20:57	05:10 21:42	05:11 21:53	05:50 21:17	06:41 20:12	07:31 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:38 16:29	08:03 17:21	07:06 18:13	06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:30 16:51	08:21 16:16
7	08:37 16:30	08:01 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:56 21:09	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:42 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:26 16:14
11	08:35 16:36	07:54 17:30	06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:48	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:34 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:41 16:41	08:28 16:14
13	08:34 16:39	07:50 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:13	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:51	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:31	06:31 20:26	05:32 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:50 16:34	08:32 16:14
18	08:29 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:29	07:52 16:33	08:33 16:14
19	08:28 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:34 17:49	06:31 18:40	06:20 20:34	05:25 21:24	05:04 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:15
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:54	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:02 16:25	08:37 16:17
25	08:21 16:59	07:26 17:57	07:22 19:47	06:12 20:41	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	08:20 17:00	07:24 17:59	07:20 19:49	06:09 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:07 16:22	08:38 16:18
28	08:17 17:04	07:19 18:02	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	08:14 17:08	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:06	08:11 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:23	06:35 20:21		07:19 17:03		08:38 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 25b - Zur Dasslage 7A/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38	09:23 (WEA 18-4)	08:11	07:05	05:59	05:12
	16:23	54 10:36 (WEA 18-3)	17:12	18:04	35 08:36 (WEA 18-1)	20:00
2	08:38	09:24 (WEA 18-4)	08:10	07:03	05:57	05:12
	16:24	53 10:36 (WEA 18-3)	17:13	18:06	35 08:36 (WEA 18-1)	20:01
3	08:38	09:23 (WEA 18-4)	08:08	07:01	05:55	05:11
	16:25	54 10:36 (WEA 18-3)	17:15	18:08	35 08:36 (WEA 18-1)	20:03
4	08:38	09:24 (WEA 18-4)	08:07	07:11	05:53	05:10
	16:27	54 10:37 (WEA 18-3)	17:17	18:10	34 08:36 (WEA 18-1)	20:05
5	08:38	09:24 (WEA 18-4)	08:05	07:08	05:52	05:09
	16:28	54 10:37 (WEA 18-3)	17:19	18:12	32 08:35 (WEA 18-1)	20:07
6	08:37	09:24 (WEA 18-4)	08:03	07:06	05:50	05:08
	16:29	55 10:37 (WEA 18-3)	17:21	18:13	30 08:35 (WEA 18-1)	20:08
7	08:37	09:25 (WEA 18-4)	08:01	07:04	05:48	05:08
	16:30	55 10:38 (WEA 18-3)	17:23	18:15	29 08:33 (WEA 18-1)	20:10
8	08:37	09:24 (WEA 18-4)	08:00	07:02	05:46	05:07
	16:32	56 10:38 (WEA 18-3)	17:25	18:17	28 08:33 (WEA 18-1)	20:12
9	08:36	09:24 (WEA 18-4)	07:58	06:59	05:44	05:07
	16:33	57 10:38 (WEA 18-3)	17:27	18:19	26 08:32 (WEA 18-1)	20:14
10	08:36	09:25 (WEA 18-4)	07:56	06:57	05:42	05:06
	16:34	55 10:38 (WEA 18-3)	17:29	18:21	22 08:29 (WEA 18-1)	20:15
11	08:35	09:25 (WEA 18-4)	07:54	06:55	05:41	05:06
	16:36	55 10:38 (WEA 18-3)	17:30	18:23	19 08:28 (WEA 18-1)	20:17
12	08:34	09:25 (WEA 18-4)	07:52	06:52	05:39	05:05
	16:37	55 10:38 (WEA 18-3)	17:32	18:24	14 08:25 (WEA 18-1)	20:19
13	08:34	09:25 (WEA 18-4)	07:50	06:50	05:37	05:05
	16:39	55 10:38 (WEA 18-3)	17:34	18:26	20:21	21:12
14	08:33	09:25 (WEA 18-4)	07:49	06:48	05:36	05:05
	16:40	54 10:38 (WEA 18-3)	17:36	18:28	20:22	21:13
15	08:32	09:26 (WEA 18-4)	07:47	06:45	05:34	05:05
	16:42	53 10:38 (WEA 18-3)	17:38	18:30	20:24	21:15
16	08:31	09:26 (WEA 18-4)	07:45	06:43	05:32	05:04
	16:43	51 10:37 (WEA 18-3)	17:40	18:31	20:26	21:17
17	08:30	09:27 (WEA 18-4)	07:43	06:41	05:31	05:04
	16:45	50 10:37 (WEA 18-3)	17:42	18:33	20:28	21:18
18	08:29	09:27 (WEA 18-4)	07:41	06:38	05:29	05:04
	16:47	47 10:36 (WEA 18-3)	17:44	18:35	20:29	21:20
19	08:28	09:28 (WEA 18-4)	07:39	06:36	05:28	05:04
	16:48	45 10:36 (WEA 18-3)	17:46	18:37	20:31	21:21
20	08:27	09:28 (WEA 18-4)	07:37	06:34	05:27	05:04
	16:50	42 10:34 (WEA 18-3)	17:48	9 08:18 (WEA 18-2)	20:33	21:23
21	08:26	09:29 (WEA 18-4)	07:34	06:31	05:25	05:04
	16:52	36 10:32 (WEA 18-3)	17:49	21 08:28 (WEA 18-1)	20:34	21:24
22	08:25	09:30 (WEA 18-4)	07:32	06:29	05:24	05:05
	16:53	29 10:30 (WEA 18-3)	17:51	26 08:31 (WEA 18-1)	20:36	21:26
23	08:24	09:30 (WEA 18-4)	07:30	06:27	05:22	05:05
	16:55	22 09:52 (WEA 18-4)	17:53	29 08:33 (WEA 18-1)	20:38	21:27
24	08:23	09:31 (WEA 18-4)	07:28	06:24	05:21	05:05
	16:57	21 09:52 (WEA 18-4)	17:55	31 08:33 (WEA 18-1)	20:40	21:29
25	08:21	09:33 (WEA 18-4)	07:26	07:22	05:20	05:05
	16:59	19 09:52 (WEA 18-4)	17:57	32 08:34 (WEA 18-1)	20:41	21:30
26	08:20	09:33 (WEA 18-4)	07:24	07:20	05:19	05:06
	17:00	18 09:51 (WEA 18-4)	17:59	34 08:35 (WEA 18-1)	20:43	21:31
27	08:19	09:35 (WEA 18-4)	07:22	07:17	05:18	05:06
	17:02	15 09:50 (WEA 18-4)	18:01	35 08:36 (WEA 18-1)	20:45	21:33
28	08:17	09:37 (WEA 18-4)	07:19	07:15	05:16	05:07
	17:04	11 09:48 (WEA 18-4)	18:02	36 08:00 (WEA 18-2)	20:47	21:34
29	08:16	09:40 (WEA 18-4)		07:13	05:15	05:07
	17:06	4 09:44 (WEA 18-4)		19:54	20:48	21:35
30	08:15			07:10	05:14	05:08
	17:08			19:56	20:50	21:37
31	08:13			07:08	05:13	
	17:10			19:58	21:38	
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung	1229	253	339			

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:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 25b - Zur Dasslage 7A/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

	Jul	August	September	Oktober		November		Dezember	
1	05:08	05:45	06:36	07:26		07:21		08:14	09:07 (WEA 18-4)
	21:54	21:22	20:19	19:08		17:01		16:19	55 10:20 (WEA 18-3)
2	05:09	05:47	06:38	07:28	08:51 (WEA 18-1)	07:23		08:15	09:07 (WEA 18-4)
	21:54	21:20	20:17	19:06	10 09:01 (WEA 18-1)	16:59		16:18	55 10:20 (WEA 18-3)
3	05:10	05:48	06:40	07:30	08:48 (WEA 18-1)	07:25		08:16	09:08 (WEA 18-4)
	21:53	21:18	20:14	19:04	16 09:04 (WEA 18-1)	16:57		16:17	55 10:21 (WEA 18-3)
4	05:11	05:50	06:41	07:31	08:45 (WEA 18-1)	07:27		08:18	09:08 (WEA 18-4)
	21:53	21:17	20:12	19:01	21 09:06 (WEA 18-1)	16:55		16:17	57 10:22 (WEA 18-3)
5	05:11	05:52	06:43	07:33	08:44 (WEA 18-1)	07:29		08:19	09:09 (WEA 18-4)
	21:52	21:15	20:10	18:59	24 09:08 (WEA 18-1)	16:53		16:16	56 10:23 (WEA 18-3)
6	05:12	05:53	06:45	07:35	08:42 (WEA 18-1)	07:30		08:21	09:10 (WEA 18-4)
	21:52	21:13	20:07	18:57	26 09:08 (WEA 18-1)	16:51		16:16	55 10:23 (WEA 18-3)
7	05:13	05:55	06:46	07:37	08:41 (WEA 18-1)	07:32		08:22	09:10 (WEA 18-4)
	21:51	21:11	20:05	18:54	28 09:09 (WEA 18-1)	16:50		16:15	55 10:23 (WEA 18-3)
8	05:14	05:56	06:48	07:38	08:40 (WEA 18-1)	07:34		08:23	09:11 (WEA 18-4)
	21:51	21:09	20:03	18:52	30 09:10 (WEA 18-1)	16:48		16:15	55 10:24 (WEA 18-3)
9	05:15	05:58	06:50	07:40	08:39 (WEA 18-1)	07:36		08:24	09:12 (WEA 18-4)
	21:50	21:08	20:00	18:50	31 09:10 (WEA 18-1)	16:46		16:14	54 10:25 (WEA 18-3)
10	05:16	06:00	06:51	07:42	08:38 (WEA 18-2)	07:38		08:26	09:12 (WEA 18-4)
	21:49	21:06	19:58	18:47	32 09:10 (WEA 18-1)	16:45		16:14	54 10:25 (WEA 18-3)
11	05:17	06:01	06:53	07:44	08:35 (WEA 18-2)	07:40		08:27	09:13 (WEA 18-4)
	21:48	21:04	19:56	18:45	35 09:10 (WEA 18-1)	16:43		16:14	53 10:25 (WEA 18-3)
12	05:18	06:03	06:55	07:45	08:35 (WEA 18-2)	07:41		08:28	09:14 (WEA 18-4)
	21:48	21:02	19:53	18:43	35 09:10 (WEA 18-1)	16:41		16:14	54 10:27 (WEA 18-3)
13	05:19	06:05	06:56	07:47	08:34 (WEA 18-2)	07:43		08:29	09:15 (WEA 18-4)
	21:47	21:00	19:51	18:41	35 09:09 (WEA 18-1)	16:40		16:14	52 10:27 (WEA 18-3)
14	05:20	06:06	06:58	07:49	08:34 (WEA 18-2)	07:45	09:13 (WEA 18-4)	08:30	09:16 (WEA 18-4)
	21:46	20:58	19:49	18:38	35 09:09 (WEA 18-1)	16:38	5 09:18 (WEA 18-4)	16:14	53 10:28 (WEA 18-3)
15	05:22	06:08	07:00	07:51	08:33 (WEA 18-2)	07:47	09:09 (WEA 18-4)	08:31	09:17 (WEA 18-4)
	21:45	20:56	19:46	18:36	36 09:09 (WEA 18-1)	16:37	11 09:20 (WEA 18-4)	16:14	51 10:28 (WEA 18-3)
16	05:23	06:10	07:01	07:52	08:33 (WEA 18-2)	07:49	09:07 (WEA 18-4)	08:32	09:17 (WEA 18-4)
	21:44	20:54	19:44	18:34	35 09:08 (WEA 18-1)	16:35	15 09:22 (WEA 18-4)	16:14	52 10:29 (WEA 18-3)
17	05:24	06:11	07:03	07:54	08:33 (WEA 18-2)	07:50	09:06 (WEA 18-4)	08:32	09:17 (WEA 18-4)
	21:43	20:52	19:41	18:32	33 09:06 (WEA 18-1)	16:34	18 09:24 (WEA 18-4)	16:14	51 10:28 (WEA 18-3)
18	05:25	06:13	07:05	07:56	08:33 (WEA 18-2)	07:52	09:05 (WEA 18-4)	08:33	09:18 (WEA 18-4)
	21:42	20:50	19:39	18:29	32 09:05 (WEA 18-1)	16:33	20 09:25 (WEA 18-4)	16:14	51 10:29 (WEA 18-3)
19	05:27	06:15	07:06	07:58	08:34 (WEA 18-2)	07:54	09:05 (WEA 18-4)	08:34	09:19 (WEA 18-4)
	21:41	20:48	19:37	18:27	30 09:04 (WEA 18-1)	16:31	21 09:26 (WEA 18-4)	16:14	51 10:30 (WEA 18-3)
20	05:28	06:16	07:08	08:00	08:35 (WEA 18-2)	07:56	09:05 (WEA 18-4)	08:35	09:19 (WEA 18-4)
	21:39	20:45	19:34	18:25	27 09:02 (WEA 18-1)	16:30	22 09:27 (WEA 18-4)	16:15	50 10:30 (WEA 18-3)
21	05:29	06:18	07:10	08:01	08:36 (WEA 18-2)	07:57	09:05 (WEA 18-4)	08:35	09:20 (WEA 18-4)
	21:38	20:43	19:32	18:23	24 09:00 (WEA 18-1)	16:29	29 10:05 (WEA 18-3)	16:15	49 10:30 (WEA 18-3)
22	05:31	06:20	07:11	08:03	08:38 (WEA 18-2)	07:59	09:05 (WEA 18-4)	08:36	09:21 (WEA 18-4)
	21:37	20:41	19:30	18:21	19 08:57 (WEA 18-1)	16:27	36 10:08 (WEA 18-3)	16:15	49 10:31 (WEA 18-3)
23	05:32	06:21	07:13	08:05	08:41 (WEA 18-2)	08:01	09:05 (WEA 18-4)	08:36	09:21 (WEA 18-4)
	21:35	20:39	19:27	18:19	6 08:47 (WEA 18-2)	16:26	42 10:11 (WEA 18-3)	16:16	49 10:31 (WEA 18-3)
24	05:33	06:23	07:15	08:07		08:02	09:05 (WEA 18-4)	08:37	09:21 (WEA 18-4)
	21:34	20:37	19:25	18:17		16:25	45 10:13 (WEA 18-3)	16:17	50 10:32 (WEA 18-3)
25	05:35	06:25	07:16	08:09		08:04	09:04 (WEA 18-4)	08:37	09:22 (WEA 18-4)
	21:33	20:35	19:22	18:15		16:24	47 10:13 (WEA 18-3)	16:17	51 10:33 (WEA 18-3)
26	05:36	06:26	07:18	08:10		08:06	09:05 (WEA 18-4)	08:38	09:22 (WEA 18-4)
	21:31	20:32	19:20	18:13		16:23	50 10:15 (WEA 18-3)	16:18	51 10:33 (WEA 18-3)
27	05:38	06:28	07:20	08:12		08:07	09:05 (WEA 18-4)	08:38	09:22 (WEA 18-4)
	21:30	20:30	19:18	18:10		16:22	51 10:16 (WEA 18-3)	16:18	50 10:33 (WEA 18-3)
28	05:39	06:30	07:21	07:14		08:09	09:06 (WEA 18-4)	08:38	09:22 (WEA 18-4)
	21:28	20:28	19:15	17:08		16:21	53 10:18 (WEA 18-3)	16:19	51 10:33 (WEA 18-3)
29	05:41	06:31	07:23	07:16		08:10	09:06 (WEA 18-4)	08:38	09:22 (WEA 18-4)
	21:27	20:26	19:13	17:06		16:20	54 10:18 (WEA 18-3)	16:20	53 10:34 (WEA 18-3)
30	05:42	06:33	07:25	07:18		08:12	09:06 (WEA 18-4)	08:38	09:23 (WEA 18-4)
	21:25	20:23	19:11	17:05		16:19	54 10:19 (WEA 18-3)	16:21	51 10:34 (WEA 18-3)
31	05:44	06:35		07:19				08:38	09:23 (WEA 18-4)
	21:23	20:21		17:03				16:22	52 10:35 (WEA 18-3)
Sonnenscheinstunden	505	456	382	332	600	265	573	241	1625
astr.max.mögl.Beschattung									

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

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

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH

Hessenweg 38

DE-49809 Lingen (Ems)

0049 591 800 1634

Thomas Wihard / wihard@zechgmbh.de

Berechnet:

18.12.2018 11:19/3.0.654

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 26a - Zur Dasslage 7/Nordwest

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38	08:11	07:17	07:05		05:59	19:56 (WEA 17-3)	05:12	05:08	05:45		06:36	07:26	07:21	08:14
	16:23	17:12	18:04	20:00		20:52	20:15 (WEA 17-3)	21:39	21:54	21:22		20:19	19:08	17:01	16:19
2	08:38	08:10	07:15	07:03		05:57	19:56 (WEA 17-3)	05:12	05:09	05:47		06:38	07:28	07:23	08:15
	16:24	17:13	18:06	20:01		20:54	20:14 (WEA 17-3)	21:40	21:54	21:20		20:17	19:06	16:59	16:18
3	08:38	08:08	07:13	07:01		05:55	19:57 (WEA 17-3)	05:11	05:10	05:48		06:40	07:30	07:25	08:16
	16:25	17:15	18:08	20:03		20:55	20:13 (WEA 17-3)	21:41	21:53	21:18		20:14	19:04	16:57	16:17
4	08:38	08:07	07:11	06:58		05:53	19:57 (WEA 17-3)	05:10	05:11	05:50		06:41	07:31	07:27	08:18
	16:27	17:17	18:10	20:05		20:57	20:12 (WEA 17-3)	21:42	21:53	21:17		20:12	19:01	16:55	16:17
5	08:38	08:05	07:08	06:56		05:52	19:59 (WEA 17-3)	05:09	05:11	05:52		06:43	07:33	07:29	08:19
	16:28	17:19	18:12	20:07		20:59	20:12 (WEA 17-3)	21:43	21:52	21:15		20:10	18:59	16:53	16:16
6	08:38	08:03	07:06	06:54		05:50	20:01 (WEA 17-3)	05:08	05:12	05:53		06:45	07:35	07:30	08:21
	16:29	17:21	18:13	20:08		21:00	20:10 (WEA 17-3)	21:44	21:52	21:13		20:07	18:57	16:51	16:16
7	08:37	08:01	07:04	06:52		05:48		05:08	05:13	05:55	20:13 (WEA 17-3)	06:46	07:37	07:32	08:22
	16:30	17:23	18:15	20:10		21:02		21:45	21:51	21:11	5 20:18 (WEA 17-3)	20:05	18:54	16:50	16:15
8	08:37	08:00	07:02	06:49		05:46		05:07	05:14	05:56	20:09 (WEA 17-3)	06:48	07:38	07:34	08:23
	16:32	17:25	18:17	20:12		21:04		21:46	21:51	21:09	11 20:20 (WEA 17-3)	20:03	18:52	16:48	16:15
9	08:36	07:58	06:59	06:47		05:44		05:07	05:15	05:58	20:08 (WEA 17-3)	06:50	07:40	07:36	08:24
	16:33	17:27	18:19	20:14		21:05		21:47	21:50	21:08	14 20:22 (WEA 17-3)	20:00	18:50	16:46	16:14
10	08:36	07:56	06:57	06:45		05:42		05:06	05:16	06:00	20:07 (WEA 17-3)	06:51	07:42	07:38	08:26
	16:34	17:29	18:21	20:15		21:07		21:48	21:49	21:06	15 20:22 (WEA 17-3)	19:58	18:47	16:45	16:14
11	08:35	07:54	06:55	06:42		05:41		05:06	05:17	06:01	20:06 (WEA 17-3)	06:53	07:44	07:40	08:27
	16:36	17:30	18:23	20:17		21:09		21:49	21:48	21:04	17 20:23 (WEA 17-3)	19:56	18:45	16:43	16:14
12	08:34	07:52	06:52	06:40		05:39		05:05	05:18	06:03	20:05 (WEA 17-3)	06:55	07:45	07:41	08:28
	16:37	17:32	18:24	20:19		21:10		21:50	21:48	21:02	18 20:23 (WEA 17-3)	19:53	18:43	16:41	16:14
13	08:34	07:50	06:50	06:38		05:37		05:05	05:19	06:05	20:05 (WEA 17-3)	06:56	07:47	07:43	08:29
	16:39	17:34	18:26	20:21		21:12		21:50	21:47	21:00	19 20:24 (WEA 17-3)	19:51	18:41	16:40	16:14
14	08:33	07:49	06:48	06:36		05:36		05:05	05:20	06:06	20:04 (WEA 17-3)	06:58	07:49	07:45	08:30
	16:40	17:36	18:28	20:22		21:13		21:51	21:46	20:58	19 20:23 (WEA 17-3)	19:49	18:38	16:38	16:14
15	08:32	07:47	06:45	06:33		05:34		05:05	05:22	06:08	20:04 (WEA 17-3)	07:00	07:51	07:47	08:31
	16:42	17:38	18:30	20:24		21:15		21:51	21:45	20:56	19 20:23 (WEA 17-3)	19:46	18:36	16:37	16:14
16	08:31	07:45	06:43	06:31		05:32		05:04	05:23	06:10	20:03 (WEA 17-3)	07:01	07:52	07:49	08:32
	16:43	17:40	18:31	20:26		21:17		21:52	21:44	20:54	20 20:23 (WEA 17-3)	19:44	18:34	16:35	16:14
17	08:30	07:43	06:41	06:29		05:31		05:04	05:24	06:11	20:04 (WEA 17-3)	07:03	07:54	07:50	08:32
	16:45	17:42	18:33	20:28		21:18		21:53	21:43	20:52	19 20:23 (WEA 17-3)	19:41	18:32	16:34	16:14
18	08:29	07:41	06:38	06:27		05:29		05:04	05:25	06:13	20:05 (WEA 17-3)	07:05	07:56	07:52	08:33
	16:47	17:44	18:35	20:29		21:20		21:53	21:42	20:50	17 20:22 (WEA 17-3)	19:39	18:29	16:33	16:14
19	08:28	07:39	06:36	06:24		05:28		05:04	05:27	06:15	20:05 (WEA 17-3)	07:06	07:58	07:54	08:34
	16:48	17:46	18:37	20:31		21:21		21:53	21:41	20:48	16 20:21 (WEA 17-3)	19:37	18:27	16:31	16:14
20	08:27	07:37	06:34	06:22		05:27		05:04	05:28	06:16	20:06 (WEA 17-3)	07:08	08:00	07:56	08:35
	16:50	17:48	18:39	20:33		21:23		21:54	21:39	20:45	13 20:19 (WEA 17-3)	19:34	18:25	16:30	16:15
21	08:26	07:34	06:31	06:20		05:25		05:04	05:29	06:18	20:07 (WEA 17-3)	07:10	08:01	07:57	08:35
	16:52	17:49	18:40	20:34		21:24		21:54	21:38	20:43	10 20:17 (WEA 17-3)	19:32	18:23	16:29	16:15
22	08:25	07:32	06:29	06:18	20:05 (WEA 17-3)	05:24		05:05	05:31	06:20	20:10 (WEA 17-3)	07:11	08:03	07:59	08:36
	16:53	17:51	18:42	20:36	5 20:10 (WEA 17-3)	21:26		21:54	21:37	20:41	4 20:14 (WEA 17-3)	19:30	18:21	16:27	16:15
23	08:24	07:30	06:27	06:16	20:02 (WEA 17-3)	05:22		05:05	05:32	06:21		07:13	08:05	08:01	08:36
	16:55	17:53	18:44	20:38	11 20:13 (WEA 17-3)	21:27		21:54	21:35	20:39		19:27	18:19	16:26	16:16
24	08:23	07:28	06:24	06:14	20:00 (WEA 17-3)	05:21		05:05	05:33	06:23		07:15	08:07	08:02	08:37
	16:57	17:55	18:46	20:40	14 20:14 (WEA 17-3)	21:29		21:55	21:34	20:37		19:25	18:17	16:25	16:17
25	08:21	07:26	07:22	06:12	19:59 (WEA 17-3)	05:20		05:05	05:35	06:25		07:16	08:09	08:04	08:37
	16:59	17:57	19:47	20:41	16 20:15 (WEA 17-3)	21:30		21:55	21:33	20:35		19:22	18:15	16:24	16:17
26	08:20	07:24	07:20	06:09	19:58 (WEA 17-3)	05:19		05:06	05:36	06:26		07:18	08:10	08:06	08:38
	17:00	17:59	19:49	20:43	18 20:16 (WEA 17-3)	21:31		21:55	21:31	20:32		19:20	18:13	16:23	16:18
27	08:19	07:22	07:17	06:07	19:57 (WEA 17-3)	05:18		05:06	05:38	06:28		07:20	08:12	08:07	08:38
	17:02	18:01	19:51	20:45	19 20:16 (WEA 17-3)	21:33		21:55	21:30	20:30		19:18	18:11	16:22	16:18
28	08:17	07:19	07:15	06:05	19:57 (WEA 17-3)	05:16		05:07	05:39	06:30		07:21	07:14	08:09	08:38
	17:04	18:02	19:53	20:47	19 20:16 (WEA 17-3)	21:34		21:55	21:28	20:28		19:15	17:08	16:21	16:19
29	08:16		07:13	06:03	19:56 (WEA 17-3)	05:15		05:07	05:41	06:31		07:23	07:16	08:11	08:38
	17:06		19:54	20:48	20 20:16 (WEA 17-3)	05:14		21:54	21:27	20:26		19:13	17:06	16:20	16:19
30	08:15		07:10	06:01	19:56 (WEA 17-3)	05:14		05:08	05:42	06:33		07:25	07:18	08:12	08:38
	17:08		19:56	20:50	20 20:16 (WEA 17-3)	21:37		21:54	21:25	20:23		19:11	17:05	16:19	16:21
31	08:13		07:08			05:13			05:44	06:35			07:19		08:38
	17:10		19:58			21:38			21:23	20:21			17:03		16:22
Sonnenscheinstunden	256	275	366	416		487		502	505	456		382	332	265	241
astr.max.mögl.Beschattung				142		90				236					

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 26b - Zur Dasslage 7/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38		09:22 (WEA 18-4)	08:11		07:17		07:58 (WEA 18-2)	07:05		05:59	05:12					
	16:23	50	10:32 (WEA 18-3)	17:12		18:04	34	08:32 (WEA 18-1)	20:00		20:52	21:39					
2	08:38		09:22 (WEA 18-4)	08:10		07:15		07:58 (WEA 18-2)	07:03		05:57	05:12					
	16:24	52	10:33 (WEA 18-3)	17:13		18:06	34	08:32 (WEA 18-1)	20:01		20:54	21:40					
3	08:38		09:21 (WEA 18-4)	08:08		07:13		07:57 (WEA 18-2)	07:01		05:55	05:11					
	16:25	52	10:32 (WEA 18-3)	17:15		18:08	35	08:32 (WEA 18-1)	20:03		20:55	21:41					
4	08:38		09:22 (WEA 18-4)	08:07		07:11		07:58 (WEA 18-2)	06:58		05:53	05:10					
	16:27	52	10:33 (WEA 18-3)	17:17		18:10	34	08:32 (WEA 18-1)	20:05		20:57	21:42					
5	08:38		09:22 (WEA 18-4)	08:05		07:08		07:59 (WEA 18-2)	06:56		05:52	05:09					
	16:28	53	10:34 (WEA 18-3)	17:19		18:12	33	08:32 (WEA 18-1)	20:07		20:59	21:43					
6	08:37		09:22 (WEA 18-4)	08:03		07:06		08:00 (WEA 18-1)	06:54		05:50	05:08					
	16:29	54	10:34 (WEA 18-3)	17:21		18:13	32	08:32 (WEA 18-1)	20:08		21:00	21:44					
7	08:37		09:22 (WEA 18-4)	08:01		07:04		08:00 (WEA 18-1)	06:52		05:48	05:08					
	16:30	55	10:35 (WEA 18-3)	17:23		18:15	31	08:31 (WEA 18-1)	20:10		21:02	21:45					
8	08:37		09:22 (WEA 18-4)	08:00		07:02		08:00 (WEA 18-1)	06:49		05:46	05:07					
	16:32	55	10:35 (WEA 18-3)	17:25		18:17	30	08:30 (WEA 18-1)	20:12		21:04	21:46					
9	08:36		09:22 (WEA 18-4)	07:58		06:59		08:01 (WEA 18-1)	06:47		05:44	05:07					
	16:33	56	10:35 (WEA 18-3)	17:27		18:19	28	08:29 (WEA 18-1)	20:14		21:05	21:47					
10	08:36		09:23 (WEA 18-4)	07:56		06:57		08:01 (WEA 18-1)	06:45		05:42	05:06					
	16:34	55	10:35 (WEA 18-3)	17:29		18:21	27	08:28 (WEA 18-1)	20:15		21:07	21:48					
11	08:35		09:22 (WEA 18-4)	07:54		06:55		08:02 (WEA 18-1)	06:42		05:41	05:06					
	16:36	56	10:35 (WEA 18-3)	17:30		18:23	24	08:26 (WEA 18-1)	20:17		21:09	21:49					
12	08:34		09:22 (WEA 18-4)	07:52		06:52		08:04 (WEA 18-1)	06:40		05:39	05:05					
	16:37	56	10:35 (WEA 18-3)	17:32		18:24	21	08:25 (WEA 18-1)	20:19		21:10	21:50					
13	08:34		09:22 (WEA 18-4)	07:50		06:50		08:05 (WEA 18-1)	06:38		05:37	05:05					
	16:39	56	10:35 (WEA 18-3)	17:34		18:26	17	08:22 (WEA 18-1)	20:21		21:12	21:50					
14	08:33		09:23 (WEA 18-4)	07:49		06:48		08:08 (WEA 18-1)	06:36		05:36	05:05					
	16:40	55	10:35 (WEA 18-3)	17:36		18:28	11	08:19 (WEA 18-1)	20:22		21:13	21:51					
15	08:32		09:23 (WEA 18-4)	07:47		06:45			06:33		05:34	05:05					
	16:42	55	10:35 (WEA 18-3)	17:38		18:30			20:24		21:15	21:51					
16	08:31		09:23 (WEA 18-4)	07:45		06:43			06:31		05:32	05:04					
	16:43	54	10:35 (WEA 18-3)	17:40		18:31			20:26		21:17	21:52					
17	08:30		09:23 (WEA 18-4)	07:43		06:41			06:29		05:31	05:04					
	16:45	54	10:35 (WEA 18-3)	17:42		18:33			20:28		21:18	21:53					
18	08:29		09:24 (WEA 18-4)	07:41		06:38			06:27		05:29	05:04					
	16:47	52	10:35 (WEA 18-3)	17:44		18:35			20:29		21:20	21:53					
19	08:28		09:24 (WEA 18-4)	07:39		06:36			06:24		05:28	05:04					
	16:48	51	10:34 (WEA 18-3)	17:46		18:37			20:31		21:21	21:53					
20	08:27		09:24 (WEA 18-4)	07:37		06:34			06:22		05:27	05:04					
	16:50	48	10:33 (WEA 18-3)	17:48		18:39			20:33		21:23	21:54					
21	08:26		09:25 (WEA 18-4)	07:34		06:31			06:20		05:25	05:04					
	16:52	44	10:32 (WEA 18-3)	17:49	6	08:14 (WEA 18-2)			20:34		21:24	21:54					
22	08:25		09:26 (WEA 18-4)	07:32		06:29			06:18		05:24	05:05					
	16:53	41	10:31 (WEA 18-3)	17:51	14	08:19 (WEA 18-1)			20:36		21:26	21:54					
23	08:24		09:26 (WEA 18-4)	07:30		06:27			06:16		05:22	05:05					
	16:55	37	10:29 (WEA 18-3)	17:53	22	08:25 (WEA 18-1)			20:38		21:27	21:54					
24	08:23		09:27 (WEA 18-4)	07:28		06:24			06:14		05:21	05:05					
	16:57	28	10:26 (WEA 18-3)	17:55	26	08:26 (WEA 18-1)			20:40		21:29	21:55					
25	08:21		09:28 (WEA 18-4)	07:26		07:22			06:12		05:20	05:05					
	16:59	22	09:50 (WEA 18-4)	17:57	28	08:28 (WEA 18-1)			20:41		21:30	21:55					
26	08:20		09:29 (WEA 18-4)	07:24		07:20			06:09		05:19	05:06					
	17:00	20	09:49 (WEA 18-4)	17:59	31	08:30 (WEA 18-1)			20:43		21:31	21:55					
27	08:19		09:30 (WEA 18-4)	07:22		07:17			06:07		05:18	05:06					
	17:02	19	09:49 (WEA 18-4)	18:01	32	08:31 (WEA 18-1)			20:45		21:33	21:55					
28	08:17		09:31 (WEA 18-4)	07:19		07:15			06:05		05:16	05:07					
	17:04	17	09:48 (WEA 18-4)	18:02	34	08:31 (WEA 18-1)			20:47		21:34	21:55					
29	08:16		09:33 (WEA 18-4)			07:13			06:03		05:15	05:07					
	17:06	13	09:46 (WEA 18-4)			19:54			20:48		21:35	21:54					
30	08:15		09:36 (WEA 18-4)			07:10			06:01		05:14	05:08					
	17:08	8	09:44 (WEA 18-4)			19:56			20:50		21:37	21:54					
31	08:13					07:08					05:13						
	17:10					19:58					21:38						
Sonnenscheinstunden				256													
astr.max.mögl.Beschattung			1320		275	193		391		416		487		502			

