



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

Bericht Nr.: I17-SCHATTEN-2014-18 Rev.02

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

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Haftungsausschluss

Die vorliegende Revision 02 des Schattenwurfimmissionsgutachtens für den Standort Miltzow wurde von der W.I.N.D. GmbH im September 2015 bei der I17-Wind GmbH & Co. KG & 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.

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

Revisionsnummer	Revisionsdatum	Änderung	Bearbeiter
0	06.06.2014	Erstellung Bericht: I17-SCHATTEN-2014-18	Kebbel
1	29.07.2015	Änderung des Anlagentyps auf V112-3.3MW mit 119m Nabenhöhe	Kebbel
2	13.10.2015	Anpassung der Vorbelastung	Gefke

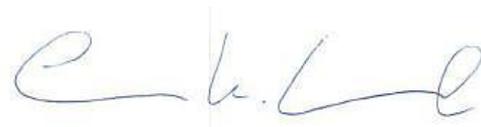
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1 Aufgabenstellung

Der Auftraggeber plant die Errichtung von einer Windenergieanlage des Typs Vestas V112-3.3/3.45 MW mit einer Nabenhöhe von 119 Metern im Windpark Miltzow. Der Windpark liegt ca. 15 km südöstlich der Stadt Stralsund in der Gemeinde Sundhagen in Mecklenburg-Vorpommern. Für das Genehmigungsverfahren nach dem BImSchG [2] ist der Nachweis der Einhaltung der gesetzlichen Richtwerte für die Schattenwurfimmissionen zu führen. Die Berechnungen sollen Auskunft darüber geben, ob schädliche Umwelteinwirkungen durch Schattenwurf von der geplanten Anlage ausgehen können.

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

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 in der Höhe von 10m bis 30m über NN.

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.

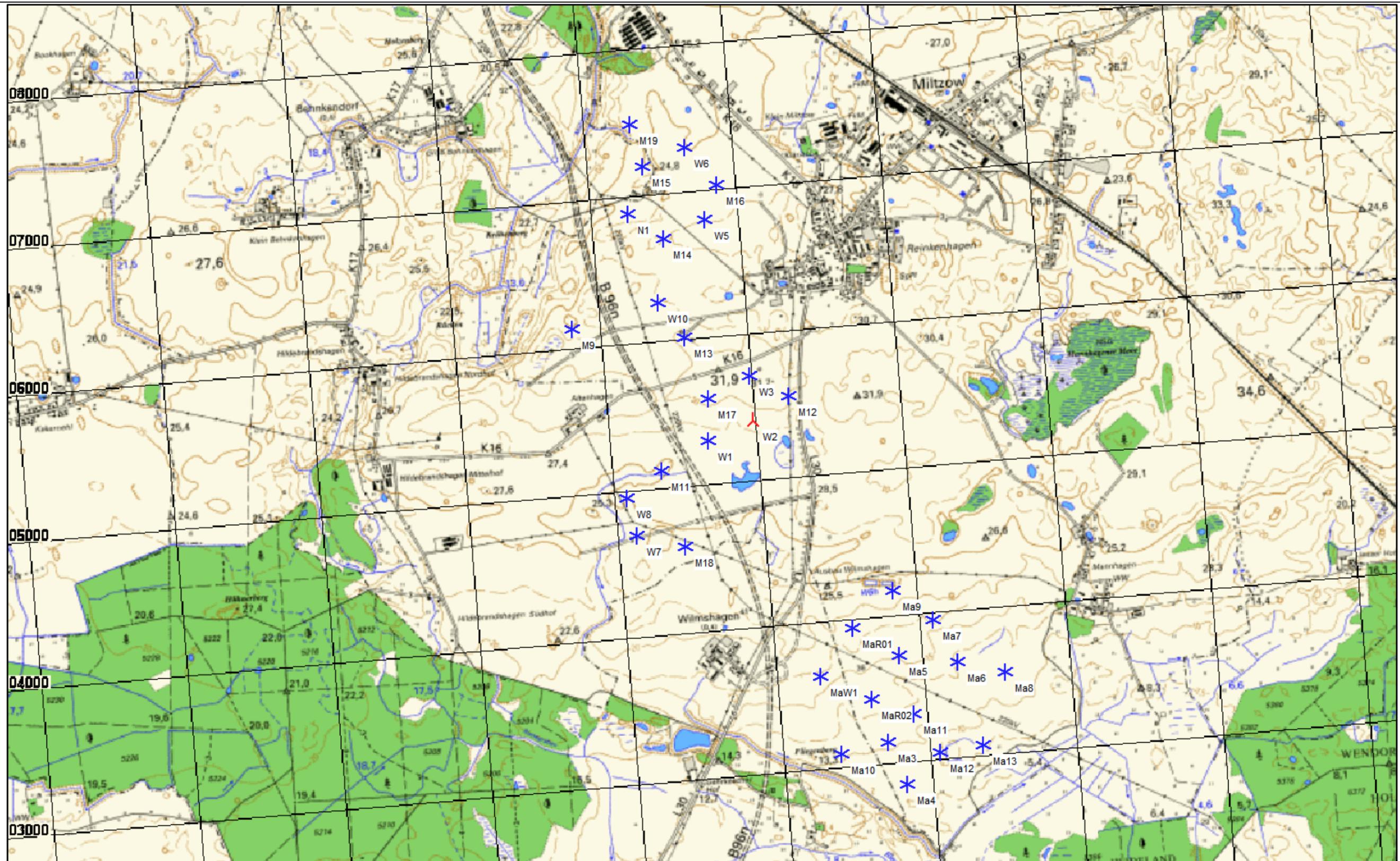


Abbildung 2.1: WEA Standorte
 Blaue Sterne: Bestandsanlagen bzw. im Genehmigungsverfahren befindliche WEA; Rote(s) Kreuz(e): Neu geplante WEA; Kartenmaterial [3]

3 Beurteilungsgrundlagen

3.1 Berechnungs- und Beurteilungsverfahren

Die hier zu untersuchenden Immissionen durch direkten Schattenwurf des Rotors können bei drehendem Rotor störend wirken. Aus der Anzahl der Rotorblätter und der Drehzahl des Rotors ergibt sich die jeweilige Frequenz mit der wechselnde Lichtverhältnisse im Schattenbereich auftreten können. Bei den gegenwärtigen Anlagengrößen handelt es sich um niedrige Frequenzen im Bereich von ca. 0.5 bis 3 Hz. Die Bund-Länder-Arbeitsgemeinschaft für Immissionsschutz (LAI) [1] hat die federführend vom staatlichen Umweltamt Schleswig unter Mitarbeit von Fachleuten, Gutachtern, Gewerbeaufsichtsämtern 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 Anhaltswerte:

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

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

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

4 Beschreibung der geplanten Windenergieanlage

4.1 Anlagenbeschreibung

Der Auftraggeber plant am Standort Miltzow die Errichtung und den Betrieb von einer Windenergieanlage des Herstellers Vestas vom Typ V112-3.3/3.45MW auf 119m Nabenhöhe. Nachfolgend werden die Eckdaten und die Koordinaten der berücksichtigten Windenergieanlagen zusammengefasst.

Hersteller:	Vestas
Anlagentyp:	V112-3.3/3.45MW
Nabenhöhe:	119 m
Rotordurchmesser:	112 m
Nennleistung:	3.300 kW bzw. 3.450 kW
Drehzahlbereich:	6.2 – 17.7 U/min
Maximale Blatttiefe:	4.00m
Blatttiefe bei 90% Radius:	1.03m

4.2 Position der geplanten Windenergieanlage

Tabelle 4.1 ist die Position und der Anlagentyp mit Nabenhöhe der geplanten Windenergieanlage am Standort Miltzow zu entnehmen.

Nr.	Typ	Bez.	Rotor- durchmesser [m]	Naben- höhe [m]	Koordinaten UTM ETRS Zone 33 Ost	Koordinaten UTM ETRS Zone 33 Nord	Höhe über NN [m]
1	Vestas V112- 3.3/3.45MW	W2	112	119	3380985	6005403	25

Tabelle 4.1: Position der geplanten WEA

4.3 Vorbelastung

Am Standort Miltzow sind derzeit 32 Windenergieanlagen in Betrieb, genehmigt oder geplant, welche als Vorbelastung berücksichtigt werden müssen. In Tabelle 4.2 sind die Windenergieanlagen mit Typ, Nabenhöhe und Position aufgeführt.

Nr.	Typ	Bez.	Rotor-durch-messer [m]	Naben-höhe [m]	Koordinaten UTM ETRS Zone 33 Ost	Koordinaten UTM ETRS Zone 33 Nord	Höhe über NN [m]
1	V80-2.0MW	Ma3	80	78.0	3381716	6003135	10
2	V80-2.0MW	Ma4	80	78.0	3381825	6002839	10
3	V80-2.0MW	Ma5	80	78.0	3381841	6003718	13
4	V80-2.0MW	Ma6	80	78.0	3382234	6003642	10
5	V80-2.0MW	Ma7	80	78.0	3382091	6003945	16
6	V80-2.0MW	Ma8	80	78.0	3382555	6003551	10
7	V90-2.0MW	Ma9	90	105.0	3381835	6004165	20
8	GE 1.5sl	Ma10	77	100.0	3381393	6003081	10
9	V112-3.0MW	Ma11	112	94.0	3381906	6003313	10
10	V112-3.0MW	Ma12	112	119.0	3382068	6003040	10
11	V112-3.0MW	Ma13	112	119.0	3382362	6003062	10
12	V112-3.3MW	MaR01	112	140.0	3381539	6003932	18
13	V112-3.3MW	MaR02	112	140.0	3381628	6003435	10
14	V126-3.3MW	MaW1	126	137.0	3381299	6003623	14
15	V90-2.0MW	N1	90	105.0	3380256	6006880	22
16	V90-2.0MW	M13	90	105.0	3380570	6006010	30
17	V90-2.0MW	M14	90	105.0	3380480	6006690	24
18	V90-2.0MW	M15	90	105.0	3380381	6007196	22
19	V90-2.0MW	M16	90	105.0	3380876	6007030	25
20	V90-2.0MW	M17	90	105.0	3380692	6005580	27
21	V90-2.0MW	M18	90	105.0	3380456	6004584	21
22	V90-2.0MW	M19	90	105.0	3380322	6007487	20
23	V112-3.0MW	M9	112	119.0	3379812	6006127	23
24	V112-3.3MW	M11	112	119.0	3380338	6005115	26
25	V112-3.3MW	M12	112	94.0	3381244	6005548	25
26	V112-3.3/3.45MW	W1	112	140	3380673	6005294	25
27	V112-3.3/3.45MW	W6	112	119	3380681	6007305	23
28	V112-3.3/3.45MW	W3	112	119	3380987	6005709	27
29	V112-3.3/3.45MW	W5	112	119	3380771	6006801	25
30	V112-3.3/3.45MW	W10	112	119	3380408	6006259	26
31	V112-3.3/3.45MW	W7	112	140	3380134	6004688	140
32	V112-3.3/3.45MW	W8	112	140	3380083	6004945	140

Tabelle 4.2: Positionen der Bestandsanlagen am Standort

5 Einwirkungsbereiche der Windenergieanlage und Immissionspunkte

Als Immissionsorte für die Schattenwurfprognose wurden die nächstgelegenen Gebäude berücksichtigt. Die Auswahl der Immissionsorte wurde anhand einer Standortbesichtigung vom 10.02.2014, sowie der vorliegenden Dokumentation vorgenommen. Bei der Standortbesichtigung wurde die bestehende Wohnbebauung mit Angaben aus dem Kartenmaterial abgeglichen und Abweichungen dokumentiert und korrigiert. Laut den WEA-Schattenwurf-Hinweisen des Länderausschusses für Immissionsschutz (LAI) [1] sind maßgebliche Immissionsorte u.a.:

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

Die nächstgelegene Bebauung, welche diese Kriterien erfüllt, ist die Ortschaft Reinkenhagen nordöstlich der geplanten Anlage, sowie die Wohnbebauung in Altenhagen westlich der geplanten Anlage (siehe Abbildung 5.1). Im Anschluss wurden nur die Immissionsorte berücksichtigt, die innerhalb der Schattenwurf-Isolinie liegen (Siehe Tabelle 5.1).

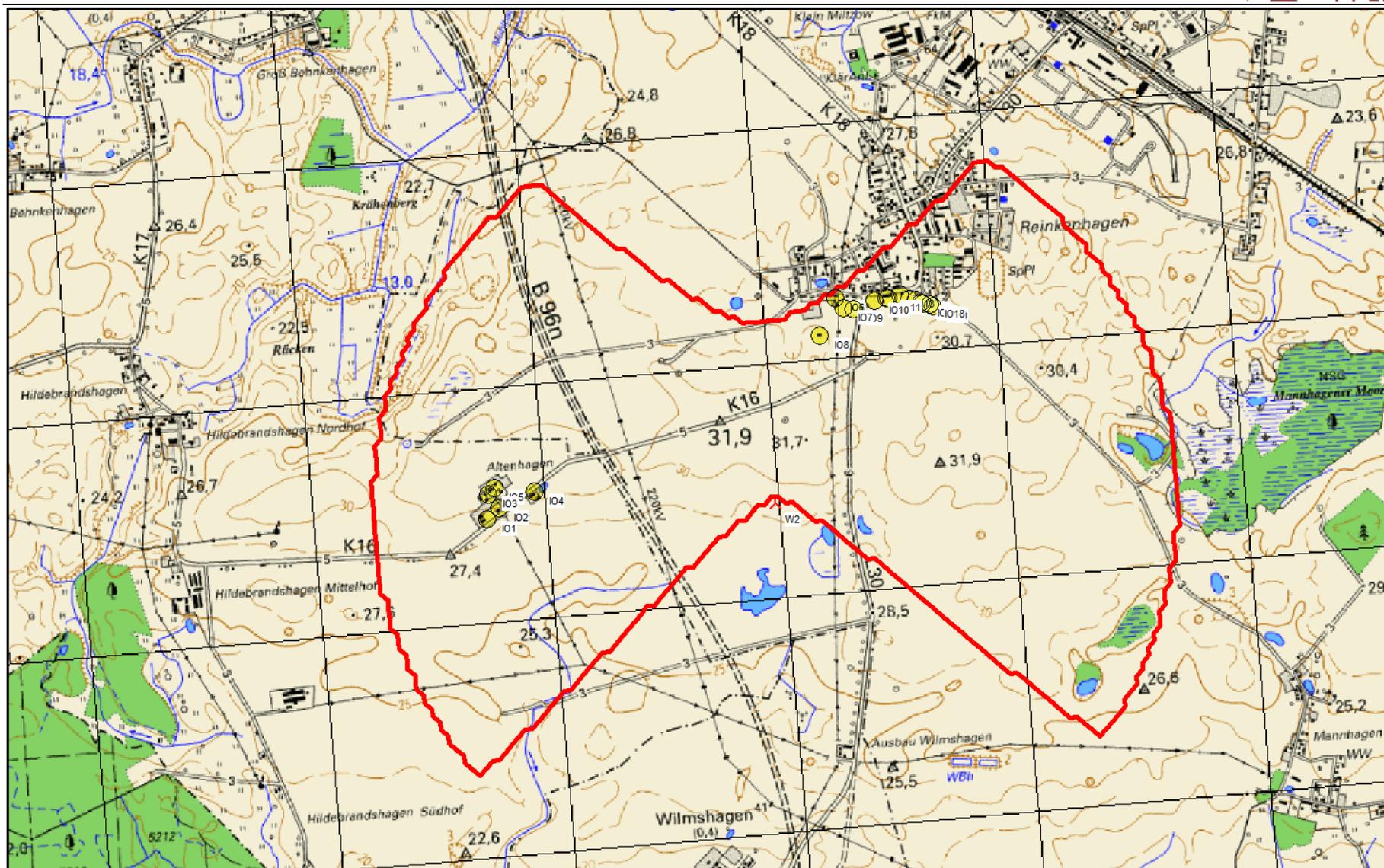


Abbildung 5.1: Einwirkungsbereich der geplanten WEA

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

Nr.	Immissionspunkte	Koordinaten UTM ETRS Zone 33 Ost	Koordinaten UTM ETRS Zone 33 Nord	Höhe über NN [m]
IO1	Altenhagen 1	3379744	6005439	30
IO2	Altenhagen 2	3379799	6005479	30
IO3	Altenhagen 6	3379757	6005542	30
IO4	Altenhagen 3	3379957	6005537	30
IO5	Altenhagen 4	3379788	6005568	30
IO6	Alte Dorfstr. 5, Reinkenhagen	3381318	6006250	29
IO7	Alte Dorfstr. 4, Reinkenhagen	3381348	6006206	28
IO8	Hauptstr. 1, Reinkenhagen	3381236	6006098	28
IO9	Hauptstr. 2, Reinkenhagen	3381392	6006197	28
IO10	Hauptstr. 59, Reinkenhagen	3381483	6006225	28
IO11	Hauptstr. 58, Reinkenhagen	3381534	6006232	29
IO12	Hauptstr. 57, Reinkenhagen	3381543	6006233	29
IO13	Hauptstr. 56, Reinkenhagen	3381596	6006242	29
IO14	Hauptstr. 55a, Reinkenhagen	3381632	6006222	29
IO15	Mannhäger Straße 9, Reinkenhagen	3381666	6006214	29
IO16	Mannhäger Straße 8, Reinkenhagen	3381682	6006201	29
IO17	Mannhäger Straße 5, Reinkenhagen	3381690	6006198	29
IO18	Mannhäger Straße 4, Reinkenhagen	3381722	6006190	29
IO19	Mannhäger Straße 3, Reinkenhagen	3381731	6006181	29

Tabelle 5.1: Immissionsorte

6 Rechenergebnisse und Beurteilungen

In den nachfolgenden Tabellen sind die Ergebnisse der Analysen sowohl für die Vorbelastung als auch Zusatz- und Gesamtbelastung der im Einwirkungsbereich befindlichen Immissionsorte dargestellt. Überschreitungen der Grenzwerte sind **fett** gekennzeichnet. Im Anhang befinden sich die Ausdrücke der Berechnung der Vor-, Zusatz- und Gesamtbelastung.

Vorbelastung					
Nr.	Immissionspunkte	Astron. max. mögl. Beschattungsdauer			Meteorologisch wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Anzahl der Tage mit Schatten pro Jahr	Max. Schattendauer, in Std/ Tag	Std. / Jahr
IO1	Altenhagen 1	<u>152:37</u>	280	<u>01:08</u>	<u>22:23</u>
IO2	Altenhagen 2	<u>154:48</u>	271	<u>01:06</u>	<u>22:06</u>
IO3	Altenhagen 6	<u>148:37</u>	290	<u>01:04</u>	<u>22:48</u>
IO4	Altenhagen 3	<u>144:46</u>	240	<u>01:04</u>	<u>21:04</u>
IO5	Altenhagen 4	<u>141:27</u>	283	<u>01:00</u>	<u>22:13</u>
IO6	Alte Dorfstr. 5, Reinkenhagen	<u>141:49</u>	237	<u>01:10</u>	<u>22:13</u>
IO7	Alte Dorfstr. 4, Reinkenhagen	<u>141:23</u>	247	<u>01:08</u>	<u>22:36</u>
IO8	Hauptstr. 1, Reinkenhagen	<u>208:51</u>	241	<u>01:47</u>	<u>29:22</u>
IO9	Hauptstr. 2, Reinkenhagen	<u>128:26</u>	238	<u>01:06</u>	<u>20:37</u>
IO10	Hauptstr. 59, Reinkenhagen	<u>104:43</u>	223	<u>00:58</u>	<u>16:36</u>
IO11	Hauptstr. 58, Reinkenhagen	<u>104:57</u>	242	<u>00:56</u>	<u>17:44</u>
IO12	Hauptstr. 57, Reinkenhagen	<u>104:55</u>	247	<u>00:55</u>	<u>17:50</u>
IO13	Hauptstr. 56, Reinkenhagen	<u>108:03</u>	259	<u>00:50</u>	<u>19:07</u>
IO14	Hauptstr. 55a, Reinkenhagen	<u>107:32</u>	258	<u>00:46</u>	<u>18:35</u>
IO15	Mannhäger Straße 9, Reinkenhagen	<u>104:57</u>	262	<u>00:43</u>	<u>18:27</u>
IO16	Mannhäger Straße 8, Reinkenhagen	<u>105:26</u>	264	<u>00:41</u>	<u>18:27</u>
IO17	Mannhäger Straße 5, Reinkenhagen	<u>105:28</u>	266	<u>00:40</u>	<u>18:29</u>
IO18	Mannhäger Straße 4, Reinkenhagen	<u>105:20</u>	270	<u>00:38</u>	<u>18:28</u>
IO19	Mannhäger Straße 3, Reinkenhagen	<u>104:59</u>	269	<u>00:38</u>	<u>18:22</u>

Tabelle 6.1: Analyseergebnisse Vorbelastung

Zusatzbelastung					
Nr.	Immissionspunkte	Astron. max. mögl. Beschattungsdauer			Meteorologisch wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Anzahl der Tage mit Schatten pro Jahr	Max. Schattendauer, in Std/ Tag	Std. / Jahr
IO1	Altenhagen 1	06:56	26	00:21	01:40
IO2	Altenhagen 2	07:38	28	00:22	01:46
IO3	Altenhagen 6	06:52	27	00:21	01:32
IO4	Altenhagen 3	10:08	32	00:25	02:16
IO5	Altenhagen 4	07:17	27	00:21	01:37
IO6	Alte Dorfstr. 5, Reinkenhagen	03:51	20	00:14	00:19
IO7	Alte Dorfstr. 4, Reinkenhagen	13:15	38	00:26	01:10
IO8	Hauptstr. 1, Reinkenhagen	23:42	50	00:35	02:07
IO9	Hauptstr. 2, Reinkenhagen	18:02	46	00:29	01:39
IO10	Hauptstr. 59, Reinkenhagen	20:29	52	00:29	01:57
IO11	Hauptstr. 58, Reinkenhagen	22:17	56	00:28	02:11
IO12	Hauptstr. 57, Reinkenhagen	22:43	56	00:28	02:14
IO13	Hauptstr. 56, Reinkenhagen	23:47	60	00:27	02:23
IO14	Hauptstr. 55a, Reinkenhagen	26:23	68	00:27	02:44
IO15	Mannhäger Straße 9, Reinkenhagen	26:43	72	00:26	02:49
IO16	Mannhäger Straße 8, Reinkenhagen	26:35	74	00:26	02:51
IO17	Mannhäger Straße 5, Reinkenhagen	26:26	76	00:26	02:51
IO18	Mannhäger Straße 4, Reinkenhagen	23:04	80	00:25	02:35
IO19	Mannhäger Straße 3, Reinkenhagen	20:41	66	00:26	02:23

Tabelle 6.2: Analyseergebnisse Zusatzbelastung

Gesamtbelastung					
Nr.	Immissionspunkte	Astron. max. mögl. Beschattungsdauer			Meteorologisch wahrscheinliche Beschattungsdauer
		Gesamtdauer in Std/ Jahr	Anzahl der Tage mit Schatten pro Jahr	Max. Schattendauer, in Std/ Tag	Std. / Jahr
IO1	Altenhagen 1	<u>159:33</u>	280	<u>01:08</u>	<u>23:59</u>
IO2	Altenhagen 2	<u>162:26</u>	271	<u>01:06</u>	<u>23:48</u>
IO3	Altenhagen 6	<u>155:29</u>	291	<u>01:04</u>	<u>24:18</u>
IO4	Altenhagen 3	<u>154:54</u>	240	<u>01:04</u>	<u>23:14</u>
IO5	Altenhagen 4	<u>148:44</u>	286	<u>01:00</u>	<u>23:47</u>
IO6	Alte Dorfstr. 5, Reinkenhagen	<u>145:40</u>	237	<u>01:19</u>	<u>22:32</u>
IO7	Alte Dorfstr. 4, Reinkenhagen	<u>154:38</u>	247	<u>01:14</u>	<u>23:44</u>
IO8	Hauptstr. 1, Reinkenhagen	<u>232:33</u>	241	<u>02:13</u>	<u>31:24</u>
IO9	Hauptstr. 2, Reinkenhagen	<u>146:28</u>	238	<u>01:09</u>	<u>22:13</u>
IO10	Hauptstr. 59, Reinkenhagen	<u>125:12</u>	223	<u>01:02</u>	<u>18:30</u>
IO11	Hauptstr. 58, Reinkenhagen	<u>127:14</u>	242	<u>00:58</u>	<u>19:52</u>
IO12	Hauptstr. 57, Reinkenhagen	<u>127:38</u>	247	<u>00:59</u>	<u>20:01</u>
IO13	Hauptstr. 56, Reinkenhagen	<u>131:50</u>	259	<u>00:57</u>	<u>21:28</u>
IO14	Hauptstr. 55a, Reinkenhagen	<u>133:55</u>	258	<u>00:59</u>	<u>21:16</u>
IO15	Mannhäger Straße 9, Reinkenhagen	<u>131:40</u>	262	<u>00:58</u>	<u>21:13</u>
IO16	Mannhäger Straße 8, Reinkenhagen	<u>132:01</u>	264	<u>01:00</u>	<u>21:15</u>
IO17	Mannhäger Straße 5, Reinkenhagen	<u>131:54</u>	266	<u>01:00</u>	<u>21:17</u>
IO18	Mannhäger Straße 4, Reinkenhagen	<u>127:37</u>	270	<u>01:01</u>	<u>20:55</u>
IO19	Mannhäger Straße 3, Reinkenhagen	<u>124:19</u>	269	<u>01:02</u>	<u>20:33</u>

Tabelle 6.3: Analyseergebnisse Gesamtbelastung

Der Empfehlungswert für die astronomisch maximal mögliche Schattenwurfdauer von 30 Stunden pro Jahr oder 30 Minuten pro Tag der Gesamtbelastung wird an allen Immissionspunkten überschritten. Dasselbe gilt für die meteorologisch wahrscheinliche Beschattungsdauer in Stunden / Jahr.

7 Zusammenfassung

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

Die durchgeführten Berechnungen kommen zu dem Ergebnis, dass bei der Gesamtbelastung der Empfehlungswert für die astronomisch maximal mögliche Schattenwurfdauer von 30 Stunden pro Jahr oder 30 Minuten pro Tag an allen Immissionspunkten überschritten wird.

Auf Grund der bestehenden Vorbelastung und der dadurch bereits ausgeschöpften Immissionsrichtwerte darf die geplante Anlage W2 an keinem Immissionspunkt einen zusätzlichen Beitrag zur Schattenwurfbelastung verursachen.

An den Immissionspunkten sollte die Rotorschattenwurfdauer durch den Einsatz eines Schattenwurfabschaltmoduls begrenzt werden. Dieses Modul schaltet die WEA ab, wenn an den relevanten Immissionsorten die vorgegebenen Empfehlungswerte erreicht sind. Da der Richtwert von 30 Stunden pro Kalenderjahr auf Grundlage der astronomisch möglichen Beschattung entwickelt wurde, ist für die Schattenwurfabschaltautomatik der Wert für die tatsächliche, meteorologische Schattendauer auf 8 Stunden pro Kalenderjahr zu berücksichtigen. Ferner ist der Tatsache Rechnung zu tragen, dass sich die Zeitpunkte für den Schattenwurf jedes Jahr leicht verschieben. Hier muss die Abschaltung auf dem realen Sonnenstand basieren.

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

8 Abkürzungs- und Symbolverzeichnis

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

9 Literaturverzeichnis

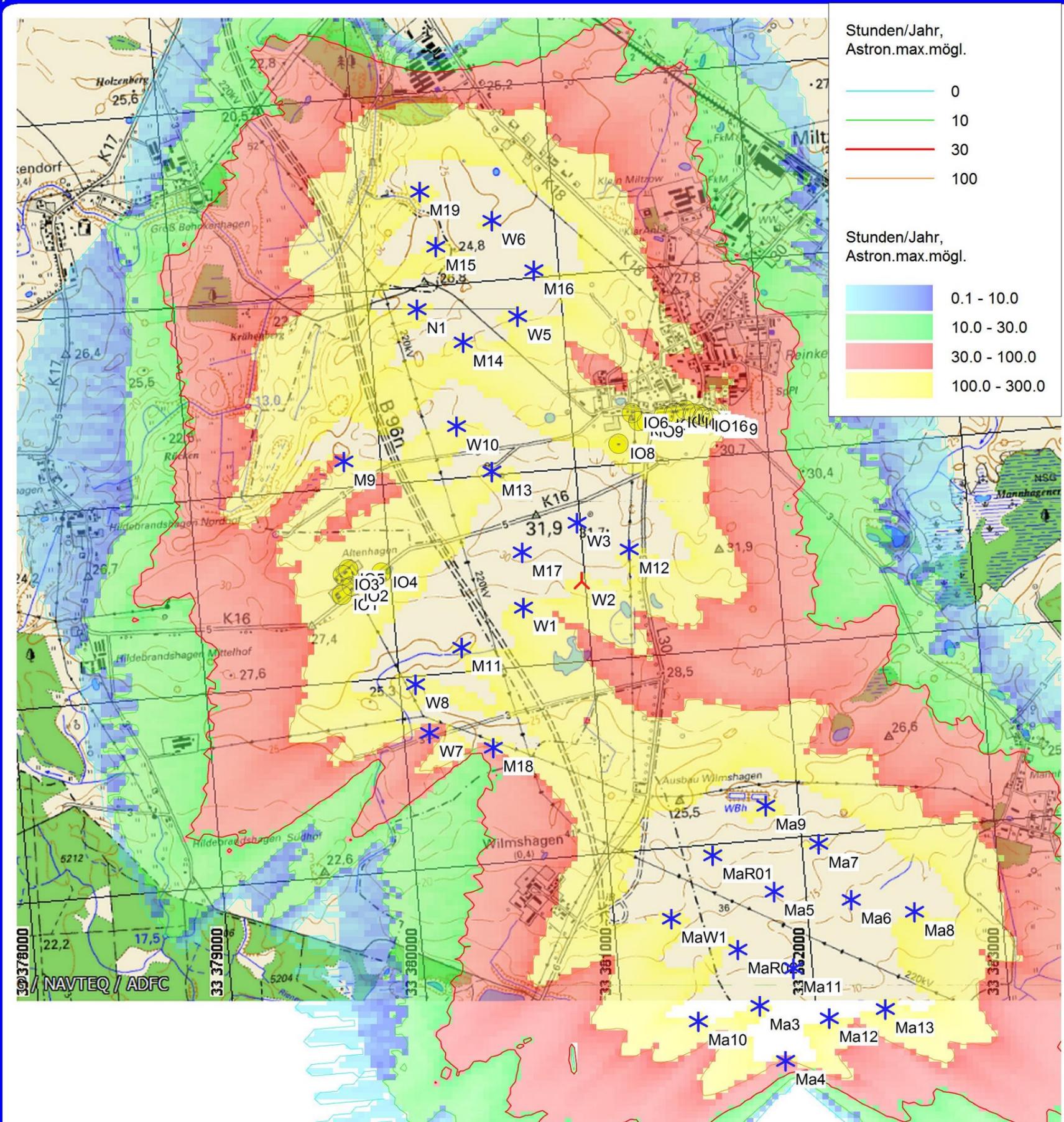
- [1] *LAI; Länderausschuss für Immissionsschutz: Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen. WEA-Schattenwurf-Hinweise. Stand 13.03.2002*
- [2] *BImSchG Bundes-Immissionsschutzgesetz*
- [3] *MagicMaps Tour Explorer, TOP25 Karten*
- [4] *EEN GmbH; Ute Heitmann; 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;*

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SHADOW - Karte

Berechnung: Gesamtbelastung



0 500 1000 1500 2000 m

Karte: Karte_Mittel , Maßstab 1:30,000, Mitte: Germany UTM ETRS89 Zone: 33 Ost: 3,381,007 Nord: 6,005,706

▲ Neue WEA * Existierende WEA ● Schattenrezeptor

Höhe der Schattenkarte: Höhenlinien: 131029_SRTM_Miltzow_25x25km.wpo (11)

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SHADOW - Hauptergebnis

Berechnung: Vorbelastung

Voraussetzungen für Berechnung des Schattenwurfs

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

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

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

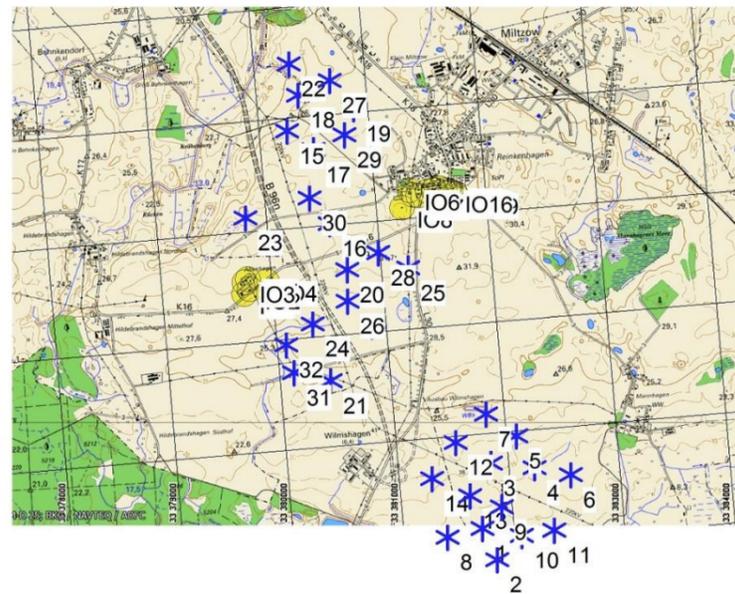
Betriebsstunden ermittelt aus WEA in Berechnung und Windverteilung:
WAsP_DEWI_Referenzpunkt2_138m

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
345 329 400 569 528 740 990 1,020 1,223 932 355 7,960
: 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

Augenhöhe: 1.5 m
Rasterauflösung: 10.0 m



Maßstab 1:75,000
* Existierende WEA ● Schattenrezeptor

WEA

Germany UTM ETRS89 Zone: 33			WEA-Typ		Schattendaten						
Ost	Nord	Z	Beschreibung	Aktuell	Hersteller	Typ	Nennleistung [kW]	Rotor-durchmesser [m]	Nabenhöhe [m]	Beschatt.-Bereich [m]	U/min [U/min]
		[m]									
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	12.8 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	15.8 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	V112-3,000	3,000	112.0	119.0	1,709	12.8
11	3,382,362	6,003,062	10.0 Ma13	Ja	VESTAS	V112-3,000	3,000	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	1,711	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	1,711	13.1
14	3,381,299	6,003,623	14.1 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	21.8 N1	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
16	3,380,570	6,006,010	30.0 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	21.6 M15	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
19	3,380,876	6,007,030	24.9 M16	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
20	3,380,692	6,005,580	27.1 M17	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
21	3,380,456	6,004,584	20.8 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	23.2 M9	Ja	VESTAS	V112-3,000	3,000	112.0	119.0	1,709	12.8
24	3,380,338	6,005,115	25.6 M11	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	13.1
25	3,381,244	6,005,548	24.7 M12	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	94.0	1,714	13.1
26	3,380,673	6,005,294	25.4 W1	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	140.0	1,711	13.1
27	3,380,681	6,007,305	22.9 W6	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	13.1
28	3,380,987	6,005,709	26.8 W3	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	13.1
29	3,380,771	6,006,801	25.0 W5	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	13.1
30	3,380,408	6,006,259	26.1 W10	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	13.1
31	3,380,134	6,004,688	22.1 W7	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	140.0	1,711	13.1
32	3,380,083	6,004,945	24.6 W8	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	140.0	1,711	13.1

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SHADOW - Hauptergebnis

Berechnung: Vorbelastung

Schattenrezeptor-Eingabe

Germany UTM ETRS89 Zone: 33

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe über Grund	Azimutwinkel (von Süd)	Neigung des Fensters	Ausrichtungsmodus
A	IO1	3,379,744	6,005,439	29.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
B	IO2	3,379,799	6,005,479	29.9	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
C	IO3	3,379,757	6,005,542	30.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
D	IO4	3,379,957	6,005,537	29.8	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
E	IO5	3,379,788	6,005,568	30.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
F	IO6	3,381,318	6,006,250	28.9	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
G	IO7	3,381,348	6,006,206	28.4	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
H	IO8	3,381,236	6,006,098	28.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
I	IO9	3,381,392	6,006,197	28.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
J	IO10	3,381,483	6,006,225	28.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
K	IO11	3,381,534	6,006,232	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
L	IO12	3,381,543	6,006,233	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
M	IO13	3,381,596	6,006,242	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
N	IO14	3,381,632	6,006,222	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
O	IO15	3,381,666	6,006,214	28.8	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
P	IO16	3,381,682	6,006,201	29.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
Q	IO17	3,381,690	6,006,198	29.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
R	IO18	3,381,722	6,006,190	29.3	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
S	IO19	3,381,731	6,006,181	29.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"

Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer		met. wahrsch. Beschattungsdauer	
		Stunden/Jahr	Schattentage/a	Max.Schatten Stunden/Tag	Stunden/Jahr
		[Std./Jahr]	[Tage/Jahr]	[Std./Tag]	[Std./Jahr]
A	IO1	152:37	280	1:08	22:23
B	IO2	154:48	271	1:06	22:06
C	IO3	148:37	290	1:04	22:48
D	IO4	144:46	240	1:04	21:04
E	IO5	141:27	283	1:00	22:13
F	IO6	141:49	237	1:10	22:13
G	IO7	141:23	247	1:08	22:36
H	IO8	208:51	241	1:47	29:22
I	IO9	128:26	238	1:06	20:37
J	IO10	104:43	223	0:58	16:36
K	IO11	104:57	242	0:56	17:44
L	IO12	104:55	247	0:55	17:50
M	IO13	108:03	259	0:50	19:07
N	IO14	107:32	258	0:46	18:35
O	IO15	104:57	262	0:43	18:27
P	IO16	105:26	264	0:41	18:27
Q	IO17	105:28	266	0:40	18:29
R	IO18	105:20	270	0:38	18:28
S	IO19	104:59	269	0:38	18:22

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal	Erwartet
		[Std./Jahr]	[Std./Jahr]
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

(Fortsetzung nächste Seite)...

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SHADOW - Hauptergebnis

Berechnung: Vorbelastung

...(Fortsetzung von letzter Seite)

Nr.	Name	Maximal [Std/Jahr]	Erwartet [Std/Jahr]
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	23:02	6:11
16	M13	70:10	17:18
17	M14	39:08	10:33
18	M15	0:37	0:09
19	M16	0:00	0:00
20	M17	87:24	15:06
21	M18	32:19	2:44
22	M19	0:00	0:00
23	M9	10:28	2:21
24	M11	137:06	18:35
25	M12	131:28	13:21
26	W1	121:10	16:51
27	W6	0:00	0:00
28	W3	208:19	29:47
29	W5	30:50	7:56
30	W10	39:25	9:58
31	W7	57:17	4:48
32	W8	167:49	16:21

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SHADOW - Hauptergebnis

Berechnung: Zusatzbelastung

Voraussetzungen für Berechnung des Schattenwurfs

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

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

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

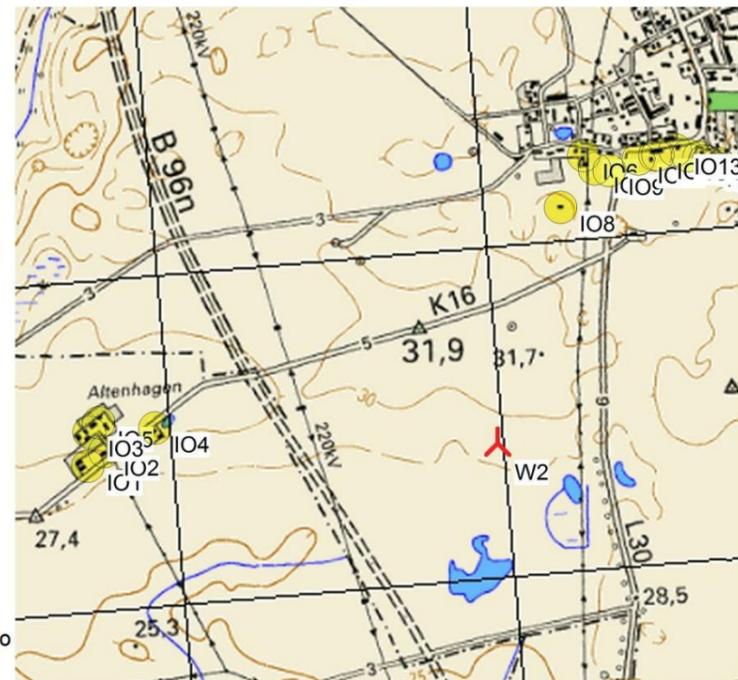
Betriebsstunden ermittelt aus WEA in Berechnung und Windverteilung:
WAsP_DEWI_Referenzpunkt2_138m

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
362 345 415 588 549 552 778 1,034 1,060 1,267 973 374 8,297
: 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

Augenhöhe: 1.5 m
Rasterauflösung: 10.0 m



WEA

Germany UTM ETRS89 Zone: 33				WEA-Typ			Schattendaten				
Ost	Nord	Z	Beschreibung	Aktuell	Hersteller	Typ	Nennleistung [kW]	Rotor-durchmesser [m]	Nabenhöhe [m]	Beschatt.-Bereich [m]	U/min [U/min]
1	3,380,985	6,005,403	24.8 W2	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	13.1

Schattenrezeptor-Eingabe

Germany UTM ETRS89 Zone: 33											
Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe über Grund	Azimutwinkel (von Süd)	Neigung des Fensters	Ausrichtungsmodus	
					[m]	[m]	[m]	[°]	[°]		
A	IO1	3,379,744	6,005,439	29.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
B	IO2	3,379,799	6,005,479	29.9	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
C	IO3	3,379,757	6,005,542	30.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
D	IO4	3,379,957	6,005,537	29.8	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
E	IO5	3,379,788	6,005,568	30.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
F	IO6	3,381,318	6,006,250	28.9	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
G	IO7	3,381,348	6,006,206	28.4	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
H	IO8	3,381,236	6,006,098	28.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
I	IO9	3,381,392	6,006,197	28.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
J	IO10	3,381,483	6,006,225	28.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
K	IO11	3,381,534	6,006,232	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
L	IO12	3,381,543	6,006,233	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
M	IO13	3,381,596	6,006,242	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
N	IO14	3,381,632	6,006,222	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
O	IO15	3,381,666	6,006,214	28.8	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
P	IO16	3,381,682	6,006,201	29.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
Q	IO17	3,381,690	6,006,198	29.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
R	IO18	3,381,722	6,006,190	29.3	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	
S	IO19	3,381,731	6,006,181	29.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"	

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13/10/2015 13:21/2.9.285

SHADOW - Hauptergebnis

Berechnung: Zusatzbelastung

Berechnungsergebnisse

Nr.	Name	astron. max. mögl. Beschattungsdauer		met. wahrsch. Beschattungsdauer	
		Stunden/Jahr	Schattentage/a	Max.Schatten Stunden/Tag	Stunden/Jahr
		[Std/Jahr]	[Tage/Jahr]	[Std/Tag]	[Std/Jahr]
A	IO1	6:56	26	0:21	1:40
B	IO2	7:38	28	0:22	1:46
C	IO3	6:52	27	0:21	1:32
D	IO4	10:08	32	0:25	2:16
E	IO5	7:17	27	0:21	1:37
F	IO6	3:51	20	0:14	0:19
G	IO7	13:15	38	0:26	1:10
H	IO8	23:42	50	0:35	2:07
I	IO9	18:02	46	0:29	1:39
J	IO10	20:29	52	0:29	1:57
K	IO11	22:17	56	0:28	2:11
L	IO12	22:43	56	0:28	2:14
M	IO13	23:47	60	0:27	2:23
N	IO14	26:23	68	0:27	2:44
O	IO15	26:43	72	0:26	2:49
P	IO16	26:35	74	0:26	2:51
Q	IO17	26:26	76	0:26	2:51
R	IO18	23:04	80	0:25	2:35
S	IO19	20:41	66	0:26	2:23

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [Std/Jahr]	Erwartet [Std/Jahr]
1	W2	135:15	16:02

Projekt:
151008_Miltzow_III-VII

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SHADOW - Hauptergebnis

Berechnung: Gesamtbelastung

Voraussetzungen für Berechnung des Schattenwurfs

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

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

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

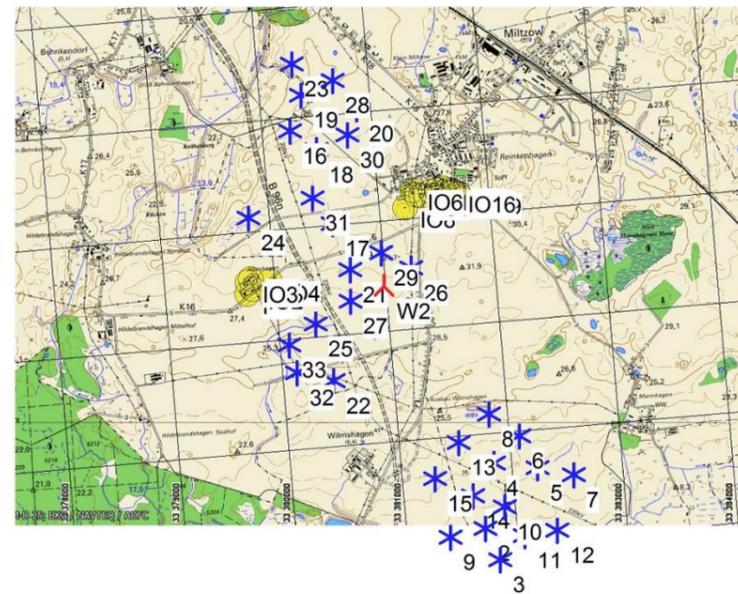
Eine WEA wird nicht berücksichtigt, wenn sie von keinem Teil der Rezeptorfläche aus sichtbar ist. Die Sichtbarkeitsberechnung basiert auf den folgenden Annahmen:

Verwendete Höhenlinien: Höhenlinien: 131029_SRTM_Miltzow_25x25km.wpo

Hindernisse in Berechnung verwendet

Augenhöhe: 1.5 m

Rasterauflösung: 10.0 m



Maßstab 1:75,000
▲ Neue WEA ★ Existierende WEA ● Schattenrezeptor

WEA

Germany UTM ETRS89 Zone: 33			WEA-Typ		Schattendaten							
Ost	Nord	Z	Beschreibung	Aktuell	Hersteller	Typ	Nennleistung [kW]	Rotor-durchmesser [m]	Nabenhöhe [m]	Beschatt.-Bereich [m]	U/min [U/min]	
1	3,380,985	6,005,403	24.8	W2	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	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	12.8	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	15.8	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	V112-3,000	3,000	112.0	119.0	1,709	12.8
12	3,382,362	6,003,062	10.0	Ma13	Ja	VESTAS	V112-3,000	3,000	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	1,711	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	1,711	13.1
15	3,381,299	6,003,623	14.1	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	21.8	N1	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
17	3,380,570	6,006,010	30.0	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	21.6	M15	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
20	3,380,876	6,007,030	24.9	M16	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
21	3,380,692	6,005,580	27.1	M17	Ja	VESTAS	V90-2,000	2,000	90.0	105.0	1,506	14.9
22	3,380,456	6,004,584	20.8	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	23.2	M9	Ja	VESTAS	V112-3,000	3,000	112.0	119.0	1,709	12.8
25	3,380,338	6,005,115	25.6	M11	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	13.1
26	3,381,244	6,005,548	24.7	M12	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	94.0	1,714	13.1
27	3,380,673	6,005,294	25.4	W1	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	140.0	1,711	13.1
28	3,380,681	6,007,305	22.9	W6	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	13.1
29	3,380,987	6,005,709	26.8	W3	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	13.1
30	3,380,771	6,006,801	25.0	W5	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	13.1
31	3,380,408	6,006,259	26.1	W10	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	119.0	1,713	13.1
32	3,380,134	6,004,688	22.1	W7	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	140.0	1,711	13.1
33	3,380,083	6,004,945	24.6	W8	Ja	VESTAS	V112-3.3 Gridstreame-3,300	3,300	112.0	140.0	1,711	13.1

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SHADOW - Hauptergebnis

Berechnung: Gesamtbelastung

Schattenrezeptor-Eingabe

Germany UTM ETRS89 Zone: 33

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe über Grund	Azimutwinkel (von Süd)	Neigung des Fensters	Ausrichtungsmodus
		[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	IO1	3,379,744	6,005,439	29.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
B	IO2	3,379,799	6,005,479	29.9	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
C	IO3	3,379,757	6,005,542	30.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
D	IO4	3,379,957	6,005,537	29.8	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
E	IO5	3,379,788	6,005,568	30.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
F	IO6	3,381,318	6,006,250	28.9	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
G	IO7	3,381,348	6,006,206	28.4	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
H	IO8	3,381,236	6,006,098	28.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
I	IO9	3,381,392	6,006,197	28.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
J	IO10	3,381,483	6,006,225	28.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
K	IO11	3,381,534	6,006,232	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
L	IO12	3,381,543	6,006,233	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
M	IO13	3,381,596	6,006,242	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
N	IO14	3,381,632	6,006,222	28.5	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
O	IO15	3,381,666	6,006,214	28.8	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
P	IO16	3,381,682	6,006,201	29.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
Q	IO17	3,381,690	6,006,198	29.0	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
R	IO18	3,381,722	6,006,190	29.3	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"
S	IO19	3,381,731	6,006,181	29.2	0.1	0.1	2.0	0.0	0.0	"Gewächshaus-Modus"

Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer		met. wahrsch. Beschattungsdauer	
		Stunden/Jahr	Schattentage/a	Max.Schatten Stunden/Tag	Stunden/Jahr
		[Std./Jahr]	[Tage/Jahr]	[Std./Tag]	[Std./Jahr]
A	IO1	159:33	280	1:08	23:59
B	IO2	162:26	271	1:06	23:48
C	IO3	155:29	291	1:04	24:18
D	IO4	154:54	240	1:04	23:14
E	IO5	148:44	286	1:00	23:47
F	IO6	145:40	237	1:19	22:32
G	IO7	154:38	247	1:14	23:44
H	IO8	232:33	241	2:13	31:24
I	IO9	146:28	238	1:09	22:13
J	IO10	125:12	223	1:02	18:30
K	IO11	127:14	242	0:58	19:52
L	IO12	127:38	247	0:59	20:01
M	IO13	131:50	259	0:57	21:28
N	IO14	133:55	258	0:59	21:16
O	IO15	131:40	262	0:58	21:13
P	IO16	132:01	264	1:00	21:15
Q	IO17	131:54	266	1:00	21:17
R	IO18	127:37	270	1:01	20:55
S	IO19	124:19	269	1:02	20:33

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal	Erwartet
		[Std./Jahr]	[Std./Jahr]
1	W2	135:15	15:26
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

(Fortsetzung nächste Seite)...

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Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Hauptergebnis

Berechnung: Gesamtbelastung

...(Fortsetzung von letzter Seite)

Nr.	Name	Maximal [Std/Jahr]	Erwartet [Std/Jahr]
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	23:02	6:11
17	M13	70:10	17:19
18	M14	39:08	10:34
19	M15	0:37	0:09
20	M16	0:00	0:00
21	M17	87:24	15:08
22	M18	32:19	2:44
23	M19	0:00	0:00
24	M9	10:28	2:21
25	M11	137:06	18:36
26	M12	131:28	13:25
27	W1	121:10	16:55
28	W6	0:00	0:00
29	W3	208:19	29:48
30	W5	30:50	7:57
31	W10	39:25	9:59
32	W7	57:17	4:49
33	W8	167:49	16:22

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SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1 08:28		09:03 (22) 07:57	09:31 (33) 06:59	07:52 (25) 06:43	07:14 (1) 05:33	04:42	
15:54	47	10:21 (32) 16:46	10:14 (33) 17:43	08:30 (25) 19:42	08:04 (27) 20:39	21:30	
2 08:28		09:03 (22) 07:55	09:31 (33) 06:57	07:51 (25) 06:40	07:04 (26) 05:31	04:41	
15:56	48	10:22 (32) 16:48	10:15 (33) 17:45	08:29 (25) 19:44	08:02 (27) 20:40	21:31	
3 08:28		09:02 (22) 07:54	09:32 (33) 06:54	07:52 (25) 06:38	07:02 (26) 05:29	04:41	
15:57	49	10:22 (32) 16:50	10:16 (33) 17:47	08:29 (25) 19:46	07:59 (27) 20:42	21:32	
4 08:27		09:02 (22) 07:52	09:32 (33) 06:52	07:51 (25) 06:36	06:59 (26) 05:27	04:40	
15:58	50	10:23 (32) 16:52	10:16 (33) 17:49	08:28 (25) 19:48	07:31 (1) 20:44	21:33	
5 08:27		09:02 (22) 07:50	09:32 (33) 06:49	07:52 (25) 06:33	06:57 (26) 05:25	04:39	
15:59	51	10:23 (32) 16:54	10:16 (33) 17:51	08:28 (25) 19:50	07:29 (1) 20:46	21:34	
6 08:27		09:02 (22) 07:48	09:33 (33) 06:47	07:52 (25) 06:31	06:54 (26) 05:23	04:38	
16:01	51	10:23 (32) 16:57	10:15 (33) 17:53	08:26 (25) 19:52	07:26 (1) 20:48	21:35	
7 08:26		09:03 (22) 07:46	09:33 (33) 06:45	07:53 (25) 06:28	06:52 (26) 05:21	04:37	05:13 (17)
16:02	51	10:24 (32) 16:59	10:15 (33) 17:55	08:26 (25) 19:54	07:07 (26) 20:50	21:36	5 05:18 (17)
8 08:26		09:03 (22) 07:44	09:33 (33) 06:42	07:53 (25) 06:26	06:52 (26) 05:19	04:37	05:12 (17)
16:03	51	10:24 (32) 17:01	10:14 (33) 17:57	08:24 (25) 19:56	07:06 (26) 20:51	21:37	8 05:20 (17)
9 08:25		09:03 (22) 07:42	09:33 (33) 06:40	08:28 (25) 19:50	06:52 (26) 05:17	04:36	05:12 (17)
16:05	52	10:24 (32) 17:03	10:13 (33) 17:59	08:23 (25) 19:57	07:04 (26) 20:53	21:38	9 05:21 (17)
10 08:24		09:03 (22) 07:40	09:34 (33) 06:37	07:56 (25) 06:21	06:55 (26) 05:15	04:36	05:11 (17)
16:06	52	10:25 (32) 17:05	10:13 (33) 18:01	08:22 (25) 19:59	07:02 (26) 20:55	21:39	11 05:22 (17)
11 08:24		09:04 (22) 07:38	09:35 (33) 06:35	07:57 (25) 06:18	06:45 (21) 05:13	04:35	05:11 (17)
16:08	57	10:25 (32) 17:07	10:12 (33) 18:03	08:19 (25) 20:01	06:55 (21) 20:57	21:40	12 05:23 (17)
12 08:23		09:04 (22) 07:36	09:36 (33) 06:32	08:00 (25) 06:16	06:42 (21) 05:11	04:35	05:11 (17)
16:09	63	10:25 (32) 17:09	10:11 (33) 18:04	08:18 (25) 20:03	06:57 (21) 20:59	21:41	13 05:24 (17)
13 08:22		09:04 (22) 07:34	09:38 (33) 06:30	08:03 (25) 06:14	06:41 (21) 05:09	04:35	05:10 (17)
16:11	66	10:25 (32) 17:11	10:10 (33) 18:06	08:11 (25) 20:05	07:08 (21) 21:00	21:41	13 05:23 (17)
14 08:21		09:05 (22) 07:32	09:39 (33) 06:28	08:11 (25) 20:01	06:40 (21) 05:08	04:34	05:10 (17)
16:13	67	10:25 (32) 17:13	10:09 (33) 18:08	08:11 (25) 20:07	06:59 (21) 21:02	21:42	14 05:24 (17)
15 08:20		09:06 (22) 07:30	09:40 (33) 06:25	08:09 (25) 06:09	06:33 (29) 05:06	04:34	05:10 (17)
16:14	68	10:26 (32) 17:15	10:07 (33) 18:10	08:09 (25) 06:06	06:59 (21) 21:04	21:43	15 05:25 (17)
16:15		09:06 (22) 07:28	09:42 (33) 06:23	08:07 (25) 06:07	06:31 (29) 05:04	04:34	05:10 (17)
17 08:18		09:07 (22) 07:26	09:43 (33) 06:20	08:08 (25) 06:04	06:29 (29) 05:02	04:33	05:09 (17)
16:18	68	10:26 (32) 17:19	10:02 (33) 18:14	08:08 (25) 06:02	07:00 (21) 21:07	21:44	16 05:26 (17)
18 08:17		09:08 (22) 07:24	08:04 (25) 06:18	06:55 (27) 06:02	06:26 (29) 05:01	04:34	05:10 (17)
16:20	67	10:25 (32) 17:21	09:56 (33) 18:16	07:03 (27) 20:14	06:59 (21) 21:09	21:44	16 05:26 (17)
19 08:16		09:09 (22) 07:22	08:01 (25) 06:15	06:51 (27) 06:00	06:24 (29) 04:59	04:34	05:10 (17)
16:21	67	10:25 (32) 17:23	08:22 (25) 18:18	07:05 (27) 20:16	06:58 (21) 21:10	21:45	16 05:26 (17)
20 08:15		09:10 (22) 07:19	07:59 (25) 06:13	06:49 (27) 05:57	06:23 (29) 04:58	04:34	05:09 (17)
16:23	66	10:25 (32) 17:25	08:24 (25) 18:20	07:08 (27) 20:18	06:58 (21) 21:12	21:45	16 05:26 (17)
21 08:14		09:11 (22) 07:17	07:58 (25) 06:10	06:47 (27) 05:55	06:23 (29) 04:56	04:34	05:10 (17)
16:25	63	10:24 (32) 17:27	08:26 (25) 18:22	07:08 (27) 20:20	06:57 (21) 21:14	21:45	16 05:26 (17)
22 08:12		09:13 (22) 07:15	07:56 (25) 06:08	06:46 (27) 05:53	06:22 (29) 04:55	04:34	05:11 (17)
16:27	61	10:24 (32) 17:29	08:27 (25) 18:24	07:10 (27) 20:22	06:56 (21) 21:15	21:45	16 05:27 (17)
23 08:11		09:16 (22) 07:13	07:55 (25) 06:05	06:44 (27) 05:50	06:22 (29) 04:53	04:34	05:11 (17)
16:29	53	10:22 (32) 17:31	08:28 (25) 18:25	07:09 (27) 20:24	06:54 (21) 21:17	21:45	16 05:27 (17)
24 08:10		09:32 (33) 07:10	07:55 (25) 06:03	06:44 (27) 05:48	06:22 (29) 04:52	04:35	05:11 (17)
16:31	48	10:20 (32) 17:33	08:29 (25) 18:27	07:10 (27) 20:26	06:53 (21) 21:18	21:46	16 05:27 (17)
25 08:08		09:32 (33) 07:08	07:53 (25) 06:00	06:24 (1) 05:46	06:23 (29) 04:51	04:35	05:12 (17)
16:33	46	10:18 (32) 17:35	08:29 (25) 18:29	07:10 (27) 20:27	06:50 (21) 21:20	21:46	16 05:28 (17)
26 08:07		09:32 (33) 07:06	07:53 (25) 05:58	06:22 (1) 05:44	06:23 (29) 04:49	04:35	05:12 (17)
16:35	40	10:12 (33) 17:37	08:29 (25) 18:31	07:10 (27) 20:29	06:41 (29) 21:21	21:46	15 05:27 (17)
27 08:05		09:31 (33) 07:04	07:52 (25) 05:55	06:19 (1) 05:41	06:24 (29) 04:48	04:36	05:12 (17)
16:36	41	10:12 (33) 17:39	08:29 (25) 18:33	07:09 (27) 20:31	06:40 (29) 21:23	21:45	15 05:27 (17)
28 08:04		09:32 (33) 07:01	07:52 (25) 05:53	06:17 (1) 05:39	06:25 (29) 04:47	04:36	05:13 (17)
16:38	42	10:14 (33) 17:41	08:29 (25) 18:35	07:09 (27) 20:33	06:38 (29) 21:24	21:45	14 05:27 (17)
29 08:02		09:31 (33) 07:00	07:50 (25) 05:50	07:15 (1) 05:37	06:27 (29) 04:46	04:37	05:14 (17)
16:40	43	10:14 (33) 17:43	08:29 (25) 18:37	07:08 (27) 20:35	06:36 (29) 21:26	21:45	14 05:28 (17)
30 08:01		09:31 (33) 07:00	07:48 (25) 05:48	07:15 (1) 05:35	06:25 (29) 04:45	04:38	05:14 (17)
16:42	43	10:14 (33) 17:45	08:29 (25) 18:39	06:07 (27) 20:37	06:36 (29) 21:27	21:45	13 05:27 (17)
31 07:59		09:31 (33) 07:00	07:45 (25) 05:45	07:14 (1) 05:34	06:24 (29) 04:44	04:43	05:14 (17)
16:44	43	10:14 (33) 17:47	08:29 (25) 18:41	08:05 (27) 20:39	06:35 (29) 21:28	21:45	13 05:27 (17)
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung	1682	971	812	693		330	
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41		0.45	
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91		0.91	
Reduktion Windrichtung	0.59	0.61	0.65	0.68		0.70	
Gesamte Reduktion	0.09	0.13	0.18	0.25		0.28	
Met.wahrsch.Beschattung	153	125	146	172		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	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 5
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember	
1	04:38	05:15 (17) 05:19	06:14	06:44 (21) 07:08	08:40 (25) 07:07	09:04 (33) 08:03	
2	21:45	12 05:27 (17) 21:09	20:01	10 06:54 (21) 18:47	14 08:54 (25) 16:35	39 09:43 (33) 15:50	
3	04:39	05:16 (17) 05:20	06:16	06:52 (25) 07:10	08:37 (25) 07:09	09:03 (33) 08:05	
4	21:44	11 05:27 (17) 21:07	19:59	8 07:00 (25) 18:44	20 08:57 (25) 16:33	40 09:43 (33) 15:46	
5	04:40	05:16 (17) 05:22	06:18	06:50 (26) 07:12	08:34 (25) 07:11	09:02 (33) 08:06	
6	21:44	10 05:26 (17) 21:05	19:56	12 07:02 (26) 18:42	24 08:58 (25) 16:31	42 09:44 (33) 15:48	
7	04:41	05:17 (17) 05:24	06:19	06:49 (26) 07:14	08:32 (25) 07:13	09:03 (33) 08:08	
8	21:43	9 05:26 (17) 21:03	19:54	14 07:03 (26) 18:39	27 08:59 (25) 16:29	42 09:45 (33) 15:48	
9	04:41	05:19 (17) 05:26	06:21	06:49 (26) 07:15	08:30 (25) 07:15	09:02 (33) 08:09	
10	21:43	6 05:25 (17) 21:01	19:51	15 07:04 (26) 18:37	31 09:01 (25) 16:27	43 09:45 (33) 15:47	
11	04:42	05:27	06:23	06:50 (26) 07:17	08:29 (25) 07:17	09:02 (33) 08:10	
12	21:42	20:59	19:49	21 07:22 (1) 18:34	32 09:01 (25) 16:25	43 09:45 (33) 15:46	
13	04:43	05:29	06:25	06:52 (26) 07:19	08:28 (25) 07:19	09:02 (33) 08:12	
14	21:41	20:57	19:46	24 07:24 (1) 18:32	34 09:02 (25) 16:23	43 09:45 (33) 15:46	
15	04:44	05:31	06:27	06:54 (26) 07:21	08:27 (25) 07:21	09:02 (33) 08:13	
16	21:41	20:55	19:44	25 07:26 (1) 18:29	36 09:03 (25) 16:21	43 09:45 (33) 15:46	
17	04:45	05:33	06:28	06:55 (26) 07:23	08:29 (25) 07:23	09:02 (33) 08:14	
18	21:40	20:53	19:41	36 07:52 (27) 18:27	36 09:03 (25) 16:20	43 09:45 (33) 15:45	
19	04:47	05:34	06:30	06:57 (26) 07:25	08:26 (25) 07:25	09:02 (33) 08:16	
20	21:39	20:51	19:39	40 07:55 (27) 18:24	37 09:03 (25) 16:18	43 09:45 (33) 15:45	
21	04:48	05:36	06:32	06:59 (26) 07:27	08:26 (25) 07:27	09:03 (33) 08:17	
22	21:38	20:49	19:36	41 07:56 (27) 18:22	37 09:03 (25) 16:16	43 09:46 (33) 15:45	
23	04:49	05:38	06:34	07:06 (1) 07:29	08:25 (25) 07:29	09:03 (33) 08:18	
24	21:37	20:47	19:34	43 07:57 (27) 18:20	38 09:03 (25) 16:14	43 09:46 (33) 15:44	
25	04:50	05:40	06:36	45 07:57 (27) 18:17	38 09:03 (25) 16:13	43 09:46 (33) 15:44	
26	21:36	20:45	1 06:39 (29) 19:32	45 07:57 (27) 18:17	38 09:03 (25) 16:13	43 09:46 (33) 15:44	
27	04:51	05:42	06:34 (29) 06:37	07:05 (1) 07:32	08:25 (25) 07:33	09:04 (33) 08:20	
28	21:35	20:43	10 06:44 (29) 19:29	45 07:58 (27) 18:15	37 09:02 (25) 16:11	42 09:46 (33) 15:44	
29	04:53	05:43	06:32 (29) 06:39	07:06 (1) 07:34	08:25 (25) 07:35	09:04 (33) 08:21	
30	21:34	20:40	14 06:46 (29) 19:27	44 07:58 (27) 18:13	37 09:02 (25) 16:09	41 09:45 (33) 15:44	
31	04:54	05:45	06:30 (29) 06:41	07:08 (1) 07:36	08:25 (25) 07:37	09:05 (33) 08:22	
32	21:33	20:38	16 06:46 (29) 19:24	41 07:58 (27) 18:10	36 09:01 (25) 16:08	40 09:45 (33) 15:44	
33	04:55	05:47	06:30 (29) 06:43	07:09 (1) 07:38	08:26 (25) 07:38	09:05 (33) 08:23	
34	21:32	20:36	17 06:47 (29) 19:22	39 07:57 (27) 18:08	35 09:01 (25) 16:06	47 09:52 (32) 15:44	
35	04:57	05:49	06:29 (29) 06:45	07:11 (1) 07:40	08:26 (25) 07:40	09:06 (33) 08:23	
36	21:30	20:34	27 06:57 (21) 19:19	35 07:57 (27) 18:06	34 09:00 (25) 16:05	48 09:54 (32) 15:45	
37	04:58	05:51	06:28 (29) 06:46	07:31 (27) 07:42	08:27 (25) 07:42	08:50 (32) 08:24	
38	21:29	20:32	31 06:59 (21) 19:16	26 07:57 (27) 18:03	32 08:59 (25) 16:03	53 09:56 (32) 15:45	
39	05:00	05:52	06:48 (29) 06:48	07:31 (27) 07:44	08:28 (25) 07:44	08:48 (32) 08:25	
40	21:28	20:29	32 07:00 (21) 19:14	25 07:56 (27) 18:01	29 08:57 (25) 16:02	61 09:59 (32) 15:45	
41	05:01	05:54	06:28 (29) 06:50	07:31 (27) 07:46	08:29 (25) 07:46	08:47 (32) 08:26	
42	21:26	20:27	33 07:01 (21) 19:11	24 07:55 (27) 17:59	27 08:56 (25) 16:01	63 10:00 (32) 15:46	
43	05:03	05:56	06:28 (29) 06:52	07:31 (27) 07:48	08:30 (25) 07:48	08:46 (32) 08:26	
44	21:25	20:25	34 07:02 (21) 19:09	22 07:53 (27) 17:56	24 08:54 (25) 15:59	66 10:01 (32) 15:46	
45	05:04	05:58	06:27 (29) 06:54	07:32 (27) 07:50	08:32 (25) 07:50	08:46 (32) 08:27	
46	21:23	20:22	35 07:02 (21) 19:06	20 07:52 (27) 17:54	20 08:52 (25) 15:58	66 10:02 (32) 15:47	
47	05:06	06:00	06:28 (29) 06:55	07:34 (27) 07:52	08:34 (25) 07:51	08:46 (32) 08:27	
48	21:22	20:20	34 07:02 (21) 19:04	16 07:50 (27) 17:52	25 10:28 (33) 15:57	67 10:03 (32) 15:47	
49	05:07	06:01	06:30 (29) 06:57	07:37 (27) 06:53	07:40 (25) 07:53	08:45 (32) 08:27	
50	21:20	20:18	32 07:02 (21) 19:01	10 07:47 (27) 16:50	21 09:32 (33) 15:56	68 10:03 (32) 15:48	
51	05:09	06:03	06:31 (29) 06:59	07:38 (27) 06:55	09:11 (33) 07:55	08:45 (32) 08:28	
52	21:19	20:15	30 07:01 (21) 18:59	16:48	24 09:35 (33) 15:55	67 10:04 (32) 15:49	
53	05:10	06:05	06:33 (29) 07:01	06:57	09:09 (33) 07:57	08:45 (32) 08:28	
54	21:17	20:13	28 07:01 (21) 18:56	16:45	27 09:36 (33) 15:54	68 10:05 (32) 15:49	
55	05:12	06:07	06:35 (29) 07:03	06:59	09:08 (33) 07:58	08:45 (32) 08:28	
56	21:16	20:11	24 07:01 (21) 18:54	16:43	31 09:39 (33) 15:53	68 10:06 (32) 15:50	
57	05:14	06:09	06:41 (21) 07:04	07:01	09:07 (33) 08:00	08:45 (32) 08:28	
58	21:14	20:08	19 07:00 (21) 18:51	16:41	33 09:40 (33) 15:52	66 10:06 (32) 15:51	
59	05:15	06:10	06:41 (21) 07:06	07:03	09:06 (33) 08:01	08:46 (32) 08:28	
60	21:12	20:06	17 06:58 (21) 18:49	16:39	35 09:41 (33) 15:51	63 10:07 (32) 15:52	
61	05:17	06:12	06:42 (21)	07:05	09:05 (33)	08:28	
62	21:10	20:04	15 06:57 (21)	16:37	37 09:42 (33)	15:53	
63	Sonnenscheinstunden	514	461	383	328	257	231
64	astr.max.mögl.Beschattung	48	449	681	948	1544	1415
65	Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
66	Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91
67	Reduktion Windrichtung	0.70	0.68	0.67	0.62	0.59	0.59
68	Gesamte Reduktion	0.27	0.29	0.24	0.18	0.11	0.07
69	Met.wahrsch.Beschattung	13	132	162	173	169	102

