



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

Bericht Nr.: I17-SCHATTEN-2015-17 Rev. 02

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

Bericht-Nr. I17-SCHATTEN-2015-17 Rev. 02

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## Haftungsausschluss und Urheberrecht

Die vorliegende Revision 02 des Schattenwurfimmissionsgutachten für den Standort Miltzow wurde von der wpd Windpark Nr. 263 Renditefonds GmbH & Co. KG im Mai 2019 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.

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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 der Windenergieanlage.

Revisionsnummer	Revisionsdatum	Änderung	Bearbeiter
0	03.06.2015	Erstellung des Gutachtens	Gefke
1	12.10.2015	Änderung der Vorbelastung	Gefke
2	13.06.2019	Ergänzung von weiteren Immissionsorten	Gefke

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## 1 Aufgabenstellung

Der Auftraggeber plant die Errichtung von einer Vestas V112-3.3/3.45 MW mit einer Nabenhöhe von 119 m im Windpark Miltzow. Der Windpark liegt ca. 15 km südöstlich der Stadt Stralsund in der Gemeinde Sundhagen in Mecklenburg-Vorpommern.

Eine WEA mit einer Gesamthöhe von mehr als 50 Metern stellt nach der 4. BImSchV eine genehmigungsbedürftige Anlage dar, welche das Genehmigungsverfahren nach dem Bundes-Immissionschutzgesetz (BImSchG) [2] zu durchlaufen hat.

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

## 2 Örtliche Beschreibung

Der Windpark Miltzow befindet sich in der Gemeinde Sundhagen in einem Gebiet nördlich der Ortschaft Wilmshagen und westlich der Ortschaft Miltzow. Der Windpark wird durch die Bundesstraße B96n geteilt, wobei sich ein Großteil der Anlagen östlich der Bundesstraße befindet. Direkt südlich des Windparks schließt sich der Windpark Miltzow-Mannhagen an. In der Umgebung des Windparks erstrecken sich vereinzelt Höfe und dörfliche Siedlungen. Das Gelände um die Windenergieanlagenstandorte variiert nur leicht in der Höhe von 10 bis 30 m über NN.

Die geplante WEA stellt eine Erweiterung des bestehenden Windparks Miltzow-Reinkenhagen dar. Weiter südlich befindet sich der angrenzende Windpark Miltzow-Mannhagen. Alle genannten WEA finden im vorliegenden Schattenwurfgutachten als Vorbelastung Berücksichtigung.

Die Angaben zu den Koordinaten der bestehenden und geplanten Windenergieanlagen wurden vom Auftraggeber zur Verfügung gestellt [6]. 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.

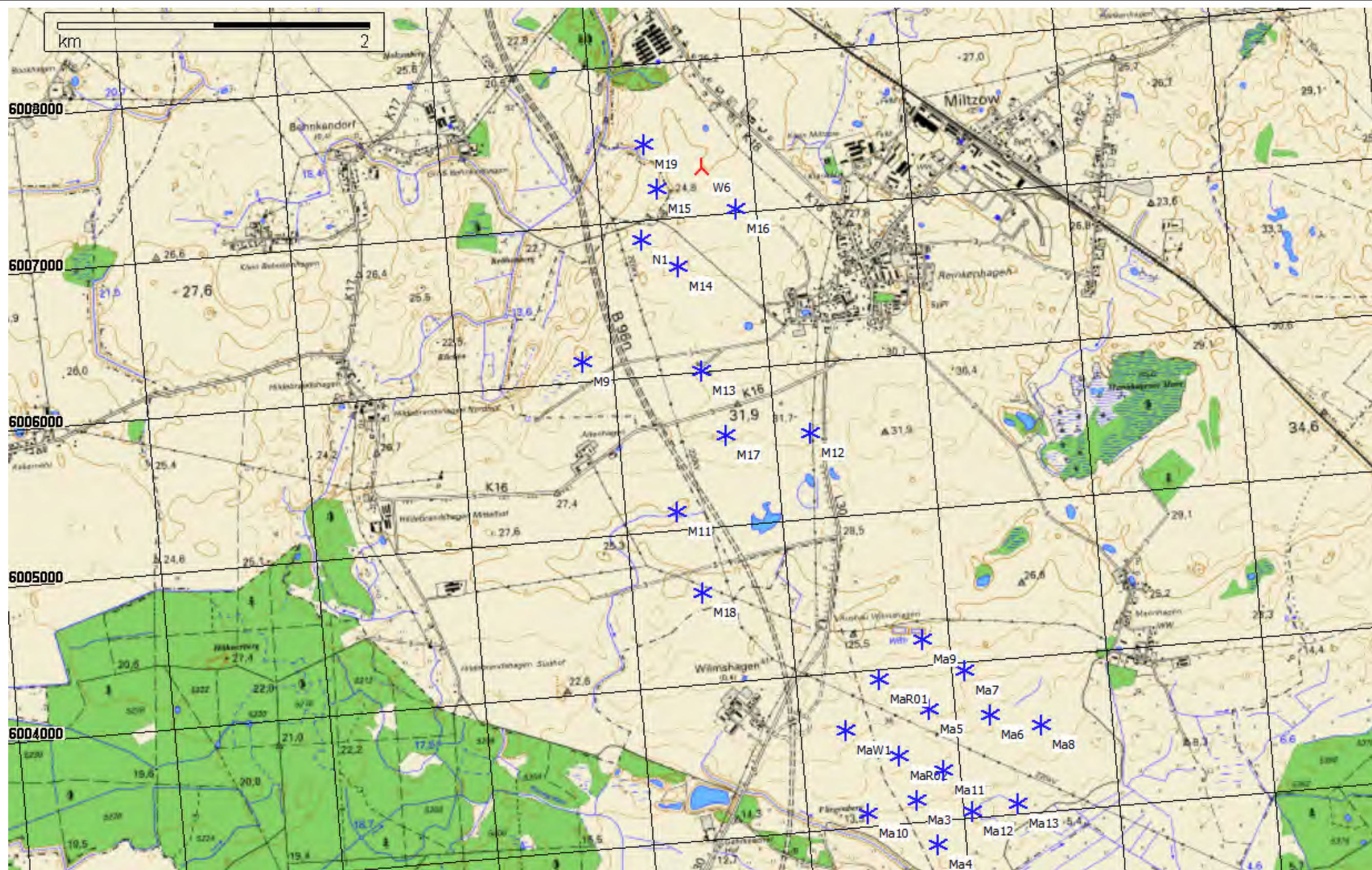


Abbildung 2.1: WEA Standorte  
 Blaue Sterne: Bestandsanlagen; Rote Kreuz: Neu geplante WEA; Kartenmaterial [3]

- = neu geplante WEA
- = Bestehende WEA

## 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, Gewerbeaufsichtsamtern 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  $3^\circ$  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.
- Der Immissionsort empfängt Schatten aus allen Richtungen („Gewächshaus“-Modus)

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 Miltzow (W6) die Errichtung und den Betrieb von einer Windenergieanlage des Herstellers Vestas Wind Systems A/S [6]. Nachfolgend werden die Eckdaten der geplanten Windenergieanlage zusammengefasst:

Hersteller:	Vestas Wind Systems A/S
Anlagentyp:	V112-3.3/3.45 MW
Nabenhöhe:	119 m
Rotordurchmesser:	112 m
Nennleistung:	3.300 kW bzw. 3.450 kW
Drehzahlbereich:	6.2 – 17.7 U/min
Maximale Blatttiefe [5]:	4.0 m
Blatttiefe bei 90% Radius [5]:	1.03 m

### 4.2 Position der geplanten Windenergieanlage

Die Angabe zu den Koordinaten wurden vom Auftraggeber übermittelt [6]. Der nachfolgenden Tabelle 4.1 ist die Position und der Anlagentyp mit Nabenhöhe der geplanten Windenergieanlage zu entnehmen.

Nr.	Typ	Bez.	Nabenhöhe [m]	Rotordurchmesser [m]	Koordinaten UTM ETRS 89 Zone 33 Ost	Koordinaten UTM ETRS 89 Zone 33 Nord	Höhe über NN [m]
1	V112-3.3/3.45 MW	W6	119.0	112.0	3380681	6007305	23

Tabelle 4.1: Position der geplanten WEA [6]

### 4.3 Vorbelastung

Am Standort Miltzow sind derzeit 11 Windenergieanlagen und im WP Mannhagen weitere 14 WEA in Betrieb, genehmigt oder geplant, welche alle als Vorbelastung berücksichtigt werden müssen. In Tabelle 4.2 sind die Windenergieanlagen mit Typ, Nabenhöhe und Position [6] aufgeführt.

Nr.	Typ	Bez.	Rotor- durch- messer [m]	Na- ben- höhe [m]	Koordinaten UTM ETRS 89 Zone 33 Ost	Koordinaten UTM ETRS 89 Zone 33 Nord	Höhe über NN [m]
1	V80-2.0MW	Ma3	80	78	3381716	6003135	10
2	V80-2.0MW	Ma4	80	78	3381825	6002839	10
3	V80-2.0MW	Ma5	80	78	3381841	6003718	13
4	V80-2.0MW	Ma6	80	78	3382234	6003642	10
5	V80-2.0MW	Ma7	80	78	3382091	6003945	16
6	V80-2.0MW	Ma8	80	78	3382555	6003551	10
7	V90-2.0MW	Ma9	90	105	3381835	6004165	20
8	GE_1.5sl	Ma10	77	100	3381393	6003081	10
9	V112-3.0MW	Ma11	112	94	3381906	6003313	10
10	V112-3.0MW	Ma12	112	119	3382068	6003040	10
11	V112-3.0MW	Ma13	112	119	3382362	6003062	10
12	V112-3.3MW	MaR1	112	140	3381539	6003932	18
13	V112-3.3MW	MaR2	112	140	3381628	6003435	10
14	V126-3.3MW	MaW1	126	137	3381299	6003623	14
15	V90-2.0MW	N1	90	105	3380256	6006880	22
16	V90-2.0MW	M13	90	105	3380570	6006010	23
17	V90-2.0MW	M14	90	105	3380480	6006690	24
18	V90-2.0MW	M15	90	105	3380381	6007196	22
19	V90-2.0MW	M16	90	105	3380876	6007030	25
20	V90-2.0MW	M17	90	105	3380692	6005580	22
21	V90-2.0MW	M18	90	105	3380456	6004584	21
22	V90-2.0MW	M19	90	105	3380322	6007487	20
23	V112-3.0MW	M9	112	119	3379812	6006127	22
24	V112-3.3MW	M11	112	119	3380337	6005115	26
25	V112-3.3MW	M12	112	94	3381234	6005547	25

Tabelle 4.2: Positionen der Bestandsanlagen am Standort [6]

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## 5 Einwirkungsbereich der Windenergieanlage und Immissionsorte

Als repräsentative, kritische Immissionsorte wurden die nächstgelegenen Bebauungen gewählt. 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 nächstgelegenen Bebauungen, welche diese Kriterien erfüllen, sind der nachfolgenden Abbildung 5.1 sowie der Tabelle 5.1 zu entnehmen. Es wurden insgesamt 134 Immissionsorte untersucht und berücksichtigt. Während einer Standortbesichtigung durch einen Mitarbeiter der I17-Wind GmbH & Co. KG wurde die Lage der Immissionsorte mittels GPS überprüft. Abweichungen wurden dokumentiert und korrigiert.

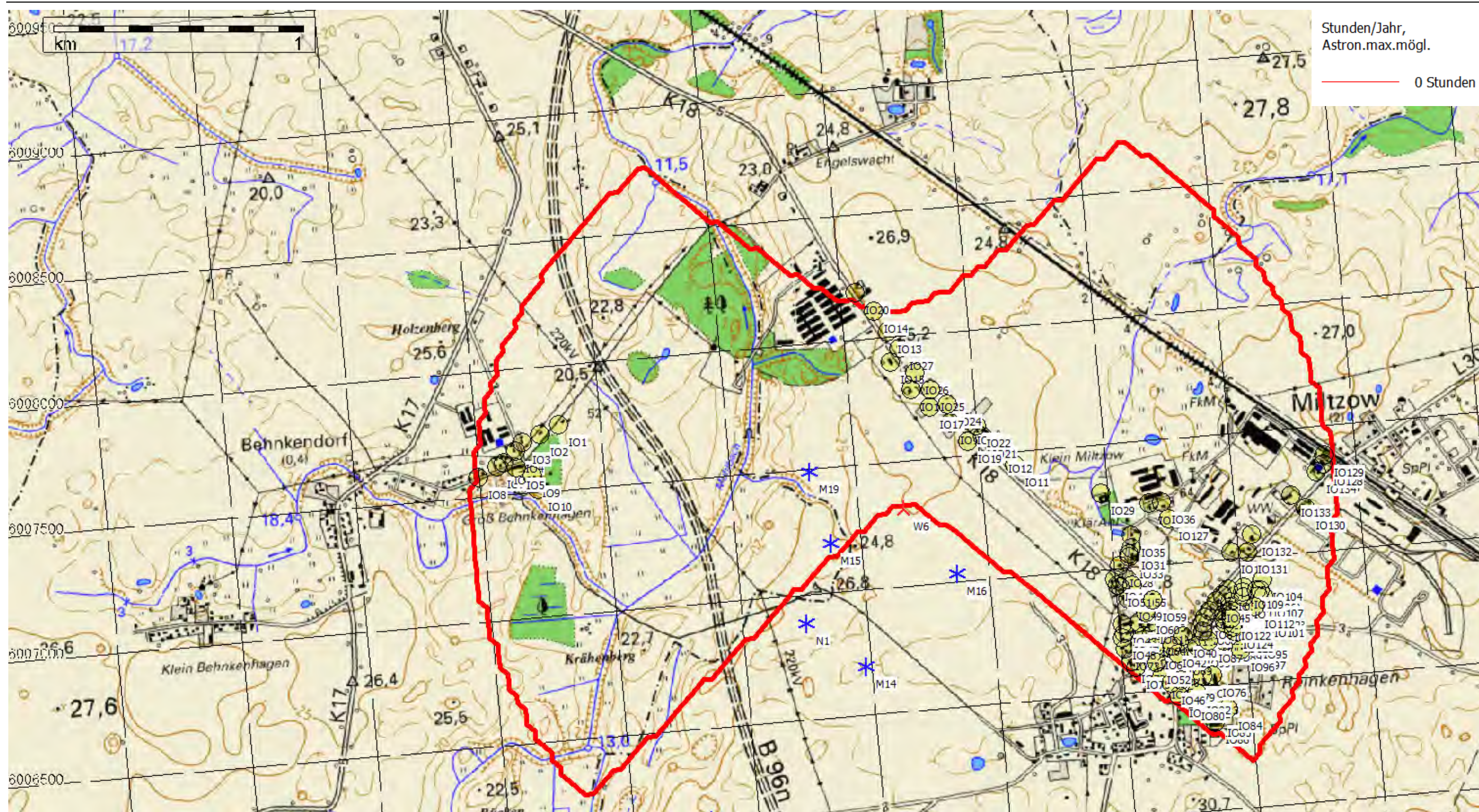


Abbildung 5.1: Einwirkungsbereich der neu geplanten WEA und Lage der Schattenrezeptoren  
 Rote(s) Kreuz(e): Neu geplante WEA; Gelbe Kreise: Schattenrezeptoren bzw. Immissionsorte; Kartenmaterial [8]

- ▲ = neu geplante WEA
- = Schattenrezeptor bzw. Immissionsort

Die Lage und Bezeichnung der Immissionsorte sind in Tabelle 5.1 zusammengefasst.

Nr.	Bezeichnung	Koordinaten UTM ETRS 89 Zone 33 Ost	Koordinaten UTM ETRS 89 Zone 33 Nord	Höhe über NN [m]
IO1	Groß Behnkenhagen, Nr. 21	3379339	6007761	20
IO2	Groß Behnkenhagen, Nr. 20	3379260	6007726	20
IO3	Groß Behnkenhagen, Nr. 18	3379189	6007700	20
IO4	Groß Behnkenhagen, Nr. 17	3379159	6007670	20
IO5	Groß Behnkenhagen, Nr. 16	3379154	6007602	20
IO6	Groß Behnkenhagen, Nr. 15	3379106	6007626	20
IO7	Groß Behnkenhagen, Nr. 12/13	3379079	6007614	20
IO8	Groß Behnkenhagen, Nr. 9/10/11	3378999	6007578	20
IO9	Groß Behnkenhagen, Nr. 23	3379217	6007566	20
IO10	Groß Behnkenhagen, Nr. 24	3379233	6007510	20
IO11	Engelswacht, Landstr. 1	3381140	6007445	26
IO12	Engelswacht, Landstr. 2	3381081	6007507	25
IO13	Engelswacht, Landstr. 9	3380680	6008022	22
IO14	Engelswacht, Landstr. 10	3380631	6008108	22
IO15	Engelswacht, Landstr. 16	3380680	6007898	23
IO16	Engelswacht, Landstr. 17	3380752	6007783	23
IO17	Engelswacht, Landstr. 18	3380823	6007706	24
IO18	Engelswacht, Landstr. 19	3380899	6007635	24
IO19	Engelswacht, Landstr. 21	3380961	6007557	25
IO20	Engelswacht, Landstr. 11	3380566	6008190	21
IO21	Engelswacht, Landstr. 3	3381023	6007570	25
IO22	Engelswacht, Landstr. 3a	3381004	6007613	25
IO23	Engelswacht, Landstr. 4	3380965	6007629	25
IO24	Engelswacht, Landstr. 5	3380893	6007710	24
IO25	Engelswacht, Landstr. 6	3380831	6007776	24
IO26	Engelswacht, Landstr. 7	3380776	6007848	23
IO27	Engelswacht, Landstr. 8	3380719	6007950	23
IO28	Klein Miltzow, An den Weiden 1	3381524	6007005	28
IO29	Klein Miltzow, An den Weiden 2	3381475	6007301	27
IO30	Klein Miltzow, Kleine Str. 12	3381664	6007245	24
IO31	Klein Miltzow, An den Weiden 8	3381579	6007074	28
IO32	Klein Miltzow, An den Weiden 9/10	3381566	6007049	28
IO33	Klein Miltzow, An den Weiden 11/12	3381565	6007038	28
IO34	Klein Miltzow, An den Weiden 13	3381551	6006948	28
IO35	Klein Miltzow, An den Weiden 6/7	3381583	6007123	27
IO36	Klein Miltzow, Kleine Str. 2	3381713	6007246	24
IO37	Reinkenhagen, Hauptstr. 22	3381653	6006544	30
IO38	Reinkenhagen, Hauptstr. 34/35	3381924	6006855	28
IO39	Reinkenhagen, Hauptstr. 30/31	3381770	6006723	29
IO40	Reinkenhagen, Hauptstr. 28/29	3381753	6006701	30
IO41	Reinkenhagen, Hauptstr. 26/27	3381738	6006682	30
IO42	Reinkenhagen, Hauptstr. 25	3381710	6006668	30
IO43	Reinkenhagen, Engelswachter Str. 6-8	3381515	6006771	29

Nr.	Bezeichnung	Koordinaten UTM ETRS 89 Zone 33 Ost	Koordinaten UTM ETRS 89 Zone 33 Nord	Höhe über NN [m]
IO44	Reinkenhagen, Engelswachter Str. 12	3381502	6006951	28
IO45	Reinkenhagen, Hauptstr. 36/37	3381900	6006833	29
IO46	Reinkenhagen, Hauptstr. 49	3381692	6006519	30
IO47	Reinkenhagen, Engelswachter Str. 3-5	3381522	6006736	30
IO48	Reinkenhagen, Schulmeisterweg 4/4a	3381512	6006716	30
IO49	Reinkenhagen, Engelswachter Str. 9	3381548	6006869	29
IO50	Reinkenhagen, Engelswachter Str. 10	3381522	6006918	29
IO51	Reinkenhagen, Engelswachter Str. 11	3381512	6006929	29
IO52	Reinkenhagen, Hauptstr. 23	3381638	6006605	30
IO53	Reinkenhagen, Hauptstr. 24	3381655	6006647	30
IO54	Reinkenhagen, Hauptstr. 32/33	3381948	6006877	28
IO55	Reinkenhagen, Engelswachter Str. 13	3381569	6006922	29
IO56	Reinkenhagen, Engelswachter Str. 14	3381608	6006844	29
IO57	Reinkenhagen, Engelswachter Str. 14a	3381628	6006834	29
IO58	Reinkenhagen, Engelswachter Str. 15	3381642	6006841	29
IO59	Reinkenhagen, Engelswachter Str. 15a	3381647	6006858	29
IO60	Reinkenhagen, Engelswachter Str. 16/17	3381615	6006811	29
IO61	Reinkenhagen, Engelswachter Str. 18	3381625	6006767	29
IO62	Reinkenhagen, Engelswachter Str. 1	3381599	6006715	30
IO63	Reinkenhagen, Engelswachter Str. 2	3381583	6006772	29
IO64	Reinkenhagen, Engelswachter Str. 19	3381629	6006720	30
IO65	Reinkenhagen, Engelswachter Str. 20	3381637	6006667	30
IO66	Reinkenhagen, Hauptstr. 38/39	3381869	6006795	29
IO67	Reinkenhagen, Hauptstr. 40/41	3381848	6006770	29
IO68	Reinkenhagen, Hauptstr. 42/43	3381838	6006746	29
IO69	Reinkenhagen, Hauptstr. 44/45/46	3381727	6006634	30
IO70	Reinkenhagen, Hauptstr. 47	3381675	6006593	30
IO71	Reinkenhagen, Hauptstr. 48	3381683	6006552	30
IO72	Reinkenhagen, Schulmeisterweg 1/2	3381538	6006618	30
IO73	Reinkenhagen, Schulmeisterweg 3	3381521	6006672	30
IO74	Reinkenhagen, Schwarzer Weg 1	3381606	6006589	30
IO75	Reinkenhagen, Schwarzer Weg 7	3381556	6006594	30
IO76	Reinkenhagen, Schulstr. 12-15	3381858	6006535	30
IO77	Reinkenhagen, Schulstr. 8-11	3381817	6006537	30
IO78	Reinkenhagen, Schulstr. 4-7	3381772	6006540	30
IO79	Reinkenhagen, Schulstr. 1/2/3	3381730	6006528	30
IO80	Reinkenhagen, Schulstr. 24 (Schule)	3381763	6006448	30
IO81	Reinkenhagen, Schulstr. 25 (Schule)	3381720	6006467	30
IO82	Reinkenhagen, Schulstr. 23	3381789	6006471	30
IO83	Reinkenhagen, Schulstr. 22	3381820	6006470	30
IO84	Reinkenhagen, Schulstr. 21a (Sporthalle)	3381909	6006397	30
IO85	Reinkenhagen, Schulstr. 19/20	3381864	6006374	30
IO86	Reinkenhagen, Schulstr. 17/18	3381853	6006347	30
IO87	Reinkenhagen, Holzhausen 1	3381852	6006673	30
IO88	Reinkenhagen, Holzhausen 2	3381917	6006671	29

Nr.	Bezeichnung	Koordinaten UTM ETRS 89 Zone 33 Ost	Koordinaten UTM ETRS 89 Zone 33 Nord	Höhe über NN [m]
IO89	Reinkenhagen, Holzhausen 3	3381934	6006672	29
IO90	Reinkenhagen, Holzhausen 4	3381950	6006672	29
IO91	Reinkenhagen, Holzhausen 5	3381967	6006673	29
IO92	Reinkenhagen, Holzhausen 6	3381983	6006674	29
IO93	Reinkenhagen, Holzhausen 7	3382001	6006674	29
IO94	Reinkenhagen, Holzhausen 8	3382018	6006675	29
IO95	Reinkenhagen, Holzhausen 9	3382035	6006675	29
IO96	Reinkenhagen, Ringweg 1/2	3381981	6006630	29
IO97	Reinkenhagen, Ringweg 3/4	3382023	6006632	29
IO98	Reinkenhagen, Am Rosenplatz 1/2	3381773	6006651	30
IO99	Reinkenhagen, Am Rosenplatz 3/4	3381806	6006659	30
IO100	Reinkenhagen, Am Rosenplatz 5/6	3381835	6006715	29
IO101	Reinkenhagen, Veilchenweg 5	3382086	6006757	29
IO102	Reinkenhagen, Veilchenweg 4	3382070	6006789	28
IO103	Reinkenhagen, Veilchenweg 6	3382091	6006790	28
IO104	Reinkenhagen, Sonnenblumenweg 3	3382088	6006902	28
IO105	Reinkenhagen, Tulpenweg 3	3382070	6006836	28
IO106	Reinkenhagen, Tulpenweg 4	3382064	6006863	28
IO107	Reinkenhagen, Tulpenweg 5	3382087	6006836	28
IO108	Reinkenhagen, Tulpenweg 6	3382080	6006861	28
IO109	Reinkenhagen, Dahlienweg 9	3382012	6006877	28
IO110	Reinkenhagen, Dahlienweg 10	3382007	6006857	28
IO111	Reinkenhagen, Dahlienweg 11	3382011	6006838	28
IO112	Reinkenhagen, Dahlienweg 16	3382051	6006797	28
IO113	Reinkenhagen, Kurze Straße 1	3381926	6006705	29
IO114	Reinkenhagen, Kurze Straße 2	3381926	6006720	29
IO115	Reinkenhagen, Kurze Straße 3	3381925	6006740	29
IO116	Reinkenhagen, Kurze Straße 4	3381924	6006757	29
IO117	Reinkenhagen, Kurze Straße 5	3381924	6006774	29
IO118	Reinkenhagen, Kurze Straße 6	3381952	6006822	29
IO119	Reinkenhagen, Kurze Straße 7	3381952	6006806	29
IO120	Reinkenhagen, Kurze Straße 8	3381953	6006789	29
IO121	Reinkenhagen, Kurze Straße 9	3381954	6006772	29
IO122	Reinkenhagen, Kurze Straße 10	3381953	6006755	29
IO123	Reinkenhagen, Kurze Straße 11	3381956	6006738	29
IO124	Reinkenhagen, Kurze Straße 12	3381956	6006721	29
IO125	Reinkenhagen, Kurze Straße 13	3381957	6006704	29
IO126	Reinkenhagen, Bohrturmstr. 1	3381974	6007024	27
IO127	Reinkenhagen, Bohrturmstr. 2	3381737	6007176	25
IO128	Miltzow, Am Bahndamm 2/3	3382370	6007343	24
IO129	Miltzow, Am Bahndamm 5	3382379	6007380	24
IO130	Miltzow, Reinberger Str. 12	3382286	6007174	26
IO131	Miltzow, Reinberger Str. 13	3382039	6007017	27
IO132	Miltzow, Reinberger Str. 14 (E.T.S. Miltzow)	3382062	6007085	26
IO133	Miltzow, Reinberger Str. 17	3382231	6007231	25

Nr.	Bezeichnung	Koordinaten UTM ETRS 89 Zone 33 Ost	Koordinaten UTM ETRS 89 Zone 33 Nord	Höhe über NN [m]
IO134	Miltzow, Reinberger Str. 20	3382342	6007314	25

*Tabelle 5.1: Immissionsorte*



## 6 Rechenergebnisse und Beurteilungen

In der nachfolgenden Tabelle ist das Ergebnis der Analyse für die Vor-, 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 wurden die Sonnenscheinwahrscheinlichkeit der Wetterstation Heiligendamm [4] und eine repräsentative Windverteilung vom Standort herangezogen.

Vorbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO1	Groß Behnkenhagen, Nr. 21	19:39	84	0:20	2:54
IO2	Groß Behnkenhagen, Nr. 20	16:39	75	0:19	2:36
IO3	Groß Behnkenhagen, Nr. 18	14:33	69	0:18	2:24
IO4	Groß Behnkenhagen, Nr. 17	13:52	68	0:18	2:22
IO5	Groß Behnkenhagen, Nr. 16	13:53	67	0:18	2:30
IO6	Groß Behnkenhagen, Nr. 15	12:34	64	0:17	2:16
IO7	Groß Behnkenhagen, Nr. 12/13	11:50	61	0:17	2:10
IO8	Groß Behnkenhagen, Nr. 9/10/11	10:17	57	0:16	1:55
IO9	Groß Behnkenhagen, Nr. 23	16:04	72	0:19	2:55
IO10	Groß Behnkenhagen, Nr. 24	18:20	79	0:19	3:26
IO11	Engelswacht, Landstr. 1	<b>108:39</b>	182	<b>1:03</b>	<b>14:33</b>
IO12	Engelswacht, Landstr. 2	<b>101:45</b>	173	<b>1:04</b>	<b>12:47</b>
IO13	Engelswacht, Landstr. 9	<b>39:58</b>	82	<b>0:34</b>	4:03
IO14	Engelswacht, Landstr. 10	25:09	56	<b>0:32</b>	2:17
IO15	Engelswacht, Landstr. 16	<b>45:41</b>	105	<b>0:39</b>	5:22
IO16	Engelswacht, Landstr. 17	<b>61:24</b>	124	<b>0:40</b>	<b>8:12</b>
IO17	Engelswacht, Landstr. 18	<b>68:01</b>	142	<b>0:37</b>	<b>9:17</b>
IO18	Engelswacht, Landstr. 19	<b>74:57</b>	160	<b>0:46</b>	<b>10:07</b>
IO19	Engelswacht, Landstr. 21	<b>84:07</b>	171	<b>0:51</b>	<b>11:19</b>
IO20	Engelswacht, Landstr. 11	5:32	24	0:17	0:26
IO21	Engelswacht, Landstr. 3	<b>78:50</b>	164	<b>0:55</b>	<b>10:10</b>
IO22	Engelswacht, Landstr. 3a	<b>63:51</b>	159	<b>0:34</b>	<b>8:42</b>
IO23	Engelswacht, Landstr. 4	<b>65:17</b>	158	<b>0:38</b>	<b>8:58</b>
IO24	Engelswacht, Landstr. 5	<b>56:51</b>	143	<b>0:34</b>	7:52
IO25	Engelswacht, Landstr. 6	<b>60:51</b>	127	<b>0:36</b>	7:54
IO26	Engelswacht, Landstr. 7	<b>50:09</b>	113	<b>0:36</b>	6:20
IO27	Engelswacht, Landstr. 8	<b>37:27</b>	97	<b>0:35</b>	4:15
IO28	Klein Miltzow, An den Weiden 1	<b>46:42</b>	171	<b>0:49</b>	<b>10:04</b>
IO29	Klein Miltzow, An den Weiden 2	<b>37:44</b>	117	<b>0:47</b>	7:28
IO30	Klein Miltzow, Kleine Str. 12	23:41	98	0:28	4:56

Vorbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO31	Klein Miltzow, An den Weiden 8	<u>40:09</u>	163	<u>0:40</u>	<u>8:02</u>
IO32	Klein Miltzow, An den Weiden 9/10	<u>41:10</u>	165	<u>0:43</u>	<u>8:26</u>
IO33	Klein Miltzow, An den Weiden 11/12	<u>41:17</u>	161	<u>0:44</u>	<u>8:38</u>
IO34	Klein Miltzow, An den Weiden 13	<u>42:44</u>	149	<u>0:48</u>	<u>9:44</u>
IO35	Klein Miltzow, An den Weiden 6/7	<u>39:47</u>	157	<u>0:32</u>	7:33
IO36	Klein Miltzow, Kleine Str. 2	21:01	91	0:25	4:22
IO37	Reinkenhagen, Hauptstr. 22	<u>49:16</u>	200	0:25	<u>11:13</u>
IO38	Reinkenhagen, Hauptstr. 34/35	9:17	43	0:20	2:16
IO39	Reinkenhagen, Hauptstr. 30/31	18:29	82	0:23	4:25
IO40	Reinkenhagen, Hauptstr. 28/29	19:50	86	0:23	4:50
IO41	Reinkenhagen, Hauptstr. 26/27	23:29	108	0:23	5:47
IO42	Reinkenhagen, Hauptstr. 25	<u>34:55</u>	169	0:24	7:24
IO43	Reinkenhagen, Engelswachter Str. 6-8	<u>52:55</u>	158	<u>0:44</u>	<u>13:01</u>
IO44	Reinkenhagen, Engelswachter Str. 12	<u>49:48</u>	165	<u>0:51</u>	<u>11:15</u>
IO45	Reinkenhagen, Hauptstr. 36/37	10:04	46	0:20	2:29
IO46	Reinkenhagen, Hauptstr. 49	<u>45:00</u>	188	0:23	<u>10:25</u>
IO47	Reinkenhagen, Engelswachter Str. 3-5	<u>57:51</u>	178	<u>0:45</u>	<u>14:18</u>
IO48	Reinkenhagen, Schulmeisterweg 4/4a	<u>66:26</u>	190	<u>0:46</u>	<u>16:25</u>
IO49	Reinkenhagen, Engelswachter Str. 9	<u>42:43</u>	144	<u>0:39</u>	<u>10:00</u>
IO50	Reinkenhagen, Engelswachter Str. 10	<u>46:36</u>	154	<u>0:47</u>	<u>10:45</u>
IO51	Reinkenhagen, Engelswachter Str. 11	<u>48:10</u>	157	<u>0:49</u>	<u>11:03</u>
IO52	Reinkenhagen, Hauptstr. 23	<u>54:55</u>	219	0:26	<u>12:16</u>
IO53	Reinkenhagen, Hauptstr. 24	<u>44:11</u>	186	0:25	<u>9:32</u>
IO54	Reinkenhagen, Hauptstr. 32/33	8:53	42	0:20	2:08
IO55	Reinkenhagen, Engelswachter Str. 13	<u>40:25</u>	142	<u>0:46</u>	<u>9:19</u>
IO56	Reinkenhagen, Engelswachter Str. 14	<u>35:53</u>	132	<u>0:35</u>	<u>8:24</u>
IO57	Reinkenhagen, Engelswachter Str. 14a	<u>33:50</u>	128	<u>0:33</u>	7:56
IO58	Reinkenhagen, Engelswachter Str. 15	<u>32:40</u>	127	<u>0:34</u>	7:38
IO59	Reinkenhagen, Engelswachter Str. 15a	<u>32:24</u>	129	<u>0:36</u>	7:33
IO60	Reinkenhagen, Engelswachter Str. 16/17	<u>35:09</u>	131	0:30	<u>8:23</u>
IO61	Reinkenhagen, Engelswachter Str. 18	<u>35:03</u>	133	0:29	<u>8:32</u>
IO62	Reinkenhagen, Engelswachter Str. 1	<u>46:53</u>	170	<u>0:38</u>	<u>10:47</u>
IO63	Reinkenhagen, Engelswachter Str. 2	<u>40:28</u>	145	<u>0:34</u>	<u>9:49</u>
IO64	Reinkenhagen, Engelswachter Str. 19	<u>38:47</u>	160	0:27	<u>8:28</u>
IO65	Reinkenhagen, Engelswachter Str. 20	<u>44:50</u>	182	0:26	<u>9:38</u>
IO66	Reinkenhagen, Hauptstr. 38/39	10:56	48	0:21	2:42
IO67	Reinkenhagen, Hauptstr. 40/41	14:33	69	0:21	3:18
IO68	Reinkenhagen, Hauptstr. 42/43	14:58	70	0:21	3:27
IO69	Reinkenhagen, Hauptstr. 44/45/46	<u>33:04</u>	161	0:23	7:23
IO70	Reinkenhagen, Hauptstr. 47	<u>46:16</u>	216	0:24	<u>10:33</u>

Vorbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO71	Reinkenhagen, Hauptstr. 48	<u>47:06</u>	197	0:24	<u>10:56</u>
IO72	Reinkenhagen, Schulmeisterweg 1/2	<u>68:07</u>	206	<u>0:43</u>	<u>15:22</u>
IO73	Reinkenhagen, Schulmeisterweg 3	<u>69:26</u>	203	<u>0:45</u>	<u>16:29</u>
IO74	Reinkenhagen, Schwarzer Weg 1	<u>57:24</u>	215	0:26	<u>12:37</u>
IO75	Reinkenhagen, Schwarzer Weg 7	<u>57:15</u>	205	0:28	<u>12:21</u>
IO76	Reinkenhagen, Schulstr. 12-15	25:19	113	0:20	4:53
IO77	Reinkenhagen, Schulstr. 8-11	28:28	137	0:21	5:40
IO78	Reinkenhagen, Schulstr. 4-7	28:44	139	0:22	6:16
IO79	Reinkenhagen, Schulstr. 1/2/3	<u>39:06</u>	173	0:23	<u>9:08</u>
IO80	Reinkenhagen, Schulstr. 24 (Schule)	<u>44:23</u>	172	0:23	<u>8:28</u>
IO81	Reinkenhagen, Schulstr. 25 (Schule)	<u>40:13</u>	161	0:22	<u>8:11</u>
IO82	Reinkenhagen, Schulstr. 23	<u>42:25</u>	178	0:22	<u>8:13</u>
IO83	Reinkenhagen, Schulstr. 22	<u>39:15</u>	166	0:24	7:09
IO84	Reinkenhagen, Schulstr. 21a (Sporthalle)	<u>44:52</u>	175	0:26	7:14
IO85	Reinkenhagen, Schulstr. 19/20	<u>51:51</u>	189	0:27	<u>8:46</u>
IO86	Reinkenhagen, Schulstr. 17/18	<u>52:39</u>	187	0:27	<u>8:38</u>
IO87	Reinkenhagen, Holzhausen 1	14:57	71	0:21	3:39
IO88	Reinkenhagen, Holzhausen 2	12:39	64	0:20	3:01
IO89	Reinkenhagen, Holzhausen 3	10:27	55	0:19	2:29
IO90	Reinkenhagen, Holzhausen 4	11:19	61	0:19	2:30
IO91	Reinkenhagen, Holzhausen 5	12:07	66	0:19	2:30
IO92	Reinkenhagen, Holzhausen 6	12:48	68	0:18	2:30
IO93	Reinkenhagen, Holzhausen 7	11:18	55	0:18	2:01
IO94	Reinkenhagen, Holzhausen 8	12:11	56	0:18	2:04
IO95	Reinkenhagen, Holzhausen 9	12:51	58	0:18	2:04
IO96	Reinkenhagen, Ringweg 1/2	16:38	78	0:18	2:57
IO97	Reinkenhagen, Ringweg 3/4	15:49	64	0:19	2:25
IO98	Reinkenhagen, Am Rosenplatz 1/2	19:45	88	0:22	4:57
IO99	Reinkenhagen, Am Rosenplatz 3/4	16:59	75	0:22	4:13
IO100	Reinkenhagen, Am Rosenplatz 5/6	15:13	71	0:21	3:36
IO101	Reinkenhagen, Veilchenweg 5	8:38	48	0:17	1:34
IO102	Reinkenhagen, Veilchenweg 4	5:14	30	0:17	1:17
IO103	Reinkenhagen, Veilchenweg 6	6:22	38	0:17	1:21
IO104	Reinkenhagen, Sonnenblumenweg 3	4:43	22	0:17	1:08
IO105	Reinkenhagen, Tulpenweg 3	4:56	24	0:17	1:14
IO106	Reinkenhagen, Tulpenweg 4	4:58	24	0:17	1:13
IO107	Reinkenhagen, Tulpenweg 5	4:46	22	0:17	1:11
IO108	Reinkenhagen, Tulpenweg 6	4:41	22	0:17	1:09
IO109	Reinkenhagen, Dahlienweg 9	5:37	24	0:18	1:23
IO110	Reinkenhagen, Dahlienweg 10	5:41	26	0:19	1:25

Vorbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO111	Reinkenhagen, Dahlienweg 11	5:34	24	0:18	1:24
IO112	Reinkenhagen, Dahlienweg 16	5:11	24	0:17	1:19
IO113	Reinkenhagen, Kurze Straße 1	9:43	45	0:19	2:24
IO114	Reinkenhagen, Kurze Straße 2	9:39	44	0:19	2:22
IO115	Reinkenhagen, Kurze Straße 3	9:42	45	0:20	2:22
IO116	Reinkenhagen, Kurze Straße 4	9:41	44	0:19	2:22
IO117	Reinkenhagen, Kurze Straße 5	9:26	44	0:19	2:19
IO118	Reinkenhagen, Kurze Straße 6	8:53	42	0:19	2:11
IO119	Reinkenhagen, Kurze Straße 7	8:54	44	0:19	2:12
IO120	Reinkenhagen, Kurze Straße 8	8:56	42	0:19	2:12
IO121	Reinkenhagen, Kurze Straße 9	8:49	43	0:19	2:10
IO122	Reinkenhagen, Kurze Straße 10	9:01	44	0:19	2:13
IO123	Reinkenhagen, Kurze Straße 11	9:03	42	0:19	2:13
IO124	Reinkenhagen, Kurze Straße 12	9:07	44	0:19	2:14
IO125	Reinkenhagen, Kurze Straße 13	9:03	44	0:19	2:13
IO126	Reinkenhagen, Bohrturmstr. 1	5:54	24	0:19	1:20
IO127	Reinkenhagen, Bohrturmstr. 2	19:07	83	0:24	4:09
IO128	Miltzow, Am Bahndamm 2/3	0:00	0	0:00	0:00
IO129	Miltzow, Am Bahndamm 5	0:00	0	0:00	0:00
IO130	Miltzow, Reinberger Str. 12	2:56	18	0:15	0:38
IO131	Miltzow, Reinberger Str. 13	5:06	24	0:18	1:09
IO132	Miltzow, Reinberger Str. 14 (E.T.S. Miltzow)	4:49	22	0:18	1:03
IO133	Miltzow, Reinberger Str. 17	3:19	19	0:15	0:42
IO134	Miltzow, Reinberger Str. 20	2:37	17	0:14	0:31

Tabelle 6.1: Analyseergebnisse Vorbelastung

Zusatzbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO1	Groß Behnkenhagen, Nr. 21	5:18	23	0:18	1:01
IO2	Groß Behnkenhagen, Nr. 20	4:41	23	0:17	0:54
IO3	Groß Behnkenhagen, Nr. 18	4:10	21	0:16	0:49
IO4	Groß Behnkenhagen, Nr. 17	4:00	21	0:16	0:48
IO5	Groß Behnkenhagen, Nr. 16	4:06	20	0:17	0:53
IO6	Groß Behnkenhagen, Nr. 15	3:44	20	0:16	0:47
IO7	Groß Behnkenhagen, Nr. 12/13	3:34	19	0:16	0:46

Zusatzbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO8	Groß Behnkenhagen, Nr. 9/10/11	3:06	19	0:15	0:41
IO9	Groß Behnkenhagen, Nr. 23	4:37	22	0:17	1:00
IO10	Groß Behnkenhagen, Nr. 24	4:44	22	0:18	1:03
IO11	Engelswacht, Landstr. 1	<b><u>44:25</u></b>	65	<b><u>0:52</u></b>	<b><u>10:17</u></b>
IO12	Engelswacht, Landstr. 2	<b><u>50:59</u></b>	71	<b><u>0:56</u></b>	<b><u>11:09</u></b>
IO13	Engelswacht, Landstr. 9	13:34	36	0:28	1:07
IO14	Engelswacht, Landstr. 10	0:13	4	0:04	0:01
IO15	Engelswacht, Landstr. 16	<b><u>41:11</u></b>	64	<b><u>0:46</u></b>	3:43
IO16	Engelswacht, Landstr. 17	<b><u>76:01</u></b>	92	<b><u>0:56</u></b>	7:29
IO17	Engelswacht, Landstr. 18	<b><u>101:08</u></b>	115	<b><u>1:02</u></b>	<b><u>11:19</u></b>
IO18	Engelswacht, Landstr. 19	<b><u>85:31</u></b>	105	<b><u>1:05</u></b>	<b><u>12:50</u></b>
IO19	Engelswacht, Landstr. 21	<b><u>74:16</u></b>	88	<b><u>1:06</u></b>	<b><u>14:16</u></b>
IO20	Engelswacht, Landstr. 11	0:00	0	0:00	0:00
IO21	Engelswacht, Landstr. 3	<b><u>57:48</u></b>	78	<b><u>0:58</u></b>	<b><u>11:17</u></b>
IO22	Engelswacht, Landstr. 3a	<b><u>58:50</u></b>	80	<b><u>0:57</u></b>	<b><u>10:17</u></b>
IO23	Engelswacht, Landstr. 4	<b><u>66:43</u></b>	87	<b><u>0:59</u></b>	<b><u>10:51</u></b>
IO24	Engelswacht, Landstr. 5	<b><u>90:41</u></b>	118	<b><u>0:58</u></b>	<b><u>10:55</u></b>
IO25	Engelswacht, Landstr. 6	<b><u>77:34</u></b>	96	<b><u>0:55</u></b>	7:54
IO26	Engelswacht, Landstr. 7	<b><u>55:05</u></b>	76	<b><u>0:50</u></b>	5:12
IO27	Engelswacht, Landstr. 8	28:07	53	<b><u>0:39</u></b>	2:27
IO28	Klein Miltzow, An den Weiden 1	19:52	52	0:30	5:45
IO29	Klein Miltzow, An den Weiden 2	17:49	42	<b><u>0:32</u></b>	4:33
IO30	Klein Miltzow, Kleine Str. 12	11:47	35	0:26	3:03
IO31	Klein Miltzow, An den Weiden 8	15:43	43	0:29	4:19
IO32	Klein Miltzow, An den Weiden 9/10	16:41	46	0:29	4:40
IO33	Klein Miltzow, An den Weiden 11/12	16:55	46	0:29	4:46
IO34	Klein Miltzow, An den Weiden 13	19:50	54	0:29	5:47
IO35	Klein Miltzow, An den Weiden 6/7	15:05	40	0:29	4:07
IO36	Klein Miltzow, Kleine Str. 2	10:36	32	0:25	2:43
IO37	Reinkenhagen, Hauptstr. 22	7:45	37	0:17	2:00
IO38	Reinkenhagen, Hauptstr. 34/35	7:42	31	0:20	2:11
IO39	Reinkenhagen, Hauptstr. 30/31	13:32	50	0:22	3:51
IO40	Reinkenhagen, Hauptstr. 28/29	15:28	57	0:23	4:20
IO41	Reinkenhagen, Hauptstr. 26/27	18:53	75	0:23	5:12
IO42	Reinkenhagen, Hauptstr. 25	22:42	74	0:23	6:11
IO43	Reinkenhagen, Engelswachter Str. 6-8	27:22	66	0:28	7:22
IO44	Reinkenhagen, Engelswachter Str. 12	24:08	63	0:30	7:01
IO45	Reinkenhagen, Hauptstr. 36/37	8:09	33	0:21	2:21
IO46	Reinkenhagen, Hauptstr. 49	8:21	39	0:17	2:10
IO47	Reinkenhagen, Engelswachter Str. 3-5	23:08	59	0:28	6:10

Zusatzbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO48	Reinkenhagen, Schulmeisterweg 4/4a	18:58	52	0:27	5:00
IO49	Reinkenhagen, Engelswachter Str. 9	25:29	73	0:28	7:12
IO50	Reinkenhagen, Engelswachter Str. 10	24:06	65	0:29	6:56
IO51	Reinkenhagen, Engelswachter Str. 11	24:29	65	0:30	7:04
IO52	Reinkenhagen, Hauptstr. 23	15:19	50	0:23	4:01
IO53	Reinkenhagen, Hauptstr. 24	21:13	62	0:24	5:40
IO54	Reinkenhagen, Hauptstr. 32/33	7:14	30	0:20	2:00
IO55	Reinkenhagen, Engelswachter Str. 13	19:28	55	0:28	5:40
IO56	Reinkenhagen, Engelswachter Str. 14	20:07	60	0:27	5:45
IO57	Reinkenhagen, Engelswachter Str. 14a	18:49	57	0:26	5:24
IO58	Reinkenhagen, Engelswachter Str. 15	17:25	54	0:26	5:02
IO59	Reinkenhagen, Engelswachter Str. 15a	16:34	50	0:26	4:48
IO60	Reinkenhagen, Engelswachter Str. 16/17	21:55	69	0:26	6:10
IO61	Reinkenhagen, Engelswachter Str. 18	26:24	82	0:26	7:17
IO62	Reinkenhagen, Engelswachter Str. 1	25:19	68	0:26	6:50
IO63	Reinkenhagen, Engelswachter Str. 2	28:56	77	0:27	7:55
IO64	Reinkenhagen, Engelswachter Str. 19	25:59	73	0:25	7:04
IO65	Reinkenhagen, Engelswachter Str. 20	22:21	64	0:25	5:59
IO66	Reinkenhagen, Hauptstr. 38/39	9:05	35	0:21	2:40
IO67	Reinkenhagen, Hauptstr. 40/41	9:48	39	0:21	2:52
IO68	Reinkenhagen, Hauptstr. 42/43	10:20	40	0:21	3:00
IO69	Reinkenhagen, Hauptstr. 44/45/46	21:37	70	0:23	5:50
IO70	Reinkenhagen, Hauptstr. 47	16:45	54	0:23	4:25
IO71	Reinkenhagen, Hauptstr. 48	12:18	46	0:22	3:12
IO72	Reinkenhagen, Schulmeisterweg 1/2	5:04	28	0:14	1:18
IO73	Reinkenhagen, Schulmeisterweg 3	12:39	41	0:23	3:17
IO74	Reinkenhagen, Schwarzer Weg 1	9:21	39	0:19	2:25
IO75	Reinkenhagen, Schwarzer Weg 7	3:50	25	0:12	0:59
IO76	Reinkenhagen, Schulstr. 12-15	17:02	68	0:20	4:35
IO77	Reinkenhagen, Schulstr. 8-11	17:38	64	0:21	4:43
IO78	Reinkenhagen, Schulstr. 4-7	16:52	58	0:21	4:28
IO79	Reinkenhagen, Schulstr. 1/2/3	13:14	49	0:21	3:27
IO80	Reinkenhagen, Schulstr. 24 (Schule)	6:01	36	0:14	1:33
IO81	Reinkenhagen, Schulstr. 25 (Schule)	4:25	31	0:12	1:08
IO82	Reinkenhagen, Schulstr. 23	11:16	47	0:20	2:56
IO83	Reinkenhagen, Schulstr. 22	13:06	51	0:20	3:26
IO84	Reinkenhagen, Schulstr. 21a (Sporthalle)	11:34	50	0:19	3:01
IO85	Reinkenhagen, Schulstr. 19/20	6:06	38	0:14	1:34
IO86	Reinkenhagen, Schulstr. 17/18	2:46	28	0:08	0:42
IO87	Reinkenhagen, Holzhausen 1	10:56	45	0:21	3:07

Zusatzbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO88	Reinkenhagen, Holzhausen 2	8:49	38	0:20	2:32
IO89	Reinkenhagen, Holzhausen 3	8:25	37	0:20	2:26
IO90	Reinkenhagen, Holzhausen 4	7:58	36	0:19	2:18
IO91	Reinkenhagen, Holzhausen 5	7:38	34	0:19	2:13
IO92	Reinkenhagen, Holzhausen 6	7:19	33	0:19	2:08
IO93	Reinkenhagen, Holzhausen 7	6:56	32	0:18	2:02
IO94	Reinkenhagen, Holzhausen 8	6:41	32	0:19	1:58
IO95	Reinkenhagen, Holzhausen 9	6:21	31	0:18	1:52
IO96	Reinkenhagen, Ringweg 1/2	7:34	35	0:18	2:10
IO97	Reinkenhagen, Ringweg 3/4	6:42	32	0:18	1:56
IO98	Reinkenhagen, Am Rosenplatz 1/2	17:24	71	0:22	4:47
IO99	Reinkenhagen, Am Rosenplatz 3/4	13:33	54	0:21	3:48
IO100	Reinkenhagen, Am Rosenplatz 5/6	10:53	42	0:21	3:08
IO101	Reinkenhagen, Veilchenweg 5	5:27	27	0:18	1:34
IO102	Reinkenhagen, Veilchenweg 4	5:35	27	0:18	1:34
IO103	Reinkenhagen, Veilchenweg 6	5:20	26	0:18	1:29
IO104	Reinkenhagen, Sonnenblumenweg 3	5:20	26	0:18	1:25
IO105	Reinkenhagen, Tulpenweg 3	5:34	27	0:18	1:31
IO106	Reinkenhagen, Tulpenweg 4	5:37	26	0:18	1:31
IO107	Reinkenhagen, Tulpenweg 5	5:22	26	0:18	1:27
IO108	Reinkenhagen, Tulpenweg 6	5:24	26	0:18	1:27
IO109	Reinkenhagen, Dahlienweg 9	6:17	28	0:19	1:42
IO110	Reinkenhagen, Dahlienweg 10	6:20	29	0:19	1:44
IO111	Reinkenhagen, Dahlienweg 11	6:22	28	0:19	1:46
IO112	Reinkenhagen, Dahlienweg 16	5:46	28	0:18	1:38
IO113	Reinkenhagen, Kurze Straße 1	8:18	36	0:20	2:25
IO114	Reinkenhagen, Kurze Straße 2	8:14	35	0:20	2:24
IO115	Reinkenhagen, Kurze Straße 3	8:10	34	0:20	2:24
IO116	Reinkenhagen, Kurze Straße 4	8:01	33	0:20	2:22
IO117	Reinkenhagen, Kurze Straße 5	8:01	34	0:20	2:22
IO118	Reinkenhagen, Kurze Straße 6	7:17	32	0:20	2:05
IO119	Reinkenhagen, Kurze Straße 7	7:18	31	0:20	2:07
IO120	Reinkenhagen, Kurze Straße 8	7:20	32	0:20	2:09
IO121	Reinkenhagen, Kurze Straße 9	7:21	32	0:20	2:10
IO122	Reinkenhagen, Kurze Straße 10	7:31	32	0:20	2:13
IO123	Reinkenhagen, Kurze Straße 11	7:30	33	0:19	2:13
IO124	Reinkenhagen, Kurze Straße 12	7:34	34	0:19	2:14
IO125	Reinkenhagen, Kurze Straße 13	7:38	34	0:19	2:14
IO126	Reinkenhagen, Bohrturmstr. 1	6:35	28	0:19	1:47
IO127	Reinkenhagen, Bohrturmstr. 2	10:29	34	0:24	2:47

Zusatzbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO128	Miltzow, Am Bahndamm 2/3	2:59	19	0:15	0:41
IO129	Miltzow, Am Bahndamm 5	2:58	18	0:15	0:41
IO130	Miltzow, Reinberger Str. 12	3:26	18	0:16	0:52
IO131	Miltzow, Reinberger Str. 13	5:49	26	0:19	1:34
IO132	Miltzow, Reinberger Str. 14 (E.T.S. Miltzow)	5:33	26	0:19	1:28
IO133	Miltzow, Reinberger Str. 17	3:55	21	0:16	0:57
IO134	Miltzow, Reinberger Str. 20	3:07	18	0:15	0:43

Tabelle 6.2: Analyseergebnisse Zusatzbelastung

Gesamtbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO1	Groß Behnkenhagen, Nr. 21	23:48	96	0:25	3:40
IO2	Groß Behnkenhagen, Nr. 20	20:59	89	0:25	3:24
IO3	Groß Behnkenhagen, Nr. 18	18:41	83	0:24	3:10
IO4	Groß Behnkenhagen, Nr. 17	17:52	83	0:22	3:09
IO5	Groß Behnkenhagen, Nr. 16	17:59	84	0:18	3:21
IO6	Groß Behnkenhagen, Nr. 15	16:18	80	0:17	3:01
IO7	Groß Behnkenhagen, Nr. 12/13	15:24	77	0:17	2:54
IO8	Groß Behnkenhagen, Nr. 9/10/11	13:23	73	0:16	2:34
IO9	Groß Behnkenhagen, Nr. 23	20:41	91	0:19	3:53
IO10	Groß Behnkenhagen, Nr. 24	23:04	98	0:19	4:26
IO11	Engelswacht, Landstr. 1	<b><u>148:07</u></b>	210	<b><u>1:03</u></b>	<b><u>23:20</u></b>
IO12	Engelswacht, Landstr. 2	<b><u>148:38</u></b>	203	<b><u>1:04</u></b>	<b><u>22:28</u></b>
IO13	Engelswacht, Landstr. 9	<b><u>53:32</u></b>	82	<b><u>0:57</u></b>	5:06
IO14	Engelswacht, Landstr. 10	25:22	56	<b><u>0:35</u></b>	2:18
IO15	Engelswacht, Landstr. 16	<b><u>86:52</u></b>	111	<b><u>1:09</u></b>	<b><u>8:52</u></b>
IO16	Engelswacht, Landstr. 17	<b><u>137:25</u></b>	146	<b><u>1:28</u></b>	<b><u>15:14</u></b>
IO17	Engelswacht, Landstr. 18	<b><u>169:09</u></b>	163	<b><u>1:34</u></b>	<b><u>20:00</u></b>
IO18	Engelswacht, Landstr. 19	<b><u>160:28</u></b>	186	<b><u>1:35</u></b>	<b><u>22:20</u></b>
IO19	Engelswacht, Landstr. 21	<b><u>158:23</u></b>	212	<b><u>1:33</u></b>	<b><u>24:49</u></b>
IO20	Engelswacht, Landstr. 11	5:32	24	0:17	0:26
IO21	Engelswacht, Landstr. 3	<b><u>136:33</u></b>	201	<b><u>1:22</u></b>	<b><u>20:48</u></b>
IO22	Engelswacht, Landstr. 3a	<b><u>122:32</u></b>	191	<b><u>1:24</u></b>	<b><u>18:26</u></b>
IO23	Engelswacht, Landstr. 4	<b><u>132:00</u></b>	187	<b><u>1:28</u></b>	<b><u>19:17</u></b>



Gesamtbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO24	Engelswacht, Landstr. 5	<u>147:32</u>	161	<u>1:28</u>	<u>18:14</u>
IO25	Engelswacht, Landstr. 6	<u>138:25</u>	143	<u>1:28</u>	<u>15:21</u>
IO26	Engelswacht, Landstr. 7	<u>105:14</u>	129	<u>1:19</u>	<u>11:14</u>
IO27	Engelswacht, Landstr. 8	<u>65:34</u>	102	<u>0:56</u>	6:34
IO28	Klein Miltzow, An den Weiden 1	<u>64:15</u>	197	<u>0:49</u>	<u>14:58</u>
IO29	Klein Miltzow, An den Weiden 2	<u>55:33</u>	137	<u>0:47</u>	<u>11:50</u>
IO30	Klein Miltzow, Kleine Str. 12	<u>35:28</u>	114	<u>0:37</u>	7:51
IO31	Klein Miltzow, An den Weiden 8	<u>55:21</u>	183	<u>0:41</u>	<u>12:05</u>
IO32	Klein Miltzow, An den Weiden 9/10	<u>56:50</u>	187	<u>0:43</u>	<u>12:41</u>
IO33	Klein Miltzow, An den Weiden 11/12	<u>56:53</u>	183	<u>0:44</u>	<u>12:54</u>
IO34	Klein Miltzow, An den Weiden 13	<u>59:27</u>	178	<u>0:48</u>	<u>14:24</u>
IO35	Klein Miltzow, An den Weiden 6/7	<u>54:52</u>	175	<u>0:44</u>	<u>11:32</u>
IO36	Klein Miltzow, Kleine Str. 2	<u>31:37</u>	109	<u>0:34</u>	6:58
IO37	Reinkenhagen, Hauptstr. 22	<u>57:01</u>	200	<u>0:40</u>	<u>13:10</u>
IO38	Reinkenhagen, Hauptstr. 34/35	16:59	74	0:20	4:21
IO39	Reinkenhagen, Hauptstr. 30/31	<u>32:01</u>	126	0:23	<u>8:06</u>
IO40	Reinkenhagen, Hauptstr. 28/29	<u>35:18</u>	135	0:23	<u>8:59</u>
IO41	Reinkenhagen, Hauptstr. 26/27	<u>42:22</u>	172	0:26	<u>10:46</u>
IO42	Reinkenhagen, Hauptstr. 25	<u>57:37</u>	228	<u>0:31</u>	<u>13:20</u>
IO43	Reinkenhagen, Engelswachter Str. 6-8	<u>76:03</u>	196	<u>0:46</u>	<u>18:56</u>
IO44	Reinkenhagen, Engelswachter Str. 12	<u>70:16</u>	200	<u>0:51</u>	<u>16:57</u>
IO45	Reinkenhagen, Hauptstr. 36/37	18:13	79	0:21	4:44
IO46	Reinkenhagen, Hauptstr. 49	<u>53:21</u>	188	<u>0:38</u>	<u>12:31</u>
IO47	Reinkenhagen, Engelswachter Str. 3-5	<u>76:59</u>	191	<u>0:48</u>	<u>19:08</u>
IO48	Reinkenhagen, Schulmeisterweg 4/4a	<u>81:29</u>	190	<u>0:50</u>	<u>20:12</u>
IO49	Reinkenhagen, Engelswachter Str. 9	<u>64:04</u>	193	<u>0:39</u>	<u>15:45</u>
IO50	Reinkenhagen, Engelswachter Str. 10	<u>66:48</u>	193	<u>0:47</u>	<u>16:18</u>
IO51	Reinkenhagen, Engelswachter Str. 11	<u>68:43</u>	196	<u>0:49</u>	<u>16:43</u>
IO52	Reinkenhagen, Hauptstr. 23	<u>70:14</u>	219	<u>0:42</u>	<u>16:08</u>
IO53	Reinkenhagen, Hauptstr. 24	<u>65:24</u>	220	<u>0:38</u>	<u>15:00</u>
IO54	Reinkenhagen, Hauptstr. 32/33	16:07	72	0:20	4:03
IO55	Reinkenhagen, Engelswachter Str. 13	<u>56:30</u>	172	<u>0:46</u>	<u>13:48</u>
IO56	Reinkenhagen, Engelswachter Str. 14	<u>52:07</u>	169	<u>0:35</u>	<u>12:50</u>
IO57	Reinkenhagen, Engelswachter Str. 14a	<u>49:01</u>	163	<u>0:33</u>	<u>12:06</u>
IO58	Reinkenhagen, Engelswachter Str. 15	<u>46:35</u>	158	<u>0:34</u>	<u>11:28</u>
IO59	Reinkenhagen, Engelswachter Str. 15a	<u>45:37</u>	156	<u>0:36</u>	<u>11:12</u>
IO60	Reinkenhagen, Engelswachter Str. 16/17	<u>53:11</u>	177	0:30	<u>13:13</u>
IO61	Reinkenhagen, Engelswachter Str. 18	<u>57:44</u>	193	<u>0:31</u>	<u>14:29</u>
IO62	Reinkenhagen, Engelswachter Str. 1	<u>68:37</u>	214	<u>0:40</u>	<u>16:21</u>
IO63	Reinkenhagen, Engelswachter Str. 2	<u>65:24</u>	200	<u>0:37</u>	<u>16:18</u>

Gesamtbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO64	Reinkenhagen, Engelswachter Str. 19	<u>64:46</u>	216	<u>0:35</u>	<u>15:14</u>
IO65	Reinkenhagen, Engelswachter Str. 20	<u>67:11</u>	219	<u>0:39</u>	<u>15:24</u>
IO66	Reinkenhagen, Hauptstr. 38/39	20:01	83	0:21	5:15
IO67	Reinkenhagen, Hauptstr. 40/41	24:21	108	0:21	6:04
IO68	Reinkenhagen, Hauptstr. 42/43	25:18	109	0:21	6:20
IO69	Reinkenhagen, Hauptstr. 44/45/46	<u>54:41</u>	213	<u>0:32</u>	<u>12:59</u>
IO70	Reinkenhagen, Hauptstr. 47	<u>63:01</u>	216	<u>0:39</u>	<u>14:48</u>
IO71	Reinkenhagen, Hauptstr. 48	<u>59:24</u>	197	<u>0:40</u>	<u>14:01</u>
IO72	Reinkenhagen, Schulmeisterweg 1/2	<u>70:46</u>	206	<u>0:47</u>	<u>16:03</u>
IO73	Reinkenhagen, Schulmeisterweg 3	<u>78:16</u>	203	<u>0:51</u>	<u>18:42</u>
IO74	Reinkenhagen, Schwarzer Weg 1	<u>66:45</u>	215	<u>0:44</u>	<u>14:59</u>
IO75	Reinkenhagen, Schwarzer Weg 7	<u>61:05</u>	205	<u>0:40</u>	<u>13:20</u>
IO76	Reinkenhagen, Schulstr. 12-15	<u>42:21</u>	167	0:25	<u>9:19</u>
IO77	Reinkenhagen, Schulstr. 8-11	<u>46:06</u>	182	0:28	<u>10:13</u>
IO78	Reinkenhagen, Schulstr. 4-7	<u>45:36</u>	170	<u>0:31</u>	<u>10:34</u>
IO79	Reinkenhagen, Schulstr. 1/2/3	<u>52:20</u>	173	<u>0:36</u>	<u>12:27</u>
IO80	Reinkenhagen, Schulstr. 24 (Schule)	<u>50:24</u>	172	<u>0:33</u>	<u>9:59</u>
IO81	Reinkenhagen, Schulstr. 25 (Schule)	<u>44:38</u>	161	<u>0:34</u>	<u>9:18</u>
IO82	Reinkenhagen, Schulstr. 23	<u>53:41</u>	178	<u>0:33</u>	<u>11:04</u>
IO83	Reinkenhagen, Schulstr. 22	<u>52:21</u>	183	0:30	<u>10:29</u>
IO84	Reinkenhagen, Schulstr. 21a (Sporthalle)	<u>56:26</u>	197	0:26	<u>10:12</u>
IO85	Reinkenhagen, Schulstr. 19/20	<u>57:57</u>	189	0:30	<u>10:20</u>
IO86	Reinkenhagen, Schulstr. 17/18	<u>55:25</u>	187	0:27	<u>9:22</u>
IO87	Reinkenhagen, Holzhausen 1	25:53	110	0:21	6:38
IO88	Reinkenhagen, Holzhausen 2	21:28	100	0:20	5:27
IO89	Reinkenhagen, Holzhausen 3	18:52	90	0:20	4:49
IO90	Reinkenhagen, Holzhausen 4	19:17	95	0:19	4:43
IO91	Reinkenhagen, Holzhausen 5	19:45	99	0:19	4:38
IO92	Reinkenhagen, Holzhausen 6	20:07	101	0:19	4:33
IO93	Reinkenhagen, Holzhausen 7	18:14	87	0:18	3:58
IO94	Reinkenhagen, Holzhausen 8	18:52	88	0:19	3:57
IO95	Reinkenhagen, Holzhausen 9	19:12	89	0:18	3:52
IO96	Reinkenhagen, Ringweg 1/2	24:12	111	0:18	5:03
IO97	Reinkenhagen, Ringweg 3/4	22:31	96	0:19	4:18
IO98	Reinkenhagen, Am Rosenplatz 1/2	<u>37:09</u>	148	0:25	<u>9:31</u>
IO99	Reinkenhagen, Am Rosenplatz 3/4	<u>30:32</u>	120	0:22	7:51
IO100	Reinkenhagen, Am Rosenplatz 5/6	26:06	110	0:21	6:36
IO101	Reinkenhagen, Veilchenweg 5	14:05	75	0:18	3:04
IO102	Reinkenhagen, Veilchenweg 4	10:49	57	0:18	2:48
IO103	Reinkenhagen, Veilchenweg 6	11:42	64	0:18	2:47

Gesamtbelastung					
Nr.	Immissionsort	Astron. max. mögl. Beschattungsdauer			Met. wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Schattentage in Tage/ Jahr	Max. Schattendauer, in Std/ Tag	Max. Schattendauer in Std. / Jahr
IO104	Reinkenhagen, Sonnenblumenweg 3	10:03	48	0:18	2:30
IO105	Reinkenhagen, Tulpenweg 3	10:30	51	0:18	2:41
IO106	Reinkenhagen, Tulpenweg 4	10:35	50	0:18	2:40
IO107	Reinkenhagen, Tulpenweg 5	10:08	48	0:18	2:35
IO108	Reinkenhagen, Tulpenweg 6	10:05	48	0:18	2:32
IO109	Reinkenhagen, Dahlienweg 9	11:54	52	0:19	3:01
IO110	Reinkenhagen, Dahlienweg 10	12:01	55	0:19	3:05
IO111	Reinkenhagen, Dahlienweg 11	11:56	52	0:19	3:06
IO112	Reinkenhagen, Dahlienweg 16	10:57	52	0:18	2:53
IO113	Reinkenhagen, Kurze Straße 1	18:01	80	0:20	4:43
IO114	Reinkenhagen, Kurze Straße 2	17:53	79	0:20	4:40
IO115	Reinkenhagen, Kurze Straße 3	17:52	79	0:20	4:40
IO116	Reinkenhagen, Kurze Straße 4	17:42	77	0:20	4:38
IO117	Reinkenhagen, Kurze Straße 5	17:27	78	0:20	4:35
IO118	Reinkenhagen, Kurze Straße 6	16:10	74	0:20	4:11
IO119	Reinkenhagen, Kurze Straße 7	16:12	75	0:20	4:13
IO120	Reinkenhagen, Kurze Straße 8	16:16	74	0:20	4:16
IO121	Reinkenhagen, Kurze Straße 9	16:10	75	0:20	4:15
IO122	Reinkenhagen, Kurze Straße 10	16:32	76	0:20	4:20
IO123	Reinkenhagen, Kurze Straße 11	16:33	75	0:19	4:20
IO124	Reinkenhagen, Kurze Straße 12	16:41	78	0:19	4:22
IO125	Reinkenhagen, Kurze Straße 13	16:41	78	0:19	4:21
IO126	Reinkenhagen, Bohrturmstr. 1	12:29	52	0:19	3:02
IO127	Reinkenhagen, Bohrturmstr. 2	29:36	99	<b>0:35</b>	6:49
IO128	Miltzow, Am Bahndamm 2/3	2:59	19	0:15	0:39
IO129	Miltzow, Am Bahndamm 5	2:58	18	0:15	0:38
IO130	Miltzow, Reinberger Str. 12	6:22	36	0:16	1:28
IO131	Miltzow, Reinberger Str. 13	10:55	50	0:19	2:39
IO132	Miltzow, Reinberger Str. 14 (E.T.S. Miltzow)	10:22	48	0:19	2:27
IO133	Miltzow, Reinberger Str. 17	7:14	40	0:16	1:37
IO134	Miltzow, Reinberger Str. 20	5:44	35	0:15	1:12

Tabelle 6.3: Analyseergebnisse Gesamtbelastung

Der Grenzwert für die astronomisch maximal mögliche Schattenwurfdauer von 30 Stunden pro Jahr und/oder 30 Minuten pro Tag wird bei der Gesamtbelastung an den Immissionsorten **IO11 - IO19, IO21 - IO37, IO39 - IO44, IO46 - IO53, IO55 - IO65, IO69 - IO86, IO98, IO99 und IO127** überschritten.

Die meteorologisch wahrscheinliche Beschattungsdauer in Stunden / Jahr wird an 65 Immissionsorten überschritten.

## 7 Zusammenfassung

Für das Genehmigungsverfahren nach dem BImSchG [2] ist der Nachweis der Einhaltung der gesetzlichen Grenzwerte für die Schattenwurfimmissionen zu führen. Gemäß den Hinweisen zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen des Länderausschusses für Immissionsschutz [1] darf eine Belastung von 30 Stunden im Jahr oder 30 Minuten pro Tag nicht überschritten werden.

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 IO11 - IO19, IO21 - IO37, IO39 - IO44, IO46 - IO53, IO55 - IO65, IO69 - IO86, IO98, IO99 und IO127 überschritten wird.

Auf Grund der bereits durch die Vorbelastung ausgeschöpften oder überschrittenen Grenzwerte an den Immissionsorten IO11 - IO19, IO21 - IO29, IO31 - IO35, IO37, IO42 - IO44, IO46 - IO53, IO55 - IO65, IO69 - IO75 und IO79 - IO86, darf die geplante Anlage an diesen Immissionsorten keinen weiteren Schattenwurf verursachen.

An den o.g. Immissionsorten IO11 - IO19, IO21 - IO37, IO39 - IO44, IO46 - IO53, IO55 - IO65, IO69 - IO86, IO98, IO99 und IO127 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 des Einsatzes eines Schattenwurfabschaltmoduls erteilt werden.

## 8 Abkürzungs- und Symbolverzeichnis

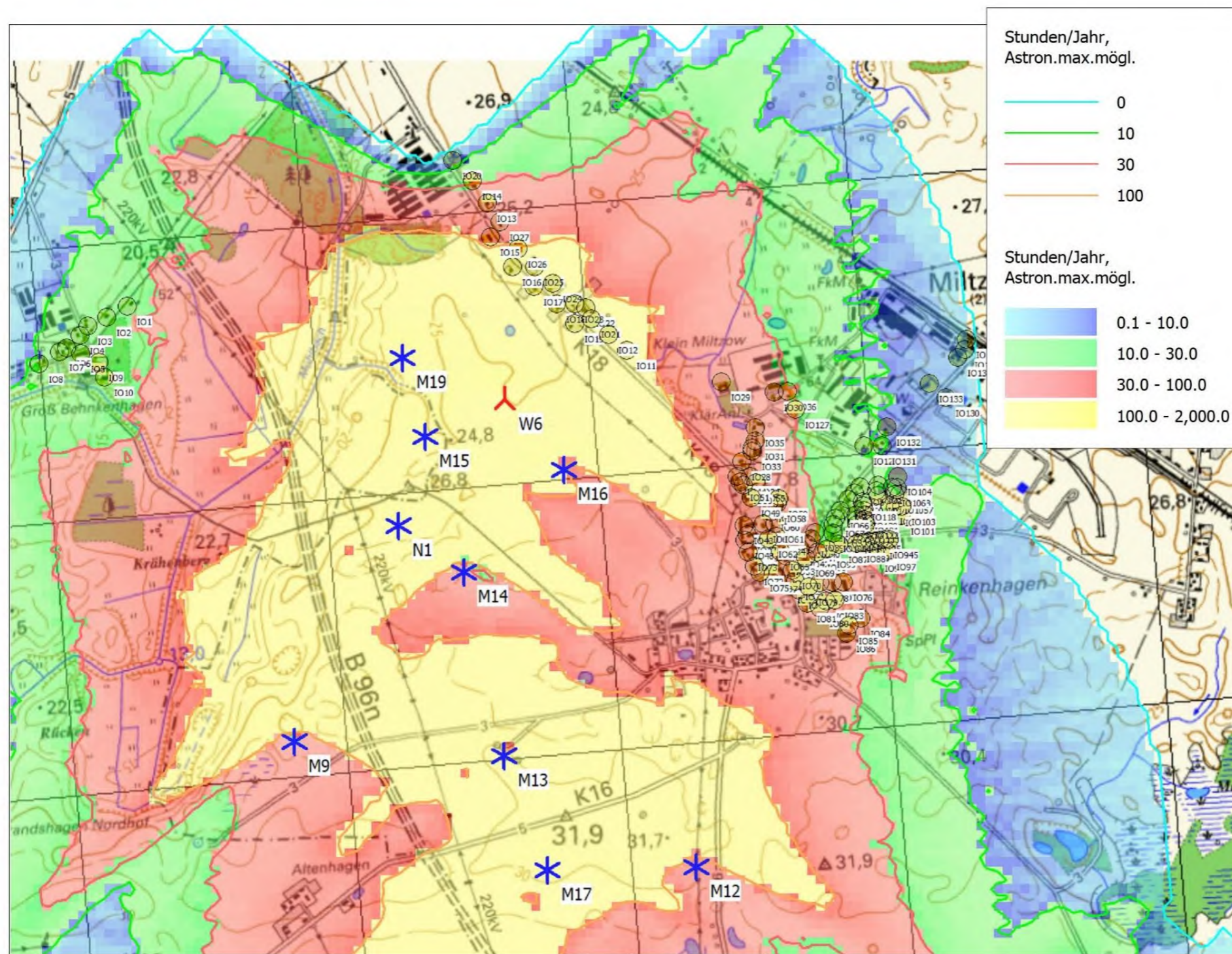
Abb.	Abbildung
Astron.	Astronomisch
GB	Gesamtbelastung
GPS	Global Positioning System
Hz	Hertz
IO	Immissionsort
Max.	Maximal
Met.	Meteorologisch
NN	Normalnull
Nr.	Nummer
Std.	Stunden
UTM	Universal Transverse Mercator
VB	Vorbelastung
WEA	Windenergieanlage
W-Nr.	Interne WEA Nummer

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## 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] *Sonnenwahrscheinlichkeit Wetterstation Heiligendamm, WindPRO-Datenbank WRDC - [http://wrd-cmgo.nrel.gov/html/get\\_data-ap.html](http://wrd-cmgo.nrel.gov/html/get_data-ap.html)*
- [5] *Vestas Deutschland GmbH; Rotorblatttiefen an Vestas Windenergieanlagen; Dokument Nr.: 0030-2627 V07; vom 27.02.2019*
- [6] *EEN GmbH; Ute Heitmann; E-Mail vom 30.01.2014; Auszüge aus diversen Gutachten; Koordinatentabelle der Anlagen am Standort; Staatliches Amt für Landwirtschaft und Umwelt Vorpommern; Janina Kleffling; 22.10.2013;*

# Anhang 1 / Übersichtskarte der Gesamtbelastung mit Iso-Schattenlinien



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

▲ Neue WEA     
 ✳ Existierende WEA     
 ● Schattenrezeptor  
 Karte: Miltzow MM, Maßstab 1:22,500, Mitte: Germany UTM ETRS89 Zone: 33 Ost: 3,381,244 Nord: 6,007,131  
 Höhe der Schattenkarte: Höhenlinien: 131029\_SRTM\_Miltzow\_25x25km.wpo (11)

**SHADOW - Karte**  
Berechnung:  
GB

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

# Anhang 2 / Hauptergebnis: Vorbelastung

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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

Berechnet:  
André Gefke / andre.gefke@i17-wind.de  
13.06.2019 15:51/3.2.744

## 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

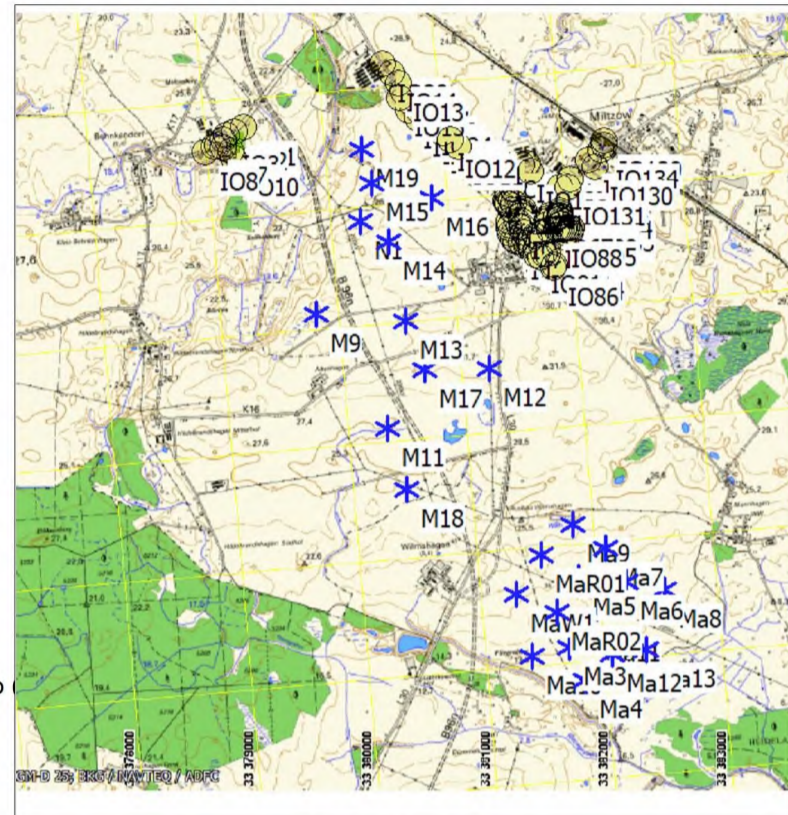
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]  
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsstunden ermittelt aus WEA in Berechnung und Windverteilung:  
WASP\_DEWI\_Referenzpunkt2\_138m

Betriebsdauer je Sektor  
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
341 325 395 564 522 522 731 979 1,010 1,211 921 350 7,872  
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: 131029\_SRTM\_Miltzow\_25x25km.wpo  
Hindernisse in Berechnung verwendet  
Berechnungshöhe ü.Gr. für Karte: 1.5 m  
Rasterauflösung: 1.0 m

Alle Koordinatenangaben in:  
Germany UTM ETRS89 Zone: 33



Maßstab 1:75,000  
\* Existierende WEA    ● Schattenrezeptor

### WEA

	X(Ost)	Y(Nord)	Z	Beschreibung	WEA-Typ		Typ	Nennleistung	Rotor-durchmesser	Nabenhöhe	Schattendaten	
					Aktuell	Hersteller					Beschatt.-Bereich	U/min
			[m]				[kW]	[m]	[m]	[m]	[U/min]	
1	3,381,716	6,003,135	10.0	Ma3	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
2	3,381,825	6,002,839	10.0	Ma4	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
3	3,381,841	6,003,718	12.9	Ma5	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
4	3,382,234	6,003,642	10.0	Ma6	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
5	3,382,091	6,003,945	15.7	Ma7	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
6	3,382,555	6,003,551	10.0	Ma8	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
7	3,381,835	6,004,165	20.0	Ma9	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
8	3,381,393	6,003,081	10.0	Ma10	Nein	GE WIND ENERGY	GE 1.5sl-1,500	1,500	77.0	100.0	2,500	18.0
9	3,381,906	6,003,313	10.0	Ma11	Ja	VESTAS	V112-3,000	3,000	112.0	94.0	1,711	12.8
10	3,382,068	6,003,040	10.0	Ma12	Ja	VESTAS	V112-3,075	3,075	112.0	119.0	1,709	12.8
11	3,382,362	6,003,062	10.0	Ma13	Ja	VESTAS	V112-3,075	3,075	112.0	119.0	1,709	12.8
12	3,381,539	6,003,932	17.9	MaR01	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	140.0	1,708	13.1
13	3,381,628	6,003,435	10.2	MaR02	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	140.0	1,708	13.1
14	3,381,299	6,003,623	14.0	MaW1	Ja	VESTAS	V126-3.3MW-3,300	3,300	126.0	137.0	1,715	12.0
15	3,380,256	6,006,880	21.7	N1	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
16	3,380,570	6,006,010	22.8	M13	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
17	3,380,480	6,006,690	23.5	M14	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
18	3,380,381	6,007,196	21.5	M15	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
19	3,380,876	6,007,030	24.8	M16	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
20	3,380,692	6,005,580	22.0	M17	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
21	3,380,456	6,004,584	20.5	M18	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
22	3,380,322	6,007,487	20.3	M19	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
23	3,379,812	6,006,127	21.8	M9	Ja	VESTAS	V112-3,000	3,000	112.0	119.0	1,709	12.8
24	3,380,337	6,005,115	25.5	M11	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,709	13.1
25	3,381,234	6,005,547	24.7	M12	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,709	13.1



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
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André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 15:51/3.2.744

## SHADOW - Hauptergebnis

Berechnung: VB

### Schattenrezeptor-Eingabe

Nr.	Name	X(Ost)	Y(Nord)	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
					[m]	[m]	[m]	[°]		[m]
A	IO1	3,379,339	6,007,761	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
B	IO2	3,379,260	6,007,726	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
C	IO3	3,379,189	6,007,700	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
D	IO4	3,379,159	6,007,670	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
E	IO5	3,379,154	6,007,602	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
F	IO6	3,379,106	6,007,626	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
G	IO7	3,379,079	6,007,614	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
H	IO8	3,378,999	6,007,578	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
I	IO9	3,379,217	6,007,566	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
J	IO10	3,379,233	6,007,510	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
K	IO11	3,381,140	6,007,445	25.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
L	IO12	3,381,081	6,007,507	25.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
M	IO13	3,380,680	6,008,022	22.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
N	IO14	3,380,631	6,008,108	21.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
O	IO15	3,380,680	6,007,898	22.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
P	IO16	3,380,752	6,007,783	23.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
Q	IO17	3,380,823	6,007,706	23.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
R	IO18	3,380,899	6,007,635	24.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
S	IO19	3,380,961	6,007,557	24.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
T	IO20	3,380,566	6,008,190	21.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
U	IO21	3,381,023	6,007,570	24.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
V	IO22	3,381,004	6,007,613	24.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
W	IO23	3,380,965	6,007,629	24.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
X	IO24	3,380,893	6,007,710	24.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
Y	IO25	3,380,831	6,007,776	23.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
Z	IO26	3,380,776	6,007,848	23.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AA	IO27	3,380,719	6,007,950	22.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AB	IO28	3,381,524	6,007,005	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AC	IO29	3,381,475	6,007,301	26.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AD	IO30	3,381,664	6,007,245	24.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AE	IO31	3,381,579	6,007,074	27.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AF	IO32	3,381,566	6,007,049	27.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AG	IO33	3,381,565	6,007,038	28.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AH	IO34	3,381,551	6,006,948	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AI	IO35	3,381,583	6,007,123	26.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AJ	IO36	3,381,713	6,007,246	24.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AK	IO37	3,381,653	6,006,544	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AL	IO38	3,381,924	6,006,855	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AM	IO39	3,381,770	6,006,723	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AN	IO40	3,381,753	6,006,701	29.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AO	IO41	3,381,738	6,006,682	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AP	IO42	3,381,710	6,006,668	29.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AQ	IO43	3,381,515	6,006,771	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AR	IO44	3,381,502	6,006,951	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AS	IO45	3,381,900	6,006,833	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AT	IO46	3,381,692	6,006,519	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AU	IO47	3,381,522	6,006,736	29.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AV	IO48	3,381,512	6,006,716	29.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AW	IO49	3,381,548	6,006,869	28.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AX	IO50	3,381,522	6,006,918	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AY	IO51	3,381,512	6,006,929	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AZ	IO52	3,381,638	6,006,605	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BA	IO53	3,381,655	6,006,647	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BB	IO54	3,381,948	6,006,877	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BC	IO55	3,381,569	6,006,922	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BD	IO56	3,381,608	6,006,844	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BE	IO57	3,381,628	6,006,834	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BF	IO58	3,381,642	6,006,841	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BG	IO59	3,381,647	6,006,858	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BH	IO60	3,381,615	6,006,811	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BI	IO61	3,381,625	6,006,767	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BJ	IO62	3,381,599	6,006,715	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BK	IO63	3,381,583	6,006,772	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BL	IO64	3,381,629	6,006,720	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0

(Fortsetzung nächste Seite)...

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 15:51/3.2.744

## SHADOW - Hauptergebnis

Berechnung: VB

...(Fortsetzung von letzter Seite)

Nr.	Name	X(Ost)	Y(Nord)	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
					[m]	[m]	[m]	[°]		[m]
BM	IO65	3,381,637	6,006,667	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BN	IO66	3,381,869	6,006,795	28.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BO	IO67	3,381,848	6,006,770	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BP	IO68	3,381,838	6,006,746	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BQ	IO69	3,381,727	6,006,634	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BR	IO70	3,381,675	6,006,593	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BS	IO71	3,381,683	6,006,552	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BT	IO72	3,381,538	6,006,618	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BU	IO73	3,381,521	6,006,672	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BV	IO74	3,381,606	6,006,589	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BW	IO75	3,381,556	6,006,594	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BX	IO76	3,381,858	6,006,535	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BY	IO77	3,381,817	6,006,537	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BZ	IO78	3,381,772	6,006,540	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CA	IO79	3,381,730	6,006,528	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CB	IO80	3,381,763	6,006,448	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CC	IO81	3,381,720	6,006,467	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CD	IO82	3,381,789	6,006,471	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CE	IO83	3,381,820	6,006,470	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CF	IO84	3,381,909	6,006,397	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CG	IO85	3,381,864	6,006,374	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CH	IO86	3,381,853	6,006,347	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CI	IO87	3,381,852	6,006,673	29.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CJ	IO88	3,381,917	6,006,671	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CK	IO89	3,381,934	6,006,672	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CL	IO90	3,381,950	6,006,672	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CM	IO91	3,381,967	6,006,673	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CN	IO92	3,381,983	6,006,674	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CO	IO93	3,382,001	6,006,674	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CP	IO94	3,382,018	6,006,675	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CQ	IO95	3,382,035	6,006,675	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CR	IO96	3,381,981	6,006,630	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CS	IO97	3,382,023	6,006,632	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CT	IO98	3,381,773	6,006,651	29.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CU	IO99	3,381,806	6,006,659	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CV	IO100	3,381,835	6,006,715	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CW	IO101	3,382,086	6,006,757	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CX	IO102	3,382,070	6,006,789	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CY	IO103	3,382,091	6,006,790	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CZ	IO104	3,382,088	6,006,902	27.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DA	IO105	3,382,070	6,006,836	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DB	IO106	3,382,064	6,006,863	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DC	IO107	3,382,087	6,006,836	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DD	IO108	3,382,080	6,006,861	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DE	IO109	3,382,012	6,006,877	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DF	IO110	3,382,007	6,006,857	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DG	IO111	3,382,011	6,006,838	28.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DH	IO112	3,382,051	6,006,797	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DI	IO113	3,381,926	6,006,705	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DJ	IO114	3,381,926	6,006,720	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DK	IO115	3,381,925	6,006,740	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DL	IO116	3,381,924	6,006,757	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DM	IO117	3,381,924	6,006,774	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DN	IO118	3,381,952	6,006,822	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DO	IO119	3,381,952	6,006,806	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DP	IO120	3,381,953	6,006,789	28.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DQ	IO121	3,381,954	6,006,772	28.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DR	IO122	3,381,953	6,006,755	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DS	IO123	3,381,956	6,006,738	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DT	IO124	3,381,956	6,006,721	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DU	IO125	3,381,957	6,006,704	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DV	IO126	3,381,974	6,007,024	26.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DW	IO127	3,381,737	6,007,176	25.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DX	IO128	3,382,370	6,007,343	24.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0

(Fortsetzung nächste Seite)...

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
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André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 15:51/3.2.744

## SHADOW - Hauptergebnis

Berechnung: VB

...(Fortsetzung von letzter Seite)

Nr.	Name	X(Ost)	Y(Nord)	Z	Breite	Höhe	Höhe	Neigung des	Ausrichtungsmodus	Augenhöhe (ZVI)	ü.Gr.
					[m]	[m]	[m]	[°]		[m]	
DY	IO129	3,382,379	6,007,380	24.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	
DZ	IO130	3,382,286	6,007,174	25.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	
EA	IO131	3,382,039	6,007,017	27.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	
EB	IO132	3,382,062	6,007,085	26.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	
EC	IO133	3,382,231	6,007,231	25.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	
ED	IO134	3,382,342	6,007,314	24.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	

## Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer	
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr	[h/a]
		[h/a]	[d/a]	[h/d]		
A	IO1	19:39	84	0:20	2:54	
B	IO2	16:39	75	0:19	2:36	
C	IO3	14:33	69	0:18	2:24	
D	IO4	13:52	68	0:18	2:22	
E	IO5	13:53	67	0:18	2:30	
F	IO6	12:34	64	0:17	2:16	
G	IO7	11:50	61	0:17	2:10	
H	IO8	10:17	57	0:16	1:55	
I	IO9	16:04	72	0:19	2:55	
J	IO10	18:20	79	0:19	3:26	
K	IO11	108:39	182	1:03	14:33	
L	IO12	101:45	173	1:04	12:47	
M	IO13	39:58	82	0:34	4:03	
N	IO14	25:09	56	0:32	2:17	
O	IO15	45:41	105	0:39	5:22	
P	IO16	61:24	124	0:40	8:12	
Q	IO17	68:01	142	0:37	9:17	
R	IO18	74:57	160	0:46	10:07	
S	IO19	84:07	171	0:51	11:19	
T	IO20	5:32	24	0:17	0:26	
U	IO21	78:50	164	0:55	10:10	
V	IO22	63:51	159	0:34	8:42	
W	IO23	65:17	158	0:38	8:58	
X	IO24	56:51	143	0:34	7:52	
Y	IO25	60:51	127	0:36	7:54	
Z	IO26	50:09	113	0:36	6:20	
AA	IO27	37:27	97	0:35	4:15	
AB	IO28	46:42	171	0:49	10:04	
AC	IO29	37:44	117	0:47	7:28	
AD	IO30	23:41	98	0:28	4:56	
AE	IO31	40:09	163	0:40	8:02	
AF	IO32	41:10	165	0:43	8:26	
AG	IO33	41:17	161	0:44	8:38	
AH	IO34	42:44	149	0:48	9:44	
AI	IO35	39:47	157	0:32	7:33	
AJ	IO36	21:01	91	0:25	4:22	
AK	IO37	49:16	200	0:25	11:13	
AL	IO38	9:17	43	0:20	2:16	
AM	IO39	18:29	82	0:23	4:25	
AN	IO40	19:50	86	0:23	4:50	
AO	IO41	23:29	108	0:23	5:47	
AP	IO42	34:55	169	0:24	7:24	
AQ	IO43	52:55	158	0:44	13:01	
AR	IO44	49:48	165	0:51	11:15	
AS	IO45	10:04	46	0:20	2:29	
AT	IO46	45:00	188	0:23	10:25	
AU	IO47	57:51	178	0:45	14:18	
AV	IO48	66:26	190	0:46	16:25	
AW	IO49	42:43	144	0:39	10:00	
AX	IO50	46:36	154	0:47	10:45	
AY	IO51	48:10	157	0:49	11:03	

(Fortsetzung nächste Seite)...

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
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André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 15:51/3.2.744

## SHADOW - Hauptergebnis

**Berechnung:** VB

...(Fortsetzung von letzter Seite)

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr
		[h/a]	[d/a]	[h/d]	[h/a]
AZ	IO52	54:55	219	0:26	12:16
BA	IO53	44:11	186	0:25	9:32
BB	IO54	8:53	42	0:20	2:08
BC	IO55	40:25	142	0:46	9:19
BD	IO56	35:53	132	0:35	8:24
BE	IO57	33:50	128	0:33	7:56
BF	IO58	32:40	127	0:34	7:38
BG	IO59	32:24	129	0:36	7:33
BH	IO60	35:09	131	0:30	8:23
BI	IO61	35:03	133	0:29	8:32
BJ	IO62	46:53	170	0:38	10:47
BK	IO63	40:28	145	0:34	9:49
BL	IO64	38:47	160	0:27	8:28
BM	IO65	44:50	182	0:26	9:38
BN	IO66	10:56	48	0:21	2:42
BO	IO67	14:33	69	0:21	3:18
BP	IO68	14:58	70	0:21	3:27
BQ	IO69	33:04	161	0:23	7:23
BR	IO70	46:16	216	0:24	10:33
BS	IO71	47:06	197	0:24	10:56
BT	IO72	68:07	206	0:43	15:22
BU	IO73	69:26	203	0:45	16:29
BV	IO74	57:24	215	0:26	12:37
BW	IO75	57:15	205	0:28	12:21
BX	IO76	25:19	113	0:20	4:53
BY	IO77	28:28	137	0:21	5:40
BZ	IO78	28:44	139	0:22	6:16
CA	IO79	39:06	173	0:23	9:08
CB	IO80	44:23	172	0:23	8:28
CC	IO81	40:13	161	0:22	8:11
CD	IO82	42:25	178	0:22	8:13
CE	IO83	39:15	166	0:24	7:09
CF	IO84	44:52	175	0:26	7:14
CG	IO85	51:51	189	0:27	8:46
CH	IO86	52:39	187	0:27	8:38
CI	IO87	14:57	71	0:21	3:39
CJ	IO88	12:39	64	0:20	3:01
CK	IO89	10:27	55	0:19	2:29
CL	IO90	11:19	61	0:19	2:30
CM	IO91	12:07	66	0:19	2:30
CN	IO92	12:48	68	0:18	2:30
CO	IO93	11:18	55	0:18	2:01
CP	IO94	12:11	56	0:18	2:04
CQ	IO95	12:51	58	0:18	2:04
CR	IO96	16:38	78	0:18	2:57
CS	IO97	15:49	64	0:19	2:25
CT	IO98	19:45	88	0:22	4:57
CU	IO99	16:59	75	0:22	4:13
CV	IO100	15:13	71	0:21	3:36
CW	IO101	8:38	48	0:17	1:34
CX	IO102	5:14	30	0:17	1:17
CY	IO103	6:22	38	0:17	1:21
CZ	IO104	4:43	22	0:17	1:08
DA	IO105	4:56	24	0:17	1:14
DB	IO106	4:58	24	0:17	1:13
DC	IO107	4:46	22	0:17	1:11
DD	IO108	4:41	22	0:17	1:09
DE	IO109	5:37	24	0:18	1:23
DF	IO110	5:41	26	0:19	1:25
DG	IO111	5:34	24	0:18	1:24
DH	IO112	5:11	24	0:17	1:19
DI	IO113	9:43	45	0:19	2:24
DJ	IO114	9:39	44	0:19	2:22
DK	IO115	9:42	45	0:20	2:22

(Fortsetzung nächste Seite)...

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
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André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 15:51/3.2.744

## SHADOW - Hauptergebnis

**Berechnung:** VB

...(Fortsetzung von letzter Seite)

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr
		[h/a]	[d/a]	[h/d]	[h/a]
DL	IO116	9:41	44	0:19	2:22
DM	IO117	9:26	44	0:19	2:19
DN	IO118	8:53	42	0:19	2:11
DO	IO119	8:54	44	0:19	2:12
DP	IO120	8:56	42	0:19	2:12
DQ	IO121	8:49	43	0:19	2:10
DR	IO122	9:01	44	0:19	2:13
DS	IO123	9:03	42	0:19	2:13
DT	IO124	9:07	44	0:19	2:14
DU	IO125	9:03	44	0:19	2:13
DV	IO126	5:54	24	0:19	1:20
DW	IO127	19:07	83	0:24	4:09
DX	IO128	0:00	0	0:00	0:00
DY	IO129	0:00	0	0:00	0:00
DZ	IO130	2:56	18	0:15	0:38
EA	IO131	5:06	24	0:18	1:09
EB	IO132	4:49	22	0:18	1:03
EC	IO133	3:19	19	0:15	0:42
ED	IO134	2:37	17	0:14	0:31

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal	Erwartet
		[h/a]	[h/a]
1	Ma3	0:00	0:00
2	Ma4	0:00	0:00
3	Ma5	0:00	0:00
4	Ma6	0:00	0:00
5	Ma7	0:00	0:00
6	Ma8	0:00	0:00
7	Ma9	0:00	0:00
8	Ma10	0:00	0:00
9	Ma11	0:00	0:00
10	Ma12	0:00	0:00
11	Ma13	0:00	0:00
12	MaR01	0:00	0:00
13	MaR02	0:00	0:00
14	MaW1	0:00	0:00
15	N1	147:06	20:50
16	M13	59:55	8:26
17	M14	114:49	18:41
18	M15	239:35	38:25
19	M16	401:33	72:49
20	M17	41:58	4:27
21	M18	0:00	0:00
22	M19	316:10	56:34
23	M9	0:00	0:00
24	M11	0:00	0:00
25	M12	49:43	4:38

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: Zusatzbelastung

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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

Berechnet:  
André Gefke / andre.gefke@i17-wind.de  
13.06.2019 14:44/3.2.744

## SHADOW - Hauptergebnis

**Berechnung:** ZB\_W6

### 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:  
WAsP\_DEWI\_Referenzpunkt2\_138m

Betriebsdauer je Sektor  
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
359 343 419 593 548 549 768 1,033 1,067 1,277 983 365 8,304  
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: 131029\_SRTM\_Miltzow\_25x25km.wpo  
Hindernisse in Berechnung verwendet  
Berechnungshöhe ü.Gr. für Karte: 1.5 m  
Rasterauflösung: 1.0 m

Alle Koordinatenangaben in:  
Germany UTM ETRS89 Zone: 33

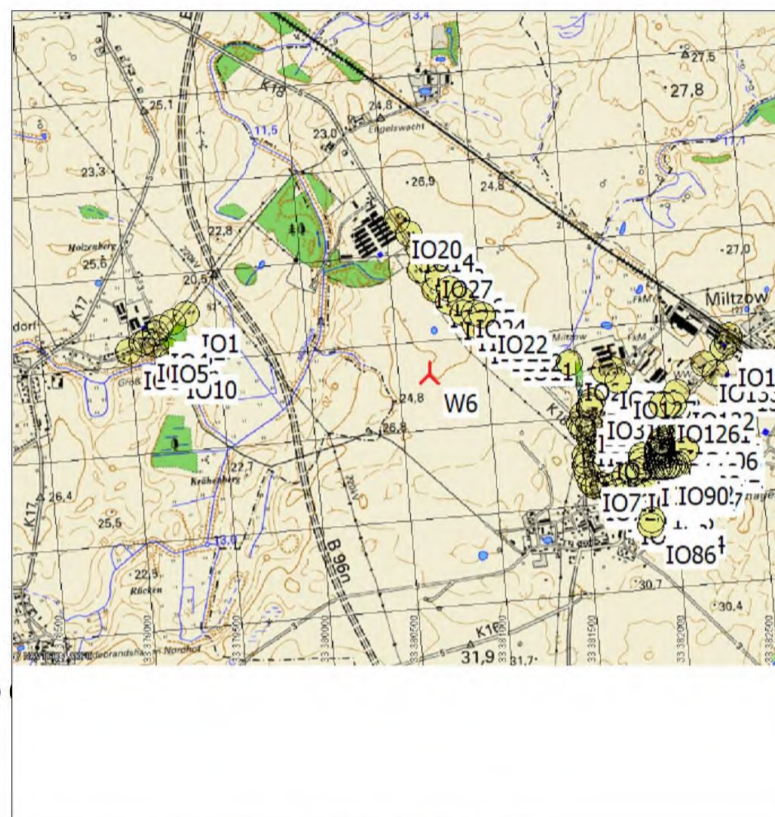
### WEA

X(Ost)	Y(Nord)	Z	Beschreibung	WEA-Typ			Nennleistung	Rotorhöhe	Nabenhöhe	Schattendaten	
				Aktuell	Hersteller	Typ				Beschatt.-Bereich	U/min
1	3,380,681	6,007,305	23.2 W6	Ja	VESTAS	V112-3.3 Gridstream-3,300	3,300	112.0	119.0	1,709	13.1

### Schattenrezeptor-Eingabe

Nr.	Name	X(Ost)	Y(Nord)	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
A	IO1	3,379,339	6,007,761	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
B	IO2	3,379,260	6,007,726	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
C	IO3	3,379,189	6,007,700	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
D	IO4	3,379,159	6,007,670	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
E	IO5	3,379,154	6,007,602	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
F	IO6	3,379,106	6,007,626	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
G	IO7	3,379,079	6,007,614	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
H	IO8	3,378,999	6,007,578	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
I	IO9	3,379,217	6,007,566	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
J	IO10	3,379,233	6,007,510	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
K	IO11	3,381,140	6,007,445	25.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
L	IO12	3,381,081	6,007,507	25.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
M	IO13	3,380,680	6,008,022	22.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
N	IO14	3,380,631	6,008,108	21.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
O	IO15	3,380,680	6,007,898	22.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
P	IO16	3,380,752	6,007,783	23.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
Q	IO17	3,380,823	6,007,706	23.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
R	IO18	3,380,899	6,007,635	24.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
S	IO19	3,380,961	6,007,557	24.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
T	IO20	3,380,566	6,008,190	21.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
U	IO21	3,381,023	6,007,570	24.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
V	IO22	3,381,004	6,007,613	24.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
W	IO23	3,380,965	6,007,629	24.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
X	IO24	3,380,893	6,007,710	24.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0

(Fortsetzung nächste Seite)...



Maßstab 1:50,000  
Neue WEA Schattenrezeptor

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 14:44/3.2.744

## SHADOW - Hauptergebnis

Berechnung: ZB\_W6

...(Fortsetzung von letzter Seite)

Nr.	Name	X(Ost)	Y(Nord)	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
					[m]	[m]	[m]	[°]		[m]
Y	IO25	3,380,831	6,007,776	23.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
Z	IO26	3,380,776	6,007,848	23.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AA	IO27	3,380,719	6,007,950	22.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AB	IO28	3,381,524	6,007,005	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AC	IO29	3,381,475	6,007,301	26.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AD	IO30	3,381,664	6,007,245	24.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AE	IO31	3,381,579	6,007,074	27.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AF	IO32	3,381,566	6,007,049	27.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AG	IO33	3,381,565	6,007,038	28.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AH	IO34	3,381,551	6,006,948	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AI	IO35	3,381,583	6,007,123	26.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AJ	IO36	3,381,713	6,007,246	24.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AK	IO37	3,381,653	6,006,544	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AL	IO38	3,381,924	6,006,855	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AM	IO39	3,381,770	6,006,723	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AN	IO40	3,381,753	6,006,701	29.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AO	IO41	3,381,738	6,006,682	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AP	IO42	3,381,710	6,006,668	29.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AQ	IO43	3,381,515	6,006,771	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AR	IO44	3,381,502	6,006,951	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AS	IO45	3,381,900	6,006,833	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AT	IO46	3,381,692	6,006,519	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AU	IO47	3,381,522	6,006,736	29.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AV	IO48	3,381,512	6,006,716	29.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AW	IO49	3,381,548	6,006,869	28.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AX	IO50	3,381,522	6,006,918	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AY	IO51	3,381,512	6,006,929	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AZ	IO52	3,381,638	6,006,605	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BA	IO53	3,381,655	6,006,647	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BB	IO54	3,381,948	6,006,877	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BC	IO55	3,381,569	6,006,922	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BD	IO56	3,381,608	6,006,844	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BE	IO57	3,381,628	6,006,834	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BF	IO58	3,381,642	6,006,841	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BG	IO59	3,381,647	6,006,858	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BH	IO60	3,381,615	6,006,811	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BI	IO61	3,381,625	6,006,767	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BJ	IO62	3,381,599	6,006,715	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BK	IO63	3,381,583	6,006,772	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BL	IO64	3,381,629	6,006,720	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BM	IO65	3,381,637	6,006,667	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BN	IO66	3,381,869	6,006,795	28.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BO	IO67	3,381,848	6,006,770	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BP	IO68	3,381,838	6,006,746	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BQ	IO69	3,381,727	6,006,634	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BR	IO70	3,381,675	6,006,593	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BS	IO71	3,381,683	6,006,552	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BT	IO72	3,381,538	6,006,618	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BU	IO73	3,381,521	6,006,672	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BV	IO74	3,381,606	6,006,589	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BW	IO75	3,381,556	6,006,594	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BX	IO76	3,381,858	6,006,535	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BY	IO77	3,381,817	6,006,537	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BZ	IO78	3,381,772	6,006,540	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CA	IO79	3,381,730	6,006,528	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CB	IO80	3,381,763	6,006,448	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CC	IO81	3,381,720	6,006,467	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CD	IO82	3,381,789	6,006,471	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CE	IO83	3,381,820	6,006,470	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CF	IO84	3,381,909	6,006,397	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CG	IO85	3,381,864	6,006,374	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CH	IO86	3,381,853	6,006,347	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CI	IO87	3,381,852	6,006,673	29.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CJ	IO88	3,381,917	6,006,671	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0

(Fortsetzung nächste Seite)...

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 14:44/3.2.744

## SHADOW - Hauptergebnis

Berechnung: ZB\_W6

...(Fortsetzung von letzter Seite)

Nr.	Name	X(Ost)	Y(Nord)	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
					[m]	[m]	[m]	[°]		[m]
CK	IO89	3,381,934	6,006,672	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CL	IO90	3,381,950	6,006,672	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CM	IO91	3,381,967	6,006,673	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CN	IO92	3,381,983	6,006,674	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CO	IO93	3,382,001	6,006,674	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CP	IO94	3,382,018	6,006,675	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CQ	IO95	3,382,035	6,006,675	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CR	IO96	3,381,981	6,006,630	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CS	IO97	3,382,023	6,006,632	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CT	IO98	3,381,773	6,006,651	29.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CU	IO99	3,381,806	6,006,659	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CV	IO100	3,381,835	6,006,715	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CW	IO101	3,382,086	6,006,757	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CX	IO102	3,382,070	6,006,789	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CY	IO103	3,382,091	6,006,790	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CZ	IO104	3,382,088	6,006,902	27.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DA	IO105	3,382,070	6,006,836	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DB	IO106	3,382,064	6,006,863	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DC	IO107	3,382,087	6,006,836	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DD	IO108	3,382,080	6,006,861	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DE	IO109	3,382,012	6,006,877	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DF	IO110	3,382,007	6,006,857	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DG	IO111	3,382,011	6,006,838	28.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DH	IO112	3,382,051	6,006,797	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DI	IO113	3,381,926	6,006,705	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DJ	IO114	3,381,926	6,006,720	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DK	IO115	3,381,925	6,006,740	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DL	IO116	3,381,924	6,006,757	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DM	IO117	3,381,924	6,006,774	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DN	IO118	3,381,952	6,006,822	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DO	IO119	3,381,952	6,006,806	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DP	IO120	3,381,953	6,006,789	28.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DQ	IO121	3,381,954	6,006,772	28.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DR	IO122	3,381,953	6,006,755	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DS	IO123	3,381,956	6,006,738	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DT	IO124	3,381,956	6,006,721	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DU	IO125	3,381,957	6,006,704	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DV	IO126	3,381,974	6,007,024	26.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DW	IO127	3,381,737	6,007,176	25.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DX	IO128	3,382,370	6,007,343	24.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DY	IO129	3,382,379	6,007,380	24.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DZ	IO130	3,382,286	6,007,174	25.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
EA	IO131	3,382,039	6,007,017	27.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
EB	IO132	3,382,062	6,007,085	26.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
EC	IO133	3,382,231	6,007,231	25.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
ED	IO134	3,382,342	6,007,314	24.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0

### Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer	
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr	Stunden/Jahr
		[h/a]	[d/a]	[h/d]	[h/a]	[h/a]
A	IO1	5:18	23	0:18	1:01	1:01
B	IO2	4:41	23	0:17	0:54	0:54
C	IO3	4:10	21	0:16	0:49	0:49
D	IO4	4:00	21	0:16	0:48	0:48
E	IO5	4:06	20	0:17	0:53	0:53
F	IO6	3:44	20	0:16	0:47	0:47
G	IO7	3:34	19	0:16	0:46	0:46
H	IO8	3:06	19	0:15	0:41	0:41
I	IO9	4:37	22	0:17	1:00	1:00
J	IO10	4:44	22	0:18	1:03	1:03
K	IO11	44:25	65	0:52	10:17	10:17

(Fortsetzung nächste Seite)...



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 14:44/3.2.744

## SHADOW - Hauptergebnis

Berechnung: ZB\_W6

...(Fortsetzung von letzter Seite)

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr
		[h/a]	[d/a]	[h/d]	[h/a]
L	IO12	50:59	71	0:56	11:09
M	IO13	13:34	36	0:28	1:07
N	IO14	0:13	4	0:04	0:01
O	IO15	41:11	64	0:46	3:43
P	IO16	76:01	92	0:56	7:29
Q	IO17	101:08	115	1:02	11:19
R	IO18	85:31	105	1:05	12:50
S	IO19	74:16	88	1:06	14:16
T	IO20	0:00	0	0:00	0:00
U	IO21	57:48	78	0:58	11:17
V	IO22	58:50	80	0:57	10:17
W	IO23	66:43	87	0:59	10:51
X	IO24	90:41	118	0:58	10:55
Y	IO25	77:34	96	0:55	7:54
Z	IO26	55:05	76	0:50	5:12
AA	IO27	28:07	53	0:39	2:27
AB	IO28	19:52	52	0:30	5:45
AC	IO29	17:49	42	0:32	4:33
AD	IO30	11:47	35	0:26	3:03
AE	IO31	15:43	43	0:29	4:19
AF	IO32	16:41	46	0:29	4:40
AG	IO33	16:55	46	0:29	4:46
AH	IO34	19:50	54	0:29	5:47
AI	IO35	15:05	40	0:29	4:07
AJ	IO36	10:36	32	0:25	2:43
AK	IO37	7:45	37	0:17	2:00
AL	IO38	7:42	31	0:20	2:11
AM	IO39	13:32	50	0:22	3:51
AN	IO40	15:28	57	0:23	4:20
AO	IO41	18:53	75	0:23	5:12
AP	IO42	22:42	74	0:23	6:11
AQ	IO43	27:22	66	0:28	7:22
AR	IO44	24:08	63	0:30	7:01
AS	IO45	8:09	33	0:21	2:21
AT	IO46	8:21	39	0:17	2:10
AU	IO47	23:08	59	0:28	6:10
AV	IO48	18:58	52	0:27	5:00
AW	IO49	25:29	73	0:28	7:12
AX	IO50	24:06	65	0:29	6:56
AY	IO51	24:29	65	0:30	7:04
AZ	IO52	15:19	50	0:23	4:01
BA	IO53	21:13	62	0:24	5:40
BB	IO54	7:14	30	0:20	2:00
BC	IO55	19:28	55	0:28	5:40
BD	IO56	20:07	60	0:27	5:45
BE	IO57	18:49	57	0:26	5:24
BF	IO58	17:25	54	0:26	5:02
BG	IO59	16:34	50	0:26	4:48
BH	IO60	21:55	69	0:26	6:10
BI	IO61	26:24	82	0:26	7:17
BJ	IO62	25:19	68	0:26	6:50
BK	IO63	28:56	77	0:27	7:55
BL	IO64	25:59	73	0:25	7:04
BM	IO65	22:21	64	0:25	5:59
BN	IO66	9:05	35	0:21	2:40
BO	IO67	9:48	39	0:21	2:52
BP	IO68	10:20	40	0:21	3:00
BQ	IO69	21:37	70	0:23	5:50
BR	IO70	16:45	54	0:23	4:25
BS	IO71	12:18	46	0:22	3:12
BT	IO72	5:04	28	0:14	1:18
BU	IO73	12:39	41	0:23	3:17
BV	IO74	9:21	39	0:19	2:25
BW	IO75	3:50	25	0:12	0:59

(Fortsetzung nächste Seite)...

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
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André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 14:44/3.2.744

## SHADOW - Hauptergebnis

Berechnung: ZB\_W6

...(Fortsetzung von letzter Seite)

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr
		[h/a]	[d/a]	[h/d]	[h/a]
BX	IO76	17:02	68	0:20	4:35
BY	IO77	17:38	64	0:21	4:43
BZ	IO78	16:52	58	0:21	4:28
CA	IO79	13:14	49	0:21	3:27
CB	IO80	6:01	36	0:14	1:33
CC	IO81	4:25	31	0:12	1:08
CD	IO82	11:16	47	0:20	2:56
CE	IO83	13:06	51	0:20	3:26
CF	IO84	11:34	50	0:19	3:01
CG	IO85	6:06	38	0:14	1:34
CH	IO86	2:46	28	0:08	0:42
CI	IO87	10:56	45	0:21	3:07
CJ	IO88	8:49	38	0:20	2:32
CK	IO89	8:25	37	0:20	2:26
CL	IO90	7:58	36	0:19	2:18
CM	IO91	7:38	34	0:19	2:13
CN	IO92	7:19	33	0:19	2:08
CO	IO93	6:56	32	0:18	2:02
CP	IO94	6:41	32	0:19	1:58
CQ	IO95	6:21	31	0:18	1:52
CR	IO96	7:34	35	0:18	2:10
CS	IO97	6:42	32	0:18	1:56
CT	IO98	17:24	71	0:22	4:47
CU	IO99	13:33	54	0:21	3:48
CV	IO100	10:53	42	0:21	3:08
CW	IO101	5:27	27	0:18	1:34
CX	IO102	5:35	27	0:18	1:34
CY	IO103	5:20	26	0:18	1:29
CZ	IO104	5:20	26	0:18	1:25
DA	IO105	5:34	27	0:18	1:31
DB	IO106	5:37	26	0:18	1:31
DC	IO107	5:22	26	0:18	1:27
DD	IO108	5:24	26	0:18	1:27
DE	IO109	6:17	28	0:19	1:42
DF	IO110	6:20	29	0:19	1:44
DG	IO111	6:22	28	0:19	1:46
DH	IO112	5:46	28	0:18	1:38
DI	IO113	8:18	36	0:20	2:25
DJ	IO114	8:14	35	0:20	2:24
DK	IO115	8:10	34	0:20	2:24
DL	IO116	8:01	33	0:20	2:22
DM	IO117	8:01	34	0:20	2:22
DN	IO118	7:17	32	0:20	2:05
DO	IO119	7:18	31	0:20	2:07
DP	IO120	7:20	32	0:20	2:09
DQ	IO121	7:21	32	0:20	2:10
DR	IO122	7:31	32	0:20	2:13
DS	IO123	7:30	33	0:19	2:13
DT	IO124	7:34	34	0:19	2:14
DU	IO125	7:38	34	0:19	2:14
DV	IO126	6:35	28	0:19	1:47
DW	IO127	10:29	34	0:24	2:47
DX	IO128	2:59	19	0:15	0:41
DY	IO129	2:58	18	0:15	0:41
DZ	IO130	3:26	18	0:16	0:52
EA	IO131	5:49	26	0:19	1:34
EB	IO132	5:33	26	0:19	1:28
EC	IO133	3:55	21	0:16	0:57
ED	IO134	3:07	18	0:15	0:43

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 14:44/3.2.744

### SHADOW - Hauptergebnis

**Berechnung:** ZB\_W6

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal	Erwartet
		[h/a]	[h/a]
1	W6	646:33	116:02

*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 4 / Hauptergebnis & detaillierte Ergebnisse: Gesamtbelastung

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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

Berechnet:  
André Gefke / andre.gefke@i17-wind.de  
13.06.2019 16:04/3.2.744

## 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

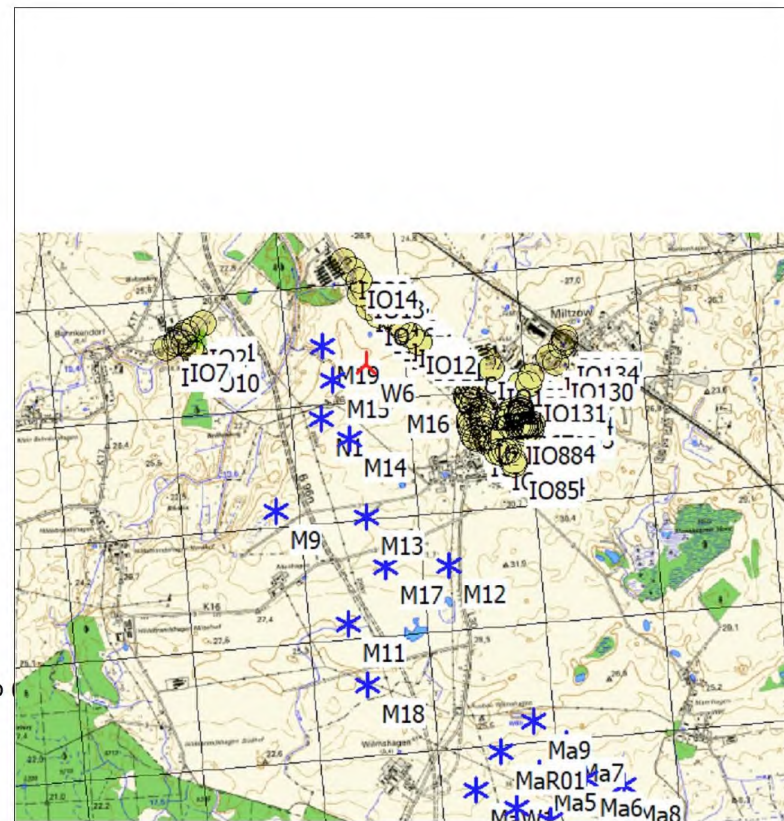
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]  
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1.39 2.32 3.70 5.75 8.12 7.70 7.33 7.20 5.12 3.48 1.79 1.03

Betriebsstunden ermittelt aus WEA in Berechnung und Windverteilung:  
WAsP\_DEWI\_Referenzpunkt2\_138m

Betriebsdauer je Sektor  
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
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: 131029\_SRTM\_Miltzow\_25x25km.wpo  
Hindernisse in Berechnung verwendet  
Berechnungshöhe ü.Gr. für Karte: 1.5 m  
Rasterauflösung: 1.0 m

Alle Koordinatenangaben in:  
Germany UTM ETRS89 Zone: 33



Maßstab 1:75,000  
Neue WEA Existierende WEA Schattenrezeptor

### WEA

X(Ost)	Y(Nord)	Z	Beschreibung	WEA-Typ		Typ	Nennleistung [kW]	Rotor-durchmesser [m]	Nabenhöhe [m]	Schattendaten	
				Ak-tuell	Hersteller					Beschatt.-Bereich [m]	U/min [U/min]
		[m]									
1	3,380,681	6,007,305	23.2 W6	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,709	13.1
2	3,381,716	6,003,135	10.0 Ma3	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
3	3,381,825	6,002,839	10.0 Ma4	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
4	3,381,841	6,003,718	12.9 Ma5	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
5	3,382,234	6,003,642	10.0 Ma6	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
6	3,382,091	6,003,945	15.7 Ma7	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
7	3,382,555	6,003,551	10.0 Ma8	Ja	VESTAS	V80-2.0MW-2,000	2,000	80.0	78.0	1,582	16.7
8	3,381,835	6,004,165	20.0 Ma9	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
9	3,381,393	6,003,081	10.0 Ma10	Nein	GE WIND ENERGY	GE 1.5sl-1,500	1,500	77.0	100.0	2,500	18.0
10	3,381,906	6,003,313	10.0 Ma11	Ja	VESTAS	V112-3,000	3,000	112.0	94.0	1,711	12.8
11	3,382,068	6,003,040	10.0 Ma12	Ja	VESTAS	V112-3,075	3,075	112.0	119.0	1,709	12.8
12	3,382,362	6,003,062	10.0 Ma13	Ja	VESTAS	V112-3,075	3,075	112.0	119.0	1,709	12.8
13	3,381,539	6,003,932	17.9 MaR01	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	140.0	1,708	13.1
14	3,381,628	6,003,435	10.2 MaR02	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	140.0	1,708	13.1
15	3,381,299	6,003,623	14.0 MaW1	Ja	VESTAS	V126-3.3MW-3,300	3,300	126.0	137.0	1,715	12.0
16	3,380,256	6,006,880	21.7 N1	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
17	3,380,570	6,006,010	22.8 M13	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
18	3,380,480	6,006,690	23.5 M14	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
19	3,380,381	6,007,196	21.5 M15	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
20	3,380,876	6,007,030	24.8 M16	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
21	3,380,692	6,005,580	22.0 M17	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
22	3,380,456	6,004,584	20.5 M18	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
23	3,380,322	6,007,487	20.3 M19	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
24	3,379,812	6,006,127	21.8 M9	Ja	VESTAS	V112-3,000	3,000	112.0	119.0	1,709	12.8
25	3,380,337	6,005,115	25.5 M11	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,709	13.1
26	3,381,234	6,005,547	24.7 M12	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,709	13.1

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

## SHADOW - Hauptergebnis

Berechnung: GB

### Schattenrezeptor-Eingabe

Nr.	Name	X(Ost)	Y(Nord)	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
					[m]	[m]	[m]	[°]		[m]
A	IO1	3,379,339	6,007,761	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
B	IO2	3,379,260	6,007,726	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
C	IO3	3,379,189	6,007,700	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
D	IO4	3,379,159	6,007,670	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
E	IO5	3,379,154	6,007,602	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
F	IO6	3,379,106	6,007,626	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
G	IO7	3,379,079	6,007,614	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
H	IO8	3,378,999	6,007,578	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
I	IO9	3,379,217	6,007,566	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
J	IO10	3,379,233	6,007,510	20.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
K	IO11	3,381,140	6,007,445	25.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
L	IO12	3,381,081	6,007,507	25.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
M	IO13	3,380,680	6,008,022	22.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
N	IO14	3,380,631	6,008,108	21.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
O	IO15	3,380,680	6,007,898	22.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
P	IO16	3,380,752	6,007,783	23.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
Q	IO17	3,380,823	6,007,706	23.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
R	IO18	3,380,899	6,007,635	24.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
S	IO19	3,380,961	6,007,557	24.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
T	IO20	3,380,566	6,008,190	21.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
U	IO21	3,381,023	6,007,570	24.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
V	IO22	3,381,004	6,007,613	24.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
W	IO23	3,380,965	6,007,629	24.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
X	IO24	3,380,893	6,007,710	24.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
Y	IO25	3,380,831	6,007,776	23.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
Z	IO26	3,380,776	6,007,848	23.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AA	IO27	3,380,719	6,007,950	22.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AB	IO28	3,381,524	6,007,005	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AC	IO29	3,381,475	6,007,301	26.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AD	IO30	3,381,664	6,007,245	24.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AE	IO31	3,381,579	6,007,074	27.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AF	IO32	3,381,566	6,007,049	27.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AG	IO33	3,381,565	6,007,038	28.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AH	IO34	3,381,551	6,006,948	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AI	IO35	3,381,583	6,007,123	26.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AJ	IO36	3,381,713	6,007,246	24.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AK	IO37	3,381,653	6,006,544	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AL	IO38	3,381,924	6,006,855	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AM	IO39	3,381,770	6,006,723	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AN	IO40	3,381,753	6,006,701	29.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AO	IO41	3,381,738	6,006,682	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AP	IO42	3,381,710	6,006,668	29.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AQ	IO43	3,381,515	6,006,771	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AR	IO44	3,381,502	6,006,951	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AS	IO45	3,381,900	6,006,833	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AT	IO46	3,381,692	6,006,519	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AU	IO47	3,381,522	6,006,736	29.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AV	IO48	3,381,512	6,006,716	29.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AW	IO49	3,381,548	6,006,869	28.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AX	IO50	3,381,522	6,006,918	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AY	IO51	3,381,512	6,006,929	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
AZ	IO52	3,381,638	6,006,605	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BA	IO53	3,381,655	6,006,647	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BB	IO54	3,381,948	6,006,877	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BC	IO55	3,381,569	6,006,922	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BD	IO56	3,381,608	6,006,844	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BE	IO57	3,381,628	6,006,834	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BF	IO58	3,381,642	6,006,841	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BG	IO59	3,381,647	6,006,858	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BH	IO60	3,381,615	6,006,811	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BI	IO61	3,381,625	6,006,767	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BJ	IO62	3,381,599	6,006,715	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BK	IO63	3,381,583	6,006,772	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BL	IO64	3,381,629	6,006,720	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0

(Fortsetzung nächste Seite)...

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

## SHADOW - Hauptergebnis

Berechnung: GB

...(Fortsetzung von letzter Seite)

Nr.	Name	X(Ost)	Y(Nord)	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
					[m]	[m]	[m]	[°]		[m]
BM	IO65	3,381,637	6,006,667	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BN	IO66	3,381,869	6,006,795	28.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BO	IO67	3,381,848	6,006,770	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BP	IO68	3,381,838	6,006,746	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BQ	IO69	3,381,727	6,006,634	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BR	IO70	3,381,675	6,006,593	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BS	IO71	3,381,683	6,006,552	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BT	IO72	3,381,538	6,006,618	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BU	IO73	3,381,521	6,006,672	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BV	IO74	3,381,606	6,006,589	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BW	IO75	3,381,556	6,006,594	29.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BX	IO76	3,381,858	6,006,535	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BY	IO77	3,381,817	6,006,537	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
BZ	IO78	3,381,772	6,006,540	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CA	IO79	3,381,730	6,006,528	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CB	IO80	3,381,763	6,006,448	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CC	IO81	3,381,720	6,006,467	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CD	IO82	3,381,789	6,006,471	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CE	IO83	3,381,820	6,006,470	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CF	IO84	3,381,909	6,006,397	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CG	IO85	3,381,864	6,006,374	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CH	IO86	3,381,853	6,006,347	30.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CI	IO87	3,381,852	6,006,673	29.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CJ	IO88	3,381,917	6,006,671	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CK	IO89	3,381,934	6,006,672	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CL	IO90	3,381,950	6,006,672	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CM	IO91	3,381,967	6,006,673	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CN	IO92	3,381,983	6,006,674	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CO	IO93	3,382,001	6,006,674	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CP	IO94	3,382,018	6,006,675	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CQ	IO95	3,382,035	6,006,675	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CR	IO96	3,381,981	6,006,630	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CS	IO97	3,382,023	6,006,632	29.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CT	IO98	3,381,773	6,006,651	29.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CU	IO99	3,381,806	6,006,659	29.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CV	IO100	3,381,835	6,006,715	29.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CW	IO101	3,382,086	6,006,757	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CX	IO102	3,382,070	6,006,789	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CY	IO103	3,382,091	6,006,790	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
CZ	IO104	3,382,088	6,006,902	27.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DA	IO105	3,382,070	6,006,836	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DB	IO106	3,382,064	6,006,863	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DC	IO107	3,382,087	6,006,836	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DD	IO108	3,382,080	6,006,861	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DE	IO109	3,382,012	6,006,877	28.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DF	IO110	3,382,007	6,006,857	28.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DG	IO111	3,382,011	6,006,838	28.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DH	IO112	3,382,051	6,006,797	28.4	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DI	IO113	3,381,926	6,006,705	29.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DJ	IO114	3,381,926	6,006,720	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DK	IO115	3,381,925	6,006,740	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DL	IO116	3,381,924	6,006,757	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DM	IO117	3,381,924	6,006,774	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DN	IO118	3,381,952	6,006,822	28.5	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DO	IO119	3,381,952	6,006,806	28.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DP	IO120	3,381,953	6,006,789	28.7	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DQ	IO121	3,381,954	6,006,772	28.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DR	IO122	3,381,953	6,006,755	28.9	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DS	IO123	3,381,956	6,006,738	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DT	IO124	3,381,956	6,006,721	29.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DU	IO125	3,381,957	6,006,704	29.1	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DV	IO126	3,381,974	6,007,024	26.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DW	IO127	3,381,737	6,007,176	25.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0
DX	IO128	3,382,370	6,007,343	24.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0

(Fortsetzung nächste Seite)...

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
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-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

## SHADOW - Hauptergebnis

Berechnung: GB

...(Fortsetzung von letzter Seite)

Nr.	Name	X(Ost)	Y(Nord)	Z	Breite	Höhe	Höhe	Neigung des	Ausrichtungsmodus	Augenhöhe (ZVI)	ü.Gr.
					[m]	[m]	[m]	[°]		[m]	
DY	IO129	3,382,379	6,007,380	24.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	
DZ	IO130	3,382,286	6,007,174	25.8	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	
EA	IO131	3,382,039	6,007,017	27.0	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	
EB	IO132	3,382,062	6,007,085	26.3	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	
EC	IO133	3,382,231	6,007,231	25.2	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	
ED	IO134	3,382,342	6,007,314	24.6	0.1	0.1	2.0	0.0	"Gewächshaus-Modus"	2.0	

## Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer	
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr	
		[h/a]	[d/a]	[h/d]	[h/a]	
A	IO1	23:48	96	0:25	3:40	
B	IO2	20:59	89	0:25	3:24	
C	IO3	18:41	83	0:24	3:10	
D	IO4	17:52	83	0:22	3:09	
E	IO5	17:59	84	0:18	3:21	
F	IO6	16:18	80	0:17	3:01	
G	IO7	15:24	77	0:17	2:54	
H	IO8	13:23	73	0:16	2:34	
I	IO9	20:41	91	0:19	3:53	
J	IO10	23:04	98	0:19	4:26	
K	IO11	148:07	210	1:03	23:20	
L	IO12	148:38	203	1:04	22:28	
M	IO13	53:32	82	0:57	5:06	
N	IO14	25:22	56	0:35	2:18	
O	IO15	86:52	111	1:09	8:52	
P	IO16	137:25	146	1:28	15:14	
Q	IO17	169:09	163	1:34	20:00	
R	IO18	160:28	186	1:35	22:20	
S	IO19	158:23	212	1:33	24:49	
T	IO20	5:32	24	0:17	0:26	
U	IO21	136:33	201	1:22	20:48	
V	IO22	122:32	191	1:24	18:26	
W	IO23	132:00	187	1:28	19:17	
X	IO24	147:32	161	1:28	18:14	
Y	IO25	138:25	143	1:28	15:21	
Z	IO26	105:14	129	1:19	11:14	
AA	IO27	65:34	102	0:56	6:34	
AB	IO28	64:15	197	0:49	14:58	
AC	IO29	55:33	137	0:47	11:50	
AD	IO30	35:28	114	0:37	7:51	
AE	IO31	55:21	183	0:41	12:05	
AF	IO32	56:50	187	0:43	12:41	
AG	IO33	56:53	183	0:44	12:54	
AH	IO34	59:27	178	0:48	14:24	
AI	IO35	54:52	175	0:44	11:32	
AJ	IO36	31:37	109	0:34	6:58	
AK	IO37	57:01	200	0:40	13:10	
AL	IO38	16:59	74	0:20	4:21	
AM	IO39	32:01	126	0:23	8:06	
AN	IO40	35:18	135	0:23	8:59	
AO	IO41	42:22	172	0:26	10:46	
AP	IO42	57:37	228	0:31	13:20	
AQ	IO43	76:03	196	0:46	18:56	
AR	IO44	70:16	200	0:51	16:57	
AS	IO45	18:13	79	0:21	4:44	
AT	IO46	53:21	188	0:38	12:31	
AU	IO47	76:59	191	0:48	19:08	
AV	IO48	81:29	190	0:50	20:12	
AW	IO49	64:04	193	0:39	15:45	
AX	IO50	66:48	193	0:47	16:18	
AY	IO51	68:43	196	0:49	16:43	

(Fortsetzung nächste Seite)...

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

## SHADOW - Hauptergebnis

Berechnung: GB

...(Fortsetzung von letzter Seite)

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr
		[h/a]	[d/a]	[h/d]	[h/a]
AZ	IO52	70:14	219	0:42	16:08
BA	IO53	65:24	220	0:38	15:00
BB	IO54	16:07	72	0:20	4:03
BC	IO55	56:30	172	0:46	13:48
BD	IO56	52:07	169	0:35	12:50
BE	IO57	49:01	163	0:33	12:06
BF	IO58	46:35	158	0:34	11:28
BG	IO59	45:37	156	0:36	11:12
BH	IO60	53:11	177	0:30	13:13
BI	IO61	57:44	193	0:31	14:29
BJ	IO62	68:37	214	0:40	16:21
BK	IO63	65:24	200	0:37	16:18
BL	IO64	64:46	216	0:35	15:14
BM	IO65	67:11	219	0:39	15:24
BN	IO66	20:01	83	0:21	5:15
BO	IO67	24:21	108	0:21	6:04
BP	IO68	25:18	109	0:21	6:20
BQ	IO69	54:41	213	0:32	12:59
BR	IO70	63:01	216	0:39	14:48
BS	IO71	59:24	197	0:40	14:01
BT	IO72	70:46	206	0:47	16:03
BU	IO73	78:16	203	0:51	18:42
BV	IO74	66:45	215	0:44	14:59
BW	IO75	61:05	205	0:40	13:20
BX	IO76	42:21	167	0:25	9:19
BY	IO77	46:06	182	0:28	10:13
BZ	IO78	45:36	170	0:31	10:34
CA	IO79	52:20	173	0:36	12:27
CB	IO80	50:24	172	0:33	9:59
CC	IO81	44:38	161	0:34	9:18
CD	IO82	53:41	178	0:33	11:04
CE	IO83	52:21	183	0:30	10:29
CF	IO84	56:26	197	0:26	10:12
CG	IO85	57:57	189	0:30	10:20
CH	IO86	55:25	187	0:27	9:22
CI	IO87	25:53	110	0:21	6:38
CJ	IO88	21:28	100	0:20	5:27
CK	IO89	18:52	90	0:20	4:49
CL	IO90	19:17	95	0:19	4:43
CM	IO91	19:45	99	0:19	4:38
CN	IO92	20:07	101	0:19	4:33
CO	IO93	18:14	87	0:18	3:58
CP	IO94	18:52	88	0:19	3:57
CQ	IO95	19:12	89	0:18	3:52
CR	IO96	24:12	111	0:18	5:03
CS	IO97	22:31	96	0:19	4:18
CT	IO98	37:09	148	0:25	9:31
CU	IO99	30:32	120	0:22	7:51
CV	IO100	26:06	110	0:21	6:36
CW	IO101	14:05	75	0:18	3:04
CX	IO102	10:49	57	0:18	2:48
CY	IO103	11:42	64	0:18	2:47
CZ	IO104	10:03	48	0:18	2:30
DA	IO105	10:30	51	0:18	2:41
DB	IO106	10:35	50	0:18	2:40
DC	IO107	10:08	48	0:18	2:35
DD	IO108	10:05	48	0:18	2:32
DE	IO109	11:54	52	0:19	3:01
DF	IO110	12:01	55	0:19	3:05
DG	IO111	11:56	52	0:19	3:06
DH	IO112	10:57	52	0:18	2:53
DI	IO113	18:01	80	0:20	4:43
DJ	IO114	17:53	79	0:20	4:40
DK	IO115	17:52	79	0:20	4:40

(Fortsetzung nächste Seite)...



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
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Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

## SHADOW - Hauptergebnis

**Berechnung:** GB

...(Fortsetzung von letzter Seite)

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr
		[h/a]	[d/a]	[h/d]	[h/a]
DL	IO116	17:42	77	0:20	4:38
DM	IO117	17:27	78	0:20	4:35
DN	IO118	16:10	74	0:20	4:11
DO	IO119	16:12	75	0:20	4:13
DP	IO120	16:16	74	0:20	4:16
DQ	IO121	16:10	75	0:20	4:15
DR	IO122	16:32	76	0:20	4:20
DS	IO123	16:33	75	0:19	4:20
DT	IO124	16:41	78	0:19	4:22
DU	IO125	16:41	78	0:19	4:21
DV	IO126	12:29	52	0:19	3:02
DW	IO127	29:36	99	0:35	6:49
DX	IO128	2:59	19	0:15	0:39
DY	IO129	2:58	18	0:15	0:38
DZ	IO130	6:22	36	0:16	1:28
EA	IO131	10:55	50	0:19	2:39
EB	IO132	10:22	48	0:19	2:27
EC	IO133	7:14	40	0:16	1:37
ED	IO134	5:44	35	0:15	1:12

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal	Erwartet
		[h/a]	[h/a]
1	W6	646:33	110:13
2	Ma3	0:00	0:00
3	Ma4	0:00	0:00
4	Ma5	0:00	0:00
5	Ma6	0:00	0:00
6	Ma7	0:00	0:00
7	Ma8	0:00	0:00
8	Ma9	0:00	0:00
9	Ma10	0:00	0:00
10	Ma11	0:00	0:00
11	Ma12	0:00	0:00
12	Ma13	0:00	0:00
13	MaR01	0:00	0:00
14	MaR02	0:00	0:00
15	MaW1	0:00	0:00
16	N1	147:06	20:53
17	M13	59:55	8:27
18	M14	114:49	18:43
19	M15	239:35	38:30
20	M16	401:33	72:58
21	M17	41:58	4:28
22	M18	0:00	0:00
23	M19	316:10	56:41
24	M9	0:00	0:00
25	M11	0:00	0:00
26	M12	49:43	4:39

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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	08:53 (16)	06:59	07:24 (1)	06:43
	15:54	16:46	17:43	17:43	19:42	20:39
2	08:28	07:56	08:58 (16)	06:57	07:21 (1)	06:40
	15:55	16:48	17:45	17:45	19:44	20:41
3	08:28	07:54	06:54	06:54	07:19 (1)	06:38
	15:57	16:50	17:47	17:47	19:46	20:42
4	08:28	07:52	06:52	06:52	07:18 (1)	06:36
	15:58	16:52	17:49	17:49	19:48	20:44
5	08:27	07:50	06:49	06:49	07:18 (1)	06:33
	15:59	16:54	17:51	17:51	19:50	20:46
6	08:27	07:48	06:47	06:47	07:13 (23)	06:31
	16:00	16:56	17:53	17:53	19:52	20:48
7	08:26	07:46	06:45	06:45	07:11 (23)	06:28
	16:02	16:59	17:55	17:55	19:54	20:50
8	08:26	07:45	06:42	06:42	07:10 (23)	06:26
	16:03	17:01	17:57	17:57	19:56	20:52
9	08:25	07:43	06:40	06:40	07:08 (23)	06:23
	16:05	17:03	17:59	17:59	19:57	20:53
10	08:25	07:41	06:37	06:37	07:08 (23)	06:21
	16:06	17:05	18:01	18:01	19:59	20:55
11	08:24	07:39	06:35	06:35	07:07 (23)	06:18
	16:08	17:07	18:03	18:03	19:57	20:53
12	08:23	07:37	06:33	06:33	07:07 (23)	06:16
	16:09	17:09	18:04	18:04	19:56	20:52
13	08:22	07:34	06:30	06:30	07:06 (23)	06:14
	16:11	17:11	18:06	18:06	19:55	20:51
14	08:21	07:32	07:59 (19)	06:28	07:07 (23)	06:11
	16:13	17:13	18:08	18:08	19:54	20:50
15	08:20	07:30	07:56 (19)	06:25	07:07 (23)	06:09
	16:14	17:15	18:10	18:10	19:53	20:49
16	08:19	08:51 (16)	07:28	07:54 (19)	06:23	07:08 (23)
	16:16	08:54 (16)	17:17	08:09 (19)	18:12	15 07:23 (23)
17	08:18	08:50 (16)	07:26	07:54 (19)	06:20	07:09 (23)
	16:18	08:56 (16)	17:19	08:10 (19)	18:14	12 07:21 (23)
18	08:17	08:48 (16)	07:24	07:54 (19)	06:18	07:14 (23)
	16:20	08:57 (16)	17:21	08:11 (19)	18:16	3 07:17 (23)
19	08:16	08:47 (16)	07:22	07:53 (19)	06:15	05:59
	16:21	08:59 (16)	17:23	08:10 (19)	18:18	20:16
20	08:15	08:46 (16)	07:20	07:53 (19)	06:13	05:57
	16:23	09:00 (16)	17:25	08:10 (19)	18:20	20:18
21	08:14	08:45 (16)	07:17	07:53 (19)	06:10	05:55
	16:25	09:00 (16)	17:27	08:10 (19)	18:22	20:20
22	08:12	08:45 (16)	07:15	07:53 (19)	06:08	05:53
	16:27	09:01 (16)	17:29	08:09 (19)	18:24	20:22
23	08:11	08:45 (16)	07:13	07:54 (19)	06:05	05:50
	16:29	09:02 (16)	17:31	08:08 (19)	18:25	20:24
24	08:10	08:46 (16)	07:11	07:56 (19)	06:03	05:48
	16:31	09:03 (16)	17:33	08:07 (19)	18:27	20:26
25	08:08	08:45 (16)	07:08	07:58 (19)	06:00	05:46
	16:33	09:02 (16)	17:35	08:04 (19)	18:29	20:28
26	08:07	08:45 (16)	07:06	05:58	05:44	04:49
	16:34	09:02 (16)	17:37	18:31	20:29	21:21
27	08:05	08:47 (16)	07:04	05:55	05:41	04:48
	16:36	09:03 (16)	17:39	18:33	20:31	21:23
28	08:04	08:47 (16)	07:01	05:53	05:39	04:47
	16:38	09:03 (16)	17:41	07:26 (1)	18:35	20:33
29	08:02	08:48 (16)	06:50	05:50	05:37	04:46
	16:40	09:02 (16)	17:41	19:37	20:35	21:26
30	08:01	08:48 (16)	06:48	06:48	05:35	04:44
	16:42	09:01 (16)	17:41	19:39	20:37	21:27
31	07:59	08:50 (16)	06:45	06:45	04:43	04:43
	16:44	09:00 (16)	17:41	19:41	21:28	21:28
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung	212	177	319			
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31			
Reduktion Betriebsdauer	0.90	0.90	0.90			
Reduktion Windrichtung	0.59	0.63	0.63			
Gesamte Reduktion	0.09	0.13	0.18			
Met.wahrsch.Beschattung	19	24	57			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember			
1	04:38	05:19	06:14	07:08	07:46 (23)	07:07	08:03		
	21:45	21:09	20:01	18:47	20 08:06 (23)	16:35	15:50		
2	04:39	05:20	06:16	07:10	07:46 (23)	07:09	08:05		
	21:44	21:07	19:59	18:44	20 08:06 (23)	16:33	15:49		
3	04:40	05:22	06:18	07:12	07:46 (23)	07:11	08:06		
	21:44	21:05	19:56	18:42	22 08:08 (1)	16:31	15:48		
4	04:40	05:24	06:19	07:14	07:45 (23)	07:13	08:08		
	21:43	21:03	19:54	18:39	24 08:09 (1)	16:29	15:48		
5	04:41	05:26	06:21	07:16	07:45 (23)	07:15	08:09		
	21:43	21:01	19:51	18:37	25 08:10 (1)	16:27	15:47		
6	04:42	05:27	06:23	07:17	07:46 (23)	07:17	08:11		
	21:42	20:59	19:49	18:34	25 08:11 (1)	16:25	15:46		
7	04:43	05:29	06:25	07:19	07:48 (23)	07:19	08:12		
	21:42	20:57	19:46	18:32	23 08:11 (1)	16:23	15:46		
8	04:44	05:31	06:27	07:21	07:51 (23)	07:21	08:13		
	21:41	20:55	19:44	18:29	20 08:11 (1)	16:21	15:45		
9	04:45	05:33	06:28	07:23	07:53 (1)	07:23	08:15		
	21:40	20:53	19:42	18:27	18 08:11 (1)	16:20	15:45		
10	04:46	05:34	06:30	07:25	07:53 (1)	07:25	08:16		
	21:39	20:51	19:39	18:24	17 08:10 (1)	16:18	15:45		
11	04:48	05:36	06:32	07:27	07:54 (1)	07:27	08:17		
	21:38	20:49	19:37	18:22	15 08:09 (1)	16:16	15:45		
12	04:49	05:38	06:34	07:29	07:56 (1)	07:29	08:18		
	21:37	20:47	19:34	18:20	12 08:08 (1)	16:14	15:44		
13	04:50	05:40	06:36	07:30	07:58 (1)	07:31	08:19		
	21:36	20:45	19:32	18:17	9 08:07 (1)	16:13	15:44		
14	04:51	05:42	06:37	07:32	08:00 (1)	07:33	08:19		
	21:35	20:43	19:29	18:15	4 08:04 (1)	16:11	15:44		
15	04:53	05:43	06:39	07:34		07:35	08:19		
	21:34	20:41	19:27	18:13		16:09	15:44		
16	04:54	05:45	06:41	07:36		07:37	08:18		
	21:33	20:38	19:24	18:10		16:08	15:44		
17	04:55	05:47	06:43	07:38	08:29 (19)	07:39	08:18		
	21:32	20:36	19:22	18:08	8 08:37 (19)	16:06	15:44		
18	04:57	05:49	06:45	07:40	08:27 (19)	07:40	08:20		
	21:31	20:34	19:19	18:06	12 08:39 (19)	16:05	15:45		
19	04:58	05:50	06:46	07:42	08:25 (19)	07:42	08:20		
	21:29	20:32	19:17	18:03	15 08:40 (19)	16:03	15:45		
20	05:00	05:52	06:48	07:44	08:24 (19)	07:44	08:20		
	21:28	20:29	19:14	18:01	17 08:41 (19)	16:02	15:45		
21	05:01	05:54	06:50	07:46	08:24 (19)	07:46	08:21		
	21:27	20:27	19:12	17:59	17 08:41 (19)	16:01	15:46		
22	05:03	05:56	06:52	07:48	08:23 (19)	07:48	08:22		
	21:25	20:25	19:09	17:56	18 08:41 (19)	15:59	15:46		
23	05:04	05:58	06:54	07:50	08:23 (19)	07:50	08:24		
	21:24	20:23	19:06	17:54	18 08:41 (19)	15:58	15:47		
24	05:06	06:00	06:55	07:52	08:23 (19)	07:51	08:26		
	21:22	20:20	19:04	17:52	17 08:40 (19)	15:57	15:47		
25	05:07	06:01	06:57	06:54	07:23 (19)	07:53	08:28		
	21:21	20:18	19:01	16:50	16 07:39 (19)	15:56	15:48		
26	05:09	06:03	06:59	06:56	07:24 (19)	07:55	08:30		
	21:19	20:16	18:59	10 08:03 (23)	16:48	14 07:38 (19)	15:55	3 08:33 (16)	15:49
27	05:10	06:05	07:01	07:50 (23)	06:57	07:27 (19)	07:57	08:28	
	21:17	20:13	18:56	14 08:04 (23)	16:45	11 07:38 (19)	15:53	15:49	
28	05:12	06:07	07:03	07:48 (23)	06:59	07:29 (19)	07:58	08:28	
	21:16	20:11	18:54	17 08:05 (23)	16:43	6 07:35 (19)	15:52	15:50	
29	05:14	06:09	07:04	07:47 (23)	07:01		08:00	08:28	
	21:14	20:08	18:51	18 08:05 (23)	16:41		15:52	15:51	
30	05:15	06:10	07:06	07:46 (23)	07:03		08:02	08:28	
	21:12	20:06	18:49	20 08:06 (23)	16:39		15:51	15:52	
31	05:17	06:12		07:05				08:28	
	21:10	20:04		16:37				15:53	
Sonnenscheinstunden	515	461	383	328	257		231		
astr.max.mögl.Beschattung			79	423		218			
Red.Sonnenscheinwahrsch.			0.40	0.33		0.21			
Reduktion Betriebsdauer			0.90	0.90		0.90			
Reduktion Windrichtung			0.63	0.63		0.59			
Gesamte Reduktion			0.23	0.19		0.11			
Met.wahrsch.Beschattung			18	79		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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni				
1	08:28	07:57	08:35 (16)	06:59	07:48 (19)	06:43	05:33	04:42		
	15:54	16:46	16	08:51 (16)	17:43	3	07:51 (19)	19:42	20:39	21:30
2	08:28	07:56	08:35 (16)	06:57	06:40	05:31	04:41			
	15:55	16:48	15	08:50 (16)	17:45	19:44	20:41	21:31		
3	08:28	07:54	08:36 (16)	06:54	07:19 (1)	06:38	05:29	04:40		
	15:57	16:50	14	08:50 (16)	17:47	4	07:23 (1)	19:46	20:42	21:32
4	08:28	07:52	08:37 (16)	06:52	07:16 (1)	06:36	05:27	04:40		
	15:58	16:52	12	08:49 (16)	17:49	9	07:25 (1)	19:48	20:44	21:33
5	08:27	07:50	08:38 (16)	06:49	07:14 (1)	06:33	05:25	04:39		
	15:59	16:54	10	08:48 (16)	17:51	12	07:26 (1)	19:50	20:46	21:34
6	08:27	07:48	08:41 (16)	06:47	07:11 (1)	06:31	05:23	04:38		
	16:00	16:56	4	08:45 (16)	17:53	15	07:26 (1)	19:52	20:48	21:35
7	08:26	07:46	06:45	07:10 (1)	06:28	05:21	04:37			
	16:02	16:59	17	07:27 (1)	19:54	20:50	21:36			
8	08:26	07:45	06:42	07:10 (1)	06:26	05:19	04:37			
	16:03	17:01	17	07:27 (1)	19:56	20:52	21:37			
9	08:25	07:43	06:40	07:09 (1)	06:23	05:17	04:36			
	16:05	17:03	17	07:26 (1)	19:57	20:53	21:38			
10	08:25	07:41	06:37	07:03 (23)	06:21	05:15	04:36			
	16:06	17:05	23	07:26 (1)	19:59	20:55	21:39			
11	08:24	07:39	06:35	07:00 (23)	06:18	05:13	04:35			
	16:08	17:07	24	07:24 (1)	20:01	20:57	21:40			
12	08:23	07:37	06:33	06:59 (23)	06:16	05:11	04:35			
	16:09	17:09	24	07:23 (1)	20:03	20:59	21:41			
13	08:22	07:35	06:30	06:57 (23)	06:14	05:09	04:34			
	16:11	17:11	23	07:20 (1)	20:05	21:00	21:42			
14	08:21	07:32	06:28	06:57 (23)	06:11	05:08	04:34			
	16:13	17:13	18	07:15 (23)	20:07	21:02	21:42			
15	08:20	07:30	06:25	06:56 (23)	06:09	05:06	04:34			
	16:14	17:15	19	07:15 (23)	20:09	21:04	21:43			
16	08:20	07:28	06:23	06:56 (23)	06:07	05:04	04:34			
	16:16	17:17	19	07:15 (23)	20:11	21:06	21:43			
17	08:18	07:26	06:20	06:56 (23)	06:04	05:02	04:34			
	16:18	17:19	18	07:14 (23)	20:13	21:07	21:44			
18	08:17	07:24	06:18	06:57 (23)	06:02	05:01	04:34			
	16:20	17:21	3	07:53 (19)	18:16	16	07:13 (23)	20:14	21:09	21:44
19	08:16	07:22	06:15	06:57 (23)	05:59	04:59	04:34			
	16:21	17:23	8	07:55 (19)	18:18	14	07:11 (23)	20:16	21:11	21:45
20	08:15	07:20	06:13	06:59 (23)	05:57	04:58	04:34			
	16:23	17:25	12	07:57 (19)	18:20	11	07:10 (23)	20:18	21:12	21:45
21	08:14	07:17	06:10	07:02 (23)	05:55	04:56	04:34			
	16:25	17:27	15	07:58 (19)	18:22	3	07:05 (23)	20:20	21:14	21:45
22	08:13	07:15	06:08	05:53	04:55	04:34				
	16:27	17:29	16	07:58 (19)	18:24	20:22	21:15	21:46		
23	08:11	07:13	06:05	05:50	04:53	04:34				
	16:29	17:31	16	07:58 (19)	18:25	20:24	21:17	21:46		
24	08:10	07:11	06:03	05:48	04:52	04:34				
	16:31	5 08:45 (16)	17	07:59 (19)	18:27	20:26	21:19	21:46		
25	08:08	07:08	06:00	05:46	04:50	04:35				
	16:33	8 08:46 (16)	17	07:58 (19)	18:29	20:28	21:20	21:46		
26	08:07	07:06	05:58	05:44	04:49	04:35				
	16:34	11 08:47 (16)	15	07:57 (19)	18:31	20:29	21:21	21:46		
27	08:05	07:04	05:55	05:41	04:48	04:36				
	16:36	14 08:49 (16)	14	07:57 (19)	18:33	20:31	21:23	21:46		
28	08:04	07:01	05:53	05:39	04:47	04:36				
	16:38	15 08:49 (16)	10	07:54 (19)	18:35	20:33	21:24	21:46		
29	08:02	06:50	05:37	04:46	04:37					
	16:40	17 08:50 (16)	19:37	20:35	21:26	21:45				
30	08:01	06:48	05:35	04:44	04:37					
	16:42	17 08:50 (16)	19:39	20:37	21:27	21:45				
31	07:59	06:45	05:33	04:43	04:34					
	16:44	17 08:50 (16)	19:41	21:28	21:45					
Sonnenscheinstunden	248	272	367	421	496	513				
astr.max.mögl.Beschattung	104	214	306							
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31							
Reduktion Betriebsdauer	0.90	0.90	0.90							
Reduktion Windrichtung	0.60	0.62	0.64							
Gesamte Reduktion	0.09	0.13	0.18							
Met.wahrsch.Beschattung	10	29	55							

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	07:08	07:37 (23)   07:07	08:03
	21:45	21:09	20:01	18:47	24 08:01 (1)   16:35	15:50
2	04:39	05:20	06:16	07:10	07:38 (23)   07:09	08:05
	21:44	21:07	19:59	18:44	25 08:03 (1)   16:33	15:49
3	04:40	05:22	06:18	07:12	07:39 (23)   07:11	08:06
	21:44	21:05	19:56	18:42	25 08:04 (1)   16:31	15:48
4	04:40	05:24	06:19	07:14	07:41 (23)   07:13	08:08
	21:43	21:03	19:54	18:39	22 08:03 (1)   16:29	15:48
5	04:41	05:26	06:21	07:16	07:46 (1)   07:15	08:10 (16)   08:09
	21:43	21:01	19:51	18:37	17 08:03 (1)   16:27	5 08:15 (16)   15:47
6	04:42	05:27	06:23	07:17	07:46 (1)   07:17	08:08 (16)   08:11
	21:42	20:59	19:49	18:34	17 08:03 (1)   16:25	10 08:18 (16)   15:46
7	04:43	05:29	06:25	07:19	07:46 (1)   07:19	08:06 (16)   08:12
	21:42	20:57	19:46	18:32	16 08:02 (1)   16:23	13 08:19 (16)   15:46
8	04:44	05:31	06:27	07:21	07:48 (1)   07:21	08:05 (16)   08:13
	21:41	20:55	19:44	18:29	14 08:02 (1)   16:21	15 08:20 (16)   15:45
9	04:45	05:33	06:28	07:23	07:50 (1)   07:23	08:05 (16)   08:15
	21:40	20:53	19:42	18:27	10 08:00 (1)   16:20	15 08:20 (16)   15:45
10	04:46	05:34	06:30	07:25	07:52 (1)   07:25	08:05 (16)   08:16
	21:39	20:51	19:39	18:24	7 07:59 (1)   16:18	16 08:21 (16)   15:45
11	04:48	05:36	06:32	07:27	07:54 (1)   07:27	08:05 (16)   08:17
	21:38	20:49	19:37	18:22	1 07:55 (1)   16:16	17 08:22 (16)   15:45
12	04:49	05:38	06:34	07:29	07:29	08:05 (16)   08:18
	21:37	20:47	19:34	18:20	17 08:14	17 08:22 (16)   15:44
13	04:50	05:40	06:36	07:30	08:19 (19)   07:31	08:05 (16)   08:19
	21:36	20:45	19:32	18:17	7 08:26 (19)   16:13	16 08:21 (16)   15:44
14	04:51	05:42	06:37	07:32	08:17 (19)   07:33	08:06 (16)   08:20
	21:35	20:43	19:29	18:15	11 08:28 (19)   16:11	15 08:21 (16)   15:44
15	04:53	05:43	06:39	07:34	08:15 (19)   07:35	08:07 (16)   08:21
	21:34	20:41	19:27	18:13	14 08:29 (19)   16:09	14 08:21 (16)   15:44
16	04:54	05:45	06:41	07:36	08:14 (19)   07:37	08:09 (16)   08:22
	21:33	20:38	19:24	18:10	16 08:30 (19)   16:08	11 08:20 (16)   15:44
17	04:55	05:47	06:43	07:38	08:14 (19)   07:39	08:11 (16)   08:23
	21:32	20:36	19:22	18:08	16 08:30 (19)   16:06	8 08:19 (16)   15:44
18	04:57	05:49	06:45	07:40	08:13 (19)   07:40	08:14 (16)   08:24
	21:31	20:34	19:19	18:06	17 08:30 (19)   16:05	5 08:19 (16)   15:45
19	04:58	05:51	06:46	07:42	08:13 (19)   07:42	08:24
	21:29	20:32	19:17	18:03	17 08:30 (19)   16:03	15:45
20	05:00	05:52	06:48	07:44	08:13 (19)   07:44	08:25
	21:28	20:29	19:14	18:01	16 08:29 (19)   16:02	15:45
21	05:01	05:54	06:50	07:46	08:14 (19)   07:46	08:26
	21:27	20:27	19:12	17:59	14 08:28 (19)   16:01	15:46
22	05:03	05:56	06:52	07:48	08:16 (19)   07:48	08:26
	21:25	20:25	19:09	17:56	11 08:27 (19)   15:59	15:46
23	05:04	05:58	06:54	07:43 (23)   07:50	08:18 (19)   07:50	08:27
	21:24	20:23	19:06	10 07:53 (23)   17:54	7 08:25 (19)   15:58	15:47
24	05:06	06:00	06:55	07:41 (23)   07:52	07:51	08:27
	21:22	20:20	19:04	14 07:55 (23)   17:52	15:57	15:47
25	05:07	06:01	06:57	07:40 (23)   06:54	07:53	08:28
	21:21	20:18	19:01	16 07:56 (23)   16:50	15:56	15:48
26	05:09	06:03	06:59	07:39 (23)   06:56	07:55	08:28
	21:19	20:16	18:59	17 07:56 (23)   16:48	15:55	15:49
27	05:10	06:05	07:01	07:37 (23)   06:57	07:57	08:28
	21:17	20:13	18:56	19 07:56 (23)   16:45	15:54	15:49
28	05:12	06:07	07:03	07:37 (23)   06:59	07:58	08:28
	21:16	20:11	18:54	19 07:56 (23)   16:43	15:52	15:50
29	05:14	06:09	07:04	07:37 (23)   07:01	08:00	08:28
	21:14	20:08	18:52	18 07:55 (23)   16:41	15:52	15:51
30	05:15	06:10	07:06	07:37 (23)   07:03	08:02	08:28
	21:12	20:06	18:49	21 07:58 (1)   16:39	15:51	15:52
31	05:17	06:12		07:05		08:28
	21:11	20:04		16:37		15:53
Sonnenscheinstunden	515	461	383	328	257	231
astr.max.mögl.Beschattung			134	324	177	
Red.Sonnenscheinwahrsch.			0.40	0.33	0.21	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.64	0.64	0.60	
Gesamte Reduktion			0.23	0.19	0.11	
Met.wahrsch.Beschattung			31	61	20	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28	07:57	08:26 (16)	06:59	07:34 (19)	06:43	05:33	04:42
	15:54	16:46	13 08:39 (16)	17:43	14 07:48 (19)	19:42	20:39	21:30
2	08:28	07:56	08:25 (16)	06:57	07:34 (19)	06:40	05:31	04:41
	15:55	16:48	15 08:40 (16)	17:45	12 07:46 (19)	19:44	20:41	21:31
3	08:28	07:54	08:24 (16)	06:54	07:36 (19)	06:38	05:29	04:40
	15:57	16:50	16 08:40 (16)	17:47	9 07:45 (19)	19:46	20:42	21:32
4	08:28	07:52	08:24 (16)	06:52		06:36	05:27	04:40
	15:58	16:52	16 08:40 (16)	17:49		19:48	20:44	21:33
5	08:27	07:50	08:25 (16)	06:49	07:14 (1)	06:33	05:25	04:39
	15:59	16:54	15 08:40 (16)	17:51	2 07:16 (1)	19:50	20:46	21:34
6	08:27	07:48	08:25 (16)	06:47	07:12 (1)	06:31	05:23	04:38
	16:00	16:57	15 08:40 (16)	17:53	7 07:19 (1)	19:52	20:48	21:35
7	08:26	07:46	08:26 (16)	06:45	07:09 (1)	06:28	05:21	04:37
	16:02	16:59	14 08:40 (16)	17:55	10 07:19 (1)	19:54	20:50	21:36
8	08:26	07:45	08:27 (16)	06:42	07:07 (1)	06:26	05:19	04:37
	16:03	17:01	12 08:39 (16)	17:57	13 07:20 (1)	19:56	20:52	21:37
9	08:25	07:43	08:28 (16)	06:40	07:04 (1)	06:23	05:17	04:36
	16:05	17:03	8 08:36 (16)	17:59	16 07:20 (1)	19:57	20:53	21:38
10	08:25	07:41		06:37	07:04 (1)	06:21	05:15	04:36
	16:06	17:05		18:01	16 07:20 (1)	19:59	20:55	21:39
11	08:24	07:39		06:35	07:03 (1)	06:18	05:13	04:35
	16:08	17:07		18:03	16 07:19 (1)	20:01	20:57	21:40
12	08:23	07:37		06:33	06:57 (23)	06:16	05:11	04:35
	16:09	17:09		18:04	19 07:19 (1)	20:03	20:59	21:41
13	08:22	07:35		06:30	06:54 (23)	06:14	05:09	04:34
	16:11	17:11		18:06	24 07:18 (1)	20:05	21:00	21:42
14	08:21	07:32		06:28	06:52 (23)	06:11	05:08	04:34
	16:13	17:13		18:08	24 07:16 (1)	20:07	21:02	21:42
15	08:20	07:30		06:25	06:50 (23)	06:09	05:06	04:34
	16:14	17:15		18:10	22 07:13 (1)	20:09	21:04	21:43
16	08:20	07:28		06:23	06:50 (23)	06:07	05:04	04:34
	16:16	17:17		18:12	17 07:07 (23)	20:11	21:06	21:43
17	08:18	07:26		06:20	06:49 (23)	06:04	05:02	04:34
	16:18	17:19		18:14	17 07:06 (23)	20:13	21:07	21:44
18	08:17	07:24		06:18	06:49 (23)	06:02	05:01	04:34
	16:20	17:21		18:16	18 07:07 (23)	20:14	21:09	21:44
19	08:16	07:22		06:15	06:48 (23)	05:59	04:59	04:34
	16:21	17:23		18:18	18 07:06 (23)	20:16	21:11	21:45
20	08:15	07:20		06:13	06:49 (23)	05:57	04:58	04:34
	16:23	17:25		18:20	16 07:05 (23)	20:18	21:12	21:45
21	08:14	07:17		06:10	06:49 (23)	05:55	04:56	04:34
	16:25	17:27		18:22	14 07:03 (23)	20:20	21:14	21:45
22	08:13	07:15	07:40 (19)	06:08	06:51 (23)	05:53	04:55	04:34
	16:27	17:29	5 07:45 (19)	18:24	11 07:02 (23)	20:22	21:15	21:46
23	08:11	07:13	07:38 (19)	06:05	06:54 (23)	05:50	04:53	04:34
	16:29	17:31	10 07:48 (19)	18:25	4 06:58 (23)	20:24	21:17	21:46
24	08:10	07:11	07:36 (19)	06:03		05:48	04:52	04:34
	16:31	17:33	13 07:49 (19)	18:27		20:26	21:19	21:46
25	08:08	07:08	07:33 (19)	06:00		05:46	04:50	04:35
	16:33	17:35	16 07:49 (19)	18:29		20:28	21:20	21:46
26	08:07	07:06	07:33 (19)	05:58		05:44	04:49	04:35
	16:34	17:37	16 07:49 (19)	18:31		20:29	21:21	21:46
27	08:05	07:04	07:34 (19)	05:55		05:41	04:48	04:36
	16:36	17:39	16 07:50 (19)	18:33		20:31	21:23	21:46
28	08:04	07:01	07:33 (19)	05:53		05:39	04:47	04:36
	16:38	17:41	16 07:49 (19)	18:35		20:33	21:24	21:46
29	08:02	08:31 (16)		06:50		05:37	04:46	04:37
	16:40	4 08:35 (16)		19:37		20:35	21:26	21:45
30	08:01	08:29 (16)		06:48		05:35	04:44	04:37
	16:42	7 08:36 (16)		19:39		20:37	21:27	21:45
31	07:59	08:27 (16)		06:45			04:43	
	16:44	11 08:38 (16)		19:41			21:28	
Sonnenscheinstunden	248	272	367		421	496	513	
astr.max.mögl.Beschattung	22	216	319					
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31					
Reduktion Betriebsdauer	0.90	0.90	0.90					
Reduktion Windrichtung	0.61	0.62	0.64					
Gesamte Reduktion	0.10	0.13	0.18					
Met.wahrsch.Beschattung	2	29	57					

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	07:08	07:35 (23)	08:00 (16)
	21:45	21:09	20:01	18:47	16:35	15:50
2	04:39	05:20	06:16	07:10	07:42 (1)	08:05
	21:44	21:07	19:59	18:44	16:33	15:49
3	04:40	05:22	06:18	07:12	07:42 (1)	08:06
	21:44	21:05	19:56	18:42	16:31	15:48
4	04:40	05:24	06:19	07:14	07:41 (1)	08:08
	21:43	21:03	19:54	18:39	16:29	15:48
5	04:41	05:26	06:21	07:16	07:42 (1)	08:09
	21:43	21:01	19:51	18:37	16:27	15:47
6	04:42	05:27	06:23	07:17	07:44 (1)	08:11
	21:42	20:59	19:49	18:34	16:25	15:46
7	04:43	05:29	06:25	07:19	07:46 (1)	08:12
	21:42	20:57	19:46	18:32	16:23	15:46
8	04:44	05:31	06:27	07:21	07:48 (1)	08:13
	21:41	20:55	19:44	18:29	16:21	15:45
9	04:45	05:33	06:28	07:23	07:23	08:15
	21:40	20:53	19:42	18:27	16:20	15:45
10	04:46	05:34	06:30	07:25	08:12 (19)	08:16
	21:39	20:51	19:39	18:24	16:18	15:45
11	04:48	05:36	06:32	07:27	08:09 (19)	08:17
	21:38	20:49	19:37	18:22	16:16	15:45
12	04:49	05:38	06:34	07:29	08:08 (19)	08:18
	21:37	20:47	19:34	18:20	16:14	15:44
13	04:50	05:40	06:36	07:31	08:07 (19)	08:19
	21:36	20:45	19:32	18:17	16:13	15:44
14	04:51	05:42	06:37	07:32	08:06 (19)	08:20
	21:35	20:43	19:29	18:15	16:11	15:44
15	04:53	05:43	06:39	07:34	08:06 (19)	08:21
	21:34	20:41	19:27	18:13	16:09	15:44
16	04:54	05:45	06:41	07:36	08:06 (19)	08:22
	21:33	20:38	19:24	18:10	16:08	15:44
17	04:55	05:47	06:43	07:38	08:06 (19)	08:23
	21:32	20:36	19:22	18:08	16:06	15:44
18	04:57	05:49	06:45	07:40	08:08 (19)	08:24
	21:31	20:34	19:19	18:06	16:05	15:45
19	04:58	05:51	06:46	07:42	08:10 (19)	08:24
	21:29	20:32	19:17	18:03	16:03	15:45
20	05:00	05:52	06:48	07:44	08:12 (19)	08:25
	21:28	20:29	19:14	18:01	16:02	15:45
21	05:01	05:54	06:50	07:37 (23)	07:46	08:26
	21:27	20:27	19:12	17:59	16:01	15:46
22	05:03	05:56	06:52	07:34 (23)	07:48	08:26
	21:25	20:25	19:09	17:56	15:59	15:46
23	05:04	05:58	06:54	07:33 (23)	07:50	08:27
	21:24	20:23	19:07	17:54	15:58	15:47
24	05:06	06:00	06:55	07:32 (23)	07:52	08:27
	21:22	20:20	19:04	17:52	15:57	15:47
25	05:07	06:01	06:57	07:32 (23)	07:53	08:28
	21:21	20:18	19:01	17:50	15:56	15:48
26	05:09	06:03	06:59	07:31 (23)	07:55	08:28
	21:19	20:16	18:59	17:49 (23)	15:55	15:49
27	05:10	06:05	07:01	07:30 (23)	07:57	08:28
	21:17	20:13	18:56	17:48 (23)	15:54	15:49
28	05:12	06:07	07:03	07:31 (23)	07:58	08:28
	21:16	20:11	18:54	17:47 (23)	15:52	15:50
29	05:14	06:09	07:04	07:31 (23)	08:00	08:28
	21:14	20:08	18:52	17:45 (1)	15:52	15:51
30	05:15	06:10	07:06	07:33 (23)	08:02	08:28
	21:12	20:06	18:49	17:43 (1)	15:51	15:52
31	05:17	06:12		07:05		08:28
	21:11	20:04		16:37		15:53
Sonnenscheinstunden	515	461	383	328	257	231
astr.max.mögl.Beschattung			172	239	153	
Red.Sonnenscheinwahrsch.			0.40	0.33	0.21	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.65	0.63	0.61	
Gesamte Reduktion			0.23	0.19	0.11	
Met.wahrsch.Beschattung			40	45	17	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28	07:57	08:26 (16)	06:59	07:27 (19)	06:43	05:33	04:42
	15:54	16:46	3 08:29 (16)	17:43	16 07:43 (19)	19:42	20:39	21:30
2	08:28	07:56	08:24 (16)	06:57	07:27 (19)	06:40	05:31	04:41
	15:55	16:48	7 08:31 (16)	17:45	15 07:42 (19)	19:44	20:41	21:31
3	08:28	07:54	08:22 (16)	06:54	07:27 (19)	06:38	05:29	04:40
	15:57	16:50	10 08:32 (16)	17:47	15 07:42 (19)	19:46	20:42	21:32
4	08:28	07:52	08:20 (16)	06:52	07:28 (19)	06:36	05:27	04:40
	15:58	16:52	13 08:33 (16)	17:49	12 07:40 (19)	19:48	20:44	21:33
5	08:27	07:50	08:18 (16)	06:49	07:29 (19)	06:33	05:25	04:39
	15:59	16:54	16 08:34 (16)	17:51	10 07:39 (19)	19:50	20:46	21:34
6	08:27	07:48	08:18 (16)	06:47	07:33 (19)	06:31	05:23	04:38
	16:00	16:57	16 08:34 (16)	17:53	3 07:36 (19)	19:52	20:48	21:35
7	08:26	07:46	08:18 (16)	06:45	07:09 (1)	06:28	05:21	04:37
	16:02	16:59	16 08:34 (16)	17:55	2 07:11 (1)	19:54	20:50	21:36
8	08:26	07:45	08:19 (16)	06:42	07:07 (1)	06:26	05:19	04:37
	16:03	17:01	15 08:34 (16)	17:57	7 07:14 (1)	19:56	20:52	21:37
9	08:25	07:43	08:18 (16)	06:40	07:04 (1)	06:23	05:17	04:36
	16:05	17:03	15 08:33 (16)	17:59	10 07:14 (1)	19:57	20:53	21:38
10	08:25	07:41	08:19 (16)	06:37	07:02 (1)	06:21	05:15	04:36
	16:06	17:05	13 08:32 (16)	18:01	13 07:15 (1)	19:59	20:55	21:39
11	08:24	07:39	08:21 (16)	06:35	06:59 (1)	06:18	05:13	04:35
	16:08	17:07	10 08:31 (16)	18:03	16 07:15 (1)	20:01	20:57	21:40
12	08:23	07:37	08:23 (16)	06:33	06:59 (1)	06:16	05:11	04:35
	16:09	17:09	7 08:30 (16)	18:04	16 07:15 (1)	20:03	20:59	21:41
13	08:22	07:35	08:16 (16)	06:30	06:58 (1)	06:14	05:09	04:34
	16:11	17:11	18:06	16 07:14 (1)	20:05	21:00	21:42	
14	08:21	07:32	08:16 (16)	06:28	06:59 (1)	06:11	05:08	04:34
	16:13	17:13	18:08	15 07:14 (1)	20:07	21:02	21:42	
15	08:20	07:30	08:15 (16)	06:25	06:49 (23)	06:09	05:06	04:34
	16:14	17:15	18:10	21 07:12 (1)	20:09	21:04	21:43	
16	08:20	07:28	08:14 (16)	06:23	06:47 (23)	06:07	05:04	04:34
	16:16	17:17	18:12	22 07:11 (1)	20:11	21:06	21:43	
17	08:18	07:26	08:13 (16)	06:20	06:44 (23)	06:04	05:02	04:34
	16:18	17:19	18:14	17 07:06 (1)	20:13	21:07	21:44	
18	08:17	07:24	08:12 (16)	06:18	06:44 (23)	06:02	05:01	04:34
	16:20	17:21	18:16	16 07:00 (23)	20:14	21:09	21:44	
19	08:16	07:22	08:11 (16)	06:15	06:43 (23)	05:59	04:59	04:34
	16:21	17:23	18:18	17 07:00 (23)	20:16	21:11	21:45	
20	08:15	07:20	08:10 (16)	06:13	06:43 (23)	05:57	04:58	04:34
	16:23	17:25	18:20	17 07:00 (23)	20:18	21:12	21:45	
21	08:14	07:17	08:09 (16)	06:10	06:42 (23)	05:55	04:56	04:34
	16:25	17:27	18:22	17 06:59 (23)	20:20	21:14	21:45	
22	08:13	07:15	08:08 (16)	06:08	06:43 (23)	05:53	04:55	04:34
	16:27	17:29	18:24	16 06:59 (23)	20:22	21:15	21:46	
23	08:11	07:13	08:06 (16)	06:05	06:43 (23)	05:50	04:53	04:34
	16:29	17:31	18:25	14 06:57 (23)	20:24	21:17	21:46	
24	08:10	07:11	08:05 (16)	06:03	06:44 (23)	05:48	04:52	04:34
	16:31	17:33	2 07:38 (19)	18:27	12 06:56 (23)	20:26	21:19	21:46
25	08:08	07:08	08:03 (16)	06:00	06:46 (23)	05:46	04:50	04:35
	16:33	17:35	7 07:40 (19)	18:29	6 06:52 (23)	20:28	21:20	21:46
26	08:07	07:06	08:01 (16)	05:58	06:47 (23)	05:44	04:49	04:35
	16:34	17:37	11 07:42 (19)	18:31	06:48 (23)	20:29	21:21	21:46
27	08:05	07:04	08:00 (16)	05:55	06:48 (23)	05:41	04:48	04:36
	16:36	17:39	14 07:43 (19)	18:33	06:49 (23)	20:31	21:23	21:46
28	08:04	07:01	08:00 (16)	05:53	06:49 (23)	05:39	04:47	04:36
	16:38	17:41	16 07:43 (19)	18:35	06:50 (23)	20:33	21:24	21:46
29	08:02	07:00	08:00 (16)	05:50	06:50 (23)	05:37	04:46	04:37
	16:40	17:43	18:37	15 07:44 (19)	18:37	20:35	21:26	21:45
30	08:01	07:00	08:00 (16)	05:48	06:50 (23)	05:35	04:44	04:37
	16:42	17:45	18:39	14 07:44 (19)	18:39	20:37	21:27	21:45
31	07:59	07:00	08:00 (16)	05:45	06:51 (23)	05:34	04:43	04:37
	16:44	17:47	18:41	13 07:45 (19)	18:41	20:39	21:28	21:45
Sonneneinstrahlung	248	272	367	421	496	513		
astr.max.mögl.Beschattung		191	341					
Red.Sonneneinstrahlung		0.24	0.31					
Reduktion Betriebsdauer		0.90	0.90					
Reduktion Windrichtung		0.62	0.65					
Gesamte Reduktion		0.13	0.18					
Met.wahrsch.Beschattung		25	62					

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember				
1	04:38	05:19	06:14	07:08	07:38 (1)	07:07	07:49 (16)	08:03		
	21:45	21:09	20:01	18:47	16	07:54 (1)	16:35	13	08:02 (16)	15:50
2	04:39	05:20	06:16	07:10	07:38 (1)	07:09	07:48 (16)	08:05		
	21:44	21:07	19:59	18:44	16	07:54 (1)	16:33	15	08:03 (16)	15:49
3	04:40	05:22	06:18	07:12	07:39 (1)	07:11	07:48 (16)	08:06		
	21:44	21:05	19:56	18:42	14	07:53 (1)	16:31	16	08:04 (16)	15:48
4	04:40	05:24	06:19	07:14	07:40 (1)	07:13	07:48 (16)	08:08		
	21:43	21:03	19:54	18:39	12	07:52 (1)	16:29	16	08:04 (16)	15:48
5	04:41	05:26	06:21	07:16	07:42 (1)	07:15	07:48 (16)	08:09		
	21:43	21:01	19:51	18:37	8	07:50 (1)	16:27	16	08:04 (16)	15:47
6	04:42	05:27	06:23	07:17	07:44 (1)	07:17	07:48 (16)	08:11		
	21:42	20:59	19:49	18:34	4	07:48 (1)	16:25	15	08:03 (16)	15:46
7	04:43	05:29	06:25	07:19	07:46 (1)	07:19	07:50 (16)	08:12		
	21:42	20:57	19:46	18:32	13	08:03 (16)	16:23	13	08:03 (16)	15:46
8	04:44	05:31	06:27	07:21	08:06 (19)	07:21	07:52 (16)	08:13		
	21:41	20:55	19:44	18:29	7	08:13 (19)	16:21	10	08:02 (16)	15:45
9	04:45	05:33	06:28	07:23	08:03 (19)	07:23	07:54 (16)	08:15		
	21:40	20:53	19:42	18:27	12	08:15 (19)	16:20	7	08:01 (16)	15:45
10	04:46	05:34	06:30	07:25	08:02 (19)	07:25	07:57 (16)	08:16		
	21:39	20:51	19:39	18:25	14	08:16 (19)	16:18	3	08:00 (16)	15:45
11	04:48	05:36	06:32	07:27	08:01 (19)	07:27	08:17			
	21:38	20:49	19:37	18:22	15	08:16 (19)	16:16	15:45		
12	04:49	05:38	06:34	07:29	08:01 (19)	07:29	08:18			
	21:37	20:47	19:34	18:20	15	08:16 (19)	16:14	15:44		
13	04:50	05:40	06:36	07:31	08:00 (19)	07:31	08:19			
	21:36	20:45	19:32	18:17	16	08:16 (19)	16:13	15:44		
14	04:51	05:42	06:37	07:32	08:00 (19)	07:33	08:20			
	21:35	20:43	19:29	18:15	16	08:16 (19)	16:11	15:44		
15	04:53	05:43	06:39	07:34	08:02 (19)	07:35	08:21			
	21:34	20:41	19:27	18:13	13	08:15 (19)	16:09	15:44		
16	04:54	05:45	06:41	07:36	08:04 (19)	07:37	08:22			
	21:33	20:38	19:24	18:10	10	08:14 (19)	16:08	15:44		
17	04:55	05:47	06:43	07:38	08:06 (19)	07:39	08:23			
	21:32	20:36	19:22	18:08	6	08:12 (19)	16:06	15:44		
18	04:57	05:49	06:45	07:40	08:08 (19)	07:40	08:24			
	21:31	20:34	19:19	3	07:35 (23)	18:06	16:05	15:45		
19	04:58	05:51	06:46	07:42	07:31 (23)	07:42	08:24			
	21:29	20:32	19:17	11	07:42 (23)	18:03	16:03	15:45		
20	05:00	05:52	06:48	07:44	07:30 (23)	07:44	07:44	08:25		
	21:28	20:29	19:14	13	07:43 (23)	18:01	16:02	15:45		
21	05:01	05:54	06:50	07:46	07:29 (23)	07:46	07:46	08:26		
	21:27	20:27	19:12	15	07:44 (23)	17:59	16:01	15:46		
22	05:03	05:56	06:52	07:48	07:27 (23)	07:48	07:48	08:26		
	21:25	20:25	19:09	17	07:44 (23)	17:56	15:59	15:46		
23	05:04	05:58	06:54	07:50	07:26 (23)	07:50	07:50	08:27		
	21:24	20:23	19:07	18	07:44 (23)	17:54	15:58	15:47		
24	05:06	06:00	06:55	07:52	07:26 (23)	07:52	07:51	08:27		
	21:22	20:20	19:04	18	07:44 (23)	17:52	15:57	15:47		
25	05:07	06:01	06:57	07:54	07:26 (23)	06:54	07:53	08:28		
	21:21	20:18	19:01	17	07:43 (23)	16:50	15:56	15:48		
26	05:09	06:03	06:59	07:56	07:27 (23)	06:56	07:55	08:28		
	21:19	20:16	18:59	15	07:42 (23)	16:48	15:55	15:49		
27	05:10	06:05	07:01	07:58	07:27 (23)	06:58	07:57	08:28		
	21:17	20:13	18:56	21	07:51 (1)	16:45	15:54	15:49		
28	05:12	06:07	07:03	07:59	07:29 (23)	06:59	07:58	08:28		
	21:16	20:11	18:54	21	07:52 (1)	16:43	15:52	15:50		
29	05:14	06:09	07:04	07:61	07:31 (23)	07:01	08:00	08:28		
	21:14	20:08	18:52	18	07:53 (1)	16:41	15:52	15:51		
30	05:15	06:10	07:06	07:62	07:38 (1)	07:03	07:52 (16)	08:02	08:28	
	21:12	20:06	18:49	16	07:54 (1)	16:39	8	08:00 (16)	15:51	
31	05:17	06:12	07:07	07:63	07:05	07:50 (16)	08:02	08:28		
	21:11	20:04	18:47	16:37	11	08:01 (16)	15:51	15:53		
Sonneneinstrahlung	515	461	383	328	257	231				
astr.max.mögl.Beschattung			203	213	124					
Red.Sonneneinstrahlung			0.40	0.33	0.21					
Reduktion Betriebsdauer			0.90	0.90	0.90					
Reduktion Windrichtung			0.65	0.64	0.62					
Gesamte Reduktion			0.23	0.19	0.12					
Met.wahrsch.Beschattung			48	40	14					

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: E - IO5

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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	07:24 (19)	06:43	05:33
	15:54	16:46	17:43	6 07:30 (19)	19:42	20:39
2	08:28	07:56	06:57	07:21 (19)	06:40	05:31
	15:55	16:48	17:45	10 07:31 (19)	19:44	20:41
3	08:28	07:54	06:54	07:19 (19)	06:38	05:29
	15:57	16:50	17:47	13 07:32 (19)	19:46	20:42
4	08:28	07:52	06:52	07:17 (19)	06:36	05:27
	15:58	16:52	17:49	15 07:32 (19)	19:48	20:44
5	08:27	07:50	06:49	07:17 (19)	06:33	05:25
	15:59	16:54	17:51	16 07:33 (19)	19:50	20:46
6	08:27	07:48	06:47	07:17 (19)	06:31	05:23
	16:01	16:57	6 08:22 (16)	17:53	16 07:33 (19)	19:52
7	08:26	07:46	06:45	07:17 (19)	06:28	05:21
	16:02	16:59	10 08:24 (16)	17:55	15 07:32 (19)	19:54
8	08:26	07:45	06:42	07:18 (19)	06:26	05:19
	16:03	17:01	13 08:25 (16)	17:57	13 07:31 (19)	19:56
9	08:25	07:43	06:40	07:18 (19)	06:23	05:17
	16:05	17:03	15 08:24 (16)	17:59	11 07:29 (19)	19:57
10	08:25	07:41	06:37	07:21 (19)	06:21	05:15
	16:06	17:05	16 08:25 (16)	18:01	6 07:27 (19)	19:59
11	08:24	07:39	06:35	06:59 (1)	06:18	05:13
	16:08	17:07	16 08:25 (16)	18:03	4 07:03 (1)	20:01
12	08:23	07:37	06:33	06:57 (1)	06:16	05:11
	16:09	17:09	15 08:25 (16)	18:04	8 07:05 (1)	20:03
13	08:22	07:35	06:30	06:54 (1)	06:14	05:09
	16:11	17:11	15 08:25 (16)	18:06	11 07:05 (1)	20:05
14	08:21	07:32	06:28	06:52 (1)	06:11	05:08
	16:13	17:13	14 08:25 (16)	18:08	14 07:06 (1)	20:07
15	08:20	07:30	06:25	06:49 (1)	06:09	05:06
	16:14	17:15	12 08:23 (16)	18:10	17 07:06 (1)	20:09
16	08:20	07:28	06:23	06:50 (1)	06:07	05:04
	16:16	17:17	8 08:21 (16)	18:12	16 07:06 (1)	20:11
17	08:18	07:26	06:20	06:49 (1)	06:04	05:02
	16:18	17:19	18:14	16 07:05 (1)	20:13	21:07
18	08:17	07:24	06:18	06:50 (1)	06:02	05:01
	16:20	17:21	18:16	14 07:04 (1)	20:14	21:09
19	08:16	07:22	06:15	06:50 (1)	05:59	04:59
	16:21	17:23	18:18	13 07:03 (1)	20:16	21:11
20	08:15	07:20	06:13	06:57 (23)	05:57	04:58
	16:23	17:25	18:20	17 07:01 (1)	20:18	21:12
21	08:14	07:17	06:10	06:54 (23)	05:55	04:56
	16:25	17:27	18:22	12 06:46 (23)	20:20	21:14
22	08:13	07:15	06:08	06:52 (23)	05:53	04:55
	16:27	17:29	18:24	16 06:48 (23)	20:22	21:15
23	08:11	07:13	06:05	06:51 (23)	05:50	04:53
	16:29	17:31	18:25	17 06:48 (23)	20:24	21:17
24	08:10	07:11	06:03	06:51 (23)	05:48	04:52
	16:31	17:33	18:27	17 06:48 (23)	20:26	21:19
25	08:08	07:08	06:00	06:50 (23)	05:46	04:50
	16:33	17:35	18:29	17 06:47 (23)	20:28	21:20
26	08:07	07:06	05:58	06:50 (23)	05:44	04:49
	16:34	17:37	18:31	17 06:47 (23)	20:29	21:21
27	08:05	07:04	05:55	06:50 (23)	05:41	04:48
	16:36	17:39	18:33	16 06:46 (23)	20:31	21:23
28	08:04	07:01	05:53	06:51 (23)	05:39	04:47
	16:38	17:41	18:35	14 06:45 (23)	20:33	21:24
29	08:02		06:50	07:32 (23)	05:37	04:46
	16:40		19:37	11 07:43 (23)	20:35	21:26
30	08:01		06:48	07:35 (23)	05:35	04:44
	16:42		19:39	5 07:40 (23)	20:37	21:27
31	07:59		06:45			04:43
	16:44		19:41			21:28
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung		141	393			
Red.Sonnenscheinwahrsch.		0.24	0.31			
Reduktion Betriebsdauer		0.90	0.90			
Reduktion Windrichtung		0.62	0.65			
Gesamte Reduktion		0.13	0.18			
Met.wahrsch.Beschattung		19	72			

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: E - IO5  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	07:08	07:35 (1)   07:07	07:39 (16)   08:03
	21:45	21:09	20:01	18:47	9 07:44 (1)   16:35	16 07:55 (16)   15:50
2	04:39	05:20	06:16	07:10	07:37 (1)   07:09	07:39 (16)   08:05
	21:44	21:07	19:59	18:44	6 07:43 (1)   16:33	15 07:54 (16)   15:49
3	04:40	05:22	06:18	07:12	08:01 (19)   07:11	07:42 (16)   08:06
	21:44	21:05	19:56	18:42	1 08:02 (19)   16:31	12 07:54 (16)   15:48
4	04:40	05:24	06:19	07:14	07:56 (19)   07:13	07:44 (16)   08:08
	21:43	21:03	19:54	18:39	9 08:05 (19)   16:29	9 07:53 (16)   15:48
5	04:41	05:26	06:21	07:16	07:54 (19)   07:15	07:46 (16)   08:09
	21:43	21:01	19:51	18:37	13 08:07 (19)   16:27	6 07:52 (16)   15:47
6	04:42	05:27	06:23	07:17	07:53 (19)   07:17	08:11
	21:42	20:59	19:49	18:34	15 08:08 (19)   16:25	15:46
7	04:43	05:29	06:25	07:19	07:52 (19)   07:19	08:12
	21:42	20:57	19:46	18:32	16 08:08 (19)   16:23	15:46
8	04:44	05:31	06:27	07:21	07:52 (19)   07:21	08:13
	21:41	20:55	19:44	18:29	16 08:08 (19)   16:21	15:45
9	04:45	05:33	06:28	07:23	07:52 (19)   07:23	08:15
	21:40	20:53	19:42	18:27	16 08:08 (19)   16:20	15:45
10	04:46	05:34	06:30	07:25	07:52 (19)   07:25	08:16
	21:39	20:51	19:39	18:25	15 08:07 (19)   16:18	15:45
11	04:48	05:36	06:32	07:27	07:54 (19)   07:27	08:17
	21:38	20:49	19:37	18:22	12 08:06 (19)   16:16	15:45
12	04:49	05:38	06:34	07:29	07:56 (19)   07:29	08:18
	21:37	20:47	19:34	18:20	8 08:04 (19)   16:14	15:44
13	04:50	05:40	06:36	07:31	07:58 (19)   07:31	08:19
	21:36	20:45	19:32	18:17	4 08:02 (19)   16:13	15:44
14	04:51	05:42	06:37	07:32	07:33	08:20
	21:35	20:43	19:29	18:15	16:11	15:44
15	04:53	05:43	06:39	07:34	07:35	08:21
	21:34	20:41	19:27	18:13	16:09	15:44
16	04:54	05:45	06:41	07:36	07:37	08:22
	21:33	20:38	19:24	18:10	16:08	15:44
17	04:55	05:47	06:43	07:38	07:39	08:23
	21:32	20:36	19:22	18:08	16:06	15:44
18	04:57	05:49	06:45	07:40	07:40	08:24
	21:31	20:34	19:19	18:06	16:05	15:45
19	04:58	05:51	06:46	07:42	07:42	08:24
	21:29	20:32	19:17	18:03	16:03	15:45
20	05:00	05:52	06:48	07:44	07:44	08:25
	21:28	20:29	19:14	18:01	16:02	15:45
21	05:01	05:54	06:50	07:46	07:46	08:26
	21:27	20:27	19:12	17:59	16:01	15:46
22	05:03	05:56	06:52	07:48	07:48	08:26
	21:25	20:25	19:09	17:56	15:59	15:46
23	05:04	05:58	06:54	07:50	07:50	08:27
	21:24	20:23	19:07	17:54	15:58	15:47
24	05:06	06:00	06:55	07:52	07:51	08:27
	21:22	20:20	19:04	17:52	15:57	15:47
25	05:07	06:01	06:57	07:54	07:53	08:28
	21:21	20:18	19:01	16:50	15:56	15:48
26	05:09	06:03	06:59	07:56	07:55	08:28
	21:19	20:16	18:59	16:48	9 07:51 (16)   15:55	15:49
27	05:10	06:05	07:01	07:58	07:57	08:28
	21:17	20:13	18:56	16:45	13 07:54 (16)   15:54	15:49
28	05:12	06:07	07:03	07:59	07:58	08:28
	21:16	20:11	18:54	16:43	14 07:54 (16)   15:53	15:50
29	05:14	06:09	07:04	07:01	07:40 (16)   08:00	08:28
	21:14	20:08	18:52	16:41	15 07:55 (16)   15:52	15:51
30	05:15	06:10	07:06	07:03	07:39 (16)   08:02	08:28
	21:12	20:06	18:49	16:39	16 07:55 (16)   15:51	15:52
31	05:17	06:12		07:05	07:39 (16)	08:28
	21:11	20:04		16:37	16 07:55 (16)	15:53
Sonnenscheinstunden	515	461	383	328	257	231
astr.max.mögl.Beschattung			264	223	58	
Red.Sonnenscheinwahrsch.			0.40	0.33	0.21	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.66	0.63	0.62	
Gesamte Reduktion			0.24	0.19	0.12	
Met.wahrsch.Beschattung			63	42	7	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	07:24 (19)	06:43	05:33
	15:54	16:46	17:43	8 07:32 (19)	19:42	20:39
2	08:28	07:56	06:57	07:21 (19)	06:40	05:31
	15:55	16:48	17:45	11 07:32 (19)	19:44	20:41
3	08:28	07:54	06:54	07:19 (19)	06:38	05:29
	15:57	16:50	17:47	14 07:33 (19)	19:46	20:42
4	08:28	07:52	06:52	07:17 (19)	06:36	05:27
	15:58	16:52	17:49	16 07:33 (19)	19:48	20:44
5	08:27	07:50	06:49	07:18 (19)	06:33	05:25
	15:59	16:54	17:51	15 07:33 (19)	19:50	20:46
6	08:27	07:48	06:47	07:18 (19)	06:31	05:23
	16:01	16:57	4 08:16 (16)	17:53	15 07:33 (19)	19:52
7	08:26	07:46	08:14 (16)	06:45	07:18 (19)	06:28
	16:02	16:59	8 08:22 (16)	17:55	13 07:31 (19)	19:54
8	08:26	07:45	08:12 (16)	06:42	07:20 (19)	06:26
	16:03	17:01	11 08:23 (16)	17:57	10 07:30 (19)	19:56
9	08:25	07:43	08:09 (16)	06:40	07:21 (19)	06:23
	16:05	17:03	14 08:23 (16)	17:59	6 07:27 (19)	19:57
10	08:25	07:41	08:08 (16)	06:37	07:02 (1)	06:21
	16:06	17:05	15 08:23 (16)	18:01	3 07:05 (1)	19:59
11	08:24	07:39	08:08 (16)	06:35	06:59 (1)	06:18
	16:08	17:07	16 08:24 (16)	18:03	7 07:06 (1)	20:01
12	08:23	07:37	08:09 (16)	06:33	06:57 (1)	06:16
	16:09	17:09	15 08:24 (16)	18:04	10 07:07 (1)	20:03
13	08:22	07:35	08:09 (16)	06:30	06:54 (1)	06:14
	16:11	17:11	15 08:24 (16)	18:06	13 07:07 (1)	20:05
14	08:21	07:32	08:10 (16)	06:28	06:52 (1)	06:11
	16:13	17:13	13 08:23 (16)	18:08	16 07:08 (1)	20:07
15	08:20	07:30	08:10 (16)	06:25	06:51 (1)	06:09
	16:14	17:15	11 08:21 (16)	18:10	16 07:07 (1)	20:09
16	08:20	07:28	08:13 (16)	06:23	06:52 (1)	06:07
	16:16	17:17	6 08:19 (16)	18:12	15 07:07 (1)	20:11
17	08:18	07:26	06:20	06:20	06:51 (1)	06:04
	16:18	17:19	18:14	14 07:05 (1)	20:13	21:07
18	08:17	07:24	06:18	06:18	06:42 (23)	06:02
	16:20	17:21	18:16	16 07:04 (1)	20:14	21:09
19	08:16	07:22	06:15	06:15	06:39 (23)	06:00
	16:21	17:23	18:18	17 07:01 (1)	20:16	21:11
20	08:15	07:20	06:13	06:13	06:37 (23)	05:57
	16:23	17:25	18:20	13 06:50 (23)	20:18	21:12
21	08:14	07:17	06:10	06:10	06:34 (23)	05:55
	16:25	17:27	18:22	16 06:50 (23)	20:20	21:14
22	08:13	07:15	06:08	06:08	06:34 (23)	05:53
	16:27	17:29	18:24	17 06:51 (23)	20:22	21:15
23	08:11	07:13	06:05	06:33 (23)	05:50	04:53
	16:29	17:31	18:25	17 06:50 (23)	20:24	21:17
24	08:10	07:11	06:03	06:34 (23)	05:48	04:52
	16:31	17:33	18:27	16 06:50 (23)	20:26	21:19
25	08:08	07:08	06:00	06:33 (23)	05:46	04:50
	16:33	17:35	18:29	16 06:49 (23)	20:28	21:20
26	08:07	07:06	05:58	06:34 (23)	05:44	04:49
	16:34	17:37	18:31	14 06:48 (23)	20:29	21:21
27	08:05	07:04	05:55	06:35 (23)	05:41	04:48
	16:36	17:39	18:33	11 06:46 (23)	20:31	21:23
28	08:04	07:01	05:53	06:38 (23)	05:39	04:47
	16:38	17:41	4 07:26 (19)	18:35	5 06:43 (23)	20:33
29	08:02	06:50	06:50	06:50	05:37	04:46
	16:40	19:37	20:35	21:26	21:45	
30	08:01	06:48	06:48	06:48	05:35	04:44
	16:42	19:39	20:37	21:27	21:45	
31	07:59	06:45	06:45	06:45	05:33	04:43
	16:44	19:41	20:39	21:28	21:45	
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung		132	360			
Red.Sonnenscheinwahrsch.		0.24	0.31			
Reduktion Betriebsdauer		0.90	0.90			
Reduktion Windrichtung		0.62	0.65			
Gesamte Reduktion		0.13	0.18			
Met.wahrsch.Beschattung		18	66			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	05:19	06:14	07:08	07:35 (1)   07:07	07:38 (16)   08:03	
	21:45	21:09	20:01	18:47	11 07:46 (1)   16:35	15 07:53 (16)   15:50	
2	04:39	05:20	06:16	07:10	07:37 (1)   07:09	07:39 (16)   08:05	
	21:44	21:07	19:59	18:44	8 07:45 (1)   16:33	13 07:52 (16)   15:49	
3	04:40	05:22	06:18	07:12	07:39 (1)   07:11	07:42 (16)   08:06	
	21:44	21:05	19:56	18:42	5 07:44 (1)   16:31	11 07:53 (16)   15:48	
4	04:40	05:24	06:19	07:14	07:13	07:44 (16)   08:08	
	21:43	21:03	19:54	18:39	16:29	7 07:51 (16)   15:48	
5	04:41	05:26	06:21	07:16	07:57 (19)   07:15	07:46 (16)   08:09	
	21:43	21:01	19:51	18:37	9 08:06 (19)   16:27	4 07:50 (16)   15:47	
6	04:42	05:27	06:23	07:17	07:55 (19)   07:17	08:11	08:11
	21:42	20:59	19:49	18:34	12 08:07 (19)   16:25	15:46	15:46
7	04:43	05:29	06:25	07:19	07:54 (19)   07:19	08:12	08:12
	21:42	20:57	19:46	18:32	14 08:08 (19)   16:23	15:46	15:46
8	04:44	05:31	06:27	07:21	07:53 (19)   07:21	08:13	08:13
	21:41	20:55	19:44	18:29	15 08:08 (19)   16:21	15:45	15:45
9	04:45	05:33	06:28	07:23	07:53 (19)   07:23	08:15	08:15
	21:40	20:53	19:42	18:27	15 08:08 (19)   16:20	15:45	15:45
10	04:46	05:34	06:30	07:25	07:53 (19)   07:25	08:16	08:16
	21:39	20:51	19:39	18:25	15 08:08 (19)   16:18	15:45	15:45
11	04:48	05:36	06:32	07:27	07:54 (19)   07:27	08:17	08:17
	21:38	20:49	19:37	18:22	13 08:07 (19)   16:16	15:45	15:45
12	04:49	05:38	06:34	07:29	07:56 (19)   07:29	08:18	08:18
	21:37	20:47	19:34	18:20	10 08:06 (19)   16:14	15:44	15:44
13	04:50	05:40	06:36	07:31	07:58 (19)   07:31	08:19	08:19
	21:36	20:45	19:32	18:17	6 08:04 (19)   16:13	15:44	15:44
14	04:51	05:42	06:37	07:32	08:00 (19)   07:33	08:20	08:20
	21:35	20:43	19:29	18:15	1 08:01 (19)   16:11	15:44	15:44
15	04:53	05:43	06:39	07:28 (23)   07:34	07:35	08:21	08:21
	21:34	20:41	19:27	3 07:31 (23)   18:13	16:09	15:44	15:44
16	04:54	05:45	06:41	07:25 (23)   07:36	07:37	08:22	08:22
	21:33	20:38	19:24	10 07:35 (23)   18:10	16:08	15:44	15:44
17	04:55	05:47	06:43	07:22 (23)   07:38	07:39	08:23	08:23
	21:32	20:36	19:22	13 07:35 (23)   18:08	16:06	15:44	15:44
18	04:57	05:49	06:45	07:21 (23)   07:40	07:40	08:24	08:24
	21:31	20:34	19:19	15 07:36 (23)   18:06	16:05	15:45	15:45
19	04:58	05:51	06:46	07:20 (23)   07:42	07:42	08:24	08:24
	21:29	20:32	19:17	16 07:36 (23)   18:03	16:03	15:45	15:45
20	05:00	05:52	06:48	07:20 (23)   07:44	07:44	08:25	08:25
	21:28	20:29	19:14	17 07:37 (23)   18:01	16:02	15:45	15:45
21	05:01	05:54	06:50	07:20 (23)   07:46	07:46	08:26	08:26
	21:27	20:27	19:12	16 07:36 (23)   17:59	16:01	15:46	15:46
22	05:03	05:56	06:52	07:19 (23)   07:48	07:48	08:26	08:26
	21:25	20:25	19:09	16 07:35 (23)   17:56	15:59	15:46	15:46
23	05:04	05:58	06:54	07:20 (23)   07:50	07:50	08:27	08:27
	21:24	20:23	19:07	14 07:34 (23)   17:54	15:58	15:47	15:47
24	05:06	06:00	06:55	07:22 (23)   07:52	07:51	08:27	08:27
	21:22	20:20	19:04	16 07:44 (1)   17:52	15:57	15:47	15:47
25	05:07	06:01	06:57	07:24 (23)   06:54	07:53	08:28	08:28
	21:21	20:18	19:01	17 07:46 (1)   16:50	15:56	15:48	15:48
26	05:09	06:03	06:59	07:35 (1)   06:56	07:42 (16)   07:55	08:28	08:28
	21:19	20:16	18:59	13 07:48 (1)   16:48	7 07:49 (16)   15:55	15:49	15:49
27	05:10	06:05	07:01	07:33 (1)   06:58	07:41 (16)   07:57	08:28	08:28
	21:17	20:13	18:56	14 07:47 (1)   16:45	11 07:52 (16)   15:54	15:49	15:49
28	05:12	06:07	07:03	07:32 (1)   06:59	07:39 (16)   07:58	08:28	08:28
	21:16	20:11	18:54	16 07:48 (1)   16:43	14 07:53 (16)   15:53	15:50	15:50
29	05:14	06:09	07:04	07:32 (1)   07:01	07:39 (16)   08:00	08:28	08:28
	21:14	20:08	18:52	16 07:48 (1)   16:41	14 07:53 (16)   15:52	15:51	15:51
30	05:15	06:10	07:06	07:33 (1)   07:03	07:38 (16)   08:02	08:28	08:28
	21:12	20:06	18:49	14 07:47 (1)   16:39	15 07:53 (16)   15:51	15:52	15:52
31	05:17	06:12	07:05	07:35	07:38 (16)	08:28	08:28
	21:11	20:04	18:37	15 07:53 (16)	15:53	15:53	15:53
Sonneneinstrahlung	515	461	383	328	257	231	
astr.max.mögl.Beschattung			226	210	50		
Red.Sonneneinstrahlung			0.40	0.33	0.21		
Reduktion Betriebsdauer			0.90	0.90	0.90		
Reduktion Windrichtung			0.66	0.63	0.62		
Gesamte Reduktion			0.24	0.19	0.12		
Met.wahrsch.Beschattung			54	39	6		

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: G - IO7

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	07:24 (19)	06:43	05:33
	15:54	16:46	17:43	2 07:26 (19)	19:42	20:39
2	08:28	07:56	06:57	07:21 (19)	06:40	05:31
	15:55	16:48	17:45	7 07:28 (19)	19:44	20:41
3	08:28	07:54	06:54	07:19 (19)	06:38	05:29
	15:57	16:50	17:47	10 07:29 (19)	19:46	20:42
4	08:28	07:52	06:52	07:16 (19)	06:36	05:27
	15:58	16:52	17:49	13 07:29 (19)	19:48	20:44
5	08:27	07:50	06:49	07:15 (19)	06:33	05:25
	15:59	16:54	17:51	15 07:30 (19)	19:50	20:46
6	08:27	07:48	06:47	07:15 (19)	06:31	05:23
	16:01	16:57	17:53	15 07:30 (19)	19:52	20:48
7	08:26	07:46	06:45	07:15 (19)	06:28	05:21
	16:02	16:59	1 08:15 (16)	14 07:29 (19)	19:54	20:50
8	08:26	07:45	06:42	07:16 (19)	06:26	05:19
	16:03	17:01	6 08:18 (16)	13 07:29 (19)	19:56	20:52
9	08:25	07:43	06:40	07:16 (19)	06:23	05:17
	16:05	17:03	9 08:18 (16)	11 07:27 (19)	19:57	20:53
10	08:25	07:41	06:37	07:19 (19)	06:21	05:15
	16:06	17:05	12 08:19 (16)	6 07:25 (19)	19:59	20:55
11	08:24	07:39	06:35	06:59 (1)	06:18	05:13
	16:08	17:07	15 08:20 (16)	3 07:02 (1)	20:01	20:57
12	08:23	07:37	06:33	06:57 (1)	06:16	05:11
	16:09	17:09	15 08:20 (16)	7 07:04 (1)	20:03	20:59
13	08:22	07:35	06:30	06:54 (1)	06:14	05:09
	16:11	17:11	15 08:20 (16)	10 07:04 (1)	20:05	21:00
14	08:21	07:32	06:28	06:52 (1)	06:11	05:08
	16:13	17:13	14 08:20 (16)	13 07:05 (1)	20:07	21:02
15	08:20	07:30	06:25	06:49 (1)	06:09	05:06
	16:14	17:15	14 08:19 (16)	16 07:05 (1)	20:09	21:04
16	08:20	07:28	06:23	06:49 (1)	06:07	05:04
	16:16	17:17	11 08:18 (16)	16 07:05 (1)	20:11	21:06
17	08:18	07:26	06:20	06:49 (1)	06:04	05:02
	16:18	17:19	8 08:16 (16)	15 07:04 (1)	20:13	21:07
18	08:17	07:24	06:18	06:50 (1)	06:02	05:01
	16:20	17:21	18:16	13 07:03 (1)	20:14	21:09
19	08:16	07:22	06:15	06:39 (23)	06:00	04:59
	16:21	17:23	18:18	15 07:01 (1)	20:16	21:11
20	08:15	07:20	06:13	06:37 (23)	05:57	04:58
	16:23	17:25	18:20	13 06:58 (1)	20:18	21:12
21	08:14	07:17	06:10	06:34 (23)	05:55	04:56
	16:25	17:27	18:22	13 06:47 (23)	20:20	21:14
22	08:13	07:15	06:08	06:32 (23)	05:53	04:55
	16:27	17:29	18:24	16 06:48 (23)	20:22	21:15
23	08:11	07:13	06:05	06:31 (23)	05:50	04:53
	16:29	17:31	18:25	16 06:47 (23)	20:24	21:17
24	08:10	07:11	06:03	06:31 (23)	05:48	04:52
	16:31	17:33	18:27	17 06:48 (23)	20:26	21:19
25	08:08	07:08	06:00	06:31 (23)	05:46	04:50
	16:33	17:35	18:29	16 06:47 (23)	20:28	21:20
26	08:07	07:06	05:58	06:31 (23)	05:44	04:49
	16:34	17:37	18:31	15 06:46 (23)	20:29	21:21
27	08:05	07:04	05:55	06:31 (23)	05:41	04:48
	16:36	17:39	18:33	13 06:44 (23)	20:31	21:23
28	08:04	07:01	05:53	06:33 (23)	05:39	04:47
	16:38	17:41	18:35	10 06:43 (23)	20:33	21:24
29	08:02		06:50		05:37	04:46
	16:40		19:37		20:35	21:26
30	08:01		06:48		05:35	04:44
	16:42		19:39		20:37	21:27
31	07:59		06:45			04:43
	16:44		19:41			21:28
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung		120	343			
Red.Sonnenscheinwahrsch.		0.24	0.31			
Reduktion Betriebsdauer		0.90	0.90			
Reduktion Windrichtung		0.63	0.65			
Gesamte Reduktion		0.13	0.18			
Met.wahrsch.Beschattung		16	63			

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: G - IO7

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember		
1	04:38	05:19	06:14	07:08	07:35 (1)	07:07	07:37 (16)	08:03
	21:45	21:09	20:01	18:47	9 07:44 (1)	16:35	11 07:48 (16)	15:50
2	04:39	05:20	06:16	07:10	07:37 (1)	07:09	07:39 (16)	08:05
	21:44	21:07	19:59	18:44	5 07:42 (1)	16:33	8 07:47 (16)	15:49
3	04:40	05:22	06:18	07:12	07:11	07:11	07:42 (16)	08:06
	21:44	21:05	19:56	18:42	16:31	5 07:47 (16)	15:48	08:08
4	04:40	05:24	06:19	07:14	07:54 (19)	07:13	08:03 (19)	16:29
	21:43	21:03	19:54	18:39	9 08:03 (19)	16:29	15:48	08:09
5	04:41	05:26	06:21	07:16	07:52 (19)	07:15	08:04 (19)	16:27
	21:43	21:01	19:51	18:37	12 08:04 (19)	16:27	15:47	08:11
6	04:42	05:27	06:23	07:17	07:51 (19)	07:17	08:05 (19)	16:25
	21:42	20:59	19:49	18:34	14 08:05 (19)	16:25	15:46	08:12
7	04:43	05:29	06:25	07:19	07:50 (19)	07:19	08:05 (19)	16:23
	21:42	20:57	19:46	18:32	15 08:05 (19)	16:23	15:45	08:13
8	04:44	05:31	06:27	07:21	07:50 (19)	07:21	08:05 (19)	16:21
	21:41	20:55	19:44	18:29	15 08:05 (19)	16:21	15:45	08:15
9	04:45	05:33	06:28	07:23	07:50 (19)	07:23	08:05 (19)	16:20
	21:40	20:53	19:42	18:27	15 08:05 (19)	16:20	15:45	08:16
10	04:46	05:34	06:30	07:25	07:52 (19)	07:25	08:04 (19)	16:18
	21:39	20:51	19:39	18:25	12 08:04 (19)	16:18	15:45	08:17
11	04:48	05:36	06:32	07:27	07:54 (19)	07:27	08:03 (19)	16:16
	21:38	20:49	19:37	18:22	9 08:03 (19)	16:16	15:45	08:18
12	04:49	05:38	06:34	07:29	07:56 (19)	07:29	08:01 (19)	16:14
	21:37	20:47	19:34	18:20	5 08:01 (19)	16:14	15:44	08:19
13	04:50	05:40	06:36	07:31	07:31	07:31	16:13	15:44
	21:36	20:45	19:32	18:17	07:32	07:33	16:11	15:44
14	04:51	05:42	06:37	07:32	18:15	16:11	07:35	16:09
	21:35	20:43	19:29	18:15	9 07:32 (23)	18:13	07:37	16:08
15	04:53	05:43	06:39	07:23 (23)	07:34	16:09	15:44	08:22
	21:34	20:41	19:27	18:13	07:21 (23)	07:36	16:08	15:44
16	04:54	05:45	06:41	07:21 (23)	07:36	16:08	15:44	08:23
	21:33	20:38	19:24	18:10	12 07:33 (23)	18:10	16:06	15:44
17	04:55	05:47	06:43	07:19 (23)	07:38	16:06	15:44	08:24
	21:32	20:36	19:22	18:08	14 07:33 (23)	18:08	16:05	15:45
18	04:57	05:49	06:45	07:18 (23)	07:40	16:05	15:45	08:24
	21:31	20:34	19:19	18:06	16 07:34 (23)	18:06	16:03	15:45
19	04:58	05:51	06:46	07:18 (23)	07:42	16:03	15:45	08:25
	21:29	20:32	19:17	18:03	16 07:34 (23)	18:03	16:02	15:45
20	05:00	05:52	06:48	07:18 (23)	07:44	16:01	15:45	08:26
	21:28	20:29	19:14	18:01	16 07:34 (23)	18:01	16:01	15:46
21	05:01	05:54	06:50	07:18 (23)	07:46	16:01	15:46	08:26
	21:27	20:27	19:12	18:00	15 07:33 (23)	17:59	16:01	15:46
22	05:03	05:56	06:52	07:18 (23)	07:48	15:59	15:46	08:26
	21:25	20:25	19:09	17:56	14 07:32 (23)	17:56	15:59	15:47
23	05:04	05:58	06:54	07:20 (23)	07:50	15:58	15:47	08:27
	21:24	20:23	19:07	17:54	10 07:30 (23)	17:54	15:58	15:47
24	05:06	06:00	06:55	07:22 (23)	07:52	15:57	15:47	08:28
	21:22	20:20	19:04	17:52	2 08:41 (16)	07:51	15:57	15:48
25	05:07	06:01	06:57	07:33 (1)	06:54	07:37 (16)	07:53	15:48
	21:21	20:18	19:01	16:50	9 07:45 (1)	16:50	07:46 (16)	15:56
26	05:09	06:03	06:59	07:32 (1)	06:56	07:36 (16)	07:55	15:48
	21:19	20:16	18:59	14 07:46 (1)	16:48	12 07:48 (16)	15:55	15:49
27	05:10	06:05	07:01	07:30 (1)	06:58	07:36 (16)	07:57	15:49
	21:17	20:13	18:56	16 07:46 (1)	16:45	13 07:49 (16)	15:54	15:49
28	05:12	06:07	07:03	07:30 (1)	06:59	07:35 (16)	07:58	15:50
	21:16	20:11	18:54	16 07:46 (1)	16:43	15 07:50 (16)	15:53	15:50
29	05:14	06:09	07:04	07:31 (1)	07:01	07:35 (16)	08:00	15:51
	21:14	20:08	18:52	14 07:45 (1)	16:41	15 07:50 (16)	15:52	15:51
30	05:15	06:10	07:06	07:33 (1)	07:03	07:34 (16)	08:02	15:52
	21:12	20:06	18:49	12 07:45 (1)	16:39	16 07:50 (16)	15:51	15:52
31	05:17	06:12	07:05	07:35 (1)	07:05	07:35 (16)	08:02	15:53
	21:11	20:04	18:48	16:37	14 07:49 (16)	15:51	15:53	231
Sonnenscheinstunden	515	461	383	328	257	216	24	
astr.max.mögl.Beschattung			221	216		0.33	0.21	
Red.Sonnenscheinwahrsch.			0.40	0.33		0.90	0.63	
Reduktion Betriebsdauer			0.90	0.90		0.12	3	
Reduktion Windrichtung			0.66	0.63				
Gesamte Reduktion			0.24	0.19				
Met.wahrsch.Beschattung			52	40				

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28   07:57		06:59	06:43	07:26 (23)   05:33	04:42
	15:54   16:46		17:43	19:42	13 07:39 (23)   20:39	21:30
2	08:28   07:56		06:57	07:21 (19)   06:40	07:28 (23)   05:31	04:41
	15:55   16:48		17:45	6 07:27 (19)   19:44	7 07:35 (23)   20:41	21:31
3	08:28   07:54		06:54	07:19 (19)   06:38		05:29   04:40
	15:57   16:50		17:47	11 07:30 (19)   19:46		20:42   21:32
4	08:28   07:52		06:52	07:16 (19)   06:36		05:27   04:40
	15:58   16:52		17:49	14 07:30 (19)   19:48		20:44   21:33
5	08:27   07:50		06:49	07:15 (19)   06:33		05:25   04:39
	15:59   16:54	2 08:20 (16)   17:51	16 07:31 (19)   19:50			20:46   21:34
6	08:27   07:48	08:16 (16)   06:47	07:14 (19)   06:31			05:23   04:38
	16:01   16:57	7 08:23 (16)   17:53	17 07:31 (19)   19:52			20:48   21:35
7	08:26   07:46	08:14 (16)   06:45	07:14 (19)   06:28			05:21   04:37
	16:02   16:59	11 08:25 (16)   17:55	17 07:31 (19)   19:54			20:50   21:36
8	08:26   07:45	08:12 (16)   06:42	07:15 (19)   06:26			05:19   04:37
	16:03   17:01	14 08:26 (16)   17:57	16 07:31 (19)   19:56			20:52   21:37
9	08:25   07:43	08:10 (16)   06:40	07:14 (19)   06:23			05:17   04:36
	16:05   17:03	16 08:26 (16)   17:59	16 07:30 (19)   19:57			20:53   21:38
10	08:25   07:41	08:10 (16)   06:37	07:15 (19)   06:21			05:15   04:36
	16:06   17:05	17 08:27 (16)   18:01	14 07:29 (19)   19:59			20:55   21:39
11	08:24   07:39	08:10 (16)   06:35	07:16 (19)   06:18			05:13   04:35
	16:08   17:07	17 08:27 (16)   18:03	11 07:27 (19)   20:01			20:57   21:40
12	08:23   07:37	08:10 (16)   06:33	06:57 (1)   06:16			05:11   04:35
	16:09   17:09	17 08:27 (16)   18:04	7 07:24 (19)   20:03			20:59   21:41
13	08:22   07:34	08:11 (16)   06:30	06:54 (1)   06:14			05:09   04:34
	16:11   17:11	16 08:27 (16)   18:06	7 07:01 (1)   20:05			21:00   21:42
14	08:21   07:32	08:11 (16)   06:28	06:52 (1)   06:11			05:08   04:34
	16:13   17:13	16 08:27 (16)   18:08	11 07:03 (1)   20:07			21:02   21:42
15	08:20   07:30	08:11 (16)   06:25	06:49 (1)   06:09			05:06   04:34
	16:14   17:15	14 08:25 (16)   18:10	14 07:03 (1)   20:09			21:04   21:43
16	08:19   07:28	08:13 (16)   06:23	06:47 (1)   06:07			05:04   04:34
	16:16   17:17	11 08:24 (16)   18:12	17 07:04 (1)   20:11			21:06   21:43
17	08:18   07:26	08:16 (16)   06:20	06:46 (1)   06:04			05:02   04:34
	16:18   17:19	6 08:22 (16)   18:14	17 07:03 (1)   20:13			21:07   21:44
18	08:17   07:24	06:18	06:46 (1)   06:02			05:01   04:34
	16:20   17:21	18:16	17 07:03 (1)   20:14			21:09   21:44
19	08:16   07:22	06:15	06:46 (1)   05:59			04:59   04:34
	16:21   17:23	18:18	16 07:02 (1)   20:16			21:11   21:45
20	08:15   07:20	06:13	06:47 (1)   05:57			04:58   04:34
	16:23   17:25	18:20	15 07:02 (1)   20:18			21:12   21:45
21	08:14   07:17	06:10	06:47 (1)   05:55			04:56   04:34
	16:25   17:27	18:22	13 07:00 (1)   20:20			21:14   21:45
22	08:12   07:15	06:08	06:33 (23)   05:53			04:55   04:34
	16:27   17:29	18:24	15 06:58 (1)   20:22			21:15   21:45
23	08:11   07:13	06:05	06:29 (23)   05:50			04:53   04:34
	16:29   17:31	18:25	12 06:41 (23)   20:24			21:17   21:46
24	08:10   07:11	06:03	06:28 (23)   05:48			04:52   04:34
	16:31   17:33	18:27	15 06:43 (23)   20:26			21:19   21:46
25	08:08   07:08	06:00	06:26 (23)   05:46			04:50   04:35
	16:33   17:35	18:29	17 06:43 (23)   20:28			21:20   21:46
26	08:07   07:06	05:58	06:26 (23)   05:44			04:49   04:35
	16:34   17:37	18:31	17 06:43 (23)   20:29			21:21   21:46
27	08:05   07:04	05:55	06:24 (23)   05:41			04:48   04:36
	16:36   17:39	18:33	19 06:43 (23)   20:31			21:23   21:46
28	08:04   07:01	05:53	06:25 (23)   05:39			04:47   04:36
	16:38   17:41	18:35	18 06:43 (23)   20:33			21:24   21:45
29	08:02	06:50	07:24 (23)   05:37			04:46   04:37
	16:40	19:37	18 07:42 (23)   20:35			21:26   21:45
30	08:01	06:48	07:25 (23)   05:35			04:44   04:37
	16:42	19:39	17 07:42 (23)   20:37			21:27   21:45
31	07:59	06:45	07:25 (23)			04:43
	16:44	19:41	15 07:40 (23)			21:28
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung		164	435	20		
Red.Sonnenscheinwahrsch.		0.24	0.31	0.41		
Reduktion Betriebsdauer		0.90	0.90	0.90		
Reduktion Windrichtung		0.62	0.65	0.67		
Gesamte Reduktion		0.13	0.18	0.25		
Met.wahrsch.Beschattung		22	80	5		

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	07:08	07:35 (1)   07:07	07:40 (16)   08:03
	21:45	21:09	20:01	18:47	4 07:39 (1)   16:35	16 07:56 (16)   15:50
2	04:39	05:20	06:16	07:10	07:56 (19)   07:09	07:40 (16)   08:05
	21:44	21:07	19:59	18:44	9 08:05 (19)   16:33	16 07:56 (16)   15:49
3	04:40	05:22	06:18	07:12	07:54 (19)   07:11	07:41 (16)   08:06
	21:44	21:05	19:56	18:42	13 08:07 (19)   16:31	14 07:55 (16)   15:48
4	04:40	05:24	06:19	07:14	07:52 (19)   07:13	07:44 (16)   08:08
	21:43	21:03	19:54	18:39	14 08:06 (19)   16:29	11 07:55 (16)   15:48
5	04:41	05:26	06:21	07:16	07:51 (19)   07:15	07:46 (16)   08:09
	21:43	21:01	19:51	18:37	16 08:07 (19)   16:27	7 07:53 (16)   15:47
6	04:42	05:27	06:23	07:17	07:50 (19)   07:17	07:48 (16)   08:11
	21:42	20:59	19:49	18:34	17 08:07 (19)   16:25	1 07:49 (16)   15:46
7	04:43	05:29	06:25	07:19	07:50 (19)   07:19	08:12
	21:42	20:57	19:46	18:32	17 08:07 (19)   16:23	15:46
8	04:44	05:31	06:27	07:21	07:50 (19)   07:21	08:13
	21:41	20:55	19:44	18:29	16 08:06 (19)   16:21	15:45
9	04:45	05:33	06:28	07:23	07:50 (19)   07:23	08:15
	21:40	20:53	19:42	18:27	16 08:06 (19)   16:20	15:45
10	04:46	05:34	06:30	07:25	07:52 (19)   07:25	08:16
	21:39	20:51	19:39	7 07:28 (23)   18:24	12 08:04 (19)   16:18	15:45
11	04:48	05:36	06:32	07:19 (23)   07:27	07:54 (19)   07:27	08:17
	21:38	20:49	19:37	12 07:31 (23)   18:22	9 08:03 (19)   16:16	15:45
12	04:49	05:38	06:34	07:17 (23)   07:29	07:56 (19)   07:29	08:18
	21:37	20:47	19:34	15 07:32 (23)   18:20	3 07:59 (19)   16:14	15:44
13	04:50	05:40	06:36	07:15 (23)   07:30	07:31	08:19
	21:36	20:45	19:32	17 07:32 (23)   18:17	16:13	15:44
14	04:51	05:42	06:37	07:14 (23)   07:32	07:33	08:20
	21:35	20:43	19:29	18 07:32 (23)   18:15	16:11	15:44
15	04:53	05:43	06:39	07:14 (23)   07:34	07:35	08:21
	21:34	20:41	19:27	18 07:32 (23)   18:13	16:09	15:44
16	04:54	05:45	06:41	07:14 (23)   07:36	07:37	08:22
	21:33	20:38	19:24	18 07:32 (23)   18:10	16:08	15:44
17	04:55	05:47	06:43	07:13 (23)   07:38	07:39	08:23
	21:32	20:36	19:22	18 07:31 (23)   18:08	16:06	15:44
18	04:57	05:49	06:45	07:13 (23)   07:40	07:40	08:24
	21:31	20:34	19:19	17 07:30 (23)   18:06	16:05	15:45
19	04:58	05:51	06:46	07:14 (23)   07:42	07:42	08:24
	21:29	20:32	19:17	15 07:29 (23)   18:03	16:03	15:45
20	05:00	05:52	06:48	07:15 (23)   07:44	07:44	08:25
	21:28	20:29	19:14	13 07:28 (23)   18:01	16:02	15:45
21	05:01	05:54	06:50	07:17 (23)   07:46	07:46	08:26
	21:27	20:27	19:12	14 07:42 (1)   17:59	16:01	15:46
22	05:03	05:56	06:52	07:32 (1)   07:48	07:48	08:26
	21:25	20:25	19:09	12 07:44 (1)   17:56	15:59	15:46
23	05:04	05:58	06:54	07:31 (1)   07:50	07:50	08:27
	21:24	20:23	19:06	14 07:45 (1)   17:54	15:58	15:47
24	05:06	06:00	06:55	07:30 (1)   07:52	07:51	08:27
	21:22	20:20	19:04	16 07:46 (1)   17:52	15:57	15:47
25	05:07	06:01	06:57	07:29 (1)   06:54	07:44 (16)   07:53	08:27
	21:21	20:18	19:01	17 07:46 (1)   16:50	8 07:52 (16)   15:56	15:48
26	05:09	06:03	06:59	07:29 (1)   06:56	07:42 (16)   07:55	08:28
	21:19	20:16	18:59	17 07:46 (1)   16:48	12 07:54 (16)   15:55	15:49
27	05:10	06:05	07:01	07:28 (1)   06:57	07:42 (16)   07:57	08:28
	21:17	20:13	18:56	17 07:45 (1)   16:45	14 07:56 (16)   15:54	15:49
28	05:12	06:07	07:03	07:29 (1)   06:59	07:41 (16)   07:58	08:28
	21:16	20:11	18:54	15 07:44 (1)   16:43	15 07:56 (16)   15:53	15:50
29	05:14	06:09	07:04	07:31 (1)   07:01	07:40 (16)   08:00	08:28
	21:14	20:08	18:52	12 07:43 (1)   16:41	17 07:57 (16)   15:52	15:51
30	05:15	06:10	07:06	07:33 (1)   07:03	07:40 (16)   08:02	08:28
	21:12	20:06	18:49	9 07:42 (1)   16:39	17 07:57 (16)   15:51	15:52
31	05:17	06:12	07:05	07:05	07:40 (16)	08:28
	21:10	20:04	18:37	17 07:57 (16)	15:53	
Sonneneinstrahlung	515	461	383	328	257	231
astr.max.mögl.Beschattung			311	246	65	
Red.Sonneneinstrahlung			0.40	0.33	0.21	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.66	0.63	0.62	
Gesamte Reduktion			0.24	0.19	0.12	
Met.wahrsch.Beschattung			74	46	8	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28   07:57		06:59	06:43	07:14 (23)   05:33	04:42		
	15:54   16:46		17:43	19:42	19   07:33 (23)   20:39	21:30		
2	08:28   07:56		06:57	06:40	07:13 (23)   05:31	04:41		
	15:55   16:48		17:45	19:44	19   07:32 (23)   20:41	21:31		
3	08:28   07:54		06:54	06:38	07:14 (23)   05:29	04:40		
	15:57   16:50		17:47	19:46	18   07:32 (23)   20:42	21:32		
4	08:28   07:52		06:52	06:36	07:13 (23)   05:27	04:40		
	15:58   16:52		17:49	19:48	17   07:30 (23)   20:44	21:33		
5	08:27   07:50		06:49	06:33	07:15 (23)   05:25	04:39		
	15:59   16:54	2	08:20 (18)   17:51	19:50	14   07:29 (23)   20:46	21:34		
6	08:27   07:48		06:47	06:31	07:16 (23)   05:23	04:38		
	16:01   16:57	6	08:22 (18)   17:53	9	07:20 (19)   19:52	12	07:28 (23)   20:48	21:35
7	08:26   07:46		06:45	06:28	07:09 (19)   06:28	07:18 (23)   05:21	04:37	
	16:02   16:59	9	08:23 (18)   17:55	13	07:22 (19)   19:54	6	07:24 (23)   20:50	21:36
8	08:26   07:44		06:42	06:26	07:08 (19)   06:26	05:19	04:37	
	16:03   17:01	12	08:24 (18)   17:57	15	07:23 (19)   19:56	20:52	21:37	
9	08:25   07:43		06:40	06:23	07:06 (19)   06:23	05:17	04:36	
	16:05   17:03	14	08:23 (18)   17:59	17	07:23 (19)   19:57	20:53	21:38	
10	08:25   07:41		06:37	06:21	07:06 (19)   06:21	05:15	04:36	
	16:06   17:05	17	08:24 (18)   18:01	18	07:24 (19)   19:59	20:55	21:39	
11	08:24   07:39		06:35	06:18	07:06 (19)   06:18	05:13	04:35	
	16:08   17:07	18	08:23 (18)   18:03	17	07:23 (19)   20:01	20:57	21:40	
12	08:23   07:37		06:33	06:16	07:06 (19)   06:16	05:11	04:35	
	16:09   17:09	18	08:23 (18)   18:04	17	07:23 (19)   20:03	20:59	21:41	
13	08:22   07:34		06:30	06:14	07:06 (19)   06:14	05:09	04:34	
	16:11   17:11	18	08:22 (18)   18:06	15	07:21 (19)   20:05	21:00	21:42	
14	08:21   07:32		06:28	06:11	07:07 (19)   06:11	05:08	04:34	
	16:13   17:13	18	08:22 (16)   18:08	13	07:20 (19)   20:07	21:02	21:42	
15	08:20   07:30		06:25	06:09	06:49 (1)   06:09	05:06	04:34	
	16:14   17:15	17	08:21 (16)   18:10	12	07:18 (19)   20:09	21:04	21:43	
16	08:19   07:28		06:23	06:07	06:47 (1)   06:07	05:04	04:34	
	16:16   17:17	17	08:21 (16)   18:12	8	07:14 (19)   20:11	21:06	21:43	
17	08:18   07:26		06:20	06:04	06:44 (1)   06:04	05:02	04:34	
	16:18   17:19	16	08:21 (16)   18:14	11	06:55 (1)   20:13	21:07	21:44	
18	08:17   07:24		06:18	06:02	06:42 (1)   06:02	05:01	04:34	
	16:20   17:21	14	08:20 (16)   18:16	14	06:56 (1)   20:14	21:09	21:44	
19	08:16   07:22		06:15	05:59	06:39 (1)   05:59	04:59	04:34	
	16:21   17:23	12	08:18 (16)   18:18	17	06:56 (1)   20:16	21:11	21:45	
20	08:15   07:20		06:13	05:57	06:39 (1)   05:57	04:58	04:34	
	16:23   17:25	7	08:16 (16)   18:20	17	06:56 (1)   20:18	21:12	21:45	
21	08:14   07:17		06:10	05:55	06:38 (1)   05:55	04:56	04:34	
	16:25   17:27		18:22	18	06:56 (1)   20:20	21:14	21:45	
22	08:12   07:15		06:08	05:53	06:39 (1)   05:53	04:55	04:34	
	16:27   17:29		18:24	17	06:56 (1)   20:22	21:15	21:45	
23	08:11   07:13		06:05	05:50	06:39 (1)   05:50	04:53	04:34	
	16:29   17:31		18:25	15	06:54 (1)   20:24	21:17	21:46	
24	08:10   07:11		06:03	05:48	06:40 (1)   05:48	04:52	04:34	
	16:31   17:33		18:27	13	06:53 (1)   20:26	21:19	21:46	
25	08:08   07:08		06:00	05:46	06:41 (1)   05:46	04:50	04:35	
	16:33   17:35		18:29	10	06:51 (1)   20:28	21:20	21:46	
26	08:07   07:06		05:58	05:44	06:42 (1)   05:44	04:49	04:35	
	16:34   17:37		18:31	20:29	21:21	21:46		
27	08:05   07:04		05:55	05:41	06:19 (23)   05:41	04:48	04:36	
	16:36   17:39		18:33	11	06:30 (23)   20:31	21:23	21:46	
28	08:04   07:01		05:53	05:39	06:18 (23)   05:39	04:47	04:36	
	16:38   17:41		18:35	14	06:32 (23)   20:33	21:24	21:45	
29	08:02   07:00		06:50	05:37	07:16 (23)   05:37	04:46	04:37	
	16:40   17:43		19:37	16	07:32 (23)   20:35	21:26	21:45	
30	08:01   07:00		06:48	05:35	07:15 (23)   05:35	04:44	04:37	
	16:42   17:45		19:39	18	07:33 (23)   20:37	21:27	21:45	
31	07:59   07:00		06:45	05:33	07:14 (23)   05:33	04:43	04:37	
	16:44   17:47		19:41	19	07:33 (23)   20:39	21:28	21:45	
Sonnenscheinstunden	248	272	367	421	496	513		
astr.max.mögl.Beschattung		215	364	105				
Red.Sonnenscheinwahrsch.		0.24	0.31	0.41				
Reduktion Betriebsdauer		0.90	0.90	0.90				
Reduktion Windrichtung		0.62	0.65	0.68				
Gesamte Reduktion		0.13	0.18	0.25				
Met.wahrsch.Beschattung		29	67	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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember						
1	04:38	05:19	06:14	07:08	07:45 (19)	07:07	07:37 (16)	08:03				
	21:45	21:09	20:01	18:47	16	08:01 (19)	16:35	16	07:53 (18)	15:50		
2	04:39	05:20	06:16	07:10	07:45 (19)	07:09	07:39 (18)	08:05				
	21:44	21:07	19:59	18:44	17	08:02 (19)	16:33	14	07:53 (18)	15:49		
3	04:40	05:22	06:18	07:12	07:44 (19)	07:11	07:41 (18)	08:06				
	21:44	21:05	19:56	18:42	18	08:02 (19)	16:31	11	07:52 (18)	15:48		
4	04:40	05:24	06:19	07:14	07:43 (19)	07:13	07:44 (18)	08:08				
	21:43	21:03	19:54	18:39	17	08:00 (19)	16:29	9	07:53 (18)	15:48		
5	04:41	05:26	06:21	07:16 (23)	07:16	07:43 (19)	07:15	07:46 (18)	08:09			
	21:43	21:01	19:51	5	07:21 (23)	18:37	16	07:59 (19)	16:27	6	07:52 (18)	15:47
6	04:42	05:27	06:23	07:11 (23)	07:17	07:44 (19)	07:17	07:48 (18)	08:11			
	21:42	20:59	19:49	12	07:23 (23)	18:34	14	07:58 (19)	16:25	2	07:50 (18)	15:46
7	04:43	05:29	06:25	07:10 (23)	07:19	07:46 (19)	07:19	08:12				
	21:41	20:57	19:46	14	07:24 (23)	18:32	11	07:57 (19)	16:23	15:46		
8	04:44	05:31	06:27	07:09 (23)	07:21	07:48 (19)	07:21	08:13				
	21:41	20:55	19:44	16	07:25 (23)	18:29	6	07:54 (19)	16:21	15:45		
9	04:45	05:33	06:28	07:07 (23)	07:23	07:23	08:15					
	21:40	20:53	19:42	18	07:25 (23)	18:27	16:20	15:45				
10	04:46	05:34	06:30	07:06 (23)	07:25	07:25	08:16					
	21:39	20:51	19:39	19	07:25 (23)	18:24	16:18	15:45				
11	04:48	05:36	06:32	07:06 (23)	07:27	07:27	08:17					
	21:38	20:49	19:37	19	07:25 (23)	18:22	16:16	15:45				
12	04:49	05:38	06:34	07:06 (23)	07:29	07:29	08:18					
	21:37	20:47	19:34	19	07:25 (23)	18:20	16:14	15:44				
13	04:50	05:40	06:36	07:05 (23)	07:30	07:30	08:19					
	21:36	20:45	19:32	18	07:23 (23)	18:17	16:13	15:44				
14	04:51	05:42	06:37	07:06 (23)	07:32	07:32	08:20					
	21:35	20:43	19:29	17	07:23 (23)	18:15	16:11	15:44				
15	04:53	05:43	06:39	07:07 (23)	07:34	07:35	08:21					
	21:34	20:41	19:27	14	07:21 (23)	18:13	16:09	15:44				
16	04:54	05:45	06:41	07:08 (23)	07:36	07:37	08:22					
	21:33	20:38	19:24	12	07:20 (23)	18:10	16:08	15:44				
17	04:55	05:47	06:43	07:11 (23)	07:38	07:39	08:23					
	21:32	20:36	19:22	4	07:15 (23)	18:08	16:06	15:44				
18	04:57	05:49	06:45	07:29 (1)	07:40	07:40	08:24					
	21:31	20:34	19:19	8	07:37 (1)	18:06	16:05	15:45				
19	04:58	05:51	06:46	07:27 (1)	07:42	07:42	08:24					
	21:29	20:32	19:17	12	07:39 (1)	18:03	16:03	15:45				
20	05:00	05:52	06:48	07:25 (1)	07:44	07:44	08:25					
	21:28	20:29	19:14	15	07:40 (1)	18:01	16:02	15:45				
21	05:01	05:54	06:50	07:24 (1)	07:46	07:46	08:26					
	21:27	20:27	19:12	17	07:41 (1)	17:59	16:01	15:46				
22	05:03	05:56	06:52	07:23 (1)	07:48	08:38 (16)	07:48	08:26				
	21:25	20:25	19:09	17	07:40 (1)	17:56	9	08:47 (16)	15:59	15:46		
23	05:04	05:58	06:54	07:23 (1)	07:50	08:36 (16)	07:50	08:27				
	21:24	20:23	19:06	17	07:40 (1)	17:54	13	08:49 (16)	15:58	15:47		
24	05:06	06:00	06:55	07:23 (1)	07:52	08:35 (16)	07:51	08:27				
	21:22	20:20	19:04	17	07:40 (1)	17:52	15	08:50 (16)	15:57	15:47		
25	05:07	06:01	06:57	07:24 (1)	06:54	07:34 (16)	07:53	08:27				
	21:21	20:18	19:01	15	07:39 (1)	16:50	16	07:50 (16)	15:56	15:48		
26	05:09	06:03	06:59	07:26 (1)	06:56	07:33 (16)	07:55	08:28				
	21:19	20:16	18:59	12	07:38 (1)	16:48	18	07:51 (16)	15:55	15:49		
27	05:10	06:05	07:01	07:27 (1)	06:57	07:34 (16)	07:57	08:28				
	21:17	20:13	18:56	9	07:36 (1)	16:45	18	07:52 (16)	15:54	15:49		
28	05:12	06:07	07:03	07:29 (1)	06:59	07:34 (16)	07:58	08:28				
	21:16	20:11	18:54	12	07:58 (19)	16:43	17	07:51 (18)	15:53	15:50		
29	05:14	06:09	07:04	07:47 (19)	07:01	07:34 (16)	08:00	08:28				
	21:14	20:08	18:52	13	08:00 (19)	16:41	18	07:52 (18)	15:52	15:51		
30	05:15	06:10	07:06	07:46 (19)	07:03	07:34 (16)	08:02	08:28				
	21:12	20:06	18:49	15	08:01 (19)	16:39	19	07:53 (18)	15:51	15:52		
31	05:17	06:12	07:05	07:05	07:35 (16)	07:35 (16)	08:28					
	21:10	20:04	16:37	18	07:53 (18)	15:53	15:53					
Sonneneinstunden	515	461	383	328	257	231						
astr.max.mögl.Beschattung			366	276	58							
Red.Sonneneinstunden			0.40	0.33	0.21							
Reduktion Betriebsdauer			0.90	0.90	0.90							
Reduktion Windrichtung			0.66	0.63	0.62							
Gesamte Reduktion			0.24	0.19	0.12							
Met.wahrsch.Beschattung			88	51	7							

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 523 733 981 1.012 1.213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1   08:28	14:05 (20)   07:57	14:09 (20)   06:59	16:50 (19)   06:43	17:22 (1)   05:33	04:42	
15:54	45 15:11 (18)   16:46	40 14:49 (20)   17:43	19 17:09 (19)   19:42	59 19:10 (23)   20:39	21:30	
2   08:28	14:05 (20)   07:55	14:09 (20)   06:56	16:48 (19)   06:40	17:23 (1)   05:31	04:41	
15:55	47 15:12 (18)   16:48	45 16:16 (16)   17:45	22 17:10 (19)   19:44	59 19:11 (23)   20:40	21:31	
3   08:28	14:05 (20)   07:54	14:11 (20)   06:54	16:47 (19)   06:38	17:25 (1)   05:28	04:40	
15:57	48 15:12 (18)   16:50	48 16:19 (16)   17:47	24 17:11 (19)   19:46	56 19:11 (23)   20:42	21:32	
4   08:27	14:05 (20)   07:52	14:12 (20)   06:52	16:46 (19)   06:35	17:26 (1)   05:26	04:40	
15:58	49 15:13 (18)   16:52	50 16:21 (16)   17:49	25 17:11 (19)   19:48	53 19:11 (23)   20:44	21:33	
5   08:27	14:05 (20)   07:50	14:13 (20)   06:49	16:46 (19)   06:33	17:29 (1)   05:24	04:39	
15:59	51 15:14 (18)   16:54	51 16:23 (16)   17:51	25 17:11 (19)   19:50	49 19:11 (23)   20:46	21:34	
6   08:27	14:05 (20)   07:48	14:15 (20)   06:47	16:40 (1)   06:31	17:32 (1)   05:22	04:38	
16:00	53 15:15 (18)   16:56	49 16:24 (16)   17:53	31 17:11 (19)   19:52	42 19:11 (23)   20:48	21:35	
7   08:26	14:05 (20)   07:46	14:16 (20)   06:45	16:36 (1)   06:28	18:46 (23)   05:20	04:37	
16:02	54 15:15 (18)   16:58	48 16:24 (16)   17:55	35 17:11 (19)   19:54	25 19:11 (23)   20:50	21:36	
8   08:26	14:04 (20)   07:44	14:17 (20)   06:42	16:33 (1)   06:26	18:46 (23)   05:18	04:37	
16:03	55 15:15 (18)   17:00	45 16:24 (16)   17:57	37 17:10 (19)   19:55	24 19:10 (23)   20:51	21:37	
9   08:25	14:04 (20)   07:42	14:20 (20)   06:40	16:31 (1)   06:23	18:46 (23)   05:17	04:36	
16:05	57 15:16 (18)   17:03	40 16:24 (16)   17:59	39 17:10 (19)   19:57	23 19:09 (23)   20:53	21:38	
10   08:24	14:04 (20)   07:40	14:23 (20)   06:37	16:28 (1)   06:21	18:47 (23)   05:15	04:36	
16:06	57 15:16 (18)   17:05	35 16:24 (16)   18:00	40 17:08 (19)   19:59	21 19:08 (23)   20:55	21:39	
11   08:24	14:04 (20)   07:38	16:05 (16)   06:35	16:27 (1)   06:18	18:47 (23)   05:13	04:35	
16:08	59 15:17 (18)   17:07	19 16:24 (16)   18:02	41 17:08 (19)   20:01	19 19:06 (23)   20:57	21:40	
12   08:23	14:04 (20)   07:36	16:05 (16)   06:32	16:25 (1)   06:16	18:48 (23)   05:11	04:35	
16:09	59 15:17 (18)   17:09	19 16:24 (16)   18:04	42 17:07 (1)   20:03	17 19:05 (23)   20:55	21:41	
13   08:22	14:04 (20)   07:34	16:06 (16)   06:30	16:24 (1)   06:14	18:50 (23)   05:09	04:34	
16:11	60 15:18 (18)   17:11	18 16:24 (16)   18:06	44 17:08 (1)   20:05	13 19:03 (23)   21:00	21:41	
14   08:21	14:04 (20)   07:32	16:07 (16)   06:27	16:22 (1)   06:11	18:53 (23)   05:07	04:34	
16:13	61 15:18 (18)   17:13	16 16:23 (16)   18:08	46 17:08 (1)   20:07	6 18:59 (23)   21:02	21:42	
15   08:20	14:04 (20)   07:30	16:08 (16)   06:25	16:22 (1)   06:09	18:59 (23)   05:06	04:34	
16:14	61 15:18 (18)   17:15	13 16:21 (16)   18:10	47 17:09 (1)   20:09	19:04 (23)   21:04	21:43	
16   08:19	14:04 (20)   07:28	16:10 (16)   06:23	16:21 (1)   06:06	18:59 (23)   05:04	04:34	
16:16	63 15:19 (18)   17:17	10 16:20 (16)   18:12	48 17:09 (1)   20:11	19:04 (23)   21:05	21:43	
17   08:18	14:05 (20)   07:26	16:20 (1)   06:20	16:20 (1)   06:04	18:59 (23)   05:02	04:33	
16:18	62 15:19 (18)   17:19	18:14	50 17:10 (1)   20:12	19:04 (23)   21:07	21:44	
18   08:17	14:04 (20)   07:24	16:18	16:19 (1)   06:02	18:59 (23)   05:01	04:33	
16:19	63 15:19 (18)   17:21	18:16	51 17:10 (1)   20:14	19:04 (23)   21:09	21:44	
19   08:16	14:05 (20)   07:22	16:15	16:19 (1)   05:59	18:59 (23)   04:59	04:33	
16:21	62 15:19 (18)   17:23	18:18	51 17:10 (1)   20:16	19:04 (23)   21:10	21:45	
20   08:15	14:05 (20)   07:19	16:13	16:18 (1)   05:57	18:59 (23)   04:58	04:34	
16:23	61 15:19 (18)   17:25	18:20	52 17:10 (1)   20:18	19:04 (23)   21:12	21:45	
21   08:14	14:05 (20)   07:17	16:10	16:18 (1)   05:55	18:59 (23)   04:56	04:34	
16:25	60 15:18 (18)   17:27	18:22	52 17:10 (1)   20:20	19:04 (23)   21:14	21:45	
22   08:12	14:05 (20)   07:15	16:08	16:18 (1)   05:52	18:59 (23)   04:55	04:34	
16:27	59 15:18 (18)   17:29	18:23	51 17:09 (1)   20:22	19:04 (23)   21:15	21:45	
23   08:11	14:05 (20)   07:13	16:05	16:18 (1)   05:50	18:59 (23)   04:53	04:34	
16:29	56 15:17 (18)   17:31	18:25	51 17:09 (1)   20:24	19:04 (23)   21:17	21:46	
24   08:10	14:05 (20)   07:10	16:03	16:17 (1)   05:48	18:59 (23)   04:52	04:34	
16:31	52 15:15 (18)   17:33	18:27	51 17:08 (1)   20:26	19:04 (23)   21:18	21:46	
25   08:08	14:06 (20)   07:08	16:00	16:18 (1)   05:46	18:59 (23)   04:50	04:35	
16:32	43 14:49 (20)   17:35	18:29	50 17:08 (1)   20:27	19:04 (23)   21:20	21:46	
26   08:07	14:06 (20)   07:06	15:58	16:18 (1)   05:43	18:59 (23)   04:49	04:35	
16:34	43 14:49 (20)   17:37	18:31	49 17:07 (1)   20:29	19:04 (23)   21:21	21:46	
27   08:05	14:06 (20)   07:04	16:53 (19)   05:55	16:18 (1)   05:41	18:59 (23)   04:48	04:36	
16:36	43 14:49 (20)   17:39	12 17:05 (19)   18:33	49 17:07 (1)   20:31	19:04 (23)   21:23	21:46	
28   08:04	14:07 (20)   07:01	16:51 (19)   05:53	16:18 (1)   05:39	18:59 (23)   04:47	04:36	
16:38	43 14:50 (20)   17:41	16 17:07 (19)   18:35	47 17:05 (1)   20:33	19:04 (23)   21:24	21:45	
29   08:02	14:07 (20)   07:00	16:50	17:19 (1)   05:37	18:59 (23)   04:45	04:37	
16:40	43 14:50 (20)   17:42	19:37	53 19:04 (23)   20:35	19:04 (23)   21:26	21:45	
30   08:01	14:08 (20)   07:00	16:48	17:20 (1)   05:35	18:59 (23)   04:44	04:37	
16:42	41 14:49 (20)   17:43	19:39	58 19:08 (23)   20:37	19:04 (23)   21:27	21:45	
31   07:59	14:08 (20)   07:00	16:45	17:21 (1)   05:34	18:59 (23)   04:43	04:37	
16:44	41 14:49 (20)   17:44	19:40	59 19:09 (23)   20:38	19:04 (23)   21:28	21:45	
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung	1651	574	1339	466		
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41		
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90		
Reduktion Windrichtung	0.67	0.68	0.68	0.68		
Gesamte Reduktion	0.10	0.15	0.19	0.25		
Met.wahrsch.Beschattung	173	84	257	116		

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

## 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38	05:19	06:14	18:47 (23)	07:08	17:04 (1)	07:07	13:52 (20)	08:03	13:46 (20)		
	21:45	21:09	20:01	19:06 (23)	18:46	43	17:47 (1)	16:35	36	15:54 (16)	15:50	59
2	04:39	05:20	06:16	18:45 (23)	07:10		17:05 (1)	07:09		13:49 (20)	08:05	13:47 (20)
	21:44	21:07	19:59	19:06 (23)	18:44	41	17:46 (1)	16:33	41	15:54 (16)	15:49	57
3	04:40	05:22	06:17	18:44 (23)	07:12		17:05 (1)	07:11		13:47 (20)	08:06	13:48 (20)
	21:44	21:05	19:56	19:07 (23)	18:41	41	17:46 (19)	16:31	45	15:54 (16)	15:48	56
4	04:40	05:24	06:19	18:43 (23)	07:14		17:07 (1)	07:13		13:46 (20)	08:08	13:49 (20)
	21:43	21:03	19:54	19:07 (23)	18:39	40	17:47 (19)	16:29	48	15:54 (16)	15:47	56
5	04:41	05:25	06:21	18:42 (23)	07:15		17:09 (1)	07:15		13:44 (20)	08:09	13:50 (20)
	21:43	21:01	19:51	19:07 (23)	18:37	38	17:47 (19)	16:27	49	15:53 (16)	15:47	54
6	04:42	05:27	06:23	17:28 (1)	07:17		17:11 (1)	07:17		13:43 (20)	08:10	13:50 (20)
	21:42	20:59	19:49	19:07 (23)	18:34	36	17:47 (19)	16:25	50	15:52 (16)	15:46	52
7	04:43	05:29	06:25	17:24 (1)	07:19		17:14 (1)	07:19		13:42 (20)	08:12	13:52 (20)
	21:41	20:57	19:46	19:07 (23)	18:32	33	17:47 (19)	16:23	50	15:51 (16)	15:46	51
8	04:44	05:31	06:26	17:22 (1)	07:21		17:18 (1)	07:21		13:41 (20)	08:13	13:52 (20)
	21:41	20:55	19:44	19:06 (23)	18:29	29	17:47 (19)	16:21	47	15:49 (16)	15:45	49
9	04:45	05:33	06:28	17:18 (1)	07:23		17:21 (19)	07:23		13:40 (20)	08:14	13:54 (20)
	21:40	20:53	19:41	19:05 (23)	18:27	25	17:46 (19)	16:20	43	15:46 (16)	15:45	48
10	04:46	05:34	06:30	17:16 (1)	07:25		17:21 (19)	07:25		13:39 (20)	08:16	13:54 (20)
	21:39	20:51	19:39	19:04 (23)	18:24	24	17:45 (19)	16:18	40	14:19 (20)	15:45	47
11	04:48	05:36	06:32	17:15 (1)	07:27		17:22 (19)	07:27		13:40 (20)	08:17	13:55 (20)
	21:38	20:49	19:36	19:03 (23)	18:22	22	17:44 (19)	16:16	41	14:21 (20)	15:44	45
12	04:49	05:38	06:34	17:13 (1)	07:28		17:23 (19)	07:29		13:40 (20)	08:18	13:56 (20)
	21:37	20:47	19:34	19:01 (23)	18:20	20	17:43 (19)	16:14	41	14:21 (20)	15:44	43
13	04:50	05:40	06:35	17:11 (1)	07:30		17:24 (19)	07:31		13:39 (20)	08:19	13:56 (20)
	21:36	20:45	19:31	18:59 (23)	18:17	18	17:42 (19)	16:13	42	14:21 (20)	15:44	43
14	04:51	05:41	06:37	17:10 (1)	07:32		17:25 (19)	07:33		13:39 (20)	08:20	13:57 (20)
	21:35	20:43	19:29	18:55 (23)	18:15	15	17:40 (19)	16:11	43	14:22 (20)	15:44	41
15	04:52	05:43	06:39	17:09 (1)	07:34		17:28 (19)	07:35		13:39 (20)	08:21	13:58 (20)
	21:34	20:40	19:26	17:56 (1)	18:12	8	17:36 (19)	16:09	43	14:22 (20)	15:44	40
16	04:54	05:45	06:41	17:08 (1)	07:36		17:37 (19)	07:37		13:39 (20)	08:22	13:59 (20)
	21:33	20:38	19:24	17:56 (1)	18:10		16:08	43	14:22 (20)	15:44	40	15:02 (18)
17	04:55	05:47	06:43	17:06 (1)	07:38		16:06	43	14:22 (20)	15:44	38	15:02 (18)
	21:32	20:36	19:21	17:55 (1)	18:08		16:06	43	14:22 (20)	15:44	38	15:02 (18)
18	04:57	05:49	06:44	17:05 (1)	07:40		16:05	53	14:49 (18)	15:44	37	15:03 (18)
	21:30	20:34	19:19	17:56 (1)	18:05		16:05	53	14:49 (18)	15:44	37	15:03 (18)
19	04:58	05:50	06:46	17:05 (1)	07:42		16:03	56	14:52 (18)	15:45	37	15:04 (18)
	21:29	20:32	19:16	17:56 (1)	18:03		16:03	56	14:52 (18)	15:45	37	15:04 (18)
20	04:59	05:52	06:48	17:04 (1)	07:44		16:02	59	14:53 (18)	15:45	36	15:03 (18)
	21:28	20:29	19:14	17:56 (1)	18:01		16:02	59	14:53 (18)	15:45	36	15:03 (18)
21	05:01	05:54	06:50	17:03 (1)	07:46		16:01	60	14:54 (18)	15:45	37	15:04 (18)
	21:26	20:27	19:11	17:55 (1)	17:59		16:01	60	14:54 (18)	15:45	37	15:04 (18)
22	05:02	05:56	06:52	17:03 (1)	07:48		16:01	61	14:55 (18)	15:46	37	15:04 (18)
	21:25	20:25	19:09	17:55 (1)	17:56		16:01	61	14:55 (18)	15:46	37	15:04 (18)
23	05:04	05:58	06:53	17:03 (1)	07:50		16:01	61	14:55 (18)	15:46	37	15:04 (18)
	21:24	20:22	19:06	17:54 (1)	17:54		16:01	61	14:55 (18)	15:46	37	15:04 (18)
24	05:06	05:59	06:55	17:03 (1)	07:52		16:01	62	14:56 (18)	15:46	36	15:05 (18)
	21:22	20:20	19:04	17:54 (1)	17:52		16:01	62	14:56 (18)	15:46	36	15:05 (18)
25	05:07	06:01	06:57	17:03 (1)	06:53		16:01	62	14:56 (18)	15:46	36	15:05 (18)
	21:20	20:18	19:01	17:54 (1)	16:50	4	15:42 (16)	07:53	63	14:57 (18)	15:47	37
26	05:09	06:03	06:59	17:02 (1)	06:55		16:01	62	14:56 (18)	15:48	37	15:06 (18)
	21:19	20:15	18:59	17:02 (1)	06:55		16:01	62	14:56 (18)	15:48	37	15:06 (18)
27	05:10	06:05	07:01	17:02 (1)	06:57	11	15:50 (16)	15:54	62	14:57 (18)	15:48	38
	21:17	20:13	18:56	17:02 (1)	06:57		15:50 (16)	15:54	62	14:57 (18)	15:48	38
28	05:12	06:07	07:03	17:02 (1)	06:59	14	15:51 (16)	15:53	62	14:58 (18)	15:49	39
	21:16	20:11	18:54	17:02 (1)	06:59		15:51 (16)	15:53	62	14:58 (18)	15:49	39
29	05:14	06:08	18:54 (23)	17:03 (1)	07:01		15:51 (16)	15:53	62	14:58 (18)	15:49	39
	21:14	20:08	6	17:50 (1)	16:41	19	15:54 (16)	15:51	60	14:59 (18)	15:51	41
30	05:15	06:10	18:50 (23)	17:04 (1)	07:03		15:54 (16)	15:51	60	14:59 (18)	15:51	41
	21:12	20:06	13	17:50 (1)	16:41	19	15:54 (16)	15:51	60	14:59 (18)	15:51	41
31	05:17	06:12	18:48 (23)	17:49 (1)	16:39	19	15:54 (16)	15:51	60	14:59 (18)	15:51	41
	21:10	20:03	17	17:49 (1)	16:39	19	15:54 (16)	15:51	60	14:59 (18)	15:51	41
Sonnenscheinstunden	515	461	383		328		257		231		1359	
astr. max. mögl. Beschattung			36		1395		541		1526		1359	
Red. Sonnenscheinwahrsch.			0.48		0.40		0.33		0.21		0.14	
Reduktion Betriebsdauer			0.90		0.90		0.90		0.90		0.90	
Reduktion Windrichtung			0.67		0.68		0.69		0.67		0.67	
Gesamte Reduktion			0.29		0.25		0.20		0.13		0.08	
Met. wahrsch. Beschattung			11		343		110		193		114	

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)	Schatteneinfang	(WEA mit erstem Schatten)	Schattende	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: L - IO12  
**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  
342 326 396 565 523 523 733 981 1.012 1.213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	13:22 (20)   07:57	15:46 (16)   06:59	15:52 (1)   06:43	18:31 (23)   05:33	04:42
	15:54	63   14:54 (18)   16:46	20   16:06 (16)   17:43	61   16:53 (19)   19:42	27   18:58 (23)   20:39	21:30
2	08:28	13:22 (20)   07:55	15:46 (16)   06:56	15:50 (1)   06:40	18:31 (23)   05:31	04:41
	15:55	64   14:55 (18)   16:48	21   16:07 (16)   17:45	61   16:51 (19)   19:44	26   18:57 (23)   20:40	21:31
3	08:28	13:22 (20)   07:54	15:47 (16)   06:54	15:49 (1)   06:38	18:31 (23)   05:28	04:40
	15:57	63   14:54 (18)   16:50	21   16:08 (16)   17:47	62   16:51 (19)   19:46	26   18:57 (23)   20:42	21:32
4	08:27	13:23 (20)   07:52	15:47 (16)   06:52	15:48 (1)   06:35	18:31 (23)   05:26	04:40
	15:58	63   14:55 (18)   16:52	21   16:08 (16)   17:49	61   16:49 (19)   19:48	24   18:55 (23)   20:44	21:33
5	08:27	13:23 (20)   07:50	15:48 (16)   06:49	15:48 (1)   06:33	18:32 (23)   05:24	04:39
	15:59	63   14:55 (18)   16:54	20   16:08 (16)   17:51	60   16:48 (19)   19:50	23   18:55 (23)   20:46	21:34
6	08:27	13:24 (20)   07:48	15:48 (16)   06:47	15:47 (1)   06:31	18:32 (23)   05:22	04:38
	16:00	63   14:56 (18)   16:56	19   16:07 (16)   17:53	59   16:46 (19)   19:52	21   18:53 (23)   20:48	21:35
7	08:26	13:24 (20)   07:46	15:49 (16)   06:45	15:46 (1)   06:28	18:34 (23)   05:20	04:37
	16:02	62   14:56 (18)   16:58	18   16:07 (16)   17:55	57   16:43 (19)   19:54	17   18:51 (23)   20:50	21:36
8	08:26	13:24 (20)   07:44	15:50 (16)   06:42	15:45 (1)   06:26	18:37 (23)   05:18	04:37
	16:03	62   14:56 (18)   17:00	15   16:05 (16)   17:57	55   16:40 (1)   19:55	12   18:49 (23)   20:51	21:37
9	08:25	13:24 (20)   07:42	15:51 (16)   06:40	15:46 (1)   06:23	18:41 (23)   05:17	04:36
	16:05	61   14:56 (18)   17:03	12   16:03 (16)   17:59	55   16:41 (1)   19:57	1   18:42 (23)   20:53	21:38
10	08:24	13:25 (20)   07:40	15:54 (16)   06:37	15:45 (1)   06:21	18:41 (23)   05:15	04:36
	16:06	60   14:55 (18)   17:05	7   16:01 (16)   18:00	55   16:40 (1)   19:59	1   18:42 (23)   20:55	21:39
11	08:24	13:25 (20)   07:38	16:01 (16)   06:35	15:45 (1)   06:18	18:42 (23)   05:13	04:35
	16:08	59   14:55 (18)   17:07	18:02	55   16:40 (1)   20:01	1   18:42 (23)   20:57	21:40
12	08:23	13:25 (20)   07:36	16:02 (16)   06:32	15:44 (1)   06:16	18:43 (23)   05:11	04:35
	16:09	58   14:55 (18)   17:09	18:04	56   16:40 (1)   20:03	1   18:42 (23)   20:55	21:41
13	08:22	13:26 (20)   07:34	16:03 (16)   06:30	15:43 (1)   06:14	18:44 (23)   05:09	04:34
	16:11	57   14:55 (18)   17:11	18:06	55   16:40 (1)   20:05	1   18:42 (23)   21:00	21:41
14	08:21	13:27 (20)   07:32	16:04 (16)   06:27	15:42 (1)   06:11	18:45 (23)   05:07	04:34
	16:13	53   14:54 (18)   17:13	18:08	54   16:39 (1)   20:07	1   18:42 (23)   21:02	21:42
15	08:20	13:27 (20)   07:30	16:05 (16)   06:25	15:41 (1)   06:09	18:46 (23)   05:06	04:34
	16:14	50   14:53 (18)   17:15	18:10	53   16:38 (1)   20:09	1   18:42 (23)   21:04	21:43
16	08:19	13:28 (20)   07:28	16:06 (16)   06:23	15:40 (1)   06:06	18:47 (23)   05:04	04:34
	16:16	46   14:52 (18)   17:17	18:12	52   16:37 (1)   20:11	1   18:42 (23)   21:05	21:43
17	08:18	13:29 (20)   07:26	16:07 (16)   06:20	15:39 (1)   06:04	18:48 (23)   05:02	04:33
	16:18	40   14:09 (20)   17:19	18:14	51   16:37 (1)   20:12	1   18:42 (23)   21:07	21:44
18	08:17	13:29 (20)   07:24	16:08 (16)   06:18	15:38 (1)   06:02	18:49 (23)   05:01	04:33
	16:19	40   14:09 (20)   17:21	3   16:42 (19)   18:16	50   16:36 (1)   20:14	1   18:42 (23)   21:09	21:44
19	08:16	13:30 (20)   07:22	16:09 (16)   06:15	15:37 (1)   05:59	18:50 (23)   04:59	04:33
	16:21	39   14:09 (20)   17:23	12   16:46 (19)   18:18	48   16:35 (1)   20:16	1   18:42 (23)   21:10	21:45
20	08:15	13:31 (20)   07:19	16:10 (16)   06:13	15:36 (1)   05:57	18:51 (23)   04:58	04:34
	16:23	38   14:09 (20)   17:25	17   16:49 (19)   18:20	45   16:33 (1)   20:18	1   18:42 (23)   21:12	21:45
21	08:14	13:31 (20)   07:17	16:11 (16)   06:10	15:35 (1)   05:55	18:52 (23)   04:56	04:34
	16:25	38   14:09 (20)   17:27	33   16:51 (19)   18:22	43   16:32 (1)   20:20	1   18:42 (23)   21:14	21:45
22	08:12	13:33 (20)   07:15	16:12 (16)   06:08	15:34 (1)   05:52	18:53 (23)   04:55	04:34
	16:27	36   14:09 (20)   17:29	43   16:51 (19)   18:23	40   16:30 (1)   20:22	1   18:42 (23)   21:15	21:45
23	08:11	13:33 (20)   07:13	16:13 (16)   06:05	15:33 (1)   05:50	18:54 (23)   04:53	04:34
	16:29	35   14:08 (20)   17:31	50   16:52 (19)   18:25	45   17:51 (23)   20:24	1   18:42 (23)   21:17	21:46
24	08:10	13:34 (20)   07:10	16:14 (16)   06:03	15:32 (1)   05:48	18:55 (23)   04:52	04:34
	16:31	33   14:07 (20)   17:33	53   16:53 (19)   18:27	49   17:54 (23)   20:26	1   18:42 (23)   21:18	21:46
25	08:08	13:36 (20)   07:08	16:15 (16)   06:00	15:31 (1)   05:46	18:56 (23)   04:50	04:35
	16:32	38   15:59 (16)   17:35	56   16:53 (19)   18:29	48   17:56 (23)   20:27	1   18:42 (23)   21:20	21:46
26	08:07	13:37 (20)   07:06	16:16 (16)   05:58	15:30 (1)   05:43	18:57 (23)   04:49	04:35
	16:34	41   16:01 (16)   17:37	57   16:53 (19)   18:31	44   17:56 (23)   20:29	1   18:42 (23)   21:21	21:46
27	08:05	13:38 (20)   07:04	16:17 (16)   05:55	15:29 (1)   05:41	18:58 (23)   04:48	04:36
	16:36	41   16:02 (16)   17:39	59   16:52 (19)   18:33	39   17:58 (23)   20:31	1   18:42 (23)   21:23	21:46
28	08:04	13:40 (20)   07:01	16:18 (16)   05:53	15:28 (1)   05:39	18:59 (23)   04:47	04:36
	16:38	40   16:04 (16)   17:41	61   16:53 (19)   18:35	25   17:58 (23)   20:33	1   18:42 (23)   21:24	21:45
29	08:02	13:42 (20)   07:00	16:19 (16)   05:50	15:27 (1)   05:37	19:00 (23)   04:45	04:37
	16:40	38   16:05 (16)   17:43	63   16:54 (19)   18:37	26   18:58 (23)   20:35	1   18:42 (23)   21:26	21:45
30	08:01	13:45 (20)   06:58	16:20 (16)   05:48	15:26 (1)   05:35	19:01 (23)   04:44	04:37
	16:42	34   16:06 (16)   17:45	65   16:55 (19)   18:39	27   18:59 (23)   20:37	1   18:42 (23)   21:27	21:45
31	07:59	13:50 (20)   06:56	16:21 (16)   05:45	15:25 (1)   05:33	19:02 (23)   04:43	04:37
	16:44	25   16:06 (16)   17:47	67   16:56 (19)   18:41	27   18:58 (23)   20:39	1   18:42 (23)   21:28	21:45
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung	1503	618	1518	177		
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41		
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90		
Reduktion Windrichtung	0.65	0.70	0.70	0.68		
Gesamte Reduktion	0.10	0.15	0.19	0.25		
Met.wahrsch.Beschattung	152	92	295	44		

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: L - IO12  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	07:08	16:24 (1) 07:07	15:23 (16) 08:03
	21:45	21:09	20:01	18:46	17:19 (1) 16:35	15:31 (16) 15:50
2	04:39	05:20	06:16	07:10	16:24 (1) 07:09	15:21 (16) 08:05
	21:44	21:07	19:59	18:44	17:19 (1) 16:33	15:33 (16) 15:49
3	04:40	05:22	06:17	07:12	16:23 (1) 07:11	15:19 (16) 08:06
	21:44	21:05	19:56	18:41	17:18 (1) 16:31	15:35 (16) 15:48
4	04:40	05:24	06:19	18:34 (23) 07:14	16:23 (1) 07:13	15:19 (16) 08:08
	21:43	21:03	19:54	18:46 (23) 18:39	17:18 (1) 16:29	15:36 (16) 15:47
5	04:41	05:25	06:21	18:30 (23) 07:15	16:22 (1) 07:15	15:18 (16) 08:09
	21:43	21:01	19:51	18:47 (23) 18:37	17:17 (1) 16:27	15:37 (16) 15:47
6	04:42	05:27	06:23	18:29 (23) 07:17	16:22 (1) 07:17	15:17 (16) 08:10
	21:42	20:59	19:49	18:49 (23) 18:34	17:17 (1) 16:25	15:37 (16) 15:46
7	04:43	05:29	06:25	18:27 (23) 07:19	16:22 (1) 07:19	15:17 (16) 08:12
	21:41	20:57	19:46	18:50 (23) 18:32	17:21 (19) 16:23	15:37 (16) 15:46
8	04:44	05:31	06:26	18:26 (23) 07:21	16:23 (1) 07:21	15:17 (16) 08:13
	21:41	20:55	19:44	18:50 (23) 18:29	17:23 (19) 16:21	15:38 (16) 15:45
9	04:45	05:33	06:28	18:25 (23) 07:23	16:23 (1) 07:23	15:17 (16) 08:14
	21:40	20:53	19:41	18:50 (23) 18:27	17:24 (19) 16:20	15:37 (16) 15:45
10	04:46	05:34	06:30	18:24 (23) 07:25	16:23 (1) 07:25	15:17 (16) 08:16
	21:39	20:51	19:39	18:50 (23) 18:24	17:25 (19) 16:18	15:37 (16) 15:45
11	04:48	05:36	06:32	18:24 (23) 07:27	16:24 (1) 07:27	13:21 (20) 08:17
	21:38	20:49	19:36	18:50 (23) 18:22	17:25 (19) 16:16	15:38 (16) 15:44
12	04:49	05:38	06:34	18:23 (23) 07:28	16:24 (1) 07:29	13:17 (20) 08:18
	21:37	20:47	19:34	18:50 (23) 18:20	17:26 (19) 16:14	15:37 (16) 15:44
13	04:50	05:40	06:35	18:22 (23) 07:30	16:25 (1) 07:31	13:14 (20) 08:19
	21:36	20:45	19:31	18:49 (23) 18:17	17:26 (19) 16:13	15:37 (16) 15:44
14	04:51	05:41	06:37	18:22 (23) 07:32	16:26 (1) 07:33	13:12 (20) 08:20
	21:35	20:43	19:29	18:49 (23) 18:15	17:26 (19) 16:11	15:36 (16) 15:44
15	04:52	05:43	06:39	18:23 (23) 07:34	16:27 (1) 07:35	13:11 (20) 08:21
	21:34	20:40	19:26	18:48 (23) 18:12	17:26 (19) 16:09	15:35 (16) 15:44
16	04:54	05:45	06:41	16:53 (1) 07:36	16:28 (1) 07:37	13:10 (20) 08:22
	21:33	20:38	19:24	18:47 (23) 18:10	17:25 (19) 16:08	15:34 (16) 15:44
17	04:55	05:47	06:43	16:47 (1) 07:38	16:30 (1) 07:38	13:09 (20) 08:23
	21:32	20:36	19:21	18:45 (23) 18:08	17:25 (19) 16:06	15:32 (16) 15:44
18	04:57	05:49	06:44	16:44 (1) 07:40	16:32 (1) 07:40	13:08 (20) 08:24
	21:30	20:34	19:19	18:44 (23) 18:05	17:24 (19) 16:05	15:31 (16) 15:44
19	04:58	05:50	06:46	16:41 (1) 07:42	16:34 (1) 07:42	13:08 (20) 08:24
	21:29	20:32	19:16	18:42 (23) 18:03	17:23 (19) 16:03	15:30 (16) 15:45
20	04:59	05:52	06:48	16:39 (1) 07:44	16:37 (1) 07:44	13:08 (20) 08:25
	21:28	20:29	19:14	18:39 (23) 18:01	17:22 (19) 16:02	15:34 (16) 15:45
21	05:01	05:54	06:50	16:36 (1) 07:46	16:43 (1) 07:46	13:07 (20) 08:26
	21:26	20:27	19:11	17:16 (1) 17:59	17:20 (19) 16:01	13:45 (20) 15:45
22	05:02	05:56	06:52	16:34 (1) 07:48	17:03 (19) 07:48	13:07 (20) 08:26
	21:25	20:25	19:09	17:17 (1) 17:56	17:18 (19) 15:59	13:45 (20) 15:46
23	05:04	05:58	06:53	16:33 (1) 07:50	17:05 (19) 07:50	13:07 (20) 08:27
	21:24	20:22	19:06	17:18 (1) 17:54	17:16 (19) 15:58	13:46 (20) 15:46
24	05:06	05:59	06:55	16:31 (1) 07:52	07:51	13:07 (20) 08:27
	21:22	20:20	19:04	17:18 (1) 17:52	15:57	13:47 (20) 15:47
25	05:07	06:01	06:57	16:30 (1) 06:53	07:53	13:06 (20) 08:27
	21:20	20:18	19:01	17:19 (1) 16:50	15:56	13:46 (20) 15:48
26	05:09	06:03	06:59	16:28 (1) 06:55	07:55	13:06 (20) 08:28
	21:19	20:15	18:59	17:18 (1) 16:48	15:54	14:29 (18) 15:48
27	05:10	06:05	07:01	16:27 (1) 06:57	07:57	13:06 (20) 08:28
	21:17	20:13	18:56	17:19 (1) 16:45	15:53	14:32 (18) 15:49
28	05:12	06:07	07:03	16:26 (1) 06:59	07:58	13:07 (20) 08:28
	21:16	20:11	18:54	17:19 (1) 16:43	15:52	14:34 (18) 15:50
29	05:14	06:08	07:04	16:26 (1) 07:01	08:00	13:07 (20) 08:28
	21:14	20:08	18:51	17:19 (1) 16:41	15:51	14:36 (18) 15:51
30	05:15	06:10	07:06	16:25 (1) 07:03	08:02	13:08 (20) 08:28
	21:12	20:06	18:49	17:19 (1) 16:39	15:51	14:37 (18) 15:52
31	05:17	06:12		07:05		08:28
	21:10	20:03		16:37		15:53
Sonnenscheinstunden	515	461	383	328	257	231
astr.max.mögl.Beschattung			988	1181	991	1942
Red.Sonnenscheinwahrsch.			0.40	0.33	0.21	0.14
Reduktion Betriebsdauer			0.90	0.90	0.90	0.90
Reduktion Windrichtung			0.69	0.70	0.66	0.65
Gesamte Reduktion			0.25	0.21	0.12	0.08
Met.wahrsch.Beschattung			245	242	122	157

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: M - IO13**

**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  
342 326 396 565 523 523 733 981 1.012 1.213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	11:51 (1) 07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
2	15:54	14:43 (23) 16:46	17:43	19:42	20:39	21:30	21:45	21:09	20:01	18:46	16:35	15:33
3	08:28	11:52 (1) 07:55	06:57	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:05
4	15:57	14:44 (23) 16:48	17:45	19:44	20:41	21:31	21:44	21:07	19:59	18:44	16:33	15:49
5	08:28	11:53 (1) 07:54	06:54	06:38	05:29	04:40	04:40	05:22	06:17	07:12	07:11	08:06
6	15:57	14:44 (23) 16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:56	18:41	16:31	15:48
7	08:28	11:55 (1) 07:52	06:52	06:35	05:26	04:40	04:40	05:24	06:19	07:14	07:13	08:08
8	15:58	14:45 (23) 16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:47
9	08:27	11:55 (1) 07:50	06:49	06:33	05:24	04:39	04:41	05:25	06:21	07:15	07:15	08:09
10	15:59	14:45 (23) 16:54	17:51	19:50	20:46	21:34	21:43	21:01	19:51	18:37	16:27	15:47
11	08:27	11:58 (1) 07:48	06:47	06:31	05:22	04:38	04:42	05:27	06:23	07:17	07:17	08:11
12	15:00	14:47 (23) 16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
13	08:26	11:59 (1) 07:46	06:45	06:28	05:20	04:37	04:43	05:29	06:25	07:19	07:19	08:12
14	16:02	14:47 (23) 16:58	17:55	19:54	20:50	21:36	21:41	20:57	19:46	18:32	16:23	15:46
15	08:26	12:02 (1) 07:44	06:42	06:26	05:18	04:37	04:44	05:31	06:26	07:21	07:21	08:13
16	16:03	14:47 (23) 17:00	17:57	19:56	20:51	21:37	21:41	20:55	19:44	18:29	16:21	15:45
17	08:25	14:14 (23) 07:42	06:40	06:23	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14
18	16:05	14:48 (23) 17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
19	08:25	14:14 (23) 07:41	06:37	06:21	05:15	04:36	04:46	05:34	06:30	07:25	07:25	08:16
20	16:06	14:48 (23) 17:05	18:01	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45
21	08:24	14:16 (23) 07:39	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17
22	16:08	14:49 (23) 17:07	18:02	19:59	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:44
23	08:23	14:16 (23) 07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:29	07:29	08:18
24	16:09	14:50 (23) 17:09	18:04	20:03	20:59	21:41	21:37	20:47	19:34	18:20	16:14	15:44
25	08:22	14:15 (23) 07:34	06:30	06:14	05:09	04:34	04:50	05:40	06:35	07:30	07:31	08:19
26	16:14	14:50 (23) 17:15	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44
27	08:21	14:16 (23) 07:32	06:28	06:11	05:07	04:34	04:51	05:41	06:37	07:32	07:33	08:20
28	16:13	14:50 (23) 17:13	18:08	20:07	21:02	21:42	21:35	20:43	19:29	18:15	16:11	15:44
29	08:20	14:16 (23) 07:30	06:25	06:09	05:06	04:34	04:52	05:43	06:39	07:34	07:35	08:21
30	16:14	14:50 (23) 17:15	18:10	20:09	21:04	21:43	21:34	20:40	19:26	18:12	16:09	15:44
31	08:19	14:17 (23) 07:28	06:23	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:37	08:22
1	16:16	14:51 (23) 17:17	18:12	20:11	21:06	21:43	21:33	20:38	19:24	18:10	16:08	15:44
2	08:18	14:18 (23) 07:26	06:20	06:04	05:02	04:33	04:55	05:47	06:43	07:38	07:39	08:23
3	16:18	14:51 (23) 17:19	18:14	20:12	21:07	21:44	21:32	20:36	19:21	18:08	16:06	15:44
4	08:17	14:18 (23) 07:24	06:16	06:02	05:01	04:33	04:57	05:49	06:44	07:40	07:40	08:24
5	16:19	14:51 (23) 17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:05	16:05	15:44
6	08:16	14:18 (23) 07:22	06:15	05:59	04:59	04:33	04:58	05:50	06:46	07:42	07:42	08:24
7	16:21	14:51 (23) 17:23	18:18	20:16	21:11	21:45	21:29	20:32	19:16	18:03	16:03	15:45
8	08:15	14:19 (23) 07:19	06:13	05:57	04:58	04:34	04:59	05:52	06:48	07:44	07:44	08:25
9	16:23	14:52 (23) 17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45
10	08:14	14:20 (23) 07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:26
11	16:25	14:51 (23) 17:27	18:22	20:20	21:14	21:45	21:26	20:27	19:11	17:59	16:01	15:45
12	08:12	14:21 (23) 07:15	06:08	05:52	04:55	04:34	05:02	05:56	06:52	07:48	07:48	08:26
13	16:27	14:52 (23) 17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:47
14	08:11	14:21 (23) 07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:50	07:50	08:27
15	16:29	14:51 (23) 17:31	18:25	20:24	21:17	21:46	21:24	20:22	19:06	17:54	15:58	15:48
16	08:10	14:23 (23) 07:10	06:03	05:48	04:52	04:34	05:06	05:59	06:55	07:52	07:51	08:27
17	16:31	14:51 (23) 17:33	18:27	20:26	21:18	21:46	21:22	20:20	19:04	17:52	15:57	15:48
18	08:09	14:23 (23) 07:08	06:00	05:46	04:50	04:35	05:07	06:01	06:57	07:54	07:53	08:27
19	16:32	14:50 (23) 17:35	18:29	20:27	21:20	21:46	21:21	20:18	19:01	17:50	15:56	15:48
20	08:07	14:24 (23) 07:06	05:58	05:43	04:49	04:35	05:09	06:03	06:59	07:55	07:55	08:28
21	16:34	14:50 (23) 17:37	18:31	20:29	21:21	21:46	21:19	20:15	18:59	17:48	15:54	15:48
22	08:05	14:26 (23) 07:04	05:55	05:41	04:48	04:36	05:10	06:05	07:01	06:57	07:57	08:28
23	16:36	14:49 (23) 17:39	18:33	20:31	21:23	21:46	21:17	20:13	18:56	17:45	15:53	15:49
24	08:04	14:27 (23) 07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:03	06:59	07:58	08:28
25	16:38	14:48 (23) 17:41	18:35	20:33	21:24	21:45	21:16	20:11	18:54	17:43	15:52	15:48
26	08:02	14:29 (23)	05:50	05:37	04:45	04:37	05:14	06:08	07:04	07:01	08:00	15:48
27	16:40	14:46 (23)	18:37	20:35	21:26	21:45	21:14	20:08	18:51	17:41	15:51	15:44
28	08:01	14:32 (23)	06:48	05:35	04:44	04:37	05:15	06:10	07:06	07:03	08:02	15:50
29	16:42	14:44 (23)	18:39	20:37	21:27	21:45	21:12	20:06	18:49	17:39	15:51	15:42
30	08:01	14:37 (23)	06:45	05:43	04:43	04:37	05:17	06:12	07:05	07:05	08:02	15:50
31	16:44	14:39 (23)	18:40	20:38	21:28	21:45	21:10	20:04	18:57	17:47	15:53	15:44
astr.max.mögl.Beschattung	248	272	367	421	496	513	515	461	383	328	257	231
Red.Sonnenscheinwahrsch.	1048										552	1612
Reduktion Betriebsdauer	0.17										0.21	0.14
Reduktion Windrichtung	0.90										0.90	0.90
Gesamte Reduktion	0.66										0.67	0.64
Met.wahrsch.Beschattung	0.10										0.13	0.08
	108										69	129

**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	

Projekt: 180413\_Miltzow\_LAI\_Antrag III - VII

Lizenzierte Anwender: I17-Wind GmbH & Co. KG Am Westersielzug 11 DE-25840 Friedrichstadt - André Gefke / andre.gefke@i17-wind.de

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: N - IO14

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]

Table with 12 columns for months (Jan to Dez) and values for S (1.39 to 1.03).

