

4.7 Sonstige Emissionen

Anlagen:

- 4.7.1 Schattengutachten_I17_180925.pdf
- 4.7.2 Schattenwurf-Abschaltsystem Allgemeine Beschreibung.pdf



Berechnung der Schattenwurfdauer für die Errichtung
und den Betrieb von einer Windenergieanlage
am Standort Görmin

Bericht Nr.: I17-SCHATTEN-2018-34

Berechnung der Schattenwurfdauer für die Errichtung und den Betrieb von
einer Windenergieanlage am Standort Görmin

Bericht-Nr. I17-SCHATTEN-2018-34

Auftraggeber: Görminer Peenetal Energie GmbH & Co. KG
Böker Str. 9
D-17121 Görmin

Auftragsnehmer: I17-Wind GmbH & Co. KG
Am Westersielzug 11
25840 Friedrichstadt
Tel.: 04881 – 93 6 49 80
Fax.: 04881 – 93 6 49 81 9
E-Mail: mail@i17-wind.de
Internet: www.i17-wind.de

Bearbeiter: André Gefke (Dipl.-Ing. (FH))

Prüfer: Christian Kebbel (Dipl.-Ing. (FH))

Datum: 25. August 2018

Haftungsausschluss und Urheberrecht

Das vorliegende Schattenwurfimmissionsgutachten für die geplante Windenergieanlage (WEA) am Standort Görmin wurde von der Görminer Peenetal Energie GmbH & Co. KG im Juni 2018 bei der I17-Wind GmbH & Co. KG in Auftrag gegeben. Das Schattenwurfgutachten wurde nach bestem Wissen und Gewissen unparteiisch und nach dem gegenwärtigen Stand von Wissenschaft und Technik erstellt. Für die Daten, die nicht von der I17-Wind GmbH & Co. KG gemessen, erhoben und verarbeitet wurden, kann keine Garantie übernommen werden. Eine auszugsweise Vervielfältigung dieses Berichtes ist nur mit ausdrücklicher Zustimmung der I17-Wind GmbH & Co. KG erlaubt.

Urheber des vorliegenden Gutachtens ist die I17-Wind GmbH & Co. KG. Der Auftraggeber erhält nach § 31 Urheberrechtsgesetz das einfache Nutzungsrecht, welches nur durch Zustimmung des Urhebers übertragen werden kann. Eine Bereitstellung zum uneingeschränkten Download in elektronischen Medien ist ohne gesonderte Zustimmung des Urhebers nicht gestattet.

Für die physikalische Einhaltung der prognostizierten Werte an den Immissionsorten können seitens des Gutachters keine Garantien übernommen werden. Die Ergebnisse basieren auf vom Auftraggeber und Anlagenhersteller zur Verfügung gestellten Angaben zum Standort und zu den Windenergieanlagen.

| Revisionsnummer | Revisionsdatum | Änderung | Bearbeiter |
|-----------------|----------------|---------------------------|------------|
| 0 | 25.08.2018 | Erstellung des Gutachtens | Gefke |

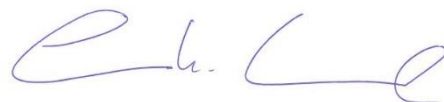
Bearbeiter

Dipl.-Ing. (FH) André Gefke,
Sachverständiger
Friedrichstadt, 25.08.2018



Geprüft

Dipl.-Ing. (FH) Christian Kebbel,
Sachverständiger
Friedrichstadt, 27.08.2018



Inhaltsverzeichnis

| | |
|---|-----|
| Abbildungsverzeichnis..... | 5 |
| Tabellenverzeichnis..... | 5 |
| 1 Aufgabenstellung..... | 6 |
| 2 Örtliche Beschreibung..... | 6 |
| 3 Beurteilungsgrundlagen..... | 8 |
| 3.1 Berechnungs- und Beurteilungsverfahren..... | 8 |
| 4 Beschreibung der geplanten Windenergieanlage..... | 9 |
| 4.1 Anlagenbeschreibung..... | 9 |
| 4.2 Position der geplanten Windenergieanlage..... | 9 |
| 4.3 Vorbelastung..... | 10 |
| 5 Einwirkungsbereiche der Windenergieanlage und Immissionspunkte..... | 11 |
| 6 Rechenergebnisse und Beurteilungen..... | 14 |
| 7 Zusammenfassung..... | 17 |
| 8 Abkürzungs- und Symbolverzeichnis..... | 18 |
| 9 Literaturverzeichnis..... | 19 |
| Anhang 1 / Übersichtskarten der Gesamtbelastung mit Iso-Schattenlinien..... | 20 |
| Anhang 2 / Hauptergebnis Berechnungsergebnisse der Vorbelastung..... | 21 |
| Anhang 3 / Hauptergebnis Berechnungsergebnisse der Zusatzbelastung..... | 24 |
| Anhang 4 / Berechnungsergebnisse der Gesamtbelastung / Detaillierte Ergebnisse..... | 26 |
| Anhang 5/ Fotodokumentation der Immissionsorte..... | 113 |

Abbildungsverzeichnis

| | |
|---|----|
| Abbildung 2.1: WEA Standorte..... | 7 |
| Abbildung 5.1: Einwirkungsbereich der geplanten WEA | 12 |

Tabellenverzeichnis

| | |
|---|----|
| Tabelle 4.1: Position der geplanten WEA [6] | 9 |
| Tabelle 4.2: Position der Bestandsanlagen am Standort [4, 8, 9] | 10 |
| Tabelle 5.1: Immissionsorte | 13 |
| Tabelle 6.1: Analyseergebnisse Vorbelastung..... | 14 |
| Tabelle 6.2: Analyseergebnisse Zusatzbelastung | 15 |
| Tabelle 6.3: Analyseergebnisse Gesamtbelastung..... | 16 |

1 Aufgabenstellung

Der Auftraggeber plant die Errichtung von einer Windenergieanlage (WEA) ca. 3 km nordöstlich der Gemeinde Görmin im Landkreis Vorpommern-Greifswald in Mecklenburg-Vorpommern.

Für das Genehmigungsverfahren nach dem BImSchG [2] ist der Nachweis der Einhaltung der gesetzlichen Richtwerte für die Schattenwurfimmissionen zu führen. Die Berechnungen sollen Auskunft darüber geben, ob schädliche Umwelteinwirkungen durch Schattenwurf von den geplanten Anlagen ausgehen können.

Am Standort befinden sich bereits Windenergieanlagen in Betrieb, welche im vorliegenden Schattenwurfgutachten als Vorbelastung Berücksichtigung finden.

2 Örtliche Beschreibung

Die geplante Windenergieanlage befindet sich ca. 3 km nordöstlich der Gemeinde Görmin im Landkreis Vorpommern-Greifswald. Nordwestlich, in einer Entfernung von ca. 2.5 km liegt die Ortschaft Groß Zastrow. Westlich befindet sich, in einem Abstand von ca. 1 km zu der geplanten WEA, die Ortschaft Böken. Westlich, unmittelbar angrenzend an den geplanten Windpark verläuft die Bundesautobahn A20. Im weiteren Umfeld befinden sich weitere dörfliche Splittersiedlungen und Einzelgehöfte der Gemeinden Klein Zastrow und Neu-, bzw. Alt Negentin.

Bei der geplanten WEA handelt es sich um eine Windparkerweiterung. Südwestlich der Bundesautobahn A20 befinden sich bereits Windenergieanlagen in Betrieb und nordwestlich der A20 direkt anschließend an die geplante WEA sind weitere vier WEA geplant, welche im vorliegenden Schattenwurfimmissionsgutachten als Vorbelastung Berücksichtigung finden. Das Gelände um die Windenergieanlagenstandorte variiert in der Höhe von 20 bis 35 m über NN.

Die Angaben zu den Koordinaten der bestehenden und geplanten Windenergieanlagen wurden vom Fachplaner Energie Engineering Nord GmbH zur Verfügung gestellt [4].

Für die Koordinatenangaben in diesem Gutachten findet das System UTM ETRS 89 Zone 33 Anwendung. Die Windenergieanlagenpositionen sind in der nachfolgenden Abbildung 2.1 dargestellt.

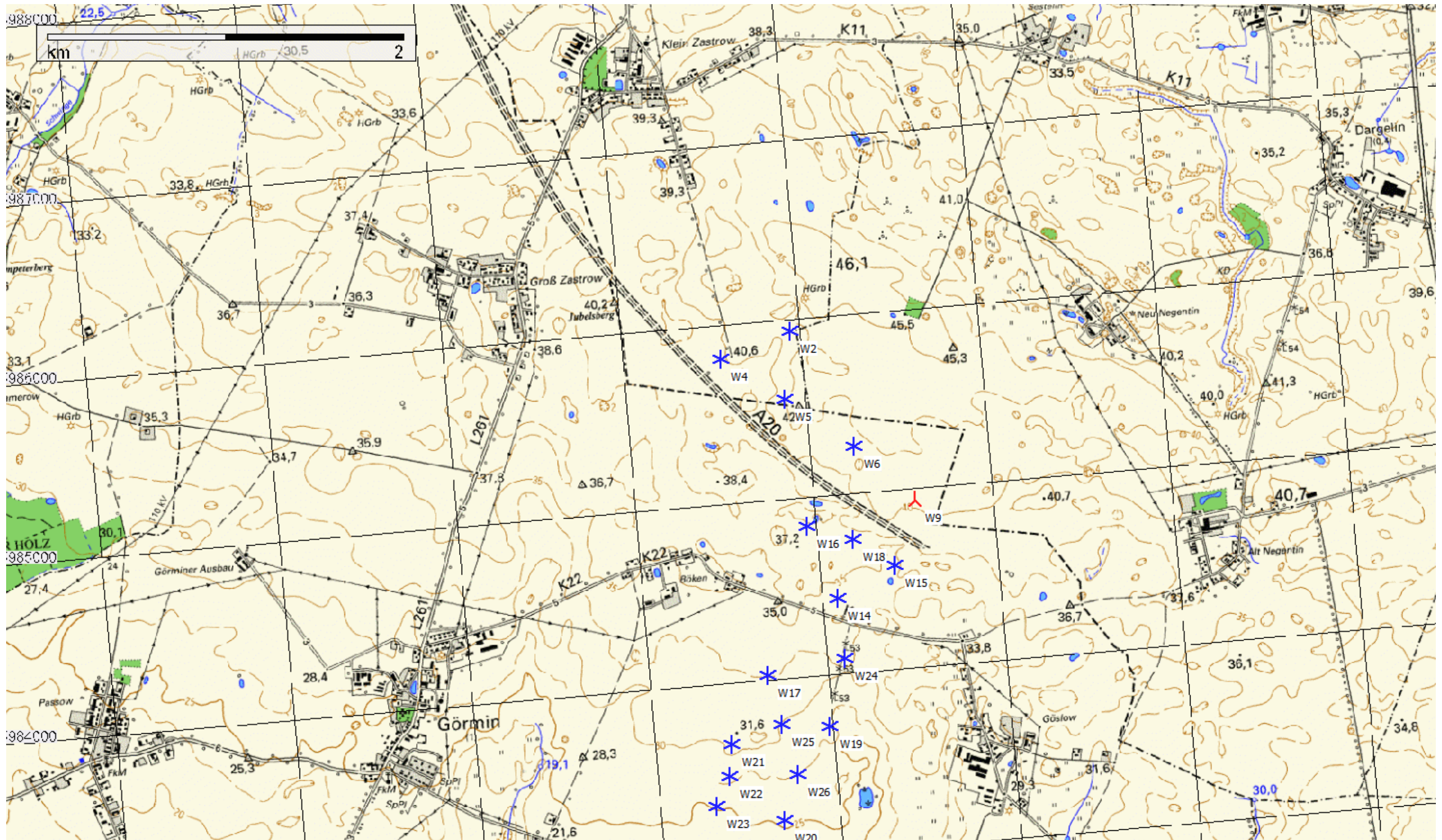


Abbildung 2.1: WEA Standorte
Blaue Sterne: Bestandsanlagen; Rote(s) Kreuz(e): Neu geplante WEA; Kartenmaterial [3]

3 Beurteilungsgrundlagen

3.1 Berechnungs- und Beurteilungsverfahren

Die hier zu untersuchenden Immissionen durch direkten Schattenwurf des Rotors können bei drehendem Rotor störend wirken. Aus der Anzahl der Rotorblätter und der Drehzahl des Rotors ergibt sich die jeweilige Frequenz mit der wechselnde Lichtverhältnisse im Schattenbereich auftreten können. Bei den gegenwärtigen Anlagengrößen handelt es sich um niedrige Frequenzen im Bereich von ca. 0.5 bis 3 Hz. Die Bund-Länder-Arbeitsgemeinschaft für Immissionsschutz (LAI) [1] hat die federführend vom staatlichen Umweltamt Schleswig unter Mitarbeit von Fachleuten, Gutachtern, Gewerbeaufsichtsdirektoren und Weiteren erarbeiteten *Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (WEA-Schattenwurf-Hinweise)* [1] im Jahr 2002 als Standard anerkannt. Die WEA-Schattenwurf-Hinweise enthalten folgende Grenzwerte:

- Die astronomisch maximal mögliche Beschattungsdauer darf maximal 30 Stunden im Jahr und maximal 30 Minuten am Tag betragen.
- Ein Schattenwurf bei Sonnenständen unter 3° ist nicht zu berücksichtigen.
- Wenn am Immissionsort aufgrund der Entfernung zur WEA die Sonne zu weniger als 20 % durch das Rotorblatt verdeckt wird, können die dadurch entstehenden Helligkeitsschwankungen (Schatten) vernachlässigt werden.
- Um die Vergleichbarkeit der Ergebnisse zu ermöglichen, wird die Berechnung für einen punktförmigen Rezeptor von 0.1 m x 0.1 m in ca. 2 m Höhe durchgeführt.

Die Beschattungsdauer an der umgebenden Bebauung kann für eine oder mehrere WEA in Abhängigkeit von Nabenhöhe und Rotordurchmesser ermittelt werden. Der Berechnung der astronomisch möglichen Beschattungsdauer - dem worst case - liegen folgende Annahmen zu Grunde:

- Es herrscht durchgehender Sonnenschein von Sonnenaufgang bis Sonnenuntergang.
- Die Sonnenstrahlung steht senkrecht zur Rotorkreisfläche.
- Die WEA befindet sich permanent in Betrieb.

Zyklische Lichtblitze / Discoeffekte sowie periodischer Schattenwurf sind Immissionen im Sinne des Bundes-Immissionsschutzgesetzes [2]. Durch Verwendung mittelreflektierender Farben (z.B. RAL 7035-HR) und matten Glanzgraden gemäß DIN 67530 / ISO 2813 kann Lichtblitzen vorgebeugt werden.

4 Beschreibung der geplanten Windenergieanlage

4.1 Anlagenbeschreibung

Der Auftraggeber plant am Standort die Errichtung und den Betrieb von einer Windenergieanlage des Herstellers Vestas Wind Systems A/S. Nachfolgend werden die Eckdaten [7] und die Koordinaten der berücksichtigten Windenergieanlagen zusammengefasst.

| | |
|----------------------------|---------------------|
| Hersteller: | Vestas |
| Anlagentyp: | V150-4.0/4.2 MW |
| Nabenhöhe: | 166 m |
| Rotordurchmesser: | 150 m |
| Nennleistung: | 4.000 kW / 4.200 kW |
| Drehzahlbereich: | 5.3 – 16.5 U/min |
| Maximale Blatttiefe: | 4.20 m |
| Blatttiefe bei 90% Radius: | 1.40 m |

4.2 Position der geplanten Windenergieanlage

Tabelle 4.1 sind die Position [6] und der Anlagentyp mit Nabenhöhe der geplanten Windenergieanlage am Standort Görmin zu entnehmen.

| W-Nr. | Typ | Rotordurchmesser [m] | Nabenhöhe [m] | Koordinaten UTM ETRS 89 Zone 33 Ost | Koordinaten UTM ETRS 89 Zone 33 Nord | Höhe über NN [m] |
|-------|----------------|----------------------|---------------|-------------------------------------|--------------------------------------|------------------|
| W9 | V150-4.0/4.2MW | 150.0 | 166.0 | 390570 | 5984934 | 38 |

Tabelle 4.1: Position der geplanten WEA [6]

4.3 Vorbelastung

In der weiteren Umgebung sind derzeit 17 Windenergieanlagen in Betrieb, genehmigt oder geplant, welche als Vorbelastung berücksichtigt werden müssen. In Tabelle 4.2 sind die Windenergieanlagen mit Typ, Nabenhöhe und Position [4] aufgeführt.

| Nr. | Typ | Rotordurchmesser [m] | Nabenhöhe [m] | Koordinaten UTM ETRS 89 Zone 33 Ost | Koordinaten UTM ETRS 89 Zone 33 Nord | Höhe über NN [m] |
|-----|--------------------------|----------------------|---------------|-------------------------------------|--------------------------------------|------------------|
| W14 | Vestas V80-2.0MW | 80.0 | 100.0 | 389090 | 5984422 | 30 |
| W15 | Vestas V80-2.0MW | 80.0 | 100.0 | 389425 | 5984580 | 33 |
| W16 | Vestas V80-2.0MW | 80.0 | 100.0 | 388953 | 5984839 | 34 |
| W17 | Vestas V80-2.0MW | 80.0 | 100.0 | 388667 | 5984022 | 30 |
| W18 | Vestas V90-2.0MW | 90.0 | 95.0 | 389204 | 5984746 | 34 |
| W19 | Vestas V47-660kW | 47.0 | 65.0 | 388986 | 5983707 | 28 |
| W20 | Vestas V47-660kW | 47.0 | 65.0 | 388691 | 5983205 | 20 |
| W21 | Vestas V47-660kW | 47.0 | 65.0 | 388433 | 5983657 | 27 |
| W22 | Vestas V47-660kW | 47.0 | 65.0 | 388405 | 5983476 | 24 |
| W23 | Vestas V47-660kW | 47.0 | 65.0 | 388320 | 5983314 | 22 |
| W24 | Enercon E-101 / 3.0MW | 101.0 | 99.0 | 389101 | 5984082 | 30 |
| W25 | Vestas V112-3.3MW | 112.0 | 94.0 | 388721 | 5983745 | 27 |
| W26 | Enercon E-126 EP3 4000kW | 127.0 | 135.0 | 388784 | 5983458 | 24 |
| W2 | V150-4.0/4.2MW | 150.0 | 166.0 | 388551 | 5985811 | 38 |
| W4 | V150-4.0/4.2MW | 150.0 | 166.0 | 388889 | 5985560 | 40 |
| W5 | V150-4.0/4.2MW | 150.0 | 166.0 | 388551 | 5985811 | 38 |
| W6 | V150-4.0/4.2MW | 150.0 | 166.0 | 389255 | 5985262 | 40 |

Tabelle 4.2: Position der Bestandsanlagen am Standort [4, 8, 9]

5 Einwirkungsbereiche der Windenergieanlage und Immissionspunkte

Als Immissionsorte für die Schattenwurfprognose wurden die nächstgelegenen Gebäude berücksichtigt. Die Auswahl der Immissionsorte wurde anhand einer Standortbesichtigung, sowie der vorliegenden Dokumentation vorgenommen. Bei der Standortbesichtigung wurde die bestehende Wohnbebauung mit Angaben aus dem Kartenmaterial abgeglichen und Abweichungen dokumentiert und korrigiert. Laut den WEA-Schattenwurf-Hinweisen des Länderausschusses für Immissionsschutz (LAI) [1] sind maßgebliche Immissionsorte u.a.:

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

Die nächstgelegene Bebauung, welche diese Kriterien erfüllt, ist die Splittersiedlung Neu Negentin nordöstlich, die Siedlungen Alt Negentin östlich und Böken südwestlich der geplanten Anlagen und die Ortschaften Groß und Klein Zastrow nordwestlich der geplanten Anlagen (siehe Abbildung 5.1). Im Anschluss wurden nur die Immissionsorte im Einwirkungsbereich berücksichtigt, d.h. die Immissionsorte die innerhalb oder nahe am Rande der Schattenwurf-Isolinie liegen (Siehe Tabelle 5.1).

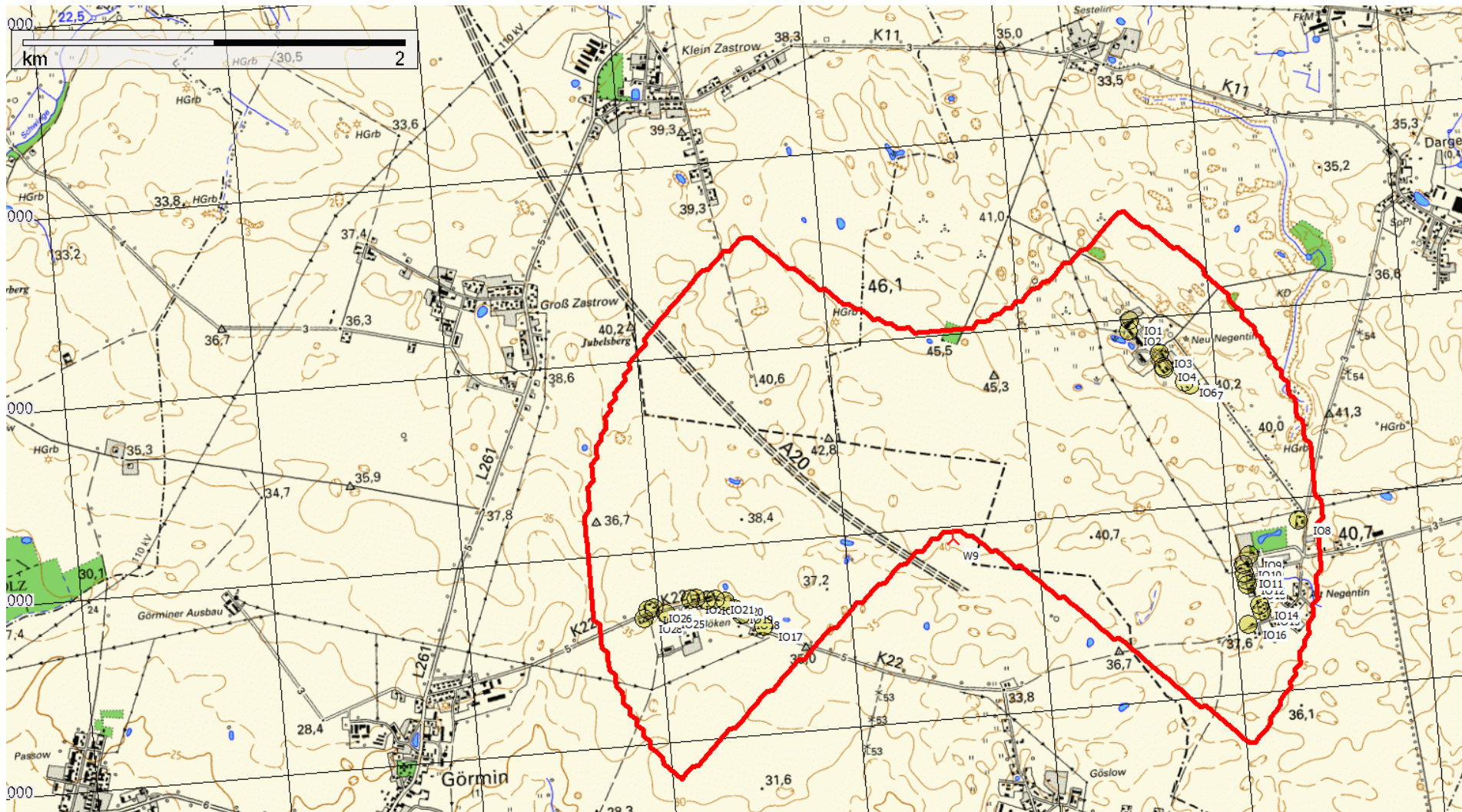


Abbildung 5.1: Einwirkbereich der geplanten WEA

Die Lage und Bezeichnung der Immissionsorte im Einwirkungsbereich ist in Tabelle 5.1 zusammengefasst.

| Nr. | Immissionspunkte | Koordinaten UTM ETRS 89 Zone 33 Ost | Koordinaten UTM ETRS 89 Zone 33 Nord | Höhe über NN [m] |
|------|------------------------------|---|--|---------------------|
| IO1 | Neu Negentin, Feldweg 9 | 390585 | 5985989 | 40 |
| IO2 | Neu Negentin, Feldweg 7 | 390574 | 5985936 | 40 |
| IO3 | Neu Negentin, Feldweg 5 | 390722 | 5985806 | 40 |
| IO4 | Neu Negentin, Feldweg 3 | 390736 | 5985734 | 40 |
| IO5 | Neu Negentin, Feldweg 2 | 390742 | 5985725 | 40 |
| IO6 | Neu Negentin, Feldweg 1 | 390840 | 5985645 | 40 |
| IO7 | Neu Negentin, Feldweg 1a | 390873 | 5985628 | 39 |
| IO8 | Alt Negentin, Dorfstr. 39 | 391374 | 5984875 | 40 |
| IO9 | Alt Negentin, Dorfstr. 34 | 391101 | 5984717 | 40 |
| IO10 | Alt Negentin, Dorfstr. 32/33 | 391071 | 5984671 | 39 |
| IO11 | Alt Negentin, Dorfstr. 31 | 391072 | 5984625 | 38 |
| IO12 | Alt Negentin, Dorfstr. 30 | 391076 | 5984588 | 38 |
| IO13 | Alt Negentin, Dorfstr. 29 | 391081 | 5984561 | 37 |
| IO14 | Alt Negentin, Dorfstr. 27 | 391136 | 5984450 | 35 |
| IO15 | Alt Negentin, Dorfstr. 25 | 391144 | 5984420 | 35 |
| IO16 | Alt Negentin, Dorfstr. 23 | 391067 | 5984357 | 33 |
| IO17 | Böken, Dorfstr. 25 | 388544 | 5984559 | 30 |
| IO18 | Böken, Dorfstr. 22 | 388435 | 5984627 | 30 |
| IO19 | Böken, Dorfstr. 21a | 388402 | 5984660 | 31 |
| IO20 | Böken, Dorfstr. 20 | 388357 | 5984706 | 31 |
| IO21 | Böken, Dorfstr. 19 | 388305 | 5984720 | 31 |
| IO22 | Böken, Dorfstr. 14/15 | 388259 | 5984720 | 31 |
| IO23 | Böken, Dorfstr. 11/12 | 388204 | 5984733 | 31 |
| IO24 | Böken, Dorfstr. 10 | 388174 | 5984730 | 31 |
| IO25 | Böken, Dorfstr. 4 | 388045 | 5984668 | 30 |
| IO26 | Böken, Dorfstr. 3 | 387980 | 5984704 | 30 |
| IO27 | Böken, Dorfstr. 2 | 387950 | 5984696 | 30 |
| IO28 | Böken, Dorfstr. 1 | 387927 | 5984651 | 30 |

Tabelle 5.1: Immissionsorte

Zum Zeitpunkt der Standortbesichtigung handelt es sich bei den **IO12, IO21 und IO24** um unbebaute Grundstücke.

6 Rechenergebnisse und Beurteilungen

In den nachfolgenden Tabellen sind die Ergebnisse der Analysen sowohl für die Vorbelastung als auch Zusatz- und Gesamtbelastung der im Einwirkungsbereich befindlichen Immissionsorte dargestellt. Überschreitungen der Grenzwerte sind **fett** gekennzeichnet. Im Anhang befinden sich die Ausdrücke der Berechnung der Vor-, Zusatz- und Gesamtbelastung. Die Angabe zu der meteorologisch wahrscheinlichen Beschattungsdauer ist für die Genehmigung eines Vorhabens nicht relevant, kann jedoch Betreibern, Betroffenen und Behörden einen Eindruck über die zu erwartende tatsächliche Schattenwurfbelastung an den Immissionsorten geben. Hierzu wurde die Sonnenscheinwahrscheinlichkeit der Wetterstation Heiligendamm [5] herangezogen.

| Vorbelastung | | | | | |
|--------------|------------------------------|--------------------------------------|---------------------------------------|---------------------------------|--|
| Nr. | Immissionspunkte | Astron. max. mögl. Beschattungsdauer | | | Meteorologisch wahrscheinliche Beschattungsdauer |
| | | Gesamtdauer in Std/ Jahr | Anzahl der Tage mit Schatten pro Jahr | Max. Schattendauer, in Std/ Tag | Std. / Jahr |
| IO1 | Neu Negentin, Feldweg 9 | 23:23 | 83 | 0:23 | 4:44 |
| IO2 | Neu Negentin, Feldweg 7 | 23:52 | 83 | 0:24 | 4:56 |
| IO3 | Neu Negentin, Feldweg 5 | 20:12 | 77 | 0:22 | 4:26 |
| IO4 | Neu Negentin, Feldweg 3 | 20:03 | 78 | 0:22 | 4:30 |
| IO5 | Neu Negentin, Feldweg 2 | 19:51 | 77 | 0:22 | 4:27 |
| IO6 | Neu Negentin, Feldweg 1 | 7:20 | 26 | 0:21 | 1:31 |
| IO7 | Neu Negentin, Feldweg 1a | 7:07 | 26 | 0:21 | 1:30 |
| IO8 | Alt Negentin, Dorfstr. 39 | 0:00 | 0 | 0:00 | 0:00 |
| IO9 | Alt Negentin, Dorfstr. 34 | 0:24 | 8 | 0:05 | 0:04 |
| IO10 | Alt Negentin, Dorfstr. 32/33 | 0:30 | 8 | 0:05 | 0:05 |
| IO11 | Alt Negentin, Dorfstr. 31 | 0:33 | 8 | 0:06 | 0:06 |
| IO12 | Alt Negentin, Dorfstr. 30 | 0:32 | 8 | 0:06 | 0:06 |
| IO13 | Alt Negentin, Dorfstr. 29 | 0:34 | 8 | 0:06 | 0:06 |
| IO14 | Alt Negentin, Dorfstr. 27 | 0:34 | 9 | 0:06 | 0:06 |
| IO15 | Alt Negentin, Dorfstr. 25 | 0:34 | 8 | 0:06 | 0:06 |
| IO16 | Alt Negentin, Dorfstr. 23 | 0:45 | 9 | 0:08 | 0:10 |
| IO17 | Böken, Dorfstr. 25 | 92:45 | 225 | 0:34 | 16:33 |
| IO18 | Böken, Dorfstr. 22 | 107:36 | 268 | 0:35 | 22:50 |
| IO19 | Böken, Dorfstr. 21a | 91:32 | 259 | 0:33 | 19:12 |
| IO20 | Böken, Dorfstr. 20 | 79:25 | 248 | 0:31 | 16:31 |
| IO21 | Böken, Dorfstr. 19 | 84:22 | 256 | 0:30 | 17:42 |
| IO22 | Böken, Dorfstr. 14/15 | 87:41 | 263 | 0:32 | 18:20 |
| IO23 | Böken, Dorfstr. 11/12 | 89:16 | 267 | 0:32 | 18:53 |
| IO24 | Böken, Dorfstr. 10 | 89:06 | 270 | 0:31 | 18:48 |
| IO25 | Böken, Dorfstr. 4 | 95:13 | 282 | 0:42 | 17:54 |
| IO26 | Böken, Dorfstr. 3 | 84:47 | 277 | 0:42 | 15:15 |
| IO27 | Böken, Dorfstr. 2 | 82:05 | 265 | 0:41 | 14:20 |
| IO28 | Böken, Dorfstr. 1 | 86:45 | 294 | 0:40 | 15:30 |

Tabelle 6.1: Analyseergebnisse Vorbelastung

| Zusatzbelastung | | | | | |
|-----------------|------------------------------|--------------------------------------|---------------------------------------|---------------------------------|--|
| Nr. | Immissionspunkte | Astron. max. mögl. Beschattungsdauer | | | Meteorologisch wahrscheinliche Beschattungsdauer |
| | | Gesamtdauer in Std/ Jahr | Anzahl der Tage mit Schatten pro Jahr | Max. Schattendauer, in Std/ Tag | Std. / Jahr |
| IO1 | Neu Negentin, Feldweg 9 | 18:43 | 60 | 0:25 | 2:13 |
| IO2 | Neu Negentin, Feldweg 7 | 17:52 | 54 | 0:26 | 2:12 |
| IO3 | Neu Negentin, Feldweg 5 | 12:42 | 40 | 0:25 | 1:54 |
| IO4 | Neu Negentin, Feldweg 3 | 12:20 | 38 | 0:25 | 2:03 |
| IO5 | Neu Negentin, Feldweg 2 | 12:16 | 38 | 0:25 | 2:04 |
| IO6 | Neu Negentin, Feldweg 1 | 10:36 | 34 | 0:24 | 2:00 |
| IO7 | Neu Negentin, Feldweg 1a | 10:04 | 32 | 0:24 | 1:56 |
| IO8 | Alt Negentin, Dorfstr. 39 | 5:54 | 24 | 0:19 | 1:29 |
| IO9 | Alt Negentin, Dorfstr. 34 | 8:58 | 32 | 0:22 | 2:27 |
| IO10 | Alt Negentin, Dorfstr. 32/33 | 9:24 | 32 | 0:23 | 2:37 |
| IO11 | Alt Negentin, Dorfstr. 31 | 9:40 | 32 | 0:23 | 2:42 |
| IO12 | Alt Negentin, Dorfstr. 30 | 9:40 | 34 | 0:23 | 2:41 |
| IO13 | Alt Negentin, Dorfstr. 29 | 9:39 | 32 | 0:22 | 2:40 |
| IO14 | Alt Negentin, Dorfstr. 27 | 9:21 | 34 | 0:22 | 2:39 |
| IO15 | Alt Negentin, Dorfstr. 25 | 9:19 | 33 | 0:22 | 2:40 |
| IO16 | Alt Negentin, Dorfstr. 23 | 11:04 | 39 | 0:23 | 3:18 |
| IO17 | Böken, Dorfstr. 25 | 38:04 | 97 | 0:33 | 12:02 |
| IO18 | Böken, Dorfstr. 22 | 20:34 | 53 | 0:30 | 6:32 |
| IO19 | Böken, Dorfstr. 21a | 18:14 | 47 | 0:30 | 5:44 |
| IO20 | Böken, Dorfstr. 20 | 16:02 | 44 | 0:29 | 4:54 |
| IO21 | Böken, Dorfstr. 19 | 14:21 | 40 | 0:27 | 4:19 |
| IO22 | Böken, Dorfstr. 14/15 | 13:14 | 39 | 0:26 | 3:57 |
| IO23 | Böken, Dorfstr. 11/12 | 11:55 | 36 | 0:25 | 3:33 |
| IO24 | Böken, Dorfstr. 10 | 11:29 | 36 | 0:25 | 3:25 |
| IO25 | Böken, Dorfstr. 4 | 9:41 | 34 | 0:23 | 2:53 |
| IO26 | Böken, Dorfstr. 3 | 8:39 | 32 | 0:22 | 2:33 |
| IO27 | Böken, Dorfstr. 2 | 8:10 | 29 | 0:22 | 2:25 |
| IO28 | Böken, Dorfstr. 1 | 8:10 | 30 | 0:21 | 2:26 |

Tabelle 6.2: Analyseergebnisse Zusatzbelastung

| Gesamtbelastung | | | | | |
|-----------------|------------------------------|--------------------------------------|---------------------------------------|---------------------------------|--|
| Nr. | Immissionspunkte | Astron. max. mögl. Beschattungsdauer | | | Meteorologisch wahrscheinliche Beschattungsdauer |
| | | Gesamtdauer in Std/ Jahr | Anzahl der Tage mit Schatten pro Jahr | Max. Schattendauer, in Std/ Tag | Std. / Jahr |
| IO1 | Neu Negentin, Feldweg 9 | <u>42:06</u> | 143 | 0:25 | 6:51 |
| IO2 | Neu Negentin, Feldweg 7 | <u>41:44</u> | 137 | 0:26 | 7:01 |
| IO3 | Neu Negentin, Feldweg 5 | <u>32:54</u> | 117 | 0:25 | 6:17 |
| IO4 | Neu Negentin, Feldweg 3 | <u>32:23</u> | 116 | 0:25 | 6:29 |
| IO5 | Neu Negentin, Feldweg 2 | <u>32:07</u> | 115 | 0:25 | 6:28 |
| IO6 | Neu Negentin, Feldweg 1 | 17:56 | 60 | 0:24 | 3:27 |
| IO7 | Neu Negentin, Feldweg 1a | 17:11 | 58 | 0:24 | 3:21 |
| IO8 | Alt Negentin, Dorfstr. 39 | 5:54 | 24 | 0:19 | 1:25 |
| IO9 | Alt Negentin, Dorfstr. 34 | 9:22 | 40 | 0:22 | 2:25 |
| IO10 | Alt Negentin, Dorfstr. 32/33 | 9:54 | 40 | 0:23 | 2:35 |
| IO11 | Alt Negentin, Dorfstr. 31 | 10:13 | 40 | 0:23 | 2:41 |
| IO12 | Alt Negentin, Dorfstr. 30 | 10:12 | 42 | 0:23 | 2:40 |
| IO13 | Alt Negentin, Dorfstr. 29 | 10:13 | 40 | 0:22 | 2:39 |
| IO14 | Alt Negentin, Dorfstr. 27 | 9:55 | 43 | 0:22 | 2:38 |
| IO15 | Alt Negentin, Dorfstr. 25 | 9:53 | 41 | 0:22 | 2:40 |
| IO16 | Alt Negentin, Dorfstr. 23 | 11:49 | 48 | 0:23 | 3:19 |
| IO17 | Böken, Dorfstr. 25 | <u>122:42</u> | 287 | <u>0:41</u> | <u>25:21</u> |
| IO18 | Böken, Dorfstr. 22 | <u>127:28</u> | 291 | <u>0:40</u> | <u>28:53</u> |
| IO19 | Böken, Dorfstr. 21a | <u>105:11</u> | 275 | <u>0:37</u> | <u>23:15</u> |
| IO20 | Böken, Dorfstr. 20 | <u>85:08</u> | 256 | <u>0:31</u> | <u>18:10</u> |
| IO21 | Böken, Dorfstr. 19 | <u>87:33</u> | 262 | 0:30 | <u>18:39</u> |
| IO22 | Böken, Dorfstr. 14/15 | <u>90:00</u> | 267 | <u>0:32</u> | <u>19:02</u> |
| IO23 | Böken, Dorfstr. 11/12 | <u>91:11</u> | 269 | <u>0:32</u> | <u>19:28</u> |
| IO24 | Böken, Dorfstr. 10 | <u>90:56</u> | 272 | <u>0:31</u> | <u>19:22</u> |
| IO25 | Böken, Dorfstr. 4 | <u>97:53</u> | 284 | <u>0:42</u> | <u>18:42</u> |
| IO26 | Böken, Dorfstr. 3 | <u>86:58</u> | 281 | <u>0:42</u> | <u>15:54</u> |
| IO27 | Böken, Dorfstr. 2 | <u>84:12</u> | 270 | <u>0:41</u> | <u>14:58</u> |
| IO28 | Böken, Dorfstr. 1 | <u>89:17</u> | 298 | <u>0:40</u> | <u>16:15</u> |

Tabelle 6:3: Analyseergebnisse Gesamtbelastung

Der Grenzwert für die astronomisch maximal mögliche Schattenwurfdauer von 30 Stunden pro Jahr und/oder 30 Minuten pro Tag der Gesamtbelastung wird an den Immissionsorten **IO1 bis IO5 und IO17 bis IO28** überschritten. Die meteorologisch wahrscheinliche Beschattungsdauer in Stunden / Jahr wird an **12** Immissionsort überschritten.

7 Zusammenfassung

Für das Genehmigungsverfahren nach dem BImSchG [2] ist der Nachweis der Einhaltung der gesetzlichen Grenzwerte für die Schattenwurfimmissionen zu führen.

Die durchgeführten Berechnungen kommen zu dem Ergebnis, dass bei der Gesamtbelastung der Grenzwert für die astronomisch maximal mögliche Schattenwurfdauer von 30 Stunden pro Jahr und/oder 30 Minuten pro Tag an den Immissionsorten **IO1 bis IO5 und IO17 bis IO28** überschritten wird.

Zum Zeitpunkt der Standortbesichtigung handelt es sich bei den **IO12, IO21 und IO24** um unbebaute Grundstücke, somit können die Immissionsorte **IO12, IO21 und IO24** aus der Betrachtung bzw. nachfolgender Schlussfolgerung ausgenommen werden solange sichergestellt ist, dass bei einer späteren Bebauung zu Wohnzwecken nachträglich entsprechende Schutzvorkehrungen getroffen werden.

Auf Grund der bereits durch die Vorbelastung ausgeschöpften Grenzwerte an den Immissionsorten **IO17 bis IO28** darf die geplante Anlage an diesen Immissionsorten keinen weiteren Schattenwurf verursachen, d.h. an den Immissionsorten **IO1 bis IO5 und IO17 bis IO28** muss die Rotorschattenwurfdauer durch den Einsatz eines Schattenwurfabschaltmoduls entsprechend der vorgenannten Empfehlungen begrenzt werden. Dieses Modul schaltet die WEA ab, wenn an den relevanten Immissionsorten die vorgegebenen Grenzwerte erreicht sind. Da der Grenzwert von 30 Stunden pro Kalenderjahr auf Grundlage der astronomisch möglichen Beschattung entwickelt wurde, ist für die Schattenwurfabschaltautomatik der Wert für die tatsächliche, meteorologische Schattendauer von 8 Stunden pro Kalenderjahr zu berücksichtigen. Ferner ist der Tatsache Rechnung zu tragen, dass sich die Zeitpunkte für den Schattenwurf jedes Jahr leicht verschieben. Hier muss die Abschaltung auf dem realen Sonnenstand basieren.

Die Genehmigung sollte mit der Auflage eines Einsatzes eines Schattenwurfabschaltmoduls erteilt werden.

8 Abkürzungs- und Symbolverzeichnis

| | |
|---------|-------------------------------|
| Abb: | Abbildung |
| Astron: | Astronomisch |
| Bez: | Bezeichnung |
| GK | Gauß – Krüger |
| IO | Immissionsorte |
| Max: | Maximal |
| Met: | Meteorologisch |
| NN | Normalnull |
| Nr: | Nummer |
| UTM | Universal Transverse Mercator |
| WEA | Windenergieanlage |

9 Literaturverzeichnis

- [1] *LAI; Länderausschuss für Immissionsschutz: Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen: WEA-Schattenwurf-Hinweise: Stand 13:03:2002*
- [2] *BImSchG Bundes-Immissionsschutzgesetz*
- [3] *MagicMaps Tour Explorer, TOP25 Karten*
- [4] *EEN GmbH, Betreff: WG: WP Görmin Erweiterung, GOER_Plan_v150_Ge-158_180529mB.pdf, KoordinatenGörmin72018.docx, per E-Mail am 05.07.2018*
- [5] *Sonnenwahrscheinlichkeit Wetterstation Heiligendamm, WindPRO-Datenbank WRDC - http://wrdc-mgo.nrel.gov/html/get_data-ap.html*
- [6] *EEN GmbH, Betreff: AW: WP Görmin Erweiterung, Übersichtstabelle 13_WEA.xlsx, per E-Mail am 16.08.2018*
- [7] *Vestas Wind Systems A/S, Rotorblatttiefen an Vestas Windenergieanlagen, Dokumentennr.: 0030-2627 V04, Datum: 2017-06-27;*
- [8] *I17-Wind GmbH & Co. KG, Berechnung der Schattenwurfdauer für die Errichtung und den Betrieb von drei Windenergieanlagen am Standort Dersekow, Bericht Nr.: I17-SCHATTEN-2018-22 vom 07.August 2018*
- [9] *I17-Wind GmbH & Co. KG, Berechnung der Schattenwurfdauer für die Errichtung und den Betrieb von einer Windenergieanlage am Standort Görmin, Bericht Nr.: I17-SCHATTEN-2018-33 vom 24. August 2018*

Anhang 1 / Übersichtskarten der Gesamtbelastung mit Iso-Schattenlinien

Projekt:
Windeignungsgebiet Görmin

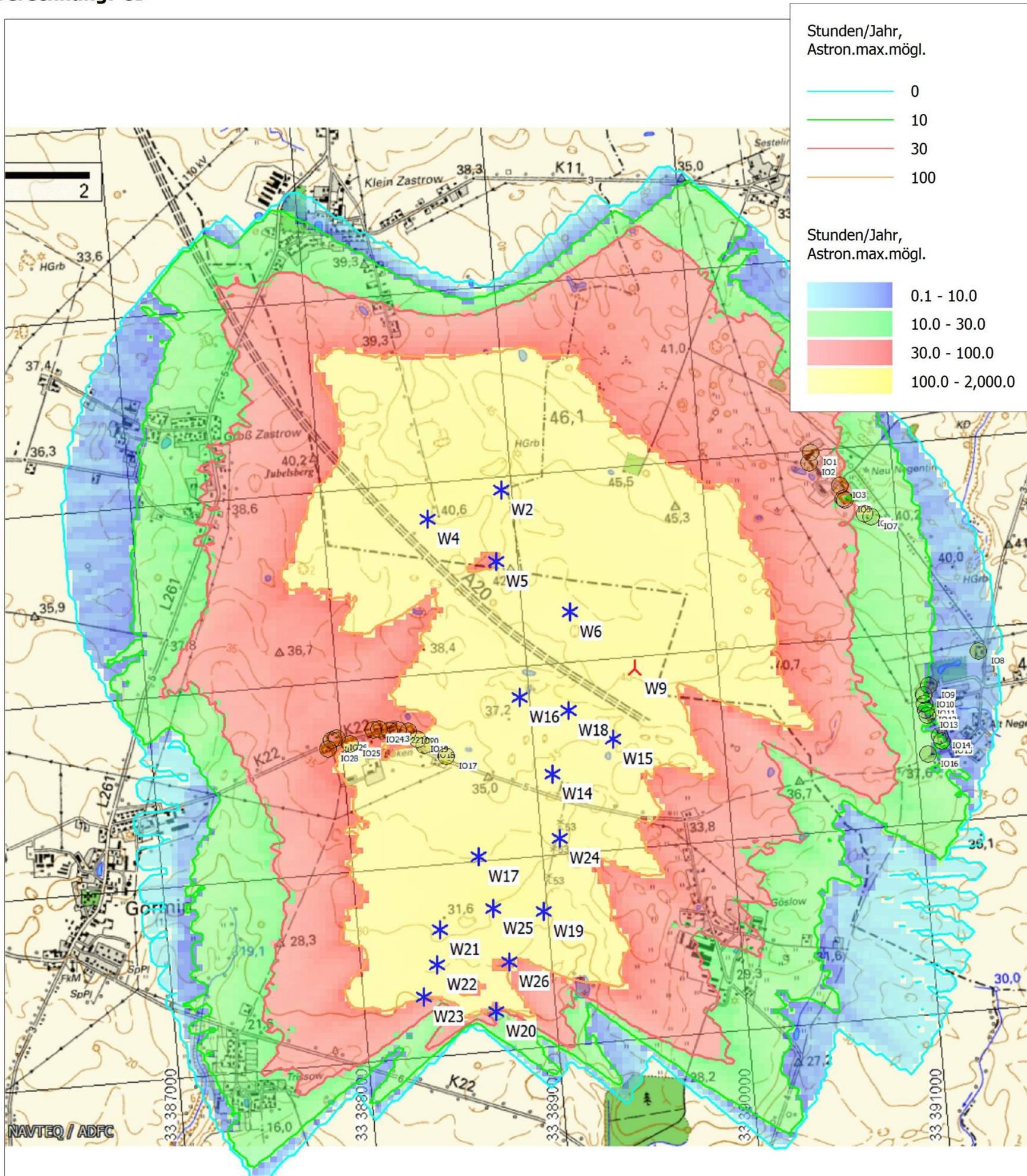
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Karte

Berechnung: GB



0 500 1000 1500 2000 m
Karte: DGD_Topo, Maßstab 1:30,000, Mitte: UTM (north)-ETRS89 Zone: 33 Ost: 389,240 Nord: 5,985,586
 ⚠ Neue WEA * Existierende WEA 📍 Schattenrezeptor
 Höhe der Schattenkarte: Höhenlinien: 150911_GöDeDa_SRTM.map (6)

Anhang 2 / Hauptergebnis Berechnungsergebnisse der Vorbelastung

Projekt:
Windeignungsgebiet Görmin

Lizenziertes Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:40/3.1.633

SHADOW - Hauptergebnis

Berechnung: VB
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

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

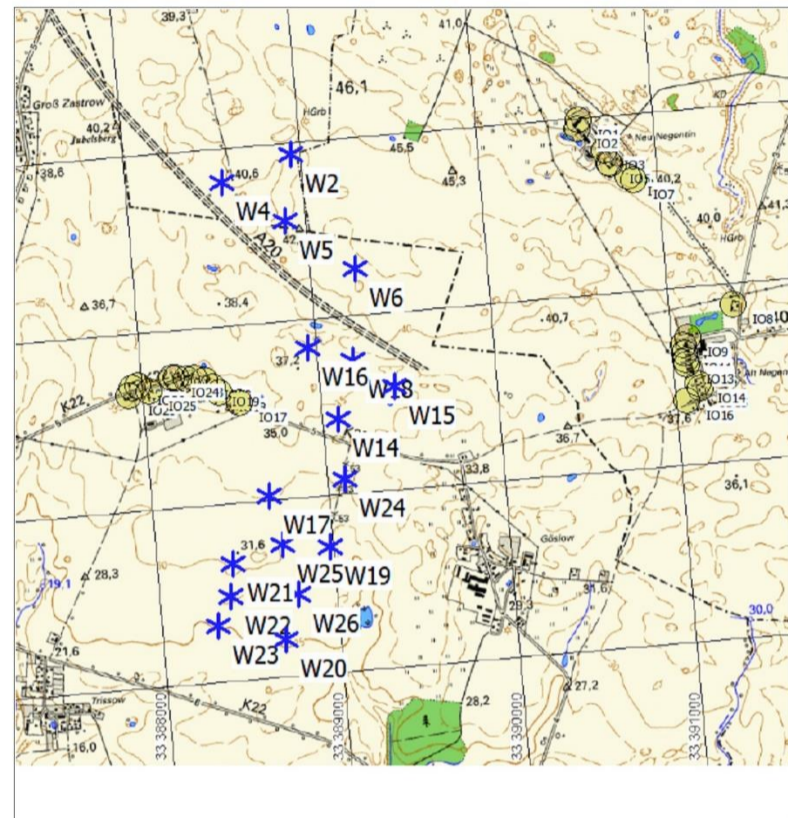
Betriebsstunden ermittelt aus WEA in Berechnung und Windverteilung:
Terraindaten: WASP (23)

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
403 491 532 461 592 595 554 824 1,167 1,137 803 557 8,117
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

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: 150911_GöDeDa_SRTM.map (6)
Hindernisse in Berechnung verwendet
Augenhöhe: 1.5 m
Rasterauflösung: 10.0 m

Alle Koordinatenangaben in:
UTM (north)-ETRS89 Zone: 33



Maßstab 1:50,000
* Existierende WEA ● Schattenrezeptor

WEA

| Ost | Nord | Z | Beschreibung | WEA-Typ | | | Nennleistung [kW] | Rotor-durchmesser [m] | Nabenhöhe [m] | Schattendaten | |
|-----|---------|-----------|--------------|---------|------------|---------------------------|-------------------|-----------------------|---------------|-----------------------|---------------|
| | | | | Aktuell | Hersteller | Typ | | | | Beschatt.-Bereich [m] | U/min [U/min] |
| 1 | 389,090 | 5,984,422 | 30.0 W14 | Ja | VESTAS | V80-2.0MW-2,000 | 2,000 | 80.0 | 100.0 | 1,581 | 16.7 |
| 2 | 389,425 | 5,984,580 | 33.0 W15 | Ja | VESTAS | V80-2.0MW-2,000 | 2,000 | 80.0 | 100.0 | 1,581 | 16.7 |
| 3 | 388,953 | 5,984,839 | 33.7 W16 | Ja | VESTAS | V80-2.0MW-2,000 | 2,000 | 80.0 | 100.0 | 1,581 | 16.7 |
| 4 | 388,667 | 5,984,022 | 30.0 W17 | Ja | VESTAS | V80-2.0MW-2,000 | 2,000 | 80.0 | 100.0 | 1,581 | 16.7 |
| 5 | 389,204 | 5,984,746 | 34.0 W18 | Ja | VESTAS | V90-2,000 | 2,000 | 90.0 | 95.0 | 1,506 | 14.9 |
| 6 | 388,986 | 5,983,707 | 27.8 W19 | Nein | VESTAS | V47-660/200 | 660 | 47.0 | 65.0 | 829 | 26.0 |
| 7 | 388,691 | 5,983,205 | 20.0 W20 | Nein | VESTAS | V47-660/200 | 660 | 47.0 | 65.0 | 829 | 26.0 |
| 8 | 388,433 | 5,983,657 | 26.5 W21 | Nein | VESTAS | V47-660/200 | 660 | 47.0 | 65.0 | 829 | 26.0 |
| 9 | 388,405 | 5,983,476 | 24.0 W22 | Nein | VESTAS | V47-660/200 | 660 | 47.0 | 65.0 | 829 | 26.0 |
| 10 | 388,320 | 5,983,314 | 21.6 W23 | Nein | VESTAS | V47-660/200 | 660 | 47.0 | 65.0 | 829 | 26.0 |
| 11 | 389,101 | 5,984,082 | 30.0 W24 | Ja | ENERCON | E-101-3,050 | 3,050 | 101.0 | 99.0 | 2,216 | 14.5 |
| 12 | 388,721 | 5,983,745 | 27.2 W25 | Ja | VESTAS | V112-3.3 Gridstream-3,300 | 3,300 | 112.0 | 94.0 | 1,714 | 12.0 |
| 13 | 388,784 | 5,983,458 | 24.4 W26 | Nein | ENERCON | E-126 EP3 TES 4000-4,000 | 4,000 | 127.0 | 135.0 | 1,746 | 12.4 |
| 14 | 388,949 | 5,985,933 | 40.0 W2 | Ja | VESTAS | V150-4.2MW-4,200 | 4,200 | 150.0 | 166.0 | 1,901 | 10.4 |
| 15 | 388,551 | 5,985,811 | 38.0 W4 | Ja | VESTAS | V150-4.2MW-4,200 | 4,200 | 150.0 | 166.0 | 1,901 | 10.4 |
| 16 | 388,889 | 5,985,560 | 39.8 W5 | Ja | VESTAS | V150-4.2MW-4,200 | 4,200 | 150.0 | 166.0 | 1,901 | 10.4 |
| 17 | 389,255 | 5,985,262 | 40.0 W6 | Ja | VESTAS | V150-4.2MW-4,200 | 4,200 | 150.0 | 166.0 | 1,901 | 10.4 |

Schattenrezeptor-Eingabe

| Nr. | Name | Ost | Nord | Z | Breite [m] | Höhe [m] | Höhe über Grund [m] | Azimutwinkel (von Süd) [°] | Neigung des Fensters [°] | Ausrichtungsmodus |
|-----|------|---------|-----------|------|------------|----------|---------------------|----------------------------|--------------------------|---------------------|
| A | IO1 | 390,585 | 5,985,989 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| B | IO2 | 390,574 | 5,985,936 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| C | IO3 | 390,722 | 5,985,806 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| D | IO4 | 390,736 | 5,985,734 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| E | IO5 | 390,742 | 5,985,725 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| F | IO6 | 390,840 | 5,985,645 | 39.7 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| G | IO7 | 390,873 | 5,985,628 | 39.4 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| H | IO8 | 391,374 | 5,984,875 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| I | IO9 | 391,101 | 5,984,717 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |

(Fortsetzung nächste Seite)...