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)

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 6

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

André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1	08:28	09:14 (22) 07:57	09:57 (33) 06:59	08:13 (25) 06:43	07:07 (26) 05:33	04:42		
15:54	65	10:39 (32) 16:46	41 10:38 (33) 17:43	34 08:47 (25) 19:42	25 07:40 (1) 20:39	21:30		
2	08:28	09:14 (22) 07:55	09:58 (33) 06:57	08:13 (25) 06:40	07:04 (26) 05:31	04:41		
15:56	65	10:40 (32) 16:48	39 10:37 (33) 17:45	32 08:45 (25) 19:44	26 07:38 (1) 20:40	21:31		
3	08:28	09:14 (22) 07:54	09:59 (33) 06:54	08:14 (25) 06:38	07:02 (26) 05:29	04:41		
15:57	66	10:40 (32) 16:50	39 10:38 (33) 17:47	30 08:44 (25) 19:46	24 07:36 (1) 20:42	21:32		
4	08:27	09:15 (22) 07:52	10:00 (33) 06:52	08:15 (25) 06:36	06:59 (26) 05:27	04:40		
15:58	65	10:40 (32) 16:52	37 10:37 (33) 17:49	27 08:42 (25) 19:48	19 07:32 (1) 20:44	21:33		
5	08:27	09:15 (22) 07:50	10:01 (33) 06:49	08:17 (25) 06:33	06:57 (26) 05:25	04:39		
15:59	66	10:40 (32) 16:54	35 10:36 (33) 17:51	23 08:40 (25) 19:50	16 07:13 (26) 20:46	21:34		
6	08:27	09:16 (22) 07:48	10:02 (33) 06:47	08:19 (25) 06:31	06:56 (26) 05:23	04:38		
16:01	65	10:40 (32) 16:57	33 10:35 (33) 17:53	18 08:37 (25) 19:52	15 07:11 (26) 20:48	21:35		
7	08:26	09:17 (22) 07:46	10:04 (33) 06:45	08:23 (25) 06:28	06:57 (26) 05:21	04:37		
16:02	66	10:41 (32) 16:59	30 10:34 (33) 17:55	10 08:33 (25) 19:54	13 07:10 (26) 20:50	21:36		
8	08:26	09:17 (22) 07:44	10:04 (33) 06:42	08:26	06:54 (21) 05:19	04:37		
16:03	66	10:41 (32) 17:01	27 10:31 (33) 17:57	19:56	14 07:08 (26) 20:51	21:37	5 05:20 (17)	
9	08:25	09:18 (22) 07:42	10:06 (33) 06:40	08:28 (25) 06:40	06:23	06:51 (21) 05:17	04:36	8 05:14 (17)
16:05	65	10:41 (32) 17:03	29 10:29 (33) 17:59	19:57	14 07:05 (21) 20:53	21:38	8 05:22 (17)	
10	08:24	09:18 (22) 07:40	08:23 (25) 06:37	06:21	06:49 (21) 05:15	04:36	5 05:13 (17)	
16:06	65	10:40 (32) 17:05	34 10:27 (33) 18:01	19:59	18 07:07 (21) 20:55	21:39	9 05:22 (17)	
11	08:24	09:19 (22) 07:38	08:21 (25) 06:35	06:18	06:48 (21) 05:13	04:35	5 05:13 (17)	
16:08	64	10:40 (32) 17:07	30 10:23 (33) 18:03	20:01	20 07:08 (21) 20:57	21:40	10 05:23 (17)	
12	08:23	09:20 (22) 07:36	08:19 (25) 06:32	06:16	06:46 (21) 05:11	04:35	5 05:13 (17)	
16:09	62	10:40 (32) 17:09	25 08:44 (25) 18:04	20:03	22 07:05 (21) 20:59	21:41	12 05:25 (17)	
13	08:22	09:21 (22) 07:34	08:18 (25) 06:30	06:14	06:38 (29) 05:09	04:35	5 05:12 (17)	
16:11	61	10:40 (32) 17:11	27 08:45 (25) 18:06	20:05	26 07:08 (21) 21:00	21:41	12 05:24 (17)	
14	08:21	09:22 (22) 07:32	08:17 (25) 06:28	07:07 (27) 06:11	06:36 (29) 05:08	04:34	5 05:12 (17)	
16:13	60	10:40 (32) 17:13	30 08:47 (25) 18:08	8 07:15 (27) 20:07	33 07:09 (21) 21:02	21:42	13 05:25 (17)	
15	08:20	09:24 (22) 07:30	08:15 (25) 06:25	07:03 (27) 06:09	06:33 (29) 05:06	04:34	5 05:12 (17)	
16:14	56	10:39 (32) 17:15	32 08:47 (25) 18:10	15 07:18 (27) 20:09	35 07:08 (21) 21:04	21:43	14 05:26 (17)	
16:16	52	09:26 (22) 07:28	08:14 (25) 06:23	07:01 (27) 06:07	06:31 (29) 05:04	04:34	5 05:12 (17)	
17	08:18	09:27 (22) 07:26	08:13 (25) 06:21	07:00 (27) 06:06	06:29 (29) 05:03	04:34	5 05:12 (17)	
16:18	44	10:38 (32) 17:19	35 08:49 (25) 18:14	23 07:21 (27) 20:12	38 07:07 (21) 21:07	21:44	15 05:27 (17)	
18	08:17	09:53 (33) 07:24	08:13 (25) 06:18	06:58 (27) 06:02	06:28 (29) 05:01	04:34	5 05:12 (17)	
16:20	43	10:36 (32) 17:21	37 08:50 (25) 18:16	24 07:22 (27) 20:14	38 07:06 (21) 21:09	21:44	15 05:27 (17)	
19	08:16	09:54 (33) 07:22	08:12 (25) 06:15	06:56 (27) 06:00	06:27 (29) 04:59	04:34	5 05:12 (17)	
16:21	42	10:36 (33) 17:23	38 08:50 (25) 18:18	26 07:22 (27) 20:16	38 07:05 (21) 21:10	21:45	15 05:27 (17)	
20	08:15	09:54 (33) 07:19	08:12 (25) 06:13	06:56 (27) 05:57	06:27 (29) 04:58	04:34	5 05:12 (17)	
16:23	43	10:37 (33) 17:25	38 08:50 (25) 18:20	27 07:23 (27) 20:18	37 07:04 (21) 21:12	21:45	15 05:27 (17)	
21	08:14	09:54 (33) 07:17	08:12 (25) 06:10	06:54 (27) 05:55	06:27 (29) 04:56	04:34	5 05:12 (17)	
16:25	43	10:37 (33) 17:27	39 08:51 (25) 18:22	28 07:22 (27) 20:20	36 07:03 (21) 21:14	21:45	16 05:28 (17)	
22	08:12	09:54 (33) 07:15	08:11 (25) 06:08	06:32 (1) 05:53	06:26 (29) 04:55	04:34	5 05:13 (17)	
16:27	44	10:38 (33) 17:29	39 08:50 (25) 18:24	36 07:23 (27) 20:22	34 07:00 (21) 21:15	21:45	15 05:28 (17)	
23	08:11	09:54 (33) 07:13	08:11 (25) 06:05	06:29 (1) 05:50	06:27 (29) 04:53	04:34	5 05:13 (17)	
16:29	44	10:38 (33) 17:31	39 08:50 (25) 18:25	40 07:22 (27) 20:24	26 06:57 (21) 21:17	21:45	15 05:28 (17)	
24	08:10	09:54 (33) 07:10	08:11 (25) 06:03	06:27 (1) 05:48	06:27 (29) 04:52	04:35	5 05:13 (17)	
16:31	44	10:38 (33) 17:33	40 08:51 (25) 18:27	43 07:22 (27) 20:26	19 06:46 (29) 21:18	21:46	15 05:28 (17)	
25	08:08	09:55 (33) 07:08	08:11 (25) 06:00	06:24 (1) 05:46	06:28 (29) 04:51	04:35	5 05:14 (17)	
16:33	43	10:38 (33) 17:35	39 08:50 (25) 18:29	47 07:21 (27) 20:27	17 06:45 (29) 21:20	21:46	15 05:29 (17)	
26	08:07	09:55 (33) 07:06	08:11 (25) 05:58	06:23 (1) 05:44	06:29 (29) 04:49	04:35	5 05:14 (17)	
16:35	43	10:38 (33) 17:37	38 08:49 (25) 18:31	46 07:20 (27) 20:29	15 06:44 (29) 21:21	21:46	14 05:28 (17)	
27	08:05	09:55 (33) 07:04	08:11 (25) 05:55	06:22 (1) 05:41	06:31 (29) 04:48	04:36	5 05:14 (17)	
16:36	43	10:38 (33) 17:39	37 08:48 (25) 18:33	46 07:19 (27) 20:31	11 06:42 (29) 21:23	21:45	14 05:28 (17)	
28	08:04	09:56 (33) 07:01	08:12 (25) 05:53	06:22 (1) 05:39	06:33 (29) 04:47	04:36	5 05:15 (17)	
16:38	43	10:39 (33) 17:41	36 08:48 (25) 18:35	44 07:18 (27) 20:33	7 06:40 (29) 21:24	21:45	13 05:28 (17)	
29	08:02	09:56 (33) 07:00	08:12 (25) 05:50	07:21 (1) 05:37	04:46	04:37	5 05:16 (17)	
16:40	43	10:39 (33) 17:43	35 08:47 (25) 18:37	40 08:15 (27) 20:35	21:26	21:45	13 05:29 (17)	
30	08:01	09:56 (33) 06:59	08:12 (25) 05:48	07:12 (26) 05:35	04:44	04:38	5 05:16 (17)	
16:42	42	10:38 (33) 17:45	34 08:46 (25) 18:39	38 08:14 (27) 20:37	21:27	21:45	12 05:28 (17)	
31	07:59	09:56 (33) 06:57	08:12 (25) 05:45	07:09 (26) 05:33	04:43	04:38	5 05:16 (17)	
16:44	42	10:38 (33) 17:47	33 08:45 (25) 18:41	34 08:10 (27) 20:39	21:28	21:45	12 05:28 (17)	
Sonnenscheinstunden	248	272	367	421	496	512		
astr.max.mögl.Beschattung	1655	977	758	673		299		
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41		0.45		
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91		0.91		
Reduktion Windrichtung	0.59	0.61	0.65	0.68		0.70		
Gesamte Reduktion	0.09	0.13	0.18	0.25		0.28		
Met.wahrsch.Beschattung	150	126	136	167		84		

Tabellen-Layout: Die Daten für jeden Tag 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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 7
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember	
1	04:38	05:17 (17) 05:19	06:14	06:47 (21) 07:08	07:07	07:53 (25) 08:03	
2	21:45	11 05:28 (17) 21:09	20:01	20 07:07 (21) 18:47	16:35	34 09:57 (33) 15:50	
3	04:39	05:18 (17) 05:20	06:16	06:47 (21) 07:10	07:09	07:59 (25) 08:05	
4	21:44	10 05:28 (17) 21:07	19:59	18 07:05 (21) 18:44	16:33	26 09:59 (33) 15:49	
5	04:40	05:18 (17) 05:22	06:18	06:49 (21) 07:12	07:11	09:34 (33) 08:06	
6	21:44	8 05:26 (17) 21:05	19:56	14 07:03 (21) 18:42	16:31	27 10:01 (33) 15:48	
7	04:41	05:20 (17) 05:24	06:19	06:51 (21) 07:14	07:13	09:33 (33) 08:08	
8	21:43	6 05:26 (17) 21:03	19:54	14 07:05 (26) 18:39	16:29	31 10:04 (33) 15:48	
9	04:41	05:26	06:21	06:54 (26) 07:15	07:15	09:32 (33) 08:09	
10	21:43	21:01	19:51	13 07:07 (26) 18:37	16:27	33 10:05 (33) 15:47	
11	04:42	05:27	06:23	06:52 (26) 07:17	07:17	09:31 (33) 08:10	
12	21:42	20:59	19:49	15 07:07 (26) 18:34	16:25	35 10:06 (33) 15:46	
13	04:43	05:29	06:25	06:52 (26) 07:19	08:57 (25) 07:19	09:30 (33) 08:12	
14	21:41	20:57	19:46	16 07:08 (26) 18:32	14 09:11 (25) 16:23	37 10:07 (33) 15:46	
15	04:44	05:31	06:27	06:54 (26) 07:21	08:53 (25) 07:21	09:29 (33) 08:13	
16	21:41	20:55	19:44	18 07:27 (21) 18:29	21 09:14 (25) 16:21	38 10:07 (33) 15:46	
17	04:45	05:33	06:28	06:56 (26) 07:23	08:51 (25) 07:23	09:28 (33) 08:14	
18	21:40	20:53	19:41	23 07:28 (21) 18:27	25 09:16 (25) 16:20	40 10:08 (33) 15:45	
19	04:47	05:34	06:30	06:57 (26) 07:25	08:49 (25) 07:25	09:28 (33) 08:16	
20	21:39	20:51	19:39	25 07:31 (1) 18:24	29 09:18 (25) 16:18	41 10:09 (33) 15:45	
21	04:48	05:36	06:32	06:59 (26) 07:27	08:48 (25) 07:27	09:28 (33) 08:17	
22	21:38	20:49	19:36	25 07:32 (1) 18:22	31 09:19 (25) 16:16	42 10:10 (33) 15:45	
23	04:49	05:38	06:34	07:01 (26) 07:29	08:47 (25) 07:29	09:28 (33) 08:18	
24	21:37	20:47	19:34	32 08:01 (27) 18:20	33 09:20 (25) 16:14	42 10:10 (33) 15:44	
25	04:50	05:40	06:36	07:02 (26) 07:30	08:46 (25) 07:31	09:28 (33) 08:19	
26	21:36	20:45	19:32	38 08:04 (27) 18:17	35 09:21 (25) 16:13	43 10:11 (33) 15:44	
27	04:51	05:42	06:37	07:11 (1) 07:32	08:45 (25) 07:33	09:28 (33) 08:20	
28	21:35	20:43	19:29	41 08:05 (27) 18:15	36 09:21 (25) 16:11	43 10:11 (33) 15:44	
29	04:53	05:43	06:40 (29) 06:39	07:11 (1) 07:34	08:44 (25) 07:35	09:28 (33) 08:21	
30	21:34	20:40	8 06:48 (29) 19:27	44 08:07 (27) 18:13	37 09:21 (25) 16:09	43 10:11 (33) 15:44	
31	04:54	05:45	06:41	07:11 (1) 07:36	08:43 (25) 07:37	09:28 (33) 08:22	
32	21:33	20:38	12 06:49 (29) 19:24	46 08:08 (27) 18:10	39 09:22 (25) 16:08	43 10:11 (33) 15:44	
33	04:55	05:47	06:43 (29) 06:43	07:10 (1) 07:38	08:43 (25) 07:38	09:28 (33) 08:23	
34	21:32	20:36	16 06:51 (29) 19:21	47 08:08 (27) 18:08	39 09:22 (25) 16:06	43 10:11 (33) 15:44	
35	04:57	05:49	06:45 (29) 06:45	07:11 (1) 07:40	08:43 (25) 07:40	09:28 (33) 08:23	
36	21:30	20:34	17 06:52 (29) 19:19	46 08:08 (27) 18:06	39 09:22 (25) 16:05	44 10:12 (33) 15:45	
37	04:58	05:51	06:43 (29) 06:48	07:13 (1) 07:42	08:42 (25) 07:42	09:28 (33) 08:24	
38	21:29	20:32	19 06:52 (29) 19:16	43 08:08 (27) 18:03	40 09:22 (25) 16:03	44 10:12 (33) 15:45	
39	05:00	05:52	06:48	07:15 (1) 07:44	08:42 (25) 07:44	09:28 (33) 08:25	
40	21:28	20:29	29 07:04 (21) 19:14	41 08:08 (27) 18:01	39 09:21 (25) 16:02	44 10:13 (33) 15:45	
41	05:01	05:54	06:52 (29) 06:50	07:17 (1) 07:46	08:42 (25) 07:46	09:30 (33) 08:26	
42	21:26	20:27	34 07:06 (21) 19:11	36 08:08 (27) 17:59	39 09:21 (25) 16:01	43 10:13 (33) 15:46	
43	05:03	05:56	06:52 (29) 06:52	07:39 (27) 07:48	08:42 (25) 07:48	09:30 (33) 08:26	
44	21:25	20:25	36 07:08 (21) 19:09	28 08:07 (27) 17:56	39 09:21 (25) 15:59	43 10:13 (33) 15:46	
45	05:04	05:58	06:51 (29) 06:54	07:39 (27) 07:50	08:42 (25) 07:50	09:31 (33) 08:27	
46	21:23	20:22	37 07:08 (21) 19:06	28 08:07 (27) 17:54	38 09:20 (25) 15:58	42 10:13 (33) 15:47	
47	05:06	06:00	06:51 (29) 06:55	07:39 (27) 07:52	08:43 (25) 07:51	09:31 (33) 08:27	
48	21:22	20:20	38 07:09 (21) 19:04	27 08:06 (27) 17:52	36 09:19 (25) 15:57	43 10:14 (33) 15:47	
49	05:07	06:01	06:52 (29) 06:57	07:40 (27) 06:53	07:43 (25) 07:53	09:31 (33) 08:27	
50	21:20	20:18	38 07:10 (21) 19:01	25 08:05 (27) 16:50	35 08:18 (25) 15:56	44 10:15 (33) 15:48	
51	05:09	06:03	06:51 (29) 06:59	07:41 (27) 06:55	07:44 (25) 07:55	09:05 (22) 08:28	
52	21:19	20:15	38 07:09 (21) 18:59	23 08:04 (27) 16:48	34 08:18 (25) 15:55	51 10:17 (33) 15:49	
53	05:10	06:05	06:53 (29) 07:01	07:41 (27) 06:57	07:44 (25) 07:57	09:03 (22) 08:28	
54	21:17	20:13	36 07:09 (21) 18:56	20 08:01 (27) 16:45	32 08:16 (25) 15:54	56 10:18 (33) 15:49	
55	05:12	06:07	06:56 (29) 07:03	07:43 (27) 06:59	07:46 (25) 07:58	09:02 (22) 08:28	
56	21:16	20:11	34 07:09 (21) 18:54	16 07:59 (27) 16:43	30 08:16 (25) 15:53	60 10:20 (33) 15:50	
57	05:14	06:09	06:57 (29) 07:04	07:45 (27) 07:01	07:47 (25) 08:00	09:02 (22) 08:28	
58	21:14	20:08	32 07:09 (21) 18:51	12 07:57 (27) 16:41	28 08:15 (25) 15:52	61 10:21 (33) 15:51	
59	05:15	06:10	06:58 (29) 07:06	07:03	07:49 (25) 08:01	09:02 (22) 08:28	
60	21:12	20:06	25 07:08 (21) 18:49	16:39	24 08:13 (25) 15:51	62 10:22 (33) 15:52	
61	05:17	06:12	06:46 (21)	07:05	07:51 (25)	08:28	
62	21:10	20:04	21 07:07 (21)	16:37	32 09:54 (33)	15:53	
63	Sonnenscheinstunden	514	461	383	328	257	231
64	astr.max.mögl.Beschattung	35	470	794	824	1278	1983
65	Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
66	Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91
67	Reduktion Windrichtung	0.70	0.68	0.66	0.62	0.59	0.59
68	Gesamte Reduktion	0.27	0.29	0.24	0.18	0.11	0.07
69	Met.wahrsch.Beschattung	10	138	187	149	139	143

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

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 8
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1 08:28		09:14 (22) 07:57	09:58 (33) 06:59	08:32 (25) 06:43	07:07 (26) 05:33	04:42	05:22 (17)
15:54	64	10:33 (32) 16:46	10:28 (33) 17:43	08:39 (25) 19:42	07:22 (26) 20:39	21:30	22 05:44 (17)
2 08:28		09:15 (22) 07:55	09:59 (33) 06:57	08:40	07:06 (26) 05:31	04:41	05:22 (17)
15:56	63	10:33 (32) 16:48	10:27 (33) 17:45	19:44	14 07:20 (26) 20:40	21:31	23 05:45 (17)
3 08:28		09:15 (22) 07:54	10:01 (33) 06:54	06:38	07:05 (21) 05:29	04:41	05:22 (17)
15:57	62	10:33 (32) 16:50	10:27 (33) 17:47	19:46	16 07:21 (21) 20:42	21:32	23 05:45 (17)
4 08:27		09:16 (22) 07:52	10:03 (33) 06:52	06:36	07:03 (21) 05:27	04:40	05:22 (17)
15:58	63	10:34 (32) 16:52	10:25 (33) 17:49	19:48	18 07:21 (21) 20:44	21:33	23 05:45 (17)
5 08:27		09:17 (22) 07:50	08:31 (25) 06:49	06:33	07:02 (21) 05:25	04:39	05:23 (17)
15:59	61	10:33 (32) 16:54	10:23 (33) 17:51	19:50	20 07:22 (21) 20:46	21:34	23 05:46 (17)
6 08:27		09:17 (22) 07:48	08:28 (25) 06:47	06:31	07:01 (21) 05:23	04:38	05:22 (17)
16:01	62	10:33 (32) 16:57	10:19 (33) 17:53	19:52	21 07:22 (21) 20:48	21:35	24 05:46 (17)
7 08:26		09:18 (22) 07:46	08:26 (25) 06:45	06:28	07:00 (21) 05:21	04:37	05:22 (17)
16:02	62	10:34 (32) 16:59	10:24 (33) 17:55	19:54	22 07:22 (21) 20:50	21:36	23 05:45 (17)
8 08:26		09:19 (22) 07:44	08:24 (25) 06:42	06:26	06:50 (20) 05:19	04:37	05:23 (17)
16:03	60	10:34 (32) 17:01	10:25 (33) 17:57	19:56	27 07:22 (21) 20:51	21:37	23 05:46 (17)
9 08:25		09:19 (22) 07:42	08:23 (25) 06:40	07:16 (27) 10:25	06:47 (20) 05:17	04:36	05:23 (17)
16:05	59	10:33 (32) 17:03	10:21 (33) 17:59	19:57	31 07:21 (21) 20:53	21:38	24 05:47 (17)
10 08:24		09:20 (22) 07:40	08:22 (25) 06:37	07:14 (27) 10:21	06:45 (20) 05:15	04:36	05:23 (17)
16:06	58	10:33 (32) 17:05	10:20 (33) 18:01	19:59	35 07:21 (21) 20:55	21:39	23 05:46 (17)
11 08:24		09:21 (22) 07:38	08:22 (25) 06:35	07:11 (27) 10:18	06:43 (20) 05:13	04:35	05:23 (17)
16:08	55	10:32 (32) 17:07	10:23 (33) 18:03	19 07:20 (27) 20:01	37 07:21 (21) 20:57	21:40	24 05:47 (17)
12 08:23		09:23 (22) 07:36	08:21 (25) 06:32	07:10 (27) 10:16	06:40 (20) 05:11	04:35	05:24 (17)
16:09	53	10:32 (32) 17:09	10:24 (33) 18:04	22 07:32 (27) 20:03	39 07:19 (21) 20:59	21:41	23 05:47 (17)
13 08:22		09:24 (22) 07:34	08:21 (25) 06:30	07:08 (27) 10:14	06:40 (20) 05:09	04:34	05:24 (17)
16:11	50	10:31 (32) 17:11	10:25 (33) 18:06	24 07:32 (27) 20:05	36 07:18 (21) 21:00	21:41	24 05:47 (17)
14 08:21		09:25 (22) 07:32	08:20 (25) 06:28	07:08 (27) 10:11	06:40 (20) 05:08	04:34	05:24 (17)
16:13	40	10:30 (32) 17:13	10:26 (33) 18:08	25 07:33 (27) 20:07	34 07:16 (21) 21:02	21:42	23 05:47 (17)
15 08:20		09:26 (22) 07:30	08:19 (25) 06:25	07:06 (27) 10:09	06:39 (20) 05:06	04:34	05:24 (17)
16:14	39	10:29 (32) 17:15	10:27 (33) 18:10	26 07:32 (27) 20:09	28 07:12 (21) 21:04	21:43	24 05:48 (17)
16 08:19		09:27 (22) 07:28	08:19 (25) 06:23	07:06 (27) 10:07	06:39 (20) 05:04	04:34	05:24 (17)
16:16	39	10:29 (32) 17:17	10:28 (33) 18:12	27 07:33 (27) 20:11	21 07:00 (20) 21:05	21:43	24 05:48 (17)
17 08:18		09:28 (22) 07:26	08:19 (25) 06:20	07:05 (27) 10:04	06:39 (20) 05:02	04:34	05:24 (17)
16:18	39	10:30 (33) 17:19	10:29 (33) 18:14	27 07:32 (27) 20:12	20 06:59 (20) 21:07	21:44	24 05:48 (17)
18 08:17		09:29 (22) 07:24	08:20 (25) 06:18	06:42 (1) 10:02	06:39 (20) 05:01	04:34	05:25 (17)
16:20	39	10:29 (33) 17:21	10:30 (33) 18:16	33 07:32 (27) 20:14	19 06:58 (20) 21:09	21:44	23 05:48 (17)
19 08:16		09:31 (33) 07:22	08:19 (25) 06:15	06:39 (1) 10:00	06:40 (20) 04:59	04:34	05:25 (17)
16:21	39	10:30 (33) 17:23	10:31 (33) 18:18	38 07:31 (27) 20:16	17 06:57 (20) 21:10	21:45	23 05:48 (17)
20 08:15		09:32 (33) 07:19	08:19 (25) 06:13	06:37 (1) 09:57	06:41 (20) 04:58	04:34	05:25 (17)
16:23	40	10:31 (33) 17:25	10:32 (33) 18:20	40 07:31 (27) 20:18	14 06:55 (20) 21:12	21:45	23 05:48 (17)
21 08:14		09:33 (33) 07:17	08:20 (25) 06:10	06:34 (1) 09:55	06:43 (20) 04:56	04:34	05:25 (17)
16:25	40	10:31 (33) 17:27	10:33 (33) 18:22	41 07:29 (27) 20:20	10 06:53 (20) 21:14	21:45	24 05:49 (17)
22 08:12		09:34 (33) 07:15	08:20 (25) 06:08	06:33 (1) 09:53	06:46 (20) 04:55	04:34	05:26 (17)
16:27	39	10:31 (33) 17:29	10:34 (33) 18:24	41 07:28 (27) 20:22	2 06:48 (20) 21:15	4 05:30 (17) 21:45	23 05:49 (17)
23 08:11		09:35 (33) 07:13	08:21 (25) 06:05	06:32 (1) 09:50	04:53	05:28 (17) 21:45	23 05:26 (17)
16:29	39	10:31 (33) 17:31	10:35 (33) 18:25	39 07:26 (27) 20:24	12 06:47 (20) 21:17	9 05:37 (17) 21:45	23 05:49 (17)
24 08:10		09:36 (33) 07:10	08:22 (25) 06:03	06:32 (1) 09:48	04:52	05:26 (17) 21:45	23 05:26 (17)
16:31	39	10:31 (33) 17:33	10:36 (33) 18:27	35 07:24 (27) 20:26	21:18	13 05:39 (17) 21:46	23 05:49 (17)
25 08:08		09:37 (33) 07:08	08:22 (25) 06:00	06:31 (1) 09:46	04:51	05:24 (17) 21:46	23 05:27 (17)
16:33	38	10:31 (33) 17:35	10:37 (33) 18:29	29 07:20 (27) 20:27	21:20	15 05:39 (17) 21:46	23 05:50 (17)
26 08:07		09:38 (33) 07:06	08:24 (25) 05:58	06:32 (1) 09:44	04:49	05:24 (17) 21:46	23 05:26 (17)
16:35	38	10:31 (33) 17:37	10:38 (33) 18:31	19 06:51 (1) 20:29	21:21	16 05:40 (17) 21:46	24 05:50 (17)
27 08:05		09:39 (33) 07:04	08:25 (25) 05:55	06:19 (26) 05:41	04:48	05:23 (17) 21:46	24 05:26 (17)
16:36	37	10:31 (33) 17:39	10:39 (33) 18:33	21 06:50 (1) 20:31	21:23	18 05:41 (17) 21:46	24 05:50 (17)
28 08:04		09:40 (33) 07:01	08:26 (25) 05:53	06:17 (26) 05:39	04:47	05:23 (17) 21:46	24 05:27 (17)
16:38	36	10:31 (33) 17:41	10:40 (33) 18:35	22 06:49 (1) 20:33	21:24	19 05:42 (17) 21:46	23 05:50 (17)
29 08:02		09:41 (33) 07:00	08:27 (25) 05:50	06:16 (26) 05:37	04:46	05:23 (17) 21:46	24 05:27 (17)
16:40	35	10:30 (33) 17:43	10:41 (33) 18:37	21 07:46 (1) 20:35	21:26	20 05:43 (17) 21:46	24 05:51 (17)
30 08:01		09:42 (33) 07:00	08:28 (25) 05:48	06:15 (26) 05:35	04:44	05:22 (17) 21:46	24 05:27 (17)
16:42	34	10:30 (33) 17:45	10:42 (33) 18:39	17 07:43 (1) 20:37	21:27	21 05:43 (17) 21:46	24 05:51 (17)
31 07:59		09:43 (33) 07:00	08:29 (25) 05:45	06:14 (26) 05:34	04:43	05:22 (17) 21:46	24 05:51 (17)
16:44	32	10:29 (33) 17:47	10:43 (33) 18:41	13 07:22 (26) 20:39	21:28	21 05:43 (17) 21:46	24 05:51 (17)
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung	1454	834	611	496	156	701	
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45	
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	
Reduktion Windrichtung	0.59	0.61	0.65	0.68	0.70	0.70	
Gesamte Reduktion	0.09	0.13	0.18	0.25	0.31	0.28	
Met.wahrsch.Beschattung	132	108	109	123	49	196	

Tabellen-Layout: Die Daten für jeden Tag 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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 9
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	[Juli]	[August]	[September]	[Oktober]	[November]	[Dezember]
1	04:38	05:27 (17) 05:19	06:14	06:42 (29) 07:08	07:48 (27) 07:07	07:52 (25) 08:03
2	21:45	24 05:51 (17) 21:09	20:01	37 07:20 (21) 18:47	23 08:11 (27) 16:35	29 08:21 (25) 15:50
3	04:39	05:28 (17) 05:20	06:16	06:43 (29) 07:10	07:49 (27) 07:09	07:53 (25) 08:05
4	21:44	24 05:52 (17) 21:07	19:59	35 07:19 (21) 18:44	21 08:10 (27) 16:33	27 08:20 (25) 15:48
5	04:40	05:27 (17) 05:22	06:18	06:45 (29) 07:12	07:50 (27) 07:11	07:54 (25) 08:06
6	21:44	24 05:51 (17) 21:05	19:56	31 07:19 (21) 18:42	17 08:07 (27) 16:31	25 08:19 (25) 15:48
7	04:41	05:28 (17) 05:24	06:19	06:47 (29) 07:14	07:52 (27) 07:13	07:56 (25) 08:08
8	21:43	23 05:51 (17) 21:03	19:54	27 07:19 (21) 18:39	12 08:04 (27) 16:29	22 08:18 (25) 15:48
9	04:41	05:28 (17) 05:26	06:21	06:57 (21) 07:15	07:15	07:58 (25) 08:09
10	21:43	24 05:52 (17) 21:01	19:51	22 07:19 (21) 18:37	16:27	29 09:49 (33) 15:47
11	04:42	05:29 (17) 05:27	06:23	06:57 (21) 07:17	07:17	08:01 (25) 08:10
12	21:42	23 05:52 (17) 20:59	19:49	21 07:18 (21) 18:34	16:25	30 09:53 (33) 15:46
13	04:43	05:29 (17) 05:29	06:25	06:57 (21) 07:19	07:19	09:33 (33) 08:12
14	21:41	23 05:52 (17) 20:57	19:46	20 07:17 (21) 18:32	16:23	22 09:55 (33) 15:46
15	04:44	05:29 (17) 05:31	06:27	06:58 (21) 07:21	07:21	09:31 (33) 08:13
16	21:41	23 05:52 (17) 20:55	19:44	18 07:16 (21) 18:29	16:21	25 09:56 (33) 15:46
17	04:45	05:29 (17) 05:33	06:28	07:08 (21) 07:23	07:23	09:30 (33) 08:14
18	21:40	23 05:52 (17) 20:53	19:41	16 07:14 (21) 18:27	16:20	28 09:27 (33) 15:45
19	04:47	05:30 (17) 05:34	06:30	06:59 (26) 07:25	07:25	09:29 (33) 08:16
20	21:39	22 05:52 (17) 20:51	19:39	14 07:13 (26) 18:24	16:18	30 09:59 (33) 15:45
21	04:48	05:30 (17) 05:36	06:32	06:59 (26) 07:27	07:27	09:29 (33) 08:17
22	21:38	22 05:52 (17) 20:49	19:36	15 07:14 (26) 18:22	16:16	32 10:01 (33) 15:45
23	04:49	05:30 (17) 05:38	06:34	07:01 (26) 07:29	07:29	09:28 (33) 08:18
24	21:37	22 05:52 (17) 20:47	19:34	13 07:14 (26) 18:20	16:14	34 10:02 (33) 15:44
25	04:50	05:31 (17) 05:40	06:36	07:02 (26) 07:30	07:30	09:27 (33) 08:19
26	21:36	21 05:52 (17) 20:45	19:32	15 07:33 (11) 18:17	12 09:15 (25) 16:13	35 10:02 (33) 15:44
27	04:51	05:31 (17) 05:42	06:37	07:04 (26) 07:32	09:00 (25) 07:33	09:27 (33) 08:20
28	21:35	20 05:51 (17) 20:43	19:29	20 07:36 (11) 18:15	18 09:18 (25) 16:11	36 10:03 (33) 15:44
29	04:53	05:32 (17) 05:43	06:39	07:06 (26) 07:34	08:57 (25) 07:35	09:26 (33) 08:21
30	21:34	20 05:52 (17) 20:40	19:27	22 07:38 (11) 18:13	23 09:20 (25) 16:09	37 10:03 (33) 15:44
31	04:54	05:33 (17) 05:45	06:41	07:08 (26) 07:36	08:55 (25) 07:37	09:26 (33) 08:22
1	21:33	18 05:51 (17) 20:38	19:24	21 07:39 (11) 18:10	26 09:21 (25) 16:08	38 10:04 (33) 15:44
2	04:55	05:33 (17) 05:47	06:43	07:09 (26) 07:38	08:54 (25) 07:38	09:26 (33) 08:23
3	21:32	17 05:50 (17) 20:36	19:22	20 07:39 (11) 18:08	28 09:22 (25) 16:06	38 10:04 (33) 15:44
4	04:57	05:34 (17) 05:49	06:45	07:19 (11) 07:40	08:53 (25) 07:40	09:26 (33) 08:23
5	21:30	15 05:49 (17) 20:34	19:19	25 08:06 (27) 18:06	30 09:23 (25) 16:05	39 10:05 (33) 15:45
6	04:58	05:35 (17) 05:51	06:48	07:19 (11) 07:42	08:52 (25) 07:42	09:26 (33) 08:24
7	21:29	14 05:49 (17) 20:32	19:16	33 08:15 (27) 18:03	32 09:24 (25) 16:03	39 10:05 (33) 15:45
8	05:00	05:36 (17) 05:52	06:48	07:19 (11) 07:44	08:51 (25) 07:44	09:27 (33) 08:25
9	21:28	12 05:48 (17) 20:29	19:14	37 08:12 (27) 18:01	33 09:24 (25) 16:02	39 10:06 (33) 15:45
10	05:01	05:38 (17) 05:54	06:50 (29) 06:50	07:19 (11) 07:46	08:50 (25) 07:46	09:27 (33) 08:26
11	21:26	8 05:46 (17) 20:27	5 06:55 (29) 19:11	41 08:14 (27) 17:59	35 09:25 (25) 16:01	40 10:07 (33) 15:46
12	05:03	05:56	06:47 (29) 06:52	07:18 (11) 07:48	08:50 (25) 07:48	09:28 (33) 08:26
13	21:25	20:25	12 06:59 (29) 19:09	42 08:14 (27) 17:56	35 09:25 (25) 15:59	39 10:07 (33) 15:46
14	05:04	05:58	06:45 (29) 06:54	07:20 (11) 07:50	08:49 (25) 07:50	09:28 (33) 08:27
15	21:23	20:22	14 06:59 (29) 19:06	40 08:14 (27) 17:54	36 09:25 (25) 15:58	39 10:07 (33) 15:47
16	05:06	06:00	06:43 (29) 06:55	07:22 (11) 07:52	08:49 (25) 07:51	09:28 (33) 08:27
17	21:22	20:20	18 07:01 (29) 19:04	39 08:15 (27) 17:52	36 09:25 (25) 15:57	39 10:07 (33) 15:47
18	05:07	06:01	06:43 (29) 06:57	07:24 (11) 06:53	07:49 (25) 07:53	09:28 (33) 08:27
19	21:20	20:18	18 07:01 (29) 19:01	35 08:15 (27) 16:50	36 08:25 (25) 15:56	39 10:07 (33) 15:48
20	05:09	06:03	06:41 (29) 06:59	07:26 (11) 06:55	07:49 (25) 07:55	09:28 (33) 08:28
21	21:19	20:15	20 07:01 (29) 18:59	30 08:15 (27) 16:48	35 08:24 (25) 15:55	39 10:07 (33) 15:49
22	05:10	06:05	06:41 (29) 07:01	07:47 (27) 06:57	07:49 (25) 07:57	09:29 (33) 08:28
23	21:17	20:13	20 07:01 (29) 18:56	27 08:14 (27) 16:45	35 08:24 (25) 15:54	39 10:08 (33) 15:49
24	05:12	06:07	06:41 (29) 07:03	07:47 (27) 06:59	07:50 (25) 07:58	09:30 (33) 08:28
25	21:16	20:11	29 07:15 (21) 18:54	26 08:13 (27) 16:43	34 08:24 (25) 15:53	40 10:10 (33) 15:50
26	05:14	06:09	06:41 (29) 07:04	07:47 (27) 07:01	07:50 (25) 08:00	09:06 (22) 08:28
27	21:14	20:08	33 07:17 (21) 18:51	26 08:13 (27) 16:41	34 08:24 (25) 15:52	49 10:12 (33) 15:51
28	05:15	06:10	06:40 (29) 07:06	07:48 (27) 07:03	07:51 (25) 08:01	09:05 (22) 08:28
29	21:12	20:06	37 07:19 (21) 18:49	24 08:12 (27) 16:39	32 08:23 (25) 15:51	53 10:14 (33) 15:52
30	05:17	06:12	06:40 (29) 07:05	07:05	07:51 (25) 08:01	08:28
31	21:10	20:04	39 07:19 (21) 18:45	16:37	31 08:22 (25) 16:37	15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	422	245	792	654	1050	1914
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91
Reduktion Windrichtung	0.70	0.68	0.66	0.62	0.59	0.59
Gesamte Reduktion	0.27	0.29	0.23	0.18	0.11	0.07
Met.wahrsch.Beschattung	116	72	185	117	115	138

Tabellen-Layout: Die Daten für jeden Tag 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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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 10
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersiezug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1 08:28		10:50 (33) 07:57	09:01 (25) 06:59	06:43	07:07 (26) 05:33	04:42	
15:54	45	11:35 (33) 16:46	09:43 (25) 17:43	19:42	07:48 (1) 20:39	21:29	
2 08:28		10:51 (33) 07:55	09:00 (25) 06:57	06:40	07:04 (26) 05:31	04:41	
15:56	45	11:36 (33) 16:48	09:44 (25) 17:45	19:44	07:23 (26) 20:40	21:31	
3 08:28		10:51 (33) 07:54	09:01 (25) 06:54	06:38	07:04 (26) 05:29	04:41	
15:57	45	11:36 (33) 16:50	09:45 (25) 17:47	19:46	07:23 (26) 20:42	21:32	
4 08:27		10:52 (33) 07:52	09:01 (25) 06:52	06:36	07:04 (26) 05:27	04:40	
15:58	45	11:37 (33) 16:52	09:46 (25) 17:49	19:48	07:21 (26) 20:44	21:33	
5 08:27		10:52 (33) 07:50	09:01 (25) 06:49	06:33	07:06 (21) 05:25	04:39	
15:59	45	11:37 (33) 16:54	09:00 (25) 17:51	19:50	07:23 (26) 20:46	21:34	
6 08:27		10:52 (33) 07:48	09:01 (25) 06:47	07:32 (27) 06:31	07:03 (21) 05:23	04:38	
16:01	45	11:37 (33) 16:57	09:46 (25) 17:53	11 07:43 (27) 19:52	18 07:21 (21) 20:48	21:35	
7 08:26		10:53 (33) 07:46	09:01 (25) 06:45	07:29 (27) 06:28	07:01 (21) 05:21	04:37	
16:02	45	11:38 (33) 16:59	09:47 (25) 17:55	18 07:47 (27) 19:54	21 07:22 (21) 20:50	21:36	
8 08:26		10:53 (33) 07:44	09:00 (25) 06:42	07:26 (27) 06:26	07:00 (21) 05:19	04:37	
16:03	45	11:38 (33) 17:01	09:46 (25) 17:57	22 07:48 (27) 19:56	24 07:24 (21) 20:51	21:37	
9 08:25		10:53 (33) 07:42	09:00 (25) 06:40	07:25 (27) 06:23	06:59 (21) 05:17	04:36	
16:05	45	11:38 (33) 17:03	09:46 (25) 17:59	25 07:50 (27) 19:57	25 07:24 (21) 20:53	21:38	
10 08:24		10:54 (33) 07:40	09:00 (25) 06:37	07:24 (27) 06:21	06:58 (21) 05:15	04:36	
16:06	44	11:38 (33) 17:05	09:46 (25) 18:01	27 07:51 (27) 19:59	26 07:24 (21) 20:55	21:39	
11 08:24		10:54 (33) 07:38	09:01 (25) 06:35	07:22 (27) 06:18	06:58 (21) 05:13	04:35	
16:08	45	11:39 (33) 17:07	09:46 (25) 18:03	29 07:51 (27) 20:01	27 07:25 (21) 20:57	21:40	
12 08:23		10:55 (33) 07:36	09:01 (25) 06:32	07:22 (27) 06:16	06:42 (29) 05:11	04:35	
16:09	44	11:39 (33) 17:09	09:46 (25) 18:04	30 07:52 (27) 20:03	38 07:24 (21) 20:59	21:41	
13 08:22		10:55 (33) 07:34	09:02 (25) 06:30	07:20 (27) 06:14	06:39 (29) 05:09	04:34	
16:11	44	11:39 (33) 17:11	09:45 (25) 18:06	32 07:52 (27) 20:05	43 07:24 (21) 21:00	21:41	
14 08:21		10:56 (33) 07:32	09:03 (25) 06:28	07:20 (27) 06:11	06:37 (29) 05:08	04:34	
16:13	43	11:39 (33) 17:13	09:45 (25) 18:08	33 07:53 (27) 20:07	46 07:23 (21) 21:02	21:42	
15 08:20		10:57 (33) 07:30	09:02 (25) 06:25	07:19 (27) 06:09	06:36 (29) 05:06	04:34	
16:14	43	11:40 (33) 17:15	09:44 (25) 18:10	33 07:52 (27) 20:09	47 07:23 (21) 21:04	21:43	
16 08:19		10:57 (33) 07:28	09:03 (25) 06:23	07:19 (27) 06:07	06:35 (29) 05:04	04:34	
16:16	43	11:40 (33) 17:17	09:43 (25) 18:12	34 07:53 (27) 20:11	48 07:23 (21) 21:05	21:43	
17 08:18		10:58 (33) 07:26	09:04 (25) 06:20	06:45 (1) 06:04	06:34 (29) 05:02	04:34	
16:18	42	11:40 (33) 17:19	09:42 (25) 18:14	43 07:52 (27) 20:12	48 07:22 (21) 21:07	21:44	
18 08:17		10:58 (33) 07:24	09:06 (25) 06:18	06:43 (1) 06:02	06:33 (29) 05:01	04:34	
16:20	42	11:40 (33) 17:21	09:41 (25) 18:16	47 07:52 (27) 20:14	48 07:21 (21) 21:09	21:44	
19 08:16		09:14 (25) 07:22	09:06 (25) 06:15	06:40 (1) 05:59	06:33 (29) 04:59	04:34	
16:21	52	11:40 (33) 17:23	09:39 (25) 18:18	50 07:50 (27) 20:16	47 07:20 (21) 21:10	21:45	
20 08:15		09:12 (25) 07:19	09:08 (25) 06:13	06:39 (1) 05:57	06:32 (29) 04:58	04:34	
16:23	55	11:40 (33) 17:25	09:38 (25) 18:20	51 07:50 (27) 20:18	45 07:18 (21) 21:12	21:45	
21 08:14		09:10 (25) 07:17	09:10 (25) 06:10	06:37 (1) 05:55	06:33 (29) 04:56	04:34	
16:25	58	11:39 (33) 17:27	09:36 (25) 18:22	52 07:48 (27) 20:20	41 07:17 (21) 21:14	21:45	
22 08:12		09:09 (25) 07:15	09:12 (25) 06:08	06:37 (1) 05:53	06:32 (29) 04:55	04:34	
16:27	61	11:39 (33) 17:29	09:33 (25) 18:24	51 07:48 (27) 20:22	37 07:14 (21) 21:15	21:45	
23 08:11		09:07 (25) 07:13	09:15 (25) 06:05	06:36 (1) 05:50	06:32 (29) 04:53	04:34	
16:29	62	11:38 (33) 17:31	09:29 (25) 18:25	48 07:45 (27) 20:24	27 07:09 (21) 21:17	21:45	
24 08:10		09:06 (25) 07:10	06:03	06:36 (1) 05:48	06:33 (29) 04:52	04:35	
16:31	62	11:37 (33) 17:33	18:27	46 07:44 (27) 20:26	22 06:55 (29) 21:18	21:46	
25 08:08		09:05 (25) 07:08	06:00	06:35 (1) 05:46	06:33 (29) 04:51	04:35	
16:33	63	11:37 (33) 17:35	18:29	41 07:41 (27) 20:27	21 06:54 (29) 21:20	21:46	
26 08:07		09:04 (25) 07:06	05:58	06:35 (1) 05:44	06:34 (29) 04:49	04:35	
16:35	63	11:36 (33) 17:37	18:31	34 07:37 (27) 20:29	19 06:53 (29) 21:21	21:46	
27 08:05		09:03 (25) 07:04	05:55	06:19 (26) 05:41	06:36 (29) 04:48	04:36	
16:36	62	11:34 (33) 17:39	18:33	27 06:58 (1) 20:31	15 06:51 (29) 21:23	21:45	
28 08:04		09:03 (25) 07:01	05:53	06:17 (26) 05:39	06:38 (29) 04:47	04:36	
16:38	61	11:34 (33) 17:41	18:35	28 06:57 (1) 20:33	11 06:49 (29) 21:24	21:45	
29 08:02		09:03 (25)	06:50	07:14 (26) 05:37	06:41 (29) 04:46	04:37	
16:40	56	11:31 (33)	19:37	30 07:56 (1) 20:35	4 06:45 (29) 21:26	21:45	
30 08:01		09:02 (25)	06:48	07:12 (26) 05:35	04:44	04:38	
16:42	52	11:28 (33)	19:39	30 07:54 (1) 20:37	04:43	21:27	21:45
31 07:59		09:01 (25)	06:45	07:09 (26)	04:43		
16:44	42	09:43 (25)	19:40	27 07:51 (1)	21:28		
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung	1544	903	899	840			
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41			
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91			
Reduktion Windrichtung	0.57	0.59	0.65	0.68			
Gesamte Reduktion	0.09	0.12	0.18	0.25			
Met.wahrsch.Beschattung	136	112	161	208			

Tabellen-Layout: Die Daten für jeden Tag 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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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 11
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38 05:19		06:14	06:57 (21) 07:08	08:00 (27) 07:07	08:30 (25) 08:03
2	21:45 21:09		20:01	27 07:24 (21) 18:46	32 08:32 (27) 16:35	45 09:15 (25) 15:50
3	04:39 05:20		06:16	06:56 (21) 07:10	08:01 (27) 07:09	08:30 (25) 08:05
4	21:44 21:07		19:59	26 07:22 (21) 18:44	30 08:31 (27) 16:33	45 09:15 (25) 15:49
5	04:40 05:22		06:18	06:57 (21) 07:12	08:00 (27) 07:11	08:30 (25) 08:06
6	21:44 21:05		19:56	25 07:22 (21) 18:42	29 08:29 (27) 16:31	45 09:15 (25) 15:48
7	04:41 05:24		06:19	06:57 (21) 07:14	08:01 (27) 07:13	08:30 (25) 08:08
8	21:43 21:03		19:54	24 07:21 (21) 18:39	26 08:27 (27) 16:29	46 09:16 (25) 15:48
9	04:41 05:26		06:21	06:58 (21) 07:15	08:03 (27) 07:15	08:30 (25) 08:09
10	21:43 21:01		19:51	22 07:20 (21) 18:37	23 08:28 (27) 16:27	46 09:16 (25) 15:47
11	04:42 05:27		06:23	06:59 (21) 07:17	08:04 (27) 07:17	08:31 (25) 08:10
12	21:42 20:59		19:49	18 07:17 (21) 18:34	20 08:24 (27) 16:25	45 09:16 (25) 15:46
13	04:43 05:29		06:25	07:01 (21) 07:19	08:07 (27) 07:19	08:31 (25) 08:12
14	21:41 20:57		19:46	14 07:15 (21) 18:32	14 08:21 (27) 16:23	44 09:15 (25) 15:46
15	04:44 05:31		06:27	07:00 (26) 07:21	08:12 (27) 07:21	08:31 (25) 08:13
16	21:41 20:55		19:44	16 07:16 (26) 18:29	3 08:15 (27) 16:21	44 09:15 (25) 15:46
17	04:45 05:33		06:28	06:58 (26) 07:23	07:23	08:31 (25) 08:14
18	21:40 20:53		19:41	18 07:16 (26) 18:27	16:20	44 09:15 (25) 15:45
19	04:47 05:34		06:30	06:57 (26) 07:25	07:25	08:32 (25) 08:16
20	21:39 20:51		19:39	19 07:16 (26) 18:24	16:18	42 09:14 (25) 15:45
21	04:48 05:36		06:32	06:59 (26) 07:27	07:27	08:33 (25) 08:17
22	21:38 20:49		19:36	20 07:39 (1) 18:22	16:16	42 09:15 (25) 15:45
23	04:49 05:38		06:34	07:01 (26) 07:29	07:29	08:34 (25) 08:18
24	21:37 20:47		19:34	27 07:43 (1) 18:20	16:14	52 11:00 (33) 15:44
25	04:50 05:40		06:36	07:02 (26) 07:30	07:30	08:34 (25) 08:19
26	21:36 20:45		19:31	29 07:44 (1) 18:17	16:13	57 11:03 (33) 15:44
27	04:51 05:42		06:37	07:04 (26) 07:32	07:33	08:35 (25) 08:20
28	21:35 20:43	7 06:47 (29) 19:29	31 07:46 (1) 18:15	16:11	62 11:06 (33) 15:44	
29	04:53 05:43	06:45 (29) 06:39	07:06 (26) 07:34	07:35	08:36 (25) 08:21	
30	21:34 20:40	12 06:57 (29) 19:26	30 07:47 (1) 18:13	16:09	62 11:07 (33) 15:44	
31	04:54 05:45	16 06:42 (29) 06:41	07:08 (26) 07:36	07:37	08:37 (25) 08:22	
32	21:33 20:38	16 06:58 (29) 19:24	27 07:47 (1) 18:10	16:08	63 11:09 (33) 15:44	
33	04:55 05:47	06:41 (29) 06:43	07:09 (26) 07:38	07:38	08:38 (25) 08:23	
34	21:32 20:36	19 07:00 (29) 19:21	33 08:24 (27) 18:08	16:06	64 11:10 (33) 15:44	
35	04:57 05:49	06:40 (29) 06:44	07:22 (1) 07:40	09:52 (25) 07:40	08:40 (25) 08:23	
36	21:30 20:34	21 07:01 (29) 19:19	41 08:28 (27) 18:06	3 09:55 (25) 16:05	62 11:11 (33) 15:45	
37	04:58 05:51	06:38 (29) 06:46	07:22 (1) 07:42	09:45 (25) 07:42	08:41 (25) 08:24	
38	21:29 20:32	23 07:01 (29) 19:16	46 08:30 (27) 18:03	17 10:02 (25) 16:03	62 11:12 (33) 15:45	
39	05:00 05:52	06:38 (29) 06:48	07:22 (1) 07:44	09:42 (25) 07:44	08:44 (25) 08:25	
40	21:28 20:29	29 07:16 (21) 19:14	48 08:32 (27) 18:01	23 10:05 (25) 16:02	61 11:14 (33) 15:45	
41	05:01 05:54	06:37 (29) 06:50	07:22 (1) 07:46	09:40 (25) 07:46	08:46 (25) 08:25	
42	21:26 20:27	39 07:20 (21) 19:11	51 08:33 (27) 17:59	27 10:07 (25) 16:01	58 11:15 (33) 15:46	
43	05:03 05:56	06:37 (29) 06:52	07:22 (1) 07:48	09:38 (25) 07:48	08:48 (25) 08:26	
44	21:25 20:25	43 07:22 (21) 19:09	51 08:33 (27) 17:56	31 10:09 (25) 15:59	55 11:16 (33) 15:46	
45	05:04 05:58	06:36 (29) 06:54	07:22 (1) 07:50	09:36 (25) 07:50	08:51 (25) 08:27	
46	21:23 20:22	45 07:22 (21) 19:06	51 08:33 (27) 17:54	34 10:10 (25) 15:58	51 11:17 (33) 15:47	
47	05:06 06:00	06:36 (29) 06:55	07:23 (1) 07:52	09:35 (25) 07:51	10:36 (33) 08:27	
48	21:22 20:20	48 07:24 (21) 19:04	51 08:34 (27) 17:52	36 10:11 (25) 15:57	42 11:18 (33) 15:47	
49	05:07 06:01	06:37 (29) 06:57	07:25 (1) 06:53	08:34 (25) 07:53	10:35 (33) 08:27	
50	21:20 20:18	48 07:25 (21) 19:01	47 08:34 (27) 16:50	38 09:12 (25) 15:56	42 11:17 (33) 15:48	
51	05:09 06:03	06:36 (29) 06:59	07:27 (1) 06:55	08:33 (25) 07:55	10:36 (33) 08:28	
52	21:19 20:15	48 07:24 (21) 18:59	44 08:34 (27) 16:48	40 09:13 (25) 15:55	42 11:18 (33) 15:49	
53	05:10 06:05	06:37 (29) 07:01	08:00 (27) 06:57	08:32 (25) 07:57	10:36 (33) 08:28	
54	21:17 20:13	48 07:25 (21) 18:56	33 08:33 (27) 16:45	41 09:13 (25) 15:54	43 11:19 (33) 15:49	
55	05:12 06:07	06:37 (29) 07:03	08:00 (27) 06:59	08:32 (25) 07:58	10:36 (33) 08:28	
56	21:16 20:11	48 07:25 (21) 18:54	33 08:33 (27) 16:43	43 09:15 (25) 15:53	44 11:20 (33) 15:50	
57	05:14 06:09	06:38 (29) 07:04	08:00 (27) 07:01	08:31 (25) 08:00	10:36 (33) 08:28	
58	21:14 20:08	46 07:24 (21) 18:51	33 08:33 (27) 16:41	44 09:15 (25) 15:52	44 11:20 (33) 15:51	
59	05:15 06:10	06:39 (29) 07:06	08:00 (27) 07:03	08:31 (25) 08:01	10:37 (33) 08:28	
60	21:12 20:06	43 07:24 (21) 18:49	32 08:32 (27) 16:39	44 09:15 (25) 15:51	44 11:21 (33) 15:52	
61	05:17 06:12	06:42 (29)	07:05	08:30 (25)	08:28	10:50 (33)
62	21:10 20:04	38 07:24 (21)	16:37	45 09:15 (25)	15:53	44 11:34 (33)
63	Sonnenscheinstunden	514 461	383	328	257	231
64	astr.max.mögl.Beschattung	621	967	643	1498	1379
65	Red.Sonnenscheinwahrsch.	0.48	0.40	0.33	0.21	0.14
66	Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91
67	Reduktion Windrichtung	0.68	0.66	0.60	0.58	0.57
68	Gesamte Reduktion	0.29	0.23	0.18	0.11	0.07
69	Met.wahrsch.Beschattung	182	226	113	160	96

Tabellen-Layout: Die Daten für jeden Tag 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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	---------------------------	----------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt: 151008_Miltzow_III-VII

Ausdruck/Seite: 13/10/2015 13:57 / 12

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

André Gefke / andre.gefke@i17-wind.de Berechnet: 13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: E - IO5

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]

Table with 12 columns (Jan, Feb, Mär, Apr, Mai, Jun, Jul, Aug, Sep, Okt, Nov, Dez) and 1 row of values: 1.39, 2.32, 3.70, 5.75, 8.12, 7.70, 7.33, 7.20, 5.12, 3.48, 1.79, 1.03

Betriebsdauer je Sektor

Table with 11 columns (N, NNO, ONO, O, OSO, SSO, S, SSW, WSW, W, WNW, NNW) and 1 row of values: 346, 330, 400, 570, 528, 528, 741, 991, 1,022, 1,224, 934, 356, 7,971

: Startwindgeschw. aus Leistungskennlinie

Main shadow calculation table with columns for months (Januar to Juni) and rows for each day (1 to 31), containing times and shading data.

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)

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 13

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

-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
: 346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	[Juli]	[August]	[September]	[Oktober]	[November]	[Dezember]		
1	04:38	05:29 (17) 05:19	06:14	06:44 (29) 07:08	07:53 (27) 07:07	08:00 (25) 08:03	09:43 (33)	
2	04:39	25 05:54 (17) 21:09	20:01	37 07:24 (21) 18:47	27 08:20 (27) 16:35	36 08:36 (25) 15:50	39 10:22 (33)	
3	04:40	05:30 (17) 05:20	06:16	06:43 (29) 07:10	07:54 (27) 07:09	08:01 (25) 08:05	09:44 (33)	
4	04:41	24 05:54 (17) 21:07	19:59	39 07:24 (21) 18:44	25 08:19 (27) 16:33	34 08:35 (25) 15:46	38 10:22 (33)	
5	04:41	05:29 (17) 05:22	06:18	06:45 (29) 07:12	07:53 (27) 07:11	08:01 (25) 08:06	09:17 (22)	
6	04:42	25 05:54 (17) 21:05	19:56	36 07:24 (21) 18:42	25 08:18 (27) 16:31	33 08:34 (25) 15:48	41 10:23 (32)	
7	04:42	05:30 (17) 05:24	06:19	06:47 (29) 07:14	07:54 (27) 07:13	08:02 (25) 08:08	09:15 (22)	
8	04:43	24 05:54 (17) 21:03	19:54	35 07:25 (21) 18:39	22 08:16 (27) 16:29	33 08:35 (25) 15:48	47 10:24 (32)	
9	04:41	05:30 (17) 05:26	06:21	06:49 (29) 07:15	07:55 (27) 07:15	08:03 (25) 08:09	09:15 (22)	
10	04:43	25 05:55 (17) 21:01	19:51	31 07:25 (21) 18:37	20 08:15 (27) 16:27	31 08:34 (25) 15:47	49 10:25 (32)	
11	04:42	05:31 (17) 05:27	06:23	07:01 (21) 07:17	07:57 (27) 07:17	08:04 (25) 08:10	09:14 (22)	
12	04:42	25 05:55 (17) 20:59	19:49	23 07:24 (21) 18:34	16 08:13 (27) 16:25	29 08:33 (25) 15:46	52 10:26 (32)	
13	04:43	05:31 (17) 05:29	06:25	07:01 (21) 07:19	07:59 (27) 07:19	08:05 (25) 08:12	09:14 (22)	
14	04:43	24 05:55 (17) 20:57	19:46	23 07:24 (21) 18:32	11 08:10 (27) 16:23	27 08:32 (25) 15:46	52 10:27 (32)	
15	04:44	05:31 (17) 05:31	06:27	07:02 (21) 07:21	07:21	08:06 (25) 08:13	09:13 (22)	
16	04:41	24 05:55 (17) 20:55	19:44	22 07:24 (21) 18:29	16:21	24 08:30 (25) 15:46	55 10:28 (32)	
17	04:45	05:31 (17) 05:33	06:28	07:01 (21) 07:23	07:23	08:07 (25) 08:14	09:14 (22)	
18	04:42	24 05:55 (17) 20:53	19:41	21 07:22 (21) 18:27	16:20	33 10:02 (33) 15:45	55 10:29 (32)	
19	04:47	05:31 (17) 05:34	06:30	07:02 (21) 07:25	07:25	08:09 (25) 08:16	09:14 (22)	
20	04:48	24 05:55 (17) 20:51	19:39	19 07:21 (21) 18:24	16:18	36 10:06 (33) 15:45	57 10:30 (32)	
21	04:48	05:32 (17) 05:36	06:32	07:03 (21) 07:27	07:27	08:13 (25) 08:17	09:14 (22)	
22	04:48	23 05:55 (17) 20:49	19:36	17 07:20 (21) 18:22	16:16	34 10:09 (33) 15:45	57 10:31 (32)	
23	04:49	05:32 (17) 05:38	06:34	07:02 (26) 07:29	07:29	08:18 (25) 08:18	09:14 (22)	
24	04:49	23 05:55 (17) 20:47	19:34	16 07:18 (21) 18:20	16:14	27 10:10 (33) 15:44	58 10:31 (32)	
25	04:50	05:32 (17) 05:40	06:36	07:02 (26) 07:30	07:31	08:19 (25) 08:19	09:15 (22)	
26	04:50	23 05:55 (17) 20:45	19:32	15 07:17 (26) 18:17	16:13	28 10:12 (33) 15:44	58 10:32 (32)	
27	04:51	05:33 (17) 05:42	06:37	07:04 (26) 07:32	07:33	09:43 (33) 08:20	09:14 (22)	
28	04:51	21 05:54 (17) 20:43	19:29	13 07:17 (26) 18:15	16:11	30 10:13 (33) 15:44	59 10:32 (32)	
29	04:53	05:34 (17) 05:43	06:39	07:06 (26) 07:34	07:35	09:42 (33) 08:21	09:15 (22)	
30	04:53	21 05:55 (17) 20:40	19:27	19 07:39 (1) 18:13	16:09	32 10:14 (33) 15:44	59 10:33 (32)	
31	04:54	05:34 (17) 05:45	06:41	07:08 (26) 07:36	07:37	09:41 (33) 08:22	09:15 (22)	
1	04:54	20 05:54 (17) 20:38	19:24	22 07:42 (1) 18:10	16:08	34 10:15 (33) 15:44	60 10:34 (32)	
2	04:55	05:35 (17) 05:47	06:43	07:09 (26) 07:38	07:38	09:41 (33) 08:23	09:16 (22)	
3	04:55	18 05:53 (17) 20:36	19:21	22 07:42 (1) 18:08	15 09:27 (25) 16:06	34 10:15 (33) 15:44	59 10:34 (32)	
4	04:57	05:35 (17) 05:49	06:45	07:11 (26) 07:40	07:40	09:09 (25) 07:40	09:41 (33) 08:23	09:16 (22)
5	04:57	18 05:53 (17) 20:34	19:19	21 07:43 (1) 18:06	20 09:29 (25) 16:05	35 10:16 (33) 15:45	60 10:35 (32)	
6	04:58	05:37 (17) 05:51	06:48	07:24 (1) 07:42	07:42	09:07 (25) 07:42	09:40 (33) 08:24	09:17 (22)
7	04:58	15 05:52 (17) 20:32	19:16	20 07:44 (1) 18:03	24 09:31 (25) 16:03	37 10:17 (33) 15:45	59 10:36 (32)	
8	05:00	05:38 (17) 05:52	06:48	07:23 (1) 07:44	07:44	09:06 (25) 07:44	09:41 (33) 08:25	09:17 (22)
9	05:00	21 05:51 (17) 20:29	19:14	21 07:44 (1) 18:01	26 09:32 (25) 16:02	37 10:18 (33) 15:45	59 10:36 (32)	
10	05:01	05:39 (17) 05:54	06:50	07:23 (1) 07:46	07:46	09:04 (25) 07:46	09:41 (33) 08:26	09:18 (22)
11	05:01	10 05:49 (17) 20:27	19:11	32 08:16 (27) 17:59	29 09:33 (25) 16:01	38 10:19 (33) 15:46	59 10:37 (32)	
12	05:03	05:42 (17) 05:56	06:52	07:22 (1) 07:48	07:48	09:03 (25) 07:48	09:41 (33) 08:26	09:18 (22)
13	05:03	6 05:48 (17) 20:25	19:09	37 08:17 (27) 17:56	31 09:34 (25) 15:59	38 10:19 (33) 15:46	59 10:37 (32)	
14	05:04	05:58	06:50 (29) 06:54	07:22 (1) 07:50	07:50	09:02 (25) 07:50	09:41 (33) 08:27	09:19 (22)
15	05:04	21 05:58 (17) 20:22	19:06	40 08:19 (27) 17:54	33 09:35 (25) 15:58	39 10:20 (33) 15:47	59 10:38 (32)	
16	05:06	06:00	06:49 (29) 06:55	07:22 (1) 07:52	07:52	09:01 (25) 07:51	09:41 (33) 08:27	09:19 (22)
17	05:06	20 06:00	19:04	42 08:20 (27) 17:52	34 09:35 (25) 15:57	39 10:20 (33) 15:47	59 10:38 (32)	
18	05:07	06:01	06:47 (29) 06:57	07:24 (1) 06:53	06:53	08:01 (25) 07:53	09:41 (33) 08:27	09:19 (22)
19	05:07	20 06:00	19:01	41 08:21 (27) 17:51	35 09:36 (25) 15:56	39 10:20 (33) 15:48	60 10:38 (32)	
20	05:09	06:03	06:45 (29) 06:59	07:26 (1) 06:55	06:55	08:00 (25) 07:55	09:41 (33) 08:28	09:19 (22)
21	05:09	21 06:00	19:02	43 08:21 (27) 17:50	36 09:36 (25) 15:56	39 10:20 (33) 15:49	60 10:38 (32)	
22	05:10	06:05	06:45 (29) 07:01	07:27 (1) 06:57	06:57	08:00 (25) 07:57	09:41 (33) 08:28	09:21 (22)
23	05:10	20 06:00	19:01	41 08:21 (27) 17:49	36 09:36 (25) 15:54	40 10:21 (33) 15:49	59 10:39 (32)	
24	05:12	06:07	06:44 (29) 07:03	07:29 (1) 06:59	06:59	08:00 (25) 07:58	09:42 (33) 08:28	09:21 (22)
25	05:12	21 06:00	19:02	43 08:21 (27) 17:48	37 09:37 (25) 15:53	39 10:21 (33) 15:50	59 10:40 (32)	
26	05:14	06:09	06:44 (29) 07:04	07:33 (1) 06:57	06:57	08:00 (25) 08:00	09:43 (33) 08:28	09:22 (22)
27	05:14	21 06:00	19:03	43 08:21 (27) 17:47	37 09:37 (25) 15:52	39 10:22 (33) 15:51	59 10:40 (32)	
28	05:15	06:10	06:43 (29) 07:06	07:35 (1) 06:58	06:58	08:00 (25) 08:01	09:43 (33) 08:28	09:22 (22)
29	05:15	21 06:00	19:03	43 08:21 (27) 17:46	37 09:37 (25) 15:51	39 10:22 (33) 15:51	59 10:40 (32)	
30	05:17	06:12	06:43 (29) 07:08	07:35 (1) 06:59	06:59	08:00 (25) 08:00	09:43 (33) 08:28	09:23 (22)
31	05:17	20 06:00	19:04	43 08:21 (27) 17:45	37 09:37 (25) 15:50	39 10:22 (33) 15:51	59 10:40 (32)	
1	05:10	20:04	35 07:22 (21) 16:37	36 08:36 (25) 16:37	36 08:36 (25) 15:53	58 10:40 (32)		
Sonnenscheinstunden	514	461	383	328	257	231		
astr.max.mögl.Beschattung	455	188	824	611	1033	1723		
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14		
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91		
Reduktion Windrichtung	0.70	0.68	0.66	0.61	0.59	0.59		
Gesamte Reduktion	0.27	0.29	0.23	0.18	0.11	0.07		
Met.wahrsch.Beschattung	124	55	193	109	112	123		

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	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 14