Betriebsdauer je Sektor

Table with 13 columns (N to Summe) and values for various sectors (342 to 7,888).

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Main shadow calculation table with columns for months (Januar to Dezember) and rows for days of the year (1 to 365). Includes summary statistics at the bottom.

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

Small table with 6 columns: Tag im Monat, Sonnenaufgang, Sonnenuntergang, Minuten mit Schatten, Zeitpunkt, Schattenanfang, Schattenende.

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1.012 1.213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1   08:28	11:41 (1)   07:57	14:44 (23)   06:59	06:43	05:33	04:42	
15:54	62   13:54 (19)   16:46	39   15:23 (23)   17:43	19:42	20:39	21:30	
2   08:28	11:42 (1)   07:55	14:45 (23)   06:57	06:40	05:31	04:41	
15:55	62   13:55 (19)   16:48	39   15:24 (23)   17:45	19:44	20:41	21:31	
3   08:28	11:42 (1)   07:54	14:46 (23)   06:54	06:38	05:29	04:40	
15:57	59   13:54 (19)   16:50	38   15:24 (23)   17:47	19:46	20:42	21:32	
4   08:28	11:43 (1)   07:52	14:46 (23)   06:52	06:35	05:26	04:40	
15:58	57   13:54 (19)   16:52	38   15:24 (23)   17:49	19:48	20:44	21:33	
5   08:27	11:43 (1)   07:50	14:46 (23)   06:49	06:33	05:24	04:39	
15:59	56   13:53 (19)   16:54	38   15:24 (23)   17:51	19:50	20:46	21:34	
6   08:27	11:44 (1)   07:48	14:47 (23)   06:47	06:31	05:22	04:38	
16:00	53   13:53 (19)   16:56	36   15:23 (23)   17:53	19:52	20:48	21:35	
7   08:26	11:45 (1)   07:46	14:48 (23)   06:45	06:28	05:20	04:37	
16:02	48   13:51 (19)   16:58	35   15:23 (23)   17:55	19:54	20:50	21:36	
8   08:26	11:45 (1)   07:44	14:48 (23)   06:42	06:26	05:18	04:37	
16:03	42   12:27 (1)   17:00	33   15:21 (23)   17:57	19:56	20:51	21:37	
9   08:25	11:46 (1)   07:42	14:49 (23)   06:40	06:23	05:17	04:36	
16:05	40   12:26 (1)   17:03	32   15:21 (23)   17:59	19:57	20:53	21:38	
10   08:25	11:46 (1)   07:41	14:50 (23)   06:37	06:21	05:15	04:36	
16:06	40   12:26 (1)   17:05	30   15:20 (23)   18:01	19:59	20:55	21:39	
11   08:24	11:48 (1)   07:38	14:52 (23)   06:35	06:18	05:13	04:35	
16:08	45   15:01 (23)   17:07	27   15:19 (23)   18:02	20:01	20:57	21:40	
12   08:23	11:49 (1)   07:36	14:53 (23)   06:32	06:16	05:11	04:35	
16:09	50   15:05 (23)   17:09	25   15:18 (23)   18:04	20:03	20:59	21:41	
13   08:22	11:49 (1)   07:34	14:56 (23)   06:30	06:14	05:09	04:34	
16:11	53   15:06 (23)   17:11	20   15:16 (23)   18:06	20:05	21:00	21:41	
14   08:21	11:50 (1)   07:32	14:59 (23)   06:28	06:11	05:07	04:34	
16:13	55   15:08 (23)   17:13	14   15:13 (23)   18:08	20:07	21:02	21:42	
15   08:20	11:51 (1)   07:30	06:25	06:09	05:06	04:34	
16:14	56   15:10 (23)   17:15	18:10	20:09	21:04	21:43	
16   08:19	11:53 (1)   07:28	06:23	06:06	05:04	04:34	
16:16	56   15:12 (23)   17:17	18:12	20:11	21:06	21:43	
17   08:18	11:54 (1)   07:26	06:20	06:04	05:02	04:33	
16:18	56   15:13 (23)   17:19	18:14	20:12	21:07	21:44	
18   08:17	11:55 (1)   07:24	06:18	06:02	05:01	04:33	
16:19	57   15:14 (23)   17:21	18:16	20:14	21:09	21:44	
19   08:16	11:57 (1)   07:22	06:15	05:59	04:59	04:33	
16:21	55   15:15 (23)   17:23	18:18	20:16	21:11	21:45	
20   08:15	11:59 (1)   07:19	06:13	05:57	04:58	04:34	
16:23	54   15:17 (23)   17:25	18:20	20:18	21:12	21:45	
21   08:14	12:01 (1)   07:17	06:10	05:55	04:56	04:34	
16:25	51   15:17 (23)   17:27	18:22	20:20	21:14	21:45	
22   08:12	12:05 (1)   07:15	06:08	05:52	04:55	04:34	
16:27	47   15:19 (23)   17:29	18:23	20:22	21:15	21:45	
23   08:11	14:45 (23)   07:13	06:05	05:50	04:53	04:34	
16:29	34   15:19 (23)   17:31	18:25	20:24	21:17	21:46	
24   08:10	14:45 (23)   07:10	06:03	05:48	04:52	04:34	
16:31	35   15:20 (23)   17:33	18:27	20:26	21:18	21:46	
25   08:08	14:44 (23)   07:08	06:00	05:46	04:50	04:35	
16:32	37   15:21 (23)   17:35	18:29	20:27	21:20	21:46	
26   08:07	14:44 (23)   07:06	05:58	05:44	04:49	04:35	
16:34	37   15:21 (23)   17:37	18:31	20:29	21:21	21:46	
27   08:05	14:45 (23)   07:04	05:55	05:41	04:48	04:36	
16:36	37   15:22 (23)   17:39	18:33	20:31	21:23	21:46	
28   08:04	14:44 (23)   07:01	05:53	05:39	04:47	04:36	
16:38	39   15:23 (23)   17:41	18:35	20:33	21:24	21:45	
29   08:02	14:44 (23)   07:00	06:50	05:37	04:45	04:37	
16:40	39   15:23 (23)   17:43	19:37	20:35	21:26	21:45	
30   08:01	14:44 (23)   07:00	06:48	05:35	04:44	04:37	
16:42	39   15:23 (23)   17:45	19:39	20:37	21:27	21:45	
31   07:59	14:44 (23)   07:00	06:45	05:34	04:43	04:37	
16:44	39   15:23 (23)   17:47	19:40	20:38	21:28	21:45	
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung	1490	444				
Red.Sonnenscheinwahrsch.	0.17	0.24				
Reduktion Betriebsdauer	0.90	0.90				
Reduktion Windrichtung	0.64	0.68				
Gesamte Reduktion	0.10	0.14				
Met.wahrsch.Beschattung	147	64				

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	05:19	06:14	07:08	07:07	14:19 (23)   08:03	11:29 (1)
	21:45	21:09	20:01	18:46	16:35	31   14:50 (23)   15:50	46   14:43 (23)
2	04:39	05:20	06:16	07:10	07:09	14:18 (23)   08:05	11:29 (1)
	21:44	21:07	19:59	18:44	16:33	33   14:51 (23)   15:49	40   12:09 (1)
3	04:40	05:22	06:17	07:12	07:11	14:17 (23)   08:06	11:30 (1)
	21:44	21:05	19:56	18:41	16:31	34   14:51 (23)   15:48	40   12:10 (1)
4	04:40	05:24	06:19	07:14	07:13	14:17 (23)   08:08	11:29 (1)
	21:43	21:03	19:54	18:39	16:29	36   14:53 (23)   15:47	42   12:11 (1)
5	04:41	05:25	06:21	07:15	07:15	14:17 (23)   08:09	11:30 (1)
	21:43	21:01	19:51	18:37	16:27	36   14:53 (23)   15:47	48   13:36 (19)
6	04:42	05:27	06:23	07:17	07:17	14:16 (23)   08:11	11:29 (1)
	21:42	20:59	19:49	18:34	16:25	37   14:53 (23)   15:46	53   13:38 (19)
7	04:43	05:29	06:25	07:19	07:19	14:16 (23)   08:12	11:30 (1)
	21:41	20:57	19:46	18:32	16:23	38   14:54 (23)   15:46	55   13:40 (19)
8	04:44	05:31	06:26	07:21	07:21	14:15 (23)   08:13	11:30 (1)
	21:41	20:55	19:44	18:29	16:21	39   14:54 (23)   15:45	57   13:41 (19)
9	04:45	05:33	06:28	07:23	07:23	14:15 (23)   08:14	11:31 (1)
	21:40	20:53	19:41	18:27	16:20	39   14:54 (23)   15:45	60   13:43 (19)
10	04:46	05:34	06:30	07:25	07:25	14:16 (23)   08:16	11:31 (1)
	21:39	20:51	19:39	18:24	16:18	39   14:55 (23)   15:45	61   13:44 (19)
11	04:48	05:36	06:32	07:27	07:27	14:16 (23)   08:17	11:31 (1)
	21:38	20:49	19:36	18:22	16:16	39   14:55 (23)   15:44	62   13:44 (19)
12	04:49	05:38	06:34	07:29	07:29	14:16 (23)   08:18	11:31 (1)
	21:37	20:47	19:34	18:20	16:14	39   14:55 (23)   15:44	64   13:45 (19)
13	04:50	05:40	06:35	07:30	07:31	14:16 (23)   08:19	11:31 (1)
	21:36	20:45	19:31	18:17	16:13	39   14:55 (23)   15:44	65   13:46 (19)
14	04:51	05:41	06:37	07:32	07:33	14:16 (23)   08:20	11:32 (1)
	21:35	20:43	19:29	18:15	16:11	38   14:54 (23)   15:44	65   13:47 (19)
15	04:52	05:43	06:39	07:34	07:35	14:17 (23)   08:21	11:32 (1)
	21:34	20:40	19:26	18:12	16:09	37   14:54 (23)   15:44	66   13:47 (19)
16	04:54	05:45	06:41	07:36	07:37	14:17 (23)   08:22	11:32 (1)
	21:33	20:38	19:24	18:10	16:08	37   14:54 (23)   15:44	67   13:48 (19)
17	04:55	05:47	06:43	07:38	07:39	14:17 (23)   08:23	11:33 (1)
	21:32	20:36	19:21	18:08	16:06	37   14:54 (23)   15:44	67   13:49 (19)
18	04:57	05:49	06:44	07:40	07:40	14:18 (23)   08:24	11:34 (1)
	21:30	20:34	19:19	18:05	16:05	35   14:53 (23)   15:44	67   13:50 (19)
19	04:58	05:50	06:46	07:42	07:42	14:20 (23)   08:24	11:34 (1)
	21:29	20:32	19:16	18:03	16:03	34   14:54 (23)   15:45	69   13:51 (19)
20	04:59	05:52	06:48	07:44	07:44	11:40 (1)   08:25	11:34 (1)
	21:28	20:29	19:14	18:01	16:02	47   14:54 (23)   15:45	68   13:50 (19)
21	05:01	05:54	06:50	07:46	07:46	11:37 (1)   08:26	11:35 (1)
	21:26	20:27	19:11	17:59	16:01	51   14:53 (23)   15:45	68   13:51 (19)
22	05:02	05:56	06:52	07:48	07:48	11:35 (1)   08:26	11:35 (1)
	21:25	20:25	19:09	17:56	15:59	54   14:53 (23)   15:46	68   13:51 (19)
23	05:04	05:58	06:53	07:50	07:50	11:34 (1)   08:27	11:36 (1)
	21:24	20:22	19:06	17:54	15:58	55   14:52 (23)   15:46	68   13:52 (19)
24	05:06	05:59	06:55	07:52	07:51	11:33 (1)   08:27	11:36 (1)
	21:22	20:20	19:04	17:52	15:57	57   14:52 (23)   15:47	68   13:52 (19)
25	05:07	06:01	06:57	06:53	07:53	11:32 (1)   08:27	11:37 (1)
	21:20	20:18	19:01	16:50	15:56	56   14:51 (23)   15:48	67   13:53 (19)
26	05:09	06:03	06:59	06:55	07:55	11:31 (1)   08:28	11:38 (1)
	21:19	20:15	18:59	16:48	15:54	56   14:50 (23)   15:48	67   13:54 (19)
27	05:10	06:05	07:01	06:57	14:31 (23)   07:57	11:30 (1)   08:28	11:38 (1)
	21:17	20:13	18:56	16:45	7   14:38 (23)   15:53	56   14:49 (23)   15:49	68   13:54 (19)
28	05:12	06:07	07:03	06:59	14:28 (23)   07:58	11:30 (1)   08:28	11:39 (1)
	21:16	20:11	18:54	16:43	16   14:44 (23)   15:52	55   14:48 (23)   15:50	66   13:54 (19)
29	05:14	06:08	07:04	07:01	14:25 (23)   08:00	11:30 (1)   08:28	11:39 (1)
	21:14	20:08	18:51	16:41	21   14:46 (23)   15:51	53   14:47 (23)   15:51	65   13:54 (19)
30	05:15	06:10	07:06	07:03	14:23 (23)   08:02	11:30 (1)   08:28	11:40 (1)
	21:12	20:06	18:49	16:39	24   14:47 (23)   15:51	50   14:46 (23)   15:52	65   13:55 (19)
31	05:17	06:12	07:05	07:05	14:21 (23)   08:02	11:30 (1)   08:28	11:40 (1)
	21:10	20:04	16:37	28   14:49 (23)   15:53	63   13:54 (19)	231	
Sonnenscheinstunden	515	461	383	328	257		
astr.max.mögl.Beschattung				96	1287		1895
Red.Sonnenscheinwahrsch.				0.33	0.21		0.14
Reduktion Betriebsdauer				0.90	0.90		0.90
Reduktion Windrichtung				0.68	0.66		0.61
Gesamte Reduktion				0.20	0.12		0.08
Met.wahrsch.Beschattung				19	158		144

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1   08:28	12:11 (1)   07:57	12:32 (1)   06:59	15:41 (23)   06:43	05:33	04:42	
15:54	87 14:38 (19)   16:46	34 13:06 (1)   17:43	30 16:11 (23)   19:42	20:39	21:30	
2   08:28	12:12 (1)   07:55	12:35 (1)   06:57	15:42 (23)   06:40	05:31	04:41	
15:55	86 14:39 (19)   16:48	30 13:05 (1)   17:45	27 16:09 (23)   19:44	20:40	21:31	
3   08:28	12:12 (1)   07:54	12:37 (1)   06:54	15:44 (23)   06:38	05:29	04:40	
15:57	86 14:39 (19)   16:50	26 13:03 (1)   17:47	23 16:07 (23)   19:46	20:42	21:32	
4   08:28	12:13 (1)   07:52	12:41 (1)   06:52	15:46 (23)   06:35	05:26	04:40	
15:58	87 14:40 (19)   16:52	19 13:00 (1)   17:49	18 16:04 (23)   19:48	20:44	21:33	
5   08:27	12:13 (1)   07:50	12:46 (1)   06:49	15:51 (23)   06:33	05:24	04:39	
15:59	87 14:40 (19)   16:54	9 12:55 (1)   17:51	9 16:00 (23)   19:50	20:46	21:34	
6   08:27	12:14 (1)   07:48	12:53 (1)   06:47	15:52 (23)   06:31	05:22	04:38	
16:00	87 14:41 (19)   16:56	17:53	19:52	20:48	21:35	
7   08:26	12:14 (1)   07:46	15:51 (23)   06:45	06:28	05:20	04:37	
16:02	88 14:41 (19)   16:58	11 16:02 (23)   17:55	19:54	20:50	21:36	
8   08:26	12:14 (1)   07:44	15:47 (23)   06:42	06:26	05:18	04:37	
16:03	87 14:41 (19)   17:00	18 16:05 (23)   17:57	19:55	20:51	21:37	
9   08:25	12:14 (1)   07:42	15:45 (23)   06:40	06:23	05:17	04:36	
16:05	88 14:42 (19)   17:03	22 16:07 (23)   17:59	19:57	20:53	21:38	
10   08:25	12:14 (1)   07:40	15:43 (23)   06:37	06:21	05:15	04:36	
16:06	88 14:42 (19)   17:05	26 16:09 (23)   18:01	19:59	20:55	21:39	
11   08:24	12:15 (1)   07:38	15:42 (23)   06:35	06:18	05:13	04:35	
16:08	87 14:42 (19)   17:07	29 16:11 (23)   18:02	20:01	20:57	21:40	
12   08:23	12:16 (1)   07:36	15:41 (23)   06:32	06:16	05:11	04:35	
16:09	87 14:43 (19)   17:09	31 16:12 (23)   18:04	20:03	20:59	21:41	
13   08:22	12:16 (1)   07:34	15:40 (23)   06:30	06:14	05:09	04:34	
16:11	86 14:43 (19)   17:11	33 16:13 (23)   18:06	20:05	21:00	21:41	
14   08:21	12:16 (1)   07:32	15:40 (23)   06:28	06:11	05:07	04:34	
16:13	86 14:43 (19)   17:13	35 16:15 (23)   18:08	20:07	21:02	21:42	
15   08:20	12:17 (1)   07:30	15:38 (23)   06:25	06:09	05:06	04:34	
16:14	85 14:43 (19)   17:15	36 16:14 (23)   18:10	20:09	21:04	21:43	
16   08:19	12:18 (1)   07:28	15:38 (23)   06:23	06:06	05:04	04:34	
16:16	84 14:43 (19)   17:17	37 16:15 (23)   18:12	20:11	21:06	21:43	
17   08:18	12:18 (1)   07:26	15:38 (23)   06:20	06:04	05:02	04:33	
16:18	84 14:44 (19)   17:19	38 16:16 (23)   18:14	20:12	21:07	21:44	
18   08:17	12:18 (1)   07:24	15:38 (23)   06:18	06:02	05:01	04:33	
16:19	82 14:43 (19)   17:21	38 16:16 (23)   18:16	20:14	21:09	21:44	
19   08:16	12:19 (1)   07:22	15:37 (23)   06:15	05:59	04:59	04:33	
16:21	80 14:43 (19)   17:23	39 16:16 (23)   18:18	20:16	21:11	21:45	
20   08:15	12:20 (1)   07:19	15:37 (23)   06:13	05:57	04:58	04:34	
16:23	78 14:43 (19)   17:25	39 16:16 (23)   18:20	20:18	21:12	21:45	
21   08:14	12:20 (1)   07:17	15:37 (23)   06:10	05:55	04:56	04:34	
16:25	76 14:42 (19)   17:27	40 16:17 (23)   18:22	20:20	21:14	21:45	
22   08:12	12:22 (1)   07:15	15:37 (23)   06:08	05:52	04:55	04:34	
16:27	73 14:42 (19)   17:29	39 16:16 (23)   18:23	20:22	21:15	21:45	
23   08:11	12:22 (1)   07:13	15:37 (23)   06:05	05:50	04:53	04:34	
16:29	69 14:40 (19)   17:31	39 16:16 (23)   18:25	20:24	21:17	21:46	
24   08:10	12:22 (1)   07:10	15:38 (23)   06:03	05:48	04:52	04:34	
16:31	66 14:39 (19)   17:33	38 16:16 (23)   18:27	20:26	21:18	21:46	
25   08:08	12:24 (1)   07:08	15:38 (23)   06:00	05:46	04:50	04:35	
16:32	59 14:37 (19)   17:35	36 16:14 (23)   18:29	20:27	21:20	21:46	
26   08:07	12:24 (1)   07:06	15:38 (23)   05:58	05:44	04:49	04:35	
16:34	48 13:12 (1)   17:37	36 16:14 (23)   18:31	20:29	21:21	21:46	
27   08:05	12:25 (1)   07:04	15:39 (23)   05:55	05:41	04:48	04:36	
16:36	46 13:11 (1)   17:39	34 16:13 (23)   18:33	20:31	21:23	21:46	
28   08:04	12:27 (1)   07:01	15:40 (23)   05:53	05:39	04:47	04:36	
16:38	44 13:11 (1)   17:41	32 16:12 (23)   18:35	20:33	21:24	21:45	
29   08:02	12:28 (1)   07:00	15:40 (23)   05:50	05:37	04:45	04:37	
16:40	42 13:10 (1)   17:43	30 16:11 (23)   18:37	20:35	21:26	21:45	
30   08:01	12:29 (1)   06:58	15:41 (23)   05:48	05:35	04:44	04:37	
16:42	40 13:09 (1)   17:45	28 16:10 (23)   18:39	20:37	21:27	21:45	
31   07:59	12:30 (1)   06:56	15:42 (23)   05:45	05:33	04:43	04:37	
16:44	38 13:08 (1)   17:47	26 16:09 (23)   18:41	20:39	21:28	21:45	
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung	2311	844	107			
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31			
Reduktion Betriebsdauer	0.90	0.90	0.90			
Reduktion Windrichtung	0.63	0.69	0.70			
Gesamte Reduktion	0.10	0.15	0.19			
Met.wahrsch.Beschattung	225	123	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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	05:19	06:14	07:08	07:07	15:13 (23)   08:03	11:57 (1)
	21:45	21:09	20:01	18:46	16:35	26 15:39 (23)   15:50	87 14:24 (19)
2	04:39	05:20	06:16	07:10	07:09	15:15 (23)   08:05	11:58 (1)
	21:44	21:07	19:59	18:44	16:33	22 15:37 (23)   15:49	87 14:25 (19)
3	04:40	05:22	06:17	07:12	07:11	15:17 (23)   08:06	11:58 (1)
	21:44	21:05	19:56	18:41	16:31	17 15:34 (23)   15:48	88 14:26 (19)
4	04:40	05:24	06:19	07:14	07:13	15:22 (23)   08:08	11:58 (1)
	21:43	21:03	19:54	18:39	16:29	9 15:31 (23)   15:47	88 14:26 (19)
5	04:41	05:25	06:21	07:15	07:15	15:23 (23)   08:09	11:59 (1)
	21:43	21:01	19:51	18:37	16:27	15:47	87 14:26 (19)
6	04:42	05:27	06:23	07:17	07:17	12:15 (1)   08:11	11:59 (1)
	21:42	20:59	19:49	18:34	16:25	11 12:26 (1)   15:46	88 14:26 (19)
7	04:43	05:29	06:25	07:19	07:19	12:10 (1)   08:12	12:00 (1)
	21:41	20:57	19:46	18:32	16:23	20 12:30 (1)   15:46	87 14:27 (19)
8	04:44	05:31	06:26	07:21	07:21	12:07 (1)   08:13	12:00 (1)
	21:41	20:55	19:44	18:29	16:21	26 12:33 (1)   15:45	87 14:27 (19)
9	04:45	05:33	06:28	07:23	16:24 (23)   07:23	12:05 (1)   08:14	12:01 (1)
	21:40	20:53	19:41	18:27	13 16:37 (23)   16:20	30 12:35 (1)   15:45	86 14:28 (19)
10	04:46	05:34	06:30	07:25	16:20 (23)   07:25	12:04 (1)   08:16	12:01 (1)
	21:39	20:51	19:39	18:24	20 16:40 (23)   16:18	34 12:38 (1)   15:45	86 14:28 (19)
11	04:48	05:36	06:32	07:27	16:18 (23)   07:27	12:02 (1)   08:17	12:01 (1)
	21:38	20:49	19:36	18:22	24 16:42 (23)   16:16	37 12:39 (1)   15:44	87 14:28 (19)
12	04:49	05:38	06:34	07:29	16:16 (23)   07:29	12:01 (1)   08:18	12:02 (1)
	21:37	20:47	19:34	18:20	28 16:44 (23)   16:14	40 12:41 (1)   15:44	87 14:29 (19)
13	04:50	05:40	06:35	07:30	16:14 (23)   07:31	12:00 (1)   08:19	12:02 (1)
	21:36	20:45	19:31	18:17	31 16:45 (23)   16:13	42 12:42 (1)   15:44	86 14:29 (19)
14	04:51	05:41	06:37	07:32	16:12 (23)   07:33	11:59 (1)   08:20	12:03 (1)
	21:35	20:43	19:29	18:15	33 16:45 (23)   16:11	44 12:43 (1)   15:44	86 14:29 (19)
15	04:52	05:43	06:39	07:34	16:11 (23)   07:35	11:58 (1)   08:21	12:03 (1)
	21:34	20:40	19:26	18:12	35 16:46 (23)   16:09	46 12:44 (1)   15:44	86 14:30 (19)
16	04:54	05:45	06:41	07:36	16:10 (23)   07:37	11:57 (1)   08:22	12:04 (1)
	21:33	20:38	19:24	18:10	37 16:47 (23)   16:08	48 12:45 (1)   15:44	85 14:30 (19)
17	04:55	05:47	06:43	07:38	16:09 (23)   07:38	11:57 (1)   08:23	12:04 (1)
	21:32	20:36	19:21	18:08	38 16:47 (23)   16:06	59 14:10 (19)   15:44	86 14:31 (19)
18	04:57	05:49	06:44	07:40	16:09 (23)   07:40	11:56 (1)   08:24	12:05 (1)
	21:30	20:34	19:19	18:05	38 16:47 (23)   16:05	66 14:13 (19)   15:44	85 14:31 (19)
19	04:58	05:50	06:46	07:42	16:08 (23)   07:42	11:57 (1)   08:24	12:06 (1)
	21:29	20:32	19:16	18:03	39 16:47 (23)   16:03	69 14:15 (19)   15:45	84 14:32 (19)
20	04:59	05:52	06:48	07:44	16:08 (23)   07:44	11:57 (1)   08:25	12:06 (1)
	21:28	20:29	19:14	18:01	39 16:47 (23)   16:02	72 14:17 (19)   15:45	85 14:32 (19)
21	05:01	05:54	06:50	07:46	16:07 (23)   07:46	11:56 (1)   08:26	12:07 (1)
	21:26	20:27	19:11	17:59	40 16:47 (23)   16:01	76 14:18 (19)   15:45	85 14:33 (19)
22	05:02	05:56	06:52	07:48	16:07 (23)   07:48	11:56 (1)   08:26	12:07 (1)
	21:25	20:25	19:09	17:56	40 16:47 (23)   15:59	78 14:19 (19)   15:46	85 14:33 (19)
23	05:04	05:58	06:53	07:50	16:07 (23)   07:50	11:56 (1)   08:27	12:08 (1)
	21:24	20:22	19:06	17:54	39 16:46 (23)   15:58	80 14:20 (19)   15:46	85 14:34 (19)
24	05:06	05:59	06:55	07:52	16:07 (23)   07:51	11:56 (1)   08:27	12:08 (1)
	21:22	20:20	19:04	17:52	39 16:46 (23)   15:57	82 14:21 (19)   15:47	84 14:34 (19)
25	05:07	06:01	06:57	06:53	15:07 (23)   07:53	11:56 (1)   08:27	12:08 (1)
	21:20	20:18	19:01	16:50	38 15:45 (23)   15:56	84 14:22 (19)   15:48	85 14:34 (19)
26	05:09	06:03	06:59	06:55	15:08 (23)   07:55	11:56 (1)   08:28	12:08 (1)
	21:19	20:15	18:59	16:48	37 15:45 (23)   15:54	84 14:21 (19)   15:48	86 14:35 (19)
27	05:10	06:05	07:01	06:57	15:08 (23)   07:57	11:56 (1)   08:28	12:10 (1)
	21:17	20:13	18:56	16:45	36 15:44 (23)   15:53	85 14:22 (19)   15:49	85 14:36 (19)
28	05:12	06:07	07:03	06:59	15:10 (23)   07:58	11:56 (1)   08:28	12:10 (1)
	21:16	20:11	18:54	16:43	34 15:44 (23)   15:52	86 14:23 (19)   15:50	85 14:36 (19)
29	05:14	06:08	07:04	07:01	15:10 (23)   08:00	11:57 (1)   08:28	12:10 (1)
	21:14	20:08	18:51	16:41	33 15:43 (23)   15:51	86 14:24 (19)   15:51	86 14:37 (19)
30	05:15	06:10	07:06	07:03	15:11 (23)   08:02	11:57 (1)   08:28	12:10 (1)
	21:12	20:06	18:49	16:39	31 15:42 (23)   15:51	87 14:24 (19)   15:52	86 14:37 (19)
31	05:17	06:12	07:05	07:05	15:12 (23)   08:03	11:57 (1)   08:28	12:10 (1)
	21:10	20:04	18:47	16:37	28 15:40 (23)   15:53	87 14:37 (19)	
Sonnenscheinstunden	515	461	383	328	257	231	
astr.max.mögl.Beschattung				770	1546	2667	
Red.Sonnenscheinwahrsch.				0.33	0.21	0.14	
Reduktion Betriebsdauer				0.90	0.90	0.90	
Reduktion Windrichtung				0.70	0.63	0.63	
Gesamte Reduktion				0.21	0.12	0.08	
Met.wahrsch.Beschattung				158	180	207	

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung: GBSchattenrezeptor: Q - IO17**

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1   08:28	12:58 (1)   07:57		13:03 (1)   06:59	16:17 (23)   06:43	05:33   04:42		
15:54	72   14:46 (16)   16:46	87	15:20 (19)   17:43	34   16:51 (23)   19:42	20:39   21:30		
2   08:28	12:58 (1)   07:55		13:05 (1)   06:57	16:16 (23)   06:40	05:31   04:41		
15:55	72   14:46 (16)   16:48	84	15:20 (19)   17:45	35   16:51 (23)   19:44	20:40   21:31		
3   08:28	12:58 (1)   07:54		13:05 (1)   06:54	16:16 (23)   06:38	05:29   04:40		
15:57	76   14:59 (19)   16:50	81	15:19 (19)   17:47	36   16:52 (23)   19:46	20:42   21:32		
4   08:28	12:59 (1)   07:52		13:06 (1)   06:52	16:15 (23)   06:35	05:26   04:40		
15:58	79   15:02 (19)   16:52	77	15:18 (19)   17:49	36   16:51 (23)   19:48	20:44   21:33		
5   08:27	12:58 (1)   07:50		13:07 (1)   06:49	16:15 (23)   06:33	05:24   04:39		
15:59	83   15:04 (19)   16:54	72	15:16 (19)   17:51	37   16:52 (23)   19:50	20:46   21:34		
6   08:27	12:59 (1)   07:48		13:08 (1)   06:47	16:14 (23)   06:31	05:22   04:38		
16:00	86   15:06 (19)   16:56	66	15:14 (19)   17:53	37   16:51 (23)   19:52	20:48   21:35		
7   08:26	12:59 (1)   07:46		13:09 (1)   06:45	16:14 (23)   06:28	05:20   04:37		
16:02	88   15:07 (19)   16:58	52	14:01 (1)   17:55	37   16:51 (23)   19:54	20:50   21:36		
8   08:26	12:59 (1)   07:44		13:09 (1)   06:42	16:14 (23)   06:26	05:18   04:37		
16:03	88   15:08 (19)   17:00	51	14:00 (1)   17:57	36   16:50 (23)   19:55	20:51   21:37		
9   08:25	12:59 (1)   07:42		13:10 (1)   06:40	16:15 (23)   06:23	05:17   04:36		
16:05	89   15:09 (19)   17:03	49	13:59 (1)   17:59	35   16:50 (23)   19:57	20:53   21:38		
10   08:25	12:59 (1)   07:40		13:12 (1)   06:37	16:14 (23)   06:21	05:15   04:36		
16:06	90   15:10 (19)   17:05	46	13:58 (1)   18:01	35   16:49 (23)   19:59	20:55   21:39		
11   08:24	12:59 (1)   07:38		13:13 (1)   06:35	16:15 (23)   06:18	05:13   04:35		
16:08	90   15:11 (19)   17:07	44	13:57 (1)   18:02	34   16:49 (23)   20:01	20:57   21:40		
12   08:23	12:59 (1)   07:36		13:15 (1)   06:32	16:16 (23)   06:16	05:11   04:35		
16:09	89   15:12 (19)   17:09	41	13:56 (1)   18:04	32   16:48 (23)   20:03	20:59   21:41		
13   08:22	12:59 (1)   07:34		13:17 (1)   06:30	16:17 (23)   06:14	05:09   04:34		
16:11	85   15:13 (19)   17:11	37	13:54 (1)   18:06	29   16:46 (23)   20:05	21:00   21:41		
14   08:21	12:59 (1)   07:32		13:20 (1)   06:27	16:18 (23)   06:11	05:07   04:34		
16:13	84   15:14 (19)   17:13	32	13:52 (1)   18:08	27   16:45 (23)   20:07	21:02   21:42		
15   08:20	12:59 (1)   07:30		13:22 (1)   06:25	16:19 (23)   06:09	05:06   04:34		
16:14	86   15:15 (19)   17:15	27	13:49 (1)   18:10	24   16:43 (23)   20:09	21:04   21:43		
16   08:19	13:00 (1)   07:28		13:26 (1)   06:23	16:22 (23)   06:06	05:04   04:34		
16:16	88   15:17 (19)   17:17	19	13:45 (1)   18:12	19   16:41 (23)   20:11	21:06   21:43		
17   08:18	13:00 (1)   07:26		13:27 (1)   06:20	16:25 (23)   06:04	05:02   04:33		
16:18	89   15:18 (19)   17:19		18:14	12   16:37 (23)   20:12	21:07   21:44		
18   08:17	12:59 (1)   07:24		16:18		06:02   05:01	04:33	
16:19	91   15:18 (19)   17:21		18:16		20:14   21:09	21:44	
19   08:16	13:00 (1)   07:22		16:15		05:59   04:59	04:33	
16:21	91   15:19 (19)   17:23		18:18		20:16   21:11	21:45	
20   08:15	13:01 (1)   07:19		16:13		05:57   04:58	04:34	
16:23	91   15:20 (19)   17:25		18:20		20:18   21:12	21:45	
21   08:14	13:00 (1)   07:17		16:10		05:55   04:56	04:34	
16:25	93   15:20 (19)   17:27		18:22		20:20   21:14	21:45	
22   08:12	13:01 (1)   07:15		16:31 (23)   06:08		05:52   04:55	04:34	
16:27	93   15:21 (19)   17:29	7	16:38 (23)   18:23		20:22   21:15	21:45	
23   08:11	13:01 (1)   07:13		16:27 (23)   06:05		05:50   04:53	04:34	
16:29	93   15:21 (19)   17:31	16	16:43 (23)   18:25		20:24   21:17	21:46	
24   08:10	13:00 (1)   07:10		16:24 (23)   06:03		05:48   04:52	04:34	
16:31	94   15:20 (19)   17:33	22	16:46 (23)   18:27		20:26   21:18	21:46	
25   08:08	13:01 (1)   07:08		16:22 (23)   06:00		05:46   04:50	04:35	
16:32	94   15:21 (19)   17:35	25	16:47 (23)   18:29		20:27   21:20	21:46	
26   08:07	13:01 (1)   07:06		16:20 (23)   05:58		05:43   04:49	04:35	
16:34	94   15:21 (19)   17:37	29	16:49 (23)   18:31		20:29   21:21	21:46	
27   08:05	13:01 (1)   07:04		16:19 (23)   05:55		05:41   04:48	04:36	
16:36	94   15:21 (19)   17:39	30	16:49 (23)   18:33		20:31   21:23	21:46	
28   08:04	13:02 (1)   07:01		16:18 (23)   05:53		05:39   04:47	04:36	
16:38	93   15:22 (19)   17:41	32	16:50 (23)   18:35		20:33   21:24	21:45	
29   08:02	13:03 (1)   07:00		16:50 (23)   18:35		05:37   04:45	04:37	
16:40	91   15:21 (19)   17:37		19:37		20:35   21:26	21:45	
30   08:01	13:03 (1)   07:00		16:48		05:35   04:44	04:37	
16:42	89   15:21 (19)   17:39		19:39		20:37   21:27	21:45	
31   07:59	13:03 (1)   07:00		16:45			04:43	
16:44	88   15:20 (19)   17:37		19:40			21:28	
Sonnenscheinstunden	248	272	367	421	496	513	
astr.max.mögl.Beschattung	2723	1026	535				
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31				
Reduktion Betriebsdauer	0.90	0.90	0.90				
Reduktion Windrichtung	0.64	0.64	0.70				
Gesamte Reduktion	0.10	0.14	0.20				
Met.wahrsch.Beschattung	273	141	104				

**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	Schattendenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: Q - IO17**  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	05:19	06:14	07:08	16:56 (23)   07:07	12:41 (1)   08:03	
	21:45	21:09	20:01	18:46	31   17:27 (23)   16:35	47   13:28 (1)   15:50	
2	04:39	05:20	06:16	07:10	16:55 (23)   07:09	12:40 (1)   08:05	
	21:44	21:07	19:59	18:44	32   17:27 (23)   16:33	49   13:29 (1)   15:49	
3	04:40	05:22	06:17	07:12	16:53 (23)   07:11	12:38 (1)   08:06	
	21:44	21:05	19:56	18:41	34   17:27 (23)   16:31	52   13:30 (1)   15:48	
4	04:40	05:24	06:19	07:14	16:52 (23)   07:13	12:38 (1)   08:08	
	21:43	21:03	19:54	18:39	35   17:27 (23)   16:29	53   13:31 (1)   15:47	
5	04:41	05:25	06:21	07:15	16:51 (23)   07:15	12:37 (1)   08:09	
	21:43	21:01	19:51	18:37	36   17:27 (23)   16:27	67   14:44 (19)   15:47	
6	04:42	05:27	06:23	07:17	16:51 (23)   07:17	12:37 (1)   08:11	
	21:42	20:59	19:49	18:34	36   17:27 (23)   16:25	72   14:46 (19)   15:46	
7	04:43	05:29	06:25	07:19	16:50 (23)   07:19	12:36 (1)   08:12	
	21:41	20:57	19:46	18:32	37   17:27 (23)   16:23	78   14:48 (19)   15:46	
8	04:44	05:31	06:26	07:21	16:50 (23)   07:21	12:35 (1)   08:13	
	21:41	20:55	19:44	18:29	37   17:27 (23)   16:21	81   14:49 (19)   15:45	
9	04:45	05:33	06:28	07:23	16:50 (23)   07:23	12:35 (1)   08:14	
	21:40	20:53	19:41	18:27	37   17:27 (23)   16:20	83   14:50 (19)   15:45	
10	04:46	05:34	06:30	07:25	16:50 (23)   07:25	12:35 (1)   08:16	
	21:39	20:51	19:39	18:24	36   17:26 (23)   16:18	87   14:52 (19)   15:45	
11	04:48	05:36	06:32	07:27	16:50 (23)   07:27	12:35 (1)   08:17	
	21:38	20:49	19:36	18:22	36   17:26 (23)   16:16	88   14:52 (19)   15:44	
12	04:49	05:38	06:34	07:29	16:50 (23)   07:29	12:35 (1)   08:18	
	21:37	20:47	19:34	18:20	35   17:25 (23)   16:14	90   14:53 (19)   15:44	
13	04:50	05:40	06:35	07:30	16:51 (23)   07:31	12:34 (1)   08:19	
	21:36	20:45	19:31	18:17	33   17:24 (23)   16:13	91   14:53 (19)   15:44	
14	04:51	05:41	06:37	07:32	16:51 (23)   07:33	12:34 (1)   08:20	
	21:35	20:43	19:29	18:15	32   17:23 (23)   16:11	93   14:54 (19)   15:44	
15	04:52	05:43	06:39	07:34	16:52 (23)   07:35	12:34 (1)   08:21	
	21:34	20:40	19:26	18:12	30   17:22 (23)   16:09	94   14:54 (19)   15:44	
16	04:54	05:45	06:41	07:36	16:53 (23)   07:37	12:34 (1)   08:22	
	21:33	20:38	19:24	18:10	27   17:20 (23)   16:08	94   14:54 (19)   15:44	
17	04:55	05:47	06:43	07:38	16:55 (23)   07:38	12:34 (1)   08:23	
	21:32	20:36	19:21	18:08	23   17:18 (23)   16:06	94   14:54 (19)   15:44	
18	04:57	05:49	06:44	07:40	16:56 (23)   07:40	12:34 (1)   08:24	
	21:30	20:34	19:19	18:05	20   17:16 (23)   16:05	94   14:54 (19)   15:44	
19	04:58	05:50	06:46	07:42	16:59 (23)   07:42	12:36 (1)   08:24	
	21:29	20:32	19:16	18:03	14   17:13 (23)   16:03	93   14:56 (19)   15:45	
20	04:59	05:52	06:48	07:44	16:59 (23)   07:44	12:36 (1)   08:25	
	21:28	20:29	19:14	18:01	11   16:02	93   14:56 (19)   15:45	
21	05:01	05:54	06:50	07:46	16:01	93   14:56 (19)   15:45	
	21:26	20:27	19:11	17:59	16:01	93   14:56 (19)   15:45	
22	05:02	05:56	06:52	07:48	16:01	93   14:56 (19)   15:45	
	21:25	20:25	19:09	17:56	15:59	91   14:56 (19)   15:46	
23	05:04	05:58	06:53	07:50	16:02	93   14:56 (19)   15:46	
	21:24	20:22	19:06	17:54	15:58	92   14:56 (19)   15:46	
24	05:06	05:59	06:55	07:52	16:03	93   14:56 (19)   15:47	
	21:22	20:20	19:04	17:52	15:57	90   14:56 (19)   15:47	
25	05:07	06:01	06:57	06:53	13:01 (1)   07:53	12:38 (1)   08:27	
	21:20	20:18	19:01	16:50	8   13:09 (1)   15:56	89   14:56 (19)   15:48	
26	05:09	06:03	06:59	06:55	12:54 (1)   07:55	12:38 (1)   08:28	
	21:19	20:15	18:59	7   17:17 (23)   16:48	22   13:16 (1)   15:54	87   14:55 (19)   15:48	
27	05:10	06:05	07:01	06:57	12:51 (1)   07:57	12:38 (1)   08:28	
	21:17	20:13	18:56	17   17:21 (23)   16:45	28   13:19 (1)   15:53	87   14:55 (19)   15:49	
28	05:12	06:07	07:03	06:59	12:49 (1)   07:58	12:39 (1)   08:28	
	21:16	20:11	18:54	22   17:23 (23)   16:43	33   13:22 (1)   15:52	85   14:55 (19)   15:50	
29	05:14	06:08	07:04	07:01	12:46 (1)   08:00	12:40 (1)   08:28	
	21:14	20:08	18:51	26   17:25 (23)   16:41	38   13:24 (1)   15:51	84   14:55 (19)   15:51	
30	05:15	06:10	07:06	07:03	12:44 (1)   08:02	12:41 (1)   08:28	
	21:12	20:06	18:49	29   17:26 (23)   16:39	41   13:25 (1)   15:51	88   14:54 (19)   15:52	
31	05:17	06:12		07:05	12:42 (1)	08:28	12:57 (1)
	21:10	20:03		16:37	45   13:27 (1)	15:53	71   14:45 (16)
Sonnenscheinstunden	515	461	383	328	257	231	2469
astr.max.mögl.Beschattung			101	816	2479		0.14
Red.Sonnenscheinwahrsch.			0.40	0.33	0.21		0.90
Reduktion Betriebsdauer			0.90	0.90	0.90		0.64
Reduktion Windrichtung			0.70	0.68	0.64		0.08
Gesamte Reduktion			0.25	0.20	0.12		196
Met.wahrsch.Beschattung			25	163	298		

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: R - IO18

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28	12:01 (20)   07:57	13:56 (1)   06:59	14:17 (1)   06:43	05:33	04:42	
	15:54	44 15:09 (16)   16:46	89 15:54 (19)   17:43	23 14:40 (1)   19:42	20:39	21:30	
2	08:28	12:02 (20)   07:55	13:56 (1)   06:56	14:23 (1)   06:40	05:31	04:41	
	15:55	43 15:10 (16)   16:48	91 15:55 (19)   17:45	11 14:34 (1)   19:44	20:40	21:31	
3	08:28	12:02 (20)   07:54	13:56 (1)   06:54	19:46	05:29	04:40	
	15:57	44 15:10 (16)   16:50	92 15:56 (19)   17:47	19:46	20:42	21:32	
4	08:28	12:04 (20)   07:52	13:56 (1)   06:52	06:35	05:26	04:40	
	15:58	42 15:11 (16)   16:52	94 15:56 (19)   17:49	19:48	20:44	21:33	
5	08:27	12:05 (20)   07:50	13:56 (1)   06:49	06:33	05:24	04:39	
	15:59	40 15:11 (16)   16:54	94 15:56 (19)   17:51	19:50	20:46	21:34	
6	08:27	12:07 (20)   07:48	13:56 (1)   06:47	17:04 (23)   06:31	05:22	04:38	
	16:00	38 15:12 (16)   16:56	95 15:57 (19)   17:53	2 17:06 (23)   19:52	20:48	21:35	
7	08:26	12:08 (20)   07:46	13:56 (1)   06:45	16:58 (23)   06:28	05:20	04:37	
	16:02	37 15:13 (16)   16:58	95 15:57 (19)   17:55	14 17:12 (23)   19:54	20:50	21:36	
8	08:26	12:10 (20)   07:44	13:55 (1)   06:42	16:55 (23)   06:26	05:18	04:37	
	16:03	34 15:13 (16)   17:00	95 15:56 (19)   17:57	19 17:14 (23)   19:55	20:51	21:37	
9	08:25	12:12 (20)   07:42	13:55 (1)   06:40	16:53 (23)   06:23	05:17	04:36	
	16:05	30 15:13 (16)   17:03	95 15:56 (19)   17:59	23 17:16 (23)   19:57	20:53	21:38	
10	08:25	14:13 (1)   07:40	13:55 (1)   06:37	16:51 (23)   06:21	05:15	04:36	
	16:06	36 15:14 (16)   17:05	93 15:55 (19)   18:01	26 17:17 (23)   19:59	20:55	21:39	
11	08:24	14:11 (1)   07:38	13:55 (1)   06:35	16:50 (23)   06:18	05:13	04:35	
	16:08	40 15:14 (16)   17:07	93 15:55 (19)   18:02	29 17:19 (23)   20:01	20:57	21:40	
12	08:23	14:09 (1)   07:36	13:56 (1)   06:32	16:49 (23)   06:16	05:11	04:35	
	16:09	44 15:14 (16)   17:09	91 15:55 (19)   18:04	31 17:20 (23)   20:03	20:59	21:41	
13	08:22	14:08 (1)   07:34	13:56 (1)   06:30	16:48 (23)   06:14	05:09	04:34	
	16:11	48 15:15 (16)   17:11	89 15:54 (19)   18:06	32 17:20 (23)   20:05	21:00	21:41	
14	08:21	14:07 (1)   07:32	13:57 (1)   06:27	16:47 (23)   06:11	05:07	04:34	
	16:13	51 15:15 (16)   17:13	86 15:53 (19)   18:08	33 17:20 (23)   20:07	21:02	21:42	
15	08:20	14:06 (1)   07:30	13:56 (1)   06:25	16:46 (23)   06:09	05:06	04:34	
	16:14	53 15:15 (16)   17:15	83 15:51 (19)   18:10	34 17:20 (23)   20:09	21:04	21:43	
16	08:19	14:05 (1)   07:28	13:57 (1)   06:23	16:46 (23)   06:06	05:04	04:34	
	16:16	55 15:16 (16)   17:17	78 15:49 (19)   18:12	34 17:20 (23)   20:11	21:06	21:43	
17	08:18	14:04 (1)   07:26	13:58 (1)   06:20	16:46 (23)   06:04	05:02	04:33	
	16:18	57 15:16 (16)   17:19	70 15:46 (19)   18:14	34 17:20 (23)   20:12	21:07	21:44	
18	08:17	14:03 (1)   07:24	13:59 (1)   06:18	16:45 (23)   06:02	05:01	04:33	
	16:19	58 15:15 (16)   17:21	59 14:58 (1)   18:16	34 17:19 (23)   20:14	21:09	21:44	
19	08:16	14:03 (1)   07:22	13:59 (1)   06:15	16:45 (23)   05:59	04:59	04:33	
	16:21	59 15:15 (16)   17:23	58 14:57 (1)   18:18	34 17:19 (23)   20:16	21:11	21:45	
20	08:15	14:02 (1)   07:19	14:00 (1)   06:13	16:45 (23)   05:57	04:58	04:34	
	16:23	61 15:15 (16)   17:25	56 14:56 (1)   18:20	32 17:17 (23)   20:18	21:12	21:45	
21	08:14	14:01 (1)   07:17	14:01 (1)   06:10	16:46 (23)   05:55	04:56	04:34	
	16:25	60 15:14 (16)   17:27	55 14:56 (1)   18:22	31 17:17 (23)   20:20	21:14	21:45	
22	08:12	14:01 (1)   07:15	14:02 (1)   06:08	16:46 (23)   05:52	04:55	04:34	
	16:27	60 15:14 (16)   17:29	52 14:54 (1)   18:23	30 17:16 (23)   20:22	21:15	21:45	
23	08:11	14:00 (1)   07:13	14:03 (1)   06:05	16:47 (23)   05:50	04:53	04:34	
	16:29	58 15:12 (16)   17:31	50 14:53 (1)   18:25	28 17:15 (23)   20:24	21:17	21:46	
24	08:10	13:59 (1)   07:10	14:05 (1)   06:03	16:48 (23)   05:48	04:52	04:34	
	16:31	55 15:39 (19)   17:33	47 14:52 (1)   18:27	25 17:13 (23)   20:26	21:18	21:46	
25	08:08	13:59 (1)   07:08	14:06 (1)   06:00	16:50 (23)   05:46	04:50	04:35	
	16:32	63 15:44 (19)   17:35	44 14:50 (1)   18:29	21 17:11 (23)   20:27	21:20	21:46	
26	08:07	13:58 (1)   07:06	14:08 (1)   05:58	16:51 (23)   05:43	04:49	04:35	
	16:34	70 15:46 (19)   17:37	40 14:48 (1)   18:31	17 17:08 (23)   20:29	21:21	21:46	
27	08:05	13:57 (1)   07:04	14:10 (1)   05:55	16:55 (23)   05:41	04:48	04:36	
	16:36	74 15:48 (19)   17:39	36 14:46 (1)   18:33	10 17:05 (23)   20:31	21:23	21:46	
28	08:04	13:58 (1)   07:01	14:13 (1)   05:53	05:39	04:47	04:36	
	16:38	77 15:50 (19)   17:41	30 14:43 (1)   18:35	20:33	21:24	21:45	
29	08:02	13:57 (1)   07:00	06:50	05:37	04:45	04:37	
	16:40	82 15:51 (19)   17:43	19:37	20:35	21:26	21:45	
30	08:01	13:57 (1)   07:00	06:48	05:35	04:44	04:37	
	16:42	83 15:52 (19)   17:45	19:39	20:37	21:27	21:45	
31	07:59	13:56 (1)   07:00	06:45		04:43		
	16:44	87 15:53 (19)   17:47	19:40		21:28		
	Sonnenscheinstunden	248	272	367	421	496	513
	astr.max.mögl.Beschattung	1683	2050	607			
	Red.Sonnenscheinwahrsch.	0.17	0.24	0.31			
	Reduktion Betriebsdauer	0.90	0.90	0.90			
	Reduktion Windrichtung	0.67	0.68	0.68			
	Gesamte Reduktion	0.10	0.14	0.19			
	Met.wahrsch.Beschattung	175	297	115			

**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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: R - IO18  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember			
1	04:38 21:45	05:19 21:09	06:14 20:01	07:08 18:46	17:28 (23) 17:59 (23)	07:07 16:35	13:25 (1) 15:50	08:03 15:50	13:53 (1) 14:56 (16)
2	04:39 21:44	05:20 21:07	06:16 19:59	07:10 18:44	17:28 (23) 17:58 (23)	07:09 16:33	13:25 (1) 15:49	08:05 15:49	13:56 (1) 14:57 (16)
3	04:40 21:44	05:22 21:05	06:17 19:56	07:12 18:41	17:28 (23) 17:56 (23)	07:11 16:31	13:24 (1) 15:48	08:06 15:48	11:56 (20) 14:57 (16)
4	04:40 21:43	05:24 21:03	06:19 19:54	07:14 18:39	17:29 (23) 17:54 (23)	07:13 16:29	13:25 (1) 15:47	08:08 15:47	11:54 (20) 14:57 (16)
5	04:41 21:43	05:25 21:01	06:21 19:51	07:15 18:37	17:31 (23) 17:52 (23)	07:15 16:27	13:25 (1) 15:46	08:09 15:47	11:53 (20) 14:58 (16)
6	04:42 21:42	05:27 20:59	06:23 19:49	07:17 18:34	17:33 (23) 17:50 (23)	07:17 16:25	13:26 (1) 15:46	08:11 15:46	11:52 (20) 14:58 (16)
7	04:43 21:41	05:29 20:57	06:25 19:46	07:19 18:32	17:36 (23) 17:46 (23)	07:19 16:23	13:26 (1) 15:46	08:12 15:46	11:52 (20) 14:58 (16)
8	04:44 21:41	05:31 20:55	06:26 19:44	07:21 18:29	17:40 (23) 17:40 (23)	07:21 16:21	13:26 (1) 15:45	08:13 15:45	11:51 (20) 14:58 (16)
9	04:45 21:40	05:33 20:53	06:28 19:41	07:23 18:27	17:44 (23) 17:44 (23)	07:23 16:20	13:26 (1) 15:45	08:14 15:45	11:52 (20) 14:59 (16)
10	04:46 21:39	05:34 20:51	06:30 19:39	07:25 18:24	17:48 (23) 17:48 (23)	07:25 16:18	13:27 (1) 15:45	08:16 15:45	11:51 (20) 14:59 (16)
11	04:48 21:38	05:36 20:49	06:32 19:36	07:27 18:22	17:52 (23) 14:53 (1)	07:27 16:16	13:28 (1) 15:44	08:17 15:44	11:51 (20) 14:59 (16)
12	04:49 21:37	05:38 20:47	06:34 19:34	07:29 18:20	14:53 (1) 15:11 (1)	07:29 16:14	13:28 (1) 15:44	08:18 15:44	11:51 (20) 14:59 (16)
13	04:50 21:36	05:40 20:45	06:35 19:31	07:30 18:17	14:48 (1) 15:15 (1)	07:31 16:13	13:29 (1) 15:44	08:19 15:44	11:51 (20) 14:59 (16)
14	04:51 21:35	05:41 20:43	06:37 19:29	07:32 18:15	14:45 (1) 15:18 (1)	07:33 16:11	13:30 (1) 15:44	08:20 15:44	11:51 (20) 14:59 (16)
15	04:52 21:34	05:43 20:40	06:39 19:26	07:34 18:12	14:42 (1) 15:20 (1)	07:35 16:09	13:30 (1) 15:44	08:21 15:44	11:51 (20) 15:00 (16)
16	04:54 21:33	05:45 20:38	06:41 19:24	17:45 (23) 17:53 (23)	14:40 (1) 15:21 (1)	07:36 16:08	13:31 (1) 15:44	08:22 15:44	11:51 (20) 15:00 (16)
17	04:55 21:32	05:47 20:36	06:43 19:21	17:40 (23) 17:56 (23)	14:37 (1) 15:23 (1)	07:38 16:06	13:32 (1) 15:44	08:23 15:44	11:52 (20) 15:01 (16)
18	04:57 21:30	05:49 20:34	06:44 19:19	17:38 (23) 17:58 (23)	14:36 (1) 15:24 (1)	07:40 16:05	13:33 (1) 15:44	08:24 15:44	11:52 (20) 15:01 (16)
19	04:58 21:29	05:50 20:32	06:46 19:16	17:36 (23) 18:00 (23)	14:34 (1) 15:25 (1)	07:42 16:03	13:35 (1) 15:45	08:24 15:45	11:53 (20) 15:02 (16)
20	04:59 21:28	05:52 20:29	06:48 19:14	17:34 (23) 18:01 (23)	14:32 (1) 15:26 (1)	07:44 16:02	13:36 (1) 15:45	08:25 15:45	11:53 (20) 15:02 (16)
21	05:01 21:26	05:54 20:27	06:50 19:11	17:32 (23) 18:01 (23)	14:31 (1) 15:26 (1)	07:46 16:01	13:37 (1) 15:45	08:26 15:45	11:54 (20) 15:03 (16)
22	05:02 21:25	05:56 20:25	06:52 19:09	17:31 (23) 18:02 (23)	14:30 (1) 15:27 (1)	07:48 16:00	13:38 (1) 15:46	08:26 15:46	11:54 (20) 15:03 (16)
23	05:04 21:24	05:58 20:22	06:53 19:06	17:30 (23) 18:02 (23)	14:29 (1) 15:27 (1)	07:50 16:00	13:40 (1) 15:46	08:27 15:46	11:55 (20) 15:04 (16)
24	05:06 21:22	05:59 20:20	06:55 19:04	17:29 (23) 18:02 (23)	14:28 (1) 15:28 (1)	07:51 16:00	13:41 (1) 15:47	08:27 15:47	11:55 (20) 15:04 (16)
25	05:07 21:20	06:01 20:18	06:57 19:01	17:29 (23) 18:02 (23)	13:27 (1) 15:17 (19)	07:53 16:00	13:43 (1) 15:48	08:27 15:48	11:55 (20) 15:04 (16)
26	05:09 21:19	06:03 20:15	06:59 18:59	17:28 (23) 18:02 (23)	13:26 (1) 15:19 (19)	07:55 16:00	13:43 (1) 15:48	08:28 15:48	11:56 (20) 15:05 (16)
27	05:10 21:17	06:05 20:13	07:01 18:56	17:27 (23) 18:01 (23)	13:26 (1) 15:21 (19)	07:57 16:00	13:45 (1) 15:49	08:28 15:49	11:57 (20) 15:06 (16)
28	05:12 21:16	06:07 20:11	07:03 18:54	17:27 (23) 18:01 (23)	13:26 (1) 15:23 (19)	07:58 16:00	13:47 (1) 15:50	08:28 15:50	11:58 (20) 15:07 (16)
29	05:14 21:14	06:08 20:08	07:04 18:51	17:27 (23) 18:00 (23)	13:26 (1) 15:24 (19)	08:00 16:00	13:49 (1) 15:51	08:28 15:51	11:58 (20) 15:07 (16)
30	05:15 21:12	06:10 20:06	07:06 18:49	17:27 (23) 18:00 (23)	13:25 (1) 15:24 (19)	08:02 16:00	13:51 (1) 15:52	08:28 15:52	11:58 (20) 15:07 (16)
31	05:17 21:10	06:12 20:03	07:08 18:47	17:27 (23) 18:00 (23)	13:25 (1) 15:25 (19)	08:00 16:00	13:51 (1) 15:53	08:28 15:53	11:59 (20) 15:08 (16)
Sonnenscheinstunden	515	461	383	328	257	2190	231	1334	106
astr.max.mögl.Beschattung			421	1343		2190		1334	
Red.Sonnenscheinwahrsch.			0.40	0.33		0.21		0.14	
Reduktion Betriebsdauer			0.90	0.90		0.90		0.90	
Reduktion Windrichtung			0.68	0.67		0.68		0.64	
Gesamte Reduktion			0.24	0.20		0.13		0.08	
Met.wahrsch.Beschattung			103	267		277		106	

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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: S - IO19

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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28	12:23 (20)   07:57	15:25 (16)   06:59	14:46 (1)   06:43	18:13 (23)   05:33	04:42	
	15:54	40 13:03 (20)   16:46	12 15:37 (16)   17:43	65 15:51 (1)   19:42	27 18:40 (23)   20:39	21:30	
2	08:28	12:24 (20)   07:55	15:28 (16)   06:56	14:46 (1)   06:40	18:13 (23)   05:31	04:41	
	15:55	39 13:03 (20)   16:48	6 15:34 (16)   17:45	64 15:50 (1)   19:44	25 18:38 (23)   20:40	21:31	
3	08:28	12:24 (20)   07:54	15:17 (1)   06:54	14:46 (1)   06:38	18:14 (23)   05:29	04:40	
	15:57	39 13:03 (20)   16:50	4 15:21 (1)   17:47	64 15:50 (1)   19:46	23 18:37 (23)   20:42	21:32	
4	08:28	12:25 (20)   07:52	15:10 (1)   06:52	14:46 (1)   06:35	18:15 (23)   05:26	04:40	
	15:58	39 13:04 (20)   16:52	18 15:28 (1)   17:49	63 15:49 (1)   19:48	20 18:35 (23)   20:44	21:33	
5	08:27	12:26 (20)   07:50	15:06 (1)   06:49	14:47 (1)   06:33	18:18 (23)   05:24	04:39	
	15:59	37 13:05 (20)   16:54	26 15:32 (1)   17:51	62 15:49 (1)   19:50	14 18:32 (23)   20:46	21:34	
6	08:27	12:27 (20)   07:48	15:04 (1)   06:47	14:47 (1)   06:31	18:22 (23)   05:22	04:38	
	16:00	37 13:04 (20)   16:56	31 15:35 (1)   17:53	61 15:48 (1)   19:52	5 18:27 (23)   20:48	21:35	
7	08:26	12:27 (20)   07:46	15:02 (1)   06:45	14:48 (1)   06:28	18:20 (23)   05:20	04:37	
	16:02	37 13:04 (20)   16:58	39 16:13 (19)   17:55	59 15:47 (1)   19:54	18:20 (23)   05:20	21:36	
8	08:26	12:28 (20)   07:44	14:59 (1)   06:42	14:48 (1)   06:26	18:20 (23)   05:18	04:37	
	16:03	36 13:04 (20)   17:00	52 16:17 (19)   17:57	58 15:46 (1)   19:55	18:20 (23)   05:18	21:37	
9	08:25	12:29 (20)   07:42	14:57 (1)   06:40	14:50 (1)   06:23	18:20 (23)   05:17	04:36	
	16:05	35 13:04 (20)   17:03	60 16:19 (19)   17:59	55 15:45 (1)   19:57	18:20 (23)   05:17	21:38	
10	08:24	12:29 (20)   07:40	14:56 (1)   06:37	14:50 (1)   06:21	18:20 (23)   05:15	04:36	
	16:06	36 15:25 (16)   17:05	66 16:21 (19)   18:01	53 15:43 (1)   19:59	18:20 (23)   05:15	21:39	
11	08:24	12:30 (20)   07:38	14:55 (1)   06:35	14:52 (1)   06:18	18:20 (23)   05:13	04:35	
	16:08	41 15:29 (16)   17:07	72 16:23 (19)   18:02	51 15:43 (1)   20:01	18:20 (23)   05:13	21:40	
12	08:23	12:31 (20)   07:36	14:54 (1)   06:32	14:54 (1)   06:16	18:20 (23)   05:11	04:35	
	16:09	43 15:31 (16)   17:09	76 16:24 (19)   18:04	48 15:42 (1)   20:03	18:20 (23)   05:11	21:41	
13	08:22	12:32 (20)   07:34	14:53 (1)   06:30	14:55 (1)   06:14	18:20 (23)   05:09	04:34	
	16:11	44 15:32 (16)   17:11	80 16:25 (19)   18:06	44 15:39 (1)   20:05	18:20 (23)   05:09	21:41	
14	08:21	12:33 (20)   07:32	14:52 (1)   06:27	14:57 (1)   06:11	18:20 (23)   05:07	04:34	
	16:13	45 15:34 (16)   17:13	84 16:26 (19)   18:08	41 15:38 (1)   20:07	18:20 (23)   05:07	21:42	
15	08:20	12:35 (20)   07:30	14:50 (1)   06:25	14:59 (1)   06:09	18:20 (23)   05:06	04:34	
	16:14	44 15:35 (16)   17:15	86 16:25 (19)   18:10	36 15:35 (1)   20:09	18:20 (23)   05:06	21:43	
16	08:19	12:36 (20)   07:28	14:50 (1)   06:23	15:02 (1)   06:06	18:20 (23)   05:04	04:34	
	16:16	44 15:36 (16)   17:17	88 16:26 (19)   18:12	31 15:33 (1)   20:11	18:20 (23)   05:04	21:43	
17	08:18	12:38 (20)   07:26	14:49 (1)   06:20	15:05 (1)   06:04	18:20 (23)   05:02	04:33	
	16:18	42 15:37 (16)   17:19	90 16:26 (19)   18:14	27 17:32 (23)   20:12	18:20 (23)   05:02	21:44	
18	08:17	12:39 (20)   07:24	14:49 (1)   06:18	15:10 (1)   06:02	18:20 (23)   05:01	04:33	
	16:19	40 15:37 (16)   17:21	92 16:27 (19)   18:16	26 17:37 (23)   20:14	18:20 (23)   05:01	21:44	
19	08:16	12:42 (20)   07:22	14:48 (1)   06:15	17:20 (23)   05:59	18:20 (23)   04:59	04:33	
	16:21	37 15:39 (16)   17:23	92 16:26 (19)   18:18	19 17:39 (23)   20:16	18:20 (23)   04:59	21:45	
20	08:15	12:46 (20)   07:19	14:47 (1)   06:13	17:18 (23)   05:57	18:20 (23)   04:58	04:34	
	16:23	32 15:40 (16)   17:25	93 16:26 (19)   18:20	22 17:40 (23)   20:18	18:20 (23)   04:58	21:45	
21	08:14	15:18 (16)   07:17	14:47 (1)   06:10	17:17 (23)   05:55	18:20 (23)   04:56	04:34	
	16:25	22 15:40 (16)   17:27	93 16:26 (19)   18:22	25 17:42 (23)   20:20	18:20 (23)   04:56	21:45	
22	08:12	15:18 (16)   07:15	14:46 (1)   06:08	17:15 (23)   05:52	18:20 (23)   04:55	04:34	
	16:27	23 15:41 (16)   17:29	93 16:25 (19)   18:23	27 17:42 (23)   20:22	18:20 (23)   04:55	21:45	
23	08:11	15:18 (16)   07:13	14:46 (1)   06:05	17:14 (23)   05:50	18:20 (23)   04:53	04:34	
	16:29	22 15:40 (16)   17:31	91 16:24 (19)   18:25	29 17:43 (23)   20:24	18:20 (23)   04:53	21:46	
24	08:10	15:18 (16)   07:10	14:46 (1)   06:03	17:13 (23)   05:48	18:20 (23)   04:52	04:34	
	16:31	22 15:40 (16)   17:33	90 16:23 (19)   18:27	30 17:43 (23)   20:26	18:20 (23)   04:52	21:46	
25	08:08	15:19 (16)   07:08	14:46 (1)   06:00	17:13 (23)   05:46	18:20 (23)   04:50	04:35	
	16:32	22 15:41 (16)   17:35	87 16:21 (19)   18:29	31 17:44 (23)   20:27	18:20 (23)   04:50	21:46	
26	08:07	15:19 (16)   07:06	14:46 (1)   05:58	17:12 (23)   05:43	18:20 (23)   04:49	04:35	
	16:34	22 15:41 (16)   17:37	84 16:20 (19)   18:31	31 17:43 (23)   20:29	18:20 (23)   04:49	21:46	
27	08:05	15:20 (16)   07:04	14:45 (1)   05:55	17:12 (23)   05:41	18:20 (23)   04:48	04:36	
	16:36	20 15:40 (16)   17:39	80 16:17 (19)   18:33	31 17:43 (23)   20:31	18:20 (23)   04:48	21:46	
28	08:04	15:21 (16)   07:01	14:46 (1)   05:53	17:11 (23)   05:39	18:20 (23)   04:47	04:36	
	16:38	20 15:41 (16)   17:41	70 16:13 (19)   18:35	31 17:42 (23)   20:33	18:20 (23)   04:47	21:45	
29	08:02	15:22 (16)   07:00	14:46 (1)   05:50	18:11 (23)   05:37	18:20 (23)   04:45	04:37	
	16:40	18 15:40 (16)   17:43	66 16:13 (19)   18:37	31 18:42 (23)   20:35	18:20 (23)   04:45	21:45	
30	08:01	15:22 (16)   06:58	14:46 (1)   05:48	18:12 (23)   05:35	18:20 (23)   04:44	04:37	
	16:42	17 15:39 (16)   17:45	66 16:13 (19)   18:37	30 18:42 (23)   20:37	18:20 (23)   04:44	21:45	
31	07:59	15:24 (16)   06:56	14:46 (1)   05:45	18:12 (23)   05:33	18:20 (23)   04:43	04:37	
	16:44	14 15:38 (16)   17:49	66 16:13 (19)   18:37	29 18:41 (23)   20:39	18:20 (23)   04:43	21:45	
	Sonnenscheinstunden	248	272	367	421	496	513
	astr.max.mögl.Beschattung	1009	1855	1274	114		
	Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41		
	Reduktion Betriebsdauer	0.90	0.90	0.90	0.90		
	Reduktion Windrichtung	0.64	0.69	0.68	0.68		
	Gesamte Reduktion	0.10	0.15	0.19	0.25		
	Met.wahrsch.Beschattung	100	272	243	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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	-------------------	----------------	------------	---------------------------	----------------------------

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: S - IO19  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	05:19	06:14	07:08	15:33 (1)   07:07	14:26 (1)   08:03	
	21:45	21:09	20:01	18:46	47 16:20 (1)   16:35	65 15:50 (19)   15:50	
2	04:39	05:20	06:16	07:10	15:31 (1)   07:09	14:27 (1)   08:05	
	21:44	21:07	19:59	18:44	50 16:21 (1)   16:33	59 15:49 (19)   15:49	
3	04:40	05:22	06:17	07:12	15:29 (1)   07:11	14:29 (1)   08:06	
	21:44	21:05	19:56	18:41	52 16:21 (1)   16:31	50 15:46 (19)   15:48	
4	04:40	05:24	06:19	07:14	15:27 (1)   07:13	14:32 (1)   08:08	
	21:43	21:03	19:54	18:39	55 16:22 (1)   16:29	34 15:06 (1)   15:47	
5	04:41	05:25	06:21	07:15	15:26 (1)   07:15	14:34 (1)   08:09	
	21:43	21:01	19:51	18:37	56 16:22 (1)   16:27	30 15:04 (1)   15:47	
6	04:42	05:27	06:23	07:17	15:25 (1)   07:17	14:36 (1)   08:10	
	21:42	20:59	19:49	5 18:18 (23)   18:34	58 16:23 (1)   16:25	25 15:01 (1)   15:46	
7	04:43	05:29	06:25	07:19	18:13 (23)   18:32	17 14:40 (1)   08:12	
	21:41	20:57	19:46	14 18:27 (23)   18:32	60 16:23 (1)   16:23	17 14:57 (1)   15:46	
8	04:44	05:31	06:26	07:21	18:11 (23)   18:29	62 16:24 (1)   16:21	15:45
	21:41	20:55	19:44	19 18:30 (23)   18:29	62 16:24 (1)   16:21	15:45	
9	04:45	05:33	06:28	07:23	18:08 (23)   18:27	62 16:24 (1)   16:20	6 15:05 (16)   15:45
	21:40	20:53	19:41	22 18:30 (23)   18:27	62 16:24 (1)   16:20	6 15:05 (16)   15:45	
10	04:46	05:34	06:30	07:25	18:06 (23)   18:24	63 16:24 (1)   16:18	12 15:08 (16)   15:45
	21:39	20:51	19:39	25 18:31 (23)   18:24	63 16:24 (1)   16:18	12 15:08 (16)   15:45	
11	04:48	05:36	06:32	07:27	18:05 (23)   18:22	64 16:24 (1)   16:16	15 15:10 (16)   15:44
	21:38	20:49	19:36	27 18:32 (23)   18:22	64 16:24 (1)   16:16	15 15:10 (16)   15:44	
12	04:49	05:38	06:34	07:29	18:04 (23)   18:20	65 16:24 (1)   16:14	17 15:11 (16)   15:44
	21:37	20:47	19:34	29 18:33 (23)   18:20	65 16:24 (1)   16:14	17 15:11 (16)   15:44	
13	04:50	05:40	06:35	07:30	18:02 (23)   18:17	65 16:24 (1)   16:13	19 15:12 (16)   15:44
	21:36	20:45	19:31	30 18:32 (23)   18:17	65 16:24 (1)   16:13	19 15:12 (16)   15:44	
14	04:51	05:41	06:37	07:32	18:02 (23)   18:15	75 16:48 (19)   16:11	20 15:13 (16)   15:44
	21:35	20:43	19:29	31 18:33 (23)   18:15	75 16:48 (19)   16:11	20 15:13 (16)   15:44	
15	04:52	05:43	06:39	07:34	18:01 (23)   18:12	82 16:51 (19)   16:09	21 15:13 (16)   15:44
	21:34	20:40	19:26	32 18:33 (23)   18:12	82 16:51 (19)   16:09	21 15:13 (16)   15:44	
16	04:54	05:45	06:41	07:36	18:01 (23)   18:10	86 16:53 (19)   16:08	22 15:14 (16)   15:44
	21:33	20:38	19:24	32 18:33 (23)   18:10	86 16:53 (19)   16:08	22 15:14 (16)   15:44	
17	04:55	05:47	06:43	07:38	18:00 (23)   18:08	88 16:54 (19)   16:06	22 15:14 (16)   15:44
	21:32	20:36	19:21	32 18:32 (23)   18:08	88 16:54 (19)   16:06	22 15:14 (16)   15:44	
18	04:57	05:49	06:44	07:40	18:00 (23)   18:05	90 16:55 (19)   16:05	22 15:14 (16)   15:44
	21:30	20:34	19:19	31 18:31 (23)   18:05	90 16:55 (19)   16:05	22 15:14 (16)   15:44	
19	04:58	05:50	06:46	07:42	18:00 (23)   18:03	92 16:56 (19)   16:03	22 15:15 (16)   15:45
	21:29	20:32	19:16	31 18:31 (23)   18:03	92 16:56 (19)   16:03	22 15:15 (16)   15:45	
20	04:59	05:52	06:48	07:44	18:01 (23)   18:01	92 16:56 (19)   16:02	23 15:16 (16)   15:45
	21:28	20:29	19:14	29 18:30 (23)   18:01	92 16:56 (19)   16:02	23 15:16 (16)   15:45	
21	05:01	05:54	06:50	07:46	18:00 (23)   17:59	92 16:56 (19)   16:01	22 15:16 (16)   15:45
	21:26	20:27	19:11	28 18:28 (23)   17:59	92 16:56 (19)   16:01	22 15:16 (16)   15:45	
22	05:02	05:56	06:52	07:48	18:01 (23)   17:56	93 16:56 (19)   15:59	32 15:16 (16)   15:46
	21:25	20:25	19:09	26 18:27 (23)   17:56	93 16:56 (19)   15:59	32 15:16 (16)   15:46	
23	05:04	05:58	06:53	07:50	18:02 (23)   17:54	92 16:56 (19)   15:58	37 15:16 (16)   15:46
	21:24	20:22	19:06	24 18:26 (23)   17:54	92 16:56 (19)   15:58	37 15:16 (16)   15:46	
24	05:06	05:59	06:55	07:52	18:03 (23)   17:52	90 16:56 (19)   15:57	41 15:16 (16)   15:47
	21:22	20:20	19:04	21 18:24 (23)   17:52	90 16:56 (19)   15:57	41 15:16 (16)   15:47	
25	05:07	06:01	06:57	07:53	18:21 (23)   16:50	89 15:56 (19)   15:56	42 15:14 (16)   15:48
	21:20	20:18	19:01	18 18:21 (23)   16:50	89 15:56 (19)   15:56	42 15:14 (16)   15:48	
26	05:09	06:03	06:59	07:55	18:18 (23)   16:48	86 15:55 (19)   15:54	44 15:14 (16)   15:48
	21:19	20:15	18:59	30 18:18 (23)   16:48	86 15:55 (19)   15:54	44 15:14 (16)   15:48	
27	05:10	06:05	07:01	07:57	18:18 (23)   16:45	85 15:55 (19)   15:53	43 15:14 (16)   15:49
	21:17	20:13	18:56	28 18:12 (1)   16:45	85 15:55 (19)   15:53	43 15:14 (16)   15:49	
28	05:12	06:07	07:03	07:58	18:11 (23)   16:42	82 15:55 (19)   15:52	45 15:14 (16)   15:50
	21:16	20:11	18:54	34 16:15 (1)   16:43	82 15:55 (19)   15:52	45 15:14 (16)   15:50	
29	05:14	06:08	07:04	07:59	18:10 (23)   16:41	81 15:54 (19)   15:51	44 15:13 (16)   15:51
	21:14	20:08	18:51	39 16:17 (1)   16:41	81 15:54 (19)   15:51	44 15:13 (16)   15:51	
30	05:15	06:10	07:06	08:00	18:09 (23)   16:40	80 15:53 (19)   15:51	43 15:13 (16)   15:52
	21:12	20:06	18:49	44 16:19 (1)   16:39	80 15:53 (19)   15:51	43 15:13 (16)   15:52	
31	05:17	06:12	07:05	08:00	18:08 (23)   16:37	79 15:52 (19)   15:51	42 15:13 (16)   15:52
	21:10	20:03	18:47	45 16:17 (1)   16:37	79 15:52 (19)   15:51	42 15:13 (16)   15:52	
Sonnenscheinstunden	515	461	383	328	257	231	
astr.max.mögl.Beschattung			681	2296	894	1380	
Red.Sonnenscheinwahrsch.			0.40	0.33	0.21	0.14	
Reduktion Betriebsdauer			0.90	0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.69	0.67	0.62	
Gesamte Reduktion			0.24	0.20	0.12	0.08	
Met.wahrsch.Beschattung			167	464	111	105	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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

Berechnet:  
André Gefke / andre.gefke@i17-wind.de  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: T - IO20

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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1   08:28	13:24 (23)	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
15:54	13:33 (23)	16:46	17:43	19:42	20:39	21:30	21:45	21:09	20:01	18:46	16:35	15:50
2   08:28	13:26 (23)	07:56	06:57	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:05
15:55	13:32 (23)	16:48	17:45	19:44	20:41	21:31	21:44	21:07	19:59	18:44	16:33	15:49
3   08:28		07:54	06:54	06:38	05:29	04:40	04:40	05:22	06:17	07:12	07:11	08:06
15:57		16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:56	18:42	16:31	15:48
4   08:28		07:52	06:52	06:35	05:26	04:40	04:40	05:24	06:19	07:14	07:13	08:08
15:58		16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:47
5   08:27		07:50	06:49	06:33	05:24	04:39	04:41	05:25	06:21	07:15	07:15	08:09
16:03		16:54	17:51	19:50	20:46	21:34	21:43	21:01	19:51	18:37	16:27	15:47
6   08:27		07:48	06:47	06:31	05:22	04:38	04:42	05:27	06:23	07:17	07:17	08:11
16:00		16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
7   08:26		07:46	06:45	06:28	05:20	04:37	04:43	05:29	06:25	07:19	07:19	08:12
16:02		16:58	17:55	19:54	20:50	21:36	21:41	20:57	19:46	18:32	16:23	15:46
8   08:26		07:44	06:42	06:26	05:18	04:37	04:44	05:31	06:26	07:21	07:21	08:13
16:03		17:00	17:57	19:56	20:52	21:37	21:41	20:55	19:44	18:29	16:21	15:45
9   08:25		07:42	06:40	06:23	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14
16:05		17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
10   08:25		07:41	06:37	06:21	05:15	04:36	04:46	05:34	06:30	07:25	07:25	08:16
16:06		17:05	18:01	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45
11   08:24		07:39	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17
16:08		17:07	18:02	20:01	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:44
12   08:23		07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:29	07:29	08:18
16:09		17:09	18:04	20:03	20:59	21:41	21:37	20:47	19:34	18:20	16:14	15:44
13   08:22		07:34	06:30	06:14	05:09	04:34	04:50	05:40	06:35	07:30	07:31	08:19
16:11		17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44
14   08:21		07:32	06:28	06:11	05:07	04:34	04:51	05:41	06:37	07:32	07:33	08:20
16:13		17:13	18:08	20:07	21:02	21:42	21:35	20:43	19:29	18:15	16:11	15:44
15   08:20		07:30	06:25	06:09	05:06	04:34	04:52	05:43	06:39	07:34	07:35	08:21
16:14		17:15	18:10	20:09	21:04	21:43	21:34	20:40	19:26	18:12	16:09	15:44
16   08:19		07:28	06:23	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:37	08:22
16:16		17:17	18:12	20:11	21:06	21:43	21:33	20:38	19:24	18:10	16:08	15:44
17   08:18		07:26	06:20	06:04	05:02	04:33	04:55	05:47	06:43	07:38	07:39	08:23
16:18		17:19	18:14	20:12	21:07	21:44	21:32	20:36	19:21	18:08	16:06	15:44
18   08:17		07:24	06:18	06:02	05:01	04:33	04:57	05:49	06:44	07:40	07:40	08:24
16:19		17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:05	16:05	15:44
19   08:16		07:22	06:15	05:59	04:59	04:33	04:58	05:50	06:46	07:42	07:42	08:24
16:21		17:23	18:18	20:16	21:11	21:45	21:29	20:32	19:16	18:03	16:03	15:45
20   08:15		07:19	06:13	05:57	04:58	04:33	04:59	05:52	06:48	07:44	07:44	08:25
16:23		17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45
21   08:14		07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:26
16:25		17:27	18:22	20:20	21:14	21:45	21:26	20:27	19:11	17:59	16:01	15:45
22   08:12		07:15	06:08	05:52	04:55	04:34	05:02	05:56	06:52	07:48	07:48	08:26
16:27		17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:46
23   08:11		07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:50	07:50	08:27
16:29		17:31	18:25	20:24	21:17	21:46	21:24	20:22	19:06	17:54	15:58	15:46
24   08:10		07:10	06:03	05:48	04:52	04:34	05:06	05:59	06:55	07:52	07:52	08:27
16:31		17:33	18:27	20:26	21:18	21:46	21:22	20:20	19:04	17:52	15:57	15:46
25   08:08		07:08	06:00	05:46	04:50	04:35	05:07	06:01	06:57	07:54	07:53	08:27
16:32		17:35	18:29	20:27	21:20	21:46	21:21	20:18	19:01	16:50	15:56	15:48
26   08:07		07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	07:55	07:55	08:28
16:34		17:37	18:31	20:29	21:21	21:46	21:19	20:15	18:59	16:48	15:54	15:48
27   08:05		07:04	05:55	05:41	04:48	04:36	05:10	06:05	07:01	06:57	07:57	08:28
16:36		17:39	18:33	20:31	21:23	21:46	21:17	20:13	18:56	16:45	15:53	15:49
28   08:04		07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:03	06:59	07:58	08:28
16:38		17:41	18:35	20:33	21:24	21:45	21:16	20:11	18:54	16:43	15:52	15:50
29   08:02			06:50	05:37	04:45	04:37	05:14	06:08	07:04	07:01	08:00	08:28
16:40			19:37	20:35	21:26	21:45	21:14	20:08	18:51	16:41	15:51	15:51
30   08:01			06:48	05:35	04:44	04:37	05:15	06:10	07:06	07:03	08:02	08:28
16:42			19:39	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52
31   07:59			06:45	05:32	04:43	04:35	05:17	06:12	07:05	07:05	08:05	08:28
16:44			19:40	20:38	21:28	21:46	21:10	20:04	16:37		15:53	15:53
Sonnenscheinstunden	248	272	367	421	496	513	515	461	383	328	257	231
astr.max.mögl.Beschattung												317
Red.Sonnenscheinwahrsch.		0.17										0.14
Reduktion Betriebsdauer		0.90										0.90
Reduktion Windrichtung		0.63										0.63
Gesamte Reduktion		0.10										0.08
Met.wahrsch.Beschattung		1										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)      Zeitpunkt (SS:MM) Schattendenende (WEA mit letztem Schatten)

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: U - IO21

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1   08:28	12:50 (20)   07:57	15:31 (16)   06:59	15:08 (1)   06:43	18:18 (23)   05:33	04:42	
15:54	50 14:30 (18)   16:46	15 15:46 (16)   17:43	58 16:06 (1)   19:42	17 18:35 (23)   20:39	21:30	
2   08:28	12:51 (20)   07:55	15:32 (16)   06:56	15:08 (1)   06:40	18:20 (23)   05:31	04:41	
15:55	48 14:30 (18)   16:48	13 15:45 (16)   17:45	57 16:05 (1)   19:44	12 18:32 (23)   20:40	21:31	
3   08:28	12:51 (20)   07:54	15:36 (16)   06:54	15:09 (1)   06:38		05:28 04:40	
15:57	47 14:29 (18)   16:50	8 15:44 (16)   17:47	55 16:04 (1)   19:46		20:42 21:32	
4   08:28	12:52 (20)   07:52		15:09 (1)   06:35		05:26 04:40	
15:58	44 14:29 (18)   16:52		54 16:03 (1)   19:48		20:44 21:33	
5   08:27	12:53 (20)   07:50		15:10 (1)   06:33		05:24 04:39	
15:59	37 14:26 (18)   16:54		53 16:03 (1)   19:50		20:46 21:34	
6   08:27	12:54 (20)   07:48	15:34 (1)   06:47	15:10 (1)   06:31		05:22 04:38	
16:00	36 13:30 (20)   16:56	7 15:41 (1)   17:53	52 16:02 (1)   19:52		20:48 21:35	
7   08:26	12:54 (20)   07:46	15:29 (1)   06:45	15:11 (1)   06:28		05:20 04:37	
16:02	36 13:30 (20)   16:58	18 15:47 (1)   17:55	50 16:01 (1)   19:54		20:50 21:36	
8   08:26	12:55 (20)   07:44	15:25 (1)   06:42	15:11 (1)   06:26		05:18 04:37	
16:03	35 13:30 (20)   17:00	24 15:49 (1)   17:57	48 15:59 (1)   19:55		20:51 21:37	
9   08:25	12:55 (20)   07:42	15:22 (1)   06:40	15:13 (1)   06:23		05:17 04:36	
16:05	35 13:30 (20)   17:03	37 16:21 (19)   17:59	46 15:59 (1)   19:57		20:53 21:38	
10   08:24	12:56 (20)   07:40	15:20 (1)   06:37	15:13 (1)   06:21		05:15 04:36	
16:06	33 13:29 (20)   17:05	48 16:25 (19)   18:01	44 15:57 (1)   19:59		20:55 21:39	
11   08:24	12:57 (20)   07:38	15:19 (1)   06:35	15:15 (1)   06:18		05:13 04:35	
16:08	32 13:29 (20)   17:07	55 16:27 (19)   18:02	41 15:56 (1)   20:01		20:57 21:40	
12   08:23	12:58 (20)   07:36	15:17 (1)   06:32	15:18 (1)   06:16		05:11 04:35	
16:09	31 13:29 (20)   17:09	62 16:29 (19)   18:04	36 15:54 (1)   20:03		20:59 21:41	
13   08:22	12:59 (20)   07:34	15:16 (1)   06:30	15:19 (1)   06:14		05:09 04:34	
16:11	30 13:29 (20)   17:11	66 16:30 (19)   18:06	32 15:51 (1)   20:05		21:00 21:41	
14   08:21	13:00 (20)   07:32	15:15 (1)   06:27	15:22 (1)   06:11		05:07 04:34	
16:13	29 13:29 (20)   17:13	70 16:31 (19)   18:08	27 15:49 (1)   20:07		21:02 21:42	
15   08:20	13:01 (20)   07:30	15:14 (1)   06:25	15:25 (1)   06:09		05:06 04:34	
16:14	34 15:38 (16)   17:15	73 16:31 (19)   18:10	20 15:45 (1)   20:09		21:04 21:43	
16   08:19	13:03 (20)   07:28	15:13 (1)   06:23	15:32 (1)   06:06		05:04 04:34	
16:16	36 15:40 (16)   17:17	76 16:32 (19)   18:12	14 17:35 (23)   20:11		21:05 21:43	
17   08:18	13:05 (20)   07:26	15:12 (1)   06:20	17:23 (23)   06:04		05:02 04:33	
16:18	36 15:42 (16)   17:19	78 16:32 (19)   18:14	16 17:39 (23)   20:12		21:07 21:44	
18   08:17	13:06 (20)   07:24	15:12 (1)   06:18	17:20 (23)   06:02		05:01 04:33	
16:19	35 15:43 (16)   17:21	80 16:33 (19)   18:16	20 17:40 (23)   20:14		21:09 21:44	
19   08:16	13:08 (20)   07:22	15:10 (1)   06:15	17:19 (23)   05:59		04:59 04:33	
16:21	33 15:44 (16)   17:23	82 16:32 (19)   18:18	22 17:41 (23)   20:16		21:11 21:45	
20   08:15	13:12 (20)   07:19	15:10 (1)   06:13	17:17 (23)   05:57		04:58 04:34	
16:23	28 15:45 (16)   17:25	82 16:32 (19)   18:20	25 17:42 (23)   20:18		21:12 21:45	
21   08:14	15:27 (16)   07:17	15:10 (1)   06:10	17:16 (23)   05:55		04:56 04:34	
16:25	19 15:46 (16)   17:27	82 16:32 (19)   18:22	27 17:43 (23)   20:20		21:14 21:45	
22   08:12	15:27 (16)   07:15	15:09 (1)   06:08	17:15 (23)   05:52		04:55 04:34	
16:27	20 15:47 (16)   17:29	82 16:31 (19)   18:23	28 17:43 (23)   20:22		21:15 21:45	
23   08:11	15:27 (16)   07:13	15:09 (1)   06:05	17:15 (23)   05:50		04:53 04:34	
16:29	20 15:47 (16)   17:31	82 16:31 (19)   18:25	28 17:43 (23)   20:24		21:17 21:46	
24   08:10	15:26 (16)   07:10	15:09 (1)   06:03	17:14 (23)   05:48		04:52 04:34	
16:31	21 15:47 (16)   17:33	80 16:30 (19)   18:27	29 17:43 (23)   20:26		21:18 21:46	
25   08:08	15:27 (16)   07:08	15:08 (1)   06:00	17:14 (23)   05:46		04:50 04:35	
16:32	21 15:48 (16)   17:35	79 16:28 (19)   18:29	29 17:43 (23)   20:27		21:20 21:46	
26   08:07	15:27 (16)   07:06	15:08 (1)   05:58	17:13 (23)   05:43		04:49 04:35	
16:34	21 15:48 (16)   17:37	76 16:27 (19)   18:31	29 17:42 (23)   20:29		21:21 21:46	
27   08:05	15:27 (16)   07:04	15:08 (1)   05:55	17:14 (23)   05:41		04:48 04:36	
16:36	21 15:48 (16)   17:39	70 16:24 (19)   18:33	28 17:42 (23)   20:31		21:23 21:46	
28   08:04	15:28 (16)   07:01	15:08 (1)   05:53	17:13 (23)   05:39		04:47 04:36	
16:38	21 15:49 (16)   17:41	60 16:19 (19)   18:35	27 17:40 (23)   20:33		21:24 21:45	
29   08:02	15:29 (16)   07:00	15:07 (1)   05:50	18:14 (23)   05:37		04:45 04:37	
16:40	19 15:48 (16)   17:40		26 18:40 (23)   20:35		21:26 21:45	
30   08:01	15:29 (16)   07:00	15:07 (1)   05:48	18:16 (23)   05:35		04:44 04:37	
16:42	19 15:48 (16)   17:41		23 18:39 (23)   20:37		21:27 21:45	
31   07:59	15:30 (16)   07:00	15:07 (1)   05:45	18:16 (23)   05:34		04:43 04:37	
16:44	17 15:47 (16)   17:42		21 18:37 (23)   20:38		21:28 21:45	
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung	944	1505	1065	29		
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41		
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90		
Reduktion Windrichtung	0.63	0.70	0.69	0.68		
Gesamte Reduktion	0.10	0.15	0.19	0.25		
Met.wahrsch.Beschattung	93	222	205	7		

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: U - IO21

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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38 21:45	05:19 21:09	06:14 20:01	07:08 18:46	15:57 (1) 16:32 (1)	07:07 16:35
2	04:39 21:44	05:20 21:07	06:16 19:59	07:10 18:44	15:55 (1) 16:34 (1)	07:09 16:33
3	04:40 21:44	05:22 21:05	06:17 19:56	07:12 18:41	15:52 (1) 16:34 (1)	07:11 16:31
4	04:40 21:43	05:24 21:03	06:19 19:54	07:14 18:39	15:50 (1) 16:35 (1)	07:13 16:29
5	04:41 21:43	05:25 21:01	06:21 19:51	07:15 18:37	15:49 (1) 16:36 (1)	07:15 16:27
6	04:42 21:42	05:27 20:59	06:23 19:49	07:17 18:34	15:47 (1) 16:37 (1)	07:17 16:25
7	04:43 21:41	05:29 20:57	06:25 19:46	07:19 18:32	15:46 (1) 16:37 (1)	07:19 16:23
8	04:44 21:41	05:31 20:55	06:26 19:44	07:21 18:29	15:45 (1) 16:38 (1)	07:21 16:21
9	04:45 21:40	05:33 20:53	06:28 19:41	07:23 18:27	15:44 (1) 16:38 (1)	07:23 16:20
10	04:46 21:39	05:34 20:51	06:30 19:39	07:25 18:25 (23)	15:43 (1) 16:38 (1)	07:25 16:18
11	04:48 21:38	05:36 20:49	06:32 19:36	07:27 18:22 (23)	15:43 (1) 16:39 (1)	07:27 16:16
12	04:49 21:37	05:38 20:47	06:34 19:34	07:28 18:20 (23)	15:42 (1) 16:39 (1)	07:29 16:14
13	04:50 21:36	05:40 20:45	06:35 19:31	07:30 18:17 (23)	15:41 (1) 16:39 (1)	07:31 16:13
14	04:51 21:35	05:41 20:43	06:37 19:29	07:32 18:15 (23)	15:41 (1) 16:55 (19)	07:33 16:11
15	04:52 21:34	05:43 20:40	06:39 19:26	07:34 18:13 (23)	15:41 (1) 16:58 (19)	07:35 16:09
16	04:54 21:33	05:45 20:38	06:41 19:24	07:36 18:12 (23)	15:40 (1) 17:00 (19)	07:37 16:08
17	04:55 21:32	05:47 20:36	06:43 19:21	07:38 18:10 (23)	15:40 (1) 17:01 (19)	07:38 16:06
18	04:57 21:30	05:49 20:34	06:44 19:19	07:40 18:08 (23)	15:40 (1) 17:01 (19)	07:40 16:05
19	04:58 21:29	05:50 20:32	06:46 19:16	07:42 18:07 (23)	15:40 (1) 17:02 (19)	07:42 16:03
20	04:59 21:28	05:52 20:29	06:48 19:14	07:44 18:06 (23)	15:40 (1) 17:02 (19)	07:44 16:02
21	05:01 21:26	05:54 20:27	06:50 19:11	07:46 18:05 (23)	15:40 (1) 17:02 (19)	07:46 16:01
22	05:02 21:25	05:56 20:25	06:52 19:09	07:48 18:04 (23)	15:41 (1) 17:02 (19)	07:48 15:59
23	05:04 21:24	05:58 20:22	06:53 19:06	07:50 18:03 (23)	15:41 (1) 17:02 (19)	07:50 15:58
24	05:06 21:22	05:59 20:20	06:55 19:04	07:52 18:02 (23)	15:41 (1) 17:02 (19)	07:52 15:57
25	05:07 21:20	06:01 20:18	06:57 19:01	07:53 18:03 (23)	14:42 (1) 16:02 (19)	07:53 15:56
26	05:09 21:19	06:03 20:15	06:59 18:59	07:55 18:04 (23)	14:42 (1) 16:01 (19)	07:55 15:54
27	05:10 21:17	06:05 20:13	07:01 18:56	07:57 18:06 (23)	14:43 (1) 16:00 (19)	07:57 15:53
28	05:12 21:16	06:07 20:11	07:03 18:54	07:59 16:08 (1)	14:45 (1) 16:00 (19)	07:58 15:52
29	05:14 21:14	06:08 20:08	07:04 18:51	08:00 16:24 (1)	14:46 (1) 16:28 (1)	08:00 15:51
30	05:15 21:12	06:10 20:06	07:06 18:49	08:01 16:00 (1)	14:47 (1) 16:30 (1)	08:02 15:51
31	05:17 21:10	06:12 20:03	07:08 18:47	08:02 16:37	14:49 (1) 15:56 (19)	08:02 15:53
Sonnenscheinstunden	515	461	383	328	257	231
astr.max.mögl.Beschattung			492	1980	674	1504
Red.Sonnenscheinwahrsch.			0.40	0.33	0.21	0.14
Reduktion Betriebsdauer			0.90	0.90	0.90	0.90
Reduktion Windrichtung			0.68	0.70	0.66	0.62
Gesamte Reduktion			0.24	0.20	0.12	0.08
Met.wahrsch.Beschattung			120	403	83	115

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: V - IO22

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1   08:28	12:42 (20)   07:57	15:00 (1)   06:59	14:55 (1)   06:43	05:33	04:42		
15:54 31	13:13 (20)   16:46	15:33 (1)   17:43	15:41 (1)   19:42	20:39	21:30		
2   08:28	12:43 (20)   07:55	14:58 (1)   06:56	14:55 (1)   06:40	05:31	04:41		
15:55 30	13:13 (20)   16:48	15:34 (1)   17:45	15:39 (1)   19:44	20:40	21:31		
3   08:28	12:43 (20)   07:54	14:58 (1)   06:54	14:57 (1)   06:38	05:28	04:40		
15:57 30	13:13 (20)   16:50	16:08 (19)   17:47	15:38 (1)   19:46	20:42	21:32		
4   08:28	12:44 (20)   07:52	14:57 (1)   06:52	14:58 (1)   06:35	05:26	04:40		
15:58 30	13:14 (20)   16:52	16:12 (19)   17:49	15:35 (1)   19:48	20:44	21:33		
5   08:27	12:45 (20)   07:50	14:56 (1)   06:49	15:01 (1)   06:33	05:24	04:39		
15:59 28	13:13 (20)   16:54	16:14 (19)   17:51	15:34 (1)   19:50	20:46	21:34		
6   08:27	12:46 (20)   07:48	14:55 (1)   06:47	15:03 (1)   06:31	05:22	04:38		
16:00 28	13:14 (20)   16:56	16:16 (19)   17:53	15:31 (1)   19:52	20:48	21:35		
7   08:26	12:47 (20)   07:46	14:54 (1)   06:45	15:06 (1)   06:28	05:20	04:37		
16:02 28	15:23 (16)   16:58	16:17 (19)   17:55	15:28 (1)   19:54	20:50	21:36		
8   08:26	12:48 (20)   07:44	14:52 (1)   06:42	15:11 (1)   06:26	05:18	04:37		
16:03 32	15:26 (16)   17:00	16:17 (19)   17:57	15:22 (1)   19:55	20:51	21:37		
9   08:25	12:49 (20)   07:42	14:52 (1)   06:40	06:23	05:17	04:36		
16:05 32	15:27 (16)   17:03	16:18 (19)   17:59	19:57	20:53	21:38		
10   08:24	12:50 (20)   07:40	14:51 (1)   06:37	06:21	05:15	04:36		
16:06 34	15:29 (16)   17:05	16:19 (19)   18:01	19:59	20:55	21:39		
11   08:24	12:51 (20)   07:38	14:51 (1)   06:35	17:14 (23)   06:18	05:13	04:35		
16:08 33	15:30 (16)   17:07	16:19 (19)   18:02	17:25 (23)   20:01	20:57	21:40		
12   08:23	12:53 (20)   07:36	14:51 (1)   06:32	17:12 (23)   06:16	05:11	04:35		
16:09 32	15:31 (16)   17:09	16:20 (19)   18:04	17:29 (23)   20:03	20:59	21:41		
13   08:22	12:55 (20)   07:34	14:51 (1)   06:30	17:09 (23)   06:14	05:09	04:34		
16:11 30	15:32 (16)   17:11	16:20 (19)   18:06	17:30 (23)   20:05	21:00	21:41		
14   08:21	12:58 (20)   07:32	14:50 (1)   06:27	17:08 (23)   06:11	05:07	04:34		
16:13 26	15:33 (16)   17:13	16:20 (19)   18:08	17:31 (23)   20:07	21:02	21:42		
15   08:20	15:16 (16)   07:30	14:49 (1)   06:25	17:06 (23)   06:09	05:06	04:34		
16:14 18	15:34 (16)   17:15	16:19 (19)   18:10	17:32 (23)   20:09	21:04	21:43		
16   08:19	15:16 (16)   07:28	14:49 (1)   06:23	17:05 (23)   06:06	05:04	04:34		
16:16 19	15:35 (16)   17:17	16:19 (19)   18:12	17:32 (23)   20:11	21:06	21:43		
17   08:18	15:16 (16)   07:26	14:50 (1)   06:20	17:04 (23)   06:04	05:02	04:33		
16:18 20	15:36 (16)   17:19	16:19 (19)   18:14	17:32 (23)   20:12	21:07	21:44		
18   08:17	15:16 (16)   07:24	14:50 (1)   06:18	17:03 (23)   06:02	05:01	04:33		
16:19 20	15:36 (16)   17:21	16:19 (19)   18:16	17:32 (23)   20:14	21:09	21:44		
19   08:16	15:16 (16)   07:22	14:49 (1)   06:15	17:03 (23)   05:59	04:59	04:33		
16:21 21	15:37 (16)   17:23	16:17 (19)   18:18	17:32 (23)   20:16	21:11	21:45		
20   08:15	15:17 (16)   07:19	14:49 (1)   06:13	17:02 (23)   05:57	04:58	04:34		
16:23 21	15:38 (16)   17:25	16:16 (19)   18:20	17:32 (23)   20:18	21:12	21:45		
21   08:14	15:17 (16)   07:17	14:50 (1)   06:10	17:03 (23)   05:55	04:56	04:34		
16:25 21	15:38 (16)   17:27	16:15 (19)   18:22	17:32 (23)   20:20	21:14	21:45		
22   08:12	15:18 (16)   07:15	14:50 (1)   06:08	17:02 (23)   05:52	04:55	04:34		
16:27 20	15:38 (16)   17:29	16:12 (19)   18:23	17:31 (23)   20:22	21:15	21:45		
23   08:11	15:18 (16)   07:13	14:50 (1)   06:05	17:03 (23)   05:50	04:53	04:34		
16:29 20	15:38 (16)   17:31	16:08 (19)   18:25	17:30 (23)   20:24	21:17	21:46		
24   08:10	15:18 (16)   07:10	14:51 (1)   06:03	17:03 (23)   05:48	04:52	04:34		
16:31 20	15:38 (16)   17:33	15:45 (1)   18:27	17:29 (23)   20:26	21:18	21:46		
25   08:08	15:19 (16)   07:08	14:51 (1)   06:00	17:04 (23)   05:46	04:50	04:35		
16:32 19	15:38 (16)   17:35	15:44 (1)   18:29	17:28 (23)   20:27	21:20	21:46		
26   08:07	15:20 (16)   07:06	14:52 (1)   05:58	17:05 (23)   05:43	04:49	04:35		
16:34 18	15:38 (16)   17:37	15:43 (1)   18:31	17:26 (23)   20:29	21:21	21:46		
27   08:05	15:20 (16)   07:04	14:52 (1)   05:55	17:07 (23)   05:41	04:48	04:36		
16:36 17	15:37 (16)   17:39	15:42 (1)   18:33	17:24 (23)   20:31	21:23	21:46		
28   08:04	15:11 (1)   07:01	14:53 (1)   05:53	17:08 (23)   05:39	04:47	04:36		
16:38 26	15:37 (16)   17:41	15:41 (1)   18:35	17:21 (23)   20:33	21:24	21:45		
29   08:02	15:07 (1)   06:50	06:50	05:37	04:45	04:37		
16:40 28	15:35 (16)   19:37	20:35	21:26	21:45			
30   08:01	15:04 (1)   06:48	06:48	05:35	04:44	04:37		
16:42 29	15:33 (16)   19:39	20:37	21:27	21:45			
31   07:59	15:02 (1)   06:45	06:45	04:43				
16:44 29	15:31 (1)   19:40	21:28	21:46				
Sonnenscheinstunden	248	272	367	421	496	513	
astr.max.mögl.Beschattung	790	1860	689				
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31				
Reduktion Betriebsdauer	0.90	0.90	0.90				
Reduktion Windrichtung	0.65	0.69	0.68				
Gesamte Reduktion	0.10	0.15	0.19				
Met.wahrsch.Beschattung	80	272	131				

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	-------------------	----------------	------------	---------------------------	----------------------------



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: V - IO22  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember				
1	04:38	05:19	06:14	07:08	17:50 (23)	07:07	14:21 (1)	08:03	12:34 (20)	
	21:45	21:09	20:01	18:46	18:08 (23)	16:35	15:48 (19)	15:50	32 15:12 (16)	
2	04:39	05:20	06:16	07:10	17:52 (23)	07:09	14:22 (1)	08:05	12:33 (20)	
	21:44	21:07	19:59	18:44	18:06 (23)	16:33	15:47 (19)	15:49	34 15:12 (16)	
3	04:40	05:22	06:17	07:12	17:55 (23)	07:11	14:22 (1)	08:06	12:33 (20)	
	21:44	21:05	19:56	18:41	18:00 (23)	16:31	15:47 (19)	15:48	32 15:11 (16)	
4	04:40	05:24	06:19	07:14	17:57 (23)	07:10	14:24 (1)	08:08	12:32 (20)	
	21:43	21:03	19:54	18:39	18:09	16:29	15:46 (19)	15:47	32 15:10 (16)	
5	04:41	05:25	06:21	07:15	17:59 (23)	07:15	14:25 (1)	08:09	12:32 (20)	
	21:43	21:01	19:51	18:37	18:07	16:27	15:45 (19)	15:47	29 15:09 (16)	
6	04:42	05:27	06:23	07:17	18:04	15:45 (1)	14:26 (1)	08:10	12:32 (20)	
	21:42	20:59	19:49	18:34	17:02 (1)	16:25	15:43 (19)	15:46	27 12:59 (20)	
7	04:43	05:29	06:25	07:19	18:08	15:40 (1)	14:27 (1)	08:12	12:32 (20)	
	21:41	20:57	19:46	18:32	17:05 (1)	16:23	15:41 (19)	15:46	28 13:00 (20)	
8	04:44	05:31	06:26	07:21	18:11	15:37 (1)	14:28 (1)	08:13	12:32 (20)	
	21:41	20:55	19:44	18:29	17:08 (1)	16:21	15:36 (19)	15:45	29 13:01 (20)	
9	04:45	05:33	06:28	07:23	18:12	15:35 (1)	14:29 (1)	08:14	12:32 (20)	
	21:40	20:53	19:41	18:27	17:07 (1)	16:20	15:05 (1)	15:45	30 13:02 (20)	
10	04:46	05:34	06:30	07:25	18:13	15:32 (1)	14:31 (1)	08:16	12:32 (20)	
	21:39	20:51	19:39	18:24	17:06 (1)	16:18	15:03 (1)	15:45	31 13:03 (20)	
11	04:48	05:36	06:32	07:27	18:14	15:30 (1)	14:34 (1)	08:17	12:32 (20)	
	21:38	20:49	19:36	18:22	17:08 (1)	16:16	15:02 (1)	15:44	31 13:03 (20)	
12	04:49	05:38	06:34	07:29	18:15	15:29 (1)	14:36 (1)	08:18	12:32 (20)	
	21:37	20:47	19:34	18:20	17:13 (1)	16:14	15:05 (16)	15:44	32 13:04 (20)	
13	04:50	05:40	06:35	07:30	18:16	15:27 (1)	14:39 (1)	08:19	12:32 (20)	
	21:36	20:45	19:31	18:17	17:14 (1)	16:13	15:07 (16)	15:44	32 13:04 (20)	
14	04:51	05:41	06:37	07:32	18:17	15:26 (1)	14:43 (1)	08:20	12:32 (20)	
	21:35	20:43	19:29	18:15	17:15 (1)	16:11	15:09 (16)	15:44	33 13:05 (20)	
15	04:52	05:43	06:39	18:00 (23)	07:34	15:25 (1)	14:53 (16)	08:21	12:33 (20)	
	21:34	20:40	19:26	18:11 (23)	18:12	16:15 (1)	15:10 (16)	15:44	32 13:05 (20)	
16	04:54	05:45	06:41	17:57 (23)	07:36	15:24 (1)	14:52 (16)	08:22	12:33 (20)	
	21:33	20:38	19:24	18:13 (23)	18:10	16:16 (1)	15:10 (16)	15:44	33 13:06 (20)	
17	04:55	05:47	06:43	17:53 (23)	07:38	15:23 (1)	14:52 (16)	08:23	12:34 (20)	
	21:32	20:36	19:21	18:14 (23)	18:08	16:16 (1)	15:11 (16)	15:44	33 13:07 (20)	
18	04:57	05:49	06:44	17:52 (23)	07:40	15:22 (1)	14:52 (16)	08:24	12:34 (20)	
	21:30	20:34	19:19	18:15 (23)	18:05	16:16 (1)	15:12 (16)	15:44	33 13:07 (20)	
19	04:58	05:50	06:46	17:51 (23)	07:42	15:21 (1)	14:53 (16)	08:24	12:35 (20)	
	21:29	20:32	19:16	18:16 (23)	18:03	16:41 (19)	16:03	20 15:13 (16)	15:45	33 13:08 (20)
20	04:59	05:52	06:48	17:50 (23)	07:44	15:21 (1)	14:53 (16)	08:25	12:35 (20)	
	21:28	20:29	19:14	18:17 (23)	18:01	16:44 (19)	16:02	20 15:13 (16)	15:45	33 13:08 (20)
21	05:01	05:54	06:50	17:48 (23)	07:46	15:20 (1)	14:53 (16)	08:26	12:36 (20)	
	21:26	20:27	19:11	18:16 (23)	17:59	16:46 (19)	16:01	21 15:14 (16)	15:45	33 13:09 (20)
22	05:02	05:56	06:52	17:47 (23)	07:48	15:20 (1)	14:53 (16)	08:26	12:36 (20)	
	21:25	20:25	19:09	18:16 (23)	17:56	16:47 (19)	15:59	21 15:14 (16)	15:46	33 13:09 (20)
23	05:04	05:58	06:53	17:47 (23)	07:50	15:19 (1)	14:53 (16)	08:27	12:37 (20)	
	21:24	20:22	19:06	18:16 (23)	17:54	16:48 (19)	15:58	21 15:14 (16)	15:46	33 13:10 (20)
24	05:06	05:59	06:55	17:47 (23)	07:52	15:19 (1)	14:54 (16)	08:27	12:37 (20)	
	21:22	20:20	19:04	18:16 (23)	17:52	16:48 (19)	15:57	20 15:14 (16)	15:47	33 13:10 (20)
25	05:07	06:01	06:57	17:47 (23)	06:53	14:19 (1)	14:54 (16)	08:27	12:37 (20)	
	21:20	20:18	19:01	18:16 (23)	16:50	15:49 (19)	15:56	19 15:13 (16)	15:48	33 13:10 (20)
26	05:09	06:03	06:59	17:47 (23)	06:55	14:19 (1)	14:54 (16)	08:28	12:37 (20)	
	21:19	20:15	18:59	18:15 (23)	16:48	15:49 (19)	15:54	19 15:13 (16)	15:48	34 13:11 (20)
27	05:10	06:05	07:01	17:46 (23)	06:57	14:19 (1)	14:55 (16)	08:28	12:39 (20)	
	21:17	20:13	18:56	18:14 (23)	16:45	15:49 (19)	15:53	18 15:13 (16)	15:49	33 13:12 (20)
28	05:12	06:07	07:03	17:47 (23)	06:59	14:20 (1)	14:55 (16)	08:28	12:39 (20)	
	21:16	20:11	18:54	18:13 (23)	16:43	15:50 (19)	15:52	26 15:13 (16)	15:50	33 13:12 (20)
29	05:14	06:08	07:04	17:47 (23)	07:01	14:20 (1)	14:56 (16)	08:28	12:40 (20)	
	21:14	20:08	18:51	18:12 (23)	16:41	15:50 (19)	15:51	30 15:13 (16)	15:51	33 13:13 (20)
30	05:15	06:10	07:06	17:48 (23)	07:03	14:20 (1)	14:57 (16)	08:28	12:40 (20)	
	21:12	20:06	18:49	18:10 (23)	16:39	15:49 (19)	15:51	32 15:13 (16)	15:52	32 13:12 (20)
31	05:17	06:12	07:08	17:49 (23)	07:05	14:21 (1)	14:58 (16)	08:28	12:41 (20)	
	21:10	20:03	18:46	18:07 (23)	16:37	15:49 (19)	15:51	31 15:13 (16)	15:53	31 13:12 (20)
Sonnenscheinstunden	515	461	383	328	257	1026	231	990	0.14	
astr.max.mögl.Beschattung			0.40	0.33	0.21	0.90	0.61	0.08	0.08	
Red.Sonnenscheinwahrsch.			0.90	0.90	0.68	0.13	0.08	0.08	0.08	
Reduktion Betriebsdauer			0.68	0.68	0.20	0.13	0.08	0.08	0.08	
Reduktion Windrichtung			0.24	0.20	0.13	0.08	0.08	0.08	0.08	
Gesamte Reduktion			0.97	0.97	0.97	0.97	0.97	0.97	0.97	
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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28	12:27 (20)   07:57	14:33 (1)   06:59	14:41 (1)   06:43	05:33	04:42	
	15:54	36 15:16 (16)   16:46	66 16:03 (19)   17:43	36 15:17 (1)   19:42	20:39	21:30	
2	08:28	12:28 (20)   07:55	14:33 (1)   06:56	14:42 (1)   06:40	05:31	04:41	
	15:55	36 15:17 (16)   16:48	70 16:05 (19)   17:45	32 15:14 (1)   19:44	20:40	21:31	
3	08:28	12:29 (20)   07:54	14:32 (1)   06:54	14:46 (1)   06:38	05:29	04:40	
	15:57	37 15:18 (16)   16:50	74 16:06 (19)   17:47	25 15:11 (1)   19:46	20:42	21:32	
4	08:28	12:30 (20)   07:52	14:32 (1)   06:52	14:49 (1)   06:35	05:26	04:40	
	15:58	37 15:19 (16)   16:52	76 16:07 (19)   17:49	18 15:07 (1)   19:48	20:44	21:33	
5	08:27	12:31 (20)   07:50	14:31 (1)   06:49		06:33	05:24	04:39
	15:59	36 15:20 (16)   16:54	79 16:08 (19)   17:51		19:50	20:46	21:34
6	08:27	12:32 (20)   07:48	14:31 (1)   06:47		06:31	05:22	04:38
	16:00	37 15:21 (16)   16:56	82 16:09 (19)   17:53		19:52	20:48	21:35
7	08:26	12:33 (20)   07:46	14:30 (1)   06:45		06:28	05:20	04:37
	16:02	36 15:22 (16)   16:58	84 16:10 (19)   17:55		19:54	20:50	21:36
8	08:26	12:35 (20)   07:44	14:29 (1)   06:42	17:10 (23)	06:26	05:18	04:37
	16:03	35 15:23 (16)   17:00	85 16:09 (19)   17:57	5 17:15 (23)	19:55	20:51	21:37
9	08:25	12:36 (20)   07:42	14:29 (1)   06:40		06:23	05:17	04:36
	16:05	33 15:23 (16)   17:03	86 16:09 (19)   17:59	14 17:20 (23)	19:57	20:53	21:38
10	08:25	12:38 (20)   07:40	14:29 (1)   06:37		06:21	05:15	04:36
	16:06	31 15:24 (16)   17:05	87 16:10 (19)   18:01	19 17:22 (23)	19:59	20:55	21:39
11	08:24	12:41 (20)   07:38	14:29 (1)   06:35		06:18	05:13	04:35
	16:08	26 15:25 (16)   17:07	87 16:10 (19)   18:02	23 17:24 (23)	20:01	20:57	21:40
12	08:23	15:05 (16)   07:36	14:29 (1)   06:32		06:16	05:11	04:35
	16:09	20 15:25 (16)   17:09	88 16:10 (19)   18:04	25 17:25 (23)	20:03	20:59	21:41
13	08:22	15:05 (16)   07:34	14:29 (1)   06:30		06:14	05:09	04:34
	16:11	21 15:26 (16)   17:11	87 16:10 (19)   18:06	28 17:26 (23)	20:05	21:00	21:41
14	08:21	15:06 (16)   07:32	14:29 (1)   06:27		06:11	05:07	04:34
	16:13	21 15:27 (16)   17:13	86 16:10 (19)   18:08	29 17:27 (23)	20:07	21:02	21:42
15	08:20	15:06 (16)   07:30	14:29 (1)   06:25		06:09	05:06	04:34
	16:14	21 15:27 (16)   17:15	85 16:08 (19)   18:10	29 17:26 (23)	20:09	21:04	21:43
16	08:19	15:07 (16)   07:28	14:29 (1)   06:23		06:06	05:04	04:34
	16:16	21 15:28 (16)   17:17	83 16:08 (19)   18:12	31 17:27 (23)	20:11	21:06	21:43
17	08:18	15:07 (16)   07:26	14:30 (1)   06:20		06:04	05:02	04:33
	16:18	22 15:29 (16)   17:19	80 16:07 (19)   18:14	31 17:26 (23)	20:12	21:07	21:44
18	08:17	15:07 (16)   07:24	14:30 (1)   06:18		06:02	05:01	04:33
	16:19	21 15:28 (16)   17:21	76 16:05 (19)   18:16	31 17:26 (23)	20:14	21:09	21:44
19	08:16	15:08 (16)   07:22	14:30 (1)   06:15		05:59	04:59	04:33
	16:21	21 15:29 (16)   17:23	72 16:03 (19)   18:18	31 17:26 (23)	20:16	21:11	21:45
20	08:15	15:09 (16)   07:19	14:31 (1)   06:13		05:57	04:58	04:34
	16:23	20 15:29 (16)   17:25	64 16:00 (19)   18:20	30 17:25 (23)	20:18	21:12	21:45
21	08:14	14:48 (1)   07:17	14:31 (1)   06:10		05:55	04:56	04:34
	16:25	33 15:29 (16)   17:27	55 15:26 (1)   18:22	29 17:24 (23)	20:20	21:14	21:45
22	08:12	14:45 (1)   07:15	14:31 (1)   06:08		05:52	04:55	04:34
	16:27	39 15:29 (16)   17:29	54 15:25 (1)   18:23	28 17:23 (23)	20:22	21:15	21:45
23	08:11	14:43 (1)   07:13	14:32 (1)   06:05		05:50	04:53	04:34
	16:29	43 15:28 (16)   17:31	53 15:25 (1)   18:25	26 17:22 (23)	20:24	21:17	21:46
24	08:10	14:41 (1)   07:10	14:34 (1)   06:03		05:48	04:52	04:34
	16:31	45 15:28 (16)   17:33	50 15:24 (1)   18:27	23 17:20 (23)	20:26	21:18	21:46
25	08:08	14:40 (1)   07:08	14:34 (1)   06:00		05:46	04:50	04:35
	16:32	46 15:27 (16)   17:35	48 15:22 (1)   18:29	20 17:19 (23)	20:27	21:20	21:46
26	08:07	14:38 (1)   07:06	14:36 (1)   05:58		05:43	04:49	04:35
	16:34	47 15:26 (16)   17:37	45 15:21 (1)   18:31	16 17:16 (23)	20:29	21:21	21:46
27	08:05	14:37 (1)   07:04	14:36 (1)   05:55		05:41	04:48	04:36
	16:36	46 15:24 (16)   17:39	43 15:19 (1)   18:33	9 17:13 (23)	20:31	21:23	21:46
28	08:04	14:36 (1)   07:01	14:38 (1)   05:53		05:39	04:47	04:36
	16:38	41 15:17 (1)   17:41	40 15:18 (1)   18:35		20:33	21:24	21:45
29	08:02	14:35 (1)   07:00	06:50		05:37	04:45	04:37
	16:40	43 15:18 (1)   17:43	19:37		20:35	21:26	21:45
30	08:01	14:34 (1)   06:59	06:48		05:35	04:44	04:37
	16:42	53 15:58 (19)   17:45	19:39		20:37	21:27	21:45
31	07:59	14:33 (1)   06:58	06:45			04:43	
	16:44	61 16:01 (19)   17:46	19:40			21:28	
	Sonnenscheinstunden	248	272	367	421	496	513
	astr.max.mögl.Beschattung	1065	1985	588			
	Red.Sonnenscheinwahrsch.	0.17	0.24	0.31			
	Reduktion Betriebsdauer	0.90	0.90	0.90			
	Reduktion Windrichtung	0.66	0.68	0.68			
	Gesamte Reduktion	0.10	0.15	0.19			
	Met.wahrsch.Beschattung	110	290	112			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember				
1	04:38 21:45	05:19 21:09	06:14 20:01	07:08 18:46	17:39 (23) 18:05 (23)	07:07 16:35	13:59 (1) 15:39 (19)	08:03 15:50	25	12:24 (20) 15:07 (16)
2	04:39 21:44	05:20 21:07	06:16 19:59	07:10 18:44	17:39 (23) 18:03 (23)	07:09 16:33	13:59 (1) 15:39 (19)	08:05 15:49	30	12:21 (20) 15:07 (16)
3	04:40 21:44	05:22 21:05	06:17 19:56	07:12 18:41	17:40 (23) 18:01 (23)	07:11 16:31	13:59 (1) 15:39 (19)	08:06 15:48	33	12:20 (20) 15:07 (16)
4	04:40 21:43	05:24 21:03	06:19 19:54	07:14 18:39	17:42 (23) 17:58 (23)	07:13 16:29	14:00 (1) 15:39 (19)	08:08 15:47	34	12:19 (20) 15:07 (16)
5	04:41 21:43	05:25 21:01	06:21 19:51	07:15 18:37	17:45 (23) 17:55 (23)	07:15 16:27	14:01 (1) 15:39 (19)	08:09 15:47	35	12:19 (20) 15:07 (16)
6	04:42 21:42	05:27 20:59	06:23 19:49	07:17 18:34	17:47 (23) 18:34	07:17 16:25	14:01 (1) 15:38 (19)	08:10 15:46	37	12:18 (20) 15:07 (16)
7	04:43 21:41	05:29 20:57	06:25 19:46	07:19 18:32	17:49 (23) 18:32	07:19 16:23	14:01 (1) 15:37 (19)	08:12 15:46	36	12:18 (20) 15:07 (16)
8	04:44 21:41	05:31 20:55	06:26 19:44	07:21 18:29	17:51 (23) 18:29	07:21 16:21	14:02 (1) 15:36 (19)	08:13 15:45	38	12:17 (20) 15:07 (16)
9	04:45 21:40	05:33 20:53	06:28 19:41	07:23 18:27	17:53 (23) 18:27	07:23 16:20	14:03 (1) 15:35 (19)	08:14 15:45	37	12:18 (20) 15:07 (16)
10	04:46 21:39	05:34 20:51	06:30 19:39	07:25 18:24	17:55 (23) 18:24	07:25 16:18	14:03 (1) 15:33 (19)	08:16 15:45	37	12:17 (20) 15:07 (16)
11	04:48 21:38	05:36 20:49	06:32 19:36	07:27 18:22	17:57 (23) 18:22	07:27 16:16	14:05 (1) 15:32 (19)	08:17 15:44	36	12:17 (20) 15:06 (16)
12	04:49 21:37	05:38 20:47	06:34 19:34	07:29 18:20	17:59 (23) 18:20	07:29 16:14	14:06 (1) 15:29 (19)	08:18 15:44	35	12:17 (20) 15:06 (16)
13	04:50 21:36	05:40 20:45	06:35 19:31	07:30 18:17	17:59 (23) 18:17	07:30 16:13	14:07 (1) 15:29 (19)	08:19 15:44	34	12:17 (20) 15:05 (16)
14	04:51 21:35	05:41 20:43	06:37 19:29	07:32 18:15	18:00 (23) 18:15	07:32 16:11	14:08 (1) 15:28 (19)	08:20 15:44	33	12:17 (20) 15:04 (16)
15	04:52 21:34	05:43 20:40	06:39 19:26	07:34 18:12	18:02 (23) 18:12	07:34 16:09	14:10 (1) 15:27 (19)	08:21 15:44	28	12:18 (20) 12:46 (20)
16	04:54 21:33	05:45 20:38	06:41 19:24	17:54 (23) 18:01 (23)	18:14 (23) 18:10	07:36 16:08	14:11 (1) 15:26 (19)	08:22 15:44	29	12:18 (20) 12:47 (20)
17	04:55 21:32	05:47 20:36	06:43 19:21	17:49 (23) 18:04 (23)	18:10 (23) 18:08	07:38 16:06	14:13 (1) 15:25 (19)	08:23 15:44	30	12:18 (20) 12:48 (20)
18	04:57 21:30	05:49 20:34	06:44 19:19	17:47 (23) 18:06 (23)	18:08 (23) 18:05	07:40 16:05	14:15 (1) 15:24 (19)	08:24 15:44	30	12:19 (20) 12:49 (20)
19	04:58 21:29	05:50 20:32	06:46 19:16	17:45 (23) 18:07 (23)	18:05 (23) 18:03	07:42 16:03	14:18 (1) 15:23 (19)	08:24 15:45	29	12:20 (20) 12:49 (20)
20	04:59 21:28	05:52 20:29	06:48 19:14	17:43 (23) 18:08 (23)	18:03 (23) 18:01	07:44 16:02	14:20 (1) 15:22 (19)	08:25 15:45	30	12:19 (20) 12:49 (20)
21	05:01 21:26	05:54 20:27	06:50 19:11	17:41 (23) 18:08 (23)	17:59 (23) 17:59	07:46 16:01	14:24 (1) 15:21 (19)	08:26 15:45	30	12:20 (20) 12:50 (20)
22	05:02 21:25	05:56 20:25	06:52 19:09	17:40 (23) 18:09 (23)	17:58 (23) 17:56	07:48 16:00	14:25 (1) 15:20 (19)	08:26 15:46	30	12:20 (20) 12:51 (20)
23	05:04 21:24	05:58 20:22	06:53 19:06	17:39 (23) 18:09 (23)	17:50 (23) 17:54	07:50 16:00	14:26 (1) 15:19 (19)	08:27 15:46	30	12:21 (20) 12:51 (20)
24	05:06 21:22	05:59 20:20	06:55 19:04	17:39 (23) 18:09 (23)	17:52 (23) 17:52	07:52 16:00	14:27 (1) 15:18 (19)	08:27 15:47	29	12:22 (20) 12:51 (20)
25	05:07 21:20	06:01 20:18	06:57 19:01	17:38 (23) 18:09 (23)	17:53 (23) 17:50	07:53 16:00	14:28 (1) 15:17 (19)	08:27 15:48	30	12:22 (20) 12:52 (20)
26	05:09 21:19	06:03 20:15	06:59 18:59	17:38 (23) 18:09 (23)	17:50 (23) 17:48	07:55 16:00	14:29 (1) 15:16 (19)	08:28 15:48	30	12:22 (20) 12:52 (20)
27	05:10 21:17	06:05 20:13	07:01 18:56	17:37 (23) 18:08 (23)	17:47 (23) 17:45	07:57 16:00	14:30 (1) 15:15 (19)	08:28 15:49	29	12:24 (20) 12:53 (20)
28	05:12 21:16	06:07 20:11	07:03 18:54	17:37 (23) 18:07 (23)	17:45 (23) 17:43	07:59 16:00	14:31 (1) 15:14 (19)	08:28 15:50	29	12:24 (20) 12:53 (20)
29	05:14 21:14	06:08 20:08	07:04 18:51	17:37 (23) 18:07 (23)	17:43 (23) 17:41	08:00 16:00	14:32 (1) 15:13 (19)	08:28 15:51	31	12:25 (20) 15:11 (16)
30	05:15 21:12	06:10 20:06	07:06 18:49	17:38 (23) 18:06 (23)	17:40 (23) 17:38	07:03 16:00	14:33 (1) 15:12 (19)	08:28 15:52	33	12:25 (20) 15:12 (16)
31	05:17 21:10	06:12 20:03	07:08 18:46	17:37 (23) 18:05 (23)	17:37 (23) 17:35	07:05 16:00	14:34 (1) 15:11 (19)	08:28 15:53	34	12:26 (20) 15:14 (16)
Sonneneinstrahlung	515	461	383	328	257	1471	231	991		
astr.max.mögl.Beschattung			385	1435		1471		991		
Red.Sonneneinstrahlung			0.40	0.33		0.21		0.14		
Reduktion Betriebsdauer			0.90	0.90		0.90		0.90		
Reduktion Windrichtung			0.68	0.68		0.68		0.62		
Gesamte Reduktion			0.24	0.20		0.13		0.08		
Met.wahrsch.Beschattung			94	288		187		76		

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1   08:28	13:37 (1)   07:57		13:38 (1)   06:59	16:30 (23)   06:43	05:33   04:42		
15:54	61   14:59 (16)   16:46	86	15:37 (19)   17:43	29   16:59 (23)   19:42	20:39   21:30		
2   08:28	13:37 (1)   07:55		13:39 (1)   06:56	16:29 (23)   06:40	05:31   04:41		
15:55	61   14:59 (16)   16:48	84	15:37 (19)   17:45	30   16:59 (23)   19:44	20:40   21:31		
3   08:28	13:37 (1)   07:54		13:40 (1)   06:54	16:28 (23)   06:38	05:29   04:40		
15:57	61   14:59 (16)   16:50	82	15:37 (19)   17:47	32   17:00 (23)   19:46	20:42   21:32		
4   08:28	13:37 (1)   07:52		13:40 (1)   06:52	16:27 (23)   06:35	05:26   04:40		
15:58	63   15:00 (16)   16:52	80	15:36 (19)   17:49	32   16:59 (23)   19:48	20:44   21:33		
5   08:27	13:37 (1)   07:50		13:41 (1)   06:49	16:27 (23)   06:33	05:24   04:39		
15:59	63   15:00 (16)   16:54	78	15:36 (19)   17:51	33   17:00 (23)   19:50	20:46   21:34		
6   08:27	13:37 (1)   07:48		13:42 (1)   06:47	16:26 (23)   06:31	05:22   04:38		
16:00	65   15:01 (16)   16:56	74	15:35 (19)   17:53	33   16:59 (23)   19:52	20:48   21:35		
7   08:26	13:37 (1)   07:46		13:42 (1)   06:45	16:26 (23)   06:28	05:20   04:37		
16:02	64   15:01 (16)   16:58	70	15:33 (19)   17:55	34   17:00 (23)   19:54	20:50   21:36		
8   08:26	13:37 (1)   07:44		13:42 (1)   06:42	16:26 (23)   06:26	05:18   04:37		
16:03	65   15:01 (16)   17:00	66	15:31 (19)   17:57	33   16:59 (23)   19:55	20:51   21:37		
9   08:25	13:36 (1)   07:42		13:43 (1)   06:40	16:26 (23)   06:23	05:17   04:36		
16:05	67   15:01 (16)   17:03	56	15:27 (19)   17:59	33   16:59 (23)   19:57	20:53   21:38		
10   08:25	13:36 (1)   07:40		13:45 (1)   06:37	16:26 (23)   06:21	05:15   04:36		
16:06	66   15:01 (16)   17:05	46	14:31 (1)   18:01	31   16:57 (23)   19:59	20:55   21:39		
11   08:24	13:36 (1)   07:38		13:46 (1)   06:35	16:27 (23)   06:18	05:13   04:35		
16:08	66   15:01 (16)   17:07	45	14:31 (1)   18:02	30   16:57 (23)   20:01	20:57   21:40		
12   08:23	13:36 (1)   07:36		13:47 (1)   06:32	16:28 (23)   06:16	05:11   04:35		
16:09	65   15:00 (16)   17:09	43	14:30 (1)   18:04	28   16:56 (23)   20:03	20:59   21:41		
13   08:22	13:36 (1)   07:34		13:49 (1)   06:30	16:28 (23)   06:14	05:09   04:34		
16:11	71   15:20 (19)   17:11	40	14:29 (1)   18:06	27   16:55 (23)   20:05	21:00   21:41		
14   08:21	13:36 (1)   07:32		13:51 (1)   06:27	16:30 (23)   06:11	05:07   04:34		
16:13	76   15:23 (19)   17:13	36	14:27 (1)   18:08	24   16:54 (23)   20:07	21:02   21:42		
15   08:20	13:36 (1)   07:30		13:52 (1)   06:25	16:31 (23)   06:09	05:06   04:34		
16:14	77   15:25 (19)   17:15	32	14:24 (1)   18:10	20   16:51 (23)   20:09	21:04   21:43		
16   08:19	13:36 (1)   07:28		13:55 (1)   06:23	16:34 (23)   06:06	05:04   04:34		
16:16	79   15:27 (19)   17:17	27	14:22 (1)   18:12	15   16:49 (23)   20:11	21:06   21:43		
17   08:18	13:37 (1)   07:26		13:59 (1)   06:20	16:38 (23)   06:04	05:02   04:33		
16:18	75   15:29 (19)   17:19	20	14:19 (1)   18:14	5   16:43 (23)   20:12	21:07   21:44		
18   08:17	13:36 (1)   07:24		14:06 (1)   06:18	06:02   05:01	04:33		
16:19	75   15:29 (19)   17:21	7	14:13 (1)   18:16	20:14   21:09	21:44		
19   08:16	13:36 (1)   07:22		06:15	05:59   04:59	04:33		
16:21	78   15:31 (19)   17:23		18:18	20:16   21:11	21:45		
20   08:15	13:37 (1)   07:19		06:13	05:57   04:58	04:34		
16:23	79   15:32 (19)   17:25		18:20	20:18   21:12	21:45		
21   08:14	13:36 (1)   07:17		06:10	05:55   04:56	04:34		
16:25	81   15:33 (19)   17:27		18:22	20:20   21:14	21:45		
22   08:12	13:37 (1)   07:15		06:08	05:52   04:55	04:34		
16:27	82   15:34 (19)   17:29		18:23	20:22   21:15	21:45		
23   08:11	13:36 (1)   07:13		06:05	05:50   04:53	04:34		
16:29	84   15:34 (19)   17:31		18:25	20:24   21:17	21:46		
24   08:10	13:36 (1)   07:10		16:42 (23)   06:03	05:48   04:52	04:34		
16:31	85   15:35 (19)   17:33	6	16:48 (23)   18:27	20:26   21:18	21:46		
25   08:08	13:37 (1)   07:08		16:37 (23)   06:00	05:46   04:50	04:35		
16:32	86   15:36 (19)   17:35	15	16:52 (23)   18:29	20:27   21:20	21:46		
26   08:07	13:37 (1)   07:06		16:35 (23)   05:58	05:43   04:49	04:35		
16:34	86   15:36 (19)   17:37	20	16:55 (23)   18:31	20:29   21:21	21:46		
27   08:05	13:37 (1)   07:04		16:32 (23)   05:55	05:41   04:48	04:36		
16:36	86   15:36 (19)   17:39	24	16:56 (23)   18:33	20:31   21:23	21:46		
28   08:04	13:38 (1)   07:01		16:31 (23)   05:53	05:39   04:47	04:36		
16:38	86   15:37 (19)   17:41	26	16:57 (23)   18:35	20:33   21:24	21:45		
29   08:02	13:38 (1)   07:00		06:50	05:37   04:45	04:37		
16:40	86   15:37 (19)   17:43		19:37	20:35   21:26	21:45		
30   08:01	13:38 (1)   07:00		06:48	05:35   04:44	04:37		
16:42	86   15:37 (19)   17:45		19:39	20:37   21:27	21:45		
31   07:59	13:38 (1)   07:00		06:45		04:43		
16:44	86   15:37 (19)   17:47		19:40		21:28		
Sonnenscheinstunden	248	272	367	421	496	513	
astr.max.mögl.Beschattung	2311	1063	469				
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31				
Reduktion Betriebsdauer	0.90	0.90	0.90				
Reduktion Windrichtung	0.66	0.66	0.69				
Gesamte Reduktion	0.10	0.14	0.19				
Met.wahrsch.Beschattung	240	151	91				

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM)	Schattenanfang	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember					
1	04:38	05:19	06:14	07:08	17:07 (23)	07:07	13:14 (1)	08:03	13:18 (1)		
	21:45	21:09	20:01	18:46	28 17:35 (23)	16:35	47 14:01 (1)	15:50	66 14:43 (16)		
2	04:39	05:20	06:16	07:10	17:06 (23)	07:09	13:13 (1)	08:05	13:19 (1)		
	21:44	21:07	19:59	18:44	30 17:36 (23)	16:33	58 14:58 (19)	15:49	66 14:44 (16)		
3	04:40	05:22	06:17	07:12	17:04 (23)	07:11	13:12 (1)	08:06	13:21 (1)		
	21:44	21:05	19:56	18:41	31 17:35 (23)	16:31	65 15:01 (19)	15:48	65 14:45 (16)		
4	04:40	05:24	06:19	07:14	17:03 (23)	07:13	13:12 (1)	08:08	13:21 (1)		
	21:43	21:03	19:54	18:39	32 17:35 (23)	16:29	70 15:03 (19)	15:47	65 14:45 (16)		
5	04:41	05:25	06:21	07:15	17:03 (23)	07:15	13:11 (1)	08:09	13:22 (1)		
	21:43	21:01	19:51	18:37	33 17:36 (23)	16:27	75 15:05 (19)	15:47	64 14:46 (16)		
6	04:42	05:27	06:23	07:17	17:02 (23)	07:17	13:11 (1)	08:11	13:22 (1)		
	21:42	20:59	19:49	18:34	34 17:36 (23)	16:25	77 15:05 (19)	15:46	65 14:46 (16)		
7	04:43	05:29	06:25	07:19	17:02 (23)	07:19	13:10 (1)	08:12	13:24 (1)		
	21:41	20:57	19:46	18:32	33 17:35 (23)	16:23	80 15:06 (19)	15:46	63 14:47 (16)		
8	04:44	05:31	06:26	07:21	17:02 (23)	07:21	13:10 (1)	08:13	13:24 (1)		
	21:41	20:55	19:44	18:29	33 17:35 (23)	16:21	82 15:07 (19)	15:45	63 14:47 (16)		
9	04:45	05:33	06:28	07:23	17:02 (23)	07:23	13:09 (1)	08:14	13:26 (1)		
	21:40	20:53	19:41	18:27	33 17:35 (23)	16:20	83 15:07 (19)	15:45	62 14:48 (16)		
10	04:46	05:34	06:30	07:25	17:02 (23)	07:25	13:09 (1)	08:16	13:26 (1)		
	21:39	20:51	19:39	18:24	32 17:34 (23)	16:18	86 15:08 (19)	15:45	61 14:48 (16)		
11	04:48	05:36	06:32	07:27	17:02 (23)	07:27	13:10 (1)	08:17	13:27 (1)		
	21:38	20:49	19:36	18:22	31 17:33 (23)	16:16	86 15:09 (19)	15:44	61 14:49 (16)		
12	04:49	05:38	06:34	07:29	17:03 (23)	07:29	13:10 (1)	08:18	13:28 (1)		
	21:37	20:47	19:34	18:20	29 17:32 (23)	16:14	86 15:09 (19)	15:44	59 14:49 (16)		
13	04:50	05:40	06:35	07:30	17:04 (23)	07:31	13:09 (1)	08:19	13:28 (1)		
	21:36	20:45	19:31	18:17	27 17:31 (23)	16:13	88 15:09 (19)	15:44	59 14:49 (16)		
14	04:51	05:41	06:37	07:32	17:05 (23)	07:33	13:09 (1)	08:20	13:29 (1)		
	21:35	20:43	19:29	18:15	25 17:30 (23)	16:11	88 15:09 (19)	15:44	59 14:50 (16)		
15	04:52	05:43	06:39	07:34	17:06 (23)	07:35	13:10 (1)	08:21	13:30 (1)		
	21:34	20:40	19:26	18:12	22 17:28 (23)	16:09	86 15:09 (19)	15:44	57 14:50 (16)		
16	04:54	05:45	06:41	07:36	17:08 (23)	07:37	13:10 (1)	08:22	13:31 (1)		
	21:33	20:38	19:24	18:10	18 17:26 (23)	16:08	86 15:09 (19)	15:44	58 14:51 (16)		
17	04:55	05:47	06:43	07:38	17:10 (23)	07:38	13:10 (1)	08:23	13:31 (1)		
	21:32	20:36	19:21	18:08	13 17:23 (23)	16:06	86 15:09 (19)	15:44	57 14:51 (16)		
18	04:57	05:49	06:44	07:40	17:11 (23)	07:40	13:10 (1)	08:24	13:32 (1)		
	21:30	20:34	19:19	18:05	12 17:22 (23)	16:05	85 15:09 (19)	15:44	56 14:52 (16)		
19	04:58	05:50	06:46	07:42	17:12 (23)	07:42	13:11 (1)	08:24	13:33 (1)		
	21:29	20:32	19:16	18:03	11 17:21 (23)	16:03	84 15:09 (19)	15:45	56 14:53 (16)		
20	04:59	05:52	06:48	07:44	17:13 (23)	07:44	13:12 (1)	08:25	13:33 (1)		
	21:28	20:29	19:14	18:01	10 17:20 (23)	16:02	82 15:09 (19)	15:45	57 14:53 (16)		
21	05:01	05:54	06:50	07:46	17:14 (23)	07:46	13:12 (1)	08:26	13:34 (1)		
	21:26	20:27	19:11	17:59	9 17:19 (23)	16:01	81 15:09 (19)	15:45	57 14:54 (16)		
22	05:02	05:56	06:52	07:48	17:15 (23)	07:48	13:13 (1)	08:26	13:34 (1)		
	21:25	20:25	19:09	17:56	8 17:18 (23)	15:59	79 15:08 (19)	15:46	56 14:53 (16)		
23	05:04	05:58	06:53	07:50	17:16 (23)	07:50	13:13 (1)	08:27	13:35 (1)		
	21:24	20:22	19:06	17:54	7 17:17 (23)	15:58	78 15:08 (19)	15:46	57 14:55 (16)		
24	05:06	05:59	06:55	07:52	14:33 (1)	07:51	13:14 (1)	08:27	13:35 (1)		
	21:22	20:20	19:04	17:52	12 14:45 (1)	15:57	74 15:07 (19)	15:47	57 14:55 (16)		
25	05:07	06:01	06:57	06:53	13:27 (1)	07:53	13:15 (1)	08:27	13:35 (1)		
	21:20	20:18	19:01	16:50	23 13:50 (1)	15:56	75 15:07 (19)	15:48	56 14:55 (16)		
26	05:09	06:03	06:59	06:55	13:24 (1)	07:55	13:15 (1)	08:28	13:35 (1)		
	21:19	20:15	18:59	16:48	28 13:52 (1)	15:54	78 15:05 (19)	15:48	57 14:55 (16)		
27	05:10	06:05	07:01	06:57	13:21 (1)	07:57	13:15 (1)	08:28	13:36 (1)		
	21:17	20:13	18:56	17:28 (23)	16:45	33 13:54 (1)	15:53	77 15:04 (19)	15:49	58 14:57 (16)	
28	05:12	06:07	07:03	06:59	17:13 (23)	06:59	13:20 (1)	07:58	13:16 (1)	08:28	13:37 (1)
	21:16	20:11	18:54	18 17:31 (23)	16:43	37 13:57 (1)	15:52	76 15:03 (19)	15:50	57 14:57 (16)	
29	05:14	06:08	07:04	07:01	17:10 (23)	07:01	13:18 (1)	08:00	13:17 (1)	08:28	13:37 (1)
	21:14	20:08	18:51	23 17:33 (23)	16:41	40 13:58 (1)	15:51	71 15:01 (19)	15:51	59 14:58 (16)	
30	05:15	06:10	07:06	07:03	13:17 (1)	08:02	13:18 (1)	08:02	13:18 (1)	08:28	13:36 (1)
	21:12	20:06	18:49	25 17:34 (23)	16:39	42 13:59 (1)	15:51	65 14:42 (16)	15:52	59 14:57 (16)	
31	05:17	06:12	07:08	07:05	13:15 (1)	08:03	13:18 (1)	08:03	13:18 (1)	08:28	13:36 (1)
	21:10	20:03	18:47	16:37	45 14:00 (1)	15:50	61 14:42 (16)	15:53	61 14:58 (16)		
Sonnenscheinstunden	515	461	383	328		257		231			
astr.max.mögl.Beschattung				744		2334				1853	
Red.Sonnenscheinwahrsch.			0.40	0.33		0.21				0.14	
Reduktion Betriebsdauer			0.90	0.90		0.90				0.90	
Reduktion Windrichtung			0.69	0.68		0.66				0.66	
Gesamte Reduktion			0.25	0.20		0.12				0.08	
Met.wahrsch.Beschattung			19	150		290				153	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: Y - IO25

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1   08:28	12:51 (1)   07:57		13:08 (1)   06:59	16:00 (23)   06:43	05:33   04:42	
15:54	87 14:57 (19)   16:46	40	13:48 (1)   17:43	32 16:32 (23)   19:42	20:39   21:30	
2   08:28	12:52 (1)   07:55		13:10 (1)   06:57	16:00 (23)   06:40	05:31   04:41	
15:55	87 14:58 (19)   16:48	37	13:47 (1)   17:45	30 16:30 (23)   19:44	20:40   21:31	
3   08:28	12:52 (1)   07:54		13:12 (1)   06:54	16:01 (23)   06:38	05:29   04:40	
15:57	86 14:58 (19)   16:50	34	13:46 (1)   17:47	28 16:29 (23)   19:46	20:42   21:32	
4   08:28	12:53 (1)   07:52		13:13 (1)   06:52	16:01 (23)   06:35	05:26   04:40	
15:58	86 15:00 (19)   16:52	32	13:45 (1)   17:49	26 16:27 (23)   19:48	20:44   21:33	
5   08:27	12:52 (1)   07:50		13:16 (1)   06:49	16:03 (23)   06:33	05:24   04:39	
15:59	85 15:00 (19)   16:54	27	13:43 (1)   17:51	23 16:26 (23)   19:50	20:46   21:34	
6   08:27	12:53 (1)   07:48		13:19 (1)   06:47	16:05 (23)   06:31	05:22   04:38	
16:00	80 15:01 (19)   16:56	21	13:40 (1)   17:53	18 16:23 (23)   19:52	20:48   21:35	
7   08:26	12:53 (1)   07:46		13:23 (1)   06:45	16:08 (23)   06:28	05:20   04:37	
16:02	81 15:02 (19)   16:58	13	13:36 (1)   17:55	12 16:20 (23)   19:54	20:50   21:36	
8   08:26	12:53 (1)   07:44		06:42	06:26	05:18   04:37	
16:03	82 15:02 (19)   17:00		17:57	19:55	20:51   21:37	
9   08:25	12:54 (1)   07:42		06:40	06:23	05:17   04:36	
16:05	81 15:02 (19)   17:03		17:59	19:57	20:53   21:38	
10   08:25	12:54 (1)   07:40		06:37	06:21	05:15   04:36	
16:06	82 15:03 (19)   17:05		18:01	19:59	20:55   21:39	
11   08:24	12:54 (1)   07:38		06:35	06:18	05:13   04:35	
16:08	83 15:04 (19)   17:07		18:02	20:01	20:57   21:40	
12   08:23	12:54 (1)   07:36		06:32	06:16	05:11   04:35	
16:09	84 15:04 (19)   17:09		18:04	20:03	20:59   21:41	
13   08:22	12:55 (1)   07:34		16:11 (23)   06:30	06:14	05:09   04:34	
16:11	84 15:05 (19)   17:11	12	16:23 (23)   18:06	20:05	21:00   21:41	
14   08:21	12:55 (1)   07:32		16:08 (23)   06:27	06:11	05:07   04:34	
16:13	84 15:05 (19)   17:13	18	16:26 (23)   18:08	20:07	21:02   21:42	
15   08:20	12:56 (1)   07:30		16:05 (23)   06:25	06:09	05:06   04:34	
16:14	84 15:06 (19)   17:15	22	16:27 (23)   18:10	20:09	21:04   21:43	
16   08:19	12:56 (1)   07:28		16:04 (23)   06:23	06:06	05:04   04:34	
16:16	84 15:06 (19)   17:17	25	16:29 (23)   18:12	20:11	21:06   21:43	
17   08:18	12:57 (1)   07:26		16:03 (23)   06:20	06:04	05:02   04:33	
16:18	84 15:07 (19)   17:19	27	16:30 (23)   18:14	20:12	21:07   21:44	
18   08:17	12:57 (1)   07:24		16:02 (23)   06:18	06:02	05:01   04:33	
16:19	84 15:07 (19)   17:21	30	16:32 (23)   18:16	20:14	21:09   21:44	
19   08:16	12:58 (1)   07:22		16:00 (23)   06:15	05:59	04:59   04:33	
16:21	82 15:07 (19)   17:23	32	16:32 (23)   18:18	20:16	21:11   21:45	
20   08:15	12:59 (1)   07:19		16:00 (23)   06:13	05:57	04:58   04:34	
16:23	82 15:08 (19)   17:25	32	16:32 (23)   18:20	20:18	21:12   21:45	
21   08:14	12:58 (1)   07:17		16:00 (23)   06:10	05:55	04:56   04:34	
16:25	81 15:07 (19)   17:27	33	16:33 (23)   18:22	20:20	21:14   21:45	
22   08:12	13:00 (1)   07:15		15:58 (23)   06:08	05:52	04:55   04:34	
16:27	80 15:08 (19)   17:29	35	16:33 (23)   18:23	20:22	21:15   21:45	
23   08:11	13:00 (1)   07:13		15:58 (23)   06:05	05:50	04:53   04:34	
16:29	79 15:07 (19)   17:31	35	16:33 (23)   18:25	20:24	21:17   21:46	
24   08:10	13:00 (1)   07:10		15:59 (23)   06:03	05:48	04:52   04:34	
16:31	76 15:06 (19)   17:33	35	16:34 (23)   18:27	20:26	21:18   21:46	
25   08:08	13:01 (1)   07:08		15:58 (23)   06:00	05:46	04:50   04:35	
16:32	76 15:07 (19)   17:35	35	16:33 (23)   18:29	20:27	21:20   21:46	
26   08:07	13:02 (1)   07:06		15:58 (23)   05:58	05:43	04:49   04:35	
16:34	72 15:06 (19)   17:37	35	16:33 (23)   18:31	20:29	21:21   21:46	
27   08:05	13:02 (1)   07:04		15:58 (23)   05:55	05:41	04:48   04:36	
16:36	70 15:05 (19)   17:39	34	16:32 (23)   18:33	20:31	21:23   21:46	
28   08:04	13:04 (1)   07:01		15:59 (23)   05:53	05:39	04:47   04:36	
16:38	66 15:05 (19)   17:41	33	16:32 (23)   18:35	20:33	21:24   21:45	
29   08:02	13:04 (1)   07:00		06:50	05:37	04:45   04:37	
16:40	61 15:03 (19)   17:43		19:37	20:35	21:26   21:45	
30   08:01	13:05 (1)   07:00		06:48	05:35	04:44   04:37	
16:42	54 15:00 (19)   17:45		19:39	20:37	21:27   21:45	
31   07:59	13:06 (1)   07:00		06:45		04:43	
16:44	43 13:49 (1)   17:47		19:40		21:28	
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung	2430	677	169			
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31			
Reduktion Betriebsdauer	0.90	0.90	0.90			
Reduktion Windrichtung	0.64	0.68	0.70			
Gesamte Reduktion	0.10	0.14	0.20			
Met.wahrsch.Beschattung	241	98	33			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: Y - IO25

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	07:08	07:07	08:03
	21:45	21:09	20:01	18:46	16:35	15:50
2	04:39	05:20	06:16	07:10	07:09	08:05
	21:44	21:07	19:59	18:44	16:33	15:49
3	04:40	05:22	06:17	07:12	07:11	08:06
	21:44	21:05	19:56	18:41	16:31	15:48
4	04:40	05:24	06:19	07:14	07:13	12:52 (1)
	21:43	21:03	19:54	18:39	16:29	15:47 (1)
5	04:41	05:25	06:21	07:15	07:15	12:48 (1)
	21:43	21:01	19:51	18:37	16:27	15:47 (1)
6	04:42	05:27	06:23	07:17	16:47 (23)	12:36 (1)
	21:42	20:59	19:49	18:34	16:25	15:46 (1)
7	04:43	05:29	06:25	07:19	16:42 (23)	12:43 (1)
	21:41	20:57	19:46	18:32	16:23	15:46 (1)
8	04:44	05:31	06:26	07:21	16:40 (23)	12:41 (1)
	21:41	20:55	19:44	18:29	16:21	15:45 (1)
9	04:45	05:33	06:28	07:23	16:37 (23)	12:40 (1)
	21:40	20:53	19:41	18:27	16:20	15:45 (1)
10	04:46	05:34	06:30	07:25	16:36 (23)	12:39 (1)
	21:39	20:51	19:39	18:24	16:18	15:45 (1)
11	04:48	05:36	06:32	07:27	16:34 (23)	12:38 (1)
	21:38	20:49	19:36	18:22	16:16	15:44 (1)
12	04:49	05:38	06:34	07:29	16:33 (23)	12:37 (1)
	21:37	20:47	19:34	18:20	16:14	15:44 (1)
13	04:50	05:40	06:35	07:30	16:32 (23)	12:36 (1)
	21:36	20:45	19:31	18:17	16:13	15:44 (1)
14	04:51	05:41	06:37	07:32	16:32 (23)	12:36 (1)
	21:35	20:43	19:29	18:15	16:11	15:44 (1)
15	04:52	05:43	06:39	07:34	16:31 (23)	12:35 (1)
	21:34	20:40	19:26	18:12	16:09	15:44 (1)
16	04:54	05:45	06:41	07:36	16:30 (23)	12:35 (1)
	21:33	20:38	19:24	18:10	16:08	15:44 (1)
17	04:55	05:47	06:43	07:38	16:30 (23)	12:34 (1)
	21:32	20:36	19:21	18:08	16:06	15:44 (1)
18	04:57	05:49	06:44	07:40	16:30 (23)	12:34 (1)
	21:30	20:34	19:19	18:05	16:05	15:44 (1)
19	04:58	05:50	06:46	07:42	16:30 (23)	12:33 (1)
	21:29	20:32	19:16	18:03	16:03	15:44 (1)
20	04:59	05:52	06:48	07:44	16:30 (23)	12:35 (1)
	21:28	20:29	19:14	18:01	16:02	15:45 (1)
21	05:01	05:54	06:50	07:46	16:30 (23)	12:35 (1)
	21:26	20:27	19:11	17:59	16:01	15:45 (1)
22	05:02	05:56	06:52	07:48	16:30 (23)	12:35 (1)
	21:25	20:25	19:09	17:56	15:59	15:46 (1)
23	05:04	05:58	06:53	07:50	16:31 (23)	12:35 (1)
	21:24	20:22	19:06	17:54	15:58	15:46 (1)
24	05:06	05:59	06:55	07:52	16:31 (23)	12:35 (1)
	21:22	20:20	19:04	17:52	15:57	15:47 (1)
25	05:07	06:01	06:57	07:53	15:52 (23)	12:35 (1)
	21:20	20:18	19:01	16:50	15:56	15:48 (1)
26	05:09	06:03	06:59	07:55	15:53 (23)	12:34 (1)
	21:19	20:15	18:59	16:48	15:54	15:48 (1)
27	05:10	06:05	07:01	07:57	15:53 (23)	12:35 (1)
	21:17	20:13	18:56	16:45	15:53	15:49 (1)
28	05:12	06:07	07:03	07:59	15:53 (23)	12:35 (1)
	21:16	20:11	18:54	16:43	15:52	15:50 (1)
29	05:14	06:08	07:04	07:01	15:41 (23)	12:36 (1)
	21:14	20:08	18:51	16:41	15:51	15:51 (1)
30	05:15	06:10	07:06	07:03	08:02	12:36 (1)
	21:12	20:06	18:49	16:39	15:51	15:52 (1)
31	05:17	06:12	07:08	07:05		08:28
	21:10	20:03		16:37		15:53
Sonnenscheinstunden	515	461	383	328	257	231
astr.max.mögl.Beschattung				658	1716	2655
Red.Sonnenscheinwahrsch.				0.33	0.21	0.14
Reduktion Betriebsdauer				0.90	0.90	0.90
Reduktion Windrichtung				0.70	0.64	0.64
Gesamte Reduktion				0.21	0.12	0.08
Met.wahrsch.Beschattung				136	203	211

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 733 981 1.012 1.213 924 351 7.888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1   08:28	12:21 (1)   07:57	15:33 (23)   06:59	06:43	05:33	04:42	
15:54	79 14:34 (19)   16:46	20 15:53 (23)   17:43	19:42	20:39	21:30	
2   08:28	12:22 (1)   07:55	15:33 (23)   06:57	06:40	05:31	04:41	
15:55	78 14:35 (19)   16:48	23 15:56 (23)   17:45	19:44	20:40	21:31	
3   08:28	12:22 (1)   07:54	15:32 (23)   06:54	06:38	05:29	04:40	
15:57	77 14:34 (19)   16:50	25 15:57 (23)   17:47	19:46	20:42	21:32	
4   08:28	12:23 (1)   07:52	15:31 (23)   06:52	06:35	05:26	04:40	
15:58	77 14:35 (19)   16:52	27 15:58 (23)   17:49	19:48	20:44	21:33	
5   08:27	12:23 (1)   07:50	15:30 (23)   06:49	06:33	05:24	04:39	
15:59	77 14:35 (19)   16:54	30 16:00 (23)   17:51	19:50	20:46	21:34	
6   08:27	12:24 (1)   07:48	15:29 (23)   06:47	06:31	05:22	04:38	
16:00	77 14:36 (19)   16:56	31 16:00 (23)   17:53	19:52	20:48	21:35	
7   08:26	12:24 (1)   07:46	15:29 (23)   06:45	06:28	05:20	04:37	
16:02	77 14:36 (19)   16:58	32 16:01 (23)   17:55	19:54	20:50	21:36	
8   08:26	12:24 (1)   07:44	15:27 (23)   06:42	06:26	05:18	04:37	
16:03	77 14:36 (19)   17:00	34 16:01 (23)   17:57	19:55	20:51	21:37	
9   08:25	12:25 (1)   07:42	15:27 (23)   06:40	06:23	05:17	04:36	
16:05	75 14:36 (19)   17:03	35 16:02 (23)   17:59	19:57	20:53	21:38	
10   08:25	12:25 (1)   07:40	15:27 (23)   06:37	06:21	05:15	04:36	
16:06	74 14:36 (19)   17:05	35 16:02 (23)   18:01	19:59	20:55	21:39	
11   08:24	12:26 (1)   07:38	15:27 (23)   06:35	06:18	05:13	04:35	
16:08	73 14:36 (19)   17:07	36 16:03 (23)   18:02	20:01	20:57	21:40	
12   08:23	12:27 (1)   07:36	15:27 (23)   06:32	06:16	05:11	04:35	
16:09	72 14:37 (19)   17:09	36 16:03 (23)   18:04	20:03	20:59	21:41	
13   08:22	12:27 (1)   07:34	15:27 (23)   06:30	06:14	05:09	04:34	
16:11	70 14:36 (19)   17:11	36 16:03 (23)   18:06	20:05	21:00	21:41	
14   08:21	12:28 (1)   07:32	15:27 (23)   06:28	06:11	05:07	04:34	
16:13	69 14:36 (19)   17:13	36 16:03 (23)   18:08	20:07	21:02	21:42	
15   08:20	12:29 (1)   07:30	15:27 (23)   06:25	06:09	05:06	04:34	
16:14	67 14:36 (19)   17:15	35 16:02 (23)   18:10	20:09	21:04	21:43	
16   08:19	12:30 (1)   07:28	15:27 (23)   06:23	06:06	05:04	04:34	
16:16	63 14:35 (19)   17:17	35 16:02 (23)   18:12	20:11	21:06	21:43	
17   08:18	12:31 (1)   07:26	15:28 (23)   06:20	06:04	05:02	04:33	
16:18	61 14:35 (19)   17:19	34 16:02 (23)   18:14	20:12	21:07	21:44	
18   08:17	12:31 (1)   07:24	15:29 (23)   06:18	06:02	05:01	04:33	
16:19	57 14:33 (19)   17:21	33 16:02 (23)   18:16	20:14	21:09	21:44	
19   08:16	12:33 (1)   07:22	15:29 (23)   06:15	05:59	04:59	04:33	
16:21	51 14:32 (19)   17:23	31 16:00 (23)   18:18	20:16	21:11	21:45	
20   08:15	12:34 (1)   07:19	15:30 (23)   06:13	05:57	04:58	04:34	
16:23	44 14:30 (19)   17:25	29 15:59 (23)   18:20	20:18	21:12	21:45	
21   08:14	12:35 (1)   07:17	15:32 (23)   06:10	05:55	04:56	04:34	
16:25	37 13:12 (1)   17:27	26 15:58 (23)   18:22	20:20	21:14	21:45	
22   08:12	12:36 (1)   07:15	15:33 (23)   06:08	05:52	04:55	04:34	
16:27	36 13:12 (1)   17:29	23 15:56 (23)   18:23	20:22	21:15	21:45	
23   08:11	12:37 (1)   07:13	15:35 (23)   06:05	05:50	04:53	04:34	
16:29	34 13:11 (1)   17:31	19 15:54 (23)   18:25	20:24	21:17	21:46	
24   08:10	12:38 (1)   07:10	15:38 (23)   06:03	05:48	04:52	04:34	
16:31	32 13:10 (1)   17:33	14 15:52 (23)   18:27	20:26	21:18	21:46	
25   08:08	12:41 (1)   07:08	06:00	05:46	04:50	04:35	
16:32	28 13:09 (1)   17:35	18:29	20:27	21:20	21:46	
26   08:07	12:42 (1)   07:06	05:58	05:43	04:49	04:35	
16:34	25 13:07 (1)   17:37	18:31	20:29	21:21	21:46	
27   08:05	12:45 (1)   07:04	05:55	05:41	04:48	04:36	
16:36	20 13:05 (1)   17:39	18:33	20:31	21:23	21:46	
28   08:04	12:49 (1)   07:01	05:53	05:39	04:47	04:36	
16:38	14 13:03 (1)   17:41	18:35	20:33	21:24	21:45	
29   08:02		06:50	05:37	04:45	04:37	
16:40		19:37	20:35	21:26	21:45	
30   08:01	15:39 (23)	06:48	05:35	04:44	04:37	
16:42	9 15:48 (23)	19:39	20:37	21:27	21:45	
31   07:59	15:35 (23)	06:45		04:43		
16:44	16 15:51 (23)	19:40		21:28		
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung	1646	715				
Red.Sonnenscheinwahrsch.	0.17	0.24				
Reduktion Betriebsdauer	0.90	0.90				
Reduktion Windrichtung	0.63	0.69				
Gesamte Reduktion	0.10	0.15				
Met.wahrsch.Beschattung	160	106				

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	05:19	06:14	07:08	07:07	14:56 (23)   08:03	12:08 (1)
	21:45	21:09	20:01	18:46	16:35	36 15:32 (23)   15:50	73 14:18 (19)
2	04:39	05:20	06:16	07:10	07:09	14:57 (23)   08:05	12:08 (1)
	21:44	21:07	19:59	18:44	16:33	34 15:31 (23)   15:49	74 14:19 (19)
3	04:40	05:22	06:17	07:12	07:11	14:57 (23)   08:06	12:09 (1)
	21:44	21:05	19:56	18:41	16:31	34 15:31 (23)   15:48	75 14:20 (19)
4	04:40	05:24	06:19	07:14	07:13	14:58 (23)   08:08	12:09 (1)
	21:43	21:03	19:54	18:39	16:29	33 15:31 (23)   15:47	75 14:20 (19)
5	04:41	05:25	06:21	07:15	07:15	14:59 (23)   08:09	12:09 (1)
	21:43	21:01	19:51	18:37	16:27	31 15:30 (23)   15:47	77 14:21 (19)
6	04:42	05:27	06:23	07:17	07:17	15:00 (23)   08:11	12:09 (1)
	21:42	20:59	19:49	18:34	16:25	29 15:29 (23)   15:46	77 14:21 (19)
7	04:43	05:29	06:25	07:19	07:19	15:00 (23)   08:12	12:10 (1)
	21:41	20:57	19:46	18:32	16:23	28 15:28 (23)   15:46	77 14:22 (19)
8	04:44	05:31	06:26	07:21	07:21	15:02 (23)   08:13	12:10 (1)
	21:41	20:55	19:44	18:29	16:21	25 15:27 (23)   15:45	77 14:22 (19)
9	04:45	05:33	06:28	07:23	07:23	15:03 (23)   08:14	12:11 (1)
	21:40	20:53	19:41	18:27	16:20	22 15:25 (23)   15:45	77 14:23 (19)
10	04:46	05:34	06:30	07:25	07:25	15:05 (23)   08:16	12:11 (1)
	21:39	20:51	19:39	18:24	16:18	20 15:25 (23)   15:45	78 14:24 (19)
11	04:48	05:36	06:32	07:27	07:27	15:08 (23)   08:17	12:11 (1)
	21:38	20:49	19:36	18:22	16:16	15 15:23 (23)   15:44	79 14:24 (19)
12	04:49	05:38	06:34	07:29	07:29	15:11 (23)   08:18	12:11 (1)
	21:37	20:47	19:34	18:20	16:14	8 15:19 (23)   15:44	79 14:24 (19)
13	04:50	05:40	06:35	07:30	07:31	15:19 (23)   08:19	12:12 (1)
	21:36	20:45	19:31	18:17	16:13	15:44	79 14:25 (19)
14	04:51	05:41	06:37	07:32	07:33	12:21 (1)   08:20	12:12 (1)
	21:35	20:43	19:29	18:15	16:11	14 12:35 (1)   15:44	79 14:25 (19)
15	04:52	05:43	06:39	07:34	07:35	12:17 (1)   08:21	12:12 (1)
	21:34	20:40	19:26	18:12	16:09	21 12:38 (1)   15:44	79 14:25 (19)
16	04:54	05:45	06:41	07:36	07:37	12:15 (1)   08:22	12:13 (1)
	21:33	20:38	19:24	18:10	16:08	25 12:40 (1)   15:44	79 14:26 (19)
17	04:55	05:47	06:43	07:38	16:13 (23)   07:38	12:14 (1)   08:23	12:14 (1)
	21:32	20:36	19:21	18:08	7 16:20 (23)   16:06	28 12:42 (1)   15:44	79 14:27 (19)
18	04:57	05:49	06:44	07:40	16:08 (23)   07:40	12:12 (1)   08:24	12:14 (1)
	21:30	20:34	19:19	18:05	16 16:24 (23)   16:05	32 12:44 (1)   15:44	79 14:27 (19)
19	04:58	05:50	06:46	07:42	16:06 (23)   07:42	12:12 (1)   08:24	12:15 (1)
	21:29	20:32	19:16	18:03	20 16:26 (23)   16:03	34 12:46 (1)   15:45	79 14:28 (19)
20	04:59	05:52	06:48	07:44	16:03 (23)   07:44	12:11 (1)   08:25	12:15 (1)
	21:28	20:29	19:14	18:01	25 16:28 (23)   16:02	36 12:47 (1)   15:45	79 14:28 (19)
21	05:01	05:54	06:50	07:46	16:02 (23)   07:46	12:11 (1)   08:26	12:16 (1)
	21:26	20:27	19:11	17:59	27 16:29 (23)   16:01	37 12:48 (1)   15:45	79 14:29 (19)
22	05:02	05:56	06:52	07:48	16:00 (23)   07:48	12:10 (1)   08:26	12:16 (1)
	21:25	20:25	19:09	17:56	30 16:30 (23)   15:59	44 14:06 (19)   15:46	79 14:29 (19)
23	05:04	05:58	06:53	07:50	15:59 (23)   07:50	12:10 (1)   08:27	12:17 (1)
	21:24	20:22	19:06	17:54	32 16:31 (23)   15:58	51 14:09 (19)   15:46	79 14:30 (19)
24	05:06	05:59	06:55	07:52	15:58 (23)   07:51	12:09 (1)   08:27	12:17 (1)
	21:22	20:20	19:04	17:52	33 16:31 (23)   15:57	57 14:11 (19)   15:47	79 14:30 (19)
25	05:07	06:01	06:57	06:53	14:57 (23)   07:53	12:09 (1)   08:27	12:17 (1)
	21:20	20:18	19:01	16:50	34 15:31 (23)   15:56	61 14:13 (19)   15:48	79 14:30 (19)
26	05:09	06:03	06:59	06:55	14:57 (23)   07:55	12:08 (1)   08:28	12:19 (1)
	21:19	20:15	18:59	16:48	35 15:32 (23)   15:54	63 14:13 (19)   15:48	78 14:31 (19)
27	05:10	06:05	07:01	06:57	14:56 (23)   07:57	12:08 (1)   08:28	12:19 (1)
	21:17	20:13	18:56	16:45	36 15:32 (23)   15:53	67 14:15 (19)   15:49	79 14:32 (19)
28	05:12	06:07	07:03	06:59	14:57 (23)   07:58	12:08 (1)   08:28	12:19 (1)
	21:16	20:11	18:54	16:43	36 15:33 (23)   15:52	69 14:16 (19)   15:50	79 14:32 (19)
29	05:14	06:08	07:04	07:01	14:57 (23)   08:00	12:08 (1)   08:28	12:20 (1)
	21:14	20:08	18:51	16:41	36 15:33 (23)   15:51	71 14:17 (19)   15:51	79 14:33 (19)
30	05:15	06:10	07:06	07:03	14:56 (23)   08:02	12:09 (1)   08:28	12:19 (1)
	21:12	20:06	18:49	16:39	36 15:32 (23)   15:51	71 14:18 (19)   15:52	79 14:32 (19)
31	05:17	06:12	07:05	07:05	14:56 (23)   08:02	12:09 (1)   08:28	12:20 (1)
	21:10	20:04	16:37	36 15:32 (23)   15:53	79 14:33 (19)		
Sonnenscheinstunden	515	461	383	328	257	231	
astr.max.mögl.Beschattung				439	1096	2418	
Red.Sonnenscheinwahrsch.				0.33	0.21	0.14	
Reduktion Betriebsdauer				0.90	0.90	0.90	
Reduktion Windrichtung				0.69	0.64	0.63	
Gesamte Reduktion				0.20	0.12	0.08	
Met.wahrsch.Beschattung				89	131	188	

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: AA - IO27**  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28 15:54	12:00 (1) 07:57 13:55 (19) 16:46	14:47 (23) 06:39 15:20 (23) 17:43	06:43 15:42	05:33 20:39	04:42 21:30	04:38 21:43	05:19 21:09	06:14 20:01	07:08 18:46	07:07 16:35	14:31 (23) 08:03 14:39 (23) 15:50
2	08:28 15:55	12:01 (1) 07:55 13:55 (19) 16:46	14:49 (23) 06:57 15:21 (23) 17:45	06:40 19:44	05:31 20:40	04:41 21:31	04:39 21:44	05:20 21:07	06:16 20:59	07:10 18:44	07:09 16:33	14:27 (23) 08:05 14:42 (23) 15:49
3	08:28 15:57	12:01 (1) 07:59 13:52 (19) 16:50	14:49 (23) 06:54 15:20 (23) 17:47	06:38 19:46	05:29 20:42	04:40 21:32	04:40 21:44	05:22 21:05	06:17 20:56	07:12 18:41	07:11 16:31	14:24 (23) 08:06 14:44 (23) 15:48
4	08:28 15:58	12:02 (1) 07:52 12:37 (1) 16:52	14:50 (23) 06:52 15:20 (23) 17:49	06:35 19:48	05:26 20:44	04:40 21:33	04:40 21:43	05:24 21:03	06:19 20:54	07:14 18:39	07:13 16:29	14:24 (23) 08:08 14:47 (23) 15:47
5	08:27 15:59	12:07 (1) 07:50 12:37 (1) 16:54	14:51 (23) 06:49 15:19 (23) 17:51	06:33 19:50	05:24 20:46	04:39 21:34	04:41 21:43	05:25 21:01	06:21 20:51	07:15 18:37	07:15 16:26	14:22 (23) 08:09 14:47 (23) 15:43
6	08:27 16:00	12:04 (1) 07:46 14:59 (23) 16:56	14:53 (23) 06:47 15:18 (23) 17:53	06:31 19:52	05:22 20:48	04:38 21:35	04:42 21:42	05:27 20:59	06:23 20:49	07:17 18:34	07:17 16:25	14:21 (23) 08:11 14:49 (23) 15:46
7	08:26 16:02	12:04 (1) 07:46 15:03 (23) 17:00	14:54 (23) 06:45 15:18 (23) 17:57	06:28 19:56	05:20 20:51	04:43 21:37	04:43 21:41	05:29 20:58	06:25 20:44	07:19 18:29	07:19 16:21	14:20 (23) 08:12 14:51 (23) 15:45
8	08:26 16:03	12:05 (1) 07:44 15:02 (23) 17:05	14:55 (23) 06:42 15:17 (23) 17:55	06:26 19:54	05:18 20:50	04:37 21:36	04:44 21:41	05:31 20:57	06:26 20:46	07:21 18:32	07:21 16:23	14:19 (23) 08:13 14:50 (23) 15:43
9	08:25 16:05	12:06 (1) 07:42 15:05 (23) 17:03	14:58 (23) 06:40 15:12 (23) 17:59	06:23 19:57	05:17 20:53	04:36 21:38	04:45 21:40	05:33 20:53	06:28 20:41	07:23 18:27	07:23 16:20	14:18 (23) 08:14 14:51 (23) 15:45
10	08:25 16:06	12:07 (1) 07:40 15:06 (23) 17:05	15:03 (23) 06:37 15:08 (23) 18:01	06:27 19:59	05:21 20:55	04:36 21:39	04:46 21:39	05:34 20:51	06:20 20:48	07:25 18:24	07:25 16:18	14:19 (23) 08:16 14:52 (23) 15:45
11	08:24 16:08	12:09 (1) 07:38 15:09 (23) 17:07	15:06 (23) 06:35 15:03 (23) 18:02	06:25 19:58	05:19 20:57	04:35 21:40	04:48 21:38	05:36 20:49	06:32 20:46	07:27 18:22	07:27 16:16	14:18 (23) 08:19 14:53 (23) 15:44
12	08:23 16:09	12:10 (1) 07:36 15:10 (23) 17:09	15:07 (23) 06:32 15:04 (23) 18:09	06:24 19:59	05:18 20:59	04:34 21:41	04:49 21:37	05:38 20:47	06:34 20:44	07:29 18:20	07:29 16:14	14:18 (23) 08:20 14:53 (23) 15:44
13	08:22 16:11	12:11 (1) 07:34 15:10 (23) 17:11	15:08 (23) 06:30 15:05 (23) 18:11	06:23 20:05	05:17 21:00	04:34 21:41	04:50 21:36	05:40 20:45	06:35 20:42	07:30 18:17	07:31 16:13	14:18 (23) 08:21 14:53 (23) 15:44
14	08:21 16:13	12:13 (1) 07:32 15:11 (23) 17:13	15:09 (23) 06:28 15:07 (23) 18:18	06:22 20:07	05:16 21:02	04:33 21:42	04:51 21:35	05:41 20:43	06:37 20:39	07:32 18:15	07:33 16:11	14:18 (23) 08:22 14:53 (23) 15:44
15	08:20 16:14	12:15 (1) 07:30 15:13 (23) 17:15	15:10 (23) 06:26 15:09 (23) 18:23	06:21 20:08	05:15 21:04	04:33 21:43	04:52 21:34	05:43 20:46	06:39 20:42	07:34 18:12	07:35 16:09	14:18 (23) 08:23 14:53 (23) 15:44
16	08:19 16:16	12:18 (1) 07:28 15:14 (23) 17:17	15:12 (23) 06:23 15:08 (23) 18:30	06:20 20:11	05:14 21:06	04:34 21:43	04:54 21:33	05:45 20:39	06:41 20:36	07:37 18:10	07:37 16:08	14:18 (23) 08:24 14:53 (23) 15:44
17	08:18 16:18	12:24 (1) 07:26 15:15 (23) 17:19	15:14 (23) 06:20 15:06 (23) 18:41	06:20 20:12	05:04 21:07	04:33 21:44	04:55 21:32	05:47 20:36	06:43 20:31	07:38 18:08	07:39 16:06	14:18 (23) 08:25 14:53 (23) 15:44
18	08:17 16:19	14:45 (23) 07:24 15:15 (23) 17:21	15:16 (23) 06:18 15:04 (23) 18:52	06:19 20:14	05:03 21:09	04:33 21:44	04:57 21:30	05:49 20:34	06:44 20:29	07:40 18:05	07:40 16:05	14:18 (23) 08:26 14:53 (23) 15:44
19	08:16 16:21	14:45 (23) 07:22 15:16 (23) 17:23	15:17 (23) 06:16 15:05 (23) 19:03	06:18 20:16	05:02 21:11	04:33 21:45	04:58 21:32	05:50 20:32	06:46 20:26	07:42 18:03	07:42 16:03	14:18 (23) 08:27 14:54 (23) 15:45
20	08:15 16:23	14:45 (23) 07:19 15:18 (23) 17:25	15:18 (23) 06:13 15:05 (23) 19:10	06:17 20:17	05:01 21:12	04:34 21:45	04:59 21:28	05:52 20:29	06:48 20:14	07:44 18:01	07:44 16:02	14:20 (23) 08:25 14:54 (23) 15:45
21	08:14 16:25	14:45 (23) 07:17 15:19 (23) 17:27	15:19 (23) 06:10 15:04 (23) 19:17	06:16 20:18	05:00 21:13	04:34 21:45	05:01 21:29	05:54 20:28	06:50 20:11	07:46 18:03	07:46 16:03	14:21 (23) 08:26 14:55 (23) 15:45
22	08:12 16:27	14:45 (23) 07:15 15:19 (23) 17:29	15:20 (23) 06:08 15:04 (23) 19:24	06:15 20:20	04:59 21:14	04:34 21:45	05:02 21:26	05:56 20:27	06:52 20:04	07:48 18:01	07:48 16:01	14:21 (23) 08:26 14:56 (23) 15:46
23	08:11 16:29	14:45 (23) 07:13 15:19 (23) 17:31	15:21 (23) 06:05 15:04 (23) 19:30	06:15 20:21	04:58 21:17	04:34 21:46	05:04 21:24	05:58 20:22	06:53 20:16	07:50 18:00	07:50 16:02	14:22 (23) 08:27 14:56 (23) 15:46
24	08:10 16:31	14:45 (23) 07:10 15:20 (23) 17:33	15:22 (23) 06:03 15:04 (23) 19:37	06:14 20:22	04:57 21:18	04:34 21:46	05:06 21:22	05:59 20:20	06:55 20:14	07:52 18:00	07:52 16:05	14:23 (23) 08:27 14:57 (23) 15:47
25	08:08 16:33	14:45 (23) 07:06 15:20 (23) 17:35	15:23 (23) 06:00 15:04 (23) 19:44	06:14 20:23	04:56 21:19	04:35 21:46	05:07 21:20	06:01 20:18	06:57 20:15	06:53 18:00	07:53 16:05	14:24 (23) 08:27 14:58 (23) 15:48
26	08:07 16:34	14:45 (23) 07:06 15:20 (23) 17:37	15:24 (23) 05:58 15:04 (23) 19:53	06:13 20:24	04:55 21:20	04:36 21:46	05:09 21:19	06:03 20:15	06:59 20:14	06:55 18:00	07:55 16:05	14:25 (23) 08:28 14:59 (23) 15:49
27	08:05 16:36	14:46 (23) 07:04 15:21 (23) 17:39	15:25 (23) 05:53 15:04 (23) 20:03	06:12 20:25	04:54 21:21	04:36 21:46	05:12 21:17	06:05 20:14	07:01 20:13	06:57 18:00	07:57 16:05	14:25 (23) 08:28 15:04 (23) 15:51
28	08:04 16:38	14:46 (23) 07:01 15:21 (23) 17:41	15:26 (23) 05:53 15:04 (23) 20:11	06:11 20:26	04:53 21:22	04:37 21:45	05:14 21:16	06:08 20:11	07:04 20:11	07:01 18:54	07:58 16:43	14:26 (23) 08:29 15:05 (23) 15:52
29	08:02 16:40	14:46 (23) 06:59 15:22 (23) 17:43	15:27 (23) 05:52 15:05 (23) 20:18	06:10 20:27	04:52 21:23	04:38 21:45	05:17 21:14	06:10 20:08	07:06 20:08	07:01 18:51	07:59 16:41	14:27 (23) 08:30 15:06 (23) 15:53
30	08:01 16:42	14:46 (23) 06:57 15:23 (23) 17:45	15:28 (23) 05:51 15:06 (23) 20:25	06:09 20:28	04:51 21:24	04:39 21:45	05:18 21:14	06:11 20:08	07:07 20:06	07:02 18:51	07:59 16:41	14:28 (23) 08:31 15:07 (23) 15:54
31	07:59 16:44	14:47 (23) 06:55 15:24 (23) 17:47	15:29 (23) 05:50 15:07 (23) 20:32	06:08 20:29	04:50 21:25	04:40 21:45	05:19 21:12	06:12 20:06	07:08 20:09	07:03 18:51	07:59 16:41	14:29 (23) 08:32 15:08 (23) 15:55
	Sonnenscheinstunden	248	272	367	421	496	513	515	461	383	328	257
	atr.max.mögl.Beschattung	1192	240									1527
	Red.Sonnenscheinwahrsch.	0.17	0.24									0.14
	Reduktion Betriebsdauer	0.90	0.90									0.90
	Reduktion Windrichtung	0.65	0.68									0.62
	Gesamte Reduktion	0.10	0.14									0.08
	Met.wahrsch.Beschattung	121	35									117

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	Schattende (WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AB - IO28

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1   08:28	15:09 (17)   07:57	06:59	17:01 (18)   06:43	18:43 (20)   05:33	19:33 (1)   04:42	
15:54	7   15:16 (17)   16:46	17:43	15   17:16 (18)   19:42	21   19:04 (20)   20:39	36   20:09 (23)   21:29	
2   08:28	15:09 (17)   07:55	06:56	16:59 (18)   06:40	18:41 (20)   05:31	19:32 (1)   04:41	
15:55	9   15:18 (17)   16:48	17:45	17   17:16 (18)   19:44	23   19:04 (20)   20:40	38   20:10 (23)   21:31	
3   08:28	15:09 (17)   07:54	06:54	16:59 (18)   06:38	18:40 (20)   05:28	19:32 (1)   04:40	
15:57	9   15:18 (17)   16:50	17:47	18   17:17 (18)   19:46	26   19:06 (20)   20:42	37   20:09 (23)   21:32	
4   08:27	15:10 (17)   07:52	06:52	16:58 (18)   06:35	18:38 (20)   05:26	19:32 (1)   04:40	
15:58	10   15:20 (17)   16:52	17:49	19   17:17 (18)   19:48	28   19:06 (20)   20:44	37   20:09 (23)   21:33	
5   08:27	15:09 (17)   07:50	06:49	16:58 (18)   06:33	18:37 (20)   05:24	19:31 (1)   04:39	
15:59	12   15:21 (17)   16:54	17:51	19   17:17 (18)   19:50	30   19:07 (20)   20:46	37   20:08 (23)   21:34	
6   08:27	15:09 (17)   07:48	06:47	16:58 (18)   06:30	18:36 (20)   05:22	19:31 (1)   04:38	
16:00	13   15:22 (17)   16:56	17:53	18   17:16 (18)   19:52	33   19:24 (19)   20:48	36   20:07 (23)   21:35	
7   08:26	15:10 (17)   07:46	06:45	16:58 (18)   06:28	18:36 (20)   05:20	19:31 (1)   04:37	
16:02	15   15:25 (17)   16:58	17:55	18   17:16 (18)   19:54	38   19:26 (19)   20:50	34   20:05 (23)   21:36	
8   08:26	15:10 (17)   07:44	06:42	16:59 (18)   06:26	18:36 (20)   05:18	19:31 (1)   04:37	
16:03	16   15:26 (17)   17:00	17:57	15   17:14 (18)   19:55	42   19:28 (19)   20:51	32   20:03 (23)   21:37	
9   08:25	15:10 (17)   07:42	06:40	17:00 (18)   06:23	18:35 (20)   05:17	19:32 (1)   04:36	
16:05	17   15:27 (17)   17:02	17:59	13   17:13 (18)   19:57	46   19:30 (19)   20:53	28   20:00 (1)   21:38	
10   08:24	15:11 (17)   07:40	06:37	17:02 (18)   06:21	18:35 (20)   05:15	19:32 (1)   04:36	
16:06	16   15:27 (17)   17:05	18:00	7   17:09 (18)   19:59	48   19:32 (19)   20:55	28   20:00 (1)   21:39	
11   08:24	15:11 (17)   07:38	06:35	06:18	18:34 (20)   05:13	19:32 (1)   04:35	
16:08	16   15:27 (17)   17:07	18:02	20:01	49   19:32 (19)   20:57	27   19:59 (1)   21:40	
12   08:23	15:12 (17)   07:36	06:32	06:16	18:35 (20)   05:11	19:33 (1)   04:35	
16:09	15   15:27 (17)   17:09	18:04	20:03	48   19:32 (19)   20:59	26   19:59 (1)   21:41	
13   08:22	15:12 (17)   07:34	06:30	06:14	18:35 (20)   05:09	19:34 (1)   04:34	
16:11	16   15:28 (17)   17:11	18:06	20:05	47   19:32 (19)   21:00	24   19:58 (1)   21:41	
14   08:21	15:13 (17)   07:32	06:27	06:11	18:35 (20)   05:07	19:34 (1)   04:34	
16:13	15   15:28 (17)   17:13	18:08	20:07	44   19:30 (19)   21:02	23   19:57 (1)   21:42	
15   08:20	15:14 (17)   07:30	06:25	17:38 (16)   06:09	18:36 (20)   05:06	19:36 (1)   04:34	
16:14	14   15:28 (17)   17:15	18:10	5   17:43 (16)   20:09	41   19:29 (19)   21:04	20   19:56 (1)   21:43	
16   08:19	15:15 (17)   07:28	06:23	17:36 (16)   06:06	18:37 (20)   05:04	19:36 (1)   04:34	
16:16	13   15:28 (17)   17:17	18:12	9   17:45 (16)   20:10	36   19:28 (19)   21:05	19   19:55 (1)   21:43	
17   08:18	15:16 (17)   07:26	06:20	17:35 (16)   06:04	18:38 (20)   05:02	19:38 (1)   04:33	
16:18	12   15:28 (17)   17:19	18:14	12   17:47 (16)   20:12	28   19:25 (19)   21:07	16   19:54 (1)   21:44	
18   08:17	15:17 (17)   07:24	06:18	17:34 (16)   06:02	18:40 (20)   05:01	19:39 (1)   04:33	
16:19	10   15:27 (17)   17:21	18:16	15   17:49 (16)   20:14	16   18:56 (20)   21:09	13   19:52 (1)   21:44	
19   08:16	15:19 (17)   07:22	06:15	17:34 (16)   05:59	18:43 (20)   04:59	19:42 (1)   04:33	
16:21	7   15:26 (17)   17:23	18:18	16   17:50 (16)   20:16	11   18:54 (20)   21:10	8   19:50 (1)   21:45	
20   08:15	15:22 (17)   07:19	06:13	17:33 (16)   05:57	04:58		04:34
16:23	2   15:24 (17)   17:25	18:20	16   17:49 (16)   20:18	21:12		21:45
21   08:14	07:17	06:10	17:34 (16)   05:55	04:56		04:34
16:25	17:27	18:22	15   17:49 (16)   20:20	21:14		21:45
22   08:12	07:15	06:08	17:34 (16)   05:52	04:55		04:34
16:27	17:29	18:23	13   17:47 (16)   20:22	21:15		21:45
23   08:11	07:13	06:05	17:36 (16)   05:50	04:53		04:34
16:29	17:31	18:25	10   17:46 (16)   20:24	21:17		21:45
24   08:10	07:10	06:03	05:48	19:45 (1)   04:52		04:34
16:31	17:33	18:27	20:26	5   19:50 (1)   21:18		21:46
25   08:08	07:08	06:00	05:46	19:41 (1)   04:50		04:35
16:32	17:35	18:29	20:27	13   19:54 (1)   21:20		21:46
26   08:07	07:06	05:58	05:43	19:39 (1)   04:49		04:35
16:34	17:37	18:31	20:29	19   20:00 (23)   21:21		21:46
27   08:05	07:03	05:55	05:41	19:37 (1)   04:48		04:36
16:36	17:39	8   17:11 (18)   18:33	20:31	25   20:02 (23)   21:23		21:45
28   08:04	07:01	05:53	05:39	19:36 (1)   04:47		04:36
16:38	17:41	11   17:13 (18)   18:35	20:33	28   20:04 (23)   21:24		21:45
29   08:02		06:50	05:37	19:35 (1)   04:45		04:37
16:40		19:37	20:35	30   20:05 (23)   21:26		21:45
30   08:00		06:48	18:50 (20)   05:35	19:34 (1)   04:44		04:37
16:42		19:39	9   18:59 (20)   20:37	33   20:07 (23)   21:27		21:45
31   07:59		06:45	18:45 (20)	04:43		
16:44		19:40	16   19:01 (20)	21:28		
Sonneneinstrahlung	248	272	367	421	496	512
astr.max.mögl.Beschattung	244	19	295	808	519	
Red.Sonneneinstrahlung	0.17	0.24	0.31	0.41	0.51	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.68	0.68	0.68	0.66	0.64	
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29	
Met.wahrsch.Beschattung	26	3	57	199	152	

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AB - IO28  
**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  
 342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember
1	04:38	05:19	19:43 (1) 06:14	18:34 (20) 07:08	07:07	08:03
	21:45	21:09	20:09 (1) 20:01	19:31 (19) 18:46	16:35	15:50
2	04:39	05:20	19:42 (1) 06:16	18:33 (20) 07:10	07:09	08:05
	21:44	21:07	20:09 (1) 19:59	19:30 (19) 18:44	16:33	15:49
3	04:40	05:22	19:42 (1) 06:17	18:33 (20) 07:12	07:11	08:06
	21:44	21:05	20:10 (1) 19:56	19:28 (19) 18:41	16:31	15:48
4	04:40	05:24	19:41 (1) 06:19	18:33 (20) 07:14	17:38 (18) 07:13	08:08
	21:43	21:03	20:10 (1) 19:54	19:25 (19) 18:39	17:49 (18) 16:29	15:47
5	04:41	05:25	19:41 (1) 06:21	18:32 (20) 07:15	17:36 (18) 07:15	08:09
	21:43	21:01	20:14 (23) 19:51	19:22 (19) 18:37	17:50 (18) 16:27	15:47
6	04:42	05:27	19:41 (1) 06:23	18:32 (20) 07:17	17:35 (18) 07:17	08:10
	21:42	20:59	20:16 (23) 19:49	19:20 (19) 18:34	17:51 (18) 16:25	15:46
7	04:43	05:29	19:40 (1) 06:25	18:32 (20) 07:19	17:34 (18) 07:19	08:12
	21:41	20:57	20:16 (23) 19:46	19:02 (20) 18:32	17:52 (18) 16:23	15:46
8	04:44	05:31	19:41 (1) 06:26	18:33 (20) 07:21	17:33 (18) 07:21	08:13
	21:41	20:55	20:17 (23) 19:44	19:01 (20) 18:29	17:52 (18) 16:21	15:45
9	04:45	05:32	19:41 (1) 06:28	18:33 (20) 07:23	17:33 (18) 07:23	08:14
	21:40	20:53	20:18 (23) 19:41	18:59 (20) 18:27	17:52 (18) 16:19	15:45
10	04:46	05:34	19:40 (1) 06:30	18:34 (20) 07:25	17:33 (18) 07:25	08:16
	21:39	20:51	20:18 (23) 19:39	18:58 (20) 18:24	17:52 (18) 16:18	15:45
11	04:48	05:36	19:41 (1) 06:32	18:35 (20) 07:27	17:33 (18) 07:27	08:17
	21:38	20:49	20:18 (23) 19:36	18:56 (20) 18:22	17:51 (18) 16:16	15:44
12	04:49	05:38	19:42 (1) 06:34	18:37 (20) 07:28	17:33 (18) 07:29	08:18
	21:37	20:47	20:17 (23) 19:34	18:54 (20) 18:20	17:50 (18) 16:14	15:44
13	04:50	05:40	19:41 (1) 06:35	18:39 (20) 07:30	17:34 (18) 07:31	08:19
	21:36	20:45	20:14 (23) 19:31	18:50 (20) 18:17	17:48 (18) 16:13	15:44
14	04:51	05:41	19:42 (1) 06:37	18:32 (20) 07:32	17:35 (18) 07:33	08:20
	21:35	20:43	20:12 (23) 19:29	18:15 (20) 17:45	17:45 (18) 16:11	15:44
15	04:52	05:43	19:43 (1) 06:39	18:34 (20) 07:34	17:38 (18) 07:35	08:21
	21:34	20:40	20:11 (23) 19:26	18:12 (20) 17:43	17:43 (18) 16:09	15:44
16	04:54	05:45	19:44 (1) 06:41	18:36 (20) 07:36	17:37 (18) 07:37	08:22
	21:33	20:38	20:08 (23) 19:24	18:10 (20) 17:40	17:38 (18) 16:08	15:44
17	04:55	05:47	19:45 (1) 06:43	18:37 (20) 07:38	17:38 (18) 07:38	08:23
	21:32	20:36	20:06 (23) 19:21	18:08 (20) 17:40	17:39 (18) 16:06	15:44
18	04:57	05:49	19:46 (1) 06:44	18:38 (20) 07:40	17:40 (18) 07:40	08:23
	21:30	20:34	20:00 (1) 19:19	18:05 (20) 17:37	17:41 (18) 16:05	15:44
19	04:58	05:50	19:52 (1) 06:46	18:39 (20) 07:42	17:42 (18) 07:42	08:24
	21:29	20:32	19:54 (1) 19:16	18:03 (20) 17:35	17:43 (18) 16:03	15:45
20	04:59	05:52	19:53 (1) 06:48	18:23 (16) 07:44	17:44 (18) 07:44	08:25
	21:28	20:29	19:14 (20) 18:01	18:32 (16) 18:01	17:45 (18) 16:02	15:45
21	05:01	05:54	19:54 (1) 06:50	18:24 (16) 07:46	17:46 (18) 07:46	08:25
	21:26	20:27	19:11 (20) 17:59	18:32 (16) 17:59	17:47 (18) 16:01	15:45
22	05:02	05:56	19:55 (1) 06:52	18:19 (16) 07:48	17:48 (18) 07:48	08:26
	21:25	20:25	19:09 (20) 17:56	18:33 (16) 17:56	15:59 2 15:00 (17) 15:46	2 15:07 (17)
23	05:04	05:58	19:56 (1) 06:53	18:18 (16) 07:50	17:49 (18) 07:50	08:27
	21:23	20:22	19:06 (20) 17:54	18:34 (16) 17:54	15:58 7 15:03 (17) 15:46	2 15:08 (17)
24	05:05	05:59	19:57 (1) 06:55	18:18 (16) 07:51	17:51 (18) 07:51	08:27
	21:22	20:20	18:58 (20) 19:04	18:34 (16) 17:52	15:57 10 15:04 (17) 15:47	2 15:08 (17)
25	05:07	19:51 (1) 06:01	18:43 (20) 06:57	18:18 (16) 06:53	17:53 (18) 07:53	14:53 (17) 08:27
	21:20	20:01 (1) 20:18	19:00 (20) 19:01	18:33 (16) 16:50	15:56 12 15:05 (17) 15:48	2 15:09 (17)
26	05:09	19:49 (1) 06:03	18:41 (20) 06:59	18:17 (16) 06:55	17:55 (18) 07:55	14:53 (17) 08:28
	21:19	20:03 (1) 20:15	19:28 (19) 18:59	18:30 (16) 16:47	15:54 13 15:06 (17) 15:48	2 15:09 (17)
27	05:10	19:48 (1) 06:05	18:39 (20) 07:01	18:17 (16) 06:57	17:56 (18) 07:56	14:54 (17) 08:28
	21:17	20:05 (1) 20:13	19:30 (19) 18:56	18:27 (16) 16:45	15:53 14 15:07 (17) 15:49	3 15:11 (17)
28	05:12	19:46 (1) 06:07	18:38 (20) 07:03	18:18 (16) 06:59	17:58 (18) 07:58	14:53 (17) 08:28
	21:16	20:06 (1) 20:11	19:31 (19) 18:54	18:25 (16) 16:43	15:52 15 15:08 (17) 15:50	4 15:12 (17)
29	05:14	19:45 (1) 06:08	18:36 (20) 07:04	18:20 (16) 07:01	18:00 (18) 08:00	14:53 (17) 08:28
	21:14	20:07 (1) 20:08	19:31 (19) 18:51	18:23 (16) 16:41	15:51 16 15:09 (17) 15:51	5 15:13 (17)
30	05:15	19:44 (1) 06:10	18:35 (20) 07:06	18:21 (16) 07:03	18:01 (18) 08:01	14:54 (17) 08:28
	21:12	20:07 (1) 20:06	19:31 (19) 18:49	18:22 (16) 16:39	15:51 16 15:10 (17) 15:52	5 15:13 (17)
31	05:17	19:44 (1) 06:12	18:35 (20) 07:07	18:23 (16) 07:05	18:02 (18) 08:02	14:55 (17) 08:28
	21:10	20:08 (1) 20:03	19:32 (19) 18:48	18:24 (16) 07:06	18:03 (18) 08:03	14:56 (17) 08:29
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	130	819	527	180	105	209
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90
Reduktion Windrichtung	0.64	0.65	0.67	0.68	0.68	0.68
Gesamte Reduktion	0.25	0.28	0.24	0.20	0.13	0.08
Met.wahrsch.Beschattung	33	232	129	37	13	18

**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	

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AC - IO29

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  
342 326 396 565 523 733 981 1.012 1.213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni						
1	08:28	07:57	06:59	16:20 (20)	06:43	18:34 (1)	05:33	04:42				
	15:54	16:46	17:43	46	17:10 (16)	19:42	30	19:04 (1)	20:39	21:30		
2	08:28	07:55	06:56	16:19 (20)	06:40	18:32 (1)	05:31	04:41				
	15:55	16:48	17:45	45	17:09 (16)	19:44	31	19:03 (1)	20:40	21:31		
3	08:28	07:54	16:17 (18)	06:54	16:19 (20)	06:38	18:32 (1)	05:28	04:40			
	15:57	16:50	2	16:19 (18)	17:47	43	17:08 (16)	19:46	32	19:04 (1)	20:42	21:32
4	08:27	07:52	16:14 (18)	06:52	16:19 (20)	06:35	18:31 (1)	05:26	04:40			
	15:58	16:52	7	16:21 (18)	17:49	37	17:05 (16)	19:48	32	19:03 (1)	20:44	21:33
5	08:27	07:50	16:13 (18)	06:49	16:20 (20)	06:33	18:31 (1)	05:24	04:39			
	15:59	16:54	10	16:23 (18)	17:51	29	16:49 (20)	19:50	32	19:03 (1)	20:46	21:34
6	08:27	07:48	16:12 (18)	06:47	16:20 (20)	06:30	18:30 (1)	05:22	04:38			
	16:00	16:56	14	16:26 (18)	17:53	28	16:48 (20)	19:52	37	19:24 (23)	20:48	21:35
7	08:26	07:46	16:10 (18)	06:45	16:21 (20)	06:28	18:31 (1)	05:20	04:37			
	16:02	16:58	17	16:27 (18)	17:55	26	16:47 (20)	19:54	40	19:26 (23)	20:50	21:36
8	08:26	07:44	16:10 (18)	06:42	16:21 (20)	06:26	18:31 (1)	05:18	04:37			
	16:03	17:00	18	16:28 (18)	17:57	24	16:45 (20)	19:55	43	19:28 (23)	20:51	21:37
9	08:25	07:42	16:10 (18)	06:40	16:23 (20)	06:23	18:31 (1)	05:17	04:36			
	16:05	17:02	18	16:28 (18)	17:59	21	16:44 (20)	19:57	45	19:30 (23)	20:53	21:38
10	08:24	07:40	16:10 (18)	06:37	16:25 (20)	06:21	18:32 (1)	05:15	04:36			
	16:06	17:05	18	16:28 (18)	18:00	16	16:41 (20)	19:59	45	19:31 (23)	20:55	21:39
11	08:24	07:38	16:10 (18)	06:35	16:29 (20)	06:18	18:32 (1)	05:13	04:35			
	16:08	17:07	18	16:28 (18)	18:02	9	16:38 (20)	20:01	44	19:31 (23)	20:57	21:40
12	08:23	07:36	16:11 (18)	06:32		06:16	18:34 (1)	05:11	04:35			
	16:09	17:09	17	16:28 (18)	18:04		20:03	40	19:30 (23)	20:59	21:41	
13	08:22	07:34	16:12 (18)	06:30		06:14	18:35 (1)	05:09	04:34			
	16:11	17:11	16	16:28 (18)	18:06		20:05	37	19:30 (23)	21:00	21:41	
14	08:21	07:32	16:13 (18)	06:27		06:11	18:37 (1)	05:07	04:34			
	16:13	17:13	14	16:27 (18)	18:08		20:07	31	19:29 (23)	21:02	21:42	
15	08:20	07:30	16:13 (18)	06:25	17:39 (19)	06:09	18:41 (1)	05:06	04:34			
	16:14	17:15	12	16:25 (18)	18:10	4	17:43 (19)	20:09	21	19:28 (23)	21:04	21:43
16	08:19	07:28	16:16 (18)	06:23	17:35 (19)	06:06	19:16 (23)	05:04	04:34			
	16:16	17:17	7	16:23 (18)	18:12	10	17:45 (19)	20:10	10	19:26 (23)	21:05	21:43
17	08:18	07:26		06:20	17:34 (19)	06:04	19:18 (23)	05:02	04:33			
	16:18	17:19		18:14	13	17:47 (19)	20:12	4	19:22 (23)	21:07	21:44	
18	08:17	07:24		06:18	17:32 (19)	06:02		05:01	04:33			
	16:19	17:21		18:16	17	17:49 (19)	20:14		21:09	21:44		
19	08:16	07:22		06:15	17:32 (19)	05:59			04:59	04:33		
	16:21	17:23		18:18	18	17:50 (19)	20:16		21:10	21:45		
20	08:15	07:19		06:13	17:31 (19)	05:57			04:57	04:33		
	16:23	17:25	12	16:42 (20)	18:20	18	17:49 (19)	20:18		21:12	21:45	
21	08:14	07:17		06:10	17:31 (19)	05:55			04:56	04:34		
	16:25	17:27	18	16:45 (20)	18:22	19	17:50 (19)	20:20		21:14	21:45	
22	08:12	07:15		06:08	17:30 (19)	05:52			04:55	04:34		
	16:27	17:29	21	16:46 (20)	18:23	19	17:49 (19)	20:22		21:15	21:45	
23	08:11	07:13		06:05	17:31 (19)	05:50			04:53	04:34		
	16:29	17:31	29	17:03 (16)	18:25	17	17:48 (19)	20:24		21:17	21:45	
24	08:10	07:10		06:03	17:31 (19)	05:48			04:52	04:34		
	16:31	17:33	34	17:05 (16)	18:27	16	17:47 (19)	20:26		21:18	21:46	
25	08:08	07:08		06:00	17:33 (19)	05:46			04:50	04:35		
	16:32	17:35	40	17:07 (16)	18:29	12	17:45 (19)	20:27		21:20	21:46	
26	08:07	07:06		05:58	17:34 (19)	05:43			04:49	04:35		
	16:34	17:37	43	17:09 (16)	18:31	20	17:56 (1)	20:29		21:21	21:46	
27	08:05	07:03		05:55	17:41 (1)	05:41			04:48	04:36		
	16:36	17:39	46	17:10 (16)	18:33	18	17:59 (1)	20:31		21:23	21:45	
28	08:04	07:01		05:53	17:38 (1)	05:39			04:47	04:36		
	16:38	17:41	46	17:10 (16)	18:35	22	18:00 (1)	20:33		21:24	21:45	
29	08:02			06:50	18:37 (1)	05:37			04:45	04:37		
	16:40			19:37	25	19:02 (1)	20:35		21:26	21:45		
30	08:00			06:48	18:36 (1)	05:35			04:44	04:37		
	16:42			19:39	27	19:03 (1)	20:37		21:27	21:45		
31	07:59			06:45	18:34 (1)				04:43			
	16:44			19:40	29	19:03 (1)			21:28			
Sonnenscheinstunden	248	272	367		421		496		513			
astr.max.mögl.Beschattung			477		628		554					
Red.Sonnenscheinwahrsch.			0.24		0.31		0.41					
Reduktion Betriebsdauer			0.90		0.90		0.90					
Reduktion Windrichtung			0.70		0.69		0.67					
Gesamte Reduktion			0.15		0.19		0.25					
Met.wahrsch.Beschattung			72		122		138					

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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AC - IO29

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	18:32 (1) 07:08	07:07	15:40 (18) 08:03
	21:45	21:09	20:01	43 19:30 (23) 18:46	16:35	18 15:58 (18) 15:50
2	04:39	05:20	06:16	18:30 (1) 07:10	17:11 (20) 07:09	15:40 (18) 08:05
	21:44	21:07	19:59	45 19:29 (23) 18:44	2 17:13 (20) 16:33	18 15:58 (18) 15:49
3	04:40	05:22	06:17	18:29 (1) 07:12	17:04 (20) 07:11	15:40 (18) 08:06
	21:44	21:05	19:56	45 19:28 (23) 18:41	14 17:18 (20) 16:31	17 15:57 (18) 15:48
4	04:40	05:24	06:19	18:29 (1) 07:14	17:01 (20) 07:13	15:41 (18) 08:08
	21:43	21:03	19:54	42 19:25 (23) 18:39	19 17:20 (20) 16:29	16 15:57 (18) 15:47
5	04:41	05:25	06:21	18:27 (1) 07:15	16:59 (20) 07:15	15:42 (18) 08:09
	21:43	21:01	19:51	40 19:22 (23) 18:37	22 17:21 (20) 16:27	13 15:55 (18) 15:47
6	04:42	05:27	06:23	18:27 (1) 07:17	16:58 (20) 07:17	15:43 (18) 08:10
	21:42	20:59	19:49	36 19:20 (23) 18:34	24 17:22 (20) 16:25	10 15:53 (18) 15:46
7	04:43	05:29	06:25	18:26 (1) 07:19	16:56 (20) 07:19	15:44 (18) 08:12
	21:41	20:57	19:46	32 18:58 (1) 18:32	27 17:23 (20) 16:23	7 15:51 (18) 15:46
8	04:44	05:31	06:26	18:26 (1) 07:21	16:55 (20) 07:21	15:47 (18) 08:13
	21:41	20:55	19:44	32 18:58 (1) 18:29	29 17:24 (20) 16:21	2 15:49 (18) 15:45
9	04:45	05:32	06:28	18:25 (1) 07:23	16:54 (20) 07:23	15:48 (18) 08:14
	21:40	20:53	19:41	32 18:57 (1) 18:27	32 17:38 (16) 16:19	15:45
10	04:46	05:34	06:30	18:25 (1) 07:25	16:54 (20) 07:25	15:48 (18) 08:16
	21:39	20:51	19:39	32 18:57 (1) 18:24	39 17:41 (16) 16:18	15:45
11	04:48	05:36	06:32	18:26 (1) 07:27	16:53 (20) 07:27	15:48 (18) 08:17
	21:38	20:49	19:36	30 18:56 (1) 18:22	44 17:43 (16) 16:16	15:44
12	04:49	05:38	06:34	18:26 (1) 07:28	16:53 (20) 07:29	15:48 (18) 08:18
	21:37	20:47	19:34	29 18:55 (1) 18:20	45 17:43 (16) 16:14	15:44
13	04:50	05:40	06:35	18:26 (1) 07:30	16:53 (20) 07:31	15:48 (18) 08:19
	21:36	20:45	19:31	27 18:53 (1) 18:17	47 17:44 (16) 16:13	15:44
14	04:51	05:41	06:37	18:27 (1) 07:32	16:53 (20) 07:33	15:48 (18) 08:20
	21:35	20:43	19:29	25 18:52 (1) 18:15	46 17:44 (16) 16:11	15:44
15	04:52	05:43	06:39	18:28 (1) 07:34	16:53 (20) 07:35	15:48 (18) 08:21
	21:34	20:40	19:26	23 18:51 (1) 18:12	46 17:43 (16) 16:09	15:44
16	04:54	05:45	06:41	18:30 (1) 07:36	16:53 (20) 07:37	15:48 (18) 08:22
	21:33	20:38	19:24	19 18:49 (1) 18:10	43 17:41 (16) 16:08	15:44
17	04:55	05:47	06:43	18:24 (19) 07:38	16:54 (20) 07:38	15:48 (18) 08:23
	21:32	20:36	19:21	20 18:45 (1) 18:08	37 17:38 (16) 16:06	15:44
18	04:57	05:49	06:44	18:21 (19) 07:40	16:54 (20) 07:40	15:48 (18) 08:23
	21:30	20:34	19:19	11 18:32 (19) 18:05	33 17:36 (16) 16:05	15:44
19	04:58	05:50	06:46	18:19 (19) 07:42	16:55 (20) 07:42	15:48 (18) 08:24
	21:29	20:32	19:16	15 18:34 (19) 18:03	26 17:33 (16) 16:03	15:45
20	04:59	05:52	06:48	18:18 (19) 07:44	16:57 (20) 07:44	15:48 (18) 08:25
	21:28	20:29	19:14	17 18:35 (19) 18:01	20 17:17 (20) 16:02	15:45
21	05:01	05:54	06:50	18:16 (19) 07:46	16:58 (20) 07:46	15:48 (18) 08:26
	21:26	20:27	19:11	18 18:34 (19) 17:59	17 17:15 (20) 16:01	15:45
22	05:02	05:56	06:52	18:16 (19) 07:48	17:01 (20) 07:48	15:48 (18) 08:26
	21:25	20:25	19:09	18 18:34 (19) 17:56	10 17:11 (20) 15:59	15:46
23	05:04	05:58	06:53	18:15 (19) 07:50	17:01 (20) 07:50	15:48 (18) 08:27
	21:23	20:22	19:06	19 18:34 (19) 17:54	15:58	15:46
24	05:05	05:59	06:55	18:15 (19) 07:51	17:01 (20) 07:51	15:48 (18) 08:27
	21:22	20:20	19:04	19 18:34 (19) 17:52	15:57	15:47
25	05:07	06:01	06:57	18:16 (19) 06:53	17:01 (20) 07:53	15:48 (18) 08:27
	21:20	20:18	19:01	17 18:33 (19) 16:50	15:56	15:48
26	05:09	06:03	19:20 (23) 06:59	18:15 (19) 06:55	15:45 (18) 07:55	15:48 (18) 08:28
	21:19	20:15	5 19:25 (23) 18:59	15 18:30 (19) 16:47	8 15:53 (18) 15:54	15:48
27	05:10	06:05	19:17 (23) 07:01	18:17 (19) 06:57	15:43 (18) 07:57	15:48 (18) 08:28
	21:17	20:13	11 19:28 (23) 18:56	10 18:27 (19) 16:45	12 15:55 (18) 15:53	15:49
28	05:12	06:07	18:42 (1) 07:03	18:19 (19) 06:59	15:42 (18) 07:58	15:48 (18) 08:28
	21:16	20:11	22 19:30 (23) 18:54	6 18:25 (19) 16:43	15 15:57 (18) 15:52	15:50
29	05:14	06:08	18:37 (1) 07:04	18:18 (19) 07:01	15:41 (18) 08:00	15:48 (18) 08:28
	21:14	20:08	32 19:30 (23) 18:51	16:41	16 15:57 (18) 15:51	15:51
30	05:15	06:10	18:35 (1) 07:06	18:17 (19) 07:03	15:40 (18) 08:01	15:48 (18) 08:28
	21:12	20:06	37 19:30 (23) 18:49	16:39	18 15:58 (18) 15:51	15:52
31	05:17	06:12	18:34 (1) 07:07	18:16 (19) 07:05	15:40 (18) 15:51	15:48 (18) 08:28
	21:10	20:03	40 19:30 (23) 18:41	16:37	18 15:58 (18) 15:51	15:53
Sonnenscheinstunden	515	461	383	328	257	231
astr.max.mögl.Beschattung		147	717	709	101	
Red.Sonnenscheinwahrsch.		0.48	0.40	0.33	0.21	
Reduktion Betriebsdauer		0.90	0.90	0.90	0.90	
Reduktion Windrichtung		0.67	0.68	0.70	0.70	
Gesamte Reduktion		0.29	0.25	0.21	0.13	
Met.wahrsch.Beschattung		43	176	147	13	

**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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AD - IO30

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28   07:57		06:59	17:15 (16)   06:43	18:52 (1)   05:33	04:42
	15:54   16:46		17:43	17:16 (16)   19:42	19:12 (1)   20:39	21:29
2	08:28   07:55		06:56	17:13 (16)   06:40	18:50 (1)   05:31	04:41
	15:55   16:48		17:45	17:17 (16)   19:44	19:13 (1)   20:40	21:31
3	08:28   07:54		06:54	17:07 (20)   06:38	18:50 (1)   05:28	04:40
	15:57   16:50		17:47	17:20 (16)   19:46	19:13 (1)   20:42	21:32
4	08:27   07:52		06:52	17:01 (20)   06:35	18:48 (1)   05:26	04:39
	15:58   16:52		17:49	17:21 (16)   19:48	19:13 (1)   20:44	21:33
5	08:27   07:50		06:49	16:59 (20)   06:33	18:48 (1)   05:24	04:39
	15:59   16:54		17:51	17:24 (16)   19:50	19:14 (1)   20:46	21:34
6	08:27   07:48		06:47	16:57 (20)   06:30	18:47 (1)   05:22	04:38
	16:00   16:56		17:53	17:24 (16)   19:52	19:13 (1)   20:48	21:35
7	08:26   07:46		06:45	16:56 (20)   06:28	18:47 (1)   05:20	04:37
	16:02   16:58		17:55	17:24 (16)   19:54	19:26 (23)   20:50	21:36
8	08:26   07:44		06:42	16:55 (20)   06:26	18:47 (1)   05:18	04:37
	16:03   17:00		17:57	17:22 (16)   19:55	19:28 (23)   20:51	21:37
9	08:25   07:42		06:40	16:55 (20)   06:23	18:47 (1)   05:17	04:36
	16:05   17:02		17:59	17:20 (16)   19:57	19:30 (23)   20:53	21:38
10	08:24   07:40		06:37	16:54 (20)   06:21	18:48 (1)   05:15	04:36
	16:06   17:05		18:00	17:19 (20)   19:59	19:32 (23)   20:55	21:39
11	08:24   07:38		06:35	16:54 (20)   06:18	18:47 (1)   05:13	04:35
	16:08   17:07		18:02	17:19 (20)   20:01	19:33 (23)   20:57	21:40
12	08:23   07:36		06:32	16:53 (20)   06:16	18:49 (1)   05:11	04:35
	16:09   17:09		18:04	17:18 (20)   20:03	19:34 (23)   20:59	21:41
13	08:22   07:34		06:30	16:54 (20)   06:14	18:50 (1)   05:09	04:34
	16:11   17:11		18:06	17:18 (20)   20:05	19:34 (23)   21:00	21:41
14	08:21   07:32	16:39 (18)	06:27	16:53 (20)   06:11	18:51 (1)   05:07	04:34
	16:12   17:13	5 16:44 (18)	18:08	17:17 (20)   20:07	19:32 (23)   21:02	21:42
15	08:20   07:30	16:36 (18)	06:25	16:55 (20)   06:09	18:55 (1)   05:06	04:34
	16:14   17:15	9 16:45 (18)	18:10	17:16 (20)   20:09	19:31 (23)   21:04	21:43
16	08:19   07:28	16:36 (18)	06:23	16:55 (20)   06:06	19:22 (23)   05:04	04:34
	16:16   17:17	11 16:47 (18)	18:12	17:14 (20)   20:10	8 19:30 (23)   21:05	21:43
17	08:18   07:26	16:35 (18)	06:20	16:57 (20)   06:04		05:02   04:33
	16:18   17:19	15 16:50 (18)	18:14	17:13 (20)   20:12		21:07   21:44
18	08:17   07:24	16:35 (18)	06:18	16:58 (20)   06:02		05:01   04:33
	16:19   17:21	16 16:51 (18)	18:16	17:10 (20)   20:14		21:09   21:44
19	08:16   07:22	16:34 (18)	06:15		05:59	04:59   04:33
	16:21   17:23	16 16:50 (18)	18:18		20:16	21:10   21:45
20	08:15   07:19	16:35 (18)	06:13	17:48 (19)	05:57	04:57   04:33
	16:23   17:25	15 16:50 (18)	18:20	5 17:53 (19)	20:18	21:12   21:45
21	08:14   07:17	16:36 (18)	06:10	17:46 (19)	05:55	04:56   04:34
	16:25   17:27	14 16:50 (18)	18:22	9 17:55 (19)	20:20	21:14   21:45
22	08:12   07:15	16:36 (18)	06:08	17:44 (19)	05:52	04:55   04:34
	16:27   17:29	12 16:48 (18)	18:23	12 17:56 (19)	20:22	21:15   21:45
23	08:11   07:13	16:38 (18)	06:05	17:44 (19)	05:50	04:53   04:34
	16:29   17:31	9 16:47 (18)	18:25	15 17:59 (19)	20:24	21:17   21:45
24	08:10   07:10	16:41 (18)	06:03	17:43 (19)	05:48	04:52   04:34
	16:30   17:33	3 16:44 (18)	18:27	16 17:59 (19)	20:26	21:18   21:46
25	08:08   07:08		06:00	17:43 (19)	05:46	04:50   04:35
	16:32   17:35		18:29	16 17:59 (19)	20:27	21:20   21:46
26	08:07   07:06		05:58	17:43 (19)	05:43	04:49   04:35
	16:34   17:37		18:31	15 17:58 (19)	20:29	21:21   21:46
27	08:05   07:03		05:55	17:44 (19)	05:41	04:48   04:36
	16:36   17:39		18:33	13 17:57 (19)	20:31	21:23   21:45
28	08:04   07:01		05:53	17:44 (19)	05:39	04:47   04:36
	16:38   17:41		18:35	11 17:55 (19)	20:33	21:24   21:45
29	08:02		06:50	18:47 (19)	05:37	04:45   04:37
	16:40		19:37	6 18:53 (19)	20:35	21:26   21:45
30	08:00		06:48	18:56 (1)	05:35	04:44   04:37
	16:42		19:38	12 19:08 (1)	20:37	21:27   21:45
31	07:59		06:45	18:54 (1)		04:43
	16:44		19:40	17 19:11 (1)		21:28
Sonnenscheinstunden	248	272	367	421	496	513
astr.max.mögl.Beschattung		125	506	425		
Red.Sonnenscheinwahrsch.		0.24	0.31	0.41		
Reduktion Betriebsdauer		0.90	0.90	0.90		
Reduktion Windrichtung		0.70	0.68	0.67		
Gesamte Reduktion		0.15	0.19	0.25		
Met.wahrsch.Beschattung		19	97	105		

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AD - IO30

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember		
1	04:38   05:19		06:14	18:47 (1)   07:08	17:33 (20)   07:07	08:03		
	21:45   21:09		20:01   37	19:33 (23)   18:46	25   17:58 (20)   16:35	15:50		
2	04:39   05:20		06:16	18:46 (1)   07:10	17:33 (20)   07:09	08:05		
	21:44   21:07		19:59   35	19:30 (23)   18:44	25   17:58 (20)   16:33	15:49		
3	04:40   05:22		06:17	18:45 (1)   07:12	17:32 (20)   07:11	08:06		
	21:44   21:05		19:56   34	19:28 (23)   18:41	25   17:57 (20)   16:31	15:48		
4	04:40   05:24		06:19	18:45 (1)   07:14	17:32 (20)   07:13	08:08		
	21:43   21:03		19:54   30	19:25 (23)   18:39	24   17:56 (16)   16:29	15:47		
5	04:41   05:25		06:21	18:43 (1)   07:15	17:32 (20)   07:15	08:09		
	21:43   21:01		19:51   27	19:22 (23)   18:37	26   17:58 (16)   16:27	15:47		
6	04:42   05:27		06:23	18:43 (1)   07:17	17:32 (20)   07:17	08:10		
	21:42   20:59		19:49   26	19:09 (1)   18:34	27   17:59 (16)   16:25	15:46		
7	04:43   05:29		06:25	18:43 (1)   07:19	17:33 (20)   07:19	08:12		
	21:41   20:57		19:46   26	19:09 (1)   18:32	27   18:00 (16)   16:23	15:46		
8	04:44   05:31		06:26	18:43 (1)   07:21	17:34 (20)   07:21	08:13		
	21:41   20:55		19:44   25	19:08 (1)   18:29	26   18:00 (16)   16:21	15:45		
9	04:45   05:32		06:28	18:43 (1)   07:23	17:35 (20)   07:23	08:14		
	21:40   20:53		19:41   24	19:07 (1)   18:27	23   17:58 (16)   16:19	15:45		
10	04:46   05:34		06:30	18:44 (1)   07:25	17:38 (20)   07:25	08:16		
	21:39   20:51		19:39   22	19:06 (1)   18:24	17   17:55 (16)   16:18	15:45		
11	04:47   05:36		06:32	18:45 (1)   07:27	17:46 (16)   07:27	08:17		
	21:38   20:49		19:36   20	19:05 (1)   18:22	7   17:53 (16)   16:16	15:44		
12	04:49   05:38		06:34	18:46 (1)   07:28	17:47 (16)   07:29	08:18		
	21:37   20:47		19:34   17	19:03 (1)   18:20	3   17:50 (16)   16:14	15:44		
13	04:50   05:40		06:35	18:47 (1)   07:30		07:31	08:19	
	21:36   20:45		19:31   13	19:00 (1)   18:17		16:13	15:44	
14	04:51   05:41		06:37	18:38 (19)   07:32		07:33	08:20	
	21:35   20:43		19:29   8	18:55 (1)   18:15		16:11	15:44	
15	04:52   05:43		06:39	18:35 (19)   07:34		07:35	08:21	
	21:34   20:40		19:26   10	18:45 (19)   18:12		16:09	15:44	
16	04:54   05:45		06:41	18:33 (19)   07:36		07:37	08:22	
	21:33   20:38		19:24   13	18:46 (19)   18:10		16:08	15:44	
17	04:55   05:47		06:43	18:31 (19)   07:38		07:38	08:23	
	21:32   20:36		19:21   15	18:46 (19)   18:08		16:06	15:44	
18	04:57   05:49		06:44	18:31 (19)   07:40		07:40	08:23	
	21:30   20:34		19:19   16	18:47 (19)   18:05	6   17:11 (18)   16:05	15:44		
19	04:58   05:50		06:46	18:30 (19)   07:42		17:08 (18)   16:04	08:24	
	21:29   20:32		19:16   17	18:47 (19)   18:03	11   17:19 (18)   16:03	15:45		
20	04:59   05:52		06:48	18:30 (19)   07:44		17:07 (18)   16:03	08:25	
	21:28   20:29		19:14   16	18:46 (19)   18:01	13   17:20 (18)   16:02	15:45		
21	05:01   05:54		06:50	18:30 (19)   07:46		17:06 (18)   16:01	08:25	
	21:26   20:27		19:11   12	18:42 (19)   17:59	15   17:21 (18)   16:01	15:45		
22	05:02   05:56		06:52	18:30 (19)   07:48		17:05 (18)   16:01	08:26	
	21:25   20:25		19:09   10	18:40 (19)   17:56	16   17:21 (18)   15:59	15:46		
23	05:04   05:58		06:53	18:32 (19)   07:50		17:05 (18)   16:01	08:27	
	21:23   20:22		19:06   6	18:38 (19)   17:54	16   17:21 (18)   15:58	15:46		
24	05:05   05:59		06:55		17:51	17:05 (18)   16:01	08:27	
	21:22   20:20		19:04		17:52	15   17:20 (18)   15:57	15:47	
25	05:07   06:01		06:57	17:43 (20)   06:53		16:05 (18)   16:01	08:27	
	21:20   20:18		19:01   9	17:52 (20)   16:50	14   16:19 (18)   15:56	15:48		
26	05:09   06:03		06:59	17:39 (20)   06:55		16:05 (18)   16:01	08:28	
	21:19   20:15		18:59   15	17:54 (20)   16:47	11   16:16 (18)   15:54	15:48		
27	05:10   06:05		07:01	17:37 (20)   06:57		16:06 (18)   16:01	08:28	
	21:17   20:13	9	19:32 (23)   18:56	17:55 (20)   16:45	8	16:14 (18)   15:53	15:49	
28	05:12   06:07		18:56 (1)   07:02	17:36 (20)   06:59		16:08 (18)   16:01	08:28	
	21:16   20:11	18	19:33 (23)   18:54	21   17:57 (20)   16:43	4	16:12 (18)   15:52	15:50	
29	05:14   06:08		18:52 (1)   07:04	17:35 (20)   07:01		16:00 (18)   16:01	08:28	
	21:14   20:08	26	19:33 (23)   18:51	22   17:57 (20)   16:41		15:51   15:51		
30	05:15   06:10		18:50 (1)   07:06	17:34 (20)   07:03		16:01 (18)   16:01	08:28	
	21:12   20:06	32	19:34 (23)   18:49	24   17:58 (20)   16:39		15:50   15:52		
31	05:17   06:12		18:49 (1)   07:05		16:37		08:28	
	21:10   20:03	35	19:34 (23)   18:47		16:37		15:53	
Sonnenscheinstunden	515	461	383	328	257	231		
astr.max.mögl.Beschattung		120	568	384				
Red.Sonnenscheinwahrsch.		0.48	0.40	0.33				
Reduktion Betriebsdauer		0.90	0.90	0.90				
Reduktion Windrichtung		0.66	0.67	0.68				
Gesamte Reduktion		0.29	0.24	0.20				
Met.wahrsch.Beschattung		35	138	78				

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AE - IO31

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1   08:28	15:08 (17)   07:57	06:59	16:52 (18)   06:43	18:22 (20)   05:33	19:19 (1)   04:42	
15:54	8   15:16 (17)   16:46	17:43	18   17:10 (18)   19:42	34   19:16 (19)   20:39	23   19:42 (1)   21:29	
2   08:28	15:08 (17)   07:55	06:56	16:52 (18)   06:40	18:22 (20)   05:31	19:19 (1)   04:41	
15:55	10   15:18 (17)   16:48	17:45	17   17:09 (18)   19:44	37   19:17 (19)   20:40	22   19:41 (1)   21:31	
3   08:28	15:08 (17)   07:54	06:54	16:53 (18)   06:38	18:23 (20)   05:28	19:20 (1)   04:40	
15:57	10   15:18 (17)   16:50	17:47	15   17:08 (18)   19:46	38   19:19 (19)   20:42	20   19:40 (1)   21:32	
4   08:27	15:09 (17)   07:52	06:52	16:53 (18)   06:35	18:23 (20)   05:26	19:22 (1)   04:40	
15:58	11   15:20 (17)   16:52	17:49	13   17:06 (18)   19:48	40   19:21 (19)   20:44	16   19:38 (1)   21:33	
5   08:27	15:09 (17)   07:50	06:49	16:55 (18)   06:33	18:24 (20)   05:24	19:23 (1)   04:39	
15:59	12   15:21 (17)   16:54	17:51	10   17:05 (18)   19:50	39   19:22 (19)   20:46	13   19:36 (1)   21:34	
6   08:27	15:09 (17)   07:48	06:47	16:54 (18)   06:30	18:25 (20)   05:22	19:27 (1)   04:38	
16:00	13   15:22 (17)   16:56	17:53	19:52	35   19:21 (19)   20:48	5   19:32 (1)   21:35	
7   08:26	15:10 (17)   07:46	06:45	16:56 (18)   06:28	18:28 (20)   05:20	19:32 (1)   21:35	
16:02	15   15:25 (17)   16:58	17:55	19:54	30   19:21 (19)   20:50	19:32 (1)   21:35	
8   08:26	15:10 (17)   07:44	06:42	16:57 (18)   06:26	18:33 (20)   05:18	19:33 (1)   21:36	
16:03	15   15:25 (17)   17:00	17:57	19:55	19   19:21 (19)   20:51	19:33 (1)   21:36	
9   08:25	15:10 (17)   07:42	06:40	16:58 (18)   06:23	18:34 (20)   05:17	19:34 (1)   21:37	
16:05	15   15:25 (17)   17:02	17:59	19:57	14   19:19 (19)   20:53	19:34 (1)   21:37	
10   08:24	15:11 (17)   07:40	06:37	16:59 (18)   06:21	18:35 (20)   05:15	19:35 (1)   21:38	
16:06	14   15:25 (17)   17:05	18:00	19:59	10   19:17 (19)   20:55	19:35 (1)   21:38	
11   08:24	15:11 (17)   07:38	06:35	17:31 (16)   06:18	19:09 (19)   05:13	19:36 (1)   21:39	
16:08	15   15:26 (17)   17:07	18:02	5   17:36 (16)   20:01	5   19:14 (19)   20:57	19:36 (1)   21:39	
12   08:23	15:12 (17)   07:36	06:32	17:29 (16)   06:16	19:10 (19)   05:11	19:37 (1)   21:40	
16:09	14   15:26 (17)   17:09	18:04	8   17:37 (16)   20:03	20:59	19:37 (1)   21:40	
13   08:22	15:12 (17)   07:34	06:30	17:28 (16)   06:14	19:11 (19)   05:09	19:38 (1)   21:41	
16:11	14   15:26 (17)   17:11	18:06	12   17:40 (16)   20:05	21:00	19:38 (1)   21:41	
14   08:21	15:13 (17)   07:32	06:27	17:27 (16)   06:11	19:12 (19)   05:07	19:39 (1)   21:42	
16:13	13   15:26 (17)   17:13	18:08	14   17:41 (16)   20:07	21:02	19:39 (1)   21:42	
15   08:20	15:15 (17)   07:30	06:25	17:27 (16)   06:09	19:32 (1)   05:06	19:40 (1)   21:43	
16:14	11   15:26 (17)   17:15	18:10	16   17:43 (16)   20:09	2   19:34 (1)   21:04	19:40 (1)   21:43	
16   08:19	15:16 (17)   07:28	06:23	17:27 (16)   06:06	19:33 (1)   05:04	19:41 (1)   21:44	
16:16	9   15:25 (17)   17:17	18:12	14   17:41 (16)   20:10	12   19:39 (1)   21:05	19:41 (1)   21:44	
17   08:18	15:18 (17)   07:26	06:20	17:28 (16)   06:04	19:33 (1)   05:02	19:42 (1)   21:45	
16:18	7   15:25 (17)   17:19	18:14	13   17:41 (16)   20:12	18   19:41 (1)   21:07	19:42 (1)   21:45	
18   08:17	07:24	06:18	17:28 (16)   06:02	19:34 (1)   05:01	19:43 (1)   21:46	
16:19	17:21	18:16	11   17:39 (16)   20:14	20   19:42 (1)   21:09	19:43 (1)   21:46	
19   08:16	07:22	06:15	17:31 (16)   05:59	19:43 (1)   04:59	19:44 (1)   21:47	
16:21	17:23	18:18	6   17:37 (16)   20:16	22   19:43 (1)   21:10	19:44 (1)   21:47	
20   08:15	07:19	06:13	17:30 (16)   05:57	19:44 (1)   04:58	19:45 (1)   21:48	
16:23	17:25	18:20	18:20	28   19:50 (23)   21:12	19:45 (1)   21:48	
21   08:14	07:17	06:10	17:34 (20)   05:55	19:49 (1)   04:56	19:46 (1)   21:49	
16:25	17:27	18:22	10   17:44 (20)   20:20	33   19:52 (23)   21:14	19:46 (1)   21:49	
22   08:12	07:15	06:08	17:31 (20)   05:52	19:49 (1)   04:55	19:47 (1)   21:50	
16:27	17:29	18:23	16   17:47 (20)   20:22	35   19:52 (23)   21:15	19:47 (1)   21:50	
23   08:11	07:13	16:57 (18)   06:05	17:29 (20)   05:50	19:49 (1)   04:54	19:48 (1)   21:51	
16:29	17:31	6   17:03 (18)   18:25	20   17:49 (20)   20:24	37   19:54 (23)   21:17	19:48 (1)   21:51	
24   08:10	07:10	16:55 (18)   06:03	17:26 (20)   05:48	19:49 (1)   04:52	19:49 (1)   21:52	
16:31	17:33	10   17:05 (18)   18:27	23   17:49 (20)   20:26	39   19:56 (23)   21:18	19:49 (1)   21:52	
25   08:08	07:08	16:53 (18)   06:00	17:26 (20)   05:46	19:49 (1)   04:50	19:50 (1)   21:53	
16:32	17:35	14   17:07 (18)   18:29	25   17:51 (20)   20:27	41   19:58 (23)   21:20	19:50 (1)   21:53	
26   08:07	07:06	16:53 (18)   05:58	17:24 (20)   05:43	19:49 (1)   04:49	19:51 (1)   21:54	
16:34	17:37	16   17:09 (18)   18:31	27   17:51 (20)   20:29	41   19:58 (23)   21:21	19:51 (1)   21:54	
27   08:05	07:03	16:52 (18)   05:55	17:24 (20)   05:41	19:49 (1)   04:48	19:52 (1)   21:55	
16:36	17:39	17   17:09 (18)   18:33	27   17:51 (20)   20:31	40   19:57 (23)   21:23	19:52 (1)   21:55	
28   08:04	07:01	16:52 (18)   05:53	17:22 (20)   05:39	19:49 (1)   04:47	19:53 (1)   21:56	
16:38	17:41	18   17:10 (18)   18:35	29   17:51 (20)   20:33	39   19:56 (23)   21:24	19:53 (1)   21:56	
29   08:02	07:00	16:51 (18)   05:50	18:22 (20)   05:37	19:49 (1)   04:45	19:54 (1)   21:57	
16:40	17:49	19   17:19 (18)   18:38	29   17:59 (20)   20:35	38   19:55 (23)   21:26	19:54 (1)   21:57	
30   08:00	06:59	16:50 (18)   05:48	18:22 (20)   05:35	19:49 (1)   04:44	19:55 (1)   21:58	
16:42	17:51	20   17:29 (18)   18:44	29   17:59 (20)   20:37	33   19:53 (23)   21:27	19:55 (1)   21:58	
31   07:59	06:58	16:49 (18)   05:47	18:22 (20)   05:33	19:49 (1)   04:43	19:56 (1)   21:59	
16:44	17:54	21   17:39 (18)   18:49	29   18:51 (20)   20:37	33   19:53 (23)   21:27	19:56 (1)   21:59	
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung	206	81	436	779	99	
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.68	0.69	0.68	0.65	0.63	
Gesamte Reduktion	0.11	0.15	0.19	0.24	0.29	
Met.wahrsch.Beschattung	22	12	84	188	29	

**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)	Schatteneanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)		Zeitpunkt (SS:MM)	Schatteneende	

Projekt: 180413\_Miltzow\_LAI\_Antrag III - VII

Libenzierter Anwender: I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet: 13.06.2019 16:04/3.2.744

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AE - IO31
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
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Table with columns for months (Juli, August, September, Oktober, November, Dezember) and rows for individual days with start/end times and sector numbers. Includes summary rows for 'Sonneneinstunden' and 'Red.Sonnenscheinwahrsch.'.