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 26b - Zur Dasslage 7/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September		Oktober		November		Dezember	
1	05:08 21:54	05:45 21:22	06:36 20:19		07:26 19:08	08:46 (WEA 18-1) 09:01 (WEA 18-1)	07:21 17:01		08:14 16:19	09:04 (WEA 18-4) 10:17 (WEA 18-3)
2	05:09 21:54	05:47 21:20	06:38 20:17		07:28 19:06	08:42 (WEA 18-1) 09:02 (WEA 18-1)	07:23 16:59		08:15 16:18	09:05 (WEA 18-4) 10:17 (WEA 18-3)
3	05:10 21:53	05:48 21:18	06:40 20:14		07:30 19:04	08:41 (WEA 18-1) 09:04 (WEA 18-1)	07:25 16:57		08:16 16:17	09:06 (WEA 18-4) 10:19 (WEA 18-3)
4	05:11 21:53	05:50 21:17	06:41 20:12		07:31 19:01	08:39 (WEA 18-1) 09:05 (WEA 18-1)	07:27 16:55		08:18 16:17	09:06 (WEA 18-4) 10:19 (WEA 18-3)
5	05:11 21:52	05:52 21:15	06:43 20:10		07:33 18:59	08:38 (WEA 18-1) 09:06 (WEA 18-1)	07:29 16:53		08:19 16:16	09:07 (WEA 18-4) 10:20 (WEA 18-3)
6	05:12 21:52	05:53 21:13	06:45 20:07		07:35 18:57	08:37 (WEA 18-1) 09:06 (WEA 18-1)	07:30 16:51		08:21 16:16	09:07 (WEA 18-4) 10:20 (WEA 18-3)
7	05:13 21:51	05:55 21:11	06:46 20:05		07:37 18:54	08:36 (WEA 18-1) 09:06 (WEA 18-1)	07:32 16:50		08:22 16:15	09:08 (WEA 18-4) 10:20 (WEA 18-3)
8	05:14 21:51	05:56 21:09	06:48 20:03		07:38 18:52	08:35 (WEA 18-1) 09:07 (WEA 18-1)	07:34 16:48		08:23 16:15	09:09 (WEA 18-4) 10:21 (WEA 18-3)
9	05:15 21:50	05:58 21:08	06:50 20:00		07:40 18:50	08:34 (WEA 18-2) 09:07 (WEA 18-1)	07:36 16:46		08:24 16:14	09:10 (WEA 18-4) 10:21 (WEA 18-3)
10	05:16 21:49	06:00 21:06	06:51 19:58		07:42 18:47	08:33 (WEA 18-2) 09:07 (WEA 18-1)	07:38 16:45		08:26 16:14	09:11 (WEA 18-4) 10:22 (WEA 18-3)
11	05:17 21:48	06:01 21:04	06:53 19:56		07:44 18:45	08:32 (WEA 18-2) 09:06 (WEA 18-1)	07:40 16:43		08:27 16:14	09:11 (WEA 18-4) 10:22 (WEA 18-3)
12	05:18 21:48	06:03 21:02	06:55 19:53		07:45 18:43	08:31 (WEA 18-2) 09:05 (WEA 18-1)	07:41 16:41		08:28 16:14	09:13 (WEA 18-4) 10:23 (WEA 18-3)
13	05:19 21:47	06:05 21:00	06:56 19:51		07:47 18:41	08:31 (WEA 18-2) 09:05 (WEA 18-1)	07:43 16:40	09:07 (WEA 18-4)	08:29 16:14	09:14 (WEA 18-4) 10:24 (WEA 18-3)
14	05:20 21:46	06:06 20:58	06:58 19:49		07:49 18:38	08:31 (WEA 18-2) 09:04 (WEA 18-1)	07:45 16:38	9 09:16 (WEA 18-4)	08:30 16:14	09:15 (WEA 18-4) 10:24 (WEA 18-3)
15	05:22 21:45	06:08 20:56	07:00 19:46		07:51 18:36	08:31 (WEA 18-2) 09:04 (WEA 18-1)	07:47 16:37	14 09:19 (WEA 18-4)	08:31 16:14	09:15 (WEA 18-4) 10:24 (WEA 18-3)
16	05:23 21:44	06:10 20:54	07:01 19:44		07:52 18:34	08:31 (WEA 18-2) 09:03 (WEA 18-1)	07:49 16:35	17 09:20 (WEA 18-4)	08:32 16:14	09:16 (WEA 18-4) 10:25 (WEA 18-3)
17	05:24 21:43	06:11 20:52	07:03 19:41		07:54 18:32	08:30 (WEA 18-2) 09:00 (WEA 18-1)	07:50 16:34	19 09:21 (WEA 18-4)	08:32 16:14	09:16 (WEA 18-4) 10:25 (WEA 18-3)
18	05:25 21:42	06:13 20:50	07:05 19:39		07:56 18:29	08:31 (WEA 18-2) 08:59 (WEA 18-1)	07:52 16:33	20 09:22 (WEA 18-4)	08:33 16:14	09:17 (WEA 18-4) 10:25 (WEA 18-3)
19	05:27 21:41	06:15 20:48	07:06 19:37		07:58 18:27	08:32 (WEA 18-2) 08:57 (WEA 18-1)	07:54 16:31	22 09:01 (WEA 18-4)	08:34 16:14	09:18 (WEA 18-4) 10:26 (WEA 18-3)
20	05:28 21:39	06:16 20:45	07:08 19:34		08:00 18:25	08:34 (WEA 18-2) 08:54 (WEA 18-1)	07:56 16:30	29 09:01 (WEA 18-4)	08:35 16:15	09:18 (WEA 18-4) 10:26 (WEA 18-3)
21	05:29 21:38	06:18 20:43	07:10 19:32		08:01 18:23	08:36 (WEA 18-2) 08:47 (WEA 18-2)	07:57 16:29	37 09:04 (WEA 18-3)	08:35 16:15	09:19 (WEA 18-4) 10:27 (WEA 18-3)
22	05:31 21:37	06:20 20:41	07:11 19:30		08:03 18:21		07:59 16:27	41 09:01 (WEA 18-4)	08:36 16:15	09:20 (WEA 18-4) 10:28 (WEA 18-3)
23	05:32 21:35	06:21 20:39	07:13 19:27		08:05 18:19		08:01 16:26	44 09:01 (WEA 18-4)	08:36 16:16	09:20 (WEA 18-4) 10:28 (WEA 18-3)
24	05:33 21:34	06:23 20:37	07:15 19:25		08:07 18:17		08:02 16:25	48 09:10 (WEA 18-3)	08:37 16:17	09:20 (WEA 18-4) 10:28 (WEA 18-3)
25	05:35 21:33	06:25 20:35	07:16 19:22		08:09 18:15		08:04 16:24	50 09:11 (WEA 18-3)	08:37 16:17	09:21 (WEA 18-4) 10:29 (WEA 18-3)
26	05:36 21:31	06:26 20:32	07:18 19:20		08:10 18:13		08:06 16:23	52 09:01 (WEA 18-4)	08:38 16:18	09:21 (WEA 18-4) 10:29 (WEA 18-3)
27	05:38 21:30	06:28 20:30	07:20 19:18		08:12 18:11		08:07 16:22	54 09:02 (WEA 18-4)	08:38 16:18	09:21 (WEA 18-4) 10:30 (WEA 18-3)
28	05:39 21:28	06:30 20:28	07:21 19:15		07:14 17:08		08:09 16:21	55 09:14 (WEA 18-3)	08:38 16:19	09:21 (WEA 18-4) 10:30 (WEA 18-3)
29	05:41 21:27	06:31 20:26	07:23 19:13		07:16 17:06		08:10 16:20	55 09:03 (WEA 18-4)	08:38 16:20	09:21 (WEA 18-4) 10:30 (WEA 18-3)
30	05:42 21:25	06:33 20:23	07:25 19:11	08:50 (WEA 18-1) 08:56 (WEA 18-1)	07:18 17:05		08:12 16:19	55 09:04 (WEA 18-4)	08:38 16:21	09:22 (WEA 18-4) 10:31 (WEA 18-3)
31	05:44 21:23	06:35 20:21			07:19 17:03				08:38 16:22	09:22 (WEA 18-4) 10:31 (WEA 18-3)
Sonnenscheinstunden	505	456	382		332		265		241	
astr.max.mögl.Beschattung				6	584		675		1538	

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 27a - Zur Dasslage 7/Nordwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:38 16:23	08:11 17:12	07:17 18:04	07:05 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:54	05:12 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:48 21:18	06:40 20:14	07:30 19:04	07:25 16:57	08:16 16:17
4	08:38 16:27	08:07 17:17	07:11 18:10	06:58 20:05	05:53 20:57	05:10 21:42	05:11 21:53	05:50 21:17	06:41 20:12	07:31 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:37 16:29	08:03 17:21	07:06 18:13	06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:30 16:51	08:21 16:16
7	08:37 16:30	08:01 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:56 21:09	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:42 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:26 16:14
11	08:35 16:36	07:54 17:30	06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:48	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:34 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:41 16:41	08:28 16:14
13	08:34 16:39	07:50 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:13	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:51	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:31	06:31 20:26	05:32 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:50 16:34	08:32 16:14
18	08:29 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:29	07:52 16:33	08:33 16:14
19	08:28 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:27 21:41	06:15 20:48	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:34 17:49	06:31 18:40	06:20 20:34	05:25 21:24	05:04 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:15
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:54	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:02 16:25	08:37 16:17
25	08:21 16:59	07:26 17:57	07:22 19:47	06:12 20:41	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	08:20 17:00	07:24 17:59	07:20 19:49	06:09 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:07 16:22	08:38 16:19
28	08:17 17:04	07:19 18:02	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:08	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:06	08:10 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:23	06:35 20:21		07:19 17:03		08:38 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 27b - Zur Dasslage 8/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38 16:23	09:50 (WEA 18-3) 08:11 10:24 (WEA 18-3) 17:12	09:23 (WEA 18-4) 07:17 09:42 (WEA 18-4) 18:04	07:51 (WEA 18-2) 07:05 08:14 (WEA 18-1) 20:00	05:59 20:52	05:12 21:39
2	08:38 16:24	09:51 (WEA 18-3) 08:10 10:25 (WEA 18-3) 17:13	09:26 (WEA 18-4) 07:15 09:41 (WEA 18-4) 18:06	07:50 (WEA 18-2) 07:03 08:16 (WEA 18-1) 20:01	05:57 20:54	05:12 21:40
3	08:38 16:25	09:51 (WEA 18-3) 08:08 10:25 (WEA 18-3) 17:15	09:28 (WEA 18-4) 07:13 09:39 (WEA 18-4) 18:08	07:49 (WEA 18-2) 07:01 08:17 (WEA 18-1) 20:03	05:55 20:55	05:11 21:41
4	08:38 16:27	09:51 (WEA 18-3) 08:07 10:26 (WEA 18-3) 17:17	07:11 18:10	07:48 (WEA 18-2) 06:58 08:18 (WEA 18-1) 20:05	05:53 20:57	05:10 21:42
5	08:38 16:28	09:23 (WEA 18-4) 08:05 10:27 (WEA 18-3) 17:19	07:08 18:12	07:48 (WEA 18-2) 06:56 08:19 (WEA 18-1) 20:07	05:52 20:59	05:09 21:43
6	08:37 16:29	09:21 (WEA 18-4) 08:03 10:27 (WEA 18-3) 17:21	07:06 18:13	07:49 (WEA 18-2) 06:54 08:20 (WEA 18-1) 20:08	05:50 21:00	05:08 21:44
7	08:37 16:30	09:20 (WEA 18-4) 08:01 10:28 (WEA 18-3) 17:23	07:04 18:15	07:48 (WEA 18-2) 06:52 08:20 (WEA 18-1) 20:10	05:48 21:02	05:08 21:45
8	08:37 16:32	09:19 (WEA 18-4) 08:00 10:28 (WEA 18-3) 17:25	07:02 18:17	07:48 (WEA 18-1) 06:49 08:20 (WEA 18-1) 20:12	05:46 21:04	05:07 21:46
9	08:36 16:33	09:18 (WEA 18-4) 07:58 10:28 (WEA 18-3) 17:27	06:59 18:19	07:48 (WEA 18-1) 06:47 08:21 (WEA 18-1) 20:14	05:44 21:05	05:07 21:47
10	08:36 16:34	09:19 (WEA 18-4) 07:56 10:29 (WEA 18-3) 17:29	06:57 18:21	07:47 (WEA 18-1) 06:45 08:20 (WEA 18-1) 20:15	05:42 21:07	05:06 21:48
11	08:35 16:36	09:18 (WEA 18-4) 07:54 10:29 (WEA 18-3) 17:30	06:55 18:23	07:47 (WEA 18-1) 06:42 08:20 (WEA 18-1) 20:17	05:41 21:09	05:06 21:49
12	08:34 16:37	09:18 (WEA 18-4) 07:52 10:29 (WEA 18-3) 17:32	06:52 18:24	07:48 (WEA 18-1) 06:40 08:19 (WEA 18-1) 20:19	05:39 21:10	05:05 21:50
13	08:34 16:39	09:17 (WEA 18-4) 07:50 10:30 (WEA 18-3) 17:34	06:50 18:26	07:47 (WEA 18-1) 06:38 08:18 (WEA 18-1) 20:21	05:37 21:12	05:05 21:50
14	08:33 16:40	09:17 (WEA 18-4) 07:49 10:30 (WEA 18-3) 17:36	06:48 18:28	07:48 (WEA 18-1) 06:36 08:18 (WEA 18-1) 20:22	05:36 21:13	05:05 21:51
15	08:32 16:42	09:17 (WEA 18-4) 07:47 10:30 (WEA 18-3) 17:38	06:45 18:30	07:48 (WEA 18-1) 06:33 08:16 (WEA 18-1) 20:24	05:34 21:15	05:05 21:51
16	08:31 16:43	09:17 (WEA 18-4) 07:45 10:30 (WEA 18-3) 17:40	06:43 18:31	07:49 (WEA 18-1) 06:31 08:15 (WEA 18-1) 20:26	05:32 21:17	05:04 21:52
17	08:30 16:45	09:17 (WEA 18-4) 07:43 10:31 (WEA 18-3) 17:42	06:41 18:33	07:50 (WEA 18-1) 06:29 08:13 (WEA 18-1) 20:28	05:31 21:18	05:04 21:53
18	08:29 16:47	09:17 (WEA 18-4) 07:41 10:31 (WEA 18-3) 17:44	06:38 18:35	07:51 (WEA 18-1) 06:27 08:11 (WEA 18-1) 20:29	05:29 21:20	05:04 21:53
19	08:28 16:48	09:17 (WEA 18-4) 07:39 10:31 (WEA 18-3) 17:46	06:36 18:37	07:54 (WEA 18-1) 06:24 08:08 (WEA 18-1) 20:31	05:28 21:21	05:04 21:53
20	08:27 16:50	09:17 (WEA 18-4) 07:37 10:30 (WEA 18-3) 17:48	06:34 18:39	07:59 (WEA 18-1) 06:22 08:03 (WEA 18-1) 20:33	05:27 21:23	05:04 21:54
21	08:26 16:52	09:17 (WEA 18-4) 07:34 10:30 (WEA 18-3) 17:49	06:31 18:40	06:20 20:34	05:25 21:24	05:04 21:54
22	08:25 16:53	09:18 (WEA 18-4) 07:32 10:30 (WEA 18-3) 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54
23	08:24 16:55	09:17 (WEA 18-4) 07:30 10:29 (WEA 18-3) 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:54
24	08:23 16:57	09:18 (WEA 18-4) 07:28 10:29 (WEA 18-3) 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55
25	08:21 16:59	09:19 (WEA 18-4) 07:26 10:29 (WEA 18-3) 17:57	07:22 08:00 (WEA 18-2) 19:47	06:12 20:41	05:20 21:30	05:05 21:55
26	08:20 17:00	09:19 (WEA 18-4) 07:24 10:27 (WEA 18-3) 17:59	07:20 08:03 (WEA 18-2) 19:49	06:09 20:43	05:19 21:31	05:06 21:55
27	08:19 17:02	09:20 (WEA 18-4) 07:22 10:26 (WEA 18-3) 18:01	07:17 08:08 (WEA 18-2) 19:51	06:07 20:45	05:18 21:33	05:06 21:55
28	08:17 17:04	09:20 (WEA 18-4) 07:19 10:24 (WEA 18-3) 18:02	07:15 08:10 (WEA 18-2) 19:53	06:05 20:47	05:16 21:34	05:07 21:55
29	08:16 17:06	09:20 (WEA 18-4) 07:17 10:21 (WEA 18-3) 18:04	07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54
30	08:15 17:08	09:22 (WEA 18-4) 07:15 09:44 (WEA 18-4) 18:06	07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54
31	08:13 17:10	09:22 (WEA 18-4) 07:13 09:43 (WEA 18-4) 18:08	07:08 19:58		05:13 21:38	
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung	1463	95	539			

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 27b - Zur Dasslage 8/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September		Oktober		November		Dezember		
1	05:08 21:54	05:45 21:22	06:36 20:19		07:26 19:08	31	08:27 (WEA 18-1) 08:58 (WEA 18-1)	07:21 17:01	08:14 16:19	55	09:00 (WEA 18-4) 10:12 (WEA 18-3)
2	05:09 21:54	05:47 21:20	06:38 20:17		07:28 19:06	31	08:26 (WEA 18-1) 08:57 (WEA 18-1)	07:23 16:59	08:15 16:18	53	09:00 (WEA 18-4) 10:11 (WEA 18-3)
3	05:10 21:53	05:48 21:18	06:40 20:14		07:30 19:04	32	08:25 (WEA 18-1) 08:57 (WEA 18-1)	07:25 16:57	08:16 16:17	52	09:02 (WEA 18-4) 10:12 (WEA 18-3)
4	05:11 21:53	05:50 21:17	06:41 20:12		07:31 19:01	33	08:25 (WEA 18-1) 08:58 (WEA 18-1)	07:27 16:55	08:18 16:17	51	09:02 (WEA 18-4) 10:12 (WEA 18-3)
5	05:11 21:52	05:52 21:15	06:43 20:10		07:33 18:59	32	08:25 (WEA 18-1) 08:57 (WEA 18-1)	07:29 16:53	08:19 16:16	49	09:04 (WEA 18-4) 10:13 (WEA 18-3)
6	05:12 21:52	05:53 21:13	06:45 20:07		07:35 18:57	32	08:24 (WEA 18-1) 08:56 (WEA 18-1)	07:30 16:51	08:21 16:16	46	09:05 (WEA 18-4) 10:13 (WEA 18-3)
7	05:13 21:51	05:55 21:11	06:46 20:05		07:37 18:54	32	08:24 (WEA 18-1) 08:56 (WEA 18-1)	07:32 16:50	08:22 16:15	43	09:07 (WEA 18-4) 10:13 (WEA 18-3)
8	05:14 21:51	05:56 21:09	06:48 20:03		07:38 18:52	31	08:24 (WEA 18-2) 08:55 (WEA 18-1)	07:34 16:48	09:03 (WEA 18-4) 09:05 (WEA 18-4)	39	08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:00		07:40 18:50	31	08:24 (WEA 18-2) 08:55 (WEA 18-1)	07:36 16:46	08:58 (WEA 18-4) 09:10 (WEA 18-4)	35	08:24 16:14
10	05:16 21:49	06:00 21:06	06:51 19:58		07:42 18:47	31	08:23 (WEA 18-2) 08:54 (WEA 18-1)	07:38 16:45	08:56 (WEA 18-4) 09:12 (WEA 18-4)	34	08:26 16:14
11	05:17 21:48	06:01 21:04	06:53 19:56		07:44 18:45	29	08:23 (WEA 18-2) 08:52 (WEA 18-1)	07:40 16:43	08:55 (WEA 18-4) 09:14 (WEA 18-4)	34	08:27 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53		07:45 18:43	27	08:23 (WEA 18-2) 08:50 (WEA 18-1)	07:41 16:41	08:54 (WEA 18-4) 09:15 (WEA 18-4)	34	08:28 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51		07:47 18:41	25	08:23 (WEA 18-2) 08:48 (WEA 18-1)	07:43 16:40	08:54 (WEA 18-4) 09:16 (WEA 18-4)	34	08:29 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49		07:49 18:38	22	08:24 (WEA 18-2) 08:46 (WEA 18-1)	07:45 16:38	08:53 (WEA 18-4) 09:54 (WEA 18-3)	34	08:30 16:14
15	05:22 21:45	06:08 20:56	07:00 19:46		07:51 18:36	18	08:25 (WEA 18-2) 08:43 (WEA 18-2)	07:47 16:37	08:52 (WEA 18-4) 09:56 (WEA 18-3)	33	08:31 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44		07:52 18:34	15	08:25 (WEA 18-2) 08:42 (WEA 18-2)	07:49 16:35	08:52 (WEA 18-4) 09:58 (WEA 18-3)	33	08:32 16:14
17	05:24 21:43	06:11 20:52	07:03 19:41		07:54 18:32	10	08:26 (WEA 18-2) 08:38 (WEA 18-2)	07:50 16:34	08:52 (WEA 18-4) 10:00 (WEA 18-3)	34	08:32 16:14
18	05:25 21:42	06:13 20:50	07:05 19:39		07:56 18:29		07:52 16:33	08:52 (WEA 18-4) 10:02 (WEA 18-3)	08:33 16:14	33	08:33 16:14
19	05:27 21:41	06:15 20:48	07:06 19:37		07:58 18:27		07:54 16:31	08:52 (WEA 18-4) 10:03 (WEA 18-3)	08:34 16:14	33	08:34 16:14
20	05:28 21:39	06:16 20:45	07:08 19:34		08:00 18:25		07:56 16:30	08:52 (WEA 18-4) 10:04 (WEA 18-3)	08:35 16:15	33	08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:32		08:01 18:23		07:57 16:29	08:53 (WEA 18-4) 10:05 (WEA 18-3)	08:35 16:15	33	08:35 16:15
22	05:31 21:37	06:20 20:41	07:11 19:30		08:03 18:21		07:59 16:27	08:53 (WEA 18-4) 10:06 (WEA 18-3)	08:36 16:15	32	08:36 16:15
23	05:32 21:35	06:21 20:39	07:13 19:27		08:05 18:19		08:01 16:26	08:54 (WEA 18-4) 10:07 (WEA 18-3)	08:36 16:16	32	08:36 16:16
24	05:33 21:34	06:23 20:37	07:15 19:25		08:07 18:17		08:02 16:25	08:54 (WEA 18-4) 10:08 (WEA 18-3)	08:37 16:17	33	08:37 16:17
25	05:35 21:33	06:25 20:35	07:16 19:22	13	08:09 18:15		08:04 16:24	08:54 (WEA 18-4) 10:08 (WEA 18-3)	08:37 16:17	33	08:37 16:17
26	05:36 21:31	06:26 20:32	07:18 19:20	19	08:10 18:13		08:06 16:23	08:55 (WEA 18-4) 10:09 (WEA 18-3)	08:38 16:18	33	08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:18	22	08:12 18:11		08:07 16:22	08:56 (WEA 18-4) 10:09 (WEA 18-3)	08:38 16:19	33	08:38 16:19
28	05:39 21:28	06:30 20:28	07:21 19:15	25	08:14 17:08		08:09 16:21	08:57 (WEA 18-4) 10:10 (WEA 18-3)	08:38 16:19	33	08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:13	27	08:16 17:06		08:10 16:20	08:57 (WEA 18-4) 10:10 (WEA 18-3)	08:38 16:20	33	08:38 16:20
30	05:42 21:25	06:33 20:23	07:25 19:11	29	08:18 17:05		08:12 16:19	08:58 (WEA 18-4) 10:11 (WEA 18-3)	08:38 16:21	34	08:38 16:21
31	05:44 21:23	06:35 20:21			07:19 17:03				08:38 16:22	33	08:38 16:22
Sonnenscheinstunden	505	456	382		332		265		241		1154
astr.max.mögl.Beschattung			135		462		993				

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

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

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 28a - Hörsten 6/Südost

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38 16:23 59	09:37 (WEA 18-2) 10:52 (WEA 18-1) 17:11	08:11 17:11 18:04	07:17 18:04 20:00	05:59 20:52 21:39	05:12 21:39 21:51
2	08:38 16:24 60	09:38 (WEA 18-2) 10:53 (WEA 18-1) 17:13	08:10 17:13 18:06	07:15 18:06 20:01	05:57 20:53 21:40	05:11 21:40 21:51
3	08:38 16:25 59	09:38 (WEA 18-2) 10:52 (WEA 18-1) 17:15	08:08 17:15 18:08	07:13 18:08 20:03	05:55 20:55 21:41	05:11 21:41 21:51
4	08:38 16:26 60	09:38 (WEA 18-2) 10:53 (WEA 18-1) 17:17	08:07 17:17 18:10	07:11 18:10 20:05	05:53 20:57 21:42	05:10 21:42 21:51
5	08:38 16:28 60	09:39 (WEA 18-2) 10:54 (WEA 18-1) 17:19	08:05 17:19 18:12	07:08 18:12 20:07	05:52 20:59 21:43	05:09 21:43 21:51
6	08:37 16:29 58	09:39 (WEA 18-2) 10:53 (WEA 18-1) 17:21	08:03 17:21 18:13	07:06 18:13 20:08	05:50 21:00 21:44	05:08 21:44 21:51
7	08:37 16:30 58	09:40 (WEA 18-2) 10:54 (WEA 18-1) 17:23	08:01 17:23 18:15	07:04 18:15 20:10	05:48 21:02 21:45	05:08 21:45 21:51
8	08:37 16:31 58	09:40 (WEA 18-2) 10:54 (WEA 18-1) 17:25	08:00 17:25 18:17	07:02 18:17 20:12	05:46 21:04 21:46	05:07 21:46 21:51
9	08:36 16:33 56	09:40 (WEA 18-2) 10:53 (WEA 18-1) 17:27	07:58 17:27 18:19	06:59 18:19 20:14	05:44 21:05 21:47	05:07 21:47 21:51
10	08:36 16:34 55	09:42 (WEA 18-2) 10:54 (WEA 18-1) 17:29	07:56 17:29 18:21	06:57 18:21 20:15	05:42 21:07 21:48	05:06 21:48 21:51
11	08:35 16:36 53	09:42 (WEA 18-2) 10:53 (WEA 18-1) 17:30	07:54 17:30 18:22	06:55 18:22 20:17	05:41 21:09 21:49	05:06 21:49 21:51
12	08:34 16:37 52	09:42 (WEA 18-2) 10:53 (WEA 18-1) 17:32	07:52 17:32 18:24	06:52 18:24 20:19	05:39 21:10 21:50	05:05 21:50 21:51
13	08:34 16:39 50	09:43 (WEA 18-2) 10:53 (WEA 18-1) 17:34	07:50 17:34 18:26	06:50 18:26 20:21	05:37 21:12 21:50	05:05 21:50 21:51
14	08:33 16:40 48	09:43 (WEA 18-2) 10:52 (WEA 18-1) 17:36	07:49 17:36 18:28	06:48 18:28 20:22	05:36 21:13 21:51	05:05 21:51 21:51
15	08:32 16:42 45	09:44 (WEA 18-2) 10:51 (WEA 18-1) 17:38	07:47 17:38 18:30	06:45 18:30 20:24	05:34 21:15 21:51	05:05 21:51 21:51
16	08:31 16:43 41	09:45 (WEA 18-2) 10:50 (WEA 18-1) 17:40	07:45 17:40 18:31	06:43 18:31 20:26	05:32 21:17 21:52	05:04 21:52 21:51
17	08:30 16:45 37	09:46 (WEA 18-2) 10:49 (WEA 18-1) 17:42	07:43 17:42 18:33	06:41 18:33 20:28	05:31 21:18 21:53	05:04 21:53 21:51
18	08:29 16:47 31	09:47 (WEA 18-2) 10:47 (WEA 18-1) 17:44	07:41 17:44 18:35	06:38 18:35 20:29	05:29 21:20 21:53	05:04 21:53 21:51
19	08:28 16:48 20	09:48 (WEA 18-2) 10:08 (WEA 18-2) 17:46	07:39 17:46 18:37	06:36 18:37 20:31	05:28 21:21 21:53	05:04 21:53 21:51
20	08:27 16:50 19	09:48 (WEA 18-2) 10:07 (WEA 18-2) 17:48	07:37 17:48 18:39	06:34 18:39 20:33	05:26 21:23 21:54	05:04 21:54 21:51
21	08:26 16:52 16	09:50 (WEA 18-2) 10:06 (WEA 18-2) 17:49	07:34 17:49 18:40	06:31 18:40 20:34	05:25 21:24 21:54	05:04 21:54 21:51
22	08:25 16:53 13	09:52 (WEA 18-2) 10:05 (WEA 18-2) 17:51	07:32 17:51 18:42	06:29 18:42 20:36	05:24 21:26 21:54	05:05 21:54 21:51
23	08:24 16:55 9	09:54 (WEA 18-2) 10:03 (WEA 18-2) 17:53	07:30 17:53 18:44	06:27 18:44 20:38	05:22 21:27 21:54	05:05 21:54 21:51
24	08:23 16:57		07:28 17:55	06:24 18:46	05:21 21:29	05:05 21:55
25	08:21 16:59		07:26 17:57	06:12 19:47	05:20 21:30	05:05 21:55
26	08:20 17:00		07:24 17:59	06:09 19:49	05:19 21:31	05:06 21:55
27	08:19 17:02		07:22 18:01	06:07 19:51	05:17 21:33	05:06 21:55
28	08:17 17:04		07:19 18:02	06:05 19:53	05:16 21:34	05:07 21:55
29	08:16 17:06			06:03 19:54	05:15 21:35	05:07 21:54
30	08:15 17:08			06:01 19:56	05:14 21:37	05:08 21:54
31	08:13 17:10				05:13 21:38	
Sonnenscheinstunden	256		275	416	487	502
astr.max.mögl.Beschattung	1017					

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

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

SHADOW - Kalender**Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 28a - Hörsten 6/Südost**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	05:10 21:53	05:48 21:18	06:40 20:14	07:30 19:04	07:25 16:57	08:16 16:17
4	05:10 21:53	05:50 21:17	06:41 20:12	07:31 19:01	07:27 16:55	08:18 16:17
5	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:30 16:51	08:21 16:16
7	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	05:14 21:51	05:56 21:09	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:26 16:14
11	05:17 21:48	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:41 16:41	08:28 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	05:21 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:50 16:34	08:32 16:14
18	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:29	07:52 16:32	08:33 16:14
19	05:26 21:40	06:15 20:48	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:15
23	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:02 16:25	08:37 16:16
25	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:12	08:06 16:23	08:38 16:18
27	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:10	08:07 16:22	08:38 16:18
28	05:39 21:28	06:30 20:28	07:21 19:15	08:14 17:08	08:09 16:21	08:38 16:19
29	05:41 21:27	06:31 20:26	07:23 19:13	08:16 17:06	08:10 16:20	08:38 16:20
30	05:42 21:25	06:33 20:23	07:25 19:11	08:18 17:04	08:12 16:19	08:38 16:21
31	05:44 21:23	06:35 20:21		07:19 17:03		08:38 16:22
Sonnenscheinstunden	505	456	382	332	265	241
astr.max.mögl.Beschattung					328	1836

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 28b - Hörsten 6/West

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:38 16:23	08:11 17:11	07:17 18:04	07:05 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:53	05:11 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:48 21:18	06:40 20:14	07:30 19:04	07:25 16:57	08:16 16:17
4	08:38 16:26	08:07 17:17	07:11 18:10	06:58 20:05	05:53 20:57	05:10 21:42	05:10 21:53	05:50 21:17	06:41 20:12	07:31 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:37 16:29	08:03 17:21	07:06 18:13	06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:30 16:51	08:21 16:16
7	08:37 16:30	08:01 17:23	07:04 18:15	06:51 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:31	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:56 21:09	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:42 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:26 16:14
11	08:35 16:36	07:54 17:30	06:55 18:22	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:48	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:34 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:41 16:41	08:28 16:14
13	08:34 16:39	07:50 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:13	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:51	05:21 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:31	06:31 20:26	05:32 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:50 16:34	08:32 16:14
18	08:29 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:29	07:52 16:32	08:33 16:14
19	08:28 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:26 21:40	06:15 20:48	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:26 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:34 17:49	06:31 18:40	06:20 20:34	05:25 21:24	05:04 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:15
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:54	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:02 16:25	08:37 16:16
25	08:21 16:59	07:26 17:57	07:22 19:47	06:12 20:41	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	08:20 17:00	07:24 17:59	07:20 19:49	06:09 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:12	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:17 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:10	08:07 16:22	08:38 16:18
28	08:17 17:04	07:19 18:02	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:08	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:06	08:10 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:04	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:23	06:35 20:21		07:19 17:03		08:38 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 29a - Zur Dasslage 6/Nordost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:38 16:23	08:11 17:12	07:17 18:04	07:05 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:53	05:11 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:48 21:18	06:40 20:14	07:30 19:04	07:25 16:57	08:16 16:17
4	08:38 16:26	08:07 17:17	07:11 18:10	06:58 20:05	05:53 20:57	05:10 21:42	05:11 21:53	05:50 21:17	06:41 20:12	07:31 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:37 16:29	08:03 17:21	07:06 18:13	06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:30 16:51	08:21 16:16
7	08:37 16:30	08:01 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:31	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:56 21:09	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:42 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:25 16:14
11	08:35 16:36	07:54 17:30	06:55 18:22	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:48	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:34 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:41 16:41	08:28 16:14
13	08:34 16:39	07:50 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:13	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:51	05:21 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:31	06:31 20:26	05:32 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:50 16:34	08:32 16:14
18	08:29 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:29	07:52 16:33	08:33 16:14
19	08:28 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:27 21:40	06:15 20:47	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:26 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:34 17:49	06:31 18:40	06:20 20:34	05:25 21:24	05:04 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:15
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:54	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:02 16:25	08:37 16:16
25	08:21 16:59	07:26 17:57	07:22 19:47	06:12 20:41	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	08:20 17:00	07:24 17:59	07:20 19:49	06:09 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:10	08:07 16:22	08:38 16:18
28	08:17 17:04	07:19 18:02	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:08	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:06	08:10 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:23	06:35 20:21		07:19 17:03		08:38 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

SHADOW - Kalender**Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 29b - Zur Dasslage 6/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38 16:23	09:51 (WEA 18-4) 11:40 (WEA 18-3)	08:11 17:12	07:17 18:04	05:59 20:52	05:12 21:39
2	08:38 16:24	09:52 (WEA 18-4) 11:41 (WEA 18-3)	08:10 17:13	07:15 18:06	05:57 20:53	05:11 21:40
3	08:38 16:25	09:52 (WEA 18-4) 11:40 (WEA 18-3)	08:08 17:15	07:13 18:08	05:55 20:53	05:11 21:41
4	08:38 16:26	09:52 (WEA 18-4) 11:41 (WEA 18-3)	08:07 17:17	07:11 18:10	05:53 20:57	05:10 21:42
5	08:38 16:28	09:53 (WEA 18-4) 11:42 (WEA 18-3)	08:05 17:19	07:08 18:12	05:52 20:59	05:09 21:43
6	08:37 16:29	09:53 (WEA 18-4) 11:41 (WEA 18-3)	08:03 17:21	07:06 18:13	05:50 21:00	05:08 21:44
7	08:37 16:30	09:54 (WEA 18-4) 11:42 (WEA 18-3)	08:01 17:23	07:04 18:15	05:48 21:02	05:08 21:45
8	08:37 16:31	09:54 (WEA 18-4) 11:42 (WEA 18-3)	08:00 17:25	07:02 18:17	05:46 21:04	05:07 21:46
9	08:36 16:33	09:54 (WEA 18-4) 11:41 (WEA 18-3)	07:58 17:27	06:59 18:19	05:44 21:05	05:07 21:47
10	08:36 16:34	09:55 (WEA 18-4) 11:42 (WEA 18-3)	07:56 17:29	06:57 18:21	05:42 21:07	05:06 21:48
11	08:35 16:36	09:56 (WEA 18-4) 11:42 (WEA 18-3)	07:54 17:30	06:55 18:22	05:41 21:09	05:06 21:49
12	08:34 16:37	09:56 (WEA 18-4) 11:41 (WEA 18-3)	07:52 17:32	06:52 18:24	05:39 21:10	05:05 21:50
13	08:34 16:39	09:56 (WEA 18-4) 11:41 (WEA 18-3)	07:50 17:34	06:50 18:26	05:37 21:12	05:05 21:50
14	08:33 16:40	09:57 (WEA 18-4) 11:40 (WEA 18-3)	07:49 17:36	06:48 18:28	05:36 21:13	05:05 21:51
15	08:32 16:42	09:58 (WEA 18-4) 11:40 (WEA 18-3)	07:47 17:38	06:45 18:30	05:34 21:15	05:05 21:51
16	08:31 16:43	09:58 (WEA 18-4) 11:39 (WEA 18-3)	07:45 17:40	06:43 18:31	05:32 21:17	05:04 21:52
17	08:30 16:45	09:59 (WEA 18-4) 11:38 (WEA 18-3)	07:43 17:42	06:41 18:33	05:31 21:18	05:04 21:53
18	08:29 16:47	10:00 (WEA 18-4) 11:37 (WEA 18-3)	07:41 17:44	06:38 18:35	05:29 21:20	05:04 21:53
19	08:28 16:48	10:01 (WEA 18-4) 11:36 (WEA 18-3)	07:39 17:46	06:36 18:37	05:28 21:21	05:04 21:53
20	08:27 16:50	10:01 (WEA 18-4) 11:33 (WEA 18-3)	07:37 17:48	06:34 18:39	05:26 21:23	05:04 21:54
21	08:26 16:52	10:03 (WEA 18-4) 10:28 (WEA 18-4)	07:34 17:49	06:31 18:40	05:25 21:24	05:04 21:54
22	08:25 16:53	10:04 (WEA 18-4) 10:27 (WEA 18-4)	07:32 17:51	06:29 18:42	05:24 21:26	05:05 21:54
23	08:24 16:55	10:05 (WEA 18-4) 10:26 (WEA 18-4)	07:30 17:53	06:27 18:44	05:22 21:27	05:05 21:54
24	08:23 16:57	10:07 (WEA 18-4) 10:25 (WEA 18-4)	07:28 17:55	06:24 18:46	05:21 21:29	05:05 21:55
25	08:21 16:59	10:09 (WEA 18-4) 10:24 (WEA 18-4)	07:26 17:57	07:22 19:47	06:12 20:41	05:05 21:55
26	08:20 17:00	10:12 (WEA 18-4) 10:21 (WEA 18-4)	07:24 17:59	07:20 19:49	06:09 20:43	05:06 21:55
27	08:19 17:02	07:22 18:01	07:22 18:01	07:17 19:51	06:07 20:45	05:06 21:55
28	08:17 17:04	07:19 18:02	07:19 18:02	07:15 19:53	06:05 20:47	05:07 21:55
29	08:16 17:06			07:13 19:54	06:03 20:48	05:07 21:54
30	08:14 17:08			07:10 19:56	06:01 20:50	05:08 21:54
31	08:13 17:10			07:08 19:58	05:13 21:38	
Sonnenscheinstunden	256	275	366	416	487	502
astr.max.mögl.Beschattung	1390	223	1017			