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:40/3.1.633

SHADOW - Hauptergebnis

Berechnung: VB

...(Fortsetzung von letzter Seite)

| Nr. | Name | Ost | Nord | Z | Breite | Höhe | Höhe über Grund | Azimutwinkel (von Süd) | Neigung des Fensters | Ausrichtungsmodus |
|-----|------|---------|-----------|------|--------|------|-----------------|------------------------|----------------------|---------------------|
| | | | | | [m] | [m] | [m] | [°] | [°] | |
| J | IO10 | 391,071 | 5,984,671 | 39.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| K | IO11 | 391,072 | 5,984,625 | 38.2 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| L | IO12 | 391,076 | 5,984,588 | 37.5 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| M | IO13 | 391,081 | 5,984,561 | 37.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| N | IO14 | 391,136 | 5,984,450 | 35.4 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| O | IO15 | 391,144 | 5,984,420 | 34.9 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| P | IO16 | 391,067 | 5,984,357 | 33.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| Q | IO17 | 388,544 | 5,984,559 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| R | IO18 | 388,435 | 5,984,627 | 30.4 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| S | IO19 | 388,402 | 5,984,660 | 30.7 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| T | IO20 | 388,357 | 5,984,706 | 31.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| U | IO21 | 388,305 | 5,984,720 | 31.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| V | IO22 | 388,259 | 5,984,720 | 31.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| W | IO23 | 388,204 | 5,984,733 | 31.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| X | IO24 | 388,174 | 5,984,730 | 30.9 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| Y | IO25 | 388,045 | 5,984,668 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| Z | IO26 | 387,980 | 5,984,704 | 30.2 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| AA | IO27 | 387,950 | 5,984,696 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| AB | IO28 | 387,927 | 5,984,651 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |

Berechnungsergebnisse

Schattenrezeptor

| Nr. | Name | astron. max. mögl. Beschattungsdauer | | met. wahrsch. Beschattungsdauer |
|-----|------|--------------------------------------|----------------|---------------------------------|
| | | Stunden/Jahr | Schattentage/a | |
| | | [Std/Jahr] | [Tage/Jahr] | Max.Schatten Stunden/Tag |
| A | IO1 | 23:23 | 83 | 0:23 |
| B | IO2 | 23:52 | 83 | 0:24 |
| C | IO3 | 20:12 | 77 | 0:22 |
| D | IO4 | 20:03 | 78 | 0:22 |
| E | IO5 | 19:51 | 77 | 0:22 |
| F | IO6 | 7:20 | 26 | 0:21 |
| G | IO7 | 7:07 | 26 | 0:21 |
| H | IO8 | 0:00 | 0 | 0:00 |
| I | IO9 | 0:24 | 8 | 0:05 |
| J | IO10 | 0:30 | 8 | 0:05 |
| K | IO11 | 0:33 | 8 | 0:06 |
| L | IO12 | 0:32 | 8 | 0:06 |
| M | IO13 | 0:34 | 8 | 0:06 |
| N | IO14 | 0:34 | 9 | 0:06 |
| O | IO15 | 0:34 | 8 | 0:06 |
| P | IO16 | 0:45 | 9 | 0:08 |
| Q | IO17 | 92:45 | 225 | 0:34 |
| R | IO18 | 107:36 | 268 | 0:35 |
| S | IO19 | 91:32 | 259 | 0:33 |
| T | IO20 | 79:25 | 248 | 0:31 |
| U | IO21 | 84:22 | 256 | 0:30 |
| V | IO22 | 87:41 | 263 | 0:32 |
| W | IO23 | 89:16 | 267 | 0:32 |
| X | IO24 | 89:06 | 270 | 0:31 |
| Y | IO25 | 95:13 | 282 | 0:42 |
| Z | IO26 | 84:47 | 277 | 0:42 |
| AA | IO27 | 82:05 | 265 | 0:41 |
| AB | IO28 | 86:45 | 294 | 0:40 |

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

| Nr. | Name | Maximal [Std/Jahr] | Erwartet [Std/Jahr] |
|-----|------|--------------------|---------------------|
| 1 | W14 | 38:37 | 7:43 |
| 2 | W15 | 19:47 | 4:42 |
| 3 | W16 | 90:03 | 26:41 |
| 4 | W17 | 117:00 | 10:18 |

(Fortsetzung nächste Seite)...

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:40/3.1.633

SHADOW - Hauptergebnis

Berechnung: VB

...(Fortsetzung von letzter Seite)

| Nr. | Name | Maximal [Std/Jahr] | Erwartet [Std/Jahr] |
|-----|------|-----------------------|------------------------|
| 5 | W18 | 51:57 | 14:48 |
| 6 | W19 | 0:00 | 0:00 |
| 7 | W20 | 0:00 | 0:00 |
| 8 | W21 | 0:00 | 0:00 |
| 9 | W22 | 0:00 | 0:00 |
| 10 | W23 | 0:00 | 0:00 |
| 11 | W24 | 45:12 | 6:25 |
| 12 | W25 | 34:51 | 3:02 |
| 13 | W26 | 24:43 | 2:00 |
| 14 | W2 | 20:22 | 4:55 |
| 15 | W4 | 0:00 | 0:00 |
| 16 | W5 | 18:12 | 3:56 |
| 17 | W6 | 84:48 | 21:42 |

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

Anhang 3 / Hauptergebnis Berechnungsergebnisse der Zusatzbelastung

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:36/3.1.633



SHADOW - Hauptergebnis

Berechnung: ZB / Einwirkungsbereich
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

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

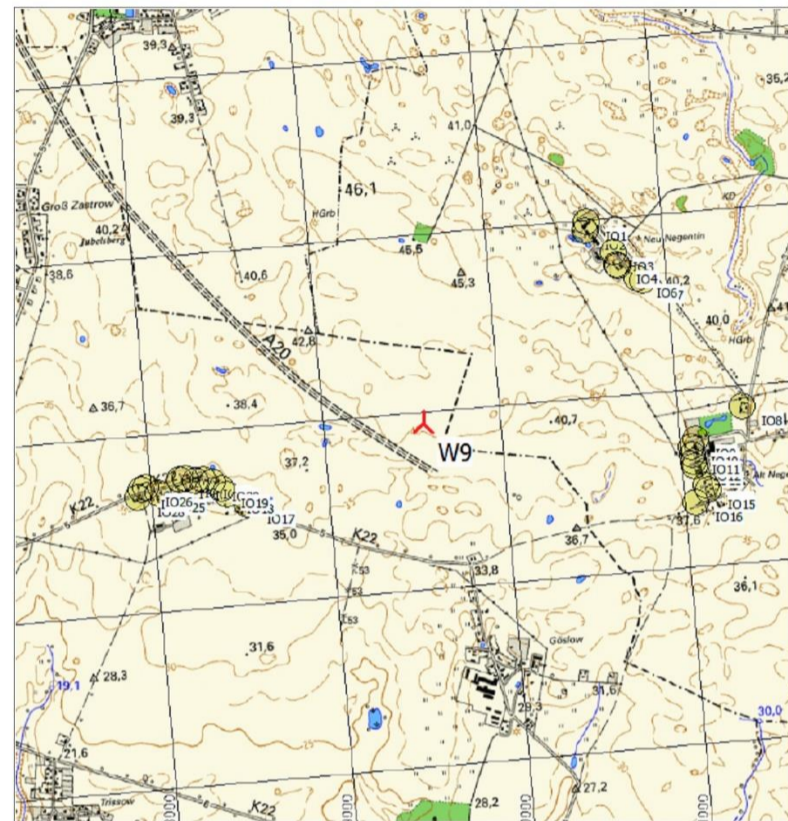
Betriebsstunden ermittelt aus WEA in Berechnung und Windverteilung:
Terraindaten: WASP (23)

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
424 516 559 484 622 625 581 869 1,227 1,195 844 585 8,530
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

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: 150911_GöDeDa_SRTM.map (6)
Hindernisse in Berechnung verwendet
Augenhöhe: 1.5 m
Rasterauflösung: 10.0 m

Alle Koordinatenangaben in:
UTM (north)-ETRS89 Zone: 33



Maßstab 1:50,000
Neue WEA Schattenrezeptor

WEA

| Ost | Nord | Z | Beschreibung | WEA-Typ | | | Nenn-leistung | Rotor-durchmesser | Nabenhöhe | Schattendaten | |
|-----|---------|-----------|--------------|---------|------------|------------------|---------------|-------------------|-----------|-------------------|-------|
| | | | | Aktuell | Hersteller | Typ | | | | Beschatt.-Bereich | U/min |
| 1 | 389,570 | 5,984,934 | 37.6 W9 | Ja | VESTAS | V150-4.2MW-4,200 | 4,200 | 150.0 | 166.0 | 1,901 | 10.4 |

Schattenrezeptor-Eingabe

| Nr. | Name | Ost | Nord | Z | Breite | Höhe | Höhe über Grund | Azimutwinkel (von Süd) | Neigung des Fensters | Ausrichtungsmodus |
|-----|------|---------|-----------|------|--------|------|-----------------|------------------------|----------------------|---------------------|
| | | [m] | [m] | [m] | [m] | [m] | [m] | [°] | [°] | |
| A | IO1 | 390,585 | 5,985,989 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| B | IO2 | 390,574 | 5,985,936 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| C | IO3 | 390,722 | 5,985,806 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| D | IO4 | 390,736 | 5,985,734 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| E | IO5 | 390,742 | 5,985,725 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| F | IO6 | 390,840 | 5,985,645 | 39.7 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| G | IO7 | 390,873 | 5,985,628 | 39.4 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| H | IO8 | 391,374 | 5,984,875 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| I | IO9 | 391,101 | 5,984,717 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| J | IO10 | 391,071 | 5,984,671 | 39.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| K | IO11 | 391,072 | 5,984,625 | 38.2 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| L | IO12 | 391,076 | 5,984,588 | 37.5 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| M | IO13 | 391,081 | 5,984,561 | 37.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| N | IO14 | 391,136 | 5,984,450 | 35.4 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| O | IO15 | 391,144 | 5,984,420 | 34.9 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| P | IO16 | 391,067 | 5,984,357 | 33.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| Q | IO17 | 388,544 | 5,984,559 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| R | IO18 | 388,435 | 5,984,627 | 30.4 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| S | IO19 | 388,402 | 5,984,660 | 30.7 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| T | IO20 | 388,357 | 5,984,706 | 31.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| U | IO21 | 388,305 | 5,984,720 | 31.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| V | IO22 | 388,259 | 5,984,720 | 31.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| W | IO23 | 388,204 | 5,984,733 | 31.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| X | IO24 | 388,174 | 5,984,730 | 30.9 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| Y | IO25 | 388,045 | 5,984,668 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |

(Fortsetzung nächste Seite)...

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:36/3.1.633

SHADOW - Hauptergebnis

Berechnung: ZB / Einwirkungsbereich

...(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] | [°] | [°] | |
| Z | IO26 | 387,980 | 5,984,704 | 30.2 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| AA | IO27 | 387,950 | 5,984,696 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| AB | IO28 | 387,927 | 5,984,651 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |

Berechnungsergebnisse

Schattenrezeptor

| Nr. | Name | astron. max. mögl. Beschattungsdauer | | met. wahrsch. Beschattungsdauer | |
|-----|------|--------------------------------------|----------------|---------------------------------|--------------|
| | | Stunden/Jahr | Schattentage/a | Max.Schatten Stunden/Tag | Stunden/Jahr |
| | | [Std/Jahr] | [Tage/Jahr] | [Std/Tag] | [Std/Jahr] |
| A | IO1 | 18:43 | 60 | 0:25 | 2:13 |
| B | IO2 | 17:52 | 54 | 0:26 | 2:12 |
| C | IO3 | 12:42 | 40 | 0:25 | 1:54 |
| D | IO4 | 12:20 | 38 | 0:25 | 2:03 |
| E | IO5 | 12:16 | 38 | 0:25 | 2:04 |
| F | IO6 | 10:36 | 34 | 0:24 | 2:00 |
| G | IO7 | 10:04 | 32 | 0:24 | 1:56 |
| H | IO8 | 5:54 | 24 | 0:19 | 1:29 |
| I | IO9 | 8:58 | 32 | 0:22 | 2:27 |
| J | IO10 | 9:24 | 32 | 0:23 | 2:37 |
| K | IO11 | 9:40 | 32 | 0:23 | 2:42 |
| L | IO12 | 9:40 | 34 | 0:23 | 2:41 |
| M | IO13 | 9:39 | 32 | 0:22 | 2:40 |
| N | IO14 | 9:21 | 34 | 0:22 | 2:39 |
| O | IO15 | 9:19 | 33 | 0:22 | 2:40 |
| P | IO16 | 11:04 | 39 | 0:23 | 3:18 |
| Q | IO17 | 38:04 | 97 | 0:33 | 12:02 |
| R | IO18 | 20:34 | 53 | 0:30 | 6:32 |
| S | IO19 | 18:14 | 47 | 0:30 | 5:44 |
| T | IO20 | 16:02 | 44 | 0:29 | 4:54 |
| U | IO21 | 14:21 | 40 | 0:27 | 4:19 |
| V | IO22 | 13:14 | 39 | 0:26 | 3:57 |
| W | IO23 | 11:55 | 36 | 0:25 | 3:33 |
| X | IO24 | 11:29 | 36 | 0:25 | 3:25 |
| Y | IO25 | 9:41 | 34 | 0:23 | 2:53 |
| Z | IO26 | 8:39 | 32 | 0:22 | 2:33 |
| AA | IO27 | 8:10 | 29 | 0:22 | 2:25 |
| AB | IO28 | 8:10 | 30 | 0:21 | 2:26 |

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

| Nr. | Name | Maximal | Erwartet |
|-----|------|------------|------------|
| | | [Std/Jahr] | [Std/Jahr] |
| 1 | W9 | 171:18 | 43:04 |

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

Projekt:
Windeignungsgebiet Görmin

Lizenziertes Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633



SHADOW - Hauptergebnis

Berechnung: GB
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

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

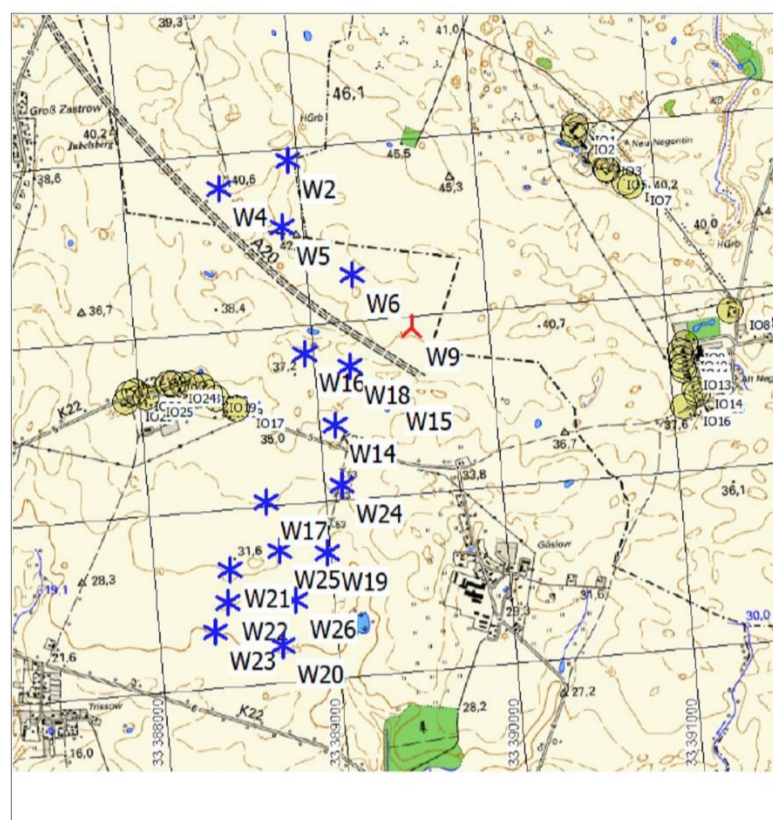
Betriebsstunden ermittelt aus WEA in Berechnung und Windverteilung:
Terraindaten: WASP (23)

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

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: 150911_GöDeDa_SRTM.map (6)
Hindernisse in Berechnung verwendet
Augenhöhe: 1.5 m
Rasterauflösung: 10.0 m

Alle Koordinatenangaben in:
UTM (north)-ETRS89 Zone: 33



Maßstab 1:50,000
▲ Neue WEA
★ Existierende WEA
● Schattenrezeptor

WEA

| Ost | Nord | Z | Beschreibung | WEA-Typ | | | Nennleistung [kW] | Rotor-durchmesser [m] | Nabenhöhe [m] | Schattendaten | |
|-----|---------|-----------|--------------|---------|------------|---------------------------|-------------------|-----------------------|---------------|-----------------------|---------------|
| | | | | Aktuell | Hersteller | Typ | | | | Beschatt.-Bereich [m] | U/min [U/min] |
| | | [m] | | | | | | | | | |
| 1 | 389,570 | 5,984,934 | 37.6 W9 | Ja | VESTAS | V150-4.2MW-4,200 | 4,200 | 150.0 | 166.0 | 1,901 | 10.4 |
| 2 | 389,090 | 5,984,422 | 30.0 W14 | Ja | VESTAS | V80-2.0MW-2,000 | 2,000 | 80.0 | 100.0 | 1,581 | 16.7 |
| 3 | 389,425 | 5,984,580 | 33.0 W15 | Ja | VESTAS | V80-2.0MW-2,000 | 2,000 | 80.0 | 100.0 | 1,581 | 16.7 |
| 4 | 388,953 | 5,984,839 | 33.7 W16 | Ja | VESTAS | V80-2.0MW-2,000 | 2,000 | 80.0 | 100.0 | 1,581 | 16.7 |
| 5 | 388,667 | 5,984,022 | 30.0 W17 | Ja | VESTAS | V80-2.0MW-2,000 | 2,000 | 80.0 | 100.0 | 1,581 | 16.7 |
| 6 | 389,204 | 5,984,746 | 34.0 W18 | Ja | VESTAS | V90-2,000 | 2,000 | 90.0 | 95.0 | 1,506 | 14.9 |
| 7 | 388,986 | 5,983,707 | 27.8 W19 | Nein | VESTAS | V47-660/200 | 660 | 47.0 | 65.0 | 829 | 26.0 |
| 8 | 388,691 | 5,983,205 | 20.0 W20 | Nein | VESTAS | V47-660/200 | 660 | 47.0 | 65.0 | 829 | 26.0 |
| 9 | 388,433 | 5,983,657 | 26.5 W21 | Nein | VESTAS | V47-660/200 | 660 | 47.0 | 65.0 | 829 | 26.0 |
| 10 | 388,405 | 5,983,476 | 24.0 W22 | Nein | VESTAS | V47-660/200 | 660 | 47.0 | 65.0 | 829 | 26.0 |
| 11 | 388,320 | 5,983,314 | 21.6 W23 | Nein | VESTAS | V47-660/200 | 660 | 47.0 | 65.0 | 829 | 26.0 |
| 12 | 389,101 | 5,984,082 | 30.0 W24 | Ja | ENERCON | E-101-3,050 | 3,050 | 101.0 | 99.0 | 2,216 | 14.5 |
| 13 | 388,721 | 5,983,745 | 27.2 W25 | Ja | VESTAS | V112-3.3 Gridstream-3,300 | 3,300 | 112.0 | 94.0 | 1,714 | 12.0 |
| 14 | 388,784 | 5,983,458 | 24.4 W26 | Nein | ENERCON | E-126 EP3 TES 4000-4,000 | 4,000 | 127.0 | 135.0 | 1,746 | 12.4 |
| 15 | 388,949 | 5,985,933 | 40.0 W2 | Ja | VESTAS | V150-4.2MW-4,200 | 4,200 | 150.0 | 166.0 | 1,901 | 10.4 |
| 16 | 388,551 | 5,985,811 | 38.0 W4 | Ja | VESTAS | V150-4.2MW-4,200 | 4,200 | 150.0 | 166.0 | 1,901 | 10.4 |
| 17 | 388,889 | 5,985,560 | 39.8 W5 | Ja | VESTAS | V150-4.2MW-4,200 | 4,200 | 150.0 | 166.0 | 1,901 | 10.4 |
| 18 | 389,255 | 5,985,262 | 40.0 W6 | Ja | VESTAS | V150-4.2MW-4,200 | 4,200 | 150.0 | 166.0 | 1,901 | 10.4 |

Schattenrezeptor-Eingabe

| Nr. | Name | Ost | Nord | Z | Breite [m] | Höhe [m] | Höhe über Grund [m] | Azimutwinkel (von Süd) [°] | Neigung des Fensters [°] | Ausrichtungsmodus |
|-----|------|---------|-----------|------|------------|----------|---------------------|----------------------------|--------------------------|---------------------|
| A | IO1 | 390,585 | 5,985,989 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| B | IO2 | 390,574 | 5,985,936 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| C | IO3 | 390,722 | 5,985,806 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| D | IO4 | 390,736 | 5,985,734 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| E | IO5 | 390,742 | 5,985,725 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| F | IO6 | 390,840 | 5,985,645 | 39.7 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| G | IO7 | 390,873 | 5,985,628 | 39.4 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |

(Fortsetzung nächste Seite)...



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Hauptergebnis

Berechnung: GB

...(Fortsetzung von letzter Seite)

| Nr. | Name | Ost | Nord | Z | Breite | Höhe | Höhe über Grund | Azimutwinkel (von Süd) | Neigung des Fensters | Ausrichtungsmodus |
|---------|---------|-----------|------|-----|--------|------|-----------------|------------------------|----------------------|---------------------|
| | | | | | [m] | [m] | [m] | [°] | [°] | |
| H IO8 | 391,374 | 5,984,875 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| I IO9 | 391,101 | 5,984,717 | 40.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| J IO10 | 391,071 | 5,984,671 | 39.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| K IO11 | 391,072 | 5,984,625 | 38.2 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| L IO12 | 391,076 | 5,984,588 | 37.5 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| M IO13 | 391,081 | 5,984,561 | 37.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| N IO14 | 391,136 | 5,984,450 | 35.4 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| O IO15 | 391,144 | 5,984,420 | 34.9 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| P IO16 | 391,067 | 5,984,357 | 33.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| Q IO17 | 388,544 | 5,984,559 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| R IO18 | 388,435 | 5,984,627 | 30.4 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| S IO19 | 388,402 | 5,984,660 | 30.7 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| T IO20 | 388,357 | 5,984,706 | 31.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| U IO21 | 388,305 | 5,984,720 | 31.1 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| V IO22 | 388,259 | 5,984,720 | 31.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| W IO23 | 388,204 | 5,984,733 | 31.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| X IO24 | 388,174 | 5,984,730 | 30.9 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| Y IO25 | 388,045 | 5,984,668 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| Z IO26 | 387,980 | 5,984,704 | 30.2 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| AA IO27 | 387,950 | 5,984,696 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |
| AB IO28 | 387,927 | 5,984,651 | 30.0 | 0.1 | 0.1 | 2.0 | 0.0 | 0.0 | 0.0 | "Gewächshaus-Modus" |

Berechnungsergebnisse

Schattenrezeptor

| Nr. | Name | astron. max. mögl. Beschattungsdauer | | met. wahrsch. Beschattungsdauer | |
|---------|------|--------------------------------------|----------------|---------------------------------|--------------|
| | | Stunden/Jahr | Schattentage/a | Stunden/Tag | Stunden/Jahr |
| | | [Std/Jahr] | [Tage/Jahr] | [Std/Tag] | [Std/Jahr] |
| A IO1 | | 42:06 | 143 | 0:25 | 6:51 |
| B IO2 | | 41:44 | 137 | 0:26 | 7:01 |
| C IO3 | | 32:54 | 117 | 0:25 | 6:17 |
| D IO4 | | 32:23 | 116 | 0:25 | 6:29 |
| E IO5 | | 32:07 | 115 | 0:25 | 6:28 |
| F IO6 | | 17:56 | 60 | 0:24 | 3:27 |
| G IO7 | | 17:11 | 58 | 0:24 | 3:21 |
| H IO8 | | 5:54 | 24 | 0:19 | 1:25 |
| I IO9 | | 9:22 | 40 | 0:22 | 2:25 |
| J IO10 | | 9:54 | 40 | 0:23 | 2:35 |
| K IO11 | | 10:13 | 40 | 0:23 | 2:41 |
| L IO12 | | 10:12 | 42 | 0:23 | 2:40 |
| M IO13 | | 10:13 | 40 | 0:22 | 2:39 |
| N IO14 | | 9:55 | 43 | 0:22 | 2:38 |
| O IO15 | | 9:53 | 41 | 0:22 | 2:40 |
| P IO16 | | 11:49 | 48 | 0:23 | 3:19 |
| Q IO17 | | 122:42 | 287 | 0:41 | 25:21 |
| R IO18 | | 127:28 | 291 | 0:40 | 28:53 |
| S IO19 | | 105:11 | 275 | 0:37 | 23:15 |
| T IO20 | | 85:08 | 256 | 0:31 | 18:10 |
| U IO21 | | 87:33 | 262 | 0:30 | 18:39 |
| V IO22 | | 90:00 | 267 | 0:32 | 19:02 |
| W IO23 | | 91:11 | 269 | 0:32 | 19:28 |
| X IO24 | | 90:56 | 272 | 0:31 | 19:22 |
| Y IO25 | | 97:53 | 284 | 0:42 | 18:42 |
| Z IO26 | | 86:58 | 281 | 0:42 | 15:54 |
| AA IO27 | | 84:12 | 270 | 0:41 | 14:58 |
| AB IO28 | | 89:17 | 298 | 0:40 | 16:15 |

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

| Nr. | Name | Maximal | Erwartet |
|-----|------|------------|------------|
| | | [Std/Jahr] | [Std/Jahr] |
| 1 | W9 | 171:18 | 41:05 |
| 2 | W14 | 38:37 | 7:44 |

(Fortsetzung nächste Seite)...

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Hauptergebnis

Berechnung: GB

...(Fortsetzung von letzter Seite)

| Nr. | Name | Maximal [Std/Jahr] | Erwartet [Std/Jahr] |
|-----|------|-----------------------|------------------------|
| 3 | W15 | 19:47 | 4:43 |
| 4 | W16 | 90:03 | 26:46 |
| 5 | W17 | 117:00 | 10:20 |
| 6 | W18 | 51:57 | 14:51 |
| 7 | W19 | 0:00 | 0:00 |
| 8 | W20 | 0:00 | 0:00 |
| 9 | W21 | 0:00 | 0:00 |
| 10 | W22 | 0:00 | 0:00 |
| 11 | W23 | 0:00 | 0:00 |
| 12 | W24 | 45:12 | 6:26 |
| 13 | W25 | 34:51 | 3:02 |
| 14 | W26 | 24:43 | 2:00 |
| 15 | W2 | 20:22 | 4:56 |
| 16 | W4 | 0:00 | 0:00 |
| 17 | W5 | 18:12 | 3:57 |
| 18 | W6 | 84:48 | 21:45 |

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: A - IO1

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]

| | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan | Feb | Mär | Apr | Mai | Jun | Jul | Aug | Sep | Okt | Nov | Dez |
| 1.39 | 2.32 | 3.70 | 5.75 | 8.12 | 7.70 | 7.33 | 7.20 | 5.12 | 3.48 | 1.79 | 1.03 |

Betriebsdauer je Sektor

| | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N | NNO | ONO | O | OSO | SSO | S | SSW | WSW | W | WNW | NNW | Summe |
| 405 | 493 | 534 | 462 | 594 | 596 | 556 | 827 | 1,170 | 1,140 | 805 | 558 | 8,140 |

Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni |
|---------------------------|----------------|--------------------|--------------------|---------------------|---------------------|---------------------|
| 1 | 08:26 15:55 | 07:56 16:46 | 15:21 (1) 17:43 | 06:58 17:43 | 06:42 19:41 | 18:39 (15) 20:37 |
| 2 | 08:26 15:56 | 07:54 16:48 | 15:24 (1) 17:45 | 06:56 17:45 | 06:40 19:43 | 18:41 (15) 20:39 |
| 3 | 08:26 15:57 | 15:10 (1) 16:50 | 07:52 17:46 | 06:53 17:46 | 17:11 (17) 19:45 | 06:37 20:41 |
| 4 | 08:26 15:58 | 15:09 (1) 16:51 | 07:51 17:46 | 06:51 17:48 | 17:08 (17) 19:47 | 06:35 20:43 |
| 5 | 08:25 16:00 | 15:17 (1) 16:54 | 07:49 17:50 | 06:49 17:50 | 17:07 (17) 19:49 | 06:33 20:45 |
| 6 | 08:25 16:01 | 15:08 (1) 16:56 | 07:47 17:52 | 06:46 17:52 | 17:06 (17) 19:51 | 06:30 20:46 |
| 7 | 08:25 16:02 | 15:21 (1) 16:58 | 07:45 17:54 | 06:44 17:54 | 17:05 (17) 19:53 | 06:28 20:48 |
| 8 | 08:24 16:04 | 15:07 (1) 17:00 | 07:43 17:56 | 06:41 17:56 | 17:05 (17) 19:55 | 06:25 20:50 |
| 9 | 08:23 16:05 | 15:06 (1) 17:02 | 07:41 17:58 | 06:39 17:58 | 17:05 (17) 19:56 | 06:23 20:52 |
| 10 | 08:23 16:07 | 15:23 (1) 17:05 | 07:39 18:00 | 16:22 (18) 18:00 | 17:05 (17) 19:58 | 06:20 20:54 |
| 11 | 08:22 16:08 | 15:07 (1) 17:07 | 07:37 18:02 | 16:20 (18) 18:02 | 17:05 (17) 20:00 | 06:18 20:55 |
| 12 | 08:21 16:10 | 15:26 (1) 17:09 | 07:35 18:04 | 16:34 (18) 18:04 | 17:23 (17) 20:02 | 06:16 20:57 |
| 13 | 08:21 16:11 | 15:06 (1) 17:11 | 07:33 18:06 | 16:17 (18) 18:06 | 17:06 (17) 20:04 | 06:13 20:59 |
| 14 | 08:20 16:13 | 15:28 (1) 17:13 | 07:31 18:08 | 16:16 (18) 18:08 | 17:09 (17) 20:06 | 06:11 21:01 |
| 15 | 08:19 16:15 | 15:06 (1) 17:15 | 07:29 18:10 | 16:16 (18) 18:10 | 17:09 (17) 20:09 | 06:09 21:02 |
| 16 | 08:18 16:16 | 15:29 (1) 17:17 | 07:27 18:11 | 16:16 (18) 18:11 | 17:09 (17) 20:09 | 06:06 21:04 |
| 17 | 08:17 16:18 | 15:06 (1) 17:19 | 07:25 18:13 | 16:16 (18) 18:13 | 17:09 (17) 20:11 | 06:04 21:06 |
| 18 | 08:16 16:20 | 15:07 (1) 17:21 | 07:23 18:15 | 16:15 (18) 18:15 | 17:09 (17) 20:13 | 06:02 21:07 |
| 19 | 08:15 16:22 | 15:31 (1) 17:23 | 07:21 18:17 | 16:15 (18) 18:17 | 17:09 (17) 20:15 | 06:01 21:09 |
| 20 | 08:13 16:23 | 15:06 (1) 17:25 | 07:18 18:19 | 16:16 (18) 18:19 | 17:22 (17) 20:17 | 06:02 21:11 |
| 21 | 08:12 16:25 | 15:07 (1) 17:27 | 07:16 18:21 | 16:16 (18) 18:21 | 17:46 (15) 20:19 | 05:55 21:12 |
| 22 | 08:11 16:27 | 15:31 (1) 17:29 | 07:14 18:23 | 16:36 (18) 18:23 | 17:43 (15) 20:21 | 05:52 21:14 |
| 23 | 08:10 16:29 | 15:07 (1) 17:31 | 07:12 18:25 | 16:19 (18) 18:25 | 17:41 (15) 20:23 | 05:50 21:15 |
| 24 | 08:08 16:31 | 15:32 (1) 17:33 | 07:10 18:27 | 16:35 (18) 18:27 | 17:41 (15) 20:24 | 05:48 21:17 |
| 25 | 08:07 16:33 | 15:09 (1) 17:35 | 07:07 18:28 | 16:24 (18) 18:28 | 17:39 (15) 20:26 | 05:46 21:18 |
| 26 | 08:05 16:35 | 15:32 (1) 17:37 | 07:05 18:30 | 16:28 (18) 18:30 | 17:58 (15) 20:28 | 05:44 21:20 |
| 27 | 08:04 16:37 | 15:11 (1) 17:39 | 07:03 18:32 | 05:55 18:32 | 17:57 (15) 20:30 | 05:41 21:21 |
| 28 | 08:02 16:38 | 15:11 (1) 17:41 | 07:00 18:34 | 05:52 18:34 | 17:37 (15) 20:32 | 05:39 21:23 |
| 29 | 08:01 16:40 | 15:12 (1) 17:43 | 06:58 18:36 | 06:50 18:36 | 18:37 (15) 20:34 | 05:37 21:24 |
| 30 | 07:59 16:42 | 15:30 (1) 17:45 | 06:56 18:38 | 06:47 18:38 | 18:37 (15) 20:35 | 05:35 21:25 |
| 31 | 07:58 16:44 | 15:15 (1) 17:47 | 06:54 18:40 | 06:45 18:39 | 18:57 (15) 20:36 | 05:33 21:26 |
| | 16:44 249 | 15:28 (1) 273 | 17:49 367 | 18:56 (15) 420 | 18:56 (15) 495 | 21:27 511 |
| Sonnenscheinstunden | 556 | 290 | 381 | 26 | | |
| astr.max.mögl.Beschattung | 0.17 | 0.24 | 0.31 | 0.41 | | |
| Red.Sonnenscheinwahrsch. | 0.93 | 0.93 | 0.93 | 0.93 | | |
| Reduktion Betriebsdauer | 0.67 | 0.70 | 0.68 | 0.68 | | |
| Reduktion Windrichtung | 0.11 | 0.15 | 0.20 | 0.26 | | |
| Gesamte Reduktion | 59 | 45 | 75 | 7 | | |
| Met.wahrsch.Beschattung | | | | | | |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: A - IO1

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember |
|---------------------------|-------|--------|-----------|------------|------------|------------|
| 1 | 04:39 | 05:19 | 06:14 | 07:07 | 17:45 (17) | 07:06 |
| | 21:43 | 21:07 | 20:00 | 18:46 | 18:01 (17) | 16:35 |
| 2 | 04:39 | 05:21 | 06:15 | 07:09 | 17:44 (17) | 07:08 |
| | 21:42 | 21:05 | 19:58 | 18:43 | 18:01 (17) | 16:33 |
| 3 | 04:40 | 05:22 | 06:17 | 07:11 | 17:43 (17) | 07:10 |
| | 21:42 | 21:03 | 19:55 | 18:41 | 18:02 (17) | 16:31 |
| 4 | 04:41 | 05:24 | 06:19 | 07:13 | 17:42 (17) | 07:12 |
| | 21:41 | 21:02 | 19:53 | 18:39 | 18:01 (17) | 16:29 |
| 5 | 04:42 | 05:26 | 06:21 | 07:15 | 17:41 (17) | 07:14 |
| | 21:41 | 21:00 | 19:50 | 18:36 | 18:01 (17) | 16:27 |
| 6 | 04:43 | 05:27 | 06:23 | 07:16 | 17:41 (17) | 07:16 |
| | 21:40 | 20:58 | 19:48 | 18:34 | 18:01 (17) | 16:25 |
| 7 | 04:44 | 05:29 | 06:24 | 07:18 | 17:41 (17) | 07:18 |
| | 21:40 | 20:56 | 19:45 | 18:31 | 18:00 (17) | 16:23 |
| 8 | 04:45 | 05:31 | 06:26 | 07:20 | 17:42 (17) | 07:20 |
| | 21:39 | 20:54 | 19:43 | 18:29 | 17:59 (17) | 16:21 |
| 9 | 04:46 | 05:33 | 06:28 | 07:22 | 17:43 (17) | 07:22 |
| | 21:38 | 20:52 | 19:41 | 18:26 | 17:57 (17) | 16:20 |
| 10 | 04:47 | 05:34 | 06:30 | 18:35 (15) | 07:24 | 17:44 (17) |
| | 21:37 | 20:50 | 19:38 | 18:45 (15) | 18:24 | 17:55 (17) |
| 11 | 04:48 | 05:36 | 06:31 | 18:32 (15) | 07:26 | 17:47 (17) |
| | 21:36 | 20:48 | 19:36 | 18:46 (15) | 18:22 | 17:52 (17) |
| 12 | 04:49 | 05:38 | 06:33 | 18:30 (15) | 07:28 | 17:48 (17) |
| | 21:35 | 20:46 | 19:33 | 18:47 (15) | 18:19 | 16:14 |
| 13 | 04:50 | 05:40 | 06:35 | 18:29 (15) | 07:29 | 17:49 (17) |
| | 21:34 | 20:43 | 19:31 | 18:48 (15) | 18:17 | 16:13 |
| 14 | 04:52 | 05:41 | 06:37 | 18:28 (15) | 07:31 | 17:50 (17) |
| | 21:33 | 20:41 | 19:28 | 18:48 (15) | 18:15 | 16:11 |
| 15 | 04:53 | 05:43 | 06:39 | 18:27 (15) | 07:33 | 17:51 (17) |
| | 21:32 | 20:39 | 19:26 | 18:48 (15) | 18:12 | 16:09 |
| 16 | 04:54 | 05:45 | 06:40 | 18:27 (15) | 07:35 | 17:52 (17) |
| | 21:31 | 20:37 | 19:23 | 18:48 (15) | 18:10 | 16:08 |
| 17 | 04:56 | 05:47 | 06:42 | 18:27 (15) | 07:37 | 17:53 (17) |
| | 21:30 | 20:35 | 19:21 | 18:47 (15) | 18:08 | 16:06 |
| 18 | 04:57 | 05:49 | 06:44 | 18:27 (15) | 07:39 | 17:54 (17) |
| | 21:29 | 20:33 | 19:18 | 18:47 (15) | 18:05 | 16:05 |
| 19 | 04:58 | 05:50 | 06:46 | 18:26 (15) | 07:41 | 17:55 (17) |
| | 21:27 | 20:30 | 19:16 | 18:45 (15) | 18:03 | 16:04 |
| 20 | 05:00 | 05:52 | 06:47 | 18:27 (15) | 07:43 | 17:56 (17) |
| | 21:26 | 20:28 | 19:13 | 18:44 (15) | 18:01 | 16:02 |
| 21 | 05:01 | 05:54 | 06:49 | 18:29 (15) | 07:45 | 17:57 (17) |
| | 21:25 | 20:26 | 19:11 | 18:42 (15) | 17:58 | 16:01 |
| 22 | 05:03 | 05:56 | 06:51 | 18:31 (15) | 07:47 | 17:58 (17) |
| | 21:23 | 20:24 | 19:08 | 18:40 (15) | 17:56 | 16:00 |
| 23 | 05:04 | 05:58 | 06:53 | 07:49 | 17:59 (17) | 16:02 |
| | 21:22 | 20:21 | 19:06 | 17:54 | 16:46 (18) | 15:48 |
| 24 | 05:06 | 05:59 | 06:55 | 07:50 | 17:00 (18) | 15:50 |
| | 21:20 | 20:19 | 19:03 | 17:52 | 16:45 (18) | 15:47 |
| 25 | 05:07 | 06:01 | 06:56 | 06:52 | 17:01 (18) | 15:52 |
| | 21:19 | 20:17 | 19:01 | 16:50 | 16:44 (18) | 15:49 |
| 26 | 05:09 | 06:03 | 06:58 | 06:54 | 17:02 (18) | 15:54 |
| | 21:17 | 20:14 | 18:58 | 16:47 | 16:43 (18) | 15:51 |
| 27 | 05:11 | 06:05 | 07:00 | 06:56 | 17:03 (18) | 15:56 |
| | 21:16 | 20:12 | 18:56 | 16:45 | 16:42 (18) | 15:54 |
| 28 | 05:12 | 06:06 | 07:02 | 06:58 | 17:04 (18) | 15:59 |
| | 21:14 | 20:10 | 18:53 | 16:43 | 16:41 (18) | 15:53 |
| 29 | 05:14 | 06:08 | 07:04 | 17:50 (17) | 07:00 | 15:46 (18) |
| | 21:12 | 20:07 | 18:51 | 17:57 (17) | 16:41 | 15:52 |
| 30 | 05:16 | 06:10 | 07:06 | 17:47 (17) | 07:02 | 15:47 (18) |
| | 21:11 | 20:05 | 18:48 | 17:59 (17) | 16:39 | 15:50 (18) |
| 31 | 05:17 | 06:12 | 07:07 | 07:04 | 15:50 (18) | 15:51 |
| | 21:09 | 20:02 | 18:46 | 16:37 | 16:04 (18) | 15:52 |
| Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 |
| astr.max.mögl.Beschattung | | | 239 | 461 | 450 | 123 |
| Red.Sonnenscheinwahrsch. | | | 0.40 | 0.33 | 0.21 | 0.14 |
| Reduktion Betriebsdauer | | | 0.93 | 0.93 | 0.93 | 0.93 |
| Reduktion Windrichtung | | | 0.68 | 0.69 | 0.67 | 0.67 |
| Gesamte Reduktion | | | 0.25 | 0.21 | 0.13 | 0.08 |
| Met.wahrsch.Beschattung | | | 60 | 97 | 58 | 10 |

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) |

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: B - IO2

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | |
|----|---------------------------|----------------------|-----------------------|-----------------------|-----------------------|-------|-----|
| 1 | 08:26 | 07:56 | 15:18 (1) 06:58 | 06:42 | 18:42 (15) 05:33 | 04:43 | |
| | 15:55 | 16:46 | 17 15:35 (1) 17:43 | 19:41 | 20 19:02 (15) 20:37 | 21:28 | |
| 2 | 08:26 | 07:54 | 15:19 (1) 06:56 | 06:40 | 18:43 (15) 05:31 | 04:42 | |
| | 15:56 | 16:48 | 14 15:33 (1) 17:45 | 19:43 | 19 19:02 (15) 20:39 | 21:29 | |
| 3 | 08:26 | 07:52 | 15:22 (1) 06:53 | 06:37 | 18:43 (15) 05:29 | 04:41 | |
| | 15:57 | 16:50 | 9 15:31 (1) 17:46 | 19:45 | 17 19:00 (15) 20:41 | 21:30 | |
| 4 | 08:26 | 07:51 | 06:51 | 06:35 | 18:44 (15) 05:27 | 04:40 | |
| | 15:58 | 16:52 | 17:48 | 19:47 | 15 18:59 (15) 20:43 | 21:31 | |
| 5 | 08:25 | 07:49 | 06:49 | 5 17:18 (17) 06:33 | 18:45 (15) 05:25 | 04:39 | |
| | 16:00 | 16:54 | 17:50 | 11 17:23 (17) 19:49 | 18:56 (15) 05:23 | 21:32 | |
| 6 | 08:25 | 07:47 | 06:46 | 17:14 (17) 06:30 | 05:23 | 04:39 | |
| | 16:01 | 16:56 | 17:52 | 11 17:25 (17) 19:51 | 20:46 | 21:33 | |
| 7 | 08:25 | 07:45 | 06:44 | 15 17:12 (17) 06:28 | 05:21 | 04:38 | |
| | 16:02 | 16:58 | 17:54 | 15 17:27 (17) 19:53 | 20:48 | 21:34 | |
| 8 | 08:24 | 15:16 (1) 07:43 | 06:41 | 17:12 (17) 06:25 | 05:19 | 04:37 | |
| | 16:04 | 5 15:21 (1) 17:00 | 17:56 | 17 17:29 (17) 19:55 | 20:50 | 21:35 | |
| 9 | 08:23 | 15:14 (1) 07:41 | 06:39 | 17:10 (17) 06:23 | 05:17 | 04:37 | |
| | 16:05 | 9 15:23 (1) 17:02 | 17:58 | 19 17:29 (17) 19:56 | 20:52 | 21:36 | |
| 10 | 08:23 | 15:13 (1) 07:39 | 06:37 | 17:10 (17) 06:20 | 05:15 | 04:36 | |
| | 16:07 | 12 15:25 (1) 17:05 | 18:00 | 19 17:29 (17) 19:58 | 20:54 | 21:37 | |
| 11 | 08:22 | 15:13 (1) 07:37 | 06:34 | 17:09 (17) 06:18 | 05:13 | 04:36 | |
| | 16:08 | 15 15:28 (1) 17:07 | 18:02 | 20 17:29 (17) 20:00 | 20:55 | 21:38 | |
| 12 | 08:21 | 15:13 (1) 07:35 | 16:30 (18) 06:32 | 17:09 (17) 06:16 | 05:11 | 04:35 | |
| | 16:10 | 16 15:29 (1) 17:09 | 5 16:35 (18) 18:04 | 20 17:29 (17) 20:02 | 20:57 | 21:39 | |
| 13 | 08:21 | 15:12 (1) 07:33 | 16:26 (18) 06:29 | 17:09 (17) 06:13 | 05:09 | 04:35 | |
| | 16:11 | 18 15:30 (1) 17:11 | 12 16:38 (18) 18:06 | 19 17:28 (17) 20:04 | 20:59 | 21:40 | |
| 14 | 08:20 | 15:11 (1) 07:31 | 16:24 (18) 06:27 | 17:10 (17) 06:11 | 05:08 | 04:35 | |
| | 16:13 | 19 15:30 (1) 17:13 | 16 16:40 (18) 18:08 | 17 17:27 (17) 20:06 | 21:01 | 21:40 | |
| 15 | 08:19 | 15:11 (1) 07:29 | 16:23 (18) 06:24 | 17:10 (17) 06:09 | 05:06 | 04:34 | |
| | 16:15 | 20 15:31 (1) 17:15 | 18 16:41 (18) 18:10 | 16 17:26 (17) 20:08 | 21:02 | 21:41 | |
| 16 | 08:18 | 15:11 (1) 07:27 | 16:22 (18) 06:22 | 17:12 (17) 06:06 | 05:04 | 04:34 | |
| | 16:16 | 21 15:32 (1) 17:17 | 20 16:42 (18) 18:11 | 12 17:24 (17) 20:09 | 21:04 | 21:41 | |
| 17 | 08:17 | 15:11 (1) 07:25 | 16:22 (18) 06:19 | 17:14 (17) 06:04 | 05:03 | 04:34 | |
| | 16:18 | 23 15:34 (1) 17:19 | 21 16:43 (18) 18:13 | 6 17:20 (17) 20:11 | 21:06 | 21:42 | |
| 18 | 08:16 | 15:11 (1) 07:23 | 16:20 (18) 06:17 | 06:02 | 05:01 | 04:34 | |
| | 16:20 | 24 15:35 (1) 17:21 | 23 16:43 (18) 18:15 | 20:13 | 21:07 | 21:42 | |
| 19 | 08:15 | 15:11 (1) 07:21 | 16:20 (18) 06:15 | 05:59 | 04:59 | 04:34 | |
| | 16:22 | 24 15:35 (1) 17:23 | 23 16:43 (18) 18:17 | 20:15 | 21:09 | 21:43 | |
| 20 | 08:13 | 15:11 (1) 07:18 | 16:20 (18) 06:12 | 05:57 | 04:58 | 04:34 | |
| | 16:23 | 25 15:36 (1) 17:25 | 24 16:44 (18) 18:19 | 20:17 | 21:11 | 21:43 | |
| 21 | 08:12 | 15:11 (1) 07:16 | 16:20 (18) 06:10 | 05:55 | 04:56 | 04:34 | |
| | 16:25 | 25 15:36 (1) 17:27 | 23 16:43 (18) 18:21 | 20:19 | 21:12 | 21:43 | |
| 22 | 08:11 | 15:11 (1) 07:14 | 16:20 (18) 06:07 | 05:52 | 04:55 | 04:34 | |
| | 16:27 | 26 15:37 (1) 17:29 | 23 16:43 (18) 18:23 | 20:21 | 21:14 | 21:43 | |
| 23 | 08:10 | 15:11 (1) 07:12 | 16:21 (18) 06:05 | 05:50 | 04:53 | 04:35 | |
| | 16:29 | 25 15:36 (1) 17:31 | 22 16:43 (18) 18:25 | 20:23 | 21:15 | 21:44 | |
| 24 | 08:08 | 15:12 (1) 07:09 | 16:21 (18) 06:02 | 17:51 (15) 05:48 | 04:52 | 04:35 | |
| | 16:31 | 25 15:37 (1) 17:33 | 20 16:41 (18) 18:27 | 8 17:59 (15) 20:24 | 21:17 | 21:44 | |
| 25 | 08:07 | 15:12 (1) 07:07 | 16:22 (18) 06:00 | 17:47 (15) 05:46 | 04:51 | 04:35 | |
| | 16:33 | 25 15:37 (1) 17:35 | 18 16:40 (18) 18:28 | 14 18:01 (15) 20:26 | 21:18 | 21:44 | |
| 26 | 08:05 | 15:13 (1) 07:05 | 16:24 (18) 05:57 | 17:46 (15) 05:43 | 04:50 | 04:36 | |
| | 16:35 | 25 15:38 (1) 17:37 | 15 16:39 (18) 18:30 | 17 18:03 (15) 20:28 | 21:20 | 21:44 | |
| 27 | 08:04 | 15:13 (1) 07:03 | 16:25 (18) 05:55 | 17:44 (15) 05:41 | 04:48 | 04:36 | |
| | 16:37 | 24 15:37 (1) 17:39 | 11 16:36 (18) 18:32 | 19 18:03 (15) 20:30 | 21:21 | 21:44 | |
| 28 | 08:02 | 15:13 (1) 07:00 | 05:52 | 17:44 (15) 05:39 | 04:47 | 04:37 | |
| | 16:38 | 24 15:37 (1) 17:41 | 18:34 | 20 18:04 (15) 20:32 | 21:23 | 21:44 | |
| 29 | 08:01 | 15:14 (1) | 06:50 | 18:42 (15) 05:37 | 04:46 | 04:37 | |
| | 16:40 | 22 15:36 (1) | 19:36 | 21 19:03 (15) 20:34 | 21:24 | 21:43 | |
| 30 | 07:59 | 15:16 (1) | 06:47 | 18:42 (15) 05:35 | 04:45 | 04:38 | |
| | 16:42 | 21 15:37 (1) | 19:38 | 22 19:04 (15) 20:35 | 21:25 | 21:43 | |
| 31 | 07:58 | 15:16 (1) | 06:45 | 18:43 (15) | 04:44 | | |
| | 16:44 | 20 15:36 (1) | 19:40 | 21 19:04 (15) | 21:27 | | |
| | Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 |
| | astr.max.mögl.Beschattung | 493 | 334 | 338 | 82 | | |
| | Red.Sonnenscheinwahrsch. | 0.17 | 0.24 | 0.31 | 0.41 | | |
| | Reduktion Betriebsdauer | 0.93 | 0.93 | 0.93 | 0.93 | | |
| | Reduktion Windrichtung | 0.67 | 0.69 | 0.68 | 0.68 | | |
| | Gesamte Reduktion | 0.11 | 0.15 | 0.20 | 0.26 | | |
| | Met.wahrsch.Beschattung | 53 | 51 | 67 | 21 | | |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: B - IO2