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

Table with columns: 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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AF - IO32

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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28 15:54	15:09 (17) 15:16 (17)	07:57 16:46	06:59 17:43	16:55 (18) 17:13 (18)	06:43 19:42
2	08:28 15:55	15:10 (17) 15:18 (17)	07:55 16:48	06:56 17:45	16:54 (18) 17:12 (18)	06:40 19:44
3	08:28 15:57	15:09 (17) 15:18 (17)	07:54 16:50	06:54 17:47	16:55 (18) 17:12 (18)	06:38 19:46
4	08:27 15:58	15:10 (17) 15:20 (17)	07:52 16:52	06:52 17:49	16:54 (18) 17:11 (18)	06:35 19:48
5	08:27 15:59	15:10 (17) 15:21 (17)	07:50 16:54	06:49 17:51	16:56 (18) 17:10 (18)	06:33 19:50
6	08:27 16:00	15:10 (17) 15:22 (17)	07:48 16:56	06:47 17:53	16:56 (18) 17:08 (18)	06:30 19:52
7	08:26 16:02	15:11 (17) 15:25 (17)	07:46 16:58	06:45 17:55	16:59 (18) 17:06 (18)	06:28 19:54
8	08:26 16:03	15:11 (17) 15:26 (17)	07:44 17:00	06:42 17:57	06:26 19:55	06:18 20:51
9	08:25 16:05	15:11 (17) 15:27 (17)	07:42 17:02	06:40 17:59	06:23 19:57	06:17 20:53
10	08:24 16:06	15:11 (17) 15:27 (17)	07:40 17:05	06:37 18:00	06:21 19:59	06:15 20:55
11	08:24 16:08	15:12 (17) 15:27 (17)	07:38 17:07	06:35 18:02	06:18 20:01	06:13 20:57
12	08:23 16:09	15:12 (17) 15:27 (17)	07:36 17:09	06:32 18:04	06:16 17:34 (16)	06:11 20:03
13	08:22 16:11	15:13 (17) 15:27 (17)	07:34 17:11	06:30 18:06	06:14 17:32 (16)	06:09 20:05
14	08:21 16:13	15:14 (17) 15:28 (17)	07:32 17:13	06:27 18:08	06:11 17:41 (16)	05:07 20:07
15	08:20 16:14	15:15 (17) 15:28 (17)	07:30 17:15	06:25 18:10	06:09 17:30 (16)	05:06 20:09
16	08:19 16:16	15:16 (17) 15:28 (17)	07:28 17:17	06:23 18:12	06:06 17:29 (16)	05:04 20:10
17	08:18 16:18	15:18 (17) 15:27 (17)	07:26 17:19	06:20 18:14	06:04 17:30 (16)	05:02 20:12
18	08:17 16:19	15:18 (17) 15:26 (17)	07:24 17:21	06:18 18:16	06:02 17:30 (16)	05:01 19:34 (1)
19	08:16 16:21	15:22 (17) 15:23 (17)	07:22 17:23	06:15 18:18	05:59 17:31 (16)	04:59 19:31 (1)
20	08:15 16:23	15:23 (17) 17:25	07:19 17:25	06:13 18:20	05:57 17:31 (16)	04:58 19:29 (1)
21	08:14 16:25	07:17 17:27	07:17 18:22	06:10 18:22	05:55 20:20	04:56 19:27 (1)
22	08:12 16:27	07:15 17:29	07:15 18:23	06:08 18:23	05:52 20:22	04:55 19:25 (1)
23	08:11 16:29	07:13 17:31	07:13 18:25	06:05 18:25	05:50 20:24	04:53 19:24 (1)
24	08:10 16:31	07:10 17:33	07:10 17:02 (18)	06:03 06:03	05:48 17:39 (20)	04:52 19:23 (1)
25	08:08 16:32	07:08 17:35	07:08 17:07 (18)	06:00 18:29	05:46 17:36 (20)	04:50 19:23 (1)
26	08:07 16:34	07:06 17:37	07:06 16:57 (18)	05:58 18:31	05:43 17:33 (20)	04:49 19:22 (1)
27	08:05 16:36	07:03 17:39	07:03 16:55 (18)	05:55 18:33	05:41 17:32 (20)	04:48 19:22 (1)
28	08:04 16:38	07:01 17:41	07:01 16:55 (18)	05:53 18:35	05:39 17:30 (20)	04:47 19:22 (1)
29	08:02 16:40	07:00 17:41	07:00 17:12 (18)	05:50 18:35	05:37 17:55 (20)	04:45 20:02 (23)
30	08:00 16:42	07:00 17:41	07:00 17:12 (18)	05:48 18:35	05:35 18:29 (20)	04:44 19:22 (1)
31	07:59 16:44	07:00 17:41	07:00 17:12 (18)	05:45 18:35	05:33 18:28 (20)	04:43 20:00 (23)
Sonneneinstrahlung	248	272	367	421	496	512
astr.max.mögl.Beschattung	219	57	383	785	217	
Red.Sonneneinstrahlung	0.17	0.24	0.31	0.41	0.51	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.68	0.69	0.68	0.65	0.63	
Gesamte Reduktion	0.11	0.15	0.19	0.24	0.29	
Met.wahrsch.Beschattung	23	8	74	191	63	

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AF - IO32

**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
342	326	396	565	523	523	733	981	1,012	1,213	924	351	7,888

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli		August		September		Oktober		November		Dezember	
1	04:38	05:19		06:14	18:33 (20)	07:08		18:13 (16)	07:07	08:03	14:54 (17)
	21:45	21:09		20:01	25 19:22 (19)	18:46	5	18:18 (16)	16:35	15:50	15:09 (17)
2	04:39	05:20		06:16	18:30 (20)	07:10			07:09	08:05	14:54 (17)
	21:44	21:07		19:59	32 19:22 (19)	18:44			16:33	15:49	15:10 (17)
3	04:40	05:22		19:42 (1)	06:17	18:28 (20)	07:12		07:11	08:06	14:55 (17)
	21:44	21:05	7	19:49 (1)	19:56	36 19:22 (19)	18:41		16:31	15:48	15:11 (17)
4	04:40	05:24		19:38 (1)	06:19	18:26 (20)	07:14		07:13	08:08	14:55 (17)
	21:43	21:03	13	19:51 (1)	19:54	40 19:22 (19)	18:39		16:29	15:47	15:10 (17)
5	04:41	05:25		19:37 (1)	06:21	18:24 (20)	07:15		07:15	08:09	14:56 (17)
	21:43	21:01	16	19:53 (1)	19:51	42 19:21 (19)	18:37		16:27	15:47	15:10 (17)
6	04:42	05:27		19:35 (1)	06:23	18:23 (20)	07:17		07:17	08:10	14:56 (17)
	21:42	20:59	20	19:55 (1)	19:49	43 19:20 (19)	18:34	2	17:40 (18)	16:25	15:46 (17)
7	04:43	05:29		19:34 (1)	06:25	18:22 (20)	07:19		17:33 (18)	07:19	15:46 (17)
	21:41	20:57	21	19:55 (1)	19:46	41 19:18 (19)	18:32	11	17:44 (18)	16:23	15:46 (17)
8	04:44	05:31		19:33 (1)	06:26	18:22 (20)	07:21		17:31 (18)	07:21	15:46 (17)
	21:41	20:55	23	19:56 (1)	19:44	39 19:16 (19)	18:29	14	17:45 (18)	16:21	15:47 (17)
9	04:45	05:32		19:32 (1)	06:28	18:20 (20)	07:23		17:30 (18)	07:23	15:47 (17)
	21:40	20:53	25	19:57 (1)	19:41	37 19:13 (19)	18:27	16	17:46 (18)	16:19	15:48 (17)
10	04:46	05:34		19:31 (1)	06:30	18:20 (20)	07:25		17:29 (18)	07:25	15:49 (17)
	21:39	20:51	33	20:05 (23)	19:39	31 19:10 (19)	18:24	17	17:46 (18)	16:18	15:49 (17)
11	04:48	05:36		19:31 (1)	06:32	18:20 (20)	07:27		17:29 (18)	07:27	15:49 (17)
	21:38	20:49	36	20:07 (23)	19:36	29 18:49 (20)	18:22	17	17:46 (18)	16:16	15:49 (17)
12	04:49	05:38		19:30 (1)	06:34	18:20 (20)	07:28		17:28 (18)	07:29	15:49 (17)
	21:37	20:47	38	20:08 (23)	19:34	29 18:49 (20)	18:20	18	17:46 (18)	16:14	15:49 (17)
13	04:50	05:40		19:29 (1)	06:35	18:19 (20)	07:30		17:28 (18)	07:31	15:49 (17)
	21:36	20:45	39	20:08 (23)	19:31	29 18:48 (20)	18:17	18	17:46 (18)	16:13	15:49 (17)
14	04:51	05:41		19:29 (1)	06:37	18:20 (20)	07:32		17:28 (18)	07:33	15:49 (17)
	21:35	20:43	40	20:09 (23)	19:29	27 18:47 (20)	18:15	17	17:45 (18)	16:11	15:49 (17)
15	04:52	05:43		19:29 (1)	06:39	18:20 (20)	07:34		17:29 (18)	07:35	15:49 (17)
	21:34	20:40	40	20:09 (23)	19:26	26 18:46 (20)	18:12	14	17:43 (18)	16:09	15:49 (17)
16	04:54	05:45		19:29 (1)	06:41	18:21 (20)	07:36		17:30 (18)	07:37	15:49 (17)
	21:33	20:38	39	20:08 (23)	19:24	24 18:45 (20)	18:10	11	17:41 (18)	16:08	15:49 (17)
17	04:55	05:47		19:29 (1)	06:43	18:21 (20)	07:38		17:31 (18)	07:38	15:49 (17)
	21:32	20:36	37	20:06 (23)	19:21	21 18:42 (20)	18:08	7	17:38 (18)	16:06	15:49 (17)
18	04:57	05:49		19:29 (1)	06:44	18:23 (20)	07:40		17:40 (18)	07:40	15:49 (17)
	21:30	20:34	35	20:04 (23)	19:19	17 18:40 (20)	18:05		17:40 (18)	16:05	15:49 (17)
19	04:58	05:50		19:29 (1)	06:46	18:26 (20)	07:42		17:42 (18)	07:42	15:49 (17)
	21:29	20:32	33	20:02 (23)	19:16	11 18:37 (20)	18:03		17:42 (18)	16:03	15:49 (17)
20	04:59	05:52		19:30 (1)	06:48		07:44		17:44 (18)	07:44	15:49 (17)
	21:28	20:29	30	20:00 (23)	19:14		18:01		16:02	15:45	15:49 (17)
21	05:01	05:54		19:31 (1)	06:50		07:46		16:04	15:45	15:49 (17)
	21:26	20:27	25	19:58 (23)	19:11		17:59		16:01	15:45	15:49 (17)
22	05:02	05:56		19:31 (1)	06:52		07:48		16:02	15:45	15:49 (17)
	21:25	20:25	20	19:51 (1)	19:09		17:56		15:59	15:46	15:49 (17)
23	05:04	05:58		19:33 (1)	06:53		07:50		15:58	15:46	15:49 (17)
	21:23	20:22	17	19:50 (1)	19:06	8	18:17 (16)	07:50	15:58	15:46	15:49 (17)
24	05:05	05:59		19:35 (1)	06:55		18:15 (16)	07:51	15:57	15:46	15:49 (17)
	21:22	20:20	13	19:48 (1)	19:04	11	18:26 (16)	17:52	15:57	15:46	15:49 (17)
25	05:07	06:01		19:39 (1)	06:57		18:14 (16)	06:53	15:56	15:46	15:49 (17)
	21:20	20:18	5	19:44 (1)	19:01	13	18:27 (16)	16:50	15:56	15:46	15:49 (17)
26	05:09	06:03		19:44 (1)	19:01		18:12 (16)	06:55	15:55	15:46	15:49 (17)
	21:19	20:15			18:59	15	18:27 (16)	16:47	15:54	15:46	15:49 (17)
27	05:10	06:05			19:01	16	18:11 (16)	06:57	15:54	15:46	15:49 (17)
	21:17	20:13			18:56	16	18:27 (16)	16:45	15:53	15:46	15:49 (17)
28	05:12	06:07			19:03		18:11 (16)	06:59	15:53	15:46	15:49 (17)
	21:16	20:11			18:54	14	18:25 (16)	16:43	15:52	15:46	15:49 (17)
29	05:14	06:08			19:04		18:11 (16)	07:01	15:52	15:46	15:49 (17)
	21:14	20:08			18:51	12	18:23 (16)	16:41	15:51	15:46	15:49 (17)
30	05:15	06:10			19:12 (19)	07:06	18:12 (16)	07:03	15:51	15:46	15:49 (17)
	21:12	20:06	6	19:18 (19)	18:49	8	18:20 (16)	16:39	15:51	15:46	15:49 (17)
31	05:17	06:12			19:09 (19)			07:05	15:51	15:46	15:49 (17)
	21:10	20:03	12	19:21 (19)				16:37	15:51	15:46	15:49 (17)
Sonneneinstrahlung	514	461		383			328		257		231
astr.max.mögl.Beschattung			623		676		167				199
Red.Sonneneinstrahlung			0.48		0.40		0.33		0.21		0.14
Reduktion Betriebsdauer			0.90		0.90		0.90		0.90		0.90
Reduktion Windrichtung			0.63		0.68		0.69		0.68		0.68
Gesamte Reduktion			0.28		0.25		0.20		0.13		0.08
Met.wahrsch.Beschattung			173		166		34		11		17

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AG - IO33

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1   08:28	15:10 (17)   07:57	06:59	16:57 (18)   06:43	17:43	17:14 (18)   19:42	29   19:00 (20)   20:39	38   20:02 (23)   21:29
15:54	6   15:16 (17)   16:46	17:43	17:14 (18)   19:42	29   19:00 (20)   20:39	38   20:02 (23)   21:29		
2   08:28	15:11 (17)   07:55	06:56	16:56 (18)   06:40	17:45	18:30 (20)   05:31	19:24 (1)   04:41	
15:55	7   15:18 (17)   16:48	17:45	18:30 (20)   05:31	29   18:59 (20)   20:40	37   20:01 (23)   21:31		
3   08:28	15:11 (17)   07:54	06:54	16:56 (18)   06:38	17:47	18:30 (20)   05:28	19:24 (1)   04:40	
15:57	7   15:18 (17)   16:50	17:47	18:30 (20)   05:28	31   19:19 (19)   20:42	35   19:59 (23)   21:32		
4   08:27	15:11 (17)   07:52	06:52	16:56 (18)   06:35	17:49	18:29 (20)   05:26	19:25 (1)   04:40	
15:58	9   15:20 (17)   16:52	17:49	18:29 (20)   05:26	37   19:21 (19)   20:44	28   19:55 (23)   21:33		
5   08:27	15:11 (17)   07:50	06:49	16:56 (18)   06:33	17:51	18:29 (20)   05:24	19:25 (1)   04:39	
15:59	10   15:21 (17)   16:54	17:51	18:29 (20)   05:24	41   19:23 (19)   20:46	25   19:50 (1)   21:34		
6   08:27	15:11 (17)   07:48	06:47	16:57 (18)   06:30	17:53	18:29 (20)   05:22	19:25 (1)   04:38	
16:00	11   15:22 (17)   16:56	17:53	18:29 (20)   05:22	42   19:24 (19)   20:48	24   19:49 (1)   21:35		
7   08:26	15:12 (17)   07:46	06:45	16:58 (18)   06:28	17:55	18:29 (20)   05:20	19:26 (1)   04:37	
16:02	13   15:25 (17)   16:58	17:55	18:29 (20)   05:20	44   19:26 (19)   20:50	22   19:48 (1)   21:36		
8   08:26	15:12 (17)   07:44	06:42	17:01 (18)   06:26	17:57	18:30 (20)   05:18	19:27 (1)   04:37	
16:03	14   15:26 (17)   17:00	17:57	5   17:06 (18)   19:55	43   19:27 (19)   20:51	19   19:46 (1)   21:37		
9   08:25	15:12 (17)   07:42	06:40	18:30 (20)   05:17	17:59	18:30 (20)   05:17	19:29 (1)   04:36	
16:05	15   15:27 (17)   17:02	17:59	19:57   06:23	42   19:26 (19)   20:53	17   19:46 (1)   21:38		
10   08:24	15:12 (17)   07:40	06:37	18:32 (20)   05:15	18:00	18:32 (20)   05:15	19:31 (1)   04:36	
16:06	16   15:28 (17)   17:05	18:00	19:59   06:18	38   19:26 (19)   20:55	13   19:44 (1)   21:39		
11   08:24	15:13 (17)   07:38	06:35	18:33 (20)   05:13	18:02	19:26 (19)   20:55	19:33 (1)   04:35	
16:08	15   15:28 (17)   17:07	18:02	20:01   06:16	34   19:25 (19)   20:57	7   19:40 (1)   21:40		
12   08:23	15:13 (17)   07:36	06:32	18:35 (20)   05:11	18:04	19:25 (19)   20:57	19:40 (1)   21:40	
16:09	15   15:28 (17)   17:09	18:04	20:03   06:16	28   18:35 (20)   05:11	19:40 (1)   21:40		
13   08:22	15:14 (17)   07:34	06:30	17:35 (16)   06:14	18:06	19:24 (19)   20:59	19:40 (1)   21:40	
16:11	15   15:29 (17)   17:11	18:06	5   17:40 (16)   20:05	16   19:22 (19)   21:00	19:40 (1)   21:40		
14   08:21	15:15 (17)   07:32	06:27	17:33 (16)   06:11	18:08	19:14 (19)   05:07	19:40 (1)   21:40	
16:13	14   15:29 (17)   17:13	18:08	8   17:41 (16)   20:07	4   19:18 (19)   21:02	19:40 (1)   21:40		
15   08:20	15:15 (17)   07:30	06:25	17:32 (16)   06:09	18:10	05:06   21:04	19:40 (1)   21:40	
16:14	14   15:29 (17)   17:15	18:10	11   17:43 (16)   20:09	06:23	21:04   21:43	19:40 (1)   21:40	
16   08:19	15:17 (17)   07:28	06:23	17:31 (16)   06:06	18:12	05:04   21:43	19:40 (1)   21:40	
16:16	12   15:29 (17)   17:17	18:12	14   17:45 (16)   20:10	06:20	21:05   21:43	19:40 (1)   21:40	
17   08:18	15:18 (17)   07:26	06:20	17:31 (16)   06:04	18:14	05:02   21:43	19:40 (1)   21:40	
16:18	11   15:29 (17)   17:19	18:14	16   17:47 (16)   20:12	06:18	21:07   21:44	19:40 (1)   21:40	
18   08:17	15:18 (17)   07:24	06:18	17:31 (16)   06:02	18:16	05:01   21:44	19:40 (1)   21:40	
16:19	10   15:28 (17)   17:21	18:16	15   17:46 (16)   20:14	06:15	21:09   21:44	19:40 (1)   21:40	
19   08:16	15:21 (17)   07:22	06:15	17:31 (16)   05:59	18:18	19:37 (1)   04:59	19:40 (1)   21:40	
16:21	6   15:27 (17)   17:23	18:18	14   17:45 (16)   20:16	06:13	19:42 (1)   21:10	19:40 (1)   21:40	
20   08:15	15:19 (17)   07:19	06:13	17:32 (16)   05:57	18:20	19:33 (1)   04:58	19:40 (1)   21:40	
16:23	17:25   07:25	18:20	11   17:43 (16)   20:18	13   19:46 (1)   21:12	19:40 (1)   21:40		
21   08:14	15:20 (17)   07:17	06:10	17:34 (16)   05:55	18:22	19:31 (1)   04:56	19:40 (1)   21:40	
16:25	17:27   07:27	18:22	8   17:42 (16)   20:20	18   19:49 (1)   21:14	19:40 (1)   21:40		
22   08:12	15:21 (17)   07:15	06:08	17:35 (16)   05:52	18:23	19:29 (1)   04:55	19:40 (1)   21:40	
16:27	17:29   07:29	18:23	20:22   05:52	20   19:49 (1)   21:15	19:40 (1)   21:40		
23   08:11	15:22 (17)   07:13	06:05	17:36 (16)   05:50	18:25	19:27 (1)   04:53	19:40 (1)   21:40	
16:29	17:31   07:31	18:25	20:24   05:50	26   19:54 (23)   21:17	19:40 (1)   21:40		
24   08:10	15:23 (17)   07:10	06:03	17:37 (16)   05:48	18:27	19:26 (1)   04:52	19:40 (1)   21:40	
16:31	17:33   07:33	18:27	20:26   05:48	30   19:56 (23)   21:18	19:40 (1)   21:40		
25   08:08	15:24 (17)   07:08	06:00	17:44 (20)   05:46	16:32	19:26 (1)   04:50	19:40 (1)   21:40	
16:32	17:35   07:35	5   17:07 (18)   18:29	6   17:50 (20)   20:27	32   19:58 (23)   21:20	19:40 (1)   21:40		
26   08:07	15:25 (17)   07:06	05:58	17:39 (20)   05:43	16:34	19:25 (1)   04:49	19:40 (1)   21:40	
16:34	17:37   07:37	9   17:09 (18)   18:31	14   17:53 (20)   20:29	35   20:00 (23)   21:21	19:40 (1)   21:40		
27   08:05	15:26 (17)   07:03	05:55	17:37 (20)   05:41	16:36	19:25 (1)   04:48	19:40 (1)   21:40	
16:36	17:39   07:39	13   17:11 (18)   18:33	19   17:56 (20)   20:31	37   20:02 (23)   21:23	19:40 (1)   21:40		
28   08:04	15:27 (17)   07:01	05:53	17:35 (20)   05:39	16:38	19:24 (1)   04:47	19:40 (1)   21:40	
16:38	17:41   07:41	16   17:13 (18)   18:35	22   17:57 (20)   20:33	39   20:03 (23)   21:24	19:40 (1)   21:40		
29   08:02	15:28 (17)   06:59	05:50	18:34 (20)   05:37	16:40	19:24 (1)   04:45	19:40 (1)   21:40	
16:40	17:42   07:42	18:37	24   18:58 (20)   20:35	39   20:03 (23)   21:26	19:40 (1)   21:40		
30   08:00	15:29 (17)   06:57	05:48	18:32 (20)   05:35	16:42	19:24 (1)   04:44	19:40 (1)   21:40	
16:42	17:43   07:43	18:39	26   18:58 (20)   20:37	39   20:03 (23)   21:27	19:40 (1)   21:40		
31   07:59	15:30 (17)   06:55	05:45	18:31 (20)   05:33	16:44	04:43   21:28	19:40 (1)   21:40	
16:44	17:44   07:44	18:40	28   18:59 (20)   20:39	16:44	21:28   21:28	19:40 (1)   21:40	
Sonneneinstrahlung	248	272	367	421	496	512	
astr.max.mögl.Beschattung	220	43	359	791	265		
Red.Sonneneinstrahlung	0.17	0.24	0.31	0.41	0.51		
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90		
Reduktion Windrichtung	0.68	0.69	0.68	0.66	0.63		
Gesamte Reduktion	0.11	0.15	0.19	0.24	0.29		
Met.wahrsch.Beschattung	23	6	69	193	77		

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		

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: AG - IO33**

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember		
1	04:38	05:19			06:14	18:32 (20)	07:08		18:16 (16)	07:07		08:03	14:55 (17)
	21:45	21:09			20:01	35	19:25 (19)	18:46	2	18:18 (16)	16:35	15:50	15:10 (17)
2	04:39	05:20		19:42 (1)	06:16		18:30 (20)	07:10		07:09		08:05	14:55 (17)
	21:44	21:07	10	19:52 (1)	19:59	38	19:24 (19)	18:44		16:33		15:49	15:11 (17)
3	04:40	05:22		19:40 (1)	06:17		18:28 (20)	07:12		07:11		08:06	14:56 (17)
	21:44	21:05	15	19:55 (1)	19:56	42	19:24 (19)	18:41		16:31		15:48	15:11 (17)
4	04:40	05:24		19:38 (1)	06:19		18:27 (20)	07:14		07:13		08:08	14:56 (17)
	21:43	21:03	18	19:56 (1)	19:54	43	19:24 (19)	18:39		16:29		15:47	15:10 (17)
5	04:41	05:25		19:37 (1)	06:21		18:26 (20)	07:15		07:15		08:09	14:57 (17)
	21:43	21:01	20	19:57 (1)	19:51	43	19:22 (19)	18:37		16:27		15:47	15:10 (17)
6	04:42	05:27		19:36 (1)	06:23		18:25 (20)	07:17		07:17		08:10	14:57 (17)
	21:42	20:59	22	19:58 (1)	19:49	42	19:20 (19)	18:34	9	17:36 (18)	16:25	15:46	11 15:08 (17)
7	04:43	05:29		19:35 (1)	06:25		18:24 (20)	07:19		17:33 (18)	07:19	08:12	14:58 (17)
	21:41	20:57	23	19:58 (1)	19:46	41	19:18 (19)	18:32	14	17:47 (18)	16:23	15:46	10 15:08 (17)
8	04:44	05:31		19:34 (1)	06:26		18:24 (20)	07:21		17:32 (18)	07:21	08:13	14:58 (17)
	21:41	20:55	25	19:59 (1)	19:44	37	19:16 (19)	18:29	16	17:48 (18)	16:21	15:45	9 15:07 (17)
9	04:45	05:32		19:34 (1)	06:28		18:23 (20)	07:23		17:31 (18)	07:23	08:14	15:00 (17)
	21:40	20:53	32	20:07 (23)	19:41	33	19:13 (19)	18:27	17	17:48 (18)	16:19	15:45	8 15:08 (17)
10	04:46	05:34		19:33 (1)	06:30		18:23 (20)	07:25		17:30 (18)	07:25	08:16	15:00 (17)
	21:39	20:51	35	20:08 (23)	19:39	29	18:52 (20)	18:24	18	17:48 (18)	16:18	15:45	7 15:07 (17)
11	04:48	05:36		19:32 (1)	06:32		18:23 (20)	07:27		17:30 (18)	07:27	08:17	15:00 (17)
	21:38	20:49	37	20:09 (23)	19:36	29	18:52 (20)	18:22	18	17:48 (18)	16:16	15:44	6 15:06 (17)
12	04:49	05:38		19:32 (1)	06:34		18:23 (20)	07:28		17:30 (18)	07:28	08:18	15:01 (17)
	21:37	20:47	38	20:10 (23)	19:34	28	18:51 (20)	18:20	18	17:48 (18)	16:14	15:44	5 15:06 (17)
13	04:50	05:40		19:31 (1)	06:35		18:23 (20)	07:30		17:30 (18)	07:31	08:19	15:01 (17)
	21:36	20:45	39	20:10 (23)	19:31	27	18:50 (20)	18:17	17	17:47 (18)	16:13	15:44	4 15:05 (17)
14	04:51	05:41		19:32 (1)	06:37		18:24 (20)	07:32		17:31 (18)	07:33	08:20	15:02 (17)
	21:35	20:43	39	20:11 (23)	19:29	25	18:49 (20)	18:15	14	17:45 (18)	16:11	15:44	3 15:05 (17)
15	04:52	05:43		19:32 (1)	06:39		18:25 (20)	07:34		17:31 (18)	07:35	08:21	15:03 (17)
	21:34	20:40	39	20:11 (23)	19:26	22	18:47 (20)	18:12	12	17:43 (18)	16:09	15:44	2 15:05 (17)
16	04:54	05:45		19:31 (1)	06:41		18:26 (20)	07:36		17:33 (18)	07:37	08:22	15:04 (17)
	21:33	20:38	37	20:08 (23)	19:24	20	18:46 (20)	18:10	8	17:41 (18)	16:08	15:44	1 15:05 (17)
17	04:55	05:47		19:32 (1)	06:43		18:27 (20)	07:38		17:36 (18)	07:38	08:23	15:04 (17)
	21:32	20:36	34	20:06 (23)	19:21	16	18:43 (20)	18:08	2	17:38 (18)	16:06	15:44	2 15:06 (17)
18	04:57	05:49		19:32 (1)	06:44		18:30 (20)	07:40		07:40		08:23	15:05 (17)
	21:30	20:34	32	20:04 (23)	19:19	9	18:39 (20)	18:05		16:05		15:44	1 15:06 (17)
19	04:58	05:50		19:32 (1)	06:46		18:31 (20)	07:42		07:42		08:24	15:06 (17)
	21:29	20:32	30	20:02 (23)	19:16		18:03			16:03		15:45	
20	04:59	05:52		19:33 (1)	06:48		07:44			07:44		08:25	15:07 (17)
	21:28	20:29	26	20:00 (23)	19:14		18:01			16:02		15:45	
21	05:01	05:54		19:34 (1)	06:50		07:46			07:46		08:25	15:08 (17)
	21:26	20:27	21	19:55 (1)	19:11		17:59			16:01		15:45	
22	05:02	05:56		19:35 (1)	06:52		18:19 (16)	07:48		07:48		08:26	15:09 (17)
	21:25	20:25	17	19:52 (1)	19:09	7	18:26 (16)	17:56		15:59		15:46	
23	05:04	05:58		19:37 (1)	06:53		18:17 (16)	07:50		07:50		08:27	15:10 (17)
	21:23	20:22	13	19:50 (1)	19:06	11	18:28 (16)	17:54		15:58	6	15:04 (17)	15:46
24	05:05	05:59		19:43 (1)	06:55		18:15 (16)	07:51		07:51		14:56 (17)	08:27
	21:22	20:20	1	19:44 (1)	19:04	14	18:29 (16)	17:52		15:57	9	15:05 (17)	15:47
25	05:07	06:01			06:57		18:15 (16)	06:53		07:53		14:55 (17)	08:27
	21:20	20:18			19:01	14	18:29 (16)	16:50		15:56	11	15:06 (17)	15:48
26	05:09	06:03			06:59		18:13 (16)	06:55		07:55		14:55 (17)	08:28
	21:19	20:15			18:59	15	18:28 (16)	16:47		15:54	12	15:07 (17)	15:48
27	05:10	06:05			07:01		18:13 (16)	06:57		07:56		14:55 (17)	08:28
	21:17	20:13			18:56	14	18:27 (16)	16:45		15:53	13	15:08 (17)	15:49
28	05:12	06:07			07:03		18:13 (16)	06:59		07:58		14:55 (17)	08:28
	21:16	20:11			18:54	12	18:25 (16)	16:43		15:52	14	15:09 (17)	15:50
29	05:14	06:08		19:14 (19)	07:04		18:13 (16)	07:01		08:00		14:55 (17)	08:28
	21:14	20:08	6	19:20 (19)	18:51	10	18:23 (16)	16:41		15:51	15	15:10 (17)	15:51
30	05:15	06:10		18:39 (20)	07:06		18:14 (16)	07:03		08:01		14:55 (17)	08:28
	21:12	20:06	17	19:22 (19)	18:49	6	18:20 (16)	16:39		15:51	16	15:11 (17)	15:52
31	05:17	06:12		18:35 (20)				07:05				08:28	15:10 (17)
	21:10	20:03	28	19:24 (19)				16:37				15:53	4 15:14 (17)
Sonneneinstrahlung	514	461			383			328		257		231	
astr.max.mögl.Beschattung			654		662		165			96		158	
Red.Sonneneinstrahlung			0.48		0.40		0.33			0.21		0.14	
Reduktion Betriebsdauer			0.90		0.90		0.90			0.90		0.90	
Reduktion Windrichtung			0.64		0.68		0.69			0.68		0.68	
Gesamte Reduktion			0.28		0.25		0.20			0.13		0.08	
Met.wahrsch.Beschattung			183		163		34			12		13	

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: AH - IO34**

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28	07:57	06:59	06:43	05:33	19:48 (1) 04:42	
	15:54	16:46	17:43	19:42	20:39	21 20:09 (23) 21:29	
2	08:28	07:55	06:56	06:40	05:31	19:46 (1) 04:41	
	15:55	16:48	17:45	19:44	20:40	25 20:11 (23) 21:31	
3	08:28	07:54	06:54	17:17 (18) 06:38	05:28	19:45 (1) 04:40	
	15:57	16:50	17:47	17:20 (18) 19:46	20:42	27 20:12 (23) 21:32	
4	08:27	07:52	06:52	17:13 (18) 06:35	05:26	19:44 (1) 04:40	
	15:58	16:52	17:49	17:21 (18) 19:48	20:44	30 20:14 (23) 21:33	
5	08:27	07:50	06:49	17:11 (18) 06:33	05:24	19:43 (1) 04:39	
	15:59	16:54	17:51	17:24 (18) 19:50	20:46	32 20:15 (23) 21:34	
6	08:27	07:48	06:47	17:09 (18) 06:30	05:22	19:42 (1) 04:38	
	16:00	16:56	17:53	17:25 (18) 19:52	19:02 (20)	33 20:15 (23) 21:35	
7	08:26	15:23 (17) 07:46	06:45	17:09 (18) 06:28	18:59 (20)	05:20	19:42 (1) 04:37
	16:02	2 15:25 (17) 16:58	17:55	17:27 (18) 19:54	17 19:16 (20)	20:50	32 20:14 (23) 21:36
8	08:26	15:22 (17) 07:44	06:42	17:08 (18) 06:26	18:57 (20)	05:18	19:41 (1) 04:37
	16:03	4 15:26 (17) 17:00	17:57	17:26 (18) 19:55	21 19:18 (20)	20:51	33 20:14 (23) 21:37
9	08:25	15:22 (17) 07:42	06:40	17:08 (18) 06:23	18:55 (20)	05:17	19:42 (1) 04:36
	16:05	5 15:27 (17) 17:02	17:59	17:27 (18) 19:57	23 19:18 (20)	20:53	31 20:13 (23) 21:38
10	08:24	15:22 (17) 07:40	06:37	17:07 (18) 06:21	18:54 (20)	05:15	19:42 (1) 04:36
	16:06	7 15:29 (17) 17:05	18:00	17:26 (18) 19:59	30 19:32 (19)	20:55	30 20:12 (23) 21:39
11	08:24	15:22 (17) 07:38	06:35	17:08 (18) 06:18	18:52 (20)	05:13	19:41 (1) 04:35
	16:08	9 15:31 (17) 17:07	18:02	17:26 (18) 20:01	35 19:33 (19)	20:57	29 20:10 (23) 21:40
12	08:23	15:22 (17) 07:36	06:32	17:08 (18) 06:16	18:52 (20)	05:11	19:42 (1) 04:35
	16:09	10 15:32 (17) 17:09	18:04	17:24 (18) 20:03	39 19:35 (19)	20:59	28 20:10 (1) 21:41
13	08:22	15:22 (17) 07:34	06:30	17:10 (18) 06:14	18:51 (20)	05:09	19:42 (1) 04:34
	16:11	12 15:34 (17) 17:11	18:06	17:23 (18) 20:05	44 19:37 (19)	21:00	28 20:10 (1) 21:41
14	08:21	15:22 (17) 07:32	06:27	17:11 (18) 06:11	18:50 (20)	05:07	19:42 (1) 04:34
	16:13	14 15:36 (17) 17:13	18:08	17:20 (18) 20:07	46 19:38 (19)	21:02	27 20:09 (1) 21:42
15	08:20	15:22 (17) 07:30	06:25	06:09	18:50 (20)	05:06	19:43 (1) 04:34
	16:14	16 15:38 (17) 17:15	18:10	20:09	47 19:39 (19)	21:04	26 20:09 (1) 21:43
16	08:19	15:23 (17) 07:28	06:23	06:06	18:50 (20)	05:04	19:43 (1) 04:34
	16:16	16 15:39 (17) 17:17	18:12	20:10	47 19:39 (19)	21:05	25 20:08 (1) 21:43
17	08:18	15:24 (17) 07:26	06:20	06:04	18:49 (20)	05:02	19:44 (1) 04:33
	16:18	16 15:40 (17) 17:19	18:14	20:12	47 19:38 (19)	21:07	24 20:08 (1) 21:44
18	08:17	15:23 (17) 07:24	06:18	17:47 (16) 06:02	18:49 (20)	05:01	19:44 (1) 04:33
	16:19	16 15:39 (17) 17:21	18:16	2 17:49 (16) 20:14	45 19:37 (19)	21:09	23 20:07 (1) 21:44
19	08:16	15:24 (17) 07:22	06:15	17:45 (16) 05:59	18:50 (20)	04:59	19:45 (1) 04:33
	16:21	16 15:40 (17) 17:23	18:18	6 17:51 (16) 20:16	42 19:36 (19)	21:10	22 20:07 (1) 21:45
20	08:15	15:25 (17) 07:19	06:13	17:43 (16) 05:57	18:50 (20)	04:58	19:45 (1) 04:34
	16:23	15 15:40 (17) 17:25	18:20	10 17:53 (16) 20:18	39 19:35 (19)	21:12	20 20:05 (1) 21:45
21	08:14	15:25 (17) 07:17	06:10	17:43 (16) 05:55	18:51 (20)	04:56	19:47 (1) 04:34
	16:25	14 15:39 (17) 17:27	18:22	12 17:55 (16) 20:20	33 19:33 (19)	21:14	18 20:05 (1) 21:45
22	08:12	15:27 (17) 07:15	06:08	17:42 (16) 05:52	18:51 (20)	04:55	19:48 (1) 04:34
	16:27	13 15:40 (17) 17:29	18:23	14 17:56 (16) 20:22	24 19:15 (20)	21:15	16 20:04 (1) 21:45
23	08:11	15:28 (17) 07:13	06:05	17:42 (16) 05:50	18:52 (20)	04:53	19:50 (1) 04:34
	16:29	11 15:39 (17) 17:31	18:25	16 17:58 (16) 20:24	22 19:14 (20)	21:17	13 20:03 (1) 21:45
24	08:10	15:29 (17) 07:10	06:03	17:41 (16) 05:48	18:54 (20)	04:52	19:51 (1) 04:34
	16:31	8 15:37 (17) 17:33	18:27	15 17:56 (16) 20:26	19 19:13 (20)	21:18	10 20:01 (1) 21:46
25	08:08	15:33 (17) 07:08	06:00	17:42 (16) 05:46	18:56 (20)	04:50	19:55 (1) 04:35
	16:32	2 15:35 (17) 17:35	18:29	14 17:56 (16) 20:27	15 19:11 (20)	21:20	3 19:58 (1) 21:46
26	08:07	07:06	05:58	17:42 (16) 05:43	18:59 (20)	04:49	04:35
	16:34	17:37	18:31	12 17:54 (16) 20:29	8 19:07 (20)	21:21	21:46
27	08:05	07:03	05:55	17:45 (16) 05:41	04:48	04:48	04:36
	16:36	17:39	18:33	7 17:52 (16) 20:31	21:23	21:23	21:45
28	08:04	07:01	05:53	05:39	04:47	04:47	04:36
	16:38	17:41	18:35	20:33	21:24	21:24	21:45
29	08:02	06:50	05:37	19:52 (1)	04:45	04:45	04:37
	16:40	19:37	20:35	10 20:02 (1)	21:26	21:26	21:45
30	08:00	06:48	05:35	19:49 (1)	04:44	04:44	04:37
	16:42	19:38	20:37	18 20:07 (23)	21:27	21:27	21:45
31	07:59	06:45	05:34	04:43	04:43	04:43	04:36
	16:44	19:40	21:28	21:28	21:28	21:28	21:45
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung	206		278	682	606		
Red.Sonnenscheinwahrsch.	0.17		0.31	0.41	0.51		
Reduktion Betriebsdauer	0.90		0.90	0.90	0.90		
Reduktion Windrichtung	0.68		0.68	0.66	0.64		
Gesamte Reduktion	0.11		0.19	0.24	0.29		
Met.wahrsch.Beschattung	22		54	166	177		

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AH - IO34  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember	
1   04:38	05:19	19:52 (1)   06:14	18:52 (20)   07:08	17:48 (18)   07:07	08:03	15:04 (17)	
21:45	21:09	29 20:21 (1)   20:01	35 19:33 (19)   18:46	16 18:04 (18)   16:35	15:50	9 15:13 (17)	
2   04:39	05:20	19:52 (1)   06:16	18:52 (20)   07:10	17:47 (18)   07:09	08:05	15:05 (17)	
21:44	21:07	29 20:21 (23)   19:59	30 19:30 (19)   18:44	17 18:04 (18)   16:33	15:49	7 15:12 (17)	
3   04:40	05:22	19:52 (1)   06:17	18:53 (20)   07:12	17:46 (18)   07:11	08:06	15:06 (17)	
21:44	21:05	31 20:23 (23)   19:56	23 19:16 (20)   18:41	18 18:04 (18)   16:31	15:48	5 15:11 (17)	
4   04:40	05:24	19:51 (1)   06:19	18:54 (20)   07:14	17:45 (18)   07:13	08:08	15:06 (17)	
21:43	21:03	32 20:23 (23)   19:54	21 19:15 (20)   18:39	19 18:04 (18)   16:29	15:47	4 15:10 (17)	
5   04:41	05:25	19:52 (1)   06:21	18:55 (20)   07:15	17:45 (18)   07:15	08:09	15:08 (17)	
21:43	21:01	32 20:24 (23)   19:51	17 19:12 (20)   18:37	18 18:03 (18)   16:27	15:47	2 15:10 (17)	
6   04:42	05:27	19:52 (1)   06:23	18:58 (20)   07:17	17:45 (18)   07:17	08:10	15:45	
21:42	20:59	33 20:25 (23)   19:49	11 19:09 (20)   18:34	18 18:03 (18)   16:25	15:46	15:46	
7   04:43	05:29	19:52 (1)   06:25	07:19	17:45 (18)   07:19	08:12	15:46	
21:41	20:57	32 20:24 (23)   19:46	18:32	17 18:02 (18)   16:23	15:46	15:46	
8   04:44	05:31	19:53 (1)   06:26	07:21	17:46 (18)   07:21	08:13	15:45	
21:41	20:55	31 20:24 (23)   19:44	18:29	14 18:00 (18)   16:21	15:45	15:45	
9   04:45	05:32	19:54 (1)   06:28	07:23	17:47 (18)   07:23	08:14	15:45	
21:40	20:53	29 20:23 (23)   19:41	18:27	11 17:58 (18)   16:19	15:45	15:45	
10   04:46	05:34	19:54 (1)   06:30	07:25	17:49 (18)   07:25	08:16	15:45	
21:39	20:51	26 20:20 (23)   19:39	18:24	6 17:55 (18)   16:18	15:45	15:45	
11   04:48	05:36	19:55 (1)   06:32	07:27	07:27	08:17	15:44	
21:38	20:49	23 20:18 (23)   19:36	18:22	16:16	15:44	15:44	
12   04:49	05:38	19:56 (1)   06:34	07:28	07:29	08:18	15:44	
21:37	20:47	21 20:17 (23)   19:34	18:20	16:14	15:44	15:44	
13   04:50	05:40	19:57 (1)   06:35	07:30	07:31	08:19	15:44	
21:36	20:45	17 20:14 (23)   19:31	18:17	16:13	15:44	15:44	
14   04:51	05:41	20:00 (1)   06:37	07:32	07:33	08:20	15:44	
21:35	20:43	9 20:09 (1)   19:29	18:15	16:11	15:44	15:44	
15   04:52	05:43	06:39	07:34	07:35	08:21	15:44	
21:34	20:40	19:26	18:12	16:09	15:44	15:44	
16   04:54	05:45	06:41	18:35 (16)   07:36	07:37	08:22	15:44	
21:33	20:38	19:24	6 18:41 (16)   18:10	16:08	15:44	15:44	
17   04:55	05:47	19:05 (20)   06:43	18:31 (16)   07:38	07:38	15:06 (17)   08:23	15:44	
21:32	20:36	10 19:15 (20)   19:21	11 18:42 (16)   18:08	16:06	2 15:08 (17)   15:44	15:44	
18   04:57	05:49	19:02 (20)   06:44	18:30 (16)   07:40	07:40	15:03 (17)   08:23	15:44	
21:30	20:34	16 19:18 (20)   19:19	13 18:43 (16)   18:05	16:05	8 15:11 (17)   15:44	15:44	
19   04:58	20:02 (1)   05:50	18:59 (20)   06:46	18:29 (16)   07:42	07:42	15:02 (17)   08:24	15:44	
21:29	7 20:09 (1)   20:32	20 19:19 (20)   19:16	15 18:44 (16)   18:03	16:03	11 15:13 (17)   15:45	15:45	
20   04:59	20:00 (1)   05:52	18:58 (20)   06:48	18:28 (16)   07:44	07:44	15:02 (17)   08:25	15:45	
21:28	12 20:12 (1)   20:29	22 19:20 (20)   19:14	16 18:44 (16)   18:01	16:02	13 15:15 (17)   15:45	15:45	
21   05:01	19:59 (1)   05:54	18:57 (20)   06:50	18:27 (16)   07:46	07:46	15:02 (17)   08:25	15:45	
21:26	14 20:13 (1)   20:27	24 19:21 (20)   19:11	15 18:42 (16)   17:59	16:01	14 15:16 (17)   15:45	15:45	
22   05:02	19:58 (1)   05:56	18:55 (20)   06:52	18:27 (16)   07:48	07:48	15:01 (17)   08:26	15:45	
21:25	17 20:15 (1)   20:25	34 19:37 (19)   19:09	13 18:40 (16)   17:56	15:59	15 15:16 (17)   15:46	15:46	
23   05:04	19:57 (1)   05:58	18:54 (20)   06:53	18:28 (16)   07:50	07:50	15:01 (17)   08:27	15:46	
21:23	19 20:16 (1)   20:22	40 19:39 (19)   19:06	10 18:38 (16)   17:54	15:58	16 15:17 (17)   15:46	15:46	
24   05:05	19:55 (1)   05:59	18:54 (20)   06:55	18:28 (16)   07:51	07:51	15:00 (17)   08:27	15:46	
21:22	21 20:16 (1)   20:20	42 19:40 (19)   19:04	7 18:35 (16)   17:52	15:57	16 15:16 (17)   15:47	15:47	
25   05:07	19:55 (1)   06:01	18:53 (20)   06:57	18:30 (16)   06:53	07:53	15:01 (17)   08:27	15:47	
21:20	23 20:18 (1)   20:18	46 19:41 (19)   19:01	3 18:33 (16)   16:50	15:56	16 15:17 (17)   15:48	15:48	
26   05:09	19:54 (1)   06:03	18:52 (20)   06:59	06:55	07:55	15:01 (17)   08:28	15:48	
21:19	24 20:18 (1)   20:15	47 19:41 (19)   18:59	16:47	15:54	16 15:17 (17)   15:48	15:48	
27   05:10	19:54 (1)   06:05	18:52 (20)   07:01	06:57	07:56	15:01 (17)   08:28	15:48	
21:17	25 20:19 (1)   20:13	47 19:41 (19)   18:56	16:45	15:53	16 15:17 (17)   15:49	15:49	
28   05:12	19:53 (1)   06:07	18:52 (20)   07:03	06:59	07:58	15:02 (17)   08:28	15:49	
21:16	26 20:19 (1)   20:11	48 19:41 (19)   18:54	16:43	15:52	14 15:16 (17)   15:50	15:50	
29   05:14	19:53 (1)   06:08	18:51 (20)   07:04	17:53 (18)   07:01	08:00	15:03 (17)   08:28	15:50	
21:14	27 20:20 (1)   20:08	46 19:39 (19)   18:51	7 18:00 (18)   16:41	15:51	12 15:15 (17)   15:51	15:51	
30   05:15	19:52 (1)   06:10	18:51 (20)   07:06	17:50 (18)   07:03	08:01	15:04 (17)   08:28	15:51	
21:12	27 20:19 (1)   20:06	44 19:37 (19)   18:49	12 18:02 (18)   16:39	15:51	10 15:14 (17)   15:52	15:52	
31   05:17	19:52 (1)   06:12	18:51 (20)   07:05	07:05	08:02	08:28	15:52	
21:10	28 20:20 (1)   20:03	40 19:35 (19)   18:41	16:37	15:53	15:53	15:53	
Sonneneinstrahlung	514	461	383	328	257	231	
astr.max.mögl.Beschattung	270	900	265	154	179	27	
Red.Sonneneinstrahlung	0.44	0.48	0.40	0.33	0.21	0.14	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.64	0.65	0.67	0.68	0.68	0.68	
Gesamte Reduktion	0.25	0.28	0.24	0.20	0.13	0.09	
Met.wahrsch.Beschattung	69	256	65	31	23	2	

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

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



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AI - IO35

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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	15:03 (17)	07:57	06:59	16:48 (18)	06:43
	15:54	13 15:16 (17)	16:46	17:43	12 17:00 (18)	19:42
2	08:28	15:03 (17)	07:55	06:56	16:49 (18)	06:40
	15:55	15 15:18 (17)	16:48	17:45	8 16:57 (18)	19:44
3	08:28	15:03 (17)	07:54	06:54	06:38	17 19:15 (19)
	15:57	15 15:18 (17)	16:50	17:47	17 19:15 (19)	20:42
4	08:27	15:04 (17)	07:52	06:52	06:35	18:58 (19)
	15:58	15 15:19 (17)	16:52	17:49	16 19:14 (19)	20:44
5	08:27	15:04 (17)	07:50	06:49	06:33	18:59 (19)
	15:59	15 15:19 (17)	16:54	17:51	19:50	19:13 (19)
6	08:27	15:04 (17)	07:48	06:47	06:30	18:58 (19)
	16:00	15 15:19 (17)	16:56	17:53	19:52	19:11 (19)
7	08:26	15:06 (17)	07:46	06:45	06:28	19:01 (19)
	16:02	14 15:20 (17)	16:58	17:55	19:54	8 19:09 (19)
8	08:26	15:06 (17)	07:44	06:42	17:24 (16)	06:26
	16:03	14 15:20 (17)	17:00	17:57	5 17:29 (16)	19:55
9	08:25	15:07 (17)	07:42	06:40	17:23 (16)	06:23
	16:05	13 15:20 (17)	17:02	17:59	9 17:32 (16)	19:57
10	08:24	15:07 (17)	07:40	06:37	17:22 (16)	06:21
	16:06	13 15:20 (17)	17:05	18:00	11 17:33 (16)	19:59
11	08:24	15:08 (17)	07:38	06:35	17:22 (16)	06:18
	16:08	12 15:20 (17)	17:07	18:02	14 17:36 (16)	20:01
12	08:23	15:09 (17)	07:36	06:32	17:21 (16)	06:16
	16:09	10 15:19 (17)	17:09	18:04	15 17:36 (16)	20:03
13	08:22	15:10 (17)	07:34	06:30	17:22 (16)	06:14
	16:11	9 15:19 (17)	17:11	18:06	14 17:36 (16)	20:05
14	08:21	15:12 (17)	07:32	06:27	17:21 (16)	06:11
	16:13	6 15:18 (17)	17:13	18:08	14 17:35 (16)	20:07
15	08:20	07:30	07:30	06:25	17:23 (16)	06:09
	16:14	17:15	18:10	18:10	11 17:34 (16)	20:09
16	08:19	07:28	07:28	06:23	17:21 (20)	06:06
	16:16	17:17	18:12	18:12	14 17:35 (20)	20:10
17	08:18	07:26	07:26	06:20	17:19 (20)	06:04
	16:18	17:19	18:14	18:14	18 17:37 (20)	20:12
18	08:17	07:24	07:24	06:18	17:16 (20)	06:02
	16:19	17:21	18:16	18:16	22 17:38 (20)	20:14
19	08:16	07:22	07:22	06:15	17:15 (20)	05:59
	16:21	17:23	1 16:53 (18)	18:18	25 17:40 (20)	20:16
20	08:15	07:19	16:49 (18)	06:13	17:14 (20)	05:57
	16:23	17:25	7 16:56 (18)	18:20	26 17:40 (20)	20:18
21	08:14	07:17	16:48 (18)	06:10	17:13 (20)	05:55
	16:25	17:27	11 16:59 (18)	18:22	27 17:40 (20)	20:20
22	08:12	07:15	16:46 (18)	06:08	17:12 (20)	05:52
	16:27	17:29	14 17:00 (18)	18:23	28 17:40 (20)	20:22
23	08:11	07:13	16:46 (18)	06:05	17:12 (20)	05:50
	16:29	17:31	17 17:03 (18)	18:25	29 17:41 (20)	20:24
24	08:10	07:10	16:46 (18)	06:03	17:11 (20)	05:48
	16:31	17:33	17 17:03 (18)	18:27	29 17:40 (20)	20:26
25	08:08	07:08	16:45 (18)	06:00	17:12 (20)	05:46
	16:32	17:35	17 17:02 (18)	18:29	28 17:40 (20)	20:27
26	08:07	07:06	16:45 (18)	05:58	17:11 (20)	05:43
	16:34	17:37	18 17:03 (18)	18:31	28 17:39 (20)	20:29
27	08:05	07:03	16:45 (18)	05:55	17:12 (20)	05:41
	16:36	17:39	16 17:01 (18)	18:33	26 17:38 (20)	20:31
28	08:04	07:01	16:46 (18)	05:53	17:12 (20)	05:39
	16:38	17:41	15 17:01 (18)	18:35	28 18:07 (19)	20:33
29	08:02			06:50	18:13 (20)	05:37
	16:40			19:37	31 19:10 (19)	20:35
30	08:00			06:48	18:13 (20)	05:35
	16:42			19:38	32 19:11 (19)	20:37
31	07:59			06:45	18:15 (20)	
	16:44			19:40	32 19:13 (19)	
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung	179	133	536	692		
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41		
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90		
Reduktion Windrichtung	0.68	0.69	0.68	0.65		
Gesamte Reduktion	0.11	0.15	0.19	0.24		
Met.wahrsch.Beschattung	19	20	104	167		

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

## SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AI - IO35

### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember			
1	04:38	05:19			06:14	19:18 (1)	07:08	18:01 (16)	07:07		08:03	14:50 (17)		
	21:45	21:09			20:01	11 19:29 (1)	18:46	15 18:16 (16)	16:35		15:50	12 15:02 (17)		
2	04:39	05:20			06:16		07:10		18:01 (16)	07:09		08:05	14:50 (17)	
	21:44	21:07			19:59		18:44	14 18:15 (16)	16:33		15:49	13 15:03 (17)		
3	04:40	05:22			06:17		07:12		18:00 (16)	07:11		08:06	14:51 (17)	
	21:44	21:05			19:56		18:41	12 18:12 (16)	16:31		15:48	13 15:04 (17)		
4	04:40	05:24			06:19		07:14		18:00 (16)	07:13		08:08	14:50 (17)	
	21:43	21:03			19:54		18:39	10 18:10 (16)	16:29		15:47	14 15:04 (17)		
5	04:41	05:25			06:21		18:57 (19)	07:15	18:01 (16)	07:15		08:09	14:51 (17)	
	21:43	21:01			19:51	8 19:05 (19)	18:37	6 18:07 (16)	16:27		15:47	14 15:05 (17)		
6	04:42	05:27			06:23		18:55 (19)	07:17	18:02 (16)	07:17		08:10	14:51 (17)	
	21:42	20:59			19:49	12 19:07 (19)	18:34	3 18:05 (16)	16:25		15:46	14 15:05 (17)		
7	04:43	05:29			06:25		18:54 (19)	07:19		07:19		08:12	14:51 (17)	
	21:41	20:57			19:46	14 19:08 (19)	18:32		16:23		15:46	15 15:06 (17)		
8	04:44	05:31			06:26		18:53 (19)	07:21		07:21		08:13	14:51 (17)	
	21:41	20:55			19:44	16 19:09 (19)	18:29		16:21		15:45	15 15:06 (17)		
9	04:45	05:32			06:28		18:51 (19)	07:23		07:23		08:14	14:52 (17)	
	21:40	20:53			19:41	17 19:08 (19)	18:27		16:19		15:45	15 15:07 (17)		
10	04:46	05:34			06:30		18:51 (19)	07:25		07:25		08:16	14:53 (17)	
	21:39	20:51			19:39	17 19:08 (19)	18:24		16:18		15:45	14 15:07 (17)		
11	04:48	05:36			06:32		18:11 (20)	07:27		17:26 (18)	07:27	08:17	14:53 (17)	
	21:38	20:49			19:36	28 19:08 (19)	18:22	2 17:28 (18)	16:16		15:44	13 15:06 (17)		
12	04:49	05:38			06:34		18:08 (20)	07:28		17:22 (18)	07:29	08:18	14:53 (17)	
	21:37	20:47			19:34	32 19:06 (19)	18:20	10 17:32 (18)	16:14		15:44	13 15:06 (17)		
13	04:50	05:40			06:35		18:05 (20)	07:30		17:20 (18)	07:31	08:19	14:53 (17)	
	21:36	20:45	10 19:23 (1)	19:33 (1)	19:31	32 19:03 (19)	18:17	14 17:34 (18)	16:13		15:44	12 15:05 (17)		
14	04:51	05:41			19:20 (1)	06:37		18:03 (20)	07:32		17:19 (18)	07:33	08:20	14:54 (17)
	21:35	20:43	16 19:36 (1)	19:29	31 19:00 (19)	18:15	15 17:34 (18)	16:11			15:44	11 15:05 (17)		
15	04:52	05:43			19:19 (1)	06:39		18:02 (20)	07:34		17:18 (18)	07:35	08:21	14:54 (17)
	21:34	20:40	18 19:37 (1)	19:26	29 18:58 (19)	18:12	17 17:35 (18)	16:09			15:44	11 15:05 (17)		
16	04:54	05:45			19:17 (1)	06:41		18:01 (20)	07:36		17:17 (18)	07:37	08:22	14:55 (17)
	21:33	20:38	27 19:52 (23)	19:24	27 18:28 (20)	18:10	18 17:35 (18)	16:08			15:44	10 15:05 (17)		
17	04:55	05:47			19:16 (1)	06:43		18:00 (20)	07:38		17:17 (18)	07:38	08:23	14:56 (17)
	21:32	20:36	34 19:55 (23)	19:21	27 18:27 (20)	18:08	18 17:35 (18)	16:06			15:44	10 15:06 (17)		
18	04:57	05:49			19:15 (1)	06:44		17:59 (20)	07:40		17:17 (18)	07:40	08:23	14:56 (17)
	21:30	20:34	38 19:56 (23)	19:19	28 18:27 (20)	18:05	17 17:34 (18)	16:05			15:44	10 15:06 (17)		
19	04:58	05:50			19:13 (1)	06:46		17:59 (20)	07:42		17:17 (18)	07:42	08:24	14:57 (17)
	21:29	20:32	41 19:56 (23)	19:16	28 18:27 (20)	18:03	16 17:33 (18)	16:03			15:45	9 15:06 (17)		
20	04:59	05:52			19:13 (1)	06:48		17:59 (20)	07:44		17:18 (18)	07:44	08:25	14:57 (17)
	21:28	20:29	42 19:56 (23)	19:14	28 18:27 (20)	18:01	13 17:31 (18)	16:02			15:45	9 15:06 (17)		
21	05:01	05:54			19:13 (1)	06:50		17:58 (20)	07:46		17:19 (18)	07:46	08:25	14:58 (17)
	21:26	20:27	43 19:57 (23)	19:11	28 18:26 (20)	17:59	9 17:28 (18)	16:01			15:45	9 15:07 (17)		
22	05:02	05:56			19:11 (1)	06:52		17:58 (20)	07:48		17:20 (18)	07:48	08:26	14:58 (17)
	21:25	20:25	44 19:55 (23)	19:09	27 18:25 (20)	17:56	6 17:26 (18)	15:59			15:46	9 15:07 (17)		
23	05:04	05:58			19:11 (1)	06:53		17:58 (20)	07:50		17:20 (18)	07:50	08:27	14:59 (17)
	21:23	20:22	42 19:53 (23)	19:06	27 18:25 (20)	17:54		15:58			15:46	9 15:08 (17)		
24	05:05	05:59			19:12 (1)	06:55		17:59 (20)	07:51		17:21 (18)	07:51	08:27	14:59 (17)
	21:22	20:20	38 19:51 (23)	19:04	25 18:24 (20)	17:52		15:57			15:47	9 15:08 (17)		
25	05:07	06:01			19:12 (1)	06:57		18:00 (20)	06:53		17:22 (18)	07:53	08:27	14:59 (17)
	21:20	20:18	35 19:49 (23)	19:01	22 18:22 (20)	16:50		15:56			15:48	10 15:09 (17)		
26	05:09	06:03			19:11 (1)	06:59		18:00 (20)	06:55		17:23 (18)	07:55	08:28	15:00 (17)
	21:19	20:15	31 19:46 (23)	18:59	20 18:20 (20)	16:47		15:54			15:48	9 15:09 (17)		
27	05:10	06:05			19:12 (1)	07:01		18:02 (20)	06:57		17:24 (18)	07:56	08:28	15:01 (17)
	21:17	20:13	25 19:37 (1)	18:56	16 18:18 (20)	16:45		15:53			15:49	10 15:11 (17)		
28	05:12	06:07			19:12 (1)	07:03		18:04 (16)	06:59		17:58		08:28	15:01 (17)
	21:16	20:11	25 19:37 (1)	18:54	10 18:14 (16)	16:43		15:52	6 14:52 (17)		15:50	11 15:12 (17)		
29	05:14	06:08			19:12 (1)	07:04		18:03 (16)	07:01		14:51 (17)	08:28	15:02 (17)	
	21:14	20:08	23 19:35 (1)	18:51	12 18:15 (16)	16:41		15:51	9 15:00 (17)		15:51	11 15:13 (17)		
30	05:15	06:10			19:14 (1)	07:06		18:02 (16)	07:03		14:51 (17)	08:28	15:01 (17)	
	21:12	20:06	19 19:33 (1)	18:49	14 18:16 (16)	16:39		15:51	10 15:01 (17)		15:52	12 15:13 (17)		
31	05:17	06:12			19:15 (1)			16:37			15:53	12 15:14 (17)		
	21:10	20:03	17 19:32 (1)					16:37			15:53	12 15:14 (17)		
	Sonnenscheinstunden	514	461		383			328		257		231		
	astr.max.mögl.Beschattung			568		586		215		25		358		
	Red.Sonnenscheinwahrsch.			0.48		0.40		0.33		0.21		0.14		
	Reduktion Betriebsdauer			0.90		0.90		0.90		0.90		0.90		
	Reduktion Windrichtung			0.64		0.68		0.69		0.68		0.68		
	Gesamte Reduktion			0.28		0.25		0.21		0.13		0.08		
	Met.wahrsch.Beschattung			160		145		44		3		30		

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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AJ - IO36

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28   07:57		06:59	06:43	18:52 (1)   05:33	04:42	
	15:54   16:46		17:43	19:42	21   19:13 (1)   20:39	21:29	
2	08:28   07:55		06:56	17:15 (16)   06:40	18:50 (1)   05:31	04:41	
	15:55   16:48		17:45	2   17:17 (16)   19:44	23   19:13 (1)   20:40	21:31	
3	08:28   07:54		06:54	17:14 (16)   06:38	18:50 (1)   05:28	04:40	
	15:57   16:50		17:47	6   17:20 (16)   19:46	23   19:13 (1)   20:42	21:32	
4	08:27   07:52		06:52	17:08 (20)   06:35	18:49 (1)   05:26	04:39	
	15:58   16:52		17:49	13   17:21 (16)   19:48	24   19:13 (1)   20:44	21:33	
5	08:27   07:50		06:49	17:05 (20)   06:33	18:49 (1)   05:24	04:39	
	15:59   16:54		17:51	19   17:24 (16)   19:50	24   19:13 (1)   20:46	21:34	
6	08:27   07:48		06:47	17:02 (20)   06:30	18:48 (1)   05:22	04:38	
	16:00   16:56		17:53	23   17:25 (16)   19:52	24   19:12 (1)   20:48	21:35	
7	08:26   07:46		06:45	17:01 (20)   06:28	18:48 (1)   05:20	04:37	
	16:02   16:58		17:55	24   17:25 (16)   19:54	28   19:26 (23)   20:50	21:36	
8	08:26   07:44		06:42	16:59 (20)   06:26	18:49 (1)   05:18	04:37	
	16:03   17:00		17:57	25   17:24 (16)   19:55	30   19:28 (23)   20:51	21:37	
9	08:25   07:42		06:40	16:59 (20)   06:23	18:48 (1)   05:17	04:36	
	16:05   17:02		17:59	23   17:22 (16)   19:57	34   19:30 (23)   20:53	21:38	
10	08:24   07:40		06:37	16:58 (20)   06:21	18:49 (1)   05:15	04:36	
	16:06   17:05		18:00	23   17:21 (20)   19:59	34   19:32 (23)   20:55	21:39	
11	08:24   07:38		06:35	16:58 (20)   06:18	18:49 (1)   05:13	04:35	
	16:08   17:07		18:02	24   17:22 (20)   20:01	34   19:33 (23)   20:57	21:40	
12	08:23   07:36		06:32	16:57 (20)   06:16	18:51 (1)   05:11	04:35	
	16:09   17:09		18:04	24   17:21 (20)   20:03	29   19:33 (23)   20:59	21:41	
13	08:22   07:34		06:30	16:58 (20)   06:14	18:54 (1)   05:09	04:34	
	16:11   17:11		18:06	23   17:21 (20)   20:05	23   19:32 (23)   21:00	21:41	
14	08:21   07:32		06:27	16:58 (20)   06:11	19:19 (23)   05:07	04:34	
	16:12   17:13		18:08	22   17:20 (20)   20:07	11   19:30 (23)   21:02	21:42	
15	08:20   07:30	16:42 (18)	06:25	16:59 (20)   06:09	19:21 (23)   05:06	04:34	
	16:14   17:15	3   16:45 (18)	18:10	20   17:19 (20)   20:09	7   19:28 (23)   21:04	21:43	
16	08:19   07:28	16:40 (18)	06:23	16:59 (20)   06:06		05:04	04:34
	16:16   17:17	7   16:47 (18)	18:12	18   17:17 (20)   20:10		21:05	21:43
17	08:18   07:26	16:39 (18)	06:20	17:01 (20)   06:04		05:02	04:33
	16:18   17:19	11   16:50 (18)	18:14	15   17:16 (20)   20:12		21:07	21:44
18	08:17   07:24	16:39 (18)	06:18	17:02 (20)   06:02		05:01	04:33
	16:19   17:21	13   16:52 (18)	18:16	11   17:13 (20)   20:14		21:09	21:44
19	08:16   07:22	16:38 (18)	06:15		05:59	04:59	04:33
	16:21   17:23	15   16:53 (18)	18:18		20:16	21:10	21:45
20	08:15   07:19	16:38 (18)	06:13	17:48 (19)	05:57	04:57	04:33
	16:23   17:25	16   16:54 (18)	18:20	5   17:53 (19)	20:18	21:12	21:45
21	08:14   07:17	16:39 (18)	06:10	17:47 (19)	05:55	04:56	04:34
	16:25   17:27	15   16:54 (18)	18:22	8   17:55 (19)	20:20	21:14	21:45
22	08:12   07:15	16:39 (18)	06:08	17:45 (19)	05:52	04:54	04:34
	16:27   17:29	13   16:52 (18)	18:23	11   17:56 (19)	20:22	21:15	21:45
23	08:11   07:13	16:40 (18)	06:05	17:45 (19)	05:50	04:53	04:34
	16:29   17:31	11   16:51 (18)	18:25	14   17:59 (19)	20:24	21:17	21:45
24	08:10   07:10	16:42 (18)	06:03	17:44 (19)	05:48	04:52	04:34
	16:30   17:33	8   16:50 (18)	18:27	15   17:59 (19)	20:25	21:18	21:46
25	08:08   07:08		06:00	17:44 (19)	05:46	04:50	04:35
	16:32   17:35		18:29	15   17:59 (19)	20:27	21:20	21:46
26	08:07   07:06		05:58	17:44 (19)	05:43	04:49	04:35
	16:34   17:37		18:31	14   17:58 (19)	20:29	21:21	21:46
27	08:05   07:03		05:55	17:45 (19)	05:41	04:48	04:36
	16:36   17:39		18:33	12   17:57 (19)	20:31	21:23	21:45
28	08:04   07:01		05:53	17:46 (19)	05:39	04:47	04:36
	16:38   17:41		18:35	9   17:55 (19)	20:33	21:24	21:45
29	08:02		06:50	18:58 (1)	05:37	04:45	04:37
	16:40		19:37	9   19:07 (1)	20:35	21:26	21:45
30	08:00		06:48	18:55 (1)	05:35	04:44	04:37
	16:42		19:38	14   19:09 (1)	20:37	21:27	21:45
31	07:59		06:45	18:53 (1)		04:43	
	16:44		19:40	18   19:11 (1)		21:28	
Sonnenscheinstunden	248	272	367	421	496	513	
astr.max.mögl.Beschattung		112	459	369			
Red.Sonnenscheinwahrsch.		0.24	0.31	0.41			
Reduktion Betriebsdauer		0.90	0.90	0.90			
Reduktion Windrichtung		0.70	0.68	0.67			
Gesamte Reduktion		0.15	0.19	0.25			
Met.wahrsch.Beschattung		17	88	91			

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM)	Schattenanfang	Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AJ - IO36

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember		
1	04:38   05:19		06:14	18:49 (1)   07:08	17:37 (20)   07:07	08:03		
	21:45   21:09		20:01   34	19:33 (23)   18:46	24   18:01 (20)   16:35	15:50		
2	04:39   05:20		06:16	18:47 (1)   07:10	17:37 (20)   07:09	08:05		
	21:44   21:07		19:59   34	19:30 (23)   18:44	24   18:01 (20)   16:33	15:49		
3	04:40   05:22		06:17	18:46 (1)   07:12	17:36 (20)   07:11	08:06		
	21:44   21:05		19:56   34	19:28 (23)   18:41	23   17:59 (20)   16:31	15:48		
4	04:40   05:24		06:19	18:46 (1)   07:14	17:36 (20)   07:13	08:08		
	21:43   21:03		19:54   30	19:25 (23)   18:39	23   17:59 (20)   16:29	15:47		
5	04:41   05:25		06:21	18:44 (1)   07:15	17:36 (20)   07:15	08:09		
	21:43   21:01		19:51   28	19:22 (23)   18:37	24   18:00 (16)   16:27	15:47		
6	04:42   05:27		06:23	18:44 (1)   07:17	17:37 (20)   07:17	08:10		
	21:42   20:59		19:49   25	19:09 (1)   18:34	24   18:01 (16)   16:25	15:46		
7	04:43   05:29		06:25	18:44 (1)   07:19	17:37 (20)   07:19	08:12		
	21:41   20:57		19:46   24	19:08 (1)   18:32	24   18:01 (16)   16:23	15:46		
8	04:44   05:31		06:26	18:44 (1)   07:21	17:39 (20)   07:21	08:13		
	21:41   20:55		19:44   24	19:08 (1)   18:29	21   18:00 (16)   16:21	15:45		
9	04:45   05:32		06:28	18:43 (1)   07:23	17:41 (20)   07:23	08:14		
	21:40   20:53		19:41   24	19:07 (1)   18:27	17   17:58 (16)   16:19	15:45		
10	04:46   05:34		06:30	18:43 (1)   07:25	17:48 (16)   07:25	08:16		
	21:39   20:51		19:39   23	19:06 (1)   18:24	7   17:55 (16)   16:18	15:45		
11	04:47   05:36		06:32	18:44 (1)   07:27	17:49 (16)   07:27	08:17		
	21:38   20:49		19:36   21	19:05 (1)   18:22	4   17:53 (16)   16:16	15:44		
12	04:49   05:38		06:34	18:45 (1)   07:28		07:29	08:18	
	21:37   20:47		19:34   19	19:04 (1)   18:20		16:14	15:44	
13	04:50   05:40		06:35	18:46 (1)   07:30		07:31	08:19	
	21:36   20:45		19:31   15	19:01 (1)   18:17		16:13	15:44	
14	04:51   05:41		06:37	18:48 (1)   07:32		07:33	08:20	
	21:35   20:43		19:29   10	18:58 (1)   18:15		16:11	15:44	
15	04:52   05:43		06:39	18:37 (19)   07:34		07:35	08:21	
	21:34   20:40		19:26   7	18:44 (19)   18:12		16:09	15:44	
16	04:54   05:45		06:41	18:35 (19)   07:36		07:37	08:22	
	21:33   20:38		19:24   11	18:46 (19)   18:10		16:08	15:44	
17	04:55   05:47		06:43	18:32 (19)   07:38	17:16 (18)   07:38	08:23	08:23	
	21:32   20:36		19:21   14	18:46 (19)   18:08	3   17:19 (18)   16:06	15:44	08:23	
18	04:57   05:49		06:44	18:32 (19)   07:40		17:12 (18)   07:40	08:23	
	21:30   20:34		19:19   15	18:47 (19)   18:05	10   17:22 (18)   16:05	15:44	08:24	
19	04:58   05:50		06:46	18:31 (19)   07:42		17:11 (18)   07:42	08:24	
	21:29   20:32		19:16   16	18:47 (19)   18:03	12   17:23 (18)   16:03	15:45	08:25	
20	04:59   05:52		06:48	18:31 (19)   07:44		17:10 (18)   07:44	08:25	
	21:28   20:29		19:14   15	18:46 (19)   18:01	14   17:24 (18)   16:02	15:45	08:25	
21	05:01   05:54		06:50	18:30 (19)   07:46		17:09 (18)   07:46	08:25	
	21:26   20:27		19:11   12	18:42 (19)   17:59	15   17:24 (18)   16:01	15:45	08:26	
22	05:02   05:56		06:52	18:31 (19)   07:48		17:08 (18)   07:48	08:26	
	21:25   20:25		19:09   9	18:40 (19)   17:56	16   17:24 (18)   15:59	15:46	08:27	
23	05:04   05:58		06:53	18:32 (19)   07:50		17:08 (18)   07:50	08:27	
	21:23   20:22		19:06   6	18:38 (19)   17:54	16   17:24 (18)   15:58	15:46	08:27	
24	05:05   05:59		06:55		07:51	17:08 (18)   07:51	08:27	15:47
	21:22   20:20		19:04		17:52	13   17:21 (18)   15:57	15:47	08:27
25	05:07   06:01		06:57	17:47 (20)   06:53		16:09 (18)   07:53	08:27	15:48
	21:20   20:18		19:01   8	17:55 (20)   16:50	10   16:19 (18)   15:56	15:48	08:28	
26	05:09   06:03		06:59	17:43 (20)   06:55		16:10 (18)   07:55	08:28	15:48
	21:19   20:15		18:59   14	17:57 (20)   16:47	6   16:16 (18)   15:54	15:48	08:28	
27	05:10   06:05		07:01	17:41 (20)   06:57		16:12 (18)   07:56	08:28	15:49
	21:17   20:13		18:56   17	17:58 (20)   16:45	2   16:14 (18)   07:58	08:28	15:50	
28	05:12   06:07	19:23 (23)	07:02	17:40 (20)   06:59			08:28	15:50
	21:16   20:11	7   19:30 (23)	18:54	20   18:00 (20)   16:43		15:52	15:50	08:28
29	05:14   06:08	19:20 (23)	07:04	17:39 (20)   07:01		08:00	08:28	15:51
	21:14   20:08	11   19:31 (23)	18:51	21   18:00 (20)   16:41		15:51	15:51	08:28
30	05:15   06:10	18:53 (1)	07:06	17:38 (20)   07:03		08:01	08:28	15:52
	21:12   20:06	24   19:32 (23)	18:49	23   18:01 (20)   16:39		15:50	15:52	08:28
31	05:17   06:12	18:51 (1)			07:05		08:28	15:53
	21:10   20:03	30   19:33 (23)			16:37		15:53	231
Sonnenscheinstunden	515	461	383	328	257	231		
astr.max.mögl.Beschattung		72	553		332			
Red.Sonnenscheinwahrsch.		0.48	0.40		0.33			
Reduktion Betriebsdauer		0.90	0.90		0.90			
Reduktion Windrichtung		0.66	0.67		0.68			
Gesamte Reduktion		0.29	0.24		0.20			
Met.wahrsch.Beschattung		21	135		68			

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AK - IO37

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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni			
1	08:28	15:15 (21)	07:57	06:59	06:43	05:33	04:42		20:20 (20)
	15:54	1	15:16 (21)	16:46	17:43	19:42	20:39		21:29 24
2	08:28	15:14 (21)	07:55	06:56	06:40	05:31	04:41		20:21 (20)
	15:55	3	15:17 (21)	16:48	17:45	19:44	20:40		21:31 24
3	08:28	15:15 (21)	07:54	06:54	06:38	05:28	04:40		20:21 (20)
	15:57	3	15:18 (21)	16:50	17:47	19:46	20:42		21:32 26
4	08:27	15:15 (21)	07:52	06:52	06:35	05:26	04:40		20:21 (20)
	15:58	5	15:20 (21)	16:52	17:49	19:48	20:44		21:33 29
5	08:27	15:15 (21)	07:50	06:49	06:33	05:24	04:39		20:21 (20)
	15:59	6	15:21 (21)	16:54	17:51	19:50	20:46		21:34 30
6	08:27	15:14 (21)	07:48	06:47	06:30	05:22	04:38		20:21 (20)
	16:00	8	15:22 (21)	16:56	17:53	19:52	20:48	2	20:17 (19)
7	08:26	15:15 (21)	07:46	06:45	06:28	05:20	04:37		20:21 (20)
	16:02	10	15:25 (21)	16:58	17:55	19:54	20:50	5	20:18 (19)
8	08:26	15:15 (21)	07:44	06:42	06:26	05:18	04:37		20:22 (20)
	16:03	11	15:26 (21)	17:00	17:57	19:55	20:51	8	20:20 (19)
9	08:25	15:15 (21)	07:42	06:40	06:23	05:17	04:36		20:22 (20)
	16:05	12	15:27 (21)	17:03	17:59	19:57	20:53	9	20:22 (19)
10	08:24	15:15 (21)	07:40	06:37	06:21	05:15	04:36		20:22 (20)
	16:06	14	15:29 (21)	17:05	18:00	19:59	20:55	12	20:24 (19)
11	08:24	15:16 (21)	07:38	06:35	06:18	05:13	04:35		20:23 (20)
	16:08	15	15:31 (21)	17:07	18:02	20:01	20:57	13	20:25 (19)
12	08:23	15:16 (21)	07:36	16:34 (17)	06:32	06:16	05:11		20:22 (20)
	16:09	16	15:32 (21)	17:09	5	16:39 (17)	18:04	20:03	13
13	08:22	15:16 (21)	07:34	16:33 (17)	06:30	06:14	05:09		20:23 (20)
	16:11	17	15:33 (21)	17:11	8	16:41 (17)	18:06	20:05	13
14	08:21	15:17 (21)	07:32	16:31 (17)	06:27	06:11	05:07		20:23 (20)
	16:13	16	15:33 (21)	17:13	12	16:43 (17)	18:08	20:07	7
15	08:20	15:17 (21)	07:30	16:30 (17)	06:25	06:09	05:06		20:24 (20)
	16:14	16	15:33 (21)	17:15	15	16:45 (17)	18:10	20:09	10
16	08:19	15:18 (21)	07:28	16:30 (17)	06:23	06:06	05:04		20:24 (20)
	16:16	16	15:34 (21)	17:17	17	16:47 (17)	18:12	20:10	12
17	08:18	15:19 (21)	07:26	16:30 (17)	06:20	06:04	05:02		20:24 (20)
	16:18	15	15:34 (21)	17:19	18	16:48 (17)	18:14	20:12	15
18	08:17	15:19 (21)	07:24	16:30 (17)	06:18	06:02	05:01		20:25 (20)
	16:19	14	15:33 (21)	17:21	17	16:47 (17)	18:16	20:14	13
19	08:16	15:21 (21)	07:22	16:30 (17)	06:15	05:59	04:59		20:25 (20)
	16:21	12	15:33 (21)	17:23	17	16:47 (17)	18:18	20:16	11
20	08:15	15:21 (21)	07:19	16:31 (17)	06:13	05:57	04:58		20:25 (20)
	16:23	11	15:32 (21)	17:25	15	16:46 (17)	18:20	20:18	9
21	08:14	15:23 (21)	07:17	16:32 (17)	06:10	05:55	04:56		20:25 (20)
	16:25	8	15:31 (21)	17:27	13	16:45 (17)	18:22	20:20	3
22	08:12	15:27 (21)	07:15	16:33 (17)	06:08	05:52	04:55		20:25 (20)
	16:27	3	15:30 (21)	17:29	10	16:43 (17)	18:23	20:22	21:15
23	08:11	07:13		16:37 (17)	06:05	05:50	04:53		20:26 (20)
	16:29	17:31	3	16:40 (17)	18:25	20:24	21:17	18	20:41 (20)
24	08:10	07:10			06:03	05:48	04:52		20:26 (20)
	16:31	17:33			18:27	20:25	21:18	19	20:41 (20)
25	08:08	07:08			06:00	05:46	04:50		20:26 (20)
	16:32	17:35			18:29	20:27	21:20	21	20:42 (20)
26	08:07	07:06			05:58	05:43	04:49		20:26 (20)
	16:34	17:37			18:31	20:29	21:21	21	20:42 (20)
27	08:05	07:03			05:55	05:41	04:48		20:26 (20)
	16:36	17:39			18:33	20:31	21:23	22	20:43 (20)
28	08:04	07:01			05:53	05:39	04:47		20:27 (20)
	16:38	17:41			18:35	20:33	21:24	22	20:43 (20)
29	08:02				06:50	05:37	04:45		20:26 (20)
	16:40				19:37	20:35	21:26	23	20:44 (20)
30	08:00				06:48	05:35	04:44		20:27 (20)
	16:42				19:38	20:37	21:27	23	20:44 (20)
31	07:59				06:45		04:43		20:20 (20)
	16:44				19:40		21:28	24	20:44 (20)
Sonnenscheinstunden	248	272	367	421	496	512			
astr.max.mögl.Beschattung	232	150		231	372	1065			
Red.Sonnenscheinwahrsch.	0.17	0.24		0.41	0.51	0.45			
Reduktion Betriebsdauer	0.90	0.90		0.90	0.90	0.90			
Reduktion Windrichtung	0.68	0.70		0.65	0.63	0.62			
Gesamte Reduktion	0.11	0.15		0.24	0.29	0.25			
Met.wahrsch.Beschattung	25	23		56	108	275			

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AK - IO37  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38											
2	04:39											
3	04:40											
4	04:40											
5	04:41											
6	04:42											
7	04:43											
8	04:44											
9	04:45											
10	04:46											
11	04:48											
12	04:49											
13	04:50											
14	04:51											
15	04:53											
16	04:54											
17	04:55											
18	04:57											
19	04:58											
20	04:59											
21	05:01											
22	05:02											
23	05:04											
24	05:06											
25	05:07											
26	05:09											
27	05:10											
28	05:12											
29	05:14											
30	05:15											
31	05:17											
	21:10	15	20:37 (19)	20:03	13	19:35 (16)		16:37				
	Sonnenscheinstunden	514		461		383		328		257		231
	astr.max.mögl.Beschattung	668		169		128		152		143		91
	Red.Sonnenscheinwahrsch.	0.44		0.48		0.40		0.33		0.21		0.14
	Reduktion Betriebsdauer	0.90		0.90		0.90		0.90		0.90		0.90
	Reduktion Windrichtung	0.62		0.64		0.66		0.70		0.68		0.68
	Gesamte Reduktion	0.25		0.28		0.24		0.21		0.13		0.09
	Met.wahrsch.Beschattung	167		48		31		32		18		8

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AL - IO38  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28   07:57   06:59			06:43	05:33	19:44 (1)   04:42	
	15:54   16:46   17:43			19:42	20:39	19   20:03 (1)   21:29	
2	08:28   07:55   06:56			06:40	05:31	19:44 (1)   04:41	
	15:55   16:48   17:45			19:44	20:40	19   20:03 (1)   21:31	
3	08:28   07:54   06:54			06:38	05:28	19:44 (1)   04:40	
	15:57   16:50   17:47			19:46	20:42	18   20:02 (1)   21:32	
4	08:27   07:52   06:52			06:35	05:26	19:45 (1)   04:39	
	15:58   16:52   17:49			19:48	20:44	16   20:01 (1)   21:33	
5	08:27   07:50   06:49			06:33	05:24	19:45 (1)   04:39	
	15:59   16:54   17:51			19:50	20:46	15   20:00 (1)   21:34	
6	08:27   07:48   06:47			06:30	05:22	19:46 (1)   04:38	
	16:00   16:56   17:53			19:52	20:48	13   19:59 (1)   21:35	
7	08:26   07:46   06:44			06:28	19:19 (20)   05:20	19   19:48 (1)   04:37	
	16:02   16:58   17:55			19:54	7   19:26 (20)   20:50	9   19:57 (1)   21:36	
8	08:26   07:44   06:42			06:26	19:17 (20)   05:18		04:37
	16:03   17:00   17:57			19:55	11   19:28 (20)   20:51		21:37
9	08:25   07:42   06:40			06:23	19:14 (20)   05:17		04:36
	16:05   17:02   17:59			19:57	16   19:30 (20)   20:53		21:38
10	08:24   07:40   06:37			06:21	19:13 (20)   05:15		04:36
	16:06   17:05   18:00			19:59	18   19:31 (20)   20:55		21:39
11	08:24   07:38   06:35			06:18	19:12 (20)   05:13		04:35
	16:08   17:07   18:02			20:01	19   19:31 (20)   20:57		21:40
12	08:23   07:36   06:32			06:16	19:12 (20)   05:11		04:35
	16:09   17:09   18:04			20:03	19   19:31 (20)   20:59		21:41
13	08:22   07:34   06:30			06:14	19:12 (20)   05:09		04:34
	16:11   17:11   18:06	2	17:40 (18)   20:05	19   19:31 (20)   21:00		21:41	
14	08:21   07:32   06:27		17:36 (18)   06:11	19:11 (20)   05:07		04:34	
	16:12   17:13   18:08	5	17:41 (18)   20:07	19   19:30 (20)   21:02		21:42	
15	08:20   07:30   06:25		17:35 (18)   06:09	19:11 (20)   05:06		04:34	
	16:14   17:15   18:10	8	17:43 (18)   20:09	19   19:30 (20)   21:04		21:43	
16	08:19   07:28   06:22		17:34 (18)   06:06	19:12 (20)   05:04		04:34	
	16:16   17:17   18:12	11	17:45 (18)   20:10	17   19:29 (20)   21:05		21:43	
17	08:18   07:26   06:20		17:34 (18)   06:04	19:12 (20)   05:02		04:33	
	16:18   17:19   18:14	13	17:47 (18)   20:12	15   19:27 (20)   21:07		21:44	
18	08:17   07:24   06:18		17:33 (18)   06:02	19:13 (20)   05:01		04:33	
	16:19   17:21   18:16	14	17:47 (18)   20:14	13   19:26 (20)   21:09		21:44	
19	08:16   07:22   06:15		17:34 (18)   05:59	19:15 (20)   04:59		04:33	
	16:21   17:23   18:18	12	17:46 (18)   20:16	9   19:24 (20)   21:10		21:44	
20	08:15   07:19   06:13		17:35 (18)   05:57		04:57	04:33	
	16:23   17:25   18:20	9	17:44 (18)   20:18		21:12	21:45	
21	08:14   07:17   06:10		17:39 (18)   05:55		04:56	04:34	
	16:25   17:27   18:21	2	17:41 (18)   20:20		21:14	21:45	
22	08:12   07:15   06:08		05:52		04:55	04:34	
	16:27   17:29   18:23		20:22		21:15	21:45	
23	08:11   07:13   06:05		05:50	19:49 (1)   04:53		04:34	
	16:29   17:31   18:25		20:24	5   19:54 (1)   21:17		21:45	
24	08:10   07:10   06:03		05:48	19:47 (1)   04:52		04:34	
	16:30   17:33   18:27		20:25	9   19:56 (1)   21:18		21:46	
25	08:08   07:08   06:00		05:46	19:46 (1)   04:50		04:35	
	16:32   17:35   18:29		20:27	12   19:58 (1)   21:20		21:46	
26	08:07   07:06   05:58		05:43	19:45 (1)   04:49		04:35	
	16:34   17:37   18:31		20:29	15   20:00 (1)   21:21		21:46	
27	08:05   07:03   05:55		05:41	19:45 (1)   04:48		04:36	
	16:36   17:39   18:33		20:31	17   20:02 (1)   21:23		21:45	
28	08:04   07:01   05:53		05:39	19:44 (1)   04:47		04:36	
	16:38   17:41   18:35		20:33	20   20:04 (1)   21:24		21:45	
29	08:02   06:50		05:37	19:44 (1)   04:45		04:37	
	16:40   19:37		20:35	20   20:04 (1)   21:26		21:45	
30	08:00   06:48		05:35	19:44 (1)   04:44		04:37	
	16:42   19:38		20:37	20   20:04 (1)   21:27		21:45	
31	07:59   06:45				04:43		
	16:44   19:40				21:28		
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung			76	319	109		
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51		
Reduktion Betriebsdauer			0.90	0.90	0.90		
Reduktion Windrichtung			0.68	0.65	0.64		
Gesamte Reduktion			0.19	0.24	0.29		
Met.wahrsch.Beschattung			15	76	32		

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AL - IO38

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember				
1	04:38	05:19	06:14	19:12 (20)	07:08	08:03				
	21:44	21:09	20:01	18	19:30 (20)	18:46	16:35	15:50		
2	04:39	05:20	06:16	19:11 (20)	07:10	08:05				
	21:44	21:07	19:59	18	19:29 (20)	18:44	16:33	15:49		
3	04:40	05:22	06:17	19:12 (20)	07:12	08:06				
	21:44	21:05	19:56	16	19:28 (20)	18:41	16:31	15:48		
4	04:40	05:24	06:19	19:14 (20)	07:14	08:08				
	21:43	21:03	19:54	11	19:25 (20)	18:39	16:29	15:47		
5	04:41	05:25	20:00 (1)	06:21	19:15 (20)	07:15	07:15	08:09		
	21:43	21:01	5	20:05 (1)	19:51	7	19:22 (20)	18:37	16:27	15:47
6	04:42	05:27	19:58 (1)	06:23	07:17	07:17	08:10			
	21:42	20:59	10	20:08 (1)	19:49	18:34	16:25	15:46		
7	04:43	05:29	19:55 (1)	06:25	07:19	07:19	08:12			
	21:41	20:57	14	20:09 (1)	19:46	18:32	16:23	15:46		
8	04:44	05:31	19:54 (1)	06:26	07:21	07:21	08:13			
	21:41	20:55	16	20:10 (1)	19:44	18:29	16:21	15:45		
9	04:45	05:32	19:54 (1)	06:28	07:23	07:23	08:14			
	21:40	20:53	17	20:11 (1)	19:41	18:27	16:19	15:45		
10	04:46	05:34	19:52 (1)	06:30	07:25	07:25	08:16			
	21:39	20:51	19	20:11 (1)	19:39	18:24	16:18	15:45		
11	04:48	05:36	19:52 (1)	06:32	07:27	07:27	08:17			
	21:38	20:49	19	20:11 (1)	19:36	18:22	16:16	15:44		
12	04:49	05:38	19:51 (1)	06:34	07:28	07:29	08:18			
	21:37	20:47	20	20:11 (1)	19:34	18:20	16:14	15:44		
13	04:50	05:40	19:51 (1)	06:35	07:30	07:31	08:19			
	21:36	20:45	20	20:11 (1)	19:31	18:17	16:13	15:44		
14	04:51	05:41	19:51 (1)	06:37	07:32	07:33	08:20			
	21:35	20:43	20	20:11 (1)	19:29	18:15	16:11	15:44		
15	04:52	05:43	19:52 (1)	06:39	07:34	07:35	08:21			
	21:34	20:40	19	20:11 (1)	19:26	18:12	16:09	15:44		
16	04:54	05:45	19:51 (1)	06:41	07:36	07:36	08:22			
	21:33	20:38	17	20:08 (1)	19:24	18:10	16:08	15:44		
17	04:55	05:47	19:52 (1)	06:43	07:38	07:38	08:23			
	21:32	20:36	14	20:06 (1)	19:21	18:08	16:06	15:44		
18	04:57	05:49	19:53 (1)	06:44	07:40	07:40	08:23			
	21:30	20:34	11	20:04 (1)	19:19	18:05	16:05	15:44		
19	04:58	05:50	19:53 (1)	06:46	07:42	07:42	08:24			
	21:29	20:31	9	20:02 (1)	19:16	18:03	16:03	15:45		
20	04:59	05:52	19:55 (1)	06:48	07:44	07:44	08:25			
	21:28	20:29	5	20:00 (1)	19:14	18:01	16:02	15:45		
21	05:01	05:54	06:50	07:46	07:46	08:25				
	21:26	20:27	19:11	17:59	16:01	15:45				
22	05:02	05:56	06:52	07:48	07:48	08:26				
	21:25	20:25	19:09	17:56	15:59	15:46				
23	05:04	05:58	06:53	07:49	07:49	08:26				
	21:23	20:22	19:06	8	18:28 (18)	17:54	15:58	15:46		
24	05:05	05:59	19:19 (20)	06:55	18:18 (18)	07:51	07:51	08:27		
	21:22	20:20	9	19:28 (20)	19:04	12	18:30 (18)	17:52	15:57	15:47
25	05:07	06:01	19:17 (20)	06:57	18:17 (18)	06:53	07:53	08:27		
	21:20	20:18	13	19:30 (20)	19:01	13	18:30 (18)	16:50	15:56	15:48
26	05:09	06:03	19:14 (20)	06:59	18:16 (18)	06:55	07:55	08:28		
	21:19	20:15	16	19:30 (20)	18:59	14	18:30 (18)	16:47	15:54	15:48
27	05:10	06:05	19:14 (20)	07:01	18:15 (18)	06:57	07:56	08:28		
	21:17	20:13	17	19:31 (20)	18:56	12	18:27 (18)	16:45	15:53	15:49
28	05:12	06:07	19:13 (20)	07:02	18:16 (18)	06:59	07:58	08:28		
	21:15	20:11	19	19:32 (20)	18:54	9	18:25 (18)	16:43	15:52	15:50
29	05:14	06:08	19:12 (20)	07:04	18:16 (18)	07:01	08:00	08:28		
	21:14	20:08	19	19:31 (20)	18:51	7	18:23 (18)	16:41	15:51	15:51
30	05:15	06:10	19:11 (20)	07:06	18:17 (18)	07:03	08:01	08:28		
	21:12	20:06	20	19:31 (20)	18:49	3	18:20 (18)	16:39	15:51	15:52
31	05:17	06:12	19:12 (20)	07:05	16:37	07:05	08:28			
	21:10	20:03	19	19:31 (20)	16:37	328	257	231		
Sonnenscheinstunden	514	461	383							
astr.max.mögl.Beschattung			367	148						
Red.Sonnenscheinwahrsch.			0.48	0.40						
Reduktion Betriebsdauer			0.90	0.90						
Reduktion Windrichtung			0.64	0.67						
Gesamte Reduktion			0.28	0.24						
Met.wahrsch.Beschattung			103	36						

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AM - IO39  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28	07:57	06:59	06:43	05:33	19:36 (20)	04:42	
	15:54	16:46	17:43	19:42	20:39	23	19:59 (20)	
2	08:28	07:55	06:56	06:40	05:31	19:36 (20)	04:41	
	15:55	16:48	17:45	19:44	20:40	23	19:59 (20)	
3	08:28	07:54	06:54	06:38	05:28	19:36 (20)	04:40	
	15:57	16:50	17:47	19:46	20:42	22	19:58 (20)	
4	08:27	07:52	16:19 (17)	06:52	05:26	19:37 (20)	04:40	
	15:58	16:52	2	16:21 (17)	19:48	21	19:58 (20)	
5	08:27	07:50	16:18 (17)	06:49	05:24	19:37 (20)	04:39	
	15:59	16:54	5	16:23 (17)	19:50	20	19:57 (20)	
6	08:27	07:48	16:17 (17)	06:47	05:22	19:37 (20)	04:38	
	16:00	16:56	8	16:25 (17)	19:52	20	19:56 (20)	
7	08:26	07:46	16:16 (17)	06:44	05:20	19:38 (20)	04:37	
	16:02	16:58	11	16:27 (17)	19:54	17	19:55 (20)	
8	08:26	07:44	16:16 (17)	06:42	05:18	19:39 (20)	04:37	
	16:03	17:00	13	16:29 (17)	19:55	18	20:20 (1)	
9	08:25	07:42	16:16 (17)	06:40	05:17	19:41 (20)	04:36	
	16:05	17:02	16	16:32 (17)	19:57	19	20:22 (1)	
10	08:24	07:40	16:17 (17)	06:37	05:15	19:44 (20)	04:36	
	16:06	17:05	15	16:32 (17)	19:59	17	20:24 (1)	
11	08:24	07:38	16:17 (17)	06:35	05:13	20:11 (1)	04:35	
	16:08	17:07	14	16:31 (17)	20:01	14	20:25 (1)	
12	08:23	07:36	16:18 (17)	06:32	05:11	20:11 (1)	04:35	
	16:09	17:09	13	16:31 (17)	20:03	16	20:27 (1)	
13	08:22	07:34	16:20 (17)	06:30	05:09	20:10 (1)	04:34	
	16:11	17:11	10	16:30 (17)	20:05	18	20:28 (1)	
14	08:21	07:32	16:22 (17)	06:27	05:07	20:09 (1)	04:34	
	16:13	17:13	4	16:26 (17)	20:07	21	20:30 (1)	
15	08:20	07:30	06:25	06:09	05:06	20:09 (1)	04:34	
	16:14	17:15	18:10	20:09	21:04	22	20:31 (1)	
16	08:19	07:28	06:23	06:06	05:04	20:09 (1)	04:34	
	16:16	17:17	18:12	20:10	21:05	21	20:30 (1)	
17	08:18	07:26	06:20	06:04	05:02	20:09 (1)	04:33	
	16:18	17:19	18:14	20:12	21:07	22	20:31 (1)	
18	08:17	07:24	06:18	06:02	05:01	20:08 (1)	04:33	
	16:19	17:21	18:16	20:14	21:09	22	20:30 (1)	
19	08:16	07:22	06:15	05:59	04:59	20:09 (1)	04:33	
	16:21	17:23	18:18	20:16	21:10	22	20:31 (1)	
20	08:15	07:19	06:13	05:57	04:58	20:09 (1)	04:34	
	16:23	17:25	18:20	20:18	21:12	21	20:30 (1)	
21	08:14	07:17	06:10	17:50 (18)	05:55	19:49 (19)	04:56	
	16:25	17:27	18:22	5	17:55 (18)	20:20	3	19:52 (19)
22	08:12	07:15	06:08	17:48 (18)	05:52	19:47 (19)	04:55	
	16:27	17:29	18:23	8	17:56 (18)	20:22	5	19:52 (19)
23	08:11	07:13	06:05	17:47 (18)	05:50	19:44 (20)	04:53	
	16:29	17:31	18:25	12	17:59 (18)	20:24	10	19:54 (19)
24	08:10	07:10	06:03	17:46 (18)	05:48	19:41 (20)	04:52	
	16:31	17:33	18:27	14	18:00 (18)	20:25	15	19:56 (19)
25	08:08	07:08	06:00	17:46 (18)	05:46	19:40 (20)	04:50	
	16:32	17:35	18:29	16	18:02 (18)	20:27	18	19:58 (19)
26	08:07	07:06	05:58	17:45 (18)	05:43	19:39 (20)	04:49	
	16:34	17:37	18:31	16	18:01 (18)	20:29	21	20:00 (19)
27	08:05	07:03	05:55	17:46 (18)	05:41	19:38 (20)	04:48	
	16:36	17:39	18:33	15	18:01 (18)	20:31	21	19:59 (19)
28	08:04	07:01	05:53	17:46 (18)	05:39	19:37 (20)	04:47	
	16:38	17:41	18:35	13	17:59 (18)	20:33	22	19:59 (19)
29	08:02	07:00	05:50	18:48 (18)	05:37	19:37 (20)	04:45	
	16:40	17:43	19:37	9	18:57 (18)	20:35	22	19:59 (20)
30	08:00	07:00	06:48	18:51 (18)	05:35	19:37 (20)	04:44	
	16:42	17:45	19:38	2	18:53 (18)	20:37	22	19:59 (20)
31	07:59	07:00	06:45	19:40	21:27	11	20:26 (1)	
	16:44	17:47	19:40	421	496	8	20:25 (1)	
Sonnenscheinstunden	248	272	367	421	496	512	3	
astr.max.mögl.Beschattung		111	110	159	576		0.45	
Red.Sonnenscheinwahrsch.		0.24	0.31	0.41	0.51		0.45	
Reduktion Betriebsdauer		0.90	0.90	0.90	0.90		0.90	
Reduktion Windrichtung		0.70	0.68	0.64	0.63		0.63	
Gesamte Reduktion		0.15	0.19	0.24	0.29		0.26	
Met.wahrsch.Beschattung		17	21	38	168		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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AM - IO39

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:22 (1) 06:14	07:08	07:07	15:46 (17) 08:03
	21:44	21:09	15 20:37 (1) 20:01	18:46	16:35	15 16:01 (17) 15:50
2	04:39	05:20	20:22 (1) 06:16	07:10	07:09	15:46 (17) 08:05
	21:44	21:07	13 20:35 (1) 19:59	18:44	16:33	15 16:01 (17) 15:49
3	04:40	05:22	19:53 (20) 06:17	07:12	07:11	15:46 (17) 08:06
	21:44	21:05	18 20:33 (1) 19:56	18:41	16:31	13 15:59 (17) 15:48
4	04:40	05:24	19:50 (20) 06:19	07:14	07:13	15:46 (17) 08:08
	21:43	21:03	19 20:31 (1) 19:54	18:39	16:29	10 15:56 (17) 15:47
5	04:41	05:25	19:49 (20) 06:21	07:15	07:15	15:47 (17) 08:09
	21:43	21:01	18 20:30 (1) 19:51	18:37	16:27	8 15:55 (17) 15:47
6	04:42	05:27	19:48 (20) 06:23	07:17	07:17	15:48 (17) 08:10
	21:42	20:59	18 20:06 (20) 19:49	18:34	16:25	5 15:53 (17) 15:46
7	04:43	05:29	19:47 (20) 06:25	07:19	07:19	15:49 (17) 08:12
	21:41	20:57	19 20:06 (20) 19:46	18:32	16:23	2 15:51 (17) 15:46
8	04:44	05:31	19:46 (20) 06:26	07:21	07:21	08:13
	21:41	20:55	20 20:06 (20) 19:44	18:29	16:21	15:45
9	04:45	05:32	19:46 (20) 06:28	07:23	07:23	08:14
	21:40	20:53	21 20:07 (20) 19:41	18:27	16:19	15:45
10	04:46	05:34	19:45 (20) 06:30	07:25	07:25	08:16
	21:39	20:51	22 20:07 (20) 19:39	18:24	16:18	15:45
11	04:48	05:36	19:45 (20) 06:32	07:27	07:27	08:17
	21:38	20:49	22 20:07 (20) 19:36	18:22	16:16	15:44
12	04:49	20:26 (1) 05:38	19:45 (20) 06:34	07:28	07:29	08:18
	21:37	20:32 (1) 20:47	22 20:07 (20) 19:34	18:20	16:14	15:44
13	04:50	20:25 (1) 05:40	19:44 (20) 06:35	07:30	07:31	08:19
	21:36	9 20:34 (1) 20:45	22 20:06 (20) 19:31	18:17	16:13	15:44
14	04:51	20:23 (1) 05:41	19:44 (20) 06:37	18:39 (18) 07:32	07:33	08:20
	21:35	12 20:35 (1) 20:43	22 20:06 (20) 19:29	8 18:47 (18) 18:15	16:11	15:44
15	04:52	20:22 (1) 05:43	19:45 (20) 06:39	18:37 (18) 07:34	07:35	08:21
	21:34	14 20:36 (1) 20:40	21 20:06 (19) 19:26	12 18:49 (18) 18:12	16:09	15:44
16	04:54	20:22 (1) 05:45	19:45 (20) 06:41	18:36 (18) 07:36	07:36	08:22
	21:33	16 20:38 (1) 20:38	21 20:06 (19) 19:24	14 18:50 (18) 18:10	16:08	15:44
17	04:55	20:22 (1) 05:47	19:46 (20) 06:43	18:34 (18) 07:38	07:38	08:23
	21:32	16 20:38 (1) 20:36	20 20:06 (19) 19:21	15 18:49 (18) 18:08	16:06	15:44
18	04:57	20:21 (1) 05:49	19:47 (20) 06:44	18:33 (18) 07:40	07:40	08:23
	21:30	17 20:38 (1) 20:34	17 20:04 (19) 19:19	16 18:49 (18) 18:05	16:05	15:44
19	04:58	20:20 (1) 05:50	19:47 (20) 06:46	18:33 (18) 07:42	07:42	08:24
	21:29	19 20:39 (1) 20:31	15 20:02 (19) 19:16	15 18:48 (18) 18:03	16:03	15:45
20	04:59	20:20 (1) 05:52	19:50 (20) 06:48	18:34 (18) 07:44	07:44	08:25
	21:28	20 20:40 (1) 20:29	10 20:00 (19) 19:14	12 18:46 (18) 18:01	16:02	15:45
21	05:01	20:20 (1) 05:54	19:53 (19) 06:50	18:33 (18) 07:46	07:46	08:25
	21:26	20:40 (1) 20:27	5 19:58 (19) 19:11	9 18:42 (18) 17:59	16:01	15:45
22	05:02	20:20 (1) 05:56	19:53 (19) 06:52	18:34 (18) 07:48	07:48	08:26
	21:25	21 20:41 (1) 20:25	19:09 6 18:40 (18) 17:56	15:59	15:59	15:46
23	05:04	20:19 (1) 05:58	06:53	18:36 (18) 07:50	07:49	08:26
	21:23	22 20:41 (1) 20:22	19:06 2 18:38 (18) 17:54	15:58	15:58	15:46
24	05:05	20:19 (1) 05:59	06:55	07:51	07:51	08:27
	21:22	22 20:41 (1) 20:20	19:04	17:52	15:57	15:47
25	05:07	20:19 (1) 06:01	06:57	06:53	07:53	08:27
	21:20	22 20:41 (1) 20:18	19:01	16:50	15:56	15:48
26	05:09	20:19 (1) 06:03	06:59	06:55	07:55	08:28
	21:19	22 20:41 (1) 20:15	18:59	16:47	15:54	15:48
27	05:10	20:19 (1) 06:05	07:01	06:57	07:56	08:28
	21:17	22 20:41 (1) 20:13	18:56	16:45	15:53	15:49
28	05:12	20:19 (1) 06:07	07:02	06:59	15:50 (17) 07:58	08:28
	21:16	22 20:41 (1) 20:11	18:54	16:43	7 15:57 (17) 15:52	15:50
29	05:14	20:20 (1) 06:08	07:04	07:01	15:49 (17) 08:00	08:28
	21:14	21 20:41 (1) 20:08	18:51	16:41	10 15:59 (17) 15:51	15:51
30	05:15	20:20 (1) 06:10	07:06	07:03	15:48 (17) 08:01	08:28
	21:12	19 20:39 (1) 20:06	18:49	16:39	12 16:00 (17) 15:51	15:52
31	05:17	20:20 (1) 06:12		07:05	15:47 (17)	08:28
	21:10	18 20:38 (1) 20:03		16:37	14 16:01 (17)	15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	360	382	109	43	68	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.63	0.63	0.68	0.70	0.70	
Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	
Met.wahrsch.Beschattung	91	106	27	9	9	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	-------------------	----------------	------------	---------------------------	----------------------------

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AN - IO40

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni				
1	08:28	07:57	06:59	06:43	05:33	19:42 (20)	04:42	20:17 (1)		
	15:54	16:46	17:43	19:42	20:39	22	20:04 (20)	21:29		
2	08:28	07:55	06:56	06:40	05:31	19:42 (20)	04:41	20:19 (1)		
	15:55	16:48	17:45	19:44	20:40	22	20:04 (20)	21:31		
3	08:28	07:54	06:54	06:38	05:28	19:41 (20)	04:40	20:20 (1)		
	15:57	16:50	17:47	19:46	20:42	23	20:04 (20)	21:32		
4	08:27	07:52	06:52	06:35	05:26	19:41 (20)	04:40	20:20 (1)		
	15:58	16:52	17:49	19:48	20:44	23	20:04 (20)	21:33		
5	08:27	07:50	06:49	06:33	05:24	19:41 (20)	04:39	20:21 (1)		
	15:59	16:54	17:51	19:50	20:46	22	20:03 (20)	21:34		
6	08:27	07:48	06:47	06:30	05:22	19:41 (20)	04:38	20:23 (1)		
	16:00	16:56	17:53	19:52	20:48	22	20:03 (20)	21:35		
7	08:26	07:46	06:44	06:28	05:20	19:41 (20)	04:37	20:24 (1)		
	16:02	16:58	17:55	19:54	20:50	22	20:03 (20)	21:36		
8	08:26	07:44	06:42	06:26	05:18	19:41 (20)	04:37			
	16:03	17:00	17:57	19:55	20:51	21	20:02 (20)	21:37		
9	08:25	07:42	06:40	06:23	05:17	19:42 (20)	04:36			
	16:05	17:02	17:59	19:57	20:53	20	20:02 (20)	21:38		
10	08:24	07:40	06:37	06:21	05:15	19:43 (20)	04:36			
	16:06	17:05	18:00	19:59	20:55	18	20:01 (20)	21:39		
11	08:24	07:38	06:35	06:18	05:13	19:43 (20)	04:35			
	16:08	17:07	18:02	20:01	20:57	23	20:25 (1)	21:40		
12	08:23	07:36	06:32	06:16	05:11	19:45 (20)	04:35			
	16:09	17:09	18:04	20:03	20:59	23	20:27 (1)	21:41		
13	08:22	07:34	06:30	06:14	05:09	19:47 (20)	04:34			
	16:11	17:11	18:06	20:05	21:00	22	20:28 (1)	21:41		
14	08:21	07:32	06:27	06:11	05:07	19:49 (20)	04:34			
	16:13	17:13	18:08	20:07	21:02	20	20:30 (1)	21:42		
15	08:20	07:30	06:25	06:09	05:06	20:15 (1)	04:34			
	16:14	17:15	18:10	20:09	21:04	17	20:32 (1)	21:43		
16	08:19	07:28	06:23	06:06	05:04	20:14 (1)	04:34			
	16:16	17:17	18:12	20:10	21:05	19	20:33 (1)	21:43		
17	08:18	07:26	06:20	06:04	05:02	20:14 (1)	04:33			
	16:18	17:19	18:14	20:12	21:07	21	20:35 (1)	21:44		
18	08:17	07:24	06:18	06:02	05:01	20:13 (1)	04:33			
	16:19	17:21	18:16	20:14	21:09	22	20:35 (1)	21:44		
19	08:16	07:22	06:15	05:59	04:59	20:13 (1)	04:33			
	16:21	17:23	18:18	20:16	21:10	22	20:35 (1)	21:44		
20	08:15	07:19	06:13	05:57	04:58	20:13 (1)	04:34			
	16:23	17:25	18:20	20:18	21:12	22	20:35 (1)	21:45		
21	08:14	07:17	06:10	05:55	04:56	20:13 (1)	04:34			
	16:25	17:27	18:22	20:20	21:14	22	20:35 (1)	21:45		
22	08:12	07:15	06:08	17:53 (18)	05:52	04:55	20:13 (1)	04:34		
	16:27	17:29	18:23	3 17:56 (18)	20:22	21:15	23	20:36 (1)	21:45	
23	08:11	07:13	06:05	17:52 (18)	05:50	04:53	20:14 (1)	04:34		
	16:29	17:31	18:25	7 17:59 (18)	20:24	3 19:54 (19)	21:17	22	20:36 (1)	21:45
24	08:10	07:10	06:03	17:50 (18)	05:48	19:50 (19)	04:52	20:13 (1)	04:34	
	16:31	17:33	18:27	10 18:00 (18)	20:25	6 19:56 (19)	21:18	22	20:35 (1)	21:46
25	08:08	07:08	06:00	17:49 (18)	05:46	19:50 (19)	04:50	20:14 (1)	04:35	
	16:32	17:35	18:29	13 18:02 (18)	20:27	8 19:58 (19)	21:20	21	20:35 (1)	21:46
26	08:07	07:06	05:58	17:48 (18)	05:43	19:48 (20)	04:49	20:14 (1)	04:35	
	16:34	17:37	18:31	16 18:04 (18)	20:29	12 20:00 (19)	21:21	21	20:35 (1)	21:46
27	08:05	07:03	05:55	17:48 (18)	05:41	19:46 (20)	04:48	20:15 (1)	04:36	
	16:36	17:39	18:33	16 18:04 (18)	20:31	16 20:02 (19)	21:23	20	20:35 (1)	21:45
28	08:04	07:01	05:53	17:48 (18)	05:39	19:45 (20)	04:47	20:15 (1)	04:36	
	16:38	17:41	18:35	15 18:03 (18)	20:33	18 20:03 (19)	21:24	20	20:35 (1)	21:45
29	08:02		06:50	18:49 (18)	05:37	19:44 (20)	04:45	20:16 (1)	04:37	
	16:40		19:37	14 19:03 (18)	20:35	19 20:03 (19)	21:26	18	20:34 (1)	21:45
30	08:00		06:48	18:49 (18)	05:35	19:43 (20)	04:44	20:16 (1)	04:37	
	16:42		19:38	12 19:01 (18)	20:37	20 20:03 (20)	21:27	18	20:34 (1)	21:45
31	07:59		06:45	18:51 (18)			04:43	20:17 (1)		
	16:44		19:40	8 18:59 (18)			21:28	17	20:34 (1)	
Sonnenscheinstunden	248	272	367	421	496			512		
astr.max.mögl.Beschattung		110	114	102	650			76		
Red.Sonnenscheinwahrsch.		0.24	0.31	0.41	0.51			0.45		
Reduktion Betriebsdauer		0.90	0.90	0.90	0.90			0.90		
Reduktion Windrichtung		0.70	0.68	0.64	0.63			0.63		
Gesamte Reduktion		0.15	0.19	0.24	0.29			0.26		
Met.wahrsch.Beschattung		17	22	24	189			20		

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: AN - IO40**

**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
342	326	396	565	523	733	981	1,012	1,213	924	351	7,888	

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember			
1	04:38		05:19		19:55 (20)	06:14		07:08		07:07	15:47 (17)	08:03		
	21:44		21:09	23	20:37 (1)	20:01		18:46		16:35	16	16:03 (17)	15:50	
2	04:39		05:20		19:53 (20)	06:16		07:10		07:09		15:47 (17)	08:05	
	21:44		21:07	21	20:35 (1)	19:59		18:44		16:33	14	16:01 (17)	15:49	
3	04:40		05:22		19:53 (20)	06:17		07:12		07:11		15:47 (17)	08:06	
	21:44		21:05	19	20:12 (20)	19:56		18:41		16:31	12	15:59 (17)	15:48	
4	04:40		05:24		19:51 (20)	06:19		07:14		07:13		15:48 (17)	08:08	
	21:43		21:03	21	20:12 (20)	19:54		18:39		16:29	8	15:56 (17)	15:47	
5	04:41		20:32 (1)	05:25	19:51 (20)	06:21		07:15		07:15		15:49 (17)	08:09	
	21:45		20:34 (1)	21:01	20:12 (20)	19:51		18:37		16:27	6	15:55 (17)	15:47	
6	04:42		20:30 (1)	05:27	19:51 (20)	06:23		07:17		07:17		15:51 (17)	08:10	
	21:42	6	20:36 (1)	20:59	22	20:13 (20)	19:49		18:34		16:25	2	15:53 (17)	15:46
7	04:43		20:29 (1)	05:29	19:50 (20)	06:25		07:19		07:19			08:12	
	21:41	9	20:38 (1)	20:57	23	20:13 (20)	19:46		18:32		16:23		15:46	
8	04:44		20:28 (1)	05:31	19:50 (20)	06:26		07:21		07:21			08:13	
	21:41	11	20:39 (1)	20:55	23	20:13 (20)	19:44		18:29		16:21		15:45	
9	04:45		20:27 (1)	05:32	19:50 (20)	06:28		07:23		07:23			08:14	
	21:40	13	20:40 (1)	20:53	23	20:13 (20)	19:41		18:27		16:19		15:45	
10	04:46		20:27 (1)	05:34	19:50 (20)	06:30		07:25		07:25			08:16	
	21:39	14	20:41 (1)	20:51	22	20:12 (20)	19:39		18:24		16:18		15:45	
11	04:48		20:26 (1)	05:36	19:50 (20)	06:32		07:27		07:27			08:17	
	21:38	15	20:41 (1)	20:49	22	20:12 (20)	19:36		18:22		16:16		15:44	
12	04:49		20:26 (1)	05:38	19:51 (20)	06:34		18:44 (18)		07:28			08:18	
	21:37	16	20:42 (1)	20:47	21	20:12 (20)	19:34	7	18:51 (18)		16:20		15:44	
13	04:50		20:25 (1)	05:40	19:50 (20)	06:35		18:40 (18)		07:30			08:19	
	21:36	17	20:42 (1)	20:45	21	20:11 (20)	19:31	12	18:52 (18)		16:13		15:44	
14	04:51		20:25 (1)	05:41	19:51 (20)	06:37		18:39 (18)		07:32			08:20	
	21:35	18	20:43 (1)	20:43	19	20:10 (19)	19:29	14	18:53 (18)		16:11		15:44	
15	04:52		20:24 (1)	05:43	19:53 (20)	06:39		18:38 (18)		07:34			08:21	
	21:34	19	20:43 (1)	20:40	18	20:11 (19)	19:26	15	18:53 (18)		16:09		15:44	
16	04:54		20:24 (1)	05:45	19:53 (20)	06:41		18:38 (18)		07:36			08:22	
	21:33	20	20:44 (1)	20:38	15	20:08 (19)	19:24	16	18:54 (18)		16:08		15:44	
17	04:55		20:24 (1)	05:47	19:56 (19)	06:43		18:36 (18)		07:38			08:23	
	21:32	20	20:44 (1)	20:36	10	20:06 (19)	19:21	17	18:53 (18)		16:06		15:44	
18	04:57		20:24 (1)	05:49	19:56 (19)	06:44		18:37 (18)		07:40			08:23	
	21:30	21	20:45 (1)	20:34	8	20:04 (19)	19:19	13	18:50 (18)		16:05		15:44	
19	04:58		20:23 (1)	05:50	19:56 (19)	06:46		18:37 (18)		07:42			08:24	
	21:29	22	20:45 (1)	20:31	6	20:02 (19)	19:16	11	18:48 (18)		16:03		15:45	
20	04:59		20:24 (1)	05:52	19:57 (19)	06:48		18:38 (18)		07:44			08:25	
	21:28	21	20:45 (1)	20:29	3	20:00 (19)	19:14	8	18:46 (18)		16:02		15:45	
21	05:01		20:23 (1)	05:54		06:50		18:38 (18)		07:46			08:25	
	21:26	22	20:45 (1)	20:27		19:11	4	18:42 (18)		17:59		16:01	15:45	
22	05:02		20:24 (1)	05:56		06:52				07:48			08:26	
	21:25	22	20:46 (1)	20:25		19:09				17:56		15:59	15:46	
23	05:04		20:23 (1)	05:58		06:53				07:50			08:26	
	21:23	23	20:46 (1)	20:22		19:06				17:54		15:58	15:46	
24	05:05		20:23 (1)	05:59		06:55				07:51			08:27	
	21:22	22	20:45 (1)	20:20		19:04				17:52		15:57	15:47	
25	05:07		20:24 (1)	06:01		06:57				06:53		07:53	08:27	
	21:20	22	20:46 (1)	20:18		19:01				16:50		15:56	15:48	
26	05:09		20:24 (1)	06:03		06:59				06:55		07:55	08:28	
	21:19	21	20:45 (1)	20:15		18:59				16:47		15:54	15:48	
27	05:10		20:25 (1)	06:05		07:01				06:57		07:56	08:28	
	21:17	19	20:44 (1)	20:13		18:56			6	16:45	15:58 (17)	15:53	15:49	
28	05:12		20:25 (1)	06:07		07:02				06:59		15:50 (17)	07:58	08:28
	21:16	17	20:42 (1)	20:11		18:54				16:43	10	16:00 (17)	15:52	15:50
29	05:14		20:26 (1)	06:08		07:04				07:01		15:49 (17)	08:00	08:28
	21:14	15	20:41 (1)	20:08		18:51				16:41	13	16:02 (17)	15:51	15:51
30	05:15		19:58 (20)	06:10		07:06				07:03		15:48 (17)	08:01	08:28
	21:12	21	20:39 (1)	20:06		18:49				16:39	15	16:03 (17)	15:51	15:52
31	05:17		19:56 (20)	06:12						07:05		15:48 (17)		08:28
	21:10	23	20:38 (1)	20:03						16:37	15	16:03 (17)		15:53
Sonnenscheinstunden		514		461		383				328		257		231
astr.max.mögl.Beschattung		471		361		117				59				58
Red.Sonnenscheinwahrsch.		0.44		0.48		0.40				0.33				0.21
Reduktion Betriebsdauer		0.90		0.90		0.90				0.90				0.90
Reduktion Windrichtung		0.63		0.64		0.68				0.70				0.70
Gesamte Reduktion		0.25		0.28		0.25				0.21				0.13
Met.wahrsch.Beschattung		119		101		29				12				8

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBSchattenrezeptor: AO - IO41  
**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  
342 326 396 565 523 523 733 981 1.012 1.213 924 351 7.888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni			
1	08:28	07:57	06:59	06:43	18:53 (18)	05:33	19:49 (20)	04:42	20:19 (1)
	15:54	16:46	17:43	19:42	19:03 (18)	20:39	20:07 (20)	21:29	20:39 (1)
2	08:28	07:55	06:56	06:40	18:55 (18)	05:31	19:48 (20)	04:41	20:21 (1)
	15:55	16:48	17:45	19:44	18:59 (18)	20:40	20:07 (20)	21:31	20:40 (1)
3	08:28	07:54	06:54	06:38	19:17 (16)	05:28	19:47 (20)	04:40	20:21 (1)
	15:57	16:50	17:47	19:46	19:19 (16)	20:42	21:00 (20)	21:32	20:39 (1)
4	08:27	07:52	06:52	06:35	19:15 (16)	05:26	19:46 (20)	04:40	20:21 (1)
	15:58	16:52	17:49	19:48	19:20 (16)	20:44	22:00 (20)	21:33	20:39 (1)
5	08:27	07:50	06:49	06:33	19:15 (16)	05:24	19:46 (20)	04:39	20:21 (1)
	15:59	16:54	17:51	19:50	19:23 (16)	20:46	22:00 (20)	21:34	20:38 (1)
6	08:27	07:48	06:47	06:30	19:14 (16)	05:22	19:45 (20)	04:38	20:22 (1)
	16:00	16:56	16:21 (17)	17:52	19:24 (16)	20:48	23:00 (20)	21:35	16:20 (38)
7	08:26	07:46	06:45	06:28	19:14 (16)	05:20	19:45 (20)	04:37	20:23 (1)
	16:02	16:58	16:27 (17)	17:55	19:24 (16)	20:50	23:00 (20)	21:36	15:20 (38)
8	08:26	07:44	06:42	06:26	19:14 (16)	05:18	19:45 (20)	04:37	20:24 (1)
	16:03	17:00	16:29 (17)	17:57	19:27 (16)	20:51	23:00 (20)	21:37	14:20 (38)
9	08:25	07:42	06:40	06:23	19:14 (16)	05:17	19:46 (20)	04:36	20:24 (1)
	16:05	17:02	16:32 (17)	17:59	19:27 (16)	20:53	22:00 (20)	21:38	13:20 (37)
10	08:24	07:40	06:37	06:21	19:16 (16)	05:15	19:46 (20)	04:36	20:25 (1)
	16:06	17:05	16:34 (17)	18:00	19:24 (16)	20:55	22:00 (20)	21:39	12:20 (37)
11	08:24	07:38	06:35	06:18	19:16 (16)	05:13	19:46 (20)	04:35	20:26 (1)
	16:08	17:07	16:35 (17)	18:02	20:01	20:57	21:00 (20)	21:40	11:20 (37)
12	08:23	07:36	06:32	06:16	19:16 (16)	05:11	19:47 (20)	04:35	20:26 (1)
	16:09	17:09	16:35 (17)	18:04	20:03	20:59	20:07 (20)	21:41	10:20 (36)
13	08:22	07:34	06:30	06:14	19:15 (16)	05:09	19:47 (20)	04:34	20:27 (1)
	16:11	17:11	16:34 (17)	18:06	20:05	21:00	20:28 (20)	21:41	9:20 (36)
14	08:21	07:32	06:27	06:11	19:15 (16)	05:07	19:47 (20)	04:34	20:28 (1)
	16:13	17:13	16:32 (17)	18:08	20:07	21:02	20:30 (20)	21:42	8:20 (36)
15	08:20	07:30	06:25	06:09	19:16 (16)	05:06	19:49 (20)	04:34	20:29 (1)
	16:14	17:15	16:31 (17)	18:10	20:09	21:04	20:32 (20)	21:43	7:20 (36)
16	08:19	07:28	06:23	06:06	19:17 (16)	05:04	19:50 (20)	04:34	20:30 (1)
	16:16	17:17	18:12	20:10	21:05	20:33 (20)	21:43	5:20 (35)	20:31 (1)
17	08:18	07:26	06:20	06:04	19:18 (16)	05:02	19:52 (20)	04:34	20:31 (1)
	16:18	17:19	18:14	20:12	21:07	20:35 (20)	21:44	4:20 (35)	20:32 (1)
18	08:17	07:24	06:18	06:02	19:19 (16)	05:01	20:18 (20)	04:33	20:32 (1)
	16:19	17:21	18:16	20:14	21:09	20:36 (20)	21:44	2:20 (34)	
19	08:16	07:22	06:15	05:59	19:20 (16)	04:59	20:18 (20)	04:33	20:33 (1)
	16:21	17:23	18:18	20:16	21:10	20:38 (20)	21:44		
20	08:15	07:19	06:13	05:57	19:21 (16)	04:58	20:17 (20)	04:34	20:34 (1)
	16:23	17:25	18:20	20:18	21:12	20:38 (20)	21:45		
21	08:14	07:17	06:10	05:55	19:22 (16)	04:56	20:17 (20)	04:34	20:35 (1)
	16:25	17:27	18:22	20:20	21:14	20:39 (20)	21:45		
22	08:12	07:15	06:08	05:52	19:23 (16)	04:55	20:18 (20)	04:34	20:36 (1)
	16:27	17:29	18:23	20:22	21:15	20:39 (20)	21:45		
23	08:11	07:13	06:05	05:50	19:24 (16)	04:53	20:18 (20)	04:34	20:37 (1)
	16:29	17:31	18:25	20:24	21:17	20:40 (20)	21:45		
24	08:10	07:10	06:03	05:48	19:25 (16)	04:52	20:17 (20)	04:34	20:38 (1)
	16:31	17:33	18:27	20:25	21:19	20:39 (20)	21:46	2:20 (35)	
25	08:08	07:08	06:00	05:46	19:26 (16)	04:50	20:17 (20)	04:35	20:32 (1)
	16:32	17:35	18:29	20:27	21:20	20:39 (20)	21:46	4:20 (36)	
26	08:07	07:06	05:58	05:43	19:27 (16)	04:49	20:18 (20)	04:35	20:32 (1)
	16:34	17:37	18:31	20:29	21:21	20:40 (20)	21:46	5:20 (37)	
27	08:05	07:03	05:55	05:41	19:28 (16)	04:48	20:18 (20)	04:36	20:31 (1)
	16:36	17:39	18:33	20:31	21:23	20:40 (20)	21:45	7:20 (38)	
28	08:04	07:01	05:53	05:39	19:29 (16)	04:47	20:18 (20)	04:36	20:31 (1)
	16:38	17:41	18:35	20:33	21:24	20:40 (20)	21:45	8:20 (39)	
29	08:02	07:00	05:50	05:37	19:30 (16)	04:45	20:18 (20)	04:37	20:31 (1)
	16:40	17:43	18:37	20:35	21:26	20:40 (20)	21:45	8:20 (39)	
30	08:00	06:58	05:48	05:35	19:31 (16)	04:44	20:19 (20)	04:37	20:31 (1)
	16:42	17:45	18:39	20:37	21:27	20:40 (20)	21:45	9:20 (40)	
31	07:59	06:57	05:45	05:31	19:32 (16)	04:43	20:19 (20)	04:37	20:31 (1)
	16:44	17:47	18:41	20:39	21:28	20:40 (20)	21:45	10:20 (41)	
Sonneneinstrahlung	248	272	367	421	496	512			
astr.max.mögl.Beschattung		115	105	147	678	261			
Red.Sonneneinstrahlung		0.24	0.31	0.41	0.51	0.45			
Reduktion Betriebsdauer		0.90	0.90	0.90	0.90	0.90			
Reduktion Windrichtung		0.70	0.68	0.65	0.63	0.63			
Gesamte Reduktion		0.15	0.19	0.24	0.29	0.26			
Met.wahrsch.Beschattung		17	20	36	197	67			

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)	
	Sonnenuntergang (SS:MM)			Zeitpunkt (SS:MM)		Schattenanfang		Schattenende	

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

## SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AO - IO41

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  
 342 326 396 565 523 733 981 1.012 1.213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38	20:31 (1)	05:19	19:57 (20)	06:14	19:57 (20)	06:14	19:08	07:07	15:48 (17)	08:03	
	21:44	10	20:41 (1)	21:09	21	20:18 (20)	20:01	18:46	16:35	15	16:03 (17)	15:50
2	04:39	20:30 (1)	05:20	19:56 (20)	06:16	19:56 (20)	06:16	19:14 (16)	07:10	16:03 (17)	08:05	
	21:44	11	20:41 (1)	21:07	21	20:17 (20)	19:59	18:44	16:33	13	16:01 (17)	15:49
3	04:40	20:29 (1)	05:22	19:56 (20)	06:17	19:56 (20)	06:17	19:12 (16)	07:12	16:31	15:49 (17)	08:06
	21:44	13	20:42 (1)	21:05	22	20:18 (20)	19:56	18:41	16:31	10	15:59 (17)	15:48
4	04:40	20:29 (1)	05:24	19:55 (20)	06:19	19:55 (20)	06:19	19:12 (16)	07:14	16:29	15:49 (17)	08:08
	21:43	14	20:43 (1)	21:03	23	20:18 (20)	19:54	18:39	16:29	7	15:56 (17)	15:47
5	04:41	20:29 (1)	05:25	19:55 (20)	06:21	19:55 (20)	06:21	19:10 (16)	07:15	16:27	15:51 (17)	08:09
	21:43	15	20:44 (1)	21:01	23	20:18 (20)	19:51	18:37	16:27	4	15:55 (17)	15:47
6	04:42	20:29 (1)	05:27	19:55 (20)	06:23	19:55 (20)	06:23	19:10 (16)	07:17	16:25	08:10	
	21:42	16	20:45 (1)	20:59	23	20:18 (20)	19:49	18:34	16:25	15:46		
7	04:43	20:29 (1)	05:29	19:55 (20)	06:25	19:55 (20)	06:25	19:10 (16)	07:19	16:23	08:12	
	21:41	16	20:45 (1)	20:57	22	20:17 (20)	19:46	18:32	16:23	15:46		
8	04:44	20:29 (1)	05:31	19:55 (20)	06:26	19:55 (20)	06:26	19:11 (16)	07:21	16:21	08:13	
	21:41	17	20:46 (1)	20:55	22	20:17 (20)	19:44	18:29	16:21	15:45		
9	04:45	20:28 (1)	05:32	19:56 (20)	06:28	19:56 (20)	06:28	19:11 (16)	07:23	16:19	08:14	
	21:40	18	20:46 (1)	20:53	21	20:17 (20)	19:41	18:27	16:19	15:45		
10	04:46	20:28 (1)	05:34	19:55 (20)	06:30	19:55 (20)	06:30	18:49 (18)	07:25	16:18	08:16	
	21:39	19	20:47 (1)	20:51	21	20:16 (20)	19:39	18:24	16:18	15:45		
11	04:48	20:28 (1)	05:36	19:56 (20)	06:32	19:56 (20)	06:32	18:45 (18)	07:27	16:16	08:17	
	21:38	19	20:47 (1)	20:49	20	20:16 (20)	19:36	18:22	16:16	15:44		
12	04:49	20:28 (1)	05:38	19:57 (20)	06:34	19:57 (20)	06:34	18:44 (18)	07:28	16:14	08:18	
	21:37	20	20:48 (1)	20:47	18	20:15 (20)	19:34	18:20	16:14	15:44		
13	04:50	20:27 (1)	05:40	19:58 (20)	06:35	19:58 (20)	06:35	18:41 (18)	07:30	16:13	08:19	
	21:36	21	20:48 (1)	20:45	16	20:14 (19)	19:31	18:17	16:13	15:44		
14	04:51	20:27 (1)	05:41	19:59 (19)	06:37	19:59 (19)	06:37	18:41 (18)	07:32	16:11	08:20	
	21:35	21	20:48 (1)	20:43	13	20:12 (19)	19:29	18:15	16:11	15:44		
15	04:52	20:27 (1)	05:43	20:00 (19)	06:39	20:00 (19)	06:39	18:40 (18)	07:34	16:09	08:21	
	21:34	21	20:48 (1)	20:40	11	20:11 (19)	19:26	18:12	16:09	15:44		
16	04:54	20:27 (1)	05:45	19:59 (19)	06:41	19:59 (19)	06:41	18:40 (18)	07:36	16:08	08:22	
	21:33	22	20:49 (1)	20:38	9	20:08 (19)	19:24	18:10	16:08	15:44		
17	04:55	20:27 (1)	05:47	19:59 (19)	06:43	19:59 (19)	06:43	18:39 (18)	07:38	16:06	08:23	
	21:32	22	20:49 (1)	20:36	7	20:06 (19)	19:21	18:08	16:06	15:44		
18	04:57	20:27 (1)	05:49	20:00 (19)	06:44	20:00 (19)	06:44	18:40 (18)	07:40	16:05	08:23	
	21:30	22	20:49 (1)	20:34	4	20:04 (19)	19:19	18:05	16:05	15:44		
19	04:58	20:27 (1)	05:50	20:01 (19)	06:46	20:01 (19)	06:46	18:41 (18)	07:42	16:03	08:24	
	21:29	22	20:49 (1)	20:31	1	20:02 (19)	19:16	18:03	16:03	15:45		
20	04:59	20:27 (1)	05:52	19:58 (19)	06:48	19:58 (19)	06:48	18:43 (18)	07:44	16:02	08:25	
	21:28	23	20:50 (1)	20:29			19:14	18:01	16:02	15:45		
21	05:01	20:27 (1)	05:54	20:02 (19)	06:50	20:02 (19)	06:50	18:46 (18)	07:46	16:01	08:25	
	21:26	22	20:49 (1)	20:27			19:11	17:59	16:01	15:45		
22	05:02	20:28 (1)	05:56	20:03 (19)	06:52	20:03 (19)	06:52	18:48 (18)	07:48	16:00	08:26	
	21:25	22	20:50 (1)	20:25			19:09	17:56	16:00	15:46		
23	05:04	20:28 (1)	05:58	20:04 (19)	06:53	20:04 (19)	06:53	18:49 (18)	07:50	16:00	08:26	
	21:23	21	20:49 (1)	20:22			19:06	17:54	16:00	15:46		
24	05:05	20:28 (1)	05:59	20:05 (19)	06:55	20:05 (19)	06:55	18:50 (18)	07:51	16:00	08:27	
	21:22	20	20:48 (1)	20:20			19:04	17:52	16:00	15:47		
25	05:07	20:29 (1)	06:01	20:06 (19)	06:57	20:06 (19)	06:57	18:51 (18)	07:53	16:00	08:27	
	21:20	18	20:47 (1)	20:18			19:01	16:50	15:56	15:48		
26	05:09	20:04 (20)	06:03	20:07 (19)	06:59	20:07 (19)	06:59	16:55	15:54 (17)	15:54	08:28	
	21:19	22	20:45 (1)	20:15			18:59	16:47	15:59 (17)	15:54	15:48	
27	05:10	20:02 (20)	06:05	20:08 (19)	07:01	20:08 (19)	07:01	16:57	15:51 (17)	15:56	08:28	
	21:17	24	20:44 (1)	20:13			18:56	16:45	16:01 (17)	15:53	15:49	
28	05:12	20:00 (20)	06:07	20:10 (19)	07:02	20:10 (19)	07:02	16:59	15:50 (17)	15:58	08:28	
	21:16	25	20:42 (1)	20:11			18:54	16:43	16:02 (17)	15:52	15:50	
29	05:14	19:59 (20)	06:08	20:11 (19)	07:04	19:59 (20)	07:04	16:57	15:50 (17)	16:00	08:28	
	21:14	25	20:41 (1)	20:08			18:51	16:41	16:04 (17)	15:51	15:51	
30	05:15	19:57 (20)	06:10	20:12 (19)	07:06	19:57 (20)	07:06	16:59	15:49 (17)	16:01	08:28	
	21:12	24	20:39 (1)	20:06			18:49	16:39	16:04 (17)	15:51	15:52	
31	05:17	19:57 (20)	06:12	20:13 (19)	07:07	19:57 (20)	07:07	16:59	15:49 (17)	16:02	08:28	
	21:10	22	20:38 (1)	20:03				16:37	16:04 (17)	15:53	15:53	
Sonnenscheinstunden	514		461		383		191		328	257		231
astr.max.mögl.Beschattung	607		318		191		40		71		49	
Red.Sonnenscheinwahrsch.	0.44		0.48		0.40		0.33		0.33		0.21	
Reduktion Betriebsdauer	0.90		0.90		0.90		0.90		0.90		0.90	
Reduktion Windrichtung	0.63		0.64		0.67		0.70		0.70		0.70	
Gesamte Reduktion	0.25		0.28		0.24		0.21		0.21		0.13	
Met.wahrsch.Beschattung	153		89		47		15		15		6	

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

## SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AP - IO42  
**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  
 342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

		Juli		August		September		Oktober		November		Dezember						
1	04:38	20:31 (1)	05:19			20:00 (20)	06:14	19:17 (16)	07:08	07:07	15:48 (17)	08:03	14:53 (21)					
	21:44	18	20:49 (1)	21:09	24	20:24 (20)	20:01	19:26 (16)	18:46	16:35	15	16:03 (17)	15:50	13	15:06 (21)			
2	04:39		20:30 (1)	05:20		19:59 (20)	06:16	19:14 (16)	07:10	07:09	15:48 (17)	08:05	14:53 (21)					
	21:44	19	20:49 (1)	21:07	24	20:23 (20)	19:59	12	19:26 (16)	18:44	16:33	13	16:01 (17)	15:49	14	15:07 (21)		
3	04:40		20:30 (1)	05:22		20:00 (20)	06:17	19:13 (16)	07:12	07:11	15:48 (17)	08:06	14:54 (21)					
	21:44	20	20:50 (1)	21:05	23	20:23 (20)	19:56	14	19:27 (16)	18:41	16:31	11	15:59 (17)	15:48	14	15:08 (21)		
4	04:40		20:31 (1)	05:24		19:59 (20)	06:19	19:13 (16)	07:14	07:13	15:49 (17)	08:08	14:53 (21)					
	21:43	19	20:50 (1)	21:03	24	20:23 (20)	19:54	12	19:25 (16)	18:39	16:29	7	15:56 (17)	15:47	15	15:08 (21)		
5	04:41		20:31 (1)	05:25		20:00 (20)	06:21	19:12 (16)	07:15	07:15	15:51 (17)	08:09	14:54 (21)					
	21:43	20	20:51 (1)	21:01	23	20:23 (20)	19:51	10	19:22 (16)	18:37	16:27	4	15:55 (17)	15:47	15	15:09 (21)		
6	04:42		20:31 (1)	05:27		20:01 (20)	06:23	19:12 (16)	07:17	07:17	15:48 (17)	08:10	14:54 (21)					
	21:42	20	20:51 (1)	20:59	22	20:23 (20)	19:49	8	19:20 (16)	18:34	16:25		15:46	15	15:09 (21)			
7	04:43		20:31 (1)	05:29		20:00 (20)	06:25	19:13 (16)	07:19	07:19	15:48 (17)	08:12	14:55 (21)					
	21:41	21	20:52 (1)	20:57	21	20:21 (20)	19:46	5	19:18 (16)	18:32	16:23		15:46	13	15:08 (21)			
8	04:44		20:31 (1)	05:31		20:01 (20)	06:26	19:14 (16)	07:21	07:21	15:48 (17)	08:13	14:55 (21)					
	21:41	21	20:52 (1)	20:55	20	20:21 (20)	19:44	2	19:16 (16)	18:29	16:21		15:45	12	15:07 (21)			
9	04:45		20:31 (1)	05:32		20:02 (20)	06:28	18:49 (18)	07:23	07:23	15:48 (17)	08:14	14:56 (21)					
	21:40	22	20:53 (1)	20:53	18	20:20 (20)	19:41	6	18:55 (18)	18:27	16:19		15:45	12	15:08 (21)			
10	04:46		20:31 (1)	05:34		20:03 (19)	06:30	18:47 (18)	07:25	07:25	15:46 (17)	08:16	14:56 (21)					
	21:39	22	20:53 (1)	20:51	15	20:18 (20)	19:39	11	18:58 (18)	18:24	16:18		15:45	11	15:07 (21)			
11	04:48		20:31 (1)	05:36		20:03 (19)	06:32	18:45 (18)	07:27	07:27	15:46 (17)	08:17	14:56 (21)					
	21:38	22	20:53 (1)	20:49	14	20:17 (19)	19:36	14	18:59 (18)	18:22	16:16		15:44	10	15:06 (21)			
12	04:49		20:31 (1)	05:38		20:03 (19)	06:34	18:44 (18)	07:28	07:29	15:47 (17)	08:18	14:57 (21)					
	21:37	22	20:53 (1)	20:47	14	20:17 (19)	19:34	16	19:00 (18)	18:20	16:14		15:44	9	15:06 (21)			
13	04:50		20:31 (1)	05:40		20:02 (19)	06:35	18:42 (18)	07:30	07:31	15:48 (17)	08:19	14:57 (21)					
	21:36	22	20:53 (1)	20:45	12	20:14 (19)	19:31	17	18:59 (18)	18:17	16:13		15:44	9	15:06 (21)			
14	04:51		20:30 (1)	05:41		20:02 (19)	06:37	18:42 (18)	07:32	07:33	15:48 (17)	08:20	14:57 (21)					
	21:35	23	20:53 (1)	20:43	10	20:12 (19)	19:29	17	18:59 (18)	18:15	16:11		15:44	8	15:05 (21)			
15	04:52		20:30 (1)	05:43		20:03 (19)	06:39	18:42 (18)	07:34	07:35	15:48 (17)	08:21	14:58 (21)					
	21:34	23	20:53 (1)	20:40	8	20:11 (19)	19:26	16	18:58 (18)	18:12	16:09		15:44	7	15:05 (21)			
16	04:54		20:31 (1)	05:45		20:03 (19)	06:41	18:42 (18)	07:36	07:36	15:46 (17)	08:22	14:59 (21)					
	21:33	23	20:54 (1)	20:38	5	20:08 (19)	19:24	14	18:56 (18)	18:10	16:08		15:44	6	15:05 (21)			
17	04:55		20:31 (1)	05:47		20:04 (19)	06:43	18:42 (18)	07:38	07:38	15:46 (17)	08:23	14:59 (21)					
	21:32	23	20:54 (1)	20:36	2	20:06 (19)	19:21	11	18:53 (18)	18:08	16:06		15:44	7	15:06 (21)			
18	04:57		20:31 (1)	05:49		06:44	06:44	18:43 (18)	07:40	07:40	15:46 (17)	08:24	15:00 (21)					
	21:30	22	20:53 (1)	20:34		19:19	19:19	7	18:50 (18)	18:05	16:05		15:44	6	15:06 (21)			
19	04:58		20:31 (1)	05:50		06:46	06:46	18:45 (18)	07:42	07:42	15:46 (17)	08:24	15:01 (21)					
	21:29	22	20:53 (1)	20:31		19:16	19:16	3	18:48 (18)	18:03	16:03		15:45	6	15:07 (21)			
20	04:59		20:32 (1)	05:52		06:48	06:48		07:44	07:44	15:46 (17)	08:25	15:01 (21)					
	21:28	21	20:53 (1)	20:29		19:14	19:14		18:01	18:01	16:02		15:45	5	15:06 (21)			
21	05:01		20:09 (20)	05:54		06:50	06:50		07:46	07:46	15:46 (17)	08:25	15:02 (21)					
	21:26	25	20:52 (1)	20:27		19:11	19:11		17:59	17:59	16:01		15:45	5	15:07 (21)			
22	05:02		20:07 (20)	05:56		06:52	06:52		07:48	07:48	15:46 (17)	08:26	15:02 (21)					
	21:25	29	20:52 (1)	20:25		19:09	19:09		17:56	17:56	15:59		15:46	5	15:07 (21)			
23	05:04		20:05 (20)	05:58		06:53	06:53		07:50	07:49	15:58		15:46	5	15:08 (21)			
	21:23	30	20:50 (1)	20:22		19:06	19:06		17:54	17:54	15:58		15:46	5	15:08 (21)			
24	05:06		20:03 (20)	05:59		06:55	06:55		07:51	07:51	15:58		15:46	5	15:08 (21)			
	21:22	30	20:48 (1)	20:20		19:04	19:04		17:52	17:52	15:57		15:47	5	15:09 (21)			
25	05:07		20:03 (20)	06:01		06:57	06:57		07:53	07:53	15:58		15:48	5	15:09 (21)			
	21:20	29	20:47 (1)	20:18		19:01	19:01		16:50	16:50	15:56		15:48	6	15:09 (21)			
26	05:09		20:02 (20)	06:03		06:59	06:59		07:55	07:55	15:58		15:49	6	15:09 (21)			
	21:19	28	20:45 (1)	20:15		18:59	18:59		16:47	16:47	15:53 (17)	07:55	14:56 (21)	15:48	6	15:09 (21)		
27	05:10		20:02 (20)	06:05		07:01	07:01		06:57	06:57	15:50 (17)	07:56	14:54 (21)	15:48	6	15:09 (21)		
	21:17	26	20:44 (1)	20:13		18:56	18:56		16:45	16:45	11	16:01 (17)	15:53	8	15:02 (21)	15:49	6	15:10 (21)
28	05:12		20:01 (20)	06:07		07:02	07:02		06:59	06:59	15:49 (17)	07:58	14:54 (21)	15:49	6	15:10 (21)		
	21:16	23	20:42 (1)	20:11		18:54	18:54		16:43	16:43	13	16:02 (17)	15:52	9	14:54 (21)	15:50	7	15:12 (21)
29	05:14		20:01 (20)	06:08		07:04	07:04		07:01	07:01	15:49 (17)	08:00	14:54 (21)	15:50	7	15:12 (21)		
	21:14	22	20:23 (20)	20:08		18:51	18:51		16:41	16:41	15	16:04 (17)	15:51	11	15:05 (21)	15:51	8	15:12 (21)
30	05:15		20:00 (20)	06:10		07:06	07:06		07:03	07:03	15:48 (17)	08:01	14:54 (21)	15:51	8	15:12 (21)		
	21:12	23	20:23 (20)	20:06		18:49	18:49		16:39	16:39	16	16:04 (17)	15:51	12	15:06 (21)	15:52	8	15:13 (21)
31	05:17		20:00 (20)	06:12		19:19 (16)	19:19		07:05	07:05	15:48 (17)	08:02	14:54 (21)	15:52	8	15:13 (21)		
	21:10	23	20:23 (20)	20:03	4	19:23 (16)	19:23		16:37	16:37	16	16:04 (17)	15:53	9	15:14 (21)			
Sonnenscheinstunden	514			461			383			328		257		231				
astr.max.mögl.Beschattung			713			283		204		77		93		277				
Red.Sonnenscheinwahrsch.			0.44			0.48		0.40		0.33		0.21		0.14				
Reduktion Betriebsdauer			0.90			0.90		0.90		0.90		0.90		0.90				
Reduktion Windrichtung			0.63			0.64		0.67		0.70		0.69		0.68				
Gesamte Reduktion			0.25			0.28		0.24		0.21		0.13		0.09				
Met.wahrsch.Beschattung			180			79		50		16		12		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)	Schattende	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

## SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AQ - IO43

### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Januar	Februar	März	April	Mai	Juni	
1   08:28	07:57	15:45 (17)   06:59	06:43	19:06 (16)   05:33	19:48 (19)   04:42	
15:54	16:46 15 16:00 (17)   17:43	19:42	10 19:16 (16)   20:39	17 20:05 (19)   21:29	37 20:47 (1)	
2   08:28	07:55	15:46 (17)   06:56	06:40	19:04 (16)   05:31	19:45 (20)   04:41	
15:55	16:48 13 15:59 (17)   17:45	19:44	13 19:17 (16)   20:40	20 20:05 (19)   21:31	32 20:48 (1)	
3   08:28	07:54	15:47 (17)   06:54	06:38	19:04 (16)   05:28	19:43 (20)   04:40	
15:57	16:50 11 15:58 (17)   17:47	19:46	15 19:19 (16)   20:42	21 20:04 (19)   21:32	27 20:48 (1)	
4   08:27	07:52	15:51 (17)   06:52	06:35	19:03 (16)   05:26	19:41 (20)   04:40	
15:58	16:52 5 15:56 (17)   17:49	19:48	16 19:19 (16)   20:44	22 20:03 (19)   21:33	27 20:48 (1)	
5   08:27	07:50	06:49	06:33	19:03 (16)   05:24	19:40 (20)   04:39	
15:59	16:54	17:51	19:50	16 19:19 (16)   20:46	24 20:04 (20)   21:34	28 20:48 (1)
6   08:27	07:48	06:47	06:30	19:03 (16)   05:22	19:39 (20)   04:38	
16:00	16:56	17:53	19:52	15 19:18 (16)   20:48	26 20:05 (20)   21:35	28 20:49 (1)
7   08:26	07:46	06:45	06:28	19:04 (16)   05:20	19:38 (20)   04:37	
16:02	16:58	17:55	19:54	13 19:17 (16)   20:50	27 20:05 (20)   21:36	28 20:49 (1)
8   08:26	07:44	06:42	06:26	19:06 (16)   05:18	19:37 (20)   04:37	
16:03	17:00	17:57	19:55	9 19:15 (16)   20:51	28 20:05 (20)   21:37	27 20:49 (1)
9   08:25	07:42	06:40	06:23	19:09 (16)   05:17	19:37 (20)   04:36	
16:05	17:03	17:59	19:57	1 19:10 (16)   20:53	30 20:07 (20)   21:38	28 20:49 (1)
10   08:24	07:40	06:37	06:21	05:15	19:37 (20)   04:36	
16:06	17:05	18:00	19:59	20:55	30 20:07 (20)   21:39	28 20:50 (1)
11   08:24	07:38	06:35	06:18	05:13	19:36 (20)   04:35	
16:08	17:07	18:02	20:01	20:57	31 20:07 (20)   21:40	28 20:50 (1)
12   08:23	07:36	06:32	06:16	05:11	19:36 (20)   04:35	
16:09	17:09	18:04	20:03	20:59	31 20:07 (20)   21:41	28 20:50 (1)
13   08:22	07:34	06:30	06:14	05:09	19:36 (20)   04:34	
16:11	17:11	18:06	20:05	21:00	31 20:07 (20)   21:41	28 20:50 (1)
14   08:21	07:32	06:27	06:11	05:07	19:36 (20)   04:34	
16:13	17:13	18:08	20:07	21:02	34 20:30 (23)   21:42	28 20:51 (1)
15   08:20	07:30	06:25	06:09	05:06	19:36 (20)   04:34	
16:14	17:15	18:10	20:09	21:04	36 20:32 (23)   21:43	28 20:51 (1)
16   08:19	07:28	06:23	06:06	05:04	19:36 (20)   04:34	
16:16	17:17	18:12	20:10	21:05	38 20:33 (23)   21:43	28 20:51 (1)
17   08:18	07:26	06:20	17:40 (18)   06:04	05:02	19:37 (20)   04:34	
16:18	17:19	18:14	7 17:47 (18)   20:12	21:07	39 20:35 (23)   21:44	27 20:51 (1)
18   08:17	07:24	06:18	17:37 (18)   06:02	05:01	19:36 (20)   04:33	
16:19	17:21	18:16	12 17:49 (18)   20:14	21:09	41 20:36 (23)   21:44	28 20:52 (1)
19   08:16	07:22	06:15	17:35 (18)   05:59	04:59	19:37 (20)   04:33	
16:21	17:23	18:18	16 17:51 (18)   20:16	21:10	43 20:38 (23)   21:45	28 20:52 (1)
20   08:15	15:45 (17)   07:19	06:13	17:34 (18)   05:57	04:58	19:37 (20)   04:34	
16:23	3 15:48 (17)   17:25	18:20	18 17:52 (18)   20:18	21:12	43 20:38 (23)   21:45	28 20:52 (1)
21   08:14	15:44 (17)   07:17	06:10	17:33 (18)   05:55	04:56	19:38 (20)   04:34	
16:25	6 15:50 (17)   17:27	18:22	19 17:52 (18)   20:20	21:14	43 20:40 (23)   21:45	28 20:52 (1)
22   08:12	15:44 (17)   07:15	06:08	17:32 (18)   05:52	04:55	19:38 (20)   04:34	
16:27	9 15:53 (17)   17:29	18:23	20 17:52 (18)   20:22	21:15	44 20:41 (23)   21:45	28 20:52 (1)
23   08:11	15:43 (17)   07:13	06:05	17:32 (18)   05:50	04:53	19:39 (20)   04:34	
16:29	11 15:54 (17)   17:31	18:25	20 17:52 (18)   20:24	21:17	44 20:42 (1)   21:45	28 20:53 (1)
24   08:10	15:42 (17)   07:10	06:03	17:32 (18)   05:48	04:52	19:39 (20)   04:34	
16:31	14 15:56 (17)   17:33	18:27	19 17:51 (18)   20:25	21:18	45 20:43 (1)   21:46	28 20:53 (1)
25   08:08	15:43 (17)   07:08	06:00	17:33 (18)   05:46	04:50	19:40 (20)   04:35	
16:32	16 15:59 (17)   17:35	18:29	18 17:51 (18)   20:27	7 19:58 (19)   21:20	46 20:44 (1)   21:46	27 20:52 (1)
26   08:07	15:43 (17)   07:06	05:58	17:33 (18)   05:43	04:49	19:41 (20)   04:35	
16:34	17 16:00 (17)   17:37	18:31	16 17:49 (18)   20:29	10 20:00 (19)   21:21	44 20:44 (1)   21:46	28 20:53 (1)
27   08:05	15:42 (17)   07:03	05:55	17:34 (18)   05:41	04:48	19:42 (20)   04:36	
16:36	18 16:00 (17)   17:39	18:33	14 17:48 (18)   20:31	13 20:02 (19)   21:23	44 20:45 (1)   21:45	28 20:53 (1)
28   08:04	15:43 (17)   07:01	05:53	17:35 (18)   05:39	04:47	19:43 (20)   04:36	
16:38	18 16:01 (17)   17:41	18:35	10 17:45 (18)   20:33	16 20:04 (19)   21:24	44 20:46 (1)   21:45	28 20:54 (1)
29   08:02	15:43 (17)	06:50	05:37	04:45	19:44 (20)   04:37	
16:40	18 16:01 (17)	19:37	20:35	17 20:05 (19)   21:26	42 20:46 (1)   21:45	28 20:53 (1)
30   08:00	15:44 (17)	06:48	19:10 (16)   05:35	04:44	19:45 (20)   04:37	
16:42	17 16:01 (17)	19:38	2 19:12 (16)   20:37	17 20:05 (19)   21:27	41 20:47 (1)   21:45	28 20:54 (1)
31   07:59	15:44 (17)	06:45	19:07 (16)	04:43	19:46 (20)	
16:44	16 16:00 (17)	19:40	6 19:13 (16)	21:28	39 20:47 (1)	
Sonneneinstrahlung	272	367	421	496	512	
astr.max.mögl.Beschattung	163	44	197	191	1088	848
Red.Sonneneinstrahlung	0.17	0.24	0.31	0.41	0.51	0.45
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90
Reduktion Windrichtung	0.69	0.69	0.68	0.65	0.63	0.62
Gesamte Reduktion	0.11	0.15	0.19	0.24	0.29	0.25
Met.wahrsch.Beschattung	18	7	38	46	317	216

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AQ - IO43

#### 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  
 342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

		Juli		August		September		Oktober		November		Dezember		
1	04:38		20:26 (1)	05:19		19:47 (20)	06:14		07:08	07:07			08:03	
	21:45	28	20:54 (1)	21:09	31	20:18 (20)	20:01		18:46	16:35			15:50	
2	04:39		20:26 (1)	05:20		19:46 (20)	06:16		07:10	07:09			08:05	
	21:44	28	20:54 (1)	21:07	31	20:17 (20)	19:59		18:44	16:33			15:49	
3	04:40		20:26 (1)	05:22		19:47 (20)	06:17		19:07 (16)	07:12			08:06	
	21:44	28	20:54 (1)	21:05	30	20:17 (20)	19:56	1	19:08 (16)	18:41			15:48	
4	04:40		20:27 (1)	05:24		19:47 (20)	06:19		19:03 (16)	07:14			08:08	
	21:43	28	20:55 (1)	21:03	29	20:16 (20)	19:54	9	19:12 (16)	18:39			15:47	
5	04:41		20:27 (1)	05:25		19:48 (20)	06:21		19:00 (16)	07:15			08:09	
	21:43	28	20:55 (1)	21:01	28	20:16 (20)	19:51	13	19:13 (16)	18:37			15:47	
6	04:42		20:27 (1)	05:27		19:48 (20)	06:23		18:59 (16)	07:17			08:10	
	21:42	28	20:55 (1)	20:59	27	20:15 (20)	19:49	15	19:14 (16)	18:34			15:46	
7	04:43		20:28 (1)	05:29		19:49 (20)	06:25		18:59 (16)	07:19		15:20 (17)	08:12	
	21:41	27	20:55 (1)	20:57	25	20:14 (20)	19:46	15	19:14 (16)	18:32	6	15:26 (17)	15:46	
8	04:44		20:28 (1)	05:31		19:50 (20)	06:26		18:58 (16)	07:21		15:18 (17)	08:13	
	21:41	28	20:56 (1)	20:55	23	20:13 (20)	19:44	16	19:14 (16)	18:29	11	15:29 (17)	15:45	
9	04:45		20:28 (1)	05:33		19:51 (20)	06:28		18:57 (16)	07:23		15:16 (17)	08:14	
	21:40	28	20:56 (1)	20:53	22	20:13 (19)	19:41	16	19:13 (16)	18:27	14	15:30 (17)	15:45	
10	04:46		20:29 (1)	05:34		19:52 (20)	06:30		18:57 (16)	07:25		15:16 (17)	08:16	
	21:39	27	20:56 (1)	20:51	21	20:13 (19)	19:39	13	19:10 (16)	18:24	15	15:31 (17)	15:45	
11	04:48		19:57 (20)	05:36		19:54 (20)	06:32		18:58 (16)	07:27		15:16 (17)	08:17	
	21:38	35	20:56 (1)	20:49	19	20:13 (19)	19:36	10	19:08 (16)	18:22	16	15:32 (17)	15:44	
12	04:49		19:55 (20)	05:38		19:56 (19)	06:34		18:59 (16)	07:28		15:15 (17)	08:18	
	21:37	38	20:55 (1)	20:47	18	20:14 (19)	19:34	7	19:06 (16)	18:20	18	15:33 (17)	15:44	
13	04:50		19:54 (20)	05:40		19:55 (19)	06:35		18:59 (16)	07:30		15:15 (17)	08:19	
	21:36	40	20:55 (1)	20:45	18	20:13 (19)	19:31	4	19:03 (16)	18:17	18	15:33 (17)	15:44	
14	04:51		19:53 (20)	05:41		19:56 (19)	06:37			07:32		15:15 (17)	08:20	
	21:35	41	20:55 (1)	20:43	16	20:12 (19)	19:29		18:15	16:11	18	15:33 (17)	15:44	
15	04:53		19:52 (20)	05:43		19:56 (19)	06:39		18:26 (18)	07:34		15:15 (17)	08:21	
	21:34	42	20:54 (1)	20:40	15	20:11 (19)	19:26	9	18:35 (18)	18:12	16:09	18	15:33 (17)	15:44
16	04:54		19:52 (20)	05:45		19:56 (19)	06:41		18:24 (18)	07:36		15:15 (17)	08:22	
	21:33	44	20:55 (1)	20:38	12	20:08 (19)	19:24	13	18:37 (18)	18:10	16:08	18	15:33 (17)	15:44
17	04:55		19:51 (20)	05:47		19:57 (19)	06:43		18:21 (18)	07:38		15:16 (17)	08:23	
	21:32	45	20:54 (1)	20:36	9	20:06 (19)	19:21	17	18:38 (18)	18:08	16:06	16	15:32 (17)	15:44
18	04:57		19:50 (20)	05:49		19:58 (19)	06:44		18:20 (18)	07:40		15:16 (17)	08:23	
	21:30	45	20:54 (1)	20:34	6	20:04 (19)	19:19	18	18:38 (18)	18:05	16:05	14	15:30 (17)	15:44
19	04:58		19:49 (20)	05:50		19:59 (19)	06:46		18:19 (18)	07:42		15:17 (17)	08:24	
	21:29	46	20:53 (1)	20:32	3	20:02 (19)	19:16	20	18:39 (18)	18:03	16:03	11	15:28 (17)	15:45
20	04:59		19:49 (20)	05:52			06:48		18:19 (18)	07:44		15:18 (17)	08:25	
	21:28	45	20:53 (1)	20:29			19:14	20	18:39 (18)	18:01	16:02	9	15:27 (17)	15:45
21	05:01		19:48 (20)	05:54			06:50		18:18 (18)	07:46		15:20 (17)	08:25	
	21:26	44	20:51 (1)	20:27			19:11	20	18:38 (18)	17:59	16:01	6	15:26 (17)	15:45
22	05:02		19:49 (20)	05:56			06:52		18:18 (18)	07:48		15:22 (17)	08:26	
	21:25	42	20:51 (23)	20:25			19:09	19	18:37 (18)	17:56	15:59	3	15:25 (17)	15:46
23	05:04		19:48 (20)	05:58			06:53		18:18 (18)	07:50		15:18 (17)	08:27	
	21:23	43	20:50 (23)	20:22			19:06	19	18:37 (18)	17:54	15:58		15:46	
24	05:06		19:47 (20)	05:59			06:55		18:19 (18)	07:51		15:17 (17)	08:27	
	21:22	42	20:48 (23)	20:20			19:04	16	18:35 (18)	17:52	15:57		15:47	
25	05:07		19:47 (20)	06:01			06:57		18:20 (18)	06:53	17:53		15:48	
	21:20	41	20:47 (23)	20:18			19:01	13	18:33 (18)	16:50	15:56		15:48	
26	05:09		19:46 (20)	06:03			06:59		18:21 (18)	06:55	17:55		15:48	
	21:19	41	20:45 (23)	20:15			18:59	9	18:30 (18)	16:48	15:54		15:48	
27	05:10		19:47 (20)	06:05			07:01		16:57	17:56			15:48	
	21:17	39	20:44 (23)	20:13			18:56		16:45	15:53			15:49	
28	05:12		19:46 (20)	06:07			07:03		16:59	17:58			15:48	
	21:16	37	20:42 (23)	20:11			18:54		16:43	15:52			15:50	
29	05:14		19:47 (20)	06:08			07:04		17:01	18:00			15:48	
	21:14	35	20:41 (23)	20:08			18:51		16:41	15:51			15:51	
30	05:15		19:46 (20)	06:10			07:06		17:03	18:01			15:48	
	21:12	32	20:39 (23)	20:06			18:49		16:39	15:51			15:52	
31	05:17		19:46 (20)	06:12					17:05				15:48	
	21:10	31	20:17 (20)	20:03					16:37				15:53	
	Sonnenscheinstunden		514	461		383			328	257			231	
	astr.max.mögl.Beschattung		1126		383		312				211			
	Red.Sonnenscheinwahrsch.		0.44		0.48		0.40				0.21			
	Reduktion Betriebsdauer		0.90		0.90		0.90				0.90			
	Reduktion Windrichtung		0.63		0.64		0.68				0.69			
	Gesamte Reduktion		0.25		0.28		0.25				0.13			
	Met.wahrsch.Beschattung		284		107		77				28			

**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)	
	Sonnennuntergang (SS:MM)			Zeitpunkt (SS:MM) Schattende		(WEA mit letztem Schatten)	



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: AR - IO44**

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28	15:14 (17) 07:57	06:59	06:43	05:33	19:55 (1) 04:42		
	15:54	2 15:16 (17) 16:46	17:43	19:42	20:39	13 20:09 (23) 21:29		
2	08:28	15:14 (17) 07:55	06:56	17:15 (18) 06:40	05:31	19:52 (1) 04:41		
	15:55	4 15:18 (17) 16:48	17:45	1 17:16 (18) 19:44	20:40	19 20:11 (23) 21:31		
3	08:28	15:14 (17) 07:54	06:54	17:10 (18) 06:38	05:28	19:50 (1) 04:40		
	15:57	4 15:18 (17) 16:50	17:47	10 17:20 (18) 19:46	20:42	22 20:12 (23) 21:32		
4	08:27	15:14 (17) 07:52	06:52	17:08 (18) 06:35	05:26	19:48 (1) 04:40		
	15:58	6 15:20 (17) 16:52	17:49	13 17:21 (18) 19:48	20:44	26 20:14 (23) 21:33		
5	08:27	15:14 (17) 07:50	06:49	17:07 (18) 06:33	05:24	19:47 (1) 04:39		
	15:59	7 15:21 (17) 16:54	17:51	17 17:24 (18) 19:50	20:46	28 20:15 (23) 21:34		
6	08:27	15:13 (17) 07:48	06:47	17:05 (18) 06:30	05:22	19:46 (1) 04:38		
	16:00	9 15:22 (17) 16:56	17:53	19 17:24 (18) 19:52	20:48	31 20:17 (23) 21:35		
7	08:26	15:14 (17) 07:46	06:45	17:05 (18) 06:28	19:01 (20)	05:20	19:45 (1) 04:37	
	16:02	11 15:25 (17) 16:58	17:55	19 17:24 (18) 19:54	11 19:12 (20)	20:50	32 20:17 (23) 21:36	
8	08:26	15:14 (17) 07:44	06:42	17:04 (18) 06:26	18:58 (20)	05:18	19:44 (1) 04:37	
	16:03	12 15:26 (17) 17:00	17:57	20 17:24 (18) 19:55	18 19:16 (20)	20:51	33 20:17 (23) 21:37	
9	08:25	15:14 (17) 07:42	06:40	17:05 (18) 06:23	18:55 (20)	05:17	19:45 (1) 04:36	
	16:05	13 15:27 (17) 17:03	17:59	19 17:24 (18) 19:57	22 19:17 (20)	20:53	32 20:17 (23) 21:38	
10	08:24	15:14 (17) 07:40	06:37	17:04 (18) 06:21	18:54 (20)	05:15	19:44 (1) 04:36	
	16:06	15 15:29 (17) 17:05	18:00	19 17:23 (18) 19:59	24 19:18 (20)	20:55	33 20:17 (23) 21:39	
11	08:24	15:14 (17) 07:38	06:35	17:05 (18) 06:18	18:52 (20)	05:13	19:43 (1) 04:35	
	16:08	17 15:31 (17) 17:07	18:02	18 17:23 (18) 20:01	33 19:33 (19)	20:57	32 20:15 (23) 21:40	
12	08:23	15:15 (17) 07:36	06:32	17:05 (18) 06:16	18:51 (20)	05:11	19:44 (1) 04:35	
	16:09	16 15:31 (17) 17:09	18:04	16 17:21 (18) 20:03	39 19:35 (19)	20:59	31 20:15 (23) 21:41	
13	08:22	15:15 (17) 07:34	06:30	17:07 (18) 06:14	18:50 (20)	05:09	19:43 (1) 04:34	
	16:11	17 15:32 (17) 17:11	18:06	13 17:20 (18) 20:05	43 19:37 (19)	21:00	30 20:13 (23) 21:41	
14	08:21	15:15 (17) 07:32	06:27	17:09 (18) 06:11	18:49 (20)	05:07	19:43 (1) 04:34	
	16:13	17 15:32 (17) 17:13	18:08	7 17:16 (18) 20:07	46 19:38 (19)	21:02	30 20:13 (1) 21:42	
15	08:20	15:16 (17) 07:30	06:25	06:09	18:48 (20)	05:06	19:44 (1) 04:34	
	16:14	17 15:33 (17) 17:15	18:10	20:09	50 19:40 (19)	21:04	29 20:13 (1) 21:43	
16	08:19	15:17 (17) 07:28	06:23	06:06	18:48 (20)	05:04	19:43 (1) 04:34	
	16:16	16 15:33 (17) 17:17	18:12	20:10	51 19:40 (19)	21:05	30 20:13 (1) 21:43	
17	08:18	15:18 (17) 07:26	06:20	06:04	18:47 (20)	05:02	19:44 (1) 04:34	
	16:18	15 15:33 (17) 17:19	18:14	20:12	51 19:39 (19)	21:07	29 20:13 (1) 21:44	
18	08:17	15:18 (17) 07:24	06:18	06:02	18:47 (20)	05:01	19:44 (1) 04:33	
	16:19	15 15:33 (17) 17:21	18:16	4 17:49 (16)	20:14	51 19:39 (19)	21:09	28 20:12 (1) 21:44
19	08:16	15:19 (17) 07:22	06:15	05:59	18:47 (20)	04:59	19:45 (1) 04:33	
	16:21	14 15:33 (17) 17:23	18:18	7 17:51 (16)	20:16	49 19:38 (19)	21:10	28 20:13 (1) 21:45
20	08:15	15:20 (17) 07:19	06:13	05:57	18:46 (20)	04:58	19:44 (1) 04:34	
	16:23	13 15:33 (17) 17:25	18:20	11 17:53 (16)	20:18	46 19:38 (19)	21:12	28 20:12 (1) 21:45
21	08:14	15:21 (17) 07:17	06:10	05:55	18:48 (20)	04:56	19:45 (1) 04:34	
	16:25	10 15:31 (17) 17:27	18:22	14 17:55 (16)	20:20	43 19:36 (19)	21:14	27 20:12 (1) 21:45
22	08:12	15:24 (17) 07:15	06:08	05:52	18:48 (20)	04:55	19:46 (1) 04:34	
	16:27	7 15:31 (17) 17:29	18:23	16 17:56 (16)	20:22	39 19:34 (19)	21:15	25 20:11 (1) 21:45
23	08:11	07:13	06:05	05:50	18:48 (20)	04:53	19:47 (1) 04:34	
	16:29	17:31	18:25	17 17:57 (16)	20:24	29 19:17 (20)	21:17	24 20:11 (1) 21:45
24	08:10	07:10	06:03	05:48	18:49 (20)	04:52	19:47 (1) 04:34	
	16:31	17:33	18:27	16 17:56 (16)	20:26	27 19:16 (20)	21:18	23 20:10 (1) 21:46
25	08:08	07:08	06:00	05:46	18:50 (20)	04:50	19:48 (1) 04:35	
	16:32	17:35	18:29	14 17:55 (16)	20:27	25 19:15 (20)	21:20	21 20:09 (1) 21:46
26	08:07	07:06	05:58	05:43	18:51 (20)	04:49	19:49 (1) 04:35	
	16:34	17:37	18:31	12 17:53 (16)	20:29	23 19:14 (20)	21:21	20 20:09 (1) 21:46
27	08:05	07:03	05:55	05:41	18:53 (20)	04:48	19:50 (1) 04:36	
	16:36	17:39	18:33	8 17:51 (16)	20:31	19 19:12 (20)	21:23	18 20:08 (1) 21:45
28	08:04	07:01	05:53	05:39	18:55 (20)	04:47	19:51 (1) 04:36	
	16:38	17:41	18:35	20:33	15 19:10 (20)	21:24	16 20:07 (1) 21:45	
29	08:02	06:50	05:37	05:37	18:58 (20)	04:45	19:53 (1) 04:37	
	16:40	19:37	20:35	8 19:06 (20)	21:26	13 20:06 (1) 21:45		
30	08:00	06:48	05:35	05:35	04:44	19:54 (1) 04:37		
	16:42	19:39	20:37	21:27	11 20:05 (1) 21:45			
31	07:59	06:45	05:33	04:43	19:56 (1)			
	16:44	19:40	21:28	7 20:03 (1) 21:45				
Sonnenscheinstunden	248	272	367	421	496	512		
astr.max.mögl.Beschattung	257		310	762	769			
Red.Sonnenscheinwahrsch.	0.17		0.31	0.41	0.51			
Reduktion Betriebsdauer	0.90		0.90	0.90	0.90			
Reduktion Windrichtung	0.68		0.68	0.66	0.64			
Gesamte Reduktion	0.11		0.19	0.24	0.29			
Met.wahrsch.Beschattung	27		60	186	225			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt: 180413\_Miltzow\_LAI\_Antrag III - VII

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

André Gefke / andre.gefke@i17-wind.de Berechnet: 13.06.2019 16:04/3.2.744

SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AR - IO44 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 342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Table with columns for months (Juli to Dezember) and rows for time slots (e.g., 04:38 to 21:10). Includes summary rows for 'Sonneneinstrahlung', 'astr. max. mögl. Beschattung', and 'Red. Sonneneinstrahlung'.

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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AS - IO45  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:48 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	20:08 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	19:47 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	21:08 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	19:47 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	20:07 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	19:47 (1) 04:39
	15:58	16:52	17:49	19:48	20:44	20:07 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:47 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	19:06 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	19:46 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	20:06 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	19:46 (1) 04:37
	16:02	16:58	17:55	19:54	20:50	17:20 (1) 21:36
8	08:26	07:44	06:42	06:26	05:18	19:49 (1) 04:37
	16:03	17:00	17:57	19:55	20:51	14:20 (1) 21:37
9	08:25	07:42	06:40	06:23	19:23 (20) 05:17	19:51 (1) 04:36
	16:05	17:02	17:59	19:57	6 19:29 (20) 20:53	12 20:03 (1) 21:38
10	08:24	07:40	06:37	06:21	19:21 (20) 05:15	19:52 (1) 04:36
	16:06	17:05	18:00	19:59	11 19:32 (20) 20:55	9 20:01 (1) 21:39
11	08:24	07:38	06:35	06:18	19:18 (20) 05:13	04:35
	16:08	17:07	18:02	20:01	15 19:33 (20) 20:57	21:40
12	08:23	07:36	06:32	06:16	19:17 (20) 05:11	04:35
	16:09	17:09	18:04	20:03	17 19:34 (20) 20:59	21:41
13	08:22	07:34	06:30	06:14	19:16 (20) 05:09	04:34
	16:11	17:11	18:06	20:05	19 19:35 (20) 21:00	21:41
14	08:21	07:32	06:27	06:11	19:15 (20) 05:07	04:34
	16:12	17:13	18:08	1 17:41 (18) 20:07	20 19:35 (20) 21:02	21:42
15	08:20	07:30	06:25	06:09	19:15 (20) 05:06	04:34
	16:14	17:15	18:10	5 17:43 (18) 20:09	20 19:35 (20) 21:04	21:43
16	08:19	07:28	06:22	06:06	19:15 (20) 05:04	04:34
	16:16	17:17	18:12	9 17:45 (18) 20:10	20 19:35 (20) 21:05	21:43
17	08:18	07:26	06:20	06:04	19:14 (20) 05:02	04:33
	16:18	17:19	18:14	11 17:47 (18) 20:12	20 19:34 (20) 21:07	21:44
18	08:17	07:24	06:18	06:02	19:15 (20) 05:01	04:33
	16:19	17:21	18:16	14 17:49 (18) 20:14	18 19:33 (20) 21:09	21:44
19	08:16	07:22	06:15	05:59	19:15 (20) 04:59	04:33
	16:21	17:23	18:18	14 17:50 (18) 20:16	18 19:33 (20) 21:10	21:44
20	08:15	07:19	06:13	05:57	19:16 (20) 04:57	04:33
	16:23	17:25	18:20	12 17:48 (18) 20:18	16 19:32 (20) 21:12	21:45
21	08:14	07:17	06:10	05:55	19:18 (20) 04:56	04:34
	16:25	17:27	18:21	10 17:47 (18) 20:20	12 19:30 (20) 21:14	21:45
22	08:12	07:15	06:08	05:52	19:19 (20) 04:55	04:34
	16:27	17:29	18:23	6 17:44 (18) 20:22	8 19:27 (20) 21:15	21:45
23	08:11	07:13	06:05	05:50	04:53	04:34
	16:29	17:31	18:25	20:24	21:17	21:45
24	08:10	07:10	06:03	05:48	04:52	04:34
	16:30	17:33	18:27	20:25	21:18	21:46
25	08:08	07:08	06:00	05:46	19:54 (1) 04:50	04:35
	16:32	17:35	18:29	20:27	4 19:58 (1) 21:20	21:46
26	08:07	07:06	05:58	05:43	19:52 (1) 04:49	04:35
	16:34	17:37	18:31	20:29	8 20:00 (1) 21:21	21:46
27	08:05	07:03	05:55	05:41	19:50 (1) 04:48	04:36
	16:36	17:39	18:33	20:31	12 20:02 (1) 21:23	21:45
28	08:04	07:01	05:53	05:39	19:49 (1) 04:47	04:36
	16:38	17:41	18:35	20:33	15 20:04 (1) 21:24	21:45
29	08:02	06:50	05:50	05:37	19:49 (1) 04:45	04:37
	16:40	19:37	20:35	16 20:05 (1) 21:26	21:45	
30	08:00	06:48	05:48	05:35	19:48 (1) 04:44	04:37
	16:42	19:38	20:37	19 20:07 (1) 21:27	21:45	
31	07:59	06:45	06:45	06:45	04:43	
	16:44	19:40	21:28	496	512	
Sonnenscheinstunden	248	272	367	421		
astr.max.mögl.Beschattung			82	294	170	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.65	0.64	
Gesamte Reduktion			0.19	0.24	0.29	
Met.wahrsch.Beschattung			16	70	50	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AS - IO45

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	19:18 (20)	07:08	07:07
	21:44	21:09	20:01	15 19:33 (20)	18:46	16:35
2	04:39	05:20	20:04 (1)	06:16	19:19 (20)	07:10
	21:44	21:07	5 20:09 (1)	19:59	11 19:30 (20)	18:44
3	04:40	05:22	20:02 (1)	06:17	19:21 (20)	07:12
	21:44	21:05	10 20:12 (1)	19:56	6 19:27 (20)	18:41
4	04:40	05:24	20:00 (1)	06:19	07:14	07:13
	21:43	21:03	13 20:13 (1)	19:54	18:39	16:29
5	04:41	05:25	19:59 (1)	06:21	07:15	07:15
	21:43	21:01	15 20:14 (1)	19:51	18:37	16:27
6	04:42	05:27	19:58 (1)	06:23	07:17	07:17
	21:42	20:59	17 20:15 (1)	19:49	18:34	16:25
7	04:43	05:29	19:57 (1)	06:25	07:19	07:19
	21:41	20:57	18 20:15 (1)	19:46	18:32	16:23
8	04:44	05:31	19:57 (1)	06:26	07:21	07:21
	21:41	20:55	19 20:16 (1)	19:44	18:29	16:21
9	04:45	05:32	19:57 (1)	06:28	07:23	07:23
	21:40	20:53	19 20:16 (1)	19:41	18:27	16:19
10	04:46	05:34	19:56 (1)	06:30	07:25	07:25
	21:39	20:51	20 20:16 (1)	19:39	18:24	16:18
11	04:48	05:36	19:56 (1)	06:32	07:27	07:27
	21:38	20:49	20 20:16 (1)	19:36	18:22	16:16
12	04:49	05:38	19:56 (1)	06:34	07:28	07:29
	21:37	20:47	20 20:16 (1)	19:34	18:20	16:14
13	04:50	05:40	19:56 (1)	06:35	07:30	07:31
	21:36	20:45	18 20:14 (1)	19:31	18:17	16:13
14	04:51	05:41	19:56 (1)	06:37	07:32	07:33
	21:35	20:43	16 20:12 (1)	19:29	18:15	16:11
15	04:52	05:43	19:57 (1)	06:39	07:34	07:35
	21:34	20:40	14 20:11 (1)	19:26	18:12	16:09
16	04:54	05:45	19:57 (1)	06:41	07:36	07:36
	21:33	20:38	11 20:08 (1)	19:24	18:10	16:08
17	04:55	05:47	19:59 (1)	06:43	07:38	07:38
	21:32	20:36	7 20:06 (1)	19:21	18:08	16:06
18	04:57	05:49	20:01 (1)	06:44	07:40	07:40
	21:30	20:34	3 20:04 (1)	19:19	18:05	16:05
19	04:58	05:50	06:46	07:42	07:42	08:24
	21:29	20:31	19:16	18:03	16:03	15:45
20	04:59	05:52	06:48	07:44	07:44	08:25
	21:28	20:29	19:14	18:01	16:02	15:45
21	05:01	05:54	19:24 (20)	06:50	18:25 (18)	07:46
	21:26	20:27	9 19:33 (20)	19:11	4 18:29 (18)	17:59
22	05:02	05:56	19:21 (20)	06:52	18:22 (18)	07:48
	21:25	20:25	13 19:34 (20)	19:09	10 18:32 (18)	17:56
23	05:04	05:58	19:20 (20)	06:53	18:21 (18)	07:49
	21:23	20:22	15 19:35 (20)	19:06	12 18:33 (18)	17:54
24	05:05	05:59	19:19 (20)	06:55	18:20 (18)	07:51
	21:22	20:20	17 19:36 (20)	19:04	13 18:33 (18)	17:52
25	05:07	06:01	19:18 (20)	06:57	18:19 (18)	06:53
	21:20	20:18	19 19:37 (20)	19:01	14 18:33 (18)	16:50
26	05:09	06:03	19:17 (20)	06:59	18:18 (18)	06:55
	21:19	20:15	19 19:36 (20)	18:59	12 18:30 (18)	16:47
27	05:10	06:05	19:17 (20)	07:01	18:18 (18)	06:57
	21:17	20:13	20 19:37 (20)	18:56	9 18:27 (18)	16:45
28	05:12	06:07	19:17 (20)	07:02	18:19 (18)	06:59
	21:15	20:11	20 19:37 (20)	18:54	6 18:25 (18)	16:43
29	05:14	06:08	19:16 (20)	07:04	18:20 (18)	07:01
	21:14	20:08	19 19:35 (20)	18:51	3 18:23 (18)	16:41
30	05:15	06:10	19:16 (20)	07:06	07:03	08:01
	21:12	20:06	19 19:35 (20)	18:49	16:39	15:51
31	05:17	06:12	19:17 (20)	07:05	07:05	08:28
	21:10	20:03	17 19:34 (20)	18:47	16:37	15:53
Sonnenscheinstunden	514	461	383		328	257
astr.max.mögl.Beschattung		432	115			
Red.Sonnenscheinwahrsch.		0.48	0.40			
Reduktion Betriebsdauer		0.90	0.90			
Reduktion Windrichtung		0.64	0.67			
Gesamte Reduktion		0.28	0.24			
Met.wahrsch.Beschattung		121	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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AT - IO46

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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28	07:57	06:59	06:43	05:33	04:42		20:22 (20)
	15:54	16:46	17:43	19:42	20:39	21:29	23	20:45 (20)
2	08:28	07:55	06:56	06:40	05:31	04:41		20:23 (20)
	15:55	16:48	17:45	19:44	20:40	21:31	25	20:56 (1)
3	08:28	07:54	06:54	06:38	05:28	04:40		20:22 (20)
	15:57	16:50	17:47	19:46	20:42	21:32	28	20:57 (1)
4	08:27	07:52	06:52	06:35	19:16 (18)	05:26		04:40
	15:58	16:52	17:49	19:48	19:20 (18)	20:44	4	21:33
	08:27	07:50	06:49	06:33	19:15 (18)	05:24		04:39
	15:59	16:54	17:51	19:50	8 19:23 (18)	20:46		21:34
6	08:27	07:48	06:47	06:30	19:13 (18)	05:22	20:16 (19)	04:38
	16:00	16:56	17:53	19:52	11 19:24 (18)	20:48	1	20:17 (19)
7	08:26	07:46	06:45	06:28	19:12 (18)	05:20	20:14 (19)	04:37
	16:02	16:58	17:55	19:54	14 19:26 (18)	20:50	4	20:18 (19)
8	08:26	07:44	06:42	06:26	19:12 (18)	05:18	20:13 (19)	04:37
	16:03	15:25 (21)	17:00	17:57	16 19:28 (18)	20:51	7	20:20 (19)
9	08:25	15:25 (21)	07:42	06:40	06:23	19:11 (18)	05:17	20:14 (19)
	16:05	2 15:27 (21)	17:03	17:59	17 19:28 (18)	20:53	8	20:22 (19)
10	08:24	15:24 (21)	07:40	06:37	06:21	19:11 (18)	05:15	20:13 (19)
	16:06	5 15:29 (21)	17:05	18:00	18:00	19:59	17	19:28 (18)
11	08:24	15:24 (21)	07:38	06:35	06:18	19:11 (18)	05:13	20:13 (19)
	16:08	7 15:31 (21)	17:07	18:02	20:01	15 19:26 (18)	20:57	12 20:25 (19)
12	08:23	15:24 (21)	07:36	06:32	06:16	19:12 (18)	05:11	20:13 (19)
	16:09	8 15:32 (21)	17:09	18:04	20:03	14 19:26 (18)	20:59	14 20:27 (19)
13	08:22	15:24 (21)	07:34	06:30	06:14	19:13 (18)	05:09	20:13 (19)
	16:11	10 15:34 (21)	17:11	18:06	20:05	12 19:37 (16)	21:00	14 20:27 (19)
14	08:21	15:25 (21)	07:32	06:27	06:11	19:14 (18)	05:07	20:13 (19)
	16:13	11 15:36 (21)	17:13	1 16:43 (17)	18:08	20:07	11 19:38 (16)	21:02
15	08:20	15:25 (21)	07:30	06:25	06:09	19:33 (16)	05:06	20:15 (19)
	16:14	13 15:38 (21)	17:15	5 16:45 (17)	18:10	20:09	7 19:40 (16)	21:04
16	08:19	15:25 (21)	07:28	16:39 (17)	06:23	06:06	19:33 (16)	05:04
	16:16	15 15:40 (21)	17:17	8 16:47 (17)	18:12	20:10	9 19:42 (16)	21:05
17	08:18	15:26 (21)	07:26	16:38 (17)	06:20	06:04	19:32 (16)	05:02
	16:18	16 15:42 (21)	17:19	12 16:50 (17)	18:14	20:12	12 19:44 (16)	21:07
18	08:17	15:26 (21)	07:24	16:37 (17)	06:18	06:02	19:32 (16)	05:01
	16:19	16 15:42 (21)	17:21	14 16:51 (17)	18:16	20:14	14 19:46 (16)	21:09
19	08:16	15:26 (21)	07:22	16:36 (17)	06:15	05:59	19:32 (16)	04:59
	16:21	16 15:42 (21)	17:23	17 16:53 (17)	18:18	20:16	13 19:45 (16)	21:10
20	08:15	15:26 (21)	07:19	16:37 (17)	06:13	05:57	19:33 (16)	04:58
	16:23	16 15:42 (21)	17:25	17 16:54 (17)	18:20	20:18	11 19:44 (16)	21:12
21	08:14	15:28 (21)	07:17	16:37 (17)	06:10	05:55	19:35 (16)	04:56
	16:25	14 15:42 (21)	17:27	17 16:54 (17)	18:22	20:20	7 19:42 (16)	21:14
22	08:12	15:29 (21)	07:15	16:37 (17)	06:08	05:52		20:24 (20)
	16:27	13 15:42 (21)	17:29	15 16:52 (17)	18:23	20:22	21:15	17 20:41 (20)
23	08:11	15:30 (21)	07:13	16:38 (17)	06:05	05:50	04:53	20:24 (20)
	16:29	11 15:41 (21)	17:31	14 16:52 (17)	18:25	20:24	21:17	18 20:42 (20)
24	08:10	15:31 (21)	07:10	16:40 (17)	06:03	05:48	04:52	20:22 (20)
	16:31	9 15:40 (21)	17:33	11 16:51 (17)	18:27	20:25	21:18	20 20:42 (20)
25	08:08	15:34 (21)	07:08	16:41 (17)	06:00	05:46	04:50	20:22 (20)
	16:32	5 15:39 (21)	17:35	6 16:47 (17)	18:29	20:27	21:20	20 20:42 (20)
26	08:07	07:06	05:58	05:43	04:49	04:49	20:22 (20)	20:42 (20)
	16:34	17:37	18:31	20:29	21:21	21 20:43 (20)	21:46	38 21:09 (1)
27	08:05	07:03	05:55	05:41	04:48	04:48	20:22 (20)	04:36
	16:36	17:39	18:33	20:31	21:23	21 20:43 (20)	21:45	38 21:09 (1)
28	08:04	07:01	05:53	05:39	04:47	04:47	20:22 (20)	04:36
	16:38	17:41	18:35	20:33	21:24	22 20:44 (20)	21:45	38 21:09 (1)
29	08:02		06:50	05:37	04:45	04:45	20:22 (20)	04:37
	16:40		19:37	20:35	21:26	22 20:44 (20)	21:45	36 21:08 (1)
30	08:00		06:48	05:35	04:44	04:44	20:22 (20)	04:37
	16:42		19:38	20:37	21:27	22 20:44 (20)	21:45	37 21:08 (1)
31	07:59		06:45		04:43	04:43	20:22 (20)	
	16:44		19:40		21:28	22 20:44 (20)		
Sonnenscheinstunden	248	272	367	421	496	512		
astr.max.mögl.Beschattung	188	137		212	356	1049		
Red.Sonnenscheinwahrsch.	0.17	0.24		0.41	0.51	0.45		
Reduktion Betriebsdauer	0.90	0.50		0.90	0.90	0.90		
Reduktion Windrichtung	0.68	0.70		0.65	0.63	0.62		
Gesamte Reduktion	0.11	0.15		0.24	0.29	0.25		
Met.wahrsch.Beschattung	20	21		51	103	266		

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AT - IO46  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	20:29 (20) 05:19	20:24 (19) 06:14	19:11 (18) 07:08	07:07	08:03	15:06 (21)
	21:44	37 21:09 (1) 21:09	13 20:37 (19) 20:01	15 19:26 (18) 18:46	16:35	15:50	7 15:13 (21)
2	04:39	20:28 (20) 05:20	20:23 (19) 06:16	19:09 (18) 07:10	07:09	08:05	15:08 (21)
	21:44	35 21:07 (1) 21:07	12 20:35 (19) 19:59	17 19:26 (18) 18:44	16:33	15:49	4 15:12 (21)
3	04:40	20:29 (20) 05:22	20:24 (19) 06:17	19:09 (18) 07:12	07:11	08:06	15:09 (21)
	21:44	34 21:07 (1) 21:05	9 20:33 (19) 19:56	17 19:26 (18) 18:41	16:31	15:48	3 15:12 (21)
4	04:40	20:29 (20) 05:24	20:23 (19) 06:19	19:09 (18) 07:14	07:13	08:08	15:09 (21)
	21:43	34 21:07 (1) 21:03	8 20:31 (19) 19:54	16 19:25 (18) 18:39	16:29	15:47	1 15:10 (21)
5	04:41	20:30 (20) 05:25	20:24 (19) 06:21	19:08 (18) 07:15	07:15	08:09	
	21:43	34 21:07 (1) 21:01	6 20:30 (19) 19:51	14 19:22 (18) 18:37	16:27	15:47	
6	04:42	20:29 (20) 05:27	20:25 (19) 06:23	19:09 (18) 07:17	07:17	08:10	
	21:42	32 21:06 (1) 20:59	3 20:28 (19) 19:49	11 19:20 (18) 18:34	16:25	15:46	
7	04:43	20:30 (20) 05:29	06:25	19:10 (18) 07:19	07:19	08:12	
	21:41	30 21:06 (1) 20:57	19:46	8 19:18 (18) 18:32	16:23	15:46	
8	04:44	20:30 (20) 05:31	06:26	19:11 (18) 07:21	07:21	08:13	
	21:41	30 21:05 (1) 20:55	19:44	5 19:16 (18) 18:29	16:21	15:45	
9	04:45	20:30 (20) 05:32	06:28	07:23	07:23	08:14	
	21:40	29 21:05 (1) 20:53	19:41	18:27	16:19	15:45	
10	04:46	20:30 (20) 05:34	06:30	07:25	07:25	08:16	
	21:39	26 21:04 (1) 20:51	19:39	18:24	16:18	15:45	
11	04:48	20:30 (20) 05:36	06:32	07:27	07:27	08:17	
	21:38	23 20:53 (20) 20:49	19:36	18:22	16:16	15:44	
12	04:49	20:30 (20) 05:38	06:34	07:28	07:29	08:18	
	21:37	23 20:53 (20) 20:47	19:34	18:20	16:14	15:44	
13	04:50	20:30 (20) 05:40	06:35	07:30	07:31	08:19	
	21:36	23 20:53 (20) 20:45	19:31	18:17	16:13	15:44	
14	04:51	20:30 (20) 05:41	06:37	07:32	07:33	08:20	
	21:35	23 20:53 (20) 20:43	19:29	18:15	16:11	15:44	
15	04:53	20:30 (20) 05:43	06:39	07:34	07:35	08:21	
	21:34	22 20:52 (20) 20:40	19:26	18:12	16:09	15:44	
16	04:54	20:31 (20) 05:45	06:41	07:36	07:36	08:22	
	21:33	22 20:53 (20) 20:38	19:24	18:10	16:08	15:44	
17	04:55	20:32 (20) 05:47	06:43	07:38	9 17:12 (17) 07:38	15:07 (21) 08:23	
	21:32	21 20:53 (20) 20:36	19:21	18:08	17:21 (17) 16:06	5 15:12 (21) 15:44	
18	04:57	20:32 (20) 05:49	06:44	07:40	17:10 (17) 07:40	15:05 (21) 08:23	
	21:30	20 20:52 (20) 20:34	19:19	18:05	17:22 (17) 16:05	9 15:14 (21) 15:44	
19	04:58	20:32 (20) 05:50	06:46	07:42	17:09 (17) 07:42	15:04 (21) 08:24	
	21:29	20 20:52 (20) 20:31	19:16	18:03	17:23 (17) 16:03	11 15:15 (21) 15:45	
20	04:59	20:33 (20) 05:52	06:48	07:44	17:08 (17) 07:44	15:03 (21) 08:25	
	21:28	19 20:52 (20) 20:29	19:14	18:01	17:24 (17) 16:02	13 15:16 (21) 15:45	
21	05:01	20:33 (20) 05:54	06:50	07:46	17:07 (17) 07:46	15:03 (21) 08:25	
	21:26	18 20:51 (20) 20:27	19:11	17:59	17:24 (17) 16:01	14 15:17 (21) 15:45	
22	05:02	20:35 (20) 05:56	19:39 (16) 06:52	07:48	17:07 (17) 07:48	15:03 (21) 08:26	
	21:25	16 20:51 (20) 20:25	7 19:46 (16) 19:09	17:56	17:24 (17) 15:59	16 15:19 (21) 15:46	
23	05:04	20:36 (20) 05:58	19:37 (16) 06:53	07:50	17:07 (17) 07:49	15:02 (21) 08:26	
	21:23	13 20:49 (20) 20:22	11 19:48 (16) 19:06	17:54	17:24 (17) 15:58	16 15:18 (21) 15:46	
24	05:06	20:37 (20) 05:59	19:36 (16) 06:55	07:51	17:07 (17) 07:51	15:03 (21) 08:27	
	21:22	10 20:47 (20) 20:20	13 19:49 (16) 19:04	17:52	17:21 (17) 15:57	16 15:19 (21) 15:47	
25	05:07	20:39 (20) 06:01	19:36 (16) 06:57	06:53	16:07 (17) 07:53	15:03 (21) 08:27	
	21:20	7 20:46 (20) 20:18	13 19:49 (16) 19:01	16:50	16:19 (17) 15:56	16 15:19 (21) 15:48	
26	05:09	20:28 (19) 06:03	19:34 (16) 06:59	06:55	16:08 (17) 07:55	15:03 (21) 08:28	
	21:19	5 20:33 (19) 20:15	12 19:46 (16) 18:59	16:47	8 16:16 (17) 15:54	15 15:18 (21) 15:48	
27	05:10	20:26 (19) 06:05	19:34 (16) 07:01	06:57	16:10 (17) 07:56	15:04 (21) 08:28	
	21:17	9 20:35 (19) 20:13	10 19:44 (16) 18:56	16:45	4 16:14 (17) 15:53	13 15:17 (21) 15:49	
28	05:12	20:25 (19) 06:07	19:35 (16) 07:02	06:59	07:58	15:05 (21) 08:28	
	21:15	11 20:36 (19) 20:11	7 19:42 (16) 18:54	16:43	15:52	11 15:16 (21) 15:50	
29	05:14	20:25 (19) 06:08	19:15 (18) 07:04	07:01	08:00	15:05 (21) 08:28	
	21:14	12 20:37 (19) 20:08	11 19:39 (16) 18:51	16:41	15:51	10 15:15 (21) 15:51	
30	05:15	20:24 (19) 06:10	19:13 (18) 07:06	07:03	08:01	15:06 (21) 08:28	
	21:12	13 20:37 (19) 20:06	12 19:37 (16) 18:49	16:39	15:51	9 15:15 (21) 15:52	
31	05:17	20:24 (19) 06:12	19:11 (18) 07:05	07:05	08:02	15:07 (21) 08:28	
	21:10	14 20:38 (19) 20:03	15 19:26 (18) 18:41	16:37		15:53	
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	665	162	103	140	174	15	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.62	0.64	0.66	0.70	0.68	0.68	
Gesamte Reduktion	0.25	0.28	0.24	0.21	0.13	0.09	
Met.wahrsch.Beschattung	166	46	25	29	22	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	Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	-------------------	----------------	--------------	---------------------------	----------------------------



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AU - IO47  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni								
1   08:28	07:57	15:49 (17)	06:59	06:43	19:15 (16)	05:33	19:53 (19)	04:42	19:50 (20)					
15:54	16:46	18 16:07 (17)	17:43	19:42	1 19:16 (16)	20:39	16 20:09 (19)	21:29	46 20:51 (1)					
2   08:28	07:55	15:49 (17)	06:56	06:40	19:12 (16)	05:31	19:53 (19)	04:41	19:51 (20)					
15:55	16:48	17 16:06 (17)	17:45	19:44	5 19:17 (16)	20:40	17 20:10 (19)	21:31	47 20:52 (1)					
3   08:28	07:54	15:50 (17)	06:54	06:38	19:10 (16)	05:28	19:52 (19)	04:40	19:52 (20)					
15:57	16:50	16 16:06 (17)	17:47	19:46	9 19:19 (16)	20:42	18 20:10 (19)	21:32	46 20:53 (1)					
4   08:27	07:52	15:52 (17)	06:52	06:35	19:09 (16)	05:26	19:52 (19)	04:40	19:52 (20)					
15:58	16:52	14 16:06 (17)	17:49	19:48	11 19:20 (16)	20:44	17 20:09 (19)	21:33	45 20:53 (1)					
5   08:27	07:50	15:53 (17)	06:49	06:33	19:08 (16)	05:24	19:53 (19)	04:39	19:53 (20)					
15:59	16:54	12 16:05 (17)	17:51	19:50	15 19:23 (16)	20:46	16 20:09 (19)	21:34	45 20:53 (1)					
6   08:27	07:48	15:55 (17)	06:47	06:30	19:07 (16)	05:22	19:53 (19)	04:38	19:54 (20)					
16:00	16:56	9 16:04 (17)	17:53	19:52	17 19:24 (16)	20:48	15 20:08 (19)	21:35	44 20:54 (1)					
7   08:26	07:46	06:45	06:28	06:28	19:08 (16)	05:20	19:52 (20)	04:37	19:54 (20)					
16:02	16:58	17:55	19:54	16 19:24 (16)	20:50	17 20:09 (20)	21:36	44 20:54 (1)						
8   08:26	07:44	06:42	06:26	06:26	19:08 (16)	05:18	19:50 (20)	04:37	19:56 (20)					
16:03	17:00	17:57	19:55	15 19:23 (16)	20:51	20 20:10 (20)	21:37	41 20:54 (1)						
9   08:25	07:42	06:40	06:23	06:23	19:08 (16)	05:17	19:49 (20)	04:36	19:56 (20)					
16:05	17:03	17:59	19:57	13 19:21 (16)	20:53	23 20:12 (20)	21:38	41 20:54 (1)						
10   08:24	07:40	06:37	06:21	06:21	19:10 (16)	05:15	19:48 (20)	04:36	19:58 (20)					
16:06	17:05	18:00	19:59	10 19:20 (16)	20:55	25 20:13 (20)	21:39	39 20:55 (1)						
11   08:24	07:38	06:35	06:18	06:18	19:11 (16)	05:13	19:47 (20)	04:35	19:59 (20)					
16:08	17:07	18:02	20:01	6 19:17 (16)	20:57	26 20:13 (20)	21:40	37 20:55 (1)						
12   08:23	07:36	06:32	06:16	06:16	05:11	19:47 (20)	04:35	19:59 (20)						
16:09	17:09	18:04	20:03	20:59	27 20:14 (20)	21:41	36 20:55 (1)	20:01 (20)						
13   08:22	07:34	06:30	06:14	06:14	05:09	19:46 (20)	04:34	20:01 (20)						
16:11	17:11	18:06	20:05	21:00	29 20:15 (20)	21:41	33 20:55 (1)	20:02 (20)						
14   08:21	07:32	06:27	06:11	06:11	05:07	19:46 (20)	04:34	20:02 (20)						
16:13	17:13	18:08	20:07	21:02	28 20:14 (20)	21:42	32 20:56 (1)	20:29 (1)						
15   08:20	07:30	06:25	06:09	06:09	05:06	19:46 (20)	04:34	20:29 (1)						
16:14	17:15	18:10	20:09	21:04	29 20:15 (20)	21:43	27 20:56 (1)	20:29 (1)						
16   08:19	07:28	06:23	06:06	06:06	05:04	19:45 (20)	04:34	20:29 (1)						
16:16	17:17	18:12	20:10	21:05	31 20:33 (23)	21:43	28 20:57 (1)	20:29 (1)						
17   08:18	07:26	06:20	06:04	06:04	05:02	19:45 (20)	04:34	20:29 (1)						
16:18	17:19	18:14	20:12	21:07	35 20:35 (23)	21:44	28 20:57 (1)	20:30 (1)						
18   08:17	07:24	06:18	06:02	06:02	05:01	19:45 (20)	04:33	20:30 (1)						
16:19	17:21	18:16	20:14	21:09	36 20:36 (23)	21:44	27 20:57 (1)	20:30 (1)						
19   08:16	07:22	06:15	05:59	05:59	04:59	19:45 (20)	04:33	20:30 (1)						
16:21	17:23	18:18	20:16	21:10	39 20:38 (23)	21:45	27 20:57 (1)	20:30 (1)						
20   08:15	07:19	06:13	05:57	05:57	04:58	19:45 (20)	04:34	20:30 (1)						
16:23	17:25	18:20	9 17:53 (18)	20:18	21:12	39 20:38 (23)	21:45	27 20:57 (1)						
21   08:14	07:17	06:10	05:55	05:55	04:56	19:45 (20)	04:34	20:30 (1)						
16:25	17:27	18:22	13 17:55 (18)	20:20	21:14	42 20:40 (23)	21:45	27 20:57 (1)						
22   08:12	07:15	06:08	05:52	05:52	04:55	19:46 (20)	04:34	20:30 (1)						
16:27	17:29	18:23	16 17:56 (18)	20:22	21:15	43 20:42 (23)	21:45	27 20:57 (1)						
23   08:11	07:13	06:05	05:50	05:50	04:53	19:46 (20)	04:34	20:31 (1)						
16:29	2 15:54 (17)	17:31	18:25	18 17:58 (18)	20:24	21:17	44 20:44 (23)	21:45	27 20:58 (1)					
24   08:10	07:10	06:03	05:48	05:48	04:52	19:46 (20)	04:34	20:31 (1)						
16:31	5 15:56 (17)	17:33	18:27	19 17:57 (18)	20:25	21:18	44 20:44 (23)	21:46	27 20:58 (1)					
25   08:08	07:08	06:00	05:46	05:46	04:50	19:46 (20)	04:35	20:31 (1)						
16:32	9 15:59 (17)	17:35	18:29	20 17:58 (18)	20:27	21:20	46 20:46 (1)	21:46	27 20:58 (1)					
26   08:07	07:06	05:58	05:43	05:43	04:49	19:59 (19)	04:49	19:47 (20)	04:35	20:31 (1)				
16:34	12 16:01 (17)	17:37	18:31	20 17:57 (18)	20:29	1 20:00 (19)	21:21	45 20:47 (1)	21:46	28 20:59 (1)				
27   08:05	07:03	05:55	05:41	05:41	04:48	19:56 (19)	04:48	19:47 (20)	04:36	20:31 (1)				
16:36	14 16:03 (17)	17:39	18:33	19 17:57 (18)	20:31	6 20:02 (19)	21:23	46 20:48 (1)	21:45	27 20:58 (1)				
28   08:04	07:01	05:53	05:39	05:39	04:47	19:55 (19)	04:47	19:48 (20)	04:36	20:06 (20)				
16:38	17 16:06 (17)	17:41	18:35	18 17:56 (18)	20:33	9 20:04 (19)	21:24	46 20:49 (1)	21:45	30 20:59 (1)				
29   08:02	07:00	05:50	05:37	05:37	04:46	19:54 (19)	04:45	19:48 (20)	04:37	20:04 (20)				
16:40	17 16:06 (17)	17:41	19:37	16 18:55 (18)	20:35	11 20:05 (19)	21:26	47 20:50 (1)	21:45	34 20:59 (1)				
30   08:00	06:58	05:48	05:35	05:35	04:44	19:53 (19)	04:44	19:49 (20)	04:37	20:04 (20)				
16:42	18 16:07 (17)	17:43	19:38	14 18:54 (18)	20:37	14 20:07 (19)	21:27	46 20:50 (1)	21:45	35 20:59 (1)				
31   07:59	06:57	05:47	05:34	05:34	04:43	19:49 (20)	04:43	19:49 (20)	04:37	20:04 (20)				
16:44	18 16:07 (17)	17:43	19:40	9 18:51 (18)	20:37	21:28	48 20:51 (1)	512	1029					
Sonnenscheinstunden   248	272	367	421	496	1000	512	1029	0.45	0.51	0.59	0.62	0.25	0.25	262
astr.max.mögl.Beschattung   112	86	191	159	1000	512	1029	0.45	0.51	0.59	0.62	0.25	0.25	262	
Red.Sonnenscheinwahrsch.   0.17	0.24	0.31	0.41	0.51	0.59	0.62	0.25	0.25	262					
Reduktion Betriebsdauer   0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Reduktion Windrichtung   0.70	0.70	0.68	0.66	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Gesamte Reduktion   0.11	0.15	0.19	0.24	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Met.wahrsch.Beschattung   12	13	37	39	291	291	291	291	291	291	291	291	291	291	291

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBSchattenrezeptor: AU - IO47

**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  
 342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38	20:03 (20)	05:19	19:58 (20)	06:14	19:11 (16)	07:08	07:07				08:03
	21:45	37 21:00 (1)	21:09	27 20:25 (20)	20:01	6 19:17 (16)	18:46	16:35				15:50
2	04:39	20:02 (20)	05:20	19:58 (20)	06:16	19:08 (16)	07:10	07:09				08:05
	21:44	39 20:59 (1)	21:07	25 20:23 (20)	19:59	10 19:18 (16)	18:44	16:33				15:49
3	04:40	20:02 (20)	05:22	19:59 (20)	06:17	19:06 (16)	07:12	07:11				08:06
	21:44	39 20:59 (1)	21:05	24 20:23 (20)	19:56	13 19:19 (16)	18:41	16:31				15:48
4	04:40	20:01 (20)	05:24	19:59 (20)	06:19	19:05 (16)	07:14	07:13			15:27 (17)	08:08
	21:43	42 21:00 (1)	21:03	22 20:21 (20)	19:54	15 19:20 (16)	18:39	16:29	2	15:29 (17)	15:47	
5	04:41	20:01 (20)	05:25	20:01 (20)	06:21	19:04 (16)	07:15	07:15			15:24 (17)	08:09
	21:43	42 21:00 (1)	21:01	19 20:20 (20)	19:51	16 19:20 (16)	18:37	16:27	10	15:34 (17)	15:47	
6	04:42	20:01 (20)	05:27	20:03 (20)	06:23	19:03 (16)	07:17	07:17			15:23 (17)	08:10
	21:42	43 21:00 (1)	20:59	16 20:19 (20)	19:49	17 19:20 (16)	18:34	16:25	12	15:35 (17)	15:46	
7	04:43	20:00 (20)	05:29	20:02 (19)	06:25	19:04 (16)	07:19	07:19			15:21 (17)	08:12
	21:41	45 21:00 (1)	20:57	15 20:17 (19)	19:46	14 19:18 (16)	18:32	16:23	15	15:36 (17)	15:46	
8	04:44	20:00 (20)	05:31	20:02 (19)	06:26	19:04 (16)	07:21	07:21			15:21 (17)	08:13
	21:41	44 21:00 (1)	20:55	16 20:18 (19)	19:44	12 19:16 (16)	18:29	16:21	16	15:37 (17)	15:45	
9	04:45	19:59 (20)	05:33	20:02 (19)	06:28	19:03 (16)	07:23	07:23			15:20 (17)	08:14
	21:40	46 21:00 (1)	20:53	17 20:19 (19)	19:41	10 19:13 (16)	18:27	16:19	17	15:37 (17)	15:45	
10	04:46	19:59 (20)	05:34	20:01 (19)	06:30	19:05 (16)	07:25	07:25			15:20 (17)	08:16
	21:39	46 21:00 (1)	20:51	17 20:18 (19)	19:39	5 19:10 (16)	18:24	16:18	17	15:37 (17)	15:45	
11	04:48	19:59 (20)	05:36	20:01 (19)	06:32	19:07 (16)	07:27	07:27			15:21 (17)	08:17
	21:38	46 21:00 (1)	20:49	17 20:18 (19)	19:36	1 19:08 (16)	18:22	16:16	18	15:39 (17)	15:44	
12	04:49	19:58 (20)	05:38	20:01 (19)	06:34	18:34 (18)	07:28	07:29			15:21 (17)	08:18
	21:37	47 20:59 (1)	20:47	16 20:17 (19)	19:34	9 18:43 (18)	18:20	16:14	18	15:39 (17)	15:44	
13	04:50	19:58 (20)	05:40	20:01 (19)	06:35	18:31 (18)	07:30	07:31			15:21 (17)	08:19
	21:36	46 20:59 (1)	20:45	13 20:14 (19)	19:31	13 18:44 (18)	18:17	16:13	17	15:38 (17)	15:44	
14	04:51	19:57 (20)	05:41	20:02 (19)	06:37	18:29 (18)	07:32	07:33			15:21 (17)	08:20
	21:35	47 20:58 (1)	20:43	10 20:12 (19)	19:29	16 18:45 (18)	18:15	16:11	16	15:37 (17)	15:44	
15	04:53	19:57 (20)	05:43	20:03 (19)	06:39	18:28 (18)	07:34	07:35			15:22 (17)	08:21
	21:34	46 20:58 (1)	20:40	8 20:11 (19)	19:26	18 18:46 (18)	18:12	16:09	13	15:35 (17)	15:44	
16	04:54	19:57 (20)	05:45	20:03 (19)	06:41	18:27 (18)	07:36	07:37			15:22 (17)	08:22
	21:33	46 20:58 (1)	20:38	5 20:08 (19)	19:24	19 18:46 (18)	18:10	16:08	12	15:34 (17)	15:44	
17	04:55	19:57 (20)	05:47		06:43	18:26 (18)	07:38	07:38			15:23 (17)	08:23
	21:32	44 20:57 (1)	20:36		19:21	20 18:46 (18)	18:08	16:06	9	15:32 (17)	15:44	
18	04:57	19:56 (20)	05:49		06:44	18:26 (18)	07:40	07:40			15:25 (17)	08:23
	21:30	46 20:56 (1)	20:34		19:19	19 18:45 (18)	18:05	16:05	5	15:30 (17)	15:44	
19	04:58	19:56 (20)	05:50		06:46	18:26 (18)	07:42	07:42			15:26 (17)	08:24
	21:29	44 20:54 (23)	20:32		19:16	19 18:45 (18)	18:03	16:03	2	15:28 (17)	15:45	
20	04:59	19:56 (20)	05:52		06:48	18:26 (18)	07:44	07:44			15:25 (17)	08:25
	21:28	45 20:54 (23)	20:29		19:14	18 18:44 (18)	18:01	16:02			15:21 (17)	08:25
21	05:01	19:56 (20)	05:54		06:50	18:26 (18)	07:46	07:46			15:21 (17)	08:25
	21:26	42 20:52 (23)	20:27		19:11	16 18:42 (18)	17:59	16:01			15:21 (17)	08:25
22	05:02	19:56 (20)	05:56		06:52	18:27 (18)	07:48	07:48			15:21 (17)	08:26
	21:25	42 20:52 (23)	20:25		19:09	13 18:40 (18)	17:56	15:59			15:21 (17)	08:26
23	05:04	19:56 (20)	05:58		06:53	18:28 (18)	07:50	07:49			15:21 (17)	08:27
	21:23	40 20:50 (23)	20:22		19:06	10 18:38 (18)	17:54	15:58			15:21 (17)	08:27
24	05:06	19:55 (20)	05:59		06:55	18:32 (18)	07:51	07:51			15:21 (17)	08:27
	21:22	40 20:48 (23)	20:20		19:04	3 18:35 (18)	17:52	15:57			15:21 (17)	08:27
25	05:07	19:56 (20)	06:01		06:57		06:53	07:53			15:21 (17)	08:27
	21:20	37 20:47 (23)	20:18		19:01		16:50	15:56			15:21 (17)	08:27
26	05:09	19:55 (20)	06:03		06:59		06:55	07:55			15:21 (17)	08:28
	21:19	35 20:45 (23)	20:15		18:59		16:48	15:54			15:21 (17)	08:28
27	05:10	19:56 (20)	06:05		07:01		06:57	07:56			15:21 (17)	08:28
	21:17	32 20:44 (23)	20:13		18:56		16:45	15:53			15:21 (17)	08:28
28	05:12	19:56 (20)	06:07		07:03		06:59	07:58			15:21 (17)	08:28
	21:16	29 20:25 (20)	20:11		18:54		16:43	15:52			15:21 (17)	08:28
29	05:14	19:56 (20)	06:08		07:04		07:01	08:00			15:21 (17)	08:28
	21:14	30 20:26 (20)	20:08		18:51		16:41	15:51			15:21 (17)	08:28
30	05:15	19:56 (20)	06:10		07:06		07:03	08:01			15:21 (17)	08:28
	21:12	29 20:25 (20)	20:06		18:49		16:39	15:51			15:21 (17)	08:28
31	05:17	19:57 (20)	06:12				07:05				15:21 (17)	08:28
	21:10	28 20:25 (20)	20:03				16:37				15:21 (17)	08:28
	Sonnenscheinstunden	514	461	383	312	328	257	199	231			
	astr.max.mögl.Beschattung	1264	267	312	199							
	Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.21							
	Reduktion Betriebsdauer	0.90	0.90	0.90	0.90							
	Reduktion Windrichtung	0.63	0.64	0.67	0.70							
	Gesamte Reduktion	0.25	0.28	0.25	0.13							
	Met.wahrsch.Beschattung	318	74	76	26							

**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		Schattende	
	Sonnennuntergang (SS:MM)			Zeitpunkt (SS:MM)		(WEA mit erstem Schatten)		(WEA mit letztem Schatten)	

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AV - IO48  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni				
1   08:28	07:57	15:50 (17)	06:59	06:43	18:43 (18)	05:33	19:57 (19)	04:42	19:53 (20)	
15:54	16:46	18 16:08 (17)	17:43	19:42	13 18:56 (18)	20:39	12 20:09 (19)	21:29	48 20:54 (1)	
2   08:28	07:55	15:50 (17)	06:56	06:40	18:45 (18)	05:31	19:57 (19)	04:41	19:55 (20)	
15:55	16:48	18 16:08 (17)	17:45	19:44	8 18:53 (18)	20:40	14 20:11 (19)	21:31	48 20:55 (1)	
3   08:28	07:54	15:51 (17)	06:54	06:38	19:16 (16)	05:28	19:56 (19)	04:40	19:55 (20)	
15:57	16:50	17 16:08 (17)	17:47	19:46	3 19:19 (16)	20:42	16 20:12 (19)	21:32	48 20:55 (1)	
4   08:27	07:52	15:52 (17)	06:52	06:35	19:13 (16)	05:26	19:56 (19)	04:40	19:55 (20)	
15:58	16:52	17 16:09 (17)	17:49	19:48	7 19:20 (16)	20:44	17 20:13 (19)	21:33	49 20:56 (1)	
5   08:27	07:50	15:53 (17)	06:49	06:33	19:12 (16)	05:24	19:55 (19)	04:39	19:55 (20)	
15:59	16:54	15 16:08 (17)	17:51	19:50	11 19:23 (16)	20:46	18 20:13 (19)	21:34	50 20:56 (1)	
6   08:27	07:48	15:55 (17)	06:47	06:30	19:11 (16)	05:22	19:55 (19)	04:38	19:56 (20)	
16:00	16:56	12 16:07 (17)	17:53	19:52	13 19:24 (16)	20:48	17 20:12 (19)	21:35	49 20:57 (1)	
7   08:26	07:46	15:55 (17)	06:45	06:28	19:11 (16)	05:20	19:56 (19)	04:37	19:56 (20)	
16:02	16:58	10 16:05 (17)	17:55	19:54	15 19:26 (16)	20:50	16 20:12 (19)	21:36	50 20:57 (1)	
8   08:26	07:44	16:02	06:42	06:26	19:11 (16)	05:18	19:56 (19)	04:37	19:57 (20)	
16:03	17:00	17:57	18:02	19:55	16 19:27 (16)	20:51	15 20:14 (19)	21:37	49 20:58 (1)	
9   08:25	07:42	16:03	06:40	06:23	19:10 (16)	05:17	19:57 (19)	04:36	19:57 (20)	
16:05	17:03	17:59	18:04	19:57	16 19:26 (16)	20:53	15 20:12 (19)	21:38	49 20:58 (1)	
10   08:24	07:40	16:04	06:37	06:21	19:11 (16)	05:15	19:58 (19)	04:36	19:58 (20)	
16:06	17:05	18:00	18:05	19:59	14 19:25 (16)	20:55	16 20:14 (19)	21:39	48 20:58 (1)	
11   08:24	07:38	16:05	06:35	06:18	19:11 (16)	05:13	19:57 (19)	04:35	19:59 (20)	
16:08	17:07	18:02	18:07	20:01	12 19:23 (16)	20:57	19 20:16 (19)	21:40	48 20:59 (1)	
12   08:23	07:36	16:06	06:32	06:16	19:13 (16)	05:11	19:57 (19)	04:35	19:58 (20)	
16:09	17:09	18:04	18:09	20:03	9 19:22 (16)	20:59	20 20:17 (19)	21:41	49 20:59 (1)	
13   08:22	07:34	16:07	06:30	06:14	19:14 (16)	05:09	19:55 (19)	04:34	19:59 (20)	
16:11	17:11	18:06	18:11	20:05	21:00	23 20:18 (19)	21:41	47 20:59 (1)		
14   08:21	07:32	16:08	06:27	06:11	19:14 (16)	05:07	19:54 (19)	04:34	20:00 (20)	
16:13	17:13	18:08	18:13	20:07	21:02	25 20:19 (19)	21:42	48 21:00 (1)		
15   08:20	07:30	16:09	06:25	06:09	19:15 (16)	05:06	19:54 (19)	04:34	20:00 (20)	
16:14	17:15	18:10	18:15	20:09	21:04	26 20:20 (19)	21:43	48 21:00 (1)		
16   08:19	07:28	16:10	06:23	06:06	19:16 (16)	05:04	19:53 (19)	04:34	20:01 (20)	
16:16	17:17	18:12	18:17	20:10	21:05	27 20:20 (19)	21:43	48 21:01 (1)		
17   08:18	07:26	16:11	06:20	06:04	19:17 (16)	05:02	19:53 (19)	04:34	20:01 (20)	
16:18	17:19	18:14	18:19	20:12	21:07	28 20:21 (19)	21:44	47 21:01 (1)		
18   08:17	07:24	16:12	06:18	06:02	19:18 (16)	05:01	19:52 (19)	04:33	20:01 (20)	
16:19	17:21	18:16	18:21	20:14	21:09	30 20:26 (19)	21:44	47 21:01 (1)		
19   08:16	07:22	16:13	06:15	05:59	19:19 (16)	04:59	19:52 (19)	04:33	20:02 (20)	
16:21	17:23	18:18	18:23	20:16	21:10	34 20:38 (19)	21:44	46 21:01 (1)		
20   08:15	07:19	16:14	06:13	05:57	19:20 (16)	04:58	19:51 (19)	04:34	20:02 (20)	
16:23	17:25	18:20	18:25	20:18	21:12	35 20:38 (19)	21:45	46 21:01 (1)		
21   08:14	07:17	16:15	06:10	05:55	17:51 (18)	04:56	19:51 (19)	04:34	20:02 (20)	
16:25	17:27	18:22	4 17:55 (18)	20:20	21:14	38 20:40 (19)	21:45	46 21:01 (1)		
22   08:12	07:15	16:16	06:08	05:52	17:46 (18)	04:55	19:52 (19)	04:34	20:02 (20)	
16:27	17:29	18:23	10 17:56 (18)	20:22	21:15	39 20:42 (19)	21:45	46 21:01 (1)		
23   08:11	07:13	16:17	06:05	05:50	17:45 (18)	04:53	19:52 (19)	04:34	20:03 (20)	
16:29	17:31	18:25	14 17:59 (18)	20:24	21:17	42 20:44 (19)	21:45	46 21:02 (1)		
24   08:10	07:10	16:18	06:03	05:48	17:43 (18)	04:52	19:51 (19)	04:34	20:02 (20)	
16:31	17:33	18:27	17 18:00 (18)	20:25	21:18	43 20:44 (19)	21:46	47 21:02 (1)		
25   08:08	07:08	16:19	06:00	05:46	17:42 (18)	04:50	19:52 (19)	04:35	20:02 (20)	
16:32	6 15:59 (17)	17:35	18:29	19 18:01 (18)	20:27	21:20	44 20:46 (19)	21:46	47 21:02 (1)	
26   08:07	07:06	16:20	05:58	05:43	17:41 (18)	04:49	19:52 (19)	04:35	20:03 (20)	
16:34	9 16:01 (17)	17:37	18:31	19 18:00 (18)	20:29	21:21	44 20:47 (19)	21:46	47 21:03 (1)	
27   08:05	07:03	16:21	05:55	05:41	17:41 (18)	04:48	19:52 (19)	04:36	20:02 (20)	
16:36	12 16:03 (17)	17:39	18:33	20 18:01 (18)	20:31	21:23	46 20:48 (19)	21:45	48 21:02 (1)	
28   08:04	07:01	16:22	05:53	05:39	17:40 (18)	04:47	19:52 (19)	04:36	20:03 (20)	
16:38	15 16:06 (17)	17:41	18:35	20 18:00 (18)	20:33	2 20:04 (19)	21:24	47 20:49 (1)	21:45	48 21:03 (1)
29   08:02	07:00	16:23	05:50	05:37	18:41 (18)	04:45	19:53 (19)	04:37	20:02 (20)	
16:40	17 16:08 (17)	17:49	19:37	19 19:00 (18)	20:35	5 20:05 (19)	21:26	47 20:51 (1)	21:45	48 21:03 (1)
30   08:00	07:00	16:24	05:48	05:35	18:41 (18)	04:44	19:53 (19)	04:37	20:03 (20)	
16:42	18 16:08 (17)	17:51	19:38	18 18:59 (18)	20:37	9 20:07 (19)	21:27	47 20:52 (1)	21:45	48 21:03 (1)
31   07:59	07:00	16:25	05:45	05:33	18:42 (18)	04:43	19:53 (19)	04:37	20:03 (20)	
16:44	18 16:08 (17)	17:52	19:40	15 18:57 (18)	20:38	21:28	48 20:53 (1)	512		
Sonnenscheinstunden   248	272	367	421	496	512	512	512	1433		
astr.max.mögl.Beschattung	97	107	175	153	908	908	908	1433		
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.51	0.51	0.45		
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Reduktion Windrichtung	0.70	0.70	0.68	0.66	0.63	0.63	0.63	0.63		
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29	0.29	0.29	0.26		
Met.wahrsch.Beschattung	11	16	34	38	264	264	264	366		

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM)	Schattenanfang	(WEA mit erstem Schatten)	Zeitpunkt (SS:MM)	Schattenende	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AV - IO48

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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember		
1	04:38	20:03 (20) 05:19	20:07 (20) 06:14	19:11 (16) 07:08	07:07	08:03		
	21:45	48 21:03 (1) 21:09	20:20:27 (20) 20:01	12 19:23 (16) 18:46	16:35	15:50		
2	04:39	20:02 (20) 05:20	20:08 (20) 06:16	19:09 (16) 07:10	07:09	08:05		
	21:44	49 21:03 (1) 21:07	17 20:25 (20) 19:59	14 19:23 (16) 18:44	16:33	15:49		
3	04:40	20:02 (20) 05:22	20:08 (19) 06:17	19:08 (16) 07:12	07:11	15:28 (17) 08:06		
	21:44	49 21:03 (1) 21:05	16 20:24 (20) 19:56	16 19:24 (16) 18:41	16:31	4 15:32 (17) 15:48		
4	04:40	20:02 (20) 05:24	20:06 (19) 06:19	19:08 (16) 07:14	07:13	15:25 (17) 08:08		
	21:43	49 21:03 (1) 21:03	15 20:21 (19) 19:54	16 19:24 (16) 18:39	16:29	10 15:35 (17) 15:47		
5	04:41	20:02 (20) 05:25	20:06 (19) 06:21	19:07 (16) 07:15	07:15	15:24 (17) 08:09		
	21:43	50 21:03 (1) 21:01	16 20:22 (19) 19:51	15 19:22 (16) 18:37	16:27	13 15:37 (17) 15:47		
6	04:42	20:02 (20) 05:27	20:06 (19) 06:23	19:07 (16) 07:17	07:17	15:23 (17) 08:10		
	21:42	49 21:03 (1) 20:59	16 20:22 (19) 19:49	13 19:20 (16) 18:34	16:25	15 15:38 (17) 15:46		
7	04:43	20:02 (20) 05:29	20:05 (19) 06:25	19:07 (16) 07:19	07:19	15:22 (17) 08:12		
	21:41	49 21:03 (1) 20:57	17 20:22 (19) 19:46	11 19:18 (16) 18:32	16:23	17 15:39 (17) 15:46		
8	04:44	20:02 (20) 05:31	20:05 (19) 06:26	19:08 (16) 07:21	07:21	15:22 (17) 08:13		
	21:41	49 21:03 (1) 20:55	17 20:22 (19) 19:44	8 19:16 (16) 18:29	16:21	17 15:39 (17) 15:45		
9	04:45	20:02 (20) 05:33	20:05 (19) 06:28	19:09 (16) 07:23	07:23	15:21 (17) 08:14		
	21:40	49 21:03 (1) 20:53	17 20:22 (19) 19:41	4 19:13 (16) 18:27	16:20	18 15:39 (17) 15:45		
10	04:46	20:02 (20) 05:34	20:05 (19) 06:30	18:38 (18) 07:25	07:25	15:21 (17) 08:16		
	21:39	49 21:03 (1) 20:51	15 20:20 (19) 19:39	8 18:46 (18) 18:24	16:18	18 15:39 (17) 15:45		
11	04:48	20:02 (20) 05:36	20:05 (19) 06:32	18:36 (18) 07:27	07:27	15:22 (17) 08:17		
	21:38	47 21:02 (1) 20:49	13 20:18 (19) 19:36	12 18:48 (18) 18:22	16:16	18 15:40 (17) 15:44		
12	04:49	20:02 (20) 05:38	20:06 (19) 06:34	18:34 (18) 07:28	07:29	15:22 (17) 08:18		
	21:37	48 21:02 (1) 20:47	11 20:17 (19) 19:34	16 18:50 (18) 18:20	16:14	18 15:40 (17) 15:44		
13	04:50	20:01 (20) 05:40	20:06 (19) 06:35	18:32 (18) 07:30	07:31	15:23 (17) 08:19		
	21:36	48 21:01 (1) 20:45	8 20:14 (19) 19:31	17 18:49 (18) 18:17	16:13	16 15:39 (17) 15:44		
14	04:51	20:01 (20) 05:41	20:07 (19) 06:37	18:31 (18) 07:32	07:33	15:23 (17) 08:20		
	21:35	48 21:00 (1) 20:43	5 20:12 (19) 19:29	19 18:50 (18) 18:15	16:11	14 15:37 (17) 15:44		
15	04:53	20:01 (20) 05:43	20:10 (19) 06:39	18:31 (18) 07:34	07:35	15:24 (17) 08:21		
	21:34	47 20:59 (1) 20:40	1 20:11 (19) 19:26	19 18:50 (18) 18:12	16:09	11 15:35 (17) 15:44		
16	04:54	20:02 (20) 05:45	06:41	18:30 (18) 07:36	07:37	15:25 (17) 08:22		
	21:33	45 20:58 (23) 20:38	19:24	20 18:50 (18) 18:10	16:08	9 15:34 (17) 15:44		
17	04:55	20:01 (20) 05:47	06:43	18:29 (18) 07:38	07:38	15:26 (17) 08:23		
	21:32	46 20:57 (23) 20:36	19:21	20 18:49 (18) 18:08	16:06	6 15:32 (17) 15:44		
18	04:57	20:01 (20) 05:49	06:44	18:29 (18) 07:40	07:40	15:28 (17) 08:23		
	21:30	45 20:56 (23) 20:34	19:19	19 18:48 (18) 18:05	16:05	2 15:30 (17) 15:44		
19	04:58	20:01 (20) 05:50	06:46	18:30 (18) 07:42	07:42	15:28 (17) 08:24		
	21:29	43 20:54 (23) 20:32	19:16	18 18:48 (18) 18:03	16:03	15:45		
20	04:59	20:02 (20) 05:52	06:48	18:31 (18) 07:44	07:44	15:28 (17) 08:25		
	21:28	41 20:54 (23) 20:29	19:14	15 18:46 (18) 18:01	16:02	15:45		
21	05:01	20:01 (20) 05:54	06:50	18:31 (18) 07:46	07:46	15:28 (17) 08:25		14:38 (21)
	21:26	40 20:52 (23) 20:27	19:11	11 18:42 (18) 17:59	16:01	15:45	2	14:40 (21)
22	05:02	20:02 (20) 05:56	06:52	18:34 (18) 07:48	07:48	15:26 (17) 08:26		14:38 (21)
	21:25	39 20:52 (23) 20:25	19:09	6 18:40 (18) 17:56	15:59	15:46	2	14:40 (21)
23	05:04	20:02 (20) 05:58	06:53	07:50	07:49	15:27 (17) 08:27		14:39 (21)
	21:23	36 20:50 (23) 20:22	19:06	17:54	15:58	15:46	1	14:40 (21)
24	05:06	20:02 (20) 05:59	06:55	07:51	07:51	15:27 (17) 08:27		
	21:22	33 20:48 (23) 20:20	19:04	17:52	15:57	15:47		
25	05:07	20:03 (20) 06:01	06:57	06:53	07:53	15:27 (17) 08:27		
	21:20	31 20:47 (23) 20:18	19:01	16:50	15:56	15:48		
26	05:09	20:02 (20) 06:03	06:59	06:55	07:55	15:28 (17) 08:28		
	21:19	29 20:31 (20) 20:15	18:59	16:48	15:54	15:48		
27	05:10	20:03 (20) 06:05	07:01	06:57	07:56	15:28 (17) 08:28		
	21:17	28 20:31 (20) 20:13	18:56	16:45	15:53	15:49		
28	05:12	20:03 (20) 06:07	07:03	06:59	07:58	15:28 (17) 08:28		
	21:16	27 20:30 (20) 20:11	18:54	16:43	15:52	15:50		
29	05:14	20:04 (20) 06:08	07:04	07:01	08:00	15:28 (17) 08:28		
	21:14	26 20:30 (20) 20:08	18:51	16:41	15:51	15:51		
30	05:15	20:05 (20) 06:10	07:06	07:03	08:01	15:28 (17) 08:28		
	21:12	24 20:29 (20) 20:06	18:49	16:39	15:51	15:52		
31	05:17	20:06 (20) 06:12	9 19:13 (16)	07:05	07:05	15:28 (17) 08:28		
	21:10	22 20:28 (20) 20:03	9 19:22 (16)	16:37	15:53	15:53		
Sonnenscheinstunden	514	461	383	328	257	231		
astr. max. mögl. Beschattung	1283	213	309	400	206	5		
Red. Sonnenscheinwahrsch.	0.44	0.48	0.40	0.21	0.21	0.14		
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90		
Reduktion Windrichtung	0.63	0.64	0.67	0.70	0.70	0.67		
Gesamte Reduktion	0.25	0.28	0.24	0.13	0.13	0.08		
Met. wahrsch. Beschattung	323	59	76	27	27	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)	Minuten mit Schatten	Zeitpunkt (SS:MM)	Schattenanfang	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	-------------------	----------------	------------	---------------------------	----------------------------

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AW - IO49

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28	07:57	06:59	06:43	18:54 (16)	05:33	19:10 (20)	04:42
	15:54	16:46	17:43	19:42	19:03 (16)	20:39	19:38 (20)	21:29
2	08:28	07:55	06:56	06:40		05:31	19:11 (20)	04:41
	15:55	16:48	17:45	19:44		20:40	19:37 (20)	21:31
3	08:28	07:54	06:54	06:38		05:28	19:11 (20)	04:40
	15:57	16:50	17:47	19:46		20:42	19:36 (20)	21:32
4	08:27	07:52	06:52	06:35		05:26	19:12 (20)	04:40
	15:58	16:52	17:49	19:48		20:44	19:35 (20)	21:33
5	08:27	07:50	06:49	06:33		05:24	19:13 (20)	04:39
	15:59	16:54	17:51	19:50		20:46	20:15 (23)	21:34
6	08:27	07:48	06:47	06:30		05:22	19:14 (20)	04:38
	16:00	16:56	17:53	19:52		20:48	20:17 (23)	21:35
7	08:26	07:46	06:45	06:28		05:20	19:16 (20)	04:37
	16:02	16:58	17:55	19:54		20:50	20:18 (23)	21:36
8	08:26	07:44	06:42	06:26		05:18	19:18 (20)	04:37
	16:03	17:00	17:57	19:55		20:51	20:20 (23)	21:37
9	08:25	07:42	06:40	17:28 (18)	06:23	05:17	20:03 (1)	04:36
	16:05	17:03	17:59	17:32 (18)	19:57	20:53	19:20 (22)	21:38
10	08:24	07:40	06:37	17:24 (18)	06:21	05:15	20:01 (1)	04:36
	16:06	17:05	18:00	17:33 (18)	19:59	20:55	20:24 (23)	21:39
11	08:24	07:38	06:35	17:23 (18)	06:18	05:13	20:00 (1)	04:35
	16:08	17:07	18:02	17:36 (18)	20:01	20:57	20:25 (23)	21:40
12	08:23	07:36	06:32	17:21 (18)	06:16	05:11	20:00 (1)	04:35
	16:09	17:09	18:04	17:37 (18)	20:03	20:59	20:26 (23)	21:41
13	08:22	07:34	06:30	17:20 (18)	06:14	05:09	19:59 (1)	04:34
	16:11	17:11	18:06	17:38 (18)	20:05	21:00	20:25 (23)	21:41
14	08:21	15:34 (17)	07:32	17:19 (18)	06:11	05:07	19:58 (1)	04:34
	16:13	15:36 (17)	17:13	18:08	19:38 (18)	20:07	21:02	20:24 (23)
15	08:20	15:34 (17)	07:30	17:19 (18)	06:09	05:06	19:58 (1)	04:34
	16:14	15:38 (17)	17:15	18:10	19:38 (18)	20:09	21:04	20:25 (1)
16	08:19	15:34 (17)	07:28	17:19 (18)	06:06	19:22 (20)	05:04	19:58 (1)
	16:16	15:40 (17)	17:17	18:12	19:37 (18)	20:10	21:05	20:25 (1)
17	08:18	15:34 (17)	07:26	17:19 (18)	06:04	19:42 (19)	05:02	19:58 (1)
	16:18	15:42 (17)	17:19	18:14	19:37 (18)	20:12	21:07	20:25 (1)
18	08:17	15:33 (17)	07:24	17:19 (18)	06:02	19:44 (19)	05:01	19:57 (1)
	16:19	15:44 (17)	17:21	18:16	19:36 (18)	20:14	21:09	20:25 (1)
19	08:16	15:33 (17)	07:22	17:21 (18)	05:59	19:15 (20)	04:59	19:58 (1)
	16:21	15:46 (17)	17:23	18:18	17:21 (18)	20:16	21:10	20:25 (1)
20	08:15	15:32 (17)	07:19	17:22 (18)	05:57	19:48 (19)	04:58	19:57 (1)
	16:23	15:48 (17)	17:25	18:20	17:32 (18)	20:18	21:12	20:25 (1)
21	08:14	15:33 (17)	07:17	17:20	05:55	19:13 (20)	04:56	19:57 (1)
	16:25	15:50 (17)	17:27	18:22	20:20	37:19:50 (19)	21:14	20:25 (1)
22	08:12	15:34 (17)	07:15	17:20	05:52	19:11 (20)	04:55	19:58 (1)
	16:27	15:51 (17)	17:29	18:23	20:22	38:19:49 (19)	21:15	20:26 (1)
23	08:11	15:34 (17)	07:13	17:20	05:50	19:10 (20)	04:53	19:58 (1)
	16:29	15:50 (17)	17:31	18:25	17:59 (16)	20:24	39:19:49 (19)	21:17
24	08:10	15:34 (17)	07:10	17:20	05:48	19:10 (20)	04:52	19:58 (1)
	16:31	15:50 (17)	17:33	18:27	18:00 (16)	20:25	39:19:49 (19)	21:18
25	08:08	15:35 (17)	07:08	17:20	05:46	19:10 (20)	04:50	19:58 (1)
	16:32	15:51 (17)	17:35	18:29	18:02 (16)	20:27	38:19:48 (19)	21:20
26	08:07	15:35 (17)	07:06	17:20	05:43	19:09 (20)	04:49	19:59 (1)
	16:34	15:50 (17)	17:37	18:31	18:04 (16)	20:29	37:19:46 (19)	21:21
27	08:05	15:36 (17)	07:03	17:20	05:41	19:09 (20)	04:48	19:59 (1)
	16:36	15:49 (17)	17:39	18:33	18:06 (16)	20:31	35:19:44 (19)	21:23
28	08:04	15:38 (17)	07:01	17:20	05:39	19:09 (20)	04:47	20:00 (1)
	16:38	15:49 (17)	17:41	18:35	18:07 (16)	20:33	30:19:39 (20)	21:24
29	08:02	15:39 (17)	07:00	17:20	05:37	19:10 (20)	04:45	20:00 (1)
	16:40	15:48 (17)	17:40	18:34	19:07 (16)	20:35	29:19:39 (20)	21:26
30	08:00	15:43 (17)	06:58	17:20	05:35	19:10 (20)	04:44	20:01 (1)
	16:42	15:44 (17)	17:41	18:34	19:06 (16)	20:37	29:19:39 (20)	21:27
31	07:59	15:43 (17)	06:55	17:20	05:33	19:10 (20)	04:43	20:01 (1)
	16:44	15:44 (17)	17:42	18:35	19:04 (16)	20:39	21:28	20:23 (1)
	248	272	367	421		496		512
Sonnenscheinstunden								
astr.max.mögl.Beschattung	191		273		497	790		159
Red.Sonnenscheinwahrsch.	0.17		0.31		0.41	0.51		0.45
Reduktion Betriebsdauer	0.90		0.90		0.90	0.90		0.90
Reduktion Windrichtung	0.69		0.68		0.64	0.63		0.63
Gesamte Reduktion	0.11		0.19		0.24	0.29		0.26
Met.wahrsch.Beschattung	21		53		118	231		41

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)	Schatteneinfang	Schatteneinfang	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AW - IO49

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	20:17 (1)   05:19	20:11 (1)   06:14	07:08	18:00 (18)   07:07	08:03	
	21:45	4 20:21 (1)   21:09	25 20:36 (23)   20:01	18:46	18 18:18 (18)   16:35	15:50	
2	04:39	20:15 (1)   05:20	20:11 (1)   06:16	07:10	18:01 (18)   07:09	08:05	
	21:44	7 20:22 (1)   21:07	24 20:35 (23)   19:59	18:44	14 18:15 (18)   16:33	15:49	
3	04:40	20:14 (1)   05:22	20:12 (1)   06:17	07:12	18:01 (18)   07:11	08:06	
	21:44	10 20:24 (1)   21:05	21 20:33 (23)   19:56	18:41	11 18:12 (18)   16:31	15:48	
4	04:40	20:14 (1)   05:24	19:31 (20)   06:19	07:14	18:03 (18)   07:13	08:08	
	21:43	11 20:25 (1)   21:03	22 20:31 (23)   19:54	18:39	7 18:10 (18)   16:29	15:47	
5	04:41	20:13 (1)   05:25	19:27 (20)   06:21	07:15	18:00 (18)   07:15	08:09	
	21:43	13 20:26 (1)   21:01	27 20:30 (23)   19:51	18:37	15:27	15:47	
6	04:42	20:13 (1)   05:27	19:25 (20)   06:23	07:17	18:01 (18)   07:17	08:10	
	21:42	14 20:27 (1)   20:59	27 20:28 (23)   19:49	18:34	16:25	15:46	
7	04:43	20:13 (1)   05:29	19:23 (20)   06:25	07:19	18:01 (18)   07:19	08:12	
	21:41	15 20:28 (1)   20:57	23 20:26 (23)   19:46	18:32	16:23	15:46	
8	04:44	20:12 (1)   05:31	19:22 (20)   06:26	07:21	18:01 (18)   07:21	08:13	
	21:41	17 20:29 (1)   20:55	22 19:44 (20)   19:44	18:29	16:21	15:45	
9	04:45	20:12 (1)   05:32	19:21 (20)   06:28	07:23	18:01 (18)   07:23	08:14	
	21:40	18 20:30 (1)   20:53	24 19:45 (20)   19:41	18:27	16:19	15:45	
10	04:46	20:11 (1)   05:34	19:19 (20)   06:30	07:25	18:01 (18)   07:25	08:16	
	21:39	20 20:31 (1)   20:51	26 19:45 (20)   19:39	18:24	16:18	15:45	
11	04:48	20:11 (1)   05:36	19:19 (20)   06:32	07:27	18:01 (18)   07:27	08:17	
	21:38	20 20:31 (1)   20:49	27 19:46 (20)   19:36	8 18:47 (16)   18:22	16:16	15:44	
12	04:49	20:10 (1)   05:38	19:19 (20)   06:34	07:28	18:01 (18)   07:28	08:18	
	21:37	22 20:32 (1)   20:47	28 19:47 (20)   19:34	12 18:57 (16)   18:20	16:14	3 15:17 (17)   15:44	
13	04:50	20:10 (1)   05:40	19:17 (20)   06:35	07:30	18:43 (16)   07:30	08:19	
	21:36	22 20:32 (1)   20:45	29 19:46 (20)   19:31	14 18:57 (16)   18:17	16:13	9 15:20 (17)   15:44	
14	04:51	20:09 (1)   05:41	19:17 (20)   06:37	07:32	18:42 (16)   07:32	08:20	
	21:35	24 20:33 (1)   20:43	30 19:47 (20)   19:29	15 18:57 (16)   18:15	16:11	11 15:21 (17)   15:44	
15	04:52	20:09 (1)   05:43	19:17 (20)   06:39	07:34	18:41 (16)   07:34	08:21	
	21:34	24 20:33 (1)   20:40	30 19:47 (20)   19:26	16 18:57 (16)   18:12	16:09	13 15:22 (17)   15:44	
16	04:54	20:09 (1)   05:45	19:16 (20)   06:41	07:36	18:41 (16)   07:36	08:22	
	21:33	25 20:34 (1)   20:38	35 19:51 (19)   19:24	15 18:56 (16)   18:10	16:08	15 15:23 (17)   15:44	
17	04:55	20:09 (1)   05:47	19:16 (20)   06:43	07:38	18:40 (16)   07:38	08:23	
	21:32	25 20:34 (1)   20:36	37 19:53 (19)   19:21	13 18:53 (16)   18:08	16:06	16 15:24 (17)   15:44	
18	04:57	20:08 (1)   05:49	19:16 (20)   06:44	07:40	18:41 (16)   07:40	08:23	
	21:30	26 20:34 (1)   20:34	38 19:54 (19)   19:19	9 18:50 (16)   18:05	16:05	16 15:24 (17)   15:44	
19	04:58	20:08 (1)   05:50	19:16 (20)   06:46	07:42	18:42 (16)   07:42	08:24	
	21:29	26 20:34 (1)   20:32	38 19:54 (19)   19:16	6 18:48 (16)   18:03	16:03	16 15:24 (17)   15:45	
20	04:59	20:08 (1)   05:52	19:16 (20)   06:48	07:44	18:44 (16)   07:44	08:25	
	21:28	27 20:35 (1)   20:29	39 19:55 (19)   19:14	2 18:46 (16)   18:01	16:02	17 15:25 (17)   15:45	
21	05:01	20:08 (1)   05:54	19:17 (20)   06:50	07:46	18:01 (18)   07:46	08:25	
	21:26	27 20:35 (1)   20:27	38 19:55 (19)   19:11	17:59	16:01	17 15:26 (17)   15:45	
22	05:02	20:08 (1)   05:56	19:16 (20)   06:52	07:48	18:01 (18)   07:48	08:26	
	21:25	28 20:36 (1)   20:25	38 19:54 (19)   19:09	17:56	15:59	15 15:25 (17)   15:46	
23	05:04	20:08 (1)   05:58	19:17 (20)   06:53	07:50	18:07 (18)   07:50	08:27	
	21:23	28 20:36 (1)   20:22	36 19:53 (19)   19:06	9 18:16 (18)   17:54	15:58	13 15:23 (17)   15:46	
24	05:06	20:07 (1)   05:59	19:18 (20)   06:55	07:52	18:05 (18)   07:51	08:27	
	21:22	28 20:35 (1)   20:20	33 19:51 (19)   19:04	13 18:18 (18)   17:52	15:57	11 15:21 (17)   15:47	
25	05:07	20:08 (1)   06:01	19:20 (20)   06:57	07:54	18:03 (18)   06:53	08:27	
	21:20	28 20:36 (1)   20:18	29 19:49 (19)   19:01	16 18:19 (18)   16:50	15:56	9 15:20 (17)   15:48	
26	05:09	20:08 (1)   06:03	19:21 (20)   06:59	07:56	18:01 (18)   06:55	08:28	
	21:19	27 20:35 (1)   20:15	23 19:46 (19)   18:59	18 18:19 (18)   16:47	15:54	6 15:18 (17)   15:48	
27	05:10	20:08 (1)   06:05	19:24 (20)   07:01	07:58	18:01 (18)   06:57	08:28	
	21:17	28 20:36 (1)   20:13	13 19:44 (19)   18:56	18 18:19 (18)   16:45	15:53	4 15:17 (17)   15:49	
28	05:12	20:08 (1)   06:07	19:23 (20)   07:03	07:59	18:00 (18)   06:59	08:28	
	21:16	27 20:35 (1)   20:11	18:54	19 18:19 (18)   16:43	15:52	2 15:16 (17)   15:50	
29	05:14	20:09 (1)   06:08	19:24 (20)   07:04	08:00	18:00 (18)   07:01	08:28	
	21:14	26 20:35 (23)   20:08	18:51	19 18:19 (18)   16:41	15:51	15:51	
30	05:15	20:09 (1)   06:10	19:25 (20)   07:06	08:01	18:00 (18)   07:03	08:28	
	21:12	26 20:35 (23)   20:06	18:49	18 18:18 (18)   16:39	15:51	15:52	
31	05:17	20:10 (1)   06:12	19:26 (20)   07:07	08:02	18:01 (18)   07:05	08:28	
	21:10	26 20:36 (23)   20:03	18:47	16:37	328	257	15:53
	Sonnenscheinstunden	514	461	383	328	257	231
	astr.max.mögl.Beschattung	669	782	240	50	193	
	Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	
	Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
	Reduktion Windrichtung	0.63	0.64	0.68	0.68	0.69	
	Gesamte Reduktion	0.25	0.28	0.25	0.20	0.13	
	Met.wahrsch.Beschattung	170	218	59	10	25	

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AX - IO50

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28	07:57	06:59	06:43	05:33	19:03 (20)	04:42
	15:54	16:46	17:43	19:42	20:39	17	19:20 (20)
2	08:28	07:55	06:56	06:40	05:31	19:05 (20)	04:41
	15:55	16:48	17:45	19:44	20:40	14	20:11 (23)
3	08:28	07:54	06:54	06:38	05:28	19:09 (20)	04:40
	15:57	16:50	17:47	19:46	20:42	13	20:12 (23)
4	08:27	07:52	06:52	06:35	05:26	19:58 (1)	04:40
	15:58	16:52	17:49	19:48	20:44	16	20:14 (23)
5	08:27	07:50	06:49	17:20 (18)	06:33	19:56 (1)	04:39
	15:59	16:54	17:51	17:24 (18)	19:50	20:46	20:15 (23)
6	08:27	07:48	06:47	17:16 (18)	06:30	05:22	19:54 (1)
	16:00	16:56	17:53	17:25 (18)	19:52	20:48	20:17 (23)
7	08:26	15:23 (17)	07:46	17:14 (18)	06:28	05:20	19:53 (1)
	16:02	2 15:25 (17)	16:58	17:28 (18)	19:54	20:50	25 20:18 (23)
8	08:26	15:23 (17)	07:44	17:12 (18)	06:26	05:18	19:51 (1)
	16:03	3 15:26 (17)	17:00	17:29 (18)	19:55	20:51	29 20:20 (23)
9	08:25	15:22 (17)	07:42	17:12 (18)	06:23	05:17	19:51 (1)
	16:05	5 15:27 (17)	17:03	17:30 (18)	19:57	20:53	30 20:21 (23)
10	08:24	15:22 (17)	07:40	17:11 (18)	06:21	05:15	19:51 (1)
	16:06	7 15:29 (17)	17:05	17:30 (18)	19:59	20:55	30 20:21 (23)
11	08:24	15:22 (17)	07:38	17:11 (18)	06:18	19:08 (20)	05:13
	16:08	9 15:31 (17)	17:07	17:30 (18)	20:01	13 19:21 (20)	20:57
12	08:23	15:22 (17)	07:36	17:10 (18)	06:16	19:06 (20)	05:11
	16:09	10 15:32 (17)	17:09	17:29 (18)	20:03	18 19:24 (20)	20:59
13	08:22	15:22 (17)	07:34	17:11 (18)	06:14	19:04 (20)	05:09
	16:11	12 15:34 (17)	17:11	17:29 (18)	20:05	26 19:37 (19)	21:00
14	08:21	15:22 (17)	07:32	17:11 (18)	06:11	19:01 (20)	05:07
	16:13	14 15:36 (17)	17:13	17:27 (18)	20:07	34 19:38 (19)	21:02
15	08:20	15:22 (17)	07:30	17:12 (18)	06:09	19:00 (20)	05:06
	16:14	16 15:38 (17)	17:15	17:27 (18)	20:09	39 19:40 (19)	21:04
16	08:19	15:23 (17)	07:28	17:13 (18)	06:06	19:00 (20)	05:04
	16:16	16 15:39 (17)	17:17	17:24 (18)	20:10	42 19:42 (19)	21:05
17	08:18	15:23 (17)	07:26	17:17 (18)	06:04	18:58 (20)	05:02
	16:18	17 15:40 (17)	17:19	17:20 (18)	20:12	46 19:44 (19)	21:07
18	08:17	15:23 (17)	07:24	17:17 (18)	06:02	18:58 (20)	05:01
	16:19	17 15:40 (17)	17:21	18:16	20:14	46 19:44 (19)	21:09
19	08:16	15:24 (17)	07:22	18:16	20:16	47 18:57 (20)	04:59
	16:21	16 15:40 (17)	17:23	18:18	20:16	47 19:44 (19)	21:10
20	08:15	15:25 (17)	07:19	18:13	05:57	18:57 (20)	04:58
	16:23	16 15:41 (17)	17:25	18:20	20:18	47 19:44 (19)	21:12
21	08:14	15:25 (17)	07:17	18:22	05:55	18:57 (20)	04:56
	16:25	15 15:40 (17)	17:27	18:22	20:20	46 19:43 (19)	21:14
22	08:12	15:26 (17)	07:15	18:23	05:52	18:56 (20)	04:55
	16:27	14 15:40 (17)	17:29	18:23	20:22	45 19:41 (19)	21:15
23	08:11	15:27 (17)	07:13	18:25	05:50	18:56 (20)	04:53
	16:29	13 15:40 (17)	17:31	18:25	20:24	43 19:40 (19)	21:17
24	08:10	15:28 (17)	07:10	18:27	05:48	18:56 (20)	04:52
	16:31	10 15:38 (17)	17:33	18:27	20:26	39 19:38 (19)	21:18
25	08:08	15:30 (17)	07:08	18:29	05:46	18:57 (20)	04:50
	16:32	8 15:38 (17)	17:35	18:29	20:27	30 19:27 (20)	21:20
26	08:07	17:37	07:06	18:31	05:43	18:57 (20)	04:49
	16:34	17:37	18:31	18:00 (16)	20:29	29 19:26 (20)	21:21
27	08:05	17:37	07:03	18:00 (16)	05:41	18:58 (20)	04:48
	16:36	17:39	18:33	18:00 (16)	20:31	27 19:25 (20)	21:23
28	08:04	17:41	07:01	18:00 (16)	05:39	18:59 (20)	04:47
	16:38	17:41	18:35	17:58 (16)	20:33	25 19:24 (20)	21:24
29	08:02	17:41	06:50	18:47 (16)	05:37	19:00 (20)	04:45
	16:40	17:41	19:37	18:56 (16)	20:35	23 19:23 (20)	21:26
30	08:00	17:41	06:48	19:01 (20)	05:35	19:01 (20)	04:44
	16:42	17:41	19:38	20:37	21 19:22 (20)	21:27	18 20:14 (1)
31	07:59	17:41	06:45	19:40	05:33	04:43	19:57 (1)
	16:44	17:41	19:40	21:28	16 20:13 (1)	512	
Sonneneinstrahlung	248	272	367	421	496		
astr.max.mögl.Beschattung	220		298		686	754	
Red.Sonneneinstrahlung	0.17		0.31		0.41	0.51	0.45
Reduktion Betriebsdauer	0.90		0.90		0.90	0.90	0.90
Reduktion Windrichtung	0.68		0.68		0.65	0.64	0.63
Gesamte Reduktion	0.11		0.19		0.24	0.29	0.26
Met.wahrsch.Beschattung	24		57		165	220	10