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 29b - Zur Dasslage 6/Südwest

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September		Oktober		November		Dezember	
1	05:08 21:54	05:45 21:22	06:36 20:19		07:26 19:08	45	08:47 (WEA 18-1) 09:32 (WEA 18-1)	07:21 17:01	08:14 16:19	09:38 (WEA 18-4) 11:23 (WEA 18-3)
2	05:09 21:54	05:47 21:20	06:38 20:17		07:28 19:06	46	08:45 (WEA 18-1) 09:31 (WEA 18-1)	07:23 16:59	08:15 16:18	09:38 (WEA 18-4) 11:24 (WEA 18-3)
3	05:10 21:53	05:48 21:18	06:40 20:14		07:30 19:04	47	08:44 (WEA 18-2) 09:31 (WEA 18-1)	07:25 16:57	08:16 16:17	09:38 (WEA 18-4) 11:25 (WEA 18-3)
4	05:11 21:53	05:50 21:17	06:41 20:12		07:31 19:01	49	08:42 (WEA 18-2) 09:31 (WEA 18-1)	07:27 16:55	08:18 16:17	09:38 (WEA 18-4) 11:25 (WEA 18-3)
5	05:11 21:52	05:52 21:15	06:43 20:10		07:33 18:59	50	08:41 (WEA 18-2) 09:31 (WEA 18-1)	07:29 16:53	08:19 16:16	09:39 (WEA 18-4) 11:27 (WEA 18-3)
6	05:12 21:52	05:53 21:13	06:45 20:07		07:35 18:57	51	08:39 (WEA 18-2) 09:30 (WEA 18-1)	07:30 16:51	08:21 16:16	09:39 (WEA 18-4) 11:27 (WEA 18-3)
7	05:13 21:51	05:55 21:11	06:46 20:05		07:37 18:54	52	08:38 (WEA 18-2) 09:30 (WEA 18-1)	07:32 16:50	08:22 16:15	09:39 (WEA 18-4) 11:27 (WEA 18-3)
8	05:14 21:51	05:56 21:09	06:48 20:03		07:38 18:52	51	08:38 (WEA 18-2) 09:29 (WEA 18-1)	07:34 16:48	08:23 16:15	09:40 (WEA 18-4) 11:29 (WEA 18-3)
9	05:15 21:50	05:58 21:08	06:50 20:00		07:40 18:50	52	08:37 (WEA 18-2) 09:29 (WEA 18-1)	07:36 16:46	08:24 16:14	09:40 (WEA 18-4) 11:29 (WEA 18-3)
10	05:16 21:49	06:00 21:06	06:51 19:58		07:42 18:47	51	08:37 (WEA 18-2) 09:28 (WEA 18-1)	07:38 16:45	08:25 16:14	09:41 (WEA 18-4) 11:30 (WEA 18-3)
11	05:17 21:48	06:01 21:04	06:53 19:56		07:44 18:45	50	08:36 (WEA 18-2) 09:26 (WEA 18-1)	07:40 16:43	08:27 16:14	09:41 (WEA 18-4) 11:30 (WEA 18-3)
12	05:18 21:48	06:03 21:02	06:55 19:53		07:45 18:43	49	08:36 (WEA 18-2) 09:25 (WEA 18-1)	07:41 16:41	08:28 16:14	09:42 (WEA 18-4) 11:31 (WEA 18-3)
13	05:19 21:47	06:05 21:00	06:56 19:51		07:47 18:41	48	08:36 (WEA 18-2) 09:24 (WEA 18-1)	07:43 16:40	08:29 16:14	09:43 (WEA 18-4) 11:32 (WEA 18-3)
14	05:20 21:46	06:06 20:58	06:58 19:49		07:49 18:38	47	08:36 (WEA 18-2) 09:23 (WEA 18-1)	07:45 16:38	08:30 16:14	09:43 (WEA 18-4) 11:33 (WEA 18-3)
15	05:21 21:45	06:08 20:56	07:00 19:46		07:51 18:36	44	08:37 (WEA 18-2) 09:21 (WEA 18-1)	07:47 16:37	08:31 16:14	09:44 (WEA 18-4) 11:33 (WEA 18-3)
16	05:23 21:44	06:10 20:54	07:01 19:44		07:52 18:34	42	08:38 (WEA 18-2) 09:20 (WEA 18-1)	07:49 16:35	08:32 16:14	09:43 (WEA 18-4) 11:33 (WEA 18-3)
17	05:24 21:43	06:11 20:52	07:03 19:41		07:54 18:32	39	08:37 (WEA 18-2) 09:16 (WEA 18-1)	07:50 16:34	08:32 16:14	09:44 (WEA 18-4) 11:33 (WEA 18-3)
18	05:25 21:42	06:13 20:50	07:05 19:39		07:56 18:29	34	08:39 (WEA 18-2) 09:13 (WEA 18-1)	07:52 16:32	08:33 16:14	09:45 (WEA 18-4) 11:34 (WEA 18-3)
19	05:27 21:40	06:15 20:47	07:06 19:37		07:58 18:27	27	08:40 (WEA 18-2) 09:08 (WEA 18-1)	07:54 16:31	08:34 16:14	09:46 (WEA 18-4) 11:35 (WEA 18-3)
20	05:28 21:39	06:16 20:45	07:08 19:34	09:06 (WEA 18-1)	08:00 18:25	16	08:42 (WEA 18-2) 08:58 (WEA 18-2)	07:56 16:30	08:35 16:15	09:45 (WEA 18-4) 11:35 (WEA 18-3)
21	05:29 21:38	06:18 20:43	07:10 19:32	09:18 (WEA 18-1)	08:01 18:23	8	08:46 (WEA 18-2) 08:54 (WEA 18-2)	07:57 16:29	08:35 16:15	09:46 (WEA 18-4) 11:36 (WEA 18-3)
22	05:31 21:37	06:20 20:41	07:11 19:30	09:02 (WEA 18-1)	08:03 18:21			07:59 16:27	08:36 16:15	09:47 (WEA 18-4) 11:37 (WEA 18-3)
23	05:32 21:35	06:21 20:39	07:13 19:27	08:59 (WEA 18-1)	08:05 18:19			08:01 16:26	08:36 16:16	09:47 (WEA 18-4) 11:37 (WEA 18-3)
24	05:33 21:34	06:23 20:37	07:15 19:25	09:25 (WEA 18-1)	08:07 18:17			08:02 16:25	08:37 16:16	09:47 (WEA 18-4) 11:37 (WEA 18-3)
25	05:35 21:33	06:25 20:35	07:16 19:22	08:55 (WEA 18-1)	08:09 18:15			08:04 16:24	08:37 16:17	09:48 (WEA 18-4) 11:38 (WEA 18-3)
26	05:36 21:31	06:26 20:32	07:18 19:20	08:53 (WEA 18-1)	08:10 18:13			08:06 16:23	08:38 16:18	09:49 (WEA 18-4) 11:38 (WEA 18-3)
27	05:38 21:30	06:28 20:30	07:20 19:18	09:29 (WEA 18-1)	08:12 18:10			08:07 16:22	08:38 16:18	09:49 (WEA 18-4) 11:38 (WEA 18-3)
28	05:39 21:28	06:30 20:28	07:21 19:15	08:50 (WEA 18-1)	07:14 17:08			08:09 16:21	08:38 16:19	09:49 (WEA 18-4) 11:39 (WEA 18-3)
29	05:41 21:27	06:31 20:26	07:23 19:13	08:49 (WEA 18-1)	07:16 17:06			08:10 16:20	08:38 16:20	09:50 (WEA 18-4) 11:39 (WEA 18-3)
30	05:42 21:25	06:33 20:23	07:25 19:11	08:48 (WEA 18-1)	07:18 17:05			08:12 16:19	08:38 16:21	09:50 (WEA 18-4) 11:39 (WEA 18-3)
31	05:44 21:23	06:35 20:21		09:31 (WEA 18-1)	07:19 17:03				08:38 16:22	09:50 (WEA 18-4) 11:40 (WEA 18-3)
Sonnenscheinstunden	505	456	382		332			265	241	
astr.max.mögl.Beschattung			364		898			542	2252	

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: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 30a - Zur Dasslage 11/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38			08:11		09:01 (WEA 18-4)	07:17		07:05		07:58 (WEA 18-1)	05:59		05:12				
	16:23			17:12	75	10:30 (WEA 18-3)	18:04		20:00	38	08:36 (WEA 18-1)	20:52		21:39				
2	08:38			08:10		09:02 (WEA 18-4)	07:15		07:03		07:58 (WEA 18-1)	05:57		05:12				
	16:24			17:13	76	10:31 (WEA 18-3)	18:06		20:01	38	08:36 (WEA 18-1)	20:53		21:40				
3	08:38		09:57 (WEA 18-3)	08:08		09:01 (WEA 18-4)	07:13		07:01		07:58 (WEA 18-1)	05:55		05:11				
	16:25	2	09:59 (WEA 18-3)	17:15	76	10:30 (WEA 18-3)	18:08		20:03	38	08:36 (WEA 18-1)	20:55		21:41				
4	08:38		09:54 (WEA 18-3)	08:07		09:01 (WEA 18-4)	07:11		06:58		07:57 (WEA 18-1)	05:53		05:10				
	16:27	9	10:03 (WEA 18-3)	17:17	76	10:30 (WEA 18-3)	18:10		20:05	38	08:35 (WEA 18-1)	20:57		21:42				
5	08:38		09:53 (WEA 18-3)	08:05		09:00 (WEA 18-4)	07:08		06:56		07:57 (WEA 18-1)	05:52		05:09				
	16:28	13	10:06 (WEA 18-3)	17:19	78	10:30 (WEA 18-3)	18:12		20:07	38	08:35 (WEA 18-1)	20:59		21:43				
6	08:37		09:51 (WEA 18-3)	08:03		09:00 (WEA 18-4)	07:06		06:54		07:58 (WEA 18-1)	05:50		05:08				
	16:29	16	10:07 (WEA 18-3)	17:21	76	10:29 (WEA 18-3)	18:13		20:08	36	08:34 (WEA 18-1)	21:00		21:44				
7	08:37		09:51 (WEA 18-3)	08:01		09:00 (WEA 18-4)	07:04		06:52		07:57 (WEA 18-1)	05:48		05:08				
	16:30	18	10:09 (WEA 18-3)	17:23	75	10:28 (WEA 18-3)	18:15		20:10	36	08:33 (WEA 18-1)	21:02		21:45				
8	08:37		09:50 (WEA 18-3)	08:00		09:01 (WEA 18-4)	07:02		06:49		07:58 (WEA 18-1)	05:46		05:07				
	16:32	20	10:10 (WEA 18-3)	17:25	74	10:29 (WEA 18-3)	18:17		20:12	34	08:32 (WEA 18-1)	21:04		21:46				
9	08:36		09:49 (WEA 18-3)	07:58		09:01 (WEA 18-4)	06:59		06:47		07:58 (WEA 18-1)	05:44		05:07				
	16:33	23	10:12 (WEA 18-3)	17:27	72	10:28 (WEA 18-3)	18:19		20:14	33	08:31 (WEA 18-1)	21:05		21:47				
10	08:36		09:49 (WEA 18-3)	07:56		09:02 (WEA 18-4)	06:57		06:45		07:59 (WEA 18-1)	05:42		05:06				
	16:34	25	10:14 (WEA 18-3)	17:29	69	10:27 (WEA 18-3)	18:21		20:15	31	08:30 (WEA 18-1)	21:07		21:48				
11	08:35		09:48 (WEA 18-3)	07:54		09:02 (WEA 18-4)	06:55		06:42		07:59 (WEA 18-1)	05:41		05:06				
	16:36	27	10:15 (WEA 18-3)	17:30	66	10:26 (WEA 18-3)	18:23		20:17	29	08:28 (WEA 18-1)	21:09		21:49				
12	08:34		09:47 (WEA 18-3)	07:52		09:03 (WEA 18-4)	06:52		06:40		08:01 (WEA 18-1)	05:39		05:05				
	16:37	29	10:16 (WEA 18-3)	17:32	63	10:25 (WEA 18-3)	18:24		20:19	25	08:26 (WEA 18-1)	21:10		21:50				
13	08:34		09:47 (WEA 18-3)	07:50		09:04 (WEA 18-4)	06:50		06:38		08:03 (WEA 18-1)	05:37		05:05				
	16:39	30	10:17 (WEA 18-3)	17:34	58	10:23 (WEA 18-3)	18:26	7	07:26 (WEA 18-2)		08:24 (WEA 18-1)	21:12		21:50				
14	08:33		09:46 (WEA 18-3)	07:49		09:05 (WEA 18-4)	06:48		07:22 (WEA 18-2)		08:05 (WEA 18-1)	05:36		05:05				
	16:40	32	10:18 (WEA 18-3)	17:36	53	10:22 (WEA 18-3)	18:28	15	07:37 (WEA 18-2)		08:22 (WEA 18-1)	21:13		21:51				
15	08:32		09:46 (WEA 18-3)	07:47		09:06 (WEA 18-4)	06:45		07:19 (WEA 18-2)		08:09 (WEA 18-1)	05:34		05:05				
	16:42	33	10:19 (WEA 18-3)	17:38	46	10:19 (WEA 18-3)	18:30	19	07:38 (WEA 18-2)		08:18 (WEA 18-1)	21:15		21:51				
16	08:31		09:46 (WEA 18-3)	07:45		09:07 (WEA 18-4)	06:43		07:18 (WEA 18-2)			05:32		05:04				
	16:43	34	10:20 (WEA 18-3)	17:40	37	10:16 (WEA 18-3)	18:31	21	07:39 (WEA 18-2)			21:17		21:52				
17	08:30		09:45 (WEA 18-3)	07:43		09:09 (WEA 18-4)	06:41		07:17 (WEA 18-2)			05:31		05:04				
	16:45	37	10:22 (WEA 18-3)	17:42	21	10:10 (WEA 18-3)	18:33	24	07:41 (WEA 18-2)			21:18		21:53				
18	08:29		09:45 (WEA 18-3)	07:41		09:12 (WEA 18-4)	06:38		07:15 (WEA 18-2)			05:29		05:04				
	16:47	38	10:23 (WEA 18-3)	17:44	9	09:21 (WEA 18-4)	18:35	25	07:40 (WEA 18-2)			21:20		21:53				
19	08:28		09:45 (WEA 18-3)	07:39			06:36		07:15 (WEA 18-2)			05:28		05:04				
	16:48	39	10:24 (WEA 18-3)	17:46			18:37	26	07:41 (WEA 18-2)			21:21		21:53				
20	08:27		09:44 (WEA 18-3)	07:37			06:34		07:14 (WEA 18-2)			05:27		05:04				
	16:50	40	10:24 (WEA 18-3)	17:48			18:39	28	07:42 (WEA 18-2)			21:23		21:54				
21	08:26		09:44 (WEA 18-3)	07:34			06:31		07:13 (WEA 18-2)			05:25		05:04				
	16:52	41	10:25 (WEA 18-3)	17:49			18:40	28	07:41 (WEA 18-2)			21:24		21:54				
22	08:25		09:44 (WEA 18-3)	07:32			06:29		07:13 (WEA 18-2)			05:24		05:05				
	16:53	42	10:26 (WEA 18-3)	17:51			18:42	28	07:41 (WEA 18-2)			21:26		21:54				
23	08:24		09:44 (WEA 18-3)	07:30			06:27		07:11 (WEA 18-1)			05:22		05:05				
	16:55	42	10:26 (WEA 18-3)	17:53			18:44	29	07:40 (WEA 18-2)			21:27		21:54				
24	08:23		09:11 (WEA 18-4)	07:28			06:24		07:09 (WEA 18-1)			05:21		05:05				
	16:57	50	10:27 (WEA 18-3)	17:55			18:46	30	07:39 (WEA 18-2)			21:29		21:55				
25	08:21		09:09 (WEA 18-4)	07:26			07:22		08:07 (WEA 18-1)			05:20		05:05				
	16:59	57	10:28 (WEA 18-3)	17:57			19:47	32	08:39 (WEA 18-2)			21:30		21:55				
26	08:20		09:06 (WEA 18-4)	07:24			07:20		08:04 (WEA 18-1)			05:19		05:06				
	17:00	62	10:28 (WEA 18-3)	17:59			19:49	33	08:37 (WEA 18-2)			21:31		21:55				
27	08:19		09:06 (WEA 18-4)	07:22			07:17		08:03 (WEA 18-1)			05:18		05:06				
	17:02	65	10:29 (WEA 18-3)	18:01			19:51	33	08:36 (WEA 18-2)			21:33		21:55				
28	08:17		09:04 (WEA 18-4)	07:19			07:15		08:02 (WEA 18-1)			05:16		05:07				
	17:04	68	10:29 (WEA 18-3)	18:02			19:53	34	08:36 (WEA 18-1)			21:34		21:55				
29	08:16		09:03 (WEA 18-4)				07:13		08:01 (WEA 18-1)			05:15		05:07				
	17:06	71	10:29 (WEA 18-3)				19:54	35	08:36 (WEA 18-1)			21:35		21:54				
30	08:15		09:03 (WEA 18-4)				07:10		08:00 (WEA 18-1)			05:14		05:08				
	17:08	72	10:30 (WEA 18-3)				19:56	36	08:36 (WEA 18-1)			21:37		21:54				
31	08:13		09:02 (WEA 18-4)				07:08		08:00 (WEA 18-1)			05:13						
	17:10	74	10:30 (WEA 18-3)				19:58	37	08:37 (WEA 18-1)			21:38						
Sonnenscheinstunden		256		275			366		416			461		502				
astr. max. mögl. Beschattung		1109		1100			520		461									

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

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

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654**SHADOW - Kalender****Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 30a - Zur Dasslage 11/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	05:08 21:54	05:45 21:22			06:36 20:19	08:01 (WEA 18-1) 08:26 (WEA 18-1)	07:26 19:08	11	08:04 (WEA 18-2) 08:15 (WEA 18-2)	07:21 17:01	08:32 (WEA 18-4) 09:56 (WEA 18-3)	08:14 16:19	29	09:29 (WEA 18-3) 09:58 (WEA 18-3)
2	05:09 21:54	05:47 21:20			06:38 20:17	07:58 (WEA 18-1) 08:27 (WEA 18-1)	07:28 19:06			07:23 16:59	08:31 (WEA 18-4) 09:57 (WEA 18-3)	08:15 16:18	27	09:30 (WEA 18-3) 09:57 (WEA 18-3)
3	05:10 21:53	05:48 21:18			06:40 20:14	07:57 (WEA 18-1) 08:28 (WEA 18-1)	07:30 19:04			07:25 16:57	08:31 (WEA 18-4) 09:58 (WEA 18-3)	08:16 16:17	25	09:32 (WEA 18-3) 09:57 (WEA 18-3)
4	05:11 21:53	05:50 21:17			06:41 20:12	07:55 (WEA 18-1) 08:28 (WEA 18-1)	07:31 19:01			07:27 16:55	08:31 (WEA 18-4) 09:59 (WEA 18-3)	08:18 16:17	23	09:33 (WEA 18-3) 09:56 (WEA 18-3)
5	05:11 21:52	05:52 21:15			06:43 20:10	07:55 (WEA 18-1) 08:29 (WEA 18-1)	07:33 18:59			07:29 16:53	08:31 (WEA 18-4) 09:59 (WEA 18-3)	08:19 16:16	21	09:35 (WEA 18-3) 09:56 (WEA 18-3)
6	05:12 21:52	05:53 21:13			06:45 20:07	07:54 (WEA 18-1) 08:30 (WEA 18-1)	07:35 18:57			07:30 16:51	08:31 (WEA 18-4) 10:00 (WEA 18-3)	08:21 16:16	18	09:36 (WEA 18-3) 09:54 (WEA 18-3)
7	05:13 21:51	05:55 21:11			06:46 20:05	07:53 (WEA 18-1) 08:29 (WEA 18-1)	07:37 18:54			07:32 16:50	08:31 (WEA 18-4) 10:00 (WEA 18-3)	08:22 16:15	16	09:37 (WEA 18-3) 09:53 (WEA 18-3)
8	05:14 21:51	05:56 21:09			06:48 20:03	07:52 (WEA 18-1) 08:30 (WEA 18-1)	07:38 18:52			07:34 16:48	08:32 (WEA 18-4) 10:01 (WEA 18-3)	08:23 16:15	13	09:40 (WEA 18-3) 09:53 (WEA 18-3)
9	05:15 21:50	05:58 21:08			06:50 20:00	07:51 (WEA 18-1) 08:29 (WEA 18-1)	07:40 18:50			07:36 16:46	08:32 (WEA 18-4) 10:01 (WEA 18-3)	08:24 16:14	9	09:42 (WEA 18-3) 09:51 (WEA 18-3)
10	05:16 21:49	06:00 21:06			06:51 19:58	07:51 (WEA 18-1) 08:29 (WEA 18-1)	07:42 18:47			07:38 16:45	08:32 (WEA 18-4) 10:01 (WEA 18-3)	08:25 16:14	3	09:45 (WEA 18-3) 09:48 (WEA 18-3)
11	05:17 21:48	06:01 21:04			06:53 19:56	07:51 (WEA 18-1) 08:29 (WEA 18-1)	07:44 18:45			07:40 16:43	08:33 (WEA 18-4) 10:02 (WEA 18-3)	08:27 16:14		
12	05:18 21:48	06:03 21:02			06:55 19:53	07:51 (WEA 18-1) 08:28 (WEA 18-1)	07:45 18:43			07:41 16:41	08:34 (WEA 18-4) 10:02 (WEA 18-3)	08:28 16:14		
13	05:19 21:47	06:05 21:00			06:56 19:51	07:51 (WEA 18-1) 08:28 (WEA 18-1)	07:47 18:41			07:43 16:40	08:35 (WEA 18-4) 10:02 (WEA 18-3)	08:29 16:14		
14	05:20 21:46	06:06 20:58			06:58 19:49	07:50 (WEA 18-1) 08:27 (WEA 18-1)	07:49 18:38			07:45 16:38	08:35 (WEA 18-4) 10:01 (WEA 18-3)	08:30 16:14		
15	05:22 21:45	06:08 20:56			07:00 19:46	07:51 (WEA 18-1) 08:26 (WEA 18-1)	07:51 18:36			07:47 16:37	08:36 (WEA 18-4) 10:01 (WEA 18-3)	08:31 16:14		
16	05:23 21:44	06:10 20:54			07:01 19:44	07:52 (WEA 18-1) 08:25 (WEA 18-1)	07:52 18:34			07:49 16:35	08:38 (WEA 18-4) 10:01 (WEA 18-3)	08:32 16:14		
17	05:24 21:43	06:11 20:52			07:03 19:41	07:51 (WEA 18-1) 08:24 (WEA 18-1)	07:54 18:32			07:50 16:34	08:39 (WEA 18-4) 10:01 (WEA 18-3)	08:32 16:14		
18	05:25 21:42	06:13 20:50			07:05 19:39	07:53 (WEA 18-1) 08:25 (WEA 18-2)	07:56 18:29			07:52 16:33	08:42 (WEA 18-4) 10:01 (WEA 18-3)	08:33 16:14		
19	05:27 21:40	06:15 20:48			07:06 19:37	07:54 (WEA 18-1) 08:26 (WEA 18-2)	07:58 18:27			07:54 16:31	08:45 (WEA 18-4) 10:01 (WEA 18-3)	08:34 16:14		
20	05:28 21:39	06:16 20:45			07:08 19:34	07:55 (WEA 18-1) 08:26 (WEA 18-2)	08:00 18:25			07:56 16:30	09:19 (WEA 18-3) 10:01 (WEA 18-3)	08:35 16:15		
21	05:29 21:38	06:18 20:43			07:10 19:32	07:57 (WEA 18-1) 08:26 (WEA 18-2)	08:01 18:23			07:57 16:29	09:19 (WEA 18-3) 10:01 (WEA 18-3)	08:35 16:15		
22	05:31 21:37	06:20 20:41			07:11 19:30	07:59 (WEA 18-1) 08:26 (WEA 18-2)	08:03 18:21			07:59 16:27	09:20 (WEA 18-3) 10:01 (WEA 18-3)	08:36 16:15		
23	05:32 21:35	06:21 20:39			07:13 19:27	07:58 (WEA 18-1) 08:25 (WEA 18-2)	08:05 18:19			08:01 16:26	09:21 (WEA 18-3) 10:01 (WEA 18-3)	08:36 16:16		
24	05:33 21:34	06:23 20:37			07:15 19:25	07:58 (WEA 18-1) 08:25 (WEA 18-2)	08:07 18:17			08:02 16:25	09:22 (WEA 18-3) 10:01 (WEA 18-3)	08:37 16:17		
25	05:35 21:33	06:25 20:35			07:16 19:22	07:58 (WEA 18-1) 08:25 (WEA 18-2)	08:09 18:15	11	09:41 (WEA 18-4) 09:52 (WEA 18-4)	08:04 16:24	09:22 (WEA 18-3) 10:00 (WEA 18-3)	08:37 16:17		
26	05:36 21:31	06:26 20:32			07:18 19:20	07:58 (WEA 18-1) 08:23 (WEA 18-2)	08:10 18:13	27	09:38 (WEA 18-4) 10:42 (WEA 18-3)	08:06 16:23	09:23 (WEA 18-3) 10:00 (WEA 18-3)	08:38 16:18		
27	05:38 21:30	06:28 20:30			07:20 19:18	07:58 (WEA 18-1) 08:23 (WEA 18-2)	08:12 18:11	40	09:36 (WEA 18-4) 10:47 (WEA 18-3)	08:07 16:22	09:25 (WEA 18-3) 09:59 (WEA 18-3)	08:38 16:19		
28	05:39 21:28	06:30 20:28			07:21 19:15	07:59 (WEA 18-1) 08:22 (WEA 18-2)	07:14 17:08	48	08:35 (WEA 18-4) 09:49 (WEA 18-3)	08:09 16:21	09:26 (WEA 18-3) 09:59 (WEA 18-3)	08:38 16:19		
29	05:41 21:27	06:31 20:26	10	08:09 (WEA 18-1) 08:19 (WEA 18-1)	07:23 19:13	07:59 (WEA 18-2) 08:19 (WEA 18-2)	07:16 17:06	55	08:34 (WEA 18-4) 09:52 (WEA 18-3)	08:10 16:20	09:26 (WEA 18-3) 09:58 (WEA 18-3)	08:38 16:20		
30	05:42 21:25	06:33 20:23	18	08:04 (WEA 18-1) 08:23 (WEA 18-1)	07:25 19:11	08:01 (WEA 18-2) 08:17 (WEA 18-2)	07:18 17:05	59	08:33 (WEA 18-4) 09:53 (WEA 18-3)	08:12 16:19	09:28 (WEA 18-3) 09:58 (WEA 18-3)	08:38 16:21		
31	05:44 21:23	06:35 20:21	22	08:02 (WEA 18-1) 08:24 (WEA 18-1)			07:19 17:03	65	08:32 (WEA 18-4) 09:55 (WEA 18-3)			08:38 16:22		
Sonnenscheinstunden	505	456			382		332		265			241		
astr.max.mögl.Beschattung		50			929		316		1737			184		

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 30b - Zur Dasslage 11/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:38 16:23	08:11 17:12	07:17 18:04	07:05 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:53	05:12 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:48 21:18	06:40 20:14	07:30 19:04	07:25 16:57	08:16 16:17
4	08:38 16:27	08:07 17:17	07:11 18:10	06:58 20:05	05:53 20:57	05:10 21:42	05:11 21:53	05:50 21:17	06:41 20:12	07:31 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:37 16:29	08:03 17:21	07:06 18:13	06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:30 16:51	08:21 16:16
7	08:37 16:30	08:01 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:56 21:09	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:42 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:25 16:14
11	08:35 16:36	07:54 17:30	06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:48	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:34 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:41 16:41	08:28 16:14
13	08:34 16:39	07:50 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:13	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:51	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:31	06:31 20:26	05:32 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:50 16:34	08:32 16:14
18	08:29 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:29	07:52 16:33	08:33 16:14
19	08:28 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:27 21:40	06:15 20:48	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:34 17:49	06:31 18:40	06:20 20:34	05:25 21:24	05:04 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:15
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:54	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:02 16:25	08:37 16:17
25	08:21 16:59	07:26 17:57	07:22 19:47	06:12 20:41	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	08:20 17:01	07:24 17:59	07:20 19:49	06:09 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:07 16:22	08:38 16:19
28	08:17 17:04	07:19 18:02	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:08	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:06	08:10 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:23	06:35 20:21		07:19 17:03		08:38 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 31a - Zur Dasslage 13/Nordwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:38 16:23	08:11 17:12	07:17 18:04	07:05 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:14 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:53	05:12 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:48 21:18	06:40 20:14	07:30 19:04	07:25 16:57	08:16 16:17
4	08:38 16:27	08:07 17:17	07:11 18:10	06:58 20:05	05:53 20:57	05:10 21:42	05:11 21:53	05:50 21:17	06:41 20:12	07:31 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:37 16:29	08:03 17:21	07:06 18:13	06:54 20:08	05:50 21:00	05:08 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:30 16:51	08:21 16:16
7	08:37 16:30	08:01 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:56 21:09	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:42 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:25 16:14
11	08:35 16:36	07:54 17:30	06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:48	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:34 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:05 21:50	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:41 16:41	08:28 16:14
13	08:34 16:39	07:50 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:13	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:51	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:31	06:31 20:26	05:33 21:17	05:04 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 20:28	05:31 21:18	05:04 21:53	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:50 16:34	08:32 16:14
18	08:29 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:29	07:52 16:33	08:33 16:14
19	08:28 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:27 21:40	06:15 20:48	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	08:00 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:34 17:49	06:31 18:40	06:20 20:34	05:25 21:24	05:04 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:15
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:54	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:55	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:02 16:25	08:37 16:17
25	08:21 16:59	07:26 17:57	07:22 19:47	06:12 20:41	05:20 21:30	05:05 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:04 16:24	08:37 16:17
26	08:20 17:01	07:24 17:59	07:20 19:49	06:09 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:07 16:22	08:38 16:19
28	08:17 17:04	07:19 18:02	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:55	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:08	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07	08:10 16:20	08:38 16:20
30	08:15 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:23	06:35 20:21		07:19 17:03		08:38 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

SHADOW - Kalender**Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 31b - Zur Dasslage 13/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März		April		Mai		Juni	
1	08:38 16:23	08:11 17:12		07:17 18:04	71	08:24 (WEA 18-4) 09:35 (WEA 18-3)	07:05 20:00	07:43 (WEA 18-2) 08:08 (WEA 18-2)	05:59 20:52	07:26 (WEA 18-1) 07:38 (WEA 18-1)	05:12 21:39
2	08:38 16:24	08:10 17:13		07:15 18:06	69	08:25 (WEA 18-4) 09:34 (WEA 18-3)	07:03 20:01	07:42 (WEA 18-2) 08:08 (WEA 18-2)	05:57 20:53		05:12 21:40
3	08:38 16:25	08:08 17:15		07:13 18:08	63	08:26 (WEA 18-4) 09:32 (WEA 18-3)	07:01 20:03	07:42 (WEA 18-2) 08:08 (WEA 18-2)	05:55 20:55		05:11 21:41
4	08:38 16:27	08:07 17:17		07:11 18:10	57	08:28 (WEA 18-4) 09:31 (WEA 18-3)	06:58 20:05	07:41 (WEA 18-2) 08:07 (WEA 18-2)	05:53 20:57		05:10 21:42
5	08:38 16:28	08:05 17:19		07:08 18:12	50	08:31 (WEA 18-4) 09:30 (WEA 18-3)	06:56 20:07	07:42 (WEA 18-2) 08:07 (WEA 18-2)	05:52 20:59		05:09 21:43
6	08:37 16:29	08:03 17:21		07:06 18:13	34	08:55 (WEA 18-3) 09:29 (WEA 18-3)	06:54 20:08	07:42 (WEA 18-2) 08:06 (WEA 18-2)	05:50 21:00		05:08 21:44
7	08:37 16:30	08:01 17:23	09:07 (WEA 18-3)	07:04 18:15	31	08:55 (WEA 18-3) 09:26 (WEA 18-3)	06:52 20:10	07:42 (WEA 18-2) 08:04 (WEA 18-2)	05:48 21:02		05:08 21:45
8	08:37 16:32	08:00 17:25	13 09:20 (WEA 18-3)	07:02 18:17	27	08:57 (WEA 18-3) 09:24 (WEA 18-3)	06:49 20:12	07:31 (WEA 18-1) 08:03 (WEA 18-2)	05:46 21:04		05:07 21:46
9	08:36 16:33	07:58 17:27	20 09:25 (WEA 18-3)	06:59 18:19	21	09:00 (WEA 18-3) 09:21 (WEA 18-3)	06:47 20:14	07:28 (WEA 18-1) 08:02 (WEA 18-2)	05:44 21:05		05:07 21:47
10	08:36 16:34	07:56 17:29	25 09:27 (WEA 18-3)	06:57 18:21	13	09:03 (WEA 18-3) 09:16 (WEA 18-3)	06:45 20:15	07:26 (WEA 18-1) 07:59 (WEA 18-2)	05:42 21:07		05:06 21:48
11	08:35 16:36	07:54 17:30	29 09:29 (WEA 18-3)	06:55 18:23			06:42 20:17	07:52 (WEA 18-1) 07:54 (WEA 18-1)	05:41 21:09		05:06 21:49
12	08:34 16:37	07:52 17:32	32 08:59 (WEA 18-3)	06:52 18:24			06:40 20:19	07:22 (WEA 18-1) 07:51 (WEA 18-1)	05:39 21:10		05:05 21:50
13	08:34 16:39	07:50 17:34	35 09:32 (WEA 18-3)	06:50 18:26			06:38 20:21	07:21 (WEA 18-1) 07:52 (WEA 18-1)	05:37 21:12		05:05 21:50
14	08:33 16:40	07:49 17:36	49 08:34 (WEA 18-4)	06:48 18:28			06:36 20:22	07:20 (WEA 18-1) 07:52 (WEA 18-1)	05:36 21:13		05:05 21:51
15	08:32 16:42	07:47 17:38	57 09:34 (WEA 18-3)	06:45 18:30			06:33 20:24	07:20 (WEA 18-1) 07:53 (WEA 18-1)	05:34 21:15		05:05 21:51
16	08:31 16:43	07:45 17:40	63 09:35 (WEA 18-3)	06:43 18:31			06:31 20:26	07:18 (WEA 18-1) 07:52 (WEA 18-1)	05:33 21:17		05:04 21:52
17	08:30 16:45	07:43 17:42	67 09:36 (WEA 18-3)	06:41 18:33			06:29 20:28	07:18 (WEA 18-1) 07:52 (WEA 18-1)	05:31 21:18		05:04 21:53
18	08:29 16:47	07:41 17:44	70 09:36 (WEA 18-3)	06:38 18:35			06:27 20:29	07:18 (WEA 18-1) 07:52 (WEA 18-1)	05:29 21:20		05:04 21:53
19	08:28 16:48	07:39 17:46	71 09:36 (WEA 18-3)	06:36 18:37			06:24 20:31	07:17 (WEA 18-1) 07:52 (WEA 18-1)	05:28 21:21		05:04 21:53
20	08:27 16:50	07:37 17:48	73 08:24 (WEA 18-4)	06:34 18:39			06:22 20:33	07:17 (WEA 18-1) 07:52 (WEA 18-1)	05:27 21:23		05:04 21:54
21	08:26 16:52	07:34 17:49	73 09:37 (WEA 18-3)	06:31 18:40			06:20 20:34	07:17 (WEA 18-1) 07:52 (WEA 18-1)	05:25 21:24		05:04 21:54
22	08:25 16:53	07:32 17:51	74 09:38 (WEA 18-3)	06:29 18:42			06:18 20:36	07:17 (WEA 18-1) 07:51 (WEA 18-1)	05:24 21:26		05:05 21:54
23	08:24 16:55	07:30 17:53	75 08:22 (WEA 18-4)	06:27 18:44			06:16 20:38	07:18 (WEA 18-1) 07:51 (WEA 18-1)	05:22 21:27		05:05 21:54
24	08:23 16:57	07:28 17:55	75 09:37 (WEA 18-3)	06:24 18:46			06:14 20:40	07:18 (WEA 18-1) 07:50 (WEA 18-1)	05:21 21:29		05:05 21:55
25	08:21 16:59	07:26 17:57	75 08:23 (WEA 18-4)	07:22 19:47			06:12 20:41	07:19 (WEA 18-1) 07:49 (WEA 18-1)	05:20 21:30		05:05 21:55
26	08:20 17:01	07:24 17:59	74 08:23 (WEA 18-4)	07:20 19:49		07:52 (WEA 18-2)	06:09 20:43	07:19 (WEA 18-1) 07:48 (WEA 18-1)	05:19 21:31		05:06 21:55
27	08:19 17:02	07:22 18:01	74 09:37 (WEA 18-3)	07:17 19:51	11	07:49 (WEA 18-2)	06:07	07:20 (WEA 18-1) 07:47 (WEA 18-1)	05:18 21:33		05:06 21:56
28	08:17 17:04	07:19 18:02	73 08:24 (WEA 18-4)	07:15 19:53	16	08:05 (WEA 18-2)	06:05	07:21 (WEA 18-1) 07:45 (WEA 18-1)	05:16 21:34		05:07 21:55
29	08:16 17:06		72 09:35 (WEA 18-3)	07:13 19:54	19	07:45 (WEA 18-2)	06:03	07:22 (WEA 18-1) 07:43 (WEA 18-1)	05:15 21:35		05:07 21:54
30	08:15 17:08			07:10 19:56	22	08:07 (WEA 18-2)	06:01	07:24 (WEA 18-1) 07:41 (WEA 18-1)	05:14 21:37		05:08 21:54
31	08:13 17:10			07:08 19:58	23	08:08 (WEA 18-2)	06:00		05:13		
Sonnenscheinstunden		256	275	366	552	416	883	487	502		
astr. max. mögl. Beschattung			1269					12			