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1 08:28	13:58 (29) 07:57		14:13 (29) 06:59	16:53 (17) 06:43	18:38 (31) 05:33	04:42	20:10 (18)
2 15:54	64 15:12 (25) 15:46	28	14:41 (29) 17:43	14	17:07 (17) 19:42	28	19:06 (31) 20:39
3 08:28	13:58 (29) 07:54	24	14:39 (29) 17:45	18	17:08 (17) 19:44	28	18:37 (31) 05:31
4 08:27	13:59 (29) 07:52	21	14:38 (29) 17:47	21	17:10 (17) 19:46	28	19:05 (31) 20:42
5 08:27	13:58 (29) 07:50	15	14:26 (29) 17:49	23	17:10 (17) 19:48	28	19:04 (31) 20:44
6 08:27	13:59 (29) 07:48	5	14:31 (29) 17:51	24	17:11 (17) 19:50	27	19:04 (31) 20:46
7 08:26	13:59 (29) 07:46		17:53	26	17:11 (17) 19:52	27	19:03 (31) 20:48
8 08:26	13:59 (29) 07:44		17:55	26	17:11 (17) 19:54	25	19:02 (31) 20:50
9 08:25	13:59 (29) 07:42		17:57	27	17:11 (17) 19:55	24	19:02 (31) 20:51
10 08:24	13:59 (29) 07:40		17:59	26	17:11 (17) 19:57	21	18:59 (31) 20:53
11 08:24	13:59 (29) 07:38		18:00	26	17:10 (17) 19:59	18	18:58 (31) 20:55
12 08:23	13:59 (29) 07:36		18:02	24	17:09 (17) 20:01	14	18:55 (31) 20:57
13 08:22	13:59 (29) 07:34		18:04	23	17:08 (17) 20:03	5	18:51 (31) 20:59
14 08:21	13:59 (29) 07:32		18:06	21	17:07 (17) 20:05		18:50 (31) 21:00
15 08:20	13:59 (29) 07:30		18:08	18	17:05 (17) 20:07	24	20:06 (18) 04:34
16 08:19	13:59 (29) 07:28		18:10	14	17:03 (17) 20:09	21	20:06 (18) 04:34
17 08:18	13:59 (29) 07:26		18:12	12	17:02 (17) 20:11	18	20:06 (18) 04:34
18 08:17	13:59 (29) 07:24		18:14	8	17:00 (17) 20:13	14	20:06 (18) 04:34
19 08:16	13:59 (29) 07:22		18:16	12	17:00 (17) 20:15	11	20:06 (18) 04:34
20 08:15	13:59 (29) 07:20		18:18	14	17:00 (17) 20:17	10	20:06 (18) 04:34
21 08:14	13:59 (29) 07:18		18:20	17	17:00 (17) 20:19	9	20:06 (18) 04:34
22 08:12	13:59 (29) 07:16		18:22	16	17:00 (17) 20:21	8	20:06 (18) 04:34
23 08:11	13:59 (29) 07:14		18:24	16	17:00 (17) 20:23	8	20:06 (18) 04:34
24 08:10	13:59 (29) 07:12		18:26	14	17:00 (17) 20:25	7	20:06 (18) 04:34
25 08:08	13:59 (29) 07:10		18:28	11	17:00 (17) 20:27	6	20:06 (18) 04:34
26 08:07	13:59 (29) 07:08		18:30	9	17:00 (17) 20:29	5	20:06 (18) 04:34
27 08:05	13:59 (29) 07:06		18:32	14	17:00 (17) 20:31	4	20:06 (18) 04:34
28 08:04	13:59 (29) 07:04		18:34	18	17:00 (17) 20:33	3	20:06 (18) 04:34
29 08:02	13:59 (29) 07:02		18:36	21	17:00 (17) 20:35	2	20:06 (18) 04:34
30 08:00	13:59 (29) 07:00		18:38	23	17:00 (17) 20:37	1	20:06 (18) 04:34
31 07:59	13:59 (29) 06:58		18:40	25	17:00 (17) 20:39		20:06 (18) 04:34
16:44	30 14:42 (29)		19:40	27	19:05 (31)		21:28
Sonnenscheinstunden	248	272	367	421	496	512	73
astr.max.mögl.Beschattung	1949	100	588	273	629	0.45	0.91
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.63	0.79
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Reduktion Windrichtung	0.67	0.67	0.68	0.68	0.68	0.68	0.68
Gesamte Reduktion	0.11	0.15	0.20	0.25	0.29	0.26	0.26
Met.wahrsch.Beschattung	208	15	115	69	185	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	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	---------------------------	----------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 15
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember
1	04:38	05:19	20:19 (18) 06:14	18:41 (31) 07:08	17:25 (17) 07:07	08:03
2	21:44	21:09	16 20:35 (18) 20:01	14 18:55 (31) 18:46	23 17:48 (17) 16:35	15:50 69 15:04 (21)
3	04:39	05:20	20:19 (18) 06:16	18:30 (31) 07:10	17:24 (17) 07:09	08:05 69 15:04 (21)
4	21:44	21:07	15 20:34 (18) 19:59	18 18:56 (31) 18:44	24 17:48 (17) 16:33	15:46 69 15:04 (21)
5	04:40	05:22	20:22 (18) 06:17	18:36 (31) 07:12	17:23 (17) 07:11	08:06 69 15:04 (21)
6	21:44	21:05	10 20:32 (18) 19:56	21 18:57 (31) 18:41	25 17:48 (17) 16:31	15:48 70 15:05 (21)
7	04:40	05:24	20:24 (18) 06:19	18:35 (31) 07:14	17:22 (17) 07:13	08:08 69 15:04 (21)
8	21:43	21:03	5 20:29 (18) 19:54	24 18:59 (31) 18:39	26 17:48 (17) 16:29	15:48 69 15:04 (21)
9	04:41	05:26	06:21	18:33 (31) 07:15	17:22 (17) 07:15	08:09 69 15:04 (21)
10	21:43	21:01	19:51	25 18:58 (31) 18:37	26 17:48 (17) 16:27	15:47 69 15:04 (21)
11	04:42	05:27	06:23	18:33 (31) 07:17	17:21 (17) 07:17	13:55 (29) 08:10 69 15:04 (21)
12	21:42	20:59	19:49	26 18:59 (31) 18:34	26 17:47 (17) 16:25	7 14:02 (29) 15:46 68 15:03 (21)
13	04:43	20:24 (18) 05:29	06:25	18:32 (31) 07:19	17:21 (17) 07:19	13:50 (29) 08:12 68 15:03 (21)
14	21:41	20:26 (18) 05:57	19:46	27 18:59 (31) 18:32	26 17:47 (17) 16:23	16 14:06 (29) 15:46 67 15:04 (21)
15	04:44	20:22 (18) 05:31	06:26	18:32 (31) 07:21	17:21 (17) 07:21	13:47 (29) 08:13 68 15:03 (21)
16	21:41	20:29 (18) 05:55	19:44	27 18:59 (31) 18:29	25 17:46 (17) 16:21	22 14:09 (29) 15:45 67 15:03 (21)
17	04:45	20:21 (18) 05:33	06:28	18:30 (31) 07:23	17:22 (17) 07:23	13:45 (29) 08:14 68 15:03 (21)
18	21:40	20:41 (18) 05:53	19:41	28 18:58 (31) 18:27	24 17:46 (17) 16:20	25 14:10 (29) 15:45 66 15:03 (21)
19	04:46	20:20 (18) 05:34	06:30	18:30 (31) 07:25	17:23 (17) 07:25	13:44 (29) 08:16 68 15:03 (21)
20	21:39	20:43 (16) 05:51	19:39	28 18:58 (31) 18:24	21 17:44 (17) 16:18	28 14:12 (29) 15:45 65 15:02 (21)
21	04:48	20:19 (18) 05:36	06:32	18:30 (31) 07:27	17:23 (17) 07:27	13:43 (29) 08:17 68 15:03 (21)
22	21:38	20:44 (16) 05:49	19:36	28 18:58 (31) 18:22	20 17:43 (17) 16:16	31 14:14 (29) 15:44 65 15:03 (25)
23	04:49	20:19 (18) 05:38	06:34	18:31 (31) 07:28	17:25 (17) 07:29	13:42 (29) 08:18 68 15:03 (21)
24	21:37	20:45 (16) 05:47	19:34	26 18:57 (31) 18:20	16 17:41 (17) 16:14	42 14:55 (21) 15:44 70 15:03 (25)
25	04:50	20:18 (18) 05:40	06:35	18:30 (31) 07:30	17:27 (17) 07:31	13:41 (29) 08:19 68 15:03 (21)
26	21:36	20:46 (16) 05:45	19:31	26 18:56 (31) 18:17	12 17:39 (17) 16:13	48 14:57 (21) 15:44 72 15:03 (25)
27	04:51	20:17 (18) 05:41	06:37	18:31 (31) 07:32	17:33	13:41 (29) 08:20 68 15:03 (21)
28	21:35	20:46 (16) 05:43	19:29	24 18:55 (31) 18:15	16:11	52 14:58 (21) 15:44 75 15:04 (25)
29	04:53	20:17 (18) 05:43	06:39	18:32 (31) 07:34	17:35	13:40 (29) 08:21 68 15:03 (21)
30	21:34	20:47 (16) 05:40	19:26	21 18:53 (31) 18:12	16:09	55 14:59 (21) 15:44 75 15:04 (25)
31	04:54	20:17 (18) 05:45	06:41	18:33 (31) 07:36	17:37	13:39 (29) 08:22 68 15:03 (21)
1	21:33	20:48 (16) 05:38	19:24	19 18:52 (31) 18:10	16:08	59 15:00 (21) 15:44 76 15:04 (25)
2	04:55	20:16 (18) 05:47	06:43	18:34 (31) 07:38	17:38	13:39 (29) 08:23 68 15:03 (21)
3	21:32	20:48 (16) 05:36	19:21	15 18:49 (31) 18:08	16:06	60 15:01 (21) 15:44 77 15:05 (25)
4	04:57	20:16 (18) 05:49	06:44	18:29 (24) 07:40	17:40	13:39 (29) 08:23 68 15:03 (21)
5	21:30	20:49 (16) 05:34	19:19	11 18:45 (31) 18:05	16:05	62 15:02 (21) 15:45 77 15:06 (25)
6	04:58	20:16 (18) 05:50	06:46	18:26 (24) 07:42	17:42	13:39 (29) 08:24 68 15:03 (21)
7	21:29	20:50 (16) 05:32	19:16	10 18:36 (24) 18:03	16:03	63 15:02 (21) 15:45 77 15:06 (25)
8	04:59	20:16 (18) 05:52	06:48	18:24 (24) 07:44	17:44	13:38 (29) 08:25 68 15:03 (21)
9	21:28	20:49 (16) 05:29	19:14	14 18:38 (24) 18:01	16:02	66 15:03 (21) 15:45 77 15:06 (25)
10	05:01	20:15 (18) 05:54	06:50	18:22 (24) 07:46	17:46	13:39 (29) 08:25 68 15:03 (21)
11	21:26	20:49 (16) 05:27	19:11	15 18:37 (24) 17:59	16:01	66 15:04 (21) 15:46 77 15:07 (25)
12	05:02	20:16 (18) 05:56	06:52	18:21 (24) 07:48	17:48	13:39 (29) 08:26 68 15:03 (21)
13	21:25	20:50 (16) 05:25	19:09	17 18:38 (24) 17:56	15:59	67 15:04 (21) 15:46 77 15:07 (25)
14	05:04	20:15 (18) 05:58	06:53	18:21 (24) 07:50	17:49	13:40 (29) 08:27 68 15:03 (21)
15	21:23	20:49 (16) 05:22	19:06	17 18:38 (24) 17:54	15:58	66 15:05 (21) 15:47 77 15:08 (25)
16	05:06	20:15 (18) 05:59	06:55	18:21 (24) 07:51	17:51	13:39 (29) 08:27 68 15:03 (21)
17	21:22	20:48 (16) 05:20	19:04	14 18:35 (24) 17:52	15:57	66 15:04 (21) 15:47 77 15:08 (25)
18	05:07	20:15 (18) 06:01	06:57	18:21 (24) 06:53	17:53	13:39 (29) 08:27 68 15:03 (21)
19	21:20	20:47 (16) 05:18	19:01	12 18:33 (24) 16:50	15:56	66 15:04 (21) 15:48 79 15:09 (25)
20	05:09	20:15 (18) 06:03	06:59	18:21 (24) 06:55	17:55	13:40 (29) 08:28 68 15:03 (21)
21	21:19	20:45 (16) 05:15	18:59	9 18:30 (24) 16:48	15:55	65 15:04 (21) 15:48 77 15:09 (25)
22	05:10	20:16 (18) 06:05	07:01	18:22 (24) 06:57	17:56	13:40 (29) 08:28 68 15:03 (21)
23	21:17	20:44 (16) 05:13	18:56	5 18:27 (24) 16:45	15:53	66 15:04 (21) 15:49 76 15:09 (25)
24	05:12	20:16 (18) 06:07	07:03	17:31 (17) 06:59	17:58	13:41 (29) 08:28 68 15:03 (21)
25	21:16	20:42 (16) 05:11	18:54	14 18:25 (24) 16:43	15:52	66 15:05 (21) 15:50 76 15:11 (25)
26	05:14	20:17 (18) 06:08	07:04	17:29 (17) 07:01	18:00	13:41 (29) 08:28 68 15:03 (21)
27	21:14	20:41 (16) 05:08	18:51	16 17:45 (17) 16:41	15:51	69 15:05 (21) 15:51 74 15:10 (25)
28	05:15	20:17 (18) 06:10	07:06	17:27 (17) 07:03	18:01	13:42 (29) 08:28 68 15:03 (21)
29	21:12	20:39 (16) 05:06	18:49	20 17:47 (17) 16:39	15:51	69 15:05 (21) 15:52 75 15:11 (25)
30	05:17	20:18 (18) 06:12	18:45 (31) 18:45 (31)	07:05	18:49	13:43 (29) 08:28 68 15:03 (21)
31	21:10	20:36 (18) 05:03	6 18:51 (31) 18:51 (31)	16:37	18:49	15:53 71 15:12 (25)
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	653	52	571	294	1302	2256
Red.Sonnenscheinwährsch.	0.44	0.48	0.40	0.33	0.21	0.14
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91
Reduktion Windrichtung	0.63	0.64	0.68	0.68	0.67	0.67
Gesamte Reduktion	0.26	0.28	0.25	0.21	0.13	0.08
Met.währsch.Beschattung	167	15	142	61	167	191

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt: 151008_Miltzow_III-VII
Ausdruck/Seite: 13/10/2015 13:57 / 16
Lizenzierter Anwender: I17-Wind GmbH & Co. KG
Am Westersiezug 11
DE-25840 Friedrichstadt
André Gefke / andre.gefke@i17-wind.de

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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

Table with columns for months (Januar to Juni) and rows for various parameters including solar hours, shadow reduction, and wind probability. Includes summary rows for 'Sonneneinstrahlung' and 'Reduktion'.

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)

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 17

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

André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	20:30 (18) 06:14	18:45 (31) 07:08	17:36 (17) 07:07	14:06 (29) 08:03
2	21:44	21:09	6 20:36 (18) 20:01	24 19:09 (31) 18:46	25 18:01 (17) 16:35	18 14:24 (29) 15:50
3	04:39	05:20	06:16	18:43 (31) 07:10	17:36 (17) 07:09	14:03 (29) 08:05
4	21:44	21:07	19:59	26 19:09 (31) 18:44	25 18:01 (17) 16:33	24 14:27 (29) 15:46
5	04:40	05:22	06:17	18:43 (31) 07:12	17:35 (17) 07:11	14:01 (29) 08:06
6	21:44	21:05	19:56	26 19:09 (31) 18:41	24 17:59 (17) 16:31	27 14:28 (29) 15:48
7	04:40	05:24	06:19	18:42 (31) 07:14	17:36 (17) 07:13	14:00 (29) 08:08
8	21:43	21:03	19:54	27 19:09 (31) 18:39	23 17:59 (17) 16:29	30 14:30 (29) 15:48
9	04:41	05:26	06:21	18:41 (31) 07:15	17:36 (17) 07:15	13:59 (29) 08:09
10	21:43	21:01	19:51	27 19:08 (31) 18:37	21 17:57 (17) 16:27	33 14:32 (29) 15:47
11	04:42	05:27	06:23	18:41 (31) 07:17	17:37 (17) 07:17	13:58 (29) 08:10
12	21:42	20:59	19:49	27 19:08 (31) 18:34	19 17:56 (17) 16:25	37 15:03 (21) 15:46
13	04:43	05:29	06:25	18:41 (31) 07:19	17:39 (17) 07:19	13:57 (29) 08:12
14	21:41	20:57	19:46	27 19:08 (31) 18:32	15 17:54 (17) 16:23	46 15:07 (21) 15:46
15	04:44	05:31	06:26	18:41 (31) 07:21	17:41 (17) 07:21	13:56 (29) 08:13
16	21:41	20:55	19:44	27 19:08 (31) 18:29	10 17:51 (17) 16:21	53 15:09 (21) 15:45
17	04:45	05:33	06:28	18:40 (31) 07:23	17:42 (17) 07:23	13:55 (29) 08:14
18	21:40	20:53	19:41	25 19:06 (31) 18:27	16:20	57 15:10 (21) 15:45
19	04:46	05:34	06:30	18:42 (31) 07:25	17:42 (17) 07:25	13:55 (29) 08:16
20	21:39	20:51	19:39	23 19:05 (31) 18:24	16:18	59 15:11 (21) 15:45
21	04:48	05:36	06:32	18:42 (31) 07:27	17:42 (17) 07:27	13:55 (29) 08:17
22	21:38	20:49	19:36	22 19:04 (31) 18:22	16:16	62 15:13 (21) 15:44
23	04:49	05:38	06:34	18:43 (31) 07:28	17:42 (17) 07:28	13:55 (29) 08:18
24	21:37	20:47	19:34	18 18:41 (31) 18:20	16:14	64 15:14 (21) 15:44
25	04:50	05:40	06:35	18 18:45 (31) 07:30	17:31	65 15:14 (21) 15:44
26	21:36	20:45	19:31	14 18:59 (31) 18:17	16:13	65 15:14 (21) 15:44
27	04:51	05:41	06:37	18:48 (31) 07:32	17:33	13:54 (29) 08:20
28	21:35	20:43	19:29	8 18:56 (31) 18:15	16:11	66 15:14 (21) 15:44
29	04:53	05:43	06:39	17:34	17:35	13:54 (29) 08:21
30	21:34	20:40	19:26	18:12	16:09	66 15:14 (21) 15:44
31	04:54	05:45	06:41	18:35 (24) 07:36	17:37	13:54 (29) 08:22
32	21:33	20:44	19:24	7 18:42 (24) 18:10	16:08	68 15:15 (21) 15:44
33	04:55	05:47	06:43	18:31 (24) 07:38	17:38	13:54 (29) 08:23
34	21:32	20:36	19:21	12 18:43 (24) 18:08	16:06	68 15:15 (21) 15:44
35	04:57	05:49	06:44	18:30 (24) 07:40	17:40	13:54 (29) 08:23
36	21:30	20:34	19:19	14 18:44 (24) 18:05	16:05	68 15:15 (21) 15:45
37	04:58	05:50	06:46	18:29 (24) 07:42	17:42	13:55 (29) 08:24
38	21:29	20:32	19:16	16 18:45 (24) 18:03	16:03	67 15:15 (21) 15:45
39	04:59	05:52	06:48	18:28 (24) 07:44	17:44	13:55 (29) 08:25
40	21:28	20:29	19:14	17 18:45 (24) 18:01	16:02	66 15:15 (21) 15:45
41	05:01	05:54	06:50	18:27 (24) 07:46	17:46	13:56 (29) 08:25
42	21:26	20:27	19:11	15 18:42 (24) 17:59	16:01	65 15:15 (21) 15:46
43	05:02	05:56	06:52	18:27 (24) 07:48	17:48	13:57 (29) 08:26
44	21:25	20:25	19:09	13 18:40 (24) 17:56	15:59	66 15:15 (21) 15:46
45	05:04	05:58	06:53	17:46 (17) 07:50	17:49	13:56 (29) 08:26
46	21:23	20:22	19:06	21 18:38 (24) 17:54	15:58	67 15:14 (21) 15:47
47	05:06	05:59	06:55	17:43 (17) 07:51	17:51	13:57 (29) 08:27
48	21:22	20:20	19:04	23 18:35 (24) 17:52	15:57	67 15:14 (21) 15:47
49	05:07	06:01	06:57	17:42 (17) 06:53	17:53	13:57 (29) 08:27
50	21:20	20:18	19:01	21 18:33 (24) 16:50	15:56	66 15:13 (21) 15:48
51	05:09	06:03	06:59	17:39 (17) 06:55	17:55	13:58 (29) 08:28
52	21:19	20:15	18:59	21 18:00 (17) 16:48	15:55	66 15:13 (21) 15:48
53	05:10	06:05	07:01	17:38 (17) 06:57	17:56	13:59 (29) 08:28
54	21:17	20:13	18:56	23 18:01 (17) 16:45	15:53	64 15:12 (21) 15:49
55	05:12	06:07	18:53 (31) 07:03	17:37 (17) 06:59	17:58	14:00 (29) 08:28
56	21:16	20:11	11 19:04 (31) 18:54	24 18:01 (17) 16:43	15:52	63 15:11 (21) 15:50
57	05:14	06:08	18:49 (31) 07:04	17:37 (17) 07:01	18:00	14:01 (29) 08:28
58	21:14	20:08	16 19:05 (31) 18:51	25 18:02 (17) 16:41	15:51	60 15:10 (21) 15:51
59	05:15	06:10	18:48 (31) 07:06	17:36 (17) 07:03	18:01	14:02 (29) 08:28
60	21:12	20:06	19 19:07 (31) 18:49	26 18:02 (17) 16:39	15:51	56 15:06 (25) 15:52
61	05:17	06:12	18:46 (31)	17:05	14:10 (29)	08:28
62	21:10	20:03	22 19:08 (31)	16:37	11 14:21 (29)	15:53
63	05:14	06:03	383	328	257	231
64	04:4	04:8	04:0	0:33	0:21	0:14
65	0:91	0:91	0:88	0:91	0:91	0:91
66	0:63	0:67	0:68	0:68	0:68	0:66
67	0:25	0:30	0:25	0:20	0:13	0:08
68	173	22	149	35	218	181

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

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite:
13/10/2015 13:57 / 18

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: H - IO8

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1 08:28		11:40 (26) 07:57				
15:54	131	15:16 (25) 15:46	85	13:58 (29) 06:59	06:43	18:11 (17) 05:33
2 08:28		11:40 (26) 07:55				
15:55	132	15:17 (25) 16:48	84	13:58 (29) 06:56	19:42	38 19:08 (24) 20:39
3 08:28		11:42 (26) 07:54				
15:57	131	15:19 (25) 16:50	83	15:42 (21) 17:47	06:40	18:12 (17) 05:31
4 08:27		11:43 (26) 07:52				
15:58	130	15:20 (25) 16:52	82	15:43 (21) 17:49	19:44	33 19:06 (24) 20:40
5 08:27		11:43 (26) 07:50				
15:59	133	15:21 (25) 16:54	79	15:42 (21) 17:51	06:38	18:14 (17) 05:29
6 08:27		11:44 (26) 07:48				
16:00	132	15:22 (25) 16:56	79	15:42 (21) 17:53	19:46	25 19:05 (24) 20:42
7 08:26		11:46 (26) 07:46				
16:02	133	15:25 (25) 16:58	75	15:40 (21) 17:55	06:35	18:18 (17) 05:26
8 08:26		11:47 (26) 07:44				
16:03	132	15:26 (25) 17:01	73	15:39 (21) 17:57	19:48	8 19:00 (24) 20:44
9 08:25		11:48 (26) 07:42				
16:05	130	15:27 (25) 17:03	68	14:01 (29) 06:40	06:33	20:46
10 08:24		11:49 (26) 07:40				
16:06	130	15:29 (25) 17:05	60	14:02 (29) 06:37	06:31	05:17
11 08:24		11:50 (26) 07:38				
16:08	128	15:30 (25) 17:07	50	14:03 (29) 06:35	06:28	05:20
12 08:23		11:52 (26) 07:36				
16:09	123	15:31 (25) 17:09	49	14:04 (29) 06:32	19:54	20:50
13 08:22		11:54 (26) 07:34				
16:11	119	15:31 (25) 17:11	47	14:05 (29) 06:30	06:26	05:19
14 08:21		11:57 (26) 07:32				
16:13	111	15:32 (25) 17:13	45	14:05 (29) 06:27	19:55	20:51
15 08:20		12:01 (26) 07:30				
16:14	100	15:33 (25) 17:15	43	14:06 (29) 06:25	06:23	05:17
16 08:19		14:00 (29) 07:28				
16:16	82	15:33 (25) 17:17	40	14:08 (29) 06:23	17:23 (17) 05:06	20:51
17 08:18		14:00 (29) 07:26				
16:18	82	15:34 (25) 17:19	37	14:08 (29) 06:21	5 17:28 (17) 20:10	27 19:06 (31) 05:04
18 08:17		13:59 (29) 07:24				
16:19	82	15:34 (25) 17:21	33	14:09 (29) 06:20	06:14	19:10 (16) 05:09
19 08:16		13:59 (29) 07:22				
16:21	82	15:34 (25) 17:23	28	14:10 (29) 06:20	17:19 (17) 05:04	19:05 (31) 05:02
20 08:15		13:59 (29) 07:19				
16:23	82	15:35 (25) 17:25	22	14:11 (29) 06:19	14:12 (29) 06:18	19:04 (31) 05:01
21 08:14		13:59 (29) 07:17				
16:25	81	15:37 (25) 17:27	12	14:12 (29) 06:18	19 17:35 (17) 20:14	29 19:34 (31) 21:07
22 08:12		13:59 (29) 07:15				
16:27	80	15:38 (25) 17:29				
23 08:11		13:58 (29) 07:13				
16:29	79	15:39 (25) 17:31				
24 08:10		13:58 (29) 07:10				
16:31	78	15:39 (25) 17:33				
25 08:08		13:58 (29) 07:08				
16:32	80	15:41 (25) 17:35				
26 08:07		13:58 (29) 07:06				
16:34	81	15:41 (25) 17:37				
27 08:05		13:58 (29) 07:03				
16:36	81	15:41 (25) 17:39				
28 08:04		13:58 (29) 07:01				
16:38	84	15:42 (25) 17:41				
29 08:02		13:58 (29) 07:00				
16:40	85	15:43 (25) 17:43				
30 08:00		13:58 (29) 06:58				
16:42	85	15:43 (25) 17:45				
31 07:59		13:58 (29) 06:56				
16:44	85	15:43 (25) 17:47				
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung	3204	1174	498	616	26	346
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91
Reduktion Windrichtung	0.66	0.67	0.68	0.65	0.65	0.61
Gesamte Reduktion	0.10	0.15	0.19	0.24	0.30	0.25
Met.wahrsch.Beschattung	333	171	96	150	8	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	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 19

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: H - IO8

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember		
1	04:38	20:56 (18) 05:19	06:14	19:15 (31) 07:08	07:07	13:31 (29) 08:03	11:33 (26)	
2	21:44	12 21:08 (16) 21:09	20:01	10 19:25 (31) 18:46	16:35	63 15:05 (21) 15:50	127 15:12 (33)	
3	04:39	20:56 (18) 05:20	06:16	07:09	07:09	13:30 (29) 08:05	11:32 (26)	
4	21:44	11 21:07 (16) 21:07	19:59	18:44	16:33	68 15:07 (21) 15:49	130 15:12 (33)	
5	04:40	20:57 (18) 05:22	06:17	07:12	07:11	13:30 (29) 08:06	11:32 (26)	
6	21:44	10 21:07 (16) 21:05	19:56	18:41	16:31	73 15:09 (21) 15:48	133 15:12 (33)	
7	04:40	20:59 (18) 05:24	06:19	07:14	07:13	13:29 (29) 08:08	11:31 (26)	
8	21:43	8 21:07 (16) 21:03	19:54	18:39	16:29	77 15:10 (21) 15:48	131 15:10 (33)	
9	04:41	21:01 (18) 05:26	06:21	07:15	07:15	13:30 (29) 08:09	11:31 (26)	
10	21:43	6 21:07 (16) 21:01	19:51	18:37	16:27	79 15:12 (21) 15:47	133 15:10 (33)	
11	04:42	21:03 (16) 05:27	06:23	07:17	07:17	13:29 (29) 08:10	11:30 (26)	
12	21:42	3 21:06 (16) 20:59	19:49	18:34	16:25	81 15:12 (21) 15:46	133 15:09 (33)	
13	04:43	21:05 (16) 05:29	06:25	07:19	07:19	13:29 (29) 08:12	11:31 (26)	
14	21:41	1 21:06 (16) 20:57	19:46	18:32	16:23	83 15:13 (21) 15:46	133 15:09 (33)	
15	04:44	05:31	06:26	18:14 (17) 07:21	07:21	13:29 (29) 08:13	11:30 (26)	
16	21:41	20:55	19:44	3 18:17 (17) 18:29	16:21	83 15:13 (21) 15:45	133 15:08 (33)	
17	04:45	05:33	06:28	18:08 (17) 07:23	07:23	13:29 (29) 08:14	11:31 (26)	
18	21:40	20:53	19:41	23 18:58 (24) 18:27	16:20	84 15:13 (21) 15:45	132 15:08 (25)	
19	04:46	05:34	19:24 (31) 06:30	18:05 (17) 07:25	07:25	13:29 (29) 08:16	11:30 (26)	
20	21:39	20:51	2 19:26 (31) 19:39	32 18:59 (24) 18:24	16:18	84 15:13 (21) 15:45	132 15:07 (25)	
21	04:48	05:36	19:19 (31) 06:32	18:03 (17) 07:27	07:27	13:30 (29) 08:17	11:30 (26)	
22	21:38	20:49	13 19:32 (31) 19:36	37 19:00 (24) 18:22	16:16	85 15:15 (21) 15:44	130 15:06 (25)	
23	04:49	05:38	19:17 (31) 06:34	18:02 (17) 07:28	07:29	13:30 (29) 08:18	11:30 (26)	
24	21:37	20:47	17 19:34 (31) 19:34	41 19:01 (24) 18:20	16:14	85 15:15 (21) 15:44	129 15:06 (25)	
25	04:50	05:40	19:15 (31) 06:35	18:00 (17) 07:30	07:31	13:30 (29) 08:19	11:30 (26)	
26	21:36	20:45	20 19:35 (31) 19:31	44 19:00 (24) 18:17	16:13	84 15:14 (21) 15:44	128 15:06 (25)	
27	04:51	05:41	19:14 (31) 06:37	17:59 (17) 07:32	07:33	13:30 (29) 08:20	11:31 (26)	
28	21:35	20:43	22 19:36 (31) 19:29	46 19:00 (24) 18:15	16:11	83 15:14 (21) 15:44	126 15:05 (25)	
29	04:53	05:43	19:13 (31) 06:39	17:58 (17) 07:34	07:35	13:30 (29) 08:21	11:31 (26)	
30	21:34	20:40	24 19:37 (31) 19:26	45 18:58 (24) 18:12	16:09	82 15:14 (21) 15:44	127 15:05 (25)	
31	04:54	05:45	19:11 (31) 06:41	17:58 (17) 07:36	07:37	13:31 (29) 08:22	11:31 (26)	
32	21:33	20:38	26 19:37 (31) 19:24	43 18:56 (24) 18:10	16:08	81 15:14 (21) 15:44	124 15:05 (25)	
33	04:55	05:47	19:10 (31) 06:43	17:56 (17) 07:38	07:38	13:31 (29) 08:23	11:32 (26)	
34	21:32	20:36	28 19:38 (31) 19:21	41 18:53 (24) 18:08	16:06	80 15:14 (21) 15:44	125 15:06 (25)	
35	04:57	05:49	19:10 (31) 06:44	17:56 (17) 07:40	07:40	13:32 (29) 08:23	11:32 (26)	
36	21:30	20:34	29 19:39 (31) 19:19	37 18:50 (24) 18:05	16:05	78 15:13 (21) 15:45	123 15:06 (25)	
37	04:58	05:50	19:08 (31) 06:46	17:56 (17) 07:42	07:42	13:32 (29) 08:24	11:33 (26)	
38	21:29	20:32	30 19:36 (31) 19:16	33 18:48 (24) 18:03	16:03	79 15:13 (21) 15:45	122 15:07 (25)	
39	05:00	05:52	19:09 (31) 06:48	17:56 (17) 07:44	07:44	13:33 (29) 08:25	11:33 (26)	
40	21:28	20:29	30 19:38 (31) 19:14	30 18:26 (17) 18:01	16:02	80 15:12 (21) 15:45	121 15:06 (25)	
41	05:01	05:54	19:08 (31) 06:50	17:55 (17) 07:46	14:51 (29) 07:46	13:35 (29) 08:25	11:34 (26)	
42	21:26	20:27	31 19:39 (31) 19:11	29 18:24 (17) 17:59	16 15:07 (29) 16:01	81 15:13 (21) 15:46	121 15:07 (25)	
43	05:02	05:56	19:07 (31) 06:52	17:56 (17) 07:48	14:47 (29) 07:48	13:35 (29) 08:26	11:34 (26)	
44	21:25	20:25	31 19:38 (31) 19:09	27 18:23 (17) 17:56	24 15:11 (29) 15:59	82 15:12 (21) 15:46	121 15:07 (25)	
45	05:04	05:58	19:07 (31) 06:53	17:57 (17) 07:50	29 14:44 (29) 07:49	13:35 (29) 08:26	11:35 (26)	
46	21:23	20:22	31 19:38 (31) 19:06	25 18:22 (17) 17:54	29 15:13 (29) 15:58	82 15:10 (21) 15:47	121 15:08 (25)	
47	05:06	05:59	19:07 (31) 06:55	17:57 (17) 07:51	14:41 (29) 07:51	13:36 (29) 08:27	11:35 (26)	
48	21:22	20:20	31 19:38 (31) 19:04	24 18:21 (17) 17:52	34 15:15 (29) 15:57	82 15:11 (33) 15:47	121 15:08 (25)	
49	05:07	06:01	19:08 (31) 06:57	17:59 (17) 06:53	13:39 (29) 07:53	13:37 (29) 08:27	11:35 (26)	
50	21:20	20:18	29 19:37 (31) 19:01	20 18:19 (17) 16:50	38 14:17 (29) 15:56	82 15:11 (33) 15:48	123 15:09 (25)	
51	05:09	06:03	19:07 (31) 06:59	18:00 (17) 06:55	13:37 (29) 07:55	13:38 (29) 08:28	11:35 (26)	
52	21:19	20:15	29 19:36 (31) 18:59	16 18:16 (17) 16:48	41 14:18 (29) 15:56	82 15:11 (33) 15:48	124 15:09 (25)	
53	05:10	06:05	19:09 (31) 07:01	18:03 (17) 06:57	13:38 (29) 07:56	11:40 (26) 08:28	11:36 (26)	
54	21:17	20:13	27 19:35 (31) 18:56	9 18:12 (17) 16:45	43 14:19 (29) 15:53	100 15:12 (33) 15:49	123 15:10 (25)	
55	05:12	06:07	19:09 (31) 07:03	06:59	13:34 (29) 07:58	11:37 (26) 08:28	11:37 (26)	
56	21:16	20:11	25 19:34 (31) 18:54	16:43	46 14:20 (29) 15:52	111 15:12 (33) 15:50	126 15:11 (25)	
57	05:14	06:08	19:09 (31) 07:04	07:01	13:34 (29) 08:00	11:36 (26) 08:28	11:37 (26)	
58	21:14	20:08	23 19:32 (31) 18:51	16:41	48 14:22 (29) 15:51	118 15:13 (33) 15:51	127 15:12 (25)	
59	05:15	06:10	19:10 (31) 07:06	07:03	13:35 (29) 08:01	11:34 (26) 08:28	11:38 (26)	
60	21:12	20:06	20 19:30 (31) 18:49	16:39	49 14:22 (29) 15:51	123 15:13 (33) 15:52	128 15:13 (25)	
61	05:17	06:12	19:12 (31)	07:05	13:32 (29)	11:37 (26) 08:28	11:39 (26)	
62	21:10	20:03	16 19:28 (31)	16:37	51 14:23 (29)	15:53	128 15:14 (25)	
63	Sonnenscheinstunden	514	461	383	328	257	231	
64	astr.max.mögl.Beschattung	51	534	615	419	2535	3935	
65	Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14	
66	Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	
67	Reduktion Windrichtung	0.61	0.65	0.68	0.67	0.67	0.64	
68	Gesamte Reduktion	0.24	0.29	0.25	0.20	0.13	0.08	
69	Met.wahrsch.Beschattung	12	152	153	84	322	316	

Tabellen-Layout: Die Daten für jeden Tag 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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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 20

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1 08:28	12:55 (26) 07:57		14:38 (29) 06:59		18:53 (31) 05:33		04:42
15:54	65 15:16 (25) 16:46	63	15:51 (21) 17:43		19:42	20	19:13 (31) 20:39
2 08:28	12:56 (26) 07:55		14:38 (29) 06:56		18:51 (31) 05:31		04:41
15:55	64 15:17 (25) 16:48	62	15:50 (21) 17:45		19:44	22	19:13 (31) 20:40
3 08:28	13:01 (26) 07:54		14:39 (29) 06:54		18:50 (31) 05:29		04:40
15:57	57 15:18 (25) 16:50	60	15:50 (21) 17:47		19:46	24	19:14 (31) 20:42
4 08:27	13:52 (1) 07:52		14:40 (29) 06:52		18:49 (31) 05:26		04:40
15:58	56 15:20 (25) 16:52	58	15:50 (21) 17:49		19:48	25	19:14 (31) 20:44
5 08:27	13:53 (1) 07:50		14:41 (29) 06:49		18:49 (31) 05:24		04:39
15:59	57 15:21 (25) 16:54	54	15:49 (21) 17:51		19:50	25	19:14 (31) 20:46
6 08:27	13:53 (1) 07:48		14:41 (29) 06:47		18:48 (31) 05:22		04:38
16:00	58 15:22 (25) 16:56	49	15:46 (21) 17:53		19:52	26	19:14 (31) 20:48
7 08:26	13:55 (1) 07:46		14:42 (29) 06:45		18:48 (31) 05:20		04:37
16:02	59 15:25 (25) 16:58	42	15:44 (21) 17:55	9	17:20 (17) 19:54	26	19:14 (31) 20:50
8 08:26	13:56 (1) 07:44		14:43 (29) 06:42		17:08 (17) 06:26		18:48 (31) 05:19
16:03	59 15:26 (25) 17:00	33	15:16 (29) 17:57	14	17:22 (17) 19:55	26	19:14 (31) 20:51
9 08:25	13:57 (1) 07:42		14:44 (29) 06:40		17:06 (17) 06:23		18:47 (31) 05:17
16:05	59 15:27 (25) 17:03	32	15:16 (29) 17:59	18	17:24 (17) 19:57	25	19:12 (31) 20:53
10 08:24	13:58 (1) 07:40		14:46 (29) 06:37		17:04 (17) 06:21		18:48 (31) 05:15
16:06	60 15:29 (25) 17:05	28	15:14 (29) 18:00	21	17:25 (17) 19:59	24	19:12 (31) 20:55
11 08:24	13:59 (1) 07:38		14:48 (29) 06:35		17:04 (17) 06:18		18:48 (31) 05:13
16:08	59 15:29 (25) 17:07	25	15:13 (29) 18:02	22	17:26 (17) 20:01	22	19:10 (31) 20:57
12 08:23	14:01 (1) 07:36		14:50 (29) 06:32		17:02 (17) 06:16		18:49 (31) 05:11
16:09	58 15:30 (25) 17:09	21	15:11 (29) 18:04	24	17:26 (17) 20:03	20	19:09 (31) 20:59
13 08:22	14:04 (1) 07:34		14:53 (29) 06:30		17:02 (17) 06:14		18:51 (31) 05:09
16:11	55 15:30 (25) 17:11	16	15:09 (29) 18:06	24	17:26 (17) 20:05	17	19:08 (31) 21:00
14 08:21	14:09 (29) 07:32		15:00 (29) 06:27		17:01 (17) 06:11		18:52 (31) 05:07
16:13	48 15:31 (25) 17:13	1	15:01 (29) 18:08	24	17:25 (17) 20:07	13	19:05 (31) 21:02
15 08:20	14:38 (29) 07:30		15:02 (29) 06:25		17:02 (17) 06:09		18:55 (31) 05:06
16:14	50 15:31 (25) 17:15		18:10	24	17:26 (17) 20:09	6	19:01 (31) 21:04
16 08:19	14:38 (29) 07:28		15:03 (29) 06:23		17:01 (17) 06:06		21
16:16	52 15:32 (25) 17:17		18:12	24	17:25 (17) 20:10		23
17 08:18	14:38 (29) 07:26		15:02 (29) 06:20		17:02 (17) 06:04		23
16:18	52 15:32 (25) 17:19		18:14	22	17:24 (17) 20:12		25
18 08:17	14:37 (29) 07:24		15:01 (29) 06:18		17:02 (17) 06:02		25
16:19	58 15:39 (21) 17:21		18:16	21	17:23 (17) 20:14		27
19 08:16	14:38 (29) 07:22		15:01 (29) 06:15		17:03 (17) 05:59		27
16:21	62 15:42 (21) 17:23		18:18	23	17:31 (24) 20:16		28
20 08:15	14:04 (1) 07:19		15:03 (29) 06:13		17:04 (17) 05:57		28
16:23	63 15:43 (21) 17:25		18:20	24	17:53 (24) 20:18		29
21 08:14	14:37 (29) 07:17		15:00 (29) 06:10		17:07 (17) 05:55		29
16:25	66 15:45 (21) 17:27		18:22	20	17:55 (24) 20:20		31
22 08:12	14:38 (29) 07:15		15:00 (29) 06:08		17:43 (24) 05:52		31
16:27	65 15:47 (21) 17:29		18:23	13	17:56 (24) 20:22		31
23 08:11	14:37 (29) 07:13		15:00 (29) 06:05		17:44 (24) 05:50		31
16:29	62 15:47 (21) 17:31		18:25	15	17:59 (24) 20:24		31
24 08:10	14:37 (29) 07:10		15:00 (29) 06:03		17:43 (24) 05:48		31
16:31	61 15:48 (21) 17:33		18:27	16	17:59 (24) 20:25		30
25 08:08	14:37 (29) 07:08		15:00 (29) 06:00		17:44 (24) 05:46		30
16:32	62 15:49 (21) 17:35		18:29	14	17:58 (24) 20:27		29
26 08:07	14:37 (29) 07:06		15:00 (29) 05:58		17:44 (24) 05:44		29
16:34	64 15:50 (21) 17:37		18:31	13	17:57 (24) 20:29		29
27 08:05	14:37 (29) 07:03		15:00 (29) 05:55		17:46 (24) 05:41		29
16:36	64 15:50 (21) 17:39		18:33	9	17:55 (24) 20:31		29
28 08:04	14:38 (29) 07:01		15:00 (29) 05:53		17:44 (24) 05:39		29
16:38	64 15:51 (21) 17:41		18:35		17:44 (24) 05:37		27
29 08:02	14:38 (29) 06:59		15:00 (29) 05:50		17:43 (24) 05:35		27
16:40	64 15:51 (21) 17:43		18:37		17:43 (24) 05:33		26
30 08:00	14:38 (29) 06:57		15:00 (29) 05:48		17:42 (24) 05:31		26
16:42	64 15:51 (21) 17:45		18:39	11	18:58 (31) 05:35		24
31 07:59	14:38 (29) 06:55		15:00 (29) 05:45		18:09 (31) 20:37		24
16:44	64 15:51 (21) 17:47		18:41	17	18:54 (31) 05:33		21
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung	1851	544	422	321	528	32	
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45	
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	
Reduktion Windrichtung	0.68	0.68	0.68	0.67	0.63	0.63	
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29	0.26	
Met.wahrsch.Beschattung	199	81	82	81	155	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	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 21
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersieglug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38 21:44	05:19 21:09	06:14 20:24 (18)	07:08 18:48 (31)	07:07 17:42 (17)	08:03 14:15 (29)	
2	04:39 21:44	05:20 21:07	06:15 20:25 (18)	07:09 18:46 (31)	07:08 17:42 (17)	08:05 14:14 (29)	
3	04:40 21:44	05:22 21:07	06:17 20:28 (18)	07:12 18:45 (31)	07:11 17:42 (17)	08:06 14:13 (29)	
4	04:40 21:43	05:24 21:03	06:19 20:33 (18)	07:14 18:45 (31)	07:13 17:43 (17)	08:08 14:11 (29)	
5	04:41 21:43	05:26 21:03	06:21 20:33 (18)	07:15 18:44 (31)	07:15 17:44 (17)	08:09 14:12 (29)	
6	04:42 21:42	05:27 20:59	06:23 20:33 (18)	07:17 18:44 (31)	07:17 17:46 (17)	08:10 14:11 (29)	
7	04:43 21:41	05:29 20:57	06:25 20:33 (18)	07:19 18:44 (31)	07:19 17:50 (17)	08:12 14:10 (29)	
8	04:44 21:41	05:31 20:55	06:26 20:33 (18)	07:21 18:44 (31)	07:21 17:51 (17)	08:13 14:10 (29)	
9	04:45 21:40	05:33 20:53	06:28 20:33 (18)	07:23 18:44 (31)	07:23 17:52 (17)	08:14 14:10 (29)	
10	04:46 21:39	05:34 20:51	06:30 20:33 (18)	07:25 18:44 (31)	07:25 17:53 (17)	08:16 14:10 (29)	
11	04:48 21:38	05:36 20:49	06:32 20:33 (18)	07:27 18:45 (31)	07:27 17:54 (17)	08:17 14:10 (29)	
12	04:49 21:37	05:38 20:47	06:34 20:33 (18)	07:28 18:46 (31)	07:29 17:55 (17)	08:18 14:10 (29)	
13	04:50 21:36	05:40 20:45	06:35 20:33 (18)	07:30 18:47 (31)	07:31 17:56 (17)	08:19 14:10 (29)	
14	04:51 21:35	05:41 20:43	06:37 20:33 (18)	07:32 18:48 (31)	07:33 17:57 (17)	08:20 14:10 (29)	
15	04:53 21:34	05:43 20:41	06:39 20:33 (18)	07:34 18:49 (31)	07:35 17:58 (17)	08:21 14:10 (29)	
16	04:54 21:33	05:45 20:39	06:41 20:33 (18)	07:36 18:50 (31)	07:37 17:59 (17)	08:22 14:10 (29)	
17	04:55 21:32	05:47 20:37	06:43 20:33 (18)	07:38 18:51 (31)	07:39 18:00 (17)	08:23 14:10 (29)	
18	04:57 21:30	05:49 20:35	06:44 20:33 (18)	07:40 18:52 (31)	07:40 18:01 (17)	08:23 14:10 (29)	
19	04:58 21:29	05:50 20:33	06:46 20:33 (18)	07:42 18:53 (31)	07:42 18:02 (17)	08:24 14:10 (29)	
20	04:59 21:28	05:52 20:31	06:48 20:33 (18)	07:44 18:54 (31)	07:44 18:03 (17)	08:25 14:10 (29)	
21	05:01 21:26	05:54 20:29	06:50 20:33 (18)	07:46 18:55 (31)	07:46 18:04 (17)	08:25 14:10 (29)	
22	05:02 21:25	05:56 20:27	06:52 20:33 (18)	07:48 18:56 (31)	07:48 18:05 (17)	08:26 14:10 (29)	
23	05:04 21:23	05:58 20:25	06:53 20:33 (18)	07:49 18:57 (31)	07:49 18:06 (17)	08:26 14:10 (29)	
24	05:06 21:22	05:59 20:23	06:55 20:33 (18)	07:51 18:58 (31)	07:51 18:07 (17)	08:27 14:10 (29)	
25	05:07 21:20	06:01 20:21	06:57 20:33 (18)	07:53 18:59 (31)	07:53 18:08 (17)	08:27 14:10 (29)	
26	05:09 21:19	06:03 20:19	06:59 20:33 (18)	07:55 19:00 (31)	07:55 18:09 (17)	08:28 14:10 (29)	
27	05:10 21:17	06:05 20:17	07:01 20:33 (18)	07:57 19:01 (31)	07:57 18:10 (17)	08:28 14:10 (29)	
28	05:12 21:16	06:07 20:15	07:03 20:33 (18)	07:59 19:02 (31)	07:59 18:11 (17)	08:29 14:10 (29)	
29	05:14 21:14	06:08 20:13	07:04 20:33 (18)	08:01 19:03 (31)	08:01 18:12 (17)	08:29 14:10 (29)	
30	05:15 21:12	06:10 20:11	07:06 20:33 (18)	08:03 19:04 (31)	08:03 18:13 (17)	08:29 14:10 (29)	
31	05:17 21:10	06:12 20:09	07:08 20:33 (18)	08:05 19:05 (31)	08:05 18:14 (17)	08:29 14:10 (29)	
Sonnenscheinstunden 514		20:03 461		19:09 (31) 383		16:37 257	
astr.max.mögl.Beschattung	534	87	580	328	190	1681	2018
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.33	0.21	0.14
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Reduktion Windrichtung	0.63	0.66	0.68	0.68	0.68	0.68	0.68
Gesamte Reduktion	0.25	0.29	0.25	0.20	0.20	0.13	0.08
Met.wahrsch.Beschattung	136	25	144	39	218	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	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 22
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1 08:28	13:22 (26) 07:57		14:58 (29) 06:59	06:43	18:47 (31) 05:33	04:42
15:54	59 15:08 (27) 16:46	58 15:59 (21) 17:43		19:42	23 19:10 (31) 20:39	21:29
2 08:28	13:23 (26) 07:55	57 14:58 (29) 06:56		06:40	18:46 (31) 05:31	20:08 (18) 04:41
15:55	57 15:08 (27) 16:48	57 15:59 (21) 17:45		19:44	23 19:09 (31) 20:40	2 20:10 (18) 21:31
3 08:28	13:25 (26) 07:54		14:58 (29) 06:54	06:38	18:46 (31) 05:29	20:04 (18) 04:40
15:57	56 15:10 (27) 16:50	57 15:59 (21) 17:47		19:46	24 19:10 (31) 20:42	8 20:12 (18) 21:32
4 08:27	13:27 (26) 07:52		15:00 (29) 06:52	06:35	18:45 (31) 05:26	20:03 (18) 04:40
15:58	53 15:11 (27) 16:52	54 15:59 (21) 17:49		19:48	24 19:09 (31) 20:44	11 20:14 (18) 21:33
5 08:27	13:30 (26) 07:50		15:00 (29) 06:49	06:33	18:46 (31) 05:24	20:01 (18) 04:39
15:59	49 15:21 (25) 16:54	52 15:59 (21) 17:51		19:50	22 19:08 (31) 20:46	14 20:15 (18) 21:34
6 08:27	14:10 (1) 07:48		15:00 (29) 06:47	17:10 (17) 06:30	18:45 (31) 05:22	20:00 (18) 04:38
16:00	47 15:22 (25) 16:56	49 15:57 (21) 17:53	11 17:21 (17) 19:52	22 19:07 (31) 20:48	17 20:17 (18) 21:35	
7 08:26	14:11 (1) 07:46		15:01 (29) 06:45	17:08 (17) 06:28	18:46 (31) 05:20	19:59 (18) 04:37
16:02	48 15:25 (25) 16:58	44 15:55 (21) 17:55	15 17:23 (17) 19:54	20 19:06 (31) 20:50	19 20:18 (18) 21:36	
8 08:26	14:12 (1) 07:44		15:02 (29) 06:42	17:06 (17) 06:26	18:48 (31) 05:19	19:59 (18) 04:37
16:03	50 15:26 (25) 17:00	38 15:53 (21) 17:57	18 17:24 (17) 19:55	17 19:05 (31) 20:51	21 20:20 (18) 21:37	
9 08:25	14:12 (1) 07:42		15:03 (29) 06:40	17:06 (17) 06:23	18:49 (31) 05:17	19:59 (18) 04:36
16:05	51 15:27 (25) 17:03	29 15:32 (29) 17:59	19 17:25 (17) 19:57	13 19:02 (31) 20:53	23 20:22 (18) 21:38	
10 08:24	14:13 (1) 07:40		15:04 (29) 06:37	17:04 (17) 06:21	18:52 (31) 05:15	19:59 (18) 04:36
16:06	53 15:29 (25) 17:05	27 15:31 (29) 18:00	21 17:25 (17) 19:59	7 18:59 (31) 20:55	25 20:24 (18) 21:39	
11 08:24	14:14 (1) 07:38		15:06 (29) 06:35	17:04 (17) 06:18	05:13	19:59 (18) 04:35
16:08	53 15:31 (25) 17:07	24 15:30 (29) 18:02	22 17:26 (17) 20:01	20:57	26 20:25 (18) 21:40	
12 08:23	14:15 (1) 07:36		15:08 (29) 06:32	17:03 (17) 06:16	05:11	19:59 (18) 04:35
16:09	54 15:32 (25) 17:09	21 15:29 (29) 18:04	22 17:26 (17) 20:03	20:59	28 20:27 (18) 21:41	
13 08:22	14:17 (1) 07:34		15:11 (29) 06:30	17:03 (17) 06:14	05:09	19:59 (18) 04:34
16:11	53 15:34 (25) 17:11	15 15:26 (29) 18:06	22 17:25 (17) 20:05	21:00	29 20:28 (18) 21:41	
14 08:21	14:19 (1) 07:32		15:15 (29) 06:27	17:03 (17) 06:11	05:07	19:59 (18) 04:34
16:13	54 15:36 (25) 17:13	6 15:21 (29) 18:08	21 17:24 (17) 20:07	21:02	31 20:30 (18) 21:42	
15 08:20	14:21 (1) 07:30		15:25 (29) 06:25	17:04 (17) 06:09	05:06	20:00 (18) 04:34
16:14	54 15:38 (25) 17:15		18:10	20 17:24 (17) 20:09	21:04	30 20:30 (18) 21:43
16 08:19	14:24 (1) 07:28		16:23	17:04 (17) 06:06	05:04	20:01 (18) 04:34
16:16	47 15:38 (25) 17:17		18:12	18 17:22 (17) 20:10	21:05	28 20:29 (18) 21:43
17 08:18	14:57 (27) 07:26		16:20	17:06 (17) 06:04	05:02	20:02 (18) 04:34
16:18	42 15:39 (25) 17:19		18:14	15 17:21 (17) 20:12	21:07	28 20:30 (18) 21:44
18 08:17	14:56 (27) 07:24		16:18	17:07 (17) 06:02	05:01	20:03 (18) 04:33
16:19	42 15:38 (25) 17:21		18:16	15 17:49 (24) 20:14	21:09	24 20:29 (18) 21:44
19 08:16	14:57 (27) 07:22		16:15	17:44 (24) 05:59	04:59	20:05 (18) 04:33
16:21	42 15:39 (25) 17:23		18:18	7 17:51 (24) 20:16	21:10	19 20:28 (18) 21:44
20 08:15	14:57 (27) 07:19		16:13	17:42 (24) 05:57	04:58	20:18 (18) 04:34
16:23	41 15:38 (25) 17:25		18:20	11 17:53 (24) 20:18	21:12	10 20:28 (18) 21:45
21 08:14	14:59 (27) 07:17		16:10	17:42 (24) 05:55	04:56	20:19 (18) 04:34
16:25	39 15:38 (25) 17:27		18:22	13 17:55 (24) 20:20	21:14	7 20:26 (18) 21:45
22 08:12	14:59 (29) 07:15		16:08	17:42 (24) 05:52	04:55	04:34
16:27	47 15:51 (21) 17:29		18:23	14 17:56 (24) 20:22	21:15	21:45
23 08:11	14:58 (29) 07:13		16:05	17:42 (24) 05:50	04:53	04:34
16:29	51 15:53 (21) 17:31		18:25	15 17:57 (24) 20:24	21:17	21:45
24 08:10	14:58 (29) 07:10		16:03	17:42 (24) 05:48	04:52	04:34
16:31	51 15:54 (21) 17:33		18:27	13 17:55 (24) 20:25	21:18	21:46
25 08:08	14:58 (29) 07:08		16:00	17:44 (24) 05:46	04:50	04:35
16:32	51 15:56 (21) 17:35		18:29	10 17:54 (24) 20:27	21:20	21:46
26 08:07	14:58 (29) 07:06		16:05	17:47 (24) 05:43	04:49	04:35
16:34	53 15:57 (21) 17:37		18:31	5 18:01 (31) 20:29	21:21	21:46
27 08:05	14:57 (29) 07:03		16:05	17:54 (24) 05:41	04:48	04:36
16:36	55 15:57 (21) 17:39		18:33	12 18:06 (31) 20:31	21:23	21:45
28 08:04	14:58 (29) 07:01		16:05	17:51 (31) 05:39	04:47	04:36
16:38	57 15:59 (21) 17:41		18:35	16 18:07 (31) 20:33	21:24	21:45
29 08:02	14:58 (29) 07:00		16:00	18:49 (31) 05:37	04:45	04:37
16:40	58 15:59 (21) 17:43		18:37	19 19:08 (31) 20:35	21:26	21:45
30 08:00	14:58 (29) 07:00		16:04	18:49 (31) 05:35	04:44	04:37
16:42	58 15:59 (21) 17:45		18:38	21 19:10 (31) 20:37	21:27	21:45
31 07:59	14:58 (29) 07:00		16:04	18:47 (31) 05:35	04:43	04:37
16:44	58 15:59 (21) 17:47		18:40	22 19:09 (31) 20:37	21:28	21:45
Sonnenscheinstunden	248	272	367	421	496	512
astr.max.mögl.Beschattung	1583	531	417	195	400	
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	
Reduktion Windrichtung	0.68	0.68	0.68	0.67	0.63	
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.29	
Met.wahrsch.Beschattung	170	79	81	49	118	

Tabellen-Layout: Die Daten für jeden Tag 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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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 23
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember	
1 04:38	05:19	20:10 (18) 06:14		07:08	17:43 (17) 07:07	14:34 (29) 08:03	13:56 (1)
2 21:44	21:09	27 20:37 (16) 20:01		18:46	22 18:05 (17) 16:35	27 15:01 (29) 15:50	53 15:13 (25)
3 04:39	05:20	20:09 (18) 06:16		18:50 (31) 07:10	17:43 (17) 07:09	14:32 (29) 08:05	13:56 (1)
2 21:44	21:07	26 20:35 (16) 19:59	7	18:57 (31) 18:44	22 18:05 (17) 16:33	30 15:02 (29) 15:46	53 15:12 (25)
3 04:40	05:22	20:09 (18) 06:17		18:47 (31) 07:12	17:42 (17) 07:11	14:31 (29) 08:06	13:57 (1)
2 21:44	21:05	24 20:33 (16) 19:56	13	19:00 (31) 18:41	21 18:03 (17) 16:31	39 15:23 (21) 15:48	51 15:12 (25)
4 04:40	05:24	20:09 (18) 06:19		18:45 (31) 07:14	17:42 (17) 07:13	14:30 (29) 08:08	13:56 (1)
2 21:43	21:03	22 20:31 (16) 19:54	17	19:02 (31) 18:39	21 18:03 (17) 16:29	45 15:25 (21) 15:48	49 15:10 (25)
5 04:41	05:25	20:09 (18) 06:21		18:43 (31) 07:15	17:43 (17) 07:15	14:31 (29) 08:09	13:56 (1)
2 21:43	21:01	21 20:30 (16) 19:51	19	19:02 (31) 18:37	19 18:02 (17) 16:27	50 15:28 (21) 15:47	49 15:10 (25)
6 04:42	05:27	20:10 (18) 06:23		18:42 (31) 07:17	17:44 (17) 07:17	14:30 (29) 08:10	13:56 (1)
2 21:42	20:59	18 20:28 (18) 19:49	21	19:03 (31) 18:34	16 18:00 (17) 16:25	53 15:29 (21) 15:46	48 15:09 (25)
7 04:43	05:29	20:10 (18) 06:25		18:41 (31) 07:19	17:45 (17) 07:19	14:30 (29) 08:12	13:17 (26)
2 21:41	20:57	16 20:26 (18) 19:46	22	19:03 (31) 18:32	13 17:58 (17) 16:23	54 15:29 (21) 15:46	49 15:09 (25)
8 04:44	05:31	20:11 (18) 06:26		18:40 (31) 07:21	17:48 (17) 07:21	14:29 (29) 08:13	13:14 (26)
2 21:41	20:55	13 20:24 (18) 19:44	24	19:04 (31) 18:29	7 17:55 (17) 16:21	57 15:30 (21) 15:45	54 15:08 (25)
9 04:45	05:33	20:12 (18) 06:28		18:39 (31) 07:23	17:49 (17) 07:23	14:29 (29) 08:14	13:14 (26)
2 21:40	20:53	11 20:23 (18) 19:41	24	19:03 (31) 18:27	16:20	58 15:30 (21) 15:45	57 14:59 (27)
10 04:46	05:34	20:14 (18) 06:30		18:39 (31) 07:25	17:49 (17) 07:25	14:29 (29) 08:16	13:13 (26)
2 21:39	20:51	6 20:20 (18) 19:39	24	19:03 (31) 18:24	16:18	58 15:30 (21) 15:45	58 14:59 (27)
11 04:48	05:36	06:32		18:39 (31) 07:27	17:49 (17) 07:27	14:30 (29) 08:17	13:12 (26)
2 21:38	20:49	19:36	23	19:02 (31) 18:22	16:16	58 15:31 (21) 15:44	59 14:58 (27)
12 04:49	05:38	06:34		18:39 (31) 07:28	17:49 (17) 07:28	14:30 (29) 08:18	13:12 (26)
2 21:37	20:47	19:34	23	19:02 (31) 18:20	16:14	58 15:31 (21) 15:44	60 14:58 (27)
13 04:50	05:40	06:35		18:39 (31) 07:30	17:49 (17) 07:31	14:30 (29) 08:19	13:11 (26)
2 21:36	20:45	19:31	21	19:00 (31) 18:17	16:13	58 15:31 (21) 15:44	60 14:58 (27)
14 04:51	05:41	06:37		18:40 (31) 07:32	17:49 (17) 07:33	14:30 (29) 08:20	13:11 (26)
2 21:35	20:43	19:29	19	18:59 (31) 18:15	16:11	55 15:30 (21) 15:44	62 14:58 (27)
15 04:53	05:43	06:39		18:41 (31) 07:34	17:49 (17) 07:35	14:30 (29) 08:21	13:11 (26)
2 21:34	20:40	19:26	17	18:58 (31) 18:12	16:09	55 15:30 (21) 15:44	62 14:58 (27)
16 04:54	05:45	06:41		18:43 (31) 07:36	17:49 (17) 07:36	14:31 (29) 08:22	13:12 (26)
2 21:33	20:38	19:24	13	18:56 (31) 18:10	16:08	53 15:30 (21) 15:44	61 14:59 (27)
17 04:55	05:47	06:43		18:45 (31) 07:38	17:49 (17) 07:38	14:31 (29) 08:23	13:12 (26)
2 21:32	20:36	19:21	6	18:51 (31) 18:08	16:06	51 15:29 (21) 15:44	61 14:59 (27)
18 04:57	05:49	06:44		18:32 (24) 07:40	17:40	14:32 (29) 08:23	13:12 (26)
2 21:30	20:34	19:19	9	18:41 (24) 18:05	16:05	51 15:28 (21) 15:45	61 14:59 (27)
19 04:58	05:50	06:46		18:30 (24) 07:42	17:42	14:32 (29) 08:24	13:13 (26)
2 21:29	20:31	19:16	12	18:42 (24) 18:03	16:03	51 15:27 (21) 15:45	61 15:00 (27)
20 04:59	05:52	06:48		18:29 (24) 07:44	17:44	14:33 (29) 08:25	13:13 (26)
2 21:28	20:29	19:14	14	18:43 (24) 18:01	16:02	48 15:26 (21) 15:45	62 15:00 (27)
21 05:01	05:54	06:50		18:27 (24) 07:46	17:46	14:34 (27) 08:25	13:14 (26)
2 21:26	20:27	19:11	15	18:42 (24) 17:59	16:01	39 15:13 (25) 15:46	61 15:00 (27)
22 05:02	05:56	06:52		18:27 (24) 07:48	17:48	14:34 (27) 08:26	13:14 (26)
2 21:25	20:25	19:09	13	18:40 (24) 17:56	15:59	41 15:15 (25) 15:46	61 15:00 (27)
23 05:04	05:58	06:53		18:27 (24) 07:50	17:49	14:33 (27) 08:26	13:15 (26)
2 21:23	20:22	19:06	11	18:38 (24) 17:54	15:58	42 15:15 (25) 15:47	62 15:02 (27)
24 05:06	05:59	06:55		18:27 (24) 07:51	17:49	14:33 (27) 08:27	13:15 (26)
2 21:22	20:20	19:04	8	18:35 (24) 17:52	15:57	42 15:15 (25) 15:47	61 15:02 (27)
25 05:07	06:01	06:57		17:52 (17) 06:53	17:53	14:34 (27) 08:27	13:15 (26)
2 21:20	20:18	19:01	14	18:33 (24) 16:50	15:56	42 15:16 (25) 15:48	61 15:02 (27)
26 05:09	06:03	06:59		17:48 (17) 06:55	17:55	14:02 (1) 08:28	13:16 (26)
2 21:19	20:15	18:59	16	18:30 (24) 16:48	15:54	47 15:16 (25) 15:48	61 15:03 (27)
27 05:10	06:05	07:01		17:46 (17) 06:57	17:56	14:00 (1) 08:28	13:16 (26)
2 21:17	20:13	18:56	17	18:03 (17) 16:45	15:53	54 15:17 (25) 15:49	61 15:03 (27)
28 05:12	06:07	07:03		17:45 (17) 06:59	17:58	13:59 (1) 08:28	13:17 (26)
2 21:15	20:11	18:54	19	18:04 (17) 16:43	9 14:52 (29) 15:52	55 15:16 (25) 15:50	62 15:04 (27)
29 05:14	06:08	07:04		17:44 (17) 07:01	17:59	14:40 (29) 08:00	13:58 (1) 08:28
2 21:14	20:08	18:51	21	18:05 (17) 16:41	16 14:56 (29) 15:51	54 15:15 (25) 15:51	61 15:05 (27)
30 05:15	06:10	07:06		17:43 (17) 07:03	17:59	14:37 (29) 08:01	13:58 (1) 08:28
2 21:12	20:06	18:49	22	18:05 (17) 16:39	22 14:59 (29) 15:51	54 15:15 (25) 15:52	61 15:06 (27)
31 05:17	06:12			17:05	14:35 (29)		08:28
2 21:10	20:03			16:37	25 15:00 (29)		15:53
Sonnenscheinstunden	514	461	383	328	213	257	231
astr.max.mögl.Beschattung	224	184	484	213	1479		1802
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21		0.14
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91		0.91
Reduktion Windrichtung	0.63	0.63	0.68	0.68	0.68		0.66
Gesamte Reduktion	0.26	0.28	0.25	0.20	0.13		0.08
Met.wahrsch.Beschattung	57	52	120	43	192		150