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

## SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AX - IO50  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember		
1	04:38	05:19	20:01 (1)   06:14	19:08 (20)   07:08	17:50 (18)   07:07	08:03	15:04 (17)	
	21:45	21:09	20:31 (23)   20:01	19:21 (20)   18:46	18:09 (18)   16:35	15:50	9 15:13 (17)	
2	04:39	05:20	20:00 (1)   06:16		07:10	17:50 (18)   07:09	08:05	15:05 (17)
	21:44	21:07	20:30 (23)   19:59		18:44	19 18:09 (18)   16:33	15:49	7 15:12 (17)
3	04:40	05:22	20:01 (1)   06:17		07:12	17:49 (18)   07:11	08:06	15:06 (17)
	21:44	21:05	20:31 (23)   19:56		18:41	19 18:08 (18)   16:31	15:48	5 15:11 (17)
4	04:40	05:24	20:01 (1)   06:19		07:14	17:49 (18)   07:13	08:08	15:07 (17)
	21:43	21:03	20:31 (23)   19:54		18:39	18 18:07 (18)   16:29	15:47	3 15:10 (17)
5	04:41	05:25	20:02 (1)   06:21		07:15	17:49 (18)   07:15	08:09	15:08 (17)
	21:43	21:01	20:30 (23)   19:51		18:37	18 18:07 (18)   16:27	15:47	2 15:10 (17)
6	04:42	05:27	20:03 (1)   06:23		07:17	17:50 (18)   07:17	08:10	
	21:42	20:59	20:28 (23)   19:49		18:34	15 18:05 (18)   16:25	15:46	
7	04:43	05:29	20:04 (1)   06:25		07:19	17:51 (18)   07:19	08:12	
	21:41	20:57	20:26 (23)   19:46		18:32	11 18:02 (18)   16:23	15:46	
8	04:44	05:31	20:06 (1)   06:26		07:21	17:53 (18)   07:21	08:13	
	21:41	20:55	20:24 (23)   19:44		18:29	7 18:00 (18)   16:21	15:45	
9	04:45	05:32	20:08 (1)   06:28		07:23		08:14	
	21:40	20:16 (1)   20:53	15 20:23 (23)   19:41		18:27		15:45	
10	04:46	20:08 (1)   05:34	19:15 (20)   06:30		07:25		08:16	
	21:39	20:18 (1)   20:51	12 20:20 (23)   19:39		18:24		15:45	
11	04:48	20:07 (1)   05:36	19:12 (20)   06:32		07:27		08:17	
	21:38	20:20 (1)   20:49	15 19:27 (20)   19:36		18:22		15:44	
12	04:49	20:06 (1)   05:38	19:11 (20)   06:34		07:28		08:18	
	21:37	20:21 (1)   20:47	18 19:29 (20)   19:34		18:20		15:44	
13	04:50	20:05 (1)   05:40	19:08 (20)   06:35		07:30		08:19	
	21:36	20:22 (1)   20:45	22 19:30 (20)   19:31		18:17		15:44	
14	04:51	20:04 (1)   05:41	19:07 (20)   06:37		18:38 (16)   07:32		08:20	
	21:35	20:22 (1)   20:43	24 19:31 (20)   19:29	8	18:46 (16)   18:15		15:44	
15	04:52	20:03 (1)   05:43	19:06 (20)   06:39		18:36 (16)   07:34		08:21	
	21:34	20:23 (1)   20:40	26 19:32 (20)   19:26	12	18:48 (16)   18:12		15:44	
16	04:54	20:03 (1)   05:45	19:04 (20)   06:41		18:35 (16)   07:36		08:22	
	21:33	20:25 (1)   20:38	28 19:32 (20)   19:24	14	18:49 (16)   18:10		15:44	
17	04:55	20:03 (1)   05:47	19:04 (20)   06:43		18:33 (16)   07:38		08:23	
	21:32	20:25 (1)   20:36	29 19:33 (20)   19:21	15	18:48 (16)   18:08	8	15:11 (17)   15:44	
18	04:57	20:02 (1)   05:49	19:03 (20)   06:44		18:32 (16)   07:40		08:23	
	21:30	20:25 (1)   20:34	30 19:33 (20)   19:19	17	18:49 (16)   18:05	10	15:12 (17)   15:44	
19	04:58	20:01 (1)   05:50	19:02 (20)   06:46		18:32 (16)   07:42		08:24	
	21:29	20:26 (1)   20:32	40 19:44 (19)   19:16	16	18:48 (16)   18:03	13	15:14 (17)   15:45	
20	04:59	20:01 (1)   05:52	19:02 (20)   06:48		18:32 (16)   07:44		08:25	
	21:28	20:27 (1)   20:29	44 19:46 (19)   19:14	14	18:46 (16)   18:01		15:15 (17)   15:45	
21	05:01	20:01 (1)   05:54	19:02 (20)   06:50		18:32 (16)   07:46		08:25	
	21:26	20:27 (1)   20:27	45 19:47 (19)   19:11	10	18:42 (16)   17:59	14	15:16 (17)   15:45	
22	05:02	20:01 (1)   05:56	19:01 (20)   06:52		18:33 (16)   07:48		08:26	
	21:25	20:28 (1)   20:25	46 19:47 (19)   19:09	7	18:40 (16)   17:56	16	15:17 (17)   15:46	
23	05:04	20:00 (1)   05:58	19:01 (20)   06:53		18:34 (16)   07:50		08:27	
	21:23	20:28 (1)   20:22	46 19:47 (19)   19:06	4	18:38 (16)   17:54	16	15:17 (17)   15:46	
24	05:06	20:00 (1)   05:59	19:01 (20)   06:55		07:51		08:27	
	21:22	20:28 (1)   20:20	47 19:48 (19)   19:04		17:52	17	15:17 (17)   15:47	
25	05:07	20:00 (1)   06:01	19:01 (20)   06:57		06:53		08:27	
	21:20	20:29 (1)   20:18	47 19:48 (19)   19:01		16:50	17	15:17 (17)   15:48	
26	05:09	19:59 (1)   06:03	19:01 (20)   06:59		06:55		08:28	
	21:19	20:28 (1)   20:15	45 19:46 (19)   18:59		16:47	16	15:17 (17)   15:48	
27	05:10	20:00 (1)   06:05	19:02 (20)   07:01		17:56 (18)   06:57		08:28	
	21:17	20:29 (1)   20:13	42 19:44 (19)   18:56	9	18:05 (18)   16:45	16	15:17 (17)   15:49	
28	05:12	19:59 (1)   06:07	19:02 (20)   07:03		17:53 (18)   06:59		08:28	
	21:16	20:28 (1)   20:11	39 19:42 (19)   18:54	14	18:07 (18)   16:43	15	15:16 (17)   15:50	
29	05:14	20:00 (1)   06:08	19:02 (20)   07:04		17:52 (18)   07:01		08:28	
	21:14	20:29 (1)   20:08	34 19:39 (19)   18:51	16	18:08 (18)   16:41	12	15:15 (17)   15:51	
30	05:15	19:59 (1)   06:10	19:04 (20)   07:06		17:51 (18)   07:03		08:28	
	21:12	20:28 (23)   20:06	26 19:37 (19)   18:49	18	18:09 (18)   16:39	10	15:14 (17)   15:52	
31	05:17	20:00 (1)   06:12	19:06 (20)   07:07		07:05		08:28	
	21:10	20:29 (23)   20:03	17 19:23 (20)   18:59		16:37		15:53	
	Sonnenscheinstunden   514	461	383	328	257	231		
	astr.max.mögl.Beschattung   529	950	187	126	194	26		
	Red.Sonnenscheinwahrsch.   0.44	0.48	0.40	0.33	0.21	0.14		
	Reduktion Betriebsdauer   0.90	0.90	0.90	0.90	0.90	0.90		
	Reduktion Windrichtung   0.63	0.65	0.68	0.68	0.68	0.68		
	Gesamte Reduktion   0.25	0.28	0.25	0.20	0.13	0.09		
	Met.wahrsch.Beschattung   134	269	46	26	25	2		

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	



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AY - IO51

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28	07:57	06:59	06:43	05:33	19:02 (20)	04:42	19:57 (1)
	15:54	16:46	17:43	19:42	20:39	13	19:15 (20)	21:29
2	08:28	07:55	06:56	06:40	05:31	19:05 (20)	04:41	19:59 (1)
	15:55	16:48	17:45	19:44	20:40	9	20:11 (23)	21:31
3	08:28	07:54	06:54	06:38	05:28	19:58 (1)	04:40	20:09 (1)
	15:57	16:50	17:47	19:46	20:42	14	20:12 (23)	21:32
4	08:27	07:52	06:52	17:17 (18)	06:35	05:26	19:55 (1)	04:40
	15:58	16:52	17:49	17:21 (18)	19:48	20:44	19	20:14 (23)
5	08:27	15:19 (17)	07:50	06:49	05:24	19:53 (1)	04:39	
	15:59	15:21 (17)	16:54	17:51	10	17:24 (18)	19:50	20:15 (23)
6	08:27	15:19 (17)	07:48	06:47	05:22	22	19:52 (1)	04:38
	16:00	3	15:22 (17)	16:56	17:53	14	17:25 (18)	19:52
7	08:26	15:19 (17)	07:46	06:45	05:20	20:48	25	20:17 (23)
	16:02	6	15:25 (17)	16:58	17:55	16	17:27 (18)	19:54
8	08:26	15:19 (17)	07:44	06:42	05:18	19:49 (1)	04:37	
	16:03	7	15:26 (17)	17:00	17:57	18	17:27 (18)	19:55
9	08:25	15:19 (17)	07:42	06:40	05:17	20:51	31	20:20 (23)
	16:05	8	15:27 (17)	17:03	17:59	19	17:28 (18)	19:57
10	08:24	15:19 (17)	07:40	06:37	05:15	19:06 (20)	05:15	19:49 (1)
	16:06	10	15:29 (17)	17:05	18:00	19	17:27 (18)	19:59
11	08:24	15:19 (17)	07:38	06:35	05:13	19:02 (20)	05:13	19:48 (1)
	16:08	12	15:31 (17)	17:07	18:02	20	17:28 (18)	20:01
12	08:23	15:19 (17)	07:36	06:32	05:11	19:21 (20)	05:11	19:48 (1)
	16:09	13	15:32 (17)	17:09	18:04	18	17:26 (18)	20:03
13	08:22	15:19 (17)	07:34	06:30	05:09	19:35 (19)	20:59	31
	16:11	15	15:34 (17)	17:11	18:06	17	17:26 (18)	20:05
14	08:21	15:19 (17)	07:32	06:27	05:07	19:37 (19)	21:00	30
	16:13	17	15:36 (17)	17:13	18:08	15	17:24 (18)	20:07
15	08:20	15:20 (17)	07:30	06:25	05:05	19:38 (19)	21:02	29
	16:14	16	15:36 (17)	17:15	18:10	12	17:23 (18)	20:09
16	08:19	15:20 (17)	07:28	06:23	05:04	19:40 (19)	21:04	29
	16:16	17	15:37 (17)	17:17	18:12	5	17:19 (18)	20:10
17	08:18	15:21 (17)	07:26	06:20	05:02	18:57 (20)	20:57	30
	16:18	17	15:38 (17)	17:19	18:14	48	19:42 (19)	21:07
18	08:17	15:21 (17)	07:24	06:18	05:01	18:54 (20)	20:56	29
	16:19	16	15:37 (17)	17:21	18:16	48	19:42 (19)	21:09
19	08:16	15:22 (17)	07:22	06:15	05:59	18:54 (20)	20:55	29
	16:21	15	15:37 (17)	17:23	18:18	48	19:42 (19)	21:10
20	08:15	15:23 (17)	07:19	06:13	05:57	18:54 (20)	20:58	29
	16:23	15	15:38 (17)	17:25	18:20	6	17:47 (16)	05:57
21	08:14	15:23 (17)	07:17	06:10	05:55	48	19:42 (19)	21:12
	16:25	14	15:37 (17)	17:27	18:22	9	17:46 (16)	05:55
22	08:12	15:25 (17)	07:15	06:08	05:52	18:54 (20)	20:56	28
	16:27	12	15:37 (17)	17:29	18:23	12	17:56 (16)	20:22
23	08:11	15:26 (17)	07:13	06:05	05:50	47	19:41 (19)	21:14
	16:29	10	15:36 (17)	17:31	18:25	15	17:59 (16)	20:24
24	08:10	15:27 (17)	07:10	06:03	05:48	42	19:38 (19)	21:17
	16:31	7	15:34 (17)	17:33	18:27	16	17:43 (16)	05:48
25	08:08	07:08	06:00	05:46	05:46	35	19:35 (19)	21:18
	16:32	17:35	18:29	16	17:43 (16)	29	19:23 (20)	21:20
26	08:07	07:06	05:58	05:43	05:43	28	18:55 (20)	04:49
	16:34	17:37	18:31	15	17:58 (16)	28	19:23 (20)	21:21
27	08:05	07:03	05:55	05:41	05:41	28	19:23 (20)	21:21
	16:36	17:39	18:33	13	17:57 (16)	26	19:22 (20)	21:23
28	08:04	07:01	05:53	05:39	05:39	22	20:14 (1)	21:45
	16:38	17:41	18:35	10	17:55 (16)	20:33	24	19:21 (20)
29	08:02	06:50	05:37	05:37	05:37	20	21:24	20
	16:40	19:37	4	18:52 (16)	20:35	21	19:19 (20)	21:26
30	08:00	06:48	05:35	05:35	05:35	19	20:13 (1)	21:45
	16:42	19:39	20:37	18	19:17 (20)	17	20:12 (1)	21:45
31	07:59	06:45	05:33	05:33	05:33	17	20:12 (1)	21:45
	16:44	19:40	20:37	18	19:17 (20)	17	20:12 (1)	21:45
Sonnenscheinstunden	248	272	367	421	496	15	20:11 (1)	512
astr.max.mögl.Beschattung	232		303		725		764	
Red.Sonnenscheinwahrsch.	0.17		0.31		0.41		0.51	0.45
Reduktion Betriebsdauer	0.90		0.90		0.90		0.90	0.90
Reduktion Windrichtung	0.68		0.68		0.65		0.64	0.64
Gesamte Reduktion	0.11		0.19		0.24		0.29	0.26
Met.wahrsch.Beschattung	25		58		175		223	8

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: AY - IO51  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	05:19	19:59 (1) 06:14	19:02 (20) 07:08	17:48 (18) 07:07	08:03	15:01 (17)
	21:45	21:09	20:29 (23) 20:01	19:21 (20) 18:46	18:06 (18) 16:35	15:50	12 15:13 (17)
2	04:39	05:20	19:58 (1) 06:16	19:04 (20) 07:10	17:47 (18) 07:09	08:05	15:02 (17)
	21:44	21:07	20:29 (23) 19:59	19:17 (20) 18:44	18:06 (18) 16:33	15:49	10 15:12 (17)
3	04:40	05:22	19:59 (1) 06:17	19:02 (20) 07:12	17:46 (18) 07:11	08:06	15:03 (17)
	21:44	21:05	20:30 (23) 19:56	18:41	19:18:05 (18) 16:31	15:48	8 15:11 (17)
4	04:40	05:24	19:59 (1) 06:19	19:04 (20) 07:14	17:46 (18) 07:13	08:08	15:03 (17)
	21:43	21:03	20:30 (23) 19:54	18:39	19:18:05 (18) 16:29	15:47	7 15:10 (17)
5	04:41	05:25	20:00 (1) 06:21	19:05 (20) 07:15	17:46 (18) 07:15	08:09	15:04 (17)
	21:43	21:01	20:30 (23) 19:51	18:37	19:18:05 (18) 16:27	15:47	6 15:10 (17)
6	04:42	05:27	20:01 (1) 06:23	19:06 (20) 07:17	17:46 (18) 07:17	08:10	15:05 (17)
	21:42	20:59	20:28 (23) 19:49	18:34	18:18:04 (18) 16:25	15:46	4 15:09 (17)
7	04:43	05:29	20:02 (1) 06:25	19:07 (20) 07:19	17:47 (18) 07:19	08:12	15:06 (17)
	21:41	20:57	20:26 (23) 19:46	18:32	15:18:02 (18) 16:23	15:46	2 15:08 (17)
8	04:44	05:31	20:03 (1) 06:26	19:08 (20) 07:21	17:48 (18) 07:21	08:13	15:07 (17)
	21:41	20:55	20:24 (23) 19:44	18:29	12 18:00 (18) 16:21	15:45	
9	04:45	05:32	20:05 (1) 06:28	19:09 (20) 07:23	17:50 (18) 07:23	08:14	15:08 (17)
	21:40	20:13 (1) 20:53	18 20:23 (23) 19:41	18:27	8 17:58 (18) 16:19	15:45	
10	04:46	05:34	20:07 (1) 06:30	19:10 (20) 07:25	17:51 (18) 07:25	08:16	15:09 (17)
	21:39	20:16 (1) 20:51	13 20:20 (23) 19:39	18:24	16:18	15:45	
11	04:48	05:36	19:12 (20) 06:32	19:12 (20) 07:27	17:53 (18) 07:27	08:17	15:10 (17)
	21:38	20:18 (1) 20:49	10 20:18 (23) 19:36	18:22	16:16	15:44	
12	04:49	05:38	19:09 (20) 06:34	19:09 (20) 07:28	17:54 (18) 07:28	08:18	15:11 (17)
	21:37	20:19 (1) 20:47	15 19:24 (20) 19:34	18:20	16:14	15:44	
13	04:50	05:40	19:07 (20) 06:35	19:10 (20) 07:30	17:55 (18) 07:30	08:19	15:12 (17)
	21:36	20:20 (1) 20:45	18 19:25 (20) 19:31	18:17	16:13	15:44	
14	04:51	05:41	19:05 (20) 06:37	19:11 (20) 07:32	17:56 (18) 07:32	08:20	15:13 (17)
	21:35	20:21 (1) 20:43	22 19:27 (20) 19:29	18:15	16:11	15:44	
15	04:52	05:43	19:04 (20) 06:39	19:12 (20) 07:34	17:57 (18) 07:34	08:21	15:14 (17)
	21:34	20:21 (1) 20:40	24 19:28 (20) 19:26	18:16	16:09	15:44	
16	04:54	05:45	19:02 (20) 06:41	19:13 (20) 07:36	17:58 (18) 07:36	08:22	15:15 (17)
	21:33	20:23 (1) 20:38	26 19:28 (20) 19:24	18:16	16:08	15:44	
17	04:55	05:47	19:01 (20) 06:43	19:14 (20) 07:38	17:59 (18) 07:38	08:23	15:16 (17)
	21:32	20:23 (1) 20:36	28 19:29 (20) 19:21	18:17	16:06	15:44	
18	04:57	05:49	19:01 (20) 06:44	19:15 (20) 07:40	17:59 (18) 07:40	08:24	15:17 (17)
	21:30	20:24 (1) 20:34	29 19:30 (20) 19:19	18:18	16:05	7 15:08 (17) 15:44	
19	04:58	05:50	18:59 (20) 06:46	19:16 (20) 07:42	18:00 (18) 07:42	15:00 (17) 08:24	15:45
	21:29	20:24 (1) 20:32	37 19:41 (19) 19:16	18:19	16:03	10 15:10 (17) 15:45	
20	04:59	05:52	18:59 (20) 06:48	19:17 (20) 07:44	18:01 (18) 07:44	15:00 (17) 08:25	15:46
	21:28	20:25 (1) 20:29	42 19:44 (19) 19:14	18:20	16:02	12 15:12 (17) 15:45	
21	05:01	05:54	18:59 (20) 06:50	19:18 (20) 07:46	18:02 (18) 07:46	15:01 (17) 08:25	15:46
	21:26	20:25 (1) 20:27	45 19:45 (19) 19:11	18:21	16:01	14 15:13 (17) 15:45	
22	05:02	05:56	18:57 (20) 06:52	19:19 (20) 07:48	18:03 (18) 07:48	15:02 (17) 08:26	15:47
	21:25	20:27 (1) 20:25	48 19:45 (19) 19:09	18:22	15:59	15 15:14 (17) 15:46	
23	05:04	05:58	18:57 (20) 06:53	19:20 (20) 07:50	18:04 (18) 07:50	15:03 (17) 08:27	15:48
	21:23	20:26 (1) 20:22	49 19:46 (19) 19:06	18:23	15:58	15 15:14 (17) 15:46	
24	05:06	05:59	18:58 (20) 06:55	19:21 (20) 07:51	18:05 (18) 07:51	15:04 (17) 08:28	15:49
	21:22	20:26 (1) 20:20	48 19:46 (19) 19:04	18:24	15:57	16 15:14 (17) 15:47	
25	05:07	06:01	18:58 (20) 06:57	19:22 (20) 07:52	18:06 (18) 07:52	15:05 (17) 08:29	15:50
	21:20	20:27 (1) 20:18	48 19:46 (19) 19:01	18:25	15:56	17 15:15 (17) 15:48	
26	05:09	06:03	18:57 (20) 06:59	19:23 (20) 07:54	18:07 (18) 07:54	15:06 (17) 08:30	15:51
	21:19	20:27 (1) 20:15	48 19:45 (19) 18:59	18:26	15:54	17 15:15 (17) 15:48	
27	05:10	06:05	18:58 (20) 07:01	19:24 (20) 07:56	18:08 (18) 07:56	15:07 (17) 08:31	15:52
	21:17	20:27 (1) 20:13	46 19:44 (19) 18:56	18:27	15:53	16 15:15 (17) 15:49	
28	05:12	06:07	18:58 (20) 07:03	19:25 (20) 07:58	18:09 (18) 07:58	15:08 (17) 08:32	15:53
	21:16	20:27 (1) 20:11	43 19:42 (19) 18:54	18:28	15:52	17 15:16 (17) 15:50	
29	05:14	06:08	18:58 (20) 07:04	19:26 (20) 07:59	18:10 (18) 07:59	15:09 (17) 08:33	15:54
	21:14	20:27 (1) 20:08	38 19:39 (19) 18:51	18:29	15:51	15 15:15 (17) 15:51	
30	05:15	06:10	18:59 (20) 07:06	19:27 (20) 08:00	18:11 (18) 08:00	15:10 (17) 08:34	15:55
	21:12	20:27 (23) 20:06	33 19:37 (19) 18:49	18:30	15:51	13 15:14 (17) 15:52	
31	05:17	06:12	19:00 (20) 07:07	19:28 (20) 08:01	18:12 (18) 08:01	15:11 (17) 08:35	15:56
	21:10	20:28 (23) 20:03	26 19:35 (19) 18:41	18:31	15:50	14 15:14 (17) 15:53	
	Sonneneinstrahlung	514	461	383	328	257	231
	astr.max.mögl.Beschattung	520	979	191	147	184	49
	Red.Sonneneinstrahlung	0.44	0.48	0.40	0.33	0.21	0.14
	Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90
	Reduktion Windrichtung	0.64	0.65	0.68	0.68	0.68	0.68
	Gesamte Reduktion	0.25	0.28	0.25	0.20	0.13	0.08
	Met.wahrsch.Beschattung	132	278	47	30	24	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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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

André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AZ - IO52

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1   08:28	15:04 (21)   07:57		06:59	06:43	19:01 (18)   05:33		04:42	20:09 (20)
15:54	12   15:16 (21)   16:46		17:43	19:42	15   19:16 (18)   20:39		21:29	37   20:54 (1)
2   08:28	15:03 (21)   07:55		06:56	06:40	19:00 (18)   05:31		04:41	20:11 (20)
15:35	14   15:17 (21)   16:48		17:45	19:44	17   19:17 (18)   20:40	2	20:09 (19)	37   20:56 (1)
3   08:28	15:04 (21)   07:54		06:54	06:38	19:00 (18)   05:28		20:07 (19)	20:11 (20)
15:57	14   15:18 (21)   16:50		17:47	19:46	17   19:17 (18)   20:42	5	20:12 (19)	21:32   39   20:57 (1)
4   08:27	15:05 (21)   07:52		06:52	06:35	18:59 (18)   05:26		20:06 (19)	20:11 (20)
15:58	15   15:20 (21)   16:52		17:49	19:48	18   19:17 (18)   20:44	8	20:14 (19)	21:33   40   20:58 (1)
5   08:27	15:05 (21)   07:50		06:49	06:33	18:59 (18)   05:24		20:06 (19)	20:11 (20)
15:59	16   15:21 (21)   16:54		17:51	19:50	17   19:16 (18)   20:46	9	20:15 (19)	21:34   40   20:58 (1)
6   08:27	15:05 (21)   07:48		06:47	06:30	18:59 (18)   05:22		20:05 (19)	20:12 (20)
16:00	16   15:21 (21)   16:56		17:53	19:52	16   19:15 (18)   20:48	12	20:17 (19)	21:35   41   21:00 (1)
7   08:26	15:06 (21)   07:46	16:24 (17)   06:45	06:28	19:00 (18)   05:20		20:05 (19)	04:37	20:12 (20)
16:02	16   15:22 (21)   16:58	3   16:27 (17)   17:55	19:54	14   19:14 (18)   20:50	13	20:18 (19)	21:36   41   21:00 (1)	
8   08:26	15:06 (21)   07:44	16:22 (17)   06:42	06:26	19:02 (18)   05:18		20:04 (19)	04:37	20:13 (20)
16:03	16   15:22 (21)   17:00	7   16:29 (17)   17:57	19:55	11   19:13 (18)   20:51	16	20:20 (19)	21:37   42   21:02 (1)	
9   08:25	15:07 (21)   07:42	16:21 (17)   06:40	06:23	19:04 (18)   05:17		20:05 (19)	04:36	20:13 (20)
16:05	15   15:22 (21)   17:03	11   16:32 (17)   17:59	19:57	9   19:30 (16)   20:53	15	20:20 (19)	21:38   41   21:01 (1)	
10   08:24	15:07 (21)   07:40	16:21 (17)   06:37	06:21	19:25 (16)   05:15		20:05 (19)	04:36	20:14 (20)
16:06	15   15:22 (21)   17:05	13   16:34 (17)   18:00	19:59	7   19:32 (16)   20:55	15	20:20 (19)	21:39   41   21:02 (1)	
11   08:24	15:08 (21)   07:38	16:20 (17)   06:35	06:18	19:23 (16)   05:13		20:06 (19)	04:35	20:14 (20)
16:08	14   15:22 (21)   17:07	16   16:36 (17)   18:02	20:01	10   19:33 (16)   20:57	13	20:19 (19)	21:40   41   21:03 (1)	
12   08:23	15:09 (21)   07:36	16:20 (17)   06:32	06:16	19:23 (16)   05:11		20:07 (19)	04:35	20:14 (20)
16:09	13   15:22 (21)   17:09	18   16:38 (17)   18:04	20:03	12   19:35 (16)   20:59	11	20:18 (19)	21:41   40   21:02 (1)	
13   08:22	15:10 (21)   07:34	16:21 (17)   06:30	06:14	19:23 (16)   05:09		20:08 (19)	04:34	20:15 (20)
16:11	12   15:22 (21)   17:11	17   16:38 (17)   18:06	20:05	14   19:37 (16)   21:00	17	20:25 (20)	21:41   41   21:03 (1)	
14   08:21	15:11 (21)   07:32	16:20 (17)   06:27	06:11	19:23 (16)   05:07		20:10 (19)	04:34	20:16 (20)
16:13	11   15:22 (21)   17:13	17   16:37 (17)   18:08	20:07	14   19:37 (16)   21:02	16	20:26 (20)	21:42   39   21:03 (1)	
15   08:20	15:12 (21)   07:30	16:21 (17)   06:25	06:09	19:23 (16)   05:06		20:13 (20)	04:34	20:16 (20)
16:14	10   15:22 (21)   17:15	16   16:37 (17)   18:10	20:09	13   19:36 (16)   21:04	15	20:28 (20)	21:43   40   21:04 (1)	
16   08:19	15:14 (21)   07:28	16:22 (17)   06:23	06:06	19:25 (16)   05:04		20:11 (20)	04:34	20:17 (20)
16:16	7   15:21 (21)   17:17	14   16:36 (17)   18:12	20:10	10   19:35 (16)   21:05	18	20:29 (20)	21:43   39   21:04 (1)	
17   08:18	15:17 (21)   07:26	16:23 (17)   06:20	06:04	19:26 (16)   05:02		20:11 (20)	04:34	20:17 (20)
16:18	2   15:19 (21)   17:19	12   16:35 (17)   18:14	20:12	6   19:32 (16)   21:07	19	20:30 (20)	21:44   38   21:04 (1)	
18   08:17	15:19 (21)   07:24	16:24 (17)   06:18	06:02	19:27 (16)   05:01		20:09 (20)	04:33	20:17 (20)
16:19	17:21	8   16:32 (17)   18:16	20:14	21:09	22	20:31 (20)	21:44	39   21:05 (1)
19   08:16	17:22	06:15	20:14	21:09	22	20:31 (20)	21:44	39   21:05 (1)
16:21	17:23	18:18	20:16	21:10	23	20:32 (20)	21:44	38   21:05 (1)
20   08:15	17:19	06:13	20:16	21:10	23	20:32 (20)	21:44	38   21:05 (1)
16:23	17:25	18:20	20:18	21:12	23	20:31 (20)	21:45	38   21:05 (1)
21   08:14	17:17	06:10	20:18	21:12	23	20:31 (20)	21:45	38   21:05 (1)
16:25	17:27	18:22	20:20	21:14	24	20:32 (20)	21:45	38   21:05 (1)
22   08:12	17:15	06:08	20:22	21:15	24	20:33 (20)	21:45	38   21:05 (1)
16:27	17:29	18:23	20:22	21:15	24	20:33 (20)	21:45	38   21:05 (1)
23   08:11	17:13	06:05	20:24	21:17	24	20:33 (20)	21:45	38   21:05 (1)
16:29	17:31	18:25	20:24	21:17	24	20:33 (20)	21:45	38   21:06 (1)
24   08:10	17:10	06:03	20:25	21:18	25	20:33 (20)	21:46	39   21:06 (1)
16:31	17:33	18:27	20:25	21:18	25	20:33 (20)	21:46	39   21:06 (1)
25   08:08	17:08	06:00	20:27	21:20	25	20:33 (20)	21:46	39   21:06 (1)
16:32	17:35	18:29	20:27	21:20	25	20:33 (20)	21:46	39   21:06 (1)
26   08:07	17:06	05:58	20:29	21:21	25	20:33 (20)	21:46	39   21:06 (1)
16:34	17:37	18:31	20:29	21:21	25	20:33 (20)	21:46	39   21:06 (1)
27   08:05	17:03	05:55	20:31	21:22	26	20:34 (20)	21:45	40   21:06 (1)
16:36	17:39	18:33	20:31	21:22	26	20:34 (20)	21:45	40   21:06 (1)
28   08:04	17:01	05:53	20:33	21:24	30	20:50 (1)	21:45	40   21:07 (1)
16:38	17:41	18:35	20:33	21:24	30	20:50 (1)	21:45	40   21:07 (1)
29   08:02		06:50	20:35	21:26	32	20:51 (1)	21:45	40   21:06 (1)
16:40		19:37	3   19:10 (18)   20:35	21:26	32	20:51 (1)	21:45	40   21:06 (1)
30   08:00		06:48	20:37	21:27	34	20:52 (1)	21:45	41   21:07 (1)
16:42		19:38	8   19:11 (18)   20:37	21:27	34	20:52 (1)	21:45	41   21:07 (1)
31   07:59		06:45	20:43	21:28	35	20:53 (1)		
16:44		19:40	11   19:13 (18)	21:28	35	20:53 (1)		
Sonnenscheinstunden	248	272	367	421	496	512		
astr.max.mögl.Beschattung	218	152	22	220	576		1184	
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51		0.45	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90		0.90	
Reduktion Windrichtung	0.68	0.70	0.67	0.66	0.63		0.62	
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29		0.25	
Met.wahrsch.Beschattung	23	23	4	54	168		302	

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	

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: AZ - IO52

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38	20:19 (20)	05:19		20:17 (19)	06:14	19:23 (16)	07:08	07:07	15:50 (17)	08:03	14:50 (21)
	21:44	21:07 (1)	21:09	12	20:29 (19)	20:01	19:33 (16)	18:46	16:35	13	16:03 (17)	15:50
2	04:39	20:18 (20)	05:20		20:16 (19)	06:16	19:23 (16)	07:10	07:09	15:51 (17)	08:05	14:50 (21)
	21:44	21:06 (1)	21:07	13	20:29 (19)	19:59	19:30 (16)	18:44	16:33	10	16:01 (17)	15:49
3	04:40	20:18 (20)	05:22		20:16 (19)	06:17	19:02 (18)	07:12	07:11	15:52 (17)	08:06	14:51 (21)
	21:44	21:07 (1)	21:05	14	20:30 (19)	19:56	19:28 (16)	18:41	16:31	7	15:59 (17)	15:48
4	04:40	20:18 (20)	05:24		20:15 (19)	06:19	18:59 (18)	07:14	07:13	15:54 (17)	08:08	14:51 (21)
	21:43	21:07 (1)	21:03	15	20:30 (19)	19:54	19:10 (18)	18:39	16:29	2	15:56 (17)	15:47
5	04:41	20:18 (20)	05:25		20:15 (19)	06:21	18:56 (18)	07:15	07:15		08:09	14:51 (21)
	21:43	21:07 (1)	21:01	15	20:30 (19)	19:51	19:10 (18)	18:37	16:21		15:47	15:07 (21)
6	04:42	20:18 (20)	05:27		20:15 (19)	06:23	18:55 (18)	07:17	07:17		08:10	14:51 (21)
	21:42	21:06 (1)	20:59	13	20:28 (19)	19:49	19:11 (18)	18:34	16:25		15:46	15:07 (21)
7	04:43	20:18 (20)	05:29		20:15 (19)	06:25	18:54 (18)	07:19	07:19		08:12	14:52 (21)
	21:41	21:06 (1)	20:57	11	20:26 (19)	19:46	19:11 (18)	18:32	16:23		15:46	15:08 (21)
8	04:44	20:18 (20)	05:31		20:15 (19)	06:26	18:54 (18)	07:21	07:21		08:13	14:52 (21)
	21:41	21:05 (1)	20:55	9	20:24 (19)	19:44	19:12 (18)	18:29	16:21		15:45	15:07 (21)
9	04:45	20:18 (20)	05:32		20:16 (19)	06:28	18:53 (18)	07:23	07:23		08:14	14:53 (21)
	21:40	21:05 (1)	20:53	7	20:23 (19)	19:41	19:11 (18)	18:27	16:19		15:45	15:08 (21)
10	04:46	20:18 (20)	05:34		20:16 (19)	06:30	18:53 (18)	07:25	07:25		08:16	14:53 (21)
	21:39	21:04 (1)	20:51	4	20:20 (19)	19:39	19:10 (18)	18:24	16:18		15:45	15:07 (21)
11	04:48	20:18 (20)	05:36			06:32	18:53 (18)	07:27	07:27		08:17	14:54 (21)
	21:38	21:03 (1)	20:49			19:36	19:08 (18)	18:22	16:16		15:44	15:06 (21)
12	04:49	20:18 (20)	05:38			06:34	18:54 (18)	07:28	07:29		08:18	14:54 (21)
	21:37	21:02 (1)	20:47			19:34	19:06 (18)	18:20	16:14		15:44	15:06 (21)
13	04:50	20:18 (20)	05:40			06:35	18:54 (18)	07:30	07:31		08:19	14:55 (21)
	21:36	21:01 (1)	20:45			19:31	19:03 (18)	18:17	16:13		15:44	15:06 (21)
14	04:51	20:17 (20)	05:41			06:37	18:57 (18)	07:32	07:33		08:20	14:55 (21)
	21:35	21:00 (1)	20:43			19:29	19:00 (18)	18:15	16:11		15:44	15:05 (21)
15	04:53	20:17 (20)	05:43			06:39		07:34	07:35		08:21	14:56 (21)
	21:34	20:59 (1)	20:40			19:26		18:12	16:09		15:44	15:05 (21)
16	04:54	20:18 (20)	05:45			06:41		07:36	07:36		08:22	14:56 (21)
	21:33	20:59 (1)	20:38			19:24		18:10	16:08		15:44	15:05 (21)
17	04:55	20:18 (20)	05:47			06:43		07:38	07:38		08:23	14:57 (21)
	21:32	20:43 (20)	20:36			19:21		18:08	16:06		15:44	15:06 (21)
18	04:57	20:18 (20)	05:49			06:44		07:40	07:40		08:23	14:58 (21)
	21:30	20:43 (20)	20:34			19:19		18:05	16:05		15:44	15:06 (21)
19	04:58	20:17 (20)	05:50			06:46		07:42	07:42		08:24	14:59 (21)
	21:29	20:42 (20)	20:32			19:16		18:03	16:03		15:45	15:07 (21)
20	04:59	20:18 (20)	05:52			06:48		07:44	07:44		08:25	14:58 (21)
	21:28	20:43 (20)	20:29			19:14		18:01	16:02		15:45	15:06 (21)
21	05:01	20:18 (20)	05:54			06:50		07:46	07:46		08:25	14:59 (21)
	21:26	20:43 (20)	20:27			19:11		17:59	16:01		15:45	15:07 (21)
22	05:02	20:19 (20)	05:56			06:52		07:48	07:48		08:26	14:59 (21)
	21:25	20:43 (20)	20:25			19:09		17:56	15:59		15:46	15:07 (21)
23	05:04	20:19 (20)	05:58			06:53		07:50	07:49		08:27	15:00 (21)
	21:23	20:42 (20)	20:22			19:06		17:54	15:58		15:46	15:08 (21)
24	05:06	20:19 (20)	05:59			06:55		07:51	07:51		08:27	15:00 (21)
	21:22	20:42 (20)	20:20			19:04		17:52	9	16:54 (17)	15:47	15:09 (21)
25	05:07	20:20 (20)	06:01			06:57		07:53	9	17:03 (17)	15:57	15:11 (21)
	21:20	20:42 (20)	20:18			19:01		16:50	13	16:05 (17)	15:56	15:09 (21)
26	05:09	20:20 (20)	06:03		19:28 (16)	06:59		06:55	15:51 (17)	07:55	14:52 (21)	15:01 (21)
	21:19	20:41 (20)	20:15	7	19:35 (16)	18:59		16:47	15	16:06 (17)	15:54	15:09 (21)
27	05:10	20:21 (20)	06:05		19:26 (16)	07:01		06:57	15:50 (17)	07:56	14:51 (21)	15:01 (21)
	21:17	20:40 (20)	20:13	11	19:37 (16)	18:56		16:45	16	16:06 (17)	15:53	15:10 (21)
28	05:12	20:22 (20)	06:07		19:25 (16)	07:02		06:59	15:49 (17)	07:58	14:51 (21)	15:02 (21)
	21:16	20:39 (20)	20:11	13	19:38 (16)	18:54		16:43	17	16:06 (17)	15:52	15:12 (21)
29	05:14	20:23 (20)	06:08		19:24 (16)	07:04		07:01	15:50 (17)	08:00	14:51 (21)	15:02 (21)
	21:14	20:38 (20)	20:08	14	19:38 (16)	18:51		16:41	17	16:07 (17)	15:51	15:12 (21)
30	05:15	20:19 (19)	06:10		19:23 (16)	07:06		07:03	15:50 (17)	08:01	14:51 (21)	15:02 (21)
	21:12	20:36 (20)	20:06	14	19:37 (16)	18:49		16:39	17	16:07 (17)	15:51	15:13 (21)
31	05:17	20:18 (19)	06:12		19:23 (16)	07:05		07:05	15:50 (17)		08:28	15:03 (21)
	21:10	20:34 (20)	20:03	12	19:35 (16)			16:37	16	16:06 (17)		15:53
Sonnenscheinstunden	514		461		383			328		257		231
astr.max.mögl.Beschattung	928		184		176			120		87		347
Red.Sonnenscheinwahrsch.	0.44		0.48		0.40			0.33		0.21		0.14
Reduktion Betriebsdauer	0.90		0.90		0.90			0.90		0.90		0.90
Reduktion Windrichtung	0.63		0.64		0.67			0.70		0.69		0.68
Gesamte Reduktion	0.25		0.28		0.24			0.21		0.13		0.09
Met.wahrsch.Beschattung	233		52		43			25		11		30

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: BA - IO53**  
**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  
 342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1   08:28	15:01 (21)   07:57		06:59	06:43	18:54 (18)   05:33	20:00 (19)   04:42	20:05 (20)	
15:54	15:16 (21)   16:46		17:43	19:42	19:11 (18)   20:39	9   20:09 (19)   21:29	34   20:52 (1)	
2   08:28	15:01 (21)   07:55		06:56	06:40	18:54 (18)   05:31	20:00 (19)   04:41	33   20:07 (20)	
15:55	15:17 (21)   16:48		17:45	19:44	16   19:10 (18)   20:40	11   20:11 (19)   21:31	30   20:54 (1)	
3   08:28	15:02 (21)   07:54		06:54	06:38	18:54 (18)   05:28	19:59 (19)   04:40	30   20:08 (20)	
15:57	15:18 (21)   16:50		17:47	19:46	15   19:09 (18)   20:42	13   20:12 (19)   21:32	30   20:54 (1)	
4   08:27	15:03 (21)   07:52		06:52	06:35	18:55 (18)   05:26	19:59 (19)   04:40	30   20:11 (20)	
15:58	15:18 (21)   16:52		17:49	19:48	12   19:07 (18)   20:44	15   20:14 (19)   21:33	25   20:54 (1)	
5   08:27	15:03 (21)   07:50		06:49	06:33	18:57 (18)   05:24	19:59 (19)   04:39	30   20:30 (1)	
15:59	15:18 (21)   16:54	3   16:23 (17)   17:51	19:50	9   19:06 (18)   20:46	15   20:14 (19)   21:34	24   20:54 (1)		
6   08:27	15:03 (21)   07:48		06:47	06:30	19:21 (16)   05:22	19:59 (19)   04:38	30   20:31 (1)	
16:00	15:18 (21)   16:56	8   16:25 (17)   17:53	19:52	3   19:24 (16)   20:48	14   20:13 (19)   21:35	23   20:54 (1)		
7   08:26	15:05 (21)   07:46		06:45	06:28	19:20 (16)   05:20	19:59 (19)   04:37	30   20:31 (1)	
16:02	15:19 (21)   16:58	11   16:27 (17)   17:55	19:54	6   19:26 (16)   20:50	16   20:15 (20)   21:36	23   20:54 (1)		
8   08:26	15:05 (21)   07:44		06:42	06:26	19:20 (16)   05:18	20:00 (19)   04:37	30   20:31 (1)	
16:03	15:19 (21)   17:00	13   16:29 (17)   17:57	19:55	8   19:28 (16)   20:51	17   20:17 (20)   21:37	24   20:55 (1)		
9   08:25	15:05 (21)   07:42		06:40	06:23	19:18 (16)   05:17	20:02 (19)   04:36	30   20:31 (1)	
16:05	15:19 (21)   17:03	16   16:32 (17)   17:59	19:57	12   19:30 (16)   20:53	17   20:19 (20)   21:38	23   20:54 (1)		
10   08:24	15:06 (21)   07:40		06:37	06:21	19:18 (16)   05:15	20:00 (20)   04:36	30   20:31 (1)	
16:06	15:19 (21)   17:05	17   16:33 (17)   18:00	19:59	14   19:32 (16)   20:55	20   20:20 (20)   21:39	24   20:55 (1)		
11   08:24	15:07 (21)   07:38		06:35	06:18	19:18 (16)   05:13	19:59 (20)   04:35	30   20:32 (1)	
16:08	15:19 (21)   17:07	17   16:33 (17)   18:02	20:01	14   19:32 (16)   20:57	21   20:20 (20)   21:40	24   20:56 (1)		
12   08:23	15:08 (21)   07:36		06:32	06:16	19:18 (16)   05:11	19:59 (20)   04:35	30   20:32 (1)	
16:09	15:19 (21)   17:09	16   16:33 (17)   18:04	20:03	13   19:31 (16)   20:59	22   20:21 (20)   21:41	23   20:55 (1)		
13   08:22	15:09 (21)   07:34		06:30	06:14	19:20 (16)   05:09	19:58 (20)   04:34	30   20:32 (1)	
16:11	15:18 (21)   17:11	15   16:32 (17)   18:06	20:05	10   19:30 (16)   21:00	23   20:21 (20)   21:41	23   20:55 (1)		
14   08:21	15:11 (21)   07:32		06:27	06:11	19:21 (16)   05:07	19:58 (20)   04:34	30   20:32 (1)	
16:13	15:17 (21)   17:13	14   16:31 (17)   18:08	20:07	6   19:27 (16)   21:02	23   20:21 (20)   21:42	24   20:56 (1)		
15   08:20	15:11 (21)   07:30		06:25	06:09	19:22 (16)   05:06	19:58 (20)   04:34	30   20:33 (1)	
16:14	17:15	11   16:30 (17)   18:10	20:09	21:04	24   20:22 (20)   21:43	23   20:56 (1)		
16   08:19	17:28		06:23	06:06	05:04	19:57 (20)   04:34	30   20:33 (1)	
16:16	17:17	5   16:27 (17)   18:12	20:10	21:05	25   20:22 (20)   21:43	23   20:56 (1)		
17   08:18	17:26		06:20	06:04	05:02	19:58 (20)   04:34	30   20:33 (1)	
16:18	17:19		18:14	20:12	21:07	25   20:23 (20)   21:44	24   20:57 (1)	
18   08:17	17:24		06:18	06:02	05:01	19:57 (20)   04:33	30   20:34 (1)	
16:19	17:21		18:16	20:14	21:09	25   20:22 (20)   21:44	23   20:57 (1)	
19   08:16	17:22		06:15	05:59	04:59	19:58 (20)   04:33	30   20:34 (1)	
16:21	17:23		18:18	20:16	21:10	24   20:22 (20)   21:44	23   20:57 (1)	
20   08:15	17:19		06:13	05:57	04:58	19:57 (20)   04:34	30   20:34 (1)	
16:23	17:25		18:20	20:18	21:12	25   20:22 (20)   21:45	23   20:57 (1)	
21   08:14	17:17		06:10	05:55	04:56	19:58 (20)   04:34	30   20:34 (1)	
16:25	17:27		18:22	20:20	21:14	24   20:22 (20)   21:45	23   20:57 (1)	
22   08:12	17:15		06:08	05:52	04:55	19:58 (20)   04:34	30   20:34 (1)	
16:27	17:29		18:23	20:22	21:15	30   20:42 (1)   21:45	23   20:57 (1)	
23   08:11	17:13		06:05	05:50	04:53	19:59 (20)   04:34	30   20:35 (1)	
16:29	17:31		18:25	20:24	21:17	32   20:44 (1)   21:45	23   20:58 (1)	
24   08:10	17:10		06:03	05:48	04:52	19:59 (20)   04:34	30   20:35 (1)	
16:31	17:33		18:27	20:25	21:18	33   20:44 (1)   21:46	23   20:58 (1)	
25   08:08	17:08		06:00	05:46	04:50	19:59 (20)   04:35	30   20:34 (1)	
16:32	17:35		18:29	20:27	21:20	36   20:46 (1)   21:46	24   20:58 (1)	
26   08:07	17:06		05:58	18:00 (18)   05:43	04:49	20:00 (20)   04:35	30   20:35 (1)	
16:34	17:37		18:31	4   18:04 (18)   20:29	21:21	36   20:47 (1)   21:46	24   20:59 (1)	
27   08:05	17:03		05:55	17:58 (18)   05:41	04:48	20:01 (20)   04:36	30   20:35 (1)	
16:36	17:39		18:33	8   18:06 (18)   20:31	21:23	35   20:48 (1)   21:45	23   20:58 (1)	
28   08:04	17:01		05:53	17:56 (18)   05:39	04:47	20:01 (20)   04:36	30   20:36 (1)	
16:38	17:41		18:35	11   18:07 (18)   20:33	21:24	38   20:50 (1)   21:45	23   20:59 (1)	
29   08:02			06:50	18:55 (18)   05:37	20:02 (19)   04:45	20:02 (20)   04:37	30   20:35 (1)	
16:40			19:37	15   19:10 (18)   20:35	3   20:05 (19)   21:26	38   20:51 (1)   21:45	24   20:59 (1)	
30   08:00			06:48	18:54 (18)   05:35	20:01 (19)   04:44	20:03 (20)   04:37	30   20:36 (1)	
16:42			19:38	17   19:11 (18)   20:37	6   20:07 (19)   21:27	37   20:52 (1)   21:45	23   20:59 (1)	
31   07:59			06:45	18:54 (18)		04:43	20:04 (20)	
16:44			19:40	17   19:11 (18)		21:28	36   20:52 (1)	
Sonnenscheinstunden	248	272	367	421	496	512	729	
astr.max.mögl.Beschattung	185	146	72	164	759		045	
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51		0.90	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90		0.90	
Reduktion Windrichtung	0.68	0.70	0.67	0.66	0.63		0.62	
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29		0.25	
Met.wahrsch.Beschattung	20	22	14	40	221		186	

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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

-  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: BA - IO53**

**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  
 342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	20:36 (1) 05:19	20:10 (20) 06:14	19:18 (16) 07:08	07:07	15:45 (17) 08:03 14:49 (21)
	21:44	21:00 (1) 21:09	21 20:31 (20) 20:01	19:32 (16) 18:46	16:35	17 16:02 (17) 15:50 12 15:01 (21)
2	04:39	20:36 (1) 05:20	20:10 (20) 06:16	19:16 (16) 07:10	07:09	15:46 (17) 08:05 14:49 (21)
	21:44	20:59 (1) 21:07	20 20:30 (20) 19:59	19:30 (16) 18:44	16:33	15 16:01 (17) 15:49 13 15:02 (21)
3	04:40	20:36 (1) 05:22	20:11 (20) 06:17	19:16 (16) 07:12	07:11	15 15:46 (17) 08:06 14:50 (21)
	21:44	21:00 (1) 21:05	19 20:30 (20) 19:56	19:28 (16) 18:41	16:31	13 15:59 (17) 15:48 13 15:03 (21)
4	04:40	20:37 (1) 05:24	20:11 (19) 06:19	19:17 (16) 07:14	07:13	15 15:46 (17) 08:08 14:49 (21)
	21:43	21:00 (1) 21:03	17 20:28 (20) 19:54	8 19:25 (16) 18:39	16:29	10 15:56 (17) 15:47 14 15:03 (21)
5	04:41	20:37 (1) 05:25	20:10 (19) 06:21	19:16 (16) 07:15	07:15	15 15:48 (17) 08:09 14:50 (21)
	21:43	21:00 (1) 21:01	16 20:26 (20) 19:51	6 19:22 (16) 18:37	16:27	7 15:55 (17) 15:47 14 15:04 (21)
6	04:42	20:37 (1) 05:27	20:10 (19) 06:23	19:17 (16) 07:17	07:17	15 15:49 (17) 08:10 14:49 (21)
	21:42	21:01 (1) 20:59	14 20:24 (20) 19:49	3 19:20 (16) 18:34	16:25	4 15:53 (17) 15:46 15 15:04 (21)
7	04:43	20:37 (1) 05:29	20:08 (19) 06:25	18:52 (18) 07:19	07:19	08:12 14:50 (21)
	21:41	21:01 (1) 20:57	15 20:23 (19) 19:46	9 19:01 (18) 18:32	16:23	15 15:05 (21)
8	04:44	20:38 (1) 05:31	20:08 (19) 06:26	18:50 (18) 07:21	07:21	08:13 14:50 (21)
	21:41	21:01 (1) 20:55	15 20:23 (19) 19:44	12 19:02 (18) 18:29	16:21	15 15:06 (21)
9	04:45	20:16 (20) 05:32	20:08 (19) 06:28	18:48 (18) 07:23	07:23	08:14 14:51 (21)
	21:40	21:01 (1) 20:53	15 20:23 (19) 19:41	15 19:03 (18) 18:27	16:19	15 15:07 (21)
10	04:46	20:15 (20) 05:34	20:08 (19) 06:30	18:47 (18) 07:25	07:25	08:16 14:51 (21)
	21:39	21:01 (1) 20:51	12 20:20 (19) 19:39	16 19:03 (18) 18:24	16:18	15 15:07 (21)
11	04:48	20:14 (20) 05:36	20:08 (19) 06:32	18:46 (18) 07:27	07:27	08:17 14:51 (21)
	21:38	21:01 (1) 20:49	10 20:18 (19) 19:36	18 19:04 (18) 18:22	16:16	15 15:06 (21)
12	04:49	20:13 (20) 05:38	20:09 (19) 06:34	18:46 (18) 07:28	07:29	08:18 14:52 (21)
	21:37	21:01 (1) 20:47	8 20:17 (19) 19:34	18 19:04 (18) 18:20	16:14	15 15:06 (21)
13	04:50	20:12 (20) 05:40	20:09 (19) 06:35	18:45 (18) 07:30	07:31	08:19 14:52 (21)
	21:36	21:01 (1) 20:45	5 20:14 (19) 19:31	17 19:02 (18) 18:17	16:13	15 15:06 (21)
14	04:51	20:11 (20) 05:41	20:10 (19) 06:37	18:45 (18) 07:32	07:33	08:20 14:53 (21)
	21:35	21:00 (1) 20:43	2 20:12 (19) 19:29	15 19:00 (18) 18:15	16:11	15 15:05 (21)
15	04:52	20:10 (20) 05:43	20:09 (19) 06:39	18:46 (18) 07:34	07:35	08:21 14:53 (21)
	21:34	20:59 (1) 20:40	19:26	12 18:58 (18) 18:12	16:09	15 15:05 (21)
16	04:54	20:10 (20) 05:45	06:41	18:47 (18) 07:36	07:36	08:22 14:54 (21)
	21:33	20:59 (1) 20:38	19:24	9 18:56 (18) 18:10	16:08	15 15:05 (21)
17	04:55	20:10 (20) 05:47	06:43	18:48 (18) 07:38	07:38	08:23 14:54 (21)
	21:32	20:57 (1) 20:36	19:21	5 18:53 (18) 18:08	16:06	15 15:06 (21)
18	04:57	20:09 (20) 05:49	06:44	07:40	07:40	08:23 14:55 (21)
	21:30	20:56 (1) 20:34	19:19	18:05	16:05	15 15:06 (21)
19	04:58	20:08 (20) 05:50	06:46	07:42	07:42	08:24 14:56 (21)
	21:29	20:54 (1) 20:32	19:16	18:03	16:03	15 15:07 (21)
20	04:59	20:09 (20) 05:52	06:48	07:44	07:44	08:25 14:56 (21)
	21:28	20:54 (1) 20:29	19:14	18:01	16:02	15 15:06 (21)
21	05:01	20:08 (20) 05:54	06:50	07:46	07:46	08:25 14:57 (21)
	21:26	20:52 (1) 20:27	19:11	17:59	16:01	15 15:07 (21)
22	05:02	20:08 (20) 05:56	06:52	07:48	07:48	08:26 14:57 (21)
	21:25	20:52 (1) 20:25	19:09	17:56	15:59	15 15:07 (21)
23	05:04	20:08 (20) 05:58	06:53	07:50	07:49	08:27 14:58 (21)
	21:23	20:52 (1) 20:22	19:06	17:54	15:58	15 15:08 (21)
24	05:06	20:07 (20) 05:59	06:55	07:51	07:51	08:27 14:58 (21)
	21:22	20:52 (1) 20:20	19:04	17:52	15:57	15 15:09 (21)
25	05:07	20:08 (20) 06:01	06:57	06:53	07:53	08:27 14:58 (21)
	21:20	20:53 (20) 20:18	19:01	16:50	15:56	15 15:09 (21)
26	05:09	20:07 (20) 06:03	06:59	06:55	07:55	08:28 14:58 (21)
	21:19	20:52 (20) 20:15	18:59	16:47	8 15:58 (17) 15:54	15 15:09 (21)
27	05:10	20:08 (20) 06:05	07:01	06:57	15:48 (17) 07:56	08:28 14:59 (21)
	21:17	20:53 (20) 20:13	18:56	16:45	11 15:59 (17) 15:53	15 15:10 (21)
28	05:12	20:08 (20) 06:07	07:02	06:59	15:47 (17) 07:58	14:51 (21) 08:28 15:00 (21)
	21:16	20:52 (20) 20:11	18:54	16:43	13 16:00 (17) 15:52	6 14:57 (21) 15:50 12 15:12 (21)
29	05:14	20:08 (20) 06:08	07:04	07:01	15:47 (17) 08:00	14:50 (21) 08:28 14:59 (21)
	21:14	20:52 (20) 20:08	7 19:28 (16) 18:51	16:41	15 16:02 (17) 15:51	9 14:59 (21) 15:51 13 15:12 (21)
30	05:15	20:08 (20) 06:10	19:19 (16) 07:06	07:03	15:46 (17) 08:01	14:50 (21) 08:28 15:00 (21)
	21:12	20:52 (20) 20:06	11 19:30 (16) 18:49	16:39	16 16:02 (17) 15:51	11 15:01 (21) 15:52 13 15:13 (21)
31	05:17	20:09 (20) 06:12	19:18 (16) 07:05	07:05	15:46 (17) 08:02	14:51 (21) 08:28 15:01 (21)
	21:10	20:52 (20) 20:03	13 19:31 (16) 07:07	16:37	16 16:02 (17) 15:53	13 15:14 (21)
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	885	220	203	79	92	390
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90
Reduktion Windrichtung	0.63	0.64	0.67	0.70	0.69	0.68
Gesamte Reduktion	0.25	0.28	0.24	0.21	0.13	0.09
Met.wahrsch.Beschattung	223	62	50	17	12	33

**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)    Schattende (WEA mit letztem Schatten)

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBSchattenrezeptor: BB - IO54  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:41 (1)   04:42
	15:54	16:46	17:43	19:42	20:39	17 19:58 (1)   21:29
2	08:28	07:55	06:56	06:40	05:31	19:42 (1)   04:41
	15:55	16:48	17:45	19:44	20:40	15 19:57 (1)   21:31
3	08:28	07:54	06:54	06:38	05:28	19:42 (1)   04:40
	15:57	16:50	17:47	19:46	20:42	14 19:56 (1)   21:32
4	08:27	07:52	06:52	06:35	05:26	19:44 (1)   04:39
	15:58	16:52	17:49	19:48	20:44	10 19:54 (1)   21:33
5	08:27	07:50	06:49	06:33	19:15 (20)   05:24	19:47 (1)   04:39
	15:59	16:54	17:51	19:50	8 19:23 (20)   20:46	3 19:50 (1)   21:34
6	08:27	07:48	06:47	06:30	19:12 (20)   05:22	04:38
	16:00	16:56	17:53	19:52	12 19:24 (20)   20:48	21:35
7	08:26	07:46	06:44	06:28	19:11 (20)   05:20	04:37
	16:02	16:58	17:55	19:54	15 19:26 (20)   20:50	21:36
8	08:26	07:44	06:42	06:26	19:10 (20)   05:18	04:37
	16:03	17:00	17:57	19:55	17 19:27 (20)   20:51	21:37
9	08:25	07:42	06:40	06:23	19:09 (20)   05:17	04:36
	16:05	17:02	17:59	19:57	18 19:27 (20)   20:53	21:38
10	08:24	07:40	06:37	06:21	19:08 (20)   05:15	04:36
	16:06	17:05	18:00	19:59	19 19:27 (20)   20:55	21:39
11	08:24	07:38	06:35	06:18	19:07 (20)   05:13	04:35
	16:08	17:07	18:02	20:01	20 19:27 (20)   20:57	21:40
12	08:23	07:36	06:32	17:35 (18)   06:16	19:08 (20)   05:11	04:35
	16:09	17:09	18:04	2 17:37 (18)   20:03	18 19:26 (20)   20:59	21:41
13	08:22	07:34	06:30	17:34 (18)   06:14	19:08 (20)   05:09	04:34
	16:11	17:11	18:06	6 17:40 (18)   20:05	18 19:26 (20)   21:00	21:41
14	08:21	07:32	06:27	17:32 (18)   06:11	19:08 (20)   05:07	04:34
	16:12	17:13	18:08	9 17:41 (18)   20:07	16 19:24 (20)   21:02	21:42
15	08:20	07:30	06:25	17:32 (18)   06:09	19:09 (20)   05:06	04:34
	16:14	17:15	18:10	11 17:43 (18)   20:09	14 19:23 (20)   21:04	21:43
16	08:19	07:28	06:22	17:32 (18)   06:06	19:11 (20)   05:04	04:34
	16:16	17:17	18:12	13 17:45 (18)   20:10	11 19:22 (20)   21:05	21:43
17	08:18	07:26	06:20	17:32 (18)   06:04	19:13 (20)   05:02	04:33
	16:18	17:19	18:14	13 17:45 (18)   20:12	4 19:17 (20)   21:07	21:44
18	08:17	07:24	06:18	17:32 (18)   06:02	05:01	04:33
	16:19	17:21	18:16	12 17:44 (18)   20:14	21:09	21:44
19	08:16	07:22	06:15	17:34 (18)   05:59	04:59	04:33
	16:21	17:23	18:18	8 17:42 (18)   20:16	21:10	21:44
20	08:15	07:19	06:13	05:57	21:10	04:33
	16:23	17:25	18:20	20:18	04:57	21:45
21	08:14	07:17	06:10	05:55	19:46 (1)   04:56	04:34
	16:25	17:27	18:21	20:20	6 19:52 (1)   21:14	21:45
22	08:12	07:15	06:08	05:52	19:43 (1)   04:54	04:34
	16:27	17:29	18:23	20:22	9 19:52 (1)   21:15	21:45
23	08:11	07:13	06:05	05:50	19:42 (1)   04:53	04:34
	16:29	17:31	18:25	20:24	12 19:54 (1)   21:17	21:45
24	08:10	07:10	06:03	05:48	19:41 (1)   04:52	04:34
	16:30	17:33	18:27	20:25	15 19:56 (1)   21:18	21:46
25	08:08	07:08	06:00	05:46	19:41 (1)   04:50	04:35
	16:32	17:35	18:29	20:27	17 19:58 (1)   21:20	21:46
26	08:07	07:06	05:58	05:43	19:40 (1)   04:49	04:35
	16:34	17:37	18:31	20:29	20 20:00 (1)   21:21	21:46
27	08:05	07:03	05:55	05:41	19:40 (1)   04:48	04:36
	16:36	17:39	18:33	20:31	20 20:00 (1)   21:23	21:45
28	08:04	07:01	05:53	05:39	19:40 (1)   04:47	04:36
	16:38	17:41	18:35	20:33	20 20:00 (1)   21:24	21:45
29	08:02	06:50	05:37	05:37	19:40 (1)   04:45	04:37
	16:40	19:37	20:35	19 19:59 (1)   21:26	21:45	
30	08:00	06:48	05:35	05:35	19:40 (1)   04:44	04:37
	16:42	19:38	20:37	19 19:59 (1)   21:27	21:45	
31	07:59	06:45	06:45	04:43	04:43	
	16:44	19:40	21:28	496	512	
Sonnenscheinstunden	248	272	367	421		
astr.max.mögl.Beschattung			74	347	59	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.65	0.64	
Gesamte Reduktion			0.19	0.24	0.29	
Met.wahrsch.Beschattung			14	83	17	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BB - IO54

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38   05:19		06:14	19:07 (20)   07:08	18:14 (18)	07:07   08:03
	21:44   21:09		20:01 (1)   19:44	19:27 (20)   18:46	18:18 (18)	16:35   15:50
2	04:39   05:20		06:16	19:06 (20)   07:10		07:09   08:05
	21:44   21:07		19:59	19:25 (20)   18:44		16:33   15:49
3	04:40   05:22		06:17	19:07 (20)   07:12		07:11   08:06
	21:44   21:05		19:56	19:25 (20)   18:41		16:31   15:48
4	04:40   05:24		06:19	19:07 (20)   07:14		07:13   08:08
	21:43   21:03		19:54	19:25 (20)   18:39		16:29   15:47
5	04:41   05:25		06:21	19:07 (20)   07:15		07:15   08:09
	21:43   21:01		19:51	19:22 (20)   18:37		16:27   15:47
6	04:42   05:27		06:23	19:08 (20)   07:17		07:17   08:10
	21:42   20:59		19:49	19:20 (20)   18:34		16:25   15:46
7	04:43   05:29		06:25	19:10 (20)   07:19		07:19   08:12
	21:41   20:57		19:46	19:18 (20)   18:32		16:23   15:46
8	04:44   05:31		19:55 (1)   06:26	07:21		07:21   08:13
	21:41   20:55	6	20:01 (1)   19:44	18:29		16:21   15:45
9	04:45   05:32		19:53 (1)   06:28	07:23		07:23   08:14
	21:40   20:53	11	20:04 (1)   19:41	18:27		16:19   15:45
10	04:46   05:34		19:51 (1)   06:30	07:25		07:25   08:16
	21:39   20:51	14	20:05 (1)   19:39	18:24		16:18   15:45
11	04:47   05:36		19:50 (1)   06:32	07:27		07:27   08:17
	21:38   20:49	16	20:06 (1)   19:36	18:22		16:16   15:44
12	04:49   05:38		19:48 (1)   06:34	07:28		07:29   08:18
	21:37   20:47	18	20:06 (1)   19:34	18:20		16:14   15:44
13	04:50   05:40		19:48 (1)   06:35	07:30		07:31   08:19
	21:36   20:45	18	20:06 (1)   19:31	18:17		16:13   15:44
14	04:51   05:41		19:48 (1)   06:37	07:32		07:33   08:20
	21:35   20:43	19	20:07 (1)   19:29	18:15		16:11   15:44
15	04:52   05:43		19:47 (1)   06:39	07:34		07:35   08:21
	21:34   20:40	20	20:07 (1)   19:26	18:12		16:09   15:44
16	04:54   05:45		19:47 (1)   06:41	07:36		07:36   08:22
	21:33   20:38	19	20:06 (1)   19:24	18:10		16:08   15:44
17	04:55   05:47		19:47 (1)   06:43	07:38		07:38   08:23
	21:32   20:36	19	20:06 (1)   19:21	18:08		16:06   15:44
18	04:57   05:49		19:47 (1)   06:44	07:40		07:40   08:23
	21:30   20:34	17	20:04 (1)   19:19	18:05		16:05   15:44
19	04:58   05:50		19:47 (1)   06:46	07:42		07:42   08:24
	21:29   20:31	15	20:02 (1)   19:16	18:03		16:03   15:45
20	04:59   05:52		19:48 (1)   06:48	07:44		07:44   08:25
	21:28   20:29	12	20:00 (1)   19:14	18:01		16:02   15:45
21	05:01   05:54		19:49 (1)   06:50	07:46		07:46   08:25
	21:26   20:27	9	19:58 (1)   19:11	17:59		16:01   15:45
22	05:02   05:56		19:50 (1)   06:52	07:48		07:48   08:26
	21:25   20:25	5	19:55 (1)   19:09	17:56		15:59   15:46
23	05:04   05:58		06:53	07:49		07:49   08:26
	21:23   20:22		19:06	17:54		15:58   15:46
24	05:05   05:59		06:55	18:19 (18)   07:51		07:51   08:27
	21:22   20:20		19:04	18:25 (18)   17:52		15:57   15:47
25	05:07   06:01		06:57	18:16 (18)   06:53		07:53   08:27
	21:20   20:18		19:01	18:27 (18)   16:50		15:56   15:48
26	05:09   06:03		19:16 (20)   06:59	18:14 (18)   06:55		07:55   08:28
	21:19   20:15	5	19:21 (20)   18:59	18:27 (18)   16:47		15:54   15:48
27	05:10   06:05		19:13 (20)   07:01	18:13 (18)   06:57		07:56   08:28
	21:17   20:13	11	19:24 (20)   18:56	18:27 (18)   16:45		15:53   15:49
28	05:12   06:07		19:11 (20)   07:02	18:13 (18)   06:59		07:58   08:28
	21:15   20:11	14	19:25 (20)   18:54	18:25 (18)   16:43		15:52   15:50
29	05:14   06:08		19:09 (20)   07:04	18:13 (18)   07:01		08:00   08:28
	21:14   20:08	16	19:25 (20)   18:51	18:23 (18)   16:41		15:51   15:51
30	05:15   06:10		19:08 (20)   07:06	18:13 (18)   07:03		08:01   08:28
	21:12   20:06	18	19:26 (20)   18:49	18:20 (18)   16:39		15:50   15:52
31	05:17   06:12		19:08 (20)	07:05		08:02   08:28
	21:10   20:03	18	19:26 (20)	16:37		15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung		300	183	4		
Red.Sonnenscheinwahrsch.		0.48	0.40	0.33		
Reduktion Betriebsdauer		0.90	0.90	0.90		
Reduktion Windrichtung		0.64	0.67	0.68		
Gesamte Reduktion		0.28	0.24	0.20		
Met.wahrsch.Beschattung		84	44	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	Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BC - IO55

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28	07:57	06:59	06:43	05:33	19:55 (1)   04:42	
	15:54	16:46	17:43	19:42	20:39	14   20:09 (23)   21:29	
2	08:28	07:55	06:56	06:40	05:31	19:53 (1)   04:41	
	15:55	16:48	17:45	19:44	20:40	18   20:11 (23)   21:31	
3	08:28	07:54	06:54	06:38	05:28	19:51 (1)   04:40	
	15:57	16:50	17:47	19:46	20:42	21   20:12 (23)   21:32	
4	08:27	07:52	06:52	06:35	05:26	19:50 (1)   04:40	
	15:58	16:52	17:49	19:48	20:44	24   20:14 (23)   21:33	
5	08:27	07:50	06:49	06:33	05:24	19:48 (1)   04:39	
	15:59	16:54	17:51	19:50	20:46	27   20:15 (23)   21:34	
6	08:27	07:48	06:47	17:18 (18)   06:30	05:22	29   19:48 (1)   04:38	
	16:00	16:56	17:53	7   17:25 (18)   19:52	20:48	29   20:17 (23)   21:35	
7	08:26	07:46	06:45	17:16 (18)   06:28	05:20	19:47 (1)   04:37	
	16:02	16:58	17:55	12   17:28 (18)   19:54	20:50	30   20:17 (23)   21:36	
8	08:26	07:44	06:42	17:14 (18)   06:26	05:18	19:46 (1)   04:37	
	16:03	17:00	17:57	15   17:29 (18)   19:55	20:51	31   20:17 (23)   21:37	
9	08:25	07:42	06:40	17:14 (18)   06:23	19:07 (20)   05:17	19:47 (1)   04:36	
	16:05	17:02	17:59	17   17:31 (18)   19:57	13   19:20 (20)   20:53	30   20:17 (23)   21:38	
10	08:24	07:40	06:37	17:13 (18)   06:21	19:05 (20)   05:15	19:46 (1)   04:36	
	16:06	17:05	18:00	18   17:31 (18)   19:59	17   19:22 (20)   20:55	30   20:16 (23)   21:39	
11	08:24	15:29 (17)   07:38	06:35	17:13 (18)   06:18	19:02 (20)   05:13	19:46 (1)   04:35	
	16:08	2   15:31 (17)   17:07	18:02	18   17:31 (18)   20:01	21   19:23 (20)   20:57	28   20:14 (23)   21:40	
12	08:23	15:29 (17)   07:36	06:32	17:12 (18)   06:16	19:01 (20)   05:11	19:46 (1)   04:35	
	16:09	3   15:32 (17)   17:09	18:04	18   17:30 (18)   20:03	29   19:35 (19)   20:59	28   20:14 (1)   21:41	
13	08:22	15:28 (17)   07:34	06:30	17:13 (18)   06:14	19:00 (20)   05:09	19:46 (1)   04:34	
	16:11	6   15:34 (17)   17:11	18:06	17   17:30 (18)   20:05	35   19:37 (19)   21:00	27   20:13 (1)   21:41	
14	08:21	15:28 (17)   07:32	06:27	17:13 (18)   06:11	18:58 (20)   05:07	19:46 (1)   04:34	
	16:13	8   15:36 (17)   17:13	18:08	16   17:29 (18)   20:07	39   19:38 (19)   21:02	27   20:13 (1)   21:42	
15	08:20	15:28 (17)   07:30	06:25	17:14 (18)   06:09	18:58 (20)   05:06	19:46 (1)   04:34	
	16:14	10   15:38 (17)   17:15	18:10	14   17:28 (18)   20:09	42   19:40 (19)   21:04	27   20:13 (1)   21:43	
16	08:19	15:28 (17)   07:28	06:23	17:15 (18)   06:06	18:57 (20)   05:04	19:46 (1)   04:34	
	16:16	12   15:40 (17)   17:17	18:12	10   17:25 (18)   20:10	45   19:42 (19)   21:05	27   20:13 (1)   21:43	
17	08:18	15:29 (17)   07:26	06:20	06:04	18:56 (20)   05:02	19:47 (1)   04:33	
	16:18	13   15:42 (17)   17:19	18:14	20:12	46   19:42 (19)   21:07	26   20:13 (1)   21:44	
18	08:17	15:28 (17)   07:24	06:18	06:02	18:56 (20)   05:01	19:47 (1)   04:33	
	16:19	16   15:44 (17)   17:21	18:16	20:14	45   19:41 (19)   21:09	25   20:12 (1)   21:44	
19	08:16	15:29 (17)   07:22	06:15	05:59	18:56 (20)   04:59	19:48 (1)   04:33	
	16:21	16   15:45 (17)   17:23	18:18	20:16	45   19:41 (19)   21:10	24   20:12 (1)   21:45	
20	08:15	15:29 (17)   07:19	06:13	17:50 (16)   05:57	18:57 (20)   04:58	19:48 (1)   04:34	
	16:23	16   15:45 (17)   17:25	18:20	3   17:53 (16)   20:18	43   19:40 (19)   21:12	22   20:10 (1)   21:45	
21	08:14	15:30 (17)   07:17	06:10	17:48 (16)   05:55	18:57 (20)   04:56	19:49 (1)   04:34	
	16:25	15   15:45 (17)   17:27	18:22	7   17:55 (16)   20:20	40   19:39 (19)   21:14	21   20:10 (1)   21:45	
22	08:12	15:31 (17)   07:15	06:08	17:46 (16)   05:52	18:56 (20)   04:55	19:50 (1)   04:34	
	16:27	15   15:46 (17)   17:29	18:23	10   17:56 (16)   20:22	36   19:36 (19)   21:15	20   20:10 (1)   21:45	
23	08:11	15:31 (17)   07:13	06:05	17:46 (16)   05:50	18:57 (20)   04:53	19:52 (1)   04:34	
	16:29	14   15:45 (17)   17:31	18:25	13   17:59 (16)   20:24	26   19:23 (20)   21:17	17   20:09 (1)   21:45	
24	08:10	15:31 (17)   07:10	06:03	17:45 (16)   05:48	18:58 (20)   04:52	19:52 (1)   04:34	
	16:31	14   15:45 (17)   17:33	18:27	15   18:00 (16)   20:25	24   19:22 (20)   21:18	15   20:07 (1)   21:46	
25	08:08	15:33 (17)   07:08	06:00	17:45 (16)   05:46	18:59 (20)   04:50	19:54 (1)   04:35	
	16:32	12   15:45 (17)   17:35	18:29	16   18:01 (16)   20:27	22   19:21 (20)   21:20	12   20:06 (1)   21:46	
26	08:07	15:34 (17)   07:06	05:58	17:45 (16)   05:43	19:00 (20)   04:49	19:56 (1)   04:35	
	16:34	10   15:44 (17)   17:37	18:31	14   17:59 (16)   20:29	20   19:20 (20)   21:21	9   20:05 (1)   21:46	
27	08:05	15:36 (17)   07:03	05:55	17:46 (16)   05:41	19:02 (20)   04:48	20:00 (1)   04:36	
	16:36	5   15:41 (17)   17:39	18:33	13   17:59 (16)   20:31	16   19:18 (20)   21:23	1   20:01 (1)   21:45	
28	08:04	07:01	05:53	17:47 (16)   05:39	19:04 (20)   04:47	04:36	
	16:38	17:41	18:35	9   17:56 (16)   20:33	12   19:16 (20)   21:24	21:45	
29	08:02	06:50	05:37	18:50 (16)   05:37	04:45	04:37	
	16:40	19:37	4   18:54 (16)   20:35	21:26	21:45		
30	08:00	06:48	05:35	05:35	19:59 (1)   04:44	04:37	
	16:42	19:38	20:37	4   20:03 (1)   21:27	21:45		
31	07:59	06:45	05:33	04:43	04:43	21:45	
	16:44	19:40	21:28	496	512		
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung	187		266	620	610		
Red.Sonnenscheinwahrsch.	0.17		0.31	0.41	0.51		
Reduktion Betriebsdauer	0.90		0.90	0.90	0.90		
Reduktion Windrichtung	0.68		0.68	0.65	0.64		
Gesamte Reduktion	0.11		0.19	0.24	0.29		
Met.wahrsch.Beschattung	20		51	150	178		

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BC - IO55  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	19:57 (1) 06:14	19:02 (20) 07:08	17:52 (18) 07:07	08:03 15:11 (17)
	21:45	21:09	20:25 (23) 20:01	19:23 (20) 18:46	18:10 (18) 16:35	15:50 2 15:13 (17)
2	04:39	05:20	19:56 (1) 06:16	19:03 (20) 07:10	17:52 (18) 07:09	08:05
	21:44	21:07	20:25 (23) 19:59	19:20 (20) 18:44	18:10 (18) 16:33	15:49
3	04:40	05:22	19:56 (1) 06:17	19:05 (20) 07:12	17:50 (18) 07:11	08:06
	21:44	21:05	20:26 (23) 19:56	19:18 (20) 18:41	18:09 (18) 16:31	15:48
4	04:40	05:24	19:56 (1) 06:19	19:07 (20) 07:14	17:51 (18) 07:13	08:08
	21:43	21:03	20:26 (23) 19:54	18:39 17	18:08 (18) 16:29	15:47
5	04:41	05:25	19:57 (1) 06:21	19:07 (20) 07:15	17:51 (18) 07:15	08:09
	21:43	21:01	20:27 (23) 19:51	18:37 16	18:07 (18) 16:27	15:47
6	04:42	05:27	19:57 (1) 06:23	19:07 (20) 07:17	17:52 (18) 07:17	08:10
	21:42	20:59	20:28 (23) 19:49	18:34 13	18:05 (18) 16:25	15:46
7	04:43	05:29	19:57 (1) 06:25	19:07 (20) 07:19	17:53 (18) 07:19	08:12
	21:41	20:57	20:26 (23) 19:46	18:32 9	18:02 (18) 16:23	15:46
8	04:44	05:31	19:58 (1) 06:26	19:07 (20) 07:21	17:55 (18) 07:21	08:13
	21:41	20:55	20:24 (23) 19:36	18:29 5	18:00 (18) 16:21	15:45
9	04:45	05:32	19:59 (1) 06:28	19:07 (20) 07:23	17:52 (18) 07:23	08:14
	21:40	20:53	20:23 (23) 19:41	18:27 16	17:49 (18) 16:19	15:45
10	04:46	05:34	20:00 (1) 06:30	19:07 (20) 07:25	17:52 (18) 07:25	08:16
	21:39	20:51	20:20 (23) 19:39	18:24 16	17:48 (18) 16:18	15:45
11	04:48	05:36	20:02 (1) 06:32	19:07 (20) 07:27	17:52 (18) 07:27	08:17
	21:38	20:49	20:18 (23) 19:36	18:22 16	17:46 (18) 16:16	15:44
12	04:49	05:38	20:04 (1) 06:34	19:07 (20) 07:28	17:52 (18) 07:28	08:18
	21:37	20:47	20:17 (23) 19:34	18:20 16	17:45 (18) 16:14	15:44
13	04:50	05:40	06:35	19:07 (20) 07:30	17:53 (18) 07:31	08:19
	21:36	20:45	19:31	18:17 16	17:44 (18) 16:13	15:44
14	04:51	05:41	19:14 (20) 06:37	19:07 (20) 07:32	17:53 (18) 07:33	08:20
	21:35	20:43	19:20 (20) 19:29	18:15 16	17:43 (18) 16:11	15:44
15	04:52	05:43	19:11 (20) 06:39	18:37 (16) 18:15	17:54 (18) 07:35	08:21
	21:34	20:40	19:24 (20) 19:26	18:47 (16) 18:12	16:09 5	15:09 (17) 15:44
16	04:54	05:45	19:08 (20) 06:41	18:36 (16) 07:36	17:57 (17) 07:37	08:22
	21:33	20:38	19:25 (20) 19:24	18:48 (16) 18:10	16:08 10	15:17 (17) 15:44
17	04:55	20:07 (1) 05:47	19:06 (20) 06:43	18:33 (16) 07:38	17:58 (17) 07:38	08:23
	21:32	20:13 (1) 05:49	19:27 (20) 19:21	18:48 (16) 18:08	16:06 12	15:18 (17) 15:44
18	04:57	20:04 (1) 05:49	19:05 (20) 06:44	18:33 (16) 07:40	17:40 15	15:05 (17) 08:23
	21:30	20:15 (1) 05:50	19:28 (20) 19:19	18:48 (16) 18:05	16:05 14	15:19 (17) 15:44
19	04:58	20:02 (1) 05:50	19:03 (20) 06:46	18:32 (16) 07:42	17:42 15	15:05 (17) 08:24
	21:29	20:16 (1) 05:52	19:28 (20) 19:16	18:48 (16) 18:03	16:03 14	15:19 (17) 15:45
20	04:59	20:02 (1) 05:52	19:02 (20) 06:48	18:32 (16) 07:44	17:44 15	15:05 (17) 08:25
	21:28	20:18 (1) 05:54	19:39 (19) 19:14	18:46 (16) 18:01	16:02 15	15:20 (17) 15:45
21	05:01	20:01 (1) 05:54	19:02 (20) 06:50	18:32 (16) 07:46	17:46 16	15:06 (17) 08:25
	21:26	20:19 (1) 05:56	19:42 (19) 19:11	18:42 (16) 17:59	16:01 15	15:21 (17) 15:45
22	05:02	20:00 (1) 05:56	19:01 (20) 06:52	18:32 (16) 07:48	17:48 16	15:06 (17) 08:26
	21:25	20:20 (1) 05:58	19:43 (19) 19:09	18:40 (16) 17:56	15:59 16	15:22 (17) 15:46
23	05:04	19:59 (1) 05:58	19:00 (20) 06:53	18:34 (16) 07:50	17:49 16	15:06 (17) 08:27
	21:23	20:21 (1) 05:59	19:44 (19) 19:06	18:38 (16) 17:54	15:58 16	15:22 (17) 15:46
24	05:05	19:58 (1) 05:59	19:00 (20) 06:55	18:32 (16) 07:51	17:51 16	15:05 (17) 08:27
	21:22	20:21 (1) 06:01	19:45 (19) 19:04	18:42 (16) 17:57	15:57 16	15:21 (17) 15:47
25	05:07	19:58 (1) 06:01	19:00 (20) 06:57	18:32 (16) 07:53	17:53 16	15:06 (17) 08:27
	21:20	20:22 (1) 06:03	19:45 (19) 19:01	18:40 (16) 17:56	15:56 14	15:20 (17) 15:48
26	05:09	19:57 (1) 06:03	18:59 (20) 06:59	18:32 (16) 07:55	17:55 16	15:07 (17) 08:28
	21:19	20:22 (1) 06:05	19:44 (19) 18:59	18:47 16	15:54 11	15:18 (17) 15:48
27	05:10	19:57 (1) 06:05	18:59 (20) 07:01	17:58 (18) 06:57	17:56 16	15:07 (17) 08:28
	21:17	20:23 (1) 06:07	19:44 (19) 18:56	18:06 (18) 16:45	15:53 10	15:17 (17) 15:49
28	05:12	19:57 (1) 06:07	19:00 (20) 07:03	17:56 (18) 06:59	17:58 16	15:08 (17) 08:28
	21:16	20:23 (1) 06:09	19:42 (19) 18:54	18:08 (18) 16:43	15:52 8	15:16 (17) 15:50
29	05:14	19:57 (1) 06:08	18:59 (20) 07:04	17:54 (18) 07:01	18:00 16	15:09 (17) 08:28
	21:14	20:24 (1) 06:10	19:39 (19) 18:51	18:09 (18) 16:41	15:51 6	15:15 (17) 15:51
30	05:15	19:56 (1) 06:10	19:00 (20) 07:06	17:53 (18) 07:03	18:01 16	15:11 (17) 08:28
	21:12	20:23 (1) 06:12	19:37 (19) 18:49	18:10 (18) 16:39	15:51 3	15:14 (17) 15:52
31	05:17	19:56 (1) 06:12	19:01 (20) 07:05	18:05 16	17:52 (18) 07:05	08:28
	21:10	20:24 (1) 06:13	19:35 (19) 18:49	18:10 (18) 16:39	15:51 3	15:14 (17) 15:52
Sonneneinstrahlung	514	403	383	328	257	231
astr.max.mögl.Beschattung	313	885	207	115	185	2
Red.Sonneneinstrahlung	0.44	0.48	0.40	0.33	0.21	0.14
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90
Reduktion Windrichtung	0.64	0.65	0.67	0.68	0.68	0.68
Gesamte Reduktion	0.25	0.28	0.25	0.20	0.13	0.09
Met.wahrsch.Beschattung	80	251	51	23	24	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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BD - IO56  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni			
1   08:28	07:57	15:48 (17)	06:59	06:43	18:56 (16)	05:33	19:16 (20)	04:42	20:06 (1)
15:54	16:46	11 15:59 (17)	17:43	19:42	12 19:08 (16)	20:39	25 19:41 (20)	21:29	13 20:19 (1)
2   08:28	07:55	15:50 (17)	06:56	06:40	18:57 (16)	05:31	19:17 (20)	04:41	20:08 (1)
15:55	16:48	7 15:57 (17)	17:45	19:44	9 19:06 (16)	20:40	23 19:40 (20)	21:31	11 20:19 (1)
3   08:28	07:54	06:54	06:38	06:28	05:28	05:28	19:17 (20)	04:40	20:09 (1)
15:57	16:50	17:47	19:46	20:42	22 19:39 (20)	21:32	9 20:18 (1)	20:11 (1)	4 20:15 (1)
4   08:27	07:52	06:52	06:35	06:26	05:26	05:26	19:18 (20)	04:40	20:11 (1)
15:58	16:52	17:49	19:48	20:44	19 19:37 (20)	21:33	4 20:15 (1)	20:11 (1)	20:15 (1)
5   08:27	07:50	06:49	06:33	06:24	05:24	05:24	19:20 (20)	04:39	20:10 (1)
16:03	16:54	17:51	19:50	20:46	18 20:15 (23)	21:34	20:02 (1)	04:36	20:10 (1)
6   08:27	07:48	06:47	06:30	06:22	05:22	05:22	19:21 (20)	04:38	20:10 (1)
16:00	16:56	17:53	19:52	20:48	23 20:17 (23)	21:35	20:02 (1)	04:36	20:10 (1)
7   08:26	07:46	06:45	06:28	06:20	05:20	05:20	19:25 (20)	04:37	20:10 (1)
16:02	16:58	17:55	19:54	20:50	19 20:18 (23)	21:36	20:03 (1)	04:37	20:10 (1)
8   08:26	07:44	06:42	06:26	06:18	05:18	05:18	20:03 (1)	04:37	20:10 (1)
16:03	17:00	17:57	19:55	20:51	17 20:20 (23)	21:37	20:00 (1)	04:36	20:10 (1)
9   08:25	07:42	06:40	06:23	06:15	05:17	05:17	20:00 (1)	04:36	20:10 (1)
16:05	17:02	17:59	19:57	20:53	20 20:22 (23)	21:38	20:00 (1)	04:36	20:10 (1)
10   08:24	07:40	06:37	06:21	06:13	05:15	05:15	20:01 (1)	04:36	20:10 (1)
16:06	17:05	18:00	19:59	20:55	23 20:24 (23)	21:39	20:00 (1)	04:36	20:10 (1)
11   08:24	07:38	06:35	06:18	06:10	05:13	05:13	20:00 (1)	04:35	20:10 (1)
16:08	17:07	18:02	20:01	20:57	25 20:25 (23)	21:40	20:00 (1)	04:35	20:10 (1)
12   08:23	07:36	06:32	17:31 (18)	06:16	05:11	05:11	20:00 (1)	04:35	20:10 (1)
16:09	17:09	18:04	6 17:37 (18)	20:03	20:59	25 20:25 (23)	21:41	20:00 (1)	20:10 (1)
13   08:22	07:34	06:30	17:29 (18)	06:14	05:09	05:09	19:59 (1)	04:34	20:10 (1)
16:11	17:11	18:06	11 17:40 (18)	20:05	21:00	25 20:24 (23)	21:41	20:00 (1)	20:10 (1)
14   08:21	07:32	06:27	17:27 (18)	06:11	05:07	05:07	19:58 (1)	04:34	20:10 (1)
16:13	17:13	18:08	14 17:41 (18)	20:07	21:02	26 20:24 (1)	21:42	20:00 (1)	20:10 (1)
15   08:20	07:30	06:25	17:27 (18)	06:09	05:06	05:06	19:59 (1)	04:34	20:10 (1)
16:14	17:15	18:10	16 17:43 (18)	20:09	21:04	25 20:24 (1)	21:43	20:00 (1)	20:10 (1)
16   08:19	07:28	06:23	17:25 (18)	06:06	19:41 (19)	05:04	19:58 (1)	04:34	20:10 (1)
16:16	17:17	18:12	18 17:43 (18)	20:10	1 19:42 (19)	21:05	26 20:24 (1)	21:43	20:10 (1)
17   08:18	07:26	06:20	17:25 (18)	06:04	19:24 (20)	05:02	19:59 (1)	04:33	20:10 (1)
16:18	17:19	18:14	18 17:43 (18)	20:12	18 19:44 (19)	21:07	26 20:25 (1)	21:44	20:10 (1)
18   08:17	07:24	06:18	17:25 (18)	06:02	19:22 (20)	05:01	19:58 (1)	04:33	20:10 (1)
16:19	17:21	18:16	18 17:43 (18)	20:14	24 19:46 (19)	21:09	26 20:24 (1)	21:44	20:10 (1)
19   08:16	07:22	06:15	17:26 (18)	05:59	19:20 (20)	04:59	19:59 (1)	04:33	20:10 (1)
16:21	17:23	18:18	16 17:42 (18)	20:16	28 19:48 (19)	21:10	26 20:25 (1)	21:45	20:10 (1)
20   08:15	15:45 (17)	07:19	06:13	05:57	19:19 (20)	04:58	19:58 (1)	04:34	20:10 (1)
16:23	3 15:48 (17)	17:25	18:20	15 17:41 (18)	20:18	31 19:50 (19)	21:12	26 20:24 (1)	21:45
21   08:14	15:45 (17)	07:17	06:10	17:27 (18)	05:55	31 19:18 (20)	04:56	19:59 (1)	04:34
16:25	5 15:50 (17)	17:27	18:22	13 17:40 (18)	20:20	34 19:52 (19)	21:14	25 20:24 (1)	21:45
22   08:12	15:45 (17)	07:15	06:08	17:29 (18)	05:52	19:16 (20)	04:55	19:59 (1)	04:34
16:27	8 15:53 (17)	17:29	18:23	8 17:37 (18)	20:22	35 19:51 (19)	21:15	25 20:24 (1)	21:45
23   08:11	15:44 (17)	07:13	06:05	05:50	19:16 (20)	04:53	20:00 (1)	04:34	20:10 (1)
16:29	10 15:54 (17)	17:31	18:25	20:24	34 19:50 (19)	21:17	24 20:24 (1)	21:45	20:10 (1)
24   08:10	15:44 (17)	07:10	06:03	05:48	19:15 (20)	04:52	20:00 (1)	04:34	20:10 (1)
16:31	12 15:56 (17)	17:33	18:27	20:25	35 19:50 (19)	21:18	23 20:23 (1)	21:46	20:10 (1)
25   08:08	15:44 (17)	07:08	06:00	18:00 (16)	05:46	19:15 (20)	04:50	20:00 (1)	04:35
16:32	15 15:59 (17)	17:35	18:29	2 18:02 (16)	20:27	34 19:49 (19)	21:20	23 20:23 (1)	21:46
26   08:07	15:44 (17)	07:06	05:58	17:57 (16)	05:43	19:15 (20)	04:49	20:01 (1)	04:35
16:34	16 16:00 (17)	17:37	18:31	7 18:04 (16)	20:29	33 19:48 (19)	21:21	22 20:23 (1)	21:46
27   08:05	15:44 (17)	07:03	05:55	17:56 (16)	05:41	19:15 (20)	04:48	20:02 (1)	04:36
16:36	16 16:00 (17)	17:39	18:33	10 18:06 (16)	20:31	30 19:45 (19)	21:23	20 20:22 (1)	21:45
28   08:04	15:45 (17)	07:01	05:53	17:55 (16)	05:39	19:15 (20)	04:47	20:03 (1)	04:36
16:38	16 16:01 (17)	17:41	18:35	12 18:07 (16)	20:33	27 19:42 (20)	21:24	19 20:22 (1)	21:45
29   08:02	15:45 (17)	07:00	06:50	18:55 (16)	05:37	19:15 (20)	04:45	20:03 (1)	04:37
16:40	16 16:01 (17)	17:41	19:37	15 19:10 (16)	20:35	27 19:42 (20)	21:26	19 20:22 (1)	21:45
30   08:00	15:46 (17)	07:00	06:48	18:55 (16)	05:35	19:16 (20)	04:44	20:04 (1)	04:37
16:42	14 16:00 (17)	17:41	19:38	14 19:09 (16)	20:37	25 19:41 (20)	21:27	17 20:21 (1)	21:45
31   07:59	15:47 (17)	07:00	06:45	18:55 (16)	05:33	19:16 (20)	04:43	20:05 (1)	21:45
16:44	13 16:00 (17)	17:42	19:40	14 19:09 (16)	20:37	25 19:41 (20)	21:27	17 20:21 (1)	21:45
Sonnenscheinstunden	248	272	367	421	496	512	512	512	512
astr.max.mögl.Beschattung	144	18	227	437	697	789	846	846	846
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.51	0.45	0.45	0.45
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Reduktion Windrichtung	0.69	0.69	0.68	0.64	0.63	0.63	0.63	0.63	0.63
Gesamte Reduktion	0.11	0.15	0.19	0.24	0.29	0.29	0.26	0.26	0.26
Met.wahrsch.Beschattung	16	3	44	103	203	203	203	203	203

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BD - IO56

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  
342 326 396 565 523 733 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:11 (1)   06:14	07:08	18:10 (18)   07:07	08:03
	21:45	21:09	24 20:35 (23)   20:01	18:46	8 18:18 (18)   16:35	15:50
2	04:39	05:20	20:11 (1)   06:16	07:10	18:12 (18)   07:09	08:05
	21:44	21:07	24 20:35 (23)   19:59	18:44	3 18:15 (18)   16:33	15:49
3	04:40	05:22	20:12 (1)   06:17	07:12	07:11	08:06
	21:44	21:05	21 20:33 (23)   19:56	18:41	16:31	15:48
4	04:40	05:24	20:12 (1)   06:19	07:14	07:13	08:08
	21:43	21:03	19 20:31 (23)   19:54	18:39	16:29	15:47
5	04:41	05:25	20:14 (1)   06:21	07:15	07:15	08:09
	21:43	21:01	16 20:30 (23)   19:51	18:37	16:27	15:47
6	04:42	05:27	19:34 (20)   06:23	07:17	07:17	08:10
	21:42	20:59	20 20:28 (23)   19:49	18:34	16:25	15:46
7	04:43	05:29	19:30 (20)   06:25	07:19	07:19	08:12
	21:41	20:57	22 20:26 (23)   19:46	18:32	16:23	15:46
8	04:44	05:31	19:29 (20)   06:26	07:21	07:21	08:13
	21:41	20:55	18 20:24 (23)   19:44	18:29	16:21	15:45
9	04:45	20:18 (1)   05:32	19:27 (20)   06:28	07:23	07:23	08:14
	21:40	20:24 (1)   20:53	20 19:47 (20)   19:41	18:27	16:19	8 15:20 (17)   15:45
10	04:46	20:16 (1)   05:34	19:26 (20)   06:30	8 18:51 (16)   07:25	07:25	15:19 (17)   08:16
	21:39	20:26 (1)   20:51	22 19:48 (20)   19:39	8 18:59 (16)   18:24	16:18	11 15:30 (17)   15:45
11	04:48	20:15 (1)   05:36	19:25 (20)   06:32	18:49 (16)   07:27	07:27	15:19 (17)   08:17
	21:38	20:27 (1)   20:49	24 19:49 (20)   19:36	11 19:00 (16)   18:22	16:16	13 15:32 (17)   15:44
12	04:49	20:14 (1)   05:38	19:24 (20)   06:34	18:48 (16)   07:28	07:29	15:18 (17)   08:18
	21:37	20:28 (1)   20:47	25 19:49 (20)   19:34	13 19:01 (16)   18:20	16:14	14 15:32 (17)   15:44
13	04:50	20:13 (1)   05:40	19:23 (20)   06:35	18:46 (16)   07:30	07:31	15:17 (17)   08:19
	21:36	20:29 (1)   20:45	26 19:49 (20)   19:31	15 19:01 (16)   18:17	16:13	16 15:33 (17)   15:44
14	04:51	20:12 (1)   05:41	19:23 (20)   06:37	18:46 (16)   07:32	07:33	15:17 (17)   08:20
	21:35	20:30 (1)   20:43	27 19:50 (20)   19:29	14 19:00 (16)   18:15	16:11	16 15:33 (17)   15:44
15	04:52	20:11 (1)   05:43	19:23 (20)   06:39	18:46 (16)   07:34	07:35	15:17 (17)   08:21
	21:34	20:30 (1)   20:40	27 19:50 (20)   19:26	12 18:58 (16)   18:12	16:09	16 15:33 (17)   15:44
16	04:54	20:12 (1)   05:45	19:22 (20)   06:41	18:46 (16)   07:36	07:37	15:17 (17)   08:22
	21:33	20:32 (1)   20:38	30 19:52 (19)   19:24	10 18:56 (16)   18:10	16:08	16 15:33 (17)   15:44
17	04:55	20:11 (1)   05:47	19:22 (20)   06:43	18:45 (16)   07:38	07:38	15:17 (17)   08:23
	21:32	20:32 (1)   20:36	32 19:54 (19)   19:21	8 18:53 (16)   18:08	16:06	15 15:32 (17)   15:44
18	04:57	20:10 (1)   05:49	19:22 (20)   06:44	18:47 (16)   07:40	07:40	15:18 (17)   08:23
	21:30	20:32 (1)   20:34	34 19:56 (19)   19:19	3 18:50 (16)   18:05	16:05	12 15:30 (17)   15:44
19	04:58	20:10 (1)   05:50	19:21 (20)   06:46	07:42	07:42	15:18 (17)   08:24
	21:29	20:33 (1)   20:32	35 19:56 (19)   19:16	18:03	16:03	10 15:28 (17)   15:45
20	04:59	20:10 (1)   05:52	19:21 (20)   06:48	07:44	07:44	15:19 (17)   08:25
	21:28	20:34 (1)   20:29	35 19:56 (19)   19:14	18:01	16:02	8 15:27 (17)   15:45
21	05:01	20:09 (1)   05:54	19:22 (20)   06:50	18:15 (18)   07:46	07:46	15:21 (17)   08:25
	21:26	20:34 (1)   20:27	34 19:56 (19)   19:11	6 18:21 (18)   17:59	16:01	5 15:26 (17)   15:45
22	05:02	20:10 (1)   05:56	19:22 (20)   06:52	18:12 (18)   07:48	07:48	15:22 (17)   08:26
	21:25	20:35 (1)   20:25	33 19:55 (19)   19:09	12 18:24 (18)   17:56	15:59	3 15:25 (17)   15:46
23	05:04	20:09 (1)   05:58	19:23 (20)   06:53	18:11 (18)   07:50	07:49	08:27
	21:23	20:35 (1)   20:22	30 19:53 (19)   19:06	14 18:25 (18)   17:54	15:58	15:46
24	05:05	20:09 (1)   05:59	19:24 (20)   06:55	18:09 (18)   07:51	07:51	08:27
	21:22	20:34 (1)   20:20	27 19:51 (19)   19:04	17 18:26 (18)   17:52	15:57	15:47
25	05:07	20:09 (1)   06:01	19:26 (20)   06:57	18:09 (18)   06:53	07:53	08:27
	21:20	20:35 (1)   20:18	23 19:49 (19)   19:01	17 18:26 (18)   16:50	15:56	15:48
26	05:09	20:08 (1)   06:03	19:27 (20)   06:59	18:07 (18)   06:55	07:55	08:28
	21:19	20:35 (1)   20:15	17 19:46 (19)   18:59	18 18:25 (18)   16:47	15:54	15:48
27	05:10	20:09 (1)   06:05	19:43 (19)   07:01	18:07 (18)   06:57	07:56	08:28
	21:17	20:35 (1)   20:13	1 19:44 (19)   19:14	18 18:25 (18)   16:45	15:53	15:49
28	05:12	20:09 (1)   06:07	19:44 (19)   07:02	18:07 (18)   06:59	07:58	08:28
	21:16	20:34 (1)   20:11	18:54	18 18:25 (18)   16:43	15:52	15:50
29	05:14	20:09 (1)   06:08	07:04	18:08 (18)   07:01	08:00	08:28
	21:14	20:35 (1)   20:08	18:51	15 18:23 (18)   16:41	15:51	15:51
30	05:15	20:09 (1)   06:10	07:06	18:08 (18)   07:03	08:01	08:28
	21:12	20:34 (23)   20:06	18:49	12 18:20 (18)   16:39	15:51	15:52
31	05:17	20:10 (1)   06:12	07:05	07:05	08:28	08:28
	21:10	20:35 (23)   20:03	16:37	328	257	15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	486	666	241	11	163	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.63	0.63	0.68	0.68	0.69	
Gesamte Reduktion	0.25	0.28	0.25	0.20	0.13	
Met.wahrsch.Beschattung	123	186	60	2	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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	-------------------	----------------	------------	---------------------------	----------------------------

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBSchattenrezeptor: BE - IO57  
**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  
 342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni			
1	08:28	07:57	15:50 (17) 06:59	06:43	18:57 (16) 05:33	19:18 (20) 04:42			20:08 (1)
	15:54	16:46	13 16:03 (17) 17:43	19:42	13 19:10 (16) 20:39	19:42 (20) 21:29	10		20:18 (1)
2	08:28	07:55	15:51 (17) 06:56	06:40	18:58 (16) 05:31	19:19 (20) 04:41			20:10 (1)
	15:55	16:48	11 16:02 (17) 17:45	19:44	10 19:08 (16) 20:40	19:41 (20) 21:31	7		20:17 (1)
3	08:28	07:54	15:53 (17) 06:54	06:38	19:01 (16) 05:28	19:19 (20) 04:40			
	15:57	16:50	8 16:01 (17) 17:47	19:46	4 19:05 (16) 20:42	19:40 (20) 21:32			
4	08:27	07:52	06:52	06:35	05:26	19:20 (20) 04:40			
	15:58	16:52	17:49	19:48	20:44	19 19:39 (20) 21:33			
5	08:27	07:50	06:49	06:33	05:24	19:22 (20) 04:39			
	15:59	16:54	17:51	19:50	20:46	17 20:15 (23) 21:34			
6	08:27	07:48	06:47	06:30	05:22	19:24 (20) 04:38			
	16:00	16:56	17:53	19:52	20:48	21 20:17 (23) 21:35			
7	08:26	07:46	06:45	06:28	05:20	19:28 (20) 04:37			
	16:02	16:58	17:55	19:54	20:50	14 20:18 (23) 21:36			
8	08:26	07:44	06:42	06:26	05:18	20:03 (1) 04:37			
	16:03	17:00	17:57	19:55	20:51	17 20:20 (23) 21:37			
9	08:25	07:42	06:40	06:23	05:17	20:02 (1) 04:36			
	16:05	17:02	17:59	19:57	20:53	20 20:22 (23) 21:38			
10	08:24	07:40	06:37	06:21	05:15	20:01 (1) 04:36			
	16:06	17:05	18:00	19:59	20:55	23 20:24 (23) 21:39			
11	08:24	07:38	06:35	06:18	05:13	20:00 (1) 04:35			
	16:08	17:07	18:02	20:01	20:57	25 20:25 (23) 21:40			
12	08:23	07:36	06:32	06:16	05:11	20:00 (1) 04:35			
	16:09	17:09	18:04	20:03	20:59	25 20:25 (23) 21:41			
13	08:22	07:34	06:30	17:33 (18) 06:14	05:09	20:00 (1) 04:34			
	16:11	17:11	18:06	7 17:40 (18) 20:05	21:00	24 20:24 (23) 21:41			
14	08:21	07:32	06:27	17:30 (18) 06:11	05:07	19:59 (1) 04:34			
	16:13	17:13	18:08	11 17:41 (18) 20:07	21:02	25 20:24 (1) 21:42			
15	08:20	07:30	06:25	17:29 (18) 06:09	05:06	19:59 (1) 04:34			
	16:14	17:15	18:10	14 17:43 (18) 20:09	21:04	26 20:25 (1) 21:43			
16	08:19	07:28	06:23	17:28 (18) 06:06	05:04	19:59 (1) 04:34			
	16:16	17:17	18:12	17 17:45 (18) 20:10	21:05	25 20:24 (1) 21:43			
17	08:18	07:26	06:20	17:28 (18) 06:04	19:27 (20) 05:02	19:59 (1) 04:33			
	16:18	17:19	18:14	18 17:46 (18) 20:12	14 19:44 (19) 21:07	26 20:25 (1) 21:44			
18	08:17	07:24	06:18	17:27 (18) 06:02	05:01	19:59 (1) 04:33			
	16:19	17:21	18:16	18 17:45 (18) 20:14	22 19:46 (19) 21:09	25 20:24 (1) 21:44			
19	08:16	07:22	06:15	17:28 (18) 05:59	05:00	19:59 (1) 04:33			
	16:21	17:23	18:18	17 17:45 (18) 20:16	26 19:48 (19) 21:10	26 20:25 (1) 21:45			
20	08:15	07:19	06:13	17:27 (18) 05:57	05:00	19:59 (1) 04:34			
	16:23	17:25	18:20	16 17:43 (18) 20:18	29 19:50 (19) 21:12	25 20:24 (1) 21:45			
21	08:14	07:17	06:10	17:28 (18) 05:55	05:00	19:59 (1) 04:34			
	16:25	17:27	18:22	15 17:43 (18) 20:20	32 19:25 (19) 21:14	24 20:24 (1) 21:45			
22	08:12	15:50 (17) 07:15	06:08	17:29 (18) 05:52	05:00	19:59 (1) 04:34			
	16:27	3 15:53 (17) 17:29	18:23	11 17:40 (18) 20:22	33 19:51 (19) 21:15	24 20:24 (1) 21:45			
23	08:11	15:49 (17) 07:13	06:05	17:32 (18) 05:50	05:00	19:59 (1) 04:34			
	16:29	5 15:54 (17) 17:31	18:25	6 17:38 (18) 20:24	33 19:51 (19) 21:17	23 20:24 (1) 21:45			
24	08:10	15:48 (17) 07:10	06:03	05:48	19:17 (20) 04:52	20:01 (1) 04:34			
	16:31	8 15:56 (17) 17:33	18:27	05:46	33 19:50 (19) 21:18	22 20:23 (1) 21:46			
25	08:08	15:48 (17) 07:08	06:00	05:46	19:17 (20) 04:50	20:01 (1) 04:35			
	16:32	11 15:59 (17) 17:35	18:29	05:46	33 19:50 (19) 21:20	22 20:23 (1) 21:46			
26	08:07	15:48 (17) 07:06	05:58	17:59 (16) 05:43	05:00	19:59 (1) 04:35			
	16:34	13 16:01 (17) 17:37	18:31	5 18:04 (16) 20:29	31 19:48 (19) 21:21	20 20:22 (1) 21:46			
27	08:05	15:47 (17) 07:03	05:55	17:58 (16) 05:41	05:00	19:59 (1) 04:36			
	16:36	16 16:03 (17) 17:39	18:33	8 18:06 (16) 20:31	29 19:46 (19) 21:23	19 20:22 (1) 21:45			
28	08:04	15:48 (17) 07:01	05:53	17:57 (16) 05:39	05:00	19:59 (1) 04:37			
	16:38	17 16:05 (17) 17:41	18:35	10 18:07 (16) 20:33	27 19:44 (20) 21:24	18 20:22 (1) 21:45			
29	08:02	15:48 (17) 07:00	06:50	18:57 (16) 05:37	05:00	19:59 (1) 04:37			
	16:40	16 16:04 (17) 17:40	19:37	13 19:10 (16) 20:35	26 19:43 (20) 21:26	16 20:21 (1) 21:45			
30	08:00	15:49 (17) 07:00	06:48	18:56 (16) 05:35	05:00	19:59 (1) 04:37			
	16:42	15 16:04 (17) 17:42	19:38	15 19:11 (16) 20:37	25 19:43 (20) 21:27	14 20:20 (1) 21:45			
31	07:59	15:49 (17) 07:00	06:45	18:57 (16) 05:35	05:00	19:59 (1) 04:37			
	16:44	15 16:04 (17) 17:42	19:40	14 19:11 (16) 20:37	25 19:43 (20) 21:27	14 20:20 (1) 21:45			
	Sonnenscheinstunden	248	272	367	421	496	512		
	astr.max.mögl.Beschattung	119	32	215	420	664	17		
	Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45		
	Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90		
	Reduktion Windrichtung	0.69	0.69	0.68	0.64	0.63	0.63		
	Gesamte Reduktion	0.11	0.15	0.19	0.24	0.29	0.26		
	Met.wahrsch.Beschattung	13	5	42	99	194	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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BE - IO57

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:11 (1)   06:14	07:08	18:14 (18)   07:07	08:03
	21:45	21:09	24 20:35 (23)   20:01	18:46	4 18:18 (18)   16:35	15:50
2	04:39	05:20	20:11 (1)   06:16	07:10	07:09	08:05
	21:44	21:07	24 20:35 (23)   19:59	18:44	16:33	15:49
3	04:40	05:22	20:12 (1)   06:17	07:12	07:11	08:06
	21:44	21:05	21 20:33 (23)   19:56	18:41	16:31	15:48
4	04:40	05:24	20:12 (1)   06:19	07:14	07:13	08:08
	21:43	21:03	19 20:31 (23)   19:54	18:39	16:29	15:47
5	04:41	05:25	20:14 (1)   06:21	07:15	07:15	08:09
	21:43	21:01	16 20:30 (23)   19:51	18:37	16:27	15:47
6	04:42	05:27	19:36 (20)   06:23	07:17	07:17	08:10
	21:42	20:59	19 20:28 (23)   19:49	18:34	16:25	15:46
7	04:43	05:29	19:32 (20)   06:25	07:19	07:19	15:27 (17)   08:12
	21:41	20:57	22 20:26 (23)   19:46	18:32	16:23	1 15:28 (17)   15:46
8	04:44	05:31	19:31 (20)   06:26	07:21	07:21	15:32 (17)   08:13
	21:41	20:55	17 20:24 (23)   19:44	18:29	16:21	9 15:32 (17)   15:45
9	04:45	05:32	19:30 (20)   06:28	18:55 (16)   07:23	07:23	15:22 (17)   08:14
	21:40	20:53	19 19:49 (20)   19:41	3 18:58 (16)   18:27	16:19	11 15:33 (17)   15:45
10	04:46	20:19 (1)   05:34	19:28 (20)   06:30	18:51 (16)   07:25	07:25	15:21 (17)   08:16
	21:39	5 20:24 (1)   20:51	21 19:49 (20)   19:39	10 19:01 (16)   18:24	16:18	13 15:34 (17)   15:45
11	04:48	20:17 (1)   05:36	19:27 (20)   06:32	18:50 (16)   07:27	07:27	15:21 (17)   08:17
	21:38	9 20:26 (1)   20:49	23 19:50 (20)   19:36	12 19:02 (16)   18:22	16:16	15 15:36 (17)   15:44
12	04:49	20:16 (1)   05:38	19:26 (20)   06:34	18:49 (16)   07:28	07:29	15:21 (17)   08:18
	21:37	11 20:27 (1)   20:47	25 19:51 (20)   19:34	14 19:03 (16)   18:20	16:14	15 15:36 (17)   15:44
13	04:50	20:15 (1)   05:40	19:25 (20)   06:35	18:47 (16)   07:30	07:31	15:20 (17)   08:19
	21:36	13 20:28 (1)   20:45	25 19:50 (20)   19:31	15 19:02 (16)   18:17	16:13	16 15:36 (17)   15:44
14	04:51	20:14 (1)   05:41	19:25 (20)   06:37	18:47 (16)   07:32	07:33	15:20 (17)   08:20
	21:35	15 20:29 (1)   20:43	26 19:51 (20)   19:29	13 19:00 (16)   18:15	16:11	16 15:36 (17)   15:44
15	04:52	20:13 (1)   05:43	19:25 (20)   06:39	18:47 (16)   07:34	07:35	15:20 (17)   08:21
	21:34	17 20:30 (1)   20:40	26 19:51 (20)   19:26	11 18:58 (16)   18:12	16:09	15 15:35 (17)   15:44
16	04:54	20:13 (1)   05:45	19:24 (20)   06:41	18:48 (16)   07:36	07:37	15:21 (17)   08:22
	21:33	18 20:31 (1)   20:38	29 19:53 (19)   19:24	8 18:56 (16)   18:10	16:08	13 15:34 (17)   15:44
17	04:55	20:12 (1)   05:47	19:24 (20)   06:43	18:48 (16)   07:38	07:38	15:21 (17)   08:23
	21:32	20 20:32 (1)   20:36	31 19:55 (19)   19:21	5 18:53 (16)   18:08	16:06	11 15:32 (17)   15:44
18	04:57	20:11 (1)   05:49	19:24 (20)   06:44	18:49 (16)   07:40	07:40	15:22 (17)   08:23
	21:30	21 20:32 (1)   20:34	32 19:56 (19)   19:19	1 18:50 (16)   18:05	16:05	8 15:30 (17)   15:44
19	04:58	20:11 (1)   05:50	19:23 (20)   06:46	07:42	07:42	15:23 (17)   08:24
	21:29	21 20:32 (1)   20:32	33 19:56 (19)   19:16	18:03	16:03	5 15:28 (17)   15:45
20	04:59	20:11 (1)   05:52	19:24 (20)   06:48	07:44	07:44	15:24 (17)   08:25
	21:28	23 20:34 (1)   20:29	33 19:57 (19)   19:14	18:01	16:02	3 15:27 (17)   15:45
21	05:01	20:10 (1)   05:54	19:24 (20)   06:50	18:15 (18)   07:46	07:46	08:25
	21:26	24 20:34 (1)   20:27	33 19:57 (19)   19:11	10 18:25 (18)   17:59	16:01	15:45
22	05:02	20:10 (1)   05:56	19:24 (20)   06:52	18:13 (18)   07:48	07:48	08:26
	21:25	25 20:35 (1)   20:25	31 19:55 (19)   19:09	14 18:27 (18)   17:56	15:59	15:46
23	05:04	20:10 (1)   05:58	19:25 (20)   06:53	18:12 (18)   07:50	07:49	08:27
	21:23	24 20:34 (1)   20:22	28 19:53 (19)   19:06	16 18:28 (18)   17:54	15:58	15:46
24	05:05	20:09 (1)   05:59	19:26 (20)   06:55	18:11 (18)   07:51	07:51	08:27
	21:22	25 20:34 (1)   20:20	25 19:51 (19)   19:04	17 18:28 (18)   17:52	15:57	15:47
25	05:07	20:10 (1)   06:01	19:28 (20)   06:57	18:11 (18)   06:53	07:53	08:27
	21:20	25 20:35 (1)   20:18	21 19:49 (19)   19:01	17 18:28 (18)   16:50	15:56	15:48
26	05:09	20:09 (1)   06:03	19:30 (20)   06:59	18:10 (18)   06:55	07:55	08:28
	21:19	26 20:35 (1)   20:15	13 19:46 (19)   18:59	17 18:27 (18)   16:47	15:54	15:48
27	05:10	20:10 (1)   06:05	07:01	18:10 (18)   06:57	07:56	08:28
	21:17	25 20:35 (1)   20:13	18:56	17 18:27 (18)   16:45	15:53	15:49
28	05:12	20:09 (1)   06:07	07:02	18:10 (18)   06:59	07:58	08:28
	21:16	26 20:35 (1)   20:11	18:54	15 18:25 (18)   16:43	15:52	15:50
29	05:14	20:10 (1)   06:08	07:04	18:11 (18)   07:01	08:00	08:28
	21:14	25 20:35 (1)   20:08	18:51	12 18:23 (18)   16:41	15:51	15:51
30	05:15	20:09 (1)   06:10	07:06	18:12 (18)   07:03	08:01	08:28
	21:12	25 20:34 (23)   20:06	18:49	8 18:20 (18)   16:39	15:51	15:52
31	05:17	20:10 (1)   06:12	07:05	07:05		08:28
	21:10	25 20:35 (23)   20:03	16:37	328		15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	448	636	235	4	151	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.63	0.63	0.68	0.68	0.69	
Gesamte Reduktion	0.25	0.28	0.25	0.20	0.13	
Met.wahrsch.Beschattung	114	177	58	1	20	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	-------------------	----------------	------------	---------------------------	----------------------------

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BF - IO58

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  
342 326 396 565 523 523 733 981 1.012 1.213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni					
1	08:28	07:57	15:50 (17)	06:59	06:43	18:57 (16)	05:33	19:18 (20)	04:42		
	15:54	16:46	14 16:04 (17)	17:43	19:42	11 19:08 (16)	20:39	20 19:38 (20)	21:29		
2	08:28	07:55	15:52 (17)	06:56	06:40	18:58 (16)	05:31	19:19 (20)	04:41		
	15:55	16:48	11 16:03 (17)	17:45	19:44	8 19:06 (16)	20:40	18 19:37 (20)	21:31		
3	08:28	07:54	15:53 (17)	06:54	06:38		05:28	19:20 (20)	04:40		
	15:57	16:50	8 16:01 (17)	17:47	19:46		20:42	15 19:35 (20)	21:32		
4	08:27	07:52		06:52	06:35		05:26	19:22 (20)	04:40		
	15:58	16:52		17:49	19:48		20:44	17 20:14 (23)	21:33		
5	08:27	07:50		06:49	06:33		05:24	19:27 (20)	04:39		
	15:59	16:54		17:51	19:50		20:46	12 20:15 (23)	21:34		
6	08:27	07:48		06:47	06:30		05:22	20:02 (1)	04:38		
	16:00	16:56		17:53	19:52		20:48	15 20:17 (23)	21:35		
7	08:26	07:46		06:45	06:28		05:20	20:01 (1)	04:37		
	16:02	16:58		17:55	19:54		20:50	17 20:18 (23)	21:36		
8	08:26	07:44		06:42	06:26		05:18	19:59 (1)	04:37		
	16:03	17:00		17:57	19:55		20:51	21 20:20 (23)	21:37		
9	08:25	07:42		06:40	06:23		05:17	19:59 (1)	04:36		
	16:05	17:02		17:59	19:57		20:53	23 20:22 (23)	21:38		
10	08:24	07:40		06:37	06:21		05:15	19:58 (1)	04:36		
	16:06	17:05		18:00	19:59		20:55	25 20:23 (23)	21:39		
11	08:24	07:38		06:35	06:18		05:13	19:57 (1)	04:35		
	16:08	17:07		18:02	20:01		20:57	26 20:23 (23)	21:40		
12	08:23	07:36		06:32	17:34 (18)		05:11	19:58 (1)	04:35		
	16:09	17:09		18:04	3 17:37 (18)		20:59	25 20:23 (23)	21:41		
13	08:22	07:34		06:30	17:31 (18)		05:09	19:57 (1)	04:34		
	16:11	17:11		18:06	9 17:40 (18)		21:00	25 20:22 (1)	21:41		
14	08:21	07:32		06:27	17:29 (18)		05:07	19:57 (1)	04:34		
	16:13	17:13		18:08	12 17:41 (18)		21:02	25 20:22 (1)	21:42		
15	08:20	07:30		06:25	17:28 (18)		05:06	19:57 (1)	04:34		
	16:14	17:15		18:10	15 17:43 (18)		21:04	25 20:22 (1)	21:43		
16	08:19	07:28		06:23	17:27 (18)		05:04	19:57 (1)	04:34		
	16:16	17:17		18:12	17 17:44 (18)		21:05	25 20:22 (1)	21:43		
17	08:18	07:26		06:20	17:27 (18)		05:02	19:57 (1)	04:33		
	16:18	17:19		18:14	18 17:45 (18)		21:07	25 20:22 (1)	21:44		
18	08:17	07:24		06:18	17:27 (18)		05:01	19:57 (1)	04:33		
	16:19	17:21		18:16	17 17:44 (18)		21:09	25 20:22 (1)	21:44		
19	08:16	07:22		06:15	17:27 (18)		05:00	19:59 (1)	04:33		
	16:21	17:23		18:18	17 17:44 (18)		21:10	24 20:22 (1)	21:44		
20	08:15	07:19		06:13	17:27 (18)		05:00	19:58 (1)	04:34		
	16:23	17:25		18:20	15 17:42 (18)		21:12	24 20:21 (1)	21:45		
21	08:14	07:17		06:10	17:29 (18)		05:00	19:58 (1)	04:34		
	16:25	17:27		18:22	12 17:41 (18)		21:14	23 20:21 (1)	21:45		
22	08:12	07:15		06:08	17:30 (18)		05:05	19:59 (1)	04:34		
	16:27	15:51 (17)	17:29	18:23	8 17:38 (18)		21:15	22 20:21 (1)	21:45		
23	08:11	07:13		06:05	05:50		05:05	20:00 (1)	04:34		
	16:29	4 15:54 (17)	17:31	18:25	20:24		34 19:49 (19)	21:17	21 20:21 (1)	21:45	
24	08:10	07:10		06:03	05:48		05:05	20:00 (1)	04:34		
	16:31	7 15:56 (17)	17:33	18:27	20:25		33 19:48 (19)	21:18	19 20:19 (1)	21:46	
25	08:08	07:08		06:00	18:00 (16)		05:46	19:15 (20)	04:50	20:01 (1)	04:35
	16:32	10 15:59 (17)	17:35	18:29	2 18:02 (16)		20:27	32 19:47 (19)	21:20	18 20:19 (1)	21:46
26	08:07	07:06		05:58	17:58 (16)		05:43	19:15 (20)	04:49	20:02 (1)	04:35
	16:34	13 16:01 (17)	17:37	18:31	6 18:04 (16)		20:29	30 19:45 (19)	21:21	16 20:18 (1)	21:46
27	08:05	07:03		05:55	17:57 (16)		05:41	19:15 (20)	04:48	20:03 (1)	04:36
	16:36	15 16:03 (17)	17:39	18:33	9 18:06 (16)		20:31	26 19:41 (20)	21:23	15 20:18 (1)	21:45
28	08:04	07:01		05:53	17:56 (16)		05:39	19:16 (20)	04:47	20:04 (1)	04:36
	16:38	16 16:05 (17)	17:41	18:35	11 18:07 (16)		20:33	25 19:41 (20)	21:24	13 20:17 (1)	21:45
29	08:02	07:00		05:50	18:56 (16)		05:37	19:16 (20)	04:45	20:06 (1)	04:37
	16:40	16 16:05 (17)		19:37	14 19:10 (16)		20:35	24 19:40 (20)	21:26	10 20:16 (1)	21:45
30	08:00	07:00		06:48	18:55 (16)		05:35	19:17 (20)	04:44	20:08 (1)	04:37
	16:42	16 16:05 (17)		19:38	15 19:10 (16)		20:37	22 19:39 (20)	21:27	6 20:14 (1)	21:45
31	07:59	07:00		06:45	18:56 (16)				04:43		
	16:44	14 16:04 (17)		19:40	13 19:09 (16)				21:28		
Sonneneinstrahlung	248	272	367	421	496						512
astr.max.mögl.Beschattung	113			213	437			595			
Red.Sonneneinstrahlung	0.17	0.24		0.31	0.41			0.51			
Reduktion Betriebsdauer	0.90	0.90		0.90	0.90			0.90			
Reduktion Windrichtung	0.69	0.69		0.68	0.64			0.63			
Gesamte Reduktion	0.11	0.15		0.19	0.24			0.29			
Met.wahrsch.Beschattung	12	5		41	104			174			

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BF - IO58

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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:08 (1)   06:14	07:08	18:12 (18)   07:07	08:03
	21:45	21:09	25 20:33 (23)   20:01	18:46	6 18:18 (18)   16:35	15:50
2	04:39	05:20	20:08 (1)   06:16	07:10	07:09	08:05
	21:44	21:07	25 20:33 (23)   19:59	18:44	16:33	15:49
3	04:40	05:22	20:09 (1)   06:17	07:12	07:11	08:06
	21:44	21:05	24 20:33 (23)   19:56	18:41	16:31	15:48
4	04:40	05:24	20:09 (1)   06:19	07:14	07:13	08:08
	21:43	21:03	22 20:31 (23)   19:54	18:39	16:29	15:47
5	04:41	05:25	20:10 (1)   06:21	07:15	07:15	08:09
	21:43	21:01	20 20:30 (23)   19:51	18:37	16:27	15:47
6	04:42	05:27	20:11 (1)   06:23	07:17	07:17	08:10
	21:42	20:59	17 20:28 (23)   19:49	18:34	16:25	15:46
7	04:43	05:29	20:12 (1)   06:25	07:19	07:19	15:27 (17)   08:12
	21:41	20:57	14 20:26 (23)   19:46	18:32	16:23	2 15:29 (17)   15:46
8	04:44	05:31	19:33 (20)   06:26	07:21	07:21	15:24 (17)   08:13
	21:41	20:55	17 20:24 (23)   19:44	18:29	16:21	8 15:32 (17)   15:45
9	04:45	05:32	19:31 (20)   06:28	07:23	07:23	15:22 (17)   08:14
	21:40	20:53	14 20:23 (23)   19:41	18:27	16:19	12 15:34 (17)   15:45
10	04:46	05:34	19:28 (20)   06:30	18:52 (16)   07:25	07:25	15:21 (17)   08:16
	21:39	20:51	16 19:44 (20)   19:39	6 18:58 (16)   18:24	16:18	14 15:35 (17)   15:45
11	04:48	05:36	19:27 (20)   06:32	18:50 (16)   07:27	07:27	15:22 (17)   08:17
	21:38	20:49	19 19:46 (20)   19:36	10 19:00 (16)   18:22	16:16	14 15:36 (17)   15:44
12	04:49	05:38	19:26 (20)   06:34	18:48 (16)   07:28	07:29	15:21 (17)   08:18
	21:37	20:47	21 19:47 (20)   19:34	13 19:01 (16)   18:20	16:14	16 15:37 (17)   15:44
13	04:50	05:40	19:24 (20)   06:35	18:47 (16)   07:30	07:31	15:21 (17)   08:19
	21:36	20:21 (1)   05:41	23 19:47 (20)   19:31	14 19:01 (16)   18:17	16:13	16 15:37 (17)   15:44
14	04:51	05:41	19:24 (20)   06:37	18:46 (16)   07:32	07:33	15:21 (17)   08:20
	21:35	8 20:23 (1)   05:43	24 19:48 (20)   19:29	14 19:00 (16)   18:15	16:11	16 15:37 (17)   15:44
15	04:52	05:42	19:23 (20)   06:39	18:46 (16)   07:34	07:35	15:21 (17)   08:21
	21:34	12 20:25 (1)   05:45	25 19:48 (20)   19:26	12 18:58 (16)   18:12	16:09	14 15:35 (17)   15:44
16	04:54	05:45	19:22 (20)   06:41	18:46 (16)   07:36	07:37	15:21 (17)   08:22
	21:33	14 20:27 (1)   05:47	26 19:48 (20)   19:24	10 18:56 (16)   18:10	16:08	13 15:34 (17)   15:44
17	04:55	05:47	19:22 (20)   06:43	18:46 (16)   07:38	07:38	15:22 (17)   08:23
	21:32	16 20:28 (1)   05:49	30 19:52 (19)   19:21	7 18:53 (16)   18:08	16:06	10 15:32 (17)   15:44
18	04:57	05:49	19:22 (20)   06:44	18:47 (16)   07:40	07:40	15:23 (17)   08:23
	21:30	17 20:28 (1)   05:50	32 19:54 (19)   19:19	3 18:50 (16)   18:05	16:05	7 15:30 (17)   15:44
19	04:58	05:50	19:21 (20)   06:46	07:42	07:42	15:24 (17)   08:24
	21:29	19 20:29 (1)   05:52	33 19:54 (19)   19:16	18:03	16:03	4 15:28 (17)   15:45
20	04:59	05:52	19:21 (20)   06:48	07:44	07:44	15:25 (17)   08:25
	21:28	20 20:30 (1)   05:54	34 19:55 (19)   19:14	18:01	16:02	2 15:27 (17)   15:45
21	05:01	05:54	19:21 (20)   06:50	18:16 (18)   07:46	07:46	08:25
	21:26	21 20:30 (1)   05:56	34 19:55 (19)   19:11	7 18:23 (18)   17:59	16:01	15:45
22	05:02	05:56	19:21 (20)   06:52	18:14 (18)   07:48	07:48	08:26
	21:25	22 20:31 (1)   05:58	34 19:55 (19)   19:09	11 18:25 (18)   17:56	15:59	15:46
23	05:04	05:58	19:22 (20)   06:53	18:12 (18)   07:50	07:49	08:27
	21:23	24 20:32 (1)   06:00	31 19:53 (19)   19:06	15 18:27 (18)   17:54	15:58	15:46
24	05:05	06:00	19:23 (20)   06:55	18:11 (18)   07:51	07:51	08:27
	21:22	23 20:31 (1)   06:01	28 19:51 (19)   19:04	16 18:27 (18)   17:52	15:57	15:47
25	05:07	06:01	19:24 (20)   06:57	18:10 (18)   06:53	07:53	08:27
	21:20	24 20:32 (1)   06:02	25 19:49 (19)   19:01	17 18:27 (18)   16:50	15:56	15:48
26	05:09	06:03	19:24 (20)   06:59	18:09 (18)   06:55	07:55	08:28
	21:19	25 20:32 (1)   06:03	22 19:46 (19)   18:59	18 18:27 (18)   16:47	15:54	15:48
27	05:10	06:05	19:27 (20)   07:01	18:09 (18)   06:57	07:56	08:28
	21:17	25 20:33 (1)   06:05	14 19:44 (19)   18:56	17 18:26 (18)   16:45	15:53	15:49
28	05:12	06:07	07:02	18:09 (18)   06:59	07:58	08:28
	21:16	25 20:32 (1)   06:07	16 18:25 (18)   16:43	15:52	15:50	
29	05:14	06:08	07:04	18:10 (18)   07:01	08:00	08:28
	21:14	26 20:33 (1)   06:08	13 18:23 (18)   16:41	15:51	15:51	
30	05:15	06:10	07:06	18:11 (18)   07:03	08:01	08:28
	21:12	25 20:32 (1)   06:10	9 18:20 (18)   16:39	15:51	15:52	
31	05:17	06:12	07:05	16:37	07:05	08:28
	21:10	24 20:32 (23)   06:13	16:37	328	257	15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	373	649	228	6	148	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.63	0.64	0.68	0.68	0.69	
Gesamte Reduktion	0.25	0.28	0.25	0.20	0.13	
Met.wahrsch.Beschattung	95	181	56	1	19	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BG - IO59

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni				
1	08:28	07:57	15:50 (17)	06:59	06:43	18:57 (16)	05:33	19:17 (20)	04:42	
	15:54	16:46	11 16:01 (17)	17:43	19:42	7 19:04 (16)	20:39	13 19:30 (20)	21:29	
2	08:28	07:55	15:51 (17)	06:56	06:40		05:31	19:20 (20)	04:41	
	15:55	16:48	9 16:00 (17)	17:45	19:44		20:40	8 20:11 (23)	21:31	
3	08:28	07:54	15:55 (17)	06:54	06:38		05:28	20:02 (1)	04:40	
	15:57	16:50	2 15:57 (17)	17:47	19:46		20:42	10 20:12 (23)	21:32	
4	08:27	07:52		06:52	06:35		05:26	20:00 (1)	04:40	
	15:58	16:52		17:49	19:48		20:44	14 20:14 (23)	21:33	
5	08:27	07:50		06:49	06:33		05:24	19:58 (1)	04:39	
	15:59	16:54		17:51	19:50		20:46	17 20:15 (23)	21:34	
6	08:27	07:48		06:47	06:30		05:22	19:57 (1)	04:38	
	16:00	16:56		17:53	19:52		20:48	20:17 (23)	21:35	
7	08:26	07:46		06:45	06:28		05:20	19:56 (1)	04:37	
	16:02	16:58		17:55	19:54		20:50	22 20:18 (23)	21:36	
8	08:26	07:44		06:42	06:26		05:18	19:55 (1)	04:37	
	16:03	17:00		17:57	19:55		20:51	25 20:20 (23)	21:37	
9	08:25	07:42		06:40	06:23		05:17	19:55 (1)	04:36	
	16:05	17:02		17:59	19:57		20:53	26 20:21 (23)	21:38	
10	08:24	07:40		06:37	06:21		05:15	19:54 (1)	04:36	
	16:06	17:05		18:00	19:59		20:55	26 20:20 (23)	21:39	
11	08:24	07:38		06:35	17:31 (18)	06:18	05:13	19:54 (1)	04:35	
	16:08	17:07		18:02	5 17:36 (18)	20:01	20:57	25 20:19 (23)	21:40	
12	08:23	07:36		06:32	17:28 (18)	06:16	05:11	19:54 (1)	04:35	
	16:09	17:09		18:04	9 17:37 (18)	20:03	20:59	25 20:19 (23)	21:41	
13	08:22	07:34		06:30	17:27 (18)	06:14	05:09	19:54 (1)	04:34	
	16:11	17:11		18:06	13 17:40 (18)	20:05	21:00	25 20:19 (1)	21:41	
14	08:21	07:32		06:27	17:26 (18)	06:11	19:20 (20)	05:07	19:53 (1)	04:34
	16:13	17:13		18:08	15 17:41 (18)	20:07	12 19:32 (20)	21:02	25 20:18 (1)	21:42
15	08:20	07:30		06:25	17:25 (18)	06:09	19:18 (20)	05:06	19:54 (1)	04:34
	16:14	17:15		18:10	18 17:43 (18)	20:09	20 19:40 (19)	21:04	25 20:19 (1)	21:43
16	08:19	07:28		06:23	17:25 (18)	06:06	19:16 (20)	05:04	19:54 (1)	04:34
	16:16	17:17		18:12	17 17:42 (18)	20:10	26 19:42 (19)	21:05	24 20:18 (1)	21:43
17	08:18	07:26		06:20	17:25 (18)	06:04	19:14 (20)	05:02	19:55 (1)	04:33
	16:18	17:19		18:14	17 17:42 (18)	20:12	30 19:44 (19)	21:07	23 20:18 (1)	21:44
18	08:17	07:24		06:18	17:25 (18)	06:02	19:14 (20)	05:01	19:54 (1)	04:33
	16:19	17:21		18:16	16 17:41 (18)	20:14	32 19:46 (19)	21:09	24 20:18 (1)	21:44
19	08:16	07:22		06:15	17:26 (18)	05:59	19:13 (20)	04:59	19:55 (1)	04:33
	16:21	17:23		18:18	14 17:40 (18)	20:16	35 19:48 (19)	21:10	23 20:18 (1)	21:45
20	08:15	07:19		06:13	17:26 (18)	05:57	19:12 (20)	04:58	19:55 (1)	04:34
	16:23	17:25		18:20	12 17:38 (18)	20:18	36 19:48 (19)	21:12	22 20:17 (1)	21:45
21	08:14	15:49 (17)	07:17	06:10	17:29 (18)	05:55	19:12 (20)	04:56	19:56 (1)	04:34
	16:25	1 15:50 (17)	17:27	18:22	7 17:36 (18)	20:20	36 19:48 (19)	21:14	20 20:16 (1)	21:45
22	08:12	15:48 (17)	07:15	06:08		05:52	19:11 (20)	04:55	19:57 (1)	04:34
	16:27	5 15:53 (17)	17:29	18:23		20:22	35 19:46 (19)	21:15	19 20:16 (1)	21:45
23	08:11	15:47 (17)	07:13	06:05		05:50	19:11 (20)	04:53	19:58 (1)	04:34
	16:29	7 15:54 (17)	17:31	18:25		20:24	34 19:45 (19)	21:17	18 20:16 (1)	21:45
24	08:10	15:47 (17)	07:10	06:03	17:58 (16)	05:48	19:11 (20)	04:52	19:59 (1)	04:34
	16:31	9 15:56 (17)	17:33	18:27	2 18:00 (16)	20:25	33 19:44 (19)	21:18	15 20:14 (1)	21:46
25	08:08	15:47 (17)	07:08	06:00	17:56 (16)	05:46	19:11 (20)	04:50	20:00 (1)	04:35
	16:32	12 15:59 (17)	17:35	18:29	6 18:02 (16)	20:27	29 19:41 (19)	21:20	13 20:13 (1)	21:46
26	08:07	15:47 (17)	07:06	05:58	17:55 (16)	05:43	19:12 (20)	04:49	20:02 (1)	04:35
	16:34	14 16:01 (17)	17:37	18:31	9 18:04 (16)	20:29	24 19:36 (20)	21:21	10 20:12 (1)	21:46
27	08:05	15:47 (17)	07:03	05:55	17:54 (16)	05:41	19:12 (20)	04:48	20:04 (1)	04:36
	16:36	15 16:02 (17)	17:39	18:33	12 18:06 (16)	20:31	24 19:36 (20)	21:23	6 20:10 (1)	21:45
28	08:04	15:48 (17)	07:01	05:53	17:54 (16)	05:39	19:13 (20)	04:47		04:36
	16:38	15 16:03 (17)	17:41	18:35	13 18:07 (16)	20:33	22 19:35 (20)	21:24		21:45
29	08:02	15:48 (17)		06:50	18:54 (16)	05:37	19:14 (20)	04:45		04:37
	16:40	15 16:03 (17)		19:37	14 19:08 (16)	20:35	20 19:34 (20)	21:26		21:45
30	08:00	15:48 (17)		06:48	18:54 (16)	05:35	19:15 (20)	04:44		04:37
	16:42	15 16:03 (17)		19:38	13 19:07 (16)	20:37	17 19:32 (20)	21:27		21:45
31	07:59	15:49 (17)		06:45	18:55 (16)			04:43		
	16:44	13 16:02 (17)		19:40	11 19:06 (16)			21:28		
	Sonnenscheinstunden	248	272	367	421		496		512	
	astr.max.mögl.Beschattung	121			223		472		523	
	Red.Sonnenscheinwahrsch.	0.17	0.24		0.31		0.41		0.51	
	Reduktion Betriebsdauer	0.90	0.90		0.90		0.90		0.90	
	Reduktion Windrichtung	0.69	0.69		0.68		0.64		0.64	
	Gesamte Reduktion	0.11	0.15		0.19		0.24		0.29	
	Met.wahrsch.Beschattung	13	3		43		112		153	

**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	

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BG - IO59

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:04 (1) 06:14	07:08	18:08 (18) 07:07	08:03
	21:45	21:09	26 20:30 (23) 20:01	18:46	10 18:18 (18) 16:35	15:50
2	04:39	05:20	20:04 (1) 06:16	07:10	18:09 (18) 07:09	08:05
	21:44	21:07	26 20:30 (23) 19:59	18:44	6 18:15 (18) 16:33	15:49
3	04:40	05:22	20:05 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	26 20:31 (23) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:04 (1) 06:19	07:14	07:13	08:08
	21:43	21:03	27 20:31 (23) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:05 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	25 20:30 (23) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:06 (1) 06:23	07:17	07:17	08:10
	21:42	20:59	22 20:28 (23) 19:49	18:34	16:25	15:46
7	04:43	05:29	20:06 (1) 06:25	07:19	07:19	08:12
	21:41	20:57	20 20:26 (23) 19:46	18:32	16:23	15:46
8	04:44	05:31	20:08 (1) 06:26	07:21	07:21	15:25 (17) 08:13
	21:41	20:55	16 20:24 (23) 19:44	18:29	16:21	3 15:28 (17) 15:45
9	04:45	05:32	20:10 (1) 06:28	07:23	07:23	15:22 (17) 08:14
	21:40	20:53	13 20:23 (23) 19:41	18:27	16:19	9 15:31 (17) 15:45
10	04:46	05:34	20:11 (1) 06:30	07:25	07:25	15:21 (17) 08:16
	21:39	20:51	9 20:20 (23) 19:39	18:24	16:18	11 15:32 (17) 15:45
11	04:48	05:36	19:27 (20) 06:32	07:27	07:27	15:21 (17) 08:17
	21:38	20:49	10 19:37 (20) 19:36	6 18:56 (16) 18:22	16:16	13 15:34 (17) 15:44
12	04:49	05:38	19:25 (20) 06:34	07:28	07:28	15:20 (17) 08:18
	21:37	20:47	14 19:39 (20) 19:34	10 18:58 (16) 18:20	16:14	15 15:35 (17) 15:44
13	04:50	05:40	19:22 (20) 06:35	07:30	07:31	15:20 (17) 08:19
	21:36	20:45	18 19:40 (20) 19:31	13 18:58 (16) 18:17	16:13	15 15:35 (17) 15:44
14	04:51	05:41	19:21 (20) 06:37	07:32	07:33	15:20 (17) 08:20
	21:35	20:43	20 19:41 (20) 19:29	14 18:58 (16) 18:15	16:11	15 15:35 (17) 15:44
15	04:52	05:43	19:20 (20) 06:39	07:34	07:35	15:20 (17) 08:21
	21:34	20:40	23 19:43 (20) 19:26	14 18:58 (16) 18:12	16:09	15 15:35 (17) 15:44
16	04:54	05:45	19:19 (20) 06:41	07:36	07:37	15:20 (17) 08:22
	21:33	20:38	23 19:42 (20) 19:24	12 18:56 (16) 18:10	16:08	14 15:34 (17) 15:44
17	04:55	20:12 (1) 05:47	19:18 (20) 06:43	07:38	07:38	15:20 (17) 08:23
	21:32	8 20:20 (1) 20:36	25 19:43 (20) 19:21	10 18:53 (16) 18:08	16:06	12 15:32 (17) 15:44
18	04:57	20:10 (1) 05:49	19:18 (20) 06:44	07:40	07:40	15:21 (17) 08:23
	21:30	12 20:22 (1) 20:34	30 19:48 (19) 19:19	6 18:50 (16) 18:05	16:05	9 15:30 (17) 15:44
19	04:58	20:09 (1) 05:50	19:17 (20) 06:46	07:42	07:42	15:21 (17) 08:24
	21:29	14 20:23 (1) 20:32	33 19:50 (19) 19:16	3 18:48 (16) 18:03	16:03	7 15:28 (17) 15:45
20	04:59	20:09 (1) 05:52	19:17 (20) 06:48	07:44	07:44	15:22 (17) 08:25
	21:28	16 20:25 (1) 20:29	34 19:51 (19) 19:14	18:01	16:02	5 15:27 (17) 15:45
21	05:01	20:07 (1) 05:54	19:17 (20) 06:50	07:46	07:46	15:25 (17) 08:25
	21:26	18 20:25 (1) 20:27	35 19:52 (19) 19:11	17:59	16:01	1 15:26 (17) 15:45
22	05:02	20:07 (1) 05:56	19:16 (20) 06:52	07:48	07:48	08:26
	21:25	20 20:27 (1) 20:25	36 19:52 (19) 19:09	4 18:19 (18) 17:56	15:59	15:46
23	05:04	20:06 (1) 05:58	19:16 (20) 06:53	07:50	07:49	08:27
	21:23	21 20:27 (1) 20:22	36 19:52 (19) 19:06	11 18:22 (18) 17:54	15:58	15:46
24	05:05	20:05 (1) 05:59	19:17 (20) 06:55	07:51	07:51	08:27
	21:22	22 20:27 (1) 20:20	34 19:51 (19) 19:04	14 18:24 (18) 17:52	15:57	15:47
25	05:07	20:05 (1) 06:01	19:17 (20) 06:57	07:53	07:53	08:27
	21:20	23 20:28 (1) 20:18	32 19:49 (19) 19:01	15 18:24 (18) 16:50	15:56	15:48
26	05:09	20:05 (1) 06:03	19:17 (20) 06:59	07:55	07:55	08:28
	21:19	23 20:28 (1) 20:15	29 19:46 (19) 18:59	17 18:24 (18) 16:47	15:54	15:48
27	05:10	20:05 (1) 06:05	19:18 (20) 07:01	07:57	07:56	08:28
	21:17	24 20:29 (1) 20:13	26 19:44 (19) 18:56	18 18:24 (18) 16:45	15:53	15:49
28	05:12	20:04 (1) 06:07	19:20 (20) 07:02	07:58	07:58	08:28
	21:16	25 20:29 (1) 20:11	20 19:42 (19) 18:54	18 18:24 (18) 16:43	15:52	15:50
29	05:14	20:04 (1) 06:08	19:21 (20) 07:04	07:01	08:00	08:28
	21:14	25 20:29 (1) 20:08	12 19:33 (20) 18:51	17 18:23 (18) 16:41	15:51	15:51
30	05:15	20:04 (1) 06:10	07:06	18:07 (18) 07:03	08:01	08:28
	21:12	25 20:29 (1) 20:06	18:49	13 18:20 (18) 16:39	15:51	15:52
31	05:17	20:04 (1) 06:12		07:05		08:28
	21:10	25 20:29 (1) 20:03		16:37		15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	301	700	215	16	144	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.63	0.64	0.68	0.68	0.69	
Gesamte Reduktion	0.25	0.28	0.25	0.20	0.13	
Met.wahrsch.Beschattung	77	196	53	3	19	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BH - IO60  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni				
1	08:28	07:57	15:51 (17)	06:59	06:43	18:59 (16)	05:33	19:23 (20)	04:42	20:08 (1)
	15:54	16:46	15 16:06 (17)	17:43	19:42	15 19:14 (16)	20:39	19:50 (20)	21:29	20:28 (1)
2	08:28	07:55	15:51 (17)	06:56	06:40	18:59 (16)	05:31	19:23 (20)	04:41	20:10 (1)
	15:55	16:48	14 16:05 (17)	17:45	19:44	14 19:13 (16)	20:40	19:49 (20)	21:31	20:28 (1)
3	08:28	07:54	15:52 (17)	06:54	06:38	19:00 (16)	05:28	19:23 (20)	04:40	20:10 (1)
	15:57	16:50	12 16:04 (17)	17:47	19:46	12 19:12 (16)	20:42	19:49 (20)	21:32	17 20:27 (1)
4	08:27	07:52	15:55 (17)	06:52	06:35	19:01 (16)	05:26	19:23 (20)	04:40	20:10 (1)
	15:58	16:52	9 16:04 (17)	17:49	19:48	8 19:09 (16)	20:44	19:48 (20)	21:33	17 20:27 (1)
5	08:27	07:50		06:49	06:33		05:24	19:23 (20)	04:39	20:11 (1)
	15:59	16:54		17:51	19:50		20:46	19:48 (20)	21:34	15 20:26 (1)
6	08:27	07:48		06:47	06:30		05:22	19:24 (20)	04:38	20:12 (1)
	16:00	16:56		17:53	19:52		20:48	19:47 (20)	21:35	14 20:26 (1)
7	08:26	07:46		06:45	06:28		05:20	19:25 (20)	04:37	20:13 (1)
	16:02	16:58		17:55	19:54		20:50	20:18 (23)	21:36	12 20:25 (1)
8	08:26	07:44		06:42	06:26		05:18	19:25 (20)	04:37	20:14 (1)
	16:03	17:00		17:57	19:55		20:51	20:20 (23)	21:37	11 20:25 (1)
9	08:25	07:42		06:40	06:23		05:17	19:27 (20)	04:36	20:15 (1)
	16:05	17:02		17:59	19:57		20:53	20:22 (23)	21:38	8 20:23 (1)
10	08:24	07:40		06:37	06:21		05:15	19:29 (20)	04:36	20:17 (1)
	16:06	17:05		18:00	19:59		20:55	20:24 (23)	21:39	6 20:23 (1)
11	08:24	07:38		06:35	06:18		05:13	19:31 (20)	04:35	20:19 (1)
	16:08	17:07		18:02	20:01		20:57	20:25 (23)	21:40	2 20:21 (1)
12	08:23	07:36		06:32	06:16		05:11	20:07 (1)	04:35	
	16:09	17:09		18:04	20:03		20:59	20:27 (23)	21:41	
13	08:22	07:34		06:30	06:14		05:09	20:06 (1)	04:34	
	16:11	17:11		18:06	20:05		21:00	20:28 (23)	21:41	
14	08:21	07:32		06:27	06:11		05:07	20:05 (1)	04:34	
	16:13	17:13		18:08	4 17:41 (18)	20:07	21:02	20:28 (23)	21:42	
15	08:20	07:30		06:25	17:35 (18)	06:09	19:45 (19)	20:05 (1)	04:34	
	16:14	17:15		18:10	8 17:43 (18)	20:09	21:04	20:29 (1)	21:43	
16	08:19	07:28		06:23	17:32 (18)	06:06	05:04	20:04 (1)	04:34	
	16:16	17:17		18:12	13 17:45 (18)	20:10	21:05	20:29 (1)	21:43	
17	08:18	07:26		06:20	17:32 (18)	06:04	05:02	20:05 (1)	04:34	
	16:18	17:19		18:14	15 17:47 (18)	20:12	21:07	20:29 (1)	21:44	
18	08:17	07:24		06:18	17:30 (18)	06:02	19:45 (19)	05:01	20:04 (1)	04:33
	16:19	17:21		18:16	18 17:48 (18)	20:14	1 19:46 (19)	21:09	20:29 (1)	21:44
19	08:16	07:22		06:15	17:30 (18)	05:59	19:43 (19)	04:59	20:04 (1)	04:33
	16:21	17:23		18:18	18 17:48 (18)	20:16	5 19:48 (19)	21:10	20:30 (1)	21:44
20	08:15	07:19		06:13	17:30 (18)	05:57	19:34 (20)	04:58	20:04 (1)	04:34
	16:23	17:25		18:20	18 17:48 (18)	20:18	16 19:50 (19)	21:12	20:29 (1)	21:45
21	08:14	07:17		06:10	17:30 (18)	05:55	19:31 (20)	04:56	20:04 (1)	04:34
	16:25	17:27		18:22	17 17:47 (18)	20:20	21 19:52 (19)	21:14	20:30 (1)	21:45
22	08:12	07:15		06:08	17:30 (18)	05:52	19:28 (20)	04:55	20:04 (1)	04:34
	16:27	17:29		18:23	16 17:46 (18)	20:22	24 19:52 (19)	21:15	20:30 (1)	21:45
23	08:11	07:13		06:05	17:31 (18)	05:50	19:27 (20)	04:53	20:05 (1)	04:34
	16:29	17:31		18:25	14 17:45 (18)	20:24	27 19:54 (19)	21:17	20:30 (1)	21:45
24	08:10	07:10		06:03	17:32 (18)	05:48	19:25 (20)	04:52	20:04 (1)	04:34
	16:31	17:33		18:27	11 17:43 (18)	20:25	30 19:55 (19)	21:18	20:29 (1)	21:46
25	08:08	07:08		06:00	17:37 (18)	05:46	19:25 (20)	04:50	20:05 (1)	04:35
	16:32	17:35		18:29	1 17:38 (18)	20:27	30 19:55 (19)	21:20	20:29 (1)	21:46
26	08:07	07:06		05:58		05:43	19:24 (20)	04:49	20:05 (1)	04:35
	16:34	17:37		18:31		20:29	30 19:54 (19)	21:21	20:29 (1)	21:46
27	08:05	07:03		05:55	18:04 (16)	05:41	19:23 (20)	04:48	20:06 (1)	04:36
	16:36	17:39		18:33	2 18:06 (16)	20:31	30 19:53 (19)	21:23	20:29 (1)	21:45
28	08:04	07:01		05:53	18:01 (16)	05:39	19:23 (20)	04:47	20:06 (1)	04:36
	16:38	17:41		18:35	6 18:07 (16)	20:33	29 19:52 (19)	21:24	20:29 (1)	21:45
29	08:02	07:00		06:50	19:00 (16)	05:37	19:23 (20)	04:45	20:07 (1)	04:37
	16:40	17:41		19:37	10 19:10 (16)	20:35	27 19:50 (19)	21:26	20:29 (1)	21:45
30	08:00	07:00		06:48	18:59 (16)	05:35	19:23 (20)	04:44	20:07 (1)	04:37
	16:42	17:41		19:38	12 19:11 (16)	20:37	27 19:50 (20)	21:27	20:29 (1)	21:45
31	07:59	07:00		06:45	18:59 (16)			04:43	20:08 (1)	04:37
	16:44	17:41		19:40	14 19:13 (16)			21:28	20:28 (1)	04:37
Sonnenscheinstunden	248	272	367	421	496	512				
astr.max.mögl.Beschattung	107	50	197	346	750	140				
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45				
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90				
Reduktion Windrichtung	0.69	0.69	0.68	0.64	0.63	0.63				
Gesamte Reduktion	0.11	0.15	0.19	0.24	0.29	0.26				
Met.wahrsch.Beschattung	12	8	38	82	218	36				

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BH - IO60

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:18 (1)   06:14	07:08	07:07	08:03
	21:45	21:09	19 20:37 (23)   20:01	18:46	16:35	15:50
2	04:39	20:22 (1)   05:20	19:41 (20)   06:16	07:10	07:09	08:05
	21:44	20:26 (1)   21:07	25 20:35 (23)   19:59	18:44	16:33	15:49
3	04:40	20:21 (1)   05:22	19:39 (20)   06:17	07:12	07:11	08:06
	21:44	20:28 (1)   21:05	26 20:33 (23)   19:56	18:41	16:31	15:48
4	04:40	20:20 (1)   05:24	19:36 (20)   06:19	07:14	07:13	08:08
	21:43	20:30 (1)   21:03	26 20:31 (23)   19:54	18:39	16:29	15:47
5	04:41	20:20 (1)   05:25	19:35 (20)   06:21	07:15	07:15	08:09
	21:43	20:31 (1)   21:01	25 20:30 (23)   19:51	18:37	16:27	15:47
6	04:42	20:19 (1)   05:27	19:35 (20)   06:23	07:17	07:17	08:10
	21:42	20:32 (1)   20:59	22 20:28 (23)   19:49	18:34	16:25	15:46
7	04:43	20:19 (1)   05:29	19:33 (20)   06:25	07:19	07:19	08:12
	21:41	20:33 (1)   20:57	23 19:56 (20)   19:46	18:32	16:23	15:46
8	04:44	20:18 (1)   05:31	19:33 (20)   06:26	18:57 (16)   07:21	07:21	15:23 (17)   08:13
	21:41	20:34 (1)   20:55	24 19:57 (20)   19:44	7 19:04 (16)   18:29	16:21	12 15:35 (17)   15:45
9	04:45	20:18 (1)   05:32	19:32 (20)   06:28	18:54 (16)   07:23	07:23	15:22 (17)   08:14
	21:40	20:35 (1)   20:53	26 19:58 (20)   19:41	11 19:05 (16)   18:27	16:19	14 15:36 (17)   15:45
10	04:46	20:17 (1)   05:34	19:31 (20)   06:30	18:52 (16)   07:25	07:25	15:21 (17)   08:16
	21:39	20:35 (1)   20:51	27 19:58 (20)   19:39	14 19:06 (16)   18:24	16:18	15 15:36 (17)   15:45
11	04:48	20:17 (1)   05:36	19:31 (20)   06:32	18:52 (16)   07:27	07:27	15:22 (17)   08:17
	21:38	20:36 (1)   20:49	27 19:58 (20)   19:36	14 19:06 (16)   18:22	16:16	16 15:38 (17)   15:44
12	04:49	20:16 (1)   05:38	19:31 (20)   06:34	18:51 (16)   07:28	07:29	15:22 (17)   08:18
	21:37	20:36 (1)   20:47	27 19:58 (20)   19:34	15 19:06 (16)   18:20	16:14	16 15:38 (17)   15:44
13	04:50	20:16 (1)   05:40	19:30 (20)   06:35	18:50 (16)   07:30	07:31	15:22 (17)   08:19
	21:36	20:37 (1)   20:45	28 19:58 (20)   19:31	13 19:03 (16)   18:17	16:13	16 15:38 (17)   15:44
14	04:51	20:15 (1)   05:41	19:30 (20)   06:37	18:51 (16)   07:32	07:33	15:22 (17)   08:20
	21:35	20:37 (1)   20:43	28 19:58 (19)   19:29	9 19:00 (16)   18:15	16:11	15 15:37 (17)   15:44
15	04:52	20:15 (1)   05:43	19:31 (20)   06:39	18:51 (16)   07:34	07:35	15:22 (17)   08:21
	21:34	20:37 (1)   20:40	29 20:00 (19)   19:26	7 18:58 (16)   18:12	16:09	13 15:35 (17)   15:44
16	04:54	20:15 (1)   05:45	19:30 (20)   06:41	18:53 (16)   07:36	07:37	15:23 (17)   08:22
	21:33	20:39 (1)   20:38	30 20:00 (19)   19:24	3 18:56 (16)   18:10	16:08	11 15:34 (17)   15:44
17	04:55	20:15 (1)   05:47	19:31 (20)   06:43	07:38	07:38	15:23 (17)   08:23
	21:32	20:39 (1)   20:36	30 20:01 (19)   19:21	18:08	16:06	9 15:32 (17)   15:44
18	04:57	20:14 (1)   05:49	19:31 (20)   06:44	07:40	07:40	15:24 (17)   08:23
	21:30	20:39 (1)   20:34	30 20:01 (19)   19:19	18:05	16:05	6 15:30 (17)   15:44
19	04:58	20:14 (1)   05:50	19:31 (20)   06:46	18:20 (18)   07:42	07:42	15:25 (17)   08:24
	21:29	20:39 (1)   20:32	30 20:01 (19)   19:16	9 18:29 (18)   18:03	16:03	3 15:28 (17)   15:45
20	04:59	20:15 (1)   05:52	19:32 (20)   06:48	18:18 (18)   07:44	07:44	15:25 (17)   08:25
	21:28	20:40 (1)   20:29	28 20:00 (19)   19:14	13 18:31 (18)   18:01	16:02	15:45
21	05:01	20:14 (1)   05:54	19:34 (20)   06:50	18:16 (18)   07:46	07:46	15:25 (17)   08:25
	21:26	20:40 (1)   20:27	24 19:58 (19)   19:11	15 18:31 (18)   17:59	16:01	15:45
22	05:02	20:15 (1)   05:56	19:35 (20)   06:52	18:15 (18)   07:48	07:48	15:26 (17)   08:26
	21:25	20:40 (1)   20:25	20 19:55 (19)   19:09	17 18:32 (18)   17:56	15:59	15:46
23	05:04	20:14 (1)   05:58	19:39 (20)   06:53	18:14 (18)   07:50	07:49	15:27 (17)   08:27
	21:23	20:40 (1)   20:22	14 19:53 (19)   19:06	18 18:32 (18)   17:54	15:58	15:46
24	05:05	20:14 (1)   05:59	19:47 (19)   06:55	18:14 (18)   07:51	07:51	15:28 (17)   08:27
	21:22	20:40 (1)   20:20	4 19:51 (19)   19:04	18 18:32 (18)   17:52	15:57	15:47
25	05:07	20:15 (1)   06:01	06:57	18:14 (18)   06:53	07:53	15:29 (17)   08:27
	21:20	20:40 (1)   20:18	19:01	18 18:32 (18)   16:50	15:56	15:48
26	05:09	20:14 (1)   06:03	06:59	18:13 (18)   06:55	07:55	15:30 (17)   08:28
	21:19	20:39 (1)   20:15	18:59	17 18:30 (18)   16:47	15:54	15:48
27	05:10	20:15 (1)   06:05	07:01	18:14 (18)   06:57	07:56	15:31 (17)   08:28
	21:17	20:40 (1)   20:13	18:56	13 18:27 (18)   16:45	15:53	15:49
28	05:12	20:15 (1)   06:07	07:02	18:15 (18)   06:59	07:58	15:32 (17)   08:28
	21:16	20:39 (1)   20:11	18:54	10 18:25 (18)   16:43	15:52	15:50
29	05:14	20:16 (1)   06:08	07:04	18:17 (18)   07:01	08:00	15:33 (17)   08:28
	21:14	20:39 (23)   20:08	18:51	6 18:23 (18)   16:41	15:51	15:51
30	05:15	20:16 (1)   06:10	07:06	07:03	08:01	15:34 (17)   08:28
	21:12	20:38 (23)   20:06	18:49	16:39	15:51	15:52
31	05:17	20:17 (1)   06:12	07:05	07:05	08:02	15:35 (17)   08:28
	21:10	20:38 (23)   20:03	16:37	328	257	15:53
Sonnenscheinstunden	514	461	383			231
astr.max.mögl.Beschattung	605	592	247		157	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40		0.21	
Reduktion Betriebsdauer	0.90	0.90	0.90		0.90	
Reduktion Windrichtung	0.63	0.63	0.68		0.69	
Gesamte Reduktion	0.25	0.28	0.25		0.13	
Met.wahrsch.Beschattung	153	165	61		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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BI - IO61  
**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  
 342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni						
1   08:28	07:57	15:56 (17)	06:59	06:43	19:06 (16)	05:33	19:34 (20)	04:42	20:13 (1)			
15:54	16:46	17 16:13 (17)	17:43	19:42	10 19:16 (16)	20:39	25 19:59 (20)	21:29	23 20:36 (1)			
2   08:28	07:55	15:56 (17)	06:56	06:40	19:04 (16)	05:31	19:33 (20)	04:41	20:14 (1)			
15:55	16:48	17 16:13 (17)	17:45	19:44	13 19:17 (16)	20:40	26 19:59 (20)	21:31	23 20:37 (1)			
3   08:28	07:54	15:57 (17)	06:54	06:38	19:05 (16)	05:28	19:33 (20)	04:40	20:14 (1)			
15:57	16:50	16 16:13 (17)	17:47	19:46	14 19:19 (16)	20:42	26 19:59 (20)	21:32	23 20:37 (1)			
4   08:27	07:52	15:58 (17)	06:52	06:35	19:04 (16)	05:26	19:32 (20)	04:40	20:14 (1)			
15:58	16:52	15 16:13 (17)	17:49	19:48	14 19:18 (16)	20:44	27 19:59 (20)	21:33	22 20:36 (1)			
5   08:27	07:50	15:59 (17)	06:49	06:33	19:05 (16)	05:24	19:32 (20)	04:39	20:15 (1)			
15:59	16:54	14 16:13 (17)	17:51	19:50	13 19:18 (16)	20:46	27 19:59 (20)	21:34	21 20:36 (1)			
6   08:27	07:48	16:00 (17)	06:47	06:30	19:05 (16)	05:22	19:32 (20)	04:38	20:16 (1)			
16:00	16:56	12 16:12 (17)	17:53	19:52	11 19:16 (16)	20:48	27 19:59 (20)	21:35	20 20:36 (1)			
7   08:26	07:46	16:01 (17)	06:45	06:28	19:07 (16)	05:20	19:32 (20)	04:37	20:16 (1)			
16:02	16:58	9 16:10 (17)	17:55	19:54	7 19:14 (16)	20:50	26 19:58 (20)	21:36	20 20:36 (1)			
8   08:26	07:44	06:42	06:42	06:26	19:08	05:18	19:32 (20)	04:37	20:17 (1)			
16:03	17:00	17:57	17:57	19:55	20:51	26 19:58 (20)	21:37	19 20:36 (1)				
9   08:25	07:42	06:40	06:40	06:23	05:17	19:35 (20)	04:36	20:17 (1)				
16:05	17:02	17:59	17:59	19:57	20:53	25 19:58 (20)	21:38	18 20:35 (1)				
10   08:24	07:40	06:37	06:37	06:21	05:15	19:33 (20)	04:36	20:18 (1)				
16:06	17:05	18:00	18:00	19:59	20:55	28 20:24 (23)	21:39	17 20:35 (1)				
11   08:24	07:38	06:35	06:35	06:18	05:13	19:34 (20)	04:35	20:19 (1)				
16:08	17:07	18:02	18:02	20:01	20:57	28 20:25 (23)	21:40	17 20:36 (1)				
12   08:23	07:36	06:32	06:32	06:16	05:11	19:35 (20)	04:35	20:18 (1)				
16:09	17:09	18:04	18:04	20:03	20:59	28 20:27 (23)	21:41	17 20:35 (1)				
13   08:22	07:34	06:30	06:30	06:14	05:09	19:35 (20)	04:34	20:19 (1)				
16:11	17:11	18:06	18:06	20:05	21:00	30 20:28 (23)	21:41	16 20:35 (1)				
14   08:21	07:32	06:27	06:27	06:11	05:07	19:36 (20)	04:34	20:20 (1)				
16:13	17:13	18:08	18:08	20:07	21:02	31 20:30 (23)	21:42	15 20:35 (1)				
15   08:20	07:30	06:25	06:25	06:09	05:06	19:38 (20)	04:34	20:20 (1)				
16:14	17:15	18:10	18:10	20:09	21:04	31 20:32 (23)	21:43	15 20:35 (1)				
16   08:19	07:28	06:23	06:23	06:06	05:04	19:40 (20)	04:34	20:21 (1)				
16:16	17:17	18:12	18:12	20:10	21:05	29 20:33 (23)	21:43	14 20:35 (1)				
17   08:18	07:26	06:20	06:20	17:45 (18)	06:04	05:02	19:44 (20)	04:34	20:21 (1)			
16:18	17:19	18:14	2 17:47 (18)	20:12	21:07	24 20:34 (1)	21:44	14 20:35 (1)				
18   08:17	07:24	06:18	17:41 (18)	06:02	05:01	20:12 (1)	04:33	20:22 (1)				
16:19	17:21	18:16	8 17:49 (18)	20:14	21:09	22 20:34 (1)	21:44	13 20:35 (1)				
19   08:16	07:22	06:15	17:40 (18)	05:59	04:59	20:12 (1)	04:33	20:22 (1)				
16:21	17:23	18:18	11 17:51 (18)	20:16	21:10	23 20:35 (1)	21:44	13 20:35 (1)				
20   08:15	07:19	06:13	17:38 (18)	05:57	04:58	20:11 (1)	04:34	20:22 (1)				
16:23	17:25	18:20	15 17:53 (18)	20:18	21:12	24 20:35 (1)	21:45	13 20:35 (1)				
21   08:14	07:17	06:10	17:38 (18)	05:55	19:50 (19)	04:56	20:11 (1)	04:34	20:22 (1)			
16:25	17:27	18:22	17 17:55 (18)	20:20	2 19:52 (19)	21:14	25 20:36 (1)	21:45	13 20:35 (1)			
22   08:12	07:15	06:08	17:36 (18)	05:52	19:47 (19)	04:55	20:12 (1)	04:34	20:22 (1)			
16:27	17:29	18:23	18 17:54 (18)	20:22	5 19:52 (19)	21:15	24 20:36 (1)	21:45	13 20:35 (1)			
23   08:11	07:13	06:05	17:37 (18)	05:50	19:46 (19)	04:53	20:12 (1)	04:34	20:23 (1)			
16:29	17:31	18:25	17 17:54 (18)	20:24	8 19:54 (19)	21:17	25 20:37 (1)	21:45	13 20:36 (1)			
24   08:10	07:10	06:03	17:36 (18)	05:48	19:45 (19)	04:52	20:11 (1)	04:34	20:23 (1)			
16:31	17:33	18:27	17 17:53 (18)	20:25	11 19:56 (19)	21:18	25 20:36 (1)	21:46	13 20:35 (1)			
25   08:08	07:08	06:00	17:37 (18)	05:46	19:42 (20)	04:50	20:11 (1)	04:35	20:23 (1)			
16:32	17:35	18:29	16 17:53 (18)	20:27	16 19:58 (19)	21:20	25 20:36 (1)	21:46	13 20:36 (1)			
26   08:07	16:00 (17)	07:06	17:37 (18)	05:43	19:39 (20)	04:49	20:11 (1)	04:35	20:23 (1)			
16:34	1 16:01 (17)	17:37	18:31	14 17:51 (18)	20:29	21 20:00 (19)	21:21	26 20:37 (1)	21:46	14 20:37 (1)		
27   08:05	15:58 (17)	07:03	05:55	17:39 (18)	05:41	19:37 (20)	04:48	20:12 (1)	04:36	20:23 (1)		
16:36	5 16:03 (17)	17:39	18:33	11 17:50 (18)	20:31	24 20:01 (19)	21:23	25 20:37 (1)	21:45	14 20:37 (1)		
28   08:04	15:58 (17)	07:01	05:53	17:41 (18)	05:39	19:36 (20)	04:47	20:12 (1)	04:36	20:23 (1)		
16:38	8 16:06 (17)	17:41	18:35	5 17:46 (18)	20:33	24 20:00 (19)	21:24	25 20:37 (1)	21:45	15 20:38 (1)		
29   08:02	15:57 (17)	07:00	06:50	19:37	05:37	19:35 (20)	04:45	20:12 (1)	04:37	20:22 (1)		
16:40	11 16:08 (17)	17:42	19:37	20:35	25 20:00 (19)	21:26	25 20:37 (1)	21:45	16 20:38 (1)			
30   08:00	15:57 (17)	07:00	06:48	19:07 (16)	05:35	19:34 (20)	04:44	20:12 (1)	04:37	20:23 (1)		
16:42	13 16:10 (17)	17:44	19:38	4 19:11 (16)	20:37	25 19:59 (19)	21:27	25 20:37 (1)	21:45	16 20:39 (1)		
31   07:59	15:56 (17)	07:00	06:45	19:06 (16)	05:34	19:33 (20)	04:43	20:13 (1)	21:45			
16:44	16 16:12 (17)	17:46	19:40	7 19:13 (16)	20:38	21:28	23 20:36 (1)					
Sonnenscheinstunden	248	272	367	421	496	512	512	493	493	493	493	493
astr.max.mögl.Beschattung	54	100	162	243	306	306	306	293	293	293	293	293
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.51	0.51	0.49	0.49	0.49	0.49	0.49
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Reduktion Windrichtung	0.70	0.70	0.68	0.65	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Gesamte Reduktion	0.11	0.15	0.19	0.24	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Met.wahrsch.Beschattung	6	15	31	58	86	106	106	106	106	106	106	106

**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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BI - IO61

#### 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  
342 326 396 565 523 733 981 1.012 1.213 924 351 7.888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

		Juli		August		September		Oktober		November		Dezember			
1	04:38	20:23 (1)	05:19	19:45 (20)	06:14	07:08	07:07						08:03		
	21:45	17	20:40 (1)	21:09	29	20:37 (23)	20:01	18:46	16:35				15:50		
2	04:39	20:22 (1)	05:20	19:44 (20)	06:16	07:10	07:09						08:05		
	21:44	18	20:40 (1)	21:07	28	20:35 (23)	19:59	18:44	16:33				15:49		
3	04:40	20:22 (1)	05:22	19:43 (20)	06:17	07:12	07:11					15:33 (17)	08:06		
	21:44	18	20:40 (1)	21:05	27	20:33 (23)	19:56	18:41	16:31	4		15:37 (17)	15:48		
4	04:40	20:22 (1)	05:24	19:42 (20)	06:19	07:14	07:13						08:08		
	21:43	19	20:41 (1)	21:03	25	20:07 (20)	19:54	18:39	16:29	10		15:40 (17)	15:47		
5	04:41	20:22 (1)	05:25	19:42 (20)	06:21			19:04 (16)	07:15				15:30 (17)		
	21:43	20	20:42 (1)	21:01	26	20:08 (20)	19:51	6	19:10 (16)	18:37		16:27	12	15:42 (17)	15:47
6	04:42	20:22 (1)	05:27	19:42 (20)	06:23				19:01 (16)	07:17					08:10
	21:42	20	20:42 (1)	20:59	27	20:09 (20)	19:49	11	19:12 (16)	18:34		16:25	14	15:43 (17)	15:46
7	04:43	20:22 (1)	05:29	19:41 (20)	06:25				19:00 (16)	07:19				15:28 (17)	08:12
	21:41	21	20:43 (1)	20:57	27	20:08 (20)	19:46	13	19:13 (16)	18:32		16:23	15	15:43 (17)	15:46
8	04:44	20:22 (1)	05:31	19:41 (20)	06:26				18:59 (16)	07:21				15:27 (17)	08:13
	21:41	21	20:43 (1)	20:55	27	20:08 (20)	19:44	15	19:14 (16)	18:29		16:21	17	15:44 (17)	15:45
9	04:45	20:22 (1)	05:32	19:42 (20)	06:28				18:58 (16)	07:23				15:27 (17)	08:14
	21:40	22	20:44 (1)	20:53	26	20:08 (20)	19:41	15	19:13 (16)	18:27		16:19	17	15:44 (17)	15:45
10	04:46	20:22 (1)	05:34	19:41 (20)	06:30				18:58 (16)	07:25				15:27 (17)	08:16
	21:39	22	20:44 (1)	20:51	26	20:07 (20)	19:39	12	19:10 (16)	18:24		16:18	17	15:44 (17)	15:45
11	04:48	20:21 (1)	05:36	19:42 (20)	06:32				18:58 (16)	07:27				15:28 (17)	08:17
	21:38	24	20:45 (1)	20:49	25	20:07 (20)	19:36	10	19:08 (16)	18:22		16:16	15	15:43 (17)	15:44
12	04:49	20:21 (1)	05:38	19:42 (20)	06:34				18:58 (16)	07:28				15:29 (17)	08:18
	21:37	24	20:45 (1)	20:47	25	20:07 (20)	19:34	8	19:06 (16)	18:20		16:14	12	15:41 (17)	15:44
13	04:50	20:21 (1)	05:40	19:42 (20)	06:35				18:58 (16)	07:30				15:29 (17)	08:19
	21:36	24	20:45 (1)	20:45	24	20:06 (19)	19:31	5	19:03 (16)	18:17		16:13	10	15:39 (17)	15:44
14	04:51	20:21 (1)	05:41	19:43 (20)	06:37					07:32				15:30 (17)	08:20
	21:35	24	20:45 (1)	20:43	24	20:07 (19)	19:29			18:15		16:11	7	15:37 (17)	15:44
15	04:52	20:21 (1)	05:43	19:44 (20)	06:39				18:33 (18)	07:34				15:31 (17)	08:21
	21:34	24	20:45 (1)	20:40	24	20:08 (19)	19:26	2	18:35 (18)	18:12		16:09	4	15:35 (17)	15:44
16	04:54	20:21 (1)	05:45	19:44 (20)	06:41				18:29 (18)	07:36				15:33 (17)	08:22
	21:33	25	20:46 (1)	20:38	23	20:07 (19)	19:24	10	18:39 (18)	18:10		16:08	1	15:34 (17)	15:44
17	04:55	20:21 (1)	05:47	19:46 (20)	06:43				18:26 (18)	07:38				15:33 (17)	08:23
	21:32	25	20:46 (1)	20:36	20	20:06 (19)	19:21	13	18:39 (18)	18:08		16:06		15:44	
18	04:57	20:21 (1)	05:49	19:49 (20)	06:44				18:25 (18)	07:40				15:40	08:23
	21:30	25	20:46 (1)	20:34	15	20:04 (19)	19:19	15	18:40 (18)	18:05		16:05		15:44	
19	04:58	20:21 (1)	05:50	19:51 (19)	06:46				18:24 (18)	07:42				15:42	08:24
	21:29	25	20:46 (1)	20:32	11	20:02 (19)	19:16	17	18:41 (18)	18:03		16:03		15:45	
20	04:59	20:21 (1)	05:52	19:52 (19)	06:48				18:23 (18)	07:44				15:44	08:25
	21:28	25	20:46 (1)	20:29	8	20:00 (19)	19:14	18	18:41 (18)	18:01		16:02		15:45	
21	05:01	20:21 (1)	05:54	19:53 (19)	06:50				18:22 (18)	07:46				15:46	08:25
	21:26	25	20:46 (1)	20:27	5	19:58 (19)	19:11	18	18:40 (18)	17:59		16:01		15:45	
22	05:02	20:22 (1)	05:56	19:54 (19)	06:52				18:22 (18)	07:48				15:46	08:26
	21:25	25	20:47 (1)	20:25	1	19:55 (19)	19:09	18	18:40 (18)	17:56		15:59		15:46	
23	05:04	20:22 (1)	05:58		06:53				18:22 (18)	07:50				15:47	08:27
	21:23	24	20:46 (1)	20:22		19:06	16	18:38 (18)	17:54			15:58		15:46	
24	05:06	20:22 (1)	05:59		06:55				18:23 (18)	07:51				15:47	08:27
	21:22	23	20:45 (1)	20:20		19:04	12	18:35 (18)	17:52			15:57		15:47	
25	05:07	20:23 (1)	06:01		06:57				18:24 (18)	06:53				15:48	08:27
	21:20	22	20:45 (1)	20:18		19:01	9	18:33 (18)	16:50			15:56		15:48	
26	05:09	20:23 (1)	06:03		06:59				18:25 (18)	06:55				15:48	08:28
	21:19	21	20:44 (1)	20:15		18:59	5	18:30 (18)	16:47			15:54		15:48	
27	05:10	19:52 (20)	06:05		07:01				06:57	07:56				15:48	08:28
	21:17	27	20:44 (23)	20:13		18:56			16:45	15:53				15:49	
28	05:12	19:49 (20)	06:07		07:02				06:59	07:58				15:49	08:28
	21:16	30	20:42 (23)	20:11		18:54			16:43	15:52				15:50	
29	05:14	19:48 (20)	06:08		07:04				07:01	08:00				15:50	08:28
	21:14	30	20:41 (23)	20:08		18:51			16:41	15:51				15:51	
30	05:15	19:46 (20)	06:10		07:06				07:03	08:01				15:51	08:28
	21:12	31	20:39 (23)	20:06		18:49			16:39	15:51				15:52	
31	05:17	19:45 (20)	06:12						07:05					15:52	08:28
	21:10	29	20:38 (23)	20:03					16:37					15:53	
	Sonnenscheinstunden	514		461		383			328		257			231	
	astr.max.mögl.Beschattung	730		473		248					155				
	Red.Sonnenscheinwahrsch.	0.44		0.48		0.40					0.21				
	Reduktion Betriebsdauer	0.90		0.90		0.90					0.90				
	Reduktion Windrichtung	0.63		0.64		0.68					0.70				
	Gesamte Reduktion	0.25		0.28		0.25					0.13				
	Met.wahrsch.Beschattung	184		132		61					20				

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	

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BJ - IO62

**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  
 342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni					
1	08:28	14:50 (21) 07:57	16:01 (17) 06:59	06:43	18:48 (18) 05:33	19:52 (19) 04:42	20:23 (1)				
	15:54	11 15:01 (21) 16:46	13 16:14 (17) 17:43	19:42	7 18:55 (18) 20:39	17 20:09 (19) 21:29	25 20:48 (1)				
2	08:28	14:52 (21) 07:55	16:01 (17) 06:56	06:40	19:15 (16) 05:31	19:52 (19) 04:41	20:24 (1)				
	15:55	9 15:01 (21) 16:48	15 16:16 (17) 17:45	19:44	2 19:17 (16) 20:40	16 20:08 (19) 21:31	25 20:49 (1)				
3	08:28	14:52 (21) 07:54	16:00 (17) 06:54	06:38	19:13 (16) 05:28	19:53 (19) 04:40	20:24 (1)				
	15:57	8 15:00 (21) 16:50	17 16:17 (17) 17:47	19:46	6 19:19 (16) 20:42	15 20:08 (19) 21:32	25 20:49 (1)				
4	08:27	14:54 (21) 07:52	16:01 (17) 06:52	06:35	19:12 (16) 05:26	19:52 (20) 04:40	20:24 (1)				
	15:58	6 15:00 (21) 16:52	18 16:19 (17) 17:49	19:48	8 19:20 (16) 20:44	16 20:08 (20) 21:33	25 20:49 (1)				
5	08:27	14:55 (21) 07:50	16:02 (17) 06:49	06:33	19:11 (16) 05:24	19:50 (20) 04:39	20:23 (1)				
	15:59	4 14:59 (21) 16:54	17 16:19 (17) 17:51	19:50	12 19:23 (16) 20:46	19 20:09 (20) 21:34	26 20:49 (1)				
6	08:27	14:59 (21) 07:48	16:02 (17) 06:47	06:30	19:10 (16) 05:22	19:49 (20) 04:38	20:24 (1)				
	16:00	16:56	16 16:18 (17) 17:53	19:52	14 19:24 (16) 20:48	21 20:10 (20) 21:35	26 20:50 (1)				
7	08:26	16:46	16:02 (17) 06:45	06:28	19:10 (16) 05:20	19:48 (20) 04:37	20:24 (1)				
	16:02	16:58	15 16:17 (17) 17:55	19:54	15 19:25 (16) 20:50	23 20:11 (20) 21:36	25 20:49 (1)				
8	08:26	16:44	16:03 (17) 06:42	06:26	19:11 (16) 05:18	19:47 (20) 04:37	20:25 (1)				
	16:03	17:00	13 16:16 (17) 17:57	19:55	14 19:25 (16) 20:51	24 20:11 (20) 21:37	25 20:50 (1)				
9	08:25	17:42	16:04 (17) 06:40	06:23	19:11 (16) 05:17	19:47 (20) 04:36	20:24 (1)				
	16:05	17:03	11 16:15 (17) 17:59	19:57	12 19:23 (16) 20:53	25 20:12 (20) 21:38	25 20:49 (1)				
10	08:24	17:40	16:06 (17) 06:37	06:21	19:12 (16) 05:15	19:46 (20) 04:36	20:25 (1)				
	16:06	17:05	7 16:13 (17) 18:00	19:59	10 19:22 (16) 20:55	26 20:12 (20) 21:39	25 20:50 (1)				
11	08:24	17:38	06:35	06:18	19:14 (16) 05:13	19:46 (20) 04:35	20:26 (1)				
	16:08	17:07	18:02	20:01	5 19:19 (16) 20:57	26 20:12 (20) 21:40	25 20:51 (1)				
12	08:23	17:36	06:32	06:16	05:11	19:46 (20) 04:35	20:25 (1)				
	16:09	17:09	18:04	20:03	20:59	27 20:13 (20) 21:41	25 20:50 (1)				
13	08:22	17:34	06:30	06:14	05:09	19:46 (20) 04:34	20:26 (1)				
	16:11	17:11	18:06	20:05	21:00	27 20:13 (20) 21:41	24 20:50 (1)				
14	08:21	17:32	06:27	06:11	05:07	19:45 (20) 04:34	20:26 (1)				
	16:13	17:13	18:08	20:07	21:02	28 20:30 (23) 21:42	25 20:51 (1)				
15	08:20	17:30	06:25	06:09	05:06	19:46 (20) 04:34	20:26 (1)				
	16:14	17:15	18:10	20:09	21:04	31 20:32 (23) 21:43	25 20:51 (1)				
16	08:19	17:28	06:23	06:06	05:04	19:45 (20) 04:34	20:27 (1)				
	16:16	17:17	18:12	20:10	21:05	33 20:33 (23) 21:43	24 20:51 (1)				
17	08:18	17:26	06:20	06:04	05:02	19:46 (20) 04:34	20:27 (1)				
	16:18	17:19	18:14	20:12	21:07	35 20:35 (23) 21:44	24 20:51 (1)				
18	08:17	17:24	06:18	06:02	05:01	19:46 (20) 04:33	20:27 (1)				
	16:19	17:21	18:16	20:14	21:09	35 20:36 (23) 21:44	25 20:52 (1)				
19	08:16	17:22	06:15	05:59	04:59	19:47 (20) 04:33	20:27 (1)				
	16:21	17:23	18:18	20:16	21:10	36 20:38 (23) 21:44	25 20:52 (1)				
20	08:15	17:19	06:13	05:57	04:58	19:46 (20) 04:34	20:28 (1)				
	16:23	17:25	18:20	20:18	21:12	37 20:38 (23) 21:45	24 20:52 (1)				
21	08:14	17:17	06:10	05:55	04:56	19:47 (20) 04:34	20:28 (1)				
	16:25	17:27	18:22	4 17:55 (18) 20:20	21:14	37 20:40 (23) 21:45	24 20:52 (1)				
22	08:12	17:15	06:08	05:52	04:55	19:48 (20) 04:34	20:28 (1)				
	16:27	17:29	18:23	8 17:56 (18) 20:22	21:15	38 20:42 (1) 21:45	24 20:52 (1)				
23	08:11	17:13	06:05	05:50	04:53	19:49 (20) 04:34	20:29 (1)				
	16:29	17:31	18:25	13 17:59 (18) 20:24	21:17	40 20:44 (1) 21:45	24 20:53 (1)				
24	08:10	17:10	06:03	05:48	04:52	19:49 (20) 04:34	20:28 (1)				
	16:31	17:33	18:27	15 18:00 (18) 20:25	21:18	39 20:44 (1) 21:46	25 20:53 (1)				
25	08:08	17:08	06:00	05:46	04:50	19:50 (20) 04:35	20:28 (1)				
	16:32	17:35	18:29	18 18:02 (18) 20:27	21:20	40 20:45 (1) 21:46	25 20:53 (1)				
26	08:07	17:06	05:58	05:43	04:49	19:51 (20) 04:35	20:29 (1)				
	16:34	17:37	18:31	18 18:01 (18) 20:29	4 20:00 (19) 21:21	39 20:46 (1) 21:46	24 20:53 (1)				
27	08:05	17:03	05:55	05:41	04:48	19:53 (20) 04:36	20:29 (1)				
	16:36	17:39	18:33	18 18:01 (18) 20:31	7 20:02 (19) 21:23	37 20:47 (1) 21:45	24 20:53 (1)				
28	08:04	17:01	05:53	05:39	04:47	19:54 (20) 04:36	20:29 (1)				
	16:38	17:41	18:35	17 18:00 (18) 20:33	10 20:04 (19) 21:24	35 20:47 (1) 21:45	25 20:54 (1)				
29	08:02	16:04 (17) 17:41	06:50	05:37	04:45	19:56 (20) 04:37	20:29 (1)				
	16:40	4 16:08 (17) 17:41	19:37	17 19:00 (18) 20:35	12 20:05 (19) 21:26	32 20:47 (1) 21:45	25 20:54 (1)				
30	08:00	16:02 (17) 17:41	06:48	05:35	04:44	19:59 (20) 04:37	20:29 (1)				
	16:42	8 16:10 (17) 17:41	19:38	15 18:58 (18) 20:37	14 20:07 (19) 21:27	28 20:48 (1) 21:45	25 20:54 (1)				
31	07:59	16:02 (17) 17:41	06:45	05:33	04:43	20:23 (1) 21:45	25 20:54 (1)				
	16:44	10 16:12 (17) 17:41	19:40	12 18:57 (18) 20:37	21:28	25 20:48 (1) 21:45	25 20:54 (1)				
Sonnenscheinstunden	248	272	367	421	496	512					
astr.max.mögl.Beschattung	60	142	155	152	907	743					
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45					
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90					
Reduktion Windrichtung	0.69	0.70	0.68	0.65	0.63	0.62					
Gesamte Reduktion	0.11	0.15	0.19	0.24	0.29	0.26					
Met.wahrsch.Beschattung	6	22	30	37	264	190					

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BJ - IO62

#### 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  
342 326 396 565 523 523 733 981 1.012 1.213 924 351 7.888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember				
1	04:38		20:30 (1)	05:19	19:56 (20)	06:14	19:14 (16)	07:08	07:07	15:36 (17)	08:03				
	21:45	25	20:55 (1)	21:09	20:23 (20)	20:01	5	19:19 (16)	18:46	16:35	7	15:43 (17)	15:50		
2	04:39		20:29 (1)	05:20	19:56 (20)	06:16		07:09	15:34 (17)	08:05					
	21:44	25	20:54 (1)	21:07	20:23 (20)	19:59	10	19:20 (16)	18:44	16:33	11	15:45 (17)	15:49		
3	04:40		20:30 (1)	05:22	19:57 (20)	06:17		07:12	15:32 (17)	08:06					
	21:44	25	20:55 (1)	21:05	20:23 (20)	19:56	12	19:21 (16)	18:41	16:31	14	15:46 (17)	15:48		
4	04:40		20:30 (1)	05:24	19:56 (20)	06:19		07:14	15:31 (17)	08:08					
	21:43	25	20:55 (1)	21:03	20:21 (20)	19:54	14	19:22 (16)	18:39	16:29	16	15:47 (17)	15:47		
5	04:41		20:30 (1)	05:25	19:57 (20)	06:21		07:15	15:32 (17)	08:09					
	21:43	26	20:56 (1)	21:01	20:21 (20)	19:51	16	19:22 (16)	18:37	16:27	16	15:48 (17)	15:47		
6	04:42		20:31 (1)	05:27	19:58 (20)	06:23		07:17	15:31 (17)	08:10					
	21:42	25	20:56 (1)	20:59	20:21 (20)	19:49	14	19:20 (16)	18:34	16:25	17	15:48 (17)	15:46		
7	04:43		20:31 (1)	05:29	19:59 (20)	06:25		07:19	15:31 (17)	08:12			14:43 (21)		
	21:41	25	20:56 (1)	20:57	20:19 (20)	19:46	12	19:18 (16)	18:32	16:23	17	15:48 (17)	15:46	3	14:46 (21)
8	04:44		20:31 (1)	05:31	20:00 (20)	06:26		07:21	15:31 (17)	08:13				14:41 (21)	
	21:41	25	20:56 (1)	20:55	20:18 (20)	19:44	9	19:16 (16)	18:29	16:21	17	15:48 (17)	15:45	6	14:47 (21)
9	04:45		20:31 (1)	05:32	20:02 (19)	06:28		07:23	15:31 (17)	08:14				14:41 (21)	
	21:40	25	20:56 (1)	20:53	20:17 (19)	19:41	6	19:13 (16)	18:27	16:19	15	15:46 (17)	15:45	8	14:49 (21)
10	04:46		20:31 (1)	05:34	20:01 (19)	06:30		07:25	15:32 (17)	08:16				14:41 (21)	
	21:39	26	20:57 (1)	20:51	20:17 (19)	19:39	2	19:10 (16)	18:24	16:18	12	15:44 (17)	15:45	9	14:50 (21)
11	04:48		20:32 (1)	05:36	20:01 (19)	06:32		07:27	15:33 (17)	08:17				14:41 (21)	
	21:38	24	20:56 (1)	20:49	20:17 (19)	19:36	5	18:46 (18)	18:22	16:16	10	15:43 (17)	15:44	10	14:51 (21)
12	04:49		20:32 (1)	05:38	20:01 (19)	06:34		07:28	15:34 (17)	08:18				14:40 (21)	
	21:37	24	20:56 (1)	20:47	20:17 (19)	19:34	11	18:49 (18)	18:20	16:14	7	15:41 (17)	15:44	11	14:51 (21)
13	04:50		20:32 (1)	05:40	20:00 (19)	06:35		07:30	15:36 (17)	08:19				14:40 (21)	
	21:36	24	20:56 (1)	20:45	20:14 (19)	19:31	14	18:49 (18)	18:17	16:13	3	15:39 (17)	15:44	12	14:52 (21)
14	04:51		20:05 (20)	05:41	20:01 (19)	06:37		07:32	15:33 (17)	08:20				14:41 (21)	
	21:35	31	20:56 (1)	20:43	20:12 (19)	19:29	16	18:50 (18)	18:15	16:11				14:53 (21)	
15	04:52		20:03 (20)	05:43	20:01 (19)	06:39		07:34	15:35 (17)	08:21				14:41 (21)	
	21:34	35	20:56 (1)	20:40	20:11 (19)	19:26	18	18:51 (18)	18:12	16:09				14:53 (21)	
16	04:54		20:03 (20)	05:45	20:01 (19)	06:41		07:36	15:37 (17)	08:22				14:41 (21)	
	21:33	36	20:56 (1)	20:38	20:08 (19)	19:24	18	18:51 (18)	18:10	16:08				14:54 (21)	
17	04:55		20:01 (20)	05:47	20:03 (19)	06:43		07:38	15:38 (17)	08:23				14:42 (21)	
	21:32	39	20:56 (1)	20:36	20:06 (19)	19:21	19	18:50 (18)	18:08	16:06				14:55 (21)	
18	04:57		20:00 (20)	05:49		06:44		07:40	15:40 (17)	08:24				14:42 (21)	
	21:30	39	20:55 (1)	20:34	19:19	17	18:49 (18)	18:05	16:05	15:44	13	14:55 (21)		14:55 (21)	
19	04:58		19:59 (20)	05:50		06:46		07:42	15:42 (17)	08:24				14:43 (21)	
	21:29	39	20:54 (1)	20:32	19:16	16	18:48 (18)	18:03	16:03	15:45	13	14:56 (21)		14:56 (21)	
20	04:59		19:59 (20)	05:52		06:48		07:44	15:44 (17)	08:25				14:43 (21)	
	21:28	40	20:54 (1)	20:29	19:14	13	18:33 (18)	07:44	16:02	15:45	13	14:56 (21)		14:56 (21)	
21	05:01		19:58 (20)	05:54		06:50		07:46	15:46 (17)	08:25				14:44 (21)	
	21:26	38	20:52 (1)	20:27	19:11	9	18:42 (18)	17:59	16:01	15:45	13	14:57 (21)		14:57 (21)	
22	05:02		19:58 (20)	05:56		06:52		07:48	15:48 (17)	08:26				14:44 (21)	
	21:25	38	20:52 (23)	20:25	19:09	5	18:40 (18)	17:56	15:59	15:46	13	14:57 (21)		14:57 (21)	
23	05:04		19:57 (20)	05:58		06:53		07:50	15:50 (17)	08:27				14:45 (21)	
	21:23	38	20:50 (23)	20:22	19:06			17:54	15:58 (17)	15:46	13	14:58 (21)		14:58 (21)	
24	05:06		19:57 (20)	05:59		06:55		07:51	15:51 (17)	08:27				14:45 (21)	
	21:22	36	20:48 (23)	20:20	19:04			17:52	15:57 (17)	15:47	13	14:58 (21)		14:58 (21)	
25	05:07		19:57 (20)	06:01		06:57		07:53	15:53 (17)	08:27				14:45 (21)	
	21:20	36	20:47 (23)	20:18	19:01			16:50	15:56 (17)	15:48	13	14:58 (21)		14:58 (21)	
26	05:09		19:56 (20)	06:03		06:59		07:55	15:55 (17)	08:28				14:46 (21)	
	21:19	34	20:45 (23)	20:15	18:59			16:47	15:54 (17)	15:48	13	14:59 (21)		14:59 (21)	
27	05:10		19:56 (20)	06:05		07:01		07:57	15:56 (17)	08:28				14:46 (21)	
	21:17	33	20:44 (23)	20:13	18:56			16:45	15:53 (17)	15:49	13	14:59 (21)		14:59 (21)	
28	05:12		19:56 (20)	06:07		07:02		07:58	15:58 (17)	08:28				14:48 (21)	
	21:16	31	20:42 (23)	20:11	18:54			16:43	15:52 (17)	15:50	12	15:00 (21)		15:00 (21)	
29	05:14		19:56 (20)	06:08		07:04		08:00	15:59 (17)	08:28				14:47 (21)	
	21:14	29	20:41 (23)	20:08	18:51			16:41	15:51 (17)	15:51	12	14:59 (21)		14:59 (21)	
30	05:15		19:55 (20)	06:10		07:06		08:01	15:59 (17)	08:28				14:48 (21)	
	21:12	28	20:23 (20)	20:06	18:49			16:39	15:51 (17)	15:52	12	15:00 (21)		15:00 (21)	
31	05:17		19:56 (20)	06:12				07:05	15:57 (17)	08:28				14:49 (21)	
	21:10	27	20:23 (20)	20:03				16:37	15:53 (17)	15:53	11	15:00 (21)		15:00 (21)	
Sonnenscheinstunden	514		461		383			328	257	231					
astr.max.mögl.Beschattung	951		298		261			162		286					
Red.Sonnenscheinwahrsch.	0.44		0.48		0.40			0.21		0.14					
Reduktion Betriebsdauer	0.90		0.90		0.90			0.90		0.90					
Reduktion Windrichtung	0.63		0.64		0.67			0.70		0.68					
Gesamte Reduktion	0.25		0.28		0.25			0.13		0.09					
Met.wahrsch.Beschattung	240		83		64			21		24					

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)	
	Sonnennuntergang (SS:MM)			Zeitpunkt (SS:MM) Schattende		(WEA mit letztem Schatten)	



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BK - IO63  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni						
1	08:28	07:57	15:51 (17)	06:59	06:43	19:05 (16)	05:33	19:36 (20)	04:42	20:14 (1)		
	15:54	16:46	17 16:08 (17)	17:43	19:42	11 19:16 (16)	20:39	24 20:00 (19)	21:29	26 20:40 (1)		
2	08:28	07:55	15:52 (17)	06:56	06:40	19:04 (16)	05:31	19:35 (20)	04:41	20:15 (1)		
	15:55	16:48	16 16:08 (17)	17:45	19:44	13 19:17 (16)	20:40	25 20:00 (20)	21:31	26 20:41 (1)		
3	08:28	07:54	15:52 (17)	06:54	06:38	19:04 (16)	05:28	19:34 (20)	04:40	20:15 (1)		
	15:57	16:50	15 16:07 (17)	17:47	19:46	15 19:19 (16)	20:42	27 20:01 (20)	21:32	26 20:41 (1)		
4	08:27	07:52	15:54 (17)	06:52	06:35	19:03 (16)	05:26	19:33 (20)	04:40	20:15 (1)		
	15:58	16:52	13 16:07 (17)	17:49	19:48	15 19:18 (16)	20:44	28 20:01 (20)	21:33	26 20:41 (1)		
5	08:27	07:50	15:56 (17)	06:49	06:33	19:04 (16)	05:24	19:33 (20)	04:39	20:15 (1)		
	15:59	16:54	10 16:06 (17)	17:51	19:50	14 19:18 (16)	20:46	28 20:01 (20)	21:34	25 20:40 (1)		
6	08:27	07:48	15:58 (17)	06:47	06:30	19:04 (16)	05:22	19:33 (20)	04:38	20:16 (1)		
	16:00	16:56	6 16:04 (17)	17:53	19:52	12 19:16 (16)	20:48	28 20:01 (20)	21:35	25 20:41 (1)		
7	08:26	07:46		06:45	06:28	19:06 (16)	05:20	19:32 (20)	04:37	20:16 (1)		
	16:02	16:58		17:55	19:54	8 19:14 (16)	20:50	29 20:01 (20)	21:36	24 20:40 (1)		
8	08:26	07:44		06:42	06:26		05:18	19:32 (20)	04:37	20:17 (1)		
	16:03	17:00		17:57	19:55		20:51	28 20:00 (20)	21:37	24 20:41 (1)		
9	08:25	07:42		06:40	06:23		05:17	19:34 (20)	04:36	20:17 (1)		
	16:05	17:03		17:59	19:57		20:53	28 20:01 (20)	21:38	23 20:40 (1)		
10	08:24	07:40		06:37	06:21		05:15	19:33 (20)	04:36	20:18 (1)		
	16:06	17:05		18:00	19:59		20:55	27 20:00 (20)	21:39	23 20:41 (1)		
11	08:24	07:38		06:35	06:18		05:13	19:33 (20)	04:35	20:18 (1)		
	16:08	17:07		18:02	20:01		20:57	30 20:25 (23)	21:40	23 20:41 (1)		
12	08:23	07:36		06:32	06:16		05:11	19:34 (20)	04:35	20:18 (1)		
	16:09	17:09		18:04	20:03		20:59	31 20:27 (23)	21:41	23 20:41 (1)		
13	08:22	07:34		06:30	06:14		05:09	19:34 (20)	04:34	20:19 (1)		
	16:11	17:11		18:06	20:05		21:00	32 20:28 (23)	21:41	22 20:41 (1)		
14	08:21	07:32		06:27	06:11		05:07	19:34 (20)	04:34	20:19 (1)		
	16:13	17:13		18:08	20:07		21:02	34 20:30 (23)	21:42	22 20:41 (1)		
15	08:20	07:30		06:25	06:09		05:06	19:35 (20)	04:34	20:20 (1)		
	16:14	17:15		18:10	20:09		21:04	34 20:32 (23)	21:43	21 20:41 (1)		
16	08:19	07:28		06:23	06:06		05:04	19:36 (20)	04:34	20:20 (1)		
	16:16	17:17		18:12	20:10		21:05	35 20:33 (23)	21:43	22 20:42 (1)		
17	08:18	07:26		06:20	06:04		05:02	19:37 (20)	04:34	20:20 (1)		
	16:18	17:19		18:14	5 17:47 (18)	20:12	21:07	36 20:35 (23)	21:44	22 20:42 (1)		
18	08:17	07:24		06:18	06:18	17:38 (18)	06:02	05:01	19:38 (20)	04:33	20:21 (1)	
	16:19	17:21		18:16	11 17:49 (18)	20:14	21:09	37 20:36 (1)	21:44	21 20:42 (1)		
19	08:16	07:22		06:15	06:09	17:37 (18)	05:59	04:59	19:40 (20)	04:33	20:21 (1)	
	16:21	17:23		18:18	14 17:51 (18)	20:16	21:10	35 20:37 (1)	21:44	21 20:42 (1)		
20	08:15	07:19		06:13	06:03	17:36 (18)	05:57	04:58	19:41 (20)	04:34	20:21 (1)	
	16:23	17:25		18:20	17 17:53 (18)	20:18	21:12	33 20:37 (1)	21:45	21 20:42 (1)		
21	08:14	07:17		06:10	06:04	17:35 (18)	05:55	04:56	19:44 (20)	04:34	20:21 (1)	
	16:25	17:27		18:22	18 17:53 (18)	20:20	21:14	28 20:38 (1)	21:45	21 20:42 (1)		
22	08:12	07:15		06:08	06:08	17:34 (18)	05:52	19:50 (19)	04:55	20:15 (1)	04:34	20:21 (1)
	16:27	17:29		18:23	19 17:53 (18)	20:22	2 19:52 (19)	21:15	24 20:39 (1)	21:45	21 20:42 (1)	
23	08:11	07:13		06:05	06:05	17:35 (18)	05:50	19:48 (19)	04:53	20:15 (1)	04:34	20:22 (1)
	16:29	17:31		18:25	18 17:53 (18)	20:24	6 19:54 (19)	21:17	24 20:39 (1)	21:45	21 20:43 (1)	
24	08:10	07:10	15:53 (17)	06:03	06:03	17:34 (18)	05:48	19:47 (19)	04:52	20:14 (1)	04:34	20:22 (1)
	16:31	17:33	3 15:56 (17)	17:33	18:27	18 17:52 (18)	20:25	9 19:56 (19)	21:18	25 20:39 (1)	21:46	21 20:43 (1)
25	08:08	07:08	15:53 (17)	06:00	06:00	17:35 (18)	05:46	19:46 (19)	04:50	20:14 (1)	04:35	20:21 (1)
	16:32	17:35	6 15:59 (17)	17:35	18:29	16 17:51 (18)	20:27	12 19:58 (19)	21:20	25 20:39 (1)	21:46	22 20:43 (1)
26	08:07	07:06	15:52 (17)	06:06	05:58	17:35 (18)	05:43	19:46 (19)	04:49	20:14 (1)	04:35	20:22 (1)
	16:34	17:37	9 16:01 (17)	17:37	18:31	15 17:50 (18)	20:29	14 20:00 (19)	21:21	26 20:40 (1)	21:46	22 20:44 (1)
27	08:05	07:03	15:51 (17)	06:03	05:55	17:37 (18)	05:41	19:42 (20)	04:48	20:14 (1)	04:36	20:22 (1)
	16:36	17:39	12 16:03 (17)	17:39	18:33	11 17:48 (18)	20:31	20 20:02 (19)	21:23	26 20:40 (1)	21:45	21 20:43 (1)
28	08:04	07:01	15:52 (17)	06:01	05:53	17:39 (18)	05:39	19:40 (20)	04:47	20:14 (1)	04:36	20:22 (1)
	16:38	17:41	14 16:06 (17)	17:41	18:35	5 17:44 (18)	20:33	22 20:02 (19)	21:24	26 20:40 (1)	21:45	22 20:44 (1)
29	08:02	07:01	15:51 (17)	06:00	06:50		05:37	19:38 (20)	04:45	20:14 (1)	04:37	20:22 (1)
	16:40	17:43	17 16:08 (17)	17:43	19:37		20:35	23 20:01 (19)	21:26	26 20:40 (1)	21:45	22 20:44 (1)
30	08:00	07:00	15:51 (17)	06:00	06:48	19:07 (16)	05:35	19:37 (20)	04:44	20:14 (1)	04:37	20:22 (1)
	16:42	17:45	17 16:08 (17)	17:45	19:38	4 19:11 (16)	20:37	24 20:01 (19)	21:27	26 20:40 (1)	21:45	23 20:45 (1)
31	07:59	07:00	15:51 (17)	06:00	06:45	19:06 (16)	05:34		04:43	20:14 (1)	21:45	
	16:44	17:48	17 16:08 (17)	17:48	19:40	7 19:13 (16)	05:33		21:28	26 20:40 (1)		
Sonnenscheinstunden	248	272		367		421	220	496		512	682	
astr.max.mögl.Beschattung	95	77		178		220	891			682		
Red.Sonnenscheinwahrsch.	0.17	0.24		0.31		0.41	0.51			0.45		
Reduktion Betriebsdauer	0.90	0.90		0.90		0.90	0.90			0.90		
Reduktion Windrichtung	0.70	0.70		0.68		0.65	0.63			0.63		
Gesamte Reduktion	0.11	0.15		0.19		0.24	0.29			0.26		
Met.wahrsch.Beschattung	10	12		34		53	259			175		

**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)	
	Sonnennuntergang (SS:MM)			Zeitpunkt (SS:MM) Schattende		(WEA mit letztem Schatten)	

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BK - IO63

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38		20:23 (1)	05:19	19:44 (20)	06:14	07:08	07:07				08:03
	21:45	22	20:45 (1)	21:09	31	20:37 (23)	20:01	18:46	16:35			15:50
2	04:39		20:22 (1)	05:20		19:43 (20)	06:16	07:10	07:09			08:05
	21:44	23	20:45 (1)	21:07	29	20:35 (23)	19:59	18:44	16:33			15:49
3	04:40		20:22 (1)	05:22		19:43 (20)	06:17	07:12	07:11			08:06
	21:44	24	20:46 (1)	21:05	28	20:11 (20)	19:56	18:41	16:31			15:48
4	04:40		20:22 (1)	05:24		19:42 (20)	06:19	07:14	07:13			08:08
	21:43	24	20:46 (1)	21:03	28	20:10 (20)	19:54	18:39	16:29			15:47
5	04:41		20:23 (1)	05:25		19:42 (20)	06:21	19:02 (16)	07:15			15:27 (17)
	21:43	24	20:47 (1)	21:01	29	20:11 (20)	19:51	8	19:10 (16)	18:37	7	15:34 (17)
6	04:42		20:23 (1)	05:27		19:43 (20)	06:23		19:00 (16)	07:17		15:47
	21:42	24	20:47 (1)	20:59	28	20:11 (20)	19:49	12	19:12 (16)	18:34	11	15:36 (17)
7	04:43		20:23 (1)	05:29		19:42 (20)	06:25		18:59 (16)	07:19		15:46
	21:41	25	20:48 (1)	20:57	28	20:10 (20)	19:46	14	19:13 (16)	18:32	13	15:24 (17)
8	04:44		20:23 (1)	05:31		19:42 (20)	06:26		18:58 (16)	07:21		15:46
	21:41	25	20:48 (1)	20:55	28	20:10 (20)	19:44	15	19:13 (16)	18:29	15	15:37 (17)
9	04:45		20:23 (1)	05:32		19:43 (20)	06:28		18:57 (16)	07:23		15:45
	21:40	25	20:48 (1)	20:53	27	20:10 (20)	19:41	16	19:13 (16)	18:27	17	15:22 (17)
10	04:46		20:23 (1)	05:34		19:43 (20)	06:30		18:57 (16)	07:25		15:45
	21:39	25	20:48 (1)	20:51	26	20:09 (20)	19:39	13	19:10 (16)	18:24	17	15:39 (17)
11	04:48		20:23 (1)	05:36		19:43 (20)	06:32		18:57 (16)	07:27		15:45
	21:38	26	20:49 (1)	20:49	25	20:08 (19)	19:36	11	19:08 (16)	18:22	17	15:37 (17)
12	04:49		20:23 (1)	05:38		19:44 (20)	06:34		18:58 (16)	07:28		15:44
	21:37	26	20:49 (1)	20:47	25	20:09 (19)	19:34	8	19:06 (16)	18:20	17	15:23 (17)
13	04:50		20:23 (1)	05:40		19:44 (20)	06:35		18:58 (16)	07:30		15:44
	21:36	26	20:49 (1)	20:45	24	20:08 (19)	19:31	5	19:03 (16)	18:17	16	15:39 (17)
14	04:51		20:23 (1)	05:41		19:46 (20)	06:37		18:57 (16)	07:32		15:44
	21:35	26	20:49 (1)	20:43	23	20:09 (19)	19:29		18:15	16:11	14	15:37 (17)
15	04:52		20:22 (1)	05:43		19:48 (20)	06:39		18:31 (18)	07:34		15:44
	21:34	27	20:49 (1)	20:40	21	20:09 (19)	19:26	2	18:33 (18)	18:12	11	15:35 (17)
16	04:54		20:23 (1)	05:45		19:49 (20)	06:41		18:27 (18)	07:36		15:44
	21:33	26	20:49 (1)	20:38	19	20:08 (19)	19:24	10	18:37 (18)	18:10	9	15:25 (17)
17	04:55		20:23 (1)	05:47		19:52 (19)	06:43		18:24 (18)	07:38		15:44
	21:32	26	20:49 (1)	20:36	14	20:06 (19)	19:21	14	18:38 (18)	18:08	6	15:32 (17)
18	04:57		20:23 (1)	05:49		19:53 (19)	06:44		18:23 (18)	07:40		15:44
	21:30	26	20:49 (1)	20:34	11	20:04 (19)	19:19	16	18:39 (18)	18:05	3	15:30 (17)
19	04:58		20:23 (1)	05:50		19:53 (19)	06:46		18:22 (18)	07:42		15:44
	21:29	26	20:49 (1)	20:32	9	20:02 (19)	19:16	17	18:39 (18)	18:03	16:03	15:45
20	04:59		20:24 (1)	05:52		19:54 (19)	06:48		18:21 (18)	07:44		15:44
	21:28	25	20:49 (1)	20:29	6	20:00 (19)	19:14	19	18:40 (18)	18:01	16:02	15:45
21	05:01		20:24 (1)	05:54		19:56 (19)	06:50		18:20 (18)	07:46		15:45
	21:26	24	20:48 (1)	20:27	2	19:58 (19)	19:11	19	18:39 (18)	17:59	16:01	15:45
22	05:02		20:25 (1)	05:56		19:59	06:52		18:20 (18)	07:48		15:45
	21:25	24	20:49 (1)	20:25	18	18:38 (18)	17:56	15:59	18:38 (18)	17:56	15:59	15:46
23	05:04		19:53 (20)	05:58		19:06	06:53		18:20 (18)	07:50		15:46
	21:23	31	20:48 (1)	20:22	18	18:38 (18)	17:54	15:58	18:38 (18)	17:54	15:58	15:46
24	05:06		19:50 (20)	05:59		19:04	06:55		18:21 (18)	07:51		15:46
	21:22	35	20:47 (1)	20:20	14	18:35 (18)	17:52	15:57	18:22 (18)	17:52	15:57	15:47
25	05:07		19:49 (20)	06:01		19:01	06:57		18:22 (18)	06:53	07:53	15:48
	21:20	36	20:47 (1)	20:18	11	18:33 (18)	16:50	15:56	18:33 (18)	16:50	15:56	15:48
26	05:09		19:48 (20)	06:03		19:01	06:59		18:22 (18)	06:55	07:55	15:48
	21:19	36	20:45 (23)	20:15	8	18:30 (18)	16:47	15:54	18:30 (18)	16:47	15:54	15:48
27	05:10		19:47 (20)	06:05		19:01	07:01		18:22 (18)	06:57	07:56	15:48
	21:17	35	20:44 (23)	20:13		18:56	16:45	15:53	19:44 (20)	06:59	07:58	15:49
28	05:12		19:46 (20)	06:07		19:03	07:03		18:54 (20)	06:59	07:58	15:49
	21:16	34	20:42 (23)	20:11		18:54	16:43	15:52	19:45 (20)	06:59	07:58	15:49
29	05:14		19:45 (20)	06:08		19:04	07:04		19:45 (20)	06:59	07:58	15:49
	21:14	34	20:41 (23)	20:08		18:51	16:41	15:51	19:44 (20)	06:59	07:58	15:49
30	05:15		19:44 (20)	06:10		19:06	07:06		19:44 (20)	06:59	07:58	15:49
	21:12	33	20:39 (23)	20:06		18:49	16:39	15:51	19:44 (20)	06:59	07:58	15:49
31	05:17		19:44 (20)	06:12		19:06	07:06		19:44 (20)	06:59	07:58	15:49
	21:10	32	20:38 (23)	20:03		18:54	16:37	15:53	19:44 (20)	06:59	07:58	15:49
Sonnenscheinstunden	514		461		383		328	257				231
astr.max.mögl.Beschattung	855		461		268		173					24
Red.Sonnenscheinwahrsch.	0.44		0.48		0.40		0.21					0.14
Reduktion Betriebsdauer	0.90		0.90		0.90		0.90					0.90
Reduktion Windrichtung	0.63		0.64		0.68		0.70					0.68
Gesamte Reduktion	0.25		0.28		0.25		0.13					0.08
Met.wahrsch.Beschattung	215		129		66		23					2

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: BL - IO64**  
**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  
 342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni					
1   08:28	14:53 (21)   07:57	16:04 (17)   06:59	16:14 (17)   17:43	19:42	05:33	19:50 (20)   04:42	20:20 (1)				
15:54	12   15:05 (21)   16:46	10   16:14 (17)   17:43	19:42	20:39	16   20:06 (19)   21:29	24   20:44 (1)					
2   08:28	14:54 (21)   07:55	16:03 (17)   06:56	19:40	06:40	18   19:48 (20)   04:41	20:21 (1)					
15:55	11   15:05 (21)   16:48	13   16:16 (17)   17:45	19:44	4   19:17 (16)   20:40	18   20:06 (19)   21:31	24   20:45 (1)					
3   08:28	14:54 (21)   07:54	16:03 (17)   06:54	19:38	19:12 (16)   05:28	19:47 (20)   04:40	20:21 (1)					
15:57	11   15:05 (21)   16:50	15   16:18 (17)   17:47	19:46	7   19:19 (16)   20:42	19   20:06 (20)   21:32	24   20:45 (1)					
4   08:27	14:56 (21)   07:52	16:04 (17)   06:52	19:35	19:10 (16)   05:26	19:45 (20)   04:40	20:21 (1)					
15:58	9   15:05 (21)   16:52	17   16:21 (17)   17:49	19:48	10   19:20 (16)   20:44	22   20:07 (20)   21:33	24   20:45 (1)					
5   08:27	14:56 (21)   07:50	16:04 (17)   06:49	19:33	19:10 (16)   05:24	19:45 (20)   04:39	20:21 (1)					
15:59	8   15:04 (21)   16:54	17   16:21 (17)   17:51	19:50	13   19:23 (16)   20:46	23   20:08 (20)   21:34	24   20:45 (1)					
6   08:27	14:57 (21)   07:48	16:04 (17)   06:47	19:30	19:09 (16)   05:22	19:44 (20)   04:38	20:21 (1)					
16:00	7   15:04 (21)   16:56	17   16:21 (17)   17:53	19:52	15   19:24 (16)   20:48	24   20:08 (20)   21:35	24   20:45 (1)					
7   08:26	15:00 (21)   07:46	16:04 (17)   06:45	19:28	19:10 (16)   05:20	19:43 (20)   04:37	20:21 (1)					
16:02	3   15:03 (21)   16:58	16   16:20 (17)   17:55	19:54	14   19:24 (16)   20:50	25   20:08 (20)   21:36	24   20:45 (1)					
8   08:26	16:02	16:05 (17)   06:42	19:26	19:11 (16)   05:18	19:43 (20)   04:37	20:22 (1)					
16:03	17:00	16:19 (17)   17:57	19:55	12   19:23 (16)   20:51	25   20:08 (20)   21:37	23   20:45 (1)					
9   08:25	16:02	16:06 (17)   06:40	19:23	19:11 (16)   05:17	19:43 (20)   04:36	20:22 (1)					
16:05	17:03	16:18 (17)   17:59	19:57	10   19:21 (16)   20:53	26   20:09 (20)   21:38	23   20:45 (1)					
10   08:24	17:03	16:08 (17)   06:37	19:21	19:13 (16)   05:15	19:43 (20)   04:36	20:23 (1)					
16:06	17:05	9   16:17 (17)   18:00	19:59	6   19:19 (16)   20:55	26   20:09 (20)   21:39	22   20:45 (1)					
11   08:24	17:05	16:12 (17)   06:35	19:18	05:13	19:42 (20)   04:35	20:23 (1)					
16:08	17:07	1   16:13 (17)   18:02	20:01	20:57	27   20:09 (20)   21:40	23   20:46 (1)					
12   08:23	17:07	16:16 (17)   06:32	19:16	05:11	19:43 (20)   04:35	20:23 (1)					
16:09	17:09	18:04	20:03	20:59	26   20:09 (20)   21:41	22   20:45 (1)					
13   08:22	17:09	16:20 (17)   06:30	19:14	05:09	19:43 (20)   04:34	20:23 (1)					
16:11	17:11	18:06	20:05	21:00	26   20:09 (20)   21:41	23   20:46 (1)					
14   08:21	17:11	16:27 (17)   06:27	19:11	05:07	19:43 (20)   04:34	20:24 (1)					
16:13	17:13	18:08	20:07	21:02	25   20:08 (20)   21:42	22   20:46 (1)					
15   08:20	17:13	16:25 (17)   06:25	19:09	05:06	19:44 (20)   04:34	20:24 (1)					
16:14	17:15	18:10	20:09	21:04	24   20:08 (20)   21:43	22   20:46 (1)					
16   08:19	17:15	16:23 (17)   06:23	19:06	05:04	19:44 (20)   04:34	20:25 (1)					
16:16	17:17	18:12	20:10	21:05	28   20:33 (1)   21:43	21   20:46 (1)					
17   08:18	17:17	16:20 (17)   06:20	19:04	05:02	19:45 (20)   04:34	20:25 (1)					
16:18	17:19	18:14	20:12	21:07	31   20:35 (1)   21:44	21   20:46 (1)					
18   08:17	17:19	16:18 (17)   06:18	19:02	05:01	19:45 (20)   04:33	20:25 (1)					
16:19	17:21	18:16	20:14	21:09	33   20:36 (1)   21:44	21   20:46 (1)					
19   08:16	17:21	16:15 (17)   06:15	19:09	04:59	19:46 (20)   04:33	20:26 (1)					
16:21	17:23	18:18	20:16	21:10	35   20:38 (1)   21:44	21   20:47 (1)					
20   08:15	17:23	16:13 (17)   06:13	19:07	04:58	19:46 (20)   04:34	20:26 (1)					
16:23	17:25	18:20	20:18	21:12	35   20:38 (1)   21:45	21   20:47 (1)					
21   08:14	17:25	16:10 (17)   06:10	17:49 (18)   05:55	04:56	19:48 (20)   04:34	20:26 (1)					
16:25	17:27	18:22	6   17:55 (18)   20:20	21:14	35   20:40 (1)   21:45	21   20:47 (1)					
22   08:12	17:27	16:08 (17)   06:08	17:47 (18)   05:52	04:55	19:49 (20)   04:34	20:26 (1)					
16:27	17:29	18:23	9   17:56 (18)   20:22	21:15	35   20:42 (1)   21:45	21   20:47 (1)					
23   08:11	17:29	16:05 (17)   06:05	17:46 (18)   05:50	04:53	19:51 (20)   04:34	20:27 (1)					
16:29	17:31	18:25	13   17:59 (18)   20:24	21:17	33   20:43 (1)   21:45	21   20:48 (1)					
24   08:10	17:31	16:03 (17)   06:03	17:44 (18)   05:48	04:52	19:53 (20)   04:34	20:27 (1)					
16:31	17:33	18:27	16   18:00 (18)   20:25	21:18	28   20:42 (1)   21:46	21   20:48 (1)					
25   08:08	17:33	16:00 (17)   06:00	17:44 (18)   05:46	04:50	20:20 (1)   04:35	20:26 (1)					
16:32	17:35	18:29	17   18:01 (18)   20:27	4   19:58 (19)   21:20	23   20:43 (1)   21:46	21   20:47 (1)					
26   08:07	17:35	16:05 (17)   06:05	17:43 (18)   05:43	04:49	20:20 (1)   04:35	20:27 (1)					
16:34	17:37	18:31	18   18:01 (18)   20:29	8   20:00 (19)   21:21	23   20:43 (1)   21:46	21   20:48 (1)					
27   08:05	17:37	16:05 (17)   06:05	17:43 (18)   05:41	04:48	20:20 (1)   04:36	20:27 (1)					
16:36	17:39	18:33	18   18:01 (18)   20:31	10   20:02 (19)   21:23	24   20:44 (1)   21:45	21   20:48 (1)					
28   08:04	17:39	16:05 (17)   06:05	17:43 (18)   05:39	04:47	20:20 (1)   04:36	20:27 (1)					
16:38	17:41	18:35	16   17:59 (18)   20:33	13   20:04 (19)   21:24	24   20:44 (1)   21:45	22   20:49 (1)					
29   08:02	17:41	16:05 (17)   06:05	18:44 (18)   05:37	04:45	20:20 (1)   04:37	20:27 (1)					
16:40	17:43	19:37	15   18:59 (18)   20:35	14   20:05 (19)   21:26	24   20:44 (1)   21:45	22   20:49 (1)					
30   08:00	17:43	16:06 (17)   06:06	18:44 (18)   05:35	04:44	20:20 (1)   04:37	20:27 (1)					
16:42	4   16:10 (17)   17:48	19:38	13   18:57 (18)   20:37	16   20:07 (19)   21:27	24   20:44 (1)   21:45	22   20:49 (1)					
31   07:59	16:05 (17)   17:48	19:38	13   18:57 (18)   20:37	16   20:07 (19)   21:27	24   20:44 (1)   21:45	22   20:49 (1)					
16:44	7   16:12 (17)   17:48	19:40	9   18:55 (18)   20:37	16   20:07 (19)   21:27	24   20:44 (1)   21:45	22   20:49 (1)					
Sonnenscheinstunden	248	272	367	421	496	512	666				
astr.max.mögl.Beschattung	72	141	150	156	181	211	245				
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.55	0.66				
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	0.90				
Reduktion Windrichtung	0.68	0.70	0.68	0.65	0.63	0.63	0.63				
Gesamte Reduktion	0.11	0.15	0.19	0.24	0.29	0.29	0.26				
Met.wahrsch.Beschattung	8	21	29	38	47	51	61				

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BL - IO64  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1   04:38	20:28 (1)   05:19	19:53 (20)   06:14		07:08	07:07	15:37 (17)   08:03
21:44	20:50 (1)   21:09	27 20:20 (20)   20:01		18:46	16:35	10 15:47 (17)   08:05
2   04:39	20:27 (1)   05:20	19:53 (20)   06:16		19:11 (16)   07:10	07:09	15:35 (17)   08:05
21:44	20:50 (1)   21:07	26 20:19 (20)   19:59	6	19:17 (16)   18:44	16:33	13 15:48 (17)   15:49
3   04:40	20:27 (1)   05:22	19:53 (20)   06:17		19:09 (16)   07:12	07:11	15 15:34 (17)   08:06
21:44	20:50 (1)   21:05	26 20:19 (20)   19:56	10	19:19 (16)   18:41	16:31	15 15:49 (17)   15:48
4   04:40	20:27 (1)   05:24	19:52 (20)   06:19		19:08 (16)   07:14	07:13	15 15:33 (17)   08:08
21:43	20:51 (1)   21:03	27 20:19 (20)   19:54	12	19:20 (16)   18:39	16:29	16 15:49 (17)   15:47
5   04:41	20:28 (1)   05:25	19:53 (20)   06:21		19:06 (16)   07:15	07:15	15 15:34 (17)   08:09
21:43	20:51 (1)   21:01	26 20:19 (20)   19:51	14	19:20 (16)   18:37	16:27	16 15:50 (17)   15:47
6   04:42	20:28 (1)   05:27	19:54 (20)   06:23		19:06 (16)   07:17	07:17	15 15:34 (17)   08:10
21:42	20:52 (1)   20:59	25 20:19 (20)   19:49	14	19:20 (16)   18:34	16:25	17 15:51 (17)   15:46
7   04:43	20:28 (1)   05:29	19:53 (20)   06:25		19:05 (16)   07:19	07:19	15 15:34 (17)   08:12
21:41	20:52 (1)   20:57	24 20:17 (20)   19:46	13	19:18 (16)   18:32	16:23	16 15:50 (17)   15:46
8   04:44	20:28 (1)   05:31	19:54 (20)   06:26		19:06 (16)   07:21	07:21	15 15:34 (17)   08:13
21:41	20:52 (1)   20:55	23 20:17 (20)   19:44	10	19:16 (16)   18:29	16:21	15 15:49 (17)   15:45
9   04:45	20:28 (1)   05:32	19:55 (20)   06:28		19:05 (16)   07:23	07:23	15 15:34 (17)   08:14
21:40	20:53 (1)   20:53	21 20:16 (20)   19:41	8	19:13 (16)   18:27	16:19	12 15:46 (17)   15:45
10   04:46	20:28 (1)   05:34	19:55 (20)   06:30		19:06 (16)   07:25	07:25	15 15:35 (17)   08:16
21:39	20:53 (1)   20:51	20 20:15 (20)   19:39	4	19:10 (16)   18:24	16:18	9 15:44 (17)   15:45
11   04:48	20:28 (1)   05:36	19:57 (20)   06:32		19:07 (16)   07:27	07:27	15 15:37 (17)   08:17
21:38	20:53 (1)   20:49	17 20:14 (19)   19:36		18:22	16:16	6 15:43 (17)   15:44
12   04:49	20:28 (1)   05:38	19:59 (19)   06:34		18:39 (18)   07:28	07:29	15 15:38 (17)   08:18
21:37	20:53 (1)   20:47	16 20:15 (19)   19:34	8	18:47 (18)   18:20	16:14	3 15:41 (17)   15:44
13   04:50	20:28 (1)   05:40	19:58 (19)   06:35		18:36 (18)   07:30	07:31	15 15:38 (17)   08:19
21:36	20:53 (1)   20:45	16 20:14 (19)   19:31	12	18:48 (18)   18:17	16:13	15 15:44
14   04:51	20:28 (1)   05:41	19:58 (19)   06:37		18:34 (18)   07:32	07:33	15 15:44
21:35	20:53 (1)   20:43	14 20:12 (19)   19:29	15	18:49 (18)   18:15	16:11	15 15:44
15   04:52	20:28 (1)   05:43	19:59 (19)   06:39		18:33 (18)   07:34	07:35	15 15:44
21:34	20:53 (1)   20:40	12 20:11 (19)   19:26	17	18:50 (18)   18:12	16:09	15 15:44
16   04:54	20:29 (1)   05:45	19:58 (19)   06:41		18:33 (18)   07:36	07:37	15 15:44
21:33	20:53 (1)   20:38	10 20:08 (19)   19:24	17	18:50 (18)   18:10	16:08	15 15:44
17   04:55	20:29 (1)   05:47	19:59 (19)   06:43		18:31 (18)   07:38	07:38	15 15:44
21:32	20:53 (1)   20:36	7 20:06 (19)   19:21	18	18:49 (18)   18:08	16:06	15 15:44
18   04:57	20:29 (1)   05:49	20:01 (19)   06:44		18:31 (18)   07:40	07:40	15 15:44
21:30	20:53 (1)   20:34	3 20:04 (19)   19:19	18	18:49 (18)   18:05	16:05	15 15:44
19   04:58	20:29 (1)   05:50	06:46		18:31 (18)   07:42	07:42	15 15:44
21:29	20:52 (1)   20:32	19:16	17	18:48 (18)   18:03	16:03	15 15:44
20   04:59	20:02 (20)   05:52	06:48		18:32 (18)   07:44	07:44	15 15:44
21:28	20:53 (1)   20:29	19:14	14	18:46 (18)   18:01	16:02	15 15:44
21   05:01	20:00 (20)   05:54	06:50		18:32 (18)   07:46	07:46	15 15:44
21:26	20:52 (1)   20:27	19:11	10	18:42 (18)   17:59	16:01	15 15:44
22   05:02	19:59 (20)   05:56	06:52		18:33 (18)   07:48	07:48	15 15:44
21:25	20:52 (1)   20:25	19:09	7	18:40 (18)   17:56	15:59	15 15:44
23   05:04	19:58 (20)   05:58	06:53		07:50	07:49	15 15:44
21:23	20:50 (1)   20:22	19:06		17:54	15:58	15 15:44
24   05:06	19:56 (20)   05:59	06:55		07:51	07:51	15 15:44
21:22	20:48 (1)   20:20	19:04		17:52	15:57	15 15:44
25   05:07	19:56 (20)   06:01	06:57		06:53	07:53	15 15:44
21:20	20:47 (1)   20:18	19:01		16:50	15:56	15 15:44
26   05:09	19:55 (20)   06:03	06:59		06:55	07:55	15 15:44
21:19	20:45 (1)   20:15	18:59		16:47	15:54	15 15:44
27   05:10	19:55 (20)   06:05	07:01		06:57	07:56	15 15:44
21:17	20:44 (1)   20:13	18:56		16:45	15:53	15 15:44
28   05:12	19:54 (20)   06:07	07:02		06:59	07:58	15 15:44
21:16	20:18 (20)   20:11	18:54		16:43	15:52	15 15:44
29   05:14	19:54 (20)   06:08	07:04		07:01	08:00	15 15:44
21:14	20:19 (20)   20:08	18:51		16:41	15:51	15 15:44
30   05:15	19:53 (20)   06:10	07:06		07:03	08:01	15 15:44
21:12	20:18 (20)   20:06	18:49		16:39	15:51	15 15:44
31   05:17	19:53 (20)   06:12			07:05		15 15:44
21:10	20:19 (20)   20:03			16:37	4 15:44 (17)	15 15:44
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	823	340	244	4	148	331
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90
Reduktion Windrichtung	0.63	0.64	0.67	0.70	0.70	0.68
Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	0.09
Met.wahrsch.Beschattung	208	95	60	1	20	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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BM - IO65  
**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  
 342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni			
1   08:28	14:57 (21)   07:57		06:59	06:43	18:51 (18)   05:33	19:58 (19)   04:42	20:03 (20)		
15:54	16   15:13 (21)   16:46		17:43	19:42	17   19:08 (18)   20:39	11   20:09 (19)   21:29	33   20:51 (1)		
2   08:28	14:57 (21)   07:55		06:56	06:40	18:51 (18)   05:31	19:57 (19)   04:41	20:06 (20)		
15:55	15   15:12 (21)   16:48		17:45	19:44	15   19:06 (18)   20:40	14   20:11 (19)   21:31	31   20:53 (1)		
3   08:28	14:58 (21)   07:54		16:14 (17)   06:54	06:38	18:53 (18)   05:28	19:57 (19)   04:40	20:29 (1)		
15:57	15   15:13 (21)   16:50	4	16:18 (17)   17:47	19:46	12   19:05 (18)   20:42	15   20:12 (19)   21:32	24   20:53 (1)		
4   08:27	14:59 (21)   07:52		16:14 (17)   06:52	06:35	18:54 (18)   05:26	19:57 (19)   04:40	20:29 (1)		
15:58	15   15:14 (21)   16:52	7	16:21 (17)   17:49	19:48	8   19:02 (18)   20:44	16   20:13 (19)   21:33	23   20:52 (1)		
5   08:27	15:00 (21)   07:50		16:13 (17)   06:49	06:33	19:20 (16)   05:24	19:57 (19)   04:39	20:28 (1)		
15:59	14   15:14 (21)   16:54	10	16:23 (17)   17:51	19:50	3   19:23 (16)   20:46	15   20:12 (19)   21:34	24   20:52 (1)		
6   08:27	15:00 (21)   07:48		16:12 (17)   06:47	06:30	19:18 (16)   05:22	19:58 (19)   04:38	20:29 (1)		
16:00	13   15:13 (21)   16:56	14	16:26 (17)   17:53	19:52	6   19:24 (16)   20:48	15   20:13 (20)   21:35	24   20:53 (1)		
7   08:26	15:01 (21)   07:46		16:11 (17)   06:45	06:28	19:17 (16)   05:20	19:58 (19)   04:37	20:29 (1)		
16:02	13   15:14 (21)   16:58	16	16:27 (17)   17:55	19:54	9   19:26 (16)   20:50	16   20:14 (20)   21:36	24   20:53 (1)		
8   08:26	15:02 (21)   07:44		16:11 (17)   06:42	06:26	19:17 (16)   05:18	19:58 (20)   04:37	20:30 (1)		
16:03	12   15:14 (21)   17:00	17	16:28 (17)   17:57	19:55	11   19:28 (16)   20:51	18   20:16 (20)   21:37	24   20:54 (1)		
9   08:25	15:03 (21)   07:42		16:11 (17)   06:40	06:23	19:16 (16)   05:17	19:58 (19)   04:36	20:29 (1)		
16:05	11   15:14 (21)   17:03	17	16:28 (17)   17:59	19:57	14   19:30 (16)   20:53	19   20:17 (20)   21:38	24   20:53 (1)		
10   08:24	15:04 (21)   07:40		16:12 (17)   06:37	06:21	19:16 (16)   05:15	19:56 (20)   04:36	20:30 (1)		
16:06	9   15:13 (21)   17:05	16	16:28 (17)   18:00	19:59	14   19:30 (16)   20:55	22   20:18 (20)   21:39	24   20:54 (1)		
11   08:24	15:05 (21)   07:38		16:12 (17)   06:35	06:18	19:16 (16)   05:13	19:55 (20)   04:35	20:30 (1)		
16:08	7   15:12 (21)   17:07	16	16:28 (17)   18:02	20:01	13   19:29 (16)   20:57	23   20:18 (20)   21:40	24   20:54 (1)		
12   08:23	15:07 (21)   07:36		16:13 (17)   06:32	06:16	19:17 (16)   05:11	19:56 (20)   04:35	20:30 (1)		
16:09	4   15:11 (21)   17:09	14	16:27 (17)   18:04	20:03	11   19:28 (16)   20:59	23   20:19 (20)   21:41	24   20:54 (1)		
13   08:22	07:34		16:15 (17)   06:30	06:14	19:19 (16)   05:09	19:55 (20)   04:34	20:30 (1)		
16:11	17:11	11	16:26 (17)   18:06	20:05	7   19:26 (16)   21:00	24   20:19 (20)   21:41	24   20:54 (1)		
14   08:21	07:32		16:16 (17)   06:27	06:11	05:07	19:54 (20)   04:34	20:31 (1)		
16:13	17:13	7	16:23 (17)   18:08	20:07	21:02	25   20:19 (20)   21:42	24   20:55 (1)		
15   08:20	07:30		16:23 (17)   18:08	06:09	05:06	19:54 (20)   04:34	20:31 (1)		
16:14	17:15		18:10	20:09	21:04	26   20:20 (20)   21:43	24   20:55 (1)		
16   08:19	07:28		18:12	06:06	05:04	19:54 (20)   04:34	20:31 (1)		
16:16	17:17		18:12	20:10	21:05	26   20:20 (20)   21:43	24   20:55 (1)		
17   08:18	07:26		18:10	06:04	05:02	19:54 (20)   04:34	20:32 (1)		
16:18	17:19		18:14	20:12	21:07	26   20:20 (20)   21:44	23   20:55 (1)		
18   08:17	07:24		18:18	06:02	05:01	19:54 (20)   04:33	20:32 (1)		
16:19	17:21		18:16	20:14	21:09	26   20:20 (20)   21:44	24   20:56 (1)		
19   08:16	07:22		18:15	05:59	04:59	19:55 (20)   04:33	20:32 (1)		
16:21	17:23		18:18	20:16	21:10	25   20:20 (20)   21:44	24   20:56 (1)		
20   08:15	07:19		18:13	05:57	04:58	19:54 (20)   04:34	20:32 (1)		
16:23	17:25		18:20	20:18	21:12	25   20:19 (20)   21:45	24   20:56 (1)		
21   08:14	07:17		18:10	05:55	04:56	19:55 (20)   04:34	20:32 (1)		
16:25	17:27		18:22	20:20	21:14	29   20:40 (1)   21:45	24   20:56 (1)		
22   08:12	07:15		18:10	05:52	04:55	19:55 (20)   04:34	20:32 (1)		
16:27	17:29		18:23	20:22	21:15	32   20:42 (1)   21:45	24   20:56 (1)		
23   08:11	07:13		18:25	05:50	04:53	19:56 (20)   04:34	20:33 (1)		
16:29	17:31		18:25	20:24	21:17	34   20:44 (1)   21:45	24   20:57 (1)		
24   08:10	07:10		18:20	05:48	04:52	19:56 (20)   04:34	20:33 (1)		
16:31	17:33		18:27	20:25	21:18	35   20:44 (1)   21:46	24   20:57 (1)		
25   08:08	07:08		17:56 (18)   05:46	05:50	04:50	19:57 (20)   04:35	20:33 (1)		
16:32	17:35		18:29	6   18:02 (18)   20:27	21:20	37   20:46 (1)   21:46	23   20:56 (1)		
26   08:07	07:06		17:54 (18)   05:43	05:58	04:49	19:57 (20)   04:35	20:34 (1)		
16:34	17:37		18:31	10   18:04 (18)   20:29	21:21	38   20:47 (1)   21:46	23   20:57 (1)		
27   08:05	07:03		17:53 (18)   05:41	05:55	04:48	19:58 (20)   04:36	20:33 (1)		
16:36	17:39		18:33	13   18:06 (18)   20:31	21:23	37   20:48 (1)   21:45	24   20:57 (1)		
28   08:04	07:01		17:51 (18)   05:39	05:53	20:01 (19)   04:47	39   19:59 (20)   04:36	20:34 (1)		
16:38	17:41		18:35	16   18:07 (18)   20:33	3   20:04 (19)   21:24	37   20:50 (1)   21:45	24   20:58 (1)		
29   08:02			18:51 (18)   05:37	06:50	19:59 (19)   04:45	39   20:00 (20)   04:37	20:34 (1)		
16:40			19:37	18   19:09 (18)   20:35	6   20:05 (19)   21:26	38   20:51 (1)   21:45	23   20:57 (1)		
30   08:00			18:50 (18)   05:35	06:48	18:50 (18)   05:35	19:59 (19)   04:44	20:01 (20)   04:37	20:34 (1)	
16:42			19:38	18   19:08 (18)   20:37	8   20:07 (19)   21:27	36   20:51 (1)   21:45	24   20:58 (1)		
31   07:59			18:51 (18)   05:33	06:45	18:51 (18)   05:33	04:43	20:02 (20)   04:37	20:34 (1)	
16:44			19:40	17   19:08 (18)   20:30	10   20:09 (19)   21:29	34   20:51 (1)   21:45	24   20:58 (1)		
Sonnenscheinstunden	248	272	367	421	496	512	731		
astr.max.mögl.Beschattung	144	149	98	157	799	731			
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45			
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90			
Reduktion Windrichtung	0.68	0.70	0.68	0.66	0.63	0.62			
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29	0.26			
Met.wahrsch.Beschattung	15	23	19	39	233	186			

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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BM - IO65  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38		20:35 (1)	05:19		20:06 (20)	06:14		19:16 (16)	07:08		07:07
	21:44	24	20:59 (1)	21:09	23	20:29 (20)	20:01	13	19:29 (16)	18:46		16:35
2	04:39		20:34 (1)	05:20		20:06 (20)	06:16		19:14 (16)	07:10		07:09
	21:44	24	20:58 (1)	21:07	22	20:28 (20)	19:59	14	19:28 (16)	18:44		16:33
3	04:40		20:34 (1)	05:22		20:07 (20)	06:17		19:14 (16)	07:12		07:11
	21:44	25	20:59 (1)	21:05	21	20:28 (20)	19:56	14	19:28 (16)	18:41		16:31
4	04:40		20:35 (1)	05:24		20:07 (20)	06:19		19:14 (16)	07:14		07:13
	21:43	24	20:59 (1)	21:03	19	20:26 (20)	19:54	11	19:25 (16)	18:39		16:29
5	04:41		20:35 (1)	05:25		20:09 (19)	06:21		19:13 (16)	07:15		07:15
	21:43	24	20:59 (1)	21:01	17	20:26 (20)	19:51	9	19:22 (16)	18:37		16:27
6	04:42		20:35 (1)	05:27		20:08 (19)	06:23		19:14 (16)	07:17		07:17
	21:42	25	21:00 (1)	20:59	16	20:24 (20)	19:49	6	19:20 (16)	18:34		16:25
7	04:43		20:36 (1)	05:29		20:07 (19)	06:25		19:15 (16)	07:19		07:19
	21:41	24	21:00 (1)	20:57	14	20:21 (19)	19:46	3	19:18 (16)	18:32		16:23
8	04:44		20:36 (1)	05:31		20:07 (19)	06:26		18:50 (18)	07:21		07:21
	21:41	24	21:00 (1)	20:55	15	20:22 (19)	19:44	6	18:56 (18)	18:29		16:21
9	04:45		20:36 (1)	05:32		20:07 (19)	06:28		18:46 (18)	07:23		07:23
	21:40	24	21:00 (1)	20:53	15	20:22 (19)	19:41	12	18:58 (18)	18:27		16:19
10	04:46		20:14 (20)	05:34		20:06 (19)	06:30		18:45 (18)	07:25		07:25
	21:39	29	21:00 (1)	20:51	14	20:20 (19)	19:39	14	18:59 (18)	18:24		16:18
11	04:48		20:12 (20)	05:36		20:06 (19)	06:32		18:44 (18)	07:27		07:27
	21:38	32	21:00 (1)	20:49	12	20:18 (19)	19:36	16	19:00 (18)	18:22		16:16
12	04:49		20:11 (20)	05:38		20:06 (19)	06:34		18:43 (18)	07:28		07:29
	21:37	34	21:00 (1)	20:47	11	20:17 (19)	19:34	17	19:00 (18)	18:20		16:14
13	04:50		20:10 (20)	05:40		20:06 (19)	06:35		18:42 (18)	07:30		07:31
	21:36	36	21:00 (1)	20:45	8	20:14 (19)	19:31	17	18:59 (18)	18:17		16:13
14	04:51		20:09 (20)	05:41		20:07 (19)	06:37		18:41 (18)	07:32		07:33
	21:35	37	20:59 (1)	20:43	5	20:12 (19)	19:29	18	18:59 (18)	18:15		16:11
15	04:52		20:08 (20)	05:43		20:09 (19)	06:39		18:42 (18)	07:34		07:35
	21:34	38	20:59 (1)	20:40	2	20:11 (19)	19:26	16	18:58 (18)	18:12		16:09
16	04:54		20:08 (20)	05:45		06:41			18:42 (18)	07:36		07:37
	21:33	39	20:59 (1)	20:38		19:24		14	18:56 (18)	18:10		16:08
17	04:55		20:07 (20)	05:47		06:43			18:42 (18)	07:38		07:38
	21:32	38	20:57 (1)	20:36		19:21		11	18:53 (18)	18:08		16:06
18	04:57		20:06 (20)	05:49		06:44			18:43 (18)	07:40		07:40
	21:30	37	20:56 (1)	20:34		19:19		7	18:50 (18)	18:05		16:05
19	04:58		20:06 (20)	05:50		06:46			18:47 (18)	07:42		07:42
	21:29	36	20:54 (1)	20:32		19:16		1	18:48 (18)	18:03		16:03
20	04:59		20:06 (20)	05:52		06:48			07:44			07:44
	21:28	35	20:54 (1)	20:29		19:14			18:01			16:02
21	05:01		20:05 (20)	05:54		06:50			07:46			07:46
	21:26	33	20:52 (1)	20:27		19:11			17:59			16:01
22	05:02		20:06 (20)	05:56		06:52			07:48			07:48
	21:25	31	20:52 (1)	20:25		19:09			17:56			15:59
23	05:04		20:05 (20)	05:58		06:53			07:50			07:49
	21:23	27	20:50 (1)	20:22		19:06			17:54			15:58
24	05:06		20:04 (20)	05:59		06:55			07:51			07:51
	21:22	26	20:30 (20)	20:20		19:04			17:52			15:57
25	05:07		20:05 (20)	06:01		06:57			06:53			07:53
	21:20	25	20:30 (20)	20:18		19:01			16:50			15:56
26	05:09		20:04 (20)	06:03		06:59			06:55			07:55
	21:19	26	20:30 (20)	20:15		18:59			16:47			15:54
27	05:10		20:05 (20)	06:05		07:01			06:57			07:56
	21:17	25	20:30 (20)	20:13		18:56			16:45			15:53
28	05:12		20:04 (20)	06:07		07:02			06:59		15:45 (17)	07:58
	21:16	26	20:30 (20)	20:11		18:54			16:43	9	15:54 (17)	15:52
29	05:14		20:05 (20)	06:08		07:04			07:01		15:44 (17)	08:00
	21:14	25	20:30 (20)	20:08		18:51			16:41	12	15:56 (17)	15:51
30	05:15		20:05 (20)	06:10		07:06			07:03		15:43 (17)	08:01
	21:12	24	20:29 (20)	20:06	7	19:26 (16)	18:49		16:39	14	15:57 (17)	15:51
31	05:17		20:05 (20)	06:12		19:17 (16)	18:49		07:05		15:42 (17)	08:28
	21:10	25	20:30 (20)	20:03	11	19:28 (16)	18:41		16:37	16	15:58 (17)	15:53
	514		461	463		383			328		257	231
Sonnenscheinstunden												
astr.max.mögl.Beschattung		902		232		219			51		103	446
Red.Sonnenscheinwahrsch.		0.44		0.48		0.40			0.33		0.21	0.14
Reduktion Betriebsdauer		0.90		0.90		0.90			0.90		0.90	0.90
Reduktion Windrichtung		0.63		0.64		0.67			0.70		0.70	0.68
Gesamte Reduktion		0.25		0.28		0.24			0.21		0.13	0.09
Met.wahrsch.Beschattung		228		65		54			11		14	38

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	

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBShadowrezeptor: BN - IO66  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:56 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	13 20:09 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	19:55 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	16 20:11 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	19:55 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	17 20:12 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	19:54 (1) 04:40
	15:58	16:52	17:49	19:48	20:44	20 20:14 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:54 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	20 20:14 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	19:53 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	21 20:14 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	19:53 (1) 04:37
	16:02	16:58	17:55	19:54	20:50	21 20:14 (1) 21:36
8	08:26	07:44	06:42	06:26	05:18	19:53 (1) 04:37
	16:03	17:00	17:57	19:55	20:51	20 20:13 (1) 21:37
9	08:25	07:42	06:40	06:23	05:17	19:54 (1) 04:36
	16:05	17:02	17:59	19:57	20:53	20 20:14 (1) 21:38
10	08:24	07:40	06:37	06:21	05:15	19:54 (1) 04:36
	16:06	17:05	18:00	19:59	20:55	19 20:13 (1) 21:39
11	08:24	07:38	06:35	06:18	05:13	19:54 (1) 04:35
	16:08	17:07	18:02	20:01	20:57	18 20:12 (1) 21:40
12	08:23	07:36	06:32	06:16	05:11	19:56 (1) 04:35
	16:09	17:09	18:04	20:03	20:59	16 20:12 (1) 21:41
13	08:22	07:34	06:30	06:14	05:09	19:56 (1) 04:34
	16:11	17:11	18:06	20:05	7 19:37 (20) 21:00	15 20:11 (1) 21:41
14	08:21	07:32	06:27	06:11	05:07	19:57 (1) 04:34
	16:13	17:13	18:08	20:07	12 19:38 (20) 21:02	12 20:09 (1) 21:42
15	08:20	07:30	06:25	06:09	05:06	19:59 (1) 04:34
	16:14	17:15	18:10	20:09	15 19:40 (20) 21:04	9 20:08 (1) 21:43
16	08:19	07:28	06:22	17:44 (18) 06:06	19:24 (20) 05:04	04:34
	16:16	17:17	18:12	1 17:45 (18) 20:10	17 19:41 (20) 21:05	21:43
17	08:18	07:26	06:20	17:42 (18) 06:04	19:22 (20) 05:02	04:33
	16:18	17:19	18:14	5 17:47 (18) 20:12	19 19:41 (20) 21:07	21:44
18	08:17	07:24	06:18	17:40 (18) 06:02	19:22 (20) 05:01	04:33
	16:19	17:21	18:16	9 17:49 (18) 20:14	20 19:42 (20) 21:09	21:44
19	08:16	07:22	06:15	17:40 (18) 05:59	19:21 (20) 04:59	04:33
	16:21	17:23	18:18	11 17:51 (18) 20:16	21 19:42 (20) 21:10	21:44
20	08:15	07:19	06:13	17:39 (18) 05:57	19:21 (20) 04:57	04:33
	16:23	17:25	18:20	14 17:53 (18) 20:18	21 19:42 (20) 21:12	21:45
21	08:14	07:17	06:10	17:39 (18) 05:55	19:22 (20) 04:56	04:34
	16:25	17:27	18:21	15 17:54 (18) 20:20	20 19:42 (20) 21:14	21:45
22	08:12	07:15	06:08	17:39 (18) 05:52	19:21 (20) 04:55	04:34
	16:27	17:29	18:23	14 17:53 (18) 20:22	19 19:40 (20) 21:15	21:45
23	08:11	07:13	06:05	17:40 (18) 05:50	19:21 (20) 04:53	04:34
	16:29	17:31	18:25	12 17:52 (18) 20:24	19 19:40 (20) 21:17	21:45
24	08:10	07:10	06:03	17:41 (18) 05:48	19:22 (20) 04:52	04:34
	16:30	17:33	18:27	8 17:49 (18) 20:25	17 19:39 (20) 21:18	21:46
25	08:08	07:08	06:00	05:46	19:23 (20) 04:50	04:35
	16:32	17:35	18:29	20:27	15 19:38 (20) 21:20	21:46
26	08:07	07:06	05:58	05:43	19:25 (20) 04:49	04:35
	16:34	17:37	18:31	20:29	11 19:36 (20) 21:21	21:46
27	08:05	07:03	05:55	05:41	19:28 (20) 04:48	04:36
	16:36	17:39	18:33	20:31	5 19:33 (20) 21:23	21:45
28	08:04	07:01	05:53	05:39	04:47	04:36
	16:38	17:41	18:35	20:33	21:24	21:45
29	08:02	06:50	05:37	05:37	20:00 (1) 04:45	04:37
	16:40	19:37	20:35	5 20:05 (1) 21:26	21:45	
30	08:00	06:48	05:35	05:35	19:58 (1) 04:44	04:37
	16:42	19:38	20:37	9 20:07 (1) 21:27	21:45	
31	07:59	06:45	06:45	04:43	04:43	
	16:44	19:40	21:28	496	512	
Sonnenscheinstunden	248	272	367	421		
astr.max.mögl.Beschattung			89	252	257	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.64	0.64	
Gesamte Reduktion			0.19	0.24	0.29	
Met.wahrsch.Beschattung			17	60	75	

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM)	Schattenanfang	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BN - IO66

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:06 (1) 06:14	07:08	07:07	08:03
	21:44	21:09	17 20:23 (1) 20:01	18:46	16:35	15:50
2	04:39	05:20	20:04 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	19 20:23 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	20:04 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	19 20:23 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:03 (1) 06:19	07:14	07:13	08:08
	21:43	21:03	20 20:23 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:03 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	21 20:24 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:03 (1) 06:23	07:17	07:17	08:10
	21:42	20:59	21 20:24 (1) 19:49	18:34	16:25	15:46
7	04:43	05:29	20:03 (1) 06:25	07:19	07:19	08:12
	21:41	20:57	20 20:23 (1) 19:46	18:32	16:23	15:46
8	04:44	05:31	20:03 (1) 06:26	07:21	07:21	08:13
	21:41	20:55	20 20:23 (1) 19:44	18:29	16:21	15:45
9	04:45	05:32	20:04 (1) 06:28	07:23	07:23	08:14
	21:40	20:53	19 20:23 (1) 19:41	18:27	16:19	15:45
10	04:46	05:34	20:03 (1) 06:30	07:25	07:25	08:16
	21:39	20:51	17 20:20 (1) 19:39	18:24	16:18	15:45
11	04:48	05:36	20:04 (1) 06:32	07:27	07:27	08:17
	21:38	20:49	14 20:18 (1) 19:36	18:22	16:16	15:44
12	04:49	05:38	20:05 (1) 06:34	07:28	07:29	08:18
	21:37	20:47	12 20:17 (1) 19:34	18:20	16:14	15:44
13	04:50	05:40	20:06 (1) 06:35	07:30	07:31	08:19
	21:36	20:45	8 20:14 (1) 19:31	18:17	16:13	15:44
14	04:51	05:41	20:08 (1) 06:37	07:32	07:33	08:20
	21:35	20:43	4 20:12 (1) 19:29	18:15	16:11	15:44
15	04:52	05:43	06:39	07:34	07:35	08:21
	21:34	20:40	19:26	18:12	16:09	15:44
16	04:54	05:45	19:33 (20) 06:41	07:36	07:36	08:22
	21:33	20:38	8 19:41 (20) 19:24	18:10	16:08	15:44
17	04:55	05:47	19:31 (20) 06:43	07:38	07:38	08:23
	21:32	20:36	12 19:43 (20) 19:21	18:08	16:06	15:44
18	04:57	05:49	19:30 (20) 06:44	07:40	07:40	08:23
	21:30	20:34	15 19:45 (20) 19:19	18:05	16:05	15:44
19	04:58	05:50	19:28 (20) 06:46	7 18:29 (18) 07:42	07:42	08:24
	21:29	20:31	17 19:45 (20) 19:16	18:36 (18) 18:03	16:03	15:45
20	04:59	05:52	19:27 (20) 06:48	18:27 (18) 07:44	07:44	08:25
	21:28	20:29	19 19:46 (20) 19:14	18:38 (18) 18:01	16:02	15:45
21	05:01	05:54	19:26 (20) 06:50	11 18:25 (18) 07:46	07:46	08:25
	21:26	20:27	20 19:46 (20) 19:11	13 18:38 (18) 17:59	16:01	15:45
22	05:02	05:56	19:25 (20) 06:52	18:24 (18) 07:48	07:48	08:26
	21:25	20:25	20 19:45 (20) 19:09	14 18:38 (18) 17:56	15:59	15:46
23	05:04	05:58	19:25 (20) 06:53	18:24 (18) 07:50	07:49	08:26
	21:23	20:22	21 19:46 (20) 19:06	14 18:38 (18) 17:54	15:58	15:46
24	05:05	05:59	19:25 (20) 06:55	18:24 (18) 07:51	07:51	08:27
	21:22	20:20	21 19:46 (20) 19:04	11 18:35 (18) 17:52	15:57	15:47
25	05:07	06:01	19:25 (20) 06:57	18:24 (18) 06:53	07:53	08:27
	21:20	20:18	20 19:45 (20) 19:01	9 18:33 (18) 16:50	15:56	15:48
26	05:09	06:03	19:25 (20) 06:59	18:24 (18) 06:55	07:55	08:28
	21:19	20:15	19 19:44 (20) 18:59	6 18:30 (18) 16:47	15:54	15:48
27	05:10	06:05	19:26 (20) 07:01	18:25 (18) 06:57	07:56	08:28
	21:17	20:13	17 19:43 (20) 18:56	2 18:27 (18) 16:45	15:53	15:49
28	05:12	20:11 (1) 06:07	19:27 (20) 07:02	06:59	07:58	08:28
	21:15	5 20:16 (1) 20:11	15 19:42 (20) 18:54	16:43	15:52	15:50
29	05:14	20:09 (1) 06:08	19:27 (20) 07:04	07:01	08:00	08:28
	21:14	10 20:19 (1) 20:08	12 19:39 (20) 18:51	16:41	15:51	15:51
30	05:15	20:07 (1) 06:10	19:30 (20) 07:06	07:03	08:01	08:28
	21:12	13 20:20 (1) 20:06	6 19:36 (20) 18:49	16:39	15:51	15:52
31	05:17	20:06 (1) 06:12		07:05		08:28
	21:10	15 20:21 (1) 20:03		16:37		15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	43	473	87			
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40			
Reduktion Betriebsdauer	0.90	0.90	0.90			
Reduktion Windrichtung	0.64	0.64	0.68			
Gesamte Reduktion	0.25	0.28	0.25			
Met.wahrsch.Beschattung	11	132	22			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BO - IO67