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember | |
|----|---------------------------|----------------|----------------|---------------------|--------------------------|----------------|--------------------|
| 1 | 04:39 21:43 | 05:19 21:07 | 06:14 20:00 | 07:07 18:46 | 17:48 (17) 18:08 (17) | 07:06 16:35 | 08:01 15:50 |
| 2 | 04:39 21:42 | 05:21 21:05 | 06:15 19:58 | 07:09 18:43 | 17:48 (17) 18:08 (17) | 07:08 16:33 | 15 15:10 (1) |
| 3 | 04:40 21:42 | 05:22 21:03 | 06:17 19:55 | 07:11 18:41 | 17:48 (17) 18:08 (17) | 07:10 16:31 | 12 15:08 (1) |
| 4 | 04:41 21:41 | 05:24 21:02 | 06:19 19:53 | 07:13 18:39 | 17:47 (17) 18:06 (17) | 07:12 16:29 | 10 15:08 (1) |
| 5 | 04:42 21:41 | 05:26 21:00 | 06:21 19:50 | 07:15 18:36 | 17:47 (17) 18:05 (17) | 07:14 16:27 | 6 15:06 (1) |
| 6 | 04:43 21:40 | 05:27 20:58 | 06:23 19:48 | 07:16 18:34 | 17:48 (17) 18:04 (17) | 07:16 16:25 | 15:47 |
| 7 | 04:44 21:40 | 05:29 20:56 | 06:24 19:45 | 07:18 18:31 | 17:49 (17) 18:02 (17) | 07:18 16:23 | 15:46 |
| 8 | 04:45 21:39 | 05:31 20:54 | 06:26 19:43 | 07:20 18:29 | 17:51 (17) 18:00 (17) | 07:20 16:21 | 14:52 (1) 15:46 |
| 9 | 04:46 21:38 | 05:33 20:52 | 06:28 19:41 | 07:22 18:26 | 17:51 (17) 18:00 (17) | 07:22 16:20 | 14:50 (1) 15:45 |
| 10 | 04:47 21:37 | 05:34 20:50 | 06:30 19:38 | 07:24 18:24 | 17:51 (17) 18:00 (17) | 07:24 16:18 | 14:48 (1) 15:45 |
| 11 | 04:48 21:36 | 05:36 20:48 | 06:31 19:36 | 07:26 18:22 | 17:51 (17) 18:00 (17) | 07:26 16:16 | 14:47 (1) 15:45 |
| 12 | 04:49 21:35 | 05:38 20:46 | 06:33 19:33 | 07:28 18:19 | 17:51 (17) 18:00 (17) | 07:28 16:14 | 14:46 (1) 15:45 |
| 13 | 04:50 21:34 | 05:40 20:43 | 06:35 19:31 | 07:29 18:17 | 17:51 (17) 18:00 (17) | 07:29 16:13 | 14:46 (1) 15:45 |
| 14 | 04:52 21:33 | 05:41 20:41 | 06:37 19:28 | 07:31 18:15 | 17:01 (18) 17:07 (18) | 07:31 16:11 | 14:45 (1) 15:45 |
| 15 | 04:53 21:32 | 05:43 20:39 | 06:39 19:26 | 07:33 18:12 | 16:57 (18) 17:10 (18) | 07:33 16:09 | 14:46 (1) 15:45 |
| 16 | 04:54 21:31 | 05:45 20:37 | 06:40 19:23 | 07:35 18:10 | 16:55 (18) 17:12 (18) | 07:35 16:08 | 14:46 (1) 15:45 |
| 17 | 04:56 21:30 | 05:47 20:35 | 06:42 19:21 | 07:37 18:08 | 16:54 (18) 17:13 (18) | 07:37 16:06 | 14:46 (1) 15:45 |
| 18 | 04:57 21:29 | 05:49 20:33 | 06:44 19:18 | 07:39 18:05 | 16:53 (18) 17:14 (18) | 07:39 16:05 | 14:46 (1) 15:45 |
| 19 | 04:58 21:27 | 05:50 20:30 | 06:46 19:16 | 07:41 18:03 | 16:52 (18) 17:14 (18) | 07:41 16:04 | 14:46 (1) 15:45 |
| 20 | 05:00 21:26 | 05:52 20:28 | 06:47 19:13 | 07:43 18:01 | 16:51 (18) 17:14 (18) | 07:43 16:02 | 14:46 (1) 15:46 |
| 21 | 05:01 21:25 | 05:54 20:26 | 06:49 19:11 | 07:45 17:58 | 16:51 (18) 17:14 (18) | 07:44 16:01 | 14:47 (1) 15:46 |
| 22 | 05:03 21:23 | 05:56 20:24 | 06:51 19:08 | 07:47 17:56 | 16:51 (18) 17:14 (18) | 07:46 16:00 | 14:47 (1) 15:46 |
| 23 | 05:04 21:22 | 05:58 20:21 | 06:53 19:06 | 07:49 17:54 | 16:51 (18) 17:14 (18) | 07:48 15:58 | 14:48 (1) 15:47 |
| 24 | 05:06 21:20 | 05:59 20:19 | 06:55 19:03 | 07:50 17:52 | 16:51 (18) 17:13 (18) | 07:50 15:57 | 14:48 (1) 15:48 |
| 25 | 05:07 21:19 | 06:01 20:17 | 06:56 19:01 | 07:52 17:50 | 16:51 (18) 16:50 (18) | 07:52 15:56 | 14:49 (1) 15:48 |
| 26 | 05:09 21:17 | 06:03 20:14 | 06:58 18:58 | 07:54 17:47 | 16:52 (18) 16:12 (18) | 07:53 15:55 | 14:50 (1) 15:49 |
| 27 | 05:11 21:16 | 06:05 20:12 | 07:00 18:56 | 07:56 17:45 | 16:12 (18) 15:53 (18) | 15:55 15:55 | 15:12 (1) 15:50 |
| 28 | 05:12 21:14 | 06:06 20:10 | 07:02 18:53 | 07:58 18:06 (17) | 17:51 (17) 18:06 (17) | 07:57 16:43 | 14:51 (1) 15:51 |
| 29 | 05:14 21:12 | 06:08 20:07 | 07:04 18:51 | 07:00 18:07 (17) | 17:50 (17) 18:07 (17) | 07:58 16:41 | 14:52 (1) 15:51 |
| 30 | 05:16 21:11 | 06:10 20:05 | 07:06 18:48 | 07:02 18:07 (17) | 17:49 (17) 18:07 (17) | 07:02 16:39 | 14:54 (1) 15:52 |
| 31 | 05:17 21:09 | 06:12 20:02 | 07:07 18:46 | 07:04 16:37 | 16:37 (17) 16:37 | 07:04 16:37 | 15:53 232 |
| | Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 |
| | astr.max.mögl.Beschattung | | | 286 | 432 | 496 | 43 |
| | Red.Sonnenscheinwahrsch. | | | 0.40 | 0.33 | 0.21 | 0.14 |
| | Reduktion Betriebsdauer | | | 0.93 | 0.93 | 0.93 | 0.93 |
| | Reduktion Windrichtung | | | 0.68 | 0.69 | 0.67 | 0.67 |
| | Gesamte Reduktion | | | 0.25 | 0.21 | 0.13 | 0.08 |
| | Met.wahrsch.Beschattung | | | 72 | 91 | 64 | 4 |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: C - IO3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni |
|---------------------------|--------|----------------------|-----------------------|-----------------------|-----------------------|-------|
| 1 | 08:26 | 07:56 | 15:44 (1) 06:58 | 16:44 (18) 06:42 | 18:59 (15) 05:33 | 04:43 |
| | 15:55 | 16:46 | 23 16:07 (1) 17:43 | 22 17:06 (18) 19:41 | 16 19:15 (15) 20:37 | 21:28 |
| 2 | 08:26 | 07:54 | 15:44 (1) 06:56 | 16:43 (18) 06:40 | 18:58 (15) 05:31 | 04:42 |
| | 15:56 | 16:48 | 23 16:07 (1) 17:44 | 22 17:05 (18) 19:43 | 18 19:16 (15) 20:39 | 21:29 |
| 3 | 08:26 | 07:52 | 15:44 (1) 06:53 | 16:44 (18) 06:37 | 18:57 (15) 05:29 | 04:41 |
| | 15:57 | 16:50 | 24 16:08 (1) 17:46 | 21 17:05 (18) 19:45 | 19 19:16 (15) 20:41 | 21:30 |
| 4 | 08:26 | 07:51 | 15:43 (1) 06:51 | 16:43 (18) 06:35 | 18:57 (15) 05:27 | 04:40 |
| | 15:58 | 16:52 | 25 16:08 (1) 17:48 | 20 17:03 (18) 19:47 | 19 19:16 (15) 20:43 | 21:31 |
| 5 | 08:25 | 07:49 | 15:43 (1) 06:49 | 16:45 (18) 06:33 | 18:56 (15) 05:25 | 04:39 |
| | 16:00 | 16:54 | 25 16:08 (1) 17:50 | 18 17:03 (18) 19:49 | 19 19:15 (15) 20:45 | 21:32 |
| 6 | 08:25 | 07:47 | 15:44 (1) 06:46 | 16:45 (18) 06:30 | 18:56 (15) 05:23 | 04:39 |
| | 16:01 | 16:56 | 24 16:08 (1) 17:52 | 16 17:01 (18) 19:51 | 19 19:15 (15) 20:46 | 21:33 |
| 7 | 08:25 | 07:45 | 15:44 (1) 06:44 | 16:47 (18) 06:28 | 18:57 (15) 05:21 | 04:38 |
| | 16:02 | 16:58 | 24 16:08 (1) 17:54 | 12 16:59 (18) 19:53 | 18 19:15 (15) 20:48 | 21:34 |
| 8 | 08:24 | 07:43 | 15:44 (1) 06:41 | 16:51 (18) 06:25 | 18:57 (15) 05:19 | 04:37 |
| | 16:04 | 17:00 | 24 16:08 (1) 17:56 | 4 16:55 (18) 19:55 | 16 19:13 (15) 20:50 | 21:35 |
| 9 | 08:23 | 07:41 | 15:45 (1) 06:39 | 16:52 (18) 06:23 | 18:58 (15) 05:17 | 04:37 |
| | 16:05 | 17:02 | 23 16:08 (1) 17:58 | 14 19:12 (15) 20:52 | 19 19:12 (15) 20:52 | 21:36 |
| 10 | 08:23 | 07:39 | 15:46 (1) 06:37 | 16:50 (18) 06:20 | 18:59 (15) 05:15 | 04:36 |
| | 16:07 | 17:05 | 21 16:07 (1) 18:00 | 10 19:09 (15) 20:54 | 19 19:09 (15) 20:54 | 21:37 |
| 11 | 08:22 | 07:37 | 15:47 (1) 06:34 | 16:48 (18) 06:18 | 18:59 (15) 05:13 | 04:36 |
| | 16:08 | 17:07 | 19 16:06 (1) 18:02 | 20 20:00 | 05:13 | 21:38 |
| 12 | 08:21 | 07:35 | 15:49 (1) 06:32 | 17:33 (17) 06:16 | 18:59 (15) 05:11 | 04:35 |
| | 16:10 | 17:09 | 16 16:05 (1) 18:04 | 5 17:38 (17) 20:02 | 20 20:57 | 21:39 |
| 13 | 08:21 | 07:33 | 15:50 (1) 06:29 | 17:29 (17) 06:13 | 18:59 (15) 05:09 | 04:35 |
| | 16:11 | 17:11 | 12 16:02 (1) 18:06 | 10 17:39 (17) 20:04 | 20 20:59 | 21:40 |
| 14 | 08:20 | 07:31 | 15:53 (1) 06:27 | 17:28 (17) 06:11 | 18:59 (15) 05:08 | 04:35 |
| | 16:13 | 17:13 | 6 15:59 (1) 18:08 | 13 17:41 (17) 20:06 | 21 21:01 | 21:40 |
| 15 | 08:19 | 07:29 | 16:02 (1) 06:24 | 17:26 (17) 06:09 | 18:59 (15) 05:06 | 04:34 |
| | 16:15 | 17:15 | 18 18:10 | 17 17:43 (17) 20:08 | 21 21:02 | 21:41 |
| 16 | 08:18 | 07:27 | 16:02 (1) 06:22 | 17:26 (17) 06:06 | 18:59 (15) 05:04 | 04:34 |
| | 16:16 | 17:17 | 18 18:11 | 18 17:44 (17) 20:09 | 21 21:04 | 21:41 |
| 17 | 08:17 | 07:25 | 16:01 (1) 06:19 | 17:25 (17) 06:04 | 18:59 (15) 05:03 | 04:34 |
| | 16:18 | 17:19 | 18 18:13 | 18 17:43 (17) 20:11 | 21 21:06 | 21:42 |
| 18 | 08:16 | 07:23 | 16:01 (1) 06:17 | 17:25 (17) 06:02 | 18:59 (15) 05:01 | 04:34 |
| | 16:20 | 17:21 | 18 18:15 | 18 17:43 (17) 20:13 | 21 21:07 | 21:42 |
| 19 | 08:15 | 07:21 | 16:01 (1) 06:14 | 17:25 (17) 05:59 | 18:59 (15) 04:59 | 04:34 |
| | 16:22 | 17:23 | 17 18:17 | 17 17:42 (17) 20:15 | 21 21:09 | 21:43 |
| 20 | 08:13 | 07:18 | 16:01 (1) 06:12 | 17:25 (17) 05:57 | 18:59 (15) 04:58 | 04:34 |
| | 16:23 | 17:25 | 17 18:19 | 17 17:42 (17) 20:17 | 21 21:11 | 21:43 |
| 21 | 08:12 | 07:16 | 16:01 (1) 06:10 | 17:25 (17) 05:55 | 18:59 (15) 04:56 | 04:34 |
| | 16:25 | 17:27 | 15 18:21 | 15 17:40 (17) 20:19 | 21 21:12 | 21:43 |
| 22 | 08:11 | 07:14 | 16:52 (18) 06:07 | 17:27 (17) 05:52 | 18:59 (15) 04:55 | 04:34 |
| | 16:27 | 17:29 | 6 16:58 (18) 18:23 | 12 17:39 (17) 20:21 | 21 21:14 | 21:43 |
| 23 | 08:10 | 07:12 | 16:49 (18) 06:05 | 17:29 (17) 05:50 | 18:59 (15) 04:53 | 04:35 |
| | 16:29 | 17:31 | 12 17:01 (18) 18:25 | 6 17:35 (17) 20:22 | 21 21:15 | 21:44 |
| 24 | 08:08 | 07:09 | 16:47 (18) 06:02 | 17:29 (17) 05:48 | 18:59 (15) 04:52 | 04:35 |
| | 16:31 | 17:33 | 15 17:02 (18) 18:27 | 12 17:39 (17) 20:21 | 21 21:14 | 21:43 |
| 25 | 08:07 | 07:07 | 16:46 (18) 06:00 | 17:29 (17) 05:46 | 18:59 (15) 04:51 | 04:35 |
| | 16:33 | 17:35 | 18 17:04 (18) 18:28 | 12 17:39 (17) 20:21 | 21 21:14 | 21:43 |
| 26 | 08:05 | 15:51 (1) 07:05 | 16:45 (18) 05:57 | 17:29 (17) 05:44 | 18:59 (15) 04:49 | 04:36 |
| | 16:35 | 7 15:58 (1) 17:37 | 20 17:05 (18) 18:30 | 17 17:42 (17) 20:15 | 21 21:10 | 21:44 |
| 27 | 08:04 | 15:49 (1) 07:03 | 16:44 (18) 05:55 | 17:25 (17) 05:41 | 18:59 (15) 04:48 | 04:36 |
| | 16:37 | 11 16:00 (1) 17:39 | 21 17:05 (18) 18:32 | 17 17:42 (17) 20:17 | 21 21:11 | 21:43 |
| 28 | 08:02 | 15:47 (1) 07:00 | 16:44 (18) 05:52 | 17:25 (17) 05:39 | 18:59 (15) 04:47 | 04:37 |
| | 16:38 | 15 16:02 (1) 17:41 | 21 17:05 (18) 18:34 | 17 17:42 (17) 20:17 | 21 21:11 | 21:43 |
| 29 | 08:01 | 15:46 (1) 07:00 | 16:44 (18) 05:50 | 17:25 (17) 05:37 | 18:59 (15) 04:46 | 04:37 |
| | 16:40 | 17 16:03 (1) 17:41 | 21 17:05 (18) 18:34 | 17 17:42 (17) 20:17 | 21 21:11 | 21:43 |
| 30 | 07:59 | 15:46 (1) 07:00 | 16:44 (18) 05:47 | 19:03 (15) 05:35 | 18:59 (15) 04:45 | 04:38 |
| | 16:42 | 19 16:05 (1) 17:41 | 21 17:05 (18) 18:34 | 17 17:42 (17) 20:17 | 21 21:11 | 21:43 |
| 31 | 07:57 | 15:45 (1) 07:00 | 16:44 (18) 05:45 | 19:01 (15) 05:33 | 18:59 (15) 04:44 | 04:38 |
| | 16:44 | 21 16:06 (1) 17:41 | 21 17:05 (18) 18:34 | 17 17:42 (17) 20:17 | 21 21:11 | 21:43 |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 |
| astr.max.mögl.Beschattung | 90 | 402 | 321 | 168 | | |
| Red.Sonnenscheinwahrsch. | 0.17 | 0.24 | 0.31 | 0.41 | | |
| Reduktion Betriebsdauer | 0.93 | 0.93 | 0.93 | 0.93 | | |
| Reduktion Windrichtung | 0.69 | 0.69 | 0.69 | 0.67 | | |
| Gesamte Reduktion | 0.11 | 0.15 | 0.20 | 0.26 | | |
| Met.wahrsch.Beschattung | 10 | 61 | 64 | 43 | | |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: C - IO3
Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember |
|---------------------------|---------------|---------------|---------------|--------------------|--------------------------------|------------------------|
| 1 | 04:39 21:43 | 05:19 21:07 | 06:14 20:00 | 07:07 18:46 | 18:10 (17) 07:06 | 15:15 (1) 08:01 |
| 2 | 04:39 21:42 | 05:21 21:05 | 06:15 19:58 | 18:58 (15) 07:09 | 18:17 (17) 16:35 | 22 15:37 (1) 15:50 |
| 3 | 04:40 21:42 | 05:22 21:03 | 06:17 19:55 | 18:56 (15) 07:11 | 16:33 22 15:37 (1) 15:49 | |
| 4 | 04:41 21:41 | 05:24 21:02 | 06:19 19:53 | 18:54 (15) 07:13 | 16:31 24 15:38 (1) 15:49 | |
| 5 | 04:42 21:41 | 05:26 21:00 | 06:21 19:50 | 18:53 (15) 07:15 | 16:29 24 15:38 (1) 15:48 | |
| 6 | 04:43 21:40 | 05:27 20:58 | 06:23 19:48 | 18:52 (15) 07:16 | 16:27 25 15:38 (1) 15:47 | |
| 7 | 04:44 21:40 | 05:29 20:56 | 06:24 19:45 | 18:51 (15) 07:18 | 17:25 (18) 16:25 | 25 15:38 (1) 15:47 |
| 8 | 04:45 21:39 | 05:31 20:54 | 06:26 19:43 | 18:51 (15) 07:20 | 17:22 (18) 16:25 | 25 15:38 (1) 15:46 |
| 9 | 04:46 21:38 | 05:33 20:52 | 06:28 19:41 | 18:51 (15) 07:22 | 17:20 (18) 16:21 | 24 15:38 (1) 15:46 |
| 10 | 04:47 21:37 | 05:34 20:50 | 06:30 19:38 | 18:51 (15) 07:24 | 17:19 (18) 16:21 | 23 15:38 (1) 15:45 |
| 11 | 04:48 21:36 | 05:36 20:48 | 06:31 19:36 | 18:51 (15) 07:26 | 17:18 (18) 16:20 | 22 15:37 (1) 15:45 |
| 12 | 04:49 21:35 | 05:38 20:46 | 06:33 19:33 | 18:51 (15) 07:28 | 17:17 (18) 16:19 | 21 15:37 (1) 15:45 |
| 13 | 04:50 21:34 | 05:40 20:43 | 06:35 19:31 | 18:51 (15) 07:29 | 17:17 (18) 16:18 | 19 15:36 (1) 15:45 |
| 14 | 04:52 21:33 | 05:41 20:41 | 06:37 19:28 | 18:51 (15) 07:31 | 17:17 (18) 16:17 | 17 15:35 (1) 15:45 |
| 15 | 04:53 21:32 | 05:43 20:39 | 06:39 19:26 | 18:51 (15) 07:33 | 17:17 (18) 16:16 | 15 15:34 (1) 15:45 |
| 16 | 04:54 21:31 | 05:45 20:37 | 06:40 19:23 | 18:51 (15) 07:35 | 17:17 (18) 16:15 | 11 15:33 (1) 15:45 |
| 17 | 04:56 21:30 | 05:47 20:35 | 06:42 19:21 | 18:51 (15) 07:37 | 17:17 (18) 16:14 | 7 15:31 (1) 15:45 |
| 18 | 04:57 21:29 | 05:49 20:33 | 06:44 19:18 | 18:51 (15) 07:39 | 17:16 (18) 16:13 | 18 15:31 (1) 15:45 |
| 19 | 04:58 21:27 | 05:50 20:30 | 06:46 19:16 | 18:51 (15) 07:41 | 17:16 (18) 16:12 | 15 15:30 (1) 15:45 |
| 20 | 05:00 21:26 | 05:52 20:28 | 06:47 19:13 | 18:51 (15) 07:43 | 17:16 (18) 16:11 | 11 15:29 (1) 15:45 |
| 21 | 05:01 21:25 | 05:54 20:26 | 06:49 19:11 | 18:17 (17) 07:45 | 17:16 (18) 16:10 | 4 16:02 15:46 |
| 22 | 05:03 21:23 | 05:56 20:24 | 06:51 19:08 | 18:13 (17) 07:47 | 18:24 (17) 17:58 | 11 16:01 15:46 |
| 23 | 05:04 21:22 | 05:58 20:21 | 06:53 19:06 | 18:11 (17) 07:47 | 18:26 (17) 17:56 | 11 16:01 15:46 |
| 24 | 05:06 21:20 | 05:59 20:19 | 06:55 19:03 | 18:09 (17) 07:49 | 18:25 (17) 17:54 | 15 15:59 15:46 |
| 25 | 05:07 21:19 | 06:01 20:17 | 06:56 19:01 | 18:08 (17) 07:50 | 18:25 (17) 17:52 | 16 15:58 15:47 |
| 26 | 05:09 21:17 | 06:03 20:14 | 06:58 18:58 | 18:08 (17) 07:52 | 18:26 (17) 17:50 | 18 15:57 15:48 |
| 27 | 05:11 21:16 | 06:05 20:12 | 07:00 18:56 | 18:08 (17) 07:54 | 18:26 (17) 17:48 | 18 15:56 15:48 |
| 28 | 05:12 21:14 | 06:06 20:10 | 07:02 18:53 | 18:07 (17) 07:55 | 18:24 (17) 17:46 | 17 15:54 15:48 |
| 29 | 05:14 21:12 | 06:08 20:07 | 07:04 18:51 | 18:07 (17) 07:57 | 18:24 (17) 17:44 | 15 15:53 15:48 |
| 30 | 05:16 21:11 | 06:10 20:05 | 07:06 18:48 | 18:22 (17) 07:58 | 18:09 (17) 07:58 | 13 15:52 15:48 |
| 31 | 05:17 21:09 | 06:12 20:02 | 07:08 18:46 | 18:20 (17) 07:59 | 18:09 (17) 07:59 | 11 15:51 15:48 |
| Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 |
| astr.max.mögl.Beschattung | | | 351 | 316 | 326 | |
| Red.Sonnenscheinwahrsch. | | | 0.40 | 0.33 | 0.21 | |
| Reduktion Betriebsdauer | | | 0.93 | 0.93 | 0.93 | |
| Reduktion Windrichtung | | | 0.68 | 0.69 | 0.69 | |
| Gesamte Reduktion | | | 0.25 | 0.21 | 0.13 | |
| Met.wahrsch.Beschattung | | | 89 | 67 | 43 | |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: D - IO4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]

| Jan | Feb | Mär | Apr | Mai | Jun | Jul | Aug | Sep | Okt | Nov | Dez |
|------|------|------|------|------|------|------|------|------|------|------|------|
| 1.39 | 2.32 | 3.70 | 5.75 | 8.12 | 7.70 | 7.33 | 7.20 | 5.12 | 3.48 | 1.79 | 1.03 |

Betriebsdauer je Sektor

| N | NNO | ONO | O | OSO | SSO | S | SSW | WSW | W | WNW | NNW | Summe |
|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| 405 | 493 | 534 | 462 | 594 | 596 | 556 | 827 | 1,170 | 1,140 | 805 | 558 | 8,140 |

Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni |
|---------------------------|--------|-------------|---------------------|---------------------|---------------------|-------|
| 1 | 08:26 | 07:56 | 15:59 (1) 06:58 | 16:54 (18) 06:42 | 05:33 | 04:43 |
| | 15:55 | 16:46 | 12 16:11 (1) 17:43 | 19 17:13 (18) 19:41 | 20:37 | 21:28 |
| 2 | 08:26 | 07:54 | 15:57 (1) 06:56 | 16:53 (18) 06:40 | 19:11 (15) 05:31 | 04:42 |
| | 15:56 | 16:48 | 16 16:13 (1) 17:44 | 20 17:13 (18) 19:43 | 6 19:17 (15) 20:39 | 21:29 |
| 3 | 08:26 | 07:52 | 15:56 (1) 06:53 | 16:52 (18) 06:37 | 19:08 (15) 05:29 | 04:41 |
| | 15:57 | 16:50 | 18 16:14 (1) 17:46 | 22 17:14 (18) 19:45 | 10 19:18 (15) 20:41 | 21:30 |
| 4 | 08:26 | 07:51 | 15:55 (1) 06:51 | 16:51 (18) 06:35 | 19:06 (15) 05:27 | 04:40 |
| | 15:58 | 16:52 | 20 16:15 (1) 17:48 | 22 17:13 (18) 19:47 | 14 19:20 (15) 20:43 | 21:31 |
| 5 | 08:25 | 07:49 | 15:54 (1) 06:49 | 16:51 (18) 06:33 | 19:04 (15) 05:25 | 04:39 |
| | 16:00 | 16:54 | 22 16:16 (1) 17:50 | 22 17:13 (18) 19:49 | 17 19:21 (15) 20:45 | 21:32 |
| 6 | 08:25 | 07:47 | 15:54 (1) 06:46 | 16:51 (18) 06:30 | 19:04 (15) 05:23 | 04:39 |
| | 16:01 | 16:56 | 23 16:17 (1) 17:52 | 22 17:13 (18) 19:51 | 18 19:22 (15) 20:46 | 21:33 |
| 7 | 08:25 | 07:45 | 15:53 (1) 06:44 | 16:51 (18) 06:28 | 19:04 (15) 05:21 | 04:38 |
| | 16:02 | 16:58 | 24 16:17 (1) 17:54 | 21 17:12 (18) 19:53 | 19 19:23 (15) 20:48 | 21:34 |
| 8 | 08:24 | 07:43 | 15:53 (1) 06:41 | 16:52 (18) 06:25 | 19:03 (15) 05:19 | 04:37 |
| | 16:04 | 17:00 | 25 16:18 (1) 17:56 | 20 17:12 (18) 19:55 | 19 19:22 (15) 20:50 | 21:35 |
| 9 | 08:23 | 07:41 | 15:53 (1) 06:39 | 16:52 (18) 06:23 | 19:03 (15) 05:17 | 04:37 |
| | 16:05 | 17:02 | 25 16:18 (1) 17:58 | 18 17:10 (18) 19:56 | 19 19:22 (15) 20:52 | 21:36 |
| 10 | 08:23 | 07:39 | 15:53 (1) 06:37 | 16:54 (18) 06:20 | 19:02 (15) 05:15 | 04:36 |
| | 16:07 | 17:05 | 25 16:18 (1) 18:00 | 15 17:09 (18) 19:58 | 18 19:20 (15) 20:54 | 21:37 |
| 11 | 08:22 | 07:37 | 15:54 (1) 06:34 | 16:55 (18) 06:18 | 19:03 (15) 05:13 | 04:36 |
| | 16:08 | 17:07 | 24 16:18 (1) 18:02 | 12 17:07 (18) 20:00 | 17 19:20 (15) 20:55 | 21:38 |
| 12 | 08:21 | 07:35 | 15:54 (1) 06:32 | 06:16 | 19:04 (15) 05:11 | 04:35 |
| | 16:10 | 17:09 | 24 16:18 (1) 18:04 | 20:02 | 15 19:19 (15) 20:57 | 21:39 |
| 13 | 08:21 | 07:33 | 15:54 (1) 06:29 | 06:13 | 19:05 (15) 05:09 | 04:35 |
| | 16:11 | 17:11 | 23 16:17 (1) 18:06 | 20:04 | 11 19:16 (15) 20:59 | 21:40 |
| 14 | 08:20 | 07:31 | 15:55 (1) 06:27 | 06:11 | 19:08 (15) 05:08 | 04:35 |
| | 16:13 | 17:13 | 21 16:16 (1) 18:08 | 20:06 | 6 19:14 (15) 21:01 | 21:40 |
| 15 | 08:19 | 07:29 | 15:56 (1) 06:24 | 17:41 (17) 06:09 | 05:06 | 04:34 |
| | 16:15 | 17:15 | 20 16:16 (1) 18:10 | 2 17:43 (17) 20:08 | 21:02 | 21:41 |
| 16 | 08:18 | 07:27 | 15:57 (1) 06:22 | 17:37 (17) 06:06 | 05:04 | 04:34 |
| | 16:16 | 17:17 | 18 16:15 (1) 18:11 | 8 17:45 (17) 20:09 | 21:04 | 21:41 |
| 17 | 08:17 | 07:25 | 15:59 (1) 06:19 | 17:34 (17) 06:04 | 05:03 | 04:34 |
| | 16:18 | 17:19 | 14 16:13 (1) 18:13 | 13 17:47 (17) 20:11 | 21:06 | 21:42 |
| 18 | 08:16 | 07:23 | 16:01 (1) 06:17 | 17:34 (17) 06:02 | 05:01 | 04:34 |
| | 16:20 | 17:21 | 9 16:10 (1) 18:15 | 15 17:49 (17) 20:13 | 21:07 | 21:42 |
| 19 | 08:15 | 07:21 | 06:14 | 17:32 (17) 05:59 | 04:59 | 04:34 |
| | 16:22 | 17:23 | 18:17 | 18 17:50 (17) 20:15 | 21:09 | 21:43 |
| 20 | 08:13 | 07:18 | 06:12 | 17:32 (17) 05:57 | 04:58 | 04:34 |
| | 16:23 | 17:25 | 18:19 | 18 17:50 (17) 20:17 | 21:11 | 21:43 |
| 21 | 08:12 | 07:16 | 06:10 | 17:31 (17) 05:55 | 04:56 | 04:34 |
| | 16:25 | 17:27 | 18:21 | 18 17:49 (17) 20:19 | 21:12 | 21:43 |
| 22 | 08:11 | 07:14 | 06:07 | 17:31 (17) 05:52 | 04:55 | 04:34 |
| | 16:27 | 17:29 | 18:23 | 18 17:49 (17) 20:21 | 21:14 | 21:43 |
| 23 | 08:10 | 07:12 | 06:05 | 17:31 (17) 05:50 | 04:53 | 04:35 |
| | 16:29 | 17:31 | 18:25 | 17 17:48 (17) 20:22 | 21:15 | 21:44 |
| 24 | 08:08 | 07:09 | 06:02 | 17:32 (17) 05:48 | 04:52 | 04:35 |
| | 16:31 | 17:33 | 18:27 | 15 17:47 (17) 20:24 | 21:17 | 21:44 |
| 25 | 08:07 | 07:07 | 06:00 | 17:33 (17) 05:46 | 04:51 | 04:35 |
| | 16:33 | 17:35 | 18:28 | 12 17:45 (17) 20:26 | 21:18 | 21:44 |
| 26 | 08:05 | 07:05 | 17:01 (18) 05:57 | 8 17:35 (17) 05:43 | 04:50 | 04:36 |
| | 16:35 | 17:37 | 5 17:06 (18) 18:30 | 8 17:43 (17) 20:28 | 21:20 | 21:44 |
| 27 | 08:04 | 07:03 | 16:57 (18) 05:55 | 05:41 | 04:48 | 04:36 |
| | 16:37 | 17:39 | 12 17:09 (18) 18:32 | 20:30 | 21:21 | 21:44 |
| 28 | 08:02 | 07:00 | 16:55 (18) 05:52 | 05:39 | 04:47 | 04:37 |
| | 16:38 | 17:41 | 16 17:11 (18) 18:34 | 20:32 | 21:22 | 21:43 |
| 29 | 08:01 | | 06:50 | 05:37 | 04:46 | 04:37 |
| | 16:40 | | 19:36 | 20:34 | 21:24 | 21:43 |
| 30 | 07:59 | | 06:47 | 05:35 | 04:45 | 04:38 |
| | 16:42 | | 19:38 | 20:35 | 21:25 | 21:43 |
| 31 | 07:57 | 16:02 (1) | 06:45 | | 04:44 | |
| | 16:44 | 6 16:08 (1) | 19:40 | | 21:26 | |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 |
| astr.max.mögl.Beschattung | 6 | 396 | 375 | 189 | | |
| Red.Sonnenscheinwahrsch. | 0.17 | 0.24 | 0.31 | 0.41 | | |
| Reduktion Betriebsdauer | 0.93 | 0.93 | 0.93 | 0.93 | | |
| Reduktion Windrichtung | 0.69 | 0.69 | 0.68 | 0.66 | | |
| Gesamte Reduktion | 0.11 | 0.15 | 0.20 | 0.25 | | |
| Met.wahrsch.Beschattung | 1 | 61 | 75 | 48 | | |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: D - IO4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember |
|---------------------------|-------|--------|---------------------|---------------------|---------------------|--------------------|
| 1 | 04:39 | 05:19 | 06:14 | 19:02 (15) 07:07 | 07:06 | 15:23 (1) 08:01 |
| | 21:43 | 21:07 | 20:00 | 17 19:19 (15) 18:46 | 16:35 | 25 15:48 (1) 15:50 |
| 2 | 04:39 | 05:21 | 06:15 | 19:01 (15) 07:09 | 17:35 (18) 07:08 | 15:23 (1) 08:03 |
| | 21:42 | 21:05 | 19:58 | 18 19:19 (15) 18:43 | 9 17:44 (18) 16:33 | 25 15:48 (1) 15:49 |
| 3 | 04:40 | 05:22 | 06:17 | 19:01 (15) 07:11 | 17:33 (18) 07:10 | 15:23 (1) 08:05 |
| | 21:42 | 21:03 | 19:55 | 19 19:20 (15) 18:41 | 14 17:47 (18) 16:31 | 24 15:47 (1) 15:49 |
| 4 | 04:41 | 05:24 | 06:19 | 19:00 (15) 07:13 | 17:30 (18) 07:12 | 15:23 (1) 08:06 |
| | 21:41 | 21:02 | 19:53 | 19 19:19 (15) 18:39 | 17 17:47 (18) 16:29 | 24 15:47 (1) 15:48 |
| 5 | 04:42 | 05:26 | 06:21 | 19:00 (15) 07:15 | 17:29 (18) 07:14 | 15:23 (1) 08:07 |
| | 21:41 | 21:00 | 19:50 | 19 19:19 (15) 18:36 | 19 17:48 (18) 16:27 | 23 15:46 (1) 15:47 |
| 6 | 04:43 | 05:27 | 06:23 | 19:00 (15) 07:16 | 17:28 (18) 07:16 | 15:24 (1) 08:09 |
| | 21:40 | 20:58 | 19:48 | 18 19:18 (15) 18:34 | 20 17:48 (18) 16:25 | 22 15:46 (1) 15:47 |
| 7 | 04:44 | 05:29 | 06:24 | 18:59 (15) 07:18 | 17:27 (18) 07:18 | 15:26 (1) 08:10 |
| | 21:40 | 20:56 | 19:45 | 18 19:17 (15) 18:31 | 22 17:49 (18) 16:23 | 20 15:46 (1) 15:46 |
| 8 | 04:45 | 05:31 | 06:26 | 19:00 (15) 07:20 | 17:27 (18) 07:20 | 15:27 (1) 08:11 |
| | 21:39 | 20:54 | 19:43 | 15 19:15 (15) 18:29 | 22 17:49 (18) 16:21 | 18 15:45 (1) 15:46 |
| 9 | 04:46 | 05:33 | 06:28 | 19:02 (15) 07:22 | 17:26 (18) 07:22 | 15:28 (1) 08:13 |
| | 21:38 | 20:52 | 19:41 | 10 19:12 (15) 18:26 | 22 17:48 (18) 16:20 | 15 15:43 (1) 15:45 |
| 10 | 04:47 | 05:34 | 06:30 | 19:04 (15) 07:24 | 17:26 (18) 07:24 | 15:30 (1) 08:14 |
| | 21:37 | 20:50 | 19:38 | 6 19:10 (15) 18:24 | 22 17:48 (18) 16:18 | 11 15:41 (1) 15:45 |
| 11 | 04:48 | 05:36 | 06:31 | 07:26 | 17:27 (18) 07:26 | 15:33 (1) 08:15 |
| | 21:36 | 20:48 | 19:36 | 18:22 | 20 17:47 (18) 16:16 | 5 15:38 (1) 15:45 |
| 12 | 04:49 | 05:38 | 06:33 | 07:28 | 17:27 (18) 07:27 | 15:46 |
| | 21:35 | 20:46 | 19:33 | 18:19 | 19 17:46 (18) 16:14 | 15:45 |
| 13 | 04:50 | 05:40 | 06:35 | 07:29 | 17:28 (18) 07:29 | 15:47 |
| | 21:34 | 20:43 | 19:31 | 18:17 | 17 17:45 (18) 16:13 | 15:45 |
| 14 | 04:52 | 05:41 | 06:37 | 07:31 | 17:29 (18) 07:31 | 15:48 |
| | 21:33 | 20:41 | 19:28 | 18:14 | 15 17:44 (18) 16:11 | 15:45 |
| 15 | 04:53 | 05:43 | 06:39 | 07:33 | 17:31 (18) 07:33 | 15:49 |
| | 21:32 | 20:39 | 19:26 | 18:12 | 10 17:41 (18) 16:09 | 15:45 |
| 16 | 04:54 | 05:45 | 06:40 | 07:35 | 16:08 | 07:35 |
| | 21:31 | 20:37 | 19:23 | 18:10 | 16:08 | 15:45 |
| 17 | 04:56 | 05:47 | 06:42 | 18:24 (17) 07:37 | 07:37 | 08:21 |
| | 21:30 | 20:35 | 19:21 | 7 18:31 (17) 18:08 | 16:06 | 15:45 |
| 18 | 04:57 | 05:49 | 06:44 | 18:20 (17) 07:39 | 07:39 | 08:22 |
| | 21:29 | 20:33 | 19:18 | 12 18:32 (17) 18:05 | 16:05 | 15:45 |
| 19 | 04:58 | 05:50 | 06:46 | 18:19 (17) 07:41 | 16:04 | 07:41 |
| | 21:27 | 20:30 | 19:16 | 15 18:34 (17) 18:03 | 16:04 | 15:45 |
| 20 | 05:00 | 05:52 | 06:47 | 18:18 (17) 07:43 | 07:43 | 08:23 |
| | 21:26 | 20:28 | 19:13 | 16 18:34 (17) 18:01 | 16:02 | 15:46 |
| 21 | 05:01 | 05:54 | 06:49 | 18:17 (17) 07:45 | 07:44 | 08:24 |
| | 21:25 | 20:26 | 19:11 | 18 18:35 (17) 17:58 | 16:01 | 15:46 |
| 22 | 05:03 | 05:56 | 06:51 | 18:17 (17) 07:47 | 07:46 | 08:24 |
| | 21:23 | 20:24 | 19:08 | 18 18:35 (17) 17:56 | 16:00 | 15:46 |
| 23 | 05:04 | 05:58 | 06:53 | 18:15 (17) 07:49 | 07:48 | 08:25 |
| | 21:22 | 20:21 | 19:06 | 19 18:34 (17) 17:54 | 15:58 | 15:47 |
| 24 | 05:06 | 05:59 | 06:55 | 18:16 (17) 07:50 | 16:31 (1) 07:50 | 08:25 |
| | 21:20 | 20:19 | 19:03 | 17 18:33 (17) 17:52 | 10 16:41 (1) 15:57 | 15:48 |
| 25 | 05:07 | 06:01 | 06:56 | 18:16 (17) 06:52 | 15:28 (1) 07:52 | 08:26 |
| | 21:19 | 20:17 | 19:01 | 16 18:32 (17) 16:50 | 15 15:43 (1) 15:56 | 15:48 |
| 26 | 05:09 | 06:03 | 06:58 | 18:17 (17) 06:54 | 15:26 (1) 07:53 | 08:26 |
| | 21:17 | 20:14 | 18:58 | 13 18:30 (17) 16:47 | 19 15:45 (1) 15:55 | 15:49 |
| 27 | 05:11 | 06:05 | 07:00 | 18:18 (17) 06:56 | 15:25 (1) 07:55 | 08:26 |
| | 21:16 | 20:12 | 18:56 | 10 18:28 (17) 16:45 | 20 15:45 (1) 15:54 | 15:50 |
| 28 | 05:12 | 06:06 | 07:02 | 18:19 (17) 06:58 | 15:24 (1) 07:57 | 08:26 |
| | 21:14 | 20:10 | 18:53 | 5 18:24 (17) 16:43 | 22 15:46 (1) 15:53 | 15:51 |
| 29 | 05:14 | 06:08 | 19:08 (15) 07:04 | 07:00 | 15:23 (1) 07:58 | 08:26 |
| | 21:12 | 20:07 | 7 19:15 (15) 18:51 | 16:41 | 24 15:47 (1) 15:52 | 15:51 |
| 30 | 05:16 | 06:10 | 19:06 (15) 07:05 | 07:02 | 15:23 (1) 08:00 | 08:26 |
| | 21:11 | 20:05 | 11 19:17 (15) 18:48 | 16:39 | 24 15:47 (1) 15:51 | 15:52 |
| 31 | 05:17 | 06:12 | 19:03 (15) 07:04 | 07:04 | 15:23 (1) 07:57 | 08:26 |
| | 21:09 | 20:02 | 15 19:18 (15) 16:37 | 25 15:48 (1) 15:53 | | 15:53 |
| Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 |
| astr.max.mögl.Beschattung | | 33 | 325 | 407 | 212 | |
| Red.Sonnenscheinwahrsch. | | 0.48 | 0.40 | 0.33 | 0.21 | |
| Reduktion Betriebsdauer | | 0.93 | 0.93 | 0.93 | 0.93 | |
| Reduktion Windrichtung | | 0.66 | 0.67 | 0.69 | 0.69 | |
| Gesamte Reduktion | | 0.30 | 0.25 | 0.21 | 0.13 | |
| Met.wahrsch.Beschattung | | 10 | 62 | 86 | 28 | |

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 | Schattenende | (WEA mit erstem Schatten) | (WEA mit letztem Schatten) |
|--------------|-----------------------|-------------------------|----------------------|-------------------|----------------|--------------|---------------------------|----------------------------|
|--------------|-----------------------|-------------------------|----------------------|-------------------|----------------|--------------|---------------------------|----------------------------|

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: E - IOS

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]

| | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan | Feb | Mär | Apr | Mai | Jun | Jul | Aug | Sep | Okt | Nov | Dez |
| 1.39 | 2.32 | 3.70 | 5.75 | 8.12 | 7.70 | 7.33 | 7.20 | 5.12 | 3.48 | 1.79 | 1.03 |

Betriebsdauer je Sektor

| | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N | NNO | ONO | O | OSO | SSO | S | SSW | WSW | W | WNW | NNW | Summe |
| 405 | 493 | 534 | 462 | 594 | 596 | 556 | 827 | 1,170 | 1,140 | 805 | 558 | 8,140 |

Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni |
|---------------------------|---------------|---------------|-------------------|--------------------|------------|-------|
| 1 | 08:26 15:55 | 07:56 16:46 | 16:02 (1) 06:58 | 16:56 (18) 06:42 | 05:33 | 04:43 |
| 2 | 08:26 15:56 | 07:54 16:48 | 16:00 (1) 06:56 | 17:13 (18) 19:41 | 20:37 | 21:28 |
| 3 | 08:26 15:57 | 07:52 16:50 | 15:58 (1) 06:53 | 16:54 (18) 06:40 | 05:31 | 04:42 |
| 4 | 08:26 15:58 | 07:51 16:52 | 16:15 (1) 06:51 | 17:14 (18) 19:43 | 20:39 | 21:29 |
| 5 | 08:25 16:00 | 07:49 16:54 | 15:56 (1) 06:49 | 16:54 (18) 06:37 | 19:09 (15) | 05:29 |
| 6 | 08:25 16:01 | 07:47 16:56 | 16:17 (1) 06:50 | 16:53 (18) 06:35 | 19:18 (15) | 05:27 |
| 7 | 08:25 16:02 | 07:45 16:58 | 16:18 (1) 06:52 | 17:14 (18) 19:47 | 19:20 (15) | 20:43 |
| 8 | 08:24 16:04 | 07:43 17:00 | 15:55 (1) 06:41 | 16:53 (18) 06:33 | 19:06 (15) | 05:25 |
| 9 | 08:23 16:05 | 07:41 17:02 | 16:19 (1) 06:56 | 17:15 (18) 19:49 | 19:21 (15) | 20:45 |
| 10 | 08:23 16:07 | 07:39 17:05 | 15:55 (1) 06:39 | 16:52 (18) 06:30 | 19:05 (15) | 05:23 |
| 11 | 08:22 16:08 | 07:37 17:07 | 16:20 (1) 06:37 | 17:14 (18) 19:51 | 18:23 (15) | 20:46 |
| 12 | 08:21 16:10 | 07:35 17:09 | 15:55 (1) 06:32 | 16:52 (18) 06:28 | 19:05 (15) | 05:21 |
| 13 | 08:21 16:11 | 07:33 17:11 | 16:19 (1) 06:50 | 17:14 (18) 19:53 | 18:23 (15) | 20:48 |
| 14 | 08:20 16:13 | 07:31 17:13 | 15:56 (1) 06:27 | 16:53 (18) 06:25 | 19:04 (15) | 05:19 |
| 15 | 08:19 16:15 | 07:29 17:15 | 16:18 (1) 06:24 | 17:14 (18) 19:55 | 19:23 (15) | 20:50 |
| 16 | 08:18 16:16 | 07:27 17:17 | 15:57 (1) 06:22 | 16:53 (18) 06:23 | 19:04 (15) | 05:17 |
| 17 | 08:17 16:18 | 07:25 17:19 | 16:20 (1) 06:20 | 17:12 (18) 19:56 | 19:23 (15) | 20:52 |
| 18 | 08:16 16:20 | 07:23 17:21 | 15:55 (1) 06:17 | 16:54 (18) 06:20 | 19:03 (15) | 05:15 |
| 19 | 08:15 16:22 | 07:21 17:23 | 16:20 (1) 06:14 | 17:11 (18) 19:58 | 18:21 (15) | 20:54 |
| 20 | 08:13 16:23 | 07:18 17:25 | 15:55 (1) 06:11 | 16:55 (18) 06:18 | 19:04 (15) | 05:13 |
| 21 | 08:12 16:25 | 07:16 17:27 | 16:20 (1) 06:10 | 17:09 (18) 20:00 | 19:21 (15) | 20:55 |
| 22 | 08:11 16:27 | 07:14 17:29 | 15:55 (1) 06:07 | 16:58 (18) 06:16 | 19:05 (15) | 05:11 |
| 23 | 08:10 16:29 | 07:12 17:31 | 16:20 (1) 06:05 | 17:06 (18) 20:02 | 19:20 (15) | 20:57 |
| 24 | 08:08 16:31 | 07:09 17:33 | 16:19 (1) 06:02 | 17:39 (17) 06:06 | 19:05 (15) | 05:09 |
| 25 | 08:07 16:33 | 07:07 17:35 | 16:18 (1) 06:00 | 17:45 (17) 20:09 | 19:18 (15) | 20:59 |
| 26 | 08:05 16:35 | 07:05 17:37 | 15:58 (1) 06:22 | 17:36 (17) 06:04 | 19:07 (15) | 05:08 |
| 27 | 08:04 16:37 | 07:03 17:39 | 16:17 (1) 06:19 | 17:47 (17) 20:11 | 19:16 (15) | 21:01 |
| 28 | 08:02 16:38 | 07:00 17:41 | 16:16 (1) 06:17 | 17:35 (17) 06:02 | 20:06 | 05:06 |
| 29 | 08:01 16:40 | 06:58 17:43 | 16:15 (1) 06:15 | 17:49 (17) 20:13 | 21:02 | 21:41 |
| 30 | 07:59 16:42 | 06:56 17:45 | 16:09 (1) 06:12 | 17:33 (17) 05:59 | 21:04 | 21:41 |
| 31 | 07:57 16:44 | 06:54 17:47 | 16:08 (1) 06:10 | 17:51 (17) 20:17 | 21:06 | 21:42 |
| Sonneneinstrahlung | 249 | 273 | 367 | 420 | 495 | 511 |
| astr.max.mögl.Beschattung | | 390 | 385 | 182 | | |
| Red.Sonneneinstrahlung | | 0.24 | 0.31 | 0.41 | | |
| Reduktion Betriebsdauer | | 0.93 | 0.93 | 0.93 | | |
| Reduktion Windrichtung | | 0.69 | 0.68 | 0.66 | | |
| Gesamte Reduktion | | 0.15 | 0.20 | 0.25 | | |
| Met.wahrsch.Beschattung | | 60 | 77 | 46 | | |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: E - IOS

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember |
|---------------------------|-------|--------|---------------------|---------------------|---------------------|---------------------------------------|
| 1 | 04:39 | 05:19 | 06:14 | 19:03 (15) 07:07 | 17:39 (18) 07:06 | 15:25 (1) 08:01 |
| | 21:43 | 21:07 | 20:00 | 17 | 19:20 (15) 18:46 | 4 17:43 (18) 16:35 24 15:49 (1) 15:50 |
| 2 | 04:39 | 05:21 | 06:15 | 19:02 (15) 07:09 | 17:35 (18) 07:08 | 15:24 (1) 08:03 |
| | 21:42 | 21:05 | 19:58 | 18 19:20 (15) 18:43 | 12 17:47 (18) 16:33 | 25 15:49 (1) 15:49 |
| 3 | 04:40 | 05:22 | 06:17 | 19:02 (15) 07:11 | 17:33 (18) 07:10 | 15:25 (1) 08:04 |
| | 21:42 | 21:03 | 19:55 | 19 19:21 (15) 18:41 | 16 17:49 (18) 16:31 | 24 15:49 (1) 15:49 |
| 4 | 04:41 | 05:24 | 06:19 | 19:01 (15) 07:13 | 17:31 (18) 07:12 | 15:25 (1) 08:06 |
| | 21:41 | 21:02 | 19:53 | 19 19:20 (15) 18:39 | 18 17:49 (18) 16:29 | 23 15:48 (1) 15:48 |
| 5 | 04:42 | 05:26 | 06:21 | 19:01 (15) 07:15 | 17:29 (18) 07:14 | 15:25 (1) 08:07 |
| | 21:41 | 21:00 | 19:50 | 18 19:19 (15) 18:36 | 20 17:49 (18) 16:27 | 22 15:47 (1) 15:47 |
| 6 | 04:43 | 05:27 | 06:23 | 19:01 (15) 07:16 | 17:29 (18) 07:16 | 15:26 (1) 08:09 |
| | 21:40 | 20:58 | 19:48 | 18 19:19 (15) 18:34 | 21 17:50 (18) 16:25 | 21 15:47 (1) 15:47 |
| 7 | 04:44 | 05:29 | 06:24 | 19:01 (15) 07:18 | 17:28 (18) 07:18 | 15:28 (1) 08:10 |
| | 21:40 | 20:56 | 19:45 | 16 19:17 (15) 18:31 | 22 17:50 (18) 16:23 | 19 15:47 (1) 15:46 |
| 8 | 04:45 | 05:31 | 06:26 | 19:02 (15) 07:20 | 17:28 (18) 07:20 | 15:29 (1) 08:11 |
| | 21:39 | 20:54 | 19:43 | 13 19:15 (15) 18:29 | 22 17:50 (18) 16:21 | 16 15:45 (1) 15:46 |
| 9 | 04:46 | 05:33 | 06:28 | 19:03 (15) 07:22 | 17:28 (18) 07:22 | 15:31 (1) 08:13 |
| | 21:38 | 20:52 | 19:41 | 9 19:12 (15) 18:26 | 22 17:50 (18) 16:20 | 13 15:44 (1) 15:45 |
| 10 | 04:47 | 05:34 | 06:30 | 19:07 (15) 07:24 | 17:28 (18) 07:24 | 15:34 (1) 08:14 |
| | 21:37 | 20:50 | 19:38 | 3 19:10 (15) 18:24 | 21 17:49 (18) 16:18 | 7 15:41 (1) 15:45 |
| 11 | 04:48 | 05:36 | 06:31 | 07:26 | 17:28 (18) 07:26 | 08:15 |
| | 21:36 | 20:48 | 19:36 | 07:26 | 20 17:48 (18) 16:16 | 15:45 |
| 12 | 04:49 | 05:38 | 06:33 | 07:28 | 17:29 (18) 07:27 | 08:16 |
| | 21:35 | 20:46 | 19:33 | 18 18:19 | 17:47 (18) 16:14 | 15:45 |
| 13 | 04:50 | 05:40 | 06:35 | 07:29 | 17:30 (18) 07:29 | 08:17 |
| | 21:34 | 20:43 | 19:31 | 16 18:17 | 17:46 (18) 16:13 | 15:45 |
| 14 | 04:52 | 05:41 | 06:37 | 07:31 | 17:31 (18) 07:31 | 08:18 |
| | 21:33 | 20:41 | 19:28 | 13 18:14 | 17:44 (18) 16:11 | 15:45 |
| 15 | 04:53 | 05:43 | 06:39 | 07:33 | 17:34 (18) 07:33 | 08:19 |
| | 21:32 | 20:39 | 19:26 | 6 18:12 | 17:40 (18) 16:09 | 15:45 |
| 16 | 04:54 | 05:45 | 06:40 | 07:35 | 07:35 | 08:20 |
| | 21:31 | 20:37 | 19:23 | 18:10 | 16:08 | 15:45 |
| 17 | 04:56 | 05:47 | 06:42 | 18:24 (17) 07:37 | 07:37 | 08:21 |
| | 21:30 | 20:35 | 19:21 | 9 18:33 (17) 18:08 | 16:06 | 15:45 |
| 18 | 04:57 | 05:49 | 06:44 | 18:21 (17) 07:39 | 07:39 | 08:22 |
| | 21:29 | 20:33 | 19:18 | 13 18:34 (17) 18:05 | 16:05 | 15:45 |
| 19 | 04:58 | 05:50 | 06:46 | 18:19 (17) 07:41 | 07:41 | 08:22 |
| | 21:27 | 20:30 | 19:16 | 16 18:35 (17) 18:03 | 16:04 | 15:45 |
| 20 | 05:00 | 05:52 | 06:47 | 18:18 (17) 07:43 | 07:43 | 08:23 |
| | 21:26 | 20:28 | 19:13 | 18 18:36 (17) 18:01 | 16:02 | 15:46 |
| 21 | 05:01 | 05:54 | 06:49 | 18:18 (17) 07:45 | 07:44 | 08:24 |
| | 21:25 | 20:26 | 19:11 | 18 18:36 (17) 17:58 | 16:01 | 15:46 |
| 22 | 05:03 | 05:56 | 06:51 | 18:18 (17) 07:47 | 07:46 | 08:24 |
| | 21:23 | 20:24 | 19:08 | 18 18:36 (17) 17:56 | 16:00 | 15:46 |
| 23 | 05:04 | 05:58 | 06:53 | 18:17 (17) 07:49 | 16:34 (1) 07:48 | 08:25 |
| | 21:22 | 20:21 | 19:06 | 18 18:35 (17) 17:54 | 7 16:41 (1) 15:58 | 15:47 |
| 24 | 05:06 | 05:59 | 06:55 | 18:17 (17) 07:50 | 16:31 (1) 07:50 | 08:25 |
| | 21:20 | 20:19 | 19:03 | 17 18:34 (17) 17:52 | 13 16:44 (1) 15:57 | 15:48 |
| 25 | 05:07 | 06:01 | 06:56 | 18:17 (17) 06:52 | 15:29 (1) 07:52 | 08:26 |
| | 21:19 | 20:17 | 19:01 | 15 18:32 (17) 16:50 | 17 15:46 (1) 15:56 | 15:48 |
| 26 | 05:09 | 06:03 | 06:58 | 18:18 (17) 06:54 | 15:27 (1) 07:53 | 08:26 |
| | 21:17 | 20:14 | 18:58 | 12 18:30 (17) 16:47 | 20 15:47 (1) 15:55 | 15:49 |
| 27 | 05:11 | 06:05 | 07:00 | 18:20 (17) 06:56 | 15:26 (1) 07:55 | 08:26 |
| | 21:16 | 20:12 | 18:56 | 8 18:28 (17) 16:45 | 22 15:48 (1) 15:54 | 15:50 |
| 28 | 05:12 | 06:06 | 07:02 | 06:58 | 15:25 (1) 07:57 | 08:26 |
| | 21:14 | 20:10 | 18:53 | 16:43 | 23 15:48 (1) 15:53 | 15:51 |
| 29 | 05:14 | 06:08 | 19:08 (15) 07:04 | 07:00 | 15:24 (1) 07:58 | 08:26 |
| | 21:12 | 20:07 | 9 19:17 (15) 18:51 | 16:41 | 24 15:48 (1) 15:52 | 15:51 |
| 30 | 05:16 | 06:10 | 19:06 (15) 07:05 | 07:02 | 15:24 (1) 08:00 | 08:26 |
| | 21:11 | 20:05 | 13 19:19 (15) 18:48 | 16:39 | 25 15:49 (1) 15:51 | 15:52 |
| 31 | 05:17 | 06:12 | 19:04 (15) 07:04 | 07:04 | 15:25 (1) 07:57 | 08:26 |
| | 21:09 | 20:02 | 15 19:19 (15) 16:37 | 25 15:50 (1) 07:57 | 15:53 | 15:53 |
| Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 |
| astr.max.mögl.Beschattung | | 37 | 312 | 427 | 194 | |
| Red.Sonnenscheinwahrsch. | | 0.48 | 0.40 | 0.33 | 0.21 | |
| Reduktion Betriebsdauer | | 0.93 | 0.93 | 0.93 | 0.93 | |
| Reduktion Windrichtung | | 0.66 | 0.67 | 0.69 | 0.69 | |
| Gesamte Reduktion | | 0.30 | 0.25 | 0.21 | 0.13 | |
| Met.wahrsch.Beschattung | | 11 | 79 | 90 | 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 | Schattenende | (WEA mit erstem Schatten) | (WEA mit letztem Schatten) |
|--------------|-----------------------|-------------------------|----------------------|-------------------|----------------|--------------|---------------------------|----------------------------|
|--------------|-----------------------|-------------------------|----------------------|-------------------|----------------|--------------|---------------------------|----------------------------|

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: F - IO6

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | |
|---------------------------|--------|---------|--------------------|---------------|-------|-------|-------|
| 1 | 08:26 | 07:56 | 06:58 | 06:42 | 05:33 | 04:43 | |
| | 15:55 | 16:46 | 17:43 | 19:41 | 20:37 | 21:28 | |
| 2 | 08:26 | 07:54 | 06:56 | 06:40 | 05:31 | 04:42 | |
| | 15:56 | 16:48 | 17:44 | 19:43 | 20:39 | 21:29 | |
| 3 | 08:26 | 07:52 | 06:53 | 06:37 | 05:29 | 04:41 | |
| | 15:57 | 16:50 | 17:46 | 19:45 | 20:41 | 21:30 | |
| 4 | 08:26 | 07:51 | 06:51 | 7 17:13 (18) | 06:35 | 05:27 | 04:40 |
| | 15:58 | 16:52 | 17:48 | 17:20 (18) | 19:47 | 20:43 | 21:31 |
| 5 | 08:25 | 07:49 | 06:48 | 17:10 (18) | 06:33 | 05:25 | 04:39 |
| | 16:00 | 16:54 | 17:50 | 13 17:23 (18) | 19:49 | 20:45 | 21:32 |
| 6 | 08:25 | 07:47 | 06:46 | 17:08 (18) | 06:30 | 05:23 | 04:39 |
| | 16:01 | 16:56 | 17:52 | 16 17:24 (18) | 19:51 | 20:46 | 21:33 |
| 7 | 08:25 | 07:45 | 06:44 | 17:07 (18) | 06:28 | 05:21 | 04:38 |
| | 16:02 | 16:58 | 17:54 | 18 17:25 (18) | 19:53 | 20:48 | 21:34 |
| 8 | 08:24 | 07:43 | 06:41 | 17:06 (18) | 06:25 | 05:19 | 04:37 |
| | 16:04 | 17:00 | 17:56 | 20 17:26 (18) | 19:55 | 20:50 | 21:35 |
| 9 | 08:23 | 07:41 | 16:20 (1) 06:39 | 17:05 (18) | 06:23 | 05:17 | 04:37 |
| | 16:05 | 17:02 | 9 16:29 (1) 17:58 | 21 17:26 (18) | 19:56 | 20:52 | 21:36 |
| 10 | 08:23 | 07:39 | 16:17 (1) 06:37 | 17:05 (18) | 06:20 | 05:15 | 04:36 |
| | 16:07 | 17:05 | 15 16:32 (1) 18:00 | 21 17:26 (18) | 19:58 | 20:54 | 21:37 |
| 11 | 08:22 | 07:37 | 16:16 (1) 06:34 | 17:04 (18) | 06:18 | 05:13 | 04:36 |
| | 16:08 | 17:07 | 17 16:33 (1) 18:02 | 21 17:25 (18) | 20:00 | 20:55 | 21:38 |
| 12 | 08:21 | 07:35 | 16:15 (1) 06:32 | 17:05 (18) | 06:16 | 05:11 | 04:35 |
| | 16:10 | 17:09 | 20 16:35 (1) 18:04 | 20 17:25 (18) | 20:02 | 20:57 | 21:39 |
| 13 | 08:21 | 07:33 | 16:13 (1) 06:29 | 17:05 (18) | 06:13 | 05:09 | 04:35 |
| | 16:11 | 17:11 | 22 16:35 (1) 18:06 | 19 17:24 (18) | 20:04 | 20:59 | 21:40 |
| 14 | 08:20 | 07:31 | 16:13 (1) 06:27 | 17:06 (18) | 06:11 | 05:08 | 04:35 |
| | 16:13 | 17:13 | 22 16:35 (1) 18:08 | 17 17:23 (18) | 20:06 | 21:01 | 21:40 |
| 15 | 08:19 | 07:29 | 16:13 (1) 06:24 | 17:06 (18) | 06:09 | 05:06 | 04:34 |
| | 16:15 | 17:15 | 23 16:36 (1) 18:10 | 15 17:21 (18) | 20:08 | 21:02 | 21:41 |
| 16 | 08:18 | 07:27 | 16:13 (1) 06:22 | 17:09 (18) | 06:06 | 05:04 | 04:34 |
| | 16:16 | 17:17 | 24 16:37 (1) 18:11 | 10 17:19 (18) | 20:09 | 21:04 | 21:41 |
| 17 | 08:17 | 07:25 | 16:13 (1) 06:19 | 06:04 | 05:03 | 04:34 | |
| | 16:18 | 17:19 | 24 16:37 (1) 18:13 | 20:11 | 21:06 | 21:42 | |
| 18 | 08:16 | 07:23 | 16:12 (1) 06:17 | 06:02 | 05:01 | 04:34 | |
| | 16:20 | 17:21 | 24 16:36 (1) 18:15 | 20:13 | 21:07 | 21:42 | |
| 19 | 08:15 | 07:21 | 16:13 (1) 06:14 | 05:59 | 04:59 | 04:34 | |
| | 16:22 | 17:23 | 23 16:36 (1) 18:17 | 20:15 | 21:09 | 21:43 | |
| 20 | 08:13 | 07:18 | 16:13 (1) 06:12 | 05:57 | 04:58 | 04:34 | |
| | 16:23 | 17:25 | 23 16:36 (1) 18:19 | 20:17 | 21:10 | 21:43 | |
| 21 | 08:12 | 07:16 | 16:13 (1) 06:10 | 05:55 | 04:56 | 04:34 | |
| | 16:25 | 17:27 | 21 16:34 (1) 18:21 | 20:19 | 21:12 | 21:43 | |
| 22 | 08:11 | 07:14 | 16:15 (1) 06:07 | 05:52 | 04:55 | 04:34 | |
| | 16:27 | 17:29 | 18 16:33 (1) 18:23 | 20:21 | 21:14 | 21:43 | |
| 23 | 08:10 | 07:12 | 16:16 (1) 06:05 | 05:50 | 04:53 | 04:35 | |
| | 16:29 | 17:31 | 16 16:32 (1) 18:25 | 20:22 | 21:15 | 21:44 | |
| 24 | 08:08 | 07:09 | 16:18 (1) 06:02 | 05:48 | 04:52 | 04:35 | |
| | 16:31 | 17:33 | 11 16:29 (1) 18:27 | 20:24 | 21:17 | 21:44 | |
| 25 | 08:07 | 07:07 | 16:22 (1) 06:00 | 05:46 | 04:51 | 04:35 | |
| | 16:33 | 17:35 | 3 16:25 (1) 18:28 | 20:26 | 21:18 | 21:44 | |
| 26 | 08:05 | 07:05 | 05:57 | 05:43 | 04:50 | 04:36 | |
| | 16:35 | 17:37 | 18:30 | 20:28 | 21:20 | 21:44 | |
| 27 | 08:04 | 07:03 | 05:55 | 05:41 | 04:48 | 04:36 | |
| | 16:37 | 17:39 | 18:32 | 20:30 | 21:21 | 21:44 | |
| 28 | 08:02 | 07:00 | 05:52 | 05:39 | 04:47 | 04:37 | |
| | 16:38 | 17:41 | 18:34 | 20:32 | 21:22 | 21:43 | |
| 29 | 08:01 | | 06:50 | 05:37 | 04:46 | 04:37 | |
| | 16:40 | | 19:36 | 20:34 | 21:24 | 21:43 | |
| 30 | 07:59 | | 06:47 | 05:35 | 04:45 | 04:38 | |
| | 16:42 | | 19:38 | 20:35 | 21:25 | 21:43 | |
| 31 | 07:57 | | 06:45 | | 04:44 | | |
| | 16:44 | | 19:40 | | 21:26 | | |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 | |
| astr.max.mögl.Beschattung | | 315 | 218 | | | | |
| Red.Sonnenscheinwahrsch. | | 0.24 | 0.31 | | | | |
| Reduktion Betriebsdauer | | 0.93 | 0.93 | | | | |
| Reduktion Windrichtung | | 0.70 | 0.68 | | | | |
| Gesamte Reduktion | | 0.15 | 0.20 | | | | |
| Met.wahrsch.Beschattung | | 49 | 43 | | | | |