Tabellen-Layout: Die Daten für jeden Tag 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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	---------------------------	----------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 24
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1 08:28		13:35 (26) 07:57	15:09 (29) 06:59	06:43	18:46 (31) 05:33	19:59 (18) 04:42		
15:54	57	15:11 (27) 16:46	16:05 (21) 17:43	19:42	19:09 (31) 20:39	10 20:09 (18) 21:29		
2 08:28		13:35 (26) 07:55	15:09 (29) 06:56	06:40	18:46 (31) 05:31	19:58 (18) 04:41		
15:55	58	15:12 (27) 16:48	16:05 (21) 17:45	19:44	22 19:08 (31) 20:40	12 20:10 (18) 21:31		
3 08:28		13:37 (26) 07:54	15:09 (29) 06:54	06:38	18:46 (31) 05:29	19:57 (18) 04:40	20:45 (30)	
15:57	58	15:13 (27) 16:50	16:05 (21) 17:47	19:46	22 19:08 (31) 20:42	15 20:12 (18) 21:32	7 20:52 (30)	
4 08:27		13:38 (26) 07:52	15:10 (29) 06:52	06:35	18:46 (31) 05:26	19:56 (18) 04:40	20:43 (30)	
15:58	58	15:15 (27) 16:52	16:05 (21) 17:49	19:48	21 19:07 (31) 20:44	18 20:14 (18) 21:33	11 20:54 (30)	
5 08:27		13:39 (26) 07:50	15:11 (29) 06:49	06:33	18:46 (31) 05:24	19:56 (18) 04:39	20:42 (30)	
15:59	56	15:15 (27) 16:54	16:05 (21) 17:51	19:50	20 19:06 (31) 20:46	18 20:14 (18) 21:34	13 20:55 (30)	
6 08:27		13:41 (26) 07:48	15:10 (29) 06:47	06:30	18:47 (31) 05:22	19:55 (18) 04:38	20:42 (30)	
16:00	55	15:16 (27) 16:56	16:03 (21) 17:53	11 17:23 (17) 19:52	17 19:04 (31) 20:48	22 20:17 (16) 21:35	14 20:56 (30)	
7 08:26		13:43 (26) 07:46	15:11 (29) 06:45	06:28	18:48 (31) 05:20	19:55 (18) 04:37	20:41 (30)	
16:02	53	15:18 (27) 16:58	16:03 (21) 17:55	15 17:25 (17) 19:54	15 19:03 (31) 20:50	23 20:18 (16) 21:36	16 20:57 (30)	
8 08:26		13:46 (26) 07:44	15:12 (29) 06:42	06:26	17:08 (17) 06:26	18:51 (31) 05:19	19:55 (18) 04:37	20:41 (30)
16:03	47	15:18 (27) 17:00	16:01 (21) 17:57	17 17:25 (17) 19:55	10 19:01 (31) 20:51	25 20:20 (16) 21:37	17 20:58 (30)	
9 08:25		14:21 (1) 07:42	15:12 (29) 06:40	06:23	17:08 (17) 06:23	05:17	19:56 (18) 04:36	20:40 (30)
16:05	45	15:27 (25) 17:03	15:59 (21) 17:59	19 17:27 (17) 19:57	20:53	26 20:22 (16) 21:38	18 20:58 (30)	
10 08:24		14:22 (1) 07:40	15:14 (29) 06:37	06:21	17:06 (17) 06:21	05:15	19:56 (18) 04:36	20:40 (30)
16:06	47	15:29 (25) 17:05	15:42 (29) 18:00	20 17:26 (17) 19:59	20:55	28 20:24 (16) 21:39	19 20:59 (30)	
11 08:24		14:23 (1) 07:38	15:15 (29) 06:35	06:18	17:06 (17) 06:18	05:13	19:56 (18) 04:35	20:40 (30)
16:08	48	15:31 (25) 17:07	15:41 (29) 18:02	21 17:27 (17) 20:01	20:57	29 20:25 (16) 21:40	20 21:00 (30)	
12 08:23		14:24 (1) 07:36	15:17 (29) 06:32	06:16	17:05 (17) 06:16	05:11	19:57 (18) 04:35	20:39 (30)
16:09	48	15:32 (25) 17:09	15:40 (29) 18:04	21 17:26 (17) 20:03	20:58	29 20:26 (16) 21:41	21 21:00 (30)	
13 08:22		14:25 (1) 07:34	15:19 (29) 06:30	06:14	17:06 (17) 06:14	05:09	19:58 (18) 04:34	20:40 (30)
16:11	50	15:34 (25) 17:11	15:38 (29) 18:06	20 17:26 (17) 20:05	21:00	27 20:26 (16) 21:41	22 21:05 (19)	
14 08:21		14:26 (1) 07:32	15:20 (29) 06:27	06:11	17:06 (17) 06:11	05:07	19:59 (18) 04:34	20:40 (30)
16:13	50	15:36 (25) 17:13	15:35 (29) 18:08	19 17:25 (17) 20:07	21:02	24 20:25 (16) 21:42	22 21:06 (19)	
15 08:20		14:28 (1) 07:30	15:25 (29) 06:25	06:09	17:07 (17) 06:09	05:06	20:02 (18) 04:34	20:40 (30)
16:14	50	15:38 (25) 17:15	15:31 (29) 18:10	17 17:24 (17) 20:09	21:04	17 20:25 (16) 21:43	23 21:06 (19)	
16 08:19		14:29 (1) 07:28	06:23	06:06	17:07 (17) 06:06	05:04	20:13 (16) 04:34	20:40 (30)
16:16	51	15:40 (25) 17:17	18:12	16 17:23 (17) 20:10	21:05	10 20:23 (16) 21:43	24 21:07 (19)	
17 08:18		14:32 (1) 07:26	06:20	06:04	17:09 (17) 06:04	05:02	20:15 (16) 04:34	20:40 (30)
16:18	51	15:43 (25) 17:19	18:14	12 17:21 (17) 20:12	21:07	7 20:22 (16) 21:44	25 21:07 (19)	
18 08:17		14:34 (1) 07:24	06:18	06:02	17:11 (17) 06:02	05:01	20:16 (16) 04:33	20:40 (30)
16:19	45	15:42 (25) 17:21	18:16	6 17:17 (17) 20:14	21:09		21:44	26 21:08 (19)
19 08:16		15:03 (27) 07:22	06:15	05:59	17:24 (17) 20:16	04:59	04:33	20:40 (30)
16:21	40	15:43 (25) 17:23	18:18	20:16	21:10	21:10	21:44	26 21:08 (19)
20 08:15		15:03 (27) 07:19	06:13	05:57	17:23 (17) 20:14	04:58	04:34	20:40 (30)
16:23	40	15:43 (25) 17:25	18:20	20:18	21:12	21:12	21:45	26 21:08 (19)
21 08:14		15:04 (27) 07:17	06:10	05:55	17:24 (17) 20:15	04:56	04:34	20:40 (30)
16:25	39	15:43 (25) 17:27	18:22	20:20	21:14	21:14	21:45	26 21:08 (19)
22 08:12		15:06 (27) 07:15	06:08	05:52	17:25 (17) 20:16	04:55	04:34	20:40 (30)
16:27	37	15:43 (25) 17:29	18:23	20:22	21:15	21:15	21:45	26 21:08 (19)
23 08:11		15:06 (27) 07:13	06:05	05:50	17:26 (17) 20:17	04:53	04:34	20:41 (30)
16:29	36	15:42 (25) 17:31	18:25	20:24	21:17	21:17	21:45	26 21:09 (19)
24 08:10		15:07 (27) 07:10	06:03	05:48	17:27 (17) 20:18	04:52	04:34	20:41 (30)
16:31	41	15:56 (21) 17:33	18:27	20:25	21:18	21:18	21:46	26 21:09 (19)
25 08:08		15:08 (27) 07:08	06:00	05:46	17:28 (17) 20:19	04:50	04:35	20:41 (30)
16:32	44	15:59 (21) 17:35	18:29	20:27	21:20	21:20	21:46	26 21:09 (19)
26 08:07		15:09 (27) 07:06	05:58	05:43	17:53 (31) 05:43	04:49	04:35	20:42 (30)
16:34	45	16:00 (21) 17:37	18:31	11 18:04 (31) 20:29	21:21	21:21	21:46	24 21:09 (19)
27 08:05		15:09 (29) 07:03	05:55	05:37	17:51 (31) 05:41	04:48	04:36	20:42 (30)
16:36	47	16:01 (21) 17:39	18:33	15 18:06 (31) 20:31	21:23	21:23	21:45	24 21:09 (19)
28 08:04		15:10 (29) 07:01	05:53	05:39	17:49 (31) 05:39	04:47	04:36	20:43 (30)
16:38	50	16:03 (21) 17:41	18:35	18 18:07 (31) 20:33	21:24	21:24	21:45	23 21:09 (19)
29 08:02		15:09 (29)	06:50	05:37	18:48 (31) 05:37	04:45	04:37	20:43 (30)
16:40	53	16:04 (21)	19:37	20 19:08 (31) 20:35	21:26	21:26	21:45	22 21:08 (19)
30 08:00		15:09 (29)	06:48	05:35	18:48 (31) 05:35	04:44	04:37	20:44 (30)
16:42	53	16:04 (21)	19:38	21 19:09 (31) 20:37	6 20:07 (18) 21:27	21:27	21:45	20 21:04 (30)
31 07:59		15:09 (29)	06:45	05:31	18:46 (31)	04:43		
16:44	54	16:04 (21)	19:40	23 19:09 (31)	21:28			
Sonnenscheinstunden	248	272	367	421	496	512		
astr.max.mögl.Beschattung	1506	567	322	156	340	593		
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45		
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91		
Reduktion Windrichtung	0.68	0.68	0.68	0.67	0.63	0.61		
Gesamte Reduktion	0.11	0.15	0.19	0.25	0.30	0.25		
Met.wahrsch.Beschattung	162	85	63	40	101	151		

Tabellen-Layout: Die Daten für jeden Tag 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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 25
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember	
1	04:38	20:44 (30) 05:19	20:08 (18) 06:14		17:45 (17) 07:07	14:43 (29) 08:03	14:05 (1)
2	21:44	21:05 (30) 21:09	20:37 (16) 20:01	18:46	18:06 (17) 16:35	15:12 (29) 15:50	48 15:13 (25)
3	04:39	20:44 (30) 05:20	20:06 (18) 06:16	10:10	17:45 (17) 07:09	14:42 (29) 08:05	14:05 (1)
4	21:44	21:04 (30) 21:07	20:35 (16) 19:59	18:44	18:06 (17) 16:33	15:29 (29) 15:46	47 15:12 (25)
5	04:40	20:45 (30) 05:22	20:06 (18) 06:17	10:12	17:44 (17) 07:11	14:41 (29) 08:06	14:05 (1)
6	21:44	21:04 (30) 21:05	20:33 (16) 19:56	18:41	18:04 (17) 16:31	15:31 (21) 15:48	46 15:12 (25)
7	04:40	20:46 (30) 05:24	20:05 (18) 06:19	18:48 (31) 07:14	17:44 (17) 07:13	14:40 (29) 08:08	13:31 (26)
8	21:43	21:04 (30) 21:03	20:31 (16) 19:54	10	18:04 (17) 16:29	15:32 (21) 15:48	45 15:02 (27)
9	04:41	20:47 (30) 05:25	20:05 (18) 06:21	18:44 (31) 07:15	17:45 (17) 07:15	14:41 (29) 08:09	13:29 (26)
10	21:43	21:03 (30) 21:01	20:30 (16) 19:51	15	18:59 (31) 18:37	15:34 (21) 15:47	52 15:03 (27)
11	04:42	20:48 (30) 05:27	20:05 (18) 06:23	18:43 (31) 07:17	17:46 (17) 07:17	14:40 (29) 08:10	13:27 (25)
12	21:42	21:03 (30) 20:59	20:28 (16) 19:49	17	19:00 (31) 18:34	15:35 (21) 15:46	55 15:02 (27)
13	04:43	20:49 (30) 05:29	20:05 (18) 06:25	18:42 (31) 07:19	17:47 (17) 07:19	14:40 (29) 08:12	13:27 (26)
14	21:41	21:03 (30) 20:57	20:26 (16) 19:46	19	19:01 (31) 18:32	15:35 (21) 15:46	56 15:03 (27)
15	04:44	20:50 (30) 05:31	20:05 (18) 06:26	18:41 (31) 07:21	17:50 (17) 07:21	14:40 (29) 08:13	13:26 (26)
16	21:41	21:02 (30) 20:55	20:23 (16) 19:44	21	19:02 (31) 18:29	15:35 (21) 15:45	57 15:02 (27)
17	04:45	20:52 (30) 05:33	20:06 (18) 06:28	18:39 (31) 07:23	17:57 (17) 07:23	14:40 (29) 08:14	13:26 (26)
18	21:40	21:01 (30) 20:53	20:23 (16) 19:41	22	19:01 (31) 18:27	15:35 (21) 15:45	58 15:02 (27)
19	04:46	20:54 (30) 05:34	20:06 (18) 06:30	18:39 (31) 07:25	17:57 (17) 07:25	14:40 (29) 08:16	13:25 (26)
20	21:39	20:58 (30) 20:51	20:20 (16) 19:39	22	19:01 (31) 18:24	15:35 (21) 15:45	58 15:02 (27)
21	04:48	20:56 (30) 05:36	20:07 (18) 06:32	18:39 (31) 07:27	17:57 (17) 07:27	14:41 (29) 08:17	13:25 (26)
22	21:38	20:49	20:18 (18) 19:36	22	19:01 (31) 18:22	15:35 (21) 15:44	57 15:01 (27)
23	04:49	20:58	20:08 (18) 06:34	22	18:39 (31) 07:28	14:41 (29) 08:18	13:25 (26)
24	21:37	20:47	20:17 (18) 19:34	22	19:01 (31) 18:20	15:35 (21) 15:44	56 15:01 (27)
25	04:50	20:50	20:09 (18) 06:35	22	18:38 (31) 07:30	14:41 (29) 08:19	13:25 (26)
26	21:36	20:45	20:14 (18) 19:31	22	19:00 (31) 18:17	15:35 (21) 15:44	56 15:00 (27)
27	04:51	20:43	20:06 (18) 06:37	22	18:38 (31) 07:32	14:42 (29) 08:20	13:25 (26)
28	21:35	20:43	19:29	21	18:59 (31) 18:15	15:35 (21) 15:44	51 14:35 (1)
29	04:53	20:43	19:29	21	18:59 (31) 18:15	14:42 (29) 08:21	13:25 (26)
30	21:34	20:40	19:26	19	18:58 (31) 18:12	15:34 (21) 15:44	53 14:36 (1)
31	04:54	20:45	19:26	19	18:40 (31) 07:36	14:42 (27) 08:22	13:25 (26)
1	21:33	20:38	19:24	16	18:56 (31) 18:10	15:33 (21) 15:44	53 14:36 (1)
2	04:55	20:47	19:24	16	18:56 (31) 18:10	14:41 (27) 08:23	13:26 (26)
3	21:32	20:36	19:21	12	18:53 (31) 18:08	15:32 (21) 15:44	54 14:37 (1)
4	04:57	20:49	19:21	12	18:45 (31) 07:40	14:40 (27) 08:23	13:26 (26)
5	21:30	20:34	19:19	4	18:49 (31) 18:05	15:30 (21) 15:45	55 14:38 (1)
6	04:58	20:50	19:19	4	18:49 (31) 18:05	14:40 (27) 08:24	13:27 (26)
7	21:29	20:31	19:16	11	18:02 (17) 16:48	15:16 (25) 15:45	54 14:39 (1)
8	04:59	20:52	19:16	11	18:03 (17) 16:48	14:40 (27) 08:25	13:27 (26)
9	21:28	20:29	19:14	18:01	16:02	15:17 (25) 15:45	54 14:38 (1)
10	05:01	05:54	06:50	17:59	16:02	14:39 (27) 08:25	13:27 (26)
11	21:26	20:27	19:11	17:59	16:01	15:18 (25) 15:46	55 14:39 (1)
12	05:02	05:56	06:52	17:58	16:01	14:40 (27) 08:26	13:27 (26)
13	21:25	20:25	19:09	17:56	15:59	15:20 (25) 15:46	55 14:39 (1)
14	05:04	05:58	06:53	17:50	16:00	14:40 (27) 08:26	13:28 (26)
15	21:23	20:22	19:06	17:54	15:58	15:19 (25) 15:46	55 14:40 (1)
16	05:06	05:59	06:55	17:51	16:00	14:41 (27) 08:27	13:29 (26)
17	21:22	20:20	19:04	17:52	15:57	15:20 (25) 15:47	53 14:40 (1)
18	05:07	06:01	06:57	17:53	16:00	14:09 (1) 08:27	13:29 (26)
19	21:20	20:18	19:01	16:50	15:56	15:20 (25) 15:48	55 14:41 (1)
20	05:09	20:26 (16) 06:03	06:59	17:51 (17) 06:55	16:00	14:07 (1) 08:28	13:29 (26)
21	21:19	20:31 (16) 20:15	18:59	11	18:02 (17) 16:48	15:18 (25) 15:48	55 14:41 (1)
22	05:10	20:25 (16) 06:05	07:01	17:49 (17) 06:57	15:54	14:07 (1) 08:28	13:30 (26)
23	21:17	20:33 (16) 20:13	18:56	15	18:04 (17) 16:45	15:17 (25) 15:49	54 14:41 (1)
24	05:12	20:23 (16) 06:07	07:03	17:48 (17) 06:59	15:49 (29) 07:58	14:06 (1) 08:28	13:31 (26)
25	21:15	20:34 (16) 20:11	18:54	17	18:05 (17) 16:43	15:16 (25) 15:50	53 14:42 (1)
26	05:14	20:11 (18) 06:08	07:04	17:47 (17) 07:01	15:48 (29) 08:00	14:06 (1) 08:28	13:31 (26)
27	21:14	20:35 (16) 20:08	18:51	19	18:06 (17) 16:41	15:15 (25) 15:51	53 14:42 (1)
28	05:15	20:09 (18) 06:10	07:06	17:46 (17) 07:03	15:46 (29) 08:01	14:06 (1) 08:28	13:32 (26)
29	21:12	20:35 (16) 20:06	18:49	20	18:06 (17) 16:39	15:10 (29) 15:51	56 15:07 (27)
30	05:17	20:08 (18) 06:12	07:05	17:44 (17) 07:05	15:44 (29) 08:28	15:15 (25) 15:52	56 15:07 (27)
31	21:10	20:36 (16) 20:03	07:06	16:37	15:11 (29) 15:53	15:15 (25) 15:53	57 15:09 (27)
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	242	254	346	232	1408	1668	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14	
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	
Reduktion Windrichtung	0.62	0.64	0.68	0.68	0.68	0.66	
Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	0.08	
Met.wahrsch.Beschattung	61	72	86	48	184	140	

Tabellen-Layout: Die Daten für jeden Tag 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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------	------------------------------	----------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 26
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1 08:28							
15:54	57	13:37 (26) 07:57	53	15:11 (29) 06:59	06:43		
2 08:28		15:11 (27) 16:48		16:05 (21) 17:43	19:42	23	18:46 (31) 05:33
15:55	57	13:37 (26) 07:54	54	15:11 (29) 06:54	06:38	22	18:46 (31) 05:29
3 08:28		15:14 (27) 16:50		16:06 (21) 17:47	19:46	22	19:08 (31) 05:26
15:57	58	13:40 (26) 07:52	55	15:12 (29) 06:52	06:35	16	18:46 (31) 05:26
4 08:27		15:15 (27) 16:52		16:06 (21) 17:49	19:48	20	19:06 (31) 05:24
15:58	58	13:41 (26) 07:50	54	15:12 (29) 06:49	06:33	18	18:47 (31) 05:24
5 08:27		15:15 (27) 16:54		16:06 (21) 17:51	19:50	19	19:06 (31) 05:22
15:59	58	13:42 (26) 07:48	53	15:12 (29) 06:47	06:30	19	18:47 (31) 05:22
6 08:27		15:17 (27) 16:56		16:05 (21) 17:53	19:52	17	19:04 (31) 05:20
16:00	56	13:45 (26) 07:46	50	15:13 (29) 06:45	06:28	22	20:17 (16) 04:38
7 08:26		15:18 (27) 16:58		16:04 (21) 17:55	19:54	13	19:02 (31) 05:20
16:02	54	13:47 (26) 07:44	47	15:13 (29) 06:42	06:26	24	20:18 (16) 04:37
8 08:26		15:19 (27) 17:00		16:03 (21) 17:57	19:55	8	19:00 (31) 05:19
16:03	51	14:23 (1) 07:42	45	15:14 (29) 06:40	06:23	26	20:20 (16) 04:37
9 08:25		15:27 (25) 17:03		16:01 (21) 17:59	19:57	27	20:22 (16) 04:36
16:05	43	14:23 (1) 07:40	39	15:15 (29) 06:37	06:21	27	20:22 (16) 04:36
10 08:24		15:29 (25) 17:05		16:04 (21) 17:55	19:59	28	20:24 (16) 04:35
16:06	44	14:24 (1) 07:38	29	15:16 (29) 06:35	06:18	28	20:24 (16) 04:35
11 08:24		15:32 (25) 17:09		16:03 (21) 17:57	19:59	29	20:25 (16) 04:34
16:08	47	14:25 (1) 07:36	27	15:18 (29) 06:32	06:16	29	20:25 (16) 04:34
12 08:23		15:34 (25) 17:11		16:02 (21) 17:55	19:58	28	20:25 (16) 04:34
16:09	47	14:26 (1) 07:34	24	15:19 (29) 06:30	06:14	28	20:25 (16) 04:34
13 08:22		15:35 (25) 17:12		16:01 (21) 17:57	19:57	25	20:25 (16) 04:34
16:11	49	14:27 (1) 07:32	20	15:20 (29) 06:30	06:12	21	20:25 (16) 04:34
14 08:21		15:36 (25) 17:13		16:00 (21) 17:55	19:56	20	20:26 (16) 04:34
16:13	50	14:29 (1) 07:30	16	15:21 (29) 06:27	06:11	20	20:26 (16) 04:34
15 08:20		15:37 (25) 17:14		16:00 (21) 17:55	19:56	20	20:26 (16) 04:34
16:14	51	14:29 (1) 07:30	8	15:22 (29) 06:25	06:10	20	20:26 (16) 04:34
16 08:19		15:38 (25) 17:15		16:00 (21) 17:55	19:56	10	20:26 (16) 04:34
16:15	51	14:30 (1) 07:28		16:00 (21) 17:55	19:56	10	20:26 (16) 04:34
17 08:18		15:40 (25) 17:17		16:00 (21) 17:55	19:56	9	20:26 (16) 04:34
16:16	51	14:32 (1) 07:26		16:00 (21) 17:55	19:56	9	20:26 (16) 04:34
18 08:17		15:43 (25) 17:19		16:00 (21) 17:55	19:56	4	20:26 (16) 04:34
16:18	52	14:34 (1) 07:24		16:00 (21) 17:55	19:56	4	20:26 (16) 04:34
18 08:17		15:44 (25) 17:20		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:19	48	15:05 (27) 07:22		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
19 08:16		15:45 (25) 17:21		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:16	48	15:05 (27) 07:22		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
20 08:15		15:46 (25) 17:22		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:17	39	15:04 (27) 07:19		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
21 08:14		15:47 (25) 17:23		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:18	39	15:43 (25) 17:25		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
22 08:12		15:44 (25) 17:24		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:19	37	15:07 (27) 07:17		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
23 08:11		15:45 (25) 17:25		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:20	36	15:07 (27) 07:13		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
24 08:10		15:46 (25) 17:26		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:21	36	15:07 (27) 07:10		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
25 08:08		15:47 (25) 17:27		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:22	38	15:55 (21) 17:33		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
26 08:07		15:48 (25) 17:28		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:23	38	15:09 (27) 07:08		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
27 08:05		15:49 (25) 17:29		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:24	42	15:10 (27) 07:06		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
28 08:04		15:50 (27) 07:10		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:25	45	16:01 (21) 17:37		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
29 08:02		15:51 (29) 07:03		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:26	47	16:02 (21) 17:39		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
30 08:00		15:52 (29) 07:04		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:27	49	16:04 (21) 17:41		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
31 07:59		15:53 (29) 07:05		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:28	53	16:05 (21) 17:45		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
16:44	53	16:05 (21) 17:45		16:00 (21) 17:55	19:56	5	20:26 (16) 04:34
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung	1500	574	322	155	329	625	
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45	
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	
Reduktion Windrichtung	0.68	0.69	0.68	0.67	0.63	0.61	
Gesamte Reduktion	0.11	0.15	0.20	0.25	0.30	0.25	
Met.wahrsch.Beschattung	162	86	63	39	98	159	

Tabellen-Layout: Die Daten für jeden Tag 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:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 27
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

		Juli		August		September		Oktober		November		Dezember	
1	04:38												
2	21:44	22	20:42 (30) 05:19			29	20:07 (18) 06:14						
3	04:39		20:42 (30) 05:20				20:06 (18) 06:16						
4	21:44	21	21:03 (30) 21:07			29	20:35 (16) 19:59						
5	04:40		20:43 (30) 05:22				20:06 (18) 06:17						
6	21:44	20	21:03 (30) 21:05			27	20:33 (16) 19:56						
7	04:40		20:44 (30) 05:24				20:05 (18) 06:19						
8	21:43	19	21:03 (30) 21:03			26	20:31 (16) 19:54	8	18:49 (31) 07:14				
9	04:41		20:44 (30) 05:25				20:05 (18) 06:21						
10	21:43	19	21:03 (30) 21:01			25	20:30 (16) 19:51	13	18:58 (31) 18:37				
11	04:42		20:45 (30) 05:27				20:05 (18) 06:23						
12	21:42	18	21:03 (30) 20:59			23	20:28 (16) 19:49	17	19:00 (31) 18:34				
13	04:43		20:46 (30) 05:29				20:04 (18) 06:25						
14	21:41	17	21:03 (30) 20:57			22	20:26 (16) 19:46	19	19:01 (31) 18:32				
15	04:44		20:47 (30) 05:31				20:04 (18) 06:26						
16	21:41	15	21:02 (30) 20:55			20	20:24 (16) 19:44	20	19:01 (31) 18:29	7	17:57 (17) 16:21		
17	04:45		20:48 (30) 05:33				20:05 (18) 06:28						
18	21:40	13	21:01 (30) 20:53			17	20:22 (18) 19:41	22	19:01 (31) 18:27				
19	04:46		20:49 (30) 05:34				20:05 (18) 06:30						
20	21:39	11	21:00 (30) 20:51			15	20:20 (18) 19:39	22	19:01 (31) 18:24				
21	04:48		20:51 (30) 05:36				20:06 (18) 06:32						
22	21:38	8	20:59 (30) 20:49			12	20:18 (18) 19:36	22	19:01 (31) 18:22				
23	04:49		05:38				20:07 (18) 06:34						
24	21:37		20:47			10	20:17 (18) 19:34	22	19:01 (31) 18:20				
25	04:50		05:40				20:07 (18) 06:35						
26	21:36		20:45			7	20:14 (18) 19:31	21	18:59 (31) 18:17				
27	04:51		05:41				20:11 (18) 06:37						
28	21:35		20:43			1	20:12 (18) 19:29	21	18:59 (31) 18:15				
29	04:53		05:43				06:39						
30	21:34		20:40				19:26	19	18:58 (31) 18:12				
31	04:54		05:45				06:41						
32	21:33		20:38				19:24	16	18:56 (31) 18:10				
33	04:55		05:47				06:43						
34	21:32		20:36				19:21	12	18:53 (31) 18:08				
35	04:57		05:49				06:44						
36	21:30		20:34				19:19	6	18:50 (31) 18:05				
37	04:58		05:50				06:46						
38	21:29		20:31				19:16						
39	04:59		05:52				06:48						
40	21:28		20:29				19:14						
41	05:01		05:54				06:50						
42	21:26		20:27				19:11						
43	05:02		05:56				06:52						
44	21:25		20:25				19:09						
45	05:04		05:58				06:53						
46	21:23		20:22				19:06						
47	05:06		05:59				06:55						
48	21:22		20:20				19:04						
49	05:07		06:01				06:57						
50	21:20		20:18				19:01						
51	05:09		06:03				06:59						
52	21:19		20:15				18:59	10	18:02 (17) 16:48				
53	05:10		20:25 (16) 20:13				07:01						
54	21:17	7	20:32 (16) 20:13				18:56	14	18:04 (17) 16:45	10	15:04 (29) 15:53		
55	05:12		20:23 (16) 06:07				07:03						
56	21:15	10	20:33 (16) 20:11				18:54	17	18:05 (17) 16:43	17	15:07 (29) 15:52		
57	05:14		20:14 (18) 06:08				07:04						
58	21:14	12	20:34 (16) 20:08				18:51	19	18:06 (17) 16:41	21	15:10 (29) 15:51		
59	05:15		20:09 (18) 06:10				07:06						
60	21:12	22	20:34 (16) 20:06				18:49	20	18:06 (17) 16:39	25	15:12 (29) 15:51		
61	05:17		20:08 (18) 06:12										
62	21:10	26	20:35 (16) 20:03										
63	Sonnenscheinstunden		514				383						
64	astr.max.mögl.Beschattung		260				263						
65	Red.Sonnenscheinwahrsch.		0.44				0.48						
66	Reduktion Betriebsdauer		0.91				0.91						
67	Reduktion Windrichtung		0.62				0.64						
68	Gesamte Reduktion		0.25				0.28						
69	Met.wahrsch.Beschattung		66				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	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt: 151008_Miltzow_III-VII	Ausdruck/Seite: 13/10/2015 13:57 / 28
	Lizenzierter Anwender: I17-Wind GmbH & Co. KG Am Westersielzug 11 DE-25840 Friedrichstadt -
	Berechnet: 13/10/2015 13:41/2.9.285 André Gefke / andre.gefke@i17-wind.de

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni			
1	08:28 15:54	13:50 (26) 07:57 14:54 (1) 15:46	15:21 (29) 06:59 16:10 (21) 17:43	06:43 19:42	18:46 (31) 05:33 19:07 (31) 20:39	19:52 (18) 04:42 20:09 (18) 21:29	20:28 (30) 20:50 (30)		
2	08:28 15:55	13:50 (26) 07:55 14:54 (1) 16:48	15:21 (29) 06:56 16:10 (21) 17:45	06:40 19:44	18:46 (31) 05:31 19:06 (31) 20:40	19:51 (18) 04:41 20:09 (18) 21:31	20:28 (30) 20:52 (30)		
3	08:28 15:57	13:51 (26) 07:54 14:55 (1) 16:50	15:21 (29) 06:54 16:10 (21) 17:47	06:38 19:46	18:46 (31) 05:29 19:05 (31) 20:42	19:51 (18) 04:40 20:12 (16) 21:32	20:28 (30) 20:52 (30)		
4	08:27 15:58	13:52 (26) 07:52 14:56 (1) 16:52	15:22 (29) 06:52 16:11 (21) 17:49	06:35 19:48	18:46 (31) 05:26 19:04 (31) 20:44	19:51 (18) 04:40 20:14 (16) 21:33	20:27 (30) 20:52 (30)		
5	08:27 15:59	13:53 (26) 07:50 14:56 (1) 16:54	15:22 (29) 06:49 16:11 (21) 17:51	06:33 19:50	18:48 (31) 05:24 19:02 (31) 20:46	19:51 (18) 04:39 20:15 (16) 21:34	20:27 (30) 20:52 (30)		
6	08:27 16:00	13:54 (26) 07:48 15:18 (27) 16:56	15:21 (29) 06:47 16:10 (21) 17:53	10 17:14 (17) 06:30 19:52	18:49 (31) 05:22 20:17 (16) 21:35	19:51 (18) 04:38 19:52 (18) 04:37	20:27 (30) 20:53 (30)		
7	08:26 16:02	13:56 (26) 07:46 15:21 (27) 16:58	15:22 (29) 06:45 16:10 (21) 17:55	14 17:12 (17) 06:28 19:54	18:49 (31) 05:20 20:17 (16) 21:36	19:52 (18) 04:37 20:18 (16) 21:36	20:27 (30) 20:53 (30)		
8	08:26 16:03	13:57 (26) 07:44 15:22 (27) 17:00	15:22 (29) 06:42 16:09 (21) 17:57	14 17:10 (17) 06:26 19:55	18:49 (31) 05:18 20:17 (16) 21:37	19:53 (18) 04:37 20:09 (16) 21:37	20:27 (30) 20:54 (30)		
9	08:25 16:05	13:58 (26) 07:42 15:23 (27) 17:03	15:23 (29) 06:40 16:08 (21) 17:59	17 17:08 (17) 06:23 19:57	18:49 (31) 05:17 20:18 (16) 21:38	19:55 (18) 04:36 20:21 (16) 21:38	20:28 (30) 20:54 (30)		
10	08:24 16:06	14:00 (26) 07:40 15:24 (27) 17:05	15:24 (29) 06:37 16:06 (21) 18:00	18 17:08 (17) 06:21 19:59	17:08 (17) 06:21 20:55	19:56 (18) 04:36 20:20 (16) 21:39	20:27 (30) 20:54 (30)		
11	08:24 16:08	14:02 (26) 07:38 15:25 (27) 17:07	15:25 (29) 06:35 16:06 (21) 18:02	19 17:08 (17) 06:18 20:01	20 17:08 (17) 06:16 19:59	19:56 (18) 04:35 20:20 (16) 21:40	20:28 (30) 20:55 (30)		
12	08:23 16:09	14:33 (1) 07:36 15:32 (25) 17:09	15:26 (29) 06:32 16:09 (21) 18:04	20 17:08 (17) 06:16 20:03	17:08 (17) 06:16 19:57	19:56 (18) 04:35 20:19 (16) 21:41	20:27 (30) 20:54 (30)		
13	08:22 16:11	14:34 (1) 07:34 15:34 (25) 17:11	15:27 (29) 06:30 16:08 (21) 18:06	19 17:08 (17) 06:14 20:05	17:08 (17) 06:14 19:57	19:56 (18) 04:35 20:17 (16) 21:41	20:28 (30) 20:55 (30)		
14	08:21 16:13	14:35 (1) 07:32 15:36 (25) 17:13	15:28 (29) 06:27 16:08 (21) 18:08	18 17:08 (17) 06:11 20:07	17:08 (17) 06:11 19:57	19:56 (18) 04:34 20:19 (16) 21:41	20:28 (30) 20:55 (30)		
15	08:20 16:14	14:36 (1) 07:30 15:38 (25) 17:15	15:29 (29) 06:25 16:09 (21) 18:10	17 17:09 (17) 06:09 20:09	17:09 (17) 06:09 19:57	19:56 (18) 04:34 20:20 (16) 21:41	20:28 (30) 20:56 (30)		
16	08:19 16:16	14:38 (1) 07:28 15:40 (25) 17:17	15:30 (29) 06:23 16:10 (21) 18:12	16 17:25 (17) 06:06 20:10	17:25 (17) 06:06 19:58	19:56 (18) 04:34 20:21 (16) 21:42	20:29 (30) 20:56 (30)		
17	08:18 16:18	14:39 (1) 07:26 15:43 (25) 17:19	15:31 (29) 06:21 16:11 (21) 18:14	15 17:25 (17) 06:04 20:12	17:25 (17) 06:04 20:12	19:58 (18) 04:34 20:22 (16) 21:42	20:29 (30) 20:56 (30)		
18	08:17 16:19	14:40 (1) 07:24 15:44 (25) 17:21	15:32 (29) 06:19 16:12 (21) 18:16	14 17:26 (17) 06:02 20:14	17:26 (17) 06:02 20:14	19:59 (18) 04:33 20:23 (16) 21:43	20:29 (30) 20:57 (30)		
19	08:16 16:21	14:41 (1) 07:22 15:46 (25) 17:23	15:33 (29) 06:18 16:13 (21) 18:18	13 17:27 (17) 06:01 20:16	17:27 (17) 06:01 20:16	19:59 (18) 04:33 20:24 (16) 21:44	20:29 (30) 20:57 (30)		
20	08:15 16:23	14:44 (1) 07:19 15:47 (25) 17:25	15:34 (29) 06:17 16:14 (21) 18:20	12 17:28 (17) 05:57 20:18	17:28 (17) 05:57 20:18	19:59 (18) 04:34 20:25 (16) 21:45	20:29 (30) 20:57 (30)		
21	08:14 16:25	15:11 (27) 07:17 15:48 (25) 17:27	15:35 (29) 06:16 16:15 (21) 18:22	11 17:28 (17) 05:55 20:20	17:28 (17) 05:55 20:20	19:59 (18) 04:34 20:26 (16) 21:45	20:29 (30) 20:57 (30)		
22	08:12 16:27	15:11 (27) 07:15 15:48 (25) 17:29	15:36 (29) 06:15 16:16 (21) 18:23	10 17:29 (17) 05:52 20:22	17:29 (17) 05:52 20:22	19:59 (18) 04:34 20:27 (16) 21:45	20:29 (30) 20:57 (30)		
23	08:11 16:29	15:12 (27) 07:13 15:49 (25) 17:31	15:37 (29) 06:14 16:17 (21) 18:25	9 17:30 (17) 05:50 20:24	17:30 (17) 05:50 20:24	19:59 (18) 04:34 20:28 (16) 21:45	20:29 (30) 20:58 (30)		
24	08:10 16:31	15:13 (27) 07:10 15:47 (25) 17:33	15:38 (29) 06:13 16:18 (21) 18:27	8 17:31 (17) 05:48 20:26	17:31 (17) 05:48 20:26	19:59 (18) 04:34 20:29 (16) 21:46	20:30 (30) 20:58 (30)		
25	08:08 16:32	15:14 (27) 07:08 15:47 (25) 17:35	15:39 (29) 06:12 16:19 (21) 18:29	7 17:32 (17) 05:46 20:27	17:32 (17) 05:46 20:27	19:59 (18) 04:34 20:30 (16) 21:46	20:30 (30) 20:58 (30)		
26	08:07 16:34	15:15 (27) 07:06 16:00 (21) 17:37	15:40 (29) 06:11 16:20 (21) 18:31	6 17:33 (17) 05:44 20:29	17:33 (17) 05:44 20:29	19:59 (18) 04:34 20:31 (16) 21:46	20:31 (30) 20:58 (30)		
27	08:05 16:36	15:16 (27) 07:03 16:03 (21) 17:39	15:41 (29) 06:10 16:21 (21) 18:33	5 17:34 (17) 05:41 20:31	17:34 (17) 05:41 20:31	19:59 (18) 04:34 20:32 (16) 21:46	20:31 (30) 20:58 (30)		
28	08:04 16:38	16:03 (21) 17:39 15:18 (27) 07:01	15:42 (29) 06:09 16:22 (21) 18:35	4 17:35 (17) 05:39 20:33	17:35 (17) 05:39 20:33	19:59 (18) 04:34 20:33 (16) 21:46	20:31 (30) 20:58 (30)		
29	08:02 16:40	16:06 (21) 17:41 15:20 (27) 07:01	15:43 (29) 06:08 16:23 (21) 18:37	3 17:36 (17) 05:37 20:35	17:36 (17) 05:37 20:35	19:59 (18) 04:34 20:34 (16) 21:46	20:31 (30) 20:58 (30)		
30	08:00 16:42	16:08 (21) 17:43 15:22 (29) 07:01	15:44 (29) 06:07 16:24 (21) 18:39	2 17:37 (17) 05:35 20:37	17:37 (17) 05:35 20:37	19:59 (18) 04:34 20:35 (16) 21:46	20:31 (30) 20:58 (30)		
31	07:59 16:44	16:09 (21) 17:45 16:09 (21) 17:45	15:45 (29) 06:06 16:25 (21) 18:41	1 17:38 (17) 05:33 20:39	17:38 (17) 05:33 20:39	19:59 (18) 04:34 20:36 (16) 21:46	20:31 (30) 20:58 (30)		
	Sonneneinstrahlung 248	272	367	421	496	512			
	astr.max.mögl.Beschattung 1428	579	314	145	374	804			
	Red.Sonneneinstrahlung 0.17	0.24	0.31	0.41	0.51	0.45			
	Reduktion Betriebsdauer 0.91	0.91	0.91	0.91	0.91	0.91			
	Reduktion Windrichtung 0.68	0.69	0.68	0.66	0.63	0.62			
	Gesamte Reduktion 0.11	0.15	0.20	0.25	0.30	0.26			
	Met.wahrsch.Beschattung 155	88	61	36	110	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	(WEA mit erstem Schatten)	Zeitpunkt (SS:MM)	Schattenende	(WEA mit letztem Schatten)
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Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 29

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

-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember		
1	04:38	20:32 (30) 05:19		20:19 (16) 06:14				
2	21:44	27 20:59 (30) 21:09	11	20:30 (16) 20:01	18:46	19	18:07 (17) 16:35	
3	04:39	20:32 (30) 05:20		20:18 (16) 06:16	18:46	19	17:47 (17) 16:35	
4	04:42	20:58 (30) 21:07	12	20:30 (16) 19:59	18:44	20	18:07 (17) 16:33	
5	04:40	20:32 (30) 05:22		20:06 (18) 06:17	17:12	17	17:46 (17) 16:11	
6	21:44	27 20:59 (30) 21:05	21	20:31 (16) 19:56	18:41	20	18:06 (17) 16:31	
7	04:40	20:33 (30) 05:24		20:03 (18) 06:19	17:14	17	17:46 (17) 16:13	
8	21:43	26 20:59 (30) 21:03	26	20:31 (16) 19:54	18:39	19	18:05 (17) 16:29	
9	04:41	20:33 (30) 05:25		20:03 (18) 06:21	17:15	17	17:47 (17) 16:15	
10	21:43	26 20:59 (30) 21:01	26	20:30 (16) 19:51	18:37	17	18:04 (17) 16:27	
11	04:42	20:34 (30) 05:27		20:02 (18) 06:23	17:48	17	17:48 (17) 16:17	
12	21:42	25 20:59 (30) 20:59	26	20:28 (16) 19:49	10	18:55 (31) 18:34	15	18:03 (17) 16:25
13	04:43	20:34 (30) 05:29		20:01 (18) 06:25	18:43	18	18:31 (17) 16:19	
14	21:41	25 20:59 (30) 20:57	25	20:26 (16) 19:46	14	18:57 (31) 18:32	12	18:01 (17) 16:23
15	04:44	20:35 (30) 05:31		20:01 (18) 06:26	18:42	18	18:31 (17) 16:21	
16	21:41	24 20:59 (30) 20:55	23	20:24 (16) 19:44	17	18:59 (31) 18:29	7	17:58 (17) 16:21
17	04:45	20:35 (30) 05:33		20:01 (18) 06:28	18:40	18	18:31 (17) 16:23	
18	21:40	24 20:59 (30) 20:53	22	20:23 (16) 19:41	19	18:59 (31) 18:27		16:20
19	04:46	20:35 (30) 05:34		20:00 (18) 06:30	18:39	18	18:31 (17) 16:25	
20	21:39	24 20:59 (30) 20:51	19	20:20 (16) 19:39	20	18:59 (31) 18:24		16:18
21	04:48	20:36 (30) 05:36		20:00 (18) 06:32	18:38	18	18:31 (17) 16:27	
22	21:38	23 20:59 (30) 20:49	18	20:18 (18) 19:36	21	18:59 (31) 18:22		16:16
23	04:49	20:36 (30) 05:38		20:00 (18) 06:34	18:38	18	18:31 (17) 16:28	
24	21:37	22 20:59 (30) 20:47	17	20:17 (18) 19:34	21	18:59 (31) 18:20		16:14
25	04:50	20:37 (30) 05:40		20:00 (18) 06:35	18:37	18	18:31 (17) 16:30	
26	21:36	21 20:58 (30) 20:45	14	20:14 (18) 19:31	21	18:58 (31) 18:17		16:13
27	04:51	20:37 (30) 05:41		20:01 (18) 06:37	18:37	18	18:31 (17) 16:32	
28	21:35	20 20:57 (30) 20:43	11	20:12 (18) 19:29	21	18:58 (31) 18:15		16:11
29	04:53	20:38 (30) 05:43		20:02 (18) 06:39	18:37	18	18:31 (17) 16:34	
30	21:34	18 20:56 (30) 20:40	9	20:11 (18) 19:26	20	18:57 (31) 18:12		16:09
31	04:54	20:40 (30) 05:45		20:03 (18) 06:41	18:36	18	18:31 (17) 16:36	
32	21:33	17 20:57 (30) 20:38	5	20:08 (18) 19:24	18	18:56 (31) 18:10		16:08
33	04:55	20:41 (30) 05:47		06:43	18:38	18	18:31 (17) 16:38	
34	21:32	14 20:55 (30) 20:36		19:21	15	18:53 (31) 18:08		16:06
35	04:57	20:42 (30) 05:49		06:44		18:40 (31) 17:40		16:04
36	21:30	12 20:54 (30) 20:34		19:19	10	18:50 (31) 18:05		16:05
37	04:58	20:44 (30) 05:50		06:48		18:43 (31) 17:42		16:03
38	21:29	8 20:52 (30) 20:31		19:16	5	18:48 (31) 18:03		16:03
39	04:59	20:38 (30) 05:52		06:48		18:44 (31) 17:44		16:04
40	21:28	20:29		19:14		18:01		16:02
41	05:01	05:54		06:50		17:46		16:02
42	21:26	20:27		19:11		17:59		16:01
43	05:02	05:56		06:52		17:48		16:01
44	21:25	20:25		19:09		17:56		16:01
45	05:04	05:58		06:53		17:50		16:01
46	21:23	20:22		19:06		17:54		16:01
47	05:06	05:59		06:55		17:51		16:01
48	21:22	20:20		19:04		17:52		16:01
49	05:07	06:01		06:57		17:53		16:01
50	21:20	20:18		19:01		17:50		16:01
51	05:09	06:03		06:59		17:56		16:01
52	21:19	20:15		18:59	4	18:00 (17) 16:48	8	15:12 (29) 15:54
53	05:10	06:05		07:01		17:52 (17) 16:57		15:00 (29) 15:56
54	21:17	20:13		18:56	12	18:04 (17) 16:45	15	15:15 (29) 15:53
55	05:12	06:07		07:02		17:51 (17) 16:59		14:57 (29) 15:58
56	21:15	20:11		18:54	14	18:05 (17) 16:43	20	15:17 (29) 15:52
57	05:14	06:08		07:04		17:49 (17) 16:51		14:57 (29) 15:52
58	21:14	20:08		18:51	17	18:06 (17) 16:41	23	15:20 (29) 15:51
59	05:15	20:22 (16) 06:10		07:06		17:48 (17) 16:53		14:55 (29) 15:51
60	21:12	20:25 (16) 20:06		18:49	19	18:07 (17) 16:39	26	15:21 (29) 15:51
61	05:17	20:20 (16) 06:12				17:05		14:54 (29)
62	21:10	8 20:28 (16) 20:03				16:37	28	15:22 (29)
63	Sonnenscheinstunden	514	461	383	328	257	231	153
64	astr.max.mögl.Beschattung	421	285	298	249	1325	1688	143
65	Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14	0.14
66	Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	0.91
67	Reduktion Windrichtung	0.62	0.64	0.68	0.68	0.69	0.67	0.67
68	Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	0.08	0.08
69	Met.wahrsch.Beschattung	106	81	75	52	174	143	143

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

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 30
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: N - IO14

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1 08:28		14:00 (26) 07:57	15:33 (29) 06:59	06:43	18:49 (31) 05:33	19:53 (18) 04:42	20:27 (30)	
15:54	58	15:03 (1) 16:46	40	16:14 (21) 17:43	19:42	21	19:10 (31) 20:39	
2 08:28		14:00 (26) 07:55	15:33 (29) 06:56	06:40	18:49 (31) 05:31	19:53 (18) 04:41	20:28 (30)	
15:55	57	15:03 (1) 16:48	43	16:16 (21) 17:45	19:44	20	19:09 (31) 20:40	
3 08:28		14:01 (26) 07:54	15:32 (29) 06:54	06:38	18:49 (31) 05:29	19:53 (18) 04:40	20:27 (30)	
15:57	57	15:04 (1) 16:50	44	16:16 (21) 17:47	19:46	20	19:09 (31) 20:42	
4 08:27		14:02 (26) 07:52	15:32 (29) 06:52	06:35	18:49 (31) 05:26	19:53 (18) 04:40	20:27 (30)	
15:58	57	15:05 (1) 16:52	45	16:17 (21) 17:49	19:48	19	19:08 (31) 20:44	
5 08:27		14:02 (26) 07:50	15:33 (29) 06:49	06:33	18:50 (31) 05:24	19:53 (18) 04:39	20:27 (30)	
15:59	56	15:05 (1) 16:54	45	16:18 (21) 17:51	19:50	17	19:07 (31) 20:46	
6 08:27		14:03 (26) 07:48	15:32 (29) 06:47	06:30	18:51 (31) 05:22	19:53 (18) 04:38	20:27 (30)	
16:00	55	15:05 (1) 16:56	46	16:18 (21) 17:53	19:52	14	19:05 (31) 20:48	
7 08:26		14:04 (26) 07:46	15:32 (29) 06:45	06:28	18:53 (31) 05:20	19:53 (18) 04:37	20:27 (30)	
16:02	55	15:06 (1) 16:58	46	16:18 (21) 17:55	19:54	9	19:02 (31) 20:50	
8 08:26		14:05 (26) 07:44	15:32 (29) 06:42	06:26	17:18 (17) 06:26	05:18	19:54 (18) 04:37	
16:03	53	15:06 (1) 17:00	45	16:17 (21) 17:57	11	17:29 (17) 19:55	20:51	
9 08:25		14:06 (26) 07:42	15:32 (29) 06:40	06:23	17:17 (17) 06:23	05:17	19:56 (18) 04:36	
16:05	52	15:06 (1) 17:03	45	16:17 (21) 17:59	14	17:31 (17) 19:57	20:53	
10 08:24		14:06 (26) 07:40	15:32 (29) 06:37	06:21	17:15 (17) 06:21	05:15	19:58 (18) 04:36	
16:06	53	15:07 (1) 17:05	45	16:17 (21) 18:00	16	17:31 (17) 19:59	20:55	
11 08:24		14:07 (26) 07:38	15:33 (29) 06:35	06:18	17:14 (17) 06:18	05:13	19:53 (18) 04:35	
16:08	55	15:27 (27) 17:07	43	16:16 (21) 18:02	18	17:32 (17) 20:01	20:57	
12 08:23		14:09 (26) 07:36	15:34 (29) 06:32	06:16	17:13 (17) 06:16	05:11	19:54 (18) 04:35	
16:09	57	15:29 (27) 17:09	39	16:14 (21) 18:04	19	17:32 (17) 20:03	20:58	
13 08:22		14:10 (26) 07:34	15:35 (29) 06:30	06:14	17:13 (17) 06:14	05:09	19:54 (18) 04:34	
16:11	57	15:31 (27) 17:11	31	16:11 (21) 18:06	19	17:32 (17) 20:05	21:00	
14 08:21		14:12 (26) 07:32	15:35 (29) 06:27	06:11	17:13 (17) 06:11	05:07	19:54 (18) 04:34	
16:13	56	15:32 (27) 17:13	26	16:01 (21) 18:08	18	17:31 (17) 20:07	21:02	
15 08:20		14:14 (26) 07:30	15:36 (29) 06:25	06:10	17:13 (17) 06:09	05:06	19:54 (18) 04:34	
16:14	55	15:34 (27) 17:15	25	16:01 (21) 18:10	18	17:31 (17) 20:09	21:04	
16 08:19		14:17 (26) 07:28	15:37 (29) 06:23	06:06	17:13 (17) 06:06	05:04	19:54 (18) 04:34	
16:16	52	15:40 (26) 17:17	23	16:00 (21) 18:12	17	17:30 (17) 20:10	21:05	
17 08:18		14:45 (1) 07:26	15:39 (29) 06:20	06:04	17:15 (17) 06:04	05:02	19:54 (18) 04:34	
16:18	45	15:43 (25) 17:19	19	15:58 (29) 18:14	14	17:29 (17) 20:12	21:07	
18 08:17		14:46 (1) 07:24	15:41 (29) 06:18	06:02	17:16 (17) 06:02	05:01	19:54 (18) 04:33	
16:19	47	15:44 (25) 17:21	14	15:55 (29) 18:16	10	17:26 (17) 20:14	21:09	
19 08:16		14:47 (1) 07:22	15:46 (29) 06:15	06:00	17:20 (17) 06:00	04:59	19:54 (18) 04:33	
16:21	49	15:46 (25) 17:23	4	15:50 (29) 18:18	2	17:22 (17) 20:16	21:10	
20 08:15		14:47 (1) 07:19	15:47 (29) 06:13	06:00	17:19 (17) 06:00	04:58	19:54 (18) 04:34	
16:23	50	15:48 (25) 17:25		18:20		20:18	21:12	
21 08:14		14:49 (1) 07:17	15:48 (29) 06:10	06:00	17:18 (17) 06:00	04:56	19:54 (18) 04:34	
16:25	49	15:50 (25) 17:27		18:22		20:20	21:14	
22 08:12		14:50 (1) 07:15	15:49 (29) 06:08	06:00	17:17 (17) 06:00	04:55	19:54 (18) 04:34	
16:27	49	15:52 (25) 17:29		18:23		20:22	21:15	
23 08:11		14:53 (1) 07:13	15:50 (29) 06:05	06:00	17:16 (17) 06:00	04:53	19:54 (18) 04:34	
16:29	46	15:54 (25) 17:31		18:25		20:24	21:17	
24 08:10		14:56 (1) 07:10	15:51 (29) 06:03	06:00	17:15 (17) 06:00	04:52	19:54 (18) 04:34	
16:31	38	15:53 (25) 17:33		18:27		20:25	21:18	
25 08:08		15:20 (27) 07:08	15:52 (29) 06:00	06:00	17:14 (17) 06:00	04:50	19:54 (18) 04:35	
16:32	34	15:54 (25) 17:35		18:29		20:27	21:20	
26 08:07		15:20 (27) 07:06	15:53 (29) 06:00	06:00	17:13 (17) 06:00	04:49	19:54 (18) 04:35	
16:34	33	15:53 (25) 17:37		18:31	8	18:04 (31) 20:29	21:21	
27 08:05		15:20 (27) 07:03	15:54 (29) 06:00	06:00	17:12 (17) 06:00	04:48	19:54 (18) 04:36	
16:36	33	15:53 (29) 17:39		18:33	12	18:06 (31) 20:31	4	20:02 (18) 21:23
28 08:04		15:22 (27) 07:01	15:55 (29) 06:00	06:00	17:11 (17) 06:00	04:47	19:54 (18) 04:36	
16:38	34	15:56 (29) 17:41		18:35	15	18:07 (31) 20:33	8	20:04 (18) 21:24
29 08:02		15:23 (27) 07:00	15:56 (29) 06:00	06:00	17:10 (17) 06:00	04:45	19:54 (18) 04:37	
16:40	34	15:57 (29) 17:43		18:37	19	19:10 (31) 20:35	10	20:05 (18) 21:26
30 08:00		15:24 (27) 07:00	15:57 (29) 06:00	06:00	17:09 (17) 06:00	04:44	19:54 (18) 04:37	
16:42	41	16:10 (21) 17:45		18:39	20	19:10 (31) 20:37	13	20:07 (18) 21:27
31 07:59		15:26 (27) 07:00	15:58 (29) 06:00	06:00	17:08 (17) 06:00	04:43	19:54 (18) 04:37	
16:44	44	16:12 (21) 17:50		18:41	21	19:10 (31) 20:40	14	20:08 (18) 21:28
Sonnenscheinstunden	248	272	367	421	496	512		
astr.max.mögl.Beschattung	1511	668	271	155	284	785		
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45		
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91		
Reduktion Windrichtung	0.68	0.69	0.68	0.67	0.63	0.62		
Gesamte Reduktion	0.11	0.15	0.20	0.25	0.29	0.26		
Met.wahrsch.Beschattung	164	102	53	39	83	202		

Tabellen-Layout: Die Daten für jeden Tag 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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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 31

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: N - IO14

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	[Juli]	[August]	[September]	[Oktober]	[November]	[Dezember]	
1	04:38	20:32 (30) 05:19	06:14	07:08	17:53 (17) 07:07	15:02 (29) 08:03	
2	21:44	27 20:59 (30) 21:08	20:01	18:46	19 18:12 (17) 16:35	44 15:46 (21) 15:50	
3	04:39	20:52 (30) 05:20	06:16	07:10	17:53 (17) 07:09	15:02 (29) 08:05	
4	21:44	26 20:58 (30) 21:07	19:59	18:44	18 18:11 (17) 16:33	45 15:47 (21) 15:49	
5	04:40	20:32 (30) 05:22	20:07 (18) 06:17	07:12	17:52 (17) 07:11	15:01 (29) 08:06	
6	21:44	26 20:58 (30) 21:05	7 20:14 (18) 19:56	18:41	18 18:10 (17) 16:31	46 15:47 (21) 15:48	
7	04:40	20:33 (30) 05:24	20:05 (18) 06:19	07:14	17:53 (17) 07:13	15:01 (29) 08:08	
8	21:43	26 20:59 (30) 21:03	11 20:16 (18) 19:54	18:39	15 18:08 (17) 16:29	46 15:47 (21) 15:47	
9	04:41	20:33 (30) 05:25	20:04 (18) 06:21	9 18:49 (31) 07:15	17:54 (17) 07:15	15:02 (29) 08:09	
10	21:43	26 20:59 (30) 21:01	13 20:17 (18) 19:51	9 18:58 (31) 18:37	13 18:07 (17) 16:27	46 15:48 (21) 15:47	
11	04:42	20:34 (30) 05:27	20:04 (18) 06:23	18:47 (31) 07:17	17:57 (17) 07:17	15:02 (29) 08:10	
12	21:42	25 20:59 (30) 20:59	14 20:18 (18) 19:49	14 19:01 (31) 18:34	7 18:04 (17) 16:25	46 15:48 (21) 15:46	
13	04:43	20:34 (30) 05:29	20:02 (18) 06:25	18:45 (31) 07:19	07:19	15:03 (29) 08:12	
14	21:41	25 20:59 (30) 20:57	16 20:18 (18) 19:46	17 19:02 (31) 18:32	16:23	45 15:48 (21) 15:46	
15	04:44	20:34 (30) 05:31	20:02 (18) 06:26	18:44 (31) 07:21	07:21	15:03 (29) 08:13	
16	21:41	25 20:59 (30) 20:55	17 20:19 (18) 19:44	19 19:03 (31) 18:29	16:21	44 15:47 (21) 15:45	
17	04:45	20:35 (30) 05:33	20:02 (18) 06:28	18:43 (31) 07:23	07:23	15:04 (29) 08:14	
18	21:40	24 20:59 (30) 20:53	17 20:19 (18) 19:41	19 19:02 (31) 18:27	16:20	42 15:46 (21) 15:45	
19	04:46	20:35 (30) 05:34	20:01 (18) 06:30	18:42 (31) 07:25	07:25	15:01 (27) 08:16	
20	21:39	24 20:59 (30) 20:51	17 20:18 (18) 19:39	21 19:03 (31) 18:24	16:18	40 15:44 (21) 15:45	
21	04:48	20:36 (30) 05:36	20:01 (18) 06:32	18:42 (31) 07:27	07:27	14:57 (21) 08:17	
22	21:38	23 20:59 (30) 20:49	17 20:18 (18) 19:36	21 19:03 (31) 18:22	16:16	43 15:43 (21) 15:44	
23	04:49	20:36 (30) 05:38	20:02 (18) 06:34	18:42 (31) 07:28	07:29	14:56 (21) 08:18	
24	21:37	23 20:59 (30) 20:47	15 20:17 (18) 19:34	20 19:02 (31) 18:20	16:14	39 15:41 (21) 15:44	
25	04:50	20:36 (30) 05:40	20:02 (18) 06:35	18:41 (31) 07:30	07:31	14:55 (21) 08:19	
26	21:36	22 20:58 (30) 20:45	12 20:14 (18) 19:31	20 19:01 (31) 18:17	16:13	34 15:29 (29) 15:44	
27	04:51	20:37 (30) 05:41	20:03 (18) 06:37	18:41 (31) 07:32	07:33	14:54 (21) 08:20	
28	21:35	21 20:58 (30) 20:43	9 20:12 (18) 19:29	19 19:00 (31) 18:15	16:11	34 15:28 (29) 15:44	
29	04:53	20:37 (30) 05:43	20:04 (18) 06:39	18:42 (31) 07:34	07:35	14:53 (21) 08:21	
30	21:34	20 20:57 (30) 20:40	7 20:11 (18) 19:26	16 18:58 (31) 18:12	16:09	33 15:26 (29) 15:44	
31	04:54	20:39 (30) 05:45	20:05 (18) 06:41	18:43 (31) 07:36	07:36	14:53 (21) 08:22	
1	21:33	18 20:57 (30) 20:38	3 20:08 (18) 19:24	13 18:56 (31) 18:10	16:08	33 15:26 (29) 15:44	
2	04:55	20:39 (30) 05:47	06:43	18:44 (31) 07:38	07:38	14:53 (21) 08:23	
3	21:32	17 20:56 (30) 20:36	19:21	9 18:53 (31) 18:08	16:06	34 15:27 (25) 15:44	
4	04:57	20:40 (30) 05:49	06:44	18:48 (31) 07:40	07:40	14:30 (1) 08:23	
5	21:30	15 20:55 (30) 20:34	19:19	2 18:50 (31) 18:05	16:05	39 15:27 (25) 15:45	
6	04:58	20:41 (30) 05:50	06:46	07:42	16:05	07:42	14:27 (1) 08:24
7	21:29	12 20:53 (30) 20:31	19:16	18:03	16:03	46 15:28 (25) 15:45	
8	04:59	20:44 (30) 05:52	06:48	07:44	16:04	14:26 (1) 08:25	
9	21:28	8 20:52 (30) 20:29	19:14	18:01	16:02	49 15:27 (25) 15:45	
10	05:01	05:54	06:50	07:46	07:46	14:24 (1) 08:25	
11	21:26	20:27	19:11	17:59	16:01	49 15:25 (25) 15:46	
12	05:02	05:56	06:52	07:48	07:48	14:24 (1) 08:26	
13	21:25	20:25	19:09	17:56	15:59	49 15:24 (25) 15:46	
14	05:04	05:58	06:53	07:50	16:05	49 15:24 (25) 15:46	
15	21:23	20:22	19:06	17:54	8 16:15 (29) 07:49	49 15:22 (25) 15:46	
16	05:06	05:59	06:55	07:51	16:11 (29) 07:51	49 15:22 (25) 15:46	
17	21:22	20:20	19:04	17:52	15 16:26 (29) 15:57	47 15:21 (25) 15:47	
18	05:07	06:01	06:57	18:00 (17) 06:53	15:08 (29) 07:53	42 (21) 08:27	
19	21:20	20:18	19:01	9 18:09 (17) 16:50	20 15:28 (29) 15:56	45 15:20 (25) 15:48	
20	05:09	06:03	06:59	17:57 (17) 06:55	15:06 (29) 07:55	52 15:20 (25) 15:48	
21	21:19	20:15	18:59	13 18:10 (17) 16:48	23 15:29 (29) 15:54	52 15:18 (25) 15:48	
22	05:10	06:05	07:01	17:55 (17) 06:57	15:05 (29) 07:56	52 15:13 (27) 15:49	
23	21:17	20:13	18:56	16 18:11 (17) 16:45	25 15:30 (29) 15:53	54 15:13 (27) 15:49	
24	05:12	06:07	07:02	17:54 (17) 06:59	15:04 (29) 07:58	52 15:12 (27) 15:50	
25	21:15	20:11	18:54	18 18:12 (17) 16:43	27 15:31 (29) 15:52	56 15:12 (27) 15:50	
26	05:14	06:08	07:04	17:54 (17) 07:01	15:04 (29) 08:00	52 15:11 (27) 15:51	
27	21:14	20:08	18:51	18 18:12 (17) 16:41	35 15:42 (21) 15:51	58 15:12 (27) 15:51	
28	05:15	06:10	07:06	17:53 (17) 07:03	15:03 (29) 08:01	52 15:11 (27) 15:51	
29	21:12	20:06	18:49	19 18:12 (17) 16:39	41 15:44 (21) 15:51	57 15:11 (27) 15:52	
30	05:17	06:12	07:05	18:02 (29)	15:02 (29)	58 15:11 (27) 15:52	
31	21:10	20:03	18:47	16:37	44 15:46 (21)	57 15:11 (27) 15:52	
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	433	175	312	328	1344	1769	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14	
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	
Reduktion Windrichtung	0.62	0.64	0.68	0.69	0.69	0.67	
Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	0.09	
Met.wahrsch.Beschattung	109	50	78	69	177	151	

Tabellen-Layout: Die Daten für jeden Tag 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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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 32

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

André Gefke / andre.gefke@i17-wind.de

Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346	330	400	570	528	528	741	991	1.022	1.224	934	356	7.971

: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1 08:28		14:09 (26) 07:57	15:30 (27) 06:59	06:43	18:51 (31) 05:33	19:53 (18) 04:42	20:25 (30)	
2 15:54	58 15:09 (1) 16:46		38 16:14 (21) 17:43	19:42	21 19:12 (31) 20:39	16 20:09 (18) 21:29	24 20:49 (30)	
3 08:28		14:09 (26) 07:54	15:41 (29) 06:54	06:40	18:50 (31) 05:31	19:53 (18) 04:41	20:25 (30)	
4 08:27		14:11 (26) 07:52	15:41 (29) 06:52	06:38	18:51 (31) 05:29	19:53 (18) 04:40	20:25 (30)	
5 08:27		14:11 (26) 07:50	15:41 (29) 06:49	06:33	18:52 (31) 05:24	19:53 (18) 04:39	20:25 (30)	
6 08:27		14:11 (26) 07:48	15:40 (29) 06:47	06:30	18:52 (31) 05:22	19:53 (18) 04:38	20:25 (30)	
7 08:26		14:13 (26) 07:46	15:40 (29) 06:44	06:28	18:55 (31) 05:20	19:54 (18) 04:37	20:25 (30)	
8 08:26		14:13 (26) 07:44	15:40 (29) 06:42	06:26	18:54 (31) 05:18	19:53 (18) 04:36	20:25 (30)	
9 08:25		14:14 (26) 07:42	15:40 (29) 06:40	06:23	18:56 (31) 05:16	19:55 (18) 04:35	20:25 (30)	
10 08:24		14:15 (26) 07:40	15:40 (29) 06:37	06:21	18:57 (31) 05:14	19:56 (18) 04:34	20:25 (30)	
11 08:24		14:15 (26) 07:38	15:40 (29) 06:35	06:18	18:58 (31) 05:12	19:57 (18) 04:33	20:25 (30)	
12 08:23		14:16 (26) 07:36	15:40 (29) 06:32	06:16	18:59 (31) 05:10	19:58 (18) 04:32	20:25 (30)	
13 08:22		14:17 (26) 07:34	15:41 (29) 06:30	06:13	19:00 (31) 05:08	19:59 (18) 04:31	20:25 (30)	
14 08:21		14:19 (26) 07:32	15:41 (29) 06:27	06:11	19:02 (31) 05:06	20:00 (18) 04:30	20:25 (30)	
15 08:20		14:20 (26) 07:30	15:42 (29) 06:25	06:09	19:04 (31) 05:04	20:02 (18) 04:29	20:25 (30)	
16 16:14	58 15:36 (27) 17:15		27 16:09 (29) 18:10	18 17:34 (17) 20:09		20:04 21:43	26 20:53 (30)	
17 08:18		14:24 (26) 07:26	15:44 (29) 06:20	06:07	19:06 (31) 05:02	20:04 (18) 04:28	20:25 (30)	
18 08:17		14:25 (26) 07:24	15:45 (29) 06:18	06:05	19:08 (31) 05:00	20:06 (18) 04:27	20:25 (30)	
19 08:16		14:26 (26) 07:22	15:46 (29) 06:16	06:03	19:10 (31) 04:58	20:08 (18) 04:26	20:25 (30)	
20 08:15		14:27 (26) 07:20	15:47 (29) 06:14	06:01	19:12 (31) 04:56	20:10 (18) 04:25	20:25 (30)	
21 08:14		14:28 (26) 07:18	15:48 (29) 06:12	05:59	19:14 (31) 04:54	20:12 (18) 04:24	20:25 (30)	
22 08:12		14:29 (26) 07:16	15:49 (29) 06:10	05:57	19:16 (31) 04:52	20:14 (18) 04:23	20:25 (30)	
23 08:11		14:30 (26) 07:14	15:50 (29) 06:08	05:55	19:18 (31) 04:50	20:16 (18) 04:22	20:25 (30)	
24 08:10		14:31 (26) 07:12	15:51 (29) 06:06	05:53	19:20 (31) 04:48	20:18 (18) 04:21	20:25 (30)	
25 08:08		14:32 (26) 07:10	15:52 (29) 06:04	05:51	19:22 (31) 04:46	20:20 (18) 04:20	20:25 (30)	
26 08:07		14:33 (26) 07:08	15:53 (29) 06:02	05:49	19:24 (31) 04:44	20:22 (18) 04:19	20:25 (30)	
27 08:05		14:34 (26) 07:06	15:54 (29) 06:00	05:47	19:26 (31) 04:42	20:24 (18) 04:18	20:25 (30)	
28 08:04		14:35 (26) 07:04	15:55 (29) 05:58	05:45	19:28 (31) 04:40	20:26 (18) 04:17	20:25 (30)	
29 08:02		14:36 (26) 07:02	15:56 (29) 05:56	05:43	19:30 (31) 04:38	20:28 (18) 04:16	20:25 (30)	
30 08:00		14:37 (26) 07:00	15:57 (29) 05:54	05:41	19:32 (31) 04:36	20:30 (18) 04:15	20:25 (30)	
31 07:59		14:38 (26) 06:58	15:58 (29) 05:52	05:39	19:34 (31) 04:34	20:32 (18) 04:14	20:25 (30)	
16:44	32 16:03 (29) 17:41		20 16:04 (29) 18:18	8 17:28 (17) 20:16		21:10 21:44	26 20:54 (30)	
16:44	32 16:03 (29) 17:35		20 16:05 (29) 18:16	13 17:30 (17) 20:14		21:09 21:44	26 20:54 (30)	
astr.max.mögl.Beschattung	1433	686	367	254	159	313	770	
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.34	0.41	0.51	0.45	
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Reduktion Windrichtung	0.68	0.70	0.68	0.66	0.66	0.63	0.62	
Gesamte Reduktion	0.11	0.15	0.20	0.25	0.29	0.29	0.26	
Met.wahrsch.Beschattung	155	105	50	40	40	92	199	