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	20:06 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	3 20:09 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	20:03 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	8 20:11 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	20:01 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	11 20:12 (1) 21:32
4	08:27	07:52	16:20 (17) 06:52	06:35	05:26	20:00 (1) 04:40
	15:58	16:52	1 16:21 (17) 17:49	19:48	20:44	14 20:14 (1) 21:33
5	08:27	07:50	16:19 (17) 06:49	06:33	05:24	19:59 (1) 04:39
	15:59	16:54	4 16:23 (17) 17:51	19:50	20:46	16 20:15 (1) 21:34
6	08:27	07:48	16:17 (17) 06:47	06:30	05:22	19:59 (1) 04:38
	16:00	16:56	8 16:25 (17) 17:53	19:52	20:48	18 20:17 (1) 21:35
7	08:26	07:46	16:17 (17) 06:44	06:28	05:20	19:58 (1) 04:37
	16:02	16:58	10 16:27 (17) 17:55	19:54	20:50	20 20:18 (1) 21:36
8	08:26	07:44	16:17 (17) 06:42	06:26	05:18	19:57 (1) 04:37
	16:03	17:00	12 16:29 (17) 17:57	19:55	20:51	21 20:18 (1) 21:37
9	08:25	07:42	16:17 (17) 06:40	06:23	05:17	19:58 (1) 04:36
	16:05	17:02	14 16:31 (17) 17:59	19:57	20:53	21 20:19 (1) 21:38
10	08:24	07:40	16:18 (17) 06:37	06:21	05:15	19:58 (1) 04:36
	16:06	17:05	13 16:31 (17) 18:00	19:59	20:55	21 20:19 (1) 21:39
11	08:24	07:38	16:19 (17) 06:35	06:18	05:13	19:58 (1) 04:35
	16:08	17:07	12 16:31 (17) 18:02	20:01	20:57	20 20:18 (1) 21:40
12	08:23	07:36	16:20 (17) 06:32	06:16	05:11	19:58 (1) 04:35
	16:09	17:09	10 16:30 (17) 18:04	20:03	20:59	20 20:18 (1) 21:41
13	08:22	07:34	16:23 (17) 06:30	06:14	05:09	19:58 (1) 04:34
	16:11	17:11	5 16:28 (17) 18:06	20:05	21:00	20 20:18 (1) 21:41
14	08:21	07:32	06:27	06:11	05:07	19:59 (1) 04:34
	16:13	17:13	18:08	20:07	21:02	18 20:17 (1) 21:42
15	08:20	07:30	06:25	06:09	05:06	20:00 (1) 04:34
	16:14	17:15	18:10	20:09	21:04	17 20:17 (1) 21:43
16	08:19	07:28	06:23	06:06	19:34 (20) 05:04	20:00 (1) 04:34
	16:16	17:17	18:12	20:10	8 19:42 (20) 21:05	15 20:15 (1) 21:43
17	08:18	07:26	06:20	06:04	19:30 (20) 05:02	20:02 (1) 04:33
	16:18	17:19	18:14	20:12	14 19:44 (20) 21:07	13 20:15 (1) 21:44
18	08:17	07:24	06:18	06:02	19:29 (20) 05:01	20:02 (1) 04:33
	16:19	17:21	18:16	4 17:45 (18) 20:14	16 19:45 (20) 21:09	11 20:13 (1) 21:44
19	08:16	07:22	06:15	17:44 (18) 05:59	19:28 (20) 04:59	20:05 (1) 04:33
	16:21	17:23	18:18	7 17:51 (18) 20:16	18 19:46 (20) 21:10	7 20:12 (1) 21:44
20	08:15	07:19	06:13	17:42 (18) 05:57	19:27 (20) 04:57	04:34
	16:23	17:25	18:20	11 17:53 (18) 20:18	20 19:47 (20) 21:12	21:45
21	08:14	07:17	06:10	17:42 (18) 05:55	19:27 (20) 04:56	04:34
	16:25	17:27	18:21	13 17:55 (18) 20:20	20 19:47 (20) 21:14	21:45
22	08:12	07:15	06:08	17:41 (18) 05:52	19:26 (20) 04:55	04:34
	16:27	17:29	18:23	15 17:56 (18) 20:22	20 19:46 (20) 21:15	21:45
23	08:11	07:13	06:05	17:42 (18) 05:50	19:25 (20) 04:53	04:34
	16:29	17:31	18:25	14 17:56 (18) 20:24	21 19:46 (20) 21:17	21:45
24	08:10	07:10	06:03	17:42 (18) 05:48	19:26 (20) 04:52	04:34
	16:30	17:33	18:27	13 17:55 (18) 20:25	20 19:46 (20) 21:18	21:46
25	08:08	07:08	06:00	17:43 (18) 05:46	19:26 (20) 04:50	04:35
	16:32	17:35	18:29	11 17:54 (18) 20:27	20 19:46 (20) 21:20	21:46
26	08:07	07:06	05:58	17:44 (18) 05:43	19:26 (20) 04:49	04:35
	16:34	17:37	18:31	7 17:51 (18) 20:29	19 19:45 (20) 21:21	21:46
27	08:05	07:03	05:55	05:41	19:27 (20) 04:48	04:36
	16:36	17:39	18:33	20:31	17 19:44 (20) 21:23	21:45
28	08:04	07:01	05:53	05:39	19:28 (20) 04:47	04:36
	16:38	17:41	18:35	20:33	15 19:43 (20) 21:24	21:45
29	08:02		06:50	05:37	19:29 (20) 04:45	04:37
	16:40		19:37	20:35	13 19:42 (20) 21:26	21:45
30	08:00		06:48	05:35	19:31 (20) 04:44	04:37
	16:42		19:38	20:37	8 19:39 (20) 21:27	21:45
31	07:59		06:45			04:43
	16:44		19:40			21:28
Sonneneinstrahlung	248	272	367	421	496	512
astr.max.mögl.Beschattung		89	95	249	294	
Red.Sonneneinstrahlung		0.24	0.31	0.41	0.51	
Reduktion Betriebsdauer		0.90	0.90	0.90	0.90	
Reduktion Windrichtung		0.70	0.68	0.63	0.64	
Gesamte Reduktion		0.15	0.19	0.23	0.29	
Met.wahrsch.Beschattung		14	18	59	86	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BO - IO67

**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  
 342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:09 (1) 06:14	07:08	07:07	15:47 (17) 08:03
	21:44	21:09	20:29 (1) 20:01	18:46	16:35	14 16:01 (17) 15:50
2	04:39	05:20	20:08 (1) 06:16	07:10	07:09	15:47 (17) 08:05
	21:44	21:07	20:28 (1) 19:59	18:44	16:33	14 16:01 (17) 15:49
3	04:40	05:22	20:08 (1) 06:17	07:12	07:11	15:47 (17) 08:06
	21:44	21:05	20:29 (1) 19:56	18:41	16:31	12 15:59 (17) 15:48
4	04:40	05:24	20:07 (1) 06:19	07:14	07:13	15:47 (17) 08:08
	21:43	21:03	20:28 (1) 19:54	18:39	16:29	9 15:56 (17) 15:47
5	04:41	05:25	20:08 (1) 06:21	07:15	07:15	15:48 (17) 08:09
	21:43	21:01	20:28 (1) 19:51	18:37	16:27	7 15:55 (17) 15:47
6	04:42	05:27	20:08 (1) 06:23	07:17	07:17	15:49 (17) 08:10
	21:42	20:59	20:28 (1) 19:49	18:34	16:25	4 15:53 (17) 15:46
7	04:43	05:29	20:08 (1) 06:25	07:19	07:19	15:50 (17) 08:12
	21:41	20:57	20:26 (1) 19:46	18:32	16:23	1 15:51 (17) 15:46
8	04:44	05:31	20:09 (1) 06:26	07:21	07:21	08:13
	21:41	20:55	20:24 (1) 19:44	18:29	16:21	15:45
9	04:45	05:32	20:10 (1) 06:28	07:23	07:23	08:14
	21:40	20:53	20:23 (1) 19:41	18:27	16:19	15:45
10	04:46	05:34	20:10 (1) 06:30	07:25	07:25	08:16
	21:39	20:51	20:20 (1) 19:39	18:24	16:18	15:45
11	04:48	05:36	20:12 (1) 06:32	07:27	07:27	08:17
	21:38	20:49	20:18 (1) 19:36	18:22	16:16	15:44
12	04:49	05:38	20:15 (1) 06:34	07:28	07:29	08:18
	21:37	20:47	20:17 (1) 19:34	18:20	16:14	15:44
13	04:50	05:40	19:38 (20) 06:35	07:30	07:31	08:19
	21:36	20:45	19:48 (20) 19:31	18:17	16:13	15:44
14	04:51	05:41	19:36 (20) 06:37	07:32	07:33	08:20
	21:35	20:43	19:50 (20) 19:29	18:15	16:11	15:44
15	04:52	05:43	19:35 (20) 06:39	07:34	07:35	08:21
	21:34	20:40	19:51 (20) 19:26	18:12	16:09	15:44
16	04:54	05:45	19:33 (20) 06:41	07:36	07:36	08:22
	21:33	20:38	19:51 (20) 19:24	18:10	16:08	15:44
17	04:55	05:47	19:33 (20) 06:43	18:34 (18) 07:38	07:38	08:23
	21:32	20:36	19:52 (20) 19:21	4 18:38 (18) 18:08	16:06	15:44
18	04:57	05:49	19:32 (20) 06:44	18:31 (18) 07:40	07:40	08:23
	21:30	20:34	19:52 (20) 19:19	10 18:41 (18) 18:05	16:05	15:44
19	04:58	05:50	19:31 (20) 06:46	18:29 (18) 07:42	07:42	08:24
	21:29	20:31	19:52 (20) 19:16	13 18:42 (18) 18:03	16:03	15:45
20	04:59	05:52	19:31 (20) 06:48	18:28 (18) 07:44	07:44	08:25
	21:28	20:29	19:52 (20) 19:14	15 18:43 (18) 18:01	16:02	15:45
21	05:01	05:54	19:31 (20) 06:50	18:27 (18) 07:46	07:46	08:25
	21:26	20:27	19:52 (20) 19:11	15 18:42 (18) 17:59	16:01	15:45
22	05:02	05:56	19:31 (20) 06:52	18:27 (18) 07:48	07:48	08:26
	21:25	20:25	20:19 (20) 19:09	13 18:40 (18) 17:56	15:59	15:46
23	05:04	05:58	19:31 (20) 06:53	18:27 (18) 07:50	07:49	08:26
	21:23	20:22	19:50 (20) 19:06	11 18:38 (18) 17:54	15:58	15:46
24	05:05	20:17 (1) 05:59	19:32 (20) 06:55	18:27 (18) 07:51	07:51	08:27
	21:22	2 20:19 (1) 20:20	19:50 (20) 19:04	8 18:35 (18) 17:52	15:57	15:47
25	05:07	20:14 (1) 06:01	19:33 (20) 06:57	18:28 (18) 06:53	07:53	08:27
	21:20	9 20:23 (1) 20:18	19:49 (20) 19:01	5 18:33 (18) 16:50	15:56	15:48
26	05:09	20:12 (1) 06:03	19:33 (20) 06:59	18:29 (18) 06:55	07:55	08:28
	21:19	12 20:24 (1) 20:15	19:46 (20) 18:59	1 18:30 (18) 16:47	15:54	15:48
27	05:10	20:11 (1) 06:05	19:36 (20) 07:01	06:57	07:56	08:28
	21:17	15 20:26 (1) 20:13	8 19:44 (20) 18:56	16:45	15:53	15:49
28	05:12	20:10 (1) 06:07	07:02	06:59	07:58	08:28
	21:15	16 20:26 (1) 20:11	18:54	16:43	15:52	15:50
29	05:14	20:10 (1) 06:08	07:04	07:01	15:51 (17) 08:00	08:28
	21:14	17 20:27 (1) 20:08	18:51	16:41	7 15:58 (17) 15:51	15:51
30	05:15	20:09 (1) 06:10	07:06	07:03	15:49 (17) 08:01	08:28
	21:12	18 20:27 (1) 20:06	18:49	16:39	11 16:00 (17) 15:51	15:52
31	05:17	20:09 (1) 06:12	07:05	07:05	15:48 (17)	08:28
	21:10	19 20:28 (1) 20:03	16:37	12 16:00 (17)	15:53	15:53
Sonneneinstrahlung	514	461	383	328	257	231
astr.max.mögl.Beschattung	108	440		30		
Red.Sonneneinstrahlung	0.44	0.48	0.40	0.33	0.21	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.64	0.63	0.68	0.70	0.70	
Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	
Met.wahrsch.Beschattung	27	122	24	6	8	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BP - IO68

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:33 (20)   04:42
	15:54	16:46	17:43	19:42	20:39	15   19:48 (20)   21:29
2	08:28	07:55	06:56	06:40	05:31	19:34 (20)   04:41
	15:55	16:48	17:45	19:44	20:40	12   19:46 (20)   21:31
3	08:28	07:54	06:54	06:38	05:28	19:36 (20)   04:40
	15:57	16:50	17:47	19:46	20:42	10   20:12 (1)   21:32
4	08:27	07:52	06:52	06:35	05:26	20:07 (1)   04:40
	15:58	16:52	17:49	19:48	20:44	7   20:14 (1)   21:33
5	08:27	07:50	16:22 (17)   06:49	06:33	05:24	20:05 (1)   04:39
	15:59	16:54	16:23 (17)   17:51	19:50	20:46	10   20:15 (1)   21:34
6	08:27	07:48	16:20 (17)   06:47	06:30	05:22	20:04 (1)   04:38
	16:00	16:56	5   16:25 (17)   17:53	19:52	20:48	13   20:17 (1)   21:35
7	08:26	07:46	16:19 (17)   06:44	06:28	05:20	20:03 (1)   04:37
	16:02	16:58	8   16:27 (17)   17:55	19:54	20:50	15   20:18 (1)   21:36
8	08:26	07:44	16:19 (17)   06:42	06:26	05:18	20:02 (1)   04:37
	16:03	17:00	10   16:29 (17)   17:57	19:55	20:51	18   20:20 (1)   21:37
9	08:25	07:42	16:19 (17)   06:40	06:23	05:17	20:02 (1)   04:36
	16:05	17:02	13   16:32 (17)   17:59	19:57	20:53	20   20:22 (1)   21:38
10	08:24	07:40	16:19 (17)   06:37	06:21	05:15	20:02 (1)   04:36
	16:06	17:05	15   16:34 (17)   18:00	19:59	20:55	20   20:22 (1)   21:39
11	08:24	07:38	16:20 (17)   06:35	06:18	05:13	20:01 (1)   04:35
	16:08	17:07	14   16:34 (17)   18:02	20:01	20:57	21   20:22 (1)   21:40
12	08:23	07:36	16:21 (17)   06:32	06:16	05:11	20:02 (1)   04:35
	16:09	17:09	12   16:33 (17)   18:04	20:03	20:59	21   20:23 (1)   21:41
13	08:22	07:34	16:22 (17)   06:30	06:14	05:09	20:02 (1)   04:34
	16:11	17:11	10   16:32 (17)   18:06	20:05	21:00	20   20:22 (1)   21:41
14	08:21	07:32	16:23 (17)   06:27	06:11	05:07	20:01 (1)   04:34
	16:13	17:13	6   16:29 (17)   18:08	20:07	21:02	21   20:22 (1)   21:42
15	08:20	07:30	06:25	06:09	05:06	20:02 (1)   04:34
	16:14	17:15	18:10	20:09	21:04	20   20:22 (1)   21:43
16	08:19	07:28	06:23	06:06	05:04	20:02 (1)   04:34
	16:16	17:17	18:12	20:10	21:05	19   20:21 (1)   21:43
17	08:18	07:26	06:20	06:04	05:02	20:03 (1)   04:33
	16:18	17:19	18:14	20:12	21:07	18   20:21 (1)   21:44
18	08:17	07:24	06:18	06:02	05:01	20:03 (1)   04:33
	16:19	17:21	18:16	20:14	5   19:39 (20)   21:09	17   20:20 (1)   21:44
19	08:16	07:22	06:15	05:59	19:36 (20)   04:59	20:05 (1)   04:33
	16:21	17:23	18:18	1   17:51 (18)   20:16	12   19:48 (20)   21:10	15   20:20 (1)   21:44
20	08:15	07:19	06:13	17:47 (18)   05:57	19:34 (20)   04:58	20:05 (1)   04:34
	16:23	17:25	18:20	6   17:53 (18)   20:18	15   19:49 (20)   21:12	13   20:18 (1)   21:45
21	08:14	07:17	06:10	17:46 (18)   05:55	19:33 (20)   04:56	20:07 (1)   04:34
	16:25	17:27	18:21	9   17:55 (18)   20:20	17   19:50 (20)   21:14	10   20:17 (1)   21:45
22	08:12	07:15	06:08	17:45 (18)   05:52	19:31 (20)   04:55	20:09 (1)   04:34
	16:27	17:29	18:23	11   17:56 (18)   20:22	19   19:50 (20)   21:15	7   20:16 (1)   21:45
23	08:11	07:13	06:05	17:45 (18)   05:50	19:31 (20)   04:53	20:09 (1)   04:34
	16:29	17:31	18:25	14   17:59 (18)   20:24	20   19:51 (20)   21:17	21:45
24	08:10	07:10	06:03	17:44 (18)   05:48	19:30 (20)   04:52	20:09 (1)   04:34
	16:30	17:33	18:27	15   17:59 (18)   20:25	21   19:51 (20)   21:18	21:46
25	08:08	07:08	06:00	17:44 (18)   05:46	19:30 (20)   04:50	20:09 (1)   04:33
	16:32	17:35	18:29	15   17:59 (18)   20:27	21   19:51 (20)   21:20	21:46
26	08:07	07:06	05:58	17:45 (18)   05:43	19:30 (20)   04:49	20:09 (1)   04:33
	16:34	17:37	18:31	12   17:57 (18)   20:29	21   19:51 (20)   21:21	21:46
27	08:05	07:03	05:55	17:46 (18)   05:41	19:30 (20)   04:48	20:09 (1)   04:33
	16:36	17:39	18:33	9   17:55 (18)   20:31	21   19:51 (20)   21:23	21:45
28	08:04	07:01	05:53	05:39	19:30 (20)   04:47	20:09 (1)   04:33
	16:38	17:41	18:35	20:33	20   19:50 (20)   21:24	21:45
29	08:02	06:50	05:50	05:37	19:31 (20)   04:45	20:09 (1)   04:33
	16:40	17:43	19:37	20:35	19   19:50 (20)   21:26	21:45
30	08:00	06:48	05:48	05:35	19:32 (20)   04:44	20:09 (1)   04:33
	16:42	17:45	19:38	20:37	17   19:49 (20)   21:27	21:45
31	07:59	06:45	06:45	06:33	04:43	20:09 (1)   04:33
	16:44	17:47	19:40	20:39	21:28	21:45
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung		94	92	228	342	
Red.Sonnenscheinwahrsch.		0.24	0.31	0.41	0.51	
Reduktion Betriebsdauer		0.90	0.90	0.90	0.90	
Reduktion Windrichtung		0.70	0.68	0.63	0.63	
Gesamte Reduktion		0.15	0.19	0.24	0.29	
Met.wahrsch.Beschattung		14	18	54	100	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BP - IO68

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:12 (1) 06:14	07:08	07:07	15:49 (17) 08:03
	21:44	21:09	21 20:33 (1) 20:01	18:46	16:35	14 16:03 (17) 15:50
2	04:39	05:20	20:12 (1) 06:16	07:10	07:09	15:49 (17) 08:05
	21:44	21:07	21 20:33 (1) 19:59	18:44	16:33	12 16:01 (17) 15:49
3	04:40	05:22	20:12 (1) 06:17	07:12	07:11	15:49 (17) 08:06
	21:44	21:05	21 20:33 (1) 19:56	18:41	16:31	10 15:59 (17) 15:48
4	04:40	05:24	20:12 (1) 06:19	07:14	07:13	15:49 (17) 08:08
	21:43	21:03	19 20:31 (1) 19:54	18:39	16:29	7 15:56 (17) 15:47
5	04:41	05:25	20:13 (1) 06:21	07:15	07:15	15:51 (17) 08:09
	21:43	21:01	17 20:30 (1) 19:51	18:37	16:27	4 15:55 (17) 15:47
6	04:42	05:27	20:14 (1) 06:23	07:17	07:17	15:52 (17) 08:10
	21:42	20:59	14 20:28 (1) 19:49	18:34	16:25	1 15:53 (17) 15:46
7	04:43	05:29	20:14 (1) 06:25	07:19	07:19	15:52 (17) 08:12
	21:41	20:57	12 20:26 (1) 19:46	18:32	16:23	15:46
8	04:44	05:31	20:15 (1) 06:26	07:21	07:21	08:13
	21:41	20:55	9 20:24 (1) 19:44	18:29	16:21	15:45
9	04:45	05:32	20:17 (1) 06:28	07:23	07:23	08:14
	21:40	20:53	6 20:23 (1) 19:41	18:27	16:19	15:45
10	04:46	05:34	19:44 (20) 06:30	07:25	07:25	08:16
	21:39	20:51	9 19:53 (20) 19:39	18:24	16:18	15:45
11	04:48	05:36	19:42 (20) 06:32	07:27	07:27	08:17
	21:38	20:49	13 19:55 (20) 19:36	18:22	16:16	15:44
12	04:49	05:38	19:41 (20) 06:34	07:28	07:29	08:18
	21:37	20:47	15 19:56 (20) 19:34	18:20	16:14	15:44
13	04:50	05:40	19:39 (20) 06:35	07:30	07:31	08:19
	21:36	20:45	17 19:56 (20) 19:31	18:17	16:13	15:44
14	04:51	05:41	19:38 (20) 06:37	07:32	07:33	08:20
	21:35	20:43	19 19:57 (20) 19:29	18:15	16:11	15:44
15	04:52	05:43	19:38 (20) 06:39	07:34	07:35	08:21
	21:34	20:40	20 19:58 (20) 19:26	18:12	16:09	15:44
16	04:54	05:45	19:37 (20) 06:41	8 18:36 (18) 07:36	07:36	08:22
	21:33	20:38	20 19:57 (20) 19:24	8 18:44 (18) 18:10	16:08	15:44
17	04:55	05:47	19:37 (20) 06:43	8 18:33 (18) 07:38	07:38	08:23
	21:32	20:36	21 19:58 (20) 19:21	12 18:45 (18) 18:08	16:06	15:44
18	04:57	05:49	19:37 (20) 06:44	12 18:32 (18) 07:40	07:40	08:23
	21:30	20:34	21 19:58 (20) 19:19	14 18:46 (18) 18:05	16:05	15:44
19	04:58	05:50	19:36 (20) 06:46	14 18:31 (18) 07:42	07:42	08:24
	21:29	20:31	21 19:57 (20) 19:16	15 18:46 (18) 18:03	16:03	15:45
20	04:59	05:52	19:36 (20) 06:48	15 18:31 (18) 07:44	07:44	08:25
	21:28	20:29	20 19:56 (20) 19:14	15 18:46 (18) 18:01	16:02	15:45
21	05:01	20:20 (1) 05:54	19:37 (20) 06:50	15 18:30 (18) 07:46	07:46	08:25
	21:26	4 20:24 (1) 20:27	19 19:56 (20) 19:11	12 18:42 (18) 17:59	16:01	15:45
22	05:02	20:18 (1) 05:56	19:37 (20) 06:52	12 18:30 (18) 07:48	07:48	08:26
	21:25	9 20:27 (1) 20:25	17 19:54 (20) 19:09	10 18:40 (18) 17:56	15:59	15:46
23	05:04	20:16 (1) 05:58	19:38 (20) 06:53	10 18:31 (18) 07:50	07:49	08:26
	21:23	12 20:28 (1) 20:22	15 19:53 (20) 19:06	7 18:38 (18) 17:54	15:58	15:46
24	05:05	20:15 (1) 05:59	19:40 (20) 06:55	7 18:33 (18) 07:51	07:51	08:27
	21:22	14 20:29 (1) 20:20	11 19:51 (20) 19:04	2 18:35 (18) 17:52	15:57	15:47
25	05:07	20:15 (1) 06:01	19:44 (20) 06:57	2 18:35 (18) 17:52	07:53	08:27
	21:20	16 20:31 (1) 20:18	3 19:47 (20) 19:01	06:53	15:56	15:48
26	05:09	20:13 (1) 06:03	06:59	06:55	07:55	08:28
	21:19	18 20:31 (1) 20:15	18:59	16:47	15:54	15:48
27	05:10	20:13 (1) 06:05	07:01	06:57	07:56	08:28
	21:17	19 20:32 (1) 20:13	18:56	16:45	15:53	15:49
28	05:12	20:12 (1) 06:07	07:02	06:59	15:52 (17) 07:58	08:28
	21:15	20 20:32 (1) 20:11	18:54	16:43	7 15:59 (17) 15:52	15:50
29	05:14	20:13 (1) 06:08	07:04	07:01	15:51 (17) 08:00	08:28
	21:14	20 20:33 (1) 20:08	18:51	16:41	11 16:02 (17) 15:51	15:51
30	05:15	20:12 (1) 06:10	07:06	07:03	15:50 (17) 08:01	08:28
	21:12	20 20:32 (1) 20:06	18:49	16:39	13 16:03 (17) 15:51	15:52
31	05:17	20:12 (1) 06:12	07:07	07:05	15:49 (17) 15:51	08:28
	21:10	21 20:33 (1) 20:03	07:08	16:37	14 16:03 (17) 15:51	15:53
Sonneneinstrahlung	514	461	383	328	257	231
astr.max.mögl.Beschattung	173	401	95	45	48	
Red.Sonneneinstrahlung	0.44	0.48	0.40	0.33	0.21	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.63	0.63	0.68	0.70	0.70	
Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	
Met.wahrsch.Beschattung	44	112	24	9	6	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BQ - IO69  
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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni							
1	08:28	15:13 (21)	07:57	06:59	06:43	18:57 (18)	05:33	19:58 (19)	04:42	20:26 (1)			
2	15:54	15:16 (21)	16:46	17:43	19:42	19:13 (18)	20:39	11	20:09 (19)	21:29	22	20:48 (1)	
3	08:28	15:12 (21)	07:55	06:56	06:40	18:56 (18)	05:31	19:58 (19)	04:41	20:27 (1)			
4	15:57	15:17 (21)	16:48	17:45	19:44	19:12 (18)	20:40	13	20:11 (19)	21:31	22	20:49 (1)	
5	08:28	15:13 (21)	07:54	06:54	06:38	18:57 (18)	05:28	19:58 (19)	04:40	20:27 (1)			
6	15:57	15:18 (21)	16:50	17:47	19:46	19:11 (18)	20:42	14	20:12 (19)	21:32	22	20:49 (1)	
7	08:27	15:13 (21)	07:52	06:52	06:35	18:57 (18)	05:26	19:58 (19)	04:40	20:27 (1)			
8	15:58	15:20 (21)	16:52	17:49	19:48	19:09 (18)	20:44	14	20:12 (19)	21:33	22	20:49 (1)	
9	08:27	15:13 (21)	07:50	06:49	06:33	19:00 (18)	05:24	19:59 (19)	04:39	20:27 (1)			
10	15:59	15:21 (21)	16:54	17:51	19:50	19:07 (18)	20:46	15	20:14 (20)	21:34	21	20:48 (1)	
11	08:27	15:13 (21)	07:48	06:47	06:30	19:22 (16)	05:22	19:59 (19)	04:38	20:28 (1)			
12	16:00	15:22 (21)	16:56	17:53	19:52	2	19:24 (16)	20:48	16	20:15 (20)	21:35	21	20:49 (1)
13	08:26	15:14 (21)	07:46	06:45	06:28	19:21 (16)	05:20	19:57 (20)	04:37	20:28 (1)			
14	16:02	15:25 (21)	16:58	17:55	19:54	5	19:26 (16)	20:50	19	20:16 (20)	21:36	21	20:49 (1)
15	08:26	15:14 (21)	07:44	06:42	06:26	19:20 (16)	05:18	19:56 (20)	04:37	20:28 (1)			
16	16:03	15:26 (21)	17:00	17:57	19:55	8	19:28 (16)	20:51	20	20:16 (20)	21:37	21	20:49 (1)
17	08:25	15:14 (21)	07:42	06:40	06:23	19:19 (16)	05:17	19:57 (20)	04:36	20:28 (1)			
18	16:05	15:27 (21)	17:02	17:59	19:57	11	19:30 (16)	20:53	21	20:18 (20)	21:38	21	20:49 (1)
19	08:24	15:15 (21)	07:40	06:37	06:21	19:19 (16)	05:15	19:56 (20)	04:36	20:29 (1)			
20	16:06	15:29 (21)	17:05	18:00	19:59	13	19:32 (16)	20:55	22	20:18 (20)	21:39	20	20:49 (1)
21	08:24	15:15 (21)	07:38	06:35	06:18	19:19 (16)	05:13	19:55 (20)	04:35	20:30 (1)			
22	16:08	15:30 (21)	17:07	18:02	20:01	13	19:32 (16)	20:57	23	20:18 (20)	21:40	20	20:50 (1)
23	08:23	15:16 (21)	07:36	06:32	06:16	19:20 (16)	05:11	19:56 (20)	04:35	20:29 (1)			
24	16:09	15:30 (21)	17:09	18:04	20:03	11	19:31 (16)	20:59	23	20:19 (20)	21:41	20	20:49 (1)
25	08:22	15:16 (21)	07:34	06:30	06:14	19:21 (16)	05:09	19:55 (20)	04:34	20:30 (1)			
26	16:11	15:30 (21)	17:11	18:06	20:05	9	19:30 (16)	21:00	23	20:18 (20)	21:41	19	20:49 (1)
27	08:21	15:17 (21)	07:32	06:27	06:11	19:25 (20)	05:07	19:55 (20)	04:34	20:30 (1)			
28	16:13	15:31 (21)	17:13	18:08	20:07	21:02	23	20:18 (20)	21:42	19	20:49 (1)		
29	08:20	15:18 (21)	07:30	06:25	06:09	19:26 (16)	05:06	19:56 (20)	04:34	20:31 (1)			
30	16:14	15:31 (21)	17:15	18:10	20:09	21:04	22	20:18 (20)	21:43	19	20:50 (1)		
31	08:19	15:19 (21)	07:28	06:23	06:06	05:04	19:55 (20)	04:34	20:31 (1)				
32	16:16	15:31 (21)	17:17	18:12	20:10	21:05	23	20:18 (20)	21:43	19	20:50 (1)		
33	08:18	15:20 (21)	07:26	06:20	06:04	05:02	19:56 (20)	04:34	20:32 (1)				
34	16:18	15:31 (21)	17:19	18:14	20:12	21:07	22	20:18 (20)	21:44	18	20:50 (1)		
35	08:17	15:21 (21)	07:24	06:18	06:02	05:01	19:56 (20)	04:33	20:32 (1)				
36	16:19	15:29 (21)	17:21	18:16	20:14	21:09	25	20:36 (1)	21:44	18	20:50 (1)		
37	08:16	15:24 (21)	07:22	06:15	05:59	04:59	19:57 (20)	04:33	20:32 (1)				
38	16:21	15:28 (21)	17:23	18:18	20:16	21:10	28	20:38 (1)	21:44	18	20:50 (1)		
39	08:15	15:20 (21)	07:19	06:13	05:57	04:58	19:57 (20)	04:34	20:32 (1)				
40	16:23	17:25	18:20	19:15	20:18	21:12	28	20:38 (1)	21:45	18	20:50 (1)		
41	08:14	15:17 (21)	07:17	06:10	05:55	04:56	19:58 (20)	04:34	20:32 (1)				
42	16:25	17:27	18:22	19:17	20:20	21:14	30	20:40 (1)	21:45	18	20:50 (1)		
43	08:12	15:15 (21)	07:15	06:08	05:52	04:55	19:59 (20)	04:34	20:32 (1)				
44	16:27	17:29	18:23	19:18	20:22	21:15	30	20:42 (1)	21:45	18	20:50 (1)		
45	08:11	15:13 (21)	07:13	06:05	05:50	04:53	20:00 (20)	04:34	20:33 (1)				
46	16:29	17:31	18:25	19:20	20:24	21:17	32	20:44 (1)	21:45	18	20:51 (1)		
47	08:10	15:10 (21)	07:10	06:03	05:48	04:52	20:01 (20)	04:34	20:33 (1)				
48	16:31	17:33	18:27	19:22	20:25	21:18	30	20:44 (1)	21:46	18	20:51 (1)		
49	08:08	15:08 (21)	07:08	06:00	05:46	04:50	20:03 (20)	04:35	20:33 (1)				
50	16:32	17:35	18:29	19:24	20:27	21:20	28	20:46 (1)	21:46	18	20:51 (1)		
51	08:07	15:06 (21)	07:06	05:58	05:43	04:49	20:06 (20)	04:35	20:33 (1)				
52	16:34	17:37	18:31	19:26	20:29	21:21	24	20:47 (1)	21:46	19	20:52 (1)		
53	08:05	15:03 (21)	07:03	05:55	05:41	04:48	20:26 (1)	04:36	20:33 (1)				
54	16:36	17:39	18:33	19:28	20:31	21:23	21	20:47 (1)	21:45	19	20:52 (1)		
55	08:04	15:01 (21)	07:01	05:53	05:39	04:47	20:00 (19)	04:37	20:34 (1)				
56	16:38	17:41	18:35	19:30	20:33	21:24	22	20:48 (1)	21:45	19	20:53 (1)		
57	08:02	15:00 (21)	07:00	05:50	05:37	04:45	19:59 (19)	04:37	20:33 (1)				
58	16:40	17:43	18:37	19:32	20:35	21:26	22	20:48 (1)	21:45	19	20:52 (1)		
59	08:00	15:00 (21)	07:00	05:48	05:35	04:44	19:59 (19)	04:37	20:34 (1)				
60	16:42	17:45	18:39	19:34	20:37	21:27	22	20:48 (1)	21:45	19	20:53 (1)		
61	07:59	15:00 (21)	07:00	05:45	05:32	04:43	20:07 (19)	04:37	20:34 (1)				
62	16:44	17:47	18:41	19:36	20:39	21:28	22	20:48 (1)	21:45	19	20:53 (1)		
63	Sonnenscheinstunden	192	272	367	421	496		512					
64	astr.max.mögl.Beschattung			57	155	688		586					
65	Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51		0.45					
66	Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90		0.90					
67	Reduktion Windrichtung	0.68	0.70	0.67	0.66	0.63		0.62					
68	Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29		0.26					
69	Met.wahrsch.Beschattung	21	19	11	38	200		150					

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	

Projekt:  
180413\_Miltzow\_LAI\_Antrag III - VII

Lizenzierter Anwender:  
I17-Wind GmbH & Co. KG  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BQ - IO69  
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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1   04:38	20:34 (1)   05:19	20:06 (20)   06:14	19:19 (16)   07:08	07:07	15:55 (17)   08:03	14:57 (21)	
21:44	20:54 (1)   21:09	23 20:29 (20)   20:01	13 19:32 (16)   18:46	16:35	8 16:03 (17)   15:50	15 15:12 (21)	
2   04:39	20:33 (1)   05:20	20:06 (20)   06:16	19:17 (16)   07:10	07:09	15:56 (17)   08:05	14:58 (21)	
21:44	20:53 (1)   21:07	22 20:28 (20)   19:59	13 19:30 (16)   18:44	16:33	5 16:01 (17)   15:49	14 15:12 (21)	
3   04:40	20:34 (1)   05:22	20:06 (20)   06:17	19:17 (16)   07:12	07:11	15:57 (17)   08:06	14:58 (21)	
21:44	20:54 (1)   21:05	22 20:28 (20)   19:56	11 19:28 (16)   18:41	16:31	2 15:59 (17)   15:48	14 15:12 (21)	
4   04:40	20:34 (1)   05:24	20:06 (20)   06:19	19:17 (16)   07:14	07:13	15:57 (17)   08:08	14:58 (21)	
21:43	20:54 (1)   21:03	21 20:27 (20)   19:54	8 19:25 (16)   18:39	16:29	15:47	12 15:10 (21)	
5   04:41	20:34 (1)   05:25	20:07 (20)   06:21	19:17 (16)   07:15	07:15	15:58 (17)   08:09	14:59 (21)	
21:43	20:55 (1)   21:01	20 20:27 (20)   19:51	5 19:22 (16)   18:37	16:27	15:47	11 15:10 (21)	
6   04:42	20:34 (1)   05:27	20:08 (20)   06:23	19:18 (16)   07:17	07:17	15:59 (17)   08:10	14:59 (21)	
21:42	20:55 (1)   20:59	18 20:26 (20)   19:49	2 19:20 (16)   18:34	16:25	15:46	10 15:09 (21)	
7   04:43	20:34 (1)   05:29	20:08 (19)   06:25	18:55 (18)   07:19	07:19	15:50 (17)   08:12	15:00 (21)	
21:41	20:56 (1)   20:57	16 20:24 (20)   19:46	7 19:02 (18)   18:32	16:23	15:46	8 15:08 (21)	
8   04:44	20:34 (1)   05:31	20:08 (19)   06:26	18:53 (18)   07:21	07:21	15:46	8 15:08 (21)	
21:41	20:56 (1)   20:55	15 20:23 (20)   19:44	11 19:04 (18)   18:29	16:21	15:45	6 15:07 (21)	
9   04:45	20:34 (1)   05:32	20:07 (19)   06:28	18:50 (18)   07:23	07:23	15:44	6 15:07 (21)	
21:40	20:56 (1)   20:53	14 20:21 (19)   19:41	14 19:04 (18)   18:27	16:19	15:45	6 15:08 (21)	
10   04:46	20:34 (1)   05:34	20:06 (19)   06:30	18:49 (18)   07:25	07:25	15:46	6 15:09 (21)	
21:39	20:56 (1)   20:51	14 20:20 (19)   19:39	16 19:05 (18)   18:24	16:18	15:45	5 15:07 (21)	
11   04:48	20:34 (1)   05:36	20:06 (19)   06:32	18:49 (18)   07:27	07:27	15:47	5 15:08 (21)	
21:38	20:57 (1)   20:49	12 20:18 (19)   19:36	16 19:05 (18)   18:22	16:16	15:44	3 15:06 (21)	
12   04:49	20:34 (1)   05:38	20:07 (19)   06:34	18:49 (18)   07:28	07:29	15:48	3 15:08 (21)	
21:37	20:57 (1)   20:47	10 20:17 (19)   19:34	16 19:05 (18)   18:20	16:14	15:44	3 15:06 (21)	
13   04:50	20:34 (1)   05:40	20:06 (19)   06:35	18:48 (18)   07:30	07:31	15:49	3 15:09 (21)	
21:36	20:57 (1)   20:45	8 20:14 (19)   19:31	15 19:03 (18)   18:17	16:13	15:44	2 15:06 (21)	
14   04:51	20:34 (1)   05:41	20:07 (19)   06:37	18:48 (18)   07:32	07:33	15:48	2 15:09 (21)	
21:35	20:57 (1)   20:43	5 20:12 (19)   19:29	12 19:00 (18)   18:15	16:11	15:44	1 15:05 (21)	
15   04:52	20:34 (1)   05:43	20:08 (19)   06:39	18:49 (18)   07:34	07:35	15:49	2 15:10 (21)	
21:34	20:56 (1)   20:40	3 20:11 (19)   19:26	9 18:58 (18)   18:12	16:09	15:44	1 15:05 (21)	
16   04:54	20:35 (1)   05:45	06:41	18:50 (18)   07:36	07:36	15:48	1 15:08 (21)	
21:33	20:57 (1)   20:38	19:24	6 18:56 (18)   18:10	16:08	15:44	1 15:05 (21)	
17   04:55	20:36 (1)   05:47	06:43	18:52 (18)   07:38	07:38	15:48	1 15:09 (21)	
21:32	20:57 (1)   20:36	19:21	1 18:53 (18)   18:08	16:06	15:44	1 15:05 (21)	
18   04:57	20:14 (20)   05:49	06:44	07:40	07:40	15:48	1 15:08 (21)	
21:30	20:56 (1)   20:34	19:19	18:05	16:05	15:44	1 15:05 (21)	
19   04:58	20:11 (20)   05:50	06:46	07:42	07:42	15:48	1 15:09 (21)	
21:29	20:54 (1)   20:31	19:16	18:03	16:03	15:45	1 15:06 (21)	
20   04:59	20:11 (20)   05:52	06:48	07:44	07:44	15:49	1 15:10 (21)	
21:28	20:54 (1)   20:29	19:14	18:01	16:02	15:45	1 15:06 (21)	
21   05:01	20:09 (20)   05:54	06:50	07:46	07:46	15:49	1 15:10 (21)	
21:26	20:52 (1)   20:27	19:11	17:59	16:01	15:45	1 15:06 (21)	
22   05:02	20:09 (20)   05:56	06:52	07:48	07:48	15:49	1 15:10 (21)	
21:25	20:52 (1)   20:25	19:09	17:56	15:59	15:46	1 15:07 (21)	
23   05:04	20:08 (20)   05:58	06:53	07:50	07:49	15:50 (21)   08:26	1 15:08 (21)	
21:23	20:50 (1)   20:22	19:06	17:54	15:58	4 15:04 (21)   15:46	1 15:06 (21)	
24   05:06	20:07 (20)   05:59	06:55	07:51	16:58 (17)   07:51	14:58 (21)   08:27	1 15:09 (21)	
21:22	20:48 (1)   20:20	19:04	17:52	9 17:07 (17)   15:53	8 15:06 (21)   15:47	1 15:07 (21)	
25   05:07	20:07 (20)   06:01	06:57	07:53	15:56 (17)   07:53	14:57 (21)   08:27	1 15:08 (21)	
21:20	20:47 (1)   20:18	19:01	16:50	12 16:08 (17)   15:56	11 15:08 (21)   15:48	1 15:06 (21)	
26   05:09	20:06 (20)   06:03	06:59	07:55	15:55 (17)   07:55	14:57 (21)   08:28	1 15:09 (21)	
21:19	20:45 (1)   20:15	18:59	16:47	14 16:09 (17)   15:54	12 15:09 (21)   15:48	1 15:06 (21)	
27   05:10	20:06 (20)   06:05	07:01	07:57	15:54 (17)   07:56	14:57 (21)   08:28	1 15:09 (21)	
21:17	20:28 (20)   20:13	18:56	16:45	15 16:09 (17)   15:53	13 15:10 (21)   15:49	1 15:07 (21)	
28   05:12	20:06 (20)   06:07	07:02	07:59	15:53 (17)   07:58	14:57 (21)   08:28	1 15:08 (21)	
21:16	20:28 (20)   20:11	18:54	16:43	16 16:09 (17)   15:52	14 15:11 (21)   15:50	1 15:09 (21)	
29   05:14	20:06 (20)   06:08	07:04	07:01	15:54 (17)   08:00	14:57 (21)   08:28	1 15:11 (21)	
21:14	20:29 (20)   20:08	18:51	16:41	16 16:10 (17)   15:51	15 15:12 (21)   15:51	1 15:12 (21)	
30   05:15	20:05 (20)   06:10	07:06	07:03	15:54 (17)   08:01	14:58 (21)   08:28	1 15:12 (21)	
21:12	20:28 (20)   20:06	9 19:30 (16)   18:49	16:39	14 16:08 (17)   15:51	14 15:12 (21)   15:52	1 15:13 (21)	
31   05:17	20:06 (20)   06:12	07:05	07:05	15:54 (17)   08:28	14:57 (21)   08:28	1 15:12 (21)	
21:10	20:29 (20)   20:03	11 19:31 (16)   18:49	16:37	12 16:06 (17)   15:53	2 15:14 (21)	1 15:11 (21)	
Sonnenscheinstunden   514	461	383	328	257	231	114	
astr.max.mögl.Beschattung   734	243	175	108	106	114	114	
Red.Sonnenscheinwahrsch.   0.44	0.48	0.40	0.33	0.21	0.14	0.14	
Reduktion Betriebsdauer   0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung   0.63	0.64	0.67	0.70	0.68	0.68	0.68	
Gesamte Reduktion   0.25	0.28	0.24	0.21	0.13	0.09	0.09	
Met.wahrsch.Beschattung   185	68	43	23	14	10	10	

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BR - IO70  
**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  
 342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1   08:28	15:11 (21)   07:57		06:59	06:43	19:04 (18)   05:33		04:42	20:10 (20)
15:54	5   15:16 (21)   16:46		17:43	19:42	12   19:16 (18)   20:39		21:29	37   20:54 (1)
2   08:28	15:10 (21)   07:55		06:56	06:40	19:02 (18)   05:31		20:08 (19)   04:41	37   20:11 (20)
15:35	7   15:17 (21)   16:48		17:45	19:44	15   19:17 (18)   20:40	3	20:11 (19)   21:31	37   20:56 (1)
3   08:28	15:11 (21)   07:54		06:54	06:38	19:02 (18)   05:28		20:07 (19)   04:40	39   20:11 (20)
15:57	7   15:18 (21)   16:50		17:47	19:46	17   19:19 (18)   20:42	5	20:12 (19)   21:32	39   20:57 (1)
4   08:27	15:11 (21)   07:52		06:52	06:35	19:01 (18)   05:26		20:06 (19)   04:40	38   20:12 (20)
15:58	9   15:20 (21)   16:52		17:49	19:48	17   19:18 (18)   20:44	8	20:14 (19)   21:33	38   20:58 (1)
5   08:27	15:11 (21)   07:50		06:49	06:33	19:01 (18)   05:24		20:05 (19)   04:39	37   20:12 (20)
15:59	10   15:21 (21)   16:54		17:51	19:50	17   19:18 (18)   20:46	10	20:15 (19)   21:34	37   21:00 (1)
6   08:27	15:11 (21)   07:48		06:47	06:30	19:01 (18)   05:22		20:05 (19)   04:38	38   20:13 (20)
16:00	11   15:22 (21)   16:56		17:53	19:52	16   19:17 (18)   20:48	12	20:17 (19)   21:35	39   21:00 (1)
7   08:26	15:12 (21)   07:46		06:45	06:28	19:02 (18)   05:20		20:04 (19)   04:37	37   20:13 (20)
16:02	13   15:25 (21)   16:58		17:55	19:54	14   19:16 (18)   20:50	14	20:18 (19)   21:36	37   20:59 (1)
8   08:26	15:12 (21)   07:44		06:42	06:26	19:03 (18)   05:18		20:04 (19)   04:37	37   20:15 (20)
16:03	14   15:26 (21)   17:00		17:57	19:55	12   19:15 (18)   20:51	15	20:19 (19)   21:37	37   21:00 (1)
9   08:25	15:12 (21)   07:42		06:40	06:23	19:05 (18)   05:17		20:05 (19)   04:36	37   20:15 (20)
16:05	15   15:27 (21)   17:03	3	16:29 (17)   17:59	19:57	9   19:30 (16)   20:53	14	20:19 (19)   21:38	36   21:00 (1)
10   08:24	15:13 (21)   07:40		06:37	06:21	19:26 (16)   05:15		20:06 (19)   04:36	36   20:16 (20)
16:06	15   15:28 (21)   17:05	7	16:34 (17)   18:00	19:59	6   19:32 (16)   20:55	12	20:18 (19)   21:39	36   21:01 (1)
11   08:24	15:13 (21)   07:38		06:35	06:18	19:25 (16)   05:13		20:06 (19)   04:35	36   20:17 (20)
16:08	16   15:29 (21)   17:07	10	16:36 (17)   18:02	20:01	8   19:33 (16)   20:57	15	20:21 (20)   21:40	34   21:01 (1)
12   08:23	15:14 (21)   07:36		06:32	06:16	19:24 (16)   05:11		20:08 (19)   04:35	36   20:17 (20)
16:09	15   15:29 (21)   17:09	13	16:39 (17)   18:04	20:03	11   19:35 (16)   20:59	17	20:25 (20)   21:41	34   21:01 (1)
13   08:22	15:14 (21)   07:34		06:30	06:14	19:24 (16)   05:09		20:10 (19)   04:34	36   20:18 (20)
16:11	15   15:29 (21)   17:11	15	16:41 (17)   18:06	20:05	13   19:37 (16)   21:00	16	20:26 (20)   21:41	32   21:01 (1)
14   08:21	15:15 (21)   07:32		06:27	06:11	19:24 (16)   05:07		20:11 (20)   04:34	36   20:19 (20)
16:13	14   15:29 (21)   17:13	17	16:42 (17)   18:08	20:07	13   19:37 (16)   21:02	16	20:27 (20)   21:42	31   21:02 (1)
15   08:20	15:16 (21)   07:30		06:25	06:09	19:24 (16)   05:06		20:10 (20)   04:34	36   20:20 (20)
16:14	14   15:30 (21)   17:15	17	16:42 (17)   18:10	20:09	13   19:37 (16)   21:04	19	20:29 (20)   21:43	30   21:02 (1)
16   08:19	15:17 (21)   07:28		06:23	06:06	19:26 (16)   05:04		20:09 (20)   04:34	36   20:21 (20)
16:16	13   15:30 (21)   17:17	17	16:42 (17)   18:12	20:10	10   19:36 (16)   21:05	20	20:29 (20)   21:43	28   21:02 (1)
17   08:18	15:18 (21)   07:26		06:20	06:04	19:27 (16)   05:02		20:09 (20)   04:34	36   20:21 (20)
16:18	12   15:30 (21)   17:19	15	16:41 (17)   18:14	20:12	6   19:33 (16)   21:07	21	20:30 (20)   21:44	29   21:03 (1)
18   08:17	15:19 (21)   07:24		06:18	06:02	19:28 (16)   05:01		20:08 (20)   04:33	36   20:22 (20)
16:19	9   15:28 (21)   17:21	14	16:40 (17)   18:16	20:14		21:09	22   20:30 (20)   21:44	27   21:03 (1)
19   08:16	15:21 (21)   07:22		06:15	05:59	19:29 (16)   04:59		20:08 (20)   04:33	36   20:23 (20)
16:21	6   15:27 (21)   17:23	10	16:38 (17)   18:18	20:16		21:10	23   20:31 (20)   21:44	26   21:03 (1)
20   08:15	07:19		06:13	05:57	19:27 (16)   04:58		20:07 (20)   04:34	36   20:23 (20)
16:23	17:25	5	16:36 (17)   18:20	20:18		21:12	24   20:31 (20)   21:45	25   21:03 (1)
21   08:14	07:17		06:10	05:55	19:28 (16)   04:56		20:07 (20)   04:34	36   20:24 (20)
16:25	17:27		18:22	20:20		21:14	24   20:31 (20)   21:45	24   21:03 (1)
22   08:12	07:15		06:08	05:52	19:29 (16)   04:55		20:08 (20)   04:34	36   20:24 (20)
16:27	17:29		18:23	20:22		21:15	24   20:32 (20)   21:45	24   21:03 (1)
23   08:11	07:13		06:05	05:50	19:30 (16)   04:53		20:08 (20)   04:34	36   20:24 (20)
16:29	17:31		18:25	20:24		21:17	24   20:32 (20)   21:45	26   21:04 (1)
24   08:10	07:10		06:03	05:48	19:31 (16)   04:52		20:07 (20)   04:34	36   20:23 (20)
16:31	17:33		18:27	20:25		21:18	24   20:31 (20)   21:46	27   21:04 (1)
25   08:08	07:08		06:00	05:46	19:32 (16)   04:50		20:08 (20)   04:35	36   20:23 (20)
16:32	17:35		18:29	20:27		21:20	23   20:31 (20)   21:46	28   21:04 (1)
26   08:07	07:06		05:58	05:43	19:33 (16)   04:49		20:08 (20)   04:35	36   20:23 (20)
16:34	17:37		18:31	20:29		21:21	28   20:47 (1)   21:46	28   21:04 (1)
27   08:05	07:03		05:55	05:41	19:34 (16)   04:48		20:08 (20)   04:36	36   20:22 (20)
16:36	17:39		18:33	20:31		21:23	30   20:48 (1)   21:45	30   21:04 (1)
28   08:04	07:01		05:53	05:39	19:35 (16)   04:47		20:09 (20)   04:36	36   20:22 (20)
16:38	17:41		18:35	20:33		21:24	32   20:50 (1)   21:45	31   21:05 (1)
29   08:02			06:50	05:37	19:36 (16)   04:45		20:09 (20)   04:37	36   20:21 (20)
16:40			19:37	20:35		21:26	33   20:51 (1)   21:45	32   21:04 (1)
30   08:00			06:48	05:35	19:37 (16)   04:44		20:09 (20)   04:37	36   20:21 (20)
16:42			19:38	20:37		21:27	35   20:52 (1)   21:45	34   21:05 (1)
31   07:59			06:45	05:31	19:38 (16)   04:43		20:10 (20)   04:37	36   20:21 (20)
16:44			19:40	20:38		21:28	35   20:53 (1)   21:45	34   21:05 (1)
Sonnenscheinstunden   248	272	367	421	496	512			
astr.max.mögl.Beschattung   220	143	13	0.41	598	954			
Red.Sonnenscheinwahrsch.   0.17	0.24	0.31	0.41	0.51	0.45			
Reduktion Betriebsdauer   0.90	0.90	0.90	0.90	0.90	0.90			
Reduktion Windrichtung   0.68	0.70	0.67	0.66	0.63	0.62			
Gesamte Reduktion   0.11	0.15	0.19	0.25	0.29	0.25			
Met.wahrsch.Beschattung   24	22	2	51	174	243			

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)
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Projekt:  
180413\_Miltzow\_LAI\_Antrag III - VII

Lizenzierte Anwender:  
I17-Wind GmbH & Co. KG  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BR - IO70  
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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember						
1	04:38		20:21 (20)	05:19		20:18 (19)	06:14		19:25 (16)	07:08		07:07	15:57 (17)	08:03	14:55 (21)		
	21:44	34	21:05 (1)	21:09	16	20:34 (20)	20:01	8	19:33 (16)	18:46		16:35	6	16:03 (17)	15:50	16	15:11 (21)
2	04:39		20:20 (20)	05:20		20:16 (19)	06:16		19:24 (16)	07:10		07:09		15:59 (17)	08:05	14:56 (21)	
	21:44	35	21:05 (1)	21:07	12	20:28 (19)	19:59	6	19:30 (16)	18:44		16:33	2	16:01 (17)	15:49	15	15:11 (21)
3	04:40		20:20 (20)	05:22		20:16 (19)	06:17		19:03 (18)	07:12		07:11			08:06	14:56 (21)	
	21:44	36	21:05 (1)	21:05	13	20:29 (19)	19:56	9	19:28 (16)	18:41		16:31		15:48	16	15:12 (21)	
4	04:40		20:20 (20)	05:24		20:15 (19)	06:19		19:00 (18)	07:14		07:13		08:08	14:56 (21)		
	21:43	37	21:06 (1)	21:03	14	20:29 (19)	19:54	12	19:12 (18)	18:39		16:29		15:47	14	15:10 (21)	
5	04:41		20:20 (20)	05:25		20:15 (19)	06:21		18:58 (18)	07:15		07:15		08:09	14:57 (21)		
	21:43	37	21:06 (1)	21:01	14	20:29 (19)	19:51	14	19:12 (18)	18:37		16:27		15:47	13	15:10 (21)	
6	04:42		20:20 (20)	05:27		20:15 (19)	06:23		18:57 (18)	07:17		07:17		08:10	14:57 (21)		
	21:42	38	21:06 (1)	20:59	13	20:28 (19)	19:49	16	19:13 (18)	18:34		16:25		15:46	12	15:09 (21)	
7	04:43		20:20 (20)	05:29		20:14 (19)	06:25		18:56 (18)	07:19		07:19		08:12	14:58 (21)		
	21:41	38	21:06 (1)	20:57	12	20:26 (19)	19:46	17	19:13 (18)	18:32		16:23		15:46	10	15:08 (21)	
8	04:44		20:19 (20)	05:31		20:15 (19)	06:26		18:56 (18)	07:21		07:21		08:13	14:59 (21)		
	21:41	39	21:05 (1)	20:55	9	20:24 (19)	19:44	17	19:13 (18)	18:29		16:21		15:45	8	15:07 (21)	
9	04:45		20:19 (20)	05:32		20:15 (19)	06:28		18:55 (18)	07:23		07:23		08:14	15:00 (21)		
	21:40	38	21:05 (1)	20:53	8	20:23 (19)	19:41	17	19:12 (18)	18:27		16:19		15:45	8	15:08 (21)	
10	04:46		20:19 (20)	05:34		20:15 (19)	06:30		18:55 (18)	07:25		07:25		08:16	15:00 (21)		
	21:39	38	21:04 (1)	20:51	5	20:20 (19)	19:39	15	19:10 (18)	18:24		16:18		15:45	7	15:07 (21)	
11	04:48		20:18 (20)	05:36		20:17 (19)	06:32		18:56 (18)	07:27		07:27		08:17	15:01 (21)		
	21:38	37	21:03 (1)	20:49	1	20:18 (19)	19:36	12	19:08 (18)	18:22		16:16		15:44	5	15:06 (21)	
12	04:49		20:18 (20)	05:38			06:34		18:57 (18)	07:28		07:29		08:18	15:01 (21)		
	21:37	36	21:02 (1)	20:47			19:34	9	19:06 (18)	18:20		16:14		15:44	5	15:06 (21)	
13	04:50		20:18 (20)	05:40			06:35		18:57 (18)	07:30		07:31		08:19	15:02 (21)		
	21:36	35	21:01 (1)	20:45			19:31	6	19:03 (18)	18:17		16:13		15:44	4	15:06 (21)	
14	04:51		20:18 (20)	05:41			06:37			07:32		07:33		08:20	15:02 (21)		
	21:35	34	21:00 (1)	20:43			19:29			18:15		16:11		15:44	3	15:05 (21)	
15	04:52		20:17 (20)	05:43			06:39			07:34		07:35		08:21	15:03 (21)		
	21:34	33	20:59 (1)	20:40			19:26			18:12		16:09		15:44	2	15:05 (21)	
16	04:54		20:18 (20)	05:45			06:41			07:36		07:36		08:22	15:04 (21)		
	21:33	31	20:59 (1)	20:38			19:24			18:10		16:08		15:44	1	15:05 (21)	
17	04:55		20:18 (20)	05:47			06:43			07:38		07:38		08:23	15:05 (21)		
	21:32	28	20:57 (1)	20:36			19:21			18:08		16:06		15:44	1	15:06 (21)	
18	04:57		20:17 (20)	05:49			06:44			07:40		07:40		08:23	15:05 (21)		
	21:30	26	20:56 (1)	20:34			19:19			18:05		16:05		15:44	1	15:06 (21)	
19	04:58		20:17 (20)	05:50			06:46			07:42		07:42		08:24	15:06 (21)		
	21:29	24	20:41 (20)	20:31			19:16			18:03		16:03		15:45	1	15:07 (21)	
20	04:59		20:18 (20)	05:52			06:48			07:44		07:44		08:25	15:07 (21)		
	21:28	24	20:42 (20)	20:29			19:14			18:01		16:02		15:45			
21	05:01		20:17 (20)	05:54			06:50			07:46		07:46		08:25	15:08 (21)		
	21:26	24	20:41 (20)	20:27			19:11			17:59		16:01		15:45			
22	05:02		20:18 (20)	05:56			06:52			07:48		07:48		08:26	15:10 (21)		
	21:25	24	20:42 (20)	20:25			19:09			17:56	7	17:07 (17)	15:59		15:46		
23	05:04		20:18 (20)	05:58			06:53			07:50		16:58 (17)	07:49		08:26		
	21:23	23	20:41 (20)	20:22			19:06			17:54	11	17:09 (17)	15:58	6	15:03 (21)	15:46	
24	05:06		20:18 (20)	05:59			06:55			07:51		16:57 (17)	07:51		14:56 (21)	08:27	
	21:22	23	20:41 (20)	20:20			19:04			17:52	13	17:10 (17)	15:57	9	15:05 (21)	15:47	
25	05:07		20:19 (20)	06:01			06:57			07:53		15:56 (17)	07:53		14:55 (21)	08:27	
	21:20	22	20:41 (20)	20:18			19:01			16:50	15	16:11 (17)	15:56	12	15:07 (21)	15:48	
26	05:09		20:18 (20)	06:03			06:59			07:55		15:55 (17)	07:55		14:55 (21)	08:28	
	21:19	22	20:40 (20)	20:15	7	19:36 (16)	18:59			16:47	16	16:11 (17)	15:54	13	15:08 (21)	15:48	
27	05:10		20:20 (20)	06:05			06:57			07:56		15:54 (17)	07:56		14:55 (21)	08:28	
	21:17	20	20:40 (20)	20:13	11	19:38 (16)	18:56			16:45	17	16:11 (17)	15:53	14	15:09 (21)	15:49	
28	05:12		20:20 (20)	06:07			06:59			07:58		15:54 (17)	07:58		14:55 (21)	08:28	
	21:16	19	20:39 (20)	20:11	13	19:39 (16)	18:54			16:43	17	16:11 (17)	15:52	14	15:09 (21)	15:50	
29	05:14		20:21 (20)	06:08			07:01			07:01		15:55 (17)	08:00		14:55 (21)	08:28	
	21:14	18	20:39 (20)	20:08	13	19:38 (16)	18:51			16:41	15	16:10 (17)	15:51	15	15:10 (21)	15:51	
30	05:15		20:21 (20)	06:10			07:06			07:03		15:56 (17)	08:01		14:56 (21)	08:28	
	21:12	16	20:37 (20)	20:06	13	19:37 (16)	18:49			16:39	12	16:08 (17)	15:51	15	15:11 (21)	15:52	
31	05:17		20:19 (19)	06:12			07:05			07:05		15:56 (17)			08:28	15:10 (21)	
	21:10	17	20:36 (20)	20:03	11	19:35 (16)				16:37	10	16:06 (17)			15:53	4	15:14 (21)
Sonnenscheinstunden	514		461		383		328		257		231		156		13		
astr.max.mögl.Beschattung	906		185		158		133		106		81		66		52		
Red.Sonnenscheinwahrsch.	0.44		0.48		0.40		0.33		0.21		0.14		0.10		0.08		
Reduktion Betriebsdauer	0.90		0.90		0.90		0.90		0.90		0.90		0.90		0.90		
Reduktion Windrichtung	0.63		0.64		0.67		0.70		0.68		0.68		0.68		0.68		
Gesamte Reduktion	0.25		0.28		0.24		0.21		0.13		0.09		0.09		0.09		
Met.wahrsch.Beschattung	228		52		38		28		14		13		10		8		

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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BS - IO71

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28	07:57	06:59	06:43	05:33	04:42	20:16 (20)
	15:54	16:46	17:43	19:42	20:39	21:29	31 20:54 (1)
2	08:28	07:55	06:56	06:40	19:12 (18) 05:31	04:41	20:17 (20)
	15:55	16:48	17:45	19:44	5 19:17 (18) 20:40	21:31	32 20:56 (1)
3	08:28	07:54	06:54	06:38	19:10 (18) 05:28	04:40	20:17 (20)
	15:57	16:50	17:47	19:46	9 19:19 (18) 20:42	21:32	34 20:57 (1)
4	08:27	15:19 (21) 07:52	06:52	06:35	19:08 (18) 05:26	20:13 (19) 04:40	20:17 (20)
	15:58	1 15:20 (21) 16:52	17:49	19:48	12 19:20 (18) 20:44	1 20:14 (19) 21:33	36 20:58 (1)
5	08:27	15:18 (21) 07:50	06:49	06:33	19:08 (18) 05:24	20:11 (19) 04:39	20:17 (20)
	15:59	3 15:21 (21) 16:54	17:51	19:50	15 19:23 (18) 20:46	4 20:15 (19) 21:34	35 20:58 (1)
6	08:27	15:18 (21) 07:48	06:47	06:30	19:07 (18) 05:22	20:10 (19) 04:38	20:18 (20)
	16:00	4 15:22 (21) 16:56	17:53	19:52	17 19:24 (18) 20:48	7 20:17 (19) 21:35	37 21:00 (1)
7	08:26	15:19 (21) 07:46	06:45	06:28	19:07 (18) 05:20	20:10 (19) 04:37	20:18 (20)
	16:02	6 15:25 (21) 16:58	17:55	19:54	17 19:24 (18) 20:50	8 20:18 (19) 21:36	37 21:00 (1)
8	08:26	15:18 (21) 07:44	06:42	06:26	19:07 (18) 05:18	20:09 (19) 04:37	20:19 (20)
	16:03	8 15:26 (21) 17:00	17:57	19:55	17 19:24 (18) 20:51	11 20:20 (19) 21:37	38 21:02 (1)
9	08:25	15:18 (21) 07:42	06:40	06:23	19:07 (18) 05:17	20:10 (19) 04:36	20:19 (20)
	16:05	9 15:27 (21) 17:03	17:59	19:57	15 19:22 (18) 20:53	12 20:22 (19) 21:38	38 21:02 (1)
10	08:24	15:18 (21) 07:40	06:37	06:21	19:08 (18) 05:15	20:09 (19) 04:36	20:20 (20)
	16:06	11 15:29 (21) 17:05	18:00	19:59	13 19:21 (18) 20:55	15 20:24 (19) 21:39	38 21:03 (1)
11	08:24	15:19 (21) 07:38	06:35	06:18	19:08 (18) 05:13	20:09 (19) 04:35	20:20 (20)
	16:08	12 15:31 (21) 17:07	18:02	20:01	12 19:33 (16) 20:57	15 20:24 (19) 21:40	39 21:04 (1)
12	08:23	15:19 (21) 07:36	16:36 (17) 06:32	06:16	19:11 (18) 05:11	20:10 (19) 04:35	20:20 (20)
	16:09	13 15:32 (21) 17:09	16:39 (17) 18:04	20:03	9 19:35 (16) 20:59	14 20:24 (19) 21:41	39 21:04 (1)
13	08:22	15:19 (21) 07:34	16:34 (17) 06:30	06:14	19:30 (16) 05:09	20:11 (19) 04:34	20:21 (20)
	16:11	15 15:34 (21) 17:11	7 16:41 (17) 18:06	20:05	7 19:37 (16) 21:00	12 20:23 (19) 21:41	39 21:05 (1)
14	08:21	15:20 (21) 07:32	16:32 (17) 06:27	06:11	19:29 (16) 05:07	20:11 (19) 04:34	20:21 (20)
	16:13	15 15:35 (21) 17:13	11 16:43 (17) 18:08	20:07	9 19:38 (16) 21:02	10 20:21 (19) 21:42	40 21:06 (1)
15	08:20	15:20 (21) 07:30	16:32 (17) 06:25	06:09	19:29 (16) 05:06	20:13 (19) 04:34	20:22 (20)
	16:14	16 15:36 (21) 17:15	13 16:45 (17) 18:10	20:09	11 19:40 (16) 21:04	10 20:28 (20) 21:43	39 21:06 (1)
16	08:19	15:21 (21) 07:28	16:32 (17) 06:23	06:06	19:29 (16) 05:04	20:15 (19) 04:34	20:22 (20)
	16:16	15 15:36 (21) 17:17	15 16:47 (17) 18:12	20:10	13 19:42 (16) 21:05	11 20:31 (20) 21:43	39 21:07 (1)
17	08:18	15:22 (21) 07:26	16:32 (17) 06:20	06:04	19:28 (16) 05:02	20:20 (20) 04:34	20:23 (20)
	16:18	15 15:37 (21) 17:19	17 16:49 (17) 18:14	20:12	13 19:41 (16) 21:07	13 20:33 (20) 21:44	38 21:07 (1)
18	08:17	15:22 (21) 07:24	16:31 (17) 06:18	06:02	19:29 (16) 05:01	20:19 (20) 04:33	20:23 (20)
	16:19	14 15:36 (21) 17:21	17 16:48 (17) 18:16	20:14	11 19:40 (16) 21:09	15 20:34 (20) 21:44	38 21:07 (1)
19	08:16	15:23 (21) 07:22	16:32 (17) 06:15	05:59	19:31 (16) 04:59	20:18 (20) 04:33	20:23 (20)
	16:21	13 15:36 (21) 17:23	16 16:48 (17) 18:18	20:16	8 19:39 (16) 21:10	18 20:36 (20) 21:44	38 21:07 (1)
20	08:15	15:23 (21) 07:19	16:32 (17) 06:13	05:57	04:58	20:17 (20) 04:34	20:23 (20)
	16:23	12 15:35 (21) 17:25	15 16:47 (17) 18:20	20:18	21:12	19 20:36 (20) 21:45	38 21:07 (1)
21	08:14	15:25 (21) 07:17	16:34 (17) 06:10	05:55	04:56	20:17 (20) 04:34	20:23 (20)
	16:25	10 15:35 (21) 17:27	13 16:47 (17) 18:22	20:20	21:14	20 20:37 (20) 21:45	39 21:08 (1)
22	08:12	15:27 (21) 07:15	16:34 (17) 06:08	05:52	04:55	20:16 (20) 04:34	20:23 (20)
	16:27	7 15:34 (21) 17:29	10 16:44 (17) 18:23	20:22	21:15	22 20:38 (20) 21:45	39 21:08 (1)
23	08:11	07:13	16:39 (17) 06:05	05:50	04:53	20:16 (20) 04:34	20:24 (20)
	16:29	17:31	2 16:41 (17) 18:25	20:24	21:17	22 20:38 (20) 21:45	38 21:08 (1)
24	08:10	07:10	06:03	05:48	04:52	20:15 (20) 04:34	20:24 (20)
	16:31	17:33	18:27	20:25	21:18	23 20:38 (20) 21:46	38 21:08 (1)
25	08:08	07:08	06:00	05:46	04:50	20:15 (20) 04:35	20:24 (20)
	16:32	17:35	18:29	20:27	21:20	23 20:38 (20) 21:46	38 21:08 (1)
26	08:07	07:06	05:58	05:43	04:49	20:16 (20) 04:35	20:24 (20)
	16:34	17:37	18:31	20:29	21:21	23 20:39 (20) 21:46	39 21:09 (1)
27	08:05	07:03	05:55	05:41	04:48	20:16 (20) 04:36	20:24 (20)
	16:36	17:39	18:33	20:31	21:23	23 20:39 (20) 21:45	40 21:09 (1)
28	08:04	07:01	05:53	05:39	04:47	20:16 (20) 04:36	20:24 (20)
	16:38	17:41	18:35	20:33	21:24	23 20:39 (20) 21:45	40 21:09 (1)
29	08:02		06:50	05:37	04:45	20:16 (20) 04:37	20:24 (20)
	16:40		19:37	20:35	21:26	23 20:39 (20) 21:45	39 21:08 (1)
30	08:00		06:48	05:35	04:44	20:16 (20) 04:37	20:24 (20)
	16:42		19:38	20:37	21:27	26 20:52 (1) 21:45	38 21:08 (1)
31	07:59		06:45		04:43	20:16 (20)	
	16:44		19:40		21:28	29 20:53 (1)	
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung	199	139		213	452	1131	
Red.Sonnenscheinwahrsch.	0.17	0.24		0.41	0.51	0.45	
Reduktion Betriebsdauer	0.90	0.90		0.90	0.90	0.90	
Reduktion Windrichtung	0.68	0.70		0.66	0.63	0.62	
Gesamte Reduktion	0.11	0.15		0.24	0.29	0.25	
Met.wahrsch.Beschattung	21	21		52	131	287	

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

## SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BS - IO71

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38	20:25 (20)	05:19		20:21 (19)	06:14	19:08 (18)	07:08	07:07		08:03	15:01 (21)
	21:44	39	21:09 (1)	21:09	13	20:34 (19)	20:01	12	19:33 (16)	18:46	16:35	15:50 12
2	04:39	20:24 (20)	05:20		20:20 (19)	06:16	19:06 (18)	07:10	07:09		08:05	15:01 (21)
	21:44	38	21:07 (1)	21:07	14	20:34 (19)	19:59	13	19:19 (18)	18:44	16:33	15:49 11
3	04:40	20:24 (20)	05:22		20:20 (19)	06:17	19:05 (18)	07:12	07:11		08:06	15:02 (21)
	21:44	38	21:07 (1)	21:05	13	20:33 (19)	19:56	15	19:20 (18)	18:41	16:31	15:48 10
4	04:40	20:24 (20)	05:24		20:19 (19)	06:19	19:04 (18)	07:14	07:13		08:08	15:03 (21)
	21:43	38	21:07 (1)	21:03	12	20:31 (19)	19:54	17	19:21 (18)	18:39	16:29	15:47 7
5	04:41	20:24 (20)	05:25		20:20 (19)	06:21	19:03 (18)	07:15	07:15		08:09	15:04 (21)
	21:43	38	21:07 (1)	21:01	10	20:30 (19)	19:51	17	19:20 (18)	18:37	16:27	15:47 6
6	04:42	20:25 (20)	05:27		20:20 (19)	06:23	19:03 (18)	07:17	07:17		08:10	15:04 (21)
	21:42	36	21:06 (1)	20:59	8	20:28 (19)	19:49	17	19:20 (18)	18:34	16:25	15:46 5
7	04:43	20:25 (20)	05:29		20:20 (19)	06:25	19:03 (18)	07:19	07:19		08:12	15:05 (21)
	21:41	35	21:06 (1)	20:57	6	20:26 (19)	19:46	15	19:18 (18)	18:32	16:23	15:46 3
8	04:44	20:25 (20)	05:31		20:21 (19)	06:26	19:03 (18)	07:21	07:21		08:13	15:06 (21)
	21:41	35	21:05 (1)	20:55	3	20:24 (19)	19:44	13	19:16 (18)	18:29	16:21	15:45 1
9	04:45	20:25 (20)	05:32			06:28	19:03 (18)	07:23	07:23		08:14	15:07 (21)
	21:40	34	21:05 (1)	20:53		19:41	10	19:13 (18)	18:27	16:19	15:45	15:08 (21)
10	04:46	20:25 (20)	05:34			06:30	19:05 (18)	07:25	07:25		08:16	
	21:39	32	21:04 (1)	20:51		19:39	5	19:10 (18)	18:24	16:18	15:45	
11	04:48	20:25 (20)	05:36			06:32		07:27	07:27		08:17	
	21:38	32	21:03 (1)	20:49		19:36		18:22	18:22	16:16	15:44	
12	04:49	20:24 (20)	05:38			06:34		07:28	07:28		08:18	
	21:37	31	21:02 (1)	20:47		19:34		18:20	18:20	16:14	15:44	
13	04:50	20:24 (20)	05:40			06:35		07:30	07:31		08:19	
	21:36	28	21:01 (1)	20:45		19:31		18:17	18:17	16:13	15:44	
14	04:51	20:24 (20)	05:41			06:37		07:32	07:32		08:20	
	21:35	26	21:00 (1)	20:43		19:29		18:15	18:15	16:11	15:44	
15	04:53	20:24 (20)	05:43			06:39		07:34	07:34		08:21	
	21:34	24	20:48 (20)	20:40		19:26		18:12	18:12	16:09	15:44	
16	04:54	20:25 (20)	05:45			06:41		07:36	07:36		08:22	
	21:33	24	20:49 (20)	20:38		19:24		18:10	18:10	16:08	15:44	
17	04:55	20:25 (20)	05:47			06:43		07:38	07:38		08:23	
	21:32	23	20:48 (20)	20:36		19:21		18:08	18:08	16:06	15:44	
18	04:57	20:25 (20)	05:49			06:44		07:40	07:40		08:23	
	21:30	23	20:48 (20)	20:34		19:19		18:05	18:05	16:05	15:44	
19	04:58	20:25 (20)	05:50			06:46		07:42	07:42	17:08 (17)	07:42	08:24
	21:29	23	20:48 (20)	20:31		19:16		18:03	18:03	6	17:14 (17)	16:03
20	04:59	20:26 (20)	05:52			06:48		07:44	07:44	17:05 (17)	07:44	15:45
	21:28	22	20:48 (20)	20:29		19:14		18:01	18:01	11	17:16 (17)	16:02
21	05:01	20:26 (20)	05:54			06:50		07:46	07:46	17:04 (17)	07:46	7
	21:26	21	20:47 (20)	20:27		19:11		17:59	17:59	13	17:17 (17)	16:01
22	05:02	20:27 (20)	05:56			06:52		07:48	07:48	17:02 (17)	07:48	15:45
	21:25	21	20:48 (20)	20:25		19:09		17:56	17:56	16	17:18 (17)	15:59
23	05:04	20:27 (20)	05:58		19:38 (16)	06:53		07:50	07:50	17:02 (17)	07:49	14:59 (21)
	21:23	20	20:47 (20)	20:22	1	19:39 (16)	19:06	17:54	17:54	16	17:18 (17)	15:58
24	05:06	20:27 (20)	05:59		19:34 (16)	06:55		07:51	07:51	17:01 (17)	07:51	14:59 (21)
	21:22	19	20:46 (20)	20:20	9	19:43 (16)	19:04	17:52	17:52	17	17:18 (17)	15:57
25	05:07	20:29 (20)	06:01		19:33 (16)	06:57		06:53	16:01 (17)	07:53	14:59 (21)	08:27
	21:20	16	20:45 (20)	20:18	11	19:44 (16)	19:01	16:50	17	16:18 (17)	15:56	15
26	05:09	20:29 (20)	06:03		19:31 (16)	06:59		06:55	16:01 (17)	07:55	14:59 (21)	08:28
	21:19	15	20:44 (20)	20:15	13	19:44 (16)	18:59	16:47	15	16:16 (17)	15:54	15
27	05:10	20:31 (20)	06:05		19:31 (16)	07:01		06:57	16:01 (17)	07:56	14:59 (21)	08:28
	21:17	12	20:43 (20)	20:13	13	19:44 (16)	18:56	16:45	13	16:14 (17)	15:53	16
28	05:12	20:24 (20)	06:07		19:30 (16)	07:02		06:59	16:02 (17)	07:58	15:00 (21)	08:28
	21:15	12	20:40 (20)	20:11	12	19:42 (16)	18:54	16:43	10	16:12 (17)	15:52	16
29	05:14	20:23 (19)	06:08		19:29 (16)	07:04		07:01	16:04 (17)	08:00	15:00 (21)	08:28
	21:14	9	20:32 (19)	20:08	10	19:39 (16)	18:51	16:41	6	16:10 (17)	15:51	15
30	05:15	20:21 (19)	06:10		19:30 (16)	07:06		07:03	16:06 (17)	08:01	15:01 (21)	08:28
	21:12	11	20:32 (19)	20:06	7	19:37 (16)	18:49	16:39	2	16:08 (17)	15:51	14
31	05:17	20:21 (19)	06:12		19:11 (18)	07:05		07:05				08:28
	21:10	12	20:33 (19)	20:03	9	19:35 (16)		16:37				15:53
Sonnenscheinstunden	514		461		383			328		257		231
astr.max.mögl.Beschattung	787		164		134			142		147		56
Red.Sonnenscheinwahrsch.	0.44		0.48		0.40			0.33		0.21		0.14
Reduktion Betriebsdauer	0.90		0.90		0.90			0.90		0.90		0.90
Reduktion Windrichtung	0.62		0.64		0.66			0.70		0.68		0.68
Gesamte Reduktion	0.25		0.28		0.24			0.21		0.13		0.09
Met.wahrsch.Beschattung	197		46		32			30		19		5

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BT - IO72

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1   08:28	14:50 (21)   07:57		06:59	06:43	18:59 (18)   05:33	04:42	20:16 (20)	
15:54	15:05 (21)   16:46		17:43	19:42	17 19:16 (18)   20:39	21:29	36 20:54 (23)	
2   08:28	14:51 (21)   07:55	4 16:12 (17)   06:56	06:40	19:44	19:16 (18)   20:40	04:41	20:17 (20)	
15:55	15:05 (21)   16:48		17:45	19:44	18:57 (18)   05:28	21:31	39 20:56 (23)	
3   08:28	14:51 (21)   07:54	8 16:10 (17)   06:54	06:38	19:46	19:16 (18)   20:42	04:40	20:16 (20)	
15:57	15:05 (21)   16:50		17:47	19:46	18:56 (18)   05:26	21:32	41 20:57 (23)	
4   08:27	14:52 (21)   07:52	11 16:21 (17)   06:52	06:35	19:48	19:15 (18)   20:44	04:40	20:16 (20)	
15:58	15:06 (21)   16:52		17:49	19:48	18:56 (18)   05:24	21:33	42 20:58 (23)	
5   08:27	14:52 (21)   07:50	13 16:10 (17)   06:49	06:33	19:50	19:15 (18)   20:46	04:39	20:16 (20)	
15:59	15:05 (21)   16:54		17:51	19:50	18:56 (18)   05:22	21:34	42 20:58 (23)	
6   08:27	14:53 (21)   07:48	16 16:09 (17)   06:47	06:30	19:52	18:57 (18)   05:20	04:38	20:17 (20)	
16:00	15:05 (21)   16:56		17:53	19:52	18:57 (18)   05:20	21:35	42 20:59 (23)	
7   08:26	14:54 (21)   07:46	18 16:08 (17)   06:45	06:28	19:54	19:14 (18)   20:48	04:37	20:16 (20)	
16:02	15:05 (21)   16:58		17:55	19:54	18:57 (18)   05:20	21:36	42 20:59 (23)	
8   08:26	14:55 (21)   07:44	21 16:08 (17)   06:42	06:26	19:55	18:58 (18)   05:18	04:37	20:17 (20)	
16:03	15:05 (21)   17:00		17:57	19:55	18:58 (18)   05:17	21:37	44 21:02 (1)	
9   08:25	14:57 (21)   07:42	24 16:08 (17)   06:40	06:23	19:57	19:30 (16)   20:53	04:36	20:16 (20)	
16:05	15:04 (21)   17:03		17:59	19:57	19:01 (18)   05:15	21:38	45 21:02 (1)	
10   08:24	14:59 (21)   07:40	27 16:08 (17)   06:37	06:21	19:59	19:32 (16)   20:55	04:36	20:17 (20)	
16:06	15:02 (21)   17:05		18:00	19:59	19:24 (16)   05:13	21:39	45 21:03 (1)	
11   08:24	14:59 (21)   07:38	30 16:09 (17)   06:35	06:18	20:00	19:35 (16)   20:57	04:35	20:17 (20)	
16:08	15:05 (21)   17:07		18:02	20:01	19:23 (16)   05:11	21:40	46 21:04 (1)	
12   08:23	14:59 (21)   07:36	33 16:09 (17)   06:32	06:16	20:03	19:35 (16)   20:59	04:34	20:17 (20)	
16:09	15:07 (21)   17:09		18:04	20:03	19:23 (16)   05:09	21:41	45 21:04 (1)	
13   08:22	14:59 (21)   07:34	36 16:11 (17)   06:30	06:14	20:05	19:37 (16)   21:00	04:34	20:17 (20)	
16:11	15:09 (21)   17:11		18:06	20:05	19:22 (16)   05:07	21:41	47 21:05 (1)	
14   08:21	14:59 (21)   07:32	39 16:11 (17)   06:27	06:11	20:07	19:38 (16)   21:02	04:34	20:18 (20)	
16:13	15:11 (21)   17:13		18:08	20:07	19:22 (16)   05:06	21:42	46 21:06 (1)	
15   08:20	14:59 (21)   07:30	42 16:14 (17)   06:25	06:09	20:09	19:38 (16)   21:04	04:34	20:18 (20)	
16:14	15:13 (21)   17:15		18:10	20:09	19:23 (16)   05:04	21:43	47 21:06 (1)	
16   08:19	14:59 (21)   07:28	45 16:15 (17)   06:23	06:06	20:10	19:37 (16)   21:05	04:34	20:18 (20)	
16:16	15:17 (21)   17:17		18:12	20:10	19:23 (16)   05:02	21:43	47 21:07 (1)	
17   08:18	14:59 (21)   07:26	48 16:16 (17)   06:20	06:04	20:12	19:35 (16)   21:07	04:34	20:19 (20)	
16:18	15:19 (21)   17:19		18:14	20:12	19:24 (16)   05:01	21:44	46 21:07 (1)	
18   08:17	14:59 (21)   07:24	51 16:17 (17)   06:18	06:02	20:14	19:34 (16)   21:09	04:33	20:19 (20)	
16:19	15:21 (21)   17:21		18:16	20:14	19:27 (16)   04:59	21:44	47 21:08 (1)	
19   08:16	14:59 (21)   07:22	54 16:18 (17)   06:15	05:59	20:16	19:31 (16)   21:10	04:33	20:19 (20)	
16:21	15:23 (21)   17:23		18:18	20:16	19:22 (16)   05:00	21:44	47 21:08 (1)	
20   08:15	14:59 (21)   07:19	57 16:19 (17)   06:13	05:57	20:18	19:31 (16)   21:11	04:34	20:19 (20)	
16:23	15:25 (21)   17:25		18:20	20:18	19:22 (16)   05:00	21:45	47 21:08 (1)	
21   08:14	14:59 (21)   07:17	60 16:20 (17)   06:10	05:55	20:20	19:33 (16)   21:14	04:34	20:19 (20)	
16:25	15:27 (21)   17:27		18:22	20:20	19:22 (16)   05:00	21:45	47 21:08 (1)	
22   08:12	14:59 (21)   07:15	63 16:21 (17)   06:08	05:52	20:22	19:35 (16)   21:16	04:34	20:20 (20)	
16:27	15:29 (21)   17:29		18:23	20:22	19:23 (16)   05:00	21:45	47 21:08 (1)	
23   08:11	14:59 (21)   07:13	66 16:22 (17)   06:05	05:50	20:24	19:37 (16)   21:18	04:34	20:20 (20)	
16:29	15:31 (21)   17:31		18:25	20:24	19:24 (16)   05:00	21:45	47 21:09 (1)	
24   08:10	14:59 (21)   07:10	69 16:23 (17)   06:03	05:48	20:26	19:38 (16)   21:20	04:34	20:20 (20)	
16:31	15:33 (21)   17:33		18:27	20:25	19:25 (16)   05:00	21:46	46 21:09 (1)	
25   08:08	14:59 (21)   07:08	72 16:24 (17)   06:00	05:46	20:27	19:39 (16)   21:22	04:35	20:20 (20)	
16:32	15:35 (21)   17:35		18:29	20:27	19:26 (16)   05:00	21:46	47 21:09 (1)	
26   08:07	14:59 (21)   07:06	75 16:25 (17)   05:58	05:43	20:29	19:40 (16)   21:24	04:35	20:21 (20)	
16:34	15:37 (21)   17:37		18:31	20:29	19:27 (16)   05:00	21:46	46 21:09 (1)	
27   08:05	14:59 (21)   07:03	78 16:26 (17)   05:55	05:41	20:31	19:41 (16)   21:26	04:36	20:20 (20)	
16:36	15:39 (21)   17:39		18:33	20:31	19:28 (16)   05:00	21:45	47 21:09 (1)	
28   08:04	14:59 (21)   07:01	81 16:27 (17)   05:53	05:39	20:33	19:42 (16)   21:28	04:36	20:21 (20)	
16:38	15:41 (21)   17:41		18:35	20:33	19:29 (16)   05:00	21:45	46 21:09 (1)	
29   08:02	14:59 (21)   06:59	84 16:28 (17)   05:50	05:37	20:35	19:43 (16)   21:30	04:37	20:21 (20)	
16:40	15:43 (21)   17:43		18:37	20:35	19:30 (16)   05:00	21:45	45 21:08 (1)	
30   08:00	14:59 (21)   06:57	87 16:29 (17)   05:48	05:35	20:37	19:44 (16)   21:32	04:37	20:21 (20)	
16:42	15:45 (21)   17:45		18:39	20:37	19:31 (16)   05:00	21:45	46 21:08 (1)	
31   07:59	14:59 (21)   06:55	90 16:30 (17)   05:46	05:33	20:39	19:45 (16)   21:34	04:37	20:21 (20)	
16:44	15:47 (21)   17:47		18:41	20:39	19:32 (16)   05:00	21:45	46 21:08 (1)	
Sonneneinstrahlung	248	272	367	421	496	512	1347	
astr.max.mögl.Beschattung	113	192	30	276	433	512	1347	
Red.Sonneneinstrahlung	0.17	0.24	0.31	0.41	0.51	0.51	0.45	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.68	0.70	0.67	0.66	0.63	0.63	0.62	
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29	0.29	0.25	
Met.wahrsch.Beschattung	12	29	6	68	126	144	343	

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

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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

André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BT - IO72  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli			August			September			Oktober			November			Dezember		
1	04:38																	
2	04:39																	
3	04:40																	
4	04:40																	
5	04:41																	
6	04:42																	
7	04:43																	
8	04:44																	
9	04:45																	
10	04:46																	
11	04:48																	
12	04:49																	
13	04:50																	
14	04:51																	
15	04:53																	
16	04:54																	
17	04:55																	
18	04:57																	
19	04:58																	
20	04:59																	
21	05:01																	
22	05:02																	
23	05:04																	
24	05:06																	
25	05:07																	
26	05:09																	
27	05:10																	
28	05:12																	
29	05:14																	
30	05:15																	
31	05:17																	
	21:10	16	20:35 (19)	20:03	12	19:35 (16)												
	Sonnenscheinstunden	514		461		383		210		71		125		257		231		433
	astr.max.mögl.Beschattung	829		187		210		0.40		0.33		0.21		0.14		0.14		0.14
	Red.Sonnenscheinwahrsch.	0.44		0.48		0.50		0.90		0.90		0.90		0.90		0.90		0.90
	Reduktion Betriebsdauer	0.90		0.90		0.90		0.90		0.90		0.90		0.90		0.90		0.90
	Reduktion Windrichtung	0.62		0.64		0.67		0.70		0.70		0.70		0.68		0.68		0.68
	Gesamte Reduktion	0.25		0.28		0.24		0.21		0.21		0.13		0.09		0.09		0.09
	Met.wahrsch.Beschattung	208		53		51		15		17		17		37		37		37

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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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

André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BU - IO73  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni				
1   08:28	14:46 (21)   07:57	15:58 (17)   06:59	06:43	18:48 (18)   05:33	20:07 (19)   04:42	20:03 (20)				
15:54	7   14:53 (21)   16:46	16   16:14 (17)   17:43	19:42	19   19:07 (18)   20:39	2   20:09 (19)   21:29	46   20:54 (1)				
2   08:28	14:47 (21)   07:55	15:58 (17)   06:56	06:40	18:48 (18)   05:31	20:05 (19)   04:41	20:04 (20)				
15:55	6   14:53 (21)   16:48	17   16:15 (17)   17:45	19:44	18   19:06 (18)   20:40	6   20:11 (19)   21:31	47   20:56 (1)				
3   08:28	14:49 (21)   07:54	15:58 (17)   06:54	06:38	18:48 (18)   05:28	20:04 (19)   04:40	20:04 (20)				
15:57	2   14:51 (21)   16:50	18   16:16 (17)   17:47	19:46	17   19:05 (18)   20:42	8   20:12 (19)   21:32	47   20:57 (1)				
4   08:27	07:52	15:59 (17)   06:52	06:35	18:49 (18)   05:26	20:03 (19)   04:40	20:04 (20)				
15:58	16:52	18   16:17 (17)   17:49	19:48	14   19:03 (18)   20:44	11   20:14 (19)   21:33	48   20:58 (1)				
5   08:27	07:50	15:59 (17)   06:49	06:33	18:51 (18)   05:24	20:02 (19)   04:39	20:04 (20)				
15:59	16:54	18   16:17 (17)   17:51	19:50	11   19:02 (18)   20:46	13   20:15 (19)   21:34	47   20:58 (1)				
6   08:27	07:48	15:59 (17)   06:47	06:30	18:54 (18)   05:22	20:02 (19)   04:38	20:05 (20)				
16:00	16:56	18   16:17 (17)   17:53	19:52	7   19:24 (16)   20:48	15   20:17 (19)   21:35	48   21:00 (1)				
7   08:26	07:46	15:59 (17)   06:45	06:28	19:19 (16)   05:20	20:01 (19)   04:37	20:04 (20)				
16:02	16:58	17   16:16 (17)   17:55	19:54	7   19:26 (16)   20:50	17   20:18 (19)   21:36	49   21:00 (1)				
8   08:26	07:44	16:00 (17)   06:42	06:26	19:18 (16)   05:18	20:01 (19)   04:37	20:05 (20)				
16:03	17:00	15   16:15 (17)   17:57	19:55	10   19:28 (16)   20:51	17   20:18 (19)   21:37	49   21:02 (1)				
9   08:25	07:42	16:01 (17)   06:40	06:23	19:16 (16)   05:17	20:02 (19)   04:36	20:05 (20)				
16:05	17:03	13   16:14 (17)   17:59	19:57	14   19:30 (16)   20:53	16   20:18 (19)   21:38	49   21:02 (1)				
10   08:24	07:40	16:02 (17)   06:37	06:21	19:16 (16)   05:15	20:02 (19)   04:36	20:06 (20)				
16:06	17:05	11   16:13 (17)   18:00	19:59	16   19:32 (16)   20:55	16   20:18 (19)   21:39	48   21:03 (1)				
11   08:24	07:38	16:05 (17)   06:35	06:18	19:15 (16)   05:13	20:02 (19)   04:35	20:06 (20)				
16:08	17:07	5   16:10 (17)   18:02	20:01	16   19:31 (16)   20:57	15   20:17 (19)   21:40	49   21:03 (1)				
12   08:23	07:36	06:32	06:16	19:16 (16)   05:11	20:03 (19)   04:35	20:06 (20)				
16:09	17:09	18:04	20:03	15   19:31 (16)   20:59	14   20:17 (19)   21:41	49   21:03 (1)				
13   08:22	07:34	06:30	06:14	19:16 (16)   05:09	20:04 (19)   04:34	20:06 (20)				
16:11	17:11	18:06	20:05	15   19:31 (16)   21:00	12   20:16 (19)   21:41	51   21:04 (1)				
14   08:21	07:32	06:27	06:11	19:17 (16)   05:07	20:05 (19)   04:34	20:07 (20)				
16:13	17:13	18:08	20:07	12   19:29 (16)   21:02	14   20:19 (20)   21:42	49   21:04 (1)				
15   08:20	07:30	06:25	06:09	19:18 (16)   05:06	20:07 (19)   04:34	20:07 (20)				
16:14	17:15	18:10	20:09	9   19:27 (16)   21:04	16   20:23 (20)   21:43	50   21:05 (1)				
16   08:19	07:28	06:23	06:06	05:04	20:09 (20)   04:34	20:08 (20)				
16:16	17:17	18:12	20:10	21:05	16   20:25 (20)   21:43	49   21:05 (1)				
17   08:18	07:26	06:20	06:04	05:02	20:08 (20)   04:34	20:08 (20)				
16:18	17:19	18:14	20:12	21:07	18   20:26 (20)   21:44	51   21:06 (1)				
18   08:17	07:24	06:18	06:02	05:01	20:06 (20)   04:33	20:08 (20)				
16:19	17:21	18:16	20:14	21:09	21   20:27 (20)   21:44	51   21:06 (1)				
19   08:16	07:22	06:15	05:59	04:59	20:06 (20)   04:33	20:08 (20)				
16:21	17:23	18:18	20:16	21:10	22   20:28 (20)   21:44	51   21:06 (1)				
20   08:15	07:19	06:13	05:57	04:58	20:05 (20)   04:34	20:09 (20)				
16:23	17:25	18:20	20:18	21:12	24   20:29 (20)   21:45	50   21:06 (1)				
21   08:14	07:17	06:10	05:55	04:56	20:04 (20)   04:34	20:09 (20)				
16:25	17:27	18:22	20:20	21:14	26   20:30 (20)   21:45	50   21:06 (1)				
22   08:12	07:15	06:08	05:52	04:55	20:04 (20)   04:34	20:09 (20)				
16:27	17:29	18:23	20:22	21:15	28   20:42 (23)   21:45	50   21:06 (1)				
23   08:11	07:13	06:05	05:50	04:53	20:04 (20)   04:34	20:09 (20)				
16:29	17:31	18:25	20:24	21:17	32   20:44 (23)   21:45	51   21:07 (1)				
24   08:10	07:10	06:03	05:48	04:52	20:03 (20)   04:34	20:09 (20)				
16:31	17:33	18:27	20:25	21:18	34   20:44 (23)   21:46	51   21:07 (1)				
25   08:08	07:08	06:00	05:46	04:50	20:03 (20)   04:35	20:09 (20)				
16:32	17:35	18:29	7   18:02 (18)   20:27	21:20	36   20:46 (23)   21:46	51   21:07 (1)				
26   08:07	07:06	05:58	05:43	04:49	20:03 (20)   04:35	20:10 (20)				
16:34	17:37	18:31	12   18:04 (18)   20:29	21:21	38   20:47 (23)   21:46	49   21:07 (1)				
27   08:05	07:03	05:55	05:41	04:48	20:03 (20)   04:36	20:10 (20)				
16:36	17:39	18:33	15   18:06 (18)   20:31	21:23	39   20:48 (23)   21:45	49   21:07 (1)				
28   08:04	16:03 (17)   07:01	05:53	05:39	04:47	20:03 (20)   04:36	20:10 (20)				
16:38	3   16:06 (17)   17:41	18:35	18   18:07 (18)   20:33	21:24	42   20:50 (23)   21:45	50   21:08 (1)				
29   08:02	16:01 (17)	06:50	05:37	04:45	20:03 (20)   04:37	20:10 (20)				
16:40	7   16:08 (17)	19:37	19   19:08 (18)   20:35	21:26	43   20:51 (23)   21:45	49   21:07 (1)				
30   08:00	16:00 (17)	06:48	05:35	04:44	20:03 (20)   04:37	20:10 (20)				
16:42	10   16:10 (17)	19:38	20   19:08 (18)   20:37	21:27	44   20:52 (23)   21:45	49   21:07 (1)				
31   07:59	15:59 (17)	06:45	05:33	04:43	20:03 (20)					
16:44	13   16:12 (17)	19:40	19   19:07 (18)	21:28	45   20:53 (23)					
Sonnenscheinstunden	248	272	367	421	496	512				
astr.max.mögl.Beschattung	48	166	110	200	700	1477				
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45				
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90				
Reduktion Windrichtung	0.69	0.70	0.68	0.66	0.63	0.62				
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29	0.25				
Met.wahrsch.Beschattung	5	25	21	49	203	376				

**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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BU - IO73  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1   04:38	20:11 (20)   05:19	20:13 (19)   06:14	19:15 (16)   07:08	07:07	15:32 (17)   08:03	
21:45	49   21:08 (1)   21:09	15   20:28 (19)   20:01	16   19:31 (16)   18:46	16:35	11   15:43 (17)   15:50	
2   04:39	20:10 (20)   05:20	20:12 (19)   06:16	19:14 (16)   07:10	07:09	15:30 (17)   08:05	
21:44	49   21:07 (1)   21:07	16   20:28 (19)   19:59	16   19:30 (16)   18:44	16:33	14   15:44 (17)   15:49	
3   04:40	20:10 (20)   05:22	20:12 (19)   06:17	19:14 (16)   07:12	07:11	15:29 (17)   08:06	
21:44	48   21:07 (1)   21:05	16   20:28 (19)   19:56	14   19:28 (16)   18:41	16:31	16   15:45 (17)   15:48	
4   04:40	20:11 (20)   05:24	20:11 (19)   06:19	19:15 (16)   07:14	07:13	15:28 (17)   08:08	
21:43	48   21:07 (1)   21:03	17   20:28 (19)   19:54	10   19:25 (16)   18:39	16:29	17   15:45 (17)   15:47	
5   04:41	20:11 (20)   05:25	20:11 (19)   06:21	19:15 (16)   07:15	07:15	15:29 (17)   08:09	
21:41	49   21:07 (1)   21:01	17   20:28 (19)   19:51	7   19:22 (16)   18:37	16:27	18   15:47 (17)   15:47	
6   04:42	20:11 (20)   05:27	20:12 (19)   06:23	18:50 (16)   07:17	07:17	15:28 (17)   08:10	
21:42	48   21:06 (1)   20:59	16   20:28 (19)   19:49	7   19:20 (16)   18:34	16:25	19   15:47 (17)   15:46	
7   04:43	20:11 (20)   05:29	20:11 (19)   06:25	18:46 (16)   07:19	07:19	15:28 (17)   08:12	
21:41	49   21:06 (1)   20:57	15   20:26 (19)   19:46	11   18:57 (16)   18:32	16:23	19   15:47 (17)   15:46	
8   04:44	20:11 (20)   05:31	20:12 (19)   06:26	18:44 (16)   07:21	07:21	15:28 (17)   08:13	
21:41	48   21:05 (1)   20:55	12   20:24 (19)   19:44	14   18:58 (16)   18:29	16:21	19   15:47 (17)   15:45	
9   04:45	20:11 (20)   05:33	20:12 (19)   06:28	18:42 (16)   07:23	07:23	15:29 (17)   08:14	
21:40	48   21:05 (1)   20:53	11   20:23 (19)   19:41	16   18:58 (16)   18:27	16:20	17   15:46 (17)   15:45	2   14:40 (21)
10   04:46	20:12 (20)   05:34	20:13 (19)   06:30	18:41 (16)   07:25	07:25	15:29 (17)   08:16	14:37 (21)
21:39	46   21:04 (1)   20:51	7   20:20 (19)   19:39	18   18:59 (16)   18:24	16:18	15   15:44 (17)   15:45	5   14:42 (21)
11   04:48	20:12 (20)   05:36	20:14 (19)   06:32	18:40 (16)   07:27	07:27	15:31 (17)   08:17	14:36 (21)
21:38	45   21:03 (1)   20:49	4   20:18 (19)   19:36	20   19:00 (16)   18:22	16:16	12   15:43 (17)   15:44	7   14:43 (21)
12   04:49	20:12 (20)   05:38	06:34	18:40 (16)   07:28	07:29	15:32 (17)   08:18	14:36 (21)
21:37	44   21:02 (23)   20:47	19:34	20   19:00 (16)   18:20	16:14	9   15:41 (17)   15:44	8   14:44 (21)
13   04:50	20:12 (20)   05:40	06:35	18:39 (16)   07:30	07:31	15:33 (17)   08:19	14:35 (21)
21:36	43   21:01 (23)   20:45	19:31	19   18:58 (16)   18:17	16:13	6   15:39 (17)   15:44	10   14:45 (21)
14   04:51	20:12 (20)   05:41	06:37	18:39 (16)   07:32	07:33	15:35 (17)   08:20	14:35 (21)
21:35	42   21:00 (23)   20:43	19:29	19   18:58 (16)   18:15	16:11	2   15:37 (17)   15:44	11   14:46 (21)
15   04:53	20:12 (20)   05:43	06:39	18:39 (16)   07:34	07:35	08:21	14:36 (21)
21:34	42   20:59 (23)   20:40	19:26	18   18:57 (16)   18:12	16:09	15:44	10   14:46 (21)
16   04:54	20:13 (20)   05:45	06:41	18:40 (16)   07:36	07:37	08:22	14:36 (21)
21:33	41   20:59 (23)   20:38	19:24	16   18:56 (16)   18:10	16:08	15:44	11   14:47 (21)
17   04:55	20:13 (20)   05:47	06:43	18:40 (16)   07:38	07:38	08:23	14:36 (21)
21:32	39   20:57 (23)   20:36	19:21	13   18:53 (16)   18:08	16:06	15:44	12   14:48 (21)
18   04:57	20:13 (20)   05:49	06:44	18:42 (16)   07:40	07:40	08:23	14:37 (21)
21:30	37   20:56 (23)   20:34	19:19	8   18:50 (16)   18:05	16:05	15:44	12   14:49 (21)
19   04:58	20:13 (20)   05:50	06:46	07:42	07:42	08:24	14:38 (21)
21:29	35   20:54 (23)   20:32	19:16	18:03	16:03	15:45	12   14:50 (21)
20   04:59	20:14 (20)   05:52	06:48	07:44	07:44	08:25	14:37 (21)
21:28	32   20:54 (23)   20:29	19:14	18:01	16:02	15:45	13   14:50 (21)
21   05:01	20:14 (20)   05:54	06:50	07:46	07:46	08:25	14:38 (21)
21:26	29   20:52 (23)   20:27	19:11	17:59	16:01	15:45	12   14:50 (21)
22   05:02	20:15 (20)   05:56	06:52	07:48	07:48	08:26	14:38 (21)
21:25	28   20:52 (23)   20:25	19:09	17:56	15:59	15:46	12   14:50 (21)
23   05:04	20:15 (20)   05:58	06:53	07:50	07:49	08:27	14:39 (21)
21:23	25   20:40 (20)   20:22	19:06	17:54	15:58	15:46	12   14:51 (21)
24   05:06	20:15 (20)   05:59	06:55	07:51	07:51	08:27	14:39 (21)
21:22	24   20:39 (20)   20:20	19:04	17:52	15:57	15:47	13   14:52 (21)
25   05:07	20:17 (20)   06:01	06:57	07:53	07:53	08:27	14:40 (21)
21:20	21   20:38 (20)   20:18	19:01	16:50	15:56	15:48	12   14:52 (21)
26   05:09	20:17 (20)   06:03	06:59	06:55	07:55	08:28	14:40 (21)
21:19	20   20:37 (20)   20:15	18:59	16:48	15:54	15:48	12   14:52 (21)
27   05:10	20:19 (20)   06:05	07:01	06:57	07:56	08:28	14:41 (21)
21:17	17   20:36 (20)   20:13	18:56	16:45	15:53	15:49	11   14:52 (21)
28   05:12	20:20 (20)   06:07	19:20 (16)   07:03	06:59	07:58	08:28	14:42 (21)
21:16	14   20:34 (20)   20:11	9   19:29 (16)   18:54	16:43	15:52	15:50	11   14:53 (21)
29   05:14	20:17 (19)   06:08	19:17 (16)   07:04	07:01	08:00	08:28	14:42 (21)
21:14	15   20:32 (20)   20:08	12   19:29 (16)   18:51	16:41	15:51	15:51	10   14:52 (21)
30   05:15	20:14 (19)   06:10	19:16 (16)   07:06	07:03	08:01	08:28	14:43 (21)
21:12	11   20:25 (19)   20:06	14   19:30 (16)   18:49	16:39	15:51	15:52	10   14:53 (21)
31   05:17	20:14 (19)   06:12	19:16 (16)   07:05	07:05	7   15:34 (17)	08:28	14:44 (21)
21:10	13   20:27 (19)   20:03	15   19:31 (16)	16:37	7   15:41 (17)	15:53	9   14:53 (21)
Sonnenscheinstunden   514	461	383	328	257	231	
astr.max.mögl.Beschattung	1099	196	262	7	194	237
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90
Reduktion Windrichtung	0.63	0.64	0.67	0.70	0.70	0.68
Gesamte Reduktion	0.25	0.28	0.24	0.21	0.13	0.08
Met.wahrsch.Beschattung	276	55	64	1	26	20

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BV - IO74  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1   08:28	15:01 (21)   07:57		06:59	06:43	19:05 (18)   05:33		04:42	20:15 (20)
15:54	15:16 (21)   16:46		17:43	19:42	11 19:16 (18)   20:39		21:29	20:41 (20)
2   08:28	15:01 (21)   07:55		06:56	06:40	19:03 (18)   05:31		04:41	20:16 (20)
15:35	15:17 (21)   16:48		17:45	19:44	14 19:17 (18)   20:40		21:31	20:56 (1)
3   08:28	15:02 (21)   07:54		06:54	06:38	19:03 (18)   05:28		04:40	20:16 (20)
15:57	15:18 (21)   16:50		17:47	19:46	16 19:19 (18)   20:42		21:32	20:57 (1)
4   08:27	15:03 (21)   07:52		06:52	06:35	19:01 (18)   05:26		04:40	20:16 (20)
15:58	15:19 (21)   16:52		17:49	19:48	18 19:19 (18)   20:44	1 20:14 (19)   21:33	34	20:58 (1)
5   08:27	15:03 (21)   07:50		06:49	06:33	19:01 (18)   05:24	20:11 (19)   21:37		20:16 (20)
15:59	15:19 (21)   16:54		17:51	19:50	19 19:20 (18)   20:46	4 20:15 (19)   21:34	35	20:56 (1)
6   08:27	15:03 (21)   07:48		06:47	06:30	19:01 (18)   05:22	20:10 (19)   21:36		20:16 (20)
16:00	15:19 (21)   16:56		17:53	19:52	18 19:19 (18)   20:48	7 20:17 (19)   21:35	37	21:00 (1)
7   08:26	15:04 (21)   07:46		06:45	06:28	19:01 (18)   05:20	20:09 (19)   21:37		20:16 (20)
16:02	15:20 (21)   16:58	4 16:27 (17)   17:55		19:54	17 19:18 (18)   20:50	9 20:18 (19)   21:36	38	21:00 (1)
8   08:26	15:04 (21)   07:44		06:42	06:26	19:02 (18)   05:18	20:08 (19)   21:37		20:17 (20)
16:03	15:20 (21)   17:00	7 16:29 (17)   17:57		19:55	16 19:18 (18)   20:51	12 20:20 (19)   21:37	39	21:02 (1)
9   08:25	15:05 (21)   07:42		06:40	06:23	19:02 (18)   05:17	20:09 (19)   21:38		20:17 (20)
16:05	15:20 (21)   17:03	11 16:32 (17)   17:59		19:57	14 19:16 (18)   20:53	13 20:22 (19)   21:36	39	21:02 (1)
10   08:24	15:05 (21)   07:40		06:37	06:21	19:04 (18)   05:15	20:09 (19)   21:36		20:17 (20)
16:06	15:20 (21)   17:05	14 16:34 (17)   18:00		19:59	12 19:32 (16)   20:55	15 20:24 (19)   21:39	41	21:03 (1)
11   08:24	15:06 (21)   07:38		06:35	06:18	19:06 (18)   05:13	20:08 (19)   21:36		20:18 (20)
16:08	15:20 (21)   17:07	16 16:36 (17)   18:02		20:01	10 19:33 (16)   20:57	16 20:24 (19)   21:40	41	21:04 (1)
12   08:23	15:07 (21)   07:36		06:32	06:16	19:27 (16)   05:11	20:09 (19)   21:35		20:18 (20)
16:09	15:20 (21)   17:09	17 16:37 (17)   18:04		20:03	8 19:35 (16)   20:59	15 20:24 (19)   21:41	41	21:04 (1)
13   08:22	15:08 (21)   07:34		06:30	06:14	19:26 (16)   05:09	20:09 (19)   21:34		20:18 (20)
16:11	15:20 (21)   17:11	18 16:38 (17)   18:06		20:05	11 19:37 (16)   21:00	14 20:23 (19)   21:41	42	21:05 (1)
14   08:21	15:09 (21)   07:32		06:27	06:11	19:25 (16)   05:07	20:09 (19)   21:34		20:18 (20)
16:13	15:20 (21)   17:13	18 16:37 (17)   18:08		20:07	13 19:38 (16)   21:02	13 20:22 (19)   21:42	43	21:06 (1)
15   08:20	15:10 (21)   07:30		06:25	06:09	19:25 (16)   05:06	20:11 (19)   21:34		20:19 (20)
16:14	15:20 (21)   17:15	16 16:36 (17)   18:10		20:09	15 19:40 (16)   21:04	11 20:22 (19)   21:43	43	21:06 (1)
16   08:19	15:12 (21)   07:28		06:23	06:06	19:26 (16)   05:04	20:12 (19)   21:34		20:19 (20)
16:16	15:18 (21)   17:17	15 16:36 (17)   18:12		20:10	14 19:40 (16)   21:05	9 20:21 (19)   21:43	44	21:07 (1)
17   08:18	07:26		06:20	06:04	19:25 (16)   05:02	20:14 (19)   21:34		20:20 (20)
16:18	17:19	13 16:35 (17)   18:14		20:12	13 19:38 (16)   21:07	5 20:19 (19)   21:44	42	21:07 (1)
18   08:17	07:24		06:18	06:02	19:27 (16)   05:01	20:22 (20)   21:33		20:20 (20)
16:19	17:21	10 16:33 (17)   18:16		20:14	10 19:37 (16)   21:09	9 20:31 (20)   21:44	43	21:08 (1)
19   08:16	07:22		06:15	05:59	19:29 (16)   04:59	20:21 (20)   21:33		20:20 (20)
16:21	17:23	2 16:29 (17)   18:18		20:16	5 19:34 (16)   21:10	13 20:34 (20)   21:44	43	21:08 (1)
20   08:15	07:19		06:13	05:57	20:19 (20)   20:34	04:58		20:20 (20)
16:23	17:25		18:20	20:18	21:12	16 20:35 (20)   21:45	43	21:08 (1)
21   08:14	07:17		06:10	05:55	20:18 (20)   20:34	04:56		20:20 (20)
16:25	17:27		18:22	20:20	21:14	18 20:36 (20)   21:45	43	21:08 (1)
22   08:12	07:15		06:08	05:52	20:18 (20)   20:34	04:55		20:20 (20)
16:27	17:29		18:23	20:22	21:15	19 20:37 (20)   21:45	43	21:08 (1)
23   08:11	07:13		06:05	05:50	20:17 (20)   20:34	04:53		20:21 (20)
16:29	17:31		18:25	20:24	21:17	21 20:38 (20)   21:45	43	21:09 (1)
24   08:10	07:10		06:03	05:48	20:16 (20)   20:34	04:52		20:21 (20)
16:31	17:33		18:27	20:25	21:18	22 20:38 (20)   21:46	43	21:09 (1)
25   08:08	07:08		06:00	05:46	20:16 (20)   20:34	04:50		20:21 (20)
16:32	17:35		18:29	20:27	21:20	23 20:39 (20)   21:46	43	21:09 (1)
26   08:07	07:06		05:58	05:43	20:16 (20)   20:34	04:49		20:21 (20)
16:34	17:37		18:31	20:29	21:21	23 20:39 (20)   21:46	43	21:09 (1)
27   08:05	07:03		05:55	05:41	20:16 (20)   20:34	04:48		20:21 (20)
16:36	17:39		18:33	20:31	21:23	24 20:40 (20)   21:45	44	21:09 (1)
28   08:04	07:01		05:53	05:39	20:15 (20)   20:34	04:47		20:22 (20)
16:38	17:41		18:35	20:33	21:24	25 20:40 (20)   21:45	44	21:09 (1)
29   08:02			06:50	05:37	20:15 (20)   20:34	04:45		20:21 (20)
16:40			19:37	20:35	21:26	25 20:40 (20)   21:45	42	21:08 (1)
30   08:00			06:48	05:35	20:15 (20)   20:34	04:44		20:22 (20)
16:42			19:38	20:37	21:27	26 20:41 (20)   21:45	41	21:08 (1)
31   07:59			06:45	19:07 (18)   20:37	04:43	26 20:41 (20)   21:45		
16:44			19:40	6 19:13 (18)   20:37	21:28	26 20:41 (20)   21:45		
Sonnenscheinstunden   248	272	367	421	496	512			
astr.max.mögl.Beschattung	222	161	6	254	434			1199
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51			0.45
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90			0.90
Reduktion Windrichtung	0.68	0.70	0.67	0.66	0.63			0.62
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29			0.25
Met.wahrsch.Beschattung	24	25	1	62	126			305

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BV - IO74  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember					
1	04:38		20:22 (20)	05:19		20:19 (19)	06:14	19:06 (18)	07:08	07:07	15:50 (17)	08:03	14:48 (21)			
	21:44	42	21:09 (1)	21:09	16	20:35 (19)	20:01	19:33 (16)	18:46	16:35	13	16:03 (17)	15:50	14	15:02 (21)	
2	04:39		20:22 (20)	05:20		20:19 (19)	06:16	19:02 (18)	07:10	07:09	15:50 (17)	08:05	14:48 (21)			
	21:44	40	21:07 (1)	21:07	15	20:34 (19)	19:59	19:30 (16)	18:44	16:33	11	16:01 (17)	15:49	15	15:03 (21)	
3	04:40		20:22 (20)	05:22		20:19 (19)	06:17	19:00 (18)	07:12	07:11	15:51 (17)	08:06	14:49 (21)			
	21:44	39	21:07 (1)	21:05	14	20:33 (19)	19:56	14	19:14 (18)	18:41	16:31	8	15:59 (17)	15:48	15	15:04 (21)
4	04:40		20:22 (20)	05:24		20:18 (19)	06:19	18:59 (18)	07:14	07:13	15:53 (17)	08:08	14:48 (21)			
	21:43	39	21:07 (1)	21:03	13	20:31 (19)	19:54	16	19:15 (18)	18:39	16:29	3	15:56 (17)	15:47	16	15:04 (21)
5	04:41		20:23 (20)	05:25		20:19 (19)	06:21	18:57 (18)	07:15	07:15	15:52 (17)	08:09	14:49 (21)			
	21:43	37	21:07 (1)	21:01	11	20:30 (19)	19:51	17	19:14 (18)	18:37	16:27	15:47	16	15:05 (21)		
6	04:42		20:23 (20)	05:27		20:20 (19)	06:23	18:57 (18)	07:17	07:17	15:53 (17)	08:10	14:49 (21)			
	21:42	37	21:06 (1)	20:59	8	20:28 (19)	19:49	18	19:15 (18)	18:34	16:25	15:46	16	15:05 (21)		
7	04:43		20:23 (20)	05:29		20:20 (19)	06:25	18:57 (18)	07:19	07:19	15:54 (17)	08:12	14:50 (21)			
	21:41	36	21:06 (1)	20:57	6	20:26 (19)	19:46	18	19:15 (18)	18:32	16:23	15:46	16	15:06 (21)		
8	04:44		20:23 (20)	05:31		20:21 (19)	06:26	18:57 (18)	07:21	07:21	15:55 (17)	08:13	14:50 (21)			
	21:41	34	21:05 (1)	20:55	3	20:24 (19)	19:44	18	19:15 (18)	18:29	16:21	15:45	16	15:06 (21)		
9	04:45		20:23 (20)	05:33		20:22 (19)	06:28	18:56 (18)	07:23	07:23	15:56 (17)	08:14	14:51 (21)			
	21:40	32	21:05 (1)	20:53		19:41	19:41	17	19:13 (18)	18:27	16:19	15:45	16	15:07 (21)		
10	04:46		20:23 (20)	05:34		20:22 (19)	06:30	18:56 (18)	07:25	07:25	15:57 (17)	08:16	14:51 (21)			
	21:39	30	21:04 (1)	20:51		19:39	19:39	14	19:10 (18)	18:24	16:18	15:45	16	15:07 (21)		
11	04:48		20:24 (20)	05:36		20:23 (19)	06:32	18:57 (18)	07:27	07:27	15:58 (17)	08:17	14:51 (21)			
	21:38	25	20:49 (20)	20:49		19:36	19:36	11	19:08 (18)	18:22	16:16	15:44	15	15:06 (21)		
12	04:49		20:24 (20)	05:38		20:24 (19)	06:34	18:56 (18)	07:28	07:29	15:59 (17)	08:18	14:52 (21)			
	21:37	25	20:49 (20)	20:47		19:34	19:34	7	19:06 (18)	18:20	16:14	15:44	14	15:06 (21)		
13	04:50		20:24 (20)	05:40		20:25 (19)	06:35	18:56 (18)	07:30	07:31	15:59 (17)	08:19	14:52 (21)			
	21:36	25	20:49 (20)	20:45		19:31	19:31		18:17	18:17	16:13	15:44	14	15:06 (21)		
14	04:51		20:24 (20)	05:41		20:25 (19)	06:37	18:57 (18)	07:32	07:32	15:59 (17)	08:20	14:52 (21)			
	21:35	25	20:49 (20)	20:43		19:29	19:29		18:15	18:15	16:11	15:44	13	15:05 (21)		
15	04:53		20:24 (20)	05:43		20:26 (19)	06:39	18:57 (18)	07:34	07:34	15:59 (17)	08:21	14:53 (21)			
	21:34	25	20:49 (20)	20:40		19:26	19:26		18:12	18:12	16:09	15:44	12	15:05 (21)		
16	04:54		20:25 (20)	05:45		20:27 (19)	06:41	18:57 (18)	07:36	07:36	15:59 (17)	08:22	14:54 (21)			
	21:33	24	20:49 (20)	20:38		19:24	19:24		18:10	18:10	16:08	15:44	11	15:05 (21)		
17	04:55		20:25 (20)	05:47		20:28 (19)	06:43	18:57 (18)	07:38	07:38	15:59 (17)	08:23	14:54 (21)			
	21:32	24	20:49 (20)	20:36		19:21	19:21		18:08	18:08	16:06	15:44	12	15:06 (21)		
18	04:57		20:25 (20)	05:49		20:29 (19)	06:44	18:57 (18)	07:40	07:40	15:59 (17)	08:23	14:55 (21)			
	21:30	24	20:49 (20)	20:34		19:19	19:19		18:05	18:05	16:05	15:44	11	15:06 (21)		
19	04:58		20:25 (20)	05:50		20:30 (19)	06:46	18:57 (18)	07:42	07:42	15:59 (17)	08:24	14:56 (21)			
	21:29	23	20:48 (20)	20:32		19:16	19:16		18:03	18:03	16:03	15:45	11	15:07 (21)		
20	04:59		20:27 (20)	05:52		20:31 (19)	06:48	18:57 (18)	07:44	07:44	15:59 (17)	08:25	14:56 (21)			
	21:28	21	20:48 (20)	20:29		19:14	19:14		18:01	18:01	16:02	15:45	10	15:06 (21)		
21	05:01		20:27 (20)	05:54		20:32 (19)	06:50	18:57 (18)	07:46	07:46	15:59 (17)	08:25	14:57 (21)			
	21:26	20	20:47 (20)	20:27		19:11	19:11		17:59	17:59	16:01	15:45	10	15:07 (21)		
22	05:02		20:28 (20)	05:56		20:33 (19)	06:52	18:57 (18)	07:48	07:48	15:59 (17)	08:26	14:57 (21)			
	21:25	19	20:47 (20)	20:25		19:09	19:09		17:56	17:56	15:59	15:46	10	15:07 (21)		
23	05:04		20:29 (20)	05:58		20:34 (19)	06:53	18:57 (18)	07:50	07:50	15:59 (17)	08:27	14:58 (21)			
	21:23	17	20:46 (20)	20:22		19:06	19:06		17:54	17:54	16:00	15:46	10	15:08 (21)		
24	05:06		20:30 (20)	05:59		19:32 (16)	06:55	18:57 (18)	07:51	07:51	16:00	15:46	10	15:08 (21)		
	21:22	14	20:44 (20)	20:20	7	19:39 (16)	19:39		17:52	17:52	16:01	15:47	10	15:08 (21)		
25	05:07		20:32 (20)	06:01		19:30 (16)	06:57	18:57 (18)	07:53	07:53	16:01	15:47	10	15:08 (21)		
	21:20	11	20:43 (20)	20:18	11	19:41 (16)	19:41		17:50	17:50	16:00	15:47	10	15:08 (21)		
26	05:09		20:34 (20)	06:03		19:28 (16)	06:59	18:57 (18)	07:55	07:55	16:01	15:48	11	15:09 (21)		
	21:19	7	20:41 (20)	20:15	13	19:41 (16)	18:59	16	16:06 (17)	15:54	5	14:56 (21)	15:48	11	15:09 (21)	
27	05:10		20:33 (19)	06:05		19:27 (16)	07:01	18:57 (18)	07:56	07:56	16:01	15:48	11	15:09 (21)		
	21:17	8	20:31 (19)	20:13	15	19:42 (16)	18:56	16	16:06 (17)	15:53	9	14:58 (21)	15:49	12	15:10 (21)	
28	05:12		20:31 (19)	06:07		19:27 (16)	07:02	18:57 (18)	07:58	07:58	16:01	15:49	11	15:10 (21)		
	21:16	10	20:31 (19)	20:11	15	19:42 (16)	18:54	16	16:06 (17)	15:52	11	15:00 (21)	15:50	12	15:12 (21)	
29	05:14		20:31 (19)	06:08		19:26 (16)	07:04	18:57 (18)	07:59	07:59	16:01	15:49	11	15:10 (21)		
	21:14	12	20:33 (19)	20:08	13	19:39 (16)	18:51	16	16:07 (17)	15:51	12	15:01 (21)	15:51	13	15:12 (21)	
30	05:15		20:30 (19)	06:10		19:26 (16)	07:06	18:57 (18)	07:59	07:59	16:01	15:49	11	15:10 (21)		
	21:12	13	20:33 (19)	20:06	11	19:37 (16)	18:49	16	16:07 (17)	15:51	13	15:02 (21)	15:52	13	15:13 (21)	
31	05:17		20:19 (19)	06:12		19:26 (16)	07:08	18:57 (18)	07:59	07:59	16:01	15:49	11	15:10 (21)		
	21:10	15	20:34 (19)	20:03	9	19:35 (16)	19:35	16	16:06 (17)	15:51	14	15:03 (21)	15:53	14	15:14 (21)	
	Sonneneinstrahlung	514		461		383		328		257		231				
	astr.max.mögl.Beschattung	753		180		172		134		85		405				
	Red.Sonneneinstrahlung	0.44		0.48		0.40		0.33		0.21		0.14				
	Reduktion Betriebsdauer	0.90		0.90		0.90		0.90		0.90		0.90				
	Reduktion Windrichtung	0.63		0.64		0.67		0.70		0.69		0.68				
	Gesamte Reduktion	0.25		0.28		0.24		0.21		0.13		0.09				
	Met.wahrsch.Beschattung	189		51		42		28		11		35				

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung: GBSchattenrezeptor: BW - IO75**  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1   08:28	14:54 (21)   07:57		06:59	06:43	19:05 (18)   05:33		04:42	20:20 (20)
15:54	16   15:10 (21)   16:46		17:43	19:42	11   19:16 (18)   20:39		21:29	20:45 (20)
2   08:28	14:54 (21)   07:55		06:56	06:40	19:03 (18)   05:31		04:41	20:21 (20)
15:55	16   15:10 (21)   16:48		17:45	19:44	14   19:17 (18)   20:40		21:31	20:46 (20)
3   08:28	14:55 (21)   07:54		06:54	06:38	19:02 (18)   05:28		04:40	20:21 (20)
15:57	16   15:11 (21)   16:50		17:47	19:46	17   19:19 (18)   20:42		21:32	20:46 (20)
4   08:27	14:56 (21)   07:52		06:52	06:35	19:01 (18)   05:26		04:40	20:20 (20)
15:58	16   15:12 (21)   16:52		17:49	19:48	18   19:19 (18)   20:44		21:33	20:46 (20)
5   08:27	14:56 (21)   07:50		06:49	06:33	19:00 (18)   05:24		04:39	20:20 (20)
15:59	16   15:12 (21)   16:54	5   16:23 (17)   17:51	17:51	19:50	19   19:19 (18)   20:46		21:34	20:46 (20)
6   08:27	14:56 (21)   07:48		06:47	06:30	18:59 (18)   05:22	20:14 (19)   04:38		20:21 (20)
16:00	15   15:11 (21)   16:56	10   16:26 (17)   17:53	17:53	19:52	20   19:19 (18)   20:48	3   20:17 (19)   21:35	26   20:47 (20)	
7   08:26	14:58 (21)   07:46		06:45	06:28	19:00 (18)   05:20		04:37	20:20 (20)
16:02	14   15:12 (21)   16:58	12   16:27 (17)   17:55	17:55	19:54	18   19:18 (18)   20:50	5   20:18 (19)   21:36	27   20:47 (20)	
8   08:26	14:58 (21)   07:44		06:42	06:26	19:00 (18)   05:18		04:37	20:21 (20)
16:03	14   15:12 (21)   17:00	15   16:29 (17)   17:57	17:57	19:55	18   19:18 (18)   20:51	9   20:20 (19)   21:37	27   20:48 (20)	
9   08:25	14:59 (21)   07:42		06:40	06:23	19:00 (18)   05:17		04:36	20:20 (20)
16:05	13   15:12 (21)   17:03	17   16:31 (17)   17:59	17:59	19:57	16   19:16 (18)   20:53	10   20:22 (19)   21:38	30   21:02 (1)	
10   08:24	15:00 (21)   07:40		06:37	06:21	19:02 (18)   05:15		04:36	20:21 (20)
16:06	11   15:11 (21)   17:05	19   16:32 (17)   18:00	18:00	19:59	14   19:32 (16)   20:55	13   20:24 (19)   21:39	32   21:03 (1)	
11   08:24	15:01 (21)   07:38		06:35	06:18	19:03 (18)   05:13		04:35	20:21 (20)
16:08	10   15:11 (21)   17:07	18   16:32 (17)   18:02	18:02	20:01	14   19:33 (16)   20:57	15   20:25 (19)   21:40	34   21:04 (1)	
12   08:23	15:02 (21)   07:36		06:32	06:16	19:27 (16)   05:11		04:35	20:21 (20)
16:09	8   15:10 (21)   17:09	18   16:32 (17)   18:04	18:04	20:03	8   19:35 (16)   20:59	16   20:27 (19)   21:41	34   21:04 (1)	
13   08:22	15:04 (21)   07:34		06:30	06:14	19:27 (16)   05:09		04:34	20:21 (20)
16:11	5   15:09 (21)   17:11	18   16:32 (17)   18:06	18:06	20:05	10   19:37 (16)   21:00	16   20:27 (19)   21:41	37   21:05 (1)	
14   08:21	07:32		06:27	06:11	19:25 (16)   05:07		04:34	20:22 (20)
16:13	17   17:13	17   16:31 (17)   18:08	18:08	20:07	13   19:38 (16)   21:02	16   20:26 (19)   21:42	37   21:06 (1)	
15   08:20	07:30		06:25	06:09	19:25 (16)   05:06		04:34	20:22 (20)
16:14	17:15	15   16:30 (17)   18:10	18:10	20:09	15   19:40 (16)   21:04	15   20:26 (19)   21:43	38   21:06 (1)	
16   08:19	07:28		06:23	06:06	19:25 (16)   05:04		04:34	20:22 (20)
16:16	17:17	12   16:29 (17)   18:12	18:12	20:10	16   19:41 (16)   21:05	14   20:25 (19)   21:43	39   21:07 (1)	
17   08:18	07:26		06:20	06:04	19:25 (16)   05:02		04:34	20:23 (20)
16:18	17:19	8   16:27 (17)   18:14	18:14	20:12	14   19:39 (16)   21:07	12   20:25 (19)   21:44	38   21:07 (1)	
18   08:17	07:24		06:18	06:02	19:26 (16)   05:01		04:33	20:23 (20)
16:19	17:21		18:16	20:14	13   19:39 (16)   21:09	11   20:24 (19)   21:44	39   21:08 (1)	
19   08:16	07:22		06:15	05:59	19:27 (16)   04:59		04:33	20:23 (20)
16:21	17:23		18:18	20:16	10   19:37 (16)   21:10	8   20:23 (19)   21:44	39   21:08 (1)	
20   08:15	07:19		06:13	05:57	19:30 (16)   04:58		04:34	20:23 (20)
16:23	17:25		18:20	20:18	5   19:35 (16)   21:12	4   20:20 (19)   21:45	40   21:08 (1)	
21   08:14	07:17		06:10	05:55	19:25 (16)   04:56		04:34	20:23 (20)
16:25	17:27		18:22	20:20		21:14	40   21:45	
22   08:12	07:15		06:08	05:52		04:55	20:29 (20)   04:34	20:23 (20)
16:27	17:29		18:23	20:22		21:15	6   20:35 (20)   21:45	40   21:08 (1)
23   08:11	07:13		06:05	05:50		04:53	20:27 (20)   04:34	20:24 (20)
16:29	17:31		18:25	20:24		21:17	11   20:38 (20)   21:45	40   21:09 (1)
24   08:10	07:10		06:03	05:48		04:52	20:25 (20)   04:34	20:24 (20)
16:31	17:33		18:27	20:25		21:18	14   20:39 (20)   21:46	39   21:09 (1)
25   08:08	07:08		06:00	05:46		04:50	20:24 (20)   04:35	20:24 (20)
16:32	17:35		18:29	20:27		21:20	16   20:40 (20)   21:46	39   21:09 (1)
26   08:07	07:06		05:58	05:43		04:49	20:23 (20)   04:35	20:24 (20)
16:34	17:37		18:31	20:29		21:21	18   20:41 (20)   21:46	39   21:09 (1)
27   08:05	07:03		05:55	05:41		04:48	20:22 (20)   04:36	20:24 (20)
16:36	17:39		18:33	20:31		21:23	20   20:42 (20)   21:45	39   21:09 (1)
28   08:04	07:01		05:53	05:39		04:47	20:22 (20)   04:36	20:25 (20)
16:38	17:41		18:35	20:33		21:24	21   20:43 (20)   21:45	37   21:09 (1)
29   08:02			06:50	05:37		04:45	20:21 (20)   04:37	20:24 (20)
16:40			19:37	20:35		21:26	23   20:44 (20)   21:45	37   21:08 (1)
30   08:00			06:48	05:35		04:44	20:21 (20)   04:37	20:25 (20)
16:42			19:38	20:37		21:27	23   20:44 (20)   21:45	35   21:08 (1)
31   07:59			06:45	19:07 (18)   20:37		04:43	20:21 (20)   21:45	
16:44			19:40	6   19:13 (18)   20:37		21:28	24   20:45 (20)   21:45	
Sonnenscheinstunden   248	272	367	421	496	512			
astr.max.mögl.Beschattung	170	184	6	283	343		1029	
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51		0.45	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90		0.90	
Reduktion Windrichtung	0.68	0.70	0.67	0.66	0.63		0.62	
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29		0.25	
Met.wahrsch.Beschattung	18	28	1	70	100		262	

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: BW - IO75**  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember						
1	04:38	20:26 (20)	05:19		20:21 (19)	06:14	19:03 (18)	07:08	07:07	15:43 (17)	08:03	14:43 (21)					
	21:44	34	21:09 (1)	21:09	16	20:37 (19)	20:01	14	19:33 (16)	18:46	16:35	18	16:01 (17)	15:50	10	14:53 (21)	
2	04:39	20:25 (20)	05:20		20:21 (19)	06:16	19:00 (18)	07:10	07:09	15:43 (17)	08:05	14:43 (21)					
	21:44	32	21:07 (1)	21:07	14	20:35 (19)	19:59	14	19:30 (16)	18:44	16:33	18	16:01 (17)	15:49	12	14:55 (21)	
3	04:40	20:26 (20)	05:22		20:21 (19)	06:17	18:58 (18)	07:12	07:11	15:44 (17)	08:06	14:43 (21)					
	21:44	30	21:07 (1)	21:05	12	20:33 (19)	19:56	16	19:14 (18)	18:41	16:31	15	15:59 (17)	15:48	13	14:56 (21)	
4	04:40	20:26 (20)	05:24		20:21 (19)	06:19	18:58 (18)	07:14	07:13	15:44 (17)	08:08	14:42 (21)					
	21:43	27	20:53 (20)	21:03	10	20:31 (19)	19:54	17	19:15 (18)	18:39	16:29	12	15:56 (17)	15:47	14	14:56 (21)	
5	04:41	20:27 (20)	05:25		20:22 (19)	06:21	18:56 (18)	07:15	07:15	15:46 (17)	08:09	14:43 (21)					
	21:43	26	20:53 (20)	21:01	8	20:30 (19)	19:51	18	19:14 (18)	18:37	16:27	9	15:55 (17)	15:47	14	14:57 (21)	
6	04:42	20:27 (20)	05:27		20:23 (19)	06:23	18:56 (18)	07:17	07:17	15:48 (17)	08:10	14:42 (21)					
	21:42	27	20:54 (20)	20:59	5	20:28 (19)	19:49	19	19:15 (18)	18:34	16:25	5	15:53 (17)	15:46	15	14:57 (21)	
7	04:43	20:27 (20)	05:29		20:24 (19)	06:25	18:55 (18)	07:19	07:19	15:48 (17)	08:12	14:43 (21)					
	21:41	27	20:54 (20)	20:57	2	20:26 (19)	19:46	20	19:15 (18)	18:32	16:23	15:46	16	14:59 (21)			
8	04:44	20:28 (20)	05:31			06:26	18:56 (18)	07:21	07:21	15:48 (17)	08:13	14:43 (21)					
	21:41	26	20:54 (20)	20:55		19:44	18	19:14 (18)	18:29	16:21	15:45	16	14:59 (21)				
9	04:45	20:28 (20)	05:33			06:28	18:55 (18)	07:23	07:23	15:48 (17)	08:14	14:44 (21)					
	21:40	26	20:54 (20)	20:53		19:41	18	19:13 (18)	18:27	16:20	15:45	16	15:00 (21)				
10	04:46	20:28 (20)	05:34			06:30	18:56 (18)	07:25	07:25	15:48 (17)	08:16	14:44 (21)					
	21:39	26	20:54 (20)	20:51		19:39	14	19:10 (18)	18:24	16:18	15:45	16	15:00 (21)				
11	04:48	20:29 (20)	05:36			06:32	18:57 (18)	07:27	07:27	15:49 (17)	08:17	14:44 (21)					
	21:38	24	20:53 (20)	20:49		19:36	11	19:08 (18)	18:22	16:16	15:44	17	15:01 (21)				
12	04:49	20:29 (20)	05:38			06:34	18:59 (18)	07:28	07:29	15:49 (17)	08:18	14:44 (21)					
	21:37	24	20:53 (20)	20:47		19:34	7	19:06 (18)	18:20	16:14	15:44	17	15:01 (21)				
13	04:50	20:29 (20)	05:40			06:35		07:30	07:31	15:49 (17)	08:19	14:44 (21)					
	21:36	24	20:53 (20)	20:45		19:31		18:17	16:13	15:44	17	15:01 (21)					
14	04:51	20:30 (20)	05:41			06:37		07:32	07:33	15:49 (17)	08:20	14:45 (21)					
	21:35	22	20:52 (20)	20:43		19:29		18:15	16:11	15:44	17	15:02 (21)					
15	04:53	20:30 (20)	05:43			06:39		07:34	07:35	15:49 (17)	08:21	14:45 (21)					
	21:34	22	20:52 (20)	20:40		19:26		18:12	16:09	15:44	17	15:02 (21)					
16	04:54	20:32 (20)	05:45			06:41		07:36	07:37	15:48 (17)	08:22	14:46 (21)					
	21:33	20	20:52 (20)	20:38		19:24		18:10	16:08	15:44	17	15:03 (21)					
17	04:55	20:32 (20)	05:47			06:43		07:38	07:38	15:49 (17)	08:23	14:46 (21)					
	21:32	19	20:51 (20)	20:36		19:21		18:08	16:06	15:44	17	15:03 (21)					
18	04:57	20:33 (20)	05:49			06:44		07:40	07:40	15:49 (17)	08:23	14:47 (21)					
	21:30	17	20:50 (20)	20:34		19:19		18:05	16:05	15:44	17	15:04 (21)					
19	04:58	20:34 (20)	05:50			06:46		07:42	07:42	15:49 (17)	08:24	14:48 (21)					
	21:29	15	20:49 (20)	20:32		19:16		18:03	16:03	15:45	17	15:05 (21)					
20	04:59	20:36 (20)	05:52			06:48		07:44	07:44	15:49 (17)	08:25	14:48 (21)					
	21:28	12	20:48 (20)	20:29		19:14		18:01	16:02	15:45	17	15:05 (21)					
21	05:01	20:37 (20)	05:54			06:50		07:46	07:46	15:49 (17)	08:25	14:49 (21)					
	21:26	9	20:46 (20)	20:27		19:11		17:59	16:01	15:45	17	15:06 (21)					
22	05:02		05:56			06:52		07:48	07:48	15:49 (17)	08:26	14:49 (21)					
	21:25		20:25			19:09		17:56	15:59	15:46	16	15:05 (21)					
23	05:04		05:58		19:33 (16)	06:53		07:50	07:49	15:49 (17)	08:27	14:50 (21)					
	21:23		20:22		6	19:39 (16)	19:06		17:54	15:48	16	15:07 (21)					
24	05:06		05:59		19:31 (16)	06:55		07:51	07:51	15:49 (17)	08:27	14:50 (21)					
	21:22	7	20:32 (19)	20:20	10	19:41 (16)	19:04		17:52	15:47	17	15:07 (21)					
25	05:07		20:24 (19)	06:01		19:29 (16)	06:57		06:53	15:48 (17)	07:53	14:50 (21)					
	21:20	10	20:34 (19)	20:18	13	19:42 (16)	19:01		16:50	9	15:57 (17)	15:56	15:48	17	15:07 (21)		
26	05:09		20:23 (19)	06:03		19:28 (16)	06:59		06:55	15:46 (17)	07:55	14:50 (21)					
	21:19	12	20:35 (19)	20:15	14	19:42 (16)	18:59		16:48	13	15:59 (17)	15:54	15:48	17	15:07 (21)		
27	05:10		20:23 (19)	06:05		19:27 (16)	07:01		06:57	15:44 (17)	07:56	14:51 (21)					
	21:17	13	20:36 (19)	20:13	16	19:43 (16)	18:56		16:45	16	16:00 (17)	15:53	15:49	17	15:08 (21)		
28	05:12		20:21 (19)	06:07		19:27 (16)	07:03		06:59	15:43 (17)	07:58	14:52 (21)					
	21:16	15	20:36 (19)	20:11	15	19:42 (16)	18:54		16:43	17	16:00 (17)	15:52	15:50	17	15:09 (21)		
29	05:14		20:21 (19)	06:08		19:26 (16)	07:04		07:01	15:44 (17)	08:00	14:46 (21)	15:50	17	15:09 (21)		
	21:14	16	20:37 (19)	20:08	13	19:39 (16)	18:51		16:41	18	16:02 (17)	15:51	4	14:50 (21)	15:51	16	15:08 (21)
30	05:15		20:21 (19)	06:10		19:26 (16)	07:06		07:03	15:43 (17)	08:01	14:44 (21)	15:49	17	15:09 (21)		
	21:12	16	20:37 (19)	20:06	11	19:37 (16)	18:49		16:39	19	16:02 (17)	15:51	8	14:52 (21)	15:52	17	15:09 (21)
31	05:17		20:21 (19)	06:12		19:27 (16)	07:05		07:05	15:43 (17)	08:02	14:43 (21)					
	21:10	16	20:37 (19)	20:03	8	19:35 (16)		16:37	19	16:02 (17)	15:53	17	15:10 (21)				
Sonnenscheinstunden	514		461			383		328		257		231					
astr.max.mögl.Beschattung	594		173			186		111		89		497					
Red.Sonnenscheinwahrsch.	0.44		0.48			0.40		0.33		0.21		0.14					
Reduktion Betriebsdauer	0.90		0.90			0.90		0.90		0.90		0.90					
Reduktion Windrichtung	0.63		0.64			0.67		0.70		0.70		0.68					
Gesamte Reduktion	0.25		0.28			0.24		0.21		0.13		0.09					
Met.wahrsch.Beschattung	149		49			45		23		12		42					

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	

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BX - IO76

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar		Februar		März		April		Mai		Juni			
1	08:28		14:19 (26)	07:57		06:59	06:43		19:15 (18)	05:33		04:42	20:31 (1)	
	15:54	16	14:35 (26)	16:46		17:43	19:42	1	19:16 (18)	20:39		21:29	19 20:50 (1)	
2	08:28		14:19 (26)	07:55		06:56	06:40		19:12 (18)	05:31		04:41	20:32 (1)	
	15:55	15	14:34 (26)	16:48		17:45	19:44	5	19:17 (18)	20:40		21:31	19 20:51 (1)	
3	08:28		14:21 (26)	07:54		06:54	06:38		19:11 (18)	05:28		04:40	20:32 (1)	
	15:57	14	14:35 (26)	16:50		17:47	19:46	8	19:19 (18)	20:42		21:32	19 20:51 (1)	
4	08:27		14:22 (26)	07:52		06:52	06:35		19:09 (18)	05:26		04:40	20:32 (1)	
	15:58	13	14:35 (26)	16:52		17:49	19:48	11	19:20 (18)	20:44		21:33	18 20:50 (1)	
5	08:27		14:23 (26)	07:50		06:49	06:33		19:09 (18)	05:24		04:39	20:32 (1)	
	15:59	11	14:34 (26)	16:54		17:51	19:50	14	19:23 (18)	20:46		21:34	18 20:50 (1)	
6	08:27		14:24 (26)	07:48		06:47	06:30		19:09 (18)	05:22		04:38	20:33 (1)	
	16:00	9	14:33 (26)	16:56		17:53	19:52	14	19:23 (18)	20:48	5	20:12 (20)	20:35 (1)	
7	08:26		14:27 (26)	07:46		06:44	06:28		19:09 (18)	05:20		20:09 (20)	04:37	18 20:33 (1)
	16:02	5	14:32 (26)	16:58		17:55	19:54	14	19:23 (18)	20:50	9	20:18 (20)	21:36	17 20:50 (1)
8	08:26			07:44		06:42	06:26		19:10 (18)	05:18		20:08 (20)	04:37	20:33 (1)
	16:03			17:00		17:57	19:55	12	19:22 (18)	20:51	12	20:20 (20)	21:37	18 20:51 (1)
9	08:25			07:42		06:40	06:23		19:11 (18)	05:17		20:07 (20)	04:36	20:33 (1)
	16:05			17:02		17:59	19:57	9	19:20 (18)	20:53	15	20:22 (20)	21:38	17 20:50 (1)
10	08:24			07:40		06:37	06:21		19:14 (18)	05:15		20:06 (20)	04:36	20:34 (1)
	16:06			17:05		18:00	19:59	3	19:17 (18)	20:55	18	20:24 (20)	21:39	16 20:50 (1)
11	08:24			07:38		06:35	06:18			05:13		20:06 (20)	04:35	20:35 (1)
	16:08			17:07		18:02	20:01			20:57	18	20:24 (20)	21:40	16 20:51 (1)
12	08:23			07:36		06:32	06:16			05:11		20:06 (20)	04:35	20:35 (1)
	16:09			17:09		18:04	20:03			20:58	19	20:25 (20)	21:41	15 20:50 (1)
13	08:22			07:34		06:30	06:14			05:09		20:05 (20)	04:34	20:35 (1)
	16:11			17:11		18:06	20:05			21:00	20	20:25 (20)	21:41	15 20:50 (1)
14	08:21			07:32		06:27	06:11			05:07		20:05 (20)	04:34	20:36 (1)
	16:13			17:13		18:08	20:07			21:02	20	20:25 (20)	21:42	14 20:50 (1)
15	08:20			07:30		06:25	06:09			05:06		20:05 (20)	04:34	20:36 (1)
	16:14			17:15		18:10	20:09			21:04	20	20:25 (20)	21:43	14 20:50 (1)
16	08:19			07:28		06:22	06:06			05:04		20:05 (20)	04:34	20:37 (1)
	16:16			17:17		18:12	20:10			21:05	19	20:24 (20)	21:43	14 20:51 (1)
17	08:18			07:26		06:20	06:04			05:02		20:06 (20)	04:34	20:37 (1)
	16:18			17:19		18:14	20:12			21:07	19	20:25 (20)	21:44	14 20:51 (1)
18	08:17			07:24		16:48 (17)	06:18	06:02		05:01		20:06 (20)	04:33	20:38 (1)
	16:19			17:21	3	16:51 (17)	18:16	20:14		21:09	18	20:24 (20)	21:44	13 20:51 (1)
19	08:16			07:22		16:47 (17)	06:15	05:59		04:59		20:06 (20)	04:33	20:38 (1)
	16:21			17:23	7	16:54 (17)	18:18	20:16		21:10	21	20:38 (1)	21:44	13 20:51 (1)
20	08:15			07:19		16:47 (17)	06:13	05:57		04:58		20:06 (20)	04:34	20:38 (1)
	16:23			17:25	9	16:56 (17)	18:20	20:18		21:12	22	20:38 (1)	21:45	13 20:51 (1)
21	08:14			07:17		16:47 (17)	06:10	05:55		04:56		20:07 (20)	04:34	20:38 (1)
	16:25			17:27	12	16:59 (17)	18:21	20:20		21:14	24	20:40 (1)	21:45	13 20:51 (1)
22	08:12			07:15		16:46 (17)	06:08	05:52		04:55		20:09 (20)	04:34	20:38 (1)
	16:27			17:29	14	17:00 (17)	18:23	20:22		21:15	23	20:42 (1)	21:45	13 20:51 (1)
23	08:11			07:13		16:46 (17)	06:05	05:50		04:53		20:10 (20)	04:34	20:39 (1)
	16:29			17:31	15	17:01 (17)	18:25	20:24		21:17	24	20:44 (1)	21:45	13 20:52 (1)
24	08:10			07:10		16:47 (17)	06:03	05:48		04:52		20:10 (20)	04:34	20:39 (1)
	16:31			17:33	14	17:01 (17)	18:27	20:25		21:18	24	20:44 (1)	21:46	13 20:52 (1)
25	08:08			07:08		16:47 (17)	06:00	05:46		04:50		20:13 (20)	04:35	20:38 (1)
	16:32			17:35	12	16:59 (17)	18:29	20:27		21:20	21	20:46 (1)	21:46	14 20:52 (1)
26	08:07			07:06		16:49 (17)	05:58	05:43		04:49		20:30 (1)	04:35	20:39 (1)
	16:34			17:37	8	16:57 (17)	18:31	20:29		21:21	17	20:47 (1)	21:46	14 20:53 (1)
27	08:05			07:03		16:55	05:41			04:48		20:30 (1)	04:36	20:39 (1)
	16:36			17:39		18:33	20:31			21:23	18	20:48 (1)	21:45	14 20:53 (1)
28	08:04			07:01		16:53	05:39			04:47		20:30 (1)	04:36	20:39 (1)
	16:38			17:41		18:35	20:33			21:24	20	20:50 (1)	21:45	14 20:53 (1)
29	08:02					16:50	05:37			04:45		20:30 (1)	04:37	20:39 (1)
	16:40					19:37	20:35			21:26	20	20:50 (1)	21:45	14 20:53 (1)
30	08:00					16:48	05:35			04:44		20:30 (1)	04:37	20:39 (1)
	16:42					19:38	20:37			21:27	20	20:50 (1)	21:45	15 20:54 (1)
31	07:59					16:45				04:43		20:31 (1)		
	16:44					19:40				21:28	19	20:50 (1)		
Sonnenscheinstunden			248		272		367		421		496		512	
astr.max.mögl.Beschattung			83						91			485		457
Red.Sonnenscheinwahrsch.			0.17		0.24				0.41			0.51		0.45
Reduktion Betriebsdauer			0.90		0.90				0.90			0.90		0.90
Reduktion Windrichtung			0.67		0.69				0.66			0.63		0.62
Gesamte Reduktion			0.11		0.15				0.25			0.29		0.26
Met.wahrsch.Beschattung			9		14				23			141		117

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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

André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BX - IO76

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38		20:39 (1)	05:19		20:16 (20)	06:14		07:08		07:07	08:03
	21:44	16	20:55 (1)	21:08	19	20:35 (20)	20:01		18:46		16:35	15:50
2	04:39		20:38 (1)	05:20		20:16 (20)	06:16		07:10		07:09	08:05
	21:44	16	20:54 (1)	21:07	18	20:34 (20)	19:59	3	19:15 (18)	18:44	16:33	15:49
3	04:40		20:39 (1)	05:22		20:17 (20)	06:17		07:12		07:11	08:06
	21:44	16	20:55 (1)	21:05	16	20:33 (20)	19:56	9	19:18 (18)	18:41	16:31	15:48
4	04:40		20:39 (1)	05:24		20:17 (20)	06:19		07:14		07:13	08:08
	21:43	17	20:56 (1)	21:03	14	20:31 (20)	19:54	12	19:19 (18)	18:39	16:29	15:47
5	04:41		20:39 (1)	05:25		20:19 (20)	06:21		07:15		07:15	08:09
	21:43	17	20:56 (1)	21:01	11	20:30 (20)	19:51	14	19:19 (18)	18:37	16:27	15:47
6	04:42		20:39 (1)	05:27		20:20 (20)	06:23		07:17		07:17	08:10
	21:42	18	20:57 (1)	20:59	8	20:28 (20)	19:49	14	19:19 (18)	18:34	16:25	15:46
7	04:43		20:39 (1)	05:29		20:23 (20)	06:25		07:19		07:19	08:12
	21:41	18	20:57 (1)	20:57	3	20:26 (20)	19:46	13	19:18 (18)	18:32	16:23	15:46
8	04:44		20:39 (1)	05:31			06:26		07:21		07:21	08:13
	21:41	19	20:58 (1)	20:55			19:44	11	19:16 (18)	18:29	16:21	15:45
9	04:45		20:39 (1)	05:32			06:28		07:23		07:23	08:14
	21:40	19	20:58 (1)	20:53			19:41	9	19:13 (18)	18:27	16:19	15:45
10	04:46		20:39 (1)	05:34			06:30		07:25		07:25	08:16
	21:39	19	20:58 (1)	20:51			19:39	5	19:10 (18)	18:24	16:18	15:45
11	04:48		20:39 (1)	05:36			06:32		07:27		07:27	08:17
	21:38	19	20:58 (1)	20:49			19:36	2	19:08 (18)	18:22	16:16	15:44
12	04:49		20:39 (1)	05:38			06:34		07:28		07:29	08:18
	21:37	19	20:58 (1)	20:47			19:34		18:20		16:14	15:44
13	04:50		20:39 (1)	05:40			06:35		07:30		07:31	08:19
	21:36	20	20:59 (1)	20:45			19:31		18:17		16:13	15:44
14	04:51		20:39 (1)	05:41			06:37		07:32		07:33	08:20
	21:35	19	20:58 (1)	20:43			19:29		18:15		16:11	15:44
15	04:52		20:39 (1)	05:43			06:39		07:34		17:24 (17)	07:35
	21:34	19	20:58 (1)	20:40			19:26		18:12	4	17:28 (17)	16:09
16	04:54		20:40 (1)	05:45			06:41		07:36		17:21 (17)	07:36
	21:33	19	20:59 (1)	20:38			19:24		18:10	9	17:30 (17)	16:08
17	04:55		20:40 (1)	05:47			06:43		07:38		17:19 (17)	07:38
	21:32	17	20:57 (1)	20:36			19:21		18:08	13	17:32 (17)	16:06
18	04:57		20:40 (1)	05:49			06:44		07:40		17:18 (17)	07:40
	21:30	16	20:56 (1)	20:34			19:19		18:05	14	17:32 (17)	16:05
19	04:58		20:21 (20)	05:50			06:46		07:42		17:17 (17)	07:42
	21:29	22	20:54 (1)	20:31			19:16		18:03	15	17:32 (17)	16:03
20	04:59		20:20 (20)	05:52			06:48		07:44		17:17 (17)	07:44
	21:28	24	20:54 (1)	20:29			19:14		18:01	14	17:31 (17)	16:02
21	05:01		20:19 (20)	05:54			06:50		07:46		17:17 (17)	07:46
	21:26	24	20:52 (1)	20:27			19:11		17:59	11	17:28 (17)	16:01
22	05:02		20:18 (20)	05:56			06:52		07:48		17:17 (17)	07:48
	21:25	25	20:52 (1)	20:25			19:09		17:56	9	17:26 (17)	15:59
23	05:04		20:17 (20)	05:58			06:53		07:49		17:18 (17)	07:49
	21:23	23	20:50 (1)	20:22			19:06		17:54	6	17:24 (17)	15:58
24	05:05		20:16 (20)	05:59			06:55		07:51		17:19 (17)	07:51
	21:22	22	20:48 (1)	20:20			19:04		17:52	2	17:21 (17)	15:57
25	05:07		20:17 (20)	06:01			06:57		06:53		07:53	08:27
	21:20	19	20:47 (1)	20:18			19:01		16:50		15:56	15:48
26	05:09		20:16 (20)	06:03			06:59		06:55		07:55	08:28
	21:19	18	20:34 (20)	20:15			18:59		16:47		15:54	15:48
27	05:10		20:16 (20)	06:05			07:01		06:57		07:56	08:28
	21:17	19	20:35 (20)	20:13			18:56		16:45		15:53	15:49
28	05:12		20:15 (20)	06:07			07:02		06:59		07:58	08:28
	21:15	20	20:35 (20)	20:11			18:54		16:43		15:52	15:50
29	05:14		20:16 (20)	06:08			07:04		07:01		08:00	08:28
	21:14	19	20:35 (20)	20:08			18:51		16:41		15:51	15:51
30	05:15		20:15 (20)	06:10			07:06		07:03		08:01	08:28
	21:12	20	20:35 (20)	20:06			18:49		16:39		15:51	15:52
31	05:17		20:16 (20)	06:12					07:05		08:28	14:18 (26)
	21:10	19	20:35 (20)	20:03					16:37		15:53	16
Sonnenscheinstunden	514		461			383		92		328		257
astr.max.mögl.Beschattung	597		89			92		0.40		97		456
Red.Sonnenscheinwahrsch.	0.44		0.48			0.40		0.33		0.33		0.14
Reduktion Betriebsdauer	0.90		0.90			0.90		0.90		0.90		0.90
Reduktion Windrichtung	0.63		0.63			0.66		0.69		0.69		0.67
Gesamte Reduktion	0.25		0.28			0.24		0.21		0.21		0.08
Met.wahrsch.Beschattung	150		25			22		20		20		38

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BY - IO77

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni			
1	08:28	14:14 (26)	07:57	06:59	06:43	19:15 (18)	05:33	04:42	20:33 (1)
	15:54	10 14:24 (26)	16:46	17:43	19:42	1 19:16 (18)	20:39	21:29	20:53 (1)
2	08:28	14:15 (26)	07:55	06:56	06:40	19:12 (18)	05:31	04:41	20:34 (1)
	15:55	8 14:23 (26)	16:48	17:45	19:44	5 19:17 (18)	20:40	21:31	20:54 (1)
3	08:28	14:17 (26)	07:54	06:54	06:38	19:11 (18)	05:28	04:40	20:34 (1)
	15:57	6 14:23 (26)	16:50	17:47	19:46	8 19:19 (18)	20:42	21:32	20:54 (1)
4	08:27		07:52	06:52	06:35	19:10 (18)	05:26	04:40	20:34 (1)
	15:58		16:52	17:49	19:48	10 19:20 (18)	20:44	21:33	20:54 (1)
5	08:27		07:50	06:49	06:33	19:09 (18)	05:24	04:39	20:34 (1)
	15:59		16:54	17:51	19:50	14 19:23 (18)	20:46	21:34	20:54 (1)
6	08:27		07:48	06:47	06:30	19:08 (18)	05:22	04:38	20:35 (1)
	16:00		16:56	17:53	19:52	16 19:24 (18)	20:48	21:35	20:54 (1)
7	08:26		07:46	06:44	06:28	19:09 (18)	05:20	04:37	20:34 (1)
	16:02		16:58	17:55	19:54	15 19:24 (18)	20:50	21:36	20:54 (1)
8	08:26		07:44	06:42	06:26	19:10 (18)	05:18	04:37	20:35 (1)
	16:03		17:00	17:57	19:55	13 19:23 (18)	20:51	21:37	20:55 (1)
9	08:25		07:42	06:40	06:23	19:10 (18)	05:17	04:36	20:35 (1)
	16:05		17:02	17:59	19:57	11 19:21 (18)	20:53	21:38	20:54 (1)
10	08:24		07:40	06:37	06:21	19:12 (18)	05:15	04:36	20:36 (1)
	16:06		17:05	18:00	19:59	7 19:19 (18)	20:55	21:39	20:55 (1)
11	08:24		07:38	06:35	06:18		05:13	04:35	20:36 (1)
	16:08		17:07	18:02	20:01		20:57	21:40	20:55 (1)
12	08:23		07:36	06:32	06:16		05:11	04:35	20:36 (1)
	16:09		17:09	18:04	20:03		20:58	21:41	20:55 (1)
13	08:22		07:34	06:30	06:14		05:09	04:34	20:36 (1)
	16:11		17:11	18:06	20:05		21:00	21:41	20:55 (1)
14	08:21		07:32	06:27	06:11		05:07	04:34	20:37 (1)
	16:13		17:13	18:08	20:07		21:02	21:42	20:55 (1)
15	08:20		07:30	06:25	06:09		05:06	04:34	20:37 (1)
	16:14		17:15	18:10	20:09		21:04	21:43	20:55 (1)
16	08:19		07:28	06:23	06:06		05:04	04:34	20:38 (1)
	16:16	1 15:39 (21)	17:17	18:12	20:10		21:05	21:43	20:56 (1)
17	08:18		07:26	16:46 (17)	06:04		05:02	04:34	20:38 (1)
	16:18	4 15:43 (21)	17:19	16:50 (17)	18:14		21:07	21:44	20:56 (1)
18	08:17		07:24	16:44 (17)	06:18		05:01	04:33	20:38 (1)
	16:19	6 15:44 (21)	17:21	16:51 (17)	18:16		21:09	21:44	20:56 (1)
19	08:16		07:22	16:44 (17)	06:15		04:59	04:33	20:38 (1)
	16:21	7 15:46 (21)	17:23	16:54 (17)	18:18		21:10	21:44	20:56 (1)
20	08:15		07:19	16:44 (17)	06:13		04:58	04:34	20:38 (1)
	16:23	10 15:48 (21)	17:25	16:56 (17)	18:20		21:12	21:45	20:56 (1)
21	08:14		07:17	16:44 (17)	06:10		04:56	04:34	20:39 (1)
	16:25	11 15:50 (21)	17:27	16:59 (17)	18:21		21:14	21:45	20:56 (1)
22	08:12		07:15	16:43 (17)	06:08		04:55	04:34	20:39 (1)
	16:27	14 15:53 (21)	17:29	16:58 (17)	18:23		21:15	21:45	20:56 (1)
23	08:11		07:13	16:44 (17)	06:05		04:53	04:34	20:39 (1)
	16:29	15 15:54 (21)	17:31	16:58 (17)	18:25		21:17	21:45	20:57 (1)
24	08:10		07:10	16:45 (17)	06:03		04:52	04:34	20:39 (1)
	16:31	15 15:54 (21)	17:33	16:57 (17)	18:27		21:18	21:46	20:57 (1)
25	08:08		07:08	16:46 (17)	06:00		04:50	04:35	20:39 (1)
	16:32	13 15:54 (21)	17:35	16:55 (17)	18:29		21:20	21:46	20:57 (1)
26	08:07		07:06	16:49 (17)	05:58		04:49	04:35	20:40 (1)
	16:34	12 15:53 (21)	17:37	16:52 (17)	18:31		21:21	21:46	20:58 (1)
27	08:05		07:03	05:55	05:41		04:48	04:36	20:39 (1)
	16:36	10 15:52 (21)	17:39	18:33	20:31		21:23	21:45	20:57 (1)
28	08:04		07:01	05:53	05:39		04:47	04:36	20:40 (1)
	16:38	7 15:52 (21)	17:41	18:35	20:33		21:24	21:45	20:58 (1)
29	08:02			06:50	05:37		04:45	04:37	20:40 (1)
	16:40			19:37	20:35		21:26	21:45	20:58 (1)
30	08:00			06:48	05:35		04:44	04:37	20:40 (1)
	16:42			19:38	20:37		21:27	21:45	20:59 (1)
31	07:59			06:45			04:43		
	16:44			19:40			21:28	20:53 (1)	
Sonnenscheinstunden	248	272	367	421	496			512	
astr.max.mögl.Beschattung	149	101		100	489			559	
Red.Sonnenscheinwahrsch.	0.17	0.24		0.41	0.51			0.45	
Reduktion Betriebsdauer	0.90	0.90		0.90	0.90			0.90	
Reduktion Windrichtung	0.69	0.70		0.66	0.63			0.62	
Gesamte Reduktion	0.11	0.15		0.25	0.29			0.25	
Met.wahrsch.Beschattung	16	15		25	142			142	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BY - IO77  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	20:40 (1) 05:19	20:20 (20) 06:14	07:08	07:07	08:03	
2	21:44	19 20:59 (1) 21:08	17 20:37 (20) 20:01	18:46	16:35	15:50	
3	04:39	20:40 (1) 05:20	20:20 (20) 06:16	7 19:10 (18) 07:10	07:09	08:05	
4	21:44	19 20:59 (1) 21:07	15 20:35 (20) 19:59	19:17 (18) 18:44	16:33	15:49	
5	04:40	20:40 (1) 05:22	20:22 (20) 06:17	19:08 (18) 07:12	07:11	08:06	
6	21:44	19 20:59 (1) 21:05	11 20:33 (20) 19:56	11 19:19 (18) 18:41	16:31	15:48	
7	04:40	20:40 (1) 05:24	20:23 (20) 06:19	19:07 (18) 07:14	07:13	08:08	
8	21:43	20:40 (1) 21:03	8 20:31 (20) 19:54	13 19:20 (18) 18:39	16:29	15:47	
9	04:41	20:41 (1) 05:25	20:26 (20) 06:21	19:05 (18) 07:15	07:15	08:09	
10	21:43	19 21:00 (1) 21:01	4 20:30 (20) 19:51	15 19:20 (18) 18:37	16:27	15:47	
11	04:42	20:41 (1) 05:27	06:23	19:04 (18) 07:17	07:17	08:10	
12	21:42	20 21:01 (1) 20:59	19:49	16 19:20 (18) 18:34	16:25	15:46	
13	04:43	20:41 (1) 05:29	06:25	19:04 (18) 07:19	07:19	08:12	
14	21:41	20 21:01 (1) 20:57	19:46	14 19:18 (18) 18:32	16:23	15:46	
15	04:44	20:41 (1) 05:31	06:26	19:05 (18) 07:21	07:21	08:13	
16	21:41	20 21:01 (1) 20:55	19:44	11 19:16 (18) 18:29	16:21	15:45	
17	04:45	20:41 (1) 05:32	06:28	19:04 (18) 07:23	07:23	08:14	
18	21:40	20 21:01 (1) 20:53	19:41	9 19:13 (18) 18:27	16:19	15:45	5 14:07 (26)
19	04:46	20:41 (1) 05:34	06:30	19:05 (18) 07:25	07:25	08:16	14:05 (26)
20	21:39	21 21:02 (1) 20:51	19:39	5 19:10 (18) 18:24	16:18	15:45	8 14:13 (26)
21	04:48	20:42 (1) 05:36	06:32	19:07 (18) 07:27	07:27	08:17	14:04 (26)
22	21:38	20 21:02 (1) 20:49	19:36	1 19:08 (18) 18:22	16:16	15:44	10 14:14 (26)
23	04:49	20:42 (1) 05:38	06:34	07:28	07:29	08:18	14:04 (26)
24	21:37	20 21:02 (1) 20:47	19:34	18:20	16:14	15:44	11 14:15 (26)
25	04:50	20:42 (1) 05:40	06:35	07:30	07:31	08:19	14:04 (26)
26	21:36	19 21:01 (1) 20:45	19:31	18:17	16:13	15:44	12 14:16 (26)
27	04:51	20:25 (20) 05:41	06:37	07:32	07:33	08:20	14:04 (26)
28	21:35	23 21:00 (1) 20:43	19:29	18:15	16:11	15:24 (21)	13 14:17 (26)
29	04:52	20:23 (20) 05:43	06:39	07:34	07:35	15:15 (21)	14:04 (26)
30	21:34	26 20:59 (1) 20:40	19:26	18:12	16:09	10 15:25 (21)	14 14:18 (26)
31	04:54	20:22 (20) 05:45	06:41	07:36	17:20 (17) 07:36	15:14 (21)	14:04 (26)
32	21:33	28 20:59 (1) 20:38	19:24	18:10	6 17:26 (17) 16:08	12 15:26 (21)	15 14:19 (26)
33	04:55	20:21 (20) 05:47	06:43	07:38	17:17 (17) 07:38	15:14 (21)	14:04 (26)
34	21:32	27 20:57 (1) 20:36	19:21	18:08	11 17:28 (17) 16:06	13 15:27 (21)	16 14:20 (26)
35	04:57	20:20 (20) 05:49	06:44	07:40	17:16 (17) 07:40	15:13 (21)	14:05 (26)
36	21:30	27 20:56 (1) 20:34	19:19	18:05	13 17:29 (17) 16:05	14 15:27 (21)	16 14:21 (26)
37	04:58	20:19 (20) 05:50	06:46	07:42	17:15 (17) 07:42	15:13 (21)	14:06 (26)
38	21:29	26 20:54 (1) 20:31	19:16	18:03	14 17:29 (17) 16:03	15 15:28 (21)	15 14:21 (26)
39	04:59	20:20 (20) 05:52	06:48	07:44	17:14 (17) 07:44	15:13 (21)	14:05 (26)
40	21:28	26 20:54 (1) 20:29	19:14	18:01	16 17:30 (17) 16:02	14 15:27 (21)	16 14:21 (26)
41	05:01	20:19 (20) 05:54	06:50	07:46	17:14 (17) 07:46	15:14 (21)	14:06 (26)
42	21:26	24 20:52 (1) 20:27	19:11	17:59	14 17:28 (17) 16:01	11 15:25 (21)	15 14:22 (26)
43	05:02	20:19 (20) 05:56	06:52	07:48	17:14 (17) 07:48	15:15 (21)	14:06 (26)
44	21:25	23 20:52 (1) 20:25	19:09	17:56	12 17:26 (17) 15:59	10 15:25 (21)	16 14:22 (26)
45	05:04	20:18 (20) 05:58	06:53	07:49	17:14 (17) 07:49	15:15 (21)	14:07 (26)
46	21:23	21 20:50 (1) 20:22	19:06	17:54	10 17:24 (17) 15:58	7 15:22 (21)	16 14:23 (26)
47	05:05	20:18 (20) 05:59	06:55	07:51	17:15 (17) 07:51	15:15 (21)	14:07 (26)
48	21:22	20 20:38 (20) 20:20	19:04	17:52	6 17:21 (17) 15:57	6 15:21 (21)	16 14:23 (26)
49	05:07	20:18 (20) 06:01	06:57	07:53	16:16 (17) 07:53	15:16 (21)	14:08 (26)
50	21:20	20 20:38 (20) 20:18	19:01	16:50	3 16:19 (17) 15:56	4 15:20 (21)	16 14:24 (26)
51	05:09	20:18 (20) 06:03	06:59	07:55	07:55	15:17 (21)	14:08 (26)
52	21:19	20 20:38 (20) 20:15	18:59	16:47	15:54	1 15:18 (21)	16 14:24 (26)
53	05:10	20:18 (20) 06:05	07:01	06:57	07:56	08:28	14:09 (26)
54	21:17	21 20:39 (20) 20:13	18:56	16:45	15:53	15:49	15 14:24 (26)
55	05:12	20:18 (20) 06:07	07:02	06:59	07:58	08:28	14:09 (26)
56	21:15	20 20:38 (20) 20:11	18:54	16:43	15:52	15:50	15 14:24 (26)
57	05:14	20:18 (20) 06:08	07:04	07:01	08:00	08:28	14:10 (26)
58	21:14	20 20:38 (20) 20:08	18:51	16:41	15:51	15:51	14 14:24 (26)
59	05:15	20:18 (20) 06:10	07:06	07:03	08:01	08:28	14:11 (26)
60	21:12	19 20:37 (20) 20:06	18:49	16:39	15:51	15:52	13 14:24 (26)
61	05:17	20:19 (20) 06:12	07:05	07:05	08:28	08:28	14:12 (26)
62	21:10	18 20:37 (20) 20:03	18:47	16:37	15:53	15:53	12 14:24 (26)
63	Sonnenscheinstunden	514	461	383	328	257	231
64	astr.max.mögl.Beschattung	665	55	102	105	125	316
65	Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
66	Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90
67	Reduktion Windrichtung	0.63	0.63	0.66	0.70	0.69	0.67
68	Gesamte Reduktion	0.25	0.28	0.24	0.21	0.13	0.08
69	Met.wahrsch.Beschattung	167	15	25	22	16	26

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

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: BZ - IO78

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni			
1	08:28	07:57	06:59	06:43		05:33		04:42	
	15:54	16:46	17:43	19:42		20:39		21:29	
2	08:28	07:55	06:56	06:40	19:13 (18)	05:31		04:41	
	15:55	16:48	17:45	19:44	4 19:17 (18)	20:40		21:31	
3	08:28	07:54	06:54	06:38	19:11 (18)	05:28		04:40	
	15:57	16:50	17:47	19:46	8 19:19 (18)	20:42		21:32	
4	08:27	07:52	06:52	06:35	19:09 (18)	05:26		04:40	
	15:58	16:52	17:49	19:48	11 19:20 (18)	20:44		21:33	
5	08:27	07:50	06:49	06:33	19:09 (18)	05:24		04:39	
	15:59	16:54	17:51	19:50	14 19:23 (18)	20:46		21:34	
6	08:27	07:48	06:47	06:30	19:08 (18)	05:22		04:38	
	16:00	16:56	17:53	19:52	16 19:24 (18)	20:48		21:35	
7	08:26	07:46	06:44	06:28	19:08 (18)	05:20		04:37	
	16:02	16:58	17:55	19:54	16 19:24 (18)	20:50		21:36	
8	08:26	07:44	06:42	06:26	19:09 (18)	05:18		04:37	
	16:03	17:00	17:57	19:55	15 19:24 (18)	20:51		21:37	
9	08:25	07:42	06:40	06:23	19:09 (18)	05:17		04:36	
	16:05	17:02	17:59	19:57	13 19:22 (18)	20:53		21:38	
10	08:24	07:40	06:37	06:21	19:10 (18)	05:15	20:19 (20)	04:36	
	16:06	17:05	18:00	19:59	11 19:21 (18)	20:55	4 20:23 (20)	21:39	
11	08:24	07:38	06:35	06:18	19:12 (18)	05:13	20:16 (20)	04:35	
	16:08	17:07	18:02	20:01	5 19:17 (18)	20:57	9 20:25 (20)	21:40	
12	08:23	07:36	06:32	06:16		05:11	20:15 (20)	04:35	
	16:09	17:09	18:04	20:03		20:58	12 20:27 (20)	21:41	
13	08:22	15:33 (21)	07:34	06:30	06:14	05:09	20:13 (20)	04:34	
	16:11	1 15:34 (21)	17:11	18:06	20:05	21:00	15 20:28 (20)	21:41	
14	08:21	15:33 (21)	07:32	06:27	06:11	05:07	20:12 (20)	04:34	
	16:13	3 15:36 (21)	17:13	18:08	20:07	21:02	17 20:29 (20)	21:42	
15	08:20	15:33 (21)	07:30	16:44 (17)	06:25	06:09	20:12 (20)	04:34	
	16:14	5 15:38 (21)	17:15	1 16:45 (17)	18:10	20:09	21:04	18 20:30 (20)	21:43
16	08:19	15:33 (21)	07:28	16:42 (17)	06:23	06:06	05:04	20:11 (20)	04:34
	16:16	7 15:40 (21)	17:17	5 16:47 (17)	18:12	20:10	21:05	19 20:30 (20)	21:43
17	08:18	15:33 (21)	07:26	16:41 (17)	06:20	06:04	05:02	20:11 (20)	04:34
	16:18	10 15:43 (21)	17:19	9 16:50 (17)	18:14	20:12	21:07	20 20:31 (20)	21:44
18	08:17	15:32 (21)	07:24	16:40 (17)	06:18	06:02	05:01	20:10 (20)	04:33
	16:19	12 15:44 (21)	17:21	11 16:51 (17)	18:16	20:14	21:09	21 20:31 (20)	21:44
19	08:16	15:33 (21)	07:22	16:40 (17)	06:15	05:59	04:59	20:10 (20)	04:33
	16:21	13 15:46 (21)	17:23	14 16:54 (17)	18:18	20:16	21:10	22 20:32 (20)	21:44
20	08:15	15:33 (21)	07:19	16:40 (17)	06:13	05:57	04:58	20:10 (20)	04:34
	16:23	15 15:48 (21)	17:25	16 16:56 (17)	18:20	20:18	21:12	21 20:31 (20)	21:45
21	08:14	15:34 (21)	07:17	16:40 (17)	06:10	05:55	04:56	20:10 (20)	04:34
	16:25	15 15:49 (21)	17:27	16 16:56 (17)	18:22	20:20	21:14	22 20:32 (20)	21:45
22	08:12	15:35 (21)	07:15	16:40 (17)	06:08	05:52	04:55	20:11 (20)	04:34
	16:27	14 15:49 (21)	17:29	15 16:55 (17)	18:23	20:22	21:15	21 20:32 (20)	21:45
23	08:11	15:35 (21)	07:13	16:41 (17)	06:05	05:50	04:53	20:11 (20)	04:34
	16:29	14 15:49 (21)	17:31	13 16:54 (17)	18:25	20:24	21:17	21 20:32 (20)	21:45
24	08:10	15:35 (21)	07:10	16:43 (17)	06:03	05:48	04:52	20:10 (20)	04:34
	16:31	13 15:48 (21)	17:33	10 16:53 (17)	18:27	20:25	21:18	24 20:44 (1)	21:46
25	08:08	15:37 (21)	07:08	16:45 (17)	06:00	05:46	04:50	20:11 (20)	04:35
	16:32	11 15:48 (21)	17:35	5 16:50 (17)	18:29	20:27	21:20	26 20:46 (1)	21:46
26	08:07	15:38 (21)	07:06	05:58	05:43		04:49	20:12 (20)	04:35
	16:34	8 15:46 (21)	17:37	18:31	20:29		21:21	27 20:47 (1)	21:46
27	08:05	15:41 (21)	07:03	05:55	05:41		04:48	20:12 (20)	04:36
	16:36	2 15:43 (21)	17:39	18:33	20:31		21:23	29 20:48 (1)	21:45
28	08:04		07:01	05:53	05:39		04:47	20:13 (20)	04:36
	16:38		17:41	18:35	20:33		21:24	30 20:50 (1)	21:45
29	08:02			06:50	05:37		04:45	20:13 (20)	04:37
	16:40			19:37	20:35		21:26	30 20:51 (1)	21:45
30	08:00			06:48	05:35		04:44	20:14 (20)	04:37
	16:42			19:38	20:37		21:27	31 20:52 (1)	21:45
31	07:59			06:45			04:43	20:14 (20)	
	16:44			19:40			21:28	31 20:53 (1)	
Sonnenscheinstunden	248	272	367	421	496			512	
astr.max.mögl.Beschattung	143	115		113		470		662	
Red.Sonnenscheinwahrsch.	0.17	0.24		0.41		0.51		0.45	
Reduktion Betriebsdauer	0.90	0.90		0.90		0.90		0.90	
Reduktion Windrichtung	0.69	0.70		0.66		0.63		0.62	
Gesamte Reduktion	0.11	0.15		0.25		0.29		0.25	
Met.wahrsch.Beschattung	16	17		28		136		168	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: BZ - IO78  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember		
1	04:38	20:43 (1) 05:19	20:26 (20) 06:14	19:12 (18) 07:08	07:07	08:03		
	21:44	21:04 (1) 21:09	20:37 (20) 20:01	19:17 (18) 18:46	16:35	15:50		
2	04:39	20:42 (1) 05:20	20:27 (20) 06:16	19:08 (18) 07:10	07:09	08:05		
	21:44	21:03 (1) 21:07	20:35 (20) 19:59	19:19 (18) 18:44	16:33	15:49		
3	04:40	20:43 (1) 05:22	06:17	19:07 (18) 07:12	07:11	08:06		
	21:44	21:03 (1) 21:05	19:56	19:20 (18) 18:41	16:31	15:48		
4	04:40	20:43 (1) 05:24	06:19	19:06 (18) 07:14	07:13	08:08		
	21:43	21:04 (1) 21:03	19:54	19:21 (18) 18:39	16:29	15:47		
5	04:41	20:43 (1) 05:25	06:21	19:04 (18) 07:15	07:15	08:09		
	21:43	21:04 (1) 21:01	19:51	19:20 (18) 18:37	16:27	15:47		
6	04:42	20:44 (1) 05:27	06:23	19:04 (18) 07:17	07:17	08:10		
	21:42	21:04 (1) 20:59	19:49	19:20 (18) 18:34	16:25	15:46		
7	04:43	20:29 (20) 05:29	06:25	19:04 (18) 07:19	07:19	08:12		
	21:41	21:05 (1) 20:57	19:46	19:18 (18) 18:32	16:23	15:46		
8	04:44	20:27 (20) 05:31	06:26	19:05 (18) 07:21	07:21	08:13		
	21:41	21:05 (1) 20:55	19:44	19:16 (18) 18:29	16:21	15:45		
9	04:45	20:26 (20) 05:32	06:28	19:04 (18) 07:23	07:23	08:14		
	21:40	21:05 (1) 20:53	19:41	9 19:13 (18) 18:27	16:19	15:45		
10	04:46	20:25 (20) 05:34	06:30	19:06 (18) 07:25	07:25	08:16		
	21:39	21:04 (1) 20:51	19:39	4 19:10 (18) 18:24	16:18	15:45		
11	04:48	20:24 (20) 05:36	06:32	07:27	07:27	08:17		
	21:38	21:03 (1) 20:49	19:36	18:22	16:16	15:44		
12	04:49	20:23 (20) 05:38	06:34	07:28	07:29	08:18		
	21:37	21:02 (1) 20:47	19:34	18:20	16:14	15:44		
13	04:50	20:23 (20) 05:40	06:35	07:30	07:31	08:19		
	21:36	21:01 (1) 20:45	19:31	18:17	16:13	15:44		
14	04:51	20:22 (20) 05:41	06:37	07:32	07:33	08:20		
	21:35	21:00 (1) 20:43	19:29	18:15	16:11	15:44		
15	04:52	20:21 (20) 05:43	06:39	07:34	07:35	08:21		
	21:34	20:59 (1) 20:40	19:26	18:12	16:09	3 15:17 (21) 15:44	4 14:00 (26)	
16	04:54	20:22 (20) 05:45	06:41	07:36	07:36	15:11 (21) 08:22	14:00 (26)	
	21:33	20:59 (1) 20:38	19:24	18:10	16:08	8 15:19 (21) 15:44	6 14:06 (26)	
17	04:55	20:21 (20) 05:47	06:43	07:38	07:38	15:10 (21) 08:23	14:00 (26)	
	21:32	20:57 (1) 20:36	19:21	18:08	7 17:23 (17) 16:06	11 15:21 (21) 15:44	7 14:07 (26)	
18	04:57	20:21 (20) 05:49	06:44	07:40	07:40	17:13 (17) 07:40	15:09 (21) 08:23	14:00 (26)
	21:30	20:56 (1) 20:34	19:19	18:05	12 17:25 (17) 16:05	13 15:22 (21) 15:44	8 14:08 (26)	
19	04:58	20:20 (20) 05:50	06:46	07:42	07:42	17:12 (17) 07:42	15:09 (21) 08:24	14:00 (26)
	21:29	20:54 (1) 20:31	19:16	18:03	14 17:26 (17) 16:03	14 15:23 (21) 15:45	9 14:09 (26)	
20	04:59	20:21 (20) 05:52	06:48	07:44	07:44	17:11 (17) 07:44	15:09 (21) 08:25	14:00 (26)
	21:28	20:54 (1) 20:29	19:14	18:01	15 17:26 (17) 16:02	14 15:23 (21) 15:45	9 14:09 (26)	
21	05:01	20:20 (20) 05:54	06:50	07:46	07:46	17:11 (17) 07:46	15:09 (21) 08:25	14:01 (26)
	21:26	20:41 (20) 20:27	19:11	17:59	15 17:26 (17) 16:01	15 15:24 (21) 15:45	9 14:10 (26)	
22	05:02	20:21 (20) 05:56	06:52	07:48	07:48	17:10 (17) 07:48	15:10 (21) 08:26	14:01 (26)
	21:25	20:42 (20) 20:25	19:09	17:56	16 17:26 (17) 15:59	15 15:25 (21) 15:46	9 14:10 (26)	
23	05:04	20:20 (20) 05:58	06:53	07:50	07:50	17:10 (17) 07:49	15:09 (21) 08:26	14:02 (26)
	21:23	20:42 (20) 20:22	19:06	17:54	14 17:24 (17) 15:58	13 15:22 (21) 15:46	9 14:11 (26)	
24	05:06	20:20 (20) 05:59	06:55	07:51	07:51	17:10 (17) 07:51	15:09 (21) 08:27	14:02 (26)
	21:22	20:41 (20) 20:20	19:04	17:52	11 17:21 (17) 15:57	12 15:21 (21) 15:47	9 14:11 (26)	
25	05:07	20:21 (20) 06:01	06:57	07:53	07:53	16:11 (17) 07:53	15:10 (21) 08:27	14:03 (26)
	21:20	20:42 (20) 20:18	19:01	16:50	8 16:19 (17) 15:56	10 15:20 (21) 15:48	8 14:11 (26)	
26	05:09	20:21 (20) 06:03	06:59	07:55	07:55	16:12 (17) 07:55	15:11 (21) 08:28	14:03 (26)
	21:19	20:41 (20) 20:15	18:59	16:47	4 16:16 (17) 15:54	7 15:18 (21) 15:48	8 14:11 (26)	
27	05:10	20:21 (20) 06:05	07:01	07:57	07:57	15:12 (21) 08:28	14:04 (26)	
	21:17	20:41 (20) 20:13	18:56	16:45	5 15:17 (21) 15:49	7 14:11 (26)		
28	05:12	20:21 (20) 06:07	07:02	07:59	07:58	15:13 (21) 08:28	14:06 (26)	
	21:15	20:41 (20) 20:11	18:54	16:43	15:52	3 15:16 (21) 15:50	4 14:10 (26)	
29	05:14	20:22 (20) 06:08	07:04	08:00	08:00	15:14 (21) 08:28		
	21:14	20:40 (20) 20:08	18:51	16:41	15:51	1 15:15 (21) 15:51		
30	05:15	20:23 (20) 06:10	07:06	08:01	08:01	15:15 (21) 08:28		
	21:12	20:39 (20) 20:06	18:49	16:39	15:51			
31	05:17	20:24 (20) 06:12	07:05	08:05				
	21:10	20:38 (20) 20:03		16:37				
Sonnenscheinstunden	514	461	383	328	257	231		
astr.max.mögl.Beschattung	734	19	114	116	144	106		
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14		
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90		
Reduktion Windrichtung	0.63	0.63	0.66	0.70	0.69	0.66		
Gesamte Reduktion	0.25	0.28	0.24	0.21	0.13	0.08		
Met.wahrsch.Beschattung	184	5	28	24	19	9		

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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: CA - IO79

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28	07:57	06:59	06:43	05:33	04:42	20:17 (20)
	15:54	16:46	17:43	19:42	20:39	21:29	31 20:54 (1)
2	08:28	07:55	06:56	06:40	05:31	04:41	20:18 (20)
	15:55	16:48	17:45	19:44	20:40	21:31	32 20:56 (1)
3	08:28	07:54	06:54	06:38	19:15 (18) 05:28	04:40	20:19 (20)
	15:57	16:50	17:47	19:46	4 19:19 (18) 20:42	21:32	33 20:57 (1)
4	08:27	07:52	06:52	06:35	19:13 (18) 05:26	20:13 (19) 04:40	20:19 (20)
	15:58	16:52	17:49	19:48	7 19:20 (18) 20:44	1 20:14 (19) 21:33	34 20:58 (1)
5	08:27	07:50	06:49	06:33	19:12 (18) 05:24	20:12 (19) 04:39	20:19 (20)
	15:59	16:54	17:51	19:50	11 19:23 (18) 20:46	3 20:15 (19) 21:34	34 20:58 (1)
6	08:27	07:48	06:47	06:30	19:10 (18) 05:22	20:11 (19) 04:38	20:20 (20)
	16:00	16:56	17:53	19:52	14 19:24 (18) 20:48	6 20:17 (19) 21:35	34 21:00 (1)
7	08:26	07:46	06:44	06:28	19:10 (18) 05:20	20:10 (19) 04:37	20:20 (20)
	16:02	16:58	17:55	19:54	16 19:26 (18) 20:50	8 20:18 (19) 21:36	35 21:00 (1)
8	08:26	07:44	06:42	06:26	19:10 (18) 05:18	20:10 (19) 04:37	20:21 (20)
	16:03	17:00	17:57	19:55	17 19:27 (18) 20:51	10 20:20 (19) 21:37	35 21:02 (1)
9	08:25	07:42	06:40	06:23	19:10 (18) 05:17	20:10 (19) 04:36	20:21 (20)
	16:05	17:02	17:59	19:57	15 19:25 (18) 20:53	12 20:22 (19) 21:38	35 21:02 (1)
10	08:24	07:40	06:37	06:21	19:10 (18) 05:15	20:10 (19) 04:36	20:22 (20)
	16:06	17:05	18:00	19:59	15 19:25 (18) 20:55	14 20:24 (19) 21:39	36 21:03 (1)
11	08:24	07:38	06:35	06:18	19:10 (18) 05:13	20:10 (19) 04:35	20:23 (20)
	16:08	2 15:31 (21) 17:07	18:02	20:01	13 19:23 (18) 20:57	14 20:24 (19) 21:40	35 21:04 (1)
12	08:23	15:28 (21) 07:36	06:32	06:16	19:12 (18) 05:11	20:11 (19) 04:35	20:22 (20)
	16:09	4 15:32 (21) 17:09	18:04	20:03	10 19:22 (18) 20:58	13 20:24 (19) 21:41	36 21:04 (1)
13	08:22	15:28 (21) 07:34	06:30	06:14	19:16 (18) 05:09	20:12 (19) 04:34	20:23 (20)
	16:11	6 15:34 (21) 17:11	18:06	20:05	2 19:18 (18) 21:00	11 20:23 (19) 21:41	34 21:04 (1)
14	08:21	15:28 (21) 07:32	06:27	06:11	05:07	20:13 (19) 04:34	20:24 (20)
	16:13	8 15:36 (21) 17:13	18:08	20:07	21:02	8 20:21 (19) 21:42	34 21:05 (1)
15	08:20	15:29 (21) 07:30	16:42 (17) 06:25	06:09	05:06	20:15 (19) 04:34	20:24 (20)
	16:14	9 15:38 (21) 17:15	3 16:45 (17) 18:10	20:09	21:04	15 20:32 (20) 21:43	34 21:05 (1)
16	08:19	15:29 (21) 07:28	16:41 (17) 06:23	06:06	05:04	20:20 (20) 04:34	20:25 (20)
	16:16	11 15:40 (21) 17:17	6 16:47 (17) 18:12	20:10	21:05	13 20:33 (20) 21:43	33 21:06 (1)
17	08:18	15:29 (21) 07:26	16:40 (17) 06:20	06:04	05:02	20:19 (20) 04:34	20:25 (20)
	16:18	14 15:43 (21) 17:19	10 16:50 (17) 18:14	20:12	21:07	16 20:35 (20) 21:44	33 21:06 (1)
18	08:17	15:29 (21) 07:24	16:38 (17) 06:18	06:02	05:01	20:18 (20) 04:33	20:26 (20)
	16:19	15 15:44 (21) 17:21	13 16:51 (17) 18:16	20:14	21:09	17 20:35 (20) 21:44	32 21:06 (1)
19	08:16	15:30 (21) 07:22	16:38 (17) 06:15	05:59	04:59	20:18 (20) 04:33	20:26 (20)
	16:21	15 15:45 (21) 17:23	16 16:54 (17) 18:18	20:16	21:10	18 20:36 (20) 21:44	32 21:06 (1)
20	08:15	15:30 (21) 07:19	16:38 (17) 06:13	05:57	04:58	20:17 (20) 04:34	20:26 (20)
	16:23	15 15:45 (21) 17:25	17 16:55 (17) 18:20	20:18	21:12	19 20:36 (20) 21:45	32 21:06 (1)
21	08:14	15:31 (21) 07:17	16:39 (17) 06:10	05:55	04:56	20:17 (20) 04:34	20:26 (20)
	16:25	14 15:45 (21) 17:27	16 16:55 (17) 18:22	20:20	21:14	20 20:37 (20) 21:45	32 21:06 (1)
22	08:12	15:32 (21) 07:15	16:39 (17) 06:08	05:52	04:55	20:17 (20) 04:34	20:26 (20)
	16:27	14 15:46 (21) 17:29	15 16:54 (17) 18:23	20:22	21:15	21 20:38 (20) 21:45	32 21:06 (1)
23	08:11	15:32 (21) 07:13	16:40 (17) 06:05	05:50	04:53	20:17 (20) 04:34	20:27 (20)
	16:29	13 15:45 (21) 17:31	13 16:53 (17) 18:25	20:24	21:17	21 20:38 (20) 21:45	32 21:07 (1)
24	08:10	15:33 (21) 07:10	16:41 (17) 06:03	05:48	04:52	20:16 (20) 04:34	20:27 (20)
	16:31	11 15:44 (21) 17:33	11 16:52 (17) 18:27	20:25	21:18	22 20:38 (20) 21:46	32 21:07 (1)
25	08:08	15:35 (21) 07:08	16:43 (17) 06:00	05:46	04:50	20:16 (20) 04:35	20:27 (20)
	16:32	9 15:44 (21) 17:35	6 16:49 (17) 18:29	20:27	21:20	22 20:38 (20) 21:46	32 21:07 (1)
26	08:07	15:37 (21) 07:06	05:58	05:43	04:49	20:16 (20) 04:35	20:27 (20)
	16:34	4 15:41 (21) 17:37	18:31	20:29	21:21	22 20:38 (20) 21:46	33 21:08 (1)
27	08:05	07:03	05:55	05:41	04:48	20:16 (20) 04:36	20:27 (20)
	16:36	17:39	18:33	20:31	21:23	22 20:38 (20) 21:45	33 21:07 (1)
28	08:04	07:01	05:53	05:39	04:47	20:16 (20) 04:36	20:27 (20)
	16:38	17:41	18:35	20:33	21:24	25 20:50 (1) 21:45	34 21:08 (1)
29	08:02		06:50	05:37	04:45	20:17 (20) 04:37	20:26 (20)
	16:40		19:37	20:35	21:26	26 20:51 (1) 21:45	35 21:08 (1)
30	08:00		06:48	05:35	04:44	20:17 (20) 04:37	20:27 (20)
	16:42		19:38	20:37	21:27	28 20:52 (1) 21:45	35 21:08 (1)
31	07:59		06:45		04:43	20:17 (20)	
	16:44		19:40		21:28	29 20:53 (1)	
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung	164	126		124	456		1004
Red.Sonnenscheinwahrsch.	0.17	0.24		0.41	0.51		0.45
Reduktion Betriebsdauer	0.90	0.90		0.90	0.90		0.90
Reduktion Windrichtung	0.68	0.70		0.66	0.63		0.62
Gesamte Reduktion	0.11	0.15		0.25	0.29		0.25
Met.wahrsch.Beschattung	18	19		30	132		255

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CA - IO79  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1   04:38	20:27 (20)   05:19		20:22 (19)   06:14	19:10 (18)   07:08	07:07	08:03
21:44	36 21:09 (1)   21:09	12	20:34 (19)   20:01	19:23 (18)   18:46	16:35	15:50
2   04:39	20:26 (20)   05:20		20:20 (19)   06:16	19:08 (18)   07:10	07:09	08:05
21:44	35 21:07 (1)   21:07	14	20:34 (19)   19:59	19:23 (18)   18:44	16:33	15:49
3   04:40	20:26 (20)   05:22		20:21 (19)   06:17	19:08 (18)   07:12	07:11	08:06
21:44	36 21:07 (1)   21:05	12	20:33 (19)   19:56	19:23 (18)   18:41	16:31	15:48
4   04:40	20:26 (20)   05:24		20:20 (19)   06:19	19:07 (18)   07:14	07:13	08:08
21:43	35 21:07 (1)   21:03	11	20:31 (19)   19:54	19:24 (18)   18:39	16:29	15:47
5   04:41	20:26 (20)   05:25		20:20 (19)   06:21	19:06 (18)   07:15	07:15	08:09
21:43	36 21:07 (1)   21:01	10	20:30 (19)   19:51	19:22 (18)   18:37	16:27	15:47
6   04:42	20:26 (20)   05:27		20:21 (19)   06:23	19:06 (18)   07:17	07:17	08:10
21:42	34 21:06 (1)   20:59	7	20:28 (19)   19:49	19:20 (18)   18:34	16:25	15:46
7   04:43	20:26 (20)   05:29		20:20 (19)   06:25	19:07 (18)   07:19	07:19	08:12
21:41	35 21:06 (1)   20:57	6	20:26 (19)   19:46	19:18 (18)   18:32	16:23	15:46
8   04:44	20:26 (20)   05:31		20:22 (19)   06:26	19:08 (18)   07:21	07:21	08:13
21:41	34 21:05 (1)   20:55	2	20:24 (19)   19:44	19:16 (18)   18:29	16:21	15:45
9   04:45	20:26 (20)   05:32		06:28	19:08 (18)   07:23	07:23	08:14
21:40	34 21:05 (1)   20:53		19:41	19:13 (18)   18:27	16:19	15:45
10   04:46	20:26 (20)   05:34		06:30	07:25	07:25	08:16
21:39	32 21:04 (1)   20:51		19:39	18:24	16:18	15:45
11   04:48	20:26 (20)   05:36		06:32	07:27	07:27	08:17
21:38	32 21:03 (1)   20:49		19:36	18:22	16:16	15:44
12   04:49	20:26 (20)   05:38		06:34	07:28	07:29	08:18
21:37	30 21:02 (1)   20:47		19:34	18:20	16:14	15:44
13   04:50	20:25 (20)   05:40		06:35	07:30	07:31	08:19
21:36	29 21:01 (1)   20:45		19:31	18:17	16:13	15:44
14   04:51	20:25 (20)   05:41		06:37	07:32	07:33	08:20
21:35	27 21:00 (1)   20:43		19:29	18:15	16:11	15:44
15   04:52	20:25 (20)   05:43		06:39	07:34	07:35	08:21
21:34	25 20:59 (1)   20:40		19:26	18:12	16:09	15:44
16   04:54	20:26 (20)   05:45		06:41	07:36	07:36	08:22
21:33	22 20:48 (20)   20:38		19:24	18:10	16:08	15:44
17   04:55	20:26 (20)   05:47		06:43	07:38	07:38	08:23
21:32	22 20:48 (20)   20:36		19:21	18:08	16:06	15:44
18   04:57	20:25 (20)   05:49		06:44	07:40	17:12 (17)   07:40	15:07 (21)   08:23
21:30	23 20:48 (20)   20:34		19:19	18:05	16:05	15:18 (21)   15:44
19   04:58	20:25 (20)   05:50		06:46	07:42	17:11 (17)   07:42	15:06 (21)   08:24
21:29	22 20:47 (20)   20:31		19:16	18:03	16:03	15:19 (21)   15:45
20   04:59	20:26 (20)   05:52		06:48	07:44	17:10 (17)   07:44	15:06 (21)   08:25
21:28	22 20:48 (20)   20:29		19:14	18:01	16:02	15:20 (21)   15:45
21   05:01	20:26 (20)   05:54		06:50	07:46	17:09 (17)   07:46	15:06 (21)   08:25
21:26	21 20:47 (20)   20:27		19:11	17:59	16:01	15:20 (21)   15:45
22   05:02	20:27 (20)   05:56		06:52	07:48	17:09 (17)   07:48	15:07 (21)   08:26
21:25	21 20:48 (20)   20:25		19:09	17:56	16:01	15:22 (21)   15:46
23   05:04	20:27 (20)   05:58		06:53	07:50	17:09 (17)   07:49	15:06 (21)   08:26
21:23	20 20:47 (20)   20:22		19:06	17:54	16:01	15:21 (21)   15:46
24   05:06	20:27 (20)   05:59		06:55	07:51	17:09 (17)   07:51	15:06 (21)   08:27
21:22	19 20:46 (20)   20:20		19:04	17:52	16:01	15:21 (21)   15:47
25   05:07	20:28 (20)   06:01		06:57	07:53	16:09 (17)   07:53	15:06 (21)   08:27
21:20	18 20:46 (20)   20:18		19:01	16:50	16:19 (17)   15:56	15:20 (21)   15:48
26   05:09	20:29 (20)   06:03		06:59	07:55	16:10 (17)   07:55	15:07 (21)   08:28
21:19	16 20:45 (20)   20:15		18:59	16:47	16:16 (17)   15:54	15:18 (21)   15:48
27   05:10	20:30 (20)   06:05		07:01	07:57	16:12 (17)   07:56	15:08 (21)   08:28
21:17	14 20:44 (20)   20:13		18:56	16:45	16:14 (17)   15:53	15:17 (21)   15:49
28   05:12	20:31 (20)   06:07		07:02	07:59	16:14 (17)   07:58	15:09 (21)   08:28
21:15	11 20:42 (20)   20:11		18:54	16:43	16:15 (17)   15:52	15:16 (21)   15:50
29   05:14	20:24 (19)   06:08		07:04	08:00	16:16 (17)   15:54	15:18 (21)   15:51
21:14	14 20:41 (20)   20:08		18:51	16:41	16:17 (17)   15:53	15:17 (21)   15:51
30   05:15	20:22 (19)   06:10		07:06	08:01	16:18 (17)   15:55	15:19 (21)   15:52
21:12	10 20:32 (19)   20:06	3	19:15 (18)   18:49	16:39	16:19 (17)   15:56	15:20 (21)   15:52
31   05:17	20:22 (19)   06:12		07:05	08:02	16:20 (17)   15:57	15:21 (21)   15:53
21:10	11 20:33 (19)   20:03	10	19:22 (18)	16:37	16:21 (17)   15:58	15:22 (21)   15:54
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	776	87	114	126	161	2
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90
Reduktion Windrichtung	0.62	0.64	0.66	0.70	0.68	0.68
Gesamte Reduktion	0.25	0.28	0.24	0.21	0.13	0.09
Met.wahrsch.Beschattung	194	24	27	26	21	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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CB - IO80  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1   08:28	14:08 (26)   07:57	15:50 (21)   06:59	16:53 (17)   06:43	05:33	04:42	20:28 (20)		
15:54	20 14:28 (26)   16:46	6 15:56 (21)   17:43	13 17:06 (17)   19:42	20:39	21:29	21:29 (20)		
2   08:28	14:08 (26)   07:55	06:56	16:54 (17)   06:40	05:31	04:41	20:29 (20)		
15:55	20 14:28 (26)   16:48	17:45	9 17:03 (17)   19:44	20:40	21:31	21:31 (20)		
3   08:28	14:10 (26)   07:54	06:54	06:38	05:28	04:40	20:29 (20)		
15:57	18 14:28 (26)   16:50	17:47	19:46	20:42	21:32	21:32 (20)		
4   08:27	14:11 (26)   07:52	06:52	06:35	05:26	04:40	20:29 (20)		
15:58	18 14:29 (26)   16:52	17:49	19:48	20:44	21:33	21:33 (20)		
5   08:27	14:12 (26)   07:50	06:49	06:33	05:24	04:39	20:29 (20)		
15:59	16 14:28 (26)   16:54	17:51	19:50	20:46	21:34	21:34 (20)		
6   08:27	14:12 (26)   07:48	06:47	06:30	05:22	04:38	20:30 (20)		
16:00	15 14:27 (26)   16:56	17:53	19:52	20:48	21:35	21:35 (20)		
7   08:26	14:14 (26)   07:46	06:44	06:28	05:20	04:37	20:29 (20)		
16:02	14 14:28 (26)   16:58	17:55	19:54	20:50	21:36	21:36 (20)		
8   08:26	14:16 (26)   07:44	06:42	06:26	05:18	04:37	20:30 (20)		
16:03	11 14:27 (26)   17:00	17:57	19:55	3 19:28 (18)   20:51	21:37	21:37 (20)		
9   08:25	14:18 (26)   07:42	06:40	06:23	05:17	04:36	20:30 (20)		
16:05	7 14:25 (26)   17:02	17:59	19:57	8 19:30 (18)   20:53	21:38	21:38 (20)		
10   08:24	07:40	06:37	06:21	05:15	04:36	20:30 (20)		
16:06	17:05	18:00	19:59	10 19:32 (18)   20:55	21:39	21:39 (20)		
11   08:24	07:38	06:35	06:18	05:13	04:35	20:31 (20)		
16:08	17:07	18:02	20:01	13 19:33 (18)   20:57	21:40	21:40 (20)		
12   08:23	07:36	06:32	06:16	05:11	04:35	20:31 (20)		
16:09	17:09	18:04	20:03	15 19:35 (18)   20:58	21:41	21:41 (20)		
13   08:22	07:34	06:30	06:14	05:09	04:34	20:31 (20)		
16:11	17:11	18:06	20:05	16 19:36 (18)   21:00	21:41	21:41 (20)		
14   08:21	07:32	06:27	06:11	05:07	04:34	20:32 (20)		
16:13	17:13	18:08	20:07	16 19:35 (18)   21:02	21:42	21:42 (20)		
15   08:20	07:30	06:25	06:09	05:06	04:34	20:32 (20)		
16:14	17:15	18:10	20:09	14 19:34 (18)   21:04	21:43	21:43 (20)		
16   08:19	07:28	06:23	06:06	05:04	04:34	20:32 (20)		
16:16	17:17	18:12	20:10	12 19:33 (18)   21:05	21:43	21:43 (20)		
17   08:18	07:26	06:20	06:04	05:02	04:34	20:33 (20)		
16:18	17:19	18:14	20:12	8 19:30 (18)   21:07	21:44	21:44 (20)		
18   08:17	07:24	06:18	06:02	05:01	04:33	20:33 (20)		
16:19	17:21	18:16	20:14	21:09	21:44	21:44 (20)		
19   08:16	15:45 (21)   07:22	06:15	05:59	04:59	04:33	20:33 (20)		
16:21	1 15:46 (21)   17:23	18:18	20:16	21:10	21:44	21:44 (20)		
20   08:15	15:44 (21)   07:19	06:13	05:57	04:58	04:34	20:33 (20)		
16:23	4 15:48 (21)   17:25	18:20	20:18	21:12	21:45	21:45 (20)		
21   08:14	15:44 (21)   07:17	06:10	05:55	04:56	20:34 (20)   04:34	20:33 (20)		
16:25	6 15:50 (21)   17:27	3 16:59 (17)   18:22	20:20	21:14	6 20:40 (20)   21:45	33 21:08 (1)		
22   08:12	15:43 (21)   07:15	06:08	05:52	04:55	20:33 (20)   04:34	20:33 (20)		
16:27	9 15:52 (21)   17:29	7 17:00 (17)   18:23	20:22	21:15	9 20:42 (20)   21:45	33 21:08 (1)		
23   08:11	15:44 (21)   07:13	06:05	05:50	04:53	20:32 (20)   04:34	20:34 (20)		
16:29	10 15:54 (21)   17:31	11 17:03 (17)   18:25	20:24	21:17	12 20:44 (20)   21:45	33 21:09 (1)		
24   08:10	15:43 (21)   07:10	06:03	05:48	04:52	20:30 (20)   04:34	20:34 (20)		
16:31	13 15:56 (21)   17:33	13 17:05 (17)   18:27	20:25	21:18	14 20:44 (20)   21:46	33 21:09 (1)		
25   08:08	15:44 (21)   07:08	06:00	05:46	04:50	20:30 (20)   04:35	20:34 (20)		
16:32	15 15:59 (21)   17:35	16 17:07 (17)   18:29	20:27	21:20	16 20:46 (20)   21:46	33 21:09 (1)		
26   08:07	15:44 (21)   07:06	05:58	05:43	04:49	20:29 (20)   04:35	20:35 (20)		
16:34	16 16:00 (21)   17:37	17 17:08 (17)   18:31	20:29	21:21	18 20:47 (20)   21:46	32 21:09 (1)		
27   08:05	15:44 (21)   07:03	05:55	05:41	04:48	20:29 (20)   04:36	20:34 (20)		
16:36	15 15:59 (21)   17:39	16 17:07 (17)   18:33	20:31	21:23	19 20:48 (20)   21:45	33 21:09 (1)		
28   08:04	15:45 (21)   07:01	05:53	05:39	04:47	20:29 (20)   04:36	20:35 (20)		
16:38	15 16:00 (21)   17:41	14 17:06 (17)   18:35	20:33	21:24	19 20:48 (20)   21:45	31 21:09 (1)		
29   08:02	15:46 (21)   07:00	05:50	05:37	04:45	20:29 (20)   04:37	20:34 (20)		
16:40	14 16:00 (21)   17:40	19:37	20:35	21:26	19 20:48 (20)   21:45	32 21:08 (1)		
30   08:00	15:47 (21)   07:00	05:48	05:35	04:44	20:29 (20)   04:37	20:35 (20)		
16:42	12 15:59 (21)   17:42	19:38	20:37	21:27	20 20:49 (20)   21:45	31 21:08 (1)		
31   07:59	15:48 (21)   07:00	05:45	05:33	04:43	20:29 (20)   04:37	20:35 (20)		
16:44	10 15:58 (21)   17:44	19:40	20:38	21:28	20 20:49 (20)   21:45	31 21:08 (1)		
Sonnenscheinstunden   248	272	367	421	496	512	899		
astr.max.mögl.Beschattung   279	103	22	115	172	899	899		
Red.Sonnenscheinwahrsch.   0.17	0.24	0.31	0.41	0.51	0.45	0.45		
Reduktion Betriebsdauer   0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Reduktion Windrichtung   0.68	0.69	0.69	0.65	0.62	0.62	0.62		
Gesamte Reduktion   0.11	0.15	0.20	0.24	0.29	0.25	0.25		
Met.wahrsch.Beschattung   30	16	4	28	50	229	229		

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CB - IO80  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	20:35 (20) 05:19	06:14	19:20 (18) 07:08	07:07	08:03	
	21:44	31 21:09 (1) 21:08	20:01	13 19:33 (18) 18:46	16:35	15:50	
2	04:39	20:35 (20) 05:20	06:16	19:20 (18) 07:10	07:09	08:05	
	21:44	29 21:07 (1) 21:07	19:59	10 19:30 (18) 18:44	16:33	15:49	
3	04:40	20:35 (20) 05:22	06:17	19:20 (18) 07:12	07:11	08:06	14:02 (26)
	21:44	30 21:07 (1) 21:05	19:56	8 19:28 (18) 18:41	16:31	15:48	7 14:09 (26)
4	04:40	20:35 (20) 05:24	06:19	19:22 (18) 07:14	07:13	08:08	14:00 (26)
	21:43	29 21:07 (1) 21:03	19:54	3 19:25 (18) 18:39	16:29	15:47	11 14:11 (26)
5	04:41	20:36 (20) 05:25	06:21	07:15	07:15	08:09	14:00 (26)
	21:43	27 21:07 (1) 21:01	19:51	18:37	16:27	15:47	13 14:13 (26)
6	04:42	20:36 (20) 05:27	06:23	07:17	07:17	08:10	13:59 (26)
	21:42	26 21:06 (1) 20:59	19:49	18:34	16:25	15:46	14 14:13 (26)
7	04:43	20:36 (20) 05:29	06:25	07:19	07:19	08:12	13:59 (26)
	21:41	26 21:06 (1) 20:57	19:46	18:32	16:23	15:46	16 14:15 (26)
8	04:44	20:36 (20) 05:31	06:26	07:21	07:21	08:13	13:58 (26)
	21:41	24 21:05 (1) 20:55	19:44	18:29	16:21	15:45	18 14:16 (26)
9	04:45	20:37 (20) 05:32	06:28	07:23	07:23	08:14	13:59 (26)
	21:40	21 21:05 (1) 20:53	19:41	18:27	16:19	15:45	18 14:17 (26)
10	04:46	20:37 (20) 05:34	06:30	07:25	07:25	08:16	13:59 (26)
	21:39	21 20:58 (20) 20:51	19:39	18:24	16:18	6 15:27 (21) 15:45	19 14:18 (26)
11	04:48	20:37 (20) 05:36	06:32	07:27	7 17:29 (17) 07:27	15:20 (21) 08:17	13:58 (26)
	21:38	21 20:58 (20) 20:49	19:36	18:22	7 17:36 (17) 16:16	10 15:30 (21) 15:44	20 14:18 (26)
12	04:49	20:37 (20) 05:38	06:34	07:28	17:27 (17) 07:29	15:19 (21) 08:18	13:58 (26)
	21:37	20 20:57 (20) 20:47	19:34	18:20	11 17:38 (17) 16:14	12 15:31 (21) 15:44	21 14:19 (26)
13	04:50	20:37 (20) 05:40	06:35	07:30	17:25 (17) 07:31	15:18 (21) 08:19	13:58 (26)
	21:36	20 20:57 (20) 20:45	19:31	18:17	14 17:39 (17) 16:13	13 15:31 (21) 15:44	21 14:19 (26)
14	04:51	20:37 (20) 05:41	06:37	07:32	17:24 (17) 07:33	15:17 (21) 08:20	13:59 (26)
	21:35	20 20:57 (20) 20:43	19:29	18:15	16 17:40 (17) 16:11	15 15:32 (21) 15:44	21 14:20 (26)
15	04:53	20:37 (20) 05:43	06:39	07:34	17:24 (17) 07:35	15:17 (21) 08:21	13:59 (26)
	21:34	20 20:57 (20) 20:40	19:26	18:12	16 17:40 (17) 16:09	15 15:32 (21) 15:44	22 14:21 (26)
16	04:54	20:39 (20) 05:45	06:41	07:36	17:23 (17) 07:36	15:17 (21) 08:22	13:59 (26)
	21:33	18 20:57 (20) 20:38	19:24	18:10	17 17:40 (17) 16:08	16 15:33 (21) 15:44	22 14:21 (26)
17	04:55	20:39 (20) 05:47	06:43	07:38	17:23 (17) 07:38	15:17 (21) 08:23	14:00 (26)
	21:32	18 20:57 (20) 20:36	19:21	18:08	15 17:38 (17) 16:06	15 15:32 (21) 15:44	22 14:22 (26)
18	04:57	20:39 (20) 05:49	06:44	07:40	17:23 (17) 07:40	15:17 (21) 08:23	14:00 (26)
	21:30	17 20:56 (20) 20:34	19:19	18:05	13 17:36 (17) 16:05	13 15:30 (21) 15:44	23 14:23 (26)
19	04:58	20:39 (20) 05:50	06:46	07:42	17:24 (17) 07:42	15:18 (21) 08:24	14:01 (26)
	21:29	15 20:54 (20) 20:31	19:16	18:03	9 17:33 (17) 16:03	10 15:28 (21) 15:45	23 14:24 (26)
20	04:59	20:41 (20) 05:52	06:48	07:44	17:25 (17) 07:44	15:18 (21) 08:25	14:01 (26)
	21:28	13 20:54 (20) 20:29	19:14	18:01	6 17:31 (17) 16:02	9 15:27 (21) 15:45	23 14:24 (26)
21	05:01	20:42 (20) 05:54	06:50	07:46	17:27 (17) 07:46	15:19 (21) 08:25	14:02 (26)
	21:26	10 20:52 (20) 20:27	19:11	17:59	1 17:28 (17) 16:01	6 15:25 (21) 15:45	23 14:25 (26)
22	05:02	20:44 (20) 05:56	06:52	07:48	07:48	15:20 (21) 08:26	14:02 (26)
	21:25	8 20:52 (20) 20:25	19:09	17:56	15:59	4 15:24 (21) 15:46	23 14:25 (26)
23	05:04	20:45 (20) 05:58	06:53	07:49	07:49	15:21 (21) 08:26	14:03 (26)
	21:23	5 20:50 (20) 20:22	19:06	17:54	15:58	1 15:22 (21) 15:46	23 14:26 (26)
24	05:06	05:59	06:55	07:51	07:51	08:27	14:03 (26)
	21:22	20:20	19:04	17:52	15:57	15:47	23 14:26 (26)
25	05:07	06:01	19:29 (18) 06:57	06:53	07:53	08:27	14:03 (26)
	21:20	20:18	1 19:30 (18) 19:01	16:50	15:56	15:48	23 14:26 (26)
26	05:09	06:03	19:24 (18) 06:59	06:55	07:55	08:28	14:04 (26)
	21:19	20:15	9 19:33 (18) 18:59	16:47	15:54	15:48	22 14:26 (26)
27	05:10	06:05	19:23 (18) 07:01	06:57	07:56	08:28	14:04 (26)
	21:17	20:13	12 19:35 (18) 18:56	16:45	15:53	15:49	22 14:26 (26)
28	05:12	06:07	19:22 (18) 07:02	06:59	07:58	08:28	14:05 (26)
	21:15	20:11	14 19:36 (18) 18:54	16:43	15:52	15:50	22 14:27 (26)
29	05:14	06:08	19:20 (18) 07:04	07:01	08:00	08:28	14:05 (26)
	21:14	20:08	15 19:35 (18) 18:51	16:41	15:51	15:51	22 14:27 (26)
30	05:15	06:10	19:20 (18) 07:06	07:03	08:01	08:28	14:06 (26)
	21:12	20:06	16 19:36 (18) 18:49	16:39	15:51	15:52	21 14:27 (26)
31	05:17	06:12	19:20 (18) 18:49	07:05	08:02	08:28	14:07 (26)
	21:10	20:03	15 19:35 (18) 18:47	16:37	15:50	15:53	21 14:28 (26)
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	469	82	34	125	145	579	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.62	0.65	0.65	0.69	0.69	0.67	
Gesamte Reduktion	0.25	0.29	0.24	0.21	0.13	0.08	
Met.wahrsch.Beschattung	118	24	8	26	19	49	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBSchattenrezeptor: CC - IO81  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1   08:28		14:02 (26)   07:57	06:59	16:52 (17)   06:43	05:33	04:42	20:29 (20)	
15:54	11	14:13 (26)   16:46	17:43	4   16:56 (17)   19:42	20:39	21:29	21:20 (20)	
2   08:28		14:02 (26)   07:55	06:56	06:40	05:31	04:41	20:30 (20)	
15:55	10	14:12 (26)   16:48	17:45	19:44	20:40	21:31	21:20 (20)	
3   08:28		14:05 (26)   07:54	06:54	06:38	05:28	04:40	20:30 (20)	
15:57	7	14:12 (26)   16:50	17:47	19:46	20:42	21:32	21:20 (20)	
4   08:27		07:52	06:52	06:35	05:26	04:40	20:30 (20)	
15:58		16:52	17:49	19:48	20:44	21:33	21:20 (20)	
5   08:27		07:50	06:49	06:33	05:24	04:39	20:29 (20)	
16:03		17:00	17:57	19:50	20:46	21:34	22:20 (20)	
6   08:27		07:48	06:47	06:30	05:22	04:38	20:30 (20)	
16:00		16:56	17:53	19:52	20:48	21:35	24:21:00 (1)	
7   08:26		07:46	06:44	06:28	2   19:24 (18)   05:20	04:37	20:30 (20)	
16:02		16:58	17:55	19:54	2   19:26 (18)   20:50	21:36	25:21:00 (1)	
8   08:26		07:44	06:42	06:26	19:22 (18)   05:18	04:37	20:30 (20)	
16:03		17:00	17:57	6   19:28 (18)   20:51	21:37	27:21:02 (1)		
9   08:25		07:42	06:40	06:23	19:20 (18)   05:17	04:36	20:30 (20)	
16:05		17:03	17:59	19:57   10   19:30 (18)   20:53	21:38	28:21:02 (1)		
10   08:24		07:40	06:37	06:21	19:19 (18)   05:15	04:36	20:31 (20)	
16:06		17:05	18:00	19:59   13   19:32 (18)   20:55	21:39	29:21:03 (1)		
11   08:24		07:38	06:35	06:18	19:18 (18)   05:13	04:35	20:31 (20)	
16:08		17:07	18:02	20:01	15   19:33 (18)   20:57	21:40	30:21:04 (1)	
12   08:23		07:36	06:32	06:16	19:18 (18)   05:11	04:35	20:31 (20)	
16:09		17:09	18:04	20:03	16   19:34 (18)   20:58	21:41	30:21:04 (1)	
13   08:22		07:34	06:30	06:14	19:18 (18)   05:09	04:34	20:31 (20)	
16:11		17:11	18:06	20:05	16   19:34 (18)   21:00	21:41	31:21:05 (1)	
14   08:21		07:32	06:27	06:11	19:17 (18)   05:07	04:34	20:32 (20)	
16:13		17:13	18:08	20:07	16   19:33 (18)   21:02	21:42	31:21:06 (1)	
15   08:20		15:37 (21)   07:30	06:25	06:09	19:18 (18)   05:06	04:34	20:32 (20)	
16:14	1	15:38 (21)   17:15	18:10	20:09	14   19:32 (18)   21:04	21:43	32:21:06 (1)	
16   08:19		15:37 (21)   07:28	06:23	06:06	19:19 (18)   05:04	04:34	20:32 (20)	
16:16	3	15:40 (21)   17:17	18:12	20:10	12   19:31 (18)   21:05	21:43	33:21:07 (1)	
17   08:18		15:36 (21)   07:26	06:20	06:04	19:20 (18)   05:02	04:34	20:33 (20)	
16:18	7	15:43 (21)   17:19	18:14	20:12	8   19:28 (18)   21:07	21:44	32:21:07 (1)	
18   08:17		15:36 (21)   07:24	06:18	06:02	05:01	04:33	20:33 (20)	
16:19	8	15:44 (21)   17:21	18:16	20:14	21:09	21:44	33:21:08 (1)	
19   08:16		15:36 (21)   07:22	16:49 (17)   06:15	05:59	04:59	04:33	20:33 (20)	
16:21	10	15:46 (21)   17:23	5   16:54 (17)   18:18	20:16	21:10	21:44	33:21:08 (1)	
20   08:15		15:35 (21)   07:19	16:48 (17)   06:13	05:57	04:58	04:34	20:33 (20)	
16:23	13	15:48 (21)   17:25	8   16:56 (17)   18:20	20:18	21:12	21:45	33:21:08 (1)	
21   08:14		15:36 (21)   07:17	16:47 (17)   06:10	05:55	04:56	04:34	20:33 (20)	
16:25	14	15:50 (21)   17:27	12   16:59 (17)   18:22	20:20	21:14	21:45	33:21:08 (1)	
22   08:12		15:37 (21)   07:15	16:46 (17)   06:08	05:52	04:55	20:37 (20)   04:34	20:33 (20)	
16:27	16	15:53 (21)   17:29	14   17:00 (17)   18:23	20:22	21:15	4   20:41 (20)   21:45	33:21:08 (1)	
23   08:11		15:36 (21)   07:13	16:46 (17)   06:05	05:50	04:53	20:35 (20)   04:34	20:34 (20)	
16:29	16	15:52 (21)   17:31	17   17:03 (17)   18:25	20:24	21:17	9   20:44 (20)   21:45	34:21:09 (1)	
24   08:10		15:36 (21)   07:10	16:46 (17)   06:03	05:48	04:52	20:33 (20)   04:34	20:34 (20)	
16:31	16	15:52 (21)   17:33	17   17:03 (17)   18:27	20:25	21:18	11   20:44 (20)   21:46	33:21:09 (1)	
25   08:08		15:38 (21)   07:08	16:46 (17)   06:00	05:46	04:50	20:32 (20)   04:35	20:34 (20)	
16:32	15	15:53 (21)   17:35	16   17:02 (17)   18:29	20:27	21:20	14   20:46 (20)   21:46	33:21:09 (1)	
26   08:07		15:38 (21)   07:06	16:46 (17)   05:58	05:43	04:49	20:31 (20)   04:35	20:35 (20)	
16:34	14	15:52 (21)   17:37	16   17:02 (17)   18:31	20:29	21:21	16   20:47 (20)   21:46	32:21:09 (1)	
27   08:05		15:39 (21)   07:03	16:47 (17)   05:55	05:41	04:48	20:31 (20)   04:36	20:34 (20)	
16:36	12	15:51 (21)   17:39	13   17:00 (17)   18:33	20:31	21:23	17   20:48 (20)   21:45	33:21:09 (1)	
28   08:04		15:41 (21)   07:01	16:48 (17)   05:53	05:39	04:47	20:30 (20)   04:36	20:35 (20)	
16:38	10	15:51 (21)   17:41	11   16:59 (17)   18:35	20:33	21:24	19   20:49 (20)   21:45	32:21:09 (1)	
29   08:02		15:42 (21)	06:50	05:37	04:45	20:30 (20)   04:37	20:34 (20)	
16:40	8	15:50 (21)	19:37	20:35	21:26	19   20:49 (20)   21:45	31:21:08 (1)	
30   08:00			06:48	05:35	04:44	20:30 (20)   04:37	20:35 (20)	
16:42			19:38	20:37	21:27	20   20:50 (20)   21:45	30:21:08 (1)	
31   07:59			06:45	05:33	04:43	20:30 (20)   04:37	20:35 (20)	
16:44			19:40	20:37	21:28	20   20:50 (20)		
Sonnenscheinstunden   248		272	367	421	496	512		
astr.max.mögl.Beschattung	191	129	4	128	149	881		
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45		
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90		
Reduktion Windrichtung	0.68	0.69	0.69	0.65	0.62	0.62		
Gesamte Reduktion	0.11	0.15	0.20	0.24	0.29	0.25		
Met.wahrsch.Beschattung	21	19	1	31	43	224		

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM)	Schattenanfang	Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CC - IO81  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	20:36 (20) 05:19	06:14	19:18 (18) 07:08	07:07	08:03	
	21:44	30 21:09 (1) 21:09	20:01	15 19:33 (18) 18:46	16:35	15:50	
2	04:39	20:35 (20) 05:20	06:16	19:17 (18) 07:10	07:09	08:05	
	21:44	29 21:07 (1) 21:07	19:59	13 19:30 (18) 18:44	16:33	15:49	
3	04:40	20:35 (20) 05:22	06:17	19:18 (18) 07:12	07:11	08:06	
	21:44	28 21:07 (1) 21:05	19:56	10 19:28 (18) 18:41	16:31	15:48	
4	04:40	20:36 (20) 05:24	06:19	19:19 (18) 07:14	07:13	08:08	
	21:43	27 21:07 (1) 21:03	19:54	6 19:25 (18) 18:39	16:29	15:47	
5	04:41	20:36 (20) 05:25	06:21	19:20 (18) 07:15	07:15	08:09	
	21:43	26 21:07 (1) 21:01	19:51	2 19:22 (18) 18:37	16:27	15:47	
6	04:42	20:36 (20) 05:27	06:23	07:17	07:17	08:10	
	21:42	24 21:06 (1) 20:59	19:49	18:34	16:25	15:46	
7	04:43	20:37 (20) 05:29	06:25	07:19	07:19	08:12	
	21:41	22 20:59 (20) 05:27	19:46	18:32	16:23	15:46	
8	04:44	20:37 (20) 05:31	06:26	07:21	07:21	08:13	
	21:41	22 20:59 (20) 05:25	19:44	18:29	16:21	15:45	
9	04:45	20:37 (20) 05:32	06:28	07:23	07:23	08:14	
	21:40	22 20:59 (20) 05:33	19:41	18:27	16:19	15:45	6 14:00 (26)
10	04:46	20:37 (20) 05:34	06:30	07:25	07:25	08:16	13:53 (26)
	21:39	22 20:59 (20) 05:31	19:39	18:24	16:18	15:45	9 14:02 (26)
11	04:48	20:38 (20) 05:36	06:32	07:27	07:27	08:17	13:52 (26)
	21:38	21 20:59 (20) 05:49	19:36	18:22	16:16	15:44	11 14:03 (26)
12	04:49	20:38 (20) 05:38	06:34	07:28	07:29	08:18	13:51 (26)
	21:37	20 20:58 (20) 05:47	19:34	18:20	16:14	15:44	13 14:04 (26)
13	04:50	20:38 (20) 05:40	06:35	07:30	8 17:23 (17) 07:31	15:14 (21) 08:19	13:51 (26)
	21:36	20 20:58 (20) 05:45	19:31	18:17	8 17:31 (17) 16:13	15:22 (21) 15:44	14 14:05 (26)
14	04:51	20:38 (20) 05:41	06:37	07:32	17:21 (17) 07:33	15:13 (21) 08:20	13:51 (26)
	21:35	20 20:58 (20) 05:43	19:29	18:15	12 17:33 (17) 16:11	15:23 (21) 15:44	15 14:06 (26)
15	04:53	20:39 (20) 05:43	06:39	07:34	17:19 (17) 07:35	15:12 (21) 08:21	13:51 (26)
	21:34	18 20:57 (20) 05:40	19:26	18:12	15 17:34 (17) 16:09	15:24 (21) 15:44	16 14:07 (26)
16	04:54	20:40 (20) 05:45	06:41	07:36	17:18 (17) 07:36	15:11 (21) 08:22	13:52 (26)
	21:33	18 20:58 (20) 05:45	19:24	18:10	16 17:34 (17) 16:08	15:25 (21) 15:44	16 14:08 (26)
17	04:55	20:41 (20) 05:47	06:43	07:38	17:18 (17) 07:38	15:11 (21) 08:23	13:52 (26)
	21:32	16 20:57 (20) 05:49	19:21	18:08	16 17:34 (17) 16:06	15:26 (21) 15:44	16 14:08 (26)
18	04:57	20:41 (20) 05:49	06:44	07:40	17:17 (17) 07:40	15:10 (21) 08:23	13:52 (26)
	21:30	15 20:56 (20) 05:50	19:19	18:05	17 17:34 (17) 16:05	15:26 (21) 15:44	17 14:09 (26)
19	04:58	20:42 (20) 05:50	06:46	07:42	17:17 (17) 07:42	15:10 (21) 08:24	13:53 (26)
	21:29	12 20:54 (20) 05:52	19:16	18:03	16 17:33 (17) 16:03	15:26 (21) 15:45	17 14:10 (26)
20	04:59	20:44 (20) 05:52	06:48	07:44	17:17 (17) 07:44	15:11 (21) 08:25	13:53 (26)
	21:28	10 20:54 (20) 05:59	19:14	18:01	14 17:31 (17) 16:02	15:27 (21) 15:45	17 14:10 (26)
21	05:01	20:45 (20) 05:54	06:50	07:46	17:18 (17) 07:46	15:11 (21) 08:25	13:54 (26)
	21:26	7 20:52 (20) 05:54	19:11	17:59	10 17:28 (17) 16:01	15:25 (21) 15:45	17 14:11 (26)
22	05:02	05:56	06:52	07:48	17:19 (17) 07:48	15:12 (21) 08:26	13:54 (26)
	21:25	20:25	19:09	17:56	7 17:26 (17) 15:59	13 15:25 (21) 15:46	17 14:11 (26)
23	05:04	05:58	06:53	07:50	17:20 (17) 07:49	15:12 (21) 08:26	13:55 (26)
	21:23	20:22	19:06	17:54	4 17:24 (17) 15:58	10 15:22 (21) 15:46	17 14:12 (26)
24	05:06	05:59	06:55	07:51	07:51	15:13 (21) 08:27	13:55 (26)
	21:22	20:20	19:04	17:52	8 15:21 (21) 15:47	17 14:12 (26)	
25	05:07	06:01	06:57	07:53	07:53	15:14 (21) 08:27	13:55 (26)
	21:20	20:18	19:01	16:50	15:56	6 15:20 (21) 15:48	17 14:12 (26)
26	05:09	06:03	19:23 (18) 06:59	06:55	07:55	15:15 (21) 08:28	13:56 (26)
	21:19	20:15	8 19:31 (18) 18:59	16:47	15:54	3 15:18 (21) 15:48	16 14:12 (26)
27	05:10	06:05	19:21 (18) 07:01	06:57	07:56	15:16 (21) 08:28	13:56 (26)
	21:17	20:13	12 19:33 (18) 18:56	16:45	15:53	1 15:17 (21) 15:49	16 14:12 (26)
28	05:12	06:07	19:20 (18) 07:02	06:59	07:58	08:28	13:57 (26)
	21:15	14 19:34 (18) 18:54	16:43	15:52	15:50	16 14:13 (26)	
29	05:14	06:08	19:18 (18) 07:04	07:01	08:00	08:28	13:58 (26)
	21:14	20:08	16 19:34 (18) 18:51	16:41	15:51	15:51	15 14:13 (26)
30	05:15	06:10	19:18 (18) 07:06	07:03	08:01	08:28	13:59 (26)
	21:12	20:06	16 19:34 (18) 18:49	16:39	15:51	15:52	14 14:13 (26)
31	05:17	06:12	19:18 (18) 07:09	07:05	08:02	08:28	14:00 (26)
	21:10	20:03	16 19:34 (18) 18:47	16:37	15:53	13 14:13 (26)	
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	429	82	46	135	162	342	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.62	0.65	0.65	0.69	0.69	0.66	
Gesamte Reduktion	0.25	0.29	0.24	0.21	0.13	0.08	
Met.wahrsch.Beschattung	107	24	11	28	21	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	(WEA mit erstem Schatten)	Zeitpunkt (SS:MM)	Schattende	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBSchattenrezeptor: CD - IO82  
**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  
 342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28	14:11 (26)   07:57	06:59	16:53 (17)   06:43	05:33	04:42	20:22 (20)	
	15:54	19 14:30 (26)   16:46	17:43	9 17:02 (17)   19:42	20:39	21:29	27 20:54 (1)	
2	08:28	14:12 (26)   07:55	06:56	06:40	05:31	04:41	20:24 (20)	
	15:55	18 14:30 (26)   16:48	17:45	19:44	20:40	21:31	27 20:56 (1)	
3	08:28	14:13 (26)   07:54	06:54	06:38	05:28	04:40	20:24 (20)	
	15:57	17 14:30 (26)   16:50	17:47	19:46	20:42	21:32	29 20:57 (1)	
4	08:27	14:14 (26)   07:52	06:52	06:35	05:26	04:40	20:24 (20)	
	15:58	17 14:31 (26)   16:52	17:49	19:48	20:44	21:33	30 20:58 (1)	
5	08:27	14:15 (26)   07:50	06:49	06:33	05:24	04:39	20:24 (20)	
	15:59	15 14:30 (26)   16:54	17:51	19:50	20:46	21:34	30 20:58 (1)	
6	08:27	14:16 (26)   07:48	06:47	06:30	05:22	04:38	20:25 (20)	
	16:00	13 14:29 (26)   16:56	17:53	19:52	3 19:24 (18)   20:48	21:35	32 21:00 (1)	
7	08:26	14:18 (26)   07:46	06:44	06:28	05:20	04:37	20:25 (20)	
	16:02	11 14:29 (26)   16:58	17:55	19:54	6 19:26 (18)   20:50	21:36	31 21:00 (1)	
8	08:26	14:19 (26)   07:44	06:42	06:26	05:18	04:37	20:26 (20)	
	16:03	9 14:28 (26)   17:00	17:57	19:55	9 19:28 (18)   20:51	21:37	32 21:02 (1)	
9	08:25	14:22 (26)   07:42	06:40	06:23	05:17	04:36	20:26 (20)	
	16:05	4 14:26 (26)   17:02	17:59	19:57	13 19:30 (18)   20:53	21:38	32 21:02 (1)	
10	08:24	07:40	06:37	06:21	05:15	04:36	20:27 (20)	
	16:06	17:05	18:00	19:59	15 19:32 (18)   20:55	21:39	32 21:03 (1)	
11	08:24	07:38	06:35	06:18	05:13	04:35	20:27 (20)	
	16:08	17:07	18:02	20:01	16 19:32 (18)   20:57	21:40	32 21:04 (1)	
12	08:23	07:36	06:32	06:16	05:11	04:35	20:27 (20)	
	16:09	17:09	18:04	20:03	15 19:32 (18)   20:58	21:41	33 21:04 (1)	
13	08:22	07:34	06:30	06:14	05:09	04:34	20:28 (20)	
	16:11	17:11	18:06	20:05	14 19:31 (18)   21:00	21:41	32 21:05 (1)	
14	08:21	07:32	06:27	06:11	05:07	04:34	20:29 (20)	
	16:13	17:13	18:08	20:07	11 19:29 (18)   21:02	21:42	32 21:06 (1)	
15	08:20	07:30	06:25	06:09	05:06	04:34	20:29 (20)	
	16:14	17:15	18:10	20:09	7 19:27 (18)   21:04	21:43	32 21:06 (1)	
16	08:19	07:28	06:23	06:06	05:04	04:34	20:30 (20)	
	16:16	17:17	18:12	20:10	21:05	4 20:33 (20)   21:43	32 21:07 (1)	
17	08:18	07:26	06:20	06:04	05:02	04:34	20:30 (20)	
	16:18	17:19	18:14	20:12	21:07	8 20:35 (20)   21:44	31 21:07 (1)	
18	08:17	07:24	06:18	06:02	05:01	04:33	20:31 (20)	
	16:19	17:21	18:16	20:14	21:09	11 20:36 (20)   21:44	31 21:08 (1)	
19	08:16	15:45 (21)   07:22	06:15	05:59	04:59	04:59	20:31 (20)	
	16:21	1 15:46 (21)   17:23	18:18	20:16	21:10	14 20:38 (20)   21:44	31 21:08 (1)	
20	08:15	15:44 (21)   07:19	06:13	05:57	04:58	04:58	20:31 (20)	
	16:23	4 15:48 (21)   17:25	2 16:56 (17)   18:20	20:18	21:12	15 20:38 (20)   21:45	31 21:08 (1)	
21	08:14	15:44 (21)   07:17	06:10	05:55	04:56	04:56	20:31 (20)	
	16:25	6 15:50 (21)   17:27	6 16:59 (17)   18:21	20:20	21:14	17 20:40 (20)   21:45	31 21:08 (1)	
22	08:12	15:43 (21)   07:15	06:08	05:52	04:55	04:55	20:31 (20)	
	16:27	9 15:52 (21)   17:29	9 17:00 (17)   18:23	20:22	21:15	19 20:41 (20)   21:45	31 21:08 (1)	
23	08:11	15:44 (21)   07:13	06:05	05:50	04:53	04:53	20:32 (20)	
	16:29	10 15:54 (21)   17:31	13 17:03 (17)   18:25	20:24	21:17	20 20:42 (20)   21:45	31 21:09 (1)	
24	08:10	15:43 (21)   07:10	06:03	05:48	04:52	04:52	20:32 (20)	
	16:31	13 15:56 (21)   17:33	15 17:05 (17)   18:27	20:25	21:18	20 20:41 (20)   21:46	31 21:09 (1)	
25	08:08	15:44 (21)   07:08	06:00	05:46	04:50	04:50	20:31 (20)	
	16:32	15 15:59 (21)   17:35	15 17:05 (17)   18:29	20:27	21:20	20 20:42 (20)   21:46	32 21:09 (1)	
26	08:07	15:44 (21)   07:06	05:58	05:43	04:49	04:49	20:32 (20)	
	16:34	15 15:59 (21)   17:37	15 17:05 (17)   18:31	20:29	21:21	20 20:42 (20)   21:46	31 21:09 (1)	
27	08:05	15:44 (21)   07:03	05:55	05:41	04:48	04:48	20:31 (20)	
	16:36	15 15:59 (21)   17:39	14 17:04 (17)   18:33	20:31	21:23	20 20:42 (20)   21:45	33 21:09 (1)	
28	08:04	15:46 (21)   07:01	05:53	05:39	04:47	04:47	20:32 (20)	
	16:38	14 16:00 (21)   17:41	12 17:03 (17)   18:35	20:33	21:24	20 20:42 (20)   21:45	32 21:09 (1)	
29	08:02	15:46 (21)   07:00	05:50	05:37	04:45	04:45	20:31 (20)	
	16:40	13 15:59 (21)   17:41	19:37	20:35	21:26	22 20:51 (1)   21:45	32 21:08 (1)	
30	08:00	15:47 (21)   07:00	05:48	05:35	04:44	04:44	20:32 (20)	
	16:42	11 15:58 (21)   17:42	19:38	20:37	21:27	24 20:52 (1)   21:45	32 21:08 (1)	
31	07:59	15:49 (21)   07:00	05:45	05:33	04:43	04:43	20:32 (20)	
	16:44	8 15:57 (21)   17:41	19:40	20:37	21:28	25 20:53 (1)   21:45	32 21:08 (1)	
Sonnenscheinstunden	248	272	367	421	496	512	935	
astr.max.mögl.Beschattung	257	101	9	109	279	935		
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45		
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90		
Reduktion Windrichtung	0.68	0.69	0.69	0.65	0.63	0.62		
Gesamte Reduktion	0.11	0.15	0.20	0.24	0.29	0.25		
Met.wahrsch.Beschattung	28	15	2	27	81	238		

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CD - IO82  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	20:32 (20) 05:19	06:14	19:16 (18) 07:08	07:07	08:03	
	21:44	32 21:09 (1) 21:08	20:01	16 19:32 (18) 18:46	16:35	15:50	
2	04:39	20:31 (20) 05:20	06:16	19:15 (18) 07:10	07:09	08:05	
	21:44	31 21:07 (1) 21:07	19:59	15 19:30 (18) 18:44	16:33	15:49	
3	04:40	20:31 (20) 05:22	06:17	19:15 (18) 07:12	07:11	08:06	14:07 (26)
	21:44	32 21:07 (1) 21:05	19:56	13 19:28 (18) 18:41	16:31	15:48	3 14:10 (26)
4	04:40	20:31 (20) 05:24	06:19	19:16 (18) 07:14	07:13	08:08	14:04 (26)
	21:43	32 21:07 (1) 21:03	19:54	9 19:25 (18) 18:39	16:29	15:47	8 14:12 (26)
5	04:41	20:31 (20) 05:25	06:21	19:16 (18) 07:15	07:15	08:09	14:03 (26)
	21:43	32 21:07 (1) 21:01	19:51	6 19:22 (18) 18:37	16:27	15:47	11 14:14 (26)
6	04:42	20:31 (20) 05:27	06:23	19:17 (18) 07:17	07:17	08:10	14:02 (26)
	21:42	31 21:06 (1) 20:59	19:49	3 19:20 (18) 18:34	16:25	15:46	13 14:15 (26)
7	04:43	20:31 (20) 05:29	06:25	07:19	07:19	08:12	14:02 (26)
	21:41	31 21:06 (1) 20:57	19:46	18:32	16:23	15:46	15 14:17 (26)
8	04:44	20:31 (20) 05:31	06:26	07:21	07:21	08:13	14:01 (26)
	21:41	30 21:05 (1) 20:55	19:44	18:29	16:21	15:45	17 14:18 (26)
9	04:45	20:31 (20) 05:32	06:28	07:23	07:23	08:14	14:02 (26)
	21:40	30 21:05 (1) 20:53	19:41	18:27	16:19	15:45	17 14:19 (26)
10	04:46	20:31 (20) 05:34	06:30	07:25	07:25	08:16	14:02 (26)
	21:39	28 21:04 (1) 20:51	19:39	18:24	16:18	15:45	18 14:20 (26)
11	04:48	20:31 (20) 05:36	06:32	07:27	07:27	08:17	14:02 (26)
	21:38	28 21:03 (1) 20:49	19:36	18:22	16:16	15:44	18 14:20 (26)
12	04:49	20:31 (20) 05:38	06:34	07:28	17:28 (17) 07:29	8 15:29 (21) 08:18	14:01 (26)
	21:37	26 21:02 (1) 20:47	19:34	18:20	5 17:33 (17) 16:14	11 15:30 (21) 15:44	20 14:21 (26)
13	04:50	20:31 (20) 05:40	06:35	07:30	17:25 (17) 07:31	15:18 (21) 08:19	14:02 (26)
	21:36	24 21:01 (1) 20:45	19:31	18:17	11 17:36 (17) 16:13	13 15:31 (21) 15:44	20 14:22 (26)
14	04:51	20:31 (20) 05:41	06:37	07:32	17:24 (17) 07:33	15:18 (21) 08:20	14:02 (26)
	21:35	22 21:00 (1) 20:43	19:29	18:15	13 17:37 (17) 16:11	14 15:32 (21) 15:44	20 14:22 (26)
15	04:52	20:30 (20) 05:43	06:39	07:34	17:23 (17) 07:35	15:17 (21) 08:21	14:02 (26)
	21:34	21 20:51 (20) 20:40	19:26	18:12	14 17:37 (17) 16:09	15 15:32 (21) 15:44	21 14:23 (26)
16	04:54	20:31 (20) 05:45	06:41	07:36	17:22 (17) 07:36	15:17 (21) 08:22	14:02 (26)
	21:33	21 20:52 (20) 20:38	19:24	18:10	16 17:38 (17) 16:08	15 15:32 (21) 15:44	22 14:24 (26)
17	04:55	20:31 (20) 05:47	06:43	07:38	17:22 (17) 07:38	15:17 (21) 08:23	14:03 (26)
	21:32	21 20:52 (20) 20:36	19:21	18:08	16 17:38 (17) 16:06	15 15:32 (21) 15:44	21 14:24 (26)
18	04:57	20:31 (20) 05:49	06:44	07:40	17:22 (17) 07:40	15:17 (21) 08:23	14:03 (26)
	21:30	20 20:51 (20) 20:34	19:19	18:05	14 17:36 (17) 16:05	13 15:30 (21) 15:44	22 14:25 (26)
19	04:58	20:31 (20) 05:50	06:46	07:42	17:22 (17) 07:42	15:18 (21) 08:24	14:04 (26)
	21:29	20 20:51 (20) 20:31	19:16	18:03	11 17:33 (17) 16:03	10 15:28 (21) 15:45	22 14:26 (26)
20	04:59	20:32 (20) 05:52	06:48	07:44	17:22 (17) 07:44	15:18 (21) 08:25	14:04 (26)
	21:28	19 20:51 (20) 20:29	19:14	18:01	9 17:31 (17) 16:02	9 15:27 (21) 15:45	22 14:26 (26)
21	05:01	20:32 (20) 05:54	06:50	07:46	17:23 (17) 07:46	15:19 (21) 08:25	14:05 (26)
	21:26	19 20:51 (20) 20:27	19:11	17:59	5 17:28 (17) 16:01	6 15:25 (21) 15:45	22 14:27 (26)
22	05:02	20:33 (20) 05:56	06:52	07:48	17:25 (17) 07:48	15:20 (21) 08:26	14:05 (26)
	21:25	18 20:51 (20) 20:25	19:09	17:56	1 17:26 (17) 15:59	4 15:24 (21) 15:46	22 14:27 (26)
23	05:04	20:33 (20) 05:58	06:53	07:49	07:49	15:21 (21) 08:26	14:06 (26)
	21:23	17 20:50 (20) 20:22	19:06	17:54	1 15:58	1 15:22 (21) 15:46	22 14:28 (26)
24	05:06	20:33 (20) 05:59	06:55	07:51	07:51	08:27	14:06 (26)
	21:22	15 20:48 (20) 20:20	19:04	17:52	15:57	15:47	22 14:28 (26)
25	05:07	20:35 (20) 06:01	06:57	07:53	07:53	08:27	14:06 (26)
	21:20	12 20:47 (20) 20:18	19:01	16:50	15:56	15:48	22 14:28 (26)
26	05:09	20:36 (20) 06:03	06:59	07:55	07:55	08:28	14:07 (26)
	21:19	9 20:45 (20) 20:15	18:59	16:47	15:54	15:48	21 14:28 (26)
27	05:10	20:38 (20) 06:05	07:01	07:57	07:56	08:28	14:07 (26)
	21:17	6 20:44 (20) 20:13	18:56	16:45	15:53	15:49	21 14:28 (26)
28	05:12	06:07	19:21 (18) 07:02	06:59	07:58	08:28	14:08 (26)
	21:15	20:11	8 19:29 (18) 18:54	16:43	15:52	15:50	21 14:29 (26)
29	05:14	06:08	19:18 (18) 07:04	07:01	08:00	08:28	14:08 (26)
	21:14	20:08	12 19:30 (18) 18:51	16:41	15:51	15:51	21 14:29 (26)
30	05:15	06:10	19:17 (18) 07:06	07:03	08:01	08:28	14:09 (26)
	21:12	20:06	14 19:31 (18) 18:49	16:39	15:51	15:52	20 14:29 (26)
31	05:17	06:12	19:17 (18) 07:09	07:05	08:02	08:28	14:10 (26)
	21:10	20:03	15 19:32 (18) 07:13	16:37	15:53	15:53	20 14:30 (26)
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	627	49	62	115	134	544	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.62	0.65	0.65	0.69	0.69	0.67	
Gesamte Reduktion	0.25	0.29	0.24	0.21	0.13	0.08	
Met.wahrsch.Beschattung	157	14	15	24	18	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	



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CE - IO83

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni			
1	08:28	14:16 (26)   07:57	15:52 (21)   06:59	16:54 (17)   06:43	05:33	04:42	20:21 (20)		
	15:54	21   14:37 (26)   16:46	8   16:00 (21)   17:43	11   17:05 (17)   19:42	20:39	21:29	29   20:54 (1)		
2	08:28	14:15 (26)   07:55	06:56	16:56 (17)   06:40	05:31	04:41	20:22 (20)		
	15:55	21   14:37 (26)   16:48	17:45	5   17:01 (17)   19:44	20:40	21:31	29   20:56 (1)		
3	08:28	14:18 (26)   07:54	06:54	06:38	05:28	04:40	20:23 (20)		
	15:57	20   14:38 (26)   16:50	17:47	19:46	20:42	21:32	29   20:57 (1)		
4	08:27	14:19 (26)   07:52	06:52	06:35	05:26	04:40	20:23 (20)		
	15:58	19   14:38 (26)   16:52	17:49	19:48	20:44	21:33	30   20:58 (1)		
5	08:27	14:19 (26)   07:50	06:49	06:33	05:24	04:39	20:23 (20)		
	15:59	19   14:38 (26)   16:54	17:51	19:50	20:46	21:34	29   20:58 (1)		
6	08:27	14:20 (26)   07:48	06:47	06:30	05:22	04:38	20:25 (20)		
	16:00	17   14:37 (26)   16:56	17:53	19:52	4   19:24 (18)   20:48	21:35	30   21:00 (1)		
7	08:26	14:22 (26)   07:46	06:44	06:28	05:20	04:37	20:25 (20)		
	16:02	16   14:38 (26)   16:58	17:55	19:54	7   19:26 (18)   20:50	21:36	29   21:00 (1)		
8	08:26	14:23 (26)   07:44	06:42	06:26	05:18	04:37	20:26 (20)		
	16:03	14   14:37 (26)   17:00	17:57	19:55	10   19:28 (18)   20:51	21:37	29   21:02 (1)		
9	08:25	14:24 (26)   07:42	06:40	06:23	05:17	04:36	20:26 (20)		
	16:05	12   14:36 (26)   17:02	17:59	19:57	13   19:30 (18)   20:53	21:38	29   21:02 (1)		
10	08:24	14:25 (26)   07:40	06:37	06:21	05:15	04:36	20:28 (20)		
	16:06	10   14:35 (26)   17:05	18:00	19:59	15   19:32 (18)   20:55	21:39	27   21:03 (1)		
11	08:24	14:28 (26)   07:38	06:35	06:18	05:13	04:35	20:29 (20)		
	16:08	5   14:33 (26)   17:07	18:02	20:01	15   19:31 (18)   20:57	21:40	27   21:04 (1)		
12	08:23	07:36	06:32	06:16	05:11	04:35	20:30 (20)		
	16:09	17:09	18:04	20:03	14   19:31 (18)   20:58	21:41	23   21:03 (1)		
13	08:22	07:34	06:30	06:14	05:09	04:34	20:44 (1)		
	16:11	17:11	18:06	20:05	12   19:30 (18)   21:00	21:41	20   21:04 (1)		
14	08:21	07:32	06:27	06:11	05:07	04:34	20:44 (1)		
	16:13	17:13	18:08	20:07	10   19:28 (18)   21:02	4   20:30 (20)   21:42	20   21:04 (1)		
15	08:20	07:30	06:25	06:09	05:06	04:34	20:45 (1)		
	16:14	17:15	18:10	20:09	8   20:32 (20)   21:43	19   21:04 (1)			
16	08:19	07:28	06:23	06:06	05:04	04:34	20:45 (1)		
	16:16	17:17	18:12	20:10	2   19:24 (18)   21:04	11   20:33 (20)   21:43	20   21:05 (1)		
17	08:18	07:26	06:20	06:04	05:02	04:34	20:45 (1)		
	16:18	17:19	18:14	20:12	13   20:35 (20)   21:44	20   21:05 (1)			
18	08:17	07:24	06:18	06:02	05:01	04:33	20:45 (1)		
	16:19	17:21	18:16	20:14	16   20:36 (20)   21:44	20   21:05 (1)			
19	08:16	07:22	06:15	05:59	04:59	04:33	20:46 (1)		
	16:21	17:23	18:18	20:16	18   20:38 (20)   21:44	19   21:05 (1)			
20	08:15	07:19	06:13	05:57	04:58	04:34	20:46 (1)		
	16:23	17:25	18:20	20:18	19   20:38 (20)   21:45	19   21:05 (1)			
21	08:14	07:17	06:10	05:55	04:56	04:34	20:46 (1)		
	16:25	2   15:50 (21)   17:27	3   16:59 (17)   18:21	20:20	21:14	19   20:38 (20)   21:45	19   21:05 (1)		
22	08:12	07:15	06:08	05:52	04:55	04:34	20:46 (1)		
	16:27	5   15:52 (21)   17:29	7   17:00 (17)   18:23	20:22	21:15	20   20:39 (20)   21:45	19   21:05 (1)		
23	08:11	07:13	06:05	05:50	04:53	04:34	20:47 (1)		
	16:29	7   15:54 (21)   17:31	10   17:03 (17)   18:25	20:24	21:17	19   20:39 (20)   21:45	19   21:06 (1)		
24	08:10	07:10	06:03	05:48	04:52	04:34	20:47 (1)		
	16:31	9   15:56 (21)   17:33	12   17:05 (17)   18:27	20:25	21:18	20   20:39 (20)   21:46	19   21:06 (1)		
25	08:08	07:08	06:00	05:46	04:50	04:35	20:46 (1)		
	16:32	11   15:59 (21)   17:35	15   17:07 (17)   18:29	20:27	21:20	20   20:39 (20)   21:46	20   21:06 (1)		
26	08:07	07:06	05:58	05:43	04:49	04:35	20:47 (1)		
	16:34	14   16:01 (21)   17:37	15   17:07 (17)   18:31	20:29	21:21	20   20:39 (20)   21:46	20   21:07 (1)		
27	08:05	07:03	05:55	05:41	04:48	04:36	20:47 (1)		
	16:36	15   16:02 (21)   17:39	14   17:06 (17)   18:33	20:31	21:23	20   20:48 (1)   21:45	20   21:07 (1)		
28	08:04	07:01	05:53	05:39	04:47	04:36	20:48 (1)		
	16:38	14   16:03 (21)   17:41	13   17:06 (17)   18:35	20:33	21:24	23   20:50 (1)   21:45	19   21:07 (1)		
29	08:02	07:00	05:50	05:37	04:45	04:37	20:47 (1)		
	16:40	14   16:03 (21)   17:41	13   17:06 (17)   18:35	20:33	21:24	23   20:50 (1)   21:45	19   21:07 (1)		
30	08:00	06:58	05:48	05:35	04:44	04:37	20:34 (20)		
	16:42	12   16:02 (21)   17:41	13   17:06 (17)   18:35	20:33	21:24	23   20:50 (1)   21:45	19   21:07 (1)		
31	07:59	06:45	05:45	05:31	04:43	04:37	21:07 (1)		
	16:44	10   16:01 (21)   17:39	13   17:06 (17)   18:35	20:33	21:24	23   20:50 (1)   21:45	19   21:07 (1)		
	Sonnenscheinstunden	248	272	367	421	496	512		
	astr.max.mögl.Beschattung	287	97	16	102	328	695		
	Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45		
	Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90		
	Reduktion Windrichtung	0.68	0.69	0.69	0.65	0.63	0.62		
	Gesamte Reduktion	0.11	0.15	0.20	0.25	0.29	0.25		
	Met.wahrsch.Beschattung	31	15	3	25	95	177		