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:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: F - IO6

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember |
|---------------------------|-------|--------|-----------|-----------------------|-----------------------|----------------------|
| 1 | 04:39 | 05:19 | 06:14 | 07:07 | 17:44 (18) 07:06 | 15:47 (1) 08:01 |
| | 21:43 | 21:07 | 20:00 | 18:46 | 20 18:04 (18) 16:35 | 14 16:01 (1) 15:50 |
| 2 | 04:39 | 05:21 | 06:15 | 07:09 | 17:43 (18) 07:08 | 15:50 (1) 08:03 |
| | 21:42 | 21:05 | 19:58 | 18:43 | 21 18:04 (18) 16:33 | 8 15:58 (1) 15:49 |
| 3 | 04:40 | 05:22 | 06:17 | 07:11 | 17:43 (18) 07:10 | 08:04 |
| | 21:42 | 21:03 | 19:55 | 18:41 | 21 18:04 (18) 16:31 | 15:49 |
| 4 | 04:41 | 05:24 | 06:19 | 07:13 | 17:42 (18) 07:12 | 08:06 |
| | 21:41 | 21:02 | 19:53 | 18:39 | 21 18:03 (18) 16:29 | 15:48 |
| 5 | 04:42 | 05:26 | 06:21 | 07:15 | 17:42 (18) 07:14 | 08:07 |
| | 21:41 | 21:00 | 19:50 | 18:36 | 20 18:02 (18) 16:27 | 15:47 |
| 6 | 04:43 | 05:27 | 06:23 | 07:16 | 17:43 (18) 07:16 | 08:09 |
| | 21:40 | 20:58 | 19:48 | 18:34 | 19 18:02 (18) 16:25 | 15:47 |
| 7 | 04:44 | 05:29 | 06:24 | 07:18 | 17:43 (18) 07:18 | 08:10 |
| | 21:40 | 20:56 | 19:45 | 18:31 | 17 18:00 (18) 16:23 | 15:46 |
| 8 | 04:45 | 05:31 | 06:26 | 07:20 | 17:44 (18) 07:20 | 08:11 |
| | 21:39 | 20:54 | 19:43 | 18:29 | 15 17:59 (18) 16:21 | 15:46 |
| 9 | 04:46 | 05:33 | 06:28 | 07:22 | 17:46 (18) 07:22 | 08:13 |
| | 21:38 | 20:52 | 19:41 | 18:26 | 11 17:57 (18) 16:20 | 15:45 |
| 10 | 04:47 | 05:34 | 06:30 | 07:24 | 07:24 | 08:14 |
| | 21:37 | 20:50 | 19:38 | 18:24 | 16:18 | 15:45 |
| 11 | 04:48 | 05:36 | 06:31 | 07:26 | 07:26 | 08:15 |
| | 21:36 | 20:48 | 19:36 | 18:22 | 16:16 | 15:45 |
| 12 | 04:49 | 05:38 | 06:33 | 07:28 | 07:27 | 08:16 |
| | 21:35 | 20:46 | 19:33 | 18:19 | 16:14 | 15:45 |
| 13 | 04:50 | 05:40 | 06:35 | 07:29 | 07:29 | 08:17 |
| | 21:34 | 20:43 | 19:31 | 18:17 | 16:13 | 15:45 |
| 14 | 04:52 | 05:41 | 06:37 | 07:31 | 07:31 | 08:18 |
| | 21:33 | 20:41 | 19:28 | 18:14 | 16:11 | 15:45 |
| 15 | 04:53 | 05:43 | 06:39 | 07:33 | 07:33 | 08:19 |
| | 21:32 | 20:39 | 19:26 | 18:12 | 16:09 | 15:45 |
| 16 | 04:54 | 05:45 | 06:40 | 07:35 | 07:35 | 08:20 |
| | 21:31 | 20:37 | 19:23 | 18:10 | 16:08 | 15:45 |
| 17 | 04:56 | 05:47 | 06:42 | 07:37 | 16:52 (1) 07:37 | 08:21 |
| | 21:30 | 20:35 | 19:21 | 18:07 | 8 17:00 (1) 16:06 | 15:45 |
| 18 | 04:57 | 05:49 | 06:44 | 07:39 | 16:49 (1) 07:39 | 08:22 |
| | 21:29 | 20:33 | 19:18 | 18:05 | 14 17:03 (1) 16:05 | 15:45 |
| 19 | 04:58 | 05:50 | 06:46 | 07:41 | 16:47 (1) 07:41 | 08:22 |
| | 21:27 | 20:30 | 19:16 | 18:03 | 17 17:04 (1) 16:04 | 15:45 |
| 20 | 05:00 | 05:52 | 06:47 | 07:43 | 16:45 (1) 07:43 | 08:23 |
| | 21:26 | 20:28 | 19:13 | 18:01 | 20 17:05 (1) 16:02 | 15:46 |
| 21 | 05:01 | 05:54 | 06:49 | 07:45 | 16:44 (1) 07:44 | 08:24 |
| | 21:25 | 20:26 | 19:11 | 17:58 | 22 17:06 (1) 16:01 | 15:46 |
| 22 | 05:03 | 05:56 | 06:51 | 07:47 | 16:44 (1) 07:46 | 08:24 |
| | 21:23 | 20:24 | 19:08 | 17:56 | 22 17:06 (1) 15:59 | 15:46 |
| 23 | 05:04 | 05:57 | 06:53 | 07:49 | 16:43 (1) 07:48 | 08:25 |
| | 21:22 | 20:21 | 19:06 | 17:54 | 23 17:06 (1) 15:58 | 15:47 |
| 24 | 05:06 | 05:59 | 06:55 | 07:50 | 16:43 (1) 07:50 | 08:25 |
| | 21:20 | 20:19 | 19:03 | 17:52 | 23 17:06 (1) 15:57 | 15:48 |
| 25 | 05:07 | 06:01 | 06:56 | 06:52 | 15:42 (1) 07:52 | 08:26 |
| | 21:19 | 20:17 | 19:01 | 16:50 | 24 16:06 (1) 15:56 | 15:48 |
| 26 | 05:09 | 06:03 | 06:58 | 06:54 | 15:42 (1) 07:53 | 08:26 |
| | 21:17 | 20:14 | 18:58 | 16:47 | 24 16:06 (1) 15:55 | 15:49 |
| 27 | 05:11 | 06:05 | 07:00 | 17:51 (18) 06:56 | 15:42 (1) 07:55 | 08:26 |
| | 21:16 | 20:12 | 18:56 | 9 18:00 (18) 16:45 | 23 16:05 (1) 15:54 | 15:50 |
| 28 | 05:12 | 06:06 | 07:02 | 17:48 (18) 06:58 | 15:43 (1) 07:57 | 08:26 |
| | 21:14 | 20:10 | 18:53 | 13 18:01 (18) 16:43 | 22 16:05 (1) 15:53 | 15:51 |
| 29 | 05:14 | 06:08 | 07:04 | 17:46 (18) 07:00 | 15:43 (1) 07:58 | 08:26 |
| | 21:12 | 20:07 | 18:51 | 17 18:03 (18) 16:41 | 21 16:04 (1) 15:52 | 15:51 |
| 30 | 05:16 | 06:10 | 07:05 | 17:45 (18) 07:02 | 15:44 (1) 08:00 | 08:26 |
| | 21:11 | 20:05 | 18:48 | 18 18:03 (18) 16:39 | 19 16:03 (1) 15:51 | 15:52 |
| 31 | 05:17 | 06:12 | | 07:04 | 15:46 (1) | 08:26 |
| | 21:09 | 20:02 | | 16:37 | 17 16:03 (1) | 15:53 |
| Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 |
| astr.max.mögl.Beschattung | | | 57 | 464 | | 22 |
| Red.Sonnenscheinwahrsch. | | | 0.40 | 0.33 | | 0.21 |
| Reduktion Betriebsdauer | | | 0.93 | 0.93 | | 0.93 |
| Reduktion Windrichtung | | | 0.68 | 0.69 | | 0.70 |
| Gesamte Reduktion | | | 0.25 | 0.21 | | 0.13 |
| Met.wahrsch.Beschattung | | | 14 | 98 | | 3 |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: G - IO7
Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENFAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | Juli | August | September | Oktober | November | Dezember | | |
|---------------------------|--------|---------|-----------|-------|------------|-------|-------|--------|-----------|---------|------------|------------|-------|-------|
| 1 | 08:26 | 07:56 | 06:58 | 06:42 | 05:33 | 04:43 | 04:39 | 05:19 | 06:14 | 07:07 | 17:47 (18) | 07:06 | 08:01 | |
| 2 | 15:56 | 16:48 | 17:44 | 19:41 | 20:37 | 21:28 | 21:43 | 21:07 | 20:00 | 18:46 | 20 | 18:07 (18) | 16:35 | 15:50 |
| 3 | 08:26 | 07:52 | 06:53 | 06:37 | 05:29 | 04:41 | 04:40 | 05:22 | 06:17 | 07:11 | 17:46 (18) | 07:10 | 08:04 | |
| 4 | 08:26 | 07:51 | 06:51 | 06:35 | 05:27 | 04:40 | 04:41 | 05:24 | 06:19 | 07:13 | 17:45 (18) | 07:12 | 08:06 | |
| 5 | 08:25 | 07:49 | 06:48 | 06:32 | 05:25 | 04:39 | 04:42 | 05:26 | 06:21 | 07:15 | 17:46 (18) | 07:14 | 08:07 | |
| 6 | 08:25 | 07:47 | 06:46 | 06:30 | 05:23 | 04:39 | 04:43 | 05:27 | 06:23 | 07:16 | 17:47 (18) | 07:16 | 08:09 | |
| 7 | 08:25 | 07:45 | 06:44 | 06:28 | 05:21 | 04:38 | 04:44 | 05:29 | 06:24 | 07:18 | 17:48 (18) | 07:18 | 08:10 | |
| 8 | 08:24 | 07:43 | 06:41 | 06:25 | 05:19 | 04:37 | 04:45 | 05:31 | 06:26 | 07:20 | 17:50 (18) | 07:20 | 08:11 | |
| 9 | 08:23 | 07:41 | 06:39 | 06:23 | 05:17 | 04:37 | 04:46 | 05:33 | 06:28 | 07:22 | 17:51 (18) | 07:22 | 08:13 | |
| 10 | 08:23 | 07:39 | 06:36 | 06:20 | 05:15 | 04:36 | 04:47 | 05:34 | 06:30 | 07:24 | 17:52 (18) | 07:24 | 08:14 | |
| 11 | 08:22 | 07:37 | 16:24 (1) | 06:34 | 17:07 (18) | 06:18 | 05:13 | 04:36 | 04:48 | 05:36 | 06:31 | 07:26 | 08:15 | |
| 12 | 08:21 | 07:35 | 16:22 (1) | 06:32 | 17:08 (18) | 06:16 | 05:11 | 04:35 | 04:49 | 05:38 | 06:33 | 07:28 | 08:16 | |
| 13 | 08:21 | 07:33 | 16:20 (1) | 06:29 | 17:07 (18) | 06:13 | 05:09 | 04:35 | 04:50 | 05:40 | 06:35 | 07:29 | 08:17 | |
| 14 | 08:20 | 07:31 | 16:19 (1) | 06:27 | 17:08 (18) | 06:11 | 05:08 | 04:35 | 04:52 | 05:41 | 06:37 | 07:31 | 08:18 | |
| 15 | 08:19 | 07:29 | 16:18 (1) | 06:24 | 17:08 (18) | 06:09 | 05:06 | 04:34 | 04:53 | 05:43 | 06:39 | 07:33 | 08:19 | |
| 16 | 08:18 | 07:27 | 16:18 (1) | 06:22 | 17:10 (18) | 06:06 | 05:04 | 04:34 | 04:54 | 05:45 | 06:40 | 07:35 | 08:20 | |
| 17 | 08:17 | 07:25 | 16:18 (1) | 06:19 | 17:11 (18) | 06:04 | 05:03 | 04:34 | 04:56 | 05:47 | 06:42 | 07:37 | 08:21 | |
| 18 | 08:16 | 07:23 | 16:17 (1) | 06:17 | 17:12 (18) | 06:02 | 05:01 | 04:34 | 04:57 | 05:49 | 06:44 | 07:39 | 08:22 | |
| 19 | 08:15 | 07:21 | 16:17 (1) | 06:14 | 17:13 (18) | 06:00 | 05:00 | 04:34 | 04:59 | 05:51 | 06:46 | 07:41 | 08:23 | |
| 20 | 08:14 | 07:19 | 16:17 (1) | 06:11 | 17:14 (18) | 05:58 | 04:58 | 04:34 | 04:58 | 05:50 | 06:46 | 07:43 | 08:24 | |
| 21 | 08:13 | 07:18 | 16:17 (1) | 06:08 | 17:15 (18) | 05:56 | 04:56 | 04:34 | 04:58 | 05:52 | 06:47 | 07:45 | 08:25 | |
| 22 | 08:12 | 07:16 | 16:17 (1) | 06:05 | 17:16 (18) | 05:54 | 04:54 | 04:34 | 04:58 | 05:54 | 06:49 | 07:47 | 08:26 | |
| 23 | 08:11 | 07:14 | 16:17 (1) | 06:02 | 17:17 (18) | 05:52 | 04:52 | 04:34 | 04:58 | 05:56 | 06:51 | 07:49 | 08:27 | |
| 24 | 08:10 | 07:12 | 16:17 (1) | 05:59 | 17:18 (18) | 05:50 | 04:50 | 04:34 | 04:58 | 05:58 | 06:53 | 07:51 | 08:28 | |
| 25 | 08:09 | 07:10 | 16:17 (1) | 05:56 | 17:19 (18) | 05:48 | 04:48 | 04:34 | 04:58 | 05:60 | 06:55 | 07:53 | 08:29 | |
| 26 | 08:08 | 07:09 | 16:17 (1) | 05:53 | 17:20 (18) | 05:46 | 04:46 | 04:34 | 04:58 | 05:62 | 06:57 | 07:55 | 08:30 | |
| 27 | 08:07 | 07:07 | 16:17 (1) | 05:50 | 17:21 (18) | 05:44 | 04:44 | 04:34 | 04:58 | 05:64 | 06:59 | 07:57 | 08:31 | |
| 28 | 08:06 | 07:05 | 16:17 (1) | 05:47 | 17:22 (18) | 05:42 | 04:42 | 04:34 | 04:58 | 05:66 | 07:01 | 07:59 | 08:32 | |
| 29 | 08:05 | 07:03 | 16:17 (1) | 05:44 | 17:23 (18) | 05:40 | 04:40 | 04:34 | 04:58 | 05:68 | 07:03 | 08:01 | 08:33 | |
| 30 | 08:04 | 07:01 | 16:17 (1) | 05:41 | 17:24 (18) | 05:38 | 04:38 | 04:34 | 04:58 | 05:70 | 07:05 | 08:03 | 08:34 | |
| 31 | 08:03 | 07:00 | 16:17 (1) | 05:38 | 17:25 (18) | 05:36 | 04:36 | 04:34 | 04:58 | 05:72 | 07:07 | 08:05 | 08:35 | |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 | 513 | 460 | 382 | 328 | 258 | 232 | | |
| astr.max.mögl.Beschattung | | 297 | 212 | | | | | | 76 | 446 | | | | |
| Red.Sonnenscheinwahrsch. | | 0.24 | 0.31 | | | | | | 0.40 | 0.33 | | | | |
| Reduktion Betriebsdauer | | 0.93 | 0.93 | | | | | | 0.93 | 0.93 | | | | |
| Reduktion Windrichtung | | 0.70 | 0.68 | | | | | | 0.68 | 0.69 | | | | |
| Gesamte Reduktion | | 0.15 | 0.20 | | | | | | 0.25 | 0.21 | | | | |
| Met.wahrsch.Beschattung | | 46 | 42 | | | | | | 19 | 94 | | | | |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: H - IO8

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]

| | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan | Feb | Mär | Apr | Mai | Jun | Jul | Aug | Sep | Okt | Nov | Dez |
| 1.39 | 2.32 | 3.70 | 5.75 | 8.12 | 7.70 | 7.33 | 7.20 | 5.12 | 3.48 | 1.79 | 1.03 |

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe

405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140

Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | Juli | August | September | Oktober | November | Dezember | |
|----|--|---------|------|---|-------------------------------|------|------|--------|-------------------------------|-----------------------|----------|----------|-----|
| 1 | 08:26 07:56 06:58 15:55 16:46 17:43 | | | 06:42 18:51 (1) 05:33 19:41 19 19:10 (1) 20:37 | 04:43 04:39 05:19 06:14 | | | | | 07:07 07:06 08:01 | | | |
| 2 | 08:26 07:54 06:56 15:56 16:48 17:44 | | | 06:40 18:51 (1) 05:31 19:43 19 19:10 (1) 20:39 | 04:42 04:39 05:21 06:15 | | | | | 07:08 07:08 08:03 | | | |
| 3 | 08:26 07:52 06:53 15:57 16:50 17:46 | | | 06:37 18:51 (1) 05:29 19:45 17 19:08 (1) 20:41 | 04:41 04:40 05:22 06:17 | | | | | 07:11 07:10 08:04 | | | |
| 4 | 08:26 07:51 06:51 15:58 16:52 17:48 | | | 06:35 18:51 (1) 05:27 19:47 17 19:08 (1) 20:43 | 04:40 04:41 05:24 06:19 | | | | | 07:13 07:12 08:06 | | | |
| 5 | 08:25 07:49 06:48 16:00 16:54 17:50 | | | 06:33 18:52 (1) 05:25 19:49 14 19:06 (1) 20:45 | 04:39 04:42 05:26 06:21 | | | | | 07:15 07:14 08:07 | | | |
| 6 | 08:25 07:47 06:46 16:01 16:56 17:52 | | | 06:30 18:54 (1) 05:23 19:51 10 19:04 (1) 20:46 | 04:38 04:44 05:29 06:24 | | | | 18:50 (1) 18:50 (1) 19:34 | 16:25 15:47 | | | |
| 7 | 08:24 07:45 06:44 16:02 16:58 17:54 | | | 06:28 18:52 (1) 05:21 19:53 | 04:38 04:44 05:29 06:24 | | | | 18:47 (1) 18:31 16:23 | 16:23 15:46 | | | |
| 8 | 08:24 07:43 06:41 16:04 17:00 17:56 | | | 06:25 18:54 (1) 05:19 19:54 | 04:37 04:45 05:31 06:26 | | | | 18:46 (1) 18:29 16:21 | 15:46 | | | |
| 9 | 08:23 07:41 06:39 16:05 17:02 17:58 | | | 06:23 18:54 (1) 05:17 19:56 | 04:37 04:46 05:33 06:28 | | | | 18:45 (1) 18:26 16:20 | 15:45 | | | |
| 10 | 08:23 07:39 06:36 16:07 17:05 18:00 | | | 06:20 18:55 (1) 05:15 19:58 | 04:36 04:47 05:34 06:30 | | | | 18:44 (1) 18:24 16:18 | 15:45 | | | |
| 11 | 08:22 07:37 06:34 16:08 17:07 18:02 | | | 06:18 18:55 (1) 05:13 20:00 | 04:36 04:48 05:36 06:31 | | | | 18:43 (1) 18:22 16:16 | 15:45 | | | |
| 12 | 08:21 07:35 06:32 16:10 17:09 18:04 | | | 06:16 18:55 (1) 05:11 20:02 | 04:35 04:49 05:38 06:33 | | | | 18:43 (1) 18:19 16:14 | 15:45 | | | |
| 13 | 08:20 07:33 06:29 16:11 17:11 18:06 | | | 06:13 18:55 (1) 05:09 20:04 | 04:35 04:50 05:40 06:35 | | | | 18:43 (1) 18:17 16:13 | 15:45 | | | |
| 14 | 08:20 07:31 06:27 16:13 17:13 18:08 | | | 06:11 18:55 (1) 05:08 20:06 | 04:35 04:52 05:41 06:37 | | | | 18:43 (1) 18:14 16:11 | 15:45 | | | |
| 15 | 08:19 07:29 06:24 16:15 17:15 18:10 | | | 06:09 18:55 (1) 05:06 20:08 | 04:34 04:53 05:43 06:39 | | | | 18:43 (1) 18:12 16:09 | 15:45 | | | |
| 16 | 08:18 07:27 06:22 16:16 17:17 18:11 | | | 06:06 18:55 (1) 05:04 20:09 | 04:34 04:54 05:45 06:40 | | | | 18:45 (1) 18:10 16:08 | 15:45 | | | |
| 17 | 08:17 07:25 06:19 16:18 17:19 18:13 | | | 06:04 18:55 (1) 05:03 20:11 | 04:34 04:56 05:47 06:42 | | | | 18:47 (1) 18:07 16:06 | 15:45 | | | |
| 18 | 08:16 07:23 06:17 16:20 17:21 18:15 | | | 06:02 18:55 (1) 05:01 20:13 | 04:34 04:57 05:49 06:44 | | | | 18:53 (1) 18:07 16:05 | 15:45 | | | |
| 19 | 08:14 07:20 06:14 16:22 17:23 18:17 | | | 05:59 18:55 (1) 05:00 20:15 | 04:34 04:58 05:50 06:46 | | | | 18:05 16:05 15:45 | | | | |
| 20 | 08:13 07:18 06:12 16:23 17:25 18:19 | | | 05:57 18:55 (1) 04:59 20:17 | 04:34 05:00 05:52 06:47 | | | | 18:03 16:04 15:45 | | | | |
| 21 | 08:12 07:16 06:10 16:25 17:27 18:21 | | | 05:55 18:55 (1) 04:58 20:19 | 04:34 05:01 05:54 06:49 | | | | 18:01 16:02 15:46 | | | | |
| 22 | 08:11 07:14 06:07 16:27 17:29 18:23 | | | 05:52 18:55 (1) 04:55 20:21 | 04:34 05:03 05:56 06:51 | | | | 17:58 16:01 15:46 | | | | |
| 23 | 08:09 07:12 06:05 16:29 17:31 18:25 | | | 05:50 18:55 (1) 04:53 20:22 | 04:35 05:04 05:57 06:53 | | | | 17:56 16:01 15:46 | | | | |
| 24 | 08:08 07:09 06:02 16:31 17:33 18:26 | | | 05:48 18:55 (1) 04:52 20:24 | 04:35 05:06 05:59 06:55 | | | | 17:54 16:00 15:47 | | | | |
| 25 | 08:07 07:07 06:00 16:33 17:35 18:28 | | | 05:46 18:55 (1) 04:51 20:26 | 04:35 05:07 06:01 06:56 | | | | 17:52 16:00 15:48 | | | | |
| 26 | 08:05 07:05 05:57 16:35 17:37 18:30 | | | 05:43 18:55 (1) 04:50 20:28 | 04:36 05:09 06:03 06:58 | | | | 17:52 16:00 15:48 | | | | |
| 27 | 08:04 07:03 05:55 16:37 17:39 18:32 | | | 05:41 18:55 (1) 04:49 20:30 | 04:36 05:11 06:05 07:00 | | | | 17:52 16:00 15:48 | | | | |
| 28 | 08:02 07:00 05:52 16:38 17:41 18:34 | | | 05:39 18:55 (1) 04:47 20:32 | 04:37 05:12 06:06 07:02 | | | | 17:52 16:00 15:48 | | | | |
| 29 | 08:01 07:00 05:50 16:40 17:43 18:36 | | | 05:37 18:55 (1) 04:46 20:34 | 04:37 05:14 06:08 07:04 | | | | 17:52 16:00 15:48 | | | | |
| 30 | 07:59 07:00 05:48 16:42 17:45 18:38 | | | 05:35 18:55 (1) 04:45 20:35 | 04:38 05:16 06:10 07:05 | | | | 17:52 16:00 15:48 | | | | |
| 31 | 07:57 07:00 05:46 16:44 17:47 18:40 | | | 05:33 18:55 (1) 04:44 19:09 (1) 20:35 | 04:38 05:17 06:12 07:06 | | | | 17:52 16:00 15:48 | | | | |
| | Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 | 513 | 460 | 382 | 178 | 258 | 232 |
| | astr.max.mögl.Beschattung | | | 80 | 96 | | | | | | 0.40 | | |
| | Red.Sonnenscheinwahrsch. | | | 0.31 | 0.41 | | | | | | 0.93 | | |
| | Reduktion Betriebsdauer | | | 0.93 | 0.93 | | | | | | 0.67 | | |
| | Reduktion Windrichtung | | | 0.67 | 0.67 | | | | | | 0.25 | | |
| | Gesamte Reduktion | | | 0.20 | 0.26 | | | | | | 0.45 | | |
| | Met.wahrsch.Beschattung | | | 16 | 25 | | | | | | | | |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: I - IO9
Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | |
|---------------------------|--------|---------|--------------|-------|--------------|-------|-------|
| 1 | 08:26 | 07:56 | 06:58 | 06:42 | 05:33 | 04:43 | |
| | 15:55 | 16:46 | 17:43 | 19:41 | 20:37 | 21:28 | |
| 2 | 08:26 | 07:54 | 06:56 | 06:40 | 05:31 | 04:42 | |
| | 15:56 | 16:48 | 17:44 | 19:43 | 20:39 | 21:29 | |
| 3 | 08:26 | 07:52 | 06:53 | 06:37 | 05:29 | 04:41 | |
| | 15:57 | 16:50 | 17:46 | 19:45 | 20:41 | 21:30 | |
| 4 | 08:26 | 07:51 | 06:51 | 06:35 | 05:27 | 04:40 | |
| | 15:58 | 16:52 | 17:48 | 19:47 | 20:43 | 21:31 | |
| 5 | 08:25 | 07:49 | 06:48 | 06:33 | 19:15 (1) | 05:25 | 04:39 |
| | 16:00 | 16:54 | 17:50 | 19:49 | 19:19 (1) | 20:45 | 21:32 |
| 6 | 08:25 | 07:47 | 06:46 | 06:30 | 19:11 (1) | 05:23 | 04:39 |
| | 16:01 | 16:56 | 17:52 | 19:51 | 12 19:23 (1) | 20:46 | 21:33 |
| 7 | 08:24 | 07:45 | 06:44 | 06:28 | 19:09 (1) | 05:21 | 04:38 |
| | 16:02 | 16:58 | 17:54 | 19:53 | 16 19:25 (1) | 20:48 | 21:34 |
| 8 | 08:24 | 07:43 | 06:41 | 06:25 | 19:07 (1) | 05:19 | 04:37 |
| | 16:04 | 17:00 | 17:56 | 19:54 | 18 19:25 (1) | 20:50 | 21:35 |
| 9 | 08:23 | 07:41 | 06:39 | 06:23 | 19:06 (1) | 05:17 | 04:37 |
| | 16:05 | 17:02 | 17:58 | 19:56 | 20 19:26 (1) | 20:52 | 21:36 |
| 10 | 08:23 | 07:39 | 06:36 | 06:20 | 19:04 (1) | 05:15 | 04:36 |
| | 16:07 | 17:05 | 18:00 | 19:58 | 22 19:26 (1) | 20:54 | 21:37 |
| 11 | 08:22 | 07:37 | 06:34 | 06:18 | 19:04 (1) | 05:13 | 04:36 |
| | 16:08 | 17:07 | 18:02 | 20:00 | 22 19:26 (1) | 20:55 | 21:38 |
| 12 | 08:21 | 07:35 | 06:32 | 06:16 | 19:04 (1) | 05:11 | 04:35 |
| | 16:10 | 17:09 | 18:04 | 20:02 | 22 19:26 (1) | 20:57 | 21:39 |
| 13 | 08:20 | 07:33 | 06:29 | 06:13 | 19:03 (1) | 05:09 | 04:35 |
| | 16:11 | 17:11 | 18:06 | 20:04 | 22 19:25 (1) | 20:59 | 21:39 |
| 14 | 08:20 | 07:31 | 06:27 | 06:11 | 19:03 (1) | 05:08 | 04:35 |
| | 16:13 | 17:13 | 18:08 | 20:06 | 22 19:25 (1) | 21:00 | 21:40 |
| 15 | 08:19 | 07:29 | 06:24 | 06:09 | 19:04 (1) | 05:06 | 04:34 |
| | 16:15 | 17:15 | 18:10 | 20:08 | 21 19:25 (1) | 21:02 | 21:41 |
| 16 | 08:18 | 07:27 | 06:22 | 06:06 | 19:04 (1) | 05:04 | 04:34 |
| | 16:16 | 17:17 | 18:11 | 20:09 | 19 19:23 (1) | 21:04 | 21:41 |
| 17 | 08:17 | 07:25 | 06:19 | 06:04 | 19:05 (1) | 05:03 | 04:34 |
| | 16:18 | 17:19 | 18:13 | 20:11 | 17 19:22 (1) | 21:06 | 21:42 |
| 18 | 08:16 | 07:23 | 06:17 | 06:02 | 19:06 (1) | 05:01 | 04:34 |
| | 16:20 | 17:21 | 18:15 | 20:13 | 15 19:21 (1) | 21:07 | 21:42 |
| 19 | 08:14 | 07:20 | 06:14 | 05:59 | 19:08 (1) | 04:59 | 04:34 |
| | 16:22 | 17:23 | 18:17 | 20:15 | 11 19:19 (1) | 21:09 | 21:43 |
| 20 | 08:13 | 07:18 | 06:12 | 05:57 | 19:12 (1) | 04:58 | 04:34 |
| | 16:23 | 17:25 | 18:19 | 20:17 | 3 19:15 (1) | 21:10 | 21:43 |
| 21 | 08:12 | 07:16 | 06:10 | 05:55 | | 04:56 | 04:34 |
| | 16:25 | 17:27 | 18:21 | 20:19 | | 21:12 | 21:43 |
| 22 | 08:11 | 07:14 | 06:07 | 05:52 | | 04:55 | 04:35 |
| | 16:27 | 17:29 | 18:23 | 20:21 | | 21:14 | 21:43 |
| 23 | 08:09 | 07:12 | 06:05 | 05:50 | | 04:54 | 04:35 |
| | 16:29 | 17:31 | 18:25 | 20:22 | | 21:15 | 21:44 |
| 24 | 08:08 | 07:09 | 06:02 | 05:48 | | 04:52 | 04:35 |
| | 16:31 | 17:33 | 18:26 | 20:24 | | 21:17 | 21:44 |
| 25 | 08:07 | 07:07 | 17:06 (12) | 06:00 | 05:46 | 04:51 | 04:35 |
| | 16:33 | 17:35 | 1 17:07 (12) | 18:28 | 20:26 | 21:18 | 21:44 |
| 26 | 08:05 | 07:05 | 17:07 (12) | 05:57 | 05:43 | 04:50 | 04:36 |
| | 16:35 | 17:37 | 2 17:09 (12) | 18:30 | 20:28 | 21:20 | 21:44 |
| 27 | 08:04 | 07:03 | 17:07 (12) | 05:55 | 05:41 | 04:48 | 04:36 |
| | 16:37 | 17:39 | 4 17:11 (12) | 18:32 | 20:30 | 21:21 | 21:44 |
| 28 | 08:02 | 07:00 | 17:08 (12) | 05:52 | 05:39 | 04:47 | 04:37 |
| | 16:38 | 17:41 | 5 17:13 (12) | 18:34 | 20:32 | 21:22 | 21:43 |
| 29 | 08:01 | | 06:50 | 05:37 | | 04:46 | 04:37 |
| | 16:40 | | 19:36 | 20:34 | | 21:24 | 21:43 |
| 30 | 07:59 | | 06:47 | 05:35 | | 04:45 | 04:38 |
| | 16:42 | | 19:38 | 20:35 | | 21:25 | 21:43 |
| 31 | 07:57 | | 06:45 | | | 04:44 | |
| | 16:44 | | 19:40 | | | 21:26 | |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 | |
| astr.max.mögl.Beschattung | | | | | 266 | | |
| Red.Sonnenscheinwahrsch. | | 0.24 | | | 0.41 | | |
| Reduktion Betriebsdauer | | 0.93 | | | 0.93 | | |
| Reduktion Windrichtung | | 0.69 | | | 0.66 | | |
| Gesamte Reduktion | | 0.15 | | | 0.25 | | |
| Met.wahrsch.Beschattung | | 2 | | | 67 | | |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: I - IO9

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember |
|---------------------------|---------------|---------------|-------------------|-------------------|----------------------|---------------|
| 1 | 04:39 21:43 | 05:19 21:07 | 06:14 20:00 | 19:03 (1) 07:07 | 07:06 16:35 | 08:01 15:50 |
| 2 | 04:39 21:42 | 05:21 21:05 | 06:15 19:58 | 19:03 (1) 07:09 | 07:08 16:33 | 08:03 15:49 |
| 3 | 04:40 21:42 | 05:22 21:03 | 06:17 19:55 | 19:04 (1) 07:11 | 07:10 16:31 | 08:04 15:49 |
| 4 | 04:41 21:41 | 05:24 21:01 | 06:19 19:53 | 19:04 (1) 07:13 | 07:12 16:29 | 08:06 15:48 |
| 5 | 04:42 21:41 | 05:26 21:00 | 06:21 19:50 | 19:05 (1) 07:15 | 07:14 16:27 | 08:07 15:47 |
| 6 | 04:43 21:40 | 05:27 20:58 | 06:23 19:48 | 19:07 (1) 07:16 | 07:16 16:25 | 08:09 15:47 |
| 7 | 04:44 21:39 | 05:29 20:56 | 06:24 19:45 | 19:09 (1) 07:18 | 07:18 16:23 | 08:10 15:46 |
| 8 | 04:45 21:39 | 05:31 20:54 | 06:26 19:43 | 19:14 (1) 07:20 | 07:20 16:21 | 08:11 15:46 |
| 9 | 04:46 21:38 | 05:33 20:52 | 06:28 19:41 | 18:29 07:22 | 07:22 16:20 | 08:13 15:45 |
| 10 | 04:47 21:37 | 05:34 20:50 | 06:30 19:38 | 18:26 07:24 | 07:24 16:18 | 08:14 15:45 |
| 11 | 04:48 21:36 | 05:36 20:48 | 06:31 19:36 | 18:24 07:26 | 07:26 16:16 | 08:15 15:45 |
| 12 | 04:49 21:35 | 05:38 20:46 | 06:33 19:33 | 18:22 07:28 | 07:27 16:14 | 08:16 15:45 |
| 13 | 04:50 21:34 | 05:40 20:43 | 06:35 19:31 | 18:19 07:29 | 17:43 (12) 07:29 | 16:14 08:17 |
| 14 | 04:52 21:33 | 05:41 20:41 | 06:37 19:28 | 18:17 07:31 | 4 17:47 (12) 07:31 | 16:13 08:18 |
| 15 | 04:53 21:32 | 05:43 20:39 | 06:39 19:26 | 18:14 07:33 | 4 17:45 (12) 07:33 | 16:11 08:19 |
| 16 | 04:54 21:31 | 05:45 20:37 | 06:40 19:23 | 18:12 07:35 | 3 17:43 (12) 07:35 | 16:10 08:20 |
| 17 | 04:56 21:30 | 05:47 20:35 | 06:42 19:21 | 18:10 07:37 | 1 17:40 (12) 07:37 | 16:08 08:21 |
| 18 | 04:57 21:29 | 05:49 20:33 | 06:44 19:18 | 18:07 07:39 | 16:06 07:39 | 16:06 08:22 |
| 19 | 04:58 21:27 | 05:50 20:30 | 06:46 19:16 | 18:05 07:41 | 16:05 07:41 | 16:05 08:22 |
| 20 | 05:00 21:26 | 05:52 20:28 | 06:47 19:13 | 18:03 07:43 | 16:04 07:43 | 16:04 08:23 |
| 21 | 05:01 21:25 | 05:54 20:26 | 06:49 19:11 | 18:01 07:45 | 16:02 07:44 | 16:02 08:24 |
| 22 | 05:03 21:23 | 05:56 20:24 | 06:51 19:08 | 17:58 07:47 | 16:01 07:46 | 16:01 08:24 |
| 23 | 05:04 21:22 | 05:58 20:21 | 19:15 (1) 06:53 | 17:56 07:48 | 16:00 07:48 | 16:00 08:25 |
| 24 | 05:06 21:20 | 05:59 20:19 | 19:20 (1) 06:55 | 17:54 07:50 | 15:58 07:50 | 15:58 08:25 |
| 25 | 05:07 21:19 | 06:01 20:17 | 19:11 (1) 06:55 | 17:52 07:52 | 15:57 07:51 | 15:57 08:26 |
| 26 | 05:09 21:17 | 06:03 20:14 | 19:23 (1) 06:56 | 17:50 07:54 | 15:56 07:53 | 15:56 08:26 |
| 27 | 05:11 21:16 | 06:05 20:12 | 19:07 (1) 06:58 | 17:48 07:56 | 15:55 07:55 | 15:55 08:26 |
| 28 | 05:12 21:14 | 06:06 20:10 | 19:25 (1) 07:00 | 17:46 07:58 | 15:54 07:57 | 15:54 08:26 |
| 29 | 05:14 21:12 | 06:08 20:07 | 19:05 (1) 07:02 | 17:44 07:59 | 15:53 07:58 | 15:53 08:26 |
| 30 | 05:16 21:11 | 06:10 20:05 | 19:26 (1) 07:04 | 17:43 08:00 | 15:52 07:58 | 15:52 08:26 |
| 31 | 05:17 21:09 | 06:12 20:02 | 19:26 (1) 07:05 | 17:41 08:01 | 15:51 07:58 | 15:51 08:26 |
| | | | 19:03 (1) 07:06 | 16:39 07:04 | 15:51 07:58 | 15:51 08:26 |
| | | | 19:25 (1) 07:07 | 16:37 07:04 | 15:51 07:58 | 15:51 08:26 |
| Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 |
| astr.max.mögl.Beschattung | | 157 | 115 | 12 | | |
| Red.Sonnenscheinwahrsch. | | 0.48 | 0.40 | 0.33 | | |
| Reduktion Betriebsdauer | | 0.93 | 0.93 | 0.93 | | |
| Reduktion Windrichtung | | 0.66 | 0.66 | 0.69 | | |
| Gesamte Reduktion | | 0.30 | 0.25 | 0.21 | | |
| Met.wahrsch.Beschattung | | 46 | 28 | 3 | | |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: J - IO10

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni |
|---------------------------|---------------|---------------|----------------------|--------------------|----------------------|---------------|
| 1 | 08:26 15:55 | 07:56 16:46 | 06:58 17:43 | 17:11 (12) 06:42 | 05:33 20:37 | 04:43 21:28 |
| 2 | 08:26 15:56 | 07:54 16:48 | 06:56 17:44 | 17:12 (12) 06:40 | 05:31 20:39 | 04:42 21:29 |
| 3 | 08:26 15:57 | 07:52 16:50 | 06:53 17:46 | 17:17 (12) 06:37 | 05:29 20:41 | 04:41 21:30 |
| 4 | 08:26 15:58 | 07:51 16:52 | 06:51 17:48 | 06:35 19:47 | 05:27 20:43 | 04:40 21:31 |
| 5 | 08:25 16:00 | 07:49 16:54 | 06:48 17:50 | 06:33 19:49 | 05:25 20:45 | 04:39 21:32 |
| 6 | 08:25 16:01 | 07:47 16:56 | 06:46 17:52 | 06:30 19:51 | 05:23 20:46 | 04:39 21:33 |
| 7 | 08:24 16:02 | 07:45 16:58 | 06:44 17:54 | 06:28 19:53 | 05:21 20:48 | 04:38 21:34 |
| 8 | 08:24 16:04 | 07:43 17:00 | 06:41 17:56 | 06:25 19:54 | 19:20 (1) 05:19 | 04:37 21:35 |
| 9 | 08:23 16:05 | 07:41 17:03 | 06:39 17:58 | 06:23 19:56 | 3 19:23 (1) 05:17 | 04:37 21:36 |
| 10 | 08:23 16:07 | 07:39 17:05 | 06:36 18:00 | 06:20 19:58 | 12 19:16 (1) 05:15 | 04:36 21:37 |
| 11 | 08:22 16:08 | 07:37 17:07 | 06:34 18:02 | 06:18 20:00 | 16 19:28 (1) 05:13 | 04:36 21:38 |
| 12 | 08:21 16:10 | 07:35 17:09 | 06:32 18:04 | 06:16 20:02 | 18 19:30 (1) 05:11 | 04:35 21:39 |
| 13 | 08:20 16:11 | 07:33 17:11 | 06:29 18:06 | 06:13 20:04 | 20 19:31 (1) 05:09 | 04:35 21:40 |
| 14 | 08:20 16:13 | 07:31 17:13 | 06:27 18:08 | 06:11 20:06 | 22 19:09 (1) 05:08 | 04:35 21:41 |
| 15 | 08:19 16:15 | 07:29 17:15 | 06:24 18:10 | 06:09 20:08 | 22 19:31 (1) 05:06 | 04:34 21:42 |
| 16 | 08:18 16:16 | 07:27 17:17 | 06:22 18:11 | 06:06 20:09 | 19:09 (1) 05:04 | 04:34 21:43 |
| 17 | 08:17 16:18 | 07:25 17:19 | 06:19 18:13 | 06:04 20:11 | 22 19:31 (1) 05:03 | 04:34 21:44 |
| 18 | 08:16 16:20 | 07:23 17:21 | 06:17 18:15 | 06:02 20:13 | 19:08 (1) 05:01 | 04:34 21:45 |
| 19 | 08:14 16:22 | 07:20 17:23 | 06:14 18:17 | 05:59 20:15 | 22 19:30 (1) 04:59 | 04:34 21:46 |
| 20 | 08:13 16:23 | 07:18 17:25 | 06:12 18:19 | 05:57 20:17 | 19:09 (1) 04:58 | 04:34 21:47 |
| 21 | 08:12 16:25 | 07:16 17:27 | 06:10 18:21 | 05:55 20:19 | 19 19:29 (1) 04:56 | 04:34 21:48 |
| 22 | 08:11 16:27 | 07:14 17:29 | 06:07 18:23 | 05:52 20:21 | 17 19:27 (1) 04:55 | 04:35 21:49 |
| 23 | 08:09 16:29 | 07:12 17:31 | 06:05 18:25 | 05:50 20:22 | 14 19:25 (1) 04:54 | 04:35 21:50 |
| 24 | 08:08 16:31 | 07:09 17:33 | 06:02 18:26 | 05:48 20:24 | 9 19:23 (1) 04:52 | 04:35 21:51 |
| 25 | 08:07 16:33 | 07:07 17:35 | 06:00 18:28 | 05:46 20:26 | 04:52 21:17 | 04:35 21:52 |
| 26 | 08:05 16:35 | 07:05 17:37 | 05:57 18:30 | 05:43 20:28 | 04:51 21:18 | 04:35 21:53 |
| 27 | 08:04 16:37 | 07:03 17:39 | 17:09 (12) 05:55 | 05:41 20:30 | 04:50 21:20 | 04:36 21:54 |
| 28 | 08:02 16:38 | 07:00 17:41 | 2 17:11 (12) 05:52 | 05:39 20:32 | 04:48 21:21 | 04:36 21:55 |
| 29 | 08:01 16:40 | 06:58 17:43 | 4 17:13 (12) 05:50 | 05:37 20:34 | 04:47 21:22 | 04:37 21:56 |
| 30 | 07:59 16:42 | 06:56 17:45 | 06:50 19:36 | 05:35 20:36 | 04:46 21:23 | 04:37 21:57 |
| 31 | 07:57 16:44 | 06:54 17:47 | 06:47 19:38 | 05:33 20:38 | 04:45 21:24 | 04:38 21:58 |
| | 06:45 19:40 | 06:52 17:49 | 06:45 19:40 | 05:31 20:40 | 04:44 21:25 | 04:38 21:59 |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 |
| astr.max.mögl.Beschattung | | 6 | 10 | 282 | | |
| Red.Sonnenscheinwahrsch. | | 0.24 | 0.31 | 0.41 | | |
| Reduktion Betriebsdauer | | 0.93 | 0.93 | 0.93 | | |
| Reduktion Windrichtung | | 0.68 | 0.68 | 0.65 | | |
| Gesamte Reduktion | | 0.15 | 0.20 | 0.25 | | |
| Met.wahrsch.Beschattung | | 1 | 2 | 70 | | |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: J - IO10

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember |
|---------------------------|---------------|---------------|-------------------|-------------------|----------------------|---------------|
| 1 | 04:39 21:43 | 05:19 21:07 | 06:14 20:00 | 19:11 (1) 07:07 | 07:06 16:35 | 08:01 15:50 |
| 2 | 04:39 21:42 | 05:21 21:05 | 06:15 19:58 | 19:12 (1) 07:09 | 07:08 16:33 | 08:03 15:49 |
| 3 | 04:40 21:42 | 05:22 21:03 | 06:17 19:55 | 19:14 (1) 07:11 | 07:10 16:31 | 08:04 15:49 |
| 4 | 04:41 21:41 | 05:24 21:01 | 06:19 19:53 | 19:17 (1) 07:13 | 07:12 16:29 | 08:06 15:48 |
| 5 | 04:42 21:41 | 05:26 21:00 | 06:21 19:50 | 19:20 (1) 07:15 | 07:14 16:27 | 08:07 15:47 |
| 6 | 04:43 21:40 | 05:27 20:58 | 06:23 19:48 | 18:36 07:16 | 15:27 07:16 | 15:47 08:09 |
| 7 | 04:44 21:39 | 05:29 20:56 | 06:24 19:45 | 18:34 07:18 | 15:25 07:18 | 15:47 08:10 |
| 8 | 04:45 21:39 | 05:31 20:54 | 06:26 19:43 | 18:31 07:20 | 15:23 07:20 | 15:46 08:11 |
| 9 | 04:46 21:38 | 05:33 20:52 | 06:28 19:41 | 18:29 07:22 | 15:21 07:22 | 15:46 08:13 |
| 10 | 04:47 21:37 | 05:34 20:50 | 06:30 19:38 | 18:26 07:24 | 15:20 07:24 | 15:45 08:14 |
| 11 | 04:48 21:36 | 05:36 20:48 | 06:31 19:36 | 18:24 07:26 | 15:18 07:26 | 15:45 08:15 |
| 12 | 04:49 21:35 | 05:38 20:46 | 06:33 19:33 | 18:22 07:28 | 15:16 07:27 | 15:45 08:16 |
| 13 | 04:50 21:34 | 05:40 20:43 | 06:35 19:31 | 18:19 07:29 | 5 17:45 (12) 07:29 | 15:45 08:17 |
| 14 | 04:52 21:33 | 05:41 20:41 | 06:37 19:28 | 18:17 07:31 | 5 17:48 (12) 07:31 | 15:45 08:18 |
| 15 | 04:53 21:32 | 05:43 20:39 | 06:39 19:26 | 18:14 07:33 | 3 17:45 (12) 07:33 | 15:45 08:19 |
| 16 | 04:54 21:31 | 05:45 20:37 | 06:40 19:23 | 18:12 07:35 | 1 17:43 (12) 07:35 | 15:45 08:20 |
| 17 | 04:56 21:30 | 05:47 20:35 | 06:42 19:21 | 18:10 07:37 | 16:08 07:37 | 15:45 08:21 |
| 18 | 04:57 21:29 | 05:49 20:33 | 06:44 19:18 | 18:07 07:39 | 16:06 07:39 | 15:45 08:22 |
| 19 | 04:58 21:27 | 05:50 20:30 | 06:46 19:16 | 18:05 07:41 | 16:05 07:41 | 15:45 08:22 |
| 20 | 05:00 21:26 | 05:52 20:28 | 19:19 (1) 06:47 | 18:03 07:43 | 07:41 16:04 | 15:45 08:23 |
| 21 | 05:01 21:25 | 05:54 20:26 | 19:29 (1) 06:49 | 18:01 07:45 | 17:43 (12) 16:02 | 15:46 08:24 |
| 22 | 05:03 21:23 | 05:56 20:24 | 19:14 (1) 06:51 | 17:58 07:47 | 07:44 16:01 | 15:46 08:24 |
| 23 | 05:04 21:22 | 05:58 20:21 | 19:31 (1) 06:53 | 17:56 07:48 | 07:46 16:00 | 15:47 08:24 |
| 24 | 05:06 21:20 | 05:59 20:19 | 19:13 (1) 06:55 | 17:54 07:48 | 07:48 15:58 | 15:47 08:25 |
| 25 | 05:07 21:19 | 06:01 20:17 | 19:33 (1) 06:56 | 17:52 07:50 | 15:58 07:50 | 15:47 08:25 |
| 26 | 05:09 21:17 | 06:03 20:14 | 19:33 (1) 06:58 | 17:52 07:52 | 15:57 07:51 | 15:48 08:26 |
| 27 | 05:11 21:16 | 06:05 20:12 | 19:11 (1) 07:00 | 17:50 07:54 | 15:56 07:53 | 15:48 08:26 |
| 28 | 05:12 21:14 | 06:06 20:10 | 19:33 (1) 07:02 | 17:48 07:56 | 15:55 07:55 | 15:49 08:26 |
| 29 | 05:14 21:12 | 06:08 20:07 | 19:10 (1) 07:04 | 17:45 07:58 | 15:54 07:57 | 15:50 08:26 |
| 30 | 05:16 21:11 | 06:10 20:05 | 19:32 (1) 07:05 | 17:43 07:59 | 15:53 07:57 | 15:51 08:26 |
| 31 | 05:17 21:09 | 06:12 20:02 | 19:10 (1) 07:06 | 16:41 07:00 | 15:52 07:58 | 15:51 08:26 |
| Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 |
| astr.max.mögl.Beschattung | | 233 | 49 | 14 | | |
| Red.Sonnenscheinwahrsch. | | 0.48 | 0.40 | 0.33 | | |
| Reduktion Betriebsdauer | | 0.93 | 0.93 | 0.93 | | |
| Reduktion Windrichtung | | 0.65 | 0.65 | 0.68 | | |
| Gesamte Reduktion | | 0.29 | 0.24 | 0.21 | | |
| Met.wahrsch.Beschattung | | 68 | 12 | 3 | | |

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 | Schattenende | (WEA mit erstem Schatten) | (WEA mit letztem Schatten) |
|--------------|-----------------------|-------------------------|----------------------|-------------------|----------------|--------------|---------------------------|----------------------------|
|--------------|-----------------------|-------------------------|----------------------|-------------------|----------------|--------------|---------------------------|----------------------------|