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

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

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 33
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember
1	04:38	20:31 (30) 05:19	06:14	07:08	17:56 (17) 07:07	15:09 (29) 08:03
2	21:44	26 20:57 (30) 21:08	20:01	18:46	18 18:14 (17) 16:35	43 15:52 (21) 15:50
3	04:39	20:50 (30) 05:20	06:16	07:10	17:57 (17) 07:09	43 15:09 (29) 08:05
4	21:44	26 20:56 (30) 21:07	19:59	18:44	16 18:13 (17) 16:33	43 15:52 (21) 15:49
5	04:40	20:31 (30) 05:22	06:17	07:12	17:56 (17) 07:11	15:09 (29) 08:06
6	21:44	25 20:56 (30) 21:05	19:56	18:41	15 18:11 (17) 16:31	43 15:52 (21) 15:48
7	04:40	20:31 (30) 05:24	20:07 (18) 06:19	07:14	17:57 (17) 07:13	15:09 (29) 08:08
8	21:43	26 20:57 (30) 21:03	6 20:13 (18) 19:54	18:39	13 18:10 (17) 16:29	43 15:52 (21) 15:47
9	04:41	20:31 (30) 05:25	20:05 (18) 06:21	18:51 (31) 07:15	18:00 (17) 07:15	15:11 (29) 08:09
10	21:43	26 20:57 (30) 21:01	10 20:15 (18) 19:51	9 19:00 (31) 18:37	7 18:07 (17) 16:27	41 15:52 (21) 15:47
11	04:42	20:32 (30) 05:27	20:04 (18) 06:23	18:48 (31) 07:17	07:17	15:11 (29) 08:10
12	21:42	25 20:57 (30) 20:59	13 20:17 (18) 19:49	14 19:02 (31) 18:34	16:25	41 15:52 (21) 15:46
13	04:43	20:32 (30) 05:29	20:02 (18) 06:25	18:47 (31) 07:19	07:19	15:12 (29) 08:12
14	21:41	26 20:58 (30) 20:57	15 20:17 (18) 19:46	16 19:03 (31) 18:32	16:23	39 15:51 (21) 15:46
15	04:44	20:32 (30) 05:31	20:02 (18) 06:26	18:46 (31) 07:21	07:21	15:12 (29) 08:13
16	21:41	26 20:58 (30) 20:55	16 20:18 (18) 19:44	18 19:04 (31) 18:29	16:21	37 15:49 (21) 15:45
17	04:45	20:33 (30) 05:33	20:02 (18) 06:28	18:44 (31) 07:23	07:23	15:03 (27) 08:14
18	21:40	25 20:58 (30) 20:53	16 20:18 (18) 19:41	19 19:03 (31) 18:27	16:20	39 15:46 (21) 15:45
19	04:46	20:33 (30) 05:34	20:01 (18) 06:30	18:44 (31) 07:25	07:25	15:00 (27) 08:16
20	21:39	25 20:58 (30) 20:51	17 20:18 (18) 19:39	20 19:04 (31) 18:24	16:18	38 15:44 (21) 15:45
21	04:48	20:33 (30) 05:36	20:01 (18) 06:32	18:43 (31) 07:27	07:27	15:00 (27) 08:17
22	21:38	25 20:58 (30) 20:49	17 20:18 (18) 19:36	21 19:04 (31) 18:22	16:16	33 15:35 (29) 15:44
23	04:49	20:33 (30) 05:38	20:01 (18) 06:34	18:43 (31) 07:28	07:29	14:59 (27) 08:18
24	21:37	24 20:57 (30) 20:47	16 20:17 (18) 19:34	21 19:04 (31) 18:20	16:14	31 15:33 (29) 15:47
25	04:50	20:34 (30) 05:40	20:01 (18) 06:35	18:43 (31) 07:30	07:31	14:58 (27) 08:19
26	21:36	23 20:57 (30) 20:45	13 20:14 (18) 19:31	19 19:02 (31) 18:17	16:13	28 15:31 (29) 15:44
27	04:51	20:34 (30) 05:41	20:02 (18) 06:37	18:43 (31) 07:32	07:33	14:58 (27) 08:20
28	21:35	23 20:57 (30) 20:43	10 20:12 (18) 19:29	17 19:00 (31) 18:15	16:11	18 15:16 (27) 15:44
29	04:53	20:34 (30) 05:43	20:03 (18) 06:39	18:44 (31) 07:34	07:35	14:57 (27) 08:21
30	21:34	22 20:56 (30) 20:40	8 20:11 (18) 19:26	14 18:58 (31) 18:12	16:09	20 15:17 (27) 15:44
31	04:54	20:35 (30) 05:45	20:03 (18) 06:41	18:45 (31) 07:36	07:36	14:36 (1) 08:22
1	21:33	22 20:57 (30) 20:38	5 20:08 (18) 19:24	11 18:56 (31) 18:10	16:08	26 15:17 (27) 15:44
2	04:55	20:36 (30) 05:47	06:43	18:46 (31) 07:38	07:38	14:33 (1) 08:23
3	21:32	20 20:56 (30) 20:36	19:21	7 18:53 (31) 18:08	16:06	32 15:17 (27) 15:44
4	04:57	20:36 (30) 05:49	06:44	07:40	14:32 (1) 08:23	14:02 (26)
5	21:30	19 20:55 (30) 20:34	19:19	18:05	16:05	35 15:17 (27) 15:45
6	04:58	20:37 (30) 05:50	06:46	07:42	16:05	14:31 (1) 08:24
7	21:29	17 20:54 (30) 20:31	19:16	18:03	16:03	36 15:17 (27) 15:45
8	04:59	20:39 (30) 05:52	06:48	07:44	16:03	14:30 (1) 08:25
9	21:28	15 20:54 (30) 20:29	19:14	18:01	16:02	38 15:17 (27) 15:45
10	05:01	20:40 (30) 05:54	06:50	07:46	16:01	14:29 (1) 08:25
11	21:26	12 20:52 (30) 20:27	19:11	17:59	16:01	39 15:17 (27) 15:46
12	05:02	20:42 (30) 05:56	06:52	07:48	16:01	14:29 (1) 08:26
13	21:25	9 20:51 (30) 20:25	19:09	17:56	13 16:32 (29) 15:59	40 15:17 (27) 15:46
14	05:04	20:42	06:53	07:50	16:17 (29) 07:49	14:04 (26) 08:26
15	21:23	20:22	19:06	17:54	18 16:35 (29) 15:58	50 15:17 (27) 15:46
16	05:06	05:59	06:55	18:05 (17) 07:51	16:15 (29) 07:51	14:02 (26) 08:27
17	21:22	20:20	19:04	5 18:10 (17) 17:52	21 16:36 (29) 15:57	55 15:17 (27) 15:47
18	05:07	06:01	06:57	18:02 (17) 06:53	15:13 (29) 07:53	14:01 (26) 08:27
19	21:20	20:18	19:01	11 18:13 (17) 16:50	24 15:37 (29) 15:56	56 15:16 (27) 15:48
20	05:09	06:03	06:59	17:59 (17) 06:55	15:12 (29) 07:55	14:00 (26) 08:28
21	21:19	20:15	19:00	15 18:14 (17) 16:48	26 15:38 (29) 15:54	58 15:16 (27) 15:48
22	05:10	06:05	07:01	17:58 (17) 06:57	15:11 (29) 07:56	13:59 (26) 08:28
23	21:17	20:13	18:56	16 18:14 (17) 16:45	28 15:39 (29) 15:53	58 15:15 (27) 15:49
24	05:12	06:07	07:02	17:57 (17) 06:59	15:10 (29) 07:58	13:59 (26) 08:28
25	21:15	20:11	18:54	18 18:15 (17) 16:43	37 15:47 (21) 15:52	55 15:13 (27) 15:50
26	05:14	06:08	07:04	17:56 (17) 07:01	15:10 (29) 08:00	13:59 (26) 08:28
27	21:14	20:08	18:51	19 18:15 (17) 16:41	40 15:50 (21) 15:51	52 14:56 (1) 15:51
28	05:15	06:10	07:06	17:56 (17) 07:03	15:10 (29) 08:01	13:58 (26) 08:28
29	21:12	20:06	18:49	19 18:15 (17) 16:39	41 15:51 (21) 15:51	54 14:56 (1) 15:52
30	05:17	06:12	07:05	17:55 (17) 07:05	15:10 (29) 08:28	13:58 (26) 08:28
31	21:10	20:03	18:37	42 15:52 (21) 16:37	257	15:53
Sonnenscheinstunden	514	461	383	328	257	231
astr.max.mögl.Beschattung	487	162	309	359	1221	1747
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91
Reduktion Windrichtung	0.62	0.64	0.68	0.69	0.68	0.67
Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	0.09
Met.wahrsch.Beschattung	123	46	77	76	161	150

Tabellen-Layout: Die Daten für jeden Tag 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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	---------------------------	----------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt: 151008_Miltzow_III-VII	Ausdruck/Seite: 13/10/2015 13:57 / 34
	Lizenzierter Anwender: I17-Wind GmbH & Co. KG Am Westersielzug 11 DE-25840 Friedrichstadt
	Berechnet: 13/10/2015 13:41/2.9.285
	André Gefke / andre.gefke@i17-wind.de

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
 346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
 : Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1 08:28		14:15 (26) 07:57	15:31 (27) 06:59	06:43	18:53 (31) 05:33	19:54 (18) 04:42	20:26 (30)	
15:54	55	15:12 (1) 15:46	29 16:06 (29) 17:43	19:42	20 19:13 (31) 20:39	15 20:09 (18) 21:29	23 20:49 (30)	
2 08:28		14:14 (26) 07:55	15:33 (27) 06:56	06:40	18:52 (31) 05:31	19:54 (18) 04:41	20:26 (30)	
15:55	56	15:12 (1) 16:48	30 16:08 (29) 17:45	19:44	20 19:12 (31) 20:40	16 20:10 (18) 21:31	25 20:51 (30)	
3 08:28		14:15 (26) 07:54	15:35 (27) 06:54	06:38	18:53 (31) 05:29	19:54 (18) 04:40	20:26 (30)	
15:57	57	15:13 (1) 16:50	35 16:18 (21) 17:47	19:46	19 19:12 (31) 20:42	16 20:10 (18) 21:32	25 20:51 (30)	
4 08:27		14:16 (26) 07:52	15:47 (29) 06:52	06:35	18:52 (31) 05:26	19:54 (18) 04:40	20:26 (30)	
15:58	57	15:14 (1) 16:52	33 16:20 (21) 17:49	19:48	19 19:11 (31) 20:44	16 20:10 (18) 21:33	25 20:51 (30)	
5 08:27		14:16 (26) 07:50	15:47 (29) 06:49	06:33	18:53 (31) 05:24	19:54 (18) 04:39	20:26 (30)	
15:59	58	15:15 (1) 16:54	35 16:22 (21) 17:51	19:50	18 19:11 (31) 20:46	15 20:09 (18) 21:34	25 20:51 (30)	
6 08:27		14:17 (26) 07:48	15:48 (29) 06:47	06:30	18:53 (31) 05:22	19:54 (18) 04:38	20:26 (30)	
16:00	58	15:15 (1) 16:56	39 16:25 (21) 17:53	19:52	16 19:09 (31) 20:48	14 20:08 (18) 21:35	25 20:51 (30)	
7 08:26		14:18 (26) 07:46	15:45 (29) 06:44	06:28	18:55 (31) 05:20	19:55 (18) 04:37	20:26 (30)	
16:02	57	15:16 (1) 16:58	40 16:25 (21) 17:55	19:54	12 19:07 (31) 20:50	12 20:07 (18) 21:36	25 20:51 (30)	
8 08:26		14:18 (26) 07:44	15:45 (29) 06:42	06:26	18:58 (31) 05:18	19:56 (18) 04:37	20:27 (30)	
16:03	58	15:17 (1) 17:00	41 16:26 (21) 17:57	19:55	6 19:04 (31) 20:51	10 20:06 (18) 21:37	25 20:52 (30)	
9 08:25		14:19 (26) 07:42	15:45 (29) 06:40	06:23	18:57 (31) 05:17	19:59 (18) 04:36	20:27 (30)	
16:05	57	15:17 (1) 17:03	41 16:26 (21) 17:59	19:57	20:53	5 20:04 (18) 21:38	26 20:52 (30)	
10 08:24		14:19 (26) 07:40	15:45 (29) 06:37	17:24 (17) 06:21	05:15	04:36	20:27 (30)	
16:06	57	15:17 (1) 17:05	41 16:26 (21) 18:00	9 17:33 (17) 19:59	20:55	21:39	25 20:52 (30)	
11 08:24		14:20 (26) 07:38	15:45 (29) 06:35	17:22 (17) 06:18	05:13	04:35	20:27 (30)	
16:08	57	15:18 (1) 17:07	41 16:26 (21) 18:02	14 17:36 (17) 20:01	20:57	21:40	26 20:53 (30)	
12 08:23		14:21 (26) 07:36	15:45 (29) 06:32	17:20 (17) 06:16	05:11	04:35	20:27 (30)	
16:09	55	15:18 (1) 17:09	41 16:26 (21) 18:04	16 17:36 (17) 20:03	20:58	21:41	25 20:52 (30)	
13 08:22		14:22 (26) 07:34	15:46 (29) 06:30	17:20 (17) 06:14	05:09	04:34	20:27 (30)	
16:11	55	15:19 (1) 17:11	39 16:25 (21) 18:06	17 17:37 (17) 20:05	21:00	21:41	26 20:53 (30)	
14 08:21		14:23 (26) 07:32	15:45 (29) 06:27	17:19 (17) 06:11	05:07	04:34	20:28 (30)	
16:13	53	15:19 (1) 17:13	38 16:23 (21) 18:08	18 17:37 (17) 20:07	21:02	21:42	25 20:53 (30)	
15 08:20		14:24 (26) 07:30	15:46 (29) 06:25	17:19 (17) 06:09	05:06	04:34	20:28 (30)	
16:14	53	15:20 (1) 17:15	35 16:21 (21) 18:10	18 17:37 (17) 20:09	21:04	21:43	25 20:53 (30)	
16 08:19		14:25 (26) 07:28	15:46 (29) 06:23	17:18 (17) 06:06	05:04	04:34	20:28 (30)	
16:16	57	15:38 (27) 17:17	28 16:14 (29) 18:12	18 17:36 (17) 20:10	21:05	21:43	26 20:54 (30)	
17 08:18		14:27 (26) 07:26	15:47 (29) 06:20	17:19 (17) 06:04	05:02	04:34	20:29 (30)	
16:18	59	15:40 (27) 17:19	27 16:14 (29) 18:14	17 17:36 (17) 20:12	21:07	21:44	25 20:54 (30)	
18 08:17		14:27 (26) 07:24	15:48 (29) 06:18	17:19 (17) 06:02	05:01	04:33	20:29 (30)	
16:19	60	15:41 (27) 17:21	24 16:12 (29) 18:16	15 17:34 (17) 20:14	21:09	21:44	25 20:54 (30)	
19 08:16		14:29 (26) 07:22	15:49 (29) 06:15	17:20 (17) 05:59	04:59	04:33	20:29 (30)	
16:21	59	15:43 (27) 17:23	22 16:11 (29) 18:18	13 17:33 (17) 20:16	21:10	21:44	25 20:54 (30)	
20 08:15		14:30 (26) 07:19	15:51 (29) 06:13	17:22 (17) 05:57	04:58	04:34	20:29 (30)	
16:23	55	15:43 (27) 17:25	19 16:10 (29) 18:20	8 17:30 (17) 20:18	21:12	21:45	25 20:54 (30)	
21 08:14		14:33 (26) 07:17	15:54 (29) 06:10	17:25 (17) 05:55	04:56	04:34	20:29 (30)	
16:25	53	15:45 (27) 17:27	14 16:08 (29) 18:22	20:20	21:14	5 20:39 (30) 21:45	25 20:54 (30)	
22 08:12		14:37 (26) 07:15	15:57 (29) 06:08	17:28 (17) 05:52	04:55	04:34	20:29 (30)	
16:27	45	15:45 (27) 17:29	6 16:03 (29) 18:23	20:22	21:15	10 20:42 (30) 21:45	25 20:54 (30)	
23 08:11		14:59 (1) 07:13	16:05	17:30 (17) 05:50	04:53	04:34	20:30 (30)	
16:29	40	15:46 (27) 17:31	18:25	20:24	21:17	14 20:44 (30) 21:45	25 20:55 (30)	
24 08:10		15:00 (1) 07:10	16:03	17:31 (17) 05:48	04:52	04:34	20:30 (30)	
16:31	38	15:46 (27) 17:33	18:27	20:25	21:18	15 20:44 (30) 21:46	25 20:55 (30)	
25 08:08		15:02 (1) 07:08	16:00	17:32 (17) 05:46	04:50	04:35	20:30 (30)	
16:32	37	15:48 (27) 17:35	18:29	20:27	21:20	18 20:46 (30) 21:46	25 20:55 (30)	
26 08:07		15:03 (1) 07:06	16:05	17:33 (17) 05:43	04:49	04:35	20:30 (30)	
16:34	33	15:47 (27) 17:37	18:31	20:29	21:21	20 20:47 (30) 21:46	26 20:56 (30)	
27 08:05		15:05 (1) 07:03	16:05	18:00 (31) 05:41	19:58 (18) 04:48	20:27 (30) 04:36	20:30 (30)	
16:36	29	15:47 (27) 17:39	18:33	6 18:06 (31) 20:31	4 20:02 (18) 21:23	20 20:47 (30) 21:45	25 20:55 (30)	
28 08:04		15:29 (27) 17:01	16:07	17:57 (31) 05:39	19:57 (18) 04:47	20:27 (30) 04:36	20:31 (30)	
16:38	19	15:48 (27) 17:41	18:35	10 18:07 (31) 20:33	7 20:04 (18) 21:24	21 20:48 (30) 21:45	25 20:56 (30)	
29 08:02		15:29 (27)	16:06	18:56 (31) 05:37	19:55 (18) 04:45	20:26 (30) 04:37	20:30 (30)	
16:40	19	15:48 (27)	19:37	14 19:10 (31) 20:35	10 20:05 (18) 21:26	23 20:49 (30) 21:45	26 20:56 (30)	
30 08:00		15:30 (27)	16:08	18:54 (31) 05:35	19:55 (18) 04:44	20:26 (30) 04:37	20:31 (30)	
16:42	17	15:47 (27)	19:38	17 19:11 (31) 20:37	12 20:07 (18) 21:27	23 20:49 (30) 21:45	25 20:56 (30)	
31 07:59		15:30 (27)	16:45	18:53 (31)		04:43	20:26 (30)	
16:44	25	16:03 (29)	19:40	20 19:13 (31)		21:28	23 20:49 (30)	
Sonnenscheinstunden	248	272	698	367	230	421	163	512
astr.max.mögl.Beschattung	1488				230		163	512
Red.Sonnenscheinwahrsch.	0.17		0.24		0.31		0.41	0.45
Reduktion Betriebsdauer	0.91		0.91		0.91		0.91	0.91
Reduktion Windrichtung	0.68		0.70		0.68		0.67	0.63
Gesamte Reduktion	0.11		0.15		0.20		0.25	0.29
Met.wahrsch.Beschattung	161		107		45		41	91

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 35

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

		July	August	September	Oktober	November	Dezember
1	04:38			06:14	07:08	18:00 (17) 07:07	15:15 (29) 08:03
	21:44	25 20:32 (30) 05:19		20:01	18:46	16 18:16 (17) 16:35	41 15:56 (21) 15:50
2	04:39	20:31 (30) 05:20		06:16	07:10	18:00 (17) 07:09	15:15 (29) 08:05
	21:44	25 20:56 (30) 05:07		19:59	18:44	15 18:15 (17) 16:33	41 15:56 (21) 15:49
3	04:40	20:31 (30) 05:22		06:17	07:12	18:01 (17) 07:11	15:15 (29) 08:06
	21:44	26 20:57 (30) 21:05		19:56	18:41	11 18:12 (17) 16:31	40 15:55 (21) 15:48
4	04:40	20:32 (30) 05:24		06:19	07:14	18:03 (17) 07:13	15:15 (29) 08:08
	21:43	25 20:57 (30) 21:03	7 20:07 (18) 06:19	19:54	18:55 (31) 18:39	7 18:10 (17) 16:29	40 15:55 (21) 15:47
5	04:41	20:32 (30) 05:25		06:21	07:15	18:51 (31) 18:35	15:17 (29) 08:09
	21:43	26 20:58 (30) 21:01	10 20:16 (18) 19:51	12 19:03 (31) 18:37	18:46 (31) 18:37	16:27	38 15:55 (21) 15:47
6	04:42	20:33 (30) 05:27		06:23	07:17	18:50 (31) 18:34	15:17 (29) 08:10
	21:42	25 20:58 (30) 20:59	13 20:18 (18) 19:49	15 19:05 (31) 18:34	18:46 (31) 18:34	16:25	36 15:53 (21) 15:46
7	04:43	20:33 (30) 05:29		06:25	07:19	18:48 (31) 18:32	15:18 (29) 08:12
	21:41	25 20:58 (30) 20:57	15 20:18 (18) 19:46	18 19:06 (31) 18:32	18:48 (31) 18:32	16:23	33 15:51 (21) 15:46
8	04:44	20:33 (30) 05:31		06:26	07:21	18:48 (31) 18:32	15:18 (29) 08:13
	21:41	25 20:58 (30) 20:55	16 20:19 (18) 19:44	18 19:06 (31) 18:29	18:46 (31) 18:29	16:21	36 15:49 (21) 15:45
9	04:45	20:33 (30) 05:33		06:28	07:23	19:05 (31) 18:27	15:18 (29) 08:14
	21:40	25 20:58 (30) 20:53	16 20:19 (18) 19:41	20 19:06 (31) 18:27	18:46 (31) 18:27	16:20	31 15:50 (21) 15:45
10	04:46	20:34 (30) 05:34		06:30	07:25	18:46 (31) 18:25	15:18 (29) 08:16
	21:39	24 20:58 (30) 20:51	17 20:19 (18) 19:39	20 19:06 (31) 18:24	18:46 (31) 18:24	16:18	29 15:50 (21) 15:45
11	04:48	20:34 (30) 05:36		06:32	07:27	19:06 (31) 18:22	15:17 (29) 08:17
	21:38	24 20:58 (30) 20:49	16 20:18 (18) 19:36	20 19:06 (31) 18:22	18:46 (31) 18:22	16:16	25 15:50 (21) 15:44
12	04:49	20:34 (30) 05:38		06:34	07:28	19:06 (31) 18:22	15:17 (29) 08:18
	21:37	24 20:58 (30) 20:47	14 20:17 (18) 19:34	19 19:05 (31) 18:20	18:46 (31) 18:20	16:14	18 15:50 (21) 15:44
13	04:50	20:34 (30) 05:40		06:35	07:30	19:05 (31) 18:20	15:17 (29) 08:19
	21:36	24 20:58 (30) 20:45	12 20:14 (18) 19:31	18 19:03 (31) 18:17	18:46 (31) 18:17	16:13	19 15:50 (21) 15:44
14	04:51	20:35 (30) 05:41		06:37	07:32	19:06 (31) 18:15	15:17 (29) 08:20
	21:35	22 20:57 (30) 20:43	9 20:12 (18) 19:29	14 19:00 (31) 18:15	18:47 (31) 18:15	16:11	19 15:50 (21) 15:44
15	04:53	20:35 (30) 05:43		06:39	07:34	19:06 (31) 18:15	15:18 (29) 08:21
	21:34	22 20:57 (30) 20:40	7 20:11 (18) 19:26	11 18:58 (31) 18:12	18:47 (31) 18:12	16:09	29 15:50 (21) 15:44
16	04:54	20:36 (30) 05:45		06:41	07:36	19:07 (31) 18:12	15:19 (29) 08:22
	21:33	21 20:57 (30) 20:38	3 20:08 (18) 19:24	7 18:56 (31) 18:10	18:48 (31) 18:10	16:08	33 15:50 (21) 15:44
17	04:55	20:37 (30) 05:47		06:43	07:38	19:08 (31) 18:10	15:19 (29) 08:23
	21:32	19 20:56 (30) 20:36		19:21	18:08	16:06	36 15:50 (21) 15:44
18	04:57	20:37 (30) 05:49		06:44	07:40	19:09 (31) 18:10	15:19 (29) 08:23
	21:30	19 20:56 (30) 20:34		19:19	18:05	16:05	38 15:50 (21) 15:45
19	04:58	20:38 (30) 05:50		06:46	07:42	19:10 (31) 18:10	15:19 (29) 08:24
	21:29	16 20:54 (30) 20:31		19:16	18:03	16:03	40 15:50 (21) 15:45
20	04:59	20:39 (30) 05:52		06:48	07:44	19:11 (31) 18:10	15:19 (29) 08:25
	21:28	15 20:54 (30) 20:29		19:14	18:01	16:26 (29) 16:02	45 15:50 (21) 15:45
21	05:01	20:40 (30) 05:54		06:50	07:46	19:12 (31) 18:10	15:19 (29) 08:26
	21:26	12 20:52 (30) 20:27		19:11	17:59	16 16:39 (29) 16:01	52 15:50 (21) 15:46
22	05:02	20:43 (30) 05:56		06:52	07:48	19:13 (31) 18:10	15:19 (29) 08:26
	21:25	9 20:52 (30) 20:25		19:09	17:56	20 16:41 (29) 16:03	55 15:50 (21) 15:46
23	05:04	20:45 (30) 05:58		06:54	07:50	19:14 (31) 18:10	15:19 (29) 08:27
	21:23	20:22 (30) 05:40		19:06	18:08 (17) 17:49	23 16:19 (29) 16:01	59 15:50 (21) 15:46
24	05:06	20:46 (30) 05:59		06:55	07:51	19:15 (31) 18:10	15:19 (29) 08:28
	21:22	20:20 (30) 05:42		19:04	18:16 (17) 17:52	25 16:43 (29) 16:05	60 15:50 (21) 15:47
25	05:07	20:47 (30) 06:01		06:57	07:53	19:16 (31) 18:10	15:19 (29) 08:29
	21:20	18:18 (17) 16:50		19:01	18:17 (17) 17:53	27 16:44 (29) 16:06	58 15:50 (21) 15:48
26	05:09	20:48 (30) 06:03		06:59	07:55	19:17 (31) 18:10	15:19 (29) 08:30
	21:19	20:15 (30) 05:45		19:00	18:17 (17) 17:54	28 16:45 (29) 16:07	58 15:50 (21) 15:48
27	05:10	20:49 (30) 06:05		07:01	07:57	19:18 (31) 18:10	15:19 (29) 08:31
	21:17	20:13 (30) 05:47		18:56	18:18 (17) 17:54	36 16:46 (29) 16:08	53 15:50 (21) 15:49
28	05:12	20:14 (30) 06:07		07:02	07:58	19:19 (31) 18:10	15:19 (29) 08:32
	21:15	20:11 (30) 05:49		18:54	18:18 (17) 17:54	39 16:47 (29) 16:09	54 15:50 (21) 15:49
29	05:14	20:12 (30) 06:08		07:04	07:59	19:20 (31) 18:10	15:19 (29) 08:33
	21:14	20:08 (30) 05:50		18:51	18:17 (17) 17:54	40 16:48 (29) 16:10	55 15:50 (21) 15:49
30	05:15	20:13 (30) 06:09		07:06	08:00	19:21 (31) 18:10	15:19 (29) 08:34
	21:12	20:06 (30) 05:52		18:49	18:17 (17) 17:54	40 16:49 (29) 16:11	56 15:50 (21) 15:50
31	05:17	20:14 (30) 06:12		07:08	08:01	19:22 (31) 18:10	15:19 (29) 08:35
	21:10	20:03 (30) 05:54		18:47	18:18 (17) 17:55	41 16:50 (29) 16:12	57 15:50 (21) 15:51
Sonnenscheinstunden	514	461	383	316	328	257	231
astr.max.mögl.Beschattung	478	155	0	0	394	1227	1707
Red.Sonnenscheinwahrsh.	0.44	0.48	0.40	0.40	0.33	0.21	0.14
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Reduktion Windrichtung	0.62	0.64	0.68	0.68	0.70	0.88	0.87
Gesamte Reduktion	0.25	0.28	0.25	0.25	0.21	0.13	0.09
Met.wahrshsch.Beschattung	121	44	79	83	161	147	147

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

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 36
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersieglug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni		
1 08:28		14:17 (26) 07:57	15:32 (27) 06:59	06:43	18:54 (31) 05:33	19:54 (18) 04:42	20:25 (30)	
15:54	55	15:13 (1) 16:46	27	16:06 (29) 17:43	19:42	20	19:14 (31) 20:39	
2 08:28		14:17 (26) 07:55	15:33 (27) 06:56	06:40	18:53 (31) 05:31	19:54 (18) 04:41	20:26 (30)	
15:55	55	15:13 (1) 16:48	29	16:09 (29) 17:45	19:44	20	19:13 (31) 20:40	
3 08:28		14:18 (26) 07:54	15:35 (27) 06:54	06:38	18:53 (31) 05:29	19:54 (18) 04:40	20:26 (30)	
15:57	56	15:14 (1) 16:50	33	16:18 (21) 17:47	19:46	20	19:13 (31) 20:42	
4 08:27		14:19 (26) 07:52	15:39 (27) 06:52	06:35	18:53 (31) 05:26	19:54 (18) 04:40	20:26 (30)	
15:58	56	15:16 (1) 16:52	32	16:20 (21) 17:49	19:48	19	19:12 (31) 20:44	
5 08:27		14:19 (26) 07:50	15:49 (29) 06:49	06:33	18:54 (31) 05:24	19:54 (18) 04:39	20:25 (30)	
15:59	56	15:16 (1) 16:54	33	16:22 (21) 17:51	19:50	17	19:11 (31) 20:46	
6 08:27		14:19 (26) 07:48	15:48 (29) 06:47	06:30	18:54 (31) 05:22	19:54 (18) 04:38	20:26 (30)	
16:00	57	15:16 (1) 16:56	37	16:25 (21) 17:53	19:52	15	19:09 (31) 20:48	
7 08:26		14:20 (26) 07:46	15:48 (29) 06:44	06:28	18:56 (31) 05:20	19:55 (18) 04:37	20:26 (30)	
16:02	58	15:18 (1) 16:58	38	16:26 (21) 17:55	19:54	12	19:08 (31) 20:50	
8 08:26		14:21 (26) 07:44	15:47 (29) 06:42	06:26	18:58 (31) 05:18	19:56 (18) 04:37	20:26 (30)	
16:03	57	15:18 (1) 17:00	40	16:27 (21) 17:57	19:55	7	19:05 (31) 20:51	
9 08:25		14:21 (26) 07:42	15:47 (29) 06:40	06:23	18:57 (31) 05:17	19:57 (18) 04:36	20:26 (30)	
16:05	57	15:18 (1) 17:03	40	16:27 (21) 17:59	19:57	3	20:53 (18) 21:38	
10 08:24		14:22 (26) 07:40	15:47 (29) 06:37	17:25 (17) 06:21	05:15	04:36	20:27 (30)	
16:06	57	15:19 (1) 17:05	40	16:27 (21) 18:00	8	17:33 (17) 19:59	20:55	
11 08:24		14:22 (26) 07:38	15:47 (29) 06:35	17:23 (17) 06:18	05:13	04:35	20:27 (30)	
16:08	57	15:19 (1) 17:07	40	16:27 (21) 18:02	13	17:36 (17) 20:01	20:57	
12 08:23		14:23 (26) 07:36	15:47 (29) 06:32	17:21 (17) 06:16	05:11	04:35	20:27 (30)	
16:09	56	15:20 (1) 17:09	40	16:27 (21) 18:04	16	17:37 (17) 20:03	20:58	
13 08:22		14:24 (26) 07:34	15:47 (29) 06:30	17:21 (17) 06:14	05:09	04:34	20:27 (30)	
16:11	56	15:21 (1) 17:11	40	16:27 (21) 18:06	17	17:38 (17) 20:05	21:00	
14 08:21		14:25 (26) 07:32	15:47 (29) 06:27	17:19 (17) 06:11	05:07	04:34	20:28 (30)	
16:13	55	15:21 (1) 17:13	38	16:25 (21) 18:08	18	17:37 (17) 20:07	21:02	
15 08:20		14:26 (26) 07:30	15:47 (29) 06:25	17:20 (17) 06:09	05:06	04:34	20:28 (30)	
16:14	54	15:22 (1) 17:15	37	16:24 (21) 18:10	18	17:38 (17) 20:09	21:04	
16 08:19		14:27 (26) 07:28	15:48 (29) 06:23	17:19 (17) 06:06	05:04	04:34	20:28 (30)	
16:16	53	15:22 (1) 17:17	31	16:20 (21) 18:12	18	17:37 (17) 20:10	21:05	
17 08:18		14:28 (26) 07:26	15:49 (29) 06:20	17:20 (17) 06:04	05:02	04:34	20:29 (30)	
16:18	59	15:40 (27) 17:19	27	16:16 (29) 18:14	16	17:36 (17) 20:12	21:07	
18 08:17		14:29 (26) 07:24	15:49 (29) 06:18	17:20 (17) 06:02	05:01	04:33	20:29 (30)	
16:19	60	15:42 (27) 17:21	25	16:14 (29) 18:16	15	17:35 (17) 20:14	21:09	
19 08:16		14:31 (26) 07:22	15:50 (29) 06:15	17:21 (17) 05:59	04:59	04:33	20:29 (30)	
16:21	59	15:43 (27) 17:23	24	16:14 (29) 18:18	13	17:34 (17) 20:16	21:10	
20 08:15		14:32 (26) 07:19	15:52 (29) 06:13	17:22 (17) 05:57	04:58	04:34	20:29 (30)	
16:23	58	15:44 (27) 17:25	21	16:13 (29) 18:20	9	17:31 (17) 20:18	21:12	
21 08:14		14:34 (26) 07:17	15:54 (29) 06:10	05:55	04:56	20:32 (30) 04:34	20:29 (30)	
16:25	57	15:46 (27) 17:27	17	16:11 (29) 18:22	20:20	8	20:40 (30) 21:45	25
22 08:12		14:36 (26) 07:15	15:56 (29) 06:08	05:52	04:55	20:31 (30) 04:34	20:29 (30)	
16:27	52	15:46 (27) 17:29	11	16:07 (29) 18:23	20:22	11	20:42 (30) 21:45	25
23 08:11		15:01 (1) 07:13	06:05	05:50	04:53	20:30 (30) 04:34	20:30 (30)	
16:29	39	15:47 (27) 17:31	18:25	20:24	21:17	14	20:44 (30) 21:45	25
24 08:10		15:01 (1) 07:10	06:03	05:48	04:52	20:28 (30) 04:34	20:30 (30)	
16:31	40	15:48 (27) 17:33	18:27	20:25	21:18	16	20:44 (30) 21:46	25
25 08:08		15:03 (1) 07:08	06:00	05:46	04:50	20:27 (30) 04:35	20:30 (30)	
16:32	38	15:49 (27) 17:35	18:29	20:27	21:20	19	20:46 (30) 21:46	25
26 08:07		15:04 (1) 07:06	05:58	05:43	04:49	20:27 (30) 04:35	20:30 (30)	
16:34	36	15:49 (27) 17:37	18:31	20:29	21:21	20	20:47 (30) 21:46	25
27 08:05		15:06 (1) 07:03	05:55	05:41	04:48	20:27 (30) 04:36	20:30 (30)	
16:36	32	15:49 (27) 17:39	18:33	5	18:06 (31) 20:31	4	20:02 (18) 21:23	20
28 08:04		15:10 (1) 07:01	05:53	17:58 (31) 05:39	19:57 (18) 04:47	20:26 (30) 04:36	20:31 (30)	
16:38	26	15:49 (27) 17:41	18:35	9	18:07 (31) 20:33	7	20:04 (18) 21:24	22
29 08:02		15:30 (27)	06:50	18:56 (31) 05:37	19:55 (18) 04:45	20:26 (30) 04:37	20:30 (30)	
16:40	19	15:49 (27)	19:37	14	19:10 (31) 20:35	10	20:05 (18) 21:25	22
30 08:00		15:31 (27)	06:48	18:54 (31) 05:35	19:55 (18) 04:44	20:26 (30) 04:37	20:31 (30)	
16:42	18	15:49 (27)	19:38	17	19:11 (31) 20:37	12	20:07 (18) 21:27	23
31 07:59		15:31 (27)	06:45	18:54 (31)	04:43	20:26 (30)	25	
16:44	17	15:48 (27)	19:40	19	19:13 (31)	21:28	23	20:49 (30)
Sonnenscheinstunden	248	272	367	421	496	512		
astr.max.mögl.Beschattung	1505	700	225	163	314	746		
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45		
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91		
Reduktion Windrichtung	0.68	0.70	0.68	0.67	0.63	0.62		
Gesamte Reduktion	0.11	0.15	0.20	0.25	0.29	0.26		
Met.wahrsch.Beschattung	163	107	44	41	92	193		

Tabellen-Layout: Die Daten für jeden Tag 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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------	------------------------------	----------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 37

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember	
1	04:38	20:31 (30) 05:19	06:14	07:08	18:01 (17) 07:07	15:17 (29) 08:03	
2	21:44	26 20:57 (30) 21:08	20:01	18:46	16 18:17 (17) 16:35	40 15:57 (21) 15:50	
3	04:39	20:31 (30) 05:20	06:16	07:10	18:02 (17) 07:09	15:17 (29) 08:05	
4	21:44	25 20:56 (30) 21:07	19:59	18:44	13 18:15 (17) 16:33	40 15:52 (29) 15:49	
5	04:40	20:31 (30) 05:22	06:17	07:12	18:02 (17) 07:11	15:17 (29) 08:06	
6	21:44	26 20:57 (30) 21:05	19:56	18:41	10 18:12 (17) 16:31	39 15:56 (21) 15:48	
7	04:40	20:32 (30) 05:24	20:08 (18) 06:19	18:56 (31) 07:14	18:05 (17) 07:13	15:18 (29) 08:08	
8	21:43	25 20:57 (30) 21:03	6 20:14 (18) 19:54	6 19:02 (31) 18:39	4 18:09 (17) 16:29	38 15:56 (21) 15:47	
9	04:41	20:32 (30) 05:25	20:06 (18) 06:21	18:52 (31) 07:15	07:15	15:19 (29) 08:09	
10	21:43	25 20:57 (30) 21:01	10 20:18 (18) 19:51	12 19:04 (31) 18:37	16:27	36 15:55 (21) 15:47	
11	04:42	20:32 (30) 05:27	20:05 (18) 06:23	18:50 (31) 07:17	07:17	15:20 (29) 08:10	
12	21:42	25 20:57 (30) 20:59	13 20:18 (18) 19:49	15 19:05 (31) 18:34	16:25	33 15:53 (21) 15:46	
13	04:43	20:33 (30) 05:29	20:04 (18) 06:25	18:49 (31) 07:19	07:19	15:09 (27) 08:12	
14	21:41	25 20:58 (30) 20:57	14 20:18 (18) 19:46	17 19:06 (31) 18:32	16:23	34 15:51 (21) 15:46	
15	04:44	20:33 (30) 05:31	20:03 (18) 06:26	18:48 (31) 07:21	07:21	15:06 (27) 08:13	
16	21:41	25 20:58 (30) 20:55	16 20:19 (18) 19:44	19 19:07 (31) 18:29	16:21	33 15:49 (21) 15:45	
17	04:45	20:33 (30) 05:33	20:03 (18) 06:28	18:46 (31) 07:23	07:23	15:04 (27) 08:14	
18	21:40	25 20:58 (30) 20:53	16 20:19 (18) 19:41	20 19:06 (31) 18:27	16:20	28 15:39 (29) 15:45	
19	04:46	20:33 (30) 05:34	20:02 (18) 06:30	18:46 (31) 07:25	07:25	15:03 (27) 08:16	
20	21:39	25 20:58 (30) 20:51	17 20:19 (18) 19:39	20 19:06 (31) 18:24	16:18	25 15:37 (29) 15:45	
21	04:48	20:34 (30) 05:36	20:02 (18) 06:32	18:46 (31) 07:27	07:27	15:03 (27) 08:17	
22	21:38	24 20:58 (30) 20:49	16 20:18 (18) 19:36	20 19:06 (31) 18:22	16:16	17 15:20 (27) 15:44	
23	04:49	20:34 (30) 05:38	20:03 (18) 06:34	18:46 (31) 07:28	07:29	15:02 (27) 08:18	
24	21:37	24 20:58 (30) 20:47	14 20:17 (18) 19:34	20 19:06 (31) 18:20	16:14	19 15:21 (27) 15:44	
25	04:50	20:34 (30) 05:40	20:02 (18) 06:35	18:46 (31) 07:30	07:31	15:02 (27) 08:19	
26	21:36	23 20:57 (30) 20:45	12 20:14 (18) 19:31	17 19:03 (31) 18:17	16:13	19 15:21 (27) 15:44	
27	04:51	20:34 (30) 05:41	20:03 (18) 06:37	18:46 (31) 07:32	07:33	14:41 (1) 08:20	
28	21:35	23 20:57 (30) 20:43	9 20:12 (18) 19:29	14 19:00 (31) 18:15	16:11	27 15:21 (27) 15:44	
29	04:53	20:35 (30) 05:43	20:04 (18) 06:39	18:48 (31) 07:34	07:35	14:39 (1) 08:21	
30	21:34	22 20:57 (30) 20:40	7 20:11 (18) 19:26	10 18:58 (31) 18:12	16:09	32 15:22 (27) 15:44	
31	04:54	20:36 (30) 05:45	20:05 (18) 06:41	18:50 (31) 07:36	07:36	14:37 (1) 08:22	
1	21:33	21 20:57 (30) 20:38	3 20:08 (18) 19:24	6 18:56 (31) 18:10	16:08	36 15:22 (27) 15:44	
2	04:55	20:36 (30) 05:47	06:43	07:38	07:38	14:36 (1) 08:23	
3	21:32	20 20:56 (30) 20:36	19:21	18:08	16:06	38 15:22 (27) 15:44	
4	04:57	20:37 (30) 05:49	06:44	07:40	07:40	14:35 (1) 08:23	
5	21:30	19 20:56 (30) 20:34	19:19	18:05	16:05	39 15:21 (27) 15:45	
6	04:58	20:37 (30) 05:50	06:46	07:42	07:42	14:35 (1) 08:24	
7	21:29	17 20:54 (30) 20:31	19:16	18:03	2 16:34 (29) 07:42	39 15:21 (27) 15:45	
8	04:59	20:39 (30) 05:52	06:48	07:44	07:44	14:11 (26) 08:25	
9	21:28	15 20:54 (30) 20:29	19:14	18:01	13 16:40 (29) 07:46	52 15:21 (27) 15:45	
10	05:01	20:40 (30) 05:54	06:50	07:46	07:46	14:09 (26) 08:25	
11	21:26	12 20:52 (30) 20:27	19:11	17:59	18 16:42 (29) 07:46	57 15:21 (27) 15:46	
12	05:02	20:42 (30) 05:56	06:52	07:48	07:48	14:08 (26) 08:26	
13	21:25	10 20:52 (30) 20:25	19:09	17:56	21 16:43 (29) 07:46	58 15:20 (27) 15:46	
14	05:04	20:44 (30) 05:58	06:53	07:49	07:49	14:07 (26) 08:26	
15	21:23	5 20:49 (30) 20:22	19:06	7 18:08 (17) 07:49	24 16:20 (29) 07:49	60 15:20 (27) 15:46	
16	05:06	05:59	06:55	07:51	07:51	14:06 (26) 08:27	
17	21:22	20:20	19:04	12 18:17 (17) 07:52	26 16:45 (29) 07:53	60 15:19 (27) 15:47	
18	05:07	06:01	06:57	07:53	07:53	14:06 (26) 08:27	
19	21:20	20:18	19:01	14 18:18 (17) 07:54	28 15:46 (29) 07:56	58 15:17 (27) 15:48	
20	05:09	06:03	06:59	07:55	07:55	14:05 (26) 08:28	
21	21:19	20:15	19:08	17 18:18 (17) 07:56	34 15:51 (21) 15:54	52 15:00 (1) 15:48	
22	05:10	06:05	07:01	07:57	07:57	14:05 (26) 08:28	
23	21:17	20:13	18:56	17 18:18 (17) 07:58	36 15:53 (21) 15:53	54 15:01 (1) 15:49	
24	05:12	06:07	07:02	07:59	07:59	14:05 (26) 08:28	
25	21:15	20:11	18:54	18 18:18 (17) 07:59	39 15:55 (21) 15:52	55 15:01 (1) 15:50	
26	05:14	06:08	07:04	08:00	08:00	14:05 (26) 08:28	
27	21:14	20:08	18:51	18 18:18 (17) 08:00	39 15:56 (21) 15:51	56 15:02 (1) 15:51	
28	05:15	06:10	07:06	08:01	08:01	14:05 (26) 08:28	
29	21:12	20:06	18:49	18 18:18 (17) 08:02	40 15:57 (21) 15:51	56 15:02 (1) 15:52	
30	05:17	06:12		08:05	08:05	14:06 (26) 08:28	
31	21:10	20:03		16:37	40 15:57 (21)	15:53	
	Sonnenscheinstunden	514 461	383	317	328	257	231
	astr.max.mögl.Beschattung	487	153	403	1230	1671	
	Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14
	Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91
	Reduktion Windrichtung	0.62	0.64	0.68	0.70	0.68	0.67
	Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	0.09
	Met.wahrsch.Beschattung	123	43	79	85	162	144

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

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt: 151008_Miltzow_III-VII	Ausdruck/Seite: 13/10/2015 13:57 / 38 Lizenzierter Anwender: I17-Wind GmbH & Co. KG Am Westersielzug 11 DE-25840 Friedrichstadt André Gefke / andre.gefke@i17-wind.de Berechnet: 13/10/2015 13:41/2.9.285
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SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** 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
 346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
 : Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1 08:28		14:26 (26) 07:57	15:35 (27) 06:59	06:43	18:55 (31) 05:33	19:54 (18) 04:42	20:24 (30)
1 15:54	49 15:16 (1) 16:46	18 15:53 (27) 17:43	19:42	20 19:15 (31) 20:39	15 20:09 (18) 21:29	24 20:48 (30)	
2 08:28		14:26 (26) 07:55	15:36 (27) 06:56	06:40	18:54 (31) 05:31	19:54 (18) 04:41	20:25 (30)
3 08:28		14:27 (26) 07:54	16 15:52 (27) 17:45	19:44	20 19:14 (31) 20:40	16 20:10 (18) 21:31	24 20:49 (30)
3 15:57	51 15:18 (1) 16:50	22 16:11 (29) 17:47	19:46	19 19:14 (31) 20:42	15 20:09 (18) 21:32	25 20:49 (30)	
4 08:27		14:28 (26) 07:52	15:39 (27) 06:52	06:35	18:54 (31) 05:26	19:54 (18) 04:40	20:24 (30)
4 15:58	52 15:20 (1) 16:52	25 16:14 (29) 17:49	19:48	19 19:13 (31) 20:44	15 20:09 (18) 21:33	25 20:49 (30)	
5 08:27		14:28 (26) 07:50	15:42 (27) 06:49	06:33	18:55 (31) 05:24	19:54 (18) 04:39	20:24 (30)
5 15:59	52 15:20 (1) 16:54	28 16:22 (21) 17:51	19:50	17 19:12 (31) 20:46	14 20:08 (18) 21:34	24 20:48 (30)	
6 08:27		14:28 (26) 07:48	15:57 (29) 06:47	06:30	18:55 (31) 05:22	19:55 (18) 04:38	20:25 (30)
6 16:00	53 15:21 (1) 16:56	28 16:25 (21) 17:53	19:52	15 19:10 (31) 20:48	12 20:07 (18) 21:35	24 20:49 (30)	
7 08:26		14:29 (26) 07:46	15:56 (29) 06:44	06:28	18:57 (31) 05:20	19:56 (18) 04:37	20:25 (30)
7 16:02	53 15:22 (1) 16:58	31 16:27 (21) 17:55	19:54	12 19:09 (31) 20:50	9 20:05 (18) 21:36	24 20:49 (30)	
8 08:26		14:29 (26) 07:44	15:55 (29) 06:42	06:26	19:00 (31) 05:18	19:58 (18) 04:37	20:25 (30)
8 16:03	54 15:23 (1) 17:00	34 16:29 (21) 17:57	19:55	6 19:06 (31) 20:51	5 20:03 (18) 21:37	25 20:50 (30)	
9 08:25		14:30 (26) 07:42	15:55 (29) 06:40	06:23	18:57 (31) 05:17	19:57 (18) 04:36	20:25 (30)
9 16:05	53 15:23 (1) 17:03	36 16:31 (21) 17:59	19:57		20:53	21:38	24 20:49 (30)
10 08:24		14:30 (26) 07:40	15:54 (29) 06:37	06:21	18:58 (31) 05:15	19:58 (18) 04:36	20:26 (30)
10 16:06	54 15:24 (1) 17:05	37 16:31 (21) 18:00	19:59		20:55	21:39	24 20:50 (30)
11 08:24		14:31 (26) 07:38	15:54 (29) 06:35	17:27 (17) 06:18	18:59 (31) 05:13	19:59 (18) 04:35	20:26 (30)
11 16:08	54 15:25 (1) 17:07	38 16:32 (21) 18:02	9 17:36 (17) 20:01	20:57	21:40	24 20:50 (30)	
12 08:23		14:31 (26) 07:36	15:54 (29) 06:32	17:25 (17) 06:16	18:59 (31) 05:11	19:59 (18) 04:35	20:26 (30)
12 16:09	54 15:25 (1) 17:09	38 16:32 (21) 18:04	12 17:37 (17) 20:03	20:58	21:41	24 20:50 (30)	
13 08:22		14:32 (26) 07:34	15:54 (29) 06:30	17:24 (17) 06:14	18:59 (31) 05:09	19:59 (18) 04:34	20:26 (30)
13 16:11	54 15:26 (1) 17:11	38 16:32 (21) 18:06	15 17:39 (17) 20:05	21:00	21:41	24 20:50 (30)	
14 08:21		14:33 (26) 07:32	15:53 (29) 06:27	17:22 (17) 06:11	18:59 (31) 05:07	19:59 (18) 04:34	20:27 (30)
14 16:13	54 15:27 (1) 17:13	37 16:30 (21) 18:08	17 17:39 (17) 20:07	21:02	21:42	23 20:50 (30)	
15 08:20		14:34 (26) 07:30	15:53 (29) 06:25	17:22 (17) 06:09	18:59 (31) 05:06	19:59 (18) 04:34	20:27 (30)
15 16:14	53 15:27 (1) 17:15	37 16:30 (21) 18:10	18 17:40 (17) 20:09	21:04	21:43	24 20:51 (30)	
16 08:19		14:35 (26) 07:28	15:54 (29) 06:23	17:21 (17) 06:06	18:59 (31) 05:04	19:59 (18) 04:34	20:27 (30)
16 16:16	53 15:28 (1) 17:17	34 16:28 (21) 18:12	18 17:39 (17) 20:10	21:05	21:43	24 20:51 (30)	
17 08:18		14:36 (26) 07:26	15:54 (29) 06:20	17:22 (17) 06:04	18:59 (31) 05:02	19:59 (18) 04:34	20:28 (30)
17 16:18	53 15:29 (1) 17:19	32 16:26 (21) 18:14	17 17:39 (17) 20:12	21:07	21:44	23 20:51 (30)	
18 08:17		14:36 (26) 07:24	15:54 (29) 06:18	17:22 (17) 06:02	18:59 (31) 05:01	19:59 (18) 04:33	20:28 (30)
18 16:19	52 15:28 (1) 17:21	28 16:22 (29) 18:16	16 17:38 (17) 20:14	21:09	21:44	23 20:51 (30)	
19 08:16		14:37 (26) 07:22	15:55 (29) 06:15	17:23 (17) 05:59	18:59 (31) 04:59	19:59 (18) 04:33	20:28 (30)
19 16:21	57 15:44 (27) 17:23	26 16:21 (29) 18:18	14 17:37 (17) 20:16	21:10	6 20:38 (30) 21:44	23 20:51 (30)	
20 08:15		14:38 (26) 07:19	15:56 (29) 06:13	17:24 (17) 06:14	18:59 (31) 04:58	19:59 (18) 04:34	20:29 (30)
20 16:23	60 15:46 (27) 17:25	24 16:20 (29) 18:20	11 17:35 (17) 20:18	21:12	9 20:38 (30) 21:45	23 20:51 (30)	
21 08:14		14:39 (26) 07:17	15:58 (29) 06:10	17:27 (17) 05:55	18:59 (31) 04:56	19:59 (18) 04:34	20:28 (30)
21 16:25	60 15:48 (27) 17:27	21 16:19 (29) 18:22	5 17:32 (17) 20:20	21:14	12 20:40 (30) 21:45	23 20:51 (30)	
22 08:12		14:40 (26) 07:15	15:59 (29) 06:08	17:28 (17) 05:52	18:59 (31) 04:55	19:59 (18) 04:34	20:28 (30)
22 16:27	61 15:49 (27) 17:29	18 16:17 (29) 18:23	20:22	21:15	15 20:42 (30) 21:45	23 20:51 (30)	
23 08:11		14:43 (26) 07:13	16:01 (29) 06:05	17:30 (17) 05:50	18:59 (31) 04:53	19:59 (18) 04:34	20:29 (30)
23 16:29	57 15:51 (27) 17:31	14 16:15 (29) 18:25	11 17:37 (17) 20:19	21:17	18 20:44 (30) 21:45	23 20:52 (30)	
24 08:10		14:45 (26) 07:10	16:06 (29) 06:03	17:30 (17) 05:48	18:59 (31) 04:52	19:59 (18) 04:34	20:29 (30)
24 16:31	54 15:51 (27) 17:33	5 16:11 (29) 18:27	20:25	21:18	19 20:44 (30) 21:45	23 20:52 (30)	
25 08:08		14:48 (26) 07:08	16:07 (29) 06:00	17:32 (17) 05:46	18:59 (31) 04:50	19:59 (18) 04:35	20:29 (30)
25 16:32	48 15:52 (27) 17:35	18:29	20:27	21:20	20 20:45 (30) 21:46	23 20:52 (30)	
26 08:07		15:08 (1) 07:06	16:08 (29) 05:58	17:33 (17) 05:43	19:59 (18) 04:49	20:25 (30) 04:35	20:30 (30)
26 16:34	39 15:53 (27) 17:37	18:31	20:29	1 20:00 (18) 21:21	21 20:46 (30) 21:46	23 20:53 (30)	
27 08:05		15:09 (1) 07:03	16:09 (29) 05:55	18:03 (31) 05:41	19:57 (18) 04:48	20:24 (30) 04:36	20:29 (30)
27 16:36	38 15:53 (27) 17:39	18:33	3 18:06 (31) 20:31	5 20:02 (18) 21:23	22 20:46 (30) 21:45	24 20:53 (30)	
28 08:04		15:12 (1) 07:01	16:10 (29) 05:53	17:59 (31) 05:39	19:56 (18) 04:47	20:24 (30) 04:36	20:30 (30)
28 16:38	35 15:54 (27) 17:41	18:35	8 18:07 (31) 20:33	8 20:04 (18) 21:24	23 20:47 (30) 21:45	23 20:53 (30)	
29 08:02		15:13 (1)	16:11 (29) 05:50	18:58 (31) 05:37	19:55 (18) 04:45	20:24 (30) 04:37	20:29 (30)
29 16:40	32 15:54 (27)	19:37	12 19:10 (31) 20:35	10 20:05 (18) 21:25	23 20:47 (30) 21:45	24 20:53 (30)	
30 08:00		15:16 (1)	16:12 (29) 05:48	18:56 (31) 05:35	19:54 (18) 04:44	20:24 (30) 04:37	20:30 (30)
30 16:42	25 15:54 (27)	19:38	15 19:11 (31) 20:37	13 20:07 (18) 21:27	23 20:47 (30) 21:45	24 20:54 (30)	
31 07:59		15:35 (27)	16:13 (29) 06:45	18:56 (31)			
31 16:44	18 15:53 (27)	19:40	17 19:13 (31)		21:28	24 20:48 (30)	
Sonnenscheinstunden	248	272	367	421	496	512	
astr.max.mögl.Beschattung	1532	665	207	165	336	711	
Red.Sonnenscheinwahrsch.	0.17	0.24	0.31	0.41	0.51	0.45	
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	
Reduktion Windrichtung	0.68	0.70	0.68	0.66	0.63	0.62	
Gesamte Reduktion	0.11	0.15	0.20	0.25	0.29	0.26	
Met.wahrsch.Beschattung	166	102	41	41	99	184	

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

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VIIAusdruck/Seite
13/10/2015 13:57 / 39Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285**SHADOW - Kalender**

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971

: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1 04:38	20:30 (30) 05:19		06:14		07:08	
2 04:39	20:34 (30) 05:20		06:16		07:10	
3 04:40	20:30 (30) 05:22		06:17		07:11	
4 04:40	20:31 (30) 05:24		06:19		07:13	
5 04:41	20:31 (30) 05:25		06:21		07:15	
6 04:42	20:31 (30) 05:27		06:23		07:17	
7 04:43	20:31 (30) 05:29		06:25		07:19	
8 04:44	20:32 (30) 05:31		06:26		07:21	
9 04:45	20:32 (30) 05:33		06:28		07:23	
10 04:46	20:32 (30) 05:34		06:30		07:25	
11 04:48	20:32 (30) 05:36		06:32		07:27	
12 04:49	20:32 (30) 05:38		06:34		07:29	
13 04:50	20:32 (30) 05:40		06:35		07:31	
14 04:51	20:32 (30) 05:41		06:37		07:33	
15 04:53	20:33 (30) 05:43		06:39		07:35	
16 04:54	20:34 (30) 05:45		06:41		07:36	
17 04:55	20:34 (30) 05:47		06:43		07:38	
18 04:57	20:34 (30) 05:49		06:44		07:40	
19 04:58	20:34 (30) 05:50		06:46		07:42	
20 04:59	20:34 (30) 05:52		06:48		07:44	
21 05:01	20:36 (30) 05:54		06:50		07:46	
22 05:02	20:38 (30) 05:56		06:52		07:48	
23 05:04	20:39 (30) 05:58		06:53		07:49	
24 05:06	20:40 (30) 05:59		06:55		07:51	
25 05:07	20:48 (30) 06:01		06:57		07:53	
26 05:09	20:48 (30) 06:03		06:59		07:55	
27 05:10	20:15		07:01		07:57	
28 05:12	20:13		07:02		07:58	
29 05:14	20:08		07:04		08:00	
30 05:15	20:06		07:06		08:01	
31 05:17	20:06		07:08		08:02	
21:10	20:03		07:10		08:03	
Sonnenscheinstunden	514 461 383 309 428 257 231					
astr.max.mögl.Beschattung	513 138 309 428 1232 1421					
Red.Sonnenscheinwahrsh.	0.44 0.48 0.40 0.33 0.21 0.14					
Reduktion Betriebsdauer	0.91 0.91 0.91 0.91 0.91 0.91					
Reduktion Windrichtung	0.62 0.64 0.68 0.70 0.88 0.88					
Gesamte Reduktion	0.25 0.28 0.25 0.21 0.13 0.09					
Met.wahrsh.Beschattung	130 39 77 91 162 122					

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)			Schattenende (WEA mit letztem Schatten)	

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 40

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni				
1 08:28	14:30 (26) 07:57		15:37 (27) 06:59	06:43		18:57 (31) 05:33	19:55 (18) 04:42	20:24 (30)		
15:54	43 15:16 (1) 16:46	18	15:55 (27) 17:43	19:42	19	19:16 (31) 20:39	14 20:09 (18) 21:29	24 20:48 (30)		
2 08:28	14:30 (26) 07:55		15:38 (27) 06:56	06:40		18:56 (31) 05:31	19:55 (18) 04:41	20:25 (30)		
15:55	45 15:17 (1) 16:48	17	15:55 (27) 17:45	19:44	19	19:15 (31) 20:40	15 20:10 (18) 21:31	24 20:49 (30)		
3 08:28	14:31 (26) 07:54		15:38 (27) 06:54	06:38		18:56 (31) 05:28	19:55 (18) 04:40	20:25 (30)		
15:57	46 15:18 (1) 16:50	16	15:54 (27) 17:47	19:46	19	19:15 (31) 20:42	15 20:10 (18) 21:32	24 20:49 (30)		
4 08:27	14:31 (26) 07:52		15:40 (27) 06:52	06:35		18:55 (31) 05:26	19:55 (18) 04:40	20:25 (30)		
15:58	48 15:20 (1) 16:52	15	16:11 (29) 17:49	19:48	19	19:14 (31) 20:44	15 20:10 (18) 21:33	24 20:49 (30)		
5 08:27	14:31 (26) 07:50		15:41 (27) 06:49	06:33		18:56 (31) 05:24	19:55 (18) 04:39	20:25 (30)		
15:59	50 15:21 (1) 16:54	23	16:16 (29) 17:51	19:50	18	19:14 (31) 20:46	14 20:09 (18) 21:34	24 20:49 (30)		
6 08:27	14:31 (26) 07:48		15:45 (27) 06:47	06:30		18:56 (31) 05:22	19:55 (18) 04:38	20:25 (30)		
16:00	51 15:22 (1) 16:56	26	16:25 (21) 17:53	19:52	16	19:12 (31) 20:48	12 20:08 (18) 21:35	24 20:50 (30)		
7 08:26	14:33 (26) 07:46		16:01 (29) 06:44	06:28		18:57 (31) 05:20	19:56 (18) 04:37	20:25 (30)		
16:02	51 15:24 (1) 16:58	26	16:27 (21) 17:55	19:54	14	19:11 (31) 20:50	10 20:06 (18) 21:36	24 20:49 (30)		
8 08:26	14:33 (26) 07:44		15:59 (29) 06:42	06:26		18:59 (31) 05:18	19:58 (18) 04:37	20:26 (30)		
16:03	51 15:24 (1) 17:00	30	16:29 (21) 17:57	19:55	10	19:09 (31) 20:51	6 20:04 (18) 21:37	24 20:50 (30)		
9 08:25	14:33 (26) 07:42		15:59 (29) 06:40	06:23		18:56 (31) 05:17	19:57 (18) 04:36	20:25 (30)		
16:05	52 15:25 (1) 17:03	33	16:32 (21) 17:59	19:57		18:57 (31) 05:15	19:58 (18) 04:35	20:25 (30)		
10 08:24	14:33 (26) 07:40		15:58 (29) 06:37	06:21		18:57 (31) 05:13	19:57 (18) 04:34	20:26 (30)		
16:06	53 15:26 (1) 17:05	35	16:33 (21) 18:00	19:59		18:56 (31) 05:11	19:56 (18) 04:33	20:26 (30)		
11 08:24	14:34 (26) 07:38		15:57 (29) 06:35	17:31 (17) 06:18		18:56 (31) 05:10	19:56 (18) 04:32	20:27 (30)		
16:08	53 15:27 (1) 17:07	37	16:34 (21) 18:02	5 17:36 (17) 20:01		18:55 (31) 05:09	19:55 (18) 04:31	20:27 (30)		
12 08:23	14:34 (26) 07:36		15:57 (29) 06:32	17:28 (17) 06:16		18:55 (31) 05:08	19:55 (18) 04:30	20:27 (30)		
16:09	53 15:27 (1) 17:09	37	16:34 (21) 18:04	9 17:37 (17) 20:03		18:54 (31) 05:07	19:54 (18) 04:29	20:27 (30)		
13 08:22	14:35 (26) 07:34		15:57 (29) 06:30	17:26 (17) 06:14		18:53 (31) 05:06	19:53 (18) 04:28	20:27 (30)		
16:11	53 15:28 (1) 17:11	37	16:34 (21) 18:06	14 17:40 (17) 20:05		18:52 (31) 05:05	19:52 (18) 04:27	20:27 (30)		
14 08:21	14:36 (26) 07:32		15:56 (29) 06:27	17:25 (17) 06:11		18:51 (31) 05:04	19:51 (18) 04:26	20:27 (30)		
16:13	53 15:29 (1) 17:13	37	16:33 (21) 18:08	15 17:40 (17) 20:07		18:50 (31) 05:03	19:50 (18) 04:25	20:27 (30)		
15 08:20	14:36 (26) 07:30		15:56 (29) 06:25	17:24 (17) 06:09		18:49 (31) 05:02	19:49 (18) 04:24	20:28 (30)		
16:14	54 15:30 (1) 17:15	36	16:32 (21) 18:10	17 17:41 (17) 20:09		18:48 (31) 05:01	19:48 (18) 04:23	20:28 (30)		
16 08:19	14:37 (26) 07:28		15:57 (29) 06:23	17:23 (17) 06:06		18:47 (31) 05:00	19:47 (18) 04:22	20:28 (30)		
16:16	53 15:30 (1) 17:17	35	16:32 (21) 18:12	18 17:41 (17) 20:10		18:46 (31) 04:59	19:46 (18) 04:21	20:29 (30)		
17 08:18	14:38 (26) 07:26		15:57 (29) 06:20	17:23 (17) 06:04		18:45 (31) 04:58	19:45 (18) 04:20	20:29 (30)		
16:18	53 15:31 (1) 17:19	33	16:30 (21) 18:14	18 17:41 (17) 20:12		18:44 (31) 04:57	19:44 (18) 04:19	20:29 (30)		
18 08:17	14:38 (26) 07:24		15:57 (29) 06:18	17:23 (17) 06:02		18:43 (31) 04:56	19:43 (18) 04:18	20:29 (30)		
16:19	53 15:31 (1) 17:21	30	16:27 (21) 18:16	17 17:40 (17) 20:14		18:42 (31) 04:55	19:42 (18) 04:17	20:29 (30)		
19 08:16	14:40 (26) 07:22		15:57 (29) 06:15	17:24 (17) 05:59		18:41 (31) 04:54	19:41 (18) 04:16	20:29 (30)		
16:21	52 15:32 (1) 17:23	28	16:25 (29) 18:18	15 17:39 (17) 20:16		18:40 (31) 04:53	19:40 (18) 04:15	20:29 (30)		
20 08:15	14:40 (26) 07:19		15:58 (29) 06:13	17:24 (17) 05:57		18:39 (31) 04:52	19:39 (18) 04:14	20:29 (30)		
16:23	55 15:45 (27) 17:25	26	16:24 (29) 18:20	13 17:37 (17) 20:18		18:38 (31) 04:51	19:38 (18) 04:13	20:29 (30)		
21 08:14	14:42 (26) 07:17		16:00 (29) 06:10	17:26 (17) 05:55		18:37 (31) 04:50	19:37 (18) 04:12	20:29 (30)		
16:25	60 15:49 (27) 17:27	24	16:24 (29) 18:22	10 17:36 (17) 20:20		18:36 (31) 04:49	19:36 (18) 04:11	20:29 (30)		
22 08:12	14:42 (26) 07:15		16:00 (29) 06:08	17:25 (17) 05:52		18:35 (31) 04:48	19:35 (18) 04:10	20:29 (30)		
16:27	62 15:50 (27) 17:29	22	16:22 (29) 18:23	9 17:35 (17) 20:22		18:34 (31) 04:47	19:34 (18) 04:09	20:29 (30)		
23 08:11	14:44 (26) 07:13		16:02 (29) 06:05	17:24 (17) 05:50		18:33 (31) 04:46	19:33 (18) 04:08	20:29 (30)		
16:29	62 15:52 (27) 17:31	18	16:20 (29) 18:25	15 17:34 (17) 20:24		18:32 (31) 04:45	19:32 (18) 04:07	20:29 (30)		
24 08:10	14:45 (26) 07:10		16:05 (29) 06:03	17:23 (17) 05:48		18:31 (31) 04:44	19:31 (18) 04:06	20:29 (30)		
16:31	60 15:52 (27) 17:33	13	16:18 (29) 18:27	11 17:33 (17) 20:26		18:30 (31) 04:43	19:30 (18) 04:05	20:29 (30)		
25 08:08	14:48 (26) 07:08		16:09 (29) 06:00	17:22 (17) 05:46		18:29 (31) 04:42	19:29 (18) 04:04	20:29 (30)		
16:32	55 15:54 (27) 17:35	4	16:13 (29) 18:29	9 17:32 (17) 20:27		18:28 (31) 04:41	19:28 (18) 04:03	20:29 (30)		
26 08:07	14:50 (26) 07:06		16:05 (29) 05:58	17:21 (17) 05:43		18:27 (31) 04:40	19:27 (18) 04:02	20:29 (30)		
16:34	52 15:54 (27) 17:37		16:02 (29) 05:56	17:20 (17) 05:41		18:26 (31) 04:39	19:26 (18) 04:01	20:29 (30)		
27 08:05	15:11 (1) 07:03		16:05 (29) 05:55	17:19 (17) 05:39		18:25 (31) 04:38	19:25 (18) 04:00	20:29 (30)		
16:36	39 15:55 (27) 17:39		16:05 (29) 05:54	17:18 (17) 05:37	4	20:02 (18) 21:23	22 20:47 (30) 21:45	23 20:53 (30)		
28 08:04	15:13 (1) 07:01		16:05 (29) 05:53	18:02 (31) 05:39		19:57 (18) 04:47	20:25 (30) 04:36	20:31 (30)		
16:38	38 15:56 (27) 17:41		16:05 (29) 05:52	5 18:07 (31) 20:33	7	20:04 (18) 21:24	22 20:47 (30) 21:45	23 20:54 (30)		
29 08:02	15:14 (1) 07:01		16:05 (29) 05:51	19:00 (31) 05:37		19:56 (18) 04:45	20:25 (30) 04:34	20:30 (30)		
16:40	36 15:56 (27) 17:41		16:05 (29) 05:50	10 19:10 (31) 20:35	9	20:05 (18) 21:25	23 20:48 (30) 21:45	24 20:54 (30)		
30 08:00	15:16 (1) 07:01		16:05 (29) 05:49	18:58 (31) 05:35		19:55 (18) 04:44	20:25 (30) 04:32	20:31 (30)		
16:42	32 15:56 (27) 17:41		16:05 (29) 05:48	13 19:11 (31) 20:37	12	20:07 (18) 21:27	23 20:48 (30) 21:45	23 20:54 (30)		
31 07:59	15:19 (1) 07:01		16:05 (29) 05:47	18:57 (31) 05:34		19:54 (18) 04:43	20:25 (30) 04:31	20:31 (30)		
16:44	25 15:56 (27) 17:41		16:05 (29) 05:46	16 19:13 (31) 20:39		19:53 (18) 04:42	20:25 (30) 04:30	20:31 (30)		
Sonnenscheinstunden	248	272	656	367	195	421	496	512	703	
astr.max.mögl.Beschattung	1543		656		166		327		703	
Red.Sonnenscheinwahrsch.	0.17		0.24		0.31		0.51		0.45	
Reduktion Betriebsdauer	0.91		0.91		0.91		0.91		0.91	
Reduktion Windrichtung	0.68		0.70		0.68		0.66		0.62	
Gesamte Reduktion	0.11		0.15		0.20		0.25		0.26	
Met.wahrsch.Beschattung	168		101		38		42		182	