**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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CE - IO83  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	20:34 (20) 05:19	06:14	19:16 (18) 07:08	07:07	08:03	14:10 (26)
	21:44	25 21:08 (1) 21:08	20:01	15 19:31 (18) 18:46	16:35	15:50	5 14:15 (26)
2	04:39	20:32 (20) 05:20	06:16	19:15 (18) 07:10	07:09	08:05	14:09 (26)
	21:44	27 21:07 (1) 21:07	19:59	15 19:30 (18) 18:44	16:33	15:49	9 14:18 (26)
3	04:40	20:32 (20) 05:22	06:17	19:15 (18) 07:12	07:11	08:06	14:08 (26)
	21:44	28 21:07 (1) 21:05	19:56	13 19:28 (18) 18:41	16:31	15:48	12 14:20 (26)
4	04:40	20:32 (20) 05:24	06:19	19:15 (18) 07:14	07:13	08:08	14:07 (26)
	21:43	28 21:07 (1) 21:03	19:54	10 19:25 (18) 18:39	16:29	15:47	14 14:21 (26)
5	04:41	20:31 (20) 05:25	06:21	19:15 (18) 07:15	07:15	08:09	14:07 (26)
	21:43	30 21:07 (1) 21:01	19:51	7 19:22 (18) 18:37	16:27	15:47	16 14:23 (26)
6	04:42	20:31 (20) 05:27	06:23	19:16 (18) 07:17	07:17	08:10	14:06 (26)
	21:42	29 21:06 (1) 20:59	19:49	4 19:20 (18) 18:34	16:25	15:46	17 14:23 (26)
7	04:43	20:31 (20) 05:29	06:25	07:19	07:19	08:12	14:06 (26)
	21:41	30 21:06 (1) 20:57	19:46	07:19	16:23	15:46	19 14:25 (26)
8	04:44	20:31 (20) 05:31	06:26	07:21	07:21	08:13	14:06 (26)
	21:41	29 21:05 (1) 20:55	19:44	18:29	16:21	15:45	19 14:25 (26)
9	04:45	20:30 (20) 05:32	06:28	07:23	07:23	08:14	14:07 (26)
	21:40	30 21:05 (1) 20:53	19:41	18:27	16:19	15:45	20 14:27 (26)
10	04:46	20:30 (20) 05:34	06:30	07:25	07:25	08:16	14:06 (26)
	21:39	29 21:04 (1) 20:51	19:39	18:24	16:18	8 15:31 (21) 15:45	21 14:27 (26)
11	04:48	20:30 (20) 05:36	06:32	07:27	07:27	08:17	14:06 (26)
	21:38	28 21:03 (1) 20:49	19:36	18:22	16:16	11 15:33 (21) 15:44	21 14:27 (26)
12	04:49	20:29 (20) 05:38	06:34	07:28	17:29 (17) 07:29	15:21 (21) 08:18	14:06 (26)
	21:37	28 21:02 (1) 20:47	19:34	18:20	8 17:37 (17) 16:14	13 15:34 (21) 15:44	22 14:28 (26)
13	04:50	20:29 (20) 05:40	06:35	07:30	17:27 (17) 07:31	15:21 (21) 08:19	14:07 (26)
	21:36	26 21:01 (1) 20:45	19:31	18:17	11 17:38 (17) 16:13	14 15:35 (21) 15:44	22 14:29 (26)
14	04:51	20:29 (20) 05:41	06:37	07:32	17:25 (17) 07:33	15:20 (21) 08:20	14:07 (26)
	21:35	26 21:00 (1) 20:43	19:29	18:15	14 17:39 (17) 16:11	15 15:35 (21) 15:44	22 14:29 (26)
15	04:52	20:29 (20) 05:43	06:39	07:34	17:25 (17) 07:35	15:20 (21) 08:21	14:07 (26)
	21:34	24 20:59 (1) 20:40	19:26	18:12	15 17:40 (17) 16:09	15 15:35 (21) 15:44	23 14:30 (26)
16	04:54	20:29 (20) 05:45	06:41	07:36	17:24 (17) 07:36	15:20 (21) 08:22	14:08 (26)
	21:33	23 20:59 (1) 20:38	19:24	18:10	16 17:40 (17) 16:08	14 15:34 (21) 15:44	22 14:30 (26)
17	04:55	20:29 (20) 05:47	06:43	07:38	17:24 (17) 07:38	15:21 (21) 08:23	14:08 (26)
	21:32	20 20:49 (20) 20:36	19:21	18:08	14 17:38 (17) 16:06	11 15:32 (21) 15:44	23 14:31 (26)
18	04:57	20:29 (20) 05:49	06:44	07:40	17:24 (17) 07:40	15:21 (21) 08:23	14:09 (26)
	21:30	20 20:49 (20) 20:34	19:19	18:05	12 17:36 (17) 16:05	9 15:30 (21) 15:44	23 14:32 (26)
19	04:58	20:28 (20) 05:50	06:46	07:42	17:24 (17) 07:42	15:21 (21) 08:24	14:09 (26)
	21:29	20 20:48 (20) 20:31	19:16	18:03	9 17:33 (17) 16:03	7 15:28 (21) 15:45	24 14:33 (26)
20	04:59	20:29 (20) 05:52	06:48	07:44	17:25 (17) 07:44	15:22 (21) 08:25	14:09 (26)
	21:28	20 20:49 (20) 20:29	19:14	18:01	6 17:31 (17) 16:02	5 15:27 (21) 15:45	24 14:33 (26)
21	05:01	20:29 (20) 05:54	06:50	07:46	17:27 (17) 07:46	15:23 (21) 08:25	14:10 (26)
	21:26	20 20:49 (20) 20:27	19:11	17:59	1 17:28 (17) 16:01	2 15:25 (21) 15:45	23 14:33 (26)
22	05:02	20:30 (20) 05:56	06:52	07:48	07:48	08:26	14:10 (26)
	21:25	19 20:49 (20) 20:25	19:09	17:56	15:59	15:46	23 14:33 (26)
23	05:04	20:30 (20) 05:58	06:53	07:49	07:49	08:26	14:11 (26)
	21:23	19 20:49 (20) 20:22	19:06	17:54	15:58	15:46	23 14:34 (26)
24	05:06	20:30 (20) 05:59	06:55	07:51	07:51	08:27	14:11 (26)
	21:22	18 20:48 (20) 20:20	19:04	17:52	15:57	15:47	24 14:36 (26)
25	05:07	20:31 (20) 06:01	06:57	07:53	07:53	08:27	14:12 (26)
	21:20	16 20:47 (20) 20:18	19:01	16:50	15:56	15:48	23 14:35 (26)
26	05:09	20:31 (20) 06:03	06:59	07:55	07:55	08:28	14:12 (26)
	21:19	14 20:45 (20) 20:15	18:59	16:47	15:54	15:48	23 14:35 (26)
27	05:10	20:32 (20) 06:05	07:01	07:57	07:56	08:28	14:12 (26)
	21:17	12 20:44 (20) 20:13	18:56	16:45	15:53	15:49	23 14:35 (26)
28	05:12	20:33 (20) 06:07	19:23 (18) 07:02	06:59	07:58	08:28	14:13 (26)
	21:15	9 20:42 (20) 20:11	4 19:27 (18) 18:54	16:43	15:52	15:50	23 14:36 (26)
29	05:14	20:35 (20) 06:08	19:19 (18) 07:04	07:01	08:00	08:28	14:14 (26)
	21:14	6 20:41 (20) 20:08	10 19:29 (18) 18:51	16:41	15:51	15:51	22 14:36 (26)
30	05:15	06:10	19:18 (18) 07:06	07:03	08:01	08:28	14:14 (26)
	21:12	20:06	12 19:30 (18) 18:49	16:39	15:51	15:52	22 14:36 (26)
31	05:17	06:12	19:17 (18) 18:49	07:05	08:02	08:28	14:15 (26)
	21:10	20:03	14 19:31 (18) 18:47	16:37	15:53	15:53	22 14:37 (26)
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	653	40		106	124	629	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.62	0.65	0.65	0.69	0.69	0.67	
Gesamte Reduktion	0.25	0.29	0.24	0.21	0.13	0.08	
Met.wahrsch.Beschattung	164	12	15	22	16	53	

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: CF - IO84

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1   08:28	14:39 (26)   07:57	16:05 (21)   06:59	17:07 (17)   06:43	05:33	04:42	20:26 (20)		
15:54	25   15:04 (26)   16:46	9   16:14 (21)   17:43	9   17:16 (17)   19:42	20:39	21:29	25   20:54 (1)		
2   08:28	14:38 (26)   07:55	16:05 (21)   06:56	17:05 (17)   06:40	05:31	04:41	20:27 (20)		
15:55	26   15:04 (26)   16:48	11   16:16 (21)   17:45	12   17:17 (17)   19:44	20:40	21:31	25   20:56 (1)		
3   08:28	14:39 (26)   07:54	16:05 (21)   06:54	17:06 (17)   06:38	05:28	04:40	20:28 (20)		
15:57	26   15:05 (26)   16:50	13   16:18 (21)   17:47	14   17:20 (17)   19:46	20:42	21:32	25   20:57 (1)		
4   08:27	14:40 (26)   07:52	16:05 (21)   06:52	17:05 (17)   06:35	05:26	04:40	20:28 (20)		
15:58	26   15:06 (26)   16:52	15   16:20 (21)   17:49	14   17:19 (17)   19:48	20:44	21:33	26   20:58 (1)		
5   08:27	14:40 (26)   07:50	16:06 (21)   06:49	17:06 (17)   06:33	05:24	04:39	20:29 (20)		
15:59	26   15:06 (26)   16:54	13   16:19 (21)   17:51	13   17:19 (17)   19:50	20:46	21:34	24   20:58 (1)		
6   08:27	14:40 (26)   07:48	16:07 (21)   06:47	17:06 (17)   06:30	05:22	04:38	20:30 (20)		
16:00	26   15:06 (26)   16:56	12   16:19 (21)   17:53	11   17:17 (17)   19:52	20:48	21:35	24   21:00 (1)		
7   08:26	14:41 (26)   07:46	16:08 (21)   06:44	17:09 (17)   06:28	05:20	04:37	20:30 (20)		
16:02	26   15:07 (26)   16:58	10   16:18 (21)   17:55	6   17:15 (17)   19:54	20:50	21:36	25   21:00 (1)		
8   08:26	14:41 (26)   07:44	16:10 (21)   06:42	06:26	05:18	04:37	20:32 (20)		
16:03	26   15:07 (26)   17:00	6   16:16 (21)   17:57	19:55	20:51	21:37	23   21:02 (1)		
9   08:25	14:42 (26)   07:42	06:40	06:23	19:28 (18)   05:17	04:36	20:32 (20)		
16:05	25   15:07 (26)   17:02	17:59	19:57	2   19:30 (18)   20:53	21:38	23   21:02 (1)		
10   08:24	14:42 (26)   07:40	06:37	06:21	19:27 (18)   05:15	04:36	20:34 (20)		
16:06	25   15:07 (26)   17:05	18:00	19:59	5   19:32 (18)   20:55	21:39	20   21:03 (1)		
11   08:24	14:43 (26)   07:38	06:35	06:18	19:25 (18)   05:13	04:35	20:46 (1)		
16:08	24   15:07 (26)   17:07	18:02	20:01	8   19:33 (18)   20:57	21:40	18   21:04 (1)		
12   08:23	14:43 (26)   07:36	06:32	06:16	19:25 (18)   05:11	04:35	20:46 (1)		
16:09	25   15:08 (26)   17:09	18:04	20:03	10   19:35 (18)   20:58	21:41	18   21:04 (1)		
13   08:22	14:44 (26)   07:34	06:30	06:14	19:25 (18)   05:09	04:34	20:46 (1)		
16:11	24   15:08 (26)   17:11	18:06	20:05	12   19:37 (18)   21:00	21:41	19   21:05 (1)		
14   08:21	14:45 (26)   07:32	06:27	06:11	19:24 (18)   05:07	04:34	20:47 (1)		
16:13	23   15:08 (26)   17:13	18:08	20:07	14   19:38 (18)   21:02	21:42	18   21:05 (1)		
15   08:20	14:46 (26)   07:30	06:25	06:09	19:25 (18)   05:06	04:34	20:47 (1)		
16:14	22   15:08 (26)   17:15	18:10	20:09	12   19:37 (18)   21:04	1   20:32 (20)   21:43	18   21:05 (1)		
16   08:19	14:47 (26)   07:28	06:22	06:06	19:26 (18)   05:04	04:34	20:47 (1)		
16:16	21   15:08 (26)   17:17	18:12	20:10	11   19:37 (18)   21:05	5   20:33 (20)   21:43	19   21:06 (1)		
17   08:18	14:48 (26)   07:26	06:20	06:04	19:26 (18)   05:02	04:34	20:48 (1)		
16:18	20   15:08 (26)   17:19	18:14	20:12	8   19:34 (18)   21:07	8   20:35 (20)   21:44	18   21:06 (1)		
18   08:17	14:48 (26)   07:24	06:18	06:02	19:25 (18)   05:01	04:33	20:48 (1)		
16:19	19   15:07 (26)   17:21	18:16	20:14	10   20:36 (20)   21:44	18   21:06 (1)			
19   08:16	14:50 (26)   07:22	06:15	05:59	04:59	20:25 (20)   04:33	20:48 (1)		
16:21	17   15:07 (26)   17:23	18:18	20:16	13   20:38 (20)   21:44	18   21:06 (1)			
20   08:15	14:50 (26)   07:19	06:13	05:57	04:58	20:24 (20)   04:34	20:48 (1)		
16:23	16   15:06 (26)   17:25	18:20	20:18	14   20:38 (20)   21:45	18   21:06 (1)			
21   08:14	14:53 (26)   07:17	06:10	05:55	04:56	20:24 (20)   04:34	20:48 (1)		
16:25	12   15:05 (26)   17:27	18:21	20:20	16   20:40 (20)   21:45	18   21:06 (1)			
22   08:12	14:55 (26)   07:15	06:08	05:52	04:55	20:24 (20)   04:34	20:48 (1)		
16:27	8   15:03 (26)   17:29	18:23	20:22	11   20:42 (20)   21:45	18   21:06 (1)			
23   08:11	07:13	06:05	05:50	04:53	20:25 (20)   04:34	20:49 (1)		
16:29	17:31	18:25	20:24	21:17	18   20:43 (20)   21:45	18   21:07 (1)		
24   08:10	07:10	06:03	05:48	04:52	20:24 (20)   04:34	20:49 (1)		
16:31	17:33	18:27	20:25	18   20:42 (20)   21:45	18   21:07 (1)			
25   08:08	07:08	06:00	05:46	04:50	20:24 (20)   04:35	20:49 (1)		
16:32	17:35	18:29	20:27	18   20:42 (20)   21:46	18   21:07 (1)			
26   08:07	07:06	05:58	05:43	04:49	20:24 (20)   04:35	20:50 (1)		
16:34	17:37	18:31	20:29	18   20:42 (20)   21:46	18   21:08 (1)			
27   08:05	07:03	17:08 (17)   05:55	05:41	04:48	20:25 (20)   04:36	20:49 (1)		
16:36	17:39	3   17:11 (17)   18:33	20:31	21:23	17   20:42 (20)   21:45	18   21:07 (1)		
28   08:04	07:01	17:07 (17)   05:53	05:39	04:47	20:25 (20)   04:36	20:50 (1)		
16:38	17:41	6   17:13 (17)   18:35	20:33	21:24	19   20:50 (1)   21:45	18   21:08 (1)		
29   08:02	16:07 (21)   06:50	05:37	05:33	04:45	20:25 (20)   04:37	20:50 (1)		
16:40	1   16:08 (21)   19:37	20:35	21:25	21   20:51 (1)   21:45	18   21:08 (1)			
30   08:00	16:06 (21)   06:48	05:35	05:35	04:44	20:25 (20)   04:37	20:50 (1)		
16:42	4   16:10 (21)   19:38	20:37	21:27	23   20:52 (1)   21:45	18   21:08 (1)			
31   07:59	16:06 (21)   06:45	05:33	05:33	04:43	20:26 (20)   04:37	20:50 (1)		
16:44	6   16:12 (21)   19:40	20:37	21:28	23   20:53 (1)   21:45	18   21:08 (1)			
Sonnenscheinstunden   248	272	367	421	496	512	602		
astr.max.mögl.Beschattung   499	98	79	82	260	602			
Red.Sonnenscheinwahrsch.   0.17	0.24	0.31	0.41	0.51	0.45			
Reduktion Betriebsdauer   0.90	0.90	0.90	0.90	0.90	0.90			
Reduktion Windrichtung   0.68	0.70	0.68	0.65	0.63	0.62			
Gesamte Reduktion   0.11	0.15	0.20	0.24	0.29	0.26			
Met.wahrsch.Beschattung   54	15	15	20	76	154			

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CF - IO84  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	20:51 (1) 05:19	06:14	19:25 (18) 07:08	07:07	08:03	14:25 (26)
	21:44	18 21:09 (1) 21:08	20:01	8 19:33 (18) 18:46	16:35	15:50	24 14:49 (26)
2	04:39	20:50 (1) 05:20	06:16	19:25 (18) 07:10	07:09	08:05	14:25 (26)
	21:44	17 21:07 (1) 21:07	19:59	5 19:30 (18) 18:44	16:33	15:49	25 14:50 (26)
3	04:40	20:38 (20) 05:22	06:17	19:26 (18) 07:12	07:11	15:39 (21) 08:06	14:26 (26)
	21:44	21 21:07 (1) 21:05	19:56	2 19:28 (18) 18:41	16:31	7 15:46 (21) 15:48	25 14:51 (26)
4	04:40	20:37 (20) 05:24	06:19	07:14	07:13	15:37 (21) 08:08	14:26 (26)
	21:43	23 21:07 (1) 21:03	19:54	18:39	16:29	11 15:48 (21) 15:47	25 14:51 (26)
5	04:41	20:37 (20) 05:25	06:21	07:15	07:15	15:37 (21) 08:09	14:26 (26)
	21:43	25 21:07 (1) 21:01	19:51	18:37	16:27	13 15:50 (21) 15:47	26 14:52 (26)
6	04:42	20:37 (20) 05:27	06:23	07:17	07:17	17:47 (17) 15:36 (21) 08:10	14:26 (26)
	21:42	24 21:06 (1) 20:59	19:49	18:34	2 17:49 (17) 16:25	14 15:50 (21) 15:46	26 14:52 (26)
7	04:43	20:36 (20) 05:29	06:25	07:19	07:19	17:43 (17) 15:36 (21) 08:12	14:27 (26)
	21:41	25 21:06 (1) 20:57	19:46	18:32	9 17:52 (17) 16:23	14 15:50 (21) 15:46	26 14:53 (26)
8	04:44	20:36 (20) 05:31	06:26	07:21	07:21	15:36 (21) 08:13	14:27 (26)
	21:41	24 21:05 (1) 20:55	19:44	18:29	12 17:54 (17) 16:21	13 15:49 (21) 15:45	26 14:53 (26)
9	04:45	20:35 (20) 05:32	06:28	07:23	07:23	17:41 (17) 15:36 (21) 08:14	14:27 (26)
	21:40	26 21:05 (1) 20:53	19:41	18:27	13 17:54 (17) 16:19	10 15:46 (21) 15:45	26 14:53 (26)
10	04:46	20:35 (20) 05:34	06:30	07:25	07:25	17:40 (17) 15:36 (21) 08:16	14:29 (26)
	21:39	25 21:04 (1) 20:51	19:39	18:24	15 17:55 (17) 16:18	8 15:44 (21) 15:45	25 14:54 (26)
11	04:48	20:35 (20) 05:36	06:32	07:27	07:27	17:40 (17) 15:38 (21) 08:17	14:29 (26)
	21:38	24 21:03 (1) 20:49	19:36	18:22	13 17:53 (17) 16:16	5 15:43 (21) 15:44	25 14:54 (26)
12	04:49	20:34 (20) 05:38	06:34	07:28	07:28	17:40 (17) 15:38 (21) 08:18	14:29 (26)
	21:37	24 21:02 (1) 20:47	19:34	18:20	10 17:50 (17) 16:14	3 15:41 (21) 15:44	25 14:54 (26)
13	04:50	20:34 (20) 05:40	06:35	07:30	07:30	17:40 (17) 15:31	08:19
	21:36	23 21:01 (1) 20:45	19:31	18:17	8 17:48 (17) 16:13	15:44	24 14:54 (26)
14	04:51	20:34 (20) 05:41	06:37	07:32	07:32	17:41 (17) 15:33	08:20
	21:35	22 21:00 (1) 20:43	19:29	18:15	4 17:45 (17) 16:11	15:44	25 14:55 (26)
15	04:52	20:33 (20) 05:43	06:39	07:34	07:34	17:42 (17) 15:35	08:21
	21:34	21 20:59 (1) 20:40	19:26	18:12	1 17:43 (17) 16:09	15:44	24 14:55 (26)
16	04:54	20:34 (20) 05:45	06:41	07:36	07:36	16:08	08:22
	21:33	19 20:59 (1) 20:38	19:24	18:10	16:08	15:44	25 14:56 (26)
17	04:55	20:34 (20) 05:47	06:43	07:38	07:38	16:08	08:23
	21:32	18 20:52 (20) 20:36	19:21	18:08	16:06	15:44	24 14:56 (26)
18	04:57	20:34 (20) 05:49	06:44	07:40	07:40	16:08	08:23
	21:30	18 20:52 (20) 20:34	19:19	18:05	16:05	15:44	24 14:57 (26)
19	04:58	20:33 (20) 05:50	06:46	07:42	07:42	16:08	08:24
	21:29	19 20:52 (20) 20:31	19:16	18:03	16:03	15:45	25 14:57 (26)
20	04:59	20:34 (20) 05:52	06:48	07:44	07:44	16:03	08:25
	21:28	18 20:52 (20) 20:29	19:14	18:01	16:02	8 14:30 (26) 15:45	24 14:57 (26)
21	05:01	20:34 (20) 05:54	06:50	07:46	07:46	14:28 (26) 15:45	24 14:57 (26)
	21:26	18 20:52 (20) 20:27	19:11	17:59	16:01	12 14:40 (26) 15:45	24 14:58 (26)
22	05:02	20:35 (20) 05:56	06:52	07:48	07:48	14:27 (26) 15:46	24 14:58 (26)
	21:25	17 20:52 (20) 20:25	19:09	17:56	15:59	15 14:42 (26) 15:46	24 14:58 (26)
23	05:04	20:35 (20) 05:58	06:53	07:49	07:49	14:26 (26) 15:46	24 14:59 (26)
	21:23	15 20:50 (20) 20:22	19:06	17:54	15:58	17 14:43 (26) 15:46	24 14:59 (26)
24	05:06	20:35 (20) 05:59	06:55	07:51	07:51	14:25 (26) 15:47	24 14:59 (26)
	21:22	13 20:48 (20) 20:20	19:04	17:52	15:57	19 14:44 (26) 15:47	24 14:59 (26)
25	05:07	20:36 (20) 06:01	06:57	07:53	07:53	14:25 (26) 15:48	24 14:59 (26)
	21:20	11 20:47 (20) 20:18	19:01	16:50	15:56	20 14:45 (26) 15:48	24 15:00 (26)
26	05:09	20:36 (20) 06:03	8 19:29 (18) 06:59	06:55	07:55	14:25 (26) 15:48	24 15:00 (26)
	21:19	9 20:45 (20) 20:15	8 19:37 (18) 18:59	16:47	15:54	21 14:46 (26) 15:48	24 15:00 (26)
27	05:10	20:38 (20) 06:05	19:27 (18) 07:01	06:57	07:56	14:25 (26) 15:48	24 15:00 (26)
	21:17	6 20:44 (20) 20:13	11 19:38 (18) 18:56	16:45	15:53	22 14:47 (26) 15:49	24 15:00 (26)
28	05:12	20:39 (20) 06:07	19:26 (18) 07:02	06:59	07:58	14:25 (26) 15:48	24 15:01 (26)
	21:15	3 20:42 (20) 20:11	13 19:39 (18) 18:54	16:43	15:52	23 14:48 (26) 15:50	25 15:01 (26)
29	05:14	06:08	19:25 (18) 07:04	07:01	08:00	14:25 (26) 15:48	24 15:01 (26)
	21:14	20:08	14 19:39 (18) 18:51	16:41	15:51	24 14:49 (26) 15:51	24 15:01 (26)
30	05:15	06:10	19:25 (18) 07:06	07:03	08:01	14:25 (26) 15:48	24 15:01 (26)
	21:12	20:06	12 19:37 (18) 18:49	16:39	15:51	25 14:50 (26) 15:52	25 15:02 (26)
31	05:17	06:12	19:25 (18) 07:08	07:05	08:02	14:25 (26) 15:48	24 15:02 (26)
	21:10	20:03	10 19:35 (18) 18:47	16:37	15:53	25 15:03 (26)	
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	526	68	15	87	304	766	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.62	0.65	0.65	0.68	0.68	0.68	
Gesamte Reduktion	0.25	0.29	0.24	0.21	0.13	0.09	
Met.wahrsch.Beschattung	133	20	4	18	40	66	

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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

André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CG - IO85  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni			
1   08:28	14:33 (26)   07:57	16:04 (21)   06:59	17:08 (17)   06:43	05:33	04:42	20:32 (20)			
15:54	26   14:59 (26)   16:46	10   16:14 (21)   17:43	8   17:16 (17)   19:42	20:39	21:29	18   20:50 (20)			
2   08:28	14:33 (26)   07:55	16:04 (21)   06:56	17:06 (17)   06:40	05:31	04:41	20:33 (20)			
15:55	26   14:59 (26)   16:48	12   16:16 (21)   17:45	11   17:17 (17)   19:44	20:40	21:31	18   20:51 (20)			
3   08:28	14:34 (26)   07:54	16:04 (21)   06:54	17:06 (17)   06:38	05:28	04:40	20:33 (20)			
15:57	26   15:00 (26)   16:50	14   16:18 (21)   17:47	14   17:20 (17)   19:46	20:42	21:32	20   20:57 (11)			
4   08:27	14:35 (26)   07:52	16:04 (21)   06:52	17:06 (17)   06:35	05:26	04:40	20:33 (20)			
15:58	26   15:01 (26)   16:52	15   16:19 (21)   17:49	15   17:21 (17)   19:48	20:44	21:33	22   20:58 (11)			
5   08:27	14:35 (26)   07:50	16:04 (21)   06:49	17:06 (17)   06:33	05:24	04:39	20:32 (20)			
15:59	26   15:01 (26)   16:54	14   16:18 (21)   17:51	15   17:21 (17)   19:50	20:46	21:34	23   20:58 (11)			
6   08:27	14:35 (26)   07:48	16:05 (21)   06:47	17:06 (17)   06:30	05:22	04:38	20:33 (20)			
16:00	26   15:01 (26)   16:56	13   16:18 (21)   17:53	14   17:20 (17)   19:52	20:48	21:35	25   21:00 (11)			
7   08:26	14:36 (26)   07:46	16:06 (21)   06:44	17:07 (17)   06:28	05:20	04:37	20:33 (20)			
16:02	26   15:02 (26)   16:58	11   16:17 (21)   17:55	12   17:19 (17)   19:54	20:50	21:36	25   21:00 (11)			
8   08:26	14:36 (26)   07:44	16:08 (21)   06:42	17:09 (17)   06:26	05:18	04:37	20:34 (20)			
16:03	26   15:02 (26)   17:00	8   16:16 (21)   17:57	7   17:16 (17)   19:55	20:51	21:37	26   21:02 (11)			
9   08:25	14:36 (26)   07:42	16:06 (21)   06:40	17:07 (17)   06:23	05:17	04:36	20:34 (20)			
16:05	26   15:02 (26)   17:02	17:59	19:57	20:53	21:38	26   21:02 (11)			
10   08:24	14:37 (26)   07:40	16:07	17:06	19:54	20:50	21:36	25   21:00 (11)		
16:06	26   15:03 (26)   17:05	18:00	19:59	20:55	21:39	27   21:03 (11)			
11   08:24	14:37 (26)   07:38	16:05	17:04	19:52	20:48	21:35	25   21:00 (11)		
16:08	26   15:03 (26)   17:07	18:02	19:57	20:52	21:40	27   21:04 (11)			
12   08:23	14:38 (26)   07:36	16:05	17:04	19:51	20:46	21:34	23   20:58 (11)		
16:09	25   15:03 (26)   17:09	18:04	19:58	20:53	21:41	27   21:04 (11)			
13   08:22	14:39 (26)   07:34	16:03	17:02	19:49	20:44	21:33	20   20:57 (11)		
16:11	24   15:03 (26)   17:11	18:06	19:59	20:55	21:41	29   21:05 (11)			
14   08:21	14:39 (26)   07:32	16:02	17:00	19:47	20:42	21:32	20   20:57 (11)		
16:13	24   15:03 (26)   17:13	18:08	19:57	20:53	21:42	28   21:06 (11)			
15   08:20	14:40 (26)   07:30	16:02	17:00	19:46	20:41	21:31	19   20:56 (11)		
16:14	23   15:03 (26)   17:15	18:10	19:59	20:55	21:43	28   21:06 (11)			
16   08:19	14:41 (26)   07:28	16:02	17:00	19:45	20:40	21:30	19   20:55 (11)		
16:16	22   15:03 (26)   17:17	18:12	19:59	20:54	21:43	28   21:07 (11)			
17   08:18	14:43 (26)   07:26	16:00	17:00	19:44	20:39	21:29	18   20:54 (11)		
16:18	20   15:03 (26)   17:19	18:14	19:57	20:52	21:44	28   21:07 (11)			
18   08:17	14:43 (26)   07:24	16:01	17:00	19:43	20:38	21:28	17   20:53 (11)		
16:19	19   15:02 (26)   17:21	18:16	19:59	20:54	21:44	30   21:08 (11)			
19   08:16	14:45 (26)   07:22	16:05	17:00	19:42	20:37	21:27	17   20:52 (11)		
16:21	17   15:02 (26)   17:23	18:18	19:59	20:55	21:44	28   21:08 (11)			
20   08:15	14:46 (26)   07:19	16:03	17:00	19:41	20:36	21:26	16   20:51 (11)		
16:23	15   15:01 (26)   17:25	18:20	19:58	20:54	21:45	28   21:08 (11)			
21   08:14	14:48 (26)   07:17	16:00	17:00	19:38	20:31	21:25	15   20:50 (11)		
16:25	12   15:00 (26)   17:27	18:21	19:58	20:54	21:44	28   21:08 (11)			
22   08:12	14:51 (26)   07:15	16:08	17:00	19:37	20:30	21:24	14   20:49 (11)		
16:27	6   14:57 (26)   17:29	18:23	19:59	20:54	21:45	28   21:08 (11)			
23   08:11	14:53 (26)   07:13	16:05	17:00	19:35	20:28	21:21	13   20:46 (11)		
16:29	17   15:03 (26)   17:31	18:25	19:59	20:54	21:47	29   21:09 (11)			
24   08:10	14:54 (26)   07:10	16:03	17:00	19:33	20:25	21:19	12   20:41 (11)		
16:31	16   15:04 (26)   17:33	18:27	19:59	20:54	21:46	29   21:09 (11)			
25   08:08	14:55 (26)   07:08	16:00	17:00	19:30	20:21	21:16	11   20:44 (11)		
16:32	17   15:05 (26)   17:35	18:29	19:59	20:54	21:46	30   21:09 (11)			
26   08:07	14:56 (26)   07:06	16:05	17:00	19:27	20:18	21:13	10   20:40 (11)		
16:34	17   15:06 (26)   17:37	18:31	19:59	20:54	21:47	28   21:09 (11)			
27   08:05	14:57 (26)   07:03	16:03	17:00	19:24	20:14	21:10	9   20:35 (11)		
16:36	17   15:07 (26)   17:39	18:33	19:59	20:54	21:48	28   21:09 (11)			
28   08:04	14:58 (26)   07:01	16:04	17:00	19:21	20:11	21:07	8   20:32 (11)		
16:38	17   15:08 (26)   17:41	18:37	19:59	20:54	21:49	28   21:09 (11)			
29   08:02	14:59 (26)   06:59	16:02	17:00	19:18	20:08	21:05	7   20:30 (11)		
16:40	2   16:08 (21)   19:37	18:39	19:59	20:54	21:50	28   21:10 (11)			
30   08:00	14:59 (26)   06:57	16:01	17:00	19:15	20:05	21:03	6   20:27 (11)		
16:42	5   16:10 (21)   19:38	18:41	19:59	20:54	21:51	28   21:10 (11)			
31   07:59	14:59 (26)   06:54	16:05	17:00	19:12	20:02	21:02	5   20:24 (11)		
16:44	8   16:12 (21)   19:40	18:44	19:59	20:54	21:52	28   21:10 (11)			
Sonnenscheinstunden   248		272	367	421	496	512			
astr.max.mögl.Beschattung   508		101	96	91	148	794			
Red.Sonnenscheinwahrsch.   0.17		0.24	0.31	0.41	0.51	0.45			
Reduktion Betriebsdauer   0.90		0.90	0.90	0.90	0.90	0.90			
Reduktion Windrichtung   0.68		0.70	0.68	0.64	0.62	0.62			
Gesamte Reduktion   0.11		0.15	0.20	0.24	0.29	0.26			
Met.wahrsch.Beschattung   55		15	19	22	43	203			

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CG - IO85  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	20:39 (20) 05:19	06:14	19:32 (18) 07:08	07:07	08:03	14:19 (26)
	21:44	28 21:09 (1) 21:08	20:01	1 19:33 (18) 18:46	16:35	15:50	26 14:45 (26)
2	04:39	20:39 (20) 05:20	06:16	07:10	07:09	08:05	14:20 (26)
	21:44	27 21:07 (1) 21:07	19:59	18:44	16:33	15:49	26 14:46 (26)
3	04:40	20:39 (20) 05:22	06:17	07:12	07:11	08:06	14:20 (26)
	21:44	26 21:07 (1) 21:05	19:56	18:41	16:31	9 15:46 (21) 15:48	27 14:47 (26)
4	04:40	20:39 (20) 05:24	06:19	07:14	07:13	08:08	14:20 (26)
	21:43	26 21:07 (1) 21:03	19:54	18:39	16:29	11 15:47 (21) 15:47	26 14:46 (26)
5	04:41	20:40 (20) 05:25	06:21	07:15	07:15	08:09	14:21 (26)
	21:43	25 21:07 (1) 21:01	19:51	18:37	3 17:51 (17) 16:27	13 15:49 (21) 15:47	26 14:47 (26)
6	04:42	20:40 (20) 05:27	06:23	07:17	07:17	08:10	14:21 (26)
	21:42	24 21:06 (1) 20:59	19:49	18:34	10 17:54 (17) 16:25	14 15:49 (21) 15:46	26 14:47 (26)
7	04:43	20:40 (20) 05:29	06:25	07:19	07:19	08:12	14:22 (26)
	21:41	23 21:06 (1) 20:57	19:46	18:32	12 17:55 (17) 16:23	15 15:50 (21) 15:46	26 14:48 (26)
8	04:44	20:40 (20) 05:31	06:26	07:21	07:21	08:13	14:22 (26)
	21:41	22 21:05 (1) 20:55	19:44	18:29	14 17:56 (17) 16:21	15 15:49 (21) 15:45	26 14:48 (26)
9	04:45	20:40 (20) 05:32	06:28	07:23	07:23	08:14	14:23 (26)
	21:40	22 21:05 (1) 20:53	19:41	18:27	15 17:56 (17) 16:19	12 15:46 (21) 15:45	26 14:49 (26)
10	04:46	20:40 (20) 05:34	06:30	07:25	07:25	08:16	14:23 (26)
	21:39	20 21:04 (1) 20:51	19:39	18:24	14 17:55 (17) 16:18	9 15:44 (21) 15:45	26 14:49 (26)
11	04:48	20:40 (20) 05:36	06:32	07:27	07:27	08:17	14:23 (26)
	21:38	19 20:59 (20) 20:49	19:36	18:22	13 17:53 (17) 16:16	7 15:43 (21) 15:44	27 14:50 (26)
12	04:49	20:40 (20) 05:38	06:34	07:28	07:28	08:18	14:23 (26)
	21:37	19 20:59 (20) 20:47	19:34	18:20	9 17:50 (17) 16:14	4 15:41 (21) 15:44	27 14:50 (26)
13	04:50	20:40 (20) 05:40	06:35	07:30	07:31	08:19	14:24 (26)
	21:36	19 20:59 (20) 20:45	19:31	18:17	7 17:48 (17) 16:13	1 15:39 (21) 15:44	26 14:50 (26)
14	04:51	20:40 (20) 05:41	06:37	07:32	07:32	08:20	14:24 (26)
	21:35	19 20:59 (20) 20:43	19:29	18:15	2 17:45 (17) 16:11	15:44	26 14:50 (26)
15	04:52	20:40 (20) 05:43	06:39	07:34	07:35	08:21	14:25 (26)
	21:34	18 20:58 (20) 20:40	19:26	18:12	16:09	15:44	26 14:51 (26)
16	04:54	20:42 (20) 05:45	06:41	07:36	07:36	08:22	14:25 (26)
	21:33	17 20:59 (20) 20:38	19:24	18:10	16:08	15:44	26 14:51 (26)
17	04:55	20:42 (20) 05:47	06:43	07:38	07:38	08:23	14:26 (26)
	21:32	15 20:57 (20) 20:36	19:21	18:08	16:06	15:44	26 14:52 (26)
18	04:57	20:42 (20) 05:49	06:44	07:40	07:40	08:23	14:27 (26)
	21:30	14 20:56 (20) 20:34	19:19	18:05	16:05	15:44	26 14:53 (26)
19	04:58	20:42 (20) 05:50	06:46	07:42	07:42	08:24	14:27 (26)
	21:29	12 20:54 (20) 20:31	19:16	18:03	16:03	15:45	25 14:52 (26)
20	04:59	20:44 (20) 05:52	06:48	07:44	07:44	08:25	14:27 (26)
	21:28	10 20:54 (20) 20:29	19:14	18:01	16:02	6 14:32 (26) 15:45	26 14:53 (26)
21	05:01	20:44 (20) 05:54	06:50	07:46	07:46	08:25	14:28 (26)
	21:26	8 20:52 (20) 20:27	19:11	17:59	16:01	12 14:35 (26) 15:45	26 14:54 (26)
22	05:02	20:46 (20) 05:56	06:52	07:48	07:48	08:26	14:28 (26)
	21:25	6 20:52 (20) 20:25	19:09	17:56	15:59	15 14:37 (26) 15:46	26 14:54 (26)
23	05:04	20:47 (20) 05:58	06:53	07:49	07:49	08:26	14:29 (26)
	21:23	3 20:50 (20) 20:22	6 19:41 (18) 19:06	17:54	15:58	17 14:38 (26) 15:46	26 14:55 (26)
24	05:06	20:48 (20) 05:59	06:55	07:51	07:51	08:27	14:29 (26)
	21:22	20:20	10 19:43 (18) 19:04	17:52	15:57	19 14:39 (26) 15:47	26 14:56 (26)
25	05:07	06:01	19:32 (18) 06:57	06:53	07:53	14:20 (26) 08:27	14:30 (26)
	21:20	20:18	12 19:44 (18) 19:01	16:50	15:56	20 14:40 (26) 15:48	26 14:56 (26)
26	05:09	06:03	19:30 (18) 06:59	06:55	07:55	14:20 (26) 08:28	14:30 (26)
	21:19	20:15	14 19:44 (18) 18:59	16:47	15:54	21 14:41 (26) 15:48	26 14:56 (26)
27	05:10	06:05	19:30 (18) 07:01	06:57	07:56	14:19 (26) 08:28	14:30 (26)
	21:17	20:13	14 19:44 (18) 18:56	16:45	15:53	23 14:42 (26) 15:49	26 14:56 (26)
28	05:12	06:07	19:29 (18) 07:02	06:59	07:58	14:19 (26) 08:28	14:31 (26)
	21:15	20:11	13 19:42 (18) 18:54	16:43	15:52	24 14:43 (26) 15:50	26 14:57 (26)
29	05:14	06:08	19:29 (18) 07:04	07:01	08:00	14:20 (26) 08:28	14:31 (26)
	21:14	20:08	10 19:39 (18) 18:51	16:41	15:51	24 14:44 (26) 15:51	26 14:57 (26)
30	05:15	06:10	19:29 (18) 07:06	07:03	08:01	14:20 (26) 08:28	14:32 (26)
	21:12	20:06	8 19:37 (18) 18:49	16:39	15:51	25 14:45 (26) 15:52	26 14:58 (26)
31	05:17	06:12	19:30 (18) 07:05	07:05	08:02	14:20 (26) 08:28	14:32 (26)
	21:10	20:03	5 19:35 (18) 18:47	16:37	15:53	27 14:46 (26) 15:53	27 14:59 (26)
	Sonnenscheinstunden	514	461	383	328	257	231
	astr.max.mögl.Beschattung	422	92	1	99	316	809
	Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
	Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90
	Reduktion Windrichtung	0.62	0.64	0.64	0.68	0.68	0.68
	Gesamte Reduktion	0.25	0.29	0.24	0.21	0.13	0.09
	Met.wahrsch.Beschattung	106	26	0	20	41	69

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CH - IO86

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni				
1   08:28	14:34 (26)   07:57		16:07 (21)   06:59	17:13 (17)   06:43	05:33	04:42	20:38 (20)			
15:54	27   15:01 (26)   16:46	7	16:14 (21)   17:43	3   17:16 (17)   19:42	20:39	21:29	16	20:54 (20)		
2   08:28	14:34 (26)   07:55		16:06 (21)   06:56	17:11 (17)   06:40	05:31	04:41	20:38 (20)			
15:55	27   15:01 (26)   16:48	10	16:16 (21)   17:45	6   17:17 (17)   19:44	20:40	21:31	18	20:56 (20)		
3   08:28	14:35 (26)   07:54		16:06 (21)   06:54	17:10 (17)   06:38	05:28	04:40	20:38 (20)			
15:57	27   15:02 (26)   16:50	12	16:18 (21)   17:47	10   17:20 (17)   19:46	20:42	21:32	18	20:56 (20)		
4   08:27	14:36 (26)   07:52		16:06 (21)   06:52	17:09 (17)   06:35	05:26	04:40	20:38 (20)			
15:58	27   15:03 (26)   16:52	14	16:20 (21)   17:49	12   17:21 (17)   19:48	20:44	21:33	18	20:56 (20)		
5   08:27	14:36 (26)   07:50		16:06 (21)   06:49	17:09 (17)   06:33	05:24	04:39	20:37 (20)			
15:59	27   15:03 (26)   16:54	15	16:21 (21)   17:51	15   17:24 (17)   19:50	20:46	21:34	19	20:56 (20)		
6   08:27	14:36 (26)   07:48		16:06 (21)   06:47	17:08 (17)   06:30	05:22	04:38	20:38 (20)			
16:00	27   15:03 (26)   16:56	15	16:21 (21)   17:53	16   17:24 (17)   19:52	20:48	21:35	19	20:57 (20)		
7   08:26	14:37 (26)   07:46		16:07 (21)   06:44	17:09 (17)   06:28	05:20	04:37	20:38 (20)			
16:02	27   15:04 (26)   16:58	14	16:21 (21)   17:55	14   17:23 (17)   19:54	20:50	21:36	19	20:57 (20)		
8   08:26	14:37 (26)   07:44		16:08 (21)   06:42	17:09 (17)   06:26	05:18	04:37	20:39 (20)			
16:03	27   15:04 (26)   17:00	12	16:20 (21)   17:57	13   17:22 (17)   19:55	20:51	21:37	20	21:02 (1)		
9   08:25	14:37 (26)   07:42		16:10 (21)   06:40	17:11 (17)   06:23	05:17	04:36	20:38 (20)			
16:05	27   15:04 (26)   17:02	9	16:19 (21)   17:59	10   17:21 (17)   19:57	20:53	21:38	22	21:02 (1)		
10   08:24	14:38 (26)   07:40		16:14 (21)   06:37	17:13 (17)   06:21	05:15	04:36	20:39 (20)			
16:06	27   15:05 (26)   17:05	1	16:15 (21)   18:00	4   17:17 (17)   19:59	20:55	21:39	22	21:03 (1)		
11   08:24	14:38 (26)   07:38		06:35	06:18	05:13	04:35	20:39 (20)			
16:08	27   15:05 (26)   17:07		18:02	20:01	20:57	21:40	23	21:04 (1)		
12   08:23	14:39 (26)   07:36		06:32	06:16	05:11	04:35	20:39 (20)			
16:09	26   15:05 (26)   17:09		18:04	20:03	20:58	21:41	23	21:04 (1)		
13   08:22	14:39 (26)   07:34		06:30	06:14	05:09	04:34	20:39 (20)			
16:11	26   15:05 (26)   17:11		18:06	20:05	2	19:37 (18)   21:00	21:41	25	21:05 (1)	
14   08:21	14:40 (26)   07:32		06:27	06:11	19:33 (18)   05:07	04:34	20:40 (20)			
16:13	26   15:06 (26)   17:13		18:08	20:07	5	19:38 (18)   21:02	21:42	25	21:06 (1)	
15   08:20	14:41 (26)   07:30		06:25	06:09	19:32 (18)   05:06	04:34	20:40 (20)			
16:14	25   15:06 (26)   17:15		18:10	20:09	8	19:40 (18)   21:04	21:43	25	21:06 (1)	
16   08:19	14:42 (26)   07:28		06:22	06:06	19:32 (18)   05:04	04:34	20:41 (20)			
16:16	24   15:06 (26)   17:17		18:12	20:10	10	19:42 (18)   21:05	21:43	26	21:07 (1)	
17   08:18	14:43 (26)   07:26		06:20	06:04	19:30 (18)   05:02	04:34	20:41 (20)			
16:18	23   15:06 (26)   17:19		18:14	20:12	14	19:44 (18)   21:07	21:44	25	21:07 (1)	
18   08:17	14:43 (26)   07:24		06:18	06:02	19:31 (18)   05:01	04:33	20:41 (20)			
16:19	22   15:05 (26)   17:21		18:16	20:14	14	19:45 (18)   21:09	21:44	26	21:08 (1)	
19   08:16	14:44 (26)   07:22		06:15	05:59	19:31 (18)   04:59	04:33	20:41 (20)			
16:21	21   15:05 (26)   17:23		18:18	20:16	14	19:45 (18)   21:10	21:44	26	21:08 (1)	
20   08:15	14:45 (26)   07:19		06:13	05:57	19:32 (18)   04:58	04:34	20:41 (20)			
16:23	19   15:04 (26)   17:25		18:20	20:18	12	19:44 (18)   21:12	21:45	26	21:08 (1)	
21   08:14	14:47 (26)   07:17		06:10	05:55	19:33 (18)   04:56	04:34	20:41 (20)			
16:25	17   15:04 (26)   17:27		18:21	20:20	10	19:43 (18)   21:14	21:45	26	21:08 (1)	
22   08:12	14:48 (26)   07:15		06:08	05:52	19:34 (18)   04:55	04:34	20:41 (20)			
16:27	14   15:02 (26)   17:29		18:23	20:22	6	19:40 (18)   21:15	21:45	26	21:08 (1)	
23   08:11	14:51 (26)   07:13		06:05	05:50		04:53	04:34	20:42 (20)		
16:29	10   15:01 (26)   17:31		18:25	20:24		21:17	21:45	26	21:09 (1)	
24   08:10	14:55 (26)   07:10		06:03	05:48		04:52	04:34	20:42 (20)		
16:31	2   14:57 (26)   07:08		18:27	20:25		21:18	1	20:44 (20)   21:46	26	21:09 (1)
25   08:08		07:08	06:00	05:46		04:50	20:41 (20)   04:55	20:42 (20)		
16:32		17:35	18:29	20:27		21:20	5	20:46 (20)   21:46	26	21:09 (1)
26   08:07		07:06	05:58	05:43		04:49	20:40 (20)   04:55	20:43 (20)		
16:34		17:37	18:31	20:29		21:21	7	20:47 (20)   21:46	26	21:09 (1)
27   08:05		07:03	05:55	05:41		04:48	20:39 (20)   04:56	20:42 (20)		
16:36		17:39	18:33	20:31		21:23	9	20:48 (20)   21:45	27	21:09 (1)
28   08:04		07:01	05:53	05:39		04:47	20:39 (20)   04:56	20:43 (20)		
16:38		17:41	18:35	20:33		21:24	11	20:50 (20)   21:45	25	21:09 (1)
29   08:02			06:50	05:37		04:45	20:38 (20)   04:57	20:43 (20)		
16:40			19:37	20:35		21:25	13	20:51 (20)   21:45	24	21:08 (1)
30   08:00			06:48	05:35		04:44	20:38 (20)   04:57	20:43 (20)		
16:42	1	16:10 (21)	19:38	20:37		21:27	14	20:52 (20)   21:45	24	21:08 (1)
31   07:59		16:07 (21)	06:45	06:17		04:43	20:38 (20)			
16:44	5	16:12 (21)	19:40			21:28	15	20:53 (20)		
Sonnenscheinstunden	248	272	367	421	496	512				
astr.max.mögl.Beschattung	558		109	103	95	75		697		
Red.Sonnenscheinwahrsch.	0.17		0.24	0.31	0.41	0.51		0.45		
Reduktion Betriebsdauer	0.90		0.90	0.90	0.90	0.90		0.90		
Reduktion Windrichtung	0.68		0.70	0.68	0.64	0.62		0.62		
Gesamte Reduktion	0.11		0.15	0.19	0.24	0.29		0.25		
Met.wahrsch.Beschattung	60		17	20	23	22		178		

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CH - IO86

**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  
342 326 396 565 523 733 981 1.012 1.213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember				
1	04:38		20:44 (20)	05:19	06:14		07:08		07:07		15:42 (21)	08:03	14:20 (26)		
	21:44	23	21:09 (1)	21:08	20:01		18:46		16:35	4	15:46 (21)	15:50	27	14:47 (26)	
2	04:39		20:43 (20)	05:20	06:16		07:10		07:09		15:39 (21)	08:05	14:21 (26)		
	21:44	23	21:07 (1)	21:07	19:59		18:44		16:33	10	15:49 (21)	15:49	27	14:48 (26)	
3	04:40		20:43 (20)	05:22	06:17		07:12		07:11		15:38 (21)	08:06	14:21 (26)		
	21:44	22	21:07 (1)	21:05	19:56		18:41		16:31	12	15:50 (21)	15:48	27	14:48 (26)	
4	04:40		20:44 (20)	05:24	06:19		07:14		06:19		17:49 (17)	07:13	15:37 (21)	08:08	14:21 (26)
	21:43	21	21:07 (1)	21:03	19:54		18:39	8	17:57 (17)	16:29	13	15:50 (21)	15:47	27	14:48 (26)
5	04:41		20:44 (20)	05:25	06:21		07:15		17:47 (17)	07:15		15:37 (21)	08:09	14:22 (26)	
	21:43	20	21:07 (1)	21:01	19:51		18:37	11	17:58 (17)	16:27	15	15:52 (21)	15:47	27	14:49 (26)
6	04:42		20:45 (20)	05:27	06:23		07:17		17:45 (17)	07:17		15:37 (21)	08:10	14:22 (26)	
	21:42	18	21:03 (20)	20:59	19:49		18:34	14	17:59 (17)	16:25	15	15:52 (21)	15:46	27	14:49 (26)
7	04:43		20:45 (20)	05:29	06:25		07:19		17:45 (17)	07:19		15:37 (21)	08:12	14:23 (26)	
	21:41	18	21:03 (20)	20:57	19:46		18:32	15	18:00 (17)	16:23	14	15:51 (21)	15:46	27	14:50 (26)
8	04:44		20:45 (20)	05:31	06:26		07:21		17:44 (17)	07:21		15:37 (21)	08:13	14:23 (26)	
	21:41	19	21:04 (20)	20:55	19:44		18:29	16	18:00 (17)	16:21	12	15:49 (21)	15:45	27	14:50 (26)
9	04:45		20:45 (20)	05:32	06:28		07:23		17:44 (17)	07:23		15:37 (21)	08:14	14:23 (26)	
	21:40	19	21:04 (20)	20:53	19:41		18:27	14	17:58 (17)	16:19	9	15:46 (21)	15:45	27	14:50 (26)
10	04:46		20:46 (20)	05:34	06:30		07:25		17:44 (17)	07:25		15:37 (21)	08:16	14:24 (26)	
	21:39	18	21:04 (20)	20:51	19:39		18:24	11	17:55 (17)	16:18	7	15:44 (21)	15:45	27	14:51 (26)
11	04:48		20:46 (20)	05:36	06:32		07:27		17:45 (17)	07:27		15:39 (21)	08:17	14:24 (26)	
	21:38	17	21:03 (20)	20:49	19:36		18:22	8	17:53 (17)	16:16	4	15:43 (21)	15:44	27	14:51 (26)
12	04:49		20:46 (20)	05:38	06:34		07:28		17:46 (17)	07:29		15:44	08:18	14:25 (26)	
	21:37	16	21:02 (20)	20:47	19:34		18:20	4	17:50 (17)	16:14		15:44	26	14:51 (26)	
13	04:50		20:46 (20)	05:40	06:35		07:30		17:44	07:31		15:44	08:19	14:25 (26)	
	21:36	15	21:01 (20)	20:45	19:31		18:17		16:13			15:44	27	14:52 (26)	
14	04:51		20:47 (20)	05:41	06:37		07:32		17:43	07:33		15:44	08:20	14:26 (26)	
	21:35	13	21:00 (20)	20:43	19:29		18:15		16:11			15:44	26	14:52 (26)	
15	04:53		20:47 (20)	05:43	06:39		07:34		17:42	07:35		15:44	08:21	14:26 (26)	
	21:34	12	20:59 (20)	20:40	19:26		18:12		16:09			15:44	26	14:52 (26)	
16	04:54		20:49 (20)	05:45	06:41		07:36		17:36	07:36		15:44	08:22	14:27 (26)	
	21:33	10	20:59 (20)	20:38	19:24		18:10		16:08			15:44	26	14:53 (26)	
17	04:55		20:49 (20)	05:47	06:43		07:38		17:38	07:38		15:44	08:23	14:27 (26)	
	21:32	8	20:57 (20)	20:36	19:21		18:08		16:06			15:44	26	14:53 (26)	
18	04:57		20:50 (20)	05:49	06:44		07:40		17:40	07:40		14:29 (26)	08:23	14:28 (26)	
	21:30	6	20:56 (20)	20:34	19:19		18:05		16:05	2	14:31 (26)	15:44	26	14:54 (26)	
19	04:58		20:51 (20)	05:50	06:46		07:42		17:42	07:42		14:25 (26)	08:24	14:28 (26)	
	21:29	3	20:54 (20)	20:31	19:16		18:03		16:03	10	14:35 (26)	15:45	26	14:54 (26)	
20	04:59		20:46 (20)	05:52	06:48		07:44		17:44	07:44		14:23 (26)	08:25	14:29 (26)	
	21:28		20:29		19:14		18:01		16:02	14	14:37 (26)	15:45	26	14:55 (26)	
21	05:01		05:54		19:39 (18)	06:50	07:46		17:46			14:22 (26)	08:25	14:30 (26)	
	21:26		20:27	7	19:46 (18)	19:11	17:59		16:01	17	14:39 (26)	15:45	25	14:55 (26)	
22	05:02		05:56		19:36 (18)	06:52	07:48		17:48			14:21 (26)	08:26	14:30 (26)	
	21:25		20:25	11	19:47 (18)	19:09	17:56		15:59	19	14:40 (26)	15:46	25	14:55 (26)	
23	05:04		05:58		19:35 (18)	06:53	07:49		17:49			14:20 (26)	08:26	14:31 (26)	
	21:23		20:22	13	19:48 (18)	19:06	17:54		15:58	21	14:41 (26)	15:46	26	14:57 (26)	
24	05:06		05:59		19:35 (18)	06:55	07:51		17:51			14:20 (26)	08:27	14:31 (26)	
	21:22		20:20	14	19:49 (18)	19:04	17:52		15:57	22	14:42 (26)	15:47	26	14:57 (26)	
25	05:07		06:01		19:34 (18)	06:57	06:53		17:53			14:20 (26)	08:27	14:31 (26)	
	21:20		20:18	15	19:49 (18)	19:01	16:50		15:56	23	14:43 (26)	15:48	26	14:57 (26)	
26	05:09		06:03		19:33 (18)	06:59	06:55		17:55			14:20 (26)	08:28	14:31 (26)	
	21:19		20:15	13	19:46 (18)	18:59	16:47		15:54	24	14:44 (26)	15:48	26	14:57 (26)	
27	05:10		06:05		19:33 (18)	07:01	06:57		17:56			14:20 (26)	08:28	14:32 (26)	
	21:17		20:13	11	19:44 (18)	18:56	16:45		15:53	25	14:45 (26)	15:49	26	14:58 (26)	
28	05:12		06:07		19:34 (18)	07:02	06:59		17:58			14:20 (26)	08:28	14:32 (26)	
	21:15		20:11	8	19:42 (18)	18:54	16:43		15:52	26	14:46 (26)	15:50	26	14:58 (26)	
29	05:14		06:08		19:34 (18)	07:04	07:01		18:00			14:20 (26)	08:28	14:32 (26)	
	21:14		20:08	5	19:39 (18)	18:51	16:41		15:51	26	14:46 (26)	15:51	27	14:59 (26)	
30	05:15		06:10		19:35 (18)	07:06	07:03		18:01			14:21 (26)	08:28	14:33 (26)	
	21:12		20:06	2	19:37 (18)	18:49	16:39		15:51	26	14:47 (26)	15:52	26	14:59 (26)	
31	05:17		06:12				07:05					08:28		14:34 (26)	
	21:10		20:03				16:37					15:53	26	15:00 (26)	
	Sonnenscheinstunden		514	461		383	328		257			231			
	astr.max.mögl.Beschattung		301				101			370				817	
	Red.Sonnenscheinwahrsch.		0.44	0.48			0.33			0.21				0.14	
	Reduktion Betriebsdauer		0.90	0.90			0.90			0.90				0.90	
	Reduktion Windrichtung		0.62	0.64			0.68			0.68				0.68	
	Gesamte Reduktion		0.25	0.28			0.20			0.13				0.09	
	Met.wahrsch.Beschattung		75	28			21			48				70	

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CI - IO87

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28   07:57		06:59	06:43	18:57 (18)	19:42 (20)   04:42
	15:54   16:46		17:43	19:42	6 19:03 (18)	20:03 (20)   21:29
2	08:28   07:55		06:56	06:40	05:31	19:42 (20)   04:41
	15:55   16:48		17:45	19:44	20:40	20:03 (20)   21:31
3	08:28   07:54		06:54	06:38	05:28	19:42 (20)   04:40
	15:57   16:50		17:47	19:46	20:42	20:02 (20)   21:32
4	08:27   07:52		06:52	06:35	05:26	19:42 (20)   04:40
	15:58   16:52		17:49	19:48	20:44	20:02 (20)   21:33
5	08:27   07:50		06:49	06:33	05:24	19:43 (20)   04:39
	15:59   16:54		17:51	19:50	20:46	18 20:01 (20)   21:34
6	08:27   07:48		06:47	06:30	05:22	19:43 (20)   04:38
	16:00   16:56		17:53	19:52	20:48	17 20:00 (20)   21:35
7	08:26   07:46		06:44	06:28	05:20	19:44 (20)   04:37
	16:02   16:58		17:55	19:54	20:50	15 19:59 (20)   21:36
8	08:26   07:44		06:42	06:26	05:18	19:45 (20)   04:37
	16:03   17:00		17:57	19:55	20:51	15 20:20 (1)   21:37
9	08:25   07:42		06:40	06:23	05:17	19:47 (20)   04:36
	16:05   17:02		17:59	19:57	20:53	16 20:22 (1)   21:38
10	08:24   07:40	16:31 (17)	06:37	06:21	05:15	19:49 (20)   04:36
	16:06   17:05	3 16:34 (17)	18:00	19:59	20:55	15 20:24 (1)   21:39
11	08:24   07:38	16:30 (17)	06:35	06:18	05:13	20:13 (1)   04:35
	16:08   17:07	6 16:36 (17)	18:02	20:01	20:57	12 20:25 (1)   21:40
12	08:23   07:36	16:30 (17)	06:32	06:16	05:11	20:13 (1)   04:35
	16:09   17:09	9 16:39 (17)	18:04	20:03	20:58	14 20:27 (1)   21:41
13	08:22   07:34	16:30 (17)	06:30	06:14	05:09	20:12 (1)   04:34
	16:11   17:11	11 16:41 (17)	18:06	20:05	21:00	16 20:28 (1)   21:41
14	08:21   07:32	16:29 (17)	06:27	06:11	05:07	20:11 (1)   04:34
	16:13   17:13	14 16:43 (17)	18:08	20:07	21:02	19 20:30 (1)   21:42
15	08:20   07:30	16:29 (17)	06:25	06:09	05:06	20:12 (1)   04:34
	16:14   17:15	14 16:43 (17)	18:10	20:09	21:04	20 20:32 (1)   21:43
16	08:19   07:28	16:30 (17)	06:22	06:06	05:04	20:11 (1)   04:34
	16:16   17:17	13 16:43 (17)	18:12	20:10	21:05	20 20:31 (1)   21:43
17	08:18   07:26	16:31 (17)	06:20	06:04	05:02	20:11 (1)   04:33
	16:18   17:19	11 16:42 (17)	18:14	20:12	21:07	21 20:32 (1)   21:44
18	08:17   07:24	16:32 (17)	06:18	06:02	05:01	20:11 (1)   04:33
	16:19   17:21	8 16:40 (17)	18:16	20:14	21:09	20 20:31 (1)   21:44
19	08:16   07:22	06:15	06:15	05:59	04:59	20:12 (1)   04:33
	16:21   17:23	18:18	18:18	20:16	21:10	20 20:32 (1)   21:44
20	08:15   07:19	06:13	06:13	05:57	04:58	20:11 (1)   04:34
	16:23   17:25	18:20	18:20	20:18	21:12	20 20:31 (1)   21:45
21	08:14   07:17	06:10	06:10	05:55	04:56	20:12 (1)   04:34
	16:25   17:27	18:21	18:21	20:20	21:14	19 20:31 (1)   21:45
22	08:12   07:15	06:08	06:08	05:52	04:55	20:13 (1)   04:34
	16:27   17:29	18:23	18:23	20:22	21:15	18 20:31 (1)   21:45
23	08:11   07:13	06:05	06:05	05:50	04:53	20:13 (1)   04:34
	16:29   17:31	18:25	18:25	20:24	21:17	18 20:31 (1)   21:45
24	08:10   07:10	06:03	06:03	05:48	04:52	20:13 (1)   04:34
	16:31   17:33	18:27	3 18:00 (18)	20:25	6 19:56 (20)	17 20:30 (1)   21:46
25	08:08   07:08	06:00	06:00	05:46	04:50	20:14 (1)   04:35
	16:32   17:35	18:29	7 18:02 (18)	20:27	10 19:58 (20)	15 20:29 (1)   21:46
26	08:07   07:06	05:58	05:58	05:43	04:49	20:15 (1)   04:35
	16:34   17:37	18:31	10 18:04 (18)	20:29	14 20:00 (20)	14 21:21   21:46
27	08:05   07:03	05:55	05:55	05:41	04:48	20:16 (1)   04:36
	16:36   17:39	18:33	13 18:06 (18)	20:31	17 20:02 (20)	12 20:28 (1)   21:45
28	08:04   07:01	05:53	05:53	05:39	04:47	20:18 (1)   04:36
	16:38   17:41	18:35	14 18:07 (18)	20:33	18 20:02 (20)	9 20:27 (1)   21:45
29	08:02	06:50	06:50	05:37	04:45	20:19 (1)   04:37
	16:40	19:37	14 19:07 (18)	20:35	20 20:03 (20)	6 20:25 (1)   21:45
30	08:00	06:48	06:48	05:35	04:44	04:37
	16:42	19:38	13 19:06 (18)	20:37	20 20:03 (20)	21:27
31	07:59	06:45	06:45	05:33	04:43	04:37
	16:44	19:40	11 19:05 (18)	20:39	21:28	21:45
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung		89	85	111	488	
Red.Sonnenscheinwahrsch.		0.24	0.31	0.41	0.51	
Reduktion Betriebsdauer		0.90	0.90	0.90	0.90	
Reduktion Windrichtung		0.70	0.68	0.64	0.63	
Gesamte Reduktion		0.15	0.19	0.24	0.29	
Met.wahrsch.Beschattung		13	16	26	142	

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CI - IO87

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:24 (1) 06:14	07:08	07:07	16:01 (17) 08:03
	21:44	21:09	13 20:37 (1) 20:01	18:46	16:35	2 16:03 (17) 15:50
2	04:39	05:20	20:24 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	11 20:35 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	19:58 (20) 06:17	07:12	07:11	08:06
	21:44	21:05	16 20:33 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	19:56 (20) 06:19	07:14	07:13	08:08
	21:43	21:03	16 20:31 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	19:55 (20) 06:21	07:15	07:15	08:09
	21:43	21:01	15 20:30 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	19:54 (20) 06:23	07:17	07:17	08:10
	21:42	20:59	16 20:10 (20) 19:49	18:34	16:25	15:46
7	04:43	05:29	19:52 (20) 06:25	07:19	07:19	08:12
	21:41	20:57	18 20:10 (20) 19:46	18:32	16:23	15:46
8	04:44	05:31	19:52 (20) 06:26	07:21	07:21	08:13
	21:41	20:55	19 20:11 (20) 19:44	18:29	16:21	15:45
9	04:45	05:32	19:52 (20) 06:28	07:23	07:23	08:14
	21:40	20:53	19 20:11 (20) 19:41	18:27	16:19	15:45
10	04:46	05:34	19:51 (20) 06:30	07:25	07:25	08:16
	21:39	20:51	20 20:11 (20) 19:39	18:24	16:18	15:45
11	04:48	05:36	19:51 (20) 06:32	18:49 (18) 07:27	07:27	08:17
	21:38	20:49	20 20:11 (20) 19:36	6 18:55 (18) 18:22	16:16	15:44
12	04:49	05:38	19:51 (20) 06:34	18:47 (18) 07:28	07:29	08:18
	21:37	20:47	20 20:11 (20) 19:34	10 18:57 (18) 18:20	16:14	15:44
13	04:50	05:40	19:50 (20) 06:35	18:44 (18) 07:30	07:31	08:19
	21:36	20:45	20 20:10 (20) 19:31	13 18:57 (18) 18:17	16:13	15:44
14	04:51	20:29 (1) 05:41	19:51 (20) 06:37	18:43 (18) 07:32	07:33	08:20
	21:35	4 20:33 (1) 20:43	19 20:10 (20) 19:29	15 18:58 (18) 18:15	16:11	15:44
15	04:52	20:27 (1) 05:43	19:52 (20) 06:39	18:43 (18) 07:34	07:35	08:21
	21:34	8 20:35 (1) 20:40	18 20:10 (20) 19:26	15 18:58 (18) 18:12	16:09	15:44
16	04:54	20:26 (1) 05:45	19:52 (20) 06:41	18:43 (18) 07:36	07:36	08:22
	21:33	11 20:37 (1) 20:38	16 20:08 (20) 19:24	13 18:56 (18) 18:10	16:08	15:44
17	04:55	20:25 (1) 05:47	19:53 (20) 06:43	18:42 (18) 07:38	07:38	08:23
	21:32	13 20:38 (1) 20:36	13 20:06 (20) 19:21	11 18:53 (18) 18:08	16:06	15:44
18	04:57	20:24 (1) 05:49	19:55 (20) 06:44	18:43 (18) 07:40	07:40	08:23
	21:30	14 20:38 (1) 20:34	9 20:04 (20) 19:19	7 18:50 (18) 18:05	16:05	15:44
19	04:58	20:23 (1) 05:50	19:57 (20) 06:46	18:44 (18) 07:42	07:42	08:24
	21:29	16 20:39 (1) 20:31	4 20:01 (20) 19:16	4 18:48 (18) 18:03	16:03	15:45
20	04:59	20:23 (1) 05:52	19:50 (20) 06:48	18:44 (18) 07:44	07:44	08:25
	21:28	17 20:40 (1) 20:29	19:14	18:01	16:02	15:45
21	05:01	20:23 (1) 05:54	06:50	07:46	07:46	08:25
	21:26	17 20:40 (1) 20:27	19:11	17:59	16:01	15:45
22	05:02	20:23 (1) 05:56	06:52	07:48	07:48	08:26
	21:25	18 20:41 (1) 20:25	19:09	17:56	15:59	15:46
23	05:04	20:22 (1) 05:58	06:53	07:49	17:05 (17) 07:49	08:26
	21:23	19 20:41 (1) 20:22	19:06	17:54	3 17:08 (17) 15:58	15:46
24	05:05	20:21 (1) 05:59	06:55	07:51	17:02 (17) 07:51	08:27
	21:22	20 20:41 (1) 20:20	19:04	17:52	9 17:11 (17) 15:57	15:47
25	05:07	20:22 (1) 06:01	06:57	07:53	16:00 (17) 07:53	08:27
	21:20	20 20:42 (1) 20:18	19:01	16:50	12 16:12 (17) 15:56	15:48
26	05:09	20:21 (1) 06:03	06:59	07:55	15:59 (17) 07:55	08:28
	21:19	21 20:42 (1) 20:15	18:59	16:47	14 16:13 (17) 15:54	15:48
27	05:10	20:22 (1) 06:05	07:01	07:57	15:59 (17) 07:56	08:28
	21:17	20 20:42 (1) 20:13	18:56	16:45	14 16:13 (17) 15:53	15:49
28	05:12	20:21 (1) 06:07	07:02	07:59	15:58 (17) 07:58	08:28
	21:15	21 20:42 (1) 20:11	18:54	16:43	14 16:12 (17) 15:52	15:50
29	05:14	20:22 (1) 06:08	07:04	07:01	15:59 (17) 08:00	08:28
	21:14	19 20:41 (1) 20:08	18:51	16:41	11 16:10 (17) 15:51	15:51
30	05:15	20:22 (1) 06:10	07:06	07:03	15:59 (17) 08:01	08:28
	21:12	17 20:39 (1) 20:06	18:49	16:39	9 16:08 (17) 15:51	15:52
31	05:17	20:23 (1) 06:12		07:05	16:00 (17)	08:28
	21:10	15 20:38 (1) 20:03		16:37	6 16:06 (17)	15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	290	302	94	92	2	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.63	0.64	0.68	0.70	0.70	
Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	
Met.wahrsch.Beschattung	73	84	23	19	0	

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM)	Schattenanfang	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: CJ - IO88

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:41 (20)   04:42
	15:54	16:46	17:43	19:42	20:39	18   19:59 (20)   21:29
2	08:28	07:55	06:56	06:40	05:31	19:41 (20)   04:41
	15:55	16:48	17:45	19:44	20:40	17   19:58 (20)   21:31
3	08:28	07:54	06:54	06:38	05:28	19:42 (20)   04:40
	15:57	16:50	17:47	19:46	20:42	15   19:57 (20)   21:32
4	08:27	07:52	06:52	06:35	05:26	19:42 (20)   04:40
	15:58	16:52	17:49	19:48	20:44	14   19:56 (20)   21:33
5	08:27	07:50	06:49	06:33	05:24	19:43 (20)   04:39
	15:59	16:54	17:51	19:50	20:46	12   19:55 (20)   21:34
6	08:27	07:48	06:47	06:30	05:22	19:45 (20)   04:38
	16:00	16:56	17:53	19:52	20:48	11   20:17 (1)   21:35
7	08:26	07:46	06:44	06:28	05:20	20:11 (1)   04:37
	16:02	16:58	17:55	19:54	20:50	7   20:18 (1)   21:36
8	08:26	07:44	06:42	06:26	05:18	20:10 (1)   04:37
	16:03	17:00	17:57	19:55	20:51	10   20:20 (1)   21:37
9	08:25	07:42	06:40	06:23	05:17	20:10 (1)   04:36
	16:05	17:02	17:59	19:57	20:53	12   20:22 (1)   21:38
10	08:24	07:40	06:37	06:21	05:15	20:09 (1)   04:36
	16:06	17:05	18:00	19:59	20:55	15   20:24 (1)   21:39
11	08:24	07:38	06:35	06:18	05:13	20:08 (1)   04:35
	16:08	17:07	18:02	20:01	20:57	17   20:25 (1)   21:40
12	08:23	07:36	16:36 (17)   06:32	06:16	05:11	20:09 (1)   04:35
	16:09	17:09	16:39 (17)   18:04	20:03	20:58	18   20:27 (1)   21:41
13	08:22	07:34	16:35 (17)   06:30	06:14	05:09	20:08 (1)   04:34
	16:11	17:11	16:41 (17)   18:06	20:05	21:00	19   20:27 (1)   21:41
14	08:21	07:32	16:34 (17)   06:27	06:11	05:07	20:08 (1)   04:34
	16:13	17:13	16:43 (17)   18:08	20:07	21:02	19   20:27 (1)   21:42
15	08:20	07:30	16:34 (17)   06:25	06:09	05:06	20:08 (1)   04:34
	16:14	17:15	16:45 (17)   18:10	20:09	21:04	19   20:27 (1)   21:43
16	08:19	07:28	16:34 (17)   06:22	06:06	05:04	20:08 (1)   04:34
	16:16	17:17	16:47 (17)   18:12	20:10	21:05	19   20:27 (1)   21:43
17	08:18	07:26	16:35 (17)   06:20	06:04	05:02	20:09 (1)   04:33
	16:18	17:19	16:48 (17)   18:14	20:12	21:07	18   20:27 (1)   21:44
18	08:17	07:24	16:35 (17)   06:18	06:02	05:01	20:09 (1)   04:33
	16:19	17:21	16:46 (17)   18:16	20:14	21:09	17   20:26 (1)   21:44
19	08:16	07:22	16:36 (17)   06:15	05:59	04:59	20:10 (1)   04:33
	16:21	17:23	16:45 (17)   18:18	20:16	21:10	16   20:26 (1)   21:44
20	08:15	07:19	16:40 (17)   06:13	05:57	04:57	20:10 (1)   04:34
	16:23	17:25	16:42 (17)   18:20	20:18	21:12	15   20:25 (1)   21:45
21	08:14	07:17	06:10	05:55	04:56	20:11 (1)   04:34
	16:25	17:27	18:21	20:20	21:14	13   20:24 (1)   21:45
22	08:12	07:15	06:08	05:52	19:47 (20)   04:55	20:12 (1)   04:34
	16:27	17:29	18:23	20:22	5   19:52 (20)   21:15	12   20:24 (1)   21:45
23	08:11	07:13	06:05	05:50	19:45 (20)   04:53	20:14 (1)   04:34
	16:29	17:31	18:25	20:24	9   19:54 (20)   21:17	9   20:23 (1)   21:45
24	08:10	07:10	06:03	17:57 (18)   05:48	19:43 (20)   04:52	20:16 (1)   04:34
	16:30	17:33	18:27	3   18:00 (18)   20:25	13   19:56 (20)   21:18	3   20:19 (1)   21:46
25	08:08	07:08	06:00	17:56 (18)   05:46	19:42 (20)   04:50	20:17 (1)   04:35
	16:32	17:35	18:29	6   18:02 (18)   20:27	16   19:58 (20)   21:20	21:46
26	08:07	07:06	05:58	17:54 (18)   05:43	19:41 (20)   04:49	20:18 (1)   04:35
	16:34	17:37	18:31	10   18:04 (18)   20:29	18   19:59 (20)   21:21	21:46
27	08:05	07:03	05:55	17:54 (18)   05:41	19:41 (20)   04:48	20:19 (1)   04:36
	16:36	17:39	18:33	12   18:06 (18)   20:31	19   20:00 (20)   21:23	21:45
28	08:04	07:01	05:53	17:54 (18)   05:39	19:41 (20)   04:47	20:20 (1)   04:36
	16:38	17:41	18:35	13   18:07 (18)   20:33	19   20:00 (20)   21:24	21:45
29	08:02		06:50	18:54 (18)   05:37	19:40 (20)   04:45	20:21 (1)   04:37
	16:40		19:37	13   19:07 (18)   20:35	20   20:00 (20)   21:26	21:45
30	08:00		06:48	18:54 (18)   05:35	19:40 (20)   04:44	20:22 (1)   04:37
	16:42		19:38	12   19:06 (18)   20:37	19   19:59 (20)   21:27	21:45
31	07:59		06:45	18:56 (18)	04:43	20:23 (1)   04:37
	16:44		19:40	8   19:04 (18)	21:28	21:45
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung		77	77		138	345
Red.Sonnenscheinwahrsch.		0.24	0.31		0.41	0.51
Reduktion Betriebsdauer		0.90	0.90		0.90	0.90
Reduktion Windrichtung		0.70	0.68		0.64	0.63
Gesamte Reduktion		0.15	0.19		0.24	0.29
Met.wahrsch.Beschattung		12	15		33	101

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CJ - IO88

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:19 (1) 06:14	07:08	07:07	08:03
	21:44	21:08	20:37 (1) 20:01	18:46	16:35	15:50
2	04:39	05:20	20:19 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	20:35 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	20:19 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	20:33 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:19 (1) 06:19	07:14	07:13	08:08
	21:43	21:03	20:31 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:21 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	20:30 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:22 (1) 06:23	07:17	07:17	08:10
	21:42	20:59	20:28 (1) 19:49	18:34	16:25	15:46
7	04:43	05:29	19:54 (20) 06:25	07:19	07:19	08:12
	21:41	20:57	20:26 (1) 19:46	18:32	16:23	15:46
8	04:44	05:31	19:52 (20) 06:26	07:21	07:21	08:13
	21:41	20:55	20:05 (20) 19:44	18:29	16:21	15:45
9	04:45	05:32	19:51 (20) 06:28	07:23	07:23	08:14
	21:40	20:53	20:06 (20) 19:41	18:27	16:19	15:45
10	04:46	05:34	19:50 (20) 06:30	07:25	07:25	08:16
	21:39	20:51	20:06 (20) 19:39	18:24	16:18	15:45
11	04:48	05:36	19:49 (20) 06:32	07:27	07:27	08:17
	21:38	20:49	20:07 (20) 19:36	18:22	16:16	15:44
12	04:49	05:38	19:49 (20) 06:34	8 18:48 (18) 07:28	07:29	08:18
	21:37	20:47	20:08 (20) 19:34	18:56 (18) 18:20	16:14	15:44
13	04:50	05:40	19:48 (20) 06:35	18:46 (18) 07:30	07:31	08:19
	21:36	20:45	20:07 (20) 19:31	11 18:57 (18) 18:17	16:13	15:44
14	04:51	05:41	19:48 (20) 06:37	18:45 (18) 07:32	07:33	08:20
	21:35	20:43	20:07 (20) 19:29	13 18:58 (18) 18:15	16:11	15:44
15	04:52	05:43	19:48 (20) 06:39	18:44 (18) 07:34	07:35	08:21
	21:34	20:40	20:07 (20) 19:26	14 18:58 (18) 18:12	16:09	15:44
16	04:54	05:45	19:48 (20) 06:41	18:44 (18) 07:36	07:36	08:22
	21:33	20:38	20:06 (20) 19:24	12 18:56 (18) 18:10	16:08	15:44
17	04:55	05:47	19:48 (20) 06:43	18:43 (18) 07:38	07:38	08:23
	21:32	20:36	20:06 (20) 19:21	10 18:53 (18) 18:08	16:06	15:44
18	04:57	05:49	19:49 (20) 06:44	18:43 (18) 07:40	07:40	08:23
	21:30	20:34	20:04 (20) 19:19	7 18:50 (18) 18:05	16:05	15:44
19	04:58	05:50	19:49 (20) 06:46	4 18:48 (18) 07:42	07:42	08:24
	21:29	20:31	20:02 (20) 19:16	18:03	16:03	15:45
20	04:59	6 20:25 (1) 05:52	19:51 (20) 06:48	07:44	07:44	08:25
	21:28	20:31 (1) 20:29	9 20:00 (20) 19:14	18:01	16:02	15:45
21	05:01	20:23 (1) 05:54	19:54 (20) 06:50	07:46	07:46	08:25
	21:26	10 20:33 (1) 20:27	4 19:58 (20) 19:11	17:59	16:01	15:45
22	05:02	20:22 (1) 05:56	06:52	07:48	17:09 (17) 07:48	08:26
	21:25	13 20:35 (1) 20:25	19:09	17:56	5 17:14 (17) 15:59	15:46
23	05:04	20:21 (1) 05:58	06:53	07:49	17:06 (17) 07:49	08:26
	21:23	14 20:35 (1) 20:22	19:06	17:54	10 17:16 (17) 15:58	15:46
24	05:05	20:20 (1) 05:59	06:55	07:51	17:05 (17) 07:51	08:27
	21:22	15 20:35 (1) 20:20	19:04	17:52	12 17:17 (17) 15:57	15:47
25	05:07	20:20 (1) 06:01	06:57	07:53	16:04 (17) 07:53	08:27
	21:20	17 20:37 (1) 20:18	19:01	16:50	13 16:17 (17) 15:56	15:48
26	05:09	20:19 (1) 06:03	06:59	07:55	16:03 (17) 07:55	08:28
	21:19	18 20:37 (1) 20:15	18:59	16:47	13 16:16 (17) 15:54	15:48
27	05:10	20:19 (1) 06:05	07:01	07:57	16:03 (17) 07:56	08:28
	21:17	19 20:38 (1) 20:13	18:56	16:45	11 16:14 (17) 15:53	15:49
28	05:12	20:18 (1) 06:07	07:02	07:59	16:03 (17) 07:58	08:28
	21:15	19 20:37 (1) 20:11	18:54	16:43	9 16:12 (17) 15:52	15:50
29	05:14	20:19 (1) 06:08	07:04	08:01	16:05 (17) 08:00	08:28
	21:14	19 20:38 (1) 20:08	18:51	16:41	5 16:10 (17) 15:51	15:51
30	05:15	20:18 (1) 06:10	07:06	08:03	16:05 (17) 08:01	08:28
	21:12	19 20:37 (1) 20:06	18:49	16:39	3 16:08 (17) 15:51	15:52
31	05:17	20:18 (1) 06:12		07:05		08:28
	21:10	20 20:38 (1) 20:03		16:37		15:53
Sonneneinstrahlung	514	461	383	328	257	231
astr.max.mögl.Beschattung	189	302		81		
Red.Sonneneinstrahlung	0.44	0.48	0.40	0.33		
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90		
Reduktion Windrichtung	0.63	0.63	0.68	0.70		
Gesamte Reduktion	0.25	0.28	0.25	0.21		
Met.wahrsch.Beschattung	48	84	19	17		

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBSchattenrezeptor: CK - IO89  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:40 (20)   04:42
	15:54	16:46	17:43	19:42	20:39	18   19:58 (20)   21:29
2	08:28	07:55	06:56	06:40	05:31	19:41 (20)   04:41
	15:55	16:48	17:45	19:44	20:40	16   19:57 (20)   21:31
3	08:28	07:54	06:54	06:38	05:28	19:42 (20)   04:40
	15:57	16:50	17:47	19:46	20:42	14   19:56 (20)   21:32
4	08:27	07:52	06:52	06:35	05:26	19:43 (20)   04:40
	15:58	16:52	17:49	19:48	20:44	11   19:54 (20)   21:33
5	08:27	07:50	06:49	06:33	05:24	19:45 (20)   04:39
	15:59	16:54	17:51	19:50	20:46	9   20:15 (1)   21:34
6	08:27	07:48	06:47	06:30	05:22	20:11 (1)   04:38
	16:00	16:56	17:53	19:52	20:48	6   20:17 (1)   21:35
7	08:26	07:46	06:44	06:28	05:20	20:09 (1)   04:37
	16:02	16:58	17:55	19:54	20:50	9   20:18 (1)   21:36
8	08:26	07:44	06:42	06:26	05:18	20:08 (1)   04:37
	16:03	17:00	17:57	19:55	20:51	12   20:20 (1)   21:37
9	08:25	07:42	06:40	06:23	05:17	20:08 (1)   04:36
	16:05	17:02	17:59	19:57	20:53	14   20:22 (1)   21:38
10	08:24	07:40	06:37	06:21	05:15	20:07 (1)   04:36
	16:06	17:05	18:00	19:59	20:55	17   20:24 (1)   21:39
11	08:24	07:38	06:35	06:18	05:13	20:07 (1)   04:35
	16:08	17:07	18:02	20:01	20:57	18   20:25 (1)   21:40
12	08:23	07:36	06:32	06:16	05:11	20:07 (1)   04:35
	16:09	17:09	18:04	20:03	20:58	20   20:27 (1)   21:41
13	08:22	07:34	06:30	06:14	05:09	20:07 (1)   04:34
	16:11	17:11	18:06	20:05	21:00	19   20:26 (1)   21:41
14	08:21	07:32	06:27	06:11	05:07	20:07 (1)   04:34
	16:13	17:13	18:08	20:07	21:02	19   20:26 (1)   21:42
15	08:20	07:30	06:25	06:09	05:06	20:07 (1)   04:34
	16:14	17:15	18:10	20:09	21:04	19   20:26 (1)   21:43
16	08:19	07:28	06:22	06:06	05:04	20:07 (1)   04:34
	16:16	17:17	18:12	20:10	21:05	18   20:25 (1)   21:43
17	08:18	07:26	06:20	06:04	05:02	20:08 (1)   04:33
	16:18	17:19	18:14	20:12	21:07	17   20:25 (1)   21:44
18	08:17	07:24	06:18	06:02	05:01	20:08 (1)   04:33
	16:19	17:21	18:16	20:14	21:09	16   20:24 (1)   21:44
19	08:16	07:22	06:15	05:59	04:59	20:10 (1)   04:33
	16:21	17:23	18:18	20:16	21:10	14   20:24 (1)   21:44
20	08:15	07:19	06:13	05:57	04:57	20:10 (1)   04:34
	16:23	17:25	18:20	20:18	21:12	13   20:23 (1)   21:45
21	08:14	07:17	06:10	05:55	19:49 (20)   04:56	20:11 (1)   04:34
	16:25	17:27	18:21	20:20	3   19:52 (20)   21:14	11   20:22 (1)   21:45
22	08:12	07:15	06:08	05:52	19:45 (20)   04:55	20:13 (1)   04:34
	16:27	17:29	18:23	20:22	7   19:52 (20)   21:15	7   20:20 (1)   21:45
23	08:11	07:13	06:05	05:50	19:43 (20)   04:53	04:34
	16:29	17:31	18:25	20:24	11   19:54 (20)   21:17	21:45
24	08:10	07:10	06:03	17:57 (18)   05:48	19:42 (20)   04:52	04:34
	16:30	17:33	18:27	3   18:00 (18)   20:25	14   19:56 (20)   21:18	21:46
25	08:08	07:08	06:00	17:56 (18)   05:46	19:41 (20)   04:50	04:35
	16:32	17:35	18:29	6   18:02 (18)   20:27	17   19:58 (20)   21:20	21:46
26	08:07	07:06	05:58	17:54 (18)   05:43	19:40 (20)   04:49	04:35
	16:34	17:37	18:31	10   18:04 (18)   20:29	19   19:59 (20)   21:21	21:46
27	08:05	07:03	05:55	17:54 (18)   05:41	19:40 (20)   04:48	04:36
	16:36	17:39	18:33	12   18:06 (18)   20:31	19   19:59 (20)   21:23	21:45
28	08:04	07:01	05:53	17:54 (18)   05:39	19:40 (20)   04:47	04:36
	16:38	17:41	18:35	13   18:07 (18)   20:33	19   19:59 (20)   21:24	21:45
29	08:02	06:50	05:50	18:54 (18)   05:37	19:40 (20)   04:45	04:37
	16:40	19:37	13   19:07 (18)   20:35	19   19:59 (20)   21:26	21:45	
30	08:00	06:48	05:48	18:54 (18)   05:35	19:40 (20)   04:44	04:37
	16:42	19:38	11   19:05 (18)   20:37	18   19:58 (20)   21:27	21:45	
31	07:59	06:45	05:45	18:56 (18)	04:43	
	16:44	19:40	8   19:04 (18)	21:28		
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung			76	146	317	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.64	0.63	
Gesamte Reduktion			0.19	0.24	0.29	
Met.wahrsch.Beschattung			15	34	92	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CK - IO89

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:18 (1) 06:14	07:08	07:07	08:03
	21:44	21:08	19 20:37 (1) 20:01	18:46	16:35	15:50
2	04:39	05:20	20:17 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	18 20:35 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	20:18 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	15 20:33 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:18 (1) 06:19	07:14	07:13	08:08
	21:43	21:03	13 20:31 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:19 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	11 20:30 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:20 (1) 06:23	07:17	07:17	08:10
	21:42	20:59	8 20:28 (1) 19:49	18:34	16:25	15:46
7	04:43	05:29	20:21 (1) 06:25	07:19	07:19	08:12
	21:41	20:57	5 20:26 (1) 19:46	18:32	16:23	15:46
8	04:44	05:31	19:53 (20) 06:26	07:21	07:21	08:13
	21:41	20:55	10 20:24 (1) 19:44	18:29	16:21	15:45
9	04:45	05:32	19:52 (20) 06:28	07:23	07:23	08:14
	21:40	20:53	12 20:04 (20) 19:41	18:27	16:19	15:45
10	04:46	05:34	19:50 (20) 06:30	07:25	07:25	08:16
	21:39	20:51	14 20:04 (20) 19:39	18:24	16:18	15:45
11	04:48	05:36	19:49 (20) 06:32	07:27	07:27	08:17
	21:38	20:49	16 20:05 (20) 19:36	18:22	16:16	15:44
12	04:49	05:38	19:49 (20) 06:34	7 18:49 (18) 07:28	07:29	08:18
	21:37	20:47	17 20:06 (20) 19:34	7 18:56 (18) 18:20	16:14	15:44
13	04:50	05:40	19:47 (20) 06:35	18:46 (18) 07:30	07:31	08:19
	21:36	20:45	19 20:06 (20) 19:31	11 18:57 (18) 18:17	16:13	15:44
14	04:51	05:41	19:47 (20) 06:37	18:45 (18) 07:32	07:33	08:20
	21:35	20:43	19 20:06 (20) 19:29	12 18:57 (18) 18:15	16:11	15:44
15	04:52	05:43	19:47 (20) 06:39	18:44 (18) 07:34	07:35	08:21
	21:34	20:40	19 20:06 (20) 19:26	14 18:58 (18) 18:12	16:09	15:44
16	04:54	05:45	19:47 (20) 06:41	18:44 (18) 07:36	07:36	08:22
	21:33	20:38	18 20:05 (20) 19:24	12 18:56 (18) 18:10	16:08	15:44
17	04:55	05:47	19:47 (20) 06:43	18:43 (18) 07:38	07:38	08:23
	21:32	20:36	18 20:05 (20) 19:21	10 18:53 (18) 18:08	16:06	15:44
18	04:57	05:49	19:48 (20) 06:44	18:43 (18) 07:40	07:40	08:23
	21:30	20:34	16 20:04 (20) 19:19	7 18:50 (18) 18:05	16:05	15:44
19	04:58	05:50	19:47 (20) 06:46	4 18:48 (18) 07:42	07:42	08:24
	21:29	20:31	15 20:02 (20) 19:16	4 18:48 (18) 18:03	16:03	15:45
20	04:59	05:52	19:49 (20) 06:48	07:44	07:44	08:25
	21:28	20:29	11 20:00 (20) 19:14	18:01	16:02	15:45
21	05:01	20:24 (1) 05:54	19:51 (20) 06:50	07:46	07:46	08:25
	21:26	5 20:29 (1) 20:27	19:11	17:59	16:01	15:45
22	05:02	20:23 (1) 05:56	06:52	07:48	07:48	08:26
	21:25	9 20:32 (1) 20:25	19:09	17:56	15:59	15:46
23	05:04	20:21 (1) 05:58	06:53	07:49	07:49	08:26
	21:23	12 20:33 (1) 20:22	19:06	17:54	15:58	15:46
24	05:05	20:20 (1) 05:59	06:55	07:51	07:51	08:27
	21:22	13 20:33 (1) 20:20	19:04	17:52	15:57	15:47
25	05:07	20:20 (1) 06:01	06:57	06:53	07:53	08:27
	21:20	15 20:35 (1) 20:18	19:01	16:50	15:56	15:48
26	05:09	20:18 (1) 06:03	06:59	06:55	07:55	08:28
	21:19	17 20:35 (1) 20:15	18:59	16:47	15:54	15:48
27	05:10	20:18 (1) 06:05	07:01	06:57	07:56	08:28
	21:17	18 20:36 (1) 20:13	18:56	16:45	15:53	15:49
28	05:12	20:18 (1) 06:07	07:02	06:59	07:58	08:28
	21:15	18 20:36 (1) 20:11	18:54	16:43	15:52	15:50
29	05:14	20:18 (1) 06:08	07:04	07:01	08:00	08:28
	21:14	18 20:36 (1) 20:08	18:51	16:41	15:51	15:51
30	05:15	20:17 (1) 06:10	07:06	07:03	08:01	08:28
	21:12	19 20:36 (1) 20:06	18:49	16:39	15:51	15:52
31	05:17	20:17 (1) 06:12		07:05		08:28
	21:10	20 20:37 (1) 20:03		16:37		15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	164	300				52
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40			0.14
Reduktion Betriebsdauer	0.90	0.90	0.90			0.90
Reduktion Windrichtung	0.63	0.63	0.68			0.67
Gesamte Reduktion	0.25	0.28	0.25			0.08
Met.wahrsch.Beschattung	41	83	19			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	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CL - IO90  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28	07:57	06:59	06:43	05:33	19:40 (20)   04:42		
	15:54	16:46	17:43	19:42	20:39	16   19:56 (20)   21:29		
2	08:28	07:55	06:56	06:40	05:31	19:41 (20)   04:41		
	15:55	16:48	17:45	19:44	20:40	14   19:55 (20)   21:31		
3	08:28	07:54	06:54	06:38	05:28	19:42 (20)   04:40		
	15:57	16:50	17:47	19:46	20:42	12   19:54 (20)   21:32		
4	08:27	07:52	06:52	06:35	05:26	19:44 (20)   04:40		
	15:58	16:52	17:49	19:48	20:44	9   20:14 (1)   21:33		
5	08:27	07:50	06:49	06:33	05:24	20:11 (1)   04:39		
	15:59	16:54	17:51	19:50	20:46	4   20:15 (1)   21:34		
6	08:27	07:48	06:47	06:30	05:22	8   20:09 (1)   04:38		
	16:00	16:56	17:53	19:52	20:48	4   20:17 (1)   21:35		
7	08:26	07:46	06:44	06:28	05:20	20:08 (1)   04:37		
	16:02	16:58	17:55	19:54	20:50	10   20:18 (1)   21:36		
8	08:26	07:44	06:42	06:26	05:18	20:07 (1)   04:37		
	16:03	17:00	17:57	19:55	20:51	13   20:20 (1)   21:37		
9	08:25	07:42	06:40	06:23	05:17	20:07 (1)   04:36		
	16:05	17:02	17:59	19:57	20:53	15   20:22 (1)   21:38		
10	08:24	07:40	06:37	06:21	05:15	20:06 (1)   04:36		
	16:06	17:05	18:00	19:59	20:55	18   20:24 (1)   21:39		
11	08:24	07:38	06:35	06:18	05:13	20:06 (1)   04:35		
	16:08	17:07	18:02	20:01	20:57	19   20:25 (1)   21:40		
12	08:23	07:36	06:32	06:16	05:11	20:07 (1)   04:35		
	16:09	17:09	18:04	20:03	20:58	19   20:26 (1)   21:41		
13	08:22	07:34	06:30	06:14	05:09	20:06 (1)   04:34		
	16:11	17:11	18:06	20:05	21:00	19   20:25 (1)   21:41		
14	08:21	07:32	06:27	06:11	05:07	20:06 (1)   04:34		
	16:13	17:13	18:08	20:07	21:02	18   20:24 (1)   21:42		
15	08:20	07:30	06:25	06:09	05:06	20:07 (1)   04:34		
	16:14	17:15	18:10	20:09	21:04	18   20:25 (1)   21:43		
16	08:19	07:28	06:22	06:06	05:04	20:07 (1)   04:34		
	16:16	17:17	18:12	20:10	21:05	17   20:24 (1)   21:43		
17	08:18	07:26	06:20	06:04	05:02	20:08 (1)   04:33		
	16:18	17:19	18:14	20:12	21:07	16   20:24 (1)   21:44		
18	08:17	07:24	06:18	06:02	05:01	20:08 (1)   04:33		
	16:19	17:21	18:16	20:14	21:09	15   20:23 (1)   21:44		
19	08:16	07:22	06:15	05:59	04:59	20:10 (1)   04:33		
	16:21	17:23	18:18	20:16	21:10	12   20:22 (1)   21:44		
20	08:15	07:19	06:13	05:57	04:57	20:10 (1)   04:34		
	16:23	17:25	18:20	20:18	21:12	10   20:20 (1)   21:45		
21	08:14	07:17	06:10	05:55	19:46 (20)   04:56	7   20:12 (1)   04:34		
	16:25	17:27	18:21	20:20	6   19:52 (20)   21:14	7   20:19 (1)   21:45		
22	08:12	07:15	06:08	05:52	19:43 (20)   04:55	9   19:52 (20)   21:15	21:45	
	16:27	17:29	18:23	20:22	9   19:52 (20)   21:15	9   19:52 (20)   21:15	21:45	
23	08:11	07:13	06:05	05:50	19:42 (20)   04:53	12   19:54 (20)   21:17	21:45	
	16:29	17:31	18:25	20:24	12   19:54 (20)   21:17	12   19:54 (20)   21:17	21:45	
24	08:10	07:10	06:03	17:57 (18)   05:48	19:41 (20)   04:52	15   19:56 (20)   21:18	21:46	
	16:30	17:33	18:27	3   18:00 (18)   20:25	15   19:56 (20)   21:18	15   19:56 (20)   21:18	21:46	
25	08:08	07:08	06:00	17:56 (18)   05:46	19:40 (20)   04:50	18   19:58 (20)   21:20	21:46	
	16:32	17:35	18:29	6   18:02 (18)   20:27	18   19:58 (20)   21:20	18   19:58 (20)   21:20	21:46	
26	08:07	07:06	05:58	17:55 (18)   05:43	19:40 (20)   04:49	18   19:58 (20)   21:21	21:46	
	16:34	17:37	18:31	9   18:04 (18)   20:29	18   19:58 (20)   21:21	18   19:58 (20)   21:21	21:46	
27	08:05	07:03	05:55	17:54 (18)   05:41	19:39 (20)   04:48	19   19:58 (20)   21:22	21:45	
	16:36	17:39	18:33	12   18:06 (18)   20:31	19   19:58 (20)   21:23	19   19:58 (20)   21:23	21:45	
28	08:04	07:01	05:53	17:54 (18)   05:39	19:39 (20)   04:47	19   19:58 (20)   21:24	21:45	
	16:38	17:41	18:35	13   18:07 (18)   20:33	19   19:58 (20)   21:24	19   19:58 (20)   21:24	21:45	
29	08:02	06:50	05:50	18:54 (18)   05:37	19:39 (20)   04:45	19   19:58 (20)   21:26	21:45	
	16:40	19:37	13   19:07 (18)   20:35	19   19:58 (20)   21:26	19   19:58 (20)   21:26	19   19:58 (20)   21:26	21:45	
30	08:00	06:48	05:48	18:55 (18)   05:35	19:40 (20)   04:44	17   19:57 (20)   21:27	21:45	
	16:42	19:38	10   19:05 (18)   20:37	17   19:57 (20)   21:27	17   19:57 (20)   21:27	17   19:57 (20)   21:27	21:45	
31	07:59	06:45	05:45	18:57 (18)	21:28	21:28	21:28	21:45
	16:44	19:40	7   19:04 (18)	421	496	512	512	21:45
Sonnenscheinstunden	248	272	367	421	496	512	512	21:45
astr.max.mögl.Beschattung			73	152	289			21:45
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51			21:45
Reduktion Betriebsdauer			0.90	0.90	0.90			21:45
Reduktion Windrichtung			0.68	0.64	0.63			21:45
Gesamte Reduktion			0.19	0.24	0.29			21:45
Met.wahrsch.Beschattung			14	36	84			21:45

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CL - IO90

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:17 (1) 06:14	07:08	07:07	08:03
	21:44	21:08	19 20:36 (1) 20:01	18:46	16:35	15:50
2	04:39	05:20	20:16 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	19 20:35 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	20:17 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	16 20:33 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:17 (1) 06:19	07:14	07:13	08:08
	21:43	21:03	14 20:31 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:17 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	13 20:30 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:19 (1) 06:23	07:17	07:17	08:10
	21:42	20:59	9 20:28 (1) 19:49	18:34	16:25	15:46
7	04:43	05:29	20:19 (1) 06:25	07:19	07:19	08:12
	21:41	20:57	7 20:26 (1) 19:46	18:32	16:23	15:46
8	04:44	05:31	19:56 (20) 06:26	07:21	07:21	08:13
	21:41	20:55	5 20:24 (1) 19:44	18:29	16:21	15:45
9	04:45	05:32	19:52 (20) 06:28	07:23	07:23	08:14
	21:40	20:53	10 20:02 (20) 19:41	18:27	16:19	15:45
10	04:46	05:34	19:50 (20) 06:30	07:25	07:25	08:16
	21:39	20:51	13 20:03 (20) 19:39	18:24	16:18	15:45
11	04:48	05:36	19:49 (20) 06:32	07:27	07:27	08:17
	21:38	20:49	15 20:04 (20) 19:36	18:22	16:16	15:44
12	04:49	05:38	19:48 (20) 06:34	7 18:49 (18) 07:28	07:29	08:18
	21:37	20:47	17 20:05 (20) 19:34	18:56 (18) 18:20	16:14	15:44
13	04:50	05:40	19:47 (20) 06:35	7 18:46 (18) 07:30	07:31	08:19
	21:36	20:45	18 20:05 (20) 19:31	10 18:56 (18) 18:17	16:13	15:44
14	04:51	05:41	19:47 (20) 06:37	18:45 (18) 07:32	07:33	08:20
	21:35	20:43	18 20:05 (20) 19:29	12 18:57 (18) 18:15	16:11	15:44
15	04:52	05:43	19:47 (20) 06:39	18:44 (18) 07:34	07:35	08:21
	21:34	20:40	18 20:05 (20) 19:26	14 18:58 (18) 18:12	16:09	15:44
16	04:54	05:45	19:46 (20) 06:41	18:44 (18) 07:36	07:36	08:22
	21:33	20:38	19 20:05 (20) 19:24	12 18:56 (18) 18:10	16:08	15:44
17	04:55	05:47	19:46 (20) 06:43	18:43 (18) 07:38	07:38	08:23
	21:32	20:36	18 20:04 (20) 19:21	10 18:53 (18) 18:08	16:06	15:44
18	04:57	05:49	19:47 (20) 06:44	18:43 (18) 07:40	07:40	08:23
	21:30	20:34	17 20:04 (20) 19:19	7 18:50 (18) 18:05	16:05	15:44
19	04:58	05:50	19:46 (20) 06:46	4 18:48 (18) 07:42	07:42	08:24
	21:29	20:31	16 20:02 (20) 19:16	18:03	16:03	15:45
20	04:59	05:52	19:47 (20) 06:48	07:44	07:44	08:25
	21:28	20:29	13 20:00 (20) 19:14	18:01	16:02	15:45
21	05:01	05:54	19:49 (20) 06:50	07:46	07:46	08:25
	21:26	20:27	9 19:58 (20) 19:11	17:59	16:01	15:45
22	05:02	20:25 (1) 05:56	19:50 (20) 06:52	07:48	07:48	08:26
	21:25	3 20:28 (1) 20:25	5 19:55 (20) 19:09	17:56	15:59	15:46
23	05:04	20:22 (1) 05:58	06:53	07:49	07:49	08:26
	21:23	8 20:30 (1) 20:22	19:06	17:54	15:58	15:46
24	05:05	20:20 (1) 05:59	06:55	07:51	07:51	08:27
	21:22	11 20:31 (1) 20:20	19:04	17:52	15:57	15:47
25	05:07	20:19 (1) 06:01	06:57	06:53	07:53	08:27
	21:20	14 20:33 (1) 20:18	19:01	16:50	15:56	15:48
26	05:09	20:18 (1) 06:03	06:59	06:55	07:55	08:28
	21:19	15 20:33 (1) 20:15	18:59	16:47	15:54	15:48
27	05:10	20:18 (1) 06:05	07:01	06:57	07:56	08:28
	21:17	16 20:34 (1) 20:13	18:56	16:45	15:53	15:49
28	05:12	20:17 (1) 06:07	07:02	06:59	07:58	08:28
	21:15	17 20:34 (1) 20:11	18:54	16:43	15:52	15:50
29	05:14	20:17 (1) 06:08	07:04	07:01	08:00	08:28
	21:14	18 20:35 (1) 20:08	18:51	16:41	15:51	15:51
30	05:15	20:16 (1) 06:10	07:06	07:03	08:01	08:28
	21:12	19 20:35 (1) 20:06	18:49	16:39	15:51	15:52
31	05:17	20:17 (1) 06:12		07:05		08:28
	21:10	18 20:35 (1) 20:03		16:37		15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	139	308	76			120
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40			0.14
Reduktion Betriebsdauer	0.90	0.90	0.90			0.90
Reduktion Windrichtung	0.63	0.63	0.68			0.67
Gesamte Reduktion	0.25	0.28	0.25			0.08
Met.wahrsch.Beschattung	35	86	19			10

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: CM - IO91**  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:40 (20)   04:42
	15:54	16:46	17:43	19:42	20:39	15 19:55 (20)   21:29
2	08:28	07:55	06:56	06:40	05:31	19:41 (20)   04:41
	15:55	16:48	17:45	19:44	20:40	12 19:53 (20)   21:31
3	08:28	07:54	06:54	06:38	05:28	19:43 (20)   04:40
	15:57	16:50	17:47	19:46	20:42	8 19:51 (20)   21:32
4	08:27	07:52	06:52	06:35	05:26	20:10 (1)   04:40
	15:58	16:52	17:49	19:48	20:44	4 20:14 (1)   21:33
5	08:27	07:50	06:49	06:33	05:24	20:09 (1)   04:39
	15:59	16:54	17:51	19:50	20:46	6 20:15 (1)   21:34
6	08:27	07:48	06:47	06:30	05:22	20:07 (1)   04:38
	16:00	16:56	17:53	19:52	20:48	10 20:17 (1)   21:35
7	08:26	07:46	06:44	06:28	05:20	20:06 (1)   04:37
	16:02	16:58	17:55	19:54	20:50	12 20:18 (1)   21:36
8	08:26	07:44	06:42	06:26	05:18	20:06 (1)   04:37
	16:03	17:00	17:57	19:55	20:51	14 20:20 (1)   21:37
9	08:25	07:42	06:40	06:23	05:17	20:06 (1)   04:36
	16:05	17:02	17:59	19:57	20:53	16 20:22 (1)   21:38
10	08:24	07:40	06:37	06:21	05:15	20:05 (1)   04:36
	16:06	17:05	18:00	19:59	20:55	19 20:24 (1)   21:39
11	08:24	07:38	06:35	06:18	05:13	20:05 (1)   04:35
	16:08	17:07	18:02	20:01	20:57	19 20:24 (1)   21:40
12	08:23	07:36	06:32	06:16	05:11	20:06 (1)   04:35
	16:09	17:09	18:04	20:03	20:58	18 20:24 (1)   21:41
13	08:22	07:34	06:30	06:14	05:09	20:05 (1)   04:34
	16:11	17:11	18:06	20:05	21:00	19 20:24 (1)   21:41
14	08:21	07:32	06:27	06:11	05:07	20:05 (1)   04:34
	16:13	17:13	18:08	20:07	21:02	18 20:23 (1)   21:42
15	08:20	07:30	06:25	06:09	05:06	20:06 (1)   04:34
	16:14	17:15	18:10	20:09	21:04	17 20:23 (1)   21:43
16	08:19	07:28	06:22	06:06	05:04	20:07 (1)   04:34
	16:16	17:17	18:12	20:10	21:05	15 20:22 (1)   21:43
17	08:18	07:26	06:20	06:04	05:02	20:08 (1)   04:33
	16:18	17:19	18:14	20:12	21:07	14 20:22 (1)   21:44
18	08:17	07:24	06:18	06:02	05:01	20:08 (1)   04:33
	16:19	17:21	18:16	20:14	21:09	12 20:20 (1)   21:44
19	08:16	07:22	06:15	05:59	04:59	20:10 (1)   04:33
	16:21	17:23	18:18	20:16	21:10	10 20:20 (1)   21:44
20	08:15	07:19	06:13	05:57	19:47 (20)	04:57
	16:23	17:25	18:20	20:18	3 19:50 (20)	21:12
21	08:14	07:17	06:10	05:55	19:44 (20)	04:56
	16:25	17:27	18:21	20:20	8 19:52 (20)	21:14
22	08:12	07:15	06:08	05:52	19:41 (20)	04:55
	16:27	17:29	18:23	20:22	11 19:52 (20)	21:15
23	08:11	07:13	06:05	05:50	19:40 (20)	04:53
	16:29	17:31	18:25	20:24	14 19:54 (20)	21:17
24	08:10	07:10	06:03	17:57 (18)   05:48	19:39 (20)	04:52
	16:30	17:33	18:27	3 18:00 (18)   20:25	17 19:56 (20)	21:18
25	08:08	07:08	06:00	17:56 (18)   05:46	19:39 (20)	04:50
	16:32	17:35	18:29	6 18:02 (18)   20:27	18 19:57 (20)	21:20
26	08:07	07:06	05:58	17:54 (18)   05:43	19:39 (20)	04:49
	16:34	17:37	18:31	10 18:04 (18)   20:29	18 19:57 (20)	21:21
27	08:05	07:03	05:55	17:54 (18)   05:41	19:39 (20)	04:48
	16:36	17:39	18:33	12 18:06 (18)   20:31	18 19:57 (20)	21:23
28	08:04	07:01	05:53	17:54 (18)   05:39	19:39 (20)	04:47
	16:38	17:41	18:35	13 18:07 (18)   20:33	18 19:57 (20)	21:24
29	08:02	06:50	05:50	18:55 (18)   05:37	19:39 (20)	04:45
	16:40	19:37	12 19:07 (18)   20:35	17 19:56 (20)	21:26	
30	08:00	06:48	05:48	18:55 (18)   05:35	19:39 (20)	04:44
	16:42	19:38	10 19:05 (18)   20:37	16 19:55 (20)	21:27	
31	07:59	06:45	05:45	18:57 (18)	04:43	
	16:44	19:40	6 19:03 (18)	21:28		
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung			72	158	264	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.63	0.63	
Gesamte Reduktion			0.19	0.24	0.29	
Met.wahrsch.Beschattung			14	37	77	

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CM - IO91

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember			
1	04:38	05:19	20:16 (1) 06:14	07:08	07:07	08:03			
	21:44	21:08	19 20:35 (1) 20:01	18:46	16:35	15:50			
2	04:39	05:20	20:15 (1) 06:16	07:10	07:09	08:05			
	21:44	21:07	19 20:34 (1) 19:59	18:44	16:33	15:49			
3	04:40	05:22	20:16 (1) 06:17	07:12	07:11	08:06			
	21:44	21:05	17 20:33 (1) 19:56	18:41	16:31	15:48			
4	04:40	05:24	20:15 (1) 06:19	07:13	07:13	08:08			
	21:43	21:03	16 20:31 (1) 19:54	18:39	16:29	15:47			
5	04:41	05:25	20:16 (1) 06:21	07:15	07:15	08:09			
	21:43	21:01	14 20:30 (1) 19:51	18:37	16:27	15:47			
6	04:42	05:27	20:17 (1) 06:23	07:17	07:17	08:10			
	21:42	20:59	11 20:28 (1) 19:49	18:34	16:25	15:46			
7	04:43	05:29	20:17 (1) 06:25	07:19	07:19	08:12			
	21:41	20:57	9 20:26 (1) 19:46	18:32	16:23	15:46			
8	04:44	05:31	20:18 (1) 06:26	07:21	07:21	08:13			
	21:41	20:55	6 20:24 (1) 19:44	18:29	16:21	15:45			
9	04:45	05:32	19:54 (20) 06:28	07:23	07:23	08:14			
	21:40	20:53	7 20:23 (1) 19:41	18:27	16:19	15:45			
10	04:46	05:34	19:51 (20) 06:30	07:25	07:25	08:16			
	21:39	20:51	9 20:00 (20) 19:39	18:24	16:18	15:45			
11	04:48	05:36	19:49 (20) 06:32	07:27	07:27	08:17			
	21:38	20:49	13 20:02 (20) 19:36	18:22	16:16	15:44			
12	04:49	05:38	19:47 (20) 06:34	18:50 (18)	07:28	07:29	08:18		
	21:37	20:47	15 20:02 (20) 19:34	5 18:55 (18)	18:20	16:14	15:44	3	14:23 (26)
13	04:50	05:40	19:47 (20) 06:35	18:46 (18)	07:30	07:31	08:19		14:19 (26)
	21:36	20:45	16 20:03 (20) 19:31	10 18:56 (18)	18:17	16:13	15:44	6	14:25 (26)
14	04:51	05:41	19:46 (20) 06:37	18:45 (18)	07:32	07:33	08:20		14:18 (26)
	21:35	20:43	18 20:04 (20) 19:29	12 18:57 (18)	18:15	16:11	15:44	8	14:26 (26)
15	04:52	05:43	19:46 (20) 06:39	18:44 (18)	07:34	07:35	08:21		14:18 (26)
	21:34	20:40	18 20:04 (20) 19:26	14 18:58 (18)	18:12	16:09	15:44	9	14:27 (26)
16	04:54	05:45	19:45 (20) 06:41	18:44 (18)	07:36	07:36	08:22		14:18 (26)
	21:33	20:38	19 20:04 (20) 19:24	12 18:56 (18)	18:10	16:08	15:44	10	14:28 (26)
17	04:55	05:47	19:45 (20) 06:43	18:43 (18)	07:38	07:38	08:23		14:19 (26)
	21:32	20:36	19 20:04 (20) 19:21	10 18:53 (18)	18:08	16:06	15:44	10	14:29 (26)
18	04:57	05:49	19:46 (20) 06:44	18:43 (18)	07:40	07:40	08:23		14:19 (26)
	21:30	20:34	17 20:03 (20) 19:19	7 18:50 (18)	18:05	16:05	15:44	11	14:30 (26)
19	04:58	05:50	19:45 (20) 06:46	18:44 (18)	07:42	07:42	08:24		14:20 (26)
	21:29	20:31	17 20:02 (20) 19:16	4 18:48 (18)	18:03	16:03	15:45	11	14:31 (26)
20	04:59	05:52	19:46 (20) 06:48	18:45 (18)	07:44	07:44	08:25		14:19 (26)
	21:28	20:29	14 20:00 (20) 19:14	1 18:46 (18)	18:01	16:02	15:45	12	14:31 (26)
21	05:01	05:54	19:47 (20) 06:50		07:46	07:46	08:25		14:20 (26)
	21:26	20:27	11 19:58 (20) 19:11		17:59	16:01	15:45	12	14:32 (26)
22	05:02	05:56	19:48 (20) 06:52		07:48	07:48	08:26		14:20 (26)
	21:25	20:25	7 19:55 (20) 19:09		17:56	15:59	15:46	12	14:32 (26)
23	05:04	05:58	19:52 (20) 06:53		07:49	07:49	08:26		14:21 (26)
	21:23	20:22	1 19:53 (20) 19:06		17:54	15:58	15:46	12	14:33 (26)
24	05:05	20:21 (1) 05:59		06:55	07:51	07:51	08:27		14:21 (26)
	21:22	7 20:28 (1) 20:20		19:04	17:52	15:57	15:47	12	14:33 (26)
25	05:07	20:20 (1) 06:01		06:57	06:53	07:53	08:27		14:22 (26)
	21:20	11 20:31 (1) 20:18		19:01	16:50	15:56	15:48	11	14:33 (26)
26	05:09	20:18 (1) 06:03		06:59	06:55	07:55	08:28		14:22 (26)
	21:19	13 20:31 (1) 20:15		18:59	16:47	15:54	15:48	11	14:33 (26)
27	05:10	20:18 (1) 06:05		07:01	06:57	07:56	08:28		14:23 (26)
	21:17	15 20:33 (1) 20:13		18:56	16:45	15:53	15:49	10	14:33 (26)
28	05:12	20:17 (1) 06:07		07:02	06:59	07:58	08:28		14:24 (26)
	21:15	16 20:33 (1) 20:11		18:54	16:43	15:52	15:50	9	14:33 (26)
29	05:14	20:17 (1) 06:08		07:04	07:01	08:00	08:28		14:25 (26)
	21:14	17 20:34 (1) 20:08		18:51	16:41	15:51	15:51	8	14:33 (26)
30	05:15	20:16 (1) 06:10		07:06	07:03	08:01	08:28		14:26 (26)
	21:12	18 20:34 (1) 20:06		18:49	16:39	15:51	15:52	7	14:33 (26)
31	05:17	20:16 (1) 06:12			07:05		08:28		14:28 (26)
	21:10	18 20:34 (1) 20:03			16:37		15:53	5	14:33 (26)
Sonnenscheinstunden	514	461	383	328	257	231			
astr.max.mögl.Beschattung	115	312							189
Red.Sonnenscheinwahrsch.	0.44	0.48		0.40					0.14
Reduktion Betriebsdauer	0.90	0.90		0.90					0.90
Reduktion Windrichtung	0.63	0.63		0.68					0.67
Gesamte Reduktion	0.25	0.28		0.25					0.08
Met.wahrsch.Beschattung	29	87		18					16

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CN - IO92

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:40 (20)   04:42
	15:54	14:37 (26)   16:46	17:43	19:42	20:39	13   19:53 (20)   21:29
2	08:28	07:55	06:56	06:40	05:31	19:42 (20)   04:41
	15:55	14:35 (26)   16:48	17:45	19:44	20:40	9   19:51 (20)   21:31
3	08:28	07:54	06:54	06:38	05:28	20:10 (1)   04:40
	15:57	16:50	17:47	19:46	20:42	2   20:12 (1)   21:32
4	08:27	07:52	06:52	06:35	05:26	20:08 (1)   04:40
	15:58	16:52	17:49	19:48	20:44	6   20:14 (1)   21:33
5	08:27	07:50	06:49	06:33	05:24	20:07 (1)   04:39
	15:59	16:54	17:51	19:50	20:46	8   20:15 (1)   21:34
6	08:27	07:48	06:47	06:30	05:22	20:06 (1)   04:38
	16:00	16:56	17:53	19:52	20:48	11   20:17 (1)   21:35
7	08:26	07:46	06:44	06:28	05:20	11   20:05 (1)   04:37
	16:02	16:58	17:55	19:54	20:50	13   20:18 (1)   21:36
8	08:26	07:44	06:42	06:26	05:18	20:04 (1)   04:37
	16:03	17:00	17:57	19:55	20:51	16   20:20 (1)   21:37
9	08:25	07:42	06:40	06:23	05:17	20:05 (1)   04:36
	16:05	17:02	17:59	19:57	20:53	17   20:22 (1)   21:38
10	08:24	07:40	06:37	06:21	05:15	20:04 (1)   04:36
	16:06	17:05	18:00	19:59	20:55	19   20:23 (1)   21:39
11	08:24	07:38	06:35	06:18	05:13	20:04 (1)   04:35
	16:08	17:07	18:02	20:01	20:57	19   20:23 (1)   21:40
12	08:23	07:36	06:32	06:16	05:11	20:05 (1)   04:35
	16:09	17:09	18:04	20:03	20:58	18   20:23 (1)   21:41
13	08:22	07:34	06:30	06:14	05:09	20:05 (1)   04:34
	16:11	17:11	18:06	20:05	21:00	17   20:22 (1)   21:41
14	08:21	07:32	06:27	06:11	05:07	20:05 (1)   04:34
	16:12	17:13	18:08	20:07	21:02	17   20:22 (1)   21:42
15	08:20	07:30	06:25	06:09	05:06	20:06 (1)   04:34
	16:14	17:15	18:10	20:09	21:04	16   20:22 (1)   21:43
16	08:19	07:28	06:22	06:06	05:04	20:06 (1)   04:34
	16:16	17:17	18:12	20:10	21:05	14   20:20 (1)   21:43
17	08:18	07:26	06:20	06:04	05:02	20:08 (1)   04:33
	16:18	17:19	18:14	20:12	21:07	12   20:20 (1)   21:44
18	08:17	07:24	06:18	06:02	05:01	20:09 (1)   04:33
	16:19	17:21	18:16	20:14	21:09	9   20:18 (1)   21:44
19	08:16	07:22	06:15	05:59	04:59	20:11 (1)   04:33
	16:21	17:23	18:18	20:16	21:10	5   20:16 (1)   21:44
20	08:15	07:19	06:13	05:57	19:44 (20)   04:57	04:33
	16:23	17:25	18:20	20:18	19:50 (20)   21:12	21:45
21	08:14	07:17	06:10	05:55	19:42 (20)   04:56	04:34
	16:25	17:27	18:21	20:20	19:52 (20)   21:14	21:45
22	08:12	07:15	06:08	05:52	19:40 (20)   04:55	04:34
	16:27	17:29	18:23	20:22	19:52 (20)   21:15	21:45
23	08:11	07:13	06:05	05:50	19:39 (20)   04:53	04:34
	16:29	17:31	18:25	20:24	19:54 (20)   21:17	21:45
24	08:10	07:10	06:03	17:57 (18)   05:48	19:38 (20)   04:52	04:34
	16:30	17:33	18:27	3   18:00 (18)   20:25	18   19:56 (20)   21:18	21:46
25	08:08	07:08	06:00	17:56 (18)   05:46	19:38 (20)   04:50	04:35
	16:32	17:35	18:29	6   18:02 (18)   20:27	18   19:56 (20)   21:20	21:46
26	08:07	07:06	05:58	17:54 (18)   05:43	19:38 (20)   04:49	04:35
	16:34	17:37	18:31	10   18:04 (18)   20:29	18   19:56 (20)   21:21	21:46
27	08:05	07:03	05:55	17:55 (18)   05:41	19:38 (20)   04:48	04:36
	16:36	17:39	18:33	11   18:06 (18)   20:31	18   19:56 (20)   21:23	21:45
28	08:04	07:01	05:53	17:54 (18)   05:39	19:38 (20)   04:47	04:36
	16:38	17:41	18:35	13   18:07 (18)   20:33	17   19:55 (20)   21:24	21:45
29	08:02	06:50	05:47	18:55 (18)   05:37	19:39 (20)   04:45	04:37
	16:40	17:43	18:37	12   19:07 (18)   20:35	16   19:55 (20)   21:26	21:45
30	08:00	06:48	05:45	18:55 (18)   05:35	19:39 (20)   04:44	04:37
	16:42	17:45	18:39	10   19:05 (18)   20:37	15   19:54 (20)   21:27	21:45
31	07:59	06:45	05:43	18:58 (18)	04:43	
	16:44	17:47	18:41	4   19:02 (18)	21:28	
Sonneneinstrahlung	248	272	367	421	496	512
astr.max.mögl.Beschattung	10		69	163	241	
Red.Sonneneinstrahlung	0.17		0.31	0.41	0.51	
Reduktion Betriebsdauer	0.90		0.90	0.90	0.90	
Reduktion Windrichtung	0.67		0.68	0.63	0.63	
Gesamte Reduktion	0.11		0.19	0.24	0.29	
Met.wahrsch.Beschattung	1		13	39	70	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CN - IO92

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:15 (1) 06:14	07:08	07:07	08:03
	21:44	21:08	19 20:34 (1) 20:01	18:46	16:35	15:50
2	04:39	05:20	20:14 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	19 20:33 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	20:15 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	18 20:33 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:14 (1) 06:19	07:13	07:13	08:08
	21:43	21:03	17 20:31 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:15 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	15 20:30 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:16 (1) 06:23	07:17	07:17	08:10
	21:42	20:59	12 20:28 (1) 19:49	18:34	16:25	15:46
7	04:43	05:29	20:15 (1) 06:25	07:19	07:19	08:12
	21:41	20:57	11 20:26 (1) 19:46	18:32	16:23	15:46
8	04:44	05:31	20:17 (1) 06:26	07:21	07:21	08:13
	21:41	20:55	7 20:24 (1) 19:44	18:29	16:21	15:45
9	04:45	05:32	20:18 (1) 06:28	07:23	07:23	08:14
	21:40	20:53	5 20:23 (1) 19:41	18:27	16:19	15:45
10	04:46	05:34	19:52 (20) 06:30	07:25	07:25	08:16
	21:39	20:51	5 19:57 (20) 19:39	18:24	16:18	15:45
11	04:48	05:36	19:50 (20) 06:32	07:27	07:27	08:17
	21:38	20:49	10 20:00 (20) 19:36	18:22	16:16	15:44
12	04:49	05:38	19:47 (20) 06:34	18:51 (18)	07:28	07:29
	21:37	20:47	14 20:01 (20) 19:34	2 18:53 (18)	18:20	16:14
13	04:50	05:40	19:47 (20) 06:35	18:47 (18)	07:30	07:31
	21:36	20:45	15 20:02 (20) 19:31	9 18:56 (18)	18:17	16:13
14	04:51	05:41	19:46 (20) 06:37	18:45 (18)	07:32	07:33
	21:35	20:43	17 20:03 (20) 19:29	12 18:57 (18)	18:15	16:11
15	04:52	05:43	19:46 (20) 06:39	18:44 (18)	07:34	07:35
	21:34	20:40	17 20:03 (20) 19:26	13 18:57 (18)	18:12	16:09
16	04:54	05:45	19:44 (20) 06:41	18:44 (18)	07:36	07:36
	21:33	20:38	18 20:02 (20) 19:24	12 18:56 (18)	18:10	16:08
17	04:55	05:47	19:45 (20) 06:43	18:43 (18)	07:38	07:38
	21:32	20:36	18 20:03 (20) 19:21	10 18:53 (18)	18:08	16:06
18	04:57	05:49	19:45 (20) 06:44	18:43 (18)	07:40	07:40
	21:30	20:34	18 20:03 (20) 19:19	7 18:50 (18)	18:05	16:05
19	04:58	05:50	19:44 (20) 06:46	18:44 (18)	07:42	07:42
	21:29	20:31	17 20:01 (20) 19:16	4 18:48 (18)	18:03	16:03
20	04:59	05:52	19:45 (20) 06:48	18:45 (18)	07:44	07:44
	21:28	20:29	15 20:00 (20) 19:14	1 18:46 (18)	18:01	16:02
21	05:01	05:54	19:46 (20) 06:50	07:46	07:46	08:25
	21:26	20:27	12 19:58 (20) 19:11	17:59	16:01	15:45
22	05:02	05:56	19:46 (20) 06:52	07:48	07:48	08:26
	21:25	20:25	9 19:55 (20) 19:09	17:56	15:59	15:46
23	05:04	05:58	19:48 (20) 06:53	07:49	07:49	08:26
	21:23	20:22	5 19:53 (20) 19:06	17:54	15:58	15:46
24	05:05	05:59	06:55	07:51	07:51	08:27
	21:22	20:20	19:04	17:52	15:57	15:47
25	05:07	20:21 (1) 06:01	06:57	06:53	07:53	08:27
	21:20	7 20:28 (1) 20:18	19:01	16:50	15:56	15:48
26	05:09	20:18 (1) 06:03	06:59	06:55	07:55	08:28
	21:19	11 20:29 (1) 20:15	18:59	16:47	15:54	15:48
27	05:10	20:18 (1) 06:05	07:01	06:57	07:56	08:28
	21:17	13 20:31 (1) 20:13	18:56	16:45	15:53	15:49
28	05:12	20:16 (1) 06:07	07:02	06:59	07:58	08:28
	21:15	15 20:31 (1) 20:11	18:54	16:43	15:52	15:50
29	05:14	20:16 (1) 06:08	07:04	07:01	08:00	08:28
	21:14	16 20:32 (1) 20:08	18:51	16:41	15:51	15:51
30	05:15	20:15 (1) 06:10	07:06	07:03	08:01	08:28
	21:12	17 20:32 (1) 20:06	18:49	16:39	15:51	15:52
31	05:17	20:15 (1) 06:12	07:05	07:05	08:01	08:28
	21:10	18 20:33 (1) 20:03	18:47	16:37	15:53	15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	97	313	70			244
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40			0.14
Reduktion Betriebsdauer	0.90	0.90	0.90			0.90
Reduktion Windrichtung	0.63	0.63	0.68			0.67
Gesamte Reduktion	0.25	0.28	0.25			0.08
Met.wahrsch.Beschattung	25	87	17			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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung: GBSchattenrezeptor: CO - IO93**  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	14:31 (26)	07:57	06:59	06:43	05:33
	15:54	10 14:41 (26)	16:46	17:43	19:42	20:39
2	08:28	14:32 (26)	07:55	06:56	06:40	05:31
	15:55	8 14:40 (26)	16:48	17:45	19:44	20:40
3	08:28	14:34 (26)	07:54	06:54	06:38	05:28
	15:57	6 14:40 (26)	16:50	17:47	19:46	20:42
4	08:27	14:37 (26)	07:52	06:52	06:35	05:26
	15:58	1 14:38 (26)	16:52	17:49	19:48	20:44
5	08:27	07:50	06:49	06:33	05:24	20:05 (1)
	15:59	16:54	17:51	19:50	20:46	10 20:15 (1)
6	08:27	07:48	06:47	06:30	05:22	20:05 (1)
	16:00	16:56	17:53	19:52	20:48	12 20:17 (1)
7	08:26	07:46	06:44	06:28	05:20	20:04 (1)
	16:02	16:58	17:55	19:54	20:50	14 20:18 (1)
8	08:26	07:44	06:42	06:26	05:18	20:03 (1)
	16:03	17:00	17:57	19:55	20:51	17 20:20 (1)
9	08:25	07:42	06:40	06:23	05:17	20:04 (1)
	16:05	17:02	17:59	19:57	20:53	18 20:22 (1)
10	08:24	07:40	06:37	06:21	05:15	20:04 (1)
	16:06	17:05	18:00	19:59	20:55	18 20:22 (1)
11	08:24	07:38	06:35	06:18	05:13	20:03 (1)
	16:08	17:07	18:02	20:01	20:57	18 20:21 (1)
12	08:23	07:36	06:32	06:16	05:11	20:04 (1)
	16:09	17:09	18:04	20:03	20:58	18 20:22 (1)
13	08:22	07:34	06:30	06:14	05:09	20:04 (1)
	16:11	17:11	18:06	20:05	21:00	17 20:21 (1)
14	08:21	07:32	06:27	06:11	05:07	20:05 (1)
	16:12	17:13	18:08	20:07	21:02	15 20:20 (1)
15	08:20	07:30	06:25	06:09	05:06	20:06 (1)
	16:14	17:15	18:10	20:09	21:04	14 20:20 (1)
16	08:19	07:28	06:22	06:06	05:04	20:06 (1)
	16:16	17:17	18:12	20:10	21:05	12 20:18 (1)
17	08:18	07:26	06:20	06:04	05:02	20:08 (1)
	16:18	17:19	18:14	20:12	21:07	9 20:17 (1)
18	08:17	07:24	06:18	06:02	05:01	20:10 (1)
	16:19	17:21	18:16	20:14	21:09	5 20:15 (1)
19	08:16	07:22	06:15	05:59	19:45 (20)	04:59
	16:21	17:23	18:18	20:16	3 19:48 (20)	21:10
20	08:15	07:19	06:13	05:57	19:42 (20)	04:57
	16:23	17:25	18:20	20:18	8 19:50 (20)	21:12
21	08:14	07:17	06:10	05:55	19:41 (20)	04:56
	16:25	17:27	18:21	20:20	11 19:52 (20)	21:14
22	08:12	07:15	06:08	05:52	19:39 (20)	04:55
	16:27	17:29	18:23	20:22	13 19:52 (20)	21:15
23	08:11	07:13	06:05	05:50	19:38 (20)	04:53
	16:29	17:31	18:25	20:24	16 19:54 (20)	21:17
24	08:10	07:10	06:03	05:48	19:38 (20)	04:52
	16:30	17:33	18:27	20:25	17 19:55 (20)	21:18
25	08:08	07:08	06:00	05:46	19:37 (20)	04:50
	16:32	17:35	18:29	20:27	18 19:55 (20)	21:20
26	08:07	07:06	05:58	05:43	19:37 (20)	04:49
	16:34	17:37	18:31	20:29	18 19:55 (20)	21:21
27	08:05	07:03	05:55	05:41	19:38 (20)	04:48
	16:36	17:39	18:33	20:31	17 19:55 (20)	21:23
28	08:04	07:01	05:53	05:39	19:38 (20)	04:47
	16:38	17:41	18:35	20:33	16 19:54 (20)	21:24
29	08:02	06:50	05:37	05:33	19:39 (20)	04:45
	16:40	19:37	20:35	14 19:53 (20)	21:26	
30	08:00	06:48	05:35	05:35	19:39 (20)	04:44
	16:42	19:38	20:37	13 19:52 (20)	21:27	
31	07:59	06:45	05:33	05:33	04:43	
	16:44	19:40	20:37	13 19:52 (20)	21:28	
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung	25			164		222
Red.Sonnenscheinwahrsch.	0.17			0.41		0.51
Reduktion Betriebsdauer	0.90			0.90		0.90
Reduktion Windrichtung	0.67			0.63		0.63
Gesamte Reduktion	0.11			0.24		0.29
Met.wahrsch.Beschattung	3			39		65

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
180413\_Miltzow\_LAI\_Antrag III - VII

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: CO - IO93

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember				
1	04:38	05:19	20:15 (1)	06:14	07:08	07:07	08:03			
	21:44	21:08	17	20:32 (1)	20:01	18:46	16:35	15:50		
2	04:39	05:20		20:14 (1)	06:16	07:10	07:09	08:05		
	21:44	21:07	18	20:32 (1)	19:59	18:44	16:33	15:49		
3	04:40	05:22		20:14 (1)	06:17	07:12	07:11	08:06		
	21:44	21:05	18	20:32 (1)	19:56	18:41	16:31	15:48		
4	04:40	05:24		20:13 (1)	06:19	07:13	07:13	08:08		
	21:43	21:03	18	20:31 (1)	19:54	18:39	16:29	15:47		
5	04:41	05:25		20:14 (1)	06:21	07:15	07:15	08:09		
	21:43	21:01	16	20:30 (1)	19:51	18:37	16:27	15:47		
6	04:42	05:27		20:14 (1)	06:23	07:17	07:17	08:10		
	21:42	20:59	14	20:28 (1)	19:49	18:34	16:25	15:46		
7	04:43	05:29		20:14 (1)	06:25	07:19	07:19	08:12		
	21:41	20:57	12	20:26 (1)	19:46	18:32	16:23	15:46		
8	04:44	05:31		20:15 (1)	06:26	07:21	07:21	08:13		
	21:41	20:55	9	20:24 (1)	19:44	18:29	16:21	15:45		
9	04:45	05:32		20:16 (1)	06:28	07:23	07:23	08:14		
	21:40	20:53	7	20:23 (1)	19:41	18:27	16:19	15:45	6	14:23 (26)
10	04:46	05:34		20:17 (1)	06:30	07:25	07:25	08:16		14:22 (26)
	21:39	20:51	3	20:20 (1)	19:39	18:24	16:18	15:45	8	14:30 (26)
11	04:48	05:36		19:51 (20)	06:32	07:27	07:27	08:17		14:21 (26)
	21:38	20:49	6	19:57 (20)	19:36	18:22	16:16	15:44	10	14:31 (26)
12	04:49	05:38		19:48 (20)	06:34	07:28	07:29	08:18		14:21 (26)
	21:37	20:47	11	19:59 (20)	19:34	18:20	16:14	15:44	11	14:32 (26)
13	04:50	05:40		19:47 (20)	06:35	07:30	07:31	08:19		14:21 (26)
	21:36	20:45	13	20:00 (20)	19:31	18:17	16:13	15:44	12	14:33 (26)
14	04:51	05:41		19:46 (20)	06:37	07:32	07:33	08:20		14:21 (26)
	21:35	20:43	15	20:01 (20)	19:29	18:15	16:11	15:44	12	14:33 (26)
15	04:52	05:43		19:45 (20)	06:39	07:34	07:35	08:21		14:21 (26)
	21:34	20:40	17	20:02 (20)	19:26	18:12	16:09	15:44	13	14:34 (26)
16	04:54	05:45		19:44 (20)	06:41	07:36	07:36	08:22		14:21 (26)
	21:33	20:38	17	20:01 (20)	19:24	18:10	16:08	15:44	14	14:35 (26)
17	04:55	05:47		19:44 (20)	06:43	07:38	07:38	08:23		14:22 (26)
	21:32	20:36	18	20:02 (20)	19:21	18:08	16:06	15:44	14	14:36 (26)
18	04:57	05:49		19:44 (20)	06:44	07:40	07:40	08:23		14:22 (26)
	21:30	20:34	18	20:02 (20)	19:19	18:05	16:05	15:44	15	14:37 (26)
19	04:58	05:50		19:43 (20)	06:46	07:42	07:42	08:24		14:23 (26)
	21:29	20:31	18	20:01 (20)	19:16	18:03	16:03	15:45	15	14:38 (26)
20	04:59	05:52		19:44 (20)	06:48	07:44	07:44	08:25		14:23 (26)
	21:28	20:29	16	20:00 (20)	19:14	18:01	16:02	15:45	14	14:37 (26)
21	05:01	05:54		19:44 (20)	06:50	07:46	07:46	08:25		14:24 (26)
	21:26	20:27	14	19:58 (20)	19:11	17:59	16:01	15:45	14	14:38 (26)
22	05:02	05:56		19:45 (20)	06:52	07:48	07:48	08:26		14:24 (26)
	21:25	20:25	10	19:55 (20)	19:09	17:56	15:59	15:46	14	14:38 (26)
23	05:04	05:58		19:46 (20)	06:53	07:49	07:49	08:26		14:25 (26)
	21:23	20:22	7	19:53 (20)	19:06	17:54	15:58	15:46	14	14:39 (26)
24	05:05	05:59		19:49 (20)	06:55	07:51	07:51	08:27		14:25 (26)
	21:22	20:20	2	19:51 (20)	19:04	17:52	15:57	15:47	15	14:40 (26)
25	05:07	06:01			06:57	06:53	07:53	08:27		14:25 (26)
	21:20	20:18			19:01	16:50	15:56	15:48	15	14:40 (26)
26	05:09	20:19 (1)	06:03		06:59	06:55	07:55	08:28		14:26 (26)
	21:19	20:26 (1)	20:15		18:59	16:47	15:54	15:48	14	14:40 (26)
27	05:10	20:18 (1)	06:05		07:01	06:57	07:56	08:28		14:26 (26)
	21:17	20:28 (1)	20:13		18:56	16:45	15:53	15:49	14	14:40 (26)
28	05:12	20:16 (1)	06:07		07:02	06:59	07:58	08:28		14:27 (26)
	21:15	20:29 (1)	20:11		18:54	16:43	15:52	15:50	13	14:40 (26)
29	05:14	20:16 (1)	06:08		07:04	07:01	08:00	08:28		14:28 (26)
	21:14	20:30 (1)	20:08		18:51	16:41	15:51	15:51	12	14:40 (26)
30	05:15	20:15 (1)	06:10		07:06	07:03	08:01	08:28		14:28 (26)
	21:12	20:31 (1)	20:06		18:49	16:39	15:51	15:52	13	14:41 (26)
31	05:17	20:15 (1)	06:12			07:05		08:28		14:30 (26)
	21:10	20:31 (1)	20:03			16:37		15:53	11	14:41 (26)
Sonnenscheinstunden	514	461		383		328	257	231		
astr.max.mögl.Beschattung	76	314						293		
Red.Sonnenscheinwahrsch.	0.44	0.48						0.14		
Reduktion Betriebsdauer	0.90	0.90						0.90		
Reduktion Windrichtung	0.63	0.63						0.67		
Gesamte Reduktion	0.26	0.28						0.08		
Met.wahrsch.Beschattung	19	88						25		

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CP - IO94  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	14:33 (26)	07:57	06:59	06:43	05:33
	15:54	11 14:44 (26)	16:46	17:43	19:42	19:42 (20)
2	08:28	14:33 (26)	07:55	06:56	06:40	20:39
	15:55	11 14:44 (26)	16:48	17:45	19:44	6 19:48 (20)
3	08:28	14:34 (26)	07:54	06:54	06:38	05:31
	15:57	10 14:44 (26)	16:50	17:47	19:46	20:08 (1)
4	08:27	14:36 (26)	07:52	06:52	06:35	20:40
	15:58	8 14:44 (26)	16:52	17:49	19:48	3 20:11 (1)
5	08:27	14:38 (26)	07:50	06:49	06:33	05:28
	15:59	4 14:42 (26)	16:54	17:51	19:50	6 20:12 (1)
6	08:27	07:48	06:47	06:30	06:24	20:05 (1)
	16:00	16:56	17:53	19:52	20:44	9 20:14 (1)
7	08:26	07:46	06:44	06:28	06:20	20:04 (1)
	16:02	16:58	17:55	19:54	20:46	11 20:15 (1)
8	08:26	07:44	06:42	06:26	06:18	20:03 (1)
	16:03	17:00	17:57	19:55	20:52	14 20:17 (1)
9	08:25	07:42	06:40	06:23	06:15	20:03 (1)
	16:05	17:02	17:59	19:57	20:53	15 20:18 (1)
10	08:24	07:40	06:37	06:21	06:13	20:02 (1)
	16:06	17:05	18:00	19:59	20:55	18 20:20 (1)
11	08:24	07:38	06:35	06:18	06:10	20:02 (1)
	16:08	17:07	18:02	20:01	20:57	18 20:21 (1)
12	08:23	07:36	06:32	06:16	06:08	20:03 (1)
	16:09	17:09	18:04	20:03	20:58	17 20:20 (1)
13	08:22	07:34	06:30	06:13	06:05	16 20:04 (1)
	16:11	17:11	18:06	20:05	21:00	20:04 (1)
14	08:21	07:32	06:27	06:11	06:03	15 20:19 (1)
	16:12	17:13	18:08	20:07	21:02	20:04 (1)
15	08:20	07:30	06:25	06:09	06:01	14 20:18 (1)
	16:14	17:15	18:10	20:09	21:04	20:06 (1)
16	08:19	07:28	06:22	06:06	05:58	12 20:18 (1)
	16:16	17:17	18:12	20:10	21:04	20:07 (1)
17	08:18	07:26	06:20	06:04	05:56	9 20:16 (1)
	16:18	17:19	18:14	20:12	21:05	20:10 (1)
18	08:17	07:24	06:18	06:02	05:54	4 20:14 (1)
	16:19	17:21	18:16	20:14	21:07	21:44
19	08:16	07:22	06:15	05:59	05:51	04:33
	16:21	17:23	18:18	20:16	21:09	04:33
20	08:15	07:19	06:13	05:57	05:49	6 19:48 (20)
	16:23	17:25	18:20	20:18	21:12	21:10
21	08:14	07:17	06:10	05:55	05:47	10 19:50 (20)
	16:25	17:27	18:21	20:20	21:14	19:50 (20)
22	08:12	07:15	06:08	05:52	05:44	13 19:52 (20)
	16:27	17:29	18:23	20:22	21:15	19:38 (20)
23	08:11	07:13	06:05	05:50	05:42	14 19:52 (20)
	16:29	17:31	18:25	20:24	21:17	21:15
24	08:10	07:10	06:03	05:48	05:40	17 19:54 (20)
	16:30	17:33	18:27	20:25	21:18	19:37 (20)
25	08:08	07:08	06:00	05:46	05:38	17 19:54 (20)
	16:32	17:35	18:29	20:27	21:20	19:37 (20)
26	08:07	07:06	05:58	05:43	05:35	17 19:54 (20)
	16:34	17:37	18:31	20:29	21:21	19:37 (20)
27	08:05	07:03	05:55	05:41	05:33	17 19:54 (20)
	16:36	17:39	18:33	20:31	21:23	21:21
28	08:04	07:01	05:53	05:39	05:31	17 19:54 (20)
	16:38	17:41	18:35	20:33	21:24	19:38 (20)
29	08:02	06:50	05:37	05:29	05:21	15 19:53 (20)
	16:40	17:43	18:37	20:35	21:26	19:39 (20)
30	08:00	06:48	05:35	05:27	05:19	13 19:52 (20)
	16:42	17:45	18:39	20:37	21:27	19:40 (20)
31	07:59	06:45	05:25	05:17	05:09	10 19:50 (20)
	16:44	17:48	18:42	20:39	21:28	21:27
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung	44			166	205	
Red.Sonnenscheinwahrsch.	0.17			0.41	0.51	
Reduktion Betriebsdauer	0.90			0.90	0.90	
Reduktion Windrichtung	0.67			0.63	0.63	
Gesamte Reduktion	0.11			0.24	0.29	
Met.wahrsch.Beschattung	5			39	60	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CP - IO94

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38		05:19		20:14 (1)	06:14	07:08		07:07		08:03	
	21:44		21:08	17	20:31 (1)	20:01	18:46		16:35		15:50	
2	04:39		05:20		20:13 (1)	06:16	07:10		07:09		08:05	
	21:44		21:07	18	20:31 (1)	19:59	18:44		16:33		15:49	
3	04:40		05:22		20:13 (1)	06:17	07:12		07:11		08:06	
	21:44		21:05	18	20:31 (1)	19:56	18:41		16:31		15:48	
4	04:40		05:24		20:12 (1)	06:19	07:13		07:13		08:08	
	21:43		21:03	19	20:31 (1)	19:54	18:39		16:29		15:47	
5	04:41		05:25		20:13 (1)	06:21	07:15		07:15		08:09	
	21:43		21:01	17	20:30 (1)	19:51	18:37		16:27		15:47	
6	04:42		05:27		20:13 (1)	06:23	07:17		07:17		08:10	
	21:42		20:59	15	20:28 (1)	19:49	18:34		16:25		15:46	
7	04:43		05:29		20:13 (1)	06:25	07:19		07:19		08:12	14:25 (26)
	21:41		20:57	13	20:26 (1)	19:46	18:32		16:23		15:46	4 14:29 (26)
8	04:44		05:31		20:14 (1)	06:26	07:21		07:21		08:13	14:24 (26)
	21:41		20:55	10	20:24 (1)	19:44	18:29		16:21		15:45	7 14:31 (26)
9	04:45		05:32		20:15 (1)	06:28	07:23		07:23		08:14	14:24 (26)
	21:40		20:53	8	20:23 (1)	19:41	18:27		16:19		15:45	9 14:33 (26)
10	04:46		05:34		20:15 (1)	06:30	07:25		07:25		08:16	14:23 (26)
	21:39		20:51	5	20:20 (1)	19:39	18:24		16:18		15:45	11 14:34 (26)
11	04:48		05:36		20:17 (1)	06:32	07:27		07:27		08:17	14:23 (26)
	21:38		20:49	1	20:18 (1)	19:36	18:22		16:16		15:44	11 14:34 (26)
12	04:49		05:38		19:49 (20)	06:34	07:28		07:29		08:18	14:22 (26)
	21:37		20:47	7	19:56 (20)	19:34	18:20		16:14		15:44	13 14:35 (26)
13	04:50		05:40		19:47 (20)	06:35	07:30		07:31		08:19	14:22 (26)
	21:36		20:45	11	19:58 (20)	19:31	18:17		16:13		15:44	14 14:36 (26)
14	04:51		05:41		19:46 (20)	06:37	07:32		07:33		08:20	14:23 (26)
	21:35		20:43	14	20:00 (20)	19:29	18:15		16:11		15:44	14 14:37 (26)
15	04:52		05:43		19:45 (20)	06:39	07:34		07:35		08:21	14:23 (26)
	21:34		20:40	16	20:01 (20)	19:26	18:12		16:09		15:44	14 14:37 (26)
16	04:54		05:45		19:44 (20)	06:41	07:36		07:36		08:22	14:23 (26)
	21:33		20:38	16	20:00 (20)	19:24	18:10		16:08		15:44	15 14:38 (26)
17	04:55		05:47		19:43 (20)	06:43	07:38		07:38		08:23	14:24 (26)
	21:32		20:36	18	20:01 (20)	19:21	18:08		16:06		15:44	15 14:39 (26)
18	04:57		05:49		19:43 (20)	06:44	07:40		07:40		08:23	14:24 (26)
	21:30		20:34	18	20:01 (20)	19:19	18:05		16:05		15:44	16 14:40 (26)
19	04:58		05:50		19:42 (20)	06:46	07:42		07:42		08:24	14:25 (26)
	21:29		20:31	18	20:00 (20)	19:16	18:03		16:03		15:45	15 14:40 (26)
20	04:59		05:52		19:43 (20)	06:48	07:44		07:44		08:25	14:25 (26)
	21:28		20:29	17	20:00 (20)	19:14	18:01		16:02		15:45	15 14:40 (26)
21	05:01		05:54		19:43 (20)	06:50	07:46		07:46		08:25	14:25 (26)
	21:26		20:27	15	19:58 (20)	19:11	17:59		16:01		15:45	16 14:41 (26)
22	05:02		05:56		19:43 (20)	06:52	07:48		07:48		08:26	14:25 (26)
	21:25		20:25	12	19:55 (20)	19:09	17:56		15:59		15:46	16 14:41 (26)
23	05:04		05:58		19:44 (20)	06:53	07:49		07:49		08:26	14:26 (26)
	21:23		20:22	9	19:53 (20)	19:06	17:54		15:58		15:46	16 14:42 (26)
24	05:05		05:59		19:46 (20)	06:55	07:51		07:51		08:27	14:27 (26)
	21:22		20:20	5	19:51 (20)	19:04	17:52		15:57		15:47	15 14:42 (26)
25	05:07		06:01			06:57	06:53		07:53		08:27	14:27 (26)
	21:20		20:18			19:01	16:50		15:56		15:48	16 14:43 (26)
26	05:09		06:03			06:59	06:55		07:55		08:28	14:27 (26)
	21:19		20:15			18:59	16:47		15:54		15:48	16 14:43 (26)
27	05:10		06:05			07:01	06:57		07:56		08:28	14:28 (26)
	21:17	7	20:26 (1)	20:13		18:56	16:45		15:53		15:49	15 14:43 (26)
28	05:12		06:07			07:02	06:59		07:58		08:28	14:28 (26)
	21:15	10	20:27 (1)	20:11		18:54	16:43		15:52		15:50	15 14:43 (26)
29	05:14		06:08			07:04	07:01		08:00		08:28	14:29 (26)
	21:14	13	20:29 (1)	20:08		18:51	16:41		15:51		15:51	14 14:43 (26)
30	05:15		06:10			07:06	07:03		08:01		08:28	14:30 (26)
	21:12	15	20:29 (1)	20:06		18:49	16:39		15:51		15:52	14 14:44 (26)
31	05:17		06:12				07:05		08:02		08:28	14:31 (26)
	21:10	16	20:30 (1)	20:03			16:37		15:53		15:53	13 14:44 (26)
Sonnenscheinstunden   514     461     383     257     231												
astr.max.mögl.Beschattung   61     317               339												
Red.Sonnenscheinwahrsch.   0.44     0.48               0.14												
Reduktion Betriebsdauer   0.90     0.90               0.90												
Reduktion Windrichtung   0.63     0.63               0.67												
Gesamte Reduktion   0.26     0.28               0.08												
Met.wahrsch.Beschattung   16     89               29												

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CQ - IO95  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	14:34 (26)	07:57	06:59	06:43	05:33
	15:54	14:48 (26)	16:46	17:43	19:42	20:39
2	08:28	14:34 (26)	07:55	06:56	06:40	05:31
	15:55	14:47 (26)	16:48	17:45	19:44	20:40
3	08:28	14:36 (26)	07:54	06:54	06:38	05:28
	15:57	14:47 (26)	16:50	17:47	19:46	20:42
4	08:27	14:37 (26)	07:52	06:52	06:35	05:26
	15:58	14:48 (26)	16:52	17:49	19:48	20:44
5	08:27	14:38 (26)	07:50	06:49	06:33	05:24
	15:59	14:47 (26)	16:54	17:51	19:50	20:46
6	08:27	14:40 (26)	07:48	06:47	06:30	05:22
	16:00	14:45 (26)	16:56	17:53	19:52	20:48
7	08:26	07:46	06:44	06:28	05:20	20:02 (1)
	16:02	16:58	17:55	19:54	20:50	20:18 (1)
8	08:26	07:44	06:42	06:26	05:18	20:02 (1)
	16:03	17:00	17:57	19:55	20:51	20:19 (1)
9	08:25	07:42	06:40	06:23	05:17	20:02 (1)
	16:05	17:02	17:59	19:57	20:53	20:20 (1)
10	08:24	07:40	06:37	06:21	05:15	20:02 (1)
	16:06	17:05	18:00	19:59	20:55	20:20 (1)
11	08:24	07:38	06:35	06:18	05:13	20:02 (1)
	16:08	17:07	18:02	20:01	20:57	20:19 (1)
12	08:23	07:36	06:32	06:16	05:11	20:04 (1)
	16:09	17:09	18:04	20:03	20:58	20:19 (1)
13	08:22	07:34	06:30	06:13	05:09	20:04 (1)
	16:11	17:11	18:06	20:05	21:00	20:18 (1)
14	08:21	07:32	06:27	06:11	05:07	20:04 (1)
	16:12	17:13	18:08	20:07	21:02	20:16 (1)
15	08:20	07:30	06:25	06:09	05:06	20:06 (1)
	16:14	17:15	18:10	20:09	21:04	20:16 (1)
16	08:19	07:28	06:22	06:06	05:04	20:08 (1)
	16:16	17:17	18:12	20:10	21:05	20:13 (1)
17	08:18	07:26	06:20	06:04	05:02	20:13 (1)
	16:18	17:19	18:14	20:12	21:07	21:44
18	08:17	07:24	06:18	06:02	19:44 (20)	05:01
	16:19	17:21	18:16	20:14	19:46 (20)	21:09
19	08:16	07:22	06:15	05:59	19:41 (20)	04:59
	16:21	17:23	18:18	20:16	19:48 (20)	21:10
20	08:15	07:19	06:13	05:57	19:39 (20)	04:57
	16:23	17:25	18:20	20:18	19:50 (20)	21:12
21	08:14	07:17	06:10	05:55	19:38 (20)	04:56
	16:25	17:27	18:21	20:20	19:52 (20)	21:14
22	08:12	07:15	06:08	05:52	19:37 (20)	04:55
	16:27	17:29	18:23	20:22	19:52 (20)	21:15
23	08:11	07:13	06:05	05:50	19:36 (20)	04:53
	16:29	17:31	18:25	20:24	19:54 (20)	21:17
24	08:10	07:10	06:03	05:48	19:36 (20)	04:52
	16:30	17:33	18:27	20:25	19:54 (20)	21:18
25	08:08	07:08	06:00	05:46	19:36 (20)	04:50
	16:32	17:35	18:29	20:27	19:53 (20)	21:20
26	08:07	07:06	05:58	05:43	19:37 (20)	04:49
	16:34	17:37	18:31	20:29	19:53 (20)	21:21
27	08:05	07:03	05:55	05:41	19:37 (20)	04:48
	16:36	17:39	18:33	20:31	19:52 (20)	21:23
28	08:04	07:01	05:53	05:39	19:38 (20)	04:47
	16:38	17:41	18:35	20:33	19:52 (20)	21:24
29	08:02	06:50	05:37	05:37	19:39 (20)	04:45
	16:40	19:37	20:35	11	19:50 (20)	21:26
30	08:00	06:48	05:35	05:35	19:41 (20)	04:44
	16:42	19:38	20:37	7	19:48 (20)	21:27
31	07:59	06:45	05:33	05:33	04:43	
	16:44	19:40			21:28	
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung	63			165		192
Red.Sonnenscheinwahrsch.	0.17			0.41		0.51
Reduktion Betriebsdauer	0.90			0.90		0.90
Reduktion Windrichtung	0.67			0.63		0.63
Gesamte Reduktion	0.11			0.24		0.29
Met.wahrsch.Beschattung	7			39		57

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CQ - IO95

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember					
1	04:38	05:19	20:14 (1)	06:14	07:08	07:07	08:03				
	21:44	21:08	15	20:29 (1)	20:01	18:46	16:35	15:50			
2	04:39	05:20		20:13 (1)	06:16	07:10	07:09	08:05			
	21:44	21:07	16	20:29 (1)	19:59	18:44	16:33	15:49			
3	04:40	05:22		20:13 (1)	06:17	07:12	07:11	08:06			
	21:44	21:05	17	20:30 (1)	19:56	18:41	16:31	15:48			
4	04:40	05:24		20:12 (1)	06:19	07:13	07:13	08:08			
	21:43	21:03	18	20:30 (1)	19:54	18:39	16:29	15:47			
5	04:41	05:25		20:12 (1)	06:21	07:15	07:15	08:09			
	21:43	21:01	18	20:30 (1)	19:51	18:37	16:27	15:47			
6	04:42	05:27		20:12 (1)	06:23	07:17	07:17	08:10			
	21:42	20:59	16	20:28 (1)	19:49	18:34	16:25	15:46	5	14:31 (26)	
7	04:43	05:29		20:12 (1)	06:25	07:19	07:19	08:12		14:26 (26)	
	21:41	20:57	14	20:26 (1)	19:46	18:32	16:23	15:46	8	14:34 (26)	
8	04:44	05:31		20:13 (1)	06:26	07:21	07:21	08:13		14:25 (26)	
	21:41	20:55	11	20:24 (1)	19:44	18:29	16:21	15:45	10	14:35 (26)	
9	04:45	05:32		20:13 (1)	06:28	07:23	07:23	08:14		14:25 (26)	
	21:40	20:53	10	20:23 (1)	19:41	18:27	16:19	15:45	11	14:36 (26)	
10	04:46	05:34		20:14 (1)	06:30	07:25	07:25	08:16		14:24 (26)	
	21:39	20:51	6	20:20 (1)	19:39	18:24	16:18	15:45	13	14:37 (26)	
11	04:48	05:36		20:15 (1)	06:32	07:27	07:27	08:17		14:24 (26)	
	21:38	20:49	3	20:18 (1)	19:36	18:22	16:16	15:44	14	14:38 (26)	
12	04:49	05:38			06:34	07:28	07:29	08:18		14:24 (26)	
	21:37	20:47			19:34	18:20	16:14	15:44	14	14:38 (26)	
13	04:50	05:40		19:48 (20)	06:35	07:30	07:31	08:19		14:24 (26)	
	21:36	20:45	8	19:56 (20)	19:31	18:17	16:13	15:44	15	14:39 (26)	
14	04:51	05:41		19:46 (20)	06:37	07:32	07:33	08:20		14:24 (26)	
	21:35	20:43	12	19:58 (20)	19:29	18:15	16:11	15:44	16	14:40 (26)	
15	04:52	05:43		19:45 (20)	06:39	07:34	07:35	08:21		14:25 (26)	
	21:34	20:40	14	19:59 (20)	19:26	18:12	16:09	15:44	15	14:40 (26)	
16	04:54	05:45		19:43 (20)	06:41	07:36	07:36	08:22		14:25 (26)	
	21:33	20:38	16	19:59 (20)	19:24	18:10	16:08	15:44	16	14:41 (26)	
17	04:55	05:47		19:43 (20)	06:43	07:38	07:38	08:23		14:25 (26)	
	21:32	20:36	17	20:00 (20)	19:21	18:08	16:06	15:44	17	14:42 (26)	
18	04:57	05:49		19:43 (20)	06:44	07:40	07:40	08:23		14:26 (26)	
	21:30	20:34	17	20:00 (20)	19:19	18:05	16:05	15:44	17	14:43 (26)	
19	04:58	05:50		19:42 (20)	06:46	07:42	07:42	08:24		14:27 (26)	
	21:29	20:31	17	19:59 (20)	19:16	18:03	16:03	15:45	16	14:43 (26)	
20	04:59	05:52		19:42 (20)	06:48	07:44	07:44	08:25		14:26 (26)	
	21:28	20:29	17	19:59 (20)	19:14	18:01	16:02	15:45	17	14:43 (26)	
21	05:01	05:54		19:43 (20)	06:50	07:46	07:46	08:25		14:27 (26)	
	21:26	20:27	15	19:58 (20)	19:11	17:59	16:01	15:45	17	14:44 (26)	
22	05:02	05:56		19:42 (20)	06:52	07:48	07:48	08:26		14:27 (26)	
	21:25	20:25	13	19:55 (20)	19:09	17:56	15:59	15:46	17	14:44 (26)	
23	05:04	05:58		19:43 (20)	06:53	07:49	07:49	08:26		14:28 (26)	
	21:23	20:22	10	19:53 (20)	19:06	17:54	15:58	15:46	17	14:45 (26)	
24	05:05	05:59		19:45 (20)	06:55	07:51	07:51	08:27		14:29 (26)	
	21:22	20:20	6	19:51 (20)	19:04	17:52	15:57	15:47	16	14:45 (26)	
25	05:07	06:01		19:48 (20)	06:57	06:53	07:53	08:27		14:29 (26)	
	21:20	20:18	1	19:49 (20)	19:01	16:50	15:56	15:48	16	14:45 (26)	
26	05:09	06:03			06:59	06:55	07:55	08:28		14:29 (26)	
	21:19	20:15			18:59	16:47	15:54	15:48	17	14:46 (26)	
27	05:10	06:05			07:01	06:57	07:56	08:28		14:30 (26)	
	21:17	20:13			18:56	16:45	15:53	15:49	16	14:46 (26)	
28	05:12	20:17 (1)	06:07		07:02	06:59	07:58	08:28		14:30 (26)	
	21:15	7	20:24 (1)	20:11		18:54	16:43	15:52	15:50	16	14:46 (26)
29	05:14	20:16 (1)	06:08		07:04	07:01	08:00	08:28		14:31 (26)	
	21:14	11	20:27 (1)	20:08		18:51	16:41	15:51	15:51	15	14:46 (26)
30	05:15	20:14 (1)	06:10		07:06	07:03	08:01	08:28		14:32 (26)	
	21:12	13	20:27 (1)	20:06		18:49	16:39	15:51	15:52	15	14:47 (26)
31	05:17	20:14 (1)	06:12			07:05	07:05	08:28		14:33 (26)	
	21:10	14	20:28 (1)	20:03		16:37	15:53	15:53	14	14:47 (26)	
Sonneneinstrahlung	514	461			383		257			231	
astr.max.mögl.Beschattung	45	307								380	
Red.Sonneneinstrahlung	0.44	0.48								0.14	
Reduktion Betriebsdauer	0.90	0.90								0.90	
Reduktion Windrichtung	0.63	0.63								0.67	
Gesamte Reduktion	0.26	0.28								0.09	
Met.wahrsch.Beschattung	12	86								32	

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CR - IO96  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni						
1	08:28	14:30 (26)	07:57	06:59	06:43	19:00 (18)	05:33	19:45 (20)	04:42			
	15:54	15	14:45 (26)	16:46	17:43	19:42	11	19:11 (18)	20:39	17	20:02 (20)	21:29
2	08:28	14:30 (26)	07:55	06:56	06:40	19:01 (18)	05:31	19:45 (20)	04:41			
	15:55	14	14:44 (26)	16:48	17:45	19:44	8	19:09 (18)	20:40	17	20:02 (20)	21:31
3	08:28	14:32 (26)	07:54	06:54	06:38	19:05	05:28	19:45 (20)	04:40			
	15:57	12	14:44 (26)	16:50	17:47	19:46	20:42	16	20:01 (20)	21:32		
4	08:27	14:33 (26)	07:52	06:52	06:35	19:06	05:26	19:46 (20)	04:40			
	15:58	11	14:44 (26)	16:52	17:49	19:48	20:44	14	20:00 (20)	21:33		
5	08:27	14:34 (26)	07:50	06:49	06:33	19:07	05:24	19:47 (20)	04:39			
	15:59	10	14:44 (26)	16:54	17:51	19:50	20:46	12	19:59 (20)	21:34		
6	08:27	14:35 (26)	07:48	06:47	06:30	19:08	05:22	19:48 (20)	04:38			
	16:00	7	14:42 (26)	16:56	17:53	19:52	20:48	11	20:17 (1)	21:35		
7	08:26	14:39 (26)	07:46	06:44	06:28	19:09	05:20	20:13 (1)	04:37			
	16:02	2	14:41 (26)	16:58	17:55	19:54	20:50	5	20:18 (1)	21:36		
8	08:26	14:40 (26)	07:44	06:42	06:26	19:10	05:18	20:12 (1)	04:37			
	16:03	17:00	17:57	19:55	20:51	8	20:20 (1)	21:37				
9	08:25	14:41 (26)	07:42	06:40	06:23	19:11	05:17	20:12 (1)	04:36			
	16:05	17:02	17:59	19:57	20:53	10	20:22 (1)	21:38				
10	08:24	14:42 (26)	07:40	06:37	06:21	19:12	05:15	20:11 (1)	04:36			
	16:06	17:05	18:00	19:59	20:55	13	20:24 (1)	21:39				
11	08:24	14:43 (26)	07:38	06:35	06:18	19:13	05:13	20:10 (1)	04:35			
	16:08	17:07	18:02	19:58	20:51	15	20:25 (1)	21:40				
12	08:23	14:44 (26)	07:36	06:32	06:16	19:14	05:11	20:11 (1)	04:35			
	16:09	17:09	18:04	19:59	20:52	16	20:26 (1)	21:41				
13	08:22	14:45 (26)	07:34	06:30	06:14	19:15	05:09	20:10 (1)	04:34			
	16:11	17:11	18:06	19:58	20:51	18	20:28 (1)	21:41				
14	08:21	14:46 (26)	07:32	06:27	06:11	19:16	05:07	20:10 (1)	04:34			
	16:13	17:13	18:08	19:57	20:50	18	20:28 (1)	21:42				
15	08:20	14:47 (26)	07:30	06:25	06:09	19:17	05:06	20:10 (1)	04:34			
	16:14	17:15	18:10	19:56	20:49	18	20:28 (1)	21:43				
16	08:19	14:48 (26)	07:28	06:22	06:06	19:18	05:04	20:10 (1)	04:34			
	16:16	17:17	18:12	19:55	20:48	18	20:28 (1)	21:43				
17	08:18	14:49 (26)	07:26	06:20	06:04	19:19	05:02	20:11 (1)	04:33			
	16:18	17:19	18:14	19:54	20:47	17	20:28 (1)	21:44				
18	08:17	14:50 (26)	07:24	06:18	06:02	19:20	05:01	20:11 (1)	04:33			
	16:19	17:21	18:16	19:53	20:46	16	20:27 (1)	21:44				
19	08:16	14:51 (26)	07:22	06:15	05:59	19:21	04:59	20:12 (1)	04:33			
	16:21	17:23	18:18	19:52	20:45	15	20:27 (1)	21:44				
20	08:15	14:52 (26)	07:20	06:13	05:57	19:22	04:57	20:12 (1)	04:34			
	16:23	17:25	18:20	19:51	20:44	13	21:12	20:25 (1)	21:45			
21	08:14	14:53 (26)	07:17	06:10	05:55	19:23	04:56	20:14 (1)	04:34			
	16:25	17:27	18:21	19:50	20:43	11	21:14	20:25 (1)	21:45			
22	08:12	14:54 (26)	07:15	06:08	05:52	19:24	04:55	20:15 (1)	04:34			
	16:27	17:29	18:23	19:49	20:42	9	21:15	20:24 (1)	21:45			
23	08:11	14:55 (26)	07:13	06:05	05:50	19:25	04:53	20:18 (1)	04:34			
	16:29	17:31	18:25	19:48	20:41	3	19:54 (20)	21:17	4	20:22 (1)	21:45	
24	08:10	14:56 (26)	07:10	06:03	05:48	19:26	04:52	20:19 (1)	04:34			
	16:30	17:33	18:27	19:47	20:40	7	19:56 (20)	21:18	21:46			
25	08:08	14:57 (26)	07:08	06:00	05:46	19:27	04:50	20:20 (1)	04:35			
	16:32	17:35	18:29	19:46	20:39	11	19:58 (20)	21:20	21:46			
26	08:07	14:58 (26)	07:06	05:58	05:43	19:28	04:49	20:21 (1)	04:35			
	16:34	17:37	18:31	2	18:02 (18)	05:43	14	19:46 (20)	04:49	21:21	21:46	
27	08:05	14:59 (26)	07:03	05:55	05:41	19:29	04:48	20:22 (1)	04:36			
	16:36	17:39	18:33	5	18:06 (18)	05:41	16	20:02 (20)	21:23	21:45		
28	08:04	15:00 (26)	07:01	05:53	05:39	19:30	04:47	20:23 (1)	04:36			
	16:38	17:41	18:35	8	18:07 (18)	05:39	18	20:03 (20)	21:24	21:45		
29	08:02	15:01 (26)	06:59	05:51	05:37	19:31	04:45	20:24 (1)	04:37			
	16:40	17:43	18:37	11	19:10 (18)	05:37	18	20:03 (20)	21:26	21:45		
30	08:00	15:02 (26)	06:48	05:48	05:35	19:32	04:44	20:25 (1)	04:37			
	16:42	17:45	18:39	12	19:11 (18)	05:35	18	20:03 (20)	21:27	21:45		
31	07:59	15:03 (26)	06:45	05:45	05:33	19:33	04:43	20:26 (1)	04:37			
	16:44	17:47	18:41	13	19:12 (18)	05:33	18	20:03 (20)	21:28	21:45		
Sonnenscheinstunden	248	272	367	421	496	512						
astr.max.mögl.Beschattung	71		51		124		311					
Red.Sonnenscheinwahrsch.	0.17		0.31		0.41		0.51					
Reduktion Betriebsdauer	0.90		0.90		0.90		0.90					
Reduktion Windrichtung	0.67		0.67		0.64		0.63					
Gesamte Reduktion	0.11		0.19		0.24		0.29					
Met.wahrsch.Beschattung	8		10		30		91					

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM)	Schattenanfang	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CR - IO96

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:21 (1) 06:14	07:08	07:07	08:03
	21:44	21:08	16 20:37 (1) 20:01	18:46	16:35	15:50
2	04:39	05:20	20:21 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	14 20:35 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	20:21 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	12 20:33 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:21 (1) 06:19	07:13	07:13	08:08
	21:43	21:03	10 20:31 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:23 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	7 20:30 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:01 (20) 06:23	07:17	07:17	08:10
	21:42	20:59	8 20:28 (1) 19:49	18:34	16:25	15:46
7	04:43	05:29	19:57 (20) 06:25	07:19	07:19	08:12
	21:41	20:57	10 20:07 (20) 19:46	18:32	16:23	15:46
8	04:44	05:31	19:56 (20) 06:26	07:21	07:21	08:13
	21:41	20:55	13 20:09 (20) 19:44	18:29	16:21	15:45
9	04:45	05:32	19:55 (20) 06:28	07:23	07:23	08:14
	21:40	20:53	15 20:10 (20) 19:41	18:27	16:19	15:45
10	04:46	05:34	19:54 (20) 06:30	6 18:55 (18) 07:25	07:25	08:16
	21:39	20:51	16 20:10 (20) 19:39	6 19:01 (18) 18:24	16:18	15:45
11	04:48	05:36	19:53 (20) 06:32	18:53 (18) 07:27	07:27	08:17
	21:38	20:49	17 20:10 (20) 19:36	10 19:03 (18) 18:22	16:16	15:44
12	04:49	05:38	19:52 (20) 06:34	18:52 (18) 07:28	07:29	08:18
	21:37	20:47	18 20:10 (20) 19:34	12 19:04 (18) 18:20	16:14	15:44
13	04:50	05:40	19:52 (20) 06:35	18:50 (18) 07:30	07:31	08:19
	21:36	20:45	18 20:10 (20) 19:31	13 19:03 (18) 18:17	16:13	15:44
14	04:51	05:41	19:52 (20) 06:37	18:50 (18) 07:32	07:33	08:20
	21:35	20:43	18 20:10 (20) 19:29	10 19:00 (18) 18:15	16:11	15:44
15	04:52	05:43	19:53 (20) 06:39	18:50 (18) 07:34	07:35	08:21
	21:34	20:40	17 20:10 (20) 19:26	8 18:58 (18) 18:12	16:09	15:44
16	04:54	05:45	19:52 (20) 06:41	18:50 (18) 07:36	07:36	08:22
	21:33	20:38	16 20:08 (20) 19:24	6 18:56 (18) 18:10	16:08	15:44
17	04:55	05:47	19:53 (20) 06:43	18:50 (18) 07:38	07:38	08:23
	21:32	20:36	13 20:06 (20) 19:21	3 18:53 (18) 18:08	16:06	15:44
18	04:57	05:49	19:54 (20) 06:44	07:40	07:40	08:23
	21:30	20:34	10 20:04 (20) 19:19	18:05	16:05	15:44
19	04:58	05:50	19:55 (20) 06:46	07:42	07:42	08:24
	21:29	20:31	7 20:02 (20) 19:16	18:03	16:03	15:45
20	04:59	05:52	19:58 (20) 06:48	07:44	07:44	08:25
	21:28	20:29	2 20:00 (20) 19:14	18:01	16:02	15:45
21	05:01	20:26 (1) 05:54	06:50	07:46	07:46	08:25
	21:26	7 20:33 (1) 20:27	19:11	17:59	16:01	15:45
22	05:02	20:25 (1) 05:56	06:52	07:48	07:48	08:26
	21:25	10 20:35 (1) 20:25	19:09	17:56	15:59	15:46
23	05:04	20:23 (1) 05:58	06:53	07:49	07:49	08:26
	21:23	13 20:36 (1) 20:22	19:06	17:54	15:58	15:46
24	05:05	20:22 (1) 05:59	06:55	07:51	07:51	08:27
	21:22	14 20:36 (1) 20:20	19:04	17:52	15:57	15:47
25	05:07	20:22 (1) 06:01	06:57	06:53	07:53	08:27
	21:20	15 20:37 (1) 20:18	19:01	16:50	15:56	15:48
26	05:09	20:21 (1) 06:03	06:59	06:55	07:55	08:28
	21:19	17 20:38 (1) 20:15	18:59	16:47	15:54	15:48
27	05:10	20:21 (1) 06:05	07:01	06:57	07:56	08:28
	21:17	17 20:38 (1) 20:13	18:56	16:45	15:53	15:49
28	05:12	20:20 (1) 06:07	07:02	06:59	07:58	08:28
	21:15	18 20:38 (1) 20:11	18:54	16:43	15:52	15:50
29	05:14	20:21 (1) 06:08	07:04	07:01	08:00	08:28
	21:14	18 20:39 (1) 20:08	18:51	16:41	15:51	15:51
30	05:15	20:20 (1) 06:10	07:06	07:03	08:01	08:28
	21:12	18 20:38 (1) 20:06	18:49	16:39	15:51	15:52
31	05:17	20:20 (1) 06:12		07:05		08:28
	21:10	18 20:38 (1) 20:03		16:37	15:53	15:44 (26)
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	165	257	68			405
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40			0.14
Reduktion Betriebsdauer	0.90	0.90	0.90			0.90
Reduktion Windrichtung	0.63	0.63	0.67			0.67
Gesamte Reduktion	0.25	0.28	0.25			0.08
Met.wahrsch.Beschattung	42	72	17			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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CS - IO97  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	14:35 (26)	07:57	06:59	06:43	05:33
	15:54	17	14:52 (26)	16:46	17:43	19:42
2	08:28	14:35 (26)	07:55	06:56	06:40	05:31
	15:55	16	14:51 (26)	16:48	17:45	19:44
3	08:28	14:36 (26)	07:54	06:54	06:38	05:28
	15:57	16	14:52 (26)	16:50	17:47	19:46
4	08:27	14:37 (26)	07:52	06:52	06:35	05:26
	15:58	15	14:52 (26)	16:52	17:49	19:48
5	08:27	14:38 (26)	07:50	06:49	06:33	05:24
	15:59	14	14:52 (26)	16:54	17:51	19:50
6	08:27	14:38 (26)	07:48	06:47	06:30	05:22
	16:00	13	14:51 (26)	16:56	17:53	19:52
7	08:26	14:40 (26)	07:46	06:44	06:28	05:20
	16:02	12	14:52 (26)	16:58	17:55	19:54
8	08:26	14:41 (26)	07:44	06:42	06:26	05:18
	16:03	10	14:51 (26)	17:00	17:57	19:55
9	08:25	14:43 (26)	07:42	06:40	06:23	05:17
	16:05	7	14:50 (26)	17:02	17:59	19:57
10	08:24	14:44 (26)	07:40	06:37	06:21	05:15
	16:06		17:05	18:00	19:59	20:55
11	08:24	14:45 (26)	07:38	06:35	06:18	05:13
	16:08		17:07	18:02	20:01	20:57
12	08:23	14:46 (26)	07:36	06:32	06:16	05:11
	16:09		17:09	18:04	20:03	20:58
13	08:22	14:47 (26)	07:34	06:30	06:14	05:09
	16:11		17:11	18:06	20:05	21:00
14	08:21	14:48 (26)	07:32	06:27	06:11	05:07
	16:12		17:13	18:08	20:07	21:02
15	08:20	14:49 (26)	07:30	06:25	06:09	05:06
	16:14		17:15	18:10	20:09	21:04
16	08:19	14:50 (26)	07:28	06:22	06:06	05:04
	16:16		17:17	18:12	20:10	21:05
17	08:18	14:51 (26)	07:26	06:20	06:04	05:02
	16:18		17:19	18:14	20:12	21:07
18	08:17	14:52 (26)	07:24	06:18	06:02	05:01
	16:19		17:21	18:16	20:14	21:09
19	08:16	14:53 (26)	07:22	06:15	05:59	04:59
	16:21		17:23	18:18	20:16	21:10
20	08:15	14:54 (26)	07:19	06:13	05:57	04:57
	16:23		17:25	18:20	20:18	21:12
21	08:14	14:55 (26)	07:17	06:10	05:55	04:56
	16:25		17:27	18:21	20:20	21:14
22	08:12	14:56 (26)	07:15	06:08	05:52	19:48 (20)
	16:27		17:29	18:23	20:22	4 19:52 (20)
23	08:11	14:57 (26)	07:13	06:05	05:50	19:46 (20)
	16:29		17:31	18:25	20:24	8 19:54 (20)
24	08:10	14:58 (26)	07:10	06:03	05:48	19:45 (20)
	16:30		17:33	18:27	20:25	11 19:56 (20)
25	08:08	14:59 (26)	07:08	06:00	05:46	19:44 (20)
	16:32		17:35	18:29	20:27	14 19:58 (20)
26	08:07	15:00 (26)	07:06	05:58	05:43	19:43 (20)
	16:34		17:37	18:31	20:29	17 20:00 (20)
27	08:05	15:01 (26)	07:03	05:55	05:41	19:43 (20)
	16:36		17:39	18:33	20:31	17 20:00 (20)
28	08:04	15:02 (26)	07:01	05:53	05:39	19:43 (20)
	16:38		17:41	18:35	20:33	17 20:00 (20)
29	08:02	15:03 (26)	06:59	05:50	05:37	19:43 (20)
	16:40		17:43	18:37	20:35	17 20:00 (20)
30	08:00	15:04 (26)	06:56	05:47	05:34	19:43 (20)
	16:42		17:45	18:39	20:37	17 20:00 (20)
31	07:59	15:05 (26)	06:54	05:45	05:32	19:43 (20)
	16:44		17:47	18:41	20:39	17 20:00 (20)
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung	120			122	249	
Red.Sonnenscheinwahrsch.	0.17			0.41	0.51	
Reduktion Betriebsdauer	0.90			0.90	0.90	
Reduktion Windrichtung	0.67			0.64	0.63	
Gesamte Reduktion	0.11			0.24	0.29	
Met.wahrsch.Beschattung	13			29	73	

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: CS - IO97

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38		05:19		20:18 (1)	06:14	07:08		07:07		08:03	
	21:44		21:08	18	20:36 (1)	20:01	18:46		16:35		15:50	
2	04:39		05:20		20:18 (1)	06:16	07:10		07:09		08:05	
	21:44		21:07	17	20:35 (1)	19:59	18:44		16:33		15:49	
3	04:40		05:22		20:18 (1)	06:17	07:12		07:11		08:06	14:27 (26)
	21:44		21:05	15	20:33 (1)	19:56	18:41		16:31		15:48	7 14:34 (26)
4	04:40		05:24		20:18 (1)	06:19	07:13		07:13		08:08	14:26 (26)
	21:43		21:03	13	20:31 (1)	19:54	18:39		16:29		15:47	9 14:35 (26)
5	04:41		05:25		20:19 (1)	06:21	07:15		07:15		08:09	14:25 (26)
	21:43		21:01	11	20:30 (1)	19:51	18:37		16:27		15:47	12 14:37 (26)
6	04:42		05:27		20:20 (1)	06:23	07:17		07:17		08:10	14:25 (26)
	21:42		20:59	8	20:28 (1)	19:49	18:34		16:25		15:46	12 14:37 (26)
7	04:43		05:29		20:20 (1)	06:25	07:19		07:19		08:12	14:25 (26)
	21:41		20:57	6	20:26 (1)	19:46	18:32		16:23		15:46	14 14:39 (26)
8	04:44		05:31		20:22 (1)	06:26	07:21		07:21		08:13	14:24 (26)
	21:41		20:55	2	20:24 (1)	19:44	18:29		16:21		15:45	15 14:39 (26)
9	04:45		05:32		19:56 (20)	06:28	07:23		07:23		08:14	14:25 (26)
	21:40		20:53	9	20:05 (20)	19:41	18:27		16:19		15:45	16 14:41 (26)
10	04:46		05:34		19:53 (20)	06:30	07:25		07:25		08:16	14:25 (26)
	21:39		20:51	12	20:05 (20)	19:39	18:24		16:18		15:45	16 14:41 (26)
11	04:48		05:36		19:53 (20)	06:32	07:27		07:27		08:17	14:25 (26)
	21:38		20:49	14	20:07 (20)	19:36	18:22		16:16		15:44	17 14:42 (26)
12	04:49		05:38		19:51 (20)	06:34	07:28		07:29		08:18	14:25 (26)
	21:37		20:47	16	20:07 (20)	19:34	18:20		16:14		15:44	17 14:42 (26)
13	04:50		05:40		19:51 (20)	06:35	07:30		07:31		08:19	14:25 (26)
	21:36		20:45	16	20:07 (20)	19:31	18:17		16:13		15:44	18 14:43 (26)
14	04:51		05:41		19:50 (20)	06:37	07:32		07:33		08:20	14:25 (26)
	21:35		20:43	18	20:08 (20)	19:29	18:15		16:11		15:44	18 14:43 (26)
15	04:52		05:43		19:51 (20)	06:39	07:34		07:35		08:21	14:26 (26)
	21:34		20:40	17	20:08 (20)	19:26	18:12		16:09		15:44	18 14:44 (26)
16	04:54		05:45		19:50 (20)	06:41	07:36		07:36		08:22	14:26 (26)
	21:33		20:38	17	20:07 (20)	19:24	18:10		16:08		15:44	19 14:45 (26)
17	04:55		05:47		19:50 (20)	06:43	07:38		07:38		08:23	14:27 (26)
	21:32		20:36	16	20:06 (20)	19:21	18:08		16:06		15:44	18 14:45 (26)
18	04:57		05:49		19:51 (20)	06:44	07:40		07:40		08:23	14:27 (26)
	21:30		20:34	13	20:04 (20)	19:19	18:05		16:05		15:44	19 14:46 (26)
19	04:58		05:50		19:51 (20)	06:46	07:42		07:42		08:24	14:28 (26)
	21:29		20:31	11	20:02 (20)	19:16	18:03		16:03		15:45	19 14:47 (26)
20	04:59		05:52		19:52 (20)	06:48	07:44		07:44		08:25	14:28 (26)
	21:28		20:29	8	20:00 (20)	19:14	18:01		16:02		15:45	19 14:47 (26)
21	05:01		05:54		19:54 (20)	06:50	07:46		07:46		08:25	14:29 (26)
	21:26		20:27	4	19:58 (20)	19:11	17:59		16:01		15:45	19 14:48 (26)
22	05:02		05:56			06:52	07:48		07:48		08:26	14:29 (26)
	21:25		20:25			19:09	17:56		15:59		15:46	19 14:48 (26)
23	05:04		05:58			06:53	07:49		07:49		08:26	14:30 (26)
	21:23		20:22			19:06	17:54		15:58		15:46	19 14:49 (26)
24	05:05		05:59			06:55	07:51		07:51		08:27	14:30 (26)
	21:22	7	20:30 (1)	20:20		19:04	17:52		15:57		15:47	19 14:49 (26)
25	05:07		06:01			06:57	06:53		07:53		08:27	14:30 (26)
	21:20	10	20:32 (1)	20:18		19:01	16:50		15:56		15:48	19 14:49 (26)
26	05:09		06:03			06:59	06:55		07:55		08:28	14:30 (26)
	21:19	13	20:33 (1)	20:15		18:59	16:47		15:54		15:48	19 14:49 (26)
27	05:10		06:05			07:01	06:57		07:56		08:28	14:31 (26)
	21:17	14	20:34 (1)	20:13		18:56	16:45		15:53		15:49	19 14:50 (26)
28	05:12		06:07			07:02	06:59		07:58		08:28	14:31 (26)
	21:15	16	20:35 (1)	20:11		18:54	16:43		15:52		15:50	19 14:50 (26)
29	05:14		06:08			07:04	07:01		08:00		08:28	14:32 (26)
	21:14	16	20:35 (1)	20:08		18:51	16:41		15:51		15:51	18 14:50 (26)
30	05:15		06:10			07:06	07:03		08:01		08:28	14:33 (26)
	21:12	17	20:35 (1)	20:06		18:49	16:39		15:51		15:52	18 14:51 (26)
31	05:17		06:12				07:05				08:28	14:34 (26)
	21:10	18	20:36 (1)	20:03			16:37				15:53	17 14:51 (26)
Sonneneinstrahlung	514		461			383			257		231	
astr.max.mögl.Beschattung	111		261								488	
Red.Sonneneinstrahlung	0.44		0.48								0.14	
Reduktion Betriebsdauer	0.90		0.90								0.90	
Reduktion Windrichtung	0.63		0.63								0.67	
Gesamte Reduktion	0.26		0.28								0.09	
Met.wahrsch.Beschattung	28		73								42	

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	

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: CT - IO98

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni					
1	08:28 15:54	07:57 16:46	06:59 17:43	06:43 19:42	18:55 (18) 19:10 (18)	05:33 20:39	14	19:54 (20) 20:08 (19)	04:42 21:29	20	20:21 (1) 20:41 (1)
2	08:28 15:55	07:55 16:48	06:56 17:45	06:40 19:44	18:56 (18) 19:08 (18)	05:31 20:40	17	19:53 (20) 20:10 (20)	04:41 21:31	18	20:23 (1) 20:41 (1)
3	08:28 15:57	07:54 16:50	06:54 17:47	06:38 19:46	18:58 (18) 19:06 (18)	05:28 20:42	18	19:52 (20) 20:10 (20)	04:40 21:32	18	20:23 (1) 20:41 (1)
4	08:27 15:58	07:52 16:52	06:52 17:49	06:35 19:48	05:26 20:44	20	19:51 (20) 20:11 (20)	04:40 21:33	17	20:23 (1) 20:40 (1)	
5	08:27 15:59	07:50 16:54	06:49 17:51	06:33 19:50	05:24 20:46	21	19:50 (20) 20:11 (20)	04:39 21:34	17	20:23 (1) 20:40 (1)	
6	08:27 16:00	07:48 16:56	06:47 17:53	06:30 19:52	05:22 20:48	21	19:50 (20) 20:11 (20)	04:38 21:35	17	20:25 (1) 20:40 (1)	
7	08:26 16:02	07:46 16:58	06:44 17:55	06:28 19:54	05:20 20:50	22	19:49 (20) 20:11 (20)	04:37 21:36	14	20:25 (1) 20:39 (1)	
8	08:26 16:03	07:44 17:00	06:42 17:57	06:26 19:55	05:18 20:51	22	19:49 (20) 20:11 (20)	04:37 21:37	14	20:26 (1) 20:40 (1)	
9	08:25 16:05	07:42 17:02	16:28 (17) 17:59	06:23 19:57	05:17 20:53	22	19:50 (20) 20:12 (20)	04:36 21:38	13	20:26 (1) 20:39 (1)	
10	08:24 16:06	07:40 17:05	16:27 (17) 18:00	06:21 19:59	05:15 20:55	21	19:50 (20) 20:11 (20)	04:36 21:39	12	20:27 (1) 20:39 (1)	
11	08:24 16:08	07:38 17:07	16:26 (17) 18:02	06:18 20:01	05:13 20:57	22	19:49 (20) 20:11 (20)	04:35 21:40	11	20:28 (1) 20:39 (1)	
12	08:23 16:09	07:36 17:09	16:26 (17) 18:04	06:16 20:03	05:11 20:59	21	19:50 (20) 20:11 (20)	04:35 21:41	10	20:28 (1) 20:38 (1)	
13	08:22 16:11	07:34 17:11	16:25 (17) 18:06	06:14 20:05	05:09 21:00	19	19:51 (20) 20:10 (20)	04:34 21:41	9	20:29 (1) 20:38 (1)	
14	08:21 16:13	07:32 17:13	16:25 (17) 18:08	06:11 20:07	05:07 21:02	23	19:51 (20) 20:30 (1)	04:34 21:42	7	20:30 (1) 20:37 (1)	
15	08:20 16:14	07:30 17:15	16:26 (17) 18:10	06:09 20:09	05:06 21:04	25	19:52 (20) 20:32 (1)	04:34 21:43	6	20:31 (1) 20:37 (1)	
16	08:19 16:16	07:28 17:17	16:27 (17) 18:12	06:06 20:10	05:04 21:05	25	19:53 (20) 20:33 (1)	04:34 21:43	5	20:32 (1) 20:37 (1)	
17	08:18 16:18	07:26 17:19	16:28 (17) 18:14	06:04 20:12	05:02 21:07	24	19:55 (20) 20:35 (1)	04:34 21:44	2	20:34 (1) 20:36 (1)	
18	08:17 16:19	07:24 17:21	16:30 (17) 18:16	06:02 20:14	05:01 21:09	23	19:56 (20) 20:36 (1)	04:33 21:44			
19	08:16 16:21	07:22 17:23	06:15 18:18	05:59 20:16	04:59 21:10	17	20:21 (1) 20:38 (1)	04:33 21:44			
20	08:15 16:23	07:19 17:25	06:13 18:20	05:57 20:18	04:58 21:12	18	20:20 (1) 20:38 (1)	04:34 21:45			
21	08:14 16:25	07:17 17:27	06:10 18:22	05:55 20:20	04:56 21:14	20	20:20 (1) 20:40 (1)	04:34 21:45			
22	08:12 16:27	07:15 17:29	06:08 18:23	05:52 20:22	04:55 21:15	21	20:20 (1) 20:41 (1)	04:34 21:45			
23	08:11 16:29	07:13 17:31	06:05 18:25	05:50 20:24	04:53 21:17	21	20:20 (1) 20:41 (1)	04:34 21:45			
24	08:10 16:31	07:10 17:33	06:03 18:27	05:48 20:25	04:52 21:18	22	20:19 (1) 20:41 (1)	04:34 21:46			
25	08:08 16:32	07:08 17:35	06:00 18:29	05:46 20:27	04:50 19:57 (19)	22	20:19 (1) 20:41 (1)	04:35 21:46	1	20:35 (1) 20:36 (1)	
26	08:07 16:34	07:06 17:37	05:58 18:31	05:43 20:29	04:49 20:00 (19)	21	20:20 (1) 20:41 (1)	04:35 21:46	3	20:35 (1) 20:38 (1)	
27	08:05 16:36	07:03 17:39	05:55 18:33	05:41 20:31	04:48 20:02 (19)	21	20:20 (1) 20:41 (1)	04:36 21:45	5	20:34 (1) 20:39 (1)	
28	08:04 16:38	07:01 17:41	05:53 18:35	05:39 18:07 (18)	04:47 19:55 (19)	21	20:20 (1) 20:41 (1)	04:36 21:45	6	20:34 (1) 20:40 (1)	
29	08:02 16:40	06:59 17:43	05:37 18:37	05:37 18:55 (18)	04:45 19:54 (19)	21	20:21 (1) 20:41 (1)	04:37 21:45	7	20:33 (1) 20:40 (1)	
30	08:00 16:42	06:48 17:45	05:35 18:39	05:35 19:10 (18)	04:44 20:05 (19)	20	20:21 (1) 20:41 (1)	04:37 21:45	9	20:33 (1) 20:42 (1)	
31	07:59 16:44	06:45 17:48	05:33 18:41	05:33 19:10 (18)	04:43 20:07 (19)	20	20:21 (1) 20:41 (1)	04:37 21:45			
Sonnenscheinstunden	248	272	367	421	496	512					
astr.max.mögl.Beschattung		110	74	80	644	239					
Red.Sonnenscheinwahrsch.		0.24	0.31	0.41	0.51	0.45					
Reduktion Betriebsdauer		0.90	0.90	0.90	0.90	0.90					
Reduktion Windrichtung		0.70	0.67	0.65	0.63	0.63					
Gesamte Reduktion		0.15	0.19	0.24	0.29	0.26					
Met.wahrsch.Beschattung		17	14	19	187	61					

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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CT - IO98

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38	20:33 (1)	05:19	20:01 (20)	06:14	07:08	07:07	15:57 (17)	08:03			
	21:44	10	20:43 (1)	21:09	20	20:21 (20)	20:01	18:46	16:35	6	16:03 (17)	15:50
2	04:39		20:32 (1)	05:20		20:00 (20)	06:16	07:10	07:09		15:58 (17)	08:05
	21:44	11	20:43 (1)	21:07	21	20:21 (20)	19:59	18:44	16:33	3	16:01 (17)	15:49
3	04:40		20:32 (1)	05:22		20:00 (20)	06:17	07:12	07:11			08:06
	21:44	12	20:44 (1)	21:05	22	20:22 (20)	19:56	18:41	16:31			15:48
4	04:40		20:31 (1)	05:24		19:59 (20)	06:19	07:14	07:13			08:08
	21:43	14	20:45 (1)	21:03	22	20:21 (20)	19:54	18:39	16:29			15:47
5	04:41		20:31 (1)	05:25		19:59 (20)	06:21	07:15	07:15			08:09
	21:43	14	20:45 (1)	21:01	22	20:21 (20)	19:51	18:37	16:27			15:47
6	04:42		20:31 (1)	05:27		20:00 (20)	06:23	07:17	07:17			08:10
	21:42	15	20:46 (1)	20:59	21	20:21 (20)	19:49	18:34	16:25			15:46
7	04:43		20:31 (1)	05:29		19:59 (20)	06:25	07:19	07:19			08:12
	21:41	16	20:47 (1)	20:57	22	20:21 (20)	19:46	18:32	16:23			15:46
8	04:44		20:31 (1)	05:31		20:00 (20)	06:26	07:21	07:21			08:13
	21:41	16	20:47 (1)	20:55	20	20:20 (20)	19:44	18:29	16:21			15:45
9	04:45		20:31 (1)	05:32		20:01 (20)	06:28	07:23	07:23			08:14
	21:40	17	20:48 (1)	20:53	19	20:20 (20)	19:41	8 18:59 (18)	18:27	16:19		15:45
10	04:46		20:30 (1)	05:34		20:01 (20)	06:30	18:49 (18)	07:25	07:25		08:16
	21:39	18	20:48 (1)	20:51	18	20:19 (20)	19:39	12 19:01 (18)	18:24	16:18		15:45
11	04:48		20:30 (1)	05:36		20:02 (20)	06:32	18:48 (18)	07:27	07:27		08:17
	21:38	19	20:49 (1)	20:49	16	20:18 (20)	19:36	14 19:02 (18)	18:22	16:16		15:44
12	04:49		20:30 (1)	05:38		20:03 (19)	06:34	18:47 (18)	07:28	07:29		08:18
	21:37	19	20:49 (1)	20:47	14	20:17 (19)	19:34	15 19:02 (18)	18:20	16:14		15:44
13	04:50		20:29 (1)	05:40		20:02 (19)	06:35	18:46 (18)	07:30	07:31		08:19
	21:36	20	20:49 (1)	20:45	12	20:14 (19)	19:31	15 19:01 (18)	18:17	16:13		15:44
14	04:51		20:29 (1)	05:41		20:02 (19)	06:37	18:45 (18)	07:32	07:33		08:20
	21:35	21	20:50 (1)	20:43	10	20:12 (19)	19:29	15 19:00 (18)	18:15	16:11		15:44
15	04:52		20:29 (1)	05:43		20:02 (19)	06:39	18:46 (18)	07:34	07:35		08:21
	21:34	21	20:50 (1)	20:40	9	20:11 (19)	19:26	12 18:58 (18)	18:12	16:09		15:44
16	04:54		20:30 (1)	05:45		20:02 (19)	06:41	18:46 (18)	07:36	07:36		08:22
	21:33	21	20:51 (1)	20:38	6	20:08 (19)	19:24	10 18:56 (18)	18:10	16:08		15:44
17	04:55		20:29 (1)	05:47		20:03 (19)	06:43	18:46 (18)	07:38	07:38		08:23
	21:32	22	20:51 (1)	20:36	3	20:06 (19)	19:21	7 18:53 (18)	18:08	16:06		15:44
18	04:57		20:29 (1)	05:49			06:44	18:48 (18)	07:40	07:40		08:23
	21:30	22	20:51 (1)	20:34			19:19	2 18:50 (18)	18:05	16:05		15:44
19	04:58		20:29 (1)	05:50			06:46	07:42	07:42	16:05		08:24
	21:29	21	20:50 (1)	20:31			19:16	18:03	16:03	16:03		15:45
20	04:59		20:30 (1)	05:52			06:48	07:44	07:44	16:04		08:25
	21:28	21	20:51 (1)	20:29			19:14	18:01	16:02	16:02		15:45
21	05:01		20:29 (1)	05:54			06:50	07:46	07:46	16:04		08:25
	21:26	22	20:51 (1)	20:27			19:11	17:59	16:01	16:01		15:45
22	05:02		20:30 (1)	05:56			06:52	07:48	07:48	16:04		08:26
	21:25	21	20:51 (1)	20:25			19:09	17:56	16:01	16:01		15:46
23	05:04		20:30 (1)	05:58			06:53	07:50	07:49	16:04		08:26
	21:23	20	20:50 (1)	20:22			19:06	17:54	16:01	16:01		15:46
24	05:05		20:30 (1)	05:59			06:55	07:51	07:51	16:04		08:27
	21:22	18	20:48 (1)	20:20			19:04	17:52	9 17:08 (17)	15:57		15:47
25	05:07		20:09 (20)	06:01			06:57	06:53	15:57 (17)	07:53		08:27
	21:20	20	20:47 (1)	20:18			19:01	16:50	12 16:09 (17)	15:56		15:48
26	05:09		20:05 (20)	06:03			06:59	06:55	15:56 (17)	07:55		08:28
	21:19	24	20:45 (1)	20:15			18:59	16:47	14 16:10 (17)	15:54		15:48
27	05:10		20:04 (20)	06:05			07:01	06:57	15:55 (17)	07:56		08:28
	21:17	24	20:44 (1)	20:13			18:56	16:45	15 16:10 (17)	15:53		15:49
28	05:12		20:03 (20)	06:07			07:02	06:59	15:55 (17)	07:58		08:28
	21:15	24	20:42 (1)	20:11			18:54	16:43	15 16:10 (17)	15:52		15:50
29	05:14		20:02 (20)	06:08			07:04	07:01	15:56 (17)	08:00		08:28
	21:14	23	20:41 (1)	20:08			18:51	16:41	14 16:10 (17)	15:51		15:51
30	05:15		20:01 (20)	06:10			07:06	07:03	15:56 (17)	08:01		08:28
	21:12	20	20:39 (1)	20:06			18:49	16:39	12 16:08 (17)	15:51		15:52
31	05:17		20:01 (20)	06:12				07:05	15:56 (17)			08:28
	21:10	19	20:20 (20)	20:03				16:37	10 16:06 (17)			15:53
Sonnenscheinstunden		514		461		383		328		257		231
astr.max.mögl.Beschattung		585		277		110		101		9		
Red.Sonnenscheinwahrsch.		0.44		0.48		0.40		0.33		0.21		
Reduktion Betriebsdauer		0.90		0.90		0.90		0.90		0.90		
Reduktion Windrichtung		0.63		0.64		0.67		0.70		0.70		
Gesamte Reduktion		0.25		0.28		0.25		0.21		0.13		
Met.wahrsch.Beschattung		147		77		27		21		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	(WEA mit erstem Schatten)	Zeitpunkt (SS:MM) Schattende	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: CU - IO99

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni					
1	08:28	07:57	06:59	06:43	18:55 (18)	05:33	19:49 (20)	04:42	20:20 (1)		
	15:54	16:46	17:43	19:42	19:07 (18)	20:39	18	20:07 (20)	21:29	15	20:35 (1)
2	08:28	07:55	06:56	06:40	18:56 (18)	05:31	19:48 (20)	04:41	20:22 (1)		
	15:55	16:48	17:45	19:44	19:05 (18)	20:40	20	20:08 (20)	21:31	13	20:35 (1)
3	08:28	07:54	06:54	06:38	06:38	05:28	19:47 (20)	04:40	20:23 (1)		
	15:57	16:50	17:47	19:46	19:46	20:42	21	20:08 (20)	21:32	11	20:34 (1)
4	08:27	07:52	06:52	06:35	06:35	05:26	19:47 (20)	04:40	20:23 (1)		
	15:58	16:52	17:49	19:48	19:48	20:44	21	20:08 (20)	21:33	10	20:33 (1)
5	08:27	07:50	06:49	06:33	06:33	05:24	19:46 (20)	04:39	20:24 (1)		
	15:59	16:54	17:51	19:50	19:50	20:46	22	20:08 (20)	21:34	8	20:32 (1)
6	08:27	07:48	06:47	06:30	06:30	05:22	19:46 (20)	04:38	20:27 (1)		
	16:00	16:56	17:53	19:52	19:52	20:48	22	20:08 (20)	21:35	4	20:31 (1)
7	08:26	07:46	06:44	06:28	06:28	05:20	19:46 (20)	04:37			
	16:02	16:58	17:55	19:54	19:54	20:50	21	20:07 (20)	21:36		
8	08:26	07:44	06:42	06:26	06:26	05:18	19:46 (20)	04:37			
	16:03	17:00	17:57	19:55	19:55	20:51	21	20:07 (20)	21:37		
9	08:25	07:42	06:40	06:23	06:23	05:17	19:47 (20)	04:36			
	16:05	17:02	17:59	19:57	19:57	20:53	20	20:07 (20)	21:38		
10	08:24	07:40	06:37	06:21	06:21	05:15	19:48 (20)	04:36			
	16:06	17:05	18:00	19:59	19:59	20:55	18	20:06 (20)	21:39		
11	08:24	07:38	06:35	06:18	06:18	05:13	19:48 (20)	04:35			
	16:08	17:07	18:02	20:01	20:01	20:57	19	20:25 (1)	21:40		
12	08:23	07:36	06:32	06:16	06:16	05:11	19:50 (20)	04:35			
	16:09	17:09	18:04	20:03	20:03	20:59	20	20:27 (1)	21:41		
13	08:22	07:34	06:30	06:14	06:14	05:09	19:50 (20)	04:34			
	16:11	17:11	18:06	20:05	20:05	21:00	21	20:28 (1)	21:41		
14	08:21	07:32	06:27	06:11	06:11	05:07	19:52 (20)	04:34			
	16:13	17:13	18:08	20:07	20:07	21:02	21	20:30 (1)	21:42		
15	08:20	07:30	06:25	06:09	06:09	05:06	19:56 (20)	04:34			
	16:14	17:15	18:10	20:09	20:09	21:04	16	20:32 (1)	21:43		
16	08:19	07:28	06:23	06:06	06:06	05:04	20:17 (1)	04:34			
	16:16	17:17	18:12	20:10	20:10	21:05	16	20:33 (1)	21:43		
17	08:18	07:26	06:20	06:04	06:04	05:02	20:17 (1)	04:33			
	16:18	17:19	18:14	20:12	20:12	21:07	18	20:35 (1)	21:44		
18	08:17	07:24	06:18	06:02	06:02	05:01	20:16 (1)	04:33			
	16:19	17:21	18:16	20:14	20:14	21:09	20	20:36 (1)	21:44		
19	08:16	07:22	06:15	05:59	05:59	04:59	20:16 (1)	04:33			
	16:21	17:23	18:18	20:16	20:16	21:10	21	20:37 (1)	21:44		
20	08:15	07:19	06:13	05:57	05:57	04:58	20:16 (1)	04:34			
	16:23	17:25	18:20	20:18	20:18	21:12	21	20:37 (1)	21:45		
21	08:14	07:17	06:10	05:55	05:55	04:56	20:16 (1)	04:34			
	16:25	17:27	18:21	20:20	20:20	21:14	21	20:37 (1)	21:45		
22	08:12	07:15	06:08	05:52	05:52	04:55	20:16 (1)	04:34			
	16:27	17:29	18:23	20:22	20:22	21:15	21	20:37 (1)	21:45		
23	08:11	07:13	06:05	05:50	05:50	04:53	20:17 (1)	04:34			
	16:29	17:31	18:25	20:24	20:24	21:17	21	20:38 (1)	21:45		
24	08:10	07:10	06:03	05:48	05:48	04:52	20:16 (1)	04:34			
	16:31	17:33	18:27	20:25	20:25	21:18	21	20:37 (1)	21:46		
25	08:08	07:08	06:00	05:46	05:46	04:50	20:17 (1)	04:35			
	16:32	17:35	18:29	20:27	20:27	21:20	20	20:37 (1)	21:46		
26	08:07	07:06	05:58	05:43	05:43	04:49	20:17 (1)	04:35			
	16:34	17:37	18:31	20:29	20:29	21:21	20	20:37 (1)	21:46		
27	08:05	07:03	05:55	05:41	05:41	04:48	20:18 (1)	04:36			
	16:36	17:39	18:33	20:31	20:31	21:23	19	20:37 (1)	21:45		
28	08:04	07:01	05:53	05:39	05:39	04:47	20:18 (1)	04:36			
	16:38	17:41	18:35	20:33	20:33	21:24	18	20:36 (1)	21:45		
29	08:02		05:50	05:37	05:37	04:45	20:19 (1)	04:37			
	16:40		19:37	20:35	20:35	21:26	17	20:36 (1)	21:45		
30	08:00		05:48	05:35	05:35	04:44	20:19 (1)	04:37			
	16:42		19:38	20:37	20:37	21:27	17	20:36 (1)	21:45		
31	07:59		05:45	05:31	05:31	04:43	20:20 (1)				
	16:44		19:40	20:38	20:38	21:28	15	20:35 (1)			
Sonnenscheinstunden	248	272	367	421	496	607	512				
astr.max.mögl.Beschattung		101	81	67	607		61				
Red.Sonnenscheinwahrsch.		0.24	0.31	0.41	0.51		0.45				
Reduktion Betriebsdauer		0.90	0.90	0.90	0.90		0.90				
Reduktion Windrichtung		0.70	0.68	0.65	0.63		0.63				
Gesamte Reduktion		0.15	0.19	0.24	0.29		0.26				
Met.wahrsch.Beschattung		15	15	16	176		16				

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CU - IO99

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:00 (20)   06:14	07:08	07:07	15:59 (17)   08:03
	21:44	21:09	19	20:37 (1)   20:01	18:46	16:35   4   16:03 (17)   15:50
2	04:39	05:20	19:58 (20)   06:16	07:10	07:09	16:00 (17)   08:05
	21:44	21:07	18	20:16 (20)   19:59	18:44	16:33   1   16:01 (17)   15:49
3	04:40	05:22	19:58 (20)   06:17	07:12	07:11	16:06   08:06
	21:44	21:05	19	20:17 (20)   19:56	18:41	16:31   15:48
4	04:40	05:24	19:57 (20)   06:19	07:14	07:13	16:08   08:08
	21:43	21:03	19	20:16 (20)   19:54	18:39	16:29   15:47
5	04:41	05:25	19:56 (20)   06:21	07:15	07:15	16:09   08:09
	21:43	21:01	21	20:17 (20)   19:51	18:37	16:27   15:47
6	04:42	20:34 (1)   05:27	19:56 (20)   06:23	07:17	07:17	16:08   08:10
	21:42	20:36 (1)   20:59	22	20:18 (20)   19:49	18:34	16:25   15:46
7	04:43	20:32 (1)   05:29	19:56 (20)   06:25	07:19	07:19	16:08   08:12
	21:41	20:39 (1)   20:57	21	20:17 (20)   19:46	18:32	16:23   15:46
8	04:44	20:31 (1)   05:31	19:56 (20)   06:26	07:21	07:21	16:08   08:13
	21:41	20:40 (1)   20:55	21	20:17 (20)   19:44	18:29	16:21   15:45
9	04:45	20:30 (1)   05:32	19:56 (20)   06:28	07:23	07:23	16:08   08:14
	21:40	20:41 (1)   20:53	21	20:17 (20)   19:41	18:27	16:19   15:45
10	04:46	20:30 (1)   05:34	19:56 (20)   06:30	8	18:50 (18)   07:25	16:08   08:16
	21:39	20:42 (1)   20:51	20	20:16 (20)   19:39	18:58 (18)   18:24	16:18   15:45
11	04:48	20:29 (1)   05:36	19:56 (20)   06:32	12	18:48 (18)   07:27	16:08   08:17
	21:38	20:43 (1)   20:49	20	20:16 (20)   19:36	18:47 (18)   18:22	16:16   15:44
12	04:49	20:28 (1)   05:38	19:57 (20)   06:34	13	18:47 (18)   07:28	16:09   08:18
	21:37	20:43 (1)   20:47	18	20:15 (20)   19:34	18:45 (18)   18:20	16:14   15:44
13	04:50	20:28 (1)   05:40	19:57 (20)   06:35	15	18:45 (18)   07:30	16:09   08:19
	21:36	20:44 (1)   20:45	17	20:14 (20)   19:31	18:45 (18)   18:17	16:13   15:44
14	04:51	20:27 (1)   05:41	19:59 (20)   06:37	15	18:45 (18)   07:32	16:09   08:20
	21:35	20:44 (1)   20:43	13	20:12 (20)   19:29	18:44 (18)   18:15	16:11   15:44
15	04:52	20:27 (1)   05:43	20:01 (20)   06:39	14	18:44 (18)   07:34	16:09   08:21
	21:34	20:45 (1)   20:40	10	20:11 (20)   19:26	18:45 (18)   18:12	16:09   15:44
16	04:54	20:27 (1)   05:45	19:26	14	18:45 (18)   07:36	16:09   08:22
	21:33	20:46 (1)   20:38	19:24	11	18:56 (18)   18:10	16:08   15:44
17	04:55	20:27 (1)   05:47	06:43	11	18:44 (18)   07:38	16:08   08:23
	21:32	20:46 (1)   20:36	19:21	9	18:53 (18)   18:08	16:06   15:44
18	04:57	20:26 (1)   05:49	06:44	9	18:45 (18)   07:40	16:06   08:23
	21:30	20:46 (1)   20:34	19:19	5	18:50 (18)   18:05	16:05   15:44
19	04:58	20:26 (1)   05:50	06:46	5	18:50 (18)   18:05	16:05   08:24
	21:29	20:46 (1)   20:31	19:16	18:03	16:03   15:45	
20	04:59	20:26 (1)   05:52	06:48	18:03	16:03   08:25	
	21:28	20:47 (1)   20:29	19:14	18:01	16:02   15:45	
21	05:01	20:26 (1)   05:54	06:50	17:59	16:02   08:25	
	21:26	20:47 (1)   20:27	19:11	17:59	16:01   15:45	
22	05:02	20:27 (1)   05:56	06:52	17:59	16:01   08:26	
	21:25	20:48 (1)   20:25	19:09	17:56	15:59   15:46	
23	05:04	20:26 (1)   05:58	06:53	17:56	15:59   08:26	
	21:23	20:47 (1)   20:22	19:06	17:54	15:58   15:46	
24	05:05	20:26 (1)   05:59	06:55	17:54	15:58   08:27	
	21:22	20:47 (1)   20:20	19:04	17:52	15:57   15:47	
25	05:07	20:27 (1)   06:01	06:57	17:52	15:57   08:27	
	21:20	20:47 (1)   20:18	19:01	17:50	15:56   15:48	
26	05:09	20:27 (1)   06:03	06:59	17:50	15:56   08:28	
	21:19	20:45 (1)   20:15	18:59	17:48	15:55   15:48	
27	05:10	20:28 (1)   06:05	07:01	17:47	15:54   08:28	
	21:17	20:44 (1)   20:13	18:56	17:46	15:53   15:49	
28	05:12	20:28 (1)   06:07	07:02	17:45	15:52   08:28	
	21:15	20:42 (1)   20:11	18:54	17:44	15:51   15:50	
29	05:14	20:04 (20)   06:08	07:04	17:43	15:50   08:28	
	21:14	20:41 (1)   20:08	18:51	17:42	15:49   15:51	
30	05:15	20:01 (20)   06:10	07:06	17:41	15:48   08:28	
	21:12	20:39 (1)   20:06	18:49	17:40	15:47   15:52	
31	05:17	20:00 (20)   06:12	07:08	17:39	15:46   08:28	
	21:10	20:38 (1)   20:03	18:47	17:38	15:45   15:53	
Sonneneinstrahlung	514	461	383	328	257	231
astr.max.mögl.Beschattung	432	279	102	97	5	
Red.Sonneneinstrahlung	0.44	0.48	0.40	0.33	0.21	
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	
Reduktion Windrichtung	0.63	0.64	0.68	0.70	0.70	
Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	
Met.wahrsch.Beschattung	109	78	25	20	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	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CV - IO100  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28	07:57	06:59	06:43	05:33	19:36 (20)   04:42	
	15:54	16:46	17:43	19:42	20:39	20   19:56 (20)   21:29	
2	08:28	07:55	06:56	06:40	05:31	19:36 (20)   04:41	
	15:55	16:48	17:45	19:44	20:40	19   19:55 (20)   21:31	
3	08:28	07:54	06:54	06:38	05:28	19:37 (20)   04:40	
	15:57	16:50	17:47	19:46	20:42	17   19:54 (20)   21:32	
4	08:27	07:52	06:52	06:35	05:26	19:38 (20)   04:40	
	15:58	16:52	17:49	19:48	20:44	15   19:53 (20)   21:33	
5	08:27	07:50	06:49	06:33	05:24	19:39 (20)   04:39	
	15:59	16:54	17:51	19:50	20:46	13   19:52 (20)   21:34	
6	08:27	07:48	06:47	06:30	05:22	19:40 (20)   04:38	
	16:00	16:56	17:53	19:52	20:48	15   20:17 (1)   21:35	
7	08:26	07:46	16:24 (17)   06:44	06:28	05:20	20:10 (1)   04:37	
	16:02	16:58	3 16:27 (17)   17:55	19:54	20:50	8   20:18 (1)   21:36	
8	08:26	07:44	16:23 (17)   06:42	06:26	05:18	20:09 (1)   04:37	
	16:03	17:00	6 16:29 (17)   17:57	19:55	20:51	11   20:20 (1)   21:37	
9	08:25	07:42	16:23 (17)   06:40	06:23	05:17	20:08 (1)   04:36	
	16:05	17:02	9 16:32 (17)   17:59	19:57	20:53	14   20:22 (1)   21:38	
10	08:24	07:40	16:23 (17)   06:37	06:21	05:15	20:07 (1)   04:36	
	16:06	17:05	11 16:34 (17)   18:00	19:59	20:55	17   20:24 (1)   21:39	
11	08:24	07:38	16:23 (17)   06:35	06:18	05:13	20:07 (1)   04:35	
	16:08	17:07	13 16:36 (17)   18:02	20:01	20:57	18   20:25 (1)   21:40	
12	08:23	07:36	16:23 (17)   06:32	06:16	05:11	20:07 (1)   04:35	
	16:09	17:09	15 16:38 (17)   18:04	20:03	20:59	20   20:27 (1)   21:41	
13	08:22	07:34	16:24 (17)   06:30	06:14	05:09	20:06 (1)   04:34	
	16:11	17:11	13 16:37 (17)   18:06	20:05	21:00	21   20:27 (1)   21:41	
14	08:21	07:32	16:24 (17)   06:27	06:11	05:07	20:06 (1)   04:34	
	16:13	17:13	12 16:36 (17)   18:08	20:07	21:02	21   20:27 (1)   21:42	
15	08:20	07:30	16:26 (17)   06:25	06:09	05:06	20:06 (1)   04:34	
	16:14	17:15	9 16:35 (17)   18:10	20:09	21:04	21   20:27 (1)   21:43	
16	08:19	07:28	16:29 (17)   06:23	06:06	05:04	20:06 (1)   04:34	
	16:16	17:17	3 16:32 (17)   18:12	20:10	21:05	21   20:27 (1)   21:43	
17	08:18	07:26	06:20	06:04	05:02	20:07 (1)   04:33	
	16:18	17:19	18:14	20:12	21:07	20   20:27 (1)   21:44	
18	08:17	07:24	06:18	06:02	05:01	20:07 (1)   04:33	
	16:19	17:21	18:16	20:14	21:09	19   20:26 (1)   21:44	
19	08:16	07:22	06:15	05:59	04:59	20:07 (1)   04:33	
	16:21	17:23	18:18	20:16	21:10	19   20:26 (1)   21:44	
20	08:15	07:19	06:13	05:57	04:58	20:07 (1)   04:34	
	16:23	17:25	18:20	20:18	21:12	18   20:25 (1)   21:45	
21	08:14	07:17	06:10	17:53 (18)   05:55	19:44 (20)   04:56	18   20:08 (1)   04:34	
	16:25	17:27	18:21	2 17:55 (18)   20:20	7 19:51 (20)   21:14	17   20:25 (1)   21:45	
22	08:12	07:15	06:08	17:50 (18)   05:52	19:41 (20)   04:55	20:09 (1)   04:34	
	16:27	17:29	18:23	6 17:56 (18)   20:22	11 19:52 (20)   21:15	16   20:25 (1)   21:45	
23	08:11	07:13	06:05	17:50 (18)   05:50	19:39 (20)   04:53	20:10 (1)   04:34	
	16:29	17:31	18:25	9 17:59 (18)   20:24	15 19:54 (20)   21:17	14   20:24 (1)   21:45	
24	08:10	07:10	06:03	17:48 (18)   05:48	19:38 (20)   04:52	20:11 (1)   04:34	
	16:31	17:33	18:27	12 18:00 (18)   20:25	17 19:55 (20)   21:18	12   20:23 (1)   21:46	
25	08:08	07:08	06:00	17:48 (18)   05:46	19:37 (20)   04:50	20:12 (1)   04:35	
	16:32	17:35	18:29	14 18:02 (18)   20:27	19 19:56 (20)   21:20	9   20:21 (1)   21:46	
26	08:07	07:06	05:58	17:47 (18)   05:43	19:36 (20)   04:49	20:15 (1)   04:35	
	16:34	17:37	18:31	15 18:02 (18)   20:29	20 19:56 (20)   21:21	5   20:20 (1)   21:46	
27	08:05	07:03	05:55	17:48 (18)   05:41	19:36 (20)   04:48	20:16 (1)   04:36	
	16:36	17:39	18:33	14 18:02 (18)   20:31	21 19:57 (20)   21:23	21:45	
28	08:04	07:01	05:53	17:48 (18)   05:39	19:36 (20)   04:47	20:17 (1)   04:36	
	16:38	17:41	18:35	12 18:00 (18)   20:33	21 19:57 (20)   21:24	21:45	
29	08:02		06:50	18:50 (18)   05:37	19:36 (20)   04:45	20:18 (1)   04:37	
	16:40		19:37	9 18:59 (18)   20:35	21 19:57 (20)   21:26	21:45	
30	08:00		06:48		05:35	19:36 (20)   04:44	20:17 (1)   04:37
	16:42		19:38	20 19:56 (20)   21:27	21:27	21:45	
31	07:59		06:45			04:43	
	16:44		19:40			21:28	
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung		94	93	172	420		
Red.Sonnenscheinwahrsch.		0.24	0.31	0.41	0.51		
Reduktion Betriebsdauer		0.90	0.90	0.90	0.90		
Reduktion Windrichtung		0.70	0.68	0.63	0.63		
Gesamte Reduktion		0.15	0.19	0.24	0.29		
Met.wahrsch.Beschattung		14	18	41	122		

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CV - IO100

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:17 (1) 06:14	07:08	07:07	15:52 (17) 08:03
	21:44	21:09	20:37 (1) 20:01	18:46	16:35	11 16:03 (17) 15:50
2	04:39	05:20	20:17 (1) 06:16	07:10	07:09	15:53 (17) 08:05
	21:44	21:07	20:35 (1) 19:59	18:44	16:33	8 16:01 (17) 15:49
3	04:40	05:22	20:18 (1) 06:17	07:12	07:11	15:53 (17) 08:06
	21:44	21:05	20:33 (1) 19:56	18:41	16:31	6 15:59 (17) 15:48
4	04:40	05:24	20:18 (1) 06:19	07:14	07:13	15:54 (17) 08:08
	21:43	21:03	20:31 (1) 19:54	18:39	16:29	2 15:56 (17) 15:47
5	04:41	05:25	20:19 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	20:30 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	19:53 (20) 06:23	07:17	07:17	08:10
	21:42	20:59	19:49 (20) 06:25	18:34	16:25	15:46
7	04:43	05:29	19:49 (20) 06:25	07:19	07:19	08:12
	21:41	20:57	19:48 (20) 06:26	18:32	16:23	15:46
8	04:44	05:31	19:48 (20) 06:26	07:21	07:21	08:13
	21:41	20:55	19:47 (20) 06:28	18:29	16:21	15:45
9	04:45	05:32	19:47 (20) 06:28	07:23	07:23	08:14
	21:40	20:53	19:46 (20) 06:29	18:27	16:19	15:45
10	04:46	05:34	19:45 (20) 06:30	07:25	07:25	08:16
	21:39	20:51	19:45 (20) 06:31	18:24	16:18	15:45
11	04:48	05:36	19:45 (20) 06:32	07:27	07:27	08:17
	21:38	20:49	19:44 (20) 06:33	18:22	16:16	15:44
12	04:49	05:38	19:44 (20) 06:34	07:28	07:28	08:18
	21:37	20:47	19:43 (20) 06:35	18:20	16:14	15:44
13	04:50	05:40	19:43 (20) 06:35	07:30	07:31	08:19
	21:36	20:45	19:42 (20) 06:36	18:17	16:13	15:44
14	04:51	05:41	19:43 (20) 06:37	18:41 (18) 07:32	07:33	08:20
	21:35	20:43	19:42 (20) 06:38	18:49 (18) 18:15	16:11	15:44
15	04:52	05:43	19:43 (20) 06:39	18:39 (18) 07:34	07:35	08:21
	21:34	20:40	19:42 (20) 06:40	18:51 (18) 18:12	16:09	15:44
16	04:54	05:45	19:43 (20) 06:41	18:38 (18) 07:36	07:36	08:22
	21:33	20:38	19:42 (20) 06:42	18:51 (18) 18:10	16:08	15:44
17	04:55	05:47	19:43 (20) 06:43	18:36 (18) 07:38	07:38	08:23
	21:32	20:36	19:42 (20) 06:44	18:51 (18) 18:08	16:06	15:44
18	04:57	20:23 (1) 05:49	19:44 (20) 06:44	18:36 (18) 07:40	07:40	08:23
	21:30	20:30 (1) 05:50	19:43 (20) 06:45	18:50 (18) 18:05	16:05	15:44
19	04:58	20:21 (1) 05:50	19:44 (20) 06:46	18:36 (18) 07:42	07:42	08:24
	21:29	20:32 (1) 05:51	19:43 (20) 06:47	18:48 (18) 18:03	16:03	15:45
20	04:59	20:21 (1) 05:52	19:45 (20) 06:48	18:36 (18) 07:44	07:44	08:25
	21:28	20:33 (1) 05:53	19:44 (20) 06:49	18:46 (18) 18:01	16:02	15:45
21	05:01	20:19 (1) 05:54	19:47 (20) 06:50	18:36 (18) 07:46	07:46	08:25
	21:26	20:34 (1) 05:55	19:46 (20) 06:51	18:42 (18) 17:59	16:01	15:45
22	05:02	20:19 (1) 05:56	19:49 (20) 06:52	18:37 (18) 07:48	07:48	08:26
	21:25	20:35 (1) 05:57	19:54 (20) 06:53	18:40 (18) 17:56	15:59	15:46
23	05:04	20:18 (1) 05:58	19:53 (20) 06:54	07:50	07:49	08:26
	21:23	20:36 (1) 05:59	19:52 (20) 06:55	17:54	15:58	15:46
24	05:05	20:17 (1) 05:59	19:51 (20) 06:56	07:51	07:51	08:27
	21:22	20:36 (1) 06:00	19:50 (20) 06:57	17:52	15:57	15:47
25	05:07	20:18 (1) 06:01	19:49 (20) 06:58	07:53	07:53	08:27
	21:20	20:37 (1) 06:02	19:48 (20) 06:59	16:50	15:56	15:48
26	05:09	20:17 (1) 06:03	19:47 (20) 07:00	06:55	15:57 (17) 07:55	08:28
	21:19	20:37 (1) 06:04	19:46 (20) 07:01	16:47	5 16:02 (17) 15:54	15:48
27	05:10	20:17 (1) 06:05	19:45 (20) 07:02	06:57	15:55 (17) 07:56	08:28
	21:17	20:37 (1) 06:06	19:44 (20) 07:03	16:45	9 16:04 (17) 15:53	15:49
28	05:12	20:16 (1) 06:07	19:43 (20) 07:04	06:59	15:53 (17) 07:58	08:28
	21:15	20:37 (1) 06:08	19:42 (20) 07:05	16:43	12 16:05 (17) 15:52	15:50
29	05:14	20:17 (1) 06:08	19:41 (20) 07:06	07:01	15:53 (17) 08:00	08:28
	21:14	20:38 (1) 06:09	19:40 (20) 07:07	16:41	14 16:07 (17) 15:51	15:51
30	05:15	20:16 (1) 06:10	19:39 (20) 07:08	07:03	15:53 (17) 08:01	08:28
	21:12	20:37 (1) 06:11	19:38 (20) 07:09	16:39	14 16:07 (17) 15:51	15:52
31	05:17	20:17 (1) 06:12	19:37 (20) 07:10	07:05	15:52 (17) 08:02	08:28
	21:10	20:37 (1) 06:13	19:36 (20) 07:11	16:37	14 16:06 (17) 15:51	15:53
Sonneneinstrahlung	514	461	383	328	257	231
astr.max.mögl.Beschattung	240	359	438	468	457	427
Red.Sonneneinstrahlung	0.44	0.48	0.40	0.33	0.21	0.21
Reduktion Betriebsdauer	0.90	0.90	0.90	0.90	0.90	0.90
Reduktion Windrichtung	0.63	0.63	0.68	0.70	0.70	0.70
Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	0.13
Met.wahrsch.Beschattung	61	100	23	14	4	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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CW - IO101  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	14:38 (26)	07:57	06:59	06:43	05:33
	15:54	5 14:43 (26)	16:46	17:43	19:42	20:39
2	08:28	14:39 (26)	07:55	06:56	06:40	05:31
	15:55	2 14:41 (26)	16:48	17:45	19:44	20:40
3	08:28	07:54	06:54	06:38	05:28	19:51 (1)
	15:57	16:50	17:47	19:46	20:42	17 20:08 (1)
4	08:27	07:52	06:52	06:35	05:26	19:51 (1)
	15:58	16:52	17:49	19:48	20:44	16 20:07 (1)
5	08:27	07:50	06:49	06:33	05:24	19:52 (1)
	15:59	16:54	17:51	19:50	20:46	14 20:06 (1)
6	08:27	07:48	06:47	06:30	05:22	19:53 (1)
	16:00	16:56	17:53	19:52	20:48	12 20:05 (1)
7	08:26	07:46	06:44	06:28	05:20	19:54 (1)
	16:02	16:58	17:55	19:54	20:50	9 20:03 (1)
8	08:26	07:44	06:42	06:26	05:18	04:37
	16:03	17:00	17:57	19:55	20:51	21:37
9	08:25	07:42	06:40	06:23	05:17	04:36
	16:05	17:02	17:59	19:57	20:53	21:38
10	08:24	07:40	06:37	06:21	05:15	04:36
	16:06	17:05	18:00	19:59	20:55	21:39
11	08:24	07:38	06:35	06:18	19:31 (20)	05:13
	16:08	17:07	18:02	20:01	2 19:33 (20)	20:57
12	08:23	07:36	06:32	06:16	19:28 (20)	05:11
	16:09	17:09	18:04	20:03	7 19:35 (20)	20:58
13	08:22	07:34	06:30	06:13	19:27 (20)	05:09
	16:11	17:11	18:06	20:05	10 19:37 (20)	21:00
14	08:21	07:32	06:27	06:11	19:25 (20)	05:07
	16:12	17:13	18:08	20:07	13 19:38 (20)	21:02
15	08:20	07:30	06:25	06:09	19:25 (20)	05:06
	16:14	17:15	18:10	20:09	15 19:40 (20)	21:04
16	08:19	07:28	06:22	06:06	19:25 (20)	05:04
	16:16	17:17	18:12	20:10	16 19:41 (20)	21:05
17	08:18	07:26	06:20	06:04	19:24 (20)	05:02
	16:18	17:19	18:14	20:12	16 19:40 (20)	21:07
18	08:17	07:24	06:18	06:02	19:24 (20)	05:01
	16:19	17:21	18:16	20:14	16 19:40 (20)	21:09
19	08:16	07:22	06:15	05:59	19:24 (20)	04:59
	16:21	17:23	18:18	20:16	16 19:40 (20)	21:10
20	08:15	07:19	06:13	05:57	19:25 (20)	04:57
	16:23	17:25	18:20	20:18	14 19:39 (20)	21:12
21	08:14	07:17	06:10	05:55	19:26 (20)	04:56
	16:25	17:27	18:21	20:20	11 19:37 (20)	21:14
22	08:12	07:15	06:08	05:52	19:28 (20)	04:54
	16:27	17:29	18:23	20:22	6 19:34 (20)	21:15
23	08:11	07:13	06:05	05:50	04:53	04:34
	16:29	17:31	18:25	20:24	21:17	21:45
24	08:10	07:10	06:03	05:48	04:52	04:34
	16:30	17:33	18:27	20:25	21:18	21:46
25	08:08	07:08	06:00	05:46	19:55 (1)	04:50
	16:32	17:35	18:29	20:27	3 19:58 (1)	21:20
26	08:07	07:06	05:58	05:43	19:54 (1)	04:49
	16:34	17:37	18:31	20:29	6 20:00 (1)	21:21
27	08:05	07:03	05:55	05:41	19:53 (1)	04:48
	16:36	17:39	18:33	20:31	9 20:02 (1)	21:23
28	08:04	07:01	05:53	05:39	19:52 (1)	04:47
	16:38	17:41	18:35	20:33	12 20:04 (1)	21:24
29	08:02	06:50	05:37	19:51 (1)	04:45	04:37
	16:40	19:37	20:35	14 20:05 (1)	21:26	21:45
30	08:00	06:48	05:35	19:51 (1)	04:44	04:37
	16:42	19:38	20:37	16 20:07 (1)	21:27	21:45
31	07:59	06:45	05:32	19:50 (1)	04:43	04:36
	16:44	19:40	20:39	16 20:07 (1)	21:28	21:45
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung				202		102
Red.Sonnenscheinwahrsch.	0.17			0.41		0.51
Reduktion Betriebsdauer	0.90			0.90		0.90
Reduktion Windrichtung	0.67			0.64		0.64
Gesamte Reduktion	0.11			0.24		0.29
Met.wahrsch.Beschattung	1			48		30

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CW - IO101  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember				
1	04:38	05:19	06:14	19:31 (20)	07:08	08:03				
	21:44	21:08	20:01	2	19:33 (20)	18:46	16:35	15:50		
2	04:39	05:20	06:16	07:10	07:09	08:05				
	21:44	21:07	19:59	18:44	16:33	15:49				
3	04:40	05:22	06:17	07:12	07:11	08:06				
	21:44	21:05	19:56	18:41	16:31	15:48				
4	04:40	05:24	06:19	07:13	07:13	08:08				
	21:43	21:03	19:54	18:39	16:29	15:47				
5	04:41	05:25	20:06 (1)	06:21	07:15	07:15	08:09			
	21:43	21:01	20:11 (1)	19:51	18:36	16:27	15:47			
6	04:42	05:27	20:04 (1)	06:23	07:17	07:17	08:10			
	21:42	20:59	10	20:14 (1)	19:49	18:34	16:25	15:46		
7	04:43	05:29	20:02 (1)	06:25	07:19	07:19	08:12			
	21:41	20:57	12	20:14 (1)	19:46	18:32	16:23	15:46		
8	04:44	05:31	20:01 (1)	06:26	07:21	07:21	08:13			
	21:41	20:55	15	20:16 (1)	19:44	18:29	16:21	15:45		
9	04:45	05:32	20:01 (1)	06:28	07:23	07:23	08:14			
	21:40	20:53	15	20:16 (1)	19:41	18:27	16:19	15:45		
10	04:46	05:34	19:59 (1)	06:30	07:25	07:25	08:16	14:30 (26)		
	21:39	20:51	17	20:16 (1)	19:39	18:24	16:18	15:45	1	14:31 (26)
11	04:47	05:36	19:59 (1)	06:32	07:27	07:27	08:17	14:28 (26)		
	21:38	20:49	18	20:17 (1)	19:36	18:22	16:16	15:44	5	14:33 (26)
12	04:49	05:38	19:58 (1)	06:34	07:28	07:29	08:18	14:27 (26)		
	21:37	20:47	18	20:16 (1)	19:34	18:20	16:14	15:44	7	14:34 (26)
13	04:50	05:40	19:59 (1)	06:35	07:30	07:31	08:19	14:27 (26)		
	21:36	20:45	15	20:14 (1)	19:31	18:17	16:13	15:44	8	14:35 (26)
14	04:51	05:41	19:59 (1)	06:37	07:32	07:33	08:20	14:27 (26)		
	21:35	20:43	13	20:12 (1)	19:29	18:15	16:11	15:44	9	14:36 (26)
15	04:52	05:43	20:00 (1)	06:39	07:34	07:35	08:21	14:27 (26)		
	21:34	20:40	11	20:11 (1)	19:26	18:12	16:09	15:44	10	14:37 (26)
16	04:54	05:45	19:59 (1)	06:41	07:36	07:36	08:22	14:27 (26)		
	21:33	20:38	9	20:08 (1)	19:24	18:10	16:08	15:44	11	14:38 (26)
17	04:55	05:47	20:01 (1)	06:43	07:38	07:38	08:23	14:27 (26)		
	21:32	20:36	5	20:06 (1)	19:21	18:08	16:06	15:44	12	14:39 (26)
18	04:57	05:49	20:02 (1)	06:44	07:40	07:40	08:23	14:28 (26)		
	21:30	20:34	2	20:04 (1)	19:19	18:05	16:05	15:44	12	14:40 (26)
19	04:58	05:50	06:46	07:42	07:42	08:24	14:28 (26)			
	21:29	20:31	19:16	18:03	16:03	15:45	13	14:41 (26)		
20	04:59	05:52	06:48	07:44	07:44	08:25	14:28 (26)			
	21:28	20:29	19:14	18:01	16:02	15:45	13	14:41 (26)		
21	05:01	05:54	19:33 (20)	06:50	07:46	07:46	08:25	14:29 (26)		
	21:26	20:27	7	19:40 (20)	19:11	17:59	16:00	15:45	13	14:42 (26)
22	05:02	05:56	19:30 (20)	06:52	07:48	07:48	08:26	14:29 (26)		
	21:25	20:25	11	19:41 (20)	19:09	17:56	15:59	15:46	13	14:42 (26)
23	05:04	05:58	19:29 (20)	06:53	07:49	07:49	08:26	14:30 (26)		
	21:23	20:22	14	19:43 (20)	19:06	17:54	15:58	15:46	13	14:43 (26)
24	05:05	05:59	19:28 (20)	06:55	07:51	07:51	08:27	14:30 (26)		
	21:22	20:20	15	19:43 (20)	19:04	17:52	15:57	15:47	13	14:43 (26)
25	05:07	06:01	19:28 (20)	06:57	06:53	07:53	08:27	14:31 (26)		
	21:20	20:18	16	19:44 (20)	19:01	16:50	15:56	15:48	12	14:43 (26)
26	05:09	06:03	19:26 (20)	06:59	06:55	07:55	08:28	14:31 (26)		
	21:19	20:15	17	19:43 (20)	18:59	16:47	15:54	15:48	12	14:43 (26)
27	05:10	06:05	19:26 (20)	07:01	06:57	07:56	08:28	14:32 (26)		
	21:17	20:13	17	19:43 (20)	18:56	16:45	15:53	15:49	11	14:43 (26)
28	05:12	06:07	19:27 (20)	07:02	06:59	07:58	08:28	14:32 (26)		
	21:15	20:11	15	19:42 (20)	18:54	16:43	15:52	15:50	11	14:43 (26)
29	05:14	06:08	19:26 (20)	07:04	07:01	08:00	08:28	14:33 (26)		
	21:14	20:08	13	19:39 (20)	18:51	16:41	15:51	15:51	10	14:43 (26)
30	05:15	06:10	19:27 (20)	07:06	07:03	08:01	08:28	14:34 (26)		
	21:12	20:06	10	19:37 (20)	18:49	16:39	15:50	15:52	9	14:43 (26)
31	05:17	06:12	19:28 (20)	07:05	07:05	08:03	08:28	14:36 (26)		
	21:10	20:03	7	19:35 (20)	18:47	16:37	15:53	15:53	7	14:43 (26)
Sonnenscheinstunden	514	461	383	328	257	231				
astr.max.mögl.Beschattung			307	2						225
Red.Sonnenscheinwahrsch.			0.48	0.40						0.14
Reduktion Betriebsdauer			0.90	0.90						0.90
Reduktion Windrichtung			0.64	0.64						0.67
Gesamte Reduktion			0.28	0.23						0.08
Met.wahrsch.Beschattung			86	0						19

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CX - IO102  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:48 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	17 20:05 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	19:48 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	16 20:04 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	19:48 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	15 20:03 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	19:49 (1) 04:39
	15:58	16:52	17:49	19:48	20:44	13 20:02 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:50 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	11 20:01 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	19:53 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	5 19:58 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	04:37
	16:02	16:58	17:55	19:54	20:50	21:36
8	08:26	07:44	06:42	06:26	05:18	04:37
	16:03	17:00	17:57	19:55	20:51	21:37
9	08:25	07:42	06:40	06:23	19:28 (20) 05:17	04:36
	16:05	17:02	17:59	19:57	2 19:30 (20) 20:53	21:38
10	08:24	07:40	06:37	06:21	19:25 (20) 05:15	04:36
	16:06	17:05	18:00	19:59	7 19:32 (20) 20:55	21:39
11	08:24	07:38	06:35	06:18	19:22 (20) 05:13	04:35
	16:08	17:07	18:02	20:01	11 19:33 (20) 20:57	21:40
12	08:23	07:36	06:32	06:16	19:22 (20) 05:11	04:35
	16:09	17:09	18:04	20:03	13 19:35 (20) 20:58	21:41
13	08:22	07:34	06:30	06:13	19:21 (20) 05:09	04:34
	16:11	17:11	18:06	20:05	16 19:37 (20) 21:00	21:41
14	08:21	07:32	06:27	06:11	19:20 (20) 05:07	04:34
	16:12	17:13	18:08	20:07	17 19:37 (20) 21:02	21:42
15	08:20	07:30	06:25	06:09	19:20 (20) 05:06	04:34
	16:14	17:15	18:10	20:09	17 19:37 (20) 21:04	21:43
16	08:19	07:28	06:22	06:06	19:20 (20) 05:04	04:34
	16:16	17:17	18:12	20:10	17 19:37 (20) 21:05	21:43
17	08:18	07:26	06:20	06:04	19:20 (20) 05:02	04:33
	16:18	17:19	18:14	20:12	15 19:35 (20) 21:07	21:44
18	08:17	07:24	06:18	06:02	19:21 (20) 05:01	04:33
	16:19	17:21	18:16	20:14	13 19:34 (20) 21:09	21:44
19	08:16	07:22	06:15	05:59	19:22 (20) 04:59	04:33
	16:21	17:23	18:18	20:16	11 19:33 (20) 21:10	21:44
20	08:15	07:19	06:13	05:57	19:24 (20) 04:57	04:33
	16:23	17:25	18:20	20:18	7 19:31 (20) 21:12	21:45
21	08:14	07:17	06:10	05:55	04:56	04:34
	16:25	17:27	18:21	20:20	21:14	21:45
22	08:12	07:15	06:08	05:52	04:54	04:34
	16:27	17:29	18:23	20:22	21:15	21:45
23	08:11	07:13	06:05	05:50	19:53 (1) 04:53	04:34
	16:29	17:31	18:25	20:24	1 19:54 (1) 21:17	21:45
24	08:10	07:10	06:03	05:48	19:51 (1) 04:52	04:34
	16:30	17:33	18:27	20:25	5 19:56 (1) 21:18	21:46
25	08:08	07:08	06:00	05:46	19:50 (1) 04:50	04:35
	16:32	17:35	18:29	20:27	8 19:58 (1) 21:20	21:46
26	08:07	07:06	05:58	05:43	19:49 (1) 04:49	04:35
	16:34	17:37	18:31	20:29	11 20:00 (1) 21:21	21:46
27	08:05	07:03	05:55	05:41	19:48 (1) 04:48	04:36
	16:36	17:39	18:33	20:31	14 20:02 (1) 21:23	21:45
28	08:04	07:01	05:53	05:39	19:48 (1) 04:47	04:36
	16:38	17:41	18:35	20:33	16 20:04 (1) 21:24	21:45
29	08:02	06:50	05:37	19:48 (1) 04:45	04:37	04:37
	16:40	19:37	20:35	17 20:05 (1) 21:26	21:45	21:45
30	08:00	06:48	05:35	19:48 (1) 04:44	04:37	04:37
	16:42	19:38	20:37	17 20:05 (1) 21:27	21:45	21:45
31	07:59	06:45			04:43	
	16:44	19:40			21:28	
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung				235	77	
Red.Sonnenscheinwahrsch.				0.41	0.51	
Reduktion Betriebsdauer				0.90	0.90	
Reduktion Windrichtung				0.64	0.64	
Gesamte Reduktion				0.24	0.29	
Met.wahrsch.Beschattung				56	22	

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CX - IO102  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	19:22 (20)	07:08	08:03
	21:44	21:08	20:01	11 19:33 (20)	18:46	16:35
2	04:39	05:20	06:16	19:23 (20)	07:10	08:05
	21:44	21:07	19:59	7 19:30 (20)	18:44	16:33
3	04:40	05:22	06:17	19:26 (20)	07:12	08:06
	21:44	21:05	19:56	2 19:28 (20)	18:41	16:31
4	04:40	05:24	06:19	07:13	07:13	08:08
	21:43	21:03	19:54	18:39	16:29	15:47
5	04:41	05:25	06:21	07:15	07:15	08:09
	21:43	21:01	19:51	18:36	16:27	15:47
6	04:42	05:27	06:23	07:17	07:17	08:10
	21:42	20:59	19:49	18:34	16:25	15:46
7	04:43	05:29	20:01 (1)	06:25	07:19	08:12
	21:41	20:57	8 20:09 (1)	19:46	18:32	16:23
8	04:44	05:31	19:59 (1)	06:26	07:21	08:13
	21:41	20:55	12 20:11 (1)	19:44	18:29	16:21
9	04:45	05:32	19:58 (1)	06:28	07:23	08:14
	21:40	20:53	14 20:12 (1)	19:41	18:27	16:19
10	04:46	05:34	19:57 (1)	06:30	07:25	08:16
	21:39	20:51	15 20:12 (1)	19:39	18:24	16:18
11	04:47	05:36	19:56 (1)	06:32	07:27	08:17
	21:38	20:49	17 20:13 (1)	19:36	18:22	16:16
12	04:49	05:38	19:55 (1)	06:34	07:28	08:18
	21:37	20:47	17 20:12 (1)	19:34	18:20	16:14
13	04:50	05:40	19:55 (1)	06:35	07:30	08:19
	21:36	20:45	18 20:13 (1)	19:31	18:17	16:13
14	04:51	05:41	19:55 (1)	06:37	07:32	08:20
	21:35	20:43	17 20:12 (1)	19:29	18:15	16:11
15	04:52	05:43	19:55 (1)	06:39	07:34	08:21
	21:34	20:40	16 20:11 (1)	19:26	18:12	16:09
16	04:54	05:45	19:55 (1)	06:41	07:36	08:22
	21:33	20:38	13 20:08 (1)	19:24	18:10	16:08
17	04:55	05:47	19:56 (1)	06:43	07:38	08:23
	21:32	20:36	10 20:06 (1)	19:21	18:08	16:06
18	04:57	05:49	19:57 (1)	06:44	07:40	08:23
	21:30	20:34	7 20:04 (1)	19:19	18:05	16:05
19	04:58	05:50	19:57 (1)	06:46	07:42	08:24
	21:29	20:31	5 20:02 (1)	19:16	18:03	16:03
20	04:59	05:52	06:48	07:44	07:44	08:25
	21:28	20:29	19:14	18:01	16:02	15:45
21	05:01	05:54	06:50	07:46	07:46	08:25
	21:26	20:27	19:11	17:59	16:00	15:45
22	05:02	05:56	06:52	07:48	07:48	08:26
	21:25	20:25	19:09	17:56	15:59	15:46
23	05:04	05:58	19:27 (20)	06:53	07:49	08:26
	21:23	20:22	8 19:35 (20)	19:06	17:54	15:58
24	05:05	05:59	19:25 (20)	06:55	07:51	08:27
	21:22	20:20	12 19:37 (20)	19:04	17:52	15:57
25	05:07	06:01	19:24 (20)	06:57	06:53	07:53
	21:20	20:18	14 19:38 (20)	19:01	16:50	15:56
26	05:09	06:03	19:22 (20)	06:59	06:55	07:55
	21:19	20:15	16 19:38 (20)	18:59	16:47	15:54
27	05:10	06:05	19:22 (20)	07:01	06:57	07:56
	21:17	20:13	17 19:39 (20)	18:56	16:45	15:53
28	05:12	06:07	19:22 (20)	07:02	06:59	07:58
	21:15	20:11	17 19:39 (20)	18:54	16:43	15:52
29	05:14	06:08	19:21 (20)	07:04	07:01	08:00
	21:14	20:08	17 19:38 (20)	18:51	16:41	15:51
30	05:15	06:10	19:21 (20)	07:06	07:03	08:01
	21:12	20:06	16 19:37 (20)	18:49	16:39	15:50
31	05:17	06:12	19:21 (20)	07:05	07:05	08:02
	21:10	20:03	14 19:35 (20)	18:47	16:37	15:53
Sonneneinstrahlung	514	461	383	328	257	231
astr.max.mögl.Beschattung		300	20			17
Red.Sonneneinstrahlung		0.48	0.40			0.14
Reduktion Betriebsdauer		0.90	0.90			0.90
Reduktion Windrichtung		0.64	0.65			0.67
Gesamte Reduktion		0.28	0.23			0.08
Met.wahrsch.Beschattung		84	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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CY - IO103

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:47 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	16 20:03 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	19:48 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	15 20:03 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	19:48 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	14 20:02 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	19:50 (1) 04:39
	15:58	16:52	17:49	19:48	20:44	10 20:00 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:51 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	7 19:58 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	04:38
	16:00	16:56	17:53	19:52	20:48	21:35
7	08:26	07:46	06:44	06:28	05:20	04:37
	16:02	16:58	17:55	19:54	20:50	21:36
8	08:26	07:44	06:42	06:26	05:18	04:37
	16:03	17:00	17:57	19:55	20:51	21:37
9	08:25	07:42	06:40	06:23	19:25 (20) 05:17	04:36
	16:05	17:02	17:58	19:57	5 19:30 (20) 20:53	21:38
10	08:24	07:40	06:37	06:21	19:23 (20) 05:15	04:36
	16:06	17:05	18:00	19:59	9 19:32 (20) 20:55	21:39
11	08:24	07:38	06:35	06:18	19:21 (20) 05:13	04:35
	16:08	17:07	18:02	20:01	12 19:33 (20) 20:57	21:40
12	08:23	07:36	06:32	06:16	19:21 (20) 05:11	04:35
	16:09	17:09	18:04	20:03	14 19:35 (20) 20:58	21:41
13	08:22	07:34	06:30	06:13	19:20 (20) 05:09	04:34
	16:11	17:11	18:06	20:05	17 19:37 (20) 21:00	21:41
14	08:21	07:32	06:27	06:11	19:19 (20) 05:07	04:34
	16:12	17:13	18:08	20:07	17 19:36 (20) 21:02	21:42
15	08:20	07:30	06:25	06:09	19:20 (20) 05:06	04:34
	16:14	17:15	18:10	20:09	16 19:36 (20) 21:04	21:43
16	08:19	07:28	06:22	06:06	19:20 (20) 05:04	04:34
	16:16	17:17	18:12	20:10	16 19:36 (20) 21:05	21:43
17	08:18	07:26	06:20	06:04	19:20 (20) 05:02	04:33
	16:18	17:19	18:14	20:12	14 19:34 (20) 21:07	21:44
18	08:17	07:24	06:18	06:02	19:21 (20) 05:01	04:33
	16:19	17:21	18:16	20:14	12 19:33 (20) 21:09	21:44
19	08:16	07:22	06:15	05:59	19:23 (20) 04:59	04:33
	16:21	17:23	18:18	20:16	8 19:31 (20) 21:10	21:44
20	08:15	07:19	06:13	05:57	04:57	04:33
	16:23	17:25	18:20	20:18	21:12	21:45
21	08:14	07:17	06:10	05:55	04:56	04:34
	16:25	17:27	18:21	20:20	21:14	21:45
22	08:12	07:15	06:08	05:52	04:54	04:34
	16:27	17:29	18:23	20:22	21:15	21:45
23	08:11	07:13	06:05	05:50	19:51 (1) 04:53	04:34
	16:29	17:31	18:25	20:24	3 19:54 (1) 21:17	21:45
24	08:10	07:10	06:03	05:48	19:49 (1) 04:52	04:34
	16:30	17:33	18:27	20:25	7 19:56 (1) 21:18	21:46
25	08:08	07:08	06:00	05:46	19:48 (1) 04:50	04:35
	16:32	17:35	18:29	20:27	10 19:58 (1) 21:20	21:46
26	08:07	07:06	05:58	05:43	19:48 (1) 04:49	04:35
	16:34	17:37	18:31	20:29	12 20:00 (1) 21:21	21:46
27	08:05	07:03	05:55	05:41	19:47 (1) 04:48	04:36
	16:36	17:39	18:33	20:31	15 20:02 (1) 21:23	21:45
28	08:04	07:01	05:53	05:39	19:47 (1) 04:47	04:36
	16:38	17:41	18:35	20:33	17 20:04 (1) 21:24	21:45
29	08:02	06:50	05:37	05:37	19:47 (1) 04:45	04:37
	16:40	19:37	20:35	17 20:04 (1) 21:26	21:45	
30	08:00	06:48	05:35	05:35	19:47 (1) 04:44	04:37
	16:42	19:38	20:37	17 20:04 (1) 21:27	21:45	
31	07:59	06:45			04:43	
	16:44	19:40			21:28	
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung				238	62	
Red.Sonnenscheinwahrsch.				0.41	0.51	
Reduktion Betriebsdauer				0.90	0.90	
Reduktion Windrichtung				0.64	0.64	
Gesamte Reduktion				0.24	0.29	
Met.wahrsch.Beschattung				57	18	

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: CY - IO103  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	19:21 (20)	07:08	07:07
	21:44	21:08	20:01	12 19:33 (20)	18:46	16:35
2	04:39	05:20	06:16	19:21 (20)	07:10	07:09
	21:44	21:07	19:59	9 19:30 (20)	18:44	16:33
3	04:40	05:22	06:17	19:23 (20)	07:12	07:11
	21:44	21:05	19:56	5 19:28 (20)	18:41	16:31
4	04:40	05:24	06:19	07:13	07:13	08:08
	21:43	21:03	19:54	18:39	16:29	15:47
5	04:41	05:25	06:21	07:15	07:15	08:09
	21:43	21:01	19:51	18:36	16:27	15:47
6	04:42	05:27	06:23	07:17	07:17	08:10
	21:42	20:59	19:49	18:34	16:25	15:46
7	04:43	05:29	06:25	07:19	07:19	08:12
	21:41	20:57	19:46	18:32	16:23	15:46
8	04:44	05:31	20:00 (1)	06:26	07:21	07:21
	21:41	20:55	8 20:08 (1)	19:44	18:29	16:21
9	04:45	05:32	19:59 (1)	06:28	07:23	07:23
	21:40	20:53	11 20:10 (1)	19:41	18:27	16:19
10	04:46	05:34	19:57 (1)	06:30	07:25	07:25
	21:39	20:51	13 20:10 (1)	19:39	18:24	16:18
11	04:47	05:36	19:56 (1)	06:32	07:27	07:27
	21:38	20:49	15 20:11 (1)	19:36	18:22	16:16
12	04:49	05:38	19:55 (1)	06:34	07:28	07:29
	21:37	20:47	16 20:11 (1)	19:34	18:20	16:14
13	04:50	05:40	19:54 (1)	06:35	07:30	07:31
	21:36	20:45	18 20:12 (1)	19:31	18:17	16:13
14	04:51	05:41	19:54 (1)	06:37	07:32	07:33
	21:35	20:43	18 20:12 (1)	19:29	18:15	16:11
15	04:52	05:43	19:55 (1)	06:39	07:34	07:35
	21:34	20:40	16 20:11 (1)	19:26	18:12	16:09
16	04:54	05:45	19:54 (1)	06:41	07:36	07:36
	21:33	20:38	14 20:08 (1)	19:24	18:10	16:08
17	04:55	05:47	19:54 (1)	06:43	07:38	07:38
	21:32	20:36	12 20:06 (1)	19:21	18:08	16:06
18	04:57	05:49	19:55 (1)	06:44	07:40	07:40
	21:30	20:34	9 20:04 (1)	19:19	18:05	16:05
19	04:58	05:50	19:55 (1)	06:46	07:42	07:42
	21:29	20:31	7 20:02 (1)	19:16	18:03	16:03
20	04:59	05:52	19:57 (1)	06:48	07:44	07:44
	21:28	20:29	3 20:00 (1)	19:14	18:01	16:02
21	05:01	05:54	06:50	07:46	07:46	08:25
	21:26	20:27	19:11	17:59	16:00	15:45
22	05:02	05:56	06:52	07:48	07:48	08:26
	21:25	20:25	19:09	17:56	15:59	15:46
23	05:04	05:58	19:30 (20)	06:53	07:49	07:49
	21:23	20:22	1 19:31 (20)	19:06	17:54	15:58
24	05:05	05:59	19:26 (20)	06:55	07:51	07:51
	21:22	20:20	9 19:35 (20)	19:04	17:52	15:57
25	05:07	06:01	19:24 (20)	06:57	06:53	07:53
	21:20	20:18	13 19:37 (20)	19:01	16:50	15:56
26	05:09	06:03	19:22 (20)	06:59	06:55	07:55
	21:19	20:15	15 19:37 (20)	18:59	16:47	15:54
27	05:10	06:05	19:22 (20)	07:01	06:57	07:56
	21:17	20:13	16 19:38 (20)	18:56	16:45	15:53
28	05:12	06:07	19:21 (20)	07:02	06:59	07:58
	21:15	20:11	17 19:38 (20)	18:54	16:43	15:52
29	05:14	06:08	19:20 (20)	07:04	07:01	08:00
	21:14	20:08	17 19:37 (20)	18:51	16:41	15:51
30	05:15	06:10	19:20 (20)	07:06	07:03	08:01
	21:12	20:06	17 19:37 (20)	18:49	16:39	15:50
31	05:17	06:12	19:21 (20)	07:05	07:05	08:28
	21:10	20:03	14 19:35 (20)	18:47	16:37	15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung		279	26			97
Red.Sonnenscheinwahrsch.		0.48	0.40			0.14
Reduktion Betriebsdauer		0.90	0.90			0.90
Reduktion Windrichtung		0.64	0.65			0.67
Gesamte Reduktion		0.28	0.24			0.08
Met.wahrsch.Beschattung		78	6			8