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: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 31b - Zur Dasslage 13/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	05:08 21:54	05:45 21:22	06:36 20:19	07:22 (WEA 18-1) 19:08	07:21 17:01	08:28 (WEA 18-3) 16:19
2	05:09 21:54	05:47 21:20	06:38 20:17	07:22 (WEA 18-1) 19:06	07:23 16:59	08:30 (WEA 18-3) 16:18
3	05:10 21:53	05:48 21:18	06:40 20:14	07:24 (WEA 18-1) 19:04	07:25 16:57	08:32 (WEA 18-3) 16:17
4	05:11 21:53	05:50 21:17	06:41 20:12	07:25 (WEA 18-1) 19:01	09:45 (WEA 18-3) 16:55	08:35 (WEA 18-3) 16:17
5	05:11 21:52	05:52 21:15	06:43 20:10	07:28 (WEA 18-1) 18:59	09:39 (WEA 18-3) 16:53	08:38 (WEA 18-3) 16:16
6	05:12 21:52	05:53 21:13	06:45 20:07	07:34 (WEA 18-1) 18:57	09:34 (WEA 18-3) 16:51	08:40 (WEA 18-3) 16:16
7	05:13 21:51	05:55 21:11	06:46 20:05	07:37 (WEA 18-2) 18:54	09:32 (WEA 18-3) 16:50	08:42 (WEA 18-3) 16:15
8	05:14 21:51	05:56 21:09	06:48 20:03	07:37 (WEA 18-2) 18:52	09:30 (WEA 18-3) 16:48	08:44 (WEA 18-3) 16:15
9	05:15 21:50	05:58 21:08	06:50 20:00	07:36 (WEA 18-2) 18:50	09:08 (WEA 18-4) 16:46	08:46 (WEA 18-3) 16:14
10	05:16 21:49	06:00 21:06	06:51 19:58	07:35 (WEA 18-2) 18:47	09:04 (WEA 18-4) 16:45	08:48 (WEA 18-3) 16:14
11	05:17 21:48	06:01 21:04	06:53 19:56	07:36 (WEA 18-2) 18:45	09:01 (WEA 18-4) 16:43	08:50 (WEA 18-3) 16:14
12	05:18 21:48	06:03 21:02	06:55 19:53	07:35 (WEA 18-2) 18:43	08:59 (WEA 18-4) 16:41	08:52 (WEA 18-3) 16:14
13	05:19 21:47	06:05 21:00	06:56 19:51	07:35 (WEA 18-2) 18:41	08:58 (WEA 18-4) 16:40	08:54 (WEA 18-3) 16:14
14	05:20 21:46	06:06 20:58	06:58 19:49	07:35 (WEA 18-2) 18:38	08:57 (WEA 18-4) 16:38	08:56 (WEA 18-3) 16:14
15	05:22 21:45	06:08 20:56	07:00 19:46	07:36 (WEA 18-2) 18:36	08:56 (WEA 18-4) 16:37	08:58 (WEA 18-3) 16:14
16	05:23 21:44	06:10 20:54	07:01 19:44	07:37 (WEA 18-2) 18:34	08:56 (WEA 18-4) 16:35	08:59 (WEA 18-3) 16:14
17	05:24 21:43	06:11 20:52	07:03 19:41	07:37 (WEA 18-2) 18:32	08:54 (WEA 18-4) 16:34	09:00 (WEA 18-3) 16:14
18	05:25 21:42	06:13 20:50	07:05 19:39	07:40 (WEA 18-2) 18:29	08:54 (WEA 18-4) 16:33	09:02 (WEA 18-3) 16:14
19	05:27 21:40	06:15 20:48	07:06 19:37	07:51 (WEA 18-2) 18:27	08:54 (WEA 18-4) 16:31	09:04 (WEA 18-3) 16:14
20	05:28 21:39	06:16 20:45	07:08 19:34	07:58 18:25	08:54 (WEA 18-4) 16:30	09:06 (WEA 18-3) 16:15
21	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	08:54 (WEA 18-4) 16:29	09:08 (WEA 18-3) 16:15
22	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	08:54 (WEA 18-4) 16:27	09:10 (WEA 18-3) 16:15
23	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19	08:54 (WEA 18-4) 16:26	09:12 (WEA 18-3) 16:16
24	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:55 (WEA 18-4) 16:25	09:14 (WEA 18-3) 16:17
25	05:35 21:33	06:25 20:35	07:16 19:22	08:09 18:15	08:56 (WEA 18-4) 16:24	09:16 (WEA 18-3) 16:17
26	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:57 (WEA 18-4) 16:23	09:18 (WEA 18-3) 16:18
27	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:58 (WEA 18-4) 16:22	09:20 (WEA 18-3) 16:19
28	05:39 21:28	06:30 20:28	07:21 19:15	08:14 17:08	07:59 (WEA 18-4) 16:21	09:22 (WEA 18-3) 16:19
29	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07	08:01 (WEA 18-4) 16:20	09:24 (WEA 18-3) 16:20
30	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:04 (WEA 18-4) 16:19	09:26 (WEA 18-3) 16:21
31	05:44 21:23	06:35 20:21	07:21 (WEA 18-1) 07:52 (WEA 18-1)	07:19 17:03	08:27 (WEA 18-3) 09:01 (WEA 18-3)	09:28 (WEA 18-3) 16:22
Sonnenscheinstunden	505	456	382	332	265	241
astr.max.mögl.Beschattung		572	450	1613	115	

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

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

SHADOW - Kalender**Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 32 - Große Harr 13**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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	08:38 16:23	08:11 17:12	07:17 18:04	07:06 20:00	07:47 (WEA 18-4) 05:59 08:14 (WEA 18-4) 20:52	06:43 (WEA 18-2) 05:12 07:01 (WEA 18-2) 21:39
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	07:47 (WEA 18-4) 05:57 08:14 (WEA 18-4) 20:53	06:44 (WEA 18-2) 05:12 07:00 (WEA 18-2) 21:40
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	07:47 (WEA 18-4) 05:55 08:14 (WEA 18-4) 20:55	06:45 (WEA 18-2) 05:11 06:58 (WEA 18-2) 21:41
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05	07:46 (WEA 18-4) 05:54 08:12 (WEA 18-4) 20:57	06:48 (WEA 18-2) 05:10 06:57 (WEA 18-2) 21:42
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	07:42 (WEA 18-3) 05:52 08:12 (WEA 18-4) 20:59	06:59 21:43
6	08:37 16:29	08:03 17:21	07:06 18:14	06:54 20:08	07:40 (WEA 18-3) 05:50 08:11 (WEA 18-4) 21:00	06:59 21:44
7	08:37 16:30	08:01 17:23	07:04 18:15	06:52 20:10	07:37 (WEA 18-3) 05:48 08:09 (WEA 18-4) 21:02	06:21 (WEA 18-1) 05:08 06:31 (WEA 18-1) 21:45
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	07:35 (WEA 18-3) 05:46 08:07 (WEA 18-4) 21:04	06:20 (WEA 18-1) 05:07 06:34 (WEA 18-1) 21:46
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	07:34 (WEA 18-3) 05:44 08:05 (WEA 18-3) 21:05	06:18 (WEA 18-1) 05:07 06:35 (WEA 18-1) 21:47
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	07:33 (WEA 18-3) 05:43 08:06 (WEA 18-3) 21:07	06:16 (WEA 18-1) 05:06 06:36 (WEA 18-1) 21:48
11	08:35 16:36	07:54 17:31	06:55 18:23	06:42 20:17	07:31 (WEA 18-3) 05:41 08:06 (WEA 18-3) 21:09	06:16 (WEA 18-1) 05:06 06:37 (WEA 18-1) 21:49
12	08:34 16:37	07:52 17:32	06:52 18:24	06:40 20:19	07:30 (WEA 18-3) 05:39 08:06 (WEA 18-3) 21:10	06:15 (WEA 18-1) 05:05 06:37 (WEA 18-1) 21:50
13	08:34 16:39	07:50 17:34	06:50 18:26	06:38 20:21	07:30 (WEA 18-3) 05:37 08:07 (WEA 18-3) 21:12	06:15 (WEA 18-1) 05:05 06:38 (WEA 18-1) 21:50
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	07:29 (WEA 18-3) 05:36 08:07 (WEA 18-3) 21:13	06:14 (WEA 18-1) 05:05 06:38 (WEA 18-1) 21:51
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	07:29 (WEA 18-3) 05:34 08:07 (WEA 18-3) 21:15	06:14 (WEA 18-1) 05:05 06:39 (WEA 18-1) 21:51
16	08:31 16:43	07:45 17:40	06:43 18:31	06:31 20:26	07:27 (WEA 18-3) 05:33 08:06 (WEA 18-3) 21:17	06:13 (WEA 18-1) 05:05 06:38 (WEA 18-1) 21:52
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 20:28	07:27 (WEA 18-3) 05:31 08:06 (WEA 18-3) 21:18	06:13 (WEA 18-1) 05:04 06:39 (WEA 18-1) 21:53
18	08:29 16:47	07:41 17:44	06:38 18:35	06:27 20:29	07:27 (WEA 18-3) 05:29 08:06 (WEA 18-3) 21:20	06:13 (WEA 18-1) 05:04 06:38 (WEA 18-1) 21:53
19	08:28 16:48	07:39 17:46	06:36 18:37	06:24 20:31	07:27 (WEA 18-3) 05:28 08:05 (WEA 18-3) 21:21	06:13 (WEA 18-1) 05:04 06:39 (WEA 18-1) 21:53
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	06:50 (WEA 18-2) 05:27 08:05 (WEA 18-3) 21:23	06:14 (WEA 18-1) 05:04 06:39 (WEA 18-1) 21:54
21	08:26 16:52	07:34 17:49	06:31 18:40	06:20 20:34	06:47 (WEA 18-2) 05:25 08:04 (WEA 18-3) 21:24	06:14 (WEA 18-1) 05:05 06:39 (WEA 18-1) 21:54
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	06:46 (WEA 18-2) 05:24 08:04 (WEA 18-3) 21:26	06:13 (WEA 18-1) 05:05 06:38 (WEA 18-1) 21:54
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	06:45 (WEA 18-2) 05:22 08:03 (WEA 18-3) 21:27	06:14 (WEA 18-1) 05:05 06:38 (WEA 18-1) 21:54
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	06:44 (WEA 18-2) 05:21 08:02 (WEA 18-3) 21:29	06:15 (WEA 18-1) 05:05 06:38 (WEA 18-1) 21:55
25	08:21 16:59	07:26 17:57	07:22 19:47	06:12 20:41	06:44 (WEA 18-2) 05:20 08:01 (WEA 18-3) 21:30	06:15 (WEA 18-1) 05:05 06:38 (WEA 18-1) 21:55
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	06:43 (WEA 18-2) 05:19 07:59 (WEA 18-3) 21:31	06:16 (WEA 18-1) 05:06 06:37 (WEA 18-1) 21:55
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	06:43 (WEA 18-2) 05:18 07:58 (WEA 18-3) 21:33	06:16 (WEA 18-1) 05:06 06:37 (WEA 18-1) 21:55
28	08:17 17:04	07:19 18:03	07:15 19:53	06:05 20:47	06:43 (WEA 18-2) 05:16 07:56 (WEA 18-3) 21:34	06:17 (WEA 18-1) 05:07 06:37 (WEA 18-1) 21:55
29	08:16 17:06	07:13 19:54	07:13 19:54	06:03 20:48	06:43 (WEA 18-2) 05:15 07:54 (WEA 18-3) 21:35	06:18 (WEA 18-1) 05:07 06:36 (WEA 18-1) 21:54
30	08:15 17:08	07:10 19:56	07:10 19:56	06:01 20:50	06:43 (WEA 18-2) 05:14 07:51 (WEA 18-3) 21:37	06:18 (WEA 18-1) 05:08 06:35 (WEA 18-1) 21:54
31	08:13 17:10	07:08 19:58	07:08 19:58	06:01 20:50	06:43 (WEA 18-2) 05:14 07:51 (WEA 18-3) 21:37	06:19 (WEA 18-1) 05:08 06:34 (WEA 18-1) 21:54
Sonnenscheinstunden	256	275	366	416	487	502
astr. max. mögl. Beschattung			164	1151	591	40

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 32 - Große Harr 13

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	05:08		05:45		06:25 (WEA 18-1)	06:36	07:30 (WEA 18-3)	07:26	07:21	08:14		
	21:54		21:22	23	06:48 (WEA 18-1)	20:19	36	08:06 (WEA 18-3)	19:08	17:01	16:19	
2	05:09		05:47		06:25 (WEA 18-1)	06:38		07:30 (WEA 18-3)	07:28	07:23	08:15	
	21:54		21:20	22	06:47 (WEA 18-1)	20:17	35	08:05 (WEA 18-3)	19:06	16:59	16:18	
3	05:10		05:49		06:27 (WEA 18-1)	06:40		07:31 (WEA 18-3)	07:30	07:25	08:16	
	21:53		21:18	20	06:47 (WEA 18-1)	20:14	33	08:04 (WEA 18-3)	19:04	16:57	16:17	
4	05:11		05:50		06:27 (WEA 18-1)	06:41		07:31 (WEA 18-3)	07:32	07:27	08:18	
	21:53		21:17	19	06:46 (WEA 18-1)	20:12	31	08:02 (WEA 18-3)	19:01	16:55	16:17	
5	05:11		05:52		06:29 (WEA 18-1)	06:43		07:32 (WEA 18-3)	07:33	07:29	08:19	
	21:52		21:15	16	06:45 (WEA 18-1)	20:10	32	08:04 (WEA 18-4)	18:59	16:53	16:16	
6	05:12		05:53		06:30 (WEA 18-1)	06:45		07:34 (WEA 18-3)	07:35	07:30	08:21	
	21:52		21:13	13	06:43 (WEA 18-1)	20:07	32	08:06 (WEA 18-4)	18:57	16:51	16:16	
7	05:13		05:55		06:33 (WEA 18-1)	06:46		07:35 (WEA 18-3)	07:37	07:32	08:22	
	21:51		21:11	7	06:40 (WEA 18-1)	20:05	31	08:06 (WEA 18-4)	18:54	16:50	16:15	
8	05:14		05:57			06:48		07:37 (WEA 18-3)	07:38	07:34	08:23	
	21:51		21:09			20:03	30	08:07 (WEA 18-4)	18:52	16:48	16:15	
9	05:15		05:58		06:59 (WEA 18-2)	06:50		07:40 (WEA 18-4)	07:40	07:36	08:24	
	21:50	4	06:36 (WEA 18-1)	21:08	5	07:04 (WEA 18-2)	20:00	26	08:06 (WEA 18-4)	18:50	16:46	16:14
10	05:16		06:31 (WEA 18-1)	06:00		06:55 (WEA 18-2)	06:51		07:40 (WEA 18-4)	07:42	07:38	08:25
	21:49	8	06:39 (WEA 18-1)	21:06	11	07:06 (WEA 18-2)	19:58	27	08:07 (WEA 18-4)	18:47	16:45	16:14
11	05:17		06:29 (WEA 18-1)	06:01		06:54 (WEA 18-2)	06:53		07:40 (WEA 18-4)	07:44	07:40	08:27
	21:48	11	06:40 (WEA 18-1)	21:04	14	07:08 (WEA 18-2)	19:56	27	08:07 (WEA 18-4)	18:45	16:43	16:14
12	05:18		06:28 (WEA 18-1)	06:03		06:52 (WEA 18-2)	06:55		07:39 (WEA 18-4)	07:45	07:41	08:28
	21:48	13	06:41 (WEA 18-1)	21:02	17	07:09 (WEA 18-2)	19:53	27	08:06 (WEA 18-4)	18:43	16:41	16:14
13	05:19		06:28 (WEA 18-1)	06:05		06:52 (WEA 18-2)	06:56		07:39 (WEA 18-4)	07:47	07:43	08:29
	21:47	15	06:43 (WEA 18-1)	21:00	26	07:56 (WEA 18-3)	19:51	27	08:06 (WEA 18-4)	18:41	16:40	16:14
14	05:20		06:27 (WEA 18-1)	06:06		06:50 (WEA 18-2)	06:58		07:38 (WEA 18-4)	07:49	07:45	08:30
	21:46	16	06:43 (WEA 18-1)	20:58	35	07:59 (WEA 18-3)	19:49	27	08:05 (WEA 18-4)	18:38	16:38	16:14
15	05:22		06:26 (WEA 18-1)	06:08		06:50 (WEA 18-2)	07:00		07:39 (WEA 18-4)	07:51	07:47	08:31
	21:45	18	06:44 (WEA 18-1)	20:56	40	08:02 (WEA 18-3)	19:46	25	08:04 (WEA 18-4)	18:36	16:37	16:14
16	05:23		06:27 (WEA 18-1)	06:10		06:49 (WEA 18-2)	07:01		07:40 (WEA 18-4)	07:52	07:49	08:32
	21:44	19	06:46 (WEA 18-1)	20:54	45	08:03 (WEA 18-3)	19:44	23	08:03 (WEA 18-4)	18:34	16:35	16:14
17	05:24		06:26 (WEA 18-1)	06:11		06:49 (WEA 18-2)	07:03		07:40 (WEA 18-4)	07:54	07:50	08:32
	21:43	20	06:46 (WEA 18-1)	20:52	48	08:05 (WEA 18-3)	19:41	21	08:01 (WEA 18-4)	18:32	16:34	16:14
18	05:25		06:25 (WEA 18-1)	06:13		06:50 (WEA 18-2)	07:05		07:41 (WEA 18-4)	07:56	07:52	08:33
	21:42	22	06:47 (WEA 18-1)	20:50	49	08:06 (WEA 18-3)	19:39	19	08:00 (WEA 18-4)	18:30	16:33	16:14
19	05:27		06:25 (WEA 18-1)	06:15		06:49 (WEA 18-2)	07:06		07:43 (WEA 18-4)	07:58	07:54	08:34
	21:40	22	06:47 (WEA 18-1)	20:48	51	08:06 (WEA 18-3)	19:37	15	07:58 (WEA 18-4)	18:27	16:31	16:14
20	05:28		06:24 (WEA 18-1)	06:16		06:50 (WEA 18-2)	07:08		07:45 (WEA 18-4)	08:00	07:56	08:35
	21:39	23	06:47 (WEA 18-1)	20:45	52	08:08 (WEA 18-3)	19:34	9	07:54 (WEA 18-4)	18:25	16:30	16:15
21	05:29		06:25 (WEA 18-1)	06:18		06:50 (WEA 18-2)	07:10			08:01	07:57	08:35
	21:38	24	06:49 (WEA 18-1)	20:43	53	08:08 (WEA 18-3)	19:32			18:23	16:29	16:15
22	05:31		06:24 (WEA 18-1)	06:20		06:51 (WEA 18-2)	07:11			08:03	07:59	08:36
	21:37	25	06:49 (WEA 18-1)	20:41	51	08:08 (WEA 18-3)	19:30			18:21	16:27	16:16
23	05:32		06:24 (WEA 18-1)	06:21		06:51 (WEA 18-2)	07:13			08:05	08:01	08:36
	21:35	25	06:49 (WEA 18-1)	20:39	51	08:08 (WEA 18-3)	19:27			18:19	16:26	16:16
24	05:33		06:24 (WEA 18-1)	06:23		06:54 (WEA 18-2)	07:15			08:07	08:02	08:37
	21:34	26	06:50 (WEA 18-1)	20:37	47	08:09 (WEA 18-3)	19:25			18:17	16:25	16:17
25	05:35		06:24 (WEA 18-1)	06:25		07:31 (WEA 18-3)	07:16			08:09	08:04	08:37
	21:33	25	06:49 (WEA 18-1)	20:35	38	08:09 (WEA 18-3)	19:22			18:15	16:24	16:17
26	05:36		06:23 (WEA 18-1)	06:26		07:30 (WEA 18-3)	07:18			08:10	08:06	08:38
	21:31	26	06:49 (WEA 18-1)	20:32	39	08:09 (WEA 18-3)	19:20			18:13	16:23	16:18
27	05:38		06:24 (WEA 18-1)	06:28		07:30 (WEA 18-3)	07:20			08:12	08:07	08:38
	21:30	26	06:50 (WEA 18-1)	20:30	39	08:09 (WEA 18-3)	19:18			18:11	16:22	16:19
28	05:39		06:24 (WEA 18-1)	06:30		07:29 (WEA 18-3)	07:21			07:14	08:09	08:38
	21:28	25	06:49 (WEA 18-1)	20:28	39	08:08 (WEA 18-3)	19:15			17:09	16:21	16:19
29	05:41		06:24 (WEA 18-1)	06:31		07:30 (WEA 18-3)	07:23			07:16	08:10	08:38
	21:27	25	06:49 (WEA 18-1)	20:26	38	08:08 (WEA 18-3)	19:13			17:07	16:20	16:20
30	05:42		06:24 (WEA 18-1)	06:33		07:29 (WEA 18-3)	07:25			07:18	08:12	08:38
	21:25	25	06:49 (WEA 18-1)	20:23	38	08:07 (WEA 18-3)	19:11			17:05	16:19	16:21
31	05:44		06:24 (WEA 18-1)	06:35		07:29 (WEA 18-3)				07:19		08:38
	21:23	24	06:48 (WEA 18-1)	20:21	37	08:06 (WEA 18-3)				17:03		16:22
Sonnenscheinstunden	505		456			382			332	265	241	
astr.max.mögl.Beschattung	467		983			533						

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:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 33a - Große Haar 15/Nordost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38	08:11	07:17	07:06		05:59	07:24 (WEA 18-4)	05:12	06:40 (WEA 18-3)	
	16:23	17:12	18:04	20:00		20:52	10 07:34 (WEA 18-4)	21:39	51 07:31 (WEA 18-3)	
2	08:38	08:10	07:15	07:03		05:57		05:12	06:40 (WEA 18-3)	
	16:24	17:13	18:06	20:01		20:53		21:40	51 07:31 (WEA 18-3)	
3	08:38	08:08	07:13	07:01		05:55	07:01 (WEA 18-3)	05:11	06:40 (WEA 18-3)	
	16:25	17:15	18:08	20:03		20:55	7 07:08 (WEA 18-3)	21:41	50 07:30 (WEA 18-3)	
4	08:38	08:07	07:11	06:59		05:54	06:57 (WEA 18-3)	05:10	06:41 (WEA 18-3)	
	16:27	17:17	18:10	20:05		20:57	17 07:14 (WEA 18-3)	21:42	50 07:31 (WEA 18-3)	
5	08:38	08:05	07:08	06:56		05:52	06:54 (WEA 18-3)	05:09	06:40 (WEA 18-3)	
	16:28	17:19	18:12	20:07		20:59	22 07:16 (WEA 18-3)	21:43	51 07:31 (WEA 18-3)	
6	08:37	08:03	07:06	06:54		05:50	06:21 (WEA 18-2)	05:09	06:40 (WEA 18-3)	
	16:29	17:21	18:13	20:08		21:00	37 07:18 (WEA 18-3)	21:44	50 07:30 (WEA 18-3)	
7	08:37	08:01	07:04	06:52		05:48	06:19 (WEA 18-2)	05:08	06:41 (WEA 18-3)	
	16:30	17:23	18:15	20:10		21:02	45 07:20 (WEA 18-3)	21:45	50 07:31 (WEA 18-3)	
8	08:37	08:00	07:02	06:49		05:46	06:18 (WEA 18-2)	05:07	05:52 (WEA 18-1)	
	16:32	17:25	18:17	20:12	4	07:37 (WEA 18-4)	51 07:22 (WEA 18-3)	21:46	50 07:30 (WEA 18-3)	
9	08:36	07:58	06:59	06:47		07:28 (WEA 18-4)	05:44	05:07	05:50 (WEA 18-1)	
	16:33	17:27	18:19	20:14	14	07:42 (WEA 18-4)	21:05	54 07:22 (WEA 18-3)	21:47	57 07:31 (WEA 18-3)
10	08:36	07:56	06:57	06:45		07:25 (WEA 18-4)	05:43	06:16 (WEA 18-2)	05:06	05:49 (WEA 18-1)
	16:34	17:29	18:21	20:15	20	07:45 (WEA 18-4)	21:07	58 07:23 (WEA 18-3)	21:48	58 07:31 (WEA 18-3)
11	08:35	07:54	06:55	06:42		07:22 (WEA 18-4)	05:41	06:16 (WEA 18-2)	05:06	05:48 (WEA 18-1)
	16:36	17:30	18:23	20:17	23	07:45 (WEA 18-4)	21:09	62 07:25 (WEA 18-3)	21:49	60 07:31 (WEA 18-3)
12	08:34	07:52	06:52	06:40		07:21 (WEA 18-4)	05:39	06:15 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:37	17:32	18:24	20:19	26	07:47 (WEA 18-4)	21:10	64 07:25 (WEA 18-3)	21:49	62 07:31 (WEA 18-3)
13	08:34	07:50	06:50	06:38		07:20 (WEA 18-4)	05:37	06:15 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:39	17:34	18:26	20:21	28	07:48 (WEA 18-4)	21:12	66 07:26 (WEA 18-3)	21:50	62 07:31 (WEA 18-3)
14	08:33	07:49	06:48	06:36		07:19 (WEA 18-4)	05:36	06:14 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:40	17:36	18:28	20:22	29	07:48 (WEA 18-4)	21:13	67 07:26 (WEA 18-3)	21:51	64 07:32 (WEA 18-3)
15	08:32	07:47	06:45	06:33		07:18 (WEA 18-4)	05:34	06:14 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:42	17:38	18:30	20:24	31	07:49 (WEA 18-4)	21:15	69 07:27 (WEA 18-3)	21:51	63 07:32 (WEA 18-3)
16	08:31	07:45	06:43	06:31		07:16 (WEA 18-4)	05:33	06:14 (WEA 18-2)	05:05	05:46 (WEA 18-1)
	16:43	17:40	18:31	20:26	32	07:48 (WEA 18-4)	21:17	69 07:27 (WEA 18-3)	21:52	64 07:31 (WEA 18-3)
17	08:30	07:43	06:41	06:29		07:16 (WEA 18-4)	05:31	06:14 (WEA 18-2)	05:04	05:46 (WEA 18-1)
	16:45	17:42	18:33	20:28	33	07:49 (WEA 18-4)	21:18	71 07:28 (WEA 18-3)	21:52	64 07:31 (WEA 18-3)
18	08:29	07:41	06:38	06:27		07:15 (WEA 18-4)	05:29	06:14 (WEA 18-2)	05:04	05:46 (WEA 18-1)
	16:47	17:44	18:35	20:29	34	07:49 (WEA 18-4)	21:20	71 07:28 (WEA 18-3)	21:53	66 07:32 (WEA 18-3)
19	08:28	07:39	06:36	06:24		07:15 (WEA 18-4)	05:28	06:14 (WEA 18-2)	05:04	05:47 (WEA 18-1)
	16:48	17:46	18:37	20:31	34	07:49 (WEA 18-4)	21:21	71 07:28 (WEA 18-3)	21:53	65 07:33 (WEA 18-3)
20	08:27	07:37	06:34	06:22		07:15 (WEA 18-4)	05:27	06:15 (WEA 18-2)	05:04	05:47 (WEA 18-1)
	16:50	17:48	18:39	20:33	33	07:48 (WEA 18-4)	21:23	71 07:29 (WEA 18-3)	21:54	65 07:33 (WEA 18-3)
21	08:26	07:34	06:31	06:20		07:15 (WEA 18-4)	05:25	06:16 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:52	17:49	18:40	20:34	33	07:48 (WEA 18-4)	21:24	70 07:29 (WEA 18-3)	21:54	65 07:33 (WEA 18-3)
22	08:25	07:32	06:29	06:18		07:15 (WEA 18-4)	05:24	06:15 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:53	17:51	18:42	20:36	33	07:48 (WEA 18-4)	21:26	71 07:29 (WEA 18-3)	21:54	65 07:33 (WEA 18-3)
23	08:24	07:30	06:27	06:16		07:15 (WEA 18-4)	05:22	06:16 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:55	17:53	18:44	20:38	32	07:47 (WEA 18-4)	21:27	69 07:29 (WEA 18-3)	21:54	65 07:33 (WEA 18-3)
24	08:23	07:28	06:24	06:14		07:16 (WEA 18-4)	05:21	06:17 (WEA 18-2)	05:05	05:48 (WEA 18-1)
	16:57	17:55	18:46	20:40	30	07:46 (WEA 18-4)	21:29	69 07:30 (WEA 18-3)	21:55	65 07:34 (WEA 18-3)
25	08:21	07:26	07:22	06:12		07:16 (WEA 18-4)	05:20	06:18 (WEA 18-2)	05:05	05:48 (WEA 18-1)
	16:59	17:57	19:47	20:41	29	07:45 (WEA 18-4)	21:30	67 07:30 (WEA 18-3)	21:55	65 07:34 (WEA 18-3)
26	08:20	07:24	07:20	06:10		07:17 (WEA 18-4)	05:19	06:19 (WEA 18-2)	05:06	05:48 (WEA 18-1)
	17:01	17:59	19:49	20:43	27	07:44 (WEA 18-4)	21:31	66 07:30 (WEA 18-3)	21:55	65 07:33 (WEA 18-3)
27	08:19	07:22	07:17	06:07		07:17 (WEA 18-4)	05:18	06:20 (WEA 18-2)	05:06	05:49 (WEA 18-1)
	17:02	18:01	19:51	20:45	26	07:43 (WEA 18-4)	21:33	64 07:30 (WEA 18-3)	21:55	64 07:34 (WEA 18-3)
28	08:17	07:19	07:15	06:05		07:18 (WEA 18-4)	05:16	06:21 (WEA 18-2)	05:07	05:49 (WEA 18-1)
	17:04	18:03	19:53	20:47	24	07:42 (WEA 18-4)	21:34	62 07:30 (WEA 18-3)	21:54	64 07:34 (WEA 18-3)
29	08:16		07:13	06:03		07:20 (WEA 18-4)	05:15	06:23 (WEA 18-2)	05:07	05:50 (WEA 18-1)
	17:06		19:54	20:48	20	07:40 (WEA 18-4)	21:35	58 07:30 (WEA 18-3)	21:54	64 07:35 (WEA 18-3)
30	08:14		07:10	06:01		07:21 (WEA 18-4)	05:14	06:39 (WEA 18-3)	05:08	05:50 (WEA 18-1)
	17:08		19:56	20:50	17	07:38 (WEA 18-4)	21:37	51 07:30 (WEA 18-3)	21:54	63 07:35 (WEA 18-3)
31	08:13		07:08			05:13	06:39 (WEA 18-3)			
	17:10		19:58			21:38	51 07:30 (WEA 18-3)			
Sonnenscheinstunden	256	275	366	416		487	1680	502	1798	
astr.max.mögl.Beschattung				612						

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

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

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 33a - Große Haar 15/Nordost