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: K - IO11
Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | | |
|---------------------------|--------|---------|-------|--------------|--------------|-----------|-------|-------|
| 1 | 08:26 | 07:56 | 06:58 | 17:13 (12) | 06:42 | 05:33 | 04:43 | |
| | 15:55 | 16:46 | 17:43 | 3 17:16 (12) | 19:41 | 20:37 | 21:28 | |
| 2 | 08:26 | 07:54 | 06:56 | 17:13 (12) | 06:40 | 05:31 | 04:42 | |
| | 15:56 | 16:48 | 17:44 | 4 17:17 (12) | 19:43 | 20:39 | 21:29 | |
| 3 | 08:26 | 07:52 | 06:53 | 17:14 (12) | 06:37 | 05:29 | 04:41 | |
| | 15:57 | 16:50 | 17:46 | 5 17:19 (12) | 19:45 | 20:41 | 21:30 | |
| 4 | 08:26 | 07:51 | 06:51 | 17:15 (12) | 06:35 | 05:27 | 04:40 | |
| | 15:58 | 16:52 | 17:48 | 5 17:20 (12) | 19:47 | 20:43 | 21:31 | |
| 5 | 08:25 | 07:49 | 06:48 | 06:33 | 05:25 | 04:39 | | |
| | 16:00 | 16:54 | 17:50 | 19:49 | 20:45 | 21:32 | | |
| 6 | 08:25 | 07:47 | 06:46 | 06:30 | 05:23 | 04:39 | | |
| | 16:01 | 16:56 | 17:52 | 19:51 | 20:46 | 21:33 | | |
| 7 | 08:24 | 07:45 | 06:44 | 06:28 | 05:21 | 04:38 | | |
| | 16:02 | 16:58 | 17:54 | 19:53 | 20:48 | 21:34 | | |
| 8 | 08:24 | 07:43 | 06:41 | 06:25 | 05:19 | 04:37 | | |
| | 16:04 | 17:00 | 17:56 | 19:54 | 20:50 | 21:35 | | |
| 9 | 08:23 | 07:41 | 06:39 | 06:23 | 05:17 | 04:37 | | |
| | 16:05 | 17:03 | 17:58 | 19:56 | 20:52 | 21:36 | | |
| 10 | 08:23 | 07:39 | 06:36 | 06:20 | 05:15 | 04:36 | | |
| | 16:07 | 17:05 | 18:00 | 19:58 | 20:54 | 21:37 | | |
| 11 | 08:22 | 07:37 | 06:34 | 06:18 | 19:23 (1) | 05:13 | 04:36 | |
| | 16:08 | 17:07 | 18:02 | 20:00 | 7 19:30 (1) | 20:55 | 21:38 | |
| 12 | 08:21 | 07:35 | 06:32 | 06:16 | 19:20 (1) | 05:11 | 04:35 | |
| | 16:10 | 17:09 | 18:04 | 20:02 | 13 19:33 (1) | 20:57 | 21:39 | |
| 13 | 08:20 | 07:33 | 06:29 | 06:13 | 06:13 | 19:17 (1) | 05:09 | 04:35 |
| | 16:11 | 17:11 | 18:06 | 20:04 | 17 19:34 (1) | 20:59 | 21:39 | |
| 14 | 08:20 | 07:31 | 06:27 | 06:11 | 19:16 (1) | 05:08 | 04:35 | |
| | 16:13 | 17:13 | 18:08 | 20:06 | 19 19:35 (1) | 21:00 | 21:40 | |
| 15 | 08:19 | 07:29 | 06:24 | 06:09 | 19:15 (1) | 05:06 | 04:34 | |
| | 16:15 | 17:15 | 18:10 | 20:08 | 21 19:36 (1) | 21:02 | 21:41 | |
| 16 | 08:18 | 07:27 | 06:22 | 06:06 | 19:14 (1) | 05:04 | 04:34 | |
| | 16:16 | 17:17 | 18:11 | 20:09 | 21 19:35 (1) | 21:04 | 21:41 | |
| 17 | 08:17 | 07:25 | 06:19 | 06:04 | 19:14 (1) | 05:03 | 04:34 | |
| | 16:18 | 17:19 | 18:13 | 20:11 | 22 19:36 (1) | 21:06 | 21:42 | |
| 18 | 08:16 | 07:23 | 06:17 | 06:02 | 19:13 (1) | 05:01 | 04:34 | |
| | 16:20 | 17:21 | 18:15 | 20:13 | 23 19:36 (1) | 21:07 | 21:42 | |
| 19 | 08:14 | 07:20 | 06:14 | 05:59 | 19:13 (1) | 04:59 | 04:34 | |
| | 16:22 | 17:23 | 18:17 | 20:15 | 23 19:36 (1) | 21:09 | 21:43 | |
| 20 | 08:13 | 07:18 | 06:12 | 05:57 | 19:14 (1) | 04:58 | 04:34 | |
| | 16:23 | 17:25 | 18:19 | 20:17 | 22 19:36 (1) | 21:10 | 21:43 | |
| 21 | 08:12 | 07:16 | 06:10 | 05:55 | 19:13 (1) | 04:56 | 04:34 | |
| | 16:25 | 17:27 | 18:21 | 20:19 | 21 19:34 (1) | 21:12 | 21:43 | |
| 22 | 08:11 | 07:14 | 06:07 | 05:52 | 19:13 (1) | 04:55 | 04:35 | |
| | 16:27 | 17:29 | 18:23 | 20:21 | 21 19:34 (1) | 21:14 | 21:43 | |
| 23 | 08:09 | 07:12 | 06:05 | 05:50 | 19:14 (1) | 04:54 | 04:35 | |
| | 16:29 | 17:31 | 18:25 | 20:22 | 19 19:33 (1) | 21:15 | 21:44 | |
| 24 | 08:08 | 07:09 | 06:02 | 05:48 | 19:15 (1) | 04:52 | 04:35 | |
| | 16:31 | 17:33 | 18:26 | 20:24 | 17 19:32 (1) | 21:17 | 21:44 | |
| 25 | 08:07 | 07:07 | 06:00 | 05:46 | 19:17 (1) | 04:51 | 04:35 | |
| | 16:33 | 17:35 | 18:28 | 20:26 | 13 19:30 (1) | 21:18 | 21:44 | |
| 26 | 08:05 | 07:05 | 05:57 | 05:43 | 19:19 (1) | 04:50 | 04:36 | |
| | 16:35 | 17:37 | 18:30 | 20:28 | 9 19:28 (1) | 21:20 | 21:44 | |
| 27 | 08:04 | 07:03 | 05:55 | 05:41 | 05:41 | 04:48 | 04:36 | |
| | 16:37 | 17:39 | 18:32 | 20:30 | 21:21 | 21:44 | | |
| 28 | 08:02 | 07:00 | 05:52 | 05:39 | 05:39 | 04:47 | 04:37 | |
| | 16:38 | 17:41 | 18:34 | 20:32 | 21:22 | 21:43 | | |
| 29 | 08:01 | 06:50 | 05:50 | 05:37 | 05:37 | 04:46 | 04:37 | |
| | 16:40 | 19:36 | 20:34 | 20:34 | 21:24 | 21:43 | | |
| 30 | 07:59 | 06:47 | 05:35 | 05:35 | 05:35 | 04:45 | 04:38 | |
| | 16:42 | 19:38 | 20:35 | 20:35 | 21:25 | 21:43 | | |
| 31 | 07:57 | 06:45 | | | 04:44 | | | |
| | 16:44 | 19:40 | | | 21:26 | | | |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 | | |
| astr.max.mögl.Beschattung | | | 17 | 288 | | | | |
| Red.Sonnenscheinwahrsch. | | | 0.31 | 0.41 | | | | |
| Reduktion Betriebsdauer | | | 0.93 | 0.93 | | | | |
| Reduktion Windrichtung | | | 0.68 | 0.64 | | | | |
| Gesamte Reduktion | | | 0.20 | 0.25 | | | | |
| Met.wahrsch.Beschattung | | | 3 | 71 | | | | |

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) |

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: K - IO11

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember |
|---------------------------|-------|--------|------------------------|-----------------------|------------------------|----------|
| 1 | 04:39 | 05:19 | 06:14 | 19:22 (1) 07:07 | 07:06 | 08:01 |
| | 21:43 | 21:07 | 20:00 | 7 19:29 (1) 18:46 | 16:35 | 15:50 |
| 2 | 04:39 | 05:21 | 06:15 | 07:09 | 07:08 | 08:03 |
| | 21:42 | 21:05 | 19:58 | 18:43 | 16:33 | 15:49 |
| 3 | 04:40 | 05:22 | 06:17 | 07:11 | 07:10 | 08:04 |
| | 21:42 | 21:03 | 19:55 | 18:41 | 16:31 | 15:49 |
| 4 | 04:41 | 05:24 | 06:19 | 07:13 | 07:12 | 08:06 |
| | 21:41 | 21:01 | 19:53 | 18:39 | 16:29 | 15:48 |
| 5 | 04:42 | 05:26 | 06:21 | 07:15 | 07:14 | 08:07 |
| | 21:41 | 21:00 | 19:50 | 18:36 | 16:27 | 15:47 |
| 6 | 04:43 | 05:27 | 06:23 | 07:16 | 07:16 | 08:09 |
| | 21:40 | 20:58 | 19:48 | 18:34 | 16:25 | 15:47 |
| 7 | 04:44 | 05:29 | 06:24 | 07:18 | 07:18 | 08:10 |
| | 21:39 | 20:56 | 19:45 | 18:31 | 16:23 | 15:46 |
| 8 | 04:45 | 05:31 | 06:26 | 07:20 | 07:20 | 08:11 |
| | 21:39 | 20:54 | 19:43 | 18:29 | 16:21 | 15:46 |
| 9 | 04:46 | 05:33 | 06:28 | 07:22 | 07:22 | 08:13 |
| | 21:38 | 20:52 | 19:41 | 18:26 | 16:20 | 15:45 |
| 10 | 04:47 | 05:34 | 06:30 | 07:24 | 17:49 (12) 07:24 | 08:14 |
| | 21:37 | 20:50 | 19:38 | 18:24 | 6 17:55 (12) 16:18 | 15:45 |
| 11 | 04:48 | 05:36 | 06:31 | 07:26 | 17:48 (12) 07:26 | 08:15 |
| | 21:36 | 20:48 | 19:36 | 18:22 | 5 17:53 (12) 16:16 | 15:45 |
| 12 | 04:49 | 05:38 | 06:33 | 07:28 | 17:47 (12) 07:27 | 08:16 |
| | 21:35 | 20:46 | 19:33 | 18:19 | 3 17:50 (12) 16:14 | 15:45 |
| 13 | 04:50 | 05:40 | 06:35 | 07:29 | 17:46 (12) 07:29 | 08:17 |
| | 21:34 | 20:43 | 19:31 | 18:17 | 2 17:48 (12) 16:13 | 15:45 |
| 14 | 04:52 | 05:41 | 06:37 | 07:31 | 07:31 | 08:18 |
| | 21:33 | 20:41 | 19:28 | 18:14 | 16:11 | 15:45 |
| 15 | 04:53 | 05:43 | 06:39 | 07:33 | 07:33 | 08:19 |
| | 21:32 | 20:39 | 19:26 | 18:12 | 16:10 | 15:45 |
| 16 | 04:54 | 05:45 | 06:40 | 07:35 | 07:35 | 08:20 |
| | 21:31 | 20:37 | 19:23 | 18:10 | 16:08 | 15:45 |
| 17 | 04:56 | 05:47 | 19:25 (1) 06:42 | 07:37 | 07:37 | 08:21 |
| | 21:30 | 20:35 | 10 19:35 (1) 19:21 | 18:07 | 16:06 | 15:45 |
| 18 | 04:57 | 05:49 | 19:22 (1) 06:44 | 07:39 | 07:39 | 08:22 |
| | 21:29 | 20:33 | 14 19:36 (1) 19:18 | 18:05 | 16:05 | 15:45 |
| 19 | 04:58 | 05:50 | 19:21 (1) 06:46 | 07:41 | 07:41 | 08:22 |
| | 21:27 | 20:30 | 17 19:38 (1) 19:16 | 18:03 | 16:04 | 15:45 |
| 20 | 05:00 | 05:52 | 19:20 (1) 06:47 | 07:43 | 07:43 | 08:23 |
| | 21:26 | 20:28 | 19 19:39 (1) 19:13 | 18:01 | 16:02 | 15:46 |
| 21 | 05:01 | 05:54 | 19:18 (1) 06:49 | 07:45 | 07:44 | 08:24 |
| | 21:25 | 20:26 | 21 19:39 (1) 19:11 | 17:58 | 16:01 | 15:46 |
| 22 | 05:03 | 05:56 | 19:18 (1) 06:51 | 07:47 | 07:46 | 08:24 |
| | 21:23 | 20:24 | 21 19:39 (1) 19:08 | 17:56 | 16:00 | 15:47 |
| 23 | 05:04 | 05:58 | 19:17 (1) 06:53 | 07:48 | 07:48 | 08:25 |
| | 21:22 | 20:21 | 23 19:40 (1) 19:06 | 17:54 | 15:58 | 15:47 |
| 24 | 05:06 | 05:59 | 19:17 (1) 06:55 | 07:50 | 07:50 | 08:25 |
| | 21:20 | 20:19 | 23 19:40 (1) 19:03 | 17:52 | 15:57 | 15:48 |
| 25 | 05:07 | 06:01 | 19:16 (1) 06:56 | 06:52 | 07:51 | 08:26 |
| | 21:19 | 20:17 | 23 19:39 (1) 19:01 | 16:50 | 15:56 | 15:48 |
| 26 | 05:09 | 06:03 | 19:16 (1) 06:58 | 06:54 | 07:53 | 08:26 |
| | 21:17 | 20:14 | 23 19:39 (1) 18:58 | 16:47 | 15:55 | 15:49 |
| 27 | 05:11 | 06:05 | 19:17 (1) 07:00 | 06:56 | 07:55 | 08:26 |
| | 21:16 | 20:12 | 21 19:38 (1) 18:56 | 16:45 | 15:54 | 15:50 |
| 28 | 05:12 | 06:06 | 19:16 (1) 07:02 | 06:58 | 07:57 | 08:26 |
| | 21:14 | 20:10 | 21 19:37 (1) 18:53 | 16:43 | 15:53 | 15:51 |
| 29 | 05:14 | 06:08 | 19:17 (1) 07:04 | 07:00 | 07:58 | 08:26 |
| | 21:12 | 20:07 | 19 19:36 (1) 18:51 | 16:41 | 15:52 | 15:51 |
| 30 | 05:16 | 06:10 | 19:18 (1) 07:05 | 07:02 | 08:00 | 08:26 |
| | 21:11 | 20:05 | 17 19:35 (1) 18:48 | 16:39 | 15:51 | 15:52 |
| 31 | 05:17 | 06:12 | 19:19 (1) | 07:04 | | 08:26 |
| | 21:09 | 20:02 | 13 19:32 (1) | 16:37 | | 15:53 |
| Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 |
| astr.max.mögl.Beschattung | | 285 | | | 16 | |
| Red.Sonnenscheinwahrsch. | | 0.48 | 0.40 | | 0.33 | |
| Reduktion Betriebsdauer | | 0.93 | 0.93 | | 0.93 | |
| Reduktion Windrichtung | | 0.64 | 0.64 | | 0.68 | |
| Gesamte Reduktion | | 0.29 | 0.24 | | 0.21 | |
| Met.wahrsch.Beschattung | | 83 | 2 | | 3 | |

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) |



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: N - IO14
Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni |
|---------------------------|--------|---------|-------|--------------------|-------------------|-------------------|
| 1 | 08:26 | 07:56 | 06:58 | 06:42 | 05:33 | 19:32 (1) 04:43 |
| | 15:55 | 16:46 | 17:43 | 19:41 | 20:37 | 19:51 (1) 21:28 |
| 2 | 08:26 | 07:54 | 06:56 | 06:40 | 05:31 | 19:33 (1) 04:42 |
| | 15:56 | 16:48 | 17:44 | 19:43 | 20:39 | 19:51 (1) 21:29 |
| 3 | 08:26 | 07:52 | 06:53 | 06:37 | 05:29 | 19:33 (1) 04:41 |
| | 15:57 | 16:50 | 17:46 | 19:45 | 20:41 | 19:49 (1) 21:30 |
| 4 | 08:26 | 07:51 | 06:51 | 06:35 | 05:27 | 19:34 (1) 04:40 |
| | 15:58 | 16:52 | 17:48 | 19:47 | 20:43 | 19:48 (1) 21:31 |
| 5 | 08:25 | 07:49 | 06:48 | 06:33 | 05:25 | 19:36 (1) 04:39 |
| | 16:00 | 16:54 | 17:50 | 19:49 | 20:45 | 19:46 (1) 21:32 |
| 6 | 08:25 | 07:47 | 06:46 | 06:30 | 05:23 | 19:39 (1) 04:39 |
| | 16:01 | 16:56 | 17:52 | 19:51 | 20:46 | 19:42 (1) 21:33 |
| 7 | 08:24 | 07:45 | 06:44 | 06:28 | 05:21 | 19:42 (1) 04:38 |
| | 16:02 | 16:58 | 17:54 | 19:53 | 20:48 | 19:42 (1) 21:34 |
| 8 | 08:24 | 07:43 | 06:41 | 17:28 (12) 06:25 | 05:19 | 19:42 (1) 04:37 |
| | 16:04 | 17:00 | 17:56 | 17:29 (12) 19:54 | 20:50 | 19:42 (1) 21:35 |
| 9 | 08:23 | 07:41 | 06:39 | 17:28 (12) 06:23 | 05:17 | 19:42 (1) 04:37 |
| | 16:05 | 17:03 | 17:58 | 17:31 (12) 19:56 | 20:52 | 19:42 (1) 21:36 |
| 10 | 08:23 | 07:39 | 06:36 | 17:29 (12) 06:20 | 05:15 | 19:42 (1) 04:36 |
| | 16:07 | 17:05 | 18:00 | 17:34 (12) 19:58 | 20:54 | 19:42 (1) 21:37 |
| 11 | 08:22 | 07:37 | 06:34 | 17:29 (12) 06:18 | 05:13 | 19:42 (1) 04:36 |
| | 16:08 | 17:07 | 18:02 | 17:35 (12) 20:00 | 20:55 | 19:42 (1) 21:38 |
| 12 | 08:21 | 07:35 | 06:32 | 17:33 (12) 06:16 | 05:11 | 19:42 (1) 04:35 |
| | 16:10 | 17:09 | 18:04 | 17:34 (12) 20:02 | 20:57 | 19:42 (1) 21:39 |
| 13 | 08:20 | 07:33 | 06:29 | 17:34 (12) 06:13 | 05:09 | 19:42 (1) 04:35 |
| | 16:11 | 17:11 | 18:06 | 20:04 | 20:59 | 19:42 (1) 21:39 |
| 14 | 08:20 | 07:31 | 06:27 | 06:11 | 05:08 | 19:42 (1) 04:35 |
| | 16:13 | 17:13 | 18:08 | 20:06 | 21:00 | 19:42 (1) 21:40 |
| 15 | 08:19 | 07:29 | 06:24 | 06:09 | 05:06 | 19:42 (1) 04:34 |
| | 16:15 | 17:15 | 18:10 | 20:08 | 21:02 | 19:42 (1) 21:41 |
| 16 | 08:18 | 07:27 | 06:22 | 06:06 | 05:04 | 19:42 (1) 04:34 |
| | 16:16 | 17:17 | 18:11 | 20:09 | 21:04 | 19:42 (1) 21:41 |
| 17 | 08:17 | 07:25 | 06:19 | 06:04 | 05:03 | 19:42 (1) 04:34 |
| | 16:18 | 17:19 | 18:13 | 20:11 | 21:06 | 19:42 (1) 21:42 |
| 18 | 08:16 | 07:23 | 06:17 | 06:02 | 05:01 | 19:42 (1) 04:34 |
| | 16:20 | 17:21 | 18:15 | 20:13 | 21:07 | 19:42 (1) 21:42 |
| 19 | 08:14 | 07:20 | 06:14 | 05:59 | 04:59 | 19:42 (1) 04:34 |
| | 16:22 | 17:23 | 18:17 | 20:15 | 21:09 | 19:42 (1) 21:43 |
| 20 | 08:13 | 07:18 | 06:12 | 05:57 | 19:40 (1) 04:58 | 19:42 (1) 04:34 |
| | 16:23 | 17:25 | 18:19 | 20:17 | 19:47 (1) 21:10 | 19:42 (1) 21:43 |
| 21 | 08:12 | 07:16 | 06:10 | 05:55 | 19:36 (1) 04:56 | 19:42 (1) 04:34 |
| | 16:25 | 17:27 | 18:21 | 20:19 | 19:49 (1) 21:12 | 19:42 (1) 21:43 |
| 22 | 08:11 | 07:14 | 06:07 | 05:52 | 19:35 (1) 04:55 | 19:42 (1) 04:35 |
| | 16:27 | 17:29 | 18:23 | 20:21 | 19:50 (1) 21:14 | 19:42 (1) 21:43 |
| 23 | 08:09 | 07:12 | 06:05 | 05:50 | 19:34 (1) 04:54 | 19:42 (1) 04:35 |
| | 16:29 | 17:31 | 18:25 | 20:22 | 19:51 (1) 21:15 | 19:42 (1) 21:44 |
| 24 | 08:08 | 07:09 | 06:02 | 05:48 | 19:33 (1) 04:52 | 19:42 (1) 04:35 |
| | 16:31 | 17:33 | 18:26 | 20:24 | 19:52 (1) 21:17 | 19:42 (1) 21:44 |
| 25 | 08:07 | 07:07 | 06:00 | 05:46 | 19:32 (1) 04:51 | 19:42 (1) 04:35 |
| | 16:33 | 17:35 | 18:28 | 20:26 | 19:53 (1) 21:18 | 19:42 (1) 21:44 |
| 26 | 08:05 | 07:05 | 05:57 | 05:43 | 19:32 (1) 04:50 | 19:42 (1) 04:36 |
| | 16:35 | 17:37 | 18:30 | 20:28 | 19:53 (1) 21:20 | 19:42 (1) 21:44 |
| 27 | 08:04 | 07:03 | 05:55 | 05:41 | 19:32 (1) 04:48 | 19:42 (1) 04:36 |
| | 16:37 | 17:39 | 18:32 | 20:30 | 19:53 (1) 21:21 | 19:42 (1) 21:44 |
| 28 | 08:02 | 07:00 | 05:52 | 05:39 | 19:31 (1) 04:47 | 19:42 (1) 04:37 |
| | 16:38 | 17:41 | 18:34 | 20:32 | 19:53 (1) 21:22 | 19:42 (1) 21:43 |
| 29 | 08:01 | 06:50 | 05:50 | 05:37 | 19:30 (1) 04:46 | 19:42 (1) 04:37 |
| | 16:40 | 17:43 | 18:36 | 20:34 | 19:52 (1) 21:24 | 19:42 (1) 21:43 |
| 30 | 07:59 | 06:47 | 05:47 | 05:35 | 19:31 (1) 04:45 | 19:42 (1) 04:38 |
| | 16:42 | 17:45 | 18:38 | 20:35 | 19:51 (1) 21:25 | 19:42 (1) 21:43 |
| 31 | 07:57 | 06:45 | 05:45 | 05:33 | 19:30 (1) 04:44 | 19:42 (1) 04:38 |
| | 16:44 | 17:47 | 18:40 | 20:36 | 19:52 (1) 21:26 | 19:42 (1) 21:43 |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 |
| astr.max.mögl.Beschattung | | | | 198 | 80 | |
| Red.Sonnenscheinwahrsch. | | | 0.31 | 0.41 | 0.51 | |
| Reduktion Betriebsdauer | | | 0.93 | 0.93 | 0.93 | |
| Reduktion Windrichtung | | | 0.68 | 0.63 | 0.63 | |
| Gesamte Reduktion | | | 0.20 | 0.24 | 0.30 | |
| Met.wahrsch.Beschattung | | | 3 | 48 | 24 | |

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) |
|--------------|-----------------------|-------------------------|----------------------|-------------------|----------------|---------------------------|-------------------|--------------|----------------------------|
|--------------|-----------------------|-------------------------|----------------------|-------------------|----------------|---------------------------|-------------------|--------------|----------------------------|

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: N - IO14

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Juli | | August | | September Oktober | | November Dezember | |
|---------------------------|-------|-------|--------|-----------|-------------------|-------|-------------------|-------|
| 1 | 04:39 | 05:19 | | | 06:14 | 07:07 | 07:06 | 08:01 |
| | 21:43 | 21:07 | | | 20:00 | 18:46 | 16:35 | 15:50 |
| 2 | 04:39 | 05:21 | | | 06:15 | 07:09 | 18:09 (12) | 07:08 |
| | 21:42 | 21:05 | | | 19:58 | 18:43 | 18:15 (12) | 16:33 |
| 3 | 04:40 | 05:22 | | | 06:17 | 07:11 | 18:07 (12) | 07:10 |
| | 21:42 | 21:03 | | | 19:55 | 18:41 | 18:13 (12) | 16:31 |
| 4 | 04:41 | 05:24 | | | 06:19 | 07:13 | 18:05 (12) | 07:12 |
| | 21:41 | 21:01 | | | 19:53 | 18:39 | 18:09 (12) | 16:29 |
| 5 | 04:42 | 05:26 | | | 06:21 | 07:15 | 18:05 (12) | 07:14 |
| | 21:41 | 21:00 | | | 19:50 | 18:36 | 18:07 (12) | 16:27 |
| 6 | 04:43 | 05:27 | | | 06:23 | 07:16 | | 07:16 |
| | 21:40 | 20:58 | | | 19:48 | 18:34 | | 16:25 |
| 7 | 04:44 | 05:29 | | 19:47 (1) | 06:24 | 07:18 | | 07:18 |
| | 21:39 | 20:56 | 6 | 19:53 (1) | 19:45 | 18:31 | | 16:23 |
| 8 | 04:45 | 05:31 | | 19:45 (1) | 06:26 | 07:20 | | 07:20 |
| | 21:39 | 20:54 | 11 | 19:56 (1) | 19:43 | 18:29 | | 16:21 |
| 9 | 04:46 | 05:33 | | 19:42 (1) | 06:28 | 07:22 | | 07:22 |
| | 21:38 | 20:52 | 15 | 19:57 (1) | 19:41 | 18:26 | | 16:20 |
| 10 | 04:47 | 05:34 | | 19:41 (1) | 06:30 | 07:24 | | 07:24 |
| | 21:37 | 20:50 | 17 | 19:58 (1) | 19:38 | 18:24 | | 16:18 |
| 11 | 04:48 | 05:36 | | 19:41 (1) | 06:31 | 07:26 | | 07:25 |
| | 21:36 | 20:48 | 18 | 19:59 (1) | 19:36 | 18:22 | | 16:16 |
| 12 | 04:49 | 05:38 | | 19:39 (1) | 06:33 | 07:28 | | 07:27 |
| | 21:35 | 20:45 | 20 | 19:59 (1) | 19:33 | 18:19 | | 16:14 |
| 13 | 04:51 | 05:40 | | 19:39 (1) | 06:35 | 07:29 | | 07:29 |
| | 21:34 | 20:43 | 21 | 20:00 (1) | 19:31 | 18:17 | | 16:13 |
| 14 | 04:52 | 05:41 | | 19:39 (1) | 06:37 | 07:31 | | 07:31 |
| | 21:33 | 20:41 | 21 | 20:00 (1) | 19:28 | 18:14 | | 16:11 |
| 15 | 04:53 | 05:43 | | 19:38 (1) | 06:39 | 07:33 | | 07:33 |
| | 21:32 | 20:39 | 21 | 19:59 (1) | 19:26 | 18:12 | | 16:10 |
| 16 | 04:54 | 05:45 | | 19:38 (1) | 06:40 | 07:35 | | 07:35 |
| | 21:31 | 20:37 | 22 | 20:00 (1) | 19:23 | 18:10 | | 16:08 |
| 17 | 04:56 | 05:47 | | 19:38 (1) | 06:42 | 07:37 | | 07:37 |
| | 21:30 | 20:35 | 21 | 19:59 (1) | 19:21 | 18:07 | | 16:06 |
| 18 | 04:57 | 05:49 | | 19:38 (1) | 06:44 | 07:39 | | 07:39 |
| | 21:29 | 20:33 | 20 | 19:58 (1) | 19:18 | 18:05 | | 16:05 |
| 19 | 04:58 | 05:50 | | 19:39 (1) | 06:46 | 07:41 | | 07:41 |
| | 21:27 | 20:30 | 19 | 19:58 (1) | 19:16 | 18:03 | | 16:04 |
| 20 | 05:00 | 05:52 | | 19:39 (1) | 06:47 | 07:43 | | 07:43 |
| | 21:26 | 20:28 | 18 | 19:57 (1) | 19:13 | 18:01 | | 16:02 |
| 21 | 05:01 | 05:54 | | 19:40 (1) | 06:49 | 07:45 | | 07:44 |
| | 21:25 | 20:26 | 15 | 19:55 (1) | 19:11 | 17:58 | | 16:01 |
| 22 | 05:03 | 05:56 | | 19:41 (1) | 06:51 | 07:47 | | 07:46 |
| | 21:23 | 20:24 | 12 | 19:53 (1) | 19:08 | 17:56 | | 16:00 |
| 23 | 05:04 | 05:58 | | 19:44 (1) | 06:53 | 07:48 | | 07:48 |
| | 21:22 | 20:21 | 6 | 19:50 (1) | 19:06 | 17:54 | | 15:58 |
| 24 | 05:06 | 05:59 | | | 06:55 | 07:50 | | 07:50 |
| | 21:20 | 20:19 | | | 19:03 | 17:52 | | 15:57 |
| 25 | 05:07 | 06:01 | | | 06:56 | 06:52 | | 07:51 |
| | 21:19 | 20:17 | | | 19:01 | 16:50 | | 15:56 |
| 26 | 05:09 | 06:03 | | | 06:58 | 06:54 | | 07:53 |
| | 21:17 | 20:14 | | | 18:58 | 16:47 | | 15:55 |
| 27 | 05:11 | 06:05 | | | 07:00 | 06:56 | | 07:55 |
| | 21:16 | 20:12 | | | 18:56 | 16:45 | | 15:54 |
| 28 | 05:12 | 06:06 | | | 07:02 | 06:58 | | 07:57 |
| | 21:14 | 20:10 | | | 18:53 | 16:43 | | 15:53 |
| 29 | 05:14 | 06:08 | | | 07:04 | 07:00 | | 07:58 |
| | 21:12 | 20:07 | | | 18:51 | 16:41 | | 15:52 |
| 30 | 05:16 | 06:10 | | | 07:05 | 07:02 | | 08:00 |
| | 21:11 | 20:05 | | | 18:48 | 16:39 | | 15:51 |
| 31 | 05:17 | 06:12 | | | | 07:04 | | |
| | 21:09 | 20:02 | | | | 16:37 | | 15:53 |
| Sonnenscheinstunden | 513 | 460 | | | 382 | 328 | 258 | 232 |
| astr.max.mögl.Beschattung | | 283 | | | | 18 | | |
| Red.Sonnenscheinwahrsch. | | 0.48 | | | | 0.33 | | |
| Reduktion Betriebsdauer | | 0.93 | | | | 0.93 | | |
| Reduktion Windrichtung | | 0.63 | | | | 0.68 | | |
| Gesamte Reduktion | | 0.28 | | | | 0.21 | | |
| Met.wahrsch.Beschattung | | 80 | | | | 4 | | |

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 | Schattenende | (WEA mit erstem Schatten) | (WEA mit letztem Schatten) |
|--------------|-----------------------|-------------------------|----------------------|-------------------|----------------|--------------|---------------------------|----------------------------|

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: O - IO15

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni |
|---------------------------|--------|---------|-------|------------------------|------------------------|------------------------|
| 1 | 08:26 | 07:56 | 06:58 | 06:42 | 05:33 | 19:34 (1) 04:43 |
| | 15:55 | 16:46 | 17:43 | 19:41 | 20:37 | 21 19:55 (1) 21:28 |
| 2 | 08:26 | 07:54 | 06:56 | 06:40 | 05:31 | 19:35 (1) 04:42 |
| | 15:56 | 16:48 | 17:44 | 19:43 | 20:39 | 20 19:55 (1) 21:29 |
| 3 | 08:26 | 07:52 | 06:53 | 06:37 | 05:29 | 19:35 (1) 04:41 |
| | 15:57 | 16:50 | 17:46 | 19:45 | 20:41 | 19 19:54 (1) 21:30 |
| 4 | 08:26 | 07:51 | 06:51 | 06:35 | 05:27 | 19:36 (1) 04:40 |
| | 15:58 | 16:52 | 17:48 | 19:47 | 20:43 | 17 19:53 (1) 21:31 |
| 5 | 08:25 | 07:49 | 06:48 | 06:33 | 05:25 | 19:36 (1) 04:39 |
| | 16:00 | 16:54 | 17:50 | 19:49 | 20:45 | 16 19:52 (1) 21:32 |
| 6 | 08:25 | 07:47 | 06:46 | 06:30 | 05:23 | 19:38 (1) 04:39 |
| | 16:01 | 16:56 | 17:52 | 19:51 | 20:46 | 12 19:50 (1) 21:33 |
| 7 | 08:24 | 07:45 | 06:44 | 06:28 | 05:21 | 19:39 (1) 04:38 |
| | 16:02 | 16:58 | 17:54 | 19:53 | 20:48 | 9 19:48 (1) 21:34 |
| 8 | 08:24 | 07:43 | 06:41 | 06:25 | 05:19 | 04:37 |
| | 16:04 | 17:00 | 17:56 | 19:54 | 20:50 | 21:35 |
| 9 | 08:23 | 07:41 | 06:39 | 06:23 | 05:17 | 04:37 |
| | 16:05 | 17:03 | 17:58 | 19:56 | 20:52 | 21:36 |
| 10 | 08:23 | 07:39 | 06:36 | 17:31 (12) 06:20 | 05:15 | 04:36 |
| | 16:07 | 17:05 | 18:00 | 3 17:34 (12) 19:58 | 20:53 | 21:37 |
| 11 | 08:22 | 07:37 | 06:34 | 4 17:31 (12) 06:18 | 05:13 | 04:36 |
| | 16:08 | 17:07 | 18:02 | 4 17:35 (12) 20:00 | 20:55 | 21:38 |
| 12 | 08:21 | 07:35 | 06:32 | 6 17:32 (12) 06:16 | 05:11 | 04:35 |
| | 16:10 | 17:09 | 18:04 | 6 17:38 (12) 20:02 | 20:57 | 21:39 |
| 13 | 08:20 | 07:33 | 06:29 | 6 17:33 (12) 06:13 | 05:09 | 04:35 |
| | 16:11 | 17:11 | 18:06 | 5 17:38 (12) 20:04 | 20:59 | 21:39 |
| 14 | 08:20 | 07:31 | 06:27 | 06:11 | 05:08 | 04:35 |
| | 16:13 | 17:13 | 18:08 | 20:06 | 21:00 | 21:40 |
| 15 | 08:19 | 07:29 | 06:24 | 06:09 | 05:06 | 04:34 |
| | 16:15 | 17:15 | 18:10 | 20:08 | 21:02 | 21:41 |
| 16 | 08:18 | 07:27 | 06:22 | 06:06 | 05:04 | 04:34 |
| | 16:16 | 17:17 | 18:11 | 20:09 | 21:04 | 21:41 |
| 17 | 08:17 | 07:25 | 06:19 | 06:04 | 05:03 | 04:34 |
| | 16:18 | 17:19 | 18:13 | 20:11 | 21:06 | 21:42 |
| 18 | 08:16 | 07:23 | 06:17 | 06:02 | 05:01 | 04:34 |
| | 16:20 | 17:21 | 18:15 | 20:13 | 21:07 | 21:42 |
| 19 | 08:14 | 07:20 | 06:14 | 05:59 | 04:59 | 04:34 |
| | 16:22 | 17:23 | 18:17 | 20:15 | 21:09 | 21:43 |
| 20 | 08:13 | 07:18 | 06:12 | 05:57 | 04:58 | 04:34 |
| | 16:23 | 17:25 | 18:19 | 20:17 | 21:10 | 21:43 |
| 21 | 08:12 | 07:16 | 06:10 | 05:55 | 04:56 | 04:34 |
| | 16:25 | 17:27 | 18:21 | 20:19 | 21:12 | 21:43 |
| 22 | 08:11 | 07:14 | 06:07 | 05:52 | 19:41 (1) 04:55 | 04:35 |
| | 16:27 | 17:29 | 18:23 | 20:21 | 10 19:51 (1) 21:14 | 21:43 |
| 23 | 08:09 | 07:12 | 06:05 | 05:50 | 19:39 (1) 04:54 | 04:35 |
| | 16:29 | 17:31 | 18:25 | 20:22 | 14 19:53 (1) 21:15 | 21:44 |
| 24 | 08:08 | 07:09 | 06:02 | 05:48 | 19:37 (1) 04:52 | 04:35 |
| | 16:31 | 17:33 | 18:26 | 20:24 | 17 19:54 (1) 21:17 | 21:44 |
| 25 | 08:07 | 07:07 | 06:00 | 05:46 | 19:36 (1) 04:51 | 04:35 |
| | 16:33 | 17:35 | 18:28 | 20:26 | 19 19:55 (1) 21:18 | 21:44 |
| 26 | 08:05 | 07:05 | 05:57 | 05:43 | 19:36 (1) 04:50 | 04:36 |
| | 16:35 | 17:37 | 18:30 | 20:28 | 19 19:55 (1) 21:20 | 21:44 |
| 27 | 08:04 | 07:03 | 05:55 | 05:41 | 19:35 (1) 04:48 | 04:36 |
| | 16:37 | 17:39 | 18:32 | 20:30 | 21 19:56 (1) 21:21 | 21:44 |
| 28 | 08:02 | 07:00 | 05:52 | 05:39 | 19:35 (1) 04:47 | 04:37 |
| | 16:38 | 17:41 | 18:34 | 20:32 | 21 19:56 (1) 21:22 | 21:43 |
| 29 | 08:01 | 06:50 | 05:50 | 05:37 | 19:33 (1) 04:46 | 04:37 |
| | 16:40 | 19:36 | 20:34 | 22 19:55 (1) 21:24 | 21:43 | |
| 30 | 07:59 | 06:47 | 05:35 | 05:35 | 19:33 (1) 04:45 | 04:38 |
| | 16:42 | 19:38 | 20:35 | 22 19:55 (1) 21:25 | 21:43 | |
| 31 | 07:57 | 06:45 | | | 04:44 | 21:44 |
| | 16:44 | 19:40 | | | 21:26 | 21:43 |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 |
| astr.max.mögl.Beschattung | | | 18 | 165 | 114 | |
| Red.Sonnenscheinwahrsch. | | | 0.31 | 0.41 | 0.51 | |
| Reduktion Betriebsdauer | | | 0.93 | 0.93 | 0.93 | |
| Reduktion Windrichtung | | | 0.68 | 0.63 | 0.63 | |
| Gesamte Reduktion | | | 0.20 | 0.24 | 0.30 | |
| Met.wahrsch.Beschattung | | | 4 | 40 | 34 | |

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) Schattende | (WEA mit letztem Schatten) |
|--------------|-----------------------|-------------------------|----------------------|----------------------------------|---------------------------|------------------------------|----------------------------|
|--------------|-----------------------|-------------------------|----------------------|----------------------------------|---------------------------|------------------------------|----------------------------|

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: O - IO15

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Juli | | August | | September Oktober | | November Dezember | | | |
|---------------------------|-------|-------|--------|--|-------------------|-------|-------------------|------------|-------|-------|
| 1 | 04:39 | 05:19 | | | 06:14 | 07:07 | 18:11 (12) | 07:06 | 08:01 | |
| | 21:43 | 21:07 | | | 20:00 | 18:46 | 6 | 18:17 (12) | 16:35 | 15:50 |
| 2 | 04:39 | 05:21 | | | 06:15 | 07:09 | | 18:10 (12) | 07:08 | 08:03 |
| | 21:42 | 21:05 | | | 19:58 | 18:43 | 5 | 18:15 (12) | 16:33 | 15:49 |
| 3 | 04:40 | 05:22 | | | 06:17 | 07:11 | | 18:09 (12) | 07:10 | 08:04 |
| | 21:42 | 21:03 | | | 19:55 | 18:41 | 4 | 18:13 (12) | 16:31 | 15:49 |
| 4 | 04:41 | 05:24 | | | 06:19 | 07:13 | | 18:08 (12) | 07:12 | 08:06 |
| | 21:41 | 21:01 | | | 19:53 | 18:39 | 1 | 18:09 (12) | 16:29 | 15:48 |
| 5 | 04:42 | 05:26 | | | 19:52 (1) | 06:21 | | | 07:14 | 08:07 |
| | 21:41 | 21:00 | 3 | | 19:55 (1) | 19:50 | | | 16:27 | 15:47 |
| 6 | 04:43 | 05:27 | | | 19:49 (1) | 06:23 | | | 07:16 | 08:09 |
| | 21:40 | 20:58 | 10 | | 19:59 (1) | 19:48 | | | 16:25 | 15:47 |
| 7 | 04:44 | 05:29 | | | 19:46 (1) | 06:24 | | | 07:18 | 08:10 |
| | 21:39 | 20:56 | 14 | | 20:00 (1) | 19:45 | | | 16:23 | 15:46 |
| 8 | 04:45 | 05:31 | | | 19:46 (1) | 06:26 | | | 07:20 | 08:11 |
| | 21:39 | 20:54 | 15 | | 20:01 (1) | 19:43 | | | 16:21 | 15:46 |
| 9 | 04:46 | 05:33 | | | 19:44 (1) | 06:28 | | | 07:22 | 08:13 |
| | 21:38 | 20:52 | 18 | | 20:02 (1) | 19:41 | | | 16:20 | 15:45 |
| 10 | 04:47 | 05:34 | | | 19:43 (1) | 06:30 | | | 07:24 | 08:14 |
| | 21:37 | 20:50 | 20 | | 20:03 (1) | 19:38 | | | 16:18 | 15:45 |
| 11 | 04:48 | 05:36 | | | 19:43 (1) | 06:31 | | | 07:26 | 08:15 |
| | 21:36 | 20:48 | 20 | | 20:03 (1) | 19:36 | | | 16:16 | 15:45 |
| 12 | 04:49 | 05:38 | | | 19:42 (1) | 06:33 | | | 07:28 | 08:16 |
| | 21:35 | 20:45 | 21 | | 20:03 (1) | 19:33 | | | 16:14 | 15:45 |
| 13 | 04:51 | 05:40 | | | 19:42 (1) | 06:35 | | | 07:29 | 08:17 |
| | 21:34 | 20:43 | 21 | | 20:03 (1) | 19:31 | | | 16:13 | 15:45 |
| 14 | 04:52 | 05:41 | | | 19:42 (1) | 06:37 | | | 07:31 | 08:18 |
| | 21:33 | 20:41 | 21 | | 20:03 (1) | 19:28 | | | 16:11 | 15:45 |
| 15 | 04:53 | 05:43 | | | 19:41 (1) | 06:39 | | | 07:33 | 08:19 |
| | 21:32 | 20:39 | 21 | | 20:02 (1) | 19:26 | | | 16:10 | 15:45 |
| 16 | 04:54 | 05:45 | | | 19:42 (1) | 06:40 | | | 07:35 | 08:20 |
| | 21:31 | 20:37 | 20 | | 20:02 (1) | 19:23 | | | 16:08 | 15:45 |
| 17 | 04:56 | 05:47 | | | 19:42 (1) | 06:42 | | | 07:37 | 08:21 |
| | 21:30 | 20:35 | 20 | | 20:02 (1) | 19:21 | | | 16:06 | 15:45 |
| 18 | 04:57 | 05:49 | | | 19:42 (1) | 06:44 | | | 07:39 | 08:22 |
| | 21:29 | 20:33 | 18 | | 20:00 (1) | 19:18 | | | 16:05 | 15:45 |
| 19 | 04:58 | 05:50 | | | 19:43 (1) | 06:46 | | | 07:41 | 08:22 |
| | 21:27 | 20:30 | 16 | | 19:59 (1) | 19:16 | | | 16:04 | 15:45 |
| 20 | 05:00 | 05:52 | | | 19:45 (1) | 06:47 | | | 07:43 | 08:23 |
| | 21:26 | 20:28 | 13 | | 19:58 (1) | 19:13 | | | 16:02 | 15:46 |
| 21 | 05:01 | 05:54 | | | 19:46 (1) | 06:49 | | | 07:45 | 08:24 |
| | 21:25 | 20:26 | 9 | | 19:55 (1) | 19:11 | | | 16:01 | 15:46 |
| 22 | 05:03 | 05:56 | | | 06:51 | 07:47 | | | 07:46 | 08:24 |
| | 21:23 | 20:24 | | | 19:08 | 17:56 | | | 16:00 | 15:47 |
| 23 | 05:04 | 05:58 | | | 06:53 | 07:48 | | | 07:48 | 08:25 |
| | 21:22 | 20:21 | | | 19:06 | 17:54 | | | 15:58 | 15:47 |
| 24 | 05:06 | 05:59 | | | 06:55 | 07:50 | | | 07:50 | 08:25 |
| | 21:20 | 20:19 | | | 19:03 | 17:52 | | | 15:57 | 15:48 |
| 25 | 05:07 | 06:01 | | | 06:56 | 06:52 | | | 07:51 | 08:26 |
| | 21:19 | 20:17 | | | 19:01 | 16:50 | | | 15:56 | 15:48 |
| 26 | 05:09 | 06:03 | | | 06:58 | 06:54 | | | 07:53 | 08:26 |
| | 21:17 | 20:14 | | | 18:58 | 16:47 | | | 15:55 | 15:49 |
| 27 | 05:11 | 06:05 | | | 07:00 | 06:56 | | | 07:55 | 08:26 |
| | 21:16 | 20:12 | | | 18:56 | 16:45 | | | 15:54 | 15:50 |
| 28 | 05:12 | 06:06 | | | 07:02 | 06:58 | | | 07:57 | 08:26 |
| | 21:14 | 20:10 | | | 18:53 | 16:43 | | | 15:53 | 15:51 |
| 29 | 05:14 | 06:08 | | | 07:04 | 07:00 | | | 07:58 | 08:26 |
| | 21:12 | 20:07 | | | 18:51 | 16:41 | | | 15:52 | 15:51 |
| 30 | 05:16 | 06:10 | | | 07:05 | 07:02 | | | 08:00 | 08:26 |
| | 21:11 | 20:05 | | | 18:48 | 16:39 | | | 15:51 | 15:52 |
| 31 | 05:17 | 06:12 | | | | 07:04 | | | | 08:26 |
| | 21:09 | 20:02 | | | | 16:37 | | | | 15:53 |
| Sonnenscheinstunden | 513 | 460 | | | 382 | 328 | | | 258 | 232 |
| astr.max.mögl.Beschattung | | | 280 | | | | | | | |
| Red.Sonnenscheinwahrsch. | | | 0.48 | | | 0.33 | | | | |
| Reduktion Betriebsdauer | | | 0.93 | | | 0.93 | | | | |
| Reduktion Windrichtung | | | 0.63 | | | 0.68 | | | | |
| Gesamte Reduktion | | | 0.28 | | | 0.21 | | | | |
| Met.wahrsch.Beschattung | | | 80 | | | 3 | | | | |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: P - IO16
Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni |
|---------------------------|---------------|---------------|---------------|----------------------|---------------------------|-------------------|
| 1 | 08:26 15:55 | 07:56 16:46 | 06:58 17:43 | 06:42 19:41 | 05:33 20:37 | 19:45 (1) 21:28 |
| 2 | 08:26 15:56 | 07:54 16:48 | 06:56 17:44 | 06:40 19:43 | 05:31 20:39 | 19:44 (1) 21:29 |
| 3 | 08:26 15:57 | 07:52 16:50 | 06:53 17:46 | 06:37 19:45 | 05:29 20:41 | 19:43 (1) 21:30 |
| 4 | 08:26 15:58 | 07:51 16:52 | 06:51 17:48 | 06:35 19:47 | 05:27 20:43 | 19:43 (1) 21:31 |
| 5 | 08:25 16:00 | 07:49 16:54 | 06:48 17:50 | 06:33 19:49 | 05:25 20:45 | 19:42 (1) 21:32 |
| 6 | 08:25 16:01 | 07:47 16:56 | 06:46 17:52 | 06:30 19:51 | 05:23 20:46 | 19:42 (1) 21:33 |
| 7 | 08:24 16:02 | 07:45 16:58 | 06:44 17:54 | 06:28 19:53 | 05:21 20:48 | 19:42 (1) 21:34 |
| 8 | 08:24 16:04 | 07:43 17:00 | 06:41 17:56 | 06:25 19:54 | 05:19 20:50 | 19:42 (1) 21:35 |
| 9 | 08:23 16:05 | 07:41 17:03 | 06:39 17:58 | 06:23 19:56 | 05:17 20:52 | 19:43 (1) 21:36 |
| 10 | 08:23 16:07 | 07:39 17:05 | 06:36 18:00 | 06:20 19:58 | 05:15 20:54 | 19:43 (1) 21:37 |
| 11 | 08:22 16:08 | 07:37 17:07 | 06:34 18:02 | 06:18 20:00 | 05:13 20:55 | 19:44 (1) 21:38 |
| 12 | 08:21 16:10 | 07:35 17:09 | 06:32 18:04 | 06:16 20:02 | 05:11 20:57 | 19:45 (1) 21:39 |
| 13 | 08:20 16:11 | 07:33 17:11 | 06:29 18:06 | 3 17:35 (12) 06:13 | 05:09 20:59 | 20:02 (1) 21:39 |
| 14 | 08:20 16:13 | 07:31 17:13 | 06:27 18:08 | 5 17:39 (12) 06:11 | 05:08 21:00 | 19:46 (1) 21:39 |
| 15 | 08:19 16:15 | 07:29 17:15 | 06:24 18:10 | 6 17:41 (12) 06:09 | 05:06 21:02 | 20:00 (1) 21:39 |
| 16 | 08:18 16:16 | 07:27 17:17 | 06:22 18:11 | 8 17:43 (12) 06:06 | 05:04 21:04 | 19:47 (1) 21:40 |
| 17 | 08:17 16:18 | 07:25 17:19 | 06:19 18:13 | 06:04 21:06 | 05:03 21:06 | 19:57 (1) 21:41 |
| 18 | 08:16 16:20 | 07:23 17:21 | 06:17 18:15 | 06:02 21:08 | 05:01 21:07 | 04:34 21:42 |
| 19 | 08:14 16:22 | 07:20 17:23 | 06:14 18:17 | 05:59 21:09 | 04:59 21:09 | 04:34 21:43 |
| 20 | 08:13 16:23 | 07:18 17:25 | 06:12 18:19 | 05:57 21:10 | 04:58 21:10 | 04:34 21:43 |
| 21 | 08:12 16:25 | 07:16 17:27 | 06:10 18:21 | 05:55 21:12 | 04:56 21:12 | 04:34 21:43 |
| 22 | 08:11 16:27 | 07:14 17:29 | 06:07 18:23 | 05:52 21:14 | 04:55 21:14 | 04:35 21:43 |
| 23 | 08:09 16:29 | 07:12 17:31 | 06:05 18:25 | 05:50 21:15 | 04:54 21:15 | 04:35 21:44 |
| 24 | 08:08 16:31 | 07:09 17:33 | 06:02 18:26 | 05:48 21:17 | 04:52 21:17 | 04:35 21:44 |
| 25 | 08:07 16:33 | 07:07 17:35 | 06:00 18:28 | 05:46 21:18 | 04:51 21:18 | 04:35 21:44 |
| 26 | 08:05 16:35 | 07:05 17:37 | 05:57 18:30 | 05:43 21:20 | 04:50 21:20 | 04:36 21:44 |
| 27 | 08:04 16:37 | 07:03 17:39 | 05:55 18:32 | 05:41 21:21 | 6 19:52 (1) 04:48 | 04:36 21:44 |
| 28 | 08:02 16:38 | 07:00 17:41 | 05:52 18:34 | 05:39 21:22 | 19:58 (1) 04:47 | 04:37 21:43 |
| 29 | 08:01 16:40 | 06:50 19:36 | 06:50 20:34 | 12 20:01 (1) 21:22 | 19:46 (1) 04:46 | 04:37 21:43 |
| 30 | 07:59 16:42 | 06:47 19:38 | 06:47 20:35 | 15 20:01 (1) 21:24 | 05:37 19:45 (1) 04:45 | 04:37 21:43 |
| 31 | 07:57 16:44 | 06:45 19:40 | 06:45 20:35 | 17 20:02 (1) 21:25 | 05:35 19:45 (1) 04:45 | 04:38 21:43 |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 |
| astr.max.mögl.Beschattung | | | | 50 | 280 | |
| Red.Sonnenscheinwahrsch. | | | 0.31 | 0.41 | 0.51 | |
| Reduktion Betriebsdauer | | | 0.93 | 0.93 | 0.93 | |
| Reduktion Windrichtung | | | 0.68 | 0.63 | 0.63 | |
| Gesamte Reduktion | | | 0.20 | 0.24 | 0.30 | |
| Met.wahrsch.Beschattung | | | 4 | 12 | 84 | |

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) |



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: P - IO16

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]

| Jan | Feb | Mär | Apr | Mai | Jun | Jul | Aug | Sep | Okt | Nov | Dez |
|------|------|------|------|------|------|------|------|------|------|------|------|
| 1.39 | 2.32 | 3.70 | 5.75 | 8.12 | 7.70 | 7.33 | 7.20 | 5.12 | 3.48 | 1.79 | 1.03 |

Betriebsdauer je Sektor

| N | NNO | ONO | O | OSO | SSO | S | SSW | WSW | W | WNW | NNW | Summe |
|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| 405 | 493 | 534 | 462 | 594 | 596 | 556 | 827 | 1,170 | 1,140 | 805 | 558 | 8,140 |

Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember | |
|---------------------------|----------------|------------------------|------------------------|----------------|---------------------|---------------------|----------------|
| 1 | 04:39 21:43 | 05:19 21:07 | 19:55 (1) 20:12 (1) | 06:14 20:00 | 07:07 18:46 | 18:14 (12) 16:35 | 08:01 15:50 |
| 2 | 04:39 21:42 | 05:21 21:05 | 19:54 (1) 20:13 (1) | 06:15 19:58 | 07:09 18:43 | 18:14 (12) 16:33 | 08:03 15:49 |
| 3 | 04:40 21:42 | 05:22 21:03 | 19:53 (1) 20:13 (1) | 06:17 19:55 | 07:11 18:41 | 18:15 (12) 16:33 | 08:04 15:49 |
| 4 | 04:41 21:41 | 05:24 21:01 | 19:52 (1) 20:13 (1) | 06:19 19:53 | 07:13 18:39 | 18:16 (12) 16:33 | 08:06 15:48 |
| 5 | 04:42 21:41 | 05:26 21:00 | 19:52 (1) 20:14 (1) | 06:21 19:50 | 07:15 18:36 | 18:17 (12) 16:34 | 08:07 15:47 |
| 6 | 04:43 21:40 | 05:27 20:58 | 19:52 (1) 20:14 (1) | 06:23 19:48 | 07:16 18:34 | 18:18 (12) 16:35 | 08:09 15:47 |
| 7 | 04:44 21:39 | 05:29 20:56 | 19:52 (1) 20:14 (1) | 06:24 19:45 | 07:18 18:31 | 18:19 (12) 16:35 | 08:10 15:46 |
| 8 | 04:45 21:39 | 05:31 20:54 | 19:52 (1) 20:14 (1) | 06:26 19:43 | 07:20 18:29 | 18:20 (12) 16:36 | 08:11 15:46 |
| 9 | 04:46 21:38 | 05:33 20:52 | 19:52 (1) 20:14 (1) | 06:28 19:41 | 07:22 18:26 | 18:21 (12) 16:37 | 08:13 15:46 |
| 10 | 04:47 21:37 | 05:34 20:50 | 19:52 (1) 20:13 (1) | 06:30 19:38 | 07:24 18:24 | 18:22 (12) 16:38 | 08:14 15:45 |
| 11 | 04:48 21:36 | 05:36 20:48 | 19:52 (1) 20:13 (1) | 06:31 19:36 | 07:26 18:22 | 18:23 (12) 16:39 | 08:15 15:45 |
| 12 | 04:49 21:35 | 05:38 20:45 | 19:52 (1) 20:11 (1) | 06:33 19:33 | 07:28 18:19 | 18:24 (12) 16:40 | 08:16 15:45 |
| 13 | 04:51 21:34 | 05:40 20:43 | 19:53 (1) 20:10 (1) | 06:35 19:31 | 07:29 18:17 | 18:25 (12) 16:41 | 08:17 15:45 |
| 14 | 04:52 21:33 | 05:41 20:41 | 19:55 (1) 20:09 (1) | 06:37 19:28 | 07:31 18:14 | 18:26 (12) 16:42 | 08:18 15:45 |
| 15 | 04:53 21:32 | 05:43 20:39 | 19:56 (1) 20:07 (1) | 06:39 19:26 | 07:33 18:12 | 18:27 (12) 16:43 | 08:19 15:45 |
| 16 | 04:54 21:31 | 05:45 20:37 | 20:00 (1) 20:03 (1) | 06:40 19:23 | 07:35 18:10 | 18:28 (12) 16:44 | 08:20 15:45 |
| 17 | 04:56 21:30 | 05:47 20:35 | 06:42 19:21 | 06:42 19:21 | 07:37 18:08 | 18:29 (12) 16:45 | 08:21 15:45 |
| 18 | 04:57 21:29 | 05:49 20:33 | 06:44 19:18 | 06:44 19:18 | 07:39 18:05 | 18:30 (12) 16:46 | 08:22 15:45 |
| 19 | 04:58 21:27 | 05:50 20:30 | 06:46 19:16 | 06:46 19:16 | 07:41 18:03 | 18:31 (12) 16:47 | 08:22 15:45 |
| 20 | 05:00 21:26 | 05:52 20:28 | 06:47 19:13 | 06:47 19:13 | 07:43 18:01 | 18:32 (12) 16:48 | 08:23 15:46 |
| 21 | 05:01 21:25 | 05:54 20:26 | 06:49 19:11 | 06:49 19:11 | 07:45 17:58 | 18:33 (12) 16:49 | 08:24 15:46 |
| 22 | 05:03 21:23 | 05:56 20:24 | 06:51 19:08 | 06:51 19:08 | 07:47 17:56 | 18:34 (12) 16:50 | 08:24 15:47 |
| 23 | 05:04 21:22 | 05:58 20:21 | 06:53 19:06 | 06:53 19:06 | 07:48 17:54 | 18:35 (12) 16:51 | 08:25 15:47 |
| 24 | 05:06 21:20 | 05:59 20:19 | 06:55 19:03 | 06:55 19:03 | 07:50 17:52 | 18:36 (12) 16:52 | 08:25 15:48 |
| 25 | 05:07 21:19 | 06:01 20:17 | 06:56 19:01 | 06:56 19:01 | 07:52 16:50 | 18:37 (12) 16:53 | 08:26 15:48 |
| 26 | 05:09 21:17 | 06:03 20:14 | 06:58 18:58 | 06:58 18:58 | 07:54 16:47 | 18:38 (12) 16:54 | 08:26 15:49 |
| 27 | 05:11 21:16 | 06:05 20:12 | 07:00 18:56 | 07:00 18:56 | 07:56 16:45 | 18:39 (12) 16:55 | 08:26 15:50 |
| 28 | 05:12 21:14 | 20:02 (1) 20:06 (1) | 06:06 20:10 | 07:02 18:53 | 18:17 (12) 16:43 | 06:58 16:43 | 08:26 15:51 |
| 29 | 05:14 21:12 | 19:59 (1) 20:08 (1) | 06:08 20:07 | 07:04 18:51 | 18:15 (12) 16:41 | 07:00 16:41 | 08:26 15:51 |
| 30 | 05:16 21:11 | 19:57 (1) 20:10 (1) | 06:10 20:05 | 07:05 18:48 | 18:14 (12) 16:39 | 07:02 16:39 | 08:26 15:52 |
| 31 | 05:17 21:09 | 19:56 (1) 20:11 (1) | 06:12 20:02 | 18:48 | 18:20 (12) 16:37 | 07:04 16:37 | 08:26 15:53 |
| Sonnenscheinstunden | | 513 | 460 | 382 | 328 | 258 | 232 |
| astr.max.mögl.Beschattung | | 41 | 293 | 19 | 4 | | |
| Red.Sonnenscheinwahrsch. | | 0.44 | 0.48 | 0.40 | 0.33 | | |
| Reduktion Betriebsdauer | | 0.93 | 0.93 | 0.93 | 0.93 | | |
| Reduktion Windrichtung | | 0.63 | 0.63 | 0.68 | 0.68 | | |
| Gesamte Reduktion | | 0.26 | 0.28 | 0.26 | 0.21 | | |
| Met.wahrsch.Beschattung | | 11 | 83 | 5 | 1 | | |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: U - IO21

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]

Table with 12 columns (Jan to Dez) and 1 row of values: 1.39, 2.32, 3.70, 5.75, 8.12, 7.70, 7.33, 7.20, 5.12, 3.48, 1.79, 1.03

Betriebsdauer je Sektor

Table with 13 columns (N, NNO, ONO, O, OSO, SSO, S, SSW, WSW, W, WNW, NNW, Summe) and 2 rows of values

Main shadow calculation table with columns for months (Juli to Dezember) and rows for time slots (e.g., 04:39, 05:32, etc.)