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

Berechnung: GBSchattenrezeptor: CZ - IO104

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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:28   07:57   06:59   06:43	15:54   16:46   17:43   19:42	06:56   06:40	06:43	4 19:12 (20)   05:33	04:42	04:38	05:19	06:14	19:07 (20)   07:08	07:07	08:03	
2	08:28   07:55   06:56   06:40	15:55   16:48   17:45   19:44	06:56   06:40	06:43	8 19:17 (20)   05:31	04:41	04:39	05:20	20:01	19:16 (20)   07:08	07:07	08:03	
3	08:28   07:54   06:54   06:38	15:57   16:50   17:47   19:46	06:54   06:38	06:38	11 19:19 (20)   05:28	04:38	04:40	05:22	06:16	19:03 (20)   07:12	07:11	08:06	
4	08:27   07:52   06:52   06:35	15:58   16:52   17:49   19:48	06:52   06:35	06:35	15 19:21 (20)   05:24	04:39	04:41	05:25	19:56	19:18 (20)   07:13	07:12	08:08	
5	08:27   07:50   06:49   06:33	15:59   16:54   17:51   19:50	06:49   06:33	06:33	16 19:22 (20)   05:21	04:38	04:41	05:25	19:49	19:01 (20)   07:19	07:18	08:14	
6	08:27   07:48   06:47   06:30	15:59   16:56   17:53   19:52	06:47   06:30	06:30	17 19:22 (20)   05:20	04:37	04:43	05:29	19:54	19:01 (20)   07:19	07:19	08:12	
7	08:26   07:46   06:44   06:28	16:02   16:58   17:55   19:54	06:44   06:28	06:28	17 19:22 (20)   05:20	04:37	04:43	05:29	19:46	19:17 (20)   07:23	07:23	08:14	
8	08:26   07:44   06:42   06:26	16:03   17:00   17:57   19:55	06:42   06:26	06:26	16 19:21 (20)   05:17	04:36	04:45	05:32	19:36	19:01 (20)   07:23	07:23	08:14	
9	08:25   07:42   06:40   06:23	16:05   17:02   17:58   19:57	06:40   06:23	06:23	15 19:20 (20)   05:15	04:35	04:46	05:34	19:36	19:02 (20)   07:25	07:25	08:16	
10	08:24   07:40   06:37   06:21	16:06   17:05   18:00   19:59	06:37   06:21	06:21	13 19:19 (20)   05:13	04:35	04:47	05:36	19:39	19:04 (20)   07:27	07:27	08:17	
11	08:24   07:38   06:35   06:18	16:08   17:07   18:02   20:01	06:35   06:18	06:18	9 19:16 (20)   05:11	04:35	04:49	05:38	19:36	19:08 (20)   07:28	07:28	08:18	
12	08:23   07:36   06:32   06:16	16:09   17:09   18:04   20:03	06:32   06:16	06:16	12 08:23   07:36   06:32   06:16	05:11	04:35	05:38	19:34	19:08 (20)   07:28	07:28	08:18	
13	08:22   07:34   06:30   06:13	16:11   17:11   18:06   20:05	06:30   06:13	06:13	13 08:22   07:34   06:30   06:13	05:09	04:34	05:40	19:34	19:07 (20)   07:28	07:28	08:18	
14	08:21   07:32   06:27   06:11	16:12   17:13   18:08   20:07	06:27   06:11	06:11	14 08:21   07:32   06:27   06:11	05:07	04:34	05:41	19:34	19:07 (20)   07:28	07:28	08:18	
15	08:20   07:30   06:25   06:09	16:14   17:15   18:10   20:09	06:25   06:09	06:09	15 08:20   07:30   06:25   06:09	05:06	04:34	05:43	19:34	19:07 (20)   07:28	07:28	08:18	
16	08:19   07:28   06:22   06:06	16:16   17:17   18:12   20:10	06:22   06:06	06:06	16 08:19   07:28   06:22   06:06	05:04	04:34	05:45	19:34	19:07 (20)   07:28	07:28	08:18	
17	08:18   07:26   06:20   06:04	16:18   17:19   18:14   20:12	06:20   06:04	06:04	17 08:18   07:26   06:20   06:04	05:02	04:33	05:47	19:34	19:07 (20)   07:28	07:28	08:18	
18	08:17   07:24   06:18   06:02	16:19   17:21   18:16   20:14	06:18   06:02	06:02	18 08:17   07:24   06:18   06:02	05:01	04:33	05:49	19:34	19:07 (20)   07:28	07:28	08:18	
19	08:16   07:22   06:15   05:59	16:21   17:23   18:18   20:16	06:15   05:59	05:59	19 08:16   07:22   06:15   05:59	04:59	04:33	05:50	19:34	19:07 (20)   07:28	07:28	08:18	
20	08:15   07:19   06:13   05:57	16:23   17:25   18:20   20:18	06:13   05:57	05:57	20 08:15   07:19   06:13   05:57	04:57	04:33	05:52	19:34	19:07 (20)   07:28	07:28	08:18	
21	08:14   07:17   06:10   05:55	16:25   17:27   18:21   20:20	06:10   05:55	05:55	21 08:14   07:17   06:10   05:55	04:56	04:34	05:54	19:34	19:07 (20)   07:28	07:28	08:18	
22	08:12   07:15   06:08   05:52	16:27   17:29   18:23   20:22	06:08   05:52	05:52	22 08:12   07:15   06:08   05:52	04:54	04:34	05:56	19:34	19:07 (20)   07:28	07:28	08:18	
23	08:11   07:13   06:05   05:50	16:29   17:31   18:25   20:24	06:05   05:50	05:50	23 08:11   07:13   06:05   05:50	04:53	04:34	05:58	19:34	19:07 (20)   07:28	07:28	08:18	
24	08:10   07:10   06:03   05:48	16:30   17:33   18:27   20:25	06:03   05:48	05:48	24 08:10   07:10   06:03   05:48	04:52	04:34	05:59	19:34	19:07 (20)   07:28	07:28	08:18	
25	08:08   07:08   06:00   05:46	16:32   17:35   18:29   20:27	06:00   05:46	05:46	25 08:08   07:08   06:00   05:46	04:50	04:35	05:57	19:34	19:07 (20)   07:28	07:28	08:18	
26	08:07   07:06   05:58   05:43	16:34   17:37   18:31   20:29	05:58   05:43	05:43	26 08:07   07:06   05:58   05:43	04:49	04:35	05:59	19:34	19:07 (20)   07:28	07:28	08:18	
27	08:05   07:03   05:55   05:41	16:36   17:39   18:33   20:31	05:55   05:41	05:41	27 08:05   07:03   05:55   05:41	04:48	04:36	05:10	19:34	19:07 (20)   07:28	07:28	08:18	
28	08:04   07:01   05:53   05:39	16:38   17:41   18:35   20:33	05:53   05:39	05:39	28 08:04   07:01   05:53   05:39	04:47	04:36	05:12	19:34	19:07 (20)   07:28	07:28	08:18	
29	08:02   07:00   05:50   05:37	16:40   17:43   18:37   20:35	05:50   05:37	05:37	29 08:02   07:00   05:50   05:37	04:45	04:37	05:14	19:34	19:07 (20)   07:28	07:28	08:18	
30	08:00   07:00   05:48   05:35	16:42   17:45   18:39   20:37	05:48   05:35	05:35	30 08:00   07:00   05:48   05:35	04:44	04:37	05:15	19:34	19:07 (20)   07:28	07:28	08:18	
31	07:59   07:00   05:46   05:33	16:44   17:47   18:41   20:39	05:46   05:33	05:33	31 07:59   07:00   05:46   05:33	04:43	04:37	05:17	19:34	19:07 (20)   07:28	07:28	08:18	
	Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	257	231
	astr.max.mögl.Beschattung				302	0.41			159	142			
	Red.Sonnenscheinwahrsch.				0.41				0.48	0.40			
	Reduktion Betriebsdauer				0.90				0.90	0.90			
	Reduktion Windrichtung				0.65				0.63	0.66			
	Gesamte Reduktion				0.24				0.28	0.24			
	Met.wahrsch.Beschattung				72				44	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 (SS:MM)	Schattenende (SS:MM)	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierte Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung: GBSchattenrezeptor: DA - IO105**  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember				
1	08:28	07:57	06:59	06:43	05:33	18:44 (3)	04:42	04:38	05:19	06:14	19:12 (20)	07:08	07:07	08:03		
2	15:54	16:46	17:43	19:42	20:39	19:37 (3)	21:20	21:44	21:08	20:01	19:30 (20)	18:46	16:35	15:50		
3	08:28	07:54	06:54	06:38	05:28	19:45 (1)	04:41	04:39	05:20	06:16	19:12 (20)	07:10	07:09	08:05		
4	08:27	07:52	06:52	06:35	05:26	19:55 (1)	21:31	21:44	21:07	19:59	17	19:29 (20)	18:44	16:33	15:49	
5	15:58	16:52	17:49	19:48	20:44	19:48 (1)	04:40	04:40	05:22	06:17	19:13 (20)	07:12	07:11	08:06		
6	08:27	07:50	06:49	06:33	05:24	19:52 (1)	21:32	21:44	21:05	19:56	15	19:28 (20)	18:41	16:31	15:48	
7	15:58	16:52	17:49	19:48	20:44	19:52 (1)	21:32	21:44	21:05	19:56	15	19:28 (20)	18:41	16:31	15:48	
8	08:26	07:48	06:47	06:30	05:22	19:24 (20)	05:22	04:38	04:42	05:27	06:23	12	19:25 (20)	18:39	16:29	15:47
9	15:58	16:52	17:49	19:48	20:44	19:24 (20)	05:22	04:38	04:42	05:27	06:23	12	19:25 (20)	18:39	16:29	15:47
10	08:24	07:40	06:37	06:21	05:14	19:28 (20)	05:51	04:37	04:43	05:29	06:25	4	19:20 (20)	18:34	16:25	15:46
11	15:58	16:54	17:51	19:50	20:46	19:15 (20)	05:17	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
12	08:27	07:48	06:47	06:30	05:22	19:24 (20)	05:18	04:37	04:44	05:31	06:26	8	19:22 (20)	18:36	16:27	15:47
13	15:58	16:54	17:51	19:50	20:46	19:24 (20)	05:18	04:37	04:44	05:31	06:26	8	19:22 (20)	18:36	16:27	15:47
14	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
15	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
16	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
17	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
18	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
19	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
20	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
21	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
22	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
23	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
24	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
25	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
26	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
27	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
28	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
29	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
30	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
31	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
32	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
33	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
34	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
35	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
36	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
37	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
38	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
39	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
40	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
41	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
42	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
43	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
44	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
45	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
46	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
47	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
48	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
49	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
50	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
51	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
52	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
53	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
54	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
55	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
56	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
57	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
58	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
59	15:58	16:54	17:51	19:50	20:46	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
60	08:26	07:44	06:42	06:26	05:18	19:14 (20)	05:15	04:36	04:45	05:32	06:28	10	19:22 (20)	18:36	16:27	15:47
61	15:58	16:54	17:51	19:50	20:46	19:14 (20)	0									

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DB - IO106  
**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  
342 326 396 565 523 523 733 981 1.012 1.213 924 351 7.888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:28	07:57	06:59	06:43	05:33	18:44 (1)	04:42	04:38	05:19	06:14	18:09 (20)	07:08	07:07	08:03
15:54	16:46	17:43	19:42	20:39	7	19:51 (1)	21:20	21:44	21:08	20:01	19:26 (20)	18:46	16:35	15:50
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	19:08 (20)	07:10	07:09	08:05	
15:55	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	17	19:25 (20)	18:44	16:33	15:49	
3	08:28	07:54	06:54	06:38	05:28	04:40	04:40	05:22	06:17	19:08 (20)	07:12	07:11	08:06	
15:57	16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:56	17	19:25 (20)	18:41	16:31	15:48	
4	08:27	07:52	06:52	06:35	19:17 (20)	05:26	04:39	04:40	05:24	06:19	19:08 (20)	07:13	07:13	08:08
15:58	16:52	17:49	19:48	4	19:21 (20)	20:44	21:33	21:43	21:03	19:54	17	19:25 (20)	18:39	16:29
5	08:27	07:50	06:49	06:33	19:15 (20)	05:24	04:39	04:41	05:25	06:21	19:08 (20)	07:15	07:15	08:09
15:59	16:54	17:51	19:50	8	19:23 (20)	20:46	21:34	21:43	21:01	19:51	14	19:22 (20)	18:36	16:27
6	08:27	07:48	06:47	06:30	19:14 (20)	05:22	04:38	04:42	05:27	06:23	19:08 (20)	07:17	07:17	08:10
16:00	16:56	17:53	19:52	12	19:24 (20)	20:48	21:35	21:42	20:59	19:49	12	19:20 (20)	18:24	16:25
7	08:26	07:46	06:44	06:28	19:12 (20)	05:20	04:37	04:43	05:29	06:25	19:10 (20)	07:19	07:19	08:12
16:02	16:58	17:55	19:54	14	19:26 (20)	20:50	21:36	21:41	20:57	19:46	8	19:18 (20)	18:32	16:23
8	08:26	07:44	06:42	06:26	19:11 (20)	05:18	04:37	04:44	05:31	06:26	19:12 (20)	07:21	07:21	08:13
16:03	17:00	17:57	19:55	17	19:28 (20)	20:51	21:37	21:41	20:55	19:44	4	19:16 (20)	18:29	16:21
9	08:25	07:42	06:40	06:23	19:10 (20)	05:17	04:36	04:45	05:32	06:22	19:08 (20)	07:23	07:23	08:14
16:05	17:02	17:59	19:57	17	19:27 (20)	20:53	21:38	21:40	20:53	19:41	18:27	16:19	15:45	
10	08:24	07:40	06:37	06:21	19:10 (20)	05:15	04:36	04:46	05:34	06:30	19:05	07:25	07:25	08:16
16:06	17:05	18:00	19:59	17	19:27 (20)	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45	
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16:08	17:07	18:02	20:01	16	19:26 (20)	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:44	
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16:09	17:09	18:04	20:03	16	19:26 (20)	20:58	21:41	21:37	20:47	9	19:59 (1)	19:34	16:14	15:44
13	08:22	07:34	06:30	06:13	19:11 (20)	05:09	04:34	04:50	05:40	06:30	19:49 (1)	06:35	07:30	07:31
16:11	17:11	18:06	20:05	14	19:25 (20)	21:00	21:41	21:26	20:45	12	20:01 (1)	19:31	18:17	16:13
14	08:21	07:32	06:27	06:11	19:12 (20)	05:07	04:34	04:51	05:41	06:32	19:48 (1)	06:37	07:32	07:33
16:12	17:13	18:08	20:07	10	19:22 (20)	21:02	21:42	21:35	20:43	14	20:02 (1)	19:29	18:15	16:11
15	08:20	07:30	06:25	06:09	19:15 (20)	05:06	04:34	04:52	05:43	06:34	19:47 (1)	06:39	07:34	07:35
16:14	17:15	18:10	20:09	4	19:19 (20)	21:04	21:43	21:34	20:40	16	20:03 (1)	19:26	18:12	16:09
16	08:19	07:28	06:22	06:06	19:14 (20)	05:04	04:34	04:54	05:45	06:35	19:46 (1)	06:41	07:36	07:36
16:16	17:17	18:12	20:10	17	19:25 (20)	21:05	21:43	21:33	20:38	17	20:03 (1)	19:24	18:10	16:08
17	08:18	07:26	06:20	06:04	19:13 (20)	05:02	04:33	04:55	05:47	06:36	19:45 (1)	06:43	07:38	07:38
16:18	17:19	18:14	20:12	17	19:27 (20)	21:07	21:44	21:32	20:36	18	20:03 (1)	19:21	18:08	16:06
18	08:17	07:24	06:18	06:02	19:11 (20)	05:01	04:33	04:57	05:49	06:38	19:45 (1)	06:44	07:40	07:40
16:19	17:21	18:16	20:14	18	19:25 (20)	21:09	21:44	21:30	20:34	18	20:03 (1)	19:19	18:05	16:05
19	08:16	07:22	06:15	05:59	19:44 (1)	04:59	04:33	04:58	05:50	06:40	19:44 (1)	06:46	07:42	07:42
16:21	17:23	18:18	20:16	4	19:48 (1)	21:10	21:44	21:29	20:31	18	20:02 (1)	19:16	18:03	16:03
20	08:15	07:19	06:13	05:57	19:42 (1)	04:57	04:33	04:59	05:52	06:42	19:45 (1)	06:48	07:44	07:44
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21	08:14	07:17	06:10	05:55	19:41 (1)	04:56	04:34	05:01	05:54	06:44	19:45 (1)	06:50	07:46	07:46
16:25	17:27	18:21	20:20	11	19:52 (1)	21:14	21:45	21:26	20:27	13	19:58 (1)	19:11	17:59	16:00
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16:27	17:29	18:23	20:22	12	19:52 (1)	21:15	21:45	21:25	20:25	10	19:55 (1)	19:09	17:56	15:59
23	08:11	07:13	06:05	05:50	19:39 (1)	04:53	04:34	05:04	05:58	06:48	19:46 (1)	06:53	07:49	07:49
16:29	17:31	18:25	20:24	15	19:54 (1)	21:17	21:45	21:23	20:22	7	19:53 (1)	19:06	17:54	15:58
24	08:10	07:10	06:03	05:48	19:39 (1)	04:52	04:34	05:05	05:59	06:50	19:48 (1)	06:55	07:51	07:51
16:30	17:33	18:27	20:25	17	19:56 (1)	21:18	21:46	21:22	20:20	3	19:51 (1)	19:04	17:52	15:57
25	08:08	07:08	06:00	05:46	19:39 (1)	04:50	04:35	05:07	06:01	06:57	19:45 (1)	06:57	07:53	07:53
16:32	17:35	18:29	20:27	18	19:57 (1)	21:20	21:46	21:20	20:18	19:01	16:50	15:56	15:48	
26	08:07	07:06	05:58	05:43	19:39 (1)	04:49	04:35	05:09	06:03	06:59	19:46 (1)	06:59	07:55	07:55
16:34	17:37	18:31	20:29	18	19:57 (1)	21:21	21:46	21:19	20:15	18:59	16:47	15:54	15:48	
27	08:05	07:03	05:55	05:41	19:39 (1)	04:48	04:36	05:10	06:05	07:01	19:45 (1)	06:57	07:56	07:56
16:36	17:39	18:33	20:31	17	19:56 (1)	21:23	21:45	21:17	20:13	18:56	16:45	15:53	15:49	
28	08:04	07:01	05:53	05:39	19:40 (1)	04:47	04:36	05:12	06:07	07:02	19:17 (20)	07:02	07:58	07:58
16:38	17:41	18:35	20:33	15	19:55 (1)	21:24	21:45	21:15	20:11	4	19:21 (20)	18:54	18:43	15:52
29	08:02	07:00	05:50	05:37	19:40 (1)	04:45	04:37	05:14	06:08	07:03	19:13 (20)	07:04	07:51	07:51
16:40	17:43	18:37	20:35	14	19:54 (1)	21:26	21:45	21:14	20:08	10	19:23 (20)	18:51	18:41	15:51
30	08:00	07:00	05:50	05:35	19:42 (1)	04:44	04:37	05:15	06:10	07:06	19:11 (20)	07:09	07:53	07:53
16:42	17:45	18:39	20:37	11	19:53 (1)	21:27	21:45	21:12	20:06	14	19:25 (20)	18:49	18:39	15:50
31	07:59	06:45	05:30	05:15	19:43 (1)	04:43	04:37	05:17	06:12	07:08	19:10 (20)	07:11	07:55	07:55
16:44	17:47	18:41	20:39	12	19:54 (1)	21:28	21:46	21:10	20:03	15	19:25 (20)	18:37	18:27	15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	213	328	257	211	
atrz,max.mögl.Beschattung				309	7					106				
Red.Sonnenscheinwahrsch.				0.41	0.51				0.48					
Reduktion Betriebsdauer				0.90	0.90				0.90					
Reduktion Windrichtung				0.65	0.63				0.64					
Gesamte Reduktion				0.24	0.29				0.28					
Met.wahrsch.Beschattung				74	2				59					

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM)	Schattenanfang	(WEA mit erstem Schatten)	Zeitpunkt (SS:MM)	Schattenende	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

Berechnung: GBSchattenrezeptor: DC - IO107  
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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:28	07:57	06:59	06:43	05:33	18:44 (3)	04:42	04:38	05:19	06:14	19:12 (20)	07:08	07:07	08:03
2	15:54	16:46	17:43	19:42	20:30	11 19:59 (1)	21:20	21:44	21:08	20:01	17 19:30 (20)	18:46	16:35	15:50
3	08:28	07:54	06:54	06:38	05:28	19:46 (1)	04:41	04:39	05:20	06:16	19:12 (20)	07:10	07:09	08:05
4	15:57	16:50	17:47	19:46	20:42	7 19:53 (1)	21:31	21:44	21:07	19:59	17 19:29 (20)	18:44	16:33	15:49
5	08:27	07:50	06:49	06:33	05:24	04:40	04:40	05:22	06:17	06:17	19:12 (20)	07:12	07:11	08:06
6	15:58	16:52	17:49	19:48	20:44	21:32	21:44	21:05	19:56	16 19:28 (20)	18:41	16:31	15:48	08:08
7	15:00	16:56	17:53	19:52	20:46	04:39	04:40	05:24	06:19	06:19	19:13 (20)	07:13	07:13	08:08
8	08:26	07:48	06:47	06:30	05:22	21:33	21:43	21:03	19:54	12 19:25 (20)	18:39	16:29	15:47	08:10
9	15:03	16:50	17:57	19:55	20:49	21:25	21:42	20:59	19:49	06:21	19:13 (20)	07:15	07:15	08:09
10	08:25	07:46	06:44	06:28	05:20	21:34	21:43	21:01	19:51	9 19:22 (20)	18:36	16:27	15:47	08:12
11	15:59	16:54	17:51	19:50	20:46	04:38	04:42	05:27	06:23	5 19:15 (20)	07:17	07:17	08:10	08:10
12	08:26	07:48	06:47	06:30	05:22	21:35	21:42	20:59	19:49	06:25	19:20 (20)	18:24	16:25	15:46
13	15:02	16:58	17:55	19:54	20:50	04:37	04:43	05:29	06:25	06:25	19:17 (20)	07:19	07:19	08:12
14	08:26	07:49	06:48	06:31	05:23	21:36	21:41	20:57	19:46	18:32	16:23	15:46	08:13	08:13
15	15:03	16:50	17:57	19:55	20:49	04:37	04:41	05:26	06:26	06:26	07:21	07:21	08:13	08:13
16	08:25	07:46	06:44	06:28	05:20	21:37	21:41	20:55	19:44	18:29	16:21	15:45	08:14	08:14
17	15:05	17:02	17:58	19:57	20:53	04:36	04:45	05:32	06:28	07:23	07:23	08:14	08:14	08:14
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19	15:06	17:05	18:00	19:59	20:55	04:36	04:46	05:34	06:30	07:25	07:25	08:16	08:16	08:16
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21	15:08	17:07	18:02	20:01	20:57	04:35	04:47	05:36	6 19:54 (1)	06:32	07:27	08:17	08:17	08:17
22	08:23	07:36	06:32	06:16	05:11	21:40	21:38	20:49	8 20:02 (1)	19:36	18:22	16:16	15:44	08:18
23	15:09	17:09	18:04	20:03	20:58	04:35	04:49	05:38	12 20:03 (1)	19:34	07:28	07:29	08:18	08:18
24	08:22	07:34	06:30	06:13	05:09	21:41	21:37	20:47	19:50 (1)	06:35	18:20	16:14	15:44	08:19
25	15:11	17:11	18:06	20:05	20:51	04:34	04:50	05:40	15 20:05 (1)	19:31	07:30	07:31	08:19	08:19
26	08:19	07:28	06:22	06:06	05:04	21:43	21:36	20:45	18 20:06 (1)	19:24	18:17	16:13	15:44	08:20
27	15:16	17:17	18:12	20:10	21:05	04:34	04:51	05:41	17 19:50 (1)	06:37	07:32	07:33	08:20	08:20
28	08:18	07:26	06:20	06:04	05:02	21:42	21:35	20:43	15 20:05 (1)	19:29	18:15	16:11	15:44	08:21
29	15:20	17:20	18:15	20:14	21:09	04:34	04:52	05:43	17 20:04 (1)	19:19	07:34	07:35	08:21	08:21
30	08:17	07:24	06:18	06:02	05:01	21:43	21:34	20:40	16 20:06 (1)	19:16	18:12	16:09	15:44	08:22
31	15:18	17:19	18:14	20:12	21:07	04:34	04:54	05:45	19:48 (1)	06:41	07:36	07:36	08:22	08:22
32	08:17	07:24	06:18	06:02	05:01	21:43	21:33	20:38	18 20:06 (1)	19:24	18:10	16:08	15:44	08:23
33	15:19	17:21	18:16	20:14	21:09	04:33	04:55	05:47	19:48 (1)	06:43	07:38	07:38	08:23	08:23
34	08:16	07:22	06:15	05:59	04:59	21:44	21:32	20:36	18 20:06 (1)	19:21	18:08	16:06	15:44	08:24
35	15:21	17:23	18:18	20:16	21:10	04:33	04:57	05:49	19:48 (1)	06:44	07:40	07:40	08:23	08:23
36	08:15	07:19	06:13	05:57	04:57	21:44	21:30	20:34	16 20:04 (1)	19:19	18:05	16:05	15:44	08:24
37	15:23	17:25	18:20	20:18	21:12	04:33	04:58	05:50	19:48 (1)	06:46	07:42	07:42	08:24	08:24
38	08:14	07:17	06:10	05:55	04:56	21:44	21:29	20:31	14 20:02 (1)	19:16	18:03	16:03	15:45	08:25
39	15:25	17:27	18:21	20:20	21:14	04:33	04:59	05:52	19:48 (1)	06:48	07:44	07:44	08:25	08:25
40	08:12	07:15	06:08	05:52	04:54	21:45	21:28	20:29	12 20:00 (1)	19:14	18:01	16:02	15:45	08:26
41	15:27	17:29	18:23	20:22	21:15	04:34	05:01	05:54	19:49 (1)	06:50	07:46	07:46	08:25	08:25
42	08:11	07:13	06:05	05:50	04:53	21:45	21:26	20:27	9 19:58 (1)	19:11	17:59	16:00	15:45	08:26
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47	15:32	17:35	18:29	20:27	21:20	04:33	05:05	05:59	06:55	07:51	07:51	08:27	08:27	08:27
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53	15:38	17:41	18:35	20:33	21:24	04:36	05:10	06:05	6 19:27 (20)	07:01	06:57	07:56	08:28	08:28
54	08:02	07:00	05:57	05:42	04:45	21:45	21:17	20:13	8 19:27 (20)	18:56	16:45	15:53	15:49	08:29
55	15:40	17:43	18:37	20:35	21:26	04:36	05:12	06:07	19:17 (20)	07:02	06:59	07:58	08:28	08:28
56	08:00	07:00	05:55	05:40	04:45	21:45	21:15	20:11	12 19:29 (20)	18:54	16:43	15:52	15:50	08:30
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58	08:00	07:00	05:55	05:40	04:45	21:45	21:14	20:08	14 19:29 (20)	18:51	16:41	15:51	15:51	08:31
59	15:44	17:47	18:41	20:39	21:30	04:37	05:15	06:10	10 19:14 (20)	07:06	07:03	08:01	08:28	08:28
60	08:00	07:00	05:55	05:40	04:45	21:45	21:12	20:06	16 19:30 (20)	18:49	16:39	15:50	15:52	08:32
61	15:46	17:49	18:43	20:41	21:32	04:37	05:17	06:12	19:13 (20)	07:05	07:05	08:00	08:28	08:28
62	08:00	07:00	05:55	05:40	04:45	21:46	21:10	20:03	17 19:30 (20)	18:37	16:37	15:48	15:53	08:33
63	15:48	17:51	18:45	20:43	21:34	04:37	05:18	06:13	8 19:30 (20)	18:38	16:38	15:49	15:54	08:34
64	08:00	07:00	05:55	05:40	04:45	21:46	21:10	20:03	17 19:30 (20)	18:37	16:37	15:48	15:53	08:35
65	15:50	17:53	18:47	20:45	21:36	04:37	05:19	06:14	9 19:31 (20)	18:39	16:39	15:50	15:55	08:36
66	08:00	07:00	05:55	05:40	04:45	21:46	21:10	20:03	17 19:30 (20)	18:37	16:37	15:48	15:53	08:37
67	15:52	17:55	18:49	20:47	21:38	04:37	05:20	06:15	10 19:32 (20)	18:41	16:41	15:52	15:57	08:38
68	08:00	07:00	05:55											

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DD - IO108  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember				
1	08:28	07:57	06:59	06:43	05:33	19:45 (1)	04:42	04:38	05:19	06:14	19:10 (20)	07:08	07:07	08:03		
1	15:54	16:46	17:43	19:42	20:39	19:49 (5)	21:29	21:44	21:08	20:51	19:26 (20)	18:46	16:35	15:50		
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	19:08 (20)	07:10	07:09	08:05	08:05		
3	08:28	07:54	06:54	06:38	05:28	04:40	04:40	05:22	06:17	19:08 (20)	07:12	07:11	08:06	08:06		
4	08:27	07:52	06:52	06:35	19:17 (20)	05:26	21:32	21:44	21:05	19:56	19:25 (20)	18:41	16:31	15:48		
4	15:58	16:52	17:49	19:48	4	19:21 (20)	20:44	21:33	21:43	21:03	19:54	19:25 (20)	18:39	16:29	15:47	
5	08:27	07:50	06:49	06:33	19:15 (20)	05:24	04:39	04:41	05:25	06:21	19:08 (20)	07:15	07:15	08:09		
5	15:59	16:54	17:51	19:50	8	19:23 (20)	20:46	21:34	21:43	21:01	19:51	19:22 (20)	18:36	16:27	15:47	
6	08:27	07:48	06:47	06:30	19:12 (20)	05:22	04:38	04:42	05:27	06:23	19:08 (20)	07:17	07:17	08:10		
6	15:00	16:56	17:53	19:52	12	19:24 (20)	20:48	21:35	21:42	20:59	19:49	19:20 (20)	18:34	16:25	15:46	
7	08:26	07:46	06:44	06:28	19:12 (20)	05:20	04:37	04:43	05:29	06:25	19:10 (20)	07:19	07:19	08:12		
7	16:02	16:58	17:55	19:54	14	19:26 (20)	20:50	21:36	21:41	20:57	19:46	19:18 (20)	18:32	16:23	15:46	
8	08:26	07:44	06:42	06:26	19:11 (20)	05:18	04:37	04:44	05:31	06:26	19:12 (20)	07:21	07:21	08:13		
8	16:03	17:00	17:57	19:55	17	19:28 (20)	20:51	21:37	21:41	20:55	19:44	19:16 (20)	18:29	16:21	15:45	
9	08:25	07:42	06:40	06:23	19:10 (20)	05:17	04:36	04:45	05:32	06:28	19:12 (20)	07:23	07:23	08:14		
9	16:05	17:02	17:58	19:57	17	19:27 (20)	20:53	21:38	21:40	20:53	19:41	18:27	16:19	15:45		
10	08:24	07:40	06:37	06:21	19:10 (20)	05:15	04:35	04:46	05:34	06:30	19:08 (20)	07:25	07:25	08:16		
10	16:06	17:05	18:00	19:59	17	19:27 (20)	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45		
11	08:24	07:38	06:35	06:18	19:10 (20)	05:13	04:35	04:47	05:36	06:32	19:07 (20)	07:27	07:27	08:17		
11	16:08	17:07	18:02	20:01	16	19:26 (20)	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:44		
12	08:23	07:36	06:32	06:16	19:11 (20)	05:11	04:35	04:49	05:38	06:34	19:08 (20)	07:28	07:28	08:18		
13	08:22	07:34	06:30	06:13	19:12 (20)	05:09	04:34	04:50	05:40	06:35	19:49 (1)	06:35	07:30	07:31	08:19	
13	16:11	17:11	18:06	20:05	12	19:24 (20)	21:00	21:41	21:36	20:45	11	20:00 (1)	19:31	18:17	16:13	15:44
14	08:21	07:32	06:27	06:11	19:13 (20)	05:07	04:34	04:51	05:41	06:36	19:49 (1)	06:37	07:32	07:33	08:20	
14	16:12	17:13	18:08	20:07	9	19:22 (20)	21:02	21:42	21:35	20:43	13	20:01 (1)	19:29	18:15	16:11	15:44
15	08:20	07:30	06:25	06:09	19:14 (20)	05:06	04:34	04:52	05:43	06:38	19:47 (1)	06:39	07:34	07:35	08:21	
16	16:14	17:15	18:10	20:09	11	19:04	21:43	21:43	21:34	20:40	15	20:02 (1)	19:26	18:12	16:09	15:44
16	08:19	07:28	06:22	06:06	19:14 (20)	05:04	04:34	04:54	05:45	06:40	19:46 (1)	06:41	07:36	07:36	08:22	
16	16:16	17:17	18:12	20:10	21:05	21:43	21:33	20:38	16	20:02 (1)	19:24	18:10	16:08	15:44		
17	08:18	07:26	06:20	06:04	19:15 (20)	05:02	04:33	04:55	05:47	06:42	19:45 (1)	06:43	07:38	07:38	08:23	
17	16:18	17:19	18:14	20:12	21:07	21:44	21:32	20:36	18	20:03 (1)	19:21	18:08	16:06	15:44		
18	08:17	07:24	06:18	06:02	19:16 (20)	05:01	04:33	04:57	05:49	06:44	19:45 (1)	06:44	07:40	07:40	08:23	
18	16:19	17:21	18:16	20:14	21:09	21:44	21:30	20:34	18	20:03 (1)	19:19	18:05	16:05	15:44		
19	08:16	07:22	06:15	05:59	19:14 (20)	04:59	04:33	04:58	05:50	06:45	19:44 (1)	06:46	07:42	07:42	08:24	
19	16:21	17:23	18:18	20:16	4	19:48 (1)	21:10	21:44	21:29	20:31	18	20:02 (1)	19:16	18:03	16:03	15:45
20	08:15	07:19	06:13	05:57	19:14 (20)	04:57	04:33	04:59	05:52	06:47	19:45 (1)	06:48	07:44	07:44	08:25	
20	16:23	17:25	18:20	20:18	8	19:50 (1)	21:12	21:45	21:28	20:29	15	20:00 (1)	19:14	18:01	16:02	15:45
21	08:14	07:17	06:10	05:55	19:14 (20)	04:56	04:34	05:01	05:54	06:49	19:45 (1)	06:50	07:46	07:46	08:25	
21	16:25	17:27	18:21	20:20	11	19:52 (1)	21:14	21:45	21:26	20:27	13	19:58 (1)	19:11	17:59	16:00	15:45
22	08:12	07:15	06:08	05:52	19:15 (20)	04:54	04:34	05:02	05:56	06:51	19:45 (1)	06:52	07:48	07:48	08:26	
22	16:27	17:29	18:23	20:22	13	19:52 (1)	21:15	21:45	21:25	20:25	10	19:55 (1)	19:09	17:56	15:59	15:46
23	08:11	07:13	06:05	05:50	19:19 (1)	04:53	04:34	05:04	05:58	06:53	19:46 (1)	06:53	07:49	07:49	08:26	
23	16:29	17:31	18:25	20:24	15	19:54 (1)	21:17	21:45	21:23	20:22	7	19:53 (1)	19:06	17:54	15:58	15:46
24	08:10	07:10	06:03	05:48	19:19 (1)	04:52	04:34	05:05	05:59	06:54	19:48 (1)	06:55	07:51	07:51	08:27	
24	16:30	17:33	18:27	20:25	17	19:56 (1)	21:18	21:46	21:22	20:20	3	19:51 (1)	19:04	17:52	15:57	15:47
25	08:08	07:08	06:00	05:46	19:19 (1)	04:50	04:35	05:07	06:01	06:57	19:45 (1)	06:57	07:53	07:53	08:27	
25	16:32	17:35	18:29	20:27	17	19:56 (1)	21:20	21:46	21:20	20:18	1	19:01	16:50	15:56	15:48	
26	08:07	07:06	05:58	05:43	19:19 (1)	04:49	04:35	05:09	06:03	06:59	19:46 (1)	06:59	07:55	07:55	08:28	
26	16:34	17:37	18:31	20:29	17	19:56 (1)	21:21	21:46	21:19	20:15	1	18:59	16:47	15:54	15:48	
27	08:05	07:03	05:55	05:41	19:19 (1)	04:48	04:36	05:10	06:05	07:01	19:45 (1)	06:57	07:56	07:56	08:28	
27	16:36	17:39	18:33	20:31	19:56 (1)	21:23	21:45	21:17	20:13	18:56	19:13 (20)	07:04	07:01	06:00	06:28	
28	08:04	07:01	05:53	05:39	19:14 (20)	04:47	04:36	05:12	06:07	07:02	19:46 (1)	06:59	07:58	07:58	08:28	
28	16:38	17:41	18:35	20:33	15	19:55 (1)	21:24	21:45	21:15	20:11	18:54	18:43	15:52	15:50		
29	08:02	07:00	05:57	05:43	19:15 (1)	04:45	04:37	05:14	06:08	07:04	19:13 (20)	07:04	07:01	06:00	06:28	
30	08:00	07:00	05:55	05:41	19:15 (1)	04:45	04:37	05:14	06:08	07:04	19:13 (20)	07:04	07:01	06:00	06:28	
30	16:42	17:45	18:39	20:37	10	19:52 (1)	21:27	21:45	21:12	20:06	12	19:24 (20)	18:49	16:39	15:50	15:52
31	07:59	06:45	05:31	05:17	19:16 (20)	04:43	04:37	05:17	06:12	07:08	19:11 (20)	07:08	07:05	06:00	06:28	
31	16:44	17:47	18:40	20:38	11	19:53 (1)	21:28	21:45	21:10	20:03	14	19:25 (20)	18:37	16:27	15:53	
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	305	228	257	231			
astr.max.mögl.Beschattung				397	4				199	105						
Red.Sonnenscheinwahrsch.				0.41	0.51				0.48	0.40						
Reduktion Betriebsdauer				0.90	0.90				0.90	0.90						
Reduktion Windrichtung				0.65	0.63				0.64	0.66						
Gesamte Reduktion				0.24	0.29				0.28	0.24						
Met.wahrsch.Beschattung				71	1				55	25						

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung: GBSchattenrezeptor: DE - IO109**  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember												
1	08:28	07:57	06:59	06:43	05:33	18:41 (1)	04:42	04:38	05:19	06:14	18:07 (20)	07:08	07:07	08:03										
1	15:54	16:46	17:43	19:42	20:39	18:53 (1)	19:33 (1)	21:29	21:44	21:09	19:25 (20)	18:46	16:35	15:50										
2	08:28	07:55	06:56	06:40	05:31	19:44 (1)	04:41	04:39	05:20	06:16	19:06 (20)	07:10	07:09	08:05										
3	08:28	07:54	06:54	06:38	05:28	6	19:50 (1)	21:31	21:44	21:07	19:59	18	19:24 (20)	18:44	16:33	15:49								
3	15:57	16:50	17:47	19:46	20:42			21:32	21:44	21:05	19:56	18	19:24 (20)	18:41	16:31	15:48								
4	08:27	07:52	06:52	06:35	19:14 (20)	05:26		04:39	04:40	05:24	06:19	18	19:06 (20)	07:13	07:13	08:08								
4	15:58	16:52	17:49	19:48	7	19:21 (20)	20:44	21:33	21:43	21:03	19:54	18	19:24 (20)	18:39	16:29	15:47								
5	08:27	07:50	06:49	06:33	19:12 (20)	05:24		21:35	21:42	20:59	19:49					16:25	15:46							
5	15:59	16:54	17:51	19:50	11	19:23 (20)	20:46	21:34	21:43	21:01	19:51	17	19:22 (20)	18:37	16:27	15:47								
6	08:27	07:48	06:47	06:30	19:14 (20)	05:22		04:38	04:42	05:27	06:23					16:25	15:46							
6	15:00	16:56	17:53	19:52	14	19:24 (20)	20:48	21:35	21:42	20:59	19:49	14	19:20 (20)	18:34	16:25	15:46								
7	08:26	07:46	06:44	06:28	19:09 (20)	05:20		04:37	04:43	05:29	06:25					16:25	15:46							
7	16:02	16:58	17:55	19:54	17	19:26 (20)	20:50	21:36	21:41	20:57	19:46	11	19:18 (20)	18:32	16:23	15:46								
8	08:26	07:44	06:42	06:26	19:09 (20)	05:18		04:37	04:44	05:31	06:26					16:25	15:46							
8	16:03	17:00	17:57	19:55	18	19:27 (20)	20:51	21:37	21:41	20:55	19:44	7	19:16 (20)	18:29	16:21	15:45								
9	08:25	07:42	06:40	06:23	19:08 (20)	05:17		04:36	04:45	05:32	06:23					16:25	15:46							
9	16:05	17:02	17:59	19:57	18	19:26 (20)	20:53	21:38	21:40	20:53	19:41					16:25	15:46							
10	08:24	07:40	06:37	06:21	19:08 (20)	05:15		04:36	04:46	05:34	06:30					16:25	15:46							
10	16:06	17:05	18:00	19:59	18	19:26 (20)	20:55	21:39	21:39	20:51	19:39					16:24	15:45							
11	08:24	07:38	06:35	06:18	19:08 (20)	05:13		04:35	04:47	05:36	06:32					16:24	15:45							
11	16:08	17:07	18:02	20:01	17	19:25 (20)	20:57	21:40	21:38	20:49	9	20:00 (1)	19:36	18:22	16:16	15:44								
12	08:23	07:36	06:32	06:16	19:08 (20)	05:11		04:35	04:49	05:38	12	20:01 (1)	19:34	18:20	16:14	15:44								
13	08:22	07:34	06:30	06:13	19:09 (20)	05:09		04:34	04:50	05:40	15	19:47 (1)	19:35	18:22	16:14	15:44								
14	16:11	17:11	18:06	20:05	14	19:23 (20)	21:00	21:41	21:36	20:45	15	20:02 (1)	19:31	18:17	16:13	15:44								
14	08:21	07:32	06:27	06:11	19:10 (20)	05:07		04:34	04:51	05:41	15	19:47 (1)	19:37	18:24	16:14	15:44								
15	16:12	17:13	18:08	20:07	11	19:21 (20)	21:02	21:42	21:35	20:43	16	20:03 (1)	19:29	18:15	16:11	15:44								
15	08:20	07:30	06:25	06:09	19:12 (20)	05:06		04:34	04:52	05:43	19	19:46 (1)	19:39	18:24	16:14	15:44								
15	16:14	17:15	18:10	20:09	7	19:19 (20)	21:04	21:43	21:34	20:40	18	20:04 (1)	19:36	18:12	16:09	15:44								
16	08:19	07:28	06:22	06:06	19:11 (20)	05:04		04:34	04:54	05:45	19	19:45 (1)	19:41	18:26	16:14	15:44								
16	16:16	17:17	18:12	20:10	21:05			21:43	21:33	20:38	18	20:03 (1)	19:24	18:10	16:08	15:44								
17	08:18	07:26	06:20	06:04	19:10 (20)	05:02		04:33	04:55	05:47	19	19:45 (1)	19:43	18:28	16:14	15:44								
17	16:18	17:19	18:14	20:12	21:07			21:44	21:32	20:36	19	20:04 (1)	19:21	18:08	16:06	15:44								
18	08:17	07:24	06:18	06:02	19:10 (20)	05:01		04:33	04:57	05:49	19	19:45 (1)	19:44	18:29	16:14	15:44								
18	16:19	17:21	18:16	20:14	21:09			21:44	21:30	20:34	19	20:04 (1)	19:19	18:05	16:05	15:44								
19	08:16	07:22	06:15	05:59	19:45 (1)	04:59		04:33	04:58	05:50	19	19:44 (1)	19:46	18:31	16:14	15:44								
19	16:21	17:23	18:18	20:16	3	19:48 (1)	21:10	21:44	21:29	20:31	18	20:02 (1)	19:16	18:03	16:03	15:45								
20	08:15	07:19	06:13	05:57	19:43 (1)	04:57		04:33	04:59	05:52	19	19:45 (1)	19:48	18:33	16:14	15:44								
20	16:23	17:25	18:20	20:18	7	19:50 (1)	21:12	21:45	21:28	20:29	15	20:00 (1)	19:14	18:01	16:02	15:45								
21	08:14	07:17	06:10	05:55	19:41 (1)	04:56		04:34	05:01	05:54	19	19:45 (1)	19:50	18:35	16:14	15:44								
21	16:25	17:27	18:21	20:20	11	19:52 (1)	21:14	21:45	21:26	20:27	13	19:58 (1)	19:11	18:04	16:04	15:45								
22	08:12	07:15	06:08	05:52	19:40 (1)	04:54		04:34	05:02	05:56	19	19:45 (1)	19:52	18:30	16:14	15:44								
22	16:27	17:29	18:23	20:22	12	19:52 (1)	21:15	21:45	21:25	20:25	10	19:55 (1)	19:09	17:56	15:59	15:46								
23	08:11	07:13	06:05	05:50	19:39 (1)	04:53		04:34	05:04	05:58	19	19:47 (1)	19:53	18:32	16:14	15:44								
23	16:29	17:31	18:25	20:24	15	19:54 (1)	21:17	21:45	21:23	20:22	6	19:53 (1)	19:06	17:54	15:58	15:46								
24	08:10	07:10	06:03	05:48	19:39 (1)	04:52		04:34	05:05	05:59	19	19:49 (1)	19:55	18:34	16:14	15:44								
24	16:30	17:33	18:27	20:25	17	19:56 (1)	21:18	21:46	21:22	20:20	2	19:51 (1)	19:04	17:52	15:57	15:47								
25	08:08	07:08	06:00	05:46	19:38 (1)	04:50		04:35	05:07	06:01	19	19:48 (1)	19:54	18:33	16:14	15:44								
25	16:32	17:35	18:29	20:27	19	19:57 (1)	21:20	21:46	21:20	20:18	1	19:01		18:00	16:00	15:46								
26	08:07	07:06	05:58	05:43	19:38 (1)	04:49		04:35	05:09	06:03	19	19:49 (1)	19:55	18:34	16:14	15:44								
26	16:34	17:37	18:31	20:29	19	19:57 (1)	21:21	21:46	21:19	20:15	1	18:59		18:00	16:00	15:46								
27	08:05	07:03	05:55	05:41	19:38 (1)	04:48		04:36	05:10	06:05	19	19:49 (1)	19:55	18:34	16:14	15:44								
27	16:36	17:39	18:33	20:31	19	19:57 (1)	21:22	21:45	21:17	20:13	1	18:56		18:00	16:00	15:46								
28	08:04	07:01	05:53	05:39	19:39 (1)	04:47		04:36	05:12	06:07	19	19:24 (20)	19:02	18:00	16:00	15:46								
28	16:38	17:41	18:35	20:33	17	19:56 (1)	21:24	21:45	21:15	20:11	7	19:21 (20)	18:54	18:43	15:52	15:50								
29	08:02	07:00	05:52	05:38	19:39 (1)	04:45		04:37	05:14	06:08	19	19:21 (20)	19:04	18:00	16:00	15:46								
29	16:40	17:43	18:37	20:35	16	19:55 (1)	21:26	21:45	21:14	20:08	11	19:22 (20)	18:51	18:41	15:51	15:51								
30	08:00	07:00	05:50	05:35	19:40 (1)	04:44		04:37	05:15	06:10	19	19:09 (20)	18:06	18:00	16:00	15:46								
30	16:42	17:45	18:39	20:37	14	19:54 (1)	21:27	21:45	21:12	20:06	14	19:23 (20)	18:49	18:39	15:50	15:52								
31	07:59	06:45	05:31	05:16	19:39 (1)	04:43		04:37	05:17	06:12	19	19:08 (20)	17:59	18:00	16:00	15:46								
31	16:44	17:47	18:41	20:39	13	19:53 (1)	21:28	21:45	21:10	20:03	16	19:24 (20)	18:37	18:37	15:53	15:53								
Sonnenscheinstunden													248	272	367	421	496	512	514	461	383	328	257	231
schr.max.mögl.Beschattung																	337	18			238	121		
Red.Sonnenscheinwahrsch.																	0.41	0.51			0.48	0.40		
Reduktion Betriebsdauer																	0.90	0.90			0.90	0.90		
Reduktion Windrichtung																	0.65	0.63			0.64	0.66		
Gesamte Reduktion																	0.24	0.29			0.28	0.24		
Met.wahrsch.Beschattung																	81	5			66	29		

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)		Schattende (WEA mit letztem Schatten)	
	Sonnenuntergang (SS:MM)			Zeitpunkt (SS:MM)	Schattende				



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung: GBSchattenrezeptor: DF - IO110**  
**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  
 342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember					
1	08:28	07:57	06:59	06:43	05:33	19:42 (1)	04:42	04:38	05:19	06:14	19:10 (20)	07:08	07:07	08:03			
2	15:54	16:46	17:43	19:42	20:30	16	19:58 (1)	21:29	21:44	21:09	20:01	19	19:28 (20)	18:46	16:35	15:50	
3	08:28	07:54	06:54	06:38	05:28	13	19:56 (1)	21:31	21:44	21:07	19:59	18	19:27 (20)	18:44	16:33	15:49	
4	15:57	16:50	17:47	19:46	20:42	10	19:55 (1)	21:32	21:44	21:05	19:56	17	19:27 (20)	18:41	16:31	15:48	
5	08:27	07:52	06:52	06:35	05:26	3	19:51 (1)	21:33	21:43	21:03	19:54	15	19:25 (20)	18:39	16:29	15:47	
6	15:58	16:52	17:49	19:48	20:44	19:28 (20)	05:24	04:39	04:41	05:25	06:21	19:10 (20)	07:15	07:15	08:09		
7	08:27	07:50	06:49	06:33	05:24	3	19:23 (20)	20:46	21:34	21:43	21:01	19:51	12	19:22 (20)	18:37	16:27	15:47
8	15:59	16:54	17:51	19:50	20:46	19:16 (20)	05:22	04:38	04:42	05:27	06:23	19:12 (20)	07:17	07:17	08:10		
9	08:26	07:48	06:47	06:30	05:20	8	19:24 (20)	20:48	21:35	21:42	20:59	19:49	8	19:20 (20)	18:34	16:25	15:46
10	15:57	16:50	17:47	19:46	20:42	10	19:55 (1)	21:32	21:44	21:05	19:56	17	19:27 (20)	18:41	16:31	15:48	
11	08:27	07:52	06:52	06:35	05:26	3	19:51 (1)	21:33	21:43	21:03	19:54	15	19:25 (20)	18:39	16:29	15:47	
12	15:58	16:52	17:49	19:48	20:44	19:28 (20)	05:24	04:39	04:41	05:25	06:21	19:10 (20)	07:15	07:15	08:09		
13	08:27	07:50	06:49	06:33	05:24	3	19:23 (20)	20:46	21:34	21:43	21:01	19:51	12	19:22 (20)	18:37	16:27	15:47
14	15:59	16:54	17:51	19:50	20:46	19:16 (20)	05:22	04:38	04:42	05:27	06:23	19:12 (20)	07:17	07:17	08:10		
15	08:26	07:48	06:47	06:30	05:20	8	19:24 (20)	20:48	21:35	21:42	20:59	19:49	8	19:20 (20)	18:34	16:25	15:46
16	15:57	16:50	17:47	19:46	20:42	10	19:55 (1)	21:32	21:44	21:05	19:56	17	19:27 (20)	18:41	16:31	15:48	
17	08:27	07:52	06:52	06:35	05:26	3	19:51 (1)	21:33	21:43	21:03	19:54	15	19:25 (20)	18:39	16:29	15:47	
18	15:58	16:52	17:49	19:48	20:44	19:28 (20)	05:24	04:39	04:41	05:25	06:21	19:10 (20)	07:15	07:15	08:09		
19	08:27	07:50	06:49	06:33	05:24	3	19:23 (20)	20:46	21:34	21:43	21:01	19:51	12	19:22 (20)	18:37	16:27	15:47
20	15:59	16:54	17:51	19:50	20:46	19:16 (20)	05:22	04:38	04:42	05:27	06:23	19:12 (20)	07:17	07:17	08:10		
21	08:26	07:48	06:47	06:30	05:20	8	19:24 (20)	20:48	21:35	21:42	20:59	19:49	8	19:20 (20)	18:34	16:25	15:46
22	15:57	16:50	17:47	19:46	20:42	10	19:55 (1)	21:32	21:44	21:05	19:56	17	19:27 (20)	18:41	16:31	15:48	
23	08:27	07:52	06:52	06:35	05:26	3	19:51 (1)	21:33	21:43	21:03	19:54	15	19:25 (20)	18:39	16:29	15:47	
24	15:58	16:52	17:49	19:48	20:44	19:28 (20)	05:24	04:39	04:41	05:25	06:21	19:10 (20)	07:15	07:15	08:09		
25	08:27	07:50	06:49	06:33	05:24	3	19:23 (20)	20:46	21:34	21:43	21:01	19:51	12	19:22 (20)	18:37	16:27	15:47
26	15:59	16:54	17:51	19:50	20:46	19:16 (20)	05:22	04:38	04:42	05:27	06:23	19:12 (20)	07:17	07:17	08:10		
27	08:26	07:48	06:47	06:30	05:20	8	19:24 (20)	20:48	21:35	21:42	20:59	19:49	8	19:20 (20)	18:34	16:25	15:46
28	15:57	16:50	17:47	19:46	20:42	10	19:55 (1)	21:32	21:44	21:05	19:56	17	19:27 (20)	18:41	16:31	15:48	
29	08:27	07:52	06:52	06:35	05:26	3	19:51 (1)	21:33	21:43	21:03	19:54	15	19:25 (20)	18:39	16:29	15:47	
30	15:58	16:52	17:49	19:48	20:44	19:28 (20)	05:24	04:39	04:41	05:25	06:21	19:10 (20)	07:15	07:15	08:09		
31	08:27	07:50	06:49	06:33	05:24	3	19:23 (20)	20:46	21:34	21:43	21:01	19:51	12	19:22 (20)	18:37	16:27	15:47
32	15:59	16:54	17:51	19:50	20:46	19:16 (20)	05:22	04:38	04:42	05:27	06:23	19:12 (20)	07:17	07:17	08:10		
33	08:26	07:48	06:47	06:30	05:20	8	19:24 (20)	20:48	21:35	21:42	20:59	19:49	8	19:20 (20)	18:34	16:25	15:46
34	15:57	16:50	17:47	19:46	20:42	10	19:55 (1)	21:32	21:44	21:05	19:56	17	19:27 (20)	18:41	16:31	15:48	
35	08:27	07:52	06:52	06:35	05:26	3	19:51 (1)	21:33	21:43	21:03	19:54	15	19:25 (20)	18:39	16:29	15:47	
36	15:58	16:52	17:49	19:48	20:44	19:28 (20)	05:24	04:39	04:41	05:25	06:21	19:10 (20)	07:15	07:15	08:09		
37	08:27	07:50	06:49	06:33	05:24	3	19:23 (20)	20:46	21:34	21:43	21:01	19:51	12	19:22 (20)	18:37	16:27	15:47
38	15:59	16:54	17:51	19:50	20:46	19:16 (20)	05:22	04:38	04:42	05:27	06:23	19:12 (20)	07:17	07:17	08:10		
39	08:26	07:48	06:47	06:30	05:20	8	19:24 (20)	20:48	21:35	21:42	20:59	19:49	8	19:20 (20)	18:34	16:25	15:46
40	15:57	16:50	17:47	19:46	20:42	10	19:55 (1)	21:32	21:44	21:05	19:56	17	19:27 (20)	18:41	16:31	15:48	
41	08:27	07:52	06:52	06:35	05:26	3	19:51 (1)	21:33	21:43	21:03	19:54	15	19:25 (20)	18:39	16:29	15:47	
42	15:58	16:52	17:49	19:48	20:44	19:28 (20)	05:24	04:39	04:41	05:25	06:21	19:10 (20)	07:15	07:15	08:09		
43	08:27	07:50	06:49	06:33	05:24	3	19:23 (20)	20:46	21:34	21:43	21:01	19:51	12	19:22 (20)	18:37	16:27	15:47
44	15:59	16:54	17:51	19:50	20:46	19:16 (20)	05:22	04:38	04:42	05:27	06:23	19:12 (20)	07:17	07:17	08:10		
45	08:26	07:48	06:47	06:30	05:20	8	19:24 (20)	20:48	21:35	21:42	20:59	19:49	8	19:20 (20)	18:34	16:25	15:46
46	15:57	16:50	17:47	19:46	20:42	10	19:55 (1)	21:32	21:44	21:05	19:56	17	19:27 (20)	18:41	16:31	15:48	
47	08:27	07:52	06:52	06:35	05:26	3	19:51 (1)	21:33	21:43	21:03	19:54	15	19:25 (20)	18:39	16:29	15:47	
48	15:58	16:52	17:49	19:48	20:44	19:28 (20)	05:24	04:39	04:41	05:25	06:21	19:10 (20)	07:15	07:15	08:09		
49	08:27	07:50	06:49	06:33	05:24	3	19:23 (20)	20:46	21:34	21:43	21:01	19:51	12	19:22 (20)	18:37	16:27	15:47
50	15:59	16:54	17:51	19:50	20:46	19:16 (20)	05:22	04:38	04:42	05:27	06:23	19:12 (20)	07:17	07:17	08:10		
51	08:26	07:48	06:47	06:30	05:20	8	19:24 (20)	20:48	21:35	21:42	20:59	19:49	8	19:20 (20)	18:34	16:25	15:46
52	15:57	16:50	17:47	19:46	20:42	10	19:55 (1)	21:32	21:44	21:05	19:56	17	19:27 (20)	18:41	16:31	15:48	
53	08:27	07:52	06:52	06:35	05:26	3	19:51 (1)	21:33	21:43	21:03	19:54	15	19:25 (20)	18:39	16:29	15:47	
54	15:58	16:52	17:49	19:48	20:44	19:28 (20)	05:24	04:39	04:41	05:25	06:21	19:10 (20)	07:15	07:15	08:09		
55	08:27	07:50	06:49	06:33	05:24	3	19:23 (20)	20:46	21:34	21:43	21:01	19:51	12	19:22 (20)	18:37	16:27	15:47
56	15:59	16:54	17:51	19:50	20:46	19:16 (20)	05:22	04:38	04:42	05:27	06:23	19:12 (20)	07:17	07:17	08:10		
57	08:26	07:48	06:47	06:30	05:20	8	19:24 (20)	20:48	21:35	21:42	20:59	19:49	8	19:20 (20)	18:34	16:25	15:46
58	15:57	16:50	17:47	19:46	20:42	10	19:55 (1)	21:32	21:44	21:05	19:56	17	19:27 (20)	18:41	16:31	15:48	
59	08:27	07:52	06:52	06:35	05:26	3	19:51 (1)	21:33	21:43	21:03	19:54	15	19:25 (20)	18:39	16:29	15:47	
60	15:58	16:52	17:49	19:48	20:44	19:28 (20)	05:24	04:39	04:41	05:25	06:21	19:10 (20)	07:15	07:15	08:09		
61	08:27	07:50	06:49	06:33	05:24	3	19:23 (20)	20:46	21:34	21:43	21:01	19:51	12	19:22 (20)	18:37	16:27	15:47
62	15:59	16:54	17:51	19:50	20:46	19:16 (20)	05:22	04:38	04:42	05:27	06:23	19:12 (20)	07:17	07:17	08:10		
63	08:26	07:48	06:47	06:30	05:20	8	19:24 (20)	20:48	21:35	21:42	20:59	19:49	8	19:20 (20)	18:34	16:25	15:46
64	15:57	16:50	17:47	19:46	20:42	10	19:55 (1)	21:32	21:44	21:05	19:56	17	19:27 (20)	18:41	16:31	15:48	
65	08:27	07:52	06:52	06:35	05:26	3	19:51 (1)	21:33	21:43	21:03	19:54	15	19:25 (20)	18:39	16:29	15:47	
66	15:58	16:52	17:49	19:48	20:44	19:28 (20)	05:24	04:39	04:41	05:25	06:21	19:10 (20)	07:15	07:15	08:09		
67	08:27	07:50	06:49	06:33	05:24	3	19:23 (20)	20:46	21:34	21:43	21:01	19:51	12	19:22 (20)	18:37	16:27	15:47
68																	

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: DG - IO111**  
**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  
 342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: DH - IO112**  
**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  
342 326 396 565 523 523 733 981 1.012 1.213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:28 15:54	07:57 16:46	06:59 17:43	06:43 19:42	05:33 20:39	18:47 (3) 20:06 (1)	04:42 21:20	04:38 21:44	05:19 21:08	06:14 20:01	19:21 (20) 19:33 (20)	07:08 18:46	07:07 16:35	08:03 15:50
2	08:28 15:55	07:55 16:48	06:56 17:45	06:40 19:44	05:31 20:40	19:48 (1) 20:04 (1)	04:41 21:31	04:39 21:07	05:20 21:07	06:16 20:59	19:21 (20) 19:30 (20)	07:10 18:44	07:09 16:33	08:05 15:49
3	08:28 15:57	07:54 16:50	06:54 17:47	06:38 19:46	05:30 20:42	19:48 (1) 20:03 (1)	04:40 21:32	04:40 21:44	05:22 21:05	06:17 20:56	19:24 (20) 19:28 (20)	07:12 18:41	07:11 16:31	08:06 15:48
4	08:27 15:58	07:52 16:52	06:52 17:49	06:35 19:48	05:26 20:44	19:49 (1) 20:02 (1)	04:39 21:33	04:40 21:43	05:24 21:03	06:19 20:54	19:21 (20) 19:30 (20)	07:13 18:43	07:13 16:29	08:08 15:47
5	08:27 15:59	07:50 16:54	06:49 17:51	06:33 19:50	05:24 20:46	19:50 (1) 20:01 (1)	04:39 21:34	04:41 21:43	05:25 21:01	06:21 20:51	19:21 (20) 19:30 (20)	07:15 18:43	07:15 16:27	08:09 15:47
6	08:27 16:00	07:48 16:56	06:47 17:53	06:30 19:52	05:22 20:48	19:52 (1) 19:59 (1)	04:38 21:35	04:42 21:42	05:27 20:59	06:23 20:49	19:21 (20) 19:30 (20)	07:17 18:43	07:17 16:25	08:10 15:46
7	08:26 16:02	07:46 16:56	06:44 17:55	06:28 19:54	05:20 20:50	19:59 (1) 20:00 (1)	04:37 21:41	04:43 21:41	05:29 20:57	06:25 20:59	20:00 (1) 20:09 (1)	07:19 18:43	07:19 16:23	08:12 15:46
8	08:26 16:03	07:44 17:00	06:42 17:57	06:26 19:55	05:18 20:51	19:59 (1) 20:00 (1)	04:37 21:41	04:44 21:41	05:31 20:55	06:26 20:54	20:09 (1) 20:11 (1)	07:21 18:43	07:21 16:21	08:13 15:45
9	08:25 16:05	07:42 17:02	06:40 17:59	06:23 19:57	05:17 20:53	19:26 (20) 19:30 (20)	04:36 21:38	04:45 21:40	05:32 20:53	06:28 20:54	19:28 (1) 20:12 (1)	07:23 18:43	07:23 16:19	08:14 15:45
10	08:24 16:06	07:40 17:05	06:37 18:00	06:21 19:59	05:15 20:55	19:22 (20) 19:32 (20)	04:35 21:39	04:46 21:39	05:34 20:51	06:29 20:51	19:28 (1) 20:12 (1)	07:25 18:43	07:25 16:18	08:15 15:45
11	08:24 16:08	07:38 17:07	06:35 18:02	06:18 20:01	05:13 20:57	19:21 (20) 19:32 (20)	04:35 21:40	04:47 21:38	05:36 20:49	06:32 20:49	19:28 (1) 20:13 (1)	07:27 18:43	07:27 16:16	08:17 15:44
12	08:23 16:09	07:36 17:09	06:32 18:04	06:16 20:03	05:11 20:58	19:20 (20) 19:35 (20)	04:35 21:41	04:49 21:37	05:38 20:47	06:34 20:47	19:28 (1) 20:12 (1)	07:28 18:43	07:28 16:14	08:18 15:44
13	08:22 16:11	07:34 17:11	06:30 18:06	06:13 20:05	05:09 21:00	19:20 (20) 19:37 (20)	04:34 21:41	04:50 21:36	05:40 20:45	06:35 20:45	19:25 (1) 20:13 (1)	07:30 18:43	07:31 16:13	08:19 15:44
14	08:21 16:12	07:32 17:13	06:27 18:08	06:11 20:07	05:07 21:02	19:19 (20) 19:36 (20)	04:34 21:42	04:51 21:35	05:41 20:43	06:37 20:43	19:25 (1) 20:12 (1)	07:32 18:43	07:33 16:11	08:20 15:44
15	08:20 16:14	07:30 17:15	06:25 18:10	06:09 20:09	05:06 21:04	19:20 (20) 19:38 (20)	04:34 21:43	04:52 21:34	05:43 20:40	06:38 20:40	19:25 (1) 20:11 (1)	07:34 18:43	07:35 16:09	08:21 15:44
16	08:19 16:15	07:28 17:17	06:22 18:12	06:06 20:10	05:04 21:05	19:19 (20) 19:36 (20)	04:34 21:43	04:54 21:33	05:45 20:38	06:39 20:38	19:25 (1) 20:08 (1)	07:36 18:43	07:36 16:08	08:22 15:44
17	08:18 16:16	07:26 17:19	06:20 18:14	06:04 20:12	05:02 21:07	19:19 (20) 19:34 (20)	04:33 21:44	04:55 21:32	05:47 20:36	06:40 20:36	19:25 (1) 20:06 (1)	07:38 18:43	07:38 16:06	08:23 15:44
18	08:17 16:18	07:24 17:21	06:18 18:16	06:02 20:14	05:01 21:09	19:20 (20) 19:34 (20)	04:33 21:44	04:57 21:30	05:49 20:34	06:41 20:34	19:26 (1) 20:04 (1)	07:40 18:43	07:40 16:05	08:23 15:44
19	08:16 16:21	07:22 17:23	06:15 18:18	05:59 20:16	04:59 21:10	19:21 (20) 19:32 (20)	04:33 21:44	04:58 21:29	05:50 20:31	06:42 20:31	19:27 (1) 20:02 (1)	07:42 18:43	07:42 16:03	08:24 15:45
20	08:15 16:23	07:19 17:25	06:13 19:20	05:57 20:18	04:57 21:12	19:23 (20) 19:30 (20)	04:33 21:45	04:59 21:28	05:52 20:29	06:43 20:29	19:28 (1) 20:00 (1)	07:44 18:43	07:44 16:02	08:25 15:45
21	08:14 16:25	07:17 17:27	06:10 19:23	05:55 20:22	04:56 21:14	19:20 (20) 19:32 (20)	04:34 21:45	05:01 21:26	05:54 20:27	06:50 20:27	20:00 (1) 19:11	07:46 18:43	07:46 16:00	08:25 15:45
22	08:12 16:27	07:15 17:29	06:08 19:23	05:52 20:22	04:54 21:15	19:20 (20) 19:32 (20)	04:34 21:45	05:02 21:25	05:56 20:25	06:52 20:25	19:27 (20) 19:34 (20)	07:48 18:43	07:48 16:00	08:26 15:46
23	08:11 16:29	07:13 17:31	06:05 19:25	05:50 20:24	04:53 21:17	19:23 (20) 19:34 (20)	04:34 21:45	05:04 21:23	05:58 20:22	06:53 20:22	19:27 (20) 19:34 (20)	07:49 18:43	07:49 16:00	08:26 15:46
24	08:10 16:30	07:10 17:33	06:03 19:27	05:48 20:25	04:52 21:18	19:24 (20) 19:35 (20)	04:34 21:46	05:05 21:22	05:59 20:20	06:55 20:20	19:28 (20) 19:36 (20)	07:51 18:43	07:51 16:00	08:27 15:47
25	08:08 16:32	07:08 17:35	06:00 19:29	05:46 20:27	04:50 21:20	19:25 (20) 19:36 (20)	04:35 21:46	05:07 21:20	06:01 20:18	06:57 20:18	19:23 (20) 19:30 (20)	07:53 18:43	07:53 16:00	08:27 15:48
26	08:07 16:34	07:06 17:37	05:58 19:31	05:43 20:29	04:49 21:21	19:26 (20) 20:00 (1)	04:35 21:46	05:09 21:19	06:03 20:15	06:59 20:15	19:22 (20) 19:37 (20)	07:55 18:43	07:55 16:00	08:28 15:48
27	08:05 16:36	07:03 17:39	05:55 19:33	05:41 20:31	04:48 21:22	19:27 (20) 20:02 (1)	04:36 21:45	05:10 21:17	06:05 20:13	06:59 20:13	19:21 (20) 19:38 (20)	07:57 18:43	07:57 16:00	08:28 15:49
28	08:04 16:38	07:01 17:41	05:53 19:35	05:39 20:33	04:47 21:24	19:28 (20) 20:04 (1)	04:36 21:45	05:12 21:15	06:07 20:11	06:59 20:11	19:21 (20) 19:38 (20)	07:58 18:43	07:58 16:00	08:28 15:50
29	08:02 16:40	06:59 17:43	05:57 19:37	05:37 20:35	04:45 21:26	19:29 (20) 20:05 (1)	04:37 21:45	05:14 21:14	06:08 20:08	06:59 20:08	19:20 (20) 19:37 (20)	07:59 18:43	07:59 16:00	08:28 15:51
30	08:00 16:42	06:48 17:38	05:55 19:37	05:35 20:37	04:44 21:27	19:30 (20) 20:05 (1)	04:37 21:45	05:15 21:12	06:10 20:06	06:59 20:06	19:20 (20) 19:37 (20)	08:01 18:43	08:01 16:00	08:28 15:52
31	07:59 16:44	06:45 17:40	05:45 19:40	05:31 21:28	04:43 21:28	19:31 (20) 20:06 (1)	04:37 21:45	05:17 21:10	06:12 20:03	06:59 20:03	19:20 (20) 19:35 (20)	08:02 18:43	08:02 16:00	08:28 15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	305	383	328	257	231	
astr.max.mögl.Beschattung				347	80						35			
Red.Sonnenscheinwahrsch.				0.41	0.51				0.48		0.40			
Reduktion Betriebsdauer				0.90	0.90				0.90		0.90			
Reduktion Windrichtung				0.64	0.64				0.64		0.65			
Gesamte Reduktion				0.24	0.28				0.28		0.23			
Met.wahrsch.Beschattung				59	23				85		6			

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)	Schattende (WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBSchattenrezeptor: DI - IO113  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:37 (20)   04:42
	15:54	16:46	17:43	19:42	20:39	13   19:50 (20)   21:29
2	08:28	07:55	06:56	06:40	05:31	19:39 (20)   04:41
	15:55	16:48	17:45	19:44	20:40	9   19:48 (20)   21:31
3	08:28	07:54	06:54	06:38	05:28	20:09 (1)   04:40
	15:57	16:50	17:47	19:46	20:42	3   20:12 (1)   21:32
4	08:27	07:52	06:52	06:35	05:26	20:07 (1)   04:40
	15:58	16:52	17:49	19:48	20:44	7   20:14 (1)   21:33
5	08:27	07:50	06:49	06:33	05:24	20:06 (1)   04:39
	15:59	16:54	17:51	19:50	20:46	9   20:15 (1)   21:34
6	08:27	07:48	06:47	06:30	05:22	20:05 (1)   04:38
	16:00	16:56	17:53	19:52	20:48	12   20:17 (1)   21:35
7	08:26	07:46	06:44	06:28	05:20	20:04 (1)   04:37
	16:02	16:58	17:55	19:54	20:50	14   20:18 (1)   21:36
8	08:26	07:44	06:42	06:26	05:18	20:03 (1)   04:37
	16:03	17:00	17:57	19:55	20:51	17   20:20 (1)   21:37
9	08:25	07:42	06:40	06:23	05:17	20:04 (1)   04:36
	16:05	17:02	17:59	19:57	20:53	18   20:22 (1)   21:38
10	08:24	07:40	06:37	06:21	05:15	20:03 (1)   04:36
	16:06	17:05	18:00	19:59	20:55	19   20:22 (1)   21:39
11	08:24	07:38	06:35	06:18	05:13	20:03 (1)   04:35
	16:08	17:07	18:02	20:01	20:57	19   20:22 (1)   21:40
12	08:23	07:36	06:32	06:16	05:11	20:04 (1)   04:35
	16:09	17:09	18:04	20:03	20:58	19   20:23 (1)   21:41
13	08:22	07:34	06:30	06:14	05:09	20:03 (1)   04:34
	16:11	17:11	18:06	20:05	21:00	19   20:22 (1)   21:41
14	08:21	07:32	06:27	06:11	05:07	20:03 (1)   04:34
	16:13	17:13	18:08	20:07	21:02	18   20:21 (1)   21:42
15	08:20	07:30	06:25	06:09	05:06	20:04 (1)   04:34
	16:14	17:15	18:10	20:09	21:04	17   20:21 (1)   21:43
16	08:19	07:28	06:22	06:06	05:04	20:05 (1)   04:34
	16:16	17:17	18:12	20:10	21:05	15   20:20 (1)   21:43
17	08:18	07:26	06:20	06:04	05:02	20:06 (1)   04:33
	16:18	17:19	18:14	20:12	21:07	14   20:20 (1)   21:44
18	08:17	07:24	06:18	06:02	05:01	20:06 (1)   04:33
	16:19	17:21	18:16	20:14	21:09	12   20:18 (1)   21:44
19	08:16	07:22	06:15	05:59	19:42 (20)   04:59	20:08 (1)   04:33
	16:21	17:23	18:18	20:16	6   19:48 (20)   21:10	10   20:18 (1)   21:44
20	08:15	07:19	06:13	05:57	19:39 (20)   04:57	20:10 (1)   04:34
	16:23	17:25	18:20	20:18	11   19:50 (20)   21:12	5   20:15 (1)   21:45
21	08:14	07:17	06:10	05:55	19:38 (20)   04:56	20:14 (1)   04:34
	16:25	17:27	18:21	20:20	14   19:52 (20)   21:14	21:45
22	08:12	07:15	06:08	17:53 (18)   05:52	19:36 (20)   04:55	20:15 (1)   04:34
	16:27	17:29	18:23	3   17:56 (18)   20:22	16   19:52 (20)   21:15	21:45
23	08:11	07:13	06:05	17:52 (18)   05:50	19:35 (20)   04:53	20:16 (1)   04:34
	16:29	17:31	18:25	7   17:59 (18)   20:24	18   19:53 (20)   21:17	21:45
24	08:10	07:10	06:03	17:51 (18)   05:48	19:35 (20)   04:52	20:17 (1)   04:34
	16:30	17:33	18:27	9   18:00 (18)   20:25	19   19:54 (20)   21:18	21:46
25	08:08	07:08	06:00	17:51 (18)   05:46	19:35 (20)   04:50	20:18 (1)   04:35
	16:32	17:35	18:29	11   18:02 (18)   20:27	19   19:54 (20)   21:20	21:46
26	08:07	07:06	05:58	17:50 (18)   05:43	19:35 (20)   04:49	20:19 (1)   04:35
	16:34	17:37	18:31	14   18:04 (18)   20:29	19   19:54 (20)   21:21	21:46
27	08:05	07:03	05:55	17:51 (18)   05:41	19:35 (20)   04:48	20:20 (1)   04:36
	16:36	17:39	18:33	13   18:04 (18)   20:31	19   19:54 (20)   21:23	21:45
28	08:04	07:01	05:53	17:51 (18)   05:39	19:35 (20)   04:47	20:21 (1)   04:36
	16:38	17:41	18:35	11   18:02 (18)   20:33	18   19:53 (20)   21:24	21:45
29	08:02	06:50	05:50	18:52 (18)   05:37	19:36 (20)   04:45	20:22 (1)   04:37
	16:40	19:37	9   19:01 (18)   20:35	16   19:52 (20)   21:26	21:45	
30	08:00	06:48	05:48	05:35	19:36 (20)   04:44	20:23 (1)   04:37
	16:42	19:38	20:37	15   19:51 (20)   21:27	21:45	
31	07:59	06:45	05:45	05:35	04:43	21:45
	16:44	19:40	21:28	496	512	
Sonnenscheinstunden	248	272	367	421		
astr.max.mögl.Beschattung			77	190	269	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.63	0.63	
Gesamte Reduktion			0.19	0.23	0.29	
Met.wahrsch.Beschattung			15	45	78	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DI - IO113

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:14 (1)   06:14	07:08	07:07	08:03
	21:44	21:09	19 20:33 (1)   20:01	18:46	16:35	15:50
2	04:39	05:20	20:13 (1)   06:16	07:10	07:09	08:05
	21:44	21:07	20 20:33 (1)   19:59	18:44	16:33	15:49
3	04:40	05:22	20:13 (1)   06:17	07:12	07:11	08:06
	21:44	21:05	20 20:33 (1)   19:56	18:41	16:31	15:48
4	04:40	05:24	20:13 (1)   06:19	07:14	07:13	08:08
	21:43	21:03	18 20:31 (1)   19:54	18:39	16:29	15:47
5	04:41	05:25	20:14 (1)   06:21	07:15	07:15	08:09
	21:43	21:01	16 20:30 (1)   19:51	18:37	16:27	15:47
6	04:42	05:27	20:14 (1)   06:23	07:17	07:17	08:10
	21:42	20:59	14 20:28 (1)   19:49	18:34	16:25	15:46
7	04:43	05:29	20:14 (1)   06:25	07:19	07:19	08:12
	21:41	20:57	12 20:26 (1)   19:46	18:32	16:23	15:46
8	04:44	05:31	20:16 (1)   06:26	07:21	07:21	08:13
	21:41	20:55	8 20:24 (1)   19:44	18:29	16:21	15:45
9	04:45	05:32	20:17 (1)   06:28	07:23	07:23	08:14
	21:40	20:53	6 20:23 (1)   19:41	18:27	16:19	15:45
10	04:46	05:34	19:49 (20)   06:30	07:25	07:25	08:16
	21:39	20:51	6 20:20 (1)   19:39	18:24	16:18	15:45
11	04:48	05:36	19:47 (20)   06:32	07:27	07:27	08:17
	21:38	20:49	10 19:57 (20)   19:36	18:22	16:16	15:44
12	04:49	05:38	19:45 (20)   06:34	07:28	07:29	08:18
	21:37	20:47	14 19:59 (20)   19:34	18:20	16:14	15:44
13	04:50	05:40	19:44 (20)   06:35	07:30	07:31	08:19
	21:36	20:45	15 19:59 (20)   19:31	18:17	16:13	15:44
14	04:51	05:41	19:43 (20)   06:37	18:43 (18)   07:32	07:33	08:20
	21:35	20:43	17 20:00 (20)   19:29	8 18:51 (18)   18:15	16:11	15:44
15	04:52	05:43	19:43 (20)   06:39	18:41 (18)   07:34	07:35	08:21
	21:34	20:40	18 20:01 (20)   19:26	11 18:52 (18)   18:12	16:09	15:44
16	04:54	05:45	19:41 (20)   06:41	18:40 (18)   07:36	07:36	08:22
	21:33	20:38	19 20:00 (20)   19:24	13 18:53 (18)   18:10	16:08	15:44
17	04:55	05:47	19:41 (20)   06:43	18:38 (18)   07:38	07:38	08:23
	21:32	20:36	19 20:00 (20)   19:21	14 18:52 (18)   18:08	16:06	15:44
18	04:57	05:49	19:41 (20)   06:44	18:38 (18)   07:40	07:40	08:23
	21:30	20:34	19 20:00 (20)   19:19	12 18:50 (18)   18:05	16:05	15:44
19	04:58	05:50	19:41 (20)   06:46	18:38 (18)   07:42	07:42	08:24
	21:29	20:31	18 19:59 (20)   19:16	10 18:48 (18)   18:03	16:03	15:45
20	04:59	05:52	19:41 (20)   06:48	18:39 (18)   07:44	07:44	08:25
	21:28	20:29	18 19:59 (20)   19:14	7 18:46 (18)   18:01	16:02	15:45
21	05:01	05:54	19:42 (20)   06:50	18:39 (18)   07:46	07:46	08:25
	21:26	20:27	16 19:58 (20)   19:11	3 18:42 (18)   17:59	16:01	15:45
22	05:02	05:56	19:42 (20)   06:52	07:48	07:48	08:26
	21:25	20:25	13 19:55 (20)   19:09	17:56	15:59	15:46
23	05:04	05:58	19:43 (20)   06:53	07:49	07:49	08:26
	21:23	20:22	10 19:53 (20)   19:06	17:54	15:58	15:46
24	05:05	20:19 (1)   05:59	19:46 (20)   06:55	07:51	07:51	08:27
	21:22	7 20:26 (1)   20:20	5 19:51 (20)   19:04	17:52	15:57	15:47
25	05:07	20:18 (1)   06:01	06:57	06:53	07:53	08:27
	21:20	11 20:29 (1)   20:18	19:01	16:50	15:56	15:48
26	05:09	20:16 (1)   06:03	06:59	06:55	07:55	08:28
	21:19	13 20:29 (1)   20:15	18:59	16:47	15:54	15:48
27	05:10	20:16 (1)   06:05	07:01	06:57	07:56	08:28
	21:17	15 20:31 (1)   20:13	18:56	16:45	15:53	15:49
28	05:12	20:15 (1)   06:07	07:02	06:59	07:58	08:28
	21:15	16 20:31 (1)   20:11	18:54	16:43	15:52	15:50
29	05:14	20:14 (1)   06:08	07:04	07:01	08:00	08:28
	21:14	18 20:32 (1)   20:08	18:51	16:41	15:51	15:51
30	05:15	20:14 (1)   06:10	07:06	07:03	08:01	08:28
	21:12	18 20:32 (1)   20:06	18:49	16:39	15:51	15:52
31	05:17	20:14 (1)   06:12	07:05	07:05	08:02	08:28
	21:10	19 20:33 (1)   20:03	16:37	16:37	15:53	15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	117	350	78			
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40			
Reduktion Betriebsdauer	0.90	0.90	0.90			
Reduktion Windrichtung	0.63	0.63	0.68			
Gesamte Reduktion	0.25	0.28	0.25			
Met.wahrsch.Beschattung	30	97	19			

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBSchattenrezeptor: DJ - IO114  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:37 (20)   04:42
	15:54	16:46	17:43	19:42	20:39	8 19:45 (20)   21:29
2	08:28	07:55	06:56	06:40	05:31	20:07 (1)   04:41
	15:55	16:48	17:45	19:44	20:40	4 20:11 (1)   21:31
3	08:28	07:54	06:54	06:38	05:28	20:05 (1)   04:40
	15:57	16:50	17:47	19:46	20:42	7 20:12 (1)   21:32
4	08:27	07:52	06:52	06:35	05:26	20:04 (1)   04:40
	15:58	16:52	17:49	19:48	20:44	10 20:14 (1)   21:33
5	08:27	07:50	06:49	06:33	05:24	20:03 (1)   04:39
	15:59	16:54	17:51	19:50	20:46	12 20:15 (1)   21:34
6	08:27	07:48	06:47	06:30	05:22	20:02 (1)   04:38
	16:00	16:56	17:53	19:52	20:48	15 20:17 (1)   21:35
7	08:26	07:46	06:44	06:28	05:20	20:01 (1)   04:37
	16:02	16:58	17:55	19:54	20:50	17 20:18 (1)   21:36
8	08:26	07:44	06:42	06:26	05:18	20:01 (1)   04:37
	16:03	17:00	17:57	19:55	20:51	19 20:20 (1)   21:37
9	08:25	07:42	06:40	06:23	05:17	20:01 (1)   04:36
	16:05	17:02	17:59	19:57	20:53	20 20:21 (1)   21:38
10	08:24	07:40	06:37	06:21	05:15	20:01 (1)   04:36
	16:06	17:05	18:00	19:59	20:55	20 20:21 (1)   21:39
11	08:24	07:38	06:35	06:18	05:13	20:01 (1)   04:35
	16:08	17:07	18:02	20:01	20:57	19 20:20 (1)   21:40
12	08:23	07:36	06:32	06:16	05:11	20:02 (1)   04:35
	16:09	17:09	18:04	20:03	20:58	18 20:20 (1)   21:41
13	08:22	07:34	06:30	06:14	05:09	20:02 (1)   04:34
	16:11	17:11	18:06	20:05	21:00	18 20:20 (1)   21:41
14	08:21	07:32	06:27	06:11	05:07	20:02 (1)   04:34
	16:13	17:13	18:08	20:07	21:02	17 20:19 (1)   21:42
15	08:20	07:30	06:25	06:09	05:06	20:03 (1)   04:34
	16:14	17:15	18:10	20:09	21:04	16 20:19 (1)   21:43
16	08:19	07:28	06:22	06:06	05:04	20:04 (1)   04:34
	16:16	17:17	18:12	20:10	21:05	13 20:17 (1)   21:43
17	08:18	07:26	06:20	06:04	05:02	20:05 (1)   04:33
	16:18	17:19	18:14	20:12	21:07	12 20:17 (1)   21:44
18	08:17	07:24	06:18	06:02	05:01	20:06 (1)   04:33
	16:19	17:21	18:16	20:14	7 19:39 (20)   21:09	9 20:15 (1)   21:44
19	08:16	07:22	06:15	05:59	19:37 (20)   04:59	04:33
	16:21	17:23	18:18	20:16	11 19:48 (20)   21:10	21:44
20	08:15	07:19	06:13	05:57	19:35 (20)   04:57	04:33
	16:23	17:25	18:20	20:18	15 19:50 (20)   21:12	21:45
21	08:14	07:17	06:10	17:52 (18)   05:55	19:34 (20)   04:56	04:34
	16:25	17:27	18:21	3 17:55 (18)   20:20	17 19:51 (20)   21:14	21:45
22	08:12	07:15	06:08	17:50 (18)   05:52	19:33 (20)   04:55	04:34
	16:27	17:29	18:23	6 17:56 (18)   20:22	18 19:51 (20)   21:15	21:45
23	08:11	07:13	06:05	17:50 (18)   05:50	19:32 (20)   04:53	04:34
	16:29	17:31	18:25	9 17:59 (18)   20:24	19 19:51 (20)   21:17	21:45
24	08:10	07:10	06:03	17:49 (18)   05:48	19:32 (20)   04:52	04:34
	16:30	17:33	18:27	11 18:00 (18)   20:25	19 19:51 (20)   21:18	21:46
25	08:08	07:08	06:00	17:49 (18)   05:46	19:32 (20)   04:50	04:35
	16:32	17:35	18:29	13 18:02 (18)   20:27	19 19:51 (20)   21:20	21:46
26	08:07	07:06	05:58	17:48 (18)   05:43	19:32 (20)   04:49	04:35
	16:34	17:37	18:31	14 18:02 (18)   20:29	19 19:51 (20)   21:21	21:46
27	08:05	07:03	05:55	17:49 (18)   05:41	19:33 (20)   04:48	04:36
	16:36	17:39	18:33	12 18:01 (18)   20:31	17 19:50 (20)   21:23	21:45
28	08:04	07:01	05:53	17:50 (18)   05:39	19:33 (20)   04:47	04:36
	16:38	17:41	18:35	9 17:59 (18)   20:33	17 19:50 (20)   21:24	21:45
29	08:02	06:50	05:50	05:37	19:34 (20)   04:45	04:37
	16:40	19:37	20:35	15 19:49 (20)   21:26	21:45	
30	08:00	06:48	05:48	05:35	19:35 (20)   04:44	04:37
	16:42	19:38	20:37	12 19:47 (20)   21:27	21:45	
31	07:59	06:45	05:45	05:33	19:36 (20)   04:43	04:37
	16:44	19:40	20:38	12 19:48 (20)   21:28	21:45	
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung			77	205	254	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.63	0.63	
Gesamte Reduktion			0.19	0.23	0.29	
Met.wahrsch.Beschattung			15	48	74	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DJ - IO114

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:12 (1)   06:14	07:08	07:07	08:03
	21:44	21:09	19 20:31 (1)   20:01	18:46	16:35	15:50
2	04:39	05:20	20:11 (1)   06:16	07:10	07:09	08:05
	21:44	21:07	19 20:30 (1)   19:59	18:44	16:33	15:49
3	04:40	05:22	20:11 (1)   06:17	07:12	07:11	08:06
	21:44	21:05	20 20:31 (1)   19:56	18:41	16:31	15:48
4	04:40	05:24	20:11 (1)   06:19	07:14	07:13	08:08
	21:43	21:03	19 20:30 (1)   19:54	18:39	16:29	15:47
5	04:41	05:25	20:11 (1)   06:21	07:15	07:15	08:09
	21:43	21:01	19 20:30 (1)   19:51	18:37	16:27	15:47
6	04:42	05:27	20:12 (1)   06:23	07:17	07:17	08:10
	21:42	20:59	16 20:28 (1)   19:49	18:34	16:25	15:46
7	04:43	05:29	20:12 (1)   06:25	07:19	07:19	08:12
	21:41	20:57	14 20:26 (1)   19:46	18:32	16:23	15:46
8	04:44	05:31	20:12 (1)   06:26	07:21	07:21	08:13
	21:41	20:55	12 20:24 (1)   19:44	18:29	16:21	15:45
9	04:45	05:32	20:14 (1)   06:28	07:23	07:23	08:14
	21:40	20:53	9 20:23 (1)   19:41	18:27	16:19	15:45
10	04:46	05:34	20:14 (1)   06:30	07:25	07:25	08:16
	21:39	20:51	6 20:20 (1)   19:39	18:24	16:18	15:45
11	04:48	05:36	20:17 (1)   06:32	07:27	07:27	08:17
	21:38	20:49	1 20:18 (1)   19:36	18:22	16:16	15:44
12	04:49	05:38	19:45 (20)   06:34	07:28	07:29	08:18
	21:37	20:47	9 19:54 (20)   19:34	18:20	16:14	15:44
13	04:50	05:40	19:43 (20)   06:35	07:30	07:31	08:19
	21:36	20:45	12 19:55 (20)   19:31	18:17	16:13	15:44
14	04:51	05:41	19:41 (20)   06:37	07:32	07:33	08:20
	21:35	20:43	15 19:56 (20)   19:29	18:15	16:11	15:44
15	04:52	05:43	19:41 (20)   06:39	8 18:41 (18)   07:34	07:35	08:21
	21:34	20:40	16 19:57 (20)   19:26	8 18:49 (18)   18:12	16:09	15:44
16	04:54	05:45	19:39 (20)   06:41	18:39 (18)   07:36	07:36	08:22
	21:33	20:38	18 19:57 (20)   19:24	11 18:50 (18)   18:10	16:08	15:44
17	04:55	05:47	19:39 (20)   06:43	18:37 (18)   07:38	07:38	08:23
	21:32	20:36	19 19:58 (20)   19:21	13 18:50 (18)   18:08	16:06	15:44
18	04:57	05:49	19:39 (20)   06:44	18:36 (18)   07:40	07:40	08:23
	21:30	20:34	19 19:58 (20)   19:19	14 18:50 (18)   18:05	16:05	15:44
19	04:58	05:50	19:38 (20)   06:46	18:36 (18)   07:42	07:42	08:24
	21:29	20:31	19 19:57 (20)   19:16	12 18:48 (18)   18:03	16:03	15:45
20	04:59	05:52	19:38 (20)   06:48	18:36 (18)   07:44	07:44	08:25
	21:28	20:29	19 19:57 (20)   19:14	10 18:46 (18)   18:01	16:02	15:45
21	05:01	05:54	19:39 (20)   06:50	18:36 (18)   07:46	07:46	08:25
	21:26	20:27	18 19:57 (20)   19:11	6 18:42 (18)   17:59	16:01	15:45
22	05:02	05:56	19:38 (20)   06:52	18:37 (18)   07:48	07:48	08:26
	21:25	20:25	17 19:55 (20)   19:09	3 18:40 (18)   17:56	15:59	15:46
23	05:04	05:58	19:39 (20)   06:53	07:49	07:49	08:26
	21:23	20:22	14 19:53 (20)   19:06	17:54	15:58	15:46
24	05:05	05:59	19:40 (20)   06:55	07:51	07:51	08:27
	21:22	20:20	11 19:51 (20)   19:04	17:52	15:57	15:47
25	05:07	20:18 (1)   06:01	19:43 (20)   06:57	06:53	07:53	08:27
	21:20	6 20:24 (1)   20:18	6 19:49 (20)   19:01	16:50	15:56	15:48
26	05:09	20:16 (1)   06:03	06:59	06:55	07:55	08:28
	21:19	10 20:26 (1)   20:15	18:59	16:47	15:54	15:48
27	05:10	20:15 (1)   06:05	07:01	06:57	07:56	08:28
	21:17	13 20:28 (1)   20:13	18:56	16:45	15:53	15:49
28	05:12	20:14 (1)   06:07	07:02	06:59	07:58	08:28
	21:15	14 20:28 (1)   20:11	18:54	16:43	15:52	15:50
29	05:14	20:13 (1)   06:08	07:04	07:01	08:00	08:28
	21:14	16 20:29 (1)   20:08	18:51	16:41	15:51	15:51
30	05:15	20:12 (1)   06:10	07:06	07:03	08:01	08:28
	21:12	17 20:29 (1)   20:06	18:49	16:39	15:51	15:52
31	05:17	20:12 (1)   06:12	07:05	07:05	08:02	08:28
	21:10	18 20:30 (1)   20:03	16:37	16:37	15:53	15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	94	366	77			
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40			
Reduktion Betriebsdauer	0.90	0.90	0.90			
Reduktion Windrichtung	0.63	0.63	0.68			
Gesamte Reduktion	0.25	0.28	0.25			
Met.wahrsch.Beschattung	24	101	19			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DK - IO115  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	20:04 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	5 20:09 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	20:02 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	9 20:11 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	20:01 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	11 20:12 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	20:00 (1) 04:40
	15:58	16:52	17:49	19:48	20:44	14 20:14 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:59 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	16 20:15 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	19:59 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	18 20:17 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	19:58 (1) 04:37
	16:02	16:58	17:55	19:54	20:50	20 20:18 (1) 21:36
8	08:26	07:44	06:42	06:26	05:18	19:58 (1) 04:37
	16:03	17:00	17:57	19:55	20:51	20 20:18 (1) 21:37
9	08:25	07:42	06:40	06:23	05:17	19:59 (1) 04:36
	16:05	17:02	17:59	19:57	20:53	19 20:18 (1) 21:38
10	08:24	07:40	06:37	06:21	05:15	19:59 (1) 04:36
	16:06	17:05	18:00	19:59	20:55	19 20:18 (1) 21:39
11	08:24	07:38	06:35	06:18	05:13	19:59 (1) 04:35
	16:08	17:07	18:02	20:01	20:57	18 20:17 (1) 21:40
12	08:23	07:36	06:32	06:16	05:11	20:00 (1) 04:35
	16:09	17:09	18:04	20:03	20:58	17 20:17 (1) 21:41
13	08:22	07:34	06:30	06:14	05:09	20:00 (1) 04:34
	16:11	17:11	18:06	20:05	21:00	16 20:16 (1) 21:41
14	08:21	07:32	06:27	06:11	05:07	20:00 (1) 04:34
	16:12	17:13	18:08	20:07	21:02	15 20:15 (1) 21:42
15	08:20	07:30	06:25	06:09	05:06	20:02 (1) 04:34
	16:14	17:15	18:10	20:09	21:04	12 20:14 (1) 21:43
16	08:19	07:28	06:22	06:06	19:38 (20) 05:04	20:03 (1) 04:34
	16:16	17:17	18:12	20:10	19:42 (20) 21:05	10 20:13 (1) 21:43
17	08:18	07:26	06:20	06:04	19:34 (20) 05:02	20:06 (1) 04:33
	16:18	17:19	18:14	20:12	19:44 (20) 21:07	5 20:11 (1) 21:44
18	08:17	07:24	06:18	06:02	19:32 (20) 05:01	04:33
	16:19	17:21	18:16	20:14	19:46 (20) 21:09	21:44
19	08:16	07:22	06:15	05:59	19:31 (20) 04:59	04:33
	16:21	17:23	18:18	20:16	19:48 (20) 21:10	21:44
20	08:15	07:19	06:13	17:49 (18) 05:57	19:31 (20) 04:57	04:33
	16:23	17:25	18:20	4 17:53 (18) 20:18	18 19:49 (20) 21:12	21:45
21	08:14	07:17	06:10	17:48 (18) 05:55	19:30 (20) 04:56	04:34
	16:25	17:27	18:21	7 17:55 (18) 20:20	19 19:49 (20) 21:14	21:45
22	08:12	07:15	06:08	17:47 (18) 05:52	19:29 (20) 04:55	04:34
	16:27	17:29	18:23	9 17:56 (18) 20:22	19 19:48 (20) 21:15	21:45
23	08:11	07:13	06:05	17:47 (18) 05:50	19:29 (20) 04:53	04:34
	16:29	17:31	18:25	12 17:59 (18) 20:24	19 19:48 (20) 21:17	21:45
24	08:10	07:10	06:03	17:46 (18) 05:48	19:29 (20) 04:52	04:34
	16:30	17:33	18:27	14 18:00 (18) 20:25	19 19:48 (20) 21:18	21:46
25	08:08	07:08	06:00	17:47 (18) 05:46	19:29 (20) 04:50	04:35
	16:32	17:35	18:29	13 18:00 (18) 20:27	18 19:47 (20) 21:20	21:46
26	08:07	07:06	05:58	17:47 (18) 05:43	19:30 (20) 04:49	04:35
	16:34	17:37	18:31	11 17:58 (18) 20:29	17 19:47 (20) 21:21	21:46
27	08:05	07:03	05:55	17:49 (18) 05:41	19:31 (20) 04:48	04:36
	16:36	17:39	18:33	8 17:57 (18) 20:31	15 19:46 (20) 21:23	21:45
28	08:04	07:01	05:53	05:39	19:32 (20) 04:47	04:36
	16:38	17:41	18:35	20:33	13 19:45 (20) 21:24	21:45
29	08:02	06:50	05:50	05:37	19:34 (20) 04:45	04:37
	16:40	19:37	20:35	9 19:43 (20) 21:26	21:45	
30	08:00	06:48	05:35	05:35	04:44	04:37
	16:42	19:38	20:37	21:27	21:45	
31	07:59	06:45	04:43	04:43	04:43	
	16:44	19:40	21:28	496	512	
Sonnenscheinstunden	248	272	367	421		
astr.max.mögl.Beschattung			78	211	244	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.63	0.64	
Gesamte Reduktion			0.19	0.23	0.29	
Met.wahrsch.Beschattung			15	49	71	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DK - IO115

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	05:19	20:10 (1) 06:14	07:08	07:07	08:03	
	21:44	21:09	18 20:28 (1) 20:01	18:46	16:35	15:50	
2	04:39	05:20	20:09 (1) 06:16	07:10	07:09	08:05	
	21:44	21:07	19 20:28 (1) 19:59	18:44	16:33	15:49	
3	04:40	05:22	20:09 (1) 06:17	07:12	07:11	08:06	
	21:44	21:05	19 20:28 (1) 19:56	18:41	16:31	15:48	
4	04:40	05:24	20:08 (1) 06:19	07:14	07:13	08:08	
	21:43	21:03	20 20:28 (1) 19:54	18:39	16:29	15:47	
5	04:41	05:25	20:08 (1) 06:21	07:15	07:15	08:09	
	21:43	21:01	20 20:28 (1) 19:51	18:37	16:27	15:47	
6	04:42	05:27	20:09 (1) 06:23	07:17	07:17	08:10	
	21:42	20:59	19 20:28 (1) 19:49	18:34	16:25	15:46	
7	04:43	05:29	20:08 (1) 06:25	07:19	07:19	08:12	
	21:41	20:57	18 20:26 (1) 19:46	18:32	16:23	15:46	
8	04:44	05:31	20:09 (1) 06:26	07:21	07:21	08:13	
	21:41	20:55	15 20:24 (1) 19:44	18:29	16:21	15:45	
9	04:45	05:32	20:10 (1) 06:28	07:23	07:23	08:14	
	21:40	20:53	13 20:23 (1) 19:41	18:27	16:19	15:45	
10	04:46	05:34	20:10 (1) 06:30	07:25	07:25	08:16	
	21:39	20:51	10 20:20 (1) 19:39	18:24	16:18	15:45	
11	04:48	05:36	20:11 (1) 06:32	07:27	07:27	08:17	
	21:38	20:49	7 20:18 (1) 19:36	18:22	16:16	15:44	
12	04:49	05:38	20:13 (1) 06:34	07:28	07:29	08:18	
	21:37	20:47	4 20:17 (1) 19:34	18:20	16:14	15:44	
13	04:50	05:40	19:44 (20) 06:35	07:30	07:31	08:19	
	21:36	20:45	3 19:47 (20) 19:31	18:17	16:13	15:44	
14	04:51	05:41	19:41 (20) 06:37	07:32	07:33	08:20	
	21:35	20:43	10 19:51 (20) 19:29	18:15	16:11	15:44	
15	04:52	05:43	19:39 (20) 06:39	07:34	07:35	08:21	
	21:34	20:40	13 19:52 (20) 19:26	18:12	16:09	15:44	
16	04:54	05:45	19:37 (20) 06:41	7 18:39 (18)	07:36	07:36	08:22
	21:33	20:38	16 19:53 (20) 19:24	7 18:46 (18)	18:10	16:08	15:44
17	04:55	05:47	19:36 (20) 06:43	7 18:36 (18)	07:38	07:38	08:23
	21:32	20:36	18 19:54 (20) 19:21	10 18:46 (18)	18:08	16:06	15:44
18	04:57	05:49	19:36 (20) 06:44	10 18:34 (18)	07:40	07:40	08:23
	21:30	20:34	18 19:54 (20) 19:19	13 18:47 (18)	18:05	16:05	15:44
19	04:58	05:50	19:35 (20) 06:46	13 18:34 (18)	07:42	07:42	08:24
	21:29	20:31	19 19:54 (20) 19:16	14 18:48 (18)	18:03	16:03	15:45
20	04:59	05:52	19:34 (20) 06:48	14 18:33 (18)	07:44	07:44	08:25
	21:28	20:29	20 19:54 (20) 19:14	13 18:46 (18)	18:01	16:02	15:45
21	05:01	05:54	19:35 (20) 06:50	13 18:32 (18)	07:46	07:46	08:25
	21:26	20:27	19 19:54 (20) 19:11	10 18:42 (18)	17:59	16:01	15:45
22	05:02	05:56	19:34 (20) 06:52	10 18:33 (18)	07:48	07:48	08:26
	21:25	20:25	19 19:53 (20) 19:09	7 18:40 (18)	17:56	15:59	15:46
23	05:04	05:58	19:34 (20) 06:53	7 18:34 (18)	07:49	07:49	08:26
	21:23	20:22	18 19:52 (20) 19:06	4 18:38 (18)	17:54	15:58	15:46
24	05:05	05:59	19:35 (20) 06:55		07:51	07:51	08:27
	21:22	20:20	16 19:51 (20) 19:04		17:52	15:57	15:47
25	05:07	06:01	19:36 (20) 06:57		06:53	07:53	08:27
	21:20	20:18	13 19:49 (20) 19:01		16:50	15:56	15:48
26	05:09	06:03	19:37 (20) 06:59		06:55	07:55	08:28
	21:19	20:15	9 19:46 (20) 18:59		16:47	15:54	15:48
27	05:10	06:05	19:40 (20) 07:01		06:57	07:56	08:28
	21:17	20:22 (1) 20:13	4 19:44 (20)		16:45	15:53	15:49
28	05:12	06:07	07:02		06:59	07:58	08:28
	21:15	11 20:24 (1) 20:11			16:43	15:52	15:50
29	05:14	20:12 (1) 06:08			07:01	08:00	08:28
	21:14	13 20:25 (1) 20:08			16:41	15:51	15:51
30	05:15	20:10 (1) 06:10			07:03	08:01	08:28
	21:12	16 20:26 (1) 20:06			16:39	15:51	15:52
31	05:17	20:10 (1) 06:12			07:05		08:28
	21:10	17 20:27 (1) 20:03			16:37		15:53
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	64	397	78				
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40				
Reduktion Betriebsdauer	0.90	0.90	0.90				
Reduktion Windrichtung	0.64	0.63	0.68				
Gesamte Reduktion	0.25	0.28	0.25				
Met.wahrsch.Beschattung	16	110	19				

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DL - IO116  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	20:00 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	9 20:09 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	19:59 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	12 20:11 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	19:58 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	14 20:12 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	19:57 (1) 04:40
	15:58	16:52	17:49	19:48	20:44	17 20:14 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:57 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	18 20:15 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	19:56 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	20 20:16 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	19:56 (1) 04:37
	16:02	16:58	17:55	19:54	20:50	20 20:16 (1) 21:36
8	08:26	07:44	06:42	06:26	05:18	19:56 (1) 04:37
	16:03	17:00	17:57	19:55	20:51	19 20:15 (1) 21:37
9	08:25	07:42	06:40	06:23	05:17	19:57 (1) 04:36
	16:05	17:02	17:59	19:57	20:53	19 20:16 (1) 21:38
10	08:24	07:40	06:37	06:21	05:15	19:57 (1) 04:36
	16:06	17:05	18:00	19:59	20:55	18 20:15 (1) 21:39
11	08:24	07:38	06:35	06:18	05:13	19:57 (1) 04:35
	16:08	17:07	18:02	20:01	20:57	17 20:14 (1) 21:40
12	08:23	07:36	06:32	06:16	05:11	19:58 (1) 04:35
	16:09	17:09	18:04	20:03	20:58	16 20:14 (1) 21:41
13	08:22	07:34	06:30	06:14	05:09	19:59 (1) 04:34
	16:11	17:11	18:06	20:05	21:00	14 20:13 (1) 21:41
14	08:21	07:32	06:27	06:11	05:07	20:00 (1) 04:34
	16:12	17:13	18:08	20:07	21:02	11 20:11 (1) 21:42
15	08:20	07:30	06:25	06:09	19:33 (20) 05:06	20:02 (1) 04:34
	16:14	17:15	18:10	20:09	7 19:40 (20) 21:04	8 20:10 (1) 21:43
16	08:19	07:28	06:22	06:06	19:31 (20) 05:04	04:34
	16:16	17:17	18:12	20:10	11 19:42 (20) 21:05	21:43
17	08:18	07:26	06:20	06:04	19:29 (20) 05:02	04:33
	16:18	17:19	18:14	20:12	15 19:44 (20) 21:07	21:44
18	08:17	07:24	06:18	06:02	19:28 (20) 05:01	04:33
	16:19	17:21	18:16	20:14	17 19:45 (20) 21:09	21:44
19	08:16	07:22	06:15	17:48 (18) 05:59	19:27 (20) 04:59	04:33
	16:21	17:23	18:18	3 17:51 (18) 20:16	19 19:46 (20) 21:10	21:44
20	08:15	07:19	06:13	17:46 (18) 05:57	19:27 (20) 04:57	04:33
	16:23	17:25	18:20	7 17:53 (18) 20:18	19 19:46 (20) 21:12	21:45
21	08:14	07:17	06:10	17:45 (18) 05:55	19:27 (20) 04:56	04:34
	16:25	17:27	18:21	10 17:55 (18) 20:20	19 19:46 (20) 21:14	21:45
22	08:12	07:15	06:08	17:44 (18) 05:52	19:26 (20) 04:55	04:34
	16:27	17:29	18:23	12 17:56 (18) 20:22	19 19:45 (20) 21:15	21:45
23	08:11	07:13	06:05	17:45 (18) 05:50	19:26 (20) 04:53	04:34
	16:29	17:31	18:25	14 17:59 (18) 20:24	19 19:45 (20) 21:17	21:45
24	08:10	07:10	06:03	17:44 (18) 05:48	19:27 (20) 04:52	04:34
	16:30	17:33	18:27	13 17:57 (18) 20:25	17 19:44 (20) 21:18	21:46
25	08:08	07:08	06:00	17:45 (18) 05:46	19:27 (20) 04:50	04:35
	16:32	17:35	18:29	12 17:57 (18) 20:27	17 19:44 (20) 21:20	21:46
26	08:07	07:06	05:58	17:46 (18) 05:43	19:28 (20) 04:49	04:35
	16:34	17:37	18:31	8 17:54 (18) 20:29	15 19:43 (20) 21:21	21:46
27	08:05	07:03	05:55	05:41	19:30 (20) 04:48	04:36
	16:36	17:39	18:33	20:31	11 19:41 (20) 21:23	21:45
28	08:04	07:01	05:53	05:39	19:32 (20) 04:47	04:36
	16:38	17:41	18:35	20:33	6 19:38 (20) 21:24	21:45
29	08:02	06:50	05:37	05:37	04:45	04:37
	16:40	19:37	20:35	21:26	21:45	21:45
30	08:00	06:48	05:35	05:35	20:02 (1) 04:44	04:37
	16:42	19:38	20:37	5 20:07 (1) 21:27	21:45	21:45
31	07:59	06:45	06:45	04:43	04:43	
	16:44	19:40	21:28	496	512	
Sonnenscheinstunden	248	272	367	421		
astr.max.mögl.Beschattung			79	216	232	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.63	0.64	
Gesamte Reduktion			0.19	0.23	0.29	
Met.wahrsch.Beschattung			15	51	68	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DL - IO116

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:08 (1) 06:14	07:08	07:07	08:03
	21:44	21:09	17 20:25 (1) 20:01	18:46	16:35	15:50
2	04:39	05:20	20:07 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	18 20:25 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	20:07 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	19 20:26 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:06 (1) 06:19	07:14	07:13	08:08
	21:43	21:03	19 20:25 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:06 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	20 20:26 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:06 (1) 06:23	07:17	07:17	08:10
	21:42	20:59	20 20:26 (1) 19:49	18:34	16:25	15:46
7	04:43	05:29	20:06 (1) 06:25	07:19	07:19	08:12
	21:41	20:57	19 20:25 (1) 19:46	18:32	16:23	15:46
8	04:44	05:31	20:06 (1) 06:26	07:21	07:21	08:13
	21:41	20:55	18 20:24 (1) 19:44	18:29	16:21	15:45
9	04:45	05:32	20:07 (1) 06:28	07:23	07:23	08:14
	21:40	20:53	16 20:23 (1) 19:41	18:27	16:19	15:45
10	04:46	05:34	20:07 (1) 06:30	07:25	07:25	08:16
	21:39	20:51	13 20:20 (1) 19:39	18:24	16:18	15:45
11	04:48	05:36	20:08 (1) 06:32	07:27	07:27	08:17
	21:38	20:49	10 20:18 (1) 19:36	18:22	16:16	15:44
12	04:49	05:38	20:09 (1) 06:34	07:28	07:29	08:18
	21:37	20:47	8 20:17 (1) 19:34	18:20	16:14	15:44
13	04:50	05:40	20:10 (1) 06:35	07:30	07:31	08:19
	21:36	20:45	4 20:14 (1) 19:31	18:17	16:13	15:44
14	04:51	05:41	06:37	07:32	07:33	08:20
	21:35	20:43	19:29	18:15	16:11	15:44
15	04:52	05:43	19:39 (20) 06:39	07:34	07:35	08:21
	21:34	20:40	8 19:47 (20) 19:26	18:12	16:09	15:44
16	04:54	05:45	19:36 (20) 06:41	07:36	07:36	08:22
	21:33	20:38	12 19:48 (20) 19:24	18:10	16:08	15:44
17	04:55	05:47	19:35 (20) 06:43	18:35 (18) 07:38	07:38	08:23
	21:32	20:36	14 19:49 (20) 19:21	7 18:42 (18) 18:08	16:06	15:44
18	04:57	05:49	19:34 (20) 06:44	18:33 (18) 07:40	07:40	08:23
	21:30	20:34	16 19:50 (20) 19:19	11 18:44 (18) 18:05	16:05	15:44
19	04:58	05:50	19:32 (20) 06:46	18:32 (18) 07:42	07:42	08:24
	21:29	20:31	18 19:50 (20) 19:16	13 18:45 (18) 18:03	16:03	15:45
20	04:59	05:52	19:32 (20) 06:48	18:31 (18) 07:44	07:44	08:25
	21:28	20:29	19 19:51 (20) 19:14	14 18:45 (18) 18:01	16:02	15:45
21	05:01	05:54	19:32 (20) 06:50	18:30 (18) 07:46	07:46	08:25
	21:26	20:27	19 19:51 (20) 19:11	12 18:42 (18) 17:59	16:01	15:45
22	05:02	05:56	19:31 (20) 06:52	18:30 (18) 07:48	07:48	08:26
	21:25	20:25	19 19:50 (20) 19:09	10 18:40 (18) 17:56	15:59	15:46
23	05:04	05:58	19:31 (20) 06:53	18:30 (18) 07:49	07:49	08:26
	21:23	20:22	19 19:50 (20) 19:06	8 18:38 (18) 17:54	15:58	15:46
24	05:05	05:59	19:31 (20) 06:55	18:31 (18) 07:51	07:51	08:27
	21:22	20:20	19 19:50 (20) 19:04	4 18:35 (18) 17:52	15:57	15:47
25	05:07	06:01	19:32 (20) 06:57	06:53	07:53	08:27
	21:20	20:18	17 19:49 (20) 19:01	16:50	15:56	15:48
26	05:09	06:03	19:32 (20) 06:59	06:55	07:55	08:28
	21:19	20:15	14 19:46 (20) 18:59	16:47	15:54	15:48
27	05:10	06:05	19:33 (20) 07:01	06:57	07:56	08:28
	21:17	20:13	11 19:44 (20) 18:56	16:45	15:53	15:49
28	05:12	20:13 (1) 06:07	19:35 (20) 07:02	06:59	07:58	08:28
	21:15	5 20:18 (1) 20:11	7 19:42 (20) 18:54	16:43	15:52	15:50
29	05:14	20:11 (1) 06:08	07:04	07:01	08:00	08:28
	21:14	10 20:21 (1) 20:08	18:51	16:41	15:51	15:51
30	05:15	20:09 (1) 06:10	07:06	07:03	08:01	08:28
	21:12	13 20:22 (1) 20:06	18:49	16:39	15:51	15:52
31	05:17	20:09 (1) 06:12		07:05		08:28
	21:10	15 20:24 (1) 20:03		16:37		15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	43	413	79			
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40			
Reduktion Betriebsdauer	0.90	0.90	0.90			
Reduktion Windrichtung	0.64	0.63	0.68			
Gesamte Reduktion	0.25	0.28	0.25			
Met.wahrsch.Beschattung	11	115	19			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: DM - IO117**  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28	07:57	06:59	06:43	05:33	19:56 (1) 04:42	
	15:54	16:46	17:43	19:42	20:39	13 20:09 (1) 21:29	
2	08:28	07:55	06:56	06:40	05:31	19:56 (1) 04:41	
	15:55	16:48	17:45	19:44	20:40	15 20:11 (1) 21:31	
3	08:28	07:54	06:54	06:38	05:28	19:55 (1) 04:40	
	15:57	16:50	17:47	19:46	20:42	17 20:12 (1) 21:32	
4	08:27	07:52	06:52	06:35	05:26	19:54 (1) 04:40	
	15:58	16:52	17:49	19:48	20:44	20 20:14 (1) 21:33	
5	08:27	07:50	06:49	06:33	05:24	19:54 (1) 04:39	
	15:59	16:54	17:51	19:50	20:46	20 20:14 (1) 21:34	
6	08:27	07:48	06:47	06:30	05:22	19:54 (1) 04:38	
	16:00	16:56	17:53	19:52	20:48	20 20:14 (1) 21:35	
7	08:26	07:46	06:44	06:28	05:20	19:54 (1) 04:37	
	16:02	16:58	17:55	19:54	20:50	19 20:13 (1) 21:36	
8	08:26	07:44	06:42	06:26	05:18	19:54 (1) 04:37	
	16:03	17:00	17:57	19:55	20:51	19 20:13 (1) 21:37	
9	08:25	07:42	06:40	06:23	05:17	19:55 (1) 04:36	
	16:05	17:02	17:59	19:57	20:53	18 20:13 (1) 21:38	
10	08:24	07:40	06:37	06:21	05:15	19:55 (1) 04:36	
	16:06	17:05	18:00	19:59	20:55	17 20:12 (1) 21:39	
11	08:24	07:38	06:35	06:18	05:13	19:56 (1) 04:35	
	16:08	17:07	18:02	20:01	20:57	15 20:11 (1) 21:40	
12	08:23	07:36	06:32	06:16	05:11	19:57 (1) 04:35	
	16:09	17:09	18:04	20:03	20:58	13 20:10 (1) 21:41	
13	08:22	07:34	06:30	06:14	05:09	19:58 (1) 04:34	
	16:11	17:11	18:06	20:05	1 19:36 (20) 21:00	11 20:08 (1) 21:41	
14	08:21	07:32	06:27	06:11	05:07	20:00 (1) 04:34	
	16:12	17:13	18:08	20:07	9 19:38 (20) 21:02	6 20:06 (1) 21:42	
15	08:20	07:30	06:25	06:09	05:06	19:28 (20) 05:06	04:34
	16:14	17:15	18:10	20:09	12 19:40 (20) 21:04	21:43	
16	08:19	07:28	06:22	06:06	05:04	19:27 (20) 05:04	04:34
	16:16	17:17	18:12	20:10	15 19:42 (20) 21:05	21:43	
17	08:18	07:26	06:20	06:04	05:02	19:25 (20) 05:02	04:33
	16:18	17:19	18:14	20:12	18 19:43 (20) 21:07	21:44	
18	08:17	07:24	06:18	06:02	05:01	19:24 (20) 05:01	04:33
	16:19	17:21	18:16	3 17:49 (18) 20:14	19 19:43 (20) 21:09	21:44	
19	08:16	07:22	06:15	6 17:45 (18) 05:59	19:24 (20) 04:59	04:33	
	16:21	17:23	18:18	6 17:51 (18) 20:16	19 19:43 (20) 21:10	21:44	
20	08:15	07:19	06:13	17:43 (18) 05:57	19:24 (20) 04:57	04:33	
	16:23	17:25	18:20	10 17:53 (18) 20:18	19 19:43 (20) 21:12	21:45	
21	08:14	07:17	06:10	17:43 (18) 05:55	19:24 (20) 04:56	04:34	
	16:25	17:27	18:21	12 17:55 (18) 20:20	19 19:43 (20) 21:14	21:45	
22	08:12	07:15	06:08	17:42 (18) 05:52	19:24 (20) 04:55	04:34	
	16:27	17:29	18:23	14 17:56 (18) 20:22	18 19:42 (20) 21:15	21:45	
23	08:11	07:13	06:05	17:43 (18) 05:50	19:24 (20) 04:53	04:34	
	16:29	17:31	18:25	13 17:56 (18) 20:24	17 19:41 (20) 21:17	21:45	
24	08:10	07:10	06:03	17:43 (18) 05:48	19:25 (20) 04:52	04:34	
	16:30	17:33	18:27	11 17:54 (18) 20:25	15 19:40 (20) 21:18	21:46	
25	08:08	07:08	06:00	17:45 (18) 05:46	19:26 (20) 04:50	04:35	
	16:32	17:35	18:29	8 17:53 (18) 20:27	13 19:39 (20) 21:20	21:46	
26	08:07	07:06	05:58	05:43	19:28 (20) 04:49	04:35	
	16:34	17:37	18:31	20:29	9 19:37 (20) 21:21	21:46	
27	08:05	07:03	05:55	05:41	04:48	04:36	
	16:36	17:39	18:33	20:31	21:23	21:45	
28	08:04	07:01	05:53	05:39	20:02 (1) 04:47	04:36	
	16:38	17:41	18:35	20:33	2 20:04 (1) 21:24	21:45	
29	08:02	06:50	05:50	05:37	19:59 (1) 04:45	04:37	
	16:40	19:37	20:35	6 20:05 (1) 21:26	21:45		
30	08:00	06:48	05:48	05:35	19:58 (1) 04:44	04:37	
	16:42	19:38	20:37	9 20:07 (1) 21:27	21:45		
31	07:59	06:45	05:45	04:43	04:43		
	16:44	19:40	21:28	496	512		
Sonnenscheinstunden	248	272	367	421			
astr.max.mögl.Beschattung			77	220	223		
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51		
Reduktion Betriebsdauer			0.90	0.90	0.90		
Reduktion Windrichtung			0.68	0.64	0.64		
Gesamte Reduktion			0.19	0.24	0.29		
Met.wahrsch.Beschattung			15	52	65		

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DM - IO117

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:07 (1) 06:14	07:08	07:07	08:03
	21:44	21:09	14 20:21 (1) 20:01	18:46	16:35	15:50
2	04:39	05:20	20:06 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	16 20:22 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	20:05 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	18 20:23 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:04 (1) 06:19	07:14	07:13	08:08
	21:43	21:03	18 20:22 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:04 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	19 20:23 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:04 (1) 06:23	07:17	07:17	08:10
	21:42	20:59	20 20:24 (1) 19:49	18:34	16:25	15:46
7	04:43	05:29	20:03 (1) 06:25	07:19	07:19	08:12
	21:41	20:57	20 20:23 (1) 19:46	18:32	16:23	15:46
8	04:44	05:31	20:04 (1) 06:26	07:21	07:21	08:13
	21:41	20:55	19 20:23 (1) 19:44	18:29	16:21	15:45
9	04:45	05:32	20:04 (1) 06:28	07:23	07:23	08:14
	21:40	20:53	19 20:23 (1) 19:41	18:27	16:19	15:45
10	04:46	05:34	20:04 (1) 06:30	07:25	07:25	08:16
	21:39	20:51	16 20:20 (1) 19:39	18:24	16:18	15:45
11	04:48	05:36	20:04 (1) 06:32	07:27	07:27	08:17
	21:38	20:49	14 20:18 (1) 19:36	18:22	16:16	15:44
12	04:49	05:38	20:05 (1) 06:34	07:28	07:29	08:18
	21:37	20:47	12 20:17 (1) 19:34	18:20	16:14	15:44
13	04:50	05:40	20:05 (1) 06:35	07:30	07:31	08:19
	21:36	20:45	9 20:14 (1) 19:31	18:17	16:13	15:44
14	04:51	05:41	20:07 (1) 06:37	07:32	07:33	08:20
	21:35	20:43	5 20:12 (1) 19:29	18:15	16:11	15:44
15	04:52	05:43	20:10 (1) 06:39	07:34	07:35	08:21
	21:34	20:40	1 20:11 (1) 19:26	18:12	16:09	15:44
16	04:54	05:45	19:38 (20) 06:41	07:36	07:36	08:22
	21:33	20:38	3 19:41 (20) 19:24	18:10	16:08	15:44
17	04:55	05:47	19:34 (20) 06:43	07:38	07:38	08:23
	21:32	20:36	10 19:44 (20) 19:21	18:08	16:06	15:44
18	04:57	05:49	19:32 (20) 06:44	7 18:33 (18) 07:40	07:40	08:23
	21:30	20:34	14 19:46 (20) 19:19	7 18:40 (18) 18:05	16:05	15:44
19	04:58	05:50	19:30 (20) 06:46	11 18:31 (18) 07:42	07:42	08:24
	21:29	20:31	16 19:46 (20) 19:16	11 18:42 (18) 18:03	16:03	15:45
20	04:59	05:52	19:30 (20) 06:48	12 18:30 (18) 07:44	07:44	08:25
	21:28	20:29	17 19:47 (20) 19:14	12 18:42 (18) 18:01	16:02	15:45
21	05:01	05:54	19:29 (20) 06:50	14 18:28 (18) 07:46	07:46	08:25
	21:26	20:27	19 19:48 (20) 19:11	14 18:42 (18) 17:59	16:01	15:45
22	05:02	05:56	19:28 (20) 06:52	12 18:28 (18) 07:48	07:48	08:26
	21:25	20:25	19 19:47 (20) 19:09	12 18:40 (18) 17:56	15:59	15:46
23	05:04	05:58	19:28 (20) 06:53	10 18:28 (18) 07:49	07:49	08:26
	21:23	20:22	19 19:47 (20) 19:06	10 18:38 (18) 17:54	15:58	15:46
24	05:05	05:59	19:28 (20) 06:55	7 18:28 (18) 07:51	07:51	08:27
	21:22	20:20	19 19:47 (20) 19:04	7 18:35 (18) 17:52	15:57	15:47
25	05:07	06:01	19 19:28 (20) 06:57	4 18:29 (18) 06:53	07:53	08:27
	21:20	20:18	19 19:47 (20) 19:01	4 18:33 (18) 16:50	15:56	15:48
26	05:09	06:03	19:28 (20) 06:59	06:55	07:55	08:28
	21:19	20:15	17 19:45 (20) 18:59	16:47	15:54	15:48
27	05:10	06:05	19:28 (20) 07:01	06:57	07:56	08:28
	21:17	20:13	16 19:44 (20) 18:56	16:45	15:53	15:49
28	05:12	06:07	19:30 (20) 07:02	06:59	07:58	08:28
	21:15	20:11	12 19:42 (20) 18:54	16:43	15:52	15:50
29	05:14	06:08	19:30 (20) 07:04	07:01	08:00	08:28
	21:14	20:08	9 19:39 (20) 18:51	16:41	15:51	15:51
30	05:15	20:09 (1) 06:10	07:06	07:03	08:01	08:28
	21:12	9 20:18 (1) 20:06	18:49	16:39	15:51	15:52
31	05:17	20:08 (1) 06:12		07:05		08:28
	21:10	12 20:20 (1) 20:03		16:37		15:53
Sonneneinstrahlung	514	461	383	328	257	231
astr.max.mögl.Beschattung	21	429	77			
Red.Sonneneinstrahlung	0.44	0.48	0.40			
Reduktion Betriebsdauer	0.90	0.90	0.90			
Reduktion Windrichtung	0.64	0.64	0.68			
Gesamte Reduktion	0.25	0.28	0.25			
Met.wahrsch.Beschattung	5	119	19			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DN - IO118  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:47 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	20:07 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	19:47 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	19:20 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	19:47 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	19:20 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	19:47 (1) 04:39
	15:58	16:52	17:49	19:48	20:44	18:20 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:48 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	16:20 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	19:48 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	15:20 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	19:49 (1) 04:37
	16:02	16:58	17:55	19:54	20:50	13:20 (1) 21:36
8	08:26	07:44	06:42	06:26	05:18	19:51 (1) 04:37
	16:03	17:00	17:57	19:55	20:51	9:20 (1) 21:37
9	08:25	07:42	06:40	06:23	05:17	19:54 (1) 04:36
	16:05	17:02	17:59	19:57	6 19:24 (20) 05:17	4 19:58 (1) 21:38
10	08:24	07:40	06:37	06:21	19:21 (20) 05:15	04:36
	16:06	17:05	18:00	19:59	11 19:32 (20) 20:55	21:39
11	08:24	07:38	06:35	06:18	19:19 (20) 05:13	04:35
	16:08	17:07	18:02	20:01	14 19:33 (20) 20:57	21:40
12	08:23	07:36	06:32	06:16	19:18 (20) 05:11	04:35
	16:09	17:09	18:04	20:03	17 19:35 (20) 20:58	21:41
13	08:22	07:34	06:30	06:14	19:17 (20) 05:09	04:34
	16:11	17:11	18:06	20:05	19 19:36 (20) 21:00	21:41
14	08:21	07:32	06:27	06:11	19:16 (20) 05:07	04:34
	16:12	17:13	18:08	20:07	19 19:35 (20) 21:02	21:42
15	08:20	07:30	06:25	17:42 (18) 06:09	19:16 (20) 05:06	04:34
	16:14	17:15	18:10	1 17:43 (18) 20:09	19 19:35 (20) 21:04	21:43
16	08:19	07:28	06:22	17:40 (18) 06:06	19:16 (20) 05:04	04:34
	16:16	17:17	18:12	5 17:45 (18) 20:10	19 19:35 (20) 21:05	21:43
17	08:18	07:26	06:20	17:39 (18) 06:04	19:16 (20) 05:02	04:33
	16:18	17:19	18:14	8 17:47 (18) 20:12	18 19:34 (20) 21:07	21:44
18	08:17	07:24	06:18	17:38 (18) 06:02	19:16 (20) 05:01	04:33
	16:19	17:21	18:16	11 17:49 (18) 20:14	17 19:33 (20) 21:09	21:44
19	08:16	07:22	06:15	17:38 (18) 05:59	19:17 (20) 04:59	04:33
	16:21	17:23	18:18	13 17:51 (18) 20:16	15 19:32 (20) 21:10	21:44
20	08:15	07:19	06:13	17:38 (18) 05:57	19:19 (20) 04:57	04:33
	16:23	17:25	18:20	13 17:51 (18) 20:18	12 19:31 (20) 21:12	21:45
21	08:14	07:17	06:10	17:39 (18) 05:55	19:21 (20) 04:56	04:34
	16:25	17:27	18:21	11 17:50 (18) 20:20	8 19:29 (20) 21:14	21:45
22	08:12	07:15	06:08	17:39 (18) 05:52	04:55	04:34
	16:27	17:29	18:23	9 17:48 (18) 20:22	21:15	21:45
23	08:11	07:13	06:05	05:50	04:53	04:34
	16:29	17:31	18:25	20:24	21:17	21:45
24	08:10	07:10	06:03	05:48	19:54 (1) 04:52	04:34
	16:30	17:33	18:27	20:25	2 19:56 (1) 21:18	21:46
25	08:08	07:08	06:00	05:46	19:52 (1) 04:50	04:35
	16:32	17:35	18:29	20:27	6 19:58 (1) 21:20	21:46
26	08:07	07:06	05:58	05:43	19:50 (1) 04:49	04:35
	16:34	17:37	18:31	20:29	10 20:00 (1) 21:21	21:46
27	08:05	07:03	05:55	05:41	19:49 (1) 04:48	04:36
	16:36	17:39	18:33	20:31	13 20:02 (1) 21:23	21:45
28	08:04	07:01	05:53	05:39	19:48 (1) 04:47	04:36
	16:38	17:41	18:35	20:33	16 20:04 (1) 21:24	21:45
29	08:02	06:50	05:50	05:37	19:48 (1) 04:45	04:37
	16:40	19:37	20:35	17 20:05 (1) 21:26	21:45	
30	08:00	06:48	05:48	05:35	19:47 (1) 04:44	04:37
	16:42	19:38	20:37	20 20:07 (1) 21:27	21:45	
31	07:59	06:45	05:45	05:33	04:43	
	16:44	19:40	20:38	21:28		
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung			71	278	133	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.64	0.64	
Gesamte Reduktion			0.19	0.24	0.29	
Met.wahrsch.Beschattung			14	66	39	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DN - IO118

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	19:19 (20)	07:08	07:07
	21:44	21:09	20:01	14 19:33 (20)	18:46	16:35
2	04:39	05:20	06:16	19:19 (20)	07:10	07:09
	21:44	21:07	19:59	11 19:30 (20)	18:44	16:33
3	04:40	05:22	06:17	19:22 (20)	07:12	07:11
	21:44	21:05	19:56	6 19:28 (20)	18:41	16:31
4	04:40	05:24	20:02 (1)	06:19	07:14	07:13
	21:43	21:03	7 20:09 (1)	19:54	18:39	16:29
5	04:41	05:25	20:00 (1)	06:21	07:15	07:15
	21:43	21:01	11 20:11 (1)	19:51	18:37	16:27
6	04:42	05:27	19:59 (1)	06:23	07:17	07:17
	21:42	20:59	14 20:13 (1)	19:49	18:34	16:25
7	04:43	05:29	19:57 (1)	06:25	07:19	07:19
	21:41	20:57	16 20:13 (1)	19:46	18:32	16:23
8	04:44	05:31	19:57 (1)	06:26	07:21	07:21
	21:41	20:55	17 20:14 (1)	19:44	18:29	16:21
9	04:45	05:32	19:57 (1)	06:28	07:23	07:23
	21:40	20:53	18 20:15 (1)	19:41	18:27	16:19
10	04:46	05:34	19:55 (1)	06:30	07:25	07:25
	21:39	20:51	19 20:14 (1)	19:39	18:24	16:18
11	04:48	05:36	19:55 (1)	06:32	07:27	07:27
	21:38	20:49	20 20:15 (1)	19:36	18:22	16:16
12	04:49	05:38	19:55 (1)	06:34	07:28	07:29
	21:37	20:47	19 20:14 (1)	19:34	18:20	16:14
13	04:50	05:40	19:55 (1)	06:35	07:30	07:31
	21:36	20:45	19 20:14 (1)	19:31	18:17	16:13
14	04:51	05:41	19:55 (1)	06:37	07:32	07:33
	21:35	20:43	17 20:12 (1)	19:29	18:15	16:11
15	04:52	05:43	19:56 (1)	06:39	07:34	07:35
	21:34	20:40	15 20:11 (1)	19:26	18:12	16:09
16	04:54	05:45	19:56 (1)	06:41	07:36	07:36
	21:33	20:38	12 20:08 (1)	19:24	18:10	16:08
17	04:55	05:47	19:57 (1)	06:43	07:38	07:38
	21:32	20:36	9 20:06 (1)	19:21	18:08	16:06
18	04:57	05:49	19:59 (1)	06:44	07:40	07:40
	21:30	20:34	5 20:04 (1)	19:19	18:05	16:05
19	04:58	05:50	20:00 (1)	06:46	07:42	07:42
	21:29	20:31	2 20:02 (1)	19:16	18:03	16:03
20	04:59	05:52	06:48	07:44	07:44	07:44
	21:28	20:29	19:14	18:01	16:02	15:45
21	05:01	05:54	06:50	18:26 (18)	07:46	07:46
	21:26	20:27	19:11	7 18:33 (18)	17:59	16:01
22	05:02	05:56	19:24 (20)	06:52	18:24 (18)	07:48
	21:25	20:25	9 19:33 (20)	19:09	11 18:35 (18)	17:56
23	05:04	05:58	19:22 (20)	06:53	18:23 (18)	07:49
	21:23	20:22	13 19:35 (20)	19:06	12 18:35 (18)	17:54
24	05:05	05:59	19:21 (20)	06:55	18:22 (18)	07:51
	21:22	20:20	15 19:36 (20)	19:04	13 18:35 (18)	17:52
25	05:07	06:01	19:20 (20)	06:57	18:22 (18)	06:53
	21:20	20:18	17 19:37 (20)	19:01	11 18:33 (18)	16:50
26	05:09	06:03	19:18 (20)	06:59	18:21 (18)	06:55
	21:19	20:15	19 19:37 (20)	18:59	9 18:30 (18)	16:47
27	05:10	06:05	19:18 (20)	07:01	18:21 (18)	06:57
	21:17	20:13	19 19:37 (20)	18:56	6 18:27 (18)	16:45
28	05:12	06:07	19:18 (20)	07:02	18:22 (18)	06:59
	21:15	20:11	19 19:37 (20)	18:54	3 18:25 (18)	16:43
29	05:14	06:08	19:17 (20)	07:04	07:01	08:00
	21:14	20:08	19 19:36 (20)	18:51	16:41	15:51
30	05:15	06:10	19:17 (20)	07:06	07:03	08:01
	21:12	20:06	18 19:35 (20)	18:49	16:39	15:51
31	05:17	06:12	19:18 (20)	07:05	07:05	08:28
	21:10	20:03	17 19:35 (20)	18:47	16:37	15:53
Sonnenscheinstunden	514	461	383		328	257
astr.max.mögl.Beschattung		385	103			
Red.Sonnenscheinwahrsch.		0.48	0.40			
Reduktion Betriebsdauer		0.90	0.90			
Reduktion Windrichtung		0.64	0.67			
Gesamte Reduktion		0.28	0.24			
Met.wahrsch.Beschattung		108	25			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DO - IO119  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:49 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	20:09 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	19:49 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	20:09 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	19:49 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	19:20 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	19:49 (1) 04:39
	15:58	16:52	17:49	19:48	20:44	19:20 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:49 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	18 20:07 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	19:50 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	17 20:07 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	19:50 (1) 04:37
	16:02	16:58	17:55	19:54	20:50	15 20:05 (1) 21:36
8	08:26	07:44	06:42	06:26	05:18	19:51 (1) 04:37
	16:03	17:00	17:57	19:55	20:51	13 20:04 (1) 21:37
9	08:25	07:42	06:40	06:23	05:17	19:53 (1) 04:36
	16:05	17:02	17:59	19:57	20:53	10 20:03 (1) 21:38
10	08:24	07:40	06:37	06:21	19:28 (20) 05:15	19:55 (1) 04:36
	16:06	17:05	18:00	19:59	4 19:32 (20) 20:55	6 20:01 (1) 21:39
11	08:24	07:38	06:35	06:18	19:24 (20) 05:13	04:35
	16:08	17:07	18:02	20:01	9 19:33 (20) 20:57	21:40
12	08:23	07:36	06:32	06:16	19:22 (20) 05:11	04:35
	16:09	17:09	18:04	20:03	13 19:35 (20) 20:58	21:41
13	08:22	07:34	06:30	06:14	19:21 (20) 05:09	04:34
	16:11	17:11	18:06	20:05	16 19:37 (20) 21:00	21:41
14	08:21	07:32	06:27	06:11	19:19 (20) 05:07	04:34
	16:12	17:13	18:08	20:07	18 19:37 (20) 21:02	21:42
15	08:20	07:30	06:25	06:09	19:19 (20) 05:06	04:34
	16:14	17:15	18:10	20:09	19 19:38 (20) 21:04	21:43
16	08:19	07:28	06:22	17:43 (18) 06:06	19:19 (20) 05:04	04:34
	16:16	17:17	18:12	2 17:45 (18) 20:10	19 19:38 (20) 21:05	21:43
17	08:18	07:26	06:20	17:42 (18) 06:04	19:18 (20) 05:02	04:33
	16:18	17:19	18:14	5 17:47 (18) 20:12	19 19:37 (20) 21:07	21:44
18	08:17	07:24	06:18	17:40 (18) 06:02	19:18 (20) 05:01	04:33
	16:19	17:21	18:16	9 17:49 (18) 20:14	19 19:37 (20) 21:09	21:44
19	08:16	07:22	06:15	17:40 (18) 05:59	19:19 (20) 04:59	04:33
	16:21	17:23	18:18	11 17:51 (18) 20:16	17 19:36 (20) 21:10	21:44
20	08:15	07:19	06:13	17:39 (18) 05:57	19:20 (20) 04:57	04:33
	16:23	17:25	18:20	14 17:53 (18) 20:18	15 19:35 (20) 21:12	21:45
21	08:14	07:17	06:10	17:40 (18) 05:55	19:21 (20) 04:56	04:34
	16:25	17:27	18:21	13 17:53 (18) 20:20	13 19:34 (20) 21:14	21:45
22	08:12	07:15	06:08	17:40 (18) 05:52	19:22 (20) 04:55	04:34
	16:27	17:29	18:23	11 17:51 (18) 20:22	9 19:31 (20) 21:15	21:45
23	08:11	07:13	06:05	17:42 (18) 05:50	19:26 (20) 04:53	04:34
	16:29	17:31	18:25	8 17:50 (18) 20:24	1 19:27 (20) 21:17	21:45
24	08:10	07:10	06:03	05:48	04:52	04:34
	16:30	17:33	18:27	20:25	21:18	21:46
25	08:08	07:08	06:00	05:46	19:56 (1) 04:50	04:35
	16:32	17:35	18:29	20:27	2 19:58 (1) 21:20	21:46
26	08:07	07:06	05:58	05:43	19:54 (1) 04:49	04:35
	16:34	17:37	18:31	20:29	6 20:00 (1) 21:21	21:46
27	08:05	07:03	05:55	05:41	19:52 (1) 04:48	04:36
	16:36	17:39	18:33	20:31	10 20:02 (1) 21:23	21:45
28	08:04	07:01	05:53	05:39	19:51 (1) 04:47	04:36
	16:38	17:41	18:35	20:33	13 20:04 (1) 21:24	21:45
29	08:02	06:50	05:50	05:37	19:50 (1) 04:45	04:37
	16:40	19:37	20:35	15 20:05 (1) 21:26	21:45	
30	08:00	06:48	05:48	05:35	19:50 (1) 04:44	04:37
	16:42	19:38	20:37	17 20:07 (1) 21:27	21:45	
31	07:59	06:45	05:45	05:33	04:43	
	16:44	19:40	20:38	21:28		
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung			73	254	157	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.64	0.64	
Gesamte Reduktion			0.19	0.24	0.29	
Met.wahrsch.Beschattung			14	60	46	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DO - IO119  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	19:24 (20)	07:08	08:03
	21:44	21:09	20:01	9 19:33 (20)	18:46	16:35
2	04:39	05:20	06:16	19:26 (20)	07:10	08:05
	21:44	21:07	19:59	4 19:30 (20)	18:44	16:33
3	04:40	05:22	20:04 (1)	06:17	07:12	07:11
	21:44	21:05	8 20:12 (1)	19:56	18:41	16:31
4	04:40	05:24	20:02 (1)	06:19	07:14	07:13
	21:43	21:03	11 20:13 (1)	19:54	18:39	16:29
5	04:41	05:25	20:01 (1)	06:21	07:15	07:15
	21:43	21:01	14 20:15 (1)	19:51	18:37	16:27
6	04:42	05:27	20:00 (1)	06:23	07:17	07:17
	21:42	20:59	16 20:16 (1)	19:49	18:34	16:25
7	04:43	05:29	19:59 (1)	06:25	07:19	07:19
	21:41	20:57	17 20:16 (1)	19:46	18:32	16:23
8	04:44	05:31	19:59 (1)	06:26	07:21	07:21
	21:41	20:55	18 20:17 (1)	19:44	18:29	16:21
9	04:45	05:32	19:58 (1)	06:28	07:23	07:23
	21:40	20:53	19 20:17 (1)	19:41	18:27	16:19
10	04:46	05:34	19:57 (1)	06:30	07:25	07:25
	21:39	20:51	20 20:17 (1)	19:39	18:24	16:18
11	04:48	05:36	19:58 (1)	06:32	07:27	07:27
	21:38	20:49	19 20:17 (1)	19:36	18:22	16:16
12	04:49	05:38	19:57 (1)	06:34	07:28	07:29
	21:37	20:47	19 20:16 (1)	19:34	18:20	16:14
13	04:50	05:40	19:57 (1)	06:35	07:30	07:31
	21:36	20:45	17 20:14 (1)	19:31	18:17	16:13
14	04:51	05:41	19:58 (1)	06:37	07:32	07:33
	21:35	20:43	14 20:12 (1)	19:29	18:15	16:11
15	04:52	05:43	19:59 (1)	06:39	07:34	07:35
	21:34	20:40	12 20:11 (1)	19:26	18:12	16:09
16	04:54	05:45	19:59 (1)	06:41	07:36	07:36
	21:33	20:38	9 20:08 (1)	19:24	18:10	16:08
17	04:55	05:47	20:01 (1)	06:43	07:38	07:38
	21:32	20:36	5 20:06 (1)	19:21	18:08	16:06
18	04:57	05:49	06:44	07:40	07:40	08:23
	21:30	20:34	19:19	18:05	16:05	15:44
19	04:58	05:50	06:46	07:42	07:42	08:24
	21:29	20:31	19:16	18:03	16:03	15:45
20	04:59	05:52	19:30 (20)	06:48	18:29 (18)	07:44
	21:28	20:29	4 19:34 (20)	19:14	7 18:36 (18)	18:01
21	05:01	05:54	19:27 (20)	06:50	18:26 (18)	07:46
	21:26	20:27	10 19:37 (20)	19:11	11 18:37 (18)	17:59
22	05:02	05:56	19:24 (20)	06:52	18:25 (18)	07:48
	21:25	20:25	14 19:38 (20)	19:09	12 18:37 (18)	17:56
23	05:04	05:58	19:23 (20)	06:53	18:24 (18)	07:49
	21:23	20:22	16 19:39 (20)	19:06	14 18:38 (18)	17:54
24	05:05	05:59	19:22 (20)	06:55	18:24 (18)	07:51
	21:22	20:20	18 19:40 (20)	19:04	11 18:35 (18)	17:52
25	05:07	06:01	19:22 (20)	06:57	18:24 (18)	06:53
	21:20	20:18	18 19:40 (20)	19:01	9 18:33 (18)	16:50
26	05:09	06:03	19:21 (20)	06:59	18:23 (18)	06:55
	21:19	20:15	19 19:40 (20)	18:59	7 18:30 (18)	16:47
27	05:10	06:05	19:21 (20)	07:01	18:24 (18)	06:57
	21:17	20:13	19 19:40 (20)	18:56	3 18:27 (18)	16:45
28	05:12	06:07	19:21 (20)	07:02	06:59	07:58
	21:15	20:11	18 19:39 (20)	18:54	16:43	15:52
29	05:14	06:08	19:20 (20)	07:04	07:01	08:00
	21:14	20:08	18 19:38 (20)	18:51	16:41	15:51
30	05:15	06:10	19:21 (20)	07:06	07:03	08:01
	21:12	20:06	16 19:37 (20)	18:49	16:39	15:51
31	05:17	06:12	19:22 (20)	07:05	07:05	08:28
	21:10	20:03	13 19:35 (20)	18:47	16:37	15:53
Sonnenscheinstunden	514	461	383		328	257
astr.max.mögl.Beschattung		401	87			231
Red.Sonnenscheinwahrsch.		0.48	0.40			
Reduktion Betriebsdauer		0.90	0.90			
Reduktion Windrichtung		0.64	0.68			
Gesamte Reduktion		0.28	0.25			
Met.wahrsch.Beschattung		112	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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DP - IO120  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:52 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	17 20:09 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	19:52 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	19 20:11 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	19:51 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	20 20:11 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	19:51 (1) 04:39
	15:58	16:52	17:49	19:48	20:44	19 20:10 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:51 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	19 20:10 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	19:51 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	18 20:09 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	19:51 (1) 04:37
	16:02	16:58	17:55	19:54	20:50	18 20:09 (1) 21:36
8	08:26	07:44	06:42	06:26	05:18	19:52 (1) 04:37
	16:03	17:00	17:57	19:55	20:51	16 20:08 (1) 21:37
9	08:25	07:42	06:40	06:23	05:17	19:54 (1) 04:36
	16:05	17:02	17:59	19:57	20:53	13 20:07 (1) 21:38
10	08:24	07:40	06:37	06:21	05:15	19:55 (1) 04:36
	16:06	17:05	18:00	19:59	20:55	11 20:06 (1) 21:39
11	08:24	07:38	06:35	06:18	05:13	19:56 (1) 04:35
	16:08	17:07	18:02	20:01	20:57	8 20:04 (1) 21:40
12	08:23	07:36	06:32	06:16	05:11	04:35
	16:09	17:09	18:04	20:03	8 19:35 (20) 20:58	21:41
13	08:22	07:34	06:30	06:14	05:09	04:34
	16:11	17:11	18:06	20:05	12 19:37 (20) 21:00	21:41
14	08:21	07:32	06:27	06:11	05:07	04:34
	16:12	17:13	18:08	20:07	15 19:38 (20) 21:02	21:42
15	08:20	07:30	06:25	06:09	05:06	04:34
	16:14	17:15	18:10	20:09	17 19:40 (20) 21:04	21:43
16	08:19	07:28	06:22	06:06	05:04	04:34
	16:16	17:17	18:12	20:10	18 19:40 (20) 21:05	21:43
17	08:18	07:26	06:20	17:45 (18) 06:04	19:21 (20) 05:02	04:33
	16:18	17:19	18:14	2 17:47 (18) 20:12	19 19:40 (20) 21:07	21:44
18	08:17	07:24	06:18	17:43 (18) 06:02	19:21 (20) 05:01	04:33
	16:19	17:21	18:16	6 17:49 (18) 20:14	19 19:40 (20) 21:09	21:44
19	08:16	07:22	06:15	17:43 (18) 05:59	19:21 (20) 04:59	04:33
	16:21	17:23	18:18	8 17:51 (18) 20:16	19 19:40 (20) 21:10	21:44
20	08:15	07:19	06:13	17:41 (18) 05:57	19:21 (20) 04:57	04:33
	16:23	17:25	18:20	12 17:53 (18) 20:18	18 19:39 (20) 21:12	21:45
21	08:14	07:17	06:10	17:42 (18) 05:55	19:22 (20) 04:56	04:34
	16:25	17:27	18:21	13 17:55 (18) 20:20	16 19:38 (20) 21:14	21:45
22	08:12	07:15	06:08	17:41 (18) 05:52	19:22 (20) 04:55	04:34
	16:27	17:29	18:23	13 17:54 (18) 20:22	14 19:36 (20) 21:15	21:45
23	08:11	07:13	06:05	17:42 (18) 05:50	19:24 (20) 04:53	04:34
	16:29	17:31	18:25	12 17:54 (18) 20:24	11 19:35 (20) 21:17	21:45
24	08:10	07:10	06:03	17:43 (18) 05:48	19:26 (20) 04:52	04:34
	16:30	17:33	18:27	8 17:51 (18) 20:25	6 19:32 (20) 21:18	21:46
25	08:08	07:08	06:00	05:46	04:50	04:35
	16:32	17:35	18:29	20:27	21:20	21:46
26	08:07	07:06	05:58	05:43	19:59 (1) 04:49	04:35
	16:34	17:37	18:31	20:29	1 20:00 (1) 21:21	21:46
27	08:05	07:03	05:55	05:41	19:56 (1) 04:48	04:36
	16:36	17:39	18:33	20:31	6 20:02 (1) 21:23	21:45
28	08:04	07:01	05:53	05:39	19:55 (1) 04:47	04:36
	16:38	17:41	18:35	20:33	9 20:04 (1) 21:24	21:45
29	08:02	06:50	05:50	05:37	19:53 (1) 04:45	04:37
	16:40	19:37	20:35	12 20:05 (1) 21:26	21:45	
30	08:00	06:48	05:48	05:35	19:53 (1) 04:44	04:37
	16:42	19:38	20:37	14 20:07 (1) 21:27	21:45	
31	07:59	06:45	05:45	05:33	04:43	
	16:44	19:40	20:38	21:28		
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung			74	234	178	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.64	0.64	
Gesamte Reduktion			0.19	0.24	0.29	
Met.wahrsch.Beschattung			14	56	52	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	-------------------	----------------	------------	---------------------------	----------------------------

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DP - IO120  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:10 (1)   06:14	07:08	07:07	08:03
	21:44	21:09	20:12 (1)   20:01	18:46	16:35	15:50
2	04:39	05:20	20:06 (1)   06:16	07:10	07:09	08:05
	21:44	21:07	20:15 (1)   19:59	18:44	16:33	15:49
3	04:40	05:22	20:04 (1)   06:17	07:12	07:11	08:06
	21:44	21:05	20:17 (1)   19:56	18:41	16:31	15:48
4	04:40	05:24	20:03 (1)   06:19	07:14	07:13	08:08
	21:43	21:03	20:17 (1)   19:54	18:39	16:29	15:47
5	04:41	05:25	20:02 (1)   06:21	07:15	07:15	08:09
	21:43	21:01	20:18 (1)   19:51	18:37	16:27	15:47
6	04:42	05:27	20:02 (1)   06:23	07:17	07:17	08:10
	21:42	20:59	20:19 (1)   19:49	18:34	16:25	15:46
7	04:43	05:29	20:00 (1)   06:25	07:19	07:19	08:12
	21:41	20:57	20:19 (1)   19:46	18:32	16:23	15:46
8	04:44	05:31	20:00 (1)   06:26	07:21	07:21	08:13
	21:41	20:55	20:19 (1)   19:44	18:29	16:21	15:45
9	04:45	05:32	20:01 (1)   06:28	07:23	07:23	08:14
	21:40	20:53	20:20 (1)   19:41	18:27	16:19	15:45
10	04:46	05:34	20:00 (1)   06:30	07:25	07:25	08:16
	21:39	20:51	20:19 (1)   19:39	18:24	16:18	15:45
11	04:48	05:36	20:00 (1)   06:32	07:27	07:27	08:17
	21:38	20:49	20:18 (1)   19:36	18:22	16:16	15:44
12	04:49	05:38	20:00 (1)   06:34	07:28	07:29	08:18
	21:37	20:47	20:16 (1)   19:34	18:20	16:14	15:44
13	04:50	05:40	20:00 (1)   06:35	07:30	07:31	08:19
	21:36	20:45	20:14 (1)   19:31	18:17	16:13	15:44
14	04:51	05:41	20:01 (1)   06:37	07:32	07:33	08:20
	21:35	20:43	20:12 (1)   19:29	18:15	16:11	15:44
15	04:52	05:43	20:02 (1)   06:39	07:34	07:35	08:21
	21:34	20:40	20:11 (1)   19:26	18:12	16:09	15:44
16	04:54	05:45	20:03 (1)   06:41	07:36	07:36	08:22
	21:33	20:38	20:08 (1)   19:24	18:10	16:08	15:44
17	04:55	05:47	06:43	07:38	07:38	08:23
	21:32	20:36	19:21	18:08	16:06	15:44
18	04:57	05:49	06:44	07:40	07:40	08:23
	21:30	20:34	19:19	18:05	16:05	15:44
19	04:58	05:50	19:31 (20)   06:46	18:31 (18)   07:42	07:42	08:24
	21:29	20:31	19:39 (20)   19:16	18:38 (18)   18:03	16:03	15:45
20	04:59	05:52	19:29 (20)   06:48	18:29 (18)   07:44	07:44	08:25
	21:28	20:29	19:41 (20)   19:14	18:40 (18)   18:01	16:02	15:45
21	05:01	05:54	19:28 (20)   06:50	18:27 (18)   07:46	07:46	08:25
	21:26	20:27	19:42 (20)   19:11	18:40 (18)   17:59	16:01	15:45
22	05:02	05:56	19:26 (20)   06:52	18:26 (18)   07:48	07:48	08:26
	21:25	20:25	19:42 (20)   19:09	18:40 (18)   17:56	15:59	15:46
23	05:04	05:58	19:25 (20)   06:53	18:26 (18)   07:49	07:49	08:26
	21:23	20:22	19:43 (20)   19:06	18:38 (18)   17:54	15:58	15:46
24	05:05	05:59	19:25 (20)   06:55	18:26 (18)   07:51	07:51	08:27
	21:22	20:20	19:43 (20)   19:04	18:35 (18)   17:52	15:57	15:47
25	05:07	06:01	19:25 (20)   06:57	18:27 (18)   06:53	07:53	08:27
	21:20	20:18	19:44 (20)   19:01	18:33 (18)   16:50	15:56	15:48
26	05:09	06:03	19:24 (20)   06:59	18:26 (18)   06:55	07:55	08:28
	21:19	20:15	19:42 (20)   18:59	18:30 (18)   16:47	15:54	15:48
27	05:10	06:05	19:24 (20)   07:01	18:30 (18)   06:57	07:56	08:28
	21:17	20:13	19:42 (20)   18:56	18:30 (18)   16:45	15:53	15:49
28	05:12	06:07	19:24 (20)   07:02	18:30 (18)   06:59	07:58	08:28
	21:15	20:11	19:42 (20)   18:54	18:30 (18)   16:43	15:52	15:50
29	05:14	06:08	19:24 (20)   07:04	18:30 (18)   07:01	08:00	08:28
	21:14	20:08	19:39 (20)   18:51	18:30 (18)   16:41	15:51	15:51
30	05:15	06:10	19:25 (20)   07:06	18:30 (18)   07:03	08:01	08:28
	21:12	20:06	19:37 (20)   18:49	18:30 (18)   16:39	15:51	15:52
31	05:17	06:12	19:27 (20)   07:05	18:30 (18)   07:05	08:01	08:28
	21:10	20:03	19:35 (20)   07:05	18:30 (18)   16:37	15:51	15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung		414	76			
Red.Sonnenscheinwahrsch.		0.48	0.40			
Reduktion Betriebsdauer		0.90	0.90			
Reduktion Windrichtung		0.64	0.68			
Gesamte Reduktion		0.28	0.25			
Met.wahrsch.Beschattung		116	19			

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DQ - IO121  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:55 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	14 20:09 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	19:54 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	17 20:11 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	19:54 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	18 20:12 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	19:53 (1) 04:39
	15:58	16:52	17:49	19:48	20:44	20 20:13 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:53 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	19 20:12 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	19:53 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	19 20:12 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	19:53 (1) 04:37
	16:02	16:58	17:55	19:54	20:50	18 20:11 (1) 21:36
8	08:26	07:44	06:42	06:26	05:18	19:53 (1) 04:37
	16:03	17:00	17:57	19:55	20:51	18 20:11 (1) 21:37
9	08:25	07:42	06:40	06:23	05:17	19:55 (1) 04:36
	16:05	17:02	17:59	19:57	20:53	16 20:11 (1) 21:38
10	08:24	07:40	06:37	06:21	05:15	19:55 (1) 04:36
	16:06	17:05	18:00	19:59	20:55	15 20:10 (1) 21:39
11	08:24	07:38	06:35	06:18	05:13	19:56 (1) 04:35
	16:08	17:07	18:02	20:01	20:57	12 20:08 (1) 21:40
12	08:23	07:36	06:32	06:16	05:11	19:58 (1) 04:35
	16:09	17:09	18:04	20:03	20:58	9 20:07 (1) 21:41
13	08:22	07:34	06:30	06:14	19:31 (20)	05:09 04:34
	16:11	17:11	18:06	20:05	6 19:37 (20)	21:00 21:41
14	08:21	07:32	06:27	06:11	19:28 (20)	05:07 04:34
	16:12	17:13	18:08	20:07	10 19:38 (20)	21:02 21:42
15	08:20	07:30	06:25	06:09	19:27 (20)	05:06 04:34
	16:14	17:15	18:10	20:09	13 19:40 (20)	21:04 21:43
16	08:19	07:28	06:22	06:06	19:26 (20)	05:04 04:34
	16:16	17:17	18:12	20:10	16 19:42 (20)	21:05 21:43
17	08:18	07:26	06:20	06:04	19:24 (20)	05:02 04:33
	16:18	17:19	18:14	20:12	18 19:42 (20)	21:07 21:44
18	08:17	07:24	06:18	06:02	19:24 (20)	05:01 04:33
	16:19	17:21	18:16	2 17:47 (18)	20:14 18 19:42 (20)	21:09 21:44
19	08:16	07:22	06:15	17:45 (18)	05:59 19:24 (20)	04:59 04:33
	16:21	17:23	18:18	6 17:51 (18)	20:16 19 19:43 (20)	21:10 21:44
20	08:15	07:19	06:13	17:44 (18)	05:57 19:24 (20)	04:57 04:33
	16:23	17:25	18:20	9 17:53 (18)	20:18 18 19:42 (20)	21:12 21:45
21	08:14	07:17	06:10	17:44 (18)	05:55 19:24 (20)	04:56 04:34
	16:25	17:27	18:21	11 17:55 (18)	20:20 18 19:42 (20)	21:14 21:45
22	08:12	07:15	06:08	17:43 (18)	05:52 19:24 (20)	04:55 04:34
	16:27	17:29	18:23	13 17:56 (18)	20:22 17 19:41 (20)	21:15 21:45
23	08:11	07:13	06:05	17:44 (18)	05:50 19:25 (20)	04:53 04:34
	16:29	17:31	18:25	13 17:57 (18)	20:24 15 19:40 (20)	21:17 21:45
24	08:10	07:10	06:03	17:44 (18)	05:48 19:26 (20)	04:52 04:34
	16:30	17:33	18:27	11 17:55 (18)	20:25 12 19:38 (20)	21:18 21:46
25	08:08	07:08	06:00	17:46 (18)	05:46 19:28 (20)	04:50 04:35
	16:32	17:35	18:29	7 17:53 (18)	20:27 8 19:36 (20)	21:20 21:46
26	08:07	07:06	05:58	05:43	04:49	04:35
	16:34	17:37	18:31	20:29	21:21	21:46
27	08:05	07:03	05:55	05:41	20:01 (1)	04:48 04:36
	16:36	17:39	18:33	20:31	1 20:02 (1)	21:23 21:45
28	08:04	07:01	05:53	05:39	19:59 (1)	04:47 04:36
	16:38	17:41	18:35	20:33	5 20:04 (1)	21:24 21:45
29	08:02	06:50	05:50	05:37	19:57 (1)	04:45 04:37
	16:40	19:37	20:35	8 20:05 (1)	21:26 21:45	
30	08:00	06:48	05:48	05:35	19:56 (1)	04:44 04:37
	16:42	19:38	20:37	11 20:07 (1)	21:27 21:45	
31	07:59	06:45	05:45	05:33	04:43	04:35
	16:44	19:40	20:38	21:28	496	512
Sonnenscheinstunden	248	272	367	421		
astr.max.mögl.Beschattung			72	213	195	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.64	0.64	
Gesamte Reduktion			0.19	0.24	0.29	
Met.wahrsch.Beschattung			14	50	57	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DQ - IO121

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:08 (1) 06:14	07:08	07:07	08:03
	21:44	21:09	10 20:18 (1) 20:01	18:46	16:35	15:50
2	04:39	05:20	20:06 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	13 20:19 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	20:05 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	15 20:20 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:04 (1) 06:19	07:14	07:13	08:08
	21:43	21:03	16 20:20 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:04 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	17 20:21 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:03 (1) 06:23	07:17	07:17	08:10
	21:42	20:59	19 20:22 (1) 19:49	18:34	16:25	15:46
7	04:43	05:29	20:02 (1) 06:25	07:19	07:19	08:12
	21:41	20:57	19 20:21 (1) 19:46	18:32	16:23	15:46
8	04:44	05:31	20:03 (1) 06:26	07:21	07:21	08:13
	21:41	20:55	19 20:22 (1) 19:44	18:29	16:21	15:45
9	04:45	05:32	20:03 (1) 06:28	07:23	07:23	08:14
	21:40	20:53	19 20:22 (1) 19:41	18:27	16:19	15:45
10	04:46	05:34	20:02 (1) 06:30	07:25	07:25	08:16
	21:39	20:51	18 20:20 (1) 19:39	18:24	16:18	15:45
11	04:48	05:36	20:03 (1) 06:32	07:27	07:27	08:17
	21:38	20:49	15 20:18 (1) 19:36	18:22	16:16	15:44
12	04:49	05:38	20:02 (1) 06:34	07:28	07:29	08:18
	21:37	20:47	14 20:16 (1) 19:34	18:20	16:14	15:44
13	04:50	05:40	20:03 (1) 06:35	07:30	07:31	08:19
	21:36	20:45	11 20:14 (1) 19:31	18:17	16:13	15:44
14	04:51	05:41	20:05 (1) 06:37	07:32	07:33	08:20
	21:35	20:43	7 20:12 (1) 19:29	18:15	16:11	15:44
15	04:52	05:43	20:07 (1) 06:39	07:34	07:35	08:21
	21:34	20:40	4 20:11 (1) 19:26	18:12	16:09	15:44
16	04:54	05:45	06:41	07:36	07:36	08:22
	21:33	20:38	19:24	18:10	16:08	15:44
17	04:55	05:47	19:37 (20) 06:43	07:38	07:38	08:23
	21:32	20:36	3 19:40 (20) 19:21	18:08	16:06	15:44
18	04:57	05:49	19:34 (20) 06:44	6 18:34 (18) 07:40	07:40	08:23
	21:30	20:34	10 19:44 (20) 19:19	6 18:40 (18) 18:05	16:05	15:44
19	04:58	05:50	19:31 (20) 06:46	10 18:32 (18) 07:42	07:42	08:24
	21:29	20:31	13 19:44 (20) 19:16	10 18:42 (18) 18:03	16:03	15:45
20	04:59	05:52	19:30 (20) 06:48	10 18:30 (18) 07:44	07:44	08:25
	21:28	20:29	16 19:46 (20) 19:14	13 18:43 (18) 18:01	16:02	15:45
21	05:01	05:54	19:29 (20) 06:50	13 18:29 (18) 07:46	07:46	08:25
	21:26	20:27	17 19:46 (20) 19:11	13 18:42 (18) 17:59	16:01	15:45
22	05:02	05:56	19:28 (20) 06:52	12 18:28 (18) 07:48	07:48	08:26
	21:25	20:25	18 19:46 (20) 19:09	12 18:40 (18) 17:56	15:59	15:46
23	05:04	05:58	19:28 (20) 06:53	10 18:28 (18) 07:49	07:49	08:26
	21:23	20:22	18 19:46 (20) 19:06	10 18:38 (18) 17:54	15:58	15:46
24	05:05	05:59	19:27 (20) 06:55	6 18:29 (18) 07:51	07:51	08:27
	21:22	20:20	19 19:46 (20) 19:04	6 18:35 (18) 17:52	15:57	15:47
25	05:07	06:01	19:28 (20) 06:57	3 18:30 (18) 06:53	07:53	08:27
	21:20	20:18	18 19:46 (20) 19:01	3 18:33 (18) 16:50	15:56	15:48
26	05:09	06:03	19:27 (20) 06:59	06:55	07:55	08:28
	21:19	20:15	18 19:45 (20) 18:59	16:47	15:54	15:48
27	05:10	06:05	19:28 (20) 07:01	06:57	07:56	08:28
	21:17	20:13	16 19:44 (20) 18:56	16:45	15:53	15:49
28	05:12	06:07	19:28 (20) 07:02	06:59	07:58	08:28
	21:15	20:11	14 19:42 (20) 18:54	16:43	15:52	15:50
29	05:14	06:08	19:29 (20) 07:04	07:01	08:00	08:28
	21:14	20:08	10 19:39 (20) 18:51	16:41	15:51	15:51
30	05:15	06:10	19:31 (20) 07:06	07:03	08:01	08:28
	21:12	20:06	6 19:37 (20) 18:49	16:39	15:51	15:52
31	05:17	20:10 (1) 06:12		07:05		08:28
	21:10	5 20:15 (1) 20:03		16:37		15:53
Sonneneinstrahlung	514	461	383	328	257	231
astr.max.mögl.Beschattung	5	412	73			
Red.Sonneneinstrahlung	0.44	0.48	0.40			
Reduktion Betriebsdauer	0.90	0.90	0.90			
Reduktion Windrichtung	0.64	0.64	0.68			
Gesamte Reduktion	0.25	0.28	0.25			
Met.wahrsch.Beschattung	1	115	18			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	-------------------	----------------	------------	---------------------------	----------------------------

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DR - IO122  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	19:58 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	11 20:09 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	19:57 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	14 20:11 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	19:56 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	16 20:12 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	19:56 (1) 04:39
	15:58	16:52	17:49	19:48	20:44	18 20:14 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:55 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	20 20:15 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	19:55 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	19 20:14 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	19:55 (1) 04:37
	16:02	16:58	17:55	19:54	20:50	19 20:14 (1) 21:36
8	08:26	07:44	06:42	06:26	05:18	19:55 (1) 04:37
	16:03	17:00	17:57	19:55	20:51	19 20:14 (1) 21:37
9	08:25	07:42	06:40	06:23	05:17	19:56 (1) 04:36
	16:05	17:02	17:59	19:57	20:53	18 20:14 (1) 21:38
10	08:24	07:40	06:37	06:21	05:15	19:56 (1) 04:36
	16:06	17:05	18:00	19:59	20:55	17 20:13 (1) 21:39
11	08:24	07:38	06:35	06:18	05:13	19:57 (1) 04:35
	16:08	17:07	18:02	20:01	20:57	15 20:12 (1) 21:40
12	08:23	07:36	06:32	06:16	05:11	19:59 (1) 04:35
	16:09	17:09	18:04	20:03	20:58	12 20:11 (1) 21:41
13	08:22	07:34	06:30	06:14	05:09	20:00 (1) 04:34
	16:11	17:11	18:06	20:05	21:00	10 20:10 (1) 21:41
14	08:21	07:32	06:27	06:11	19:35 (20) 05:07	20:01 (1) 04:34
	16:12	17:13	18:08	20:07	3 19:38 (20) 21:02	6 20:07 (1) 21:42
15	08:20	07:30	06:25	06:09	19:31 (20) 05:06	04:34
	16:14	17:15	18:10	20:09	9 19:40 (20) 21:04	21:43
16	08:19	07:28	06:22	06:06	19:30 (20) 05:04	04:34
	16:16	17:17	18:12	20:10	12 19:42 (20) 21:05	21:43
17	08:18	07:26	06:20	06:04	19:28 (20) 05:02	04:33
	16:18	17:19	18:14	20:12	16 19:44 (20) 21:07	21:44
18	08:17	07:24	06:18	06:02	19:27 (20) 05:01	04:33
	16:19	17:21	18:16	20:14	18 19:45 (20) 21:09	21:44
19	08:16	07:22	06:15	17:49 (18) 05:59	19:27 (20) 04:59	04:33
	16:21	17:23	18:18	2 17:51 (18) 20:16	18 19:45 (20) 21:10	21:44
20	08:15	07:19	06:13	17:47 (18) 05:57	19:27 (20) 04:57	04:33
	16:23	17:25	18:20	6 17:53 (18) 20:18	18 19:45 (20) 21:12	21:45
21	08:14	07:17	06:10	17:46 (18) 05:55	19:27 (20) 04:56	04:34
	16:25	17:27	18:21	9 17:55 (18) 20:20	18 19:45 (20) 21:14	21:45
22	08:12	07:15	06:08	17:45 (18) 05:52	19:26 (20) 04:55	04:34
	16:27	17:29	18:23	11 17:56 (18) 20:22	18 19:44 (20) 21:15	21:45
23	08:11	07:13	06:05	17:45 (18) 05:50	19:26 (20) 04:53	04:34
	16:29	17:31	18:25	14 17:59 (18) 20:24	18 19:44 (20) 21:17	21:45
24	08:10	07:10	06:03	17:45 (18) 05:48	19:27 (20) 04:52	04:34
	16:30	17:33	18:27	13 17:58 (18) 20:25	16 19:43 (20) 21:18	21:46
25	08:08	07:08	06:00	17:46 (18) 05:46	19:28 (20) 04:50	04:35
	16:32	17:35	18:29	11 17:57 (18) 20:27	14 19:42 (20) 21:20	21:46
26	08:07	07:06	05:58	17:47 (18) 05:43	19:29 (20) 04:49	04:35
	16:34	17:37	18:31	8 17:55 (18) 20:29	11 19:40 (20) 21:21	21:46
27	08:05	07:03	05:55	05:41	19:32 (20) 04:48	04:36
	16:36	17:39	18:33	20:31	6 19:38 (20) 21:23	21:45
28	08:04	07:01	05:53	05:39	04:47	04:36
	16:38	17:41	18:35	20:33	21:24	21:45
29	08:02	06:50	05:37	05:37	20:01 (1) 04:45	04:37
	16:40	19:37	20:35	4 20:05 (1) 21:26	21:45	
30	08:00	06:48	05:35	05:35	19:59 (1) 04:44	04:37
	16:42	19:38	20:37	8 20:07 (1) 21:27	21:45	
31	07:59	06:45	06:45	04:43	04:43	
	16:44	19:40	21:28	496	512	
Sonnenscheinstunden	248	272	367	421		
astr.max.mögl.Beschattung			74	207	214	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.64	0.64	
Gesamte Reduktion			0.19	0.23	0.29	
Met.wahrsch.Beschattung			14	49	62	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DR - IO122

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:09 (1) 06:14	07:08	07:07	08:03
	21:44	21:09	20:22 (1) 20:01	18:46	16:35	15:50
2	04:39	05:20	20:07 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	20:23 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	20:07 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	20:24 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:05 (1) 06:19	07:14	07:13	08:08
	21:43	21:03	20:23 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:05 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	20:24 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:05 (1) 06:23	07:17	07:17	08:10
	21:42	20:59	20:25 (1) 19:49	18:34	16:25	15:46
7	04:43	05:29	20:05 (1) 06:25	07:19	07:19	08:12
	21:41	20:57	20:24 (1) 19:46	18:32	16:23	15:46
8	04:44	05:31	20:05 (1) 06:26	07:21	07:21	08:13
	21:41	20:55	20:24 (1) 19:44	18:29	16:21	15:45
9	04:45	05:32	20:05 (1) 06:28	07:23	07:23	08:14
	21:40	20:53	20:23 (1) 19:41	18:27	16:19	15:45
10	04:46	05:34	20:05 (1) 06:30	07:25	07:25	08:16
	21:39	20:51	20:20 (1) 19:39	18:24	16:18	15:45
11	04:48	05:36	20:06 (1) 06:32	07:27	07:27	08:17
	21:38	20:49	20:18 (1) 19:36	18:22	16:16	15:44
12	04:49	05:38	20:06 (1) 06:34	07:28	07:29	08:18
	21:37	20:47	20:16 (1) 19:34	18:20	16:14	15:44
13	04:50	05:40	20:07 (1) 06:35	07:30	07:31	08:19
	21:36	20:45	20:14 (1) 19:31	18:17	16:13	15:44
14	04:51	05:41	20:09 (1) 06:37	07:32	07:33	08:20
	21:35	20:43	20:12 (1) 19:29	18:15	16:11	15:44
15	04:52	05:43	06:39	07:34	07:35	08:21
	21:34	20:40	19:26	18:12	16:09	15:44
16	04:54	05:45	19:38 (20) 06:41	07:36	07:36	08:22
	21:33	20:38	19:45 (20) 19:24	18:10	16:08	15:44
17	04:55	05:47	19:36 (20) 06:43	18:36 (18) 07:38	07:38	08:23
	21:32	20:36	19:47 (20) 19:21	7 18:43 (18) 18:08	16:06	15:44
18	04:57	05:49	19:34 (20) 06:44	18:34 (18) 07:40	07:40	08:23
	21:30	20:34	19:49 (20) 19:19	10 18:44 (18) 18:05	16:05	15:44
19	04:58	05:50	19:32 (20) 06:46	18:33 (18) 07:42	07:42	08:24
	21:29	20:31	19:49 (20) 19:16	12 18:45 (18) 18:03	16:03	15:45
20	04:59	05:52	19:32 (20) 06:48	18:32 (18) 07:44	07:44	08:25
	21:28	20:29	19:49 (20) 19:14	14 18:46 (18) 18:01	16:02	15:45
21	05:01	05:54	19:31 (20) 06:50	18:31 (18) 07:46	07:46	08:25
	21:26	20:27	19:50 (20) 19:11	11 18:42 (18) 17:59	16:01	15:45
22	05:02	05:56	19:30 (20) 06:52	18:31 (18) 07:48	07:48	08:26
	21:25	20:25	19:49 (20) 19:09	9 18:40 (18) 17:56	15:59	15:46
23	05:04	05:58	19:30 (20) 06:53	18:31 (18) 07:49	07:49	08:26
	21:23	20:22	19:49 (20) 19:06	7 18:38 (18) 17:54	15:58	15:46
24	05:05	05:59	19:31 (20) 06:55	18:32 (18) 07:51	07:51	08:27
	21:22	20:20	19:49 (20) 19:04	3 18:35 (18) 17:52	15:57	15:47
25	05:07	06:01	19:31 (20) 06:57	06:53	07:53	08:27
	21:20	20:18	19:49 (20) 19:01	16:50	15:56	15:48
26	05:09	06:03	19:31 (20) 06:59	06:55	07:55	08:28
	21:19	20:15	19:46 (20) 18:59	16:47	15:54	15:48
27	05:10	06:05	19:32 (20) 07:01	06:57	07:56	08:28
	21:17	20:13	19:44 (20) 18:56	16:45	15:53	15:49
28	05:12	06:07	19:33 (20) 07:02	06:59	07:58	08:28
	21:15	20:11	9 19:42 (20) 18:54	16:43	15:52	15:50
29	05:14	06:08	19:36 (20) 07:04	07:01	08:00	08:28
	21:14	20:08	3 19:39 (20) 18:51	16:41	15:51	15:51
30	05:15	20:11 (1) 06:10	07:06	07:03	08:01	08:28
	21:12	7 20:18 (1) 20:06	18:49	16:39	15:51	15:52
31	05:17	20:09 (1) 06:12		07:05		08:28
	21:10	12 20:21 (1) 20:03		16:37		15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	19	405				
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40			
Reduktion Betriebsdauer	0.90	0.90	0.90			
Reduktion Windrichtung	0.64	0.64	0.68			
Gesamte Reduktion	0.25	0.28	0.25			
Met.wahrsch.Beschattung	5	112	18			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DS - IO123  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	20:01 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	8 20:09 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	20:00 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	11 20:11 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	19:59 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	13 20:12 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	19:58 (1) 04:40
	15:58	16:52	17:49	19:48	20:44	16 20:14 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	19:58 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	17 20:15 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	19:57 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	19 20:16 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	19:57 (1) 04:37
	16:02	16:58	17:55	19:54	20:50	19 20:16 (1) 21:36
8	08:26	07:44	06:42	06:26	05:18	19:57 (1) 04:37
	16:03	17:00	17:57	19:55	20:51	19 20:16 (1) 21:37
9	08:25	07:42	06:40	06:23	05:17	19:58 (1) 04:36
	16:05	17:02	17:59	19:57	20:53	18 20:16 (1) 21:38
10	08:24	07:40	06:37	06:21	05:15	19:58 (1) 04:36
	16:06	17:05	18:00	19:59	20:55	18 20:16 (1) 21:39
11	08:24	07:38	06:35	06:18	05:13	19:58 (1) 04:35
	16:08	17:07	18:02	20:01	20:57	17 20:15 (1) 21:40
12	08:23	07:36	06:32	06:16	05:11	20:00 (1) 04:35
	16:09	17:09	18:04	20:03	20:58	15 20:15 (1) 21:41
13	08:22	07:34	06:30	06:14	05:09	20:00 (1) 04:34
	16:11	17:11	18:06	20:05	21:00	13 20:13 (1) 21:41
14	08:21	07:32	06:27	06:11	05:07	20:01 (1) 04:34
	16:12	17:13	18:08	20:07	21:02	11 20:12 (1) 21:42
15	08:20	07:30	06:25	06:09	05:06	20:04 (1) 04:34
	16:14	17:15	18:10	20:09	21:04	6 20:10 (1) 21:43
16	08:19	07:28	06:22	06:06	19:35 (20) 05:04	04:34
	16:16	17:17	18:12	20:10	7 19:42 (20) 21:05	21:43
17	08:18	07:26	06:20	06:04	19:32 (20) 05:02	04:33
	16:18	17:19	18:14	20:12	12 19:44 (20) 21:07	21:44
18	08:17	07:24	06:18	06:02	19:31 (20) 05:01	04:33
	16:19	17:21	18:16	20:14	15 19:46 (20) 21:09	21:44
19	08:16	07:22	06:15	05:59	19:30 (20) 04:59	04:33
	16:21	17:23	18:18	20:16	17 19:47 (20) 21:10	21:44
20	08:15	07:19	06:13	17:50 (18) 05:57	19:30 (20) 04:57	04:33
	16:23	17:25	18:20	3 17:53 (18) 20:18	18 19:48 (20) 21:12	21:45
21	08:14	07:17	06:10	17:49 (18) 05:55	19:29 (20) 04:56	04:34
	16:25	17:27	18:21	6 17:55 (18) 20:20	19 19:48 (20) 21:14	21:45
22	08:12	07:15	06:08	17:48 (18) 05:52	19:28 (20) 04:55	04:34
	16:27	17:29	18:23	8 17:56 (18) 20:22	19 19:47 (20) 21:15	21:45
23	08:11	07:13	06:05	17:48 (18) 05:50	19:29 (20) 04:53	04:34
	16:29	17:31	18:25	11 17:59 (18) 20:24	18 19:47 (20) 21:17	21:45
24	08:10	07:10	06:03	17:47 (18) 05:48	19:29 (20) 04:52	04:34
	16:30	17:33	18:27	13 18:00 (18) 20:25	18 19:47 (20) 21:18	21:46
25	08:08	07:08	06:00	17:47 (18) 05:46	19:29 (20) 04:50	04:35
	16:32	17:35	18:29	13 18:00 (18) 20:27	17 19:46 (20) 21:20	21:46
26	08:07	07:06	05:58	17:48 (18) 05:43	19:30 (20) 04:49	04:35
	16:34	17:37	18:31	11 17:59 (18) 20:29	15 19:45 (20) 21:21	21:46
27	08:05	07:03	05:55	17:49 (18) 05:41	19:31 (20) 04:48	04:36
	16:36	17:39	18:33	8 17:57 (18) 20:31	13 19:44 (20) 21:23	21:45
28	08:04	07:01	05:53	05:39	19:33 (20) 04:47	04:36
	16:38	17:41	18:35	20:33	8 19:41 (20) 21:24	21:45
29	08:02	06:50	05:50	05:37	04:45	04:37
	16:40	19:37	20:35	21:26	21:45	
30	08:00	06:48	05:35	05:35	20:03 (1) 04:44	04:37
	16:42	19:38	20:37	4 20:07 (1) 21:27	21:45	
31	07:59	06:45	06:45	04:43	04:43	
	16:44	19:40	21:28	496	512	
Sonnenscheinstunden	248	272	367	421		
astr.max.mögl.Beschattung			73	200	220	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.63	0.64	
Gesamte Reduktion			0.19	0.23	0.29	
Met.wahrsch.Beschattung			14	47	64	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DS - IO123

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	05:19	20:10 (1) 06:14	07:08	07:07	08:03	
	21:44	21:08	15 20:25 (1) 20:01	18:46	16:35	15:50	
2	04:39	05:20	20:08 (1) 06:16	07:10	07:09	08:05	
	21:44	21:07	17 20:25 (1) 19:59	18:44	16:33	15:49	
3	04:40	05:22	20:08 (1) 06:17	07:12	07:11	08:06	
	21:44	21:05	18 20:26 (1) 19:56	18:41	16:31	15:48	
4	04:40	05:24	20:07 (1) 06:19	07:14	07:13	08:08	
	21:43	21:03	19 20:26 (1) 19:54	18:39	16:29	15:47	
5	04:41	05:25	20:07 (1) 06:21	07:15	07:15	08:09	
	21:43	21:01	19 20:26 (1) 19:51	18:37	16:27	15:47	
6	04:42	05:27	20:08 (1) 06:23	07:17	07:17	08:10	
	21:42	20:59	19 20:27 (1) 19:49	18:34	16:25	15:46	
7	04:43	05:29	20:07 (1) 06:25	07:19	07:19	08:12	
	21:41	20:57	19 20:26 (1) 19:46	18:32	16:23	15:46	
8	04:44	05:31	20:07 (1) 06:26	07:21	07:21	08:13	
	21:41	20:55	17 20:24 (1) 19:44	18:29	16:21	15:45	
9	04:45	05:32	20:08 (1) 06:28	07:23	07:23	08:14	
	21:40	20:53	15 20:23 (1) 19:41	18:27	16:19	15:45	
10	04:46	05:34	20:08 (1) 06:30	07:25	07:25	08:16	
	21:39	20:51	12 20:20 (1) 19:39	18:24	16:18	15:45	
11	04:48	05:36	20:09 (1) 06:32	07:27	07:27	08:17	
	21:38	20:49	9 20:18 (1) 19:36	18:22	16:16	15:44	
12	04:49	05:38	20:09 (1) 06:34	07:28	07:29	08:18	
	21:37	20:47	7 20:16 (1) 19:34	18:20	16:14	15:44	
13	04:50	05:40	20:11 (1) 06:35	07:30	07:31	08:19	
	21:36	20:45	3 20:14 (1) 19:31	18:17	16:13	15:44	
14	04:51	05:41	06:37	07:32	07:33	08:20	
	21:35	20:43	19:29	18:15	16:11	15:44	
15	04:52	05:43	19:40 (20) 06:39	07:34	07:35	08:21	
	21:34	20:40	10 19:50 (20) 19:26	18:12	16:09	15:44	
16	04:54	05:45	19:38 (20) 06:41	18:39 (18)	07:36	07:36	08:22
	21:33	20:38	12 19:50 (20) 19:24	7 18:46 (18)	18:10	16:08	15:44
17	04:55	05:47	19:37 (20) 06:43	18:36 (18)	07:38	07:38	08:23
	21:32	20:36	15 19:52 (20) 19:21	11 18:47 (18)	18:08	16:06	15:44
18	04:57	05:49	19:36 (20) 06:44	18:35 (18)	07:40	07:40	08:23
	21:30	20:34	17 19:53 (20) 19:19	13 18:48 (18)	18:05	16:05	15:44
19	04:58	05:50	19:34 (20) 06:46	18:34 (18)	07:42	07:42	08:24
	21:29	20:31	18 19:52 (20) 19:16	14 18:48 (18)	18:03	16:03	15:45
20	04:59	05:52	19:34 (20) 06:48	18:34 (18)	07:44	07:44	08:25
	21:28	20:29	19 19:53 (20) 19:14	12 18:46 (18)	18:01	16:02	15:45
21	05:01	05:54	19:34 (20) 06:50	18:33 (18)	07:46	07:46	08:25
	21:26	20:27	19 19:53 (20) 19:11	9 18:42 (18)	17:59	16:01	15:45
22	05:02	05:56	19:33 (20) 06:52	18:33 (18)	07:48	07:48	08:26
	21:25	20:25	19 19:52 (20) 19:09	7 18:40 (18)	17:56	15:59	15:46
23	05:04	05:58	19:33 (20) 06:53	18:34 (18)	07:49	07:49	08:26
	21:23	20:22	19 19:52 (20) 19:06	4 18:38 (18)	17:54	15:58	15:46
24	05:05	05:59	19:34 (20) 06:55	07:51	07:51	08:27	
	21:22	20:20	17 19:51 (20) 19:04	17:52	15:57	15:47	
25	05:07	06:01	19:35 (20) 06:57	06:53	07:53	08:27	
	21:20	20:18	14 19:49 (20) 19:01	16:50	15:56	15:48	
26	05:09	06:03	19:35 (20) 06:59	06:55	07:55	08:28	
	21:19	20:15	11 19:46 (20) 18:59	16:47	15:54	15:48	
27	05:10	06:05	19:37 (20) 07:01	06:57	07:56	08:28	
	21:17	20:13	7 19:44 (20) 18:56	16:45	15:53	15:49	
28	05:12	20:16 (1) 06:07	07:02	06:59	07:58	08:28	
	21:15	2 20:18 (1) 20:11	18:54	16:43	15:52	15:50	
29	05:14	20:13 (1) 06:08	07:04	07:01	08:00	08:28	
	21:14	9 20:22 (1) 20:08	18:51	16:41	15:51	15:51	
30	05:15	20:11 (1) 06:10	07:06	07:03	08:01	08:28	
	21:12	12 20:23 (1) 20:06	18:49	16:39	15:51	15:52	
31	05:17	20:10 (1) 06:12	07:05	07:05	08:28	08:28	
	21:10	14 20:24 (1) 20:03	16:37	16:37	15:53	15:53	
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	37	386	77				
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40				
Reduktion Betriebsdauer	0.90	0.90	0.90				
Reduktion Windrichtung	0.64	0.63	0.68				
Gesamte Reduktion	0.25	0.28	0.25				
Met.wahrsch.Beschattung	9	107	19				

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DT - IO124  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28	07:57	06:59	06:43	05:33	20:06 (1) 04:42
	15:54	16:46	17:43	19:42	20:39	3 20:09 (1) 21:29
2	08:28	07:55	06:56	06:40	05:31	20:04 (1) 04:41
	15:55	16:48	17:45	19:44	20:40	7 20:11 (1) 21:31
3	08:28	07:54	06:54	06:38	05:28	20:02 (1) 04:40
	15:57	16:50	17:47	19:46	20:42	10 20:12 (1) 21:32
4	08:27	07:52	06:52	06:35	05:26	20:01 (1) 04:40
	15:58	16:52	17:49	19:48	20:44	13 20:14 (1) 21:33
5	08:27	07:50	06:49	06:33	05:24	20:01 (1) 04:39
	15:59	16:54	17:51	19:50	20:46	14 20:15 (1) 21:34
6	08:27	07:48	06:47	06:30	05:22	20:00 (1) 04:38
	16:00	16:56	17:53	19:52	20:48	17 20:17 (1) 21:35
7	08:26	07:46	06:44	06:28	05:20	19:59 (1) 04:37
	16:02	16:58	17:55	19:54	20:50	19 20:18 (1) 21:36
8	08:26	07:44	06:42	06:26	05:18	19:59 (1) 04:37
	16:03	17:00	17:57	19:55	20:51	19 20:18 (1) 21:37
9	08:25	07:42	06:40	06:23	05:17	20:00 (1) 04:36
	16:05	17:02	17:59	19:57	20:53	19 20:19 (1) 21:38
10	08:24	07:40	06:37	06:21	05:15	20:00 (1) 04:36
	16:06	17:05	18:00	19:59	20:55	18 20:18 (1) 21:39
11	08:24	07:38	06:35	06:18	05:13	20:00 (1) 04:35
	16:08	17:07	18:02	20:01	20:57	18 20:18 (1) 21:40
12	08:23	07:36	06:32	06:16	05:11	20:01 (1) 04:35
	16:09	17:09	18:04	20:03	20:58	17 20:18 (1) 21:41
13	08:22	07:34	06:30	06:14	05:09	20:01 (1) 04:34
	16:11	17:11	18:06	20:05	21:00	16 20:17 (1) 21:41
14	08:21	07:32	06:27	06:11	05:07	20:02 (1) 04:34
	16:12	17:13	18:08	20:07	21:02	14 20:16 (1) 21:42
15	08:20	07:30	06:25	06:09	05:06	20:03 (1) 04:34
	16:14	17:15	18:10	20:09	21:04	12 20:15 (1) 21:43
16	08:19	07:28	06:22	06:06	05:04	20:04 (1) 04:34
	16:16	17:17	18:12	20:10	21:05	9 20:13 (1) 21:43
17	08:18	07:26	06:20	06:04	19:38 (20) 05:02	20:08 (1) 04:33
	16:18	17:19	18:14	20:12	6 19:44 (20) 21:07	2 20:10 (1) 21:44
18	08:17	07:24	06:18	06:02	19:35 (20) 05:01	04:33
	16:19	17:21	18:16	20:14	11 19:46 (20) 21:09	21:44
19	08:16	07:22	06:15	05:59	19:34 (20) 04:59	04:33
	16:21	17:23	18:18	20:16	14 19:48 (20) 21:10	21:44
20	08:15	07:19	06:13	05:57	19:33 (20) 04:57	04:33
	16:23	17:25	18:20	20:18	17 19:50 (20) 21:12	21:45
21	08:14	07:17	06:10	17:52 (18) 05:55	19:33 (20) 04:56	04:34
	16:25	17:27	18:21	3 17:55 (18) 20:20	18 19:51 (20) 21:14	21:45
22	08:12	07:15	06:08	17:50 (18) 05:52	19:31 (20) 04:55	04:34
	16:27	17:29	18:23	6 17:56 (18) 20:22	19 19:50 (20) 21:15	21:45
23	08:11	07:13	06:05	17:50 (18) 05:50	19:31 (20) 04:53	04:34
	16:29	17:31	18:25	9 17:59 (18) 20:24	19 19:50 (20) 21:17	21:45
24	08:10	07:10	06:03	17:49 (18) 05:48	19:31 (20) 04:52	04:34
	16:30	17:33	18:27	11 18:00 (18) 20:25	19 19:50 (20) 21:18	21:46
25	08:08	07:08	06:00	17:49 (18) 05:46	19:31 (20) 04:50	04:35
	16:32	17:35	18:29	13 18:02 (18) 20:27	18 19:49 (20) 21:20	21:46
26	08:07	07:06	05:58	17:49 (18) 05:43	19:32 (20) 04:49	04:35
	16:34	17:37	18:31	13 18:02 (18) 20:29	17 19:49 (20) 21:21	21:46
27	08:05	07:03	05:55	17:50 (18) 05:41	19:33 (20) 04:48	04:36
	16:36	17:39	18:33	11 18:01 (18) 20:31	15 19:48 (20) 21:23	21:45
28	08:04	07:01	05:53	17:51 (18) 05:39	19:34 (20) 04:47	04:36
	16:38	17:41	18:35	7 17:58 (18) 20:33	13 19:47 (20) 21:24	21:45
29	08:02	06:50	05:50	05:37	19:35 (20) 04:45	04:37
	16:40	19:37	20:35	10 19:45 (20) 21:26	21:45	
30	08:00	06:48	05:35	05:35	19:38 (20) 04:44	04:37
	16:42	19:38	20:37	4 19:42 (20) 21:27	21:45	
31	07:59	06:45	19:40	21:28	04:43	
	16:44	248	367	421	496	512
Sonnenscheinstunden		272	367	421	496	512
astr.max.mögl.Beschattung			73	200	227	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.63	0.64	
Gesamte Reduktion			0.19	0.23	0.29	
Met.wahrsch.Beschattung			14	47	66	

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DT - IO124

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:11 (1) 06:14	07:08	07:07	08:03
	21:44	21:08	17 20:28 (1) 20:01	18:46	16:35	15:50
2	04:39	05:20	20:10 (1) 06:16	07:10	07:09	08:05
	21:44	21:07	18 20:28 (1) 19:59	18:44	16:33	15:49
3	04:40	05:22	20:10 (1) 06:17	07:12	07:11	08:06
	21:44	21:05	19 20:29 (1) 19:56	18:41	16:31	15:48
4	04:40	05:24	20:09 (1) 06:19	07:14	07:13	08:08
	21:43	21:03	19 20:28 (1) 19:54	18:39	16:29	15:47
5	04:41	05:25	20:10 (1) 06:21	07:15	07:15	08:09
	21:43	21:01	19 20:29 (1) 19:51	18:37	16:27	15:47
6	04:42	05:27	20:10 (1) 06:23	07:17	07:17	08:10
	21:42	20:59	18 20:28 (1) 19:49	18:34	16:25	15:46
7	04:43	05:29	20:09 (1) 06:25	07:19	07:19	08:12
	21:41	20:57	17 20:26 (1) 19:46	18:32	16:23	15:46
8	04:44	05:31	20:10 (1) 06:26	07:21	07:21	08:13
	21:41	20:55	14 20:24 (1) 19:44	18:29	16:21	15:45
9	04:45	05:32	20:11 (1) 06:28	07:23	07:23	08:14
	21:40	20:53	12 20:23 (1) 19:41	18:27	16:19	15:45
10	04:46	05:34	20:11 (1) 06:30	07:25	07:25	08:16
	21:39	20:51	9 20:20 (1) 19:39	18:24	16:18	15:45
11	04:48	05:36	20:13 (1) 06:32	07:27	07:27	08:17
	21:38	20:49	5 20:18 (1) 19:36	18:22	16:16	15:44
12	04:49	05:38	20:14 (1) 06:34	07:28	07:29	08:18
	21:37	20:47	2 20:16 (1) 19:34	18:20	16:14	15:44
13	04:50	05:40	19:44 (20) 06:35	07:30	07:31	08:19
	21:36	20:45	7 19:51 (20) 19:31	18:17	16:13	15:44
14	04:51	05:41	19:42 (20) 06:37	07:32	07:33	08:20
	21:35	20:43	11 19:53 (20) 19:29	18:15	16:11	15:44
15	04:52	05:43	19:41 (20) 06:39	6 18:42 (18) 07:34	07:35	08:21
	21:34	20:40	14 19:55 (20) 19:26	6 18:48 (18) 18:12	16:09	15:44
16	04:54	05:45	19:39 (20) 06:41	18:40 (18) 07:36	07:36	08:22
	21:33	20:38	16 19:55 (20) 19:24	10 18:50 (18) 18:10	16:08	15:44
17	04:55	05:47	19:38 (20) 06:43	18:37 (18) 07:38	07:38	08:23
	21:32	20:36	18 19:56 (20) 19:21	13 18:50 (18) 18:08	16:06	15:44
18	04:57	05:49	19:38 (20) 06:44	18:37 (18) 07:40	07:40	08:23
	21:30	20:34	18 19:56 (20) 19:19	13 18:50 (18) 18:05	16:05	15:44
19	04:58	05:50	19:37 (20) 06:46	18:36 (18) 07:42	07:42	08:24
	21:29	20:31	18 19:55 (20) 19:16	12 18:48 (18) 18:03	16:03	15:45
20	04:59	05:52	19:37 (20) 06:48	18:36 (18) 07:44	07:44	08:25
	21:28	20:29	19 19:56 (20) 19:14	10 18:46 (18) 18:01	16:02	15:45
21	05:01	05:54	19:37 (20) 06:50	18:36 (18) 07:46	07:46	08:25
	21:26	20:27	18 19:55 (20) 19:11	6 18:42 (18) 17:59	16:01	15:45
22	05:02	05:56	19:36 (20) 06:52	18:37 (18) 07:48	07:48	08:26
	21:25	20:25	18 19:54 (20) 19:09	3 18:40 (18) 17:56	15:59	15:46
23	05:04	05:58	19:37 (20) 06:53	07:49	07:49	08:26
	21:23	20:22	16 19:53 (20) 19:06	17:54	15:58	15:46
24	05:05	05:59	19:38 (20) 06:55	07:51	07:51	08:27
	21:22	20:20	13 19:51 (20) 19:04	17:52	15:57	15:47
25	05:07	06:01	19:39 (20) 06:57	06:53	07:53	08:27
	21:20	20:18	10 19:49 (20) 19:01	16:50	15:56	15:48
26	05:09	06:03	19:41 (20) 06:59	06:55	07:55	08:28
	21:19	20:15	5 19:46 (20) 18:59	16:47	15:54	15:48
27	05:10	20:17 (1) 06:05	07:01	06:57	07:56	08:28
	21:17	5 20:22 (1) 20:13	18:56	16:45	15:53	15:49
28	05:12	20:14 (1) 06:07	07:02	06:59	07:58	08:28
	21:15	10 20:24 (1) 20:11	18:54	16:43	15:52	15:50
29	05:14	20:13 (1) 06:08	07:04	07:01	08:00	08:28
	21:14	13 20:26 (1) 20:08	18:51	16:41	15:51	15:51
30	05:15	20:12 (1) 06:10	07:06	07:03	08:01	08:28
	21:12	14 20:26 (1) 20:06	18:49	16:39	15:51	15:52
31	05:17	20:11 (1) 06:12		07:05		08:28
	21:10	16 20:27 (1) 20:03		16:37		15:53
Sonneneinstrahlung	514	461	383	328	257	231
astr.max.mögl.Beschattung	58	370				
Red.Sonneneinstrahlung	0.44	0.48	0.40			
Reduktion Betriebsdauer	0.90	0.90	0.90			
Reduktion Windrichtung	0.64	0.63	0.68			
Gesamte Reduktion	0.25	0.28	0.25			
Met.wahrsch.Beschattung	15	102	18			

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DU - IO125  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28   07:57   06:59			06:43	05:33	19:39 (20)   04:42
	15:54   16:46   17:43			19:42	20:39	7   19:46 (20)   21:29
2	08:28   07:55   06:56			06:40	05:31	20:08 (1)   04:41
	15:55   16:48   17:45			19:44	20:40	3   20:11 (1)   21:31
3	08:28   07:54   06:54			06:38	05:28	20:06 (1)   04:40
	15:57   16:50   17:47			19:46	20:42	6   20:12 (1)   21:32
4	08:27   07:52   06:52			06:35	05:26	20:04 (1)   04:40
	15:58   16:52   17:49			19:48	20:44	10   20:14 (1)   21:33
5	08:27   07:50   06:49			06:33	05:24	20:03 (1)   04:39
	15:59   16:54   17:51			19:50	20:46	12   20:15 (1)   21:34
6	08:27   07:48   06:47			06:30	05:22	20:03 (1)   04:38
	16:00   16:56   17:53			19:52	20:48	14   20:17 (1)   21:35
7	08:26   07:46   06:44			06:28	05:20	20:02 (1)   04:37
	16:02   16:58   17:55			19:54	20:50	16   20:18 (1)   21:36
8	08:26   07:44   06:42			06:26	05:18	20:01 (1)   04:37
	16:03   17:00   17:57			19:55	20:51	19   20:20 (1)   21:37
9	08:25   07:42   06:40			06:23	05:17	20:02 (1)   04:36
	16:05   17:02   17:59			19:57	20:53	19   20:21 (1)   21:38
10	08:24   07:40   06:37			06:21	05:15	20:02 (1)   04:36
	16:06   17:05   18:00			19:59	20:55	19   20:21 (1)   21:39
11	08:24   07:38   06:35			06:18	05:13	20:02 (1)   04:35
	16:08   17:07   18:02			20:01	20:57	18   20:20 (1)   21:40
12	08:23   07:36   06:32			06:16	05:11	20:03 (1)   04:35
	16:09   17:09   18:04			20:03	20:58	18   20:21 (1)   21:41
13	08:22   07:34   06:30			06:14	05:09	20:03 (1)   04:34
	16:11   17:11   18:06			20:05	21:00	17   20:20 (1)   21:41
14	08:21   07:32   06:27			06:11	05:07	20:03 (1)   04:34
	16:12   17:13   18:08			20:07	21:02	16   20:19 (1)   21:42
15	08:20   07:30   06:25			06:09	05:06	20:04 (1)   04:34
	16:14   17:15   18:10			20:09	21:04	15   20:19 (1)   21:43
16	08:19   07:28   06:22			06:06	05:04	20:05 (1)   04:34
	16:16   17:17   18:12			20:10	21:05	12   20:17 (1)   21:43
17	08:18   07:26   06:20			06:04	05:02	20:07 (1)   04:33
	16:18   17:19   18:14			20:12	21:07	9   20:16 (1)   21:44
18	08:17   07:24   06:18			06:02	05:01	20:08 (1)   04:33
	16:19   17:21   18:16			20:14	4   19:42 (20)   21:09	6   20:14 (1)   21:44
19	08:16   07:22   06:15			05:59	19:39 (20)   04:59	04:33
	16:21   17:23   18:18			20:16	9   19:48 (20)   21:10	21:44
20	08:15   07:19   06:13			05:57	19:37 (20)   04:57	04:33
	16:23   17:25   18:20			20:18	13   19:50 (20)   21:12	21:45
21	08:14   07:17   06:10			05:55	19:36 (20)   04:56	04:34
	16:25   17:27   18:21			20:20	16   19:52 (20)   21:14	21:45
22	08:12   07:15   06:08		17:54 (18)	05:52	19:35 (20)   04:55	04:34
	16:27   17:29   18:23	2	17:56 (18)	20:22	17   19:52 (20)   21:15	21:45
23	08:11   07:13   06:05		17:53 (18)	05:50	19:34 (20)   04:53	04:34
	16:29   17:31   18:25	6	17:59 (18)	20:24	18   19:52 (20)   21:17	21:45
24	08:10   07:10   06:03		17:51 (18)	05:48	19:34 (20)   04:52	04:34
	16:30   17:33   18:27	9	18:00 (18)	20:25	19   19:53 (20)   21:18	21:46
25	08:08   07:08   06:00		17:51 (18)	05:46	19:34 (20)   04:50	04:35
	16:32   17:35   18:29	11	18:02 (18)	20:27	19   19:53 (20)   21:20	21:46
26	08:07   07:06   05:58		17:50 (18)	05:43	19:34 (20)   04:49	04:35
	16:34   17:37   18:31	14	18:04 (18)	20:29	18   19:52 (20)   21:21	21:46
27	08:05   07:03   05:55		17:51 (18)	05:41	19:34 (20)   04:48	04:36
	16:36   17:39   18:33	13	18:04 (18)	20:31	18   19:52 (20)   21:23	21:45
28	08:04   07:01   05:53		17:51 (18)	05:39	19:35 (20)   04:47	04:36
	16:38   17:41   18:35	11	18:02 (18)	20:33	16   19:51 (20)   21:24	21:45
29	08:02   06:50   05:47		18:53 (18)	05:37	19:36 (20)   04:45	04:37
	16:40   19:37	8	19:01 (18)	20:35	14   19:50 (20)   21:26	21:45
30	08:00   06:48			05:35	19:37 (20)   04:44	04:37
	16:42   19:38			20:37	12   19:49 (20)   21:27	21:45
31	07:59   06:45					04:43
	16:44   19:40					21:28
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung			74	193	236	
Red.Sonnenscheinwahrsch.			0.31	0.41	0.51	
Reduktion Betriebsdauer			0.90	0.90	0.90	
Reduktion Windrichtung			0.68	0.63	0.63	
Gesamte Reduktion			0.19	0.23	0.29	
Met.wahrsch.Beschattung			14	45	69	

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DU - IO125

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	05:19	20:13 (1) 06:14	07:08	07:07	08:03	
	21:44	21:08	18 20:31 (1) 20:01	18:46	16:35	15:50	
2	04:39	05:20	20:12 (1) 06:16	07:10	07:09	08:05	
	21:44	21:07	19 20:31 (1) 19:59	18:44	16:33	15:49	
3	04:40	05:22	20:12 (1) 06:17	07:12	07:11	08:06	
	21:44	21:05	19 20:31 (1) 19:56	18:41	16:31	15:48	
4	04:40	05:24	20:11 (1) 06:19	07:13	07:13	08:08	
	21:43	21:03	19 20:30 (1) 19:54	18:39	16:29	15:47	
5	04:41	05:25	20:12 (1) 06:21	07:15	07:15	08:09	
	21:43	21:01	18 20:30 (1) 19:51	18:37	16:27	15:47	
6	04:42	05:27	20:12 (1) 06:23	07:17	07:17	08:10	
	21:42	20:59	16 20:28 (1) 19:49	18:34	16:25	15:46	
7	04:43	05:29	20:12 (1) 06:25	07:19	07:19	08:12	
	21:41	20:57	14 20:26 (1) 19:46	18:32	16:23	15:46	
8	04:44	05:31	20:13 (1) 06:26	07:21	07:21	08:13	
	21:41	20:55	11 20:24 (1) 19:44	18:29	16:21	15:45	
9	04:45	05:32	20:14 (1) 06:28	07:23	07:23	08:14	
	21:40	20:53	9 20:23 (1) 19:41	18:27	16:19	15:45	
10	04:46	05:34	20:15 (1) 06:30	07:25	07:25	08:16	
	21:39	20:51	5 20:20 (1) 19:39	18:24	16:18	15:45	
11	04:48	05:36	20:17 (1) 06:32	07:27	07:27	08:17	
	21:38	20:49	1 20:18 (1) 19:36	18:22	16:16	15:44	
12	04:49	05:38	19:46 (20) 06:34	07:28	07:29	08:18	
	21:37	20:47	8 19:54 (20) 19:34	18:20	16:14	15:44	
13	04:50	05:40	19:44 (20) 06:35	07:30	07:31	08:19	
	21:36	20:45	12 19:56 (20) 19:31	18:17	16:13	15:44	
14	04:51	05:41	19:43 (20) 06:37	18:44 (18)	07:32	07:33	08:20
	21:35	20:43	15 19:58 (20) 19:29	6 18:50 (18)	18:15	16:11	15:44
15	04:52	05:43	19:42 (20) 06:39	18:42 (18)	07:34	07:35	08:21
	21:34	20:40	17 19:59 (20) 19:26	10 18:52 (18)	18:12	16:09	15:44
16	04:54	05:45	19:41 (20) 06:41	18:41 (18)	07:36	07:36	08:22
	21:33	20:38	17 19:58 (20) 19:24	12 18:53 (18)	18:10	16:08	15:44
17	04:55	05:47	19:41 (20) 06:43	18:39 (18)	07:38	07:38	08:23
	21:32	20:36	18 19:59 (20) 19:21	14 18:53 (18)	18:08	16:06	15:44
18	04:57	05:49	19:41 (20) 06:44	18:39 (18)	07:40	07:40	08:23
	21:30	20:34	18 19:59 (20) 19:19	11 18:50 (18)	18:05	16:05	15:44
19	04:58	05:50	19:40 (20) 06:46	18:39 (18)	07:42	07:42	08:24
	21:29	20:31	18 19:58 (20) 19:16	9 18:48 (18)	18:03	16:03	15:45
20	04:59	05:52	19:40 (20) 06:48	18:39 (18)	07:44	07:44	08:25
	21:28	20:29	18 19:58 (20) 19:14	7 18:46 (18)	18:01	16:02	15:45
21	05:01	05:54	19:40 (20) 06:50	18:39 (18)	07:46	07:46	08:25
	21:26	20:27	18 19:58 (20) 19:11	3 18:42 (18)	17:59	16:01	15:45
22	05:02	05:56	19:40 (20) 06:52	07:48	07:48	08:26	
	21:25	20:25	15 19:55 (20) 19:09	17:56	15:59	15:46	
23	05:04	05:58	19:41 (20) 06:53	07:49	07:49	08:26	
	21:23	20:22	12 19:53 (20) 19:06	17:54	15:58	15:46	
24	05:05	05:59	19:43 (20) 06:55	07:51	07:51	08:27	
	21:22	20:20	8 19:51 (20) 19:04	17:52	15:57	15:47	
25	05:07	06:01	19:46 (20) 06:57	06:53	07:53	08:27	
	21:20	20:18	3 19:49 (20) 19:01	16:50	15:56	15:48	
26	05:09	20:17 (1) 06:03	06:59	06:55	07:55	08:28	
	21:19	8 20:25 (1) 20:15	18:59	16:47	15:54	15:48	
27	05:10	20:16 (1) 06:05	07:01	06:57	07:56	08:28	
	21:17	11 20:27 (1) 20:13	18:56	16:45	15:53	15:49	
28	05:12	20:15 (1) 06:07	07:02	06:59	07:58	08:28	
	21:15	13 20:28 (1) 20:11	18:54	16:43	15:52	15:50	
29	05:14	20:14 (1) 06:08	07:04	07:01	08:00	08:28	
	21:14	15 20:29 (1) 20:08	18:51	16:41	15:51	15:51	
30	05:15	20:13 (1) 06:10	07:06	07:03	08:01	08:28	
	21:12	16 20:29 (1) 20:06	18:49	16:39	15:51	15:52	
31	05:17	20:13 (1) 06:12	07:05	07:05	08:01	08:28	
	21:10	17 20:30 (1) 20:03	06:57	16:37	15:53	15:53	
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	80	346					
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40				
Reduktion Betriebsdauer	0.90	0.90	0.90				
Reduktion Windrichtung	0.63	0.63	0.68				
Gesamte Reduktion	0.25	0.28	0.25				
Met.wahrsch.Beschattung	20	96	18				

**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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: DV - IO126**  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:28 15:54	07:57 16:46	06:59 17:43	06:43 18:42	17 18:47 (20)	05:33 20:29	04:42 21:39	04:38 21:44	05:19 21:09	06:14 20:01	19:26 (1) 18:46	07:07 16:35	08:03 15:50
2	08:28 15:55	07:55 16:48	06:56 17:45	06:40 19:44	15 19:02 (20)	05:31 20:40	04:41 21:31	04:39 21:44	05:20 21:07	06:16 19:59	19:28 (1) 18:44	07:09 16:33	08:05 15:49
3	08:28 15:57	07:54 16:50	06:54 17:47	06:38 19:46	12 19:01 (20)	05:28 20:42	04:40 21:32	04:40 21:44	05:22 21:05	06:17 19:56	19:30 (1) 18:41	07:11 16:31	08:06 15:48
4	08:27 15:58	07:52 16:52	06:52 17:49	06:35 19:48	8 18:58 (20)	05:26 20:44	04:39 21:33	04:40 21:43	05:24 21:03	06:19 19:54	18:41 18:39	07:13 16:29	08:08 15:47
5	08:27 15:59	07:50 16:54	06:49 17:51	06:33 19:50	19:52 20:46	05:24 21:34	04:39 21:43	04:41 21:01	05:25 21:01	06:21 19:51	18:40 18:37	07:15 16:27	08:09 15:47
6	08:27 16:00	07:48 16:56	06:47 17:53	06:30 19:52	20:51 20:51	05:22 21:35	04:38 21:42	04:42 20:59	05:27 21:02	06:23 19:49	18:40 18:40	07:17 16:25	08:10 15:46
7	08:26 16:02	07:46 16:58	06:44 17:55	06:28 19:54	20:50 20:50	05:20 21:36	04:37 21:41	04:43 20:57	05:29 21:02	06:25 19:46	18:39 18:45	07:19 16:23	08:12 15:46
8	08:26 16:03	07:44 17:00	06:42 17:57	06:26 19:55	20:51 20:51	05:18 21:37	04:37 21:41	04:44 20:55	05:31 21:03	06:26 19:44	18:45 (20) 18:53 (20)	07:21 16:29	08:13 15:45
9	08:25 16:05	07:42 17:02	06:40 17:59	06:23 19:57	20:53 20:53	05:17 21:38	04:36 21:40	04:45 20:53	05:32 21:04	06:28 19:41	18:42 (20) 18:27	07:23 16:19	08:14 15:45
10	08:24 16:06	07:40 17:05	06:37 18:00	06:21 19:59	2 19:32 (1)	05:15 20:55	04:36 21:39	04:46 20:51	05:34 21:06	06:30 19:39	18:40 (20) 18:56 (20)	07:25 16:18	08:16 15:45
11	08:24 16:08	07:38 17:07	06:35 18:02	06:18 19:58	7 19:26 (1)	05:13 20:57	04:35 21:40	04:47 20:49	05:36 21:08	06:32 19:36	18:39 (20) 18:56 (20)	07:27 16:16	08:17 15:44
12	08:23 16:09	07:36 17:09	06:32 18:04	06:16 19:59	20:09 20:03	05:11 20:59	04:35 21:41	04:49 21:37	05:38 20:47	06:34 19:34	18:38 (20) 18:57 (20)	07:28 16:14	08:18 15:44
13	08:22 16:11	07:34 17:11	06:30 18:06	06:13 19:57	14 19:27 (1)	05:09 21:00	04:34 21:41	04:50 21:36	05:40 20:45	06:35 19:31	18:37 (20) 18:56 (20)	07:31 16:13	08:19 15:44
14	08:21 16:12	07:32 17:13	06:27 18:08	06:11 19:58	20:05 20:07	05:07 21:02	04:34 21:42	04:51 21:35	05:41 20:43	06:37 19:29	18:37 (20) 18:56 (20)	07:32 16:11	08:20 15:44
15	08:21 16:14	07:30 17:15	06:25 18:10	06:09 19:59	19 19:21 (1)	05:06 21:04	04:34 21:43	04:52 21:34	05:43 20:40	06:39 19:26	18:37 (20) 18:55 (20)	07:34 16:09	08:21 15:44
16	08:19 16:15	07:28 17:17	06:22 18:12	06:06 19:58	19 19:21 (1)	05:04 21:05	04:34 21:43	04:54 21:33	05:45 20:39	06:41 19:24	18:38 (20) 18:55 (20)	07:36 16:08	08:22 15:44
17	08:18 16:16	07:26 17:17	06:20 18:18	06:04 19:59	19 19:20 (1)	05:02 21:07	04:33 21:44	04:55 21:32	05:47 20:36	06:43 19:21	18:37 (20) 18:53 (20)	07:38 16:06	08:23 15:44
18	08:17 16:18	07:24 17:21	06:18 18:16	06:02 19:59	19 19:20 (1)	05:01 21:09	04:33 21:44	04:57 21:30	05:49 20:34	06:44 19:19	18:38 (20) 18:50 (20)	07:40 16:05	08:23 15:44
19	08:16 16:19	07:22 17:23	06:15 18:18	05:59 19:59	18 19:21 (1)	04:59 21:10	04:33 21:44	04:58 21:29	05:50 20:31	06:46 19:16	18:41 (20) 18:48 (20)	07:42 16:03	08:24 15:45
20	08:15 16:20	07:19 17:27	06:13 18:21	05:57 19:58	17 19:22 (1)	04:57 21:14	04:33 21:45	04:59 21:26	05:52 20:27	8 19:30 (1)	18:48 (20) 19:11	07:44 16:00	08:25 15:45
21	08:14 16:21	07:17 17:29	06:10 18:23	05:55 19:58	15 19:23 (1)	04:56 21:15	04:34 21:45	05:01 21:25	05:54 20:25	13 19:41 (1)	18:49 (20) 19:09	07:46 15:59	08:26 15:46
22	08:12 16:22	07:15 17:29	06:08 18:23	05:52 19:58	12 19:25 (1)	04:54 21:17	04:34 21:45	05:02 21:23	05:56 20:22	15 19:42 (1)	18:50 (20) 19:06	07:48 15:58	08:27 15:46
23	08:11 16:23	07:13 17:31	06:05 18:25	05:50 19:58	7 19:24 (1)	04:53 21:17	04:34 21:45	05:04 21:23	05:58 20:22	17 19:42 (1)	18:53 (20) 19:06	07:49 15:58	08:28 15:46
24	08:10 16:30	07:10 17:33	06:03 18:27	05:48 19:58	17 19:25 (20)	04:52 21:18	04:34 21:46	05:05 21:22	05:59 20:20	19 19:43 (1)	18:55 (20) 19:04	07:51 15:57	08:29 15:47
25	08:08 16:33	07:08 17:35	06:00 18:29	05:46 19:59	11 18:02 (20)	04:50 20:27	04:35 21:46	05:07 21:20	06:01 20:18	19 19:24 (1)	18:57 (20) 19:01	07:53 15:56	08:27 15:48
26	08:07 16:34	07:06 17:37	05:58 18:31	05:43 19:59	15 18:04 (20)	04:49 21:21	04:35 21:46	05:09 21:19	06:03 20:15	19 19:23 (1)	18:59 (20) 19:02	07:55 15:54	08:28 15:48
27	08:05 16:36	07:03 17:39	05:55 18:33	05:41 19:59	17 18:05 (20)	04:48 21:23	04:36 21:45	05:10 21:17	06:05 20:13	19 19:23 (1)	18:54 (20) 18:56 (20)	07:56 15:53	08:28 15:49
28	08:04 16:38	07:01 17:41	05:53 18:35	05:39 19:59	18 18:05 (20)	04:47 21:24	04:36 21:45	05:12 21:16	06:07 20:11	19 19:23 (1)	18:54 (20) 18:54 (20)	07:57 15:52	08:28 15:50
29	08:02 16:40	07:00 17:43	05:50 18:37	05:37 19:59	17 18:05 (20)	04:45 21:25	04:37 21:45	05:14 21:17	06:08 20:11	19 19:23 (1)	18:54 (20) 18:54 (20)	07:58 15:51	08:28 15:51
30	08:00 16:42	07:00 17:46	05:48 18:40	05:35 19:59	19 18:05 (20)	04:44 21:27	04:37 21:45	05:15 21:12	06:10 20:06	19 19:23 (1)	18:54 (20) 18:54 (20)	08:01 15:50	08:28 15:52
31	07:59 16:44	06:45 17:49	05:45 18:46	05:33 19:59	19 18:05 (20)	04:43 21:28	04:37 21:46	05:17 21:10	06:12 20:03	11 19:24 (1)	18:55 (20) 18:55 (20)	08:02 15:53	08:29 15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	188	328	257	231
astr.max.mögl.Beschattung			123							190			
Red.Sonnenscheinwahrsch.			0.31							0.48			
Reduktion Betriebsdauer			0.90							0.90			
Reduktion Windrichtung			0.68							0.64			
Gesamte Reduktion			0.19							0.28			
Met.wahrsch.Beschattung			24							53			

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)	Schattende (WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DW - IO127

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28	07:57	06:59	16:53 (18)	06:43	18:55 (19)	05:33	04:42
	15:54	16:46	17:43	5 16:58 (18)	19:42	9 19:04 (19)	20:39	21:29
2	08:28	07:55	06:56	06:40	18:58 (19)	05:31	04:41	
	15:55	16:48	17:45	19:44	2 19:00 (19)	20:40	21:31	
3	08:28	07:54	06:54	06:38	19:12 (1)	05:28	04:40	
	15:57	16:50	17:47	19:46	5 19:17 (1)	20:42	21:32	
4	08:27	07:52	06:52	06:35	19:07 (1)	05:26	04:39	
	15:58	16:52	17:49	19:48	13 19:20 (1)	20:44	21:33	
5	08:27	07:50	06:49	06:33	19:05 (1)	05:24	04:39	
	15:59	16:54	17:51	19:50	17 19:22 (1)	20:46	21:34	
6	08:27	07:48	06:47	06:30	19:03 (1)	05:22	04:38	
	16:00	16:56	17:53	19:52	19 19:22 (1)	20:48	21:35	
7	08:26	07:46	06:45	06:28	19:02 (1)	05:20	04:37	
	16:02	16:58	17:55	19:54	21 19:23 (1)	20:50	21:36	
8	08:26	07:44	06:42	06:26	19:01 (1)	05:18	04:37	
	16:03	17:00	17:57	19:55	23 19:24 (1)	20:51	21:37	
9	08:25	07:42	06:40	06:23	19:00 (1)	05:17	04:36	
	16:05	17:02	17:59	19:57	24 19:24 (1)	20:53	21:38	
10	08:24	07:40	06:37	06:21	19:00 (1)	05:15	04:36	
	16:06	17:05	18:00	19:59	24 19:24 (1)	20:55	21:39	
11	08:24	07:38	06:35	17:22 (20)	06:18	18:59 (1)	05:13	04:35
	16:08	17:07	18:02	8 17:30 (20)	20:01	28 19:33 (23)	20:57	21:40
12	08:23	07:36	06:32	17:18 (20)	06:16	18:59 (1)	05:11	04:35
	16:09	17:09	18:04	14 17:32 (20)	20:03	31 19:35 (23)	20:59	21:41
13	08:22	07:34	06:30	17:17 (20)	06:14	19:00 (1)	05:09	04:34
	16:11	17:11	18:06	17 17:34 (20)	20:05	33 19:37 (23)	21:00	21:41
14	08:21	07:32	06:27	17:15 (20)	06:11	18:59 (1)	05:07	04:34
	16:12	17:13	18:08	19 17:34 (20)	20:07	34 19:38 (23)	21:02	21:42
15	08:20	07:30	06:25	17:14 (20)	06:09	19:00 (1)	05:06	04:34
	16:14	17:15	18:10	22 17:36 (20)	20:09	35 19:40 (23)	21:04	21:43
16	08:19	07:28	06:23	17:13 (20)	06:06	19:01 (1)	05:04	04:34
	16:16	17:17	18:12	22 17:35 (20)	20:10	32 19:40 (23)	21:05	21:43
17	08:18	07:26	06:20	17:13 (20)	06:04	19:01 (1)	05:02	04:33
	16:18	17:19	18:14	23 17:36 (20)	20:12	29 19:39 (23)	21:07	21:44
18	08:17	07:24	06:18	17:12 (20)	06:02	19:03 (1)	05:01	04:33
	16:19	17:21	18:16	23 17:35 (20)	20:14	22 19:38 (23)	21:09	21:44
19	08:16	07:22	06:15	17:12 (20)	05:59	19:07 (1)	04:59	04:33
	16:21	17:23	18:18	23 17:35 (20)	20:16	10 19:35 (23)	21:10	21:45
20	08:15	07:19	06:13	17:12 (20)	05:57	04:57	04:33	
	16:23	17:25	4 16:56 (18)	18:20	22 17:34 (20)	20:18	21:12	21:45
21	08:14	07:17	06:10	17:12 (20)	05:55	04:56	04:34	
	16:25	17:27	8 16:59 (18)	18:22	22 17:34 (20)	20:20	21:14	21:45
22	08:12	07:15	06:08	17:13 (20)	05:52	04:54	04:34	
	16:27	17:29	11 17:00 (18)	18:23	19 17:32 (20)	20:22	21:15	21:45
23	08:11	07:13	06:05	17:14 (20)	05:50	04:53	04:34	
	16:29	17:31	14 17:03 (18)	18:25	17 17:31 (20)	20:24	21:17	21:45
24	08:10	07:10	06:03	17:15 (20)	05:48	04:52	04:34	
	16:30	17:33	15 17:04 (18)	18:27	16 18:00 (19)	20:25	21:18	21:46
25	08:08	07:08	06:00	17:18 (20)	05:46	04:50	04:35	
	16:32	17:35	15 17:03 (18)	18:29	14 18:02 (19)	20:27	21:20	21:46
26	08:07	07:06	05:58	17:54 (19)	05:43	04:49	04:35	
	16:34	17:37	14 17:03 (18)	18:31	10 18:04 (19)	20:29	21:21	21:46
27	08:05	07:03	05:55	17:54 (19)	05:41	04:48	04:36	
	16:36	17:39	13 17:02 (18)	18:33	12 18:06 (19)	20:31	21:23	21:45
28	08:04	07:01	05:53	17:53 (19)	05:39	04:47	04:36	
	16:38	17:41	11 17:01 (18)	18:35	14 18:07 (19)	20:33	21:24	21:45
29	08:02	06:50	05:50	18:53 (19)	05:37	04:45	04:37	
	16:40	19:37	15 19:08 (19)	20:35	21:26	21:45		
30	08:00	06:48	05:48	18:52 (19)	05:35	04:44	04:37	
	16:42	19:38	14 19:06 (19)	20:37	21:27	21:45		
31	07:59	06:45	05:45	18:53 (19)	05:33	04:43	04:37	
	16:44	19:40	13 19:06 (19)	20:39	21:28	21:45		
Sonneneinstrahlung	248	272	367	421	496	512		
astr.max.mögl.Beschattung		105	364	411				
Red.Sonneneinstrahlung		0.24	0.31	0.41				
Reduktion Betriebsdauer		0.90	0.90	0.90				
Reduktion Windrichtung		0.69	0.68	0.66				
Gesamte Reduktion		0.15	0.19	0.24				
Met.wahrsch.Beschattung		16	70	100				

**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)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBSchattenrezeptor: DW - IO127

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember		
1	04:38   05:19		06:14	18:59 (1)   07:08	17:57 (20)	07:07   08:03		
	21:45   21:09		20:01   28	19:33 (23)   18:46	16   18:13 (20)   16:35	15:50		
2	04:39   05:20		06:16	18:58 (1)   07:10		17:59 (20)   07:09	08:05	
	21:44   21:07		19:59   24	19:22 (1)   18:44	11   18:10 (20)   16:33	15:49		
3	04:40   05:22		06:17	18:58 (1)   07:12		07:11   08:06		
	21:44   21:05		19:56   24	19:22 (1)   18:41		16:31   15:48		
4	04:40   05:24		06:19	18:58 (1)   07:14		07:13   08:08		
	21:43   21:03		19:54   23	19:21 (1)   18:39		16:29   15:47		
5	04:41   05:25		06:21	18:58 (1)   07:15		07:15   08:09		
	21:43   21:01		19:51   21	19:19 (1)   18:37		16:27   15:47		
6	04:42   05:27		06:23	18:59 (1)   07:17		07:17   08:10		
	21:42   20:59		19:49   19	19:18 (1)   18:34		16:25   15:46		
7	04:43   05:29		06:25	19:00 (1)   07:19		07:19   08:12		
	21:41   20:57		19:46   17	19:17 (1)   18:32		16:23   15:46		
8	04:44   05:31		06:26	19:02 (1)   07:21		07:21   08:13		
	21:41   20:55		19:44   13	19:15 (1)   18:29		16:21   15:45		
9	04:45   05:32		06:28	19:04 (1)   07:23		07:23   08:14		
	21:40   20:53		19:41   7	19:11 (1)   18:27		16:19   15:45		
10	04:46   05:34		06:30		07:25	07:25   08:16		
	21:39   20:51		19:39		18:24	16:18   15:45		
11	04:47   05:36		06:32	18:48 (19)   07:27		07:27   08:17		
	21:38   20:49		19:36   8	18:56 (19)   18:22		16:16   15:44		
12	04:49   05:38		06:34	18:46 (19)   07:28		07:29   08:18		
	21:37   20:47		19:34   12	18:58 (19)   18:20		16:14   15:44		
13	04:50   05:40		06:35	18:44 (19)   07:30		17:25 (18)   07:31	08:19	
	21:36   20:45		19:31   14	18:58 (19)   18:17	8   17:33 (18)   16:13	15:44		
14	04:51   05:41		06:37	18:43 (19)   07:32		17:23 (18)   07:33	08:20	
	21:35   20:43		19:29   15	18:58 (19)   18:15	11   17:34 (18)   16:11	15:44		
15	04:52   05:43		06:39	18:43 (19)   07:34		17:22 (18)   07:35	08:21	
	21:34   20:40		19:26   15	18:58 (19)   18:12	13   17:35 (18)   16:09	15:44		
16	04:54   05:45		06:41	18:43 (19)   07:36		17:21 (18)   07:37	08:22	
	21:33   20:38		19:24   13	18:56 (19)   18:10	15   17:36 (18)   16:08	15:44		
17	04:55   05:47		06:43	18:42 (19)   07:38		17:20 (18)   07:38	08:23	
	21:32   20:36		19:21   11	18:53 (19)   18:08	16   17:36 (18)   16:06	15:44		
18	04:57   05:49		06:44	18:07 (20)   07:40		17:20 (18)   07:40	08:23	
	21:30   20:34		19:19   12	18:50 (19)   18:05	15   17:35 (18)   16:05	15:44		
19	04:58   05:50		06:46	18:03 (20)   07:42		17:20 (18)   07:42	08:24	
	21:29   20:32		19:16   16	18:48 (19)   18:03	13   17:33 (18)   16:03	15:45		
20	04:59   05:52		06:48	18:01 (20)   07:44		17:21 (18)   07:44	08:25	
	21:28   20:29		19:14   16	18:17 (20)   18:01	10   17:31 (18)   16:02	15:45		
21	05:01   05:54		06:50	17:58 (20)   07:46		17:21 (18)   07:46	08:25	
	21:26   20:27		19:11   19	18:17 (20)   17:59	7   17:28 (18)   16:01	15:45		
22	05:02   05:56		06:52	17:57 (20)   07:48		17:23 (18)   07:48	08:26	
	21:25   20:25		19:09   21	18:18 (20)   17:56	3   17:26 (18)   15:59	15:46		
23	05:04   05:58		06:53	17:56 (20)   07:50		07:49   08:27		
	21:23   20:22		19:06   23	18:19 (20)   17:54		15:58   15:46		
24	05:05   05:59		19:10 (1)   06:55	17:56 (20)   07:51		07:51   08:27		
	21:22   20:20	13	19:40 (23)   19:04	18:19 (20)   17:52		15:57   15:47		
25	05:07   06:01		19:07 (1)   06:57	17:55 (20)   06:53		07:53   08:27		
	21:20   20:18	23	19:41 (23)   19:01	18:19 (20)   16:50		15:56   15:48		
26	05:09   06:03		19:04 (1)   06:59	17:54 (20)   06:55		07:55   08:28		
	21:19   20:15	29	19:42 (23)   18:59	18:18 (20)   16:47		15:54   15:48		
27	05:10   06:05		19:03 (1)   07:01	17:54 (20)   06:57		07:56   08:28		
	21:17   20:13	33	19:42 (23)   18:56	18:17 (20)   16:45		15:53   15:49		
28	05:12   06:07		19:02 (1)   07:02	17:55 (20)   06:59		07:58   08:28		
	21:16   20:11	35	19:42 (23)   18:54	18:17 (20)   16:43		15:52   15:50		
29	05:14   06:08		19:00 (1)   07:04	17:55 (20)   07:01		08:00   08:28		
	21:14   20:08	34	19:39 (23)   18:51	18:16 (20)   16:41		15:51   15:51		
30	05:15   06:10		18:59 (1)   07:06	17:56 (20)   07:03		08:01   08:28		
	21:12   20:06	34	19:37 (23)   18:49	18:14 (20)   16:39		15:50   15:52		
31	05:17   06:12		18:59 (1)		07:05		08:28	
	21:10   20:03	31	19:35 (23)		16:37		15:53	
Sonnenscheinstunden	515	461	383	328	257	231		
astr.max.mögl.Beschattung		232	526	138				
Red.Sonnenscheinwahrsch.		0.48	0.40	0.33				
Reduktion Betriebsdauer		0.90	0.90	0.90				
Reduktion Windrichtung		0.65	0.67	0.69				
Gesamte Reduktion		0.29	0.24	0.21				
Met.wahrsch.Beschattung		66	129	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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	-------------------	----------------	------------	---------------------------	----------------------------



Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DX - IO128  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03	
	15:54	16:46	17:43	19:42	20:39	21:29	21:44	21:09	20:01	18:46	16:35	15:50	
2	08:28	07:55	06:56	06:40	05:30	04:41	04:39	05:20	06:16	07:10	07:09	08:05	
	15:55	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	18:44	16:33	15:49	
3	08:28	07:54	06:54	06:38	05:28	04:40	04:39	05:22	06:17	07:12	07:11	08:06	
	15:56	16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:56	18:41	16:31	15:48	
4	08:27	07:52	06:52	06:35	05:26	04:39	04:40	05:24	06:19	07:13	07:13	08:08	
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:47	
5	08:27	07:50	06:49	06:33	05:24	04:39	04:41	05:25	06:21	07:15	07:15	08:09	
	15:59	16:54	17:51	19:50	20:46	21:34	21:43	21:01	19:51	18:36	16:27	15:47	
6	08:27	07:48	06:47	06:30	05:22	04:38	04:42	05:27	06:23	07:17	07:17	08:10	
	16:00	16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46	
7	08:26	07:46	06:44	06:28	05:20	04:37	04:43	05:29	06:25	07:19	07:19	08:12	
	16:02	16:58	17:55	19:54	20:50	21:36	21:41	20:57	19:46	18:32	16:23	15:46	
8	08:26	07:44	06:42	06:26	05:18	04:37	04:44	05:31	06:26	07:21	07:21	08:13	
	16:03	17:00	17:57	19:55	20:51	21:37	21:41	20:55	19:44	18:29	16:21	15:45	
9	08:25	07:42	06:40	06:23	05:16	04:35	04:49	05:32	06:28	07:23	07:23	08:14	
	16:05	17:02	17:58	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:19	15:45	
10	08:24	07:40	06:37	06:21	05:15	04:35	04:46	05:34	06:30	07:25	07:25	08:16	
	16:06	17:04	18:00	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45	
11	08:24	07:38	06:35	06:18	05:13	04:35	04:47	05:36	06:32	07:27	07:27	08:17	
	16:08	17:07	18:02	20:01	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:44	
12	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:28	07:29	08:18	
	16:09	17:09	18:04	20:03	20:58	21:41	21:37	20:47	19:34	18:20	16:14	15:44	
13	08:22	07:34	06:30	06:13	05:09	04:34	04:50	05:40	06:35	07:30	07:31	08:19	
	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:12	15:44	
14	08:21	07:32	06:27	06:11	05:07	04:34	04:51	05:41	06:37	18:43 (1)	07:32	08:20	
	16:12	17:13	18:08	20:07	21:02	21:42	21:35	20:43	19:29	3 18:46 (1)	18:15	16:11	15:44
15	08:20	07:30	06:25	06:09	05:06	04:34	04:52	05:43	06:39	9 18:49 (1)	18:12	16:09	15:44
	16:14	17:15	18:10	20:09	21:04	21:43	21:34	20:40	19:26	18:38 (1)	07:36	07:36	08:22
16	08:19	07:28	06:22	06:06	05:04	04:34	04:54	05:45	06:41	12 18:50 (1)	18:10	16:08	15:44
	16:16	17:17	18:12	20:10	21:05	21:43	21:33	20:38	19:24	18:36 (1)	07:38	07:38	08:23
17	08:18	07:26	06:20	06:04	05:02	04:33	04:55	05:47	06:43	14 18:50 (1)	18:08	16:06	15:44
	16:18	17:19	18:14	20:12	21:07	21:44	21:32	20:36	19:21	18:35 (1)	07:40	07:40	08:23
18	08:17	07:24	06:18	06:02	05:01	04:33	04:57	05:49	06:44	15 18:50 (1)	18:05	16:05	15:44
	16:19	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:35 (1)	07:42	07:42	08:24
19	08:16	07:22	06:15	05:59	04:59	04:33	04:58	05:50	06:46	13 18:48 (1)	18:03	16:03	15:45
	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:31	19:16	18:35 (1)	07:44	07:44	08:25
20	08:15	07:19	06:13	05:57	04:57	04:33	04:59	05:52	06:48	11 18:46 (1)	18:01	16:02	15:45
	16:23	17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:35 (1)	07:46	07:46	08:25
21	08:14	07:17	06:10	17:51 (1)	05:55	04:56	04:34	05:01	05:54	7 18:42 (1)	17:59	16:00	15:45
	16:25	17:27	18:21	4 17:55 (1)	20:20	21:14	21:45	21:26	20:27	18:36 (1)	07:48	07:48	08:26
22	08:12	07:15	06:08	17:49 (1)	05:52	04:54	04:34	05:02	05:56	4 18:40 (1)	17:56	15:59	15:46
	16:27	17:29	18:23	7 17:56 (1)	20:22	21:15	21:45	21:25	20:25	18:37 (1)	07:49	07:49	08:26
23	08:11	07:13	06:05	17:49 (1)	05:50	04:53	04:34	05:04	05:58	1 18:38 (1)	17:54	15:58	15:46
	16:29	17:31	18:25	10 17:59 (1)	20:24	21:17	21:45	21:23	20:22	18:38 (1)	07:51	07:51	08:27
24	08:10	07:10	06:03	17:48 (1)	05:48	04:52	04:34	05:05	05:59	12 18:00 (1)	20:25	21:18	21:46
	16:30	17:33	18:27	12 18:00 (1)	20:25	21:18	21:46	21:22	20:20	16:50	15:56	15:52	15:47
25	08:08	07:08	06:00	17:48 (1)	05:46	04:50	04:35	05:07	06:01	14 18:02 (1)	20:27	21:20	21:46
	16:32	17:35	18:29	14 18:02 (1)	20:27	21:20	21:46	21:20	20:18	16:55	15:56	15:52	15:48
26	08:07	07:06	05:58	17:47 (1)	05:43	04:49	04:35	05:09	06:03	15 18:02 (1)	20:29	21:21	21:46
	16:34	17:37	18:31	15 18:02 (1)	20:29	21:21	21:46	21:19	20:15	16:47	15:54	15:48	15:48
27	08:05	07:03	05:55	17:48 (1)	05:41	04:48	04:36	05:10	06:05	7 18:46 (1)	18:01	16:02	15:45
	16:36	17:39	18:33	13 18:01 (1)	20:31	21:23	21:45	21:17	20:13	16:45	15:53	15:49	15:49
28	08:04	07:01	05:53	17:49 (1)	05:39	04:47	04:36	05:12	06:07	16:43	15:52	15:50	15:50
	16:38	17:41	18:35	10 17:59 (1)	20:33	21:24	21:45	21:15	20:11	16:43	15:52	15:50	15:50
29	08:02		06:50	18:52 (1)	05:37	04:45	04:37	05:13	06:08	16:43	15:52	15:50	15:50
	16:40		19:37	5 18:57 (1)	20:35	21:26	21:45	21:14	20:08	16:41	15:51	15:51	15:51
30	08:00		06:48		05:35	04:44	04:37	05:15	06:10	16:43	15:52	15:50	15:50
	16:42		19:38		20:37	21:27	21:45	21:12	20:06	16:41	15:51	15:51	15:51
31	07:59		06:45		04:43	04:43	05:17	06:12	07:05	16:43	15:52	15:50	15:50
	16:44		19:40		21:28	21:28	21:10	20:03	07:05	16:43	15:52	15:50	15:50
Sonnenscheinstunden	248	272	367	421	496	513	515	461	383	328	257	231	
astr.max.mögl.Beschattung			90						89				
Red.Sonnenscheinwahrsch.			0.31						0.40				
Reduktion Betriebsdauer			0.90						0.90				
Reduktion Windrichtung			0.68						0.68				
Gesamte Reduktion			0.19						0.25				
Met.wahrsch.Beschattung			17						22				

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: DY - IO129  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember				
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03				
	15:54	16:46	17:43	19:42	20:39	21:29	21:44	21:09	20:01	18:46	16:35	15:50				
2	08:28	07:55	06:56	06:40	05:30	04:41	04:39	05:20	06:16	07:10	07:09	08:05				
	15:55	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	18:44	16:33	15:49				
3	08:28	07:54	06:54	06:38	05:28	04:40	04:39	05:22	06:17	07:12	07:11	08:06				
	15:56	16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:56	18:41	16:31	15:48				
4	08:27	07:52	06:52	06:35	05:26	04:39	04:40	05:24	06:19	07:13	07:13	08:08				
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:47				
5	08:27	07:50	06:49	06:33	05:24	04:39	04:41	05:25	06:21	07:15	07:15	08:09				
	15:59	16:54	17:51	19:50	20:46	21:34	21:43	21:01	19:51	18:36	16:27	15:47				
6	08:27	07:48	06:47	06:30	05:22	04:38	04:42	05:27	06:23	07:17	07:17	08:10				
	16:00	16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46				
7	08:26	07:46	06:44	06:28	05:20	04:37	04:43	05:29	06:25	07:19	07:19	08:12				
	16:02	16:58	17:55	19:54	20:50	21:36	21:41	20:57	19:46	18:32	16:23	15:46				
8	08:26	07:44	06:42	06:26	05:18	04:37	04:44	05:31	06:26	07:21	07:21	08:13				
	16:03	17:00	17:57	19:55	20:51	21:37	21:41	20:55	19:44	18:29	16:21	15:45				
9	08:25	07:42	06:40	06:23	05:16	04:35	04:49	05:32	06:28	07:23	07:23	08:14				
	16:05	17:02	17:58	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:19	15:45				
10	08:24	07:40	06:37	06:21	05:15	04:35	04:46	05:34	06:30	07:25	07:25	08:16				
	16:06	17:04	18:00	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45				
11	08:24	07:38	06:35	06:18	05:13	04:35	04:47	05:36	06:32	07:27	07:27	08:17				
	16:08	17:07	18:02	20:01	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:44				
12	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:28	07:29	08:18				
	16:09	17:09	18:04	20:03	20:58	21:41	21:37	20:47	19:34	18:20	16:14	15:44				
13	08:22	07:34	06:30	06:13	05:09	04:34	04:50	05:40	06:35	07:30	07:31	08:19				
	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:12	15:44				
14	08:21	07:32	06:27	06:11	05:07	04:34	04:51	05:41	06:37	07:32	07:33	08:20				
	16:12	17:13	18:08	20:07	21:02	21:42	21:35	20:43	19:29	18:15	16:11	15:44				
15	08:20	07:30	06:25	06:02	05:06	04:34	04:52	05:43	06:39	07:34	07:35	08:21				
	16:14	17:15	18:10	20:09	21:04	21:43	21:34	20:40	19:26	18:12	16:09	15:44				
16	08:19	07:28	06:22	06:06	05:04	04:34	04:54	05:45	06:41	18:38 (1)	07:36	07:36	08:22			
	16:16	17:17	18:12	20:10	21:05	21:43	21:33	20:38	19:24	4	18:42 (1)	18:10	16:08	15:44		
17	08:18	07:26	06:20	06:04	05:02	04:33	04:55	05:47	06:43	18:34 (1)	07:38	07:38	08:23			
	16:18	17:19	18:14	20:12	21:07	21:44	21:32	20:36	19:21	10	18:44 (1)	18:08	16:06	15:44		
18	08:17	07:24	06:18	06:02	05:01	04:33	04:56	05:49	06:44	18:33 (1)	07:40	07:40	08:23			
	16:19	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	12	18:45 (1)	18:05	16:05	15:44		
19	08:16	07:22	06:15	17:48 (1)	05:59	04:59	04:33	04:58	05:50	06:46	18:32 (1)	07:42	07:42	08:24		
	16:21	17:23	18:18	3	17:51 (1)	20:16	21:10	21:44	21:29	20:31	19:16	14	18:46 (1)	18:03	16:03	15:45
20	08:15	07:19	06:13	17:46 (1)	05:57	04:57	04:33	04:59	05:52	06:48	18:31 (1)	07:44	07:44	08:25		
	16:23	17:25	18:20	7	17:53 (1)	20:18	21:12	21:45	21:28	20:29	19:14	15	18:46 (1)	18:01	16:02	15:45
21	08:14	07:17	06:10	17:46 (1)	05:55	04:56	04:34	05:01	05:54	06:50	18:30 (1)	07:46	07:46	08:25		
	16:25	17:27	18:21	9	17:55 (1)	20:20	21:14	21:45	21:26	20:27	19:11	12	18:42 (1)	17:59	16:00	15:45
22	08:12	07:15	06:08	17:44 (1)	05:52	04:54	04:34	05:02	05:56	06:52	18:30 (1)	07:48	07:48	08:26		
	16:27	17:29	18:23	12	17:56 (1)	20:22	21:15	21:45	21:25	20:25	19:09	10	18:40 (1)	17:56	15:59	15:46
23	08:11	07:13	06:05	17:45 (1)	05:50	04:53	04:34	05:04	05:58	06:53	18:30 (1)	07:49	07:49	08:26		
	16:29	17:31	18:25	14	17:59 (1)	20:24	21:17	21:45	21:23	20:22	19:06	8	18:38 (1)	17:54	15:58	15:46
24	08:10	07:10	06:03	17:44 (1)	05:48	04:52	04:34	05:05	05:59	06:55	18:31 (1)	07:51	07:51	08:27		
	16:30	17:33	18:27	14	17:58 (1)	20:25	21:18	21:46	21:22	20:20	19:04	4	18:35 (1)	17:52	15:57	15:47
25	08:08	07:08	06:00	17:45 (1)	05:46	04:50	04:35	05:07	06:01	06:57	18:32 (1)	07:53	07:53	08:27		
	16:32	17:35	18:29	13	17:58 (1)	20:27	21:20	21:46	21:20	20:18	19:01	16:50	15:56	15:48		
26	08:07	07:06	05:58	17:45 (1)	05:43	04:49	04:35	05:09	06:03	06:59	18:31 (1)	07:54	07:54	08:28		
	16:34	17:37	18:31	11	17:56 (1)	20:29	21:21	21:46	21:19	20:15	18:59	16:47	15:54	15:48		
27	08:05	07:03	05:55	17:48 (1)	05:41	04:48	04:36	05:10	06:05	07:01	18:32 (1)	07:56	07:56	08:28		
	16:36	17:39	18:33	6	17:54 (1)	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:53	15:49		
28	08:04	07:01	05:53	17:46 (1)	05:39	04:47	04:36	05:12	06:07	07:02	18:33 (1)	07:57	07:57	08:28		
	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:11	18:54	16:43	15:52	15:50				
29	08:02		06:50	05:37	04:45	04:37	05:13	06:08	07:04	07:01	08:00	08:28				
	16:40		19:37	20:35	21:26	21:45	21:14	20:08	18:51	16:41	15:51	15:51				
30	08:00		06:48	05:35	04:44	04:37	05:15	06:10	07:06	07:03	08:01	08:28				
	16:42		19:38	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:50	15:52				
31	07:59		06:45	04:43	04:43	05:17	06:12			07:05	08:00	08:28				
	16:44		19:40	21:28	21:28	21:10	20:03			16:38	16:37	15:53				
Sonnenscheinstunden	248	272	367	421	496	513	515	461	383	328	257	231				
astr.max.mögl.Beschattung			89							89						
Red.Sonnenscheinwahrsch.			0.31							0.40						
Reduktion Betriebsdauer			0.90							0.90						
Reduktion Windrichtung			0.68							0.68						
Gesamte Reduktion			0.19							0.25						
Met.wahrsch.Beschattung			17							22						

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: DZ - IO130**  
**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  
342 326 396 565 523 733 981 1.012 1.213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: EA - IO131**  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:28 15:54	07:57 16:46	06:59 17:43	06:43 18:42	18:49 (20) 19:05 (20)	05:33 20:29	04:42 21:39	04:38 21:44	05:19 21:09	06:14 20:01	19:24 (1) 19:33 (1)	07:08 18:46	07:07 16:35
2	08:28 15:55	07:55 16:48	06:56 17:45	06:40 19:44	18:50 (20) 19:03 (20)	05:31 20:40	04:41 21:31	04:39 21:44	05:20 21:07	06:16 19:59	19:25 (1) 19:30 (1)	07:09 18:44	08:05 16:33
3	08:28 15:57	07:54 16:50	06:54 17:47	06:38 19:46	18:51 (20) 19:02 (20)	05:28 20:42	04:40 21:32	04:40 21:44	05:22 21:05	06:17 19:56	19:30 (1) 18:41	07:11 16:31	08:06 15:48
4	08:27 15:58	07:52 16:52	06:52 17:49	06:35 19:48	18:54 (20) 18:58 (20)	05:26 20:44	04:39 21:33	04:40 21:43	05:24 21:03	06:19 19:54	18:41 18:39	07:13 16:29	08:08 15:47
5	08:27 15:59	07:50 16:54	06:49 17:51	06:33 19:50	18:52 20:46	05:24 21:34	04:39 21:43	04:41 21:01	05:25 21:01	06:21 19:54	18:41 18:36	07:15 16:27	08:09 15:47
6	08:27 16:00	07:48 16:56	06:47 17:53	06:30 19:52	18:53 20:46	05:22 21:35	04:38 21:42	04:42 20:59	05:27 21:02	06:23 19:49	18:41 18:34	07:17 16:25	08:10 15:46
7	08:26 16:02	07:46 16:58	06:44 17:55	06:28 19:54	18:54 20:50	05:20 21:36	04:37 21:41	04:43 20:57	05:29 21:02	06:25 19:46	18:41 18:32	07:19 16:23	08:12 15:46
8	08:26 16:03	07:44 17:00	06:42 17:57	06:26 19:55	18:55 20:51	05:18 21:37	04:37 21:41	04:44 20:55	05:31 21:00	06:26 19:44	18:36 18:29	07:21 16:21	08:13 15:45
9	08:25 16:05	07:42 17:02	06:40 18:00	06:23 19:57	18:57 20:53	05:17 21:38	04:36 21:40	04:45 20:53	05:32 21:00	06:27 19:41	18:35 18:25	07:23 16:19	08:14 15:45
10	08:24 16:06	07:40 17:05	06:37 18:00	06:21 19:59	18:59 20:55	05:15 21:39	04:35 21:39	04:46 20:51	05:33 21:01	06:28 19:39	18:34 18:24	07:25 16:18	08:15 15:45
11	08:24 16:08	07:38 17:07	06:35 18:02	06:18 20:01	19:24 (1) 19:23 (1)	05:13 20:57	04:35 21:40	04:47 21:38	05:36 20:49	06:32 19:36	18:42 (1) 18:37 (1)	07:27 16:16	08:17 15:44
12	08:23 16:09	07:36 17:09	06:32 18:04	06:16 20:03	19:23 (1) 19:35 (1)	05:11 20:59	04:35 21:41	04:49 21:37	05:38 20:47	06:34 19:34	18:41 (1) 18:38 (1)	07:28 16:14	08:18 15:44
13	08:22 16:11	07:34 17:11	06:30 18:06	06:13 20:05	19:22 (1) 19:37 (1)	05:09 21:00	04:34 21:41	04:50 21:36	05:40 20:45	06:35 19:31	18:40 (1) 18:37 (1)	07:30 16:13	08:19 15:44
14	08:21 16:12	07:32 17:13	06:27 18:08	06:11 20:07	19:21 (1) 19:38 (1)	05:07 21:02	04:34 21:42	04:51 21:35	05:41 20:43	06:37 19:29	18:39 (1) 18:35 (1)	07:32 16:11	08:20 15:44
15	08:21 16:14	07:30 17:15	06:25 18:10	06:09 20:09	19:21 (1) 19:40 (1)	05:06 21:04	04:34 21:43	04:52 21:34	05:43 20:40	06:39 19:26	18:39 (1) 18:36 (1)	07:34 16:10	08:21 15:44
16	08:19 16:16	07:28 17:17	06:22 18:12	06:06 20:10	19:21 (1) 19:40 (1)	05:04 21:05	04:34 21:43	04:54 21:33	05:45 20:39	06:41 19:24	18:40 (1) 18:36 (1)	07:36 16:08	08:22 15:44
17	08:18 16:18	07:26 17:19	06:20 18:14	06:04 20:12	19:20 (1) 19:38 (1)	05:02 21:07	04:33 21:44	04:55 21:32	05:47 20:36	06:43 19:21	18:40 (1) 18:33 (1)	07:38 16:06	08:23 15:44
18	08:17 16:19	07:24 17:21	06:18 18:16	06:02 20:14	19:21 (1) 19:38 (1)	05:01 21:09	04:33 21:44	04:57 21:30	05:49 20:34	06:44 19:19	18:41 (1) 18:30 (1)	07:40 16:05	08:23 15:44
19	08:16 16:21	07:21 17:23	06:15 18:18	05:59 20:16	19:21 (1) 19:37 (1)	04:59 21:10	04:33 21:44	04:58 21:29	05:50 20:31	06:46 19:16	18:43 (1) 18:38 (1)	07:42 16:03	08:24 15:45
20	08:15 16:23	07:19 17:25	06:13 18:20	05:57 20:18	19:22 (1) 19:36 (1)	04:57 21:12	04:33 21:45	04:59 21:28	05:52 20:29	06:48 19:14	18:42 (1) 18:37 (1)	07:44 16:02	08:25 15:45
21	08:14 16:25	07:17 17:27	06:10 18:21	05:55 20:20	19:24 (1) 19:34 (1)	04:56 21:14	04:34 21:45	05:01 21:26	05:54 20:27	06:50 19:37 (1)	18:41 (1) 18:36 (1)	07:46 16:00	08:26 15:45
22	08:12 16:27	07:15 17:29	06:08 18:23	05:52 20:22	19:23 (1) 19:30 (1)	04:54 21:15	04:34 21:45	05:02 21:25	05:56 20:25	06:52 19:28 (1)	18:40 (1) 18:35 (1)	07:48 15:59	08:26 15:46
23	08:11 16:29	07:13 17:31	06:05 18:25	05:50 20:24	19:23 (1) 19:31 (1)	04:53 21:17	04:34 21:45	05:04 21:23	05:58 20:22	06:53 19:40 (1)	18:40 (1) 18:35 (1)	07:49 15:58	08:27 15:46
24	08:10 16:30	07:10 17:33	06:03 18:27	05:48 20:25	17:57 (20) 18:00 (20)	05:48 21:18	04:34 21:46	05:05 21:22	05:59 20:20	06:54 19:41 (1)	18:40 (1) 18:35 (1)	07:51 15:57	08:27 15:47
25	08:08 16:32	07:08 17:35	06:00 18:29	05:46 20:27	17:54 (20) 18:00 (20)	05:46 21:20	04:35 21:46	05:07 21:20	06:01 20:18	06:57 19:42 (1)	18:40 (1) 18:35 (1)	07:53 15:56	08:27 15:48
26	08:07 16:34	07:06 17:37	05:58 18:31	05:43 20:29	17:51 (20) 18:04 (20)	05:43 21:21	04:35 21:46	05:09 21:19	06:03 20:15	06:59 19:23 (1)	18:40 (1) 18:35 (1)	07:55 15:54	08:28 15:48
27	08:05 16:36	07:03 17:39	05:55 18:33	05:41 20:31	17:51 (20) 18:06 (20)	05:41 21:23	04:36 21:45	05:10 21:17	06:05 20:13	06:57 19:41 (1)	18:41 (1) 18:36 (1)	07:56 15:53	08:28 15:49
28	08:04 16:38	07:01 17:41	05:53 18:35	05:39 20:33	17:49 (20) 18:06 (20)	05:39 21:24	04:36 21:45	05:12 21:15	06:07 20:11	06:59 19:41 (1)	18:41 (1) 18:34 (1)	07:57 15:52	08:28 15:50
29	08:02 16:40	07:00 17:43	05:50 18:37	05:37 20:35	18:49 (20) 19:07 (20)	05:37 21:26	04:37 21:45	05:14 21:14	06:08 20:08	06:57 19:23 (1)	18:41 (1) 18:31 (1)	07:59 15:51	08:29 15:51
30	08:00 16:42	07:00 17:46	05:48 18:40	05:35 20:37	18:48 (20) 19:06 (20)	05:35 21:27	04:37 21:45	05:15 21:12	06:10 20:06	06:59 19:22 (1)	18:41 (1) 18:37 (1)	08:01 15:52	08:29 15:52
31	07:59 16:44	06:45 17:49	05:45 18:40	05:33 20:37	18:49 (20) 19:06 (20)	05:33 21:28	04:37 21:10	05:17 20:03	06:12 20:03	06:59 19:23 (1)	18:41 (1) 18:35 (1)	08:02 15:53	08:29 15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	257	231	
astr.max.mögl.Beschattung			109	217					162				
Red.Sonnenscheinwahrsch.			0.31	0.41					0.48				
Reduktion Betriebsdauer			0.90	0.90					0.90				
Reduktion Windrichtung			0.68	0.65					0.64				
Gesamte Reduktion			0.19	0.24					0.20				
Met.wahrsch.Beschattung			21	52					46				