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	05:08		05:51 (WEA 18-1)	05:45		06:25 (WEA 18-2)	06:36		07:21 (WEA 18-4)	07:26		07:21		08:13	
	21:54	62	07:35 (WEA 18-3)	21:22	65	07:36 (WEA 18-3)	20:19	25	07:46 (WEA 18-4)	19:08		17:01		16:19	
2	05:09		05:52 (WEA 18-1)	05:47		06:25 (WEA 18-2)	06:38		07:21 (WEA 18-4)	07:28		07:23		08:15	
	21:54	61	07:36 (WEA 18-3)	21:20	63	07:35 (WEA 18-3)	20:17	23	07:44 (WEA 18-4)	19:06		16:59		16:18	
3	05:10		05:53 (WEA 18-1)	05:49		06:26 (WEA 18-2)	06:40		07:23 (WEA 18-4)	07:30		07:25		08:16	
	21:53	60	07:36 (WEA 18-3)	21:18	61	07:35 (WEA 18-3)	20:14	19	07:42 (WEA 18-4)	19:04		16:57		16:17	
4	05:11		05:54 (WEA 18-1)	05:50		06:26 (WEA 18-2)	06:41		07:25 (WEA 18-4)	07:31		07:27		08:18	
	21:53	57	07:36 (WEA 18-3)	21:17	57	07:33 (WEA 18-3)	20:12	14	07:39 (WEA 18-4)	19:01		16:55		16:17	
5	05:11		05:56 (WEA 18-1)	05:52		06:28 (WEA 18-2)	06:43		07:30 (WEA 18-4)	07:33		07:29		08:19	
	21:52	55	07:37 (WEA 18-3)	21:15	52	07:32 (WEA 18-3)	20:10	4	07:34 (WEA 18-4)	18:59		16:53		16:16	
6	05:12		06:47 (WEA 18-3)	05:53		06:28 (WEA 18-2)	06:45			07:35		07:30		08:21	
	21:52	50	07:37 (WEA 18-3)	21:13	48	07:30 (WEA 18-3)	20:07			18:57		16:51		16:16	
7	05:13		06:47 (WEA 18-3)	05:55		06:30 (WEA 18-2)	06:46			07:37		07:32		08:22	
	21:51	50	07:37 (WEA 18-3)	21:11	42	07:29 (WEA 18-3)	20:05			18:54		16:50		16:15	
8	05:14		06:47 (WEA 18-3)	05:57		06:32 (WEA 18-2)	06:48			07:38		07:34		08:23	
	21:51	50	07:37 (WEA 18-3)	21:09	34	07:27 (WEA 18-3)	20:03			18:52		16:48		16:15	
9	05:15		06:47 (WEA 18-3)	05:58		07:04 (WEA 18-3)	06:50			07:40		07:36		08:24	
	21:50	50	07:37 (WEA 18-3)	21:08	21	07:25 (WEA 18-3)	20:00			18:50		16:46		16:14	
10	05:16		06:47 (WEA 18-3)	06:00		07:07 (WEA 18-3)	06:51			07:42		07:38		08:25	
	21:49	51	07:38 (WEA 18-3)	21:06	14	07:21 (WEA 18-3)	19:58			18:47		16:45		16:14	
11	05:17		06:47 (WEA 18-3)	06:01			06:53			07:44		07:40		08:27	
	21:48	51	07:38 (WEA 18-3)	21:04			19:56			18:45		16:43		16:14	
12	05:18		06:47 (WEA 18-3)	06:03		07:36 (WEA 18-4)	06:55			07:45		07:41		08:28	
	21:48	51	07:38 (WEA 18-3)	21:02	2	07:38 (WEA 18-4)	19:53			18:43		16:41		16:14	
13	05:19		06:47 (WEA 18-3)	06:05		07:31 (WEA 18-4)	06:56			07:47		07:43		08:29	
	21:47	51	07:38 (WEA 18-3)	21:00	13	07:44 (WEA 18-4)	19:51			18:41		16:40		16:14	
14	05:20		06:47 (WEA 18-3)	06:06		07:28 (WEA 18-4)	06:58			07:49		07:45		08:30	
	21:46	51	07:38 (WEA 18-3)	20:58	18	07:46 (WEA 18-4)	19:49			18:38		16:38		16:14	
15	05:22		06:33 (WEA 18-2)	06:08		07:27 (WEA 18-4)	07:00			07:51		07:47		08:31	
	21:45	56	07:39 (WEA 18-3)	20:56	21	07:48 (WEA 18-4)	19:46			18:36		16:37		16:14	
16	05:23		06:31 (WEA 18-2)	06:10		07:25 (WEA 18-4)	07:01			07:52		07:49		08:32	
	21:44	61	07:40 (WEA 18-3)	20:54	23	07:48 (WEA 18-4)	19:44			18:34		16:35		16:14	
17	05:24		06:30 (WEA 18-2)	06:11		07:24 (WEA 18-4)	07:03			07:54		07:50		08:32	
	21:43	64	07:40 (WEA 18-3)	20:52	26	07:50 (WEA 18-4)	19:41			18:32		16:34		16:14	
18	05:25		06:29 (WEA 18-2)	06:13		07:23 (WEA 18-4)	07:05			07:56		07:52		08:33	
	21:42	65	07:39 (WEA 18-3)	20:50	28	07:51 (WEA 18-4)	19:39			18:30		16:33		16:14	
19	05:27		06:28 (WEA 18-2)	06:15		07:22 (WEA 18-4)	07:06			07:58		07:54		08:34	
	21:40	67	07:39 (WEA 18-3)	20:47	29	07:51 (WEA 18-4)	19:37			18:27		16:31		16:14	
20	05:28		06:27 (WEA 18-2)	06:16		07:21 (WEA 18-4)	07:08			08:00		07:56		08:35	
	21:39	68	07:39 (WEA 18-3)	20:45	31	07:52 (WEA 18-4)	19:34			18:25		16:30		16:15	
21	05:29		06:27 (WEA 18-2)	06:18		07:20 (WEA 18-4)	07:10			08:01		07:57		08:35	
	21:38	70	07:40 (WEA 18-3)	20:43	32	07:52 (WEA 18-4)	19:32			18:23		16:29		16:15	
22	05:31		06:26 (WEA 18-2)	06:20		07:20 (WEA 18-4)	07:11			08:03		07:59		08:36	
	21:37	71	07:40 (WEA 18-3)	20:41	32	07:52 (WEA 18-4)	19:30			18:21		16:27		16:16	
23	05:32		06:26 (WEA 18-2)	06:21		07:19 (WEA 18-4)	07:13			08:05		08:01		08:36	
	21:35	70	07:39 (WEA 18-3)	20:39	33	07:52 (WEA 18-4)	19:27			18:19		16:26		16:16	
24	05:33		06:26 (WEA 18-2)	06:23		07:19 (WEA 18-4)	07:15			08:07		08:02		08:37	
	21:34	72	07:40 (WEA 18-3)	20:37	33	07:52 (WEA 18-4)	19:25			18:17		16:25		16:17	
25	05:35		06:25 (WEA 18-2)	06:25		07:19 (WEA 18-4)	07:16			08:09		08:04		08:37	
	21:33	72	07:39 (WEA 18-3)	20:35	33	07:52 (WEA 18-4)	19:22			18:15		16:24		16:17	
26	05:36		06:25 (WEA 18-2)	06:26		07:18 (WEA 18-4)	07:18			08:10		08:06		08:38	
	21:31	72	07:39 (WEA 18-3)	20:32	33	07:51 (WEA 18-4)	19:20			18:13		16:23		16:18	
27	05:38		06:25 (WEA 18-2)	06:28		07:19 (WEA 18-4)	07:20			08:12		08:07		08:38	
	21:30	71	07:39 (WEA 18-3)	20:30	32	07:51 (WEA 18-4)	19:18			18:11		16:22		16:19	
28	05:39		06:25 (WEA 18-2)	06:30		07:18 (WEA 18-4)	07:21			07:14		08:09		08:38	
	21:28	70	07:38 (WEA 18-3)	20:28	32	07:50 (WEA 18-4)	19:15			17:09		16:21		16:19	
29	05:41		06:24 (WEA 18-2)	06:31		07:19 (WEA 18-4)	07:23			07:16		08:10		08:38	
	21:27	70	07:37 (WEA 18-3)	20:26	31	07:50 (WEA 18-4)	19:13			17:07		16:20		16:20	
30	05:42		06:25 (WEA 18-2)	06:33		07:19 (WEA 18-4)	07:25			07:18		08:12		08:38	
	21:25	68	07:37 (WEA 18-3)	20:23	29	07:48 (WEA 18-4)	19:11			17:05		16:19		16:21	
31	05:44		06:25 (WEA 18-2)	06:35		07:20 (WEA 18-4)				07:19				08:38	
	21:23	67	07:36 (WEA 18-3)	20:21	27	07:47 (WEA 18-4)				17:03				16:22	
Sonnenscheinstunden		505		456			382	85		332		265		241	
astr.max.mögl.Beschattung		1904		995											

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 33b - Große Haar 15A/Südost**
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38	08:11	07:17	07:06		05:59	07:21 (WEA 18-4)	05:12	06:38 (WEA 18-3)
	16:23	17:12	18:04	20:00		20:52	07:35 (WEA 18-4)	21:39	07:30 (WEA 18-3)
2	08:38	08:10	07:15	07:03		05:57	07:25 (WEA 18-4)	05:12	06:38 (WEA 18-3)
	16:24	17:13	18:06	20:01		20:53	07:31 (WEA 18-4)	21:40	07:29 (WEA 18-3)
3	08:38	08:08	07:13	07:01		05:55		05:11	06:38 (WEA 18-3)
	16:25	17:15	18:08	20:03		20:55		21:41	07:29 (WEA 18-3)
4	08:38	08:07	07:11	06:59		05:54	06:59 (WEA 18-3)	05:10	06:39 (WEA 18-3)
	16:27	17:17	18:10	20:05		20:57	07:09 (WEA 18-3)	21:42	07:30 (WEA 18-3)
5	08:38	08:05	07:08	06:56		05:52	06:55 (WEA 18-3)	05:09	06:39 (WEA 18-3)
	16:28	17:19	18:12	20:07		20:59	07:13 (WEA 18-3)	21:43	07:30 (WEA 18-3)
6	08:37	08:03	07:06	06:54		05:50	06:22 (WEA 18-2)	05:09	06:39 (WEA 18-3)
	16:29	17:21	18:13	20:08		21:00	07:15 (WEA 18-3)	21:44	07:29 (WEA 18-3)
7	08:37	08:01	07:04	06:52		05:48	06:19 (WEA 18-2)	05:08	06:39 (WEA 18-3)
	16:30	17:23	18:15	20:10		21:02	07:17 (WEA 18-3)	21:45	07:30 (WEA 18-3)
8	08:37	08:00	07:02	06:49		05:46	06:18 (WEA 18-2)	05:07	06:39 (WEA 18-3)
	16:32	17:25	18:17	20:12		21:04	07:19 (WEA 18-3)	21:46	07:29 (WEA 18-3)
9	08:36	07:58	06:59	06:47		05:44	06:17 (WEA 18-2)	05:07	06:40 (WEA 18-3)
	16:33	17:27	18:19	20:14	10	07:39 (WEA 18-4)	07:20 (WEA 18-3)	21:47	07:30 (WEA 18-3)
10	08:36	07:56	06:57	06:45		05:43	06:15 (WEA 18-2)	05:06	05:50 (WEA 18-1)
	16:34	17:29	18:21	20:15	18	07:43 (WEA 18-4)	07:21 (WEA 18-3)	21:48	07:30 (WEA 18-3)
11	08:35	07:54	06:55	06:42		05:41	06:15 (WEA 18-2)	05:06	05:48 (WEA 18-1)
	16:36	17:30	18:23	20:17	22	07:44 (WEA 18-4)	07:22 (WEA 18-3)	21:49	07:30 (WEA 18-3)
12	08:34	07:52	06:52	06:40		05:39	06:14 (WEA 18-2)	05:05	05:48 (WEA 18-1)
	16:37	17:32	18:24	20:19	24	07:45 (WEA 18-4)	07:23 (WEA 18-3)	21:49	07:30 (WEA 18-3)
13	08:34	07:50	06:50	06:38		05:37	06:14 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:39	17:34	18:26	20:21	27	07:46 (WEA 18-4)	07:24 (WEA 18-3)	21:50	07:30 (WEA 18-3)
14	08:33	07:49	06:48	06:36		05:36	06:14 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:40	17:36	18:28	20:22	29	07:47 (WEA 18-4)	07:24 (WEA 18-3)	21:51	07:31 (WEA 18-3)
15	08:32	07:47	06:45	06:33		05:34	06:14 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:42	17:38	18:30	20:24	31	07:48 (WEA 18-4)	07:25 (WEA 18-3)	21:51	07:31 (WEA 18-3)
16	08:31	07:45	06:43	06:31		05:33	06:13 (WEA 18-2)	05:05	05:46 (WEA 18-1)
	16:43	17:40	18:31	20:26	31	07:47 (WEA 18-4)	07:25 (WEA 18-3)	21:52	07:30 (WEA 18-3)
17	08:30	07:43	06:41	06:29		05:31	06:14 (WEA 18-2)	05:04	05:46 (WEA 18-1)
	16:45	17:42	18:33	20:28	33	07:48 (WEA 18-4)	07:26 (WEA 18-3)	21:52	07:30 (WEA 18-3)
18	08:29	07:41	06:38	06:27		05:29	06:13 (WEA 18-2)	05:04	05:46 (WEA 18-1)
	16:47	17:44	18:35	20:29	33	07:48 (WEA 18-4)	07:26 (WEA 18-3)	21:53	07:31 (WEA 18-3)
19	08:28	07:39	06:36	06:24		05:28	06:14 (WEA 18-2)	05:04	05:47 (WEA 18-1)
	16:48	17:46	18:37	20:31	34	07:48 (WEA 18-4)	07:27 (WEA 18-3)	21:53	07:32 (WEA 18-3)
20	08:27	07:37	06:34	06:22		05:27	06:14 (WEA 18-2)	05:04	05:47 (WEA 18-1)
	16:50	17:48	18:39	20:33	34	07:48 (WEA 18-4)	07:27 (WEA 18-3)	21:54	07:32 (WEA 18-3)
21	08:26	07:34	06:31	06:20		05:25	06:15 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:52	17:49	18:40	20:34	33	07:47 (WEA 18-4)	07:28 (WEA 18-3)	21:54	07:32 (WEA 18-3)
22	08:25	07:32	06:29	06:18		05:24	06:15 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:53	17:51	18:42	20:36	33	07:47 (WEA 18-4)	07:27 (WEA 18-3)	21:54	07:32 (WEA 18-3)
23	08:24	07:30	06:27	06:16		05:22	06:15 (WEA 18-2)	05:05	05:47 (WEA 18-1)
	16:55	17:53	18:44	20:38	32	07:46 (WEA 18-4)	07:28 (WEA 18-3)	21:54	07:32 (WEA 18-3)
24	08:23	07:28	06:24	06:14		05:21	06:16 (WEA 18-2)	05:05	05:48 (WEA 18-1)
	16:57	17:55	18:46	20:40	31	07:46 (WEA 18-4)	07:28 (WEA 18-3)	21:55	07:33 (WEA 18-3)
25	08:21	07:26	07:22	06:12		05:20	06:17 (WEA 18-2)	05:05	05:48 (WEA 18-1)
	16:59	17:57	19:47	20:41	30	07:45 (WEA 18-4)	07:28 (WEA 18-3)	21:55	07:33 (WEA 18-3)
26	08:20	07:24	07:20	06:10		05:19	06:18 (WEA 18-2)	05:06	05:48 (WEA 18-1)
	17:01	17:59	19:49	20:43	29	07:44 (WEA 18-4)	07:29 (WEA 18-3)	21:55	07:32 (WEA 18-3)
27	08:19	07:22	07:17	06:07		05:18	06:19 (WEA 18-2)	05:06	05:49 (WEA 18-1)
	17:02	18:01	19:51	20:45	27	07:43 (WEA 18-4)	07:29 (WEA 18-3)	21:55	07:33 (WEA 18-3)
28	08:17	07:19	07:15	06:05		05:16	06:20 (WEA 18-2)	05:07	05:49 (WEA 18-1)
	17:04	18:03	19:53	20:47	24	07:41 (WEA 18-4)	07:29 (WEA 18-3)	21:54	07:33 (WEA 18-3)
29	08:16		07:13	06:03		05:15	06:21 (WEA 18-2)	05:07	05:50 (WEA 18-1)
	17:06		19:54	20:48	22	07:40 (WEA 18-4)	07:29 (WEA 18-3)	21:54	07:34 (WEA 18-3)
30	08:14		07:10	06:01		05:14	06:23 (WEA 18-2)	05:08	05:50 (WEA 18-1)
	17:08		19:56	20:50	19	07:38 (WEA 18-4)	07:29 (WEA 18-3)	21:54	07:34 (WEA 18-3)
31	08:13		07:08			05:13	06:38 (WEA 18-3)		
	17:10		19:58			21:38	07:29 (WEA 18-3)		
Sonnenscheinstunden	256	275	366	416		487		502	
astr.max.mögl.Beschattung				606		1654		1777	

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: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 33b - Große Haar 15A/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli			August			September			Oktober		November		Dezember	
1	05:08		05:52 (WEA 18-1)	05:45		06:25 (WEA 18-2)	06:36		07:20 (WEA 18-4)	07:26		07:21		08:13	
	21:54	59	07:34 (WEA 18-3)	21:22	63	07:34 (WEA 18-3)	20:19	25	07:45 (WEA 18-4)	19:08		17:01		16:19	
2	05:09		05:53 (WEA 18-1)	05:47		06:25 (WEA 18-2)	06:38		07:21 (WEA 18-4)	07:28		07:23		08:15	
	21:54	59	07:35 (WEA 18-3)	21:20	61	07:33 (WEA 18-3)	20:17	21	07:42 (WEA 18-4)	19:06		16:59		16:18	
3	05:10		05:53 (WEA 18-1)	05:49		06:26 (WEA 18-2)	06:40		07:23 (WEA 18-4)	07:30		07:25		08:16	
	21:53	57	07:34 (WEA 18-3)	21:18	57	07:32 (WEA 18-3)	20:14	17	07:40 (WEA 18-4)	19:04		16:57		16:17	
4	05:11		05:56 (WEA 18-1)	05:50		06:26 (WEA 18-2)	06:41		07:26 (WEA 18-4)	07:31		07:27		08:18	
	21:53	53	07:35 (WEA 18-3)	21:17	55	07:31 (WEA 18-3)	20:12	10	07:36 (WEA 18-4)	19:01		16:55		16:17	
5	05:11		06:45 (WEA 18-3)	05:52		06:27 (WEA 18-2)	06:43			07:33		07:29		08:19	
	21:52	51	07:36 (WEA 18-3)	21:15	50	07:30 (WEA 18-3)	20:10			18:59		16:53		16:16	
6	05:12		06:46 (WEA 18-3)	05:53		06:28 (WEA 18-2)	06:45			07:35		07:30		08:21	
	21:52	50	07:36 (WEA 18-3)	21:13	45	07:28 (WEA 18-3)	20:07			18:57		16:51		16:16	
7	05:13		06:45 (WEA 18-3)	05:55		06:30 (WEA 18-2)	06:46			07:37		07:32		08:22	
	21:51	50	07:35 (WEA 18-3)	21:11	37	07:26 (WEA 18-3)	20:05			18:54		16:50		16:15	
8	05:14		06:45 (WEA 18-3)	05:57		06:33 (WEA 18-2)	06:48			07:38		07:34		08:23	
	21:51	51	07:36 (WEA 18-3)	21:09	26	07:24 (WEA 18-3)	20:03			18:52		16:48		16:15	
9	05:15		06:45 (WEA 18-3)	05:58		07:05 (WEA 18-3)	06:50			07:40		07:36		08:24	
	21:50	51	07:36 (WEA 18-3)	21:08	16	07:21 (WEA 18-3)	20:00			18:50		16:46		16:14	
10	05:16		06:46 (WEA 18-3)	06:00		07:11 (WEA 18-3)	06:51			07:42		07:38		08:25	
	21:49	50	07:36 (WEA 18-3)	21:06	2	07:13 (WEA 18-3)	19:58			18:47		16:45		16:14	
11	05:17		06:46 (WEA 18-3)	06:01			06:53			07:44		07:40		08:27	
	21:48	51	07:37 (WEA 18-3)	21:04			19:56			18:45		16:43		16:14	
12	05:18		06:46 (WEA 18-3)	06:03		07:31 (WEA 18-4)	06:55			07:45		07:41		08:28	
	21:48	51	07:37 (WEA 18-3)	21:02	10	07:41 (WEA 18-4)	19:53			18:43		16:41		16:14	
13	05:19		06:46 (WEA 18-3)	06:05		07:29 (WEA 18-4)	06:56			07:47		07:43		08:29	
	21:47	51	07:37 (WEA 18-3)	21:00	16	07:45 (WEA 18-4)	19:51			18:41		16:40		16:14	
14	05:20		06:33 (WEA 18-2)	06:06		07:26 (WEA 18-4)	06:58			07:49		07:45		08:30	
	21:46	53	07:37 (WEA 18-3)	20:58	20	07:46 (WEA 18-4)	19:49			18:38		16:38		16:14	
15	05:22		06:30 (WEA 18-2)	06:08		07:25 (WEA 18-4)	07:00			07:51		07:47		08:31	
	21:45	59	07:37 (WEA 18-3)	20:56	23	07:48 (WEA 18-4)	19:46			18:36		16:37		16:14	
16	05:23		06:30 (WEA 18-2)	06:10		07:23 (WEA 18-4)	07:01			07:52		07:49		08:32	
	21:44	62	07:38 (WEA 18-3)	20:54	25	07:48 (WEA 18-4)	19:44			18:34		16:35		16:14	
17	05:24		06:29 (WEA 18-2)	06:11		07:22 (WEA 18-4)	07:03			07:54		07:50		08:32	
	21:43	64	07:38 (WEA 18-3)	20:52	28	07:50 (WEA 18-4)	19:41			18:32		16:34		16:14	
18	05:25		06:28 (WEA 18-2)	06:13		07:22 (WEA 18-4)	07:05			07:56		07:52		08:33	
	21:42	66	07:38 (WEA 18-3)	20:50	29	07:51 (WEA 18-4)	19:39			18:30		16:33		16:14	
19	05:27		06:27 (WEA 18-2)	06:15		07:20 (WEA 18-4)	07:06			07:58		07:54		08:34	
	21:40	67	07:38 (WEA 18-3)	20:47	31	07:51 (WEA 18-4)	19:37			18:27		16:31		16:14	
20	05:28		06:26 (WEA 18-2)	06:16		07:20 (WEA 18-4)	07:08			08:00		07:56		08:35	
	21:39	69	07:38 (WEA 18-3)	20:45	31	07:51 (WEA 18-4)	19:34			18:25		16:30		16:15	
21	05:29		06:26 (WEA 18-2)	06:18		07:19 (WEA 18-4)	07:10			08:01		07:57		08:35	
	21:38	69	07:38 (WEA 18-3)	20:43	32	07:51 (WEA 18-4)	19:32			18:23		16:29		16:15	
22	05:31		06:25 (WEA 18-2)	06:20		07:19 (WEA 18-4)	07:11			08:03		07:59		08:36	
	21:37	71	07:38 (WEA 18-3)	20:41	33	07:52 (WEA 18-4)	19:30			18:21		16:27		16:16	
23	05:32		06:25 (WEA 18-2)	06:21		07:18 (WEA 18-4)	07:13			08:05		08:01		08:36	
	21:35	71	07:38 (WEA 18-3)	20:39	33	07:51 (WEA 18-4)	19:27			18:19		16:26		16:16	
24	05:33		06:25 (WEA 18-2)	06:23		07:18 (WEA 18-4)	07:15			08:07		08:02		08:37	
	21:34	71	07:38 (WEA 18-3)	20:37	33	07:51 (WEA 18-4)	19:25			18:17		16:25		16:17	
25	05:35		06:24 (WEA 18-2)	06:25		07:18 (WEA 18-4)	07:16			08:09		08:04		08:37	
	21:33	71	07:37 (WEA 18-3)	20:35	33	07:51 (WEA 18-4)	19:22			18:15		16:24		16:17	
26	05:36		06:24 (WEA 18-2)	06:26		07:17 (WEA 18-4)	07:18			08:10		08:06		08:38	
	21:31	71	07:37 (WEA 18-3)	20:32	33	07:50 (WEA 18-4)	19:20			18:13		16:23		16:18	
27	05:38		06:24 (WEA 18-2)	06:28		07:18 (WEA 18-4)	07:20			08:12		08:07		08:38	
	21:30	71	07:37 (WEA 18-3)	20:30	32	07:50 (WEA 18-4)	19:18			18:11		16:22		16:19	
28	05:39		06:24 (WEA 18-2)	06:30		07:17 (WEA 18-4)	07:21			07:14		08:09		08:38	
	21:28	69	07:36 (WEA 18-3)	20:28	32	07:49 (WEA 18-4)	19:15			17:09		16:21		16:19	
29	05:41		06:24 (WEA 18-2)	06:31		07:18 (WEA 18-4)	07:23			07:16		08:10		08:38	
	21:27	68	07:35 (WEA 18-3)	20:26	31	07:49 (WEA 18-4)	19:13			17:07		16:20		16:20	
30	05:42		06:24 (WEA 18-2)	06:33		07:18 (WEA 18-4)	07:25			07:18		08:12		08:38	
	21:25	68	07:35 (WEA 18-3)	20:23	29	07:47 (WEA 18-4)	19:11			17:05		16:19		16:21	
31	05:44		06:24 (WEA 18-2)	06:35		07:19 (WEA 18-4)				07:19				08:38	
	21:23	65	07:34 (WEA 18-3)	20:21	27	07:46 (WEA 18-4)				17:03				16:22	
Sonnenscheinstunden	505			456			382			332		265		241	
astr.max.mögl.Beschattung		1889			973		73								

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

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

SHADOW - Kalender**Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 34a - Große Haar 15/Nordost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38	08:11	07:17	07:06		05:59	07:10 (WEA 18-4)	05:12	06:17 (WEA 18-2)
	16:23	17:12	18:04	20:00		20:52	07:35 (WEA 18-4)	21:39	07:20 (WEA 18-3)
2	08:38	08:10	07:15	07:03		05:57	07:11 (WEA 18-4)	05:12	06:18 (WEA 18-2)
	16:24	17:13	18:06	20:01		20:53	07:34 (WEA 18-4)	21:40	07:20 (WEA 18-3)
3	08:38	08:08	07:13	07:01		05:55	07:12 (WEA 18-4)	05:11	06:19 (WEA 18-2)
	16:25	17:15	18:08	20:03		20:55	07:32 (WEA 18-4)	21:41	07:20 (WEA 18-3)
4	08:38	08:07	07:11	06:59		05:54	07:14 (WEA 18-4)	05:10	06:22 (WEA 18-2)
	16:27	17:17	18:10	20:05		20:57	07:31 (WEA 18-4)	21:42	07:21 (WEA 18-3)
5	08:38	08:05	07:08	06:56		05:52	07:16 (WEA 18-4)	05:09	06:30 (WEA 18-3)
	16:28	17:19	18:12	20:07		20:59	07:28 (WEA 18-4)	21:43	07:21 (WEA 18-3)
6	08:37	08:03	07:06	06:54		05:50	07:21 (WEA 18-4)	05:09	06:30 (WEA 18-3)
	16:29	17:21	18:13	20:08		21:00	07:22 (WEA 18-4)	21:44	07:20 (WEA 18-3)
7	08:37	08:01	07:04	06:52		05:48		05:08	06:30 (WEA 18-3)
	16:30	17:23	18:15	20:10		21:02		21:45	07:21 (WEA 18-3)
8	08:37	08:00	07:02	06:49		05:46	06:19 (WEA 18-2)	05:07	06:30 (WEA 18-3)
	16:32	17:25	18:17	20:12		21:04	06:24 (WEA 18-2)	21:46	07:21 (WEA 18-3)
9	08:36	07:58	06:59	06:47		05:44	06:16 (WEA 18-2)	05:07	06:30 (WEA 18-3)
	16:33	17:27	18:19	20:14		21:05	06:56 (WEA 18-3)	21:47	07:21 (WEA 18-3)
10	08:36	07:56	06:57	06:45		05:43	06:14 (WEA 18-2)	05:06	06:31 (WEA 18-3)
	16:34	17:29	18:21	20:15		21:07	07:01 (WEA 18-3)	21:48	07:22 (WEA 18-3)
11	08:35	07:54	06:55	06:42		05:41	06:13 (WEA 18-2)	05:06	06:31 (WEA 18-3)
	16:36	17:30	18:23	20:17		21:09	07:04 (WEA 18-3)	21:49	07:21 (WEA 18-3)
12	08:34	07:52	06:52	06:40	07:21 (WEA 18-4)	05:39	06:12 (WEA 18-2)	05:05	06:31 (WEA 18-3)
	16:37	17:32	18:24	20:19	11 07:32 (WEA 18-4)	21:10	07:06 (WEA 18-3)	21:49	07:22 (WEA 18-3)
13	08:34	07:50	06:50	06:38	07:18 (WEA 18-4)	05:37	06:11 (WEA 18-2)	05:05	06:31 (WEA 18-3)
	16:39	17:34	18:26	20:21	17 07:35 (WEA 18-4)	21:12	07:08 (WEA 18-3)	21:50	07:22 (WEA 18-3)
14	08:33	07:49	06:48	06:36	07:16 (WEA 18-4)	05:36	06:10 (WEA 18-2)	05:05	06:32 (WEA 18-3)
	16:40	17:36	18:28	20:22	21 07:37 (WEA 18-4)	21:13	07:09 (WEA 18-3)	21:51	07:23 (WEA 18-3)
15	08:32	07:47	06:45	06:33	07:14 (WEA 18-4)	05:34	06:10 (WEA 18-2)	05:05	06:32 (WEA 18-3)
	16:42	17:38	18:30	20:24	25 07:39 (WEA 18-4)	21:15	07:11 (WEA 18-3)	21:51	07:23 (WEA 18-3)
16	08:31	07:45	06:43	06:31	07:12 (WEA 18-4)	05:33	06:10 (WEA 18-2)	05:05	06:31 (WEA 18-3)
	16:43	17:40	18:31	20:26	27 07:39 (WEA 18-4)	21:17	07:11 (WEA 18-3)	21:52	07:22 (WEA 18-3)
17	08:30	07:43	06:41	06:29	07:11 (WEA 18-4)	05:31	06:10 (WEA 18-2)	05:04	06:32 (WEA 18-3)
	16:45	17:42	18:33	20:28	29 07:40 (WEA 18-4)	21:18	07:13 (WEA 18-3)	21:52	07:23 (WEA 18-3)
18	08:29	07:41	06:38	06:27	07:10 (WEA 18-4)	05:29	06:09 (WEA 18-2)	05:04	06:32 (WEA 18-3)
	16:47	17:44	18:35	20:29	30 07:40 (WEA 18-4)	21:20	07:13 (WEA 18-3)	21:53	07:23 (WEA 18-3)
19	08:28	07:39	06:36	06:24	07:09 (WEA 18-4)	05:28	06:09 (WEA 18-2)	05:04	06:33 (WEA 18-3)
	16:48	17:46	18:37	20:31	32 07:41 (WEA 18-4)	21:21	07:14 (WEA 18-3)	21:53	07:24 (WEA 18-3)
20	08:27	07:37	06:34	06:22	07:09 (WEA 18-4)	05:27	06:10 (WEA 18-2)	05:04	06:33 (WEA 18-3)
	16:50	17:48	18:39	20:33	32 07:41 (WEA 18-4)	21:23	07:15 (WEA 18-3)	21:54	07:24 (WEA 18-3)
21	08:26	07:34	06:31	06:20	07:08 (WEA 18-4)	05:25	06:10 (WEA 18-2)	05:05	06:33 (WEA 18-3)
	16:52	17:49	18:40	20:34	33 07:41 (WEA 18-4)	21:24	07:16 (WEA 18-3)	21:54	07:24 (WEA 18-3)
22	08:25	07:32	06:29	06:18	07:08 (WEA 18-4)	05:24	06:10 (WEA 18-2)	05:05	06:33 (WEA 18-3)
	16:53	17:51	18:42	20:36	33 07:41 (WEA 18-4)	21:26	07:16 (WEA 18-3)	21:54	07:24 (WEA 18-3)
23	08:24	07:30	06:27	06:16	07:08 (WEA 18-4)	05:22	06:10 (WEA 18-2)	05:05	06:33 (WEA 18-3)
	16:55	17:53	18:44	20:38	33 07:41 (WEA 18-4)	21:27	07:16 (WEA 18-3)	21:54	07:24 (WEA 18-3)
24	08:23	07:28	06:24	06:14	07:08 (WEA 18-4)	05:21	06:11 (WEA 18-2)	05:05	06:34 (WEA 18-3)
	16:57	17:55	18:46	20:40	33 07:41 (WEA 18-4)	21:29	07:17 (WEA 18-3)	21:55	07:25 (WEA 18-3)
25	08:21	07:26	07:22	06:12	07:08 (WEA 18-4)	05:20	06:11 (WEA 18-2)	05:05	06:34 (WEA 18-3)
	16:59	17:57	19:47	20:41	33 07:41 (WEA 18-4)	21:30	07:17 (WEA 18-3)	21:55	07:25 (WEA 18-3)
26	08:20	07:24	07:20	06:10	07:08 (WEA 18-4)	05:19	06:12 (WEA 18-2)	05:06	06:34 (WEA 18-3)
	17:01	17:59	19:49	20:43	32 07:40 (WEA 18-4)	21:31	07:18 (WEA 18-3)	21:55	07:25 (WEA 18-3)
27	08:19	07:22	07:17	06:07	07:08 (WEA 18-4)	05:18	06:12 (WEA 18-2)	05:06	06:34 (WEA 18-3)
	17:02	18:01	19:51	20:45	31 07:39 (WEA 18-4)	21:33	07:18 (WEA 18-3)	21:55	07:25 (WEA 18-3)
28	08:17	07:19	07:15	06:05	07:08 (WEA 18-4)	05:16	06:13 (WEA 18-2)	05:07	06:34 (WEA 18-3)
	17:04	18:03	19:53	20:47	31 07:39 (WEA 18-4)	21:34	07:18 (WEA 18-3)	21:54	07:25 (WEA 18-3)
29	08:16		07:13	06:03	07:09 (WEA 18-4)	05:15	06:13 (WEA 18-2)	05:07	06:35 (WEA 18-3)
	17:06		19:54	20:48	29 07:38 (WEA 18-4)	21:35	07:19 (WEA 18-3)	21:54	07:26 (WEA 18-3)
30	08:14		07:10	06:01	07:09 (WEA 18-4)	05:14	06:14 (WEA 18-2)	05:08	06:34 (WEA 18-3)
	17:08		19:56	20:50	28 07:37 (WEA 18-4)	21:37	07:19 (WEA 18-3)	21:54	07:25 (WEA 18-3)
31	08:13		07:08			05:13	06:15 (WEA 18-2)		
	17:10		19:58			21:38	07:19 (WEA 18-3)		
Sonnenscheinstunden	256	275	366	416		487		502	
astr.max.mögl.Beschattung				540		1424		1558	

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: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 34a - Große Haar 15/Nordost**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli			August			September			Oktober			November			Dezember		
1	05:08		06:35 (WEA 18-3)	05:45		06:22 (WEA 18-2)	06:36		07:21 (WEA 18-4)	07:26		07:21	08:13				
	21:54	51	07:26 (WEA 18-3)	21:22	48	07:18 (WEA 18-3)	20:19	11	07:32 (WEA 18-4)	19:08		17:01	16:19				
2	05:09		06:36 (WEA 18-3)	05:47		06:22 (WEA 18-2)	06:38			07:28		07:23	08:15				
	21:54	51	07:27 (WEA 18-3)	21:20	42	07:16 (WEA 18-3)	20:17			19:06		16:59	16:18				
3	05:10		06:35 (WEA 18-3)	05:49		06:24 (WEA 18-2)	06:40			07:30		07:25	08:16				
	21:53	51	07:26 (WEA 18-3)	21:18	36	07:14 (WEA 18-3)	20:14			19:04		16:57	16:17				
4	05:11		06:36 (WEA 18-3)	05:50		06:25 (WEA 18-2)	06:41			07:31		07:27	08:18				
	21:53	51	07:27 (WEA 18-3)	21:17	26	07:10 (WEA 18-3)	20:12			19:01		16:55	16:17				
5	05:11		06:36 (WEA 18-3)	05:52		06:27 (WEA 18-2)	06:43			07:33		07:29	08:19				
	21:52	51	07:27 (WEA 18-3)	21:15	9	06:36 (WEA 18-2)	20:10			18:59		16:53	16:16				
6	05:12		06:36 (WEA 18-3)	05:53			06:45			07:35		07:30	08:21				
	21:52	51	07:27 (WEA 18-3)	21:13			20:07			18:57		16:51	16:16				
7	05:13		06:36 (WEA 18-3)	05:55			06:46			07:37		07:32	08:22				
	21:51	51	07:27 (WEA 18-3)	21:11			20:05			18:54		16:50	16:15				
8	05:14		06:36 (WEA 18-3)	05:57		07:27 (WEA 18-4)	06:48			07:38		07:34	08:23				
	21:51	51	07:27 (WEA 18-3)	21:09	8	07:35 (WEA 18-4)	20:03			18:52		16:48	16:15				
9	05:15		06:36 (WEA 18-3)	05:58		07:25 (WEA 18-4)	06:50			07:40		07:36	08:24				
	21:50	51	07:27 (WEA 18-3)	21:08	14	07:39 (WEA 18-4)	20:00			18:50		16:46	16:14				
10	05:16		06:27 (WEA 18-2)	06:00		07:22 (WEA 18-4)	06:51			07:42		07:38	08:25				
	21:49	56	07:27 (WEA 18-3)	21:06	18	07:40 (WEA 18-4)	19:58			18:47		16:45	16:14				
11	05:17		06:26 (WEA 18-2)	06:01		07:21 (WEA 18-4)	06:53			07:44		07:40	08:27				
	21:48	58	07:27 (WEA 18-3)	21:04	21	07:42 (WEA 18-4)	19:56			18:45		16:43	16:14				
12	05:18		06:24 (WEA 18-2)	06:03		07:19 (WEA 18-4)	06:55			07:45		07:41	08:28				
	21:48	62	07:27 (WEA 18-3)	21:02	24	07:43 (WEA 18-4)	19:53			18:43		16:41	16:14				
13	05:19		06:24 (WEA 18-2)	06:05		07:18 (WEA 18-4)	06:56			07:47		07:43	08:29				
	21:47	63	07:27 (WEA 18-3)	21:00	26	07:44 (WEA 18-4)	19:51			18:41		16:40	16:14				
14	05:20		06:23 (WEA 18-2)	06:06		07:16 (WEA 18-4)	06:58			07:49		07:45	08:30				
	21:46	64	07:27 (WEA 18-3)	20:58	28	07:44 (WEA 18-4)	19:49			18:38		16:38	16:14				
15	05:22		06:22 (WEA 18-2)	06:08		07:16 (WEA 18-4)	07:00			07:51		07:47	08:31				
	21:45	65	07:27 (WEA 18-3)	20:56	29	07:45 (WEA 18-4)	19:46			18:36		16:37	16:14				
16	05:23		06:23 (WEA 18-2)	06:10		07:15 (WEA 18-4)	07:01			07:52		07:49	08:32				
	21:44	65	07:28 (WEA 18-3)	20:54	30	07:45 (WEA 18-4)	19:44			18:34		16:35	16:14				
17	05:24		06:22 (WEA 18-2)	06:11		07:14 (WEA 18-4)	07:03			07:54		07:50	08:32				
	21:43	66	07:28 (WEA 18-3)	20:52	32	07:46 (WEA 18-4)	19:41			18:32		16:34	16:14				
18	05:25		06:21 (WEA 18-2)	06:13		07:14 (WEA 18-4)	07:05			07:56		07:52	08:33				
	21:42	66	07:27 (WEA 18-3)	20:50	33	07:47 (WEA 18-4)	19:39			18:30		16:33	16:14				
19	05:27		06:21 (WEA 18-2)	06:15		07:13 (WEA 18-4)	07:06			07:58		07:54	08:34				
	21:40	66	07:27 (WEA 18-3)	20:47	33	07:46 (WEA 18-4)	19:37			18:27		16:31	16:14				
20	05:28		06:20 (WEA 18-2)	06:16		07:13 (WEA 18-4)	07:08			08:00		07:56	08:35				
	21:39	67	07:27 (WEA 18-3)	20:45	34	07:47 (WEA 18-4)	19:34			18:25		16:30	16:15				
21	05:29		06:21 (WEA 18-2)	06:18		07:12 (WEA 18-4)	07:10			08:01		07:57	08:35				
	21:38	66	07:27 (WEA 18-3)	20:43	34	07:46 (WEA 18-4)	19:32			18:23		16:29	16:15				
22	05:31		06:20 (WEA 18-2)	06:20		07:13 (WEA 18-4)	07:11			08:03		07:59	08:36				
	21:37	66	07:26 (WEA 18-3)	20:41	33	07:46 (WEA 18-4)	19:30			18:21		16:27	16:16				
23	05:32		06:20 (WEA 18-2)	06:21		07:12 (WEA 18-4)	07:13			08:05		08:01	08:36				
	21:35	66	07:26 (WEA 18-3)	20:39	33	07:45 (WEA 18-4)	19:27			18:19		16:26	16:16				
24	05:33		06:20 (WEA 18-2)	06:23		07:13 (WEA 18-4)	07:15			08:07		08:02	08:37				
	21:34	66	07:26 (WEA 18-3)	20:37	32	07:45 (WEA 18-4)	19:25			18:17		16:25	16:17				
25	05:35		06:20 (WEA 18-2)	06:25		07:13 (WEA 18-4)	07:16			08:09		08:04	08:37				
	21:33	65	07:25 (WEA 18-3)	20:35	31	07:44 (WEA 18-4)	19:22			18:15		16:24	16:17				
26	05:36		06:20 (WEA 18-2)	06:26		07:13 (WEA 18-4)	07:18			08:10		08:06	08:38				
	21:31	64	07:24 (WEA 18-3)	20:32	30	07:43 (WEA 18-4)	19:20			18:13		16:23	16:18				
27	05:38		06:20 (WEA 18-2)	06:28		07:14 (WEA 18-4)	07:20			08:12		08:07	08:38				
	21:30	63	07:24 (WEA 18-3)	20:30	28	07:42 (WEA 18-4)	19:18			18:11		16:22	16:19				
28	05:39		06:20 (WEA 18-2)	06:30		07:14 (WEA 18-4)	07:21			07:14		08:09	08:38				
	21:28	61	07:23 (WEA 18-3)	20:28	27	07:41 (WEA 18-4)	19:15			17:09		16:21	16:19				
29	05:41		06:20 (WEA 18-2)	06:31		07:15 (WEA 18-4)	07:23			07:16		08:10	08:38				
	21:27	57	07:21 (WEA 18-3)	20:26	24	07:39 (WEA 18-4)	19:13			17:07		16:20	16:20				
30	05:42		06:21 (WEA 18-2)	06:33		07:16 (WEA 18-4)	07:25			07:18		08:12	08:38				
	21:25	55	07:21 (WEA 18-3)	20:23	21	07:37 (WEA 18-4)	19:11			17:05		16:19	16:21				
31	05:44		06:21 (WEA 18-2)	06:35		07:18 (WEA 18-4)				07:19			08:38				
	21:23	52	07:19 (WEA 18-3)	20:21	17	07:35 (WEA 18-4)				17:03			16:22				
Sonnenscheinstunden	505			456			382			332		265	241				
astr.max.mögl.Beschattung	1838			801			11										