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

Summary table with columns: Tag im Monat, Sonnenaufgang (SS:MM), Sonnenuntergang (SS:MM), Minuten mit Schatten, Zeitpunkt (SS:MM) Schattenanfang, Zeitpunkt (SS:MM) Schattende, (WEA mit erstem Schatten), (WEA mit letztem Schatten)



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: W - IO23

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1.170 1.140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Juli | | August | | September | | Oktober | | November | | Dezember | |
|----|---------------------------|--------------------|--------------|-------------------|-------------------|--------------------|--------------|--|----------|--|----------|--|
| 1 | 04:39 | 05:40 (18) 05:19 | 06:14 | 07:07 | 08:07 (2) 07:06 | 07:47 (12) 08:02 | 09:15 (5) | | | | | |
| 2 | 04:40 | 05:40 (18) 05:21 | 06:16 | 07:07 (6) 07:09 | 08:03 (2) 07:08 | 07:47 (12) 08:03 | 09:14 (5) | | | | | |
| 3 | 04:40 | 05:41 (18) 05:22 | 06:17 | 07:05 (6) 07:11 | 08:01 (2) 07:10 | 07:46 (12) 08:05 | 09:15 (5) | | | | | |
| 4 | 04:41 | 05:41 (18) 05:24 | 06:19 | 07:03 (6) 07:13 | 07:59 (2) 07:12 | 07:46 (12) 08:06 | 09:15 (5) | | | | | |
| 5 | 04:42 | 05:41 (18) 05:26 | 06:21 | 07:02 (6) 07:15 | 07:57 (2) 07:14 | 07:46 (12) 08:08 | 09:15 (5) | | | | | |
| 6 | 04:43 | 05:41 (18) 05:28 | 06:23 | 07:01 (6) 07:17 | 07:56 (2) 07:16 | 07:46 (12) 08:09 | 09:15 (5) | | | | | |
| 7 | 04:44 | 05:41 (18) 05:29 | 06:24 | 07:01 (6) 07:18 | 07:56 (2) 07:18 | 07:49 (12) 08:10 | 09:16 (5) | | | | | |
| 8 | 04:45 | 05:42 (18) 05:31 | 06:26 | 07:00 (6) 07:20 | 07:56 (2) 07:20 | 07:51 (12) 08:12 | 09:16 (5) | | | | | |
| 9 | 04:46 | 05:42 (18) 05:33 | 06:28 | 07:00 (6) 07:22 | 07:56 (2) 07:22 | 07:53 (12) 08:13 | 09:17 (5) | | | | | |
| 10 | 04:47 | 05:42 (18) 05:35 | 06:30 | 07:00 (6) 07:24 | 07:57 (2) 07:24 | 07:55 (12) 08:14 | 09:17 (5) | | | | | |
| 11 | 04:48 | 05:42 (18) 05:36 | 06:32 | 07:00 (6) 07:26 | 07:57 (2) 07:26 | 07:57 (12) 08:15 | 09:17 (5) | | | | | |
| 12 | 04:49 | 05:43 (18) 05:38 | 06:33 | 07:00 (6) 07:28 | 07:59 (2) 07:28 | 07:59 (12) 08:16 | 09:18 (5) | | | | | |
| 13 | 04:51 | 05:43 (18) 05:40 | 06:35 | 07:02 (6) 07:30 | 08:01 (2) 07:30 | 08:01 (12) 08:17 | 09:18 (5) | | | | | |
| 14 | 04:52 | 05:44 (18) 05:42 | 06:37 | 07:04 (6) 07:32 | 08:09 (2) 07:32 | 08:09 (12) 08:18 | 09:18 (5) | | | | | |
| 15 | 04:53 | 05:44 (18) 05:43 | 06:39 | 07:04 (6) 07:33 | 08:11 (2) 07:33 | 08:11 (12) 08:19 | 09:19 (5) | | | | | |
| 16 | 04:55 | 05:45 (18) 05:45 | 06:41 | 07:06 (6) 07:35 | 08:13 (2) 07:35 | 08:13 (12) 08:20 | 09:19 (5) | | | | | |
| 17 | 04:56 | 05:45 (18) 05:47 | 06:42 | 07:07 (6) 07:37 | 08:15 (2) 07:37 | 08:15 (12) 08:21 | 09:20 (5) | | | | | |
| 18 | 04:57 | 05:46 (18) 05:49 | 06:44 | 07:09 (6) 07:39 | 08:17 (2) 07:39 | 08:17 (12) 08:22 | 09:21 (5) | | | | | |
| 19 | 04:59 | 05:46 (18) 05:51 | 06:46 | 07:11 (6) 07:41 | 08:19 (2) 07:41 | 08:19 (12) 08:23 | 09:22 (5) | | | | | |
| 20 | 05:00 | 05:47 (18) 05:52 | 06:48 | 07:13 (6) 07:43 | 08:21 (2) 07:43 | 08:21 (12) 08:24 | 09:22 (5) | | | | | |
| 21 | 05:02 | 05:48 (18) 05:54 | 06:49 | 07:15 (6) 07:45 | 08:23 (2) 07:45 | 08:23 (12) 08:25 | 09:23 (5) | | | | | |
| 22 | 05:03 | 05:49 (18) 05:56 | 06:51 | 07:17 (6) 07:47 | 08:25 (2) 07:47 | 08:25 (12) 08:26 | 09:24 (5) | | | | | |
| 23 | 05:05 | 05:50 (18) 05:58 | 06:53 | 07:19 (6) 07:49 | 08:27 (2) 07:49 | 08:27 (12) 08:27 | 09:24 (5) | | | | | |
| 24 | 05:06 | 05:52 (18) 05:59 | 06:55 | 07:21 (6) 07:51 | 08:29 (2) 07:51 | 08:29 (12) 08:28 | 09:25 (5) | | | | | |
| 25 | 05:08 | 05:53 (18) 06:01 | 06:57 | 07:23 (6) 07:53 | 08:31 (2) 07:53 | 08:31 (12) 08:29 | 09:25 (5) | | | | | |
| 26 | 05:09 | 05:55 (18) 06:03 | 06:59 | 07:25 (6) 07:55 | 08:33 (2) 07:55 | 08:33 (12) 08:30 | 09:26 (5) | | | | | |
| 27 | 05:11 | 05:57 (18) 06:05 | 07:01 | 07:27 (6) 07:57 | 08:35 (2) 07:57 | 08:35 (12) 08:31 | 09:26 (5) | | | | | |
| 28 | 05:12 | 05:59 (18) 06:07 | 07:03 | 07:29 (6) 07:59 | 08:37 (2) 07:59 | 08:37 (12) 08:32 | 09:27 (5) | | | | | |
| 29 | 05:14 | 06:01 (18) 06:09 | 07:05 | 07:31 (6) 08:01 | 08:39 (2) 08:01 | 08:39 (12) 08:33 | 09:27 (5) | | | | | |
| 30 | 05:16 | 06:03 (18) 06:11 | 07:07 | 07:33 (6) 08:03 | 08:41 (2) 08:03 | 08:41 (12) 08:34 | 09:28 (5) | | | | | |
| 31 | 05:17 | 06:05 (18) 06:13 | 07:09 | 07:35 (6) 08:05 | 08:43 (2) 08:05 | 08:43 (12) 08:35 | 09:28 (5) | | | | | |
| | 21:09 | 20:03 | 11 06:58 (1) | 16:37 | 17 08:07 (12) | 15:54 | 24 09:50 (5) | | | | | |
| | Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 | | | | | |
| | astr.max.mögl.Beschattung | 673 | 396 | 323 | 262 | 310 | 712 | | | | | |
| | Red.Sonnenscheinwahrsch. | 0.44 | 0.48 | 0.40 | 0.33 | 0.21 | 0.14 | | | | | |
| | Reduktion Betriebsdauer | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | | | | | |
| | Reduktion Windrichtung | 0.70 | 0.68 | 0.67 | 0.62 | 0.60 | 0.59 | | | | | |
| | Gesamte Reduktion | 0.28 | 0.30 | 0.25 | 0.19 | 0.11 | 0.07 | | | | | |
| | Met.wahrsch.Beschattung | 188 | 119 | 79 | 49 | 35 | 53 | | | | | |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: X - IO24

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

Table with 12 columns (Januar to Juni) and multiple rows of hourly and daily solar data, including start/end times, probabilities, and cumulative statistics at the bottom.

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

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



Projekt: Windeignungsgebiet Görmin

Lizenzierter Anwender: I17-Wind GmbH & Co. KG Am Westersielzug 11 DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de Berechnet: 25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: Z - IO26 Voraussetzungen für Berechnung des Schattenwurfs

Table with 12 columns: Jan, Feb, Mär, Apr, Mai, Jun, Jul, Aug, Sep, Okt, Nov, Dez. Row 1: 1.39, 2.32, 3.70, 5.75, 8.12, 7.70, 7.33, 7.20, 5.12, 3.48, 1.79, 1.03

Betriebsdauer je Sektor: N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe 405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Main shadow calculation table with columns for months Jan to Jun and rows for each day from 1 to 31, including solar times and shadow reduction factors.

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

Summary table with columns: Tag im Monat, Sonnenaufgang (SS:MM), Sonnenuntergang (SS:MM), Minuten mit Schatten, Zeitpunkt (SS:MM) Schattenanfang, Zeitpunkt (SS:MM) Schattende, (WEA mit erstem Schatten), (WEA mit letztem Schatten)

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: Z - IO26
Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Juli | | August | | September | | Oktober | | November | | Dezember | |
|---------------------------|-------|--------------------|--------------------|-------------------|-------------------|-------|------------|--|----------|--|----------|--|
| 1 | 04:39 | 05:58 (18) 05:19 | 05:58 (18) 06:14 | 06:44 (1) 07:07 | 07:41 (2) 07:06 | 08:02 | 08:54 (13) | | | | | |
| 2 | 04:40 | 05:58 (18) 05:21 | 05:59 (18) 06:16 | 06:48 (1) 07:09 | 07:41 (2) 07:08 | 08:03 | 08:53 (13) | | | | | |
| 3 | 04:40 | 05:58 (18) 05:22 | 06:01 (18) 06:17 | 07:03 (6) 07:11 | 07:41 (2) 07:10 | 08:05 | 08:53 (13) | | | | | |
| 4 | 04:41 | 05:58 (18) 05:24 | 06:06 (18) 06:19 | 07:00 (6) 07:13 | 07:41 (2) 07:12 | 08:06 | 08:53 (13) | | | | | |
| 5 | 04:42 | 05:58 (18) 05:25 | 06:11 (18) 06:24 | 07:01 (6) 07:14 | 07:41 (2) 07:13 | 08:07 | 08:53 (13) | | | | | |
| 6 | 04:43 | 05:56 (18) 05:28 | 06:23 | 06:57 (6) 07:17 | 07:43 (2) 07:16 | 08:09 | 08:54 (13) | | | | | |
| 7 | 04:44 | 05:56 (18) 05:29 | 06:24 | 06:57 (6) 07:18 | 07:45 (2) 07:18 | 08:10 | 08:54 (13) | | | | | |
| 8 | 04:45 | 05:56 (18) 05:31 | 06:26 | 06:55 (6) 07:20 | 07:20 | 08:12 | 08:54 (13) | | | | | |
| 9 | 04:46 | 05:55 (18) 05:33 | 06:28 | 06:55 (6) 07:22 | 07:22 | 08:13 | 08:55 (13) | | | | | |
| 10 | 04:47 | 05:55 (18) 05:35 | 06:30 | 06:57 (6) 07:24 | 07:24 | 08:14 | 08:55 (13) | | | | | |
| 11 | 04:48 | 05:55 (18) 05:36 | 06:32 | 06:58 (6) 07:26 | 07:26 | 08:15 | 08:55 (13) | | | | | |
| 12 | 04:49 | 05:54 (18) 05:38 | 06:33 | 07:00 (6) 07:28 | 07:28 | 08:16 | 08:55 (13) | | | | | |
| 13 | 04:51 | 05:54 (18) 05:40 | 06:35 | 07:02 (6) 07:30 | 07:30 | 08:17 | 08:56 (13) | | | | | |
| 14 | 04:52 | 05:55 (18) 05:42 | 06:37 | 07:07 (6) 07:32 | 07:32 | 08:18 | 08:56 (13) | | | | | |
| 15 | 04:53 | 05:54 (18) 05:43 | 06:39 | 07:11 (6) 07:36 | 07:36 | 08:19 | 08:57 (13) | | | | | |
| 16 | 04:55 | 05:54 (18) 05:45 | 06:41 | 07:20 (3) 07:35 | 07:35 | 08:20 | 08:57 (13) | | | | | |
| 17 | 04:56 | 05:53 (18) 05:47 | 06:42 | 07:21 (3) 07:37 | 07:37 | 08:21 | 08:58 (13) | | | | | |
| 18 | 04:57 | 05:54 (18) 05:49 | 06:44 | 07:26 (3) 07:41 | 07:41 | 08:22 | 08:58 (13) | | | | | |
| 19 | 04:59 | 05:54 (18) 05:51 | 06:47 | 07:31 (3) 07:46 | 07:46 | 08:23 | 08:59 (13) | | | | | |
| 20 | 05:00 | 05:53 (18) 05:52 | 06:46 | 07:36 (3) 07:51 | 07:51 | 08:24 | 09:00 (13) | | | | | |
| 21 | 05:02 | 05:54 (18) 05:54 | 06:45 | 07:41 (3) 07:56 | 07:56 | 08:25 | 09:01 (13) | | | | | |
| 22 | 05:03 | 05:54 (18) 05:56 | 06:43 | 07:46 (3) 08:01 | 08:01 | 08:26 | 09:02 (13) | | | | | |
| 23 | 05:05 | 05:53 (18) 05:58 | 06:42 | 07:51 (3) 08:06 | 08:06 | 08:27 | 09:03 (13) | | | | | |
| 24 | 05:06 | 05:54 (18) 05:59 | 06:42 | 07:56 (3) 08:11 | 08:11 | 08:28 | 09:04 (13) | | | | | |
| 25 | 05:08 | 05:54 (18) 06:01 | 06:41 | 08:01 (3) 08:16 | 08:16 | 08:29 | 09:05 (13) | | | | | |
| 26 | 05:09 | 05:55 (18) 06:03 | 06:41 | 08:06 (3) 08:21 | 08:21 | 08:30 | 09:06 (13) | | | | | |
| 27 | 05:11 | 05:54 (18) 06:05 | 06:41 | 08:11 (3) 08:26 | 08:26 | 08:31 | 09:07 (13) | | | | | |
| 28 | 05:12 | 05:55 (18) 06:07 | 06:41 | 08:16 (3) 08:31 | 08:31 | 08:32 | 09:08 (13) | | | | | |
| 29 | 05:14 | 05:55 (18) 06:08 | 06:41 | 08:21 (3) 08:36 | 08:36 | 08:33 | 09:09 (13) | | | | | |
| 30 | 05:16 | 05:57 (18) 06:10 | 06:42 | 08:26 (3) 08:41 | 08:41 | 08:34 | 09:10 (13) | | | | | |
| 31 | 05:17 | 05:57 (18) 06:12 | 06:43 | 08:31 (3) 08:46 | 08:46 | 08:35 | 09:11 (13) | | | | | |
| Sonneneinstrahlung | 513 | 460 | 382 | 328 | 258 | 232 | 168 | | | | | |
| astr.max.mögl.Beschattung | 656 | 292 | 268 | 252 | 373 | 1168 | | | | | | |
| Red.Sonneneinstrahlung | 0.44 | 0.48 | 0.40 | 0.33 | 0.21 | 0.14 | | | | | | |
| Reduktion Betriebsdauer | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | | | | | | |
| Reduktion Windrichtung | 0.69 | 0.69 | 0.67 | 0.63 | 0.58 | 0.59 | | | | | | |
| Gesamte Reduktion | 0.28 | 0.30 | 0.24 | 0.19 | 0.11 | 0.07 | | | | | | |
| Met.wahrsch.Beschattung | 181 | 87 | 65 | 47 | 40 | 85 | | | | | | |

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 | Schattenende | (WEA mit erstem Schatten) | (WEA mit letztem Schatten) |
|--------------|-----------------------|-------------------------|----------------------|-------------------|----------------|--------------|---------------------------|----------------------------|
|--------------|-----------------------|-------------------------|----------------------|-------------------|----------------|--------------|---------------------------|----------------------------|



Projekt:
Windeignungsgebiet Görmin

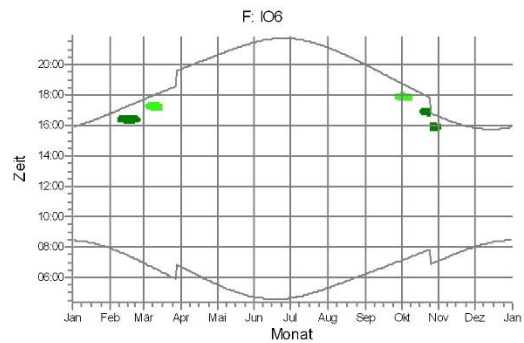
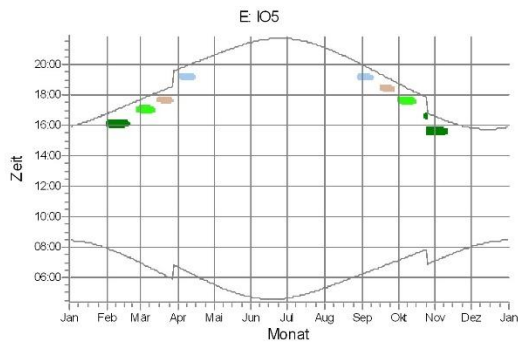
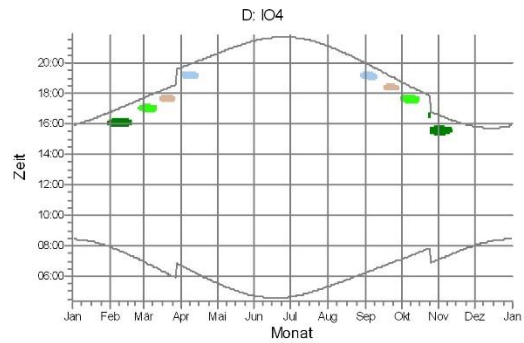
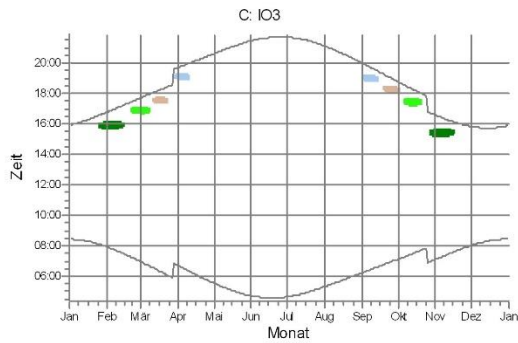
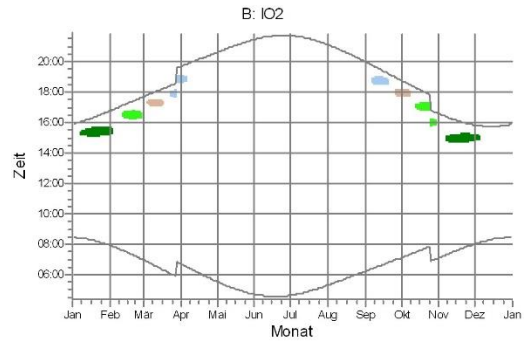
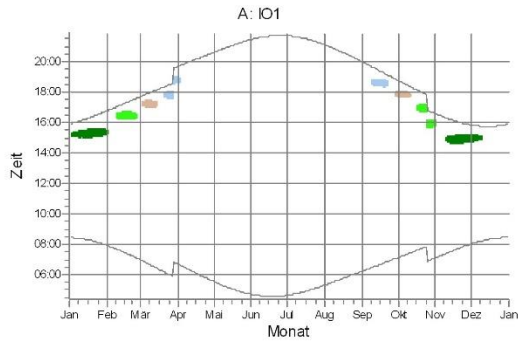
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Grafischer Kalender

Berechnung: GB



WEA



Projekt:
Windeignungsgebiet Görmin

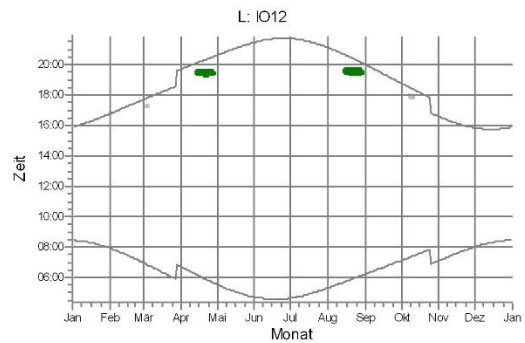
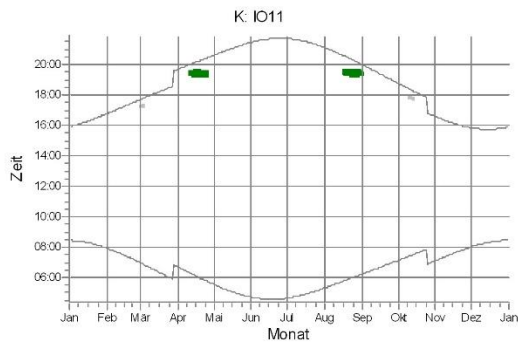
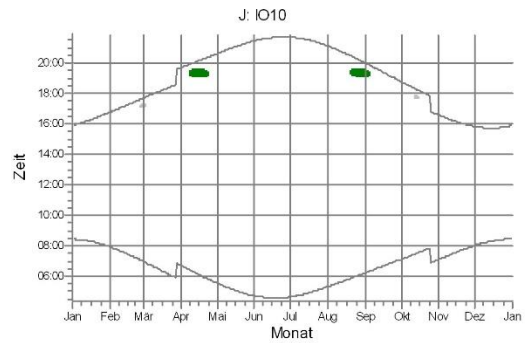
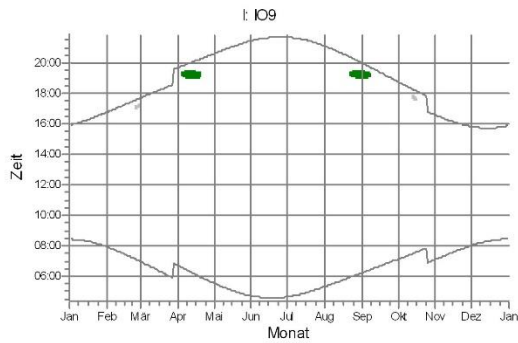
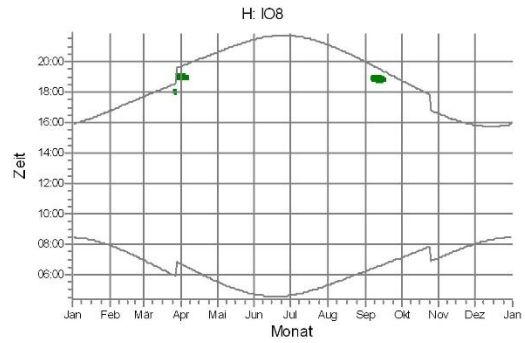
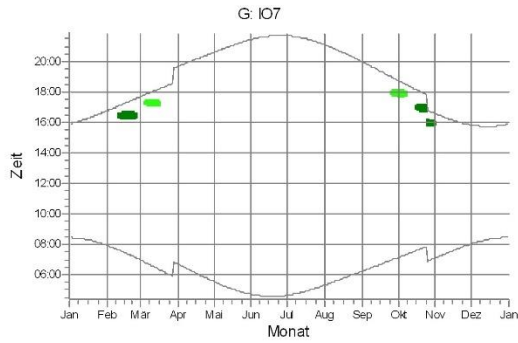
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Grafischer Kalender

Berechnung: GB



WEA

1: W9
 12: W24
 18: W6

Projekt:
Windeignungsgebiet Görmin

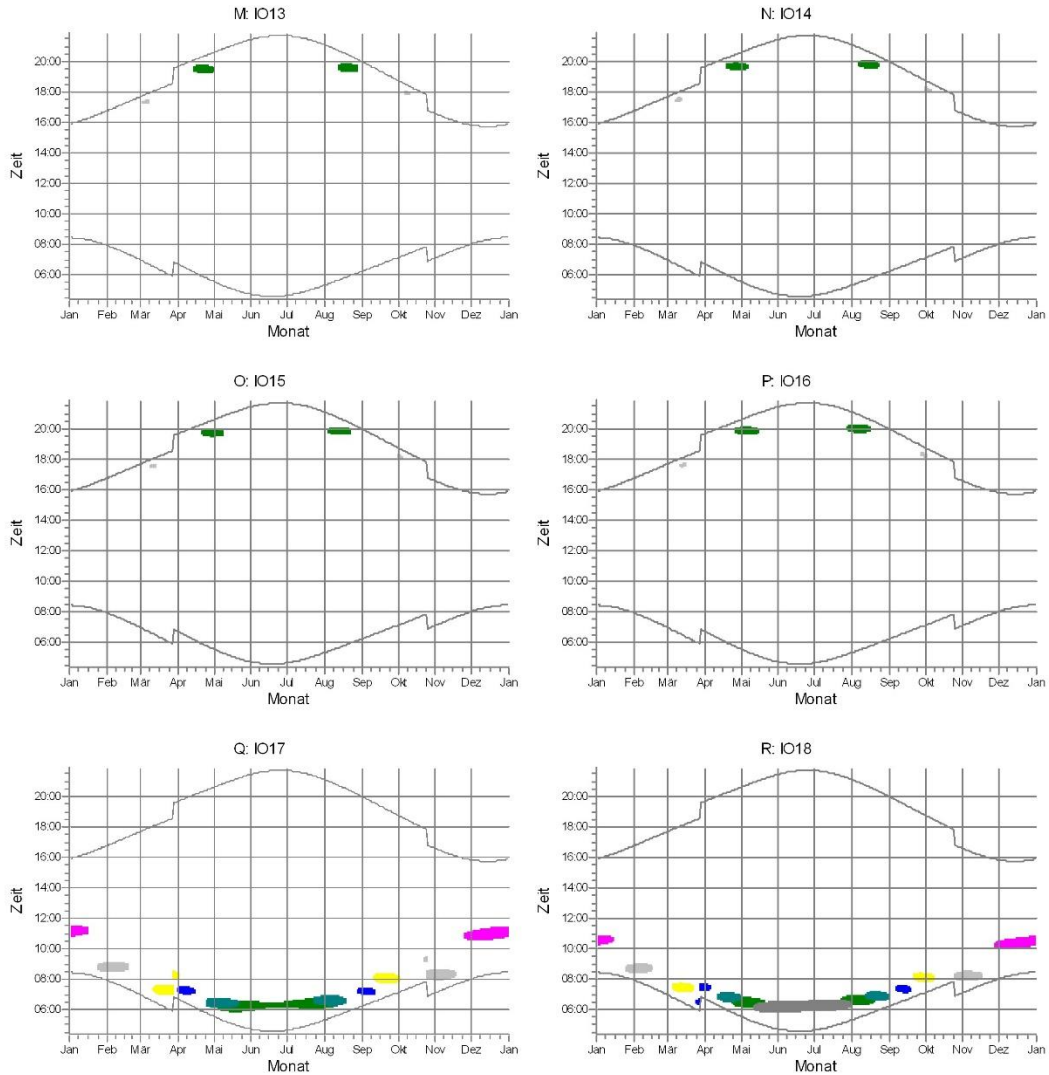
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Grafischer Kalender

Berechnung: GB



WEA



Projekt:
Windeignungsgebiet Görmin

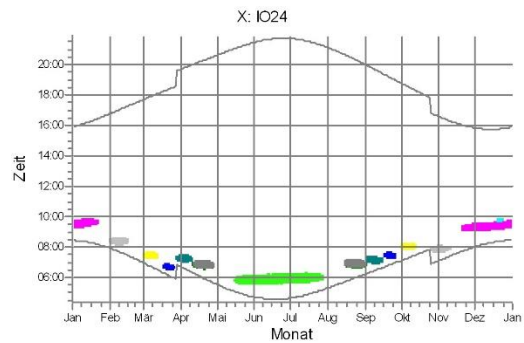
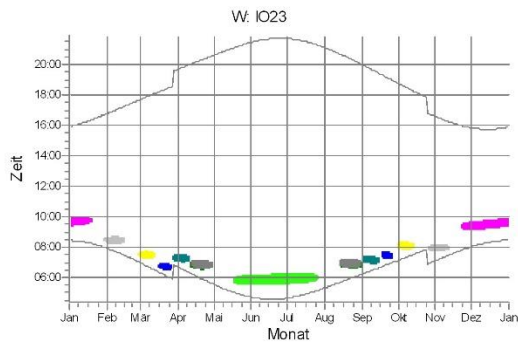
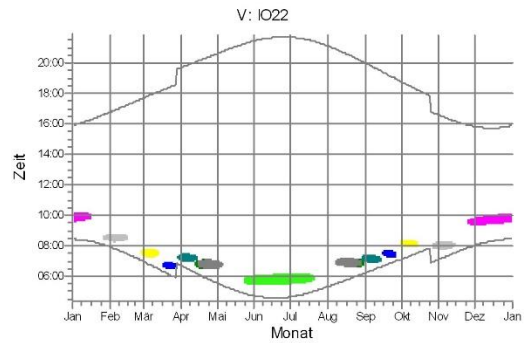
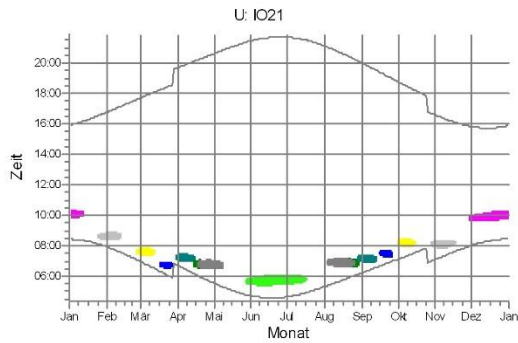
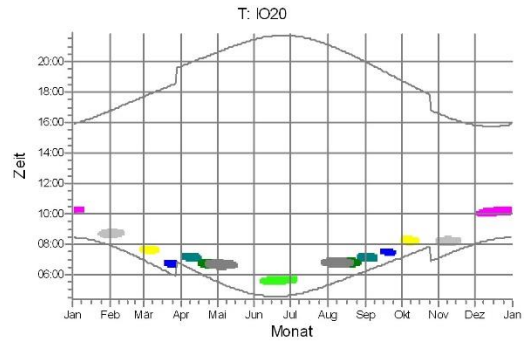
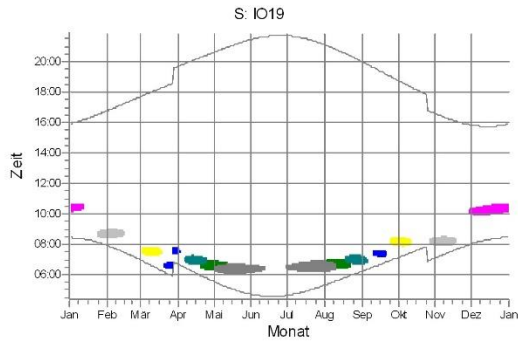
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Grafischer Kalender

Berechnung: GB



WEA



Projekt:
Windeignungsgebiet Görmin

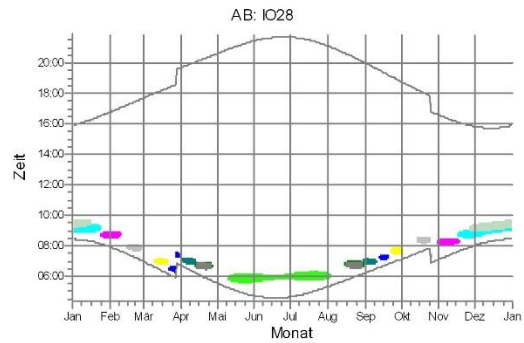
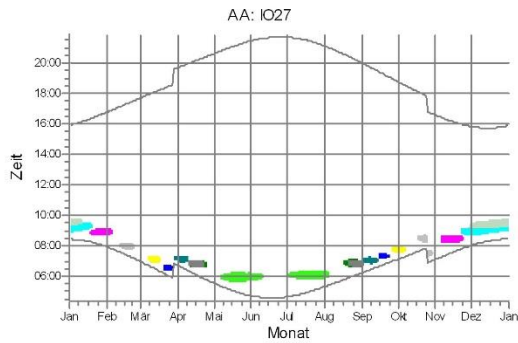
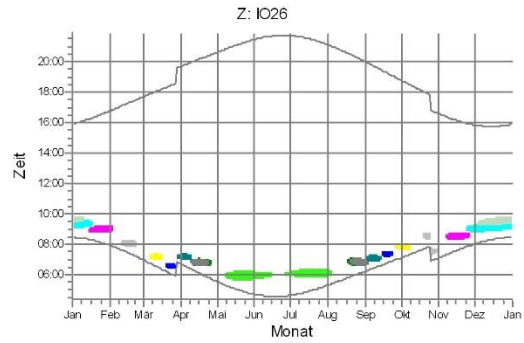
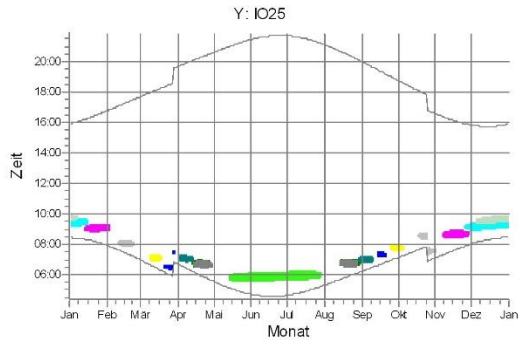
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



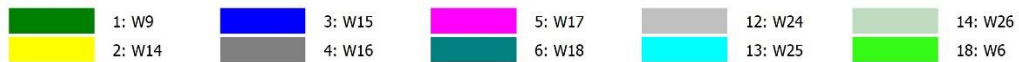
André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Grafischer Kalender

Berechnung: GB



WEA



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 1 - W9

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | |
|----|--|--|-------------------------------|--|--|-------------------------------|------------|
| 1 | 08:26 15:55 | 07:56 15:44-16:11/27 16:46 15:18-15:35/17 | 06:58 17:43 | 06:42 18:51-19:10/19 19:42 | 05:33 06:15-06:56/41 20:37 19:32-20:04/32 | 04:43 06:01-06:28/27 21:28 | |
| 2 | 08:26 15:56 | 07:54 15:44-16:13/29 16:48 15:19-15:33/14 | 06:56 17:45 | 06:40 18:51-19:10/19 19:43 | 05:31 06:15-06:55/40 20:39 19:33-20:04/31 | 04:42 06:02-06:27/25 21:29 | |
| 3 | 08:26 15:10-15:15/5 15:57 | 07:52 15:44-16:15/31 16:50 15:22-15:31/9 | 06:53 17:47 | 06:38 18:51-19:08/17 19:45 | 05:29 06:14-06:53/39 20:41 19:33-20:05/32 | 04:41 06:02-06:26/24 21:30 | |
| 4 | 08:26 15:09-15:17/8 15:58 | 07:51 15:43-16:16/33 16:52 | 06:51 17:48 | 06:35 18:51-19:08/17 19:47 | 05:27 06:10-06:52/42 20:43 19:34-20:05/31 | 04:40 06:03-06:27/24 21:31 | |
| 5 | 08:25 15:08-15:19/11 16:00 | 07:49 15:43-16:17/34 16:54 | 06:49 17:50 | 06:33 19:15-19:19/4 19:49 18:52-19:06/14 | 05:25 06:07-06:50/43 20:45 19:36-20:05/29 | 04:39 06:03-06:26/23 21:32 | |
| 6 | 08:25 15:08-15:21/13 16:01 | 07:47 15:44-16:18/34 16:57 | 06:46 17:52 | 06:30 19:11-19:23/12 19:51 18:54-19:04/10 | 05:23 06:04-06:48/44 20:46 19:38-20:04/26 | 04:39 06:04-06:25/21 21:33 | |
| 7 | 08:25 15:07-15:22/15 16:02 | 07:45 15:44-16:19/35 16:59 | 06:44 17:54 | 06:28 19:09-19:25/16 19:53 | 05:21 06:02-06:47/45 20:48 19:39-20:04/25 | 04:38 06:05-06:26/21 21:35 | |
| 8 | 08:24 15:07-15:22/15 16:04 | 07:43 15:44-16:19/35 17:01 | 06:41 17:56 | 06:25 19:07-19:25/18 19:55 | 05:19 06:02-06:47/45 20:50 19:42-20:03/21 | 04:37 06:05-06:25/20 21:35 | |
| 9 | 08:23 15:06-15:23/17 16:05 | 07:41 15:45-16:29/44 17:03 | 06:39 17:58 | 06:23 19:06-19:28/22 19:56 | 05:17 06:01-06:46/45 20:52 19:43-20:04/21 | 04:37 06:06-06:25/19 21:36 | |
| 10 | 08:23 15:06-15:25/19 16:07 | 07:39 15:46-16:32/46 17:05 | 06:37 18:00 | 06:21 06:50-06:53/3 19:58 19:04-19:29/25 | 05:15 05:59-06:44/45 20:54 19:43-20:03/20 | 04:36 06:07-06:25/18 21:37 | |
| 11 | 08:22 15:07-15:28/21 16:08 | 07:37 15:47-16:34/47 17:07 | 06:34 18:02 | 06:18 06:45-06:56/11 20:00 19:04-19:30/26 | 05:13 05:58-06:43/45 20:55 19:44-20:02/18 | 04:36 06:07-06:24/17 21:38 | |
| 12 | 08:21 15:07-15:29/22 16:10 | 07:35 15:49-16:37/48 17:09 | 06:32 18:04 | 06:16 06:43-06:59/16 20:02 19:04-19:33/29 | 05:11 05:58-06:42/44 20:57 19:45-20:02/17 | 04:35 06:08-06:24/16 21:39 | |
| 13 | 08:21 15:06-15:30/24 16:11 | 07:33 15:50-16:37/47 17:11 | 06:29 18:06 | 06:13 06:40-07:01/21 20:04 19:03-19:34/31 | 05:10 05:58-06:40/42 20:59 19:46-20:00/14 | 04:35 06:09-06:24/15 21:40 | |
| 14 | 08:20 15:06-15:30/24 16:13 | 07:31 15:53-16:38/45 17:13 | 06:27 18:08 | 06:11 06:37-07:01/24 20:06 19:03-19:36/33 | 05:08 05:58-06:40/42 21:01 19:47-19:58/11 | 04:35 06:09-06:23/14 21:40 | |
| 15 | 08:19 15:06-15:31/25 16:15 | 07:29 15:56-16:39/43 17:15 | 06:24 18:10 | 06:09 06:36-07:02/26 20:08 19:04-19:38/34 | 05:06 05:57-06:39/42 21:02 19:49-19:57/8 | 04:35 06:10-06:22/12 21:41 | |
| 16 | 08:18 15:06-15:32/26 16:16 | 07:27 15:57-16:40/43 17:17 | 06:22 18:12 | 06:06 06:35-07:03/28 20:10 19:04-19:39/35 | 05:04 05:56-06:38/42 21:04 | 04:34 06:11-06:22/11 21:41 | |
| 17 | 08:17 15:06-15:34/28 16:18 | 07:25 15:59-16:41/42 17:19 | 06:19 18:13 | 06:04 06:33-07:03/30 20:11 19:05-19:41/36 | 05:03 05:57-06:36/39 21:06 | 04:34 06:11-06:22/11 21:42 | |
| 18 | 08:16 15:07-15:35/28 16:20 | 07:23 16:01-16:40/39 17:21 | 06:17 18:15 | 06:02 06:33-07:03/30 20:13 19:06-19:42/36 | 05:01 05:57-06:35/38 21:07 | 04:34 06:12-06:22/10 21:42 | |
| 19 | 08:15 15:06-15:35/29 16:22 | 07:21 16:13-16:40/27 17:23 | 06:15 18:17 | 05:59 06:33-07:03/30 20:15 19:08-19:42/34 | 05:00 05:56-06:33/37 21:09 | 04:34 06:12-06:22/10 21:43 | |
| 20 | 08:13 15:07-15:36/29 16:23 | 07:18 16:13-16:40/27 17:25 | 06:12 18:19 | 05:57 06:33-07:03/30 20:17 19:10-19:47/37 | 04:58 05:57-06:30/33 21:11 | 04:34 06:13-06:22/9 21:43 | |
| 21 | 08:12 15:07-15:36/29 16:25 | 07:16 16:13-16:39/26 17:27 | 06:10 18:21 | 05:55 06:31-07:02/31 20:19 19:10-19:49/39 | 04:56 05:56-06:29/33 21:12 | 04:34 06:14-06:23/9 21:43 | |
| 22 | 08:11 15:07-15:37/30 16:27 | 07:14 16:15-16:39/24 17:29 | 06:07 18:23 | 05:52 06:28-07:02/34 20:21 19:11-19:51/40 | 04:55 05:57-06:29/32 21:14 | 04:35 06:14-06:23/9 21:43 | |
| 23 | 08:10 15:07-15:36/29 16:29 | 07:12 16:16-16:38/22 17:31 | 06:05 18:25 | 05:50 06:26-07:01/35 20:23 19:14-19:53/39 | 04:54 05:57-06:29/32 21:15 | 04:35 06:13-06:23/10 21:44 | |
| 24 | 08:08 15:09-15:37/28 16:31 | 07:09 16:18-16:36/18 17:33 | 06:02 18:27 | 05:48 06:25-07:01/36 20:24 19:15-19:54/39 | 04:52 05:58-06:29/31 21:17 | 04:35 06:14-06:24/10 21:44 | |
| 25 | 08:07 15:09-15:37/28 16:33 | 07:07 16:21-16:35/14 17:35 | 06:00 18:28 | 05:46 06:23-07:00/37 20:26 19:17-19:55/38 | 04:51 05:58-06:29/31 21:18 | 04:35 06:14-06:24/10 21:44 | |
| 26 | 08:05 15:51-15:58/7 16:35 | 07:05 16:24-16:32/8 15:10-15:38/28 | 05:57 17:59-18:04/5 18:30 | 05:44 06:21-07:00/39 20:28 19:19-19:56/36 | 04:50 05:59-06:29/30 21:20 | 04:36 06:13-06:24/11 21:44 | |
| 27 | 08:04 15:49-16:00/11 16:37 | 07:03 15:11-15:37/26 | 05:55 17:56-18:05/9 18:32 | 05:41 06:19-06:59/40 20:30 19:20-19:59/38 | 04:48 05:58-06:28/30 21:21 | 04:36 06:13-06:25/12 21:44 | |
| 28 | 08:02 15:47-16:02/15 16:39 | 07:00 15:11-15:37/26 | 05:52 17:54-18:07/13 18:34 | 05:39 06:18-06:58/40 20:32 19:22-20:01/39 | 04:47 05:58-06:28/30 21:23 | 04:37 06:13-06:25/12 21:44 | |
| 29 | 08:01 15:46-16:03/17 16:41 | 15:12-15:36/24 | 06:50 18:52-19:09/17 19:36 | 05:37 06:17-06:57/40 20:34 19:23-20:01/38 | 04:46 05:59-06:28/29 21:24 | 04:37 06:13-06:27/14 21:43 | |
| 30 | 07:59 15:46-16:05/19 16:42 | 15:15-15:37/22 | 06:47 18:52-19:10/18 19:38 | 05:35 06:16-06:56/40 20:36 19:25-20:02/37 | 04:45 06:00-06:28/28 21:25 | 04:38 06:13-06:28/15 21:43 | |
| 31 | 07:58 15:45-16:08/23 16:44 | 15:16-15:36/20 | 06:45 18:51-19:09/18 19:40 | 06:44 21:27 | 06:01-06:28/27 21:27 | 04:38 06:13-06:28/15 21:43 | |
| | Sonnenscheinstunden Anzahl Minuten mit Schatten | 249 741 | 273 912 | 367 80 | 420 1528 | 495 1502 | 511 459 |

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:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 1 - W9

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Juli | August | September | Oktober | November | Dezember | |
|----|--|--|--|---|--|-------------------------------|------------|
| 1 | 04:39 06:12-06:28/16 21:43 | 05:19 06:09-06:53/44 21:07 19:55-20:12/17 | 06:14 06:44-06:55/11 20:00 19:03-19:29/26 | 07:07 18:46 | 07:06 15:15-16:01/46 16:35 | 08:01 14:49-15:10/21 15:50 | |
| 2 | 04:39 06:12-06:29/17 21:42 | 05:21 06:09-06:53/44 21:05 19:54-20:13/19 | 06:15 06:48-06:51/3 19:58 19:03-19:28/25 | 07:09 18:44 | 07:08 15:50-15:58/8 16:33 15:15-15:49/34 | 08:03 14:49-15:08/19 15:49 | |
| 3 | 04:40 06:12-06:30/18 21:42 | 05:22 06:10-06:55/45 21:03 19:53-20:13/20 | 06:17 19:04-19:26/22 19:55 | 07:11 18:41 | 07:10 15:14-15:49/35 16:31 | 08:05 14:50-15:08/18 15:49 | |
| 4 | 04:41 06:11-06:30/19 21:41 | 05:24 06:11-06:56/45 21:02 19:52-20:13/21 | 06:19 19:04-19:22/18 19:53 | 07:13 18:39 | 07:12 15:14-15:48/34 16:29 | 08:06 14:51-15:07/16 15:48 | |
| 5 | 04:42 06:10-06:31/21 21:41 | 05:26 06:12-06:56/44 21:00 19:52-20:14/22 | 06:21 19:05-19:21/16 19:50 | 07:15 18:36 | 07:14 15:13-15:47/34 16:27 | 08:07 14:52-15:07/15 15:47 | |
| 6 | 04:43 06:10-06:31/21 21:40 | 05:27 06:13-06:57/44 20:58 19:49-20:14/25 | 06:23 19:07-19:19/12 19:48 18:50-19:00/10 | 07:17 18:34 | 07:16 15:13-15:47/34 16:25 | 08:09 14:53-15:06/13 15:47 | |
| 7 | 04:44 06:10-06:32/22 21:40 | 05:29 06:14-06:58/44 20:56 19:46-20:14/28 | 06:24 19:09-19:14/5 19:46 18:47-19:01/14 | 07:18 18:31 | 07:18 15:14-15:47/33 16:23 | 08:10 14:55-15:06/11 15:46 | |
| 8 | 04:45 06:10-06:33/23 21:39 | 05:31 06:17-07:00/43 20:54 19:45-20:14/29 | 06:26 18:46-19:02/16 19:43 | 07:20 18:29 | 07:20 15:14-15:45/31 16:21 14:52-15:02/10 | 08:11 14:56-15:05/9 15:46 | |
| 9 | 04:46 06:09-06:34/25 21:38 | 05:33 06:23-07:02/39 20:52 19:42-20:14/32 | 06:28 18:45-19:02/17 19:41 | 07:22 18:26 | 07:22 15:15-15:44/29 16:20 14:50-15:04/14 | 08:13 14:59-15:04/5 15:46 | |
| 10 | 04:47 06:09-06:34/25 21:37 | 05:34 06:23-07:02/39 20:50 19:41-20:13/32 | 06:30 18:44-19:03/19 19:38 | 07:24 18:24 | 07:24 15:15-15:41/26 16:18 14:48-15:06/18 | 08:14 15:45 | |
| 11 | 04:48 06:09-06:35/26 21:36 | 05:36 06:23-07:03/40 20:48 19:41-20:13/32 | 06:32 18:43-19:02/19 19:36 | 07:26 18:22 | 07:26 15:16-15:38/22 16:16 14:47-15:07/20 | 08:15 15:45 | |
| 12 | 04:49 06:08-06:35/27 21:35 | 05:38 06:24-07:04/40 20:46 19:39-20:11/32 | 06:33 18:43-19:02/19 19:33 | 07:28 18:19 | 07:28 15:17-15:36/19 16:14 14:45-15:08/23 | 08:16 15:45 | |
| 13 | 04:51 06:08-06:36/28 21:34 | 05:40 06:24-07:04/40 20:43 19:33-20:10/37 | 06:35 18:43-19:01/18 19:31 | 07:30 18:17 | 07:29 15:18-15:35/17 16:13 14:44-15:08/24 | 08:17 15:45 | |
| 14 | 04:52 06:09-06:37/28 21:33 | 05:42 06:25-07:05/40 20:41 19:31-20:09/38 | 06:37 18:43-18:59/16 19:28 | 07:31 18:15 | 07:31 15:19-15:34/15 16:11 14:43-15:09/26 | 08:18 15:45 | |
| 15 | 04:53 06:08-06:37/29 21:32 | 05:43 06:26-07:06/40 20:39 19:28-20:07/39 | 06:39 18:43-18:57/14 19:26 | 07:33 18:12 | 07:33 15:22-15:33/11 16:10 14:44-15:10/26 | 08:19 15:45 | |
| 16 | 04:54 06:08-06:38/30 21:31 | 05:45 06:26-07:06/40 20:37 19:27-20:03/36 | 06:40 18:45-18:55/10 19:23 | 07:35 16:55-17:06/11 18:10 | 07:35 15:24-15:31/7 16:08 14:43-15:11/28 | 08:20 15:45 | |
| 17 | 04:56 06:07-06:38/31 21:30 | 05:47 06:28-07:06/38 20:35 19:25-20:02/37 | 06:42 18:47-18:53/6 19:21 | 07:37 16:52-17:08/16 18:08 | 07:37 14:43-15:11/28 16:07 | 08:21 15:45 | |
| 18 | 04:57 06:08-06:39/31 21:29 | 05:49 06:30-07:07/37 20:33 19:22-20:00/38 | 06:44 19:18 | 07:39 16:49-17:09/20 18:05 | 07:39 14:43-15:11/28 16:05 | 08:22 15:45 | |
| 19 | 04:59 06:07-06:39/32 21:27 | 05:50 06:31-07:06/35 20:30 19:21-19:59/38 | 06:46 19:16 | 07:41 16:47-17:10/23 18:03 | 07:41 14:42-15:11/29 16:04 | 08:23 15:45 | |
| 20 | 05:00 06:07-06:39/32 21:26 | 05:52 06:32-07:07/35 20:28 19:19-19:58/39 | 06:48 19:13 | 07:43 16:45-17:10/25 18:01 | 07:43 14:42-15:12/30 16:02 | 08:23 15:46 | |
| 21 | 05:01 06:07-06:40/33 21:25 | 05:54 06:34-07:08/34 20:26 19:16-19:55/39 | 06:49 19:11 | 07:45 16:44-17:11/27 17:58 | 07:44 14:43-15:12/29 16:01 | 08:24 15:46 | |
| 22 | 05:03 06:07-06:40/33 21:23 | 05:56 06:36-07:07/31 20:24 19:14-19:53/39 | 06:51 19:08 | 07:47 16:44-17:11/27 17:56 | 07:46 14:43-15:12/29 16:00 | 08:24 15:47 | |
| 23 | 05:04 06:07-06:39/32 21:22 | 05:58 06:37-07:07/30 20:21 19:13-19:50/37 | 06:53 19:06 | 07:49 16:43-17:11/28 17:54 16:34-16:41/7 | 07:48 14:43-15:12/29 15:58 | 08:25 15:47 | |
| 24 | 05:06 06:07-06:41/34 21:20 | 05:59 06:37-07:07/30 20:19 19:11-19:46/35 | 06:55 19:03 | 07:50 16:31-17:11/40 17:52 | 07:50 14:44-15:12/28 15:57 | 08:25 15:48 | |
| 25 | 05:08 06:07-06:44/37 21:19 | 06:01 06:36-07:06/30 20:17 19:09-19:44/35 | 06:57 19:01 | 06:52 15:28-16:10/42 16:50 | 07:52 14:44-15:12/28 15:56 | 08:26 15:48 | |
| 26 | 05:09 06:07-06:46/39 21:17 | 06:03 06:36-07:05/29 20:14 19:07-19:43/36 | 06:58 18:58 | 06:54 15:26-16:10/44 16:47 | 07:53 14:45-15:12/27 15:55 | 08:26 15:49 | |
| 27 | 05:11 06:07-06:47/40 21:16 | 06:05 06:37-07:05/28 20:12 19:06-19:42/36 | 07:00 18:56 | 06:56 15:25-16:09/44 16:45 | 07:55 14:45-15:10/25 15:54 | 08:26 15:50 | |
| 28 | 05:12 06:08-06:49/41 21:14 | 06:07 06:38-07:04/26 20:10 19:05-19:39/34 | 07:02 18:53 | 06:58 15:22-16:08/46 16:43 | 07:57 14:46-15:10/24 15:53 | 08:26 15:51 | |
| 29 | 05:14 06:07-06:49/42 21:12 | 06:08 06:38-07:02/24 19:59-20:08/9 | 07:04 18:51 | 07:00 15:19-16:06/47 16:41 | 07:58 14:47-15:10/23 15:52 | 08:26 15:52 | |
| 30 | 05:16 06:08-06:51/43 21:11 | 06:10 06:40-07:01/21 19:57-20:10/13 | 07:06 18:48 | 07:02 15:17-16:05/48 16:39 | 08:00 14:48-15:10/22 15:51 | 08:27 15:52 | |
| 31 | 05:17 06:08-06:51/43 21:09 | 06:12 06:43-06:59/16 19:56-20:11/15 | 07:06 19:03-19:32/29 | 07:04 15:17-16:03/46 16:37 | 08:01 14:48-15:10/22 15:53 | 08:27 15:53 | |
| | Sonnenscheinstunden Anzahl Minuten mit Schatten | 513 959 | 460 2110 | 382 316 | 328 541 | 258 1003 | 232 127 |

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

| | | | | |
|--------------|---|--|--|--|
| Tag im Monat | Sonnenaufgang (SS:MM) Sonnennuntergang (SS:MM) | Zeitpunkt (SS:MM) Zeitpunkt (SS:MM) | Schattenanfang-Zeitpunkt (SS:MM) Schattenanfang-Zeitpunkt (SS:MM) | Schattenende/Minuten mit Schatten Schattenende/Minuten mit Schatten |
|--------------|---|--|--|--|