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

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 41

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember	
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9	04:41	20:32 (30) 05:25	7 20:08 (18) 06:21	18:53 (31) 07:15	07:15	15:15 (27) 08:09	14:18 (26)
10	21:43	24 20:56 (30) 21:01	20:15 (18) 19:51	14 19:07 (31) 18:37	16:27	25 15:55 (21) 15:47	51 15:09 (1)
11	04:42	20:32 (30) 05:27	20:06 (18) 06:23	16 18:52 (31) 07:17	16:25	23 15:47 (29) 15:46	50 15:08 (1)
12	21:42	24 20:56 (30) 20:59	11 20:17 (18) 19:49	16 19:08 (31) 18:34	16:25	25 15:47 (29) 15:46	50 15:08 (1)
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14	21:41	24 20:56 (30) 20:57	13 20:18 (18) 19:46	18 19:09 (31) 18:32	16:23	14 15:24 (27) 15:46	49 15:08 (1)
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16	21:41	25 20:57 (30) 20:55	14 20:18 (18) 19:44	19 19:09 (31) 18:29	16:21	16 15:25 (27) 15:45	48 15:08 (1)
17	04:45	20:33 (30) 05:33	20:04 (18) 06:28	17 19:06 (31) 18:27	16:23	15:08 (27) 08:14	14:20 (26)
18	21:40	24 20:57 (30) 20:53	15 20:19 (18) 19:41	19 19:08 (31) 18:27	16:20	18 15:26 (27) 15:45	47 15:07 (1)
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14	05:04	20:40 (30) 05:58	06:53	18:09 (17) 07:49	19 16:28 (29) 07:49	14:16 (26) 08:26	14:26 (26)
15	21:23	10 20:50 (30) 20:22	19:06	13 18:22 (17) 17:54	27 16:55 (29) 15:58	52 15:08 (1) 15:46	34 15:00 (26)
16	05:06	20:41 (30) 05:59	06:55	18:08 (17) 07:51	16 16:27 (29) 07:51	14:16 (26) 08:27	14:26 (26)
17	21:22	7 20:48 (30) 20:20	19:04	15 18:23 (17) 17:52	31 16:58 (21) 15:57	52 15:08 (1) 15:47	34 15:00 (26)
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20	05:09	06:03	06:59	18:05 (17) 06:55	15 15:26 (29) 07:55	14:15 (26) 08:28	14:27 (26)
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23	21:17	20:13	18:56	17 18:22 (17) 16:45	36 16:02 (21) 15:53	53 15:09 (1) 15:49	34 15:01 (26)
24	05:12	06:07	07:02	18:05 (17) 06:59	15 15:26 (29) 07:58	14:16 (26) 08:28	14:28 (26)
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27	21:14	20:08	18:51	17 18:22 (17) 16:41	37 16:04 (21) 15:51	53 15:09 (1) 15:51	34 15:02 (26)
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30	05:17	06:12		18:05 (17) 07:05	15 15:27 (29)	14:16 (26) 08:28	14:29 (26)
31	21:10	20:03		16:37	36 16:03 (21)	15:53	40 15:14 (1)
Sonnenscheinstunden	514	461	383	328	257	231	
astr.max.mögl.Beschattung	502	133	315	443	1236	1240	
Red.Sonnenscheinwahrsch.	0.44	0.48	0.40	0.33	0.21	0.14	
Reduktion Betriebsdauer	0.91	0.91	0.91	0.91	0.91	0.91	
Reduktion Windrichtung	0.62	0.64	0.68	0.70	0.88	0.88	
Gesamte Reduktion	0.25	0.28	0.25	0.21	0.13	0.09	
Met.wahrsch.Beschattung	127	38	79	94	162	107	

Tabellen-Layout: Die Daten für jeden Tag 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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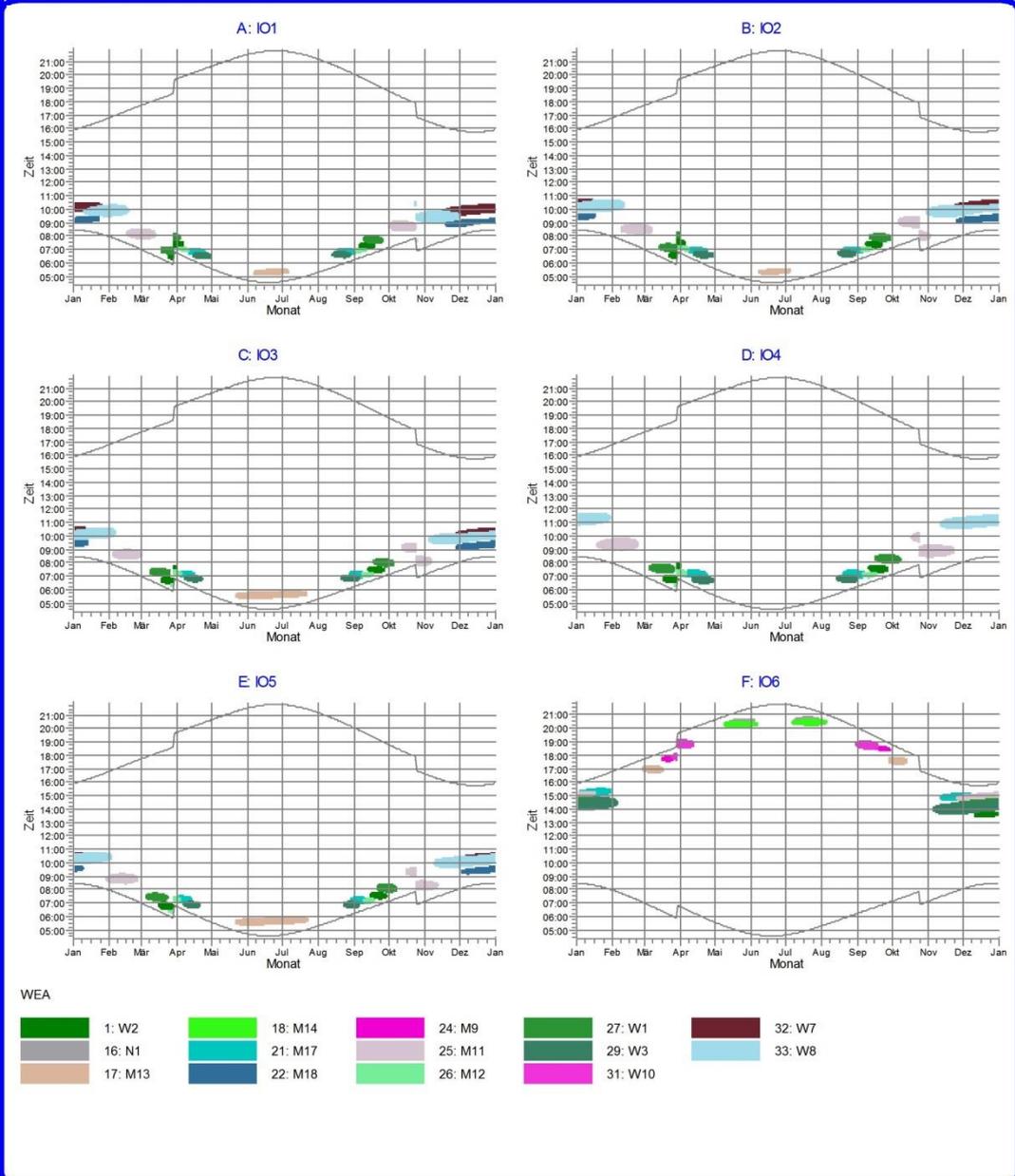
WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 42
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Grafischer Kalender

Berechnung: Gesamtbelastung



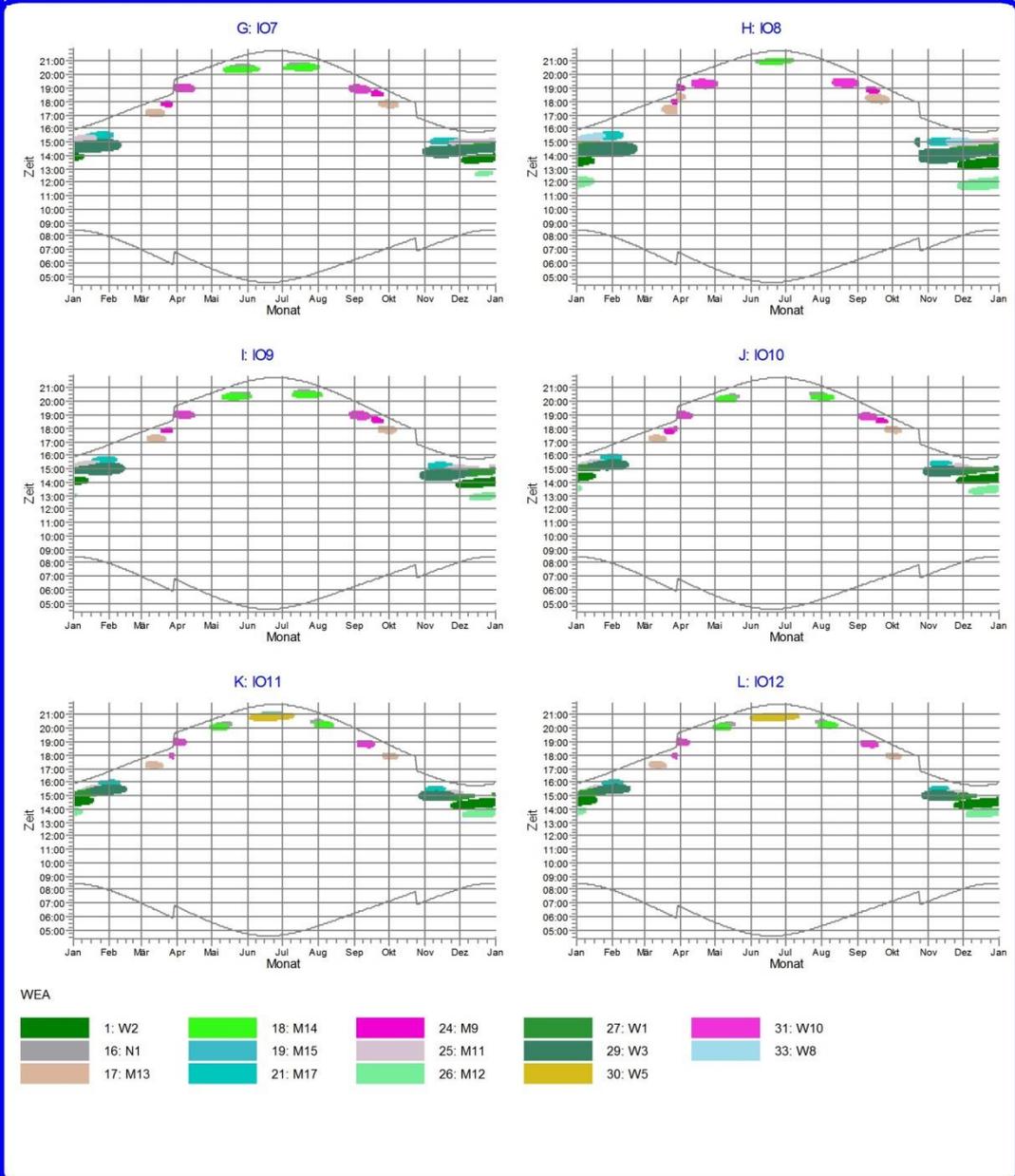
WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 43
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Grafischer Kalender

Berechnung: Gesamtbelastung



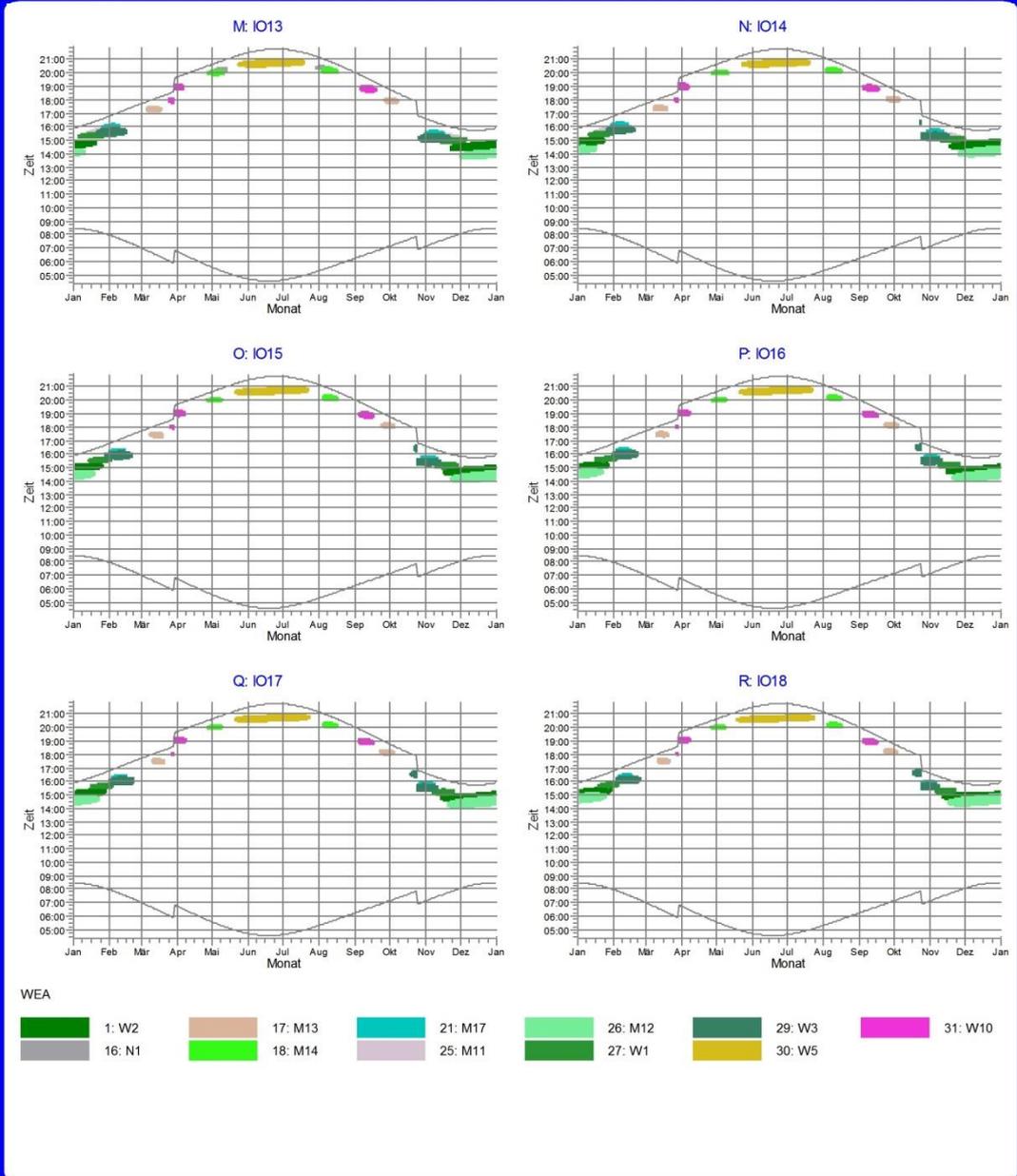
WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 44
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Grafischer Kalender

Berechnung: Gesamtbelastung



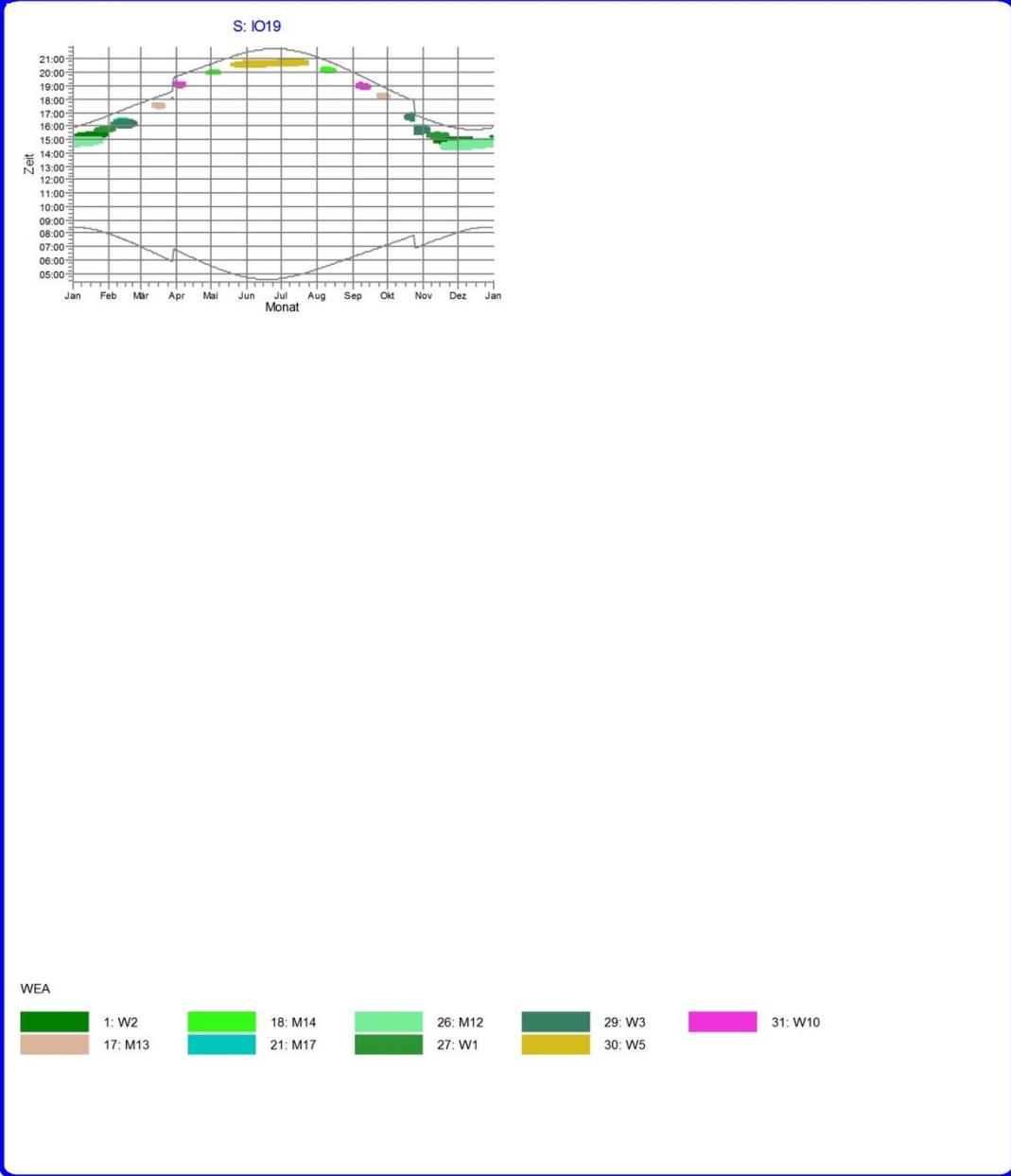
WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 45
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Grafischer Kalender

Berechnung: Gesamtbelastung



WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 46

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

André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 1 - W2

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

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2	08:28 13:14-13:46/32 15:55 13:40-15:17/97	07:55 17:45 16:48 17:45	06:56 17:45 17:45 17:45	06:40 07:14-07:38/24 19:44 19:44	05:31 20:40 19:48 20:40	04:41 21:31 19:48 21:31
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4	08:27 13:17-13:47/30 15:58 13:43-15:20/97	07:52 17:49 16:52 17:49	06:52 17:49 17:49 17:49	06:35 07:15-07:32/17 19:48 19:48	05:27 20:44 19:48 20:44	04:40 21:33 19:48 21:33
5	08:27 13:17-13:47/30 15:59 13:44-15:21/97	07:50 17:51 16:54 17:51	06:49 17:51 17:51 17:51	06:33 07:16-07:29/13 19:50 19:50	05:24 20:46 19:48 20:46	04:39 21:34 19:48 21:34
6	08:27 13:18-13:47/29 16:00 13:45-15:22/97	07:48 17:53 16:56 17:53	06:47 17:53 17:53 17:53	06:31 07:18-07:26/8 19:52 19:52	05:22 20:48 19:48 20:48	04:38 21:35 19:48 21:35
7	08:26 13:19-13:47/28 16:02 13:47-15:24/97	07:46 17:55 16:58 17:55	06:45 17:55 17:55 17:55	06:28 19:54 19:54 19:54	05:21 20:50 19:48 20:50	04:37 21:36 19:48 21:36
8	08:26 13:20-13:47/27 16:03 13:48-15:24/96	07:44 17:57 17:01 17:57	06:42 17:57 17:57 17:57	06:26 19:55 19:55 19:55	05:19 20:51 19:48 20:51	04:37 21:37 19:48 21:37
9	08:25 13:21-13:46/25 16:05 13:50-15:25/95	07:42 17:59 17:03 17:59	06:40 17:59 17:59 17:59	06:23 19:57 19:57 19:57	05:17 20:53 19:48 20:53	04:36 21:38 19:48 21:38
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23	08:11 14:53-15:32/39 16:29	07:13 18:25 17:31 18:25	06:05 18:25 18:25 18:25	05:50 20:24 20:24 20:24	04:53 21:17 19:48 21:17	04:34 21:45 19:48 21:45
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26	08:07 15:03-15:32/29 16:34	07:06 18:31 17:37 18:31	05:58 18:31 18:31 18:31	05:44 20:29 20:29 20:29	04:49 21:21 19:48 21:21	04:35 21:46 19:48 21:46
27	08:05 15:05-15:31/26 16:36	07:03 18:33 17:39 18:33	05:55 18:33 18:33 18:33	05:41 20:31 20:31 20:31	04:48 21:23 19:48 21:23	04:36 21:45 19:48 21:45
28	08:04 15:10-15:31/21 16:38	07:01 18:35 17:41 18:35	05:53 18:35 18:35 18:35	05:39 20:33 20:33 20:33	04:47 21:24 19:48 21:24	04:36 21:45 19:48 21:45
29	08:02 15:13-15:30/17 16:40	06:59 18:37 19:37 18:37	05:50 18:37 18:37 18:37	05:37 20:35 20:35 20:35	04:46 21:25 19:48 21:25	04:37 21:45 19:48 21:45
30	08:00 15:16-15:28/12 16:42	06:57 18:39 19:39 18:39	05:48 18:39 18:39 18:39	05:35 20:37 20:37 20:37	04:44 21:27 19:48 21:27	04:37 21:45 19:48 21:45
31	07:59 15:19-15:25/6 16:44	06:55 18:41 19:41 18:41	05:46 18:41 18:41 18:41	05:33 20:39 20:39 20:39	04:43 21:28 19:48 21:28	04:37 21:45 19:48 21:45
Sonnenscheinstunden 248		272	367	421	496	512
Anzahl Minuten mit Schatten 2275		0	463	116	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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

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13/10/2015 13:57 / 47

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

Berechnet:
13/10/2015 13:41/2.9.285
André Gefke / andre.gefke@i17-wind.de

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 1 - W2

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember	
1	04:38	05:19	06:14	07:08	07:07	08:03 13:05-13:28/23	
	21:44	21:09	20:01	18:46	16:35	15:50 13:41-15:09/88	
2	04:39	05:20	06:16	07:10	07:09	08:05 13:05-13:29/24	
	21:44	21:07	19:59	18:44	16:33	15:49 13:41-15:09/88	
3	04:40	05:22	06:17	07:12	07:11	08:06 13:05-13:31/26	
	21:44	21:05	19:56	18:41	16:31	15:48 13:35-15:09/94	
4	04:40	05:24	06:19	07:14	07:13	08:08 13:04-13:31/27	
	21:43	21:03	19:54	18:39	16:29	15:48 13:32-15:08/96	
5	04:41	05:26	06:21	07:15	07:15	08:09 13:04-13:32/28	
	21:43	21:01	19:51	18:37	16:27	15:47 13:32-15:09/97	
6	04:42	05:27	06:23	07:14-07:22/8	07:17	07:17	08:10 13:04-13:33/29
	21:42	20:59	19:49	18:34	16:25	15:46 13:31-15:08/97	
7	04:43	05:29	06:25	07:11-07:24/13	07:19	07:19	08:12 13:04-13:34/30
	21:41	20:57	19:46	18:32	16:23	15:46 13:31-15:08/97	
8	04:44	05:31	06:26	07:10-07:27/17	07:21	07:21	08:13 13:04-13:34/30
	21:41	20:55	19:44	18:29	16:21	15:45 13:30-15:08/98	
9	04:45	05:33	06:28	07:08-07:29/21	07:23	07:23	08:14 13:05-13:36/31
	21:40	20:53	19:41	18:27	16:20	15:45 13:31-15:07/96	
10	04:46	05:34	06:30	07:07-07:31/24	07:25	07:25	08:16 13:05-13:36/31
	21:39	20:51	19:39	18:24	16:18	15:45 13:30-15:07/97	
11	04:48	05:36	06:32	07:06-07:32/26	07:27	07:27	14:50-14:57/7
	21:38	20:49	19:36	07:36-07:39/3	18:22	16:16	15:45 13:30-15:06/96
12	04:49	05:38	06:34	07:06-07:43/37	07:28	07:29	14:48-15:00/12
	21:37	20:47	19:34	18:20	16:14	15:44 13:27-15:06/99	
13	04:50	05:40	06:35	07:05-07:44/39	07:30	07:31	14:45-15:02/17
	21:36	20:45	19:31	18:17	16:13	15:44 13:26-15:06/100	
14	04:51	05:41	06:37	07:05-07:46/41	07:32	07:33	14:41-15:03/22
	21:35	20:43	19:29	18:15	16:11	15:44 13:25-15:05/100	
15	04:53	05:43	06:39	07:06-07:40/34	07:34	07:35	14:38-15:04/26
	21:34	20:40	19:26	07:40-07:47/7	18:12	16:09	15:44 13:25-15:05/100
16	04:54	05:45	06:41	07:08-07:43/35	07:36	07:36	14:36-15:05/29
	21:33	20:38	19:24	07:43-07:47/4	18:10	16:08	15:44 13:25-15:05/100
17	04:55	05:47	06:43	07:09-07:43/34	07:38	07:38	14:33-15:05/32
	21:32	20:36	19:21	07:43-07:47/4	18:08	16:06	15:44 13:25-15:06/101
18	04:57	05:49	06:44	07:11-07:44/33	07:40	07:40	14:30-15:06/36
	21:30	20:34	19:19	07:44-07:47/3	18:06	16:05	15:45 13:26-15:06/100
19	04:58	05:50	06:46	07:13-07:45/32	07:42	07:42	14:27-15:06/39
	21:29	20:32	19:16	07:45-07:47/2	18:03	16:03	15:45 13:26-15:05/99
20	05:00	05:52	06:48	07:15-07:45/30	07:44	07:44	14:25-15:07/42
	21:28	20:29	19:14	07:45-07:46/1	18:01	16:02	15:45 13:26-15:06/100
21	05:01	05:54	06:50	07:17-07:45/28	07:46	07:46	14:24-15:07/43
	21:26	20:27	19:11	07:45-07:46/1	17:59	16:01	15:46 13:27-15:07/100
22	05:03	05:56	06:52	07:18-07:44/26	07:48	07:48	14:20-15:07/47
	21:25	20:25	19:09	17:56	15:59	15:46 13:27-15:06/99	
23	05:04	05:58	06:53	07:20-07:43/23	07:50	07:49	14:18-15:08/50
	21:23	20:22	19:06	17:54	15:58	15:47 13:28-15:08/100	
24	05:06	05:59	06:55	07:22-07:42/20	07:51	07:51	14:11-15:08/57
	21:22	20:20	19:04	17:52	15:57	15:47 13:28-15:08/100	
25	05:07	06:01	06:57	07:24-07:41/17	06:53	07:53	14:09-15:08/59
	21:20	20:18	19:01	16:50	15:56	15:48 13:28-15:09/101	
26	05:09	06:03	06:59	07:26-07:39/13	06:55	07:55	14:02-15:08/66
	21:19	20:15	18:59	16:48	15:55	15:49 13:29-15:09/100	
27	05:10	06:05	07:01	07:27-07:36/9	06:57	07:56	13:11-13:20/9
	21:17	20:13	18:56	16:45	15:53	14:00-15:09/69	15:49 13:30-15:10/100
28	05:12	06:07	07:03	07:29-07:32/3	06:59	07:58	13:09-13:23/14
	21:15	20:11	18:54	16:43	15:52	13:59-15:09/70	15:50 13:32-15:11/99
29	05:14	06:08	07:04	07:01	08:00	13:08-13:25/17	13:58-15:09/71
	21:14	20:08	18:51	16:41	15:52	13:45-13:53/8	15:51 13:32-15:12/100
30	05:15	06:10	07:06	07:03	08:01	13:07-13:27/20	13:58-15:09/71
	21:12	20:06	18:49	16:39	15:51	13:43-13:55/12	15:52 13:33-15:13/100
31	05:17	06:12		07:05			08:28 13:13-13:46/33
	21:10	20:03		16:37			15:53 13:35-15:14/99
Sonnenscheinstunden	514	461	383	328	257	231	
Anzahl Minuten mit Schatten	0	0	588		945	3728	

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:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 48
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:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 2 - Ma3

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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	
2	15:54	16:46	17:43	19:42	20:38	21:29	21:44	21:08	20:01	18:46	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	07:09	08:04	
4	15:56	16:48	17:45	19:44	20:40	21:30	21:44	21:07	19:59	18:44	16:33	15:49	
5	08:28	07:53	06:54	06:38	05:29	04:41	04:40	05:22	06:17	07:12	07:11	08:06	
6	15:57	16:50	17:47	19:46	20:42	21:32	21:43	21:05	19:56	18:41	16:31	15:48	
7	08:27	07:52	06:52	06:35	05:27	04:40	04:41	05:24	06:19	07:13	07:13	08:07	
8	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:46	
9	08:27	07:50	06:49	06:33	05:25	04:39	04:41	05:26	06:21	07:15	07:15	08:09	
10	15:59	16:54	17:51	19:50	20:46	21:34	21:42	21:01	19:51	18:37	16:27	15:47	
11	08:26	07:48	06:47	06:31	05:23	04:38	04:42	05:27	06:23	07:17	07:17	08:10	
12	16:01	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	07:46	06:44	06:28	05:21	04:37	04:43	05:29	06:25	07:19	07:19	08:12	
14	16:02	16:59	17:55	19:53	20:49	21:36	21:41	20:57	19:46	18:32	16:23	15:46	
15	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	16:03	17:01	17:57	19:55	20:51	21:37	21:40	20:55	19:44	18:29	16:21	15:46	
17	08:25	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	17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45	
19	08:24	07:40	06:37	06:21	05:15	04:36	04:47	05:34	06:30	07:25	07:25	08:15	
20	16:06	17:05	18:00	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45	
21	08:24	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17	
22	16:08	17:07	18:02	20:01	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:45	
23	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:28	07:29	08:18	
24	16:09	17:09	18:04	20:03	20:58	21:40	21:37	20:47	19:34	18:20	16:14	15:44	
25	08:22	07:34	06:30	06:14	05:09	04:35	04:50	05:40	06:35	07:30	07:31	08:19	
26	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44	
27	08:21	07:32	06:27	06:11	05:08	04:34	04:51	05:42	06:37	07:32	07:33	08:20	
28	16:13	17:13	18:08	20:07	21:02	21:42	21:35	20:42	19:29	18:15	16:11	15:44	
29	08:20	07:30	06:25	06:09	05:06	04:34	04:53	05:43	06:39	07:34	07:34	08:21	
30	16:14	17:15	18:10	20:09	21:04	21:42	21:34	20:40	19:26	18:12	16:09	15:44	
31	08:19	07:28	06:22	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:36	08:22	
32	16:16	17:17	18:12	20:10	21:05	21:43	21:33	20:38	19:24	18:10	16:08	15:44	
33	08:18	07:26	06:20	06:04	05:02	04:34	04:55	05:47	06:43	07:38	07:38	08:22	
34	16:18	17:19	18:14	20:12	21:07	21:43	21:31	20:36	19:21	18:08	16:06	15:44	
35	08:17	07:24	06:18	06:02	05:01	04:34	04:57	05:49	06:44	07:40	07:40	08:23	
36	16:20	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:05	16:05	15:45	
37	08:16	07:21	06:15	05:59	04:58	04:34	04:58	05:50	06:46	07:42	07:42	08:24	
38	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:31	19:16	18:03	16:03	15:45	
39	08:15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25	
40	16:23	17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45	
41	08:13	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:25	
42	16:25	17:27	18:21	20:20	21:13	21:45	21:26	20:27	19:11	17:59	16:01	15:46	
43	08:12	07:15	06:08	05:53	04:55	04:34	05:03	05:56	06:52	07:47	07:48	08:26	
44	16:27	17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:46	
45	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:49	07:49	08:26	
46	16:29	17:31	18:25	20:24	21:17	21:45	21:23	20:22	19:06	17:54	15:58	15:47	
47	08:09	07:10	06:03	05:48	04:52	04:35	05:06	05:59	06:55	07:51	07:51	08:27	
48	16:31	17:33	18:27	20:25	21:18	21:45	21:22	20:20	19:04	17:52	15:57	15:47	
49	08:08	07:08	06:00	05:46	04:51	04:35	05:07	06:01	06:57	06:53	07:53	08:27	
50	16:33	17:35	18:29	20:27	21:20	21:45	21:20	20:18	19:01	16:50	15:56	15:48	
51	08:07	07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	06:55	07:55	08:27	
52	16:34	17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	16:48	15:55	15:49	
53	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	06:57	07:56	08:28	
54	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:54	15:49	
55	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:02	06:59	07:58	08:28	
56	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:11	18:54	16:43	15:53	15:50	
57	08:02		06:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28	
58	16:40		19:37	20:35	21:25	21:45	21:14	20:08	18:51	16:41	15:52	15:51	
59	08:00		06:48	05:35	04:44	04:38	05:15	06:10	07:06	07:03	08:01	08:28	
60	16:42		19:38	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52	
61	07:59		06:45		04:43		05:17	06:12		07:05		08:28	
62	16:44		19:40		21:28		21:10	20:03		16:37		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:
151008_Miltzow_III-VII

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Lizenzierter Anwender:
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Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346	330	400	570	528	528	741	991	1,022	1,224	934	356	7,971

: 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	19:96	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
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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	21:13	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	16:00	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	16:00	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	16:00	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	18:00	16:00	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	18:00	16:00	15:49
27	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	08:00	07:56	08:28
	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	18:00	16:00	15:49
28	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:02	08:00	07:58	08:28
	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:11	18:54	18:00	16:00	15:50
29	08:02		06:50	05:37	04:46	04:37	05:14	06:08	07:04	08:00	08:00	08:28
	16:40		19:37	20:35	21:25	21:45	21:14	20:08	18:51	18:00	16:00	15:51
30	08:00		06:48	05:35	04:45	04:38	05:15	06:10	07:06	08:00	08:01	08:28
	16:42		19:38	20:37	21:27	21:45	21:12	20:06	18:49	18:00	16:00	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
Anzahl Minuten mit Schatten												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:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 50
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 4 - Ma5

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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										
1	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										
1	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										
1	15:57	16:50	17:47	19:46	20:42	21:32	21:43	21:05	19:96	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										
1	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										
1	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	05:22	04:38	04:42	05:27	06:23	07:17	07:17	08:10										
1	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										
1	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										
1	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										
1	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										
1	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										
1	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	05:39	06:34	07:28	07:29	08:18										
1	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										
1	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										
1	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										
1	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										
1	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										
1	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										
1	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	04:58	04:34	04:58	05:50	06:46	07:42	07:42	08:24										
1	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										
1	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										
1	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										
1	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										
1	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										
1	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	06:53	07:53	08:27										
1	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	06:55	07:55	08:27										
1	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	06:57	07:56	08:28										
1	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	06:59	07:58	08:28										
1	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		06:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28										
1	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										
1	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		367	0	421	496	0	512	0	514	0	461	0	383	0	328	0	258	0	231	0
	Anzahl Minuten mit Schatten	0	0	0	0	0	0	0	0	0	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:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 51
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 5 - Ma6

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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	08:28	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	05:26	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										
	16:01	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	05:20	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										
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	07:26	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	05:07	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	20:08	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	05:52	04:55	04:34	05:03	05:56	06:52	07:47	07:47	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	04:50	04:35	05:07	06:01	06:57	06:53	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	06:55	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	06:57	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	06:59	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		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		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

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: 151008_Miltzow_III-VII	Ausdruck/Seite 13/10/2015 13:57 / 52 Lizenzierter Anwender: I17-Wind GmbH & Co. KG Am Westersielzug 11 DE-25840 Friedrichstadt - André Gefke / andre.gefke@i17-wind.de Berechnet: 13/10/2015 13:41/2.9.285
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SHADOW - Kalender pro WEA
Berechnung: GesamtbelastungWEA: 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
 346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
 : 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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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	04:46	05:34	06:30	07:25	07:25	08:15
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	16:27	17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	16:00	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
1	16:29	17:31	18:25	20:24	21:17	21:45	21:23	20:22	19:06	17:54	16:00	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
1	16:31	17:33	18:27	20:25	21:18	21:45	21:22	20:20	19:04	17:52	16:00	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
1	16:33	17:35	18:29	20:27	21:20	21:45	21:20	20:18	19:01	17:50	16:00	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
1	16:34	17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	17:48	16:00	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
1	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	17:45	16:00	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
1	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:11	18:54	17:43	16:00	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
1	16:40		19:37	20:35	21:25	21:45	21:14	20:08	18:51	17:41	16:00	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
1	16:42		19:38	20:37	21:27	21:45	21:12	20:06	18:49	17:39	16:00	15:52
31	07:59		06:45		04:43		05:17	06:12		07:05		08:28
1	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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

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13/10/2015 13:57 / 53

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

André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: Gesamtbelastung WEA: 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
346	330	400	570	528	528	741	991	1,022	1,224	934	356	7,971

: Startwindgeschw. aus Leistungskennlinie

Januar | Februar | März | April | Mai | Juni | Juli | August | September | Oktober | November | Dezember

	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 20:38	04:42 21:29	04:38 21:44	05:19 21:08	06:14 20:01	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	04:41 21:30	04:39 21:44	05:20 21:07	06:16 19:58	07:10 18:44	07:09 16:33	08:04 15:49
3	08:27 15:57	07:53 16:50	06:54 17:47	06:38 19:46	05:29 20:42	04:40 21:32	04:40 21:43	05:22 21:05	06:17 19:56	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	04:40 21:33	04:41 21:43	05:24 21:03	06:19 19:54	07:13 18:39	07:13 16:29	08:07 15:48
5	08:27 15:59	07:50 16:54	06:49 17:51	06:33 19:50	05:24 20:46	04:39 21:34	04:41 21:42	05:26 21:01	06:21 19:51	07:15 18:36	07:15 16:27	08:09 15:47
6	08:26 16:00	07:48 16:56	06:47 17:53	06:30 19:52	05:22 20:48	04:38 21:35	04:42 21:42	05:27 20:59	06:23 19:49	07:17 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 19:53	05:20 20:49	04:37 21:36	04:43 21:41	05:29 20:57	06:25 19:46	07:19 18:32	07:19 16:23	08:12 15:46
8	08:25 16:03	07:44 17:00	06:42 17:57	06:26 19:55	05:19 20:51	04:37 21:37	04:44 21:40	05:31 20:55	06:26 19:44	07:21 18:29	07:21 16:21	08:13 15:45
9	08:25 16:05	07:42 17:03	06:40 17:58	06:23 19:57	05:17 20:53	04:36 21:38	04:45 21:40	05:33 20:53	06:28 19:41	07:23 18:27	07:23 16:20	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	04:36 21:39	04:46 21:39	05:34 20:51	06:30 19:39	07:25 18:24	07:25 16:18	08:15 15:45
11	08:23 16:08	07:38 17:07	06:35 18:02	06:18 20:01	05:13 20:57	04:35 21:40	04:48 21:38	05:36 20:49	06:32 19:36	07:26 18:22	07:27 16:16	08:17 15:45
12	08:23 16:09	07:36 17:09	06:32 18:04	06:16 20:03	05:11 20:58	04:35 21:40	04:49 21:37	05:38 20:47	06:34 19:34	07:28 18:20	07:29 16:14	08:18 15:44
13	08:22 16:11	07:34 17:11	06:30 18:06	06:14 20:05	05:09 21:00	04:34 21:41	04:50 21:36	05:40 20:45	06:35 19:31	07:30 18:17	07:31 16:13	08:19 15:44
14	08:21 16:13	07:32 17:13	06:27 18:08	06:11 20:07	05:07 21:02	04:34 21:42	04:51 21:35	05:41 20:42	06:37 19:29	07:32 18:15	07:32 16:11	08:20 15:44
15	08:20 16:14	07:30 17:15	06:25 18:10	06:09 20:08	05:06 21:04	04:34 21:42	04:53 21:34	05:43 20:40	06:39 19:26	07:34 18:12	07:34 16:09	08:21 15:44
16	08:19 16:16	07:28 17:17	06:22 18:12	06:06 20:10	05:04 21:05	04:34 21:43	04:54 21:33	05:45 20:38	06:41 19:24	07:36 18:10	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	05:02 21:07	04:34 21:43	04:55 21:31	05:47 20:36	06:43 19:21	07:38 18:08	07:38 16:06	08:22 15:44
18	08:17 16:19	07:24 17:21	06:17 18:16	06:02 20:14	05:01 21:09	04:34 21:44	04:57 21:30	05:49 20:34	06:44 19:19	07:40 18:05	07:40 16:05	08:23 15:45
19	08:16 16:21	07:21 17:23	06:15 18:18	06:05 20:16	04:59 21:10	04:34 21:44	04:58 21:29	05:50 20:31	06:46 19:16	07:42 18:03	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	04:58 21:12	04:34 21:45	05:00 21:27	05:52 20:29	06:48 19:14	07:44 18:01	07:44 16:02	08:25 15:45
21	08:13 16:25	07:17 17:27	06:10 18:21	05:55 20:20	04:56 21:13	04:34 21:45	05:01 21:26	05:54 20:27	06:50 19:11	07:46 17:59	07:46 16:01	08:25 15:46
22	08:12 16:27	07:15 17:29	06:08 18:23	05:52 20:22	04:55 21:15	04:34 21:45	05:03 21:25	05:56 20:25	06:52 19:09	07:47 17:56	07:47 16:09	08:26 15:46
23	08:11 16:29	07:13 17:31	06:05 18:25	05:50 20:23	04:53 21:17	04:34 21:45	05:04 21:23	05:58 20:22	06:53 19:06	07:49 17:54	07:49 16:08	08:26 15:47
24	08:09 16:31	07:10 17:33	06:03 18:27	05:48 20:25	04:52 21:18	04:34 21:45	05:06 21:22	05:59 20:20	06:55 19:04	07:51 17:52	07:51 16:07	08:27 15:47
25	08:08 16:32	07:08 17:35	06:00 18:29	05:46 20:27	04:50 21:20	04:35 21:45	05:07 21:20	06:01 20:18	06:57 19:01	07:53 18:01	07:53 16:05	08:27 15:48
26	08:07 16:34	07:06 17:37	05:58 18:31	05:43 20:29	04:49 21:21	04:35 21:45	05:09 21:19	06:03 20:15	06:59 18:59	07:55 18:48	07:55 16:04	08:27 15:49
27	08:05 16:36	07:03 17:39	05:55 18:33	05:41 20:31	04:48 21:23	04:36 21:45	05:10 21:17	06:05 20:13	07:01 18:56	07:57 18:45	07:56 16:03	08:28 15:49
28	08:03 16:38	07:01 17:41	05:53 18:35	05:39 20:33	04:47 21:24	04:36 21:45	05:12 21:15	06:07 20:10	07:02 18:54	07:58 18:43	07:58 16:03	08:28 15:50
29	08:02 16:40	07:00 19:37	06:50 20:35	05:37 21:25	04:46 21:25	04:37 21:45	05:14 21:14	06:08 20:08	07:04 18:51	07:01 18:41	08:00 16:41	08:28 15:51
30	08:00 16:42	07:00 19:38	06:48 20:37	05:35 21:27	04:44 21:27	04:37 21:45	05:15 21:12	06:10 20:06	07:06 18:49	07:03 18:39	08:01 16:39	08:28 15:52
31	07:59 16:44	06:50 19:40	06:45 20:37	05:35 21:28	04:43 21:28	04:37 21:45	05:17 21:10	06:12 20:03	07:05 18:37	07:05 18:37	08:01 16:37	08:28 15:53
Sonnenscheinstunden 248												
Anzahl Minuten mit Schatten 272 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:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 54
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1022 1,224 934 356 7,971
: 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												
	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	05:39	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	07:33	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	04:58	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												
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	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	06:53	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	06:55	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	06:57	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	06:59	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		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		367	0	421	0	496	0	512	0	514	0	461	0	383	0	328	0	258	0	231	0	
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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 55
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 9 - Ma10

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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
1	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
1	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
1	15:57	16:50	17:47	19:46	20:42	21:32	21:43	21:05	19:96	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
1	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
1	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
1	16:01	16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49	18:34	16:25	15:46
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1	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	08:25	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:26	07:21	07:21	08:13
1	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
1	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	08:24	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17
1	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
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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
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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
1	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	08:19	07:28	06:23	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:36	08:22
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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
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1	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
1	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
1	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
1	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
1	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
1	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	06:53	07:53	08:27
1	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	06:55	07:55	08:27
1	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	06:57	07:56	08:28
1	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	06:59	07:58	08:28
1	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	06:09	07:04	07:01	08:00	08:28
1	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	04:45	04:38	05:15	06:10	07:06	07:03	08:01	08:28
1	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	05:45	05:32	04:43	04:36	05:17	06:12	07:07	07:05	08:03	08:28
1	16:44	17:47	18:40	20:38	21:28	21:45	21:10	20:03	18:46	16:37	15:50	15:53
Sonnenscheinstunden 248												
Anzahl Minuten mit Schatten 0 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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

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13/10/2015 13:57 / 56

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 10 - Ma11

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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
1	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
1	15:56	16:48	17:45	19:44	20:40	21:30	21:44	21:07	19:59	18:44	16:33	15:49
3	08:28	07:53	06:54	06:38	05:29	04:41	04:40	05:22	06:17	07:12	07:11	08:06
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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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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
1	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
1	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
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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
1	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
1	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	04:58	04:34	04:58	05:50	06:46	07:42	07:42	08:24
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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
1	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
1	16:25	17:27	18:21	20:20	21:13	21:45	21:26	20:27	19:11	17:59	16:01	15:46
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1	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
1	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
1	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	06:53	07:53	08:27
1	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	06:55	07:55	08:27
1	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	06:57	07:56	08:28
1	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	06:59	07:58	08:28
1	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		06:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28
1	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	04:38	05:15	06:10	07:06	07:03	08:01	08:28
1	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
1	16:44		19:40		21:28		21:10	20:03		16:37		15:53
Sonnenscheinstunden 248												
Anzahl Minuten mit Schatten 272 0 0 0 0 0 0 0 0 383 328 258 231												

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 57
Lizenzierter Anwender:
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Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 11 - Ma12

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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	06:30	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	16:58	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	15:46	
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	
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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	08:23	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:26	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	05:39	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	20:08	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	
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	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	
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	16:23	17:25	18:20	20:18	21:12	21:45	21:27	20:29	19:14	18:01	16:02	15:45	
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25	08:08	07:08	06:00	05:46	04:51	04:35	05:07	06:01	06:57	06:53	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	06:55	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	06:57	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	06:59	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		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	04:38	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	495	512	514	461	383	328	258	231
Anzahl Minuten mit Schatten	0	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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 58
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: Gesamtbelastung WEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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
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	05:24	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
	16:01	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	08:25	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
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	08:23	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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12	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:39	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
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	04:58	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
	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	07:47	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	04:50	04:35	05:07	06:01	06:57	06:53	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	06:55	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	06:57	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	06:59	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		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												
Anzahl Minuten mit Schatten 272												

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 59
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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	
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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	06:53	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	06:55	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	06:57	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	06:59	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		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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 60
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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	
2	15:54	16:46	17:43	19:42	20:38	21:29	21:44	21:08	20:01	18:46	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	07:09	08:04	
4	15:56	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	18:44	16:33	15:49	
5	08:28	07:54	06:54	06:38	05:29	04:41	04:40	05:22	06:17	07:12	07:11	08:06	
6	15:57	16:50	17:47	19:46	20:42	21:32	21:43	21:05	19:56	18:41	16:31	15:48	
7	08:27	07:52	06:52	06:35	05:27	04:40	04:41	05:24	06:19	07:13	07:13	08:07	
8	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54	18:39	16:29	15:46	
9	08:27	07:50	06:49	06:33	05:25	04:39	04:41	05:26	06:21	07:15	07:15	08:09	
10	15:59	16:54	17:51	19:50	20:46	21:34	21:42	21:01	19:51	18:37	16:27	15:47	
11	08:26	07:48	06:47	06:31	05:23	04:38	04:42	05:27	06:23	07:17	07:17	08:10	
12	16:01	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	07:46	06:44	06:28	05:21	04:37	04:43	05:29	06:25	07:19	07:19	08:12	
14	16:02	16:59	17:55	19:53	20:49	21:36	21:41	20:57	19:46	18:32	16:23	15:46	
15	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	16:03	17:01	17:57	19:55	20:51	21:37	21:40	20:55	19:44	18:29	16:21	15:46	
17	08:25	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	17:03	17:59	19:57	20:53	21:38	21:40	20:53	19:41	18:27	16:20	15:45	
19	08:24	07:40	06:37	06:21	05:15	04:36	04:47	05:34	06:30	07:25	07:25	08:15	
20	16:06	17:05	18:00	19:59	20:55	21:39	21:39	20:51	19:39	18:24	16:18	15:45	
21	08:24	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17	
22	16:08	17:07	18:02	20:01	20:57	21:40	21:38	20:49	19:36	18:22	16:16	15:45	
23	08:23	07:36	06:32	06:16	05:11	04:35	04:49	05:39	06:34	07:28	07:29	08:18	
24	16:09	17:09	18:04	20:03	20:58	21:40	21:37	20:47	19:34	18:20	16:14	15:44	
25	08:22	07:34	06:30	06:14	05:09	04:35	04:50	05:40	06:35	07:30	07:31	08:19	
26	16:11	17:11	18:06	20:05	21:00	21:41	21:36	20:45	19:31	18:17	16:13	15:44	
27	08:21	07:32	06:27	06:11	05:08	04:34	04:51	05:41	06:37	07:32	07:33	08:20	
28	16:13	17:13	18:08	20:07	21:02	21:42	21:35	20:42	19:29	18:15	16:11	15:44	
29	08:20	07:30	06:25	06:09	05:06	04:34	04:53	05:43	06:39	07:34	07:34	08:21	
30	16:14	17:15	18:10	20:09	21:04	21:42	21:34	20:40	19:26	18:12	16:09	15:44	
31	08:19	07:28	06:22	06:06	05:04	04:34	04:54	05:45	06:41	07:36	07:36	08:22	
32	16:16	17:17	18:12	20:10	21:05	21:43	21:33	20:38	19:24	18:10	16:08	15:44	
33	08:18	07:26	06:20	06:04	05:02	04:34	04:55	05:47	06:43	07:38	07:38	08:22	
34	16:18	17:19	18:14	20:12	21:07	21:43	21:31	20:36	19:21	18:08	16:06	15:44	
35	08:17	07:24	06:18	06:02	05:01	04:34	04:57	05:49	06:44	07:40	07:40	08:23	
36	16:20	17:21	18:16	20:14	21:09	21:44	21:30	20:34	19:19	18:05	16:05	15:45	
37	08:16	07:21	06:15	05:59	04:58	04:34	04:58	05:50	06:46	07:42	07:42	08:24	
38	16:21	17:23	18:18	20:16	21:10	21:44	21:29	20:31	19:16	18:03	16:03	15:45	
39	08:15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25	
40	16:23	17:25	18:20	20:18	21:12	21:45	21:28	20:29	19:14	18:01	16:02	15:45	
41	08:13	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:25	
42	16:25	17:27	18:22	20:20	21:13	21:45	21:26	20:27	19:11	17:59	16:01	15:46	
43	08:12	07:15	06:08	05:53	04:55	04:34	05:03	05:56	06:52	07:48	07:48	08:26	
44	16:27	17:29	18:23	20:22	21:15	21:45	21:25	20:25	19:09	17:56	15:59	15:46	
45	08:11	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:49	07:49	08:26	
46	16:29	17:31	18:25	20:24	21:17	21:45	21:23	20:22	19:06	17:54	15:58	15:47	
47	08:09	07:10	06:03	05:48	04:52	04:35	05:06	05:59	06:55	07:51	07:51	08:27	
48	16:31	17:33	18:27	20:25	21:18	21:45	21:22	20:20	19:04	17:52	15:57	15:47	
49	08:08	07:08	06:00	05:46	04:51	04:35	05:07	06:01	06:57	06:53	07:53	08:27	
50	16:33	17:35	18:29	20:27	21:20	21:45	21:20	20:18	19:01	16:50	15:56	15:48	
51	08:07	07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	06:55	07:55	08:27	
52	16:34	17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	16:48	15:55	15:49	
53	08:05	07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	06:57	07:56	08:28	
54	16:36	17:39	18:33	20:31	21:23	21:45	21:17	20:13	18:56	16:45	15:54	15:49	
55	08:04	07:01	05:53	05:39	04:47	04:36	05:12	06:07	07:02	06:59	07:58	08:28	
56	16:38	17:41	18:35	20:33	21:24	21:45	21:15	20:11	18:54	16:43	15:53	15:50	
57	08:02		06:50	05:37	04:46	04:37	05:14	06:08	07:04	07:01	08:00	08:28	
58	16:40		19:37	20:35	21:25	21:45	21:14	20:08	18:51	16:41	15:52	15:51	
59	08:00		06:48	05:35	04:44	04:38	05:15	06:10	07:06	07:03	08:01	08:28	
60	16:42		19:38	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	15:52	
61	07:59		06:45		04:43		05:17	06:12		07:05		08:28	
62	16:44		19:40		21:28		21:10	20:03		16:37		15:53	
63	Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	258	231
64	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:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 61
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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
1	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
1	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
1	15:57	16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:96	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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
1	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	06:53	07:53	08:27
1	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	06:55	07:55	08:27
1	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	06:57	07:56	08:28
1	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	06:59	07:58	08:28
1	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
1	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
1	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	05:45	05:32	04:43	04:38	05:17	06:12	07:08	07:05	08:04	08:28
1	16:44	17:47	18:40	20:38	21:28	21:45	21:10	20:03	18:46	16:37	15:49	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 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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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 62
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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	20:26-20:38/12	04:38 21:00-21:08/8	05:19 20:19-20:33/14	06:14 07:08	07:07	08:03
2	15:54 16:48	17:43	19:42	20:39	21:30	20:38-20:42/4	21:45	21:09 20:31-20:37/6	20:31 18:46	16:35	15:50	
3	08:28 07:54	06:54 06:38	05:29 20:09-20:12/3	04:40 20:30-20:41/11	04:40 21:01-21:07/6	05:22 20:18-20:33/15	06:16 07:10	06:16 07:10	06:16 07:10	06:16 07:10	06:16 07:10	06:16 07:10
4	08:28 07:52	06:52 06:35	05:27 20:08-20:14/6	04:40 20:31-20:41/10	04:40 21:02-21:07/5	05:24 20:17-20:31/14	06:19 07:14	06:19 07:14	06:19 07:14	06:19 07:14	06:19 07:14	06:19 07:14
5	08:27 07:50	06:49 06:33	05:24 20:07-20:15/8	04:39 20:32-20:40/8	04:41 21:03-21:07/4	05:26 20:17-20:30/13	06:21 07:15	06:21 07:15	06:21 07:15	06:21 07:15	06:21 07:15	06:21 07:15
6	08:27 07:48	06:47 06:31	05:22 20:07-20:17/10	04:38 20:34-20:39/5	04:42 20:41-20:45/4	05:27 20:17-20:28/11	06:23 07:17	06:23 07:17	06:23 07:17	06:23 07:17	06:23 07:17	06:23 07:17
7	08:26 07:46	06:45 06:28	05:21 20:07-20:18/11	04:37 20:56-21:00/4	04:43 20:40-20:46/6	05:29 20:16-20:26/10	06:25 07:19	06:25 07:19	06:25 07:19	06:25 07:19	06:25 07:19	06:25 07:19
8	08:26 07:44	06:42 06:26	05:19 20:06-20:20/14	04:37 20:57-21:02/5	04:44 20:39-20:48/9	05:31 20:17-20:24/7	06:27 07:21	06:27 07:21	06:27 07:21	06:27 07:21	06:27 07:21	06:27 07:21
9	08:25 07:42	06:40 06:23	05:17 20:07-20:22/15	04:36 20:56-21:02/6	04:45 20:38-20:49/11	05:33 20:18-20:23/5	06:28 07:23	06:28 07:23	06:28 07:23	06:28 07:23	06:28 07:23	06:28 07:23
10	08:25 07:40	06:37 06:21	05:15 20:07-20:23/16	04:36 20:56-21:03/7	04:46 20:36-20:49/13	05:34 20:18-20:20/2	06:30 07:25	06:30 07:25	06:30 07:25	06:30 07:25	06:30 07:25	06:30 07:25
11	08:24 07:38	06:35 06:18	05:13 20:08-20:22/14	04:35 20:56-21:04/8	04:48 20:35-20:45/10	05:36	06:32 07:27	06:32 07:27	06:32 07:27	06:32 07:27	06:32 07:27	06:32 07:27
12	08:23 07:36	06:32 06:16	05:11 20:09-20:22/13	04:35 20:55-21:04/9	04:49 20:34-20:47/13	05:38	06:34 07:29	06:34 07:29	06:34 07:29	06:34 07:29	06:34 07:29	06:34 07:29
13	08:22 07:34	06:30 06:14	05:09 20:10-20:20/10	04:34 20:56-21:05/9	04:50 20:34-20:48/14	05:40	06:35 07:30	06:35 07:30	06:35 07:30	06:35 07:30	06:35 07:30	06:35 07:30
14	08:21 07:32	06:28 06:11	05:07 20:11-20:27/16	04:34 20:56-21:06/10	04:51 20:33-20:48/15	05:41	06:37 07:32	06:37 07:32	06:37 07:32	06:37 07:32	06:37 07:32	06:37 07:32
15	08:20 07:30	06:25 06:09	05:06 20:13-20:26/13	04:34 20:56-21:06/10	04:53 20:32-20:49/17	05:43	06:39 07:34	06:39 07:34	06:39 07:34	06:39 07:34	06:39 07:34	06:39 07:34
16	08:19 07:28	06:23 06:06	05:04 20:13-20:25/12	04:34 20:56-21:07/11	04:54 20:33-20:50/17	05:45	06:41 07:36	06:41 07:36	06:41 07:36	06:41 07:36	06:41 07:36	06:41 07:36
17	08:18 07:26	06:20 06:04	05:02 20:15-20:22/7	04:34 20:56-21:07/11	04:55 20:32-20:51/19	05:47	06:43 07:38	06:43 07:38	06:43 07:38	06:43 07:38	06:43 07:38	06:43 07:38
18	08:17 07:24	06:18 06:02	05:01 20:16-20:32/16	04:34 20:56-21:08/12	04:57 20:32-20:51/19	05:49	06:44 07:40	06:44 07:40	06:44 07:40	06:44 07:40	06:44 07:40	06:44 07:40
19	08:16 07:22	06:15 06:00	05:00 20:17-20:31/14	04:34 20:57-21:08/11	04:59 20:32-20:52/20	05:50	06:46 07:42	06:46 07:42	06:46 07:42	06:46 07:42	06:46 07:42	06:46 07:42
20	08:15 07:19	06:13 05:57	04:58 20:18-20:31/13	04:34 20:57-21:08/11	05:00 20:32-20:52/20	05:52	06:48 07:44	06:48 07:44	06:48 07:44	06:48 07:44	06:48 07:44	06:48 07:44
21	08:14 07:17	06:10 05:55	04:56 20:19-20:29/10	04:34 20:57-21:08/11	05:01 20:32-20:51/19	05:54	06:50 07:46	06:50 07:46	06:50 07:46	06:50 07:46	06:50 07:46	06:50 07:46
22	08:12 07:15	06:08 05:53	04:55 20:22-20:42/20	04:34 20:57-21:08/11	05:03 20:31-20:37/6	05:56	06:52 07:48	06:52 07:48	06:52 07:48	06:52 07:48	06:52 07:48	06:52 07:48
23	08:11 07:13	06:05 05:50	04:53 20:22-20:42/20	04:34 20:58-21:09/11	05:04 20:28-20:40/12	05:58	06:53 07:50	06:53 07:50	06:53 07:50	06:53 07:50	06:53 07:50	06:53 07:50
24	08:10 07:10	06:03 05:48	04:52 20:22-20:41/19	04:34 20:58-21:09/11	05:05 20:32-20:50/17	05:59	06:55 07:52	06:55 07:52	06:55 07:52	06:55 07:52	06:55 07:52	06:55 07:52
25	08:08 07:08	06:00 05:46	04:50 20:22-20:41/19	04:35 20:57-21:09/12	05:07 20:27-20:42/15	06:01	06:57 07:54	06:57 07:54	06:57 07:54	06:57 07:54	06:57 07:54	06:57 07:54
26	08:07 07:06	05:58 05:44	04:49 20:23-20:41/18	04:35 20:58-21:09/11	05:09 20:26-20:33/7	06:03	06:59 07:55	06:59 07:55	06:59 07:55	06:59 07:55	06:59 07:55	06:59 07:55
27	08:05 07:04	05:55 05:41	04:48 20:23-20:41/18	04:36 20:58-21:09/11	05:10 20:25-20:35/10	06:05	07:01 08:57	07:01 08:57	07:01 08:57	07:01 08:57	07:01 08:57	07:01 08:57
28	08:04 07:01	05:53 05:39	04:47 20:24-20:41/17	04:36 20:59-21:09/10	05:12 20:23-20:36/13	06:07	07:03 08:59	07:03 08:59	07:03 08:59	07:03 08:59	07:03 08:59	07:03 08:59
29	08:02	05:50 05:37	04:46 20:24-20:40/16	04:37 20:59-21:08/9	05:14 20:23-20:37/14	06:09	07:04 09:01	07:04 09:01	07:04 09:01	07:04 09:01	07:04 09:01	07:04 09:01
30	08:01	05:48 05:35	04:44 20:25-20:39/14	04:37 21:00-21:08/8	05:15 20:21-20:29/8	06:10	07:06 09:03	07:06 09:03	07:06 09:03	07:06 09:03	07:06 09:03	07:06 09:03
31	07:59	05:45 05:31	04:43 20:26-20:39/13	04:38 21:01-21:09/7	05:17 20:20-20:31/11	06:12	07:08 09:05	07:08 09:05	07:08 09:05	07:08 09:05	07:08 09:05	07:08 09:05
Sonnenscheinstunden	248	272	367	421	496	512	295	514	484	461	112	383
Anzahl Minuten mit Schatten	0	0	0	0	495	512	295	514	484	461	112	383

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:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 63

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28 15:54 08:28 15:55	07:57 16:46 07:55 16:48	06:59 17:43 06:56 17:45	16:53-17:07/14 17:49 16:50-17:08/18 17:49	06:43 19:42 06:40 19:44	18:11-18:33/22 20:39 18:12-18:31/19 20:40	05:33 21:29 05:31 21:31
2	08:28 15:57	07:54 16:50	06:54 17:47	16:49-17:10/21 17:46	06:38 19:46	18:14-18:28/14 20:42	05:29 21:32
3	08:27 15:58	07:50 16:52	06:49 17:51	16:47-17:14/27 17:51	06:35 19:48	18:18-18:23/5 20:44	05:27 21:33
4	08:27 15:59	07:48 16:54	06:47 17:53	16:45-17:24/39 17:53	06:31 19:52	06:31 20:48	05:22 21:35
5	08:26 16:02	07:46 16:59	06:45 17:55	16:45-17:26/41 17:55	06:28 19:54	06:28 20:50	05:21 21:36
6	08:26 16:03	07:44 17:01	06:42 17:57	16:44-17:29/45 17:57	06:26 19:55	06:26 20:51	05:19 21:37
7	08:25 16:05	07:42 17:03	06:40 17:59	16:45-17:32/47 17:59	06:23 19:57	06:23 20:53	05:17 21:38
8	08:24 16:06	07:40 17:05	06:37 18:01	16:44-17:33/49 18:01	06:21 19:59	06:21 20:55	05:15 21:39
9	08:24 16:08	07:38 17:07	06:35 18:02	16:45-17:36/51 18:02	06:18 20:01	06:18 20:57	05:13 21:40
10	08:23 16:09	07:36 17:09	06:32 18:04	16:45-17:37/52 18:04	06:16 20:03	06:16 20:59	05:11 21:41
11	08:22 16:11	07:34 17:11	06:30 18:06	16:46-17:40/54 18:06	06:14 20:05	06:14 21:00	05:09 21:41
12	08:21 16:13	07:32 17:13	06:28 18:08	16:47-17:40/53 18:08	06:11 20:07	06:11 21:02	05:07 21:42
13	08:20 16:14	07:30 17:15	06:25 18:10	16:49-17:41/52 18:10	06:09 20:09	06:09 21:04	05:06 21:43
14	08:19 16:16	07:28 17:17	06:23 18:12	16:52-17:41/49 18:12	06:06 20:11	06:06 21:05	05:04 21:43
15	08:18 16:18	07:26 17:19	06:20 18:14	16:57-17:41/44 18:14	06:04 20:12	06:04 21:07	05:02 21:44
16	08:17 16:20	07:24 17:21	06:18 18:16	16:57-17:40/43 18:16	06:02 20:14	06:02 21:09	05:01 21:44
17	08:16 16:21	07:22 17:23	06:15 18:18	16:59-17:39/40 18:18	05:59 20:16	05:59 21:10	04:59 21:45
18	08:15 16:23	07:19 17:25	06:13 18:20	17:01-17:37/36 18:20	05:57 20:18	05:57 21:12	04:58 21:45
19	08:14 16:25	07:17 17:27	06:10 18:22	17:07-17:17/10 17:37-17:38/1 18:22	05:55 20:20	05:55 21:14	04:56 21:45
20	08:12 16:27	07:15 17:29	06:08 18:23	17:10-17:38/28 18:23	05:53 20:22	05:53 21:15	04:55 21:45
21	08:11 16:29	07:13 17:31	06:05 18:25	17:10-17:39/29 18:25	05:50 20:24	05:50 21:17	04:53 21:45
22	08:10 16:31	07:10 17:33	06:03 18:27	17:08-17:38/30 18:27	05:48 20:26	05:48 21:18	04:52 21:46
23	08:08 16:33	07:08 17:35	06:00 18:29	17:09-17:39/30 18:29	05:46 20:27	05:46 21:20	04:50 21:46
24	08:07 16:34	07:06 17:37	05:58 18:31	17:08-17:38/30 18:31	05:44 20:29	05:44 21:21	04:49 21:46
25	08:05 16:36	07:04 17:39	05:55 18:33	17:08-17:38/30 18:33	05:41 20:31	05:41 21:23	04:48 21:45
26	08:04 16:38	07:01 17:41	05:53 18:35	17:08-17:37/29 18:35	05:39 20:33	05:39 21:24	04:47 21:45
27	08:02 16:40		06:50 19:37	18:08-18:36/28 19:37	05:37 20:35	05:37 21:26	04:46 21:45
28	08:01 16:42		06:48 19:39	18:09-18:36/27 19:39	05:35 20:37	05:35 21:27	04:44 21:45
29	07:59 16:44		06:45 19:40	18:10-18:34/24 19:40		06:43 21:28	05:22-05:46/24 21:45
Sonnenscheinstunden		248		367	421	496	512
Anzahl Minuten mit Schatten		0	7	1120	60	191	1103

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 Zeitpunkt (SS:MM)
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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 64
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September		Oktober	November	Dezember
1	04:38 05:15-05:54/39	05:19	06:14		07:08 17:25-18:18/53	07:07	08:03
	21:45	21:09	20:01		18:46	16:35	15:50
2	04:39 05:16-05:54/38	05:20	06:16		07:10 17:24-18:16/52	07:09	08:05
	21:44	21:07	19:59		18:44	16:33	15:49
3	04:40 05:16-05:26/10	05:22	06:18		07:12 17:23-18:12/49	07:11	08:06
	21:44 05:27-05:54/27	21:05	19:56		18:42	16:31	15:48
4	04:40 05:17-05:26/9	05:24	06:19		07:14 17:22-18:10/48	07:13	08:08
	21:43 05:28-05:54/26	21:03	19:54		18:39	16:29	15:48
5	04:41 05:19-05:25/6	05:26	06:21		07:15 17:22-18:07/45	07:15	08:09
	21:43 05:28-05:55/27	21:01	19:51		18:37	16:27	15:47
6	04:42 05:29-05:55/26	05:27	06:23		07:17 17:21-18:04/43	07:17	08:10
	21:42	20:59	19:49		18:34	16:25	15:46
7	04:43 05:29-05:55/26	05:29	06:25		07:19 17:21-18:01/40	07:19	08:12
	21:41	20:57	19:46		18:32	16:23	15:46
8	04:44 05:29-05:55/26	05:31	06:27	18:14-18:17/3	07:21 17:21-17:58/37	07:21	08:13
	21:41	20:55	19:44		18:29	16:21	15:45
9	04:45 05:29-05:55/26	05:33	06:28	18:08-18:21/13	07:23 17:22-17:46/24	07:23	08:14
	21:40	20:53	19:41		18:27	16:20	15:45
10	04:46 05:30-05:55/25	05:34	06:30	18:05-18:24/19	07:25 17:23-17:44/21	07:25	08:16
	21:39	20:51	19:39		18:24	16:18	15:45
11	04:48 05:30-05:55/25	05:36	06:32	18:03-18:25/22	07:27 17:23-17:43/20	07:27	08:17
	21:38	20:49	19:36		18:22	16:16	15:45
12	04:49 05:30-05:55/25	05:38	06:34	18:02-18:26/24	07:29 17:25-17:41/16	07:29	08:18
	21:37	20:47	19:34		18:20	16:14	15:44
13	04:50 05:31-05:55/24	05:40	06:35	18:00-18:26/26	07:30 17:27-17:39/12	07:31	08:19
	21:36	20:45	19:31		18:17	16:13	15:44
14	04:51 05:31-05:54/23	05:41	06:37	17:59-18:27/28	07:32	07:33	08:20
	21:35	20:43	19:29		18:15	16:11	15:44
15	04:53 05:32-05:55/23	05:43	06:39	17:58-18:27/29	07:34	07:35	08:21
	21:34	20:40	19:26		18:13	16:09	15:44
16	04:54 05:33-05:54/21	05:45	06:41	17:58-18:27/29	07:36	07:37	08:22
	21:33	20:38	19:24		18:10	16:08	15:44
17	04:55 05:33-05:53/20	05:47	06:43	17:56-18:26/30	07:38	07:38	08:23
	21:32	20:36	19:21		18:08	16:06	15:44
18	04:57 05:34-05:53/19	05:49	06:44	17:56-18:26/30	07:40	07:40	08:23
	21:30	20:34	19:19		18:06	16:05	15:45
19	04:58 05:35-05:52/17	05:50	06:46	17:56-18:26/30	07:42	07:42	08:24
	21:29	20:32	19:16		18:03	16:03	15:45
20	05:00 05:36-05:51/15	05:52	06:48	17:56-18:26/30	07:44	07:44	08:25
	21:28	20:29	19:14		18:01	16:02	15:45
21	05:01 05:38-05:49/11	05:54	06:50	17:55-18:24/29	07:46	07:46	08:25
	21:26	20:27	19:11		17:59	16:01	15:46
22	05:03 05:42-05:48/6	05:56	06:52	17:52-18:01/9 18:21-18:23/2	07:48	07:48	08:26
	21:25	20:25	19:09	17:56-18:21/25	17:56	15:59	15:46
23	05:04	05:58	06:53	17:46-18:22/36	07:50	07:50	08:27
	21:23	20:22	19:06	17:49-18:04/15	17:54	15:58	15:47
24	05:06	05:59	06:55	17:43-18:23/40	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	17:42-18:23/41	06:53	07:53	08:27
	21:20	20:18	19:01		16:50	15:56	15:48
26	05:09	06:03	06:59	17:39-18:23/44	06:55	07:55	08:28
	21:19	20:15	18:59		16:48	15:55	15:49
27	05:10	06:05	07:01	17:38-18:22/44	06:57	07:57	08:28
	21:17	20:13	18:56		16:45	15:53	15:49
28	05:12	06:07	07:03	17:31-18:22/51	06:59	07:58	08:28
	21:16	20:11	18:54		16:43	15:52	15:50
29	05:14	06:09	07:04	17:29-18:22/53	07:01	08:00	08:28
	21:14	20:08	18:51		16:41	15:52	15:51
30	05:15	06:10	07:06	17:27-18:20/53	07:03	08:01	08:28
	21:12	20:06	18:49		16:39	15:51	15:52
31	05:17	06:12			07:05		08:28
	21:10	20:03			16:37		15:53
	Sonnenscheinstunden	514	461	383	328	257	231
	Anzahl Minuten mit Schatten	540	0	735	460	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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:

151008_Miltzow_III-VII

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13/10/2015 13:57 / 65

Lizenzierter Anwender:

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DE-25840 Friedrichstadt

André Gefke / andre.gefke@i17-wind.de

Berechnet:

13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: Gesamtbelastung WEA: 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
346 330 400 570 528 528 741 991 1022 1,224 934 356 7,971

: 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 19:52-20:09/17	04:42 20:10-20:27/17	04:38 20:56-21:07/11	05:19 20:07-20:24/17	06:14 07:08	07:07 08:03
2	15:54	16:46	17:43	19:42	20:39	21:30 20:27-20:32/5	21:45	21:09 20:22-20:37/15	20:01 18:46	16:35 15:50
3	08:28	07:55	06:57	06:40	05:31 19:51-20:10/19	04:41 20:12-20:27/15	04:39 20:28-20:31/3	05:20 20:08-20:24/18	06:16 07:10	07:09 08:05
4	15:55	16:48	17:45	19:44	20:40	21:31 20:27-20:32/5	21:44 20:56-21:09/10	21:07 20:22-20:35/13	19:59 18:44	16:33 15:49
5	08:28	07:54	06:54	06:38	05:29 19:51-20:12/21	04:40 20:15-20:29/12	04:40 20:27-20:33/6	05:22 20:08-20:17/11	06:18 07:12	07:11 08:06
6	15:57	16:50	17:47	19:46	20:42 20:11-20:12/1	21:32 20:25-20:32/7	21:44 20:57-21:06/9	21:05 20:15-20:33/18	19:56 18:42	16:31 15:48
7	08:27	07:52	06:52	06:35	05:27 19:51-20:13/22	04:40 20:14-20:31/17	04:40 20:26-20:34/8	05:24 20:03-20:18/15	06:19 07:14	07:13 08:08
8	15:58	16:52	17:49	19:48	20:44 20:11-20:14/3	21:33	21:43 20:59-21:05/6	21:03 20:15-20:29/14	19:54 18:39	16:29 15:46
9	08:27	07:50	06:49	06:33	05:24 19:51-20:12/21	04:39 20:16-20:30/14	04:41 20:26-20:35/9	05:26 20:03-20:20/17	06:21 07:15	07:15 08:09
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61	08:27	07:46	06:45	06:28	05:21 19:52-20:10/18	04:37 20:19-20:29/10	04:43 20:24-20:37/13	05:29 20:01-20:21/20	06:25 07:19	07:19 08:12
62	15:58	16:54	17:51	19						

Projekt:
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13/10/2015 13:57 / 66

Lizenzierter Anwender:
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DE-25840 Friedrichstadt

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André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1022 1,224 934 356 7,971
: 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	
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20	08:15	07:19	06:13	05:57	04:58	04:34	21:05-21:08/3	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	21:05-21:08/3	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	21:05-21:08/3	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	21:06-21:09/3	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	15:47	
24	08:10	07:10	06:03	05:48	04:52	04:34	21:06-21:09/3	05:06	05:59	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	04:50	04:35	21:06-21:09/3	05:07	06:01	06:57	06:54	07:53	08:27
	16:32	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	21:07-21:09/2	05:09	06:03	06:59	06:55	07:55	08:28
	16:34	17:37	18:31	20:29	21:21	21:46	21:19	20:15	18:59	16:48	15:55	15:48	
27	08:05	07:04	05:55	05:41	04:48	04:36	21:07-21:09/2	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	21:08-21:09/1	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	21:07-21:08/1	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	15:52
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	37	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)	Schattende/Minuten mit Schatten
--------------	-----------------------	-------------------------	-------------------	----------------------------------	---------------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 67
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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	18:46	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	
	15:55	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	04:40	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	18:41	16:31	15:48	
4	08:27	07:52	06:52	06:35	05:26	04:40	04:40	05:24	06:19	07:14	07:13	08:08	
	15:56	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	21:43	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	08:10	
	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	06:45	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	05:19	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	21:41	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	08:24	07:40	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	07:38	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	15:44	
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	06:27	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	20:43	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	18:12	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	21:05	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	04:33	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	15:45	
19	08:16	07:22	06:15	05:59	04:58	04:33	04:58	05:50	06:46	07:42	07:42	08:24	
	16:21	17:23	18:18	20:16	21:10	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	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	15:46	
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	21:23	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	07:51	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	04:50	04:35	05:07	06:01	06:57	06:53	07:53	08:27	
	16:32	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	06:55	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	08:01	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	20:03		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	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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 68
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28 15:07-15:10/3	07:57 15:14-16:14/60	06:59	06:43 07:11-07:28/17	05:33	04:42
	15:54	16:46	17:43	19:42	20:39	21:29
2	08:28 15:05-15:12/7	07:55 15:15-16:16/61	06:56	06:40 07:07-07:28/21	05:31	04:41
	15:55	16:48	17:45	19:44	20:40	21:31
3	08:28 15:05-15:14/9	07:54 15:15-16:18/63	06:54	06:38 07:05-07:29/24	05:29	04:40
	15:57	16:50	17:47	19:46	20:42	21:32
4	08:27 15:05-15:16/11	07:52 15:17-16:20/63	06:52	06:35 07:03-07:29/26	05:27	04:40
	15:58	16:52	17:49	19:48	20:44	21:33
5	08:27 15:04-15:16/12	07:50 15:18-16:22/64	06:49	06:33 07:02-07:29/27	05:25	04:39
	15:59	16:54	17:51	19:50	20:46	21:34
6	08:27 15:03-15:17/14	07:48 15:18-16:25/67	06:47	06:31 07:01-07:28/27	05:23	04:38
	16:01	16:56	17:53	19:52	20:48	21:35
7	08:26 15:04-15:19/15	07:46 15:19-16:27/68	06:45	06:28 07:00-07:28/28	05:21	04:37
	16:02	16:59	17:55	19:54	20:50	21:36
8	08:26 15:03-15:20/17	07:44 15:20-15:39/19	06:42	06:26 06:54-07:28/34	05:19	04:37
	16:03	17:01 15:46-16:29/43	17:57	19:55	20:51	21:37
9	08:25 15:03-15:21/18	07:42 15:22-15:37/15	06:40	06:23 06:51-07:26/35	05:17	04:36
	16:05	17:03 15:52-16:32/40	17:59	19:57	20:53	21:38
10	08:24 15:02-15:21/19	07:40 15:25-15:34/9	06:37	06:21 06:49-07:26/37	05:15	04:36
	16:06	17:05 15:58-16:33/35	18:01	19:59	20:55	21:39
11	08:24 15:02-15:22/20	07:38 16:02-16:34/32	06:35	06:18 06:45-07:25/40	05:13	04:35
	16:08	17:07	18:02	20:01	20:57	21:40
12	08:23 15:02-15:23/21	07:36 16:04-16:34/30	06:32	06:16 06:42-07:23/41	05:11	04:35
	16:09	17:09	18:04	20:03 07:23-07:24/1	20:59	21:41
13	08:22 15:02-15:29/27	07:34 16:08-16:34/26	06:30	06:14 06:41-07:21/40	05:09	04:34
	16:11	17:11	18:06	20:05 07:21-07:24/3	21:00	21:41
14	08:21 15:02-15:31/29	07:32 16:10-16:33/23	06:27	06:11 06:40-07:23/43	05:07	04:34
	16:13	17:13	18:08	20:07	21:02	21:42
15	08:20 15:03-15:33/30	07:30 16:13-16:32/19	06:25	06:09 06:38-07:23/45	05:06	04:34
	16:14	17:15	18:10	20:09	21:04	21:43
16	08:19 15:03-15:35/32	07:28 16:17-16:32/15	06:23	06:06 06:38-07:23/45	05:04	04:34
	16:16	17:17	18:12	20:11	21:05	21:43
17	08:18 15:03-15:31/28	07:26 16:20-16:30/10	06:20	06:04 06:38-07:22/44	05:02	04:34
	16:18	17:19	18:14	20:12	21:07	21:44
18	08:17 15:03-15:39/36	07:24 16:22-16:27/5	06:18	06:02 06:37-07:21/44	05:01	04:34
	16:20	17:21	18:16	20:14	21:09	21:44
19	08:16 15:04-15:42/38	07:22	06:15	05:59 06:37-07:20/43	04:59	04:34
	16:21	17:23	18:18	20:16	21:10	21:44
20	08:15 15:03-15:43/40	07:19	06:13	05:57 06:37-07:18/41	04:58	04:34
	16:23	17:25	18:20	20:18	21:12	21:45
21	08:14 15:04-15:45/41	07:17	06:10	05:55 06:38-07:17/39	04:56	04:34
	16:25	17:27	18:22	20:20	21:14	21:45
22	08:12 15:05-15:51/46	07:15	06:08	05:53 06:38-07:00/22	04:55	04:34
	16:27	17:29	18:23	20:22 07:01-07:14/13	21:15	21:45
23	08:11 15:05-15:53/48	07:13	06:05	05:50 06:39-06:57/18	04:53	04:34
	16:29	17:31	18:25	20:24 07:05-07:09/4	21:17	21:45
24	08:10 15:06-15:56/50	07:10	06:03	05:48 06:40-06:53/13	04:52	04:34
	16:31	17:33	18:27	20:26	21:18	21:46
25	08:08 15:07-15:59/52	07:08	06:00	05:46 06:43-06:50/7	04:50	04:35
	16:33	17:35	18:29	20:27	21:20	21:46
26	08:07 15:07-16:01/54	07:06	05:58	05:44	04:49	04:35
	16:34	17:37	18:31	20:29	21:21	21:46
27	08:05 15:08-16:03/55	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 15:10-16:06/56	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 15:12-16:08/56		05:50	05:37	04:46	04:37
	16:40		19:37	20:35	21:26	21:45
30	08:00 15:14-16:10/56		06:48 07:16-07:24/8	05:35	04:44	04:37
	16:42		19:39	20:37	21:27	21:45
31	07:59 15:14-16:12/58		06:45 07:12-07:26/14		04:43	
	16:44		19:40		21:28	
Sonnenscheinstunden	248	272	367	421	496	512
Anzahl Minuten mit Schatten	1003	767	22	822	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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

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13/10/2015 13:57 / 69
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember			
1	04:38	05:19	06:14	06:44-07:24/40	07:08	07:07	14:54-15:05/11	08:03	14:44-15:04/20
	21:44	21:09	20:01		18:46		16:35	15:27-16:03/36	15:50
2	04:39	05:20	06:16	06:47-07:24/37	07:10	07:09	14:52-15:07/15	08:05	14:46-15:04/18
	21:44	21:07	19:59		18:44		16:33	15:21-16:01/40	15:49
3	04:40	05:22	06:18	06:49-07:24/35	07:12	07:11	14:50-15:09/19	08:06	14:47-15:05/18
	21:44	21:05	19:56		18:42		16:31	15:16-15:59/43	15:48
4	04:41	05:24	06:19	06:51-07:25/34	07:14	07:13	14:48-15:56/68	08:08	14:47-15:04/17
	21:43	21:03	19:54		18:39		16:29		15:48
5	04:41	05:26	06:21	06:57-07:25/28	07:15	07:15	14:48-15:55/67	08:09	14:49-15:04/15
	21:43	21:01	19:51		18:37		16:27		15:47
6	04:42	05:27	06:23	06:57-07:24/27	07:17	07:17	14:47-15:53/66	08:10	14:49-15:03/14
	21:42	20:59	19:49		18:34		16:25		15:46
7	04:43	05:29	06:25	06:57-07:24/27	07:19	07:19	14:46-15:51/65	08:12	14:51-15:04/13
	21:41	20:57	19:46		18:32		16:23		15:46
8	04:44	05:31	06:26	06:58-07:24/26	07:21	07:21	14:46-15:49/63	08:13	14:52-15:03/11
	21:41	20:55	19:44		18:29		16:21		15:45
9	04:45	05:33	06:28	06:58-07:22/24	07:23	07:23	14:45-15:46/61	08:14	14:54-15:03/9
	21:40	20:53	19:41		18:27		16:20		15:45
10	04:46	05:34	06:30	07:00-07:21/21	07:25	07:25	14:45-15:44/59	08:16	14:55-15:02/7
	21:39	20:51	19:39		18:24		16:18		15:45
11	04:48	05:36	06:32	07:02-07:20/18	07:27	07:27	14:46-15:43/57	08:17	14:57-15:01/4
	21:38	20:49	19:36		18:22		16:16		15:45
12	04:49	05:38	06:34	07:04-07:18/14	07:28	07:29	14:46-15:41/55	08:18	
	21:37	20:47	19:34		18:20		16:14		15:44
13	04:50	05:40	06:35	07:06-07:14/8	07:30	07:31	14:44-15:39/55	08:19	
	21:36	20:45	19:31		18:17		16:13		15:44
14	04:51	05:41	06:37		07:32	07:33	14:42-15:37/55	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	14:41-15:36/55	08:21	
	21:34	20:40	19:26		18:13		16:09		15:44
16	04:54	05:45	06:41		07:36	07:37	14:40-15:34/54	08:22	
	21:33	20:38	19:24		18:10		16:08		15:44
17	04:55	05:47	06:43		07:38	07:38	14:40-15:32/52	08:23	
	21:32	20:36	19:21		18:08		16:06		15:44
18	04:57	05:49	06:49-06:57/8	06:44	07:40	07:40	14:40-15:30/50	08:23	
	21:30	20:34	19:19		18:06		16:05		15:45
19	04:58	05:50	06:46-06:59/13	06:46	07:42	07:42	14:39-15:27/48	08:24	
	21:29	20:32	19:16		18:03		16:03		15:45
20	05:00	05:52	06:44-07:04/20	06:48	07:44	07:44	14:39-15:26/47	08:25	
	21:28	20:29	07:10-07:16/6	19:14	18:01	16:02		15:45	
21	05:01	05:54	06:43-07:20/37	06:50	07:46	07:46	14:40-15:20/40	08:25	
	21:26	20:27	19:11		17:59	16:01		15:46	
22	05:03	05:56	06:42-07:22/40	06:52	07:48	07:48	14:40-15:20/40	08:26	
	21:25	20:25	19:09		17:56	15:59		15:46	
23	05:04	05:58	06:41-07:22/41	06:53	07:50	07:49	14:41-15:18/37	08:27	
	21:23	20:22	19:06		17:54	15:58		15:47	
24	05:06	05:59	06:41-07:24/43	06:55	07:51	16:51-16:58/7	07:51	14:40-15:17/37	08:27
	21:22	20:20	19:04		17:52	15:57	14:55-15:09/14	15:47	
25	05:07	06:01	06:41-07:25/44	06:57	06:53	15:49-16:00/11	07:53	14:41-15:08/27	08:27
	21:20	20:18	19:01		16:50	15:56	15:08-15:13/5	15:48	
26	05:09	06:03	06:40-07:24/44	06:59	06:55	15:45-16:01/16	07:55	14:41-15:05/24	08:28
	21:19	20:15	18:59		16:48	15:55	15:05-15:13/8	15:49	
27	05:10	06:05	06:40-07:25/45	07:01	06:57	15:42-16:02/20	07:56	14:42-15:12/30	08:28
	21:17	20:13	18:56		16:45	15:54		15:49	
28	05:12	06:07	06:40-07:25/45	07:03	06:59	15:39-16:02/23	07:58	14:43-15:11/28	08:28
	21:16	20:11	18:54		16:43	15:52		15:50	
29	05:14	06:09	06:41-07:24/43	07:04	07:01	15:36-16:04/28	08:00	14:43-15:10/27	08:28
	21:14	20:08	18:51		16:41	15:52		15:51	
30	05:15	06:10	06:41-07:21/40	07:06	07:03	15:33-16:03/30	08:01	14:44-15:05/21	08:28
	21:12	20:06	07:21-07:24/3	18:49	16:39	15:51		15:52	
31	05:17	06:12	06:42-07:23/41		07:05	15:32-16:03/31		08:28	
	21:10	20:03	07:23-07:24/1		16:37			15:53	
	Sonnenscheinstunden	514	461	383	328	257	231		
	Anzahl Minuten mit Schatten	0	514	339	166	1465	146		

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

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:

151008_Miltzow_III-VII

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13/10/2015 13:57 / 70

Lizenzierter Anwender:

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

André Gefke / andre.gefke@i17-wind.de

Berechnet:

13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 22 - M18

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [HEILIGENDAMM]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
346	330	400	570	528	528	741	991	1.022	1.224	934	356	7.971

: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:28	09:03-09:39/36	07:57	06:59	06:43	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03	08:46-09:16/30
	15:54		16:46	17:43	19:42	20:39	21:29	21:44	21:08	20:01	18:46	16:35	15:50	09:16-09:18/2
2	08:29	09:03-09:40/37	07:55	06:56	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:05	08:46-09:18/32
	15:56		16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59	18:44	16:33	15:49	09:18-09:19/1
3	08:28	09:02-09:39/37	07:54	06:54	06:38	05:29	04:41	04:40	05:22	06:18	07:12	07:11	08:06	08:47-09:20/33
	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	09:02-09:40/38	07:52	06:52	06:35	05:27	04:40	04:41	05:24	06:19	07:14	07:13	08:08	08:47-09:22/35
	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	09:02-09:39/37	07:50	06:49	06:33	05:25	04:39	04:41	05:26	06:21	07:15	07:15	08:09	08:48-09:24/36
	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	09:02-09:39/37	07:48	06:47	06:31	05:23	04:38	04:42	05:27	06:23	07:17	07:17	08:10	08:48-09:25/37
	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	09:03-09:39/36	07:46	06:45	06:28	05:21	04:37	04:43	05:29	06:25	07:19	07:19	08:12	08:49-09:26/37
	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	08:25	09:03-09:38/35	07:44	06:42	06:26	05:19	04:37	04:44	05:31	06:27	07:21	07:21	08:13	08:49-09:27/38
	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	09:03-09:36/33	07:42	06:40	06:23	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14	08:51-09:28/37
	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	09:03-09:35/32	07:40	06:37	06:21	05:15	04:36	04:47	05:34	06:30	07:25	07:25	08:16	08:52-09:29/37
	16:06	09:35-09:36/1	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	09:04-09:34/30	07:38	06:35	06:18	05:13	04:35	04:48	05:36	06:32	07:27	07:27	08:17	08:53-09:29/36
	16:08	09:34-09:36/2	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	09:04-09:34/30	07:36	06:32	06:16	05:11	04:35	04:49	05:38	06:34	07:28	07:29	08:18	08:54-09:30/36
	16:09	09:34-09:35/1	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	09:04-09:33/29	07:34	06:30	06:14	05:09	04:35	04:50	05:40	06:35	07:30	07:31	08:19	08:55-09:30/35
	16:11	09:33-09:35/2	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	09:05-09:35/30	07:32	06:28	06:11	05:08	04:34	04:51	05:42	06:37	07:32	07:33	08:20	08:56-09:31/35
	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	09:06-09:34/28	07:30	06:25	06:09	05:06	04:34	04:53	05:43	06:39	07:34	07:35	08:21	08:57-09:32/35
	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	09:06-09:25/19	07:28	06:23	06:07	05:04	04:34	04:54	05:45	06:41	07:36	07:36	08:22	08:58-09:32/34
	16:16	09:26-09:33/7	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	09:07-09:25/18	07:26	06:20	06:04	05:02	04:34	04:55	05:47	06:43	07:38	07:38	08:23	08:59-09:33/34
	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	09:08-09:25/17	07:24	06:18	06:02	05:01	04:34	04:57	05:49	06:44	07:40	07:40	08:23	09:00-09:34/34
	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	09:09-09:25/16	07:22	06:15	05:59	04:59	04:34	04:58	05:51	06:46	07:42	07:42	08:24	09:01-09:34/33
	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	09:10-09:25/15	07:19	06:13	05:57	04:58	04:34	05:00	05:52	06:48	07:44	07:44	08:25	09:01-09:34/33
	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	09:11-09:23/12	07:17	06:10	05:55	04:56	04:34	05:01	05:54	06:50	07:46	07:46	08:25	09:02-09:35/33
	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	09:13-09:23/10	07:15	06:08	05:53	04:55	04:34	05:03	05:56	06:52	07:48	07:48	08:26	09:02-09:35/33
	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	09:16-09:20/4	07:13	06:05	05:50	04:53	04:34	05:04	05:58	06:53	07:50	07:49	08:26	09:03-09:36/33
	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	07:51	07:51	08:27	09:03-09:36/33
	16:31		17:33	18:27	20:26	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	06:53	07:53	08:27	09:03-09:37/34
	16:33		17:35	18:29	20:27	21:20	21:46	21:20	20:18	19:01	18:50	15:56	15:48	
26	08:07		07:06	05:58	05:44	04:49	04:35	05:09	06:03	06:59	06:55	07:55	08:28	09:03-09:37/34
	16:35		17:37	18:31	20:29	21:21	21:45	21:19	20:15	18:59	18:48	15:55	09:05-09:11/6	15:49
27	08:05		07:03	05:55	05:41	04:48	04:36	05:10	06:05	07:01	06:57	07:56	08:28	09:04-09:38/34
	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	06:59	07:58	08:28	09:04-09:38/34
	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			06:50	05:37	04:46	04:37	05:14	06:09	07:04	07:01	08:00	08:45-09:14/29	15:50
	16:40			19:37	20:35	21:25	21:45	21:14	20:08	18:51	16:41	15:52	09:14-09:16/2	15:51
30	08:00			06:48	05:35	04:45	04:38	05:15	06:10	07:06	07:03	08:01	08:46-09:16/30	15:51
	16:42			19:39	20:37	21:27	21:45	21:12	20:06	18:49	16:39	15:51	09:16-09:17/1	15:52
31	07:59			06:45		04:43		05:17	06:12		07:05		08:26	09:03-09:39/36
	16:44			19:40		21:28		21:10	20:03		16:37		15:53	
	Sonnenscheinstunden												248	
	Anzahl Minuten mit Schatten												629	

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:
151008_Miltzow_III-VII

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13/10/2015 13:57 / 71

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

-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
; 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	18:46	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	
	15:55	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	06:18	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	06:35	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	15:48	
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	21:43	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	05:19	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	15:45	
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	19:58	20:54	21:40	21:38	20:49	19:36	18:22	16:16	15:44	
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	16:09	17:09	18:04	19:59	20:55	21:41	21:37	20:47	19:34	18:20	16:14	15:44	
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	16:11	17:11	18:06	19:59	20:55	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	19:59	20:55	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	19:59	20:55	21:43	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	07:37	08:22	
	16:16	17:17	18:12	19:59	20:55	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	07:39	08:23	
	16:18	17:19	18:14	19:59	20:55	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	19:59	20:55	21:44	21:30	20:34	19:19	18:06	16:05	15:45	
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	16:21	17:23	18:18	19:59	20:55	21:44	21:45	21:29	20:32	19:16	18:03	16:03	
20	08:15	07:19	06:13	05:57	04:58	04:34	04:59	05:52	06:48	07:44	07:44	08:25	
	16:23	17:25	18:20	19:59	20:55	21:44	21:45	21:28	20:29	19:14	18:01	16:02	
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	19:59	20:55	21:44	21:45	21:26	20:27	19:11	17:59	16:01	
22	08:12	07:15	06:08	05:53	04:55	04:34	05:02	05:56	06:52	07:48	07:48	08:26	
	16:27	17:29	18:23	19:59	20:55	21:44	21:45	21:25	20:25	19:09	17:56	16:00	
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	19:59	20:55	21:44	21:46	21:24	20:22	19:06	17:54	16:00	
24	08:10	07:10	06:03	05:48	04:52	04:34	05:06	05:59	06:55	07:52	07:51	08:27	
	16:31	17:33	18:27	19:59	20:55	21:44	21:46	21:22	20:20	19:04	17:52	16:00	
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	19:59	20:55	21:44	21:46	21:20	20:18	19:01	17:50	16:00	
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	19:59	20:55	21:44	21:46	21:19	20:15	18:59	17:48	16:00	
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	19:59	20:55	21:44	21:46	21:17	20:13	18:56	17:45	16:00	
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	19:59	20:55	21:44	21:45	21:16	20:11	18:54	17:43	16:00	
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		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	513	515	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)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt: 151008_Miltzow_III-VII	Ausdruck/Seite: 13/10/2015 13:57 / 72 Lizenzierter Anwender: I17-Wind GmbH & Co. KG Am Westersielzug 11 DE-25840 Friedrichstadt André Gefke / andre.gefke@i17-wind.de Berechnet: 13/10/2015 13:41/2.9.285
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SHADOW - Kalender pro WEA
Berechnung: GesamtbelastungWEA: 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
 346 330 400 570 528 528 741 991 1022 1,224 934 356 7,971
 : Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:28	07:57	06:59	06:43	18:52-19:08/16	05:33	04:42	04:38	05:19	06:14	07:08	07:07	08:03	
	15:54	16:46	17:43	19:42	19:42	20:39	21:30	21:45	21:09	21:09	18:47	16:35	15:50	
2	08:23	07:55	06:57	06:40	18:52-19:06/14	05:31	04:41	04:38	05:20	06:16	07:10	07:09	08:05	
	15:56	16:48	17:45	19:44	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	18:54-19:05/11	05:29	04:41	04:40	05:22	06:18	07:12	07:11	08:06	
	15:57	16:50	17:47	19:46	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	18:57-19:00/3	05:27	04:40	04:41	05:24	06:19	07:14	07:13	08:08	
	15:58	16:52	17:49	19:48	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	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	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	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	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	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	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	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	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	06:23	05:17	04:36	04:45	05:33	06:28	18:48-18:58/10	07:23	07:23	08:14
	16:05	17:03	17:59	19:57	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	06:21	05:15	04:36	04:47	05:34	06:30	18:46-18:59/13	07:25	07:25	08:16
	16:06	17:05	18:01	19:59	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	06:18	05:13	04:35	04:48	05:36	06:32	18:45-19:00/15	07:27	07:27	08:17
	16:08	17:07	18:03	20:01	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	06:16	05:11	04:35	04:49	05:38	06:34	18:44-19:01/17	07:29	07:29	08:18
	16:09	17:09	18:04	20:03	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	06:14	05:09	04:34	04:50	05:40	06:36	18:42-19:00/18	07:30	07:31	08:19
	16:11	17:11	18:06	20:05	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	06:11	05:08	04:34	04:51	05:42	06:37	18:42-19:00/18	07:32	07:33	08:20
	16:13	17:13	18:08	20:07	20:07	21:02	21:42	21:36	20:43	19:29	18:15	16:11	15:44	
15	08:20	07:30	06:25	06:09	06:09	05:06	04:34	04:53	05:43	06:39	18:42-18:58/16	07:34	07:35	08:21
	16:14	17:15	18:10	20:09	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	17:40-17:45/5	06:07	05:04	04:34	04:54	05:45	06:41	18:35-18:45/10	07:36	07:37	08:22
	16:16	17:17	18:12	20:11	20:11	21:06	21:43	21:33	20:38	19:24	18:45-18:56/11	18:10	16:08	15:44
17	08:18	07:26	06:20	17:39-17:47/8	06:04	05:02	04:34	04:55	05:47	06:43	18:31-18:46/15	07:38	07:38	08:23
	16:18	17:19	18:14	20:12	20:12	21:07	21:44	21:32	20:36	19:22	18:46-18:53/7	18:08	16:06	15:44
18	08:17	07:24	06:18	17:37-17:49/12	06:02	05:01	04:34	04:57	05:49	06:45	18:29-18:43/14	07:40	07:40	08:24
	16:20	17:21	18:16	20:14	20:14	21:09	21:44	21:30	20:34	19:19	18:42-18:50/8	18:06	16:05	15:45
19	08:16	07:22	06:15	17:37-17:51/14	05:59	04:59	04:34	04:58	05:51	06:46	18:26-18:44/18	07:42	07:42	08:24
	16:21	17:23	18:18	20:16	20:16	21:11	21:45	21:29	20:32	19:16	18:43-18:48/5	18:03	16:03	15:45
20	08:15	07:19	06:13	17:36-17:53/17	05:57	04:58	04:34	05:00	05:52	06:48	18:24-18:45/21	07:44	07:44	08:25
	16:23	17:25	18:20	20:18	20:18	21:12	21:45	21:28	20:29	19:14	18:44-18:49/2	18:01	16:02	15:45
21	08:14	07:17	06:10	17:37-17:55/18	05:55	04:56	04:34	05:01	05:54	06:50	18:22-18:42/20	07:46	07:46	08:26
	16:25	17:27	18:22	20:20	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	17:36-17:56/20	05:53	04:55	04:34	05:03	05:56	06:52	18:21-18:40/19	07:48	07:48	08:26
	16:27	17:29	18:24	20:22	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	17:37-17:58/21	05:50	04:53	04:34	05:04	05:58	06:54	18:21-18:38/17	07:50	07:50	08:27
	16:29	17:31	18:25	17:58-17:59/1	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	17:38-17:57/19	05:48	04:52	04:35	05:06	06:00	06:55	18:21-18:35/14	07:52	07:51	08:27
	16:31	17:33	18:27	17:56-18:00/4	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	17:41-17:56/15	05:46	04:51	04:35	05:07	06:01	06:57	18:21-18:33/12	06:54	07:53	08:27
	16:33	17:35	18:29	17:55-18:02/7	20:27	21:20	21:46	21:20	20:18	19:01	18:50	15:56	15:48	
26	08:07	07:06	05:58	17:42-17:51/9	05:44	04:49	04:35	05:09	06:03	06:59	18:21-18:30/9	06:55	07:55	08:28
	16:35	17:37	18:31	17:50-18:04/14	20:29	21:21	21:46	21:19	20:15	18:59	18:48	15:55	15:49	
27	08:05	07:04	05:55	17:45-17:56/11	05:41	04:48	04:36	05:10	06:05	07:01	18:22-18:27/5	06:57	07:57	08:28
	16:36	17:39	18:33	17:56-18:06/10	20:31	21:23	21:46	21:17	20:13	18:56	18:45	15:54	15:49	
28	08:04	07:01	05:53	17:52-18:07/15	05:39	04:47	04:36	05:12	06:07	07:03	18:23-18:25/2	06:59	07:58	08:28
	16:38	17:41	18:35	20:33	20:33	21:24	21:45	21:16	20:11	18:54	18:43	15:53	15:50	
29	08:02		06:50	18:52-19:10/18	05:37	04:46	04:37	05:14	06:09	07:04	07:01	08:00	08:28	
	16:40		19:37	20:35	20:35	21:26	21:45	21:14	20:08	18:51	18:41	15:52	15:51	
30	08:01		06:48	18:52-19:10/18	05:35	04:44	04:37	05:15	06:10	07:06	07:03	08:02	08:28	
	16:42		19:39	20:37	20:37	21:27	21:45	21:12	20:06	18:49	18:39	15:51	15:52	
31	07:59		06:45	18:51-19:09/18		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	313	328	257	231	
Anzahl Minuten mit Schatten	0	0	272	44	0	0	0	0	0	313	328	0	231	

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

WindPRO, entwickelt von EMD International A/S, Niels Jernevej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 73

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

André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28 14:54-15:16/22 15:54	07:57 08:38-08:56/18 16:46 09:01-09:43/42	06:59 07:52-08:40/48 17:43 08:40-08:47/77	06:43 19:42	05:33 20:39	04:42 21:29
2	08:28 14:54-15:17/23 15:56	07:55 08:36-08:58/22 16:48 09:00-09:44/44	06:56 07:51-08:45/54 17:45	06:40 19:44	05:31 20:40	04:41 21:31
3	08:28 14:55-15:19/24 15:57	07:54 08:36-09:02/26 16:50 09:02-09:45/43	06:54 07:52-08:44/52 17:47	06:38 19:46	05:29 20:42	04:41 21:32
4	08:27 14:56-15:20/24 15:58	07:52 08:35-09:03/28 16:52 09:03-09:46/43	06:52 07:51-08:42/51 17:49	06:35 19:48	05:27 20:44	04:40 21:33
5	08:27 14:56-15:21/25 15:59	07:50 08:31-08:04/33 16:54 09:04-08:46/42	06:49 07:52-08:40/48 17:51	06:33 19:50	05:25 20:46	04:39 21:34
6	08:27 14:56-15:22/26 16:01	07:48 08:28-09:05/37 16:57 09:05-09:46/41	06:47 07:52-08:37/45 17:53	06:31 19:52	05:23 20:48	04:38 21:35
7	08:26 14:57-15:25/28 16:02	07:46 08:26-09:06/40 16:59 09:06-09:47/41	06:45 07:53-08:33/40 17:55	06:28 19:54	05:21 20:50	04:37 21:36
8	08:26 14:57-15:26/29 16:03	07:44 08:24-09:06/42 17:01 09:06-09:46/40	06:42 07:53-08:24/31 17:57	06:26 19:55	05:19 20:51	04:37 21:37
9	08:25 14:58-15:27/29 16:05	07:42 08:23-09:07/44 17:03 09:07-09:46/39	06:40 07:54-08:23/29 17:59	06:23 19:57	05:17 20:53	04:36 21:38
10	08:24 14:58-15:29/31 16:06	07:40 08:22-09:07/45 17:05 09:07-09:46/39	06:37 07:56-08:22/26 18:01	06:21 19:59	05:15 20:55	04:36 21:39
11	08:24 14:59-15:31/32 16:08	07:38 08:21-09:08/47 17:07 09:08-09:46/38	06:35 07:57-08:19/22 18:02	06:18 20:01	05:13 20:57	04:35 21:40
12	08:23 15:00-15:32/32 16:09	07:36 08:19-08:04/49 17:09 09:08-08:46/38	06:32 08:00-08:16/16 18:04	06:16 20:03	05:11 20:59	04:35 21:41
13	08:22 15:01-15:34/33 16:11	07:34 08:18-09:08/50 17:11 09:08-09:45/37	06:30 08:03-08:11/8 18:06	06:14 20:05	05:09 21:00	04:34 21:41
14	08:21 15:02-15:36/34 16:13	07:32 08:17-09:08/51 17:13 09:08-09:45/37	06:28 18:08	06:11 20:07	05:08 21:02	04:34 21:42
15	08:20 15:04-15:38/34 16:14	07:30 08:15-09:07/52 17:15 09:07-09:44/37	06:25 18:10	06:09 20:09	05:06 21:04	04:34 21:43
16	08:19 15:05-15:40/35 16:16	07:28 08:14-09:07/53 17:17 09:07-09:43/36	06:23 18:12	06:07 20:11	05:04 21:05	04:34 21:43
17	08:18 15:06-15:43/37 16:18	07:26 08:08-09:07/59 17:19 09:07-09:42/35	06:20 18:14	06:04 20:12	05:02 21:07	04:34 21:44
18	08:17 15:06-15:44/38 16:20	07:24 08:04-09:07/63 17:21 09:07-09:41/34	06:18 18:16	06:02 20:14	05:01 21:09	04:34 21:44
19	08:16 09:14-09:25/11 16:21	07:22 08:01-09:04/63 15:07-15:46/39	06:15 18:18	05:59 20:16	04:59 21:10	04:34 21:44
20	08:15 09:12-09:28/16 16:23	07:19 09:08-09:04/65 15:08-15:48/40	06:13 18:20	05:57 20:18	04:59 21:12	04:34 21:45
21	08:14 09:10-09:30/20 16:25	07:17 07:58-09:03/65 09:10-09:36/26	06:10 18:22	05:55 20:20	04:56 21:14	04:34 21:45
22	08:12 09:09-09:33/24 16:27	07:15 07:56-09:01/65 09:12-09:33/21	06:08 18:23	05:53 20:22	04:55 21:15	04:34 21:45
23	08:11 09:07-09:34/27 15:23-15:54/31 16:29	07:13 07:55-08:59/64 09:15-09:35/29	06:05 18:25	05:50 20:24	04:53 21:17	04:34 21:45
24	08:10 09:06-09:35/29 16:31	07:10 07:55-08:57/62 17:33	06:03 18:27	05:48 20:26	04:52 21:18	04:35 21:46
25	08:08 09:05-09:37/32 16:33	07:08 07:53-08:53/60 15:33-15:54/21	06:00 18:29	05:46 20:27	04:51 21:20	04:35 21:46
26	08:07 09:04-09:38/34 16:35	07:06 07:53-08:49/56 15:35-15:53/18	05:58 18:31	05:44 20:29	04:49 21:21	04:35 21:46
27	08:05 09:03-09:39/36 16:36	07:04 07:52-08:47/55 15:39-15:52/13	05:55 18:33	05:41 20:31	04:48 21:23	04:36 21:45
28	08:04 09:03-09:41/38 16:38	07:01 07:52-08:45/53 15:42-15:52/10	05:53 18:35	05:39 20:33	04:47 21:24	04:36 21:45
29	08:02 09:03-09:41/38 16:40	07:00 07:52-08:45/53 15:44-15:50/6	05:50 18:37	05:37 20:35	04:46 21:26	04:37 21:45
30	08:00 08:45-08:49/4 16:42	07:00 09:02-09:42/40 08:45-08:49/4	06:48 19:39	05:35 20:37	04:44 21:27	04:38 21:45
31	07:59 08:41-08:54/13 16:44	07:00 09:01-09:43/42 15:59-08:41-08:54/13	06:45 19:40	05:34 20:37	04:43 21:28	04:38 21:45
Sonnenscheinstunden 248						
Anzahl Minuten mit Schatten 1228 2201 367 477 421 0 512 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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
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Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	07:08	08:40-08:54/14	07:07 07:52-08:37/45
	21:44	21:09	20:01	18:46		16:35 08:37-09:15/38
2	04:39	05:20	06:16	07:10	08:37-08:57/20	07:09 07:53-08:36/43
	21:44	21:07	19:59	18:44		16:33 08:36-09:15/39
3	04:40	05:22	06:18	07:12	08:34-08:58/24	07:11 07:54-08:35/41
	21:44	21:05	19:56	18:42		16:31 08:35-09:15/40
4	04:41	05:24	06:19	07:14	08:32-08:59/27	07:13 07:56-08:36/40
	21:43	21:03	19:54	18:39		16:29 08:36-09:16/40
5	04:41	05:26	06:21	07:15	08:30-09:01/31	07:15 07:58-08:35/37
	21:43	21:01	19:51	18:37		16:27 08:35-09:16/41
6	04:42	05:27	06:23	07:17	08:29-09:01/32	07:17 08:01-08:34/33
	21:42	20:59	19:49	18:34		16:25 08:34-09:16/42
7	04:43	05:29	06:25	07:19	08:28-09:11/43	07:19 08:05-08:33/28
	21:41	20:57	19:46	18:32		16:23 08:33-09:15/42
8	04:44	05:31	06:27	07:21	08:27-09:14/47	07:21 08:06-08:30/24
	21:41	20:55	19:44	18:29		16:21 08:31-09:15/44
9	04:45	05:33	06:28	07:23	08:27-09:16/49	07:23 08:07-08:29/22
	21:40	20:53	19:41	18:27		16:20 08:31-09:15/44
10	04:47	05:34	06:30	07:25	08:26-09:18/52	07:25 08:09-08:27/18
	21:39	20:51	19:39	18:24		16:18 08:32-09:14/42
11	04:48	05:36	06:32	07:27	08:26-09:19/53	07:27 08:13-08:25/12
	21:38	20:49	19:36	18:22		16:16 08:33-09:15/42
12	04:49	05:38	06:34	07:29	08:25-09:20/55	07:29 08:18-08:20/2
	21:37	20:47	19:34	18:20		16:14 08:34-09:14/40
13	04:50	05:40	06:35	07:30	08:25-09:16/51	07:31 08:34-09:13/39
	21:36	20:45	19:31	18:17	09:16-09:21/5	16:13 15:16-15:22/6
14	04:51	05:42	06:37	07:32	08:25-09:19/54	07:33 08:35-09:13/38
	21:35	20:43	19:29	18:15	09:19-09:21/2	16:11 15:14-15:24/10
15	04:53	05:43	06:39	07:34	08:25-09:21/56	07:35 08:36-09:12/36
	21:34	20:40	19:26	18:13		16:09 15:11-15:25/14
16	04:54	05:45	06:41	07:36	08:25-09:22/57	07:37 08:37-09:11/34
	21:33	20:38	19:24	18:10		16:08 15:08-15:26/18
17	04:55	05:47	06:43	07:38	08:26-09:27/61	07:38 08:38-09:10/32
	21:32	20:36	19:21	18:08		16:06 15:05-15:27/22
18	04:57	05:49	06:44	07:40	08:26-09:29/63	07:40 08:40-09:09/29
	21:30	20:34	19:19	18:06	09:52-09:55/3	16:05 15:02-15:27/25
19	04:58	05:51	06:46	07:42	08:27-09:31/64	07:42 08:41-09:08/27 14:57-15:28/31
	21:29	20:32	19:16	18:03	09:45-10:02/17	16:03 14:48-14:53/5
20	05:00	05:52	06:48	07:44	08:28-09:32/64	07:44 08:44-09:08/24
	21:28	20:29	19:14	18:01	09:42-10:05/23	16:02 14:46-15:27/41
21	05:01	05:54	06:50	07:46	08:29-09:33/64	07:46 08:46-09:06/20
	21:26	20:27	19:11	17:59	09:40-10:07/27	16:01 14:46-15:25/39
22	05:03	05:56	06:52	07:48	08:30-09:34/64	07:48 08:48-09:04/16
	21:25	20:25	19:09	17:56	09:38-10:09/31	15:59 14:45-15:24/39
23	05:04	05:58	06:53	07:50	08:32-09:35/63	07:49 08:51-09:02/11
	21:23	20:22	19:06	17:54	09:36-10:10/34	15:58 14:43-15:22/39
24	05:06	06:00	06:55	07:52	08:34-09:36/62	07:51 14:43-15:21/38
	21:22	20:20	19:04	17:52	09:36-10:11/35	15:57
25	05:07	06:01	06:57	06:53	07:40-08:37/57	07:53 14:43-15:20/37
	21:20	20:18	19:01	16:50	08:37-09:12/35	15:56
26	05:09	06:03	06:59	06:55	07:44-08:37/53	07:55 14:43-15:18/35
	21:19	20:15	18:59	16:48	08:37-09:13/36	15:55
27	05:10	06:05	07:01	06:57	07:44-08:37/53	07:56 14:43-15:17/34
	21:17	20:13	18:56	16:45	08:37-09:13/36	15:54
28	05:12	06:07	07:03	06:59	07:46-08:38/52	07:58 14:43-15:16/33
	21:16	20:11	18:54	16:43	08:38-09:15/37	15:53
29	05:14	06:09	07:04	07:01	07:47-08:38/51	08:00 14:42-15:15/33
	21:14	20:08	18:51	16:41	08:38-09:15/37	15:52
30	05:15	06:10	07:06	07:03	07:49-08:37/48	08:01 14:42-15:15/33
	21:12	20:06	18:49	16:39	08:37-09:15/38	15:51
31	05:17	06:12		07:05	07:51-08:37/46	
	21:10	20:03		16:37	08:37-09:15/38	
Sonnenscheinstunden	514	461	383	328	258	231
Anzahl Minuten mit Schatten	0	0	0	1964	1677	679

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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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

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13/10/2015 13:57 / 75

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28 11:40-12:19/39 13:22-15:04/102	07:57 06:59		06:43 07:07-07:24/17	05:33 04:42		
	15:54 12:55-13:07/12	16:46 17:43		19:42 20:39	20:39 21:29		
2	08:28 11:40-12:19/39 13:23-15:04/101	07:55 06:56		06:40 07:04-07:23/19	05:31 04:41		
	15:55 12:56-13:05/9	16:48 17:45		19:44 20:40	20:40 21:31		
3	08:28 11:42-12:19/37 13:25-15:05/100	07:54 06:54		06:38 07:02-07:20/18	05:29 04:40		
	15:57 13:01-13:03/2	16:50 17:47		19:46 07:20-07:23/3	20:42 21:32		
4	08:27 11:43-12:19/36 13:38-15:06/88	07:52 06:52		06:35 06:59-07:21/22	05:26 04:40		
	15:58 13:27-13:37/10	16:52 17:49		19:48 20:44	20:44 21:33		
5	08:27 11:43-12:19/36 13:39-15:06/87	07:50 06:49		06:33 06:57-07:20/23	05:24 04:39		
	15:59 13:30-13:34/4	16:54 17:51		19:50 20:46	20:46 21:34		
6	08:27 11:44-12:18/34	07:48 06:47		06:31 06:54-07:17/23	05:22 04:38		
	16:00 13:41-15:06/85	16:56 17:53		19:52 20:48	20:48 21:35		
7	08:26 11:46-12:19/33	07:46 06:45		06:28 06:52-07:10/18	05:20 04:37		
	16:02 13:43-15:07/84	16:58 17:55		19:54 20:50	20:50 21:36		
8	08:26 11:47-12:18/31 13:57-15:07/70	07:44 06:42		06:26 06:52-07:08/16	05:19 04:37		
	16:03 13:46-13:56/10	17:01 17:57		19:55 20:51	20:51 21:37		
9	08:25 11:48-12:18/30	07:42 06:40		06:23 06:52-07:04/12	05:17 04:36		
	16:05 13:58-15:07/69	17:03 17:59		19:57 20:53	20:53 21:38		
10	08:24 11:49-12:17/28	07:40 06:37		06:21 06:55-07:02/7	05:15 04:36		
	16:06 14:00-15:08/68	17:05 18:00		19:59 20:55	20:55 21:39		
11	08:24 11:50-12:16/26	07:38 06:35		06:18 06:51	05:13 04:35		
	16:08 14:02-15:08/66	17:07 18:02		20:01 20:57	20:57 21:40		
12	08:23 11:52-12:15/23	07:36 06:32		06:16 06:49	05:11 04:35		
	16:09 14:09-15:08/59	17:09 18:04		20:03 20:58	20:58 21:41		
13	08:22 11:54-12:14/20	07:34 06:30		06:14 06:47	05:09 04:34		
	16:11 14:10-15:08/58	17:11 18:06		20:05 21:00	21:00 21:41		
14	08:21 11:57-12:12/15	07:32 06:27		06:11 06:44	05:07 04:34		
	16:13 14:12-15:09/57	17:13 18:08		20:07 21:02	21:02 21:42		
15	08:20 12:01-12:09/8	07:30 06:25		06:09 06:42	05:06 04:34		
	16:14 14:14-15:09/55	17:15 18:10		20:09 21:04	21:04 21:43		
16	08:19 14:17-15:09/52	07:28 06:23		06:06 06:39	05:04 04:34		
	16:16 14:17-15:09/52	17:17 18:12		20:10 21:05	21:05 21:43		
17	08:18 14:24-15:09/45	07:26 06:20		06:04 06:37	05:02 04:34		
	16:18 14:24-15:09/45	17:19 18:14		20:12 21:07	21:07 21:44		
18	08:17 14:25-15:09/44	07:24 06:18		06:02 06:35	05:01 04:34		
	16:19 14:25-15:09/44	17:21 18:16		20:14 21:09	21:09 21:44		
19	08:16 14:28-15:09/41	07:22 06:15		05:59 06:32	04:59 04:34		
	16:21 14:28-15:09/41	17:23 18:18		20:16 21:10	21:10 21:44		
20	08:15 14:31-15:08/37	07:19 06:13		05:57 06:30	04:58 04:34		
	16:23 14:31-15:08/37	17:25 18:20		20:18 21:12	21:12 21:45		
21	08:14 14:33-15:08/35	07:17 06:10		05:55 06:28	04:56 04:34		
	16:25 14:33-15:08/35	17:27 18:22		20:20 21:14	21:14 21:45		
22	08:12 14:36-15:07/31	07:15 06:08		05:53 06:26	04:55 04:34		
	16:27 14:36-15:07/31	17:29 18:23		20:22 21:15	21:15 21:45		
23	08:11 14:43-15:07/24	07:13 06:05		05:50 06:23	04:53 04:34		
	16:29 14:43-15:07/24	17:31 18:25		20:24 21:17	21:17 21:45		
24	08:10 14:45-15:05/20	07:10 06:03		05:48 06:21	04:52 04:34		
	16:31 14:45-15:05/20	17:33 18:27		20:25 21:18	21:18 21:45		
25	08:08 14:48-15:04/16	07:08 06:00 06:24-06:26/2		05:46 06:19	04:50 04:35		
	16:33 14:48-15:04/16	17:35 18:29		20:27 21:20	21:20 21:46		
26	08:07 14:50-15:02/12	07:06 05:58 06:22-06:27/5		05:44 06:17	04:49 04:35		
	16:34 14:50-15:02/12	17:37 18:31		20:29 21:21	21:21 21:45		
27	08:05 14:53-15:01/8	07:03 05:55 06:19-06:27/8		05:41 06:14	04:48 04:36		
	16:36 14:53-15:01/8	17:39 18:33		20:31 21:23	21:23 21:45		
28	08:04 14:56-15:00/4	07:01 05:53 06:17-06:27/10		05:39 06:12	04:47 04:36		
	16:38 14:56-15:00/4	17:41 18:35		20:33 21:24	21:24 21:45		
29	08:02 14:59-15:00/0	06:59 05:51 06:14-07:27/13		05:37 06:10	04:46 04:37		
	16:40 14:59-15:00/0	19:37 20:30		20:35 21:25	21:25 21:45		
30	08:00 15:02-15:00/0	06:48 05:40 07:12-07:26/14		05:35 06:08	04:44 04:37		
	16:42 15:02-15:00/0	19:39 20:32		20:37 21:27	21:27 21:45		
31	07:59 15:05-15:00/0	06:45 05:37 07:09-07:25/16		05:33 06:06	04:43 04:37		
	16:44 15:05-15:00/0	19:40 20:33		20:39 21:28	21:28 21:45		
	Sonnenscheinstunden 248	272	367	421	496	512	
	Anzahl Minuten mit Schatten 1988	0	68	178	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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

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13/10/2015 13:57 / 76
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 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
346 330 400 570 528 528 741 991 1022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	07:08	07:07	08:03
	21:44	21:08	20:01	18:46	16:35	15:50
2	04:39	05:20	06:16	06:52-07:00/8	07:10	07:09
	21:44	21:07	19:59	18:44	16:33	15:49
3	04:40	05:22	06:17	06:50-07:02/12	07:12	07:11
	21:44	21:05	19:56	18:41	16:31	15:48
4	04:40	05:24	06:19	06:49-07:05/16	07:14	07:13
	21:43	21:03	19:54	18:39	16:29	15:48
5	04:41	05:26	06:21	06:49-07:07/18	07:15	07:15
	21:43	21:01	19:51	18:37	16:27	15:47
6	04:42	05:27	06:23	06:50-07:13/23	07:17	07:17
	21:42	20:59	19:49	18:34	16:25	15:46
7	04:43	05:29	06:25	06:52-07:15/23	07:19	07:19
	21:41	20:57	19:46	18:32	16:23	15:46
8	04:44	05:31	06:26	06:54-07:16/22	07:21	07:21
	21:41	20:55	19:44	18:29	16:21	15:45
9	04:45	05:33	06:28	06:55-07:12/17	07:23	07:23
	21:40	20:53	19:41	07:12-07:16/4	18:27	16:20
10	04:46	05:34	06:30	06:57-07:16/19	07:25	07:25
	21:39	20:51	19:39	18:24	16:18	15:45
11	04:48	05:36	06:32	06:59-07:16/17	07:27	07:27
	21:38	20:49	19:36	18:22	16:16	15:45
12	04:49	05:38	06:34	07:01-07:17/16	07:28	07:29
	21:37	20:47	19:34	18:20	16:14	15:44
13	04:50	05:40	06:35	07:02-07:17/15	07:30	07:31
	21:36	20:45	19:31	18:17	16:13	15:44
14	04:51	05:41	06:37	07:04-07:17/13	07:32	07:33
	21:35	20:43	19:29	18:15	16:11	15:44
15	04:53	05:43	06:39	07:06-07:17/11	07:34	07:35
	21:34	20:40	19:26	18:12	16:09	15:44
16	04:54	05:45	06:41	07:08-07:17/9	07:36	07:36
	21:33	20:38	19:24	18:10	16:08	15:44
17	04:55	05:47	06:43	07:09-07:15/6	07:38	07:38
	21:32	20:36	19:21	18:08	16:06	15:44
18	04:57	05:49	06:44	07:11-07:14/3	07:40	07:40
	21:30	20:34	19:19	18:05	16:05	15:45
19	04:58	05:50	06:46	07:42	07:42	14:17-14:41/24
	21:29	20:31	19:16	18:03	16:03	15:45
20	05:00	05:52	06:48	07:44	07:44	14:11-14:42/31
	21:28	20:29	19:14	18:01	16:02	15:45
21	05:01	05:54	06:50	07:46	07:46	14:09-14:43/34
	21:26	20:27	19:11	17:59	16:01	15:46
22	05:03	05:56	06:52	07:48	07:48	14:07-14:44/37
	21:25	20:25	19:09	17:56	15:59	15:46
23	05:04	05:58	06:53	07:50	07:49	14:04-14:45/41
	21:23	20:22	19:06	17:54	15:58	15:47
24	05:06	05:59	06:55	07:51	07:51	14:02-14:46/44
	21:22	20:20	19:04	17:52	15:57	15:47
25	05:07	06:01	06:57	06:53	07:53	14:01-14:46/45
	21:20	20:18	19:01	16:50	15:56	15:48
26	05:09	06:03	06:59	06:55	07:55	13:55-14:47/52
	21:19	20:15	18:59	16:48	15:55	15:49
27	05:10	06:05	07:01	06:57	07:56	11:40-11:48/8
	21:17	20:13	18:56	16:45	15:53	13:53-14:48/55
28	05:12	06:07	07:03	06:59	07:58	11:37-11:52/15
	21:15	20:11	18:54	16:43	15:52	13:52-14:49/57
29	05:14	06:08	07:04	07:01	08:00	11:36-11:55/19
	21:14	20:08	18:51	16:41	15:52	13:51-14:50/59
30	05:15	06:10	07:06	07:03	08:01	11:34-11:57/23
	21:12	20:06	18:49	16:39	15:51	13:51-14:50/59
31	05:17	06:12		07:05		08:28
	21:10	20:03		16:37		15:53
Sonnenscheinstunden	514	461	383	328	257	231
Anzahl Minuten mit Schatten	0	0	252	0	652	4750

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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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

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13/10/2015 13:57 / 77
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 27 - W1

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28 14:20-15:11/51	07:57 15:30-15:55/25	06:59	06:43 07:44-08:04/20	05:33	04:42
	15:54	16:46	17:43	19:42	20:39	21:29
2	08:28 14:20-15:12/52	07:55 15:32-15:55/23	06:56	06:40 07:45-08:02/17	05:31	04:41
	15:56	16:48	17:45	19:44	20:40	21:31
3	08:28 14:21-15:14/53	07:54 15:35-15:54/19	06:54	06:38 07:48-07:59/11	05:29	04:41
	15:57	16:50	17:47	19:46	20:42	21:32
4	08:27 14:22-15:15/53	07:52 15:39-15:53/14	06:52	06:35	05:27	04:40
	15:58	16:52	17:49	19:48	20:44	21:33
5	08:27 14:22-15:16/54	07:50 15:41-15:52/11	06:49	06:33	05:25	04:39
	15:59	16:54	17:51	19:50	20:46	21:34
6	08:27 14:22-15:18/56	07:48 15:45-15:49/4	06:47 07:25-07:33/8	06:31	05:23	04:38
	16:01	16:56	17:53 07:33-07:43/10	19:52	20:48	21:35
7	08:26 14:23-15:21/58	07:46	06:45 07:22-07:37/15	06:28	05:21	04:37
	16:02	16:59	17:55 07:37-07:47/10	19:54	20:50	21:36
8	08:26 14:23-15:22/59	07:44	06:42 07:19-07:38/19	06:26	05:19	04:37
	16:03	17:01	17:57 07:38-07:48/10	19:55	20:51	21:37
9	08:25 14:24-15:23/59	07:42	06:40 07:16-07:40/24	06:23	05:17	04:36
	16:05	17:03	17:59 07:40-07:50/10	19:57	20:53	21:38
10	08:24 14:24-15:24/60	07:40	06:37 07:14-07:41/27	06:21	05:15	04:36
	16:06	17:05	18:01 07:41-07:51/10	19:59	20:55	21:39
11	08:24 14:24-15:27/63	07:38	06:35 07:11-07:41/30	06:18	05:13	04:35
	16:08	17:07	18:02 07:41-07:51/10	20:01	20:57	21:40
12	08:23 14:25-15:29/64	07:36	06:32 07:10-07:42/32	06:16	05:11	04:35
	16:09	17:09	18:04 07:42-07:52/10	20:03	20:59	21:41
13	08:22 14:25-15:31/66	07:34	06:30 07:08-07:42/34	06:14	05:09	04:34
	16:11	17:11	18:06 07:42-07:52/10	20:05	21:00	21:41
14	08:21 14:26-15:33/67	07:32	06:27 07:07-07:42/35	06:11	05:08	04:34
	16:13	17:13	18:08 07:42-07:53/11	20:07	21:02	21:42
15	08:20 14:26-15:36/70	07:30	06:25 07:03-07:41/38	06:09	05:06	04:34
	16:14	17:15	18:10 07:41-07:52/11	20:09	21:04	21:43
16	08:19 14:27-15:38/71	07:28	06:23 07:01-07:41/40	06:06	05:04	04:34
	16:16	17:17	18:12 07:41-07:53/12	20:10	21:05	21:43
17	08:18 14:28-15:40/72	07:26	06:20 06:58-07:40/42	06:04	05:02	04:34
	16:18	17:19	18:14 07:40-07:52/12	20:12	21:07	21:44
18	08:17 14:28-15:42/74	07:24	06:18 06:55-07:40/45	06:02	05:01	04:34
	16:20	17:21	18:16 07:40-07:52/12	20:14	21:09	21:44
19	08:16 14:29-15:44/75	07:22	06:15 06:51-07:38/47	05:59	04:59	04:34
	16:21	17:23	18:18 07:38-07:50/12	20:16	21:10	21:44
20	08:15 14:30-15:46/76	07:19	06:13 06:49-07:37/48	05:57	04:58	04:34
	16:23	17:25	18:20 07:37-07:50/13	20:18	21:12	21:45
21	08:14 14:31-15:49/78	07:17	06:10 06:47-07:34/47	05:55	04:56	04:34
	16:25	17:27	18:22 07:34-07:48/14	20:20	21:14	21:45
22	08:12 14:33-15:50/77	07:15	06:08 06:46-07:32/46	05:53	04:55	04:34
	16:27	17:29	18:23 07:32-07:48/16	20:22	21:15	21:45
23	08:11 14:34-15:52/78	07:13	06:05 06:44-07:26/42	05:50	04:53	04:34
	16:29	17:31	18:25 07:26-07:45/19	20:24	21:17	21:45
24	08:10 14:35-14:50/15	07:10	06:03 06:44-07:44/60	05:48	04:52	04:35
	16:31	17:33	18:27	20:26	21:18	21:46
25	08:08 14:38-14:49/11 15:04-15:54/50	07:08	06:00 06:43-07:21/38	05:46	04:50	04:35
	16:33	17:35	18:29 07:24-07:41/17	20:27	21:20	21:46
26	08:07 14:41-14:45/4	07:06	05:58 06:43-07:20/37	05:44	04:49	04:35
	16:34	17:37	18:31 07:27-07:37/10	20:29	21:21	21:46
27	08:05 15:11-15:55/44	07:03	05:55 06:42-07:19/37	05:41	04:48	04:36
	16:36	17:39	18:33	20:31	21:23	21:45
28	08:04 15:15-15:56/41	07:01	05:53 06:43-07:18/35	05:39	04:47	04:36
	16:38	17:41	18:35	20:33	21:24	21:45
29	08:02 15:20-15:56/36		06:50 07:42-08:15/33	05:37	04:46	04:37
	16:40		19:37	20:35	21:26	21:45
30	08:00 15:24-15:56/32		06:48 07:43-08:14/31	05:35	04:44	04:37
	16:42		19:39	20:37	21:27	21:45
31	07:59 15:26-15:56/30		06:45 07:43-08:10/27		04:43	
	16:44		19:40		21:28	
	Sonnenscheinstunden 248	272	367	421	496	512
	Anzahl Minuten mit Schatten 1859	96	1156	48	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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 78
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 27 - W1

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	07:08	07:48-08:21/33	07:07
	21:44	21:09	20:01	18:46	08:21-08:32/11	16:35
2	04:39	05:20	06:16	07:10	07:49-08:20/31	07:09
	21:44	21:07	19:59	18:44	08:20-08:31/11	16:33
3	04:40	05:22	06:18	07:12	07:50-08:19/29	07:11
	21:44	21:05	19:56	18:42	08:19-08:29/10	16:31
4	04:41	05:24	06:19	07:14	07:52-08:17/25	07:13
	21:43	21:03	19:54	18:39	08:17-08:27/10	16:29
5	04:41	05:26	06:21	07:15	07:55-08:16/21	07:15
	21:43	21:01	19:51	18:37	08:16-08:26/10	16:27
6	04:42	05:27	06:23	07:17	07:57-08:14/17	07:17
	21:42	20:59	19:49	18:34	08:14-08:24/10	16:25
7	04:43	05:29	06:25	07:19	07:59-08:11/12	07:19
	21:41	20:57	19:46	18:32	08:11-08:21/10	16:23
8	04:44	05:31	06:27	07:21	08:12-08:15/3	07:21
	21:41	20:55	19:44	18:29		16:21
9	04:45	05:33	06:28	07:41-07:52/11	07:23	15:03-15:26/23
	21:40	20:53	19:41	18:27		16:20
10	04:47	05:34	06:30	07:38-07:55/17	07:25	15:00-15:26/26
	21:39	20:51	19:39	18:24		16:18
11	04:48	05:36	06:32	07:37-07:56/19	07:27	14:57-15:27/30
	21:38	20:49	19:36	18:22		16:16
12	04:49	05:38	06:34	07:35-08:01/26	07:28	14:56-15:28/32
	21:37	20:47	19:34	18:20		16:14
13	04:50	05:40	06:35	07:33-08:04/31	07:30	14:52-15:28/36
	21:36	20:45	19:31	18:17		16:13
14	04:51	05:42	06:37	07:33-08:05/32	07:32	14:47-15:28/41
	21:35	20:43	19:29	18:15		16:11
15	04:53	05:43	06:39	07:32-08:07/35	07:34	14:44-15:27/43
	21:34	20:40	19:26	18:13		16:09
16	04:54	05:45	06:41	07:32-08:08/36	07:36	14:14-14:19/5
	21:33	20:38	19:24	18:10		16:08
17	04:55	05:47	06:43	07:30-08:08/38	07:38	14:11-14:22/11
	21:32	20:36	19:21	18:08		16:06
18	04:57	05:49	06:44	07:30-08:08/38	07:40	14:09-14:24/15
	21:30	20:34	19:19	18:06		16:05
19	04:58	05:50	06:46	07:31-08:30/59	07:42	14:08-15:26/59
	21:29	20:32	19:16	18:03		16:03
20	05:00	05:52	06:48	07:31-08:32/61	07:44	14:07-15:25/78
	21:28	20:29	19:14	18:01		16:02
21	05:01	05:54	06:50	07:31-08:17/46	07:46	14:07-15:24/77
	21:26	20:27	19:11	17:59		16:01
22	05:03	05:56	06:52	07:31-08:18/47	07:48	14:07-15:22/75
	21:25	20:25	19:09	17:56		15:59
23	05:04	05:58	06:53	07:32-08:20/48	07:50	14:05-15:20/75
	21:23	20:22	19:06	17:54		15:58
24	05:06	05:59	06:55	07:34-08:21/47	07:51	14:05-15:19/74
	21:22	20:20	19:04	17:52		15:57
25	05:07	06:01	06:57	07:37-08:22/45	06:53	14:05-15:17/72
	21:20	20:18	19:01	17:50		15:56
26	05:09	06:03	06:59	07:41-08:22/41	06:55	14:05-15:16/71
	21:19	20:15	18:59	17:48		15:55
27	05:10	06:05	07:01	07:41-08:22/41	06:57	14:05-15:15/70
	21:17	20:13	18:56	17:45		15:54
28	05:12	06:07	07:03	07:43-08:22/39	06:59	14:06-15:13/67
	21:16	20:11	18:54	17:43		15:53
29	05:14	06:09	07:04	07:45-08:22/37	07:01	14:06-15:12/66
	21:14	20:08	18:51	17:41		15:52
30	05:15	06:10	07:06	07:48-08:22/34	07:03	14:07-15:11/64
	21:12	20:06	18:49	17:39		15:51
31	05:17	06:12		07:05		
	21:10	20:03		16:37		
Sonnenscheinstunden	514	461	383	328	257	231
Anzahl Minuten mit Schatten	0	0	976	243	1340	1552

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
--------------	-----------------------	-------------------------	-------------------	----------------------------------	-----------------------------------

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

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13/10/2015 13:57 / 79

Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
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Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 28 - 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
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: 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	
1	15:54	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	07:55	06:57	06:40	05:31	04:41	04:39	05:20	06:16	07:10	07:09	08:05	
1	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	04:40	04:40	05:22	06:17	07:12	07:11	08:06	
1	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	
1	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	
1	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	05:22	04:38	04:42	05:27	06:23	07:17	07:17	08:10	
1	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	
1	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	05:19	04:37	04:44	05:31	06:26	07:21	07:21	08:13	
1	16:03	17:01	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	05:17	04:36	04:45	05:33	06:28	07:23	07:23	08:14	
1	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	07:40	06:37	06:21	05:15	04:36	04:46	05:34	06:30	07:25	07:25	08:16	
1	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	
1	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	
1	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	
1	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	
1	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	
1	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	
1	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	
1	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	
1	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	07:22	06:15	05:59	04:59	04:33	04:58	05:50	06:46	07:42	07:42	08:24	
1	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	04:59	05:52	06:48	07:44	07:44	08:25	
1	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	
1	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	05:02	05:56	06:52	07:48	07:48	08:26	
1	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	
1	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	07:51	08:27	
1	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	04:50	04:35	05:07	06:01	06:57	06:53	07:53	08:27	
1	16:32	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	06:55	07:55	08:28	
1	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	
1	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	
1	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	07:00	05:50	05:37	04:45	04:37	05:14	06:08	07:04	07:01	08:00	08:28	
1	16:40	17:43	18:37	20:35	21:26	21:45	21:14	20:08	18:51	16:41	15:51	15:51	
30	08:01	07:00	05:48	05:35	04:44	04:37	05:15	06:10	07:06	07:03	08:02	08:28	
1	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	05:45	05:32	04:43	04:37	05:17	06:12	07:08	07:05	08:04	08:28	
1	16:44	17:47	18:40	20:38	21:28	21:45	21:10	20:03	18:42	16:37	15:51	15:53	
	Sonnenscheinstunden	248	272	367	421	496	513	515	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)	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang-Zeitpunkt (SS:MM)	Schattenende/Minuten mit Schatten
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Projekt:
151008_Miltzow_III-VII