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

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

SHADOW - Kalender**Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 34b - Große Haar 15/Südost**
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38	08:11	07:17	07:06		05:59	07:09 (WEA 18-4)	05:12	06:16 (WEA 18-2)
	16:23	17:12	18:04	20:00		20:52	07:35 (WEA 18-4)	21:39	07:19 (WEA 18-3)
2	08:38	08:10	07:15	07:03		05:57	07:10 (WEA 18-4)	05:12	06:17 (WEA 18-2)
	16:24	17:13	18:06	20:01		20:53	07:34 (WEA 18-4)	21:40	07:19 (WEA 18-3)
3	08:38	08:08	07:13	07:01		05:55	07:11 (WEA 18-4)	05:11	06:18 (WEA 18-2)
	16:25	17:15	18:08	20:03		20:55	07:32 (WEA 18-4)	21:41	07:19 (WEA 18-3)
4	08:38	08:07	07:11	06:59		05:54	07:13 (WEA 18-4)	05:10	06:20 (WEA 18-2)
	16:27	17:17	18:10	20:05		20:57	07:31 (WEA 18-4)	21:42	07:20 (WEA 18-3)
5	08:38	08:05	07:08	06:56		05:52	07:14 (WEA 18-4)	05:09	06:29 (WEA 18-3)
	16:28	17:19	18:12	20:07		20:59	07:29 (WEA 18-4)	21:43	07:20 (WEA 18-3)
6	08:37	08:03	07:06	06:54		05:50	07:17 (WEA 18-4)	05:09	06:29 (WEA 18-3)
	16:29	17:21	18:13	20:08		21:00	07:25 (WEA 18-4)	21:44	07:20 (WEA 18-3)
7	08:37	08:01	07:04	06:52		05:48		05:08	06:29 (WEA 18-3)
	16:30	17:23	18:15	20:10		21:02		21:45	07:21 (WEA 18-3)
8	08:37	08:00	07:02	06:49		05:46	06:20 (WEA 18-2)	05:07	06:29 (WEA 18-3)
	16:32	17:25	18:17	20:12		21:04	06:22 (WEA 18-2)	21:46	07:20 (WEA 18-3)
9	08:36	07:58	06:59	06:47		05:44	06:16 (WEA 18-2)	05:07	06:30 (WEA 18-3)
	16:33	17:27	18:19	20:14		21:05	06:26 (WEA 18-2)	21:47	07:21 (WEA 18-3)
10	08:36	07:56	06:57	06:45		05:43	06:14 (WEA 18-2)	05:06	06:30 (WEA 18-3)
	16:34	17:29	18:21	20:15		21:07	06:58 (WEA 18-3)	21:48	07:21 (WEA 18-3)
11	08:35	07:54	06:55	06:42		05:41	06:13 (WEA 18-2)	05:06	06:30 (WEA 18-3)
	16:36	17:30	18:23	20:17		21:09	07:02 (WEA 18-3)	21:49	07:21 (WEA 18-3)
12	08:34	07:52	06:52	06:40	07:22 (WEA 18-4)	05:39	06:11 (WEA 18-2)	05:05	06:30 (WEA 18-3)
	16:37	17:32	18:24	20:19	9 07:31 (WEA 18-4)	21:10	07:04 (WEA 18-3)	21:49	07:21 (WEA 18-3)
13	08:34	07:50	06:50	06:38	07:18 (WEA 18-4)	05:37	06:11 (WEA 18-2)	05:05	06:30 (WEA 18-3)
	16:39	17:34	18:26	20:21	17 07:35 (WEA 18-4)	21:12	07:07 (WEA 18-3)	21:50	07:22 (WEA 18-3)
14	08:33	07:49	06:48	06:36	07:16 (WEA 18-4)	05:36	06:10 (WEA 18-2)	05:05	06:31 (WEA 18-3)
	16:40	17:36	18:28	20:22	21 07:37 (WEA 18-4)	21:13	07:08 (WEA 18-3)	21:51	07:22 (WEA 18-3)
15	08:32	07:47	06:45	06:33	07:14 (WEA 18-4)	05:34	06:10 (WEA 18-2)	05:05	06:31 (WEA 18-3)
	16:42	17:38	18:30	20:24	24 07:38 (WEA 18-4)	21:15	07:10 (WEA 18-3)	21:51	07:23 (WEA 18-3)
16	08:31	07:45	06:43	06:31	07:12 (WEA 18-4)	05:33	06:09 (WEA 18-2)	05:05	06:30 (WEA 18-3)
	16:43	17:40	18:31	20:26	26 07:38 (WEA 18-4)	21:17	07:10 (WEA 18-3)	21:52	07:22 (WEA 18-3)
17	08:30	07:43	06:41	06:29	07:11 (WEA 18-4)	05:31	06:09 (WEA 18-2)	05:04	06:31 (WEA 18-3)
	16:45	17:42	18:33	20:28	28 07:39 (WEA 18-4)	21:18	07:12 (WEA 18-3)	21:52	07:22 (WEA 18-3)
18	08:29	07:41	06:38	06:27	07:10 (WEA 18-4)	05:29	06:09 (WEA 18-2)	05:04	06:31 (WEA 18-3)
	16:47	17:44	18:35	20:29	30 07:40 (WEA 18-4)	21:20	07:12 (WEA 18-3)	21:53	07:22 (WEA 18-3)
19	08:28	07:39	06:36	06:24	07:09 (WEA 18-4)	05:28	06:09 (WEA 18-2)	05:04	06:32 (WEA 18-3)
	16:48	17:46	18:37	20:31	31 07:40 (WEA 18-4)	21:21	07:13 (WEA 18-3)	21:53	07:23 (WEA 18-3)
20	08:27	07:37	06:34	06:22	07:08 (WEA 18-4)	05:27	06:09 (WEA 18-2)	05:04	06:32 (WEA 18-3)
	16:50	17:48	18:39	20:33	33 07:41 (WEA 18-4)	21:23	07:14 (WEA 18-3)	21:54	07:24 (WEA 18-3)
21	08:26	07:34	06:31	06:20	07:08 (WEA 18-4)	05:25	06:10 (WEA 18-2)	05:05	06:32 (WEA 18-3)
	16:52	17:49	18:40	20:34	33 07:41 (WEA 18-4)	21:24	07:15 (WEA 18-3)	21:54	07:24 (WEA 18-3)
22	08:25	07:32	06:29	06:18	07:08 (WEA 18-4)	05:24	06:09 (WEA 18-2)	05:05	06:32 (WEA 18-3)
	16:53	17:51	18:42	20:36	33 07:41 (WEA 18-4)	21:26	07:15 (WEA 18-3)	21:54	07:24 (WEA 18-3)
23	08:24	07:30	06:27	06:16	07:07 (WEA 18-4)	05:22	06:10 (WEA 18-2)	05:05	06:32 (WEA 18-3)
	16:55	17:53	18:44	20:38	34 07:41 (WEA 18-4)	21:27	07:15 (WEA 18-3)	21:54	07:24 (WEA 18-3)
24	08:23	07:28	06:24	06:14	07:07 (WEA 18-4)	05:21	06:10 (WEA 18-2)	05:05	06:33 (WEA 18-3)
	16:57	17:55	18:46	20:40	34 07:41 (WEA 18-4)	21:29	07:16 (WEA 18-3)	21:55	07:24 (WEA 18-3)
25	08:21	07:26	07:22	06:12	07:07 (WEA 18-4)	05:20	06:10 (WEA 18-2)	05:05	06:33 (WEA 18-3)
	16:59	17:57	19:47	20:41	33 07:40 (WEA 18-4)	21:30	07:17 (WEA 18-3)	21:55	07:24 (WEA 18-3)
26	08:20	07:24	07:20	06:10	07:07 (WEA 18-4)	05:19	06:11 (WEA 18-2)	05:06	06:33 (WEA 18-3)
	17:01	17:59	19:49	20:43	33 07:40 (WEA 18-4)	21:31	07:17 (WEA 18-3)	21:55	07:24 (WEA 18-3)
27	08:19	07:22	07:17	06:07	07:07 (WEA 18-4)	05:18	06:12 (WEA 18-2)	05:06	06:34 (WEA 18-3)
	17:02	18:01	19:51	20:45	32 07:39 (WEA 18-4)	21:33	07:17 (WEA 18-3)	21:55	07:25 (WEA 18-3)
28	08:17	07:19	07:15	06:05	07:07 (WEA 18-4)	05:16	06:12 (WEA 18-2)	05:07	06:33 (WEA 18-3)
	17:04	18:03	19:53	20:47	32 07:39 (WEA 18-4)	21:34	07:18 (WEA 18-3)	21:54	07:25 (WEA 18-3)
29	08:16		07:13	06:03	07:08 (WEA 18-4)	05:15	06:13 (WEA 18-2)	05:07	06:34 (WEA 18-3)
	17:06		19:54	20:48	30 07:38 (WEA 18-4)	21:35	07:18 (WEA 18-3)	21:54	07:25 (WEA 18-3)
30	08:14		07:10	06:01	07:08 (WEA 18-4)	05:14	06:13 (WEA 18-2)	05:08	06:34 (WEA 18-3)
	17:08		19:56	20:50	29 07:37 (WEA 18-4)	21:37	07:18 (WEA 18-3)	21:54	07:25 (WEA 18-3)
31	08:13		07:08			05:13	06:14 (WEA 18-2)		
	17:10		19:58			21:38	07:18 (WEA 18-3)		
Sonnenscheinstunden	256	275	366	416		487		502	
astr.max.mögl.Beschattung				542		1408		1575	

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: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 34b - Große Haar 15/Südost
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

Juli			August			September			Oktober			November			Dezember		
1	05:08		06:34 (WEA 18-3)	05:45		06:22 (WEA 18-2)	06:36		07:22 (WEA 18-4)	07:26		07:21			08:13		
	21:54	52	07:26 (WEA 18-3)	21:22	44	07:16 (WEA 18-3)	20:19	9	07:31 (WEA 18-4)	19:08		17:01			16:19		
2	05:09		06:35 (WEA 18-3)	05:47		06:22 (WEA 18-2)	06:38			07:28		07:23			08:15		
	21:54	51	07:26 (WEA 18-3)	21:20	40	07:14 (WEA 18-3)	20:17			19:06		16:59			16:18		
3	05:10		06:34 (WEA 18-3)	05:49		06:24 (WEA 18-2)	06:40			07:30		07:25			08:16		
	21:53	52	07:26 (WEA 18-3)	21:18	30	07:11 (WEA 18-3)	20:14			19:04		16:57			16:17		
4	05:11		06:35 (WEA 18-3)	05:50		06:25 (WEA 18-2)	06:41			07:31		07:27			08:18		
	21:53	51	07:26 (WEA 18-3)	21:17	18	07:06 (WEA 18-3)	20:12			19:01		16:55			16:17		
5	05:11		06:35 (WEA 18-3)	05:52		06:27 (WEA 18-2)	06:43			07:33		07:29			08:19		
	21:52	51	07:26 (WEA 18-3)	21:15	8	06:35 (WEA 18-2)	20:10			18:59		16:53			16:16		
6	05:12		06:36 (WEA 18-3)	05:53			06:45			07:35		07:30			08:21		
	21:52	51	07:27 (WEA 18-3)	21:13			20:07			18:57		16:51			16:16		
7	05:13		06:35 (WEA 18-3)	05:55			06:46			07:37		07:32			08:22		
	21:51	51	07:26 (WEA 18-3)	21:11			20:05			18:54		16:50			16:15		
8	05:14		06:35 (WEA 18-3)	05:57		07:25 (WEA 18-4)	06:48			07:38		07:34			08:23		
	21:51	51	07:26 (WEA 18-3)	21:09	11	07:36 (WEA 18-4)	20:03			18:52		16:48			16:15		
9	05:15		06:27 (WEA 18-2)	05:58		07:23 (WEA 18-4)	06:50			07:40		07:36			08:24		
	21:50	55	07:27 (WEA 18-3)	21:08	16	07:39 (WEA 18-4)	20:00			18:50		16:46			16:14		
10	05:16		06:26 (WEA 18-2)	06:00		07:21 (WEA 18-4)	06:51			07:42		07:38			08:25		
	21:49	58	07:27 (WEA 18-3)	21:06	19	07:40 (WEA 18-4)	19:58			18:47		16:45			16:14		
11	05:17		06:24 (WEA 18-2)	06:01		07:20 (WEA 18-4)	06:53			07:44		07:40			08:27		
	21:48	62	07:27 (WEA 18-3)	21:04	22	07:42 (WEA 18-4)	19:56			18:45		16:43			16:14		
12	05:18		06:24 (WEA 18-2)	06:03		07:18 (WEA 18-4)	06:55			07:45		07:41			08:28		
	21:48	62	07:27 (WEA 18-3)	21:02	25	07:43 (WEA 18-4)	19:53			18:43		16:41			16:14		
13	05:19		06:23 (WEA 18-2)	06:05		07:17 (WEA 18-4)	06:56			07:47		07:43			08:29		
	21:47	64	07:27 (WEA 18-3)	21:00	27	07:44 (WEA 18-4)	19:51			18:41		16:40			16:14		
14	05:20		06:22 (WEA 18-2)	06:06		07:16 (WEA 18-4)	06:58			07:49		07:45			08:30		
	21:46	65	07:27 (WEA 18-3)	20:58	28	07:44 (WEA 18-4)	19:49			18:38		16:38			16:14		
15	05:22		06:21 (WEA 18-2)	06:08		07:15 (WEA 18-4)	07:00			07:51		07:47			08:31		
	21:45	66	07:27 (WEA 18-3)	20:56	30	07:45 (WEA 18-4)	19:46			18:36		16:37			16:14		
16	05:23		06:22 (WEA 18-2)	06:10		07:14 (WEA 18-4)	07:01			07:52		07:49			08:32		
	21:44	65	07:27 (WEA 18-3)	20:54	31	07:45 (WEA 18-4)	19:44			18:34		16:35			16:14		
17	05:24		06:21 (WEA 18-2)	06:11		07:14 (WEA 18-4)	07:03			07:54		07:50			08:32		
	21:43	66	07:27 (WEA 18-3)	20:52	32	07:46 (WEA 18-4)	19:41			18:32		16:34			16:14		
18	05:25		06:21 (WEA 18-2)	06:13		07:14 (WEA 18-4)	07:05			07:56		07:52			08:33		
	21:42	66	07:27 (WEA 18-3)	20:50	32	07:46 (WEA 18-4)	19:39			18:30		16:33			16:14		
19	05:27		06:20 (WEA 18-2)	06:15		07:13 (WEA 18-4)	07:06			07:58		07:54			08:34		
	21:40	66	07:26 (WEA 18-3)	20:47	33	07:46 (WEA 18-4)	19:37			18:27		16:31			16:14		
20	05:28		06:20 (WEA 18-2)	06:16		07:13 (WEA 18-4)	07:08			08:00		07:56			08:35		
	21:39	66	07:26 (WEA 18-3)	20:45	33	07:46 (WEA 18-4)	19:34			18:25		16:30			16:15		
21	05:29		06:20 (WEA 18-2)	06:18		07:12 (WEA 18-4)	07:10			08:01		07:57			08:35		
	21:38	66	07:26 (WEA 18-3)	20:43	34	07:46 (WEA 18-4)	19:32			18:23		16:29			16:15		
22	05:31		06:20 (WEA 18-2)	06:20		07:12 (WEA 18-4)	07:11			08:03		07:59			08:36		
	21:37	65	07:25 (WEA 18-3)	20:41	34	07:46 (WEA 18-4)	19:30			18:21		16:27			16:16		
23	05:32		06:19 (WEA 18-2)	06:21		07:12 (WEA 18-4)	07:13			08:05		08:01			08:36		
	21:35	66	07:25 (WEA 18-3)	20:39	33	07:45 (WEA 18-4)	19:27			18:19		16:26			16:16		
24	05:33		06:20 (WEA 18-2)	06:23		07:12 (WEA 18-4)	07:15			08:07		08:02			08:37		
	21:34	65	07:25 (WEA 18-3)	20:37	32	07:44 (WEA 18-4)	19:25			18:17		16:25			16:17		
25	05:35		06:20 (WEA 18-2)	06:25		07:13 (WEA 18-4)	07:16			08:09		08:04			08:37		
	21:33	64	07:24 (WEA 18-3)	20:35	31	07:44 (WEA 18-4)	19:22			18:15		16:24			16:17		
26	05:36		06:19 (WEA 18-2)	06:26		07:13 (WEA 18-4)	07:18			08:10		08:06			08:38		
	21:31	64	07:23 (WEA 18-3)	20:32	30	07:43 (WEA 18-4)	19:20			18:13		16:23			16:18		
27	05:38		06:20 (WEA 18-2)	06:28		07:13 (WEA 18-4)	07:20			08:12		08:07			08:38		
	21:30	61	07:23 (WEA 18-3)	20:30	29	07:42 (WEA 18-4)	19:18			18:11		16:22			16:19		
28	05:39		06:20 (WEA 18-2)	06:30		07:14 (WEA 18-4)	07:21			07:14		08:09			08:38		
	21:28	59	07:21 (WEA 18-3)	20:28	26	07:40 (WEA 18-4)	19:15			17:09		16:21			16:19		
29	05:41		06:20 (WEA 18-2)	06:31		07:15 (WEA 18-4)	07:23			07:16		08:10			08:38		
	21:27	56	07:20 (WEA 18-3)	20:26	24	07:39 (WEA 18-4)	19:13			17:07		16:20			16:20		
30	05:42		06:21 (WEA 18-2)	06:33		07:16 (WEA 18-4)	07:25			07:18		08:12			08:38		
	21:25	52	07:19 (WEA 18-3)	20:23	20	07:36 (WEA 18-4)	19:11			17:05		16:19			16:21		
31	05:44		06:21 (WEA 18-2)	06:35		07:18 (WEA 18-4)				07:19					08:38		
	21:23	48	07:17 (WEA 18-3)	20:21	16	07:34 (WEA 18-4)				17:03					16:22		
Sonnenscheinstunden			505	456		382			332	265		241					
astr.max.mögl.Beschattung			1837	788		9											

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 35 - Pius 24

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:38 16:23	08:11 17:12	07:17 18:04	07:06 20:00	05:59 20:52	05:12 21:39	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01	08:13 16:19
2	08:38 16:24	08:10 17:13	07:15 18:06	07:03 20:01	05:57 20:53	05:12 21:40	05:09 21:54	05:47 21:20	06:38 20:17	07:28 19:06	07:23 16:59	08:15 16:18
3	08:38 16:25	08:08 17:15	07:13 18:08	07:01 20:03	05:55 20:55	05:11 21:41	05:10 21:53	05:49 21:18	06:40 20:14	07:30 19:04	07:25 16:57	08:16 16:17
4	08:38 16:27	08:07 17:17	07:11 18:10	06:59 20:05	05:54 20:57	05:10 21:42	05:11 21:53	05:50 21:17	06:41 20:12	07:31 19:01	07:27 16:55	08:18 16:17
5	08:38 16:28	08:05 17:19	07:08 18:12	06:56 20:07	05:52 20:59	05:09 21:43	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53	08:19 16:16
6	08:37 16:29	08:03 17:21	07:06 18:13	06:54 20:08	05:50 21:00	05:09 21:44	05:12 21:52	05:53 21:13	06:45 20:07	07:35 18:57	07:30 16:51	08:20 16:16
7	08:37 16:30	08:01 17:23	07:04 18:15	06:52 20:10	05:48 21:02	05:08 21:45	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50	08:22 16:15
8	08:37 16:32	08:00 17:25	07:02 18:17	06:49 20:12	05:46 21:04	05:07 21:46	05:14 21:51	05:57 21:09	06:48 20:03	07:38 18:52	07:34 16:48	08:23 16:15
9	08:36 16:33	07:58 17:27	06:59 18:19	06:47 20:14	05:44 21:05	05:07 21:47	05:15 21:50	05:58 21:08	06:50 20:00	07:40 18:50	07:36 16:46	08:24 16:14
10	08:36 16:34	07:56 17:29	06:57 18:21	06:45 20:15	05:43 21:07	05:06 21:48	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45	08:25 16:14
11	08:35 16:36	07:54 17:31	06:55 18:23	06:42 20:17	05:41 21:09	05:06 21:49	05:17 21:48	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43	08:27 16:14
12	08:34 16:37	07:52 17:32	06:52 18:24	06:40 20:19	05:39 21:10	05:06 21:49	05:18 21:48	06:03 21:02	06:55 19:53	07:45 18:43	07:41 16:41	08:28 16:14
13	08:34 16:39	07:50 17:34	06:50 18:26	06:38 20:21	05:37 21:12	05:05 21:50	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40	08:29 16:14
14	08:33 16:40	07:49 17:36	06:48 18:28	06:36 20:22	05:36 21:13	05:05 21:51	05:20 21:46	06:06 20:58	06:58 19:49	07:49 18:38	07:45 16:38	08:30 16:14
15	08:32 16:42	07:47 17:38	06:45 18:30	06:33 20:24	05:34 21:15	05:05 21:51	05:22 21:45	06:08 20:56	07:00 19:46	07:51 18:36	07:47 16:37	08:31 16:14
16	08:31 16:43	07:45 17:40	06:43 18:31	06:31 20:26	05:33 21:17	05:05 21:52	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35	08:32 16:14
17	08:30 16:45	07:43 17:42	06:41 18:33	06:29 20:27	05:31 21:18	05:04 21:52	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	07:50 16:34	08:32 16:14
18	08:29 16:47	07:41 17:44	06:38 18:35	06:27 20:29	05:29 21:20	05:04 21:53	05:25 21:42	06:13 20:50	07:05 19:39	07:56 18:30	07:52 16:33	08:33 16:14
19	08:28 16:48	07:39 17:46	06:36 18:37	06:24 20:31	05:28 21:21	05:04 21:53	05:27 21:40	06:15 20:47	07:06 19:37	07:58 18:27	07:54 16:31	08:34 16:14
20	08:27 16:50	07:37 17:48	06:34 18:39	06:22 20:33	05:27 21:23	05:04 21:54	05:28 21:39	06:16 20:45	07:08 19:34	07:59 18:25	07:56 16:30	08:35 16:15
21	08:26 16:52	07:34 17:49	06:31 18:40	06:20 20:34	05:25 21:24	05:05 21:54	05:29 21:38	06:18 20:43	07:10 19:32	08:01 18:23	07:57 16:29	08:35 16:15
22	08:25 16:53	07:32 17:51	06:29 18:42	06:18 20:36	05:24 21:26	05:05 21:54	05:31 21:37	06:20 20:41	07:11 19:30	08:03 18:21	07:59 16:27	08:36 16:16
23	08:24 16:55	07:30 17:53	06:27 18:44	06:16 20:38	05:22 21:27	05:05 21:54	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26	08:36 16:16
24	08:23 16:57	07:28 17:55	06:24 18:46	06:14 20:40	05:21 21:29	05:05 21:54	05:33 21:34	06:23 20:37	07:15 19:25	08:07 18:17	08:02 16:25	08:37 16:17
25	08:21 16:59	07:26 17:57	07:22 19:47	06:12 20:41	05:20 21:30	05:06 21:55	05:35 21:33	06:25 20:35	07:16 19:22	08:08 18:15	08:04 16:24	08:37 16:17
26	08:20 17:01	07:24 17:59	07:20 19:49	06:10 20:43	05:19 21:31	05:06 21:55	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:13	08:06 16:23	08:38 16:18
27	08:19 17:02	07:22 18:01	07:17 19:51	06:07 20:45	05:18 21:33	05:06 21:55	05:38 21:30	06:28 20:30	07:20 19:18	08:12 18:11	08:07 16:22	08:38 16:19
28	08:17 17:04	07:19 18:03	07:15 19:53	06:05 20:47	05:16 21:34	05:07 21:54	05:39 21:28	06:30 20:28	07:21 19:15	07:14 17:09	08:09 16:21	08:38 16:19
29	08:16 17:06		07:13 19:54	06:03 20:48	05:15 21:35	05:07 21:54	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:07	08:10 16:20	08:38 16:20
30	08:14 17:08		07:10 19:56	06:01 20:50	05:14 21:37	05:08 21:54	05:42 21:25	06:33 20:23	07:25 19:11	07:18 17:05	08:12 16:19	08:38 16:21
31	08:13 17:10		07:08 19:58		05:13 21:38		05:44 21:23	06:35 20:21		07:19 17:03		08:38 16:22
Sonnenscheinstunden	256	275	366	416	487	502	505	456	382	332	265	241
astr.max.mögl.Beschattung												

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 36 - Bruchstraße 6

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38	08:11	07:17	07:05	05:59	05:12	20:13 (WEA 18-3)
	16:23	17:12	18:04	20:00	20:52	21:39	34 20:47 (WEA 18-3)
2	08:38	08:10	07:15	07:03	05:57	05:11	20:13 (WEA 18-3)
	16:24	17:13	18:06	20:01	20:53	21:40	34 20:47 (WEA 18-3)
3	08:38	08:08	07:13	07:01	05:55	05:11	20:13 (WEA 18-3)
	16:25	17:15	18:08	20:03	20:55	21:41	34 20:47 (WEA 18-3)
4	08:38	08:07	07:11	06:58	05:53	05:10	20:12 (WEA 18-3)
	16:26	17:17	18:10	20:05	20:57	21:42	35 20:47 (WEA 18-3)
5	08:38	08:05	07:08	06:56	05:52	05:09	20:13 (WEA 18-3)
	16:28	17:19	18:12	20:06	20:58	21:43	35 20:48 (WEA 18-3)
6	08:37	08:03	07:06	06:54	05:50	05:08	20:12 (WEA 18-3)
	16:29	17:21	18:13	20:08	21:00	21:44	36 20:48 (WEA 18-3)
7	08:37	08:01	07:04	06:51	05:48	05:08	20:13 (WEA 18-3)
	16:30	17:23	18:15	20:10	21:02	21:45	36 20:49 (WEA 18-3)
8	08:37	08:00	07:01	06:49	05:46	05:07	20:12 (WEA 18-3)
	16:31	17:25	18:17	20:12	21:04	21:46	37 20:49 (WEA 18-3)
9	08:36	07:58	06:59	06:47	05:44	05:07	20:13 (WEA 18-3)
	16:33	17:27	18:19	20:13	21:05	21:47	36 20:49 (WEA 18-3)
10	08:36	07:56	06:57	06:45	05:42	05:06	20:13 (WEA 18-3)
	16:34	17:29	18:21	20:15	21:07	21:48	37 20:50 (WEA 18-3)
11	08:35	07:54	06:55	06:42	05:41	05:06	20:13 (WEA 18-3)
	16:36	17:30	18:22	20:17	21:08	21:49	37 20:50 (WEA 18-3)
12	08:34	07:52	06:52	06:40	05:39	05:05	20:13 (WEA 18-3)
	16:37	17:32	18:24	20:19	21:10	21:49	37 20:50 (WEA 18-3)
13	08:34	07:50	06:50	06:38	05:37	05:05	20:14 (WEA 18-3)
	16:39	17:34	18:26	20:20	21:12	21:50	37 20:51 (WEA 18-3)
14	08:33	07:48	06:48	06:35	05:36	05:05	20:14 (WEA 18-3)
	16:40	17:36	18:28	20:22	21:13	21:51	37 20:51 (WEA 18-3)
15	08:32	07:46	06:45	06:33	05:34	05:05	20:13 (WEA 18-3)
	16:42	17:38	18:30	20:24	21:15	21:51	38 20:51 (WEA 18-3)
16	08:31	07:45	06:43	06:31	05:32	05:04	20:13 (WEA 18-3)
	16:43	17:40	18:31	20:26	21:17	21:52	38 20:51 (WEA 18-3)
17	08:30	07:43	06:41	06:29	05:31	05:04	20:14 (WEA 18-3)
	16:45	17:42	18:33	20:27	21:18	21:52	37 20:51 (WEA 18-3)
18	08:29	07:41	06:38	06:27	05:29	05:04	20:14 (WEA 18-3)
	16:47	17:44	18:35	20:29	21:20	21:53	37 20:51 (WEA 18-3)
19	08:28	07:38	06:36	06:24	05:28	05:04	20:14 (WEA 18-3)
	16:48	17:46	18:37	20:31	21:21	21:53	38 20:52 (WEA 18-3)
20	08:27	07:36	06:34	06:22	05:26	05:04	20:15 (WEA 18-3)
	16:50	17:47	18:38	20:33	21:23	21:54	38 20:53 (WEA 18-3)
21	08:26	07:34	06:31	06:20	05:25	05:04	20:15 (WEA 18-3)
	16:52	17:49	18:40	20:34	21:24	21:54	38 20:53 (WEA 18-3)
22	08:25	07:32	06:29	06:18	05:24	05:05	20:15 (WEA 18-3)
	16:53	17:51	18:42	20:36	21:26	21:54	38 20:53 (WEA 18-3)
23	08:24	07:30	06:27	06:16	05:22	05:05	20:15 (WEA 18-3)
	16:55	17:53	18:44	20:38	21:27	21:54	38 20:53 (WEA 18-3)
24	08:23	07:28	06:24	06:14	05:21	05:05	20:15 (WEA 18-3)
	16:57	17:55	18:46	20:40	21:29	21:54	38 20:53 (WEA 18-3)
25	08:21	07:26	07:22	06:12	05:20	05:05	20:16 (WEA 18-3)
	16:59	17:57	19:47	20:41	21:30	21:54	37 20:53 (WEA 18-3)
26	08:20	07:24	07:20	06:09	05:19	05:06	20:16 (WEA 18-3)
	17:00	17:59	19:49	20:43	21:31	21:55	37 20:53 (WEA 18-3)
27	08:19	07:22	07:17	06:07	05:18	05:06	20:16 (WEA 18-3)
	17:02	18:01	19:51	20:45	21:33	21:54	38 20:54 (WEA 18-3)
28	08:17	07:19	07:15	06:05	05:16	05:07	20:16 (WEA 18-3)
	17:04	18:02	19:53	20:47	21:34	21:54	38 20:54 (WEA 18-3)
29	08:16		07:12	06:03	05:15	05:07	20:17 (WEA 18-3)
	17:06		19:54	20:48	21:35	21:54	37 20:54 (WEA 18-3)
30	08:14		07:10	06:01	05:14	05:08	20:17 (WEA 18-3)
	17:08		19:56	20:50	21:36	21:54	37 20:54 (WEA 18-3)
31	08:13		07:08		05:13		
	17:10		19:58		21:38		
Sonnenscheinstunden	256	275	366	416	487	502	
astr.max.mögl.Beschattung					312	1104	