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 4 - W16

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni |
|-----------------------------|--------|---------|-------|-------|-------|-------|
| 1 | 08:26 | 07:56 | 06:58 | 06:43 | 05:33 | 04:43 |
| | 15:55 | 16:47 | 17:43 | 19:42 | 20:37 | 21:28 |
| 2 | 08:26 | 07:54 | 06:56 | 06:40 | 05:31 | 04:42 |
| | 15:56 | 16:49 | 17:45 | 19:43 | 20:39 | 21:29 |
| 3 | 08:26 | 07:52 | 06:53 | 06:38 | 05:29 | 04:41 |
| | 15:57 | 16:51 | 17:47 | 19:45 | 20:41 | 21:30 |
| 4 | 08:26 | 07:51 | 06:51 | 06:35 | 05:27 | 04:40 |
| | 15:58 | 16:53 | 17:49 | 19:47 | 20:43 | 21:31 |
| 5 | 08:25 | 07:49 | 06:49 | 06:33 | 05:25 | 04:39 |
| | 16:00 | 16:55 | 17:50 | 19:49 | 20:45 | 21:32 |
| 6 | 08:25 | 07:47 | 06:46 | 06:30 | 05:23 | 04:39 |
| | 16:01 | 16:57 | 17:52 | 19:51 | 20:46 | 21:34 |
| 7 | 08:25 | 07:45 | 06:44 | 06:28 | 05:21 | 04:38 |
| | 16:02 | 16:59 | 17:54 | 19:53 | 20:48 | 21:35 |
| 8 | 08:24 | 07:43 | 06:41 | 06:25 | 05:19 | 04:37 |
| | 16:04 | 17:01 | 17:56 | 19:55 | 20:50 | 21:35 |
| 9 | 08:24 | 07:41 | 06:39 | 06:23 | 05:17 | 04:37 |
| | 16:05 | 17:03 | 17:58 | 19:56 | 20:52 | 21:36 |
| 10 | 08:23 | 07:39 | 06:37 | 06:21 | 05:15 | 04:36 |
| | 16:07 | 17:05 | 18:00 | 19:58 | 20:54 | 21:37 |
| 11 | 08:22 | 07:37 | 06:34 | 06:18 | 05:13 | 04:36 |
| | 16:08 | 17:07 | 18:02 | 20:00 | 20:55 | 21:38 |
| 12 | 08:21 | 07:35 | 06:32 | 06:16 | 05:11 | 04:35 |
| | 16:10 | 17:09 | 18:04 | 20:02 | 20:57 | 21:39 |
| 13 | 08:21 | 07:33 | 06:29 | 06:13 | 05:10 | 04:35 |
| | 16:11 | 17:11 | 18:06 | 20:04 | 20:59 | 21:40 |
| 14 | 08:20 | 07:31 | 06:27 | 06:11 | 05:08 | 04:35 |
| | 16:13 | 17:13 | 18:08 | 20:06 | 21:01 | 21:40 |
| 15 | 08:19 | 07:29 | 06:24 | 06:09 | 05:06 | 04:35 |
| | 16:15 | 17:15 | 18:10 | 20:08 | 21:02 | 21:41 |
| 16 | 08:18 | 07:27 | 06:22 | 06:06 | 05:04 | 04:34 |
| | 16:16 | 17:17 | 18:12 | 20:10 | 21:04 | 21:41 |
| 17 | 08:17 | 07:25 | 06:20 | 06:04 | 05:03 | 04:34 |
| | 16:18 | 17:19 | 18:13 | 20:11 | 21:06 | 21:42 |
| 18 | 08:16 | 07:23 | 06:17 | 06:02 | 05:01 | 04:34 |
| | 16:20 | 17:21 | 18:15 | 20:13 | 21:07 | 21:42 |
| 19 | 08:15 | 07:21 | 06:15 | 05:59 | 05:00 | 04:34 |
| | 16:22 | 17:23 | 18:17 | 20:15 | 21:09 | 21:43 |
| 20 | 08:13 | 07:18 | 06:12 | 05:57 | 04:58 | 04:34 |
| | 16:23 | 17:25 | 18:19 | 20:17 | 21:11 | 21:43 |
| 21 | 08:12 | 07:16 | 06:10 | 05:55 | 04:57 | 04:34 |
| | 16:25 | 17:27 | 18:21 | 20:19 | 21:12 | 21:43 |
| 22 | 08:11 | 07:14 | 06:07 | 05:53 | 04:55 | 04:35 |
| | 16:27 | 17:29 | 18:23 | 20:21 | 21:14 | 21:44 |
| 23 | 08:10 | 07:12 | 06:05 | 05:50 | 04:54 | 04:35 |
| | 16:29 | 17:31 | 18:25 | 20:23 | 21:15 | 21:44 |
| 24 | 08:08 | 07:10 | 06:02 | 05:48 | 04:52 | 04:35 |
| | 16:31 | 17:33 | 18:27 | 20:24 | 21:17 | 21:44 |
| 25 | 08:07 | 07:07 | 06:00 | 05:46 | 04:51 | 04:36 |
| | 16:33 | 17:35 | 18:28 | 20:26 | 21:18 | 21:44 |
| 26 | 08:05 | 07:05 | 05:57 | 05:44 | 04:50 | 04:36 |
| | 16:35 | 17:37 | 18:30 | 20:28 | 21:20 | 21:44 |
| 27 | 08:04 | 07:03 | 05:55 | 05:41 | 04:48 | 04:36 |
| | 16:37 | 17:39 | 18:32 | 20:30 | 21:21 | 21:44 |
| 28 | 08:02 | 07:00 | 05:52 | 05:39 | 04:47 | 04:37 |
| | 16:39 | 17:41 | 18:34 | 20:32 | 21:23 | 21:44 |
| 29 | 08:01 | | 06:50 | 05:37 | 04:46 | 04:38 |
| | 16:41 | | 19:36 | 20:34 | 21:24 | 21:43 |
| 30 | 07:59 | | 06:47 | 05:35 | 04:45 | 04:38 |
| | 16:43 | | 19:38 | 20:36 | 21:25 | 21:43 |
| 31 | 07:58 | | 06:45 | | 04:44 | |
| | 16:45 | | 19:40 | | 21:27 | |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 |
| Anzahl Minuten mit Schatten | 0 | 0 | 0 | 592 | 1359 | 1046 |

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:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 4 - W16

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Juli | | August | | September | | Oktober | | November | | Dezember | |
|-----------------------------|-------|----------------|--------|----------------|-----------|----------------|---------|-------|----------|--|----------|--|
| 1 | 04:39 | 05:59-06:33/34 | 05:19 | 06:18-07:02/44 | 06:14 | 06:44-06:56/12 | 07:07 | 07:06 | 08:02 | | | |
| | 21:43 | | 21:07 | | 20:00 | | 18:46 | 16:35 | 15:50 | | | |
| 2 | 04:40 | 06:00-06:34/34 | 05:21 | 06:18-07:02/44 | 06:16 | 06:49-06:52/3 | 07:09 | 07:08 | 08:03 | | | |
| | 21:42 | | 21:05 | | 19:58 | | 18:44 | 16:33 | 15:49 | | | |
| 3 | 04:40 | 06:00-06:35/35 | 05:22 | 06:18-07:03/45 | 06:17 | | 07:11 | 07:10 | 08:05 | | | |
| | 21:42 | | 21:04 | | 19:55 | | 18:41 | 16:31 | 15:49 | | | |
| 4 | 04:41 | 05:59-06:36/37 | 05:24 | 06:19-07:04/45 | 06:19 | | 07:13 | 07:12 | 08:06 | | | |
| | 21:41 | | 21:02 | | 19:53 | | 18:39 | 16:29 | 15:48 | | | |
| 5 | 04:42 | 06:00-06:37/37 | 05:26 | 06:20-07:04/44 | 06:21 | | 07:15 | 07:14 | 08:07 | | | |
| | 21:41 | | 21:00 | | 19:50 | | 18:36 | 16:27 | 15:47 | | | |
| 6 | 04:43 | 06:00-06:38/38 | 05:28 | 06:21-07:04/43 | 06:23 | | 07:17 | 07:16 | 08:09 | | | |
| | 21:40 | | 20:58 | | 19:48 | | 18:34 | 16:25 | 15:47 | | | |
| 7 | 04:44 | 06:00-06:39/39 | 05:29 | 06:21-07:04/43 | 06:24 | | 07:18 | 07:18 | 08:10 | | | |
| | 21:40 | | 20:56 | | 19:46 | | 18:31 | 16:23 | 15:46 | | | |
| 8 | 04:45 | 06:00-06:40/40 | 05:31 | 06:23-07:05/42 | 06:26 | | 07:20 | 07:20 | 08:12 | | | |
| | 21:39 | | 20:54 | | 19:43 | | 18:29 | 16:22 | 15:46 | | | |
| 9 | 04:46 | 06:00-06:41/41 | 05:33 | 06:25-07:06/41 | 06:28 | | 07:22 | 07:22 | 08:13 | | | |
| | 21:38 | | 20:52 | | 19:41 | | 18:27 | 16:20 | 15:46 | | | |
| 10 | 04:47 | 06:00-06:42/42 | 05:35 | 06:28-07:06/38 | 06:30 | | 07:24 | 07:24 | 08:14 | | | |
| | 21:37 | | 20:50 | | 19:38 | | 18:24 | 16:18 | 15:45 | | | |
| 11 | 04:48 | 06:00-06:43/43 | 05:36 | 06:34-07:07/33 | 06:32 | | 07:26 | 07:26 | 08:15 | | | |
| | 21:36 | | 20:48 | | 19:36 | | 18:22 | 16:16 | 15:45 | | | |
| 12 | 04:49 | 06:01-06:43/42 | 05:38 | 06:34-07:08/34 | 06:33 | | 07:28 | 07:28 | 08:16 | | | |
| | 21:35 | | 20:46 | | 19:33 | | 18:19 | 16:15 | 15:45 | | | |
| 13 | 04:51 | 06:01-06:44/43 | 05:40 | 06:34-07:07/33 | 06:35 | | 07:30 | 07:29 | 08:17 | | | |
| | 21:34 | | 20:44 | | 19:31 | | 18:17 | 16:13 | 15:45 | | | |
| 14 | 04:52 | 06:02-06:45/43 | 05:42 | 06:34-07:08/34 | 06:37 | | 07:31 | 07:31 | 08:18 | | | |
| | 21:33 | | 20:41 | | 19:28 | | 18:15 | 16:11 | 15:45 | | | |
| 15 | 04:53 | 06:02-06:46/44 | 05:43 | 06:35-07:08/33 | 06:39 | | 07:33 | 07:33 | 08:19 | | | |
| | 21:32 | | 20:39 | | 19:26 | | 18:12 | 16:10 | 15:45 | | | |
| 16 | 04:54 | 06:02-06:46/44 | 05:45 | 06:35-07:07/32 | 06:40 | | 07:35 | 07:35 | 08:20 | | | |
| | 21:31 | | 20:37 | | 19:23 | | 18:10 | 16:08 | 15:45 | | | |
| 17 | 04:56 | 06:02-06:46/44 | 05:47 | 06:36-07:08/32 | 06:42 | | 07:37 | 07:37 | 08:21 | | | |
| | 21:30 | | 20:35 | | 19:21 | | 18:08 | 16:07 | 15:45 | | | |
| 18 | 04:57 | 06:03-06:48/45 | 05:49 | 06:37-07:09/32 | 06:44 | | 07:39 | 07:39 | 08:22 | | | |
| | 21:29 | | 20:33 | | 19:18 | | 18:05 | 16:05 | 15:45 | | | |
| 19 | 04:59 | 06:03-06:48/45 | 05:50 | 06:36-07:09/33 | 06:46 | | 07:41 | 07:41 | 08:23 | | | |
| | 21:27 | | 20:30 | | 19:16 | | 18:03 | 16:04 | 15:45 | | | |
| 20 | 05:00 | 06:03-06:48/45 | 05:52 | 06:36-07:09/33 | 06:48 | | 07:43 | 07:43 | 08:23 | | | |
| | 21:26 | | 20:28 | | 19:13 | | 18:01 | 16:02 | 15:46 | | | |
| 21 | 05:01 | 06:04-06:49/45 | 05:54 | 06:36-07:10/34 | 06:49 | | 07:45 | 07:44 | 08:24 | | | |
| | 21:25 | | 20:26 | | 19:11 | | 17:59 | 16:01 | 15:46 | | | |
| 22 | 05:03 | 06:04-06:49/45 | 05:56 | 06:35-07:09/34 | 06:51 | | 07:47 | 07:46 | 08:24 | | | |
| | 21:23 | | 20:24 | | 19:08 | | 17:56 | 16:00 | 15:47 | | | |
| 23 | 05:04 | 06:04-06:49/45 | 05:58 | 06:35-07:09/34 | 06:53 | | 07:49 | 07:48 | 08:25 | | | |
| | 21:22 | | 20:21 | | 19:06 | | 17:54 | 15:58 | 15:47 | | | |
| 24 | 05:06 | 06:05-06:49/44 | 05:59 | 06:35-07:09/34 | 06:55 | | 07:51 | 07:50 | 08:25 | | | |
| | 21:20 | | 20:19 | | 19:03 | | 17:52 | 15:57 | 15:48 | | | |
| 25 | 05:08 | 06:05-06:49/44 | 06:01 | 06:35-07:08/33 | 06:57 | | 06:52 | 07:52 | 08:26 | | | |
| | 21:19 | | 20:17 | | 19:01 | | 16:50 | 15:56 | 15:48 | | | |
| 26 | 05:09 | 06:07-06:50/43 | 06:03 | 06:35-07:07/32 | 06:58 | | 06:54 | 07:53 | 08:26 | | | |
| | 21:17 | | 20:14 | | 18:58 | | 16:47 | 15:55 | 15:49 | | | |
| 27 | 05:11 | 06:07-06:54/47 | 06:05 | 06:36-07:06/30 | 07:00 | | 06:56 | 07:55 | 08:26 | | | |
| | 21:16 | | 20:12 | | 18:56 | | 16:45 | 15:54 | 15:50 | | | |
| 28 | 05:12 | 06:09-06:57/48 | 06:07 | 06:38-07:05/27 | 07:02 | | 06:58 | 07:57 | 08:26 | | | |
| | 21:14 | | 20:10 | | 18:53 | | 16:43 | 15:53 | 15:51 | | | |
| 29 | 05:14 | 06:10-06:58/48 | 06:08 | 06:39-07:03/24 | 07:04 | | 07:00 | 07:58 | 08:27 | | | |
| | 21:12 | | 20:07 | | 18:51 | | 16:41 | 15:52 | 15:52 | | | |
| 30 | 05:16 | 06:12-07:00/48 | 06:10 | 06:42-07:01/19 | 07:06 | | 07:02 | 08:00 | 08:27 | | | |
| | 21:11 | | 20:05 | | 18:48 | | 16:39 | 15:51 | 15:53 | | | |
| 31 | 05:17 | 06:14-07:00/46 | 06:12 | 06:44-06:58/14 | | | 07:04 | | 08:27 | | | |
| | 21:09 | | 20:03 | | | | 16:37 | | 15:54 | | | |
| Sonnenscheinstunden | 513 | | 460 | | 382 | | 328 | 258 | 232 | | | |
| Anzahl Minuten mit Schatten | 1318 | | 1073 | | 15 | | 0 | 0 | 0 | | | |

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

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

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 5 - W17

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | |
|-----------------------------|---|-------------------------------|----------------|----------------|----------------|----------------|-----|
| 1 | 08:26 09:20-10:45/85 15:55 10:51-11:23/32 | 07:56 08:35-09:14/39 16:47 | 06:58 17:43 | 06:43 19:42 | 05:33 20:37 | 04:43 21:28 | |
| 2 | 08:26 09:21-10:45/84 15:56 10:52-11:24/32 | 07:54 08:34-09:13/39 16:49 | 06:56 17:45 | 06:40 19:43 | 05:31 20:39 | 04:42 21:29 | |
| 3 | 08:26 09:21-10:45/84 15:57 10:52-11:23/31 | 07:52 08:35-09:10/35 16:51 | 06:53 17:47 | 06:38 19:45 | 05:29 20:41 | 04:41 21:30 | |
| 4 | 08:26 09:22-10:46/84 15:58 10:53-11:24/31 | 07:51 08:35-09:01/26 16:53 | 06:51 17:49 | 06:35 19:47 | 05:27 20:43 | 04:40 21:31 | |
| 5 | 08:25 09:22-10:45/83 16:00 10:54-11:24/30 | 07:49 08:35-08:58/23 16:55 | 06:49 17:50 | 06:33 19:49 | 05:25 20:45 | 04:40 21:32 | |
| 6 | 08:25 09:23-10:46/83 16:01 10:55-11:24/29 | 07:47 08:36-08:53/17 16:57 | 06:46 17:52 | 06:30 19:51 | 05:23 20:46 | 04:39 21:33 | |
| 7 | 08:25 09:23-10:46/83 16:02 10:55-11:24/29 | 07:45 08:37-08:53/16 16:59 | 06:44 17:54 | 06:28 19:53 | 05:21 20:48 | 04:38 21:35 | |
| 8 | 08:24 09:23-10:45/82 16:04 10:56-11:24/28 | 07:43 08:38-08:52/14 17:01 | 06:41 17:56 | 06:25 19:55 | 05:19 20:50 | 04:37 21:35 | |
| 9 | 08:24 09:23-10:13/50 10:57-11:23/26 16:05 10:14-10:45/31 | 07:41 08:40-08:50/10 17:03 | 06:39 17:58 | 06:23 19:56 | 05:17 20:52 | 04:37 21:36 | |
| 10 | 08:23 09:25-10:14/49 10:58-11:23/25 16:07 10:18-10:45/27 | 07:39 08:44-08:47/3 17:05 | 06:37 18:00 | 06:21 19:58 | 05:15 20:54 | 04:36 21:37 | |
| 11 | 08:22 09:25-10:13/48 11:00-11:24/24 16:08 10:23-10:45/22 | 07:37 17:07 | 06:34 18:02 | 06:18 20:00 | 05:13 20:55 | 04:36 21:38 | |
| 12 | 08:21 09:26-10:12/46 11:01-11:23/22 16:10 10:25-10:44/19 | 07:35 17:09 | 06:32 18:04 | 06:16 20:02 | 05:11 20:57 | 04:36 21:39 | |
| 13 | 08:21 09:26-10:04/38 11:02-11:22/20 16:11 10:31-10:43/12 | 07:33 17:11 | 06:29 18:06 | 06:13 20:04 | 05:10 20:59 | 04:35 21:40 | |
| 14 | 08:20 08:59-09:05/6 10:33-10:40/7 16:13 09:27-10:02/35 11:03-11:21/18 | 07:31 17:13 | 06:27 18:08 | 06:11 20:06 | 05:08 21:01 | 04:35 21:40 | |
| 15 | 08:19 08:57-09:06/9 11:05-11:20/15 16:15 09:27-10:01/34 | 07:29 17:15 | 06:24 18:10 | 06:09 20:08 | 05:06 21:02 | 04:35 21:41 | |
| 16 | 08:18 08:53-09:08/15 09:53-10:00/7 16:16 09:28-09:52/24 11:08-11:18/10 | 07:27 17:17 | 06:22 18:12 | 06:06 20:10 | 05:04 21:04 | 04:34 21:41 | |
| 17 | 08:17 08:52-09:10/18 16:18 09:29-09:52/23 | 07:25 17:19 | 06:20 18:13 | 06:04 20:11 | 05:03 21:06 | 04:34 21:42 | |
| 18 | 08:16 08:51-09:11/20 16:20 09:30-09:51/21 | 07:23 17:21 | 06:17 18:15 | 06:02 20:13 | 05:01 21:07 | 04:34 21:42 | |
| 19 | 08:15 08:49-09:12/23 16:22 09:31-09:49/17 | 07:21 17:23 | 06:15 18:17 | 05:59 20:15 | 05:00 21:09 | 04:34 21:43 | |
| 20 | 08:13 08:47-09:13/26 16:24 09:33-09:45/12 | 07:18 17:25 | 06:12 18:19 | 05:57 20:17 | 04:58 21:11 | 04:34 21:43 | |
| 21 | 08:12 08:46-09:13/27 16:25 09:35-09:42/7 | 07:16 17:27 | 06:10 18:21 | 05:55 20:19 | 04:57 21:12 | 04:35 21:43 | |
| 22 | 08:11 08:45-09:14/29 16:27 | 07:14 17:29 | 06:07 18:23 | 05:53 20:21 | 04:55 21:14 | 04:35 21:43 | |
| 23 | 08:10 08:44-09:14/30 16:29 | 07:12 17:31 | 06:05 18:25 | 05:50 20:23 | 04:54 21:15 | 04:35 21:44 | |
| 24 | 08:08 08:44-09:15/31 16:31 | 07:10 17:33 | 06:02 18:27 | 05:48 20:24 | 04:52 21:17 | 04:35 21:44 | |
| 25 | 08:07 08:41-09:15/34 16:33 | 07:07 17:35 | 06:00 18:29 | 05:46 20:26 | 04:51 21:18 | 04:36 21:44 | |
| 26 | 08:05 08:39-09:16/37 16:35 | 07:05 17:37 | 05:57 18:30 | 05:44 20:28 | 04:50 21:20 | 04:36 21:44 | |
| 27 | 08:04 08:37-09:16/39 16:37 | 07:03 17:39 | 05:55 18:32 | 05:41 20:30 | 04:48 21:21 | 04:36 21:44 | |
| 28 | 08:02 08:36-09:16/40 16:39 | 07:00 17:41 | 05:52 18:34 | 05:39 20:32 | 04:47 21:23 | 04:37 21:44 | |
| 29 | 08:01 08:35-09:15/40 16:41 | | 06:50 19:36 | 05:37 20:34 | 04:46 21:24 | 04:38 21:43 | |
| 30 | 07:59 08:35-09:16/41 16:43 | | 06:47 19:38 | 05:35 20:36 | 04:45 21:25 | 04:38 21:43 | |
| 31 | 07:58 08:35-09:15/40 16:45 | | 06:45 19:40 | | 04:44 21:27 | | |
| Sonnenscheinstunden | | 249 | 273 | 367 | 420 | 495 | 511 |
| Anzahl Minuten mit Schatten | | 2104 | 222 | 0 | 0 | 0 | 0 |

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

| Tag im Monat | Sonnenaufgang (SS:MM) | 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:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 5 - W17

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember |
|-----------------------------|-------|--------|-----------|---------|----------|------------------------------------|
| 1 | 04:39 | 05:19 | 06:14 | 07:07 | 07:06 | 08:12-08:17/5 |
| | 21:43 | 21:07 | 20:00 | 18:46 | 16:35 | 15:50 10:05-10:27/22 |
| 2 | 04:40 | 05:21 | 06:16 | 07:09 | 07:08 | 08:09-08:20/11 |
| | 21:42 | 21:05 | 19:58 | 18:44 | 16:33 | 15:49 10:01-10:03/2 10:41-11:06/25 |
| 3 | 04:40 | 05:22 | 06:17 | 07:11 | 07:10 | 08:07-08:22/15 |
| | 21:42 | 21:03 | 19:55 | 18:41 | 16:31 | 15:49 09:59-10:29/30 |
| 4 | 04:41 | 05:24 | 06:19 | 07:13 | 07:12 | 08:06-08:22/16 |
| | 21:41 | 21:02 | 19:53 | 18:39 | 16:29 | 15:48 10:40-11:08/28 |
| 5 | 04:42 | 05:26 | 06:21 | 07:15 | 07:14 | 08:05-08:23/18 |
| | 21:41 | 21:00 | 19:50 | 18:36 | 16:27 | 15:48 10:41-11:09/28 |
| 6 | 04:43 | 05:28 | 06:23 | 07:17 | 07:16 | 08:06-08:30/24 |
| | 21:40 | 20:58 | 19:48 | 18:34 | 16:25 | 15:47 10:40-11:10/30 |
| 7 | 04:44 | 05:29 | 06:24 | 07:18 | 07:18 | 08:06-08:32/26 |
| | 21:40 | 20:56 | 19:46 | 18:31 | 16:23 | 15:46 10:41-11:11/30 |
| 8 | 04:45 | 05:31 | 06:26 | 07:20 | 07:20 | 08:05-08:42/37 |
| | 21:39 | 20:54 | 19:43 | 18:29 | 16:22 | 15:46 10:40-11:11/31 |
| 9 | 04:46 | 05:33 | 06:28 | 07:22 | 07:22 | 08:05-08:44/39 |
| | 21:38 | 20:52 | 19:41 | 18:27 | 16:20 | 15:46 10:40-10:34/84 |
| 10 | 04:47 | 05:35 | 06:30 | 07:24 | 07:24 | 08:05-08:45/40 |
| | 21:37 | 20:50 | 19:38 | 18:24 | 16:18 | 15:45 10:41-11:13/32 |
| 11 | 04:48 | 05:36 | 06:32 | 07:26 | 07:26 | 08:06-08:46/40 |
| | 21:36 | 20:48 | 19:36 | 18:22 | 16:16 | 15:45 10:41-11:13/32 |
| 12 | 04:49 | 05:38 | 06:33 | 07:28 | 07:28 | 08:06-08:47/41 |
| | 21:35 | 20:46 | 19:33 | 18:19 | 16:15 | 15:45 10:41-11:14/33 |
| 13 | 04:51 | 05:40 | 06:35 | 07:30 | 07:29 | 08:07-08:47/40 |
| | 21:34 | 20:44 | 19:31 | 18:17 | 16:13 | 15:45 10:42-11:14/32 |
| 14 | 04:52 | 05:42 | 06:37 | 07:31 | 07:31 | 08:09-08:49/40 |
| | 21:33 | 20:41 | 19:28 | 18:15 | 16:11 | 15:45 10:42-11:15/33 |
| 15 | 04:53 | 05:43 | 06:39 | 07:33 | 07:33 | 08:10-08:49/39 |
| | 21:32 | 20:39 | 19:26 | 18:12 | 16:10 | 15:45 10:42-10:37/85 |
| 16 | 04:55 | 05:45 | 06:40 | 07:35 | 07:35 | 08:12-08:49/37 |
| | 21:31 | 20:37 | 19:23 | 18:10 | 16:08 | 15:45 10:43-11:16/33 |
| 17 | 04:56 | 05:47 | 06:42 | 07:37 | 07:37 | 08:15-08:49/34 |
| | 21:30 | 20:35 | 19:21 | 18:08 | 16:07 | 15:45 10:43-11:17/34 |
| 18 | 04:57 | 05:49 | 06:44 | 07:39 | 07:39 | 08:18-08:49/31 |
| | 21:29 | 20:33 | 19:18 | 18:05 | 16:05 | 15:45 10:44-11:18/34 |
| 19 | 04:59 | 05:51 | 06:46 | 07:41 | 07:41 | 08:19-08:49/30 |
| | 21:27 | 20:30 | 19:16 | 18:03 | 16:04 | 15:45 10:45-11:18/33 |
| 20 | 05:00 | 05:52 | 06:48 | 07:43 | 07:43 | 08:20-08:49/29 |
| | 21:26 | 20:28 | 19:13 | 18:01 | 16:02 | 15:46 10:44-11:18/34 |
| 21 | 05:02 | 05:54 | 06:49 | 07:45 | 07:44 | 08:22-08:49/27 |
| | 21:25 | 20:26 | 19:11 | 17:59 | 16:01 | 15:46 10:45-11:19/34 |
| 22 | 05:03 | 05:56 | 06:51 | 07:47 | 07:46 | 08:23-08:49/26 |
| | 21:23 | 20:24 | 19:08 | 17:56 | 16:00 | 15:47 10:45-11:19/34 |
| 23 | 05:05 | 05:58 | 06:53 | 07:49 | 07:48 | 08:26-08:49/23 |
| | 21:22 | 20:21 | 19:06 | 17:54 | 15:58 | 15:47 10:46-11:20/34 |
| 24 | 05:06 | 05:59 | 06:55 | 07:51 | 07:50 | 08:28-08:48/20 |
| | 21:20 | 20:19 | 19:03 | 17:52 | 15:57 | 15:48 10:46-11:20/34 |
| 25 | 05:08 | 06:01 | 06:57 | 06:52 | 07:52 | 08:30-08:48/18 |
| | 21:19 | 20:17 | 19:01 | 16:50 | 15:56 | 15:48 10:47-11:20/33 |
| 26 | 05:09 | 06:03 | 06:58 | 06:54 | 07:53 | 08:32-08:47/15 09:32-09:39/7 |
| | 21:17 | 20:14 | 18:58 | 16:48 | 15:55 | 15:49 10:47-11:21/34 |
| 27 | 05:11 | 06:05 | 07:00 | 06:56 | 07:55 | 08:36-08:45/9 10:44-10:58/14 |
| | 21:16 | 20:12 | 18:56 | 16:45 | 15:54 | 15:49 10:48-11:22/34 |
| 28 | 05:12 | 06:07 | 07:02 | 06:58 | 07:57 | 08:38-08:44/6 10:13-10:19/6 |
| | 21:14 | 20:10 | 18:53 | 16:43 | 15:53 | 15:49 10:49-11:22/33 |
| 29 | 05:14 | 06:08 | 07:04 | 07:00 | 07:58 | 09:06-09:44/38 10:43-11:03/20 |
| | 21:12 | 20:07 | 18:51 | 16:41 | 15:52 | 15:52 10:50-11:23/33 |
| 30 | 05:16 | 06:10 | 07:06 | 07:02 | 08:00 | 09:07-09:53/46 10:42-11:04/22 |
| | 21:11 | 20:05 | 18:48 | 16:39 | 15:51 | 15:53 10:49-11:22/33 |
| 31 | 05:17 | 06:12 | | 07:04 | | 08:27 09:20-10:44/84 |
| | 21:09 | 20:03 | | 16:37 | | 15:54 10:50-11:23/33 |
| Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 |
| Anzahl Minuten mit Schatten | 0 | 0 | 0 | 0 | 1120 | 3574 |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 6 - W18

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | |
|-----------------------------|----------------|----------------|----------------|-------------------------|-------------------------|-------------------------|-----|
| 1 | 08:26 15:55 | 07:56 16:46 | 06:58 17:43 | 06:42 19:42 | 07:06-07:26/20 20:37 | 05:33 21:28 | |
| 2 | 08:26 15:56 | 07:54 16:48 | 06:56 17:45 | 06:40 19:43 | 07:04-07:27/23 20:39 | 05:31 21:29 | |
| 3 | 08:26 15:57 | 07:52 16:50 | 06:53 17:47 | 06:38 19:45 | 07:01-07:26/25 20:41 | 05:29 21:30 | |
| 4 | 08:26 15:58 | 07:51 16:53 | 06:51 17:49 | 06:35 19:47 | 06:59-07:26/27 20:43 | 05:27 21:31 | |
| 5 | 08:25 16:00 | 07:49 16:55 | 06:49 17:50 | 06:33 19:49 | 06:57-07:25/28 20:45 | 05:25 21:32 | |
| 6 | 08:25 16:01 | 07:47 16:57 | 06:46 17:52 | 06:30 19:51 | 06:54-07:25/31 20:46 | 05:23 21:34 | |
| 7 | 08:25 16:02 | 07:45 16:59 | 06:44 17:54 | 06:28 19:53 | 06:53-07:25/32 20:48 | 05:21 21:35 | |
| 8 | 08:24 16:04 | 07:43 17:01 | 06:41 17:56 | 06:25 19:55 | 06:52-07:24/32 20:50 | 05:19 21:35 | |
| 9 | 08:24 16:05 | 07:41 17:03 | 06:39 17:58 | 06:23 19:56 | 06:52-07:24/32 20:52 | 05:17 21:36 | |
| 10 | 08:23 16:07 | 07:39 17:05 | 06:37 18:00 | 06:21 19:58 | 06:50-07:23/33 20:54 | 05:15 21:37 | |
| 11 | 08:22 16:08 | 07:37 17:07 | 06:34 18:02 | 06:18 20:00 | 06:48-07:21/33 20:55 | 05:13 21:38 | |
| 12 | 08:21 16:10 | 07:35 17:09 | 06:32 18:04 | 06:16 20:02 | 06:46-07:21/35 20:57 | 05:11 21:39 | |
| 13 | 08:21 16:11 | 07:33 17:11 | 06:29 18:06 | 06:13 20:04 | 06:44-07:20/36 20:59 | 05:10 21:40 | |
| 14 | 08:20 16:13 | 07:31 17:13 | 06:27 18:08 | 06:11 20:06 | 06:41-07:18/37 21:01 | 05:08 21:40 | |
| 15 | 08:19 16:15 | 07:29 17:15 | 06:24 18:10 | 06:09 20:08 | 06:40-07:17/37 21:02 | 05:06 21:41 | |
| 16 | 08:18 16:16 | 07:27 17:17 | 06:22 18:12 | 06:06 20:10 | 06:39-07:15/36 21:04 | 05:04 21:41 | |
| 17 | 08:17 16:18 | 07:25 17:19 | 06:20 18:13 | 06:04 20:11 | 06:37-07:11/34 21:06 | 05:03 21:42 | |
| 18 | 08:16 16:20 | 07:23 17:21 | 06:17 18:15 | 06:02 20:13 | 06:37-07:10/33 21:07 | 05:01 21:42 | |
| 19 | 08:15 16:22 | 07:21 17:23 | 06:15 18:17 | 05:59 20:15 | 06:36-07:09/33 21:09 | 05:00 21:43 | |
| 20 | 08:13 16:23 | 07:18 17:25 | 06:12 18:19 | 05:57 20:17 | 06:36-07:08/32 21:11 | 04:58 21:43 | |
| 21 | 08:12 16:25 | 07:16 17:27 | 06:10 18:21 | 05:55 20:19 | 06:35-07:06/31 21:12 | 04:57 21:43 | |
| 22 | 08:11 16:27 | 07:14 17:29 | 06:07 18:23 | 05:52 20:21 | 06:35-07:05/30 21:14 | 04:55 21:43 | |
| 23 | 08:10 16:29 | 07:12 17:31 | 06:05 18:25 | 05:50 20:23 | 06:35-07:03/28 21:15 | 04:54 21:44 | |
| 24 | 08:08 16:31 | 07:09 17:33 | 06:02 18:27 | 05:48 20:24 | 06:36-07:01/25 21:17 | 04:52 21:44 | |
| 25 | 08:07 16:33 | 07:07 17:35 | 06:00 18:28 | 05:46 20:26 | 06:36-07:00/24 21:18 | 04:51 21:44 | |
| 26 | 08:05 16:35 | 07:05 17:37 | 05:57 18:30 | 05:44 20:28 | 06:37-06:59/22 21:20 | 04:50 21:44 | |
| 27 | 08:04 16:37 | 07:03 17:39 | 05:55 18:32 | 05:41 20:30 | 06:17-06:58/41 21:21 | 04:48 21:44 | |
| 28 | 08:02 16:39 | 07:00 17:41 | 05:52 18:34 | 05:39 20:32 | 06:15-06:57/42 21:23 | 04:47 21:44 | |
| 29 | 08:01 16:41 | | 06:50 19:36 | 07:14-07:23/9 20:34 | 05:37 21:24 | 06:14-06:55/41 21:24 | |
| 30 | 07:59 16:43 | | 06:47 19:38 | 07:11-07:24/13 20:36 | 05:35 21:25 | 06:43-06:52/9 21:25 | |
| 31 | 07:58 16:45 | | 06:45 19:40 | 07:09-07:26/17 | 05:36 21:27 | 06:13-06:40/27 | |
| Sonnenscheinstunden | | 249 | 273 | 367 | 420 | 495 | 511 |
| Anzahl Minuten mit Schatten | | 0 | 0 | 39 | 979 | 533 | 0 |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 6 - W18

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember | |
|-----------------------------|----------------|----------------|-------------------------|----------------|-------------------------|----------------|-----|
| 1 | 04:39 21:43 | 05:19 21:07 | 06:22-06:50/28 20:00 | 06:14 18:46 | 06:47-07:20/33 16:35 | 07:06 15:50 | |
| 2 | 04:40 21:42 | 05:21 21:05 | 06:21-06:50/29 19:58 | 06:16 18:44 | 06:48-07:21/33 16:33 | 07:09 15:49 | |
| 3 | 04:40 21:42 | 05:22 21:03 | 06:21-06:51/30 19:55 | 06:17 18:41 | 06:50-07:22/32 16:31 | 07:11 15:49 | |
| 4 | 04:41 21:41 | 05:24 21:02 | 06:21-06:51/30 19:53 | 06:19 18:39 | 06:49-07:21/32 16:29 | 07:13 15:48 | |
| 5 | 04:42 21:41 | 05:26 21:00 | 06:20-06:51/31 19:50 | 06:21 18:36 | 06:49-07:21/32 16:27 | 07:15 15:47 | |
| 6 | 04:43 21:40 | 05:28 20:58 | 06:20-06:51/31 19:48 | 06:23 18:34 | 06:50-07:21/31 16:25 | 07:17 15:47 | |
| 7 | 04:44 21:40 | 05:29 20:56 | 06:19-06:50/31 19:46 | 06:24 18:31 | 06:52-07:21/29 16:23 | 07:18 15:46 | |
| 8 | 04:45 21:39 | 05:31 20:54 | 06:20-06:51/31 19:43 | 06:26 18:29 | 06:53-07:20/27 16:22 | 07:20 15:46 | |
| 9 | 04:46 21:38 | 05:33 20:52 | 06:20-06:51/31 19:41 | 06:28 18:26 | 06:55-07:20/25 16:20 | 07:22 15:46 | |
| 10 | 04:47 21:37 | 05:35 20:50 | 06:20-06:50/30 19:38 | 06:30 18:24 | 06:57-07:20/23 16:18 | 07:24 15:45 | |
| 11 | 04:48 21:36 | 05:36 20:48 | 06:20-06:49/29 19:36 | 06:32 18:22 | 06:58-07:18/20 16:16 | 07:26 15:45 | |
| 12 | 04:49 21:35 | 05:38 20:46 | 06:21-06:49/28 19:33 | 06:33 18:19 | 07:00-07:17/17 16:15 | 07:28 15:45 | |
| 13 | 04:51 21:34 | 05:40 20:44 | 06:49-07:00/11 19:31 | 06:35 18:17 | 07:02-07:16/14 16:13 | 07:29 15:45 | |
| 14 | 04:52 21:33 | 05:42 20:41 | 06:22-07:03/41 19:28 | 06:37 18:15 | 07:04-07:13/9 16:11 | 07:31 15:45 | |
| 15 | 04:53 21:32 | 05:43 20:39 | 06:23-07:04/41 19:26 | 06:39 18:12 | 07:33 16:10 | 07:33 15:45 | |
| 16 | 04:54 21:31 | 05:45 20:37 | 06:24-07:05/41 19:23 | 06:40 18:10 | 07:35 16:08 | 07:35 15:45 | |
| 17 | 04:56 21:30 | 05:47 20:35 | 06:43-07:06/23 19:21 | 06:42 18:08 | 07:37 16:07 | 07:37 15:45 | |
| 18 | 04:57 21:29 | 05:49 20:33 | 06:43-07:07/24 19:18 | 06:44 18:05 | 07:39 16:05 | 07:39 15:45 | |
| 19 | 04:59 21:27 | 05:50 20:30 | 06:28-06:40/12 19:16 | 06:46 18:03 | 07:41 16:04 | 07:41 15:45 | |
| 20 | 05:00 21:26 | 05:52 20:28 | 06:41-07:09/28 19:13 | 06:48 18:01 | 07:43 16:02 | 07:43 15:46 | |
| 21 | 05:01 21:25 | 05:54 20:26 | 06:41-07:11/30 19:11 | 06:49 17:58 | 07:45 16:01 | 07:44 15:46 | |
| 22 | 05:03 21:23 | 05:56 20:24 | 06:40-07:11/31 19:08 | 06:51 17:56 | 07:47 16:00 | 07:46 15:47 | |
| 23 | 05:04 21:22 | 05:58 20:21 | 06:40-07:12/32 19:06 | 06:53 17:54 | 07:49 15:58 | 07:48 15:47 | |
| 24 | 05:06 21:20 | 05:59 20:19 | 06:40-07:13/33 19:03 | 06:55 17:52 | 07:51 15:57 | 07:50 15:48 | |
| 25 | 05:08 21:19 | 06:01 20:17 | 06:39-07:13/34 19:01 | 06:57 16:50 | 06:52 15:56 | 07:52 15:48 | |
| 26 | 05:09 21:17 | 06:03 20:14 | 06:40-07:15/35 18:58 | 06:58 16:47 | 06:54 15:55 | 07:53 15:49 | |
| 27 | 05:11 21:16 | 06:05 20:12 | 06:41-07:17/36 18:56 | 07:00 16:45 | 06:56 15:54 | 07:55 15:50 | |
| 28 | 05:12 21:14 | 06:07 20:10 | 06:42-07:19/37 18:53 | 07:02 16:43 | 06:58 15:53 | 07:57 15:51 | |
| 29 | 05:14 21:12 | 06:08 20:07 | 06:42-07:19/37 18:51 | 07:04 16:41 | 07:00 15:52 | 07:58 15:52 | |
| 30 | 05:16 21:11 | 06:10 20:05 | 06:44-07:20/36 18:48 | 07:06 16:39 | 07:02 15:51 | 08:00 15:53 | |
| 31 | 05:17 21:09 | 06:12 20:03 | 06:46-07:21/35 18:46 | 07:08 16:37 | 07:04 15:50 | 08:02 15:54 | |
| Sonnenscheinstunden | | 513 | 460 | 382 | 328 | 258 | 232 |
| Anzahl Minuten mit Schatten | | 184 | 1025 | 357 | 0 | 0 | 0 |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633



SHADOW - Kalender pro WEA

Berechnung: GBWEA: 9 - W21
Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 1,170 1,170 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | Juli | August | September | Oktober | November | Dezember |
|-----------------------------|--------|---------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|
| 1 | 08:26 | 07:56 | 06:58 | 06:43 | 05:33 | 04:43 | 04:39 | 05:19 | 06:14 | 07:07 | 07:06 | 08:01 |
| | 15:55 | 16:47 | 17:43 | 19:42 | 20:37 | 21:28 | 21:43 | 21:07 | 20:00 | 18:46 | 16:35 | 15:50 |
| 2 | 08:26 | 07:54 | 06:56 | 06:40 | 05:31 | 04:42 | 04:40 | 05:21 | 06:16 | 07:09 | 07:08 | 08:03 |
| | 15:56 | 16:49 | 17:45 | 19:43 | 20:39 | 21:29 | 21:42 | 21:05 | 19:58 | 18:44 | 16:33 | 15:50 |
| 3 | 08:26 | 07:52 | 06:53 | 06:38 | 05:29 | 04:41 | 04:40 | 05:22 | 06:17 | 07:11 | 07:10 | 08:05 |
| | 15:57 | 16:51 | 17:47 | 19:45 | 20:41 | 21:30 | 21:42 | 21:03 | 19:55 | 18:41 | 16:31 | 15:49 |
| 4 | 08:26 | 07:51 | 06:51 | 06:35 | 05:27 | 04:40 | 04:41 | 05:24 | 06:19 | 07:13 | 07:12 | 08:06 |
| | 15:59 | 16:53 | 17:49 | 19:47 | 20:43 | 21:31 | 21:41 | 21:02 | 19:53 | 18:39 | 16:29 | 15:48 |
| 5 | 08:25 | 07:49 | 06:49 | 06:33 | 05:25 | 04:40 | 04:42 | 05:26 | 06:21 | 07:15 | 07:14 | 08:07 |
| | 16:00 | 16:55 | 17:51 | 19:49 | 20:45 | 21:32 | 21:41 | 21:00 | 19:50 | 18:36 | 16:27 | 15:48 |
| 6 | 08:25 | 07:47 | 06:46 | 06:30 | 05:23 | 04:39 | 04:43 | 05:28 | 06:23 | 07:17 | 07:16 | 08:09 |
| | 16:01 | 16:57 | 17:52 | 19:51 | 20:46 | 21:33 | 21:40 | 20:58 | 19:48 | 18:34 | 16:25 | 15:47 |
| 7 | 08:25 | 07:45 | 06:44 | 06:28 | 05:21 | 04:38 | 04:44 | 05:29 | 06:24 | 07:18 | 07:18 | 08:10 |
| | 16:02 | 16:59 | 17:54 | 19:53 | 20:48 | 21:34 | 21:40 | 20:56 | 19:46 | 18:31 | 16:23 | 15:46 |
| 8 | 08:24 | 07:43 | 06:41 | 06:25 | 05:19 | 04:37 | 04:45 | 05:31 | 06:26 | 07:20 | 07:20 | 08:11 |
| | 16:04 | 17:01 | 17:56 | 19:55 | 20:50 | 21:35 | 21:39 | 20:54 | 19:43 | 18:29 | 16:22 | 15:46 |
| 9 | 08:23 | 07:41 | 06:39 | 06:23 | 05:17 | 04:37 | 04:46 | 05:33 | 06:28 | 07:22 | 07:22 | 08:13 |
| | 16:05 | 17:03 | 17:58 | 19:57 | 20:52 | 21:36 | 21:38 | 20:52 | 19:41 | 18:27 | 16:20 | 15:46 |
| 10 | 08:23 | 07:39 | 06:37 | 06:21 | 05:15 | 04:36 | 04:47 | 05:35 | 06:30 | 07:24 | 07:24 | 08:14 |
| | 16:07 | 17:05 | 18:00 | 19:58 | 20:54 | 21:37 | 21:37 | 20:50 | 19:38 | 18:24 | 16:18 | 15:45 |
| 11 | 08:22 | 07:37 | 06:34 | 06:18 | 05:13 | 04:36 | 04:48 | 05:36 | 06:32 | 07:26 | 07:26 | 08:15 |
| | 16:08 | 17:07 | 18:02 | 20:00 | 20:55 | 21:38 | 21:36 | 20:48 | 19:36 | 18:22 | 16:16 | 15:45 |
| 12 | 08:21 | 07:35 | 06:32 | 06:16 | 05:11 | 04:36 | 04:50 | 05:38 | 06:33 | 07:28 | 07:28 | 08:16 |
| | 16:10 | 17:09 | 18:04 | 20:02 | 20:57 | 21:39 | 21:35 | 20:46 | 19:33 | 18:19 | 16:15 | 15:45 |
| 13 | 08:21 | 07:33 | 06:29 | 06:13 | 05:10 | 04:35 | 04:51 | 05:40 | 06:35 | 07:30 | 07:29 | 08:17 |
| | 16:11 | 17:11 | 18:06 | 20:04 | 20:59 | 21:40 | 21:34 | 20:44 | 19:31 | 18:17 | 16:13 | 15:45 |
| 14 | 08:20 | 07:31 | 06:27 | 06:11 | 05:08 | 04:35 | 04:52 | 05:42 | 06:37 | 07:31 | 07:31 | 08:18 |
| | 16:13 | 17:13 | 18:08 | 20:06 | 21:01 | 21:40 | 21:33 | 20:41 | 19:28 | 18:15 | 16:11 | 15:45 |
| 15 | 08:19 | 07:29 | 06:24 | 06:09 | 05:06 | 04:35 | 04:53 | 05:43 | 06:39 | 07:33 | 07:33 | 08:19 |
| | 16:15 | 17:15 | 18:10 | 20:08 | 21:02 | 21:41 | 21:32 | 20:39 | 19:26 | 18:12 | 16:10 | 15:45 |
| 16 | 08:18 | 07:27 | 06:22 | 06:06 | 05:04 | 04:35 | 04:55 | 05:45 | 06:40 | 07:35 | 07:35 | 08:20 |
| | 16:16 | 17:17 | 18:12 | 20:10 | 21:04 | 21:41 | 21:31 | 20:37 | 19:23 | 18:10 | 16:08 | 15:45 |
| 17 | 08:17 | 07:25 | 06:20 | 06:04 | 05:03 | 04:34 | 04:56 | 05:47 | 06:42 | 07:37 | 07:37 | 08:21 |
| | 16:18 | 17:19 | 18:13 | 20:11 | 21:06 | 21:42 | 21:30 | 20:35 | 19:21 | 18:08 | 16:07 | 15:45 |
| 18 | 08:16 | 07:23 | 06:17 | 06:02 | 05:01 | 04:34 | 04:57 | 05:49 | 06:44 | 07:39 | 07:39 | 08:22 |
| | 16:20 | 17:21 | 18:15 | 20:13 | 21:07 | 21:42 | 21:29 | 20:33 | 19:18 | 18:05 | 16:05 | 15:45 |
| 19 | 08:15 | 07:21 | 06:15 | 05:59 | 05:00 | 04:34 | 04:59 | 05:51 | 06:46 | 07:41 | 07:41 | 08:23 |
| | 16:22 | 17:23 | 18:17 | 20:15 | 21:09 | 21:43 | 21:27 | 20:30 | 19:16 | 18:03 | 16:04 | 15:46 |
| 20 | 08:13 | 07:18 | 06:12 | 05:57 | 04:58 | 04:34 | 05:00 | 05:52 | 06:48 | 07:43 | 07:43 | 08:23 |
| | 16:24 | 17:25 | 18:19 | 20:17 | 21:11 | 21:43 | 21:26 | 20:28 | 19:13 | 18:01 | 16:02 | 15:46 |
| 21 | 08:12 | 07:16 | 06:10 | 05:55 | 04:57 | 04:35 | 05:02 | 05:54 | 06:49 | 07:45 | 07:45 | 08:24 |
| | 16:25 | 17:27 | 18:21 | 20:19 | 21:12 | 21:43 | 21:25 | 20:26 | 19:11 | 17:59 | 16:01 | 15:46 |
| 22 | 08:11 | 07:14 | 06:07 | 05:53 | 04:55 | 04:35 | 05:03 | 05:56 | 06:51 | 07:47 | 07:46 | 08:24 |
| | 16:27 | 17:29 | 18:23 | 20:21 | 21:14 | 21:43 | 21:23 | 20:24 | 19:08 | 17:56 | 16:00 | 15:47 |
| 23 | 08:10 | 07:12 | 06:05 | 05:50 | 04:54 | 04:35 | 05:05 | 05:58 | 06:53 | 07:49 | 07:48 | 08:25 |
| | 16:29 | 17:31 | 18:25 | 20:23 | 21:15 | 21:44 | 21:22 | 20:21 | 19:06 | 17:54 | 15:58 | 15:47 |
| 24 | 08:08 | 07:10 | 06:02 | 05:48 | 04:52 | 04:35 | 05:06 | 05:59 | 06:55 | 07:51 | 07:50 | 08:25 |
| | 16:31 | 17:33 | 18:27 | 20:24 | 21:17 | 21:44 | 21:20 | 20:19 | 19:03 | 17:52 | 15:57 | 15:48 |
| 25 | 08:07 | 07:07 | 06:00 | 05:46 | 04:51 | 04:36 | 05:08 | 06:01 | 06:57 | 07:52 | 07:52 | 08:26 |
| | 16:33 | 17:35 | 18:29 | 20:26 | 21:18 | 21:44 | 21:19 | 20:17 | 19:01 | 16:50 | 15:56 | 15:48 |
| 26 | 08:05 | 07:05 | 05:57 | 05:44 | 04:50 | 04:36 | 05:09 | 06:03 | 06:58 | 07:54 | 07:53 | 08:26 |
| | 16:35 | 17:37 | 18:30 | 20:28 | 21:20 | 21:44 | 21:17 | 20:14 | 18:58 | 16:48 | 15:55 | 15:49 |
| 27 | 08:04 | 07:03 | 05:55 | 05:41 | 04:49 | 04:37 | 05:11 | 06:05 | 07:00 | 07:56 | 07:55 | 08:26 |
| | 16:37 | 17:39 | 18:32 | 20:30 | 21:21 | 21:44 | 21:16 | 20:12 | 18:56 | 16:45 | 15:54 | 15:50 |
| 28 | 08:02 | 07:00 | 05:52 | 05:39 | 04:47 | 04:37 | 05:12 | 06:07 | 07:02 | 07:58 | 07:57 | 08:26 |
| | 16:39 | 17:41 | 18:34 | 20:32 | 21:23 | 21:43 | 21:14 | 20:10 | 18:53 | 16:43 | 15:53 | 15:51 |
| 29 | 08:01 | | 06:50 | 05:37 | 04:46 | 04:38 | 05:14 | 06:08 | 07:04 | 07:00 | 07:58 | 08:26 |
| | 16:41 | | 19:36 | 20:34 | 21:24 | 21:43 | 21:12 | 20:07 | 18:51 | 16:41 | 15:52 | 15:52 |
| 30 | 07:59 | | 06:47 | 05:35 | 04:45 | 04:38 | 05:16 | 06:10 | 07:06 | 07:02 | 08:00 | 08:27 |
| | 16:43 | | 19:38 | 20:36 | 21:25 | 21:43 | 21:11 | 20:05 | 18:49 | 16:39 | 15:51 | 15:53 |
| 31 | 07:58 | | 06:45 | | 04:44 | | 05:17 | 06:12 | | 07:04 | | 08:27 |
| | 16:45 | | 19:40 | | 21:27 | | 21:09 | 20:03 | | 16:37 | | 15:54 |
| Sonnenscheinstunden | 249 | 273 | 367 | 420 | 495 | 511 | 513 | 460 | 382 | 328 | 258 | 232 |
| Anzahl Minuten mit Schatten | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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

Tag im Monat Sonnenaufgang (SS:MM) 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:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 10 - W22

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

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

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

| Tag im Monat | Sonnenaufgang (SS:MM) | Sonnenuntergang (SS:MM) | Zeitpunkt (SS:MM) | Schattenanfang-Zeitpunkt (SS:MM) | Schattende/Minuten mit Schatten |
|--------------|-----------------------|-------------------------|-------------------|----------------------------------|---------------------------------|
|--------------|-----------------------|-------------------------|-------------------|----------------------------------|---------------------------------|

Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 11 - W23

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | Juli | August | September | Oktober | November | Dezember | | | | | | | | | | | | |
|-----------------------------|--------|---------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|
| 1 | 08:26 | 07:56 | 06:58 | 06:43 | 05:33 | 04:43 | 04:39 | 05:19 | 06:14 | 07:07 | 07:06 | 08:01 | | | | | | | | | | | | |
| | 15:55 | 16:47 | 17:43 | 19:42 | 20:37 | 21:28 | 21:43 | 21:07 | 20:00 | 18:46 | 16:35 | 15:50 | | | | | | | | | | | | |
| 2 | 08:26 | 07:54 | 06:56 | 06:40 | 05:31 | 04:42 | 04:40 | 05:21 | 06:16 | 07:09 | 07:08 | 08:03 | | | | | | | | | | | | |
| | 15:56 | 16:49 | 17:45 | 19:43 | 20:39 | 21:29 | 21:42 | 21:05 | 19:58 | 18:44 | 16:33 | 15:50 | | | | | | | | | | | | |
| 3 | 08:26 | 07:52 | 06:53 | 06:38 | 05:29 | 04:41 | 04:40 | 05:22 | 06:17 | 07:11 | 07:10 | 08:05 | | | | | | | | | | | | |
| | 15:57 | 16:51 | 17:47 | 19:45 | 20:41 | 21:30 | 21:42 | 21:03 | 19:55 | 18:41 | 16:31 | 15:49 | | | | | | | | | | | | |
| 4 | 08:26 | 07:51 | 06:51 | 06:35 | 05:27 | 04:40 | 04:41 | 05:24 | 06:19 | 07:13 | 07:12 | 08:06 | | | | | | | | | | | | |
| | 15:59 | 16:53 | 17:49 | 19:47 | 20:43 | 21:31 | 21:41 | 21:02 | 19:53 | 18:39 | 16:29 | 15:48 | | | | | | | | | | | | |
| 5 | 08:25 | 07:49 | 06:49 | 06:33 | 05:25 | 04:40 | 04:42 | 05:26 | 06:21 | 07:15 | 07:14 | 08:07 | | | | | | | | | | | | |
| | 16:00 | 16:55 | 17:51 | 19:49 | 20:45 | 21:32 | 21:41 | 21:00 | 19:50 | 18:36 | 16:27 | 15:48 | | | | | | | | | | | | |
| 6 | 08:25 | 07:47 | 06:46 | 06:30 | 05:23 | 04:39 | 04:43 | 05:28 | 06:23 | 07:17 | 07:16 | 08:09 | | | | | | | | | | | | |
| | 16:01 | 16:57 | 17:52 | 19:51 | 20:46 | 21:33 | 21:40 | 20:58 | 19:48 | 18:34 | 16:25 | 15:47 | | | | | | | | | | | | |
| 7 | 08:25 | 07:45 | 06:44 | 06:28 | 05:21 | 04:38 | 04:44 | 05:29 | 06:24 | 07:18 | 07:18 | 08:10 | | | | | | | | | | | | |
| | 16:02 | 16:59 | 17:54 | 19:53 | 20:48 | 21:34 | 21:40 | 20:56 | 19:46 | 18:31 | 16:23 | 15:47 | | | | | | | | | | | | |
| 8 | 08:24 | 07:43 | 06:41 | 06:25 | 05:19 | 04:38 | 04:45 | 05:31 | 06:26 | 07:20 | 07:20 | 08:11 | | | | | | | | | | | | |
| | 16:04 | 17:01 | 17:56 | 19:55 | 20:50 | 21:35 | 21:39 | 20:54 | 19:43 | 18:29 | 16:22 | 15:46 | | | | | | | | | | | | |
| 9 | 08:23 | 07:41 | 06:39 | 06:23 | 05:17 | 04:37 | 04:46 | 05:33 | 06:28 | 07:22 | 07:22 | 08:13 | | | | | | | | | | | | |
| | 16:05 | 17:03 | 17:58 | 19:57 | 20:52 | 21:36 | 21:38 | 20:52 | 19:41 | 18:27 | 16:20 | 15:46 | | | | | | | | | | | | |
| 10 | 08:23 | 07:39 | 06:37 | 06:21 | 05:15 | 04:36 | 04:47 | 05:35 | 06:30 | 07:24 | 07:24 | 08:14 | | | | | | | | | | | | |
| | 16:07 | 17:05 | 18:00 | 19:58 | 20:54 | 21:37 | 21:37 | 20:50 | 19:38 | 18:24 | 16:18 | 15:45 | | | | | | | | | | | | |
| 11 | 08:22 | 07:37 | 06:34 | 06:18 | 05:13 | 04:36 | 04:48 | 05:36 | 06:32 | 07:26 | 07:26 | 08:15 | | | | | | | | | | | | |
| | 16:08 | 17:07 | 18:02 | 20:00 | 20:55 | 21:38 | 21:36 | 20:48 | 19:36 | 18:22 | 16:16 | 15:45 | | | | | | | | | | | | |
| 12 | 08:21 | 07:35 | 06:32 | 06:16 | 05:11 | 04:36 | 04:50 | 05:38 | 06:33 | 07:28 | 07:28 | 08:16 | | | | | | | | | | | | |
| | 16:10 | 17:09 | 18:04 | 20:02 | 20:57 | 21:39 | 21:35 | 20:46 | 19:33 | 18:19 | 16:15 | 15:45 | | | | | | | | | | | | |
| 13 | 08:21 | 07:33 | 06:29 | 06:13 | 05:10 | 04:35 | 04:51 | 05:40 | 06:35 | 07:30 | 07:29 | 08:17 | | | | | | | | | | | | |
| | 16:12 | 17:11 | 18:06 | 20:04 | 20:59 | 21:40 | 21:34 | 20:44 | 19:31 | 18:17 | 16:13 | 15:45 | | | | | | | | | | | | |
| 14 | 08:20 | 07:31 | 06:27 | 06:11 | 05:08 | 04:35 | 04:52 | 05:42 | 06:37 | 07:31 | 07:31 | 08:18 | | | | | | | | | | | | |
| | 16:13 | 17:13 | 18:08 | 20:06 | 21:01 | 21:40 | 21:33 | 20:41 | 19:28 | 18:15 | 16:11 | 15:45 | | | | | | | | | | | | |
| 15 | 08:19 | 07:29 | 06:24 | 06:09 | 05:06 | 04:35 | 04:53 | 05:43 | 06:39 | 07:33 | 07:33 | 08:19 | | | | | | | | | | | | |
| | 16:15 | 17:15 | 18:10 | 20:08 | 21:02 | 21:41 | 21:32 | 20:39 | 19:26 | 18:12 | 16:10 | 15:45 | | | | | | | | | | | | |
| 16 | 08:18 | 07:27 | 06:22 | 06:06 | 05:05 | 04:35 | 04:55 | 05:45 | 06:41 | 07:35 | 07:35 | 08:20 | | | | | | | | | | | | |
| | 16:17 | 17:17 | 18:12 | 20:10 | 21:04 | 21:41 | 21:31 | 20:37 | 19:23 | 18:10 | 16:08 | 15:45 | | | | | | | | | | | | |
| 17 | 08:17 | 07:25 | 06:20 | 06:04 | 05:03 | 04:34 | 04:56 | 05:47 | 06:42 | 07:37 | 07:37 | 08:21 | | | | | | | | | | | | |
| | 16:18 | 17:19 | 18:13 | 20:11 | 21:06 | 21:42 | 21:30 | 20:35 | 19:21 | 18:08 | 16:07 | 15:45 | | | | | | | | | | | | |
| 18 | 08:16 | 07:23 | 06:17 | 06:02 | 05:01 | 04:34 | 04:57 | 05:49 | 06:44 | 07:39 | 07:39 | 08:22 | | | | | | | | | | | | |
| | 16:20 | 17:21 | 18:15 | 20:13 | 21:07 | 21:42 | 21:29 | 20:33 | 19:18 | 18:05 | 16:05 | 15:45 | | | | | | | | | | | | |
| 19 | 08:15 | 07:21 | 06:15 | 05:59 | 05:00 | 04:34 | 04:59 | 05:51 | 06:46 | 07:41 | 07:41 | 08:22 | | | | | | | | | | | | |
| | 16:22 | 17:23 | 18:17 | 20:15 | 21:09 | 21:43 | 21:27 | 20:30 | 19:16 | 18:03 | 16:04 | 15:46 | | | | | | | | | | | | |
| 20 | 08:13 | 07:18 | 06:12 | 05:57 | 04:58 | 04:34 | 05:00 | 05:52 | 06:48 | 07:43 | 07:43 | 08:23 | | | | | | | | | | | | |
| | 16:24 | 17:25 | 18:19 | 20:17 | 21:11 | 21:43 | 21:26 | 20:28 | 19:13 | 18:01 | 16:02 | 15:46 | | | | | | | | | | | | |
| 21 | 08:12 | 07:16 | 06:10 | 05:55 | 04:57 | 04:35 | 05:02 | 05:54 | 06:49 | 07:45 | 07:44 | 08:24 | | | | | | | | | | | | |
| | 16:25 | 17:27 | 18:21 | 20:19 | 21:12 | 21:43 | 21:25 | 20:26 | 19:11 | 17:59 | 16:01 | 15:46 | | | | | | | | | | | | |
| 22 | 08:11 | 07:14 | 06:07 | 05:53 | 04:55 | 04:35 | 05:03 | 05:56 | 06:51 | 07:47 | 07:46 | 08:24 | | | | | | | | | | | | |
| | 16:27 | 17:29 | 18:23 | 20:21 | 21:14 | 21:43 | 21:23 | 20:24 | 19:08 | 17:56 | 16:00 | 15:47 | | | | | | | | | | | | |
| 23 | 08:10 | 07:12 | 06:05 | 05:50 | 04:54 | 04:35 | 05:05 | 05:58 | 06:53 | 07:49 | 07:48 | 08:25 | | | | | | | | | | | | |
| | 16:29 | 17:31 | 18:25 | 20:23 | 21:15 | 21:44 | 21:22 | 20:21 | 19:06 | 17:54 | 15:59 | 15:47 | | | | | | | | | | | | |
| 24 | 08:08 | 07:10 | 06:02 | 05:48 | 04:52 | 04:35 | 05:06 | 05:59 | 06:55 | 07:51 | 07:50 | 08:25 | | | | | | | | | | | | |
| | 16:31 | 17:33 | 18:27 | 20:24 | 21:17 | 21:44 | 21:20 | 20:19 | 19:03 | 17:52 | 15:57 | 15:48 | | | | | | | | | | | | |
| 25 | 08:07 | 07:07 | 06:00 | 05:46 | 04:51 | 04:36 | 05:08 | 06:01 | 06:57 | 07:52 | 07:52 | 08:26 | | | | | | | | | | | | |
| | 16:33 | 17:35 | 18:29 | 20:26 | 21:18 | 21:44 | 21:19 | 20:17 | 19:01 | 16:50 | 15:56 | 15:49 | | | | | | | | | | | | |
| 26 | 08:05 | 07:05 | 05:57 | 05:44 | 04:50 | 04:36 | 05:09 | 06:03 | 06:58 | 07:54 | 07:53 | 08:26 | | | | | | | | | | | | |
| | 16:35 | 17:37 | 18:30 | 20:28 | 21:20 | 21:44 | 21:17 | 20:14 | 18:58 | 16:48 | 15:55 | 15:49 | | | | | | | | | | | | |
| 27 | 08:04 | 07:03 | 05:55 | 05:41 | 04:49 | 04:37 | 05:11 | 06:05 | 07:00 | 07:56 | 07:55 | 08:26 | | | | | | | | | | | | |
| | 16:37 | 17:39 | 18:32 | 20:30 | 21:21 | 21:44 | 21:16 | 20:12 | 18:56 | 16:45 | 15:54 | 15:50 | | | | | | | | | | | | |
| 28 | 08:02 | 07:00 | 05:52 | 05:39 | 04:47 | 04:37 | 05:12 | 06:07 | 07:02 | 07:58 | 07:57 | 08:26 | | | | | | | | | | | | |
| | 16:39 | 17:41 | 18:34 | 20:32 | 21:23 | 21:43 | 21:14 | 20:10 | 18:53 | 16:43 | 15:53 | 15:51 | | | | | | | | | | | | |
| 29 | 08:01 | | 06:50 | 05:37 | 04:46 | 04:38 | 05:14 | 06:08 | 07:04 | 07:00 | 07:58 | 08:26 | | | | | | | | | | | | |
| | 16:41 | | 19:36 | 20:34 | 21:24 | 21:43 | 21:12 | 20:07 | 18:51 | 16:41 | 15:52 | 15:52 | | | | | | | | | | | | |
| 30 | 07:59 | | 06:47 | 05:35 | 04:45 | 04:38 | 05:16 | 06:10 | 07:06 | 07:02 | 08:00 | 08:27 | | | | | | | | | | | | |
| | 16:43 | | 19:38 | 20:36 | 21:25 | 21:43 | 21:11 | 20:05 | 18:49 | 16:39 | 15:51 | 15:53 | | | | | | | | | | | | |
| 31 | 07:58 | | 06:45 | | 04:44 | | 05:17 | 06:12 | | 07:04 | | 08:27 | | | | | | | | | | | | |
| | 16:45 | | 19:40 | | 21:27 | | 21:09 | 20:03 | | 16:37 | | 15:54 | | | | | | | | | | | | |
| Sonnenscheinstunden | | 249 | | 273 | | 367 | | 420 | | 495 | | 511 | | 513 | | 460 | | 382 | | 328 | | 258 | | 232 |
| Anzahl Minuten mit Schatten | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |

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

| | | | | |
|--------------|-------------------------|-------------------|----------------------------------|-----------------------------------|
| Tag im Monat | Sonnenaufgang (SS:MM) | 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:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 12 - W24

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | |
|-----------------------------|----------------|-------------------------|-------------------------|----------------|----------------|----------------|-----|
| 1 | 08:26 15:55 | 07:56 16:47 | 08:24-09:03/39 17:43 | 06:43 19:42 | 05:33 20:37 | 04:43 21:28 | |
| 2 | 08:26 15:56 | 07:54 16:49 | 08:22-09:03/41 17:45 | 06:40 19:43 | 05:31 20:39 | 04:42 21:29 | |
| 3 | 08:26 15:57 | 07:52 16:51 | 08:20-09:04/44 17:47 | 06:38 19:45 | 05:29 20:41 | 04:41 21:30 | |
| 4 | 08:26 15:58 | 07:51 16:53 | 08:18-09:04/46 17:49 | 06:35 19:47 | 05:27 20:43 | 04:40 21:31 | |
| 5 | 08:25 16:00 | 07:49 16:55 | 08:16-09:05/49 17:50 | 06:33 19:49 | 05:25 20:45 | 04:39 21:32 | |
| 6 | 08:25 16:01 | 07:47 16:57 | 08:14-09:05/51 17:52 | 06:30 19:51 | 05:23 20:46 | 04:39 21:33 | |
| 7 | 08:25 16:02 | 07:45 16:59 | 08:13-09:05/52 17:54 | 06:28 19:53 | 05:21 20:48 | 04:38 21:34 | |
| 8 | 08:24 16:04 | 07:43 17:01 | 08:13-09:05/52 17:56 | 06:25 19:55 | 05:19 20:50 | 04:37 21:35 | |
| 9 | 08:23 16:05 | 07:41 17:03 | 08:13-09:05/52 17:58 | 06:23 19:56 | 05:17 20:52 | 04:37 21:36 | |
| 10 | 08:23 16:07 | 07:39 17:05 | 08:13-09:05/52 18:00 | 06:21 19:58 | 05:15 20:54 | 04:36 21:37 | |
| 11 | 08:22 16:08 | 07:37 17:07 | 08:04-08:08/4 18:02 | 06:18 20:00 | 05:13 20:55 | 04:36 21:38 | |
| 12 | 08:21 16:10 | 07:35 17:09 | 08:02-08:10/8 18:04 | 06:16 20:02 | 05:11 20:57 | 04:35 21:39 | |
| 13 | 08:21 16:11 | 07:33 17:11 | 08:00-08:11/11 18:06 | 06:13 20:04 | 05:10 20:59 | 04:35 21:40 | |
| 14 | 08:20 16:13 | 07:31 17:13 | 07:57-08:11/14 18:08 | 06:11 20:06 | 05:08 21:01 | 04:35 21:40 | |
| 15 | 08:19 16:15 | 07:29 17:15 | 07:55-08:12/17 18:10 | 06:09 20:08 | 05:06 21:02 | 04:35 21:41 | |
| 16 | 08:18 16:16 | 07:27 17:17 | 07:53-08:12/19 18:12 | 06:06 20:10 | 05:04 21:04 | 04:34 21:41 | |
| 17 | 08:17 16:18 | 07:25 17:19 | 07:51-08:13/22 18:13 | 06:04 20:11 | 05:03 21:06 | 04:34 21:42 | |
| 18 | 08:16 16:20 | 07:23 17:21 | 07:48-08:12/24 18:15 | 06:02 20:13 | 05:01 21:07 | 04:34 21:42 | |
| 19 | 08:15 16:22 | 07:21 17:23 | 07:46-08:12/26 18:17 | 05:59 20:15 | 05:00 21:09 | 04:34 21:43 | |
| 20 | 08:13 16:23 | 07:18 17:25 | 07:44-08:11/27 18:19 | 05:57 20:17 | 04:58 21:11 | 04:34 21:43 | |
| 21 | 08:12 16:25 | 07:16 17:27 | 07:42-08:11/29 18:21 | 05:55 20:19 | 04:57 21:12 | 04:34 21:43 | |
| 22 | 08:11 16:27 | 07:14 17:29 | 07:41-08:08/27 18:23 | 05:53 20:21 | 04:55 21:14 | 04:35 21:43 | |
| 23 | 08:10 16:29 | 08:39-08:43/4 17:31 | 07:42-08:07/25 18:25 | 05:50 20:23 | 04:54 21:15 | 04:35 21:44 | |
| 24 | 08:08 16:31 | 08:38-08:47/9 17:33 | 07:43-07:59/16 18:27 | 05:48 20:24 | 04:52 21:17 | 04:35 21:44 | |
| 25 | 08:07 16:33 | 08:36-08:51/15 17:35 | 07:43-07:57/14 18:28 | 05:46 20:26 | 04:51 21:18 | 04:36 21:44 | |
| 26 | 08:05 16:35 | 08:35-08:55/20 17:37 | 07:45-07:55/10 18:30 | 05:44 20:28 | 04:50 21:20 | 04:36 21:44 | |
| 27 | 08:04 16:37 | 08:33-08:57/24 17:39 | 07:49-07:52/3 18:32 | 05:41 20:30 | 04:48 21:21 | 04:36 21:44 | |
| 28 | 08:02 16:39 | 08:31-08:58/27 17:41 | 07:00-17:13/5 18:34 | 05:39 20:32 | 04:47 21:23 | 04:37 21:43 | |
| 29 | 08:01 16:41 | 08:29-08:59/30 17:43 | 06:57 18:36 | 05:37 20:34 | 04:46 21:24 | 04:38 21:43 | |
| 30 | 07:59 16:43 | 08:28-09:01/33 17:45 | 06:47 18:38 | 05:35 20:36 | 04:45 21:25 | 04:38 21:43 | |
| 31 | 07:58 16:45 | 08:26-09:02/36 17:47 | 06:45 19:40 | 05:33 20:38 | 04:44 21:27 | 04:39 21:43 | |
| Sonnenscheinstunden | | 249 | 273 | 367 | 420 | 495 | 511 |
| Anzahl Minuten mit Schatten | | 198 | 1073 | 77 | 0 | 0 | 0 |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 12 - W24

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember | |
|----|-----------------------------|----------------|----------------|----------------------------------|----------------|----------------|-----|
| 1 | 04:39 21:43 | 05:19 21:07 | 06:14 20:00 | 07:07 18:11-18:17/6 18:46 | 07:06 16:35 | 08:01 15:50 | |
| 2 | 04:40 21:42 | 05:21 21:05 | 06:16 19:58 | 07:09 18:09-18:15/6 18:44 | 07:08 16:33 | 08:03 15:49 | |
| 3 | 04:40 21:42 | 05:22 21:03 | 06:17 19:55 | 07:11 18:07-18:13/6 18:41 | 07:10 16:31 | 08:05 15:49 | |
| 4 | 04:41 21:41 | 05:24 21:02 | 06:19 19:53 | 07:13 18:05-18:09/4 18:39 | 07:12 16:29 | 08:06 15:48 | |
| 5 | 04:42 21:41 | 05:26 21:00 | 06:21 19:50 | 07:15 18:05-18:07/2 18:36 | 07:14 16:27 | 08:07 15:47 | |
| 6 | 04:43 21:40 | 05:28 20:58 | 06:23 19:48 | 07:17 18:34 | 07:16 16:25 | 08:09 15:47 | |
| 7 | 04:44 21:40 | 05:29 20:56 | 06:24 19:46 | 07:18 17:56-18:02/6 18:31 | 07:18 16:23 | 08:10 15:46 | |
| 8 | 04:45 21:39 | 05:31 20:54 | 06:26 19:43 | 07:20 17:54-18:00/6 18:29 | 07:20 16:22 | 08:11 15:46 | |
| 9 | 04:46 21:38 | 05:33 20:52 | 06:28 19:41 | 07:22 17:52-17:57/5 18:27 | 07:22 16:20 | 08:13 15:46 | |
| 10 | 04:47 21:37 | 05:35 20:50 | 06:30 19:38 | 07:24 17:49-17:55/6 18:24 | 07:24 16:18 | 08:14 15:45 | |
| 11 | 04:48 21:36 | 05:36 20:48 | 06:32 19:36 | 07:26 17:48-17:53/5 18:22 | 07:26 16:16 | 08:15 15:45 | |
| 12 | 04:49 21:35 | 05:38 20:46 | 06:33 19:33 | 07:28 17:45-17:50/5 18:19 | 07:28 16:15 | 08:16 15:45 | |
| 13 | 04:51 21:34 | 05:40 20:43 | 06:35 19:31 | 07:30 17:43-17:48/5 18:17 | 07:29 16:13 | 08:17 15:45 | |
| 14 | 04:52 21:33 | 05:42 20:41 | 06:37 19:28 | 07:31 17:41-17:45/4 18:15 | 07:31 16:11 | 08:18 15:45 | |
| 15 | 04:53 21:32 | 05:43 20:39 | 06:39 19:26 | 07:33 08:19-08:26/7 18:12 | 07:33 16:10 | 08:19 15:45 | |
| 16 | 04:54 21:31 | 05:45 20:37 | 06:40 19:23 | 07:35 08:17-08:28/11 18:10 | 07:35 16:08 | 08:20 15:45 | |
| 17 | 04:56 21:30 | 05:47 20:35 | 06:42 19:21 | 07:37 08:15-08:29/14 18:08 | 07:37 16:07 | 08:21 15:45 | |
| 18 | 04:57 21:29 | 05:49 20:33 | 06:44 19:18 | 07:39 08:14-08:35/21 18:05 | 07:39 16:05 | 08:22 15:45 | |
| 19 | 04:59 21:27 | 05:50 20:30 | 06:46 19:16 | 07:41 08:13-08:39/26 18:03 | 07:41 16:04 | 08:22 15:45 | |
| 20 | 05:00 21:26 | 05:52 20:28 | 06:48 19:13 | 07:43 08:13-08:40/27 18:01 | 07:43 16:02 | 08:23 15:46 | |
| 21 | 05:02 21:25 | 05:54 20:26 | 06:49 19:11 | 07:45 08:13-08:41/28 17:59 | 07:44 16:01 | 08:24 15:46 | |
| 22 | 05:03 21:23 | 05:56 20:24 | 06:51 19:08 | 07:47 08:15-08:42/27 17:56 | 07:46 16:00 | 08:24 15:47 | |
| 23 | 05:05 21:22 | 05:58 20:21 | 06:53 19:06 | 07:49 08:17-08:42/25 17:54 | 07:48 15:58 | 08:25 15:47 | |
| 24 | 05:06 21:20 | 05:59 20:19 | 06:55 19:03 | 07:51 08:19-08:42/23 17:52 | 07:50 15:57 | 08:25 15:48 | |
| 25 | 05:08 21:19 | 06:01 20:17 | 06:57 19:01 | 06:52 07:21-07:42/21 16:50 | 07:52 15:56 | 08:26 15:48 | |
| 26 | 05:09 21:17 | 06:03 20:14 | 06:58 18:58 | 06:54 07:23-07:42/19 16:48 | 07:53 15:55 | 08:26 15:49 | |
| 27 | 05:11 21:16 | 06:05 20:12 | 07:00 18:56 | 06:56 07:25-07:41/16 16:45 | 07:55 15:54 | 08:26 15:50 | |
| 28 | 05:12 21:14 | 06:07 20:10 | 07:02 18:53 | 06:58 07:27-07:40/13 16:43 | 07:57 15:53 | 08:26 15:51 | |
| 29 | 05:14 21:12 | 06:08 20:07 | 07:04 18:51 | 07:00 07:29-07:39/10 16:41 | 07:58 15:52 | 08:26 15:52 | |
| 30 | 05:16 21:11 | 06:10 20:05 | 07:06 18:48 | 07:02 07:32-07:39/7 16:39 | 08:00 15:51 | 08:27 15:53 | |
| 31 | 05:17 21:09 | 06:12 20:03 | | 07:04 16:37 | | 08:26 15:54 | |
| | Sonnenscheinstunden | 513 | 460 | 382 | 328 | 258 | 232 |
| | Anzahl Minuten mit Schatten | 0 | 0 | 19 | 671 | 674 | 0 |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
 Am Westersielzug 11
 DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
 Berechnet:
 25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 13 - W25

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]

| | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan | Feb | Mär | Apr | Mai | Jun | Jul | Aug | Sep | Okt | Nov | Dez |
| 1.39 | 2.32 | 3.70 | 5.75 | 8.12 | 7.70 | 7.33 | 7.20 | 5.12 | 3.48 | 1.79 | 1.03 |

Betriebsdauer je Sektor

| | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N | NNO | ONO | O | OSO | SSO | S | SSW | WSW | W | WNW | NNW | Summe |
| 405 | 493 | 534 | 462 | 594 | 596 | 556 | 827 | 1,170 | 1,140 | 805 | 558 | 8,140 |

Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | Juli | August | September | Oktober | November | Dezember |
|-----------------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------------|-------|--------|-----------|---------|----------|----------|
| 1 | 08:26 09:01-09:35/34 | 07:56 06:58 06:43 | 06:53 05:33 04:43 | 04:39 05:19 06:14 | 07:07 07:06 08:01 | 08:38-09:18/40 | | | | | | |
| 2 | 08:26 09:01-09:35/34 | 07:54 06:56 06:40 | 05:31 04:42 04:40 | 05:21 04:52 04:50 | 05:21 06:16 07:09 | 07:38 15:50 08:38-09:19/41 | | | | | | |
| 3 | 08:26 09:00-09:35/35 | 07:52 06:53 06:38 | 05:29 04:41 04:40 | 05:22 06:17 07:11 | 07:10 07:10 08:05 | 08:40-09:20/40 | | | | | | |
| 4 | 08:26 09:00-09:36/36 | 07:51 06:51 06:35 | 05:27 04:40 04:41 | 05:24 06:19 07:13 | 07:12 07:12 08:06 | 08:41-09:20/39 | | | | | | |
| 5 | 08:25 08:59-09:36/37 | 07:49 06:49 06:33 | 05:25 04:40 04:42 | 05:26 06:21 07:15 | 07:14 07:14 08:07 | 08:43-09:21/38 | | | | | | |
| 6 | 08:25 08:59-09:36/37 | 07:47 06:46 06:30 | 05:23 04:39 04:43 | 05:28 06:23 07:17 | 07:16 07:16 08:09 | 08:45-09:22/37 | | | | | | |
| 7 | 08:25 08:58-09:36/38 | 07:45 06:44 06:28 | 05:21 04:38 04:44 | 05:29 06:24 07:18 | 07:18 07:18 08:10 | 08:46-09:23/37 | | | | | | |
| 8 | 08:24 08:57-09:36/39 | 07:43 06:41 06:25 | 05:19 04:37 04:45 | 05:31 06:26 07:20 | 07:20 07:20 08:11 | 08:47-09:23/36 | | | | | | |
| 9 | 08:23 08:56-09:36/40 | 07:41 06:39 06:23 | 05:17 04:37 04:46 | 05:33 06:28 07:22 | 07:22 07:22 08:13 | 08:49-09:24/35 | | | | | | |
| 10 | 08:23 08:56-09:37/41 | 07:39 06:37 06:21 | 05:15 04:36 04:47 | 05:35 06:30 07:24 | 07:24 07:24 08:14 | 08:50-09:24/34 | | | | | | |
| 11 | 08:22 08:56-09:36/40 | 07:37 06:34 06:18 | 05:13 04:36 04:48 | 05:36 06:32 07:26 | 07:26 07:26 08:15 | 08:51-09:25/34 | | | | | | |
| 12 | 08:21 08:56-09:36/40 | 07:35 06:32 06:16 | 05:11 04:36 04:49 | 05:38 06:33 07:28 | 07:28 07:28 08:16 | 08:52-09:25/33 | | | | | | |
| 13 | 08:21 08:57-09:36/39 | 07:33 06:29 06:13 | 05:10 04:35 04:51 | 05:40 06:35 07:30 | 07:29 07:29 08:17 | 08:53-09:26/33 | | | | | | |
| 14 | 08:20 08:57-09:35/38 | 07:31 06:27 06:11 | 05:08 04:35 04:52 | 05:42 06:37 07:31 | 07:31 07:31 08:18 | 08:54-09:26/32 | | | | | | |
| 15 | 08:19 08:57-09:33/36 | 07:29 06:24 06:09 | 05:06 04:35 04:53 | 05:43 06:39 07:33 | 07:33 07:33 08:19 | 08:55-09:26/31 | | | | | | |
| 16 | 08:18 08:58-09:31/33 | 07:27 06:22 06:06 | 05:04 04:35 04:55 | 05:45 06:40 07:35 | 07:35 07:35 08:20 | 08:56-09:27/31 | | | | | | |
| 17 | 08:17 08:59-09:25/26 | 07:25 06:20 06:04 | 05:03 04:34 04:56 | 05:47 06:42 07:37 | 07:37 07:37 08:21 | 08:57-09:28/31 | | | | | | |
| 18 | 08:16 09:00-09:24/24 | 07:23 06:17 06:02 | 05:01 04:34 04:57 | 05:49 06:44 07:39 | 07:39 07:39 08:22 | 08:58-09:28/30 | | | | | | |
| 19 | 08:15 09:00-09:21/21 | 07:21 06:15 05:59 | 05:00 04:34 04:59 | 05:51 06:46 07:41 | 07:41 07:41 08:40 | 08:50-09:29/30 | | | | | | |
| 20 | 08:13 09:01-09:19/18 | 07:18 06:12 05:57 | 04:58 04:34 05:00 | 05:52 06:48 07:43 | 07:43 07:43 08:39 | 08:52/13 | | | | | | |
| 21 | 08:12 09:02-09:18/16 | 07:16 06:10 05:55 | 04:57 04:35 05:02 | 05:54 06:49 07:45 | 07:45 07:45 08:38 | 08:54/16 | | | | | | |
| 22 | 08:11 09:04-09:17/13 | 07:14 06:07 05:53 | 04:55 04:35 05:03 | 05:56 06:51 07:47 | 07:47 07:47 08:37 | 08:55/18 | | | | | | |
| 23 | 08:10 09:05-09:15/10 | 07:12 06:05 05:50 | 04:54 04:35 05:05 | 05:58 06:53 07:49 | 07:49 07:49 08:37 | 08:58/21 | | | | | | |
| 24 | 08:08 09:09-09:13/4 | 07:10 06:02 05:48 | 04:52 04:35 05:06 | 05:59 06:55 07:51 | 07:51 07:51 08:37 | 09:01/24 | | | | | | |
| 25 | 08:07 | 07:07 06:00 05:46 | 04:51 04:36 05:08 | 06:01 06:57 06:52 | 07:52 07:52 08:37 | 09:03/26 | | | | | | |
| 26 | 08:05 | 07:05 06:57 05:44 | 04:50 04:36 05:09 | 06:03 06:58 06:54 | 07:53 07:53 08:37 | 09:10/33 | | | | | | |
| 27 | 08:04 | 07:03 06:55 05:41 | 04:48 04:36 05:11 | 06:05 07:00 06:56 | 07:55 07:55 08:36 | 09:12/36 | | | | | | |
| 28 | 08:02 | 07:00 06:52 05:39 | 04:47 04:37 05:12 | 06:07 07:02 06:58 | 07:57 07:57 08:36 | 09:14/38 | | | | | | |
| 29 | 08:01 | 06:50 05:37 04:46 | 04:38 05:14 06:08 | 07:04 07:51 06:41 | 08:37-09:16/39 | | | | | | | |
| 30 | 07:59 | 06:47 05:35 04:45 | 04:38 05:16 06:10 | 07:06 07:52 06:45 | 08:00 08:00 08:37 | 09:17/40 | | | | | | |
| 31 | 07:58 | 06:45 05:44 04:44 | 04:41 05:17 06:12 | 07:04 07:04 07:04 | | | | | | | | |
| | 16:45 | 19:40 | 21:27 | 21:21 | 21:09 | 20:03 | 16:37 | 15:54 | | | | |
| Sonnenscheinstunden | 249 | 273 | 420 | 495 | 511 | 513 | 460 | 382 | 258 | 104 | | |
| Anzahl Minuten mit Schatten | 729 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 318 | 1044 | | |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 16 - W4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

Table with 13 columns (Januar to Dezember) and 31 rows of daily data showing sunrise/sunset times and shadow cast durations.

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:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 18 - W6

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | Januar | Februar | März | April | Mai | Juni | |
|-----------------------------|----------------|----------------|----------------|-------------------------|----------------|----------------|----------------|
| 1 | 08:26 15:55 | 07:56 16:46 | 06:58 17:43 | 16:44-17:13/29 17:43 | 06:42 19:42 | 05:33 20:37 | 04:43 21:28 |
| 2 | 08:26 15:56 | 07:54 16:48 | 06:56 17:45 | 16:43-17:14/31 17:45 | 06:40 19:43 | 05:31 20:39 | 04:42 21:29 |
| 3 | 08:26 15:57 | 07:52 16:50 | 06:53 17:47 | 16:44-17:15/31 17:47 | 06:38 19:45 | 05:29 20:41 | 04:41 21:30 |
| 4 | 08:26 15:58 | 07:51 16:52 | 06:51 17:48 | 16:43-17:20/37 17:48 | 06:35 19:47 | 05:27 20:43 | 04:40 21:31 |
| 5 | 08:25 16:00 | 07:49 16:55 | 06:49 17:50 | 16:45-17:23/38 17:50 | 06:33 19:49 | 05:25 20:45 | 04:39 21:32 |
| 6 | 08:25 16:01 | 07:47 16:57 | 06:46 17:52 | 16:45-17:25/40 17:52 | 06:30 19:51 | 05:23 20:46 | 04:39 21:34 |
| 7 | 08:25 16:02 | 07:45 16:59 | 06:44 17:54 | 16:47-17:27/40 17:54 | 06:28 19:53 | 05:21 20:48 | 04:38 21:35 |
| 8 | 08:24 16:04 | 07:43 17:01 | 06:41 17:56 | 16:51-17:28/37 17:56 | 06:25 19:55 | 05:19 20:50 | 04:37 21:36 |
| 9 | 08:24 16:05 | 07:41 17:03 | 06:39 17:58 | 16:52-17:28/36 17:58 | 06:23 19:56 | 05:17 20:52 | 04:37 21:36 |
| 10 | 08:23 16:07 | 07:39 17:05 | 06:37 18:00 | 16:54-17:29/35 18:00 | 06:21 19:58 | 05:15 20:54 | 04:36 21:37 |
| 11 | 08:22 16:08 | 07:37 17:07 | 06:34 18:02 | 16:55-17:28/33 18:02 | 06:18 20:00 | 05:13 20:55 | 04:36 21:38 |
| 12 | 08:21 16:10 | 07:35 17:09 | 06:32 18:04 | 16:58-17:28/30 18:04 | 06:16 20:02 | 05:11 20:57 | 04:35 21:39 |
| 13 | 08:21 16:11 | 07:33 17:11 | 06:29 18:06 | 17:05-17:27/22 18:06 | 06:13 20:04 | 05:10 20:59 | 04:35 21:40 |
| 14 | 08:20 16:13 | 07:31 17:13 | 06:27 18:08 | 17:06-17:27/21 18:08 | 06:11 20:06 | 05:08 21:01 | 04:35 21:40 |
| 15 | 08:19 16:15 | 07:29 17:15 | 06:24 18:10 | 17:06-17:25/19 18:10 | 06:09 20:08 | 05:06 21:02 | 04:35 21:41 |
| 16 | 08:18 16:16 | 07:27 17:17 | 06:22 18:12 | 17:09-17:24/15 18:12 | 06:06 20:10 | 05:04 21:04 | 04:34 21:41 |
| 17 | 08:17 16:18 | 07:25 17:19 | 06:20 18:13 | 17:11-17:21/10 18:13 | 06:04 20:11 | 05:03 21:06 | 04:34 21:42 |
| 18 | 08:16 16:20 | 07:23 17:21 | 06:17 18:15 | 17:11-17:21/10 18:15 | 06:02 20:13 | 05:01 21:07 | 04:34 21:42 |
| 19 | 08:15 16:22 | 07:21 17:23 | 06:15 18:17 | 17:11-17:21/10 18:17 | 06:00 20:15 | 05:00 21:09 | 04:34 21:43 |
| 20 | 08:13 16:23 | 07:18 17:25 | 06:12 18:19 | 17:11-17:21/10 18:19 | 05:57 20:17 | 04:58 21:11 | 04:34 21:43 |
| 21 | 08:12 16:25 | 07:16 17:27 | 06:10 18:21 | 17:11-17:21/10 18:21 | 05:55 20:19 | 04:56 21:12 | 04:34 21:43 |
| 22 | 08:11 16:27 | 07:14 17:29 | 06:07 18:23 | 16:52-16:58/6 18:23 | 05:52 20:21 | 04:55 21:14 | 04:35 21:44 |
| 23 | 08:10 16:29 | 07:12 17:31 | 06:05 18:25 | 16:49-17:01/12 18:25 | 05:50 20:23 | 04:54 21:15 | 04:35 21:44 |
| 24 | 08:08 16:31 | 07:10 17:33 | 06:02 18:27 | 16:47-17:02/15 18:27 | 05:48 20:24 | 04:52 21:17 | 04:35 21:44 |
| 25 | 08:07 16:33 | 07:07 17:35 | 06:00 18:28 | 16:46-17:04/18 18:28 | 05:46 20:26 | 04:51 21:18 | 04:35 21:44 |
| 26 | 08:05 16:35 | 07:05 17:37 | 05:57 18:30 | 16:45-17:06/21 18:30 | 05:44 20:28 | 04:50 21:20 | 04:36 21:44 |
| 27 | 08:04 16:37 | 07:03 17:39 | 05:55 18:32 | 16:44-17:09/25 18:32 | 05:41 20:30 | 04:48 21:21 | 04:36 21:44 |
| 28 | 08:02 16:39 | 07:00 17:41 | 05:52 18:34 | 16:25-16:36/11 18:34 | 05:39 20:32 | 04:47 21:23 | 04:37 21:44 |
| 29 | 08:01 16:41 | | 06:50 19:36 | 16:44-17:12/28 19:36 | 05:37 20:34 | 04:46 21:24 | 04:37 21:43 |
| 30 | 07:59 16:43 | | 06:47 19:38 | | 05:35 20:36 | 04:45 21:25 | 04:38 21:43 |
| 31 | 07:58 16:44 | | 06:45 19:40 | | | 04:44 21:27 | |
| Sonnenscheinstunden | | 249 | 273 | 367 | 420 | 495 | 511 |
| Anzahl Minuten mit Schatten | | 0 | 515 | 504 | 0 | 672 | 1234 |

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

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



Projekt:
Windeignungsgebiet Görmin

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Kalender pro WEA

Berechnung: GBWEA: 18 - W6

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
405 493 534 462 594 596 556 827 1,170 1,140 805 558 8,140
Startwindgeschwindigkeit : Startwindgeschw. aus Leistungskennlinie

| | July | August | September | Oktober | November | Dezember | |
|----|--|-------------------------------|----------------|---|-------------------------------|----------------|----------|
| 1 | 04:39 05:31-06:12/41 21:43 | 05:19 05:57-06:17/20 21:07 | 06:14 20:00 | 07:07 17:44-18:07/23 18:46 17:39-17:43/4 | 07:06 15:52-16:01/9 16:35 | 08:02 15:50 | |
| 2 | 04:39 05:32-06:13/41 21:42 | 05:21 05:59-06:15/16 21:05 | 06:15 19:58 | 07:09 17:35-18:07/32 18:44 | 07:08 16:33 | 08:03 15:49 | |
| 3 | 04:40 05:33-06:13/40 21:42 | 05:22 06:00-06:14/14 21:04 | 06:17 19:55 | 07:11 17:33-18:07/34 18:41 | 07:10 16:31 | 08:05 15:49 | |
| 4 | 04:41 05:33-06:14/41 21:41 | 05:24 06:03-06:12/9 21:02 | 06:19 19:53 | 07:13 17:30-18:05/35 18:39 | 07:12 16:29 | 08:06 15:48 | |
| 5 | 04:42 05:34-06:13/39 21:41 | 05:26 21:00 | 06:21 19:50 | 07:15 17:29-18:04/35 18:36 | 07:14 16:27 | 08:07 15:47 | |
| 6 | 04:43 05:35-06:13/38 21:40 | 05:28 20:58 | 06:23 19:48 | 07:17 17:25-18:03/38 18:34 | 07:16 16:25 | 08:09 15:47 | |
| 7 | 04:44 05:35-06:14/39 21:40 | 05:29 20:56 | 06:24 19:46 | 07:18 17:22-18:02/40 18:31 | 07:18 16:23 | 08:10 15:46 | |
| 8 | 04:45 05:36-06:14/38 21:39 | 05:31 20:54 | 06:26 19:43 | 07:20 17:20-17:59/39 18:29 | 07:20 16:21 | 08:12 15:46 | |
| 9 | 04:46 05:37-06:15/38 21:38 | 05:33 20:52 | 06:28 19:41 | 07:22 17:19-17:57/38 18:26 | 07:22 16:20 | 08:13 15:46 | |
| 10 | 04:47 05:37-06:15/38 21:37 | 05:34 20:50 | 06:30 19:38 | 07:24 17:18-17:49/31 18:24 | 07:24 16:18 | 08:14 15:45 | |
| 11 | 04:48 05:38-06:16/38 21:36 | 05:36 20:48 | 06:32 19:36 | 07:26 17:17-17:48/31 18:22 | 07:26 16:16 | 08:15 15:45 | |
| 12 | 04:49 05:39-06:16/37 21:35 | 05:38 20:46 | 06:33 19:33 | 07:28 17:17-17:47/30 18:19 | 07:28 16:14 | 08:16 15:45 | |
| 13 | 04:51 05:40-06:17/37 21:34 | 05:40 20:44 | 06:35 19:31 | 07:30 17:17-17:46/29 18:17 | 07:29 16:13 | 08:17 15:45 | |
| 14 | 04:52 05:41-06:18/37 21:33 | 05:42 20:41 | 06:37 19:28 | 07:31 17:17-17:44/27 18:15 | 07:31 16:11 | 08:18 15:45 | |
| 15 | 04:53 05:42-06:18/36 21:32 | 05:43 20:39 | 06:39 19:26 | 07:33 17:17-17:41/24 18:12 | 07:33 16:10 | 08:19 15:45 | |
| 16 | 04:54 05:43-06:18/35 21:31 | 05:45 20:37 | 06:40 19:23 | 07:35 17:17-17:37/20 18:10 | 07:35 16:08 | 08:20 15:45 | |
| 17 | 04:56 05:43-06:18/35 21:30 | 05:47 20:35 | 06:42 19:21 | 07:37 17:18-17:36/18 18:08 | 07:37 16:07 | 08:21 15:45 | |
| 18 | 04:57 05:45-06:19/34 21:29 | 05:49 20:33 | 06:44 19:18 | 07:39 17:19-17:34/15 18:05 | 07:39 16:05 | 08:22 15:45 | |
| 19 | 04:59 05:46-06:19/33 21:28 | 05:50 20:30 | 06:46 19:16 | 07:41 17:21-17:32/11 18:03 | 07:41 16:04 | 08:23 15:45 | |
| 20 | 05:00 05:46-06:19/33 21:26 | 05:52 20:28 | 06:48 19:13 | 07:43 16:48-17:14/26 18:01 | 07:43 16:02 | 08:23 15:46 | |
| 21 | 05:01 05:47-06:20/33 21:25 | 05:54 20:26 | 06:49 19:11 | 07:45 16:47-17:14/27 17:58 | 07:44 16:01 | 08:24 15:46 | |
| 22 | 05:03 05:47-06:20/33 21:23 | 05:56 20:24 | 06:51 19:08 | 07:47 16:46-17:14/28 17:56 | 07:46 16:00 | 08:24 15:47 | |
| 23 | 05:04 05:47-06:19/32 21:22 | 05:58 20:21 | 06:53 19:06 | 07:49 16:46-17:14/28 17:54 | 07:48 15:58 | 08:25 15:47 | |
| 24 | 05:06 05:48-06:20/32 21:20 | 05:59 20:19 | 06:55 19:03 | 07:51 16:45-17:13/28 17:52 | 07:50 15:57 | 08:25 15:48 | |
| 25 | 05:08 05:49-06:19/30 21:19 | 06:01 20:17 | 06:57 19:01 | 06:52 15:45-16:13/28 16:50 | 07:52 15:56 | 08:26 15:48 | |
| 26 | 05:09 05:50-06:20/30 21:17 | 06:03 20:14 | 06:58 18:58 | 17:55-18:03/8 16:47 | 06:54 15:45-16:12/27 16:45 | 07:53 15:55 | |
| 27 | 05:11 05:51-06:19/28 21:16 | 06:05 20:12 | 07:00 18:56 | 17:51-18:05/14 16:45 | 06:56 15:45-16:10/25 16:45 | 07:55 15:54 | |
| 28 | 05:12 05:52-06:19/27 21:14 | 06:07 20:10 | 07:02 18:53 | 17:48-18:06/18 16:43 | 06:58 15:46-16:09/23 16:43 | 07:57 15:53 | |
| 29 | 05:14 05:53-06:18/25 21:12 | 06:08 20:07 | 07:04 18:51 | 17:46-18:06/20 16:41 | 07:00 15:46-16:07/21 16:41 | 07:58 15:52 | |
| 30 | 05:16 05:54-06:18/24 21:11 | 06:10 20:05 | 07:06 18:48 | 17:45-18:07/22 16:39 | 07:02 15:47-16:04/17 16:39 | 08:00 15:51 | |
| 31 | 05:17 05:55-06:17/22 21:09 | 06:12 20:03 | | | 07:04 15:50-16:04/14 16:37 | | |
| | Sonnenscheinstunden Anzahl Minuten mit Schatten | 513 1064 | 460 59 | 382 82 | 328 949 | 258 9 | 232 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:
Windeignungsgebiet Görmin

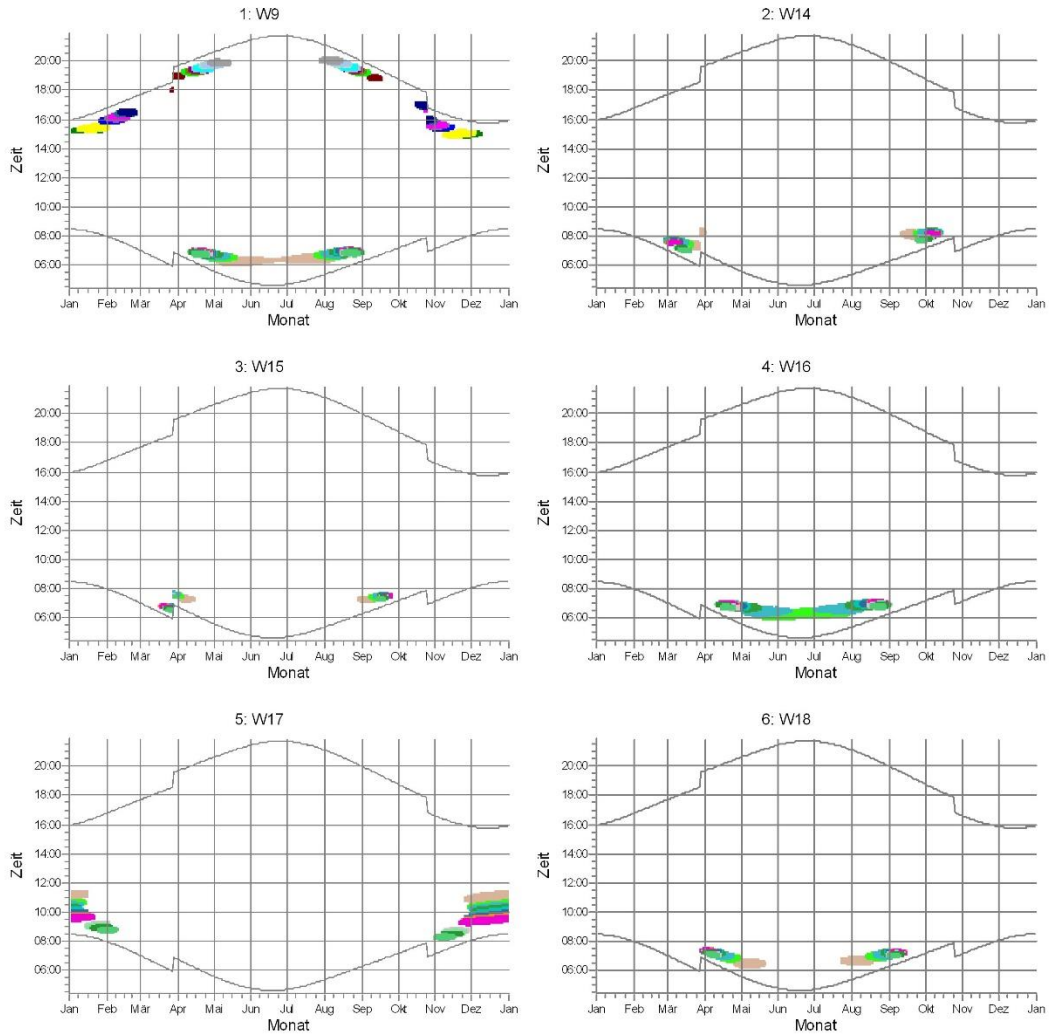
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Grafischer Kalender pro WEA

Berechnung: GB



Schattenrezeptoren

| | | | | |
|--------|---------|---------|---------|----------|
| A: IO1 | G: IO7 | M: IO13 | S: IO19 | Y: IO25 |
| B: IO2 | H: IO8 | N: IO14 | T: IO20 | Z: IO26 |
| C: IO3 | I: IO9 | O: IO15 | U: IO21 | AA: IO27 |
| D: IO4 | J: IO10 | P: IO16 | V: IO22 | AB: IO28 |
| E: IO5 | K: IO11 | Q: IO17 | W: IO23 | |
| F: IO6 | L: IO12 | R: IO18 | X: IO24 | |

Projekt:
Windeignungsgebiet Görmin

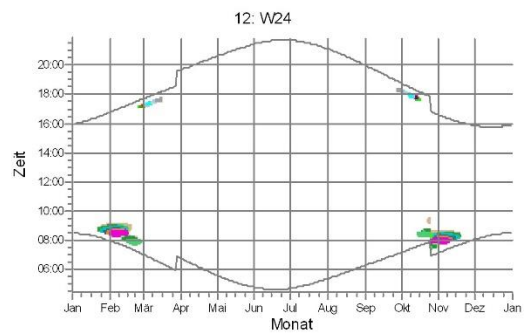
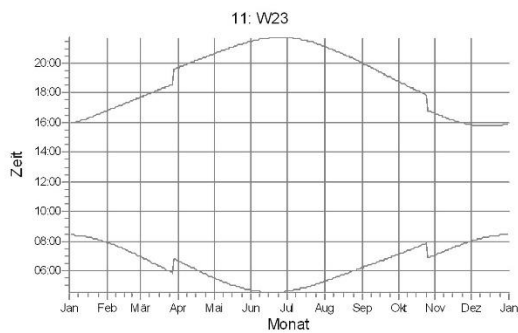
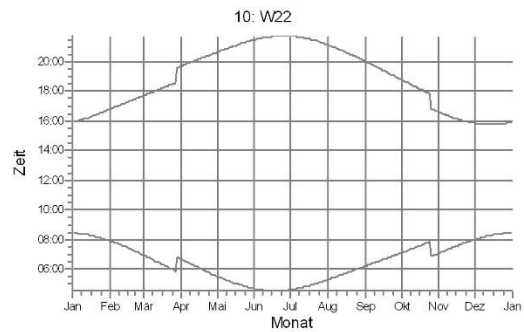
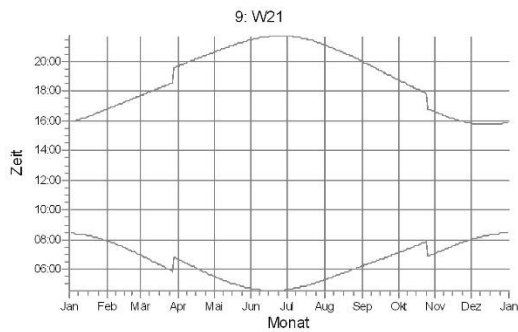
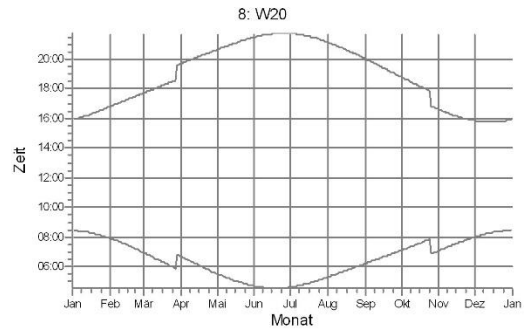
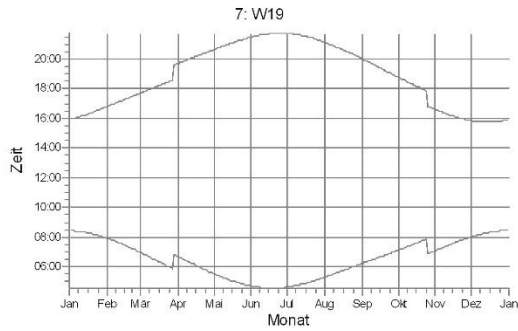
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Grafischer Kalender pro WEA

Berechnung: GB



Schattenrezeptoren

| | | | | |
|---------|---------|---------|---------|----------|
| I: IO9 | M: IO13 | Q: IO17 | U: IO21 | Y: IO25 |
| J: IO10 | N: IO14 | R: IO18 | V: IO22 | Z: IO26 |
| K: IO11 | O: IO15 | S: IO19 | W: IO23 | AA: IO27 |
| L: IO12 | P: IO16 | T: IO20 | X: IO24 | AB: IO28 |

Projekt:
Windeignungsgebiet Görmin

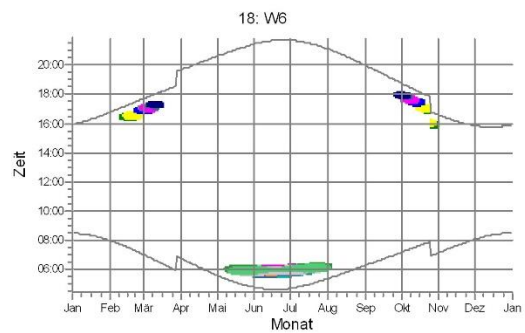
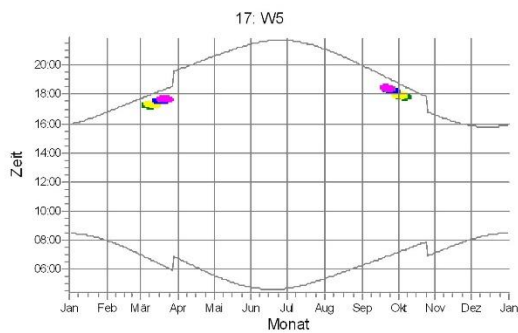
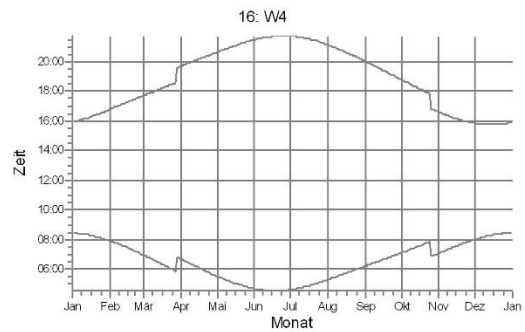
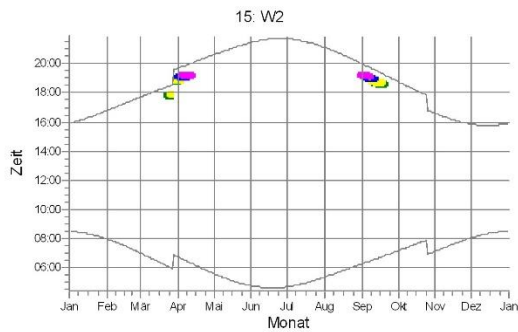
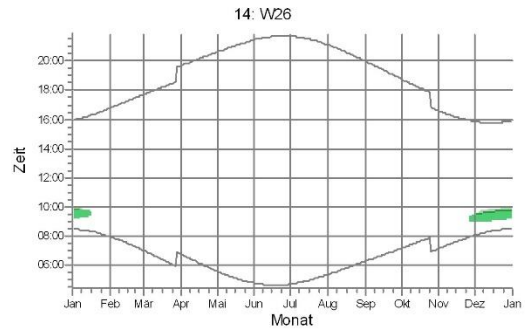
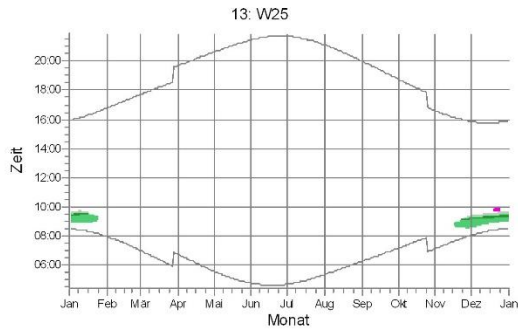
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt



André Gefke / andre.gefke@i17-wind.de
Berechnet:
25/08/2018 13:46/3.1.633

SHADOW - Grafischer Kalender pro WEA

Berechnung: GB



Schattenrezeptoren

| | | | |
|--------|---------|---------|----------|
| A: IO1 | E: IO5 | U: IO21 | Y: IO25 |
| B: IO2 | F: IO6 | V: IO22 | Z: IO26 |
| C: IO3 | G: IO7 | W: IO23 | AA: IO27 |
| D: IO4 | T: IO20 | X: IO24 | AB: IO28 |

Anhang 5/ Fotodokumentation der Immissionsorte

IO1 / Neu Negentin, Feldweg 9



IO2 / Neu Negentin, Feldweg 7



IO3 / Neu Negentin, Feldweg 5



IO4 / Neu Negentin, Feldweg 3



IO5 / Neu Negentin, Feldweg 2



IO6 / Neu Negentin, Feldweg 1



IO7 / Neu Negentin, Feldweg 1a



IO8 / Alt Negentin, Dorfstr. 39



IO9 / Alt Negentin, Dorfstr. 34



IO10 / Alt Negentin, Dorfstr. 32/33



IO11 / Alt Negentin, Dorfstr. 31



IO12 / Alt Negentin, Dorfstr. 30

Unbebautes Grundstück

IO13 / Alt Negentin, Dorfstr. 29



IO14 / Alt Negentin, Dorfstr. 27



IO15 / Alt Negentin, Dorfstr. 25



IO16 / Alt Negentin, Dorfstr. 23



IO17 / Böken, Dorfstr. 25



IO18 / Böken, Dorfstr. 22



IO19 / Böken, Dorfstr. 21a



IO20 / Böken, Dorfstr. 20



IO21 / Böken, Dorfstr. 19

Unbebautes Grundstück

IO22 / Böken, Dorfstr. 14/15



IO23 / Böken, Dorfstr. 11/12



IO24 / Böken, Dorfstr. 10

Unbebautes Grundstück

IO25 / Böken, Dorfstr. 4



IO26 / Böken, Dorfstr. 3



IO27 / Böken, Dorfstr. 2



IO28 / Böken, Dorfstr. 1