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13/10/2015 13:57 / 80

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 29 - W3

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:28 13:58-14:29/31	07:57 13:58-16:06/128	06:59	06:43	05:33	04:42	
	15:54 14:28-14:47/19	16:46	17:43	19:42	20:39	21:29	
2	08:28 13:57-14:30/33	07:55 13:58-16:09/131	06:56	06:40	05:31	04:41	
	15:55 14:29-14:48/19	16:48	17:45	19:44	20:40	21:31	
3	08:28 13:58-14:51/53	07:54 13:58-16:11/133	06:54	06:38	05:29	04:40	
	15:57 14:04-14:29/25	16:50	17:47	19:46	20:42	21:32	
4	08:27 13:59-14:55/56	07:52 13:59-16:12/133	06:52	06:35	05:27	04:40	
	15:58 14:04-14:31/27	16:52 16:12-16:14/2	17:49	19:48	20:44	21:33	
5	08:27 13:58-14:57/59	07:50 14:00-16:16/136	06:49	06:33	05:24	04:39	
	15:59 14:04-14:32/28	16:54	17:51	19:50	20:46	21:34	
6	08:27 13:58-14:58/60	07:48 14:00-16:19/139	06:47	06:31	05:22	04:38	
	16:00 14:03-14:33/30	16:56	17:53	19:52	20:48	21:35	
7	08:26 13:59-15:00/61	07:46 14:00-16:20/140	06:45	06:28 06:52-07:00/8	05:21	04:37	
	16:02 14:03-14:35/32	16:58	17:55	19:54	20:50	21:36	
8	08:26 13:59-15:02/63	07:44 14:00-16:22/142	06:42	06:26 06:50-07:03/13	05:19	04:37	
	16:03 14:02-14:36/34	17:01	17:57	19:55	20:51	21:37	
9	08:25 13:59-15:03/64	07:42 14:01-16:23/142	06:40	06:23 06:47-07:03/16	05:17	04:36	
	16:05 14:02-14:37/35	17:03	17:59	19:57	20:53	21:38	
10	08:24 13:59-15:04/65	07:40 14:02-16:24/142	06:37	06:21 06:45-07:04/19	05:15	04:36	
	16:06 14:01-14:38/37	17:05	18:01	19:59	20:55	21:39	
11	08:24 14:00-15:05/65	07:38 14:03-16:25/142	06:35	06:18 06:43-07:05/22	05:13	04:35	
	16:08 14:01-14:39/38	17:07	18:02	20:01	20:57	21:40	
12	08:23 14:00-15:07/67	07:36 14:04-16:26/142	06:32	06:16 06:40-07:04/24	05:11	04:35	
	16:09 15:08-15:14/6	17:09	18:04	20:03	20:59	21:41	
13	08:22 14:00-15:17/77	07:34 14:05-14:52/47 15:11-16:26/75	06:30	06:14 06:38-07:05/27	05:09	04:34	
	16:11	17:11 14:53-15:09/16	18:06	20:05	21:00	21:41	
14	08:21 14:00-15:19/79	07:32 14:05-14:50/45 15:15-16:26/71	06:27	06:11 06:36-07:05/29	05:07	04:34	
	16:13	17:13 15:00-15:01/1	18:08	20:07	21:02	21:42	
15	08:20 14:00-15:21/81	07:30 14:06-14:49/43	06:25	06:09 06:33-07:03/30	05:06	04:34	
	16:14	17:15 15:25-16:26/61	18:10	20:09	21:04	21:43	
16	08:19 14:00-15:23/83	07:28 14:08-14:48/40	06:23	06:06 06:31-07:03/32	05:04	04:34	
	16:16	17:17 15:36-16:26/50	18:12	20:10	21:05	21:43	
17	08:18 14:00-15:29/89	07:26 14:10-14:47/37	06:20	06:04 06:29-07:02/33	05:02	04:34	
	16:18	17:19 15:39-16:26/47	18:14	20:12	21:07	21:44	
18	08:17 13:59-15:31/92	07:24 14:12-14:45/33	06:18	06:02 06:26-07:00/34	05:01	04:34	
	16:19	17:21 15:41-16:25/44	18:16	20:14	21:09	21:44	
19	08:16 13:59-15:33/94	07:22 14:14-14:42/28	06:15	05:59 06:24-06:59/35	04:59	04:34	
	16:21	17:23 15:46-16:25/39	18:18	20:16	21:10	21:44	
20	08:15 13:58-15:35/97	07:19 14:18-14:40/22	06:13	05:57 06:23-06:57/34	04:58	04:34	
	16:23	17:25 15:50-16:24/34	18:20	20:18	21:12	21:45	
21	08:14 13:59-15:39/100	07:17 14:23-14:35/12	06:10	05:55 06:23-06:57/34	04:56	04:34	
	16:25	17:27 15:54-16:24/30	18:22	20:20	21:14	21:45	
22	08:12 13:59-15:41/102	07:15 15:56-16:22/26	06:08	05:53 06:22-06:56/34	04:55	04:34	
	16:27	17:29	18:23	20:22	21:15	21:45	
23	08:11 13:58-15:44/106	07:13 16:01-16:20/19	06:05	05:50 06:22-06:55/33	04:53	04:34	
	16:29	17:31	18:25	20:24	21:17	21:45	
24	08:10 13:58-15:45/107	07:10 16:05-16:18/13	06:03	05:48 06:22-06:55/33	04:52	04:34	
	16:31	17:33	18:27	20:25	21:18	21:46	
25	08:08 13:58-15:47/109	07:08 16:09-16:13/4	06:00	05:46 06:23-06:54/31	04:50	04:35	
	16:33	17:35	18:29	20:27	21:20	21:46	
26	08:07 13:58-15:51/113	07:06	05:58	05:44 06:23-06:53/30	04:49	04:35	
	16:34	17:37	18:31	20:29	21:21	21:46	
27	08:05 13:58-15:53/115	07:03	05:55	05:41 06:24-06:51/27	04:48	04:36	
	16:36	17:39	18:33	20:31	21:23	21:45	
28	08:04 13:58-15:56/118	07:01	05:53	05:39 06:25-06:49/24	04:47	04:36	
	16:38	17:41	18:35	20:33	21:24	21:45	
29	08:02 13:58-15:59/121		06:50	05:37 06:27-06:36/9	04:46	04:37	
	16:40		19:37	20:35 06:41-06:45/4	21:26	21:45	
30	08:00 13:58-16:02/124		06:48	05:35	04:44	04:37	
	16:42		19:39	20:37	21:27	21:45	
31	07:59 13:58-16:03/125		06:45		04:43		
	16:44		19:40		21:28		
	Sonnenscheinstunden	248	272	367	421	496	512
	Anzahl Minuten mit Schatten	2651	2489	0	615	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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WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

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-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 29 - W3

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	06:42-07:04/22	07:08	07:07
	21:44	21:09	20:01	18:46	13:31-15:54/143	08:03
2	04:39	05:20	06:16	06:43-07:02/19	07:10	07:09
	21:44	21:07	19:59	18:44	16:33	13:30-15:53/143
3	04:40	05:22	06:17	06:45-07:01/16	07:12	07:11
	21:44	21:05	19:56	18:41	16:31	13:30-15:51/141
4	04:40	05:24	06:19	06:47-07:00/13	07:14	07:13
	21:43	21:03	19:54	18:39	16:29	13:29-15:50/141
5	04:41	05:26	06:21	06:49-06:58/9	07:15	07:15
	21:43	21:01	19:51	18:37	16:27	13:30-15:49/139
6	04:42	05:27	06:23	07:17	07:17	07:17
	21:42	20:59	19:49	18:34	16:25	13:29-15:47/138
7	04:43	05:29	06:25	07:19	07:19	07:19
	21:41	20:57	19:46	18:32	16:23	13:29-15:45/136
8	04:44	05:31	06:26	07:21	07:21	07:21
	21:41	20:55	19:44	18:29	16:21	13:29-15:41/132
9	04:45	05:33	06:28	07:23	07:23	07:23
	21:40	20:53	19:41	18:27	16:20	13:29-15:39/130
10	04:46	05:34	06:30	07:25	07:25	07:25
	21:39	20:51	19:39	18:24	16:18	13:29-15:37/128
11	04:48	05:36	06:32	07:27	07:27	07:27
	21:38	20:49	19:36	18:22	16:16	13:30-15:35/125
12	04:49	05:38	06:34	07:28	07:28	07:29
	21:37	20:47	19:34	18:20	16:14	13:30-15:33/123
13	04:50	05:40	06:36-06:39/1	06:35	07:30	07:31
	21:36	20:45	19:31	18:17	16:13	13:30-15:31/121
14	04:51	05:41	06:34-06:44/10	06:37	07:32	07:33
	21:35	20:43	06:47-06:54/7	19:29	18:15	13:30-15:28/118
15	04:53	05:43	06:32-06:57/25	06:39	07:34	07:35
	21:34	20:40	19:26	18:12	16:09	13:30-15:26/116
16	04:54	05:45	06:30-06:58/28	06:41	07:36	07:37
	21:33	20:38	19:24	18:10	16:08	13:31-15:24/113
17	04:55	05:47	06:30-07:00/30	06:43	07:38	07:38
	21:32	20:36	19:21	18:08	16:06	13:31-15:20/109
18	04:57	05:49	06:29-07:01/32	06:44	07:40	07:40
	21:30	20:34	19:19	18:05	16:05	13:32-15:19/107
19	04:58	05:50	06:28-07:01/33	06:46	07:42	07:42
	21:29	20:32	19:16	18:03	16:03	13:32-15:18/106
20	05:00	05:52	06:28-07:01/33	06:48	07:44	07:44
	21:28	20:29	19:14	18:01	16:02	13:33-15:16/103
21	05:01	05:54	06:28-07:02/34	06:50	07:46	07:46
	21:26	20:27	19:11	17:59	16:01	13:35-15:14/99
22	05:03	05:56	06:28-07:02/34	06:52	07:48	07:48
	21:25	20:25	19:09	17:56	15:59	13:35-15:12/97
23	05:04	05:58	06:27-07:01/34	06:53	07:50	07:49
	21:23	20:22	19:06	17:54	15:58	13:35-15:09/94
24	05:06	05:59	06:28-07:03/35	06:55	07:51	07:51
	21:22	20:20	19:04	17:52	15:57	13:36-15:08/92
25	05:07	06:01	06:30-07:04/34	06:57	07:53	07:53
	21:20	20:18	19:01	17:50	15:56	13:37-15:06/89
26	05:09	06:03	06:31-07:04/33	06:59	07:55	07:55
	21:19	20:15	18:59	17:48	15:55	13:38-15:02/84
27	05:10	06:05	06:33-07:05/32	07:01	07:56	07:56
	21:17	20:13	18:56	17:45	15:53	13:39-15:01/82
28	05:12	06:07	06:35-07:05/30	07:03	07:58	07:58
	21:16	20:11	18:54	17:43	15:52	13:41-14:58/77
29	05:14	06:08	06:37-07:05/28	07:04	07:59	07:59
	21:14	20:08	18:51	17:41	15:51	13:41-14:58/77
30	05:15	06:10	06:38-07:04/26	07:06	08:01	08:01
	21:12	20:06	18:49	17:39	15:51	13:42-14:56/74
31	05:17	06:12	06:40-07:04/24	07:05	08:02	08:02
	21:10	20:03	18:47	17:37	15:50	13:42-14:56/74
Sonnenscheinstunden						
Anzahl Minuten mit Schatten						
	514	461	383	328	257	231
	0	543	79	1157	3380	1611

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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 82

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

Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 30 - W5

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1022 1,224 934 356 7,971
: 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 20:24-20:50/28	04:38 20:30-21:01/31 20:58-20:59/1	05:19 06:14 07:08 07:07 08:03				
2	15:54 16:46 17:43 19:42 20:39					21:30 04:41 20:25-20:52/27	21:45 20:56-20:57/1 21:00-21:05/5	21:09 20:01 18:46 16:35 15:50				
3	15:55 16:48 17:45 19:44 20:40					21:31 04:40 20:24-20:53/29	21:44 20:55-20:56/1 20:59-21:04/5	21:07 19:59 18:44 16:33 15:49				
4	15:57 16:50 17:47 19:46 20:42					21:32 20:53-20:54/1	21:44 20:56-20:57/1	21:05 19:56 18:41 16:31 15:48				
5	15:58 16:52 17:49 19:48 20:44					21:33 20:53-20:54/1	21:43 20:56-20:57/1 21:00-21:04/4	21:03 19:54 18:39 16:29 15:46				
6	15:59 16:54 17:51 19:50 20:46					21:34 20:53-20:55/2	21:43 21:00-21:03/3	21:01 19:51 18:37 16:27 15:47				
7	16:02 16:58 17:55 19:54 20:50					21:36 20:50-20:51/1 20:54-20:57/3	21:41 20:57-20:58/1	20:57 19:46 18:32 16:23 15:46				
8	16:02 16:58 17:55 19:54 20:50					21:36 20:50-20:51/1 20:54-20:57/3	21:41 20:57-20:58/1	20:57 19:46 18:32 16:23 15:46				
9	16:05 17:03 17:59 19:57 20:53					21:38 20:55-20:58/3	21:40 21:00-21:01/1	20:53 19:41 18:27 16:20 15:45				
10	16:06 17:05 18:01 19:59 20:55					21:39 20:51-20:52/1 20:55-20:59/4	21:39 20:51-20:52/1 20:55-20:59/4	20:51 19:39 18:24 16:18 15:45				
11	16:08 17:07 18:02 20:01 20:57					21:40 20:56-21:00/4	21:38 04:45 20:26-20:58/30 20:53-20:54/1	20:49 19:36 18:22 16:16 15:44				
12	16:09 17:09 18:04 20:03 20:59					21:41 20:51-20:52/1 20:55-21:00/5	21:37 04:46 20:26-20:58/30 20:53-20:54/1	20:47 19:34 18:20 16:14 15:44				
13	16:11 17:11 18:06 20:05 21:00					21:42 20:52-20:53/1 20:56-21:01/5	21:35 04:46 20:26-20:58/30 20:53-20:54/1	20:45 19:31 18:17 16:13 15:44				
14	16:13 17:13 18:08 20:07 21:02					21:42 20:52-20:53/1 20:56-21:01/5	21:35 04:46 20:26-20:58/30 20:53-20:54/1	20:45 19:31 18:17 16:13 15:44				
15	16:14 17:15 18:10 20:09 21:04					21:43 20:52-20:53/1	21:34 04:46 20:26-20:58/30 20:53-20:54/1	20:40 19:26 18:12 16:09 15:44				
16	16:16 17:17 18:12 20:11 21:05					21:43 20:52-21:02/10	21:33 04:46 20:26-20:58/30 20:53-20:54/1	20:38 19:24 18:10 16:08 15:44				
17	16:18 17:19 18:14 20:12 21:07					21:44 20:53-20:54/1	21:32 04:46 20:26-20:58/30 20:53-20:54/1	20:36 19:21 18:08 16:06 15:44				
18	16:19 17:21 18:16 20:14 21:09					21:44 20:53-20:54/1	21:30 04:46 20:26-20:58/30 20:53-20:54/1	20:34 19:19 18:05 16:05 15:45				
19	16:21 17:23 18:18 20:16 21:10					21:45 20:53-20:54/1	21:29 04:46 20:26-20:58/30 20:53-20:54/1	20:32 19:16 18:03 16:03 15:45				
20	16:23 17:25 18:20 20:18 21:12					21:45 20:53-20:54/1	21:28 04:46 20:26-20:58/30 20:53-20:54/1	20:29 19:14 18:01 16:02 15:45				
21	16:24 17:27 18:22 20:20 21:14					21:45 20:53-20:54/1	21:28 04:46 20:26-20:58/30 20:53-20:54/1	20:27 19:11 17:59 16:01 15:46				
22	16:27 17:29 18:23 20:22 21:15					21:45 20:53-20:54/1	21:25 04:46 20:26-20:58/30 20:53-20:54/1	20:25 19:09 17:56 15:59 15:46				
23	16:29 17:31 18:25 20:24 21:17					21:46 20:54-20:55/1	21:23 04:46 20:26-20:58/30 20:53-20:54/1	20:22 19:06 17:54 15:58 15:47				
24	16:30 17:30 18:24 20:26 21:18					21:46 20:54-20:55/1	21:22 04:46 20:26-20:58/30 20:53-20:54/1	20:20 19:04 17:52 15:57 15:47				
25	16:32 17:35 18:29 20:27 21:20					21:46 20:54-20:55/1 20:58-21:04/6	21:20 04:46 20:26-20:58/30 20:53-20:54/1	20:18 19:01 18:00 16:00 15:48				
26	16:34 17:37 18:31 20:29 21:21					21:46 20:54-20:55/1 20:58-21:04/6	21:19 04:46 20:26-20:58/30 20:53-20:54/1	20:15 18:59 18:48 16:00 15:48				
27	16:36 17:39 18:33 20:31 21:23					21:46 20:54-20:55/1 20:58-21:04/6	21:17 04:46 20:26-20:58/30 20:53-20:54/1	20:13 18:56 18:45 16:00 15:49				
28	16:38 17:41 18:35 20:33 21:24					21:46 20:54-20:55/1 20:58-21:04/6	21:16 04:46 20:26-20:58/30 20:53-20:54/1	20:11 18:54 18:43 16:00 15:50				
29	16:40 17:43 18:37 20:35 21:26					21:46 20:54-20:55/1 20:58-21:04/6	21:14 04:46 20:26-20:58/30 20:53-20:54/1	20:08 18:51 18:41 16:00 15:51				
30	16:42 17:46 18:40 20:37 21:27					21:46 20:54-20:55/1 20:58-21:04/6	21:12 04:46 20:26-20:58/30 20:53-20:54/1	20:06 18:49 18:39 16:00 15:52				
31	16:44 17:49 18:43 20:39 21:28					21:46 20:54-20:55/1 20:58-21:04/6	21:10 04:46 20:26-20:58/30 20:53-20:54/1	20:03 18:47 18:37 16:00 15:53				
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	257	231
Anzahl Minuten mit Schatten	0	0	0	0	245	1006	803	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:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 83
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 31 - W10

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28	07:57	06:59	06:43 18:38-19:18:38	05:33 19:09-19:25:16	04:42	04:38	05:19	06:14 18:41-19:10:29	07:08	07:07	08:03
	15:54	16:46	17:43	19:42	20:39	21:30	21:45	21:09	20:01 19:15-19:25:10	18:46	16:35	15:50
2	08:28	07:55	06:57	06:40 18:37-19:15:38	05:31 19:12-19:22:10	04:41	04:39	05:20	06:16 18:38-18:59:21	07:10	07:09	08:05
	15:55	16:48	17:45	19:44	20:40	21:31	21:44	21:07	19:59 18:58-19:10:12	18:44	16:33	15:49
3	08:28	07:54	06:54	06:38 18:37-19:15:38	05:29	04:40	04:40	05:22	06:18 18:38-19:02:26	07:12	07:11	08:06
	15:57	16:50	17:47	19:46	20:42	21:32	21:44	21:05	19:56 19:01-19:10:19	18:42	16:31	15:48
4	08:27	07:52	06:52	06:35 18:38-19:14:38	05:27	04:40	04:40	05:24	06:19 18:35-19:08:33	07:14	07:13	08:08
	15:58	16:52	17:49	19:48	20:44	21:33	21:43	21:03	19:54 19:07-19:11:14	18:39	16:29	15:46
5	08:27	07:50	06:49	06:33 18:37-19:14:37	05:24	04:39	04:41	05:26	06:21 18:33-19:08:35	07:15	07:15	08:09
	15:59	16:54	17:51	19:50	20:46	21:34	21:43	21:01	19:51 19:08-19:10:12	18:37	16:27	15:47
6	08:27	07:48	06:47	06:31 18:36-19:13:37	05:22	04:38	04:42	05:27	06:23 18:33-19:09:36	07:17	07:17	08:10
	16:00	16:56	17:53	19:52	20:48	21:35	21:42	20:59	19:49 19:09-19:10:11	18:34	16:25	15:46
7	08:26	07:46	06:45	06:28 18:37-19:12:35	05:21	04:37	04:43	05:29	06:25 18:32-19:09:37	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 18:38-19:11:33	05:19	04:37	04:44	05:31	06:27 18:32-19:09:37	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	15:45
9	08:25	07:42	06:40	06:23 18:38-19:04:26	05:17	04:36	04:45	05:33	06:28 18:30-19:08:38	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 18:40-19:07:21	05:15	04:36	04:46	05:34	19:24-19:26:2	06:30 18:30-19:08:38	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 18:41-19:10:29	05:13	04:35	04:48	05:36	19:19-19:32:13	06:32 18:30-19:08:38	07:27	08:17
	16:08	17:07	18:02	20:01 19:15-19:25:10	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 18:46-19:09:23	05:11	04:35	04:49	05:38	19:17-19:34:17	06:34 18:31-19:08:35	07:29	08:18
	16:09	17:09	18:04	20:03 19:12-19:29:17	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 18:48-19:08:20	05:09	04:34	04:50	05:40	19:15-19:35:20	06:35 18:30-19:03:33	07:30	08:19
	16:11	17:11	18:06	20:05 19:10-19:31:21	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 18:48-19:05:16	05:07	04:34	04:51	05:41	19:14-19:36:22	06:37 18:31-19:00:29	07:32	08:20
	16:13	17:13	18:08	20:07 19:08-19:31:23	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 18:51-19:02:11	05:06	04:34	04:53	05:43	19:13-19:37:24	06:39 18:32-18:58:26	07:34	08:21
	16:14	17:15	18:10	20:09 19:07-19:32:25	21:04	21:43	21:34	20:40	19:28	18:13	16:09	15:44
16	08:19	07:28	06:23	06:08 19:06-19:33:27	05:04	04:34	04:54	05:45	19:11-19:37:26	06:41 18:33-18:56:23	07:36	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 19:05-19:34:29	05:02	04:34	04:55	05:47	19:10-19:38:28	06:43 18:34-18:53:19	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 19:04-19:33:29	05:01	04:34	04:57	05:49	19:10-19:39:29	06:44 18:38-18:50:12	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 19:04-19:34:30	04:59	04:34	04:58	05:50	19:08-19:38:30	06:46 18:43-18:48:5	07:42	08:24
	16:21	17:23	18:18	20:16	21:10	21:45	21:29	20:32	19:16	18:03	16:03	15:45
20	08:15	07:19	06:13	05:57 19:03-19:34:31	04:58	04:34	05:00	05:52	19:08-19:38:30	06:48	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 19:03-19:34:31	04:56	04:34	05:01	05:54	19:08-19:39:31	06:50	07:46	08:26
	16:25	17:27	18:22	20:20	21:14	21:45	21:28	20:27	19:11	17:59	16:01	15:46
22	08:12	07:15	06:08	05:53 19:02-19:33:31	04:55	04:34	05:03	05:56	19:07-19:38:31	06:52	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 19:03-19:33:30	04:53	04:34	05:04	05:58	19:07-19:38:31	06:53	07:50	08:27
	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 19:03-19:32:29	04:52	04:34	05:06	05:59	19:07-19:38:31	06:55	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	15:47
25	08:08	07:08	06:00	05:46 19:03-19:32:29	04:50	04:35	05:07	06:01	19:08-19:37:29	06:57	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 18:48-18:04:18	04:49	04:35	05:09	06:03	19:07-19:38:29	06:59	06:55	07:55
	16:34	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 19:04-19:31:27	04:48	04:36	05:10	06:05	19:08-19:35:27	07:01	06:57	07:57
	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 19:05-19:30:25	04:47	04:36	05:12	06:07	18:53-19:04:11	07:03	06:59	07:58
	16:38	17:41	18:35	20:33	21:24	21:45	21:16	20:11	19:09-19:34:25	18:54	16:43	15:52
29	08:02	07:00	05:50	05:37 19:06-19:28:22	04:46	04:37	05:14	06:09	18:49-19:06:17	07:04	07:01	08:00
	16:40	17:43	18:37	20:35	21:26	21:45	21:14	20:08	19:09-19:32:23	18:51	16:41	15:52
30	08:01	07:00	05:48	05:35 19:08-19:27:19	04:44	04:37	05:15	06:10	18:48-19:08:20	07:06	07:03	08:01
	16:42	17:45	18:39	20:37	21:27	21:45	21:12	20:06	19:10-19:30:20	18:49	16:39	15:51
31	07:59	07:00	05:45	05:33 18:38-19:13:35	04:43	04:37	05:17	06:12	18:45-19:09:24	07:05	07:05	08:02
	16:44	17:47	18:41	20:39	21:28	21:45	21:10	20:03	19:12-19:28:16	18:50	16:37	15:53
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	565	257	231
Anzahl Minuten mit Schatten	0	0	171	978	26	0	0	606	555	0	257	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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 84

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

Berechnet:
André Gefke / andre.gefke@i17-wind.de
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 32 - W7

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:28 09:49-10:40/51	07:57 06:59	06:43 05:33	04:42 03:39	02:29 01:44	01:38 01:09	01:44 01:09	01:44 01:09	01:44 01:09	01:44 01:09	01:44 01:09	01:44 01:09
2	08:28 09:50-10:41/51	07:55 06:56	06:40 05:31	04:41 04:39	04:41 04:39	04:41 04:39	04:41 04:39	04:41 04:39	04:41 04:39	04:41 04:39	04:41 04:39	04:41 04:39
3	08:28 09:50-10:40/60	07:54 06:54	06:38 05:29	04:41 04:40	04:40 04:39	04:40 04:39	04:40 04:39	04:40 04:39	04:40 04:39	04:40 04:39	04:40 04:39	04:40 04:39
4	08:27 09:51-10:41/60	07:52 06:52	06:36 05:27	04:40 04:41	04:41 04:41	04:41 04:41	04:41 04:41	04:41 04:41	04:41 04:41	04:41 04:41	04:41 04:41	04:41 04:41
5	08:27 09:51-10:40/49	07:50 06:49	06:33 05:25	04:39 04:41	04:39 04:41	04:39 04:41	04:39 04:41	04:39 04:41	04:39 04:41	04:39 04:41	04:39 04:41	04:39 04:41
6	08:27 09:51-10:40/49	07:48 06:47	06:31 05:23	04:38 04:42	04:42 04:42	04:42 04:42	04:42 04:42	04:42 04:42	04:42 04:42	04:42 04:42	04:42 04:42	04:42 04:42
7	08:26 09:52-10:41/49	07:46 06:45	06:28 05:21	04:37 04:43	04:43 04:43	04:43 04:43	04:43 04:43	04:43 04:43	04:43 04:43	04:43 04:43	04:43 04:43	04:43 04:43
8	08:25 09:52-10:41/49	07:44 06:42	06:26 05:19	04:37 04:44	04:44 04:44	04:44 04:44	04:44 04:44	04:44 04:44	04:44 04:44	04:44 04:44	04:44 04:44	04:44 04:44
9	08:25 09:52-10:40/48	07:42 06:40	06:23 05:17	04:36 04:45	04:45 04:45	04:45 04:45	04:45 04:45	04:45 04:45	04:45 04:45	04:45 04:45	04:45 04:45	04:45 04:45
10	08:24 09:53-10:38/45	07:40 06:37	06:21 05:15	04:36 04:47	04:47 04:47	04:47 04:47	04:47 04:47	04:47 04:47	04:47 04:47	04:47 04:47	04:47 04:47	04:47 04:47
11	08:24 09:53-10:37/44	07:38 06:35	06:18 05:13	04:35 04:48	04:48 04:48	04:48 04:48	04:48 04:48	04:48 04:48	04:48 04:48	04:48 04:48	04:48 04:48	04:48 04:48
12	08:23 09:54-10:33/39	07:36 06:32	06:16 05:11	04:35 04:49	04:49 04:49	04:49 04:49	04:49 04:49	04:49 04:49	04:49 04:49	04:49 04:49	04:49 04:49	04:49 04:49
13	08:22 09:54-10:32/38	07:34 06:30	06:14 05:09	04:35 04:50	04:50 04:50	04:50 04:50	04:50 04:50	04:50 04:50	04:50 04:50	04:50 04:50	04:50 04:50	04:50 04:50
14	08:21 09:55-10:31/36	07:32 06:28	06:11 05:08	04:34 04:51	04:51 04:51	04:51 04:51	04:51 04:51	04:51 04:51	04:51 04:51	04:51 04:51	04:51 04:51	04:51 04:51
15	08:20 09:56-10:30/34	07:30 06:25	06:09 05:06	04:34 04:53	04:53 04:53	04:53 04:53	04:53 04:53	04:53 04:53	04:53 04:53	04:53 04:53	04:53 04:53	04:53 04:53
16	08:19 09:57-10:39/42	07:28 06:23	06:07 05:04	04:34 04:54	04:54 04:54	04:54 04:54	04:54 04:54	04:54 04:54	04:54 04:54	04:54 04:54	04:54 04:54	04:54 04:54
17	08:18 09:58-10:38/40	07:26 06:20	06:04 05:02	04:34 04:55	04:55 04:55	04:55 04:55	04:55 04:55	04:55 04:55	04:55 04:55	04:55 04:55	04:55 04:55	04:55 04:55
18	08:17 09:58-10:36/38	07:24 06:18	06:02 05:01	04:34 04:57	04:57 04:57	04:57 04:57	04:57 04:57	04:57 04:57	04:57 04:57	04:57 04:57	04:57 04:57	04:57 04:57
19	08:16 09:59-10:25/26	07:22 06:15	05:59 04:59	04:34 04:58	04:58 04:58	04:58 04:58	04:58 04:58	04:58 04:58	04:58 04:58	04:58 04:58	04:58 04:58	04:58 04:58
20	08:15 10:00-10:25/25	07:19 06:13	05:57 04:58	04:34 05:00	05:00 05:00	05:00 05:00	05:00 05:00	05:00 05:00	05:00 05:00	05:00 05:00	05:00 05:00	05:00 05:00
21	08:14 10:01-10:24/23	07:17 06:10	05:55 04:56	04:34 05:01	05:01 05:01	05:01 05:01	05:01 05:01	05:01 05:01	05:01 05:01	05:01 05:01	05:01 05:01	05:01 05:01
22	08:12 10:03-10:24/21	07:15 06:08	05:53 04:54	04:34 05:03	05:03 05:03	05:03 05:03	05:03 05:03	05:03 05:03	05:03 05:03	05:03 05:03	05:03 05:03	05:03 05:03
23	08:11 10:04-10:22/18	07:13 06:05	05:50 04:53	04:34 05:04	05:04 05:04	05:04 05:04	05:04 05:04	05:04 05:04	05:04 05:04	05:04 05:04	05:04 05:04	05:04 05:04
24	08:10 10:06-10:20/14	07:10 06:03	05:48 04:52	04:35 05:06	05:06 05:06	05:06 05:06	05:06 05:06	05:06 05:06	05:06 05:06	05:06 05:06	05:06 05:06	05:06 05:06
25	08:08 10:09-10:18/9	07:08 06:00	05:46 04:51	04:35 05:07	05:07 05:07	05:07 05:07	05:07 05:07	05:07 05:07	05:07 05:07	05:07 05:07	05:07 05:07	05:07 05:07
26	08:07 10:10-10:10/10	07:06 05:58	05:44 04:49	04:35 05:09	05:09 05:09	05:09 05:09	05:09 05:09	05:09 05:09	05:09 05:09	05:09 05:09	05:09 05:09	05:09 05:09
27	08:05 10:11-10:11/11	07:04 05:55	05:41 04:48	04:36 05:10	05:10 05:10	05:10 05:10	05:10 05:10	05:10 05:10	05:10 05:10	05:10 05:10	05:10 05:10	05:10 05:10
28	08:04 10:12-10:12/12	07:03 05:53	05:39 04:47	04:36 05:12	05:12 05:12	05:12 05:12	05:12 05:12	05:12 05:12	05:12 05:12	05:12 05:12	05:12 05:12	05:12 05:12
29	08:02 10:13-10:13/13	07:02 05:50	05:37 04:46	04:37 05:14	05:14 05:14	05:14 05:14	05:14 05:14	05:14 05:14	05:14 05:14	05:14 05:14	05:14 05:14	05:14 05:14
30	08:00 10:14-10:14/14	07:00 05:48	05:35 04:45	04:38 05:15	05:15 05:15	05:15 05:15	05:15 05:15	05:15 05:15	05:15 05:15	05:15 05:15	05:15 05:15	05:15 05:15
31	07:59 10:15-10:15/15	06:58 05:45	05:32 04:43	04:39 05:17	05:17 05:17	05:17 05:17	05:17 05:17	05:17 05:17	05:17 05:17	05:17 05:17	05:17 05:17	05:17 05:17
Sonnenscheinstunden	248	272	367	421	496	512	514	461	383	328	258	231
Anzahl Minuten mit Schatten	1020	0	0	0	0	0	0	0	0	0	441	1976

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:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 85

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

André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 33 - W8

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:28 09:48-10:34/46	07:57 09:31-10:35/64	06:59	06:43	05:33	04:42
	15:54 10:50-11:35/45	16:46 10:35-10:38/3	17:43	19:42	20:39	21:29
2	08:28 09:49-10:35/46	07:55 09:31-10:32/61	06:57	06:40	05:31	04:41
	15:56 10:51-11:36/45	16:48 10:32-10:37/5	17:45	19:44	20:40	21:31
3	08:28 09:49-10:35/46	07:54 09:32-10:28/56	06:54	06:38	05:29	04:41
	15:57 10:51-11:36/45	16:50 10:28-10:38/10	17:47	19:46	20:42	21:32
4	08:27 09:49-10:36/47 15:18-15:20/2	07:52 09:32-10:26/54	06:52	06:36	05:27	04:40
	15:58 10:52-11:37/45	16:52 10:26-10:37/11	17:49	19:48	20:44	21:33
5	08:27 09:49-10:37/48 15:17-15:21/4	07:50 09:32-10:24/52	06:49	06:33	05:25	04:39
	15:59 10:52-11:37/45	16:54 10:24-10:36/12	17:51	19:50	20:46	21:34
6	08:27 09:48-10:37/49 15:16-15:22/6	07:48 09:33-10:20/47	06:47	06:31	05:23	04:38
	16:01 10:52-11:37/45	16:57 10:20-10:35/15	17:53	19:52	20:48	21:35
7	08:26 09:49-10:38/49 15:16-15:25/9	07:46 09:33-10:34/61	06:45	06:28	05:21	04:37
	16:02 10:53-11:38/45	16:59	17:55	19:54	20:50	21:36
8	08:26 09:49-10:38/49 15:16-15:26/10	07:44 09:33-10:31/58	06:42	06:26	05:19	04:37
	16:03 10:53-11:38/45	17:01	17:57	19:55	20:51	21:37
9	08:25 09:49-10:39/50 15:15-15:27/12	07:42 09:33-10:29/56	06:40	06:23	05:17	04:36
	16:05 10:53-11:38/45	17:03	17:59	19:57	20:53	21:38
10	08:24 09:49-10:39/50 15:15-15:29/14	07:40 09:34-10:27/53	06:37	06:21	05:15	04:36
	16:06 10:54-11:38/44	17:05	18:01	19:59	20:55	21:39
11	08:24 09:44-10:40/56 15:15-15:30/15	07:38 09:35-10:12/37	06:35	06:18	05:13	04:35
	16:08 10:54-11:39/45	17:07 10:13-10:23/10	18:03	20:01	20:57	21:40
12	08:23 09:41-10:40/59 15:15-15:31/16	07:36 09:36-10:11/35	06:32	06:16	05:11	04:35
	16:09 10:55-11:39/44	17:09	18:04	20:03	20:59	21:41
13	08:22 09:39-10:41/62 15:15-15:31/16	07:34 09:38-10:10/32	06:30	06:14	05:09	04:35
	16:11 10:55-11:39/44	17:11	18:06	20:05	21:00	21:41
14	08:21 09:38-10:41/63 15:16-15:32/16	07:32 09:39-10:09/30	06:28	06:11	05:08	04:34
	16:13 10:56-11:39/43	17:13	18:08	20:07	21:02	21:42
15	08:20 09:37-10:42/65 15:16-15:33/17	07:30 09:40-10:07/27	06:25	06:09	05:06	04:34
	16:14 10:57-11:40/43	17:15	18:10	20:09	21:04	21:43
16	08:19 09:37-10:42/65 15:17-15:33/16	07:28 09:42-10:05/23	06:23	06:07	05:04	04:34
	16:16 10:57-11:40/43	17:17	18:12	20:11	21:05	21:43
17	08:18 09:36-10:43/67 15:17-15:34/17	07:26 09:45-10:02/17	06:20	06:04	05:02	04:34
	16:18 10:58-11:40/42	17:19	18:14	20:12	21:07	21:44
18	08:17 09:35-10:42/67 15:17-15:34/17	07:24 09:52-09:56/4	06:18	06:02	05:01	04:34
	16:20 10:58-11:40/42	17:21	18:16	20:14	21:09	21:44
19	08:16 09:34-10:43/69 15:18-15:34/16	07:22	06:15	05:59	04:59	04:34
	16:21 10:59-11:40/41	17:23	18:18	20:16	21:10	21:44
20	08:15 09:34-10:43/69 15:18-15:33/15	07:19	06:13	05:57	04:59	04:34
	16:23 11:01-11:40/39	17:25	18:20	20:18	21:12	21:45
21	08:14 09:33-10:43/70 15:19-15:34/15	07:17	06:10	05:55	04:56	04:34
	16:25 11:01-11:39/38	17:27	18:22	20:20	21:14	21:45
22	08:12 09:33-10:43/70 15:21-15:34/13	07:15	06:08	05:53	04:55	04:34
	16:27 11:02-11:39/37	17:29	18:23	20:22	21:15	21:45
23	08:11 09:33-10:43/70 15:21-15:33/12	07:13	06:05	05:50	04:53	04:34
	16:29 11:03-11:38/35	17:31	18:25	20:24	21:17	21:45
24	08:10 09:32-10:42/70 15:23-15:31/8	07:10	06:03	05:48	04:52	04:35
	16:31 11:04-11:37/33	17:33	18:27	20:26	21:18	21:46
25	08:08 09:32-10:42/70 15:26-15:30/4	07:08	06:00	05:46	04:51	04:35
	16:33 11:06-11:37/31	17:35	18:29	20:27	21:20	21:46
26	08:07 09:32-10:42/70	07:06	05:58	05:44	04:49	04:35
	16:35 11:07-11:36/29	17:37	18:31	20:29	21:21	21:46
27	08:05 09:31-10:41/70	07:04	05:55	05:41	04:48	04:36
	16:36 11:08-11:34/26	17:39	18:33	20:31	21:23	21:45
28	08:04 09:32-10:41/69	07:01	05:53	05:39	04:47	04:36
	16:38 11:11-11:34/23	17:41	18:35	20:33	21:24	21:45
29	08:02 09:31-10:40/69		06:50	05:37	04:46	04:37
	16:40 11:13-11:31/18		19:37	20:35	21:26	21:45
30	08:00 09:31-10:38/67		06:48	05:35	04:45	04:38
	16:42 11:16-11:28/12		19:39	20:37	21:27	21:45
31	07:59 09:31-10:38/67		06:45		04:43	
	16:44		19:40		21:28	
	Sonnenscheinstunden 248	272	367	421	496	512
	Anzahl Minuten mit Schatten 3311	833	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

WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

Ausdruck/Seite
13/10/2015 13:57 / 86
Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Kalender pro WEA

Berechnung: GesamtbelastungWEA: 33 - W8

Voraussetzungen für Berechnung des Schattenwurfs

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

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
346 330 400 570 528 528 741 991 1,022 1,224 934 356 7,971
: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober	November	Dezember
1	04:38	05:19	06:14	07:08	07:07 09:04-09:57/53	08:03 09:26-10:22/56 14:57-15:12/15
	21:44	21:09	20:01	18:46	16:35	15:50 10:36-11:21/45
2	04:39	05:20	06:16	07:10	07:09 09:03-09:59/56	08:05 09:32-10:22/50 14:58-15:12/14
	21:44	21:07	19:59	18:44	16:33	15:49 10:37-11:21/44
3	04:40	05:22	06:18	07:12	07:11 09:02-10:01/59	08:06 09:33-10:23/50 15:00-15:12/12
	21:44	21:05	19:56	18:42	16:31	15:48 10:38-11:22/44
4	04:41	05:24	06:19	07:14	07:13 09:03-10:04/61	08:08 09:33-10:23/50 15:00-15:10/10
	21:43	21:03	19:54	18:39	16:29	15:48 10:37-11:22/45
5	04:41	05:26	06:21	07:15	07:15 09:02-09:50/48	08:09 09:34-10:23/49 15:01-15:10/9
	21:43	21:01	19:51	18:37	16:27 09:50-10:05/15	15:47 10:38-11:23/45
6	04:42	05:27	06:23	07:17	07:17 09:02-09:54/52	08:10 09:35-10:23/48 15:02-15:09/7
	21:42	20:59	19:49	18:34	16:25 09:54-10:06/12	15:46 10:38-11:23/45
7	04:43	05:29	06:25	07:19	07:19 09:02-09:56/54	08:12 09:36-10:24/48 15:04-15:09/5
	21:41	20:57	19:46	18:32	16:23 09:56-10:07/11	15:46 10:39-11:24/45
8	04:44	05:31	06:27	07:21	07:21 09:02-09:57/55	08:13 09:36-10:24/48 15:05-15:08/3
	21:41	20:55	19:44	18:29	16:21 09:57-10:07/10	15:46 10:39-11:24/45
9	04:45	05:33	06:28	07:23	07:23 09:02-10:03/61	08:14 09:38-10:24/46
	21:40	20:53	19:41	18:27	16:20 10:03-10:08/5	15:45 10:40-11:25/45
10	04:47	05:34	06:30	07:25	07:25 09:02-10:07/65	08:16 09:38-10:24/46
	21:39	20:51	19:39	18:24	16:18 10:07-10:09/2	15:45 10:40-11:25/45
11	04:48	05:36	06:32	07:27	07:27 09:03-10:10/67	08:17 09:39-10:24/45
	21:38	20:49	19:36	18:22	16:16	15:45 10:40-11:25/45
12	04:49	05:38	06:34	07:29	07:29 09:03-10:10/67	08:18 09:39-10:25/46
	21:37	20:47	19:34	18:20	16:14 10:48-11:00/12	15:44 10:45-11:29/44
13	04:50	05:40	06:36	07:30	07:31 09:03-10:12/69	08:19 09:40-10:25/45
	21:36	20:45	19:31	18:17	16:13 10:45-11:03/18	15:44 10:41-11:26/45
14	04:51	05:42	06:37	07:32	07:33 09:04-10:13/69	08:20 09:40-10:25/45
	21:35	20:43	19:29	18:15	16:11 10:42-11:06/24	15:44 10:42-11:26/44
15	04:53	05:43	06:39	07:34	07:35 09:04-10:14/70	08:21 09:41-10:25/44
	21:34	20:40	19:26	18:13	16:09 10:41-11:07/26	15:44 10:42-11:27/45
16	04:54	05:45	06:41	07:36	07:37 09:05-10:15/70	08:22 09:42-10:26/44
	21:33	20:38	19:24	18:10	16:08 10:40-11:09/29	15:44 10:43-11:27/44
17	04:55	05:47	06:43	07:38	07:38 09:05-10:15/70 14:59-15:03/4	08:23 09:43-10:26/43
	21:32	20:36	19:21	18:08	16:06 10:38-11:10/32	15:44 10:43-11:28/45
18	04:57	05:49	06:44	07:40	07:40 09:06-10:16/70 14:57-15:05/8	08:23 09:44-10:27/43
	21:30	20:34	19:19	18:06	16:05 10:38-11:11/33	15:45 10:44-11:28/44
19	04:58	05:51	06:46	07:42	07:42 09:07-10:17/70 14:55-15:07/12	08:24 09:44-10:28/44
	21:29	20:32	19:16	18:03	16:03 10:37-11:22/35	15:45 10:45-11:29/44
20	05:00	05:52	06:48	07:44	07:44 09:08-10:18/70 14:55-15:08/13	08:25 09:44-10:27/43
	21:28	20:29	19:14	18:01	16:02 10:37-11:14/37	15:45 10:45-11:29/44
21	05:01	05:54	06:50	07:46	07:46 09:09-10:19/70 14:55-15:10/15	08:25 09:45-10:28/43
	21:26	20:27	19:11	17:59	16:01 10:37-11:15/38	15:46 10:46-11:30/44
22	05:03	05:56	06:52	07:48	07:48 09:10-10:19/69 14:55-15:10/15	08:26 09:45-10:28/43
	21:25	20:25	19:09	17:56	15:59 10:37-11:16/39	15:46 10:46-11:30/44
23	05:04	05:58	06:54	07:50	07:50 09:12-10:20/68 14:54-15:10/16	08:27 09:46-10:29/43
	21:23	20:22	19:06	17:54	15:58 10:37-11:17/40	15:47 10:47-11:31/44
24	05:06	06:00	06:55	07:52 10:18-10:28/10	07:51 09:13-10:20/67 14:54-15:11/17	08:27 09:46-10:30/44
	21:22	20:20	19:04	17:52	15:57 10:36-11:18/42	15:47 10:47-11:31/44
25	05:07	06:01	06:57	06:53 09:14-09:32/18	07:53 09:13-10:20/67 14:54-15:11/17	08:27 09:46-10:30/44
	21:20	20:18	19:01	18:50	15:56 10:35-11:17/42	15:48 10:47-11:31/44
26	05:09	06:03	06:59	06:55 09:11-09:35/24	07:55 09:15-10:20/65 14:55-15:11/16	08:28 09:47-10:30/43
	21:19	20:15	18:59	18:48	15:55 10:36-11:18/42	15:49 10:47-11:32/45
27	05:10	06:05	07:01	06:57 09:09-09:36/27	07:56 09:16-10:21/65 14:55-15:12/17	08:28 09:48-10:32/44
	21:17	20:13	18:56	18:45	15:54 10:36-11:19/43	15:49 10:48-11:32/44
28	05:12	06:07	07:03	06:59 09:08-09:39/31	07:58 09:18-10:21/63 14:56-15:12/16	08:28 09:48-10:32/44
	21:16	20:11	18:54	18:43	15:53 10:36-11:20/44	15:50 10:49-11:33/44
29	05:14	06:09	07:04	07:01 09:07-09:40/33	08:00 09:20-10:22/62 14:57-15:13/16	08:28 09:48-10:33/45
	21:14	20:08	18:51	18:41	15:52 10:36-11:20/44	15:51 10:48-11:33/45
30	05:15	06:10	07:06	07:03 09:06-09:41/35	08:01 09:23-10:22/59 14:57-15:13/16	08:28 09:48-10:33/45
	21:12	20:06	18:49	18:39	15:51 10:37-11:21/44	15:52 10:49-11:34/45
31	05:17	06:12		07:05 09:05-09:54/49		08:28 09:48-10:33/45
	21:10	20:03		18:37		15:53 10:50-11:34/44
	Sonnenscheinstunden	514	461	383	328	258
	Anzahl Minuten mit Schatten	0	0	0	227	2828
						2870

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

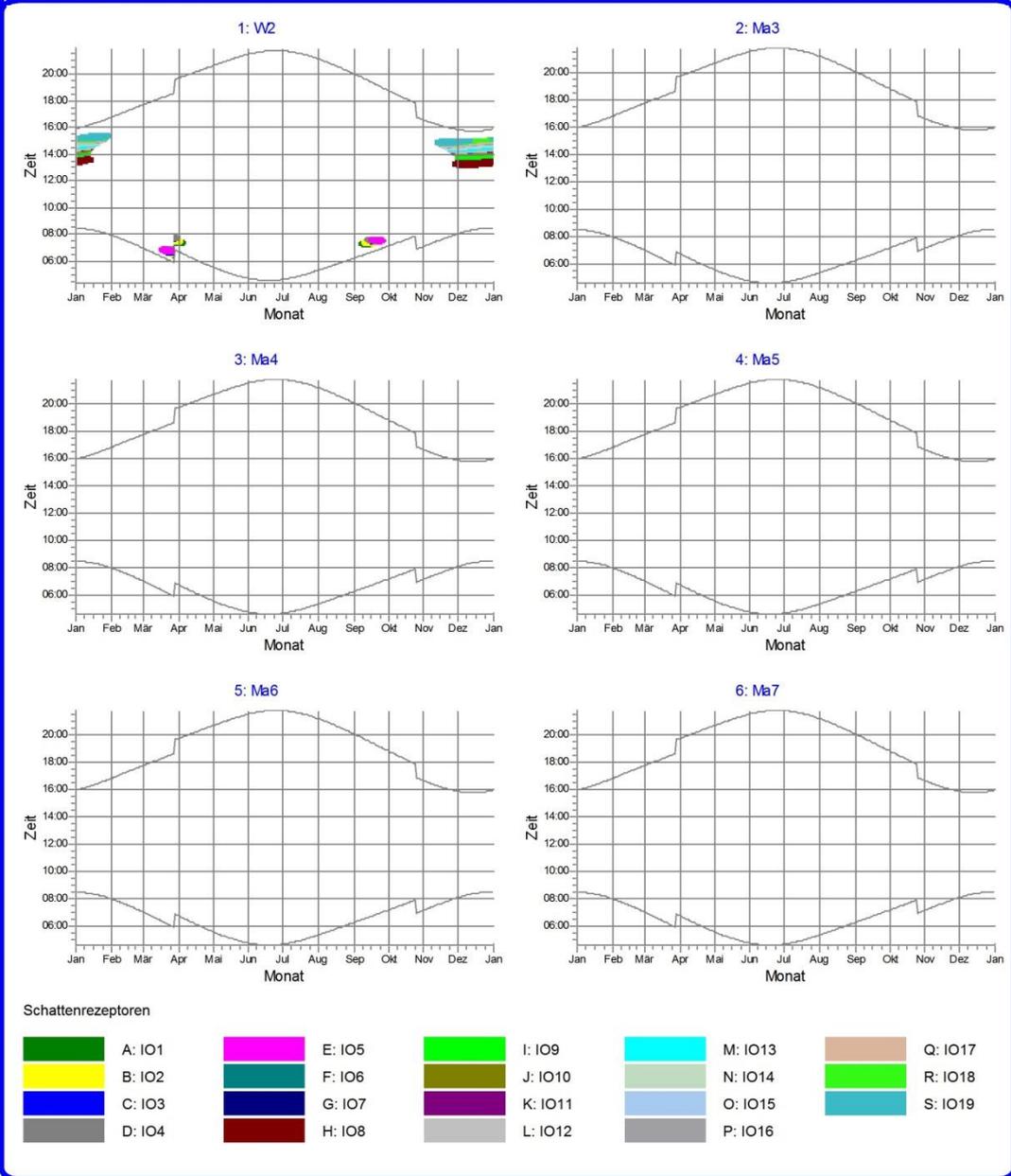
WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

Projekt:
151008_Miltzow_III-VII

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Lizenzierter Anwender:
I17-Wind GmbH & Co. KG
Am Westersielzug 11
DE-25840 Friedrichstadt
-
André Gefke / andre.gefke@i17-wind.de
Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Grafischer Kalender pro WEA

Berechnung: Gesamtbelastung



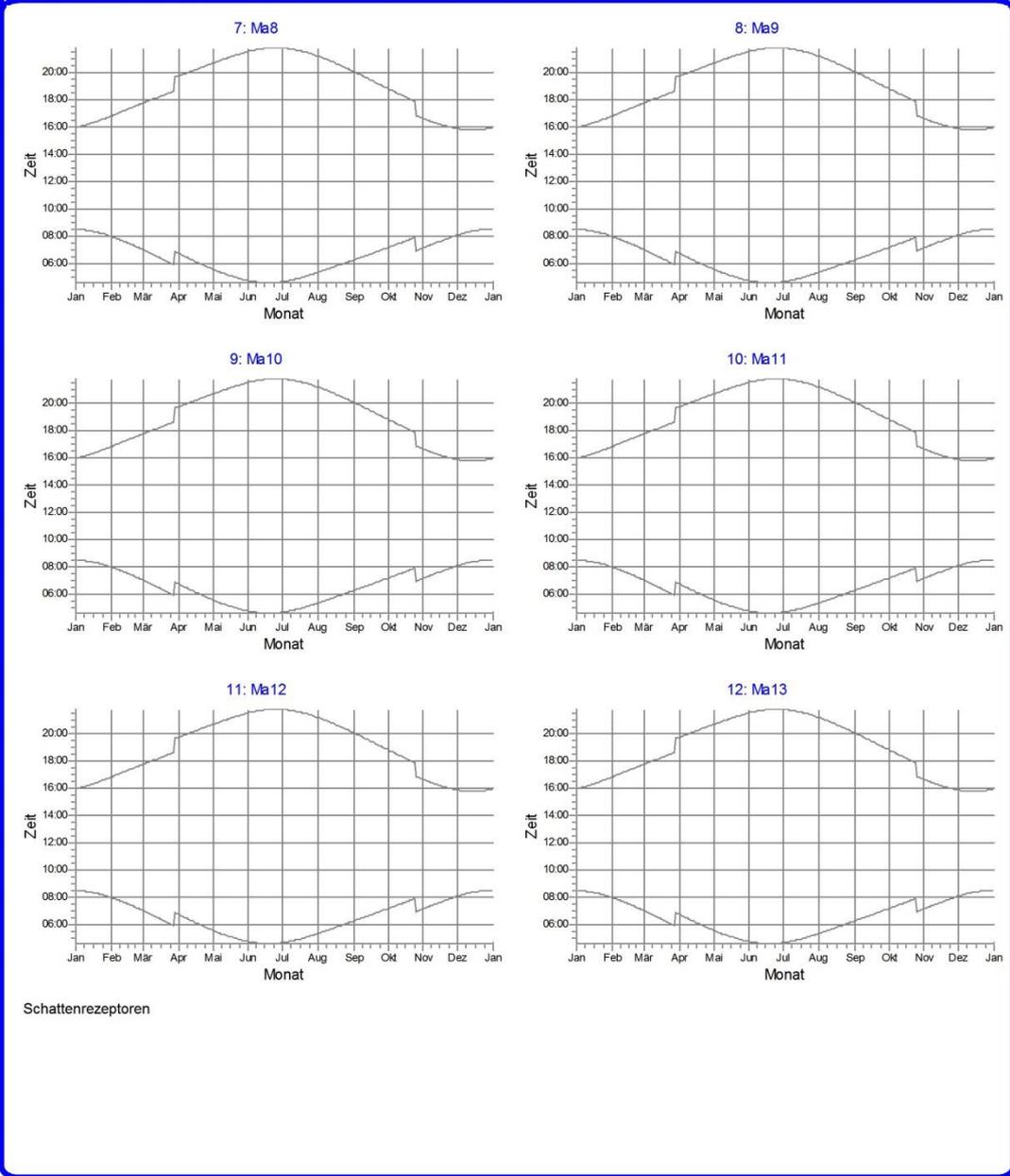
WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

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Berechnet:
13/10/2015 13:41/2.9.285

SHADOW - Grafischer Kalender pro WEA

Berechnung: Gesamtbelastung



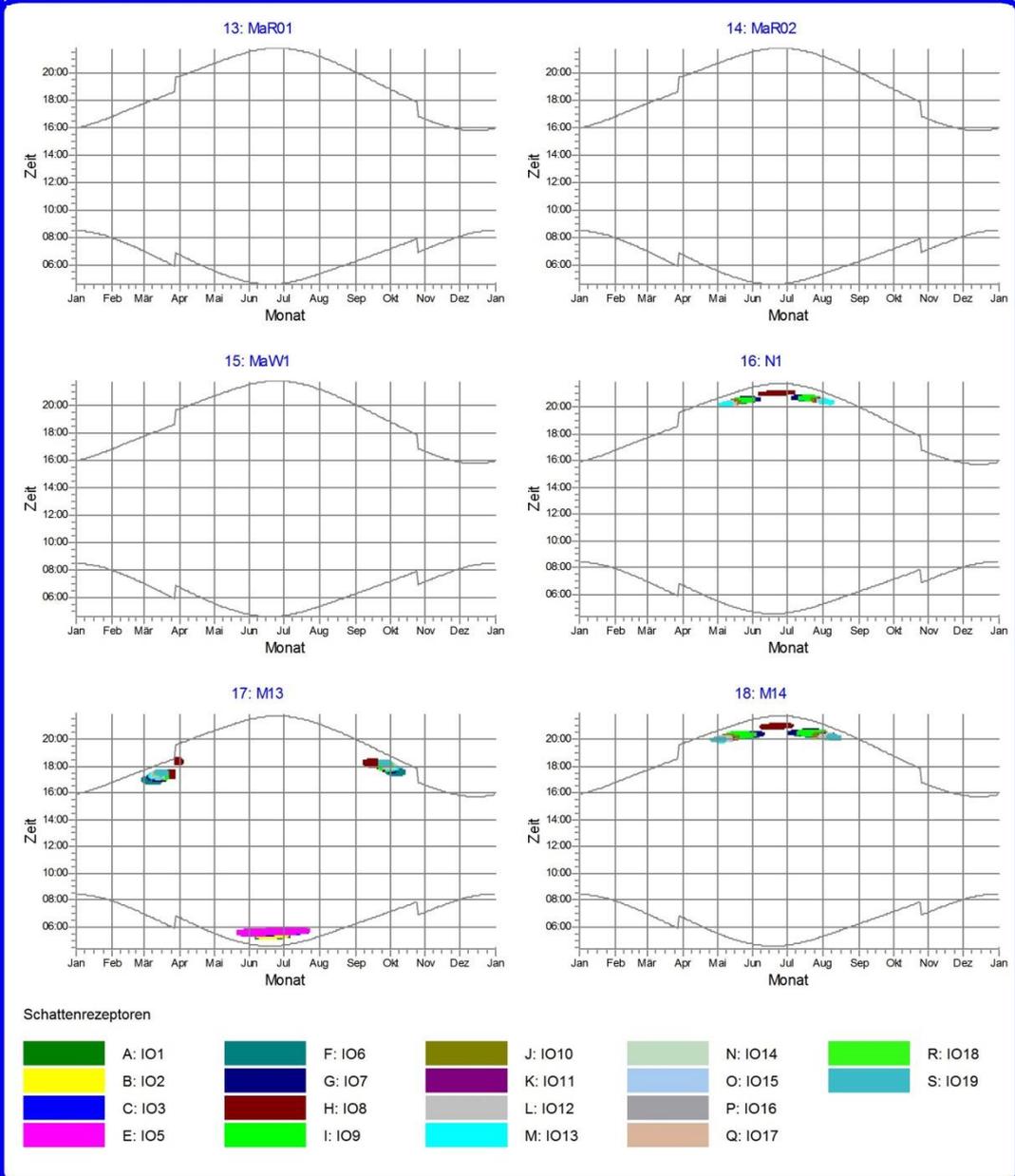
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13/10/2015 13:41/2.9.285

SHADOW - Grafischer Kalender pro WEA

Berechnung: Gesamtbelastung



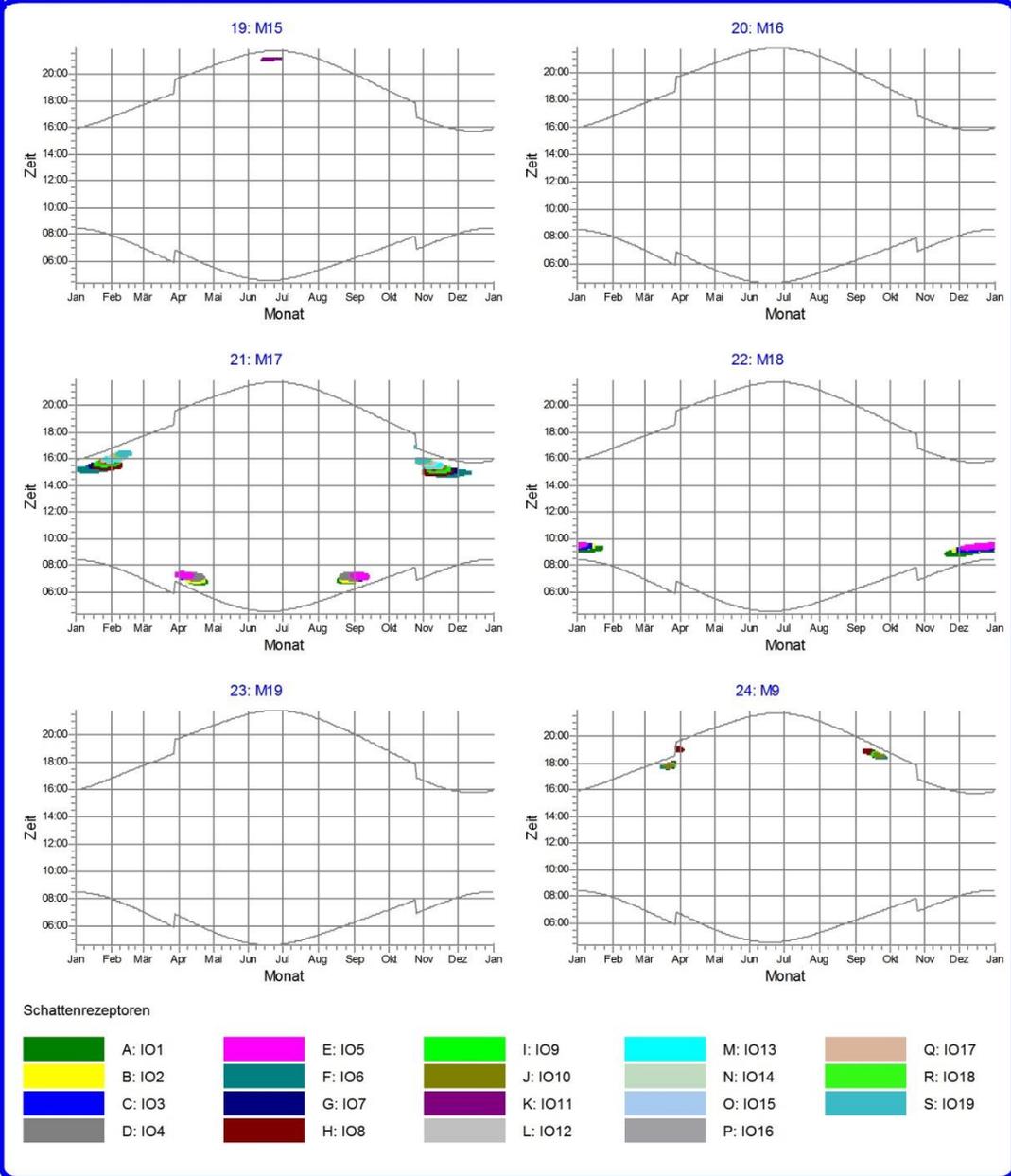
WindPRO, entwickelt von EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

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13/10/2015 13:41/2.9.285

SHADOW - Grafischer Kalender pro WEA

Berechnung: Gesamtbelastung



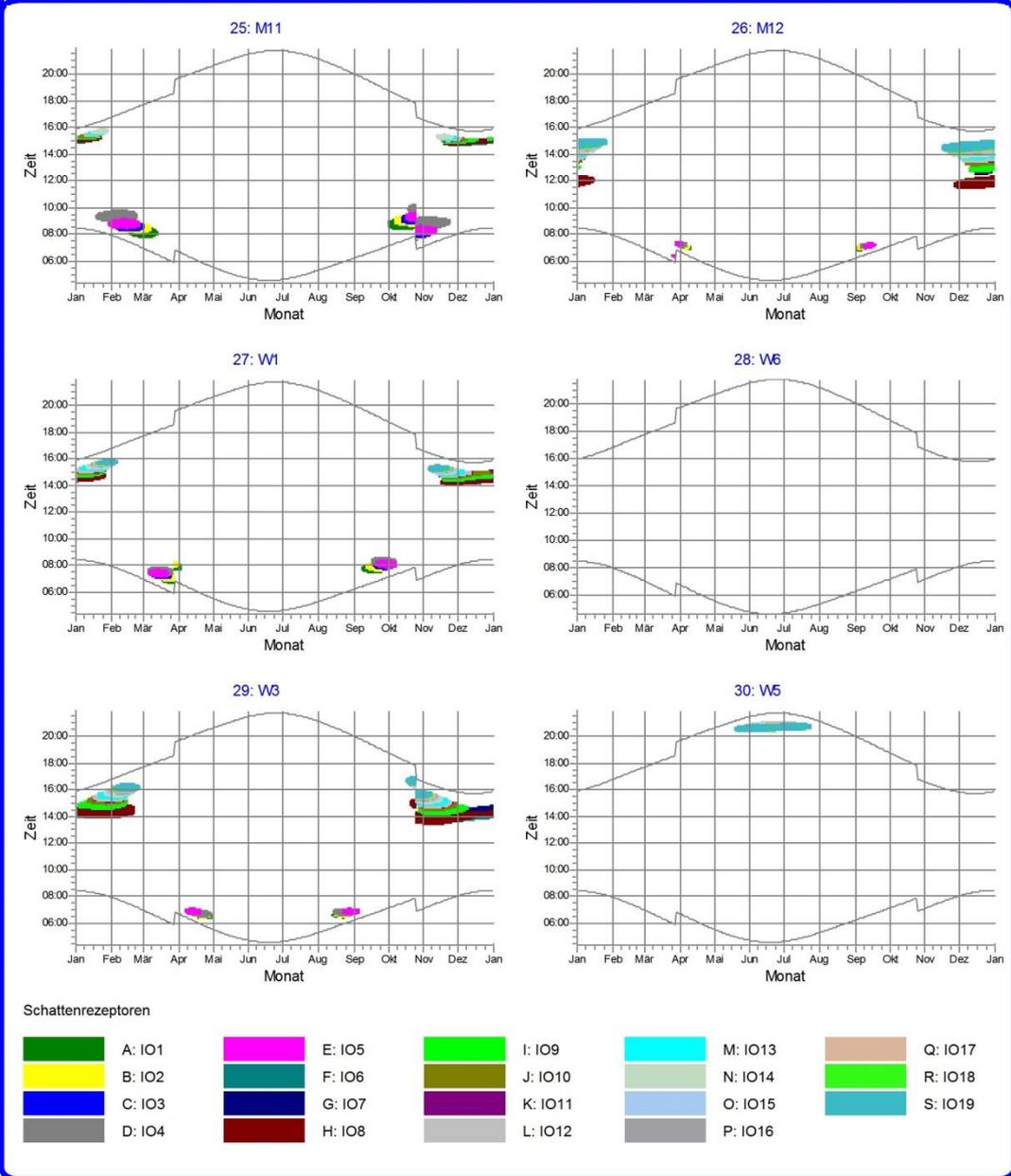
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SHADOW - Grafischer Kalender pro WEA

Berechnung: Gesamtbelastung



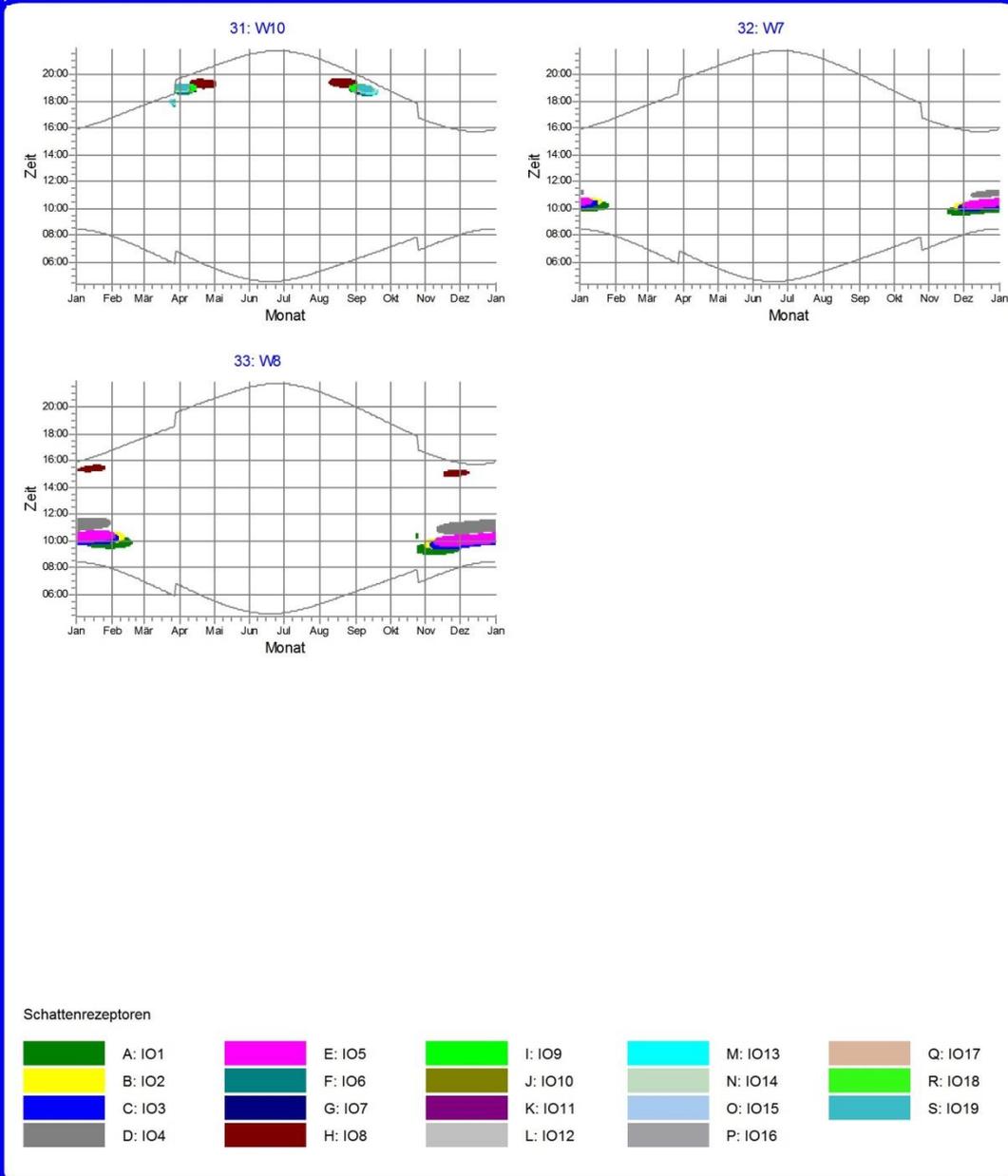
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Berechnet:
13/10/2015 13:41/2.9.285

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Berechnung: Gesamtbelastung



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