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: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 36 - Bruchstraße 6**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli	August	September	Oktober	November	Dezember
1	05:08 21:54	20:17 (WEA 18-3) 20:54 (WEA 18-3)	05:45 21:22	06:36 20:19	07:26 19:08	07:21 17:01
2	05:09 21:53	20:18 (WEA 18-3) 20:55 (WEA 18-3)	05:47 21:20	06:38 20:16	07:28 19:06	07:23 16:59
3	05:10 21:53	20:17 (WEA 18-3) 20:54 (WEA 18-3)	05:48 21:18	06:40 20:14	07:30 19:03	07:25 16:57
4	05:11 21:53	20:18 (WEA 18-3) 20:55 (WEA 18-3)	05:50 21:17	06:41 20:12	07:31 19:01	07:27 16:55
5	05:11 21:52	20:19 (WEA 18-3) 20:55 (WEA 18-3)	05:52 21:15	06:43 20:10	07:33 18:59	07:29 16:53
6	05:12 21:52	20:19 (WEA 18-3) 20:55 (WEA 18-3)	05:53 21:13	06:45 20:07	07:35 18:56	07:30 16:51
7	05:13 21:51	20:18 (WEA 18-3) 20:54 (WEA 18-3)	05:55 21:11	06:46 20:05	07:37 18:54	07:32 16:50
8	05:14 21:51	20:19 (WEA 18-3) 20:55 (WEA 18-3)	05:56 21:09	06:48 20:03	07:38 18:52	07:34 16:48
9	05:15 21:50	20:19 (WEA 18-3) 20:55 (WEA 18-3)	05:58 21:07	06:49 20:00	07:40 18:50	07:36 16:46
10	05:16 21:49	20:20 (WEA 18-3) 20:55 (WEA 18-3)	06:00 21:06	06:51 19:58	07:42 18:47	07:38 16:45
11	05:17 21:48	20:20 (WEA 18-3) 20:55 (WEA 18-3)	06:01 21:04	06:53 19:56	07:44 18:45	07:40 16:43
12	05:18 21:47	20:21 (WEA 18-3) 20:54 (WEA 18-3)	06:03 21:02	06:54 19:53	07:45 18:43	07:41 16:41
13	05:19 21:47	20:21 (WEA 18-3) 20:54 (WEA 18-3)	06:05 21:00	06:56 19:51	07:47 18:41	07:43 16:40
14	05:20 21:46	20:21 (WEA 18-3) 20:54 (WEA 18-3)	06:06 20:58	06:58 19:48	07:49 18:38	07:45 16:38
15	05:21 21:45	20:22 (WEA 18-3) 20:53 (WEA 18-3)	06:08 20:56	06:59 19:46	07:51 18:36	07:47 16:37
16	05:23 21:44	20:22 (WEA 18-3) 20:53 (WEA 18-3)	06:10 20:54	07:01 19:44	07:52 18:34	07:49 16:35
17	05:24 21:43	20:24 (WEA 18-3) 20:53 (WEA 18-3)	06:11 20:52	07:03 19:41	07:54 18:32	07:50 16:34
18	05:25 21:42	20:24 (WEA 18-3) 20:53 (WEA 18-3)	06:13 20:50	07:04 19:39	07:56 18:29	07:52 16:32
19	05:27 21:40	20:25 (WEA 18-3) 20:52 (WEA 18-3)	06:15 20:47	07:06 19:37	07:58 18:27	07:54 16:31
20	05:28 21:39	20:25 (WEA 18-3) 20:51 (WEA 18-3)	06:16 20:45	07:08 19:34	07:59 18:25	07:56 16:30
21	05:29 21:38	20:27 (WEA 18-3) 20:51 (WEA 18-3)	06:18 20:43	07:09 19:32	08:01 18:23	07:57 16:29
22	05:31 21:37	20:28 (WEA 18-3) 20:49 (WEA 18-3)	06:20 20:41	07:11 19:29	08:03 18:21	07:59 16:27
23	05:32 21:35	20:29 (WEA 18-3) 20:48 (WEA 18-3)	06:21 20:39	07:13 19:27	08:05 18:19	08:01 16:26
24	05:33 21:34	20:31 (WEA 18-3) 20:46 (WEA 18-3)	06:23 20:37	07:14 19:25	08:07 18:17	08:02 16:25
25	05:35 21:33	20:34 (WEA 18-3) 20:44 (WEA 18-3)	06:25 20:34	07:16 19:22	08:08 18:15	08:04 16:24
26	05:36 21:31		06:26 20:32	07:18 19:20	08:10 18:12	08:06 16:23
27	05:38 21:30		06:28 20:30	07:20 19:18	08:12 18:10	08:07 16:22
28	05:39 21:28		06:30 20:28	07:21 19:15	07:14 17:08	08:09 16:21
29	05:41 21:27		06:31 20:26	07:23 19:13	07:16 17:06	08:10 16:20
30	05:42 21:25		06:33 20:23	07:25 19:11	07:18 17:04	08:12 16:19
31	05:44 21:23		06:35 20:21		07:19 17:03	08:38 16:22
Sonnenscheinstunden	505	456	382	332	265	241
astr.max.mögl.Beschattung	759					

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

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

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbH

Lizenzierter Anwender:

ZECH Ingenieurgesellschaft mbH
Hessenweg 38
DE-49809 Lingen (Ems)
0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654Schattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 37a - Bruchstraße 4/Nordwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38	16:23	08:11	17:11	18:04	07:17	18:04	07:05	18:44 (WEA 18-4)	05:59	05:12	20:34 (WEA 18-1)					
	16:23	08:38	08:10	17:10	18:04	07:15	18:04	19:59	19:30 (WEA 18-3)	20:52	21:39	20:56 (WEA 18-1)	22				
2	08:38	16:24	08:10	17:13	18:06	07:15	18:06	07:03	18:44 (WEA 18-4)	05:57	05:11	20:33 (WEA 18-1)					
	16:24	08:38	08:08	17:13	18:06	07:13	18:06	20:01	19:32 (WEA 18-3)	20:53	21:40	20:57 (WEA 18-1)	24				
3	08:38	16:25	08:08	17:15	18:08	07:13	18:08	07:01	18:44 (WEA 18-4)	05:55	05:11	20:32 (WEA 18-1)					
	16:25	08:38	08:06	17:15	18:08	07:10	18:08	20:03	19:33 (WEA 18-3)	20:55	21:41	20:57 (WEA 18-1)	25				
4	08:38	16:26	08:06	17:17	18:10	07:10	18:10	06:58	18:43 (WEA 18-4)	05:53	05:10	20:32 (WEA 18-1)					
	16:26	08:38	08:05	17:17	18:10	07:08	18:10	20:05	19:32 (WEA 18-3)	20:57	21:42	20:58 (WEA 18-1)	26				
5	08:38	16:28	08:05	17:19	18:12	07:08	18:12	06:56	18:43 (WEA 18-4)	05:51	05:09	20:32 (WEA 18-1)					
	16:28	08:37	08:03	17:19	18:12	07:06	18:12	20:06	19:33 (WEA 18-3)	20:58	21:43	20:59 (WEA 18-1)	27				
6	08:37	16:29	08:03	17:21	18:13	07:06	18:13	06:54	18:43 (WEA 18-4)	05:50	05:08	20:32 (WEA 18-1)					
	16:29	08:37	08:01	17:21	18:13	07:04	18:13	20:08	19:33 (WEA 18-3)	21:00	21:44	20:59 (WEA 18-1)	27				
7	08:37	16:30	08:01	17:23	18:15	07:04	18:15	06:51	18:42 (WEA 18-4)	05:48	05:08	20:32 (WEA 18-1)					
	16:30	08:37	08:00	17:23	18:15	07:01	18:15	20:10	19:32 (WEA 18-3)	21:02	21:45	21:00 (WEA 18-1)	28				
8	08:37	16:31	08:00	17:25	18:17	07:01	18:17	06:49	18:43 (WEA 18-4)	05:46	05:07	20:31 (WEA 18-1)					
	16:31	08:36	07:58	17:25	18:17	06:59	18:17	20:12	19:32 (WEA 18-3)	21:04	21:46	21:00 (WEA 18-1)	29				
9	08:36	16:33	07:58	17:27	18:19	06:59	18:19	06:47	18:44 (WEA 18-4)	05:44	05:07	20:32 (WEA 18-1)					
	16:33	08:36	07:56	17:27	18:19	06:57	18:19	20:13	19:32 (WEA 18-3)	21:05	21:47	21:01 (WEA 18-1)	29				
10	08:36	16:34	07:56	17:28	18:21	06:57	18:21	06:45	18:44 (WEA 18-4)	05:42	05:06	20:32 (WEA 18-1)					
	16:34	08:35	07:54	17:28	18:21	06:55	18:21	20:15	19:31 (WEA 18-3)	21:07	21:48	21:01 (WEA 18-1)	29				
11	08:35	16:36	07:54	17:30	18:22	06:55	18:22	06:42	18:45 (WEA 18-4)	05:41	05:06	20:31 (WEA 18-1)					
	16:36	08:34	07:52	17:30	18:22	06:52	18:22	20:17	19:29 (WEA 18-3)	21:08	21:49	21:01 (WEA 18-1)	30				
12	08:34	16:37	07:52	17:32	18:24	06:52	18:24	06:40	18:46 (WEA 18-4)	05:39	05:05	20:32 (WEA 18-1)					
	16:37	08:34	07:50	17:32	18:24	06:50	18:24	20:19	19:28 (WEA 18-3)	21:10	21:49	21:02 (WEA 18-1)	30				
13	08:34	16:39	07:50	17:34	18:26	06:50	18:26	06:38	18:48 (WEA 18-4)	05:37	05:05	20:32 (WEA 18-1)					
	16:39	08:33	07:48	17:34	18:26	06:48	18:26	20:20	19:27 (WEA 18-3)	21:12	21:50	21:02 (WEA 18-1)	30				
14	08:33	16:40	07:48	17:36	18:28	06:48	18:28	06:35	18:50 (WEA 18-4)	05:36	05:05	20:32 (WEA 18-1)					
	16:40	08:32	07:46	17:36	18:28	06:45	18:28	20:22	19:25 (WEA 18-3)	21:13	21:51	21:03 (WEA 18-1)	31				
15	08:32	16:42	07:46	17:38	18:30	06:45	18:30	06:33	18:55 (WEA 18-4)	05:34	05:05	20:31 (WEA 18-1)					
	16:42	08:31	07:45	17:38	18:30	06:43	18:30	20:24	19:20 (WEA 18-3)	21:15	21:51	21:02 (WEA 18-1)	31				
16	08:31	16:43	07:45	17:40	18:31	06:43	18:31	06:31		05:32	05:04	20:32 (WEA 18-1)					
	16:43	08:30	07:43	17:40	18:31	06:41	18:31	20:26		21:17	21:52	21:03 (WEA 18-1)	31				
17	08:30	16:45	07:43	17:42	18:33	06:41	18:33	06:29		05:31	05:04	20:32 (WEA 18-1)					
	16:45	08:29	07:40	17:42	18:33	06:38	18:33	20:27		21:18	21:52	21:03 (WEA 18-1)	31				
18	08:29	16:47	07:40	17:44	18:35	06:38	18:35	06:27		05:29	05:04	20:32 (WEA 18-1)					
	16:47	08:28	07:38	17:44	18:35	06:35	18:35	20:29		21:20	21:53	21:03 (WEA 18-1)	31				
19	08:28	16:48	07:38	17:46	18:37	06:36	18:37	06:24		05:28	05:04	20:32 (WEA 18-1)					
	16:48	08:27	07:36	17:46	18:37	06:34	18:37	20:31		21:21	21:53	21:03 (WEA 18-1)	31				
20	08:27	16:50	07:36	17:47	18:38	06:34	18:38	06:22		05:26	05:04	20:33 (WEA 18-1)					
	16:50	08:26	07:34	17:47	18:38	06:31	18:38	20:33		21:23	21:54	21:04 (WEA 18-1)	31				
21	08:26	16:52	07:34	17:49	18:40	06:31	18:40	06:20		05:25	05:04	20:33 (WEA 18-1)					
	16:52	08:25	07:32	17:49	18:40	06:29	18:40	20:34		21:24	21:54	21:04 (WEA 18-1)	31				
22	08:25	16:53	07:32	17:51	18:42	06:29	18:42	06:18		05:24	05:05	20:33 (WEA 18-1)					
	16:53	08:24	07:30	17:51	18:42	06:27	18:42	20:36		21:26	21:54	21:04 (WEA 18-1)	31				
23	08:24	16:55	07:30	17:53	18:44	06:27	18:44	06:16		05:22	05:05	20:33 (WEA 18-1)					
	16:55	08:23	07:28	17:53	18:44	06:24	18:44	20:38		21:27	21:54	21:04 (WEA 18-1)	31				
24	08:23	16:57	07:28	17:55	18:46	06:24	18:46	06:14		05:21	05:05	20:33 (WEA 18-1)					
	16:57	08:21	07:26	17:55	18:46	06:22	18:46	20:40		21:29	21:54	21:04 (WEA 18-1)	31				
25	08:21	16:59	07:26	17:57	18:47	06:22	18:47	06:11		05:20	05:05	20:34 (WEA 18-1)					
	16:59	08:20	07:24	17:57	18:47	06:20	18:47	20:41		21:30	21:54	21:05 (WEA 18-1)	31				
26	08:20	17:00	07:24	17:59	18:49	06:20	18:49	06:09		05:19	05:06	20:34 (WEA 18-1)					
	17:00	08:19	07:22	17:59	18:49	06:19	18:49	20:43		21:31	21:55	21:05 (WEA 18-1)	31				
27	08:19	17:02	07:22	18:01	19:51	06:17	18:51 (WEA 18-4)	06:07		05:17	05:06	20:35 (WEA 18-1)					
	17:02	08:17	07:19	18:01	19:51	06:15	18:51 (WEA 18-4)	20:45		21:33	21:54	21:06 (WEA 18-1)	31				
28	08:17	17:04	07:19	18:02	19:53	06:15	18:49 (WEA 18-4)	06:05		05:16	05:07	20:35 (WEA 18-1)					
	17:04	08:16	07:12	18:02	19:53	06:12	18:49 (WEA 18-4)	20:47		21:34	21:54	21:05 (WEA 18-1)	30				
29	08:16	17:06	07:12	18:02	19:53	06:12	18:47 (WEA 18-4)	06:03		05:15	05:07	20:35 (WEA 18-1)					
	17:06	08:14	07:10	18:02	19:54	06:10	18:47 (WEA 18-4)	20:48		21:35	21:54	21:06 (WEA 18-1)	31				
30	08:14	17:08	07:10	18:02	19:56	06:10	18:46 (WEA 18-4)	06:01		05:14	05:08	20:35 (WEA 18-1)					
	17:08	08:13	07:08	18:02	19:56	06:08	18:46 (WEA 18-4)	20:50		21:36	21:54	21:05 (WEA 18-1)	30				
31	08:13	17:10	07:08	18:02	19:58	06:08	18:45 (WEA 18-4)			05:13	21:54						
	17:10		07:08	18:02	19:58	06:08	18:45 (WEA 18-4)	43	19:28 (WEA 18-3)	21:38	21:54	21:05 (WEA 18-1)					
										487	502						
Sonnenscheinstunden			256	275	366			416			89				502	881	
astr.max.mögl.Beschattung						186		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)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 37a - Bruchstraße 4/Nordwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	05:08		20:36 (WEA 18-1)	05:45		06:36	18:46 (WEA 18-4)	07:26	07:21	08:13
	21:54	30	21:06 (WEA 18-1)	21:22		20:19	19:28 (WEA 18-3)	19:08	17:01	16:19
2	05:09		20:35 (WEA 18-1)	05:47		06:38	18:43 (WEA 18-4)	07:28	07:23	08:15
	21:53	30	21:05 (WEA 18-1)	21:20		20:16	19:28 (WEA 18-3)	19:06	16:59	16:18
3	05:10		20:36 (WEA 18-1)	05:48		06:39	18:42 (WEA 18-4)	07:30	07:25	08:16
	21:53	30	21:06 (WEA 18-1)	21:18		20:14	19:29 (WEA 18-3)	19:03	16:57	16:17
4	05:10		20:37 (WEA 18-1)	05:50		06:41	18:40 (WEA 18-4)	07:31	07:27	08:18
	21:53	29	21:06 (WEA 18-1)	21:17		20:12	19:29 (WEA 18-3)	19:01	16:55	16:17
5	05:11		20:37 (WEA 18-1)	05:52		06:43	18:40 (WEA 18-4)	07:33	07:29	08:19
	21:52	29	21:06 (WEA 18-1)	21:15		20:10	19:29 (WEA 18-3)	18:59	16:53	16:16
6	05:12		20:37 (WEA 18-1)	05:53		06:44	18:38 (WEA 18-4)	07:35	07:30	08:20
	21:52	28	21:05 (WEA 18-1)	21:13		20:07	19:28 (WEA 18-3)	18:56	16:51	16:16
7	05:13		20:38 (WEA 18-1)	05:55		06:46	18:38 (WEA 18-4)	07:37	07:32	08:22
	21:51	27	21:05 (WEA 18-1)	21:11		20:05	19:28 (WEA 18-3)	18:54	16:50	16:15
8	05:14		20:38 (WEA 18-1)	05:56		06:48	18:38 (WEA 18-4)	07:38	07:34	08:23
	21:50	27	21:05 (WEA 18-1)	21:09		20:03	19:28 (WEA 18-3)	18:52	16:48	16:15
9	05:15		20:39 (WEA 18-1)	05:58		06:49	18:37 (WEA 18-4)	07:40	07:36	08:24
	21:50	26	21:05 (WEA 18-1)	21:07		20:00	19:26 (WEA 18-3)	18:50	16:46	16:14
10	05:16		20:40 (WEA 18-1)	06:00		06:51	18:37 (WEA 18-4)	07:42	07:38	08:25
	21:49	25	21:05 (WEA 18-1)	21:06		19:58	19:26 (WEA 18-3)	18:47	16:45	16:14
11	05:17		20:40 (WEA 18-1)	06:01		06:53	18:36 (WEA 18-4)	07:43	07:40	08:26
	21:48	24	21:04 (WEA 18-1)	21:04		19:56	19:24 (WEA 18-3)	18:45	16:43	16:14
12	05:18		20:41 (WEA 18-1)	06:03		06:54	18:36 (WEA 18-4)	07:45	07:41	08:28
	21:47	23	21:04 (WEA 18-1)	21:02		19:53	19:23 (WEA 18-3)	18:43	16:41	16:14
13	05:19		20:42 (WEA 18-1)	06:05		06:56	18:37 (WEA 18-4)	07:47	07:43	08:29
	21:47	21	21:03 (WEA 18-1)	21:00		19:51	19:21 (WEA 18-3)	18:40	16:40	16:14
14	05:20		20:43 (WEA 18-1)	06:06		06:58	18:36 (WEA 18-4)	07:49	07:45	08:30
	21:46	20	21:03 (WEA 18-1)	20:58		19:48	19:17 (WEA 18-3)	18:38	16:38	16:14
15	05:21		20:44 (WEA 18-1)	06:08		06:59	18:37 (WEA 18-4)	07:51	07:47	08:31
	21:45	18	21:02 (WEA 18-1)	20:56		19:46	19:05 (WEA 18-4)	18:36	16:37	16:14
16	05:23		20:45 (WEA 18-1)	06:10		07:01	18:38 (WEA 18-4)	07:52	07:49	08:31
	21:44	16	21:01 (WEA 18-1)	20:54		19:44	19:04 (WEA 18-4)	18:34	16:35	16:14
17	05:24		20:47 (WEA 18-1)	06:11		07:03	18:39 (WEA 18-4)	07:54	07:50	08:32
	21:43	13	21:00 (WEA 18-1)	20:52		19:41	19:02 (WEA 18-4)	18:32	16:34	16:14
18	05:25		20:49 (WEA 18-1)	06:13		07:04	18:41 (WEA 18-4)	07:56	07:52	08:33
	21:42	9	20:58 (WEA 18-1)	20:49		19:39	19:00 (WEA 18-4)	18:29	16:32	16:14
19	05:26			06:15		07:06	18:42 (WEA 18-4)	07:58	07:54	08:34
	21:40			20:47		19:37	18:56 (WEA 18-4)	18:27	16:31	16:14
20	05:28			06:16		07:08	18:48 (WEA 18-4)	07:59	07:56	08:35
	21:39			20:45		19:34	18:50 (WEA 18-4)	18:25	16:30	16:15
21	05:29			06:18		07:09		08:01	07:57	08:35
	21:38			20:43		19:32		18:23	16:29	16:15
22	05:31			06:20		07:11		08:03	07:59	08:36
	21:37			20:41		19:29		18:21	16:27	16:15
23	05:32			06:21		07:13		08:05	08:01	08:36
	21:35			20:39		19:27		18:19	16:26	16:16
24	05:33			06:23		07:14		08:07	08:02	08:37
	21:34			20:37		19:25		18:17	16:25	16:16
25	05:35			06:25		07:16		08:08	08:04	08:37
	21:33			20:34		19:22		18:15	16:24	16:17
26	05:36			06:26		07:18		08:10	08:06	08:37
	21:31			20:32		19:20		18:12	16:23	16:18
27	05:38			06:28		07:20		08:12	08:07	08:38
	21:30			20:30		19:18		18:10	16:22	16:18
28	05:39			06:30		07:21		07:14	08:09	08:38
	21:28			20:28		19:15		17:08	16:21	16:19
29	05:41			06:31		07:23		07:16	08:10	08:38
	21:27			20:26	10	19:22 (WEA 18-3)		17:06	16:20	16:20
30	05:42			06:33		07:25		07:18	08:12	08:38
	21:25			20:23	27	19:25 (WEA 18-3)		17:04	16:19	16:21
31	05:44			06:34		07:27		07:19		08:38
	21:23			20:21	37	19:27 (WEA 18-3)		17:02		16:22
Sonnenscheinstunden	505			456		382		332	265	241
astr.max.mögl.Beschattung		425		74		768				

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

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

Projekt:

LQ13955.2 Fürstenau-Hollenstede 18

Beschreibung:

Windenergie Hollenstede 18 Planungs-
gesellschaft mbHSchattenwurf-Untersuchung zum
Genehmigungsverfahren für die Errichtung
von 4 Windenergieanlagen in Hollenstede

Lizenzierter Anwender:

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0049 591 800 1634
Thomas Wihard / wihard@zechgmbh.de
Berechnet:
18.12.2018 11:19/3.0.654

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 37b - Bruchstraße 4/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	08:38 16:23	08:11 17:11	07:17 18:04		07:05 19:59	44	18:46 (WEA 18-4) 19:30 (WEA 18-3)	05:59 20:52	05:12 21:39	20:36 (WEA 18-1) 20:57 (WEA 18-1)
2	08:38 16:24	08:10 17:13	07:15 18:06		07:03 20:01	47	18:45 (WEA 18-4) 19:32 (WEA 18-3)	05:57 20:53	05:11 21:40	20:35 (WEA 18-1) 20:57 (WEA 18-1)
3	08:38 16:25	08:08 17:15	07:13 18:08		07:01 20:03	48	18:45 (WEA 18-4) 19:33 (WEA 18-3)	05:55 20:55	05:11 21:41	20:35 (WEA 18-1) 20:58 (WEA 18-1)
4	08:38 16:26	08:06 17:17	07:10 18:10		06:58 20:05	49	18:44 (WEA 18-4) 19:33 (WEA 18-3)	05:53 20:57	05:10 21:42	20:34 (WEA 18-1) 20:58 (WEA 18-1)
5	08:38 16:28	08:05 17:19	07:08 18:12		06:56 20:06	50	18:44 (WEA 18-4) 19:34 (WEA 18-3)	05:51 20:58	05:09 21:43	20:34 (WEA 18-1) 20:59 (WEA 18-1)
6	08:37 16:29	08:03 17:21	07:06 18:13		06:54 20:08	50	18:44 (WEA 18-4) 19:34 (WEA 18-3)	05:50 21:00	05:08 21:44	20:34 (WEA 18-1) 20:59 (WEA 18-1)
7	08:37 16:30	08:01 17:23	07:04 18:15		06:51 20:10	50	18:43 (WEA 18-4) 19:33 (WEA 18-3)	05:48 21:02	05:08 21:45	20:34 (WEA 18-1) 21:00 (WEA 18-1)
8	08:37 16:31	08:00 17:25	07:01 18:17		06:49 20:12	49	18:44 (WEA 18-4) 19:33 (WEA 18-3)	05:46 21:04	05:07 21:46	20:33 (WEA 18-1) 21:00 (WEA 18-1)
9	08:36 16:33	07:58 17:27	06:59 18:19		06:47 20:13	49	18:44 (WEA 18-4) 19:33 (WEA 18-3)	05:44 21:05	05:07 21:47	20:34 (WEA 18-1) 21:01 (WEA 18-1)
10	08:36 16:34	07:56 17:28	06:57 18:21		06:45 20:15	47	18:45 (WEA 18-4) 19:32 (WEA 18-3)	05:42 21:07	05:06 21:48	20:34 (WEA 18-1) 21:02 (WEA 18-1)
11	08:35 16:36	07:54 17:30	06:55 18:22		06:42 20:17	46	18:45 (WEA 18-4) 19:31 (WEA 18-3)	05:41 21:08	05:06 21:49	20:33 (WEA 18-1) 21:02 (WEA 18-1)
12	08:34 16:37	07:52 17:32	06:52 18:24		06:40 20:19	44	18:46 (WEA 18-4) 19:30 (WEA 18-3)	05:39 21:10	05:05 21:49	20:34 (WEA 18-1) 21:03 (WEA 18-1)
13	08:34 16:39	07:50 17:34	06:50 18:26		06:38 20:20	40	18:48 (WEA 18-4) 19:29 (WEA 18-3)	05:37 21:12	05:05 21:50	20:34 (WEA 18-1) 21:03 (WEA 18-1)
14	08:33 16:40	07:48 17:36	06:48 18:28		06:35 20:22	32	18:50 (WEA 18-4) 19:27 (WEA 18-3)	05:36 21:13	05:05 21:51	20:34 (WEA 18-1) 21:04 (WEA 18-1)
15	08:32 16:42	07:46 17:38	06:45 18:30		06:33 20:24	22	18:51 (WEA 18-4) 19:23 (WEA 18-3)	05:34 21:15	05:05 21:51	20:33 (WEA 18-1) 21:03 (WEA 18-1)
16	08:31 16:43	07:45 17:40	06:43 18:31		06:31 20:26			05:32 21:17	05:04 21:52	20:33 (WEA 18-1) 21:03 (WEA 18-1)
17	08:30 16:45	07:43 17:42	06:41 18:33		06:29 20:27			05:31 21:18	05:04 21:52	20:34 (WEA 18-1) 21:04 (WEA 18-1)
18	08:29 16:47	07:40 17:44	06:38 18:35		06:27 20:29			05:29 21:20	05:04 21:53	20:34 (WEA 18-1) 21:04 (WEA 18-1)
19	08:28 16:48	07:38 17:46	06:36 18:37		06:24 20:31			05:28 21:21	05:04 21:53	20:34 (WEA 18-1) 21:04 (WEA 18-1)
20	08:27 16:50	07:36 17:47	06:34 18:38		06:22 20:33			05:26 21:23	05:04 21:54	20:35 (WEA 18-1) 21:05 (WEA 18-1)
21	08:26 16:52	07:34 17:49	06:31 18:40		06:20 20:34			05:25 21:24	05:04 21:54	20:35 (WEA 18-1) 21:05 (WEA 18-1)
22	08:25 16:53	07:32 17:51	06:29 18:42		06:18 20:36			05:24 21:26	05:05 21:54	20:35 (WEA 18-1) 21:05 (WEA 18-1)
23	08:24 16:55	07:30 17:53	06:27 18:44		06:16 20:38			05:22 21:27	05:05 21:54	20:35 (WEA 18-1) 21:05 (WEA 18-1)
24	08:23 16:57	07:28 17:55	06:24 18:46		06:14 20:40			05:21 21:29	05:05 21:54	20:35 (WEA 18-1) 21:05 (WEA 18-1)
25	08:21 16:59	07:26 17:57	07:22 19:47	6	19:01 (WEA 18-4) 19:07 (WEA 18-4)			05:20 21:30	05:05 21:54	20:36 (WEA 18-1) 21:06 (WEA 18-1)
26	08:20 17:00	07:24 17:59	07:19 19:49	15	18:56 (WEA 18-4) 19:11 (WEA 18-4)			05:19 21:31	05:06 21:55	20:36 (WEA 18-1) 21:06 (WEA 18-1)
27	08:19 17:02	07:22 18:01	07:17 19:51	20	18:53 (WEA 18-4) 19:13 (WEA 18-4)			05:17 21:33	05:06 21:54	20:37 (WEA 18-1) 21:07 (WEA 18-1)
28	08:17 17:04	07:19 18:02	07:15 19:53	24	18:51 (WEA 18-4) 19:15 (WEA 18-4)			05:16 21:34	05:07 21:54	20:36 (WEA 18-1) 21:06 (WEA 18-1)
29	08:16 17:06		07:12 19:54	27	18:49 (WEA 18-4) 19:16 (WEA 18-4)			05:15 21:35	05:07 21:54	20:37 (WEA 18-1) 21:07 (WEA 18-1)
30	08:14 17:08		07:10 19:56	29	18:48 (WEA 18-4) 19:17 (WEA 18-4)			05:14 21:36	05:08 21:54	20:37 (WEA 18-1) 21:07 (WEA 18-1)
31	08:13 17:10		07:08 19:58	42	18:46 (WEA 18-4) 19:28 (WEA 18-3)			05:13 21:38	05:08 21:54	20:37 (WEA 18-1) 21:06 (WEA 18-1)
Sonnenscheinstunden	256	275	366		416			487	502	
astr.max.mögl.Beschattung			163		667			63	844	

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 37b - Bruchstraße 4/Südwest
Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	05:08	20:38 (WEA 18-1)	05:45		06:36	18:46 (WEA 18-4)	07:26	07:21	08:13	
	21:54	29 21:07 (WEA 18-1)	21:22		20:19	44 19:30 (WEA 18-3)	19:08	17:01	16:19	
2	05:09	20:37 (WEA 18-1)	05:47		06:38	18:44 (WEA 18-4)	07:28	07:23	08:15	
	21:53	29 21:06 (WEA 18-1)	21:20		20:16	46 19:30 (WEA 18-3)	19:06	16:59	16:18	
3	05:10	20:38 (WEA 18-1)	05:48		06:39	18:43 (WEA 18-4)	07:30	07:25	08:16	
	21:53	28 21:06 (WEA 18-1)	21:18		20:14	47 19:30 (WEA 18-3)	19:03	16:57	16:17	
4	05:10	20:39 (WEA 18-1)	05:50		06:41	18:41 (WEA 18-4)	07:31	07:27	08:18	
	21:53	28 21:07 (WEA 18-1)	21:17		20:12	49 19:30 (WEA 18-3)	19:01	16:55	16:17	
5	05:11	20:39 (WEA 18-1)	05:52		06:43	18:41 (WEA 18-4)	07:33	07:29	08:19	
	21:52	28 21:07 (WEA 18-1)	21:15		20:10	49 19:30 (WEA 18-3)	18:59	16:53	16:16	
6	05:12	20:39 (WEA 18-1)	05:53		06:44	18:39 (WEA 18-4)	07:35	07:30	08:20	
	21:52	27 21:06 (WEA 18-1)	21:13		20:07	50 19:29 (WEA 18-3)	18:56	16:51	16:16	
7	05:13	20:40 (WEA 18-1)	05:55		06:46	18:39 (WEA 18-4)	07:37	07:32	08:22	
	21:51	26 21:06 (WEA 18-1)	21:11		20:05	50 19:29 (WEA 18-3)	18:54	16:50	16:15	
8	05:14	20:40 (WEA 18-1)	05:56		06:48	18:39 (WEA 18-4)	07:38	07:34	08:23	
	21:50	26 21:06 (WEA 18-1)	21:09		20:03	50 19:29 (WEA 18-3)	18:52	16:48	16:15	
9	05:15	20:41 (WEA 18-1)	05:58		06:49	18:38 (WEA 18-4)	07:40	07:36	08:24	
	21:50	25 21:06 (WEA 18-1)	21:07		20:00	49 19:27 (WEA 18-3)	18:50	16:46	16:14	
10	05:16	20:42 (WEA 18-1)	06:00		06:51	18:38 (WEA 18-4)	07:42	07:38	08:25	
	21:49	23 21:05 (WEA 18-1)	21:06		19:58	48 19:26 (WEA 18-3)	18:47	16:45	16:14	
11	05:17	20:43 (WEA 18-1)	06:01		06:53	18:37 (WEA 18-4)	07:43	07:40	08:26	
	21:48	22 21:05 (WEA 18-1)	21:04		19:56	47 19:24 (WEA 18-3)	18:45	16:43	16:14	
12	05:18	20:43 (WEA 18-1)	06:03		06:54	18:38 (WEA 18-4)	07:45	07:41	08:28	
	21:47	21 21:04 (WEA 18-1)	21:02		19:53	45 19:23 (WEA 18-3)	18:43	16:41	16:14	
13	05:19	20:44 (WEA 18-1)	06:05		06:56	18:38 (WEA 18-4)	07:47	07:43	08:29	
	21:47	20 21:04 (WEA 18-1)	21:00		19:51	43 19:21 (WEA 18-3)	18:40	16:40	16:14	
14	05:20	20:45 (WEA 18-1)	06:06		06:58	18:38 (WEA 18-4)	07:49	07:45	08:30	
	21:46	18 21:03 (WEA 18-1)	20:58		19:48	29 19:07 (WEA 18-4)	18:38	16:38	16:14	
15	05:21	20:46 (WEA 18-1)	06:08		06:59	18:39 (WEA 18-4)	07:51	07:47	08:31	
	21:45	16 21:02 (WEA 18-1)	20:56		19:46	27 19:06 (WEA 18-4)	18:36	16:37	16:14	
16	05:23	20:48 (WEA 18-1)	06:10		07:01	18:40 (WEA 18-4)	07:52	07:49	08:31	
	21:44	12 21:00 (WEA 18-1)	20:54		19:44	25 19:05 (WEA 18-4)	18:34	16:35	16:14	
17	05:24	20:51 (WEA 18-1)	06:11		07:03	18:41 (WEA 18-4)	07:54	07:50	08:32	
	21:43	8 20:59 (WEA 18-1)	20:52		19:41	21 19:02 (WEA 18-4)	18:32	16:34	16:14	
18	05:25		06:13		07:04	18:43 (WEA 18-4)	07:56	07:52	08:33	
	21:42		20:49		19:39	17 19:00 (WEA 18-4)	18:29	16:32	16:14	
19	05:26		06:15		07:06	18:46 (WEA 18-4)	07:58	07:54	08:34	
	21:40		20:47		19:37	9 18:55 (WEA 18-4)	18:27	16:31	16:14	
20	05:28		06:16		07:08		07:59	07:56	08:35	
	21:39		20:45		19:34		18:25	16:30	16:15	
21	05:29		06:18		07:09		08:01	07:57	08:35	
	21:38		20:43		19:32		18:23	16:29	16:15	
22	05:31		06:20		07:11		08:03	07:59	08:36	
	21:37		20:41		19:29		18:21	16:27	16:15	
23	05:32		06:21		07:13		08:05	08:01	08:36	
	21:35		20:39		19:27		18:19	16:26	16:16	
24	05:33		06:23		07:14		08:07	08:02	08:37	
	21:34		20:37		19:25		18:17	16:25	16:16	
25	05:35		06:25		07:16		08:08	08:04	08:37	
	21:33		20:34		19:22		18:15	16:24	16:17	
26	05:36		06:26		07:18		08:10	08:06	08:37	
	21:31		20:32		19:20		18:12	16:23	16:18	
27	05:38		06:28		07:20		08:12	08:07	08:38	
	21:30		20:30		19:18		18:10	16:22	16:18	
28	05:39		06:30		07:21		07:14	08:09	08:38	
	21:28		20:28		19:15		17:08	16:21	16:19	
29	05:41		06:31	18:53 (WEA 18-4)	07:23		07:16	08:10	08:38	
	21:27	23 19:25 (WEA 18-3)	19:13		19:13		17:06	16:20	16:20	
30	05:42	06:33	18:49 (WEA 18-4)	07:25			07:18	08:12	08:38	
	21:25	33 19:27 (WEA 18-3)	19:10		19:10		17:04	16:19	16:21	
31	05:44	06:34	18:47 (WEA 18-4)				07:19		08:38	
	21:23	40 19:28 (WEA 18-3)					17:02		16:22	
Sonnenscheinstunden	505	456	382	745	332	265	241			
astr.max.mögl.Beschattung	386	96								

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: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 38 - Wielage 5