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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung:** GBSchattenrezeptor: EB - IO132  
**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	19:12 (1)	07:08	07:07	08:03
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	19:11 (1)	07:10	07:09	08:05
3	08:28	07:54	06:54	06:38	05:28	04:40	04:39	05:22	06:17	19:10 (1)	07:12	07:11	08:06
4	08:27	07:52	06:52	06:35	05:26	04:39	04:40	05:24	06:19	19:12 (1)	07:13	07:13	08:08
5	08:27	07:50	06:49	06:33	05:24	04:39	04:41	05:25	06:21	19:12 (1)	07:15	07:15	08:09
6	08:27	07:48	06:47	06:30	05:22	04:38	04:42	05:27	06:23	19:13 (1)	07:17	07:17	08:10
7	08:26	07:46	06:44	06:28	05:20	04:37	04:43	05:29	06:25	19:14 (1)	07:19	07:19	08:12
8	08:26	07:44	06:42	06:26	05:18	04:37	04:44	05:31	06:26	19:14 (1)	07:21	07:21	08:13
9	08:25	07:42	06:40	06:23	05:16	04:36	04:45	05:32	06:28	19:15 (1)	07:23	07:23	08:14
10	08:24	07:40	06:37	06:21	05:14	04:35	04:46	05:34	06:30	19:16 (1)	07:25	07:25	08:16
11	08:24	07:38	06:35	06:18	05:12	04:35	04:47	05:36	06:32	19:17 (1)	07:27	07:27	08:17
12	08:23	07:36	06:32	06:16	05:10	04:35	04:49	05:38	06:34	19:18 (1)	07:29	07:29	08:18
13	08:22	07:34	06:30	06:13	05:09	04:34	04:50	05:40	06:35	19:19 (1)	07:30	07:31	08:19
14	08:21	07:32	06:27	06:11	05:07	04:34	04:51	05:41	06:37	18:33 (20)	07:32	07:33	08:20
15	08:20	07:30	06:25	06:09	05:06	04:34	04:52	05:43	06:39	18:42 (20)	07:34	07:35	08:21
16	08:19	07:28	06:22	06:06	05:04	04:34	04:54	05:45	06:41	18:49 (20)	07:36	07:36	08:22
17	08:18	07:26	06:20	06:04	05:02	04:33	04:55	05:47	06:43	18:30 (20)	07:38	07:38	08:23
18	08:17	07:24	06:18	06:02	05:01	04:33	04:57	05:49	06:44	18:25 (20)	07:40	07:40	08:24
19	08:16	07:22	06:15	06:00	05:00	04:33	04:58	05:50	06:46	18:19 (20)	07:42	07:42	08:25
20	08:15	07:20	06:13	05:57	04:57	04:33	04:59	05:52	06:48	18:14 (20)	07:44	07:44	08:26
21	08:14	07:18	06:11	05:55	04:56	04:34	05:01	05:54	06:50	18:09 (20)	07:46	07:46	08:27
22	08:12	07:15	06:08	05:52	04:54	04:34	05:02	05:56	06:52	18:04 (20)	07:48	07:48	08:28
23	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	18:00 (20)	07:49	07:49	08:29
24	08:10	07:11	06:03	05:48	04:52	04:34	05:05	05:59	06:55	17:55 (20)	07:51	07:51	08:30
25	08:09	07:08	06:00	05:46	04:50	04:35	05:07	06:01	06:57	17:50 (20)	07:53	07:53	08:31
26	08:07	07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	17:45 (20)	07:55	07:55	08:32
27	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	06:59	17:40 (20)	07:56	07:56	08:33
28	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	06:59	17:35 (20)	07:58	07:58	08:34
29	08:03	07:00	05:51	05:37	04:46	04:37	05:14	06:08	06:59	17:30 (20)	07:59	07:59	08:35
30	08:00	07:00	05:48	05:35	04:44	04:37	05:15	06:10	06:59	17:25 (20)	08:00	08:00	08:36
31	07:59	07:00	05:45	05:33	04:43	04:37	05:16	06:11	06:59	17:20 (20)	08:01	08:01	08:37
32	07:58	07:00	05:42	05:31	04:42	04:37	05:17	06:12	06:59	17:15 (20)	08:02	08:02	08:38
33	07:57	07:00	05:40	05:29	04:41	04:37	05:18	06:13	06:59	17:10 (20)	08:03	08:03	08:39
34	07:56	07:00	05:38	05:27	04:40	04:37	05:19	06:14	06:59	17:05 (20)	08:04	08:04	08:40
35	07:55	07:00	05:36	05:25	04:39	04:37	05:20	06:15	06:59	17:00 (20)	08:05	08:05	08:41
36	07:54	07:00	05:34	05:23	04:38	04:37	05:21	06:16	06:59	16:55 (20)	08:06	08:06	08:42
37	07:53	07:00	05:32	05:21	04:37	04:37	05:22	06:17	06:59	16:50 (20)	08:07	08:07	08:43
38	07:52	07:00	05:30	05:19	04:36	04:37	05:23	06:18	06:59	16:45 (20)	08:08	08:08	08:44
39	07:51	07:00	05:28	05:17	04:35	04:37	05:24	06:19	06:59	16:40 (20)	08:09	08:09	08:45
40	07:50	07:00	05:26	05:15	04:34	04:37	05:25	06:20	06:59	16:35 (20)	08:10	08:10	08:46
41	07:49	07:00	05:24	05:13	04:33	04:37	05:26	06:21	06:59	16:30 (20)	08:11	08:11	08:47
42	07:48	07:00	05:22	05:11	04:32	04:37	05:27	06:22	06:59	16:25 (20)	08:12	08:12	08:48
43	07:47	07:00	05:20	05:09	04:31	04:37	05:28	06:23	06:59	16:20 (20)	08:13	08:13	08:49
44	07:46	07:00	05:18	05:07	04:30	04:37	05:29	06:24	06:59	16:15 (20)	08:14	08:14	08:50
45	07:45	07:00	05:16	05:05	04:29	04:37	05:30	06:25	06:59	16:10 (20)	08:15	08:15	08:51
46	07:44	07:00	05:14	05:03	04:28	04:37	05:31	06:26	06:59	16:05 (20)	08:16	08:16	08:52
47	07:43	07:00	05:12	05:01	04:27	04:37	05:32	06:27	06:59	16:00 (20)	08:17	08:17	08:53
48	07:42	07:00	05:10	04:59	04:26	04:37	05:33	06:28	06:59	15:55 (20)	08:18	08:18	08:54
49	07:41	07:00	05:08	04:57	04:25	04:37	05:34	06:29	06:59	15:50 (20)	08:19	08:19	08:55
50	07:40	07:00	05:06	04:55	04:24	04:37	05:35	06:30	06:59	15:45 (20)	08:20	08:20	08:56
51	07:39	07:00	05:04	04:53	04:23	04:37	05:36	06:31	06:59	15:40 (20)	08:21	08:21	08:57
52	07:38	07:00	05:02	04:51	04:22	04:37	05:37	06:32	06:59	15:35 (20)	08:22	08:22	08:58
53	07:37	07:00	05:00	04:49	04:21	04:37	05:38	06:33	06:59	15:30 (20)	08:23	08:23	08:59
54	07:36	07:00	04:58	04:47	04:20	04:37	05:39	06:34	06:59	15:25 (20)	08:24	08:24	09:00
55	07:35	07:00	04:56	04:45	04:19	04:37	05:40	06:35	06:59	15:20 (20)	08:25	08:25	09:01
56	07:34	07:00	04:54	04:43	04:18	04:37	05:41	06:36	06:59	15:15 (20)	08:26	08:26	09:02
57	07:33	07:00	04:52	04:41	04:17	04:37	05:42	06:37	06:59	15:10 (20)	08:27	08:27	09:03
58	07:32	07:00	04:50	04:39	04:16	04:37	05:43	06:38	06:59	15:05 (20)	08:28	08:28	09:04
59	07:31	07:00	04:48	04:37	04:15	04:37	05:44	06:39	06:59	15:00 (20)	08:29	08:29	09:05
60	07:30	07:00	04:46	04:35	04:14	04:37	05:45	06:40	06:59	14:55 (20)	08:30	08:30	09:06
61	07:29	07:00	04:44	04:33	04:13	04:37	05:46	06:41	06:59	14:50 (20)	08:31	08:31	09:07
62	07:28	07:00	04:42	04:31	04:12	04:37	05:47	06:42	06:59	14:45 (20)	08:32	08:32	09:08
63	07:27	07:00	04:40	04:29	04:11	04:37	05:48	06:43	06:59	14:40 (20)	08:33	08:33	09:09
64	07:26	07:00	04:38	04:27	04:10	04:37	05:49	06:44	06:59	14:35 (20)	08:34	08:34	09:10
65	07:25	07:00	04:36	04:25	04:09	04:37	05:50	06:45	06:59	14:30 (20)	08:35	08:35	09:11
66	07:24	07:00	04:34	04:23	04:08	04:37	05:51	06:46	06:59	14:25 (20)	08:36	08:36	09:12
67	07:23	07:00	04:32	04:21	04:07	04:37	05:52	06:47	06:59	14:20 (20)	08:37	08:37	09:13
68	07:22	07:00	04:30	04:19	04:06	04:37	05:53	06:48	06:59	14:15 (20)	08:38	08:38	09:14
69	07:21	07:00	04:28	04:17	04:05	04:37	05:54	06:49	06:59	14:10 (20)	08:39	08:39	09:15
70	07:20	07:00	04:26	04:15	04:04	04:37	05:55	06:50	06:59	14:05 (20)	08:40	08:40	09:16
71	07:19	07:00	04:24	04:13	04:03	04:37	05:56	06:51	06:59	14:00 (20)	08:41	08:41	09:17
72	07:18	07:00	04:22	04:11	04:02	04:37	05:57	06:52	06:59	13:55 (20)	08:42	08:42	09:18
73	07:17												

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender

**Berechnung:** GBSchattenrezeptor: EC - IO133  
**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:28 15:54	07:57 16:46	06:59 17:43	06:43 18:42	18:38 (1) 19:14 (1)	05:33 20:29	04:42 21:29	04:38 21:44	05:19 21:09	05:14 20:01	07:08 18:46	18:08 (20) 16:35	07:07 15:50
2	08:28 15:55	07:55 16:48	06:56 17:45	06:40 18:44	18:57 (1) 19:13 (1)	05:31 20:40	04:41 21:31	04:39 21:44	05:20 21:07	06:16 19:59	07:10 18:44	18:08 (20) 16:33	08:05 15:49
3	08:28 15:56	07:54 16:50	06:54 17:47	06:38 18:46	18:58 (1) 19:12 (1)	05:28 20:42	04:40 21:32	04:39 21:44	05:22 21:05	06:17 19:56	07:12 18:41	18:10 (20) 16:31	08:06 15:48
4	08:27 15:58	07:52 16:52	06:52 17:49	06:35 18:48	18:59 (1) 19:10 (1)	05:26 20:44	04:39 21:33	04:40 21:43	05:24 21:03	19:56 19:54	07:13 18:39	16:29 16:25	08:08 15:47
5	08:27 15:59	07:50 16:54	06:49 17:51	06:33 18:50	19:01 (1) 19:08 (1)	05:24 20:46	04:39 21:34	04:41 21:43	05:25 21:01	06:21 19:51	07:15 18:36	16:29 16:27	08:09 15:47
6	08:27 16:00	07:48 16:56	06:47 17:53	06:30 19:52	05:22 19:52	04:38 20:46	04:42 21:35	05:27 21:42	06:23 20:59	06:23 19:49	07:17 18:34	16:19 16:25	08:10 15:46
7	08:26 16:02	07:46 16:54	06:44 17:55	06:28 19:54	05:20 20:50	04:37 21:36	04:43 21:41	05:29 20:57	06:25 19:46	7 18:56 (1)	07:19 18:03 (1)	16:19 16:23	08:12 15:46
8	08:26 16:03	07:44 17:00	06:42 17:57	06:26 19:55	05:18 20:51	04:37 21:37	04:44 21:41	05:31 20:55	06:26 19:44	11 18:54 (1)	07:21 18:29	16:21 16:21	08:13 15:45
9	08:25 16:05	07:42 17:02	06:40 17:58	06:23 19:57	05:17 20:53	04:36 21:38	04:45 21:40	05:32 20:53	06:28 19:41	11 18:51 (1)	07:23 18:27	16:18 16:19	08:14 15:45
10	08:24 16:06	07:40 17:04	06:37 18:00	06:21 19:59	05:15 20:55	04:35 21:39	04:46 21:39	05:34 20:51	06:30 19:39	15 18:56 (1)	07:25 18:24	16:16 16:18	08:16 15:45
11	08:24 16:08	07:38 17:07	06:35 18:02	06:18 20:01	17:31 (20) 17:36 (20)	06:18 20:01	05:13 20:57	04:47 21:38	05:36 20:49	06:32 19:36	16 18:50 (1)	16:18 16:16	08:17 15:44
12	08:23 16:11	07:36 17:09	06:32 18:04	06:16 20:03	17:27 (20) 17:37 (20)	20:03	05:11 20:58	04:49 21:41	05:38 20:47	06:34 19:34	16 18:50 (1)	16:19 16:14	08:18 15:44
13	08:22 16:12	07:34 17:13	06:30 18:08	06:13 20:07	17:28 (20) 17:41 (20)	20:07	05:09 21:02	04:50 21:42	06:35 20:43	14 18:49 (1)	16:19 16:11	16:19 16:11	08:19 15:44
14	08:21 16:13	07:32 17:11	06:27 18:06	06:11 20:05	17:27 (20) 17:40 (20)	20:05	05:07 21:00	04:51 21:41	06:37 20:45	14 18:49 (1)	16:19 16:13	16:19 16:13	08:20 15:44
15	08:20 16:14	07:30 17:15	06:25 18:10	06:09 20:09	17:27 (20) 17:42 (20)	20:09	05:06 21:04	04:52 21:43	06:39 20:40	11 18:50 (1)	16:19 16:14	16:19 16:14	08:21 15:44
16	08:19 16:15	07:28 17:17	06:22 18:12	06:06 20:10	17:26 (20) 17:41 (20)	20:10	05:04 21:05	04:54 21:43	06:41 20:38	5 18:56 (1)	16:19 16:14	16:19 16:14	08:22 15:44
17	08:18 16:16	07:26 17:17	06:20 18:12	06:04 20:11	17:27 (20) 17:40 (20)	20:11	05:02 21:07	04:55 21:44	06:43 20:36	1 18:53 (1)	16:19 16:14	16:19 16:14	08:23 15:44
18	08:17 16:17	07:24 17:21	06:18 18:16	06:02 20:14	17:28 (20) 17:38 (20)	20:14	05:01 21:09	04:57 21:44	06:44 20:34	1 18:53 (1)	16:19 16:14	16:19 16:14	08:23 15:44
19	08:16 16:18	07:22 17:19	06:15 18:14	06:01 20:15	17:30 (20) 17:40 (20)	20:15	04:59 21:10	04:58 21:44	06:46 20:31	8 18:58 (1)	16:19 16:14	16:19 16:14	08:24 15:44
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21	08:14 16:22	07:17 17:25	06:10 18:20	05:55 20:18	17:36 (20) 17:46 (20)	20:16	04:56 21:12	05:01 21:45	06:50 20:27	6 18:50 (1)	16:19 16:14	16:19 16:14	08:26 15:44
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23	08:11 16:24	07:13 17:31	06:05 18:25	05:50 20:24	17:36 (20) 17:46 (20)	20:16	04:53 21:17	05:04 21:45	06:53 20:22	13 18:56 (1)	16:19 16:14	16:19 16:14	08:28 15:44
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25	08:08 16:26	07:08 17:35	06:00 18:29	05:46 20:27	17:36 (20) 17:46 (20)	20:16	04:50 21:26	05:07 21:46	06:57 20:18	3 18:18 (20)	16:19 16:14	16:19 16:14	08:30 15:44
26	08:07 16:27	07:06 17:39	05:58 18:33	05:43 20:29	17:36 (20) 17:46 (20)	20:16	04:49 21:31	05:09 21:46	06:59 20:14	9 18:22 (20)	16:19 16:14	16:19 16:14	08:31 15:44
27	08:05 16:28	07:03 17:41	05:55 18:35	05:41 20:33	18:02 (1) 18:07 (1)	20:33	04:48 21:34	05:10 21:45	07:01 20:11	14 18:08 (20)	16:19 16:14	16:19 16:14	08:32 15:44
28	08:04 16:30	07:01 17:41	05:53 18:35	05:39 20:33	18:06 (1) 18:07 (1)	20:33	04:47 21:34	05:12 21:45	06:07 20:11	14 18:08 (20)	16:19 16:14	16:19 16:14	08:33 15:44
29	08:02 16:31	06:59 17:41	05:50 18:35	05:37 20:33	18:07 (1) 18:08 (1)	20:33	04:45 21:34	05:13 21:45	06:08 20:11	15 18:23 (20)	16:19 16:14	16:19 16:14	08:34 15:44
30	08:00 16:32	06:48 17:37	05:48 18:31	05:35 20:33	19:10 (1) 19:11 (1)	20:33	04:44 21:26	05:15 21:44	07:06 20:08	15 18:22 (20)	16:19 16:14	16:19 16:14	08:35 15:44
31	07:59 16:42	06:45 17:38	05:45 18:25	05:33 20:33	19:11 (1) 19:12 (1)	20:37	04:43 21:27	05:17 21:45	07:05 20:06	13 18:20 (20)	16:19 16:14	16:19 16:14	08:36 15:44
32	07:58 16:43	06:44 17:39	05:44 18:24	05:32 20:33	19:12 (1) 19:13 (1)	20:37	04:42 21:28	05:18 21:46	07:06 20:03	13 18:20 (20)	16:19 16:14	16:19 16:14	08:37 15:44
Sonnenscheinstunden	248	272	367	421	496	513	515	461	383	200	18	257	231
atrz,max.mögl.Beschattung			152	64						200	18		
Red.Sonnenscheinwahrsch.			0.31	0.41						0.40	0.33		
Reduktion Betriebsdauer			0.90	0.90						0.90	0.90		
Reduktion Windrichtung			0.68	0.67						0.68	0.68		
Gesamte Reduktion			0.19	0.25						0.24	0.20		
Met.wahrsch.Beschattung			29	16						49	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	Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender**

**Berechnung: GBSchattenrezeptor: ED - IO134**

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

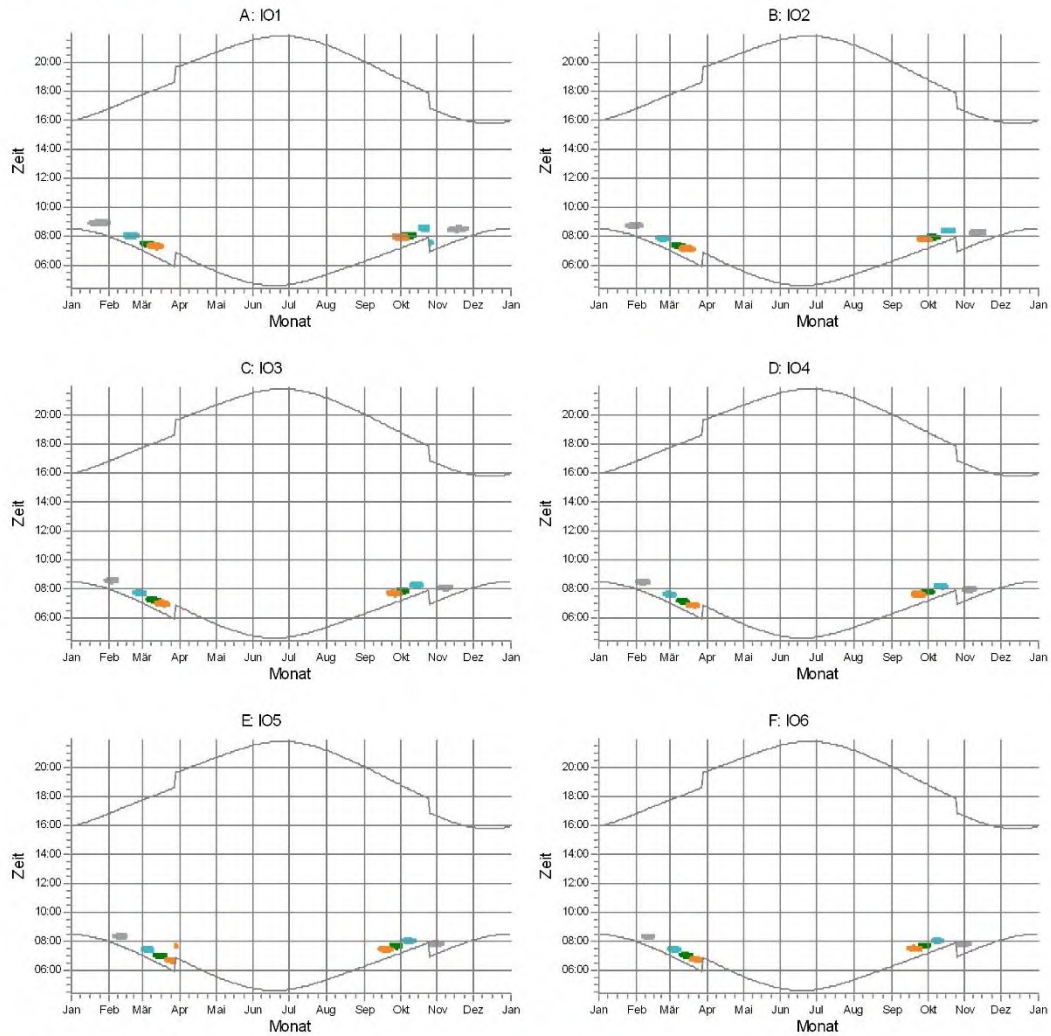
	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28   07:57   06:59			06:43	05:33	04:42	04:38	05:19	06:14	07:08	18:01 (20)   07:07	08:03
2	15:54   16:46   17:43			19:42	20:39	21:29	21:44	21:09	20:01	18:46	12   18:13 (20)   16:35	15:50
3	08:28   07:55   06:56			06:40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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Grafischer Kalender

Berechnung: GB



WEA



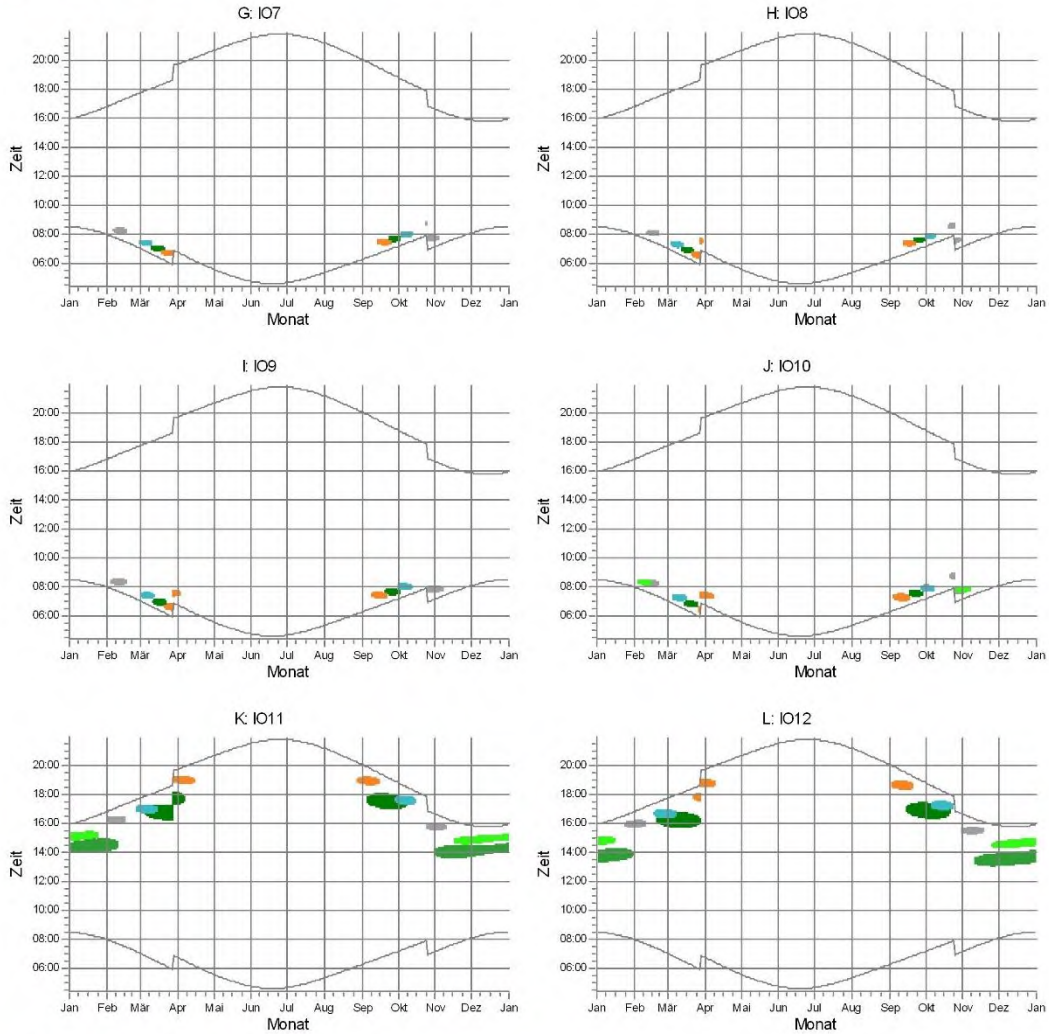


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### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

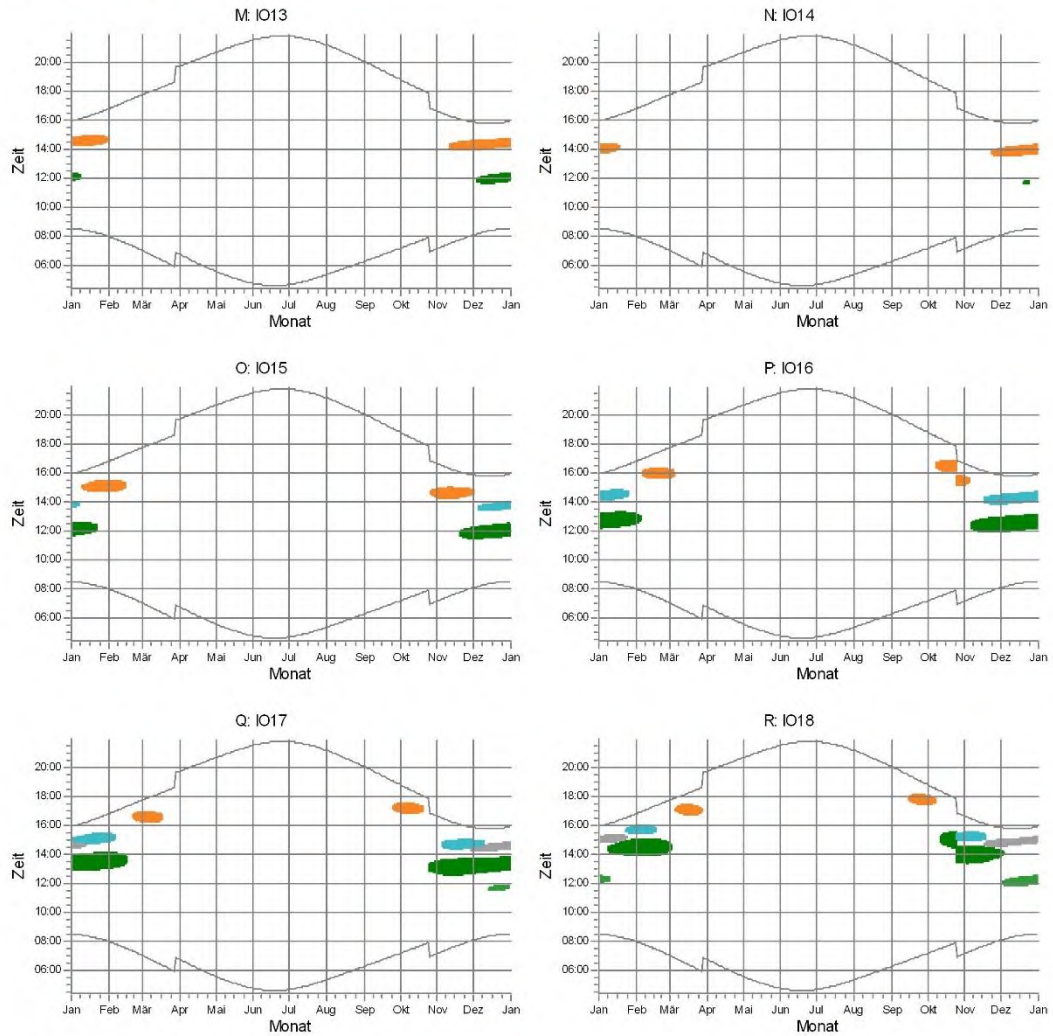


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### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

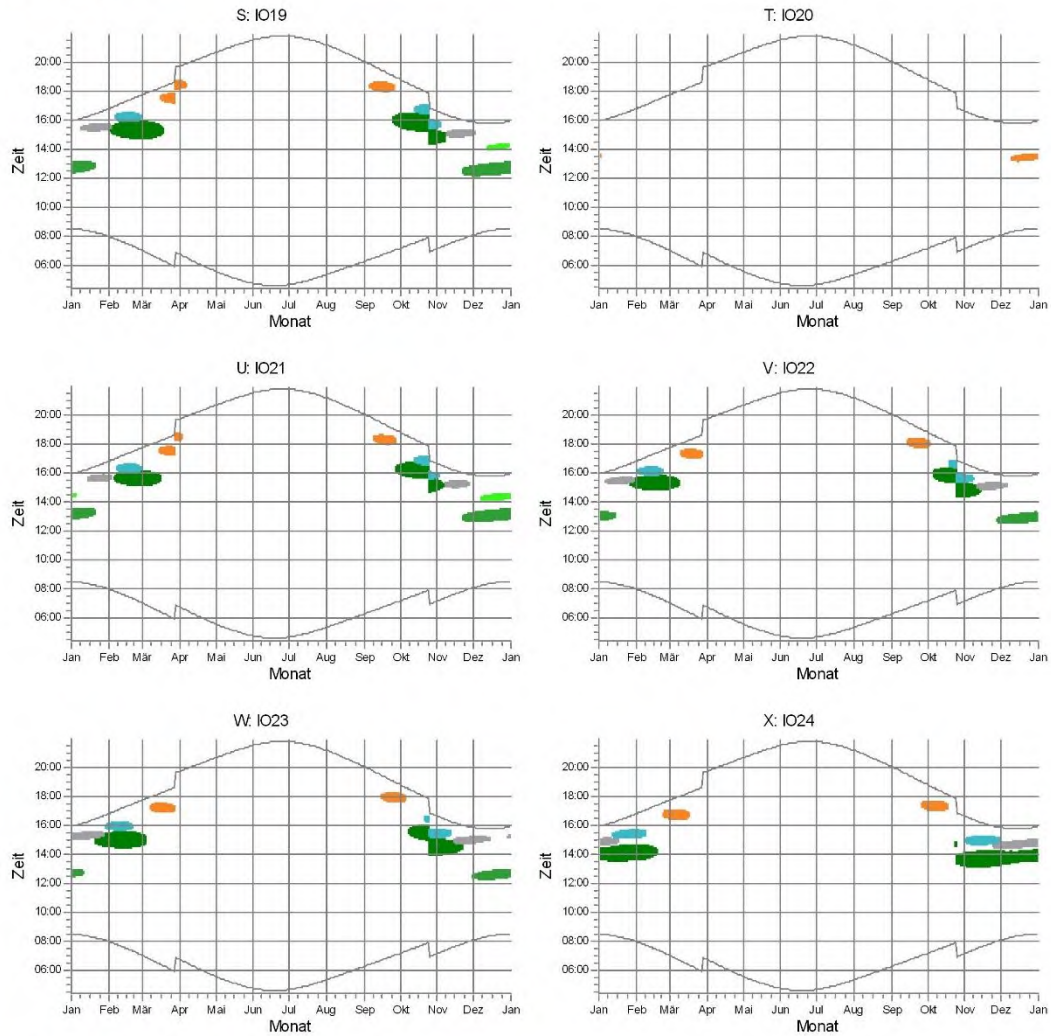


Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

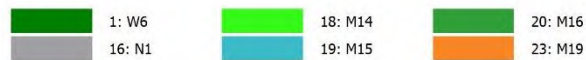
Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
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### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

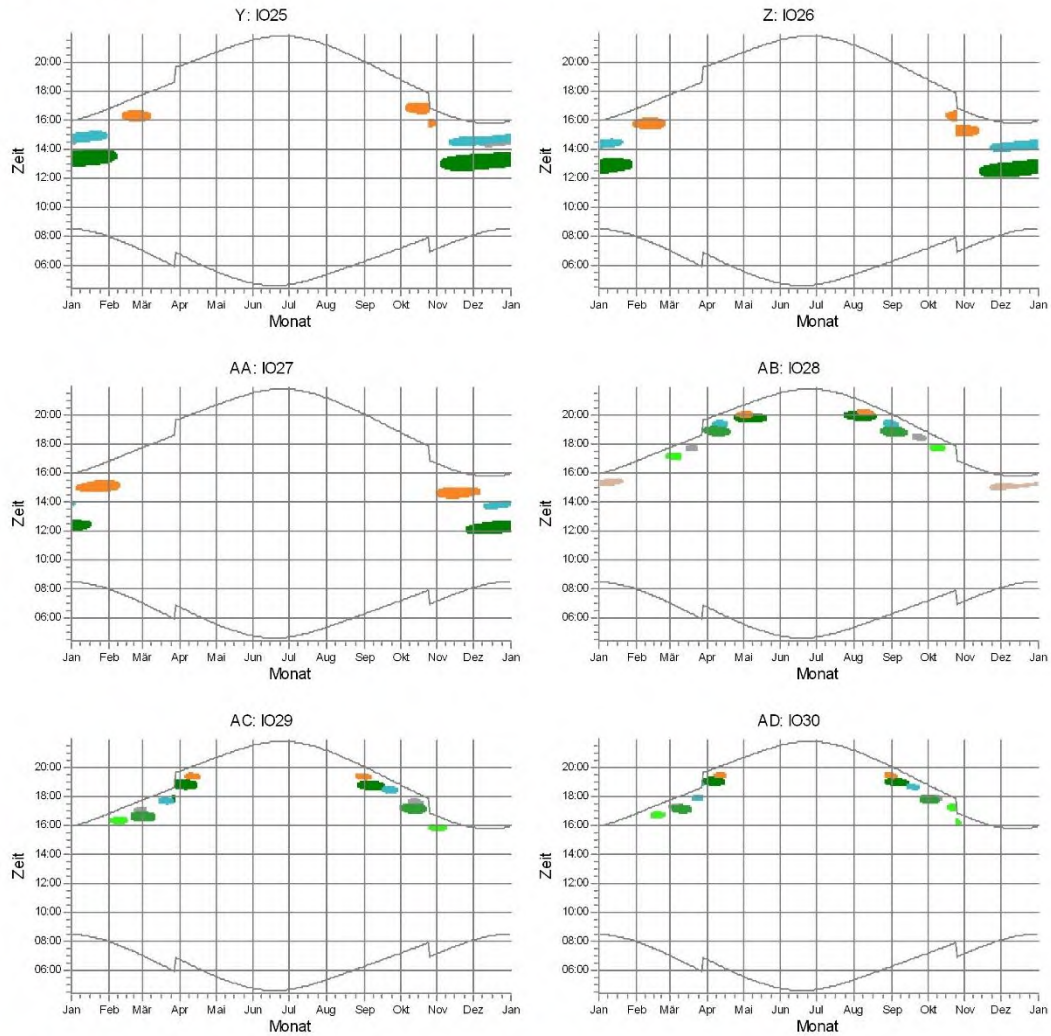


Projekt:  
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Berechnung: GB



WEA

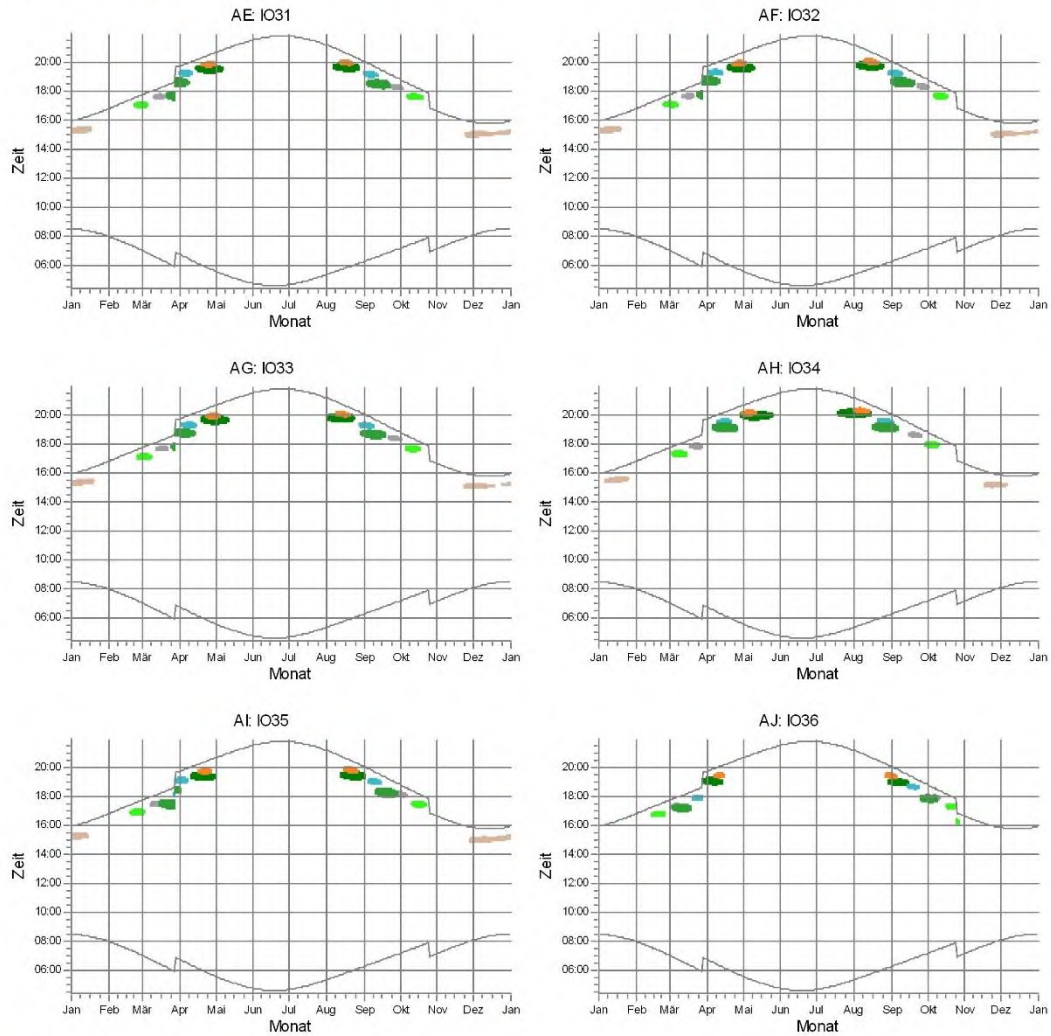


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### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

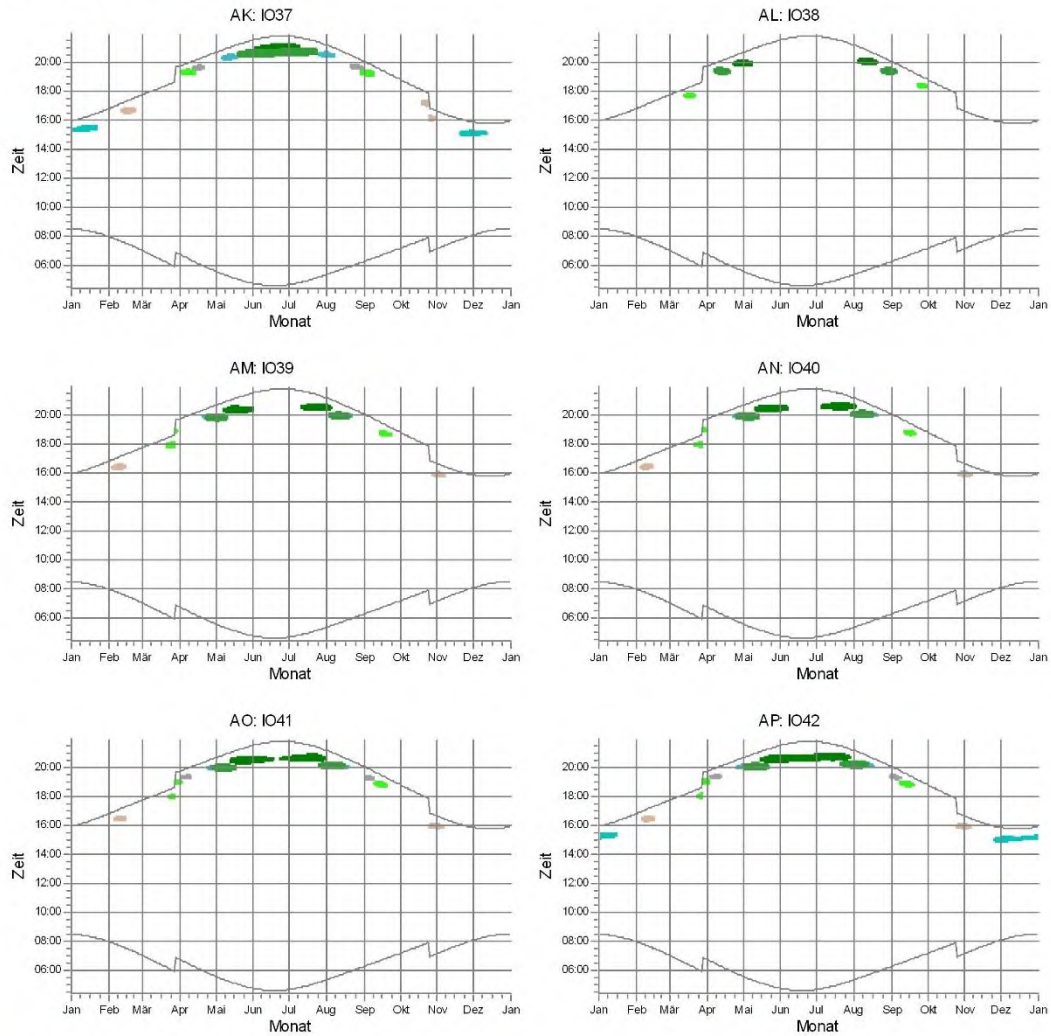


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### SHADOW - Grafischer Kalender

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WEA

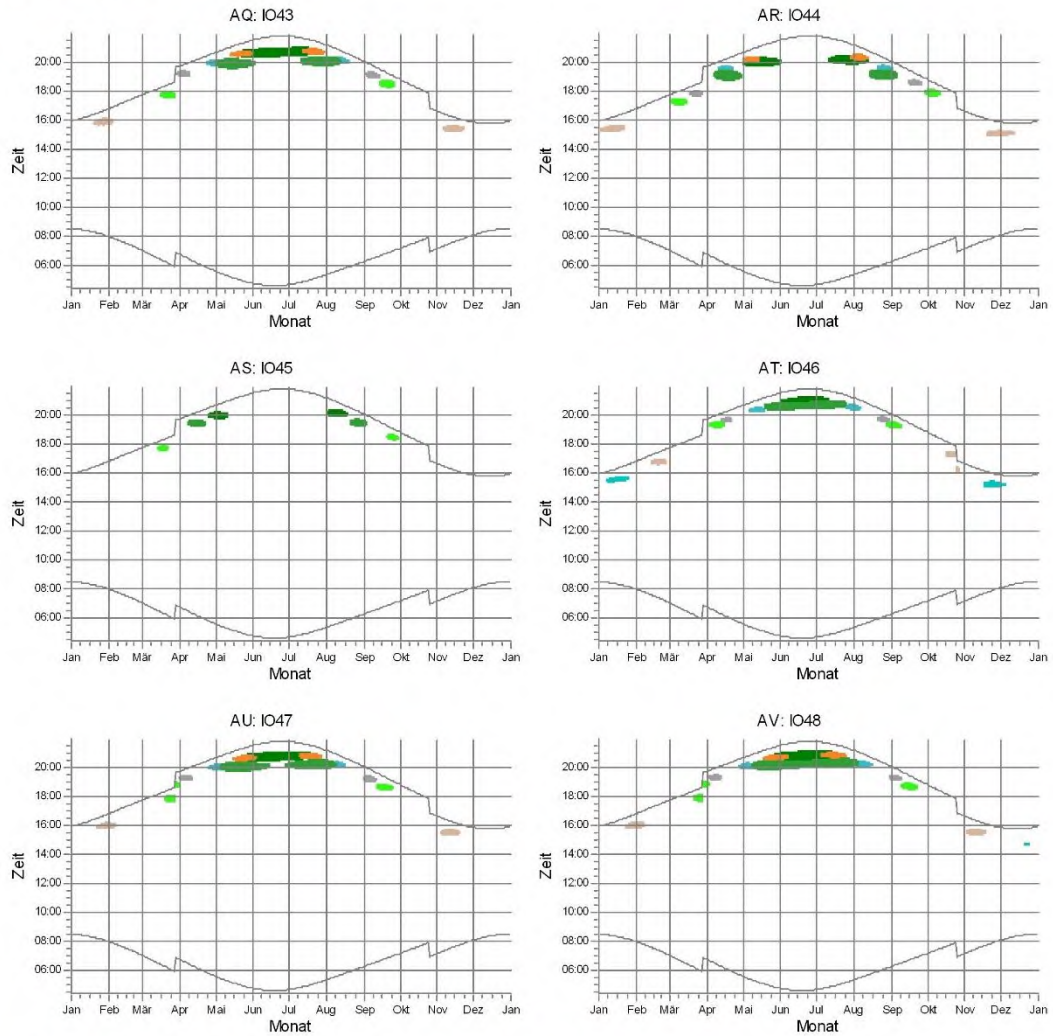


Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

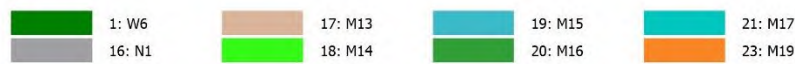
Lizenzierter Anwender:  
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### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

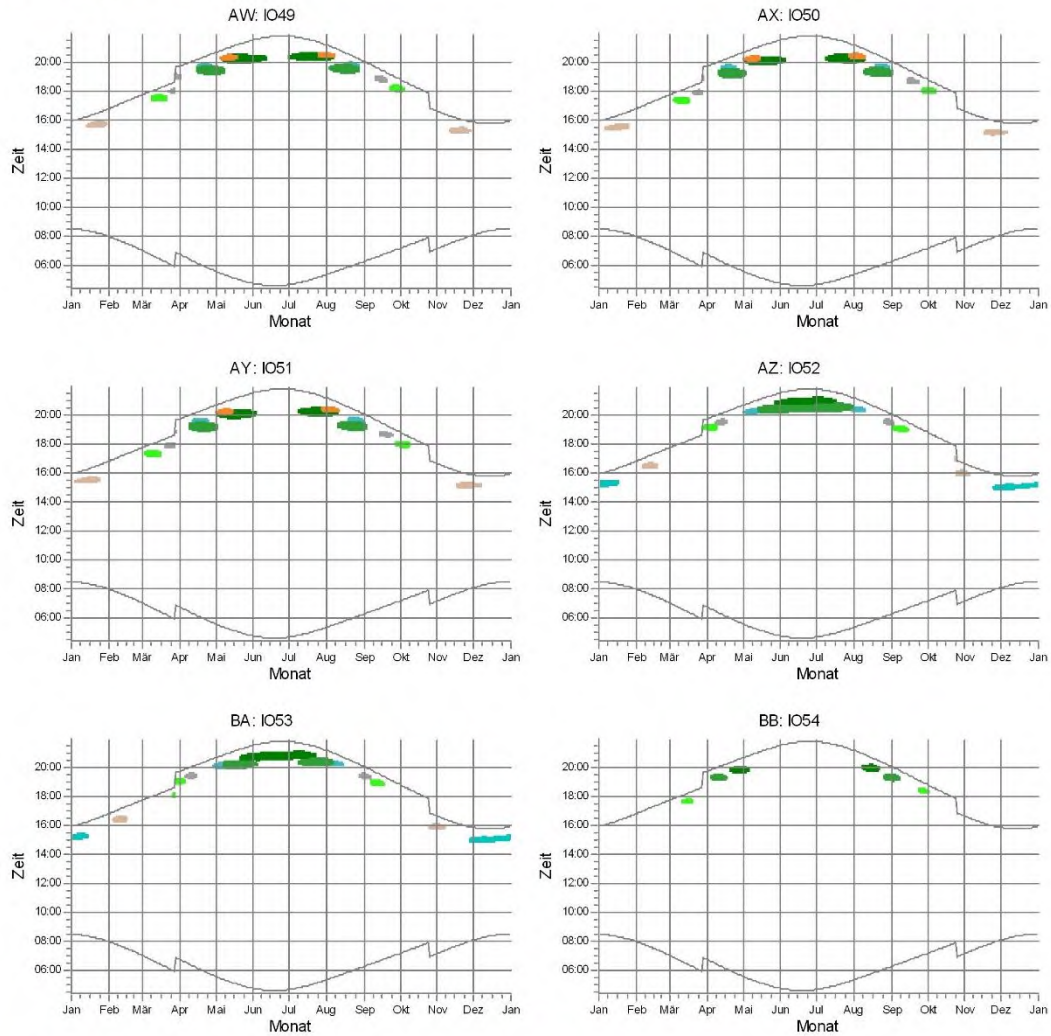


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Berechnung: GB



WEA



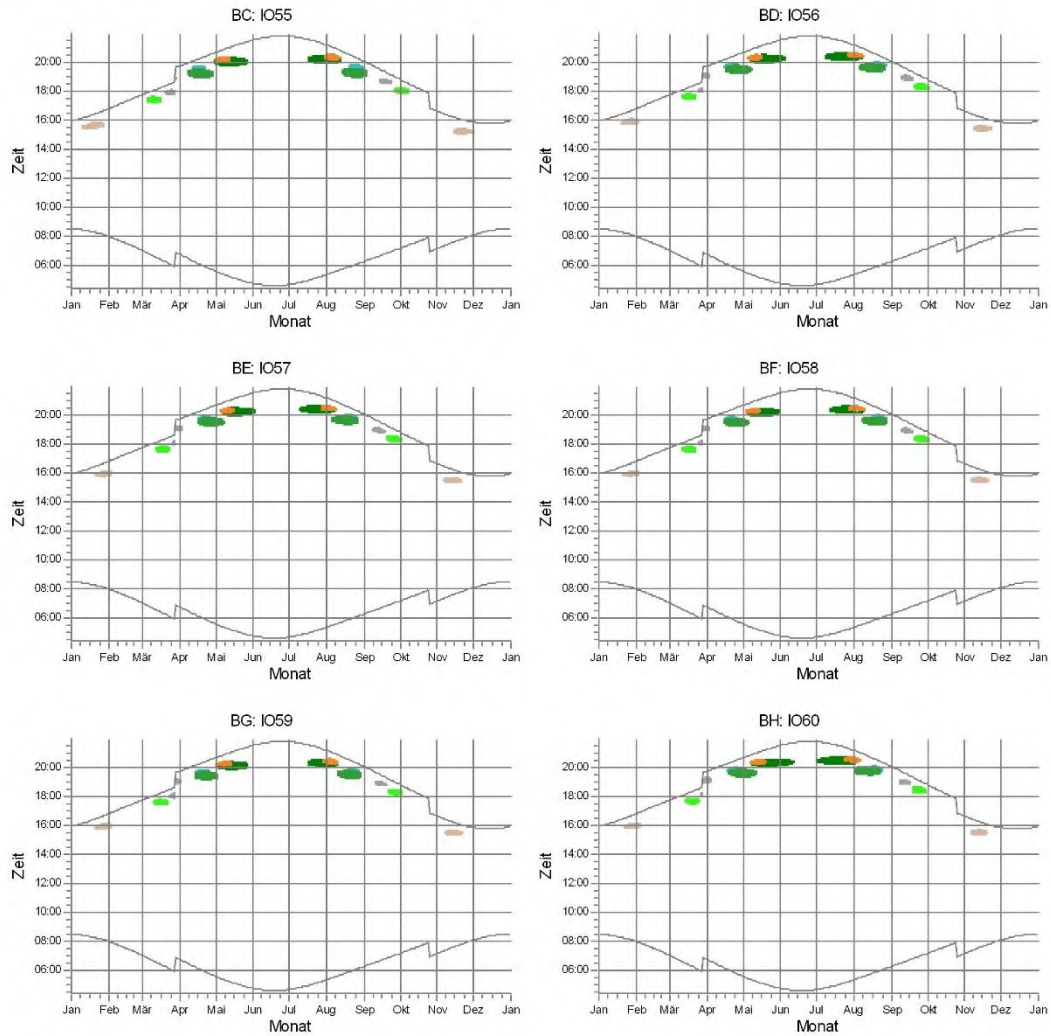


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### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

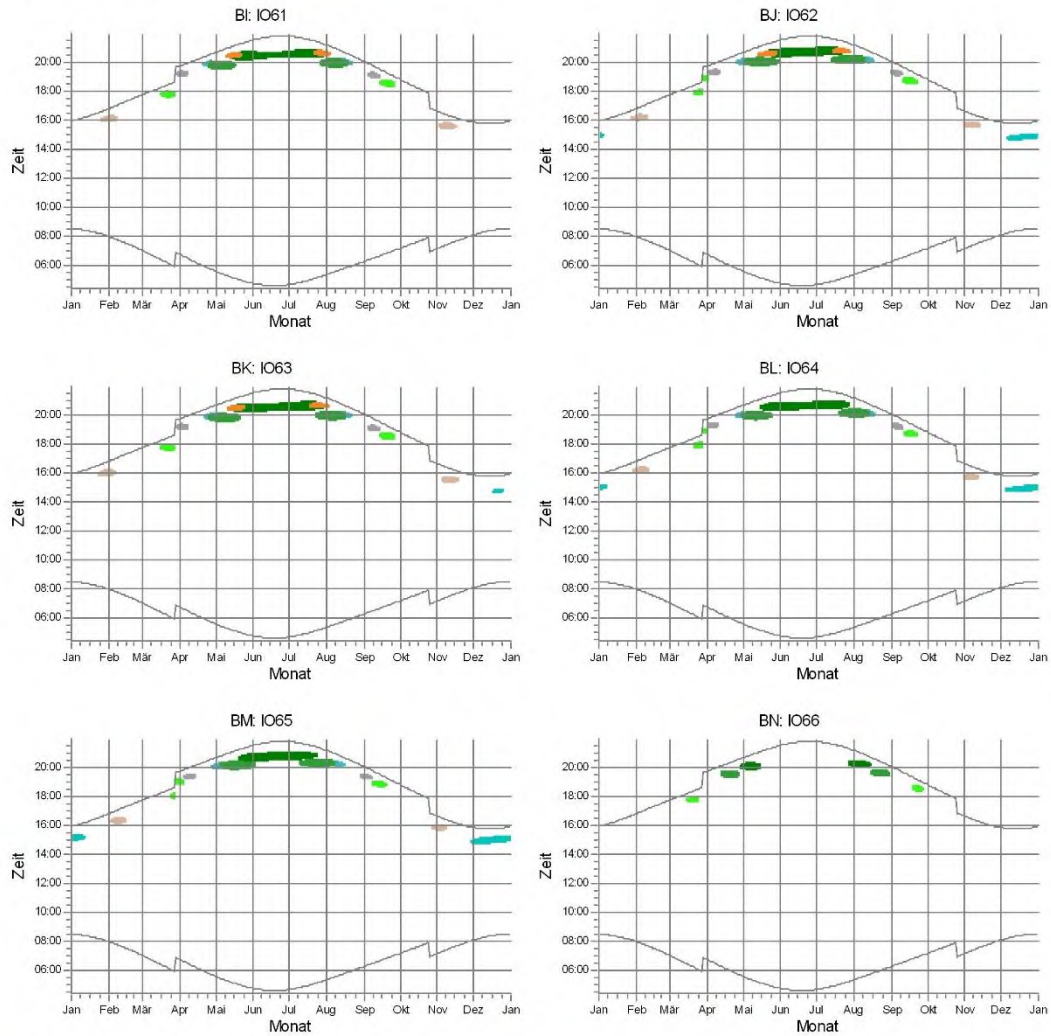


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Berechnung: GB



WEA

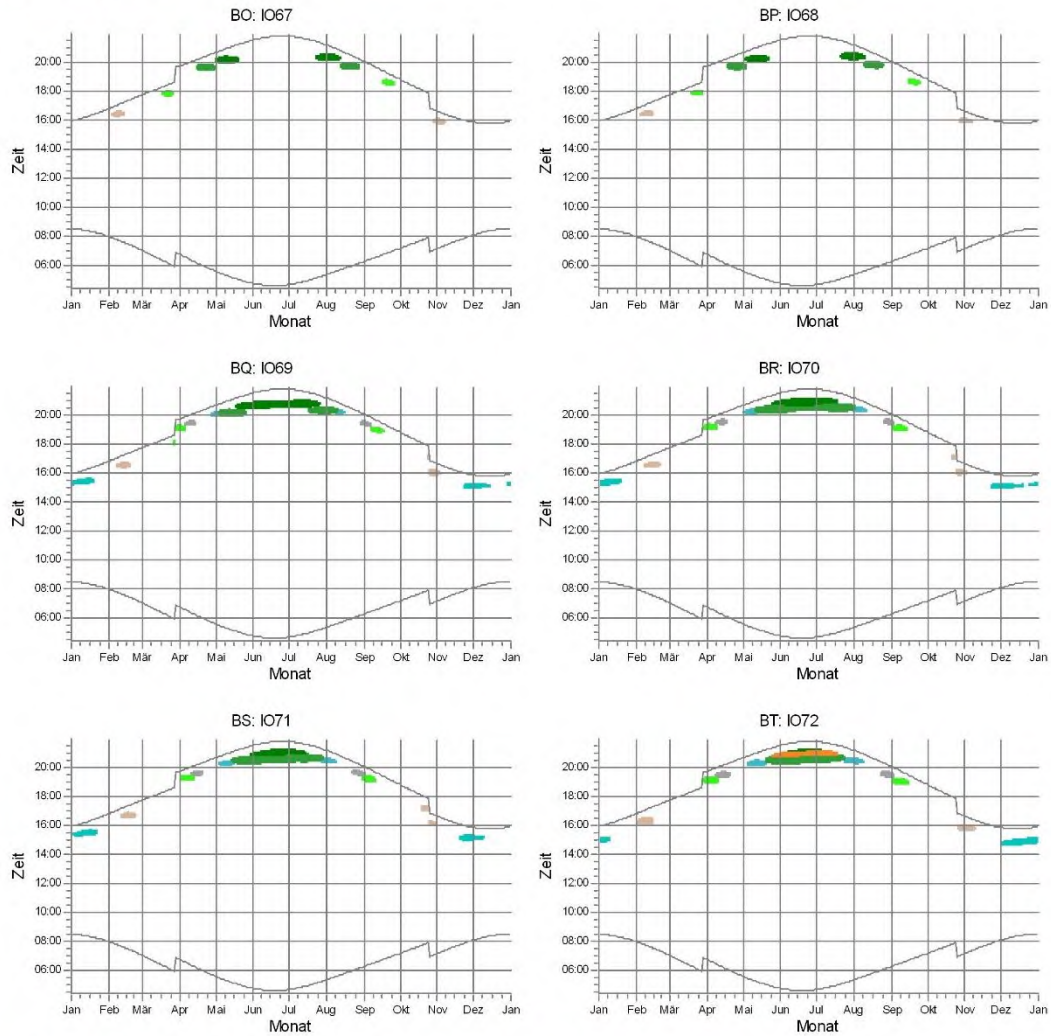


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Berechnung: GB



WEA

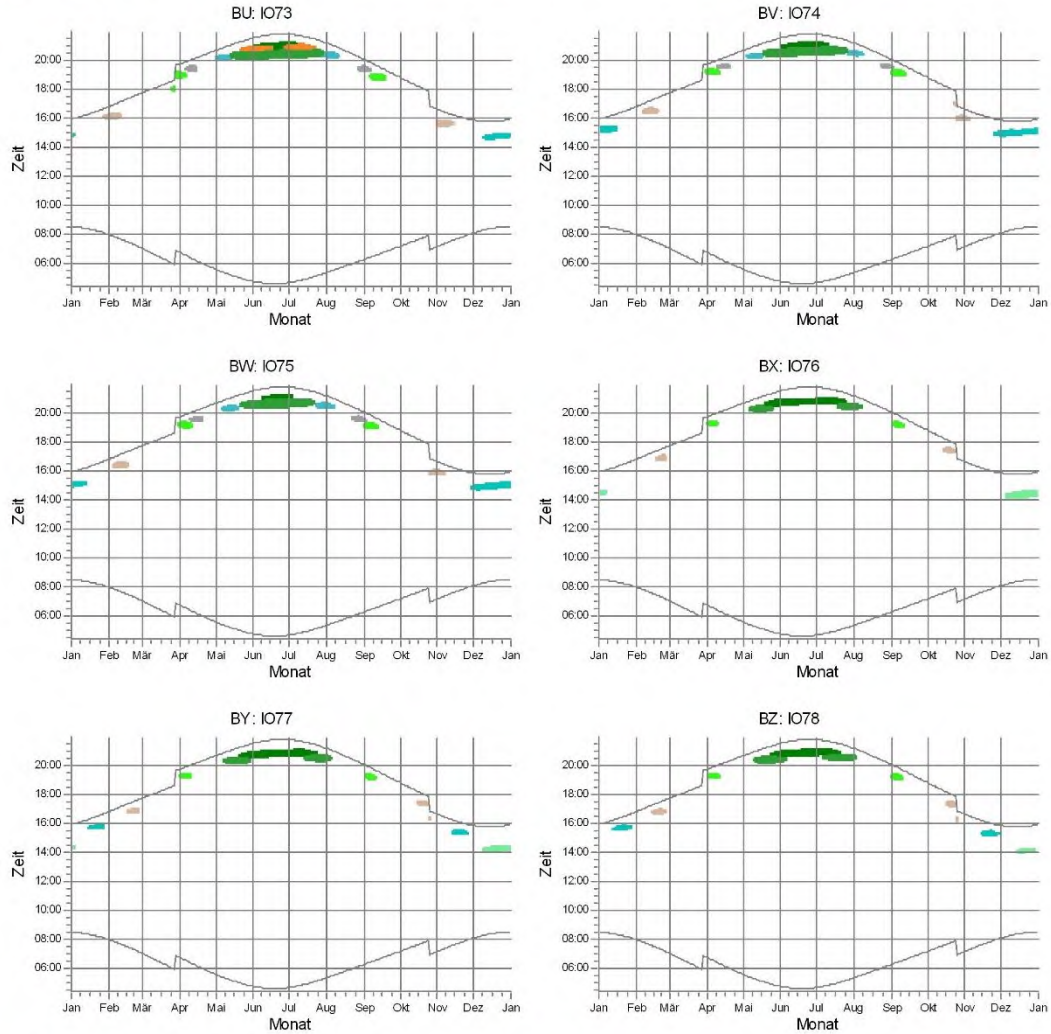


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**180413\_Miltzow\_LAI\_Antrag III - VII**

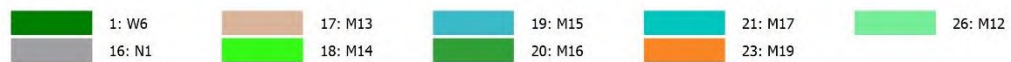
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### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

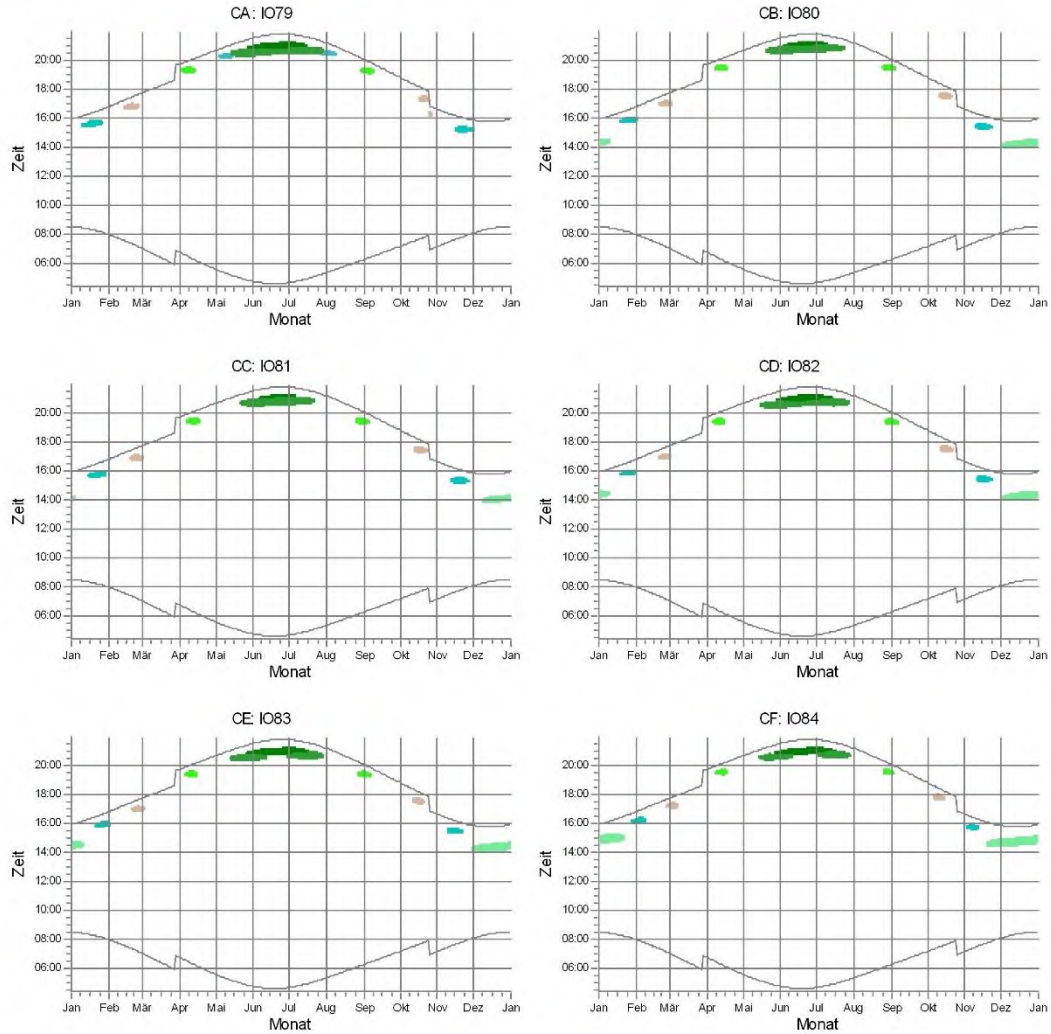


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### SHADOW - Grafischer Kalender

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WEA

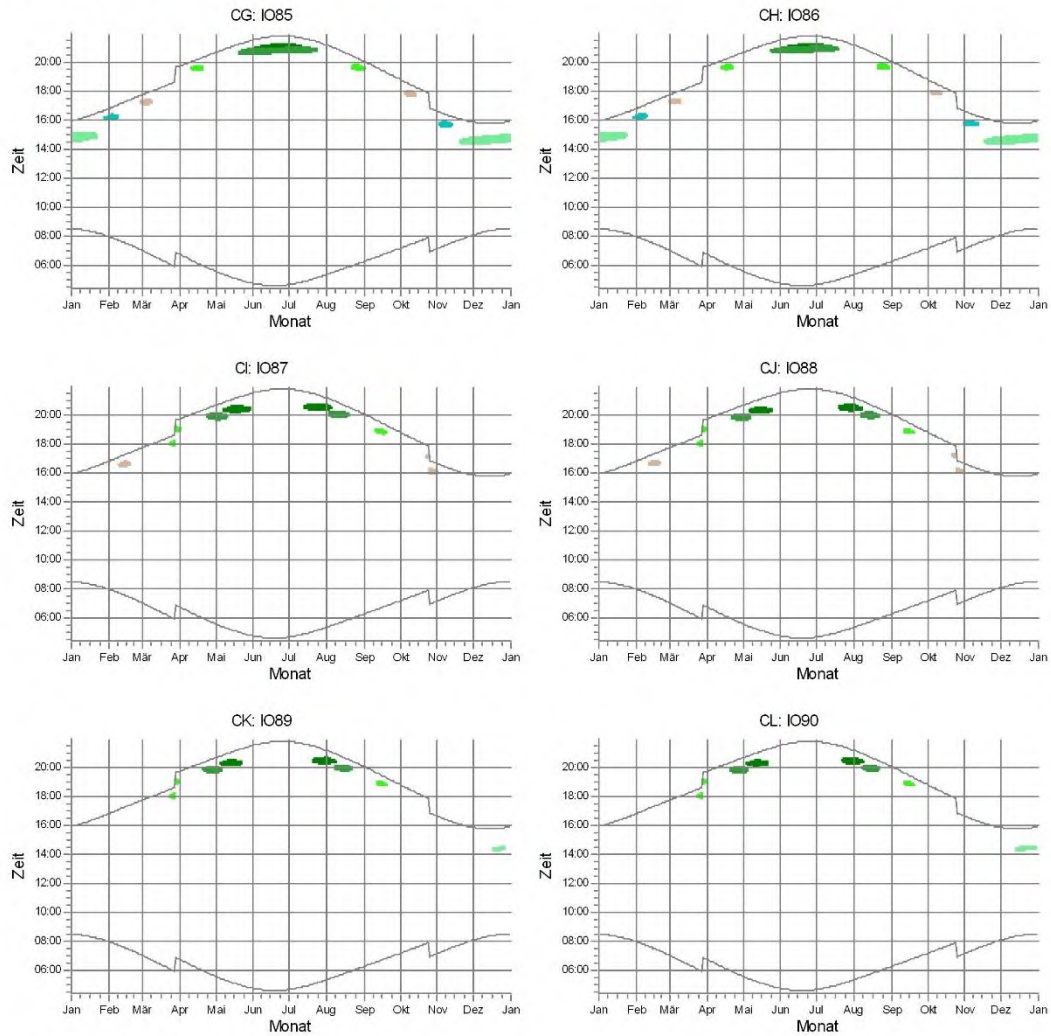


Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

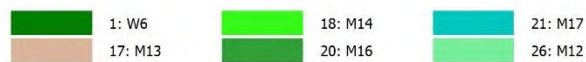
Lizenzierter Anwender:  
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### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

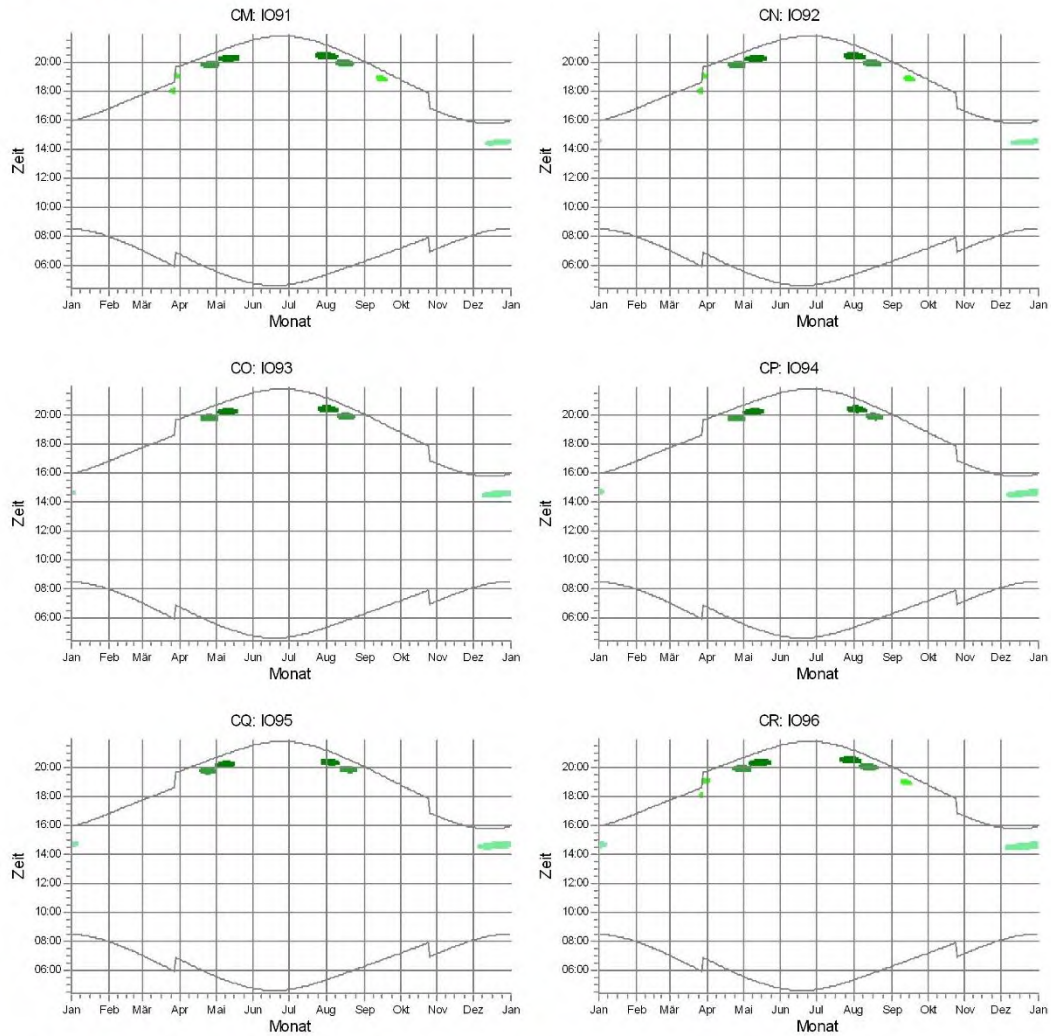


Projekt:  
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### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

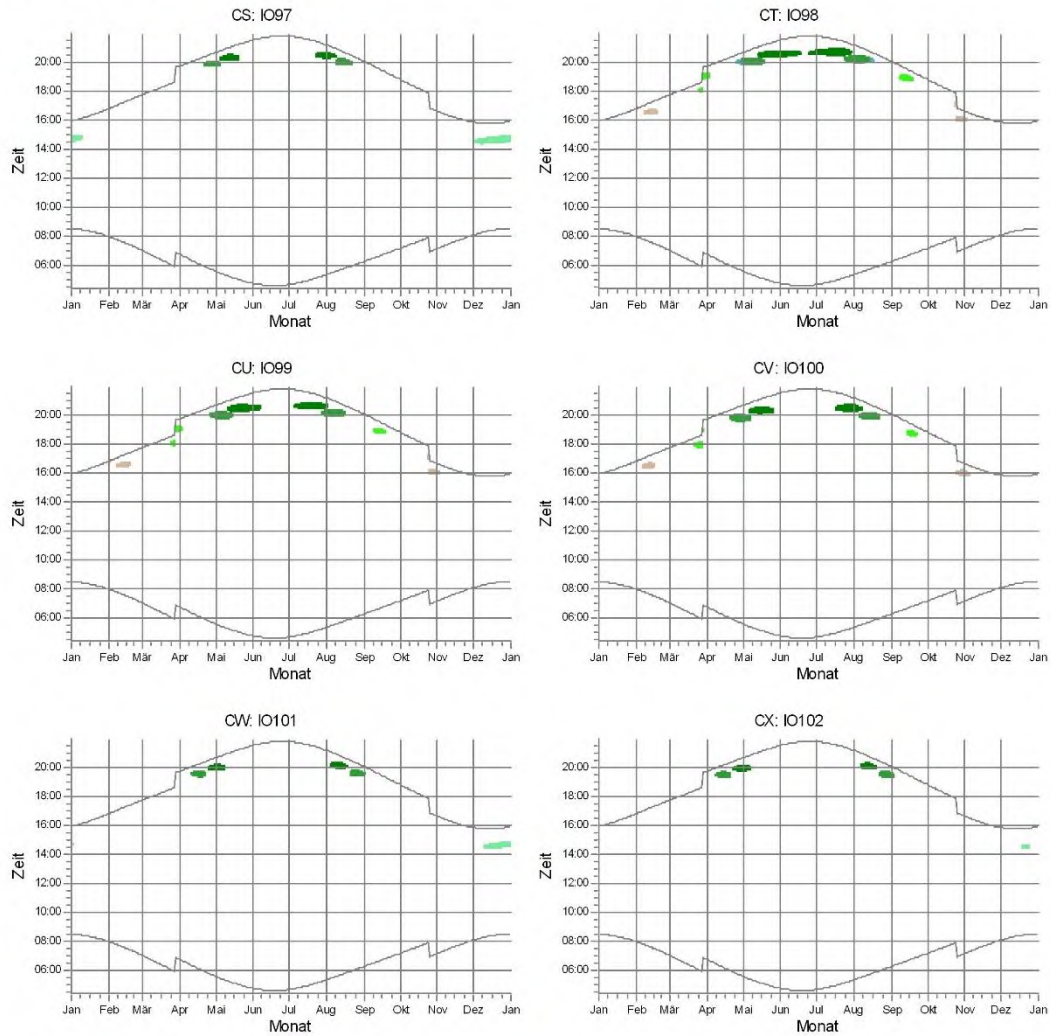


Projekt:  
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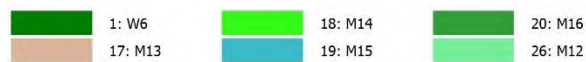
Lizenzierter Anwender:  
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13.06.2019 16:04/3.2.744

### SHADOW - Grafischer Kalender

Berechnung: GB



WEA



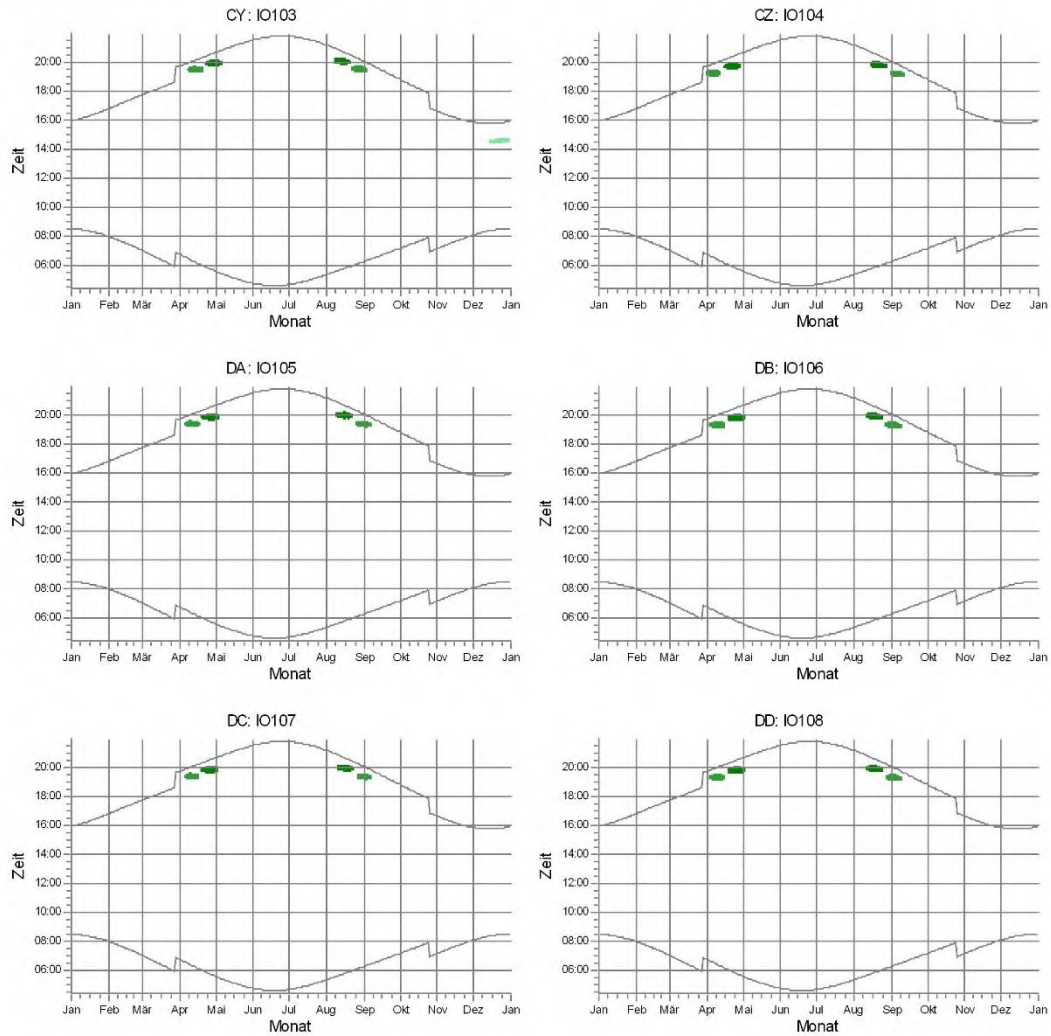


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### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

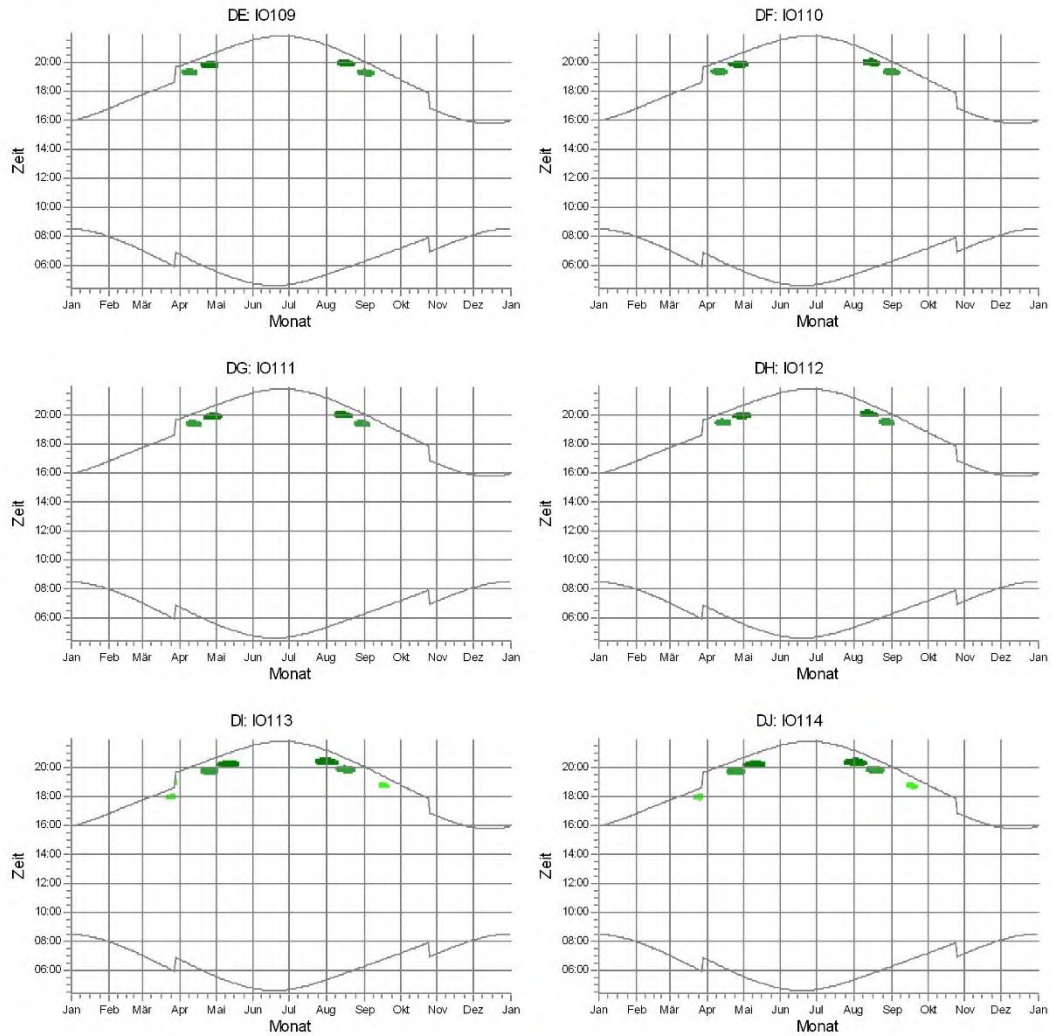


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 Berechnet:  
 13.06.2019 16:04/3.2.744

### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

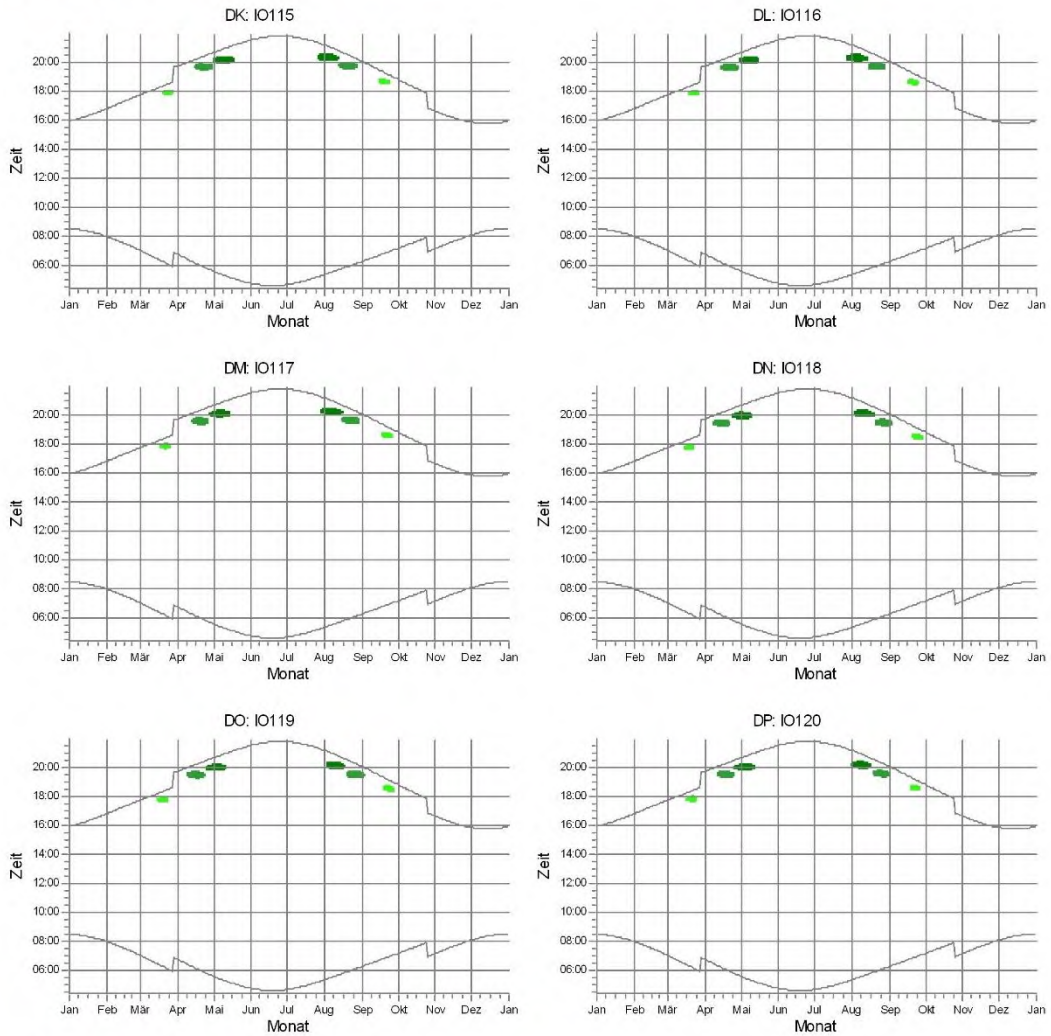


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**SHADOW - Grafischer Kalender**

Berechnung: GB



WEA

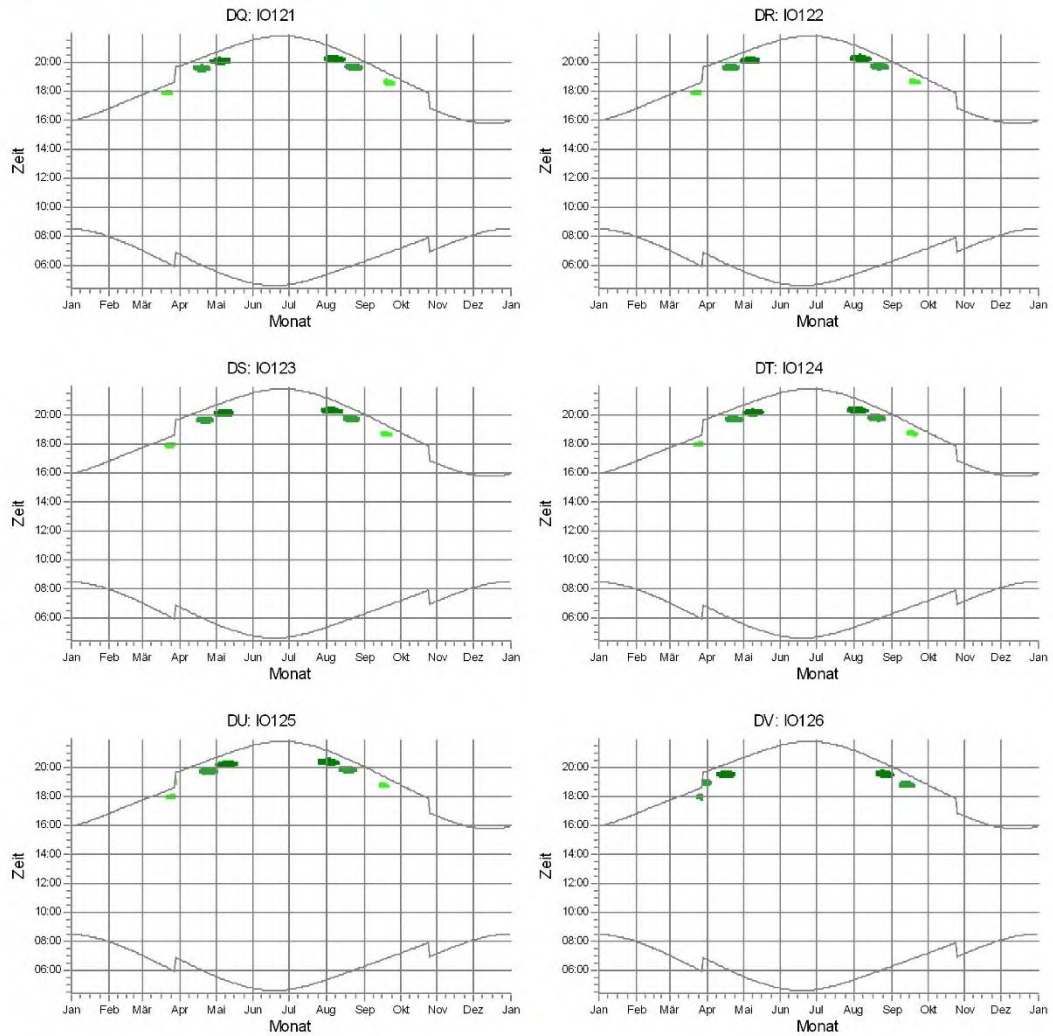


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 13.06.2019 16:04/3.2.744

### SHADOW - Grafischer Kalender

Berechnung: GB



WEA

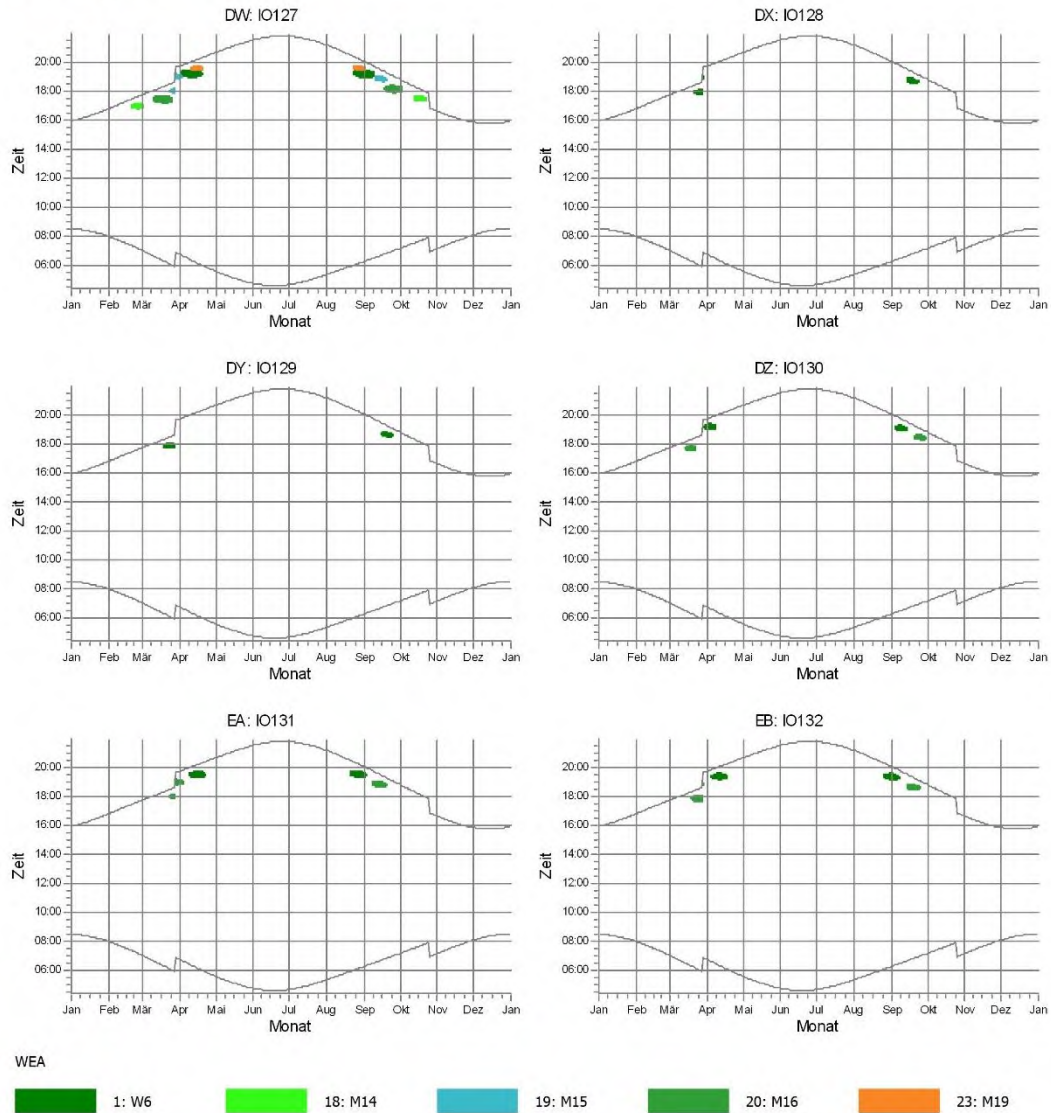


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Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Grafischer Kalender

Berechnung: GB

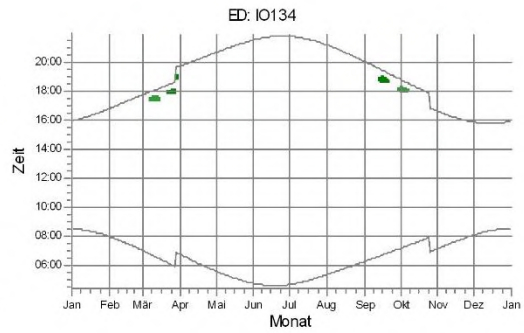
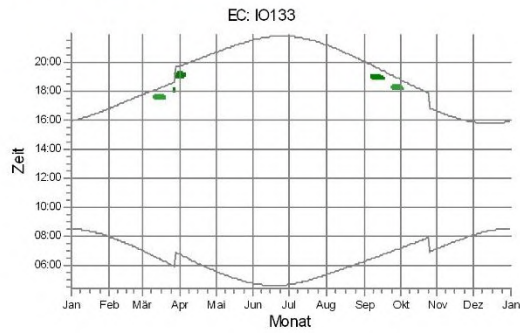


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 Berechnet:  
 13.06.2019 16:04/3.2.744

**SHADOW - Grafischer Kalender**

Berechnung: GB



WEA



1: W6



20: M16

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

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Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 1 - 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28 11:41-14:16/155 15:54	07:57 12:32-15:33/181 16:46	06:59 14:41-16:38/117 17:43 14:17-14:40/23	06:43 18:34-19:16/42 19:42 17:22-18:01/39	05:33 19:19-20:09/50 20:39	04:42 19:57-20:54/57 21:30	
2	08:28 11:42-14:17/155 15:55	07:55 12:35-15:34/179 16:48	06:57 14:42-16:39/117 17:45 14:23-14:34/11	06:40 18:32-19:17/45 19:44 17:23-17:59/36	05:31 19:19-20:11/52 20:40	04:41 19:59-20:56/57 21:31	
3	08:28 11:42-14:17/155 15:57	07:54 13:05-15:37/152 16:50 12:37-13:03/26	06:54 14:46-16:40/114 17:47 07:19-07:36/17	06:38 18:32-19:19/47 19:46 17:25-17:58/33	05:29 19:20-20:12/52 20:42	04:40 20:01-20:57/56 21:32	
4	08:28 11:43-14:19/156 15:58	07:52 13:06-15:38/152 16:52 12:41-13:00/19	06:52 14:46-16:40/114 17:49 07:16-07:35/19	06:35 18:31-19:20/49 19:48 17:26-17:55/29	05:26 19:22-20:14/52 20:44	04:40 20:04-20:58/54 21:33	
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7	08:26 11:45-14:21/156 16:02	07:46 13:09-15:47/158 16:58	06:45 14:48-17:00/132 17:55 07:09-07:35/26	06:28 18:31-19:26/55 19:54	05:20 19:25-20:18/53 20:50	04:37 20:07-21:00/53 21:36	
8	08:26 11:45-14:22/157 16:03	07:44 13:09-15:49/160 17:01	06:42 14:48-17:02/134 17:57 07:07-07:34/27	06:26 18:31-19:28/57 19:55	05:19 19:27-20:20/53 20:51	04:37 20:08-21:02/54 21:37	
9	08:25 11:46-14:23/157 16:05	07:42 13:10-15:52/162 17:03	06:40 14:50-17:04/134 17:59 07:04-07:32/28	06:23 18:31-19:30/59 19:57	05:17 19:29-20:22/53 20:53	04:36 20:09-21:02/53 21:38	
10	08:25 11:46-14:26/160 16:06	07:40 13:12-15:54/162 17:05	06:37 14:50-17:05/135 18:01 07:02-07:31/29	06:21 18:32-19:32/60 19:59	05:15 19:31-20:24/53 20:55	04:36 20:10-21:03/53 21:39	
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13	08:22 11:49-14:34/165 16:11	07:34 13:17-15:59/162 17:11	06:30 14:55-17:08/133 18:06 06:54-07:20/26	06:14 18:35-19:37/62 20:05	05:09 19:34-20:28/54 21:00	04:34 20:19-21:05/46 21:41	
14	08:21 11:50-14:36/166 16:13	07:32 13:20-16:01/161 17:13	06:28 14:57-17:08/131 18:08 06:52-07:16/24	06:11 18:37-19:38/61 20:07	05:07 19:34-20:30/56 21:02	04:34 20:19-21:06/47 21:42	
15	08:20 11:51-14:38/167 16:14	07:30 13:52-16:01/129 17:15	06:25 14:59-17:09/130 18:10 06:49-07:13/24	06:09 18:55-19:40/45 20:09	05:06 19:36-20:32/56 21:04	04:34 20:20-21:06/46 21:43	
16	08:19 11:53-14:39/166 16:16	07:28 13:55-16:02/127 17:17	06:23 15:02-15:37/35 18:12 15:45-17:09/84	06:06 19:01-19:42/41 20:11	05:04 19:36-20:33/57 21:06	04:34 20:20-21:07/47 21:43	
17	08:18 11:54-14:41/167 16:18	07:26 13:58-16:03/125 17:19	06:20 15:05-15:29/24 18:14 15:46-17:10/84	06:04 19:01-19:44/43 20:12	05:02 19:38-20:35/57 21:07	04:34 20:20-21:07/47 21:44	
18	08:17 11:55-14:42/167 16:19	07:24 13:59-16:04/125 17:21	06:18 15:10-15:22/12 18:16 15:46-17:10/84	06:02 19:03-19:46/43 20:14	05:01 19:39-20:36/57 21:09	04:33 20:21-21:08/47 21:44	
19	08:16 11:57-14:44/167 16:21	07:22 13:59-16:04/125 17:23	06:15 17:48-17:51/3 18:18 15:47-17:10/83	05:59 19:07-19:48/41 20:16	04:59 19:42-20:38/56 21:11	04:33 20:21-21:08/47 21:45	
20	08:15 11:59-14:46/167 16:23	07:19 14:00-16:05/125 17:25	06:13 17:46-17:53/7 18:20 15:48-17:10/82	05:57 19:08-19:50/42 20:18	04:58 19:44-20:38/54 21:12	04:34 20:21-21:08/47 21:45	
21	08:14 12:01-14:46/165 16:25	07:17 14:01-16:06/125 17:27	06:10 17:46-17:55/9 18:22 15:49-17:10/81	05:55 19:08-19:52/44 20:20	04:56 19:45-20:40/55 21:14	04:34 20:21-21:08/47 21:45	
22	08:12 12:22-15:05/163 16:27	07:15 14:02-16:26/144 17:29	06:08 17:44-17:56/12 18:23 15:50-17:09/79	05:53 19:07-19:52/45 20:22	04:55 19:46-20:42/56 21:15	04:34 20:21-21:08/47 21:45	
23	08:11 12:22-15:08/166 16:29	07:13 14:03-16:29/146 17:31	06:05 17:45-17:59/14 18:25 15:52-17:09/77	05:50 19:07-19:54/47 20:24	04:53 19:47-20:44/57 21:17	04:34 20:22-21:09/47 21:46	
24	08:10 12:22-15:09/167 16:31	07:10 14:05-16:32/147 17:33	06:03 17:44-18:00/16 18:27 15:53-17:08/75	05:48 19:08-19:56/48 20:26	04:52 19:47-20:44/57 21:18	04:34 20:22-21:09/47 21:46	
25	08:08 12:24-15:12/168 16:32	07:08 14:06-16:33/147 17:35	06:00 17:45-18:02/17 18:29 15:56-17:08/72	05:46 19:08-19:58/50 20:27	04:50 19:48-20:46/58 21:20	04:35 20:21-21:09/48 21:46	
26	08:07 12:24-15:13/169 16:34	07:06 14:08-16:35/147 17:37	05:58 17:44-18:04/20 18:31 15:58-17:07/69	05:44 19:09-20:00/51 20:29	04:49 19:49-20:47/58 21:21	04:35 20:22-21:09/47 21:46	
27	08:05 12:25-15:15/170 16:36	07:04 14:10-16:36/146 17:39	05:55 17:41-18:06/25 18:33 16:02-16:17/15	05:41 19:10-20:02/52 20:31	04:48 19:50-20:48/58 21:23	04:36 20:22-21:09/47 21:46	
28	08:04 12:27-15:22/175 16:38	07:01 14:13-16:37/144 17:41	05:53 17:38-18:07/29 18:35 16:18-17:05/47	05:39 19:12-20:04/52 20:33	04:47 19:51-20:50/59 21:24	04:36 20:22-21:09/47 21:45	
29	08:02 12:28-15:26/178 16:40	07:00 14:13-16:37/144 17:41	05:50 18:37-19:10/33 19:37 17:19-18:05/46	05:37 19:13-20:05/52 20:35	04:45 19:53-20:51/58 21:26	04:37 20:22-21:08/46 21:45	
30	08:01 12:29-15:28/179 16:42	07:00 14:13-16:37/144 17:41	05:48 18:36-19:11/35 19:39 17:20-18:04/44	05:35 19:16-20:07/51 20:37	04:44 19:54-20:52/58 21:27	04:37 20:22-21:08/46 21:45	
31	07:59 12:30-15:31/181 16:44	07:00 14:13-16:37/144 17:41	05:45 18:34-19:13/39 19:40 17:21-18:02/41	05:33 19:16-20:07/51 20:37	04:43 19:56-20:53/57 21:28	04:37 20:22-21:08/46 21:45	
	Sonnenscheinstunden Anzahl Minuten mit Schatten	248 5126	272 4280	367 3912	421 1696	496 1708	513 1485

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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
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-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

## SHADOW - Kalender pro WEA

Berechnung: GBWEA: 1 - 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Jul	August	September	Oktober	November	Dezember
1	04:38 20:23-21:09/46 21:45 20:17-20:21/4 21:44 20:15-21:07/52	05:19 19:43-20:37/54 21:09 05:20 19:42-20:35/53 21:07	06:14 18:32-19:33/61 20:01 06:16 18:30-19:30/60 19:59	07:08 15:33-17:47/134 18:46 07:35-08:01/26 07:10 15:31-17:46/135 18:44 07:37-08:03/26 07:12 15:29-17:44/135	07:07 12:41-15:24/163 16:35 07:08 12:40-15:21/161 16:33 07:11 12:38-15:19/161 16:31	08:03 11:29-14:11/162 15:50 08:05 11:29-14:09/160 15:49 08:06 11:30-14:07/157 15:48
2	04:40 20:14-21:07/53 21:44 04:40 20:14-21:07/53 21:43	05:24 19:38-20:31/53 21:03 05:26 19:37-20:30/53 21:01	06:19 18:29-19:25/56 19:49 06:21 18:27-19:22/55 19:51	07:14 15:27-17:42/135 18:39 07:40-08:09/29 07:15 15:26-17:40/134 18:37 07:42-08:10/28	07:13 12:38-15:16/158 16:29 07:15 12:37-15:10/153 16:27	08:08 11:29-14:06/156 15:48 08:09 11:30-14:06/156 15:47 08:10 11:29-14:06/157 15:46
3	04:42 20:13-21:06/53 21:41 04:43 20:13-21:06/53 21:41	05:29 19:34-20:26/52 20:57 05:31 19:32-20:24/52 20:55	06:23 18:27-19:20/53 19:49 06:25 18:26-19:18/52 19:46 17:24-17:48/24 06:26 18:26-19:15/49	07:19 15:23-17:34/131 18:23 07:46-08:11/25 07:21 15:22-17:16/114 07:48-08:11/23 18:29 17:18-17:29/11 07:23 15:22-17:15/113 18:27 07:50-08:11/21	07:17 12:37-15:09/152 16:25 12:15-12:26/11 07:19 12:36-15:08/152 16:23 12:10-12:30/20 07:21 12:35-15:06/151 16:21 12:07-12:33/26	08:08 11:29-14:06/156 15:48 08:12 11:30-14:06/156 15:46 08:13 11:30-14:06/156 15:45 08:14 11:31-14:07/156 15:45
4	04:45 20:10-21:05/55 21:40 04:46 20:07-21:04/57 21:39	05:33 19:31-20:23/52 20:53 05:34 19:28-20:20/52 20:51	06:28 18:25-19:13/48 19:41 17:18-17:51/33 06:30 18:25-19:10/45 19:39 17:16-17:52/36	07:23 15:22-17:15/113 18:27 07:50-08:11/21 07:25 15:21-17:14/113 18:24 07:52-08:10/18 07:27 15:18-17:13/115	07:23 12:05-15:05/180 16:20 07:25 12:04-15:03/179 16:18 07:27 12:02-15:02/180 16:16	08:14 11:31-14:07/156 15:45 08:16 11:31-14:06/155 15:45 08:17 11:31-14:06/155 15:44 08:17 11:31-14:06/155 15:44
5	04:48 20:06-21:03/57 21:38 04:49 20:05-21:02/57 21:37	05:38 19:27-20:17/50 20:47 05:40 19:23-20:14/51 20:45	06:32 18:26-19:08/42 19:36 17:15-17:54/39 06:34 18:26-19:06/40 19:34 17:13-17:55/42	07:29 15:15-17:12/117 07:56-08:08/12 18:20 14:53-15:11/18 07:30 14:48-17:11/143 18:17 07:58-08:07/9	07:29 12:01-15:00/179 16:14 07:31 12:00-14:57/177 16:13	08:18 11:31-14:06/155 15:44 08:19 11:31-14:06/155 15:44 08:20 11:32-14:06/154 15:44
6	04:50 20:03-21:01/58 21:36 04:51 20:02-21:00/58 21:35	05:41 19:20-20:12/52 20:43 05:43 19:19-20:11/52 20:40	06:37 18:27-19:00/33 19:29 17:10-17:55/45 06:39 18:28-18:58/30 19:26 17:09-17:56/47	07:32 14:45-17:10/145 18:15 08:00-08:04/4 07:34 14:42-17:08/146 18:12	07:33 11:59-14:53/174 16:11 07:35 11:58-14:48/170 16:09	08:20 11:32-14:06/154 15:44 08:21 11:32-14:07/155 15:44 08:22 11:32-14:07/155 15:44
7	04:54 20:00-20:59/59 21:34 04:54 20:00-20:59/59 21:33	05:45 19:17-20:08/51 20:38 05:47 19:16-20:06/50 20:36	06:41 18:30-18:56/26 17:08-17:56/48 19:24 16:53-17:05/12 06:43 18:31-18:53/22 19:21 16:47-17:55/68	07:36 14:40-17:07/147 18:10 07:38 14:37-17:05/148 18:08	07:37 11:57-14:46/169 16:08 07:38 11:57-14:45/168 16:06	08:22 11:32-14:07/155 15:44 08:23 11:33-14:07/154 15:44 08:24 11:34-14:08/154 15:44
8	04:57 19:58-20:56/58 21:30 04:58 19:57-20:54/57 21:29	05:49 19:15-20:04/49 20:34 05:50 19:13-20:02/49 20:32	06:44 18:33-18:50/17 07:29-07:37/8 19:19 16:44-17:56/72 06:46 18:32-18:48/16 07:27-07:39/12 19:16 16:41-17:56/75	07:40 14:36-17:02/146 18:05 07:42 14:34-17:00/146 18:03	07:40 11:56-14:43/167 16:05 07:42 11:57-14:43/166 16:04	08:24 11:34-14:08/154 15:45 08:25 11:34-14:08/154 15:45
9	04:59 19:57-20:54/57 21:28 05:01 19:56-20:52/56 21:26	05:52 19:13-20:00/47 20:29 05:54 19:13-19:58/45 20:27	06:48 18:31-18:46/15 07:25-07:40/15 19:14 16:39-17:56/77 06:50 18:30-18:42/12 07:24-07:42/18 19:11 16:36-17:55/79	07:44 14:32-16:36/124 18:01 16:37-16:56/19 07:46 14:31-16:36/125 17:59 16:43-16:50/13	07:44 11:57-14:40/163 16:02 11:40-11:53/13 07:46 11:37-14:22/165 16:01 14:24-14:37/13	08:25 11:34-14:08/154 15:45 08:26 11:35-14:09/154 15:46 08:27 11:36-14:10/154 15:46
10	05:02 19:56-20:52/56 21:25 05:04 19:55-20:50/55 21:24	05:56 19:11-19:55/44 20:25 05:58 19:11-19:53/42 20:22	06:52 18:30-18:40/10 07:23-07:44/21 19:09 16:34-17:55/81 06:53 18:30-18:38/8 07:23-07:45/22 19:06 16:33-17:54/81	07:48 14:30-16:35/125 17:55 07:50 14:29-16:34/125 17:54	07:48 11:35-14:22/167 15:39 07:50 11:34-14:21/167 15:38	08:26 11:35-14:09/154 15:46 08:27 11:36-14:10/154 15:46 08:28 11:37-14:10/153 15:47
11	05:05 19:51-20:47/56 21:20 05:06 19:50-20:45/56 21:19	06:01 19:07-19:48/41 20:18 06:03 19:04-19:46/42 20:15	06:57 15:59-16:01/2 07:24-07:47/23 19:01 16:30-17:54/84 06:59 15:49-16:10/21 07:26-07:48/22 18:59 16:28-17:52/84	06:53 13:27-15:32/125 16:50 13:01-13:09/8 06:55 13:24-15:31/127 16:48 12:54-13:16/22	07:51 11:33-14:20/167 15:37 07:53 11:32-14:19/167 15:36	08:28 11:38-14:11/153 15:48 08:29 11:38-14:12/154 15:48 08:30 11:39-14:13/154 15:49
12	05:09 19:49-20:45/56 21:17 05:12 19:46-20:42/56 21:16	06:05 19:03-19:44/41 20:13 06:07 18:56-19:42/46 20:11 18:42-18:50/8	07:01 15:44-16:12/28 07:27-07:51/24 18:56 16:27-17:51/84 07:03 15:41-16:24/43 07:29-07:52/23 18:54 16:26-17:51/85	06:57 13:21-15:30/129 16:45 12:51-13:19/28 06:59 12:49-15:30/161 16:43	07:55 11:31-14:18/167 15:34 07:57 11:30-14:17/167 15:33	08:28 11:38-14:12/154 15:48 08:29 11:39-14:13/154 15:49 08:30 11:40-14:14/154 15:50
13	05:14 19:45-20:41/56 21:14 05:15 19:44-20:39/55 21:12	06:08 18:37-19:39/62 20:08 06:10 18:35-19:37/62 20:06	07:04 15:38-17:50/132 18:51 07:31-07:55/24 07:06 15:35-17:49/134 18:49 07:33-07:58/25	07:01 12:46-15:29/163 16:41 07:03 12:44-15:27/163 16:39	08:00 11:30-14:15/165 15:51 08:02 11:30-14:14/164 15:51	08:29 11:39-14:14/155 15:51 08:28 11:40-14:14/154 15:52
14	05:17 19:44-20:38/54 21:10 Sonneneinstrahlung 515	06:12 18:34-19:35/61 20:03 Anzahl Minuten mit Schatten 1720	Sonneneinstrahlung 383 Anzahl Minuten mit Schatten 1564	Sonneneinstrahlung 328 Anzahl Minuten mit Schatten 4589	Sonneneinstrahlung 257 Anzahl Minuten mit Schatten 5068	Sonneneinstrahlung 231 Anzahl Minuten mit Schatten 4809

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
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-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 3 - Ma4

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
	15:54	16:46	17:43	19:42	20:38	21:29	21:44	21:08	20:01	18:46	16:35	15:50
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:04
	15:56	16:48	17:45	19:44	20:40	21:30	21:44	21:07	19:58	18:44	16:33	15:49
3	08:27	07:53	06:54	06:38	05:29	04:41	04:40	05:22	06:17	07:12	07:11	08:06
	15:57	16:50	17:47	19:46	20:42	21:32	21:43	21:05	19:56	18:41	16:31	15:48
4	08:27	07:52	06:52	06:35	05:27	04:40	04:41	05:24	06:19	07:13	07:13	08:07
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:48
5	08:27	07:50	06:49	06:33	05:25	04:39	04:41	05:26	06:21	07:15	07:15	08:09
	15:59	16:54	17:51	19:50	20:46	21:34	21:42	21:01	19:51	18:37	16:27	15:47
6	08:26	07:48	06:47	06:31	05:23	04:38	04:42	05:27	06:23	07:17	07:17	08:10
	16:01	16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
7	08:26	07:46	06:44	06:28	05:21	04:37	04:43	05:29	06:25	07:19	07:19	08:12
	16:02	16:59	17:55	19:53	20:49	21:36	21:41	20:57	19:46	18:32	16:23	15:46
8	08:25	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:26	07:21	07:21	08:13
	16:03	17:01	17:57	19:55	20:51	21:37	21:40	20:55	19:44	18:29	16:21	15:46
9	08:25	07:42	06:40	06:23	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14
	16:05	17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
10	08:24	07:40	06:37	06:21	05:15	04:36	04:47	05:34	06:30	07:25	07:25	08:15
	16:06	17:05	18:00	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45
11	08:24	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17
	16:08	17:07	18:02	20:01	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:45
12	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:28	07:29	08:18
	16:09	17:09	18:04	20:03	20:58	21:40	21:37	20:47	19:34	18:20	16:14	15:44
13	08:22	07:34	06:30	06:14	05:09	04:35	04:50	05:40	06:35	07:30	07:31	08:19
	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44
14	08:21	07:32	06:27	06:11	05:08	04:34	04:51	05:42	06:37	07:32	07:33	08:20
	16:13	17:13	18:08	20:07	21:02	21:42	21:35	20:42	19:29	18:15	16:11	15:44
15	08:20	07:30	06:25	06:09	05:06	04:34	04:53	05:43	06:39	07:34	07:34	08:21
	16:14	17:15	18:10	20:08	21:04	21:42	21:34	20:40	19:26	18:12	16:09	15:44
16	08:19	07:28	06:22	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:36	08:22
	16:16	17:17	18:12	20:10	21:05	21:43	21:33	20:38	19:24	18:10	16:08	15:44
17	08:18	07:26	06:20	06:04	05:02	04:34	04:55	05:47	06:43	07:38	07:38	08:22
	16:18	17:19	18:14	20:12	21:07	21:43	21:31	20:36	19:21	18:08	16:06	15:44
18	08:17	07:24	06:18	06:02	05:01	04:34	04:57	05:49	06:44	07:40	07:40	08:23
	16:20	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:05	16:05	15:45
19	08:16	07:21	06:15	05:59	04:59	04:34	04:58	05:50	06:46	07:42	07:42	08:24
	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:31	19:16	18:03	16:03	15:45
20	08:15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25
	16:23	17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45
21	08:13	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:25
	16:25	17:27	18:21	20:20	21:13	21:45	21:26	20:27	19:11	17:59	16:01	15:46
22	08:12	07:15	06:08	05:53	04:55	04:34	05:03	05:56	06:52	07:47	07:48	08:26
	16:27	17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:46
23	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:49	07:49	08:26
	16:29	17:31	18:25	20:23	21:17	21:45	21:23	20:22	19:06	17:54	15:58	15:47
24	08:09	07:10	06:03	05:48	04:52	04:35	05:06	05:59	06:55	07:51	07:51	08:27
	16:31	17:33	18:27	20:25	21:18	21:45	21:22	20:20	19:04	17:52	15:57	15:47
25	08:08	07:08	06:00	05:46	04:51	04:35	05:07	06:01	06:57	07:53	07:53	08:27
	16:33	17:35	18:29	20:27	21:20	21:45	21:20	20:18	19:01	16:50	15:56	15:48
26	08:07	07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	07:55	07:55	08:27
	16:34	17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	16:48	15:55	15:49
27	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	07:57	07:56	08:28
	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:54	15:49
28	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:02	07:59	07:58	08:28
	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:11	18:54	16:43	15:53	15:50
29	08:02	07:00	05:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28
	16:40	07:00	19:37	20:35	21:25	21:45	21:14	20:08	18:51	16:41	15:52	15:51
30	08:00	07:00	05:48	05:35	04:45	04:38	05:15	06:10	07:06	07:03	08:01	08:28
	16:42	07:00	19:38	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52
31	07:59	07:00	05:45	05:33	04:43	04:38	05:17	06:12	07:05	07:05	08:00	08:28
	16:44	07:00	19:40	20:39	21:28	21:45	21:10	20:03	18:47	16:37	15:51	15:53
Sonnenscheinstunden	248	272	367	421	495	512	514	461	383	328	258	231
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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 6 - Ma7

#### 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  
342 326 396 565 523 733 981 1,012 1,213 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
	15:54	16:46	17:43	19:42	20:38	21:29	21:44	21:08	20:01	18:46	16:35	15:50
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:04
	15:55	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	18:44	16:33	15:49
3	08:28	07:53	06:54	06:38	05:29	04:40	04:40	05:22	06:17	07:12	07:11	08:06
	15:57	16:50	17:47	19:46	20:42	21:32	21:43	21:05	19:56	18:41	16:31	15:48
4	08:27	07:52	06:52	06:35	05:26	04:40	04:41	05:24	06:19	07:13	07:13	08:07
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:48
5	08:27	07:50	06:49	06:33	05:24	04:39	04:41	05:26	06:21	07:15	07:15	08:09
	15:59	16:54	17:51	19:50	20:46	21:34	21:42	21:01	19:51	18:37	16:27	15:47
6	08:26	07:48	06:47	06:30	05:22	04:38	04:42	05:27	06:23	07:17	07:17	08:10
	16:00	16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
7	08:26	07:46	06:44	06:28	05:20	04:37	04:43	05:29	06:25	07:19	07:19	08:12
	16:02	16:58	17:55	19:53	20:49	21:36	21:41	20:57	19:46	18:32	16:23	15:46
8	08:25	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:26	07:21	07:21	08:13
	16:03	17:01	17:57	19:55	20:51	21:37	21:40	20:55	19:44	18:29	16:21	15:45
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	16:05	17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
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	16:06	17:05	18:00	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45
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	16:09	17:09	18:04	20:03	20:58	21:40	21:37	20:47	19:34	18:20	16:14	15:44
13	08:22	07:34	06:30	06:14	05:09	04:34	04:50	05:40	06:35	07:30	07:31	08:19
	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44
14	08:21	07:32	06:27	06:11	05:07	04:34	04:51	05:41	06:37	07:32	07:33	08:20
	16:13	17:13	18:08	20:07	21:02	21:42	21:35	20:42	19:29	18:15	16:11	15:44
15	08:20	07:30	06:25	06:09	05:06	04:34	04:53	05:43	06:39	07:34	07:34	08:21
	16:14	17:15	18:10	20:09	21:04	21:42	21:34	20:40	19:26	18:12	16:09	15:44
16	08:19	07:28	06:22	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:36	08:22
	16:16	17:17	18:12	20:10	21:05	21:43	21:33	20:38	19:24	18:10	16:08	15:44
17	08:18	07:26	06:20	06:04	05:02	04:34	04:55	05:47	06:43	07:38	07:38	08:22
	16:18	17:19	18:14	20:12	21:07	21:43	21:31	20:36	19:21	18:08	16:06	15:44
18	08:17	07:24	06:18	06:02	05:01	04:34	04:57	05:49	06:44	07:40	07:40	08:23
	16:20	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:05	16:05	15:45
19	08:16	07:21	06:15	05:59	04:59	04:34	04:58	05:50	06:46	07:42	07:42	08:24
	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:31	19:16	18:03	16:03	15:45
20	08:15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25
	16:23	17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45
21	08:13	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:25
	16:25	17:27	18:21	20:20	21:13	21:45	21:26	20:27	19:11	17:59	16:01	15:46
22	08:12	07:15	06:08	05:52	04:55	04:34	05:03	05:56	06:52	07:47	07:48	08:26
	16:27	17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:46
23	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:49	07:49	08:26
	16:29	17:31	18:25	20:24	21:17	21:45	21:23	20:22	19:06	17:54	15:58	15:47
24	08:09	07:10	06:03	05:48	04:52	04:34	05:06	05:59	06:55	07:51	07:51	08:27
	16:31	17:33	18:27	20:25	21:18	21:45	21:22	20:20	19:04	17:52	15:57	15:47
25	08:08	07:08	06:00	05:46	04:50	04:35	05:07	06:01	06:57	07:53	07:53	08:27
	16:33	17:35	18:29	20:27	21:20	21:45	21:20	20:18	19:01	16:50	15:56	15:48
26	08:07	07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	07:55	07:55	08:27
	16:34	17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	16:48	15:55	15:49
27	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	07:57	07:56	08:28
	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:53	15:49
28	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:02	07:59	07:58	08:28
	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:11	18:54	16:43	15:52	15:50
29	08:02	07:00	05:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28
	16:40	17:43	18:37	20:35	21:25	21:45	21:14	20:08	18:51	16:41	15:52	15:51
30	08:00	07:00	05:48	05:35	04:44	04:37	05:15	06:10	07:06	07:03	08:01	08:28
	16:42	17:45	18:39	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52
31	07:59	07:00	06:45	06:33	05:43	05:37	05:17	06:12	07:05	07:05	08:00	08:28
	16:44	17:47	18:40	20:39	21:28	21:45	21:10	20:03	18:47	16:37	15:50	15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	258	231
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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 7 - Ma8

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
	15:54	16:46	17:43	19:42	20:38	21:29	21:44	21:08	20:01	18:46	16:35	15:50
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:04
	15:55	16:48	17:45	19:44	20:40	21:30	21:44	21:07	19:58	18:44	16:33	15:49
3	08:27	07:53	06:54	06:38	05:29	04:40	04:40	05:22	06:17	07:12	07:11	08:06
	15:57	16:50	17:47	19:46	20:42	21:32	21:43	21:05	19:56	18:41	16:31	15:48
4	08:27	07:52	06:52	06:35	05:26	04:40	04:41	05:24	06:19	07:13	07:13	08:07
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:48
5	08:27	07:50	06:49	06:33	05:24	04:39	04:41	05:26	06:21	07:15	07:15	08:09
	15:59	16:54	17:51	19:50	20:46	21:34	21:42	21:01	19:51	18:36	16:27	15:47
6	08:26	07:48	06:47	06:30	05:22	04:38	04:42	05:27	06:23	07:17	07:17	08:10
	16:00	16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
7	08:26	07:46	06:44	06:28	05:20	04:37	04:43	05:29	06:25	07:19	07:19	08:12
	16:02	16:58	17:55	19:53	20:49	21:36	21:41	20:57	19:46	18:32	16:23	15:46
8	08:25	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:26	07:21	07:21	08:13
	16:03	17:00	17:57	19:55	20:51	21:37	21:40	20:55	19:44	18:29	16:21	15:45
9	08:25	07:42	06:40	06:23	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14
	16:05	17:03	17:58	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
10	08:24	07:40	06:37	06:21	05:15	04:36	04:46	05:34	06:30	07:25	07:25	08:15
	16:06	17:05	18:00	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:47
11	08:23	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:26	07:27	08:15
	16:08	17:07	18:02	20:01	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:45
12	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:28	07:29	08:18
	16:09	17:09	18:04	20:03	20:58	21:40	21:37	20:47	19:34	18:20	16:14	15:44
13	08:22	07:34	06:30	06:14	05:09	04:34	04:50	05:40	06:35	07:30	07:31	08:19
	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44
14	08:21	07:32	06:27	06:11	05:07	04:34	04:51	05:41	06:37	07:32	07:32	08:20
	16:13	17:13	18:08	20:07	21:02	21:42	21:35	20:42	19:29	18:15	16:11	15:44
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	16:14	17:15	18:10	20:08	21:04	21:42	21:34	20:40	19:26	18:12	16:09	15:44
16	08:19	07:28	06:22	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:36	08:22
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18	08:17	07:24	06:17	06:02	05:01	04:34	04:57	05:49	06:44	07:40	07:40	08:23
	16:19	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:05	16:05	15:45
19	08:16	07:21	06:15	05:59	04:59	04:34	04:58	05:50	06:46	07:42	07:42	08:24
	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:31	19:16	18:03	16:03	15:45
20	08:15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25
	16:23	17:25	18:20	20:18	21:12	21:45	21:27	20:29	19:14	18:01	16:02	15:45
21	08:13	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:25
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23	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:49	07:49	08:26
	16:29	17:31	18:25	20:23	21:17	21:45	21:23	20:22	19:06	17:54	15:58	15:47
24	08:09	07:10	06:03	05:48	04:52	04:34	05:06	05:59	06:55	07:51	07:51	08:27
	16:31	17:33	18:27	20:25	21:18	21:45	21:22	20:20	19:04	17:52	15:57	15:47
25	08:08	07:08	06:00	05:46	04:50	04:35	05:07	06:01	06:57	07:53	07:53	08:27
	16:32	17:35	18:29	20:27	21:20	21:45	21:20	20:18	19:01	16:50	15:56	15:48
26	08:07	07:06	05:58	05:43	04:49	04:35	05:09	06:03	06:59	07:55	07:55	08:27
	16:34	17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	16:48	15:55	15:49
27	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	07:57	07:56	08:28
	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:53	15:49
28	08:03	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:02	07:59	07:58	08:28
	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:10	18:54	16:43	15:52	15:50
29	08:02		06:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28
	16:40		19:37	20:35	21:25	21:45	21:14	20:08	18:51	16:41	15:52	15:51
30	08:00		06:48	05:35	04:44	04:37	05:15	06:10	07:06	07:03	08:01	08:28
	16:42		19:38	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52
31	07:59		06:45		04:43		05:17	06:12		07:05		08:28
	16:44		19:40		21:28		21:10	20:03		16:37		15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	258	231
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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 8 - Ma9

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
	15:54	16:46	17:43	19:42	20:38	21:29	21:44	21:08	20:01	18:46	16:35	15:50
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:04
	15:55	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	18:44	16:33	15:49
3	08:28	07:54	06:54	06:38	05:29	04:41	04:40	05:22	06:17	07:12	07:11	08:06
	15:57	16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:56	18:41	16:31	15:48
4	08:27	07:52	06:52	06:35	05:27	04:40	04:41	05:24	06:19	07:13	07:13	08:07
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:48
5	08:27	07:50	06:49	06:33	05:24	04:39	04:41	05:26	06:21	07:15	07:15	08:09
	15:59	16:54	17:51	19:50	20:46	21:34	21:42	21:01	19:51	18:37	16:27	15:47
6	08:27	07:48	06:47	06:30	05:22	04:38	04:42	05:27	06:23	07:17	07:17	08:10
	16:01	16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
7	08:26	07:46	06:44	06:28	05:21	04:37	04:43	05:29	06:25	07:19	07:19	08:12
	16:02	16:58	17:55	19:53	20:49	21:36	21:41	20:57	19:46	18:32	16:23	15:46
8	08:26	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:26	07:21	07:21	08:13
	16:03	17:01	17:57	19:55	20:51	21:37	21:40	20:55	19:44	18:29	16:21	15:45
9	08:25	07:42	06:40	06:23	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14
	16:05	17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
10	08:24	07:40	06:37	06:21	05:15	04:36	04:47	05:34	06:30	07:25	07:25	08:15
	16:06	17:05	18:00	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45
11	08:24	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17
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	16:09	17:09	18:04	20:03	20:58	21:40	21:37	20:47	19:34	18:20	16:14	15:44
13	08:22	07:34	06:30	06:14	05:09	04:34	04:50	05:40	06:35	07:30	07:31	08:19
	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44
14	08:21	07:32	06:27	06:11	05:07	04:34	04:51	05:41	06:37	07:32	07:33	08:20
	16:13	17:13	18:08	20:07	21:02	21:42	21:35	20:42	19:29	18:15	16:11	15:44
15	08:20	07:30	06:25	06:09	05:06	04:34	04:53	05:43	06:39	07:34	07:34	08:21
	16:14	17:15	18:10	20:09	21:04	21:42	21:34	20:40	19:26	18:12	16:09	15:44
16	08:19	07:28	06:22	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:36	08:22
	16:16	17:17	18:12	20:10	21:05	21:43	21:33	20:38	19:24	18:10	16:08	15:44
17	08:18	07:26	06:20	06:04	05:02	04:34	04:55	05:47	06:43	07:38	07:38	08:22
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18	08:17	07:24	06:18	06:02	05:01	04:34	04:57	05:49	06:44	07:40	07:40	08:23
	16:20	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:05	16:05	15:45
19	08:16	07:21	06:15	05:59	04:59	04:34	04:58	05:50	06:46	07:42	07:42	08:24
	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:31	19:16	18:03	16:03	15:45
20	08:15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25
	16:23	17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45
21	08:13	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:25
	16:25	17:27	18:21	20:20	21:14	21:45	21:26	20:27	19:11	17:59	16:01	15:46
22	08:12	07:15	06:08	05:53	04:55	04:34	05:03	05:56	06:52	07:48	07:48	08:26
	16:27	17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:46
23	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:49	07:49	08:26
	16:29	17:31	18:25	20:24	21:17	21:45	21:23	20:22	19:06	17:54	15:58	15:47
24	08:09	07:10	06:03	05:48	04:52	04:34	05:06	05:59	06:55	07:51	07:51	08:27
	16:31	17:33	18:27	20:25	21:18	21:45	21:22	20:20	19:04	17:52	15:57	15:47
25	08:08	07:08	06:00	05:46	04:50	04:35	05:07	06:01	06:57	07:53	07:53	08:27
	16:33	17:35	18:29	20:27	21:20	21:45	21:20	20:18	19:01	16:50	15:56	15:48
26	08:07	07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	07:55	07:55	08:27
	16:34	17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	16:48	15:55	15:49
27	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	07:57	07:56	08:28
	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:53	15:49
28	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:02	07:59	07:58	08:28
	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:11	18:54	16:43	15:52	15:50
29	08:02	07:00	05:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28
	16:40	17:43	18:37	20:35	21:25	21:45	21:14	20:08	18:51	16:41	15:52	15:51
30	08:00	07:00	05:48	05:35	04:44	04:37	05:15	06:10	07:06	07:03	08:01	08:28
	16:42	17:45	18:39	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52
31	07:59	07:00	06:45	06:33	05:43	05:37	05:17	06:12	07:05	07:05	08:00	08:28
	16:44	17:47	18:40	20:39	21:28	21:45	21:10	20:03	18:47	16:37	15:51	15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	258	231
Anzahl Minuten mit Schatten	0	0	0	0	0	0	0	0	0	0	0	0

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender pro WEA**

Berechnung: GBWEA: 12 - Ma13

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
	15:54	16:46	17:43	19:42	20:38	21:29	21:44	21:08	20:01	18:46	16:35	15:50
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:04
	15:56	16:48	17:45	19:44	20:40	21:30	21:44	21:06	19:58	18:44	16:33	15:49
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	15:57	16:50	17:47	19:46	20:42	21:32	21:43	21:05	19:56	18:41	16:31	15:48
4	08:27	07:52	06:52	06:35	05:27	04:40	04:41	05:24	06:19	07:13	07:13	08:07
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:48
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7	08:26	07:46	06:44	06:28	05:21	04:37	04:43	05:29	06:25	07:19	07:19	08:12
	16:02	16:58	17:55	19:53	20:49	21:36	21:41	20:57	19:46	18:32	16:23	15:46
8	08:25	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:26	07:21	07:21	08:13
	16:03	17:01	17:57	19:55	20:51	21:37	21:40	20:55	19:44	18:29	16:21	15:45
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	16:05	17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
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11	08:23	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:26	07:27	08:16
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	16:20	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:05	16:05	15:45
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	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:31	19:16	18:03	16:03	15:45
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	16:29	17:31	18:25	20:23	21:17	21:45	21:23	20:22	19:06	17:54	15:58	15:47
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	16:34	17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	16:48	15:55	15:49
27	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	07:57	07:56	08:28
	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:54	15:49
28	08:03	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:02	07:59	07:58	08:28
	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:10	18:54	16:43	15:53	15:50
29	08:02	07:00	05:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28
	16:40	17:43	18:37	20:35	21:25	21:45	21:14	20:08	18:51	16:41	15:52	15:51
30	08:00	07:00	05:48	05:35	04:44	04:37	05:15	06:10	07:06	07:03	08:01	08:28
	16:42	17:45	18:39	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52
31	07:59	07:00	06:45	06:33	05:43	05:37	05:17	06:12	07:05	07:05	08:00	08:28
	16:44	17:47	18:40	20:39	21:28	21:45	21:10	20:03	18:47	16:37	15:51	15:53
Sonnenscheinstunden	248	272	367	421	495	512	514	461	383	328	258	231
Anzahl Minuten mit Schatten	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 13 - MaR01

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
	15:54	16:46	17:43	19:42	20:38	21:29	21:44	21:08	20:01	18:46	16:35	15:50
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:04
	15:56	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	18:44	16:33	15:49
3	08:28	07:54	06:54	06:38	05:29	04:41	04:40	05:22	06:17	07:12	07:11	08:06
	15:57	16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:56	18:41	16:31	15:48
4	08:27	07:52	06:52	06:35	05:27	04:40	04:41	05:24	06:19	07:14	07:13	08:07
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:48
5	08:27	07:50	06:49	06:33	05:25	04:39	04:41	05:26	06:21	07:15	07:15	08:09
	15:59	16:54	17:51	19:50	20:46	21:34	21:42	21:01	19:51	18:37	16:27	15:47
6	08:27	07:48	06:47	06:31	05:23	04:38	04:42	05:27	06:23	07:17	07:17	08:10
	16:01	16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
7	08:26	07:46	06:44	06:28	05:21	04:37	04:43	05:29	06:25	07:19	07:19	08:12
	16:02	16:59	17:55	19:54	20:49	21:36	21:41	20:57	19:46	18:32	16:23	15:46
8	08:26	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:26	07:21	07:21	08:13
	16:03	17:01	17:57	19:55	20:51	21:37	21:40	20:55	19:44	18:29	16:21	15:46
9	08:25	07:42	06:40	06:23	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14
	16:05	17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
10	08:24	07:40	06:37	06:21	05:15	04:36	04:47	05:34	06:30	07:25	07:25	08:15
	16:06	17:05	18:00	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45
11	08:24	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17
	16:08	17:07	18:02	20:01	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:45
12	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:28	07:29	08:18
	16:09	17:09	18:04	20:03	20:58	21:40	21:37	20:47	19:34	18:20	16:14	15:44
13	08:22	07:34	06:30	06:14	05:09	04:34	04:50	05:40	06:35	07:30	07:31	08:19
	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44
14	08:21	07:32	06:27	06:11	05:08	04:34	04:51	05:41	06:37	07:32	07:33	08:20
	16:13	17:13	18:08	20:07	21:02	21:42	21:35	20:42	19:29	18:15	16:11	15:44
15	08:20	07:30	06:25	06:09	05:06	04:34	04:53	05:43	06:39	07:34	07:34	08:21
	16:14	17:15	18:10	20:09	21:04	21:42	21:34	20:40	19:26	18:12	16:09	15:44
16	08:19	07:28	06:23	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:36	08:22
	16:16	17:17	18:12	20:10	21:05	21:43	21:33	20:38	19:24	18:10	16:08	15:44
17	08:18	07:26	06:20	06:04	05:02	04:34	04:55	05:47	06:43	07:38	07:38	08:23
	16:18	17:19	18:14	20:12	21:07	21:44	21:31	20:36	19:21	18:08	16:06	15:44
18	08:17	07:24	06:18	06:02	05:01	04:34	04:57	05:49	06:44	07:40	07:40	08:23
	16:20	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:05	16:05	15:45
19	08:16	07:21	06:15	05:59	04:59	04:34	04:58	05:50	06:46	07:42	07:42	08:24
	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:31	19:16	18:03	16:03	15:45
20	08:15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25
	16:23	17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45
21	08:13	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:25
	16:25	17:27	18:22	20:20	21:14	21:45	21:26	20:27	19:11	17:59	16:01	15:46
22	08:12	07:15	06:08	05:53	04:55	04:34	05:03	05:56	06:52	07:48	07:48	08:26
	16:27	17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:46
23	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:49	07:49	08:26
	16:29	17:31	18:25	20:24	21:17	21:45	21:23	20:22	19:06	17:54	15:58	15:47
24	08:09	07:10	06:03	05:48	04:52	04:35	05:06	05:59	06:55	07:51	07:51	08:27
	16:31	17:33	18:27	20:25	21:18	21:45	21:22	20:20	19:04	17:52	15:57	15:47
25	08:08	07:08	06:00	05:46	04:50	04:35	05:07	06:01	06:57	07:53	07:53	08:27
	16:33	17:35	18:29	20:27	21:20	21:45	21:20	20:18	19:01	16:50	15:56	15:48
26	08:07	07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	07:55	07:55	08:27
	16:34	17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	16:48	15:55	15:49
27	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	07:57	07:56	08:28
	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:54	15:49
28	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:02	07:59	07:58	08:28
	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:11	18:54	16:43	15:53	15:50
29	08:02	07:00	05:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28
	16:40	07:00	19:37	20:35	21:25	21:45	21:14	20:08	18:51	16:41	15:52	15:51
30	08:00	07:00	05:48	05:35	04:44	04:37	05:15	06:10	07:06	07:03	08:01	08:28
	16:42	07:00	19:38	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52
31	07:59	07:00	05:45	05:33	04:43	04:37	05:17	06:12	07:05	07:05	08:00	08:28
	16:44	07:00	19:40	20:39	21:28	21:45	21:10	20:03	18:47	16:37	15:51	15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	258	231
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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender pro WEA**

Berechnung: GBWEA: 14 - Mar02

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
	15:54	16:46	17:43	19:42	20:38	21:29	21:44	21:08	20:01	18:46	16:35	15:50
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:04
	15:56	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	18:44	16:33	15:49
3	08:28	07:54	06:54	06:38	05:29	04:41	04:40	05:22	06:17	07:12	07:11	08:06
	15:57	16:50	17:47	19:46	20:42	21:32	21:43	21:05	19:56	18:41	16:31	15:48
4	08:27	07:52	06:52	06:35	05:27	04:40	04:41	05:24	06:19	07:13	07:13	08:07
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:48
5	08:27	07:50	06:49	06:33	05:25	04:39	04:41	05:26	06:21	07:15	07:15	08:09
	15:59	16:54	17:51	19:50	20:46	21:34	21:42	21:01	19:51	18:37	16:27	15:47
6	08:26	07:48	06:47	06:31	05:23	04:38	04:42	05:27	06:23	07:17	07:17	08:10
	16:01	16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
7	08:26	07:46	06:44	06:28	05:21	04:37	04:43	05:29	06:25	07:19	07:19	08:12
	16:02	16:59	17:55	19:53	20:49	21:36	21:41	20:57	19:46	18:32	16:23	15:46
8	08:25	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:26	07:21	07:21	08:13
	16:03	17:01	17:57	19:55	20:51	21:37	21:40	20:55	19:44	18:29	16:21	15:46
9	08:25	07:42	06:40	06:23	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14
	16:05	17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
10	08:24	07:40	06:37	06:21	05:15	04:36	04:47	05:34	06:30	07:25	07:25	08:15
	16:06	17:05	18:00	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45
11	08:24	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17
	16:08	17:07	18:02	20:01	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:45
12	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:28	07:29	08:18
	16:09	17:09	18:04	20:03	20:58	21:40	21:37	20:47	19:34	18:20	16:14	15:44
13	08:22	07:34	06:30	06:14	05:09	04:35	04:50	05:40	06:35	07:30	07:31	08:19
	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44
14	08:21	07:32	06:27	06:11	05:08	04:34	04:51	05:41	06:37	07:32	07:33	08:20
	16:13	17:13	18:08	20:07	21:02	21:42	21:35	20:42	19:29	18:15	16:11	15:44
15	08:20	07:30	06:25	06:09	05:06	04:34	04:53	05:43	06:39	07:34	07:34	08:21
	16:14	17:15	18:10	20:09	21:04	21:42	21:34	20:40	19:26	18:12	16:09	15:44
16	08:19	07:28	06:22	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:36	08:22
	16:16	17:17	18:12	20:10	21:05	21:43	21:33	20:38	19:24	18:10	16:08	15:44
17	08:18	07:26	06:20	06:04	05:02	04:34	04:55	05:47	06:43	07:38	07:38	08:22
	16:18	17:19	18:14	20:12	21:07	21:43	21:31	20:36	19:21	18:08	16:06	15:44
18	08:17	07:24	06:18	06:02	05:01	04:34	04:57	05:49	06:44	07:40	07:40	08:23
	16:20	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:05	16:05	15:45
19	08:16	07:21	06:15	05:59	04:59	04:34	04:58	05:50	06:46	07:42	07:42	08:24
	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:31	19:16	18:03	16:03	15:45
20	08:15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25
	16:23	17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45
21	08:13	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:25
	16:25	17:27	18:22	20:20	21:13	21:45	21:26	20:27	19:11	17:59	16:01	15:46
22	08:12	07:15	06:08	05:53	04:55	04:34	05:03	05:56	06:52	07:48	07:48	08:26
	16:27	17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:46
23	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:49	07:49	08:26
	16:29	17:31	18:25	20:24	21:17	21:45	21:23	20:22	19:06	17:54	15:58	15:47
24	08:09	07:10	06:03	05:48	04:52	04:35	05:06	05:59	06:55	07:51	07:51	08:27
	16:31	17:33	18:27	20:25	21:18	21:45	21:22	20:20	19:04	17:52	15:57	15:47
25	08:08	07:08	06:00	05:46	04:51	04:35	05:07	06:01	06:57	07:53	07:53	08:27
	16:33	17:35	18:29	20:27	21:20	21:45	21:20	20:18	19:01	16:50	15:56	15:48
26	08:07	07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	07:55	07:55	08:27
	16:34	17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	16:48	15:55	15:49
27	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	07:57	07:56	08:28
	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:54	15:49
28	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:02	07:59	07:58	08:28
	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:11	18:54	16:43	15:53	15:50
29	08:02	07:00	05:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28
	16:40	17:43	18:37	20:35	21:25	21:45	21:14	20:08	18:51	16:41	15:52	15:51
30	08:00	07:00	05:48	05:35	04:44	04:38	05:15	06:10	07:06	07:03	08:01	08:28
	16:42	17:45	18:39	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52
31	07:59	07:00	06:45	05:34	04:43	04:38	05:17	06:12	07:05	07:05	08:00	08:28
	16:44	17:47	18:40	20:38	21:28	21:45	21:10	20:03	18:47	16:37	15:50	15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	258	231
Anzahl Minuten mit Schatten	0	0	0	0	0	0	0	0	0	0	0	0

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender pro WEA**

Berechnung: GBWEA: 15 - MaW1

**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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
	15:54	16:46	17:43	19:42	20:38	21:29	21:44	21:08	20:01	18:46	16:35	15:50
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:04
	15:56	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	18:44	16:33	15:49
3	08:28	07:54	06:54	06:38	05:29	04:41	04:40	05:22	06:18	07:12	07:11	08:06
	15:57	16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:56	18:41	16:31	15:48
4	08:27	07:52	06:52	06:35	05:27	04:40	04:41	05:24	06:19	07:14	07:13	08:07
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:48
5	08:27	07:50	06:49	06:33	05:25	04:39	04:41	05:26	06:21	07:15	07:15	08:09
	15:59	16:54	17:51	19:50	20:46	21:34	21:42	21:01	19:51	18:37	16:27	15:47
6	08:27	07:48	06:47	06:31	05:23	04:38	04:42	05:27	06:23	07:17	07:17	08:10
	16:01	16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
7	08:26	07:46	06:44	06:28	05:21	04:37	04:43	05:29	06:25	07:19	07:19	08:12
	16:02	16:59	17:55	19:54	20:49	21:36	21:41	20:57	19:46	18:32	16:23	15:46
8	08:26	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:26	07:21	07:21	08:13
	16:03	17:01	17:57	19:55	20:51	21:37	21:40	20:55	19:44	18:29	16:21	15:46
9	08:25	07:42	06:40	06:23	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14
	16:05	17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
10	08:24	07:40	06:37	06:21	05:15	04:36	04:47	05:34	06:30	07:25	07:25	08:15
	16:06	17:05	18:01	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45
11	08:24	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17
	16:08	17:07	18:02	20:01	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:45
12	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:28	07:29	08:18
	16:09	17:09	18:04	20:03	20:58	21:40	21:37	20:47	19:34	18:20	16:14	15:44
13	08:22	07:34	06:30	06:14	05:09	04:35	04:50	05:40	06:35	07:30	07:31	08:19
	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44
14	08:21	07:32	06:27	06:11	05:08	04:34	04:51	05:42	06:37	07:32	07:33	08:20
	16:13	17:13	18:08	20:07	21:02	21:42	21:35	20:42	19:29	18:15	16:11	15:44
15	08:20	07:30	06:25	06:09	05:06	04:34	04:53	05:43	06:39	07:34	07:34	08:21
	16:14	17:15	18:10	20:09	21:04	21:42	21:34	20:40	19:26	18:13	16:09	15:44
16	08:19	07:28	06:23	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:36	08:22
	16:16	17:17	18:12	20:10	21:05	21:43	21:33	20:38	19:24	18:10	16:08	15:44
17	08:18	07:26	06:20	06:04	05:02	04:34	04:55	05:47	06:43	07:38	07:38	08:22
	16:18	17:19	18:14	20:12	21:07	21:43	21:31	20:36	19:21	18:08	16:06	15:44
18	08:17	07:24	06:18	06:02	05:01	04:34	04:57	05:49	06:44	07:40	07:40	08:23
	16:20	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:06	16:05	15:45
19	08:16	07:21	06:15	05:59	04:59	04:34	04:58	05:50	06:46	07:42	07:42	08:24
	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:31	19:16	18:03	16:03	15:45
20	08:15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25
	16:23	17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45
21	08:13	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:25
	16:25	17:27	18:22	20:20	21:14	21:45	21:26	20:27	19:11	17:59	16:01	15:46
22	08:12	07:15	06:08	05:53	04:55	04:34	05:03	05:56	06:52	07:48	07:48	08:26
	16:27	17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:46
23	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:49	07:49	08:26
	16:29	17:31	18:25	20:24	21:17	21:45	21:23	20:22	19:06	17:54	15:58	15:47
24	08:09	07:10	06:03	05:48	04:52	04:35	05:06	05:59	06:55	07:51	07:51	08:27
	16:31	17:33	18:27	20:25	21:18	21:45	21:22	20:20	19:04	17:52	15:57	15:47
25	08:08	07:08	06:00	05:46	04:51	04:35	05:07	06:01	06:57	07:53	07:53	08:27
	16:33	17:35	18:29	20:27	21:20	21:45	21:20	20:18	19:01	16:50	15:56	15:48
26	08:07	07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	07:55	07:55	08:27
	16:35	17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	16:48	15:55	15:49
27	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	07:57	07:56	08:28
	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:54	15:49
28	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:03	07:59	07:58	08:28
	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:11	18:54	16:43	15:53	15:50
29	08:02	07:00	05:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28
	16:40	07:00	19:37	20:35	21:25	21:45	21:14	20:08	18:51	16:41	15:52	15:51
30	08:00	07:00	05:48	05:35	04:44	04:38	05:15	06:10	07:06	07:03	08:01	08:28
	16:42	07:00	19:38	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52
31	07:59	07:00	05:45	05:33	04:43	04:38	05:17	06:12	07:05	07:05	08:00	08:28
	16:44	07:00	19:40	20:39	21:28	21:45	21:10	20:03	18:47	16:37	15:50	15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	258	231
Anzahl Minuten mit Schatten	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 16 - N1

#### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28 14:22-15:16/54 15:54	07:57 15:25-16:06/41 08:53-08:58/5 16:46 08:26-08:51/25	06:59 17:15-17:16/1 17:43 16:55-17:10/15	06:43 18:54-19:16/22 19:42	05:33 04:42 20:39 21:30	
2	08:28 14:23-15:17/54 15:55	07:55 15:28-15:45/17 16:10-16:16/6 16:48 15:46-16:07/21 08:24-08:50/26	06:57 17:13-17:17/4 17:45 16:55-17:09/14	06:40 18:57-19:17/20 19:44	05:31 04:41 20:40 21:31	
3	08:28 14:24-15:18/54 15:57	07:54 15:36-15:44/8 16:09-16:19/10 16:50 15:47-16:08/21 08:22-08:50/28	06:54 17:12-17:20/8 17:47 16:56-17:08/12	06:38 19:00-19:19/19 19:46	05:29 04:40 20:42 21:32	
4	08:28 14:26-15:19/53 15:58	07:52 15:47-16:21/34 16:52 08:20-08:49/29	06:52 17:11-17:21/10 17:49 16:58-17:05/7	06:35 19:01-19:20/19 19:48	05:27 04:40 20:44 21:33	
5	08:27 14:27-15:20/53 15:59	07:50 15:48-16:23/35 16:54 08:18-08:48/30	06:49 17:11-17:24/13 17:51	06:33 19:03-19:23/20 19:50	05:24 04:39 20:46 21:34	
6	08:27 14:29-15:21/52 16:00	07:48 15:48-16:24/36 08:41-08:45/4 16:56 08:16-08:40/24	06:47 17:10-17:25/15 17:53	06:31 19:03-19:24/21 19:52	05:22 04:38 20:48 21:35	
7	08:26 14:29-15:23/54 16:02	07:46 15:49-16:24/35 16:58 08:14-08:40/26	06:45 17:11-17:25/14 17:55	06:28 19:04-19:26/22 19:54	05:21 04:37 20:50 21:36	
8	08:26 14:30-15:26/56 16:03	07:44 15:50-16:24/34 17:01 08:12-08:39/27	06:42 17:11-17:29/18 17:57	06:26 19:06-19:28/22 19:56	05:19 04:37 20:51 21:37	
9	08:25 14:31-15:27/56 16:05	07:42 15:51-16:03/12 08:09-08:36/27 17:03 16:04-16:24/20	06:40 17:13-17:22/9 17:59 17:23-17:32/9	06:23 19:08-19:30/22 19:57	05:17 04:36 20:53 21:38	
10	08:25 14:32-15:29/57 16:06	07:40 15:54-16:01/7 08:07-08:32/25 17:05 16:04-16:24/20	06:37 17:22-17:33/11 18:01	06:21 19:10-19:32/22 19:59	05:15 04:36 20:55 21:39	
11	08:24 14:33-15:30/57 16:08	07:38 16:05-16:24/19 17:07 08:05-08:31/26	06:35 17:22-17:36/14 18:02	06:18 19:11-19:33/22 20:01	05:13 04:35 20:57 21:40	
12	08:23 14:35-15:31/56 16:09	07:36 16:05-16:24/19 17:09 08:03-08:30/27	06:32 17:21-17:37/16 18:04	06:16 19:13-19:35/22 20:03	05:11 04:35 20:59 21:41	
13	08:22 14:45-15:32/47 16:11	07:34 16:06-16:24/18 17:11 08:01-08:27/26	06:30 17:22-17:40/18 18:06	06:14 19:16-19:37/21 20:05	05:09 04:34 21:00 21:41	
14	08:21 14:46-15:34/48 16:13	07:32 16:07-16:23/16 17:13 07:59-08:27/28	06:28 17:21-17:41/20 18:08	06:11 19:17-19:38/21 20:07	05:07 04:34 21:02 21:42	
15	08:20 14:48-15:38/50 16:14	07:30 16:08-16:21/13 17:15 07:56-08:25/29	06:25 17:23-17:43/20 18:10	06:09 19:18-19:40/22 20:09	05:06 04:34 21:04 21:43	
16	08:19 14:50-15:40/50 16:16	07:28 16:10-16:20/10 17:17 07:55-08:24/29	06:23 17:25-17:45/20 18:12	06:06 19:23-19:42/19 20:11	05:04 04:34 21:06 21:43	
17	08:18 14:53-15:42/49 16:18	07:26 07:55-08:22/27 17:19	06:20 17:28-17:47/19 18:14	06:04 19:23-19:44/21 20:12	05:02 04:34 21:07 21:44	
18	08:17 14:56-15:43/47 16:19	07:24 07:55-08:20/25 17:21	06:18 17:28-17:49/21 18:16	06:02 19:24-19:46/22 20:14	05:01 04:34 21:09 21:44	
19	08:16 14:57-15:44/47 16:21	07:22 07:55-08:18/23 17:23	06:15 17:31-17:51/20 18:18	05:59 19:27-19:45/18 20:16	04:59 04:34 21:11 21:45	
20	08:15 14:58-15:45/47 16:23	07:19 08:09-08:16/7 17:25 07:57-08:07/10	06:13 17:31-17:53/22 18:20	05:57 19:30-19:44/14 20:18	04:58 04:34 21:12 21:45	
21	08:14 14:59-15:46/47 16:25	07:17 07:59-08:05/6 17:27	06:10 17:34-17:55/21 18:22	05:55 19:35-19:42/7 20:20	04:56 04:34 21:14 21:45	
22	08:12 15:01-15:47/46 16:27	07:15 17:29	06:08 17:34-17:56/22 18:23	05:53 20:22	04:55 04:34 21:15 21:45	
23	08:11 15:03-15:47/44 16:29	07:13 16:58-17:03/5 17:31	06:05 17:36-17:59/23 18:25	05:50 20:24	04:53 04:34 21:17 21:46	
24	08:10 15:11-15:47/36 08:40-08:45/5 16:31	07:10 16:57-17:05/8 17:33	06:03 17:40-18:00/20 18:27	05:48 20:26	04:52 04:34 21:18 21:46	
25	08:08 15:13-15:48/35 08:38-09:02/24 16:33	07:08 16:55-17:07/12 17:35	06:00 17:41-18:02/21 18:29	05:46 20:27	04:50 04:35 21:20 21:46	
26	08:07 15:14-15:48/34 08:36-09:02/26 16:34	07:06 16:55-17:09/14 17:37	05:58 17:41-18:04/23 18:31	05:44 20:29	04:49 04:35 21:21 21:46	
27	08:05 15:16-16:02/46 16:36	07:04 16:54-17:10/16 17:39	05:55 17:43-18:06/23 18:33	05:41 20:31	04:48 04:36 21:23 21:46	
28	08:04 15:21-16:04/43 16:38	07:01 16:54-17:10/16 17:41	05:53 17:45-18:07/22 18:35	05:39 20:33	04:47 04:36 21:24 21:45	
29	08:02 15:22-16:05/43 16:40		06:50 18:47-19:10/23 19:37	05:37 20:35	04:46 04:37 21:26 21:45	
30	08:01 15:22-16:06/44 16:42		06:48 18:52-19:12/20 19:39	05:35 20:37	04:44 04:37 21:27 21:45	
31	07:59 15:24-16:06/42 16:44		06:45 18:52-19:13/21 19:40		04:43 21:28	
	Sonnenscheinstunden 248 Anzahl Minuten mit Schatten 1840	272 1062	367 589	421 418	496 0	512 0

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender pro WEA**

Berechnung: GBWEA: 16 - N1

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	04:38	05:19	06:14	19:11-19:33/22	07:08	18:01-18:18/17	07:07	15:23-15:31/8	07:37-08:04/27	08:03	14:16-15:12/56	
	21:45	21:09	20:01		18:46		16:35	15:34-15:54/20		15:50		
2	04:39	05:20	06:16	19:08-19:30/22	07:10	18:01-18:15/14	07:09	15:21-15:33/12	07:39-08:06/27	08:05	14:15-15:12/57	
	21:44	21:07	19:59		18:44		16:33	15:34-15:54/20		15:49		
3	04:40	05:22	06:18	19:06-19:28/22	07:12	18:00-18:12/12	07:11	15:19-15:54/35		08:06	14:15-15:11/56	
	21:44	21:05	19:56		18:42		16:31	07:41-08:09/28		15:48		
4	04:40	05:24	06:19	19:03-19:25/22	07:14	17:52-17:58/6	07:13	15:19-15:54/35		08:08	14:14-15:10/56	
	21:43	21:03	19:54		18:39	18:00-18:10/10	16:29	07:44-08:09/25		15:48		
5	04:41	05:26	06:21	19:00-19:22/22	07:15	17:49-18:00/11	07:15	15:18-15:53/35		08:09	14:15-15:09/54	
	21:43	21:01	19:51		18:37	18:01-18:07/6	16:27	07:46-08:15/29		15:47		
6	04:42	05:27	06:23	18:59-19:20/21	07:17	17:47-18:01/14	07:17	15:17-15:52/35		08:11	14:14-15:07/53	
	21:42	20:59	19:49		18:34	18:02-18:05/3	16:25	07:48-08:18/30		15:46		
7	04:43	05:29	06:25	18:59-19:18/19	07:19	17:46-18:01/15	07:19	15:17-15:51/34		08:12	14:15-15:07/52	
	21:41	20:57	19:46		18:32		16:23	07:50-08:19/29		15:46		
8	04:44	05:31	06:27	18:57-19:16/19	07:21	17:46-18:00/14	07:21	15:05-15:14/9	15:39-15:49/10	08:13	14:13-15:07/54	
	21:41	20:55	19:44		18:29		16:21	15:17-15:38/21	07:52-08:20/28	15:45		
9	04:45	05:33	06:28	18:54-19:13/19	07:23	17:46-17:58/12	07:23	14:59-15:16/17	15:42-15:46/4	08:14	14:13-15:07/54	
	21:40	20:53	19:41		18:27	17:36-17:38/2	16:20	15:17-15:37/20	07:54-08:20/26	15:45		
10	04:46	05:34	06:30	18:51-19:10/19	07:25	17:46-17:55/9	07:25	14:56-15:37/41	08:24-08:29/5	08:16	14:13-15:07/54	
	21:39	20:51	19:39		18:24	17:32-17:41/9	16:18	07:57-08:21/24		15:45		
11	04:48	05:36	06:32	18:47-19:08/21	07:27	17:46-17:53/7	07:27	14:55-15:38/43		08:17	14:12-15:06/54	
	21:38	20:49	19:36		18:22	17:30-17:43/13	16:16	07:59-08:32/33		15:45		
12	04:49	05:38	06:34	18:45-19:06/21	07:29	17:47-17:50/3	07:29	14:54-15:37/43		08:18	14:12-15:06/54	
	21:37	20:47	19:34		18:20	17:29-17:43/14	16:14	08:01-08:33/32		15:44		
13	04:50	05:40	06:35	18:43-19:03/20	07:30	17:28-17:44/16	07:30	14:53-15:37/44		08:19	14:12-15:05/53	
	21:36	20:45	19:31		18:17		16:13	08:03-08:34/31		15:44		
14	04:51	05:41	06:37	18:38-19:00/22	07:32	17:28-17:44/16	07:32	14:53-15:36/43		08:20	14:12-14:59/47	
	21:35	20:43	19:29		18:15		16:11	08:06-08:34/28		15:44	15:00-15:04/4	
15	04:53	05:43	06:39	18:35-18:58/23	07:34	17:27-17:43/16	07:35	14:49-15:35/46		08:21	14:12-15:00/48	
	21:34	20:40	19:26		18:13		16:09	08:07-08:35/28		15:44		
16	04:54	05:45	06:41	18:33-18:56/23	07:36	17:27-17:41/14	07:37	14:47-15:21/34	08:09-08:35/26	08:22	14:13-15:00/47	
	21:33	20:38	19:24		18:10		16:08	15:22-15:34/12		15:44		
17	04:55	05:47	06:43	18:30-18:53/23	07:38	17:28-17:38/10	07:38	14:46-15:21/35	08:11-08:35/24	08:23	14:13-15:01/48	
	21:32	20:36	19:21		18:08		16:06	15:25-15:32/7		15:44		
18	04:57	05:49	06:44	18:28-18:50/22	07:40	17:29-17:36/7	07:40	14:45-15:21/36	08:14-08:19/5	08:24	14:14-15:01/47	
	21:30	20:34	19:19		18:06		16:05	14:40-14:42/2	08:20-08:37/17	15:45		
19	04:58	05:50	06:46	18:27-18:48/21	07:42	17:31-17:33/2	07:42	14:38-15:22/44		08:24	14:14-15:02/48	
	21:29	20:32	19:16		18:03		16:03	08:20-08:37/17		15:45		
20	05:00	05:52	06:48	18:23-18:46/23	07:44		07:44	14:36-15:22/46		08:25	14:14-15:02/48	
	21:28	20:29	19:14		18:01		16:02	08:20-08:37/17		15:45		
21	05:01	05:54	06:50	18:20-18:42/22	07:46	08:28-08:36/8	07:46	14:35-15:22/47		08:26	14:15-15:03/48	
	21:26	20:27	19:11		17:59		16:01	08:21-08:36/15		15:46		
22	05:03	05:56	06:52	18:19-18:40/21	07:48	08:26-08:47/21	07:48	14:34-15:22/48		08:26	14:15-15:03/48	
	21:25	20:25	19:09		17:56		15:59	08:22-08:36/14		15:46		
23	05:04	05:58	06:53	18:17-18:38/21	07:50	08:25-08:49/24	07:50	14:34-15:21/47		08:27	14:16-15:04/48	
	21:24	20:22	19:06		17:54		15:58	08:24-08:36/12		15:47		
24	05:06	05:59	06:55	18:15-18:35/20	07:52	08:25-08:50/25	07:51	14:34-15:21/47		08:27	14:16-15:04/48	
	21:22	20:20	19:04		17:52		15:57	08:26-08:35/9		15:47		
25	05:07	06:01	06:57	18:12-18:33/21	06:54	15:42-15:46/4	07:53	14:31-15:19/48		08:27	14:17-15:04/47	
	21:20	20:18	19:01		16:50	07:24-07:52/28	15:56	08:28-08:34/6		15:48		
26	05:09	06:03	06:59	18:10-18:30/20	06:55	15:39-15:50/11	07:55	14:28-15:18/50		08:28	14:17-15:05/48	
	21:19	20:15	18:59		16:48	07:24-07:54/30	15:55	08:30-08:33/3		15:48		
27	05:10	06:05	07:01	18:09-18:27/18	06:57	15:37-15:51/14	07:57	14:27-15:17/50		08:28	14:19-15:06/47	
	21:17	20:13	18:56		16:45	07:27-07:56/29	15:53			15:49		
28	05:12	06:07	07:03	18:04-18:25/21	06:59	15:36-15:53/17	07:58	14:26-15:14/48		08:28	14:19-15:07/48	
	21:16	20:11	18:54		16:43	07:29-07:56/27	15:52			15:50		
29	05:14	06:09	07:04	18:03-18:23/20	07:01	15:35-15:54/19	08:00	14:26-15:13/47		08:28	14:20-15:07/47	
	21:14	20:08	18:51		16:41	07:31-07:57/26	15:52			15:51	15:09-15:11/2	
30	05:15	06:10	07:06	18:02-18:20/18	07:03	15:35-15:54/19	08:02	14:18-15:13/55		08:28	14:20-15:12/52	
	21:12	20:06	18:49		16:39	07:33-08:00/27	15:51			15:52		
31	05:17	06:12	07:05	19:13-19:35/22	07:05	15:34-15:54/20				08:28	14:21-15:14/53	
	21:10	20:04	16:37		16:37	07:35-08:01/26				15:53		
	Sonnenscheinstunden	514	461	383	328	647	257	1873		1580		
	Anzahl Minuten mit Schatten	0	189	628								

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenziertes Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 17 - M13

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28 15:03-15:16/13 15:54	07:57 15:45-16:14/29 16:46	06:59 17:07-17:16/9 17:43 16:52-17:06/14	06:43 19:42	05:33 20:39	04:42 21:29		
2	08:28 15:03-15:18/15 15:55	07:55 15:46-16:16/30 16:48	06:56 17:05-17:17/12 17:45 16:54-17:03/9	06:40 19:44	05:31 20:40	04:41 21:31		
3	08:28 15:03-15:18/15 15:57	07:54 15:47-16:18/31 16:50	06:54 17:06-17:20/14 17:47	06:38 19:46	05:29 20:42	04:40 21:32		
4	08:27 15:04-15:20/16 15:58	07:52 15:51-16:21/30 16:52	06:52 17:05-17:21/16 17:49	06:35 19:48	05:27 20:44	04:40 21:33		
5	08:27 15:04-15:21/17 15:59	07:50 15:53-16:23/30 16:54	06:49 17:06-17:24/18 17:51	06:33 19:50	05:24 20:46	04:39 21:34		
6	08:27 15:04-15:22/18 16:00	07:48 15:55-16:26/31 16:56	06:47 17:06-17:24/18 17:53	06:31 19:52	05:22 20:48	04:38 21:35		
7	08:26 15:06-15:25/19 16:02	07:46 15:55-16:27/32 16:59	06:45 17:07-17:23/16 17:55	06:28 19:54	05:21 20:50	04:37 21:36		
8	08:26 15:06-15:26/20 16:03	07:44 16:00-16:29/29 17:01	06:42 17:09-17:22/13 17:57	06:26 19:55	05:19 20:51	04:37 21:37		
9	08:25 15:07-15:27/20 16:05	07:42 16:01-16:32/31 17:03	06:40 17:11-17:21/10 17:59	06:23 19:57	05:17 20:53	04:36 21:38		
10	08:24 15:07-15:29/22 16:06	07:40 16:02-16:34/32 17:05	06:37 17:13-17:17/4 18:01	06:21 19:59	05:15 20:55	04:36 21:39		
11	08:24 15:08-15:31/23 16:08	07:38 16:05-16:36/31 17:07	06:35 18:02	06:18 20:01	05:13 20:57	04:35 21:40		
12	08:23 15:09-15:32/23 16:09	07:36 16:09-16:39/30 17:09	06:32 18:04	06:16 20:03	05:11 20:59	04:35 21:41		
13	08:22 15:10-15:34/24 16:11	07:34 16:11-16:41/30 17:11	06:30 18:06	06:14 20:05	05:09 21:00	04:34 21:41		
14	08:21 15:12-15:36/24 16:13	07:32 16:11-16:43/32 17:13	06:28 18:08	06:11 20:07	05:07 21:02	04:34 21:42		
15	08:20 15:14-15:38/24 16:14	07:30 16:14-16:45/31 17:15	06:25 18:10	06:09 20:09	05:06 21:04	04:34 21:43		
16	08:19 15:15-15:40/25 16:16	07:28 16:17-16:47/30 17:17	06:23 18:12	06:06 20:11	05:04 21:05	04:34 21:43		
17	08:18 15:16-15:42/26 16:18	07:26 16:19-16:50/31 17:19	06:20 18:14	06:04 20:12	05:02 21:07	04:34 21:44		
18	08:17 15:17-15:44/27 16:20	07:24 16:23-16:51/28 17:21	06:18 18:16	06:02 20:14	05:01 21:09	04:34 21:44		
19	08:16 15:19-15:46/27 16:21	07:22 16:27-16:54/27 17:23	06:15 18:18	05:59 20:16	04:59 21:10	04:34 21:45		
20	08:15 15:20-15:48/28 16:23	07:19 16:31-16:56/25 17:25	06:13 18:20	05:57 20:18	04:58 21:12	04:34 21:45		
21	08:14 15:21-15:50/29 16:25	07:17 16:32-16:59/27 17:27	06:10 18:22	05:55 20:20	04:56 21:14	04:34 21:45		
22	08:12 15:24-15:53/29 16:27	07:15 16:33-17:00/27 17:29	06:08 18:23	05:53 20:22	04:55 21:15	04:34 21:45		
23	08:11 15:26-15:54/28 16:29	07:13 16:37-17:03/26 17:31	06:05 18:25	05:50 20:24	04:53 21:17	04:34 21:45		
24	08:10 15:27-15:56/29 16:31	07:10 16:40-17:05/25 17:33	06:03 18:27	05:48 20:26	04:52 21:18	04:34 21:46		
25	08:08 15:30-15:59/29 16:33	07:08 16:41-17:07/26 17:35	06:00 18:29	05:46 20:27	04:50 21:20	04:33 21:46		
26	08:07 15:34-16:01/27 16:34	07:06 16:46-17:08/22 17:37	05:58 18:31	05:44 20:29	04:49 21:21	04:33 21:46		
27	08:05 15:36-16:03/27 16:36	07:04 17:08-17:11/3 17:39	05:55 18:33	05:41 20:31	04:48 21:23	04:36 21:45		
28	08:04 15:38-16:06/28 16:38	07:01 17:07-17:13/6 17:41	05:53 18:35	05:39 20:33	04:47 21:24	04:36 21:45		
29	08:02 15:39-16:08/29 16:40		06:50 19:37	05:37 20:35	04:46 21:26	04:37 21:45		
30	08:01 15:43-16:10/27 16:42		06:48 19:39	05:35 20:37	04:44 21:27	04:37 21:45		
31	07:59 15:44-16:12/28 16:44		06:45 19:40		04:43 21:28			
Sonnenscheinstunden		248	272	367	421	496	512	0
Anzahl Minuten mit Schatten		736	800	153	0	0	0	0

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 17 - M13

#### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	07:08	07:07 15:32-16:03/31	08:03 14:50-15:13/23
	21:45	21:09	20:01	18:46	16:35	15:50
2	04:39	05:20	06:16	07:10	07:09 15:30-16:01/31	08:05 14:50-15:12/22
	21:44	21:07	19:59	18:44	16:33	15:49
3	04:40	05:22	06:18	07:12	07:11 15:28-15:59/31	08:06 14:51-15:11/20
	21:44	21:05	19:56	18:42	16:31	15:48
4	04:40	05:24	06:19	07:14 17:49-17:57/8	07:13 15:25-15:56/31	08:08 14:50-15:10/20
	21:43	21:03	19:54	18:39	16:29	15:48
5	04:41	05:26	06:21	07:15 17:47-17:58/11	07:15 15:24-15:55/31	08:09 14:51-15:10/19
	21:43	21:01	19:51	18:37	16:27	15:47
6	04:42	05:27	06:23	07:17 17:44-17:59/15	07:17 15:23-15:53/30	08:10 14:51-15:09/18
	21:42	20:59	19:49	18:34	16:25	15:46
7	04:43	05:29	06:25	07:19 17:43-18:00/17	07:19 15:20-15:51/31	08:12 14:51-15:08/17
	21:41	20:57	19:46	18:32	16:23	15:46
8	04:44	05:31	06:27	07:21 17:42-18:00/18	07:21 15:18-15:49/31	08:13 14:51-15:07/16
	21:41	20:55	19:44	18:29	16:21	15:45
9	04:45	05:33	06:28	07:23 17:41-17:58/17	07:23 15:16-15:46/30	08:14 14:52-15:08/16
	21:40	20:53	19:41	18:27	16:20	15:45
10	04:46	05:34	06:30	07:25 17:40-17:55/15	07:25 15:16-15:44/28	08:16 14:53-15:07/14
	21:39	20:51	19:39	18:24	16:18	15:45
11	04:48	05:36	06:32	07:27 17:40-17:53/13	07:27 15:16-15:43/27	08:17 14:53-15:06/13
	21:38	20:49	19:36	18:22 17:29-17:36/7	16:16	15:45
12	04:49	05:38	06:34	07:29 17:40-17:50/10	07:29 15:14-15:41/27	08:18 14:53-15:06/13
	21:37	20:47	19:34	18:20 17:27-17:38/11	16:14	15:44
13	04:50	05:40	06:35	07:30 17:40-17:48/8	07:31 15:11-15:39/28	08:19 14:53-15:05/12
	21:36	20:45	19:31	18:17 17:23-17:39/16	16:13	15:44
14	04:51	05:41	06:37	07:32 17:41-17:45/4	07:33 15:10-15:37/27	08:20 14:54-15:05/11
	21:35	20:43	19:29	18:15 17:21-17:40/19	16:11	15:44
15	04:53	05:43	06:39	07:34 17:42-17:43/1	07:35 15:09-15:35/26	08:21 14:54-15:05/11
	21:34	20:40	19:26	18:13 17:19-17:40/21	16:09	15:44
16	04:54	05:45	06:41	07:36 17:18-17:40/22	07:37 15:07-15:34/27	08:22 14:55-15:05/10
	21:33	20:38	19:24	18:10	16:08	15:44
17	04:55	05:47	06:43	07:38 17:12-17:38/26	07:38 15:03-15:32/29	08:23 14:56-15:06/10
	21:32	20:36	19:21	18:08	16:06	15:44
18	04:57	05:49	06:44	07:40 17:10-17:36/26	07:40 15:01-15:30/29	08:23 14:56-15:06/10
	21:30	20:34	19:19	18:06	16:05	15:45
19	04:58	05:50	06:46	07:42 17:07-17:33/26	07:42 15:00-15:28/28	08:24 14:57-15:06/9
	21:29	20:32	19:16	18:03	16:03	15:45
20	05:00	05:52	06:48	07:44 17:04-17:31/27	07:44 14:59-15:27/28	08:25 14:57-15:06/9
	21:28	20:29	19:14	18:01	16:02	15:45
21	05:01	05:54	06:50	07:46 17:02-17:28/26	07:46 14:57-15:26/29	08:25 14:58-15:07/9
	21:26	20:27	19:11	17:59	16:01	15:46
22	05:03	05:56	06:52	07:48 17:00-17:26/26	07:48 14:56-15:25/29	08:26 14:58-15:07/9
	21:25	20:25	19:09	17:56	15:59	15:46
23	05:04	05:58	06:53	07:50 16:55-17:24/29	07:50 14:56-15:23/27	08:27 14:59-15:08/9
	21:23	20:22	19:06	17:54	15:58	15:47
24	05:06	05:59	06:55	07:52 16:53-17:21/28	07:51 14:54-15:21/27	08:27 14:59-15:08/9
	21:22	20:20	19:04	17:52	15:57	15:47
25	05:07	06:01	06:57	06:53 15:48-16:19/31	07:53 14:53-15:20/27	08:27 14:59-15:09/10
	21:20	20:18	19:01	16:50	15:56	15:48
26	05:09	06:03	06:59	06:55 15:46-16:16/30	07:55 14:53-15:18/25	08:28 15:00-15:09/9
	21:19	20:15	18:59	16:48	15:55	15:49
27	05:10	06:05	07:01	06:57 15:43-16:14/31	07:57 14:53-15:17/24	08:28 15:01-15:11/10
	21:17	20:13	18:56	16:45	15:53	15:49
28	05:12	06:07	07:03	06:59 15:40-16:12/32	07:58 14:52-15:16/24	08:28 15:01-15:12/11
	21:16	20:11	18:54	16:43	15:52	15:50
29	05:14	06:09	07:04	07:01 15:40-16:10/30	08:00 14:51-15:15/24	08:28 15:02-15:13/11
	21:14	20:08	18:51	16:41	15:52	15:51
30	05:15	06:10	07:06	07:03 15:39-16:08/29	08:01 14:51-15:14/23	08:28 15:01-15:13/12
	21:12	20:06	18:49	16:39	15:51	15:52
31	05:17	06:12		07:05 15:34-16:06/32		08:28 15:02-15:14/12
	21:10	20:03		16:37		15:53
Sonnenscheinstunden	514	461	383	328	257	231
Anzahl Minuten mit Schatten	0	0	0	662	840	404

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 18 - M14

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28 14:18-14:30/12	07:57	06:59 16:48-17:16/28	06:43 18:43-19:16/33	05:33	04:42
	15:54 14:32-15:11/39	16:46	17:43	19:42	20:39	21:30
2	08:28 14:20-14:30/10	07:55	06:57 16:49-17:16/27	06:40 18:45-19:17/32	05:31	04:41
	15:55 14:33-15:12/39	16:48	17:45	19:44	20:40	21:31
3	08:28 14:20-14:29/9	07:54 16:17-16:19/2	06:54 16:53-17:20/27	06:38 18:48-19:19/31	05:29	04:40
	15:57 14:33-15:12/39	16:50	17:47	19:46	20:42	21:32
4	08:27 14:22-14:29/7	07:52 16:14-16:21/7	06:52 16:53-17:21/28	06:35 18:49-19:20/31	05:27	04:40
	15:58 14:34-15:13/39	16:52	17:49	19:48	20:44	21:33
5	08:27 14:25-14:26/1	07:50 16:13-16:23/10	06:49 16:55-17:24/29	06:33 18:51-19:23/32	05:24	04:39
	15:59 14:34-15:14/40	16:54 08:18-08:20/2	17:51	19:50	20:46	21:34
6	08:27 14:35-15:15/40	07:48 16:12-16:26/14	06:47 16:56-17:25/29	06:31 18:54-19:24/30	05:22	04:38
	16:00	16:56 08:16-08:22/6	17:53	19:52	20:48	21:35
7	08:26 14:36-15:15/39	07:46 16:10-16:27/17	06:45 16:58-17:28/30	06:28 18:57-19:26/29	05:21	04:37
	16:02	16:58 08:14-08:23/9	17:55	19:54	20:50	21:36
8	08:26 14:36-15:15/39	07:44 16:10-16:28/18	06:42 16:59-17:29/30	06:26 18:58-19:28/30	05:19	04:37
	16:03	17:01 08:12-08:24/12	17:57	19:55	20:51	21:37
9	08:25 14:37-15:16/39	07:42 16:10-16:28/18	06:40 17:00-17:32/32	06:23 18:58-19:30/32	05:17	04:36
	16:05	17:03 08:09-08:23/14	17:59	19:57	20:53	21:38
10	08:24 14:37-15:16/39	07:40 16:10-16:28/18	06:37 17:02-17:33/31	06:21 19:01-19:32/31	05:15	04:36
	16:06	17:05 08:09-08:24/15	18:01	19:59	20:55	21:39
11	08:24 14:38-15:17/39	07:38 16:10-16:28/18	06:35 17:05-17:36/31	06:18 19:03-19:33/30	05:13	04:35
	16:08	17:07 08:10-08:23/13	18:02	20:01	20:57	21:40
12	08:23 14:39-15:17/38	07:36 16:11-16:28/17	06:32 17:05-17:37/32	06:16 19:09-19:35/26	05:11	04:35
	16:09	17:09 08:10-08:23/13	18:04	20:03	20:59	21:41
13	08:22 14:40-14:55/15	07:34 16:12-16:28/16	06:30 17:07-17:40/33	06:14 19:11-19:37/26	05:09	04:34
	16:11 14:56-15:18/22	17:11 08:12-08:22/10	18:06	20:05	21:00	21:41
14	08:21 14:42-14:54/12	07:32 16:39-16:44/5	06:28 17:09-17:41/32	06:11 19:14-19:38/24	05:07	04:34
	16:13 14:56-15:18/22	17:13 16:13-16:27/14	18:08	20:07	21:02	21:42
15	08:20 14:44-14:53/9	07:30 16:36-16:45/9	06:25 17:11-17:43/32	06:09 19:18-19:40/22	05:06	04:34
	16:14 14:57-15:18/21	17:15 16:13-16:25/12	18:10	20:09	21:04	21:43
16	08:19 14:47-14:52/5	07:28 16:36-16:47/11	06:23 17:13-17:45/32	06:06 19:19-19:42/23	05:04	04:34
	16:16 14:57-15:19/22	17:17 16:16-16:23/7	18:12	20:11	21:05	21:43
17	08:18 14:58-15:19/21	07:26 16:35-16:50/15	06:20 17:17-17:47/30	06:04 19:20-19:44/24	05:02	04:34
	16:18	17:19	18:14	20:12	21:07	21:44
18	08:17 14:58-15:19/21	07:24 16:35-16:52/17	06:18 17:19-17:49/30	06:02 19:28-19:45/17	05:01	04:34
	16:19	17:21	18:16	20:14	21:09	21:44
19	08:16 14:59-15:19/20	07:22 16:34-16:54/20	06:15 17:21-17:51/30	05:59 19:29-19:45/16	04:59	04:34
	16:21	17:23	18:18	20:16	21:10	21:45
20	08:15 15:01-15:19/18	07:19 16:35-16:56/21	06:13 17:22-17:53/31	05:57 19:32-19:44/12	04:58	04:34
	16:23	17:25	18:20	20:18	21:12	21:45
21	08:14 15:01-15:18/17	07:17 16:36-16:59/23	06:10 17:27-17:55/28	05:55 19:33-19:43/10	04:56	04:34
	16:25	17:27	18:22	20:20	21:14	21:45
22	08:12 15:03-15:18/15	07:15 16:36-17:00/24	06:08 17:29-17:56/27	05:53 19:34-19:40/6	04:55	04:34
	16:27	17:29	18:23	20:22	21:15	21:45
23	08:11 15:04-15:17/13	07:13 16:38-17:03/25	06:05 17:31-17:59/28	05:50	04:53	04:34
	16:29	17:31	18:25	20:24	21:17	21:46
24	08:10 15:06-15:15/9	07:10 16:41-17:05/24	06:03 17:32-18:00/28	05:48	04:52	04:34
	16:31	17:33	18:27	20:26	21:18	21:46
25	08:08	07:08 16:45-17:07/22	06:00 17:33-18:02/29	05:46	04:50	04:35
	16:33	17:35	18:29	20:27	21:20	21:46
26	08:07	07:06 16:45-17:09/24	05:58 17:33-18:04/31	05:44	04:49	04:35
	16:34	17:37	18:31	20:29	21:21	21:46
27	08:05	07:04 16:45-17:11/26	05:55 17:34-18:06/32	05:41	04:48	04:36
	16:36	17:39	18:33	20:31	21:23	21:46
28	08:04	07:01 16:46-17:13/27	05:53 17:35-18:07/32	05:39	04:47	04:36
	16:38	17:41	18:35	20:33	21:24	21:45
29	08:02		06:50 18:39-19:10/31	05:37	04:46	04:37
	16:40		19:37	20:35	21:26	21:45
30	08:01		06:48 18:40-19:12/32	05:35	04:44	04:37
	16:42		19:39	20:37	21:27	21:45
31	07:59		06:45 18:42-19:13/31		04:43	
	16:44		19:40		21:28	
Sonnenscheinstunden	248	272	367	421	496	512
Anzahl Minuten mit Schatten	770	583	933	547	0	0

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

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 18 - M14

#### 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  
342 326 396 565 523 523 733 981 1.012 1.213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38   05:19		06:14 19:03-19:33/30	07:08 17:46-18:18/32	07:07 15:40-15:58/18	08:03 14:20-14:59/39
	21:45   21:09		20:01	18:46	16:35 07:39-07:53/14	15:50
2	04:39   05:20		06:16 18:59-19:30/31	07:10 17:44-18:15/31	07:09 15:40-15:58/18	08:05 14:20-14:59/39
	21:44   21:07		19:59	18:44	16:33 07:39-07:53/14	15:49
3	04:40   05:22		06:18 18:56-19:28/32	07:12 17:42-18:12/30	07:11 15:40-15:57/17	08:06 14:21-15:00/39
	21:44   21:05		19:56	18:42	16:31 07:41-07:52/11	15:48
4	04:40   05:24		06:19 18:55-19:25/30	07:14 17:38-18:10/32	07:13 15:41-15:57/16	08:08 14:20-15:00/40
	21:43   21:03		19:54	18:39	16:29 07:44-07:53/9	15:48
5	04:41   05:26		06:21 18:53-19:22/29	07:15 17:36-18:07/31	07:15 15:42-15:55/13	08:09 14:21-15:00/39
	21:43   21:01		19:51	18:37	16:27 07:46-07:52/6	15:47
6	04:42   05:27		06:23 18:50-19:20/30	07:17 17:35-18:05/30	07:17 15:43-15:53/10	08:10 14:20-15:00/40
	21:42   20:59		19:49	18:34	16:25 07:48-07:50/2	15:46
7	04:43   05:29		06:25 18:46-19:18/32	07:19 17:33-18:02/29	07:29	08:12 14:21-15:01/40
	21:41   20:57		19:46	18:32	16:23	15:46
8	04:44   05:31		06:27 18:44-19:16/32	07:21 17:31-18:00/29	07:21 15:47-15:49/2	08:13 14:10-14:16/6
	21:41   20:55		19:44	18:29	16:21	15:45 14:21-15:00/39
9	04:45   05:33		06:28 18:42-19:13/31	07:23 17:29-17:58/29	07:23	08:14 14:09-14:18/9
	21:40   20:53		19:41	18:27	16:20	15:45 14:22-15:01/39
10	04:46   05:34		06:30 18:38-19:10/32	07:25 17:27-17:55/28	07:25	08:16 14:09-14:19/10
	21:39   20:51		19:39	18:24	16:18	15:45 14:22-15:01/39
11	04:48   05:36		06:32 18:36-19:08/32	07:27 17:26-17:53/27	07:27	08:17 14:08-14:20/12
	21:38   20:49		19:36	18:22	16:16	15:44 14:22-15:01/39
12	04:49   05:38		06:34 18:34-19:06/32	07:29 17:22-17:50/28	07:29	08:18 14:08-14:21/13
	21:37   20:47		19:34	18:20	16:14	15:44 14:22-15:01/39
13	04:50   05:40		06:35 18:31-19:03/32	07:30 17:20-17:48/28	07:31	08:19 14:08-14:22/14 14:23-15:01/38
	21:36   20:45		19:31	18:17	16:13	15:44 14:01-14:05/4
14	04:51   05:41		06:37 18:29-19:00/31	07:32 17:19-17:45/26	07:33	08:20 14:08-14:22/14 14:23-15:01/38
	21:35   20:43		19:29	18:15	16:11	15:44 14:00-14:07/7
15	04:53   05:43		06:39 18:26-18:58/32	07:34 17:18-17:43/25	07:35	08:21 14:00-14:23/23
	21:34   20:40		19:26	18:13	16:09	15:44 14:24-15:02/38
16	04:54   05:45		06:41 18:24-18:56/32	07:36 17:17-17:41/24	07:37	08:22 14:00-15:02/62
	21:33   20:38		19:24	18:10	16:08	15:44
17	04:55   05:47		06:43 18:21-18:53/32	07:38 17:16-17:38/22	07:38	08:23 14:00-15:02/62
	21:32   20:36		19:21	18:08	16:06	15:44
18	04:57   05:49		06:44 18:20-18:50/30	07:40 17:11-17:36/25	07:40 14:39-14:49/10	08:24 14:01-14:47/46
	21:30   20:34		19:19	18:06	16:05	15:45 14:48-15:03/15
19	04:58   05:50		06:46 18:19-18:48/29	07:42 17:08-17:33/25	07:42 14:39-14:52/13	08:24 14:01-14:48/47
	21:29   20:32		19:16	18:03	16:03	15:45 14:49-15:04/15
20	05:00   05:52		06:48 18:18-18:46/28	07:44 17:07-17:31/24	07:44 14:38-14:53/15	08:25 14:01-14:48/47
	21:28   20:29		19:14	18:01	16:02	15:45 14:49-15:03/14
21	05:01   05:54 19:39-19:46/7		06:50 18:15-18:42/27	07:46 17:06-17:28/22	07:46 14:37-14:54/17	08:26 14:02-14:49/47
	21:26   20:27		19:11	17:59	16:01	15:46 14:50-15:04/14
22	05:03   05:56 19:36-19:47/11		06:52 18:12-18:40/28	07:48 17:05-17:26/21	07:48 14:37-14:55/18	08:26 14:02-14:49/47
	21:25   20:25		19:09	17:56	15:59	15:46 14:50-15:04/14
23	05:04   05:58 19:35-19:48/13		06:53 18:07-18:38/31	07:50 17:05-17:24/19	07:50 14:36-14:56/20	08:27 14:03-14:50/47
	21:24   20:22		19:06	17:54	15:58	15:47 14:51-15:05/14
24	05:06   05:59 19:33-19:49/16		06:55 18:05-18:35/30	07:52 17:05-17:21/16	07:51 14:36-14:57/21	08:27 14:03-14:50/47
	21:22   20:20		19:04	17:52	15:57	15:47 14:51-15:06/15
25	05:07   06:01 19:32-19:49/17		06:57 18:03-18:33/30	06:53 16:05-16:19/14	07:53 14:35-14:56/21	08:27 14:04-14:50/46
	21:20   20:18 19:29-19:30/1		19:01	16:50	15:56	15:48 14:51-15:06/15
26	05:09   06:03 19:23-19:46/23		06:59 18:01-18:30/29	06:55 16:05-16:16/11	07:55 14:25-14:29/4	08:28 14:04-14:28/24
	21:19   20:15		18:59	16:48 15:45-15:53/8	15:55 14:36-14:57/21	15:48 14:29-15:06/37
27	05:10   06:05 19:21-19:44/23		07:01 17:56-18:27/31	06:57 16:06-16:14/8 07:46-07:48/2	07:57 14:23-14:32/9	08:28 14:06-15:08/62
	21:17   20:13		18:56	16:45 15:43-15:55/12	15:53 14:36-14:58/22	15:49
28	05:12   06:07 19:20-19:42/22		07:03 17:53-18:25/32	06:59 16:08-16:12/4 07:42-07:51/9	07:58 14:22-14:34/12	08:28 14:07-15:08/61
	21:16   20:11		18:54	16:43 15:42-15:57/15	15:52 14:36-14:58/22	15:50
29	05:14   06:08 19:15-19:39/24		07:04 17:51-18:23/32	07:01 15:41-15:57/16	08:00 14:22-14:36/14	08:28 14:16-14:30/14 14:31-15:09/38
	21:14   20:08		18:51	16:41 07:41-07:52/11	15:52 14:37-14:59/22	15:51 14:08-14:15/7
30	05:15   06:10 19:11-19:37/26		07:06 17:48-18:20/32	07:03 15:40-15:58/18	08:01 14:21-14:59/38	08:28 14:16-14:29/13 14:30-15:09/39
	21:12   20:06		18:49	16:39 07:40-07:53/13	15:51	15:52 14:08-14:14/6
31	05:17   06:12 19:09-19:35/26			07:05 15:40-15:58/18		08:28 14:17-14:30/13
	21:10   20:03			16:37 07:39-07:53/14		15:53 14:31-15:10/39
Sonnenscheinstunden	514	461	383	328	257	231
Anzahl Minuten mit Schatten	0	209	921	806	456	1664

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
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-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 19 - M15

#### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Jul	August	September	Oktober	November	Dezember
1	04:38	05:19 20:12-20:37/25	06:14 19:08-19:33/25	07:08 17:28-17:45/17	07:07 14:55-15:54/59	08:03 13:52-14:53/61
2	21:45	21:09	20:01	18:46 07:45-08:01/16	16:35	15:50
3	21:44	20:09-20:35/26	06:16 19:05-19:30/25	07:10 17:26-17:46/20	07:09 14:49-15:50/61	08:05 13:53-14:53/60
4	21:44	21:07	19:59	18:44 07:45-08:05/20	16:39	15:49
5	21:44	05:22 20:08-20:33/25	06:18 19:03-19:28/25	07:12 17:24-17:46/22	07:11 14:46-15:47/61	08:06 13:53-14:53/60
6	21:44	21:05	19:56	18:42 07:44-08:07/23	16:31	15:48
7	21:43	05:24 20:06-20:31/25	06:19 19:02-19:25/23	07:14 17:23-17:47/24	07:13 14:45-15:46/61	08:07 13:53-14:52/59
8	21:43	21:03	19:54	18:39 07:43-08:06/23	16:29	15:48
9	21:43	05:26 20:04-20:30/26	06:21 18:57-19:22/25	07:15 17:22-17:47/25	07:15 14:32-15:45/73	08:09 13:53-14:52/59
10	21:43	21:01	19:51	18:37 07:43-08:07/24	16:27	15:47
11	21:43	05:27 20:02-20:28/26	06:23 18:55-19:20/25	07:17 17:11-17:17/6 07:44-08:08/24	07:17 14:29-15:43/74	08:11 13:53-14:51/58
12	21:42	20:59	19:49	18:34 07:42-17:47/26	16:25	15:46
13	21:42	05:29 20:00-20:26/26	06:25 18:54-19:18/24	07:19 17:07-17:47/40	07:19 14:27-15:41/74	08:12 13:54-14:51/57
14	21:41	20:57	19:46	18:32 07:46-08:08/22	16:23	15:46
15	21:41	05:31 19:59-20:24/25	06:27 18:53-19:16/23	07:21 17:05-17:47/42	07:21 14:26-15:36/70	08:13 13:54-14:50/56
16	21:41	20:55	19:44	18:29 07:48-08:13/25	16:21	15:45
17	21:41	05:33 19:58-20:23/25	06:28 18:51-19:13/22	07:23 17:03-17:46/43	07:23 14:25-15:35/70	08:14 13:55-14:49/54
18	21:40	20:53	19:41	18:27 07:50-08:15/25	16:20	15:45
19	21:40	05:34 19:56-20:20/24	06:30 18:51-19:10/19	07:25 17:02-17:45/43	07:25 14:25-15:33/68	08:16 13:27-13:44/17
20	21:39	20:51	19:39	18:24 07:52-08:17/25	16:18	15:45
21	21:39	05:36 19:55-20:18/23	06:32 18:48-19:08/20	07:27 17:01-17:44/43	07:27 14:24-15:32/68	08:17 13:26-13:45/19
22	21:38	20:49	19:36	18:22 07:54-08:20/26	16:16	15:44
23	21:38	05:38 19:55-20:17/22	06:34 18:46-19:06/20	07:29 17:00-17:43/43	07:29 14:22-15:29/67	08:18 13:26-13:46/20
24	21:37	20:47	19:34	18:20 07:56-08:21/25	16:14	15:44
25	21:37	05:40 19:53-20:14/21	06:35 18:44-19:03/19	07:30 16:59-17:42/43	07:31 14:20-15:23/63	08:19 13:26-13:47/21
26	21:36	20:45	19:31	18:17 07:58-08:26/28	16:13	15:44
27	21:36	05:41 19:50-20:12/22	06:37 18:43-19:00/17	07:32 16:38-16:55/17 08:00-08:28/28	07:33 14:18-15:22/64	08:20 13:26-13:48/22
28	21:35	20:43	19:29 18:38-18:42/4	18:15 16:59-17:40/41	16:11	15:44
29	21:35	05:43 19:48-20:11/23	06:39 18:35-18:58/23	07:34 16:35-16:58/23 17:28-17:36/8	07:35 14:17-15:21/64	08:21 13:26-13:49/23
30	21:34	20:40	19:26	18:13 16:59-17:26/27 08:02-08:29/27	16:09	15:44
31	21:34	05:45 19:43-20:08/25	06:41 18:33-18:56/23	07:36 16:39-17:25/22	07:37 14:16-15:19/63	08:22 13:27-13:50/23
32	21:33	20:38	19:24	18:10 08:04-08:30/26	16:08	15:44
33	21:33	05:47 19:41-20:06/25	06:43 18:31-18:53/22	07:38 16:31-17:25/54	07:38 14:15-15:17/62	08:23 13:27-13:51/24
34	21:32	20:36	19:21 18:24-18:30/6	18:08 08:06-08:37/31	16:06 13:59-14:10/11	15:44 13:57-14:49/52
35	21:32	05:49 19:40-20:04/24	06:44 18:21-18:50/29	07:40 16:30-17:24/54	07:40 14:15-15:09/54 13:57-14:13/16	08:24 13:28-13:52/24
36	21:31	20:34	19:19	18:06 08:08-08:39/31	16:05 15:10-15:13/3	15:45 13:58-14:49/51
37	21:31	05:50 19:35-20:02/27	06:46 18:19-18:48/29	07:42 16:28-17:23/55	07:42 13:57-15:09/72	08:24 13:28-13:53/25
38	21:29	20:32	19:16	18:03 08:10-08:40/30	16:03	15:45
39	21:29	05:52 19:33-20:00/27	06:48 18:18-18:46/28	07:44 16:28-17:22/54	07:44 13:56-15:09/73	08:25 13:28-13:53/25
40	21:28	20:29	19:14	18:01 08:12-08:41/29	16:02	15:45
41	21:28	05:54 19:30-19:58/28	06:50 18:16-18:42/26	07:46 16:27-17:20/53	07:46 13:55-15:09/74	08:26 13:29-13:54/25
42	21:26	20:27	19:11	17:59 08:14-08:41/27	16:01	15:46
43	21:26	05:56 19:27-19:55/28	06:52 18:16-18:40/24	07:48 16:21-17:02/41 08:16-08:41/25	07:48 13:54-15:08/74	08:26 13:29-13:54/25
44	21:25	20:25	19:09	17:56 17:03-17:18/15	15:59	15:46
45	21:25	05:58 19:26-19:53/27	06:53 18:15-18:38/23	07:50 16:18-17:02/44 08:18-08:41/23	07:50 13:54-15:08/74	08:27 13:30-13:55/25
46	21:24	20:22	19:06	17:54 17:05-17:16/11	15:58	15:47
47	21:24	05:59 19:26-19:51/25	06:55 18:15-18:34/19	07:52 16:16-17:02/46	07:51 13:53-15:07/74	08:27 13:30-13:55/25
48	21:22	20:20	19:04	17:52 08:23-08:40/17	15:57	15:47
49	21:22	06:01 19:25-19:49/24	06:57 18:16-18:33/17	06:54 15:05-16:02/57	07:53 13:53-15:07/74	08:27 13:31-13:55/24
50	21:20	20:18	19:01	16:50 07:23-07:39/16	15:56	15:48
51	21:20	06:03 19:19-19:46/27	06:59 18:15-18:30/15	06:55 15:02-16:01/59	07:55 13:52-15:05/73	08:28 13:32-13:56/24
52	21:19	20:15	18:59	16:48 07:24-07:38/14	15:55	15:48
53	21:19	06:05 19:17-19:44/27	07:01 18:17-18:27/10	06:57 15:00-16:00/60	07:57 13:52-15:04/72	08:28 13:32-13:56/24
54	21:17	20:13	18:56	16:45 07:27-07:38/11	15:53	15:49
55	21:17	06:07 19:16-19:42/26	07:03 18:19-18:25/6	06:59 14:59-16:00/61	07:58 13:53-15:03/70	08:28 13:33-13:56/23
56	21:16	20:11	18:54 07:50-07:58/8	16:43 07:29-07:35/6	15:52	15:50
57	21:16	06:08 19:14-19:39/25	07:04 17:34-17:40/6	07:01 14:58-15:59/61	08:00 13:53-15:01/68	08:28 13:34-13:56/22
58	21:14	20:08	18:51 07:47-08:00/13	16:41	15:51	15:51
59	21:14	06:10 19:11-19:37/26	07:06 17:30-17:43/13	07:03 14:57-15:58/61	08:02 13:53-14:54/61	08:28 13:35-13:56/21
60	21:12	20:06	18:49 07:46-08:01/15	16:39	15:52	15:52
61	21:12	06:12 19:09-19:35/26		07:05 14:56-15:56/60		08:28 13:35-13:55/20
62	21:10	20:04		16:37		15:53
63	21:10	15:4				14:04-14:56/52
64	128	781	383	671	2098	257
65					2065	2213

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
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-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender pro WEA**

Berechnung: GBWEA: 20 - M16

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38 20:03-21:02/59 21:45	05:19 19:44-20:37/53 21:09	06:14 18:32-19:33/61 20:01	07:08 17:33-18:18/45 18:46	07:07 13:52-14:08/16 16:35	08:03 12:12-14:23/131 15:50	
2	04:39 20:02-21:02/60 21:44	05:20 19:41-20:35/54 21:07	06:16 18:30-19:30/60 19:59	07:10 17:33-18:14/41 18:44 17:11-17:13/2	07:09 13:49-14:10/21 16:33	08:05 12:12-14:23/131 15:49	
3	04:40 20:02-21:02/60 21:44	05:22 19:39-20:33/54 21:05	06:17 18:28-19:28/60 19:56	07:12 17:32-18:12/40 18:41 17:04-17:18/14	07:11 13:47-14:12/25 16:31	08:06 12:13-14:23/130 15:48 11:56-12:04/8	
4	04:40 20:01-21:03/62 21:43	05:24 19:36-20:31/55 21:03 19:31-19:35/4	06:21 18:24-19:22/58 19:51	07:14 17:32-18:10/38 18:39 17:01-17:20/19	07:13 13:46-14:15/29 16:29	08:08 12:12-14:23/131 15:48 11:54-12:06/12	
5	04:41 20:01-21:03/62 21:43	05:26 19:27-20:30/63 21:01	06:21 18:24-19:22/58 19:51	07:15 17:59-18:07/8 16:59-17:21/22 18:37 17:32-17:58/26	07:15 13:44-14:16/32 16:27	08:09 12:13-14:23/130 15:47 11:53-12:08/15	
6	04:42 20:01-21:03/62 21:42	05:27 19:25-20:28/63 21:02	06:23 18:21-19:20/59 19:49	07:17 18:00-18:05/5 16:58-17:22/24 18:34 17:32-17:57/25	07:17 13:43-14:17/34 16:25	08:10 12:12-14:22/130 15:46 11:52-12:09/17	
7	04:43 20:00-21:03/63 21:41	05:29 19:23-20:26/63 20:57	06:25 18:20-19:18/58 19:46	07:19 18:01-18:02/1 16:56-17:23/27 18:32 17:33-17:56/23	07:19 13:42-14:18/36 16:23	08:12 12:13-14:23/130 15:46 11:52-12:11/19	
8	04:44 20:00-21:04/64 21:41	05:31 19:22-20:23/61 20:55	06:26 18:18-19:16/58 19:44	07:21 17:34-17:54/20 18:29 16:55-17:24/29	07:21 13:41-14:18/37 16:21	08:13 12:14-12:22/129 15:45 11:51-12:12/21	
9	04:45 20:00-21:04/65 21:40	05:33 19:21-20:21/60 20:53	06:28 18:16-18:59/43 19:41 19:01-19:13/12	07:23 17:35-17:52/17 18:27 16:54-17:24/30	07:23 13:40-14:19/39 16:20	08:14 11:52-13:53/121 15:45 13:54-14:23/29	
10	04:46 19:59-21:04/65 21:39	05:34 19:15-20:19/64 20:51	06:30 18:15-18:58/43 19:39 19:02-19:10/8	07:25 17:38-17:47/9 18:24 16:54-17:24/30	07:25 13:39-14:19/40 16:18	08:16 11:51-13:53/122 15:45 13:54-14:23/29	
11	04:48 19:57-21:03/66 21:38	05:36 19:12-20:18/66 20:49	06:32 18:14-18:57/46 19:36 19:04-19:08/4	07:27 16:53-17:24/31 18:22	07:27 13:21-13:28/7 16:16 13:40-14:21/41	08:17 11:51-13:53/122 15:44 13:55-14:22/27	
12	04:49 19:55-21:02/67 21:37	05:38 19:09-20:16/67 20:47	06:34 18:08-18:58/50 19:34	07:29 16:53-17:24/31 18:20	07:29 13:17-13:32/15 16:14 13:40-14:21/41	08:18 11:51-13:53/122 15:44 13:56-14:22/26	
13	04:50 19:54-21:01/67 21:36	05:40 19:07-20:14/67 20:45	06:35 18:05-18:57/52 19:31	07:30 16:53-17:24/31 18:17	07:31 13:14-13:34/20 16:13 13:39-14:21/42	08:19 11:51-13:54/123 15:44 13:56-14:22/26	
14	04:51 19:53-21:00/67 21:35	05:41 19:05-20:12/67 20:43	06:37 18:03-18:57/54 19:29	07:32 16:53-17:23/30 18:15	07:33 13:12-13:36/24 16:11 13:39-14:22/43	08:20 11:51-13:54/123 13:57-14:22/25 15:44 11:33-11:35/2	
15	04:53 19:52-20:59/67 21:34	05:43 19:02-20:11/69 20:40	06:39 18:02-18:57/55 19:26	07:34 16:53-17:23/30 18:12	07:35 13:11-13:38/27 16:09 13:39-14:22/43	08:21 11:51-13:54/123 13:58-14:22/24 15:44 11:32-11:38/6	
16	04:54 19:52-20:59/67 21:33	05:45 18:59-20:08/69 20:38	06:41 18:01-18:56/55 19:24	07:36 16:53-17:22/29 18:10	07:37 13:10-14:22/72 16:08	08:22 11:51-13:55/124 13:59-14:23/24 15:44 11:31-11:39/8	
17	04:55 19:51-20:57/66 21:32	05:47 18:58-20:06/68 20:36	06:43 18:00-18:53/53 19:21	07:38 16:54-17:21/27 18:08	07:38 13:09-14:22/73 16:06	08:23 11:52-13:55/123 14:00-14:23/23 15:44 11:31-11:41/10	
18	04:57 19:50-20:56/66 21:30	05:49 18:56-20:04/68 20:34	06:44 17:59-18:50/51 19:19	07:40 16:54-17:20/26 18:05	07:40 13:08-14:22/74 16:05	08:24 11:52-13:56/124 14:01-14:23/22 15:45 11:31-11:42/11	
19	04:58 19:49-20:54/65 21:29	05:50 18:54-20:02/68 20:32	06:46 17:59-18:48/49 19:16	07:42 16:55-17:19/24 18:03	07:42 13:08-14:23/75 16:03	08:24 11:53-13:57/124 14:02-14:24/22 15:45 11:32-11:43/11	
20	04:59 19:49-20:54/65 21:28	05:52 18:54-20:00/66 20:29	06:48 17:59-18:44/45 19:14	07:44 16:57-17:17/20 18:01	07:44 13:08-14:24/76 16:02	08:25 11:53-13:57/124 14:02-14:24/22 15:45 11:32-11:43/11	
21	05:01 19:48-20:52/64 21:26	05:54 18:53-19:58/65 20:27	06:50 17:58-18:42/44 19:11	07:46 16:58-17:15/17 17:59	07:46 13:07-14:24/77 16:01	08:26 11:54-13:57/123 14:02-14:25/23 15:46 11:32-11:44/12	
22	05:02 19:49-20:52/63 21:25	05:56 18:52-19:55/63 20:25	06:52 17:57-18:40/43 19:09	07:48 17:01-17:11/10 17:56	07:48 12:48-12:59/11 13:07-14:24/77 15:59 12:22-12:32/10	08:26 11:54-13:57/123 14:02-14:25/23 15:46 11:32-11:44/12	
23	05:04 19:48-20:50/62 21:23	05:58 18:51-19:53/62 20:22	06:53 17:56-18:38/42 19:06	07:50 17:54	07:50 12:45-13:02/17 13:07-14:24/77 15:58 12:19-12:35/16	08:27 11:55-13:59/124 14:04-14:26/22 15:46 11:33-11:45/12	
24	05:06 19:47-20:48/61 21:22	05:59 18:46-19:51/65 20:20	06:55 17:56-18:35/39 19:04	07:52 17:52	07:51 12:44-13:04/20 13:07-14:24/77 15:57 12:17-12:38/21	08:27 11:55-13:59/124 14:04-14:26/22 15:47 11:34-11:45/11	
25	05:07 19:47-20:47/60 21:20	06:01 18:43-19:49/66 20:18	06:57 17:43-18:33/50 19:01	06:53 16:50	07:53 12:42-13:05/23 13:06-14:23/77 15:56 12:15-12:38/23	08:27 11:55-13:59/124 14:04-14:26/22 15:48 11:34-11:45/11	
26	05:09 19:46-20:45/59 21:19	06:03 18:41-19:46/65 20:15	06:59 17:39-18:30/51 18:59	06:55 16:48	07:55 12:41-14:23/102 15:54 12:14-12:40/26	08:28 11:56-13:59/123 14:04-14:27/23 15:48 11:35-11:45/10	
27	05:10 19:47-20:44/57 21:17	06:05 18:39-19:44/65 20:13	07:01 17:37-18:27/50 18:56	06:57 16:45	07:57 12:14-14:23/129 15:53	08:28 11:57-14:01/124 14:05-14:28/23 15:49 11:37-11:46/9	
28	05:12 19:46-20:42/56 21:16	06:07 18:38-19:42/64 20:11	07:03 17:36-18:25/49 18:54	06:59 16:43	07:58 12:13-14:23/130 15:52	08:28 11:58-14:01/123 14:05-14:29/24 15:50 11:38-11:45/7	
29	05:14 19:45-20:41/56 21:14	06:08 18:36-19:39/63 20:08	07:04 17:35-18:23/48 18:51	07:01 16:44	08:00 12:13-14:23/130 15:51	08:28 11:58-14:02/124 14:05-14:30/25 15:51 11:40-11:44/4	
30	05:15 19:44-20:39/55 21:12	06:10 18:35-19:37/62 20:06	07:06 17:34-18:20/46 18:49	07:03 16:39	08:01 12:13-14:24/131 15:51	08:28 11:58-14:01/123 14:05-14:30/25 15:51 11:40-11:44/4	
31	05:17 19:44-20:38/54 21:10	06:12 18:35-19:35/60 20:03		07:05 13:58-14:02/4 16:37		15:52 14:04-14:30/26 15:53 14:04-14:31/27	
	Sonnenscheinstunden Anzahl Minuten mit Schatten	514 1932	461 1969	383 1555	328 805	257 2156	231 4674

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

Tag im Monat	Sonnenaufgang (SS:MM) Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

**SHADOW - Kalender pro WEA**

Berechnung: GBWEA: 21 - M17

**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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28 14:46-15:16/30 15:54	07:57 16:04-16:14/10 16:46 15:50-16:00/10	06:59 06:43 17:43 19:42	05:33 20:39 21:29 21:44	04:42 21:09 21:09 20:01	04:38 21:01 18:46 16:35	04:38 21:01 18:46 16:35	05:19 06:14 07:08 07:07	06:14 15:42-15:46/4 07:08 15:42-15:46/4	07:07 15:42-15:46/4 08:03 14:43-15:13/30	07:07 15:42-15:46/4 08:03 14:43-15:13/30	08:03 14:43-15:13/30 15:50
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 23 - M19

#### 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  
 342 326 396 565 523 523 733 981 1.012 1.213 924 351 7,888  
 Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
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22	08:12 14:21-15:19/58 16:29	07:15 15:33-16:38/65 17:29	06:08 16:46-17:43/57 18:23 06:32-07:02/30	05:53 19:35-19:52/17 20:22	04:55 20:23-20:42/19 21:15	04:34 20:50-21:00/10 21:45	
23	08:11 14:21-15:19/58 16:31	07:13 15:35-16:43/68 17:33	06:05 16:47-17:51/64 18:25 06:29-06:58/29	05:50 19:35-19:54/19 20:24	04:53 20:25-20:44/19 21:17	04:34 20:51-21:01/10 21:46	
24	08:10 14:23-15:20/57 16:34	07:10 15:38-16:48/70 17:33	06:03 16:48-17:54/66 18:27 06:27-06:56/29	05:48 19:36-19:56/20 20:26	04:52 20:25-20:44/19 21:18	04:34 20:51-21:01/10 21:46	
25	08:09 14:23-15:21/58 16:36	07:08 15:38-16:52/74 17:35	06:00 16:50-17:56/66 18:29 06:24-06:52/28	05:46 19:37-19:58/21 20:27	04:50 20:26-20:46/20 21:20	04:33 20:50-21:01/11 21:46	
26	08:07 14:24-15:21/57 16:34	07:06 15:38-16:55/77 17:37	05:58 16:51-17:56/65 18:31 06:24-06:48/24	05:44 19:38-20:00/22 20:29	04:49 20:27-20:47/20 21:21	04:35 20:51-21:02/11 21:46	
27	08:05 14:26-15:22/56 16:36	07:04 15:39-16:56/77 17:39	05:55 16:55-17:58/63 18:33 06:19-06:46/27	05:41 19:41-20:02/21 20:31	04:48 20:28-20:48/20 21:23	04:36 20:50-21:02/12 21:45	
28	08:04 14:27-15:23/56 16:38	07:01 15:40-16:57/77 17:41	05:53 17:08-17:58/50 18:35 06:18-06:45/27	05:39 19:43-20:04/21 20:33	04:47 20:29-20:50/21 21:24	04:36 20:49-21:03/14 21:45	
29	08:02 14:29-15:23/54 16:40		06:50 18:11-19:04/53 19:37 07:16-07:43/27	05:37 19:44-20:05/21 20:35	04:45 20:30-20:51/21 21:26	04:37 20:48-21:02/14 21:45	
30	08:01 14:32-15:23/51 16:42 15:39-15:40/9		06:48 18:12-19:08/56 19:39 07:15-07:42/27	05:35 19:45-20:07/22 20:37	04:44 20:31-20:52/21 21:28	04:37 20:49-21:03/14 21:45	
31	07:59 14:44-15:23/39 14:37-14:39/2 16:44 15:35-15:51/16		06:45 18:12-19:09/57 19:40 07:14-07:40/26		04:43 20:33-20:53/20 21:28		
	Sonnenscheinstunden Anzahl Minuten mit Schatten	248 2017	272 1898	367 2727	421 1080	496 651	513 435

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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
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-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 23 - M19

#### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember	
1	04:38 20:49-21:04/15 21:45	05:19 20:14-20:37/23	06:14 19:13-19:33/20	07:08 16:56-18:08/72	07:07 14:19-14:50/31	08:03 13:32-14:50/78	
2	04:39 20:48-21:04/16 21:44	05:20 20:12-20:35/23 21:07	06:16 19:12-19:30/18 19:59 18:45-19:06/21	07:10 16:55-18:06/71 18:44 07:38-08:06/28	07:09 14:18-14:51/33 16:33 14:57-15:37/40	08:05 13:32-14:49/77 15:49	
3	04:40 20:48-21:04/16 21:44	05:22 20:12-20:33/21 21:05	06:18 19:12-19:28/16 19:56 18:44-19:07/23	07:12 16:53-18:01/68 18:42 07:39-08:05/26	07:11 14:17-14:51/34 16:31 14:57-15:34/37	08:06 14:33-14:49/16 15:48 13:32-14:32/60	
4	04:40 20:48-21:05/17 21:43	05:24 20:10-20:31/21 21:03	06:19 19:13-19:25/12 19:54 18:34-19:07/33	07:14 16:52-17:58/66 18:39 07:41-08:04/23	07:13 14:17-14:53/36 16:29 14:58-15:31/33	08:08 14:34-14:48/14 15:48 13:32-14:31/59	
5	04:41 20:47-21:05/18 21:43	05:26 20:07-20:30/23 21:01	06:21 19:13-19:22/9 07:16-07:21/5 19:51 18:30-19:07/37	07:15 16:51-17:55/64 18:37 07:45-08:03/18	07:15 14:17-14:53/36 16:27 14:59-15:30/31	08:09 14:36-14:47/11 15:47 13:32-14:32/60	
6	04:42 20:46-21:06/20 21:42	05:27 20:05-20:28/23 20:59	06:23 19:15-19:20/5 18:29-19:07/38 19:49 18:18-18:23/5 07:11-07:23/12	07:17 16:47-17:50/63 18:34 07:46-08:01/15	07:17 14:16-14:53/37 16:25 15:00-15:29/29	08:11 14:38-14:45/7 15:46 13:32-14:32/60	
7	04:43 20:45-21:06/21 21:41	05:29 20:03-20:26/23 20:57	06:25 18:13-19:07/54 19:46 07:10-07:24/14	07:19 16:42-17:35/53 07:48-08:00/12 18:32 17:36-17:46/10	07:19 14:16-14:54/38 16:20 15:03-15:25/22	08:12 13:33-14:32/59 15:45	
8	04:44 20:45-21:05/20 21:41	05:31 20:03-20:24/21 20:55	06:27 18:11-19:06/55 19:44 07:09-07:25/16	07:21 16:40-17:35/55 18:29 07:51-07:56/5	07:21 14:15-14:54/39 16:21 15:02-15:27/25	08:13 13:32-14:32/60 15:45	
9	04:45 20:44-21:05/21 21:40	05:33 20:01-20:23/22 20:53	06:28 18:08-19:05/57 19:41 07:07-07:25/18	07:23 16:24-17:35/71 18:27	07:23 14:15-14:54/39 16:20 15:03-15:25/22	08:14 13:33-14:33/60 15:45	
10	04:46 20:44-21:04/20 21:39	05:34 19:58-20:20/22 20:51	06:30 18:06-19:04/58 19:39 07:06-07:28/22	07:25 16:20-17:34/74 18:24	07:25 14:16-14:55/39 16:18 15:05-15:25/20	08:16 13:16-13:21/5 15:45 13:33-14:33/60	
11	04:48 20:42-21:03/21 21:38	05:36 19:57-20:18/21 20:49	06:32 18:05-19:03/58 19:36 07:06-07:31/25	07:27 16:18-17:33/75 18:22	07:27 14:16-14:55/39 14:08-14:12/4 16:16 15:08-15:23/15	08:17 13:14-13:23/9 15:44 13:34-14:33/60	
12	04:49 20:42-21:02/20 21:37	05:38 19:56-20:17/21 20:47	06:34 18:04-19:01/57 19:34 07:06-07:32/26	07:29 16:16-17:32/76 18:20	07:29 14:13-14:55/42 16:14 15:11-15:19/8	08:18 13:13-13:24/11 15:44 13:33-14:33/60	
13	04:50 20:41-21:01/20 21:36	05:40 19:52-20:14/22 20:45	06:35 18:02-18:59/57 19:31 07:05-07:32/27	07:30 16:14-17:31/77 18:17	07:31 14:01-14:55/44 16:13	08:19 13:13-13:28/12 15:44 13:34-14:33/60	
14	04:51 20:39-21:00/21 21:35	05:41 19:51-20:12/21 20:43	06:37 18:02-18:55/53 19:29 07:06-07:33/27	07:32 16:12-17:30/78 18:15	07:33 13:59-14:54/55 16:11	08:20 13:14-13:27/13 15:44 13:35-14:35/60	
15	04:53 20:38-20:59/21 21:34	05:43 19:50-20:11/21 20:40	06:39 18:00-18:48/48 19:26 07:07-07:34/27	07:34 16:11-17:28/77 18:13	07:35 13:58-14:54/56 16:09	08:21 13:12-13:27/15 15:44 13:34-14:34/60	
16	04:54 20:38-20:59/21 21:33	05:45 19:46-20:08/22 20:38	06:41 17:54-18:47/53 07:08-07:35/27 19:24 17:45-17:53/8	07:36 16:10-17:26/76 18:10	07:37 13:57-14:54/57 16:08	08:22 13:13-13:28/15 15:44 13:35-14:34/59	
17	04:55 20:37-20:57/20 21:32	05:47 19:44-20:06/22 20:36	06:43 17:40-18:45/65 19:21 07:11-07:35/24	07:38 16:09-17:23/74 18:08	07:39 13:56-14:54/58 16:06	08:23 13:13-13:29/16 15:44 13:36-14:35/59	
18	04:57 20:36-20:56/20 21:30	05:49 19:43-20:04/21 20:34	06:44 17:38-18:44/66 19:19 07:12-07:38/26	07:40 16:08-17:16/68 18:06	07:40 13:56-14:53/57 16:05	08:24 13:13-13:30/17 15:45 13:36-14:36/60	
19	04:58 20:35-20:54/19 21:29	05:50 19:41-20:02/21 20:32	06:46 17:36-18:42/66 19:16 07:13-07:42/29	07:42 16:06-17:13/67 18:03	07:42 13:56-14:54/58 16:03	08:24 13:14-13:31/17 15:45 13:37-14:36/59	
20	04:59 20:35-20:54/19 21:28	05:52 19:41-20:00/19 20:29	06:48 17:34-18:39/65 19:14 07:15-07:43/28	07:44 16:03-17:04/61 18:01	07:44 13:54-14:54/58 16:02	08:25 13:14-13:31/17 15:45 13:37-14:36/59	
21	05:01 20:33-20:52/19 21:26	05:54 19:41-19:58/17 20:27	06:50 17:32-18:28/56 19:11 07:17-07:47/30	07:46 16:02-17:03/61 17:59	07:46 13:56-14:54/58 16:01	08:26 13:15-13:32/17 15:46 13:38-14:37/59	
22	05:02 20:33-20:52/19 21:25	05:56 19:40-19:55/15 20:25	06:52 17:31-18:28/57 19:09 07:18-07:47/29	07:48 16:00-17:03/63 17:56	07:48 13:55-14:54/59 15:59	08:26 13:15-13:32/17 15:46 13:38-14:37/59	
23	05:04 20:32-20:50/18 21:24	05:58 19:40-19:53/13 20:22	06:53 17:30-18:27/57 19:06 07:20-07:53/33	07:50 15:59-17:02/63 17:54	07:50 13:55-14:54/59 15:58	08:27 13:16-13:33/17 15:47 13:39-14:38/59	
24	05:06 20:31-20:48/17 21:22	05:59 19:33-19:40/7 20:20 19:41-19:51/10	06:55 17:29-18:26/57 19:04 07:22-07:55/33	07:52 15:58-17:01/63 17:52	07:51 13:56-14:53/57 15:57 13:39-14:37/8	08:27 13:16-13:33/17 15:48 13:39-14:38/59	
25	05:07 20:29-20:47/18 21:20	06:01 19:31-19:49/18 20:18	06:57 17:29-18:24/55 19:01 07:24-07:56/32	06:54 14:57-15:59/62 16:50	07:53 13:56-14:53/57 15:56 13:37-13:50/13	08:28 13:16-13:33/17 15:48 13:39-14:38/59	
26	05:09 20:24-20:45/21 21:19	06:03 19:29-19:46/17 20:15 19:20-19:25/5	06:59 17:28-18:21/53 07:27-08:03/36 18:59 17:10-17:17/7	06:55 14:57-15:58/61 16:48	07:55 13:55-14:52/57 15:55 13:35-13:51/16	08:28 13:18-13:34/16 15:48 13:40-14:40/60	
27	05:10 20:23-20:44/21 21:17	06:05 19:17-19:42/25 20:13	07:01 17:04-18:18/74 18:56 07:27-08:04/37	06:57 14:56-15:56/60 16:45 14:21-14:38/7	07:57 13:55-14:52/57 15:53 13:34-13:53/19	08:28 13:18-13:34/16 15:49 13:41-14:40/59	
28	05:12 20:21-20:42/21 21:16	06:07 19:16-19:42/26 20:11	07:03 17:01-18:13/72 18:54 07:29-08:05/36	06:59 14:57-15:55/58 16:43 14:28-14:44/16	07:58 13:56-14:52/56 15:52 13:33-13:54/21	08:28 13:19-13:34/15 15:50 13:41-14:41/60	
29	05:14 20:19-20:41/22 21:14	06:08 19:14-19:39/25 20:08 18:54-19:00/6	07:04 16:59-18:12/73 18:51 07:31-08:05/34	07:01 14:57-15:51/54 16:41 14:25-14:46/21	08:00 13:33-14:51/78 15:51	08:28 13:20-13:34/14 15:51 13:42-14:41/59	
30	05:15 20:16-20:39/23 21:12	06:10 19:13-19:37/24 20:06 18:50-19:03/13	07:06 16:57-18:10/73 18:49 07:33-08:06/33	07:03 14:56-15:42/46 16:39 14:23-14:47/24	08:02 13:33-14:51/78 15:51	08:28 13:21-13:34/13 15:52 13:42-14:42/60	
31	05:17 20:15-20:38/23 21:10	06:12 19:13-19:35/22 20:04 18:48-19:05/17		07:05 14:56-15:40/44 16:37 14:21-14:49/28		08:28 13:22-13:33/11 15:53 13:42-14:42/60	
	Sonnenscheinstunden Anzahl Minuten mit Schatten	515 608	461 693	383 2396	328 2285	257 1934	2246

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 24 - M9

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
	15:54	16:46	17:43	19:42	20:39	21:30	21:45	21:09	20:01	18:47	16:35	15:50
2	08:28	07:55	06:57	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:05
	15:56	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	18:44	16:33	15:49
3	08:28	07:54	06:54	06:38	05:29	04:41	04:40	05:22	06:18	07:12	07:11	08:06
	15:57	16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:56	18:42	16:31	15:48
4	08:28	07:52	06:52	06:36	05:27	04:40	04:41	05:24	06:19	07:14	07:13	08:08
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:48
5	08:27	07:50	06:49	06:33	05:25	04:39	04:41	05:26	06:21	07:15	07:15	08:09
	15:59	16:54	17:51	19:50	20:46	21:34	21:43	21:01	19:51	18:37	16:27	15:47
6	08:27	07:48	06:47	06:31	05:23	04:38	04:42	05:27	06:23	07:17	07:17	08:10
	16:01	16:57	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
7	08:26	07:46	06:45	06:28	05:21	04:37	04:43	05:29	06:25	07:19	07:19	08:12
	16:02	16:59	17:55	19:54	20:50	21:36	21:41	20:57	19:46	18:32	16:23	15:46
8	08:26	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:27	07:21	07:21	08:13
	16:03	17:01	17:57	19:56	20:51	21:37	21:41	20:55	19:44	18:29	16:21	15:46
9	08:25	07:42	06:40	06:23	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14
	16:05	17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
10	08:24	07:41	06:37	06:21	05:15	04:36	04:47	05:34	06:30	07:25	07:25	08:16
	16:06	17:05	18:01	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45
11	08:24	07:39	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17
	16:08	17:07	18:03	20:01	20:57	21:40	21:38	20:49	19:37	18:22	16:16	15:45
12	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:29	07:29	08:18
	16:09	17:09	18:04	20:03	20:59	21:41	21:37	20:47	19:34	18:20	16:14	15:44
13	08:22	07:34	06:30	06:14	05:09	04:34	04:50	05:40	06:36	07:30	07:31	08:19
	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:32	18:17	16:13	15:44
14	08:21	07:32	06:28	06:11	05:08	04:34	04:51	05:42	06:37	07:32	07:33	08:20
	16:13	17:13	18:08	20:07	21:02	21:42	21:35	20:43	19:29	18:15	16:11	15:44
15	08:20	07:30	06:25	06:09	05:06	04:34	04:53	05:43	06:39	07:34	07:35	08:21
	16:14	17:15	18:10	20:09	21:04	21:43	21:34	20:40	19:27	18:13	16:09	15:44
16	08:19	07:28	06:23	06:07	05:04	04:34	04:54	05:45	06:41	07:36	07:37	08:22
	16:16	17:17	18:12	20:11	21:06	21:43	21:33	20:38	19:24	18:10	16:08	15:44
17	08:18	07:26	06:20	06:04	05:02	04:34	04:55	05:47	06:43	07:38	07:38	08:23
	16:18	17:19	18:14	20:12	21:07	21:44	21:32	20:36	19:22	18:08	16:06	15:44
18	08:17	07:24	06:18	06:02	05:01	04:34	04:57	05:49	06:45	07:40	07:40	08:24
	16:20	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:06	16:05	15:45
19	08:16	07:22	06:15	05:59	04:59	04:34	04:58	05:51	06:46	07:42	07:42	08:24
	16:21	17:23	18:18	20:16	21:11	21:45	21:29	20:32	19:16	18:03	16:03	15:45
20	08:15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25
	16:23	17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45
21	08:14	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:26
	16:25	17:27	18:22	20:20	21:14	21:45	21:26	20:27	19:11	17:59	16:01	15:46
22	08:12	07:15	06:08	05:53	04:55	04:34	05:03	05:56	06:52	07:48	07:48	08:26
	16:27	17:29	18:24	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:46
23	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:54	07:50	07:50	08:27
	16:29	17:31	18:25	20:24	21:17	21:46	21:24	20:22	19:06	17:54	15:58	15:47
24	08:10	07:10	06:03	05:48	04:52	04:35	05:06	06:00	06:55	07:52	07:51	08:27
	16:31	17:33	18:27	20:26	21:18	21:46	21:22	20:20	19:04	17:52	15:57	15:47
25	08:08	07:08	06:00	05:46	04:51	04:35	05:07	06:01	06:57	07:54	07:53	08:27
	16:33	17:35	18:29	20:27	21:20	21:46	21:20	20:18	19:01	16:50	15:56	15:48
26	08:07	07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	07:55	07:55	08:28
	16:35	17:37	18:31	20:29	21:21	21:46	21:19	20:15	18:59	16:48	15:55	15:49
27	08:05	07:04	05:55	05:41	04:48	04:36	05:10	06:05	07:01	07:57	07:57	08:28
	16:36	17:39	18:33	20:31	21:23	21:46	21:17	20:13	18:56	16:45	15:54	15:49
28	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:03	07:59	07:58	08:28
	16:38	17:41	18:35	20:33	21:24	21:45	21:16	20:11	18:54	16:43	15:53	15:50
29	08:02		06:50	05:37	04:46	04:37	05:14	06:09	07:04	07:01	08:00	08:28
	16:40		19:37	20:35	21:26	21:45	21:14	20:08	18:51	16:41	15:52	15:51
30	08:01		06:48	05:35	04:44	04:37	05:15	06:10	07:06	07:03	08:02	08:28
	16:42		19:39	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52
31	07:59		06:45		04:43		05:17	06:12		07:05		08:28
	16:44		19:40		21:28		21:10	20:04		16:37		15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	257	231
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:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 25 - M11

#### 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  
342 326 396 565 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03
	15:54	16:46	17:43	19:42	20:39	21:29	21:44	21:09	20:01	18:46	16:35	15:50
2	08:28	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:05
	15:56	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	18:44	16:33	15:49
3	08:28	07:54	06:54	06:38	05:29	04:41	04:40	05:22	06:18	07:12	07:11	08:06
	15:57	16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:56	18:42	16:31	15:48
4	08:27	07:52	06:52	06:35	05:27	04:40	04:41	05:24	06:19	07:14	07:13	08:08
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:48
5	08:27	07:50	06:49	06:33	05:25	04:39	04:41	05:26	06:21	07:15	07:15	08:09
	15:59	16:54	17:51	19:50	20:46	21:34	21:43	21:01	19:51	18:37	16:27	15:47
6	08:27	07:48	06:47	06:31	05:23	04:38	04:42	05:27	06:23	07:17	07:17	08:10
	16:01	16:57	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
7	08:26	07:46	06:45	06:28	05:21	04:37	04:43	05:29	06:25	07:19	07:19	08:12
	16:02	16:59	17:55	19:54	20:50	21:36	21:41	20:57	19:46	18:32	16:23	15:46
8	08:26	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:27	07:21	07:21	08:13
	16:03	17:01	17:57	19:55	20:51	21:37	21:41	20:55	19:44	18:29	16:21	15:46
9	08:25	07:42	06:40	06:23	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14
	16:05	17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45
10	08:24	07:40	06:37	06:21	05:15	04:36	04:47	05:34	06:30	07:25	07:25	08:16
	16:06	17:05	18:01	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45
11	08:24	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17
	16:08	17:07	18:02	20:01	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:45
12	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:29	07:29	08:18
	16:09	17:09	18:04	20:03	20:59	21:41	21:37	20:47	19:34	18:20	16:14	15:44
13	08:22	07:34	06:30	06:14	05:09	04:34	04:50	05:40	06:35	07:30	07:31	08:19
	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44
14	08:21	07:32	06:28	06:11	05:08	04:34	04:51	05:42	06:37	07:32	07:33	08:20
	16:13	17:13	18:08	20:07	21:02	21:42	21:35	20:43	19:29	18:15	16:11	15:44
15	08:20	07:30	06:25	06:09	05:06	04:34	04:53	05:43	06:39	07:34	07:35	08:21
	16:14	17:15	18:10	20:09	21:04	21:43	21:34	20:40	19:26	18:13	16:09	15:44
16	08:19	07:28	06:23	06:07	05:04	04:34	04:54	05:45	06:41	07:36	07:37	08:22
	16:16	17:17	18:12	20:11	21:05	21:43	21:33	20:38	19:24	18:10	16:08	15:44
17	08:18	07:26	06:20	06:04	05:02	04:34	04:55	05:47	06:43	07:38	07:38	08:23
	16:18	17:19	18:14	20:12	21:07	21:44	21:32	20:36	19:21	18:08	16:06	15:44
18	08:17	07:24	06:18	06:02	05:01	04:34	04:57	05:49	06:44	07:40	07:40	08:23
	16:20	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:06	16:05	15:45
19	08:16	07:22	06:15	05:59	04:59	04:34	04:58	05:51	06:46	07:42	07:42	08:24
	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:32	19:16	18:03	16:03	15:45
20	08:15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25
	16:23	17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45
21	08:14	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:25
	16:25	17:27	18:22	20:20	21:14	21:45	21:26	20:27	19:11	17:59	16:01	15:46
22	08:12	07:15	06:08	05:53	04:55	04:34	05:03	05:56	06:52	07:48	07:48	08:26
	16:27	17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:46
23	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:50	07:49	08:26
	16:29	17:31	18:25	20:24	21:17	21:45	21:23	20:22	19:06	17:54	15:58	15:47
24	08:10	07:10	06:03	05:48	04:52	04:35	05:06	06:00	06:55	07:52	07:51	08:27
	16:31	17:33	18:27	20:26	21:18	21:46	21:22	20:20	19:04	17:52	15:57	15:47
25	08:08	07:08	06:00	05:46	04:51	04:35	05:07	06:01	06:57	07:53	07:53	08:27
	16:33	17:35	18:29	20:27	21:20	21:46	21:20	20:18	19:01	16:50	15:56	15:48
26	08:07	07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	07:55	07:55	08:28
	16:35	17:37	18:31	20:29	21:21	21:46	21:19	20:15	18:59	16:48	15:55	15:49
27	08:05	07:04	05:55	05:41	04:48	04:36	05:10	06:05	07:01	07:57	07:56	08:28
	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:54	15:49
28	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:03	07:59	07:58	08:28
	16:38	17:41	18:35	20:33	21:24	21:45	21:16	20:11	18:54	16:43	15:53	15:50
29	08:02	07:00	05:50	05:37	04:46	04:37	05:14	06:09	07:04	07:01	08:00	08:28
	16:40	07:00	19:37	20:35	21:26	21:45	21:14	20:08	18:51	16:41	15:52	15:51
30	08:00	07:00	05:48	05:35	04:44	04:38	05:15	06:10	07:06	07:03	08:01	08:28
	16:42	07:00	19:39	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52
31	07:59	07:00	05:45	05:33	04:43	04:38	05:17	06:12	07:05	07:05	08:00	08:28
	16:44	07:00	19:40	20:38	21:28	21:45	21:10	20:03	18:47	16:37	15:50	15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	258	231
Anzahl Minuten mit Schatten	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
**I17-Wind GmbH & Co. KG**  
Am Westersielzug 11  
DE-25840 Friedrichstadt  
-  
André Gefke / andre.gefke@i17-wind.de  
Berechnet:  
13.06.2019 16:04/3.2.744

### SHADOW - Kalender pro WEA

Berechnung: GBWEA: 26 - M12

#### 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  
342 326 396 565 523 523 733 981 1,012 1,213 924 351 7,888  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

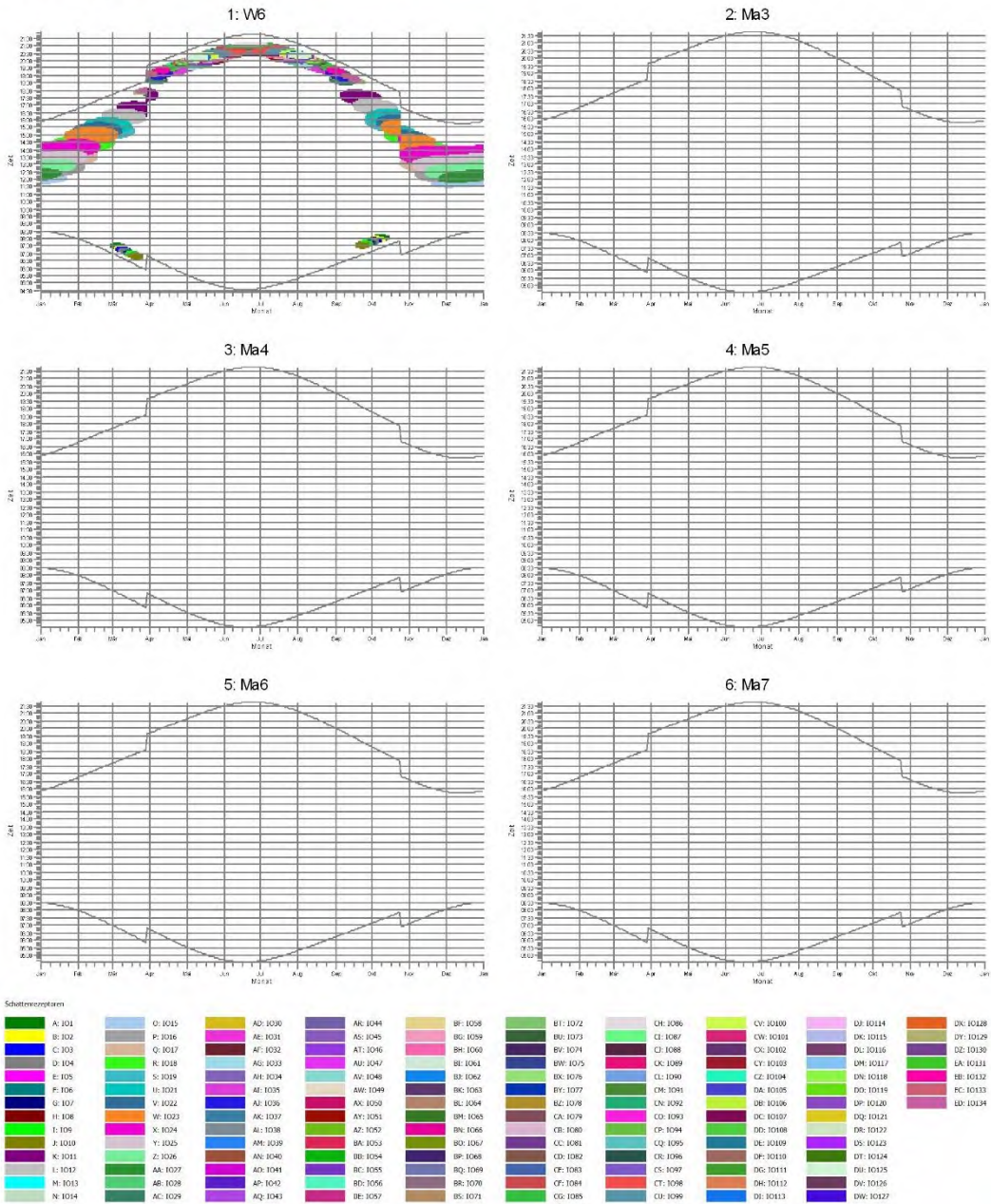
	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28 14:02-15:04/62 15:54	07:57 16:59 17:43 19:42	06:59 06:43 17:43 19:42	06:43 05:33 20:39 21:29	04:42 04:38 21:44 21:08	04:38 05:19 21:44 21:08	05:19 06:14 20:01 18:46	06:14 07:08 16:35	07:08 07:07 16:35	07:07 07:07 16:35	07:07 07:07 16:35	08:03 14:19-14:49/30 15:50 14:10-14:15/5
2	08:28 14:02-15:04/62 15:55	07:55 16:48 17:45 19:44	06:56 06:40 17:45 19:44	06:40 05:31 20:40 21:31	04:41 04:39 21:44 21:07	04:39 05:20 21:44 21:07	05:20 06:16 19:59 18:44	06:16 07:10 16:33	07:10 07:09 16:33	07:09 07:09 16:33	07:09 07:09 16:33	08:05 14:20-14:50/30 15:49 14:09-14:18/9
3	08:28 14:05-15:05/60 15:57	07:54 16:50 17:47 19:46	06:54 06:38 17:47 19:46	06:38 05:29 20:40 21:32	04:40 04:40 21:44 21:05	04:40 05:24 21:44 21:05	05:24 06:19 19:56 18:41	06:19 07:12 16:11	07:12 07:11 16:11	07:11 07:11 16:11	07:11 07:11 16:11	08:06 14:02-14:51/49 15:48
4	08:27 14:11-15:06/55 15:58	07:52 16:52 17:49 19:48	06:52 06:35 17:49 19:48	06:35 05:26 20:44 21:33	04:40 04:40 21:44 21:03	04:40 05:24 21:44 21:03	05:24 06:19 19:54 18:39	06:19 07:14 16:29	07:14 07:13 16:29	07:13 07:13 16:29	07:13 07:13 16:29	08:08 14:00-14:51/51 15:48
5	08:27 14:12-15:06/54 15:59	07:50 16:54 17:51 19:50	06:49 06:33 17:51 19:50	06:33 05:24 20:46 21:34	04:39 04:41 21:43 21:01	04:41 05:26 21:43 21:01	05:26 06:21 19:51 18:37	06:21 07:15 16:27	07:15 07:15 16:27	07:15 07:15 16:27	07:15 07:15 16:27	08:09 14:00-14:52/52 15:47
6	08:27 14:12-15:06/54 16:00	07:48 16:56 17:53 19:52	06:47 06:31 17:53 19:52	06:31 05:22 20:48 21:35	04:38 04:42 21:43 21:02	04:42 05:27 21:43 21:02	05:27 06:23 19:49 18:34	06:23 07:17 16:25	07:17 07:17 16:25	07:17 07:17 16:25	07:17 07:17 16:25	08:10 13:59-14:52/53 15:46
7	08:26 14:14-15:07/53 16:02	07:46 16:58 17:55 19:54	06:45 06:28 17:55 19:54	06:28 05:20 20:50 21:36	04:37 04:43 21:41 21:07	04:43 05:29 21:41 21:07	05:29 06:25 19:46 18:32	06:25 07:19 16:23	07:19 07:19 16:23	07:19 07:19 16:23	07:19 07:19 16:23	08:12 13:59-14:53/54 15:46
8	08:26 14:16-15:07/51 16:03	07:44 17:01 17:57 19:55	06:42 06:26 17:57 19:55	06:26 05:19 20:51 21:37	04:37 04:44 21:41 21:07	04:44 05:31 21:41 21:07	05:31 06:26 19:44 18:29	06:26 07:21 16:21	07:21 07:21 16:21	07:21 07:21 16:21	07:21 07:21 16:21	08:13 13:58-14:53/55 15:45
9	08:25 14:18-15:07/49 16:05	07:42 17:03 17:59 19:57	06:40 06:23 17:59 19:57	06:23 05:17 20:53 21:38	04:36 04:45 21:40 21:06	04:45 05:33 21:40 21:06	05:33 06:28 19:41 18:27	06:28 07:23 16:20	07:23 07:23 16:20	07:23 07:23 16:20	07:23 07:23 16:20	08:14 13:54-14:53/59 15:45
10	08:24 14:37-15:07/30 16:06	07:40 17:05 18:00 19:59	06:37 06:21 18:00 19:59	06:21 05:15 20:55 21:39	04:36 04:46 21:39 20:51	04:46 05:34 20:51 19:39	05:34 06:30 18:24 16:18	06:30 07:25 16:18	07:25 07:25 16:18	07:25 07:25 16:18	07:25 07:25 16:18	08:16 13:53-14:54/61 15:45
11	08:24 14:37-15:07/30 16:08	07:38 17:07 18:02 20:01	06:35 06:18 18:02 20:01	06:18 05:13 20:57 21:40	04:35 04:48 21:38 20:49	04:48 05:36 20:49 19:36	05:36 06:32 18:22 16:16	06:32 07:27 16:16	07:27 07:27 16:16	07:27 07:27 16:16	07:27 07:27 16:16	08:18 13:51-14:54/63 15:44
12	08:23 14:38-15:08/30 16:09	07:36 17:09 18:04 20:03	06:32 06:16 18:04 20:03	06:16 05:11 20:58 21:41	04:35 04:49 21:37 20:47	04:49 05:38 20:47 19:34	05:38 06:34 18:20 16:14	06:34 07:28 16:14	07:28 07:28 16:14	07:28 07:28 16:14	07:28 07:28 16:14	08:19 13:51-14:54/63 15:44
13	08:22 14:39-15:08/29 16:11	07:34 17:11 18:06 20:05	06:30 06:14 18:06 20:05	06:14 05:09 21:00 21:41	04:34 04:50 21:36 20:45	04:50 05:40 21:36 20:45	05:40 06:35 19:31 18:17	06:35 07:30 16:13	07:30 07:30 16:13	07:30 07:30 16:13	07:30 07:30 16:13	08:20 13:51-14:55/64 15:44
14	08:21 14:39-15:08/29 16:13	07:32 17:13 18:08 20:07	06:27 06:11 18:08 20:07	06:11 05:07 21:02 21:42	04:34 04:51 21:35 20:43	04:51 05:41 21:35 20:43	05:41 06:37 19:29 18:15	06:37 07:32 16:11	07:32 07:32 16:11	07:32 07:32 16:11	07:32 07:32 16:11	08:21 13:51-14:55/64 15:44
15	08:20 14:40-15:08/28 16:14	07:30 17:15 18:10 20:09	06:25 06:09 18:10 20:09	06:09 05:06 21:04 21:43	04:34 04:53 21:34 20:40	04:53 05:43 21:34 20:40	05:43 06:39 19:26 18:12	06:39 07:34 16:09	07:34 07:34 16:09	07:34 07:34 16:09	07:34 07:34 16:09	08:21 13:51-14:55/64 15:44
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Projekt:  
**180413\_Miltzow\_LAI\_Antrag III - VII**

Lizenzierter Anwender:  
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 Am Westersielzug 11  
 DE-25840 Friedrichstadt  
 -  
 André Gefke / andre.gefke@i17-wind.de  
 Berechnet:  
 13.06.2019 16:04/3.2.744

### SHADOW - Grafischer Kalender pro WEA

Berechnung: GB



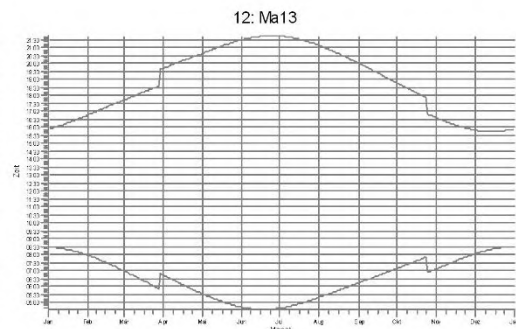
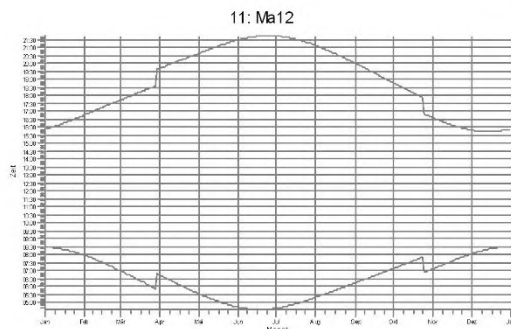
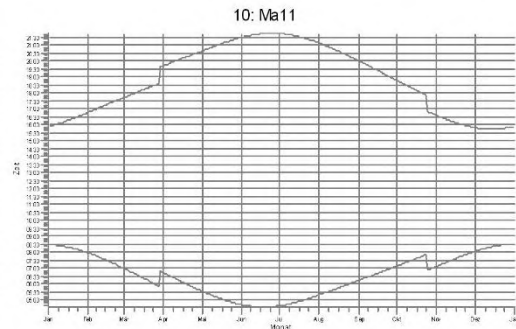
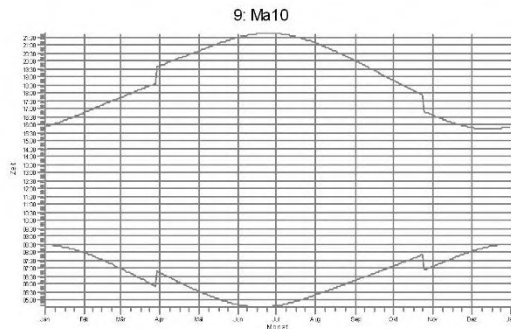
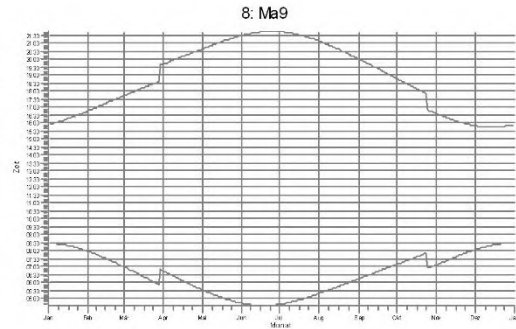
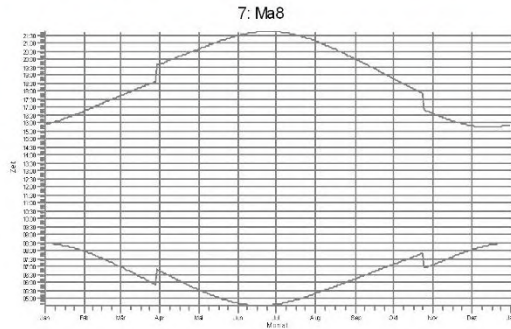


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 Berechnet:  
 13.06.2019 16:04/3.2.744

**SHADOW - Grafischer Kalender pro WEA**

Berechnung: GB



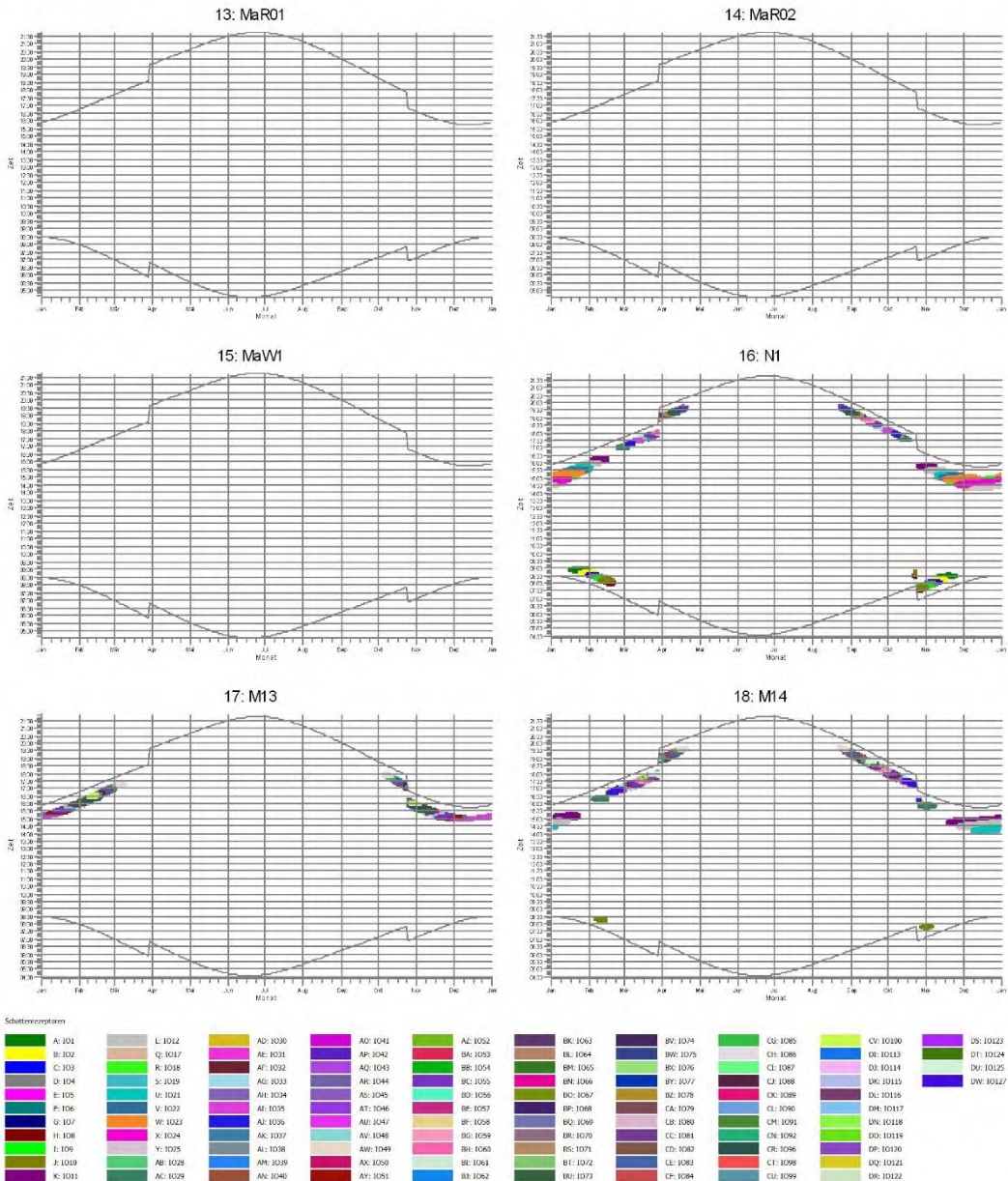
Schattensystem

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 Berechnet:  
 13.06.2019 16:04/3.2.744

**SHADOW - Grafischer Kalender pro WEA**

Berechnung: GB



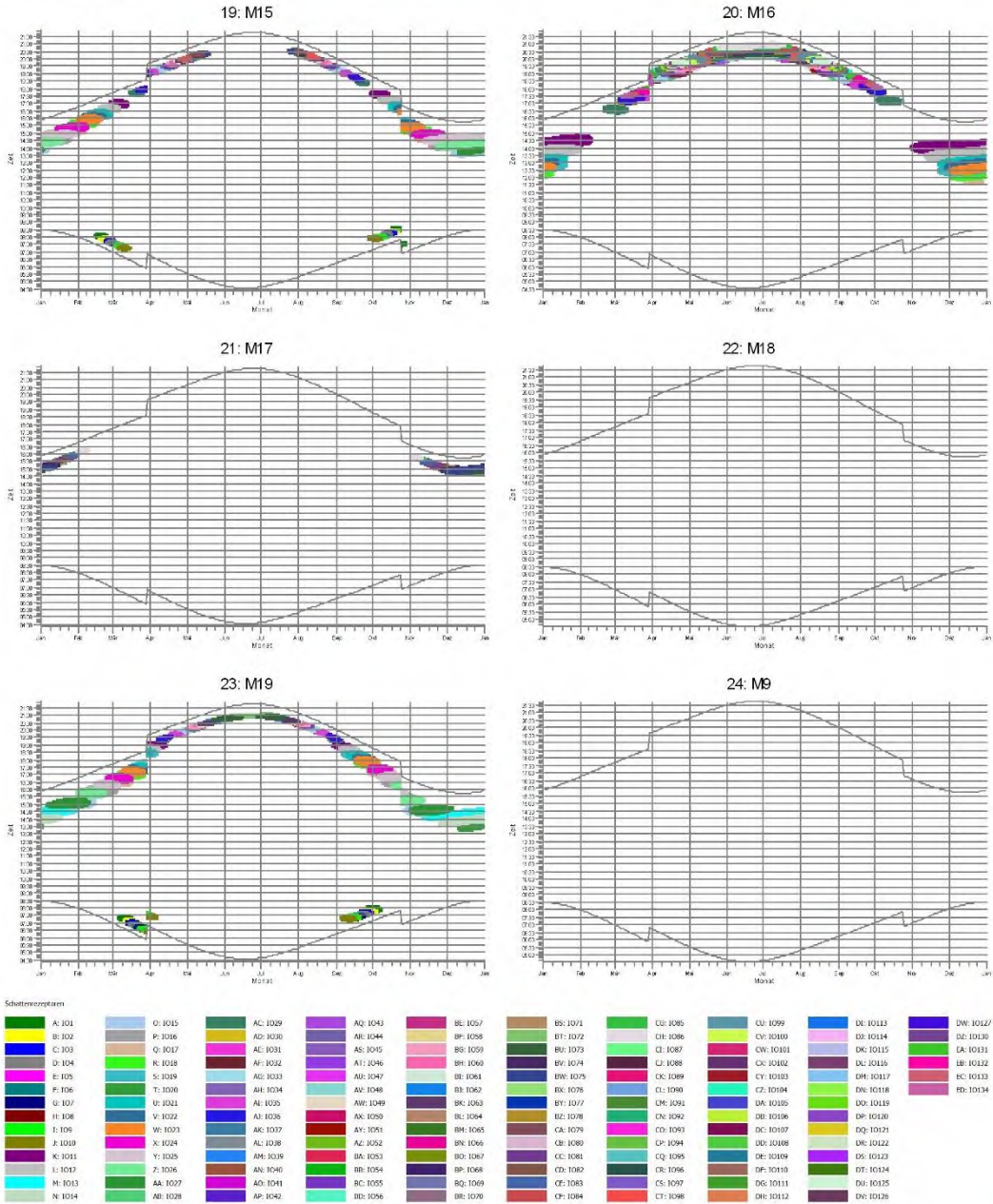
Projekt:  
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13.06.2019 16:04/3.2.744

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Berechnung: GB

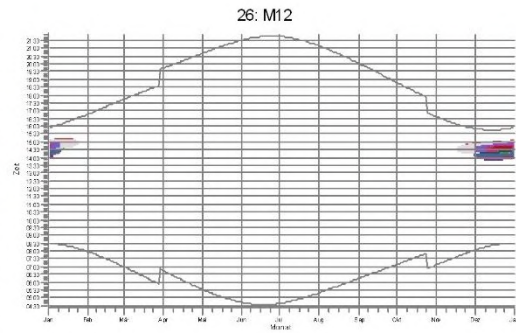
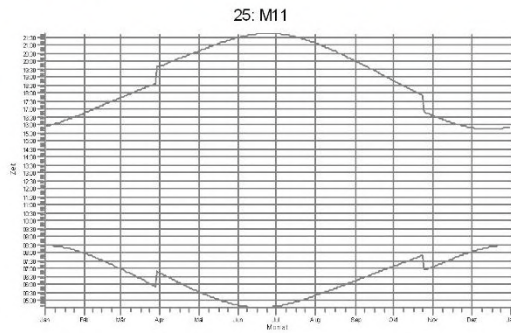


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### SHADOW - Grafischer Kalender pro WEA

Berechnung: GB



Schattenspektren

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BD: 1077	CC: 1081	CF: 1084	CK: 1089	CN: 1092	CQ: 1095	CW: 10101	
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