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

Januar		Februar		März		April		Mai		Juni	
1	08:38	08:11	15:48 (WEA 18-4)	07:17	15:54 (WEA 18-2)	07:05	05:59	05:12			
	16:23	17:11	25 16:13 (WEA 18-4)	18:04	42 16:36 (WEA 18-2)	20:00	20:52	21:39			
2	08:38	08:10	15:50 (WEA 18-4)	07:15	15:55 (WEA 18-2)	07:03	05:57	05:11			
	16:24	17:13	23 16:13 (WEA 18-4)	18:06	50 17:25 (WEA 18-1)	20:01	20:53	21:40			
3	08:38	08:08	15:51 (WEA 18-4)	07:13	15:56 (WEA 18-2)	07:01	05:55	05:11			
	16:25	17:15	21 16:12 (WEA 18-4)	18:08	55 17:28 (WEA 18-1)	20:03	20:55	21:41			
4	08:38	08:07	15:51 (WEA 18-4)	07:10	15:57 (WEA 18-2)	06:58	05:53	05:10			
	16:26	17:17	20 16:11 (WEA 18-4)	18:10	57 17:30 (WEA 18-1)	20:05	20:57	21:42			
5	08:38	08:05	15:53 (WEA 18-4)	07:08	15:58 (WEA 18-2)	06:56	05:51	05:09			
	16:28	17:19	23 16:48 (WEA 18-3)	18:12	58 17:32 (WEA 18-1)	20:06	20:59	21:43			
6	08:37	08:03	15:55 (WEA 18-4)	07:06	15:59 (WEA 18-2)	06:54	05:50	05:08			
	16:29	17:21	25 16:51 (WEA 18-3)	18:13	58 17:33 (WEA 18-1)	20:08	21:00	21:44			
7	08:37	08:01	15:57 (WEA 18-4)	07:04	16:02 (WEA 18-2)	06:51	05:48	05:08			
	16:30	17:23	35 16:53 (WEA 18-3)	18:15	56 17:34 (WEA 18-1)	20:10	21:02	21:45			
8	08:37	08:00	16:06 (WEA 18-2)	07:01	16:05 (WEA 18-2)	06:49	05:46	05:07			
	16:31	17:25	37 16:54 (WEA 18-3)	18:17	51 17:35 (WEA 18-1)	20:12	21:04	21:46			
9	08:36	07:58	16:04 (WEA 18-2)	06:59	16:08 (WEA 18-2)	06:47	05:44	05:07			
	16:33	17:27	44 16:56 (WEA 18-3)	18:19	45 17:35 (WEA 18-1)	20:13	21:05	21:47			
10	08:36	07:56	16:03 (WEA 18-2)	06:57	17:02 (WEA 18-1)	06:45	05:42	05:06			
	16:34	17:28	47 16:56 (WEA 18-3)	18:21	33 17:35 (WEA 18-1)	20:15	21:07	21:48			
11	08:35	07:54	16:01 (WEA 18-2)	06:55	17:02 (WEA 18-1)	06:42	05:41	05:06			
	16:36	17:30	53 16:57 (WEA 18-3)	18:22	34 17:36 (WEA 18-1)	20:17	21:09	21:49			
12	08:34	07:52	16:00 (WEA 18-2)	06:52	17:00 (WEA 18-1)	06:40	05:39	05:05			
	16:37	17:32	56 16:57 (WEA 18-3)	18:24	35 17:35 (WEA 18-1)	20:19	21:10	21:49			
13	08:34	07:50	15:59 (WEA 18-2)	06:50	17:01 (WEA 18-1)	06:38	05:37	05:05			
	16:39	17:34	58 16:57 (WEA 18-3)	18:26	34 17:35 (WEA 18-1)	20:20	21:12	21:50			
14	08:33	07:48	15:58 (WEA 18-2)	06:48	17:01 (WEA 18-1)	06:35	05:36	05:05			
	16:40	17:36	59 16:57 (WEA 18-3)	18:28	34 17:35 (WEA 18-1)	20:22	21:13	21:51			
15	08:32	07:46	15:57 (WEA 18-2)	06:45	17:00 (WEA 18-1)	06:33	05:34	05:05			
	16:42	17:38	60 16:57 (WEA 18-3)	18:30	34 17:34 (WEA 18-1)	20:24	21:15	21:51			
16	08:31	07:45	15:55 (WEA 18-2)	06:43	17:01 (WEA 18-1)	06:31	05:32	05:04			
	16:43	17:40	61 16:56 (WEA 18-3)	18:31	33 17:34 (WEA 18-1)	20:26	21:17	21:52			
17	08:30	07:43	15:55 (WEA 18-2)	06:41	17:01 (WEA 18-1)	06:29	05:31	05:04			
	16:45	17:42	60 16:55 (WEA 18-3)	18:33	32 17:33 (WEA 18-1)	20:27	21:18	21:52			
18	08:29	07:41	15:54 (WEA 18-2)	06:38	17:01 (WEA 18-1)	06:27	05:29	05:04			
	16:46	17:44	60 16:54 (WEA 18-3)	18:35	30 17:31 (WEA 18-1)	20:29	21:20	21:53			
19	08:28	07:38	15:54 (WEA 18-2)	06:36	17:03 (WEA 18-1)	06:24	05:28	05:04			
	16:48	17:46	59 16:53 (WEA 18-3)	18:37	27 17:30 (WEA 18-1)	20:31	21:21	21:53			
20	08:27	07:36	15:54 (WEA 18-2)	06:34	17:03 (WEA 18-1)	06:22	05:26	05:04			
	16:50	17:47	56 16:51 (WEA 18-3)	18:38	25 17:28 (WEA 18-1)	20:33	21:23	21:54			
21	08:26	07:34	15:53 (WEA 18-2)	06:31	17:05 (WEA 18-1)	06:20	05:25	05:04			
	16:52	17:49	46 16:39 (WEA 18-2)	18:40	22 17:27 (WEA 18-1)	20:34	21:24	21:54			
22	08:25	07:32	15:53 (WEA 18-2)	06:29	17:07 (WEA 18-1)	06:18	05:24	05:05			
	16:53	17:51	46 16:39 (WEA 18-2)	18:42	18 17:25 (WEA 18-1)	20:36	21:26	21:54			
23	08:24	07:30	15:52 (WEA 18-2)	06:27	17:10 (WEA 18-1)	06:16	05:22	05:05			
	16:55	17:53	47 16:39 (WEA 18-2)	18:44	10 17:20 (WEA 18-1)	20:38	21:27	21:54			
24	08:23	07:28	15:53 (WEA 18-2)	06:24		06:14	05:21	05:05			
	16:57	17:55	46 16:39 (WEA 18-2)	18:46		20:40	21:29	21:54			
25	08:21	07:26	15:53 (WEA 18-2)	07:22		06:11	05:20	05:05			
	16:59	17:57	46 16:39 (WEA 18-2)	19:47		20:41	21:30	21:55			
26	08:20	07:24	15:53 (WEA 18-2)	07:19		06:09	05:19	05:06			
	17:00	17:59	45 16:38 (WEA 18-2)	19:49		20:43	21:31	21:55			
27	08:19	07:22	15:53 (WEA 18-2)	07:17		06:07	05:17	05:06			
	17:02	18:01	44 16:37 (WEA 18-2)	19:51		20:45	21:33	21:55			
28	08:17	07:19	15:54 (WEA 18-2)	07:15		06:05	05:16	05:07			
	17:04	18:02	43 16:37 (WEA 18-2)	19:53		20:47	21:34	21:54			
29	08:16			07:12		06:03	05:15	05:07			
	17:06			19:54		20:48	21:35	21:54			
30	08:14			07:10		06:01	05:14	05:08			
	17:08			19:56		20:50	21:37	21:54			
31	08:13			07:08			05:13				
	17:10			19:58			21:38				
Sonnenscheinstunden		256									
astr.max.mögl.Beschattung		404	275	1245	873	416	487	502			

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 **Schattenrezeptor:** IP 38 - Wielage 5

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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

	July	August	September		Oktober		November		Dezember
1	05:08	05:45	06:36		07:26	17:40 (WEA 18-1)	07:21	15:30 (WEA 18-2)	08:13
	21:54	21:22	20:19		19:08	35 18:15 (WEA 18-1)	17:01	16:25 (WEA 18-3)	16:19
2	05:09	05:47	06:38		07:28	17:39 (WEA 18-1)	07:23	15:31 (WEA 18-2)	08:15
	21:54	21:20	20:16		19:06	35 18:14 (WEA 18-1)	16:59	16:25 (WEA 18-3)	16:18
3	05:10	05:48	06:39		07:30	17:39 (WEA 18-1)	07:25	15:34 (WEA 18-2)	08:16
	21:53	21:18	20:14		19:03	35 18:14 (WEA 18-1)	16:57	16:24 (WEA 18-3)	16:17
4	05:10	05:50	06:41		07:31	17:39 (WEA 18-1)	07:27	15:36 (WEA 18-2)	08:18
	21:53	21:17	20:12		19:01	34 18:13 (WEA 18-1)	16:55	16:23 (WEA 18-3)	16:17
5	05:11	05:52	06:43		07:33	16:49 (WEA 18-2)	07:29	15:26 (WEA 18-4)	08:19
	21:52	21:15	20:10		18:59	39 18:13 (WEA 18-1)	16:53	16:22 (WEA 18-3)	16:16
6	05:12	05:53	06:44		07:35	16:42 (WEA 18-2)	07:30	15:24 (WEA 18-4)	08:20
	21:52	21:13	20:07		18:56	50 18:11 (WEA 18-1)	16:51	16:20 (WEA 18-3)	16:15
7	05:13	05:55	06:46		07:37	16:39 (WEA 18-2)	07:32	15:22 (WEA 18-4)	08:22
	21:51	21:11	20:05		18:54	53 18:10 (WEA 18-1)	16:50	16:17 (WEA 18-3)	16:15
8	05:14	05:56	06:48		07:38	16:36 (WEA 18-2)	07:34	15:21 (WEA 18-4)	08:23
	21:51	21:09	20:03		18:52	57 18:09 (WEA 18-1)	16:48	15:41 (WEA 18-4)	16:15
9	05:15	05:58	06:49		07:40	16:34 (WEA 18-2)	07:36	15:20 (WEA 18-4)	08:24
	21:50	21:07	20:00		18:50	58 18:08 (WEA 18-1)	16:46	15:42 (WEA 18-4)	16:14
10	05:16	06:00	06:51		07:42	16:33 (WEA 18-2)	07:38	15:20 (WEA 18-4)	08:25
	21:49	21:06	19:58		18:47	57 18:06 (WEA 18-1)	16:44	15:43 (WEA 18-4)	16:14
11	05:17	06:01	06:53		07:43	16:30 (WEA 18-2)	07:40	15:19 (WEA 18-4)	08:27
	21:48	21:04	19:56		18:45	56 18:03 (WEA 18-1)	16:43	15:44 (WEA 18-4)	16:14
12	05:18	06:03	06:54		07:45	16:29 (WEA 18-2)	07:41	15:19 (WEA 18-4)	08:28
	21:48	21:02	19:53		18:43	53 18:01 (WEA 18-1)	16:41	15:44 (WEA 18-4)	16:14
13	05:19	06:05	06:56		07:47	16:28 (WEA 18-2)	07:43	15:19 (WEA 18-4)	08:29
	21:47	21:00	19:51		18:40	41 17:09 (WEA 18-2)	16:40	15:45 (WEA 18-4)	16:14
14	05:20	06:06	06:58		07:49	16:27 (WEA 18-2)	07:45	15:19 (WEA 18-4)	08:30
	21:46	20:58	19:48		18:38	43 17:10 (WEA 18-2)	16:38	15:45 (WEA 18-4)	16:14
15	05:21	06:08	06:59		07:51	16:27 (WEA 18-2)	07:47	15:19 (WEA 18-4)	08:31
	21:45	20:56	19:46		18:36	43 17:10 (WEA 18-2)	16:37	15:45 (WEA 18-4)	16:14
16	05:23	06:10	07:01		07:52	16:26 (WEA 18-2)	07:49	15:19 (WEA 18-4)	08:31
	21:44	20:54	19:44		18:34	44 17:10 (WEA 18-2)	16:35	15:46 (WEA 18-4)	16:14
17	05:24	06:11	07:03		07:54	16:24 (WEA 18-2)	07:50	15:19 (WEA 18-4)	08:32
	21:43	20:52	19:41		18:32	46 17:10 (WEA 18-2)	16:34	15:46 (WEA 18-4)	16:14
18	05:25	06:13	07:04		07:56	16:24 (WEA 18-2)	07:52	15:20 (WEA 18-4)	08:33
	21:42	20:50	19:39		18:29	46 17:10 (WEA 18-2)	16:32	15:46 (WEA 18-4)	16:14
19	05:26	06:15	07:06		07:58	16:24 (WEA 18-2)	07:54	15:20 (WEA 18-4)	08:34
	21:40	20:47	19:37		18:27	46 17:10 (WEA 18-2)	16:31	15:46 (WEA 18-4)	16:14
20	05:28	06:16	07:08		07:59	16:24 (WEA 18-2)	07:56	15:21 (WEA 18-4)	08:35
	21:39	20:45	19:34		18:25	46 17:10 (WEA 18-2)	16:30	15:46 (WEA 18-4)	16:15
21	05:29	06:18	07:09	17:58 (WEA 18-1)	08:01	16:24 (WEA 18-2)	07:57	15:22 (WEA 18-4)	08:35
	21:38	20:43	19:32	7 18:05 (WEA 18-1)	18:23	46 17:10 (WEA 18-2)	16:29	15:46 (WEA 18-4)	16:15
22	05:30	06:19	07:11	17:52 (WEA 18-1)	08:03	16:24 (WEA 18-2)	07:59	15:23 (WEA 18-4)	08:36
	21:37	20:41	19:29	16 18:08 (WEA 18-1)	18:21	51 17:19 (WEA 18-3)	16:27	15:46 (WEA 18-4)	16:15
23	05:32	06:21	07:13	17:50 (WEA 18-1)	08:05	16:24 (WEA 18-2)	08:01	15:24 (WEA 18-4)	08:36
	21:35	20:39	19:27	21 18:11 (WEA 18-1)	18:19	57 17:22 (WEA 18-3)	16:26	15:46 (WEA 18-4)	16:16
24	05:33	06:23	07:14	17:48 (WEA 18-1)	08:07	16:24 (WEA 18-2)	08:02	15:24 (WEA 18-4)	08:37
	21:34	20:37	19:25	24 18:12 (WEA 18-1)	18:17	60 17:24 (WEA 18-3)	16:25	15:44 (WEA 18-4)	16:16
25	05:35	06:24	07:16	17:46 (WEA 18-1)	08:08	16:25 (WEA 18-2)	08:04	15:25 (WEA 18-4)	08:37
	21:33	20:34	19:22	27 18:13 (WEA 18-1)	18:14	60 17:25 (WEA 18-3)	16:24	15:44 (WEA 18-4)	16:17
26	05:36	06:26	07:18	17:44 (WEA 18-1)	08:10	16:25 (WEA 18-2)	08:06	15:26 (WEA 18-4)	08:37
	21:31	20:32	19:20	30 18:14 (WEA 18-1)	18:12	61 17:26 (WEA 18-3)	16:23	15:44 (WEA 18-4)	16:18
27	05:38	06:28	07:20	17:43 (WEA 18-1)	08:12	16:26 (WEA 18-2)	08:07	15:28 (WEA 18-4)	08:38
	21:30	20:30	19:18	31 18:14 (WEA 18-1)	18:10	60 17:26 (WEA 18-3)	16:22	15:43 (WEA 18-4)	16:18
28	05:39	06:29	07:21	17:43 (WEA 18-1)	07:14	15:26 (WEA 18-2)	08:09	15:30 (WEA 18-4)	08:38
	21:28	20:28	19:15	32 18:15 (WEA 18-1)	17:08	61 16:27 (WEA 18-3)	16:21	15:43 (WEA 18-4)	16:19
29	05:41	06:31	07:23	17:41 (WEA 18-1)	07:16	15:27 (WEA 18-2)	08:10	15:31 (WEA 18-4)	08:38
	21:27	20:26	19:13	33 18:14 (WEA 18-1)	17:06	60 16:27 (WEA 18-3)	16:20	15:41 (WEA 18-4)	16:20
30	05:42	06:33	07:25	17:41 (WEA 18-1)	07:18	15:27 (WEA 18-2)	08:12	15:34 (WEA 18-4)	08:38
	21:25	20:23	19:10	34 18:15 (WEA 18-1)	17:04	58 16:26 (WEA 18-3)	16:19	15:39 (WEA 18-4)	16:21
31	05:44	06:34			07:19	15:28 (WEA 18-2)			08:38
	21:23	20:21			17:02	56 16:26 (WEA 18-3)			16:22
Sonnenscheinstunden	505	456	382		332		265		241
astr.max.mögl.Beschattung			255		1547		751		

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

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

SHADOW - Kalender**Berechnung:** Windenergie Hollenstede 2018-12**Schattenrezeptor:** IP 39 - Wielage 4**Voraussetzungen für Berechnung des Schattenwurfs**

Referenzjahr für Kalender

2018

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	08:38	08:11	15:57 (WEA 18-4)	07:17	16:51 (WEA 18-1)	07:05	05:59	05:12			
	16:23	17:11	27 16:24 (WEA 18-2)	18:04	28 17:19 (WEA 18-1)	19:59	20:52	21:39			
2	08:38	08:10	15:59 (WEA 18-2)	07:15	16:52 (WEA 18-1)	07:03	05:57	05:11			
	16:24	17:13	27 16:26 (WEA 18-2)	18:06	27 17:19 (WEA 18-1)	20:01	20:53	21:40			
3	08:38	08:08	15:58 (WEA 18-2)	07:13	16:51 (WEA 18-1)	07:01	05:55	05:11			
	16:25	17:15	29 16:27 (WEA 18-2)	18:08	27 17:18 (WEA 18-1)	20:03	20:55	21:41			
4	08:38	08:07	15:57 (WEA 18-2)	07:10	16:52 (WEA 18-1)	06:58	05:53	05:10			
	16:26	17:17	30 16:27 (WEA 18-2)	18:10	25 17:17 (WEA 18-1)	20:05	20:57	21:42			
5	08:38	08:05	15:56 (WEA 18-2)	07:08	16:53 (WEA 18-1)	06:56	05:51	05:09			
	16:28	17:19	32 16:28 (WEA 18-2)	18:12	23 17:16 (WEA 18-1)	20:06	20:58	21:43			
6	08:37	08:03	15:55 (WEA 18-2)	07:06	16:53 (WEA 18-1)	06:54	05:50	05:08			
	16:29	17:21	33 16:28 (WEA 18-2)	18:13	21 17:14 (WEA 18-1)	20:08	21:00	21:44			
7	08:37	08:01	15:55 (WEA 18-2)	07:04	16:55 (WEA 18-1)	06:51	05:48	05:08			
	16:30	17:23	34 16:29 (WEA 18-2)	18:15	18 17:13 (WEA 18-1)	20:10	21:02	21:45			
8	08:37	15:50 (WEA 18-4)	08:00	15:55 (WEA 18-2)	07:01	16:57 (WEA 18-1)	06:49	05:46	05:07		
	16:31	7 15:57 (WEA 18-4)	17:25	34 16:29 (WEA 18-2)	18:17	14 17:11 (WEA 18-1)	20:12	21:04	21:46		
9	08:36	15:49 (WEA 18-4)	07:58	15:55 (WEA 18-2)	06:59	17:01 (WEA 18-1)	06:47	05:44	05:07		
	16:33	9 15:58 (WEA 18-4)	17:27	35 16:30 (WEA 18-2)	18:19	4 17:05 (WEA 18-1)	20:13	21:05	21:47		
10	08:36	15:48 (WEA 18-4)	07:56	15:55 (WEA 18-2)	06:57		06:45	05:42	05:06		
	16:34	11 15:59 (WEA 18-4)	17:28	35 16:30 (WEA 18-2)	18:21		20:15	21:07	21:48		
11	08:35	15:48 (WEA 18-4)	07:54	15:55 (WEA 18-2)	06:55		06:42	05:41	05:06		
	16:36	14 16:02 (WEA 18-4)	17:30	35 16:30 (WEA 18-2)	18:22		20:17	21:09	21:49		
12	08:34	15:47 (WEA 18-4)	07:52	15:56 (WEA 18-2)	06:52		06:40	05:39	05:05		
	16:37	16 16:03 (WEA 18-4)	17:32	34 16:30 (WEA 18-2)	18:24		20:19	21:10	21:49		
13	08:34	15:47 (WEA 18-4)	07:50	15:56 (WEA 18-2)	06:50		06:38	05:37	05:05		
	16:39	17 16:04 (WEA 18-4)	17:34	34 16:30 (WEA 18-2)	18:26		20:20	21:12	21:50		
14	08:33	15:47 (WEA 18-4)	07:48	15:56 (WEA 18-2)	06:48		06:35	05:36	05:05		
	16:40	18 16:05 (WEA 18-4)	17:36	34 16:30 (WEA 18-2)	18:28		20:22	21:13	21:51		
15	08:32	15:47 (WEA 18-4)	07:46	15:57 (WEA 18-2)	06:45		06:33	05:34	05:04		
	16:42	18 16:05 (WEA 18-4)	17:38	33 16:30 (WEA 18-2)	18:30		20:24	21:15	21:51		
16	08:31	15:47 (WEA 18-4)	07:45	15:56 (WEA 18-2)	06:43		06:31	05:32	05:04		
	16:43	19 16:06 (WEA 18-4)	17:40	32 16:28 (WEA 18-2)	18:31		20:26	21:17	21:52		
17	08:30	15:47 (WEA 18-4)	07:43	15:57 (WEA 18-2)	06:41		06:29	05:31	05:04		
	16:45	20 16:07 (WEA 18-4)	17:42	30 16:27 (WEA 18-2)	18:33		20:27	21:18	21:52		
18	08:29	15:47 (WEA 18-4)	07:41	15:58 (WEA 18-2)	06:38		06:27	05:29	05:04		
	16:46	21 16:08 (WEA 18-4)	17:44	29 16:27 (WEA 18-2)	18:35		20:29	21:20	21:53		
19	08:28	15:47 (WEA 18-4)	07:38	16:00 (WEA 18-2)	06:36		06:24	05:28	05:04		
	16:48	22 16:09 (WEA 18-4)	17:46	33 17:10 (WEA 18-1)	18:37		20:31	21:21	21:53		
20	08:27	15:46 (WEA 18-4)	07:36	16:01 (WEA 18-2)	06:34		06:22	05:26	05:04		
	16:50	23 16:09 (WEA 18-4)	17:47	38 17:14 (WEA 18-1)	18:38		20:33	21:23	21:54		
21	08:26	15:47 (WEA 18-4)	07:34	16:03 (WEA 18-2)	06:31		06:20	05:25	05:04		
	16:52	22 16:09 (WEA 18-4)	17:49	38 17:16 (WEA 18-1)	18:40		20:34	21:24	21:54		
22	08:25	15:47 (WEA 18-4)	07:32	16:06 (WEA 18-2)	06:29		06:18	05:24	05:05		
	16:53	23 16:10 (WEA 18-4)	17:51	35 17:17 (WEA 18-1)	18:42		20:36	21:26	21:54		
23	08:24	15:47 (WEA 18-4)	07:30	16:54 (WEA 18-1)	06:27		06:16	05:22	05:05		
	16:55	23 16:10 (WEA 18-4)	17:53	23 17:17 (WEA 18-1)	18:44		20:38	21:27	21:54		
24	08:23	15:48 (WEA 18-4)	07:28	16:53 (WEA 18-1)	06:24		06:14	05:21	05:05		
	16:57	22 16:10 (WEA 18-4)	17:55	25 17:18 (WEA 18-1)	18:45		20:40	21:29	21:54		
25	08:21	15:48 (WEA 18-4)	07:26	16:53 (WEA 18-1)	07:22		06:11	05:20	05:05		
	16:59	22 16:10 (WEA 18-4)	17:57	26 17:19 (WEA 18-1)	19:47		20:41	21:30	21:55		
26	08:20	15:49 (WEA 18-4)	07:24	16:52 (WEA 18-1)	07:19		06:09	05:19	05:06		
	17:00	21 16:10 (WEA 18-4)	17:59	28 17:20 (WEA 18-1)	19:49		20:43	21:31	21:55		
27	08:19	15:49 (WEA 18-4)	07:22	16:51 (WEA 18-1)	07:17		06:07	05:17	05:06		
	17:02	20 16:09 (WEA 18-4)	18:01	28 17:19 (WEA 18-1)	19:51		20:45	21:33	21:55		
28	08:17	15:51 (WEA 18-4)	07:19	16:51 (WEA 18-1)	07:15		06:05	05:16	05:07		
	17:04	25 16:16 (WEA 18-2)	18:02	28 17:19 (WEA 18-1)	19:53		20:47	21:34	21:54		
29	08:16	15:51 (WEA 18-4)			07:12		06:03	05:15	05:07		
	17:06	27 16:18 (WEA 18-2)			19:54		20:48	21:35	21:54		
30	08:14	15:53 (WEA 18-4)			07:10		06:01	05:14	05:08		
	17:08	28 16:21 (WEA 18-2)			19:56		20:50	21:36	21:54		
31	08:13	15:55 (WEA 18-4)			07:08			05:13			
	17:10	28 16:23 (WEA 18-2)			19:58			21:38			
Sonnenscheinstunden		256		366		416		502			
astr.max.mögl.Beschattung		476		187							

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

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

SHADOW - Kalender

Berechnung: Windenergie Hollenstede 2018-12 Schattenrezeptor: IP 39 - Wielage 4

Voraussetzungen für Berechnung des Schattenwurfs

Referenzjahr für Kalender

2018

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	05:08 21:54	05:45 21:22	06:36 20:19	07:26 19:08		07:21 17:01	15:24 (WEA 18-2) 35 15:59 (WEA 18-2)	08:13 16:19	15:29 (WEA 18-4) 15 15:44 (WEA 18-4)
2	05:09 21:54	05:47 21:20	06:38 20:16	07:28 19:06		07:23 16:59	35 15:24 (WEA 18-2) 35 15:59 (WEA 18-2)	08:15 16:18	15:30 (WEA 18-4) 14 15:44 (WEA 18-4)
3	05:10 21:53	05:48 21:18	06:39 20:14	07:30 19:03		07:25 16:57	35 15:24 (WEA 18-2) 35 15:59 (WEA 18-2)	08:16 16:17	15:32 (WEA 18-4) 12 15:44 (WEA 18-4)
4	05:10 21:53	05:50 21:17	06:41 20:12	07:31 19:01		07:27 16:55	35 15:24 (WEA 18-2) 35 15:59 (WEA 18-2)	08:18 16:17	15:33 (WEA 18-4) 9 15:42 (WEA 18-4)
5	05:11 21:52	05:52 21:15	06:43 20:10	07:33 18:59		07:29 16:53	33 15:25 (WEA 18-2) 33 15:58 (WEA 18-2)	08:19 16:16	15:35 (WEA 18-4) 7 15:42 (WEA 18-4)
6	05:12 21:52	05:53 21:13	06:44 20:07	07:35 18:56	10	17:35 (WEA 18-1) 17:45 (WEA 18-1)	07:30 16:51	08:20 16:15	
7	05:13 21:51	05:55 21:11	06:46 20:05	07:37 18:54	16	17:32 (WEA 18-1) 17:48 (WEA 18-1)	07:32 16:50	08:22 16:15	
8	05:14 21:51	05:56 21:09	06:48 20:03	07:38 18:52	20	17:30 (WEA 18-1) 17:50 (WEA 18-1)	07:34 16:48	08:23 16:15	
9	05:15 21:50	05:58 21:07	06:49 20:00	07:40 18:50	22	17:29 (WEA 18-1) 17:51 (WEA 18-1)	07:36 16:46	08:24 16:14	
10	05:16 21:49	06:00 21:06	06:51 19:58	07:42 18:47	25	17:26 (WEA 18-1) 17:51 (WEA 18-1)	07:38 16:44	08:25 16:14	
11	05:17 21:48	06:01 21:04	06:53 19:56	07:43 18:45	26	17:26 (WEA 18-1) 17:52 (WEA 18-1)	07:40 16:43	08:27 16:14	
12	05:18 21:48	06:03 21:02	06:54 19:53	07:45 18:43	27	17:25 (WEA 18-1) 17:52 (WEA 18-1)	07:41 16:41	08:28 16:14	
13	05:19 21:47	06:05 21:00	06:56 19:51	07:47 18:40	27	17:25 (WEA 18-1) 17:52 (WEA 18-1)	07:43 16:40	08:29 16:14	
14	05:20 21:46	06:06 20:58	06:58 19:48	07:49 18:38	28	17:24 (WEA 18-1) 17:52 (WEA 18-1)	07:45 16:38	08:30 16:14	
15	05:21 21:45	06:08 20:56	06:59 19:46	07:51 18:36	28	17:24 (WEA 18-1) 17:52 (WEA 18-1)	07:47 16:37	08:31 16:14	
16	05:23 21:44	06:10 20:54	07:01 19:44	07:52 18:34	28	17:24 (WEA 18-1) 17:52 (WEA 18-1)	07:49 16:35	08:31 16:14	
17	05:24 21:43	06:11 20:52	07:03 19:41	07:54 18:32	28	17:23 (WEA 18-1) 17:51 (WEA 18-1)	07:50 16:34	08:32 16:14	
18	05:25 21:42	06:13 20:50	07:04 19:39	07:56 18:29	26	17:24 (WEA 18-1) 17:50 (WEA 18-1)	07:52 16:32	08:33 16:14	
19	05:26 21:40	06:14 20:47	07:06 19:37	07:58 18:27	24	17:25 (WEA 18-1) 17:49 (WEA 18-1)	07:54 16:31	08:34 16:14	
20	05:28 21:39	06:16 20:45	07:08 19:34	07:59 18:25	30	16:40 (WEA 18-2) 17:48 (WEA 18-1)	07:56 16:30	08:35 16:15	
21	05:29 21:38	06:18 20:43	07:09 19:32	08:01 18:23	35	16:36 (WEA 18-2) 17:47 (WEA 18-1)	07:57 16:29	08:35 16:15	
22	05:30 21:37	06:19 20:41	07:11 19:29	08:03 18:21	37	16:33 (WEA 18-2) 17:45 (WEA 18-1)	07:59 16:27	08:36 16:15	
23	05:32 21:35	06:21 20:39	07:13 19:27	08:05 18:19	37	16:31 (WEA 18-2) 17:43 (WEA 18-1)	08:01 16:26	08:36 16:16	
24	05:33 21:34	06:23 20:37	07:14 19:25	08:07 18:17	30	16:30 (WEA 18-2) 17:39 (WEA 18-1)	08:02 16:25	08:37 16:16	
25	05:35 21:33	06:24 20:34	07:16 19:22	08:08 18:14	29	16:28 (WEA 18-2) 16:57 (WEA 18-2)	08:04 16:24	08:37 16:17	
26	05:36 21:31	06:26 20:32	07:18 19:20	08:10 18:12	31	16:27 (WEA 18-2) 16:58 (WEA 18-2)	08:06 16:23	08:37 16:18	
27	05:38 21:30	06:28 20:30	07:19 19:18	08:12 18:10	32	16:27 (WEA 18-2) 16:59 (WEA 18-2)	08:07 16:22	08:38 16:18	
28	05:39 21:28	06:29 20:28	07:21 19:15	07:14 17:08	33	15:26 (WEA 18-2) 15:59 (WEA 18-2)	08:09 16:21	08:38 16:19	
29	05:41 21:27	06:31 20:26	07:23 19:13	07:16 17:06	34	15:26 (WEA 18-2) 16:00 (WEA 18-2)	08:10 16:20	08:38 16:20	
30	05:42 21:25	06:33 20:23	07:25 19:10	07:18 17:04	35	15:24 (WEA 18-2) 15:59 (WEA 18-2)	08:12 16:19	08:38 16:21	
31	05:44 21:23	06:34 20:21		07:19 17:02	35	15:24 (WEA 18-2) 15:59 (WEA 18-2)		08:38 16:22	
Sonnenscheinstunden	505	456	382	332		265		241	
astr.max.mögl.Beschattung				733		768		57	

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

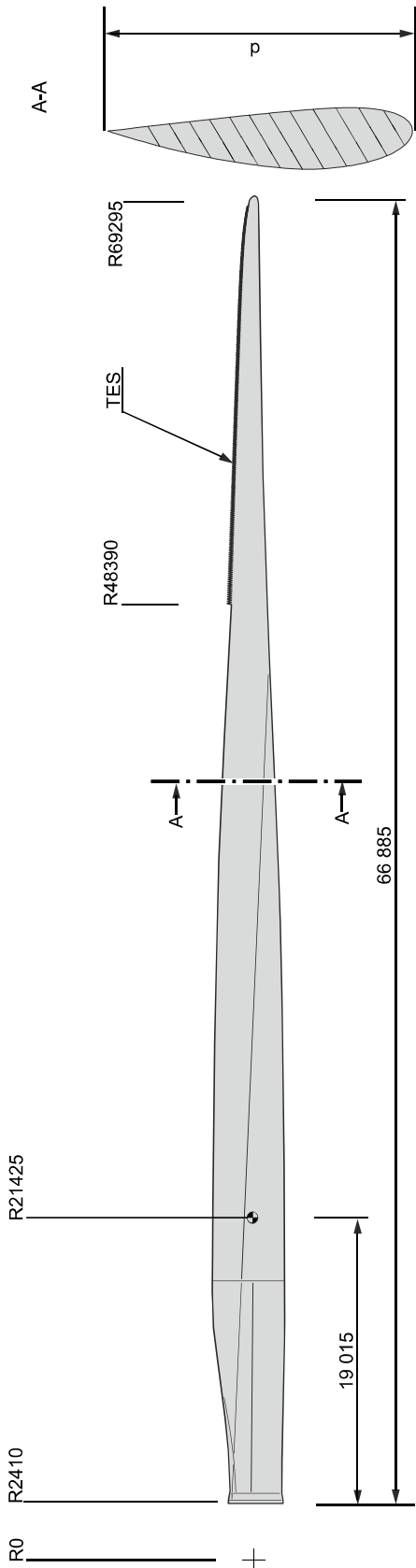
Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)

Anlage 9: Rotordatenblätter ENERCON E-138 EP3-RB-01

Rotorblatt E-138 EP3-RB-01 mit Hinterkantenkamm (TES) /
Rotor Blade E-138 EP3-RB-01 with Trailing Edge Serration (TES)

Radius R radius R R in mm	Tiefe d chord d d in mm		ohne Blattheizung without rotor blade heating system	mit Blattheizung with rotor blade heating system
2 410	2 980	ca. / approx.	18 550 kg	18 850 kg
2 590	2 980	ca. / approx.	21 425 mm	21 140 mm
2 930	2 865	ca. / approx.	19 015 mm	18 730 mm
3 519	2 865	ca. / approx.	66 885 mm	
4 416	2 914		-	
5 520	3 022			
6 693	3 178			
8 004	3 379			
9 384	3 595			
10 902	3 802			
12 558	3 944			
14 283	3 956			
16 077	3 922			
17 940	3 886			
19 941	3 845			
21 942	3 804			
24 012	3 755			
26 082	3 695			
28 221	3 620			
30 360	3 529			
32 568	3 411			
34 776	3 261			
36 984	3 080			
39 192	2 879			
41 400	2 662			
43 539	2 445			
45 678	2 227			
47 748	2 020			
49 818	1 940			
51 819	1 756			
53 820	1 596			
55 883	1 459			
57 477	1 330			
59 202	1 213			
60 858	1 108			
62 396	1 024 ¹			
63 756	951			
65 067	876			
66 240	802			
67 344	720			
68 241	634			
69 000	510			

¹ Angabe bei 90 % Blatt-
radius / Information at 90 %
blade radius



R0	Mittelpunkt der Rotorachse / center of rotor axis
TES	Hinterkantenkamm / Trailing Edge Serration

ENERCON E-138 EP3 E2 4200 138.6 !O!

Datei C:\Users\Wi\Documents\WindPRO Data\WTG Data\ENERCON E-138 EP3 E2 4200 138.6 !O!.wtg

Firma	ENERCON
Typ/Version	E-138 EP3 E2
Nennleistung	4.200,0 kW
zweiter Generator	0,0 kW
Rotordurchmesser	138,6 m
Turm	konisch
Netzfrequenz	50 Hz
Herkunftsland	DE
Blatt-Typ	E-138 EP3-RB-01
Generatortyp	variabel
Nenndrehzahl	11,1 U/min
Einschalt-drehzahl	0,0 U/min
Nabenhöhe(n)	160,0; 81,0; 111,0; 131,0 m
Maximale Blatttiefe	3,96 m
Blatttiefe bei 90% Radius	1,02 m
Aktuell	Ja
Erstellt von	USER
Erzeugt	17.12.2018 4513:45
Bearbeitet	17.12.2018 4513:45

Anlage 10: Standortkoordinaten der geplanten Windenergieanlagen

Koordinaten nach ETRS89/32U und Gauß-Krüger-Kataster-Höhen



Windparkplanung in der Gemeinde Hollenstede - Fläche 17 (WEA 1-3)

Errichtung und Betrieb von 3 WEA des Typs ENERCON E-138 EP3 - Nh 160 m

Windparkplanung in der Gemeinde Hollenstede - Fläche 18 (WEA 1-4)

Errichtung und Betrieb von 4 WEA des Typs ENERCON E-138 EP3 - Nh 160 m

Stand: 28.09.18

	WEA	Typ	UTM		Sexagesimal		Gauß-Krüger		Kataster			Höhenangaben in m über NN		
			RW	HW	Latitude	Longitude	RW	HW	Gemarkung	Flur	Flurst.	Höhe GOK	Nabenhöhe	Gesamthöhe
Fläche 17	1	E-138 EP3 Nh 160 m	409.261	5.815.378										
	2	E-138 EP3 Nh 160 m	408.752	5.815.215										
	3	E-138 EP3 Nh 160 m	409.155	5.814.940										
Fläche 18	1	E-138 EP3 Nh 160 m	411.682	5.814.008										
	2	E-138 EP3 Nh 160 m	411.992	5.813.886										
	3	E-138 EP3 Nh 160 m	411.288	5.813.534										
	4	E-138 EP3 Nh 160 m	411.624	5.813.436										